

# Appendix 1 to the R&Mfreenet Warranty Program

## 1 R&M Certification Process

The R&Mfreenet certification process is three pillars:

- a) Adherence to applicable standards, both for products and installations;
- b) - Installation performed according to the R&M instruction manual;  
- and "R&M Installation and Test Specifications for Generic Cabling";
- c) Visual inspection and test results showing no failures.

Point a)        See standards

Point b)        - See "R&M Installation and Test Specifications for Generic Cabling"  
- See R&M instruction manual

Point c)        Visual inspection on 10% of installed links (5% on patch panel and 5% on outlet) for:

- Termination according to instruction manual
- Bending radius according to "R&M Installation and Test Specifications for Generic Cabling"
- Cable jacket stripping and untwisting of cable pairs according to EN 50174 and "R&M Installation and Test Specifications for Generic Cabling"
- Labeling of components according to EN 50174
- Cable laying, management, grounding connection according to EN 50174 and "R&M Installation and Test Specifications for Generic Cabling"

100% of links fulfill the applicable/guaranteed limits according to 2 standards. The fiber optic measurement must be made with a Power Meter / Light Source according to ISO/IEC 11801 and R&M Test Procedures. Back-scattering measurements (OTDR) are used to check components and to locate errors. In special cases OTDR measurements can be recognized as performance measurements.

### 1.1 Administrative process for warranty

A complete R&M certification process package is required, consisting of:

- Cabling plans in AutoCad, PDF, RTF format;
- Worksheet describing material used, where it was used and labeling etc. in DOC, PDF format;
- Power budget at 850 nm/1300 nm or 1310 nm/1550 nm including fiber length, number of connectors and number of splices.
- Complete test report showing all autotest electrical parameters and/or optical parameters (original test equipment measurement data only), and bi-directional measurements.

## 2 Standards

### 2.1 ISO/IEC and EN

- ISO/IEC 11801 2nd Edition : Sept. 2002 (Class D2002 / E)
- EN 50173-1 : Nov. 2002 (Class D2002 / E)
- EN 50174 : 2000

### 2.2 TIA/EIA-568-B

- TIA/EIA-568-B.2 : April 2001 (Cat.5e = Class D2002)
- TIA/EIA-568-B.2-1 : June 2001 (Cat.6 = Class E)
- TIA/EIA-568-B.3 : April 2000

### 2.3 IEEE 802.3an 10GBASE-T

R&M guarantees, that the transmission characteristics of the channel will comply with the IEEE 802.3an 10GBASE-T :

- Channels composed of R&M Cat. 6 UTP components and installed and tested according to R&M guidelines will reach 55m according to the current standards.
- Channels composed of R&M Real10 Cat. 6 components and installed and tested according to R&M guidelines will reach 100m according to the current standards.

R&M reserves the right to revise this statement in case of adjustments to the standard.

## 3 Approved Test Equipment

### 3.1 Copper (Level III & IV Measurement Accuracy)

A certified party must calibrate any test equipment at least once a year.

#### Class D 2002 / E

- Fluke DSP 4000 Series
- Fluke DTX Series
- Microtest Omni II
- Wire Scope 350
- LANTEK ® 6 und 7
- Wavetek LT 8600

### 3.2 Fiber Optic (FO)

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

A certified party must calibrate any test equipment at least once a year.

## 4 Guaranteed topologies

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

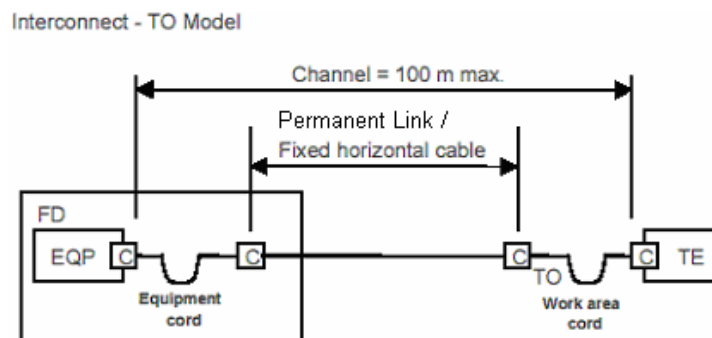
	R&M CLASSICsystem Class D 2002	R&M STARsystem* Class E	R&M VISIONsystem** Fiber Optic
Model 1	yes	yes	
Model 2	yes	yes	
Model 3	yes	yes	
Model 4	yes	yes	
Model 5			yes
Model 6			yes
Model 7			yes

\* We only give a Class E warranty, if all components in the link are Category 6 or better (R&M STARsystem components).

