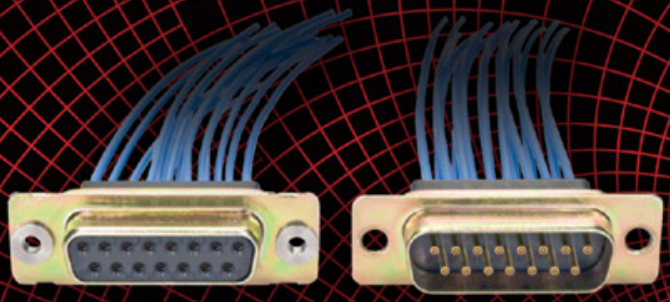
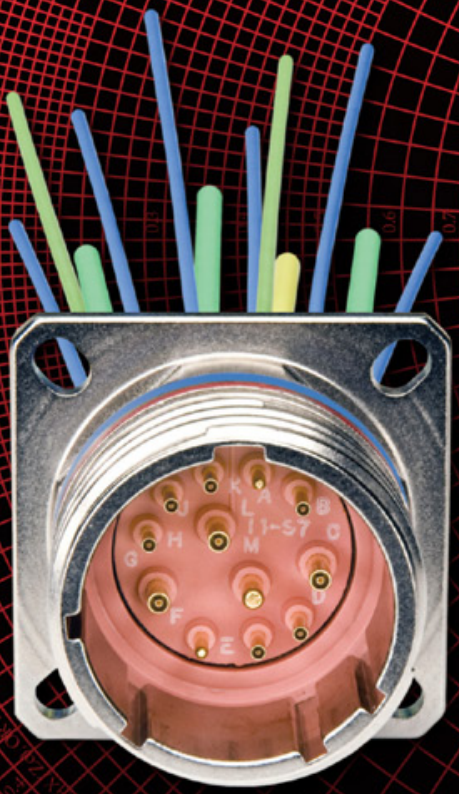
Rev. 2.2

Southwest Microwave, Inc.

SSBP High Performance Microwave Coax Contacts

For Use In Standard Multi-Contact Connectors





- **Tested and Proven Performance**
- **Reduces Cost / Improves Reliability**
- **For Cavity Sizes 20 to 8, in Standard Multi-Contact Connectors**

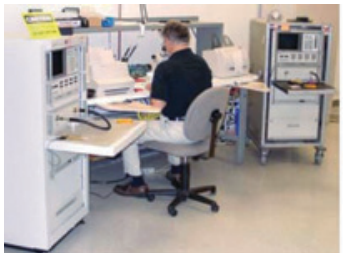
DFARS COMPLIANT · RoHS compliant · ISO 9001 COMPLIANT · REACH Compliant · Pb lead-free · MATERIAL • TRACEABILITY

SOUTHWEST MICROWAVE

Founded in 1981, Southwest Microwave's initial products were applications oriented electronic perimeter intrusion detection systems and 23 GHz wireless CCTV transmission equipment. The Microwave Products Division (MPD) was established in 1987 to provide highest performance interconnect products for millimeter wave and high-power RF applications. Today, in its own 50,000 square foot custom, modern facility, with in-house RF/microwave and electrical test capabilities, Southwest Microwave MPD continues to focus on high-end products that increase customer performance.

Let the microwave transmission line experts at Southwest Microwave improve your component and system performance with connectors and adapters that feature exceptionally low insertion loss, low VSWR, and low RF leakage. All MPD products have lot control and materials traceability. These connectors are very rugged and withstand severe environmental conditions.

In addition to standard testing, Southwest Microwave offers Special Hi-Rel testing to meet SCD and DPA requirements. Stringent quality controls assure that all parameters are met. Test Department equipment includes multiple VNA Network Analyzers.



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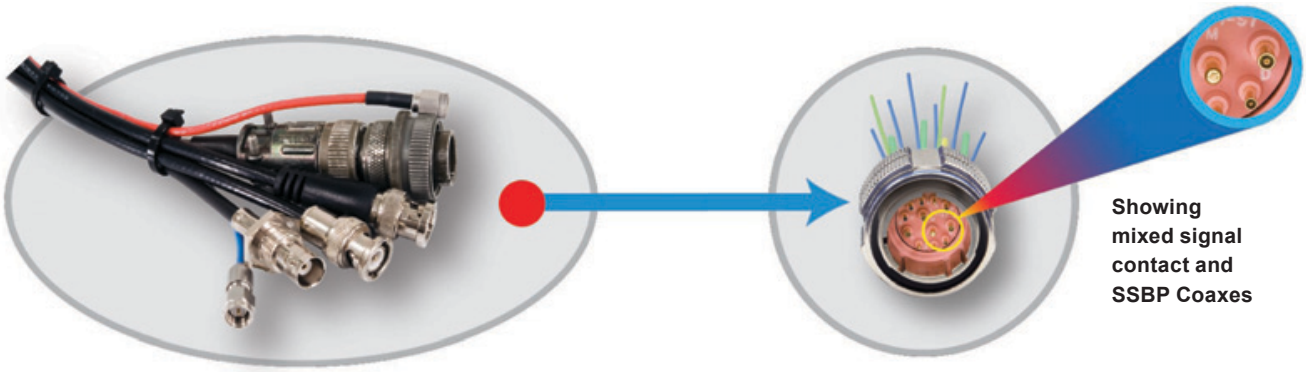
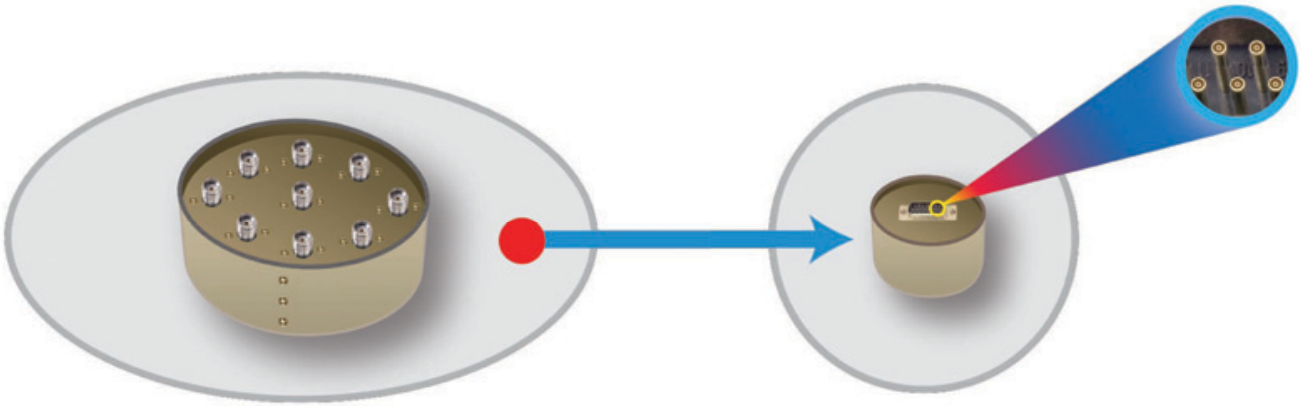
SOUTHWEST MICROWAVE

Before Use of SSBP

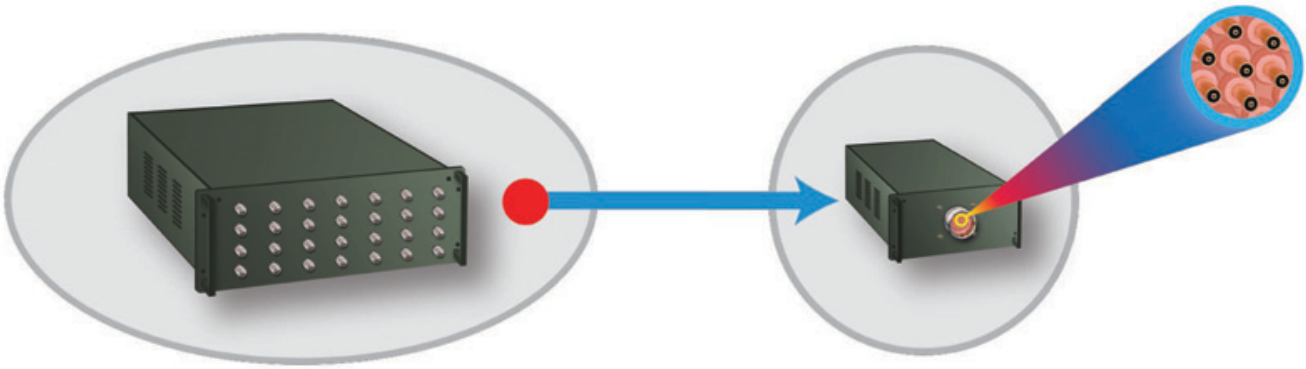
After Changing to SSBP



One Coax Family Replaces Many Types • Improves Reliability • Reduces Total Cost



Eliminate Extra Space Needed to Use/Mate Individual Cables • Eliminate Connectors



Miniaturize Packaging • Can be Sealed and Ruggedized • Win New Contracts!

Notice: Use of MIL-Specifications is for REFERENCE ONLY

Initial inquiries for "SSBP" coaxial assemblies were for hand-held instrumentation, portable medical recorder, switch matrix I/O, mobile weather radar, and bench-top test equipment. Although commercially focused for COTS connectors, Southwest Microwave has found it convenient to reference industry-standard US government specifications and SAE standards to illustrate the multi-contact connectors where SSBP can be used. Just as the earlier MIL-C-5015 connectors became the dominant connectors for the commercial machine tool industry and evolved into other configurations for medical, geophysical and general instrumentation, the connectors referenced by Southwest Microwave were selected to offer user convenience due to their widespread international multi-sourced availability and broad usage. (Use of MIL-numbers also makes them generic rather than referencing supplier-specific commercial equivalents.) Although SSBP are tested to confirm performance equal to or above selected criteria for many of the connectors listed, Southwest Microwave does not warranty or assure performance for any specific application.

Users are cautioned that performance is dependent upon the specific cable selected and third-party cable preparation beyond the control of Southwest Microwave.

SOUTHWEST MICROWAVE

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SSBP Concepts

Systemic Problems Solved by "SSBP" Coaxes

Assemblies using combinations of signal, shield and RF/coaxial connectors are faced with design concerns regarding individual connector mounting plus between-connector space and room for incoming cables to be mated. For RF/microwave, traditional problems relate to use of different connectors for each range of frequency (e.g., TNC, BNC, N, *Super* SMA, 2.92 mm and others as frequencies go higher). The outer coaxial path includes the coax-connector housing, and grounding must be assured. Standard RF/microwave connectors are not environmentally sealed and have been known to separate under vibration and shock. Applications for office environments are very different from ruggedized "outdoors" equipment (oil field instrumentation, weather radars, aircraft transceivers, mobile field instruments, communication equipment, etc.). Potentials for miniaturization are prevented by space (panel area) needed to permit manually mating individual connectors and cables. Resultant harnesses also add to cost and system complexity. Often, there is a requirement that similar cables cannot be interchanged (mis-mated) which is usually solved by using reverse sex plug-jack combinations, or special polarized versions, or different types of coax connectors, which increase parts procurement and cost. Reliability is further improved as SSBP coaxes are terminated by a simple, partial field-replaceable process. The center conductor is not soldered which eliminates a major failure model for most coaxial cable assemblies.

Southwest Microwave has been working to provide better performance (e.g., Southwest Microwave's "N" and "TNC" both operate to 18 GHz eliminating the need for Precision PN and PTNC, and the *Super* SMA operates to 27 GHz encompassing some of the "over 20 GHz" usage sometimes served by higher-cost 3.5 mm and 2.92 mm connectors). However, the basic "packaging" problems remain. Southwest Microwave's SSBP coaxes now offer uncompromised solutions for these problems.

"Partial Solution" Problems

Several versions of standard or custom multi-contact connectors that offer mixed contact combinations of signal and RF/microwave "contacts" in a common housing are marketed by others. These "combination connectors" may offer benefits for reducing package size and providing environmental sealing. However, they are usually limited to coax assemblies available for only larger contact cavities (typically for Size 8 and 12 contacts) and often involve proprietary host connector assemblies. Other concerns include exposed socket coax assembly springs, exposed pin coax outer contact spring fingers (potential physical beam damage, compromised EMI performance) and custom multi-contact connectors with proprietary non-standard contact arrangements offering limited connector layout options. All of these shortcomings are solved by Southwest Microwave's **SSBP** coaxes with performance-confirmed testing.

"Full Solution" SSBP Coax Assemblies

Southwest Microwave offers a broad family of microwave coax assemblies that provide tested and proven solutions for these packaging problems. Called "SSBP", they fit in contact cavities designed for standard signal (non-coax) contacts used in multi-sourced, worldwide-available, standard connectors. For circular connectors, these are per MIL-DTL-38999. Rectangular (rack-and-panel) connectors are the popular D-Subminiature Connectors covered by MIL-DTL-24308. The same SSBP coax assemblies used in size 20 contact locations in D-Sub connectors also can be used in special Micro-D connectors with external envelopes per MIL-DTL-83513.

In production since late 2005, SSBP are production-proven. They are tested for RF/microwave performance and environmental (shock and vibration) requirements to meet or exceed the specifications for their "host" connectors. SSBP are available in a broad range of sizes that will interchange and mix with non-coax standard contacts (Sizes 20, 16, 12 and 8) and fiber optic and coax assemblies (usually contact sizes 16 and 12) for MIL-DTL-38999 connectors. Other SSBP coax assemblies "fit" size 20 cavities in D-Subminiature (MIL-DTL-24308) and Micro-D (when configured for size 20 contacts). SSBP provides the ultimate in RF and broadband microwave performance, packaging miniaturization, packaging flexibility, systemic cost savings, and improved reliability, for the next-generation of winning designs!

Positive 3-Step Mating Sequence

The SSBP pin coax outer conductor mating end is a solid, heat-treated beryllium copper tube with a nose radiused edge. All beryllium copper (BeCu) parts are plated gold over nickel per ASTM B488-95. There are no exposed spring fingers or slots that could be damaged or allow EMI emission. In standard host connectors, the alignment of SSBP coaxes is triple redundant. As the host connectors are initially mated, the pin coax outer conductor tube encounters the closed entry socket contact insulator chamfer, the SSBP socket coax alignment bushing chamfer, and the entry chamfer of the SSBP socket coax outer contact spring fingers. This sequence occurs before the center contacts engage and the outer contact tube of the SSBP pin coax butts against the reference plane in the SSBP socket coax outer contact. Each SSBP socket coax has an integral stainless steel compression spring preloaded to a higher force than the maximum mating force for that size coax. As the host connectors are fully mated, the resultant increasing compressive force at the pin and socket coax interface overcomes the socket coax spring preload and depresses the socket coax. The final spring force at the interface is a compressive force greater than preload. This design guarantees a matched impedance, EMI tight, highly reliable and repeatable mating.

