Amphenol
Board Level and Rectangular Interconnects

Products for Military, Aerospace and Harsh Environments

- Ruggedized Options
- Hi Speed Options
- Fiber Optics & Power Options
- Hybrids

Termination Options

- PCB Tail Crimp
- Compliant Pin
- Flex Termination
- Surface Mount
- Cable

Amphenol Aerospace

The Interconnection Leader

Amphenol is the world leader in the design, manufacture, and supply of high-performance interconnect systems for military and commercial aerospace harsh environment applications.

Key markets supported are Avionics, Radar, Communications, Ordnance, Missiles, Engines, Ground Vehicles and Tanks, Space, and all levels of Aviation. Amphenol is a technology innovator that designs to meet customers' needs from program inception.

Avionics

Commercial Air

Vehicles

Missiles & Ordnance

C4I

Military Aircraft

Space

Naval

Missile Defense

UAV's

REQUEST A QUOTE

Contact our customer service representatives for pricing and availability at:

- Call 800-678-0141 (ask for customer service)
- E-mail cservice@amphenol-aao.com
- Request a Quote online at www.amphenol-aerospace/rfq.asp

TECHNICAL SUPPORT

Do you have a technical question pertaining to a type or style of a connector?

- Call 800-678-0141 (ask for customer service)
- Fill out a techical support form online at www.amphenol-aerospace.com/techsupportform.asp

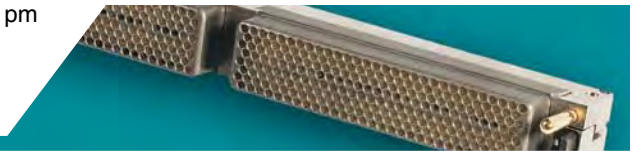
Amphenol Aerospace

YOUR SOURCE FOR INTERCONNECT PRODUCTS

CONTACT US:

Amphenol Aerospace
40-60 Delaware Avenue
Sidney, NY 13838-1395

Customer Service: Mon.-Friday 8 am - 5 pm
Phone: (800)678-0141
Fax: (607)563-5157
Online: www.amphenol-aerospace.com



ABOUT AMPHENOL AEROSPACE:

Amphenol Aerospace, a Division of Amphenol Corporation, is one of the largest manufacturers of interconnect products in the world for the Military, Commercial Aerospace and Industrial markets. Amphenol designs, manufactures and markets circular and rectangular, electronic, fiber optic, EMI/EMP filter, and a variety of special applications connectors and interconnect systems.

Our 675,000 square foot facility is nestled at the foothills of the Catskill Mountains in Sidney NY. The Amphenol complex houses state-of-the-art manufacturing technologies including CNC machining, die-casting, molding, impact and extruding, plating, screw machining and process controls. Our fully equipped material evaluation lab and engineering organization utilize the latest in computer aided design software and analysis tools, allowing us to design, test, and qualify advanced interconnect systems.

Amphenol's interconnect products are supplied to thousands of OEMs worldwide and are supported by our worldwide sales and engineering force, including the largest global network of electronic distributors.

Amphenol Aerospace, Amphenol Commercial Air and Amphenol Industrial Operations Main Facility in Sidney, N.Y. USA

Amphenol Canada Corp. (ACC) facility in Toronto, ON

Offers a comprehensive range of filtered and rectangular connector products for commercial, military and aerospace applications.

Amphenol Backplane Systems (ABS) facility in Nashua, NH

Houses the manufacturing, design and engineering of backplane systems.

Amphenol Printed Circuits, (APC) facility in Nashua, NH

Manufactures, designs and engineers flex circuit products and printed circuit boards.

Amphenol facility in Nogales, Mexico

Houses the manufacture of several industrial and aerospace product lines.

Amphenol Nexus Technologies in Stamford, CT

Designs and manufactures audio connectors for military, aviation, medical, telecommunications, auto racing, power boats & farm equipment.

Amphenol Borisch in Grand Rapids, MI

A full service electronics manufacturer specializing in defense contractors with wiring harnesses, circuit boards and other electrical hardware.

AMPHENOL AEROSPACE'S PHILOSOPHY

As a basic business philosophy, Amphenol Aerospace is dedicated to concentrating on those advanced and challenging market segments that demand an extraordinary level of supplier support and reaction. Our approach to implement this strategy is based on the following key principles:

FOCUS: Concentrate all resources on serving a limited number of tightly defined markets, and understanding the needs of those markets.

INNOVATION: Provide these markets new, creative solutions in both products and services.

RESPONSIVENESS: Identify and respond to the market and product needs more rapidly than any other supplier.

QUALITY ASSURANCE:

Amphenol Aerospace has been awarded both AS9100 - Revision B and ISO9001:2000 Quality Assurance Certifications.

Performance is the sum of these principles. It is the measure of how well we continually and consistently implement our basic strategy and key principles.

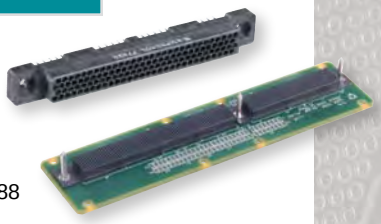
Amphenol interconnects are the chosen connector for major aircraft systems. Amphenol Corporation continually strives to meet the evolving needs for interconnect products in today's aviation, like higher speed transmission, higher density packaging, and ruggedization features. This page reference listing is to help design engineers find our products in this catalog by technology and capability parameters and also by COTS availability. Amphenol is the technology leader for interconnects and stays in the forefront of designer's needs. Give us a call for further assistance on how we can meet your specific interconnect requirements*.

High Speed Products

High Density Products

Products for Rugged Environments

COTS Products

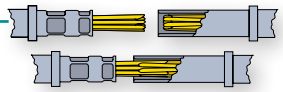


*For product assistance call Amphenol Aerospace at 800-678-0141 or 607-563-5011.
See this catalog on-line, complete or by sections:
www.amphenol-aerospace.com

Amphenol Aerospace

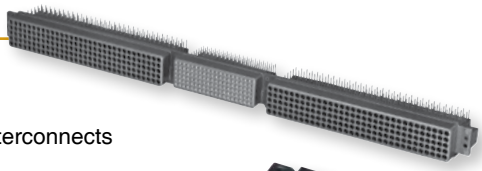
QUICK REFERENCE TO THIS CATALOG BY PRODUCTS

Introduction/Package Solutions/ Brush Contact Technology

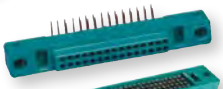


LRM (Line Replaceable Modules) with Brush Contacts/ LRM Hybrids/ Options/Accessories

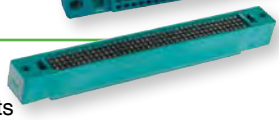
VME/VITA Interconnects



High Density HDB³ & HSB³ (High Speed) with Brush Connectors



Low Mating Force Connectors with Brush Contacts & Hybrids/ Accessories/Installation



Ruggedized Brush Rack & Panel Connectors

LMD/LMS Modular Rectangular Interconnects

Other Board Level & Rectangular Interconnects

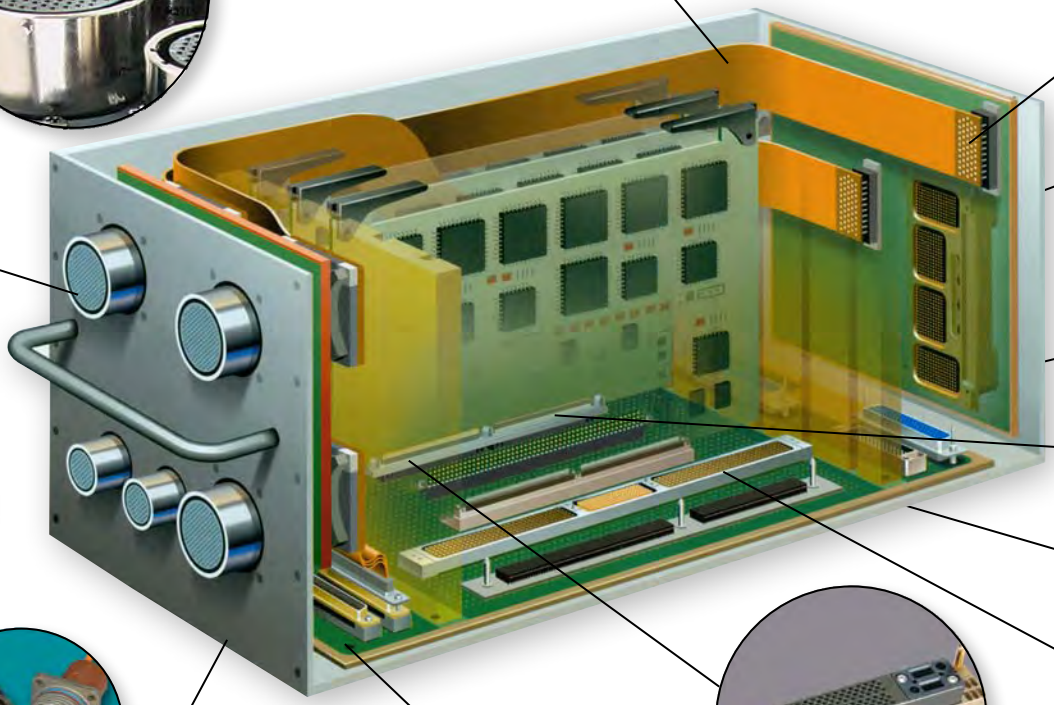
Amphenol Corporation's broad technical, product and manufacturing resources enable Amphenol Aerospace to provide exceptional performance in the area of customized system development-application specific packaging which blends both Corporate and Amphenol Aerospace products and design innovations. We provide customers with rapid, well engineered and cost-effective custom interconnect solutions.

FLEX CIRCUITRY

Rigid-Flex circuit interconnects featuring blind and buried vias, microvias, bookbinder and other cutting-edge technologies including large format panels.

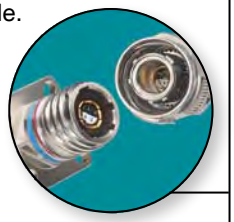
I/O FRONT PANEL CIRCULAR CONNECTORS

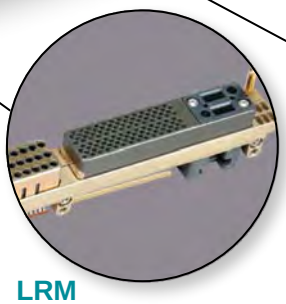
Rugged, environmentally sealed I/O connectors, filtered and non-filtered. Available in a variety of styles and classes including threaded and bayonet coupling.



HI-SPEED CONTACTS

RF, Coax, Triax,Twinax, Quadrax and new 10-G high speed contacts available.



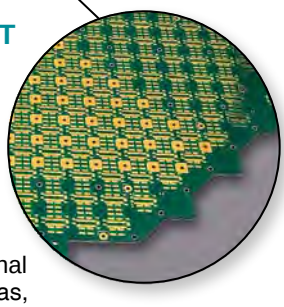


FIBER OPTICS FOR HARSH ENVIRONMENTS

Very high densities can be achieved with MT Ferrule Termini.

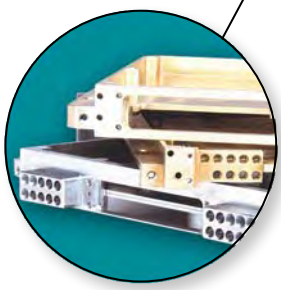
PRINTED CIRCUIT BOARDS FOR BACKPLANES & DAUGHTER-CARDS

Fabrication capabilities include a wide variety of materials to enable increasing signal speeds, deep microvias, buried, blind and back-drilled vias, sequential, lamination, panel sizes from 18" x 24" up to 24" x 54", and layer counts up to 60 with a board thickness of 0.400". Multiple plating options available.



METAL MACHINING

Faceplates, enclosures, bus bars, heat sinks and stiffener machining capabilities. Multiple plating options available.



LRM

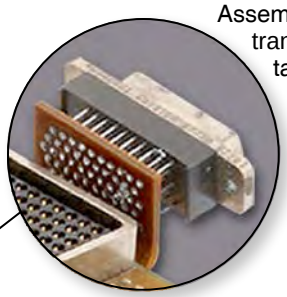
Designed to meet the high-density needs of today's integrated electronic modules, this straddle-mount connector uses the Bristle Brush contact, a proven military avionics solutions that meets MIL-DTL-55302 requirements. The low mating force, extended service life and stable electrical performance of the Brush contact enables the performance demanded by Line Replaceable Module (LRM) applications. Hybrids available with fiber optics and high power RADSOK®.

The products shown on this page and the next represent some of the broad offerings from the divisions of: Amphenol Aerospace, Amphenol Backplane Systems, Amphenol Printed Circuits and Amphenol Canada; who work together as a system-level team to work with customers for their enclosure integration of interconnects.

A BROAD OFFERING OF INTERCONNECTS

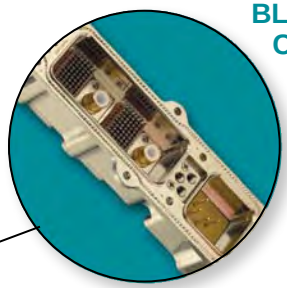
MIL-83513 MICRO D

Assembled to flex I/O transition to outside or take signals off the backplane.



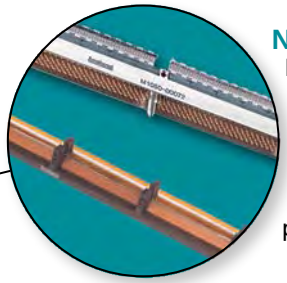
BLINDMATE RACK & PANEL CONNECTORS: ARINC 600, 404 & 83527

Designed per ARINC 600 or ARINC 400 specifications. Single double, triple or quad bay insert styles available. Customize insert arrangements to include signal, power, coax, and quadrax contacts, or fiber optic termini.



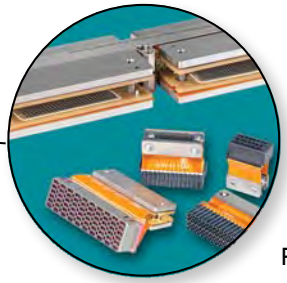
NAFI & UHD

Medium to high density connectors with fork and blade contacts. Module card with straddle-mount and through hole termination and solderless press-fit backplane contacts. EMI shielding, coax, fiber optic, and power contacts available



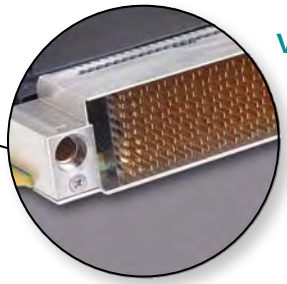
GIGASTAK, GIGASTAK-LG & DIGISTAK

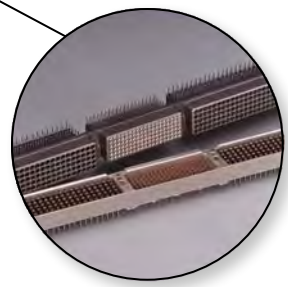
The highly reliable LRM Brush connector with cStack™ termination technology - giving the user hi-speed signal options up to 6.25 Gb/s and a solderless termination to their CCA. Designed for 100 ohm differential impedance. Provides optimized cross-talk.



VITA 60/64 VIPER

High density, modular 6+ Gbps, high vibration performing, ESD shielded connector meeting the specifications for VITA 46 and 48 in both 3U and 6U configurations. Developed using proven mechanical and signal integrity with unmatched performance in the industry.





RUGGEDIZED VME64X

Ruggedized replacement for standard VME connectors. Improved reliability and performance to meet avionic environmental packaging requirements.

Shown right is another Amphenol integrated system box that includes both circular and rectangular interconnects, flex and backplanes in a custom metal enclosure. See more information on Integrated Systems and Package Solutions from Amphenol in the Other Rectangular Board Level & Rectangular Interconnect Section of this catalog, page 122.

NEW/FEATURED PRODUCTS

Amphenol has become the leader in interconnection products through its long history of engineering expertise for product solution solving.

New and innovative solutions are under development every day within our highly skilled engineering departments who are teamed with marketing product managers and production specialists. They are always striving to meet new customer requirements in ever changing markets.

The teams have a customer-driven approach to produce the end result: quality interconnect products that meet or exceed customer demands.

Below are some of the newer product solutions that have been developed in response to our customers' ever evolving requirements for board level and rectangular interconnects.

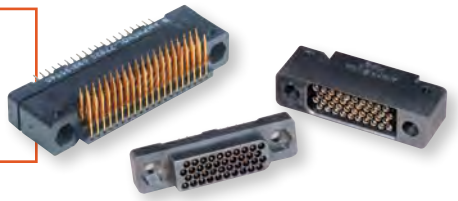
New/Featured Product

HDB³/HSB³ High Density and High Speed Brush Connector Series

Page 47

Tighter .070 inch X .060 inch staggered grid spacing provides higher density in a compact-height board level connector.

Solution:
Higher contact density plus lower mated height - thus maximizing board space.



New/Featured Product

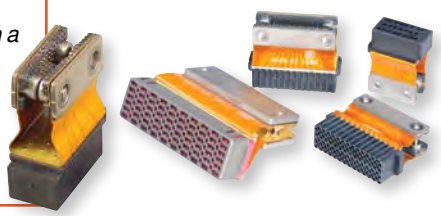
High Speed GigaStak™, Gigastak-LG™, DigiStak™ and DigiStak-X™ LRM Connectors

Pages 31-36

High speed inserts provide data transference of up to 6.25 Gb/s.

GigaStak Built for speed

Solution:
Hi Speed performance in a ruggedized connector. Utilizes new cStack™ termination - solderless interconnection between flex and board.



New/Featured Product

LRM Connectors with High Power RADSOK® Contacts

Page 30

High Amperage RADSOK® socket contacts are designed into LRM connectors for higher power applications. The RADSOK® socket imparts high current flow across the connection with minimal voltage loss with its hyperbolic, stamped grid configuration.

Solution:
High Amperage RADSOK® socket contacts allow for passing of larger amounts of current with lower mating forces than standard contacts.

New/Featured Product

VITA-66.1 Fiber Optic Interconnects

Page 44

A reliable high speed connection for the most extreme commercial and military environments. This ruggedized interconnect is among the highest density of connector products on the market.

Solution:
Higher Density in a rectangular board level connector package.

New/Featured Product

VIPER® High-Speed Interconnects

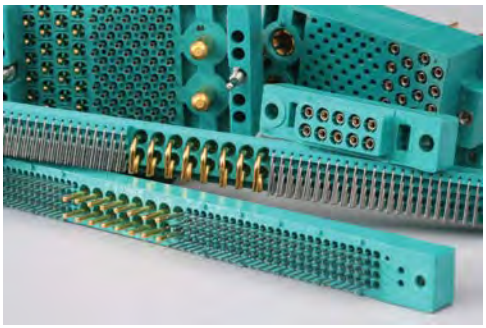
Pages 45 & 46

A shielded, high density, hi-speed modular interconnect with press-fit termination. VITA 46, VITA 48 and VITA 60 foot-print compatability. Designed for 10 + Gb/s data rate performance.

Solution:
To meet and exceed the requirements for today's high performance, high speed applications.

For assistance with your specific interconnection requirements, give a call to the Amphenol sales representative in your area,
(go online to amphenol-aerospace.com) or call for product assistance at Amphenol Aerospace, 800-678-0141 or 607-563-5011.

A SUPERIOR CHOICE FOR BOARD LEVEL INTERCONNECTS



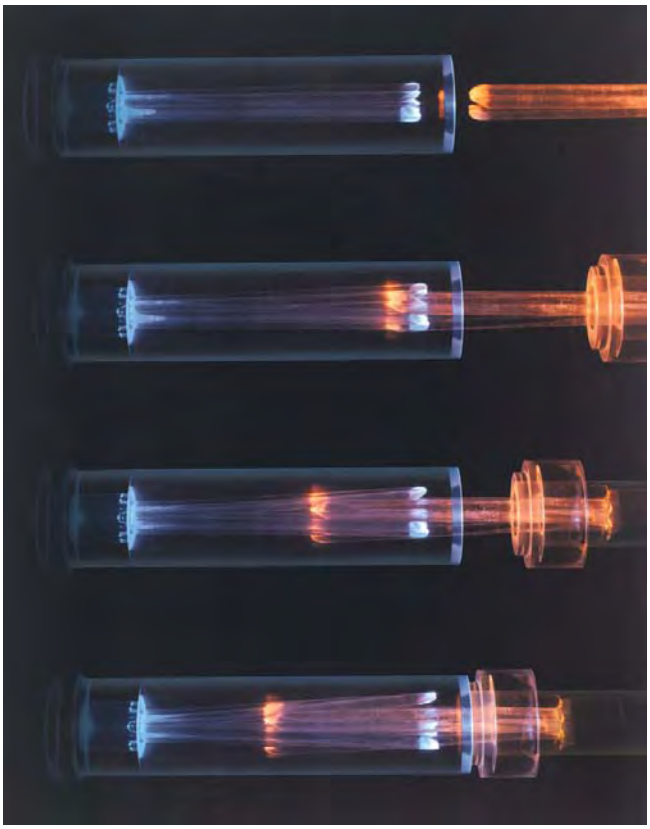
Low Mating Force Connectors with Bristle Brush contact technology.

Many styles are available, including styles that have arrangements of brush, fiber optic, coax and other contact types.

The Amphenol® Brush Contact Technology has proven advantages over standard pin & socket contacts and Amphenol has a very broad family of brush contact products which are shown in this catalog.

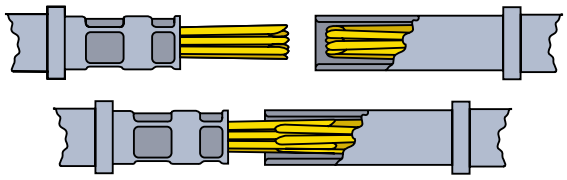
The Bristle Brush contact is used in military avionics packages and meets the requirements of MIL-DTL-55302. It provides high density in tight spacing, low mating/inmating forces, proven durability and long contact life. Applications for Amphenol connectors with brush contacts include:

- Medical equipment
- IC chip testers
- Telecommunications
- Military and Commercial Aviation
- Military Ground Vehicles
- GPS systems

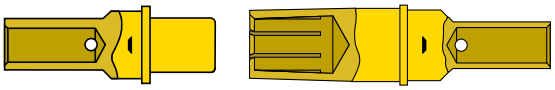


Multiple strands of high tensile strength wires bundled together, provide superior electrical connection with low mating force.

BRUSH CONTACTS



CONVENTIONAL PIN AND SOCKET CRIMP CONTACTS



Brush vs. Conventional Contacts

- Brush Contact Innovation
- Multiple contact interfaces - Strands of high tensile wire are bundled together to form brush-like contacts. By intermeshing two multi-strand wire bundles, an electrical connection is made.
- Provides redundant current paths, 14-70 (points of contact) per mated contact with a gas tight junction
- Very smooth (low friction) interface

Conventional Pin/Socket

- Machined surface finish on both parts
- Higher friction and wear
- Limited number of contact sites

Amphenol® B3 Bristle Brush Contact Advantages:

Low Mating & Unmating Forces

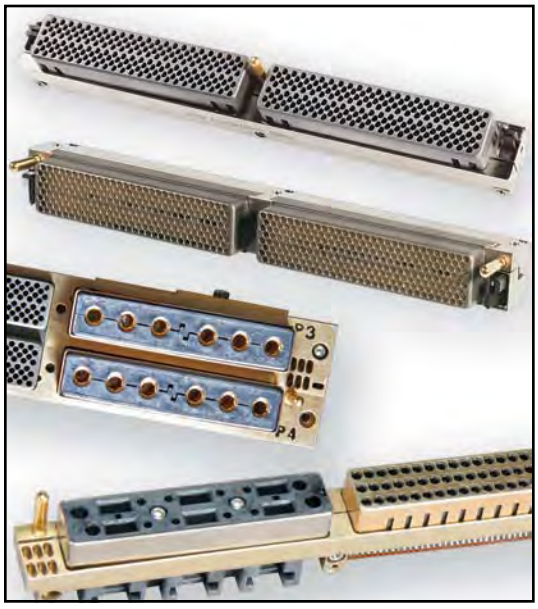
- Smooth, low friction interfaces
- 70% to 90% reduction in mating/unmating forces from conventional pin-socket contacts
- 1.5 oz. maximum forces per contact pair (one ounce typical)
- Easy mating/unmating makes high circuit counts practical (25 lbs. typical for 400 contacts)
- Mechanical mating aids not required
- No need for external board support structures for connectors up to 7 inches long. A center support is recommended for Mother Board Connectors over 7 inches.

Proven Durability and Long Contact Life

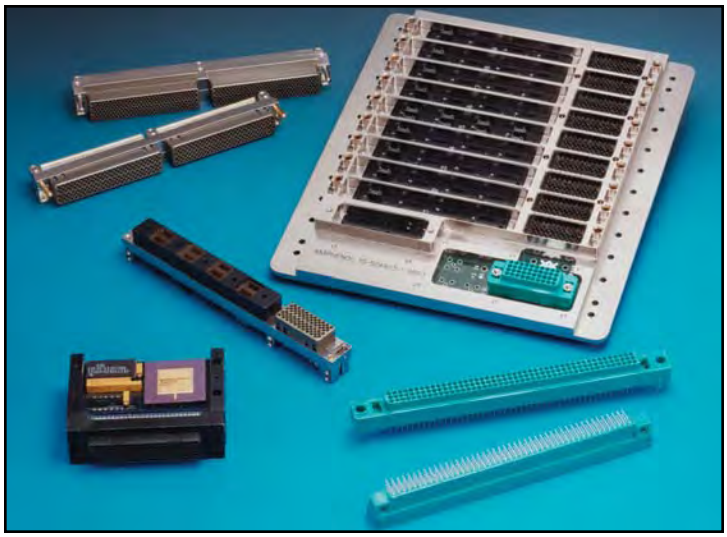
- 100,000 mating cycles even when hot swapped
- Documented intermittency free performance – no 10 nano second discontinuities during 50m cycles of 0.010 displacement
- Overall cost effectiveness (reduced life cycle costs)

Multiple Points of Contact Provide Superior Electrical Capability

- 14-70 points of contact per mated contact
- Stable, low resistance – 20 milliohms max.
- Redundant current paths results in lower total resistance
- Proven electrical and gas tight contact sites



Amphenol offers configurations of LRM connectors that combine the brush contact in some inserts along with other types of contacts in other inserts.



Amphenol rectangular products group, including low mating force PCB connectors, LRM connectors and the OBIS Backplane with brush contacts and MT ferrule fiber optics.

High technology production centers at the Amphenol home facility and its satellite facilities create volume runs that are cost effective and meet on-time delivery demands.

Amphenol
Line Replaceable Module (LRM)

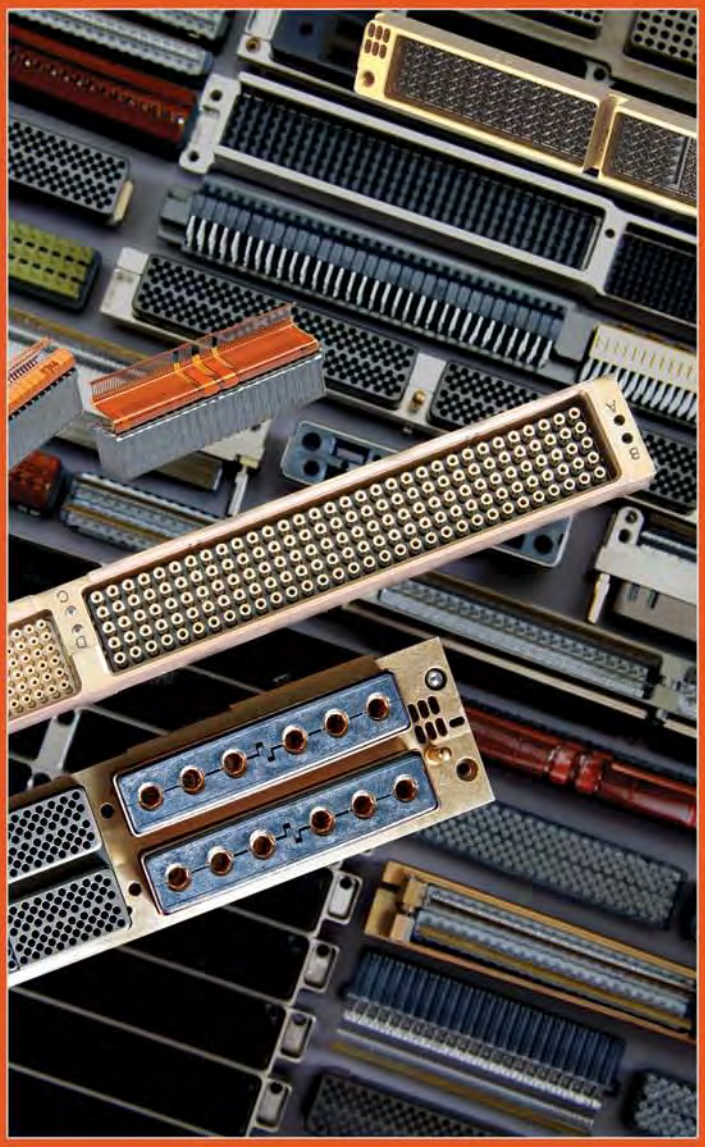


TABLE OF CONTENTS

LRM Typical Markets:
- Military & Commercial Avionics
- Military Vehicles
- Missiles/Ordnance
- Missile Defense
- C4ISR
- Space (Satellites)
- Radar

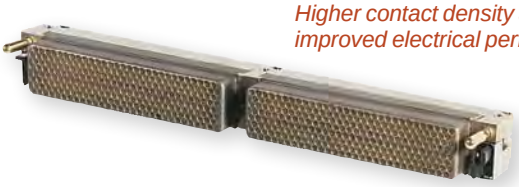
Amphenol Aerospace

Staggered Grid LRM

High contact density in SEM-E and custom form factors

GEN-X Grid LRM

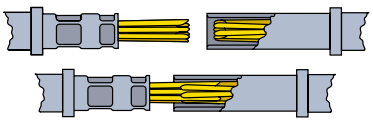
Higher contact density and improved electrical performance



High Speed LRM

Inserts with 3.125 Gb/s and 6.25 Gb/s data rate capability, with flex termination. Can be added to existing LRM configurations.

LRM INTERCONNECTS FEATURE AMPHENOL'S BRUSH CONTACT TECHNOLOGY



Multiple strands of high tensile strength wire bundled together to form brush-like contacts. See the Introduction & Brush Contact Technology section of this catalog for further description.

- With its low mating force, stable electrical performance and extended service life, the B^3 Brush contact is the standard contact for the LRM.
- Digital (Brush) inserts can be combined with each other or with inserts for power, RF, fiber optic and high speed contacts.

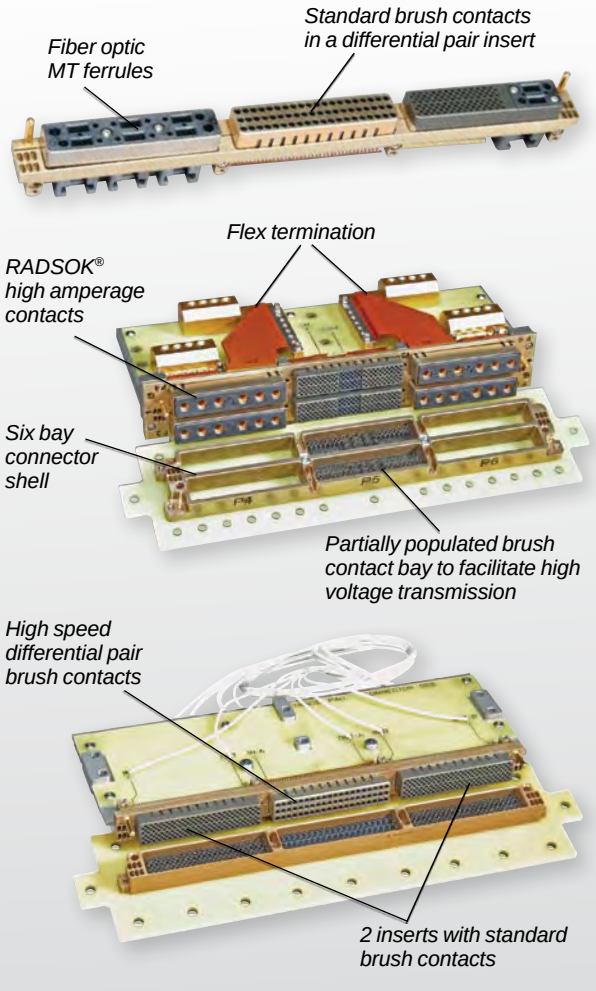
Amphenol® LRM Surface Mount Connectors meet the high density needs of today's integrated electronic modules.
Amphenol goes beyond the usual board level product offering: and that is what you would expect from a worldwide interconnect product leader.

MODULAR AVIONICS ARCHITECTURAL POSSIBILITIES

With its flexibility in design, Amphenol LRM interconnects are capable of meeting the wide variety of user requirements for a board mount connector.

- Thousands of combinations of inserts are possible - tailored to meet user needs
- LRM interconnects can be designed in 1, 2, 3 (and more) bay configurations with many shell designs available
- LRM digital (brush) inserts can be combined with inserts for power, fiber optics, RF, high speed and high amperage RADSOK® contacts

DESIGN FLEXIBILITY



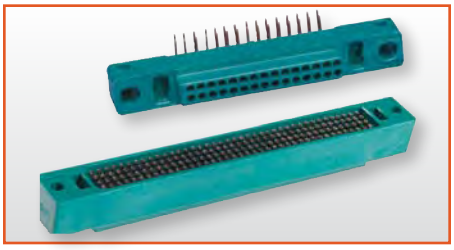
NOTE: This catalog section supersedes Amphenol's older individual catalog on LRM products, 12-037.

LRM PRODUCT EVOLUTION

Amphenol has been committed to keeping pace with the ever-changing demands of the rectangular connector marketplace. Starting with the development of the B3 contact, incorporated into the low mating force PCB connectors, and later with the development of the line replaceable module (LRM), Amphenol has led the way in the avionics packaging industry for high quality rectangular products. This page and the following page give an overview of the rectangular product evolution.

Low Mating Force Connector with Bristle Brush Contacts*

- Developed in the 1980's to provide solutions to problems caused by the high mating and unmating forces of conventional pin and socket contact pairs.
- 4 Body styles: mother board (MB), daughter board (DB), PC connector, input/output connector
- Molded of thermoplastic material
- 2, 3 and 4 row configurations, 10 to 100 contacts per row in one contact row increments
- 100 inch center to center contact spacing, square grid
- Qualified to MIL-DTL-55302/166, /167, /168, /169, /170

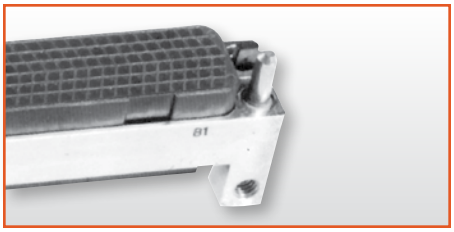


Low Mating Force Connectors - the first development of rectangulars with Brush contacts.

Line Replaceable Module (LRM) Connectors with Chevron Grid**

- Developed to meet the avionics packaging requirements for a surface mount, high contact density PCB connector in a SEM-E form factor.
- Digital insert pattern grid: 6 rows, 0.075" spacing along rows, 0.075" between rows with 0.025" offset.

** This is an older design of the LRM and is typically not used today. Staggered and GEN-X designs have replaced the Chevron design (Consult Amphenol for further details)



LRM Chevron Grid (150+180 contact pattern) (Amphenol's first LRM design)

LRM Connectors with Staggered Grid

- Advanced design to provide higher contact density for high speed integrated circuitry in SEM-E and custom form factors.
- Digital insert pattern grid is in 8 rows: 0.100 inch spacing along the row with 0.050 inch between rows, rows offset 0.050 inch. Typical standard arrangements would have 80 or 108 or 152 or 180 digital brush contacts.
- Options include various shell designs options to accommodate a wide range of PC board/heat sink combinations
- Surface mount termination on module connectors, PCB or compliant termination on backplane connectors
- Amphenol ESD protection (in module connector)
  - Designed for level 2 (flight line) maintenance
- Provides routing channels for backplane

LRM Staggered Grid (180 contact pattern) Amphenol's higher density LRM with more advantages.

Amphenol Staggered Grid Connectors are the connector of choice for the F-16 and F-22 Aircraft. The following were the criteria that determined the selection of the connector for the F-16, F-22 and F-35 aircraft:

- Reliability: Impervious to fretting corrosion, Micro-arching
- ESD Protection

Staggered Grid LRM was chosen for the F-16 and F-22 Aircraft

Amphenol LRM Evolution continues on next page.

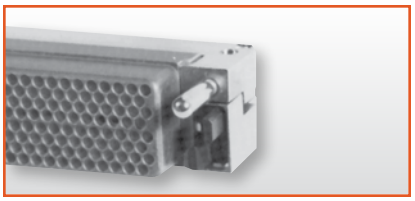
* See the Brush Contact Technology section, and the Low Mating Force MIL-DTL-55302 section of this catalog.

LRM PRODUCT EVOLUTION, CONTINUED

Certainly not standing still, and continuing to expand product offering, Amphenol now provides LRMs with higher contact densities, special purpose configurations and high speed inserts.

LRM Connectors with GEN-X Grid

- Higher contact density and improved electrical performance
- All the features of staggered LRM, including ESD protection (module connector)
- Available in SEM-E and custom form factors
- 236 contact pattern grid in 8 rows: 0.075 inch spacing along the row with 0.060 inch between rows, rows offset 0.0375 inch



LRM GEN-X Grid (236 contact pattern) Even higher densities with all the benefits of the Staggered Grid.

LRM Staggered Grid Airflow-thru Connectors

- LRM Staggered Airflow-thru inserts are available for wider board packages up to 0.425 in. These accommodate standard B³ tails in staggered pattern, but with increased spacing in the center, to accommodate airflow through heatsinks

LRM Staggered Grid Airflow-thru

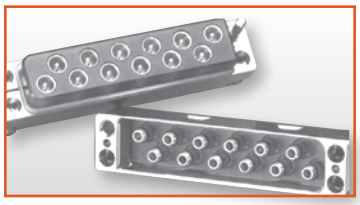
LRM Connectors with Fiber Optics

- Custom combinations of digital contacts and fiber optic termini were offered as the product line further developed in the '90's.
- Configurations included:
  - MIL-T-29504/4, /5, /14 & /15 termini
  - MT ferrule arrangements (2-24 fiber lines per ferrule)

LRM with Fiber Optic MT Ferrules

LRM Connectors to Accommodate RF Contacts

- LRM inserts are available with RF contacts:
  - Size 16 M39029/79 & /80 shielded contacts
  - Size 12 coax for DC-2 GHz; size 8 coax for DC-32 GHz
  - SMPM coax contacts*



LRM with RF Contacts

LRM Power Supply Modules

- Custom designs of LRMs have been developed with 270VDC sections which are capable of providing corona-free operation at 100,000 feet. They utilize size 22D contacts and are available in both crimp and compliant pin terminations.

LRM with High Amperage RADSOK® Contacts

- The RADSOK® contact technology enables high current flow with minimal voltage loss and low insertion force

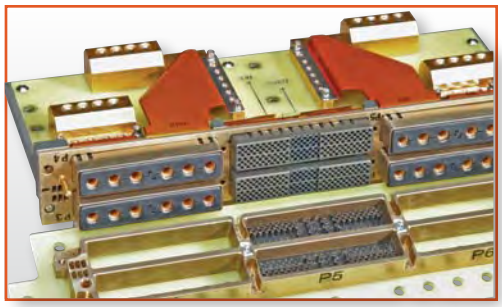
LRM backplane (left) and module connector (right) incorporating high amperage RADSOK® contacts (crimp style shown).

Board Level Interconnects of 2010 and Beyond -

More and more the customer has demanded a high level of flexibility, with designs that incorporate higher speeds and special features going beyond the standard LRM. Configurations such as:

High Speed GigaStak®, capable of data rates of 6.250 Gbps

- High speed GigaStak® LRM connectors - capable of data rates up to 6.25 Gb/s, and DigiStak® LRM connectors capable of data rates up to 3.125 Gb/s
- High speed shielded contacts - coax, triax, twinax, differential twinax, and quadrax contacts available in inserts of the LRM
- Combinations of power contacts, standard brush, high power, differential pair brush, and fiber optic termini
- Incorporation of Flex Circuits for more versatility of PC board terminations
- Custom shells with multiple bay configurations, special keying components or special guide/ground pins
- Compliant pin contacts for press-fit termination to circuit boards.



LRM special 6 bay design with RADSOK® contacts, standard brush contacts, and flex circuitry termination to module circuit card assemblies

Amphenol Backplane Capabilities

Amphenol backplanes incorporate a wide range of our interconnects.
See Other Rectangular Interconnects Section of this catalog, page 117, for more information on Amphenol backplanes.

* See Other Rectangular Interconnects Section, page 126 for more information on SMPM contacts.

Amphenol Leads in Board Level Product Technology

LRM DESIGN ENGINEERING

We take pride that Amphenol Aerospace is the undisputed leader in interconnect systems for aerospace/harsh environment applications. Such applications require a high degree of engineering sophistication and precision manufacturing capability that only a company that has been in the interconnection product design and manufacturing business for over 50 years can offer.

We have earned the reputation as the leader in the military electrical connection arena especially for military cylindrical connectors, and are fast becoming the leader for rectangular and surface mount interconnects.

Our LRM and VME64x* products are used on major programs that include the following and more:

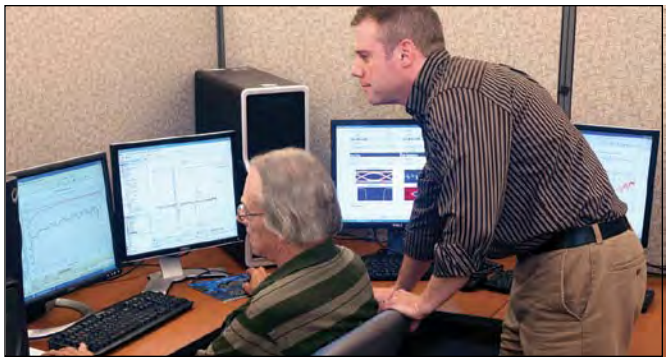
- F-35
- F-16
- F-15
- F/A-22
- F/A-18
- B2
- JTRS
- M1A2 Tank
- F-117
- AH-64 APACHE
- ASRAAM
- B52
- EA18G
- EA6B
- MEADS
- G/ATOR
- EQ-36

Expert design and applications engineering provides solid modeling and full Pro-Engineer® capabilities to develop new interconnection designs and perform structural analysis. Marketing product managers team with skilled engineers and production specialists in a customer-driven approach to produce the end result: defect-free parts, cost effectiveness, shorter lead and delivery times, and satisfied customers.

The photo top right shows the CST Microwave Studio® signal integrity modeling and simulation software at Amphenol. This state-of-the-art technology allows characterization of current connector designs and rapidly aids in the development of new high speed signal designs. It consists of a 3D, full-wave electromagnetic field solver for simulating electrical performance, producing SPICE models and eye diagrams.

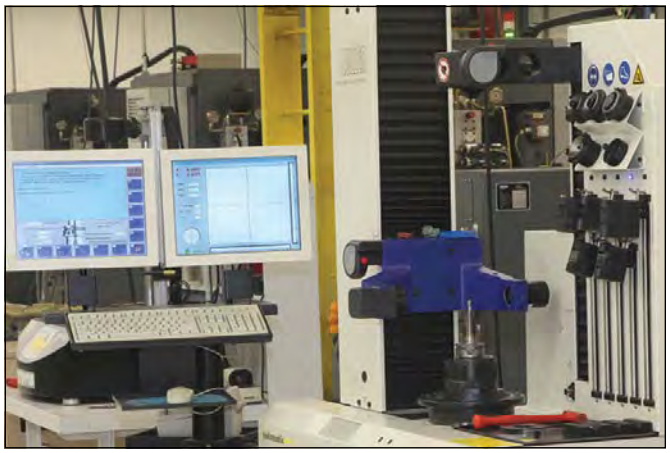
Amphenol's capability for testing of it's wide range of cylindrical and rectangular connector products also includes vibration and shock testing, humidity, engagement/separation force evaluation, durability testing, as well as salt spray/fog, corona, ESD, optical performance testing and altitude simulation.

Close-up photo showing vertical machining of heatsink housings done at Amphenol.



Engineers working at the signal integrity modeling and simulation software suite at Amphenol Aerospace Operations. (See page 28 for more information on Amphenol's testing of Hi-Speed LRM connectors).

Above and below are production areas for LRM interconnects and heatsinks. Note the orange balls on the machines - these are used as a quick checking device for processes.



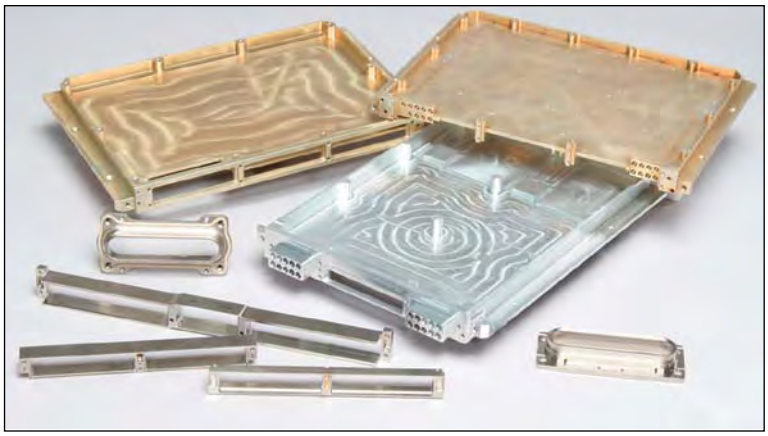
* VME64x products are covered on page 43.

Amphenol Leads in Board Level Technology

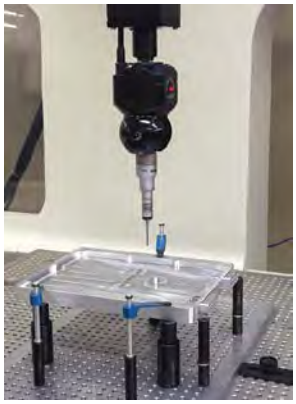
LRM MANUFACTURING EXPERTISE

Amphenol Aerospace is highly integrated to design, manufacture, assemble and ship an extensive variety of line replaceable module and backplane connectors. We also supply a wide range of heatsink hardware associated with this type of connector. The photo on right shows several heatsink forms used in the manufacture of LRM interconnects. For more information on heatsinks, see the Other Board Level and Rectangular Interconnects Section, pages 112 & 113.

Manufacturing equipment photos shown below demonstrate Amphenol's high technology capability. Focus is always on cost effective production and continuous improvement of processes. Manufacturing capabilities include state-of-the-art robotically controlled milling machines and CNC machining, as well as impact and extruding, plating, screw machining, and process control.



Variety of heatsinks and connector shells manufactured by Amphenol.



CMM measuring is done to check machined parts.

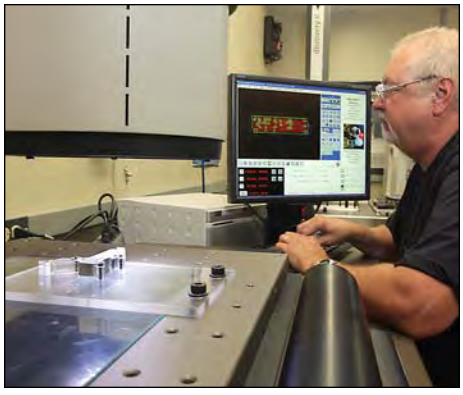
Amphenol's high technology computer driven equipment for manufacturing heatsinks.

THE ADVANTAGE OF AMPHENOL'S WIDE DIVISIONAL CAPABILITY

Amphenol divisions work together to provide a very broad manufacturing capability for board level interconnects:

- Amphenol Aerospace (AAO)* has leading expertise in the production of line replaceable module inter-connects, VME64x interconnects and low mating force brush connectors.
- Amphenol Backplane Systems (ABS)** has leading expertise in the manufacture of custom backplane assemblies - high density, ruggedized, board to backplane interconnects.
- Amphenol Printed Circuits (APC)*** has leading expertise in the manufacture of flex circuitry products used in connector-to-board attachment.

These companies of Amphenol Corporation combine to provide design, applications engineering, fabrication, value-added assembly and testing to meet customer requirements as well as to develop products for emerging technologies.



Checking for dimensional accuracy of LRM parts and heatsinks.

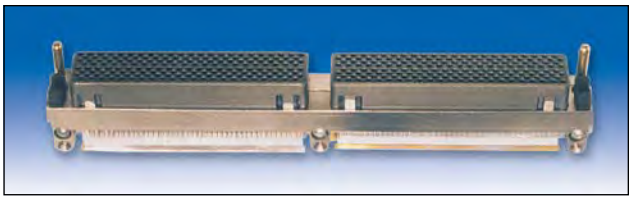
* This catalog covers the rectangular interconnect products offered by AAO division. Go online at www.amphenol-aerospace to see the wide range of cylindrical and other interconnect products offered by AAO. And see the Other Rectangular Products section at the end of this catalog for other Amphenol divisions offerings of rectangular interconnects.

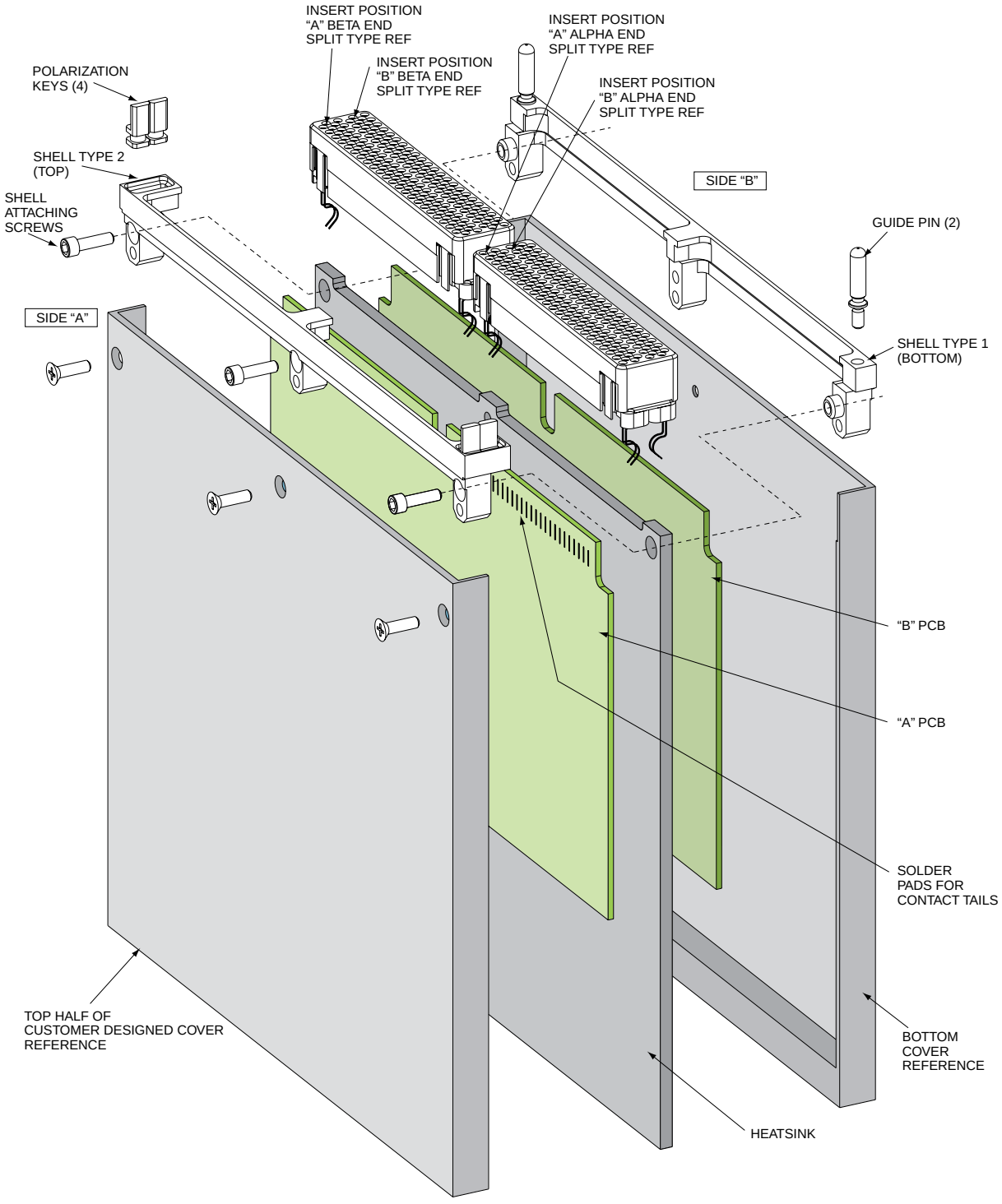
** For more information on backplane assemblies: page 117 and online at www.amphenol-abs.com.

*** For more information on flex circuit products: page 121 and online at www.amphenolapc.com.

STAGGERED GRID DOUBLE BAY SHOWN

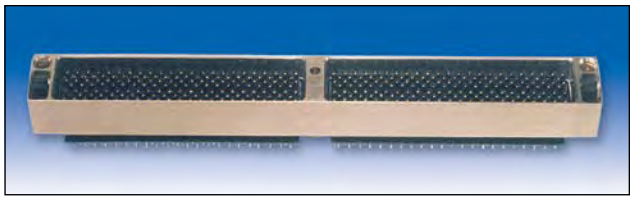
The following is the LRM Module Connector identification and naming convention. The illustration is a double bay module with a staggered grid pattern.

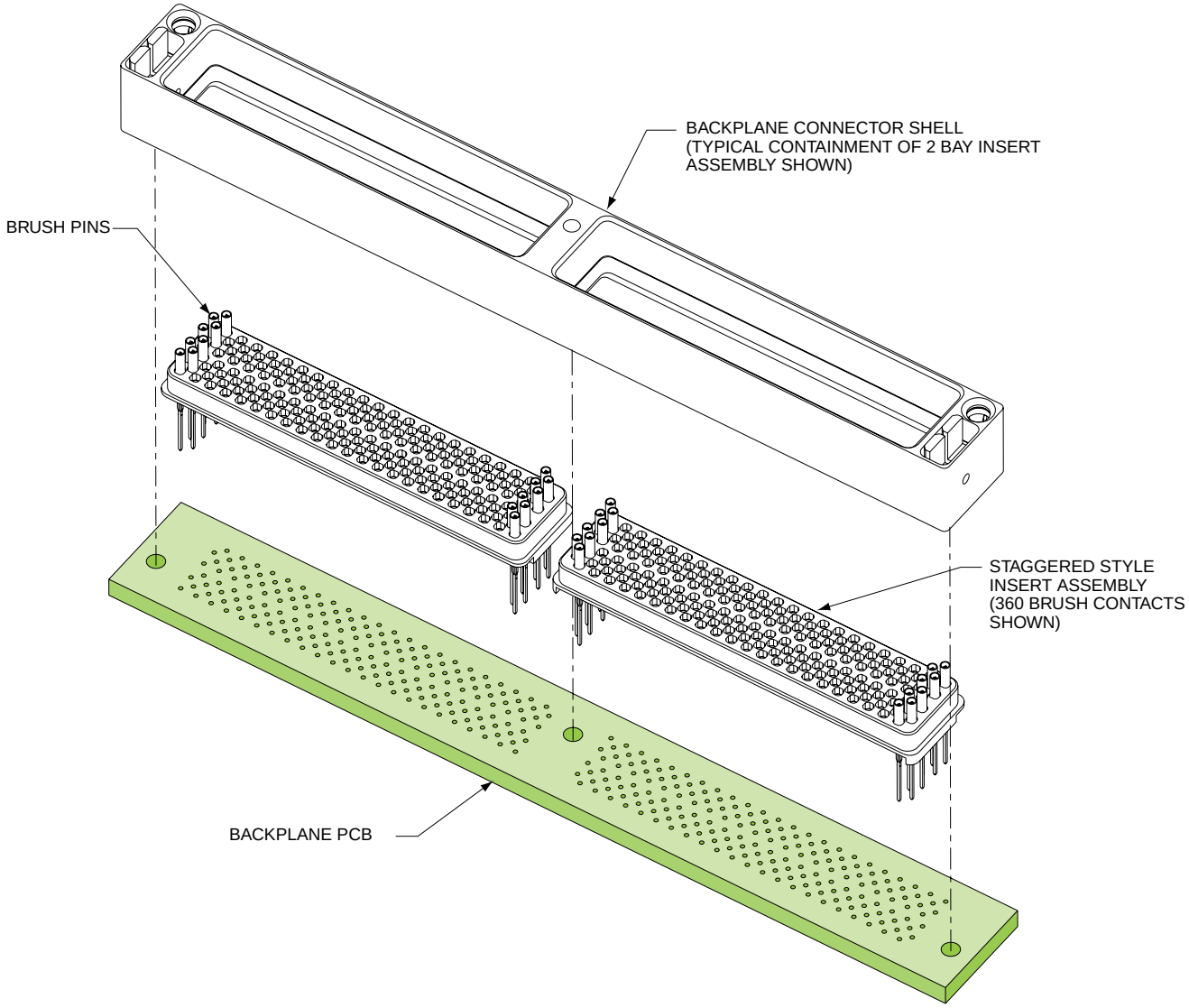




STAGGERED GRID DOUBLE BAY SHOWN

The following diagram shows an exploded view of an LRM staggered grid backplane connector in a two bay configuration.



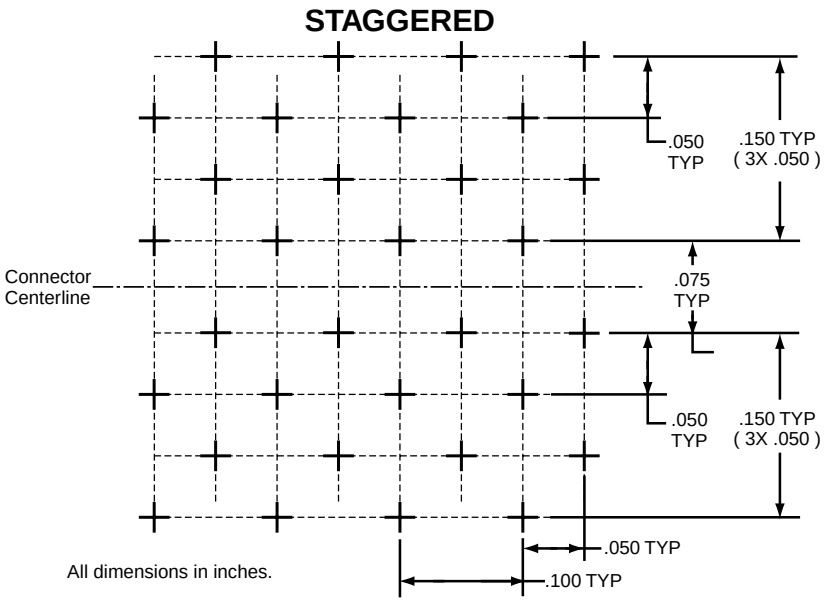


Amphenol Aerospace

CONTACT PATTERNS

STAGGERED GRID DESCRIPTION

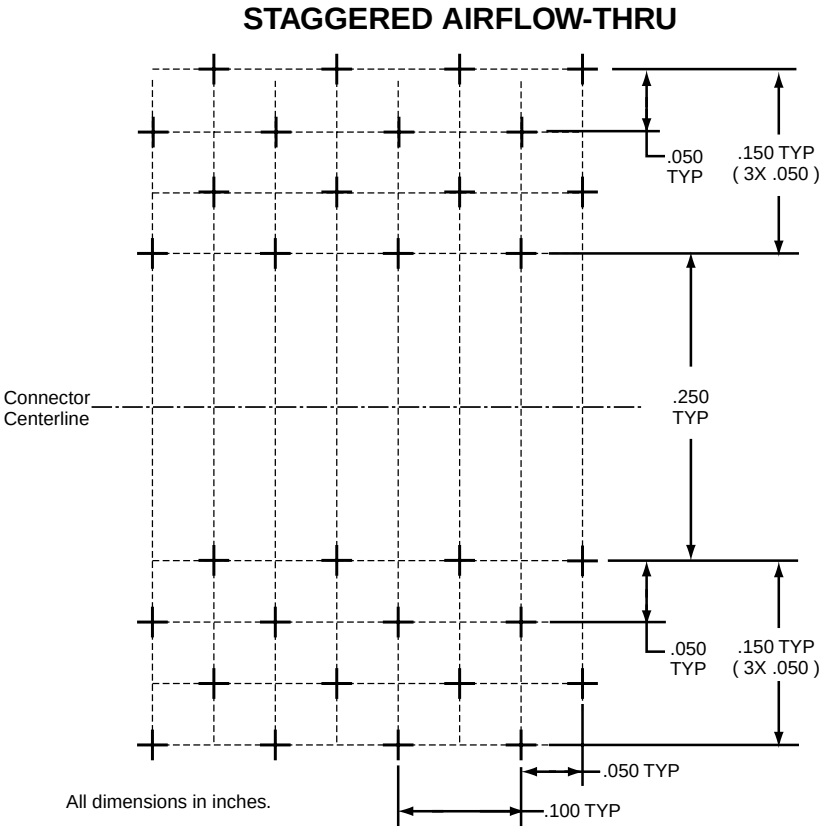
The LRM standard staggered grid pattern employs surface mount leads on .025 inch centerlines (pitch). Insert patterns of digital brush contacts are in 80, 108, 152 and 180 contact counts. See typical arrangement drawings on pages 19 and 20.

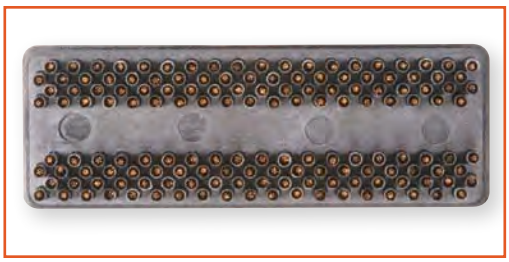


Two bay, 360 contact, module connector with standard staggered grid pattern

STAGGERED AIRFLOW-THRU GRID DESCRIPTION

The staggered grid airflow-thru inserts were designed to accommodate wider board packaging and airflow-thru heatsinks. Insert patterns of digital brush contacts are same as the staggered grid pattern (80, 108, 152 and 180 contact counts). See typical arrangement drawings on page 21.

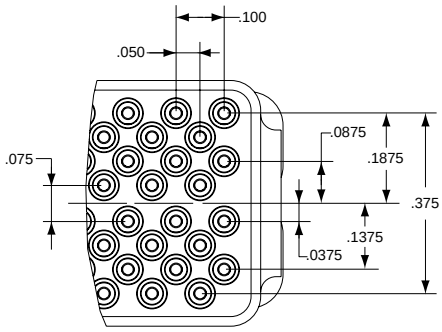


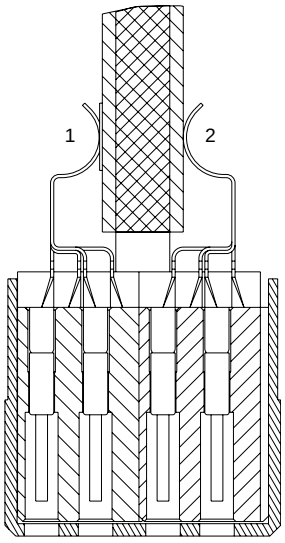


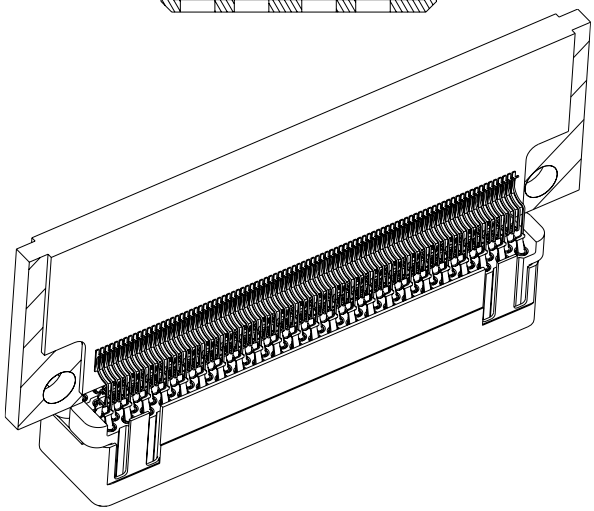
Staggered grid airflow-thru backplane insert.

