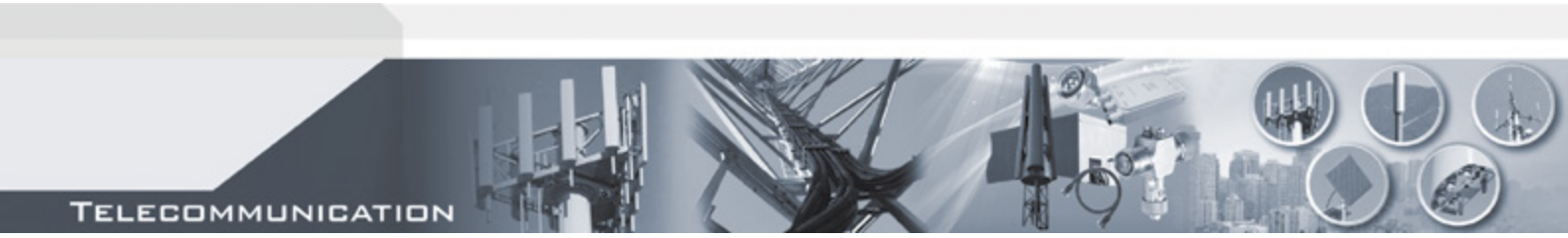
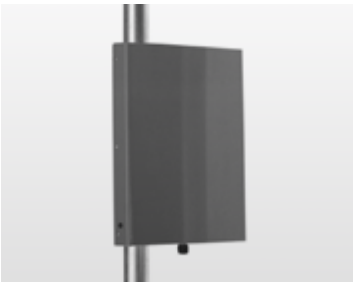
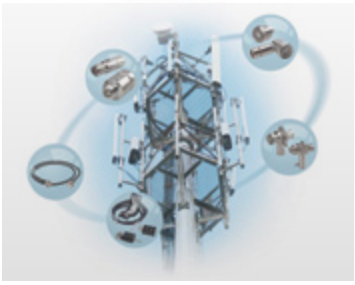
Amphenol
Connecting People & Technology

Telecommunication



Antenna Solutions

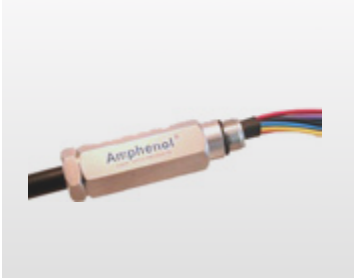




RF Products

Coaxial Cables

Fiber Optic Solutions



Amphenol
Türkiye&MiddleEast

www.amphenol.com.tr

sales@amphenol.com.tr

Amphenol Antenna Solutions is a division of Amphenol Corporation, a $6 billion NYSE company supplying to diverse markets including the mobile networks, automotive, military/aerospace, information technology and medical sectors. Amphenol Corporation was founded in 1932 and employs over 48,000 worldwide with product development and manufacturing operations on six continents.

Antenna Solutions

The division Amphenol Antenna Solutions was founded with the singular focus of designing and manufacturing high performance base station antennas. Today, the company is a single source for wireless infrastructure offering not only base station antennas, but also transmission line products including RF cable, connectors and jumpers as well as accessories (TMAs, combiners, filters, couplers, repeaters) and RET system components (surge arrestors, Bias-Ts and PDUs).

Antennas:

- **Base Station Antennas**
- **Cylindrical Antennas**
- **Small Cell, DAS and Indoor Antennas**
- **VHF/UHF/SHF Antennas**
- **Microwave Antennas**
- **Military Antennas**
- **Automobile Antennas**
- **Marine Antennas**

Base Station Antennas

Amphenol Antenna Solutions offers a wide portfolio of high performance base station antennas spanning the frequency range 25 MHz to 6 GHz. Antenna models are available in indoor, micro-cell, point-to-point, sector panel and omni-directional configurations. With more than ½ million base station antennas in operation world-wide, Amphenol Antenna Solutions products are field proven to withstand harsh tower top environments. A combination of robust mechanical designs and high production standards has earned Amphenol Antenna Solutions a reputation for quality and reliability that is second to none.

Amphenol Antenna Solutions offers a wide selection of gains, azimuth beamwidths, electrical downtilts and polarizations to give RF engineers the tools they need to optimize networks. Innovative Wideband, Dual-Band and Tri-Band configurations are available to provide maximum utilization of available tower space with minimum visual impact.

In addition to antennas, Amphenol Antenna Solutions has established expertise in tri-sector antenna structures, tower top electronics and Remote Electrical Tilt (RET) communications systems. This depth of experience allows Amphenol Antenna Solutions engineers to develop highly sophisticated site solutions to support your most challenging requirements.

SlimLine Antennas

Low Visual Impact

The SlimLine series has smaller footprint than traditional panel antennas. With a width of 253mm and a depth of 147mm along with it aero-dynamic shape it offers lower wind loading when mounted, thereby offering the customer reduced CapEx on tower expense along with cleaner visual lines.

Integrated RET (MDCU)

The MDCU (Multi-Device Control unit) module is designed for SlimLine and TRIO antennas to permit RET control for each frequency band of the antenna. It is a compact module that houses the electronic control board that drives the motors pre-installed into all antennas prior to delivery from the factory.

There is one module per antenna whatever the number of independent variable tilts in the antenna.

UltraLine Antennas

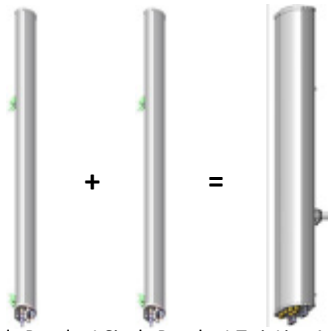
Evolutional LTE Platform

The UltraLine series combines Ultra Wideband arrays (1800+2100+2600 MHz) together with Extended Low Band arrays (698-960 MHz), capable of delivering Quad-band & Penta-band antennas as needed for MIMO x4.

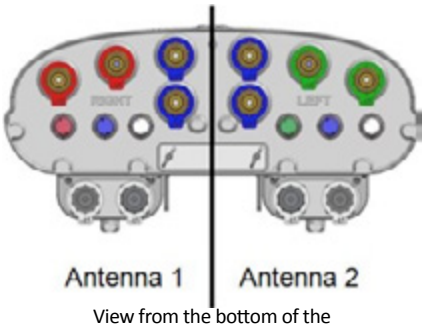
Low Visual Impact

The UltraLine series has a radome width of 305mm and depth of 160mm which accommodates 5 arrays (1 Low Band + 2 Wide Band + 2 Ultra Wide Band).

This series offers the customer reduced CapEx on tower expense along with cleaner visual lines.



1 Single Panel + 1 Single Panel = 1 TwinLine Antenna



View from the bottom of the Antenna showing 12 ports

TwinLine Antennas

The Amphenol Antenna Solutions TwinLine series are Side-by-Side panel antennas for site sharing applications.

Applications

- This product range enables two (or more) operators to share an antenna enclosure while at the same time enabling each operator to control their antenna on a stand-alone basis.
- Integrating new bandwidths / technology on an existing site (e.g. UMTS and GSM on 900 MHz for the same operator). This avoids the use of a combiner.

Low Visual Impact

The TwinLine series has a smaller footprint than two traditional panel antennas.

The dimensions along with its aero-dynamic shape offers lower wind loading when mounted, thereby offering the customer reduced CapEx on tower expense along with cleaner visual lines.

One Single Installation

Installation of a single antenna for two separate operators while maintaining traditional individual antenna properties :

- Frequency Bands
- Electrical Downtilts (Manual or Remote)
- H-Planes
- Internal Diplexing

Integrated RET (MDCU or MDDU)

MDCU Unit (Dual RET)

The TwinLine series is MET & RET compatible (AISG1.1 or 3GPP/ AISG2.0). A Single RET module is used to control all tilt angles, fully inserted inside the antenna. This unit is field replaceable.

The MDCU & MDDU are designed by Amphenol Antenna Solutions. These are RET units which are compact modules that houses the electronic control board that drives the motors pre-installed into all antennas prior to delivery from the factory.

The MDCU / MDDU Ret modules are inserted into antenna range – offering clean visual lines.

There is one module per antenna whatever the number of independent variable tilts in the antenna.

MDCU - (Multi-Device Control Unit)

MDCU Unit (RET)

The MDCU module is designed for SlimLine, TwinLine, CylLine and TRIO antennas to permit RET control for each frequency band of the antenna.

The MDCU will control both sides of the TwinLine Series from one BTS.

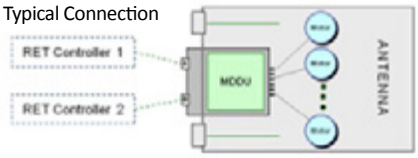
MDDU - (Multi-Device Dual Unit)

The MMDU module was developed specifically for the TwinLine antenna range.

It is utilised in the case of the control of two different tilt groups by two different AISG connections.

For Example: Two operators sharing one TwinLine antenna but requiring independent tilt settings.

MDDU Unit – Typical Connection



CylLine Antennas

CylLine antennas are a series of monosector, base mounted antennas. CylLine is a cylindrical concealment solution containing both the antenna and line accessories such as TMAs and RETs in a single 253 mm diameter unit.

CylLine forms part of Amphenol's range of concealment antennas, which includes both street work antennas and flag poles. As a self-supporting structure, CylLine is designed for hinged roof mounting in areas where planning stipulations require a more elegant and concealed solution than unsightly poles and towers.

RF Characteristics

CylLine antennas offer identical RF characteristics to the SlimLine (and other) series of panel antennas as the core of both antenna series is identical.

Therefore:

- Identical radiation patterns
- Identical gain
- Independent Remote Electrical Tilt on each sector utilising MET or Amphenol MDCU (RET) units
- Dual-Band and Tri-Band configurations
- Removable connector access panels
- Radio-wise, a panel antenna or a CylLine antenna can be selected

Integrated RET (MDCU)

There is one module per antenna whatever the number of independent variable tilts in the antenna.

MDCU Unit (Dual RET)

In-Building / Microcell Antennas

Product Description

Amphenol Antenna Solutions in-building and microcell antennas have been deployed by network operators worldwide to provide improved coverage in office buildings, campuses, tunnels and urban canyons. Our aesthetically pleasing, low profile designs are available in an assortment of directional and omni-directional configurations giving network engineers the tools needed to optimize coverage in these difficult environments.

Innovative Wideband, Dual-Band and Tri-Band configurations are available allowing one distributed antenna system to serve multiple service providers with minimum visual impact.

- SISO OMNI Antennas (Indoor DAS)
- SISO OMNI Antennas (Public Safety)
- SISO PANEL Antennas (Indoor DAS)
- SISO PANEL Antennas (Public Safety)
- MIMO OMNI Antennas (Indoor DAS)
- MIMO PANEL Antennas (DAS)

Trio Antennas

TRIO antennas are 3-sector base station antennas concealed inside a compact cylindrical shroud. Unlike Unicell structures, the TRIO radiating sub-assemblies are not individually removable. Rather, the antenna for each sector is built directly into the TRIO mechanical structure, creating the smallest possible antenna diameter.

The product range includes Wideband, Twin-Wideband, Dual-Band and Tri-Band configurations.

