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European Standard (Telecommunications series)

Telecommunications Management Network (TMN); Plesiochronous Digital Hierarchy (PDH) information model for the Network Element (NE) view



Reference

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Telecommunications Management Network (TMN).

The present document describes the information model for Network Elements (NEs), which use the Plesiochronous Digital Hierarchy (PDH) multiplexing structure.

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Date of adoption of this EN:	19 February 1999
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Introduction

Network Operators have extensive deployments of PDH and SDH equipments in their Networks. Some are flexible and/or is monitorable and do possess a standard management interface. A suitable PDH information model is required for such equipment to take advantage of the management capability provided by functional standards related to PDH interfaces of those equipments and enable it to be part of an overall managed network.

The model presented in the present document represents 4 major functional requirements:

- 1) Fixed PDH structures.
- 2) Flexible PDH structures.
- 3) SDH Transport over PDH bearers.
- 4) The monitoring of PDH Ports.

Fixed PDH Structures utilize the inheritance tree given in figure 1 and the naming tree in figure 3. As can be seen this can be used to model the rigid multiplexing structure from 64 kbits/sec to 140 Mbits/sec interfaces in line systems. An example is given in figure 7 of a 140Mbit/s line signal multiplexed through the 34Mbit/s and 8Mbit/s levels to a 2Mbit/s tributary signal which is mapped in a VC12 by a transmission system.

Flexible PDH structures use the same inheritance structure but the naming tree as in figure 2. This represents the flexible structures that may be encountered in PDH crossconnects with ports at all data rates. An example is given in figure 6.

The transport of SDH (VC12) and ATM traffic is represented by the Objects e3INTTTP and e4INTTTP for 34 Mbits/sec bearers and 140 Mbits/sec bearers respectively.

The reporting control of failures of PDH signals at the different path layers is modelled by reusing techniques specified in ITU-T Recommendation M.3100 (flexible assignment of severities to a failure).

The monitoring of the PDH ports is represented by the portMode Package that defines the behaviour. This package models a port that may be enabled for monitoring or may be disabled for monitoring. In addition the port may be set for auto monitoring providing no valid signal is present on the port. The port is then automatically enabled for monitoring when a valid signal is applied for the first time.

It should also be noted that the behaviour of the operationalState is as defined by the ETSI community (different from the SDH environment) and this only applies to this PDH model. This is apparent from the notes that remain in the document. Only equipment failures, and not transmission failures, affect the attribute value.

1 Scope

The present document defines the information model to be used at the interface between Network Elements (NEs) and management systems, for the management of equipment which use the Plesiochronous Digital Hierarchy (PDH).

The present document defines:

- the information model for network elements using PDH multiplexing, including PDH interfaces of Synchronous Digital Hierarchy (SDH) network elements.

The present document does not define:

- the protocol stack to be used for message communication;
- the network level management processes;
- the application contexts;
- the conformance requirements to be met by an implementation of this information model;
- information models for other systems or equipment.

The information model defined in the present document (and the corresponding message set) is concerned with the management of NEs, the equipment by which they are implemented and the functions contained within them. More precisely, it applies to an equipment domain visible at the element manager to element interface and is only concerned with information available within that domain. Information proper to the domain of a network level management process is not included within this model.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ETS 300 337 (1995): "Transmission and Multiplexing (TM); Generic frame structures for the transport of various signals (including Asynchronous Transfer Mode (ATM) cells and Synchronous Digital Hierarchy (SDH) elements) at the ITU-T Recommendation G.702 hierarchical rates of 2 048 kbit/s, 34 368 kbit/s and 139 264 kbit/s".
- [2] ITU-T Recommendation G.702 (1988): "Digital hierarchy bit rates".
- [3] ITU-T Recommendation M.3100 (1995): "Generic network information model".
- [4] ITU-T Recommendation X.721 (1992): "Information technology; Open Systems Interconnection; Structure of management information: Definition of management information".
- [5] ITU-T Recommendation G.704 (1995): "Synchronous frame structures used at 1 544 kbit/s, 6 312 kbit/s, 2 048 kbit/s, 8 488 kbit/s and 44 736 kbit/s hierarchical levels".
- [6] ITU-T Recommendation G.706 (1991): "Frame alignment and Cyclic Redundancy Check (CRC) procedures relating to basic frame structures defined in Recommendation G.704".

- [7] ETS 300 167 (1993): "Transmission and Multiplexing (TM); Functional characteristics of 2 048 kbit/s interfaces".
- [8] EN 300 417-5-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 5-1: Plesiochronous Digital Hierarchy (PDH) path layer functions".
- [9] EN 300 417-1-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 1-1: Generic processes and performance".
- [10] EN 300 417-2-1 (V1.1): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 2-1: Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions".

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AIS	Alarm Indication Signal
ASN.1	Abstract Syntax Notation No. 1
ATM	Asynchronous Transfer Mode
CTP	Connection Termination Point
EBER	Excessive Bit Error Ratio
FERF	Far End Receive Failure
LOF	Loss Of Frame
LOS	Loss Of Signal
NE	Network Element
PDH	Plesiochronous Digital Hierarchy
Pkg	Package
PPA	Plesiochronous Physical Adaptation
PPI	Plesiochronous Physical Interface
PPT	Plesiochronous Physical Termination
RDN	Relative Distinguished Name
SDH	Synchronous Digital Hierarchy
TMN	Telecommunications Management Network
TP	Termination Point
TTP	Trail Termination Point
VC-n	Virtual Container n

4 Registration supporting Abstract Syntax Notation No. 1 (ASN.1) for EN 300 371

```
ASN1TypeModule {ccitt(0) identified-organization(4) etsi(0) ets371(371) informationModel(0)
asn1Module(2) asn1TypeModule(0)}
DEFINITIONS IMPLICIT TAGS ::= BEGIN
-- EXPORT Everything
ETS300371 OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0) ets371(371)
informationModel(0)}
etsObjectClass OBJECT IDENTIFIER ::= {ETS300371 managedObjectClass(3)}
etsPackage OBJECT IDENTIFIER ::= {ETS300371 package(4)}
etsNameBinding OBJECT IDENTIFIER ::= {ETS300371 nameBinding(6)}
etsAttribute OBJECT IDENTIFIER ::= {ETS300371 attribute(7)}
etsAction OBJECT IDENTIFIER ::= {ETS300371 action(9)}
etsNotification OBJECT IDENTIFIER ::= {ETS300371 notification(10)}
END
```

5 PDH fragment

This clause provides managed objects required to model PDH interfaces.

In this context, the IMPORTS clause specifies the object classes which can be instantiated in the scope of the present document. The IMPORT clause does not include uninstantiated super classes.

```
BEGIN
IMPORTS
alarmSeverityAssignmentProfile
FROM ASN1DefinedTypesModule {itu(0) recommendation(0) m(13) gnm(3100) informationModel(0)
                             managedObjectClass (3)};
END
```

5.1 Object classes definitions

5.1.1 Electrical PDH physical interface

This subclass describes the object classes required to model the PDH physical interface.

NOTE: Whether these require attributes to model more features (e.g. PDH level, line code, etc.) is for further study.

```
pPITTPBidirectionalR1    MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100:1995":trailTerminationPointBidirectional,
              pPITTPSinkR1,
              pPITTPSource;
REGISTERED AS { };
```

```
pPITTPSinkR1            MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100:1995":trailTerminationPointSink;
CHARACTERIZED BY
  "Recommendation X.721:1991":administrativeStatePackage,
  "Recommendation M.3100:1995":createDeleteNotificationsPackage,
  "Recommendation M.3100:1995":stateChangeNotificationPackage,
  "Recommendation M.3100:1995":tmnCommunicationsAlarmInformationPackage,
  "Recommendation M.3100:1995":userLabelPackage,
  "Recommendation M.3100:1995":alarmSeverityAssignmentPointerPackage,
pPITTPSinkR1Pkg PACKAGE
  BEHAVIOUR
    alarmReportingControlBehaviour,
  pPITTPSinkR1BehaviourPkg BEHAVIOUR
  DEFINED AS
  "This managed object class represents the point where the incoming interface signal is converted
  into an internal logic level and the timing is recovered from the line signal. The upStream
  connectivity pointer is NULL for an instance of this class.
  A communicationsAlarm notification shall be issued if a Loss of Signal (LOS) is detected. The
  probableCause parameter of the notification shall indicate lossOfSignal [3].
  The operational state is disabled if a failure of the equipment affecting an instance of this class
  prevents the resource from operation.";;
  ATTRIBUTES
  pPITTPId                GET;;;
  CONDITIONAL PACKAGES
  tpSpecificPersistenceTimePkg    PRESENT IF
    "the persistency time for raising / clearing alarms can be set specifically for an instance
  of this class thus superseding the values which are in effect for all termination points of
  a NE",
  portModePkg             PRESENT IF
    "an instance supports it"
  ;
REGISTERED AS { };
```



```

pPITTPSource          MANAGED OBJECT CLASS
DERIVED FROM          "Recommendation M.3100:1995":trailTerminationPointSource;
CHARACTERIZED BY
  "Recommendation M.3100:1995":createDeleteNotificationsPackage,
  "Recommendation M.3100:1995":userLabelPackage,
  pPITTPSourcePkg PACKAGE
BEHAVIOUR
  pPITTPSourceBehaviourPkg BEHAVIOUR
  DEFINED AS
  "This managed object class represents the point where the internal logic level and
  the timing is converted into a line signal.
  The operational state is disabled if a failure of the equipment affecting an instance of this class
  prevents the resource from operation.
  The downstream connectivity pointer is NULL for an instance of this class.";;
  ATTRIBUTES
  pPITTPId            GET;;;
REGISTERED AS { etsObjectClass 3 };

```

NOTE: As for the attribute `operationalState` the decision has been taken in the ETSI/TM2 Meeting Dublin (Oct.97) that no transmission failures but equipment failures will impact the value of that attribute. This behaviour is applicable in general for the PDH TP fragment. No re-registration is considered to be necessary in the `pPITTPSource` class definition.

5.1.2 European PDH Alarm Indication Signal (AIS) trail termination point

This generic object class represents a particular case of termination point used in a managed element where no connectivity at respective level is provided. Instances of this object class are used when, in one layer, no flexibility is provided, but a direct adaptation to client is present.

The sink object class includes the AIS and LOF monitoring function of a respective Connection Termination Point (CTP) which is not instantiated where no connectivity on the respective level is provided.

Object classes inherited from this class are labelled according to the European PDH hierarchy (exATTP, where $x = 0$ stands for 64 kbit/s, $x = 1$ for 2 Mbit/s, $x = 2$ for 8 Mbit/s, $x = 3$ for 34 Mbit/s and $x = 4$ for 140 Mbit/s.)

NOTE: The possibility of adding conditional packages (present if the equipment supports the features) in order to model the capability to reveal Excessive Bit Error Ratio (EBER) is for further study.