Staggered Grid (Standard)

Staggered Grid for Standard Board Packages

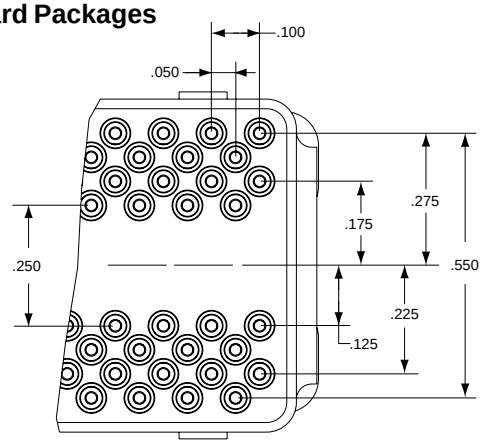


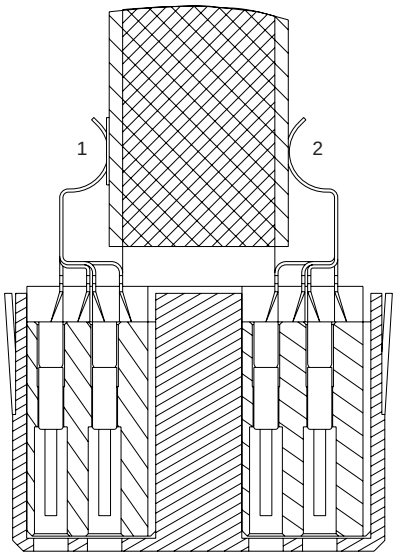


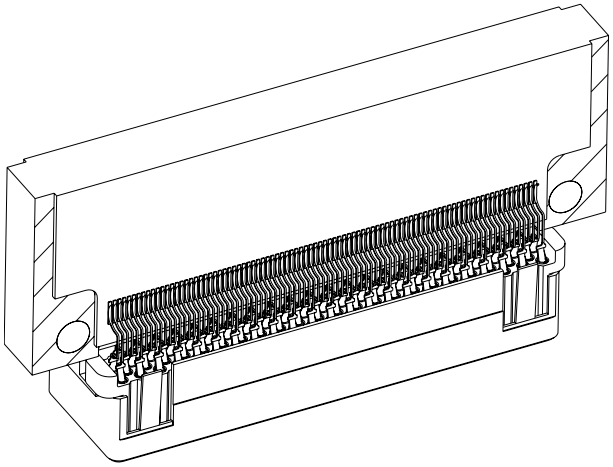


Staggered Grid Airflow-Thru

Staggered Grid Air-flow for Wider Board Packages





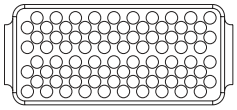


TYPICAL ARRANGEMENTS

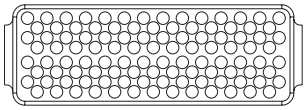
Example of a backplane connector in a 2 bay arrangement with inserts of staggered brush contacts and coax (size 12) contacts.

Staggered Grid LRM interconnects can be one, two or three bay configurations, and special additional bay arrangements. The typical arrangements shown here are depicted in one bay drawings. Amphenol's design flexibility also allow for combinations of contact types. These arrangements represent the versatility that can be arrived at by arranging digital (brush) inserts with inserts for power, RF, fiber optic and high speed contacts in various combinations within a typical bay. Consult Amphenol Aerospace for assistance in designing the LRM that best meets your specific application needs. See page 41 for an aid in selection and ordering.

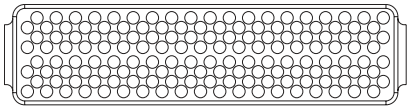
80 brush contacts



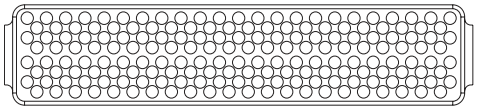
108 brush contacts



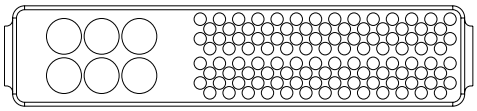
152 brush contacts



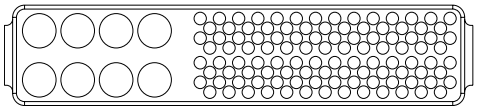
180 brush contacts



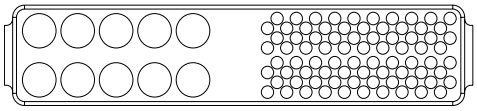
108 brush contacts plus 6 sz. 12 power or coax contacts



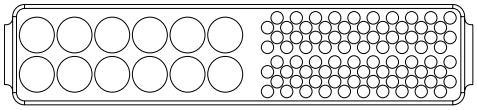
108 brush contacts plus 8 coax contacts



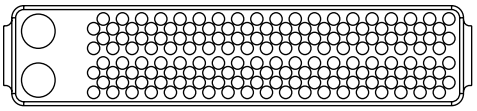
80 brush contacts plus 10 coax contacts



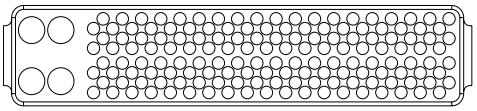
80 brush contacts plus 12 sz. 12 power or coax contacts



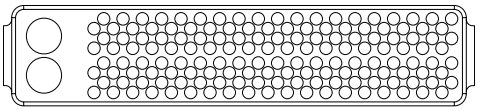
152 brush contacts plus 2 sz. 12 power or coax contacts



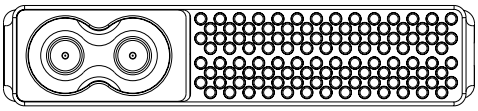
152 brush contacts plus 4 sz. 16 power or coax contacts



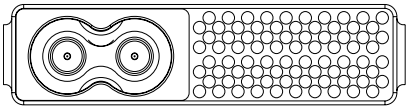
152 brush contacts plus 2 sz. 12 power or coax contacts



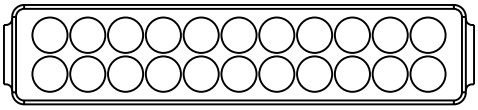
108 brush contacts plus 270 VDC power input



80 brush contacts plus 270 VDC power input

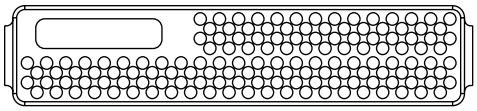


22 sz. 12 power contacts

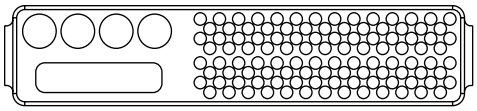


TYPICAL ARRANGEMENTS

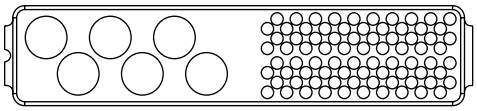
144 brush contacts plus 4 fiber optic termini



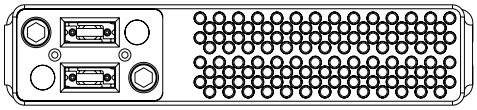
108 brush contacts plus 4 coax contacts and 4 fiber optic termini



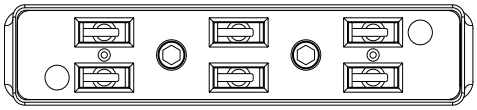
80 brush contacts plus 6 coax contacts



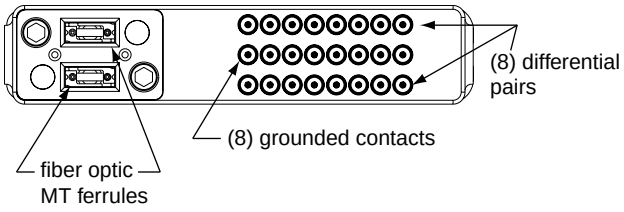
108 brush contacts plus an insert for 2 fiber optic MT ferrules*



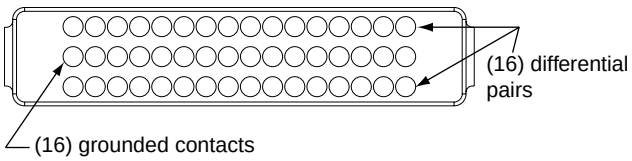
6 cavities for fiber optic MT ferrules*

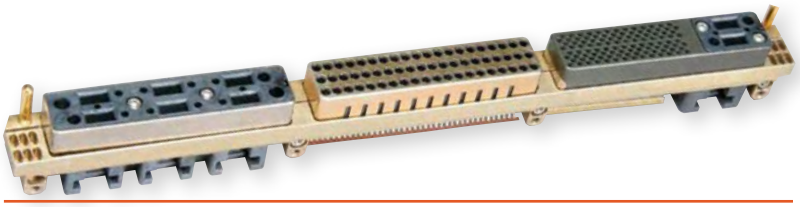


8 brush LVDS differential pairs plus an insert for 2 fiber optic MT ferrules*



16 LVD pairs





Example of a 3 bay module connector with an insert for MT fiber optic ferrules and inserts for brush LVDs and digital contacts.

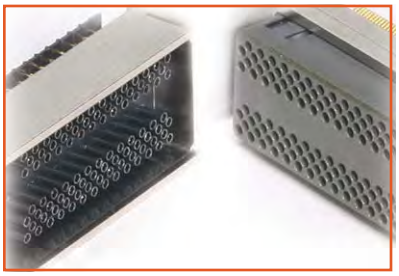
Example of a 2 bay staggered grid module connector.

Example of a staggered grid module and backplane with 108 brush contacts and an insert for 7 size 20 crimp contacts for high voltage applications.

* MT ferrules are not supplied by Amphenol Aerospace. see page 28 for more information on LRMs with MT ferrules.

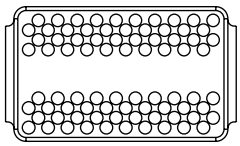
ARRANGEMENTS, CUSTOM SHELLS

The typical Airflow-thru arrangements are with brush contacts. The arrangements shown at left for staggered grid Airflow-thru are typical of what has been developed for customer requirements.

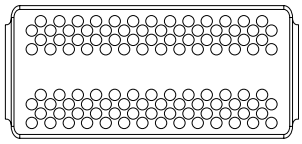


Staggered Grid Airflow-thru pattern - in a module on right, and in a backplane on left. Note the increased spacing in the center. This is designed for wider board packages, and accommodates airflow-thru heatsinks. (See illustration on page 18).

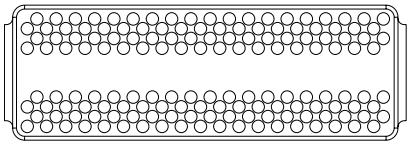
80 brush contacts (airflow-thru)



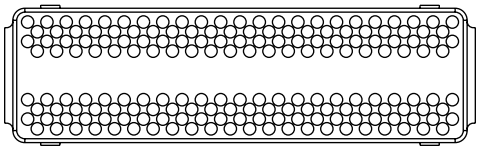
108 brush contacts (airflow-thru)



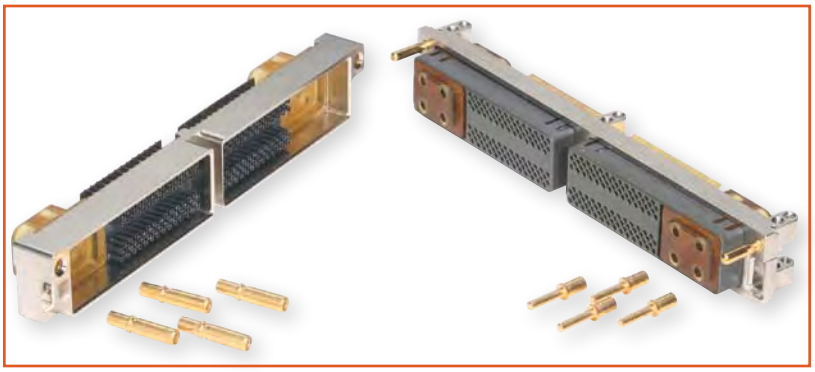
152 brush contacts (airflow-thru)



180 brush contacts (airflow-thru)



LRMs with airflow-thru inserts can be custom designed in combination with power contacts, such as the example below.



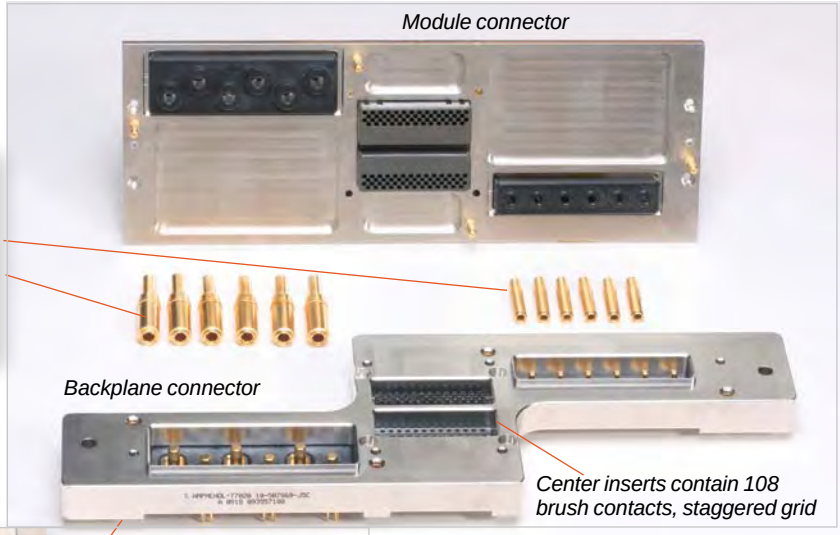
Module and backplane connectors with staggered airflow-thru inserts. Shown are 216 brush contacts and inserts for size 12 RADSOK® crimp contacts.

Amphenol designs and builds custom shell configurations such as the module face plate and its mating backplane connector.

This custom Airflow-thru module contains RADSOK® high amperage socket contacts in sizes 8 and 12.

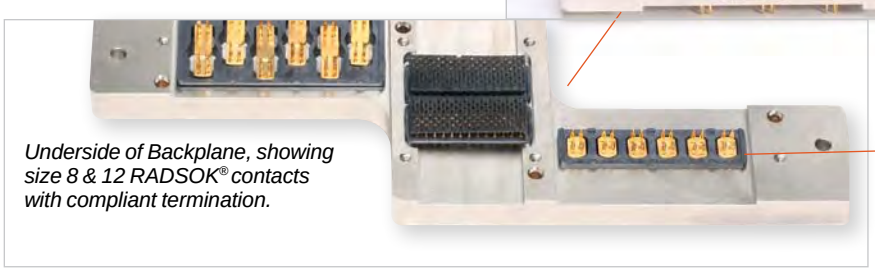
See more description of RADSOK® contacts, page 124.

Module connector



Backplane connector

Center inserts contain 108 brush contacts, staggered grid



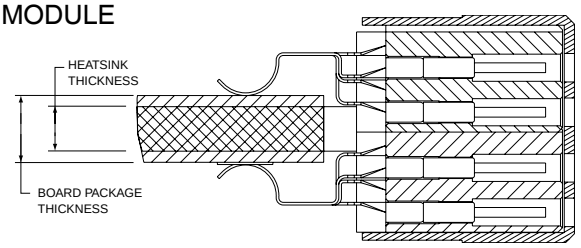
Underside of Backplane, showing size 8 & 12 RADSOK® contacts with compliant termination.

Closeup of insert with compliant pin termination power contacts.

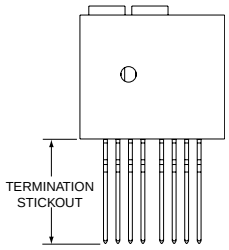
TERMINATION OPTIONS

The following is a guide to the part number suffixes to be used when ordering LRM Connectors. Due to the complexity and number of variations within the part numbering, it is necessary to consult Amphenol Aerospace for assistance when building these part numbers. See page 41 for an aid in selection and ordering, and call Amphenol at 607-563-5011 for technical support.

MODULE



BACKPLANE



An example of a typical Amphenol Module part number is:

10-507XXX-X( )( )

10-507 .....Designates Amphenol LRM Connectors

XXX-X.....Module Insert Arrangement Number - To be assigned by Amphenol.

( ) .....Heatsink Thickness Suffix for Modules

Suffix	Description
1	.125 ±.005
2	.100 ±.005
3	.075 ±.005
4	.062 ±.005

( ) .....Board Package Thickness Suffix for Modules

Suffix	Description Standard Staggered	Description Airflow-thru Staggered*
1	Surface Mount / .090 – .130 Package	Surface Mount / .265 – .305 Package
2	Surface Mount / .130 – .190 Package	Surface Mount / .305 – .365 Package
3	Surface Mount / .190 – .250 Package	Surface Mount / .365 – .425 Package
4	Surface Mount / .060 – .100 Package	Surface Mount / .235 – .275 Package
5	Surface Mount / .100 – .160 Package	Surface Mount / .275 – .335 Package
6	Surface Mount / .160 – .220 Package	Surface Mount / .335 – .395 Package

* .175 is added for increased center spacing in the airflow-thru staggered style

An example of a typical Amphenol Backplane part number is:

10-507XXX-X( )( )

10-507 .....Designates Amphenol LRM Connectors

XXX-X.....Backplane Insert Arrangement Number - To be assigned by Amphenol.

( ) .....Termination Style Suffix for Backplanes

Suffix	Description
1	.021 ±.002 Dia. PCB Tail
2	.016 ±.002 Dia. PCB Tail
5	Compliant

( ) .....Termination Stickout Suffix for Backplanes

Suffix	Description
1	.150 ±.020 (PCB)
2	.200 ±.020 (PCB)
3	.250 ±.020 (PCB)
4	.300 ±.020 (PCB)
5	.350 ±.020 (PCB)
6	.400 ±.020 (PCB)
7	.185 ±.020 (PCB)
8	.450 ±.020 (PCB)
9	.500 ±.020 (PCB)
C	.157 ±.020 (Compliant, No Wrap)
D	.217 ±.020 (Compliant, 1 Wrap)
E	.317 ±.020 (Compliant, 2 Wrap)
F	.417 ±.020 (Compliant, 3 Wrap)

TYPICAL PERFORMANCE, MATERIALS LIST

Table 1 below identifies the typical electrical, mechanical and environmental performance of an Amphenol 2 bay LRM connector assembly with 360 brush contacts in staggered grid. This data was program specific and does not reflect actual performance limitations. Table II below provides a materials list for the components of staggered grid LRM connectors.

TABLE I: PERFORMANCE

ELECTRICAL PERFORMANCE	
Electrical Parameters	**Performance**
Current carrying capability	10°C temperature rise at 2A and 30°C rise at 3A
Contact resistance	30 milliohms max. per contact, 25 milliohms max. average
Dielectric withstanding voltage at sea level	100 VRMS, 60 Hz
Dielectric withstanding voltage at altitude	100 VRMS, 60 Hz at 70,000 ft.
Insulation Resistance	1000 megohm minimum at 100V d.c.
Electrostatic Discharge Protection (module only)	± 25,000 minimum air and direct discharge (see pg. XX for details)

MECHANICAL PERFORMANCE	
Mechanical Parameters	**Performance**
Contact retention (solder type backplane assembly)	Maximum displacement of 0.010" at 1 pound load
Mating and unmating forces	Maximum 40.0 pounds mating and unmating
Vibration (Sinusoidal, 20g peak max.)	No electrical discontinuity >1 µS
Vibration (Random, 11.6g RMS max.)	No electrical discontinuity >1 µS
Shock (50g max. shock pulse)	No electrical discontinuity >1 µS
Solderability	Minimum 95% solder coverage
Resistance to soldering heat	260°C dip for 10 seconds

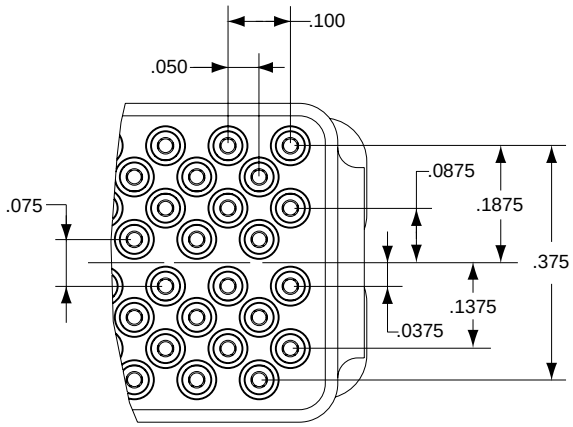
ENVIRONMENTAL PERFORMANCE	
Environmental Parameters	**Performance**
Temperature life	250 hours at 125°C maximum
Connector durability	500 cycles mating and unmating
Salt fog exposure	48 hours maximum direct exposure (5% NaCl)
Thermal shock	500 cycles at +125°C / –65°C
Humidity exposure	240 hours at 90 - 98%
Contamination exposure	Sand and dust per MIL-STD-202 Method 110
Resistance to solvents	Boiling Trichloroethylene fumes and solution

TABLE II: MATERIALS LIST

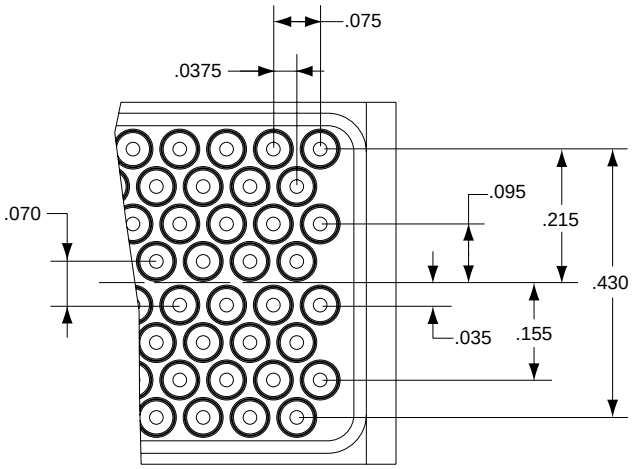
ENVIRONMENTAL PERFORMANCE	
Part	**Material / Finish Description**
Brush wires	Beryllium copper per ASTM B197; finish is gold per ASTM B488 over nickel per AMS-QQ-N-290. (The exposed ends of the brush wires need not be plated).
Module contacts	Beryllium copper per ASTM B534 C17500, or C17510 except temper HTC; finish on contact body is matte tin-lead per ASTM B579; finish on termination end is 60/40 or 63/37 tin-lead dip per J-STD-004, -005 and -006.
Backplane contacts (Compliant termination)	Contact barrel: brass per ASTM B4531/B453M-01 similar to UNS C33500; finish is tin-lead per SAE-AMS-P-81728 (min. 15% ±5% lead) over nickel. Contact tail: beryllium copper per ASTM B-534 alloy 17510 HT; finish is gold per ASTM B-488 over nickel per AMS-QQ-N-290. Contact sleeve: stainless steel per AMS 5514; finish is black oxide per MIL-DTL-13924 and conformally coated per MIL-I-46058.
Backplane contacts (PCB termination)	Contact body: brass similar to UNS C33500; finish is gold over nickel; termination end is 60/40 or 63/37 tin lead dip. Contact sleeve: stainless steel per AMS 5514; finish is black oxide per MIL-DTL-13924 and conformally coated per MIL-I-46058.
Insulators	Polyphenylene Sulfide or Liquid Crystal Polymer per MIL-M-24519
Organizer	Polyphenylene Sulfide or Liquid Crystal Polymer per MIL-M-24519
Shells	Aluminum alloy 6061-T6 per AMS 4150; finish is electroless nickel per SAE AMS 2404.
ESD shields	Aluminum alloy 6061-T6 per AMS 4150; finish is hardcoat anodize per MIL-A-8625 with epoxy final coat. Ground tabs are chromate treated (irridite).
Polarization keys	Stainless steel per AMS 5640; finish is black oxide per MIL-DTL-13924. Key retaining ring is Polyamide (nylon 12) with 50% glass filled fibers.
Guide pins	Beryllium copper alloy per ASTM B196, finish is gold per ASTM B 488 over nickel per AMS-QQ-N-290.

GEN-X PROVIDES HIGHER CONTACT DENSITY

Staggered Grid Contact Density

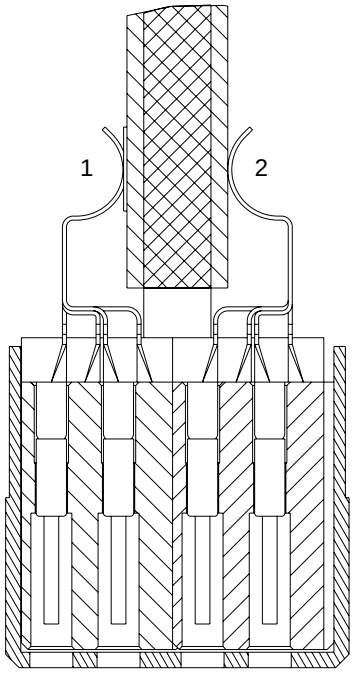


GEN-X Contact Density



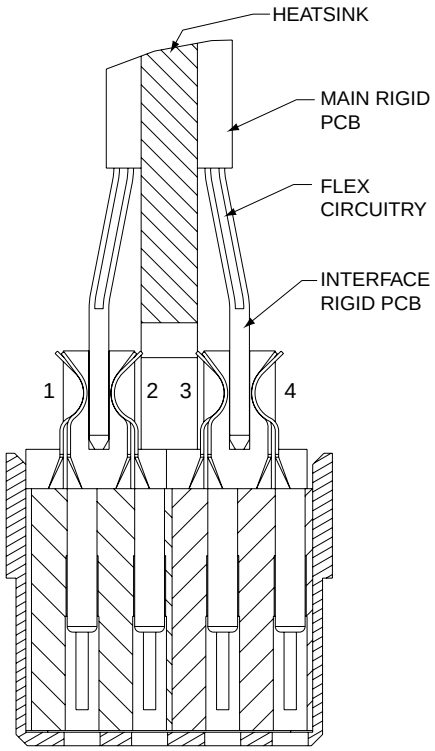
Staggered Grid Module Termination

Two Surface Mount Planes



GEN-X Module Termination

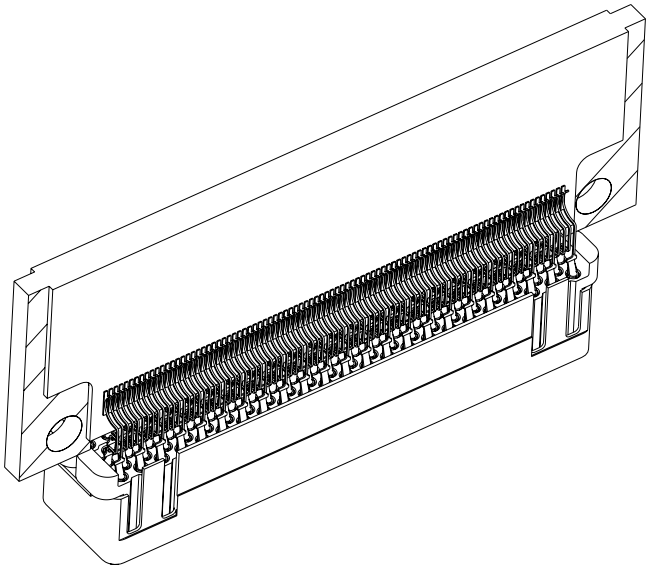
Four Surface Mount Planes



GEN-X PROVIDES HIGHER CONTACT DENSITY

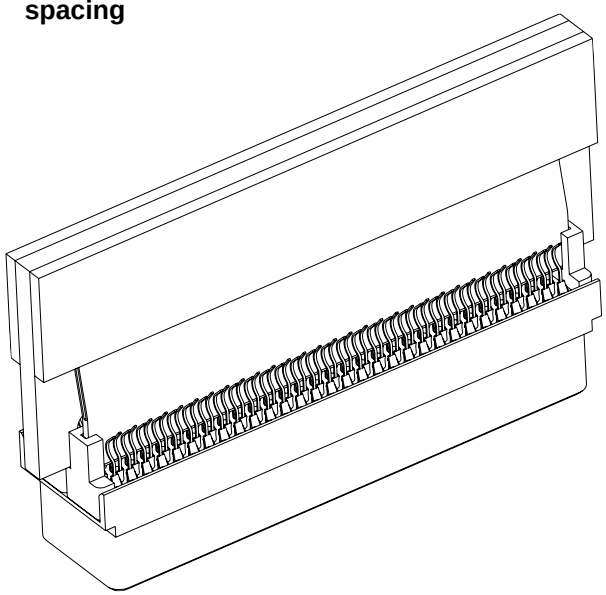
Staggered Grid Tail to Tail Placement

Staggered Grid LRM has 0.025 tail to tail centerline spacing

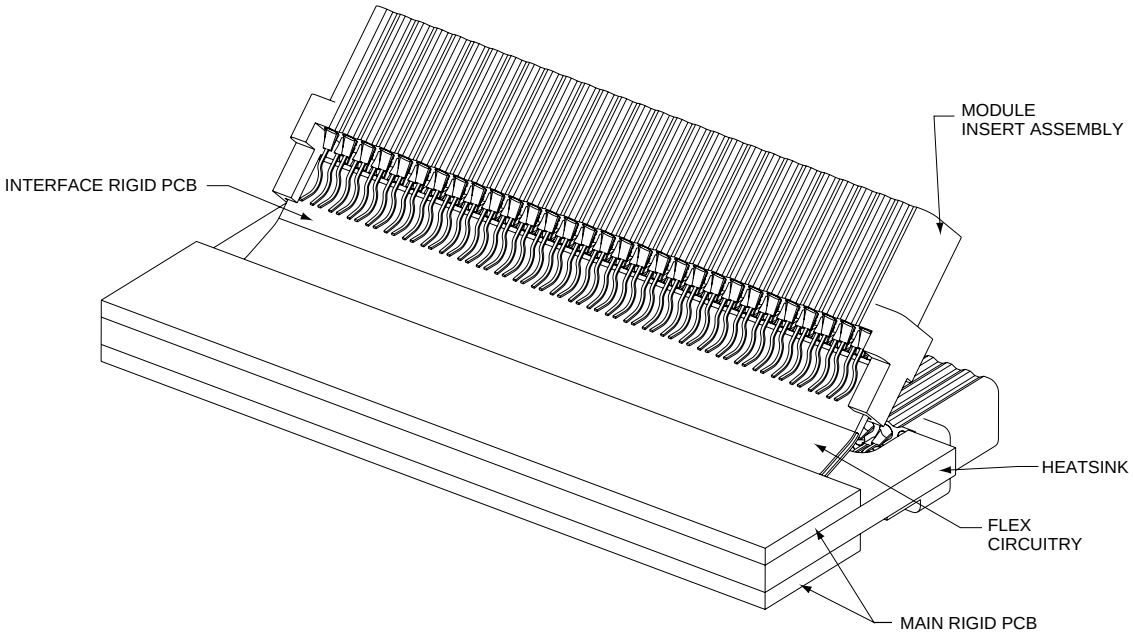


GEN-X Tail to Tail Placement

GEN-X Grid LRM has 0.0375 tail to tail centerline spacing



GEN-X is Designed to Terminate to Rigid-Flex PCB Attachment



CONTACT PATTERN & ARRANGEMENTS

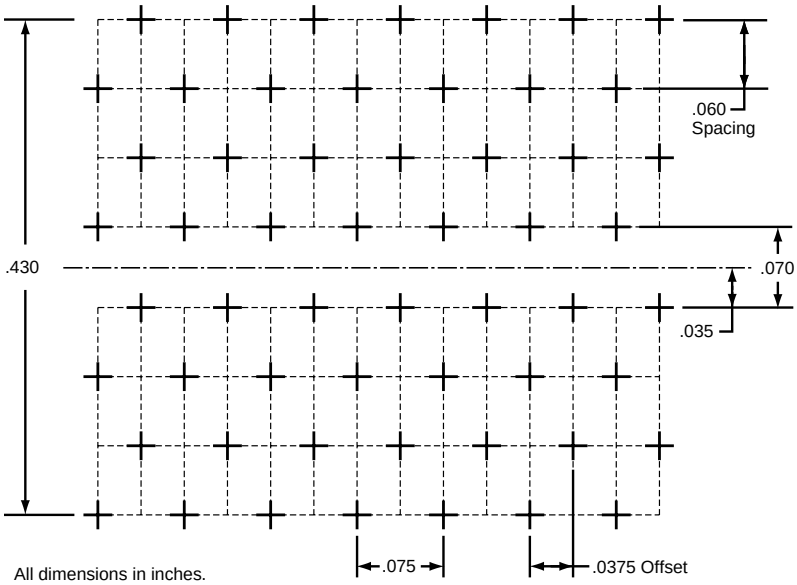
The LRM GEN-X pattern employs surface mount leads on a .0375 inch center line (module connector), yet provides higher contact density than the Staggered grid pattern. GEN-X provides all the same features as the staggered grid LRM:

- GEN-X digital (brush) inserts are available in 118 and 236 pin contact counts.
- Digital contacts can also be combined with inserts for fiber optics, RF, poser and high speed contacts.
- Various combinations of inserts can be provided in 1, 2 or 3 bay shell configurations.
- Typical insert arrangements shown here are depicted in one bay drawing.

Consult Amphenol Aerospace for assistance in designing the LRM that best meets your specific application needs. See page 41 for an aid in selection and ordering of LRM and LRU interconnects.

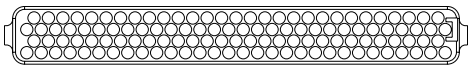
Example of a 3 bay GEN-X backplane connector.

GEN-X

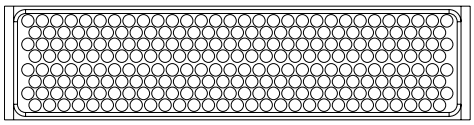


Example of a 2 bay GEN-X module connector.

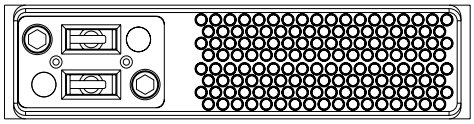
118 brush contacts



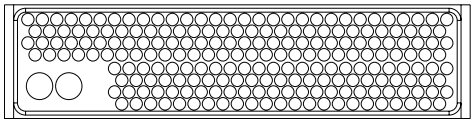
236 brush contacts



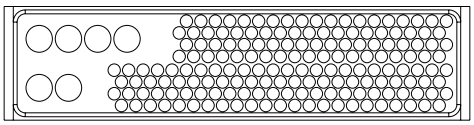
140 brush contacts plus an insert for 2 fiber optic MT ferrules*



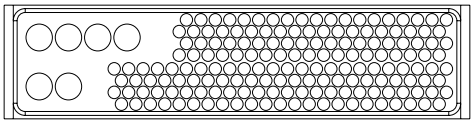
212 brush contacts plus 2 sz. 16 power or coax contacts



170 brush contacts plus 6 sz. 16 power or coax contacts



170 brush contacts plus 4 fiber optic termini and 2 sz. 16 contacts



* MT ferrules are not supplied by Amphenol Aerospace. see page 28 for more information on LRMs with MT ferrules.

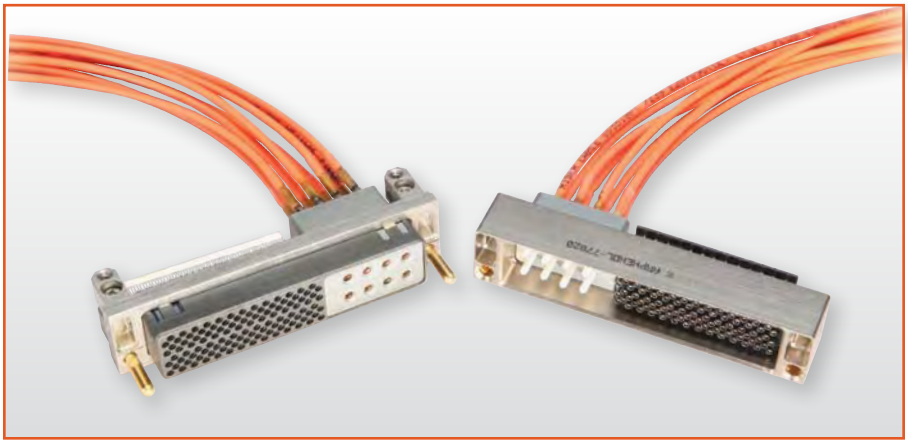
LRMS WITH FIBER OPTIC TERMINI

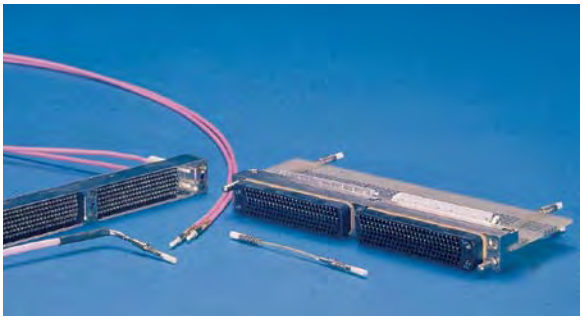
High speed fiber optic transmission is available within LRM connectors for use in advanced avionics systems. Optical performance of fiber optic termini within in LRM connectors are the same as termini used in circular connectors.*

Insertion losses range from .3dB to <1.5dB depending upon launch conditions, fiber NA, fiber size and the type of termination.

Inserts for MIL-T-29504/1, /2, /14 and /15 can be incorporated. Termini for LRMs can be supplied - consult Amphenol Aerospace for ordering information. The termini are determined by insert and shell style of the connector.

LRM interconnects can have hybrid arrangements of fiber optics with Brush contacts, as well as other contact types.

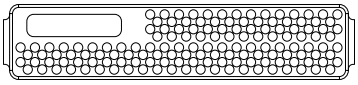




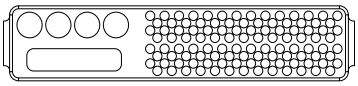
Examples of LRM connectors with fiber optic multi-mode termini in combination with brush contacts.

Staggered Grid Patterns with MIL-T-29504 Fiber Optic Termini

(These drawings are also shown with other staggered grid patterns on pages 19 and 20).



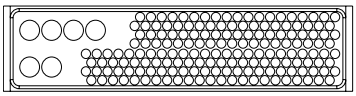
144 brush contacts plus an insert for 4 fiber optic termini



108 brush contacts plus an insert for 4 shielded contacts and an insert for 4 fiber optic termini

GEN-X Patterns with MIL-T-29504 Fiber Optic Termini

(This drawing is also shown with other GEN-X patterns on page 26).



170 brush contacts plus an insert for 4 fiber optic termini plus 2 sz. 16 contacts

*For more information on Amphenol fiber optic circular connectors, see Amphenol Circular Interconnects Catalog 12-C3, Fiber Optic section

LRMS WITH INSERTS FOR MT FERRULE FIBER OPTICS

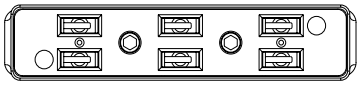
Through Amphenol's LRM design flexibility, inserts are available to house high speed MT ferrules which can have 12 or 24 fiber lines per ferrule. MT ferrules are not supplied by Amphenol; they must be purchased separately.

Termini for rectangular LRM connectors are determined by insert and shell style of the connector.

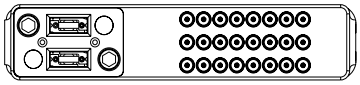
Example of an LRM module connector with MT fiber optic inserts in combination with inserts for brush LVDs and digital contacts.

Staggered Grid Patterns with MT Ferrule Fiber Optics

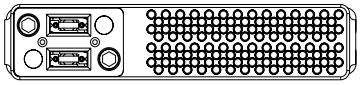
(These drawings are also shown with other staggered grid patterns on pages 19 and 20).



Insert with cavities for 6 fiber optic MT ferrules



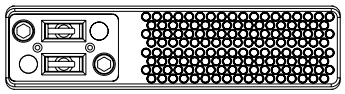
Insert with 8 brush differential pairs plus an insert for 2 fiber optic MT ferrules



Insert for 108 brush contacts plus an insert for 2 fiber optic MT ferrules

GEN-X Patterns with MT Ferrule Fiber Optics

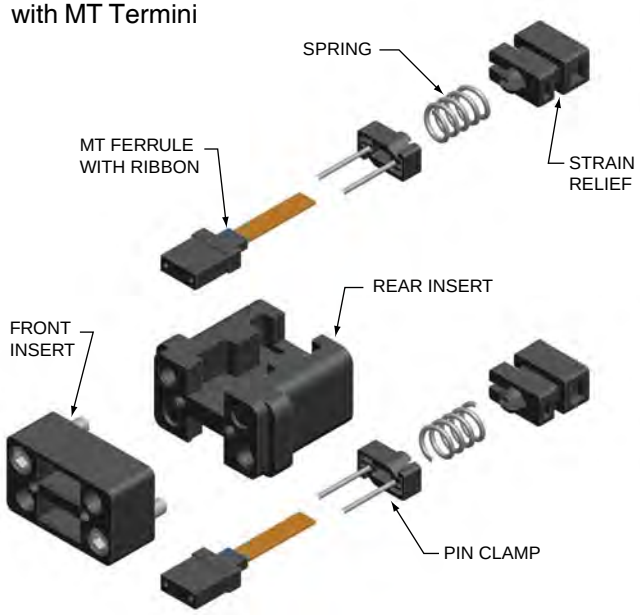
(These drawings are also shown with other GEN-X patterns on page 26).



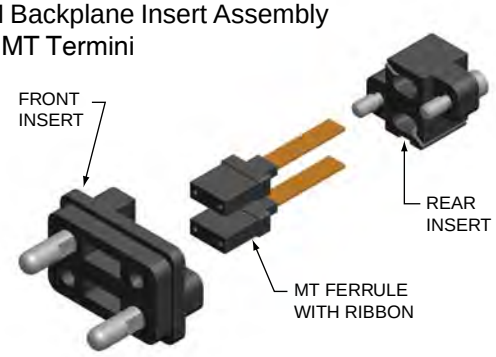
140 brush contacts plus an insert for 2 fiber optic MT ferrules

Amphenol can supply optical backplane assemblies; see more informationin the Other Board Level and Rectangular Interconnects Section on page 117.

LRM Module Insert Assembly with MT Termini



LRM Backplane Insert Assembly with MT Termini



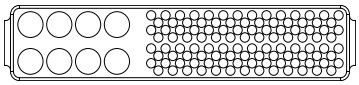
RF MODULES, LRMS WITH HIGH SPEED CONTACTS

LRM inserts have been designed to accommodate the following RF and high speed coaxial contacts:

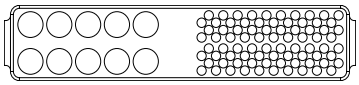
- Size 16 M39029/79 & /80 shielded contacts
- Size 12 coax for DC-65 GHz
- Size 8 coax for DC-32 GHz
- SMPM RF contacts*
- Hybrid arrangements with RF or high speed shielded contacts and brush contact combinations

Staggered Grid Patterns with RF/Coaxial Contacts

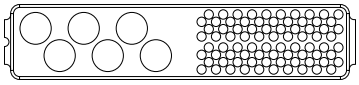
(These drawings are also shown with other staggered grid patterns on pages 19 and 20).



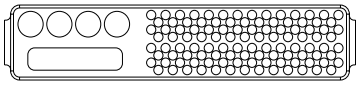
108 brush contacts plus an insert for 8 SMPM style RF contacts*



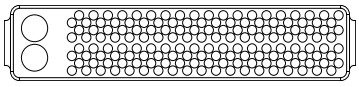
80 brush contacts plus an insert for 10 SMPM style RF contacts*



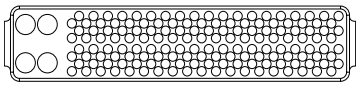
80 brush contacts plus an insert for 6 RF contacts



108 brush contacts plus inserts for 4 shielded contacts and 4 fiber optic termini



152 brush contacts plus an insert for 2 SMPM style RF contacts*



152 brush contacts plus an insert for 4 sz. 16 shielded contacts

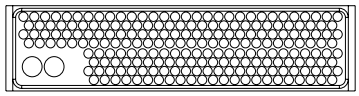
* See more information on SMPM RF contacts in Other Rectangular Interconnects Section, page 126. SMPM RF contacts can be supplied by Amphenol SV Microwave. Phone: 561-840-1800 Website: www.svmicrowave.com

RF module and backplane with size 8 coaxial contacts

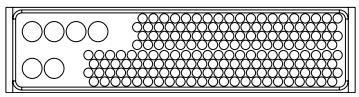
Staggered grid module with cavities for size 12 coaxial contacts

GEN-X Patterns with RF/Coaxial Contacts

(These drawings are also shown with other GEN-X patterns on page 26).



212 brush contacts plus an insert for 2 sz. 16 shielded contacts

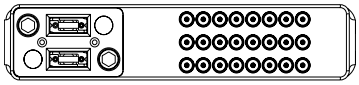


170 brush contacts plus an insert for 6 sz. 16 shielded contacts

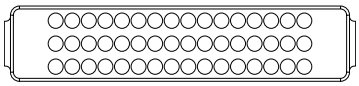
Amphenol has also developed inserts with brush differential pair contacts that are 100 ohm matched impedance. These support data rates with excess of 1.2 Gbps.

Staggered Grid Patterns with LVDS Differential Pairs

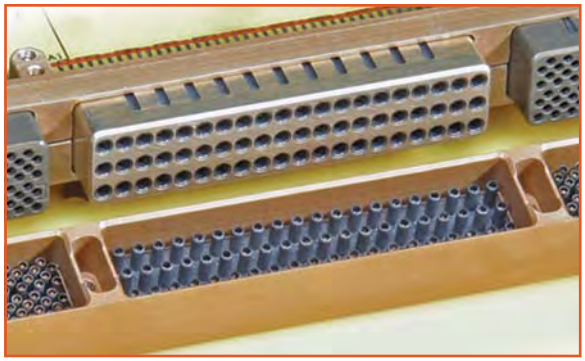
(These drawings are also shown with other staggered grid patterns on page 20).



8 brush differential pairs plus an insert for 2 fiber optic MT ferrules



16 LVDS differential pairs



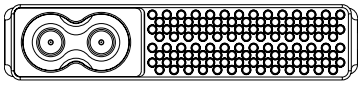
Module and backplane with LVDS differential pair brush contacts

Power Supply Modules

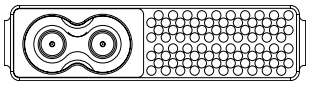
Amphenol has designed several custom 270VDC sections which are capable of providing corona-free operation at 75,000 ft. They utilize size 22D contacts and are available in both crimp and compliant pin terminations.

Amphenol has developed the patterns shown below that incorporate 270 VDC power modules.

(These drawings are also shown with other staggered grid patterns on page 19).



108 brush contacts plus 270 VDC power input



80 brush contacts plus 270 VDC power input

Power supply modules

LRM Connectors with RADSOK® Contacts

New/Featured Product

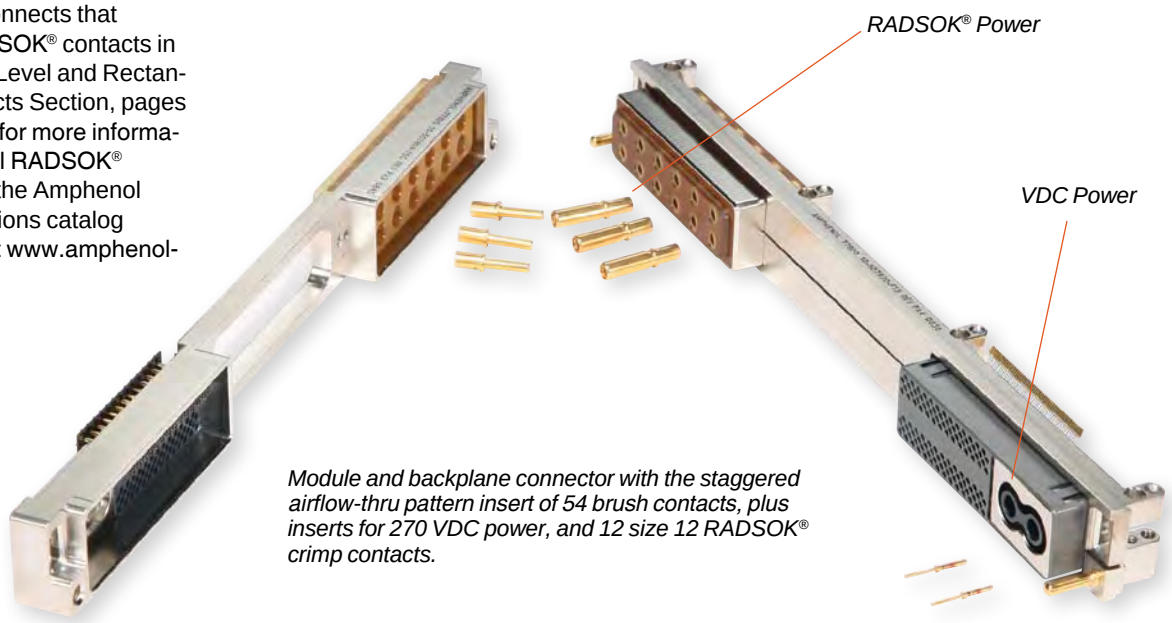
High Amperage RADSOK® socket contacts have been designed into LRM connectors in response to customer needs for passing of larger amounts of current with lower mating forces which standard contacts will not handle.

The connector design shown at right has 8 groups of 3 bussed RADSOK 3.6mm sockets (24 contacts total). Each group of 3 is expected to handle a maximum of 140A. Mating pins for the RADSOK® sockets are press-fit into aluminum bus bars behind the motherboard connector.

LRM inserts with RADSOK® high amperage contacts

The RADSOK® socket cylinder within female contact has several equally spaced longitudinal beams twisted into a hyperbolic shape. As the male pin is inserted, axial members in the female half deflect, imparting high current flow across the connection with minimal voltage loss. The hyperbolic, stamped grid configuration ensures a large, coaxial, face-to-face surface area engagement.

See more interconnects that incorporate RADSOK® contacts in the Other Board Level and Rectangular Interconnects Section, pages 124 & 125. Also, for more information on Amphenol RADSOK® connectors, see the Amphenol Industrial Operations catalog SL-391 on-line at www.amphenol-industrial.com.



Module and backplane connector with the staggered airflow-thru pattern insert of 54 brush contacts, plus inserts for 270 VDC power, and 12 size 12 RADSOK® crimp contacts.

NEW LRMS PROVIDE HIGHER SPEED DATA TRANSFERENCE

New/Featured Product

Amphenol's LRM connectors meet today's need for high speed interconnects for harsh environments. Constantly evolving and striving to meet the needs of higher data transfer rates within a board level product, Amphenol has developed LRM's to meet this challenge. These LRMs are designed, or can be configured, to achieve data rates up to 6.25 Gb/s and include all the features of our rugged and reliable staggered grid LRM series:

- Brush contact interface
- ESD protection (Level 2 flight line classification)
- Connector float
- Guide pins and polarization keys
- Metal shells
- Modular design (hybrid configuration available)
- Accepts wide range of board packages
- Accomodations for custom modular offsets

In addition, the new GigaStak™, GigaStak-LG™ and DigiStak™ Series incorporate Amphenol's cStack™ solderless termination technology (see page 35 for details).

Versatility

Unique flex and cStack terminations accommodate a variety of mounting configurations and a wide range of board packages. Connectors can terminate in a variety of ways:

- "traditional" 2 board/heatsink package
- to one or both sides of a single board
- as an offset board package

DigiStak module connectors allow mating to existing configurations of backplane connectors (users can upgrade solder termination module connectors to the solderless cStack termination).

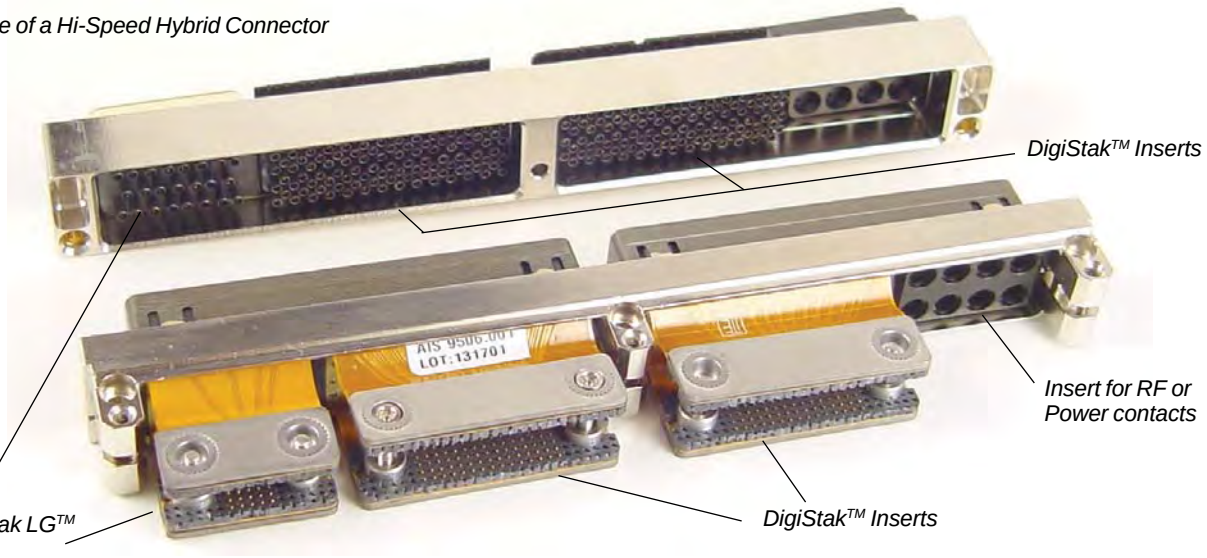
The Hi-Speed Family of LRM Connectors and associated data rates includes:

- Gigastak™ - 6.25 Gb/s
- Gigastak LG™ - 3.125 Gb/s
- Digistak™ & Digistak-X™ - 3.125 Gb/s
- Standard Staggered Grid - 1.25 Gb/s

GigaStak™ Hi-Speed Inserts (left & right: 60 Brush differential pairs; middle: 18 Brush differential pairs plus 180 Brush low speed signal contacts)

Hybrid Connector that has GigaStak-LG™ and DigiStak™ Inserts , shown on Testing Boards

Example of a Hi-Speed Hybrid Connector



GIGASTAK™- THE HIGHEST DENSITY HI-SPEED CONNECTOR

New/Featured Product

Amphenol has taken the proven and highly reliable LRM Brush connector and incorporated the cStack™ termination technology - giving the user hi-speed signal options up to 6.25 Gb/s and a solderless termination to their CCA.

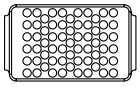
Through strategic placement of signal and ground contacts, each insert arrangement is optimized for the perfect balance of impedance control and cross-talk mitigation for a given data rate.

GigaStak™ Backplane Connector

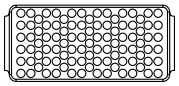
GigaStak Features:

- Hi-Speed connector designed for both single ended and differential signals
- Supports data rates of 6.25 Gb/s
- High density providing 30 differential signals per linear inch
- Designed for 100 ohm differential impedance
- Optimized cross-talk

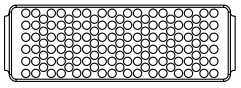
GigaStak Patterns



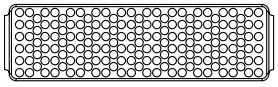
*24 Differential Pair**



*36 Differential Pair**

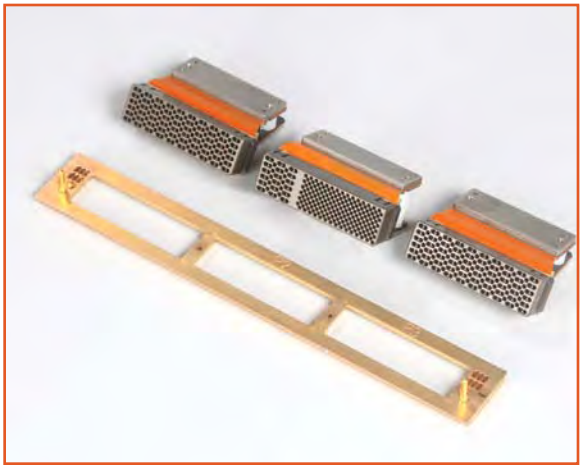


*48 Differential Pair**

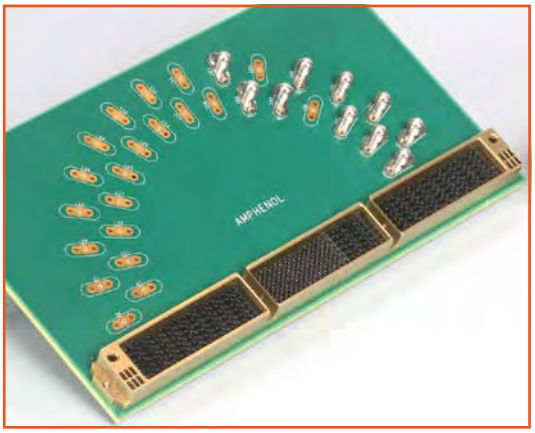


60 Differential Pair

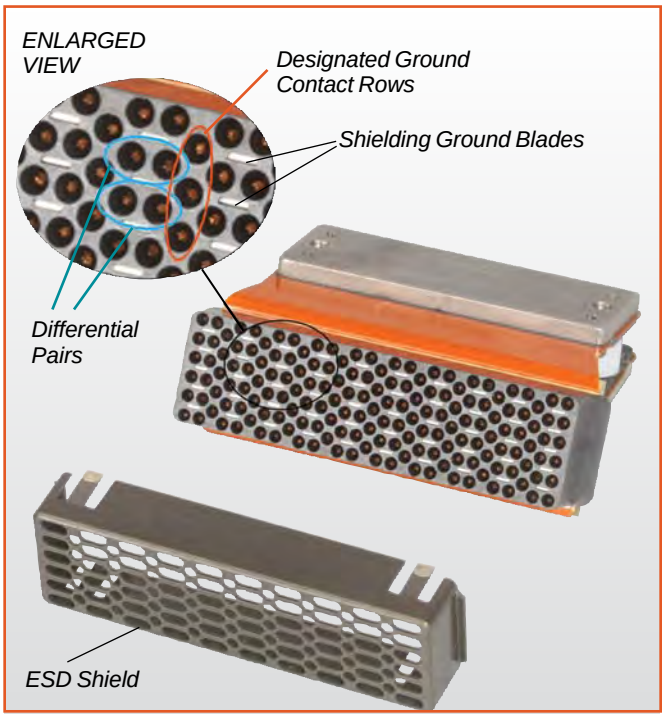
* Consult Amphenol for availability.



GigaStak™ Module Unassembled



Validation testing has been performed through both simulation (CST Microwave Studio) and actual testing of production connectors. Test reports, touchstone fles and hardware are available for review.



GigaStak 60 Differential Pair Insert with ESD Shield Exploded and Enlarged Section

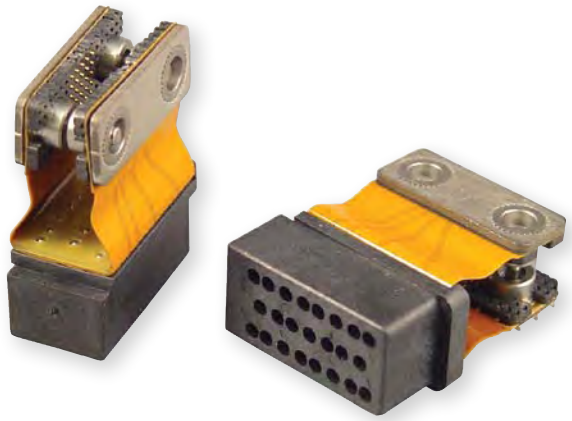
GIGASTAK-LG™

New/Featured Product

The GigaStak-LG™ inserts provide hi-speed data transference, utilzes cStack solderless termination, and can be combined with low speed signal contacts, as shown in the hybrid connector photo below.

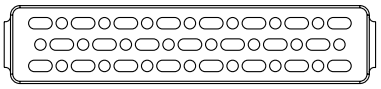
GigaStak LG Features:

- Hi-Speed connector designed for differential signals
- Supports data rates of 3.125 Gb/s
- Current Design has 8 differential pairs
- Provides 11 differential signals per linear inch
- Designed for 100 ohm differential impedance
- Optimized cross-talk

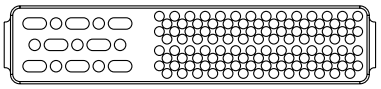


GigaStak-LG™ Inserts with 8 Hi-Speed Differential Pairs

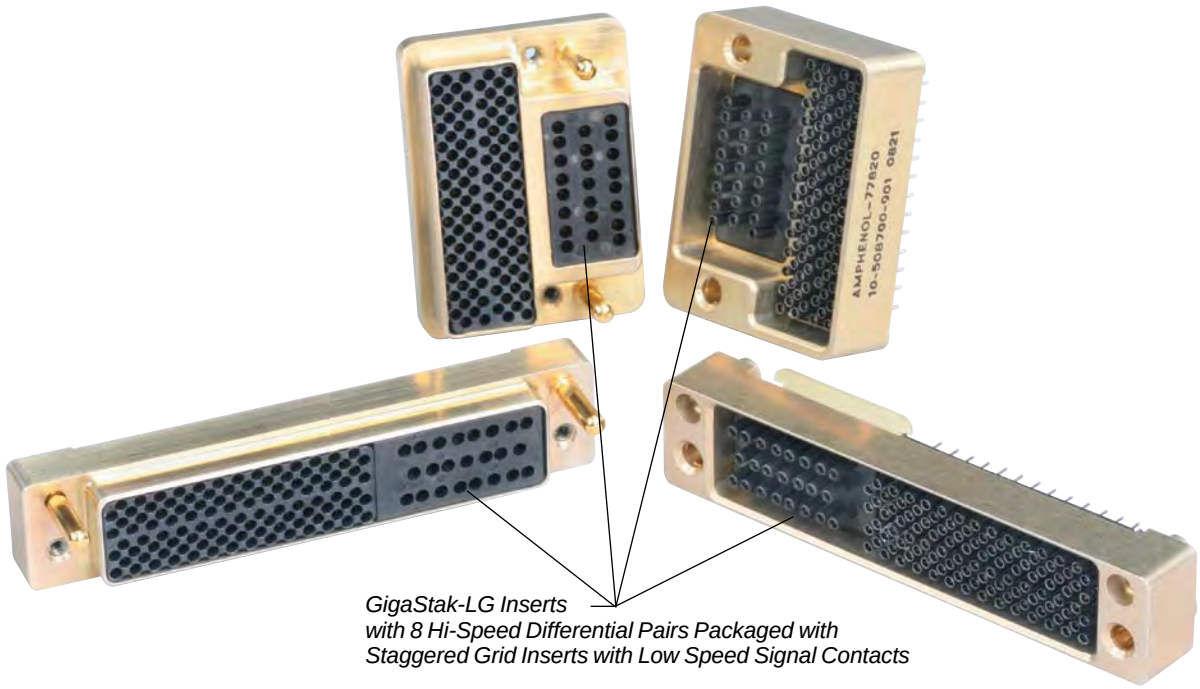
GigaStak LG Patterns



23 Differential Pairs

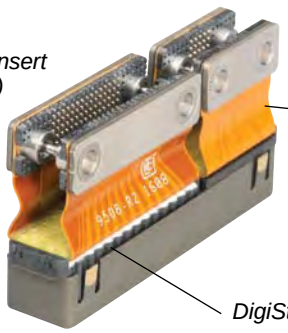


8 Differential Pairs and 108 Digital Contacts



GigaStak-LG Inserts with 8 Hi-Speed Differential Pairs Packaged with Staggered Grid Inserts with Low Speed Signal Contacts

Combined GigaStak-LG and DigiStak Insert (see next page for DigiStak description)



GigaStak-LG

DigiStak

New/Featured Product

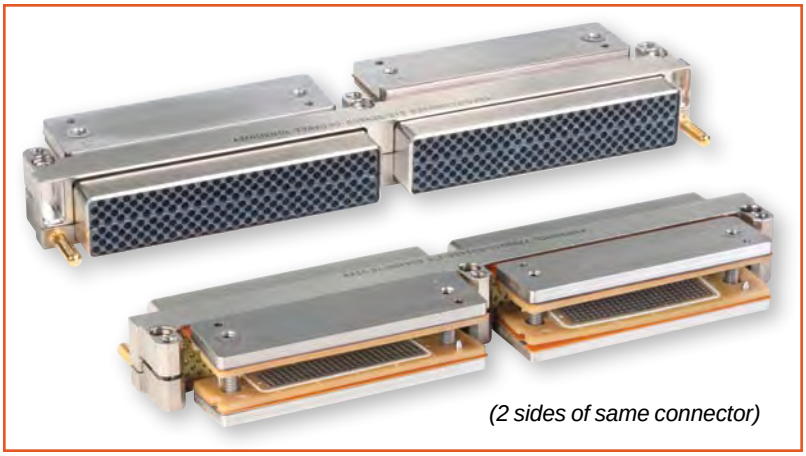
DigiStak™ Hi-Speed LRM Inserts

The DigiStak™ connector provides the standard staggered grid LRM pattern in a hi-speed connector that utilizes cStack solderless termination.

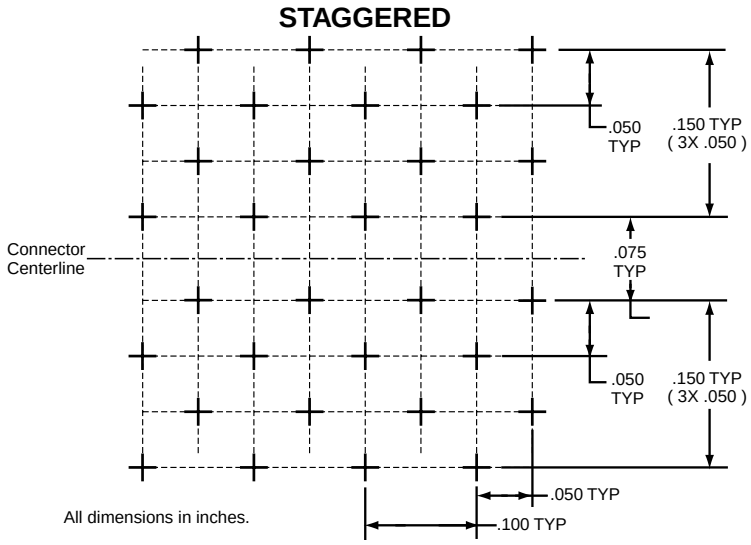
DigiStak Features:

- Designed to improve data rates in existing staggered grid LRM inserts
- Supports data rates of 3.125 Gb/s
- Configurable for up to 20 differential pairs per linear inch
- Designed for 100 ohm differential impedance
- Optimized cross-talk

The DigiStak uses standard staggered grid insert pattern shown at right. (Pages 19 and 20 show the arrangements of staggered grid connectors which are also available in the Digistak connector).