TRIO antennas are RET capable and selected models are available with azimuth panning.

Accessories such as TRIO extension canisters, lightning protection kits, flag adapter kits and mounting masts are available to enhance the product offering.

TRIO Product Features

- 3-Sector base station antennas
- Wideband, Dual-Band and Tri-Band configurations
- Removable connector access panels
- Independent Remote Electrical Tilt on each sector
- Independent AZ panning available in some modules

Available Accessories

- Antenna extensions
- Hinge pedestal
- Lightning finial
- Flag pole solutions
- TMA support

Amphenol
ANTENNA SOLUTIONS

Antenna Types

Amphenol offers antennas for virtually all applications, with product ranging from 25 MHz to 6 GHz. This product guide contains antennas for InBuilding, Microcell and DAS applications.

The tables on the following pages are sorted by antenna type, then by band type, by polarization and finally by horizontal beamwidth. Below are description of the different types of

InBuilding/Microcell/DAS antennas available from Amphenol.

Microcell Ceiling Mount Omni

Low profile, inconspicuous omni-directional antennas that can be used for a variety of applications.

Microcell Ceiling Mount with Variable Azimuth/Gain

Ceiling mount antennas that can be directional or omnidirectional depending on the pin configuration.

Microcell Panel

Standard panel and shark fin type antennas for wall or ceiling mount applications. Both front and rear connector options available.

Microcell End-Fed Omni

Small and versatile end-fed omni antennas for inbuilding or outdoor applications.

Panel

V-Pol and X-Pol single, dual and tri-band panels with fixed and variable electrical tilt options.

Planar Array

Antenna in which all elements, both active and parasitic, are in one plane. May be used for directional beam control by varying the relative phase of each element.

Yagi

Multi-element highly directional antennas. Light, but strong construction for easy deployment. Available for medium duty with 150 W or heavy duty with 300 W.

Shrouded Yagi

Standard yagi antennas with all elements enclosed in a weather resistant, fiberglass shroud offering consistent, reliable performance in all weather conditions.

Tri-Sector

3-Sector base station antennas concealed inside compact cylindrical shrouds offering maximum RF performance in the smallest diameter possible. Typically deployed as lamp posts, telephone poles, flagpoles and roof-top vents.

Omni-Directional

A rugged omni-directional series featuring upright and inverted models with and without null fill and electrical tilt. Colinear and non-colinear designs available.

Dish Reflector

Designed specifically to be used as a repeater donor antenna. Offers high gain while providing high sidelobe suppression at 90° and in the entire back hemisphere.

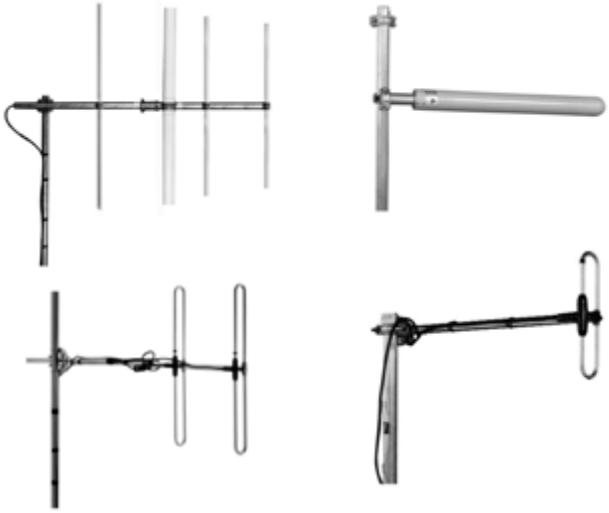
VHF/UHF & SHF Antennas

50 MHz to 1.5 GHz. Omnis, yagis, panels and stacked dipole arrays for Private Mobile Radio (PMR), Land Mobile Radio (LMR) and Terrestrial Trunked Radio (TETRA).
C & S Antennas offers a broad range of UHF, VHF and SHF antennas.

Directional Antennas

A range of Directional Panel Antennas, Stacked Dipole Array Antennas, Sector Antennas and a comprehensive portfolio of multi-element VHF/UHF & SHF yagi directional antennas. Serving markets such as PMR/ LMR /Trunked Radio, Broadcast, Air Radio, GSM-R and TETRA applications.
Produced to the highest quality standards, these robust antenna designs will ensure reliable operation in harsh environmental conditions. Low IMP rated models provide a consistently lower noise floor over the life of the antenna whilst some models are covered in a shroud ideal for in tunnel applications.

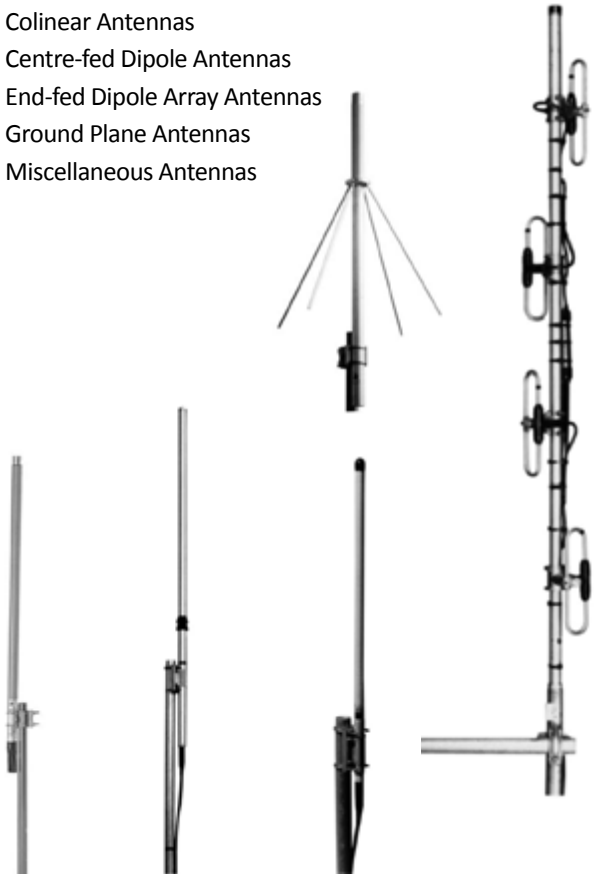
- Yagi Antennas
- Shrouded Yagi Antennas
- Stacked Dipole Array Antennas
- Directional Panel Antennas
- Sector Antennas
- Miscellaneous Antennas



Omnidirectional Antennas

Amphenol's colinear antennas are designed for deployment in VHF, UHF and SHF networks. A wide variety of options are available including gain, tilt, lightening protection and designs that have low passive intermodulation to minimize network interference.
Antennas are housed inside a high-strength glass fibre shroud and manufactured to the highest quality standard, ensuring long term, reliable operation.

- Colinear Antennas
- Centre-fed Dipole Antennas
- End-fed Dipole Array Antennas
- Ground Plane Antennas
- Miscellaneous Antennas



Indoor/Microcell Antennas (TETRA)

Amphenol's DAS, in-building and microcell antennas have been deployed by network operators worldwide to provide improved coverage in office buildings, campuses, tunnels and urban canyons. Our aesthetically pleasing, low profile designs are available in an assortment of directional and omnidirectional configurations giving network engineers the tools needed to optimize coverage in these difficult environments.
Innovative wide band, dual band and tri band configurations are available allowing one distributed antenna system to serve multiple service providers with minimum visual impact.

- Directional Antennas
- Omnidirectional Antennas

Accessories

- Phasing Harnesses
- Mounting Hardware

HF Antenna Systems (1.6-30 MHz)

C&S Antennas manufactures HF wire antennas for short, medium and long range communications. The antennas are designed for tactical, emergency and fast-reaction situations. Wires are Kevlar cored, copper braided and pvc coated with a no-kink feature. They are numbered for accurate set-up and are designed for the military environment with the solider in mind.

SOF230™ Special Forces Antenna Kit

Special Operations Forces Multi-Configurable Antenna Kit
The SOF230 antenna was designed specifically for the US Special Operations Forces for use in any environment that they may encounter. The SF230 antenna system has fifteen configurations including NVIS, Omnidirectional and Directional that cover short, medium and long range. The kit includes a counterpoise for use when poor ground conditions exist due to dry soil, such as desert conditions. The kit contains a 1:1 and 6:1 BALUN and terminating resistors that allow a broadband antenna to be erected if a tuner or coupler is not used or damaged in the field. All components are built to meet MIL-STD 810G and are extremely durable and long lasting.

MULTILITE™ Tactical Antenna (MTA)

Multi-Configuration Hf Tactical Antenna Sy
The Multilite™ Tactical Antenna system or MTA is a key element in a communication system since its deployment can be controlled by the operator to suit all operational requirements. It is comprised of seven separate antennas for seven roles:

1. Horizontal dipole – omnidirectional at short or medium-range, broadside at long-range
2. Sloping dipole – omnidirectional for short/medium-range
3. Bent dipole – low frequency ground wave
4. Inverted L – low frequency ground waves
5. Base Feed Vertical – omnidirectional for ground and long-distance skywave
6. Sloping V – directional medium-range
7. Inverted V – inverted V long-range directional

LFH-230 FANLITE™

Omnidirectional Theater Range Hf Wire Ant

The LFH-230 FANLITE™ antenna is a lightweight, transportable HF wire antenna intended for omnidirectional skywave communications to a range of about 2,000 miles, including short-range Near Vertical Incidence Skywave (NVIS) operation. Supplied in a rapidly assembled kit form, the antenna is designed for use with C&S Antennas' telescopic CARRYMAST™. When erected on one of these masts, the LFH-230 FANLITE™ may be set-up by two people in less than 25 minutes.

LONGSHOT™

Tactical Long Range Hf Wire Anten

The Longshot™ is a lightweight, transportable HF wire antenna intended primarily for long-range skywave communications. Supplied in a rapidly assembled kit form, the antenna may be erected in a variety of long wire configurations (including a low profile, jam-resistant mode) to meet contingency. The Longshot™ has a 500 Foot Sloping Vee – Long-Range, Transmit/ Receive.

Man-portable Telescopic Masts

CARRYMAST™

CARRYMAST™ is a range of lightweight, man-portable carbon fiber masts available in 9m (30 ft), 10m (34 ft), 12m (38 ft) and 15m (50 ft) standard heights. These lightweight masts are designed to be carried by one person and can be erected in the field in minutes, even under severe weather conditions. CARRYMAST™ was designed to support C&S Antennas' range of Tactical HF Antennas Systems. An assortment of adapters and accessories are available to support UHF, VHF and microwave antennas as well.

- Rapid deployment, simple operation
- Low weight
- One or two man setup
- Robust and reliable, proven in action
- No pumps or winches necessary
- Compact stowed size
- Low radar cross-section
- Ice resistant
- MIL-STD 810C and NSN listed
- Multi-antenna capable
- Ground, hardstand or vehicle

CARRYMAST™ Accessories

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational
conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

Integral Tripod

- Used for temporary roof mounting
- Folds along mast body

Tilter / Positioner

- Used to provide boresight stabilization and elevation tilt of narrowbeam antennas

T-Bar Adaptor

- Enables two antennas to be mounted at mast head simultaneously
- Straps to mast body for transportation

Half-Way Up Adaptor

- Side mounting for antenna

Microwave Antennas

0.3 meter, 0.6 meter, 1.2 meter and 1.8 meter microwave antennas.

