

ORIGINAL

Title: RJ-MAG Connector Product Specification

Part Number: RJMG20162XX1BER

Description: RJ Mag, 1000 Base T, Single Port, W/LED



Revisions Control

Rev.	ECN Number	Originator	Approval	Issue Date
A	NE-16169	Devin Yen	Roger Tsai	Jun30,2016

Product Specification Origination

Originator:	Date:	Checked By:	Date:	Approved By:	Date:
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1.0 SCOPE

This specification defines the detailed requirements for the Amphenol RJMG2016 series, single port connectors.

2.0 APPLICABLE DOCUMENTS

The following document, of the latest issue in effect at the time of performance of the qualification tests, shall form a part of this specification to the extent specified herewith.

Federal

QQ-B-626	Brass; bar, plate, rod, strip, flat wire and special shaped sections
QQ-B-750	Bronze, phosphor; bar, plate, rod, sheet, strip, flat wire, and structural and special shaped sections.
QQ-N-290	Plating, Nickel (electrodeposited)
EIA-364	Test methods for electrical connectors
IEC 603-7	Detail specification for connectors, 8 way, with accessed quality
FCC PART 68	Subpart F - connectors
IEC-512	Test methods for electrical connectors
EIA/TIA 568	Commercial Building Cabling Standard
UL-STD-94	Tests for flammability of plastic materials for parts in devices and appliances.
IEEE 802.3	Local Area Networks: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specification.

3.0 REQUIREMENTS

3.1 Materials

3.1.1 Insulator

- LCP, UL94V-0, black.

3.1.2 RJ contacts

- Phosphor bronze per QQ-B-750.
- 30 microinches minimum of selective gold plated on mating area.
- 120 microinches minimum of matte Tin plated on contact tails.
- 50 microinches minimum of Ni underplate.

3.1.3 Data pins

- Brass per QQ-B-626
- 100 microinches minimum of matte Tin.
- 50 microinches minimum of Ni underplate.

3.1.4 PCB board

- 2-layer and FR-4 Laminate, per UL 94V-0.

3.1.5 Capacitor

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- 1000pF/2KV.

3.1.6 Resistor

- 75 ohm $\pm 5\%$.

3.1.7 Shield

- Stainless steel SUS304

3.1.8 LED

LED PERFORMANCE

PARAMETER	SINGLE COLOUR		BICOLOUR				UNITS
	GREEN	YELLOW	GREEN	YELLOW	GREEN	ORANGE	
FORWARD CURRENT IF MAX	30	30	30		30		mA
REVERSE CURRENT IR MAX	10	10	10		10		uA
REVERSE VOLTAGE VR MAX	-5	-5	-5		-5		V
T OPERATURE	-40~+85	-40~+85	-40~+85		-40~+85		℃
T SOLDERING	260+/-5	260+/-5	260+/-5		260+/-5		℃
POWER DISS. Pd	80	80	80		80		mW
PEAK WAVELENTH	568	585	568	585	573	610	nM
FORWARD VOLTAGE TYP	2.2	2.2	2.2	2.2	2.2	2.2	$\frac{V}{(@IF=20mA)}$
FORWARD VOLTAGE MAX	2.5	2.5	2.5	2.5	2.5	2.5	$\frac{V}{(@IF=20mA)}$

3.2 Mechanical**3.2.1 Mating Force**

- 20.02 N [4.5 lbf] maximum at a maximum rate of 25.4mm per minute.
- Per EIA-364-13.

3.2.2 Un-mating Force

- 20.02 N [4.5 lbf] maximum with the plug locking tab inoperable at a maximum rate of 25.4mm per minute.
- Per EIA-364-13.

3.2.3 Durability

- 1500 cycles minimum with the plug locking tab inoperable.
- There shall be no physical damage and shall meet requirements of subsequent tests.
- Per EIA-364-09B, Mated and unmated connectors at a rate of 300 +/-50 cycles per hour.

3.2.4 Vibration:

- No discontinuities of 1 microsecond or longer duration.
- Subject mated samples to 3.10 G's rms between 20 to 500 Hz. Ninety minutes in each of 3 mutually perpendicular planes. Discontinuity shall be measured using a loop back connector on the plug side of the connector, no PCB connections are required.
- Per EIA-364-28, Test Condition VII, Condition D.

3.2.5 Mechanical Shock:

- No discontinuities of 1 microsecond or longer duration.
- Subject mated samples to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. Discontinuity shall be measured using a loop back connector on the plug side of the connector, no PCB connections are required.
- Per EIA-364-27, Method A.

3.2.6 Static pull, plug retention to jack, operational:

- 53.4 N [12 lbf] minimum. Show no evidence of physical damage to the jack. Plug shall not disengage from the jack.
- No discontinuities of 1 microsecond or longer duration.
- Subject samples to the specified force with the plug mated in the jack and the latch engaged. Cable shall be pulled at 40 degree angle from the normal hanging axis. Force shall be applied and held for 60 seconds in each of the 4 directions with the force removed between each direction. The four directions shall be toward the latch, away from the latch, and lateral to the latch on each side. The plug used shall be a 5.89 mm [.232 in] over-crimped plug.

3.2.7 Dynamic pull, plug retention to jack, operational:

- 35.6 N [8 lbf] minimum. Show no evidence of physical damage to the jack. Plug shall not disengage from the jack.
- No discontinuities of 1 microsecond or longer duration.
- Subject samples to the specified force with the plug mated in the jack and the latch engaged. Cable shall be pulled at 40 degree angle from the normal hanging axis. Weighted end of the cable shall be rotated through 360 degrees at a rate of 4 RPM for 3 total revolutions. Process shall be repeated using a 5.89 mm [.232 in] over-crimped plug, then a 6.02 mm [.237 in] nominal plug, and then a 6.27 mm [.247 in] undercrimped plug.