The envelope dimensions and features of SSBP coaxes closely conform to their corresponding signal contacts as defined in MIL-C-39029. The pin coax protrusion lengths are within those of the standard signal pin contacts. The MIL-DTL-24308 contact recesses and the scoop-proof features of MIL-DTL-38999 Series I, III, and IV are maintained. (Series II is not scoop-proof.)

Improved System Reliability

Connector reliability can be predicted using MIL-HDBK-217F, Reliability Prediction of Electronic Equipment, Notice 2, Section 15.1, expressed in terms of failures per million hours of operation. Values in Table 1 are per mated connector pair or, with the case of discrete coaxes, the mated connector group. For a system configured with 3 or more input/output coaxes, the predicted failure rate for a MIL-DTL-38999 host connector with 3 coaxes is notably lower than that of a group of 3 or more discrete MIL-PRF-39012 microwave connectors. As the number of coaxes increases, the net failure rate for the discrete coax connector group also increases while the failure rate for the corresponding multi-contact host connector with the same number of coaxes (plus all other types of contacts) remains constant.

Although subject to debate, according to MIL-HDBK-217F, Notice 2, pin count in a multi-contact connector is not considered a factor in predicting failure rates. However, for the same comparisons as described above, reliability calculations using MIL-HDBK-217 revisions prior to Notice 2 which include pin count factors (contact quantities are doubled for coax contacts in multi-contact connectors) result in failure rates for multi-contact connectors with coaxes that are considerably lower than those for groups of discrete coaxes. The failure rate margins between each pair of configurations are also greater for calculations using revisions prior to Notice 2 than for those using Notice 2.

Table 1 compares the predicted failure rates for MIL-DTL-38999 host connectors containing 3, 16, and 32 coaxes to those of groups of 3, 16, and 32 discrete coax connectors per MIL-PRF-39012. Blind-mate coaxes are not specifically covered by MIL-PRF-39012, nor are their failure rate factors presently included in MIL-HDBK-217F, Notice 2. The predicted reliabilities in Table 1 also are expressed in terms of Mean Time Between Failure, MTBF (hrs), which is the mathematical inverse of failure rate.

Table 1 : Reliability Predictions Per MIL-HDBK-217F, Notice 2

Number of Coaxes	MIL-DTL-38999 w/Coax		MIL-PRF-39012 Coax Group	
	Failure Rate (Failures/10^6 Hrs)	MTBF (Hrs)	Failure Rate (Failures/10^6 Hrs)	MTBF (Hrs)
3	0.288	3.472×10^6	0.354	2.825×10^6
16	0.288	3.472×10^6	1.888	0.530×10^6
32	0.288	3.472×10^6	3.776	0.265×10^6

All of the values displayed in the table above apply to existing multi-coax designs as well as SSBP coaxes. The additional reliability advantages offered by SSBP coaxes are as follows:

1) Increased coax line count per application due to higher density in the same or smaller footprint than previous configurations results in correspondingly higher MTBF values compared to the same number of discrete coaxes, and

2) Triple redundant alignment for the individual SSBP coaxes in standard connectors which, although not separately considered in MIL-HDBK-217F, Notice 2, is a feature which assures the mating reliability of each coax.

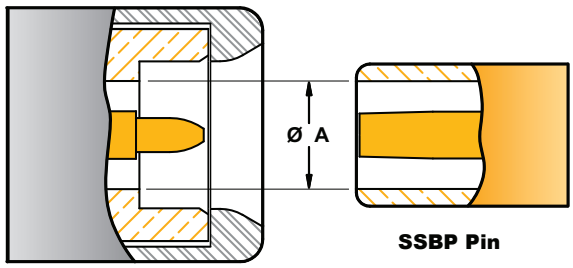
3) Termination of SSBP coaxes is exceptionally reliable and does not involve soldering of the center conductor to center contact. With other types of cable termination, cable movement can result in cracking of this soldered joint. This type of cable termination failure is not included in MIL-HDBF-217. (See page 31.)

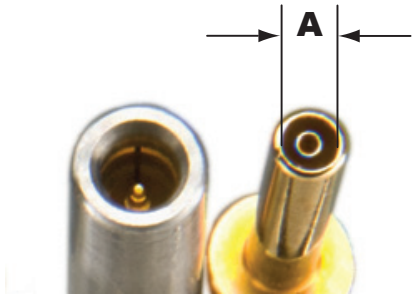
Contact "Size" Terminology for Multi-contact (Non-coax) Connectors:

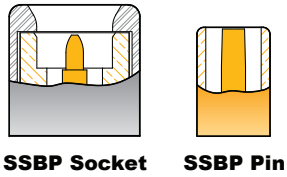
Signal or power contact "size" relates to the AWG wire size most commonly associated with that contact. For example, "Size 20 contacts" are usually terminated to 20 AWG wire. Similarly, Size 16 contacts are used with 16 AWG wire, etc. The "contact size" also designates the "cavity size" into which they are installed in multi-contact connectors.

RF/Microwave coaxial connectors usually are single-line (i.e., carry only one coax circuit). Higher Frequency microwave connectors are defined by the dimension for the inner diameter of the outer coaxial path (e.g. 2.92 mm, 2.40 mm). This is dimension "**A**" shown below.

Dimension "**A**" is critical in microwave connectors. The relationship between "A" and the outside diameter of the inner contact determines impedance.







SSBP vs. Standard / Signal Contact Sizes

SSBP "sizes" use the "contact size" terminology from multi-contact connectors. Cross-reference to "millimeter wave" designation is as follows:

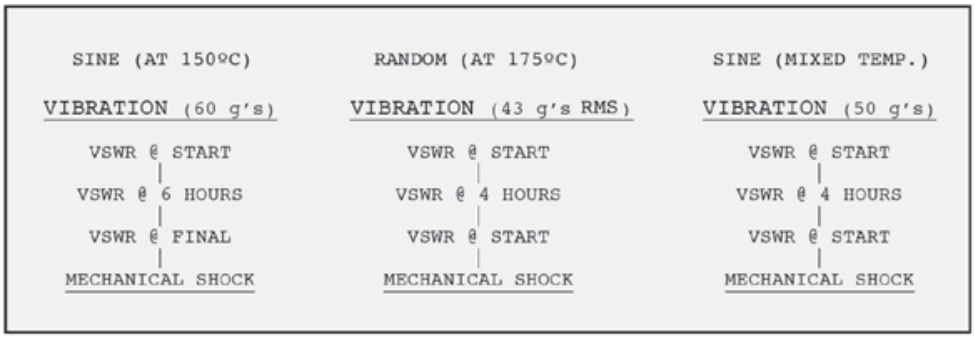
SSBP "Size":	**SSBP-20** ⚠	**SSBP-20HD** ⚠	**SSBP-16**	**SSBP-12**	**SSBP-8**
"A" Diameter: (reference only)	0.9 mm	0.9 mm	1.2 mm	1.7 mm	3.3 mm

⚠ *SSBP-20 and SSBP-20HD have the same mating interface, but different external envelopes and are not interchangeable.*

SSBP Testing *Vibration and Shock (SSBP-20 and SSBP-16)*

SSBP-20 and SSBP-16 coaxes were mounted in appropriate mated MIL-DTL-38999 Series III connectors and subjected to the following test:

Figure 1: Test Plan Flow Diagram



VSWR was Measured

IAW Specifications EIA-364, Test Procedure 108, with each mated circuit represented as follow:

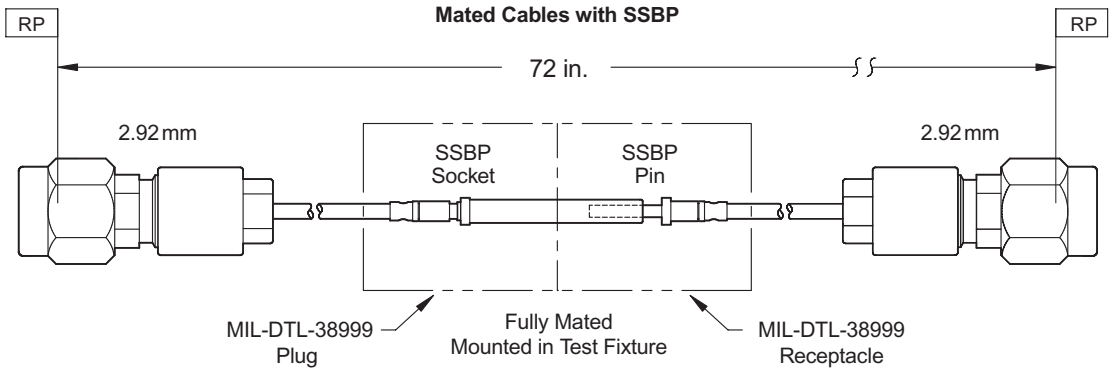


Figure 2: Assembly consisting of two (2) 36 inch cables with 2.92 mm-plug terminated to SSBP-coax. The SSBP pin and socket coaxes are installed in MIL-DTL-38999 Series III connectors.

Cables use 2.92 mm plugs as Southwest Microwave pre-test measured to 40 GHz.
(Note: 2.92 mm mate with SMA and 3.5 mm connectors.)

SSBP Testing *Vibration and Shock (SSBP-20 and SSBP-16)*

Test Procedures – Vibration

1. Vibration, Sinusoidal (At -55°C and 175°C)

VIBRATION, SINUSOIDAL (AT TEMPERATURE)

PROCEDURE:

1. The test was performed in accordance with Paragraph 4.5.22.2.1 of Specification MIL-DTL-38999L with the following conditions.

2. Test Conditions:

a) Amplitude	:	60.0 G's
b) Frequency	:	10Hz to 2000Hz
c) Duration per axis	:	12 hours / axis (3 axis)
d) Duration at +175ºC ±5ºC	:	4 hours
e) Duration at -55ºC ±5ºC	:	4 hours
f) Duration at Ambient Temp	:	4 hours
g) Duration (total)	:	36 hours
h) Test Current	:	100 milliamps (for continuity)

2. Vibration, Random

VIBRATION, RANDOM

PROCEDURE:

1. The test was performed in accordance with Paragraph 4.5.22.2.4 of Specification MIL-DTL-38999L and EIA 364, Test Procedure 28D, Test Condition V (ZONE 2) Figure 25.

2. Test Conditions:

a) Power Spectral Density	:	1.0 g^2/Hz
b) G 'RMS'	:	50.0
c) Frequency	:	50 Hz to 2000 Hz
d) Temperature	:	Ambient
e) Duration, total	:	16 hours
f) Duration	:	8 hours/longitudinal
	:	8 hours/perpendicular
g) Test Current	:	100 milliamps (for continuity)

3. Vibration, Random (At +175°C)

VIBRATION, RANDOM (AT TEMPERATURE)

PROCEDURE:

1. The test was performed in accordance with Paragraph 4.5.22.2.3 of Specification MIL-DTL-38999K and MIL-STD-1344, Test Condition VI, Table 3, Letter J, with the following conditions:

2. Test Conditions:

a) Power Spectral Density	:	1.0 g^2/Hz.
b) G 'RMS'	:	43
c) Frequency	:	50 Hz to 2000 Hz
d) Temperature	:	175ºC ±5ºC
e) Duration at high temp	:	16 hours
f) Duration	:	8 hours/longitudinal
	:	8 hours/perpendicular
g) Test Current	:	100 milliamps (for continuity)

Results

Physical:

All SSBP assemblies and host connectors exhibited no physical damage. There was no circuit disruption (measured for ≥ 1 µs). There was no evidence of movement of test samples relative to each other (as mated).

SSBP Testing *Vibration and Shock (SSBP-20 and SSBP-16)*

Test Procedures – Vibration Results

1. VSWR (After Sine 60 G's)

VSWR (Sine 60 g's):	FREQUENCY 6GHz			
References (ID#)	Avg.	Max.	Min.	Std. Dev.
D38999/26FA-98SN and 120FA-98PN (SSBP-20)				
1P2R (initial)	1.061	1.074	1.054	0.011
1P2R (Z-axis1)	1.031	1.041	1.024	0.009
1P2R (Z-axis2)	1.034	1.037	1.031	0.003
1P2R (X-axis1)	1.029	1.035	1.026	0.005
1P2R (X-axis2)	1.030	1.036	1.024	0.006
1P2R (Y-axis1)	1.031	1.036	1.025	0.005
1P2R (Y-axis2)	1.072	1.147	1.024	0.066
D38999/26FD-5SN and 120FD-5PN (SSBP-16)				
9P10R (initial)	1.078	1.103	1.035	0.038
9P10R (Z-axis1)	1.045	1.054	1.038	0.008
9P10R (Z-axis2)	1.090	1.175	1.040	0.074
9P10R (X-axis1)	1.101	1.178	1.156	0.067
9P10R (X-axis2)	1.094	1.176	1.042	0.072
9P10R (Y-axis1)	1.063	1.071	1.056	0.011
9P10R (Y-axis2)	1.069	1.075	1.064	0.006

Results (VSWR)

VSWR was measured individually on all mated lines as illustrated by Figure 2 (page 7). Results are as shown.

2. VSWR (After Random 50 G's)

VSWR (Random 50 g's):	FREQUENCY 6GHz			
References (ID#)	Avg.	Max.	Min.	Std. Dev.
D38999/26FA-98SN and 120FA-98PN (SSBP-20)				
5P6R (initial)	1.043	1.054	1.028	0.013
5P6R (longitudnal1)	1.058	1.066	1.044	0.012
5P6R (longitudnal2)	1.038	1.063	1.006	0.029
5P6R (perpendicular1)	1.037	1.064	1.001	0.027
5P6R (perpendicular2)	1.037	1.063	1.011	0.026
D38999/26FD-5SN and 120FD-5PN (SSBP-16)				
13P14R (initial)	1.145	1.203	1.044	0.088
13P14R (longitudnal1)	1.047	1.057	1.028	0.017
13P14R (longitudnal2)	1.048	1.060	1.029	0.016
13P14R (perpendicular1)	1.047	1.056	1.030	0.014
13P14R (perpendicular2)	1.047	1.059	1.028	0.017

3. VSWR (After Random 43 G's)

VSWR (Random 43 g's):	FREQUENCY 6GHz			
References (ID#)	Avg.	Max.	Min.	Std. Dev.
D38999/26FA-98SN and 120FA-98PN (SSBP-20)				
3P4R (initial)	1.111	1.217	1.054	0.092
3P4R (longitudinal1)	1.048	1.052	1.042	0.005
3P4R (longitudinal2)	1.057	1.066	1.044	0.012
3P4R (perpendicular1)	1.053	1.056	1.048	0.004
3P4R (perpendicular2)	1.064	1.074	1.057	0.009
D38999/26FD-5SN and 120FD-5PN (SSBP-16)				
11P12R (initial)	1.064	1.071	1.057	0.007
11P12R (longitudinal1)	1.047	1.054	1.034	0.011
11P12R (longitudinal2)	1.043	1.504	1.035	0.010
11P12R (perpendicular1)	1.206	1.546	1.032	0.295
11P12R (perpendicular2)	1.115	1.150	1.065	0.045

4. Shock (100 G, Half Sine, 3X Each Axis)

MECHANICAL SHOCK (SPECIFIED PULSES)

PROCEDURE:

1. The test was performed in accordance with paragraph 4.5.23.1 of specification MIL-DTL-38999K and EIA 364, Test Procedure 27B with the following test conditions.

