

INCH-POUND

MIL-PRF-39012/19H
16 November 2006
SUPERSEDING
MIL-PRF-39012/19G
26 September 1994

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, RECEPTACLE, ELECTRICAL, COAXIAL, RADIO FREQUENCY,
(SERIES BNC (CABLED), SOCKET CONTACT, JAM NUT MOUNTED CLASS 2)

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of
this specification sheet and MIL-PRF-39012.

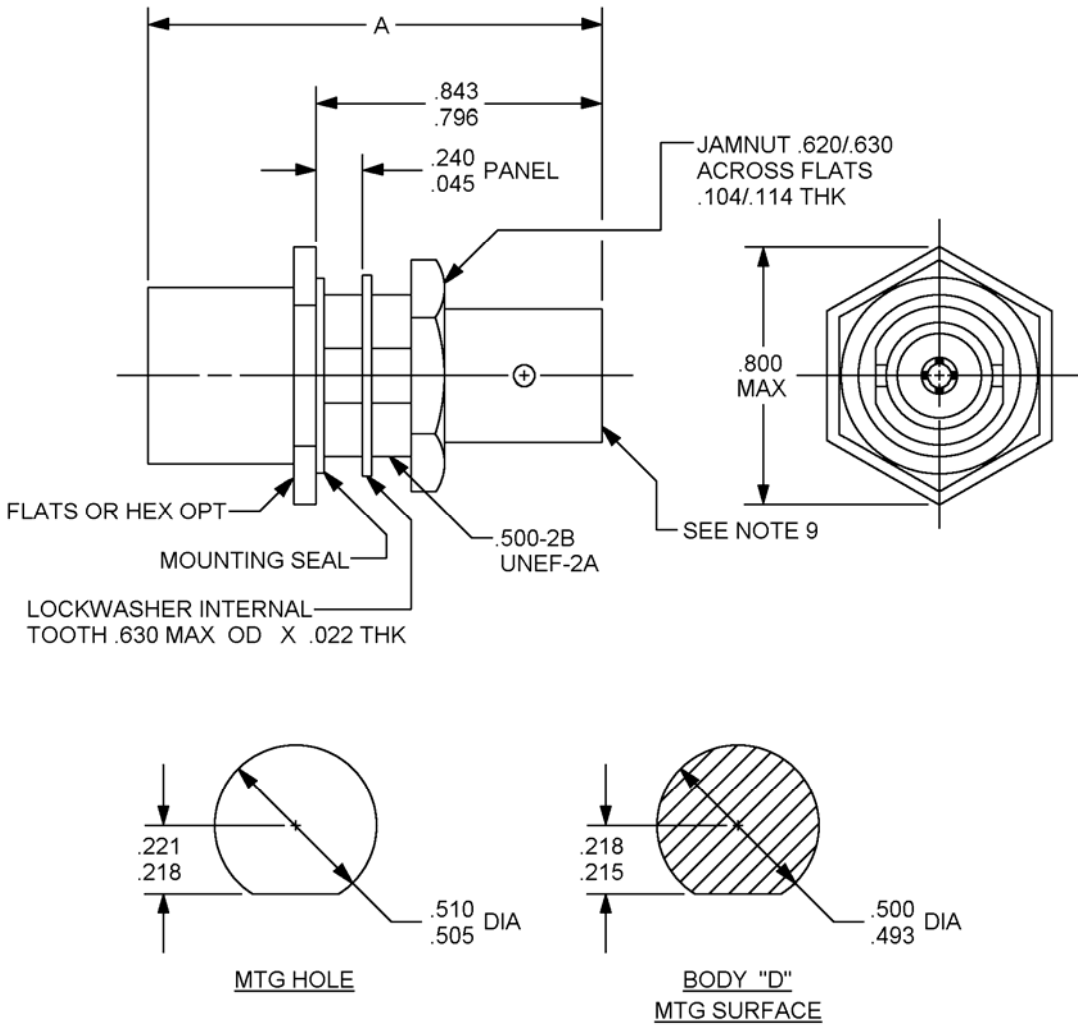


FIGURE 1. General configuration.

