International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.8021/Y.1341

Amendment 2

(02/2010)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

Packet over Transport aspects – Ethernet over Transport aspects

SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS AND NEXT-GENERATION NETWORKS

Internet protocol aspects – Transport

Characteristics of Ethernet transport network equipment functional blocks

Amendment 2

Recommendation ITU-T G.8021/Y.1341 (2007) – Amendment 2

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ITU-T G-SERIES RECOMMENDATIONS

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For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T G.8021/Y.1341

Characteristics of Ethernet transport network equipment functional blocks

Amendment 2

Summary

Amendment 2 to Recommendation ITU-T G.8021/Y.1341 contains additional material to be incorporated into the Recommendation. It presents enhancements to the ETH connection and the ODU2P to Ethernet PP-OS adaptation functions, and a reference to the ODU0P to 1 GbE client adaptation function.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T G.8021/Y.1341	2004-08-22	15
1.1	ITU-T G.8021/Y.1341 (2004) Amend. 1	2006-06-06	15
2.0	ITU-T G.8021/Y.1341	2007-12-22	15
2.1	ITU-T G.8021/Y.1341 (2007) Amend. 1	2009-01-13	15
2.2	ITU-T G.8021/Y.1341 (2007) Amend. 2	2010-02-22	15

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

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In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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CONTENTS

Recommendation ITU-T G.8021/Y.1341

Characteristics of Ethernet transport network equipment functional blocks

Amendment 2

1) New reference to the SDL recommendation

Add the following reference to clause 2:

[ITU-T Z.100] Recommendation ITU-T Z.100 (2007), *Specification and Description Language (SDL)*.

2) New Appendix V

Add the following appendix after Appendix IV:

Appendix V

SDL descriptions

(This appendix does not form an integral part of this Recommendation)

In this Recommendation, detailed characteristics of equipment functional blocks are described with SDL diagrams specified in [ITU-T Z.100]. The SDL diagrams use the following conventions:

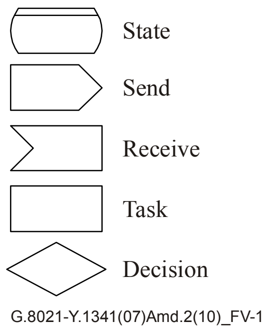


Figure V.1 – SDL symbols

3) Revision of clause 8.7, *MAC frame counter*

Replace the contents of clause 8.7 with the following figure and text:

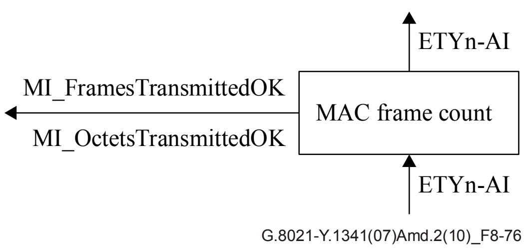


Figure 8-76 – MAC frame count function

This process passes MAC frames and counts the number of frames that are passed.

MI_pOctetsTransmittedOK[1..Np] per clause 30 of [IEEE 802.3].

MI_pFramesTransmittedOK[1..Np] per clause 30 of [IEEE 802.3].

4) Revision of Figure 9-3

Replace Figure 9-3 with the following figure:

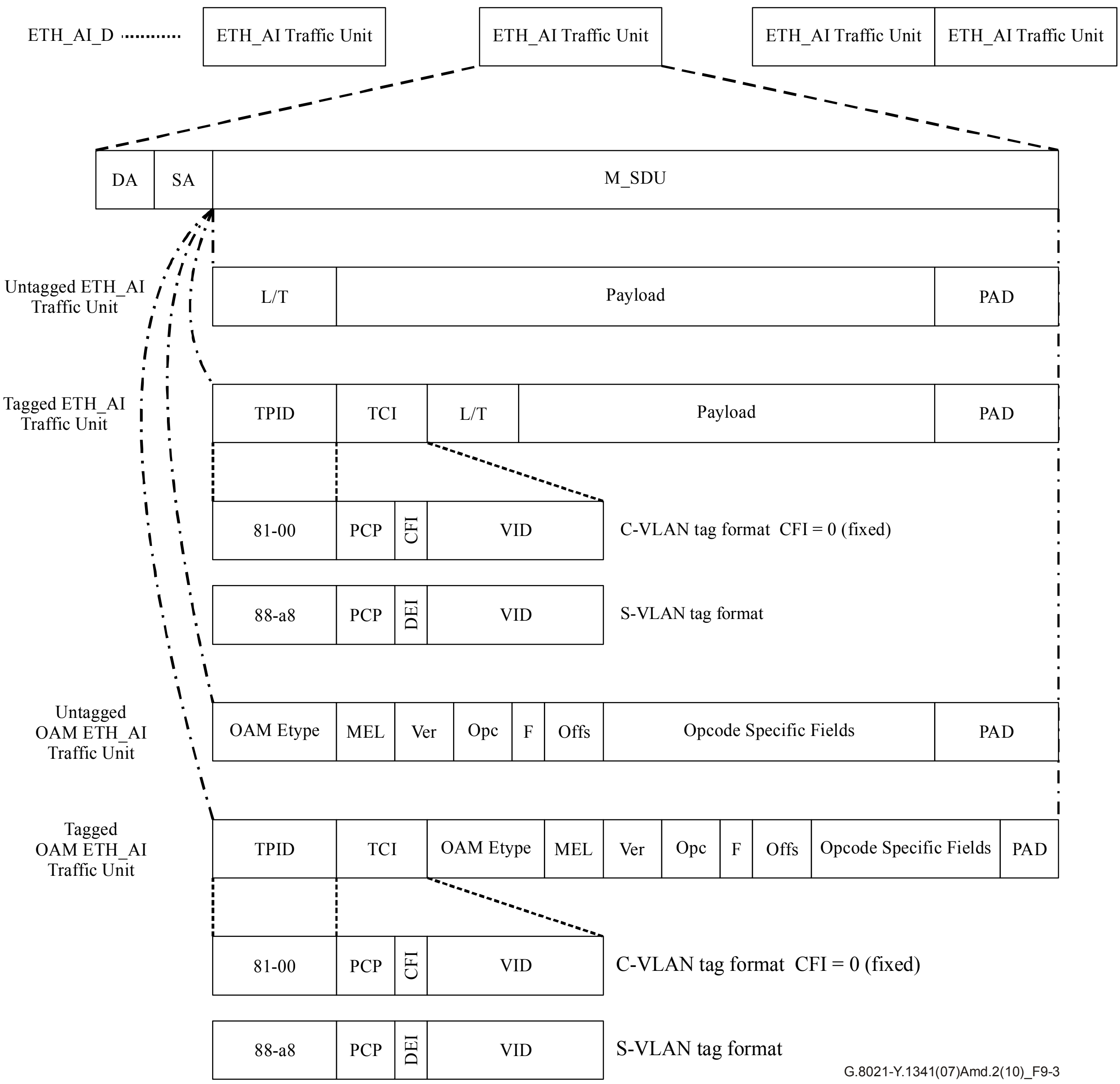


Figure 9-3 – ETH adapted information

5) Revision of Figure 9-4

Replace Figure 9-4 with the following figure:

DA	SA	TPI	TCI	OAM Etype	MEL	Ver	Opc	F	Offs	Opcode Specific OAM information	PAD

Figure 9-4 – Tagged ETH_AI carrying ETH_CI OAM

6) Revision of clause 9.1

6.1) Revision of the text for the ETH connection function

Replace:

9.1 Connection functions

with:

9.1 ETH connection function (ETH_C)

The information flow and processing of the ETH_C function is defined with reference to Figures 9-8 and 9-10. The ETH_C function connects ETH characteristic information from its input ports to its output ports. As the process does not affect the nature of characteristic information, the reference points on either side of the ETH_C function are the same as illustrated in Figure 9-8.