Automobile Antennas

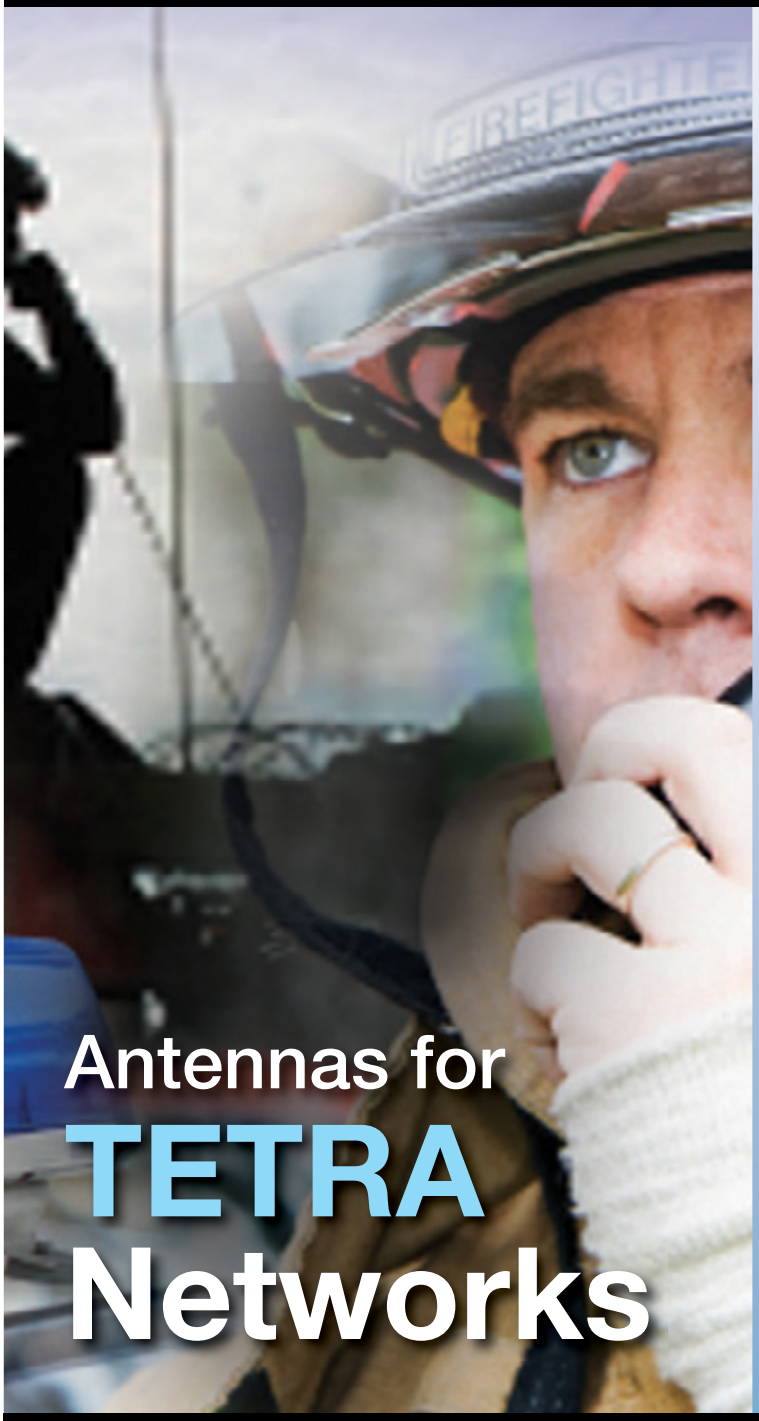
A large choice of termination styles and whip styles including ¼ wave,

½ wave, 5/8 wave and collinear to suit your specific application.

Marine Antennas

Covering the AM, FM, HF, CB, TV, VHF, UHF and Cellular frequency bands

Amphenol
ANTENNA SOLUTIONS



Antennas for TETRA Networks

Amphenol Antenna Solutions, designs and manufactures antenna technology for TETRA, PMR, Air Radio, Marine, Automobile and Broadcast industries. With over 80-years of experience, Amphenol's comprehensive range consists of 600 products serving system integrators, installer- and network operators.

Our Private Networks division offers a bespoke design service to create an antenna product that exactly matches the electrical and mechanical characteristics required by our customers, or, we can make minor modifications to existing designs, all tested in-house on our outdoor range and indoor anechoic environments.

Amphenol Antenna Solutions operates from eight strategically located manufacturing and R&D centres around the world: USA (2), Mexico, Brazil, France, UK, India and China. With teams of engineers in each regional market working directly with OEMs, operators, system integrators and installers, Amphenol remains at the forefront of relevant antenna design.

Specially designed for the base station of mobile communication system. The product are good in water resistance and reliable in connecting structure. Combining with the reasonable mechanics principle and radio frequency feature, they can be used under different circumstances. They have the features of easy in installation and reliable in connection.

RF Products

RF Connectors

Amphenol coaxial connectors for corrugated coaxial cables are available in both 7-16 DIN and N type with male and female interfaces.

Product Description

- One-piece design with O-Ring seals
- Outstanding RF performance
- Suitable for both Copper and Aluminium corrugated and smooth wall cables

Type N

Description

Named after Paul Neill of Bell Labs after being developed in the 1940's, the Type N offered the first true microwave performance. The Type N connector was developed to satisfy the need for a durable, weatherproof, medium-size RF connector with consistent performance through 18 GHz. There are two families of Type N connectors: Standard N (coaxial cable) and Corrugated N (helical and annular cable). Their primary applications are the termination of medium to miniature size coaxial cable, including RG-8, RG-58, RG-141, and RG-225.

Features/Benefits

- Accommodates a wide range of medium to miniature-sized RG coaxial cables in a rugged medium-sized design.
- Broad line of Military (M39012), Industrial (UG) and Commercial (RFX) grade products available.
- Meets many customer application demands with plug styles available in straight and right angle and jack styles available in panel mount, bulkhead mount, and receptacle.

Applications

- Antennas
- Base Stations
- Broadcast
- Instrumentation
- Microwave Radio
- Mil-Aero
- PCS
- Radar
- Radios
- Satellite Communications
- Surge Protection
- WLAN

7/16

Description

The 7/16 series name derives from the metric dimensions of the connector interface: 7mm OD of inner contact, 16 mm ID of outer contact. 7/16 connectors are designed for use in communications systems with power levels of 100 watts per channel. Long popular in Europe, the 7/16 interface has gained acceptance in the U.S. for its ability to operate at elevated power levels. There are three families of 7/16 DIN connectors: corrugated cable (both Annular and Superflex), standard cable connectors, and custom. RF coaxial connectors are the most important element in the cable system. Corrugated copper coaxial cables have the potential to deliver all the performance your system requires, but they are often limited by the performance of the connectors. Corrugated connectors have been designed from the ground up to deliver optimum performance, while retaining ease of installation. Inter-modulation distortion, a major concern in today's communications systems, is consistently low with these connectors.

Features/Benefits

- Low IMD and VSWR
- Self-flaring design ensures ease of installation
- Pre-assembled gasket protects against dust (P68) and water (IP68) per IEC 169
- Limited internal junctions reduce sources of IMD
- Silver-plated contacts and silver or white
- Bronze-plated bodies deliver a high conductivity and corrosion resistance for a long, trouble-free life
- Easy-Hex coupling nut allows tightening by hand or with a standard wrench for ease of mating

Applications

- Antennas
- Base Stations
- Broadcast
- Jumper Assemblies
- Lightning Protection
- Satellite Communications

RF Panel Mount Connectors

- Different designs for pin termination
- Waterproofing IP68
- Broadband performance covering all wireless service band
- N and DIN types are available

Coaxial Feeder Cables

Product Description

Flexible and Super flexible Copper & Aluminium RF coaxial feeder cable.

Available Types

- Low-loss Copper or Aluminium – Standard & Fire Retardant versions available
- Super flexible Copper or Aluminium – Standard & Fire Retardant versions available

Sizes

- 1/4", 3/8", 1/2", 7/8", 1-1/4" and 1-5/8".

Jumper Cables

Amphenol's range of jumper cable assemblies are designed for outdoor applications under extreme conditions with high flexibility and small bending diameters.

Product Description

- Excellent VSWR and PIM performance covering all wireless telecommunication frequency bands
- A complete product range available utilising a wide range of coaxial connectors and cables in standard or customised lengths
- IP67 Protection Rating
- High Strength & Flexibility
- Over moulded Boots

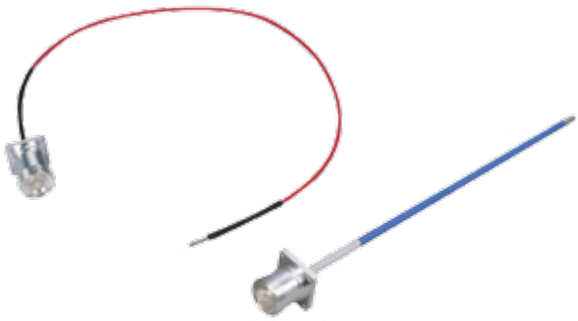
RF Incabinet Jumpers

- Excellent VSWR and PIM performance
- Using flame retardant cable
- Soldering assembly design
- In BTS cabinet application

RF Feeder Jumper Cables

- Excellent VSWR and PIM performance covering all wireless service band
- Complete product range ---- available for any cable type & length with a various connector combination
- Waterproof per IP67 water immersion testing

Jumper Cables & Superflex Jumper Cables



RF Pig Tail Jumpers

- 100% PIM performance testing
- Automatic soldering assembly
- Apply to wireless base station antenna

Surge Arrestors

Product Description

Protect cell sites against overvoltage damage with coaxial surge arrestors.

Available Types

- ¼ Wave Stub Surge Arrestors
- Gas Tube Surge Arrestors
- Hybrid Surge Arrestors

Available with N and DIN 7-16 interfaces

Couplers & Splitters

Product Description

Amphenol offers RF passive products such as couplers and splitters. These products feature broadband characteristics covering all wireless service bands with outstanding RF performance, high isolation low insertion loss and low VSWR. Couplers and splitters are available with SMA, N and DIN type connectors and are fully weather-proofed to satisfy class IP67.

Tower Mount Amplifiers

Product Description

Tower Mounted Amplifiers (TMAs), also referred to as Mast Head Amplifiers (MHA) or Low-Noise Amplifiers (LNAs), reduce the over-all system noise figure of a cell site and provide increased uplink sensitivity.

System noise figure reductions of 2–3 dB are typical, resulting in improved in-building penetration, higher call quality, fewer dropped calls, higher data rates and longer mobile battery life.

Amphenol's TMAs are housed in strong, weather-proof enclosures, utilize highly de-rated electronic components, and include internal lightning protection to insure trouble free operation.

Diplexers & Triplexers

Product Description

Diplexing & Triplexing filters from Amphenol allow operators to combine multiple carrier frequencies onto a single run of coax, resulting in reduced cost, lower wind-loads and reduced weight. Amphenol offers low insertion loss designs capable of withstanding high transmit power and providing low IM performance.