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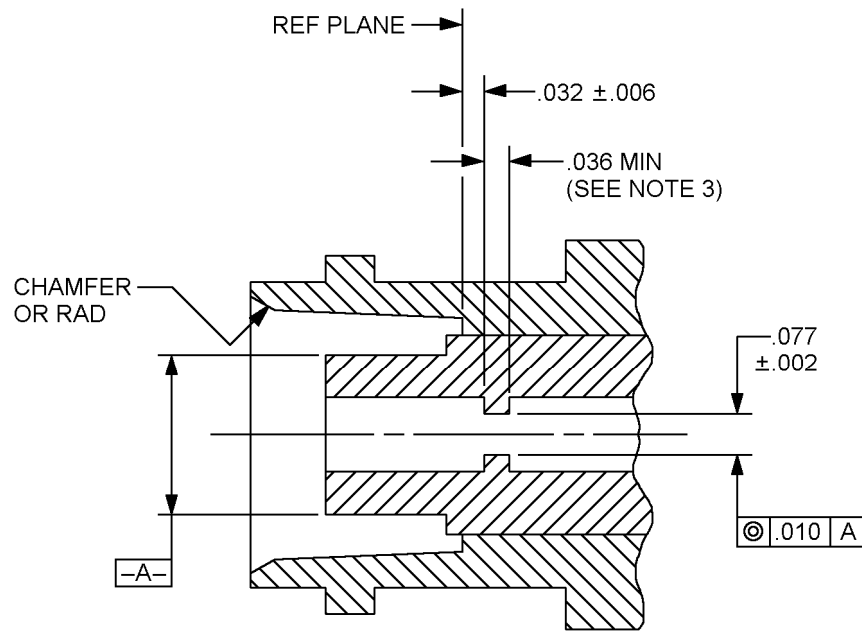
Inches	mm	Inches	mm
.022	0.56	.493	12.52
.065	1.14	.500	12.70
.104	2.64	.505	12.83
.114	2.90	.510	12.95
.215	5.46	.620	15.75
.218	5.54	.630	16.00
.221	5.61	.196	20.22
.240	6.10	.500	20.32
		.843	21.41

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. For dimension A, see tables I and III.
4. Dimension .800 inch (20.32 mm) is the largest overall diameter of the connector.
5. Wrench flats are to accommodate standard wrench opening in accordance with FED-STD-H28, appendix 10.
6. Orientation of the body hex flats, mounting flats and bayonet studs shall be $\pm 3^\circ$ of that orientation shown.
7. All undimensioned pictorial representations are for reference purposes only.
8. Dimension A defines the maxima Length of the connector when assembled to the appropriate cable.
9. Series BNC, socket contact interface in accordance with MIL-STD-348.

FIGURE 1. General configuration – Continued.

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CATEGORY "D"

Inches	mm
.002	0.05
.006	0.15
.010	0.25
.036	0.91
.077	1.96
.234	5.94

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Chamfer is optional.
4. Concave depression .100 inch (2.54 mm) x .005 inch (0.13 mm) deep between studs permissible.

FIGURE 2. Category D captivation details.

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TABLE I. Dash numbers, cross-reference, and dimensions.

Part or Identifying Number (PIN) <u>1/</u> M39012/19-	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) maximum #
Category A – Field serviceable (no special tools required) <u>3/</u>			
X101 (Superseding –0111 <u>4/</u>)	Cable group VI 60-RG142 <u>5/</u> 128-RG400 <u>6/</u>	A	1.250 (31.75)
X102 (Superseding –0118 <u>4/</u>)	Cable group VII 110-RG302 <u>5/ 6/ 7/</u>		
X110	Cable group IV 54-RG122 <u>6/</u>		
X220	Cable group II 113-RG316 <u>5/ 6/</u>		
X225	Cable group X 127-RG393 <u>5/ 6/</u>		

See notes at end of table.

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TABLE I. Dash numbers, cross-reference, and dimensions – Continued.