The connection process is unidirectional and as such no differentiation in sink and source is required.

In addition, the ETH_C function supports the following subnetwork connection protection schemes:

– 1+1 unidirectional SNC/S protection without APS protocol.

– 1+1 unidirectional SNC/S protection with an APS protocol.

– 1+1 bidirectional SNC/S protection with an APS protocol.

– 1:1 bidirectional SNC/S protection with an APS protocol.

– Ring protection with an APS protocol.

The protection functionality is described in clauses 9.1.2 and 9.1.3.

NOTE 1 – The SNC/S protection processes have a dedicated sink and source behaviour.

Symbol

The ETH connection function as shown in Figure 9-8 forwards ETH_CI signals at its input ports to its output ports.

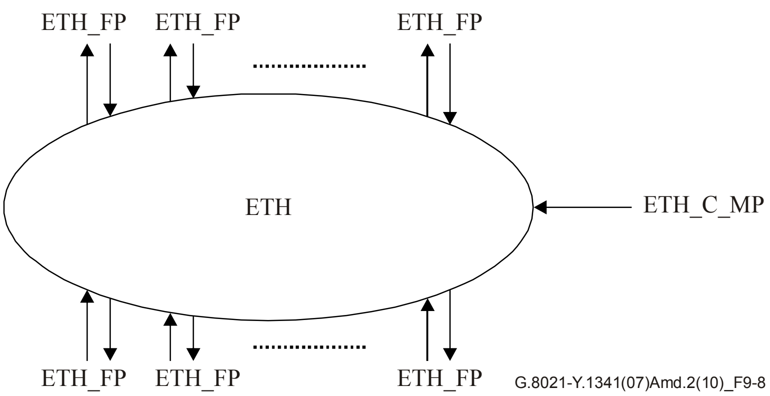


Figure 9-8 – ETH connection function

The actual forwarding is performed using flow forwarding processes, ETH_FF, interconnecting the input and output ports.

Interfaces

Table 9-2 – ETH_C interfaces

Inputs	Outputs
Per ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_APS ETH_CI_SSF ETH_CI_SSD ETH_C_MP: ETH_C_MI_Create_FF ETH_C_MI_Modify_FF ETH_C_MI_Delete_FF ETH_C_MP per flow forwarding process: ETH_C_MI_FF_Set_PortIds ETH_C_MI_FF_ConnectionType ETH_C_MI_FF_Flush_Learned ETH_C_MI_FF_Flush_Config ETH_C_MI_FF_Group_Default ETH_C_MI_FF_ETH_FF ETH_C_MI_FF_Ageing ETH_C_MI_FF_Learning ETH_C_MI_FF_STP_Learning_State[i] ETH_C_MI_FF_Flow_Port_Group[j] ETH_C_MP per SNC/S protection process: ETH_C_MI_PS_WorkingPortId ETH_C_MI_PS_ProtectionPortId ETH_C_MI_PS_ProtType ETH_C_MI_PS_OperType ETH_C_MI_PS_HoTime ETH_C_MI_PS_WTR ETH_C_MI_PS_ExtCMD ETH_C_MP per Ring protection process: ETH_C_MI_RAPS_RPL_Owner_Node ETH_C_MI_RAPS_RPL_Neighbour_Node ETH_C_MI_RAPS_Propagate_TC[1…M] ETH_C_MI_RAPS_Compatible_Version ETH_C_MI_RAPS_Revertive ETH_C_MI_RAPS_Sub_Ring_Without_Virtual_Channel	Per ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE

Processes

The processes associated with the ETH_C function are as depicted in Figure 9-10.

ETH_CI traffic units are forwarded between input and output ETH flow points by means of an ETH flow forwarding process. ETH flow points may be allocated within a protection group. ETH flow points may be allocated within a flow port group (to support split-horizon).

NOTE 2 – Neither the number of input/output signals to the connection function, nor the connectivity, is specified in this Recommendation. That is a property of individual network elements.

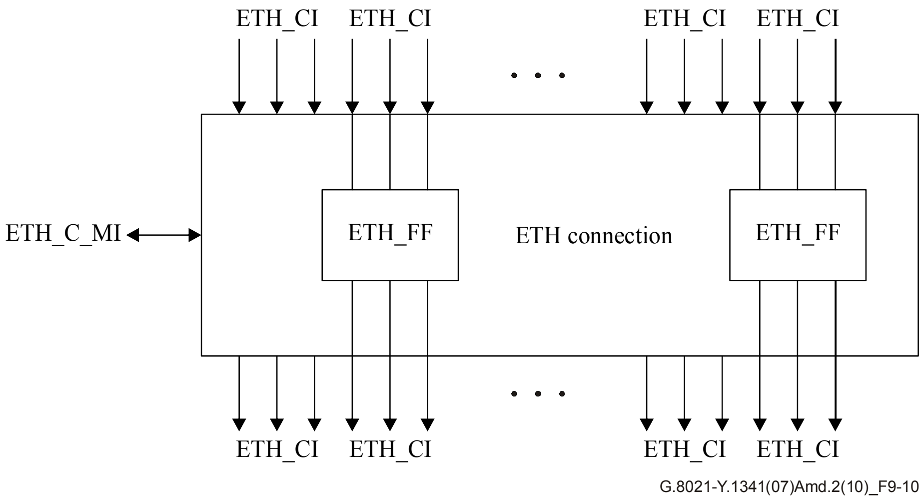


Figure 9-10 – ETH connection function with ETH_FF processes

The flow forwarding process, ETH_FF, is described in clause 9.1.1.

Defects	None.
Consequent actions	None.
Defect correlations	None.
Performance monitoring	None.

6.2) Replacement of clause 9.1.1

Replace the existing clause 9.1.1 with:

9.1.1 ETH flow forwarding process (ETH_FF)

The ETH flow forwarding process, as shown in Figure 9-10, forwards ETH_CI signals from its input ports to its output ports. The forwarding may take into account the value of the DA field of the ETH_CI traffic unit and the flow port group of which the input flow point is a member.

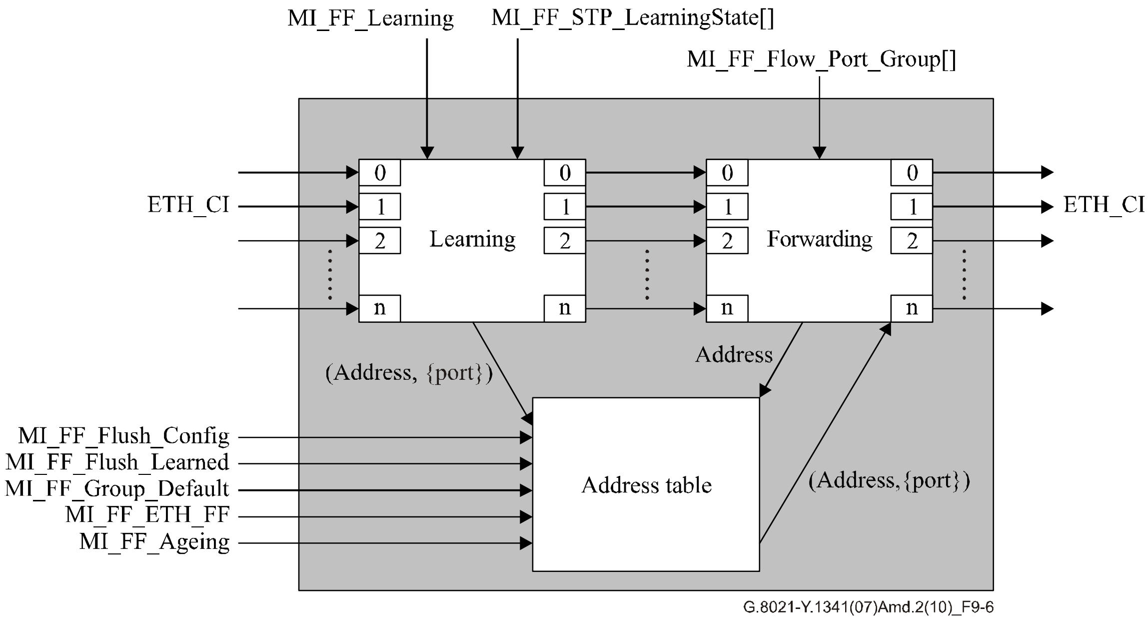


Figure 9-6 – ETH flow forwarding process

Figure 9-6 shows the ETH_FF in the case of individual VLAN learning (IVL) mode. In this mode each ETH_FF has its own address table. Figure 9-7 shows the process for the case of shared VLAN learning (SVL) mode. In this mode, two or more ETH_FF share the address table process.

