

# Amphenol

COMMUNICATIONS SOLUTIONS

## RJ / Modular Jacks & Cable Assemblies

September 2024



*Commercial  
Industrial*



# Mod-Jack Introduction

- The term Modular Jack refers to a rectangular, 2-piece, latching electrical connector initially developed in the 1970's as a telephone handset quick-disconnect, which has since proliferated to thousands of applications in virtually every market. Still used extensively in telephone equipment, modular jacks are also used as the primary interface for Ethernet ports on various types of computer equipment and peripherals, such as printers, routers, modems and switches.
- Amphenol has been a key player in expanding the use of this interface through the design, development and manufacturing of huge variety of configurations, including single and multi-port, ganged and stacked, with and without shielding, and other available features such as integrated LEDs and electrical filters.
- With more than 50 different series and 11,000+ active part numbers, Amphenol covers virtually every combination and permutation, and we are also adept at adding features and customizing to specific requirements.



Amphenol Is A Leading Modular Jack Supplier

# Modular Jacks: Summary Feature Overview

## Standard Performance



- Cat3/Cat5 performance
- 30+ Product Series
- Single, Multiport, Stacked, Ganged
- Vertical, Right Angle
- Standard, Low, Ultra-low (Recessed)
- PTH, SMT
- Tab-Up, Tab-Down
- Shields, LEDs
- High temp materials for reflow soldering

## High Performance



- Cat5e, Cat6, Cat6A performance levels
- 20+ Product Series
- Integrated PCB provides signal conditioning
- No additional compensation required
- Single, Multiport, Stacked, Ganged
- Vertical, Right Angle
- Standard, Low, Ultra-Low (Recessed), Narrow
- Combos (RJ + USB)
- LEDs

# Modular Jacks: Typical Applications

## Standard Performance



## High Performance



- 10BASE-T applications
- Telephones
- Modems
- POS Terminals
- Consumer Equipment
- Computer peripherals
- Industrial equipment
- Security systems
- Medical Equipment

- 100BASE-T, 1000BASE-T, 10GBASE-T applications
- Datacenters
- Networks switches, routers
- Ethernet ports
- Streaming Video
- Broadband CATV
- Any high bandwidth application

# Modular Jacks: Power Over Ethernet (PoE) Compatibility

- PoE (Power over Ethernet) transmits both electric power and data over the same Ethernet cabling.
- Examples of devices that use PoE are colour screens, VoIP phones, WAP (Wireless Access Point), and security cameras.

	PoE Type			
	Type 1	Type 2	Type 3	Type 4
<b>Common Name</b>	PoE	PoE+	PoE++	
<b>Other Names</b>	2 -pair PoE	PoE Plus	4-pair PoE, 4P PoE, UPOE	High-Power PoE
<b>Number of Pairs</b>	2	2	4	4
<b>Source Current (max. per pair set)</b>	350 mA	600 mA	600 mA per pair	960 mA per pair
<b>Source Voltage (min.)</b>	44 V	50 V	50 V	52 V
<b>Source Power (max.)</b>	15.4 W	30 W	60 W	100 W