The subclasses represent two types of combined functions:

1) En/Pne_A [10] and Pne_TT [8]

The function En/Pne_A is the adaptation from physical section layer to the client PDH path layer (Pne) and the function Pne_TT terminates the trail in that path layer.

2) Pme/Pne_A and Pne_TT [8]

The function Pme/Pne_A adapts from the server PDH path layer (Pme) to a framed, client PDH path layer (Pne) characteristic information (P31e_CI, P22e_CI, P12s_CI). The function Pne_TT terminates the trail in that path layers.

In both cases the management information exchanged with the combined functions is identical. As a consequence one object exATTP reflects the management view for the particular PDH path ($x=1,2,3,4$). Using the objects exATTP a PDH interface can be represented by a fewer number of instances than is obtained if objects are used which do not represent combined functions. These alternative representations are shown in figure 5 and figure 4, respectively.

```

ePDHATTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM
  ePDHTTPBidirectionalR1,
  ePDHATTPSinkR1,
  ePDHATTPSource;
REGISTERED AS { };

```

```

ePDHATTPSinkR1  MANAGED OBJECT CLASS
DERIVED FROM ePDHTTPSinkR1;
CHARACTERIZED BY
ePDHATTPSinkR1Pkg          PACKAGE
BEHAVIOUR
ePDHATTPSinkR1Behaviour    BEHAVIOUR
    DEFINED AS
    "This object class includes the AIS and LOF monitoring function of a respective CTP
    which is not instantiated where no connectivity on the respective level is provided.
    A communicationsAlarm notification shall be issued if an AIS is detected. The
    probableCause parameter of the notification shall indicate aIS.
    A communicationsAlarm notification shall be issued if a LOF is detected. The
    probableCause parameter of the notification shall indicate lossOfFrame.
    An instance of this object class is used when, in one layer, no flexibility is provided,
    but a direct adaptation to client is present.
    The upStream connectivity pointer attribute value of an instance of this object class
    is equal to NULL";
REGISTERED AS { };

```

```

ePDHATTPSource  MANAGED OBJECT CLASS
DERIVED FROM ePDHTTPSource;
CHARACTERIZED BY
ePDHTTPSourcePkg PACKAGE
BEHAVIOUR
ePDHATTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
    "The downStream connectivity pointer attribute value of an instance of this object
    class is equal to NULL.";;;
REGISTERED AS {etsObjectClass 5};

```

5.1.3 European PDH connection termination point

This subclause describes an object class (sink, source or bi-directional) which represents the model for a generic PDH connection termination point (2, 8, 34 and 140 Mbit/s).

Object classes inherited from this class are labelled according to the European PDH hierarchy (exCTP, where x = 0 stands for 64 kbit/s, x = 1 for 2 Mbit/s, x = 2 for 8 Mbit/s, x = 3 for 34 Mbit/s and x = 4 for 140 Mbit/s).

The subclasses represent two types of adaptation functions:

- 1) En/Pne_A or En/Pnx_A [10]

The function En/Pne_A adapts from physical section layer (En) to a framed PDH path layer characteristic information (P4e_CI, P31e_CI, P22e_CI, P12s_CI).

The function En/Pnx_A adapts from physical section layer (En) to an unframed PDH path layer characteristic information (Pnx_CI), which is a signal of non-specified content [10].
- 2) Pme/Pne_A or Pme/Pnx_A [8]

The function Pme/Pne_A adapts from the server PDH path layer (Pme) to a framed, client PDH path layer (Pne) characteristic information (P31e_CI, P22e_CI, P12s_CI). The function Pme/Pnx_A adapts from the server PDH path layer (Pme) to an unframed PDH path layer characteristic information (Pnx_CI), which is a signal of non-specified content [8].

```

ePDHCTPSinkR1      MANAGED OBJECT CLASS
DERIVED FROM      "Recommendation M.3100:1995":connectionTerminationPointSink;
CHARACTERIZED BY
"Recommendation M.3100:1995":createDeleteNotificationsPackage,
"Recommendation M.3100:1995":operationalStatePackage,
"Recommendation M.3100:1995":stateChangeNotificationPackage,
"Recommendation M.3100:1995":tmnCommunicationsAlarmInformationPackage,
"Recommendation M.3100:1995":alarmSeverityAssignmentPointerPackage,

ePDHCTPSinkR1Pkg  PACKAGE
    BEHAVIOUR
        alarmReportingControlBehaviour,
        ePDHCTPSinkR1Behaviour    BEHAVIOUR
    DEFINED AS
    "This object class represents the termination of a PDH connection and models the adaptation sink
    function in different PDH path layers represented by subclasses of this class.
    An instance of this object class shall be used when, in one layer, flexibility is available or when
    there is no termination of a client characteristic information (Pnx-CI).

```

The attribute `framedSignalMode` may have the values 'active' and 'inactive'. An `attributeValueChange` notification is issued when the value is modified and the inherited conditional package `attributeValueChangeNotificationPackage` is instantiated.

If the value is set 'active', then the adaptation processing of a framed signal is provisioned and the detection of the defects LOF and AIS is enabled. A `communicationsAlarm` notification shall be issued if an AIS is detected. The `probableCause` parameter of the notification shall indicate `aIS` [3]. A `communicationsAlarm` notification shall be issued if an LOF is detected. The `probableCause` parameter of the notification shall indicate `lossOfFrame` [3]. In case of defect detection the consequent action `aSSF` (all-ONES) is performed.

If the value is set 'inactive', then this adaptation function is deactivated assuming the reception of an unframed signal (characteristic information `Phx_CI`).

An `attributeValueChange` notification is issued when the value of the attribute `frameStatus` is changed and the inherited conditional package `attributeValueChangeNotificationPackage` is instantiated.

The operational state is disabled if a failure of the equipment affecting an instance of this class prevents the resource from operation.

```

ATTRIBUTES
ePDHCTPID          GET,
framedSignalMode  GET-REPLACE,
frameStatus       GET
;

CONDITIONAL PACKAGES
tpSpecificPersistenceTimePkg  PRESENT IF
"the persistancy time for raising / clearing alarms can be set specifically for an instance of this
class thus superseding the values which are in effect for all termination points of a NE"
;
REGISTERED AS { };

```

```

ePDHCTPSource  MANAGED OBJECT CLASS
DERIVED FROM  "Recommendation M.3100: 1995":connectionTerminationPointSource;
CHARACTERIZED BY
"Recommendation M.3100: 1995":createDeleteNotificationsPackage,
ePDHCTPSourcePkg  PACKAGE
BEHAVIOUR
ePDHCTPSourceBehaviourPkg BEHAVIOUR
DEFINED AS
"This object class originates a PDH hierarchy connection.
The operational state is disabled if a failure of the equipment affecting an instance of this class
prevents the resource from operation.";;

```

```

ATTRIBUTES
ePDHCTPID          GET;;;
REGISTERED AS {etsObjectClass 8};

```

NOTE 1: As for the attribute `operationalState` the decision has been taken in the ETSI/TM2 Meeting Dublin (Oct.97) that no transmission failures but equipment failures will impact the value of that attribute. This behaviour is applicable in general for the PDH TP fragment. No re-registration is considered to be necessary in the `ePDHCTPSource` class definition.

NOTE 2: The superclass `ePDHCTPBidirectionalR1` (not instantiated) needs not to be defined since the instantiable bidirectional subclasses `e*CTPBidirectionalR1` should inherit from `ePDHCTPSinkR1` and / Source only. Note that the superclass `CTPBidirectional` inherits from `cTPSink` / Source without special properties added.

5.1.3.1 Monitoring European PDH connection termination point

```

eMonitoringCTPSink  MANAGED OBJECT CLASS
DERIVED FROM  ePDHCTPSinkR1;
CHARACTERIZED BY
eMonitoringCTPSinkPkg  PACKAGE
BEHAVIOUR
pathTerminationMonitoringBehavior,
eMonitoringCTPSinkBeh  BEHAVIOUR
DEFINED AS
"An instance incorporates the monitoring capabilities of the trail termination sink function
(TTm-Sk) defined at the path layer represented by the subclass of this class. The monitoring
capabilities do not apply in case of unframed signals expected when the inherited attribute
framedSignalMode is set to value 'inactive'";;
REGISTERED AS { };

```

NOTE: No `eMonitoringCTPSource` class is introduced since the existing definition of the `eCTPSource` class is equivalent.

5.1.4 European PDH trail termination point

This subclause describes an object class (sink, source or bidirectional) which represents the model for a generic PDH trail termination point (2, 8, 34 and 140 Mbit/s).

Object classes inherited from this class are labelled according to the European PDH hierarchy (exTTP, where x = 1 stands for 2 Mbit/s, x = 2 for 8 Mbit/s, x = 3 for 34 Mbit/s and x = 4 for 140 Mbit/s).

These subclasses represent the trail termination functions P_{ne}_TT [8] which terminate the trails at the corresponding PDH path layers 2/8/34/140 Mbit/s (n=12, 22, 31, 4, respectively).

```
ePDHTTPSinkR1      MANAGED OBJECT CLASS
DERIVED FROM      "Recommendation M.3100:1995":trailTerminationPointSink;
CHARACTERIZED BY
  "Recommendation X.721: 1991":administrativeStatePackage,
  "Recommendation M.3100:1995":createDeleteNotificationsPackage,
  "Recommendation M.3100:1995":stateChangeNotificationPackage,
  "Recommendation M.3100:1995":tmnCommunicationsAlarmInformationPackage,
  "Recommendation M.3100:1995":alarmSeverityAssignmentPointerPackage,

  ePDHTTPSinkR1Pkg      PACKAGE
    BEHAVIOUR
      alarmReportingControlBehaviour,
      pathTerminationMonitoringBehavior,
    ePDHTTPSinkR1Behaviour BEHAVIOUR
  DEFINED AS
  "This object class represents the termination sink of a PDH trail.
  The operationalState is disabled when a failure of the equipment affecting an instance of this class
  prevents the resource from operation.>";

  ATTRIBUTES
  ePDHTTPId          GET;;;

  CONDITIONAL PACKAGES
    tpSpecificPersistanceTimePkg      PRESENT IF
  "the persistancy time for raising / clearing alarms can be set specifically for an instance
  of this class thus superseding the values which are in effect for all termination points of
  a NE",

REGISTERED AS { };

ePDHTTPSource MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100:1995":trailTerminationPointSource;
CHARACTERIZED BY
  "Recommendation M.3100:1995":createDeleteNotificationsPackage,
  ePDHTTPSourcePkg PACKAGE
    BEHAVIOUR
      ePDHTTPSourceBehaviourPkg BEHAVIOUR
  DEFINED AS
  "This object class originates a PDH hierarchy trail.
  The operational state is disabled if a failure of the equipment affecting an instance of      this
  class prevents the resource from operation.>";
  ATTRIBUTES
  ePDHTTPId    GET;;;

REGISTERED AS {etsObjectClass 11};
```

NOTE: As for the attribute operationalState the decision has been taken in the ETSI/TM2 Meeting Dublin (Oct.97) that no transmission failures but equipment failures will impact the value of that attribute. This behaviour is applicable in general for the PDH TP fragment. No re-registration is considered to be necessary in the ePDHTTPSource class definition.

```
ePDHTTPBidirectionalR1      MANAGED OBJECT CLASS
DERIVED FROM
  "Recommendation M.3100:1995":trailTerminationPointBidirectional,
  ePDHTTPSinkR1,
  ePDHTTPSource;
CHARACTERIZED BY
  ePDHTTPBidirectionalR1Pkg      PACKAGE
    BEHAVIOUR
      ePDHTTPBidirectionalR1Behaviour BEHAVIOUR
  DEFINED AS
```

The Far End Receiver Failure is signaled by a bidirectional trail termination that is represented by an instance of this (sub-)class if a Server Signal Fail condition is detected.>";

```
REGISTERED AS { };
```

5.1.5 European PDH TTP's for transport SDH VC's and ATM cells

This generic object class models the PDH trail used to transport SDH VC's and ATM cells and the label Int stands for **interworking**.