Housed in rugged, weather-proof enclosures, Amphenol filters are field proven to provide reliable service in harsh, tower top environments. Careful attention to materials and finishes in combination with high production standards insures long term, trouble free performance.

Indoor Earthing Kit, Clamp Type

Earthing Kits

Product Description

For Outdoor & Indoor Applications for the complete range of feeder cable sizes.

Indoor Earthing Kit, Clip Type

Outdoor Earthing Kit – Strap Type

Outdoor Earthing Kit – Spring Type

Standard Cable Clamp

Cable Clamps

Product Description

Standard Cable Clamps & Leakage Cable Clamps

- Standard cable clamps supplied in 1, 2, 3, 4, & 6 Way for the complete range of feeder cable sizes
- Leakage cable clamps supplied for 7/8", 1-1/4" & 1-5/8" cable sizes

Leakage Cable Clamp

Attenuators	AISG Cable Assemblies	AISG Lightning Arresters
		
DC Blocks	**7/16 & N-Type Calibration Kits**	**Testing Adapters**
		
Testing Jumper Cables	**Testing Loads**	**Fibre Optic - Remote Radio Head**
		

Additional BTS Accessories

Product Description

Amphenol Antenna Solutions offers a complete range of accessories for BTS installations.

All products are professionally manufactured to international standards while being cost effective at the same time.

Hybrid Cell Tower Cables
Power + Optical

Support Next-Generation Wireless

Whether you are installing new or upgrading with wireless remote radio heads (RRHs), you need to reduce installation costs, boost performance to support 4G broadband, and ensure long-term reliability in a scalable solution to future-proof your investment.

Hybrid cables from Times Fiber simplify tower cabling by providing power and optical connectivity in a single cable.

- **Flexible Configurations.** Get the right mix of power and optical for your tower
- **High Performance.** Support the latest 4G protocols, such as LTE
- **Economical.** Lower installation costs by running one cable instead of multiple cables
- **Rugged.** Tough, sunlight-resistant PVC jacket
- **Lightweight.** Significantly lighter than designs using corrugated metal shielding, our cables allow easier installation and less tower loading
- **Complete.** Install faster with factory-terminated assemblies built to your specifications
- **Customizable.** Specify other configurations of conductor counts, cable types, or shielding— with fast-turn delivery

Configuration	Power Conductors	Single-Mode Optical Fibers
Hybrid 3 x 3	6 (3 pairs)	6 (3 pairs)
Hybrid 3 x 6	6 (3 pairs)	12 (6 pairs)
Hybrid 5 x 6	10 (5 pairs)	12 (6 pairs)
Copper Power Cable Conductor Options		
Type I: 10 AWG for lengths under 50 m Type II: 8 AWG for lengths greater than 50 m		

Power Cables

Powering Next-Generation Wireless

Deliver power efficiently to new or existing telecommunications sites, while reducing installation costs, boosting performance, and ensuring long-term reliability.

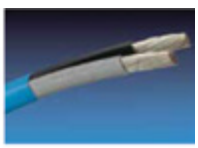
Power cables from Times Fiber deliver DC voltages reliably and efficiently to remote and indoor equipment. Special design features simplify installation and reduce space requirements.

- **Flexible Configurations.** Get the right mix of power conductors for your tower
- **Better Use of Spece.** Square conductors lay and tuck easier, allowing better routing
- **Economical.** Lower installation costs using more fexible round high-count conductors
- **Rugged.** Choose from a variety of jacket types or with optional shielding
- **Versatile.** Have products shipped on reels, drums or as coils
- **Complete.** Install faster with factory-terminated assemblies built to your specifcations
- **Customizable.** Specify other confgurations of conductor counts, cable types, or shielding—with

fast-turn delivery

Single Round

Dual Round



Dual Square

Configuration	Conductors	Power Cable Options
Single Round, 600 V	Bare Copper 4 AWG to 3/0 AWG (25 mm^2 to 95 mm^2)	Indoor Double Halogen-Free Battery Cables Indoor Double PVC General-Purpose Cables
Dual Round, 600 V	Tinned Copper 14 AWG to 6 AWG (2.5 mm^2 to 16 mm^2)	Indoor Plenum UL Type CL2P Double PVC Plenum
Dual Square, 100 V/600 V	Tinned Copper 14 AWG to 6 AWG (2.5 mm^2 to 16 mm^2)	Indoor and Outdoor Halogen-Free Thermoplastic, Shielded Indoor Double PVC General-Purpose Cables

RF CONNECTORS

Product Features:

- One piece pin design
- O ring seals
- Outstanding RF performance
- N and DIN types are available
- Suit for both copper and aluminium cables

1 5/8″ DIN Female

1 5/8″ N Male

1 1/4″ DIN Female

3/8″ N Male

1/2″ DIN Female

7/8″ DIN Male

LMR400 DIN Male

LMR600 DIN Female

LMR400 DIN Female

LMR600 DIN Male

1/2″ N Male

1/4″ N Male Angle

1/2″ DIN Male Angle

Amphenol Compression Connector

- ◇ Compression instead of screwing connector assembly will not generate any metal scratch which will impact PIM performance for the jumper.
- ◇ All-metal design of compression connector offers excellent long term performance.
- ◇ Technical friendly tools make the jumper installation ease. Manual and automatic methods are optional for cable trimming tool.
- ◇ Full range of compression connectors are available for different brands cable.
- ◇ Waterproofing system solution provides one step installation to achieve IP68 performance.

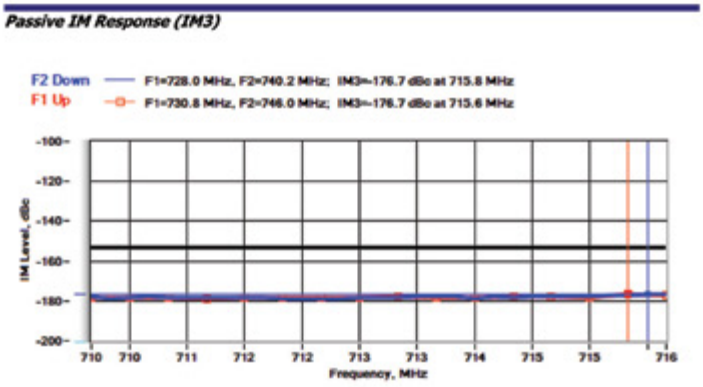
Electrical Specification

Item		DIN Type	N Type	4.1/9.5 Type
Impedance(Ω)		50		
Frequency Range		DC-3GHz		
VSWR		≤1.05		
PIM(dBc)		≤-165(2×43dBm)		
Insertion Loss(dB)		≤0.05		
Insulation Resistance(Ω)		≥10000	≥5000	≥5000
Proof Voltage(V)		3000	2500	3000
Conductor Resistance(Ω)	Outer	<0.2	<0.4	<0.4
	Inner	<0.8		

Mechanical / Environmental Specification

Item	DIN Type	N Type	4.1/9.5 Type
Nut Torque	20N.m	5N.m	10N.m
Tensile Force(Cable-Connector)	500N		
Torsion(Cable-Connector)	5N.m		
Temp. Range	-40°C~+85°C		
Weather Standard	IEC 60068 40 / 085 / 21		
Thermal Shock	IEC 60068-2-14-Na		
Vibration	IEC 60068-2-6-Fc		
Shock	IEC 60068-2-27		
Waterproofing Standard	IP68		
RoHS Compliant	Yes		

PIM Performance at 700MHz



Push on the boot

Protection up to IP68

Waterproofing System Solution for ACC Jumper

Amphenol Türkiye&MiddleEast
www.amphenol.com.tr
sales@amphenol.com.tr

LMR® Bundled Cable

ISO 9001 Certified

High Quality LMR® Low Loss Flexible 50 Ohm Coax Feeder Cable, Bundled Under a Common Outer Jacket for Multiple Run Applications:

- *Smart Antenna Feeders*
- *IF & RF Runs to Tower Mounted Amplifiers for:*
  - *— Cellular*
  - *— Point to Point*
  - *— Broadband Wireless*
  - *— Microwave Backhaul*
  - *— WiMax*
  - *— LTE Systems*

LMR® Bundled Cable is a spiral configuration of multiple LMR®-400 or smaller LMR® cables under a common polyethylene outer jacket. This innovative design acts as the perfect feeder cable for applications requiring multiple runs, such as on towers or building top sites. A unique, patented grounding fixture grounds the outer shields of each cable and a rugged end cap seals the bundle to prevent moisture ingress at the break-out point.

LMR® Bundled Cable can be supplied as complete assembly with break outs and connectors on both ends, and as a single ended assembly (base can be trimmed and terminated after installation on tower), or as a raw cable and accessories along with easy to use tools. Pictorial instructions and installation videos are available to assist in the installation of the accessories.

Features and Benefits:

- Less Cable Runs
- Fewer Ground Kits and Cable Clamps to Install
- Reduced Labor and Material Costs
- Rip cord for easy removal of outer jacket
- Inner cables labled with an identifier every six inches
- Standard Cables Include:
  - LMR-BC240-4
  - LMR-BC240-9
  - LMR-BC240-9-LW-75
  - LMR-BC-240-12
  - LMR-BC300-12
  - LMR-BC400-7
  - LMR-BC400-9
  - LMR-BC400-9-DB

Consult factory for other or custom configurations.

Amphenol Türkiye&MiddleEast

www.amphenol.com.tr
sales@amphenol.com.tr

The Leader in phase stable cables and assemblies
The Leader in low loss cables and assemblies
The Leader in test cables
The Leader in lightning & surge protection

TMS/Amphenol is the leader in the design, qualification, manufacture, and on-time delivery of high performance cable and cable assembly products to the commercial wireless and military marketplace. In 2003, TMS was selected by Lockheed Martin Aeronautics to supply the Broadband Airborne Cable Assemblies on the F-35 Joint Strike Fighter (JSF). TMS was chosen to supply this solution since its high performance cable assemblies are able to handle high-speed data in extreme avionics environments including wide variations in temperature and pressure.

Coaxial Cables

Amphenol

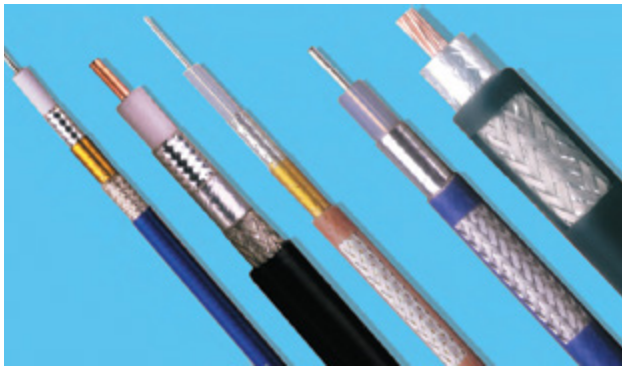
TIMES MICROWAVE SYSTEMS
An Amphenol Company

TMS/Amphenol was instrumental in the development of military specifications, including MIL-C-17 for coaxial cables and MIL-T-81490 for Transmission Lines. Times is the leading source of MIL-C-17 qualified products, holding more QPL's (Qualified Product Listings) than any other manufacturer, and Times products meet rigorous MIL-T-81490 and MIL-C-87104 requirements.

