



SLOVENSKI STANDARD
SIST ETS 300 010-2 E1:2003

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Prenos in multipleksiranje (TM) – Oprema za sinhrono prespajanje za 64 kbit/s in n x 64 kbit/s za dostopovne porte s hitrostjo prespajanja 2 048 kbit/s – 2. del: Vidiki upravljanja

Transmission and Multiplexing (TM); Synchronous cross connect equipment; 64 kbit/s and n x 64 kbit/s cross connection rate 2 048 kbit/s access ports; Part 2: Management aspects

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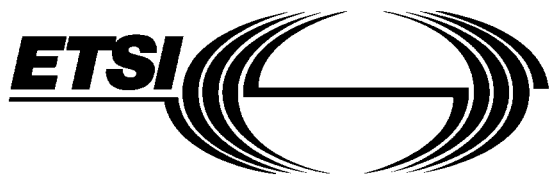
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**Transmission and Multiplexing (TM);
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64 kbit/s and n x 64 kbit/s
cross connection rate 2 048 kbit/s access ports;
Part 2: Management aspects**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunications Standards Institute (ETSI).

The ETS is required in order to meet the requirements of network operators and equipment manufacturers for the deployment and design of synchronous cross connect equipment to be used in synchronous digital leased line networks.

The corresponding standard for equipment used in cross connection of subrate signals is under development.

This ETS consists of 2 parts as follows:

Part 1: "Core functions and characteristics";

Part 2: "Management aspects".

Transposition dates	
Date of adoption	21 February 1997
Date of latest announcement of this ETS (doa):	30 June 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 December 1997
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1 Scope

This ETS addresses management aspects of the 64 (or $n \times 64$) kbit/s cross connect. The Digital Cross Connect (DXC) equipment management functions are specified and management network architecture is described.

Part 1 of this ETS describes requirements of cross connect equipment with 2 048 kbit/s access ports for use in synchronous digital leased line networks. These requirements are limited to the basic functions, external characteristics and performance of the equipment.

The part 1 of this ETS (ETS 300 010-1[14]) defines functions and makes precise whether they are mandatory or not. If supported, a function has to be managed according to part 2 of this ETS. Part 2 of this ETS specifies when necessary the optional management characteristics (attributes, operations and notifications) of the objects.

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred applies.

- [1] CCITT Recommendation G.703: "Physical/electrical characteristics of hierarchical digital interfaces".
- [2] CCITT Recommendation G.704: "Synchronous frame structures used at primary and secondary hierarchical levels".
- [3] ITU-T Recommendation G.826: "Error performance parameters and objectives for international, constant bit-rate digital paths at or above the primary rate".
- [4] ITU-T Recommendation M.20: "Maintenance philosophy for telecommunications networks".
- [5] ITU-T Recommendation M.2100: "Performance limits for bringing into service and maintenance of international digital paths, sections and transmission systems".
- [6] ITU-T Recommendation M.2110: "Bringing into service international digital paths, sections and transmission systems".
- [7] ITU-T Recommendation M.2120: "Digital path, section and transmission system fault detection and localization procedures".
- [8] ITU-T Recommendation M.3010: "Principles for a telecommunications management network".
- [9] ITU-T Recommendation M.3100: "Generic network information model".
- [10] ITU-T Recommendation O.151: "Error performance measuring equipment operating at the primary rate and above".
- [11] CCITT Recommendation X.710: "Common management information service definition for CCITT applications".
- [12] ITU-T Recommendation X.733: "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".
- [13] ITU-T Recommendation G.784: "Synchronous digital hierarchy (SDH) management".