The subclasses represent the combined functions En/Pns_A [10] and Pns_TT [8].

The function En/Pns_A is the adaptation from physical section layer to the client PDH path layer (Pns) and the function Pns_TT terminates the trail in that path layer (n=31,4).

```
ePDHIntTTPSinkR1  MANAGED OBJECT CLASS
DERIVED FROM      ePDHATTPSinkR1;
CHARACTERIZED BY
  ePDHIntTTPSinkR1Pkg  PACKAGE
  BEHAVIOUR
  ePDHIntTTPSinkR1BehaviourPkg  BEHAVIOUR
DEFINED AS
"This object class terminates a ETS 300 337 [1] trail transporting ATM cells or SDH elements.
A communicationsAlarm notification shall be issued if the trail trace received (TR byte) does not
match the trail trace expected. The probableCause parameter of the notification shall indicate trail
trace mismatch.
A communicationsAlarm notification shall be issued if the signal label received contains the all"0"
code. The probableCause parameter of the notification shall indicate 'unequipped'.";
ATTRIBUTES
  trTrailTraceExpected          GET-REPLACE,
  trTrailTraceReceived          GET;;;
REGISTERED AS { };

ePDHIntTTPSource  MANAGED OBJECT CLASS
DERIVED FROM      ePDHATTPSource;
CHARACTERIZED BY
  ePDHIntTTPSourcePkg  PACKAGE
  BEHAVIOUR
  ePDHIntTTPSourceBehaviourPkg  BEHAVIOUR
DEFINED AS
"This object class originates a ETS 300 337 [1] trail transporting ATM cells or SDH
elements.";;
ATTRIBUTES
  trTrailTraceSend              GET-REPLACE;;;
REGISTERED AS { etsObjectClass 14 };

ePDHIntTTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPBidirectionalR1,
  ePDHIntTTPSinkR1,
  ePDHIntTTPSource;
REGISTERED AS { };
```

5.1.6 140 Mbit/s object classes

```
e4ATTPSinkR1  MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSinkR1;
CHARACTERIZED BY
  e4ATTPSinkR1Pkg  PACKAGE
  BEHAVIOUR
  e4ATTPSinkR1BehaviourPkg  BEHAVIOUR
DEFINED AS
"This object class terminates a CCITT Recommendation G.702 [2] 140 Mbit/s
trail.";;
REGISTERED AS { };

e4ATTPSource  MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSource;
CHARACTERIZED BY
  e4ATTPSourcePkg  PACKAGE
  BEHAVIOUR
  e4ATTPSourceBehaviourPkg  BEHAVIOUR
DEFINED AS
"This object class originates a CCITT Recommendation G.702 [2] 140 Mbit/s trail.";;
REGISTERED AS {etsObjectClass 17};

e4ATTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM
  ePDHATTPBidirectionalR1,
  e4ATTPSinkR1,
  e4ATTPSource;
REGISTERED AS { };
```

```

e4CTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHCTPSinkR1;
CHARACTERIZED BY
    e4CTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e4CTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class terminates a CCITT Recommendation G.702 [2] 140 Mbit/s
        connection.";;;

REGISTERED AS { };

e4CTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHCTPSource;
CHARACTERIZED BY
    e4CTPSourcePkg PACKAGE
    BEHAVIOUR
    e4CTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class originates a CCITT Recommendation G.702 [2] 140 Mbit/s
        connection.";;;

REGISTERED AS {etsObjectClass 20};

e4CTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    e4CTPSinkR1,
    e4CTPSource;

REGISTERED AS { };

e4MonitoringCTPSink MANAGED OBJECT CLASS
DERIVED FROM eMonitoringCTPSink;
CHARACTERIZED BY
    e4MonitoringCTPSinkPkg PACKAGE
    BEHAVIOUR
    e4MonitoringCTPSinkBeh BEHAVIOUR
    DEFINED AS
        "An instance of this class represents the adaptation sink function but incorporates the monitoring
        capabilities of a 140Mbit/s path termination sink function";
REGISTERED AS { };

e4MonitoringCTPBidirectional MANAGED OBJECT CLASS
DERIVED FROM e4MonitoringCTPSink,
    e4CTPSource;
REGISTERED AS { };

e4TTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHTTTPSinkR1;
CHARACTERIZED BY
    e4TTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e4TTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class terminates a CCITT Recommendation G.702 [2] 140 Mbit/s
        trail.";;;
REGISTERED AS { };

e4TTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHTTPSource;
CHARACTERIZED BY
    e4TTPSourcePkg PACKAGE
    BEHAVIOUR
    e4TTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class originates a CCITT Recommendation G.702 [2] 140 Mbit/s trail.";;;
REGISTERED AS {etsObjectClass 23};

e4TTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHTTPBidirectionalR1,
    e4TTPSinkR1,
    e4TTPSource;
REGISTERED AS { };

```

```
e4IntTTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM          ePDHIntTTPSinkR1;
CHARACTERIZED BY
  e4IntTTPSinkR1Pkg PACKAGE
  BEHAVIOUR
    e4IntTTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
      "This object class terminates a ETS 300 337 [1] 140 Mbit/s trail transporting ATM
      cells or SDH elements.";;;
REGISTERED AS { };
```

```
e4IntTTPSource MANAGED OBJECT CLASS
DERIVED FROM          ePDHIntTTPSource;
CHARACTERIZED BY
  e4IntTTPSourcePkg PACKAGE
  BEHAVIOUR
    e4IntTTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
      "This object class originates a ETS 300 337 [1] 140 Mbit/s trail transporting ATM
      cells or SDH elements.";;;
REGISTERED AS { etsObjectClass 26};
```

```
e4IntTTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
  ePDHIntTTPBidirectionalR1,
  e4IntTTPSinkR1,
  e4IntTTPSource;
REGISTERED AS { };
```

5.1.7 34 Mbit/s object classes

```
e3ATTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSinkR1;
CHARACTERIZED BY
  e3ATTPSinkR1Pkg PACKAGE
  BEHAVIOUR
    e3ATTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
      "This object class terminates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;
REGISTERED AS { };
```

```
e3ATTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSource;
CHARACTERIZED BY
  e3ATTPSourcePkg PACKAGE
  BEHAVIOUR
    e3ATTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
      "This object class originates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;
REGISTERED AS {etsObjectClass 29};
```

```
e3ATTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
  ePDHATTPBidirectionalR1,
  e3ATTPSinkR1,
  e3ATTPSource;
REGISTERED AS { };
```

```
e3CTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHCTPSinkR1;
CHARACTERIZED BY
  e3CTPSinkR1Pkg PACKAGE
  BEHAVIOUR
    e3CTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
      "This object class terminates a CCITT Recommendation G.702 [2] 34 Mbit/s
      connection.";;;
REGISTERED AS { };
```

```
e3CTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHCTPSource;
CHARACTERIZED BY
  e3CTPSourcePkg PACKAGE
  BEHAVIOUR
    e3CTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
      "This object class originates a CCITT Recommendation G.702 [2] 34 Mbit/s
      connection.";;;
REGISTERED AS {etsObjectClass 32};
```

```

e3CTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    e3CTPSinkR1,
    e3CTPSource;

REGISTERED AS { };

e3MonitoringCTPSink MANAGED OBJECT CLASS
DERIVED FROM
    eMonitoringCTPSink;
CHARACTERIZED BY
    e3MonitoringCTPSinkPkg PACKAGE
    BEHAVIOUR
    e3MonitoringCTPSinkBeh BEHAVIOUR
DEFINED AS
    "An instance of this class represents the adaptation sink function but incorporates the monitoring
capabilities of a 34Mbit/s path termination sink function";
REGISTERED AS { };

e3MonitoringCTPBidirectional MANAGED OBJECT CLASS
DERIVED FROM
    e3MonitoringCTPSink,
    e3CTPSource;
REGISTERED AS { };

e3TTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHTTPSinkR1;
CHARACTERIZED BY
    e3TTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e3TTPSinkR1BehaviourPkg BEHAVIOUR
DEFINED AS
    "This object class terminates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;
REGISTERED AS { };

e3TTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHTTPSource;
CHARACTERIZED BY
    e3TTPSourcePkg PACKAGE
    BEHAVIOUR
    e3TTPSourceBehaviourPkg BEHAVIOUR
DEFINED AS
    "This object class originates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;
REGISTERED AS { etsObjectClass 35};

e3TTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHTTPBidirectionalR1,
    e3TTPSinkR1,
    e3TTPSource;
REGISTERED AS { };

e3IntTTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHIntTTPSinkR1;
CHARACTERIZED BY
    e3IntTTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e3IntTTPSinkR1BehaviourPkg BEHAVIOUR
DEFINED AS
    "This object class terminates a ETS 300 337 [1] 34 Mbit/s trail transporting ATM
cells or SDH elements.";;;
REGISTERED AS { };

e3IntTTPSource MANAGED OBJECT CLASS
DERIVED FROM
    ePDHIntTTPSource;
CHARACTERIZED BY
    e3IntTTPSourcePkg PACKAGE
    BEHAVIOUR
    e3IntTTPSourceBehaviourPkg BEHAVIOUR
DEFINED AS
    "This object class originates a ETS 300 337 [1] 34 Mbit/s trail transporting ATM
cells or SDH elements.";;;
REGISTERED AS { etsObjectClass 38};

e3IntTTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHIntTTPBidirectionalR1,
    e3IntTTPSinkR1,
    e3IntTTPSource;
REGISTERED AS { };

