

# Central Office Telephony M-BNC Plug Connector Specification



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## 1.0 Scope

The purpose of this specification is to standardize and define in detail the requirements and capabilities of 75-Ohm M-BNC Plug Connectors to be used in central office network carrier telecommunication applications.

M-BNC Plug Connectors, which are compliant with this specification in its entirety, will be intermateable with 75-Ohm M-BNC Jacks and interchangeable with compliant M-BNC Plugs. The coaxial wireline is most often D3 or E3 data rate information. Important product attributes include long life, rugged mechanical characteristics, mate/demate cycle performance, and RF electrical performance.

## 2.0 Applicable and/or Referenced Documents

ANSI/ASQC Z1.4	Sampling Procedures and Tables for Inspection by Attribute
ASTM-B16	Brass
ASTM-B36	Standard Specification for Brass
ASTM-B86	Standard Specification for Zinc-alloy Die Castings
ASTM-B139	Phosphor Bronze
ASTM-B194	Contact Material, Beryllium Copper
ASTM-D1710	TFE Fluorocarbon
ASTM-D2116	FEP - Fluorocarbon Molding and Extrusion Materials
GR-63-CORE*	Network Equipment-Building Systems (NEBS) Requirements
GR-1089-CORE*	Electromagnetic Compatibility & Electrical Safety
GR-1217-CORE *	Generic Requirements for Separable Electrical Connectors Used in Telecommunications Hardware
MIL-C-26074	Electroless nickel
MIL-C-14550	Copper Plate
MIL-P-27418	Nickel Plate, Soft, Low Stress Nickel
MIL-STD-202	Military Standard, Test Method for Electronics and Electrical Component Parts
MIL-STD-1344	Test Methods for Electrical Connectors
MIL-G-45204	MIL-P-7418 Nickel Plate
QQ-N-290	Gold Plate
TR-NWT-000078*	Nickel Plate
TR-NWT-000357*	Generic Physical Design Requirements for Telecommunications Products
ZZ-R-765	Generic Requirements for Assuring the Reliability of Components used in Telecommunications Equipment
	Silicone Rubber

\* These are Bellcore specifications, now part of Telcordia.

### 3.0 Requirements

#### Electrical

##### **3.1.1 Dielectric Withstanding Voltage**

There shall be no evidence of breakdown or flashover between the center contact and the outer body when connectors are tested in accordance with MIL-STD-1344, method 3001, test condition I, with a voltage of 1000 VAC at a duration of 5 seconds minimum.

##### **3.1.2 Insulation Resistance**

The insulation resistance between the center contact and the outer body shall be greater than 1000 Megohms at 500 volts when tested in accordance with MIL-STD-1344, method 3003.

##### **3.1.3 Working Voltage**

400 VAC, peak.

##### **3.1.4 Impedance**

75 Ohms with acceptable return loss up through 1 GHz, see section 3.1.7 below.

##### **3.1.5 Contact Resistance (Initial)**

The contact resistance of the center contact shall not exceed 6 milli-ohms at a current of 5 milli-amps maximum with a maximum open circuit of 20 milli-volts when tested in accordance with MIL-STD-202, method 307.

##### **3.1.6 Contact Resistance (After environment)**

The contact resistance of the center contact shall not exceed 12 milli-ohms at a current of 5 milli-amps maximum with a maximum open circuit of 20 milli-volts when tested in accordance with MIL-STD-202, method 307.

##### **3.1.7 Voltage Standing Wave Ratio (VSWR)**

The VSWR shall not exceed 1.10, up to 750 MHz and 1.16 up to 1 GHz, when tested in accordance with MIL-STD-1344, method 3005. This is equal to return loss values of -26.44 dB and -22.61 dB, respectfully.

##### **3.1.8 Insertion Loss**

0.1 dB max., up to 1 GHz when tested in accordance with MIL-C-39012.

## **Mechanical**

### **3.2.1 Visual and Mechanical**

Connectors shall be visually examined to verify they have been processed in such a manner as to be uniform in quality and free from defects that would affect appearance, serviceability and reliability.

### **3.2.2 Materials and Finishes**

#### **3.2.2.1 Body**

Brass per ASTM-B16, nickel plated per QQ-N-290, class 1, 0.0001 inches thick minimum. Zinc-alloy die cast per ASTM-B86, nickel plated per QQ-N-290, class 2, .0001 inches thick minimum is allowed as an alternative.

