

RF Connectors Overview

Amphenol®

Overview

Specific Connector Information

Each connector listed has a plating code / Plt.; insulation code / Ins.; and cable assembly instruction / CAI. Refer to page 232 for the code charts.

Example:

D1 = TFE or equivalent

P1 = Nickel plated body, silver plated contact

Cable Assembly Instructions

If you already know the connector P/N and are looking for the assembly instructions, refer to the Connector Assembly Index on pages 240-241. The appropriate CAI code number is listed opposite the connector part number.

Design Considerations

Typically, the shorter the cable assembly, the more critical the connector insertion loss becomes.

Typically, the longer the cable assembly, the less critical the connector insertion loss becomes.

Typically, the higher the frequency, the more critical the connector insertion loss becomes.

Typically, the more critical the connector insertion loss, the more critical the matched impedance of the cable and the connector becomes.

Intermodulation (IM)

Intermodulation is a phenomena that occurs when two or more fundamental frequencies are present in an electronic circuit. Passive components must eliminate or minimize nonlinearities known to generate IM. Two sources which create nonlinearities are contact junctions and ferromagnetic materials. Small separation of contact surfaces can generate microscopic arcing. The use of nickel or steel can also generate IM due to nonlinear voltage to current ratio.



Subminiature. Microminiature



Wireless












Miniature












Standard

RF Connectors Overview

	Micro, Subminiature						Miniature		
									
Series	MMCX	MCX	1.0/2.3	SMB	SMC	SMA	1.6/5.6	BNC	BNC TWIN
	908	919	102	903	903	901	156	31, 456	31
Impedance	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 and 75 ohms nominal	50 ohms nominal	50 ohms nominal	75 ohms nominal	50 and 75 ohms nominal	non-constant
Frequency Range	0-6 GHz	0-6 GHz	Threaded: 0-10 GHz Push-Pull: XX GHz	0-4 GHz	0-10 GHz	S/R: 0-18 GHz High Performance: 0-26.5 GHz	0-1 GHz	0-4 GHz	0-100 MHz
VSWR	1.2 max (straight connectors)	1.3 max (straight connectors)	1.3 max (straight connectors)	1.35 max (straight connectors)	1.3 max	1.25 max 0-18 GHz		1.3 max (straight connectors)	n/a
Voltage Rating	500 volts peak	335 volts peak	350 volts peak	335 volts peak	335 volts peak	500 volts peak	330 volts peak	500 volts peak	100 volts peak
Temperature Range	-40°C to +90°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)	-40°C to +155°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)	-40°C to +165°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)
Cable Termination	Crimp solder	Crimp solder	Crimp-solder	Crimp-solder	Crimp-solder	Crimp solder	Crimp-crimp	Crimp, clamp, Suretwist®, solder	Clamp
Coupling Type	Snap-on coupling	Snap-on coupling	Threaded or Push-Pull Snap-on coupling	Snap-on coupling	Threaded	1/4-36 threaded coupling	M9 x 0.5 threaded coupling	Two stud bayonet lock	Two stud bayonet lock
Standards	CECC 22000	CECC 22220	CECC 22230	Mil-C-39012	Mil-C-39012	Mil-C-39012 Mil-A-55339	CECC 22230	Mil-C-39012 Mil-A-55339	Mil-C-3655
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RF Connectors Overview

Miniature (cont'd)		Standard			Wireless			
								
TNC	REVERSE POLARITY	UHF	MINI-UHF	TWINAX	7/16	TYPE N	TYPE F	TYPE G
31	various	83	81	82	716	82, S, A	531	531
50 ohms nominal	50 ohms nominal	non-constant	50 ohms nominal	non-constant	50 ohms nominal	50 ohms nominal	75 ohms nominal	75 ohms nominal
0-11 GHz	SMA 0-18 GHz TNC 0-11 GHz BNC 0-4 GHz	0-300 MHz	0-2.5 GHz	0-200 GHz	Coax and S/R: 0-7 GHz Corrugated: 0 - 5.2 GHz	0-11 GHz	0-3 GHz	0-3 GHz
1.3 max (straight connectors)	SMA 1.25 max TNC, BNC 1.30 max	non-constant	1.25 max	n/a	1.3 max (straight connectors)	1.3 max (straight connectors)	30 dB Return Loss @ 1 GHz	30 dB Return Loss @ 1 GHz
500 volts peak	500 volts peak	500 volts peak	335 volts peak	500 volts peak	2700 volts peak	1500 volts peak	15 watts continuous	
-65°C to +165°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)	-55°C to +149°C (Phenolic insulators)	-55°C to +85°C (Polypropylene insulators)	-55°C to +85°C (Styrene insulators)	-40°C to +150°C (Teflon insulators)	-65°C to +165°C (Teflon insulators)	-40°C to +60°C	-40°C to +60°C
Clamp, crimp, solder	Crimp	Solder, crimp	Crimp	Clamp	Crimp, solder, clamp	Clamp, crimp-solder	Solder	Solder
7/16-28 threaded couplina	SMA 1/4-36 threaded TNC 7/16-28 threaded BNC bayonet	5/8-24 threaded couplina	3/8-24 threaded couplina	3/4-20 threaded couplina	M29-1.56 α threaded couplina	5/8-24 threaded couplina	Push-on	Push-on
Mil-C-39012 Mil-A-55339	Mil Std 348 interface	IEC Publication 169-12	IEC Publication 169-12	Mil-C-3655	IEC 169-4 DIN 47223	Mil-C-39012 Mil-A-55339	—	—
XXX	XXX	XXX	XXX	XXX	XXX	XX	XXX	XXX