```


5.1.8 8 Mbit/s object classes

```

e2ATTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSinkR1;
CHARACTERIZED BY
    e2ATTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e2ATTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class terminates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;
REGISTERED AS { };

e2ATTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSource;
CHARACTERIZED BY
    e2ATTPSourcePkg PACKAGE
    BEHAVIOUR
    e2ATTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class originates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;
REGISTERED AS {etsObjectClass 41};

e2ATTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHATTPBidirectionalR1,
    e2ATTPSinkR1,
    e2ATTPSource;
REGISTERED AS { };

e2CTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHCTPSinkR1;
CHARACTERIZED BY
    e2CTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e2CTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class terminates a CCITT Recommendation G.702 [2] 8 Mbit/s
        connection.";;;
REGISTERED AS { };

e2CTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHCTPSource;
CHARACTERIZED BY
    e2CTPSourcePkg PACKAGE
    BEHAVIOUR
    e2CTPSourceBehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class originates a CCITT Recommendation G.702 [2] 8 Mbit/s
        connection.";;;
REGISTERED AS {etsObjectClass 44};

e2CTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    e2CTPSinkR1,
    e2CTPSource;
REGISTERED AS { };

e2MonitoringCTPSink MANAGED OBJECT CLASS
DERIVED FROM eMonitoringCTPSink;
CHARACTERIZED BY
    e2MonitoringCTPSinkPkg PACKAGE
    BEHAVIOUR
    e2MonitoringCTPSinkBeh BEHAVIOUR
    DEFINED AS
        "An instance of this class represents the adaptation sink function but incorporates the monitoring
        capabilities of a 8Mbit/s path termination sink function";;
REGISTERED AS { };

e2MonitoringCTPBidirectional MANAGED OBJECT CLASS
DERIVED FROM e2MonitoringCTPSink,
    e2CTPSource;
REGISTERED AS { };

e2TTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHTTPSinkR1;
CHARACTERIZED BY
    e2TTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e2TTPSinkR1BehaviourPkg BEHAVIOUR
    DEFINED AS
        "This object class terminates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;
REGISTERED AS { };

```

```
e2TTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHTTPSource;
CHARACTERIZED BY
    e2TTPSourcePkg PACKAGE
        BEHAVIOUR
            e2TTPSourceBehaviourPkg BEHAVIOUR
                DEFINED AS
                    "This object class originates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;
REGISTERED AS {etsObjectClass 47};
```

```
e2TTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHTTPBidirectionalR1,
    e2TTPSinkR1,
    e2TTPSource;
REGISTERED AS { };
```

5.1.9 2 Mbit/s object classes

```
e1ATTPSinkR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSinkR1;
CHARACTERIZED BY
    e1ATTPSinkR1Pkg PACKAGE
        ATTRIBUTES
            frameStatus GET;
        BEHAVIOUR
            e1ATTPSinkR1Behaviour BEHAVIOUR
                DEFINED AS
                    "This object class terminates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.";;

    CONDITIONAL PACKAGES
        crcMonitoringPkg PRESENT IF
            "an instance supports CRC-4 procedures [6, 7]";
REGISTERED AS { };
```

```
e1ATTPSourceR1 MANAGED OBJECT CLASS
DERIVED FROM ePDHATTPSource;
CHARACTERIZED BY
    e1ATTPSourceR1Pkg PACKAGE
        BEHAVIOUR
            e1ATTPSourceR1BehaviourPkg BEHAVIOUR
                DEFINED AS
                    "This object class originates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.
The attribute crcOperationMode contained in the conditional package crcOperationPkg determines the
operation of the 2 Mbit/s trail termination source. The value 'disabled' sets the transmitted
Si-bits (bit 1 of the frame) to the binary '1' state [5].
The value 'forced' configures CRC-4 procedure. The value 'automatic' triggers the modified CRC-4
multiframe algorithm in order to allow interworking of equipments with and without a CRC-4
capability [6].";
    CONDITIONAL PACKAGES
        crcOperationPkg PRESENT IF
            "an instance supports CRC-4 procedures [6, 7]";
REGISTERED AS { };
```

```
e1ATTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHATTPBidirectionalR1,
    e1ATTPSinkR1,
    e1ATTPSourceR1;
CHARACTERIZED BY
    e1ATTPBidirectionalR1Pkg PACKAGE
        BEHAVIOUR
            e1ATTPBidirectionalR1Beh BEHAVIOUR
                DEFINED AS
                    "Either both or none of the inherited conditional packages crcMonitoringPkg and crcOperationPkg
should be instantiated.
The attribute crcOperationMode contained in the conditional package crcOperationPkg determines the
operation of the 2 Mbit/s trail termination. The value 'disabled' sets the transmitted Si-bits (bit
1 of the frame) to the binary '1' state and disables processing of the Si-bits in the receive signal
[5].
The value 'forced' configures CRC-4 procedure with consequent actions [6]: in case of loss of
CRC4-submultiframe all-ONES (aTSF) is inserted downstream and Far End Receiver Failure (FERF) is
signalized upstream (as in case of LOF). A communicationsAlarm notification is emitted with
probableCause 'lossOfMultiFrame' [3].
The value 'automatic' triggers the modified CRC-4 multiframe algorithm in order to allow
interworking of equipments with and without a CRC-4 capability [6]. If this procedure fails then
further CRC-4 processing is inhibited and transmitted E-bits are kept in binary state '0'.";;
REGISTERED AS { };
```

```

e1CTPSinkR1 MANAGED OBJECT CLASS
  DERIVED FROM      ePDHCTPSinkR1;
  CHARACTERIZED BY
  e1CTPSinkR1Pkg  PACKAGE
  BEHAVIOUR
    e1CTPSinkR1BehaviourPkg BEHAVIOUR
  DEFINED AS
  "This object class terminates a CCITT Recommendation G.702 2 Mbit/s connection..";
REGISTERED AS { };

e1CTPSource MANAGED OBJECT CLASS
DERIVED FROM ePDHCTPSource;
CHARACTERIZED BY
  e1CTPSourcePkg PACKAGE
  BEHAVIOUR
    e1CTPSourceBehaviourPkg BEHAVIOUR
  DEFINED AS
  "This object class originates a CCITT Recommendation G.702 [2] 2 Mbit/s
  connection.";
REGISTERED AS {etsObjectClass 53};

e1CTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
  e1CTPSinkR1,
  e1CTPSource;
REGISTERED AS { };

e1MonitoringCTPSink      MANAGED OBJECT CLASS
DERIVED FROM      eMonitoringCTPSink;
CHARACTERIZED BY
  e1MonitoringCTPSinkPkg      PACKAGE
  BEHAVIOUR
  e1MonitoringCTPSinkBeh      BEHAVIOUR
  DEFINED AS
  "An instance of this class represents the adaptation sink function but incorporates the monitoring
  capabilities of a 2Mbit/s path termination sink function. The conditional package crcMonitoring (if
  instantiated) is in effect when the inherited attribute framedSignalMode is set to value 'active'."
  ;
  CONDITIONAL PACKAGES
  crcMonitoringPkg      PRESENT IF
  "an instance supports CRC-4 procedures [6, 7]";
REGISTERED AS { };

e1MonitoringCTPBidirectional      MANAGED OBJECT CLASS
DERIVED FROM      e1MonitoringCTPSink,
  e1CTPSource;
CONDITIONAL PACKAGES
  isDNPackage PRESENT IF
  *the 2 Mbit/s pdh port is configures as ISDN.*;
REGISTERED AS { };

e1TTPSinkR1      MANAGED OBJECT CLASS
DERIVED FROM      ePDHTTPSinkR1;
CHARACTERIZED BY
  e1TTPSinkR1Pkg  PACKAGE
  BEHAVIOUR
  e1TTPSinkR1Behaviour  BEHAVIOUR
  DEFINED AS
  "This object class terminates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.";
  ;
  CONDITIONAL PACKAGES
  crcMonitoringPkg      PRESENT IF
  "an instance supports CRC-4 procedures [6, 7]"
  ;
REGISTERED AS { };

e1TTPSourceR1      MANAGED OBJECT CLASS
DERIVED FROM      ePDHTTPSource;
CHARACTERIZED BY
  e1TTPSourceR1Pkg  PACKAGE
  BEHAVIOUR
  e1TTPSourceR1Behaviour  BEHAVIOUR
  DEFINED AS
  "This object class originates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.
  The attribute crcOperationMode contained in the conditional package crcOperationPkg determines the
  operation of the 2 Mbit/s trail termination source. The value 'disabled' sets the transmitted
  Si-bits (bit 1 of the frame) to the binary '1' state [5].
  The value 'forced' configures CRC-4 procedure. The value 'automatic' triggers the modified CRC-4
  multiframe algorithm in order to allow interworking of equipments with and without a CRC-4
  capability [6]."
  ;

```

```

CONDITIONAL PACKAGES
crcOperationPkg PRESENT IF
"an instance supports CRC-4 procedures [6, 7]";
REGISTERED AS { };

e1TTPBidirectionalR1      MANAGED OBJECT CLASS
DERIVED FROM
  ePDHTTPBidirectionalR1,
  e1TTPSinkR1,
  e1TTPSourceR1;
CHARACTERIZED BY
  e1TTPBidirectionalR1Pkg PACKAGE
  BEHAVIOUR
  e1TTPBidirectionalR1Beh BEHAVIOUR
  DEFINED AS
"Either both or none of the inherited conditional packages crcMonitoringPkg and crcOperationPkg
should be instantiated.
The attribute crcOperationMode contained in the conditional package crcOperationPkg determines the
operation of the 2 Mbit/s trail termination. The value 'disabled' sets the transmitted Si-bits (bit
1 of the frame) to the binary '1' state and disables processing of the Si-bits in the receive signal
[5].
The value 'forced' configures CRC-4 procedure with consequent actions [6]: in case of loss of
CRC4-submultiframe all-ONES (aTSF) is inserted downstream and Far End Receiver Failure (FERF) is
signalized upstream (as in case of LOF). A communicationsAlarm notification is emitted with
probableCause 'lossOfMultiFrame' [3].
The value 'automatic' triggers the modified CRC-4 multiframe algorithm in order to allow
interworking of equipments with and without a CRC-4 capability [6]. If this procedure fails then
further CRC-4 processing is inhibited and transmitted E-bits are kept in binary state '0'.";
REGISTERED AS { };

```

5.1.10 64 kbit/s object classes

```

e0CTPSink MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100: 1995":connectionTerminationPointSink;
CHARACTERIZED BY
  "Recommendation M.3100: 1995":createDeleteNotificationsPackage,
  "Recommendation M.3100: 1995":operationalStatePackage,
  "Recommendation M.3100: 1995":stateChangeNotificationPackage,
  e0CTPSinkPkg PACKAGE
  BEHAVIOUR
  e0CTPSinkBehaviourPkg BEHAVIOUR
  DEFINED AS
" An instance of this object class terminates a 64 kbit/s connection. Where
additional features are requested and supported by the equipment, appropriate
subclassing is recommended (e.g. where monitoring is required, the
tmnCommunicationsAlarmInformationPkg should be included)";
  ATTRIBUTES
  e0CTPID GET;;;
REGISTERED AS {etsObjectClass 58};

e0CTPSource MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100: 1995":connectionTerminationPointSource;
CHARACTERIZED BY
  "Recommendation M.3100: 1995":createDeleteNotificationsPackage,
  e0CTPSourcePkg PACKAGE
  BEHAVIOUR
  e0CTPSourceBehaviourPkg BEHAVIOUR
  DEFINED AS
  "An instance of this object class originates a 64 kbit/s connection.;;;;
  ATTRIBUTES
  e0CTPID GET;;;
REGISTERED AS {etsObjectClass 59};

e0CTPBidirectional MANAGED OBJECT CLASS
DERIVED FROM
  "Recommendation M.3100: 1995":connectionTerminationPointBidirectional,
  e0CTPSink,
  e0CTPSource;
REGISTERED AS {etsObjectClass 60};

