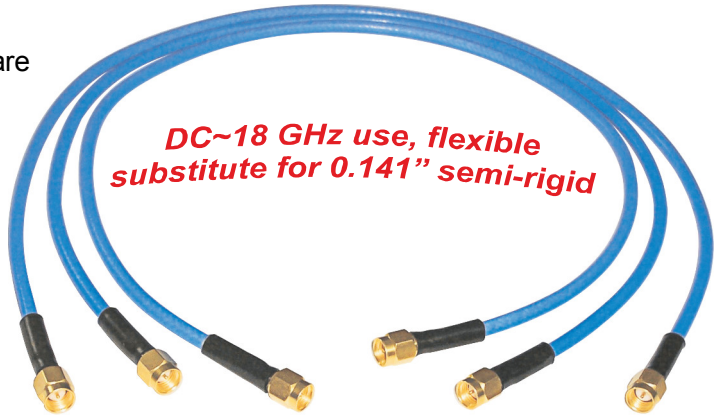
for rugged military, defense and T&M applications upto 18 GHz use

SONA Technologies
reliable performance, dependable service

MF02-Series Pre-connectorized Cable Sets are designed as flexible alternative to 0.141 inch semi-rigid types. MF02 have similar electrical and RF performance as 0.141" semi-rigid but WITHOUT the routing problems of semi-rgid types. MF02 cable sets are highly flexible and can be easily routed inside racks, rack-rack or inside LRU's. Designed for use upto 18 GHz with rugged cable-connector joints.



CONFORMANT MIL STANDARDS

- Cable conforms to MIL-C-17
- Connectors conform to MIL-PRF-39012

FLEXIBLE SUBSTITUTE TO SEMI-RIGID

MF02 cable sets are flexible alternatives to semi-rigid cables. RF and electrical parameters like loss, power handling of MF02 types are same as 0.141 inch semi-rigid types, but MF02 cable sets are flexible as compared to semi-rigid which are quite rigid. MF02 types overcome the routing problems of semi-rigid due to their flexibility. Compared to semi-rigid types there is no need for hand or machine bending

APPLICATIONS

- Military and defense systems interconnect
- General purpose test applications
- R&D labs
- Environmental and test chambers

Attenuation & Power Handling Data

Frequency	Insertion Loss		Power (watts)
	dB/ft	dB/m	
100 MHz	0.04	0.13	990
400 MHz	0.08	0.26	470
1 GHz	0.13	0.43	290
2 GHz	0.17	0.56	190
3 GHz	0.23	0.75	150
5 GHz	0.30	0.98	120
10 GHz	0.45	1.49	70
12 GHz	0.51	1.67	60
13.5 GHz	0.55	1.80	55
18 GHz	0.66	2.16	45

Physical & Mechanical Specifications

Dimensions	inches	mm
Center Conductor	0.037	0.95
Jacket	0.163	4.14
Bend Radius (min)	0.4	10
Weight	0.033 (lb/ft)	0.047 Kg/m
Temperature Range	-55°C ~ +125°C	

Electrical Specifications

Impedance	50 ohms
Velocity of Propagation	70 %
Shielding Effectiveness	better than -100 dB
Capacitance	29.9 pF/ft
Operating Frequency	20 GHz
Phase Stability with Flex	±5° @20GHz
Amplitude Stability* (dB/m@18GHz)	< ± 0.05dB

* Phase & amplitude stability test method: wrap cable 360° around a mandrel whose radius is 10 times the cable diameter