RF Connectors Cable Selection Chart

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Series	908	919	102	903		901	156	31, 456	31
	MMCX	MCX	1.0/2.3	SMB	SMC	SMA	1.6/5.6	BNC	BNC TWIN
6,6 Type, Belden 9248								108-109,125	
8, 9, 11, 213, 214								109,126	
22									
55, 142, 223, 400, TWB 1042, 4001			27,29			59-63,77-78		108-113	
58, 141, TWB 5800			27-29			59-61,77-78		108-113	
Plenum 58, 82907, 88240, 89907								108-109	
20AWG 59, Plenum 59, 59, 62								108-113,125-127	
CATV 59, 6, 7									
Double Braid 59									
Quadshield 59									
108A									
122								109	
140, 210, 302								108,111-113,126	
141B			28			41,42			
144, 165									
174, 188, 316	12-14	19,23	27-29	37-38,45	53	59-63,77-78		108,111-113	
RD188, RD316 (2 braids)	12-14	19		37-38	53	60,77		108,113	
178, 196	12-13	19		37		42		109,113	
179, 187		23	27,29	37-38,45,48	53	59-63		108,111-113,125,127	
RD179 (double braid)								125-126	
180, 195			29	45				109	
196				37					
214, 216, 225, 393									
.047S/R	13-14								
.085 S/R, .086 S/R	12,14	20	27-28			58,60-63,77			
.141 S/R			20	27		58,60-63,77			
.250 S/R									
734A								125-126	
735A TYPE				45,48				125-126	
Helical 1/4, 3/8, 1/2, 7/8, 1 1/4, 1 5/8									
TWB 6001									
.064/.285/1/.405: Belden 8213								108	
.017/.100/1/ .150: Belden 8218								108,125	
Belden 8227, 9207, IBM 7362211									
Belden 8281, 88281								108,125	
.031/.198/2/.305 Belden 9231								125	
Belden 9259, 9907, 89907								108,125	
.025/.146/1/.260 Belden 9268								110	
.108/.146/1/.405 Belden 9913									
.103/.286/1/.405 Belden 9914									
Belden 9880, 89880									

RF Connectors Cable Selection Chart

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Overview

31	various	82, 5, A	83	81	82	716	531	531
TNC	REVERSE POLARITY	TYPE N	UHF	MINI-UHF	TWINAX	7/16	TYPE F	TYPE G
		227-230,232	187-188					
141,143	151	227-231	188					
141,143-144	157	227-232	187-188	195				
141-144		227,229	187,188	195				
	172							
144			187					
		227,229-230						
141,144	151-152,157	227,231-232						
	152							
141								
		227-230				266-267		
		227,230,232						
	151-152	227,230,232				266,268		
		227,230,232				266,268		
		228,241-243				264		
		227-229						
		227						
		227						

MMCX



Amphenol's MicroMate™ MMCX connector line is a family of products designed as the next generation 50 ohm microminiature surface mount coaxial interconnection system. Providing a more robust interface for greater durability, this series is ideal for high volume wireless SMT or PCMCIA applications in cellular base stations, cellular phones and personal communicators, global positioning systems (GPS) and wireless LAN (WLAN) applications.

MCX



To address the rapid implementation of the U.S. digital cellular PCN infrastructure, Global Positioning Systems (GPS) and Instrumentation and Wireless LAN Systems, Amphenol has optimized its MCX product offering to target these high growth market applications.

The growth rate of these emerging markets has fueled an increasing demand for subminiature coaxial connectors with very good electrical performance to 6 GHz.

1.0/2.3



The 1.0/2.3 series of coaxial connectors are designed for telecommunication systems requiring a subminiature 50 ohm slide on / screw on connector. These connectors comply with the requirements of DIN41626, DIN 47297 INFC 93569 INFC 93571 and CECC22230. The connectors perform DC through 10 GHz, and feature crimp cable termination for low installation cost.