Times LMR cables are high performance broadband, flexible, low loss 50 Ohm coaxial communication cables designed for use in wireless applications

TFC FIBER COMMMUNICATION
An Amphenol Company

TFC/Amphenol is recognized worldwide as one of the pioneer developers of broadband cable technology and has to its credit a long list of technical expertise in foam polymer processing, application-specific product development, and unsurpassed, world-class customer service and support.



RG Cables

M17/RG

Features & Benefits

- Meets all MIL-C-17 Requirements
- Good Shielding Effectiveness
- Low Passive Intermod (PIM)
- Readily available in Distribution
- Uses Standard Connectors

M17/RG's are traditional MIL Spec coax cables that were born 50-60 years ago. Originally created to support WWII military applications, these cables quickly became the products of choice for commercial wireless applications once they hit the surplus market, and continue to be used today.

M17/RG's have been widely adopted for commercial and military applications. Their QPL stature insures a high quality product made to the same spec regardless of the manufacturer.

LMR

Flexible Low Loss Communications Coax

Ideal for...

- Drop-in Replacement for specific RG cables (uses standard connectors)
- Jumper Assemblies in Wireless Communications Systems
- Short Antenna Feeder runs
- Any application (e.g. WLL, GPS, LMR, WLAN, WISP, WiMax,SCADA, Mobile Antennas) requiring an easily routed,low loss RF cable

Armored Assemblies

Armored versions of many cable types are available as custom cable assemblies. Armored cable assemblies are available in the Miltech, Silverline, and TCOM product lines, as well as others. Available armor types include a range of thick wall flexible jacketing, flexible wire reinforced with extruded thick wall jackets, and full metal coverage crush resistant square-lock styles with various outer jacket types.

LSRG Military Shipboard Coax

MIL-C-17 Qualified

- MIL-Spec Air Frame, Shipboard, Ground (Tactical) Interconnect (M17/180–/200)
- Fire Retardant / Low Smoke (non-halogen)
- Flexible For Easy Deployment / Routing

Features & Benefits

- Rugged Abrasion Resistant Jacket
- Excellent Shielding Effectiveness
- Fire Retardant (non-halogen)
- Light Weight
- Flexible for Ease of Deployment
- Excellent Connector Selection

CATV

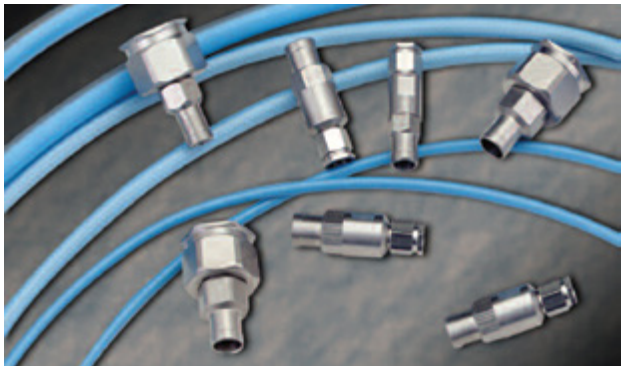
The low smoke CATV cables are designed to provide a low loss shipboard entertainment system interconnect, yet meet the rigid shipboard requirements per MIL-C-17 “G”. Detailed data sheets are available upon request.

TFlex®

Flexible Alternative to Semirigid Coax for Military and Commercial Applications including, Low Loss Microwave and Wireless Base Station Interconnects.
Developed over ten years ago as a lighter weight, flexible alternative to semirigid coax, TFlex® has been widely adopted for both military and commercial communication systems. Its Teflon FEP jacket provides excellent protection in corrosive environments and its flexible nature eliminates the need for hand or precision machine bending. Following the most convenient routing, TFlex® can be preterminated to its desired length and can then be just “plugged in”.

Features & Benefits:

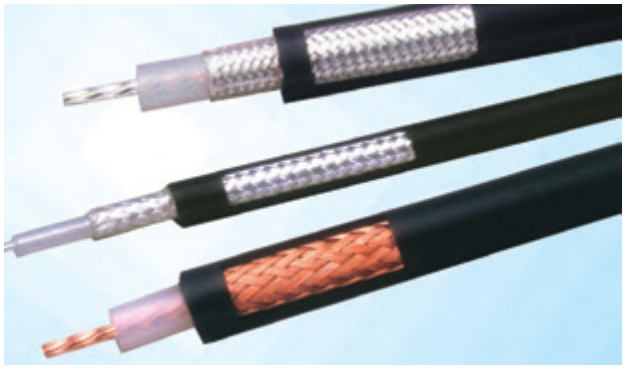
- Meets all MIL-C-17 Requirements
- Excellent Shielding Effectiveness
- Low Passive Intermod (PIM)
- Stable Loss, Phase and VSWR vs. Flexing
- Uses Standard Solder-on Semirigid Connectors



HELIFOIL

Flexible, High Power Interconnect and Jumper Cables for Military/Aerospace and Commercial/Telecom Applications.

HELIFOIL™ ultra low loss, flexible microwave coaxial cable and assemblies provide excellent performance over the DC-18 GHz frequency range. HeliFoil cable comes in three different sizes, with options of stranded center conductors for better flexibility. All sizes provide lowest attenuation, excellent phase stability, broad operating temperature range and high power handling making them a good choice for interconnect and testing applications in both field and laboratory conditions.



LSSB™

Low Smoke - Non-Halogen Military/Aerospace Coax
MIL-Spec Air Frame, Shipboard, Ground (Tactical)

Features & Benefits

- Rugged Abrasion Resistant Jacket
- Excellent Shielding Effectiveness
- Fire Retardant (non-halogen)
- Light Weight
- Flexible for Ease of Deployment
- Excellent Connector Selection

LLSB

Low Loss Military/Shipboard Coax

MIL-C-17 Qualified

- Low Loss Air Frame, Shipboard,
- Ground (Tactical) Interconnect
- Fire Retardant / Low Smoke (non-halogen)
- Flexible For Easy Deployment / Routing

Features & Benefits

- Lower Loss
- Superior Shielding

Effectiveness

- Fire Retardant (non-halogen)
- Light Weight
- Flexible for Ease of Deployment
- Excellent Connector Selection

Waterblocked, Low-Smoke Triaxial Cables

For applications that require watertightness in addition to the performance requirements of the LS/LT designs, Times is qualified to the M17/134 and M17/135 designs. These triaxial designs meet the 25 psi-6 hour watertightness test, as well as the 1000 psi-2 hour hydrostatic tests that are requirements of MIL-C-17.

Broadband Cables

T10 & TX10 Hardline Cable Solutions

The T10 & TX10 Hardline cable line is constructed with seamless extruded tube. TFC's T10 & TX10 cable will outlast the standard welded tube cables. This cable is designed to eliminate pinhole leaks and micro-cracking. This cable line can be used with industry standard coring tools and connectors.

Features

- Clean coreability and preparation
- Triple bonded
- Tighter bend radius than double bonded cable
- No air gap. eliminates a common path for moisture found in double bonded cable
- Prevents inner conductor pull-out (suckouts) as result of temperature swings.
- Eliminates outer sheath shrink-back due to temperature cycles.
- Works with all industry standard coring tools and connectors
- NEC 820 CATV & CATVR listings available
- Recyclable reels and packaging
- Seamless Extruded Aluminum Tubing

PhaseTrack Cables

Times Microwave TF4 dielectric material is the key ingredient, making our PhaseTrack products the best choice for phase critical interconnect applications.

PhaseTrack cable dielectric has been developed to eliminate the "PTFE knee" in the phase/temperature performance of cables for phase-critical applications.

The PhaseTrack flexible cable product line is available in a range of sizes using TF4 dielectric.

SiO2 Phase Cable Assemblies

SiO2 Semi-Rigid cable assemblies provide formable phase stable performance using materials developed specifically for use in applications where repeatable phase performance is critical. In short, matched TMS SiO2 cable assemblies exhibit the best phase-tracking performance available.

Work with your Times Military/Aerospace Regional Applications Engineer to get the SiO2 Semi-Rigid assembly configurations you need.

The SiO2 product line consists of cables sized from 0.090 to 0.270 inches in diameter.

QEAM

The ultimate cable design for field deployable applications is the QEAM (Quick Erecting Antenna Mast) cable. This cable series is designed specifically for use in demanding, mission critical applications, where reeling and unreeling are required over a wide temperature range. Its performance has been proven on systems such as the Hawk and Patriot Missile. The use of a taped PTFE dielectric results in exceptionally low bending moment and long bend life (typically more than 10,000 bends, depending upon radius, etc.). In the larger sizes, use of a composite center conductor further improves bend properties. Based on our MilTech aerospace cable assemblies, these assemblies are fully weather sealed and constructed in accordance with the requirements of MIL-T-81490.Heavy duty stainless steel connectors provide long term corrosion resistance and ruggedness. Qeam cables are sold only as finished assemblies, tested over the required frequency band and fitted with hoisting grips or otherwise customized to the requirements of the application.

MaxGain

DC-18 GHz Ultra Low Loss Coaxial Cable and Connectors

- Times Unique Spiral Outer Conductor Technology
- Lighter Weight Compared to Competing Technologies

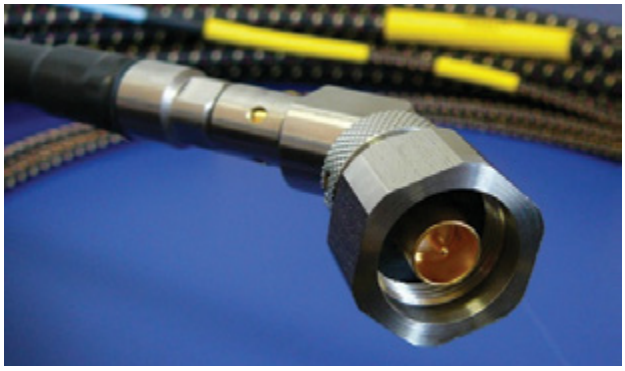
MaxGain™ ultra low loss, flexible Microwave Coaxial Cable and a full range of passivated stainless steel connectors are available as fully tested custom cable assemblies.
MaxGain™ assemblies are used for general applications in both field and laboratory conditions. They are ideally suited for applications where lowest loss and good stability with bending is required.

Features & Benefits:

- Lowest Insertion Loss Available, DC - 18 GHz
- Ultra Stable Insertion Loss and VSWR with Flcxing
- With wide Temperature Range (-65”C to + 150”C)
- Extremely Flexible, Low Minimum Bend Radius
- Superior Shielding Effectiveness (> 100 dB)

TCom®-LS

Low Loss Coaxial Cables
For applications that require repeated flexing and the need for excellent electrical performance, the TCOM-LS series offers a non-halogen, low smoke alternative to the more rigid MIL-C-28830 corrugated copper designs.



Miltech Cables

This is our high performance workhorse series in the MilTech™ product line. These rugged, low insertion loss, broadband (0.5-18GHz), vapor sealed, cable assemblies with braided Nomex™ outer jackets for abrasion resistance, are qualified to MIL-T-81490 and MIL-C-87104/2 requirements.