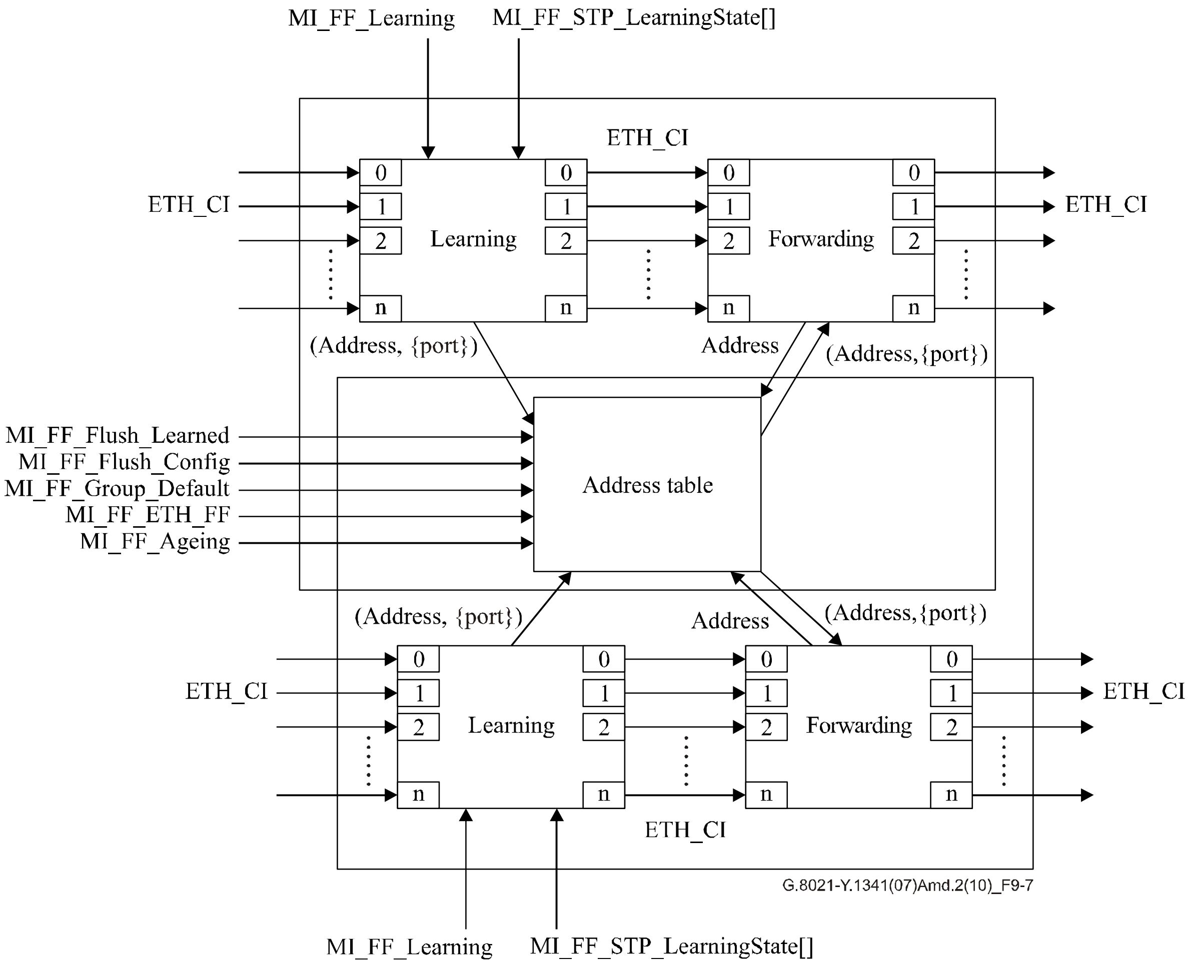


Figure 9-7 – ETH flow forwarding process in SVL mode

Address table process

The address table process maintains a list of tuples (Address, {port}). This list may be configured using MI_FF_ETH_FF input signal and by the learning process.

A tuple received from the learning process is only stored in the address table process if there is no entry present for that MAC address that has been configured by the MI_FF_ETH_FF input signal.

The MI_FF_Ageing is used to provision the ageing time period for entries configured from the learning process. Entries received from the learning process are removed from the address table ageing time period after it was received. If, before the ageing time period is expired, a new entry for the same MAC address is received, the ageing time period starts again.

There is one specific value of MI_FF_Ageing: "never". This means that the entries received from the learning process are never removed.

All the tuples received from the learning process can be cleared using the MI_FF_Flush_Learned command.

All the tuples that are entered via the MI_FF_ETH_FF can be cleared using the MI_FF_Flush_Config command. Individual entries are removed via the MI_FF_ETH_FF signal.

The address table process processes address requests from the forwarding process, and responds with the tuple (Address, {port}) for the specified address. For unicast MAC addresses, if the tuple does not exist, the port set ({port}) is empty. For multicast MAC addresses, if the tuple does not exist, the port set ({port}) contains the ports as configured using the MI_FF_Group_Default input signal.

Learning process

If the value of MI_FF_Learning is enabled, the learning process reads the SA field of the incoming ETH_CI traffic unit, and forwards a tuple (Address, {port}) to the address table process. The address contains the value of the SA field of the ETH_CI traffic unit, and port is the port on which the traffic unit was received.

If the value of MI_FF_Learning is disabled, the learning process does not submit information to the address table process.

In both cases, the ETH_CI itself is forwarded unchanged to the output of the learning process.

Forwarding process

The parameters of MI_Create_FF, MI_Modify_FF, and MI_Delete_FF are used to provision the flow forwarding process. The MI_FF_Flow_Port_Group[j] parameter is used to provision the flow port group information corresponding to each port. The parameter is (port number, group).

NOTE – ETH_C functions designed according to earlier versions of this Recommendation may not support the flow port group.

The use of parameters MI_FF_Set_PortIds and MI_FF_ConnectionType is for further study.

The MI_FF_STP_LearningState[i] input signal is provisioned per port [i]; it can be used to configure a specific port to be in the learning state. If a port is in the learning state, this means that all frames received on that port will be discarded by the learning process, and therefore not forwarded to the forwarding process; however, the (Address, {port}) tuple may be submitted to the address table process before the frame is dropped (depending on the value of MI_FF_Learning).

The forwarding process reads the DA field of the incoming ETH_CI traffic unit and sends this to the address table process, the address table process will send a tuple (Address, {port}) back in response. It will forward the ETH_CI on all ports listed in the port set field of the tuple. If the port set is empty, the ETH_CI will be forwarded on all ports (flooding). In all cases, the ETH_CI is never forwarded on the same port and flow port group as it was received on.

