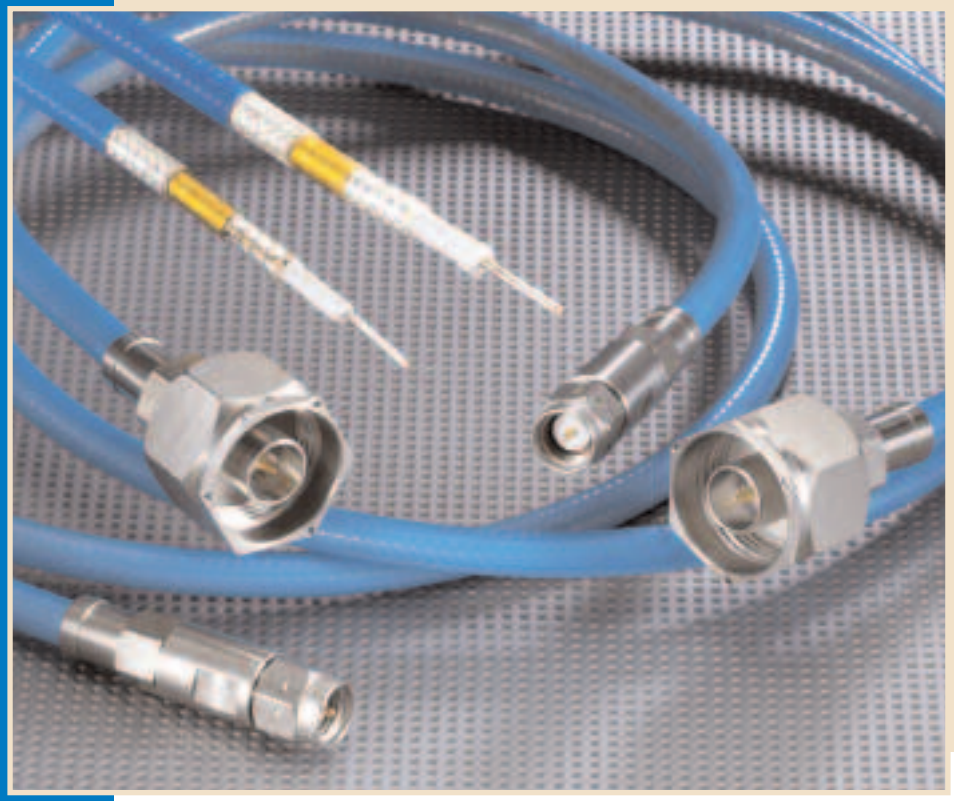
SFT™ High Performance Microwave Coaxial Cable, Connectors and Assemblies

ISO 9001 Certified



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

TIMES MICROWAVE SYSTEMS

SFT™ Cable Construction

Center Conductor — SFT™ Cables use solid center conductors for the lowest attenuation. The center conductors are solid silver- plated copper except for SFT-226 and SFT-600, which are stranded. The silver plating provides the best long-term performance in high frequency applications.

Dielectric — SFT Cables incorporate proprietary low loss taped expanded PTFE dielectrics with 76% velocity. These provide much greater inherent ruggedness than dielectrics with 80% or higher velocity. This results in better flex life and stability in applications, such as testing and field deployable antenna feeders, where the cable will be flexed over its life.

Jacket — The jacket is translucent blue FEP (Fluorinated Ethylene Propylene). This tough, high temperature material provides mechanical protection and its smooth low friction surface is ideal for routing through tight spaces. It is also inherently resistant to degradation from exposure to UV, making these cables suitable for outdoor use.

Inner Shield — The inner shield of the SFT cables is silver-plated copper flat ribbon braid. This construction, pioneered by Times Microwave Systems in the mid-1960s, replaces groups of round wire with a single silver-plated flat wire or ribbon. The result is a close approximation of a smooth, continuous silver surface — the ideal coaxial cable inner shield. This is achieved while maintaining the ability for the cable to flex and bend due to the interwoven braided construction.

Outer Shield — The outer shield consists of round wire braid. In addition to providing additional shielding and mechanical protection, this layer is used for connector attachment and retention. Connectors for these cables are designed to crimp, clamp or solder to the flat wire and round wire braids.

Interlayer — The helically applied interlayer consists of a composite Aluminum/Kapton® tape, which serves to provide improved shielding and to mechanically restrain the flat braids to maintain their electrical performance with flexing. This layer is removed for connector attachment.