PIN <u>1</u> / M39012/19-	Applicable cable <u>2</u> / M17/	Dimensions	Inches (millimeters) maximum #
Category C – Field replaceable (MIL-DTL-22520 crimp tool) See note next to applicable cable group for crimp die <u>3</u> / <u>8</u> /			
X013	Cable group VIA <u>9</u> / 111-RG303 <u>5</u> / <u>6</u> /	A	1.625 (41.28)
X014	Cable group VIB <u>9</u> / 60-RG142 <u>5</u> / 128-RG400 <u>6</u> /		
X015 (Superseding –0020 <u>4</u> /)	Cable group VIIA <u>10</u> / 110-RG302 <u>5</u> / <u>6</u> / <u>7</u> /		
X016	Cable group IV <u>11</u> / 54-RG122 <u>6</u> /		
X017	Cable group VIIB <u>10</u> / 90-RG71 <u>6</u> / <u>7</u> /		
X221	Cable group IIA <u>12</u> / 113-RG316 <u>5</u> / <u>6</u> /		

See notes at end of table.

TABLE I. Dash numbers, Cross-reference, and dimensions – Continued.

PIN <u>1/</u> M39012/19-	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) maximum #
Category D – Field replaceable – Defined piece part <u>3/ 8/ 13/ 14/</u>			
X501	Cable group IV 54-RG122 <u>6/</u>	A	1.468 (37.31)
X502	Cable group V 95-RG180 <u>5/ 6/ 7/</u>		
X503	Cable group VIB 60-RG142 <u>5/</u> 128-RG400 <u>6/</u>		
X504	Cable group VIA 111-RG303 <u>5/ 6/</u>		

1/ For cross-reference of PIN to superseded PIN or designation, see table IV.

2/ The latest version of each cable shall be applicable.

3/ These connectors have captivated center contacts.

4/ The superseded PIN is **NOT** acceptable for Government use.

5/ Cable to be used for the +200°C temperature cycling tests. This cable may be used for tests with the approval of the Qualifying Activity.

6/ Cable to be used when performing test requiring cable except as in 5/ and 7/.

7/ These are not 50-ohm cables; therefore, when attached to the specified connectors, VSWR, RF leakage and insertion loss are not applicable.

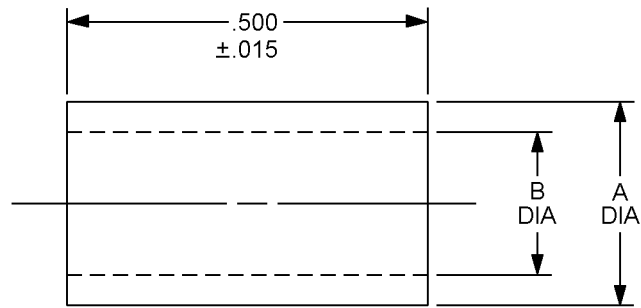
8/ These connectors are assembled using the applicable crimp tool, to the specified cables stripped as shown on figure 4.

9/ M22520/5-19 closure B or M22520/5-05 closure A.
M22520/5-11 closure A.
M22520/5-57 closure A.

TABLE I. Dash numbers, Cross-reference, and dimensions – Continued.

- 10/ M22520/5-19 closure A or M22520/5-07 closure A.
M22520/5-13 closure A.
M22520/5-59 closure A.
- 11/ M22520/5-41 closure B or M22520/5-05 closure B.
M22520/5-09 closure A.
- 12/ M22520/5-35 closure B or M22520/5-03 closure A.
- 13/ Complete connector assembly shall consist of a body, center contact, ferrule and assembly instructions.
- 14/ Not to be used in Army equipment.
- # Dimensions are in inches. Metric equivalents are given for information only.
- X Denotes connector body plating material option. The only plating options allowable are Silver or Nickel over brass in accordance with MIL-PRF-39012. Only connectors of the same materials shall be mated to avoid dissimilar metal problems. **CAUTION: A NICKEL PLATED BODY IS NOT FOR USE IN APPLICATIONS WHERE PASSIVE INTERMODULATION GENERATION (PIM) MAY BE A CONCERN** (<http://amphenolrf.com/simple/PIM%20Paper.pdf>). Silver is the preferred plating option.