```

5.2 Attributes definitions

```

pPITTPid ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  pPITTPidBehaviour BEHAVIOUR
  DEFINED AS
  "This attribute is used as a Relative Distinguished Name (RDN) for naming instances of the
  pPITTP object classes.";;

REGISTERED AS {etsAttribute 1};

ePDHCTPid ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  ePDHCTPidBehaviour BEHAVIOUR
  DEFINED AS
  "This attribute is used as a RDN for naming instances of the ePDHCTP object classes.";;

REGISTERED AS {etsAttribute 2};

ePDHTTPid ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  ePDHTTPidBehaviour BEHAVIOUR
  DEFINED AS
  "This attribute is used as a RDN for naming instances of the ePDHTTP object classes.";;

REGISTERED AS {etsAttribute 3};

trTrailTraceExpected ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1DefinedTypesModule1.TrailTrace;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  trTrailTraceExpectedBehaviour BEHAVIOUR
  DEFINED AS
  "This attribute is used to specify the value of the expected TR byte PDH trail trace 16 bytes
  message for instances of the e3IntTTP and e4IntTTP object class.";;

REGISTERED AS {etsAttribute 4};

trTrailTraceReceived ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1DefinedTypesModule1.TrailTrace;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  trTrailTraceReceivedBehaviour BEHAVIOUR
  DEFINED AS
  "This attribute is used to know the value of the incoming TR byte PDH trail trace 16 bytes
  message for instances of the e3IntTTP and e4IntTTP object class.";;;
REGISTERED AS {etsAttribute 5};
trTrailTraceSend ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1DefinedTypesModule1.TrailTrace;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  trTrailTraceSendBehaviour BEHAVIOUR
  DEFINED AS
  "This attribute is used to specify the value of the outgoing TR byte PDH trail trace 16 bytes
  message for instances of the e3IntTTP and eg4IntTTP object class.";;

REGISTERED AS {etsAttribute 6};

eOCTPid ATTRIBUTE
WITH ATTRIBUTE SYNTAX   ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  eOCTPidBehaviour BEHAVIOUR
  DEFINED AS
  "This attribute is used as a RDN for naming instances of the eOCTP object classes.";;

REGISTERED AS {etsAttribute 7};

```

5.2.1 Additional attributes

The following attributes definitions have to be added :

```

availableTimeSlots ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.AvailableTimeSlots;
  MATCHES FOR EQUALITY;
  BEHAVIOUR availableTimeSlotsBeh BEHAVIOUR
  DEFINED AS
    *This attribute is used to indicate the available Time Slots.
    If a TS is set to TRUE, the corresponding Time Slot is available
    and vice versa.*;;
REGISTERED AS {}

burstyDegradeConsecutive ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModules1.NCSBSRange;
  MATCHES FOR EQUALITY;
  BEHAVIOUR burstyDegradeConsecutiveBehaviour;
REGISTERED AS { }
;
burstyDegradeConsecutiveBehaviour BEHAVIOUR
  DEFINED AS
"The attribute burstyDegradeConsecutive indicates the number of consecutive BAD seconds that should
be counted before the declaration of degradedSignal. It indicates also number of consecutive GOOD
seconds that are necessary for the degradedSignal clearing.";;

burstyDegradeThreshold ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModules1.CapThreshold;
  MATCHES FOR EQUALITY;
  BEHAVIOUR burstyDegradeThresholdBehaviour;
REGISTERED AS { }
;
burstyDegradeThresholdBehaviour BEHAVIOUR
  DEFINED AS
"The attribute burstyDegradeThreshold contains the value that should be compared with errored blocks
in that second in order to consider that second as a GOOD one or a BAD one.";;

clearingTime ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModules1.PersistanceTime;
  MATCHES FOR EQUALITY
  ORDERING;
REGISTERED AS { };

crcOperationMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModules1.CRCOperationMode;
  MATCHES FOR EQUALITY;
REGISTERED AS { };

enableCRCMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModules1.Activation;
  MATCHES FOR EQUALITY;
REGISTERED AS { };

framedSignalMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModules1.FramedSignalMode;
  MATCHES FOR EQUALITY;
REGISTERED AS { };

frameStatus ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModules1.FramedStatus;
  MATCHES FOR EQUALITY;
  BEHAVIOUR frameStatusBehaviour;
REGISTERED AS { }
;
frameStatusBehaviour BEHAVIOUR
  DEFINED AS
*The attribute indicates the detected framing properties of the characteristic information at the
corresponding PDH path layer. If the detection process is not activated or pending then the value is
0 (noIndication)*;

```

```

portMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModules1.PortMode;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR
    portModeBehaviour      BEHAVIOUR
  DEFINED AS
  "This attribute indicates the current state of the port mode for the containing managed object
  instance. The states indicated are:
    0 - Port Mode is in the MON state.
    1 - Port Mode is in the NMON state.
    2 - Port Mode is in the AUTO state.";;
REGISTERED AS { };

raisingTime ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModules1.PersistanceTime;
  MATCHES FOR      EQUALITY
    ORDERING;
REGISTERED AS { };

remoteCRCIndication      ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModules1.Activation;
  MATCHES FOR      EQUALITY;
REGISTERED AS { };

```

5.3 Name bindings definitions

```

pPITTPSinkR1-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS pPITTPSinkR1 AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE pPITTPid;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS { };

pPITTPSource-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS pPITTPSource AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE pPITTPid;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS { etsNameBinding 2 };

ePDHTTPSinkR1-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHTTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS      "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE      ePDHTTPid;
  BEHAVIOUR ePDHTTPSinkR1-managedElementBehaviour BEHAVIOUR
  DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
  object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

ePDHTTPSource-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHTTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS      "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE      ePDHTTPid;
  BEHAVIOUR ePDHTTPSource-managedElementBehaviour BEHAVIOUR
  DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
  object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 4};

ePDHCTPSinkR1-pPITTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHCTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS      pPITTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE      ePDHCTPID;
  BEHAVIOUR
    ePDHCTPSinkR1-pPITTPSinkR1Behaviour BEHAVIOUR
  DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
  object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

```

```

ePDHCTPSource-pPITTPSource NAME BINDING
SUBORDINATE OBJECT CLASS ePDHCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS    pPITTPSource AND SUBCLASSES;
WITH ATTRIBUTE           ePDHCTPID;
BEHAVIOUR
  ePDHCTPSource-pPITTPSourceBehaviour BEHAVIOUR
DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 6};

e0CTPSink-pPITTPSinkR1 NAME BINDING
SUBORDINATE OBJECT CLASS e0CTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS    pPITTPSinkR1 AND SUBCLASSES;
WITH ATTRIBUTE           e0CTPID;
BEHAVIOUR
  e0CTPSink-pPITTPSinkR1Behaviour BEHAVIOUR
DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

e0CTPSource-pPITTPSource NAME BINDING
SUBORDINATE OBJECT CLASS e0CTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS    pPITTPSource AND SUBCLASSES;
WITH ATTRIBUTE           e0CTPID;
BEHAVIOUR
  e0CTPSource-pPITTPSourceBehaviour BEHAVIOUR
DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 8};

ePDHCTPSinkR1-ePDHTTPSinkR1 NAME BINDING
SUBORDINATE OBJECT CLASS ePDHCTPSinkR1 AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS    ePDHTTPSinkR1 AND SUBCLASSES;
WITH ATTRIBUTE           ePDHCTPID;
BEHAVIOUR
  ePDHCTPSinkR1-ePDHTTPSinkR1Behaviour BEHAVIOUR
DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

ePDHCTPSource-ePDHTTPSource NAME BINDING
SUBORDINATE OBJECT CLASS ePDHCTPSource AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS    ePDHTTPSource AND SUBCLASSES;
WITH ATTRIBUTE           ePDHCTPID;
BEHAVIOUR
  ePDHCTPSource-ePDHTTPSourceBehaviour BEHAVIOUR
DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 10};

e0CTPSink-e1TTPSinkR1 NAME BINDING
SUBORDINATE OBJECT CLASS e0CTPSink AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS    e1TTPSinkR1 AND SUBCLASSES;
WITH ATTRIBUTE           e0CTPID;
BEHAVIOUR
  e0CTPSink-e1TTPSinkR1Behaviour BEHAVIOUR
DEFINED AS
  "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

```



```

eOCTPSource-e1TTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS eOCTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e1TTPSource AND SUBCLASSES;
  WITH ATTRIBUTE           eOCTPId;
  BEHAVIOUR
    eOCTPSource-e1TTPSourceBehaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 12};

ePDHATTPSinkR1-pPITTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    pPITTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPId;
  BEHAVIOUR
    ePDHATTPSinkR1-pPITTPSinkR1Behaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

ePDHATTPSource-pPITTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHATTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    pPITTPSource AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPId;
  BEHAVIOUR
    ePDHATTPSinkR1-pPITTPSourceBehaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 14};

eOCTPSink-e1ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS eOCTPSink AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e1ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           eOCTPId;
  BEHAVIOUR
    eOCTPSink-e1ATTPSinkR1Behaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

eOCTPSource-e1ATTPSourceR1 NAME BINDING
  SUBORDINATE OBJECT CLASS eOCTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e1ATTPSourceR1 AND SUBCLASSES;
  WITH ATTRIBUTE           eOCTPId;
  BEHAVIOUR
    eOCTPSource-e1ATTPSourceR1Behaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 16};

e3ATTPSinkR1-e4ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS e3ATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e4ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPId;
  BEHAVIOUR
    e3ATTPSinkR1-e4ATTPSinkR1Behaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

e3ATTPSource-e4ATTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS e3ATTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e4ATTPSource AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPId;
  BEHAVIOUR
    e3ATTPSource-e4ATTPSourceBehaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 18};

```

```

e2ATTPSinkR1-e3ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS e2ATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e3ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIId;
  BEHAVIOUR
    e2ATTPSinkR1-e3ATTPSinkR1Behaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

e2ATTPSource-e3ATTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS e2ATTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e3ATTPSource AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIId;
  BEHAVIOUR
    e2ATTPSource-e3ATTPSourceBehaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 20};

e1ATTPSinkR1-e2ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS e1ATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e2ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIId;
  BEHAVIOUR
    e1ATTPSinkR1-e2ATTPSinkR1Behaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS { };

e1ATTPSourceR1-e2ATTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS e1ATTPSourceR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e2ATTPSource;
  WITH ATTRIBUTE           ePDHTTPIId;
  BEHAVIOUR
    e1ATTPSourceR1-e2ATTPSourceBehaviour BEHAVIOUR
  DEFINED AS
    "The subordinate managed object may be automatically instantiated when the superior managed
object is instantiated, according to the make-up and mode of operation of the equipment.";;
REGISTERED AS {etsNameBinding 22};