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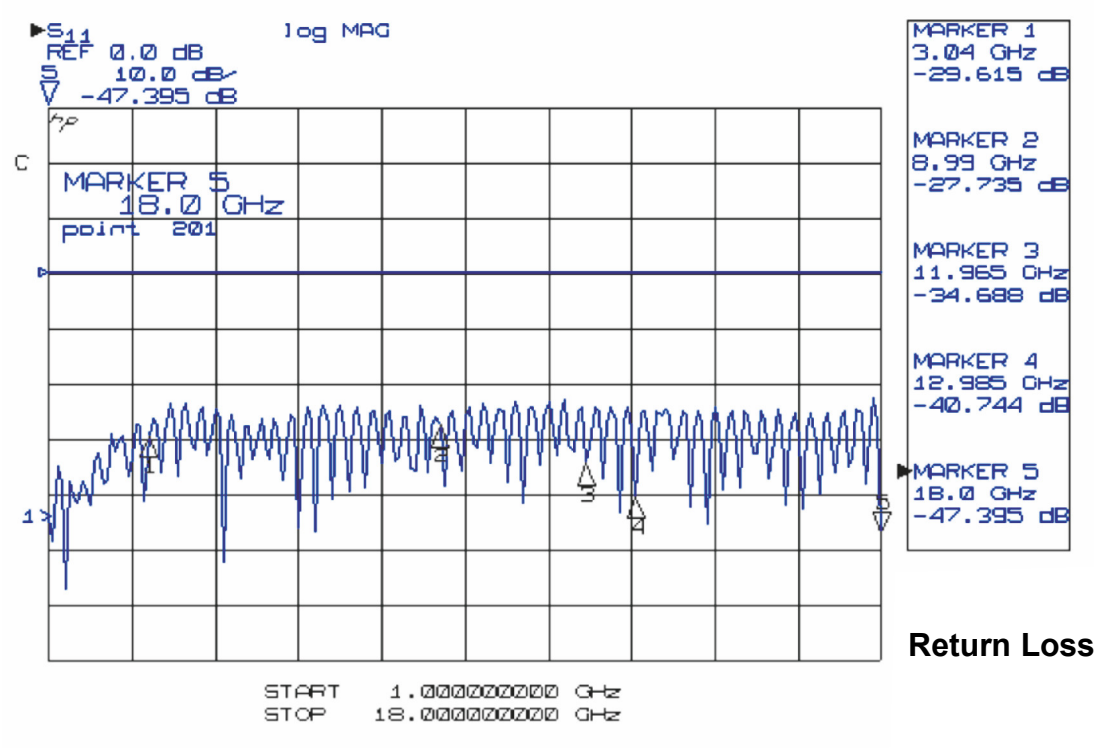
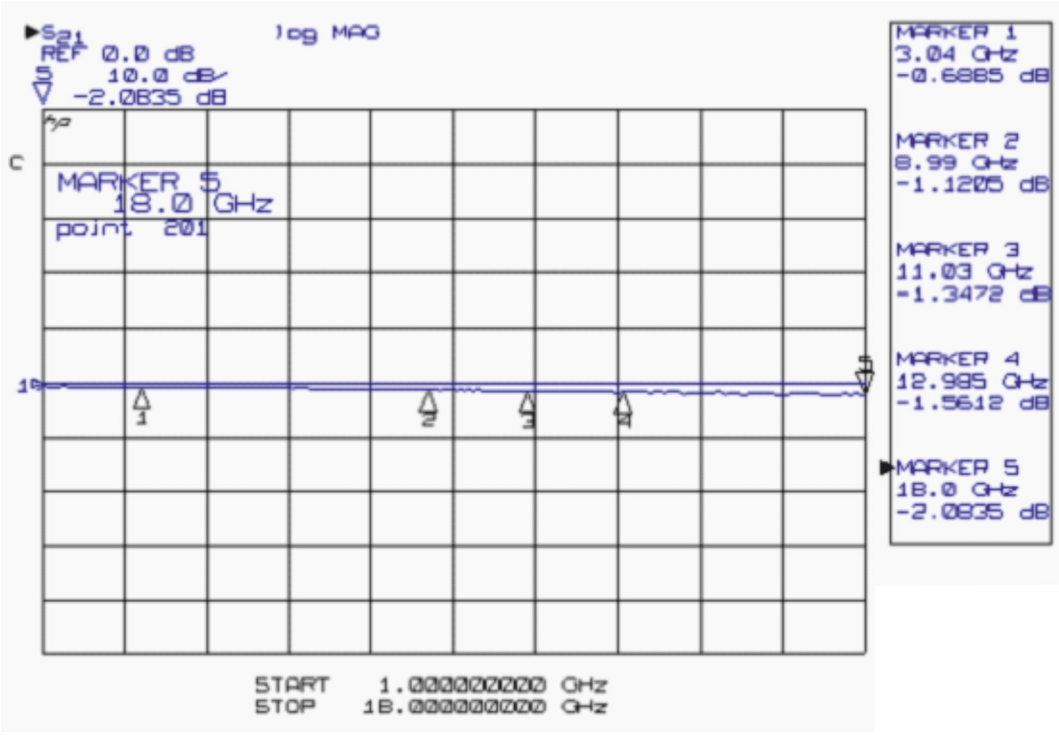
S11 Plot of 1m MF02 Pre-connectorized cable set with SMA(M) on both sides



