Convincing cabling solutions

Appendix 1
R&M*freenet* Warranty Program

1. R&M certification Process

The following persons are eligible to apply for warranty certification.

Certified person	Eligible to apply for
R&M*freenet*-Certified Installation Manager (individual person)	25 years system warranty
R&M*freenet*-Certified Designer (individual person)	Life time application warranty 25 years system warranty

1.1. R&M Certification requirements

a) Follow the applicable standards for products and installation.
See “Chapter 3 Standards”

b) Installation according latest versions of:
- R&M Product Instruction Guides
- R&M “Installation and Testing Guideline for Generic Cabling”

c) Visual inspection shows no faults:
Visual inspection covers at least 10% of installed links (5% on patch panel and 5% on outlet) according the following points:

- Termination and/or re-termination according to installation guides.
- Bending radius according to R&M*freenet* “Installation and Testing Guideline for Generic Cabling”
- Cable jacket stripping and untwisting of cable pairs according to EN 50174-1 and R&M*freenet* “Installation and Testing Guideline for Generic Cabling”;
- Labeling of components according to EN 50174-1
- Cable laying, management, grounding connection according to EN 50174-1 and “R&M*freenet* Installation and Testing Guideline for Generic Cabling”;
- The fiber optic measurement can be made with either a Light Source / Power Meter or OTDR according to ISO/IEC 11801 and

"R&M*freenet* Installation and Testing Guideline for Generic Cabling";

d) Measurement results show no faults

R&M reserves the right to refusal of warranty

1.2. Administrative process for warranty

A complete R&M certification process package is required when applying for a warranty, consisting of:

- Cabling plans in AutoCad, PDF, RTF, visio format;
- Request for certification using the online form (or using the latest version of the manual form), fully completed with all relevant information and all necessary compliance tick boxes checked.
- Power budget at 850ηm/1300ηm or 1310ηm/1550ηm including fiber length, number of connectors and number of splices for fiber applications.
- Complete test report showing all auto test electrical parameters and/or optical parameters (original test equipment measurement data only), and bi-directional measurements (for fiber applications).
- For copper **channel** certification the declaration on the warranty request form, that 50% of all channels are equipped with a work area cord and an equipment cord manufactured by R&M, must be ticked.
- For all warranty certifications, the declaration in the warranty request, of compliance to standards, R&M installation and testing guidelines and exclusive use of genuine R&M products throughout the installed system, must be ticked.
- The material list in the warranty application must be completed including at least the core products that make up the installed system.

2. Specification

2.1. Product specification

The specification of the product can be found in the product data sheet.

2.2. System specification

The table below specifies the channel and permanent link performance of the different systems. The channel and permanent link requirements are defined according to standards listed in chapter 3.

R&M system name	Permanent Link	Channel
Category 5e	Class D	Class D
Category 6	Class E	Class E
Category 6 Real 10	Class E	Class E_A
Category 6_A	Class E_A	Class E_A
OM1/2	OF-100, OF-300, OF-500, OF-2000, ISP, OSP	OF-100, OF-300, OF-500, OF-2000, ISP, OSP
OM3		
OM4		
OS2	OF-100, OF-300, OF-500, OF-2000, OF-5000, OF-10000, ISP, OSP	OF-100, OF-300, OF-500, OF-2000, OF-5000, OF-10000, ISP, OSP

The R&M Cat. 6_A system exceeds the requirements of all cabling standards for channel and permanent link as listed in chapter 3 for NEXT parameter by at least 4 dB margin.