- [14] ETS 300 010-1 (1995): "Transmission and Multiplexing (TM); Synchronous cross connect equipment 64 and n x 64 kbit/s cross connection rate 2 048 kbit/s access ports. Part 1: Core functions and characteristics".
- [15] ETS 300 371 (1994): "Transmission and Multiplexing (TM); Plesiochronous Digital Hierarchy (PDH) information model for the Network Element (NE) view".
- [16] ETR 135 (1994): "Transmission and Multiplexing (TM); Network aspects and applications for a 4 (and n x 4 kbit/s) data link in a 2 048 kbit/s frame".
- [17] ETR 241: "Transmission and Multiplexing (TM); Functional architecture of 2 Mbit/s based Plesiochronous Digital Hierarchy (PDH) transport networks".
- [18] ITU-T Recommendation X.731: "Information technology - Open Systems Interconnection - Systems Management: State management function".
- [19] ETS 300 304 (1994): "Synchronous Digital Hierarchy (SDH) information model for the network element (NE) view".
- [20] ETS 300 376-1: "Signalling Protocols and Switching (SPS); Q3 interface at the Access Network (AN) for configuration management of V5 interfaces and associated user ports".

3 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

2 048S	2 048 kbit/s CCITT Recommendation G.704 [2] framed Signal
2 048U	2 048 kbit/s Unstructured signal
2MB	2 Mbit/s
2ME	2 Mbit/s - External remote
2MI	2 Mbit/s - Internal local
A2, J1, J2,	reference points according to ETS 300 010-1 [14]
A-bit	bit 3, TS0 FAS
AE	Anomaly Event
AIS	2 048 kbit/s Alarm Indication Signal
AISTS16	64 kbit/s Alarm Indication Signal in TS16
BBE	Background Block Error
BBER	Background Block Error Ratio
BE	Block Error
CASXC	Channel Associated Signalling Cross Connection Function
CPU	Control Processing Unit
CRC4	Cyclic Redundancy Check procedure-4
DE	Defect Event
DFC	Defect or Failure Condition
DP	Degraded Performance
DXC	Digital Cross Connect equipment
EB	Errored Block
E-bit	Remote block error indication
EOC	Embedded Operation Channel
ES	Errored Second
ESR	Errored Second Ratio
EXBER	Excessive Bit Error Ratio
F	A management interface according to ITU-T Recommendation M.3010 [8]
FAS	Frame Alignment Signal
G1, G2, A1,	reference points according to ETS 300 010-1 [14]
G1a, G1b,	reference points according to ETS 300 010-1 [14]
G'2, A'1, A'2	reference points according to ETS 300 010-1 [14]
G2a, G2b,	reference points according to ETS 300 010-1 [14]
H	Hour
J'1, J'2, G'1,	reference points according to ETS 300 010-1 [14]
LC	Local Control interface
LMFA	Loss of Multiframe Alignment