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CRIMP FERRULE

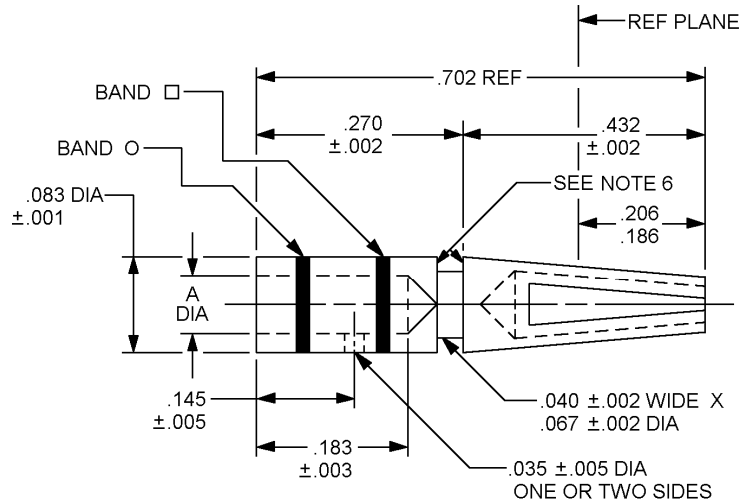
Dash number	Ferrule number <u>1/</u>	A ± 0.003	B ± 0.003	Basic crimp tool <u>2/</u>	Crimp die or positioner M22520/5
X501 X502	19-50	0.212	0.175	M22520/5-01	05, 41 Closure B or 9 Closure A
X503	19-51	0.250	0.220		05, 11, 57 Closure A or 19 Closure B
X504	19-52	0.245	0.206		

1/ Contact numbers and ferrule numbers are for identification only.

2/ Class 2 tool may be used by OEM (see MIL-DTL-22520).

FIGURE 3. Contact and ferrule dimensions for category D only.

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CENTER CONTACT

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.001	0.03	.033	0.84	.145	3.68	.220	5.59
.002	0.05	.035	0.89	.175	4.45	.230	5.84
.003	0.08	.040	1.02	.183	4.65	.235	5.97
.005	0.13	.043	1.09	.206	5.23	.250	6.35
.015	0.38	.067	1.70	.210	5.33	.478	12.14
.017	0.43	.083	2.11	.212	5.38	.500	12.70

Dash number	Contact number ^{1/}	A +0.001 -0.002	Basic crimp tool ^{2/}	Crimp die or positioner	Crimp tensile, pounds min. (N)	Color band □	Color band o
X501	19-12	0.033	M22520/1-01	M22520/1-12	10 lbs (44.48)	Orn	Blue
X502	19-11	0.017			6 lbs (26.69)	Blue	
X503 X504	19-10	0.043	M22520/1-01	M22520/1-12	20 lbs (88.96)	Red	

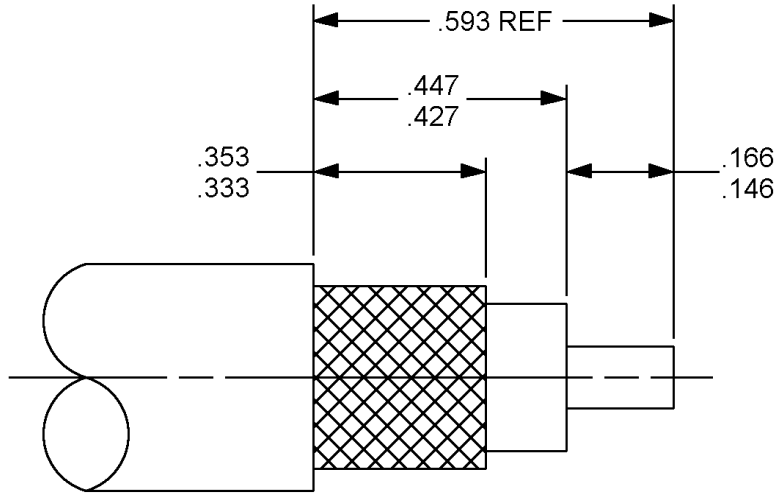
^{1/} Contact numbers and ferrule numbers are for identification only.

