

# Amphenol

COMMUNICATIONS SOLUTIONS

Rugged / Harsh  
Solutions



**Commercial  
Industrial**

# Rugged / Harsh Solutions Portfolio

• Rugged I/O Connectors • Harsh Environment • IP67 • Waterproof



## Rugged HDMI

**RUGGED HDMI PANEL MOUNT CONNECTOR IP67 SEALING**  
Rugged HDMI receptacles with die-cast housings and IP67 sealing for Harsh Environment applications, provide reliable performance in extreme conditions for the most demanding applications, and mate with standard connectors.



## Modular Jack - Rugged

**RUGGED RJ PANEL MOUNT CONNECTOR IP67 SEALING**  
Ruggedized RJ connectors with die-cast housings and IP67 sealing for Harsh Environment applications, provide reliable performance in extreme conditions for the most demanding applications, and mate with standard RJ plugs.



## ID Rugged Bulkhead Adaptor Series Connector

**RUGGED INDUSTRIAL/MILITARY RJ45 (ETHERNET) CONNECTORS**  
Amphenol's line of Rugged Bulkhead Adaptors serve many markets and applications across the globe including Transportation, Military, Medical and Industrial



## Rugged Dsub

**RUGGED D-SUB PANEL MOUNT CONNECTOR IP67 SEALING**  
Ruggedized D-sub connectors with die cast housings and IP67 sealing for Harsh Environment applications, provide reliable performance in extreme conditions for the most demanding applications and mate with standard connectors



## Rugged USB 3.0

**RUGGED USB CONNECTOR FOR HARSH ENVIRONMENT APPLICATION**  
Amphenol's Rugged USB3.0 connectors serve many markets and applications across the globe including Medical, Industrial, Telecommunication, DataComm, etc. Available with Right Angle or Vertical on PCB, and in Single Port or Stacked Version.



## LUSB (Lockable USB) Connector Series

**LOCKABLE AND HIGHLY RELIABLE RUGGED USB SOLUTION**  
Amphenol's LUSB series Lockable USB Connectors serve many markets and applications across the globe including Automotive, Communications, Consumer, Data, Industrial, and Medical.



## Rugged USB 2.0

**RUGGED USB CONNECTOR FOR HARSH ENVIRONMENT APPLICATION, GENERATION 2**  
Amphenol's MUSBR series USB Connectors is a line of Generation 2 ruggedized USB connectors with die cast housings and IP67 sealing, designed for Harsh Environment applications.



## Rugged USB Type C

**RUGGED USB TYPE C CONNECTOR FOR HARSH ENVIRONMENT APPLICATION, GENERATION 2**  
Amphenol's MUSBR series is a line of Generation 2 ruggedized USB Type C connectors with die-cast housings and IP67 sealing, designed for Harsh Environment applications



## Rugged MRD Series Circular Locking Connectors

**IP67 SEALED RUGGED CIRCULAR LATCHING CONNECTORS AND CABLES**  
BrightConnX™ MRD series IP67 connectors and cable assemblies are available in 2, 3, 4, 5, 6, 7, 8, and 9 position insert arrangements.



## Rugged MRU Series USB 2.0

**IP67-RATED HARSH ENVIRONMENT USB 2.0 TYPE A CONNECTOR**  
Amphenol's MRU series of USB 2.0 Type A connectors provide IP67 protection for enclosures per IEC 60529. With data rates up to 480Mb/s, the connector series is designed to provide a standard USB interface for enclosures exposed to harsh environments.



## FLH Series Mini Sealed 2.50mm Pitch Connectors

**IP67 SEALED WATERPROOF WIRE-TO-WIRE AND WIRE-TO-BOARD/PANEL CONNECTORS & CABLES**  
FLH Series Mini Sealed 2.50mm pitch connectors and cables provide IP67 sealed wire-to-wire and wire-to-board/panel connectivity. Its waterproof characteristics make it ideal for wet and harsh applications.



## IP67 Boot Style Hood

**SEALS INTERFACE OF EXISTING HARSH RJ AND USB CONNECTORS IN THE MATED CONDITION**  
Cost-effective, easy-to-install IP67 flexible sealed boot for Harsh Environment or standard I/O connectors, can be used with standard plugs/cables.