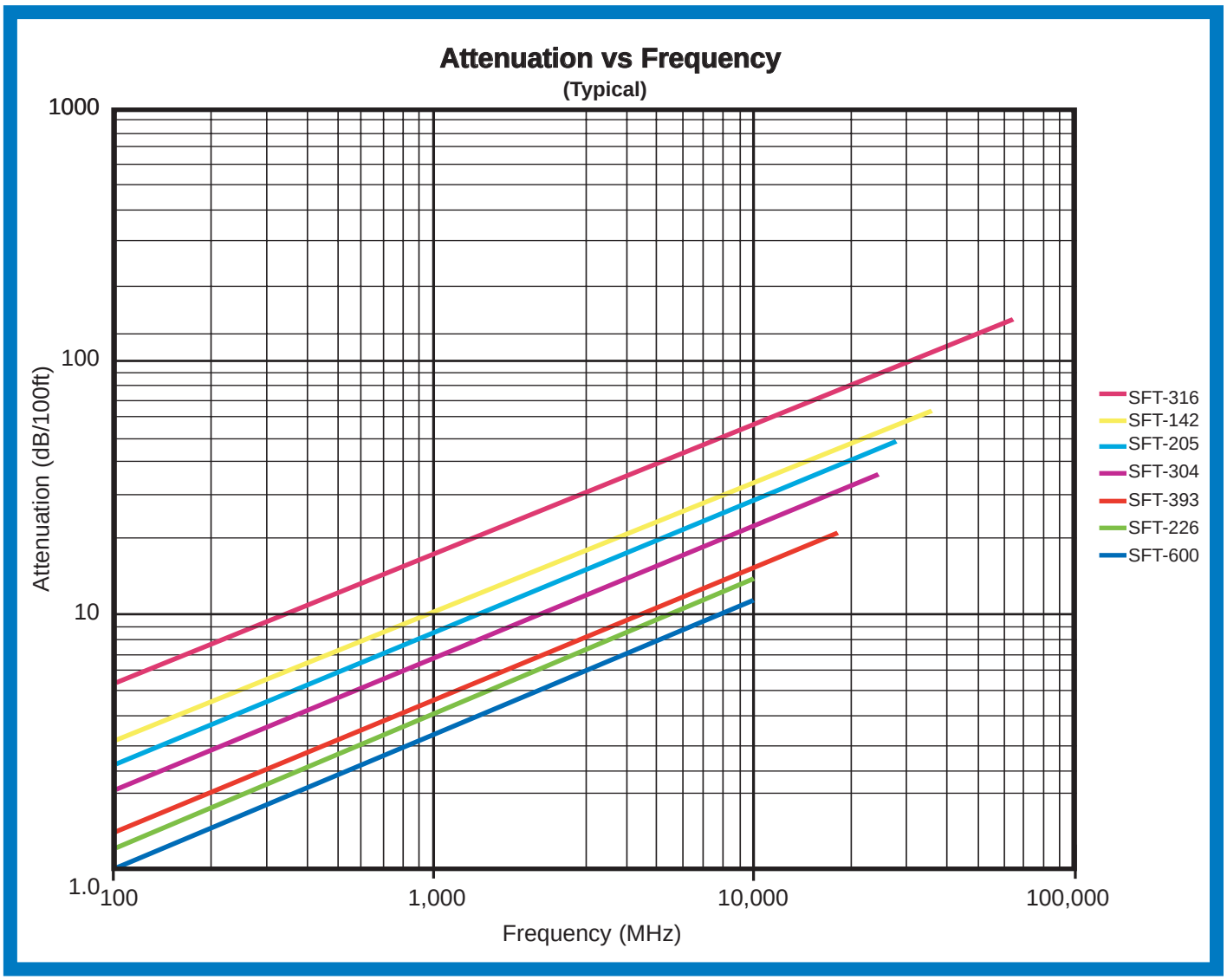
**Kapton® is a registered trademark of Dupont.*

SFT™ High Performance Microwave Coaxial Cables, Connectors

The SFT Product Line has been successfully deployed in a broad range of applications. It has been used in system level microwave interconnects for airborne and ground based military as well as, commercial telecom applications. It performs admirably as a low loss test cable for production testing of RF components and equipment with excellent phase stability and durability. The larger sizes are ideal for high power industrial applications, where their high power handling combined with flexibility provide long life in semi-conductor manufacturing equipment and robotic laser cutting equipment. Interconnects in MRI systems and other medical applications utilize the low loss and stability that these cables provide. The smaller sizes have been used as board level interconnects within LRU's in both military and commercial systems.