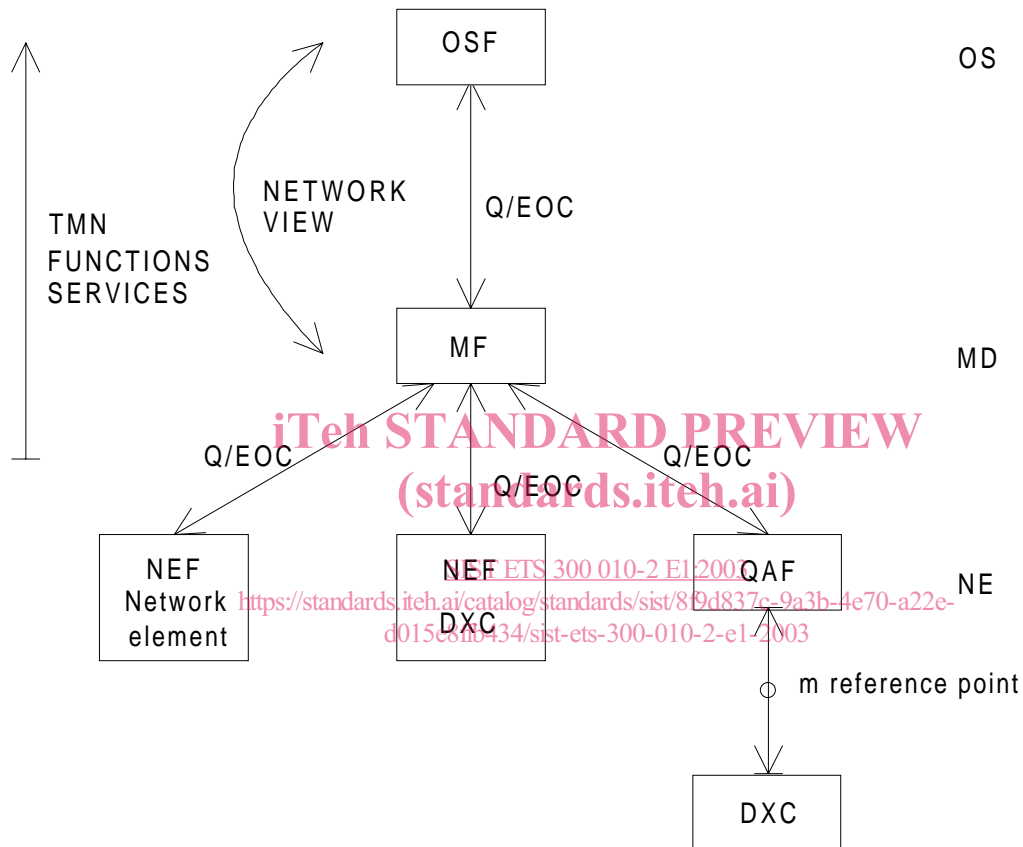
LOF	Loss of Frame
LOS	Loss of Signal
LSYNC	Loss of Synchronization
m	m reference point according to ITU-T Recommendation M.3010 [8]
M	Mandatory
MCF	Message Communication Function
MD	Mediation Device
min	Minute
NE	Network Element
NEF	Network Element Function
NP	Normal Performance
O	Optional
OS	Operations System
OSF	Operations System Function
PI	Physical Interface
PLPT	Plesiochronous Lower order Path Termination
POH	Path Overhead
PPT	Plesiochronous Path Termination
PRBS	Pseudo Random Bit Sequence
Q	Management interface to the TMN
Q3	A management interface according to ITU-T Recommendation M.3010 [8]
Qx	A management interface between a Q-adaptation function (QAF) and a Network Element Function (NEF) according to ITU-T Recommendation M.3010 [8]
RAI	Remote Alarm Indication
RMAI	Remote Multiframe
RTR1ES	Reset Threshold for Errored Second counting
RTR1SES	Reset Threshold for Severely Errored Second
s	Second
Sa	Spare bit in TS0 NFAS
San	A spare bit in TS0 NFAS
SDH	Synchronous Digital Hierarchy
SER	Severely Errored Second ratio
SES	Severely Errored Second
T1	Internal timing signal
T4	Output timing signal
TIPI	Timing Input Physical Interface
TMN	Telecommunication Management Network
TOPI	Timing Output Physical Interface
TR1ES	Threshold 1 for Errored Second counting
TR1SES	Threshold 1 for Severely Errored Second counting
TR2ES	Threshold 2 for Errored Second counting
TR2SES	Threshold 2 for Severely Errored Second counting
TS	Time Slot
TS0 FAS	Time Slot 0 with Frame Alignment Signal
TS0 NFAS	Time Slot 0 without Frame Alignment Signal
TS16	Time Slot 16
TX/RX	Transmit/Receive
UP	Unacceptable Performance
UT	Unavailable Time
WS	Work Station
XC	Cross Connect
XCTS	Cross Connect Timing Source

NOTE: Abbreviations used in subclause 7.3 are listed in subclause 7.3.1.0.

4 DXC management network

Characterization of a Digital Cross Connect (DXC) equipment management network is derived from ITU-T Recommendation G.784 [13], especially figure 1 of that document. Figure 1 below reproduces a similar organization for the management view of management network where an Embedded Operation Channel EOC replaces the specific Synchronous Digital Hierarchy (SDH) Embedded Control Channel (ECC). This figure relates only to functional aspects and does not imply implementation or routing facilities. EOC could be either supported by a particular 64 kbit/s Time Slot (TS) or by one or some of the Sa bits of the CCITT Recommendation G.704 [2] frame Network Elements (NE) could be directly connected with a Mediation Device (MD) or via other devices, including NEs.

NOTE: Network operators may be required to provide duplication of the management interface.



MD	Mediation Device
MF	Mediation Function
NEF	Network Element Function
QAF	Q Adapter Function
OS	Operations System
OSF	Operations System Function
TMN	Telecommunications Management Network

Figure 1: Functional view of management network

5 Information model

There is no information model in this edition of the ETS.

