Linx TECHNOLOGIES

RF Connector Overview Guide

Linx Technologies offers a wide variety of SMA, MCX, MMCX and MHF radio frequency connector and cable assemblies. RF connectors and cables consist of miniature precision-machined mechanical components and clever designs with complex assembly which are necessary to minimize losses and reflections. This requries tight tolerances, quality surface finishing and proper choice of metals and insulators. By combining domestic design and quality with offshore connector manufacturing, Linx offers low loss connectors at very competitive prices for OEM customers.

Wireless made simple®

Revised 2/19/15

SMA Connectors

SMA (subminiature version A) connectors are high performance coaxial RF connectors with 50-ohm matching and excellent electrical performance up to 18GHz with insertion loss as low as 0.17dB. They also have high mechanical strength through their thread coupling. This coupling minimizes reflections and attenuation by ensuring uniform contact. SMA connectors are among the most popular connector type for OEMs as they offer high durability, low VSWR and a variety of antenna mating choices. In order to comply with FCC Part 15 requirements for non-standard antenna connectors, SMA connectors are also available in reverse polarity (RP-SMA).

PCB Board Termination SMA and RP-SMA Connectors

	Connector Type	Orientation	Mount	Style	Board Thickness	Body Finish	Polarity	Part Numbers
	SMA001	Straight	Through-hole	Receptacle		Nickel	Standard	CONSMA001
						Gold		CONSMA001-G
						Nickel	Reverse	CONREVSMA001
						Gold		CONREVSMA001-G
	SMA001-SMD	Straight	Surface-mount	Receptacle		Nickel	Standard	CONSMA001-SMD
						Gold		CONSMA001-SMD-G
						Nickel	Reverse	CONREVSMA001-SMD
						Gold		CONREVSMA001-SMD-G
	SMA003	Straight	Edge	Receptacle	0.031 in	Nickel	Standard	CONSMA003.031
							Reverse	CONREVSMA003.031
					0.062 in		Standard	CONSMA003.062
							Reverse	CONREVSMA003.062
	SMA006	Straight	Edge, Bulkhead	Receptacle	0.031 in	Nickel	Standard	CONSMA006.031
							Reverse	CONREVSMA006.031
					0.062 in		Standard	CONSMA006.062
			Edge, Square Flange				Reverse	CONREVSMA006.062
								CONREVSMA006.062SQ
	SMA013	Straight	Edge	Plug	0.031 in	Nickel	Standard	CONSMA013.031
							Reverse	CONREVSMA013.031
					0.062 in		Standard	CONSMA013.062
							Reverse	CONREVSMA013.062
	SMA002	Right Angle	Through-hole	Receptacle		Nickel	Standard	CONSMA002
						Gold		CONSMA002-G
						Nickel	Reverse	CONREVSMA002
						Gold		CONREVSMA002-G
	SMA002-SMD	Right Angle	Surface-mount	Receptacle		Nickel	Standard	CONSMA002-SMD
						Gold		CONSMA002-SMD-G
						Nickel	Reverse	CONREVSMA002-SMD
						Gold		CONREVSMA002-SMD-G
	SMA009	Right Angle	Edge	Receptacle	0.062 in	Nickel	Standard	CONSMA009.062
							Reverse	CONREVSMA009.062
	SMA002-L	Right Angle, Extended	Through-hole, Bulkhead	Receptacle		Nickel	Standard	CONSMA002-L
							Reverse	CONREVSMA002-L
	SMA008	Straight, Extended	Through-hole	Receptacle		Nickel	Standard	CONSMA008
							Reverse	CONREVSMA008
	SMA003-L	Straight, Extended	Edge	Receptacle	0.031 in	Nickel	Standard	CONSMA003.031-L
							Reverse	CONREVSMA003.031-L
					0.062 in		Standard	CONSMA003.062-L
							Reverse	CONREVSMA003.062-L