6.3) Removal of clause 9.1.2

Delete clause 9.1.2, as its text has been moved to clause 9.1.

6.4) Renumbering and revision of clause 9.1.3

6.4.1) Renumbering of the title

Replace:

9.1.3 Subnetwork connection protection process

With:

9.1.2 Subnetwork connection protection process

6.4.2) Revision of second paragraph

Revise the second paragraph of clause 9.1.2 as follows:

Figure 9-11 shows the involved atomic functions in SNC/S. The ETH_FT_Sk provides the TSF/TSD protection switching criterion via the ETH/ETH_A_Sk function (SSF/SSD) to the ETH_C function.

6.4.3) Revision of Figure 9-11

Replace Figure 9-11 with the following figure:

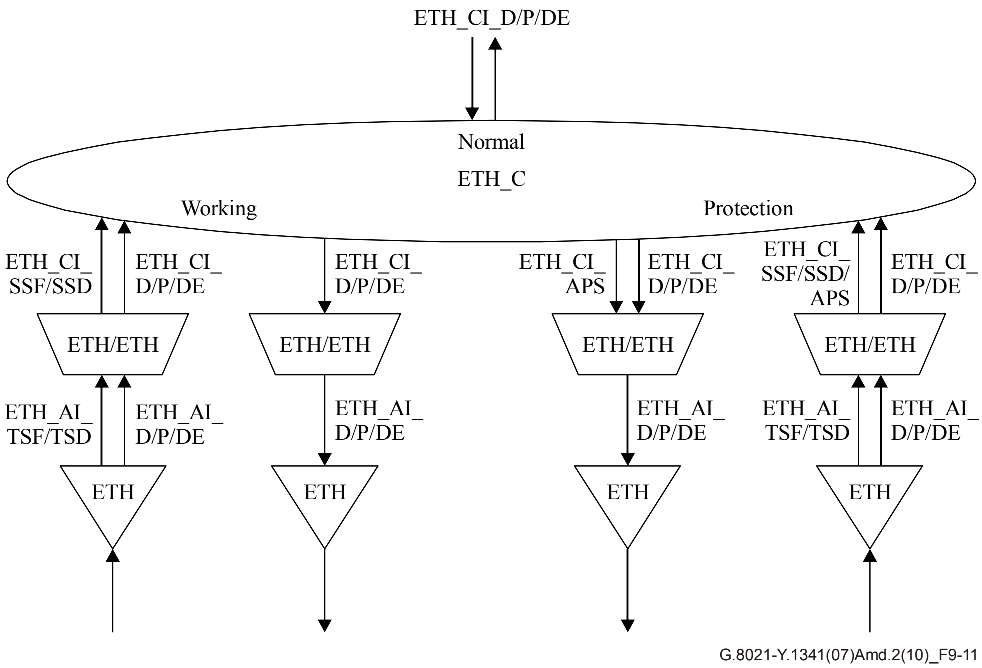


Figure 9-11 – SNC/S atomic functions

6.4.4) Revision of Figure 9-12

Replace Figure 9-12 with the following figure:

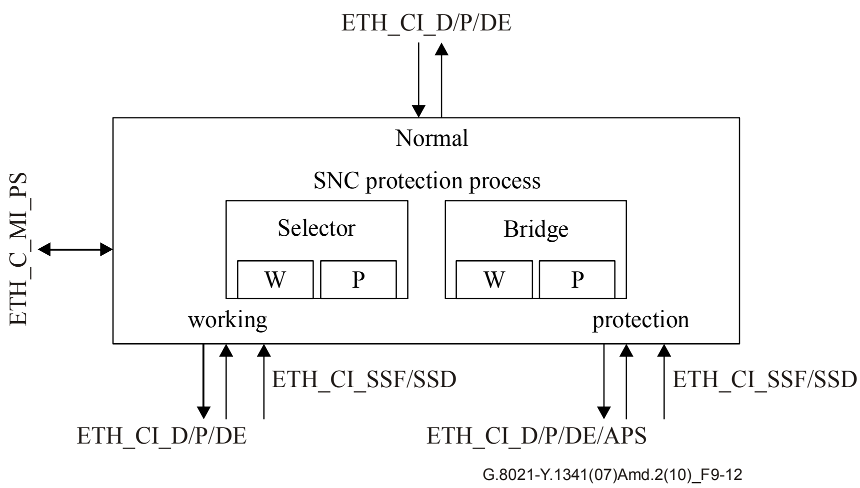


Figure 9-12 – SNC/S protection process

6.4.5) Configuration section

Revise the configuration section as follows:

Configuration

The following configuration parameters are defined in [ITU-T G.8031]:

ETH_C_MI_PS_WorkingPortId configures the working port.

ETH_C_MI_PS_ProtectionPortId configures the protection port.

ETH_C_MI_PS_ProtType configures the protection type.

ETH_C_MI_PS_OperType configures to be in revertive mode.

ETH_C_MI_PS_HoTime configures the hold off timer.

ETH_C_MI_PS_WTR configures the wait to restore timer.

ETH_C_MI_PS_ExtCMD configures the protection group command.

6.4.6) Removal of clause 9.1.4

Remove clause 9.1.4. The description of split horizon is included in new clause 9.1.1.

7) Revision of Table 9-4

Replace Table 9-4 with the following table:

Table 9-4 – ETHx_FT_Sk interfaces

Inputs	Outputs
ETHx_FP: ETHx_CI_D ETHx_CI_P ETHx_CI_DE ETHx_MP: ETHx_FT_Sk_MI_LM_Enabled ETHx_FT_Sk_MI_1Second ETHx_FT_Sk_MI_LM_DEGM ETHx_FT_Sk_MI_LM_M ETHx_FT_Sk_MI_LM_DEGTHR ETHx_FT_Sk_MI_CC_Period ETHx_FT_Sk_MI_CC_Pri ETHx_FT_Sk_MI_MEG_ID ETHx_FT_Sk_MI_PeerMEP_ID[i] ETHx_FT_Sk_MI_GetSvdCCM ETHx_FT_Sk_MI_MEL ETHx_FT_Sk_MI_CC_Enable	ETHx_AP: ETHx_AI_D ETHx_AI_P ETHx_AI_DE ETHx_AI_TSF ETHx_AI_AIS ETHx_AI_TSD ETHx_RP: ETHx_FT_Sk_RI_CC_RxFCl ETHx_FT_Sk_RI_CC_TxFCf ETHx_FT_Sk_RI_CC_RDI ETHx_FT_Sk_RI_CC_Blk ETHx_MP: ETHx_FT_Sk_MI_cSSF ETHx_FT_Sk_MI_cLCK ETHx_FT_Sk_MI_cLOC[i] ETHx_FT_Sk_MI_cMMG ETHx_FT_Sk_MI_cUNM ETHx_FT_Sk_MI_cUNP ETHx_FT_Sk_MI_cUNPr ETHx_FT_Sk_MI_cUNL ETHx_FT_Sk_MI_cRDI[i] ETHx_FT_Sk_MI_SvdCCM ETHx_FT_Sk_MI_pN_FL ETHx_FT_Sk_MI_pN_TF ETHx_FT_Sk_MI_pF_FL ETHx_FT_Sk_MI_pF_TF ETHx_FT_Sk_MI_pF_DS ETHx_FT_Sk_MI_pN_DS

8) Revision of clause 9.2.1.2

Replace the following sections in clause 9.2.1.2 as follows:

Defect generation process

This process detects and clears the defects (dLOC[i], dRDI[i], dLCK, dAIS, dUNL, dMMG, dUNM, dUNP, dUNPr, dDEG) as defined in clause 6, where [i] = maintenance entity.

Defects

This function detects dLOC[i], dRDI[i], dLCK, dAIS, dUNL, dMMG, dUNM, dUNP, dUNPr, dDEG.