#### **3.2.2.2 Bayonet Sleeve**

Brass per ASTM-B16, nickel plated per MIL-C-26074, class 1, or MIL-P-7418, 0.0001 inches thick minimum. Zinc-alloy die cast per ASTM-B86, nickel plated per MIL-C-26074, class 1, or MIL-P-27418, 0.0001 inches thick minimum is allowed as an alternative.

#### **3.2.2.3 Center Pin Contact**

Brass per ASTM-B16, condition HT or equivalent, gold plated per MIL-G-45204, type II, grade C, class 1, 0.000050 inches thick minimum over nickel per QQ-N-290, class 1, 0.00050 inches minimum over copper per MIL-C-14550, 0.000080 inches thick minimum.

#### **3.2.2.4 Dielectric**

Solid PTFE per ASTM-D1710, type II or FEP per ASTM-D2116, type II.

#### **3.2.2.5 Spring Finger**

Beryllium copper per ASTM-B194, age hardened to Rc 36-44 or phosphor bronze per ASTM-B139; nickel plated per QQ-N-290, class 1, 0.0001 inches thick minimum.

#### **3.2.2.6 Gasket**

Silicone per ZZ-R-765, class 2B.

#### **3.2.2.7 Spring Washer**

Beryllium copper per ASTM-b194, age hardened to Rc 36-44, nickel plated per MIL-P-27418, 0.0002 inches thick minimum.

**3.2.2.8 Washer**

Brass per ASTM-B36, nickel-plated per QQ-N-290, class 1, 0.0001 inches thick minimum. Plastic is allowed as an alternative for this component.

**3.2.2.9 Crimp Sleeve**

Brass per ASTM-B16, sulfamate nickel plated per MIL-P-27418, 0.0002 inches thick minimum.

**3.2.3 Center Contact Retention**

The center contact shall not dislocate when an axial load of 6 pounds is applied per MIL-STD-1344, method 2007. This is a measurement of contact retention within the dielectric and is tested prior to cable crimping.

**3.2.4 Crimp Strength**

The crimp strength (cable retention) for the overall terminated connector shall be as follows: 50 pounds minimum average for 735 type cable and 70 pounds minimum average for 734 type cable. Note that this may vary due to cable manufacturer, braid strand count, and cable stripping practices. Trompeter uses Judd and Lucent cable for this testing.

**3.2.5 Spring Finger Engagement / Withdrawal Force**

The engagement force shall be 1.5 pounds minimum, 5 pounds maximum and the withdrawal force shall be 12 ounces minimum using a 0.246 +0.000/-0.001 I.D. 16 microinch finish steel test ring gage.

## **Environmental**

### **3.3.1 Temperature Cycling**

Initial contact resistance shall be measured, followed by 50, 12 hour cycles of -40 degrees C to + 85 degrees C with contact resistance per paragraph 3.1.6 measured at conclusion of test.

### **3.3.2 Temperature Life**

Initial contact resistance per paragraph 3.1.5 shall be measured, followed by 1000 hour exposure at 105 degrees +/- 2 degrees C per MIL-STD-202, method 108, condition D with contact resistance and ground finger continuity testing per paragraph 3.3.5 at conclusion of test.

### **3.3.3 Corrosion Resistance**

Connectors shall be exposed to salt spray testing per MIL-STD-1344, method 1001, condition B.

### **3.3.4 Durability**

Connectors shall be mated and unmated for 500 cycles, not exceeding 10 cycles per minute, with no evidence of damage detrimental to normal operation.

### **3.3.5 Ground Finger Continuity Test**

The connector spring finger shall retain a 260 gram minimum load and comply with contact resistance per paragraph 3.1.5 after applying a 40 pound force in 4 axes at the rear of a semi-mated plug.

### **3.3.6 Vibration**

There shall be no physical damage, loosening of parts or DS3 bit loss when connectors are subjected to testing per MIL-STD-1344, method 1001 at 20 G's / 10 Hz to 2 kHz.

### **3.3.7 Mechanical Shock**

There shall be no physical damage, loosening of parts or DS3 bit loss when connectors are subjected to testing per MIL-STD-1344, method 2004, condition D.