Amphenol Modular Jacks support all PoE Types

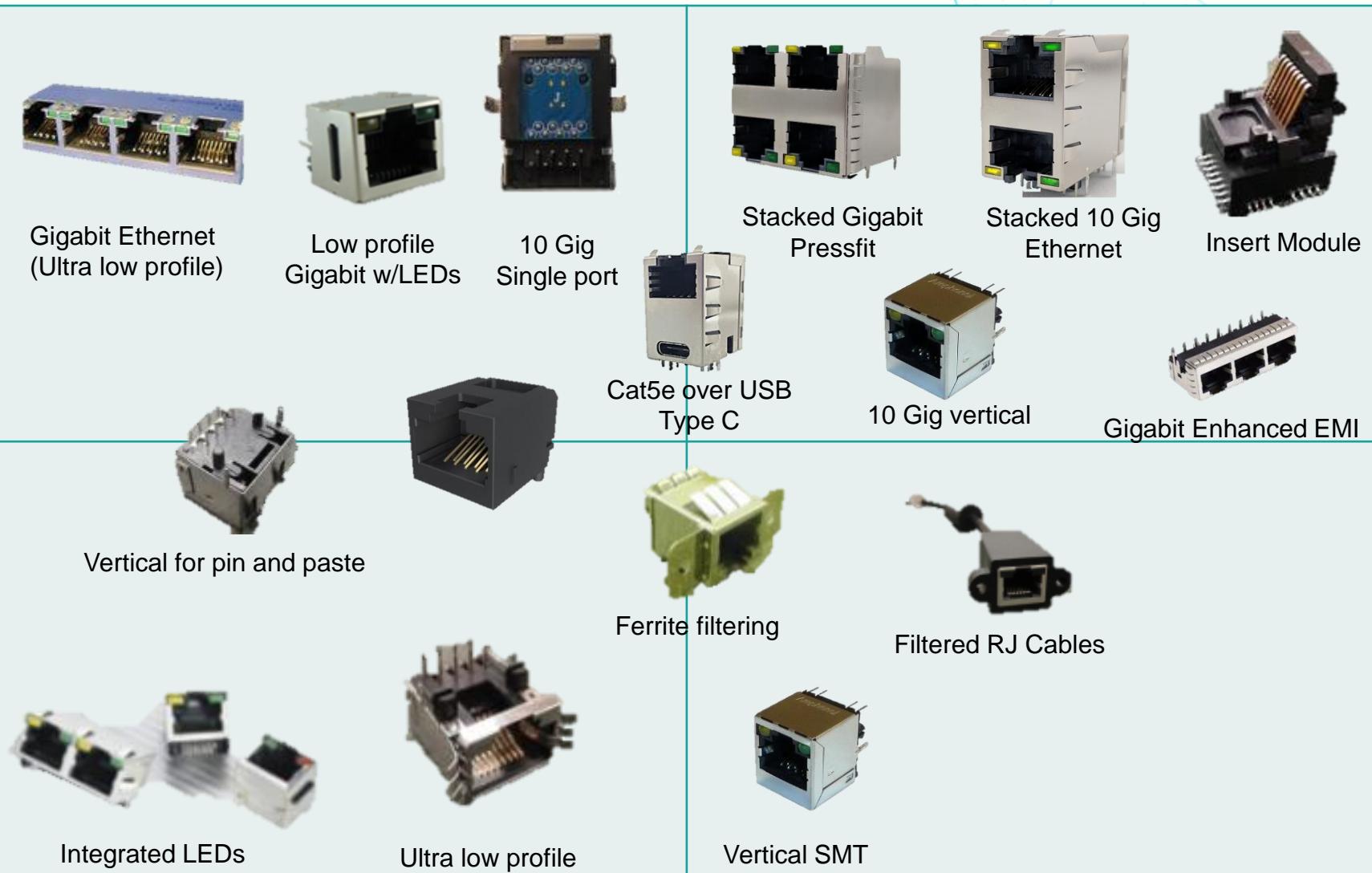
# Modular Jack - Feature Options

Feature	Options	Feature	Options
Tab Orientation	Up or Down – depends on series	Shielding	High performance - always shielded. Standard performance - shields available. With and without panel fingers
Housing Material & Colour	Standard and High Temp options. Typically Black, some series available with Red, Yellow, Green.	LEDs, Light pipes	Variety of LED single color and bi-color. Optional on many series. High temperature LEDs available for reflow. Light pipes on a few series
Contact Plating	Gold over Nickel, various thicknesses available from gold flash to 50u"	Mounting, Orientations	Through Hole, SMT and some press-fit versions. Right Angle, Vertical
Number of Contacts	2, 6, 8, 10, depending on series	Ports	Single port, Ganged Multiport, Stacked Multiport

# Modular Jacks - Range

## High Performance

- Network Servers
- Ethernet Switches
- Data Centers
- Routers
- Hubs

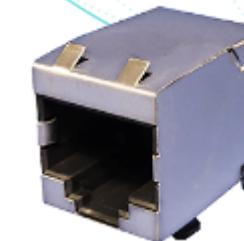


**Standard Products**

**New or Custom Products**

# Modular Jacks – Shielding & Filtering

- Shielding provides signal protection with a conductive metal composite shell surrounding the connector, which prevents Electromagnetic Interference (EMI), current leakage & crosstalk between adjacent connectors.
- Amphenol shielding has one of 2 constructions:
  - copper alloy plated with matte tin over nickel,
  - stainless steel with tin dipped tails.
- Nickel plated or Stainless-Steel Shields without tin dipping can experience solderability issues; tin dipping improves the solderability of the shield to the pcb, in addition to helping to prevent tin whisker growth, which can otherwise potentially create electrical shorts.
- Shields may incorporate integrated spring tabs which interface to the panel opening to ensure electrical bonding, and to close or minimize any EDMI window which could otherwise create susceptibility issues in terms of radiated emissions.
- Ferrite Filtering is also available to protect against high frequency EMI. High resistivity, high impedance ferrite filter blocks are used internally to guard against external EMI.