• Standard Cable Assembly Available • WTW and WTB

# Rugged / Harsh Product Ratings Per IEC 60529

## Harsh Environment

Data Rate

10Gb/s

5Gb/s

1Gb/s

100Mb/s



LUSB-3



MUSBR-2



LUSB-A



MRJ-2



MUSBR-A



MRJR-9



MUSBR-M



MRJR



MSUBR



ID



MDBR



MHDR



MUSBR 3&4



MUSB-K



MRD

IP20

IP67

IP Rating



# Rugged Solutions – Rugged USB, RJ, D-Sub, HDMI

## Product Features:

- RoHS compliant
- Nickel plated Zinc Die-Cast shells
- Inserts High Temperature Thermoplastic UL94V0, Black
- Current Rating: 1.5 Amps to 2.5 Amps
- Custom and Special Capability
- Qualification Test Reports available
- IP67 in mated and unmated condition
- Conductive Rubber Panel Gaskets
- Gen 2 sealed with internal gaskets (“R”), Gen 1 sealed with epoxy. Suggest Gen 2 for new design



<b>Rugged USB (MUSBR)</b> Type A, Type A over A stacked, Type B, Type Mini B, Type Mini AB, Type Micro AB, Type C	<b>Rugged RJ11 &amp; RJ45                      (MRJR)</b>	<b>Rugged D Subs                      (MDBR)</b>	<b>Rugged HDMI                      (MHDR)</b>	<b>Lockable USB Type A                      with Positive Latch                      (LUSB)</b>
Right angle PCB and Vertical PCB	Right Angle PCB and Vertical PCB	Standard & High Density	Right Angle PCB and Vertical PCB	Right Angle
Available mounted to a PCB with the addition of standard USB, Terminal block, cable header or any connector the customer requests. Also available mounted to a PCB for wiring only	Available mounted to a PCB with the addition of standard RJ11 & RJ45, Terminal block, cable header or any connector the customer requests. Also available mounted to a PCB for wiring only	Standard Density: 15 & 9 size Solder cup, Vertical PCB High Density: 15 & 26 Solder cup, high density Proposed: Right angle, 26 size high density	Available mounted to a PCB with the addition of standard HDMI, Terminal block, cable header or any connector the customer requests. Also available mounted to a PCB for wiring only	USB Type A 2.0 and 3.0 version available
Dust covers available for all USB types IP67 rated boot style hood for the USB Type A only	Dust covers available for all RJ's IP67 rated boot style hood	Dust cover for 9 size only	Dust Cover	Dust Covers available Type A

# Rugged / Harsh Industrial Market Segment

- Automation
- Robotics
- Medical
- LED Lighting
- Energy
- Power Management
- Transportation
- POS/ATM
- Security
- Mining
- GPS



# Filtered Connectors

## Filtered D-sub, Filtered Terminal Blocks

**Product Features:**

- RoHS compliant
- Low cost
- Stress Isolated Design – Superior Mechanical & Thermal shock characteristics
- Variety of Filter Capacitance Values available
- High voltage Capabilities
- Interchangeable with Non-Filter D subs
- Custom and Special Capability
- Qualification Test Reports
- Effective against Radiated and Conducted EMI



Right Angle PCB	Vertical PCB	Solder cup	Male/Female Adapters	Combo D's	Terminal blocks
Standard Density Pin and Socket	Standard Density Pin and Socket	Standard Density Pin and Socket	Standard Density	Solder Cup, Vertical, Right Angle, Press Fit	.437 & .650" pitch
9, 15, 25 & 37 size Stacked: 9/9, 15/15, 25/25, 37/37	9, 15, 25 & 37 size	9, 15, 25 & 37 size	9, 15, 25 & 37 size	2W2, 3W3, 5W5, 8W8, 9W4, 17W2, 24W7,	.437" pitch – 2-12 terminals .650" pitch – 2-6 terminals
.318", .405", .590" right angle footprint Bracket or bracket and board lock Thru hole, metric or UNC 4-40 threads Threaded Jack Sockets Stacked version: Spacing between connectors: .625" or .750"	Long body & short body available Thru Hole, Metric and UNC 4-40 thread 4-40 threaded Standoffs with Board Locks available.	Metric and UNC 4-40 threads	Thru Hole with Mounting Post or 4-40 threads	Available in Keyed versions Metric and UNC 4-40 threads 20,30 or 40 contact current rating High voltage available Different right angle footprints available	Threaded hole, quick disconnect, threaded post, PCB tail Thru hole mounting