Cable Termination SMA and RP-SMA Connecctors

	Connector Type	Orientation	Mount	Style	Cable Types	Body Finish	Polarity	Part Numbers
	SMA007	Straight	Crimp End	Plug	RG-174, RG-188A, RG-316	Nickel	Standard	CONSMA007
							Reverse	CONREVSMA007
	SMA007-R58	Straight	Crimp End	Plug	RG-58/58A/58C, RG-141A	Nickel	Standard	CONSMA007-R58
							Reverse	CONREVSMA007-R58
	SMA007-R178	Straight	Crimp End	Plug	RG-178, RG-196	Nickel	Standard	CONSMA007-R178
							Reverse	CONREVSMA007-R178
	SMA012	Right Angle	Crimp End	Plug	RG-174, RG-188A, RG-316	Nickel	Standard	CONSMA012
							Reverse	CONREVSMA012
	SMA012-R58	Right Angle	Crimp End	Plug	RG-58/58A/58C, RG-141A	Nickel	Standard	CONSMA012-R58
							Reverse	CONREVSMA012-R58
	SMA012-R178	Right Angle	Crimp End	Plug	RG-178, RG-196	Nickel	Standard	CONSMA012-R178
							Reverse	CONREVSMA012-R178
	SMA011	Straight	Crimp End	Receptacle	RG-174, RG-188A, RG-316	Nickel	Standard	CONSMA011
							Reverse	CONREVSMA011
	SMA011-R58	Straight	Crimp End	Receptacle	RG-58/58A/58C, RG-141A	Nickel	Standard	CONSMA011-R58
							Reverse	CONREVSMA011-R58
	SMA011-R178	Straight	Crimp End	Receptacle	RG-178, RG-196	Nickel	Standard	CONSMA011-R178
							Reverse	CONREVSMA011-R178
	SMA005	Straight	Crimp End, Bulkhead	Receptacle	RG-174, RG-188A, RG-316	Nickel	Standard	CONSMA005
							Reverse	CONREVSMA005
	SMA005-R58	Straight	Crimp End, Bulkhead	Receptacle	RG-58/58A/58C, RG-141A	Nickel	Standard	CONSMA005-R58
							Reverse	CONREVSMA005-R58
	SMA005-R178	Straight	Crimp End, Bulkhead	Receptacle	RG-178, RG-196	Nickel	Standard	CONSMA05-R178
							Reverse	CONREVSMA05-R178
	SMA014	Straight	Crimp End, Bulkhead, Rear-Mount	Receptacle	RG-174, RG-188A, RG-316	Nickel	Standard	CONSMA014
							Reverse	CONREVSMA014
	SMA014-R58	Straight	Crimp End, Bulkhead, Rear-Mount	Receptacle	RG-58/58A/58C, RG-141A	Nickel	Standard	CONSMA014-R58
							Reverse	CONREVSMA014-R58
	SMA014-R178	Straight	Crimp End, Bulkhead, Rear-Mount	Receptacle	RG-178, RG-196	Nickel	Standard	CONSMA014-R178
							Reverse	CONREVSMA014-R178
	SMA015	Straight	Crimp End, Bulkhead, Front-Mount	Receptacle	RG-174, RG-188A, RG-316	Nickel	Standard	CONSMA015
							Reverse	CONREVSMA015
	SMA015-R178	Straight	Crimp End, Bulkhead, Front-Mount	Receptacle	RG-178, RG-196	Nickel	Standard	CONSMA015-R178
							Reverse	CONREVSMA015-R178

SMA Connector General Specifications

Materials

Connector Part	Material	Finish
Bodies	Brass	Nickel or Gold
	Stainless Steel (Special Order)	Passivated or Gold
Center Contact	Male: Brass	Gold
	Female: Beryllium Copper	
Insulator	PTFE	N/A
Crimp Ferrule	Annealed Copper	Nickel or Gold