```

5.3.1 Additional name bindings

defaultNMONAlarmSeverityAssignment-managedElement

```

defaultNMONAlarmSeverityAssignment-managedElement  NAME BINDING
  SUBORDINATE OBJECT CLASS
  "Recommendation M.3100: 1995":alarmSeverityAssignmentProfile AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS
  "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE
  "RecommendationM.3100: 1995":alarmSeverityAssignmentProfileId;
  BEHAVIOUR
  defaultNMONAlarmSeverityAssignment-managedElementBeh  BEHAVIOUR
  DEFINED AS
    *One instance of the subordinate class is auto created by the node.
    The default values of this object instance shall always map all
    possible alarms which the node can generate to the "non-alarmed"
    severity code.*;
REGISTERED AS { };

```

5.4 ASN.1 definitions

```

ASN1DefinedTypesModule1 {ccitt(0) identified-organization(4) etsi(0) ets371(371) informationModel(0)
asn1Module(2) asn1DefinedTypesModule1(1)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- EXPORTS everything
IMPORTS

```

```
NameType FROM ASN1DefinedTypesModule {ccitt(0) recommendation(0) m(13) m3100(3100)
informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)};
```

```
TrailTrace ::= CHOICE {
    null          NULL,
    pathtrace    [1] GraphicString
}
Activation ::= BOOLEAN
AvailableTimeSlots ::= SEQUENCE SIZE (1..31) OF TS
CapThreshold ::= INTEGER
CRCOperationMode ::= ENUMERATED {disabled(0), forced(1), automatic(2)}
FramedSignalMode ::= ENUMERATED {inactive(0), active(1)}
FrameStatus ::= INTEGER
    --0: noIndication
    --1: edcMF
NCSBSRange ::= INTEGER(2..10)
    degradeConsecutiveDefault    NCSBSRange ::= {6}
PersistenceTime ::= INTEGER(1..300)
    defaultRaisingPersistence    PersistenceTime ::= {25}
    defaultClearingPersistence   PersistenceTime ::= {100}
PortMode ::= INTEGER

TS ::= BOOLEAN

END -- end of ASN1DefinedTypesModule
```

5.5 Packages

```
crcMonitoringPkg    PACKAGE
    BEHAVIOUR
    crcMonitoringPkgBeh BEHAVIOUR
    DEFINED AS
```

"This packages defines the monitoring capabilities applied to signals with a CRC submultiframe structure.

The attribute enableCRCMode set to TRUE selects the near/far-end performance processing of the receive signal based on CRC-4 block errors.

During this mode of operation the degraded signal criteria are in effect dependent on the setting of the attributes burstyDegradeConsecutive and burstyDegradeThreshold. A communicationsAlarm notification shall be issued if the account for the detection of the degraded defect is encountered. The probableCause parameter of the notification shall indicate 'degradedSignal' [3].

The attribute remoteCRCIndication reflects the CRC-4 multiframe generator / detector status at the far-end NE [8].

The value of burstyDegradeConsecutive attribute represents the number of consecutive seconds that should be taken into account for the detection or clearing of the degraded defect. The attribute burstyDegradeThreshold contains the value that should be compared with errored blocks in that second in order to consider that second as a GOOD one or a BAD one [9].";

```
    ATTRIBUTES
        burstyDegradeConsecutive    DEFAULT VALUE
        ASN1TypeModule.degradeConsecutiveDefault
            GET-REPLACE,
        burstyDegradeThreshold    GET-REPLACE,
        enableCRCMode            GET-REPLACE,
        remoteCRCIndication        GET;
REGISTERED AS { };
```

```
crcOperationPkg    PACKAGE
    BEHAVIOUR
    crcOperationPkgBeh BEHAVIOUR
    DEFINED AS
```

"This packages enables to control the operation modes defined for interworking with equipment which may or may not incorporate CRC procedure";

```
    ATTRIBUTES
        crcOperationMode    GET-REPLACE;
REGISTERED AS { };
```

```
iSDNPackage PACKAGE
    BEHAVIOUR iSDNPackageBehaviour BEHAVIOUR
    DEFINED AS
```

This package permits to blank n (1=<n<=31) time slots on a 2 Mbit/s signal, by setting the attribute availableTimeSlots. The default value of availableTimeSlots is all TS="FALSE", that is all time slots are written with 'all ones'.";

```
    ATTRIBUTES
        availableTimeSlots    GET-REPLACE;
REGISTERED AS {}
```

```

tpSpecificPersistanceTimePkg    PACKAGE
    BEHAVIOUR                    tpSpecificPersistanceTimePkgBehaviour;
    ATTRIBUTES
        raisingTime REPLACE-WITH-DEFAULT
            DEFAULT VALUE    ASN1TypeModule.defaultRaisingPersistency
            GET-REPLACE,
        clearingTime  REPLACE-WITH-DEFAULT
            DEFAULT VALUE    ASN1TypeModule.defaultClearingPersistency
            GET-REPLACE;
REGISTERED AS {xxx}
;
tpSpecificPersistanceTimePkgBehaviour BEHAVIOUR
DEFINED AS
"This package models the filter (f4) applied for correlated fault causes in order to indicate
failures. The integer values (p) of the contained attributes raisingTime and clearingTime define
intervals of persistance time (Tp). The nominal values Tp are associated to the integer value p by
the equation
Tp=p*0.1 sec.
The range and the default intervals of activating and clearing a failure are specified in
EN 300 417-1 [9].";

portModePkg PACKAGE
    BEHAVIOUR
        portModePkgBehaviour    BEHAVIOUR
    DEFINED AS
    "Any object supporting this package can support the portMode function. It has three states: AUTO,
    NMON and MON. The AUTO shall be the default.
    In the AUTO state the value of the portMode attribute is AUTO and the containing managed object's
    alarmSeverityAssignmentProfilePointer attribute shall point at the instance of the
    AlarmSeverityAssignmentProfile managed object class which has a nameBinding value of
    defaultNMONAlarmSeverityAssignmentProfile-managedElement.
    In the NMON state the value of the portMode is NMON and the containing managed object's
    alarmSeverityProfilePointer attribute shall point at the same instance as in AUTO mode, i.e. it
    points to the AlarmSeverityAssignmentProfile managed object class which has a nameBinding value of
    defaultNMONAlarmSeverityAssignment-managedElement.
    In the MON state the value of the portMode is MON and the containing managed object's
    alarmSeverityAssignmentProfilePointer attribute shall has a value indicating some other
    AlarmSeverityAssignmentProfile instance than the one used in NMON/AUTO state or it should be NULL.
    When portMode changes from AUTO or NMON to MON the alarmSeverityAssignmentProfilePointer shall
    revert to the value as stated above.
    The MON, NMON or AUTO state is entered via M-Set of the portMode attribute by a managing system. In
    addition, the containing object leaves the AUTO state when a valid signal is detected (i.e. LOS is
    cleared) by the containing object, and in this case an attributeValueChange notification is emitted.
    An attempt from management system to change the portMode attribute from either MON or NMON to AUTO
    is rejected, when there is a valid signal.
    When the portMode attribute changes, the alarmSeverityAssignmentProfilePointer attribute of the
    containing object changes automatically by NE according to the behaviour specified in this package.
    In NMON or AUTO state the alarmSeverityAssignmentProfilePointer should always point to the
    alarmSeverityAssignmentProfile instance with nameBinding
    defaultNMONAlarmSeverityAssignmentProfile-managedElement."
    ;
    ATTRIBUTES
        portMode    GET-REPLACE;
    NOTIFICATIONS
        "Recommendation X.721:1992":attributeValueChange;
REGISTERED AS { ? };

```

5.6 Behaviour definitions

```

alarmReportingControlBehaviour    BEHAVIOUR
DEFINED AS
    "If the attribute alarmSeverityProfilePointer points to an instance of the MOC
    alarmSeverityAssignmentProfile then the perceivedSeverity associated with the probableCause in the
    communicationsAlarm is determined by the assignment given in the attribute
    alarmSeverityAssignmentList of that instance. The value 'non-alarmed' of the severity assigned to a
    problem inhibits the emission of the potential communicationsAlarm notification of that problem.
    This behaviour meets the ability to configure the defect correlation filter not to report selected
    fault causes (i.e. problems) and hence no associated failures will be alerted by communicationsAlarm
    notifications.
    The alarmSeverityProfilePointer may point to an instance of alarmSeverityAssignmentProfile which is
    auto-created by the NE according the name-binding label
    'defaultNMONAlarmSeverityAssignment-managedElement'. This relationship of the termination point
    reflects the NMON state during which no communicationsAlarm is reported at all.
    When the severity changes to a value 'non-alarmed' for a problem which has been notified by an
    instance of this class then a communicationsAlarm notification with the perceivedSeverity 'cleared'
    is issued and the corresponding entry in the attributes currentProblemList and alarmStatus is
    removed. When the severity changes from 'non-alarmed' to a value other than 'non-alarmed' then a
    pending, persistent defect will be notified.

```

If the alarm severity cannot be assigned by the way of an alarmSeverityAssignmentProfile object (e.g. the attribute alarmSeverityProfilePointer has the value NULL or no assignment is given in the attribute alarmSeverityAssignmentList) then one of the two choices applies when reporting alarms:

- a) agent assigns the severity,
- b) the value 'indeterminate' is used." ; ;

pathTerminationMonitoringBehavior BEHAVIOUR
DEFINED AS

"A communicationsAlarm notification shall be issued if a Server Signal Fail (SSF) is detected. The probableCause parameter of the notification shall indicate serverSignalFailure.

A communicationsAlarm notification shall be issued if a Far End Receiver Failure is detected. The probableCause parameter of the notification shall indicate farEndReceiverFailure (fERF) [3].

Detection of a fERF has no effect on the operationalState.