Cable sizes from 0.13" dia up to 0.65" diameter provide a wide range of cables - allowing you make the appropriate loss/size/weight trade-off. Replaceable connectors allow field maintenance, and enhanced versatility. Vapor sealed cables provide long life in extreme environments. The MilTech™ cables are "inherently ruggedized," and are engineered using the basic cable design and construction to enhance the handling characteristics of the finished assemblies. Captivated contact terminations provide long-term interface stability. These assemblies were designed from the ground up to provide reliable microwave connections you can count on.

SFT

High Performance Microwave Coaxial Cable, Connectors and Assemblies

SFT™ - Strip Flex Taped

- Low Loss
- Flexible
- Rugged
- High Temperature
- High Power Handling
- Sizes from — SFT-316 (0.120") to SFT-600 (0.565")

SFT™ high performance microwave cables are rugged and flexible, making them ideal for interconnect applications from inside LRU's to system interconnects and antenna feeders in military and commercial systems. The wide range of available connectors covers many interface types and frequency ranges.

Features & Benefits:

- Much lower loss than solid dielectric cables
- Superior shielding effectiveness >100 dB
- Stable Loss, VSWR and phase with flexing
- Available as fully tested, custom cable assemblies

SilverLine Test Cables

SilverLine™ Test Cables are cost effective, durable, high-performance cable assemblies designed for use in a broad range of test and interconnect applications. Fabricated from rugged, solid PTFE dielectric cable with stainless steel connectors and a proven strain relief system, these cables provide long life and excellent stability in applications where they are repeatedly flexed and mated/unmated. SilverLine™ test cables are ideal for use in production, field and laboratory test environments. They're also economical enough to be used as interconnects in test systems.

Features and Benefits:

- Phase & Loss Stable
- Long Flex Life
- Triple Shielded Cable
- High Mating Cycle, Stainless Steel Connectors
- Rugged, Solder/Solder Attachment
- Redundant, Long Life Strain Relief System

Silverline Cable Types:

- BronzeLine Test Cables
- SilverLine-LP Low PIM Test Cables
- SilverLine-VNA Network Analyzer Test Cables
- SilverLine-SF Super Flexible Test Cables
- SilverLine-XF Extra Flexible Test Cables
- SilverLine-LL Low Loss Test Cables
- SilverLine-TT Temperature Testing Test Cables
- SilverLine-75 75 Ohm Test Cables
- SilverLine-DAS Low PIM DAS & Component Test Cables
- SilverLine-LPA Low PIM DIN, Mini-DIN and Type N Test Adapters

T-LNC

50 and 75 Ohm Low Noise High Performance Cables

- Stable low noise performance
- Reduced mechanically induced electrical noise
- Stranded center conductor for flexibility
- Semi-conductive layering technology
- Ruggedized polyurethane or PVC jacket
- 80° C rated

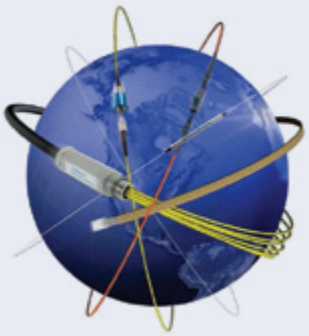
T-LNC-300-50-PUR
T-LNC-240-75-PVC

Vibration monitoring and wear detection for:

- Aerospace
- Oil & Gas
- Transportation
- Public Utility
- Machinery
- Non-Destructive Testing

Applications:

- Accelerometers
- Strain gages
- Transducers
- Low voltage signaling in high vibration

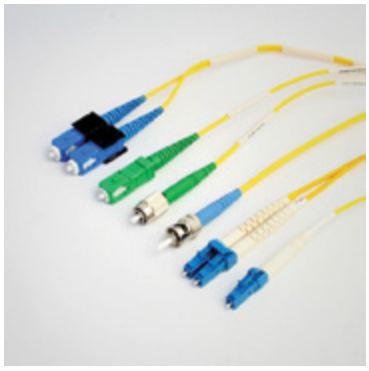


Amphenol Fiber Optic Products is a premier manufacturer of optical interconnect products. Headquartered in Lisle, Illinois, the company is a division of Amphenol Corporation, a Fortune 500 company with over eighty years of experience in providing total interconnect solutions to customers throughout the world.

Fiber Optic Solutions

Indoor Cable Assemblies

Amphenol is a premier manufacturer of a full line of indoor assemblies for the Telecommunications, Datacommunications, and Medical applications. Available in a variety of connectors, fiber and cable construction types Amphenol assemblies meet or exceed many of the industry standards for indoor cable assemblies. Patchcords and Trunk cables are available in custom configurations and lengths.



Indoor Single Mode Cable Assemblies

Amphenol is a premier manufacturer of Singlemode patchords in the telecommunications industry, meeting or exceeding many of the industry standard requirements for optical transmission loss, reflectance, visual endface specifications, and geometry. Amphenol offers standard patch cords in a variety of configurations and connector types. Both standard SMF-28e and bend reduced fiber types are available. Custom options are available upon request.

Features/Benefits

- Available in a wide variety of connector types, cable designs, and lengths
- All assemblies meet TIA/EIA and IEC intermateability standards
- Duplex assembly version utilizes a removable flexible clip providing a float between channels A and B
- RoHScompliant
- Multiple boot size, colors and angle options available
- Assemblies are available in standard SMF-28e and Bend reduced fiber types .
- Custom configurations available upon request

Indoor Multimode Cable Assemblies

Amphenol is a premier manufacturer of Multimode patchords in the telecommunications industry, meeting or exceeding many of the industry standard requirements for optical transmission loss, visual endface specifications, and geometry. Amphenol offers standard patch cords in a variety of configurations and connector types. Multimode assemblies are available in a variety of fiber types; 62.5/125, 50/125, 50/125 OM3, 50/125 OM4, and Bend reduced OM3/ OM4.

Features/Benefits

- Available in a wide variety of connector types, cable designs, and lengths
- All assemblies meet TIA/EIA and IEC intermateabilitystandards
- Duplex assembly version utilizes a removable flexible clip providing a float between channels A and B
- RoHScompliant
- Multiple boot size, colors and angle options available
- Assemblies are available in OM1, OM2, OM3, and OM4 fiber types
- Assemblies are available in OM1, OM2, OM3, and OM4 fiber types
- Custom configurations available upon request

MSFP Patchcords

Specifically designed for Brocades FC8-64 port blade, Amphenol's mini LC assemblies are available in many cable configurations. The mSFP cables support a higher rack density and are offered with laser optimized OM3 cable.

- Custom assemblies for use exclusively on Brocade equipment with mSFPs
- Small form factor LC connector enables high panel densities
- Laser optimized 50/125 OM3 multimode aqua cable for higher bandwidth capabilities
- Mini LC connectors to be installed on Brocade mSFPs are distinguished by black boots and clip
- Available in a variety of lengths and configurations
- RoHS compliant

Indoor Trunk

Multifiber assemblies and trunk cables are becoming increasingly popular in the high density marketplace. Amphenol provides assemblies in various fiber counts with distribution, loose tube, breakout, or ribbon cable styles. Multifiber assemblies can be terminated with standard connector styles or with the high density MPO connector.

MPO Cable Assemblies

MPO assemblies are becoming increasing popular due to the high density applications in the marketplace. MPO assemblies are offered with 8,12, and 24 fiber connector options. Available with ribbon, round, and trunk cable configurations, Amphenol's MPO connectors meet TIA/EIA 604-5 and IEC 61754-7. MPO assemblies are offered with straight, crossed, or QSFP pin outs. Please contact Amphenol for assistance with configuring the required cable assembly.

MPO QSFP Cable Assemblies

Amphenol's QSFP (Quad Small Form factor Pluggable) with 4TX and 4RX channels meets QSFP requirements up to 10Gb/s per channel for a 40G interface. Available in both MPO to MPO or MPO to LC breakout configurations, Amphenol's MPO connectors meet TIA/EIA 604-5 and IEC61754-7.

Medical Cable Assemblies

Amphenol's custom medical cable assemblies are designed specifically for the customer's intended applications and can be designed to be medical grade class VI. The Amphenol designed SMA connector can be utilized for the air gap ferrule technology to eliminate energy absorbing materials near the fiber end face such as epoxies, connector materials, and coatings. The connector ferrules can be made of stainless steel, beryllium copper, or other customer specified material. The ferrule is used as a heat sink pulling the heat quickly away from the fiber. Damage threshold on these assemblies will vary based on launch conditions and operational wavelength.

Each cable assembly goes through several inspections during the fabrication process, which include extensive material and optical inspection. The extensive inspections begin prior to production and continue throughout the entire production cycle, allowing highly exceptional product to be produced and delivered on time, the first time, without delays.

905 & 906 SMA Connectors

Amphenol Fiber Optics was a pioneer in developing the first industry standard fiber optic interconnect system by introducing the SMA connector. The 905 and 906 series were the first fiber optic interconnect system to gain industry wide acceptance for military, industrial, data communications and medical applications, before fiber was ever used for telephony.

Today, Amphenol Fiber Optics continues to support these markets with a wide variety of products that meet the continuing need for the family of SMAs. The SMA connector family utilizes a threaded coupling nut system for mating and de-mating. Available with zirconia or stainless steel ferrules with custom hole sizes, the SMA is an excellent choice for a robust, lowcost and reliable system.

Unlike any other connector on the market and as shown on page B-4 of this section, the SMA has a wide range of accessories such as adapters, receptacles, boots, etc. that make it the perfect choice for any sort of experimental or R&D type application. FOC stocks many of these items and can assistant your design.

FOC has the world's largest and most varied inventory of SMA connectors. If we do not have the hole size you are looking for, we can typically have it drilled out in 2 weeks or less and have production quantities in 6 weeks or less.

- **905 SMA Connector**
- **905 Ceramic Ferruled SMArt Connector**
- **905 Polymer Bodied SMA Connector**
- **906 SMA Connector**

905 SMA Damage Resistant FiberGrip® Connector

The 905 SMA Damage Resistant FiberGrip® Connector is a simple to use, epoxyless, interconnect solution for markets where High-Power Delivery is required. This two-piece connector is designed as a safe and cost effective alternative that allows for efficient ease of use during termination.

Amphenol's Damage Resistant FiberGrip® Connector are designed for high power applications and utilize air gap ferrule technology. The air gap ferrule technology eliminates energy absorbing materials near the fiber end face such as epoxies, connector materials, and coatings. The connector ferrules can be made of stainless steel, beryllium copper, or other customer specified material. The ferrule is used as a heat sink pulling the heat quickly away from the fiber. Damage threshold on these types of connectors will vary based on launch conditions and operational wavelength.

The front body of the connector is a ferrule that is designed with a custom, high-tolerance, application specific hole diameter. The rear body contains the proprietary fiber retention system designed to carefully secure the optical fiber, without the risk of damage, to the connector.

Amphenol's accelerated design and development cycle allows for rapid response to the client's custom requirements. Amphenol Fiber Optic Products is dedicated to supporting each customer by providing exceptional quality and long-term reliability of the SMA FiberGrip® connector.