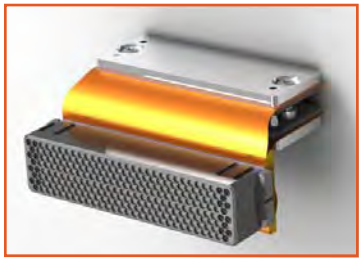


360 Pin DigiStak Module Connector



DigiStak-X™ Hi-Speed LRM Inserts

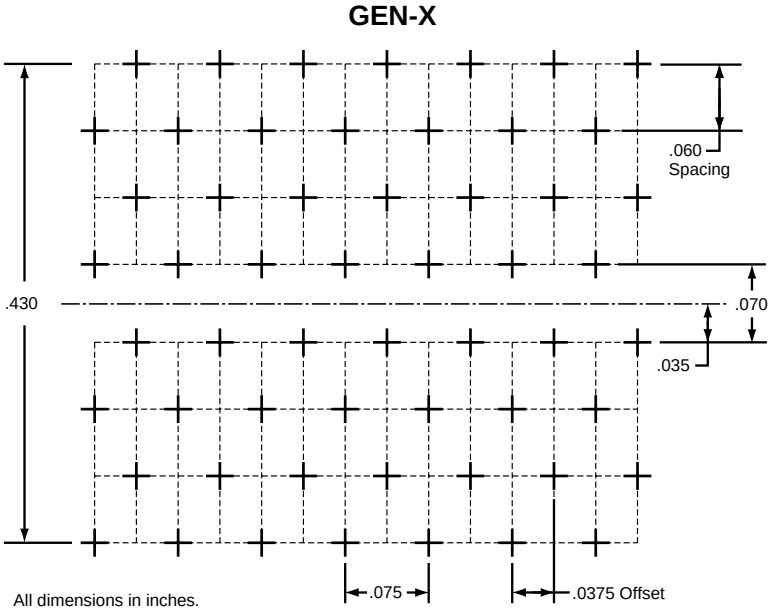
The DigiStak-X™ connector provides the GEN-X grid LRM pattern in a hi-speed connector that utilizes cStack solderless termination.



DigiStak-X Features:

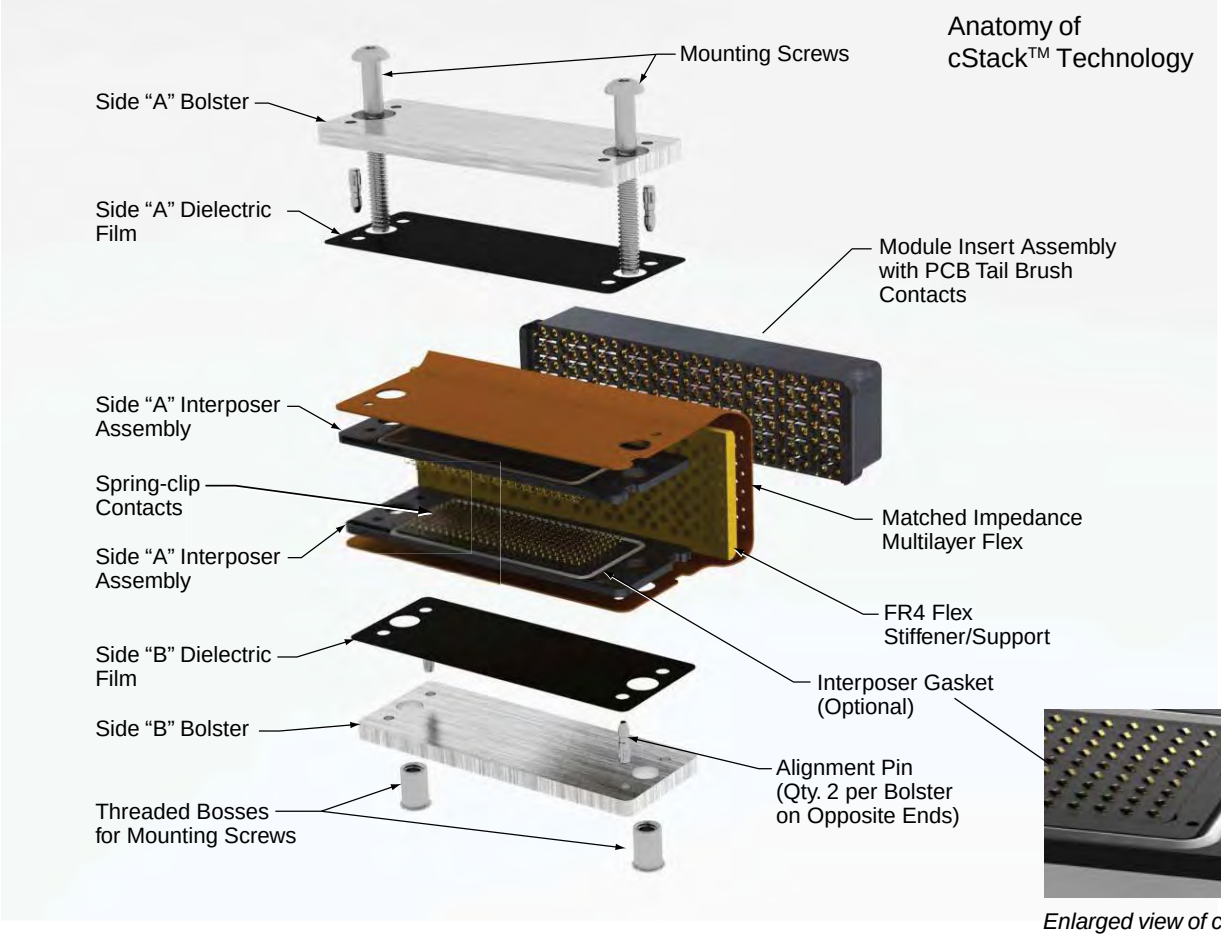
- Designed to improve data rates in existing GEN-X LRM inserts
- Supports data rates of 3.125 Gb/s
- Configurable for up to 20 differential pairs per linear inch
- Designed for 100 ohm differential impedance
- Optimized cross-talk

The DigiStak-X uses GEN-X LRM grid pattern shown at right (Page 26 shows the arrangements of GEN-X grid connectors which are also available in the Digistak-X connector.



CSTACK™ TECHNOLOGY

New/Featured Product



Enlarged view of cStack™ Contact

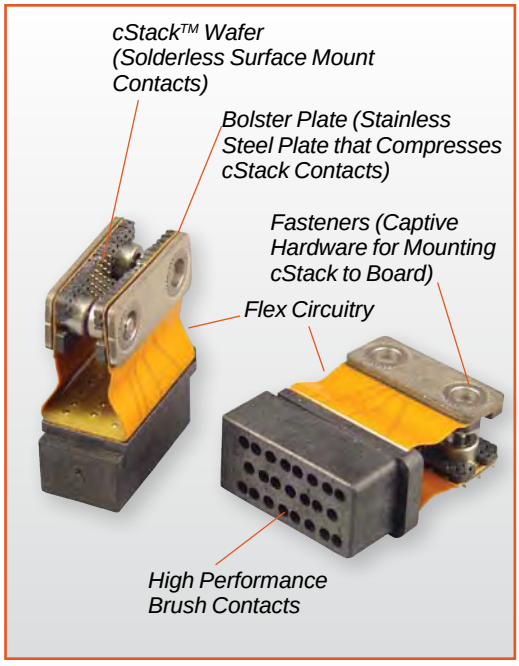
cStack™ Termination

GigaStak™, GigaStak-LG™, DigiStak™ and DigiStak-X™ series incorporate Amphenol's cStack™ termination which provides the following features and benefits:

- Flex circuit assemblies that provide high speed, impedance controlled performance with high signal integrity.
- Flex can be electrically and mechanically customized to fit system specifications.
- Allows solderless interconnection between flex and board, eliminating a principal reliability problem with traditional flex assemblies.
- Standard and customized hardware are available which allow fast, solderless interconnection with only screw attachment to boards. Hardware uses captive attachment screws, eliminating loose component pieces.

See more information on Flex Circuitry in the Other Rectangular Interconnects Section page 121 of this catalog.

cStack™ Technology for Hi-Speed LRM Connectors



Amphenol's Capabilities for Modeling and Testing Hi-Speed Contacts and Connectors

Signal Integrity

- Amphenol SI engineers apply their expertise at the system level and work hard-in-hand with design engineering

Modeling & Simulation

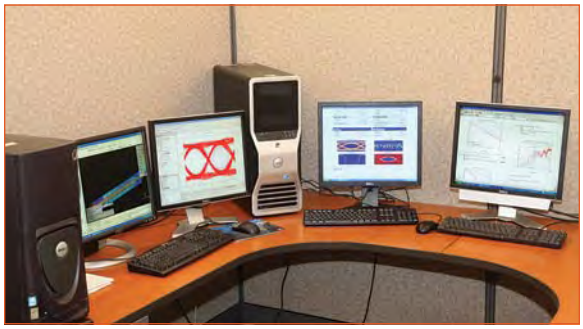
- Amphenol uses powerful modeling, simulation and analysis tools
- CST Microwave Studio
- Allows characterization of current designs
- Rapidly aids in development of new, high speed designs
- S-parameter and SPICE analysis

Test Capability

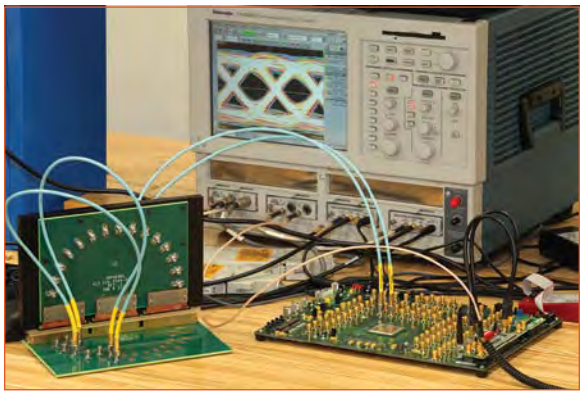
- System level (full thread) and "connector only"
- TDR with iConnect software
  - Capability for S-parameter to 15 GHz
  - Time domain/eye pattern to 10 Gb/s
- BERT to 6.5 Gb/s

Customer Support

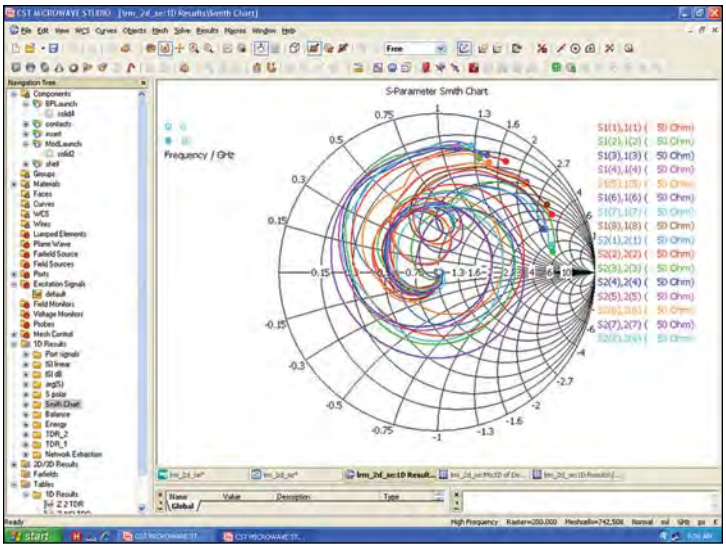
- Amphenol SI engineers directly support customers on their specific applications providing S-parameter data and Touchstone files



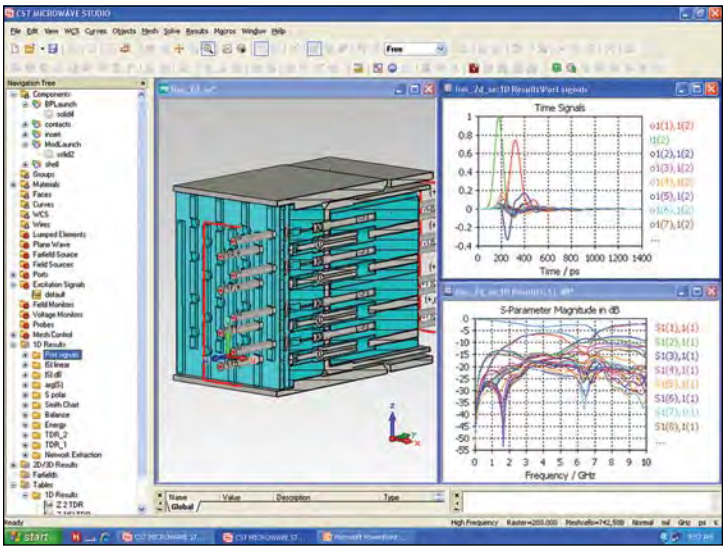
Hi-Speed Simulation Software used at Amphenol Aerospace.



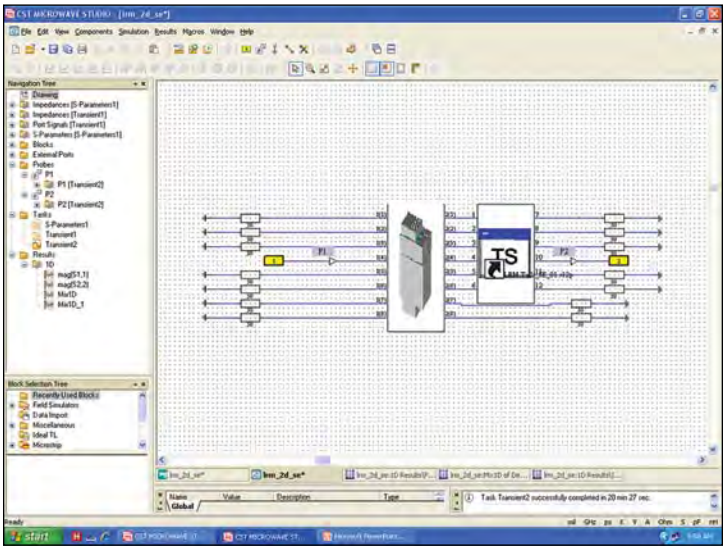
Test bench for LRM connectors. Computer screen shows a pass/fail mask test eye diagram.



Smith Chart



3DEM Model/S-Parameter



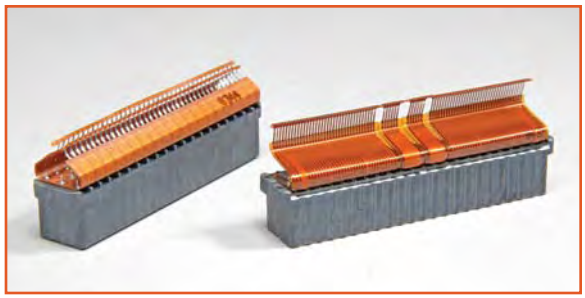
Circuit Simulation Schematic

FLEX CIRCUITRY, COMPLIANT PINS, PC TAIL CONTACTS

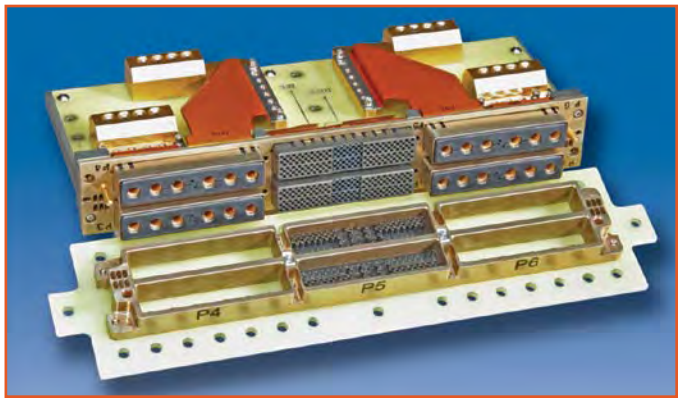
Flex Circuitry Used on LRM Connectors

Flex termination can be an integral part of the LRM connector insert as shown on top right photo or it can be used to attach the connector to the printed circuit board, as shown on next photo below.

When used for attachment to PC boards the flex circuitry is designed to meet specific length, current carrying capacity and to fit the precise geometric shape of the connector to board package. Amphenol APC (Amphenol Printed Circuits) designs and manufactures the flex circuitry. Sculptured® Flexible Circuits have built-in terminations which eliminate the failures associated with crimped or soldered-on contacts, as well as geometrically fitting the tight space requirements within a package. Flex material is strong and rigid, yet highly flexible. See page 121 in the Other Rectangular Products section for more information on Flex circuitry.



LRM module inserts with flex termination



Flex circuitry used to attach to PC boards - designed to fit specific board requirements

Compliant Pins

Compliant pin contacts are available for LRM backplane connectors. These are a press fit type contact which provide reliable, reduced cost, solderless mounting to printed circuit boards. Connectors are sold completely assembled with compliant pins and they accommodate boards with minimum of 0.125 inch thickness and 0.025 ±.002 plated through holes.

LRM backplane insert with compliant pins

LRM backplane insert with compliant pins for power contact termination

PC Tail Contacts

LRM modules can be designed with PC tail contacts for solder mounting on printed circuit boards or flex circuits. These are called I/O (input-output) LRM modules and have staggered grid pattern.

LRM module inserts (showing front and back of inserts) with PC tails in staggered grid pattern

ELECTROSTATIC DISCHARGE (ESD) PROTECTION

Amphenol has developed cylindrical and rectangular connectors which protect sensitive components from Electrostatic Discharge (ESD) without diodes, varistors, gas tubes, or "experimental" semiconductive materials.

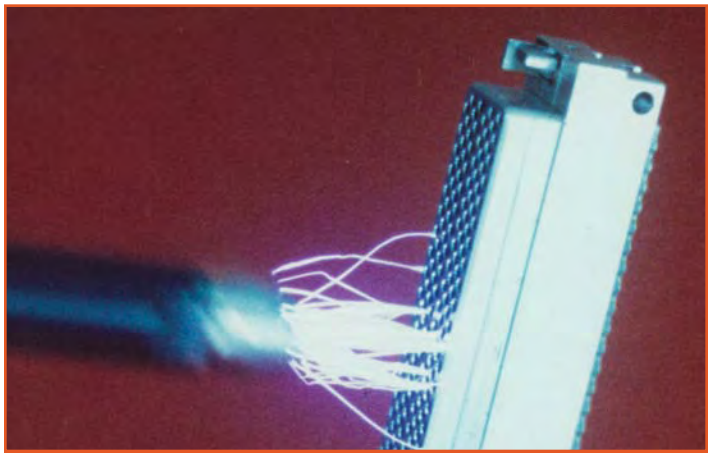
These connectors utilize the Faraday Cage principal to shunt electrostatic discharge events to the conductive enclosure on which the connector is mounted, thus never allowing the high voltage, high current discharge event to reside on any contacts.

The ESD protected connectors have the same physical envelope as their standard counterparts, and do not require special mounting or terminating techniques. All of the contacts remain fully functional, and electrical characteristics such as capacitance are not affected.

- LRM Connectors with ESD protection have the following features and benefits:
- Connector envelope is identical to unprotected design for most applications
- Exceeds protection requirements of IEC 801-2 and MIL-STD-1686:
  - Ensures that all components within a conductive enclosure are not subjected to more than 10V during electrostatic discharges between –26 KV and +26 KV
- Voltage observed on contacts during ESD events: <10V (at 1 megohm)
- Current observed on contacts during ESD events: < 100 milliamperes (at 2 ohms)
- Response time is instantaneous (voltage and current are maximum values)
- Maximum ESD voltage - tested to ±26KV
- No capacitive loading
- Eliminates the need for discrete components (such as diodes) and maximizes printed circuit board real estate for equipment housed in conductive enclosures which require ESD protection as freestanding units
- Operating voltage of connectors not effected for most designs
- Pulse life - infinite

ESD protection is standard on the Amphenol Ruggedized VME64x connectors (see page 43) and offers all the above features and benefits.

There are many drop-in replacement ESD protected connectors for retrofitting existing programs which have a conductive enclosure and require ESD protection as free-standing equipment.



ESD testing on LRM rectangular connector (actual photo)

What is Electrostatic Discharge (ESD)?

Electrostatic Discharge is the rapid transfer of a static electric charge from one body to another. A static electric charge consists of either a surplus or depletion of electrons on a body, which gives that body a potential or voltage relative to ground (or another body). The discharge is extremely fast (less than 1 nanosecond risetime) and the current flow may exceed 100 amps!

Static electricity is normally the result of two materials transferring charges when rubbed or separated, such as shoes scuffing across a dry carpet, or sheets of untreated plastic being separated. This phenomena is commonly referred to as the triboelectric effect.

The voltage developed due to the triboelectric effect depends on the materials involved, the quantity and type of contact, and relative humidity. In a dry environment a person can accumulate a charge of up to 25 KV. In a moist environment a person's potential is reduced due to the effect of moisture on the insulating properties of materials.

What is a Faraday Cage?

A Farady cage is a conductive enclosure. It may be solid in form such as a sheet-metal encloser, or it may be full of apertures, such as a wire cloth box. When a charge is placed on a faraday cage the electrons which make up the charge, having like polarity, try to position themselves as far as possible from each other. This places the electrons on the outer surface of the enclosure, leaving the inner surface uncharged. The charge on the outer surface does not induce a charge on any neutral object inside of the faraday cage, and therefore does not try to transfer itself onto the internal object. Neutral objects (such as IC's) inside of a faraday cage are thereby protected from ESD activity external to the faraday cage.

The voltage and current observed on neutral objects within a faraday cage during ESD events are due to the secondary effects of ESD. These include Electromagnetic Interference (EMI), magnetic and electrical field coupling. The faraday cage of the Amphenol ESD protected connectors has been designed to minimize these effects.

The Faraday cage on Amphenol ESD protected connectors intercepts electrostatic discharges from the contacts in the unmated state, while maintaining each contact's isolation when the connector is mated.

Publication L-2075, "ESD Attenuation Test Procedure for Connectors with Faraday Cage Protective Structures" is available as a reference document. Contact Amphenol Aerospace for any further information on ESD protection connectors.

TEST PROBE KITS

Test Probe Kit - For use with Amphenol Brush Contacts in LRM Connectors

Amphenol supplies a test probe kit especially designed for probing brush contacts to insure that they are properly wired within a connector. It consists of a plastic holder, insert, and two contacts which are usable for either the backplane or module connector. It is suggested that the user buy two kits if they are using connectors of two genders. The kits are not convertible after assembly.

Instructions for use of Backplane Test Probe -
Slide the insert back over the wire, and crimp contact on. Follow crimping procedure below. Then snap the insert contact assembly into the holder.

Instructions for use of Module Test Probe -
Slide holder over wire, and then crimp contact. Follow crimping procedure below. Slide the insert on the contact and seat it against the shoulder. Slide the holder forward and snap it onto the insert.

Crimping Procedure -
Using accepted industry procedures, strip wire end to be terminated 1/8 to 5/32 inches. Care should be taken not to nick wire strands. Assemble the M22520/2-01 crimp tool and M22520/2-27 positioner and place tool selector in correct setting for wire size. Selected wire size must not have an insulation diameter greater than .062 for the module probe and not greater than .038 for the backplane probe.

AWG	22	24	26	28
SEL	5	4	3	2

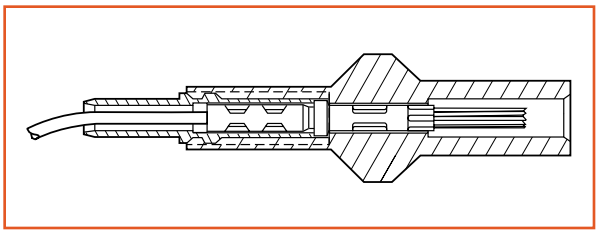
Insert stripped wire end into contact wire well. Strands should be visible in wire well inspection hole. Bottom contact and wire assembly in positioner and close handles of crimp tool to complete crimp. Handles will not open unless full crimping cycle has been completed.

Part number for ordering test probe kit is 11-10400-23.

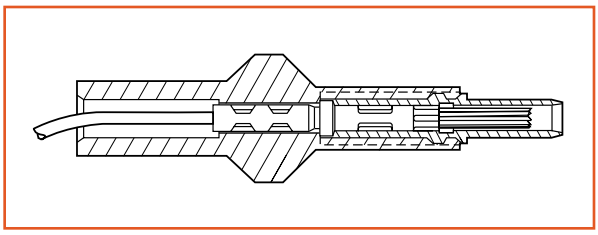
ATTENTION:

Probing brush contacts with anything other than a brush contact may damage or degrade the brush contact performance.

Test probe kit 11-10400-23 components



Test probe for brush contact in LRM backplane



Test probe for brush contact in LRM module

Brush Contact Removal, Replacement and Insertion for Backplane Staggered Grid Connectors

Contacts with solder tails within backplane LRM connectors with staggered grid are not removable or replaceable. User must replace the insert assembly.

Compliant tail type contacts within backplane LRM connectors with staggered grid are removable and replaceable.

Instructions for removal of compliant contacts: From the back of PC board side, push contact out through the front of the connector assembly with contact removal tool #10-507941-1.

Instruction for replacement/insertion of compliant contacts: Using tweezers or fingers, carefully place the replacement contact, tail first, into the appropriate contact cavity in the front of the connector. Tweezer tip must not enter sleeve. Push contact into the cavity with a flat edged rod of suitable diameter to cover entire contact sleeve circumference until contact sleeve is flush with adjacent contacts. Do not push against wires or bend sleeve.

Removal tool 10-507941-1 for removing compliant contacts from LRM backplanes

270 VDC Power Module Removal, Replacement and Insertion for Backplane Staggered Grid Connectors

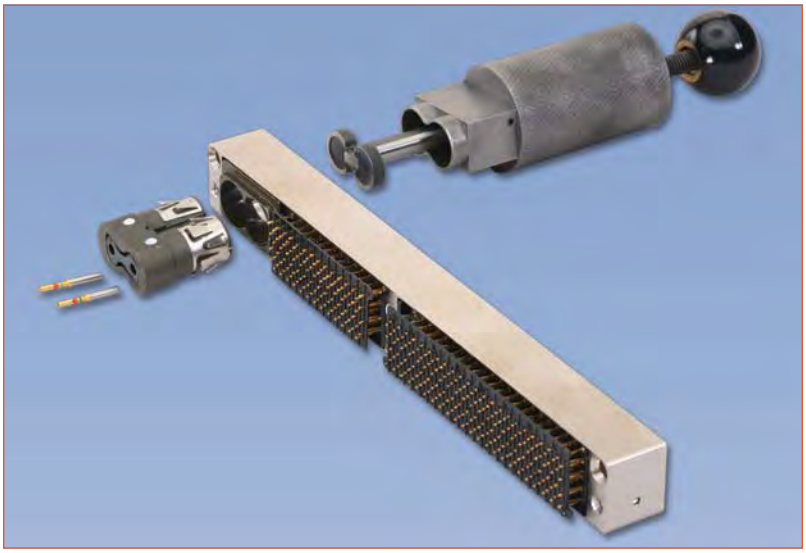
270 VDC power modules can be removed and replaced within the power insert of an LRM connector.

Instructions: Using removal tool #10507924-1 with plunger retracted, push tool down over the power module from the mating end until retention tines are released. Use plunger end of tool to push power module out of the rear the connector.

The power module may be re-installed by hand by pushing it from the rear of the connector. Push it forward until the retention clips snap into the power insert cavity of the shell.

The size 22D power contacts within the power modules are installed and removed with tool M81969/14-01.

Removal tool 10-507924-1 (plunger retracted) for removing 270 VDC power modules from LRM backplanes



Exploded view - tool 10-507924-1 has removed power module from backplane. (size 22D contacts shown removed)

For Module Staggered Grid Connectors:

Contacts within module LRM connectors with staggered grid are not removable or replaceable. User must replace the insert assembly.

Aid in Selection and Ordering of LRM and LRU Interconnects from Amphenol

Amphenol Aerospace

A FORM THAT CAN BE COPIED AND FAXED TO AMPHENOL

The following are questions to be considered when inquiring about Amphenol LRM/LRU Interconnects. The answers to these questions will help the Amphenol marketing and engineering team to determine the best board level interconnect to meet your particular needs.

You can copy this page and write your comments on it, and then fax it back to Amphenol Aerospace, Sidney, NY. Include your name and company information at the bottom. Fax number: 607-563-5351, Attn: LRM product marketing. Or call Amphenol at 607-563-5011 and ask for technical information on LRM products.

Footprint Required:

Staggered, GEN-X, NAFI, UHD, Chevron, VME or other: _____

_____

Contacts Required:

- Digital: _____
- Fiber Optic: _____
- Power: _____
- RF: _____
- LVDS: _____

Module Requirements:

Heatsink Thickness: _____

- Total Board Package Thickness: _____
- Pitch (module to module): _____
- Straddle Mount, Clamshell or Right Angle: _____
- Cover Attachment: _____
- Keying: _____

Backplane Requirements:

- Termination Style: _____
- Termination Stickout (Compliant or Solder): _____
- Shell Grounding: _____

Function Requirements:

Operating Voltage: _____

- Operating Temperature: _____
- Current Rating: _____
- Ambient Temperature: _____
- Mating Cycles: _____
- ESD: Yes or No _____
- Float: Yes or No _____
- Humidity Conditions: _____

Function Requirements:

Level of Corrosion Resistance: _____

- Vibration Requirements: _____
- Shock Requirements: _____
- EMI/EMP: _____
- Altitude: _____
- Durability: _____
- Salt Fog: _____

Please fill out information below. Thank you for writing clearly. Fax to 607-563-5351, attention: LRM product marketing.

First Name	Last Name	Phone Number	Date
Title	Dept./Mail Stop	Fax Number	
Company Name	Address		
City	State	Zip Code	Email Address

Amphenol
Ruggedized VME64x, VITA 60, 66 Interconnects

TABLE OF CONTENTS

Amphenol Ruggedized VME64x & VITA 60/ VITA 66 Interconnects

VME & VITA Typical Markets:

- Military & Commercial Avionics
- Military Vehicles
- Missiles/Ordnance
- Missile Defense
- C4ISR
- Radar

Amphenol Aerospace

FOR ATTACHMENT TO VME64X PRINTED CIRCUIT BOARDS

Amphenol Aerospace developed the Ruggedized VME64x in response to the military trend towards VME64x and the utilization of COTS Boards and Chassis.

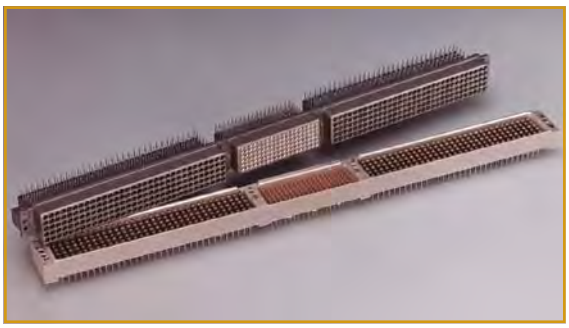
Many different companies manufacture “Ruggedized VME cards”, but they still use the standard VME COTS (Commercial Off The Shelf) connector interface. In a harsh militaryenvironment the COTS VME connector interface can fail, negating the ruggedization of the cards.

The Amphenol Ruggedized VME64x interconnect has a more rugged interface than standard connectors for improved vibration durability. It meets the needs for a harsh environment connector requiring Level 2 maintenance. Military and commercial aviation, military vehicles and GPS systems are examples of markets that need the ruggedized VME64x connector solution from Amphenol.

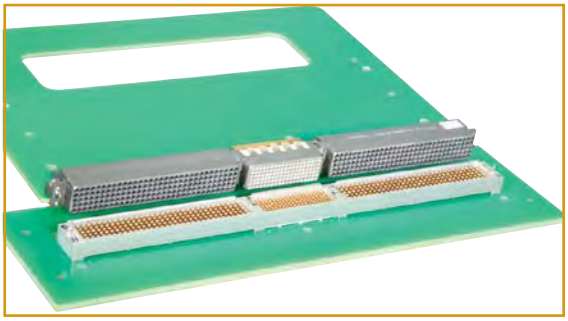
The Amphenol Ruggedized VME64x connector mounts to standard VME64x cards and backplanes, but it does not mate to other types of VME commercial connectors.

Features and benefits include:

- Metal shells - mount directly to the standard VME card mounting holes, providing support and protection to the inserts in the module and additional stiffness to the backplane
- The metal shells create a faraday cage around the contacts, preventing ESD (Electrostatic Discharge) into the contacts (module only)
- Robust contact system
- 3 module inserts in one unified shell; each can have different interconnect combinations:
  - P1, P2 and 2mm electrical P0
  - P1 and P2 combination
  - P1, P2 and fiber optic MT ferrules in the P0 position
- Inserts are designed to customer specifications
- Thru-hole solder tail or solderless termination is available on the backplane connector.



Amphenol’s ruggedized VME64x module and backplane connectors were developed to meet more rugged harsh environment applications.

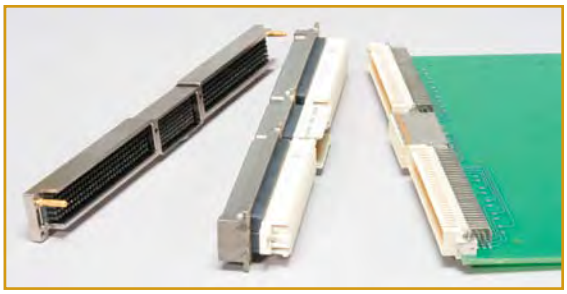


Ruggedized VME64x module and backplane connectors on a circuit board.

Ruggedized VME64x Adapter with Brush Contacts

“Cocooning” of COTS components has been successful in military applications. Amphenol supplies an adapter interconnect system for “cocooning” of COTS VME64x daughtercards.

The ruggedized VME64x adapter system provides the durable brush contact as the primary interface, and integrates the three connectors into a singular metal shell, providing passive ESD protection to the module connector. The back of the module connector mates to standard COTS VME64x daughtercards, isolating them from harsh environments.



Ruggedized VME64x backplane (left), and module adapter (center) and a typical COTS VME64x circuit board (right).

New/Featured Product

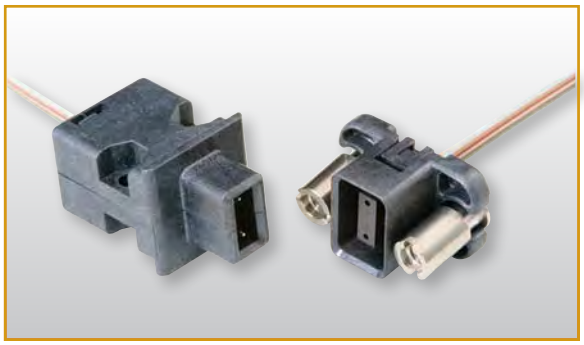
VME P0/J0 Fiber Optic Interconnects

Amphenol provides a fiber optic interconnect for attachment to standard VME-64x cards and backplanes for the P0 and J0 locations of the boards. It uses "MT" ferrules and it is used in place of P0/J0 electrical applicable connectors. MT ferrules are not supplied by Amphenol. Connectors are supplied less the MT ferrules.

Performance features include:

- Tested to IEEE 1156.1-1993
- Operating temperature from –55°C to +125°C
- Shock: 100g, 6ms, 1/2 sine, 18 pulses
  Shock: 30g, 6ms, 1/2 sine, 18 pulses
- Sine vibration: 10g, 40 min./axis, 3 axis
- Random vibration: 0.15g^2 Hz, 40 min./axis, 2 axis
- ESD: 15KV/150 pF

Amphenol's VME P0/J0 fiber optic connectors are used in military and commercial aviation, military vehicles and GPS systems. They are designed to customer specifications. Consult Amphenol Aerospace for further information.



VME P0/J0 Connectors with MT ferrule fiber optics

VME P0/J0 Module MT Connector Part Number	VME P0/J0 Backplane MT Connector Part Number
10-509050-011	10-509050-041

VITA-66.1 Fiber Optic Interconnects

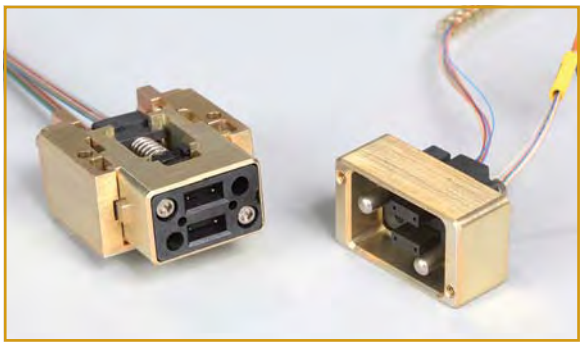
Amphenol's proposed VITA-66.1* MT connector provides a reliable high speed connection for the most extreme commercial and military environments.

This ruggedized interconnect is among the highest density of connector products on the market.

MT ferrules can be accommodated as follows:

- Up to 24 fiber optic channels per MT ferrule
- Up to 48 channels per connector

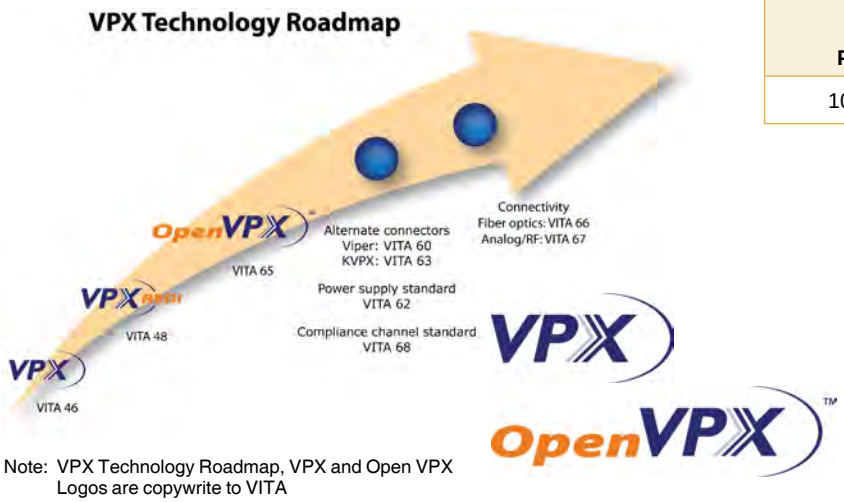
MT ferrules are not supplied by Amphenol. Connectors are supplied less the MT ferrules.



VITA-66.1 Connectors with MT ferrule fiber optics

VITA-66 Connectors	
Module MT Connector Part Number	Backplane MT Connector Part Number
10-504637-004	10-504639-002

Amphenol's VITA 66.1 Interconnect is Designed in accordance with the VPX Technology Roadmap



Note: VPX Technology Roadmap, VPX and Open VPX Logos are copywrite to VITA

* VITA-66 supersedes VITA-46.

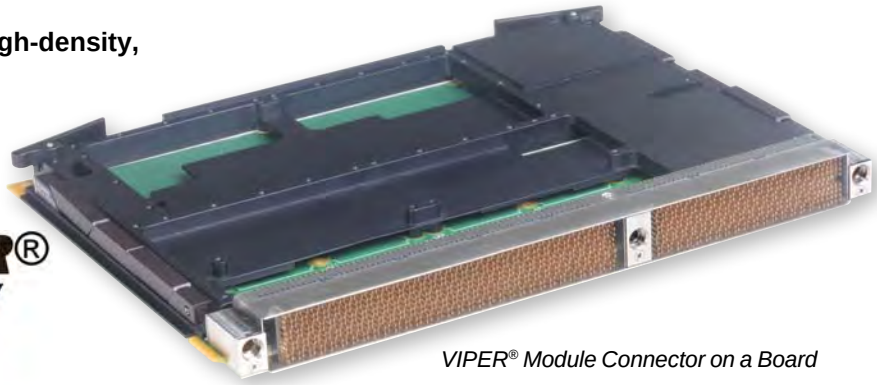
VITA 46, VITA 48 & VITA 60 FOOTPRINT COMPATIBLE

New/Featured Product

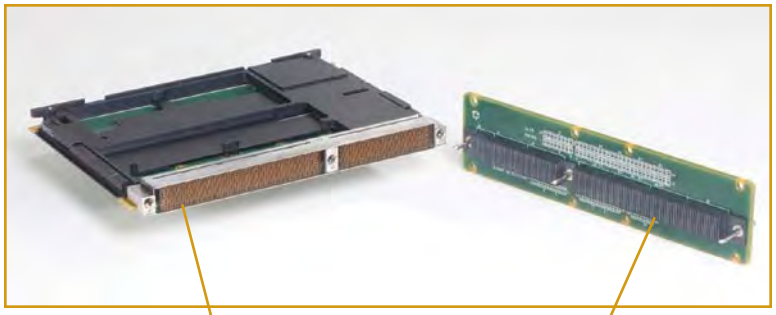
The VIPER® Connector is a shielded, high-density, high speed modular interconnect with press-fit termination.

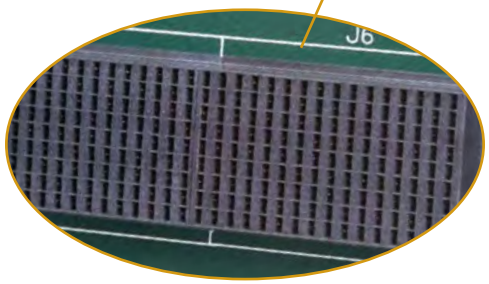
Amphenol Backplane Systems* developed the VIPER interconnect platform to meet or exceed future avionic high-level requirements such as:

- High-level vibration and mechanical shock protection
- Condensing moisture resistance
- Ruggedization in packaging that can scale to higher bandwidths without costly and time-consuming chassis redesigns. The VIPER connector platform offers the ability to scale from 80 Mbps to over 10 Gb/s while retaining the same Vita 46 platform slot pitch at 20.3mm to 25.4mm.

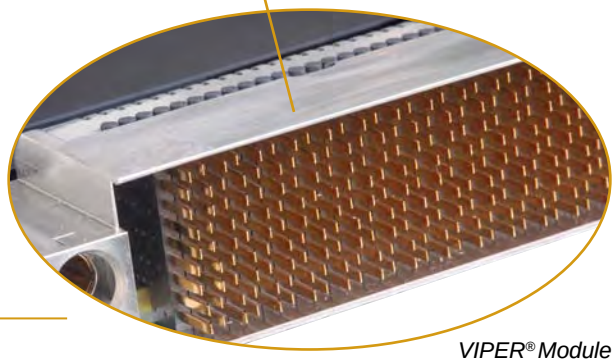


VIPER® Module Connector on a Board





VIPER® Backplane Closeup



VIPER® Module Closeup

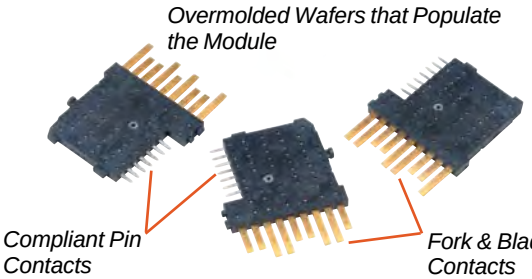
Key Features of VIPER®

- Fully footprint-compatible with VITA 46 and VITA 48 standards
- Hi-Speed: the VIPER is designed for 10 + Gb/s data rate performance
- 100 ohm impedance for differential pair configuration
- The daughtercard assembly is optimized for differential pair architecture on a 1.8mm x 1.35mm grid.
- The daughtercard is waferized, and provides single-ended and power wafer options integrated onto a stainless steel stiffener with stainless steel frame** and keying elements
- The backplane has signal contacts that incorporate a highly reliable 4-point-of-contact beam design, and ground contacts which are robust compliant pin & contact fork design
- ±0.52mm nom. translation in fully mated condition
- ESD protection supports 2-level maintenance designs
- Flexible modular design is ideal for standard 3U and 6U applications, as well as unique custom configurations incorporating RF and fiber optic MT solutions

Amphenol's VIPER® Interconnect is Designed in accordance with the VPX Technology Roadmap

VPX

OpenVPX™



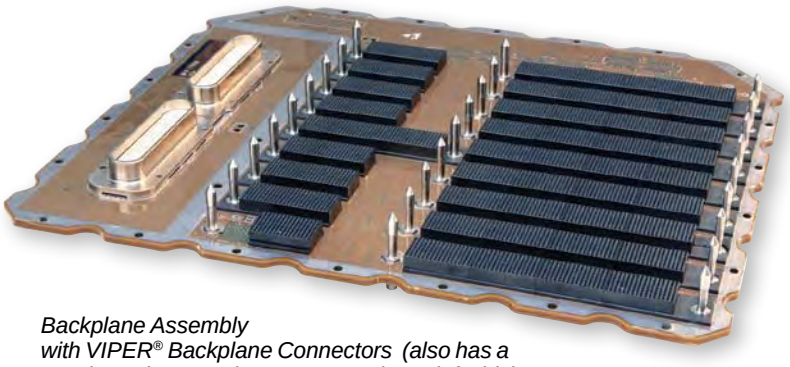
* Consult Amphenol Backplane Systems for more information on VIPER® Interconnects:
Amphenol Backplane Systems, 18 Celina Avenue, Nashua, NH 03063
Phone: 603-883-5100. Website: www.amphenol-abs.com

** Light-weight alternative available; consult Amphenol Backplane Systems.

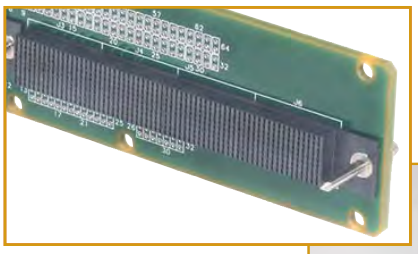
New/Featured Product

VIPER® Electrical Specifications

- Data Rate: 10 Gbps
- Differential Impedance: 100 ohms
- Differential Insertion Loss: –5 dB up to 5 GHz (10 Gbps)
- Differential Return Loss: – 5 dB up to 5 GHz (10 Gbps)
- Far End Crosstalk: –35 dB up to 8 GHz
- Near End Crosstalk: –33 dB up to 8 GHz
- Signal Contacts: 1 amp
- Power Wafer: 12 amps per wafer at 30° C T-Rise
- Compliant Pin to Plated Through Hole Resistance: 1 milliohm max
- Dielectric Withstanding Voltage: 500 volts RMS
- Insulation Resistance: 1000 megohms



Backplane Assembly with VIPER® Backplane Connectors (also has a Brush Rack & Panel Connector Pair on left side)*



One VIPER® Backplane on a Board

VIPER® Mechanical Specifications

- Signal and Ground Contact:
  - Normal Force: 85 grams per beam
  - Engagement force: 45 grams max, 35 grams typical
  - Separation force: 30 grams max, 25 grams typical
  - Durability: 500 cycles minimum
- Backplane Signal and Ground Compliant Pin:
  - Insertion Force: 4.9 kilograms maximum; 1.5 kilograms to 4.9 kilograms depending on the surface finish of PCB
  - Retention Force: 1.4 kilograms minimum
- Daughtercard Wafer Compliant Pin:
  - Insertion Force: 1.8 kilograms to 3.6 kilograms depending on the surface finish of PCB
  - Retention Force: 1.6 kilograms minimum
- Radial hole wall deformation: 0.04mm per side measured from drilled hole
- Axial hole wall deformation: 0.03mm measured in the vertical plane
- Translation: ±0.52mm nom. fully mated
- Slot Pitch: 20.30mm

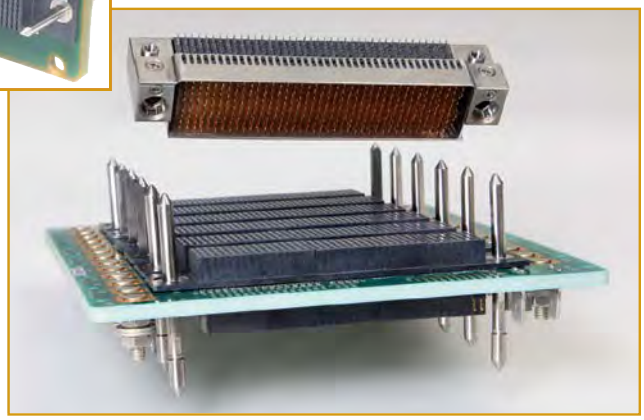
VIPER® Environmental Specifications

- Temperature: ›55°C to 125°C
- Random Vibration: 90 minutes per X, Y and Z axis at 0.6 G^2/Hz
- Mechanical Shock: 50 G'rms in Y axis, 80 G'rms in X and Z axis, 11 milliseconds, half sine
- Temperature Life: 1000 hours at 125°C

Printed Circuit Board Specifications

- Minimum Backplane and Daughtercard thickness: 1.85mm and 1.53mm
- Daughtercard pattern primary drilled hole size: 0.55mm
- Daughtercard pattern finished hole size: 0.46 ±0.05mm
- Backplane pattern primary drilled hole size: 0.65mm
- Backplane pattern finished hole size: 0.56 ±0.05mm

* See pages 96-98 for Amphenol Rack and Panel Connectors with Brush contacts.



Six VIPER® Backplane Connectors on a Board and one Mating Viper® Module above

VIPER® Materials and Finishes

Backplane Signal and Ground Contacts: C7025 copper alloy, 0.23mm. Finish is 0.00127mm nickel minimum all over per SAE-AMS-QQ-N-290, Class I. Selective 0.00127mm gold minimum per ASTM-B488, Type II, Grade C, Class 1.27 in the mating area. 0.0076mm 60/40 reflowed tin/lead minimum selectively plated in the compliant pin area.

Differential, Power, and Single-ended Daughtercard Wafer Leadframes: C7025 copper alloy, 0.38mm. Finish is 0.00127mm nickel minimum all over per SAEAMS-QQ-N-290, class I. Selective 0.00127 gold minimum per ASTM-B488, Type II, Grade C, Class 1.27 in the mating area. 0.0076mm 60/40 reflowed tin/lead minimum selectively plated in the compliant pin area.

Backplane Insulators and Daughtercard Wafer Insert Mold Material: Glass reinforced polyester (Liquid Crystal Polymer), UL 94V-0, color black.

Front and Rear Stiffeners: Stainless steel, 0.6mm, Type 301, 1/2 Hard. finish per Mill 2B.

Backplane Guide Pin: Stainless steel, Type 303, passivated.

Daughtercard Connector Header and Keying Components:** Stainless steel, Type 440, passivated.

** Light-weight aluminum header version is available. Consult Amphenol Backplane Systems.

Amphenol
High Density HDB³/HSB³ Connectors

TABLE OF CONTENTS

HDB³ and HSB³ Typical Markets:

- Transportation
- Medical Equipment
- Military & Commercial Avionics
- C4ISR
- UAVs
- Naval
- High Definition Cameras

Amphenol Aerospace

New/Featured Product

Amphenol's HDB³ High Density Brush Series with Tighter (.070 inch X .060 inch) Staggered Grid Spacing

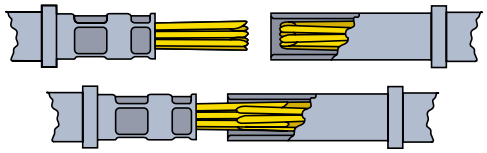
This new connector series of brush connectors incorporates a higher density contact pattern and lower mated height than Amphenol's standard low mating force rectangular connectors. HDB³ connectors utilize the same durable and reliable B³ brush contact in a tighter .070" X .060" staggered grid pattern.

HDB³ Advantages over Competitive Connectors:

- Higher density contact pattern
- Uses less board space
- Allows for shorter mated height
- Provides the durability and performance of the Brush contact
- Low cost

AMPHENOL'S BRUSH CONTACT - THE SUPERIOR CHOICE FOR BOARD LEVEL INTERCONNECTS

BRUSH CONTACT



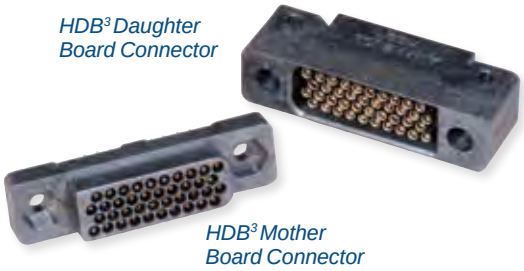
Multiple strands of high tensile strength wire bundled together to form brush-like contacts. See Brush Contact Technology section of this catalog for further description.

CONVENTIONAL PIN AND SOCKET CRIMP CONTACT

AMPHENOL HDB³ COMPARED TO COMPETITION			
Connector Features	Amphenol HDB3	Hypertronics HPH	Airborn RM4
Contact System	Brush	Hyperoloid	Pin & Socket
Durability, Mating Cycles	100,0000	2,000	500
Contact Mating Forces (ounces)	1.5	1.5	2.5
Mother Board	.070 X .060	.075 X .075	.075 X .070
Daughter Board	.070 X .060	.075 X .100	.075 X .100
Connector Width	.350	.443	.400
Mated Height, MB to 4th row of DB	.680	.986	.915

HIGH DENSITY STYLES

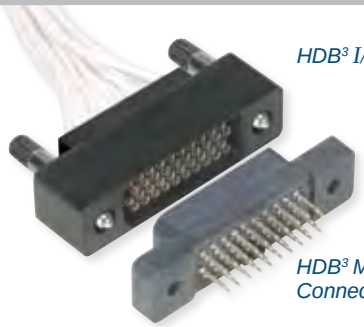
HDB³ Daughter Board/Mother Board



HDB³ Daughter Board Connector

HDB³ Mother Board Connector

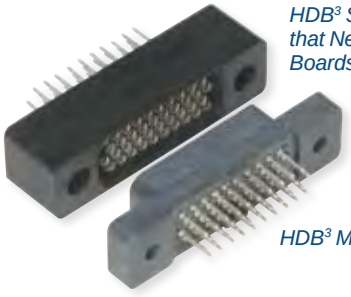
HDB³ I/O Connector



HDB³ I/O Connector

HDB³ Mother Board Connector

HDB³ Stacker

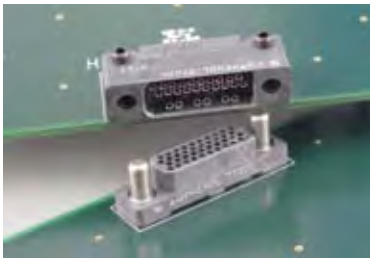


HDB³ Stacker for Applications that Need or Demand Parallel Boards

HDB³ Mother Board Connector

HSB³ High Speed

HSB³ High Speed Connectors are Capable of 6.250 Gbps

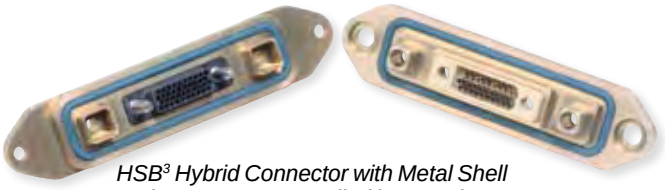


HBD³ 120 pin Mother Board and Daughter Board

HDB³ & HSB³ HIGH DENSITY CONNECTOR PERFORMANCE:

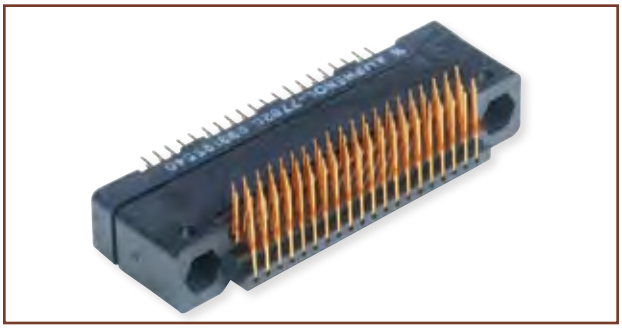
Durability	100,000 mating cycles
Insertion/Extraction Force:	1.5 ounce typical per contact
Operating Temperature:	-65° to 125°C
Current Rating:	2 amperes Hot swap 1 ampere maximum (load dependent)
Insulation Resistance:	5 gigaohms minimum
Dielectric Withstanding Voltage:	750 volts, 60 hertz, rms @ Sea Level, 250 volts, 60 hertz, rms @ 70,000 feet elevation
Solderability:	MIL-STD-202, Method 208
Salt Fog:	48 Hours IAW MIL-STD-1344, method 1001, test condition B
Humidity:	IAW MIL-STD-1344, method 1002, type II
Vibration:	4 hours in each of 3 mutually perpendicular axes IAW MIL STD-1344, method 2005, test condition V, letter H
Shock:	1 shock along each of three mutually perpendicular axes IAW MIL-STD-1344, method 2004,test condition G
Data Rate (HSB³):	Capable of up to 6.250 Gbps (consult Amphenol for arrangement)

CUSTOM DESIGN AVAILABILITY:



*HSB³ Hybrid Connector with Metal Shell and RF Contacts supplied by SV Microwave**

* See more information on SMPM RF contacts in Other Rectangular Interconnects Section, page 126. SMPM RF contacts can be supplied by Amphenol SV Microwave. Phone: 561-840-1800 Website: www.svmicrowave.com



HDB³ Mother Board and Daughter Board Mated

HDB³ & HSB³ HIGH DENSITY CONNECTOR FEATURES:

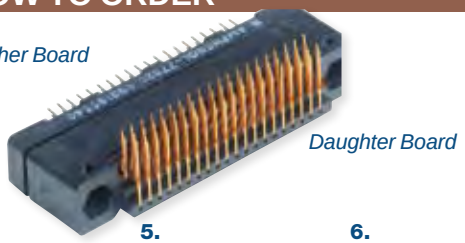
Polarization:	"D" shaped design
Keying:	Optional keys offer 36 unique keying combinations
Guide Pins	Optional guide pins provide additional alignment
Radial Misalignment:	Capable of correcting up to a 020" initial radial misalignment
Angular Misalignment:	Capable of mating with up to a 2° initial angular misalignment

MATERIALS:

Insulator:	Liquid crystal polymer, 30% glass filled
Contact: Wire:	Beryllium copper per ASTM B197; finish is gold per ASTM B488 over nickel per AMS-QQ-N-290
Holder:	Brass similar to UNS C33500; available finishes include gold per MIL-G-45204, tin-lead per MIL-P-81728 or tin per MIL-T-10727 (RoHS Compliant)
Sleeve:	Stainless steel per AMS-5514, passivated IAW QQ-P-35 (Daughter-board, I/O and Stacker connector)

HDB³ MOTHER BOARD - HOW TO ORDER

Mates with:
- Daughter Board
- I/O
- Stacker



1.	2.	3.	4.	5.	6.
	Number of Contacts	Brush Wire Plating	Termination	Contact Termination Finish	Less Hardware (Purchased separately see pg XX for hardware options)
HDB-M4	-040	M	24	2	X

1. Connector Type

HDB-M4

Designates HDB³ Mother Board

2. Number of Contacts

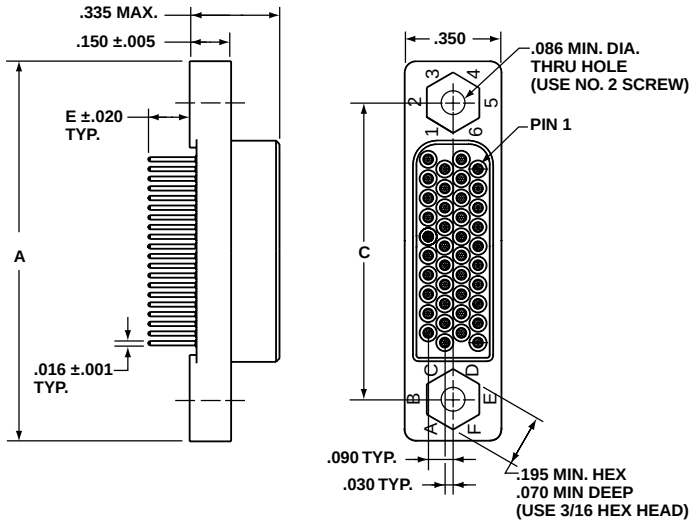
	Number of Contacts	Dimension A	Dimension C
040	40	1.375	1.075
060	60	1.725	1.425
080	80	2.075	1.775
120	120	2.775	2.475
160	160	3.475	3.175

3. Brush Wire Plating

M	0.000050 Au Min. thick over Nickel
C	0.000020 Au Min. thick over Nickel

4. Termination

	Type	Stickout (Dim. E)
22	PCB, Straight, .016 Dia	0.120
23	PCB, Straight, .016 Dia	0.150
24	PCB, Straight, .016 Dia	0.180
26	PCB, Straight, .016 Dia	0.240
28	PCB, Straight, .016 Dia	0.300



5. Contact Termination Finish

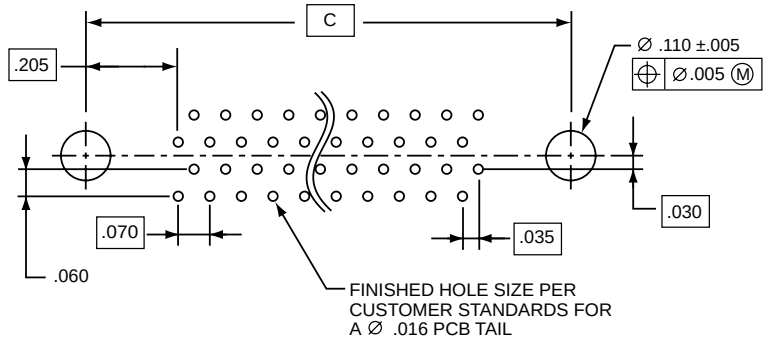
2	Gold plated in accordance with MIL-G-45204, Type II, .000030 Min. thick Gold over .000050 Min. thick Nickel
5	Tin plated in accordance with ASTM B545, .00010 Min. thick Matte Tin over .00010 Min. thick Nickel
6	Tin-Lead plated in accordance with SAE-AMS-P-81728, .00010 Min. thick Tin-Lead over .00010 Min. thick Copper

6. Hardware

X	Less Hardware

Hardware is purchased separately (see page 59 for hardware options).

Mother Board Layout



HDB³ DAUGHTER BOARD - HOW TO ORDER

Mates with:

- Mother Board

1.	2.	3.	4.	5.	
	Number of Contacts	Brush Wire Plating	Termination	Contact Termination Finish	Less Hardware (Purchased separately see pg X for hardware options)
HDB-D4	-040	M	01	2	X

1. Connector Type

HDB-D4

Designates HDB³ Daughter Board

2. Number of Contacts

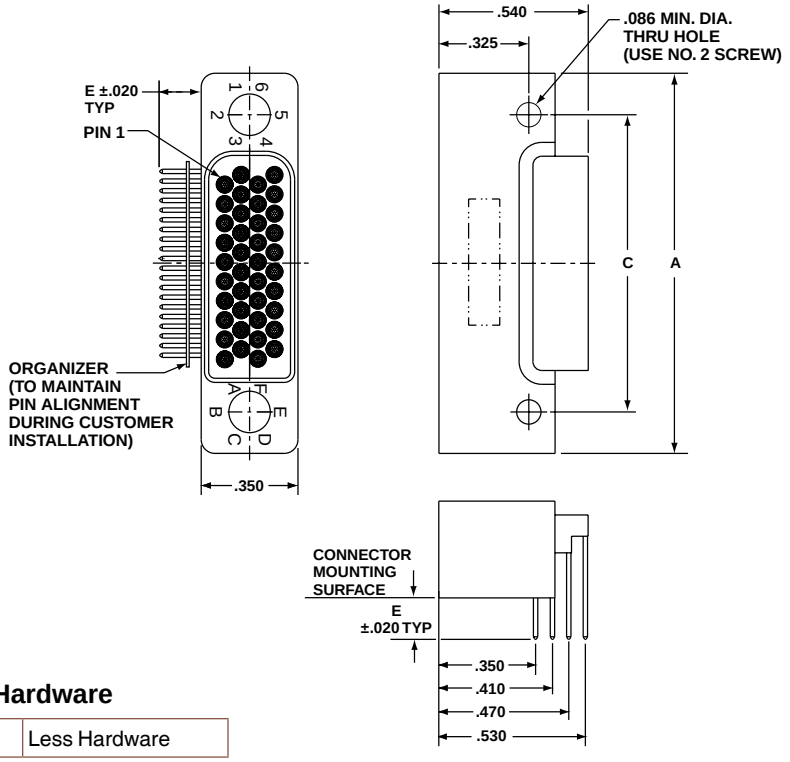
	Number of Contacts	Dimension A	Dimension C
040	40	1.375	1.075
060	60	1.725	1.425
080	80	2.075	1.775
120	120	2.775	2.475
160	160	3.475	3.175

3. Brush Wire Plating

M	0.000050 Au Min. thick over Nickel
C	0.000020 Au Min. thick over Nickel

4. Termination

	Type	Stickout (Dim. E)
01	PCB, Right Angle, .016 Dia.	0.090
02	PCB, Right Angle, .016 Dia.	0.120
03	PCB, Right Angle, .016 Dia.	0.150
04	PCB, Right Angle, .016 Dia.	0.180
06	PCB, Right Angle, .016 Dia.	0.300



5. Contact Termination Finish

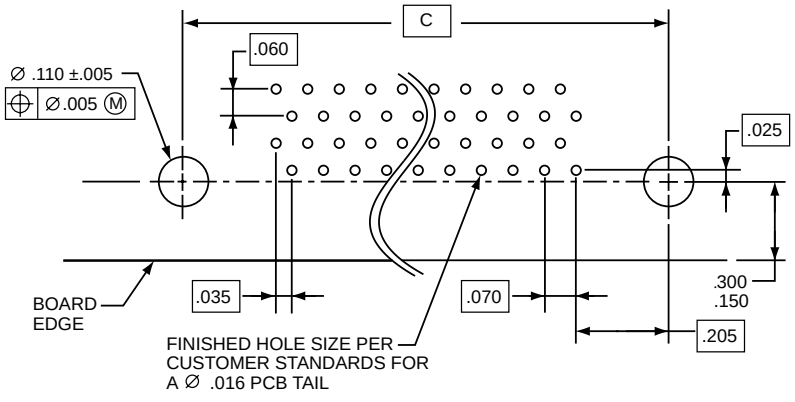
2	Gold plated in accordance with MIL-G-45204, Type II, .000030 Min. thick Gold over .000050 Min. thick Nickel
5	Tin plated in accordance with ASTM B545, .00010 Min. thick Matte Tin over .00010 Min. thick Nickel
6	Tin-Lead plated in accordance with SAE-AMS-P-81728, .00010 Min. thick Tin-Lead over .00010 Min. thick Copper

6. Hardware

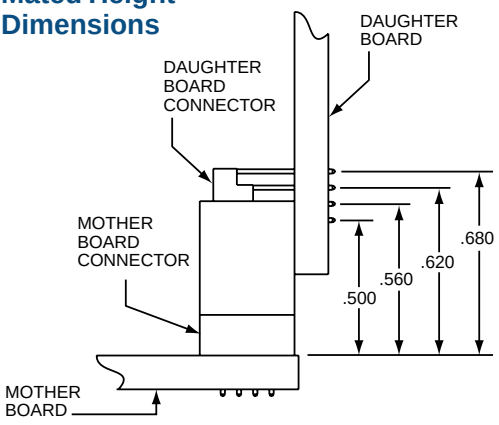
X	Less Hardware

Hardware is purchased separately (see page 59 for hardware options).

