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**NETCONNECT\* MRJ21 Gigabit Ethernet Cable Assemblies**

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**1. SCOPE**

## 1.1. Content

This specification covers performance, test and quality requirements for NETCONNECT\* MRJ21 Gigabit Ethernet Cable Assemblies.

## 1.2. Qualification

When tests are performed on subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 07Mar06. The Qualification Test Report number for this testing is 501-636. This documentation is on file at and available from Engineering Practices and Standards (EPS).

**2. APPLICABLE DOCUMENTS**

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

## 2.1. Tyco Electronics Documents

- 108-1163: Product Specification (Modular Plugs, Thru-Hole and Surface Mount Jacks, Data and Telephone, PCB Mounted RJ45 Stack Jacks)
- 108-2064: Product Specification (MRJ21 Connector System)
- 108-2211: Product Specification (MRJ21 Cassettes/Patch Panels)
- 108-2271: Design Objectives: (NETCONNECT\* MRJ21 Gigabit Ethernet Interconnect System)
- 501-636: Qualification Test Report (NETCONNECT\* MRJ21 Gigabit Ethernet Cable Assemblies)

## 2.2. Industry Standards

- IEC 61935-1: Testing of Balanced Communication Cabling in Accordance With ISO/IEC 11801 - Part 1: Installed Cabling - Edition 2
- ISO 11801: Information Technology - Generic Cabling for Customer Premises - Second Edition; Corrigendum 1: 9/2002; Corrigendum 2: 12/2002
- TIA/EIA-568-B.1 (2001): Commercial Building Telecommunication Cabling Standard - Part 1: General Requirements
- TIA/EIA-568-B.2 (2001): Commercial Building Telecommunication Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components

**3. REQUIREMENTS**

3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawings.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawings.

3.3. Ratings

- Voltage: 150 volts AC maximum
- Current: 0.5 ampere maximum
- Temperature: -40 to 70°C

3.4. Performance and Test Description

Product is designed to meet the electrical performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing.	Visual, dimensional and functional per applicable quality inspection plan.
<b>ELECTRICAL TRANSMISSION</b>		
Insertion loss.	TIA/EIA-568-B.1 Clause 11.	TIA/EIA-568-B.2 Annex I.
Propagation delay.	TIA/EIA-568-B.1 Clause 11.	TIA/EIA-568-B.2 Annex I.
Propagation delay skew.	TIA/EIA-568-B.1 Clause 11.	TIA/EIA-568-B.2 Annex I.
Return loss.	TIA/EIA-568-B.1 Clause 11. Minimum margin shall be 1.5 dB.	TIA/EIA-568-B.2 Annex I.
NEXT loss.	TIA/EIA-568-B.1 Clause 11. Minimum margin shall be 2.0 dB.	TIA/EIA-568-B.2 Annex I.
ELFEXT.	TIA/EIA-568-B.1 Clause 11.	TIA/EIA-568-B.2 Annex I.
ACR.	ISO 11801 Clause 6.4.5.	IEC 61935-1 Clause 4.2.4.
PSNEXT.	TIA/EIA-568-B.1 Clause 11.	TIA/EIA-568-B.2 Annex I.
PSELFEXT.	TIA/EIA-568-B.1 Clause 11.	TIA/EIA-568-B.2 Annex I.
PSACR.	ISO 11801 Clause 6.4.5.	IEC 61935-1 Clause 4.2.4.

Figure 1

3.5. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)			
	1(b)	2(b)	3(c)	4(c)
	Test Sequence (d)			
Examination of product	1	1	1	1
Insertion loss	2	2	2	2
Propagation delay	3	3	3	3
Propagation delay skew	4	4	4	4
Return loss	5	5	5	5
NEXT loss	6	6	6	6
ELFEXT	7	7	7	7
ACR	8	8	8	8
PSNEXT	9	9	9	9
PSELFEXT	10	10	10	10
PSACR	11	11	11	11

**NOTE**

- (a) See paragraph 4.1.A.
- (b) Permanent link test.
- (c) Channel test.
- (d) Numbers indicate sequence in which tests are performed (instrument dependent).

Figure 2

**4. QUALITY ASSURANCE PROVISIONS**

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be selected at random from current production and prepared in accordance with applicable instruction sheets and any special set up documents accompanying the test request per Figure 3. Each test group shall consist of up to 3 specimens of each type and length of cable assembly. See Figures 4 through 7 for set up configurations.

