International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.8021/Y.1341

Amendment 1

(01/2009)

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 1

Recommendation ITU-T G.8021/Y.1341 (2007) – Amendment 1

ITU-T

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ITU-T G-SERIES RECOMMENDATIONS

TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

INTERNATIONAL TELEPHONE CONNECTIONS AND CIRCUITS	G.100–G.199
GENERAL CHARACTERISTICS COMMON TO ALL ANALOGUE CARRIER-TRANSMISSION SYSTEMS	G.200–G.299
INDIVIDUAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON METALLIC LINES	G.300–G.399
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COORDINATION OF RADIOTELEPHONY AND LINE TELEPHONY	G.450–G.499
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PACKET OVER TRANSPORT ASPECTS	G.8000–G.8999
Ethernet over transport aspects	**G.8000–G.8099**
MPLS over transport aspects	G.8100–G.8199
Quality and availability targets	G.8200–G.8299
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ACCESS NETWORKS	G.9000–G.9999

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 1

Summary

Amendment 1 to Recommendation ITU-T G.8021/Y.1341 (2007) adds the necessary functionality to support the Ethernet synchronization messaging channel and the GFP CSF-RDI and CSF-FDI support.

Source

Amendment 1 to Recommendation ITU-T G.8021/Y.1341 (2007) was approved on 13 January 2009 by ITU-T Study Group 15 (2009-2012) under Recommendation ITU-T A.8 procedures.

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.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

Recommendation ITU-T G.8021/Y.1341

Characteristics of Ethernet transport network equipment functional blocks

Amendment 1

Modifications introduced by this amendment are shown in revision marks. Unchanged text is replaced by ellipsis (…). Some parts of unchanged text (clause numbers, etc.) may be kept to indicate the correct insertion points.

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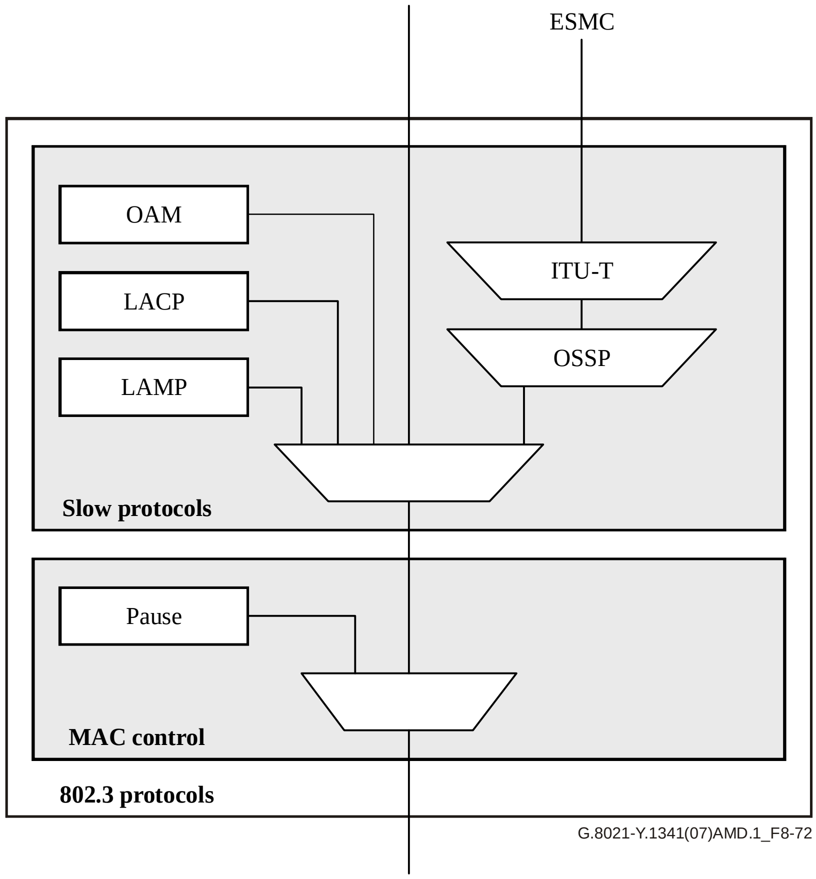

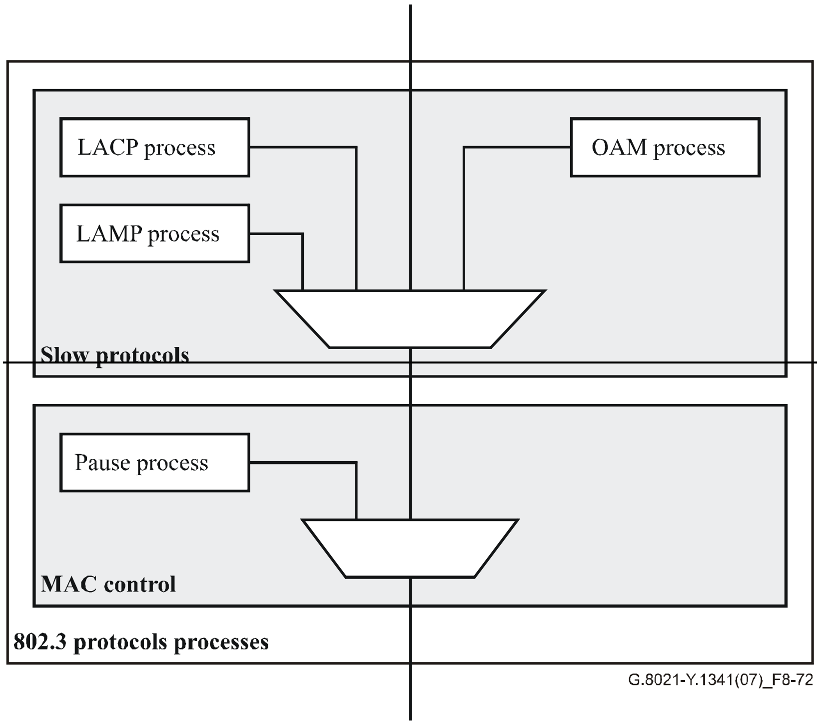

Figure 8-72 – 802.3 protocols processes

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8.5.2.3 OAM process

The OAM process generates and processes OAM frames according to clause 57 of [IEEE 802.3 2005]. The OAM PDUs have subtype=3.

8.5.2.4 OSSP process

The organization-specific slow protocol (OSSP) process inserts and extracts OSSP PDUs. The OSSP PDUs have subtype = 10. The OSSP process provides a messaging channel for other protocols. The OSSP multiplexes multiple protocols using an organizationally unique identifier (OUI).

The OSSP source process encodes input PDU signals into OSSP frames. An OSSP PDU has:

- DA = 01-80-C2-00-00-02(hex)
- SA = Local MAC address
- Ethertype = 88-09 (hex)
- Slow protocol type = 0A(hex)
- OUI = Identifying specific protocol
- PDU = PDU for the protocol

The OSSP sink process will decode the OUI and PDU information from the incoming frame. The PDU will be forwarded to the protocol function identified by the decoded OUI. If there is no protocol process associated with the OUI, the PDU is discarded.

The supported OUIs are defined in clause 8.5.2.4.1.

8.5.2.4.1 ITU slow protocols

The ITU slow protocols use OUI = 0x0019A7. The ITU-T slow protocol process allows for multiplexing multiple ITU-defined protocols by using an ITU-T subtype.

The ITU slow protocol source process takes an incoming PDU and creates an ITU-T slow protocol PDU by prepending the incoming PDU with an ITU-T subtype. The resulting ITU-T slow protocol PDU is forwarded to the OSSP process.

The ITU slow protocol sink process takes an incoming ITU-T slow protocol PDU and removes the ITU-T subtype from it. The resulting PDU is forwarded to the protocol process identified by the removed ITU-T subtype. If there is no protocol process associated with the ITU-T subtype, the PDU is discarded.

Supported ITU-T subtypes:

01: Ethernet synchronization message channel (ESMC) as defined in [ITU-T G.8264].

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8.8.5 FDI/BDI generation and detection

For further study.

8.8.6 ETH-specific GFP-F processes

8.8.6.1 ETH-specific GFP-F source process

See clause 8.5.4.1.1 of [ITU-T G.806]. GFP pFCS generation is disabled (FCSenable = false). The UPI value for frame-mapped Ethernet shall be inserted (Table 6-3 of [ITU-T G.7041]). The Ethernet frames are inserted into the client payload information field of the GFP-F frames according to clause 7.1 of [ITU-T G.7041]. Client management frame insertion is governed by the consequent actions.

Consequent actions

aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable

aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable aCSF-LOS ← CI_SSF and CSFEnable

8.8.6.2 ETH-specific GFP-F sink process

See clause 8.5.4.1.2 of [ITU-T G.806]. GFP pFCS checking, GFP p_FCSError, p_FDis are not supported (FCSdiscard = false). The UPI value for frame-mapped Ethernet shall be expected (Table 6-3 of [ITU-T G.7041]). The Ethernet frames are extracted from the client payload information field of the GFP-F frames according to clause 7.1 of [ITU-T G.7041]. The generic defects and consequent actions are extended as follows.

Defects

dCSF-RDI: GFP client signal fail – remote defect indication (dCSF-RDI) is raised when a GFP client management frame with the RDI UPI (as defined in Table 6-4 of [ITU-T G.7041]) is received. dCSF-RDI is cleared when no such GFP client management frame is received in N x 1000 ms (a value of 3 is suggested for N), a valid GFP client data frame is received, or a GFP client management frame with the DCI UPI is received.

dCSF-FDI: GFP client signal fail – forward defect indication (dCSF-FDI) is raised when a GFP client management frame with the FDI UPI (as defined in Table 6-4 of [ITU-T G.7041]) is received. dCSF-FDI is cleared when no such GFP client management frame is received in N x 1000 ms (a value of 3 is suggested for N), a valid GFP client data frame is received, or a GFP client management frame with the DCI UPI is received.

dCSF-LOS: GFP client signal fail – loss of signal (dCSF-LOS) is raised when a GFP client management frame with the LOS UPI (as defined in Table 6-4 of [ITU-T G.7041]) is received. dCSF-LOS is cleared when no such GFP client management frame is received in N x 1000 ms (a value of 3 is suggested for N), a valid GFP client data frame is received, or a GFP client management frame with the DCI UPI is received.