Daughter Board Layout



Mated Height Dimensions



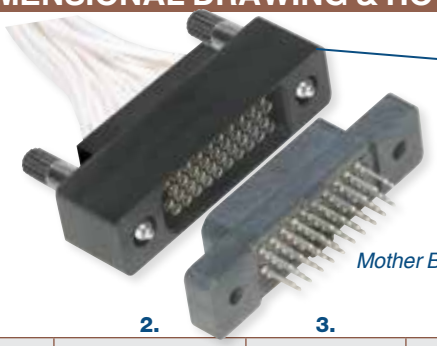
HDB³ I/O APPLICATIONS

- Cable to board applications
- Crimp termination
- Uses wire well size 22D

HDB³ I/O - HOW TO ORDER

Mates with:

- Standard Mother Board



Mother Board

I/O Connector

2-Piece Construction

1.	2.	3.	4.
	Number of Contacts	Brush Wire Plating	Contact Termination Finish
HDB-D4C	-120	C	2

1. Connector Type

HDB-D4C

Designates HDB³ I/O Connector

2. Number of Contacts

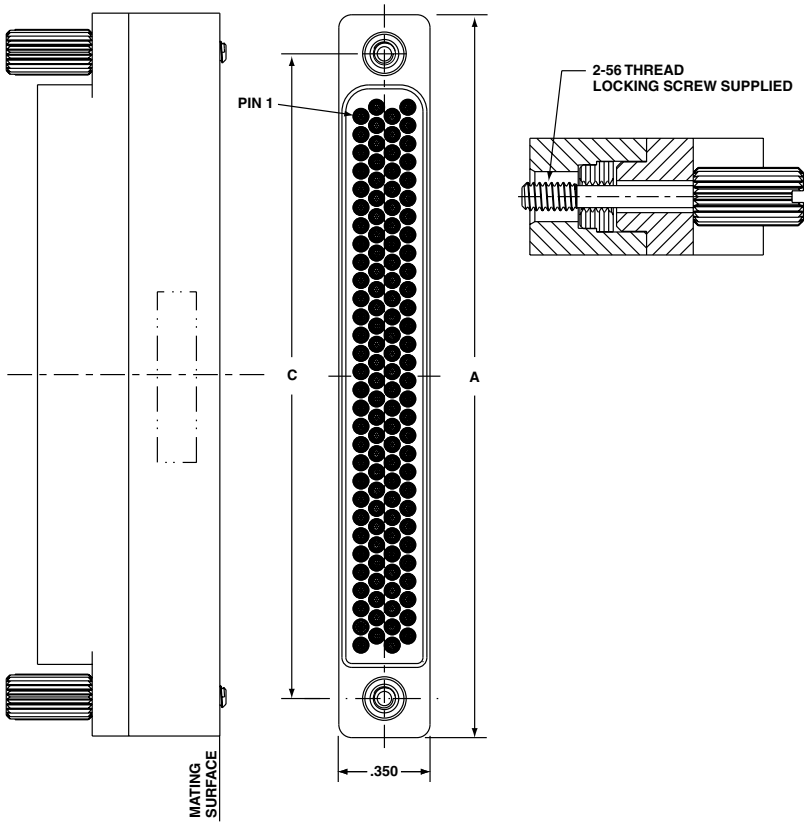
Number of Contacts	Dimension A	Dimension C
040	1.375	1.075
060	1.725	1.425
080	2.075	1.775
120	2.775	2.475
160	3.475	3.175

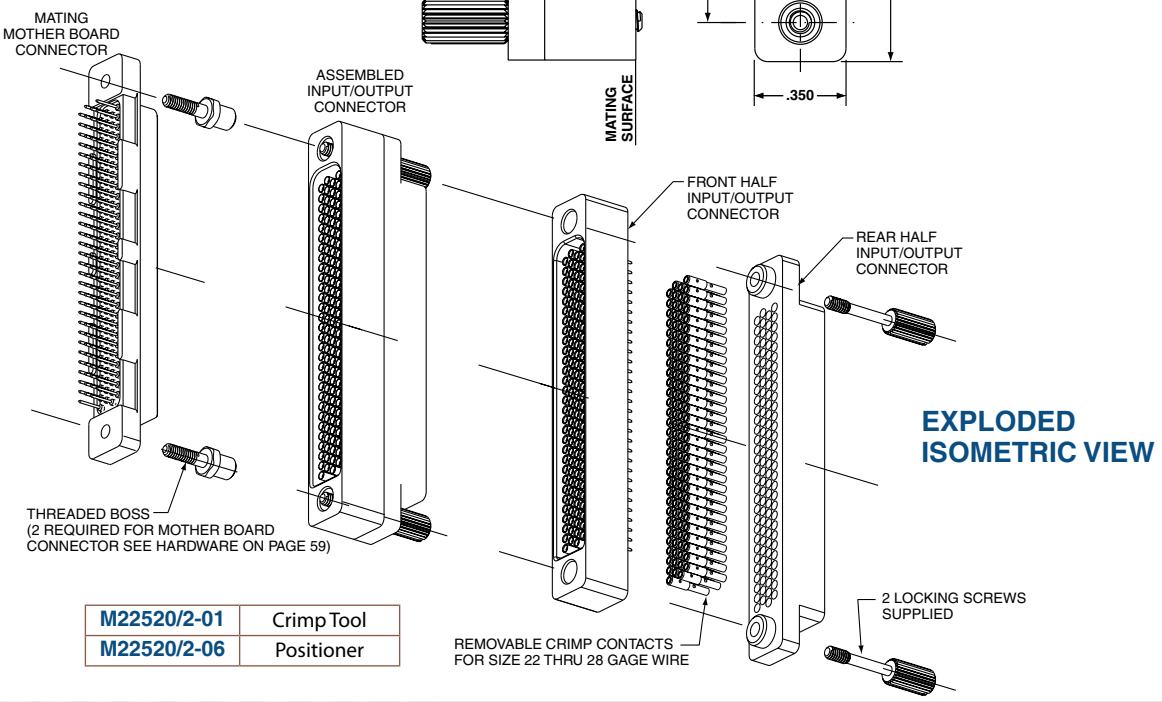
3. Brush Wire Plating

M	0.000050 Au Min. thick over Nickel
C	0.000020 Au Min. thick over Nickel

4. Contact Termination Finish

2	Gold plated in accordance with MIL-G-45204, Type II, .000030 Min. thick Gold over .000050 Min. thick Nickel



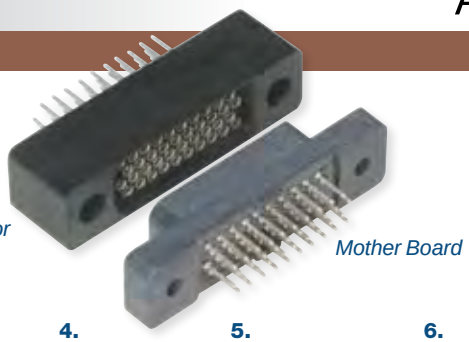


EXPLODED ISOMETRIC VIEW

M22520/2-01	Crimp Tool
M22520/2-06	Positioner

HDB³ STACKER APPLICATIONS

For applications that need or demand parallel boards



HDB³ STACKER - HOW TO ORDER

Mates with:

- Standard Mother Board

1.	2.	3.	4.	5.	6.
	Number of Contacts	Brush Wire Plating	Termination	Contact Termination Finish	Required Field
HDB-D4S	120	C	22	2	X

1. Connector Type

HDB-D4S

Designates HDB³ Stacker Connector

2. Number of Contacts

Number Diff Signals	Number of Contacts	Dimension A	Dimension C
040	40	1.375	1.075
060	60	1.725	1.425
080	80	2.075	1.775
120	120	2.775	2.475
160	160	3.475	3.175

3. Brush Wire Plating

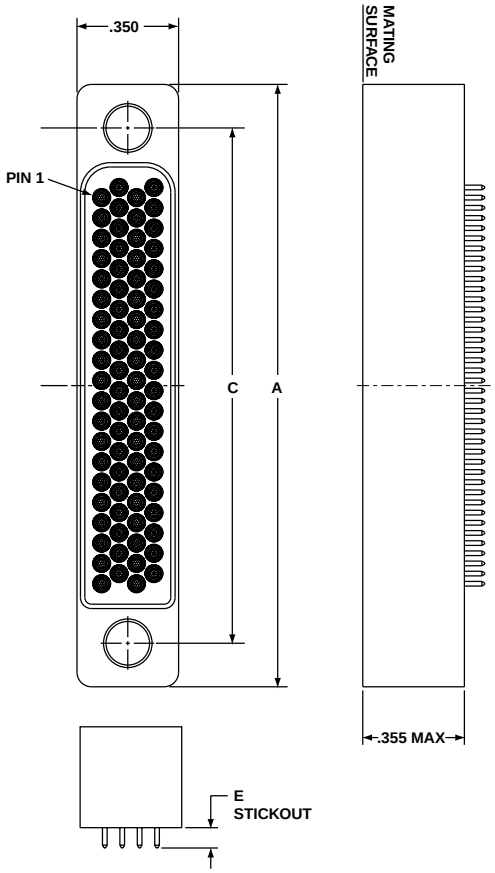
M	0.000050 Au Min. thick over Nickel
C	0.000020 Au Min. thick over Nickel

4. Termination

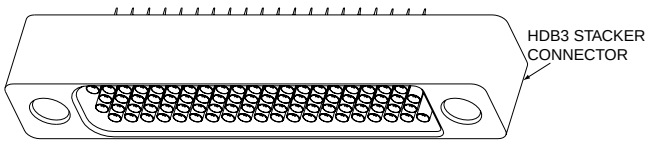
	Type	Stickout (Dim. E) ±.020
22	PCB, Straight, .016 Dia	0.100
23	PCB, Straight, .016 Dia	0.130
24	PCB, Straight, .016 Dia	0.160
28	PCB, Straight, .016 Dia	0.280

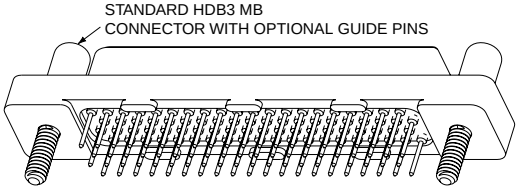
5. Contact Termination Finish

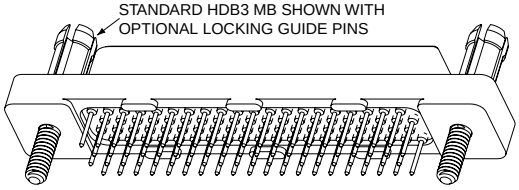
2	Gold plated in accordance with MIL-G-45204, Type II, .000030 Min. thick Gold over .000050 Min. thick Nickel



EXPLODED ISOMETRIC VIEW



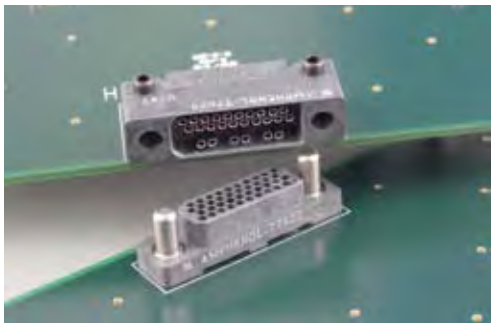




HSB³ - HIGH SPEED SERIES 6.250 GBS

High speed configuration available that allows data rates up to 6.250 Gb/s via 100 ohm matched impedance differential pairs.

- Partially populated standard HDB³ mother board and daugher board bodies
- Contact an Amphenol sales engineer for validation results



HSB³ HIGH SPEED MOTHER BOARD - HOW TO ORDER

Mates with:

- High Speed Daughter Board

1.	2.	3.	4.	5.	6.	7.
	Number of Differential Pairs	Differential Signal	Brush Wire Plating	Termination	Contact Termination Finish	Less Hardware (Purchased separately see pg XX for hardware options)
HSB-M4	-03	D	M	24	2	X

1. Connector Type

HSB-M4

Designates High Speed HDB³ I/O Connector

2. Number of Contacts

Number Differential Pairs	No. Low Speed Signals	Dimension A	Dimension C
03	20	1.375	1.075
05	30	1.725	1.425
07	40	2.075	1.775
10	60	2.775	2.475
13	80	3.475	3.175

3. Differential Signal

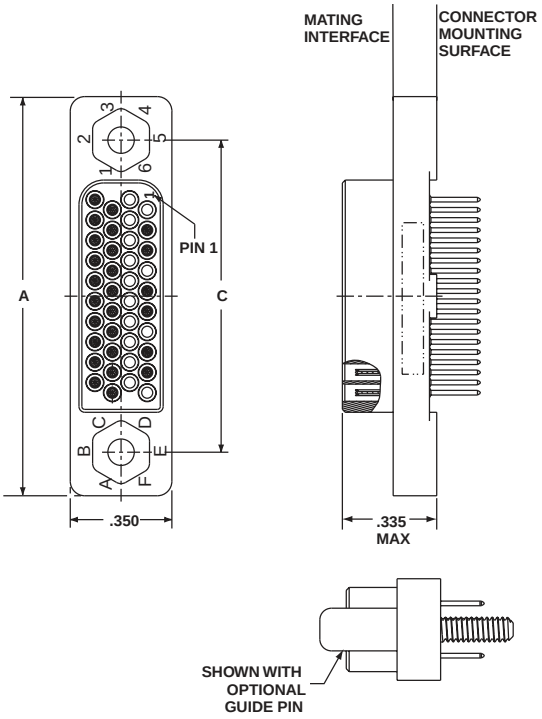
D	Standard

4. Brush Wire Plating

M	0.000050 Au Min. thick over Nickel
C	0.000020 Au Min. thick over Nickel

5. Termination

	Type	Stickout (Dim. E)
22	PCB, Straight, .016 Dia	0.120
23	PCB, Straight, .016 Dia	0.150
24	PCB, Straight, .016 Dia	0.180
26	PCB, Straight, .016 Dia	0.240
28	PCB, Straight, .016 Dia	0.300



6. Contact Termination Finish

2	Gold plated in accordance with MIL-G-45204, Type II, .000030 Min. thick Gold over .000050 Min. thick Nickel
5	Tin plated in accordance with ASTM B545, .00010 Min. thick Matte Tin over .00010 Min. thick Nickel
6	Tin-Lead plated in accordance with SAE-AMS-P-81728, .00010 Min. thick Tin-Lead over .00010 Min. thick Copper

7. Hardware

X	Less Hardware

Hardware is purchased separately (see page 59 for hardware options).

HSB³ HIGH SPEED DAUGHTER BOARD - HOW TO ORDER

Mates with:

- High Speed Mother Board

1.	2.	3.	4.	5.	6.	7.
	Number of Differential Pairs	Differential Signals	Brush Wire Plating	Termination	Contact Termination Finish	Less Hardware (Purchased separately see pg 10 for hardware options)
HSB-D4	–03	**D**	M	02	2	X

1. Connector Type

HSB-D4

Designates High Speed HSB³ Daughter Board

2. Number of Contacts

Number Diff Pairs	No. Low Speed Signals	Dimension A	Dimension D
03	20	1.375	1.075
05	30	1.725	1.425
07	40	2.075	1.775
10	60	2.775	2.475
13	80	3.475	3.175

3. Differential Signals

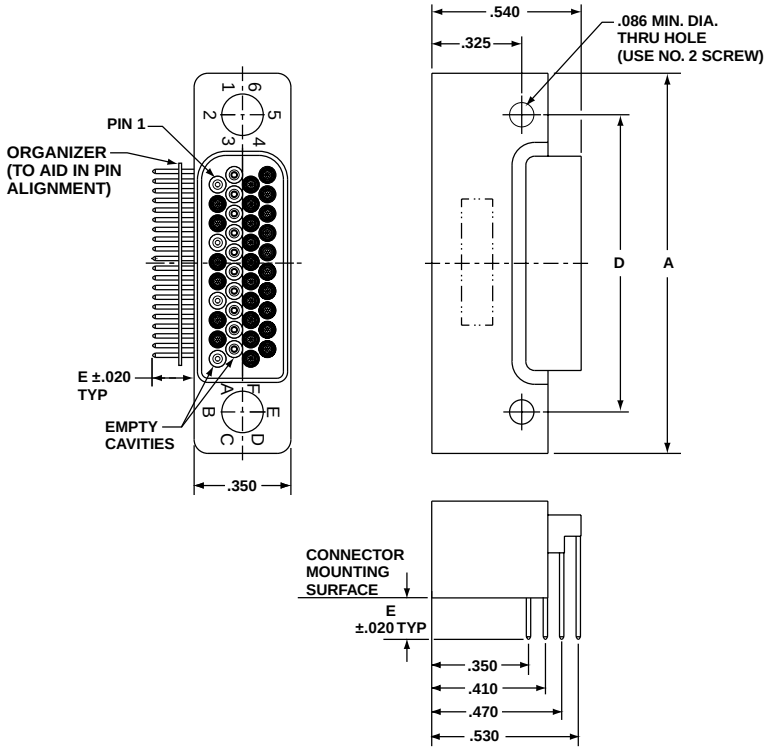
D	Standard

4. Brush Wire Plating

M	0.000050 Au Min. thick over Nickel
C	0.000020 Au Min. thick over Nickel

5. Termination

	Type	Stickout (Dim. E)
01	PCB, Right Angle, .016 Dia	0.090
02	PCB, Right Angle, .016 Dia	0.120
03	PCB, Right Angle, .016 Dia	0.150
04	PCB, Right Angle, .016 Dia	0.180
06	PCB, Right Angle, .016 Dia	0.300



6. Contact Termination Finish

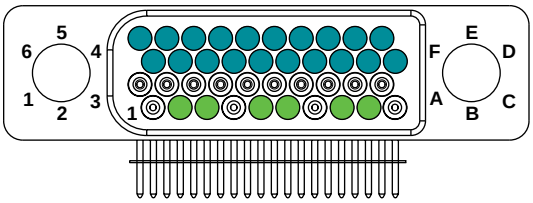
2	Gold plated in accordance with MIL-G-45204, Type II, .000030 Min. thick Gold over .000050 Min. thick Nickel
5	Tin plated in accordance with ASTM B545, .00010 Min. thick Matte Tin over .00010 Min. thick Nickel
6	Tin-Lead plated in accordance with SAE-AMS-P-81728, .00010 Min. thick Tin-Lead over .00010 Min. thick Copper

7. Hardware

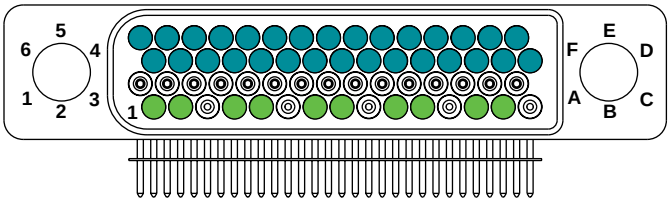
X	Less Hardware

Hardware is purchased separately (see page 59 for hardware options).

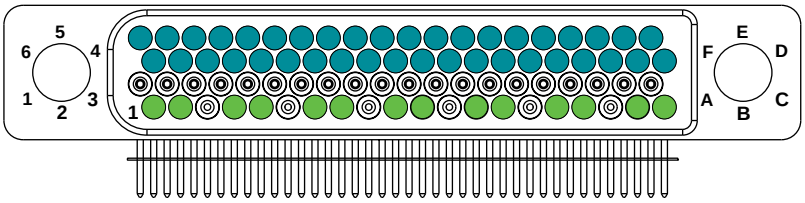
ARRANGEMENTS



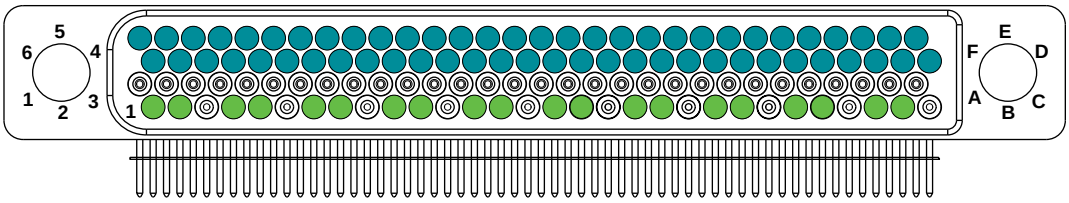
40 Pin Body with 3 Differential Pair, 20 Signal Contacts



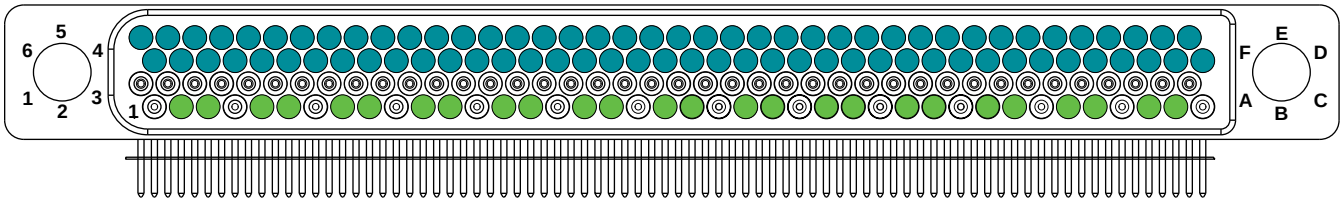
60 Pin Body with 5 Differential Pair, 30 Signal Contacts



80 Pin Body with 7 Differential Pair, 40 Signal Contacts



120 Pin Body with 10 Differential Pair, 60 Signal Contacts



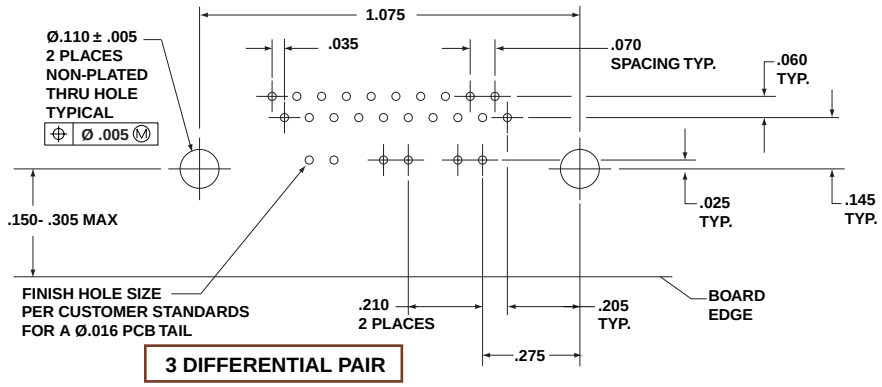
160 Pin Body with 13 Differential Pair, 80 Signal Contacts

As viewed from front of daughter board connector

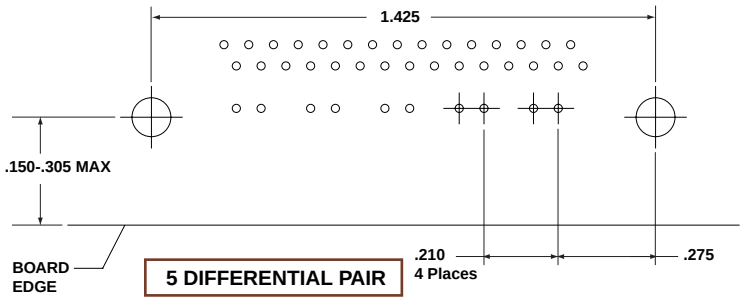
KEY

- 100 Ohm Differential Pair Contacts (100 Ohm Differential contact pairs capable of 6.250 Gb/s data rates)
- Empty Contact Cavity
- Standard Digital, Low Speed Signal Contacts

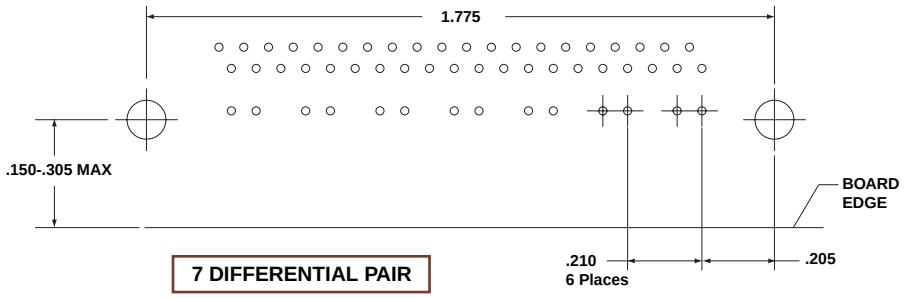
HSB³ DAUGHTER BOARD



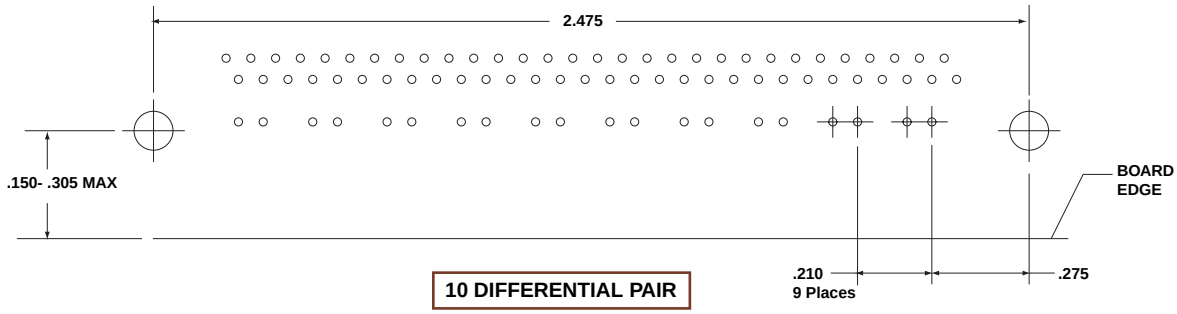
3 DIFFERENTIAL PAIR



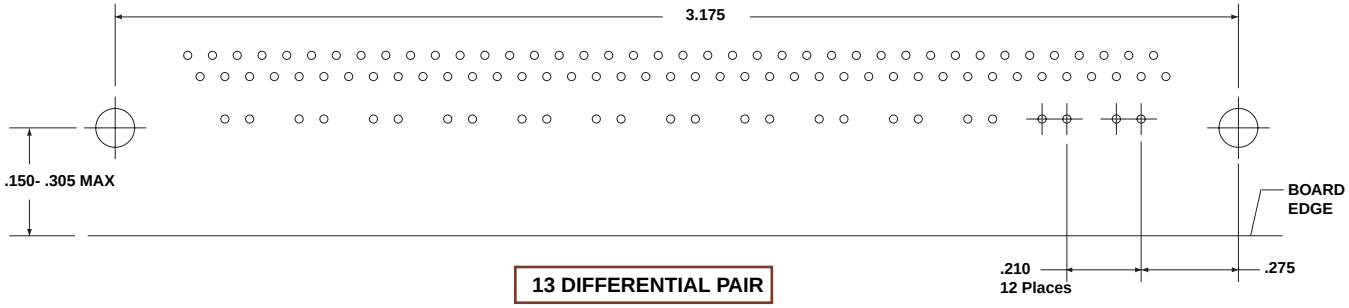
5 DIFFERENTIAL PAIR



7 DIFFERENTIAL PAIR

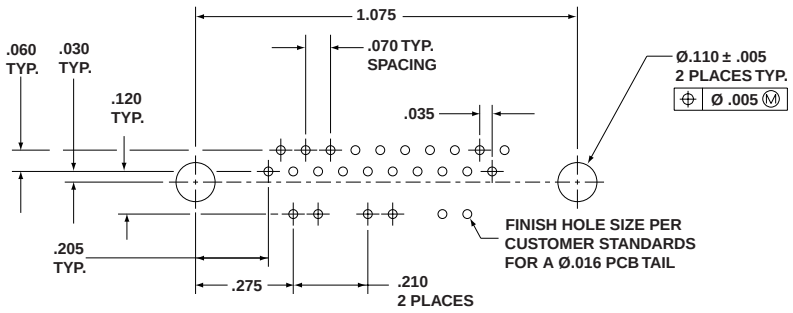


10 DIFFERENTIAL PAIR

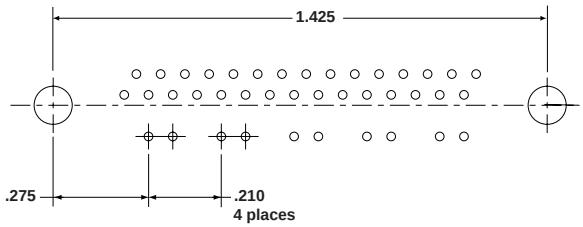


13 DIFFERENTIAL PAIR

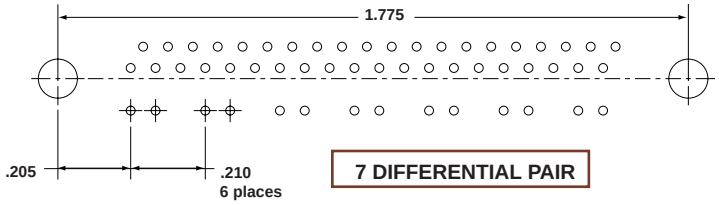
HSB³ MOTHER BOARD



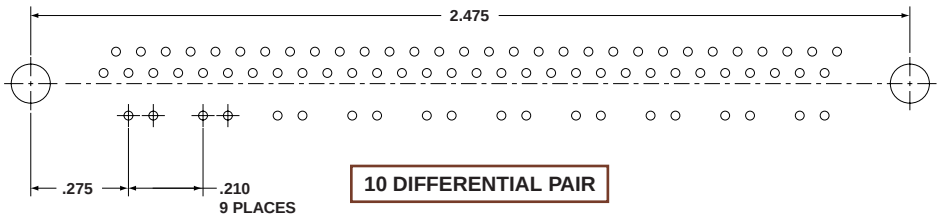
3 DIFFERENTIAL PAIR



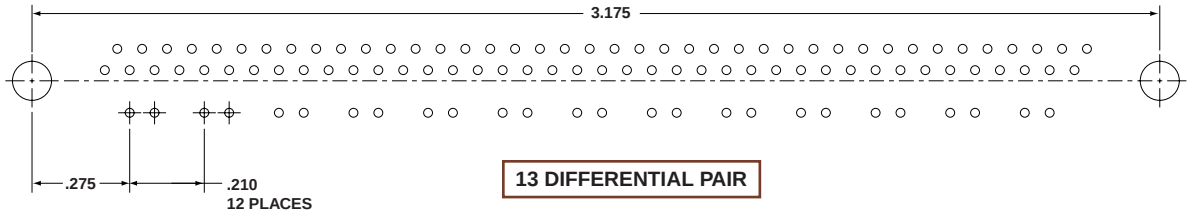
5 DIFFERENTIAL PAIR



7 DIFFERENTIAL PAIR



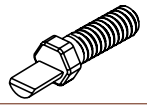
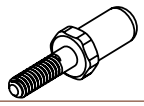
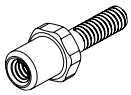
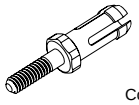
10 DIFFERENTIAL PAIR



13 DIFFERENTIAL PAIR

HARDWARE FOR ALL CONFIGURATIONS (Sold Separately)

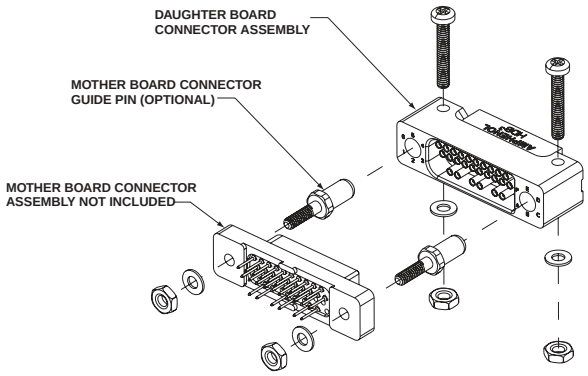
Each connector requires (2) of the component hardware listed below. These components are sold as individual units.

MOTHER BOARD			
PART NUMBER	TYPE	STICKOUT	
HDB-508803-001	POLARIZATION KEY	0.250	
HDB-508803-002	POLARIZATION KEY	0.500	
HDB-508803-003	POLARIZATION KEY	0.750	
HDB-508802-001	GUIDE PIN	0.250	
HDB-508802-002	GUIDE PIN	0.500	
HDB-508802-003	GUIDE PIN	0.750	
HDB-508808-001	THREADED BOSS*	0.250	 Accepts I/O Connector Jack Screw
HDB-508808-002	THREADED BOSS*	0.500	
HDB-508808-003	THREADED BOSS*	0.750	
HDB-508808-020	LOCKING GUIDE PIN	0.250	 Shown with Mother Board Connector on page 53
HDB-508808-021	LOCKING GUIDE PIN	0.500	
HDB-508808-022	LOCKING GUIDE PIN	0.750	

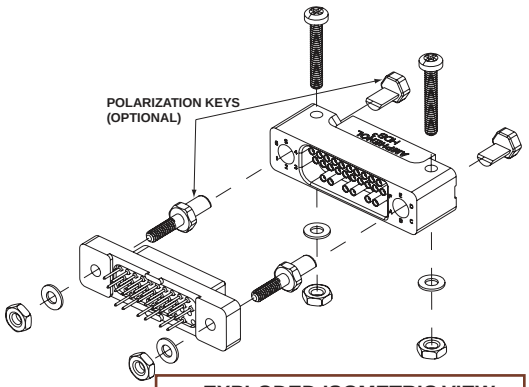
* Required with Mother Board only when mating to I/O Connector

DAUGHTER BOARD		
PART NUMBER	TYPE	
HDB-508804-000	POLARIZATION KEY	
HDB-508804-001	LOW PROFILE MOUNTING NUT	

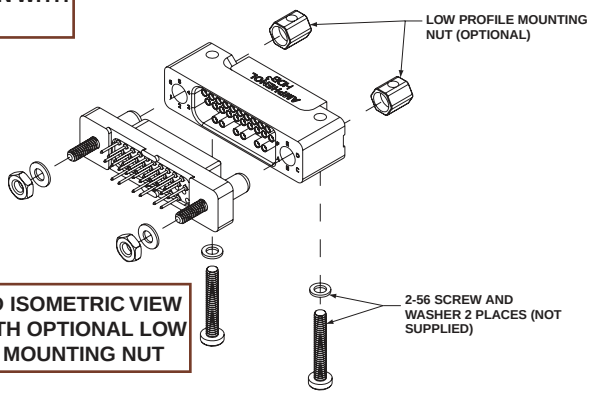
EXPLODED ISOMETRIC VIEW



EXPLODED ISOMETRIC VIEW SHOWN WITH OPTIONAL GUIDE PIN



EXPLODED ISOMETRIC VIEW SHOWN WITH OPTIONAL KEYING



EXPLODED ISOMETRIC VIEW SHOWN WITH OPTIONAL LOW PROFILE MOUNTING NUT

Amphenol
Low Mating Force Rectangulars

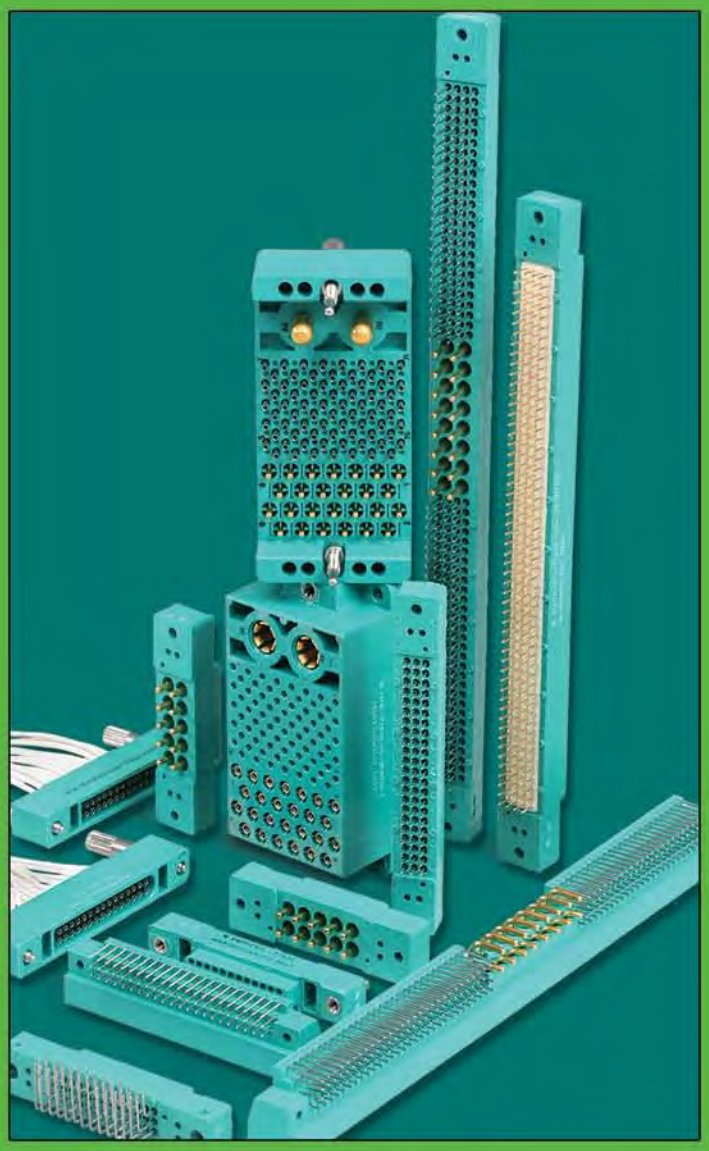


TABLE OF CONTENTS

Low Mating Force Connectors Typical Markets:

- Medical Equipment
- IC Chip Testers
- Telecommunications
- Military & Commercial Avionics
- Military Ground Vehicles
- GPS Systems

Amphenol Aerospace

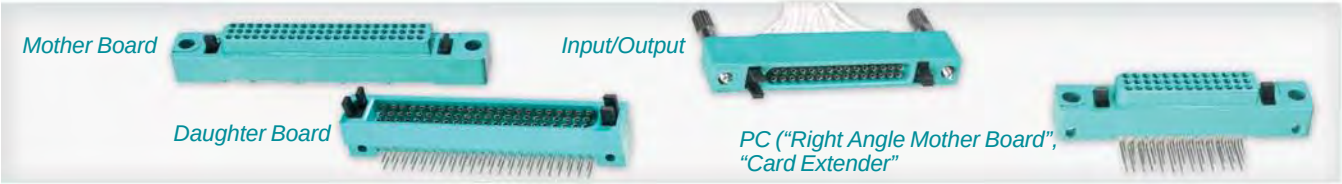
Amphenol® Low Mating Force Rectangular Connectors

MIL-DTL-55302 (M55302/166 THRU/172)

Amphenol Aerospace

Amphenol's Low Mating Force Connectors are well known in the connector arena – with proven performance on the ground, in the air, and at sea. – In service for over 25 years, with over 50 million brush contacts fielded; and qualified for use on M1A2 Abrams, F-16 Falcon, F/A-22 Raptor, F-35 Lightning II, AIM-132 ASRAAM and many more applications.

Four Standard Body Styles



Key Connector Features

- 0.100 inch center to center, square grid contact spacing
- Application flexibility (parallel boards, perpendicular boards, wire to board, end to end boards, card extenders)
- 2, 3 and 4 row contact arrangements with 10 to 100 contacts per row in one contact per row increments
- Military versions meet MIL-DTL-55302/166 through /172
- Termination versatility; straight & 90° PCB stud, wire wrap & crimp
- Options on termination lengths and plating
- Front release/front removable contacts in Mother Board, Daughter Board and PC version; rear release/rear removable crimp contacts (size 22D) or printed circuit board pins provided with Input/Output connectors
- Accessories available for latching and polarization
- Up to 256 keyed, mating polarizations available
- Hybrids available – mix signal with power, RF or fiber optics
- Smaller sized connector designs with as few as 5 contacts per row
- RoHS compliant versions are available, consult Amphenol Aerospace for more information

Performance

- voltage rating:

SL	70,000 ft.
1300	325

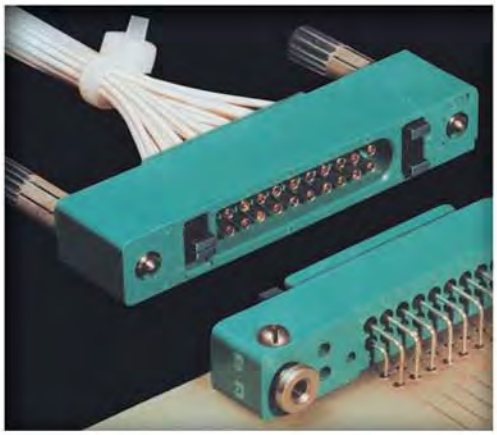
- one and one-half ounce max. average contact engaging/ separating forces
- 7 million average contact resistance for row A contacts
- (Resistance will vary depending on the point of measurement and the length of the contact.)
- 3 ampere – PCB contacts; 5 ampere – wire wrap / crimp contacts
- –65°C to +125°C temperature rating
- 5 gigaohms minimum insulation resistance

Materials

- Connector Body – Glass-filled thermoplastic molding material in accordance with MIL-M-24519 type GPT-15F and/or Grade B,
- Class 15 of MIL-P-46161 (UL94V-O)
- Polarization Keys – Glass-filled acetal plastic molding material in accordance with MIL-P-46137
- Locking Screw/Mounting Bushing – Corrosion resistant steel AISI 300 types passivated in accordance with QQ-P-35

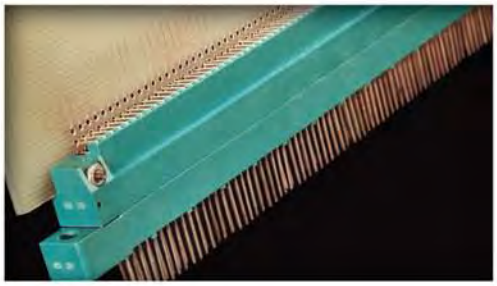
Contacts

- Holders – Copper alloy in accordance with Federal Specification QQ-B-626 or SAE J463
- Wire – Berryllium copper in accordance with Federal Specification ASTM B197
- Sleeves – If applicable, stainless steel in accordance with AMS-5514 passivated in accordance with ASTM A967



Unmated Input/Output and PC Connector

An Input/Output and Mother Board Connector



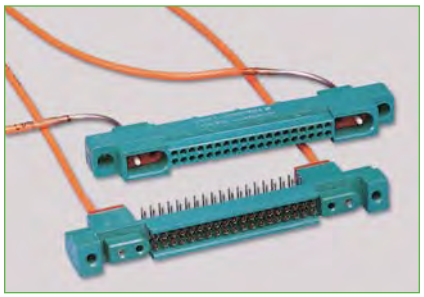
Mated Mother Board and Daughter Board Connector

The B³ Brush Contact is the standard contact for the family of connectors called Low Mating Force Rectangulars. This is because of the Brush contact's advantages for low mating force, stable electrical performance and extended service life. Amphenol provides a wide variety of interconnects within the "Brush Family of Connectors". This catalog section first gives the information you need for ordering the standard body styles, as described on pages 61 & 63, and then follows with information about further design flexibility. Below are some of the interconnect product solutions possible in Amphenol's rectangular products.

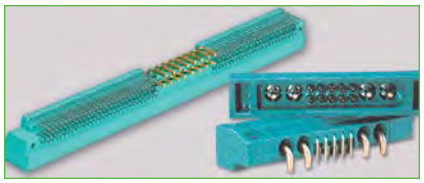
Amphenol's Broad Family of Low Mating Force Interconnect Products with Brush Contacts

Standard Brush Connectors

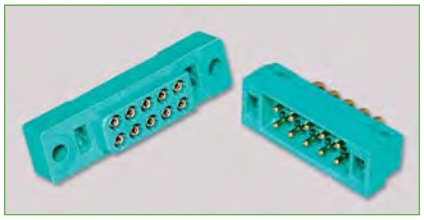
Combination of Brush Contacts and Fiber Optic Termini



Combination of Brush Contacts, Coax and Power Contacts



Power Strip Connector Series with cavities for size 16 or 12 power contacts (or size 16 or 12 coax contacts).



Smaller Sizes with as few as 10 Brush Contacts

Hybrid Custom Connector with Brush Contacts and Power Contacts

Docking Connectors - The Brush Contact offers high performance where frequent docking to charge and transfer data is a necessity.

Small Color-Coded Brush Contact Connectors for Medical Instrumentation

Other Similar Rectangular Connectors from Amphenol

Other Amphenol connectors that accommodate Brush contacts are covered in the catalog sections of this catalog as follows:

- High Density HDB³ and HSB³ Series (pgs. 47-59)
- LRM (Line Replacable Module) Interconnects (pgs. 9-41)
- High Speed Gigastak® and Digistak® LRM Interconnects (pgs. 31-36)
- Ruggedized, Non-Floating Brush Rack and Panel connectors (pgs. 96-98)

SELECTING THE CORRECT MATED CONNECTION

STANDARD FOUR BODY STYLES

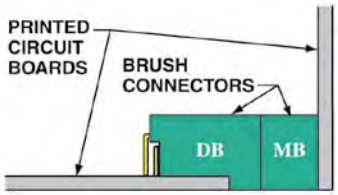
Mother Board Connector (MB)
also can be referred to as a "Back-plane" Connector
- Straight PCB stud or Wire wrap termination
- Mates with: Daughter board or I/O connectors

Daughter Board Connector (DB)
also can be referred to as a "Module Connector"
- 90° PCB stud
- Mates with: Mother board or PC connectors

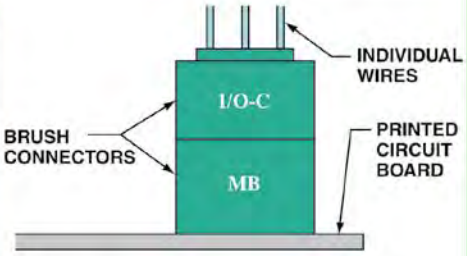
Printed Circuit Connector (PC)
also can be referred to as a "Right Angle Mother board Connector or a "Card Extender Connector"
- 90° PCB stud
- Mates with: I/O or Daughter board connectors

Input/Output Connector (I/O)
also can be referred to as a "Cable Connector"
- I/O-C has rear removable crimp contacts
- I/O-P has round PCB stud solder contacts
- Mates with: Mother board or PC connectors

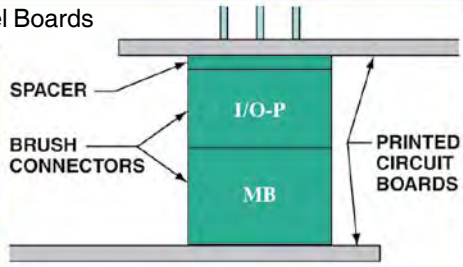
DB to MB Mating Boards at Right Angles



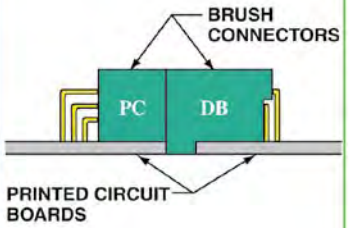
MB to I/O-C Discrete Wires to PCB



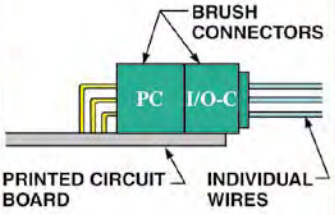
MB to I/O-P Mating Parallel Boards



PC to DB Mating Boards End to End



PC to I/O-C Discrete Wires to PCB



HOW TO ORDER (MILITARY TYPES)

MB, DB, PC Connectors
Military Part Number Ordering

Example part number M55302/166A10X1 is shown as follows:

1.	2.	3.	4.	5.	6.
	Body Type/ Contact Style	Number of Rows	Number of Contacts per Row	Tail Length	Tail Finish
M55302	/166	A	10	X	1

1. Connector Type

M55302

Designates Low Mating Force Rectangular Connectors

2. Body Type/Contact Style

/166 designates MB-P (Mother Board, Printed Circuit Board Termination)

/167 designates MB-W (Mother Board, Wire-wrap Contacts)

/168 designates PC (Printed Circuit, 90° Printed Circuit Board Termination)

/170 designates DB (Daughter Board, 90° Printed Circuit Board Termination)

3. Number of Rows

A – 2 rows

B – 3 rows

C – 4 rows

4. Number of Contacts per Row

Contact counts per row range from 10 to 100

(Only 2 digits permitted in this space; for 100 contacts per row, use 00)

5. Tail Length

MB-P (PCB Termination)*	MB-W** (Wire-wrap)
W – .222 ±.025 X – .300 ±.025 Y – .145 ±.025 Z – .113 ±.025	Y – .700 ±.025 Z – .542 ±.025

DB*	PC*
X – .300 ±.025 Y – .150 ±.025 Z – .120 ±.025	Y – .150 Z – .095

* Reference "J" Dimension on all connector drawings in this catalog.

** For MB-W only: Reference "H" Dimension on connector drawing on page 69.

6. Tail Finish

1 Tin lead per MIL-P-81728, 50 to 70%, .0001 min. thick over copper

2 Gold per MIL-G-45204, type II, grade C, class 00 (01 for MB-W) over nickel per QQ-N-290

IO Connectors
Military Part Number Ordering

Example part number M55302/169A101 is shown as follows:

1.	2.	3.	4.	5.
	Body Type	Number of Rows	Number of Contacts per Row	Contact Type/ Finish
M55302	/169	A	10	X

1. Connector Type

M55302

Designates Low Mating Force Rectangular Connectors

2. Body Type

/169 designates IO (Input/Output)

(Contact type/finish is last digit of IO part number - see list of options below)

3. Number of Rows

A – 2 rows

B – 3 rows

C – 4 rows

4. Number of Contacts per Row

Contact counts per row range from 10 to 100

(Only 2 digits permitted in this space; for 100 contacts per row, use 00)

5. Contact Type/Finish

1 Crimp contact – Tin lead per MIL-P-81728, 50 to 70% tin, .0001 min. thick over copper

2 Crimp contact – Gold per MIL-G-45204, type II, grade C, class 1 over copper

3 Connectors supplied less contacts

4 PCB contacts installed with .145 ±.025 stickout – Tin lead per MIL-P-81728, 50 to 70% tin, .0001 min. thick over copper (Reference "J" Dimension on connector drawing on page 77).

To Order Replacement IO Contacts

(For use with connectors less contacts)

M55302/171-1

suffix designates crimp well finish

Crimp well finish

1 Crimp contact – Tin lead per MIL-P-81728, 50 to 70% tin, .0001 min. thick over copper

2 Crimp contact – Gold per MIL-G-45204, type II, grade C class 1 over copper.

To order Accessories, see page 66.

HOW TO ORDER (COMMERCIAL TYPES)

MB, DB, I/O, PC Connectors Commercial Part Number Ordering

Example part number MB2-120P- ( ) is shown as follows:

1. Body Type	2. Number of Rows	3. Total Number of Contacts	4. Termination Style	5. Variation Suffix
MB	2 -	120	P	- ( )

1. Body Type

MB designates Mother Board
DB designates Daughter Board
I/O designates Input/Output
PC designates Printed Circuit

2. Number of Rows

2, 3 or 4 rows

3. Total Number of Contacts

See Contact Arrangement lists for each connector style

4. Standard Termination Style

(Stickout values below apply to "J" dimension referenced on individual connector catalog pages).

MBX-XXXP	Straight PCB stud, .021 dia, .113 ±.025 stickout, Sn/Ni plate
MBX-XXXW	Solderless wrap, .025 sq., .507 ±.025 stickout, Sn/Ni plate
DBX-XXXP	90° PCB stud, .021 dia, .085 ±.025 stickout, Sn/Ni plate
IOX-XXXC	Crimp, rear removable contact, size 22D wire well, Sn/Ni plate
IOX-XXXP	PCB stud, .021 dia, .145 ±.025 stickout, Sn/Ni plate
PCX-XXXP	90° PCB stud, .021 dia., .095 $^{+.035}_{-.025}$ stickout Sn/Ni plate

LEGEND:
Sn/Ni designates Tin over Nickel
Au/Ni designates Gold over Nickel
Au/Cu designates Gold over Copper

SnPb/Cu designates Tin-Lead over Copper

5. Variation Suffix

(Stickout values below apply to "J" dimension referenced on individual connector catalog pages.)

(700)	Gold plate in accordance with MIL-G-45204, type II, .000030 min. thick gold (.000050 for solderless wrap) over .000050 min. thick nickel (standard termination length)
(701)	Gold plate in accordance with MIL-G-45204, type II, .000050 min. thick gold over .00015 min. thick copper (standard termination length)
(702)	PCB stud stickout of .145, Sn/Ni plate, MB-P
(703)	Au/Ni [same as (700)], PCB stud stickout of .145, MB-P
(704)	Au/Cu [same as (701)], PCB stud stickout of .145, MB-P
(705)	90° PCB stud, .120 stickout. Sn/Ni plate, DB
(706)	Au/Ni [same as (700)], 90° PCB stud .120 stickout, DB
(707)	Au/Cu [same as (701)], 90° PCB .120 stickout, DB
(709)	PCB stud stickout of .300 DB (90°), .300 MB-P & .335 IO-P, Sn/Ni plate
(710)	Solderless wrap, .025 sq., .665 stickout, Sn/Ni plate, MB-W
(711)	Solderless wrap, .025 sq., .665 stickout, Au/Ni, [same as (700)], MB-W
(713)	PCB stud stickout of .060, Sn/Ni plate, IO-P
(714)	90° PCB stud stickout of .150, Sn/Ni plate, PC & DB
(715)	Solderless wrap, .025 sq., .665 stickout, Au/Cu [same as (701)], MB-W
(716)	90° PCB stud stickout of .085 matte tin, DB
(717)	90° PCB stud stickout of .095 matte tin, PC
(718)	90° PCB stud stickout of .120 matte tin, DB
(719)	PCB stud stickout of .300 MB-P & .335 IO-P, matte tin
(720)	PCB stud stickout of .060 matte tin, IO-P
(721)	PCB stud stickout of .500, Sn/Ni plate, IO-P
(722)	PCB stud stickout of .356 matte tin, MB-P
(723)	PCB stud stickout of .192, Sn/Ni plate, MB-P
(724)	90° PCB stud stickout of .095, RTV potted rear, Sn/Ni plate, PC
(725)	90° PCB stud stickout of .120, RTV potted rear, Sn/Ni plate, DB
(726)	90° PCB stud stickout of .150, RTV potted rear, Sn/Ni plate, PC & DB
(727)	PCB stud stickout of .145, RTV potted rear, Sn/Ni plate, MB-P
(728)	PCB stud stickout of .145, Au/Ni, [same as (700)], RTV potted rear, MB-P
(729)	90° PCB stud stickout of .120, Au/Ni, [same as (700)], RTV potted rear, DB
(730)	90° PCB stud stickout of .150, Au/Ni, [same as (700) above], PC and DB
(731)	PCB stud stickout of .145, matte tin, MB-P

To order Accessories, see next page.

Variation Suffixes continued on next page.

MB, DB, I/O, PC Connectors Commercial Part Number Ordering

Example part number MB2-120P- ( )

1. Body Type	2. Number of Rows	3. Total Number of Contacts	4. Termination Style	5. Variation Suffix
MB	2 -	120	P	- ( )

5. Variation Suffix, cont.

(732)	PCB stud stickout of .300 DB (90°), .300 MB-P and .335 IO-P, Au/Cu [same as (701)],
(733)	PCB stud stickout of .421, matte tin, MB-P
(734)	Solderless wrap .025 sq.; .665 stickout, Au/Ni, [same as (700)], RTV potted rear, MB-W
(735)	RTV potted rear, standard termination length, Au/Ni, [same as (700)]
(736)	RTV potted rear, standard termination length, Sn/Ni [use (724) for PC]
(737)	PCB stud stickout of .300 DB (90°), .300 MB-P and .335 IO-P, Au/Ni, [same as (700)], RTV potted rear
(738)	PCB stud stickout of .192 SnPb/Cu (Mil-Spec), MB-P
(739)	PCB stud stickout of .300 DB (90°), .300 MB-P and .335 IO-P;, RTV potted rear, Sn/Ni
(740)	Solderless wrap .025 sq.; .665 stickout, Sn/Ni, RTV potted rear, MB-W
(741)	Solderless wrap .025 sq.; .280 stickout, Au/Ni, [same as (700)], MB-W
(742)	PCB .145, Au/Ni, [same as (700)], epoxy potted rear, MB-P
(743)	90° PCB .120, Au/Ni, [same as (700)], epoxy potted rear, DB
(744)	90° PCB .120, Au/Ni, [same as (700)], (MIL-Spec), epoxy potted rear, DB
(746)	90° PCB .120, SnPb/Cu, (MIL-Spec), epoxy potted rear, DB
(747)	PCB stud stickout of .200, Sn/Ni, IO-P
(748)	PCB stud stickout of .145, Sn/Ni, epoxy potted rear, MB-P
(749)	PCB, epoxy potted rear, standard termination length, Sn/Ni
(750)	PCB stud stickout of .172 termination, Au/Ni, [same as (700)], RTV potted rear, MB-P
(751)	90° PCB stud stickout of .150, Sn/Ni, epoxy potted rear, PC
(752)	Au/Ni, epoxy potted rear, standard termination length
(753)	Solderless wrap .025 sq.; .665 stickout, Au/Ni, [same as (700)], epoxy potted rear, MB-W
(754)	PCB stud stickout of .172 termination, SnPb/Cu (MIL-Spec), MB-P
(757)	PCB stud, .391 stickout, matte tin, MB-P
(758)	PCB stud, .172 stickout, Au/Ni, [same as (700)], epoxy potted rear, MB-P
(760)	PCB stud, .192 stickout, Au/Ni (Mil-Spec), MB-P
(761)	90° PCB stud, .120 stickout, Sn/Ni, epoxy potted rear, DB
(762)	PCB stud, .145 stickout, Au/Ni (Mil-Spec), epoxy potted rear, MB-P
(763)	PCB stud, .145 stickout, SnPb/Cu (Mil-Spec), epoxy potted rear, MB-P
(764)	90° PCB stud, .150 stickout, SnPb/Cu (Mil-Spec), epoxy potted rear, DB & PC
(765)	PCB stud, stickout of .300 DB (90°), .300 MB-P, SnPb/Cu (Mil-Spec), epoxy potted rear
(766)	90° PCB stud, .120 stickout, Au/Ni (Mil-Spec), epoxy potted rear, DB
(767)	PCB stud, .192 stickout, Au/Ni (Mil-Spec), epoxy potted rear, MB-P
(768)	PCB stud, .172 stickout, Au/Ni (Mil-Spec), MB-P
(769)	90° PCB stud, .200 stickout, Au/Ni (Mil-Spec), DB
(770)	90° PCB stud, .260 stickout, Au/Ni (Mil-Spec), DB
(773)	90° PCB stud, .150 stickout, Au/Ni (Mil-Spec), RTV potted rear, PC & DB

Accessories Part Number Ordering

Amphenol® Low Mating Force Connectors are shipped less accessory items.
Accessories may be ordered by either military or proprietary part numbers shown below:

Accessory Item	Series	Military Part Number	Proprietary Part Number	Qty. Required
Polarization Keys	MB, DB, IO, PC	M55302/78-02	10-285422-2	4*
Locking/Mounting Bushing	MB	M55302/172-01	10-411196-3	2
Alternate Length Bushing (Longer)	MB	M55302/172-02	10-411196-5	2
Locking Bushing	PC	M55302/172-05	10-411196-4	2
Locking Screw, Plain	IO	M55302/172-04	10-502599	2
Locking Screw, Slotted	IO	-	10-502599-1	2
Locking Screw, Slotted (Low Profile)	IO	M55302/172-03	10-502599-2	2
Test Probe Kit	MB, DB, IO, PC	-	11-10400-22	1**

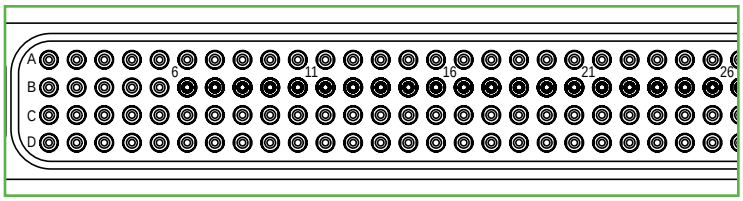
See pages 90-95 for more detailed information on these accessory items and how they are assembled into connectors.

* 4 Keys required per connector half, if used
** One kit per connector gender is recommended

ROW & CAVITY IDENTIFICATION, CONTACT ARRANGEMENTS

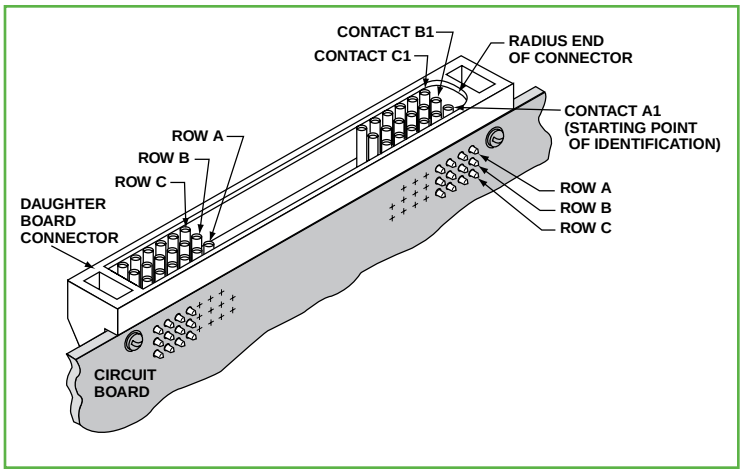
Contact rows and cavities are identified with molded-in letters and numbers respectively and, depending on the connector style, are located either on the front, rear or both faces of the connector. See illustration at right.

Note: The brand name of Bendix may appear molded-in on connectors. As manufacturing molds are remade, the correct Amphenol name will replace the former Bendix name.



CONTACT ROWS AND CAVITIES ARE IDENTIFIED WITH MOLDED-IN LETTERS AND NUMBERS (FRONT FACE OF DAUGHTER BOARD SHOWN)

As shown in the second illustration at right, row identification is always at the radius end and begins with Row "A". Contact cavity identification always starts at radius end and begins with cavity #6 and then every fifth cavity thereafter, except for arrangements consisting of 10 contacts per row, which lack numerals. Up to every 9 contact locations at the high numeral end of the contact row will not be identified.



IDENTIFICATION STARTS AT THE RADIUS END OF THE CONNECTOR

Mother Board and PC Connectors

Contact rows are identified on the front and rear faces. Contact cavities are identified on the rear face.

Daughter Board Connectors

Contact rows and cavities are identified on the front face.

Input/Output Connectors

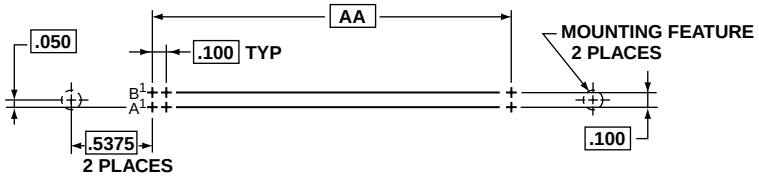
Contact rows and cavities are identified on the rear face

Contacts

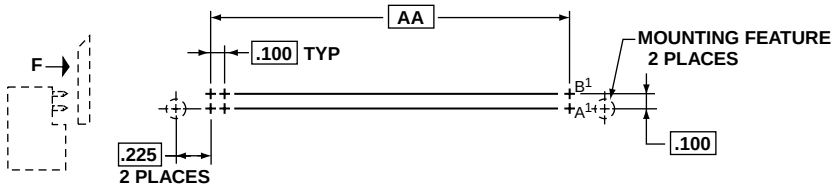
Contacts are supplied with MB, DB, IO and PC Connector Series assemblies as ordered.