Instances of the subclasses of this class may be used at the different PDH path layers to provide with performance data monitoring capabilities based on Frame Alignment Signal Errors (FASE) [8]."; ;

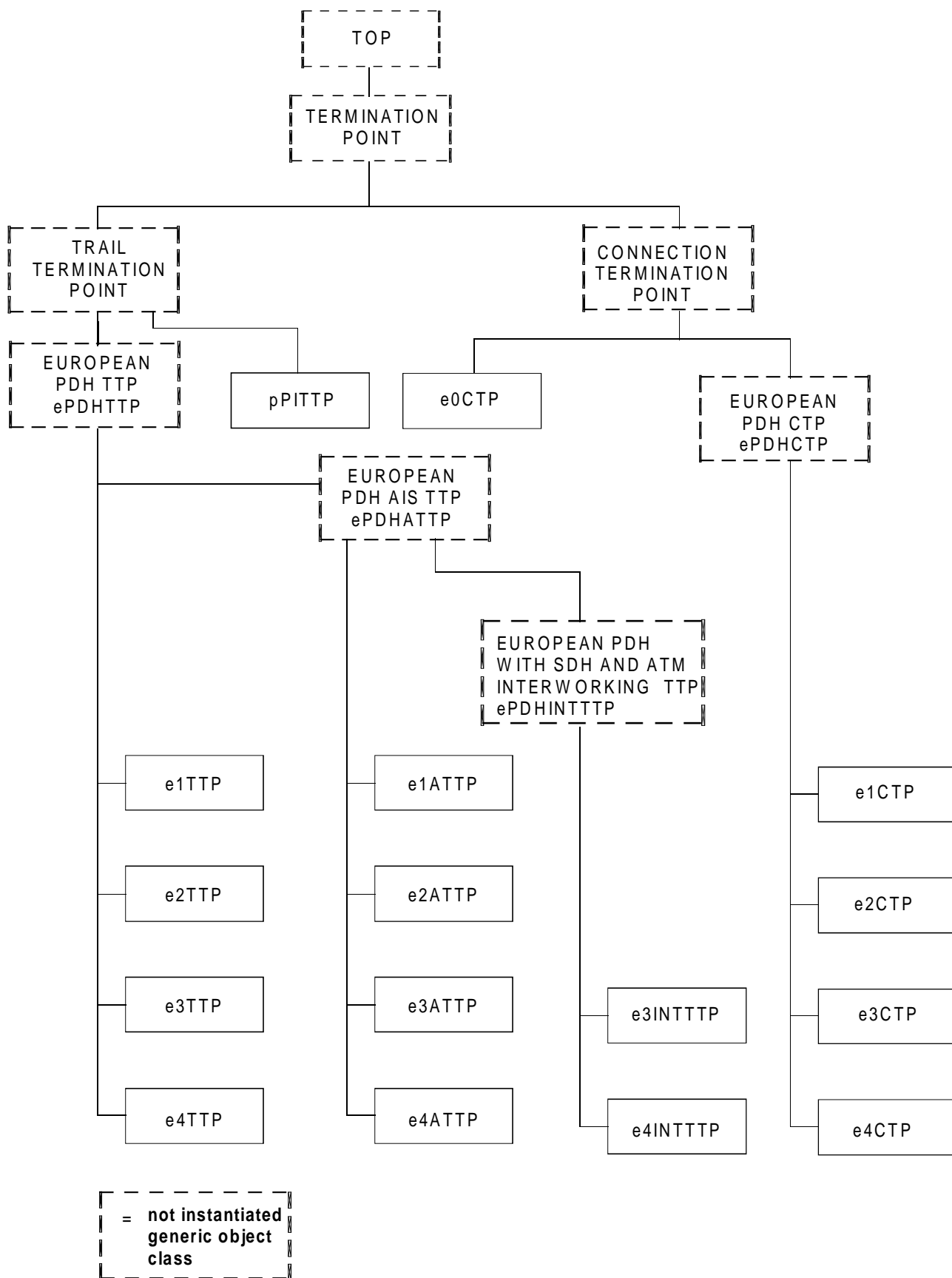


Figure 1: PDH transport object inheritance (all PDH objects may be source, sink or bidirectional)

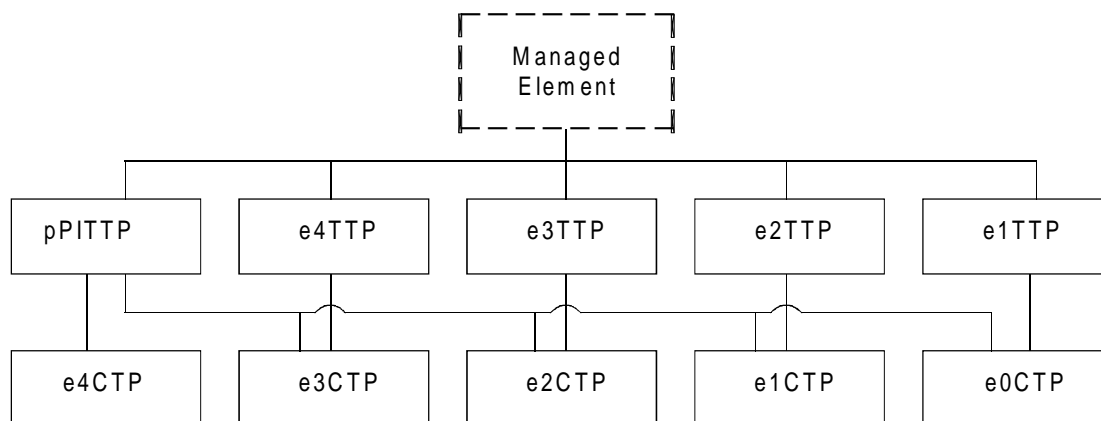


Figure 2: PDH object naming when PDH cross connectivity is available

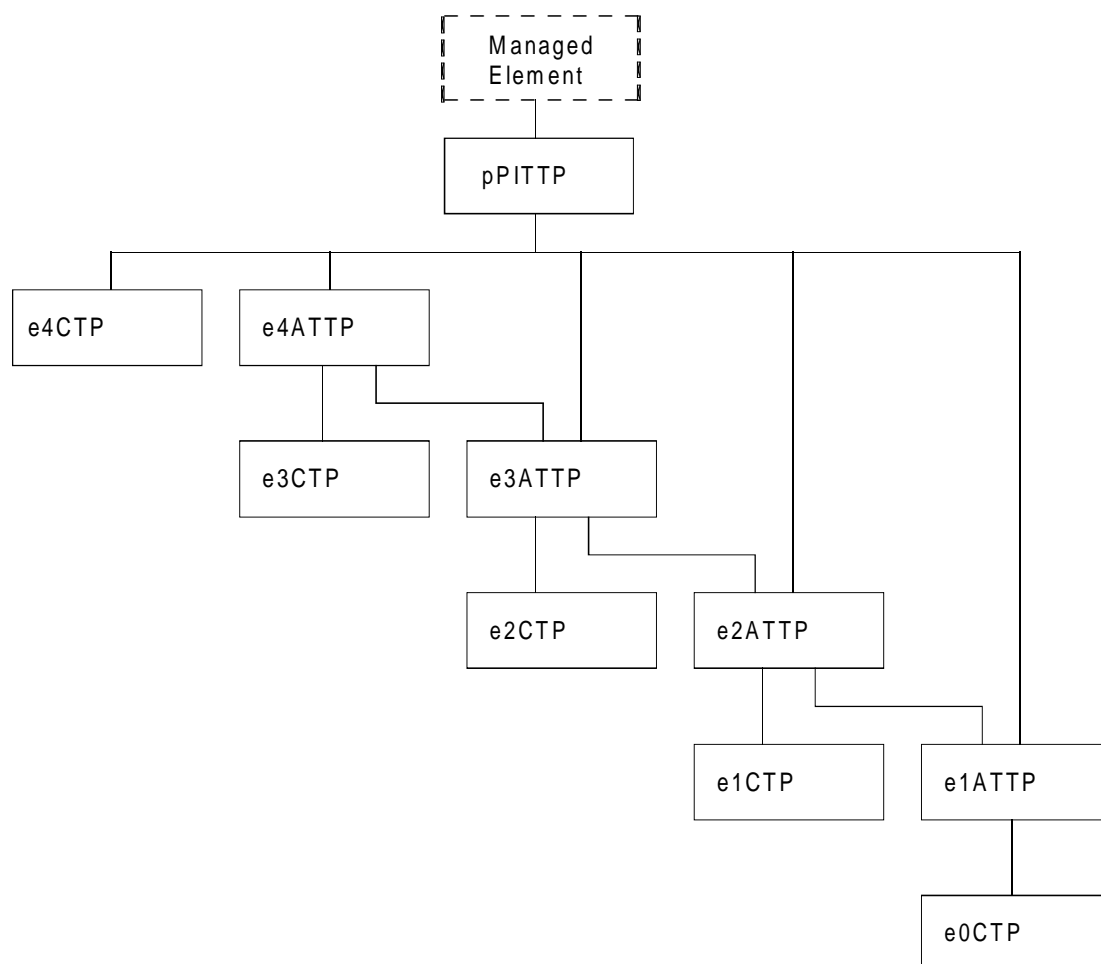
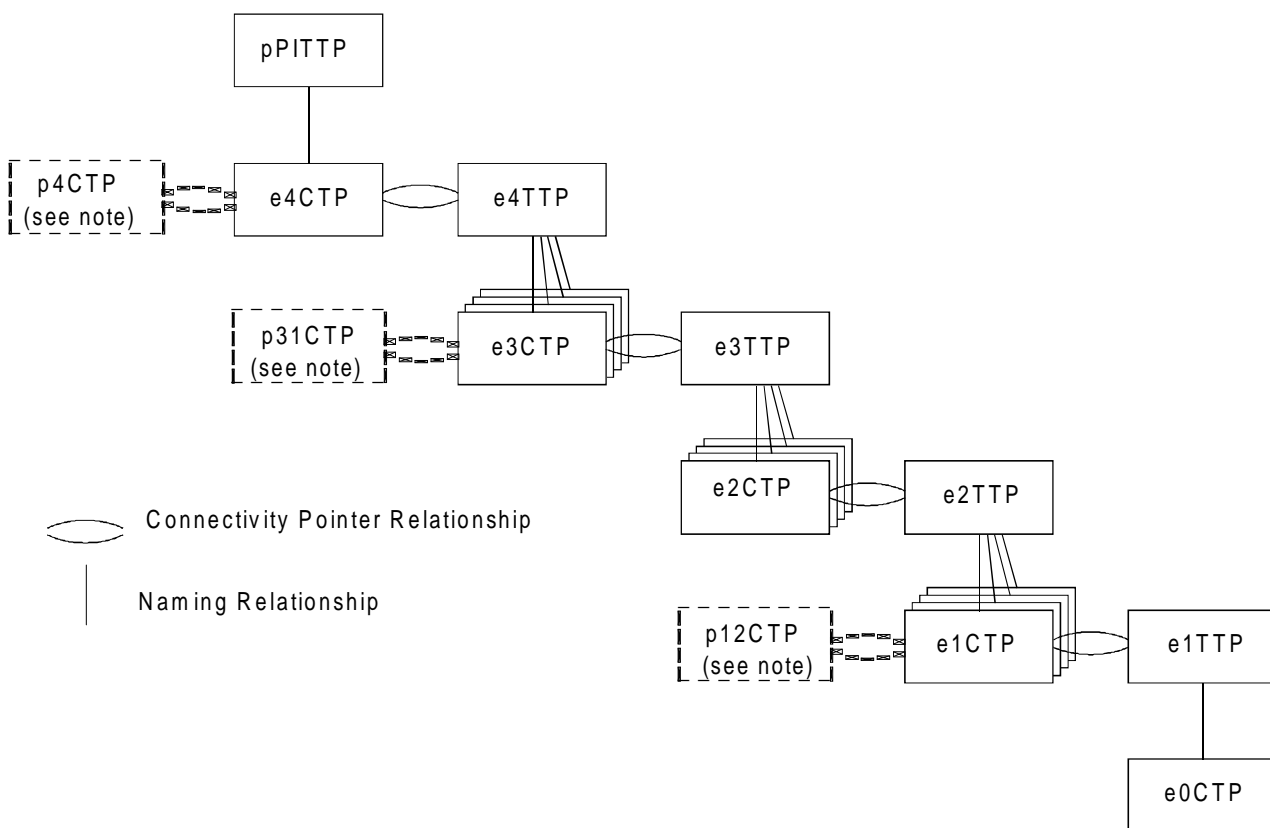
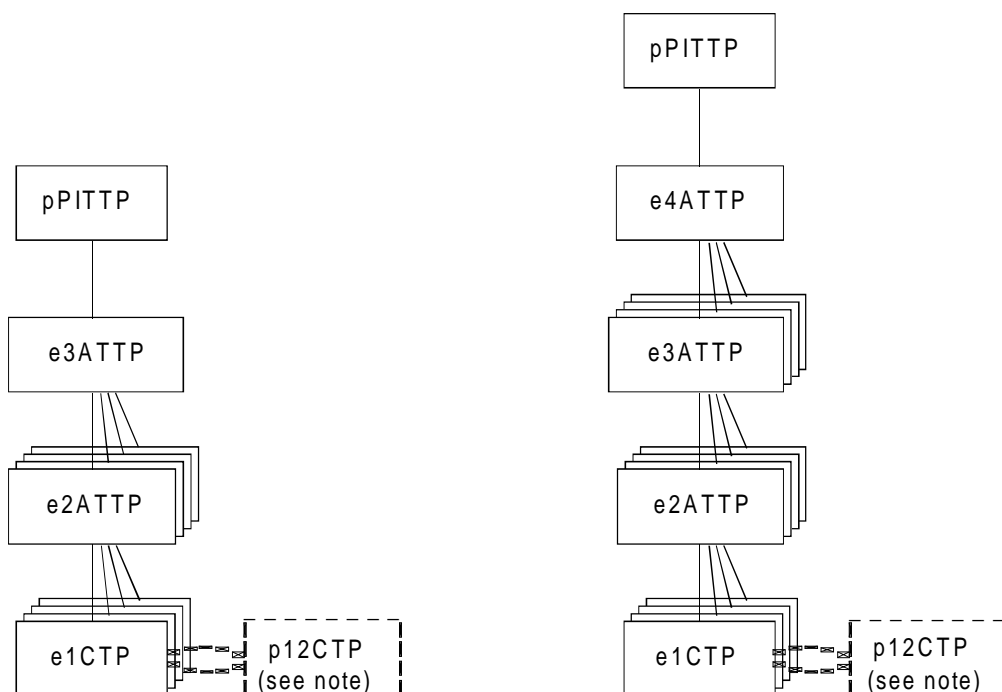