2. Test Conditions:

a) Peak Value	:	100 G
b) Duration	:	6 Milliseconds
c) Wave Form	:	Half Sine
d) Velocity	:	9.7 feet Per Second
e) No. of Shocks	:	3 Shocks/Direction, 3 Axis (18 Total)

5. Post Shock Final Results

MECHANICAL SHOCK (SPECIFIED PULSES)

RESULTS:

In Accordance with test criteria, all samples passed the following:

1) No evidence of axial movement of SSBP relative to each other.

2) No evidence of physical damage to the SSBP samples as tested.

3) No contact (signal) interruption greater than 1.0 microsecond.

Mating and Unmating Durability Test

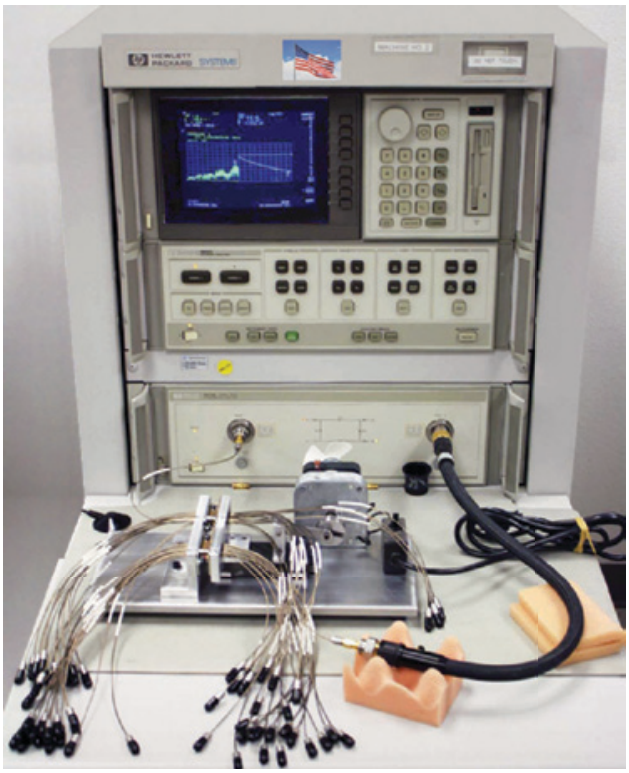
1.0 Abstract

Tests were conducted to evaluate effects of mating/unmating on SSBP-20HD coaxial assemblies. This was done as part of overall in-house qualification testing for SSBP coax assemblies. Connectors were divided into 2 groups:

Group A: To evaluate Electrical/Microwave Parameters after mating/unmating. Criteria for acceptance was maximum VSWR change of 0.10 through 27 GHz for mated assemblies. 30 pairs of SSBP-20HD pin/male and socket/female coaxial assemblies were installed in 2 standard 15-position D-Subminiature connectors and tested to 5,000 mating/unmating cycles. VSWR was measured at initial mating and after 100, 500, 1000, 3000 and 5000 cycles. Maximum VSWR change was under 0.10 VSWR for all mated SSBP-20HD pairs. (Comment: Initial test plan for group A was for 2,500 mating/unmating cycles, but results at 2,500 prompted continuing tests.)

Group B: To examine Physical Mechanical Wear after mating/unmating:
SSBP-20HD coax assemblies were installed in similar 15-position connectors used for Group A testing. One group (B-1) was subject to 500 mating/unmating cycles and another group (B-2) was subjected to 1,000 mating/unmating cycles. Both groups were then subjected to 72 hours of humidity and examined for corrosion. All passed.

SSBP-20 and SSBP-20HD have identical mating interfaces. Therefore based upon these evaluations, both SSBP-20 and SSBP-20HD coax assemblies are confirmed to provide microwave performance for 1,000 mating cycles.



Photograph showing factory mating-cycle test fixtures with mated line of SSBP-20HD coaxes being measured using HD 8510C in Southwest Microwave electrical test lab.

Mating and Unmating Durability Test *(continued)*

2.1 Introduction

SSBP coaxial assemblies are used in industry-standard multi-contact connectors. SSBP coax assemblies are described based upon the "cavity size" for equivalent-sized contacts used for non-microwave signals. (For example SSBP-20 assemblies are used where Size 20 signal contacts would otherwise fit or be used). The SSBP-20HD assemblies are used in D-Subminiature connectors, while SSBP-20, -16, -12, and size -8 are for circular connectors. Although used in different connectors, SSBP-20 and SSBP-20HD have the same mating interface. The SSBP are designed to fit within standard "contact cavities" without respect to specific contact arrangements, shell sizes or mating methods involved. Although initial applications are for commercial test equipment, to simplify describing the types of connectors that may be used, MIL-DTL-24308 and MIL-DTL-38999 are used for reference. Both connector standards require 500 mating/unmating cycles, which was used as the basis for this test. SSBP contacts were installed and removed using the same plastic CIET tools used for the non-coaxial (signal) contacts.

2.2 Testing

For all tests, mating/unmating was done at a rate of 5 cycles per min. in accordance with EIA-364-9 requirements of 200 ± 100 cycles per hour.

Group A: Although SSBP-20HD coax assemblies have been tested to 110 GHz by other than Southwest Microwave, for these tests the SSBP were cabled to SMA plug connectors for testing to 27 GHz using an HP 8510C VNA. This was done for testing convenience. Prior non-SSBP or standard microwave connector testings over time have shown that surface wear results in increased VSWR. SOLT calibration was performed before each group of measurements using the same VNA (with NIST-tracable calibration date 20/03/09), with air conditioned, stabilized, test room ambient conditions.

2.2.1

Assemblies were measured in-line (SMA plug-to-SSBP-20HD Pin mated to SSBP-20HD Socket-to-SMA plug) at the following conditions: Upon first mating (100%), after 100 cycles (100%), after 500 cycles (6 samples for reference), after 1,000 cycles (6 samples for reference), after 5,000 cycles (100%). The results after 5,000 cycles were then compared to initial readings.

2.2.3

Group B: A total of 60 pairs (SSBP-20HD Pin and 20HD Socket) were examined unmated under 10X magnification and then installed in 4 pairs of 15-position D-Subminiature connectors. Initial (pre-cycle testing) mating/demating forces were measured in accordance with EIA-364-13, and then connectors were installed in the test fixturing. The connectors were split into 2 groups of 2 mating D-Subminiature pairs (30 mating SSBP-20HD Pin and SSBP-20HD Socket coaxes each pair).

Group B-1: Subjected to 500 mating/demating cycles. Connectors were removed from the test fixturing and given 10X physical examination. Contact (SSBP-20HD coax assembly) mating and unmating forces were measured in accordance with EIA-369-13.

Group B-2: Subjected to 1,000 mating/demating cycles. Connectors were removed from the test fixturing and given 10X physical examination.

Mating and Unmating Durability Test *(continued)*

Group A Test Results: Differences in the per line VSWR measurements between initial and after 5,000 cycles are shown in Table 2 below.

Group B Test Results: Group B-1: Completed 500 durability mate/unmate cycles in accordance with MIL-STD-1344, Method 2016, on 9/24/09. Following durability cycling, those samples and 2 control sample loose pairs of SSBP-20HD coaxes completed 72 hours of humidity environmental exposure (steady state 85°C at 85% relative humidity) in chamber (calibrated 2/16/09) in an unmated condition. After humidity testing, the SSBP coaxes were removed and examined under 10X power.

Following all mechanical and humidity environmental exposure, all samples passed post durability examination in accordance with MIL-STD-1344, Method 2016, paragraph 3 d. and visual inspection for corrosion or degradation in accordance with MIL-STD 1344, Method 1001.1, paragraph 4.2.6. No evidence of corrosion or degradation was present on/in any of the SSBP-20HD samples. No condition of wear or physical damage that would affect form, fit, or function, including microwave performance, was observed.

3.0 Test Report

Copies of complete Test Report No. 91-3057 will be provided upon request.

Connectors Line	VSWR Difference (If > 0)	Pass? Fail?	Connectors Line	VSWR Difference (If > 0)	Pass? Fail?
Conn 1:			**Conn 2:**		
1	0.03	Pass	16	0	Pass
2	0.02	Pass	17	0.02	Pass
3	0.005	Pass	18	0	Pass
4	0.005	Pass	19	0.03	Pass
5	0	Pass	20	0	Pass
6	0	Pass	21	0	Pass
7	0.01	Pass	22	0.01	Pass
8	0	Pass	23	0	Pass
9	0.01	Pass	24	0.02	Pass
10	0	Pass	25	0.005	Pass
11	0	Pass	26	0.01	Pass
12	0.05	Pass	27	0.01	Pass
13	0.01	Pass	28	0	Pass
14	0	Pass	28	0	Pass
15	0.01	Pass	30	0.04	Pass

Notes: Testing with 2 pairs of DA-15 connectors (15 positions per connector). The SSBP cables for Connector 1 Line 15 and Connector 2 Line 27 were replaced at 100 cycles due to problems found at termination for SMA plugs. Initial readings for removed cables were replaced with readings for the new cables. The replacement cables have data for 4,900 matings instead of 5,000 cycles.

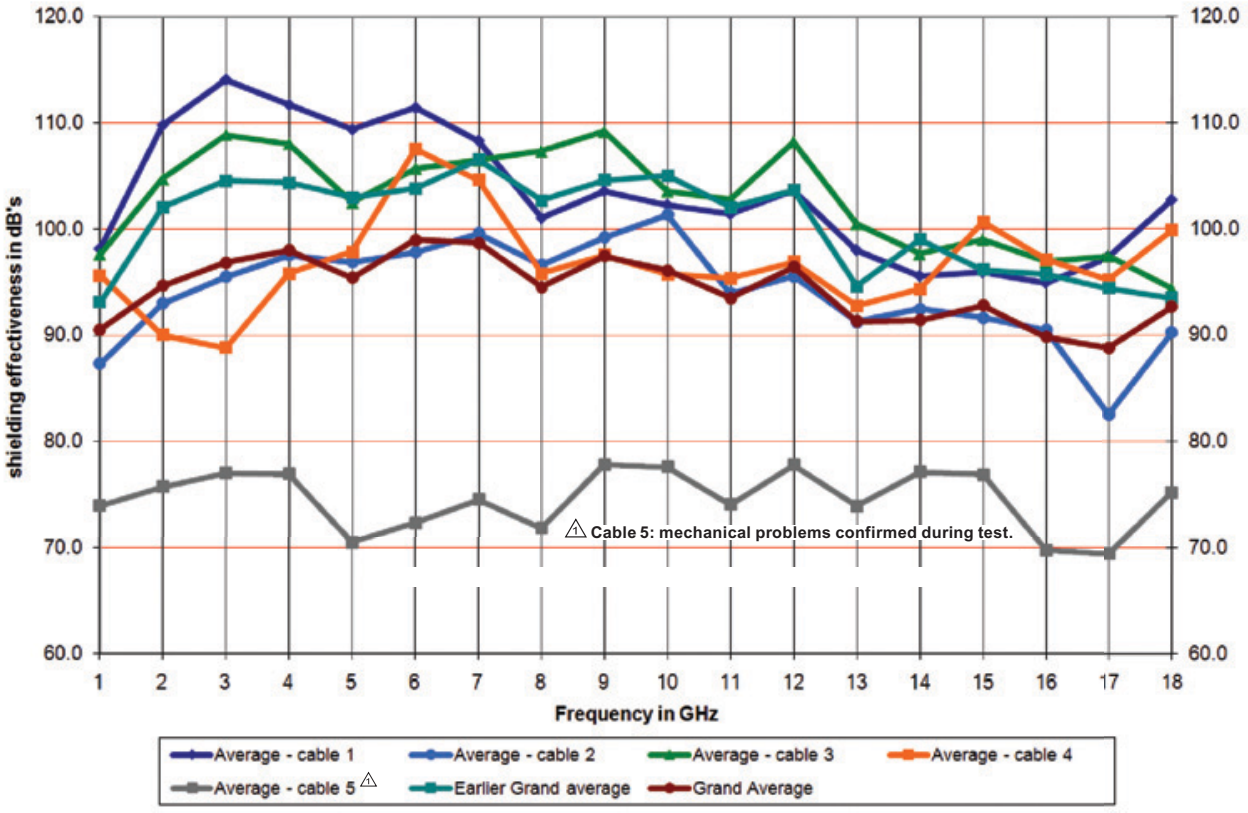
Table 2: SSBP-20 mating/demating VSWR measurement differences initial versus after 5,000 cycles.

Shielding Effectiveness

The interface configurations for all sizes of SSBP coaxes provide a high level of EMI isolation. The only openings in the outer conductor of a mated pair are extremely narrow longitudinal slots in the socket coax outer conductor interface. The slots are recessed within the outer sleeve and located behind the alignment entry of the socket coax assembly. When mated, a maximum of 0.001 in. annular space exists between the socket coax alignment sleeve entry ID and the OD of the mating SSBP pin coax outer conductor tube. The combination of contact features, (including the narrow slots at the plane of electrical contact between the pin and socket coax outer contacts, the labyrinth EMI path inside the socket coax interface, and the small annular opening at the socket coax entry) combine to provide exceptional EMI isolation for a blind-mate coax. This is confirmed by the data below for Size 20 SSBP coaxes tested in non-grounded MIL-DTL-38999 Series I connectors.

EMI Data

Shielding Effectiveness of 5 channels of mated #20 SSBP coaxes on 047 SR with SMA, 08/09/2005. Data is from 3 runs each channel, with all data per MIL-STD-1344 Method 3008.