Consequent actions

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFfdi ← dCSF-FDI and CSFrdifdiEnable

aSSF ← GFP_SF or dUPM or dCSF-LOS

Defect correlations

cCSF ← (dCSF-RDI or dCSF-FDI or dCSF-LOS) and (not dUPM) and (not GFP_SF) and CSF_Reported

The GFP_SF term refers collectively to the set of defects detected in the Common GFP-F sink process (see clause 8.5.3.2 of [ITU-T G.806]), the server-specific GFP-F sink process (see clause 8.5.2.2 of [ITU-T G.806]), or the server-specific process (see clause 11) with the consequent action of aGFP_SF. This includes dEXM, dLFD, any server-specific defects related to the GFP-F mapping, and server layer TSF.

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9.3.3.2 ETH to ETH multiplexing adaptation function (ETHx/ETH-m_Sk)

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Processes

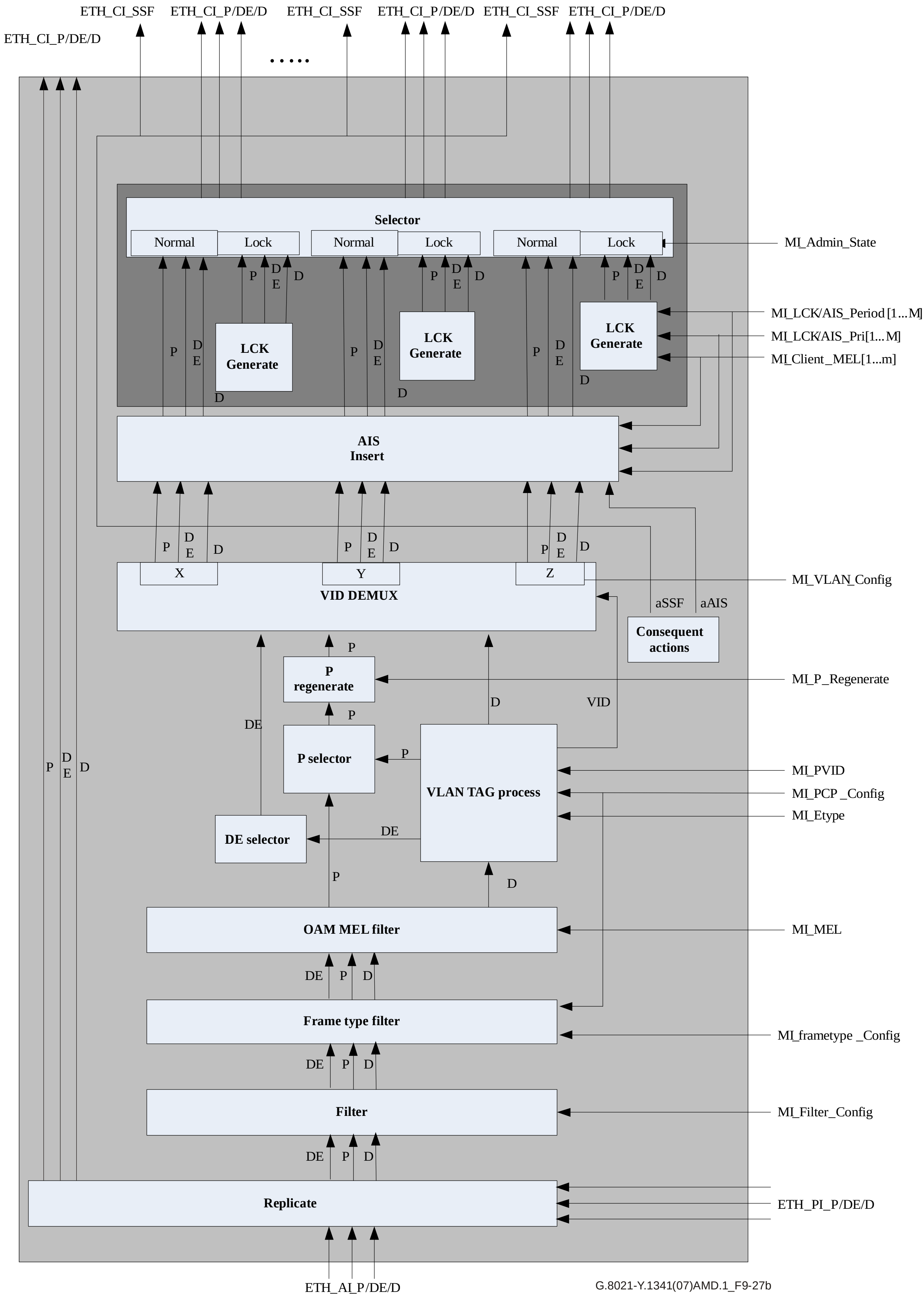

Figure 9-27 – ETHx/ETH-m_A_Sk process

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Table 9-9 – ETHG/ETH_A_So interfaces

Inputs	Outputs
ETH_FP: ETH_CI_D[1…M] ETH_CI_P[1…M] ETH_CI_DE[1…M] ETH_CI_APS ETHG/ETH_A_So_MP: ETHG/ETH_A_So_MI_MEL ETHG/ETH_A_So_MI_LCK_Period[1…M] ETHG/ETH_A_So_MI_LCK_Pri[1…M] ETHG/ETH_A_So_MI_Client_MEL[1..M] ETHG/ETH_A_So_MI_Admin_State ETHG/ETH_A_So_MI_APS_Pri	ETH_AP: ETH_AI_D[1...M] ETH_AI_P[1...M] ETH_AI_DE[1...M]