3.2.8 Initial Inspection:

- No defects that would impair normal operations. No deviation from dimensional tolerances.

3.3 Electrical**3.3.1 Low Level Contact Resistance**

- ΔR : 30 milliohms maximum per pin.
- Per EIA-364-23, 100mA maximum test current and 20mV maximum open circuit voltage <100 m Ω .

3.3.2 Insulation Resistance :

- 1000M Ω minimum.

- Per EIA-364-21, 500 VDC \pm 10%, 1 minute hold. Test between adjacent contacts and between outer shield and closest contacts of mated samples that are not electrically connected.

3.3.3 Dielectric Withstanding Voltage:

- 2250VDC for 60 seconds.
- Per EIA-364-20, 2250 volts DC between adjacent plug and PCB contacts, including shield, that are not electrically connected, 1 milliampere cutoff current per port, 200 volts per second maximum ramp. All bridged on either side of magnetics package for plug contacts.

3.3.4 Insertion Loss:

- -1.0dB Max. @ 1-100 MHz
- -1.2dB Max. @ 100-125 MHz

3.3.5 Return Loss:

- -18dB Min. @ 1–30 MHz
- -16dB Min @ 30–60 MHz
- -12dB Min @ 60–80 MHz
- -10dB Min @ 80–100 MHz

3.3.6 Common Mode to Common Mode Rejection:

- -30dB Min. @1–100MHz

3.3.7 Crosstalk:

- Rx, Tx pair shall more: -30dB+20 log(f/100MHz)dB Min. @ 1 -100 MHz

3.3.8 OCL:

- 350uH Min. @ 100KHz, 0.1V,8mA DC bias

3.3.9 Current Rating:

- 30°C maximum temperature rise.
- EIA-364-70, Method 1. All pins powered to simulate operating conditions.

3.3.10 LED Test:

- LED colors illuminate and meet visual requirements activated at application current and voltage.

3.4 Environmental

3.4.1 Operating Temperature:

- 0°C to +70°C.

3.4.2 Temperature & Humidity Cycling:

- There shall be no physical damage and shall meet requirements of subsequent tests.
- Per EIA-364-31, Method IV. Subject samples to 10 cycles (10 days) between 25 and 65°C with 80 to 100% RH.

3.4.3 Thermal Shock:

- There shall be no physical damage and shall meet requirements of subsequent tests.
- Subject mated samples to 5 cycles between -40 and 85 +3/-0°C with 30 minute dwells at temperature extremes.
- Per EIA-364-32.

3.4.4 Temperature Life:

- There shall be no physical damage and shall meet requirements of subsequent tests.
- Per EIA-364-17, Method A, Test Condition 3, Test Time Condition D. Subject mated samples to 85°C for 1000 hours.

3.4.4 Mixed Flowing Gas:

- There shall be no physical damage and shall meet requirements of subsequent tests.
- Per EIA-364-65, Class IIA (4 gas). Subject samples to environmental Class IIA, unmated for 7 days, then mated for 7 days.

3.5 Packaging and Shipping

Per Amphenol Company Operation procedure # COP-15-1

4.0 PERFORMANCE AND TEST DESCRIPTION

4.1 *General*

This test description shows the tests and the order in which they will be carried out and the requirements to be met in each test.

Unless otherwise specified, mated sets of connectors shall be tested. All the mated set of connector samples will be equally divided and assigned to each of five remaining TEST GROUPS. Care shall be taken to insure that the mated samples remain together during the completed test sequence, i.e. when un-mating is necessary for a certain test; the same connectors shall be re-mated for the subsequent testing within that GROUP.

Before testing commences, the connectors shall be stored for at least 24 hours in the non- inserted state under normal climatic conditions for testing.

In the following test sequence tables, where an ANSI/EIA test is specified without a letter suffix, the latest approved version of that shall be used.

4.2 *Test Samples Preparation*

Samples are removed at random from Amphenol Final Inspection (current production) and are prepared according to the requirements and severity of the tests to be conducted as specified in ANSI/EIA 364 or other referenced documents.

4.3 Test Sequences & Performance

Test or Inspection	Test Group						
	1	2	3	4	5	6	7
	Test Sequence						
Initial Visual Inspection	1	1	1	1	1	1	1
Low Level Contact Resistance			2,6		2,7,10	6,8,10	2,4,6,8,10,12
OCL	2						
Insertion Loss	3						
Return Loss	4						
Crosstalk	5						
Common Mode to Common Mode Rejection	6						
Insulation Resistance					3,11		
Dielectric Withstanding					4,12		
LED test					5,13	2,11	
Current Rating		2					
Vibration						12	
Mechanical Shock						13	
Durability			5		6(b)	5(b)	3(b),7(e),11(e)
Mating Force			3,7			3,14	
Un-mating Force			4,8			4,15	
Insertion Force				2			
Extraction Force				5			
Static pull, plug retention to jack, operational				4			
Dynamic pull, plug retention to jack, operational				3			
Thermal Shock					8		
Temperature & Humidity Cycling					9		
Temperature Life						7(c),9	
Mixed Flowing Gas							5(d),9
Final Visual Inspection	7	3	9	6	14	16	13
Sample Quantity	3	3	3	3(a)	3(a)	3(a)	5(a)

Notes:

- (a) Samples shall be mounted on PCB for these tests.
- (b) Perform 25 durability cycles.
- (c) Subject samples to 250 hours, perform LLCRR, and then subject samples to the remaining 750 hours for a total of 1000 hours.

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(d) *Expose samples to 7 days unmated during the first test period, then 7 days mated during the second test period, for a total of 14 days.*

(e) *Perform 1 durability cycle.*

List of Appendix

Product Drawing RJMG20162XX1BER