3. Standards

3.1. ISO/IEC

- ISO/IEC 11801 Ed.2.2 2011
- ISO/IEC 24764 Ed.1.0 2010
- ISO/IEC 14763-2 2012
- ISO/IEC 14763-3 2006
- ISO/IEC 14763-3 Amd.1 2009
- ISO/IEC TR 24750 2007

3.2. EN

- EN 50173-1, 3rd Edition 2011
- EN 50173-2 2007
- EN 50173-2/A1 + AC:2011 2010/2011
- EN 50173-5 2007
- EN 50173-5/A1 2010
- EN 50174-1 2009
- EN 50174-1/A1 2011
- EN 50174-2 2009
- EN 50174-2/A1 2011
- TR EN 50173-99-1 2007
- EN 50310 2010

3.3. TIA/EIA

- TIA/EIA-568-C.0-2 2012
- TIA/EIA-568-C.1 2009
- TIA/EIA-568-C.2 inc. Eratta 1 2009/2010
- TIA/EIA-568-C.3 inc. amd 1 2008/2011
- TIA TSB-155-A 2010
- TIA-942-A amd 1 2013

4. Approved Test Equipment

4.1. Copper certification test equipment

The listed test equipment is approved for executing certification measurements and producing an original measurement file, which is needed to apply for a warranty. The test equipments are used for Pass or Fail observations.

Class D Cat 5e MHz 1-100	Class E Cat 6 MHz 1-250	Class E_A Cat 6A MHz 1-500	
Fluke DSX-5000 Versiv™	Fluke DSX-5000 Versiv™	Fluke DSX-5000 Versiv™	
Fluke DTX 1800 CableAnalyzer	Fluke DTX 1800 CableAnalyzer	Fluke DTX 1800 CableAnalyzer	
LanTEK II	LanTEK II	LanTEK II	
JDSU Certifier 40G	JDSU Certifier 40G	JDSU Certifier 40G	
Psiber WireXpert WX4500	Psiber WireXpert WX4500	Psiber WireXpert WX4500	
Wire Scope 350	Wire Scope 350	Note: supported till Nov. 2014	

Test equipment must be calibrated in accordance with manufacturer specifications (typically once per year).

4.2. Copper reference test equipment

R&M recognized reference test equipment must be used for the warranty claim procedure.

Furthermore in case of headroom examination and system comparison only R&M recognized reference test equipment is accepted.

These test equipments exceed the required measurement accuracy of the standards set for level IIIE test equipments and approach the measurement accuracy of laboratory test equipment.

The below table specifies the R&M recognised copper reference test equipment for the relevant standards:

Class D	**Class E**	**Class E_A**
Fluke DTX 1800	Fluke DTX 1800	Fluke DTX 1800

Test equipment must be calibrated in accordance with manufacturer specifications (typically once per year).

4.3. Fiber Optic (FO)

All commercially available test equipments complying with the measurement procedure IEC 60874 or similar are admissible.

Test equipment must be calibrated in accordance with manufacturer specifications (typically once per year).

5. Guaranteed topologies

Copper

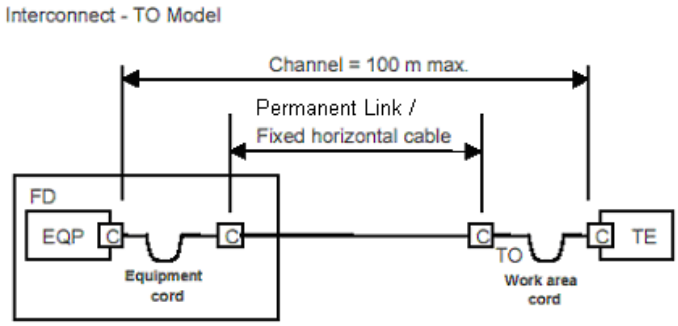
- Permanent link or channel without CP, **two**-connector model **(Model no. 1)**;
- Permanent link or channel with cross connect, **three**-connector model **(Model no. 2)**;
- Fixed horizontal cable or permanent link or channel with CP, **three**-connector model **(Model no. 3)**;
- Fixed horizontal cable or permanent link or channel with cross connect and CP, **four**-connector model **(Model no. 4)**;