Return Loss

S21 Plot of 1m MF02 Pre-connectorized cable set with SMA(M) on both sides



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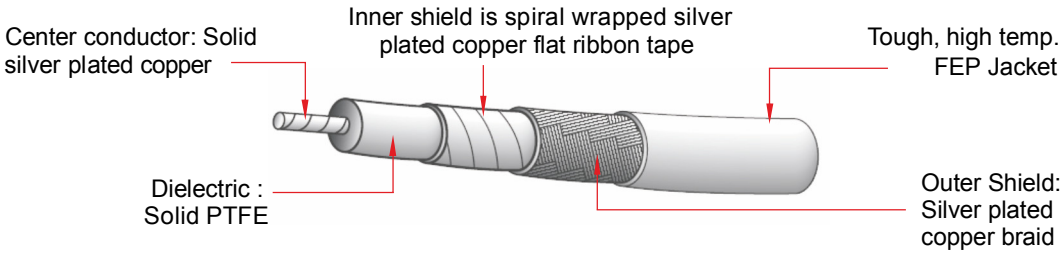
MF02 Cable Construction



Connectors Specifications

Specifications	SMA Connectors	N Connectors	TNC Connectors
Outer Conductor	Brass Gold plated	Copper alloy	Copper Alloy
Center Conductor	Brass, Gold Plated	Brass, Gold Plated	Brass, Gold Plated
Insulation	PTFE	PTFE	PTFE
Gasket	Silicon Rubber	Silicon Rubber	Silicon Rubber
Frequency range	DC~18 GHz	DC~11 GHz	DC~11
Nominal Impedance	50 Ω	50 Ω	50 Ω
Mating/Unmating	500 operations	500 operations	500 operations
Vibration	As per MIL-STD-202, method 204, test condition D		
Mechanical Shock	As per MIL-STD-202, method 213, test condition I		
Thermal Shock	As per MIL-STD-202, method 107, test condition B		
Humidity	As per MIL-STD-202, method 106		
Temperature Cycle	As per MIL-STD-202, method 102A, test condition C		

Ordering Codes Description

	(Length)		(Connector 1)		(Connector 2)	
MF02 -	□ □	-	□ (□ / □)	-	□ (□ / □) -	□
	L L		1 2 3		1 2 3	U

L L	Length	0.5 = 0.5 ; 1 = 1.0 ; 2 = 2.0
1	Connector Series	SMA = SMA ; N = N ; BNC = BNC; TNC = TNC
2	Male/Female Designator	M = Male ; F = Female
3	Orientation of Connector	ST = Straight ; RA = Right Angle
U	Unit of Length	M = Meter ; F = Feet ; I = Inch