- INSTRUMENTATION

- Control Systems
- Industrial Displays
- Electronic gauges
- Instrument panel assemblies
- Ruggedized Sensing Systems

- MOTION CONTROL, ROBOTICS, FACTORY EQUIPMENT

- Factory Robots
- Welders
- Automated Assembly
- Camera Rigs
- Controller



## AGRICULTURE

- Ruggedized Controllers
- GPS Systems
- Communication
- Displays



## POWER

- Power Supplies
- Converters
- Solar Power
- Battery Controls





# Rugged / Harsh Industrial Market –Applications

## ENVIRONMENTAL

- Building Management
- Temperature Controls
- Humidity Controls
- Home Automation



## TRANSPORTATION

- Engine Control
- GPS Tracking
- Instrumentation



# Rugged / Harsh Industrial Market –Applications

## POINT OF SALE

- POS Terminals
- Scanners
- Cashdrawers
- Receipt printers
- Displays
- ATMs



## MEDICAL

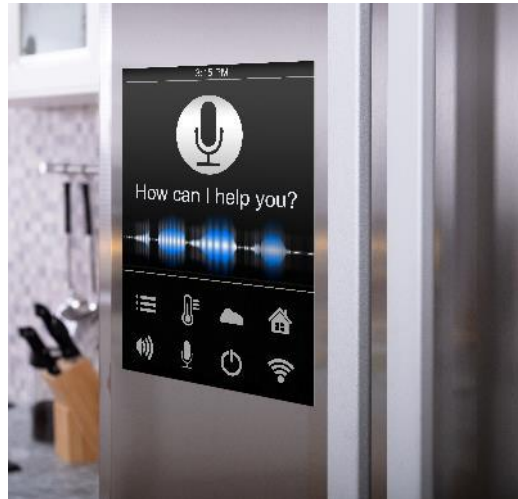
- Surgery Robotics
- Portable Patient Devices
- Ultrasound Monitors
- MRIs
- Defibrillators





## CONSUMER

- Entertainment
- Appliances
- Handheld Devices
- GPS Devices
- Drones
- Tools



## MILITARY

- Radios
- Computers/Routers
- Navigation
- Power



# Rugged / Harsh USB Type-C

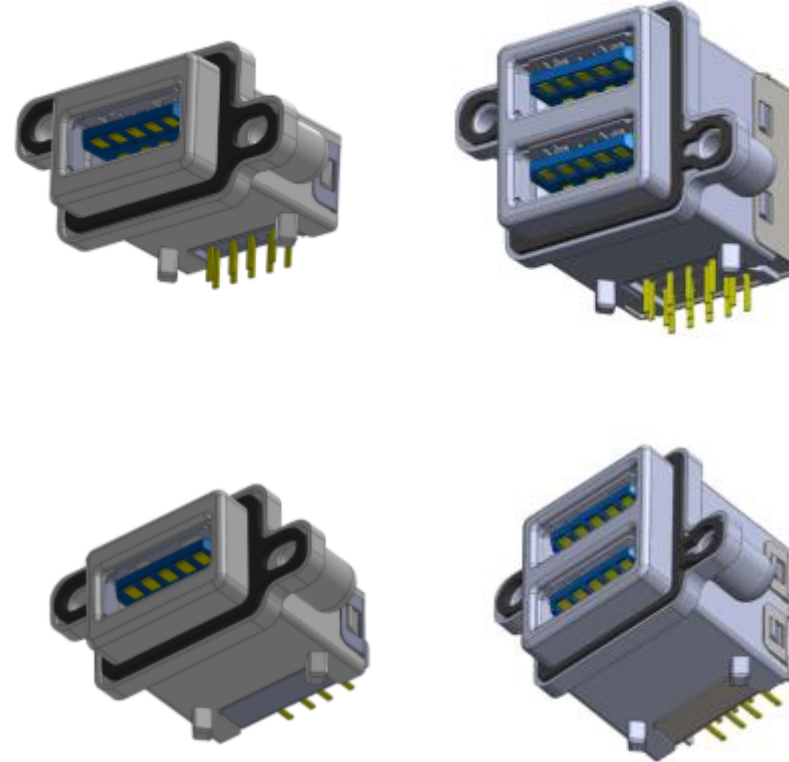
- USB Type C Receptacle with die-cast shell and silicone gasket
- Provides a reversible interface for mating with any type C cable assembly
- Product will be available in right angle and vertical configurations
- IP67 rating per IEC 60529
- 5 Gbps data rate with roadmap to 10Gbps.
- Delivers 20V of power up to 5A
- Conductive and non-conductive dust cover options