^{2/} Class 2 tool may be used by OEM (see MIL-DTL-22520).

NOTES:

- Dimensions are in inches.
- Metric equivalents are given for information only.
- Contact material shall be copper beryllium. Connectors supplied with phosphor bronze contacts are acceptable for Government use until existing stock is purged. This elimination of the contact material option shall take effect 1 year from the date of this specification.**
- Crimp tensile test shall be in accordance with SAE-AS39029.
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- .003 inch maximum break.
- Color bands shall be positioned so that no coloring material enters the inspection hole.

FIGURE 3. Contact and ferrule dimensions for category D only - Continued.



Inches	mm
.146	3.71
.166	4.22
.333	8.46
.353	8.97
.427	10.85
.447	11.35
.593	15.06

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.

FIGURE 4. Cable stripping dimensions for field replaceable connectors.

ENGINEERING DATA

Nominal impedance: 50 ohms.

Frequency range: 0 to 4 GHz.

Voltage rating:

500 volts rms, maximum working voltage at sea level.

125 volts rms, maximum at 70,000 feet (4.437 kPa).

Temperature rating: -65°C to +165°C.

REQUIREMENTS

Dimensions and configuration: See figures 1 and 3.

Force to engage and disengage:

Longitudinal force: 3 pounds (13.34 N), maximum.

Torque: 2.5 Inch-pounds (.28Nm), maximum.

Coupling proof torque: Not applicable.

Inspection conditions: Coupling torque not applicable.

Mating characteristics:

In accordance with MIL-STD-348 and figure 2 for dimensions.

Center contact (socket):

Oversize test pin: .057 inch (1.45 mm) diameter, minimum (nonclosed entry contacts only).

Insertion depth: .125 inch (3.17 mm), minimum.

Number of insertions: 1.

Insertion force test: Steel test pin diameter .054 inch (1.37 mm), minimum.

Test pin finish: 16 microinches (0.406 μ m).

Insertion force: 2 pounds, (8.90 N), maximum.

Withdrawal force test: Steel test pin diameter .052 inch (1.32 mm), maximum.

Withdrawal force: 2 ounces (.56 N), minimum.

Test pin finish: 16 microinches (0.406 μ m).

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Hermetic seat: Not applicable.

Leakage: Connector shall be mounted in mounting hole shown on figure 1 with mating end capped.

Test applicable to mounting seal only.

Air pressure - 30 Lbf/in².

Duration - 30 seconds, minimum.

Insulation resistance: Method 302 of MIL-STD-202, test condition B, 5,000 megohms, minimum.

Center contact retention: 6 pounds (26.69), minimum axial force. Applicable to captivated center contact connectors only.

Corrosion (salt spray): Method 101 of MIL-STD-202, test condition B.

Voltage standing wave ratio (VSWR): From 500 to 4 GHz, or approximately 80 percent of upper cutoff frequency of the cable, whichever is lower; 1.30, maximum.

Swept frequency VSWR test setup:

Item 6: VSWR shall be less than $1.015 + .005 F$ (F in GHz). -

Item 16: VSWR shall be less than $1.015 + .005 F$ (F in GHz).

Second step of VSWR checkout procedure: VSWR shall be less than $1.045 + .019 F$ (F in GHz).

Group B inspection: VSWR shall be less than $1.1 + .01 F$ (F in GHz).

Qualification and group C inspection: VSWR shall not exceed 1.15.

Connector durability: 500 cycles, minimum at 12 cycles per minute, maximum. The connector shall meet the mating characteristics end force to engage and disengage requirements.

Contact resistance: In milliohms, maximum:

	Initial	After environment
Center contact	1.5	2.0
Outer contact (silver)	.2	Not applicable
Outer contact (nickel)	.4	Not applicable
Braid to body	.1	Not applicable

Dielectric withstanding voltage: Method 301 of MIL-STD-202, 1,500 volts rms, minimum at sea level.