SMB



SMB connectors feature quick connect/disconnect snap-on mating and are available in both 50 and 75 ohm impedance structures. For maximum space utilization, Amphenol also offers a high density 75 ohm version. This series of connectors conform to the requirements of MIL-C-39012 and the interface is in compliance with MIL-STD-348. Using highly efficient die cast molds and high speed fully-automated assembly equipment, Amphenol's SMB connector line offers a cost effective solution for digital cellular PCN, Global Positioning Systems (GPS) and wireless LAN systems needs.

SMA



Amphenol's 50 ohm SMA connectors are semi-precision subminiature connectors performing DC through 18 GHz. SMA connectors are primarily used where trends toward higher frequencies, miniaturization, and SMA connectors are built in accordance with MIL-C-39012 and CECC 22110/111, and are available for a variety of flexible and semi-raid cables. Amphenol's line of brass SMA connectors provide a cost effective solution for applications where stainless steel construction is not required.

SMC



SMC connectors feature 10-32 threaded coupling with broadband performance with low reflection from DC-10 GHz. This series of connectors conforms to the requirements of MIL-C-39012 and the interface is in compliance with MIL-STD-348. These connectors are particularly suitable for use in high vibration environments.

BNC Twin



Amphenol's twin contact connectors are used in balanced line, high sensitivity circuits. These applications typically center on computer networks and equipment and process control devices. The BNC-twin connectors feature the same two-stud bayonet locking mechanism as standard coaxial BNC connectors where quick connect/disconnect is an advantage.

7/16



Amphenol's 7/16 connectors are designed for use in medium to high power communication systems. These connectors perform exceptionally well in multichannel cellular systems where power levels approximate 100 watts per channel. Designed for both flexible as well as corrugated cables, these connectors are used in a variety of cellular base station and broadcast communication applications. Amphenol's designs offer superior IMD characteristics and assembly onto corrugated cable has been greatly simplified.

Type N



Type N connectors are medium size threaded connectors for use DC through 11 GHz and feature a characteristic 50 ohm impedance structure. Applications for N connectors include base station equipment, broadcast and satellite communication systems as well as test and instrumentation equipment. Connector performance is per MIL-C-39012, with commercial grade versions available for the most popular configurations. Cable termination includes clamp styles and crimp styles, and connectors are available for the most widely used coaxial cables.

Twinax



Amphenol twin contact connectors are used in balance line, high sensitivity circuits. The keyed twinax style of connectors feature keyway polarization to insure system integrity and prevent signals from being mixed. These connectors have been primarily used on computer mainframe and peripherals and related network applications and are designed to terminate large size twinaxial cables.

TNC



Amphenol TNC connectors were originally developed for aircraft and missile application where extreme vibration is a factor. TNC connectors are of miniature size like the BNC connector but feature a threaded coupling nut for application requiring performance through 11 GHz. Chosen for their durability and reliability, TNC connectors are widely used in the cellular/mobile communication industry for equipment cabling and antenna interfaces.

1.6/5.6



The 1.6/5.6 is a miniature 75 ohm connector primarily designed for use in the telecommunication industry. The snap-on mating face allows for quick mating for test purposes, and it is also threaded to provide a durable condition when mated. Crimp/crimp cable terminations provide ease of assembly and low installation costs, and the small size allows for dense packing on equipment.

UHF



Amphenol UHF connectors are the original radio frequency connector interface. They are general purpose units which operate satisfactorily DC to 300 MHz. Applications include citizens band radio receivers, public address systems, and a variety of other low frequency system applications where cost is a prime consideration.

Mini-UHF



Mini-UHF connectors are a miniature version of the original UHF connector and feature a threaded coupling mechanism for reliable mating. The mini-UHF connector is designed for use in cellular mobile telephone systems where size, weight, and cost are critical. Featuring crimp cable termination for low installation costs, these connectors provide excellent RF performance in applications through 2.5 GHz.

Type F



Amphenol has developed a variety of board level F receptacles for use on high speed modems and CIU's. These connectors utilize Amphenol's unique female contact design featuring a true cylindrical coaxial contact. As a result, superior RF performance and excellent insertion / withdrawal characteristics are achieved. We also offer designs capable of handling up to 15 amps for future set-top box applications. F receptacles are available in multiple styles including SMD versions complimenting Amphenol's line of drop F connectors and adapters.

Type G



Amphenol has developed a range of high performance G receptacles for use in today's 1 GHz amplifier and fiber optic node equipment designs. Amphenol has also developed a series of 15 amp G receptacles for HFC networks. These connectors are designed to meet the 15 amp current capability required to power loop electronics in support of enhanced telephony services being implemented by CATV MSO's and telco's.

Reverse Polarity



Amphenol's reverse polarity connectors have been developed to meet the requirements of the FCC part 15.203 dictating the need for a non-standard interface to be used on connectors designed for spread spectrum wireless devices. Amphenol offers reverse polarity interfaces in the SMA, TNC and BNC connector line, allowing the user the greatest flexibility for cable and size constraints. Featuring all crimp terminations, these connectors feature performance consistent with the corresponding non-polarized product family.