Features/ Benefits

- Quick and Safe Epoxyless Termination
- Designed for use with High-Power Medical Laser Delivery Systems
- Able to be Sterilized through Autoclave
- Available Custom Optical Fiber Hole Sizes and Ferrule Tip Configurations
- Strain Relief Boots and Dust Caps Available with Medical Grade Material
- Compatible with RFID Integrated Technology

Outdoor Cable Assembly

Amphenol's sealed outdoor assembly products offer many solutions to help connect equipment and services in rugged outdoor or industrial environments. Offering industry standard assemblies as well as custom engineered solutions, Amphenol's offering will ensure continued system performance while protecting valuable equipment from the elements.

AARC

CAP, DUST W/CHAIN, AARC RECEPT

Dust cap, AARC Plug, Plastic with 160mm chain For more detailed information and customized options please contact Amphenol customer service for assistance.

Jumper, AARC (2 fiber Plug) to LC Duplex, Singlemode Outdoor

PT/LC

RECEPTACLE, PT/LC, BAYONET

Receptacle, PT/LC, Bayonet, Rear mount jam nut style For more detailed information and customized options please contact Amphenol customer service for assistance.

PT/MPO

ADAPTER, PT/MPO to LC

Receptacle, PT/MPO, Front mount jam nut style For more detailed information and customized options please contact Amphenol customer service for assistance.

ADAPTER, PT/MPO to PT/MPO (In-Line)

Receptacle, PT/MPO, In-Line Jam Nut Mount For more detailed information and customized options please contact Amphenol customer service for assistance.

R2CT

The R2CT Field Installable Weatherproof Cable Gland is designed as a cost effective means of providing a removable interface for applications requiring protection from wet or dirty environments. The R2CT allows for quick and easy installation onto either Optical LC or RJ45 style outdoor cable assemblies. The system can be field assembled over previously deployed optical duplex LC or RJ45 Ethernet cable assemblies. Factory terminated cable assemblies with the R2CT connector housing pre-installed are available for faster implementation and IP67 sealing in new deployments. The R2CT allows direct mating to edge mounted active devices or as a sealed feed-thru to adapters or internally mounted devices. The R2CT Gland is also suitable for use as a feed-through interface for other type power, signal and fiber applications. Amphenol's R2CT Field Installable cable glands are exceptionally suited for WiMax, LTE, wireless, and base station applications.

- **R2CT Plug Kit, Optical -Long**
- **R2CT Plug Kit -RJ45 Short**
- **Receptacle, R2CT with Metal Sealing Dust Cap**
- **Receptacle, R2CT with vinyl shipping dust cap**

Service Cables (Node Cables)

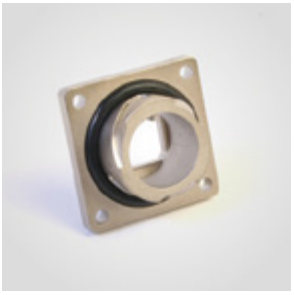
Amphenol's Service Cable Assemblies are primarily used to link the fiber optic transport cable directly to the fiber optic processing equipment. This connection is critical and requires an environmental seal between the cable and the node housing. Amphenol's Service Cables utilize a unique feed-through adapter, featuring an anti-twist coupling body. The anti-twist feature, allows the coupling body to be secured to the outdoor housing, without twisting of the cable. Amphenol's Service Cables also use a fully water blocked loose tube cable, with either armored or non-armored versions available. Assemblies can be equipped with a variety of breakout lengths, fan-out types or connector options.

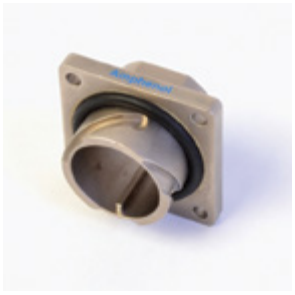
Plastic Feed-Through Adapter

For more detailed information and customized options please contact Amphenol customer service for assistance.

Standard Feed-Through Adapter

For more detailed information and customized options please contact Amphenol customer service for assistance.





TxRx Group

Description

The 957 series Harsh Environment Interconnect system is designed to provide direct connection of an outdoor sealed connector to a board mounted device within a sealed enclosure. The TxRx system can connect Optical SFF or SFP transceivers, or RJ-45 Jacks through the sealed receptacles. The system is designed to provide IP-67 dust and water protection when connector and receptacle are mated or with dust caps installed. Plug cap includes integrated pulling eye for easy installation. Optical LC/SFP assemblies are factory assembled for quick and reliable installation and are available in custom length pigtails or jumpers. Copper RJ/SFP are available as either a factory terminated assemblies or a field installable connector kit. RJ plug includes features for use with shielded category cables. Both types use a common receptacle footprint, allowing a single casting or enclosure mounting to be used with different media types.

Jumper, TxRx LC/SFP to LC Duplex
Jumper, LC/SFP to LC Duplex, Singlemode 2 Fiber

Jumper, TxRx LC/SFP to LC/SFP
Jumper, LC/SFP to LC/SFP, Singlemode 2 Fiber

Receptacle, TxRx LC/SFP, Flange Mount
Receptacle, LC/SFP Optical, front flange mount

Connector Kit, TxRx RJ45 Field Install
Plug Kit, RJ/SFP, RJ45 shielded

Receptacle, TxRx RJ45, Flange Mount
Receptacle, RJ/SFP, front flange mount

CAP, PLUG, CONN, BAYONET
Dust Cap, PT Plug, Bayonet with 160mm chain

CAP, PLUG, RECEP, BAYONET
Dust Cap, TxRx Receptacle, with chain

CAGE, SFP 1X1, NON-LATCHING
Cage, SFP Non-latching, Press fit

CONNECTOR, SFP 20 POS., HIGH
Connector, SFP right angle 20 pin, SMT

JACK, RJ45, 8P, SMT
Jack, RJ Shielded SMT Mount Cat 3/4

Connectors and Adapters

Since 1932, from the first industry standard 905 Series SMA to the advanced LX.5 small form-factor connector system and high density MPO multi-fiber interconnects, Amphenol leads innovation in fiber optic connector technology.

Amphenol offers a complete line of fiber optic connectors and adapters including SMA, ST, FC, SC, LC, LX.5, MPO and Hybrilink™ converting adapters.

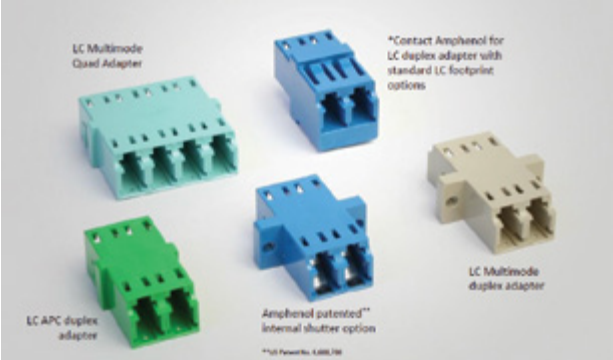
Top grade ceramic ferrules ensure the best optical performance and polishing yield. Carefully selected engineering plastics withstand the most demanding environmental stress conditions. High quality materials ensure the long-term reliability and performance of Amphenol connectors.

FC Connectors and Adapters

Amphenol's 944 Series fiber optic FC connectors effectively terminate optical fiber in a variety of network applications. The connectors are secured using a threaded coupling nut, providing a significant increase in pull-out performance. The FC connectors also feature an internal cavity and epoxy injection tube that virtually eliminates the possibility of improper epoxy application, thus providing higher manufacturing yields. Every aspect of the connector system is precision manufactured to produce reliable and consistent performance. The 944 series is available in tunable or non-tunable PC versions for flexibility in specific performance requirements. The FC/APC connector system features a tight-fit keyway that prohibits the possible mis-mating between FC/PC and FC/APC connectors.

Features/Benefits

- One-piece construction
- Non-optical disconnect feature design prevents signal interruption
- Teflon tube in rear of connector ensures clean epoxy injection
- High precision zirconia ferrules minimize insertion loss and return loss values
- Available in singlemode, angled singlemode, and multimode versions
- Available with 900µm, 2.0mm, or 3.0mm boots
- Tunable version available
- Stainless steel ferrules also available
- Compliant to IEC 61874-7 and TIA/EIA 604-4 specifications

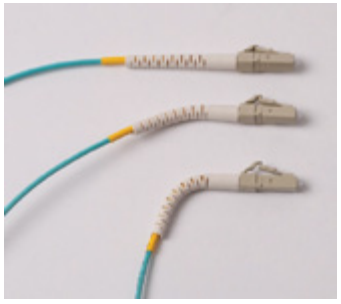


LC Connectors and Adapters

Amphenol's data communications 956 Series fiber optic LC small form factor (SFF) connectors utilize the familiar RJ-45 latching mechanism. The LC connector is almost half the size of the popular SC connector, providing great space savings in the network. With accelerated growth demanding greater bandwidth in less physical space, LC connectors have emerged as a viable solution for high density frames and patch panels. Amphenol's 956 Series LC connectors are a high density low cost solution without any sacrifice of performance. The 956 series LC connectors are compliant to the EIA/TIA-604 and IEC 61754.

Features/Benefits

- Easy RJ45 coupling mechanism enables quick installation and the audible click signifies when connector is locked in place
- Pull proof design prevents signal interruption
- Small form factor size enables increased density compared to standard connectors
- Duplex version utilizes a removable flexible clip providing a float between channels A and B
- Singlemode and multimode versions
- Available with 900µm, 900µm Behind the Wall (BTW), Short, 1.6/2.0mm, or 3.0mm boots
- Multiple boot color options
- Angled boots also available (50 degree, 90 degree, and flexible boot from 0 to 90 degree)



MPO Adapters

Amphenol's MPO adapters provide a wide variety of options for connecting high density MPO/MTP® connectors. Made in both die-cast and thermoplastics, Amphenol MPO adapters are precision manufactured to ensure intermateability with industry standard assemblies and connectors. Available with various flange styles, Amphenol MPO adapters meet the challenges and mechanical requirements of highly dense system designs while maintaining industry standard footprints.

The one-piece body die cast version is available to meet the growing need for connectors to assist in preventing EMI leaks.

An optional innovative feature of the MPO adapters is the patented fully automatic shutter. This internal shutter mechanism requires no manual actuation and has a unique stepped design that prevents contact with the ferrule endface.

Amphenol has expanded its line of MPO adapters to include plastic adapters with matched keyways, where the keys are aligned on same side of the adapter to reverse the fiber positions.

Features/Benefits

- Meets IEC 61754-7 and TIA/EIA 604-5 intermateability standards
- Accepts industry standard MPO/MTP®interfaces
- Plastic or EMI protective die-cast versions
- Multiple flange options including standard, rotated, or reduced
- Optional internal shutter mechanisms on both sides of the adapter to assist in eye safety requirements
- Shutter requires no manual actuation
- Flange on die-cast version completely covers panel cutout
- Matched keyway option available

SC Connectors and Adapters

Amphenol's premier high performance fiber optic 954 Series SC connectors utilize a push pull retention feature enabling easy insertion and removal, making it ideally suited for high-density applications. The SC connector features an internal cavity and epoxy injection tube that virtually eliminates the possibility of improper epoxy application, thus providing higher manufacturing yields and superior quality.
Amphenol's 954 Series SC connectors are compliant to the EIA/TIA-604, IEC 60874, and fully tested by a third party test lab per Telcordia GR-326 specifications.