Defect correlations

cRDI[i] ← (dRDI[1..n]) and (MI_CC_Enable)

Performance monitoring

pN_LF ← N_LF

pN_TF ← N_TF

pF_LF ← F_LF

pF_TF ← F_TF

9) Revision of Table 9-6 and Figure 9-21

Replace Table 9-6 and Figure 9-21 with the following:

Table 9-6 – ETHx/ETH_A_Sk input and outputs

Inputs	Outputs
<u>ETH_AP:</u> ETH_AI_D ETH_AI_P ETH_AI_DE ETH_AI_TSF ETH_AI_TSD ETHx/ETH_A_Sk_MP: ETHx/ETH_A_Sk_MI_AdminState ETHx/ETH_A_Sk_MI_LCK_Period ETHx/ETH_A_Sk_MI_LCK_Pri ETHx/ETH_A_Sk_MI_Client_ME_Level ETHx/ETH_A_Sk_MI_AIS_Pri ETHx/ETH_A_Sk_MI_AIS_Period ETHx/ETH_A_Sk_MI_ME_Level	<u>ETH_FP:</u> ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_APS ETH_CI_SSF ETH_CI_SSD

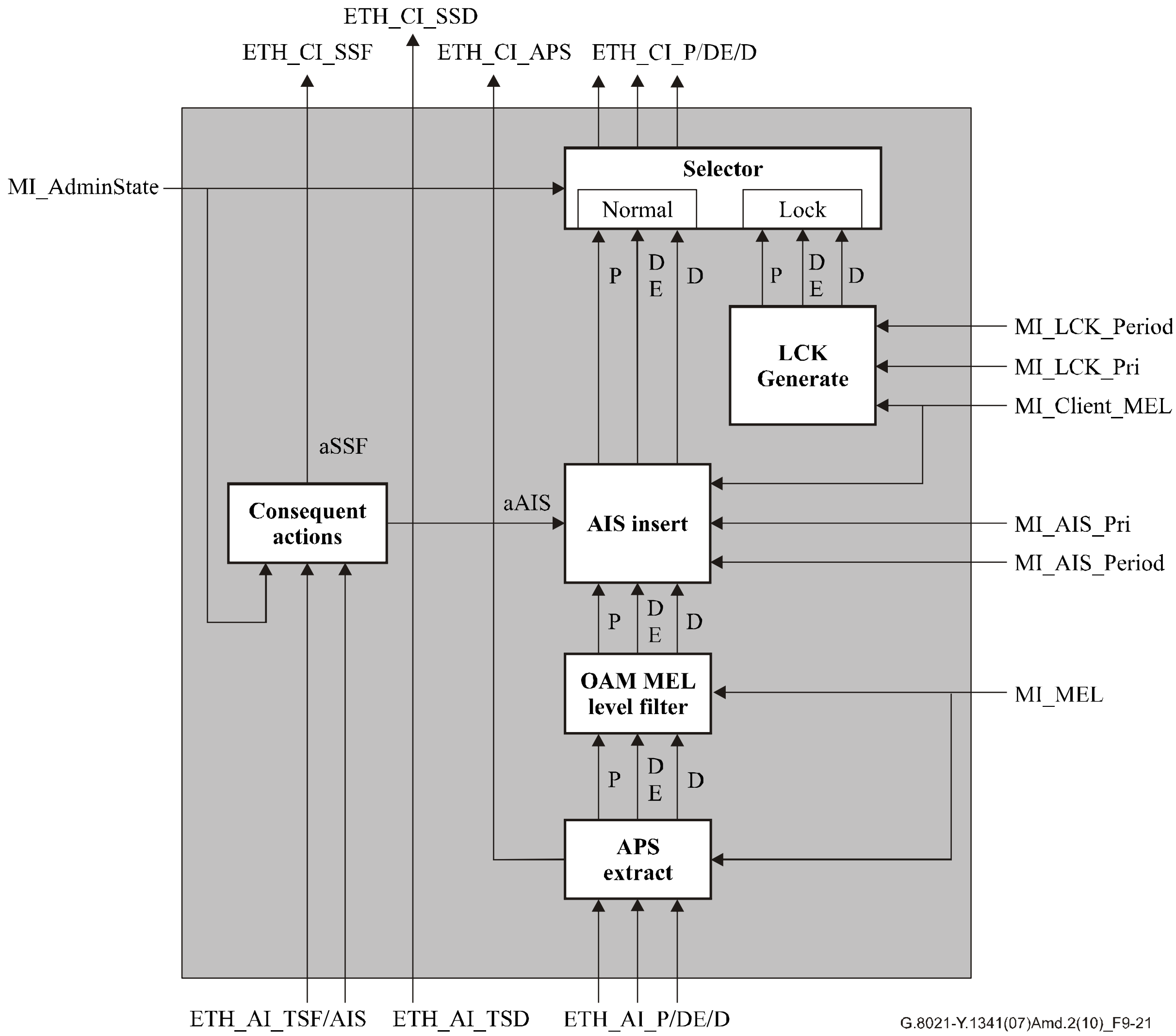
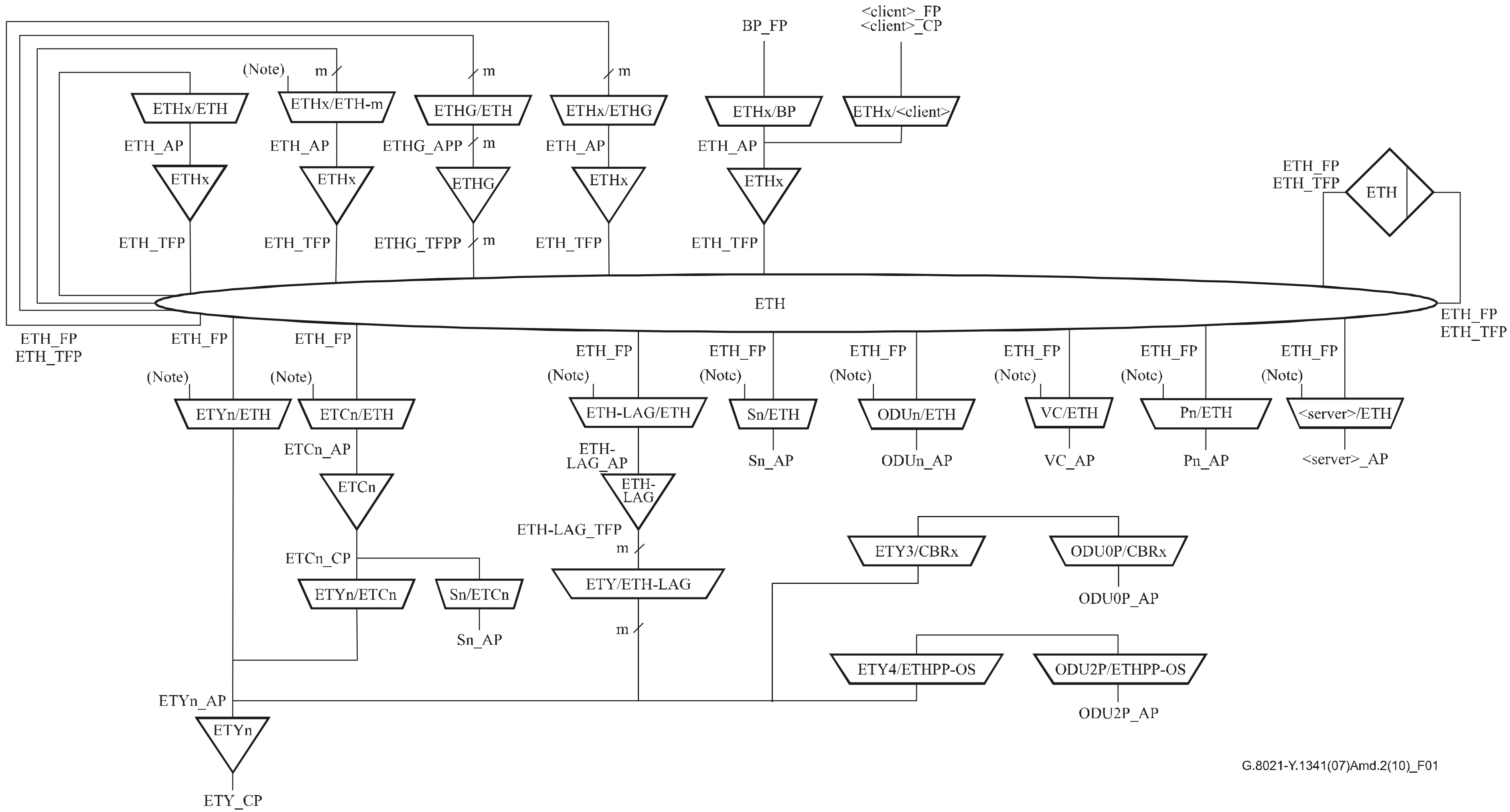


