

General Index

Note	0.0–1
Safety Rules and Operating Precautions	0.1–1
Safety Rules	0.1–1
Optical Safety	0.1–2
<i>General Information</i>	0.1–2
<i>Optical Unit Characteristics and Warning Labels</i>	0.1–3
Static Sensitive Device Handling Precautions	0.1–5
<i>Warnings and Safety Precautions</i>	0.1–5
<i>Static Electricity</i>	0.1–5
<i>Handling, Installing or Replacing Electronic Units</i>	0.1–6
<i>Storing Electronic Units</i>	0.1–7
<i>Transporting Electronic Units</i>	0.1–7
Optical Device Handling Precautions	0.1–7
<i>Handling Optical Fibre Cables</i>	0.1–7
<i>Optical Connectors</i>	0.1–8
<i>Cleaning Optical Connectors</i>	0.1–8
<i>Cleaning Methods for Optical Connectors</i>	0.1–8
 1 Information For The System Engineer	 1–I
 General Technical Characteristics	 1.1–1
General Information	1.1–1
Configuration	1.1–3
Equipment Structure	1.1–3
<i>Subrack</i>	1.1–3
<i>Common Part Units</i>	1.1–5
<i>Interchangeable Traffic Units</i>	1.1–6
Transmitted Streams	1.1–7
<i>Interfaces</i>	1.1–7
<i>Transmission Media</i>	1.1–7
Automatic Laser Shutdown	1.1–8
Cross Connection Function	1.1–10
<i>Unidirectional Cross Connections</i>	1.1–11
<i>Bidirectional Cross Connections</i>	1.1–12
<i>Broadcast Cross Connections</i>	1.1–13
<i>Concatenated Cross Connections</i>	1.1–14
<i>Monitor Connections</i>	1.1–15
<i>Loop Back Connections</i>	1.1–16
<i>Split Access Connections</i>	1.1–17
<i>Dropped Connections</i>	1.1–18
Synchronisation	1.1–21
<i>MOST Unit Type 2, MOST Unit Type 2S and MOST Unit Type 3</i>	
<i>Internal Sources</i>	1.1–21
<i>MOST Unit Type 2</i>	1.1–21
<i>MOST Unit Type 2S</i>	1.1–23
<i>MOST Unit Type 3</i>	1.1–25
<i>Selection of Synchronisation Sources</i>	1.1–27
<i>Timing Configurations</i>	1.1–28
<i>External Synchronisation Output</i>	1.1–28

Protection	1.1-29
<i>Equipment Protection</i>	1.1-29
<i>Network Protection</i>	1.1-36
Services	1.1-42
<i>Overheads (OH)</i>	1.1-42
<i>Engineering Order Wire (EOW)</i>	1.1-45
<i>Data Channels</i>	1.1-46
Equipment Management	1.1-47
<i>General</i>	1.1-47
<i>Network Management Centre Connection</i>	1.1-49
<i>Local Controller Connection</i>	1.1-50
Configuration Management	1.1-51
Maintenance	1.1-52
<i>Alarms</i>	1.1-52
<i>Alarm Report</i>	1.1-52
<i>Indication on LC and NMC</i>	1.1-57
<i>Diagnostic</i>	1.1-58
Performance Monitoring	1.1-62
Security and Access Control	1.1-63
Power Supply	1.1-63
Equipment Description	1.2-1
<i>STM-1 Line Signal Interface</i>	1.2-1
<i>STM-1 (VC-12) Tributary Signal Interface</i>	1.2-2
<i>140Mbit/s Plesiochronous Tributary Signal Interface</i>	1.2-2
<i>34 and 45Mbit/s Plesiochronous Tributary Signal Interface</i>	1.2-2
<i>1.5/2Mbit/s Plesiochronous Tributary Signal Interface</i>	1.2-3
<i>STM-1 Signal Processing and Routing of the Single TU</i>	1.2-4
<i>Overhead Extraction</i>	1.2-5
<i>DCC Processing</i>	1.2-6
<i>Auxiliary Services Processing</i>	1.2-7
<i>MS Switching</i>	1.2-7
<i>Clock References Extraction</i>	1.2-11
<i>Synchronization Signal Generation</i>	1.2-11
<i>Fault Detection</i>	1.2-14
<i>Protection</i>	1.2-15
Network Applications	1.3-1
Terminal	1.3-2
Add/Drop	1.3-3
Regenerator	1.3-4
DXC-1	1.3-5
Synchronization Master	1.3-6
Ring Master	1.3-6
Gateway	1.3-7
Network Configurations	1.3-7
Equipment Composition	1.4-1
Introduction	1.4-1
Composition Rules	1.4-3
<i>Common Parts</i>	1.4-3
<i>MOST Unit</i>	1.4-4
<i>Tributary Interface Units</i>	1.4-6
<i>Optional Units</i>	1.4-6