Protection Against EMI

Configuration options include the RJ11, RJ14, RJ25, RJ45 and RJ50 standards

“RJ” = Registered Jack

## RJ50 10P10C

- Commonly used in electrical equipment and data transfer systems.
- Available in multiple series including.
- RJE74, RJE09, RJE15 and others.

## RJ45 8P8C

- Most common configuration. Generally used in Ethernet jacks and networking.
- Available in multiple series including: RJE56, RJULE, RJE07, RJESE, FRJAE and others.

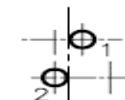
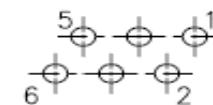
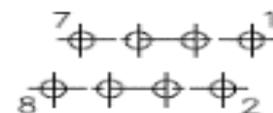
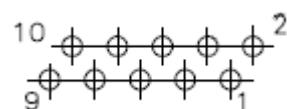
## RJ25 6P6C

- Commonly used in telephone devices.
- Available in multiple series including: RJE01, RJE56, RJULE, RJE07, RJESE, FRJAE and others.

## RJ11 6P2C

- Commonly used in telephone devices.
- Available in multiple series including: RJE01, RJE56, RJULE, RJE07, RJESE, FRJAE and others.

“6P2C” means 6 position connector with 2 contacts loaded



Covers the Range of RJ Standards

- LEDs are an option suitable for applications in which a visual indicator is required of data communications or some other attribute of the signaling status.
- Amphenol has many series with available LEDs, in a variety color options. Custom color combinations are also available on request.
- The following modular jack part series are available with LEDs:

• RJHSE	• RJE72	• RJSNE	• RJE45	• RJE59	• RJE1A
• RJCSE	• RJE73	• RJSAE	• RJE48	• RJE60	• RJE7B
• RJESE	• RJSAE	• RJE37	• RJE49	• RJE4A	• RJE1B
• RJE71	• RJSBE	• RJE39	• RJE58	• RJE1R	• RJE1C



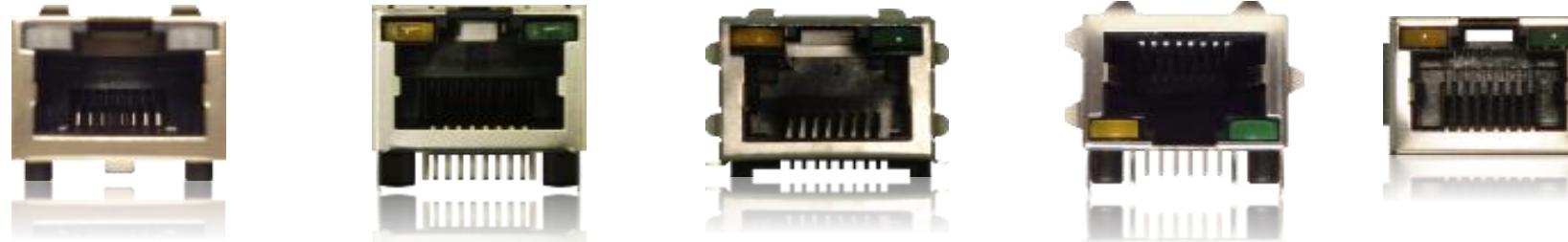
- The RJSSE series is available with light pipes (for use with a PCB mounted vertical firing LED). Available in single, two, and four port configurations.



LEDs for Visual Status Indication

# Modular Jacks – High Temperature LEDs for Reflow Assembly Applications

- For many years customers have been limited to the wave solder process for connectors with integrated LEDs.
- The high temperatures of the IR Reflow soldering process places a great deal of stress on standard LEDs. Differential thermal expansion between the metal components and epoxy body can breaking electrical bonds leading to failures.
- The general failure rate for the standard LEDs is around **5%** and can be as high as **50%** or more! This of course would require costly field repairs.
- Amphenol's robust LED solution withstands the high temperatures of the IR Reflow soldering process and drastically improves the yield rate to approximately **99%**.