6 Management interfaces

The DXC shall be able to terminate and generate the cross connect management control channel(s). For this purpose, the DXC should present, according to ITU-T Recommendation M.3010 [8], the following interfaces:

Q-interface: This interface provides a management control channel between the Operations System (OS) and the DXC. Depending on the management network implementation, it could be a Qx or a Q3 interface.

There are no protocol suites in this edition of the ETS.

If this interface is not provided, an interface supporting an m-reference point shall be provided.

F-interface: This optional interface provides Work Station (WS) access to the OS via the DXC.

m-reference point: This is supported by a proprietary interface and allows, via an external Q Adaptation Function (QAF), a management connection between an OS conforming to TMN recommendations and a DXC that does not conform to TMN recommendations.

Additionally, the DXC shall provide a Local Control (LC) interface for local attachment of a proprietary management entity. This interface is concerned with:

- installation and maintenance (with changes of the DXC-configuration), in cases where the connection to the OS is interrupted or voluntarily blocked;
- local monitoring of the DXC status (without changes of the DXC-configuration).

NOTE: For the first case, means should be implemented in the DXC and/or the OS to overcome conflict/misalignment situations between the DXC configuration locally induced via the LC interface and the DXC configuration as it is stored in the OS database.

7 Applications functions

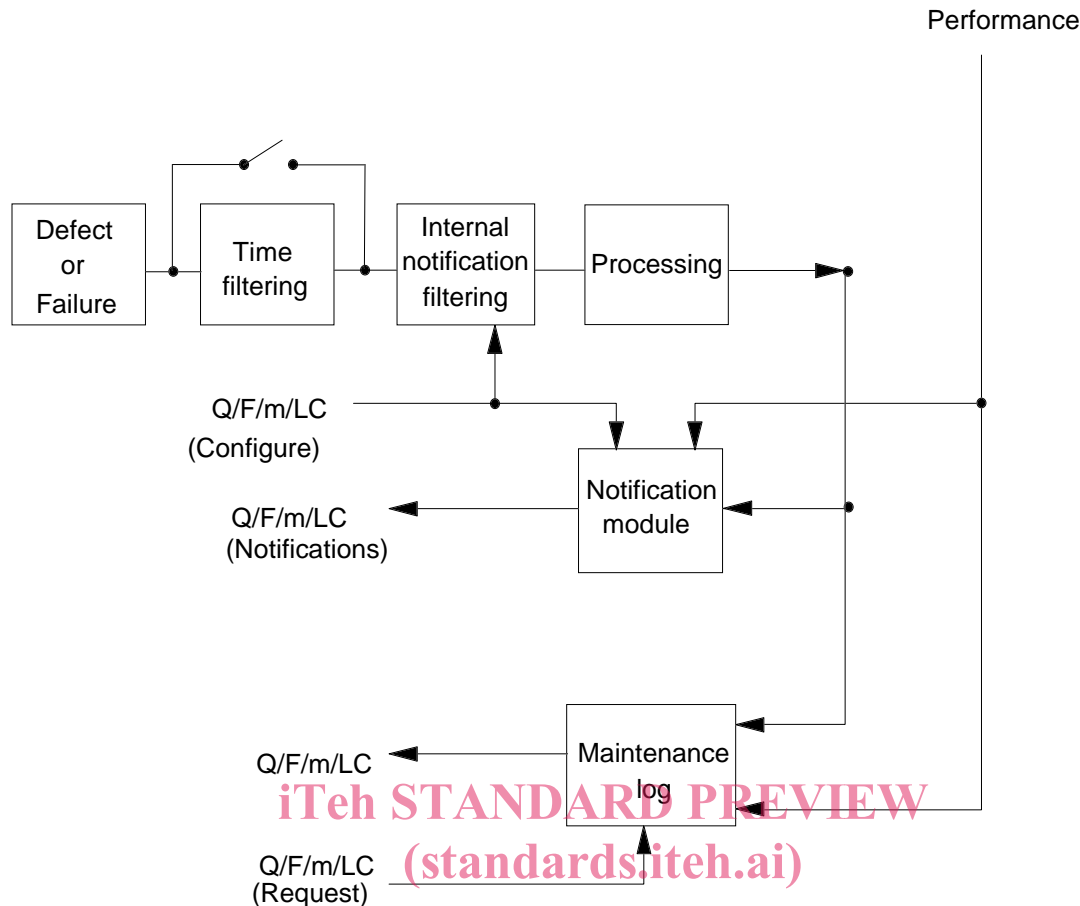
7.1 Fault management

7.1.1 Alarm surveillance

7.1.1.1 Principle

Alarm surveillance is concerned with the detection and reporting of relevant events/conditions which occur in the equipment or which are detected at equipment level. Events/conditions detected within the equipment and in the incoming signals shall be reportable. Alarms are indications that are automatically generated by the equipment or NE as the result of certain events/conditions and associated processing. The user shall have the ability to define which events/conditions generate autonomous reports. The remaining events/conditions are reportable on request.

The relevant events/conditions are derived from the Defect or Failure Conditions (DFC) given in ETS 300 010-1 [14]. The processing associated with the occurrence of DFC is described in figure 2.



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NOTE 1: TMN requires a notification function: this may be supported either by the equipment itself or by a QAF function.

NOTE 2: The "configure" arrow is shown according to the text of subclause 7.1.1.1. This representation does not preclude that the filtering module, internal notification module and processing module are also configurable.

Figure 2: Alarm related maintenance functions

Functions associated with the various functional blocks to figure 2 are as follows:

defect or failure: This functional block performs the elementary functions necessary for the detection of any of the defect or failure conditions specified in ETS 300 010-1 [14] or in this ETS.

time filtering: This functional block provides optional programmable time filtering, ranging from 0 to 10 s in steps of 1 s, which allows notification of a selected defect or failure condition only if its duration is greater than the predetermined value.

Internal notification

filtering: This functional block manages the sending of notifications (occurrence, disappearance of DFC) to the appropriate functional block. It also enables/disables discrimination of a given DFC depending upon its nature and if necessary, to forward it to appropriate functional blocks.

processing: This function receives the various notifications, gathers them and performs the necessary correlation in such a way that no redundant information will be needed. In addition, this function may allow provision of a diagnostic for the occurrence of a DFC. The processing functional block also generates synthetic notifications destined for the Equipment Management Function.

Notification

module: This functional block is under the control of the user who may determine the notifications required to be spontaneously transmitted to the Q/F/m interface/reference point. Also included is programmable notification filtering in the range of 0 s to 60 s in steps of 10 s.

Maintenance

log: This functional block registers all the DFCs occurring in the DXC in an allotted memory area. A stored DFC should include: nature (i.e. LOS, LFA, etc.), type, managed function, time (occurrence, clearing). The user shall have the ability to request transmission or display of stored information according to criteria which are described in subclause 7.1.1.2.

7.1.1.2 Alarm-related functions

The following alarm-related functions may be required to be supported at the equipment level:

- report autonomous alarms;
- request all alarms;
- report all alarms;
- allow/inhibit alarm reporting over any EOC;
- request status of allow/inhibit alarm reporting;
- report status of allow/inhibit alarm reporting.

The following table 1 contains the minimum list of alarm conditions (default values) described in subclause 7.1.2.

Table 1: Alarm conditions

Alarm type	Alarm condition	Mandatory/optional	Perceived severity level
Communication	LOS	2 048U	Major
	EXBER		Pending
	LOS	2 048S	Critical
	LOF		Critical
	EXBER		Minor
	RAI		Minor
	AIS		Minor
	LMFA		Minor
	RMAI (note)		Minor
	AIS TS16		Minor
Management link failure	LSYNC		Critical
			Major
Equipment	2MB Port		Major
	Power supply		Critical
	Cross Connection function		Critical
	Common logic		Major
	Special functions		Major
Processing	Misalignment database		Major
	Time management		Minor
	Alarm memory		Minor
	Downloading software error		Major
	Software corrupting		Major
Quality of service	Degraded performance (DP)		Minor
	Unacceptable performance (UP)		Major
NOTE: Remote Multiframe Alarm Indication (RMAI): this alarm corresponds to the Remote Alarm Indication (RAI) in time slot 16.			