<i>Tributary Termination Units</i>	1.4-7
<i>Connector Sets</i>	1.4-10
<i>Accessories</i>	1.4-11
<i>Dummy Panels</i>	1.4-13
<i>Software Kit – Rel. 3.2</i>	1.4-13
<i>MSH11C Hardware / Firmware / Software Compatibility Table</i>	1.4-15
Technical Specifications	1.5-1
Electromagnetic Compatibility	1.5-1
Environmental Condition	1.5-1
<i>Storage Endurance</i>	1.5-1
<i>Transport Endurance</i>	1.5-1
<i>Environmental Endurance for Indoor Operation</i>	1.5-2
Mechanical Features and Power Consumption	1.5-3
<i>Subrack</i>	1.5-3
<i>Units</i>	1.5-4
Power Supply	1.5-5
Equipment Power Consumption	1.5-5
Frame Structure and Multiplexing Methods	1.5-5
Physical/Electrical Characteristics of Hierarchical Digital Interfaces	1.5-6
Ground Contact and Two-wire Characteristics	1.5-6
<i>Output Relay Ground Contact and Two-wire</i>	1.5-6
<i>Output Electronic Ground Contact</i>	1.5-6
<i>Input Electronic Ground Contact</i>	1.5-7
Equipment Electrical Characteristics	1.5-9
Optical Performances	1.5-10
Attached Documents	1.6-1
Appendix AN	
Summary of ITU-T-Recommendations and Standards	AN-1
<i>ITU-T-Recommendations:</i>	AN-1
<i>DIN-Standards:</i>	AN-3
<i>IEC-Standards:</i>	AN-3
Appendix AO	
Abbreviations	A0-1
Appendix AV	
V Interface Signals	AV-1
Circuit 107	AV-1
Circuit 108	AV-2
Circuit 105	AV-2
Circuit 106	AV-2
Circuit 109	AV-3
Circuit 141	AV-3
Circuit 140	AV-3
Circuit 142	AV-3
Circuit 103	AV-3
Circuit 104	AV-4
Circuit 114	AV-4
Circuit 115	AV-4
Correspondence of V.11 signals with CCITT circuits	AV-4
Circuit used by the V.11, V.28, V.35, V.36 interfaces	AV-5

Appendix ET**Notes On The Ethernet Thin And Thick Base Band Local Networks (802.3 10BASE2 And 802.3 10BASE5) ET-1**

General Information	ET-1
Ethernet Thin Network (802.3 10BASE2)	ET-3
Ethernet Thick Network (802.3 10BASE5)	ET-4
Characteristics Of Ethernet Networks	ET-5

Appendix MN**Synchronous Digital Multiplexing Operation Principle MN-1**

Signal of the Synchronous Digital Hierarchy	MN-1
<i>Electrical and Optical Signals</i>	<i>MN-1</i>
<i>Plesiochronous Signals</i>	<i>MN-10</i>