Our expertise as a cable assembly supplier has led to the refinement of these cable designs. They provide an excellent combination of outstanding electrical performance, mechanical ruggedness and cost effectiveness. Combined with the availability of a good selection of connectors, this makes them the practical choice for a broad range of demanding applications. Our field engineers can help you to select the right cable for your application from the range of SFT cables or the large range of other standard and special cables produced by Times Microwave Systems.

SFT Attenuation -vs- Frequency



SFT™ Specifications

	SFT-316		SFT-142		SFT-205	
Physical & Mechanical Specifications						
Dimensions	inches	mm	inches	mm	inches	mm
Center Conductor	0.0226	(0.57)	0.0403	(1.02)	0.0508	(1.29)
Dielectric	0.068	(1.73)	0.121	(3.07)	0.154	(3.91)
Inner Shield	0.078	(1.98)	0.131	(3.33)	0.164	(4.17)
Interlayer	0.083	(1.85)	0.136	(3.48)	0.169	(4.29)
Outer Shield	0.096	(2.44)	0.158	(4.01)	0.187	(4.75)
Jacket	0.120	(3.05)	0.180	(4.57)	0.205	(5.21)
Bend Radius: minimum	0.500	(12.7)	0.750	(19.1)	1.000	(25.4)
Weight	0.018 lbs/ft	(0.03 kG/m)	0.036 lbs/ft	(0.05 kG/m)	0.042 lbs/ft	(0.06 kG/m)
Temperature Range	-67°/+392°F	(-55°/+200°C)				
Electrical Specifications						
Impedance	50 ohms		50 ohms		50 ohms	
Velocity of Propagation	76 %		76 %		76 %	
Dielectric Constant	1.73		1.73		1.73	
Shielding Effectiveness	>100 dB		>100 dB		>100 dB	
Time Delay	1.34 nS/ft	(4.39 nS/m)	1.34 nS/ft	(4.39 nS/m)	1.34 nS/ft	(4.39 nS/m)
Capacitance	26.7 pF/ft	(87.7 pF/m)	26.7 pF/ft	(87.7 pF/m)	26.7 pF/ft	(87.7 pF/m)
Inductance	0.067 uH/ft	(0.22 uH/m)	0.067 uH/ft	(0.22 uH/m)	0.067 uH/ft	(0.22 uH/m)
Cutoff Frequency	63 GHz		35 GHz		28 GHz	
Voltage Withstand	500 DC		1000 DC		1500 DC	
Peak Power	0.6 kW		2.5 kW		5.6 kW	
DC Resistance - ohms	ohms/1000ft	(ohms/km)	ohms/1000ft	(ohms/km)	ohms/1000ft	(ohms/km)
Inner Conductor	20.3	(66.6)	6.39	(21.0)	4.02	(13.2)
Outer Conductor	5.54	(18.2)	3.10	(10.2)	2.43	(8.0)

Attenuation & Power Handling	Attenuation (Typical; +25°C Ambient) & Power Handling (Maximum; +40°C Ambient; Sea Level; VSWR 1:1)								
Frequency (MHz)	dB/100ft	dB/100m	kW	dB/100ft	dB/100m	kW	dB/100ft	dB/100m	kW
13.56	2.0	7	4.044	1.2	3.8	5.040	1.0	3.2	6.648
30	3.0	10	2.713	1.7	5.7	3.382	1.4	4.7	4.461
100	5.5	18	1.478	3.2	10.4	1.843	2.6	8.6	2.431
150	7	22	1.203	3.9	12.8	1.501	3.2	10.6	1.980
400	11	36	0.730	6.4	20.9	0.912	5.3	17.4	1.202
900	17	55	0.481	9.6	31.6	0.601	8.0	26.2	0.792
1000	18	58	0.455	10.2	33.3	0.569	8.4	27.7	0.750
1500	22	71	0.368	12.5	41.0	0.461	10.4	34.0	0.608
2000	25	82	0.316	14.5	47.4	0.397	12.0	39.5	0.523
3000	31	101	0.255	17.8	58.4	0.320	14.8	48.7	0.422
4000	36	117	0.219	20.7	67.8	0.275	17.2	56.5	0.362
5000	40	131	0.194	23.2	76.1	0.244	19.4	63.5	0.321
6000	44	144	0.175	25.5	83.7	0.221	21.3	69.9	0.291
8000	51	167	0.149	29.6	97.3	0.189	24.8	81.3	0.249
10000	57	187	0.132	33.3	109.4	0.167	27.9	91.5	0.220
12000	63	205	0.119	36.7	120.4	0.151	30.7	100.9	0.198
13500	67	218	0.111	39.1	128.2	0.141	32.8	107.5	0.186
15000	70	231	0.105	41.3	135.6	0.133	34.7	113.7	0.175
18000	77	253	0.094	45.5	149.4	0.120	38.3	125.5	0.157
24000	90	295	0.079	53.2	174.5	0.101	44.8	146.8	0.133
28000	97	319	0.072	57.8	189.7	0.092	48.7	159.8	0.122
35000	110	359	0.063	65.3	214.2	0.081			
63000	150	492	0.043						
Attenuation at Frequency	$(A=K1\sqrt{FMHz} + K2\ FMHz)$								
K1	0.551680			0.315330			0.260980		
K2	0.000180			0.000180			0.000180		