# Rugged / Harsh USB 3.0

- USB 3.0 Type A Receptacle with die-cast shell and silicone gasket
- Designed for data transfers in harsh or demanding environments
- Single port and stacked arrangements
- Product available in right angle and vertical configurations
- IP67 rating per IEC 60529 (water and dustproof)
- 5 Gbps data rate
- Conductive and non-conductive dust cover options
- Designed to comply with USB 3.1 Gen 1



# Rugged / Harsh HDMI

- High Definition Multimedia Interface for Harsh Environments
- Receptacle mates with any standard plug
- Available in right angle and vertical orientations as well as on interposer boards for flexible mounting arrangements.
- IP67 rating per IEC 60529
- Performance complies with HDMI 1.4 to carry 4K video transmissions.
- Mate with any matching type A HDMI plug



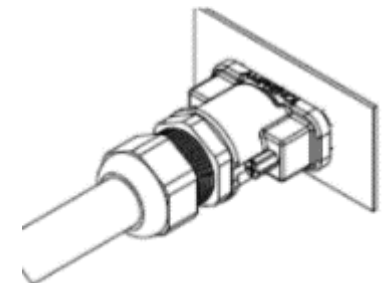
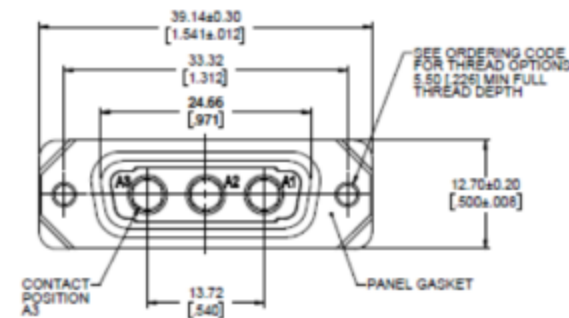


# Rugged / Harsh MDBR Products – With Filter Options

- Standard D-sub interface with IP67 protection
- Current rating up to 40A per pin.
- Termination styles include vertical and right angle PCB as well as solder cup options.
- IP67 sealing boot kit allows for sealing the mating interface while mated
- Broad range of filtering options for EMI protection
- Gold-plated screw machine contacts provide reliable connections in harsh environments.
- Die cast shell with conductive silicone gaskets provides added EMI protection



\*Please consult Amphenol if interested in 2W2, 5W5, 8W8, or combo configurations\*



# Rugged / Harsh MRD Solutions – Connectors (WTW & WTB)

- IP67 Circular Solution
  - 2, 3, 4, 5, 6, 7, 8, 9 position connectors.
  - 10A per pin, up to 500VAC
  - Cable to Cable, Cable to Panel Options Available
  - Width of panel mount connector 25.1mm
  - Accommodates outdoor 3CX18/16AWG cable (4-9mm OD)
  - Locking latch system
  - Temp -40C to 80C
  - Field termination kits available.





- IP67 Circular Solution
  - 2, 3, and 4 pin available for both end termination and single-end pigtail cables
  - 10A per pin, up to 500VAC
  - Cable to Cable, Cable to Panel
  - Locking latch system
  - Temp -40C to 80C
  - Field termination kits available.



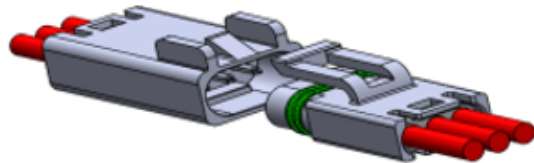
# Rugged / Harsh FLH Solutions – With Crimping Contacts (WTW)



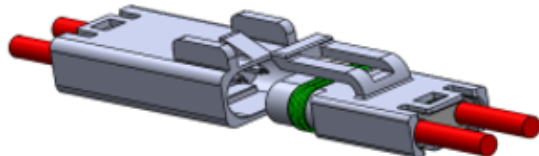
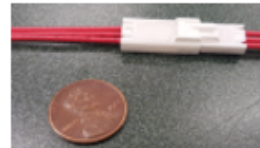
**6-Pin Connector**