Figure 3: PDH object naming when no PDH cross connectivity is available



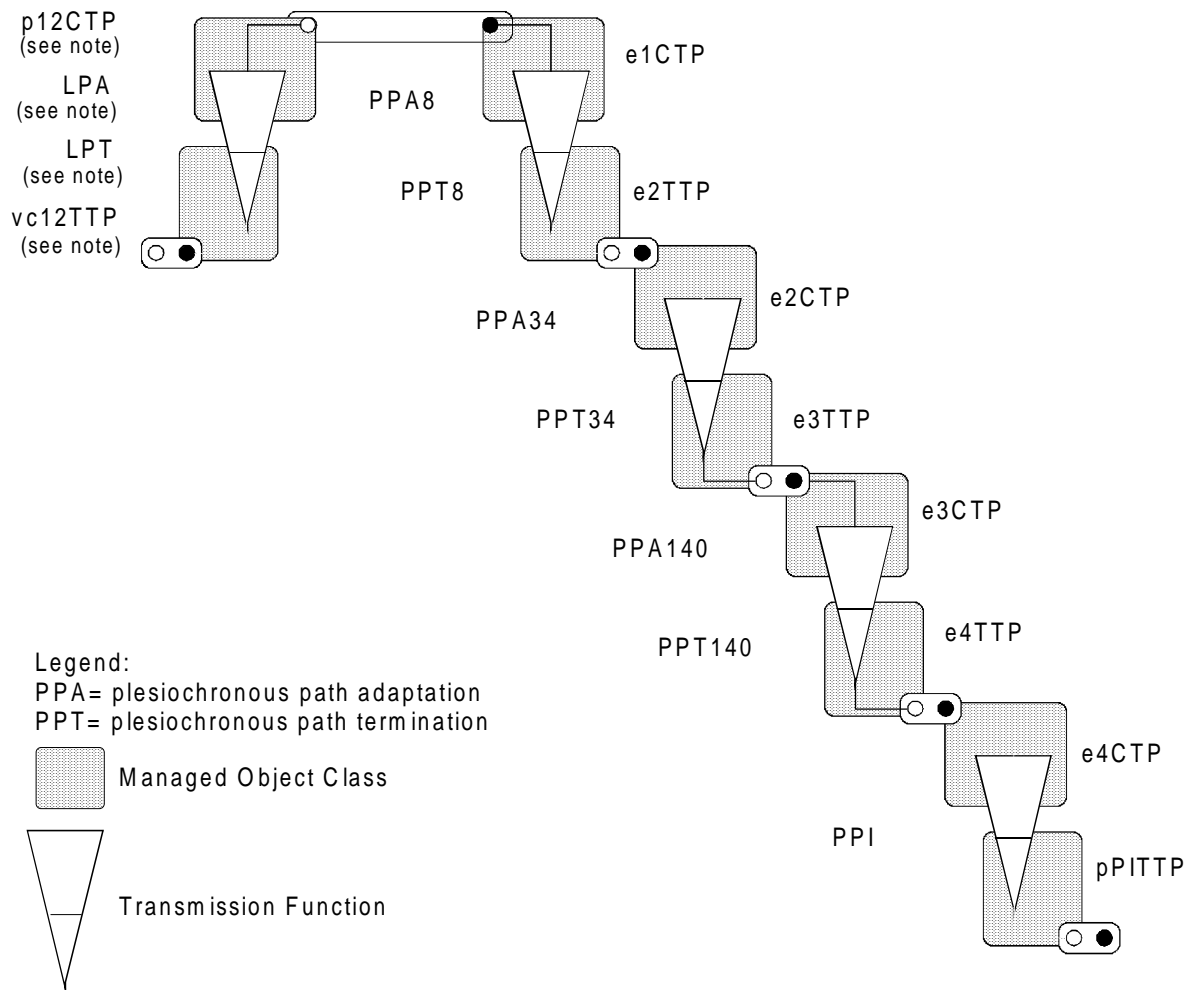
NOTE: Not defined in the present document.

Figure 4: Naming and pointer relationships for PDH and relationship with SDH object classes



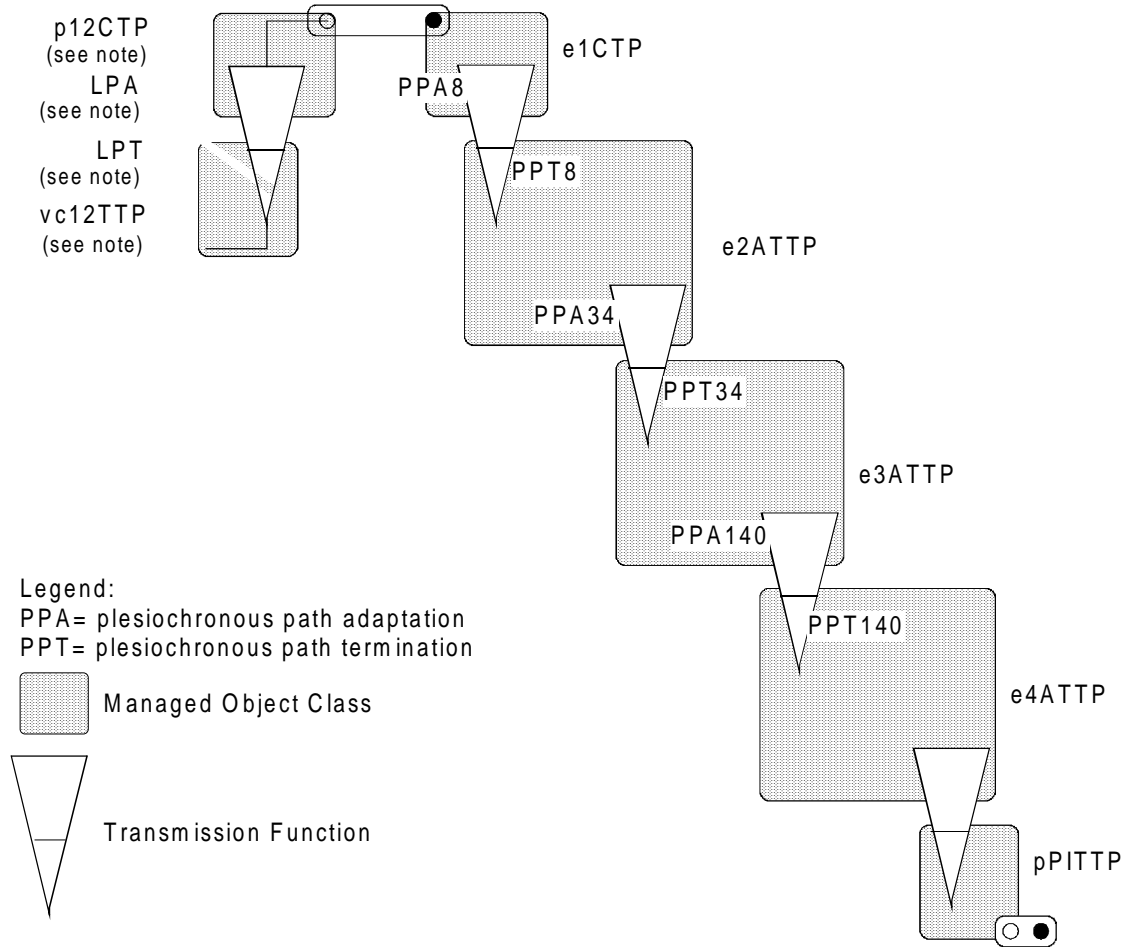
NOTE: Not defined in the present document.

Figure 5: Naming and pointer relationships examples for short version 34/vc12 and 140/vc12 transmultiplexer



NOTE: Not defined in the present document.

Figure 6: Example for relationship between object classes and transmission functions



NOTE: Not defined in the present document.

Figure 7: Example for relationship between object classes and transmission functions short version without PDH cross connectivity

History

Document history		
Edition 1	November 1994	Publication as ETS 300 371
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V1.3.1	October 1998	One-step Approval Procedure OAP 9907: 1998-10-16 to 1999-02-12
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