Figure 9-21 – Sink direction ETHx/ETH_A_Sk process

10) Revision of Figure 1-1

Replace Figure 1-1 with the following figure:



NOTE – ETH_TFP interface of adaptation functions towards the ETH_FT functions connects to logical link control. See [ITU-T G.8010] and function definition for details.

Figure 1-1 – Overview of ITU-T G.8021 atomic model functions

11) Revision of Table 9-10

Replace Table 9-10 with the following:

Table 9-10 – ETHG/ETH_A_Sk interfaces

Inputs	Outputs
ETH_AP: ETH_AI_D[1...M] ETH_AI_P[1...M] ETH_AI_DE[1...M] ETH_AI_TSF ETH_AI_AIS ETHx/ETH_A_Sk_MP: ETHG/ETH_A_Sk_MI_Admin_State ETHG/ETH_A_Sk_MI_LCK/AIS_Period[1…M] ETHG/ETH_A_Sk_MI_LCK/AIS_Pri[1…M] ETHG/ETH_A_Sk_MI_Client_MEL[1…M] ETHG/ETH_A_Sk_MI_MEL[1..M]	ETH_FP: ETH_CI_D[1…M] ETH_CI_P[1…M] ETH_CI_DE[1…M] ETH_CI_APS ETH_CI_SSF[1…M]

12) Revision of Table 9-y+1 (in Amendment 1 of ITU-T G.8021)

Replace Table 9-y+1 with the following table, in which:

ETHDi/ETH_A_Sk_MI_MEL is changed into ETHDi/ETH_A_Sk_MI_RAPS_MEL:

Table 9-y+1 – ETHDi/ETH_A_Sk Interfaces

Inputs	Outputs
ETH_AP: ETH_AI_D ETH_AI_P ETH_AI_DE ETH_AI_TSF ETHDi/ETH_A_Sk_MP: ETHDi/ETH_A_Sk_MI_RAPS_MEL	ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_RAPS ETH_CI_SSF

13) New acronym

Insert the following acronym into clause 4:

PP-OS Preamble, Payload, and Ordered Set information

14) New clause 11.5.3

Add the following clauses after clause 11.5.2.2:

11.5.3 ODU2P to Ethernet PP-OS adaptation function (ODU2P/ETHPP-OS_A)

The ODU2P to Ethernet PP-OS adaptation function supports transporting preamble and ordered set information of the 10GBASE-R signals over enhanced OPU2 payload area.

It provides XGMII service over ODU2 with extended OPU2 payload area.

As shown in Figure 46-3 of [IEEE 802.3], the Ethernet data stream at the XGMII consists of: <inter-frame><preamble><sfd><data><efd>. For the purposes of these mappings, the client data frames include the <preamble><sfd><data> information, and the ordered sets include specific information carried in the <inter-frame> characters. The mapping of both client data frames and ordered sets into ODU2 using GFP-F frames is described in this clause.

Note that there is no Ethernet MAC termination function. Consequently, since no error checking is performed on the Ethernet MAC frames, errored MAC frames are forwarded at both the ingress and egress to the GFP adaptation functions.

11.5.3.1 ODU2P/ETHPP-OS adaptation source function (ODU2P/ETHPP-OS_A_So)

The ODU2P/ETHPP-OS_A_So function creates the ODU2P signal from a free running clock. It maps the ETHPP-OS_CI information into the payload of the OPU2P, adds OPU2P overhead (RES, PT) and default ODU2P overhead.

Symbol

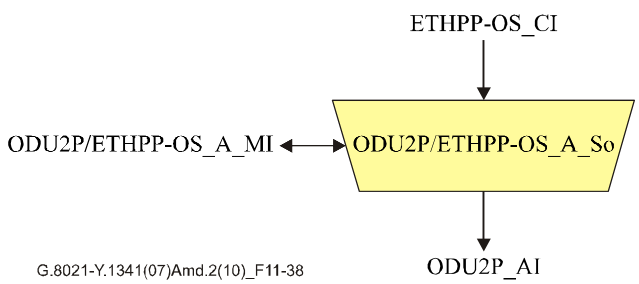


Figure 11-38 – ODU2P/ETHPP-OS_A_So symbol

Interfaces	For further study.
Processes	For further study.
Defects	For further study.
Consequent actions	For further study.
Defect correlations	For further study.
Performance monitoring	For further study.

11.5.3.2 ODU2P/ETHPP-OS adaptation sink function (ODU2P/ETHPP-OS_A_Sk)

The ODU2P/ETHPP-OS_A_Sk extracts ETHPP-OS_CI information from the ODU2P payload area, delivering ETHPP-OS_CI to ETHPP-OS_TCP. It extracts the OPU2P overhead (PT and RES) and monitors the reception of the correct payload type.

Symbol

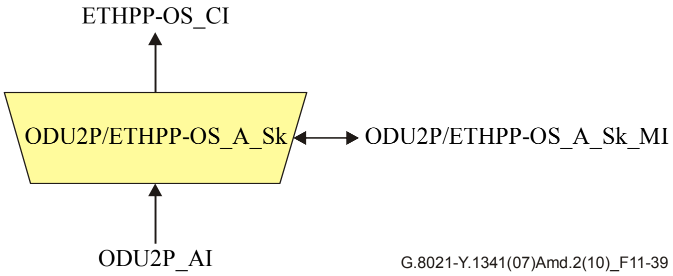


Figure 11-39 – ODU2P/ETHPP-OS_A_Sk symbol

Interfaces	For further study.
Processes	For further study.
Defects	For further study.
Consequent actions	For further study.
Defect correlations	For further study.
Performance monitoring	For further study.

15) New clause 11.5.4

Add the following clause:

11.5.4 ETY4 to Ethernet PP-OS adaptation function (ETY4/ETHPP-OS_A)

For further study.

16) New clause 11.5.5

Add the following clause:

11.5.5 ODU0P to 1 GbE client adaptation function (ODU0P/CBRx_A)

The adaptation function that supports the transport of 1GbE signals in the OTN is the ODU0P to client adaptation function (ODU0P/CBRx_A) (0≤x≤1.25G) described in [ITU-T G.798].

17) New clause 11.5.6

Add the following clause:

11.5.6 ETY3 to 1 GbE client adaptation function (ETY3/CBRx_A)

For further study.