Appendix PF**Performance Monitoring PF-1**

General	PF-1
Definition and Measurement of the Block	PF-1
<i>Regenerator section</i>	<i>PF-1</i>
<i>Multiplex section</i>	<i>PF-2</i>
<i>SDH path</i>	<i>PF-2</i>
<i>PDH path</i>	<i>PF-2</i>
SDH Performance Parameters	PF-3
PDH Performance Parameters	PF-4
Event Description	PF-5
Performance Data Recording	PF-6

Appendix SH**SDH Principles SH-1**

General	SH-1
Synchronous Transport Module of Level 1	SH-2
Parameters of STM-1 Frame	SH-4
Containers	SH-5
Virtual Containers	SH-6
Mapping of tributaries into VCs	SH-9
Tributary Units	SH-21
Tributary Unit Group (TUG)	SH-25
Higher Level Virtual Containers (45 and 140Mbit/s)	SH-25
Administrative Unit (AU)	SH-26
Administrative Unit Group (AUG)	SH-29
155Mbit/s Synchronous Frame (STM-1)	SH-29
Multiplexing Structure	SH-31
SDH Equipment Block Diagram	SH-43
<i>Signal Flow: Multiplexing (G.703 input – STM-N output)</i>	<i>SH-43</i>
<i>Signal Flow: Demultiplexing (STM-N input – G.703 output)</i>	<i>SH-45</i>
<i>Management Access</i>	<i>SH-46</i>
<i>Overhead Management</i>	<i>SH-47</i>
<i>Timing</i>	<i>SH-48</i>

Appendix SY**Synchronization in SDH Equipments SY-1**

Synchronization Sources	SY-1
Selection of Synchronization Sources	SY-2
<i>Priority Table</i>	<i>SY-2</i>
<i>Quality Table (Algorithm based on SSM)</i>	<i>SY-3</i>

Timing configurations	SY-5
Network Synchronization Example	SY-7
<i>MASTER Equipment</i>	SY-7
<i>SLAVE Equipment</i>	SY-7
<i>Ring Synchronization Example</i>	SY-8

Appendix TS

Technical Specifications for Physical/Electrical Interfaces TS-1

Physical/Electrical Characteristics of Hierarchical Digital Interfaces (ITU-T Recommendation G.703)	TS-1
<i>1544kbit/s Interface</i>	TS-1
<i>2048kbit/s Interface</i>	TS-3
<i>34368kbit/s Interface</i>	TS-5
<i>44736kbit/s Interface</i>	TS-7
<i>139264kbit/s Interface</i>	TS-8
<i>155520kbit/s Interface</i>	TS-11
<i>2048kHz Synchronization interface</i>	TS-14
Control of Jitter in Hierarchical Digital Interface (ITU-T Recommendation G.823, G.824, G.783)	TS-15
<i>Input Jitter Tolerance</i>	TS-15
<i>Jitter transfer function</i>	TS-16
<i>Maximum Output Jitter</i>	TS-18

2 Installation 2-I

Rack Installation	2.1-1
Rack Installation Details	2.1-1
Subrack Installation	2.2-1
Subrack Dimensions and Weight	2.2-1
Subrack Installation	2.2-2
Connecting the Sub-rack to the Ground	2.2-5
Connectors Layout	2.3-1
Legend	2.3-4
Electrical Connections	2.4-1
General	2.4-1
External Connection	2.4-1
Cables Installation	2.4-5
Sub-rack Ground Connection	2.4-7
Installation of Distribution Unit BMG 663 012/1 in cabinet type ETS 3001/9	2.4-8
<i>Mounting of Distribution Unit into the cabinet</i>	2.4-8
<i>Power Cables</i>	2.4-8
<i>Incoming central power connection</i>	2.4-8
<i>Internal power connection</i>	2.4-9
<i>Cable in the cabinet</i>	2.4-10
<i>Cable and connector connection</i>	2.4-10
Connectors Pin-out	2.5-1
Attached Documents	2.6-1
Appendix CC	
Rack and Cabinet Installation Instructions	CC-1