Electrical

Electrical Data	Detail		
Impedance	50-ohm		
Frequency Range	Flexible cable: 0–12.4GHz		
	Semi-rigid cable: 0–18GHz		
Insertion Loss	0.04dB max. √f GHz (straight)		
	0.06dB max. √f GHz (right angle)		
VSWR: f(GHz)	**RG-178/U** ST: 1.20+0.025f RA: 1.20+0.03f	**RG-174, 316/U** ST: 1.15+0.02f RA: 1.15+0.03f	**RG-58, 141, 142, 223/U** ST: 1.10+0.01f RA: 1.15+0.02f

MCX Connectors

MCX (micro coaxial) connectors are subminiature RF connectors that offer strong electrical performance in a smaller size, compared to SMAs and SMBs. The outer diameter of the plug is approximately 2.6 mm or 0.140 inch. Linx MCX connectors are available at 50-ohms and operate up to 6GHz at less than 0.2dB insertion loss. Their small size and snap-on connection is ideal for dense packaging such as those in consumer products, GPS and automotive application.

PCB Board Termination MCX and RP-MCX Connectors

	Connector Type	Orientation	Mount	Style	Board Thickness	Body Finish	Polarity	Part Numbers
	MCX001	Straight	Through-hole	Receptacle		Gold	Standard	CONMCX001
	MCX001-SMD	Straight	Surface-mount	Receptacle		Gold	Standard	CONMCX001-SMD
							Reverse	CONREVMCX001-SMD
	MCX003	Straight	Edge	Receptacle	0.031 in	Gold	Standard	CONMCX003.031
					0.062 in			CONMCX003.062
	MCX002	Right Angle	Through-hole	Receptacle		Gold	Standard	CONMCX002
	MCX002-SMD	Right Angle	Surface-mount	Receptacle		Gold	Standard	CONMCX002-SMD
							Reverse	CONREVMCX002-SMD
	MCX003-L	Straight, Extended	Edge	Receptacle	0.031 in	Gold	Standard	CONMCX003.031-L
					0.062 in			CONMCX003.062-L

Cable Termination MCX and RP-MCX Connectors

	Connector Type	Orientation	Mount	Style	Cable Types	Body Finish	Polarity	Part Numbers
	MCX007	Straight	Crimp End	Plug	RG-174, RG-188A, RG-316	Gold	Standard	CONMCX007
							Reverse	CONREVMCX007
	MCX007-R178	Straight	Crimp End	Plug	RG-178, RG-196	Gold	Standard	CONMCX007-R178
	MCX012	Right Angle	Crimp End	Plug	RG-174, RG-188A, RG-316	Gold	Standard	CONMCX012
	MCX012-R178	Right Angle	Crimp End	Plug	RG-178, RG-196	Gold	Standard	CONMCX012-R178
	MCX011	Straight	Crimp End, Bulkhead	Receptacle	RG-174, RG-188A, RG-316	Gold	Standard	CONMCX011
							Reverse	CONREVMCX011
	MCX011-R178	Straight	Crimp End, Bulkhead	Receptacle	RG-178, RG-196	Gold	Standard	CONMCX011-R178
	MCX005	Straight	Crimp End, Bulkhead	Receptacle	RG-174, RG-188A, RG-316	Gold	Standard	CONMCX005
							Reverse	CONREVMCX005
	MCX005-R178	Straight	Crimp End, Bulkhead	Receptacle	RG-178, RG-196	Gold	Standard	CONMCX005-R178

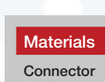
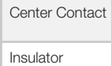
MMCX Connectors

MMCX (micro-miniature coaxial) connectors are similar to the MCX but smaller and approximately one third lighter. MMCX connectors are matched to 50-ohms and operate up to 6GHz with less than 0.3dB insertion loss. The connectors have a snap locking mechanism which allows 360° rotation. Because of their small size, MMCX connectors are popular in consumer products, PCS devices and GPS applications.