2 ROW

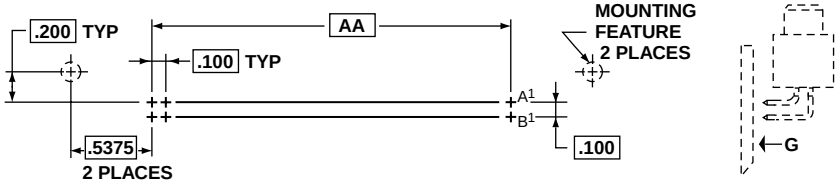
Front of Mother Board Connector, Rear of Input/Output Connector, Front of Printed Circuit Connector



Rear of 90° Daughter Board Connector, Daughter Board Hole Pattern at F



Rear of 90° Printed Circuit Connector, Hole Pattern at G



2 ROW 10 per Row

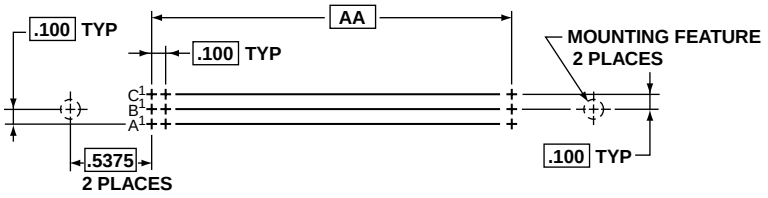
Total Contacts	AA
20	.900
30	1.400
40	1.900
50	2.400
60	2.900
70	3.400
80	3.900
90	4.400
100	4.900
110	5.400
120	5.900
130	6.400
140	6.900
150	7.400
160	7.900
170	8.400
180	8.900
190	9.400
200	9.900

▭ Designates Basic Dimension.
Consult Amphenol drawing for solderless wrap contact fixturing (datum) hole locations to facilitate connector alignment.

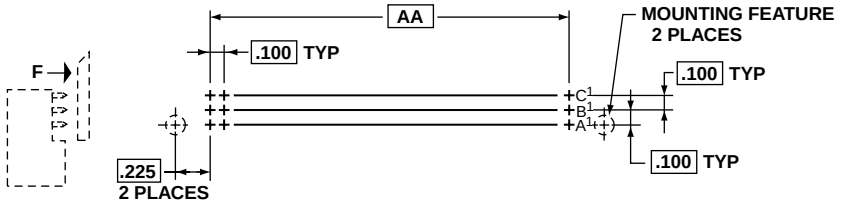
CONTACT ARRANGEMENTS, CONT.

3 ROW

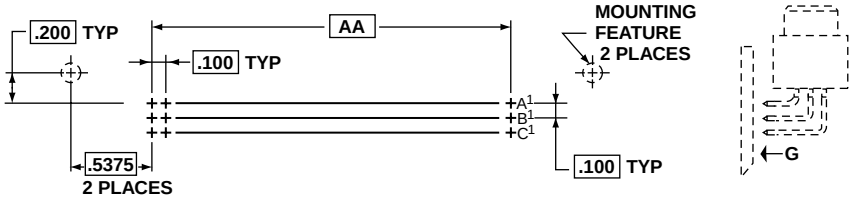
Front of Mother Board Connector, Rear of Input/Output Connector, Front of Printed Circuit Connector



Rear of 90° Daughter Board Connector, Daughter Board Hole Pattern at F



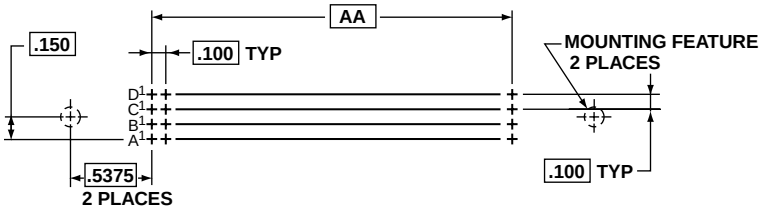
Rear of 90° Printed Circuit Connector, Hole Pattern at G



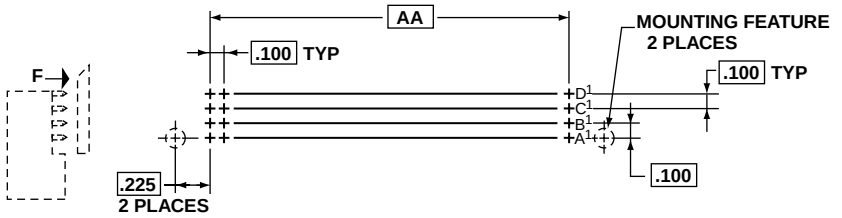
Total Contacts	AA
30	.900
45	1.400
60	1.900
75	2.400
90	2.900
105	3.400
120	3.900
135	4.400
150	4.900
165	5.400
180	5.900
195	6.400
210	6.900
225	7.400
240	7.900
255	8.400
270	8.900
285	9.400
300	9.900

4 ROW

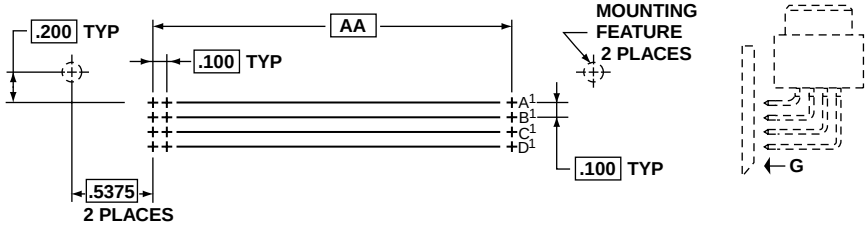
Front of Mother Board Connector, Rear of Input/Output Connector, Front of Printed Circuit Connector



Rear of 90° Daughter Board Connector, Daughter Board Hole Pattern at F



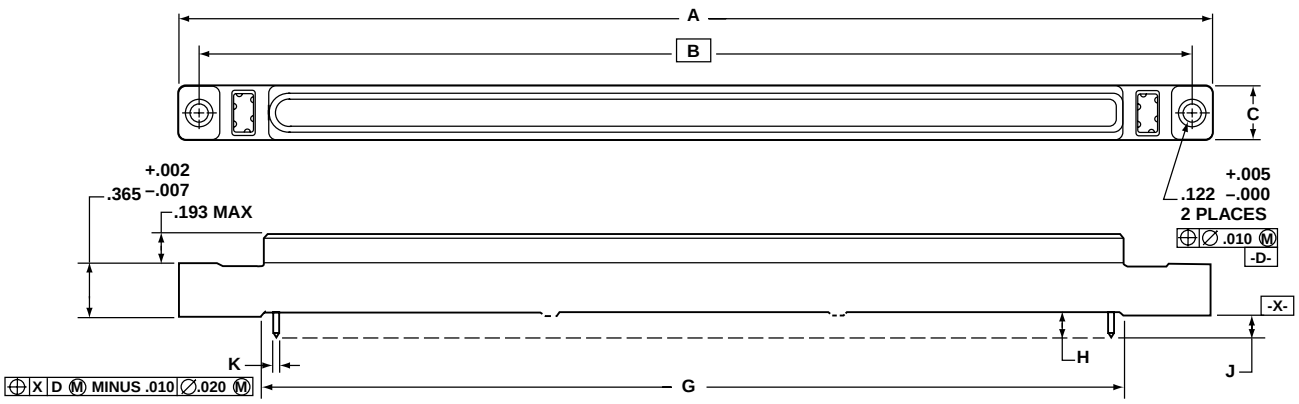
Rear of 90° Printed Circuit Connector, Hole Pattern at G

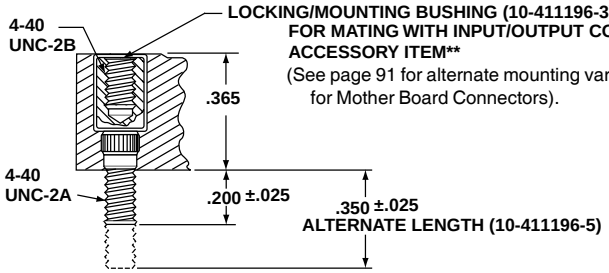


Total Contacts	AA
40	.900
60	1.400
80	1.900
100	2.400
120	2.900
140	3.400
160	3.900
180	4.400
200	4.900
220	5.400
240	5.900
260	6.400
280	6.900
300	7.400
320	7.900
340	8.400
360	8.900
380	9.400
400	9.900

▭ Designates Basic Dimension.
Consult Amphenol drawing for solderless wrap contact fixturing (datum) hole locations to facilitate connector alignment.

DIMENSIONAL DRAWING





MATES WITH DB AND IO SERIES CONNECTORS

Notes:

When mating with DB connector, a total of .035 inch minimum radial pilot is available for connector body alignment.

All dimensions for reference only.

Polarization keys are not supplied as part of MB Connector Series assemblies. See Accessories How to Order, page 66 and further description, page 90.

** Locking/mounting bushings are not supplied as part of MB Connector Series assemblies. See Accessories How to Order, page 66 and further description on page 93.

▭ Designates Basic Dimension

Consult Amphenol drawing for solderless wrap contact fixturing (datum) hole locations to facilitate connector alignment.

Contact Data				
Description	Termination Style Letter	H ±.020	J ±.020	K ±.002
Round PCB Stud Solder Termination	P	.148	.113	.021 Dia.
	P-(702)	.180	.145	.021 Dia.
	P-(709)	.335	.300	.021 Dia.
Square Solderless Wrap Termination	W	.542	.507	.025 Sq.
	W-(710)	.700	.665	.025 Sq.

NOTE: Other variations available - see pages 65 & 66, or consult Amphenol Aerospace.

2 ROW CONTACT ARRANGEMENTS

Number of Contacts	MB Number*	A Max.	B	C Max.	G Min.
020	MB2-020(*)	2.295	1.975	.390	1.040
022	MB2-022(*)	2.395	2.075	.390	1.140
024	MB2-024(*)	2.495	2.175	.390	1.240
026	MB2-026(*)	2.595	2.275	.390	1.340
028	MB2-028(*)	2.695	2.375	.390	1.440
030	MB2-030(*)	2.795	2.475	.390	1.540
032	MB2-032(*)	2.895	2.575	.390	1.640
034	MB2-034(*)	2.995	2.675	.390	1.740
036	MB2-036(*)	3.095	2.775	.390	1.840
038	MB2-038(*)	3.195	2.875	.390	1.940
040	MB2-040(*)	3.295	2.975	.390	2.040
042	MB2-042(*)	3.395	3.075	.390	2.140
044	MB2-044(*)	3.495	3.175	.390	2.240
046	MB2-046(*)	3.595	3.275	.390	2.340
048	MB2-048(*)	3.695	3.375	.390	2.440
050	MB2-050(*)	3.795	3.475	.390	2.540
052	MB2-052(*)	3.895	3.575	.390	2.640
054	MB2-054(*)	3.995	3.675	.390	2.740
056	MB2-056(*)	4.095	3.775	.390	2.840
058	MB2-058(*)	4.195	3.875	.390	2.940
060	MB2-060(*)	4.295	3.975	.390	3.040
062	MB2-062(*)	4.395	4.075	.390	3.140
064	MB2-064(*)	4.495	4.175	.390	3.240
066	MB2-066(*)	4.595	4.275	.390	3.340
068	MB2-068(*)	4.695	4.375	.390	3.440
070	MB2-070(*)	4.795	4.475	.390	3.540
072	MB2-072(*)	4.895	4.575	.390	3.640
074	MB2-074(*)	4.995	4.675	.390	3.740
076	MB2-076(*)	5.095	4.775	.390	3.840
078	MB2-078(*)	5.195	4.875	.390	3.940
080	MB2-080(*)	5.295	4.975	.390	4.040
082	MB2-082(*)	5.395	5.075	.390	4.140
084	MB2-084(*)	5.495	5.175	.390	4.240
086	MB2-086(*)	5.595	5.275	.390	4.340
088	MB2-088(*)	5.695	5.375	.390	4.440
090	MB2-090(*)	5.795	5.475	.390	4.540
092	MB2-092(*)	5.895	5.575	.390	4.640
094	MB2-094(*)	5.995	5.675	.390	4.740
096	MB2-096(*)	6.095	5.775	.390	4.840
098	MB2-098(*)	6.195	5.875	.390	4.940
100	MB2-100(*)	6.295	5.975	.390	5.040
102	MB2-102(*)	6.395	6.075	.390	5.140
104	MB2-104(*)	6.495	6.175	.390	5.240
106	MB2-106(*)	6.595	6.275	.390	5.340
108	MB2-108(*)	6.695	6.375	.390	5.440
110	MB2-110(*)	6.795	6.475	.390	5.540

Number of Contacts	MB Number*	A Max.	B	C Max.	G Min.
112	MB2-112(*)	6.895	6.575	.390	5.640
114	MB2-114(*)	6.995	6.675	.390	5.740
116	MB2-116(*)	7.095	6.775	.390	5.840
118	MB2-118(*)	7.195	6.875	.390	5.940
120	MB2-120(*)	7.295	6.975	.390	6.040
122	MB2-122(*)	7.395	7.075	.390	6.140
124	MB2-124(*)	7.495	7.175	.390	6.240
126	MB2-126(*)	7.595	7.275	.390	6.340
128	MB2-128(*)	7.695	7.375	.390	6.440
130	MB2-130(*)	7.795	7.475	.390	6.540
132	MB2-132(*)	7.895	7.575	.390	6.640
134	MB2-134(*)	7.995	7.675	.390	6.740
136	MB2-136(*)	8.095	7.775	.390	6.840
138	MB2-138(*)	8.195	7.875	.390	6.940
140	MB2-140(*)	8.295	7.975	.390	7.040
142	MB2-142(*)	8.395	8.075	.390	7.140
144	MB2-144(*)	8.495	8.175	.390	7.240
146	MB2-146(*)	8.595	8.275	.390	7.340
148	MB2-148(*)	8.695	8.375	.390	7.440
150	MB2-150(*)	8.795	8.475	.390	7.540
152	MB2-152(*)	8.895	8.575	.390	7.640
154	MB2-154(*)	8.995	8.675	.390	7.740
156	MB2-156(*)	9.095	8.775	.390	7.840
158	MB2-158(*)	9.195	8.875	.390	7.940
160	MB2-160(*)	9.295	8.975	.390	8.040
162	MB2-162(*)	9.395	9.075	.390	8.140
164	MB2-164(*)	9.495	9.175	.390	8.240
166	MB2-166(*)	9.595	9.275	.390	8.340
168	MB2-168(*)	9.695	9.375	.390	8.440
170	MB2-170(*)	9.795	9.475	.390	8.540
172	MB2-172(*)	9.895	9.575	.390	8.640
174	MB2-174(*)	9.995	9.675	.390	8.740
176	MB2-176(*)	10.095	9.775	.390	8.840
178	MB2-178(*)	10.195	9.875	.390	8.940
180	MB2-180(*)	10.295	9.975	.390	9.040
182	MB2-182(*)	10.395	10.075	.390	9.140
184	MB2-184(*)	10.495	10.175	.390	9.240
186	MB2-186(*)	10.595	10.275	.390	9.340
188	MB2-188(*)	10.695	10.375	.390	9.440
190	MB2-190(*)	10.795	10.475	.390	9.540
192	MB2-192(*)	10.895	10.575	.390	9.640
194	MB2-194(*)	10.995	10.675	.390	9.740
196	MB2-196(*)	11.095	10.775	.390	9.840
198	MB2-198(*)	11.195	10.875	.390	9.940
200	MB2-200(*)	11.295	10.975	.390	10.040

*See How to Order, pages 64-66.

Amphenol Aerospace

3 ROW CONTACT ARRANGEMENTS

Number of Contacts	MB Number*	A Max.	B	C Max.	G Min.
030	MB3-030(*)	2.295	1.975	.490	1.040
033	MB3-033(*)	2.395	2.075	.490	1.140
036	MB3-036(*)	2.495	2.175	.490	1.240
039	MB3-039(*)	2.595	2.275	.490	1.340
042	MB3-042(*)	2.695	2.375	.490	1.440
045	MB3-045(*)	2.795	2.475	.490	1.540
048	MB3-048(*)	2.895	2.575	.490	1.640
051	MB3-051(*)	2.995	2.675	.490	1.740
054	MB3-054(*)	3.095	2.775	.490	1.840
057	MB3-057(*)	3.195	2.875	.490	1.940
060	MB3-060(*)	3.295	2.975	.490	2.040
063	MB3-063(*)	3.395	3.075	.490	2.140
066	MB3-066(*)	3.495	3.175	.490	2.240
069	MB3-069(*)	3.595	3.275	.490	2.340
072	MB3-072(*)	3.695	3.375	.490	2.440
075	MB3-075(*)	3.795	3.475	.490	2.540
078	MB3-078(*)	3.895	3.575	.490	2.640
081	MB3-081(*)	3.995	3.675	.490	2.740
084	MB3-084(*)	4.095	3.775	.490	2.840
087	MB3-087(*)	4.195	3.875	.490	2.940
090	MB3-090(*)	4.295	3.975	.490	3.040
093	MB3-093(*)	4.395	4.075	.490	3.140
096	MB3-096(*)	4.495	4.175	.490	3.240
099	MB3-099(*)	4.595	4.275	.490	3.340
102	MB3-102(*)	4.695	4.375	.490	3.440
105	MB3-105(*)	4.795	4.475	.490	3.540
108	MB3-108(*)	4.895	4.575	.490	3.640
111	MB3-111(*)	4.995	4.675	.490	3.740
114	MB3-114(*)	5.095	4.775	.490	3.840
117	MB3-117(*)	5.195	4.875	.490	3.940
120	MB3-120(*)	5.295	4.975	.490	4.040
123	MB3-123(*)	5.395	5.075	.490	4.140
126	MB3-126(*)	5.495	5.175	.490	4.240
129	MB3-129(*)	5.595	5.275	.490	4.340
132	MB3-132(*)	5.695	5.375	.490	4.440
135	MB3-135(*)	5.795	5.475	.490	4.540
138	MB3-138(*)	5.895	5.575	.490	4.640
141	MB3-141(*)	5.995	5.675	.490	4.740
144	MB3-144(*)	6.095	5.775	.490	4.840
147	MB3-147(*)	6.195	5.875	.490	4.940
150	MB3-150(*)	6.295	5.975	.490	5.040
153	MB3-153(*)	6.395	6.075	.490	5.140
156	MB3-156(*)	6.495	6.175	.490	5.240
159	MB3-159(*)	6.595	6.275	.490	5.340
162	MB3-162(*)	6.695	6.375	.490	5.440
165	MB3-165(*)	6.795	6.475	.490	5.540

Number of Contacts	MB Number*	A Max.	B	C Max.	G Min.
168	MB3-168(*)	6.895	6.575	.490	5.640
171	MB3-171(*)	6.995	6.675	.490	5.740
174	MB3-174(*)	7.095	6.775	.490	5.840
177	MB3-177(*)	7.195	6.875	.490	5.940
180	MB3-180(*)	7.295	6.975	.490	6.040
183	MB3-183(*)	7.395	7.075	.490	6.140
186	MB3-186(*)	7.495	7.175	.490	6.240
189	MB3-189(*)	7.595	7.275	.490	6.340
192	MB3-192(*)	7.695	7.375	.490	6.440
195	MB3-195(*)	7.795	7.475	.490	6.540
198	MB3-198(*)	7.895	7.575	.490	6.640
201	MB3-201(*)	7.995	7.675	.490	6.740
204	MB3-204(*)	8.095	7.775	.490	6.840
207	MB3-207(*)	8.195	7.875	.490	6.940
210	MB3-210(*)	8.295	7.975	.490	7.040
213	MB3-213(*)	8.395	8.075	.490	7.140
216	MB3-216(*)	8.495	8.175	.490	7.240
219	MB3-219(*)	8.595	8.275	.490	7.340
222	MB3-222(*)	8.695	8.375	.490	7.440
225	MB3-225(*)	8.795	8.475	.490	7.540
228	MB3-228(*)	8.895	8.575	.490	7.640
231	MB3-231(*)	8.995	8.675	.490	7.740
234	MB3-234(*)	9.095	8.775	.490	7.840
237	MB3-237(*)	9.195	8.875	.490	7.940
240	MB3-240(*)	9.295	8.975	.490	8.040
243	MB3-243(*)	9.395	9.075	.490	8.140
246	MB3-246(*)	9.495	9.175	.490	8.240
249	MB3-249(*)	9.595	9.275	.490	8.340
252	MB3-252(*)	9.695	9.375	.490	8.440
255	MB3-255(*)	9.795	9.475	.490	8.540
258	MB3-258(*)	9.895	9.575	.490	8.640
261	MB3-261(*)	9.995	9.675	.490	8.740
264	MB3-264(*)	10.095	9.775	.490	8.840
267	MB3-267(*)	10.195	9.875	.490	8.940
270	MB3-270(*)	10.295	9.975	.490	9.040
273	MB3-273(*)	10.395	10.075	.490	9.140
276	MB3-276(*)	10.495	10.175	.490	9.240
279	MB3-279(*)	10.595	10.275	.490	9.340
282	MB3-282(*)	10.695	10.375	.490	9.440
285	MB3-285(*)	10.795	10.475	.490	9.540
288	MB3-288(*)	10.895	10.575	.490	9.640
291	MB3-291(*)	10.995	10.675	.490	9.740
294	MB3-294(*)	11.095	10.775	.490	9.840
297	MB3-297(*)	11.195	10.875	.490	9.940
300	MB3-300(*)	11.295	10.975	.490	10.040

*See How to Order, pages 64-66.

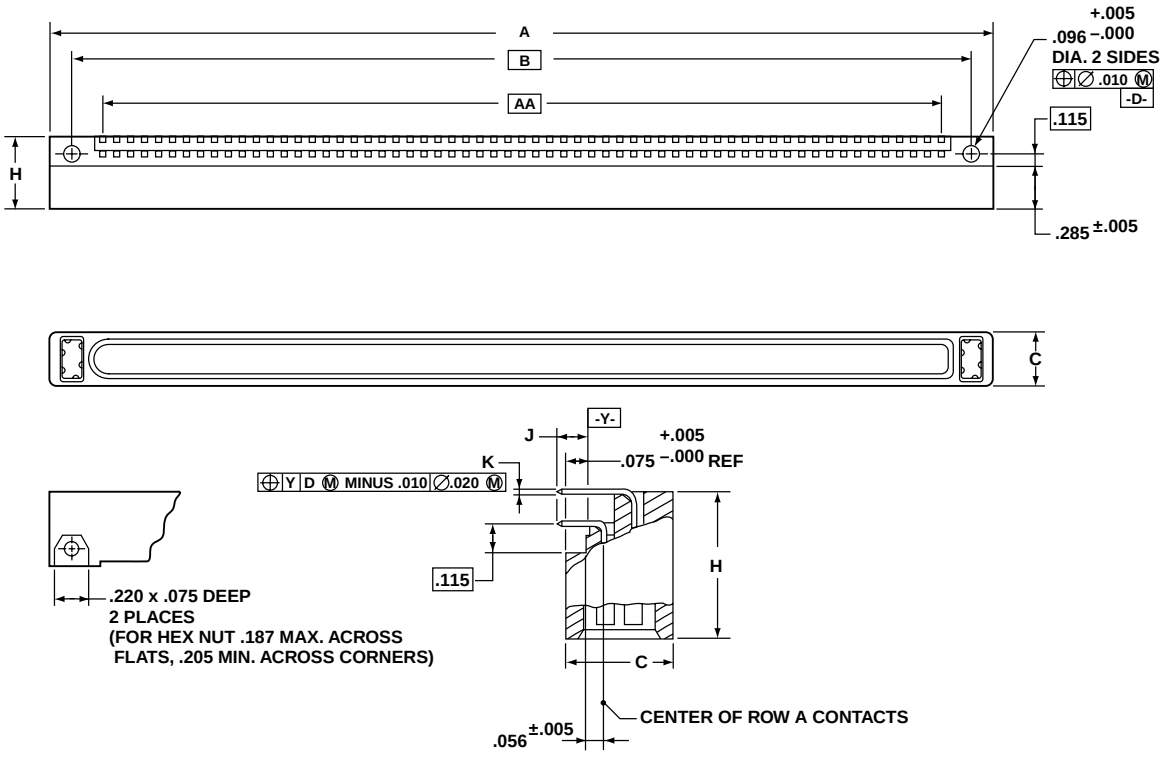
4 ROW CONTACT ARRANGMENTS

Number of Contacts	MB Number*	A Max.	B	C Max.	G Min.
040	MB4-040(*)	2.295	1.975	.590	1.040
044	MB4-044(*)	2.395	2.075	.590	1.140
048	MB4-048(*)	2.495	2.175	.590	1.240
052	MB4-052(*)	2.595	2.275	.590	1.340
056	MB4-056(*)	2.695	2.375	.590	1.440
060	MB4-060(*)	2.795	2.475	.590	1.540
064	MB4-064(*)	2.895	2.575	.590	1.640
068	MB4-068(*)	2.995	2.675	.590	1.740
072	MB4-072(*)	3.095	2.775	.590	1.840
076	MB4-076(*)	3.195	2.875	.590	1.940
080	MB4-080(*)	3.295	2.975	.590	2.040
084	MB4-084(*)	3.395	3.075	.590	2.140
088	MB4-088(*)	3.495	3.175	.590	2.240
092	MB4-092(*)	3.595	3.275	.590	2.340
096	MB4-096(*)	3.695	3.375	.590	2.440
100	MB4-100(*)	3.795	3.475	.590	2.540
104	MB4-104(*)	3.895	3.575	.590	2.640
108	MB4-108(*)	3.995	3.675	.590	2.740
112	MB4-112(*)	4.095	3.775	.590	2.840
116	MB4-116(*)	4.195	3.875	.590	2.940
120	MB4-120(*)	4.295	3.975	.590	3.040
124	MB4-124(*)	4.395	4.075	.590	3.140
128	MB4-128(*)	4.495	4.175	.590	3.240
132	MB4-132(*)	4.595	4.275	.590	3.340
136	MB4-136(*)	4.695	4.375	.590	3.440
140	MB4-140(*)	4.795	4.475	.590	3.540
144	MB4-144(*)	4.895	4.575	.590	3.640
148	MB4-148(*)	4.995	4.675	.590	3.740
152	MB4-152(*)	5.095	4.775	.590	3.840
156	MB4-156(*)	5.195	4.875	.590	3.940
160	MB4-160(*)	5.295	4.975	.590	4.040
164	MB4-164(*)	5.395	5.075	.590	4.140
168	MB4-168(*)	5.495	5.175	.590	4.240
172	MB4-172(*)	5.595	5.275	.590	4.340
176	MB4-176(*)	5.695	5.375	.590	4.440
180	MB4-180(*)	5.795	5.475	.590	4.540
184	MB4-184(*)	5.895	5.575	.590	4.640
188	MB4-188(*)	5.995	5.675	.590	4.740
192	MB4-192(*)	6.095	5.775	.590	4.840
196	MB4-196(*)	6.195	5.875	.590	4.940
200	MB4-200(*)	6.295	5.975	.590	5.040
204	MB4-204(*)	6.395	6.075	.590	5.140
208	MB4-208(*)	6.495	6.175	.590	5.240
212	MB4-212(*)	6.595	6.275	.590	5.340
216	MB4-216(*)	6.695	6.375	.590	5.440
220	MB4-220(*)	6.795	6.475	.590	5.540

Number of Contacts	MB Number*	A Max.	B	C Max.	G Min.
224	MB4-224(*)	6.895	6.575	.590	5.640
228	MB4-228(*)	6.995	6.675	.590	5.740
232	MB4-232(*)	7.095	6.775	.590	5.840
236	MB4-236(*)	7.195	6.875	.590	5.940
240	MB4-240(*)	7.295	6.975	.590	6.040
244	MB4-244(*)	7.395	7.075	.590	6.140
248	MB4-248(*)	7.495	7.175	.590	6.240
252	MB4-252(*)	7.595	7.275	.590	6.340
256	MB4-256(*)	7.695	7.375	.590	6.440
260	MB4-260(*)	7.795	7.475	.590	6.540
264	MB4-264(*)	7.895	7.575	.590	6.640
268	MB4-268(*)	7.995	7.675	.590	6.740
272	MB4-272(*)	8.095	7.775	.590	6.840
276	MB4-276(*)	8.195	7.875	.590	6.940
280	MB4-280(*)	8.295	7.975	.590	7.040
284	MB4-284(*)	8.395	8.075	.590	7.140
288	MB4-288(*)	8.495	8.175	.590	7.240
292	MB4-292(*)	8.595	8.275	.590	7.340
296	MB4-296(*)	8.695	8.375	.590	7.440
300	MB4-300(*)	8.795	8.475	.590	7.540
304	MB4-304(*)	8.895	8.575	.590	7.640
308	MB4-308(*)	8.995	8.675	.590	7.740
312	MB4-312(*)	9.095	8.775	.590	7.840
316	MB4-316(*)	9.195	8.875	.590	7.940
320	MB4-320(*)	9.295	8.975	.590	8.040
324	MB4-324(*)	9.395	9.075	.590	8.140
328	MB4-328(*)	9.495	9.175	.590	8.240
332	MB4-332(*)	9.595	9.275	.590	8.340
336	MB4-336(*)	9.695	9.375	.590	8.440
340	MB4-340(*)	9.795	9.475	.590	8.540
344	MB4-344(*)	9.895	9.575	.590	8.640
348	MB4-348(*)	9.995	9.675	.590	8.740
352	MB4-352(*)	10.095	9.775	.590	8.840
356	MB4-356(*)	10.195	9.875	.590	8.940
360	MB4-360(*)	10.295	9.975	.590	9.040
364	MB4-364(*)	10.395	10.075	.590	9.140
368	MB4-368(*)	10.495	10.175	.590	9.240
372	MB4-372(*)	10.595	10.275	.590	9.340
376	MB4-376(*)	10.695	10.375	.590	9.440
380	MB4-380(*)	10.795	10.475	.590	9.540
384	MB4-384(*)	10.895	10.575	.590	9.640
388	MB4-388(*)	10.995	10.675	.590	9.740
392	MB4-392(*)	11.095	10.775	.590	9.840
396	MB4-396(*)	11.195	10.875	.590	9.940
400	MB4-400(*)	11.295	10.975	.590	10.040

*See How to Order, pages 64-66.

DIMENSIONAL DRAWING



MATES WITH MB AND PC SERIES CONNECTORS

Notes:

When mating with MB or PC connector, a total of .035 inch minimum radial pilot is available for connector body alignment.

All dimensions for reference only.

Polarization keys are not supplied as part of DB Connector Series assemblies. See Accessories How to Order, page 66 and further description, page 90.

Designates Basic Dimension

Contact Data				
Description	Termination Style Letter	Arrangement Row	J ±.020	K ±.002
Round PCB Stud, 90° Solder Termination	P	A	.085	.021 Dia.
	P	B	.085	.021 Dia.
	P	C	.085	.021 Dia.
	P	D	.085	.021 Dia.
	P-(705)	A	.120	.021 Dia.
	P-(705)	B	.120	.021 Dia.
	P-(705)	C	.120	.021 Dia.
	P-(705)	D	.120	.021 Dia.
	P-(709)	A	.300	.021 Dia.
	P-(709)	B	.300	.021 Dia.
	P-(709)	C	.300	.021 Dia.
	P-(709)	D	.300	.021 Dia.

NOTE: Other variations available - see pages 65 & 66, or consult Amphenol Aerospace.

Low Mating Force Daughter Board Connector

2 ROW CONTACT ARRANGEMENTS

Number of Contacts	DB Number*	A Max.	B	C Max.	H Max.	AA
020	DB2-020P	1.680	1.350	.375	.545	.900
022	DB2-022P	1.780	1.450	.375	.545	1.000
024	DB2-024P	1.880	1.550	.375	.545	1.100
026	DB2-026P	1.980	1.650	.375	.545	1.200
028	DB2-028P	2.080	1.750	.375	.545	1.300
030	DB2-030P	2.180	1.850	.375	.545	1.400
032	DB2-032P	2.280	1.950	.375	.545	1.500
034	DB2-034P	2.380	2.050	.375	.545	1.600
036	DB2-036P	2.480	2.150	.375	.545	1.700
038	DB2-038P	2.580	2.250	.375	.545	1.800
040	DB2-040P	2.680	2.350	.375	.545	1.900
042	DB2-042P	2.780	2.450	.375	.545	2.000
044	DB2-044P	2.880	2.550	.375	.545	2.100
046	DB2-046P	2.980	2.650	.375	.545	2.200
048	DB2-048P	3.080	2.750	.375	.545	2.300
050	DB2-050P	3.180	2.850	.375	.545	2.400
052	DB2-052P	3.280	2.950	.375	.545	2.500
054	DB2-054P	3.380	3.050	.375	.545	2.600
056	DB2-056P	3.480	3.150	.375	.545	2.700
058	DB2-058P	3.580	3.250	.375	.545	2.800
060	DB2-060P	3.680	3.350	.375	.545	2.900
062	DB2-062P	3.780	3.450	.375	.545	3.000
064	DB2-064P	3.880	3.550	.375	.545	3.100
066	DB2-066P	3.980	3.650	.375	.545	3.200
068	DB2-068P	4.080	3.750	.375	.545	3.300
070	DB2-070P	4.180	3.850	.375	.545	3.400
072	DB2-072P	4.280	3.950	.375	.545	3.500
074	DB2-074P	4.380	4.050	.375	.545	3.600
076	DB2-076P	4.480	4.150	.375	.545	3.700
078	DB2-078P	4.580	4.250	.375	.545	3.800
080	DB2-080P	4.680	4.350	.375	.545	3.900
082	DB2-082P	4.780	4.450	.375	.545	4.000
084	DB2-084P	4.880	4.550	.375	.545	4.100
086	DB2-086P	4.980	4.650	.375	.545	4.200
088	DB2-088P	5.080	4.750	.375	.545	4.300
090	DB2-090P	5.180	4.850	.375	.545	4.400
092	DB2-092P	5.280	4.950	.375	.545	4.500
094	DB2-094P	5.380	5.050	.375	.545	4.600
096	DB2-096P	5.480	5.150	.375	.545	4.700
098	DB2-098P	5.580	5.250	.375	.545	4.800
100	DB2-100P	5.680	5.350	.375	.545	4.900
102	DB2-102P	5.780	5.450	.375	.545	5.000
104	DB2-104P	5.880	5.550	.375	.545	5.100
106	DB2-106P	5.980	5.650	.375	.545	5.200
108	DB2-108P	6.080	5.750	.375	.545	5.300
110	DB2-110P	6.180	5.850	.375	.545	5.400

Number of Contacts	DB Number*	A Max.	B	C Max.	H Max.	AA
112	DB2-112P	6.280	5.950	.375	.545	5.500
114	DB2-114P	6.380	6.050	.375	.545	5.600
116	DB2-116P	6.480	6.150	.375	.545	5.700
118	DB2-118P	6.580	6.250	.375	.545	5.800
120	DB2-120P	6.680	6.350	.375	.545	5.900
122	DB2-122P	6.780	6.450	.375	.545	6.000
124	DB2-124P	6.880	6.550	.375	.545	6.100
126	DB2-126P	6.980	6.650	.375	.545	6.200
128	DB2-128P	7.080	6.750	.375	.545	6.300
130	DB2-130P	7.180	6.850	.375	.545	6.400
132	DB2-132P	7.280	6.950	.375	.545	6.500
134	DB2-134P	7.380	7.050	.375	.545	6.600
136	DB2-136P	7.480	7.150	.375	.545	6.700
138	DB2-138P	7.580	7.250	.375	.545	6.800
140	DB2-140P	7.680	7.350	.375	.545	6.900
142	DB2-142P	7.780	7.450	.375	.545	7.000
144	DB2-144P	7.880	7.550	.375	.545	7.100
146	DB2-146P	7.980	7.650	.375	.545	7.200
148	DB2-148P	8.080	7.750	.375	.545	7.300
150	DB2-150P	8.180	7.850	.375	.545	7.400
152	DB2-152P	8.280	7.950	.375	.545	7.500
154	DB2-154P	8.380	8.050	.375	.545	7.600
156	DB2-156P	8.480	8.150	.375	.545	7.700
158	DB2-158P	8.580	8.250	.375	.545	7.800
160	DB2-160P	8.680	8.350	.375	.545	7.900
162	DB2-162P	8.780	8.450	.375	.545	8.000
164	DB2-164P	8.880	8.550	.375	.545	8.100
166	DB2-166P	8.980	8.650	.375	.545	8.200
168	DB2-168P	9.080	8.750	.375	.545	8.300
170	DB2-170P	9.180	8.850	.375	.545	8.400
172	DB2-172P	9.280	8.950	.375	.545	8.500
174	DB2-174P	9.380	9.050	.375	.545	8.600
176	DB2-176P	9.480	9.150	.375	.545	8.700
178	DB2-178P	9.580	9.250	.375	.545	8.800
180	DB2-180P	9.680	9.350	.375	.545	8.900
182	DB2-182P	9.780	9.450	.375	.545	9.000
184	DB2-184P	9.880	9.550	.375	.545	9.100
186	DB2-186P	9.980	9.650	.375	.545	9.200
188	DB2-188P	10.080	9.750	.375	.545	9.300
190	DB2-190P	10.180	9.850	.375	.545	9.400
192	DB2-192P	10.280	9.950	.375	.545	9.500
194	DB2-194P	10.380	10.050	.375	.545	9.600
196	DB2-196P	10.480	10.150	.375	.545	9.700
198	DB2-198P	10.580	10.250	.375	.545	9.800
200	DB2-200P	10.680	10.350	.375	.545	9.900

*See How to Order, pages 64-66.

Amphenol Aerospace

3 ROW CONTACT ARRANGEMENTS

Number of Contacts	DB Number*	A Max.	B	C Max.	H Max.	AA
030	DB3-030P	1.680	1.350	.475	.645	.900
033	DB3-033P	1.780	1.450	.475	.645	1.000
036	DB3-036P	1.880	1.550	.475	.645	1.100
039	DB3-039P	1.980	1.650	.475	.645	1.200
042	DB3-042P	2.080	1.750	.475	.645	1.300
045	DB3-045P	2.180	1.850	.475	.645	1.400
048	DB3-048P	2.280	1.950	.475	.645	1.500
051	DB3-051P	2.380	2.050	.475	.645	1.600
054	DB3-054P	2.480	2.150	.475	.645	1.700
057	DB3-057P	2.580	2.250	.475	.645	1.800
060	DB3-060P	2.680	2.350	.475	.645	1.900
063	DB3-063P	2.780	2.450	.475	.645	2.000
066	DB3-066P	2.880	2.550	.475	.645	2.100
069	DB3-069P	2.980	2.650	.475	.645	2.200
072	DB3-072P	3.080	2.750	.475	.645	2.300
075	DB3-075P	3.180	2.850	.475	.645	2.400
078	DB3-078P	3.280	2.950	.475	.645	2.500
081	DB3-081P	3.380	3.050	.475	.645	2.600
084	DB3-084P	3.480	3.150	.475	.645	2.700
087	DB3-087P	3.580	3.250	.475	.645	2.800
090	DB3-090P	3.680	3.350	.475	.645	2.900
093	DB3-093P	3.780	3.450	.475	.645	3.000
096	DB3-096P	3.880	3.550	.475	.645	3.100
099	DB3-099P	3.980	3.650	.475	.645	3.200
102	DB3-102P	4.080	3.750	.475	.645	3.300
105	DB3-105P	4.180	3.850	.475	.645	3.400
108	DB3-108P	4.280	3.950	.475	.645	3.500
111	DB3-111P	4.380	4.050	.475	.645	3.600
114	DB3-114P	4.480	4.150	.475	.645	3.700
117	DB3-117P	4.580	4.250	.475	.645	3.800
120	DB3-120P	4.680	4.350	.475	.645	3.900
123	DB3-123P	4.780	4.450	.475	.645	4.000
126	DB3-126P	4.880	4.550	.475	.645	4.100
129	DB3-129P	4.980	4.650	.475	.645	4.200
132	DB3-132P	5.080	4.750	.475	.645	4.300
135	DB3-135P	5.180	4.850	.475	.645	4.400
138	DB3-138P	5.280	4.950	.475	.645	4.500
141	DB3-141P	5.380	5.050	.475	.645	4.600
144	DB3-144P	5.480	5.150	.475	.645	4.700
147	DB3-147P	5.580	5.250	.475	.645	4.800
150	DB3-150P	5.680	5.350	.475	.645	4.900
153	DB3-153P	5.780	5.450	.475	.645	5.000
156	DB3-156P	5.880	5.550	.475	.645	5.100
159	DB3-159P	5.980	5.650	.475	.645	5.200
162	DB3-162P	6.080	5.750	.475	.645	5.300
165	DB3-165P	6.180	5.850	.475	.645	5.400

Number of Contacts	DB Number*	A Max.	B	C Max.	H Max.	AA
168	DB3-168P	6.280	5.950	.475	.645	5.500
171	DB3-171P	6.380	6.050	.475	.645	5.600
174	DB3-174P	6.480	6.150	.475	.645	5.700
177	DB3-177P	6.580	6.250	.475	.645	5.800
180	DB3-180P	6.680	6.350	.475	.645	5.900
183	DB3-183P	6.780	6.450	.475	.645	6.000
186	DB3-186P	6.880	6.550	.475	.645	6.100
189	DB3-189P	6.980	6.650	.475	.645	6.200
192	DB3-192P	7.080	6.750	.475	.645	6.300
195	DB3-195P	7.180	6.850	.475	.645	6.400
198	DB3-198P	7.280	6.950	.475	.645	6.500
201	DB3-201P	7.380	7.050	.475	.645	6.600
204	DB3-204P	7.480	7.150	.475	.645	6.700
207	DB3-207P	7.580	7.250	.475	.645	6.800
210	DB3-210P	7.680	7.350	.475	.645	6.900
213	DB3-213P	7.780	7.450	.475	.645	7.000
216	DB3-216P	7.880	7.550	.475	.645	7.100
219	DB3-219P	7.980	7.650	.475	.645	7.200
222	DB3-222P	8.080	7.750	.475	.645	7.300
225	DB3-225P	8.180	7.850	.475	.645	7.400
228	DB3-228P	8.280	7.950	.475	.645	7.500
231	DB3-231P	8.380	8.050	.475	.645	7.600
234	DB3-234P	8.480	8.150	.475	.645	7.700
237	DB3-237P	8.580	8.250	.475	.645	7.800
240	DB3-240P	8.680	8.350	.475	.645	7.900
243	DB3-243P	8.780	8.450	.475	.645	8.000
246	DB3-246P	8.880	8.550	.475	.645	8.100
249	DB3-249P	8.980	8.650	.475	.645	8.200
252	DB3-252P	9.080	8.750	.475	.645	8.300
255	DB3-255P	9.180	8.850	.475	.645	8.400
258	DB3-258P	9.280	8.950	.475	.645	8.500
261	DB3-261P	9.380	9.050	.475	.645	8.600
264	DB3-264P	9.480	9.150	.475	.645	8.700
267	DB3-267P	9.580	9.250	.475	.645	8.800
270	DB3-270P	9.680	9.350	.475	.645	8.900
273	DB3-273P	9.780	9.450	.475	.645	9.000
276	DB3-276P	9.880	9.550	.475	.645	9.100
279	DB3-279P	9.980	9.650	.475	.645	9.200
282	DB3-282P	10.080	9.750	.475	.645	9.300
285	DB3-285P	10.180	9.850	.475	.645	9.400
288	DB3-288P	10.280	9.950	.475	.645	9.500
291	DB3-291P	10.380	10.050	.475	.645	9.600
294	DB3-294P	10.480	10.150	.475	.645	9.700
297	DB3-397P	10.580	10.250	.475	.645	9.800
300	DB3-300P	10.680	10.350	.475	.645	9.900

*See How to Order, pages 64-66.

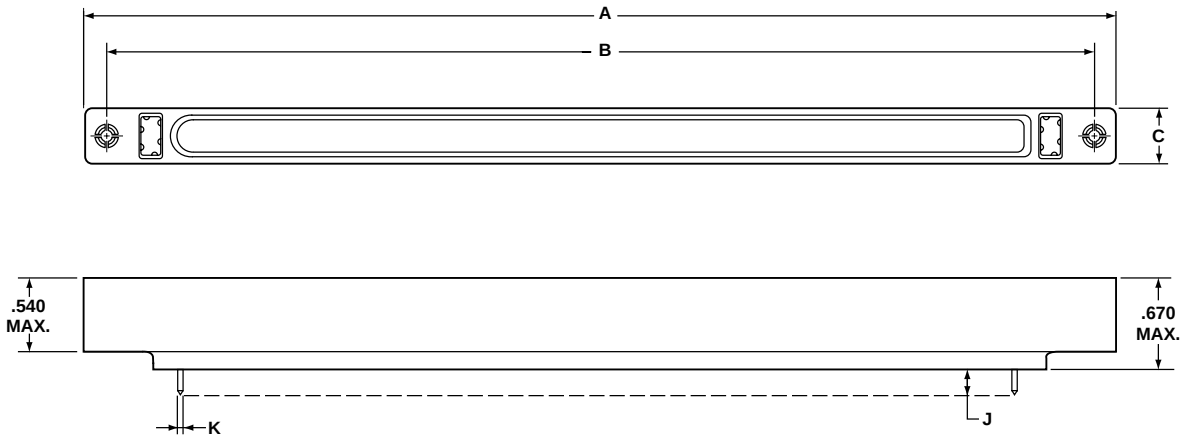
4 ROW CONTACT ARRANGEMENTS

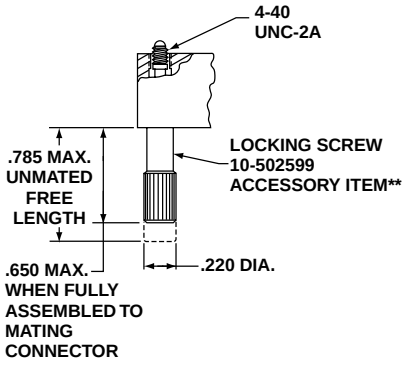
Number of Contacts	DB Number*	A Max.	B	C Max.	H Max.	AA
040	DB4-040P	1.680	1.350	.575	.745	.900
044	DB4-044P	1.780	1.450	.575	.745	1.000
048	DB4-048P	1.880	1.550	.575	.745	1.100
052	DB4-052P	1.980	1.650	.575	.745	1.200
056	DB4-056P	2.080	1.750	.575	.745	1.300
060	DB4-060P	2.180	1.850	.575	.745	1.400
064	DB4-064P	2.280	1.950	.575	.745	1.500
068	DB4-068P	2.380	2.050	.575	.745	1.600
072	DB4-072P	2.480	2.150	.575	.745	1.700
076	DB4-076P	2.580	2.250	.575	.745	1.800
080	DB4-080P	2.680	2.350	.575	.745	1.900
084	DB4-084P	2.780	2.450	.575	.745	2.000
088	DB4-088P	2.880	2.550	.575	.745	2.100
092	DB4-092P	2.980	2.650	.575	.745	2.200
096	DB4-096P	3.080	2.750	.575	.745	2.300
100	DB4-100P	3.180	2.850	.575	.745	2.400
104	DB4-104P	3.280	2.950	.575	.745	2.500
108	DB4-108P	3.380	3.050	.575	.745	2.600
112	DB4-112P	3.480	3.150	.575	.745	2.700
116	DB4-116P	3.580	3.250	.575	.745	2.800
120	DB4-120P	3.680	3.350	.575	.745	2.900
124	DB4-124P	3.780	3.450	.575	.745	3.000
128	DB4-128P	3.880	3.550	.575	.745	3.100
132	DB4-132P	3.980	3.650	.575	.745	3.200
136	DB4-136P	4.080	3.750	.575	.745	3.300
140	DB4-140P	4.180	3.850	.575	.745	3.400
144	DB4-144P	4.280	3.950	.575	.745	3.500
148	DB4-148P	4.380	4.050	.575	.745	3.600
152	DB4-152P	4.480	4.150	.575	.745	3.700
156	DB4-156P	4.580	4.250	.575	.745	3.800
160	DB4-160P	4.680	4.350	.575	.745	3.900
164	DB4-164P	4.780	4.450	.575	.745	4.000
168	DB4-168P	4.880	4.550	.575	.745	4.100
172	DB4-172P	4.980	4.650	.575	.745	4.200
176	DB4-176P	5.080	4.750	.575	.745	4.300
180	DB4-180P	5.180	4.850	.575	.745	4.400
184	DB4-184P	5.280	4.950	.575	.745	4.500
188	DB4-188P	5.380	5.050	.575	.745	4.600
192	DB4-192P	5.480	5.150	.575	.745	4.700
196	DB4-196P	5.580	5.250	.575	.745	4.800
200	DB4-200P	5.680	5.350	.575	.745	4.900
204	DB4-204P	5.780	5.450	.575	.745	5.000
208	DB4-208P	5.880	5.550	.575	.745	5.100
212	DB4-212P	5.980	5.650	.575	.745	5.200
216	DB4-216P	6.080	5.750	.575	.745	5.300
220	DB4-220P	6.180	5.850	.575	.745	5.400

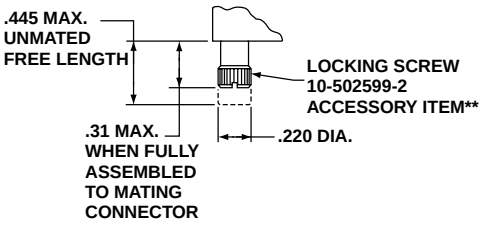
Number of Contacts	DB Number*	A Max.	B	C Max.	H Max.	AA
224	DB4-224P	6.280	5.950	.575	.745	5.500
228	DB4-228P	6.380	6.050	.575	.745	5.600
232	DB4-232P	6.480	6.150	.575	.745	5.700
236	DB4-236P	6.580	6.250	.575	.745	5.800
240	DB4-240P	6.680	6.350	.575	.745	5.900
244	DB4-244P	6.780	6.450	.575	.745	6.000
248	DB4-248P	6.880	6.550	.575	.745	6.100
252	DB4-252P	6.980	6.650	.575	.745	6.200
256	DB4-256P	7.080	6.750	.575	.745	6.300
260	DB4-260P	7.180	6.850	.575	.745	6.400
264	DB4-264P	7.280	6.950	.575	.745	6.500
268	DB4-268P	7.380	7.050	.575	.745	6.600
272	DB4-272P	7.480	7.150	.575	.745	6.700
276	DB4-276P	7.580	7.250	.575	.745	6.800
280	DB4-280P	7.680	7.350	.575	.745	6.900
284	DB4-284P	7.780	7.450	.575	.745	7.000
288	DB4-288P	7.780	7.550	.575	.745	7.100
292	DB4-292P	7.980	7.650	.575	.745	7.200
296	DB4-296P	8.080	7.750	.575	.745	7.300
300	DB4-300P	8.180	7.850	.575	.745	7.400
304	DB4-304P	8.280	7.950	.575	.745	7.500
308	DB4-308P	8.380	8.050	.575	.745	7.600
312	DB4-312P	8.480	8.150	.575	.745	7.700
316	DB4-316P	8.580	8.250	.575	.745	7.800
320	DB4-320P	8.680	8.350	.575	.745	7.900
324	DB4-324P	8.780	8.450	.575	.745	8.000
328	DB4-328P	8.880	8.550	.575	.745	8.100
332	DB4-332P	8.980	8.650	.575	.745	8.200
336	DB4-336P	9.080	8.750	.575	.745	8.300
340	DB4-340P	9.180	8.850	.575	.745	8.400
344	DB4-344P	9.280	8.950	.575	.745	8.500
348	DB4-348P	9.380	9.050	.575	.745	8.600
352	DB4-352P	9.480	9.150	.575	.745	8.700
356	DB4-356P	9.580	9.250	.575	.745	8.800
360	DB4-360P	9.680	9.350	.575	.745	8.900
364	DB4-364P	9.780	9.450	.575	.745	9.000
368	DB4-368P	9.880	9.550	.575	.745	9.100
372	DB4-372P	9.980	9.650	.575	.745	9.200
376	DB4-376P	10.080	9.750	.575	.745	9.300
380	DB4-380P	10.180	9.850	.575	.745	9.400
384	DB4-384P	10.280	9.950	.575	.745	9.500
388	DB4-388P	10.380	10.050	.575	.745	9.600
392	DB4-392P	10.480	10.150	.575	.745	9.700
396	DB4-396P	10.580	10.250	.575	.745	9.800
400	DB4-400P	10.680	10.350	.575	.745	9.900

*See How to Order, pages 64-66.

DIMENSIONAL DRAWING







MATES WITH MB AND PC SERIES CONNECTORS

Notes:

When mating with MB or PC connector, a total of .022 inch minimum radial pilot is available for connector body alignment.

All dimensions for reference only.

Crimp contact, wire well size 22D, supplied with IO Connector Series assemblies. Optional noble metal termination plating available. See How to Order, page 66.

Polarization keys are not supplied as part of IO Connector Series assemblies. See Accessories How to Order, page 66 and further description, page 90.

** Locking Screws are not supplied as part of IO Connector Series assemblies. See Accessories How to Order, page 66 and further description, page 93.

Contact Data			
Description	Termination Style Letter	J ±.020	K ±.002
Rear Removable Crimp Contact	C	N/A	N/A
Round PCB Stud Solder Termination	P	.145	.021
	P-(713)	.060	.021
	P-(709)	.335	.021

NOTE: Other variations available - see pages 65 & 66, or consult Amphenol Aerospace.

2 ROW CONTACT ARRANGEMENTS

Number of Contacts	IO Number*	A Max.	B	C Max.
020	IO2-020(*)	2.295	1.975	.390
022	IO2-022(*)	2.395	2.075	.390
024	IO2-024(*)	2.495	2.175	.390
026	IO2-026(*)	2.595	2.275	.390
028	IO2-028(*)	2.695	2.375	.390
030	IO2-030(*)	2.795	2.475	.390
032	IO2-032(*)	2.895	2.575	.390
034	IO2-034(*)	2.995	2.675	.390
036	IO2-036(*)	3.095	2.775	.390
038	IO2-038(*)	3.195	2.875	.390
040	IO2-040(*)	3.295	2.975	.390
042	IO2-042(*)	3.395	3.075	.390
044	IO2-044(*)	3.495	3.175	.390
046	IO2-046(*)	3.595	3.275	.390
048	IO2-048(*)	3.695	3.375	.390
050	IO2-050(*)	3.795	3.475	.390
052	IO2-052(*)	3.895	3.575	.390
054	IO2-054(*)	3.995	3.675	.390
056	IO2-056(*)	4.095	3.775	.390
058	IO2-058(*)	4.195	3.875	.390
060	IO2-060(*)	4.295	3.975	.390
062	IO2-062(*)	4.395	4.075	.390
064	IO2-064(*)	4.495	4.175	.390
066	IO2-066(*)	4.595	4.275	.390
068	IO2-068(*)	4.695	4.375	.390
070	IO2-070(*)	4.795	4.475	.390
072	IO2-072(*)	4.895	4.575	.390
074	IO2-074(*)	4.995	4.675	.390
076	IO2-076(*)	5.095	4.775	.390
078	IO2-078(*)	5.195	4.875	.390
080	IO2-080(*)	5.295	4.975	.390
082	IO2-082(*)	5.395	5.075	.390
084	IO2-084(*)	5.495	5.175	.390
086	IO2-086(*)	5.595	5.275	.390
088	IO2-088(*)	5.695	5.375	.390
090	IO2-090(*)	5.795	5.475	.390
092	IO2-092(*)	5.895	5.575	.390
094	IO2-094(*)	5.995	5.675	.390
096	IO2-096(*)	6.095	5.775	.390
098	IO2-098(*)	6.195	5.875	.390
100	IO2-100(*)	6.295	5.975	.390
102	IO2-102(*)	6.395	6.075	.390
104	IO2-104(*)	6.495	6.175	.390
106	IO2-106(*)	6.595	6.275	.390
108	IO2-108(*)	6.695	6.375	.390
110	IO2-110(*)	6.795	6.475	.390

Number of Contacts	IO Number*	A Max.	B	C Max.
112	IO2-112(*)	6.895	6.575	.390
114	IO2-114(*)	6.995	6.675	.390
116	IO2-116(*)	7.095	6.775	.390
118	IO2-118(*)	7.195	6.875	.390
120	IO2-120(*)	7.295	6.975	.390
122	IO2-122(*)	7.395	7.075	.390
124	IO2-124(*)	7.495	7.175	.390
126	IO2-126(*)	7.595	7.275	.390
128	IO2-128(*)	7.695	7.375	.390
130	IO2-130(*)	7.795	7.475	.390
132	IO2-132(*)	7.895	7.575	.390
134	IO2-134(*)	7.995	7.675	.390
136	IO2-136(*)	8.095	7.775	.390
138	IO2-138(*)	8.195	7.875	.390
140	IO2-140(*)	8.295	7.975	.390
142	IO2-142(*)	8.395	8.075	.390
144	IO2-144(*)	8.495	8.175	.390
146	IO2-146(*)	8.595	8.275	.390
148	IO2-148(*)	8.695	8.375	.390
150	IO2-150(*)	8.795	8.475	.390
152	IO2-152(*)	8.895	8.575	.390
154	IO2-154(*)	8.995	8.675	.390
156	IO2-156(*)	9.095	8.775	.390
158	IO2-158)*)	9.195	8.875	.390
160	IO2-160(*)	9.295	8.975	.390
162	IO2-162(*)	9.395	9.075	.390
164	IO2-164(*)	9.495	9.175	.390
166	IO2-166(*)	9.595	9.275	.390
168	IO2-168(*)	9.695	9.375	.390
170	IO2-170(*)	9.795	9.475	.390
172	IO2-172(*)	9.895	9.575	.390
174	IO2-174(*)	9.995	9.675	.390
176	IO2-176(*)	10.095	9.775	.390
178	IO2-178(*)	10.195	9.875	.390
180	IO2-180(*)	10.295	9.975	.390
182	IO2-182(*)	10.395	10.075	.390
184	IO2-184(*)	10.495	10.175	.390
186	IO2-186(*)	10.595	10.275	.390
188	IO2-188(*)	10.695	10.375	.390
190	IO2-190(*)	10.795	10.475	.390
192	IO2-192(*)	10.895	10.575	.390
194	IO2-194(*)	10.995	10.675	.390
196	IO2-196(*)	11.095	10.775	.390
198	IO2-198(*)	11.195	10.875	.390
200	IO2-200(*)	11.295	10.975	.390

*See How to Order, pages 64-66.

Amphenol Aerospace

3 ROW CONTACT ARRANGEMENTS

Number of Contacts	IO Number*	A Max.	B	C Max.
030	IO3-030(*)	2.295	1.975	.490
033	IO3-033(*)	2.395	2.075	.490
036	IO3-036(*)	2.495	2.175	.490
039	IO3-039(*)	2.595	2.275	.490
042	IO3-042(*)	2.695	2.375	.490
045	IO3-045(*)	2.795	2.475	.490
048	IO3-048(*)	2.894	2.575	.490
051	IO3-051(*)	2.995	2.675	.490
054	IO3-054(*)	3.095	2.775	.490
057	IO3-057(*)	3.195	2.875	.490
060	IO3-060(*)	3.295	2.975	.490
063	IO3-063(*)	3.395	3.075	.490
066	IO3-066(*)	3.495	3.175	.490
069	IO3-069(*)	3.595	3.275	.490
072	IO3-072(*)	3.695	3.375	.490
075	IO3-075(*)	3.795	3.475	.490
078	IO3-078(*)	3.895	3.575	.490
081	IO3-081(*)	3.995	3.675	.490
084	IO3-084(*)	4.095	3.775	.490
087	IO3-087(*)	4.195	3.875	.490
090	IO3-090(*)	4.295	3.975	.490
093	IO3-093(*)	4.395	4.075	.490
096	IO3-096(*)	4.495	4.175	.490
099	IO3-099(*)	4.595	4.275	.490
102	IO3-102(*)	4.695	4.375	.490
105	IO3-105(*)	4.795	4.475	.490
108	IO3-108(*)	4.895	4.575	.490
111	IO3-111(*)	4.995	4.675	.490
114	IO3-114(*)	5.095	4.775	.490
117	IO3-117(*)	5.195	4.875	.490
120	IO3-120(*)	5.295	4.975	.490
123	IO3-123(*)	5.395	5.075	.490
126	IO3-126(*)	5.495	5.175	.490
129	IO3-129(*)	5.595	5.275	.490
132	IO3-132(*)	5.695	5.375	.490
135	IO3-135(*)	5.795	5.475	.490
138	IO3-138(*)	5.895	5.575	.490
141	IO3-141(*)	5.995	5.675	.490
144	IO3-144(*)	6.095	5.775	.490
147	IO3-147(*)	6.195	5.875	.490
150	IO3-150(*)	6.295	5.975	.490
153	IO3-153(*)	6.395	6.075	.490
156	IO3-156(*)	6.495	6.175	.490
159	IO3-159(*)	6.595	6.275	.490
162	IO3-162(*)	6.695	6.375	.490
165	IO3-165(*)	6.795	6.475	.490

Number of Contacts	IO Number*	A Max.	B	C Max.
168	IO3-168(*)	6.895	6.575	.490
171	IO3-171(*)	6.995	6.675	.490
174	IO3-174(*)	7.095	6.775	.490
177	IO3-177(*)	7.195	6.875	.490
180	IO3-180(*)	7.295	6.975	.490
183	IO3-183(*)	7.395	7.075	.490
186	IO3-186(*)	7.495	7.175	.490
189	IO3-189(*)	7.595	7.275	.490
192	IO3-192(*)	7.695	7.375	.490
195	IO3-195(*)	7.795	7.475	.490
198	IO3-198(*)	7.895	7.575	.490
201	IO3-201(*)	7.995	7.675	.490
204	IO3-204(*)	8.095	7.775	.490
207	IO3-207(*)	8.195	7.875	.490
210	IO3-210(*)	8.295	7.975	.490
213	IO3-213(*)	8.395	8.075	.490
216	IO3-216(*)	8.495	8.175	.490
219	IO3-219(*)	8.595	8.275	.490
222	IO3-222(*)	8.695	8.375	.490
225	IO3-225(*)	8.795	8.475	.490
228	IO3-228(*)	8.895	8.575	.490
231	IO3-231(*)	8.995	8.675	.490
234	IO3-234(*)	9.095	8.775	.490
237	IO3-237(*)	9.195	8.875	.490
240	IO3-240(*)	9.295	8.975	.490
243	IO3-243(*)	9.395	9.075	.490
246	IO3-246(*)	9.495	9.175	.490
249	IO3-249(*)	9.595	9.275	.490
252	IO3-252(*)	9.695	9.375	.490
255	IO3-255(*)	9.795	9.475	.490
258	IO3-258(*)	9.895	9.575	.490
261	IO3-261(*)	9.995	9.675	.490
264	IO3-264(*)	10.095	9.775	.490
267	IO3-267(*)	10.195	9.875	.490
270	IO3-270(*)	10.295	9.975	.490
273	IO3-273(*)	10.395	10.075	.490
276	IO3-276(*)	10.495	10.175	.490
279	IO3-279(*)	10.595	10.275	.490
282	IO3-282(*)	10.695	10.375	.490
285	IO3-285(*)	10.795	10.475	.490
288	IO3-288(*)	10.895	10.575	.490
291	IO3-291(*)	10.995	10.675	.490
294	IO3-294(*)	11.095	10.775	.490
297	IO3-297(*)	11.195	10.875	.490
300	IO3-300(*)	11.295	10.975	.490

*See How to Order, pages 64-66.