ETS 300 119 Rack and Cabinet Mechanical Structure	CC-1
Rack and Cabinet Installation	CC-4
<i>Installation Tools</i>	CC-4
<i>Installation Accessories</i>	CC-6
<i>Rack (2200x600x300) Installation</i>	CC-9
Rack and Cabinet Connections	CC-23
<i>Ground Connection</i>	CC-23
<i>Service Voltage Connection</i>	CC-25
<i>Telesignal Connection</i>	CC-26
<i>Rack Alarm Unit Connection</i>	CC-27
Installation of Optical Fibre Cables	CC-28
Appendix CD	
Double Depth Cabinet Installation Instructions	CD-1
ETS 300 119 Double Depth Cabinet Mechanical Structure	CD-1
<i>Double Depth Cabinet (2200x600x600) Installation</i>	CD-3
Appendix CK	
Subrack Installation Instructions	CK-1
Subrack Mechanical Structure	CK-1
Subrack Installation	CK-4
<i>Placing And Fastening Subracks In The Rack</i>	CK-4
<i>Installation Of Cable Raceway</i>	CK-6
<i>Installation Of Optical Fiber (O.F.) Cables</i>	CK-7
<i>Fastening Optical Fiber Raceway</i>	CK-9
Insert Unit In The Subrack	CK-11
<i>Unit with Front Panel and Insertion/Extraction Plastic clasps.</i>	CK-11
<i>Unit without Front Panel and with Extraction Plastic clasps.</i>	CK-12
<i>Connection Unit Insertion</i>	CK-15
<i>Protective Cover For Optical Fiber Assembling</i>	CK-16
Plexiglass Cover Installation	CK-17
Appendix M	
Cables Characteristics	M-1
<i>ST212 Coaxial Cable</i>	M-3
<i>ST214 Coaxial Cable</i>	M-4
<i>RG58 C/U Coaxial Cable</i>	M-5
<i>Single Pair Cable, Single Screen</i>	M-6
<i>4 Pair Cable, Single Screen</i>	M-7
<i>8 Pair Cable, Double Screen</i>	M-8
<i>8 Pair Cable, Single Screen</i>	M-9
<i>8 Screened Pairs Cable, Double Screen</i>	M-10
<i>12+1 Pair Cable, Double Screen</i>	M-11
<i>12+1 Pair Cable, Single Screen</i>	M-12
<i>17+1 Pair Cable, Double Screen</i>	M-13
<i>17+1 Pair Cable, Single Screen</i>	M-14
<i>30+1 Pair Cable, Double Screen</i>	M-15
<i>30+1 Pair Cable, Single Screen</i>	M-16
<i>Power Supply Cable 2x1.5mm²</i>	M-17
<i>Power Supply Cable 2x2.5mm²</i>	M-18
<i>Screened Power Supply Cable 2x1.5mm²</i>	M-19
<i>Screened Power Supply Cable 2x2.5mm²</i>	M-20
<i>Earthing Cable</i>	M-21
<i>Single Pole Cable For Service Voltage</i>	M-22