Reduces LED Failure Rates in Assembly

# Modular Jacks – High Performance

- Increasing network speeds and data rates in Telecom, Datacenter, Networking and Home Electronics require interconnects that will not limit performance of the equipment.
- Amphenol is the industry leader in Modular Jack design and manufacturing for high data rates, providing products that exceed industry specifications for Near- and Far-End Cross Talk, Insertion Loss, Return Loss, and a variety of other parameters.
- High Performance Modular Jack products from Amphenol are available in a variety of configurations, including standard, low profile and ultra-low profile, single port and multiport (ganged and stacked) with superior EMI shielding, LEDs and tab up orientation of the mating face. A variety of “combo” versions (RJ with USB, etc) are also available.
- Amphenol's patented design and manufacturing process enables consistent and reliable performance at a competitive price.



Amphenol is the Industry Leader for High Performance RJs

# Modular Jacks – High Performance Categories

- High performance connectors are classified as Cat5e, Cat6, and Cat6A

Performance	Standard	Transmission Rate	Max Ethernet Speed	Cable Length	Applications
Category 3	10BASE-T	up to 16MHz	10 Mbps	100m	Phones, Modems, POS terminals
	100BASE-T4				
	100BASE-T2				
Category 5	100BASE-T	up to 100MHz	100 Mbps	100m	Switches, Routers, Hubs
	1000BASE-T				
Category 5e	1000BASE-T	up to 100MHz	1 Gbps	100m	Improved Hubs, switches, fast-Ethernet
	2.5GBASE-T		2.5 Gbps		
Category 6	5GBASE-T	up to 250MHz	5 Gbps	100m	New installations set up with CAT6/Cat6A cabling in preparation for higher speed requirements. Such as data centres, hospitals and medical centres, government facilities, etc.
	10GBASE-T		10 Gbps	Up to 55m	
Category 6A	10GBASE-T	up to 500MHz	10 Gbps	100m	

- Cat5e modular jacks can process 1,000 bytes of data in the same amount of time a standard connector can process 10 bytes.
- Cat6/Cat6A connectors can process 10,000 bytes of data in the same amount of time a Cat 5e connector can process 1,000 bytes.

Amphenol provides Cat5, Cat5e, Cat6, Cat6A

# Modular Jacks – Cat5e, Cat6, Cat6A High Performance Series

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Cat5e

RJE48

RJE58

RJE72

RJE1A

Cat6

RJE49

RJE59

RJE71

RJE1B

Cat6A

RJE50

RJE60

RJE7B

RJE1C



## Low profile

- Single port
- Tab up
- Integrated LEDs available in a variety of colors
- Wrap around shield with EMI tabs

## Standard profile

- Single port
- Tab up
- Integrated LEDs available in a variety of colors
- Wrap around shield with EMI tabs

## Ultra-Low profile

- 1 and 4 port
- Tab up
- Integrated LEDs available in a variety of colors
- Wrap around shield with EMI tabs

## Narrow profile

- Single Port
- Tab up
- Wrap around shield with EMI tabs

# Modular Jacks – Additional High-Performance Series

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**RJE45**



**RJE1R**



**RJE4E**



**RJSGE**



- Cat6 Performance
- Vertical Orientation
- Standard profile design
- Integrated LEDs available in a variety of colors
- Wrap around shield with EMI tabs

- Cat5, Cat5e, and Cat6 Performances
- Stacked 2x1
- Ports can support standard, Cat5e, and Cat6 configurations in any combination

- Cat5e RJ45 over USB Type C
- Stacked 2x1
- Wrap around shield with EMI tabs

- Cat5e Performance
- Stacked 2x2 Configuration
- Press-fit Terminations
- Integrated LEDs available in a variety of colors
- Tri-colored LEDs available
- Wrap around shield with EMI tabs

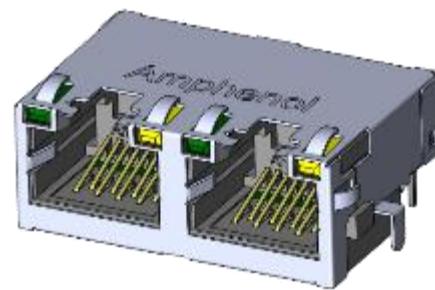
# Modular Jacks – Additional High-Performance Series

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**RJE3A**



**RJE72**



**DRP10**



**RJE4W**



- Cat5e performance
- SMT
- Standard profile design
- Integrated LEDs available in a variety of colors
- Wrap around shield with EMI tabs

- Cat5e performance
- 1x2 configuration
- Joins our RJE72 family of connectors already available in single and four port configurations
- Wrap around shield with EMI tabs

- RJ Industrial Plug
- Supports Cat6A performance
- Available in multiple configurations: straight, 90 degree, and 45 degree
- Designed for IP20 applications