SFT-304		SFT-393		SFT-226		SFT-600	
inches	mm	inches	mm	inches	mm	inches	mm
0.062	(1.57)	0.096	(2.44)	0.131	(3.33)	0.163	(4.14)
0.185	(4.70)	0.285	(7.24)	0.370	(9.40)	0.455	(11.56)
0.195	(4.95)	0.295	(7.49)	0.380	(9.65)	0.465	(11.81)
0.200	(5.08)	0.300	(7.62)	0.385	(9.78)	0.470	(11.94)
0.227	(5.77)	0.319	(8.10)	0.399	(10.14)	0.499	(12.67)
0.250	(6.35)	0.390	(9.91)	0.485	(12.32)	0.565	(14.35)
1.250	(31.8)	2.000	(50.8)	2.500	(63.5)	3.000	(76.2)
0.067 lbs/ft	(0.10 kG/m)	0.126 lbs/ft	(0.19 kG/m)	0.235 lbs/ft	(0.35 kG/m)	0.265 lbs/ft	(0.39 kG/m)
			-67°/+392°F		(-55°/+200°C)		
50 ohms		50 ohms		50 ohms		50 ohms	
76 %		76 %		76 %		76 %	
1.73		1.73		1.73		1.73	
>100 dB		>100 dB		>100 dB		>100 dB	
1.34 nS/ft	(4.39 nS/m)	1.34 nS/ft	(4.39 nS/m)	1.34 nS/ft	(4.39 nS/m)	1.34 nS/ft	(4.39 nS/m)
26.7 pF/ft	(87.7 pF/m)	26.7 pF/ft	(87.7 pF/m)	26.7 pF/ft	(87.7 pF/m)	26.7 pF/ft	(87.7 pF/m)
0.067 uH/ft	(0.22 uH/m)	0.067 uH/ft	(0.22 uH/m)	0.067 uH/ft	(0.22 uH/m)	0.067 uH/ft	(0.22 uH/m)
23 GHz		15 GHz		11 GHz		9.2 GHz	
2000 DC		2500 DC		3000 DC		4000 DC	
10 kW		16 kW		22 kW		40 kW	
ohms/1000ft	(ohms/km)	ohms/1000ft	(ohms/km)	ohms/1000ft	(ohms/km)	ohms/1000ft	(ohms/km)
2.70	(8.9)	1.13	(3.7)	0.63	(2.1)	0.52	(1.7)
2.02	(6.6)	1.3	(4.3)	1.04	(3.4)	0.8	(2.6)
Attenuation (Typical; +25°C Ambient) & Power Handling (Maximum; +40°C Ambient; Sea Level; VSWR 1:1)							
dB/100ft	dB/100m	kW	dB/100ft	dB/100m	kW	dB/100ft	dB/100m	kW	dB/100ft	dB/100m	kW
0.8	2.5	9.057	0.5	1.7	16.417	0.5	1.5	20.571	0.4	1.2	26.138
1.1	3.8	6.076	0.7	2.5	11.007	0.7	2.2	13.788	0.6	1.8	17.512
2.1	6.9	3.310	1.4	4.5	5.987	1.2	4.1	7.496	1.0	3.4	9.509
2.6	8.5	2.695	1.7	5.6	4.871	1.5	5.0	6.097	1.3	4.2	7.731
4.2	13.9	1.635	2.8	9.2	2.948	2.5	8.2	3.686	2.1	6.9	4.665
6.4	21.0	1.077	4.2	13.9	1.936	3.8	12.5	2.418	3.2	10.5	3.052
6.8	22.2	1.020	4.5	14.7	1.832	4.0	13.2	2.288	3.4	11.1	2.887
8.3	27.3	0.826	5.5	18.2	1.480	5.0	16.4	1.846	4.2	13.8	2.326
9.7	31.7	0.710	6.4	21.1	1.270	5.8	19.1	1.584	4.9	16.1	1.992
11.9	39.2	0.573	8.0	26.2	1.022	7.2	23.7	1.272	6.1	20.0	1.597
13.9	45.5	0.491	9.3	30.6	0.874	8.4	27.6	1.087	7.1	23.4	1.362
15.6	51.2	0.435	10.5	34.5	0.773	9.5	31.2	0.961	8.1	26.5	1.202
17.2	56.4	0.394	11.6	38.1	0.698	10.5	34.5	0.868	8.9	29.3	1.084
20.1	65.8	0.336	13.6	44.6	0.594	12.3	40.5	0.738	10.5	34.5	0.919
22.6	74.2	0.297	15.4	50.5	0.524	14.0	45.9	0.649			
25.0	81.9	0.268	17.1	55.9	0.471						
26.6	87.3	0.251	18.2	59.8	0.440						
28.2	92.5	0.236	19.3	63.5	0.414						
31.2	102.2	0.213									
36.6	119.9	0.180									
			(A=K1 $\sqrt{FMHz}$ + K2 FMHz)								
0.208100			0.135930			0.121830			0.101373		
0.000180			0.000180			0.000180			0.000180		