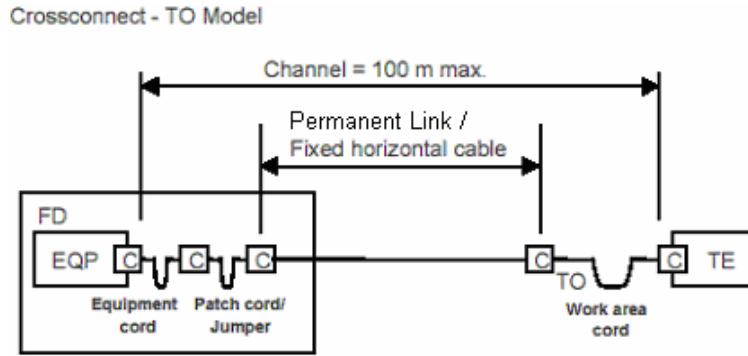
\*\* In fiber optic systems the following must be considered:  
An increased number of splices and/or connections in a channel can result in length restrictions for the compensation of the additional attenuation.

### 4.1 Copper topologies

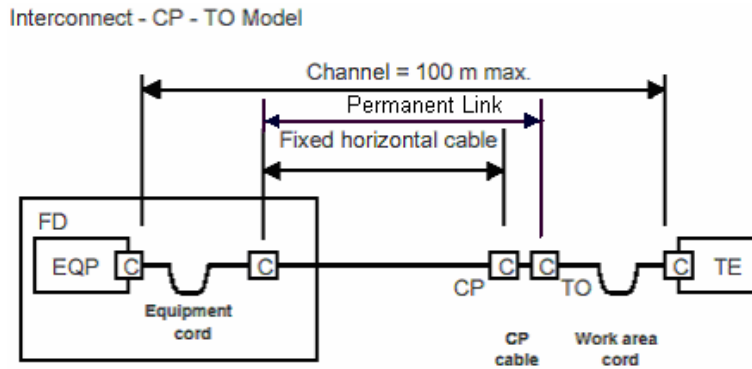
#### Model 1



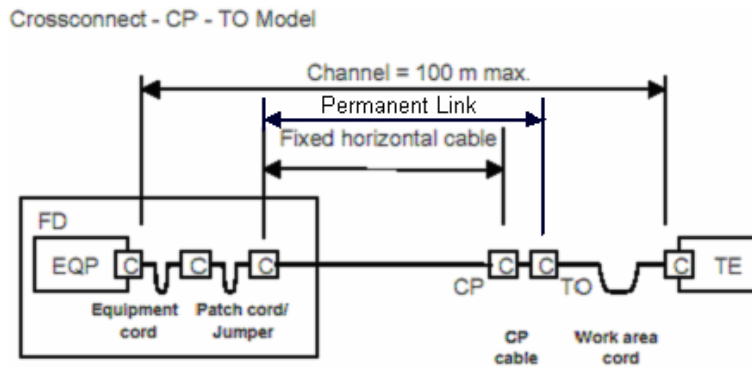