- Cat5e performance
- Stacked 2x2 configuration
- Through hole
- Integrated LEDs available in a variety of colors
- Wrap around shield with EMI tabs

# Modular Jacks – High-Performance Series Summary

Performance upgrade with internal PCB change

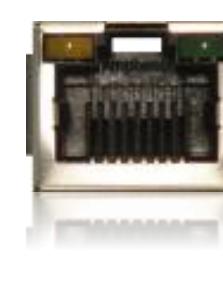
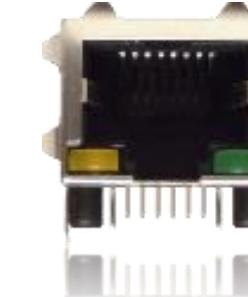
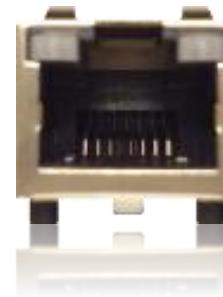
Offering the same variety of options as our standard series:  
 - LED options  
 - Shield variations  
 - Port configurations  
 - Housing color options

	Cat5e	Cat6	Cat6A		
Standard Profile	RJE58	RJE59	RJE60		Single Port, Tab-up, Integrated LEDs Wrap around shield, EMI shield tabs
Narrow Profile	RJE1A	RJE1B	RJE1C		Single Port, Tab-up, Integrated LEDs Wrap around shield, EMI shield tabs
Low Profile	RJE48	RJE49	RJE50		1 & 4 Port, Tab-up, Integrated LEDs Wrap around shield EMI shield tabs, top & side
Ultra-low Profile	RJE72	RJE71	RJE7B		1, 2 & 4 Port, Tab-up, Integrated LEDs Wrap around shield, EMI shield tabs, top & side Enhanced EMI tabs available
Vertical		RJE45	RJE4A		Vertical Cat 6, Integrated LED options With/without shield, EMI shield tabs, top & side
Stacked	RJSGE RJE1R RJE4W	RJE1R			Multiport Stacked Cat5e, Tricolour LED Enhanced EMI shield tabs, Superior EMI performance
Stacked RJ over USB Type C	RJE4E				Tab-up RJ Cat5e, USB Type C Wrap around shield, EMI shield tabs
SMT	RJE2A* RJE3A				1 Port, Tab-up and tab-down, Integrated LEDs Wrap around shield

Wide & Growing Range Of High-Performance RJs

# Modular Jacks – Standard Performance

- CAT3 / CAT5
- Vertical / Right Angle / 45 Deg
- Through Hole / SMT / Press Fit / Sunk fit
- Tab Up / Tab Down
- Wave / Reflow compatible.
- Wide range of LED selection available
- Wide range of Plating options available
- Wide range of Pin Length options available



**In addition to Amphenol's leadership position in the High-Performance RJ market, we want to emphasize our ability to provide one of the widest ranges of Standard Performance Modular Jacks!**

Amphenol benefits:

- Huge variety of product types - numerous options within each type covering the entire RJ spectrum.
- Product customization capabilities - we have a unique capability to meet your specific needs when others can't.
- Global market availability - we service customers in every corner of the globe through multiple channels
- Highly automated production lines - consistent quality, high output, and low labour cost.
- Innovation leader – Amphenol has developed LEDs that are more robust and better suited for the high-temperature IR Reflow process.