1 meter cable set with SMA (Male) on both sides = MF02-1.0-SMA(M/ST)-SMA(M/ST)-M

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Cable Set Ordering Codes

Ordering Code	Length	Insertion Loss (dB) Typical					
		1.5 GHz	3 GHz	6 GHz	9 GHz	12 GHz	18 GHz
SMA (Male) Straight - SMA (Male) Straight							
MF02-0.5-SMA(M/ST)-SMA(M/ST)-M	0.5m	0.29	0.42	0.66	0.85	1.02	1.30
MF02-1.0-SMA(M/ST)-SMA(M/ST)-M	1m	0.75	0.95	1.20	1.70	1.84	2.38
MF02-2.0-SMA(M/ST)-SMA(M/ST)-M	2m	1.25	1.70	2.27	3.10	3.49	4.55
MF02-3.0-SMA(M/ST)-SMA(M/ST)-M	3m	1.75	2.50	3.34	4.60	5.15	7.20
MF02-5.0-SMA(M/ST)-SMA(M/ST)-M	5m	2.75	3.95	5.50	7.50	8.48	11.03
MF02-1.0-SMA(M/ST)-SMA(M/ST)-F	1 feet	0.19	0.30	0.44	0.58	0.68	0.88
MF02-2.0-SMA(M/ST)-SMA(M/ST)-F	2 feet	0.34	0.51	0.77	0.98	1.19	1.54
SMA (Male) Straight - SMA (Male) Right Angle							
MF02-0.5-SMA(M/ST)-SMA(M/RA)-M	0.5m	0.31	0.46	0.67	0.87	-	-
MF02-1.0-SMA(M/ST)-SMA(M/RA)-M	1m	0.78	0.98	1.23	1.75	-	-
MF02-2.0-SMA(M/ST)-SMA(M/RA)-M	2m	1.30	1.75	2.28	3.20	-	-
MF02-3.0-SMA(M/ST)-SMA(M/RA)-M	3m	1.80	2.60	3.36	4.70	-	-
MF02-5.0-SMA(M/ST)-SMA(M/RA)-M	5m	2.80	3.98	5.53	7.60	-	-
MF02-1.0-SMA(M/ST)-SMA(M/RA)-F	1 feet	0.21	0.31	0.47	0.59	-	-
MF02-2.0-SMA(M/ST)-SMA(M/RA)-F	2 feet	0.36	0.52	0.80	1.02	-	-
SMA(Male) Right Angle - SMA(Male) Right Angle							
MF02-0.5-SMA(M/RA)-SMA(M/RA)-M	0.5m	0.32	0.48	0.71	0.89	-	-
MF02-1-SMA(M/RA)-SMA(M/RA)-M	1m	0.79	0.99	1.25	1.77	-	-
MF02-2-SMA(M/RA)-SMA(M/RA)-M	2m	1.30	1.77	2.32	3.28	-	-
MF02-3-SMA(M/RA)-SMA(M/RA)-M	3m	1.82	2.65	3.39	4.75	-	-
MF02-5-SMA(M/RA)-SMA(M/RA)-M	5m	2.83	3.99	5.54	7.65	-	-
MF02-1-SMA(M/RA)-SMA(M/RA)-F	1 feet	0.23	0.33	0.49	0.62	-	-
MF02-2-SMA(M/RA)-SMA(M/RA)-F	2 feet	0.39	0.55	0.82	1.04	-	-
N (Male) Straight - N (Male) Straight							
MF02-0.5-N(M/ST)-N(M/ST)-M	0.5m	0.30	0.45	0.67	0.86	1.03	-
MF02-1.0-N(M/ST)-N(M/ST)-M	1m	0.75	0.95	1.21	1.70	1.85	-
MF02-2.0-N(M/ST)-N(M/ST)-M	2m	1.25	1.70	2.28	3.10	3.51	-
MF02-3.0-N(M/ST)-N(M/ST)-M	3m	1.75	2.50	3.36	4.60	5.17	-
MF02-5.0-N(M/ST)-N(M/ST)-M	5m	2.75	3.95	5.51	7.50	8.50	-
MF02-1.0-N(M/ST)-N(M/ST)-F	1 feet	0.20	0.31	0.46	0.59	0.70	-
MF02-2.0-N(M/ST)-N(M/ST)-F	2 feet	0.35	0.52	0.79	1.01	1.21	-

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Cable Set Ordering Codes

Ordering Code	Length	Insertion Loss (dB) Typical					
		1.5 GHz	3 GHz	6 GHz	9 GHz	12 GHz	18 GHz
SMA (Male) Straight - N (Male) Straight							
MF02-0.5-SMA(M/ST)-N(M/ST)-M	0.5m	0.29	0.44	0.66	0.85	1.02	-
MF02-1.0-SMA(M/ST)-N(M/ST)-M	1m	0.77	0.97	1.20	1.72	1.84	-
MF02-2.0-SMA(M/ST)-N(M/ST)-M	2m	1.27	1.72	2.27	3.25	3.50	-
MF02-3.0-SMA(M/ST)-N(M/ST)-M	3m	1.77	2.52	3.35	4.65	5.16	-
TNC (Male) Straight - TNC (Male) Straight							
MF02-0.5-TNC(M/ST)-TNC(M/ST)-M	0.5m	0.32	0.47	0.70	0.88	1.05	-
MF02-1.0-TNC(M/ST)-TNC(M/ST)-M	1m	0.77	0.97	1.24	1.72	1.88	-
MF02-2.0-TNC(M/ST)-TNC(M/ST)-M	2m	1.25	1.72	2.30	3.13	3.53	-
MF02-3.0-TNC(M/ST)-TNC(M/ST)-M	3m	1.75	2.55	3.39	4.65	5.20	-
MF02-5.0-TNC(M/ST)-TNC(M/ST)-M	5m	2.75	3.97	5.53	7.52	8.53	-
MF02-1.0-TNC(M/ST)-TNC(M/ST)-F	1 feet	0.22	0.33	0.48	0.61	0.72	-
MF02-2.0-TNC(M/ST)-TNC(M/ST)-F	2 feet	0.37	0.54	0.81	1.03	1.23	-
SMA (Male) Straight - Quick Lock (Male) Straight							
MF02-0.5-SMA(M/ST)-QL(M/ST)-M	0.5m	0.35	0.51	0.76	-	-	-
MF02-1.0-SMA(M/ST)-QL(M/ST)-M	1m	0.78	0.99	1.29	-	-	-
MF02-5.0-SMA(M/ST)-QL(M/ST)-M	5m	2.80	3.99	5.59	-	-	-
MF02-1.0-SMA(M/ST)-QL(M/ST)-F	1 feet	0.25	0.37	0.55	-	-	-
MF02-2.0-SMA(M/ST)-QL(M/ST)-F	2 feet	0.40	0.59	0.87	-	-	-
SMA (Male) Straight - TNC (Male) Straight							
MF02-0.5-SMA(M/ST)-TNC(M/ST)-M	0.5m	0.35	0.51	0.76	0.96	-	-
MF02-1.0-SMA(M/ST)-TNC(M/ST)-M	1m	0.79	0.99	1.29	1.77	-	-
MF02-5.0-SMA(M/ST)-TNC(M/ST)-M	5m	2.77	3.99	5.59	7.59	-	-
MF02-1.0-SMA(M/ST)-TNC(M/ST)-M	1 feet	0.25	0.37	0.55	0.69	-	-
MF02-2.0-SMA(M/ST)-TNC(M/ST)-M	2 feet	0.40	0.59	0.87	1.11	-	-
N (Male) Straight - TNC (Male) Straight							
MF02-0.5-N(M/ST)-TNC(M/ST)-M	0.5m	0.37	0.55	0.80	1.02	-	-
MF02-1.0-N(M/ST)-TNC(M/ST)-M	1m	0.80	0.98	1.34	1.79	-	-
MF02-5.0-N(M/ST)-TNC(M/ST)-M	5m	2.79	3.98	5.64	7.65	-	-
MF02-1.0-N(M/ST)-TNC(M/ST)-M	1 feet	0.28	0.41	0.60	0.75	-	-
MF02-2.0-N(M/ST)-TNC(M/ST)-M	2 feet	0.42	0.621	0.92	1.17	-	-