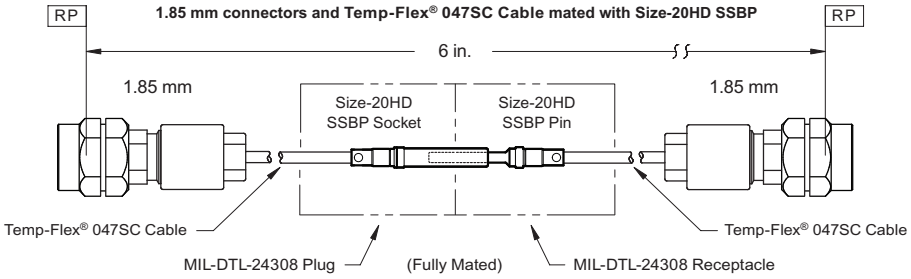


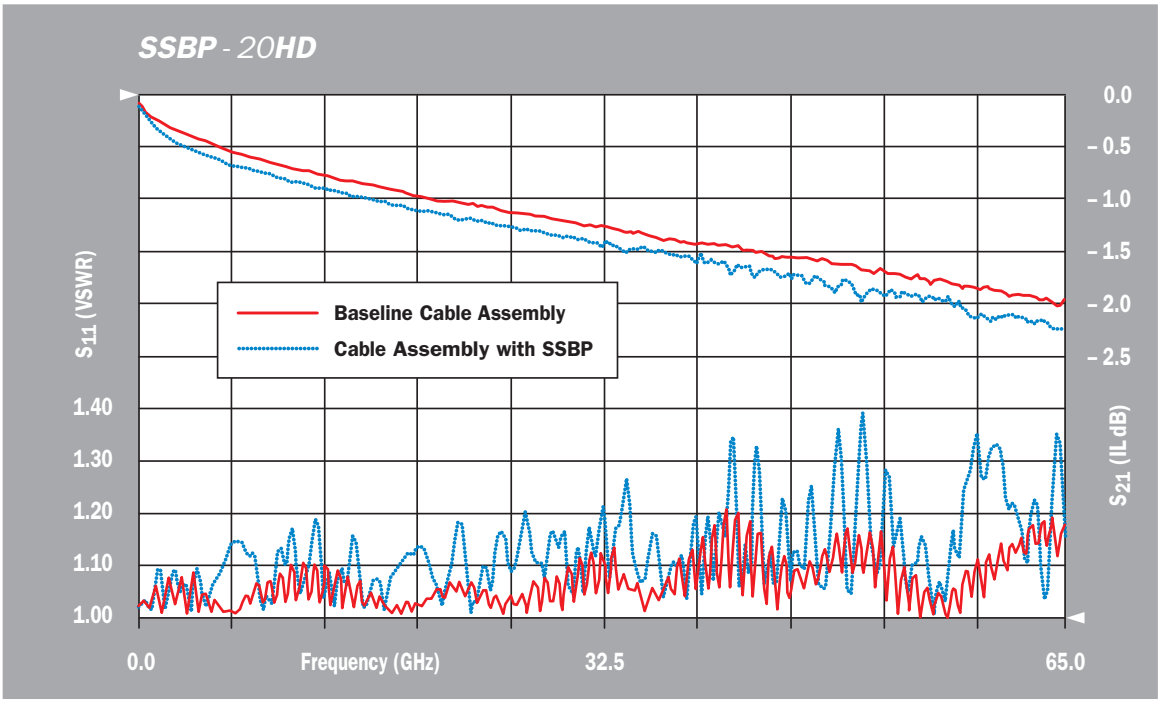
SSBP - 20**HD**

Test Data for 50102-001P & 51102-001S

Test Measurement Reference

All data was measured using an ANRITSU VNA 37297D with 1.85 mm test port connectors. Calibration was broadband SOLT (sliding load). Test frequency range was DC to 65 GHz. Cable assemblies were made using Temp-Flex® 047SC cable with two 1.85 mm plug/male connectors. The baseline cable assembly and the cable assembly with Size 20HD SSBP coaxes installed were both 6 inches between the reference planes of the 1.85 mm connectors. Both halves of the mated cable assembly pair were made phase equal (same electrical length). The SSBP cabled coaxes were installed in a mated pair of MIL-DTL-24308 connectors.





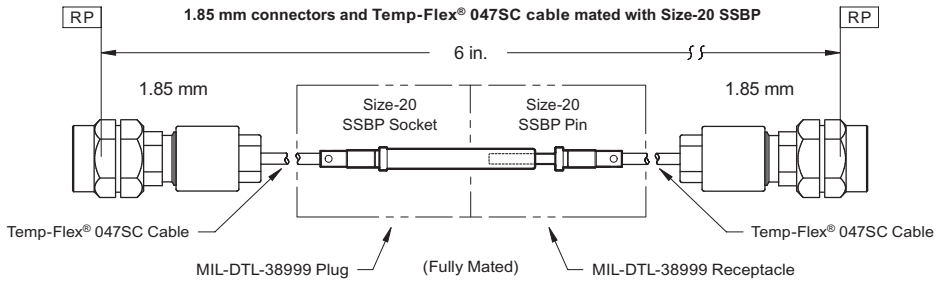
Comparison of base cable assembly to cable assembly with Size-20HD SSBP.

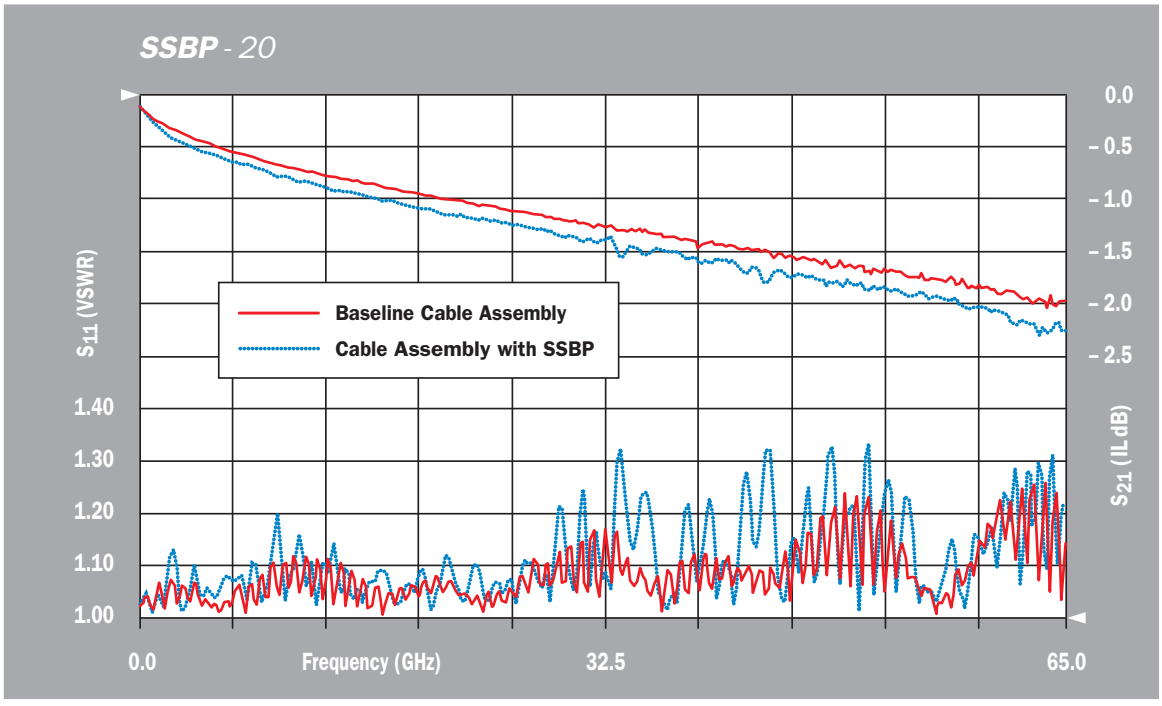
SSBP - 20

Test Data for 50000-001P & 51000-001S

Test Measurement Reference

All data was measured using an ANRITSU VNA 37297D with 1.85 mm test port connectors. Calibration was broadband SOLT (sliding load). Test frequency range was DC to 65 GHz. Cable assemblies were made using Temp-Flex® 047SC cable with two 1.85 mm plug/male connectors. The baseline cable assembly and the cable assembly with Size-20 SSBP coaxes installed were both 6 inches between the reference planes of the 1.85 mm connectors. Both halves of the mated cable assembly pair were made phase equal (same electrical length). The SSBP cabled coaxes were installed in a mated pair of MIL-DTL-38999 Series III connectors.





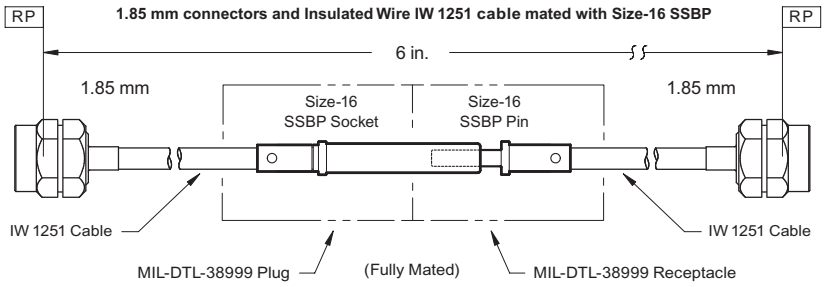
Comparison of base cable assembly to cable assembly with Size-20 SSBP.

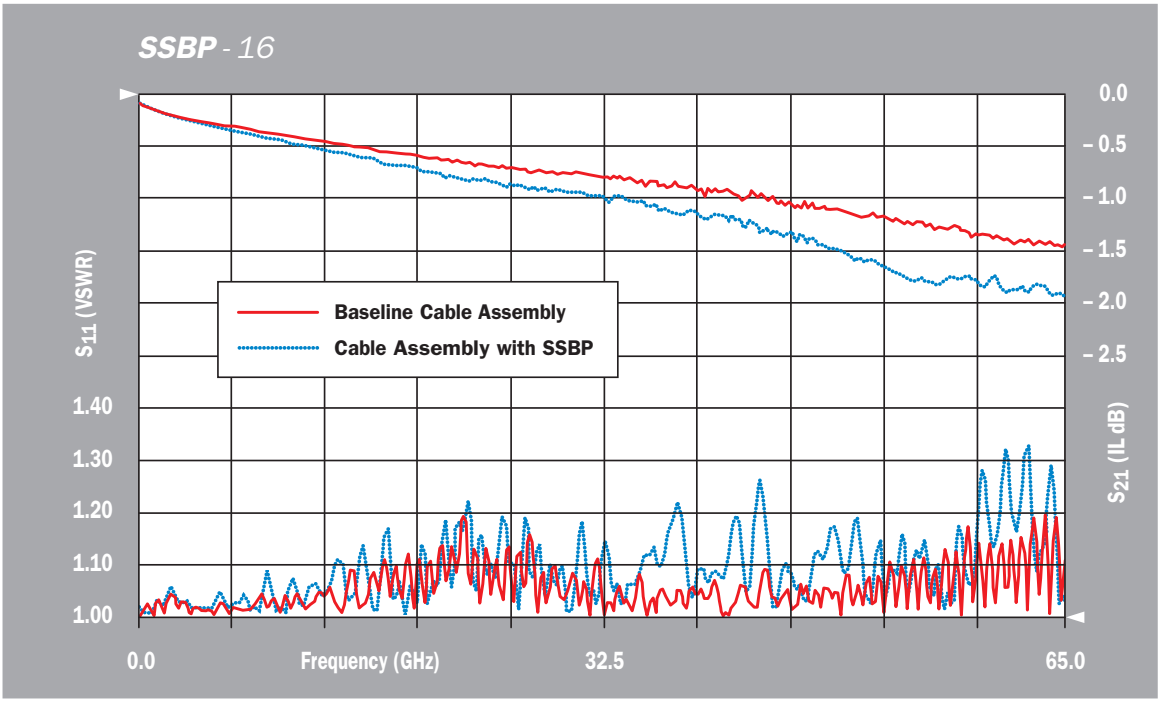
SSBP - 16

Test Data for 50200-001P & 51200-001S

Test Measurement Reference

All data was measured using an ANRITSU VNA 37297D with 1.85 mm test port connectors. Calibration was broadband SOLT (sliding load). Test frequency range was DC to 65 GHz. Cable assemblies were made using Insulated Wire IW 1251 cable with two 1.85 mm plug/male connectors produced by Southwest Microwave. The baseline cable assembly and the cable assembly with Size 16 SSBP coaxes installed were both 6 inches between the reference planes of the 1.85 mm connectors. Both halves of the mated cable assembly pair were made phase equal (same electrical length). The SSBP cabled coaxes were installed in a mated pair of MIL-DTL-38999 Series III connectors.





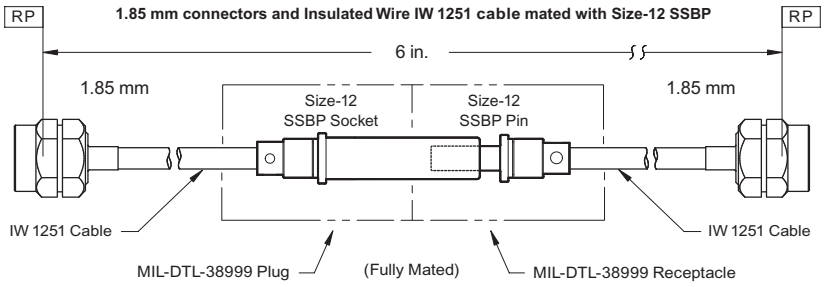
Comparison of base cable assembly to cable assembly with Size SSBP - 16.

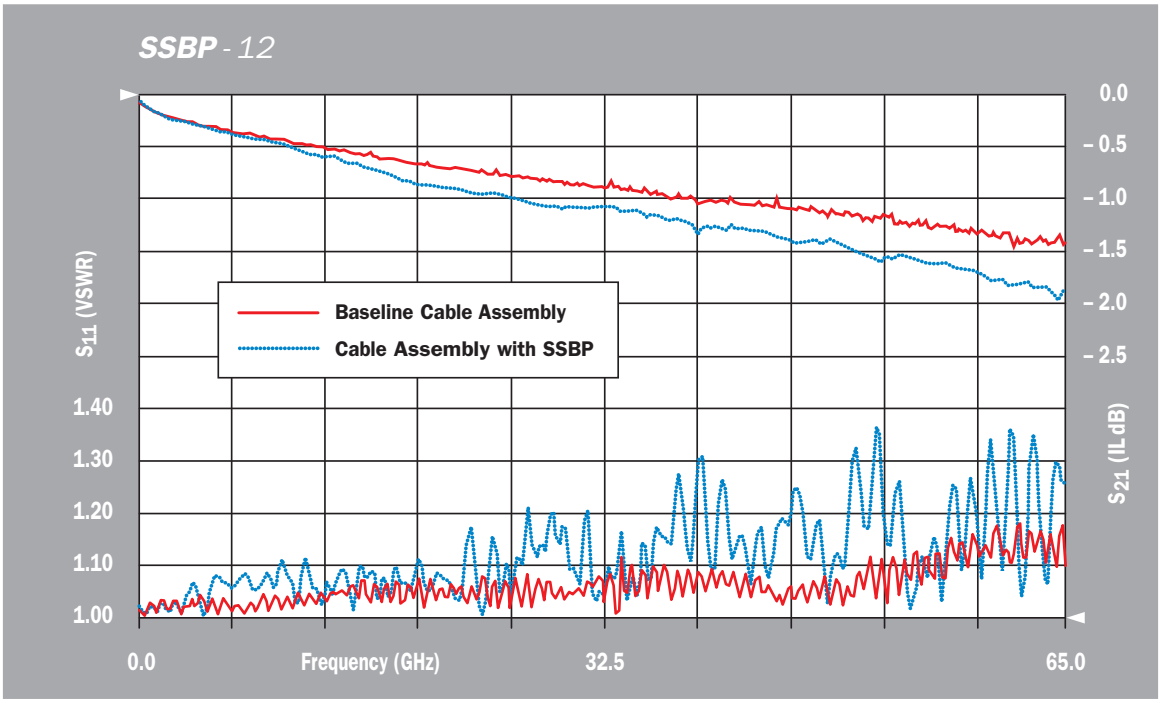
SSBP - 12

Test Data for 50400-001P & 51400-001S

Test Measurement Reference

All data was measured using an ANRITSU VNA 37297D with 1.85 mm test port connectors. Calibration was broadband SOLT (fixed load). Test frequency range was DC to 65 GHz. Cable assemblies were made using Insulated Wire IW 1251 cable with two 1.85 mm plug/male connectors produced by Southwest Microwave. The baseline cable assembly and the cable assembly with Size 12 SSBP coaxes installed were both 6 inches between the reference planes of the 1.85 mm connectors. Both halves of the mated cable assembly pair were made phase equal (same electrical length). The SSBP cabled coaxes were installed in a mated pair of MIL-DTL-38999 Series III connectors.