Specifications subject to change without notice.

For further information, pricing and delivery, please contact our Sales Department.

SFT™ Connectors

Two different series of connectors are available for SFT cables — standard and premium. These connectors differ both in their performance and in their method of attachment.

The standard connectors attach to the cable outer shield via a clamp or crimp and attach to the center conductor of the cable via soldering. Although careful removal of the interlayer tape is required to prepare the outer shield for connector attachment, they are relatively easier to attach than the premium connectors.

The standard connectors will typically provide VSWR of 1.4 or better up to about 6 GHz. This assumes proper cable preparation and is the typical performance of a 30" assembly with the same connector on each end. The premium connectors (Available for SFT-205 & SFT-304 sizes only) provide VSWR of better than 1.35 up to 18 GHz when properly attached to a 30" length of cable.

SFT Standard Connectors

Interface	Description	Part Number	Stock Code	Coupling Nut	Center Contact Attachment	Outer Contact Attachment	Finish* Body/Pin	Length in	Length mm	Width in	Width mm
SFT-316											
SMA Male	Straight Plug	TC-100-SM	3190-1551	Hex	Solder	Crimp	SS/G	1.0	25.4	0.32	8.1
TNC Male	Straight Plug	TC-100-TM	3190-1552	Knurl	Solder	Crimp	S/G	1.4	35.6	0.59	15.0
SFT-142											
N Male	Straight Plug	TC-200-NM	3190-224	Knurl	Solder	Crimp	S/G	1.5	38	0.75	19.1
TNC Male	Straight Plug	TC-200-TMC	3190-240	Knurl	Solder	Clamp	S/G	1.7	43	0.59	15.0
TNC Female	Straight Jack	TC-200-TF	3190-263	NA	Solder	Crimp	N/G	1.3	33	0.57	14.5
SMA Male	Straight Plug	TC-200-SM	3190-612	Hex	Solder	Crimp	SS/G	1.0	25	0.32	8.1
SFT-205											
N Male	Straight Plug	TC-240-NM	3190-382	Hex	Solder	Crimp	N/S	1.5	38	0.75	19.1
N Male	Right Angle	TC-240-NM-RA(A)	3190-868	Hex	Solder	Crimp	A/G	1.3	33	1.14	29.1
N Female	Bulkhead Jack	TC-240-NF-BHF(A)	3190-866	NA	Solder	Crimp	A/G	1.7	43	0.88	22.2
TNC Male	Straight Plug	TC-240-TM	3190-275	Knurl	Solder	Crimp	N/S	1.7	43	0.59	15.0
TNC Male	Right Angle	TC-240-TM-RA	3190-604	Knurl	Solder	Crimp	N/G	1.3	33	0.57	14.5
SMA Male	Straight Plug	TC-240-SM	3190-380	Hex	Solder	Crimp	SS/G	1.0	25	0.32	8.1
SFT-304											
N Male	Straight Plug	TC-300-NM	3190-498	Knurl	Solder	Crimp	N/S	1.6	41	0.85	21.6
N Male	Right Angle	TC-300-NM-RA	3190-499	Knurl	Solder	Crimp	N/S	1.5	38	0.85	21.6