3 Setting-Up 3-I

Introduction	3.1-1
Front Panel Devices	3.2-1
Subrack Layout	3.2-1
Unit Front Panels	3.2-2
<i>MOST Unit Type 2 MOST Unit Type 2S</i>	3.2-3
<i>Tributary Unit</i>	3.2-4
<i>STM-1 Optical/Mux Unit</i>	3.2-5
<i>Communication Unit</i>	3.2-6
<i>Auxiliary Unit</i>	3.2-7
Hardware Settings	3.3-1
Types of Settings	3.3-1
MOST Unit	3.3-3
STM-1 Optical/Mux Unit Type 2	3.3-13
STM-1 G.703 Electrical/Mux Unit	3.3-16
1x140Mbit/s / STM-1 (with VC-12 handling) G.703 Tributary Unit	3.3-19
63x1.5/2Mbit/s G.703 Tributary Unit	3.3-21
32x1.5/2Mbit/s G.703 Tributary Unit	3.3-23
3x34Mbit/s Tributary Unit	3.3-25
Auxiliary Unit	3.3-28
<i>Solder Pad Settings (Soldering Side)</i>	3.3-28
<i>Adjustable Dip Switch Settings (Component Side)</i>	3.3-29
Communication Unit	3.3-34
3x45Mbit/s Tributary Unit	3.3-36
Link Line Up	3.4-1
Instruments and Accessories	3.4-1
Power Supply Voltages Check	3.4-2
<i>Description</i>	3.4-2
<i>Procedure</i>	3.4-2
Commissioning	3.4-2
<i>Procedure</i>	3.4-2
Internal Fault Check	3.4-3
<i>Description</i>	3.4-3
<i>Procedure</i>	3.4-3
Bit Error Rate Check	3.4-4
<i>Description</i>	3.4-4
<i>Procedure</i>	3.4-4
Alarm Check	3.4-8
<i>Description</i>	3.4-8
<i>Procedure</i>	3.4-8
Protection Check	3.4-10
<i>Description</i>	3.4-10
<i>Procedure</i>	3.4-10
Synchronization Sources Check	3.4-13
<i>Description</i>	3.4-13
<i>Procedure</i>	3.4-13
Synchronism Protections Check	3.4-16
<i>Description</i>	3.4-16

<i>Procedure</i>	3.4-16
Out of Frequency Management Check	3.4-17
<i>Description</i>	3.4-17
<i>Procedure</i>	3.4-17
Emitted Optical Power Check	3.4-18
<i>Description</i>	3.4-18
<i>Procedure</i>	3.4-18
Receiver Sensitivity Check	3.4-20
<i>Description</i>	3.4-20
<i>Procedure</i>	3.4-20
Service Telephone Channel Operating Instructions	3.5-1
Collective Call	3.5-1
Selective Call	3.5-5
Access to a Conversation	3.5-6
Insertion/Replacement of an Auxiliary Unit	3.5-7
Making Calls in a Ring Network	3.5-8
Phone Number Assignment	3.5-8
 4 <i>Maintenance</i>	 4-I
 Routine Maintenance	 4.1-1
Fault Location: General	4.2-1
Introduction	4.2-1
 5 <i>Functional Description</i>	 5-I
 Introduction	 5.1-1
MOST Unit 131-9141/xx	5.2-1
Introduction	5.2-1
General	5.2-2
STM-1 Optical Line Sub-Unit (130-3493/** and 130-3494/**)	5.2-4
<i>General Information</i>	5.2-4
<i>Functions</i>	5.2-4
<i>Functional Description</i>	5.2-4
STM-1 El. Line Sub-unit (130-3558/01)	5.2-8
<i>General Information</i>	5.2-8
<i>Functions</i>	5.2-8
<i>Functional Description</i>	5.2-8
32x1.5/2Mbit/s Tributary Sub-unit (130-3496/05)	5.2-11
<i>General Information</i>	5.2-11
<i>Functions</i>	5.2-11
<i>Functional Description</i>	5.2-13
16x1.5/2Mbit/s Tributary Sub-unit (130-3496/06)	5.2-18
<i>General Information</i>	5.2-18
<i>Functions</i>	5.2-18
<i>Functional Description</i>	5.2-20
8x2Mbit/s + 1x34Mbit/s Tributary Sub-Unit (130-3545/02)	5.2-22
<i>General Information</i>	5.2-22