PCB Board Termination MMCX Connectors

	Connector Type	Orientation	Mount	Style	Body Finish	Polarity	Part Numbers
	MMCX001	Straight	Through-hole	Receptacle	Gold	Standard	CONMMCX001
	MMCX001-SMD	Straight	Surface-mount	Receptacle	Gold	Standard	CONMMCX001-SMD
	MMCX002	Right Angle	Through-hole	Receptacle	Gold	Standard	CONMMCX002
	MMCX002-SMD	Right Angle	Surface-mount	Receptacle	Gold	Standard	CONMMCX002-SMD

Cable Termination MMCX Connectors

	Connector Type	Orientation	Mount	Style	Cable Types	Body Finish	Polarity	Part Numbers
	MMCX007	Straight	Crimp End	Plug	RG-174, RG-188A, RG-316	Gold	Standard	CONMMCX007
	MMCX007-R178	Straight	Crimp End	Plug	RG-178, RG-196	Gold	Standard	CONMMCX007-R178
	MMCX012	Right Angle	Crimp End	Plug	RG-174, RG-188A, RG-316	Gold	Standard	CONMMCX012
	MMCX012-R178	Right Angle	Crimp End	Plug	RG-178, RG-196	Gold	Standard	CONMMCX012-R178
	MMCX011	Straight	Crimp End	Receptacle	RG-174, RG-188A, RG-316	Nickel	Standard	CONMMCX011
	MMCX011-R178	Straight	Crimp End	Receptacle	RG-178, RG-196	Nickel	Standard	CONMMCX011-R178

MCX and MMCX Connector General Specifications

Materials

Connector Part	Material	Finish
Bodies	Brass	Nickel or Gold
Center Contact	Male: Brass	Gold
	Female: Beryllium Copper	
Insulator	PTFE	N/A
Crimp Ferrule	Annealed Copper	Nickel or Gold

Electrical

Electrical Data	Detail		
Impedance	50-ohm		
Frequency Range	0–6GHz		
Insertion Loss (MCX)	0.1dB max. (straight)		
	0.2dB max. (right angle)		
Insertion Loss (MMCX)	0.2dB max. at 1GHz (straight)		
	0.3dB max. at 1GHz (right angle)		
	MCX		**MMCX**
VSWR f(GHz)	**RG-178/U** ST: 1.17+0.04f RA: 1.07+0.06f	**RG-316/U** ST: 1.13+0.04f RA: 1.07+0.04f	ST: 1.3 max. RA: 1.5 max.

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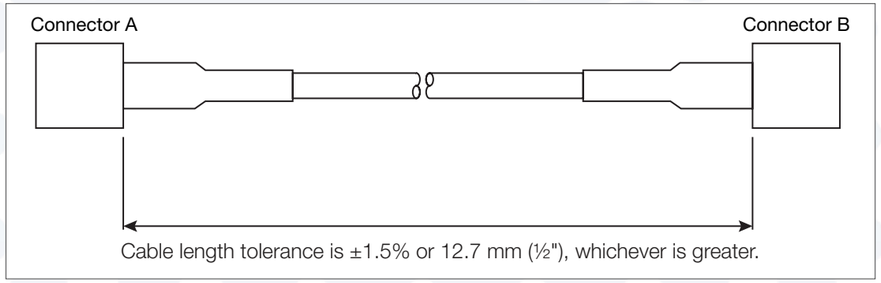
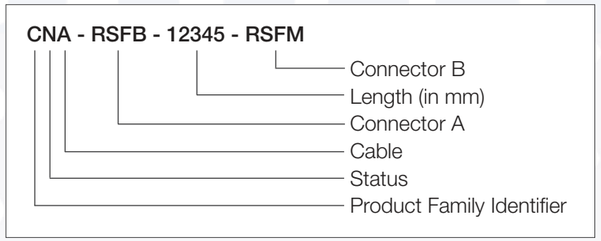
Cable Assembly Capabilities

Cable Length Tolerance



Cable Assembly Part Numbering System

Our part numbers are structured as follows:



Cable Codes and Specifications

Cable Type Code	Description	Impedance	Attenuation (dB/100M)									
			100MHz	200MHz	400MHz	700MHz	900MHz	1GHz	1.8GHz	2.45GHz	5.2GHz	5.8GHz
A	RG-174	50Ω	27.6	41	62.3	88.6	101/8					
B	RG-178	50Ω	52.49		108.27			170.61				
C	RG-58	50Ω	14.8	22.3	32.8	45.9	52.8					
D	RG-58LL	50Ω		4.66	6.32	8.45	9.67	10.2				
E	RG-316	50Ω	36.09		68.9			124.68				
I	1.13mm	50Ω							2.2	2.6	3.9	4.3

Cable Status Codes

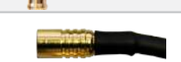
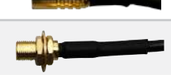
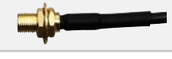
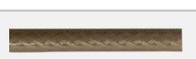
Status Code	Description
C	Custom
S	Stock*
N	Non-stock

Connector Specifications

Series	Impedance	Frequency Range	Insertion Loss
SMA & RP-SMA	50Ω	0–12.4GHz	0.04dB max
MCX & RP-MCX	50Ω	0–6GHz	
MMCX	50Ω	0–6GHz	

Connector Choices for Cable Assemblies

Connector Choices for Cable Assemblies

Type	Style	Orientation	Finish	Polarity	Connector Code	
SMA	Plug	Straight	Nickel	Standard	SMAM	
				Reverse	RPSM	
			Gold	Standard	SGAM	
				Reverse	RGSM	
		Right Angle	Nickel	Standard	SAMR	
				Reverse	RSMR	
			Gold	Standard	SGMR	
				Reverse	RGMR	
	Receptacle	Straight	Nickel	Standard	SMAF	
				Reverse	RPSF	
			Gold	Standard	SGAF	
				Reverse	RGSF	
	Receptacle, Rear-Mount, Bulkhead	Straight	Nickel	Standard	SAFB	
				Reverse	RSFB	
			Gold	Standard	SGFB	
				Reverse	RGFB	
	Receptacle, Rear-Mount, Sealed, Bulkhead	Straight	Nickel	Standard	SAFI	
				Reverse	RSFI	
			Gold	Standard	SGFI	
				Reverse	RGFI	
	Receptacle, Front-Mount, Sealed, Bulkhead	Straight	Nickel	Standard	SAFE	
				Reverse	RSFE	
			Gold	Standard	SGFE	
				Reverse	RGFE	
MCX	Plug	Straight	Gold	Standard	MCXM	
				Reverse	RPXM	
		Right Angle	Gold	Standard	MXMR	
				Reverse	RXMR	
	Receptacle	Straight	Gold	Standard	MCXF	
				Reverse	RPXF	
	Receptacle, Rear-Mount, Bulkhead	Straight	Gold	Standard	MXFB	
				Reverse	RXFB	
MMCX	Plug	Straight	Gold	Standard	MMXM	
		Right Angle	Gold	Standard	MMMR	
	Receptacle	Straight	Gold	Standard	MMXF	
	Receptacle, Rear-Mount, Bulkhead	Straight	Gold	Standard	MMFB	
MHF / U.FL	Plug	Right Angle	Gold	Standard	UFFR	
Straight Cut	N/A	N/A	N/A	N/A	STCT	
Strip & Tin	N/A	N/A	N/A	N/A	STTN	

Note: Illustrations are not representative of the final product

Cable Customization Capabilities

Properly stripping a coaxial cable and attaching it to the connector requires special fixtures and experience. Unlike digital cables, a small deviation from the ideal attachment may yield key parameters that are out of specification. Prudent customers often buy pre-built cables from Linx to benefit from Linx's quality systems, fixtures and RF expertise. In-house cable finishing allows Linx to quickly deliver a variety of cable lengths and connector combinations.

Linx Technologies Headquarters

Linx corporate headquarters are located in a beautiful custom-built facility in Merlin, Oregon, which is in the Rogue Valley near Grants Pass and the Rogue River.

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