TNC Male	Straight Plug	TC-300-TM	3190-500	Knurl	Solder	Crimp	N/S	1.7	43	0.59	15.0
SMA Male	Straight Plug	TC-300-SM	3190-501	Hex	Solder	Crimp	SS/G	1.0	25	0.35	8.9
SMA Female	Bulkhead Jack	TC-300-SF-BH	3190-590	NA	Solder	Crimp	SS/G	1.1	28	0.31	7.9
SFT-393											
N Male	Straight Plug	SC-400-NM	3190-1454	Knurl	Solder	Crimp	N/G	1.5	38	0.75	19.1
N Male	Straight Plug	TC-400-NMH	3190-552	Hex	Solder	Crimp	S/G	1.5	38	0.89	22.6
N Male	Right Angle	TC-400-NMH-RA	3190-422	Hex	Solder	Crimp	S/G	1.8	46	1.25	31.8
N Female	Straight Jack	TC-400-NFC	3190-299	NA	Solder	Clamp	N/S	1.6	41	0.75	19.1
N Female	Bulkhead Jack	TC-400-NFC-BH(A)	3190-872	NA	Solder	Clamp	A/G	1.8	46	0.88	22.4
TNC Male	Straight Plug	TC-400-TM	3190-260	Knurl	Solder	Crimp	N/S	1.7	43	0.59	15.0
TNC Male	Right Angle	TC-400-TM-RA	3190-442	Knurl	Solder	Crimp	N/G	1.7	43	0.59	15.0
SMA Male	Straight Plug	TC-400-SM	3190-439	Hex	Solder	Crimp	N/G	1.2	29	0.50	12.7
7-16 DIN Male	Straight Plug	TC-400-716-MC	3190-279	Hex	Solder	Clamp	S/S	1.4	36	1.40	35.6
7-16 DIN Female	Straight Jack	TC-400-716-FC	3190-376	NA	Solder	Clamp	S/S	1.6	41	1.13	28.7
SFT-226											
N Male	Straight Plug	TC-500-NMC	3190-377	Hex	Solder	Clamp	S/G	2.1	53	0.92	23.4
N Male	Right Angle	TC-500-NMC-RA	3190-227	Hex	Solder	Clamp	S/G	2.4	61	1.5	38.1
TNC Male	Straight Plug	TC-500-TM	3190-464	Hex	Solder	Crimp	N/G	1.5	38	0.62	15.7
SFT-600											
N Male	Straight Plug	TC-600-NMH	3190-208	Hex	Solder	Crimp	S/G	2.1	53	0.92	23.4
N Male	Right Angle	TC-600-NMH-RA	3190-785	Hex	Solder	Crimp	S/G	2.1	53	0.92	23.4
N Female	Bulkhead Jack	TC-600-NF-BH	3190-589	NA	Solder	Crimp	S/G	2.4	61	0.88	22.4
TNC Male	Straight Plug	EZ-600-TM	3190-418	Knurl	Spring Finger	Crimp	S/G	1.7	43	0.59	15.0
7-16 DIN Male	Straight Plug	TC-600-716-MC	3190-502	Hex	Solder	Clamp	S/S	2.0	51	1.30	33.0
7-16 DIN Female	Straight Jack	TC-600-716-FC	3190-375	NA	Solder	Clamp	S/S	1.1	28	1.00	25.4

Finish Metals: N=Nickel S=Silver G=Gold SS=Stainless Steel A=Alballoy

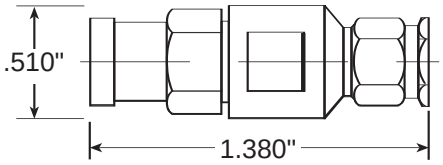
SFT™ Premium Performance Connectors

Premium connectors attach to the cable via a solder to both the outer shield and the center conductor. Achieving the stated performance requires expert soldering techniques and precise trimming of the outer shield, which is best accomplished with automated stripping equipment, and expert soldering techniques. They are suitable for use by experienced, professional cable assembly shops.