Processes

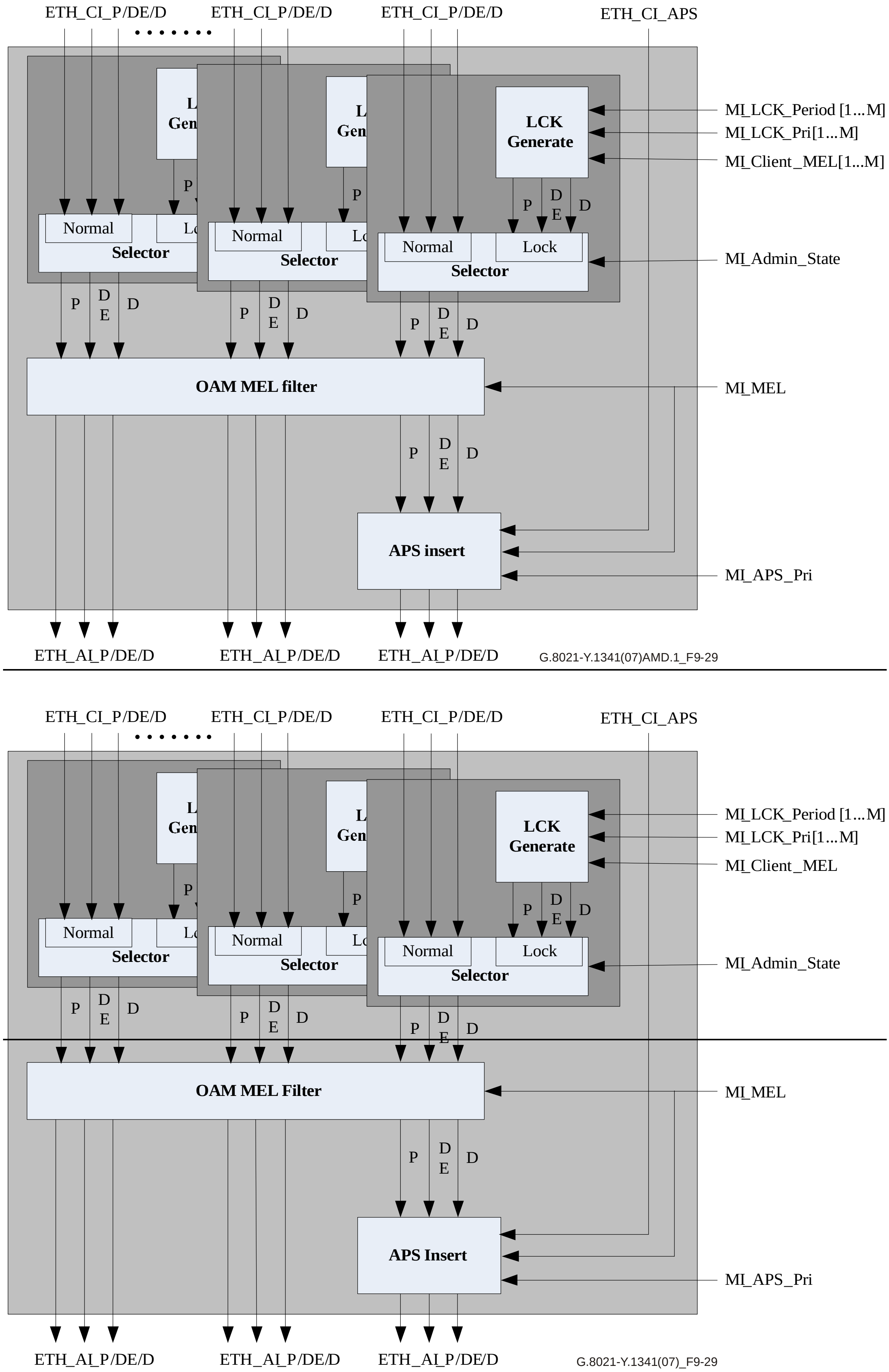

Figure 9-29 – ETHG/ETH_A_So process

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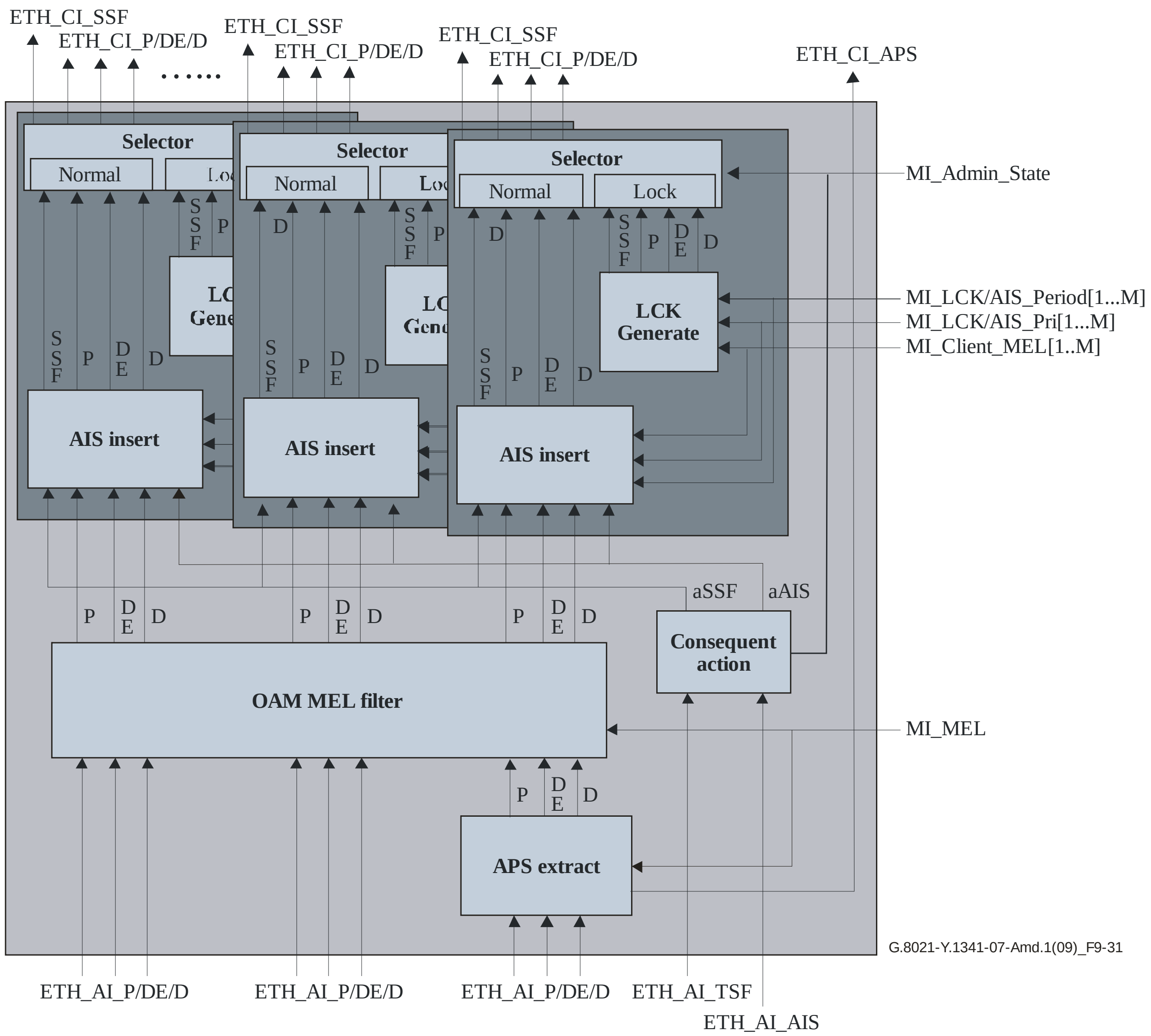
Table 9-10 – ETHG/ETH_A_Sk interfaces

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 ETHG/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 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]

Processes



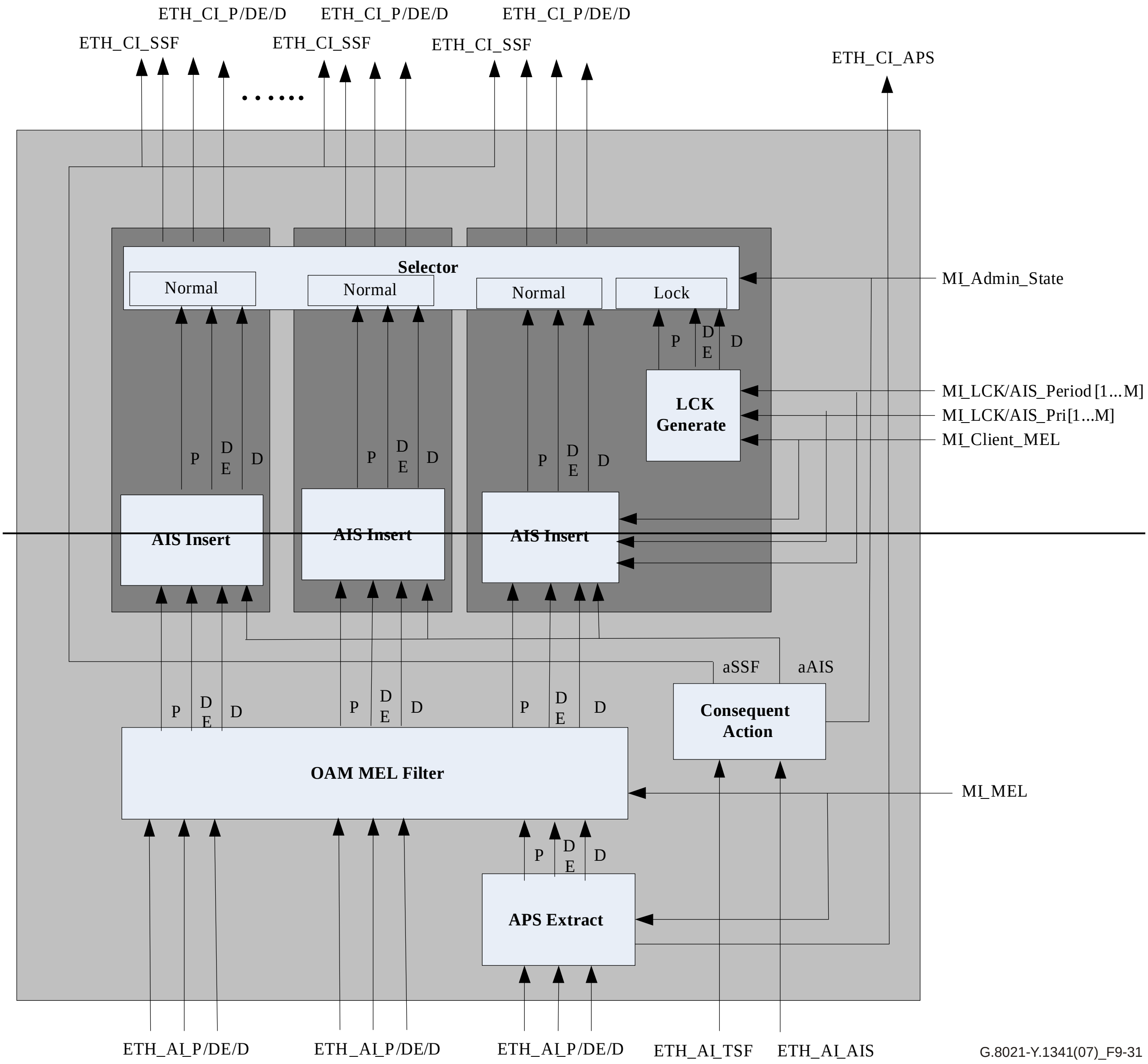


Figure 9-31 – ETHG/ETH_A_Sk process

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9.4.4 ETHDi/ETH adaptation function

The ETHDi/ETH inserts and extracts the R-APS information into or from the stream of ETH_CI.

9.4.4.1 ETHDi/ETH adaptation function source (ETHDi/ETH_A_So)

This function allows the insertion of R-APS information into a stream of ETH_CI.

Symbol

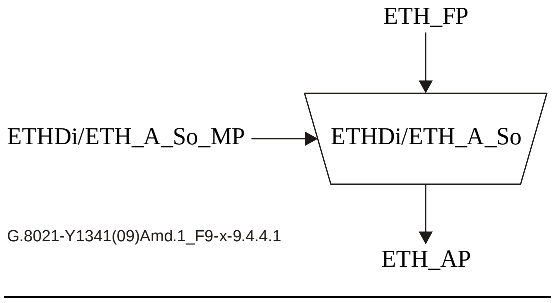

Figure 9-x – ETHDi/ETH_A_So function

Interfaces

Table 9-y – ETHDi/ETH_A_So Interfaces

Inputs	Outputs
ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_RAPS ETHDi/ETH_A_So_MP: ETHDi/ETH_A_So_MI_MEL ETHDi/ETH_A_So_MI_RAPS_Pri ETHDi/ETH_A_So_MI_MIP_MAC	ETH_AP: ETH_AI_D ETH_AI_P ETH_AI_DE

Processes

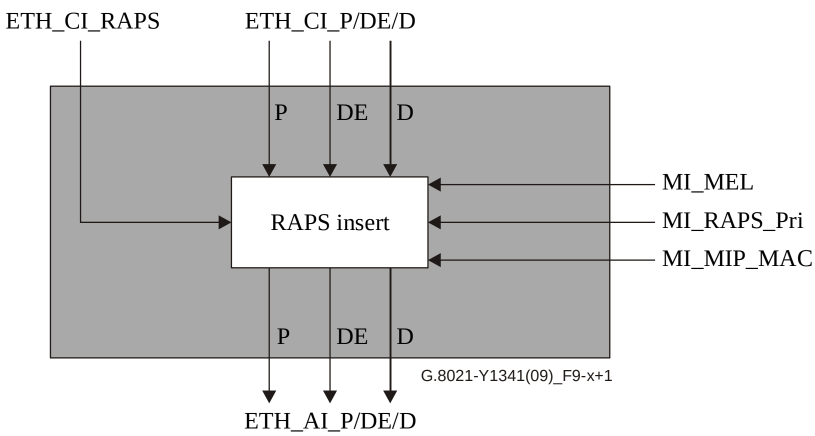

Figure 9-x+1 – ETHDi/ETH_A_So process

RAPS insert

The RAPS insert process encodes the ETH_CI_RAPS signal into the ETH_CI_D signal of an ETH_CI traffic unit; the resulting RAPS traffic unit is inserted into the stream of incoming traffic units, i.e., the outgoing stream consists of the incoming traffic units and the inserted RAPS traffic units. The ETH_CI_RAPS signal contains the RAPS-specific information as defined in [ITU-T G.8032].