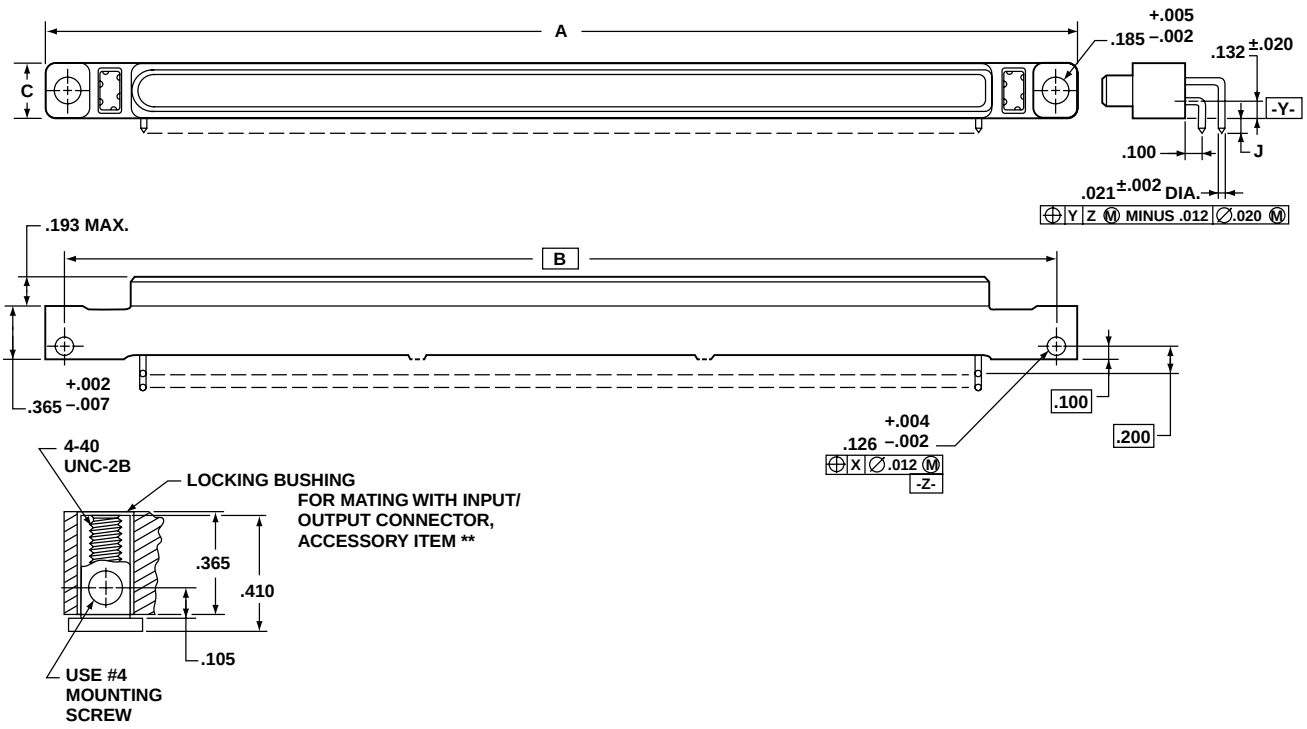
4 ROW CONTACT ARRANGEMENTS

Number of Contacts	IO Number*	A Max.	B	C Max.
040	IO4-040(*)	2.295	1.975	.590
044	IO4-044(*)	2.395	2.075	.590
048	IO4-048(*)	2.495	2.175	.590
052	IO4-052(*)	2.595	2.275	.590
056	IO4-056(*)	2.695	2.375	.590
060	IO4-060(*)	2.795	2.475	.590
064	IO4-064(*)	2.895	2.575	.590
068	IO4-068(*)	2.995	2.675	.590
072	IO4-072(*)	3.095	2.775	.590
076	IO4-076(*)	3.195	2.875	.590
080	IO4-080(*)	3.295	2.975	.590
084	IO4-084(*)	3.395	3.075	.590
088	IO4-088(*)	3.495	3.175	.590
092	IO4-092(*)	3.595	3.275	.590
096	IO4-096(*)	3.695	3.375	.590
100	IO4-100(*)	3.795	3.475	.590
104	IO4-104(*)	3.895	3.575	.590
108	IO4-108(*)	3.995	3.675	.590
112	IO4-112(*)	4.095	3.775	.590
116	IO4-116(*)	4.195	3.875	.590
120	IO4-120(*)	4.295	3.975	.590
124	IO4-124(*)	4.395	4.075	.590
128	IO4-128(*)	4.495	4.175	.590
132	IO4-132(*)	4.595	4.275	.590
136	IO4-136(*)	4.695	4.375	.590
140	IO4-140(*)	4.795	4.475	.590
144	IO4-144(*)	4.895	4.575	.590
148	IO4-148(*)	4.995	4.675	.590
152	IO4-152(*)	5.095	4.775	.590
156	IO4-156(*)	5.195	4.875	.590
160	IO4-160(*)	5.295	4.975	.590
164	IO4-164(*)	5.395	5.075	.590
168	IO4-168(*)	5.495	5.175	.590
172	IO4-172(*)	5.595	5.275	.590
176	IO4-176(*)	5.695	5.375	.590
180	IO4-180(*)	5.795	5.475	.590
184	IO4-184(*)	5.895	5.575	.590
188	IO4-188(*)	5.995	5.675	.590
192	IO4-192(*)	6.095	5.775	.590
196	IO4-196(*)	6.195	5.875	.590
200	IO4-200(*)	6.295	5.975	.590
204	IO4-204(*)	6.395	6.075	.590
208	IO4-208(*)	6.495	6.175	.590
212	IO4-212(*)	6.595	6.275	.590
216	IO4-216(*)	6.695	6.375	.590
220	IO4-220(*)	6.795	6.475	.590

Number of Contacts	IO Number*	A Max.	B	C Max.
224	IO4-224(*)	6.895	6.575	.590
228	IO4-228(*)	6.995	6.675	.590
232	IO4-232(*)	7.095	6.775	.590
236	IO4-236(*)	7.195	6.875	.590
240	IO4-240(*)	7.295	6.975	.590
244	IO4-244(*)	7.395	7.075	.590
248	IO4-248(*)	7.495	7.175	.590
252	IO4-252(*)	7.595	7.275	.590
256	IO4-256(*)	7.695	7.375	.590
260	IO4-260(*)	7.795	7.475	.590
264	IO4-264(*)	7.895	7.575	.590
268	IO4-268(*)	7.995	7.675	.590
272	IO4-272(*)	8.095	7.775	.590
276	IO4-276(*)	8.195	7.875	.590
280	IO4-280(*)	8.295	7.975	.590
284	IO4-284(*)	8.395	8.075	.590
288	IO4-288(*)	8.495	8.175	.590
292	IO4-292(*)	8.595	8.275	.590
296	IO4-296(*)	8.695	8.375	.590
300	IO4-300(*)	8.795	8.475	.590
304	IO4-304(*)	8.895	8.575	.590
308	IO4-308(*)	8.995	8.675	.590
312	IO4-312(*)	9.095	8.775	.590
316	IO4-316(*)	9.195	8.875	.590
320	IO4-320(*)	9.295	8.975	.590
324	IO4-324(*)	9.395	9.075	.590
328	IO4-328(*)	9.496	9.175	.590
332	IO4-332(*)	9.595	9.275	.590
336	IO4-336(*)	9.695	9.375	.590
340	IO4-340(*)	9.795	9.475	.590
344	IO4-344(*)	9.895	9.575	.590
348	IO4-348(*)	9.995	9.675	.590
352	IO4-352(*)	10.095	9.775	.590
356	IO4-356(*)	10.195	9.875	.590
360	IO4-360(*)	10.295	9.975	.590
364	IO4-364(*)	10.395	10.075	.590
368	IO4.368(*)	10.495	10.175	.590
372	IO4-372(*)	10.595	10.275	.590
376	IO4-376(*)	10.695	10.375	.590
380	IO4-380(*)	10.795	10.475	.590
384	IO4-384(*)	10.895	10.575	.590
388	IO4-388(*)	10.995	10.675	.590
392	IO4-392(*)	11.095	10.775	.590
396	IO4-396(*)	11.195	10.875	.590
400	IO4-400(*)	11.295	10.975	.590

*See How to Order, pages 64-66.

DIMENSIONAL DRAWING



MATES WITH DB AND IO SERIES CONNECTORS

Notes:

When mating with DB connector, a total of .035 inch minimum radial pilot is available for connector body alignment.

All dimensions for reference only.

Polarization keys are not supplied as part of PC Connector Series assemblies. See Accessories How to Order, page 66 and further description, page 90.

** Locking busings are not supplied as part of PC Connector Series assembles. See Accessories How to Order, page 66, and further description, page 93.

▭ Designates Basic Dimension

Contact Data			
Description	Termination Style Letter	Arrangement Row	J +.035 –.025
Round PCB Stud, 90° Solder Termination	P	A	.095
	P	B	.095
	P	C	.095
	P	D	.095
	P-(714)	A	.150
	P-(714)	B	.150
	P-(714)	C	.150
	P-(714)	D	.150

NOTE: Other variations available - see pages 65 & 66, or consult Amphenol Aerospace.

2 ROW CONTACT ARRANGEMENTS

Number of Contacts	PC Number*	A Max.	B	C Max.
020	PC2-020P	2.295	1.975	.390
022	PC2-022P	2.395	2.075	.390
024	PC2-024P	2.495	2.175	.390
026	PC2-026P	2.595	2.275	.390
028	PC2-028P	2.695	2.375	.390
030	PC2-030P	2.795	2.475	.390
032	PC2-032P	2.895	2.575	.390
034	PC2-034P	2.995	2.675	.390
036	PC2-036P	3.095	2.775	.390
038	PC2-038P	3.195	2.875	.390
040	PC2-040P	3.295	2.975	.390
042	PC2-042P	3.395	3.075	.390
044	PC2-044P	3.495	3.175	.390
046	PC2-046P	3.595	3.275	.390
048	PC2-048P	3.695	3.375	.390
050	PC2-050P	3.795	3.475	.390
052	PC2-052P	3.895	3.575	.390
054	PC2-054P	3.995	3.675	.390
056	PC2-056P	4.095	3.775	.390
058	PC2-058P	4.195	3.875	.390
060	PC2-060P	4.295	3.975	.390
062	PC2-062P	4.395	4.075	.390
064	PC2-064P	4.495	4.175	.390
066	PC2-066P	4.595	4.275	.390
068	PC2-068P	4.695	4.375	.390
070	PC2-070P	4.795	4.475	.390
072	PC2-072P	4.895	4.575	.390
074	PC2-074P	4.995	4.675	.390
076	PC2-076P	5.095	4.775	.390
078	PC2-078P	5.195	4.875	.390
080	PC2-080P	5.295	4.975	.390
082	PC2-082P	5.395	5.075	.390
084	PC2-084P	5.495	5.175	.390
086	PC2-086P	5.595	5.275	.390
088	PC2-088P	5.695	5.375	.390
090	PC2-090P	5.795	5.475	.390
092	PC2-092P	5.895	5.575	.390
094	PC2-094P	5.995	5.675	.390
096	PC2-096P	6.095	5.775	.390
098	PC2-098P	6.195	5.875	.390
100	PC2-100P	6.295	5.975	.390
102	PC2-102P	6.395	6.075	.390
104	PC2-104P	6.495	6.175	.390
106	PC2-106P	6.595	6.275	.390
108	PC2-108P	6.695	6.375	.390
110	PC2-110P	6.795	6.475	.390

Number of Contacts	PC Number*	A Max.	B	C Max.
112	PC2-112P	6.895	6.575	.390
114	PC2-114P	6.995	6.675	.390
116	PC2-116P	7.095	6.775	.390
118	PC2-118P	7.195	6.875	.390
120	PC2-120P	7.295	6.975	.390
122	PC2-122P	7.395	7.075	.390
124	PC2-124P	7.495	7.175	.390
126	PC2-126P	7.595	7.275	.390
128	PC2-128P	7.695	7.375	.390
130	PC2-130P	7.795	7.475	.390
132	PC2-132P	7.895	7.575	.390
134	PC2-134P	7.995	7.675	.390
136	PC2-136P	8.095	7.775	.390
138	PC2-138P	8.195	7.875	.390
140	PC2-140P	8.295	7.975	.390
142	PC2-142P	8.395	8.075	.390
144	PC2-144P	8.495	8.175	.390
146	PC2-146P	8.595	8.275	.390
148	PC2-148P	8.695	8.375	.390
150	PC2-150P	8.795	8.475	.390
152	PC2-152P	8.895	8.575	.390
154	PC2-154P	8.995	8.675	.390
156	PC2-156P	9.095	8.775	.390
158	PC2-158P	9.195	8.875	.390
160	PC2-160P	9.295	8.975	.390
162	PC2-162P	9.395	9.075	.390
164	PC2-164P	9.495	9.175	.390
166	PC2-166P	9.595	9.275	.390
168	PC2-168P	9.695	9.375	.390
170	PC2-170P	9.795	9.475	.390
172	PC2-172P	9.895	9.575	.390
174	PC2-174P	9.995	9.675	.390
176	PC2-176P	10.095	9.775	.390
178	PC2-178P	10.195	9.875	.390
180	PC2-180P	10.295	9.975	.390
182	PC2-182P	10.395	10.075	.390
184	PC2-184P	10.495	10.175	.390
186	PC2-186P	10.595	10.275	.390
188	PC2-188P	10.695	10.375	.390
190	PC2-190P	10.795	10.475	.390
192	PC2-192P	10.895	10.575	.390
194	PC2-194P	10.995	10.675	.390
196	PC2-196P	11.095	10.775	.390
198	PC2-198P	11.195	10.875	.390
200	PC2-200P	11.295	10.975	.390

*See How to Order, pages 64-66.

Amphenol Aerospace

3 ROW CONTACT ARRANGEMENTS

Number of Contacts	PC Number*	A Max.	B	C Max.
030	PC3-030P	2.295	1.975	.490
033	PC3-033P	2.395	2.075	.490
036	PC3-036P	2.495	2.175	.490
039	PC3-039P	2.595	2.275	.490
042	PC3-042P	2.695	2.375	.490
045	PC3-045P	2.795	2.475	.490
048	PC3-048P	2.895	2.575	.490
051	PC3-051P	2.995	2.675	.490
054	PC3-054P	3.095	2.775	.490
057	PC3-057P	3.195	2.875	.490
060	PC3-060P	3.295	2.975	.490
063	PC3-063P	3.395	3.075	.490
066	PC3-066P	3.495	3.175	.490
069	PC3-069P	3.595	3.275	.490
072	PC3-072P	3.695	3.375	.490
075	PC3-075P	3.795	3.475	.490
078	PC3-078P	3.895	3.575	.490
081	PC3-081P	3.995	3.675	.490
084	PC3-084P	4.095	3.775	.490
087	PC3-087P	4.195	3.875	.490
090	PC3-090P	4.295	3.975	.490
093	PC3-093P	4.395	4.075	.490
096	PC3-096P	4.495	4.175	.490
099	PC3-099P	4.595	4.275	.490
102	PC3-102P	4.695	4.375	.490
105	PC3-105P	4.795	4.475	.490
108	PC3-108P	4.895	4.575	.490
111	PC3-111P	4.995	4.675	.490
114	PC3-114P	5.095	4.775	.490
117	PC3-117P	5.195	4.875	.490
120	PC3-120P	5.295	4.975	.490
123	PC3-123P	5.395	5.075	.490
126	PC3-126P	5.495	5.175	.490
129	PC3-129P	5.595	5.275	.490
132	PC3-132P	5.695	5.375	.490
135	PC3-135P	5.795	5.475	.490
138	PC3-138P	5.895	5.575	.490
141	PC3-141P	5.995	5.675	.490
144	PC3-144P	6.095	5.775	.490
147	PC3-147P	6.195	5.875	.490
150	PC3-150P	6.295	5.975	.490
153	PC3-153P	6.395	6.075	.490
156	PC3-156P	6.495	6.175	.490
159	PC3-159P	6.595	6.275	.490
162	PC3-162P	6.695	6.375	.490
165	PC3-165P	6.795	6.475	.490

Number of Contacts	PC Number*	A Max.	B	C Max.
168	PC3-168P	6.895	6.575	.490
171	PC3-171P	6.995	6.675	.490
174	PC3-174P	7.095	6.775	.490
177	PC3-177P	7.195	6.875	.490
180	PC3-180P	7.295	6.975	.490
183	PC3-183P	7.395	7.075	.490
186	PC3-186P	7.495	7.175	.490
189	PC3-189P	7.595	7.275	.490
192	PC3-192P	7.695	7.375	.490
195	PC3-195P	7.795	7.475	.490
198	PC3-198P	7.895	7.575	.490
201	PC3-201P	7.995	7.675	.490
204	PC3-204P	8.095	7.775	.490
207	PC3-207P	8.195	7.875	.490
210	PC3-210P	8.295	7.975	.490
213	PC3-213P	8.395	8.075	.490
216	PC3-216P	8.495	8.175	.490
219	PC3-219P	8.595	8.275	.490
222	PC3-222P	8.695	8.375	.490
225	PC3-225P	8.795	8.475	.490
228	PC3-228P	8.895	8.575	.490
231	PC3-231P	8.995	8.675	.490
234	PC3-234P	9.095	8.775	.490
237	PC3-237P	9.195	8.875	.490
240	PC3-240P	9.295	8.975	.490
243	PC3-243P	9.395	9.075	.490
246	PC3-246P	9.495	9.175	.490
249	PC3-249P	9.595	9.275	.490
252	PC3-252P	9.695	9.375	.490
255	PC3-255P	9.795	9.475	.490
258	PC3-258P	9.895	9.575	.490
261	PC3-261P	9.995	9.675	.490
264	PC3-264P	10.095	9.775	.490
267	PC3-267P	10.195	9.875	.490
270	PC3-270P	10.295	9.975	.490
273	PC3-273P	10.395	10.075	.490
276	PC3-276P	10.495	10.175	.490
279	PC3-279P	10.595	10.275	.490
282	PC3-282P	10.695	10.375	.490
285	PC3-285P	10.795	10.475	.490
288	PC3-288P	10.895	10.575	.490
291	PC3-291P	10.995	10.675	.490
294	PC3-294P	11.095	10.775	.490
279	PC3-297P	11.195	10.875	.490
300	PC3-300P	11.295	10.975	.490

*See How to Order, pages 64-66.

4 ROW CONTACT ARRANGEMENTS

Number of Contacts	PC Number*	A Max.	B	C Max.
040	PC4-040P	2.295	1.975	.590
044	PC4-044P	2.395	2.075	.590
048	PC4-048P	2.495	2.175	.590
052	PC4-052P	2.595	2.275	.590
056	PC4-056P	2.695	2.375	.590
060	PC4-060P	2.795	2.475	.590
064	PC4-064P	2.895	2.575	.590
068	PC4-068P	2.995	2.675	.590
072	PC4-072P	3.095	2.775	.590
076	PC4-076P	3.195	2.875	.590
080	PC4-080P	3.295	2.975	.590
084	PC4-084P	3.395	3.075	.590
088	PC4-088P	3.495	3.175	.590
092	PC4-092P	3.595	3.275	.590
096	PC4-096P	3.695	3.375	.590
100	PC4-100P	3.795	3.475	.590
104	PC4-104P	3.895	3.575	.590
108	PC4-108P	3.995	3.675	.590
112	PC4-112P	4.095	3.775	.590
116	PC4-116P	4.195	3.875	.590
120	PC4-120P	4.295	3.975	.590
124	PC4-124P	4.395	4.075	.590
128	PC4-128P	4.495	4.175	.590
132	PC4-132P	4.595	4.275	.590
136	PC4-136P	4.695	4.375	.590
140	PC4-140P	4.795	4.475	.590
144	PC4-144P	4.895	4.575	.590
148	PC4-148P	4.995	4.675	.590
152	PC4-152P	5.095	4.775	.590
156	PC4-156P	5.195	4.875	.590
160	PC4-160P	5.295	4.975	.590
164	PC4-164P	5.395	5.075	.590
168	PC4-168P	5.495	5.175	.590
172	PC4-172P	5.595	5.275	.590
176	PC4-176P	5.695	5.375	.590
180	PC4-180P	5.795	5.475	.590
184	PC4-184P	5.895	5.575	.590
188	PC4-188P	5.995	5.675	.590
192	PC4-192P	6.095	5.775	.590
196	PC4-196P	6.195	5.875	.590
200	PC4-200P	6.295	5.975	.590
204	PC4-204P	6.395	6.075	.590
208	PC4-208P	6.495	6.175	.590
212	PC4-212P	6.595	6.275	.590
216	PC4-216P	6.695	6.375	.590
220	PC4-220P	6.795	6.475	.590

Number of Contacts	PC Number*	A Max.	B	C Max.
224	PC4-224P	6.895	6.575	.590
228	PC4-228P	6.995	6.675	.590
232	PC4-232P	7.095	6.775	.590
236	PC4-236P	7.195	6.875	.590
240	PC4-240P	7.295	6.975	.590
244	PC4-244P	7.395	7.075	.590
248	PC4-248P	7.495	7.175	.590
252	PC4-252P	7.595	7.275	.590
256	PC4-256P	7.695	7.375	.590
260	PC4-260P	7.795	7.475	.590
264	PC4-264P	7.895	7.575	.590
268	PC4-268P	7.995	7.675	.590
272	PC4-272P	8.095	7.775	.590
276	PC4-276P	8.195	7.875	.590
280	PC4-280P	8.295	7.975	.590
284	PC4-284P	8.395	8.075	.590
288	PC4-288P	8.495	8.175	.590
292	PC4-292P	8.595	8.275	.590
296	PC4-296P	8.695	8.375	.590
300	PC4-300P	8.795	8.475	.590
304	PC4-304P	8.895	8.575	.590
308	PC4-308P	8.995	8.675	.590
312	PC4-312P	9.095	8.775	.590
316	PC4-316P	9.195	8.875	.590
320	PC4-320P	9.295	8.975	.590
324	PC4-324P	9.395	9.075	.590
328	PC4-328P	9.495	9.175	.590
332	PC4-332P	9.595	9.275	.590
336	PC4-336P	9.695	9.375	.590
340	PC4-340P	9.795	9.475	.590
344	PC4-344P	9.895	9.575	.590
348	PC4-348P	9.995	9.675	.590
352	PC4-352P	10.095	9.775	.590
356	PC4-356P	10.195	9.875	.590
360	PC4-360P	10.295	9.975	.590
364	PC4-364P	10.395	10.075	.590
368	PC4-368P	10.495	10.175	.590
372	PC4-372P	10.595	10.275	.590
376	PC4-376P	10.695	10.375	.590
380	PC4-380P	10.795	10.475	.590
384	PC4-384P	10.895	10.575	.590
388	PC4-388P	10.995	10.675	.590
392	PC4-392P	11.095	10.775	.590
396	PC4-396P	11.195	10.875	.590
400	PC4-400P	11.295	10.975	.590

*See How to Order, pages 64-66.

DESIGN FLEXIBILITY

To meet more customer needs and provide more design flexibility, Amphenol expanded their low mating force connector family with smaller contact count connectors (sizes with less than standard 10 contacts per row). These are available with as few as 10 brush contacts per connector and up to 36 brush contacts per connector. The arrangements are in the same .100 X .100 square inch grid pattern as standard low mating force connectors. They are offered in mother board, daughter board, input/output and printed circuit styles. (Shown on this page and the following page). For how to order information please consult Amphenol Aerospace.

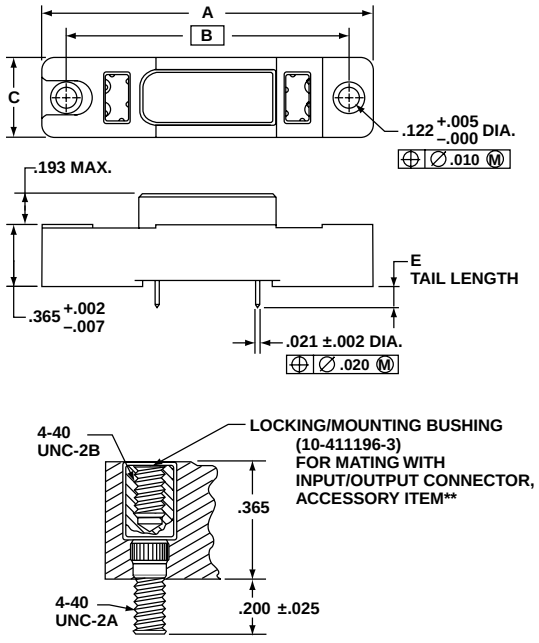
LOW MATING FORCE CONNECTORS IN SMALLER SIZES

Mother Board Connector

Number of Contacts	Contact Pattern	A Max.	B	C Max.	E Tail Length ±.020
10	2 Row X 5	1.795	1.475	.390	.148
12	2 Row X 6	1.895	1.575	.390	.180
14	2 Row X 7	1.995	1.675	.390	.335
15	3 Row X 5	1.795	1.475	.490	
16	2 Row X 8	2.095	1.775	.390	
18	2 Row X 9	2.195	1.875	.390	
	3 Row X 6	1.895	1.575	.490	
20	4 Row X 5	1.795	1.475	.590	
21	3 Row X 7	1.995	1.675	.490	
24	3 Row X 8	2.095	1.775	.490	
	4 Row X 6	1.895	1.575	.590	
27	3 Row X 9	2.195	1.875	.490	
28	4 Row X 7	1.995	1.675	.590	
32	4 Row X 8	2.095	1.775	.590	
36	4 Row X 9	2.195	1.875	.590	

** Accessory item supplied separately. See Accessory How to Order page 66 and page 93 for alternate mounting methods.

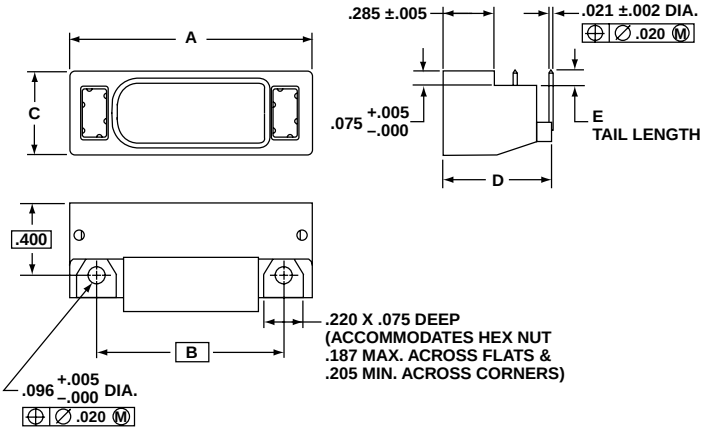
Mother Board Connector



Daughter Board Connector

Number of Contacts	Contact Pattern	A Max.	B	C Max.	D Max.	E Tail Length ±.020
10	2 Row X 5	1.180	.850	.375	.545	.085
12	2 Row X 6	1.280	.950	.375	.545	.120
14	2 Row X 7	1.380	1.050	.375	.545	.300
15	3 Row X 5	1.180	.850	.475	.645	
16	2 Row X 8	1.480	1.150	.375	.545	
18	2 Row X 9	1.580	1.250	.375	.545	
	3 Row X 6	1.280	.950	.475	.645	
20	4 Row X 5	1.180	.850	.575	.745	
21	3 Row X 7	1.380	1.050	.475	.645	
24	3 Row X 8	1.480	1.150	.475	.645	
	4 Row X 6	1.280	.950	.575	.745	
27	3 Row X 9	1.580	1.250	.475	.645	
28	4 Row X 7	1.380	1.050	.575	.745	
32	4 Row X 8	1.480	1.150	.575	.745	
36	4 Row X 9	1.580	1.250	.575	.745	

Daughter Board Connector

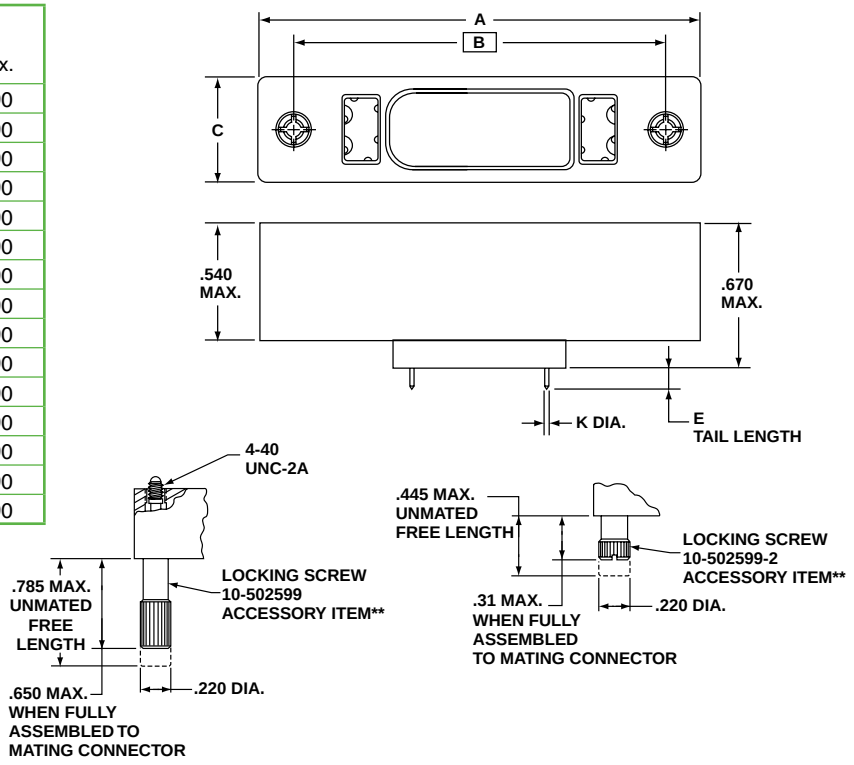


Input/Output Connector

Number of Contacts	Contact Pattern	A Max.	B	C Max.
10	2 Row X 5	1.795	1.475	.390
12	2 Row X 6	1.895	1.575	.390
14	2 Row X 7	1.995	1.675	.390
15	3 Row X 5	1.795	1.475	.490
16	2 Row X 8	2.095	1.775	.390
18	2 Row X 9	2.195	1.875	.390
	3 Row X 6	1.895	1.575	.490
20	4 Row X 5	1.795	1.475	.590
21	3 Row X 7	1.995	1.675	.490
24	3 Row X 8	2.095	1.775	.490
	4 Row X 6	1.895	1.575	.590
27	3 Row X 9	2.195	1.875	.490
28	4 Row X 7	1.995	1.675	.590
32	4 Row X 8	2.095	1.775	.590
36	4 Row X 9	2.195	1.875	.590

Contact Type	K Dia. ±.020	E Tail Length ±.020
Rear Removable Crimp Contact	N/A	N/A
Round PCB Stud Solder Termination	.021	.145
	.021	.335

Input/Output Connector



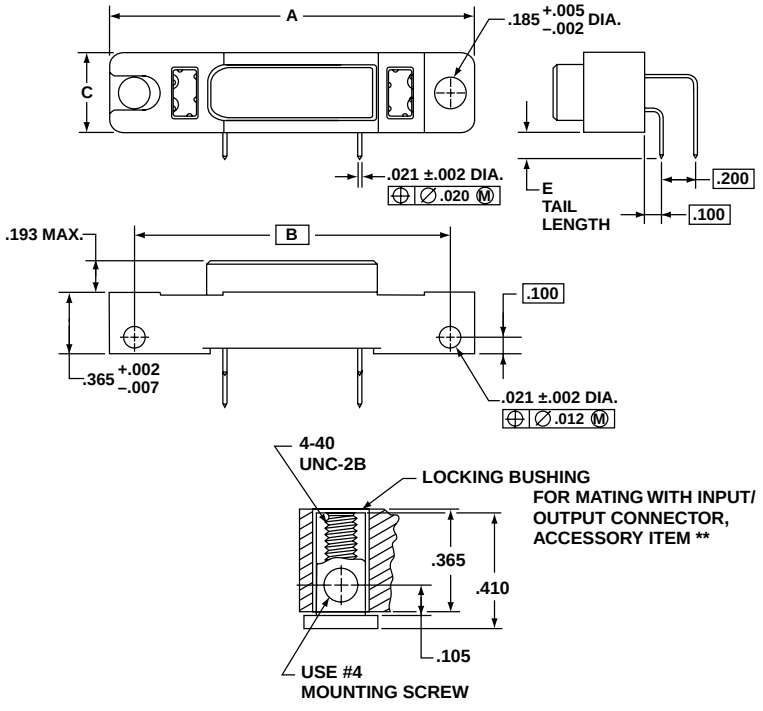
Printed Circuit Connector

Number of Contacts	Contact Pattern	A Max.	B	C Max.	D Max.
10	2 Row X 5	1.180	.850	.375	.545
12	2 Row X 6	1.280	.950	.375	.545
14	2 Row X 7	1.380	1.050	.375	.545
15	3 Row X 5	1.180	.850	.475	.645
16	2 Row X 8	1.480	1.150	.375	.545
18	2 Row X 9	1.580	1.250	.375	.545
	3 Row X 6	1.280	.950	.475	.645
20	4 Row X 5	1.180	.850	.575	.745
21	3 Row X 7	1.380	1.050	.475	.645
24	3 Row X 8	1.480	1.150	.475	.645
	4 Row X 6	1.280	.950	.575	.745
27	3 Row X 9	1.580	1.250	.475	.645
28	4 Row X 7	1.380	1.050	.575	.745
32	4 Row X 8	1.480	1.150	.575	.745
36	4 Row X 9	1.580	1.250	.575	.745

E Tail Length ±.020
.095
.150

** Accessory item supplied separately. See Accessory How to Order page 66 and page 93 for alternate mounting methods.

Printed Circuit Connector



Hybrid Configurations with Contact Options

SIGNAL, POWER, COAX OR FIBER OPTICS

The B³ Brush contact is the standard contact for Low mating force connectors due to its low mating force, stable electrical performance and extended service life. Design flexibility is expanded with the ability to add combinations of other types of contacts: signal, power, high speed coax or fiber optic termini; in one high density hybrid connector.

Power, shielded coax or twinax contacts, in combination with Brush signal contacts are available in configurations of the following (see next page for illustrations):

- A single row of size 16 power or coax or twinax contacts with 2 rows of brush contacts
- A single row of size 12 power or coax or twinax contacts with 3 rows of brush contacts
- A double row of size 16 power or coax or twinax contacts with 4 rows of brush contacts

Power and coax contacts are standard MIL-DTL-38999 Series II type. (Size 12 & 16 power contacts per M39029/57 & M39029/58. Size 12 & 16 coax per M39029/27, M39029/28, M39029/76 and M39029/77).

Consult Amphenol board level product marketing (800-678-0141) for assistance with available hybrid configurations.

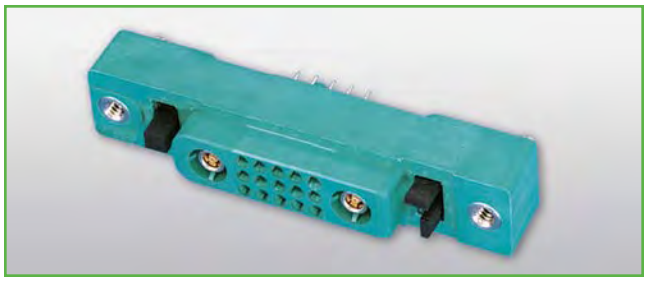
NOTE: Power and coax contacts and fiber optic termini are not provided with the connector and must be purchased separately.

POWER STRIP CONNECTORS

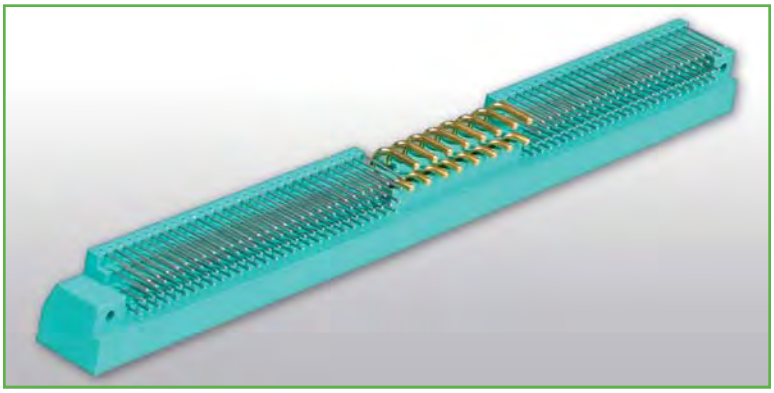
Amphenol's Power Strip connectors were developed for use as a dedicated power interface between module cards and backplanes. These connectors use the same insert bodies as Amphenol low mating force connectors, but have power contacts rather than brush contacts. Cavities allow for size 16 or 12 power contacts. Or, coax/twinax contacts can also be used in these size 16 or 12 cavities.

HYBRID BRUSH CONNECTORS WITH FIBER OPTIC TERMINI

Amphenol's superiority and breadth of product offering is demonstrated in its capability for packaging fiber termini and the Brush contact in a printed circuit board rectangular connector. Fiber optic MIL-PRF-29504 termini size 16 and HD20 can be used as well as the 90° termini style with optical performance the same as when used in cylindrical connectors.
For more information on Amphenol fiber optic connectors and termini, see the Fiber Optic section of Amphenol's Combined Circular Interconnects catalog on-line at www.amphenol-aerospace.com

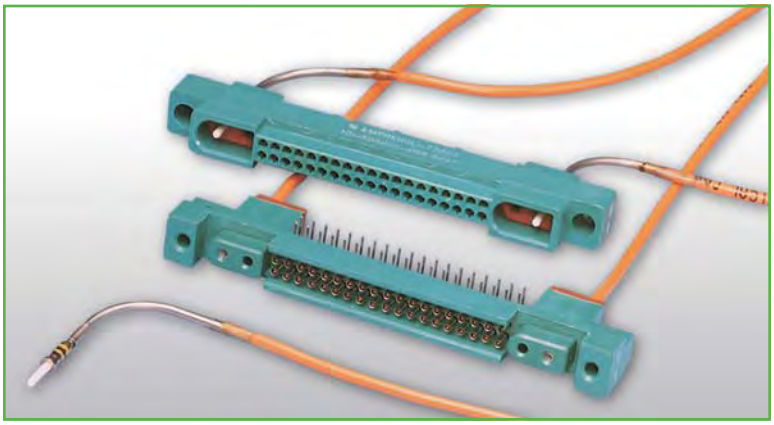


COMBINATION OF BRUSH CONTACTS & SHIELDED CONTACTS



CONNECTOR WITH BRUSH CONTACTS & SIZE 16 POWER PIN CONTACTS

POWER STRIP RECTANGULARS WITH SIZE 16 POWER CONTACTS



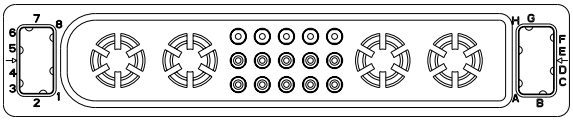
COMBINATION OF BRUSH CONTACTS & MS29504 FIBER OPTIC TERMINI

Custom Hybrid Designs, Small Color-Coded Brush Connectors

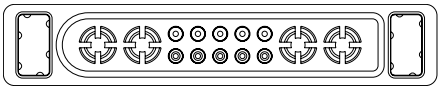
MORE DESIGN FLEXIBILITY

The following shows examples of hybrid configuration connectors that have been developed. Consult Amphenol Aerospace for assistance in solving design problems and for part numbers that will provide the proper combination of these hybrid configurations to meet your specific connector application requirements.

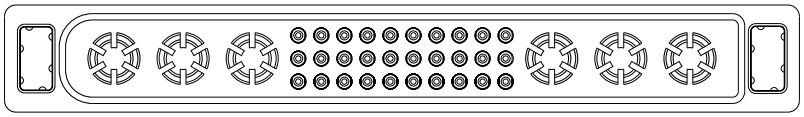
Hybrid: 15 B³ Brush contacts, 4 size 12 power/coax/twinax contacts



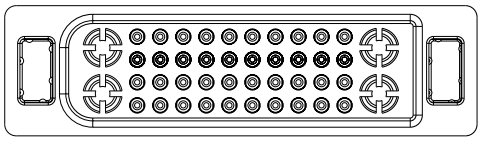
Hybrid: 10 B³ brush contacts, 4 size 16 power/coax/twinax contacts



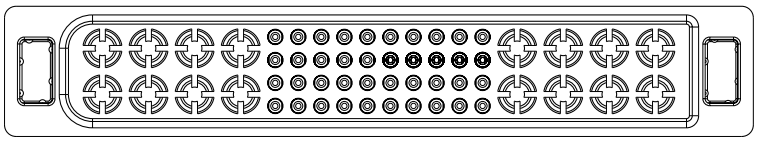
Hybrid: 30 B³ brush contacts, 6 size 12 power/coax/twinax contacts



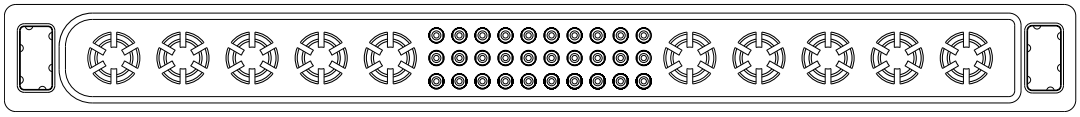
Hybrid: 40 B³ Brush contacts, 4 size 16 power/coax/twinax contacts



Hybrid: 40 B³ brush contacts, 16 size 16 power/coax/twinax contacts

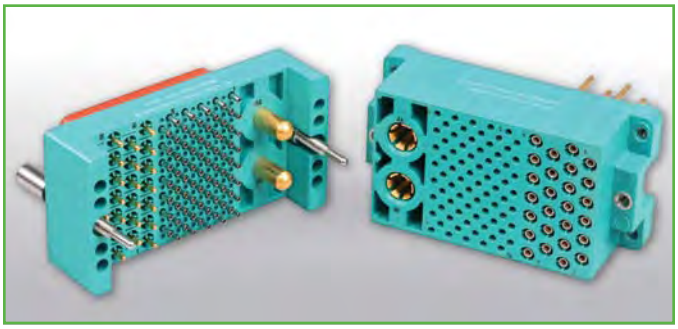


Hybrid: 30 B³ brush contacts, 10 size 12 power/coax/twinax contacts



Amphenol can meet innovative connector solutions with custom designs. Our board level engineers can work with customers who need special contact arrangements or special sized inserts.

The special hybrid connector shown at right was developed for the Vetronics System on a military tank. This custom shape insert design houses a combination of contact types, a sealing grommet, and has special mounting/locking screws.



HYBRID CUSTOM CONNECTOR WITH 75 BRUSH DIGITAL CONTACTS, 26 SIZE 16 POWER CONTACTS & 2 SIZE 04 POWER CONTACTS

SMALL COLOR-CODED BRUSH CONTACT CONNECTORS DESIGNED FOR MEDICAL INSTRUMENTATION

Amphenol has responded to the needs of the medical industry by offering even smaller inserts with brush contacts. These small profile, highly reliable interconnects, are ideal for medical and test equipment such as patient monitoring systems. As color coding is a market-driven requirement, a variety of colors are available.

SMALL COLOR-CODED BRUSH CONNECTORS WITH AS FEW AS 5 CONTACTS PER CONNECTOR

Amphenol Aerospace

.070 INCH X .100 INCH STAGGERED GRID SPACING

BRUSH CONTACT CONNECTORS MAKE THE IDEAL CHOICE FOR FREQUENT DOCKING APPLICATIONS

When frequent docking to charge and transfer data is a necessity, the brush contact system offers high performance of over 100,000 mating cycles. This long contact life without degradation in performance provides customers with reliability in frequent docking applications such as:

- Handheld GPS units
- Handheld radios
- Rugged computers
- Controllers
- Scanners
- Accessories
- Cellular phones

Amphenol offers Docking Connectors in a compact size, with tighter spaced custom brush contacts (.0787 inch x .100 inch staggered grid spacing).

Performance

Durability: . . . . . Up to 100,000 mating cycles
Insertion/Extraction Force: . 1.5 ounce typical per contact
Operating Temperature: . -65° to 125°C
Current Rating: . . . . . Up to 5 amperes (termination dependent)
Hot swap 1 ampere maximum (load dependent)
Data Rate
(Select connectors only): . Configurable for 3.125 Gbps differential signal
Insulation Resistance: . . . 5 gigaohms minimum
Dielectric Withstanding
Voltage: . . . . . 750 volts @ sea level minimum
250 volts @ 70,000 feet elevation min.
Solderability: . . . . . MIL-STD-202, method 208
Salt Fog: . . . . . 48 hours IAW MIL-STD-1344, method 1002, type II
Humidity: . . . . . IAW MIL-STD-1344, method 1002, type II
Vibration: . . . . . 4 hours in each of 3 mutually perpendicular
axes IAW MIL-STD-1344, method 2004, test condition G
Shock: . . . . . 1 shock along each of three mutually perpendicular axes IAW MIL-STD-1344, method 2004, test condition G

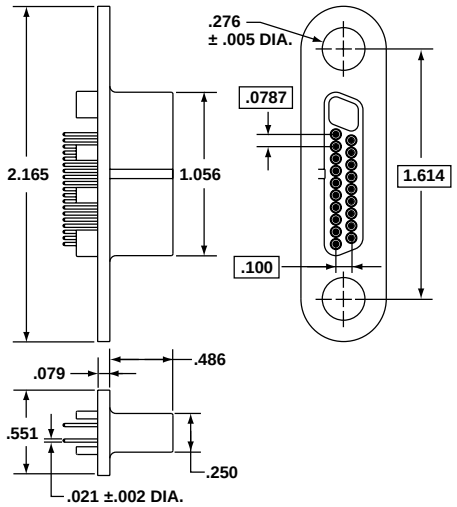
Features

Radial Misalignment: . . . Capable of correcting up to a .040" initial radial misalignment
Angular Misalignment: . . Capable of mating with up to a 4° initial angular misalignment
Polarization: . . . . . "D" shaped interface
Color: . . . . . Standard is black, variety of other colors are available

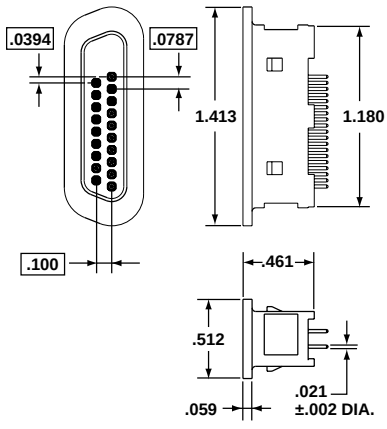
Materials

Insulator: . . . . . Glass-filled thermoplastic molding
Contact: Wire . . . . Beryllium copper per ASTM B197; finish is gold per ASTM B488 over nickel per AMS-QQ-N-290
Holder . . . . Brass similar to UNS C33500; finish is gold per MIL-G-45204 or tin-lead per MIL-P-81728 or tin per MIL-T-10727 (RoHS compliant
Sleeve: . . . . Stainless steel per AMS-5514, passivated IAW QQ-P-35
(DB and I/O connectors only)

Mother Board Docking Connector



Daughter Board Docking Connector



For more information, including how to order, consult Amphenol Aerospace. Call 800-678-0141 and ask for Amphenol board level product marketing for assistance.

POLARIZATION KEYS

General information follows on this page and the next three pages for assembling connector accessories with Amphenol® Low Mating Force B³ Brush Contact Connectors.* Provided are suggestions for proper connector installation that will help to maintain connector straightness after equipment assembly.

Low mating force connector bodies are intentionally designed to be non-rigid to facilitate application variables such as compliance to printed circuit boards, fixtures and card cages, vibration and shock exposure, thermal excursions and differential expansion characteristics. Users may employ installation procedures that will provide mating surface straightness of these non-rigid bodies within 0.010 inch to ensure maximum connector performance.

Generally, no external board support structures are required with B³ brush contact connectors as long as the mounting surface offers sufficient rigidity. However, longer installations should consider external support to prevent excessive flexing of the connector/printed circuit board assembly.

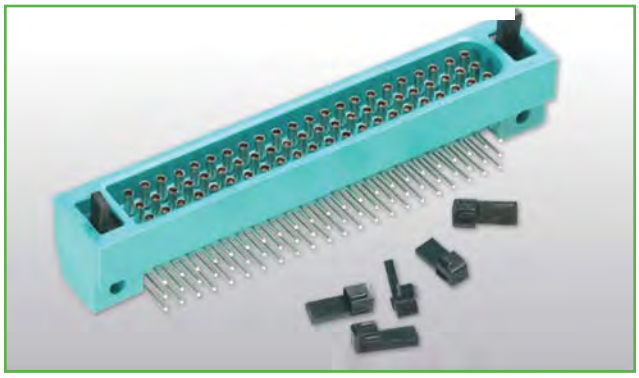
POLARIZATION KEYS

Polarization Keys, 10-285422-2 are accessory items, ordered separately for MB, DB, IO and PC Series Low Mating Force Connectors. If used, 4 keys are required per connector half. See page X for ordering information.

Examples at right show key locations for mating connector halves. The number or letter designations on all mating connectors are arranged so that the projecting keys on one relate to the same numbers or letters on the other. With the numbers or letters matching, the connector will mate.

TYPICAL CODE SEQUENCE

B, H –1, 5
4 Different possibilities
at each position = 256



DAUGHTER BOARD CONNECTOR WITH POLARIZATION KEYS

* Installation Instructions for B³ Low Mating Force Connectors had formerly been covered in publication L-1220. This has been discontinued and all installation instructions are covered here on pages 90-95.

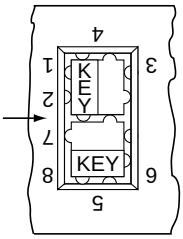
CONNECTOR ACCESSORIES THAT ARE USED WITH B³ BRUSH CONNECTORS INCLUDE:

- Locking screws for I/O connector mounting to board
- Locking/mounting bushings:
  - for PC connector mounting to board or mating to I/O connector
  - for MB connector mounting to board or mating to I/O connector
- Polarization keys for each style connector provide up to 256 different key locations for alternate keying
- Test Probe kits for ensuring that contacts are properly wired within a connector and to prevent damage to brush contacts during probing.

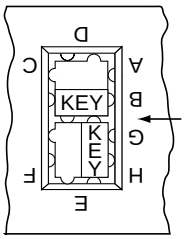
For How to Order Accessories see page 66.

B³ brush PC style connectors are shipped with PC tail combs that not only protect the tails during shipment, but aid the person assembling the connectors to boards to align the contacts.

Refer to page 63 of this catalog for illustration of the connector styles and how they mate.

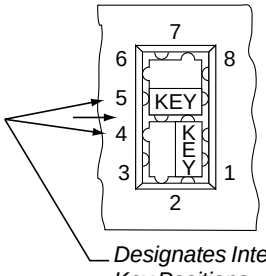


Key Locations 1 – 5
Mates with
Key Locations 1 – 5

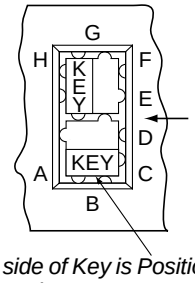


Key Locations B – H
Mates with
Key Locations B – H

KEY LOCATIONS
MOTHER BOARD OR PC CONNECTORS



Designates Interior Key Positions



Flat side of Key is Positioned next to the Letter or Number Designation

KEY LOCATIONS
DAUGHTER BOARD OR INPUT/OUTPUT CONNECTORS

TEST PROBE KIT

In order to insure that contacts are properly wired within a connector, a Test Probe Kit is needed (Part number to order is 11-10400-22). This kit is especially designed to prevent damage to brush contacts during probing. It consists of a plastic holder, insert, and two contacts, usable for either Mother Board or Daughter Board applications. It is recommended that the user buy two kits, if using connectors of two genders. The kits are not convertible after assembly.

Instructions:

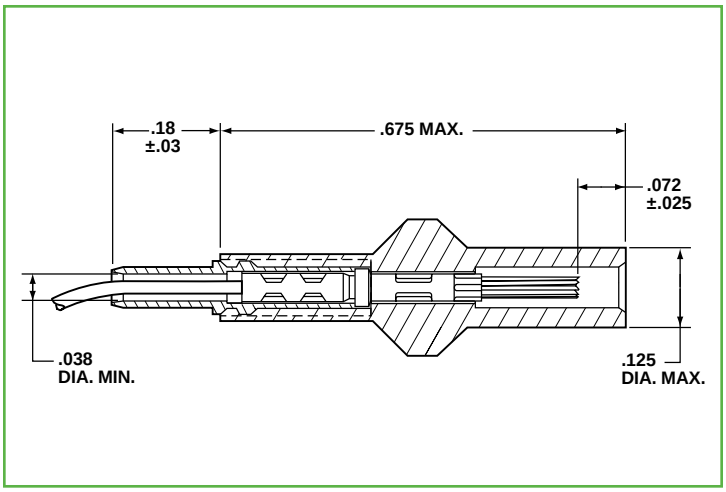
DB-IO Test Probe - Slide the insert back over the wire and crimp contact on. Follow crimping procedure below. Then snap the insert and contact assembly into the holder.

MB-PC Test probe - Slide holder over wire and then crimp contact. Follow crimping procedure below. Slide the insert on the contact and seat it against the shoulder. Slide the holder forward and snap it onto the insert.

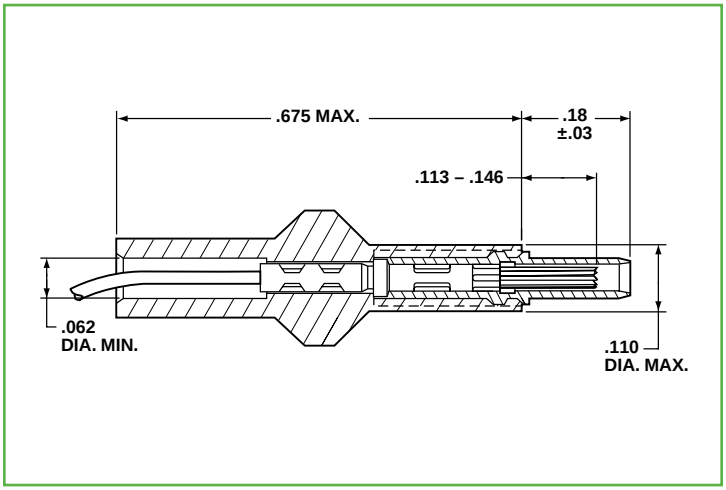
Crimping Procedure: Using accepted industry procedures, strip wire end to be terminated 1/8 to 5/32 inch. Care should be taken not to nick wire strands. Assemble the M22520/2-01 crimp tool and the M22520/2-27 positioner, and place tool selector in correct setting for wire size. Selected wire size must not have an insulation diameter more than .062 for MB-PC and not more than .038 for DB/IO.

AWG	22	24	26	28
SEL	5	4	3	2

Insert stripped wire end into contact wire well. Strands should be visible in wire well inspection hole. Bottom contact and wire assembly in positioner, and close handles of crimp tool to complete crimp. Handles will not open unless full crimping cycle has been completed.



DAUGHTER BOARD - INPUT/OUTPUT TEST PROBE



MOTHER BOARD - PC TEST PROBE

BRUSH CONNECTORS USER APPLICATION INFORMATION

The Brush B^3 connector is a highly sophisticated, innovative low mating force device designed to provide a multiplicity or highly redundant number of contact sites for high density, high performance applications. Contact resistance is stable and low, approximately 1/3 lower than the most widely available contemporary two piece printed circuit card connector type. To maximize the B^3 connector capability and assure the greatest potential reliability, several guidelines should be followed.

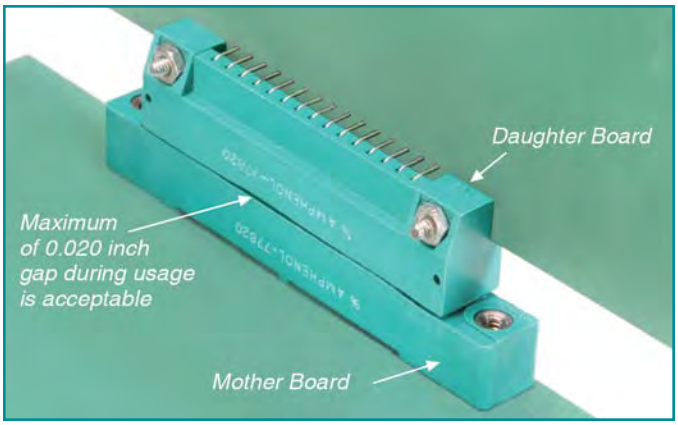
Ideally, connectors should be fully mated and not used as a packaging system tolerance absorber. Full mating occurs when the two molded thermoplastic contact housings (connector bodies) touch, plug skirt to receptacle shoulder over the entire length of the connector. However, manufacturing tolerances and user installation procedures must be considered and can be expected to prevent the "ideal" situation.

Connector bodies were intentionally designed to be non-rigid as permanent flexibility is necessary to allow compliance to user printed circuit cards, fixtures and card cages. Vibration and shock exposure, thermal excursions, contact repairability, and differential expansion characteristics further dictate the desirability of flexible connectors.

Amphenol drawing call-outs of part flatness to a 0.010 inch FIM (Total Indicator Reading - Full Indicator Movement) over the mating surface length is to be interpreted as in an "as used" condition. Rigid mounting of Mother Board (plug) parts to frames, multi-layer printed circuit boards or back panels should consider the need for the 0.010 inch maximum condition after soldering or solderless wrapping procedures.

Normal Mother Board parts in an unrestrained, unused condition may exceed the "as used" 0.010 inch reading at normal ambient or storage environments. Thermal cycling may further aggravate or adjust the condition. These parts present a profile from flat to a "smile" appearance when viewed from the side with the mating surface uppermost. (For example, see photo above). Normal positioning of this part on the Mother Board with slight restraint through use of mounting hardware or standard mounting bolts will automatically allow part compliance to the flatness condition of the board. Slight restraint is urged to allow for differential thermal expansion compensation during preheating and soldering operations. Final torquing or permanent fastening should be effected after cool down and thermal neutralization. Normal solderless wrapping procedures could ignore the differential expansion consideration.

Daughter Board connectors present the same flat to "smile" profile in a free state with the mating surface downward. The relief shelf can be used as a reference or guide when used with a straight edged Daughter Board or printed circuit board "page". Once proper positioning is verified and contact tails are solder fixed to the plated through holes, straightness will be permanently retained.



DAUGHTER BOARD AND MOTHER BOARD FULLY MATED CONDITION

Users are urged to monitor the quality of connector installation to optimize the mating of connectors.

During usage and when mated the worst case condition of the "as used" 0.010 inch maximum reading of both the plug and receptacle could cause a maximum gap between plug and receptacle moldings of 0.020 inch. This condition is well within the B^3 product mated performance goals as our minimum effective electrical contact engagement has greater than a 100% safety factor. Users are urged to monitor the quality of connector installation to optimize the mating of connectors.

Input/Output connectors also normally exhibit a flat to "smile" profile with the mating surface downward. This "smile" condition self corrects once mated with the Mother Board counterpart and accessory locking screws are fastened. Again, checking for the 0.020 inch maximum gap is urged as a quality control monitor of user application techniques.

Amphenol has attempted to design in the ultimate for connector compliancy and self-correction during normal user installation procedures. The connector capabilities and inherent reliability rely in part on practical user procedures and application considerations. Refer to pages 93-95 for other installation instructions. And, refer to page 63 for correct mating of low mating force connectors. Amphenol board level engineers and product specialists are available to assist the user with application recommendations and processing guidance. Give us a call at 607-563-5011 and ask for board level technical assistance if further information is needed.

MOTHER BOARD CONNECTOR

MB connectors that are mounted on printed circuit boards should be installed on the board and held somewhat loosely, yet assuring all connector molding standoff pads contact the surface of the board, prior to soldering. There are several methods for attaching the MB connector to the board. Inserting locking/mounting bushings with an arbor press is shown in the top photo at right. Locking/mounting bushing accessory, two per connector, may be inserted into 0.185 inch diameter CSK holes at each end of the front of a MB connector body. (Part number to order locking/mounting bushing is 10-41196-3). Using a light arbor press or similar device, firmly press the knurled section of the bushing into the lower 0.122 inch diameter hole until the front of the bushing is flush with, or slightly below, the front surface of the MB connector. Refer to Figure 1 at right.

Make sure the bushing and hole axis are properly aligned. Avoid excessive force which may crack the back surface of the MB connector body.

The back of the locking/mounting bushing has a 4–40 UNC-2A THD to mount the connector. Fasten the connector with a suitable washer and nut. The front of the locking/mounting bushing has a 4–40 UNC-2B THD which will mate with the locking screw accessory of an IO connector.

Alternate Mounting Variations for Mother Board Connector

A clinch nut (such as all ESNA 79NCFMA2-26 or equivalent may be pressed from the front, knurled end first, through the 0.185 diameter CSK into the 0.122 inch diameter hole at each end of the connector. An appropriate length 2–56 UNC-3A screw, washer, and nut may be used to mount the connector. Mounting forces should be applied to the bushing toward the rear of the connector. (See Figure 2 below)

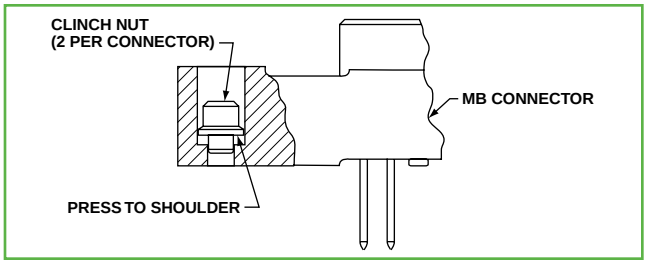


FIGURE 2: MB CONNECTOR WITH CLINCH NUT MOUNTING

When a Daughter Board is mated, use a 4–40 screw of appropriate length with a suitable washer under the head. Insert the screw from the front of the connector through the 0.185 inch diameter CSK into the 0.122 inch diameter hole at each end of the connector and fasten with a suitable washer and nut. (Refer to Figure 3 below). Torque to 5.5 pound-inch maximum after soldering operation has been completed.

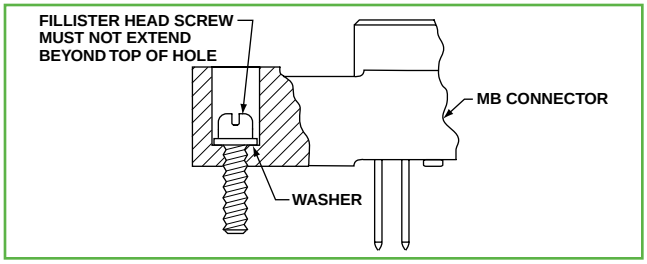
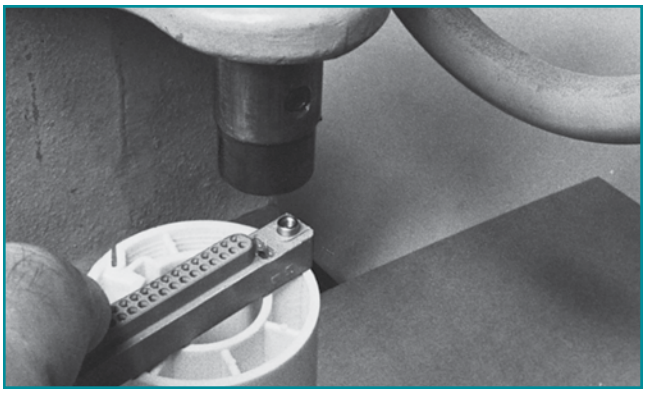


FIGURE 3: MB CONNECTOR WITH SCREW MOUNTING



LOCKING/MOUNTING BUSHING ACCESSORY INSERTED INTO MB CONNECTOR BODY

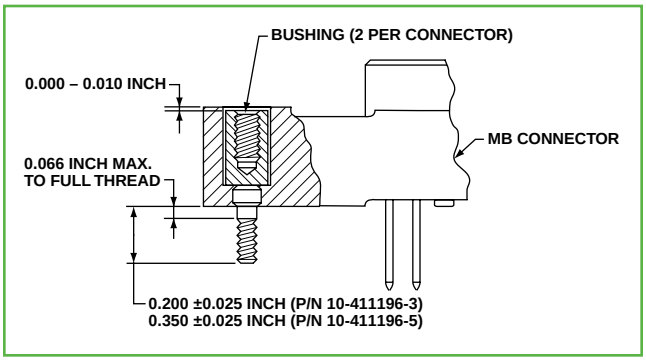


FIGURE 1:
ASSEMBLY OF LOCKING/MOUNTING BUSHING INTO MB CONNECTOR

If MB connectors are to be wave soldered to printed circuit boards, the boards should be fixtured to maintain assembly straightness prior to and during the wave soldering process. (Refer to Figure 4 below).

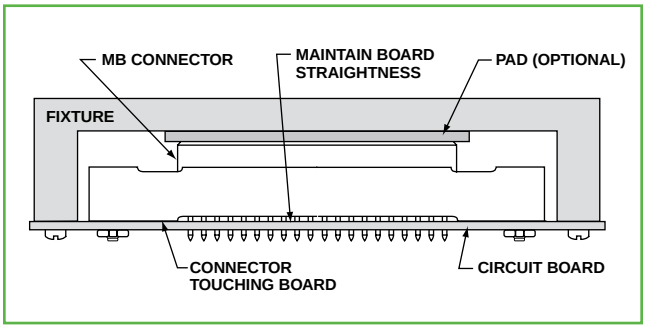


FIGURE 4: TYPICAL FIXTURE FOR SOLDERING MB CONNECTORS

DAUGHTER BOARD CONNECTOR

DB connectors should be loosely held on the printed circuit board prior to and during wave soldering. Care must be taken to ensure that the board does not bow away from the center of the connector during the soldering process. Also, especially on long length daughter board connectors, care must be taken that the connector does not bow on the circuit board. (Refer to Figure 5.)