Vibration, high frequency: Method 204 of MIL-STD-202, test condition B. No discontinuity permitted.

Shock: Method 213 of MIL-STD-202, test condition G. No discontinuity permitted.

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Thermal shock: Method 107 of MIL-STD-202, test condition B, except test high temperature shall be +85°C. High temperature shall be +200°C for connectors using +200°C cables (see tables I and III).

Moisture resistance: Method 106 of MIL-STD-202. No measurements at high humidity. Insulation resistance shall be at least 200 megohms within 5 minutes after removal from humidity.

Corona Level:

Voltage: 375 volts rms, minimum.

Altitude: 70,000 feet (4.437 kPa).

RF high potential withstanding voltage:

Voltage and frequency: 1,000 volts rms at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

Cable retention force:

Noncrimp assemblies: 40 pounds (177.92 N), minimum.

Crimp assemblies:

10 pounds (44.48 N), minimum for cables .155 - .189 inch (3.96 mm – 4.80 mm) OD.

20 pounds (88.96 N), minimum for cables .190 - .229 inch (4.83 mm – 5.82 mm) OD.

30 pounds (133.45 N), minimum for cables .230 - .249 inch (5.84 mm – 6.32 mm) OD.

40 pounds (177.93 N), minimum for cables .250 inch (6.35 mm) OD - and larger.

Coupling mechanism retention force: Not applicable.

RF leakage: -55 dB minimum, tested at a frequency between 2 and 3 GHz.

Insertion loss: .2 dB maximum tested at 3 GHz.

PIN: M39012/19 (dash number from table I or "B" number from table III).

Group qualification: See table II.

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TABLE II. Group qualification. 1/

Group	Submission and qualification of <u>2/</u> any of the following connectors M39012/	Qualifies the following connectors M39012/
I	17-X101 17-X103 17-X111 17-X118 18-X102 18-X103 18-X111 18-X118 19-X101 19-X110 19-X111 19-X118 19-X220	17-X101 17-X102 17-X103 17-X111 17-X118 18-X101 18-X102 18-X103 18-X111 18-X118 19-X101 19-X102 19-X110 19-X111 19-X118 19-X220
II	17-X102 18-X101 19-X102	17-X102 18-X101 19-X102
III	17B0004 17B0005 17B0006 17B0007 17B0009 17B0019 18B0004 18B0005 18B0006 18B0007 18B0009 18B0019 19B0003 19B0004 19B0005 19B0006 19B0008 19B0019	17B0004 17B0005 17B0006 17B0007 17B0008 17B0009 17B0012 17B0019 18B0004 18B0005 18B0006 18B0007 18B0008 18B0009 18B0012 18B0019 19B0003 19B0004 19B0005 19B0006 19B0007

See notes at end of table.

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TABLE II. Group qualification - Continued. 1/

Group	Submission and qualification of <u>2/</u> any of the following connectors M39012/	Qualifies the following connectors M39012/
III		19B0008 19B0012 19B0019
IV	17B0008 17B0012 18B0008 18B0012 19B0007 19B0012	17B0008 17B0012 18B0008 18B0012 19B0007 19B0012
V	17-X013 17-X014 17-X016 17-X020 18-X013 18-X014 18-X016 18-X020 19-X013 19-X014 19-X016 19-X020 19-X221	17-X013 17-X014 17-X015 17-X016 17-X017 17-X020 18-X013 18-X014 18-X015 18-X016 18-X017 18-X020 19-X013 19-X014 19-X015 19-X016 19-X017 19-X020 19-X221
VI	17-X015 17-X017 18-X015 18-X017 19-X015 19-X017	17-X015 17-X017 18-X015 18-X017 19-X015 19-X017
VII	19-X501 19-X503 19-X504	19-X501 19-X502 19-X503 19-X504
VIII	19-X502	19-X502

1/ If a connector manufacturer produces a connector which meets all the requirements for two or more connector PIN's (within the same series), the manufacturer may receive qualification approval for two or more connector plus qualifying the one connector. It is not necessary that such connectors be in the same group. Each connector, however, must be marked with its own appropriate PIN. For group qualification, the connectors must be of similar design and be of the same materials and plating.