The ETH_CI_D signal contains a source and destination address field and an M_SDU field. The format of the M_SDU field for RAPS traffic units is determined by the ETH_CI_RAPS signal. The MEL in the M_SDU field is determined by the MI_MEL input parameter.

The value of the source and destination address fields in the M_SDU field are determined by the local MAC address of the maintenance entity group intermediate point (MIP) (MI_MIP_MAC) and the ring multicast address as described in [ITU-T G.8032]. The value of the ring multicast MAC address is 01-19-A7-00-00-01. The value of MI_MEP_MAC should be a valid unicast MAC address.

The value of the ETH_CI_P signal associated with the generated RAPS traffic units is determined by the MI_RAPS_Pri input parameter.

The value of the ETH_CI_DE signal associated with the generated RAPS traffic units is set to drop ineligible.

9.4.4.2 ETHDi/ETH adaptation function sink (ETHDi/ETH_A_Sk)

This function extracts the RAPS information from the RAPS traffic units without filtering the traffic unit.

Symbol

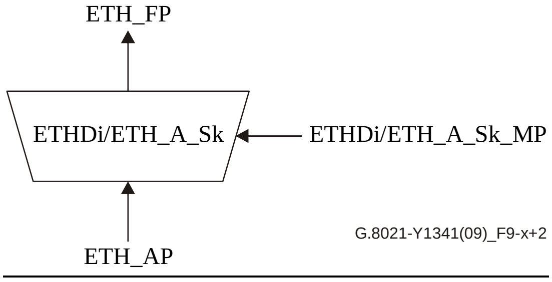

Figure 9-x+2 – ETHDi/ETH_A_Sk function

Interfaces

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_MEL	ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_RAPS ETH_CI_SSF

NOTE – Currently in Recommendation ITU-T G.8021/Y.1341, for the ETHDi_FT_Sk, no consequent action for the ETH_CI_SSF input has been defined. However, the consequent action should be ETH_AI_TSF output, to propagate the failure information.

Process

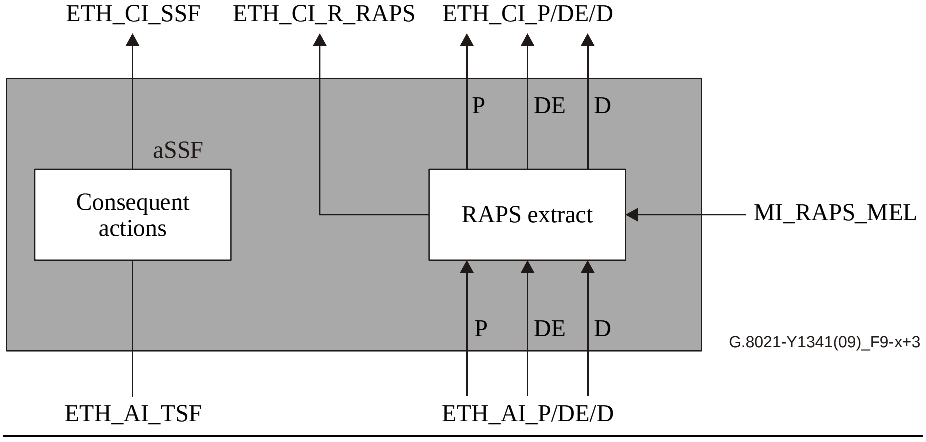

Figure 9-x+3 – ETHDi/ETH_A_Sk process

RAPS extract

The RAPS extract process extracts ETH_CI_RAPS signals from the incoming stream of ETH_CI traffic units without filtering the RAPS traffic unit. ETH_CI_RAPS signals are only extracted if they belong to the MEL as defined by the MI_MEL input parameter.

If an incoming traffic unit is an RAPS traffic unit belonging to the MEL defined by MI_MEL, the traffic unit will be duplicated. The original RAPS traffic unit will be transparently forwarded and the ETH_CI_RAPS signal will be extracted from the duplicate. The ETH_CI_RAPS is the RAPS-specific information contained in the received traffic unit. All other traffic units will be transparently forwarded without being duplicated. The encoding of the ETH_CI_D signal for RAPS frames is as defined in clause 9.10 of [ITU-T Y.1731].

The criteria for filtering are based on the values of the fields within the M_SDU field of the ETH_CI_D signal:

- length/type field equals the OAM Ethertype (89-02); and
- MEL field equals MI_MEL; and
- OAM type equals RAPS (40), as defined in clause 9.1 of [ITU-T Y.1731].

Defects None.

Consequent Actions

aSSF ← AI_TSF

Defect correlations None.

Performance Monitoring None.

…

Table 10-2 – ETYn_TT_So interfaces

Inputs	Outputs
ETYn_AP: ETYn_AI_Data ETYn_AI_Clock ETYn_AI_SSF ETYn_AI_SSFrdi ETYn_AI_SSFfdi ETHYn_RP: ETYn_RI_RSF ETYnTT_So_MP: ETYn_TT_So_MI_FTSEnable	ETYn_TFP: ETYn_CI_Data ETYn_CI_Clock ETYn_RP: ETYn_RI_FTS ETYn_TT_So_MP: ETYn_TT_So_MI_PHYType ETYn_TT_So_MI_PHYTypeList

Processes

This source function together with the corresponding sink function implements all processes in the physical layer in the IEEE 802.3-2002 model.

"Fault propagation" process

When the AI_SSF and the FTSEnable (forced transmitter shutdown) are true and RI_RSF (remote signal fail) is false, this process forces the transmitter shutdown by either turning off the output transmitting device or inserting error codes (e.g., /V/, 10B_ERR for 1 GbE).

As soon as the transmitter shutdown is forced, the RI_FTS is asserted. The RI_FTS is reset [for further study] seconds after the forcing of transmitter shutdown is removed.

NOTE – Further detail is intentionally left out of this Recommendation.

When the AI_SSFrdi is true and the PHY supports remote fault signalling, this process inserts the PHY-specific remote fault signal.

When the AI_SSFfdi is true and the PHY supports local fault signalling, this process inserts the PHY-specific local fault signal.

ETY2.2 and ETY4 support remote fault signalling. ETY4 supports local fault signalling.

Defects None.

Consequent actions None.

Defect correlations None.

Performance monitoring None.

10.2.2 ETYn trail termination sink function (ETYn_TT_Sk)

Symbol

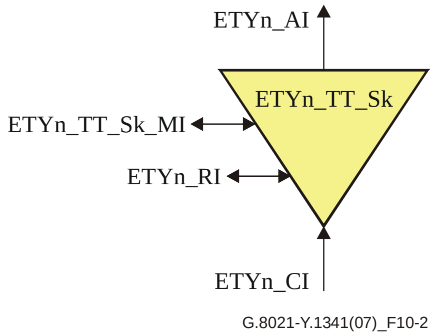

Figure 10-2 – ETYn_TT_Sk symbol

Interfaces

Table 10-3 – ETYn_TT_Sk interfaces

Inputs	Outputs
ETYn_TFP: ETYn_CI_Data ETYn_RP: ETYn_RI_FTS	ETYn_AP: ETYn_AI_Data ETYn_AI_Clock ETYn_AI_TSF ETYn_AI_TSFrdi ETYn_AI_TSFfdi ETYn_RP: ETYn_RI_RSF ETYn_TT_Sk_MP: ETYn_TT_Sk_MI_cLOS ETYn_TT_Sk_MI_cRDI ETYn_TT_Sk_MI_cFDI

Processes

This sink function, together with the corresponding source function, implements all processes in the physical layer in the IEEE 802.3-2002 model.

NOTE 1 – Further detail is intentionally left out of this Recommendation.

Fault propagation process

When the PHY supports remote fault signalling, this process inserts the AI_TSFrdi in response to the PHY-specific remote fault signal.

When the PHY supports local fault signalling, this process inserts the AI_TSFfdi in response to the PHY-specific local fault signal.

ETY2.2 and ETY4 support remote fault signalling. ETY4 supports local fault signalling.

Defects

dLOS: The defect is detected as soon as the aMediaAvailable parameter (as defined in [IEEE 802.3 2002]) gets a value different from "available" and the RI_FTS is false. The defect is cleared as soon as the aMediaAvailable parameter becomes "available".

NOTE 2 – aRSF is generated and communicated to the ETY_TT_So (RI_RSF) to prevent a forced transmitter shutdown in case of dLOS. This Recommendation does not specify the remote fault indication signalling.

dRDI: The defect is detected and cleared based on PHY-specific remote fault signalling (as defined in [IEEE 802.3 2002]).

dFDI: The defect is detected and cleared based on PHY-specific local fault signalling (as defined in [IEEE 802.3 2002]).