Comparison of base cable assembly to cable assembly with Size SSBP - 12.

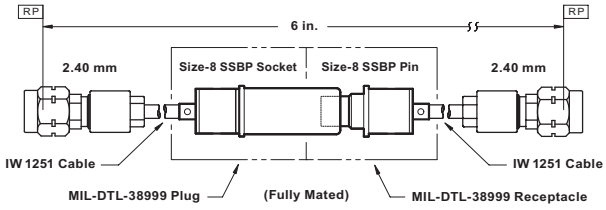
SSBP - 8

Test Data for 50600-003P & 51600-003S and Test Data for 50600-001P & 51600-001S

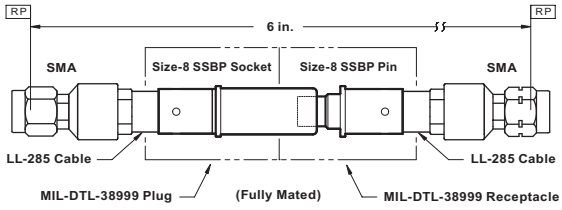
Test Measurement Reference

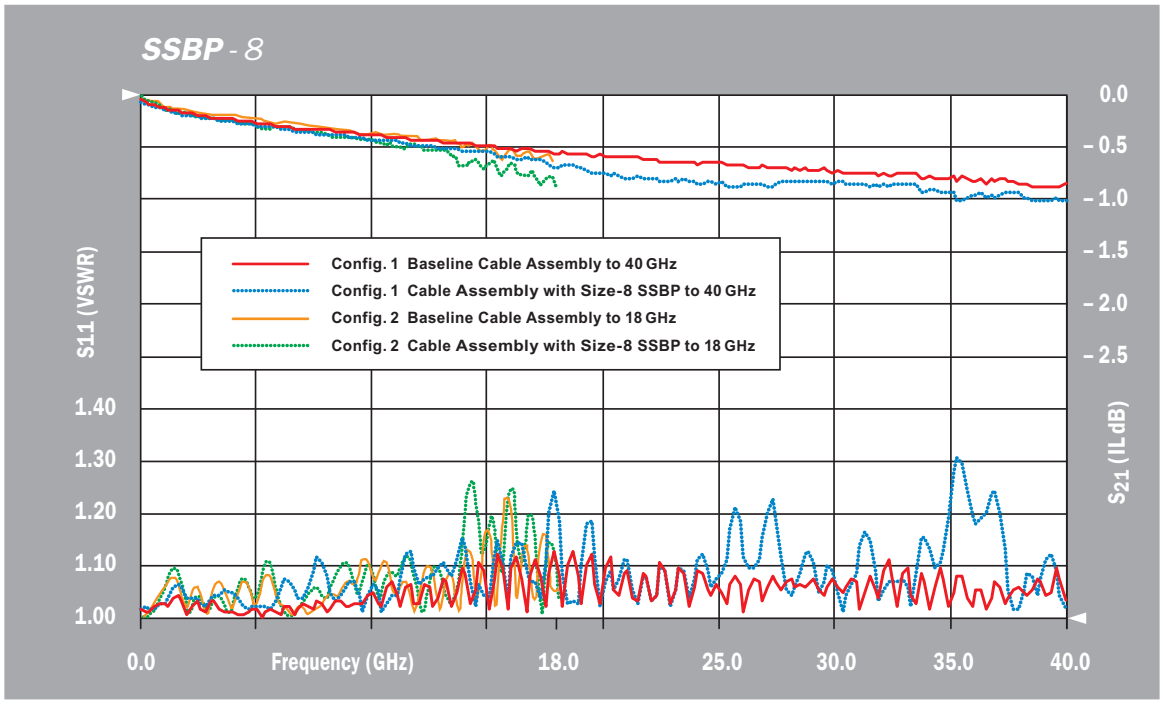
All data was measured using an HP VNA 8510C with 2.40 mm test port connectors. Calibration was broadband SOLT (sliding load). Two sets of cables were measured. ***Configuration 1:*** Cable assemblies were made using Insulated Wire IW 1251 cable with two field-replacable 2.40 mm plug/male connectors produced by Southwest Microwave. Frequency range was DC to 40 GHz. ***Configuration 2:*** Cable assemblies were made using larger dia. Harbour LL-285 cable with SMA plug/male connectors. Frequency range was DC to 18 GHz. Adapters needed to interface with 2.40 mm VNA ports were de-embedded. The baseline cable assemblies and the cable assemblies with Size-8 SSBP coaxes installed all were 6 inches between the reference planes of the applicable plug/male connectors. Both halves of each mated cable assembly pair were made phase equal (same electrical length). The SSBP cabled coaxes were installed in mated pairs of MIL-DTL-38999 Series III connectors.

(Configuration 1)
Field-replaceable 2.40 mm plug connectors and Insulated Wire IW 1251 cable mated with Size-8 SSBP



(Configuration 2)
SMA plug connectors and larger dia. Harbour LL-285 cable mated with Size-8 SSBP





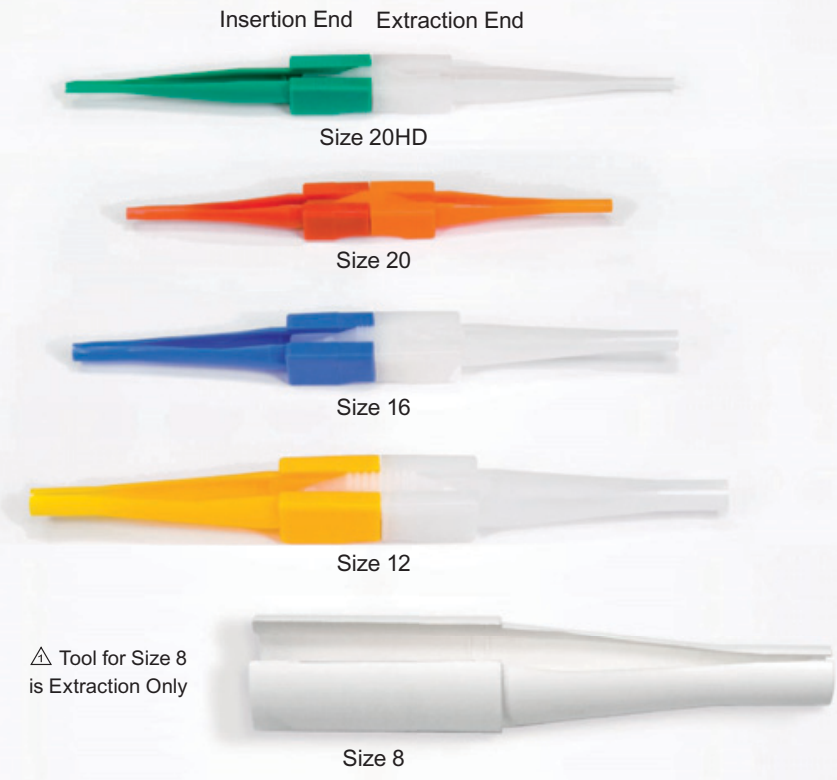
Comparison of Config. 1 & 2 baseline cable assemblies to cable assemblies with Size-8 SSBP connectors.

Insertion and Extraction Tools

Used To Install			Tool Numbers		Color Coding	
Size	Non-Coax (Signal) Contacts*	SSBP Coax Assemblies	SMI Tool No.	MIL Tool No.**	Insertion End	Extraction End
20 D-Sub	M39029/64-368	SSBP-20HDS	T-5093-20HD	M81969/39-01	Green	White
20 D-Sub	M39029/64-369	SSBP-20HDP	T-5093-20HD	M81969/39-01	Green	White
20	M39029/57-357	SSBP-20S	T-5093-20	M81969/14-10	Red	Orange
20	M39029/58-363	SSBP-20P	T-5093-20	M81969/14-10	Red	Orange
16	M39029/57-358	SSBP-16S	T-5093-16	M81969/14-03	Blue	White
16	M39029/58-364	SSBP-16P	T-5093-16	M81969/14-03	Blue	White
12	M39029/57-359	SSBP-12S	T-5093-12	M81969/14-04	Yellow	White
12	M39029/58-365	SSBP-12P	T-5093-12	M81969/14-04	Yellow	White
8	No MIL P/N	SSBP-8S	T-5093-8	None	⚠	White
8	No MIL P/N	SSBP-8P	T-5093-8	None	⚠	White

* MIL-C-39029 Superseded by AS39029 (Reference Only). ** For Reference only. ⚠ Extraction Only

Insertion / Extraction Tools



SSBP Size 20 Guide Pin

Guide Pin (SSBP-20GP) for use with SSBP Size 20 Male/Pins

Why the SSBP-20GP Guide-Pin is Needed

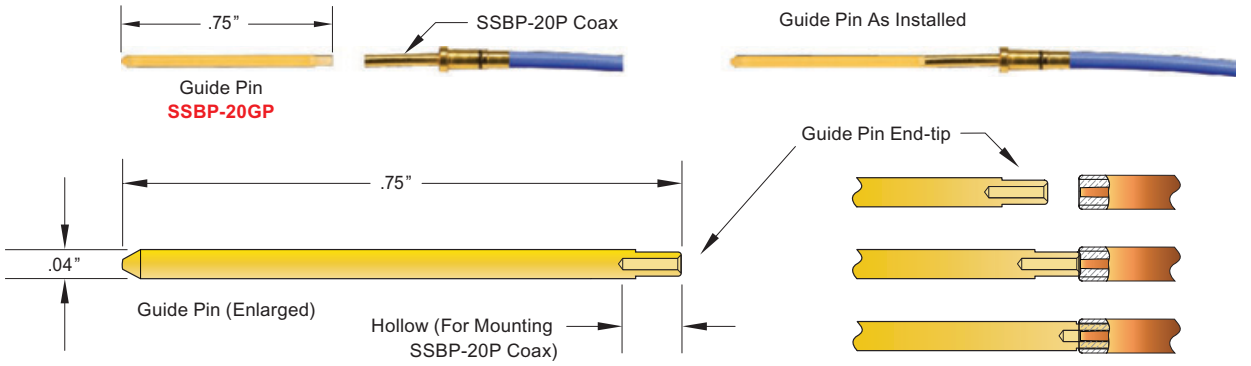
The SSBP-20GP Guide Pin is used only with the Size 20 SSBP male/pin coax assemblies. Non-coax signal contacts have similar external envelopes as SSBP coaxes. Standard signal male/pins are solid with fully radiused ends whereas the SSBP male/pin coaxes have coaxial construction (see page 10). The small SSBP-20 male/pin outer contact has a relatively thin wall forward extension tube (for the equivalent of male/pin protrusion).

The non-coax, radiused end of a solid signal male/pin contact can find its way to self-align through the square step inside of the host connector pin insert assemblies. However, the coaxial front-end of the SSBP male/pin can “catch” on this square step and hinder proper installation. To eliminate this potential problem, Southwest Microwave provides a plastic guide-pin that will help “guide” the SSBP-20 male/pin into position. Southwest Microwave has standardized its Assembly Instruction so that the SSBP-20GP can be used for all SSBP-20P male/pin assemblies in MIL-DTL-38999 connectors.

Use of the SSBP-20GP Guide-Pin

The SSBP-20GP guide pin is used only when installing SSBP-20P male/pin coaxes. (The guide pin is not used with SSBP-20 female/socket coax assemblies.) SSBP-20GP guide pins are reusable. SSBP-20GP guide pins are shipped with SSBP-20 Pin coaxes. They do not need to be ordered separately. However, if needed, they are available as stand-alone component “SSBP-20GP”.

***Guide Pin (SSBP-20GP) Installation** for use with SSBP Size 20 Male/Pins*



Inserting Guide Pin into the End of SSBP-20P Coax

Installation of the SSBP-20GP Guide-Pin

To start, the SSBP-20P coax should be terminated to cable and the cable-coax assembly "installed" into the T-5093-20 (Size 20 CIET) tool. One end of the plastic guide-pin has a hollow section. This hollow end is inserted into the end of the SSBP-20 Pin coax (see illustration above). The hollow section fits over the central pin of the coaxial contact. There is a shoulder on the guide-pin that rests against the end of the SSBP-20 Pin coax to prevent over-insertion. Contact installation proceeds per the "Contact Insertion/Extraction" discussion on page 30. After the SSBP-20 Pin coax is installed in the connector, the guide-pin will protrude from the front-face of the connector. Gently grip the guide-pin (where it extends from the front mating face of the connector) and pull it forward. The guide-pin will easily separate from the SSBP-20P coax and be available for reuse.

Materials & Finishes – SSBP Coaxes

Materials:

- Center Contacts, Outer Contact, Bushings: Beryllium Copper (BeCu), UNS-C17300 per ASTM B 196/197
- Compression Springs: Stainless Steel 304V Hyten (High Tensile Strength) per ASTM A313 (Chem only), or Stainless Steel UNS-S17700 RH950 per ASTM A313
- Alignment Sleeves, Flanged Sleeves: Stainless Steel UNS-S30300 temper cold drawn, per ASTM A582
- Contact Capture Bead Rings: High Temperature Ultem 1000, per ASTM-D-5205
- Concentricity Bead Rings (Dielectrics): Virgin PTFE Fluorocarbon, per ASTM-D-1710, Type 1, Grade 1, Class B, and ASTM-D-1457

Finishes:

- Center Contacts, Outer Contacts, Bushings: Gold per MIL-DTL-45204, Type II, Grade C, over Electroless Nickel per MIL-C-26074
- Sleeves, Compression Springs: Passivated per ASTM A967

Environmental:

- Operating Temperatures: -55°C to +165°C
- Environmental Performance (moisture, etc.) is dependent upon the multi-contact connectors used when properly mated.