<i>Functions</i>	5.2-22
<i>Functional Description</i>	5.2-24
1x34Mbit/s G.703 Tributary Sub-unit (130-3545/01)	5.2-28
<i>General Information</i>	5.2-28
<i>Functions</i>	5.2-28
<i>Functional Description</i>	5.2-29
Common Parts (130-3492/xx)	5.2-31
<i>General Information</i>	5.2-31
<i>Functions</i>	5.2-31
<i>Functional Description</i>	5.2-32
<i>Technical Characteristic</i>	5.2-45
63x2Mbit/s Tributary Unit 131-8977/01	5.3-1
General Information	5.3-1
Functions	5.3-2
Functional Description	5.3-4
<i>Reception Functions</i>	5.3-4
<i>Transmission Functions</i>	5.3-6
<i>Common Functions</i>	5.3-8
Technical Characteristics	5.3-9
<i>Microprocessor And Memories</i>	5.3-9
Communication Unit 131-8924/01	5.4-1
General Information	5.4-1
Functions	5.4-2
Functional Description	5.4-4
<i>Management of SOH</i>	5.4-4
<i>Interface Management Functions</i>	5.4-6
<i>Common Functions</i>	5.4-6
Technical Characteristics	5.4-8
<i>Microprocessor And Memories</i>	5.4-8
STM-1 G.703 Electrical Unit-Type 2	5.5-1
General Information	5.5-1
Functions	5.5-2
Functional Description	5.5-4
<i>Reception Functions</i>	5.5-6
<i>Transmission Functions</i>	5.5-9
<i>Common Functions</i>	5.5-11
Technical Characteristics	5.5-11
<i>Microprocessor And Memories</i>	5.5-11
STM-1 Optical/Mux Unit Type 2 131-8682/xx	5.6-1
General Information	5.6-1
<i>Functions</i>	5.6-2
Functional Description	5.6-5
<i>Reception Functions</i>	5.6-7
<i>Transmission Functions</i>	5.6-10
<i>Common Functions</i>	5.6-12
Technical Characteristics	5.6-12
<i>Microprocessor And Memories</i>	5.6-12
Auxiliary Unit Type 1 131-8690/01	5.7-1
Functions	5.7-1

Functional Description	5.7-2
<i>OH BUS Interface</i>	5.7-4
<i>G.703 Interface</i>	5.7-8
<i>V.11 Interface</i>	5.7-8
<i>EOW Functions</i>	5.7-9
<i>Control and Signalling</i>	5.7-10
Technical characteristics	5.7-11
<i>Microprocessor and Memories</i>	5.7-11
3x34Mbit/s Tributary Unit 131-8685/01	5.8-1
General Information	5.8-1
Function	5.8-1
<i>Transmission</i>	5.8-1
<i>Reception</i>	5.8-2
<i>Common Functions</i>	5.8-2
Functional Description	5.8-3
<i>Transmit Side</i>	5.8-3
<i>Receive side</i>	5.8-7
<i>Common Functions</i>	5.8-8
Technical Characteristics	5.8-9
<i>Microprocessor And Memories</i>	5.8-9
3x45Mbit/s Tributary Unit 131-9251/01	5.9-1
General Information	5.9-1
Function	5.9-1
<i>Transmission</i>	5.9-1
<i>Reception</i>	5.9-2
<i>Common Functions</i>	5.9-2
Functional Description	5.9-3
<i>Transmit Side</i>	5.9-3
<i>Receive side</i>	5.9-7
<i>Common Functions</i>	5.9-8
Technical Characteristics	5.9-9
<i>Microprocessor And Memories</i>	5.9-9
32x1.5/2Mbit/s G.703 Tributary Unit 131-8977/02	5.10-1
General Information	5.10-1
Functions	5.10-2
Functional Description	5.10-4
<i>Reception Functions</i>	5.10-4
<i>Transmission Functions</i>	5.10-6
<i>Common Functions</i>	5.10-8
Technical Characteristics	5.10-9
<i>Microprocessor And Memories</i>	5.10-9
1x140Mbit/s / STM-1 G.703 Tributary Unit 131-9310/11 ...	5.11-1
General Information	5.11-1
Composition	5.11-1
Functional Description	5.11-3
<i>Summary</i>	5.11-3
<i>Receive Side</i>	5.11-4
<i>Transmit Side</i>	5.11-5
<i>Common Function</i>	5.11-6
Technical Characteristics	5.11-7