Consequent actions

aTSF ← dLOS

aRSF ← dLOS

aTSFrdi ← dRDI

aTSFfdi ← dFDI

Defect correlations

cLOS ← dLOS

cRDI ← dRDI

cFDI ← dFDI

Performance monitoring None.

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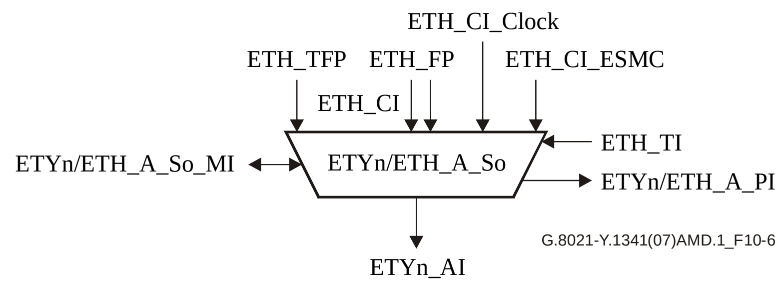

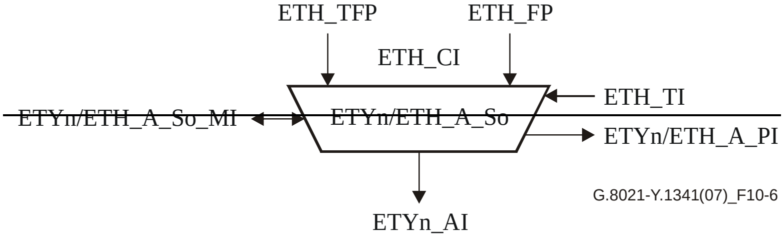

Figure 10-6 – ETYn/ETH_A_So symbol

Interfaces

Table 10-4 – ETYn/ETH_A_So interface

Inputs	Outputs
ETH_FP and ETH_TFP: ETH_CI_Data ETH_CI_Clock ETH_A_CI_PauseTrigger ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi ETH_FP: ETH_CI_ESMC ETYn/ETH_A_So_MP: ETYn/ETH_A_So_MI_TxPauseEnable ETH_TP: ETH_TI_Clock	ETYn_AP: ETYn_AI_Data ETYn_AI_Clock ETYn_AI_SSF ETYn_AI_SSFrdi ETYn_AI_SSFfdi ETH_PP: ETH_PI_Data ETYn/ETH_A_So_MP: ETYn/ETH_A_So_MI_pFramesTransmittedOK ETYn/ETH_A_So_MI_pOctetsTransmittedOK

Processes

A process diagram of this function is shown in Figure 10-7.

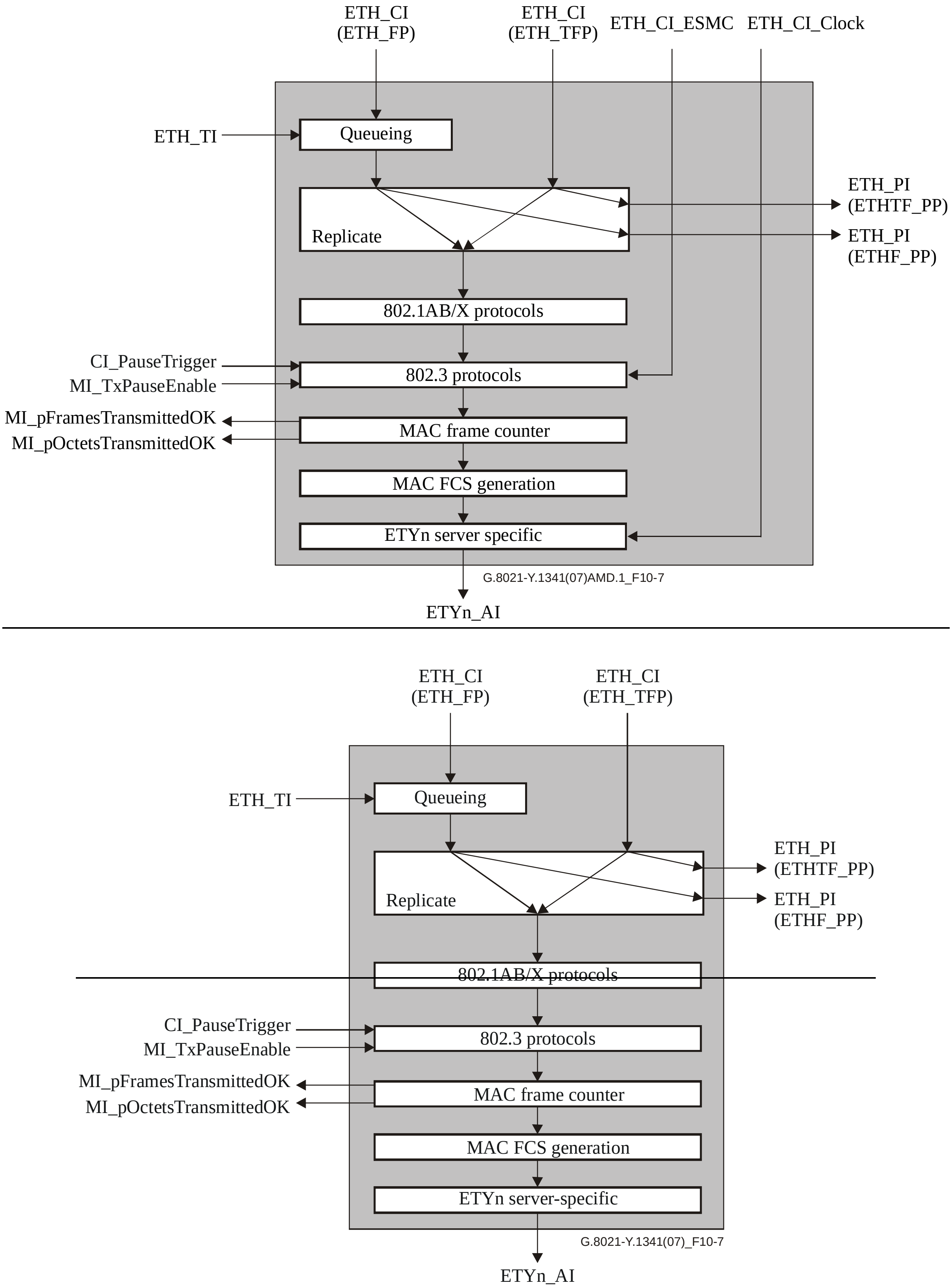

Figure 10-7 – ETYn/ETH_A_So process diagram

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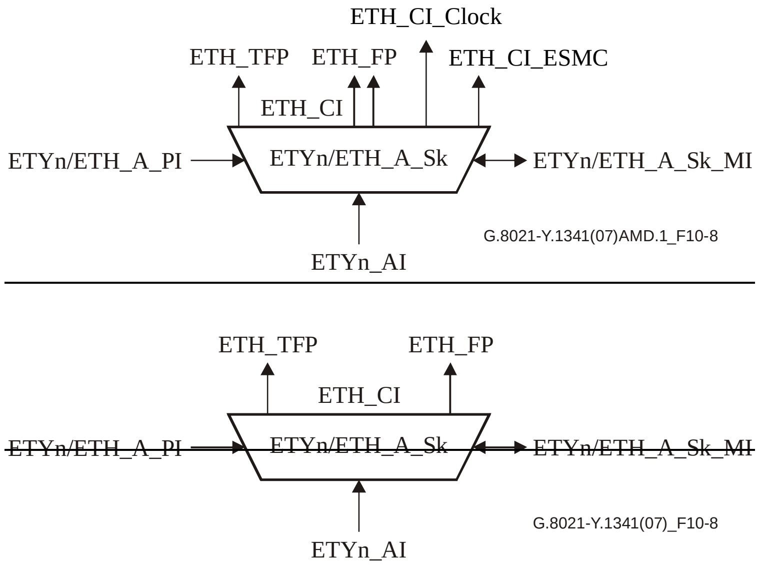