For use with standard Size 20 contact cavities for D-Subminiature (Ref: MIL-DTL-24308) and Southwest Microwave custom Micro-D connectors.

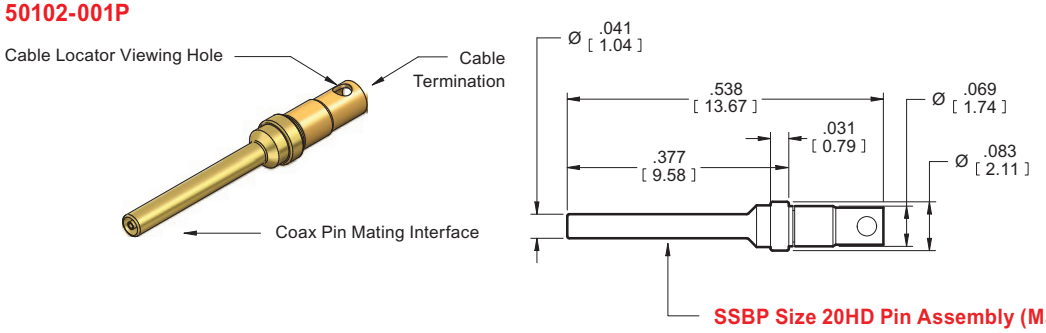
SSBP Coax Size & Gender	SSBP Coax No.	Cables ⚠1
20HDP	50102-001P	.047 solid core flex or S/R (any supplier)
20HDP	50102-002P	LL047, Temp-Flex 047-2801, or equivalent
20HDS	51102-001S	.047 solid core flex or S/R (any supplier)
20HDS	51102-002S	LL047, Temp-Flex 047-2801, or equivalent

⚠1 Contact Southwest Microwave for other connectors and cable options.

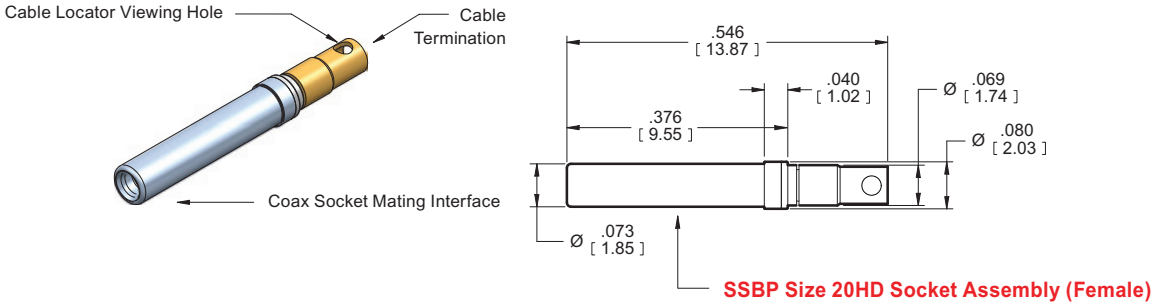
⚠2 Contact Southwest Microwave for outline drawings and assembly instructions for specific SSBP coaxes.

Dimensions: ⚠2

50102-001P



51102-001S



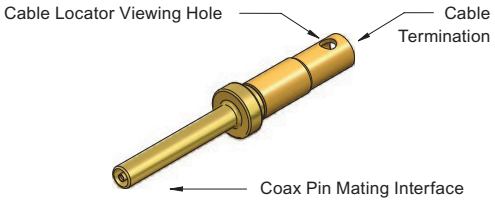
For use with Size 20 contact cavities for circular connectors per MIL-DTL-38999 and equivalents having the same contact cavity and interface dimensions.

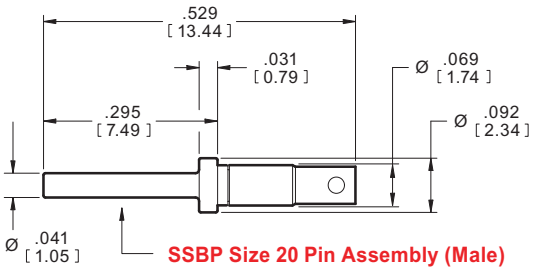
SSBP Coax Size & Gender	MIL-DTL-38999 Series ③	SSBP Coax No.	Cables ①
20P	I, II, III, IV	50000-001P	.047 solid core flex or S/R (any supplier)
20P	I, II, III, IV	50000-002P	LL047, Temp-Flex 047-2801, or equivalent
20S	I, III, IV	51000-001S	.047 solid core flex or S/R (any supplier)
20S	I, III, IV	51000-002S	LL047, Temp-Flex 047-2801, or equivalent
20S	II	51001-001S	.047 solid core flex or S/R (any supplier)
20S	II	51001-002S	LL047, Temp-Flex 047-2801, or equivalent

① Contact Southwest Microwave for other connectors and cable options.
② Contact Southwest Microwave for outline drawings and assembly instructions for specific SSBP coaxes.
③ Series II MIL-DTL-38999 uses different socket (female) contacts than Series I, III, IV.

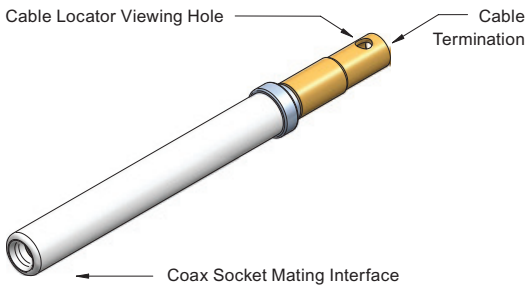
Dimensions: ②

50000-001P

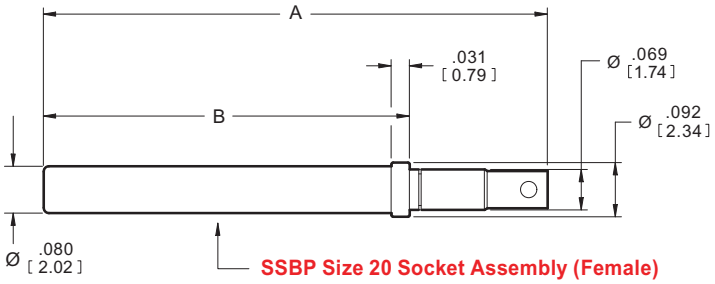




51000-001S & 51001-001S



(Not to Scale. See Table Below)



MIL-DTL-38999 Series ③	SSBP Coax No.	Dimensions, SSBP-20 Sockets / Female Coaxes	
		A	B
I, III, IV	51000-001S	.855 [21.72]	.621 [15.77]
II	51001-001S	.518 [13.16]	.284 [7.21]

For use with Size 16 contact cavities for circular connectors per MIL-DTL-38999 and equivalents having the same contact cavity and interface dimensions.

SSBP Coax Size & Gender	MIL-DTL-38999 Series ③	SSBP Coax No.	Cables ①
16P	I, II, III, IV	50200-001P	.086 solid core flex or S/R (any supplier), Insulated Wire IW-1251
16P	I, II, III, IV	50200-002P	LL086, Temp-Flex 086-2201
16P	I, II, III, IV	50200-003P	.047 solid core flex or S/R (any supplier)
16S	I, III, IV	51200-001S	.086 solid core flex or S/R (any supplier), Insulated Wire IW-1251
16S	I, III, IV	51200-002S	LL086, Temp-Flex 086-2201
16S	I, III, IV	51200-003S	.047 solid core flex or S/R (any supplier)
16S	II	51201-001S	.086 solid core flex or S/R (any supplier), Insulated Wire IW-1251
16S	II	51201-002S	LL086, Temp-Flex 086-2201
16S	II	51201-003S	.047 solid core flex or S/R (any supplier)

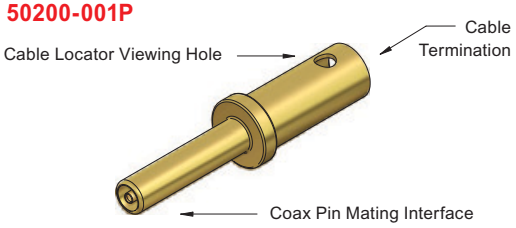
① Contact Southwest Microwave for other connectors and cable options, including 75-ohm assemblies.

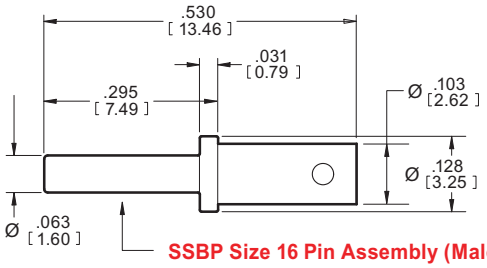
② Contact Southwest Microwave for outline drawings and assembly instructions for specific SSBP coaxes.

③ Series II MIL-DTL-38999 uses different socket (female) contacts than Series I, III, IV.

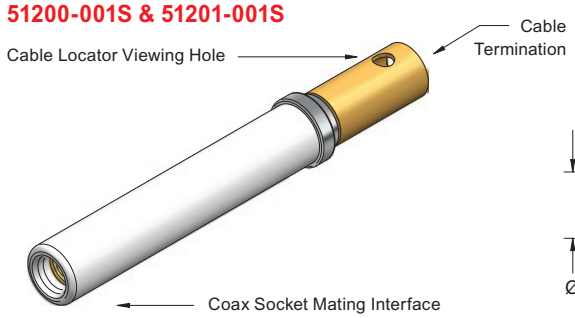
Dimensions: ②

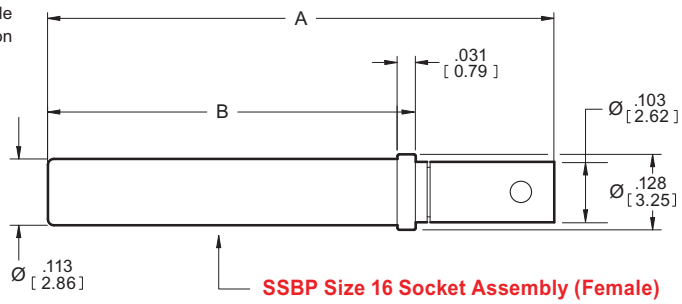
50200-001P





51200-001S & 51201-001S





MIL-DTL-38999 Series ③	SSBP Coax No.	Dimensions, SSBP-16 Sockets / Female Coaxes	
		A	B
I, III, IV	51200-001S	.859 [21.82]	.624 [15.85]
II	51201-001S	.518 [13.16]	.284 [7.21]

SSBP Product Selection

SSBP - 12

For use with Size 12 contact cavities for circular connectors per MIL-DTL-38999 Series I, III, IV and equivalents having the same contact cavity and interface dimensions.

SSBP Coax Size & Gender	SSBP Coax No.	Cables ⚠1
12P	50400-001P	0.100 braid OD, Temp-Flex 100-2001(low loss)
12P	50400-002P	0.108 braid OD, Temp-Flex 108-2001(triple shielded, low loss)
12P	50400-003P	.086 solid core flex or S/R (any supplier)
12P	50400-004P	0.130 braid OD ⚠3
12S	51400-001S	0.100 braid OD, Temp-Flex 100-2001(low loss)
12S	51400-002S	0.108 braid OD, Temp-Flex 108-2001(triple shielded, low loss)
12S	51400-003S	.086 solid core flex or S/R (any supplier)
12S	51400-004S	0.130 braid OD ⚠3

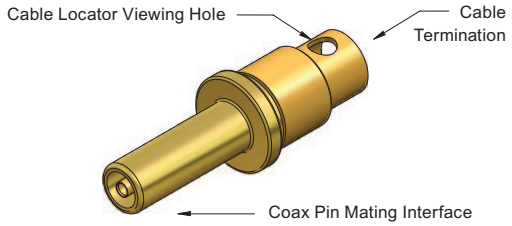
⚠1 Contact Southwest Microwave for other connectors and cable options, including 75-ohm assemblies.

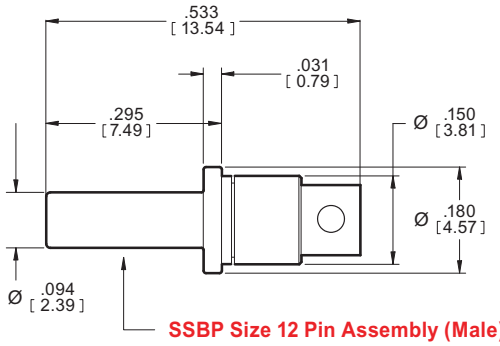
⚠2 Contact Southwest Microwave for outline drawings and assembly instructions for specific SSBP coaxes.

⚠3 Closest to .141 cable that will fit in Size 12 connector cavities.

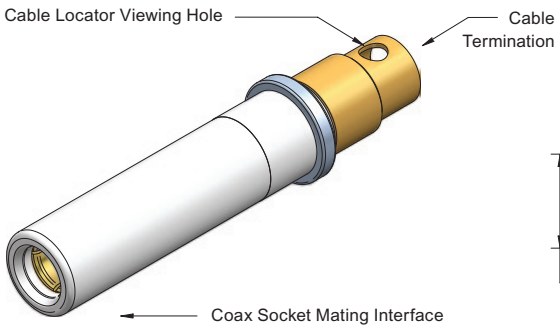
Dimensions: ⚠2

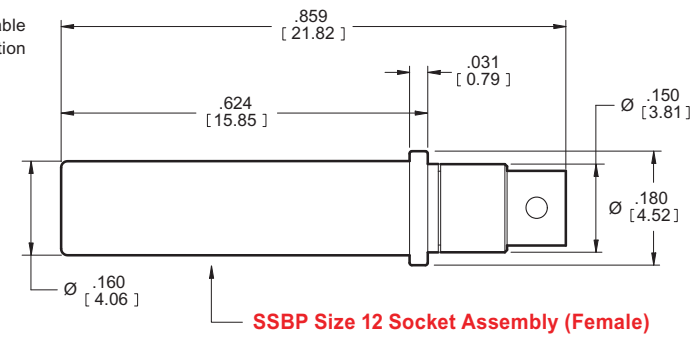
50400-001P





51400-001S





For use with Size 8 contact cavities for circular connectors per MIL-DTL-38999 Series I, III, IV and equivalents having the same contact cavity and interface dimensions.