### **3.3.8 Humidity**

Connectors shall meet DWV requirements per paragraph 3.1.1, I.R. per paragraph 3.1.2 and contact resistance per paragraph 3.1.5 after exposure to 504 hours at 40 degrees C with a relative humidity of 90 to 95% per MIL-STD-1344, method 1002, condition C.

### 3.3.9 Bayonet Sleeve Retention

The bayonet sleeve shall withstand 80 pounds minimum force for qualification testing and 25 pounds non-destructive force for in-process testing.

## 4.0 Quality Assurance

The supplier shall maintain a well-established quality assurance program in compliance with ANSI/ASQC Z1.4 and be ISO 9001 certified, assuring the manufacture and inspection of connector components and assemblies fully comply with the design, specifications and requirements.

## 5.0 Part Marking

All connector bags shall be legibly and permanently marked with the date code, part number, and supplier identification (CAGE code or FSCM number, corporate logo, or corporate website).

## 6.0 Packaging

Connectors shall be unit packaged to prevent damage from normal handling and shall include complete assembly instructions. Instructions may be printed on bags providing they remain legible after opening.

## 7.0 Tooling

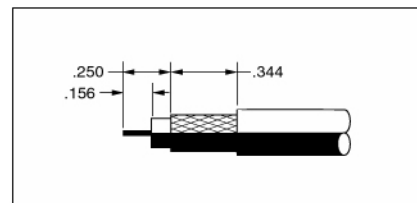
Connectors shall accommodate industry standard crimp sleeve and center contact tooling as outlined below:

### 7.1 Cable cutting

- Trompeter hand tool cutter model number 700-0024

### 7.2 Cable Stripping – two alternatives

- Schleuniger Power Cable Stripper – model number 207.
- Hand held battery operated stripper – Trompeter model number BCWS with C26T31 and C26T3D cutter heads.
- Note – strip dimensions are the same as for the classic telco BNC connector per figure shown.



SCALE 1:1  
USE AS STRIPPING  
TEMPLATE FOR 75 OHM TOOL CRIMP  
BNC PLUG

**Note:** Dimension .156 inches is a minimum, the maximum is .175 inches. Either dimension, or anything in between, works fine.

### **7.3 Center contact crimping – recommended**

- Trompeter multipoint (12-point) indenter model # 010-0098.

### **7.4 Crimp sleeve crimping – two alternatives**

- Trompeter benchtop power crimper, includes tooling for both 735 and 734 cable types, air actuated.
- Trompeter CT4L frame with CD3-19 die

**8.0 Design / Construction - Interface**

Connectors may comply with the design, construction and physical dimensions of Figures 1, 2, and 3.