Figure 10-8 – ETYn/ETH_A_Sk symbol

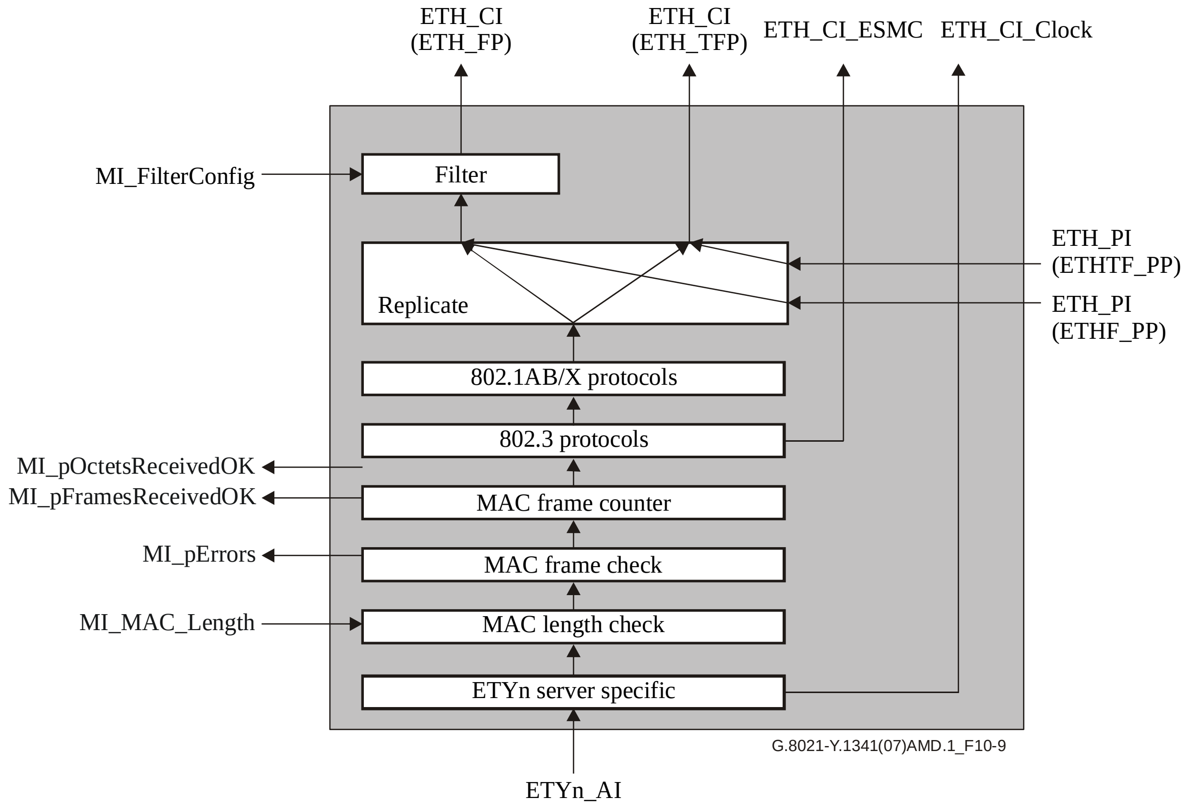
Interfaces

Table 10-5 – ETYn/ETH_A_Sk interfaces

Inputs	Outputs
ETYn_AP: ETYn_AI_Data ETYn_AI_Clock ETYn_AI_TSF ETYn_AI_TSFrdi ETYn_AI_TSFfdi ETH_PP: ETH_PI_Data ETYn/ETH_A_Sk_MP: ETYn/ETH_A_Sk_MI_FilterConfig ETYn/ETH_A_Sk_MI_MAC_Length	ETH_FP and ETH_TFP: ETH_CI_Data ETH_CI_Clock ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi ETH_FP: ETH_CI_ESMC ETYn/ETH_A_Sk_MP: ETYn/ETH_A_Sk_MI_pErrors ETYn/ETH_A_Sk_MI_pFramesReceivedOK ETYn/ETH_A_Sk_MI_pOctetsReceivedOK

Processes

A process diagram of this function is shown in Figure 10-9.



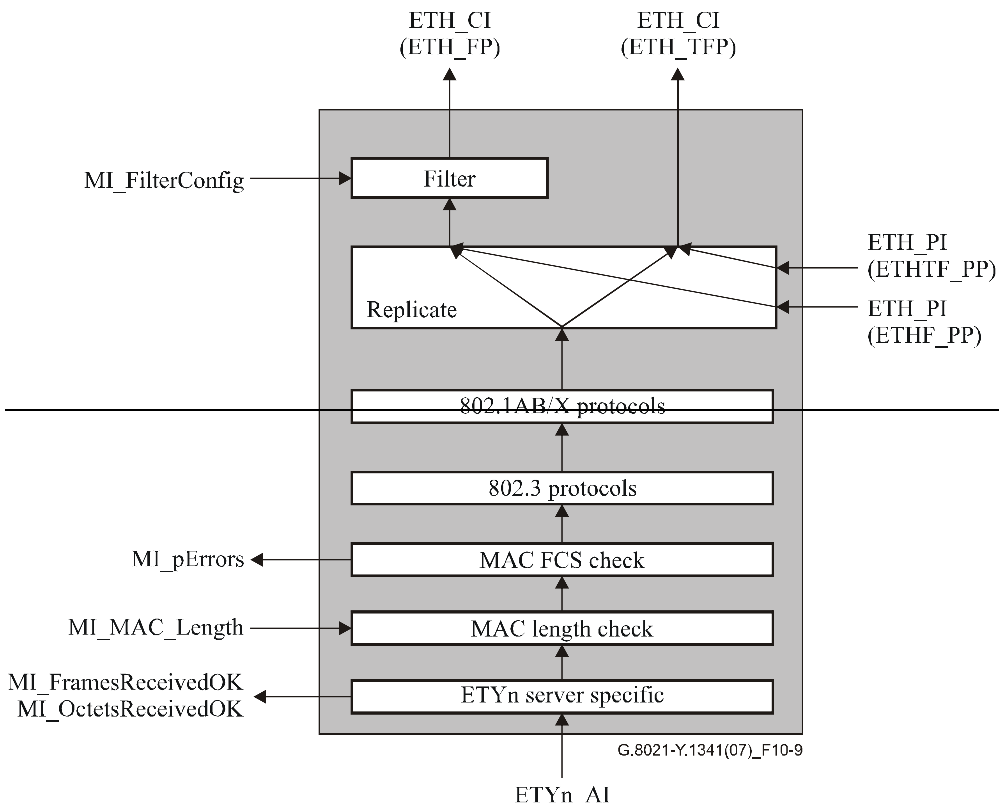


Figure 10-9 – ETYn/ETH_A_Sk process diagram

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10.4 1000BASE-(SX/LX/CX) ETY/coding sub-layer adaptation functions (ETY3/ETC3_A)

This adaptation function adapts 1000BASE-SX -LX, or -CX physical layer signals from/to 8B/10B-encoded codewords. Codewords may be extracted from or mapped into GFP-T frames, per clause 11.2, SDH/ETC adaptation functions (S4-X/ETC3_A).

10.4.1 ETY3 to ETC3 adaptation source function (ETY3/ETC3_A_So)

Symbol

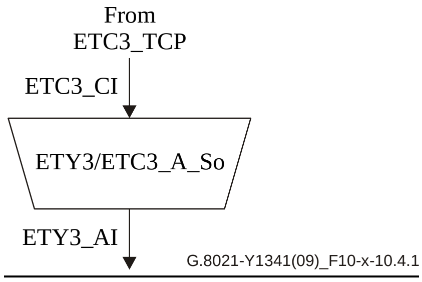


Figure 10-x – ETY3/ETC3_A_So symbol

Interfaces

Table 10-x – ETY3/ETC3_A_So interface

Inputs	Outputs
ETC3_TCP: ETC3_CI_Data_Control ETC3_CI_Clock ETC3_CI_Control_Ind ETC3_CI_SSF	ETY3_AP: ETY3_AI_Data ETY3_AI_Clock ETY3_AI_SSF

Processes

The ETY3/ETC3_A_So function adapts 8B/10B codewords to the physical layer signal.

Defects None.

Consequent actions None.

Defect correlations None.

Performance monitoring For further study.

10.4.2 ETY3 to ETC3 adaptation sink function (ETY3/ETC3_A_Sk)

Symbol

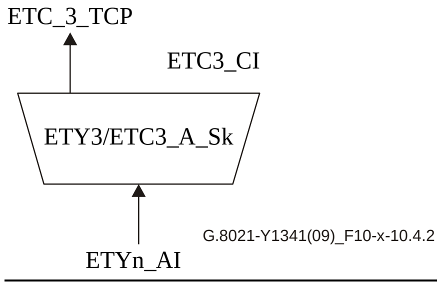


Figure 10-x+1 – ETY3/ETC3_A_Sk symbol

Interfaces

Table 10-x+1 – ETY3/ETC3_A_Sk interfaces

Inputs	Outputs
ETYn_AP: ETYn_AI_Data ETYn_AI_Clock ETYn_AI_TSF	ETC3_TCP: ETC3_CI_Data_Control ETC3_CI_Clock ETC3_CI_Control_Ind ETC3_CI_SSF

Processes

This function adapts the physical layer signal to 8B/10B codewords.

Defects None.

Consequent actions

aSSF ← AI_TSF

Defect correlations None.

Performance monitoring For further study.