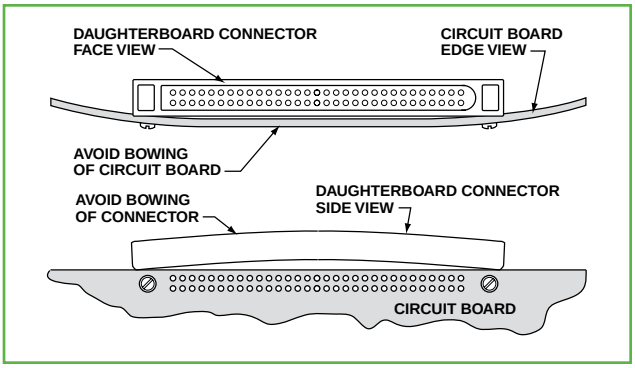


FIGURE 5: AVOID BOWING OF CIRCUIT BOARD AND/OR CONNECTOR WHEN ASSEMBLING DB CONNECTOR

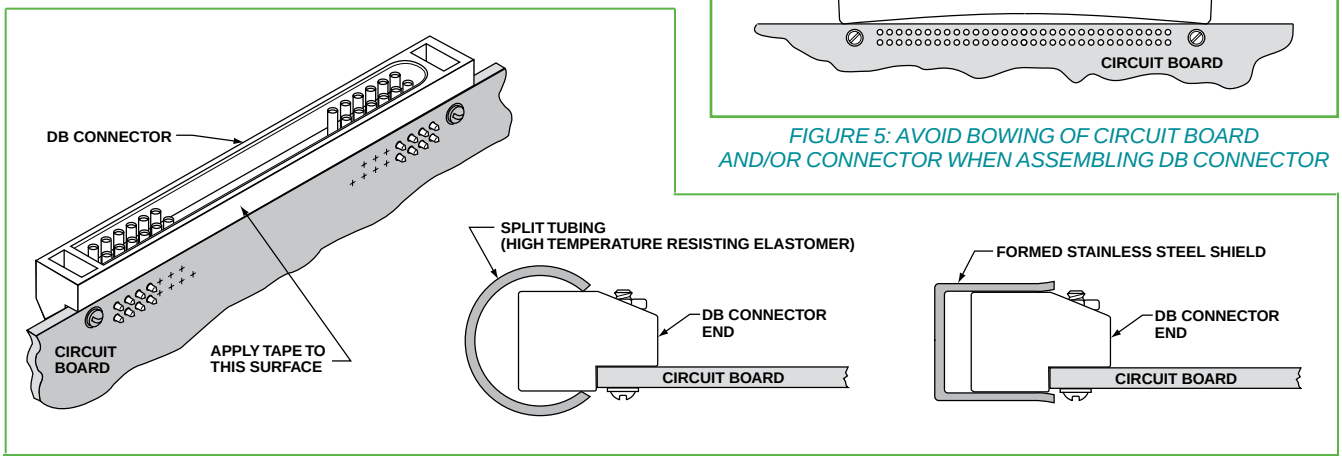


FIGURE 6: THREE TYPICAL MASKING APPLICATIONS FOR SOLDERING DB CONNECTORS

After soldering, mounting screws should be properly torqued.
For cosmetic purposes, the board side of the DB connector can be masked prior to wave soldering to protect it from heat exposure and solder wash. Acceptable masking may be accomplished with split tubing, stainless steel, or Mystik Tape #7010 or #7367. (Refer to Figure 6).
Printed wiring boards with DB connectors attached should be inserted into the housing until firmly seated. If possible, visual observation of the MB/DB mated condition is recommended. The fully mated condition occurs when the DB connector skirt bottoms on the MB or PC connector shoulder along the full length. (Refer to Figure 7).
Printed circuit boards should be supported in card guides and locked in position when connectors are fully mated.

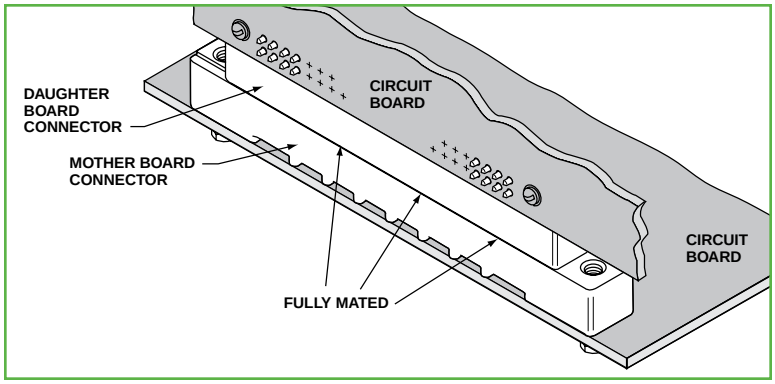
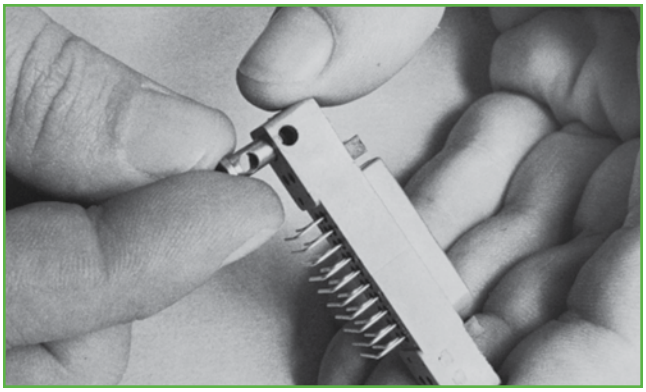


FIGURE 7: MB CONNECTOR & DB CONNECTOR IN FULLY MATED CONDITION

PC CONNECTOR

The PC connector should be loosely attached to the printed circuit board prior to any soldering of contacts.
Locking bushing accessory, two per connector, may be inserted from the back of a PC connector body into large mounting holes at each end. See photo at right. Part number to order locking bushing accessory for PC connectors is 10-411196-4.The 0.126 inch diameter cross holes in the locking bushing must be aligned with the 0.126 inch diameter cross hole in the PC connector body. These holes accept a 4–40 UNC-2A screw which should be long enough to allow mounting to the board. Fasten with a suitable washer and nut, making sure an appropriate washer is also under the head.
The front of the locking bushing has a 4–40 UNC-2B thread which will mate with the locking bushing accessory of an IO connector.



LOCKING BUSHING ACCESSORY INSERTED INTO PC CONNECTOR BODY

PC CONNECTOR, CONT.

The mounting surface to which the connector is applied should not extend forward of the shoulder of the PC connector. If the mounting surface does extend beyond the shoulder, a shim (minimum 0.005 inch thick) must be inserted between the connector body and the mounting surface. (Refer to Figure 8). After soldering, mounting screws should be properly torqued.
Fixturing of the PC connector and mounting surface may be desirable to assure straightness after wave soldering.

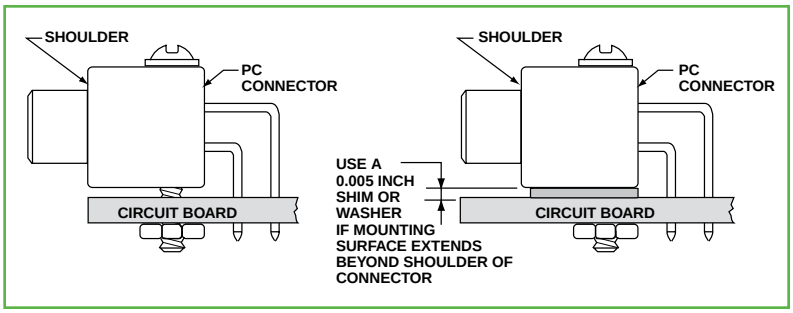
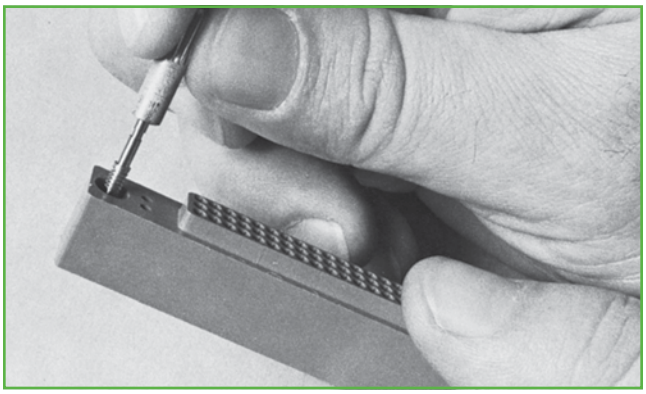


FIGURE 8: PC CONNECTOR MOUNTING

INPUT/OUTPUT CONNECTOR

Use of mating hardware, such as locking screws, is recommended with I/O connectors. See photo at right. Locking screw accessory, two per connector, may be inserted into the large holes at each end of the back of an IO connector body. Part number to order locking screw accessory is 10-411196-4. By hand, press the locking screw firmly down into the cavity until it reaches a positive stop. The locking screw is then captivated in the retention system of the cavity. The front of the locking screw has a 4-40 UNC-2A thread which will mate with the locking bushing accessories of MB or PC connectors. (Refer to Figure 9 for I/O locking screw dimensions).

Should it be necessary to remove the captivated locking screw accessory, push the screw as far forward as possible. Using vise grip pliers to grasp the threaded end and pliers to hold the knurled end, apply torque until the locking screw breaks in two. Each half will then drop out.



LOCKING SCREW ACCESSORY INSERTED INTO IO CONNECTOR BODY

Alternate Mounting Variation for Input/Output Connectors

For fixed mounting, a 6-32 thread forming screw, type AB (MS5186) may be inserted through the mounting member and into the holes at each end of the connector body from the back. The screws must be used with suitable washers and must be of sufficient length to penetrate the connector body 0.350 inch. Care must be taken not to over-tighten the screws.

Visual observation of the mating of the MB connector to the I/O connector or the PC connector to the I/O connector is recommended. The fully mated condition occurs when the I/O connector skirt bottoms on the MB or PC shoulder along the full length. (Refer to Figure 10).

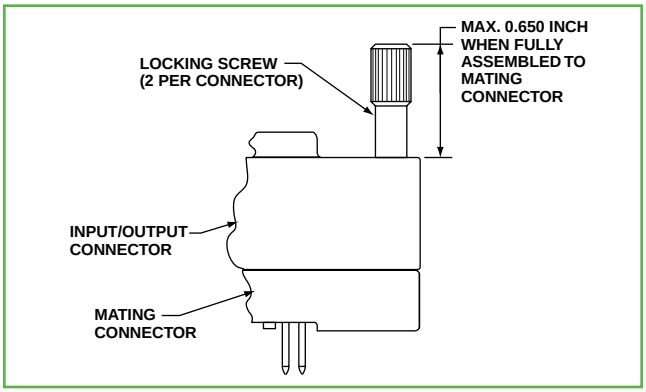


FIGURE 9: I/O LOCKING SCREW DIMENSIONS

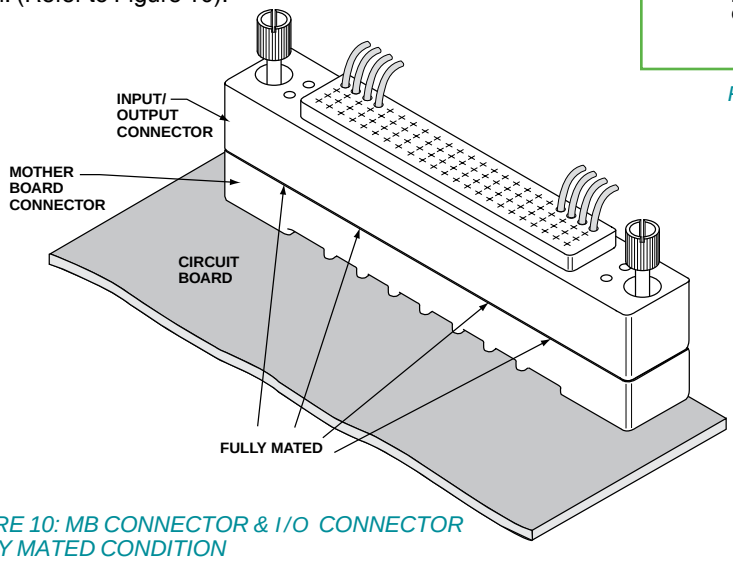


FIGURE 10: MB CONNECTOR & I/O CONNECTOR FULLY MATED CONDITION

Printed circuit boards containing PC connectors that are mating with I/O connectors should utilize a holding device that is capable of locking the board in place to prevent back-off during use.

Amphenol
Ruggedized, Non-Floating, Brush Rack and Panel Connectors

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Amphenol Ruggedized, Non-Floating Brush Rack and Panel Connectors

Ruggedized, Non-Floating Brush Rack & Panel Typical Markets:

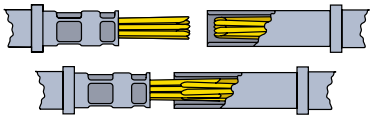
- C4ISR/Tactical Radios
- Military Avionics

Amphenol Aerospace

RUGGEDIZED, NON-FLOATING BRUSH RACK AND PANEL CONNECTORS

This connector series utilizes Amphenol's durable and reliable B^3 contact system in a rugged, non-floating Rack and Panel connector.

BRUSH CONTACT TECHNOLOGY



Multiple strands of high tensile strength wire bundled together to form brush-like contacts. See Brush Contact Technology section of this catalog for further description.

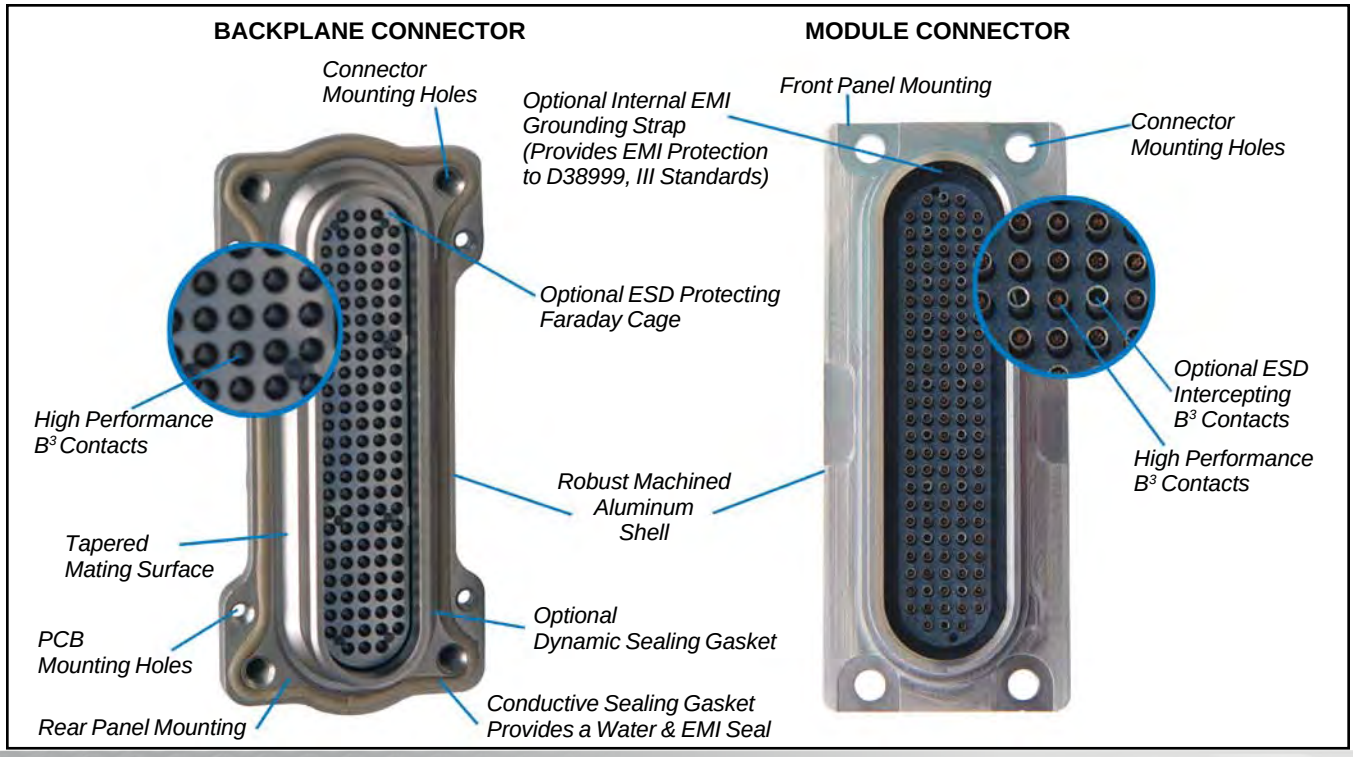
Included in this series are digital and power/digital "hybrid" insert arrangements. The hybrid series utilizes Amphenol's high performance RADSOK® power contacts along with Amphenol's proven B^3 contact. (See next page for more description of RADSOK® contacts.)

AVAILABLE FEATURES:

- High performance B^3 brush contacts
- 0.100 inch x 0.100 inch square grid footprint
- Environmentally sealed at connector interface when mated (optional feature)
- Environmentally sealed connector mounting interface
- EMI protection is available at mounting surfaces and connector interface
- ESD protection is available – allows use of Class 3 hardened chips (4KV max. voltage)
- Tapered mating surface provides near zero X & Y plane movement between mated connectors

Ruggedized, Non-Floating Brush Rack and Panel Connector (6 RADSOK® High Power Contacts and 74 Brush Contacts)

2 Bay Shell Configuration of Ruggedized, Non-Floating Rack and Panel Connector (126 Brush Contacts per Bay)



CONNECTOR PERFORMANCE:

Standard performance requirements for 126 pin signal version:

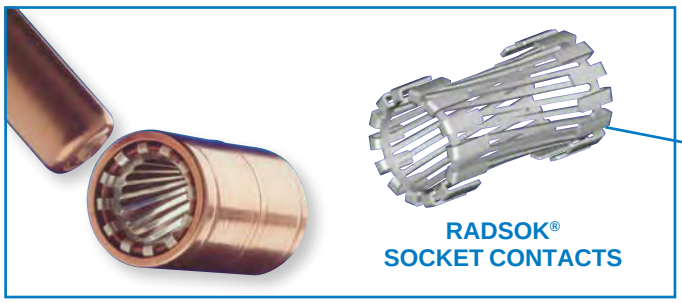
- Durability: 500 mating cycles
- Operating Temperature: -60° to 125°C
- Current Rating: 3 amperes Hot swap 1 ampere max. (load dependent) - non ESD protected version only.
- Insulation Resistance: 1 gigaohm minimum
- Dielectric Withstanding Voltage: 500V, 60 Hz RMS @ sea level, 300V, 60 Hz RMS @ 15,000 ft. elevation
- Solderability: J-STD-004, -005 & -006
- Salt Fog: EIA-364-26B, test condition B
- Humidity: EIA-364-31B, test method III
- Vibration: EIA-364-28B, test condition III
- Shock: EIA-364-27B, test condition G
- ESD Protection - intercepts ESD events on signal pins from 4kV to 25kV

Consult Amphenol Aerospace, Sidney NY for more information on ruggedized, non-floating rack and panel connectors to fit your particular interconnect needs.

Custom 2-Bay Ruggedized, Non-Floating Brush Rack and Panel Connector (126 brush contacts per bay)

Standard 126 pattern in Ruggedized, Non-Floating Brush Rack and Panel Connector.

HIGH POWER IS ACHIEVED WITH HYBRID RACK AND PANEL CONNECTORS THAT UTILIZE AMPHENOL® RADSOK® CONTACTS

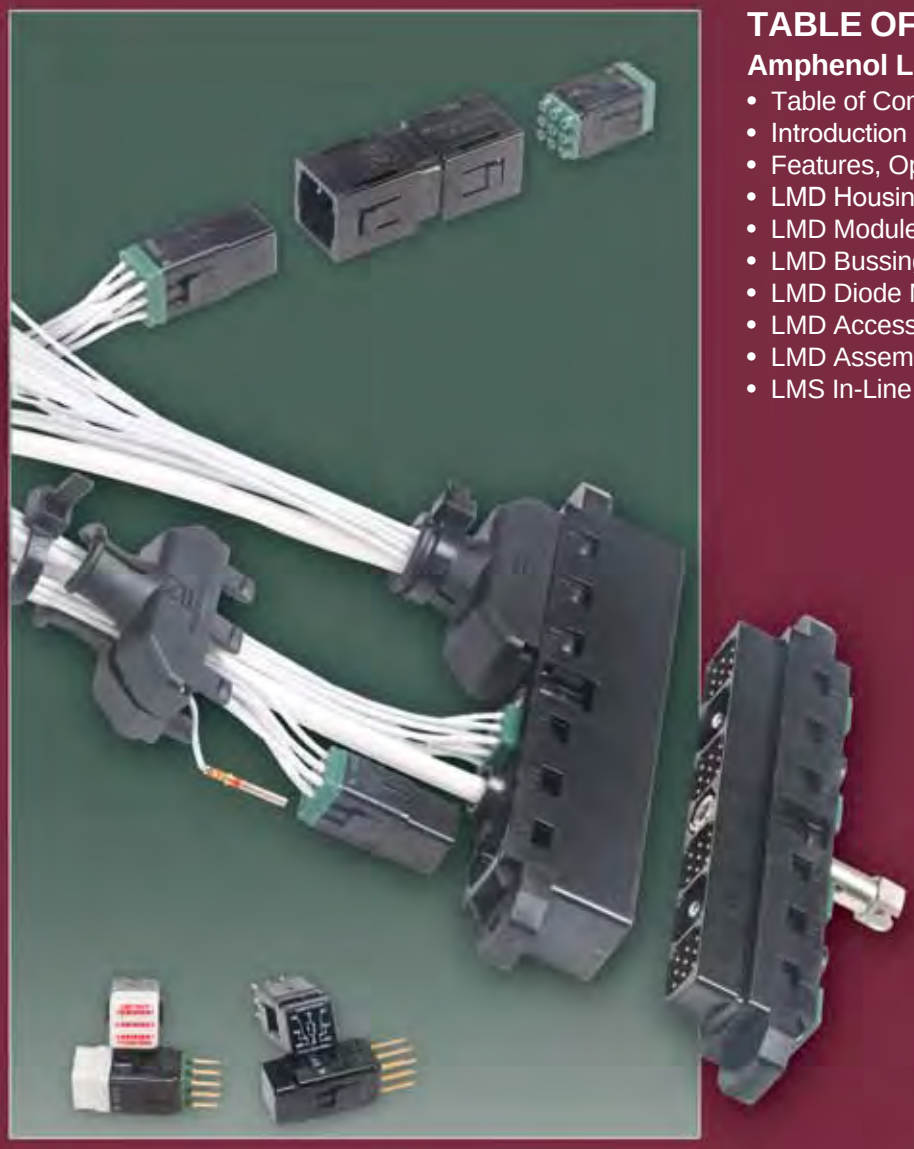


RADSOK® CONTACT TECHNOLOGY:

- Socket cylinder within female contacts has several equally spaced longitudinal beams twisted into a hyperbolic shape.
- As male pin is inserted, axial members in the female half deflect, imparting high current flow across the connection with minimal voltage loss.
- The hyperbolic, stamped grid configuration ensures a large, coaxial, face-to-face surface area engagement.
- Ideal for crimp termination applications requiring repeated mating cycles and high current with low milli-volt drop.

For more information on RADSOK® products from Amphenol:
www:amphenol-industrial.com and www.radsok.com
Contact Amphenol Aerospace Operations, Sidney, NY
(Phone: 607-563-5011) or Amphenol Power Solutions, Fraser, MI
(Phone: 586-294-7400)

Amphenol
LMD and LMS Modular Connectors



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Amphenol LMD & LMS Modular Connectors

LMD & LMS Typical Markets:

- Commerical Avionics
- Avionics Instrumention

Amphenol Aerospace

LMD Modular Connectors

The LMD Connector Series was designed by Amphenol Pyle-National to provide flexibility in the assembly of wire harnesses that are used in instrumentation and avionic control environments. The modular design of the LMD provides rack and panel or cable to cable attachment.

Design Features of LMD Connectors

- An LMD Connector is comprised of a housing, modules and contacts - each ordered separately, requiring assembly
- Lightweight housings are offered in two materials
  - standard black thermoplastic
  - high performance composite material for EMI shielding
  - white thermoplastic nylon material with increased solvent resistance
- Four standard modules are available with the following contact arrangements: 1 #8, 4 #16, 9 #20, 16 #22
- Modules are available in sealed and unsealed versions
- Linear module design may be used for rack and panel or cable to cable applications
- Bussing modules available to allow for a plurality of circuit network configurations without extra hardware
- Diode modules provide a current protection system for avionic instrumentation packages and eliminate the need for dedicated PC boards and other hardware
- Miniature relay modules can be added which eliminate the need for printed circuit boards and hardware

LMD Receptacle and Plug

LMD Benefits

- Reduces assembly and production costs
- Eliminates costly PC board and associated hardware
- Reduces inventory levels and associated costs
- Allows for a variety of circuit configurations
- Permits ease of circuit upgrading
- Facilitates equipment maintenance

LMD Performance Characteristics

Temperature Rating	–55° C to +140° C (-67 ° F to + 284° F)
Insulation Resistance (min.)	5000 megohms initial: 1000 megohms after 96 hours humidity
Durability	250 cycles (mating and unmating)
Vibration	Maximum discontinuity of one microsecond when subjected to sinusoidal vibration of 10 to 2000 Hz at 15 gravity units
Physical Shock	Maximum discontinuity of one microsecond when subjected to 1/2 -sine-wave transient shock of 50 gravity units with pulse duration of 11 milliseconds
Module Insertion & Removal Force	5 lbs. maximum
Module Retention	70 lbs. minimum

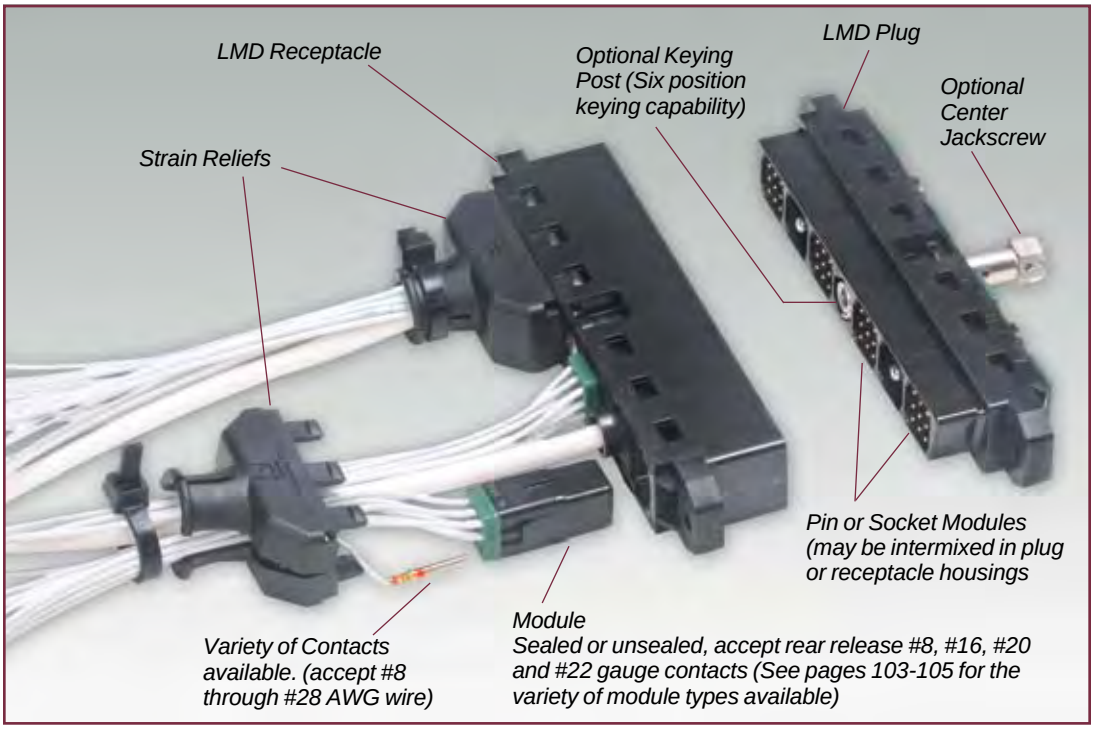
LMS Modular Connectors

Supplementing the LMD connector family, Amphenol/Pyle National offers the LMS in-line splice connector; a low cost interconnects that incorporates the LMD modules and contacts.

- Standard LMS splice connector - 3-piece assembly with module removal tool access
- Tool-less splice connector - 3-piece assembly with a push-button module release for easy module removal
- Two-piece bracket available for panel mounting
- Used in wire harness, instrument and equipment terminations and test points

LMS Tool-less Splice Connector

FEATURES, OPTIONS & CONTACT DATA



LMD Features and Options

LMD's module options provide a mix of both active and passive devices within one connector. The features and options of this series describe the design flexibility in this connector series:

- LMD Standard components are molded of a U/L rated 94VO flame retardant, light-weight thermoplastic material. Alternate white nylon material (provides resistance to industrial oils and solvents) is available; consult Amphenol Aerospace for availability.
- The linear LMD connector may be used for rack and panel or cable-to-cable applications.
- Plug and receptacle housings may be front or rear panel mounted.
- Optional keying post provides six position keying capability.
- The optional center jackscrew provides ease of mating and unmating and insures high reliability under vibration.
- Cable strain reliefs are available for internal attachment. (See page 107).
- Variety of module types. Sealed and unsealed modules accept rear release #8, #16, #20 and #22 gauge contacts. Bussing, diode and relay modules available. PC tail contacts are also available; consult Amphenol Aerospace.
- A variety of contacts accept #8 through #28 AWG wire. Commercially available automated crimp terminating equipment may be used.
- Wired or unwired modules are rear inserted and held by two retention tines. With the aid of a front release tool, the modules are easily removed from the rear. (See pg. 107).
- Pin or socket modules may be intermixed in plug or receptacle housings.

Contact Data

Contact Size	Wire Size	Contact Resistance		Dielectric Withstanding Voltage AC (RMS)	Max. Recommended Working Voltage AC (RMS)
		Test Current (amperes)	Max. Millivolts		
22	22 28	5.0 1.5	73 54	1800	600
20	20 24	7.5 3.0	55 45	1800	600
16	16 20	13.0 7.5	49 46	2300	900
8*	12 14	23 17	42 40	2300	900
8	8 10	46 33	26 28	2300	900

Contact Size	Wire Size	Contact Crimp Tensile Strength Lbs. Min.	Max. Wire Insulation
22	28 26 24 22	3 5 8 12	.054
20	24 22 20	8 12 20	.083
16	20 18 16	20 30 50	.103
8*	14 12	70 110	.255
8	10 8	150 220	.255

* with #12 wire well

HOW TO ORDER LMD HOUSINGS

Housings are ordered separately from modules and contacts. Housings are available with 6 bays. Typical housing part number is shown as follows:

1.	2.	3.	4.	5.	6.
	Housing Material	Number of Modules	Connector Type	Coupling Mechanism	Alternate Keying
LMD	-0	6	P	J	3

1. Connector Type

LMD

2. Housing Material

0	designates standard black thermoplastic
F	designates white thermoplastic nylon material - consult Amphenol for availability

3. Number of Modules

6	cavities in plug or receptacle housing (available in 6 only)

4. Connector Type

P	designates plug
R	designates receptacle

5. Coupling Mechanism

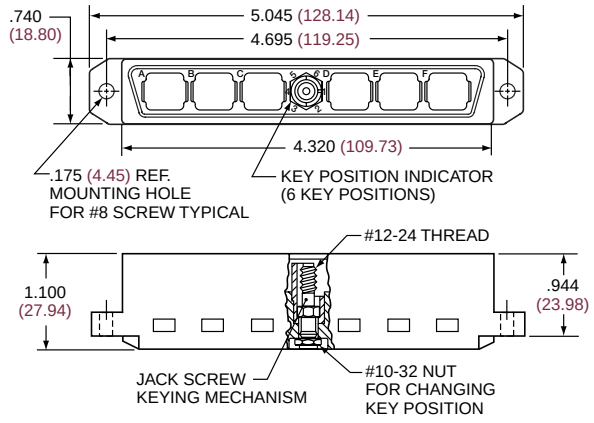
J	designates jack-socket, rotating
K	designates jack-screw, fixed
E	designates without coupling mechanism

6. Alternate Keying

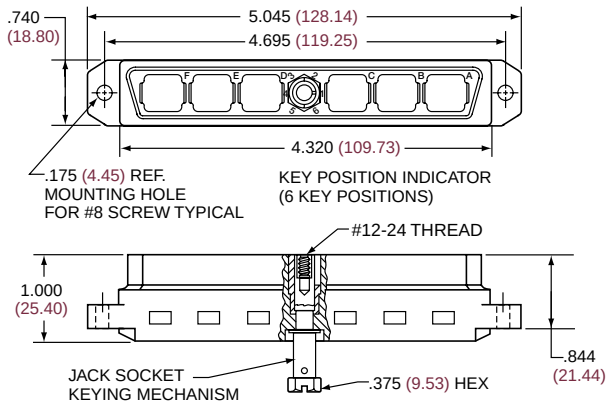
3	6 positions of keying post: 1, 2, 3, 4, 5 or 6
7	designates keying hardware shipped unassembled for field assembly
8	designates no alternate keying hardware. Keyed through housing only.

Ordering information on modules, contacts and strain reliefs is given on other pages of this LMD catalog section that follow.

RECEPTACLE HOUSING 6 BAY



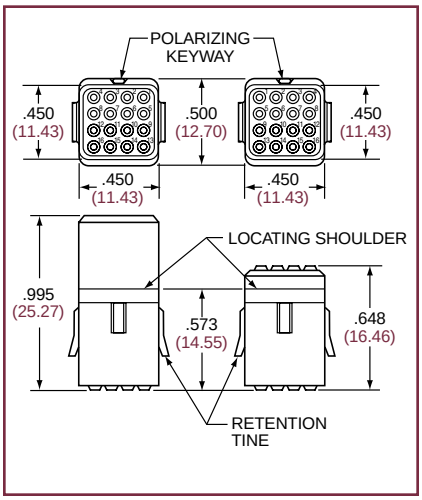
PLUG HOUSING 6 BAY

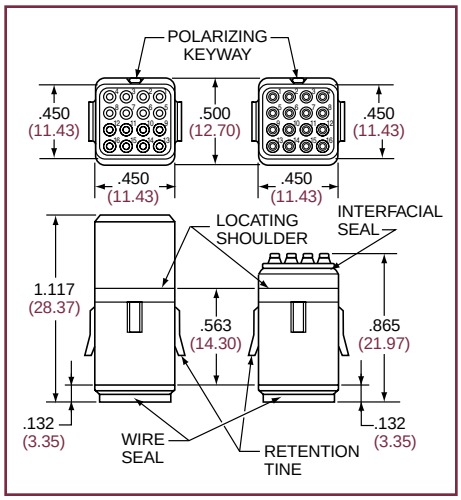


MODULE CONTACT ARRANGEMENTS

Modules and contacts for LMD connectors are sold separately from housings.

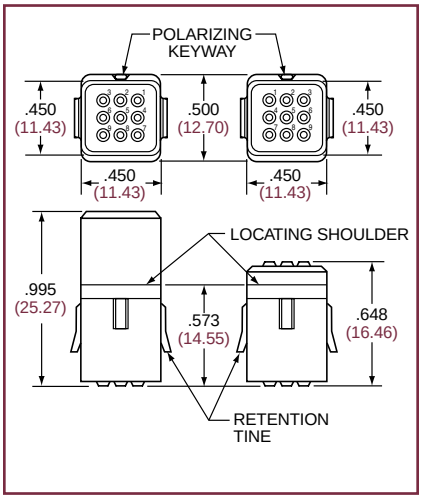
Modules with 16 Size 22 Contacts

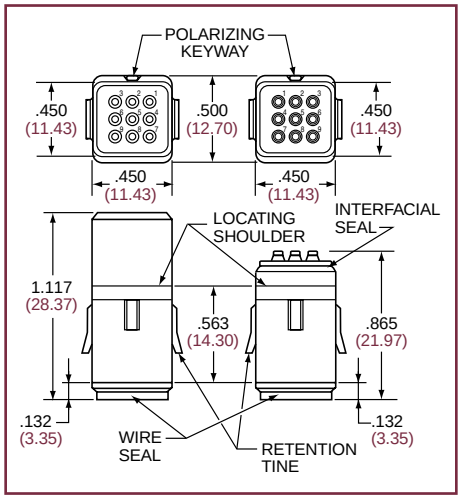




Socket Module	Pin Module	Sealed Socket Module	Sealed Pin Module
Part number: LMD-3003-S	Part number: LMD-3003-P	Part number: LMD-4003-S	Part number: LMD-4003-P

Modules with 9 Size 20 Contacts



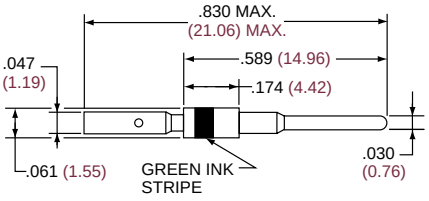


Socket Module	Pin Module	Sealed Socket Module	Sealed Pin Module
Part number: LMD-3001-S	Part number: LMD-3001-P	Part number: LMD-4001-S	Part number: LMD-4001-P

Module part numbers are for black thermoplastic material. Consult Amphenol Aerospace for availability of any other module materials.

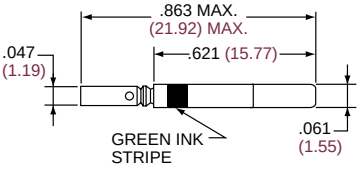
Pin Contact Size 22

Part number: LMD-4022-36LJ



Socket Contact Size 22

Part number: LMD-4122-96LD

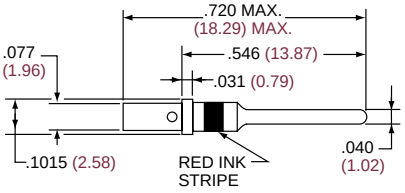


Contact Finish: Gold Plated

Pin Contact Size 20

Part number: LMD-4020-96LD

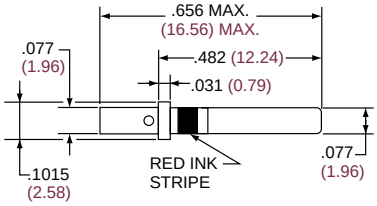
Thermocouple
Part Number: LMD-4020-10( )*



Socket Contact Size 20

Part number: LMD-4120-96LD

Thermocouple
Part Number: LMD-4120-10( )*

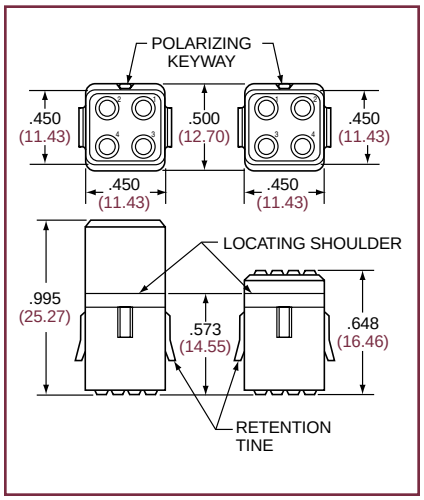


Contact Finish: Gold Plated
*Complete thermocouple part number with code letter for desired contact material as follows:
P = Chromel
R = Alumel
N = Constantan
C = Copper

MODULE CONTACT ARRANGEMENTS, CONT.

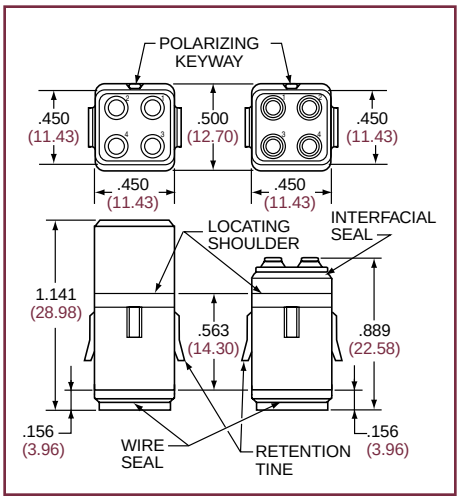
Modules and contacts for LMD connectors are sold separately from housings.

Modules with 4 Size 16 Contacts



Socket Module
Part number: LMD-3005-S

Pin Module
Part number: LMD-3005-P



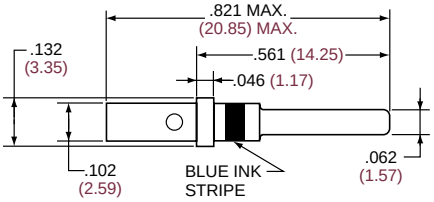
Sealed Socket Module
Part number: LMD-4005-S

Sealed Pin Module
Part number: LMD-4005-P

Pin Contact Size 16

Part number: LMD-4016-96LD

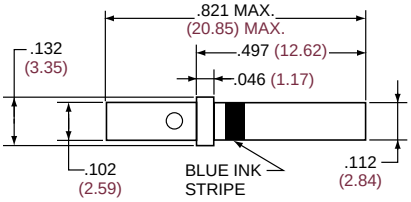
Thermocouple
Part Number: LMD-4016-10( )*



Socket Contact Size 16

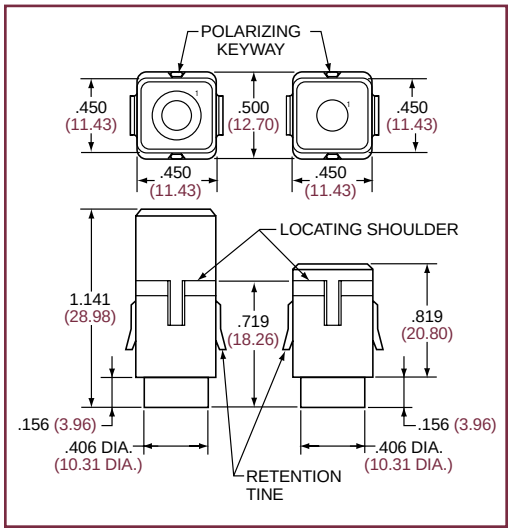
Part number: LMD-4116-96LD

Thermocouple
Part Number: LMD-4116-10( )*



Contact Finish: Gold Plated
*Complete thermocouple part number with code letter for desired contact material as follows:
P = Chromel
R = Alumel
N = Constantan
C = Copper

Modules with 1 Size 8 Contacts



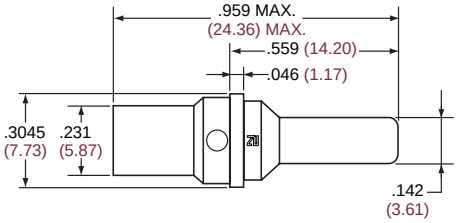
Socket Module
Part number: LMD-3004-S

Pin Module
Part number: LMD-3004-P

Module part numbers are for black thermoplastic material. Consult Amphenol Aerospace for availability of any other module materials.

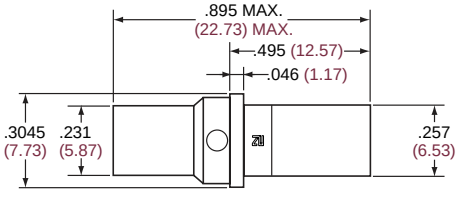
Pin Contact Size 8

Part number: LMD-4008-36L



Socket Contact Size 8

Part number: LMD-4108-36L

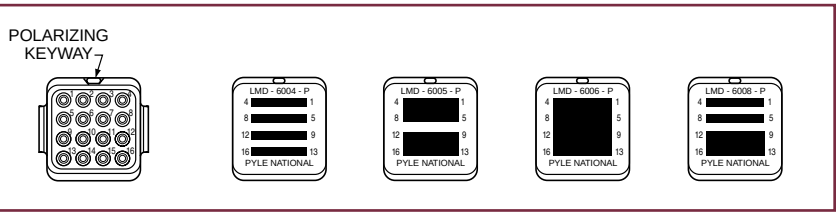


Contact Finish: Gold Plated

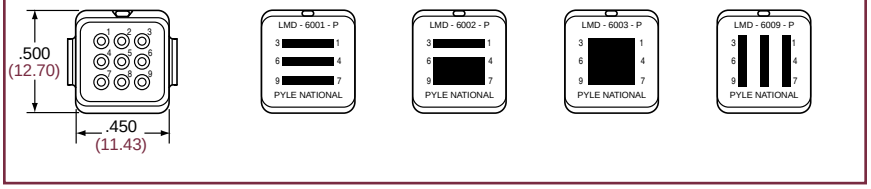
BUSSING MODULES - FOR PLURAL CIRCUIT NETWORKS

Bussing Modules were designed by Amphenol Pyle-National to provide a complete terminal junction system. This module conveniently and simply allows for a plurality of circuit network configurations, eliminated the need for "pigtails", termination strips or termination hardware. Nine bussing configurations are currently available* in either a standard or sealed module. Sealed modules have a rubber interfacial seal for increased environmental resistance. LMD Bussing Modules are currently available in black thermoplastic material.**

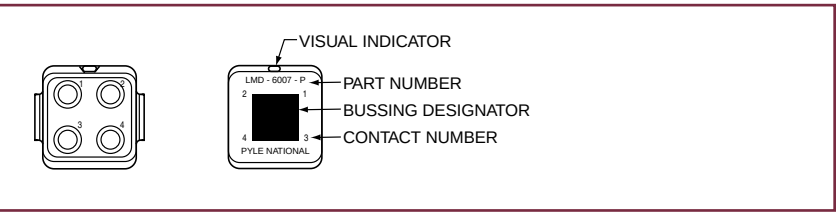
Modules with Size 22 Contacts



Modules with Size 20 Contacts



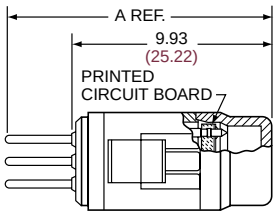
Modules with Size 16 Contacts



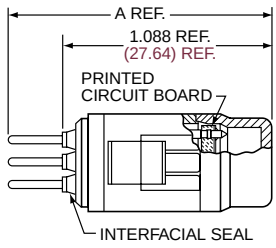
Contact Front View

Bussing Configuration (Rear View)

Standard Bussing Module



Sealed Bussing Module



Module Side View

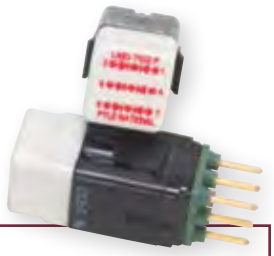
LMD Bussing Module Part Number		Contact Size	Bussing Circuits	A. Ref.
Standard Module	Sealed Module			
LMD-6001-P	LMD-6101-P	20	3	1.326
LMD-6002-P	LMD-6102-P	20	2	1.326
LMD-6003-P	LMD-6103-P	20	1	1.326
LMD-6004-P	LMD-6104-P	22	4	1.256
LMD-6005-P	LMD-6105-P	22	2	1.256
LMD-6006-P	LMD-6106-P	22	1	1.256
LMD-6007-P	LMD-6107-P	16	1	1.326
LMD-6008-P	LMD-6108-P	22	3	1.326
LMD-6009-P	LMD-6109-P	20	3	1.326

* For other circuit network configurations, consult Amphenol Aerospace.

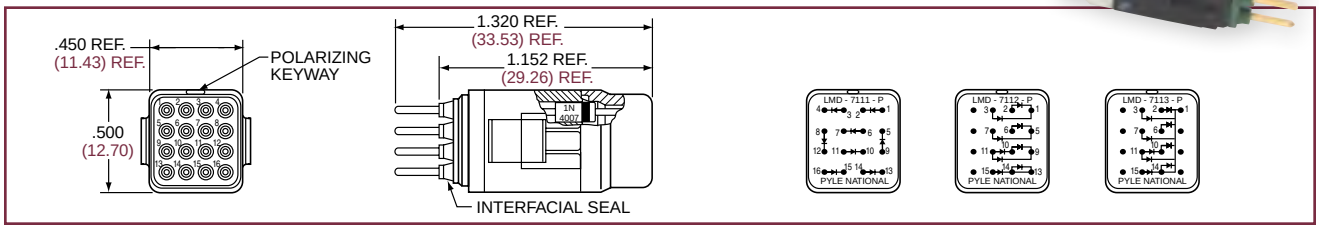
** For availability of materials other than standard black thermoplastic, consult Amphenol Aerospace.

DIODE MODULES & RELAY MODULES

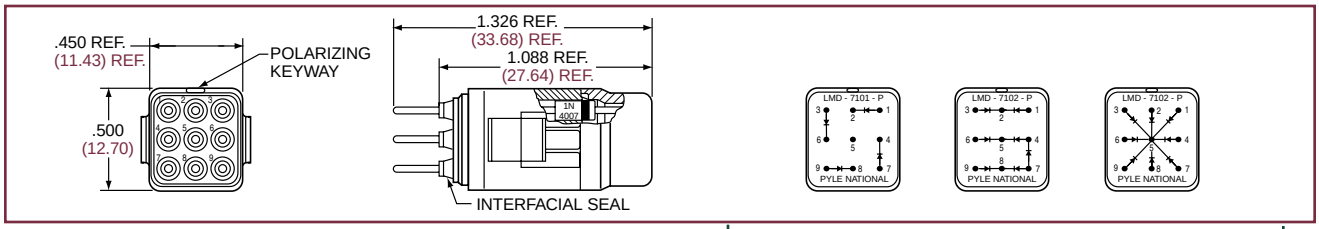
Diode Modules provide a current protection system for Avionic instrumentation packages. Module configurations represent standard system and test application requirements.*
Diode Modules eliminate dedicated PC boards and other assorted hardware. These modules are available in sealed type only, incorporating an interfacial seal for environmental protection, and are manufactured of black thermoplastic material.**



Diode Modules with Size 22 Contacts



Diode Modules with Size 20 Contacts

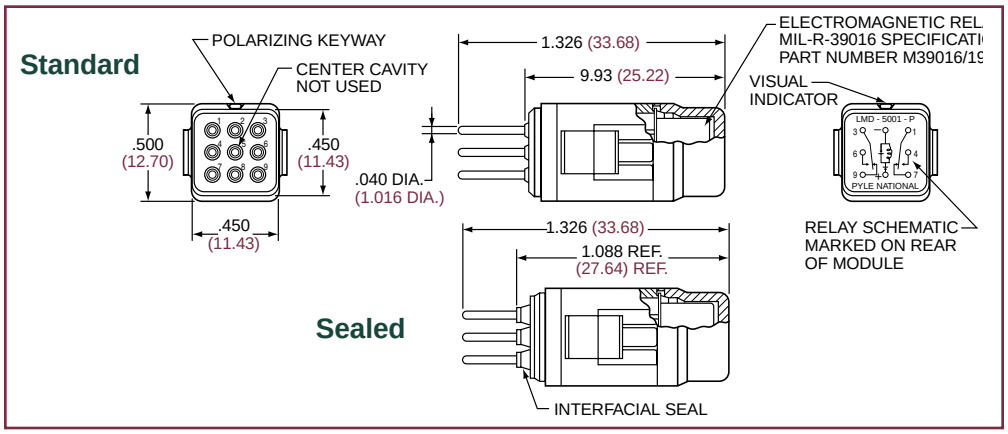


Contact Front View *Module Side View* *Diode Configuration (Rear View)*

LMD Diode Module Part Number	Contact Size	Circuit Description
LMD-7111-P	22	8 discrete diodes
LMD-7112-P	22	4 pair of diodes, each pair with common cathode
LMD-7113-P	22	8 diodes with common cathode (pin #1)
LMD-7101-P	20	4 discrete diodes
LMD-7102-P	20	3 pair of diodes, ear pair with common cathode
LMD-7103-P	20	8 diodes with common cathode (pin #5)

Relay Modules incorporate an industry standard miniature relay per MIL-R-39016 specification part number 39016/19-036L* These modules eliminate the need for PC boards and all related hardware. These modules are available in unsealed and sealed types as shown below, and are manufactured of black thermoplastic material.**

RELAY MODULES



Contact Front View *Module Side View* *Relay Configuration (Rear View)*

LMD Relay Module Part Number	
Standard Module	Sealed Module
LMD-5001-P	LMD-5101-P

* For other circuit network configurations, consult Amphenol Aerospace.

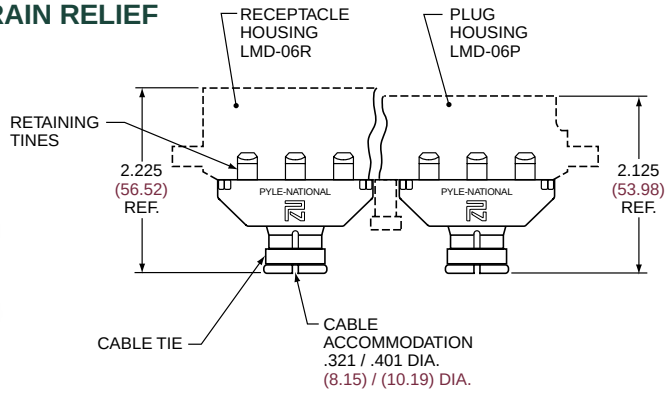
** For availability of materials other than standard black thermoplastic, consult Amphenol Aerospace.

Strain Relief for Internal Attachment of Wiring

Part number: LMD-5300-10A

Two-piece strain relief with cable tie included, for internal attachment to LMD 6 bay connector housings. Molded in black thermoplastic material.

TWO-PIECE STRAIN RELIEF



LMD TOOLS

Crimping Tool for Size 22 Contacts

	Crimping Tool Part Number	Positioner	
		For Pin Contact	For Socket Contact
Amphenol/Pyle Number	TP-201401-H2	TP-201409	TP-201401-2-07
Military Number	M22520/2-01	–	M22520/2-07

Wire Size	Crimp Tool Selector Setting
28	No. 1
26	No. 2
24	No. 3
22	No. 4

Crimping Tool for Size 20 & 16 Contacts

	Crimping Tool Part Number	Turret Head
Amphenol/Pyle Number	TP-201354	TP-201355
Military Number	M22520/1-01	M22520/1-02

Contact Size	Wire Size	Crimp Tool Selector Setting
20	24	No. 2
	22	No. 3
	20	No. 4
16	20	No. 4
	18	No. 5
	16	No. 6

Crimping Tool for Size 8 Contacts

	Crimping Tool Part Number	Locator
Amphenol/Pyle Number	TP-201393	TP-201408
Military Number	–	–

For Size 8 Contacts		For Size 8 Contacts with #12 Wire Well	
Wire Size	Crimp Tool Selector Setting	Wire Size	Crimp Tool Selector Setting
10	No. 5	14	No.2
8	No.7	12	No.3

Contact Insertion/Removal Tools

Contact Size	Color	Amphenol/Pyle Part Number	Military Part Number
22	Green	10-538988-22D	MIL-I-81969/14-01
20	Red	10-538988-201	MIL-I-81969/14-02
16	Blue	10-538988-016	MIL-I-81969/14-03
8	Red	TP-201406	MIL-1-81969/29-02

LMD Module Removal Tool

Part number: TP-201397

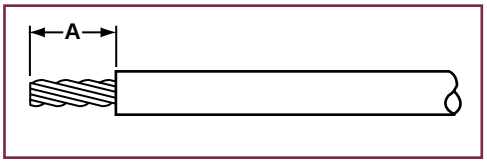
See photo on page 109 of module removal with this tool.

LMD tools can be purchased from Daniels Manufacturing Company.

CRIMPING, INSERTION & REMOVAL OF CONTACTS

Amphenol recommends the tools listed on the preceding page for use with LMD connectors, and also the following procedures for wire preparation, crimping of wire and contact insertion and removal.

Wire Preparation



Strip wires to dimension "A" shown in table at right. Avoid cutting or nicking wire strands.

Contact Size	Wire Size	Max. O. D. Insulation	Stripping Length Dimension "A"
22	20-24-26-28 AWG	.054	.156 – .125
20	20-22-24 AWG	.083	.185 – .155
16	16-18-20 AWG	.103	.260 – .230
8 (with #12 crimp)	12-14 AWG	.255	.395 – .365
8	8-10 AWG	.255	.395 – .365

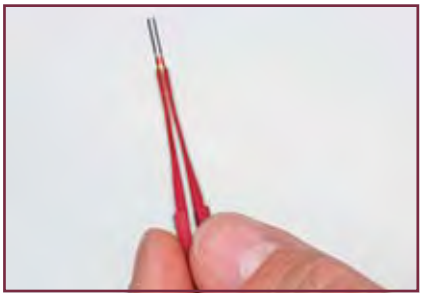
Crimping Wire to Contacts

Follow steps 1-3 for proper contact crimping.

1. Fully insert wire into contact crimp pocket. Wire must be visible through wire inspection hole.

2. Insert contact into tool (use proper crimping tool as listed on preceding page). Crimp contact to wire. Tool will not open if contact is not fully crimped.
3. After crimping, wire should be visible through wire inspection hole.

Contact Insertion



Using proper insertion/removal tool as listed on previous page, slip wire into insertion end (colored end), placing crimp end of contact inside the slotted portion and contact shoulder against end of tool.

Align contact with the cavity at the rear face of the module. Carefully push the contact into the full depth of the cavity. Withdraw tool. A slight axial pull on the wire will confirm contact is locked in proper position.

Contact Removal

Snap the extraction end (white end) of the tool over the wire of the contact selected for removal. Carefully push the tool into the full depth of the contact cavity releasing the contact retaining collet. Hold the wire against the serrations on the tool, and withdraw the tool and the wired contact from the module.

MODULE INSERTION/REMOVAL & USE OF STRAIN RELIEF

Pin or socket modules, wired or unwired, can be inserted or intermixed in plug or receptacle housings. Select from standard module configurations shown on pages 103 & 104, or select the optional bussing, diode or relay modules offered, shown on pages 105 & 106. The next instructions illustrate the proper method of insertion and removal of modules within the LMD connector.

Module Insertion

Align the module with the proper cavity at the rear of the housing. The module keyway must be positioned to accept key in housing cavity. Carefully insert the module straight in to the cavity until fully seated and locked in place. A slight axial push on the front of the module or a pull on the cable bundle will confirm module is locked in proper position.

Module Removal

Select module to be removed and place the blades of removal tool into the removal slots at the front of the connector. Push the removal tool into the full depth of the cavity, releasing the module retention tines.

With the module removal tool fully inserted, push the extraction plunger to eject the module out of the rear of the connector.

Assembly of Internal Strain Relief

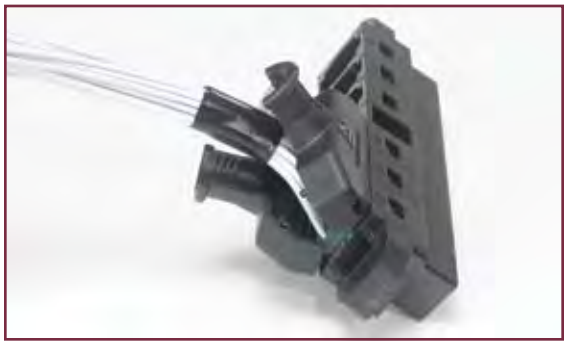
Strain reliefs, if required, may be assembled to plug or receptacle connectors which have a full complement of modules installed. The following is instruction for assembling the internal attachment strain relief, part number LMD-5300-10A (see page 107).

Tape wire bundle in area of cable clamp, and build up diameter to approx. 3/8 inches, if required. Align self-locking tines of the strain relief housing with the cavities adjacent to each module. Push the strain relief housing into place until the self-locking tines snap and lock strain relief into position. Assemble opposite half of strain relief housing to connector and tighten tie-strap to provide clamping force on the wire bundle.

Opening Strain Relief to Service Modules and Contacts

Internal attachment strain reliefs may be opened to provide module and/or contact accessibility. To service connectors, first cut and discard tie-strap on strain relief. Open strain relief halves approx. 45° each by bending along integral flexible hinge. After servicing, close strain relief halves and install and tighten new tie-strap.

To completely remove strain relief from the housing in order to provide module access; first remove tie-strap, open strain relief halves 45° each, then remove module, then remove strain relief.



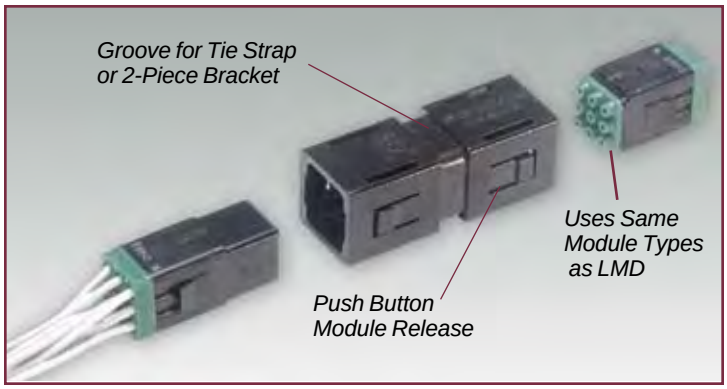
LMS Modular Connectors

Amphenol's LMS in-line splice connector incorporates LMD modules and contacts. The LMS is a simple, compact, three-piece assembly which is used in the following applications:

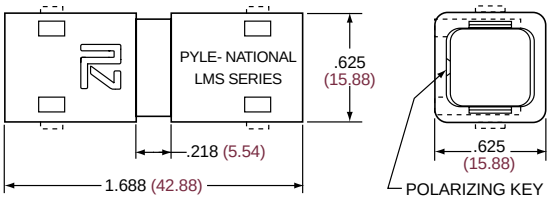
- Instrument terminations
- Equipment terminations
- Wire harness terminations
- Test points

The LMS double-ended tool-less splice (part number LMS-01T-TL) incorporated an integral release mechanism for easy tool-less module removal. It is manufactured of black thermoplastic material* and is temperature rated at –55°C to +140°C (–67°F to +284°F).
The LMS connector uses the same standard modules, bussing modules, diode modules and/or relay modules as the LMD assemblies (see pages 103-105 for module and contact availability.

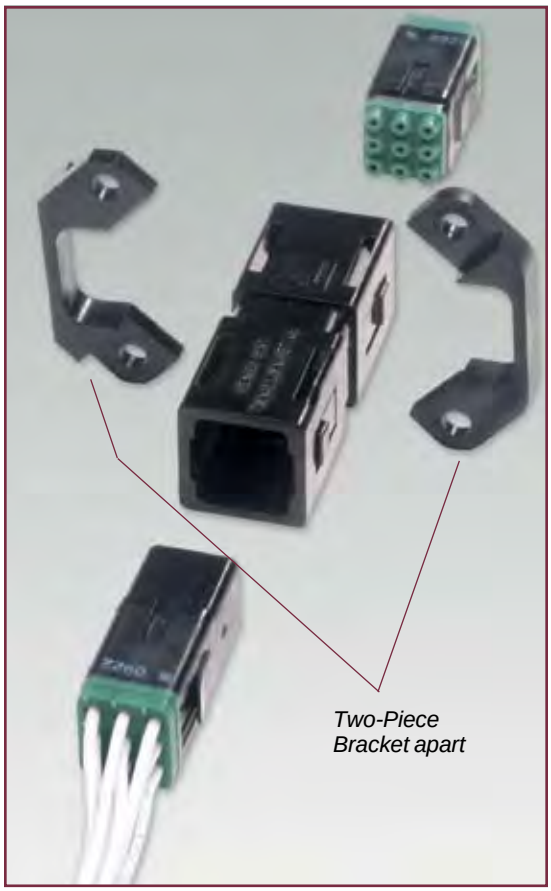
* For availability of materials other than standard black thermoplastic, consult Amphenol Aerospace.



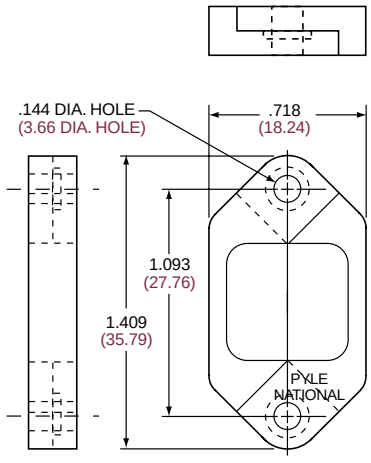
LMS Double-Ended In-Line Splice Housing
Part Number: LMS-01T-TL



LMS Two-Piece Bracket for Panel Mounting



LMS Panel Mounting Bracket
Part Number: LMS-B1-01



Amphenol
Other Board Level and Rectangular Interconnects

Heatsink & Metal Machining

ARINC Rack & Panel

D-Sub & Micro-D Connectors

Backplane Assemblies

NAFI Interconnects

UHD Interconnects

Printed Circuit Boards

Flex Termination

Integrated Systems

Quadrax Hi Speed Contacts for PCB Attachment

Rectangular PCB Products with RADSOK® High Power Contacts for Industrial Applications

RADSOK® Mil-Power Interconnects

TABLE OF CONTENTS

Other Board Level and Rectangular Interconnects from Amphenol

Other Rectangular Interconnects Typical Markets:

- Medical Equipment
- Factory Automation
- IC Chip Testers
- GPS Systems, Telecommunications
- Military & Commercial Avionics
- Military Vehicles

Amphenol Aerospace

Heat Sink and Metal Manufacturing Capabilities

TO FIT CUSTOMER BOARD LEVEL NEEDS

Amphenol Aerospace has Extensive Heat Sink and Metal Machining Manufacturing Capability. Our experienced engineering group can design a custom heat sink to fit your board or work from your CAD models, assemblies, or step files.

Benefits of Amphenol's Design and Manufacture of Custom Heat Sinks:

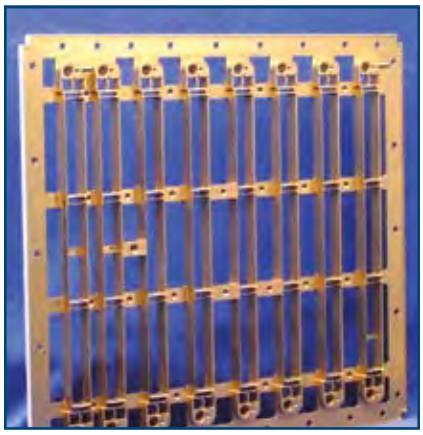
- Amphenol's familiarity with major industry and military specifications.
- Amphenol has been leading the marketplace in LRM (Line Replaceable Module Connectors) and Rectangular Low Mating Force Connectors.
- Our LRM and VME64x products are used on major programs that include the following and more: F-35, F-16, F-15, F/A-22, F/A-18, B2, JTRS, EH101, Sincgars, ATACMS, M1A2 Tank, Grippen, F-117, Harpoon, LANTRIN, AH-64 APACHE, ASRAAM, ATFLIR
- This manufacturing and design excellence provides customers with the assurance that their custom or standard Amphenol rectangular connector will mate to their heat sink design.
- Amphenol is an ISO 9001 facility. Focus is always on quality with cost effectiveness and continuous improvement of processes.