Fiber

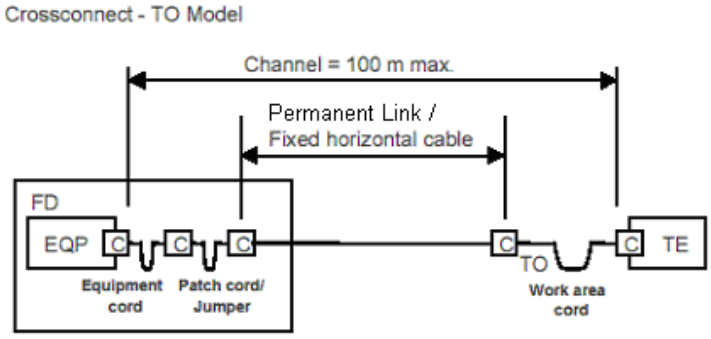
- “Direct” combined channel **(Model no. 5)**;
- “Spliced” combined channel **(Model no. 6)**;
- “Patched” combined channel **(Model no. 7)**;

5.1. Copper topologies

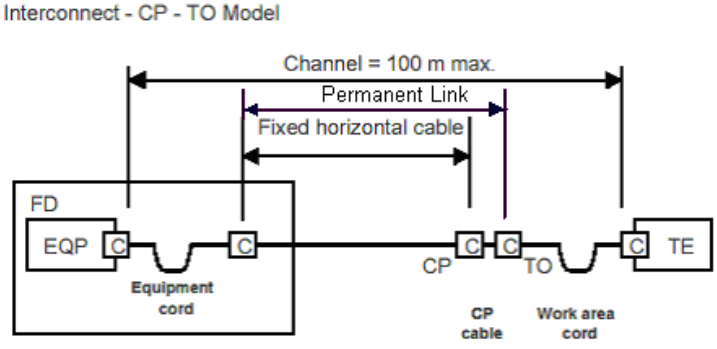
Model 1



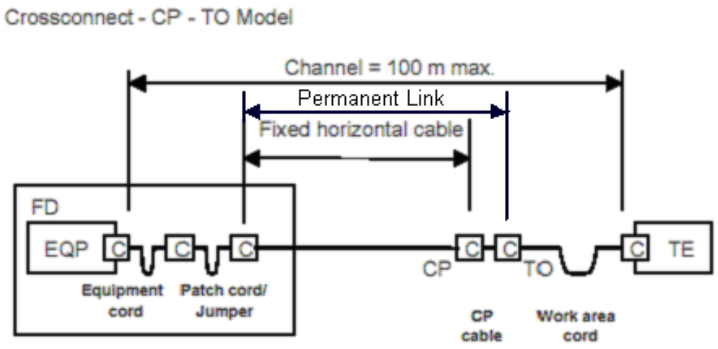
Model 2



Model 3

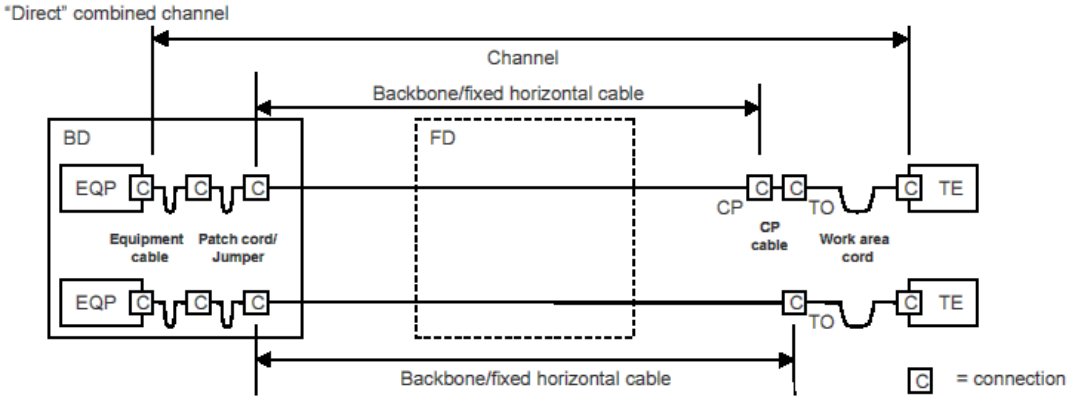


Model 4

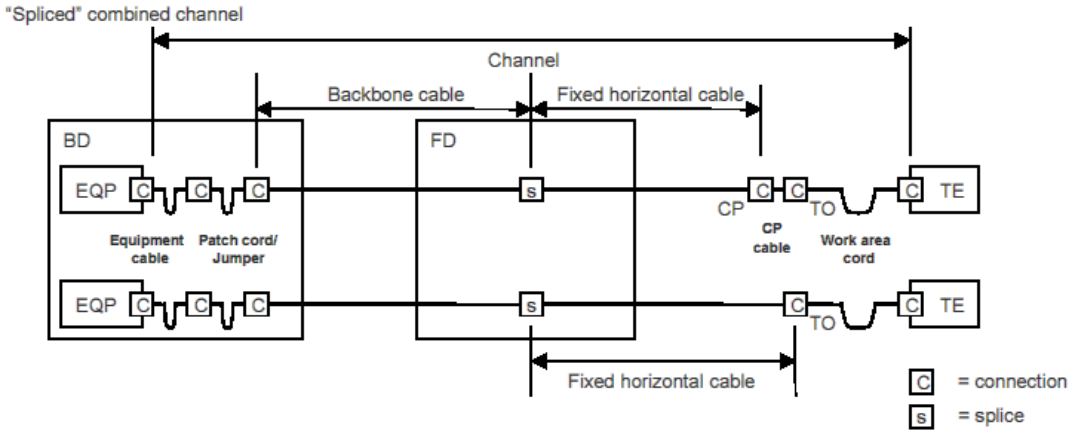


5.2. Fiber Optic Topologies

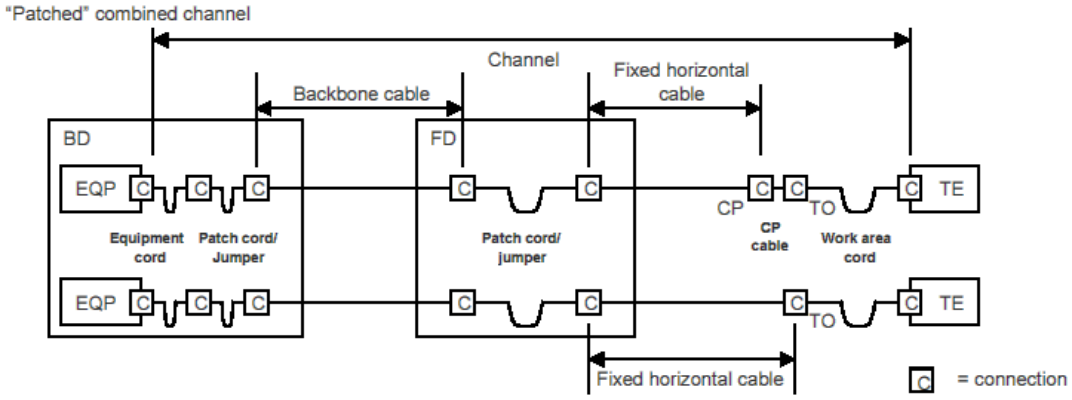
Model 5



Model 6



Model 7



EQP = Equipment BD = Building Distributor FD = Floor Distributor

CP = Consolidation Point TO= Telecommunication Outlet TE = Terminal Equipment

6. Abbreviations

CP	Consolidation Point
dB	decibel
EIA	Electronic Industries Alliance
EN	European standards
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardisation
NEXT	Near End Cross Talk
OTDR	Optical time-domain reflectometer
TIA	Telecommunications Industry Asssociation