Features/Benefits

- Third party tested per Telcordia GR-326
- Easy push pull coupling mechanism enables quick installation and the audible click signifies when connector is locked in place
- Pull proof design prevents signal interruption
- Teflon tube in rear of connector insures clean epoxy injection
- Duplex version utilizes a removable flexible clip providing a float between channels A and B
- High temperature and UL 94-V0 rated plastic housing and boots available in multiple colors
- Tight tolerance ferrules for low loss performance
- Available in singlemode, angled singlemode, and multimode versions
- Available with 900µm, 2.0mm, 3.0mm, and 90 degree boots in multiple colors

ST Connectors and Adapters

Amphenol's 953 Series fiber optic ST and ST II connectors utilize a bayonet style mating concept to provide a secure, robust coupling mechanism. The enclosed spiral slotted coupling nut allows easy insertion in densely packed patch panels.
The ST connector has been used extensively in telecom, data premise installation, and test lab applications. Special attention has been given to every ST performance parameter, increasing product repeatability and exceeding industry standards. The ST connector is available with a plastic or die cast body with a ceramic or stainless steel ferrule.

Features/Benefits

- The ST connector body and coupling nut are precision molded with a flame retardant polymer for a durable and light weight product
- The STII connector body and coupling nut are precision zinc die cast and nickel plated for superior strength and corrosion resistance
- High precision zirconia ferrules minimize insertion loss and return loss values
- Available in singlemode and multimode versions
- Available with 900µm, 2.0mm, or 3.0mm boots
- Stainless steel ferrules also available on both the ST and ST II connectors

Attenuators

Optical attenuators have proven to be a critical component of any fiber optic network by allowing the adjustment of signal transmission into the dynamic range of the receiver.

In-line Attenuators

Amphenol's Fixed In-Line Attenuators provide a medium for adjusting the transmission signal. The slender packaging design is well suited for installation into OEM equipment. In-line attenuators area available with attenuation values ranging from 1-20 dB and can be terminated with any single mode connector or left unterminated for splicing.

- **LC**
- **Open**
- **SC**
- **SC Angle**
- **ST**

Plug Attenuators

Amphenol's fixed plug style attenuators are fully qualified to Telcordia GR-910 requirements. The all fiber construction is proven to be ideally suited for optical networks with both controlled and uncontrolled temperatures, where the source wavelenght can vary due to ambient temperature.

- **Angle FC**
- **Angle SC**
- **FC/UPC**
- **LC/UPC**
- **SC/UPC**

Mode Conditioning Plug

Amphenol's MC Plugs are designed for use in Gigabit Ethernet applications and are compliant with the IEEE 802.3z standards. the use of mode conditioning plugs significantly increases the performance and applicable distances of laser diodes (LD) over multimode fiber networks.

- **LC**
- **SC**

Terminators

Amphenol's optical terminators are designed to reduce the back reflection from open connectors. This increases network performance and reduces stray laser light that can potentially cause eye injury. With increased power levels being utilized in every maket sector, there is an ever increasing demand for optical terminators.

FC:

SC:

SC:

Loopback

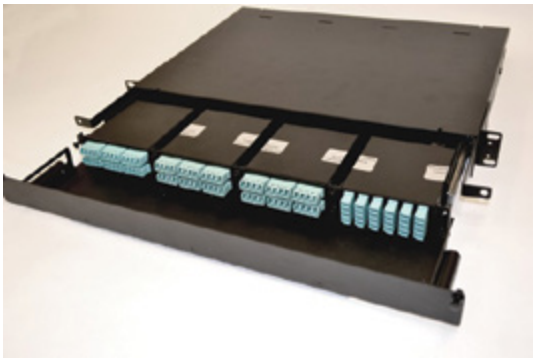
Amphenol's loopbacks are used primarily as a means to test optical links in networks or devices by "looping back" the connections from the TX (transmit) pairs to the RX (receive) pairs. By doing this, a complete optical link is formed, allowing the optical performance evaluation of a discrete component or a complete link in a network path covering one or more interfaces.

Fiber Management

The Amphenol Fiber Management Systems product line is comprised of a complete series of high density panels, MPO cassettes, wall and rack mounted enclosures that are designed to be used for the distribution and management of fiber optic cables. The product offering includes a variety of enclosures for patching, splicing, distribution, storing, splitting, and coupling of fiber optic signals for both single mode and multimode cables.

Cable Clamps

Amphenol 948 Series Cable Clamp provides a unique method for securing fiber optic cables. Each cable clamp includes a multi-diameter module that perfectly fits any size cable in its range. The multi-diameter modules easily adapt to fit fiber optic cables simply by removing a few layers from its center core. This unique method of securing the cable provides excellent protection and axial clamping.



High Density Panels

- **New HD Panel Series**
- **Higher density panels allow for more capacity**
- **4 adapter packs/MPO cassettes per 1RU versus 3 on standard panels**

Fiber Capacity for HD Panels			
Panel Type	**1RU**	**2RU**	**4RU**
Cassette/packs	4	8	16
SC Simplex	24	48	96
SC Duplex	48	96	192
LC Duplex	48	96	192
LC Quad	96	192	384

MPO Cassettes

Amphenol's MTP®/MPO Cassettes provide a seamless connection between MPO backbone cables and SC or small form factor LC patching in the network environment. This pre-terminated modular system is easily deployed and simplifies future expansions and modifications. In one cassette option, the MPO adapter is uniquely positioned at the back of the cassette with a downward angle to provide a more optimal orientation for routing. MPO Cassettes are ideally suited for data centers, enterprise, and datacom networks.

Rack Mount Distribution Panels

The Amphenol Fiber Amphenol 948 Series Rack Mount Distribution Panels combine all the features of a patch panel and a splice panel into one enclosure. They provide a protective area for patching, splicing and storing fiber optic cables. Distribution panels are typically used at building entrances, telecom closets, customer premise applications, or in equipment rooms for termination of inter-building backbone cables. Combining the patching and splicing in one enclosure eliminates unnecessarily exposing fiber optic cables which are vulnerable when utilizing separate enclosures for patching and splicing. The Rack Mount Distribution Panel fully encloses the pigtails (usually routed between separate panels), providing greater protection and shorter cable lengths. The enclosures provide ample fiber optic cable storage within a removable drawer. Each drawer accommodates up to two splice trays for a total of 48 fusion splices. Rack Mount Distribution Panels are used in backbone intermediate and horizontal cross-connects, equipment rooms, building entrances, head-ends, central offices, computer rooms and customer premise applications.

Rack Mount Patch Panels

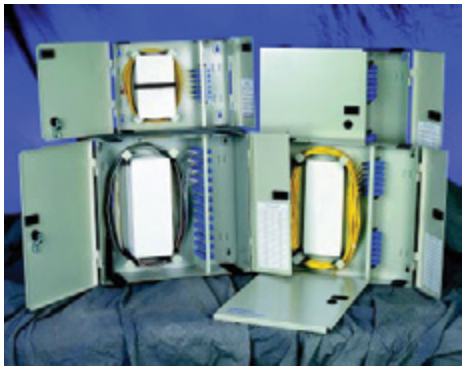
Amphenol 948 Series Patch Panels provide a convenient point for patching and storing fiber optic cables. A full range of products are available for termination of backbone cables and horizontal cables at cross-connects and for inter-connection between fiber optic distribution cables and equipment jumper cables. The Rack Mount Patch Panels can be used in both cross-connect and interconnect applications. Pre- terminated multi-channel fiber optic pigtails are excellent for reducing installation costs and installer handling. The patch panel pigtail can be quickly and easily routed to the splicing location, eliminating the need for performing field terminations. Rack Mount Patch Panels are used in backbone intermediate and horizontal cross-connects, equipment rooms, building entrances, headends, central offices and computer rooms.

Rack Mount Splice Panels

Amphenol 948 Series Splice Panels are rack mounted panels which provide a convenient point for on-rack storing and protecting of fiber optic splices. These panels are typically used at building entrances for transition splicing between the outdoor cables and indoor pigtails. They are typically used in conjunction with the 948 Series Patch Panel enclosures. The Rack Mount Splice Panel incorporates splicing within the fiber optic network bays. These enclosures are ideal for splicing a pre-terminated patch panel pigtail to the OSP cable. The enclosures provide ample fiber storage within a removable drawer. Each drawer can accommodate up to two splice trays for a total of 48 fusion splices. Rack Mount Splice Panels are used in backbone intermediate and horizontal cross-connects, equipment rooms, building entrances, head-ends, central offices and computer rooms.

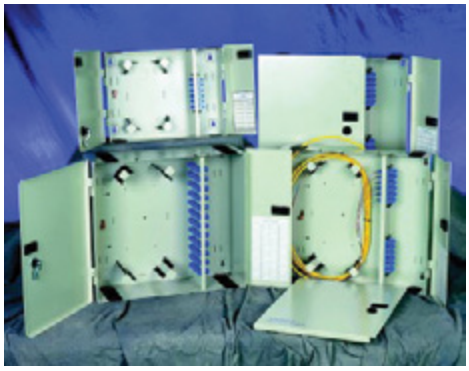
Splice Trays

Amphenol 948 Series Splice Trays provide an organized means of storing and protecting completed fiber optic splices. Bend radius protection and covers prevent fibers from being damaged during handling. Splice trays are included with Amphenol Splice and Distribution Panels



Wall Mount Distribution Panels

The Amphenol Fiber Amphenol 948 Series Wall Mount Distribution Panels combine all the features of a patch panel and a splice panel into one enclosure. They provide a protective area for patching, splicing and storing fiber optic cables. Distribution panels are typically used at building entrances, telecom closets, customer premise applications, or in equipment rooms for termination of interbuilding backbone cables. The Wall Mount Distribution Panel is designed to be compact as well as provide ample fiber optic cable routing, organization, and storage. The panels come equipped with a cam lock in the installer side (large door) of the panel, allowing unrestricted access to the patching side. A second factory-installed cam lock is available to lock both areas of the panel. Splice trays are also included with each enclosure. Wall Mount Distribution Panels are used in backbone intermediate and horizontal cross-connects, equipment rooms, building entrances, telecommunications closets, computer rooms and customer premise applications.



Wall Mount Patch Panels

Amphenol 948 Series Patch Panels provide a convenient point for patching and storing fiber optic cables. A full range of products are available for termination of backbone cables and horizontal cables at cross-connects and for inter-connection between fiber optic distribution cables and equipment jumper cables. The Wall Mount Patch Panel is designed to be compact as well as provide ample fiber optic cable routing, organization, and storage. The panels come equipped with a cam lock in the installer side (large door) of the panel, allowing unrestricted access to the patching side. A second factory-installed cam lock is available to lock both areas of the panel. Wall Mount Patch Panels are used in backbone, intermediate and horizontal cross-connects, equipment rooms, building entrances, telecommunications closets, computer rooms and customer premise applications.

Amphenol

Connecting People & Technology

TELECOMMUNICATION

Amphenol
Türkiye&MiddleEast

sales@amphenol.com.tr

www.amphenol.com.tr