18) Revision of Figure 8-16

Replace Figure 8-16 with the following:

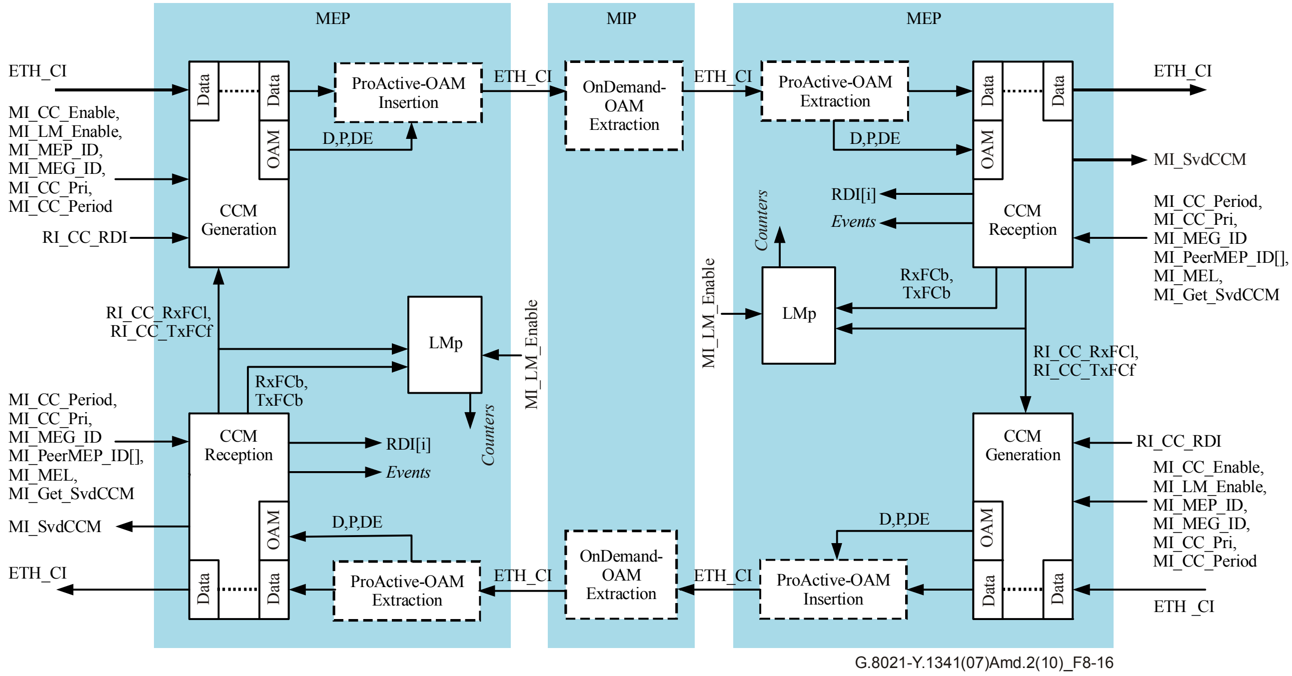


Figure 8-16 – CC Overview

19) Revision of clause 8.1.7.2

Replace the first paragraph of clause 8.1.7.2 with the following:

Figure 8-17 shows the state diagram for the CCM generation process. The CCM generation process can be enabled and disabled using the MI_CC_Enable signal, where the default value is FALSE.

20) Revision of clause 6.1.3.4

Replace clause 6.1.3.4 with the following:

6.1.3.4 Degraded signal defect (dDEG)

This defect is only defined for point-to-point ETH connections.

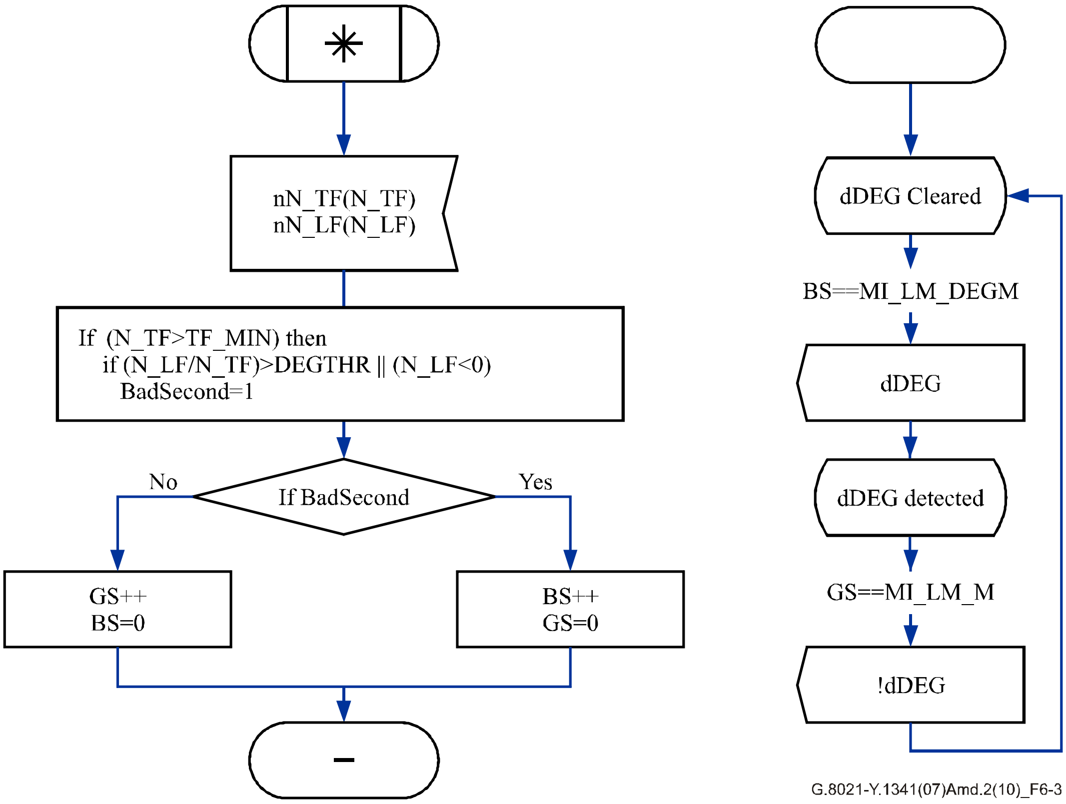


Figure 6-3 – dDEG detection and clearance process

The degraded signal defect is calculated at the ETH layer. It monitors the connectivity of an ETH trail.

Its detection and clearance are defined in Figure 6-3.

Every second the state machine receives the 1-second counters for near-end received and transmitted frames and determines whether the second was a bad second. The defect is detected if there are MI_LM_DEGM consecutive bad seconds and cleared if there are MI_LM_M consecutive good seconds.

In order to declare a bad second, the number of transmitted frames must exceed a threshold (TF_MIN). If this is true, then a bad second is declared if either the frame loss is negative (i.e., there are more frames received than transmitted) or the frame loss ratio (lost frames/transmitted frames) is greater than MI_LM_DEGTHR.

21) New acronym

Insert the following acronym into clause 4:

R-APS Ring Automatic Protection Switching

22) Revision of clause 6.1.1

Replace the fifth paragraph of clause 6.1.1 with the following:

The events defined for this Recommendation are summarized in Table 6-1. Events, other than APS or R-APS events, are generated by processes in the ETH_FT_Sk function as defined in clause 9.2.1.2. APS events are generated by the subnetwork connection protection process as defined in clause 9.1.2. R-APS events are generated by the ring protection control process as defined in clause 9.1.3. These processes define the exact conditions for these events; Table 6-1 only provides a quick overview.

23) Revision of Table 6-1

Add the following row to Table 6-1:

RAPSpm	Reception by the RPL owner of an R-APS (NR, RB) frame with a node ID that differs from its own.