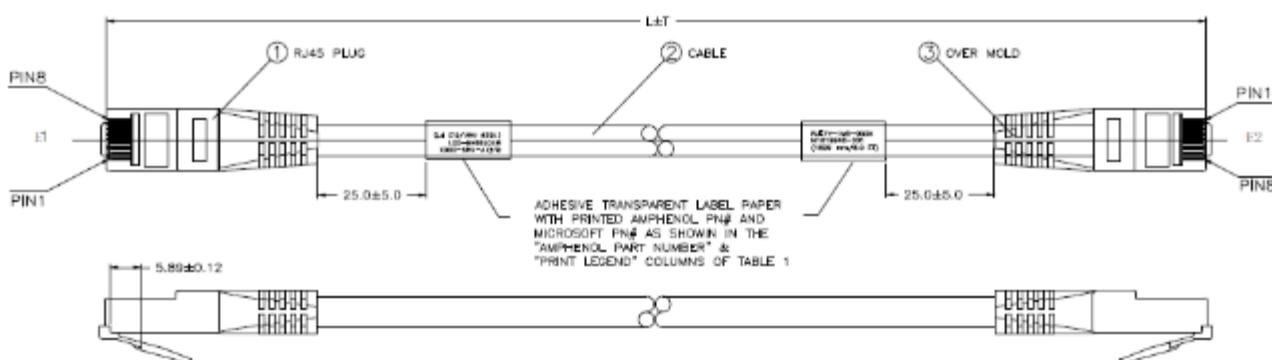
You Want It, We Have It

# RJE1Y RJ Cable Assemblies & Plugs



**NEW!**

- Available from CAT3 to CAT6A
- Planned to be Made in India (Sept 2023)
- Both Side Plug/ One Plug + One Pigtail option
- Plug Orientations available
- 7 color available
- Custom made for Length
- Shielded / Unshielded / Over-moulded



# Modular Jack – On the Web

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<https://www.amphenol-cs.com/connectors/modular-magnetic-jacks.html>

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## Modular & Magnetic Jacks

# Modular & Magnetic Jacks

Amphenol's broad range of I/O registered jacks (RJ) offer solutions to meet the increasing demand for faster speeds and greater bandwidth required by telecom & networking markets for VoIP, Ethernet, WLAN, medical, and industrial applications. All modular jacks without integrated magnetics support PoE Types 1 to 4 and are RoHS and IEC 60603-7 compliant.

Modular Jack connectors, which are known for their use in data cabling systems, can be subject to extreme environments, like telephone and data transfer cables for telecom equipment, industrial process control, tele-maintenance, airplane equipment, battlefield and naval communication, tactical radios and GPS positioning equipment. Rugged, IP67-rated shells or conductive gaskets enhance protection and performance in such environments.

### Modular Jack Selections



Right Angle

Vertical

Rugged

Standard Speed

High Speed  
(Cat5e, Cat6, Cat6A)

Standard Speed

High Speed  
(Cat6, Cat6A)

IP67 & High Speed  
(Up to Cat6A)

Surface Mount  
Through Hole  
Press Fit

Through Hole  
Press Fit

Surface Mount  
Through Hole

Through Hole

Single Port & Multi  
Port

Product Series

Product Series

Product Series

Product Series

Product Series

Convenient Categorizations To Find Products Quickly

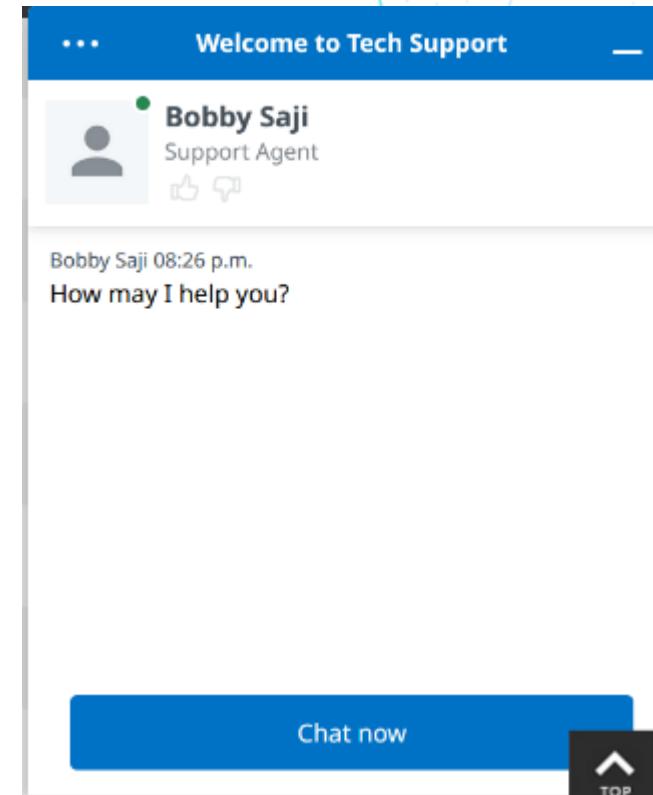
# Modular Jack - Resources

- Visit Amphenol on the web:
- <https://www.amphenol-cs.com/connectors/modular-magnetic-jacks.html>
- Download:
- Drawings
- 3D Models
- Data sheets
- Product Specs
- Request from local sales rep:
- Sample Kit
- Individual product samples
- Test reports

Product Manager:

Nishad Dravid

nishadd@amphenolcanada.com



Live chat with our web tech support team

Contact Amphenol For Your Modular Jack Needs

# Thank you

**Nishad Dravid**

**Modular Jacks Product Manager**

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