Cable ID	Connector ID	Description	Test Group			
			1	2	3	4
A		MRJ21 to MRJ21	1			
B		MRJ21 to RJ21		1		
C		Patchcord Mod Plug			1	1
D		MRJ21 to RJ45 Mod Plug 6 Port			1	
E		MRJ21 to RJ45 Mod Plug 12 Port				1
	F	Panel 6 Port 1 Gig	2	1	1	
	G	Panel 12 Port 10/100				1
	H	Panel 24 Port Straight 1 Gig RJ21		1		
		Figures	4	5	6	7

Figure 3

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

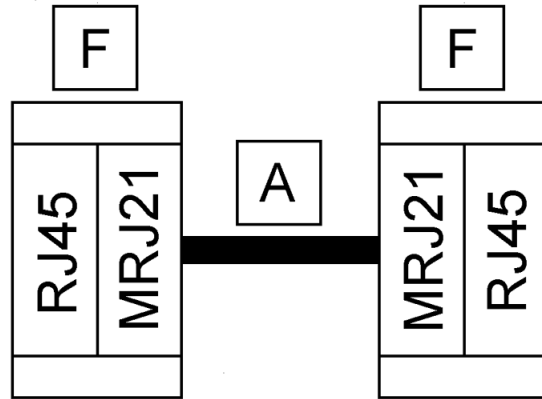


Figure 4  
MRJ21 to MRJ21 Cable, 1 Gig, Permanent Link Test

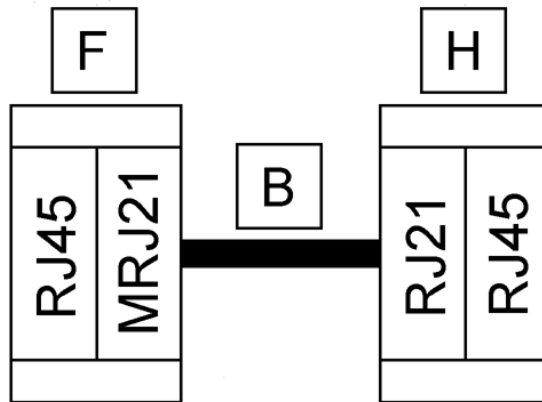


Figure 5  
MRJ21 to RJ21 Cable, 1 Gig, Permanent Link Test

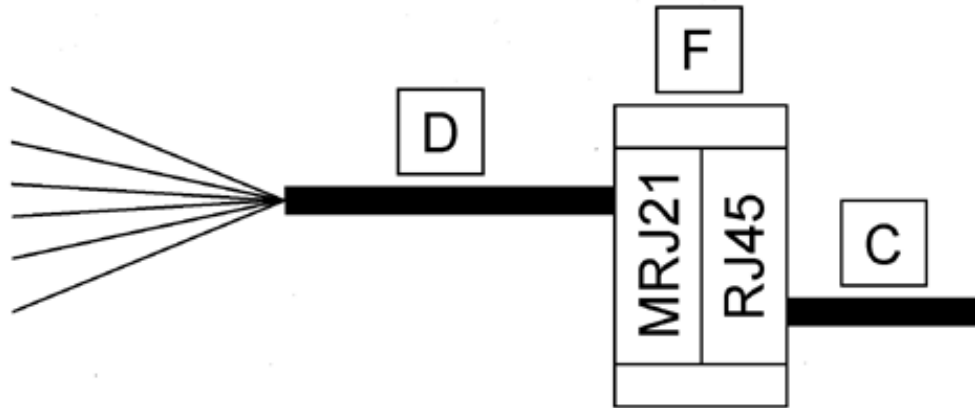


Figure 6  
MRJ21 to RJ45 Mod Plug Cable, 6 Port, 1 Gig, Channel Test

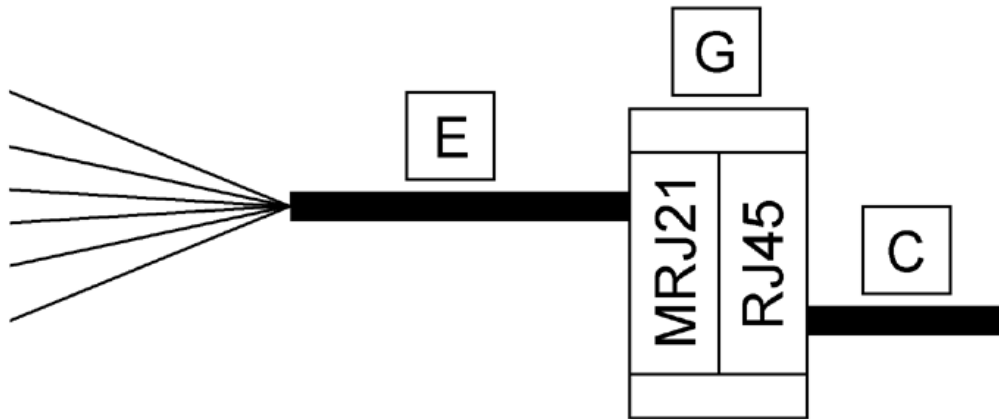


Figure 7  
MRJ21 to RJ45 Mod Plug Cable, 12 Port, 10/100, Channel Test