24) Revision of Table 6-2

In Table 6-2, replace the "dFOP-PM" row with:

dFOP-PM	APSb or RAPSpm	expAPS or #RAPSpm == 0 (K*long R-APS frame interval)

25) Revision of clause 6.1.4.3.1

Replace clause 6.1.4.3.1 with the following:

6.1.4.3.1 Linear or ring protection failure of protocol provisioning mismatch (dFOP-PM)

The failure of protocol provisioning mismatch defect is calculated at the ETH layer. It monitors provisioning mismatch of:

- linear protection by comparing B bits of the transmitted and the received APS protocol, or
- ring protection by comparing the node ID of the RPL owner and the node ID in a received R-APS (NR, RB) frame.

Its detection and clearance are defined in Table 6-2. dFOP-PM is detected:

- in the case of linear protection, on receipt of an APSb event and cleared on receipt of an expAPS event. These events are generated by the subnetwork connection protection process (clause 9.1.2); or
- in the case of ring protection, on receipt of an RAPSpm event and cleared on receipt of no RAPSpm event during K times the long R-APS frame intervals defined in [ITU-T G.8032], where K ≥ 3.5. These events are generated by the ring protection control process (clause 9.1.3).

26) Revision of a reference in clauses 6.1.4.3.2 and 6.1.4.3.3

Revise the reference given at the end of clauses 6.1.4.3.2 and 6.1.4.3.3 from "clause 9.1.3" to "clause 9.1.2", as follows:

6.1.4.3.2 Linear protection failure of protocol no response (dFOP-NR)

The failure of protocol no response defect is calculated at the ETH layer. It monitors incompletion of protection switching by comparing the transmitted "requested signal" values and the received "bridged signal" in the APS protocol.

Its detection and clearance are defined in Table 6-2. dFOP-NR is detected when APSr event continues more than 50 ms and it is cleared on receipt of the expAPS event. These events are generated by the subnetwork connection protection process (clause 9.1.2).

6.1.4.3.3 Linear protection failure of protocol configuration mismatch (dFOP-CM)

The failure of protocol configuration mismatch defect is calculated at the ETH layer. It monitors working and protection configuration mismatch by detecting the reception of APS protocol from the working transport entity.

Its detection and clearance are defined in Table 6-2. dFOP-CM is detected on receipt of an APSw event and cleared on receipt of no APSw event during K times the normal APS transmission period defined in [ITU-T G.8031], where K ≥ 3. These events are generated by the subnetwork connection protection process (clause 9.1.2).

27) New clause 9.1.3

Insert the following new clause:

9.1.3 Ring protection control process

Ring protection with inherent, sub-layer, or test trail monitoring is supported.

Figure 9-z shows a subset of the atomic functions involved, and the signal flows associated with the ring protection control process. This is only an overview of the Ethernet ring protection control process as specified in [ITU-T G.8032]. The ETH_FT_Sk provides the TSF protection switching criterion via the ETH/ETH_A_Sk function (SSF). [ITU-T G.8032] specifies the requirements, options and the ring protection protocol supported by the ring protection control process.

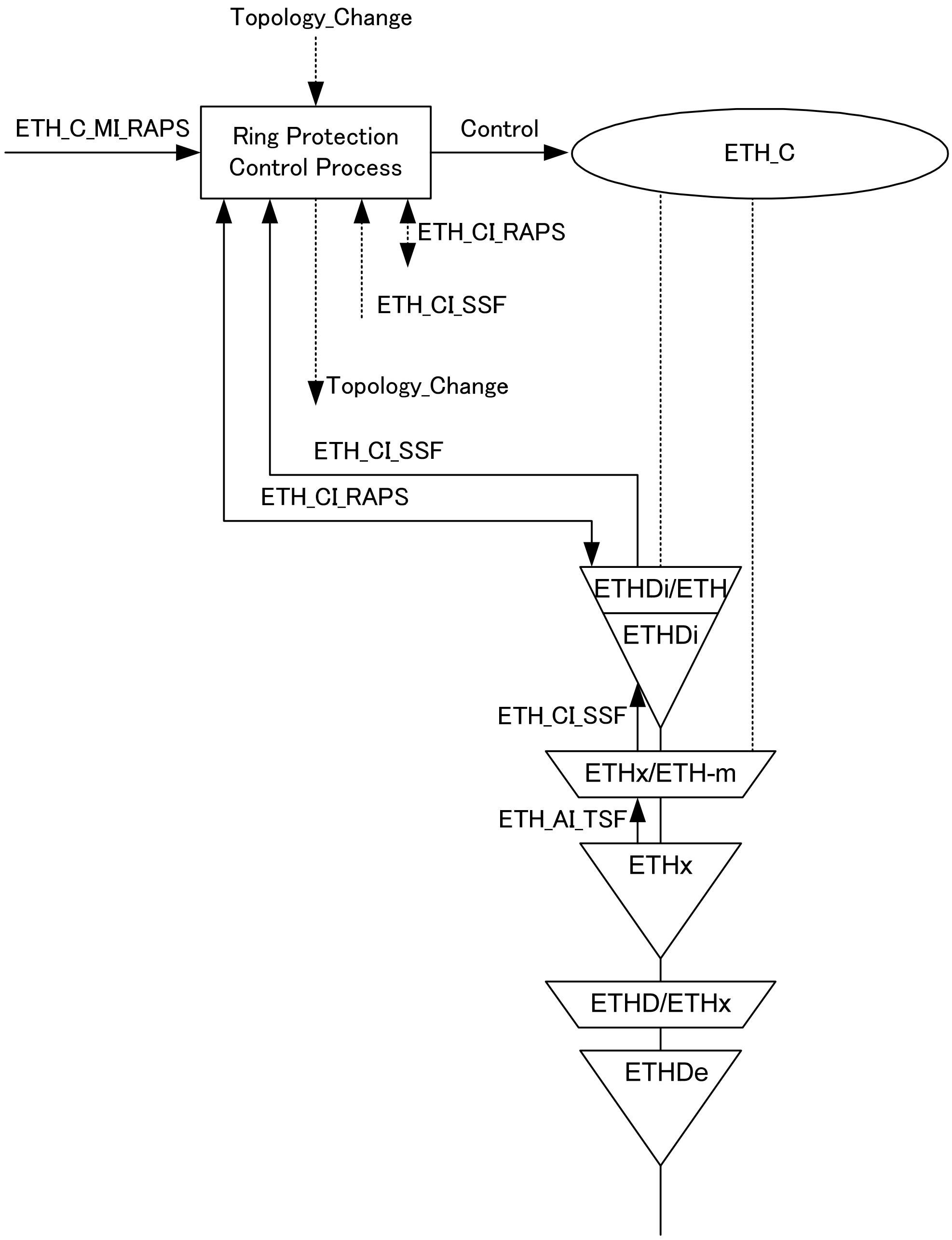


Figure 9-z – Ring protection atomic functions and control process

Configuration

The following configuration parameters are defined in [ITU-T G.8032]:

ETH_C_MI_RAPS_RPL_Owner_Node configures the node type.

ETH_C_MI_RAPS_RPL_Neighbour_Node configures the adjacency of a node to the RPL owner.

ETH_C_MI_RAPS_Propagate_TC[1…M] configures the flush logic of an interconnection node.

ETH_C_MI_RAPS_Compatible_Version configures the backward compatibility logic.

ETH_C_MI_RAPS_Revertive configures the revertive mode.

ETH_C_MI_RAPS_Sub_Ring_Without_Virtual_Channel configures the sub-ring type.

Defects

The function detects dFOP-PM in case the R-APS protocol is used.

Consequent actions None.

Defect correlations

cFOP-PM ← dFOP-PM

28) New reference

Add the following reference to clause 2:

[ITU-T G.8032] Recommendation ITU-T G.8032/Y.1344 (2010), *Ethernet ring protection switching*.

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