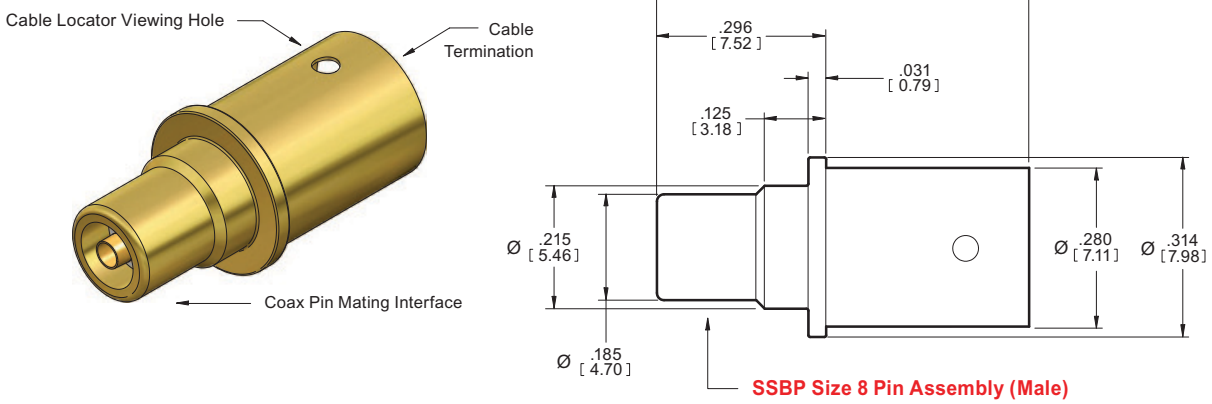
SSBP Coax Size & Gender	SSBP Coax No.	Cables ⚠1
8P	50600-001P	0.264 braid OD, Harbour LL-285 or LLS-290
8P	50600-002P	.141 solid core flex or S/R (any supplier)
8P	50600-003P	.086 solid core flex or S/R (any supplier)
8S	51600-001S	0.264 braid OD, Harbour LL-285 or LLS-290
8S	51600-002S	.141 solid core flex or S/R (any supplier)
8S	51600-003S	.086 solid core flex or S/R (any supplier)

⚠1 Contact Southwest Microwave for other connectors and cable options, including 75-ohm assemblies.

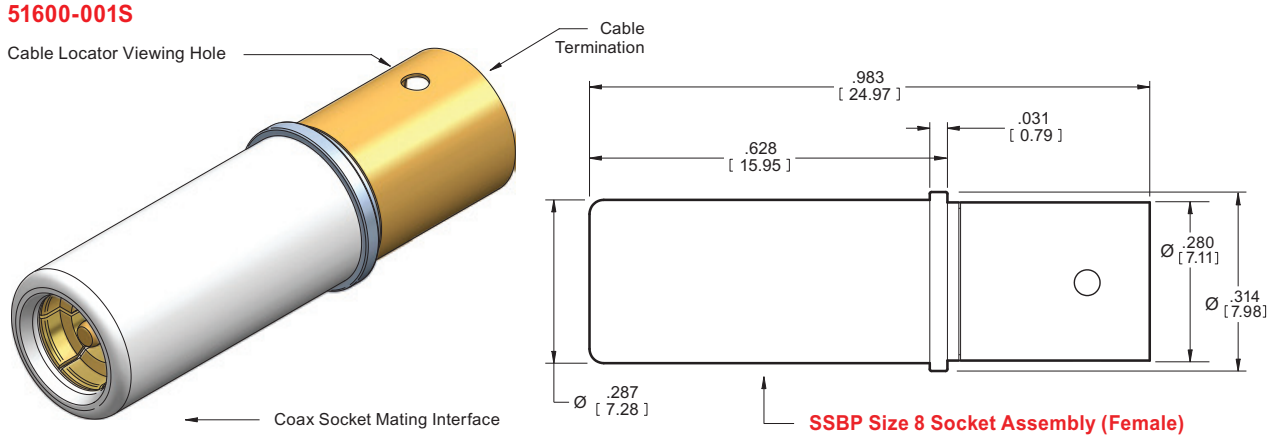
⚠2 Contact Southwest Microwave for outline drawings and assembly instructions for specific SSBP coaxes.

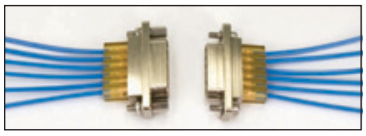
Dimensions: ⚠2

50600-001P



51600-001S





6-Position

Product Description

For these connectors, the external envelope for MIL-DTL-83513 (Micro-D) was selected for convenience due to popularity of the many commercial (plastic and metal) versions of these connectors.

Six (6) Size 20HD SSBP coaxes fit in Micro-D housing-envelopes otherwise “standard” for 25 Micro-D signal contacts. Board End Launch receptacles incorporate male/pin coaxes. Board connectors have 2 shell-extensions (as mounting lugs) for positive screw-hold-down to PCB. The board-side pin coaxes have “dog house” style terminators, positively oriented and epoxied in place. The outer and center contact surfaces are coplanar with mounting surfaces of the shell lugs and are soldered to the signal trace and coplanar or microstrip ground.

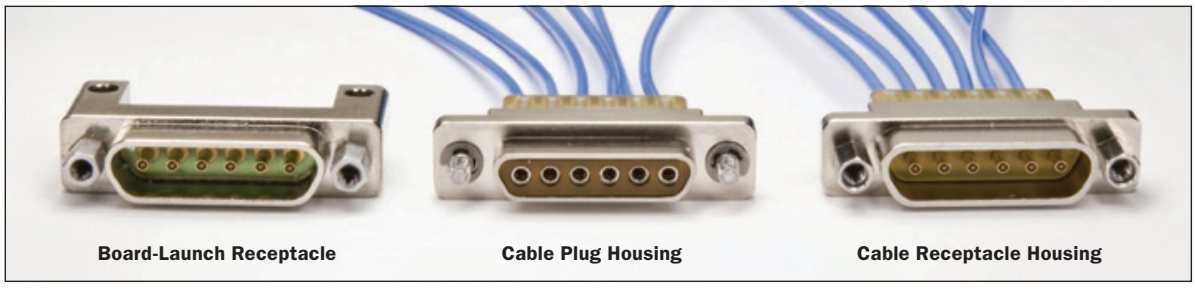
Due to movement in the spring loaded SSBP-20HD Socket (socket coax) that occurs during mating, only the pin coax can be rigidly mounted. Accordingly, board-launch receptacles are supplied with SSBP-20HD Pin “launch” coaxes installed.

Standard jackscrew hardware is used to mate the cable plug to the PC end launch receptacle and maintain firm engagement.

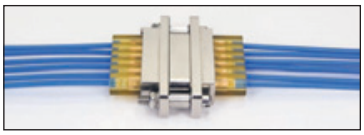
SSBP cable-to-cable versions of the Micro-D receptacles and plugs are available. They use the same cable SSBP-20HD coaxes used in D-Subminiature MIL-DTL-24308 connectors. They are installed and removed using the same plastic tools as standard D-Subminiature connectors.

Different size housings and combinations of SSBP-20HD coax and signal or grounding contacts can be provided. Contact Southwest Microwave for your specific needs.

Micro-D SSBP connectors showing installed Size 20HD SSBP coaxes.



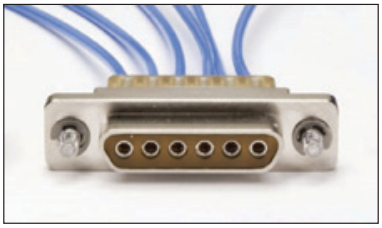
For availability of other sizes and mixed coax-signal arrangements, contact Southwest Microwave.



6-Position Cable-to-Cable Plug

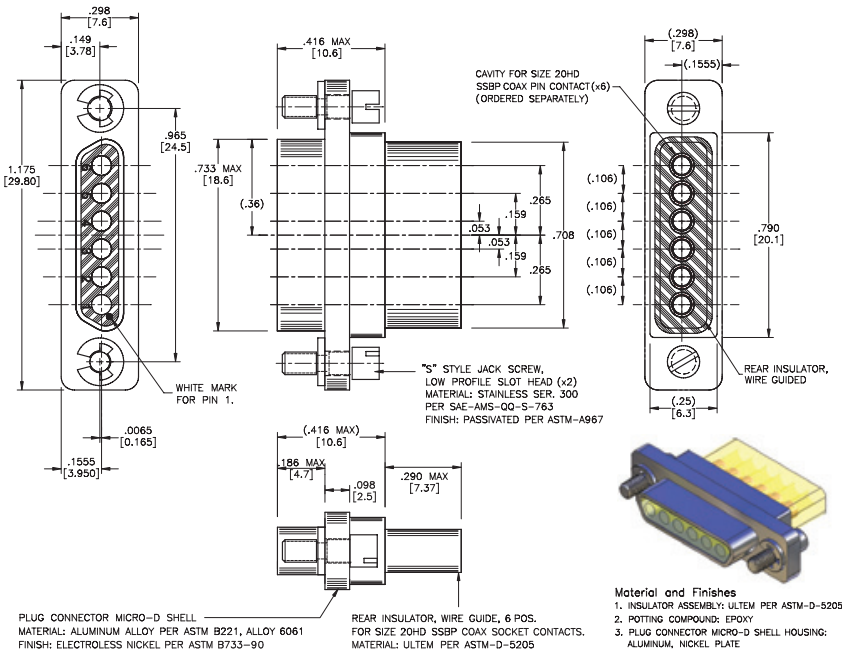
SSBP-20HDS coaxes are ordered separately. Supplied with 2 male Jackscrews installed (as shown).

Dimensions



17500-4002S
Connector Assembly
Shown with SSBP-20HD Socket coaxes installed

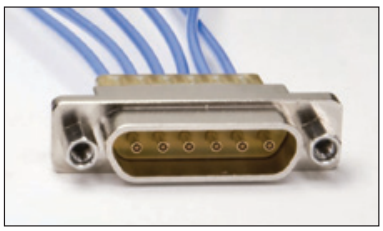
See page 22 for SSBP-20HD Socket coaxes, purchased separately



6-Position Cable-to-Cable Receptacle

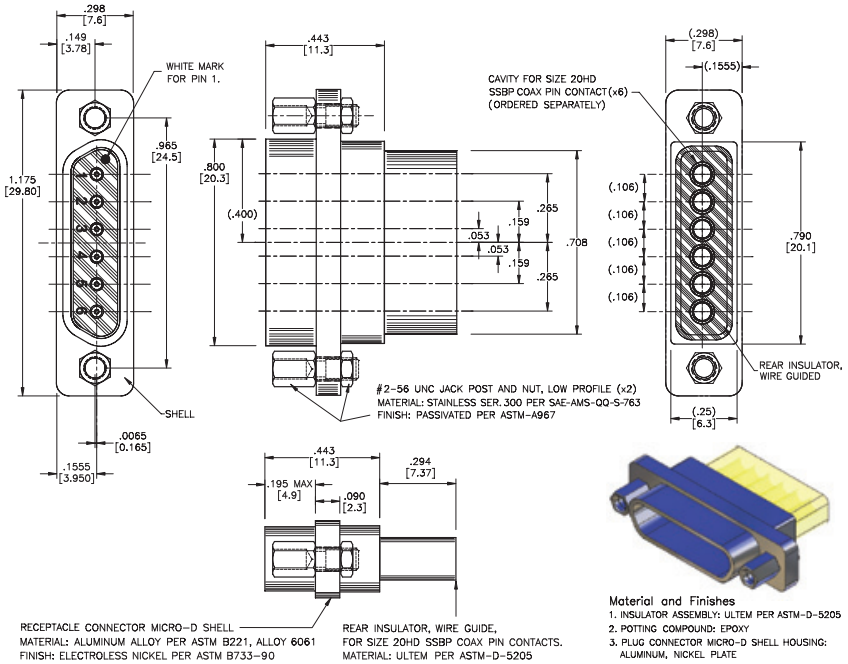
SSBP-20HD Pin coaxes are ordered separately. Supplied with 2 female Jackposts installed (as shown).

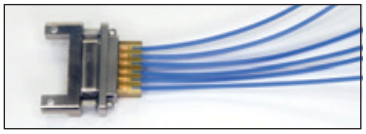
Dimensions



17500-4003P
Connector Assembly
Shown with SSBP-20HD Pin coaxes installed

See page 22 for SSBP-20HD Pin coaxes, purchased separately



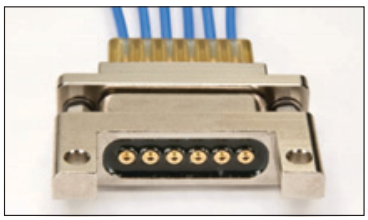


6-Position End Launch (PCB "Top Mount")

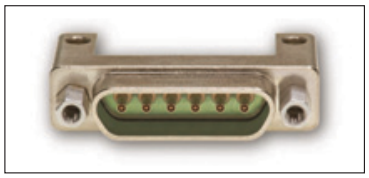
Hardware: Supplied with 2 female screwlocks installed (as shown).

The 2-56 UNC-2A mounting screws are customer-supplied. Additional hardware is optional and would be used on outside/ bottom of clamping plate (not between PCB and plate).

Min. Screw Length =
(.250 in. + PCB Thickness + Hardware Thickness + Screw Ext.)