**4-Pin Connector**



**3-Pin Connector**



**2-Pin Connector**



## •Features

- Miniature design 2.5 mm pitch
- Protective latching
- Pre assembled seals, crimped wires
- Can be inserted at assembly

## •Electrical

- Current rating up to 7 Amps / contact
- Wires 22-18 AWG
- 400V AC

## •Applications

- Commercial and residential indoor and outdoor Lighting
- Appliances
- HVAC
- Harsh environment applications

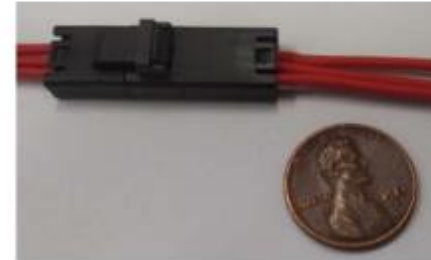
# Rugged / Harsh FLH Solutions – Poke In Connectors & Cable - WTB



**2 Pin Connector**



**3 Pin Connector**



**4-Pin Connector**



**6 Pin Connector**

Rugged FLH R/A Connector – WTB  
Available Now!

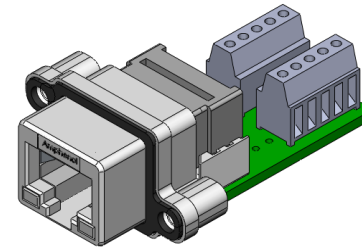


Other configurations are available on request

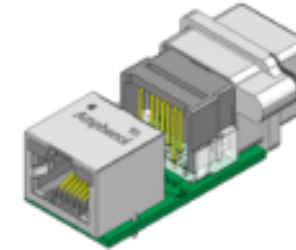


# Rugged / Harsh Connectors Value-Add Solutions

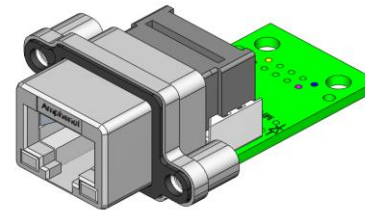
- MRJR series panel mount connector provides IP67 protection.
- Receptacle performance meet Cat5e performance levels per EIA-568-C.2 for 1000Base-T
- Die cast shell with conductive silicone gaskets provides added EMI protection
- Multiple termination options
- Upgrade path for Cat6 versions to support 10GBase-T



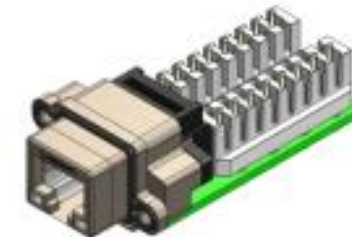
Cat5e with terminal blocks



Cat5e adapter



Cat5e with discrete wire terminations



Cat5e with IDC terminations

## Rugged Solutions

- Unique Technology Offered by Amphenol
- No competition with any product line in Amphenol Communications Solutions
- Always listen to customers' need and provide the needed environmental sealing on widely used connector standards (RJ, USB, D-SUB, HDMI) all with the standard package size or low profile size
- Rugged MRD Circular Shape Connectors and Cable Assembly offer great value to customers.
- Offer Our Customers Free Samples
- Experience in Various Markets Helping Our Customers Succeed
- Standard Offering Balanced with the Customized/Optimized Solution
- Value/Price and Service made us the TRUSTED SOLUTION PROVIDER

## Filtered Connector Solutions

- Filter D-Subs, Filter Micro Ribbon and Filter BNC connectors are a preferred alternative to discrete filters or board level filters.
- Improved insertion loss performance, 10-20db better performance than discrete filters.
- Patented Solder-less technology preferred over soldered filters
- Value/Price and Service made us the TRUSTED SOLUTION PROVIDER

# THANK YOU!

For Product Details and Support Needed,  
please contact our Product Manager Anas Waheed  
[anasw@amphenol-acpa.com](mailto:anasw@amphenol-acpa.com)

Rugged Solutions Landing Page:

[Rugged I/O Connectors | Harsh Environment | IP67 | Waterproof \(amphenol-cs.com\)](#)