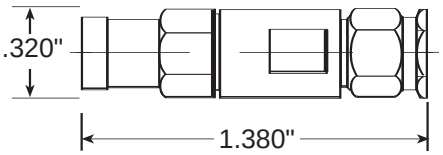
Interface	Description	Part Number	Stock Code	Coupling Nut	Center Contact Attachment	Outer Contact Attachment	Finish* Body/Pin	Length in	Length mm	Width in	Width mm	VSWR (< 18 GHz)
N Male	Straight Plug	TC-205-NMH-P	3190-1464	Hex	Solder	Solder	SS/G	1.24	31.5	0.75	19.1	< 1.35:1
SMA Male	Straight Plug	TC-205-SMH-P	3190-1462	Hex	Solder	Solder	SS/G	1.38	35.1	0.32	8.1	< 1.35:1
N Male	Straight Plug	TC-304-NMH-P	3190-1463	Hex	Solder	Solder	SS/G	1.24	31.5	0.75	19.1	< 1.35:1
SMA Male	Straight Plug	TC-304-SMH-P	3190-1461	Hex	Solder	Solder	SS/G	1.38	35.1	0.51	13.0	< 1.35:1

Finish Metals: G=Gold SS=Stainless Steel

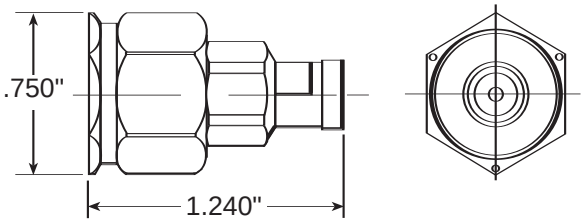
TC-304-SMH-P



TC-205-SMH-P



TC-304-NMH-P



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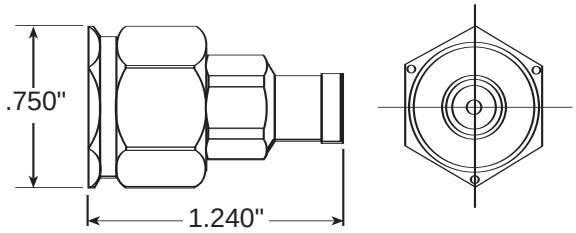
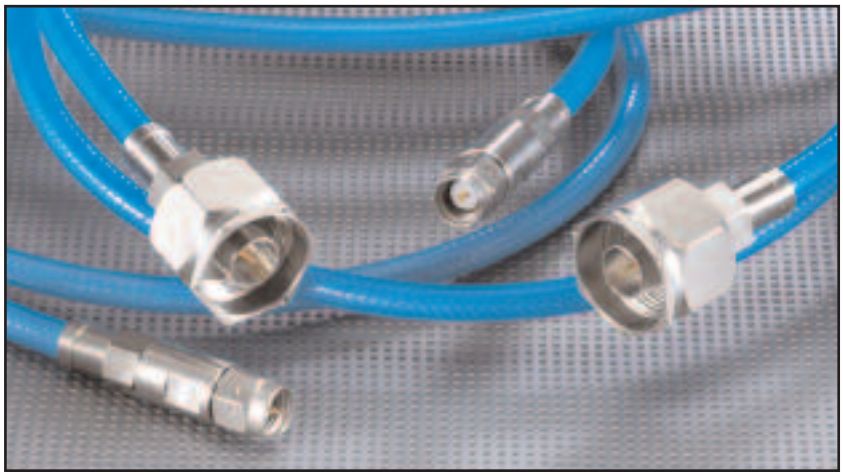


SFT™ Cable Assemblies

Times Microwave Systems also provides SFT cables as assemblies to meet a broad range of application requirements. We provide special testing, custom connectors, improved strain relief, special markings and other services to meet the requirements of your application. We produce the cable assemblies in our U.S. facility or at our facility in Shanghai, China.



About TIMES MICROWAVE SYSTEMS

Times Microwave Systems was founded in 1948 and was formerly known as Times Wire and Cable Company. Times Microwave Systems specializes in the design and manufacture of high performance flexible, semi-flexible and semi-rigid coaxial cable, connectors and cable assemblies. Times Microwave Systems, with over 50 years of leadership in the defense microwave systems arena, offers high tech solutions for today's most challenging applications.

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