**Model 2**



**Model 3**

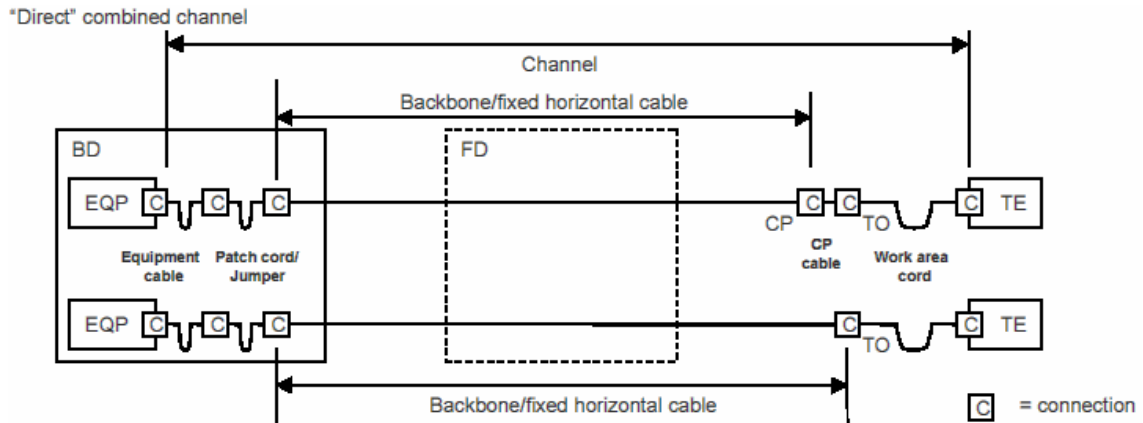


**Model 4**

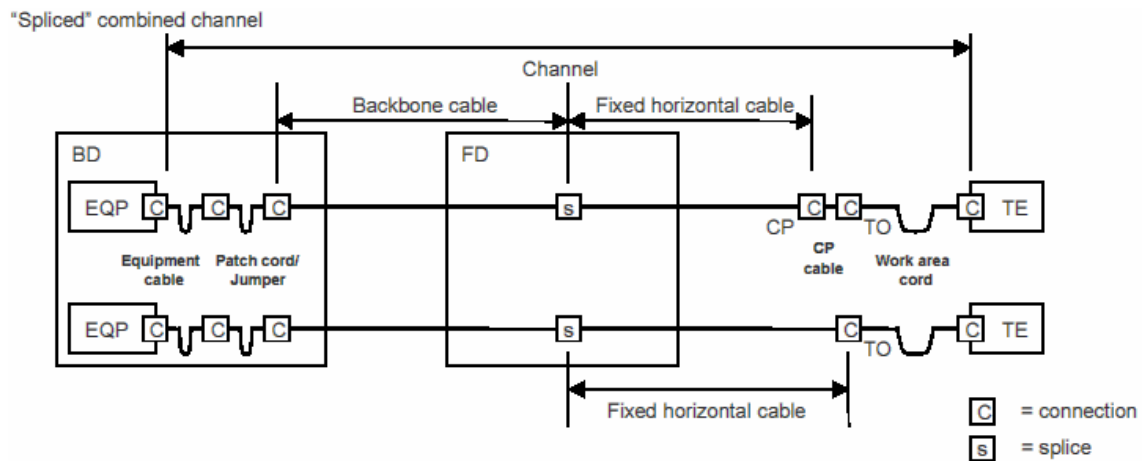


## 4.2 Fiber Optic Topologies

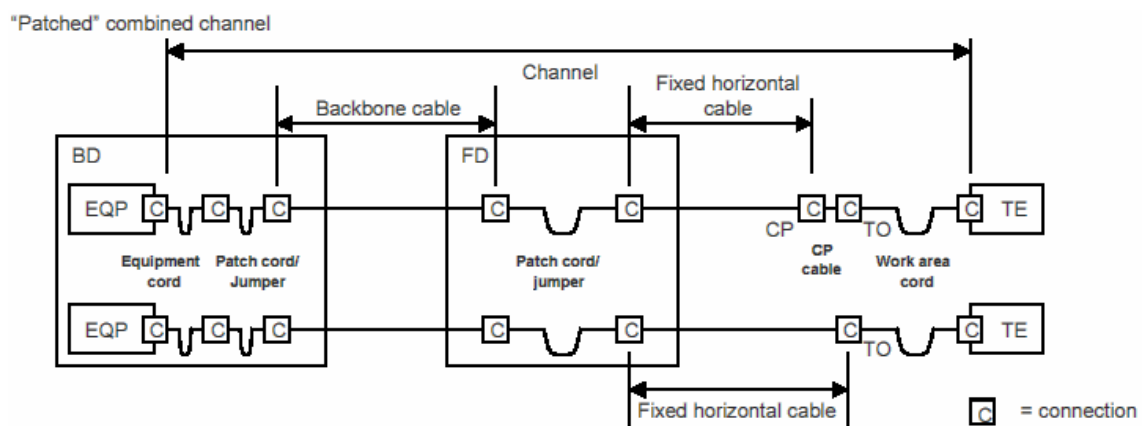
### Model 5



### Model 6



### Model 7



EQP = Equipment  
CP = Consolidation Point

BD = Building Distributor  
TO = Telecommunication Outlet

FD = Floor Distributor  
TE = Terminal Equipment