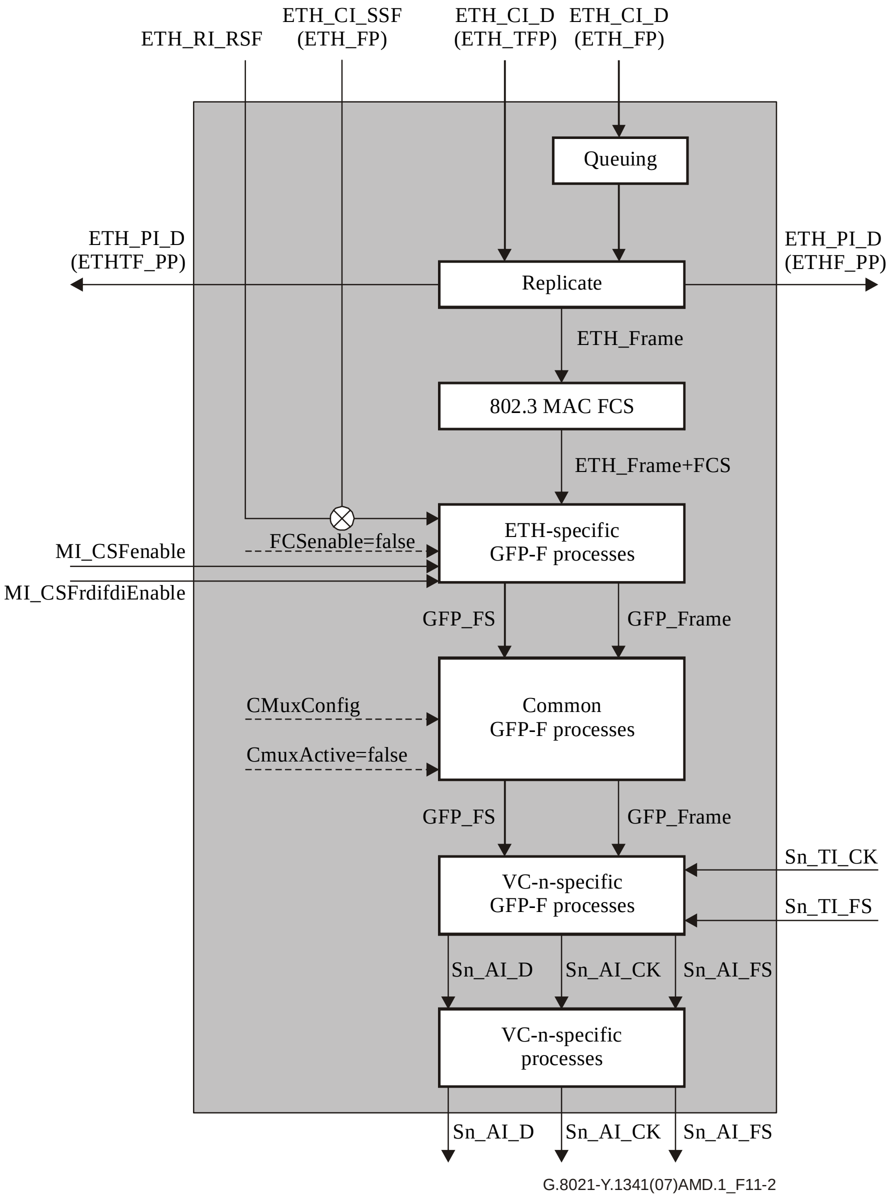
• • •

Table 11-1 – Sn/ETH_A_So interfaces

Inputs	Outputs
ETH_TFP: ETH_CI_Data ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi ETH_RP: ETH_RI_RSF Sn_TI: Sn_TI_Clock Sn_TI_FrameStart Sn/ETH_A_So_MI: Sn/ETH_A_So_MI_CSFEnable Sn/ETH_A_So_MI_CSFrdifdiEnable	Sn_AP: Sn_AI_Data Sn_AI_Clock Sn_AI_FrameStart ETHF_PP: ETH_PI_Data ETHTF_PP: ETH_PI_Data

Processes

A process diagram of this function is shown in Figure 11-2.


ETH_RI_RSF
ETH_CI_SSF
(ETH_FP)
ETH_CI_D
(ETH_TFP)
ETH_CI_D
(ETH_FP)
Queuing
ETH_PI_D
(ETHTF_PP)
Replicate
ETH_PI_D
(ETHF_PP)
ETH_Frame
802.3 MAC FCS
ETH_Frame+FCS
MI_CSFenable
FCSenable=false
ETH-specific
GFP-F processes
MI_CSFrdifdiEnable
GFP_FS
GFP_Frame
CMuxConfig
Common
GFP-F processes
CmuxActive=false
GFP_FS
GFP_Frame
Sn_TI_CK
VC-n-specific
GFP-F processes
Sn_TI_FS
Sn_AI_D
Sn_AI_CK
Sn_AI_FS
VC-n-specific
processes
Sn_AI_D
Sn_AI_CK
Sn_AI_FS
G.8021-Y.1341(07)AMD.1_F11-2

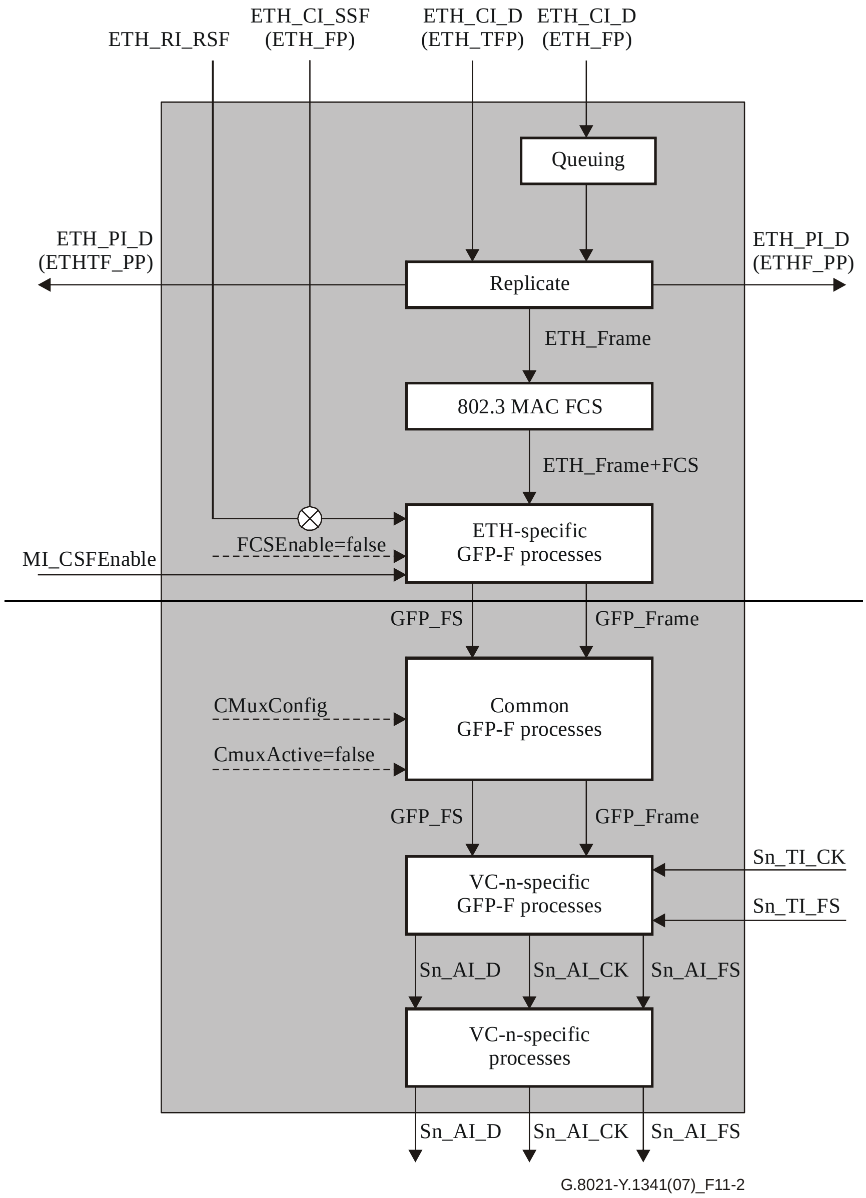


Figure 11-2 – Sn/ETH_A_So process diagram

Queuing process

See clause 8.2.

Replicate process

See clause 8.4.

802.3 MAC FCS generation

See clause 8.8.1.

Ethernet-specific GFP-F source process

See clause 8.8.6.1~~8.5.4.1.1 of [ITU-T G.806]. GFP pFCS generation is disabled (FCSenable=false). The UPI value for frame-mapped Ethernet shall be inserted (Table 6-3 of [ITU-T G.7041]). The Ethernet frames are inserted into the client payload information field of the GFP-F frames according to clause 7.1 of [ITU-T G.7041].~~

~~Response to ETH_CI_SSF asserted is for further study~~.

Common GFP source processes

See clause 8.5.3.1 of [ITU-T G.806]. GFP channel multiplexing is not supported (CMuxActive=false).

VC-n-specific GFP source process

See clause 8.5.2.1 of [ITU-T G.806]. The GFP frames are mapped into the VC-n payload area according to clause 10.6 of [ITU-T G.707].

VC-n-specific source process

C2: Signal label information is derived directly from the adaptation function type. The value for "GFP mapping" in Table 9-11 of [ITU-T G.707] is placed in the C2 byte position.

H4: For Sn/ETH_A_So with n = 3, 4, the H4 byte is sourced as all-zeros.

NOTE 1 – For Sn/ETH_A_So with n = 3-X, 4-X, the H4 byte is undefined at the Sn-X_AP output of this function (as per clause 12 of [ITU-T G.783]).

NOTE 2 – For Sn/ETH_A_So with n = 3, 4, 3-X, 4-X, the K3, F2, F3 bytes are undefined at the Sn-X_AP output of this function (as per clause 12 of [ITU-T G.783]).

Counter processes

For further study.

Defects None.

Consequent actions ~~None.~~

aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable

aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable

aCSF-LOS ← CI_SSF and CSFEnable

Defect correlations None.

Performance monitoring For further study.