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Specifications for MIL Use Semi-Flexible Low Loss RF Cable Sets

Length Connector 1 Connector 2

- Should be flexible, easily routable
- Cable should conform to MIL standards MIL-C-17 and connectors to MIL-PRF-39012

Cable Electrical Specifications

- Impedance: 50 ohms
- Frequency: DC~18 GHz
- Velocity of Propagation: 70 %
- Shielding Effectiveness: better than -100 dB
- Power Handling: > 145 Watts Average @3 GHz
  > 100 Watts Average @10 GHz
  > 45 Watts Average @18 GHz
- Insertion Loss : < 0.24 dB/feet @3 GHz
  < 0.46 dB/feet @10 GHz
  < 0.67 dB/feet @18 GHz
- VSWR : < 1.3 (DC~11 Ghz) for SMA straight connector
  < 1.4 (11~18 GHz) for SMA straight connector
  < 1.35 (DC~7 GHz) for SMA right angle connector

Cable Physical & Mechanical Specifications

- Construction should be double shielded for low loss
- Inner Conductor: Solid Silver Covered Copper
- Dielectric: PTFE
- Inner Shield: Silver Plated Copper Flat Ribbon Tape
- Outer Shield: Silver-Plated Copper Braid
- Jacket: Rugged Fluorinated Ethylene Propylene (FEP) suitable for harsh environment
- Overall diameter: < 4.15 mm
- Bending Radius: < 12 mm
- Temperature Range: -55°C ~ +125°C

Connector Specifications (SMA)

- Outer Conductor: Stainless Steel/Brass, Gold plated
- Center Conductor: Brass, Gold Plated
- Insulation: PTFE
- Frequency range: DC~18 GHz (for SMA straight)
  DC~7 GHz for SMA right angle
- Should meet test conditions of MIL-STD-202 for vibration, mechanical shock, thermal shock, corrosion, humidity, temperature cycling

Connector Specifications (N)

- Outer Conductor: Copper alloy
- Center Conductor: Brass, Gold Plated
- Insulation: PTFE
- Frequency range: DC~11 GHz for N straight
  DC~4 GHz for N right angle
- Should meet test conditions of MIL-STD-202 for vibration, mechanical shock, thermal shock, corrosion, humidity, temperature cycling

Connector Specifications (TNC)

- Outer Conductor: Copper alloy
- Center Conductor: Brass, Gold Plated
- Insulation: PTFE
- Frequency range: DC~11 GHz for TNC straight
- Should meet test conditions of MIL-STD-202 for vibration, mechanical shock, thermal shock, corrosion, humidity, temperature cycling