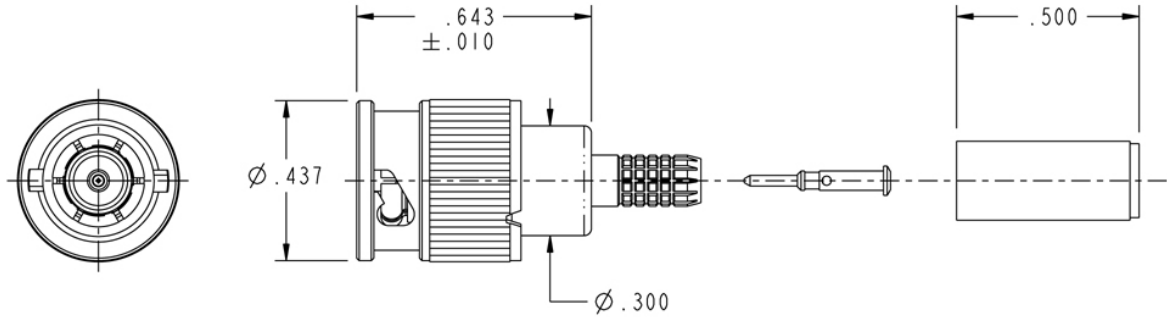
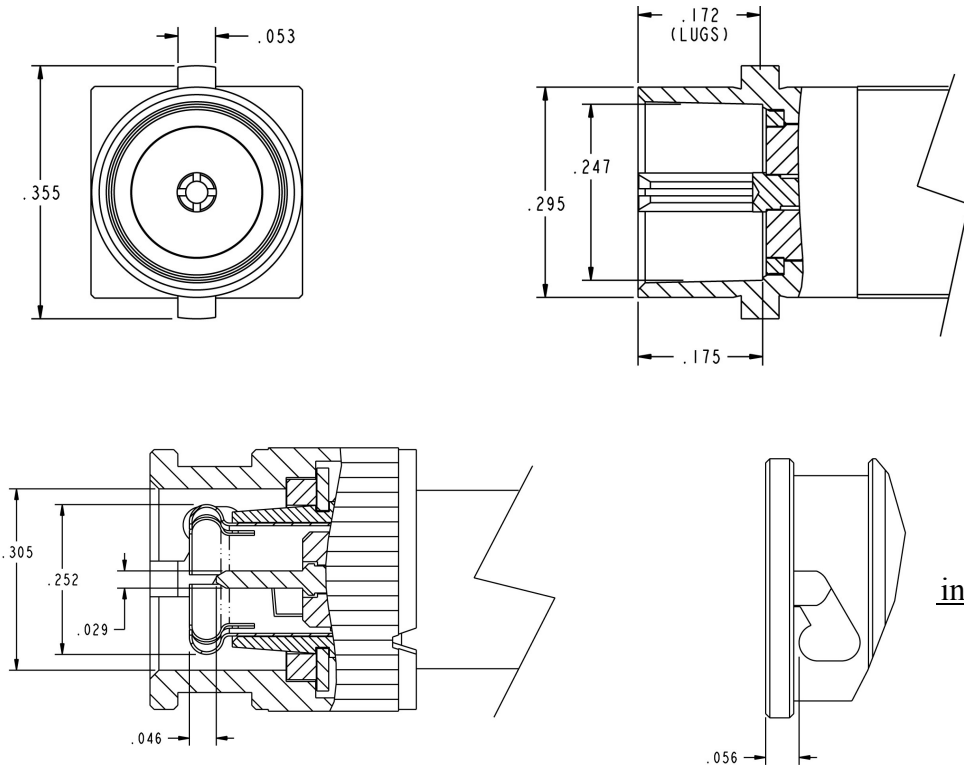
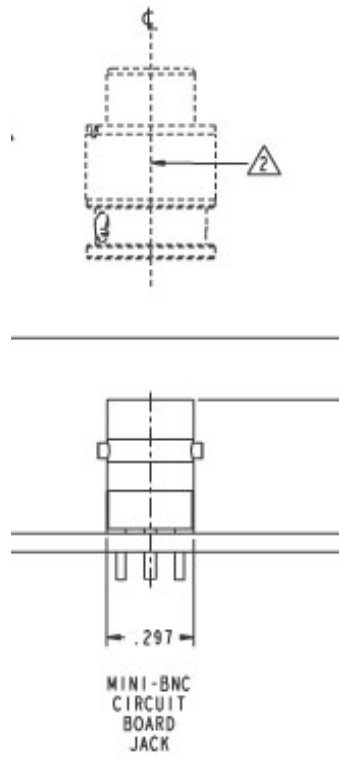


Figure 1 – Straight M-BNC connector (UPL250-xxx)



interface and cross-sectional

Figure 2 – Straight M-BNC connector (UPL250-xxx) interface dimensions



Center line to center line for M-BNC is 0.492 inches minimum.

Figure 3 – Showing M-BNC plug coupling to a M-BNC PCB-mounted straight jack

## 9.0 Approved Source of Supply

Trompeter Electronics  
31186 La Baya Drive  
Westlake Village, CA 91362  
USA

FSCM #14949

[www.trompeter.com](http://www.trompeter.com)

voice 818.707.2020

fax 818.706.1040

### Part numbers

	<u>Individual bagged</u>	<u>Bulk packs</u>
Straight BNC plug	UPL250-xxx	yes
90 Degree BNC plug	UPLR250-xxx	yes

Where xxx defines the cable group being attached to the connector, see Trompeter central office catalog or website at [www.trompeter.com](http://www.trompeter.com) For example, the -026 cable group is sized to handle traditional 735 cable and the -025 cable group is sized to handle traditional 734 cable.

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