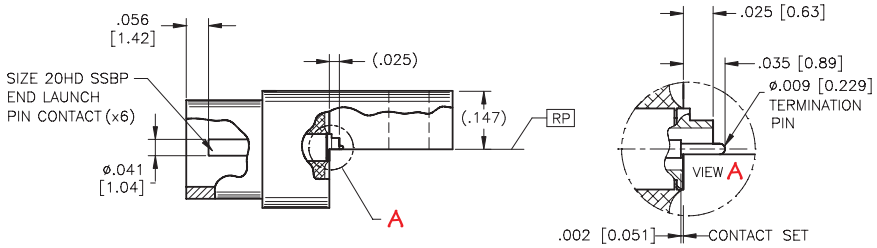


17500-4002P
Rear Board Launch View
Connector Assembly

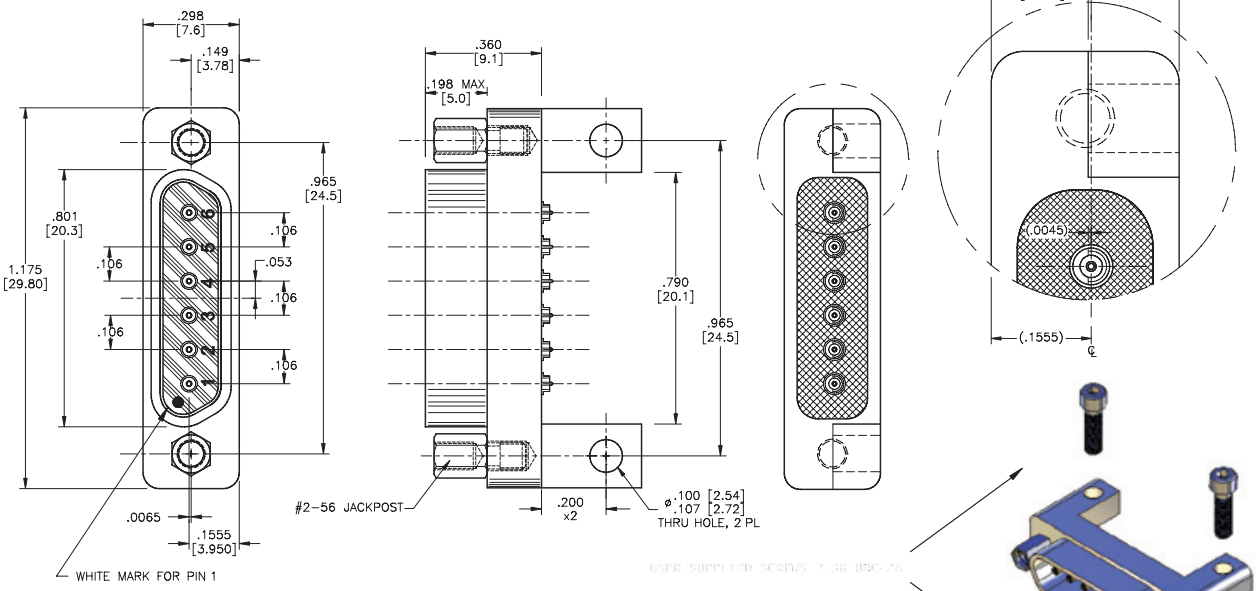


17500-4002P
Front Mating Face View
Board Launch Receptacle

(View-A) PWB Launch Configuration

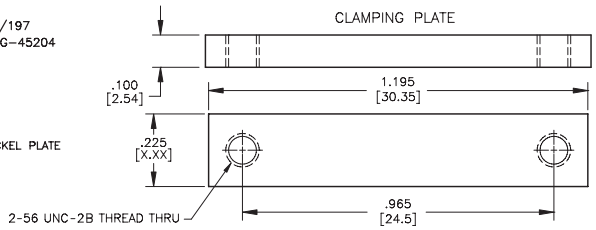


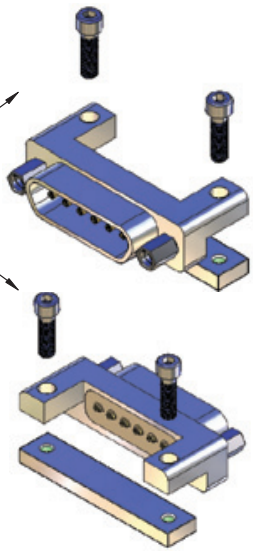
SSBP 6-Position Micro-D Receptacle End Launch Connector Assemby



Material and Finishes

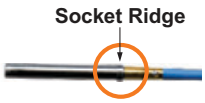
1. SSBP PIN CONTACT ASSY: (#20 SSBP SOCKET COPLANAR LAUNCH.ø.009)
   OUTER CONDUCTOR: BeCu
   HOUSING, GROUND: UNS-C17300 PER ASTM-B-196/197
   BUSHING & CENTER CONTACT: GOLD PLATE PER MIL-G-45204
   DIELECTRIC BEADS: ULTEM 1000 PER ASTM-D-5205
   KEL-F PER MIL-P-46036
2. INSULATOR: ULTEM 1000 PER ASTM-D-5205
3. POTTING COMPOUND: EPOXY
4. RECEPTACLE CONNECTOR MICRO-D SHELL: ALUMINUM, NICKEL PLATE
5. CLAMPING PLATE
   STEEL CRES ALLOY UNS-S30300 PER ASTM-A582
   PASSIVATED PER QQ-P-36

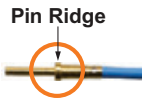


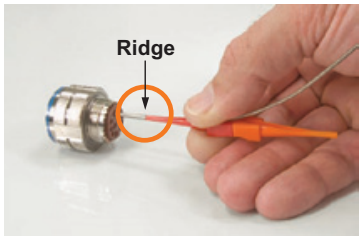


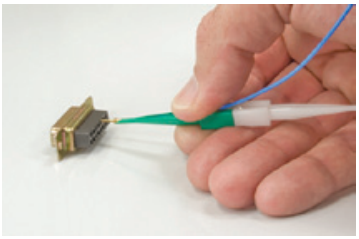
Appendix

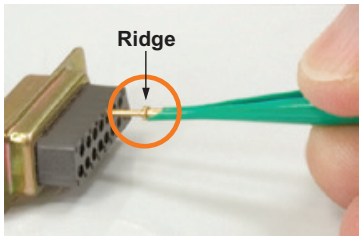
SSBP Coax Installation and Extraction Guidelines











To Insert SSBP Coaxes:

1. Start with the connector body itself, with the back shell and other rear-accessories removed.

Note: If inserting SSBP-20 Pin into MIL-DTL-38999 connectors, make sure that the SSBP-20GP guide pin is properly installed. (Refer to pages 19-20.)

2. Snap the insertion end of the appropriate size double-ended plastic tool over the wire. Press the wire over the serrated position of the tool and hold in place with your thumb. (Tools are presented on page 19.)
3. Slide the tool up to the raised ridge (for sockets: ridge is on the stainless steel sleeve; for pins: ridge/shoulder is on the pin body). See illustrations above.
4. Slowly push the contact straight into the connector cavity. Stop if there is any high resistance force and withdraw and then reinsert the tool-coax assembly.
5. A positive stop will result when the contact properly seats in the connector cavity. Sometimes a faint “click” may be heard as the connector’s retention tines snap into place behind the raised SSBP ridge/shoulder.
6. Still gripping the wire-tool combination, gently pull back lightly to confirm that the connector’s tines have locked the SSBP coax into place.
7. Release pressure so that the wire is no longer held to the tool. Gently pull the tool straight backward (out) until fully removed.

To Remove SSBP Coaxes:

1. Looking at the rear-face of the connector, snap the extraction end of the appropriate size double-ended plastic tool over the wire connected to the SSBP coax to be removed.
2. Slowly slide the tool along the wire into the contact cavity until it engages the raised ridge/shoulder of the SSBP coax. A positive resistance should be felt. At this time, the contact-retaining-tines are pushed outward to their unlocked position.
3. Press the wire of the SSBP coax to be removed against the serrations of the plastic tool. Compress the wire and tool together. Pull both the tool and the coax wire assembly out of the connector.
4. Remove the tool from the cable so that it can be reused.

Southwest Microwave recommends that customers contact suppliers of the connectors to be used to determine if they may have additional or unique insertion/extraction instructions that may apply to their connectors.

Cable Termination Guidelines

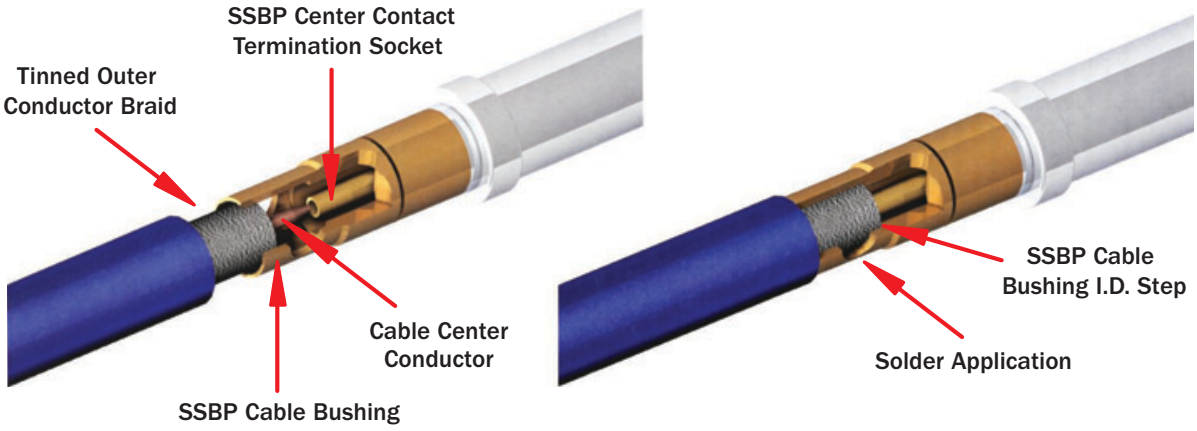
A variety of solid PTFE dielectric and low density dielectric, low loss cables have been used thus far with SSBP coaxes. Specific cables are included in the SSBP coax selection data on pages 22, 23, 24, 25, and 26. Maximum cable size for any SSBP coax size is limited by the maximum allowable OD of the SSBP pin or socket coax cable bushing which corresponds to the contact crimp barrel OD for the same size signal contact per MIL-C-39029. These limits must be maintained for connector applications which use rear insertion, rear release contacts in order for the standard contact insertion/extraction tools to be used.

For microwave engineers considering millimeter wave interconnects, the contact size designations and definitions in MIL-C-39029 are of little use. Correlations between the MIL-C-39029 contact size designations and the corresponding SSBP millimeter wave coax sizes are shown on page 6. The metric diameters listed are the IDs of the SSBP outer conductors.

SSBP cable preparation involves jacket trimming, outer conductor braid tinning and trimming, and center conductor trimming. The termination sequence for SSBP coaxes is as follows and is illustrated below:

1. Cable insertion into the SSBP cable bushing followed by center conductor insertion into the socket contact inside the rear of the SSBP coax. (The center contact provides over 300° of continuous contact around the cable center conductor.) The center conductor is not soldered and there are no free “beams” to bounce or flex during shock or vibration. This is a significant reliability gain as there is no solder joint to crack if cable is bent.
2. Bottoming of the tinned cable outer conductor against the step in the I.D. of the SSBP cable bushing.
3. Soldering the cable outer conductor directly into the I.D. of the SSBP cable bushing.

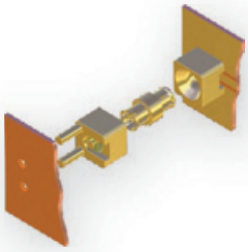
Typical SSBP Termination Configuration



⚠ *Users are cautioned that performance is dependent upon the specific cable selected and third-party cable preparation is beyond the control of Southwest Microwave.*

Appendix
Additional SSB* Products

SSBB *– Board-to-Board (SMT and Thru-Hole)*



SSBP *– Wave Guide Launch and Cabled BMMA "Drop-in" Replacements*

0.9 mm (SSBT) *– Single-Line Miniature Threaded Connectors*

SSBP *– Cable Assemblies*

SSBT, SSBB and SSBP have similar interfaces, but they are not intermateable.

Product Number Index

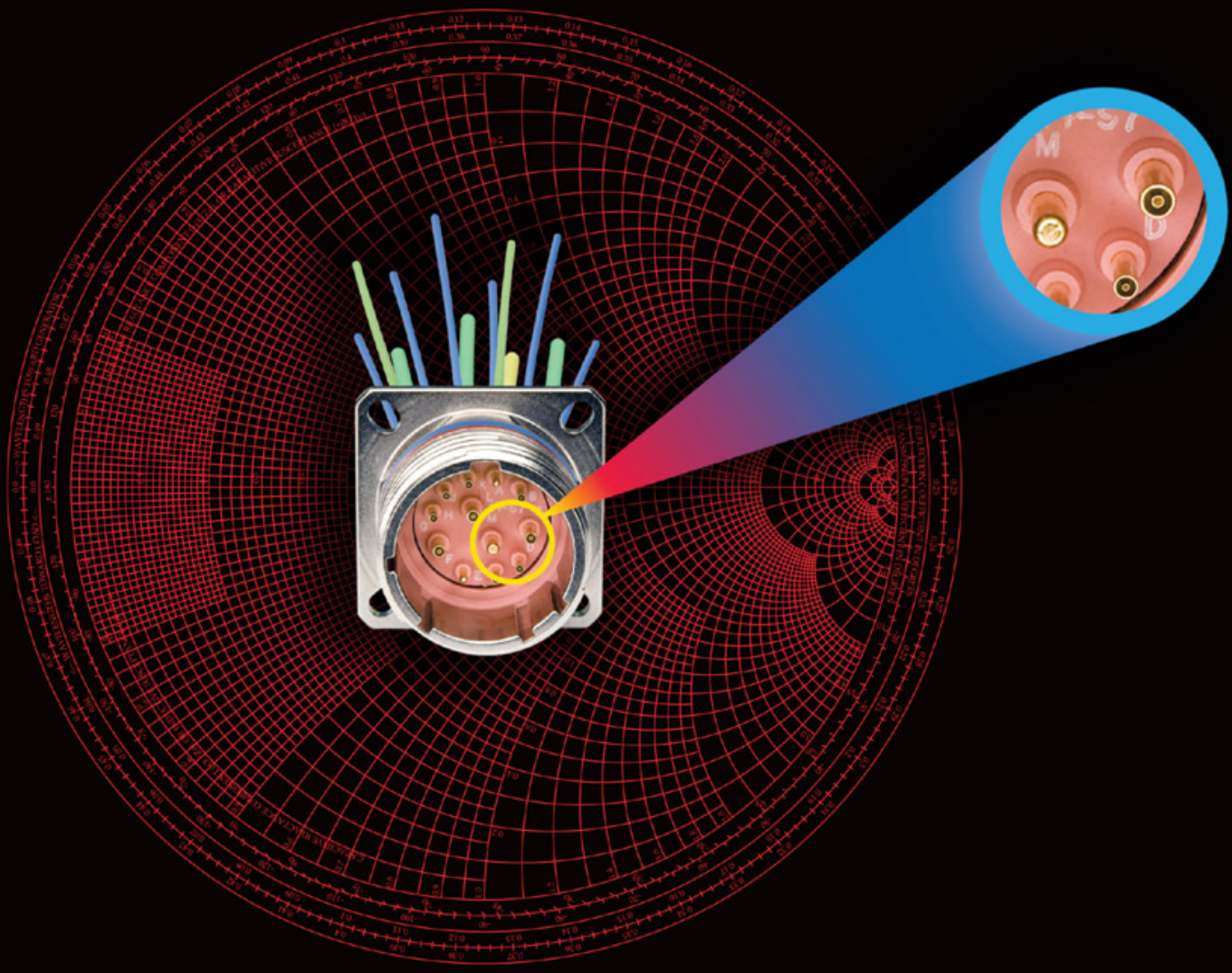
Please Refer to Our Web Site for the Latest Updates • www.southwestmicrowave.com

SOUTHWEST MICROWAVE

Southwest Microwave, Inc.

SSBP High Performance Microwave Coax Contacts

For Use In Standard Multi-Contact Connectors



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Tempe, Arizona 85284 USA
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