2/ For qualification retention, where more than one part is listed in a group in this column, data may be supplied on any of those parts in order to retain qualification for those parts in the corresponding right hand column. The part does not necessarily have to be the part initially qualified.

TABLE III. Category B – Non-field replaceable (special tools may be required).

Not for Air Force, Army or Navy use. For OEM use only.

Dash number <u>1/ 2/ 3/</u>	Applicable cable M17/ <u>4/</u>	Dimensions	Inches (millimeters) maximum #
M39012/19B0003	028-RG058*	A	1.625 (41.28)
M39012/19B0004	084-RG223*		
M39012/19B0005	111-RG303*		
M39012/19B0006	060-RG142* 29-RG59* 030-RG062 Δ		
M39012/19B0007	97-RG210 Δ		
M39012/19B0008	054-RG122		
M39012/19B0012	90-RG71* Δ		
M39012/19B0019	110-RG302* Δ		

1/ For cross-reference of PIN to superseded PIN or type designation, see table IV.

2/ For maintenance replacements for category B, see table V.

3/ Inactive for new design.

4/ The latest version of each cable shall be applicable.

Dimensions are in inches. Metric equivalents are given for information only.

* Cable to be used when performing tests requiring cable except as in notes @ and Δ .

@ Cable to be used for the +200°C temperature cycling tests. This cable may be used for tests with the approval of the Qualifying Activity.

Δ These are not 50 ohm cables; therefore, when attached to the specified connectors, VSWR, RF leakage, and insertion loss are not applicable.

TABLE IV. Cross-reference of PIN's.

Preferred PIN M39012/19	Substitute for PIN or type designation <u>1/</u> <u>2/</u>
-0101	UG-909/U, M39012/19-0001
-0102	UG-910/U, M39012/19-0002
B0003	M23329/3-15, M39012/19-0003
B0004	M23329/3-16, M39012/19-0004
B0005	M23329/3-17, M39012/19-0005
B0006	M23329/3-18, M39012/19-0006
B0007	M23329/3-19, M39012/19-0007
B0008	M23329/3-20, M39012/19-0008
-0110	M39012/19-0010
-0111	M39012/19-0011
B0012	M39012/19-0012
-0013	
-0014	
-0015	
-0016	
-0117	
-0018	M39012/19-0018
B0019	M39012/19-0019
-0020	
-0501	
-0502	
-0503	
-0504	

1/ The superseded PIN or the type designation is for cross-reference only. Where a superseded PIN or type designation is not given, none was assigned or will be assigned. The PIN M39012/19-XXXX shall be used in all cases for marking and identifying the connector.

2/ The basic type designation includes all letter versions of the specified number, e.g. UG-18/U includes UG-18 A/U, UG-18 B/U, etc.

TABLE V. Maintenance replacements for category D.

Category B* number Inactive for new design	Category C dash number	Category A dash number	Category D dash number
B0003	0013	0101	0504
B0004	0014	0101	---
B0005	0013	0101	---
B0006	0014	0101	0503
B0007	0015	0102	---
B0008	0016	0110	0501
B0012	0017	0102	---
B0019	0020	0118	---

*Category B connectors are for original installation only. They will not be stocked or acquired by the Government.

Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Referenced documents. In addition to MIL-PRF-39012, this document references the following:

- MIL-STD-202
- MIL-STD-348
- MIL-DTL-22520
- FED-STD-H28
- SAE-AS39029

CONCLUDING MATERIAL

Custodians:
 Army-CR
 Navy - EC
 Air Force – 11
 NASA - NA
 DLA – CC

Preparing activity:
 DLA-CC
 (Project 5935-2005-023)

Review activities:
 Army - AT, AV, EA, MI
 Navy - AS, MC, OS, SH
 Air Force -19, 99

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