Heat Sink Design Capabilities

- Provide manufacturing studies on prototype models, CAD models or drawing packages. (Consult Amphenol about acceptable CAD formats.)
- Provide rapid prototyping in house.
- Manufacture interface plates and other accessories; Design-in and install pins, studs and threaded inserts
- Provide extensive knowledge in geometric dimensioning and tolerancing techniques that can assist in optimizing your design to enhance manufacturability from the initial design phase (DFM).
- Provide ease of design for a variety of heat sink configurations and heat sink materials.
- Design flexibility for contact cavities for RF, digital I/O, high speed, fiber optic, power and low voltage data signal contacts.
- Provide in-process and final dimension checking

Heat Sink and LRM Connector Prototype

Variety of Heat Sinks manufactured by Amphenol



Interface Plate

Heat Sink and Metal Manufacturing Capabilities, cont.

STATE-OF-THE-ART EQUIPMENT

At Amphenol, we have experience manufacturing a wide variety of custom heat sink designs. Our state-of-the-art twin spindle machines with multi-axis control, unique fixturing, and indexing guarantee true position tolerancing on multiple faces of a machined piece. Other manufacturing features include glass scales and HSK heat shrink tool holders for greater accuracy. In addition: through-spindle probing for in-process checks, through-spindle high-pressure coolant system, single spindle mills with rotary tables, and 3-axis mills which supplement the twin-spindle machine operations. Other key benefits and features of Amphenol's manufacturing operations include:

- The ability to handle high or low run quantities.
- Machines set up and used exclusively for heat sink and related component milling.
- Temperature controlled environment to reduce the effect of thermal expansion/contraction.
- Capability to hold very precise positional, size and profile tolerances.
- Use of CAM software to translate solid models to machine instructions. This allows for a quick transition between design and manufacturing, and ensures parts are held to the proper dimensional tolerances.
- CAM programs are optimized to each machine's capabilities which minimizes run time and maximizes quality.
- Parts can be selectively plated and selectively machined to suit customer requirements
- Amphenol has a preferred status with material suppliers which ensures timely procurement of raw materials.

Quality Assurance

- All dimensions are verified after machine setup, prior to production runs.
- Dimensions are checked by contact or optical Coordinate Measuring Machine (CMM).
- We import CAD/CAM files to our CMM's to guarantee parts are within the design's dimensional specifications.
- In addition to setup part checking, we also do 100% or sample part checking.

Heat sink and Metal Machining Production Area at Amphenol

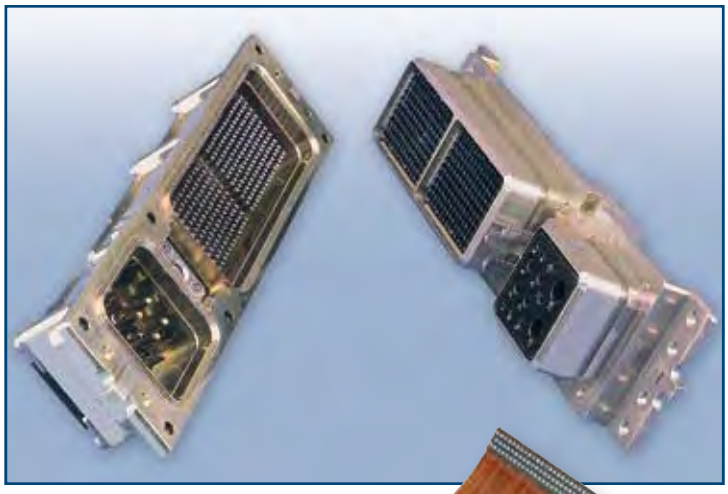
Horizontal Manufacturing of Heat Sinks - Maximizes the Set-up and Production Efficiency for Metal Machining

ARINC 404 & ARINC 600 Rack and Panel Connectors

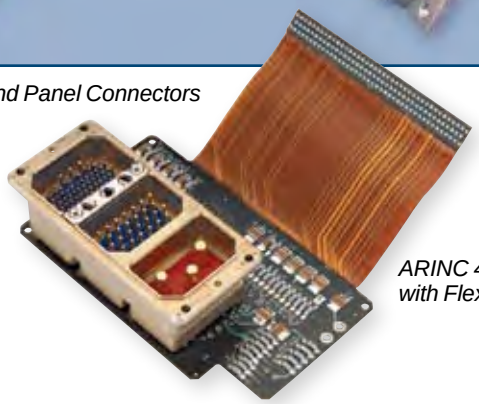
Rack and panel ARINC 404 connectors meet or exceed MIL-C-81659 and ARINC Spec. 404. The ARINC 600 connector is the successor to the 404 for many avionic designs and offers lower mating force contacts, increased contact count and a front release, floating keying system. Other features of the ARINC 600 include:

- ARINC 600 connectors are a recognized standard rack and panel connector for aircraft applications with both environmental and non-environmental versions available.
- Designed to meet all relevant ARINC 600 connector specifications
- Front removable keying posts
- Up to 800 size 22 contact positions in one connector
- Contact options: standard contacts are power/ signal crimp rear release in sizes 12, 16, 20 and 22 in crimp or PCB; or shielded coax, concentric twinax, quadrax contacts; or fiber optics
- Filtered or non-filtered
- Waveguide connections

See Amphenol Canada* publication, ARINC 600 Rack and Panel Connectors, for complete information and how to order.



ARINC 600 Rack and Panel Connectors



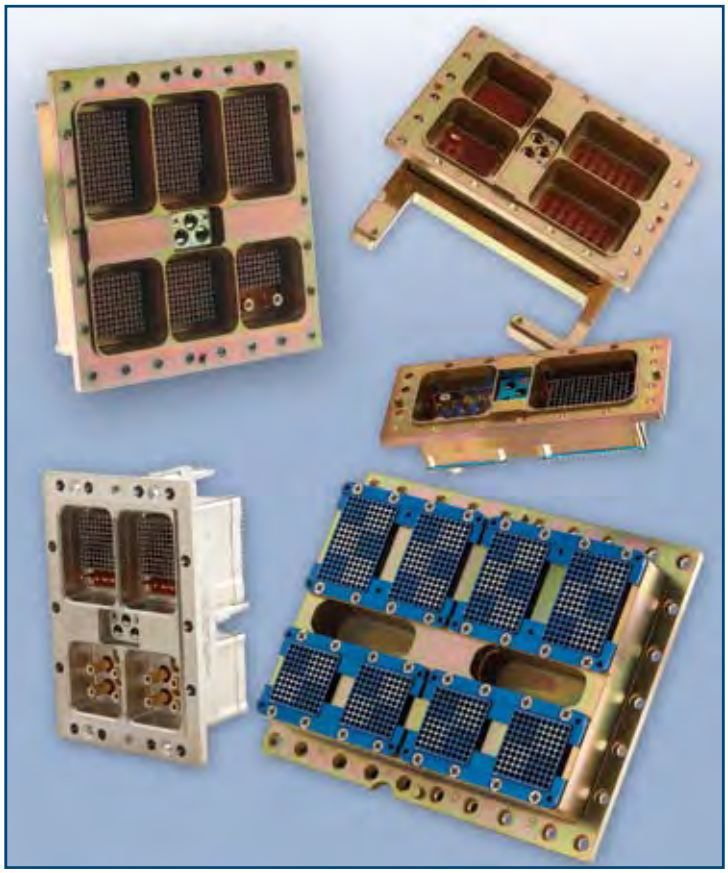
ARINC 404 with Flex

R27 Rack and Panel Connectors

The R27 Series from Amphenol Canada is a robust rectangular connector designed to meet or surpass all the requirements of the ML-DTL-83527 specification and EN 3682 European Standard. Features of the R27 Series include:

- Well suited for harsh environments - enhanced environmental sealing, robust and durable shells, EMI shielding spring
- Filtered or non-filtered
- Connectors, shells, inserts, termination modules and contacts are sold separately or fully assembled
- Interchangeable insert patterns with ARINC 600 models
- Contact options: standard contacts are power/ signal crimp rear release in sizes 12, 16, 20 and 22 in crimp or PCB; or shielded coax, concentric twinax, quadrax contacts; or fiber optics

See Amphenol Canada publication for R27 Series Connectors for complete information and how to order.



R27 Series Rack and Panel Connectors

* Contact Amphenol Canada at:
605 Milner Avenue, Toronto, Ontario,
Canada M1B 5X6
Phone: 416-291-4401 Fax: 416-292-0647
www.amphenolcanada.com

R39 Series with High Performance 38999 Features

The R39 series from Amphenol Canada* provides high performance in the severe environment demands of military specifications. Its lower profile translates into a smaller space-saving footprint. It delivers the same reliable, familiar benefits found in Amphenol's 38999 circular connectors: effortless installation, blind push-pull mating, extreme durability, quick mate. Features of the R39 Rectangular Connector series include:

- Low profile and space savings
- High density 127 position inserts or mixed inserts with power, RF or fiber-optics
- Uses same contacts and tooling as standard 38999 connectors
- Blind mate
- Rugged
- Filtered or non-filtered

See Amphenol Canada* publication R39 for complete information and how to order.

R39 High Performance Rectangular Connectors

R58 Series Designed to Requirements of MIL-DTL-83733 and JN1122

The R58 series from Amphenol Canada* are high performance environment-resistant, rectangular connectors designed to exceed the requirements of MIL-DTL-83733 and to meet the EFA requirements of JN1122. Features of the R58 Series include:

- Well suited for hostile military aircraft applications where environment is an issue or shielding effectiveness and corrosion resistance is mandatory
- Available in 2 shell sizes with a variety of hard and spring mounting configurations
- Broad range of contact arrangements available from custom to 185 standard contacts
- Crimp contacts or PCB in sizes 12, 16, 20 and 22D. Coax, twinax, triax, quadrax and fiber optics also available
- Filtered version is also available (458 series)
- Shells are machined aluminum alloy with several finish options, including OD chromate over cadmium over electroless nickel finish.
- Insulators are high grade, plastic to MIL-M-14
- Silicone rubber is used for grommets, interfacial seals and peripheral seals

See Amphenol Canada* publication, "Infinite Possibilities", Amphenol Rectangular and Filtered Products, for complete information and how to order.

R58 Series Rectangular Connectors

458 Series Filtered Rectangular Connectors

R393 Series Low Profile Connectors with High Speed RF Contacts

A product line developed from the R39, the R393 contains 38999 Series III high speed RF contacts. These connectors have a low profile, light-weight design, and are ideal for a maximum number of high speed contacts using a small amount of space. Consult Amphenol Canada for more information and how to order. Features include:

- Qualified to BACC65BY and BACC65BW specifications
- Size 8 high speed RF 38999 contacts
- Environmental and filtered options available
- Multiple shell sizes, including custom geometry
- Captive hardware and backshells available

R393 Series Rectangular Connectors

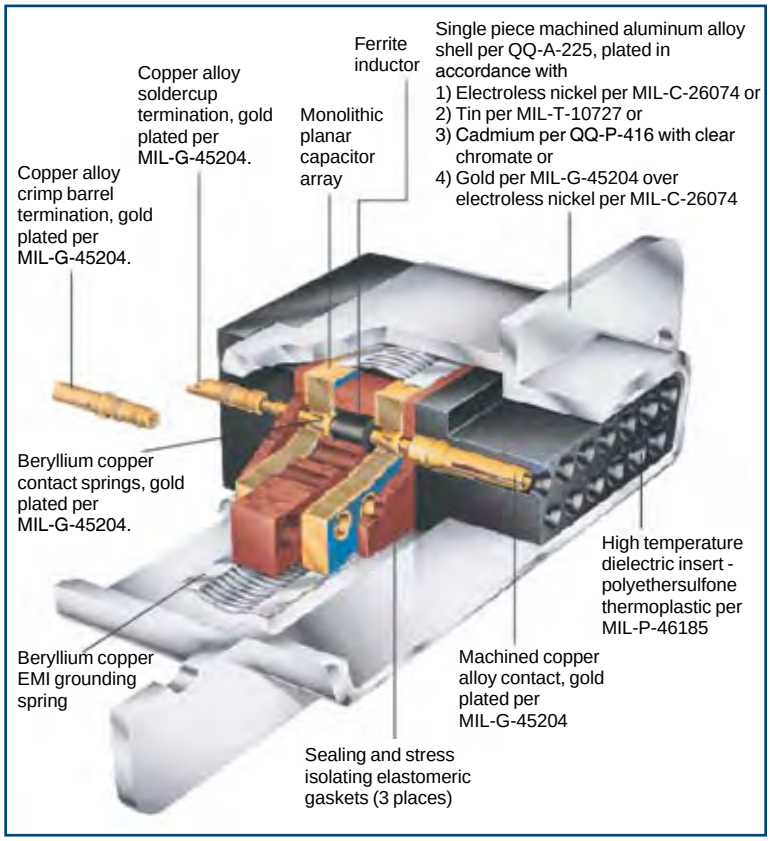
* Contact Amphenol Canada at:
605 Milner Avenue, Toronto, Ontario, Canada M1B 5X6
Phone: 416-291-4401 Fax: 416-292-0647
www.amphenolcanada.com

Amphenol Offers a Full Range of Rectangular Interconnects that Provide Filter Protection

Filter rectangular connectors are used to provide cost and space effective solutions to EMI problems in a wide range of military and commercial applications including avionics systems, satellites, missiles, communications, control systems and tempest equipment. Amphenol's unique solder-less construction which reduces stress on the ceramic elements and results in superior physical and thermal shock capabilities.

Filtering is available in the following Amphenol rectangular connectors:

- ARINC 404 & ARINC 600
- R39 - Rectangular 38999
- 458 - M83733 Style
- Micro-D
- D-Sub
- R27
- R64F Filtered Docking Connector
- D83 Compact D-Sub
- Filtered Headers and Custom Designs



D-Sub Connectors

Amphenol Canada supplies D-Subminiature Rectangular Connectors:

- SD308 Sealed D-Subs
- 308/481 Filtered D-Sub
- C308 Press-fit D-Subs (NAFI contact)

Features of D-Sub connectors include:

- Standard density and hi-density insert arrangements with pin and socket contacts
- Fixed screw machine contacts, available in solder cup, straight PCB, right angle PCB
- EMI filter D-Sub connectors use planar capacitors

Custom Rectangular

D-Sub Rectangulars

Micro-D (M83513 Style) Connectors

A small connector solution which exceeds the requirements of military M83513, the Micro-D connector is provided by Amphenol. Features include:

- Rack and Panel mounting, or panel mount, cable mount or PCB mounting
- Used where space and weight are at a premium
- Wire harness, vertical and right angle PCB terminations
- Filtered or non-filtered
- Press-fit contact

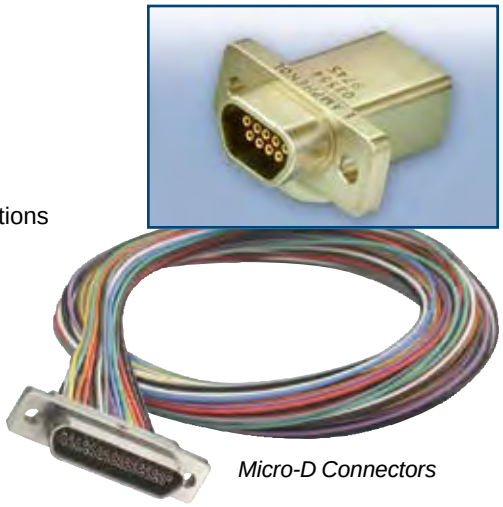
Microminiature Connectors

Series 106 Microminiature Card Connectors were also designed to meet the requirements of MIL-DTL-83513. Features include:

- High density
- Board, panel and cable mounting for card-to-card and card-to-cable applications
- Employs a D-shape for correct mating. Jack screws and jack posts
- Wire harness, vertical and right angle PCB terminations

105 Series Microminiature Strip Connectors provided by Amphenol Phoenix* Features include:

- Single row strip line configuration
- Board, panel and cable mounting
- Guide pins, jack screws
- Wire harness, right angle PCB, surface mount terminations



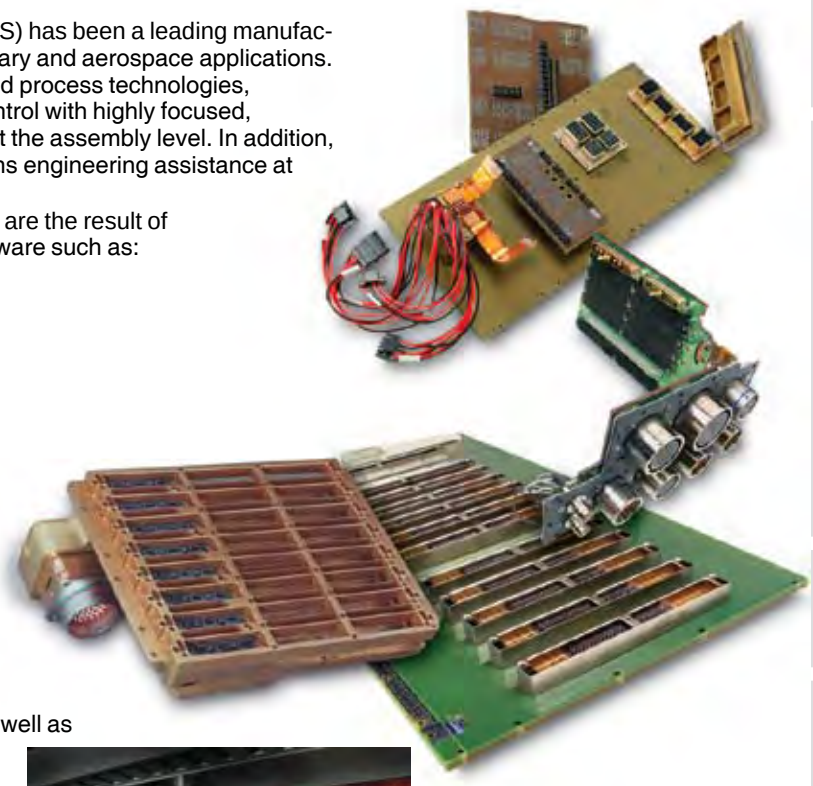
Micro-D Connectors

FROM AMPHENOL BACKPLANE SYSTEMS DIVISION

For over 40 years, Amphenol Backplane Systems (ABS) has been a leading manufacturer of backplane assemblies and enclosures for military and aerospace applications. ABS combines a wide range of innovataive product and process technologies, advanced component manufacturing, and process control with highly focused, customer specific program management and testing at the assembly level. In addition, we provide expert design and unsurpassed applications engineering assistance at every step of the way.

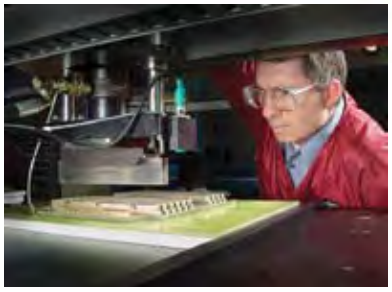
Amphenol Backplane Systems production capabilities are the result of investment in new state-of-the-art equipment and software such as:

- Press-fit installation
- Through-hole soldering
- Automated hi-temp soldering
- Large-format surface mount soldering
- Aqueous cleaning
- Conformal coat (type UR and XY)
- Electrical test



For electrical testing, ABS offers Level I (bareboard), Level II (post assembly), and Level III (in-circuit) capabilities. Our industry leading large-format surface mount line with a capability of up to 29" X 60" circuits is well positioned for the largest backplanes in the industry as well as volume production of standard backplane products.

Our advanced manufacturing support software allows us to maintain our world class configuration control as well as create a state-of-the-art visual workplace to ensure we are exceeding customer expectations. Our in-house capability for environmental testing such as Environmental Stress Screening (ESS) supports the increasing customer need for product assurance. We have also expanded our manufacturing capability to include:



- Enclosure and Value-added Assembly
- High-end Cable and Flex Assemblies
- Integrated Bus Systems
- Machined Enclosures and Metal Faceplates

In support of the continued need for leading-edge technology coupled with best cost manufacturing, we have established a qualified DoD Manufacturing Licensing Agreement (MLA) approved work center at our Amphenol Nogales, Mexico campus. This site is a duplication of our Nashua, New Hampshire manufacturing capability and will meet the needs of programs looking for a low cost option, while remaining in North America.

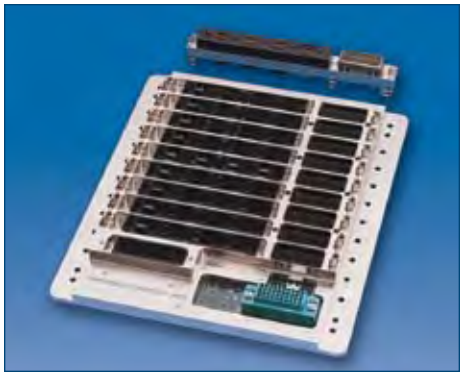
ABS MIL-Specificed qualifications include MIL-C-28859 (for components) and MIL-A-28870 (for assembled backplanes).

Amphenol's Solutions - The Pinnacle of Technology

Some of the world's most demanding programs rely on Amphenol's packaging solutions, including:

- F-35
- F-22
- F-18
- MIDS/JTRS Radio
- Theatre High Altitude Air Defense Radar (THADD)
- AH-64 Apache
- 787 Dreamliner
- Future Combat Systems
- DDG-51
- DDG-1000

Integrated Systems Solutions* are found aboard commercial airliners, helicopters, Navy and Air Force fighters, C4I electronics, missiles, ground vehicles, Homelnad Security Systems, and Navy warships.



Backplane Incorporating LRM Modules with Brush Contacts and MT Fiber Optic Inserts

* See page 12 for more information about Amphenol Integrated System Solutions.

UHD Series with Fork and Blade Contacts

Amphenol's wide range of board level interconnects also includes high density UHD (Ultra High Density) Series module and backplane connectors. These utilize fork and blade contacts in a staggered grid pattern for attachment to printed circuit boards. The staggered pattern is 80 contacts per inch, .025 pitch in 8 rows. They are SEM-E format and are qualified to: EIA 15-763, DESC 89065, IEEE 1101.1 to 1101.9. SU configurations are also available.

The UHD module connectors have surface mount blade contacts and the mating UHD backplane connectors have solderless compliant press-fit tuning fork contacts. There are a wide range of high contact density patterns and the length and style can be tailored to meet customer requirements.

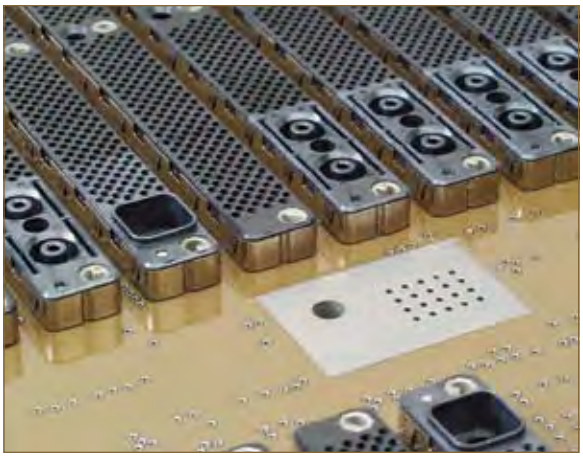
They are rigid pin terminated to the board or flex terminated to the board. Coax, fiber optics and power contacts can also be integrated into the connector configuration. Other options include EMI shielding and UHD interconnects can be provided in a stacking configuration. Module covers can be integrated into the connector system.

Extender board connector configurations are also available so that customers can have access to probe and test modules that are electrically connected to the backplane.

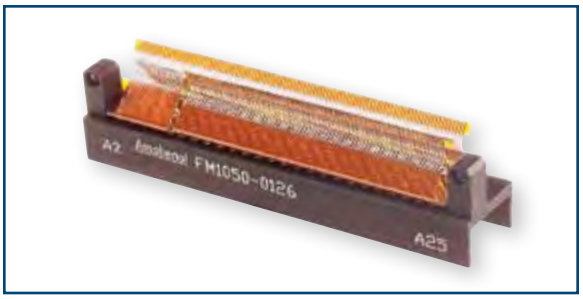
Standard configurations of UHD connectors are:

- 372 pin
- 300 pin multi-purpose (fiber optic, coax, power contacts can be intermixed
- 296 pin with 270V power contacts
- 292 pin with coax
- 396 pin Futurebus + SEM-E
- 556 pin Futurebus + 10 SU (designs up to 680 contacts)

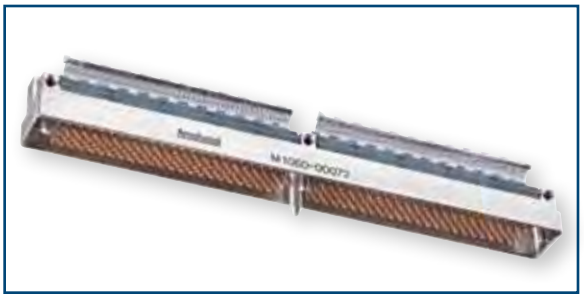
UHD Series connectors are provided by Amphenol Backplane Systems division of Amphenol. These connectors are a proven interconnect solution for advanced, high-reliability packaging requirements in markets of military and commercial aviation, space applications, shipboard applications, military vehicles, C⁴I electronics and ordnance. For more information see catalog 12-036 on-line at www.amphenol-abs.com.



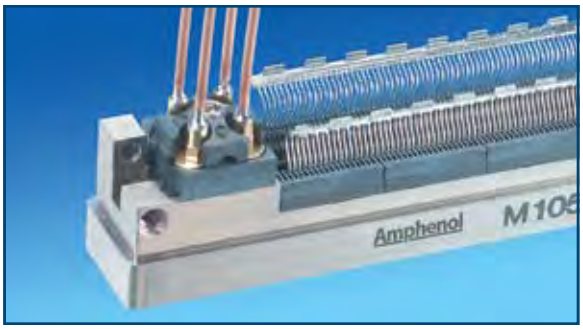
UHD Backplane Connectors on Board, Rigid Pin Termination, with Fiber Optics, Coax or Power Contacts



UHD Module Connector with Flex Termination



UHD Module Connector with Rigid Pin Termination



UHD Module Connector, Rigid Pin Termination plus Coax Contacts

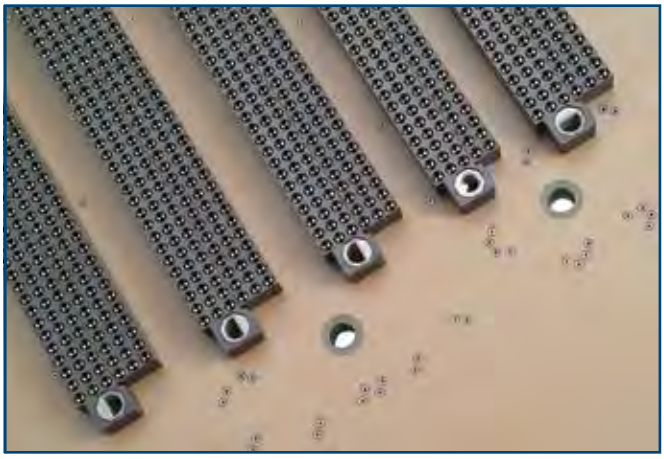
NAFI Connectors with Fork & Blade Contacts, I/O NAFI with Rear Removable Crimp Contacts

NAFI Series with Fork and Blade Contacts

Amphenol NAFI daughtercard and backplane connectors are another board level interconnect solution from Amphenol Backplane Systems. They provide a wide range of medium contact density patterns and meet MIL-C-28859 standards. Daughtercard termination is though-hole, using nickel/gold solder plated contacts. The mating interface is a blade contact which can be either parallel or perpendicular to the daughtercard.

The M Series of NAFI connectors are for through hole interconnection to printed circuit boards with rigid pin termination. Connector lengths and body styles can be tailored to meet specific needs. They are available with 2, 3, 4 and 5 rows of contacts, .100 X .100 pitch. Standard NAFI-style features such as guide pins and D-and V-shaped polarizing keys are available.

The FM Series of NAFI connectors are for surface mount interconnection to printed circuit boards with flex circuit termination. Up to 5 rows of contacts can be configured. The standard NAFI interface is maintained while the flexible circuit traces provide the link to the module. The flexible circuit termination allows for hand soldering or various automated surface mount soldering processes. To meet customer needs, connector lengths and body styles can be tailored, and the flex circuitry lengths and configurations also are designed per customer specifics. NAFI backplane connectors use solderless, compliant press-fit tuning fork contacts.



NAFI Backplane Connectors on Board

NAFI Daughtercard Connector with Flex Termination

I/O NAFI Series with Rear Removable Crimp Termination

Amphenol also provides an I/O NAFI interconnect that allows for terminating #22 and #26 gauge stranded wires to a backplane. It is available with 24, 36, 40 or 120 rear removable crimp-style blade contacts and includes captive hardware and polarizing features. The receptacle (tuning fork) connector can be placed where needed on either side of the backplane.

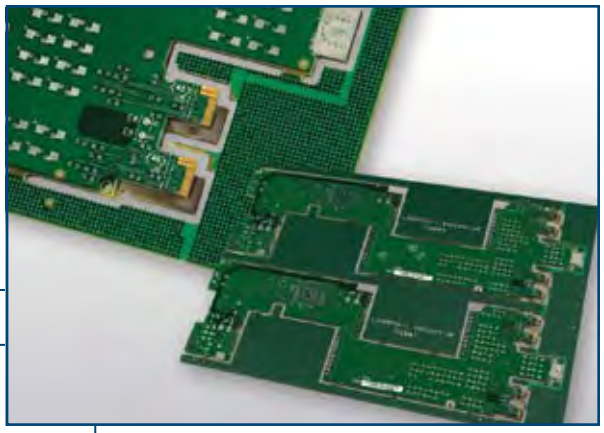
NAFI interconnects are used in military and commercial aviation, in space applications, shipboard and in military vehicles. For more information see catalog 12-036 from Amphenol Backplane Systems, on-line at www.amphenol-abs.com.

I/O NAFI Connector - for Terminating Stranded Wire to a Backplane

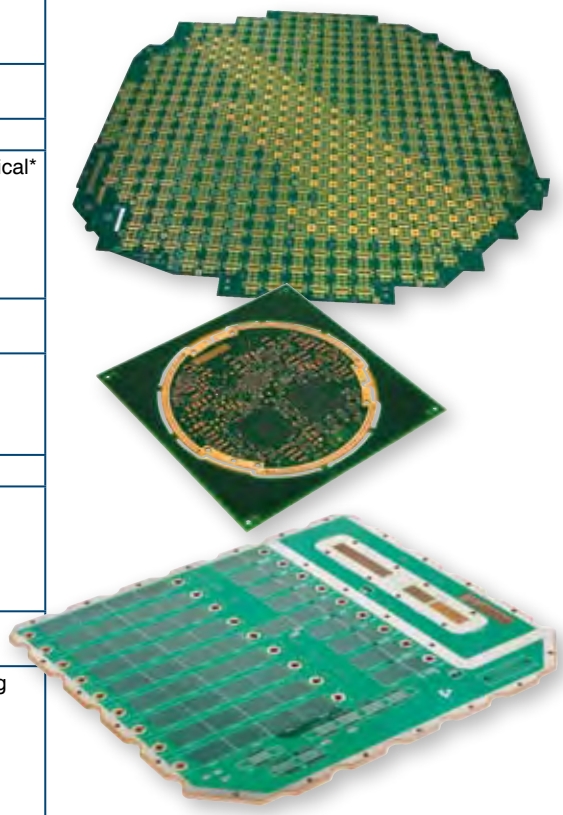
Amphenol Printed Circuits' (APC) Capabilities

Proven engineering and manufacturing expertise in the manufacture of printed circuit boards has been provided by the APC division of Amphenol for more than 25 years. Consistent quality and reliability for demanding high bandwidth systems and mission critical applications is met along with optimization in material handling. APC provides tightly controlled processes for prototype through productions of printed circuit boards. The chart below shows the Printed Circuit Board capability of Amphenol Printed Circuits.

DESIGN FORMATS	• Mentor • PADS	• Cadence • Zuken
MANUFACTURING FORMATS	• ODB++ (preferred) • DXF • Gerber 274X • Autoplot • Excellon	• HPGL • DPF • Gerber 274D • IPC D 356
MAXIMUM PANEL SIZE	• 24" x 54" (609.5mm x 1371.5mm) • 30" x 44" (762.0mm x 1117.5mm) • 36" x 42" (914.4mm x 1066.8mm)	
MAXIMUM PANEL THICKNESS	.500" (12.7mm)	
LAYER COUNT	Up to 64	
INTERCONNECT FORMATION TYPES	• Back drilled • Dual Diameter • Thru Hole* * with conductive and non-conductive via fill	• Blind (laser & mechanical* • Electrically isolated • Buried • SMT
ASPECT RATIO - DRILLED SIZE	• Compliant holes > + 0.225 (drilled size 17:1) • Via holes <.022 (drilled size 13:1)	
FINISHED HOLE SIZE	• Compliant Pinned: 0.018" (0.457mm) • Via (A/R dependent): 0.008" (0.203mm) • Buried Vias: 0.006" (0.152mm) • Microvias (up to 3 electrical layers) (0.101mm)	
BLIND VIA ASPECT RATIO	1.25:1	
INTERNAL FEATURES	• Lines: 0.003" (0.0762mm) .5 oz. copper • Spacing: 0.003" (0.0762mm) .5 oz. copper • Buried Resistors: No • Buried Capacitance: No • Minimum Core Thickness: 0.0001" (0.0254mm)	
EXTERNAL FEATURES	• Lines: 0.004" (0.1016mm) .5 oz. copper • Spacing: 0.004" (0.1016mm) .5 oz. copper	
MATERIALS*	• Low Tg FR4 (including phenolic cure) • Getek • Nelco 4000-13 & Nelco 4000-13 SI • Rogers 4350/FR4 • BT	• High Tg FR4 (including phenolic cure) • Isola FR408 • Rogers 4350 • Polymide • Cyanate Ester • Megatron 6
COPPER PROCESSING	1/4 oz. - 10 oz. copper (U/L 7 oz.)	
IMPEDANCE SINGLE & DIFFERENTIAL	• ±10% • ±7.5% • ±5.0%	
SURFACE FINISHES	• Electrolytic Ni/Au • HASL • Immersion Tin • Reflowed Tin/Lead	• ENIG • Immersion Silver • OSP-Entek 106
CERTIFICATIONS	• IPC A 600 Class I, II & III • AS 9100-B / ISO 9001:2000 • ITAR Registration • MIL PRF 31032/2a	• IPC-6012 Class I, II & III • ISO 14001:1996 • MIL-PRF-31032/lb. • MIL-P-55110



Variety of Printed Circuit Boards from APC



For more information contact:
Amphenol Printed Circuits, Inc.
91 Northeastern Blvd.
Nashua, NH 03062
Phone: 603-324-4500
www.amphenolprintedcircuits.com

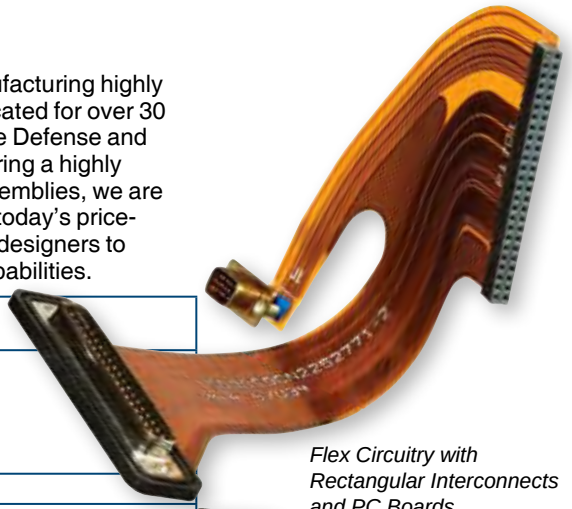
* Please contact APC for the availability of additional materials.

TIGHT FITTING, SOLDERLESS TERMINATION TO BOARDS

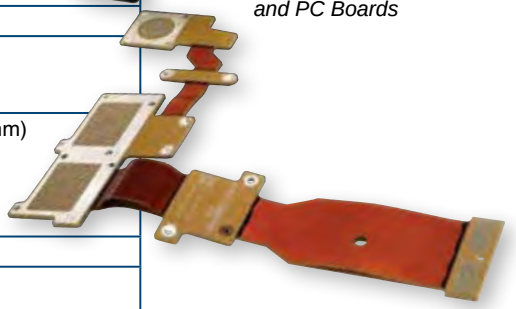
Flexible and Rigid-Flex Capabilities

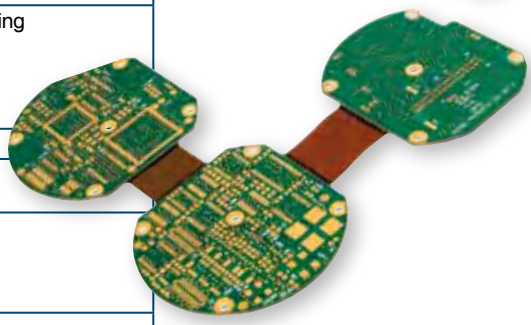
Amphenol Printed Circuits Division is a world leader in printed circuits, manufacturing highly complex Backplanes, Daughter-Cards, Flex and Rigid-Flex assemblies. Located for over 30 years in New Hampshire, APC has been delivering high quality circuits to the Defense and high-end Commercial markets, on time and within budget. While manufacturing a highly diversified product line specializing in technically challenging Rigid-Flex assemblies, we are also able to deliver low cost, lower layer count Flex and their assemblies, in today's price-competitive environment. Often an afterthought, Flex and Rigid-Flex allows designers to shrink packaging and think around corners. Below is a list of some of our capabilities.

DESIGN FORMATS	• DXF • IGES • Gerber • Pads
PANEL SIZE	• 12" x 18" (304.8mm x 457.2mm) • 18" x 24" (457.2mm x 609.6mm) • 24" x 24" (609.5mm x 609.5mm) • 24" x 36" (609.5mm x 914.4mm) • 24" x 54" (609.5mm x 1371.5mm
PANEL THICKNESS	.003"- .225" (0.0762mm - 5.715mm)
LAYER COUNT	1-30+
INTERCONNECT FORMATION TYPES	• Thru Hole • SMT • Buried • Filled Via's • Blind • Dual Diameter
FINISHED HOLE SIZE	• Compliant Pinned (rigid zone only): 0.018" (0.457mm) • Via (A/R dependent): 0.008" (0.203mm) • Buried Vias: 0.006" (0.152mm) • Microvias (up to 3 electrical layers): 0.004" - .006" (0.101mm)
BLIND VIA ASPECT RATIO	1.25:1
INTERNAL FEATURES (COPPER WEIGHT DEPENDENT)	• Trace: 0.003" (0.0762MM) • Spacing: 0.003" (0.0762mm)
MATERIALS	• Polyimide - Std. Acrylic • Copper Epoxy Shielding • Polymide - FR • Soldermask • Polymide - AP • FR-4 / -24, 26 and 28 • Polymide - GI • LCP • Silver Epoxy Shielding • FEP
COPPER PROCESSING	1/4 oz. - .400" (10.16mm)
IMPEDANCE SINGLE & DIFFERENTIAL	• ±10% • ±7.0%
SURFACE FINISHES	• HASL • Immersion Tin • Reflowed Tin/Lead • Immersion Silver • ODP-Entek 106 • Bright Tin • ENIG • Ni/Au
ASSEMBLY CAPABILITIES	• Full Turn-Key • Wire-Bond • Thru-Hole - Wave & Manual • Crimp • SMT - Pick & Place • RoHS Compliance
ASSEMBLY FINISHING	• Conformal Coat - UR, Acrylic, Parylene, Flouropel • Glop Top
TEST CAPABILITIES	• Overmolding • Four Wire Kelvin .001 ohm to 1 ohm • Impedance Testing • Bed of Nails • Hi-Pot up to 5, 000 VDC • Flying Probe • 2,000 + Points per Circuit • Flex Cycling • Insulation Resistance up to 1,000 VDC • Environmental • Functional Test
CERTIFICATIONS	• IPC 6013 Class I, II & III: Types 1-5 • AS9100 Certification • MIL-P-50884 Types 1-5 • IPC-601 • ITAR Registration • UL94VO • ISO 9001:2000



Flex Circuitry with Rectangular Interconnects and PC Boards



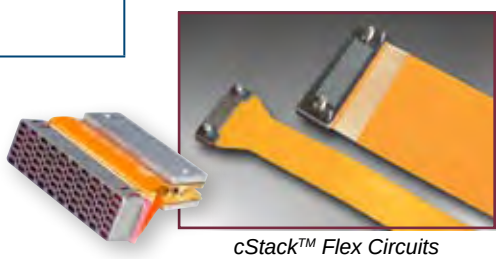


Flex circuitry is used in a wide variety of Amphenol board level and rectangular interconnects, as shown throughout this catalog:

- Flex incorporated into LRM assemblies, (see pages 10, 25 and 31-35)
- ARINC 404 connector with Flex, (see page 114)
- UHD and NAFI connectors with Flex (see pgs. 118 & 119))

Flex Circuitry used in cStack™ Technology

Flex is a key component of the cStack™ technology used in Amphenol's high speed Gigastak™ and Digastak™ connectors, (see page 35). Amphenol InterCon produces cStack™ flex circuit assemblies that combine low cost termination with high speed, impedance controlled interconnection performance. The patented cStack™ stacking connector* used to terminate these assemblies provides high signal integrity interconnection technology, because of the connector's low (.048 inch) profile between flex and board. Flex circuitry for all cStack™ flex assemblies can be electrically and mechanically customized to exactly fit system specifications.



cStack™ Flex Circuits

* US patent number 6,176,707 and 6,217,342. Other patents pending.

Integrated System Packaging

Amphenol is the leading manufacturer of integrated system solutions for the military and aerospace markets. Amphenol Integrated Systems is the synergistic combination of key Amphenol divisions:

- Amphenol Backplane Systems
- Amphenol Printed Circuits
- Amphenol Aerospace Operations Board Level Products
- Amphenol Borisch

We have over 60 years of experience in the military and aerospace market and our commitment to the industry is exemplified in everything we do.

We understand the relationship between the interconnect, the printed circuit board, the backplane and the chassis, and we use that knowledge to provide complete solutions.

Amphenol Products- Peformance in the Most Demanding Environments

Amphenol can provide system solutions - everything you need inside and outside the box - including products that will perform in harsh environmental conditions: High performance interconnect products, printed circuit boards, backplane assemblies, flex circuitry, heat-sinks and metal enclosures.

Amphenol also provides value added assembly including bussing; full system assembly including chassis build and sub-system integration and testing.

Amphenol leads the industry by offering the elements necessary for success in the military and aerospace OEM supply chain:

- Design and Modeling
- Applications Engineering
- Fabrication
- Value-added Assembly
- Test

Coupled with the largest interconnect offering in the market, Amphenol supports all of your system-level needs.

The Engineering Edge

Amphenol Integrated Systems tackles problems such as PWB routing, signal integrity, mechanical robustness, and thermal reliability concurrently rather than independently by value-added applications engineering support.

Solving complex packaging challenges depends on making sure that environmental, mechanical, and electrical factors are all addresses at the system-level. By taking this system-level perspective and focusing on these factors, Amphenol Integrated Systems is able to meet your program's most challenging packaging requirements. We are an extension of your design team, providing expert design and applications engineering assistance every step of the way to ensure program success.

See page 117 for information on Amphenol Backplane Systems capabilities for backplanes and advanced product systems and testing.
See also pages 4 & 5 in the introduction section of this catalog for more information on Package Solutions,
or call:
Amphenol Aerospace at 800-678-0141,
Amphenol Backplane Systems at 888-318-3553

Above: An example integrated system box that includes the following Amphenol interconnect products.

- Circulars: D38999 cylindrical connectors with MT fiber optics, RJ Field connectors
- Rectangulars: LRM interconnects, NAFI connectors, UHD connectors
- Rectangulars: ARINC 600 connectors, Micro-D Subminature connectors
- Rectangulars: HDB³ high density brush contact connectors
- Backplane Systems, Flex circuitry, metal enclosure

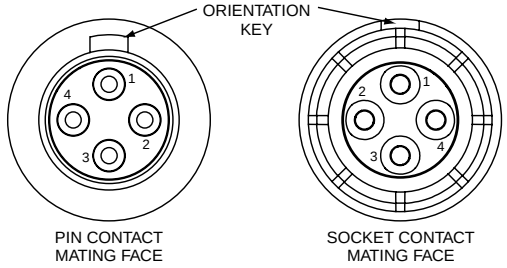
Other examples of Amphenol Integrated Systems and Enclosures.

Quadrax Contacts for Board Level Connectors

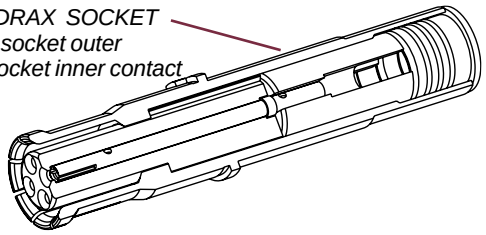
Amphenol supplies size 8 compliant pin Quadrax PCB contacts which provide several advantages for high data transfer rates, low power consumption and excellent EMI compatibility.

- Four strategically spaced inner contacts form two 100 or 150 Ohm matched impedance differential pairs
- Outer contact has rugged wall section for durability
- Same as used in cylindrical 38999 connectors - See Amphenol Combined Circular Connector catalog/PCB contact section for more information on quadrax contacts and cables.

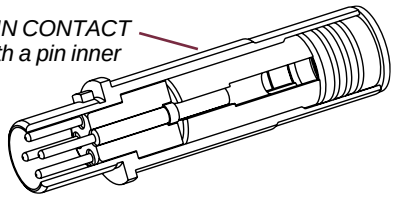
Suggested Numbering for Quadrax Contacts



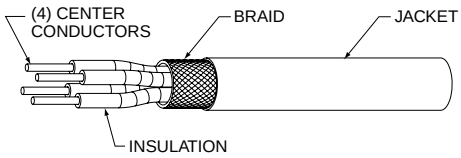
TYPICAL QUADRAX SOCKET CONTACT has socket outer contact with a socket inner contact



TYPICAL QUADRAX PIN CONTACT has pin outer contact with a pin inner contact



Cable Illustration Quadrax Contact



Quadrax Contacts are gold plated, crimp termination

Finish of mating contacts parts: supplied with 0.000050 min. gold over nickel on mating parts. Consult Amphenol for availability of other finishes.

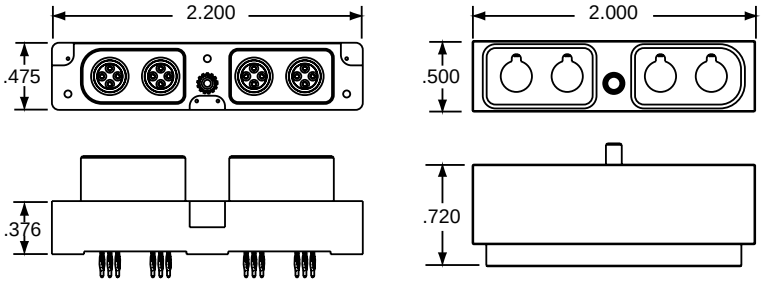
Quadrax Size 8 Contact Performance:

- Bandwidth: Up to 3 Gigahertz
- Data Rate: Exceeding 3 Gbits/sec.
- Voltage Rating: 500 Vrms max. @ sea level
- Dielectric Withstanding Voltage:
  1000 VAC rms between all inner contacts @ sea level
  500 VAC rms between inner and outer contacts @ sea level

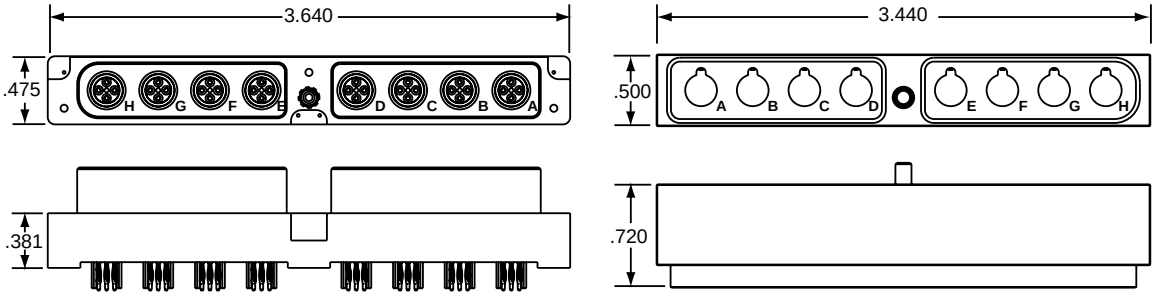
Board Level Interconnects with Quadrax Contacts

Compliant Pin Quadrax size 8 contacts are available with hole diameters:
.025 ±.002 PTH Quadrax contact
.040 ±.003 PTH shell grounding
Accomodates backplane .125 inch min. thickness
(Consult Amphenol Aerospace for availability of additional connector configurations.)

4 POSITION BOARD LEVEL CONNECTOR WITH QUADRAX



8 POSITION BOARD LEVEL CONNECTOR WITH QUADRAX



HIGH POWER APPLICATIONS

The RADSOK® Design:

RADSOK® technology is based upon a stamped and formed flat grid, uniquely twisted into a hyperbolic geometry to provide robust, high density contact to the mating pin contact.

Most pin and socket technologies rely upon spring (beam element) properties of the contact elements, which tend to weaken over time. Unlike most other pin and socket solutions, the RADSOK® also utilizes the tensile strength properties of the flat, high conductivity alloy grid. This provides the high normal forces required for conductivity while also providing large conductive surface area. Correspondingly low voltage drop and low temperature rise are also achieved while maintaining low insertion forces.

RADSOK® Key Features:

- Socket cylinder within female contact has several equally spaced longitudinal beams twisted into a hyperbolic shape
- As male pin in inserted, axial members in the female half deflect, imparting high current flow across the connection with minimal voltage loss.
- The hyperbolic, stamped grid configuration ensures a large, coaxial, face-to-face surface area engagement.
- Ideal for crimp termination applications requiring repeated mating cycles and high current with low milli-volt drop.

RADSOK® Advantages:

- **High Reliability**
  Unique RADSOK® design and construction technology create an electrical contact interface that exceeds typical interconnect requirements. Applications in aerospace, medical, industrial, automotive, mining, offshore, and other harsh environments depend on high reliability of the Amphenol RADSOK® technology.
- **Low Contact Engagement/ Separation Forces**
  The hyperbolic lamella socket contact construction distributes normal forces over a high percentage of the mating pin surface. This creates a smooth, even engagement effort. This force distribution also contributes to excellent performance in vibration applications with resistance to typical fretting corrosion.
- **Low Contact Resistance**
  The large interface area between the socket lamella and pin surface result in very low contact resistance, enabling the RADSOK® contacts' high current ratings compared to traditional power contact designs.
- **High Mating Cycle Durability**
  RADSOK® contacts with typical silver plating finishes have demonstrated survival of 20,000 mating cycles. Specialized plating and contact lubricants can extend cycle life to 200,000 matings or higher. Even with continuous exposure to harsh environmental abuse (salt, sand, and high humidity), RADSOK® contacts have been tested to maintain low contact resistance beyond 10,000 mating cycles.

The RADSOK® (**RAD**ial **SO**c**K**et) High Amperage, Low Insertion Force Electrical Terminal provides value to your purchasing, engineering, quality and manufacturing objectives.

RADSOK® Technology brings power to the board in a wide variety of applications such as:

- Replacement of ring terminals (lugs) on threaded studs
- High current PCBs
- Communication towers
- Backplane power
- Uninterrupted power supplies
- Fuel cell connectors
- Hybrid electric vehicles
- AC inductive drive motors
- Power distribution modules
- Busbar terminations (plug-in hardware/modules)
- "Pluggable" breakers
- Battery terminals
- Contacts with RADSOK® technology give 50% more ampacity.
- RADSOK® contacts can be designed to fit any housing.
- Combinations of RADSOK® and high speed copper contacts in the same interconnect package

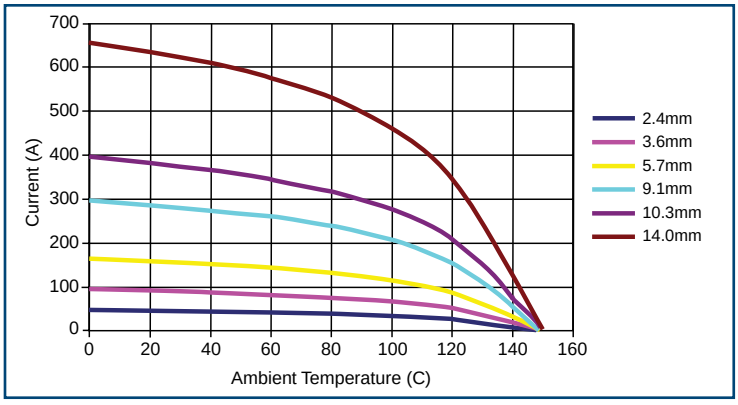
RADSOK® Technology brings high power to Military and Aerospace applications:

- Naval
- Military & Commercial Avionics
- Military Vehicles
- Missiles and Ordnance
- C4I

There are many developing military applications of RADSOK® technology - combinations of RADSOK® and high speed copper contacts in the same interconnect package has become a requirement in rectangular as well as circular connectors.

RADSOK® Derating Chart - Temp. vs. Current

Based on single conductors in free air. Wire cross-section same size as pin contact cross-sectional area.



HIGH POWER FOR BOARD LEVEL CONNECTORS

Amphenol offers high current single-point connections for PC boards with RADSOK® contacts:

- **PowerBlok™**
- **RADSERT™**
- **PGY™**

The compact footprint design of these products can supply up to 120 Amp to the board which preserves surface area and provides more flexibility in board design.

- PowerBlok is available in a 3.0mm (70 AMPS) which is press-fit into the PCB
- RADSERT's are available in 2.4mm (35 AMPS) and 3.6mm (70 (AMPS). Offered in solder or press-fit styles, and available for many board thicknesses.
- RADSOK PGY's are available in 3.6mm (70 AMPS) and 5.7mm (120 AMPS). Pgy's are connected to the PDB through a solder reflow process.

Standard and Custom-Developed Solutions

- In addition to the various standard sizes of RADSOK® components, custom-developed solutions are also available. Amphenol has the global design, engineering and manufacturing resources to provide RADSOK® sockets pressed into busbars, crimped to cables, assembled into connectors, assembled into customer or Amphenol designed specialized electrical devices, or as stand-alone components. Amphenol also manufactures a full compliment of mating pin contacts for any application.
- Steady-state current capacities for standard RADSOK® products range from 50 amps to over 1000 amps.
- Amphenol connectors with RADSOK® contacts are offered with a variety of positive-locking features that insure and maintain fully-mated connections.
- Sealing (Sealtac™) and high voltage hot break options are available within the RADSOK® itself or within a very wide range of IP rated connector housings to provide environmental protection to the contact area.

RADSOK® contacts in LRM connectors: see page 30 of the LRM Section.

RADSOK® contacts in Ruggedized Rack and Panel Connectors - see pages 97 & 98.

Rectangular Connectors for High Power Applications

Amphenol's offers new Power Interconnects for your high power applications featuring RADSOK® technology. This multi-pole family of connectors is designed for 1750 VRMS or 2450 VDC at 400 A continuous.

Design features include:

- Easy to identify shell polarization
- Split-insert construction for ease of assembly of contacts
- Shell to shell bottoming for electrical conductivity/EMI protection
- Customer programmable keying and a latch with snap detent for solid engagement locking
- Also offered in a low profile right angle 90 degree back shell option with over mold capabilities, helping ease the strain of tight fitting applications.
- Offered in standard plating options as well as Durmalon finish*

* Consult Amphenol Aerospace for more information on cadmium alternative, Durmalon finish.

New Mil-Power Group of Connectors

RF High Frequency Contacts Available for LRM Connectors

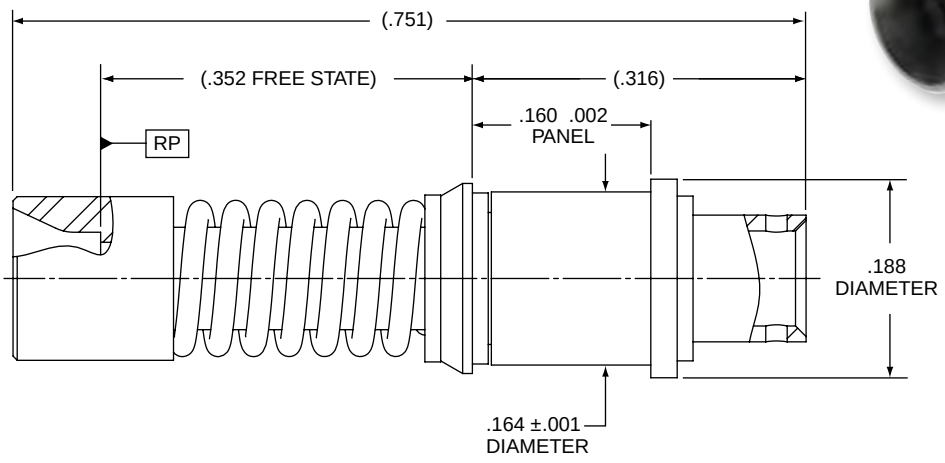
Amphenol divisions of SV Microwave and Amphenol Aerospace work together to provide connectors with high frequencies. SV Microwave division of Amphenol is a world leader in the design and manufacture of RF/MW connectors and components. They provide high frequency contacts with a unique “Float Mount” technology which allowsfor consistent microwave performance while maintaining tight mechanical tolerances. These contacts exhibit superior electrical performance and will maintain an accurate phase length when mated.

System design and platform needs have required smaller packaging with RF, D/C signal and power all in close proximity. SV Microwave’s proven designs and blindmate technology have enabled the integration of multiport RF signals into single housings for gang mating capability. For more information, consult SV Microwave.*

SMPM contacts shown on this page are available for use in LRM interconnects (as shown in staggered grid patterns on page 29 in the LRM section of this catalog).

SMPM RF Contacts for use in Amphenol LRM Connectors

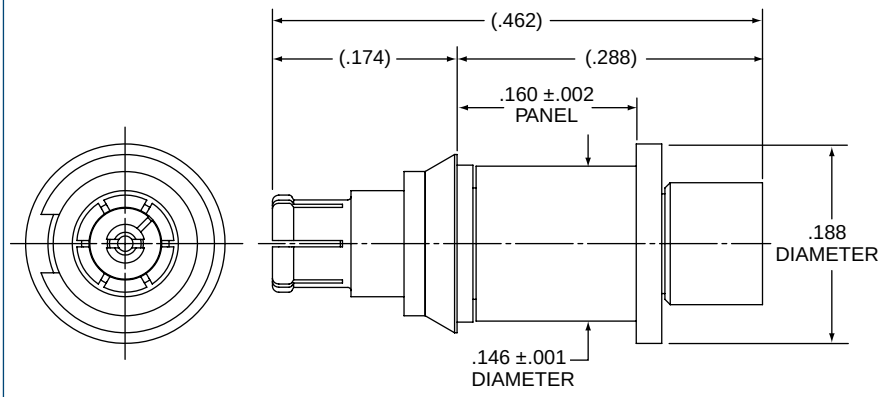
SOCKET
Size 12, 50 Ohm



Socket Contact, SMPM RF used in LRM Interconnects

SMPM RF Contacts for use in Amphenol LRM Connectors

PIN
Size 12, 50 Ohm



Pin Contact, SMPM RF used in LRM Interconnects

* SV Microwave
Phone: 561-840-1800
Website: www.svmicrowave.com

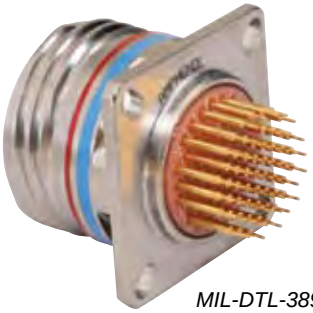
Cylindrical Connectors with PC Tail Contacts

Amphenol Aerospace is the leader in interconnect systems for aerospace/harsh environment applications. MIL-DTL-38999, MIL-C-26482, MIL-5015 as well as proprietary cylindricals can incorporate pc tail contacts. Jam nut (D hole) or panel mount (four hole) styles are solder mounted to printed circuit boards. PCB contacts are available in sizes 16, 20 and 22D.

Considerations must be made for length of PCB tails and any mechanical methods needed to stabilize the board. Commonly used tail diameters and tail stick-out dimensions are given in amphenol's combined Circular Interconnect Catalog/Printed Circuit Board section. PCB contacts are available in coax, twinax, triax and quadrax types. Cylindrical connectors can be attached to boards with flex termination which creates a self-locking terminal pad and eliminates the need for an additional interconnect to the PC board.

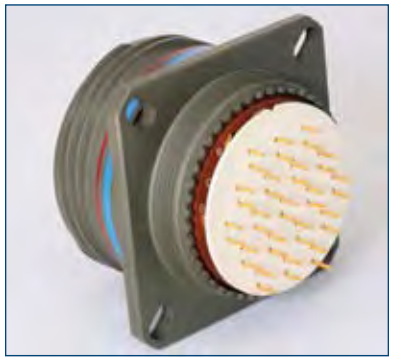
Cylindrical Connectors on PC Board

MIL-DTL-38999 with Special Stand-off Shell Configuration and Quadrax Contacts with PC Tails



MIL-DTL-38999 with PC Tail contacts

Cylindrical Connectors with Flex Circuitry. Flex is designed to geometrically fit the shape of the connector to board package. It is strong and rigid, yet the circuit body is highly flexible.



Alignment Discs on PC tail connectors provide simplified installation of contacts to PCB boards.

Cylindrical Press Fit Connectors with Compliant Pins

MIL-DTL-38999 connectors can be supplied with compliant pin contacts for solderless mounting on printed circuit boards. Compliant pins engage the plated through holes in the PC board without the need for soldering which provides for high speed, low cost board assembly. They accommodate boards with minimum of 0.090 inch thickness and 0.040 ±.003 plated through holes. Both pin and socket contacts are available in any MIL-DTL-38999 Series I, II or III insert pattern having contact size 16, 20 or 22D. Connectors are sold completely assembled or are available fully pre-assembled on a blackplane assembly.

For more information on Press Fit connectors see Amphenol's Combined Circular Interconnect catalog/Options & Others sect., on-line at www.amphenol-aerospace.com.

Cylindrical Connectors with Compliant Pin Contacts

Amphenol's Broad Product Offering of Circular Interconnects

SOLUTIONS FOR A WIDE RANGE OF APPLICATIONS

When you come to Amphenol, you are connected to the broadest range of interconnection products in the marketplace.
Amphenol has become the leader in interconnection products through its long history of engineering expertise for product solution solving. The Board Level and Rectangular interconnects shown in this catalog are only a part of the very wide range of interconnects - there is also the whole world of Circulars. Many of the military specifications for cylindrical connectors were developed by Amphenol, formerly Bendix Connector Operations, at the Sidney, NY facility.

Circular Products offered by Amphenol Aerospace include the major mil-spec cylindricals and commercial versions, plus many interconnects that meet special applications. Also within the circular interconnect offering from Amphenol, through the Amphenol Industrial Operations division, are many commercial types of connectors.

The following list is a brief overview of Circular Interconnect products offered by Amphenol Aerospace and Amphenol Industrial Operations. There is a vast array of products - many series within MIL-specs, and many options within series.

- MIL-DTL-38999 Series I, II and III
- MIL-DTL-5015 and 5015 types: 97 Series Commercial, GT and ACA-B Reverse Bayonet Connectors
- MIL-DTL-26482, Series I & 2
- MIL-DTL-83723, Series III
- Hermetic Connectors
- Filter Protection Connectors
- Fiber Optic Connectors
- Energy Suppression Connectors
- High Power Connectors including products with RADSOK® high amperage contacts
- Plus a wide range of contacts for circulars:
  - Standard 500 cycle and 1500 cycle, M39029 type power and signal
  - Crimp for front or rear release connector applications
  - Solder type fixed contacts
  - High frequency shielded coax, triax, twinax contacts
  - High-speed quadrax and differential twinax contacts
- Wide range of Accessores for use with Circular Connectors

We invite you to see our Combined Circular Interconnects catalog online at www.amphenol-aerospace.com

Also see the many circular interconnects offered by Amphenol Industrial Operations at www.amphenol-industrial.com.

Contact us at:
Phone: 607-563-5011 or 800-678-0141

The product breadth of Amphenol for Circular Interconnects represents the Amphenol expertise to provide almost any interconnection solution. Amphenol divisions work in synergy to provide our customers with what they need for their specifc performance requirements. It is this synergy and team driven effort that has made Amphenol the interconnect technology provider of choice to industry leading companies throughout the world. With a broad and diverse product portfolio, Amphenol is able to develope the right solutions for our customers across the diverse segments of the rapidly expanding electronic market.

Military/Aerospace Markets - Amphenol Circular Interconnects

Military Avionics . . Commercial Avionics . . Military Vehicles . . UAVs . . Missiles/Missiles Defense . . Naval . . C4I . . Space

Industrial Markets - Amphenol Circular Interconnects

Rail/Mass Transit . . Process Control . . Wind & Solar Energy . . Heavy Equipment . . Telecommunications . . Power Generation . . Petro-Chemical