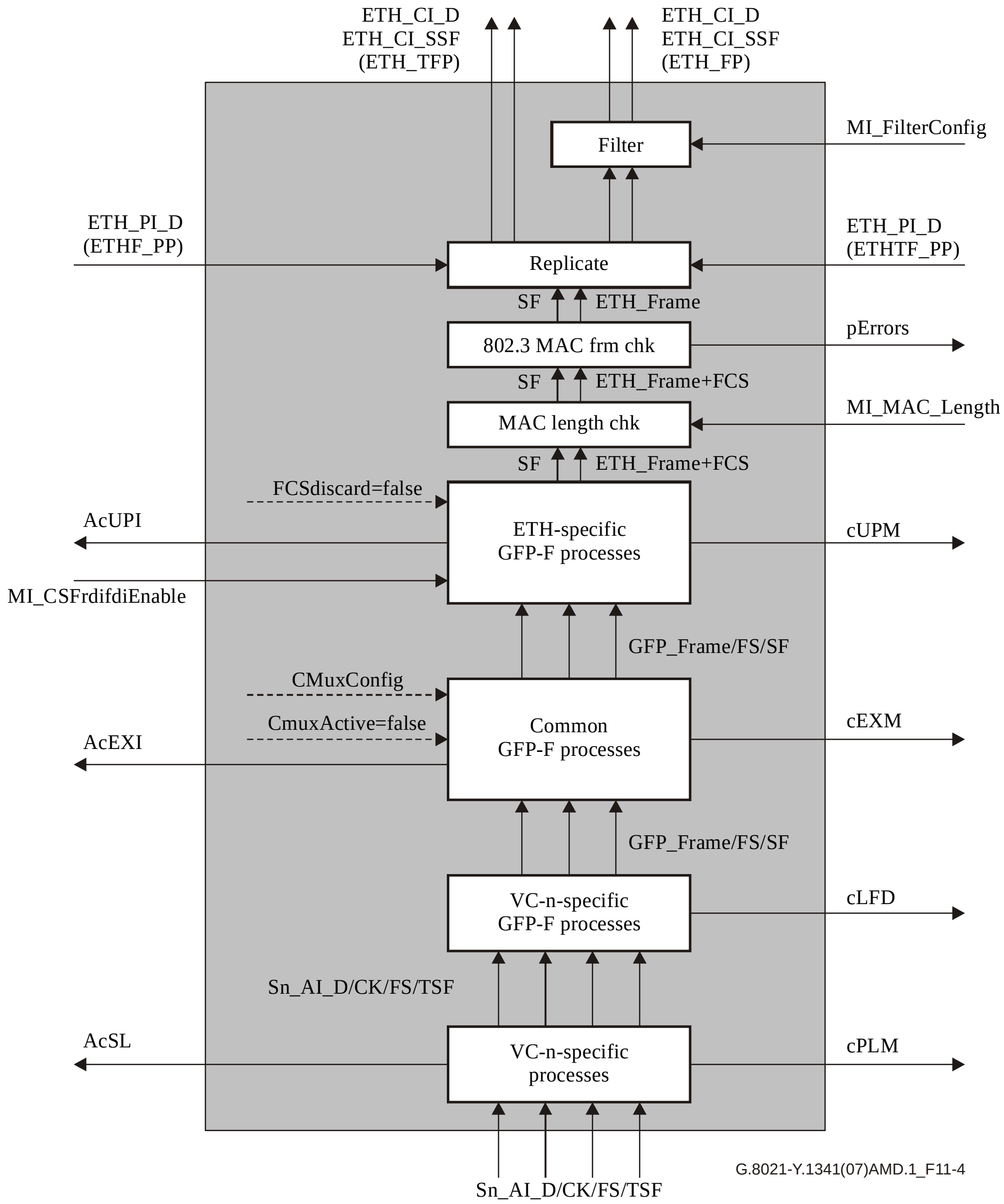
• • •

Table 11-2 – Sn/ETH_A_Sk interfaces

Inputs	Outputs
Sn_AP: Sn_AI_Data Sn_AI_ClocK Sn_AI_FrameStart Sn_AI_TSF	ETH_TFP: ETH_CI_Data ETH_CI_SSF
ETHF_PP: ETH_PI_Data	ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi
ETHTF_PP: ETH_PI_Data	ETH_RP: ETH_RI_RSF
Sn/ETH_A_Sk_MI: Sn/ETH_A_Sk_MI_FilterConfig Sn/ETH_A_Sk_MI_CSF_Reported Sn/ETH_A_Sk_MI_MAC_Length Sn/ETH_A_Sk_MI_CSFrdifdiEnable	Sn/ETH_A_Sk_MI: Sn/ETH_A_Sk_MI_AcSL Sn/ETH_A_Sk_MI_AcEXI Sn/ETH_A_Sk_MI_AcUPI Sn/ETH_A_Sk_MI_cPLM Sn/ETH_A_Sk_MI_cLFD Sn/ETH_A_Sk_MI_cUPM Sn/ETH_A_Sk_MI_cEXM Sn/ETH_A_Sk_MI_cCSF Sn/ETH_A_Sk_MI_pFCSErrors

Processes

A process diagram of this function is shown in Figure 11-4.


ETH_CI_D
ETH_CI_SSF
(ETH_TFP)
ETH_CI_D
ETH_CI_SSF
(ETH_FP)
Filter
MI_FilterConfig
ETH_PI_D
(ETHF_PP)
Replicate
ETH_PI_D
(ETHTF_PP)
SF
ETH_Frame
802.3 MAC frm chk
pErrors
SF
ETH_Frame+FCS
MAC length chk
MI_MAC_Length
SF
ETH_Frame+FCS
FCSdiscard=false
AcUPI
ETH-specific
GFP-F processes
cUPM
MI_CSFrdifdiEnable
GFP_Frame/FS/SF
CMuxConfig
CmuxActive=false
AcEXI
Common
GFP-F processes
cEXM
GFP_Frame/FS/SF
VC-n-specific
GFP-F processes
cLFD
Sn_AI_D/CK/FS/TSF
AcSL
VC-n-specific
processes
cPLM
Sn_AI_D/CK/FS/TSF
G.8021-Y.1341(07)AMD.1_F11-4

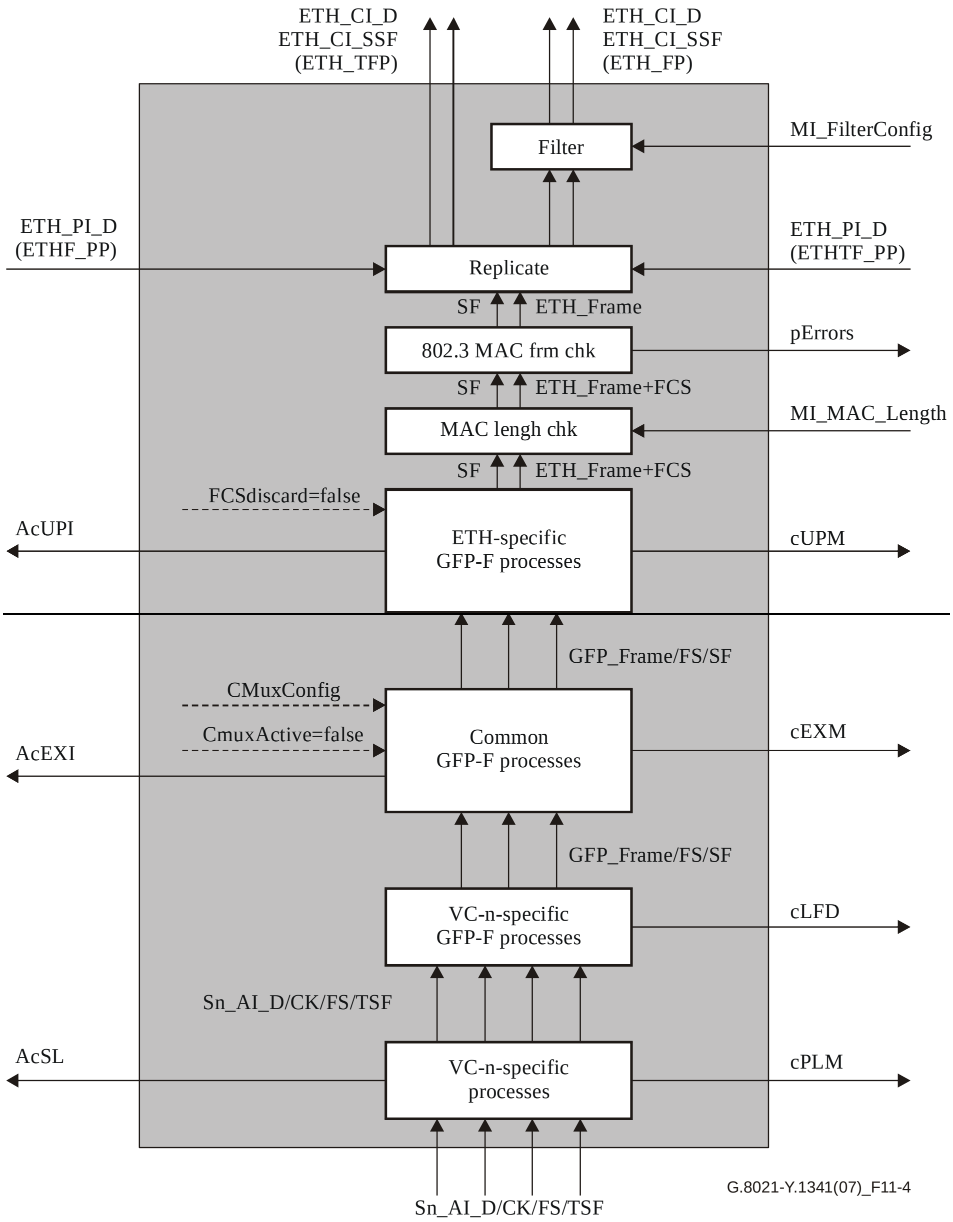


Figure 11-4 – Sn/ETH_A_Sk process diagram

Filter process

See clause 8.3.

Replicate process

See clause 8.4.

802.3 MAC FCS check process

See clause 8.8.2.

Ethernet-specific GFP-F sink process

See clause <u>8.8.6.2</u>~~8.5.4.1.2 of [ITU-T G.806]. GFP pFCS checking, GFP p_FCSError, p_FDis are not supported (FCSdiscard=false). The UPI value for Frame-Mapped Ethernet shall be expected (Table 6-3 of [ITU-T G.7041]). The Ethernet frames are extracted from the client payload information field of the GFP-F frames according to clause 7.1 of [ITU-T G.7041]~~.

Common GFP sink process

See clause 8.5.3.2 of [ITU-T G.806]. GFP channel multiplexing is not supported (MI_CMuxActive=false).

VC-n-specific GFP sink process

See clause 8.5.2.2 of [ITU-T G.806]. The GFP frames are demapped from the VC-n payload area according to clause 10.6 of [ITU-T G.707].

VC-n-specific sink process

C2: The signal label is recovered from the C2 byte as per clause 6.2.4.2 of [ITU-T G.806]. The signal label for "GFP mapping" in Table 9-11 of [ITU-T G.707] shall be expected. The accepted value of the signal label is also available at the Sn/ETH_A_Sk_MP.

Defects

dPLM – See clause 6.2.4.2 of [ITU-T G.806].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← dCSF-FDI and CSFrdifdiEnable

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

~~cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pFCSErrors: Count of FrameCheckSequenceErrors per second.

NOTE – This primitive is calculated by the MAC FCS check process.

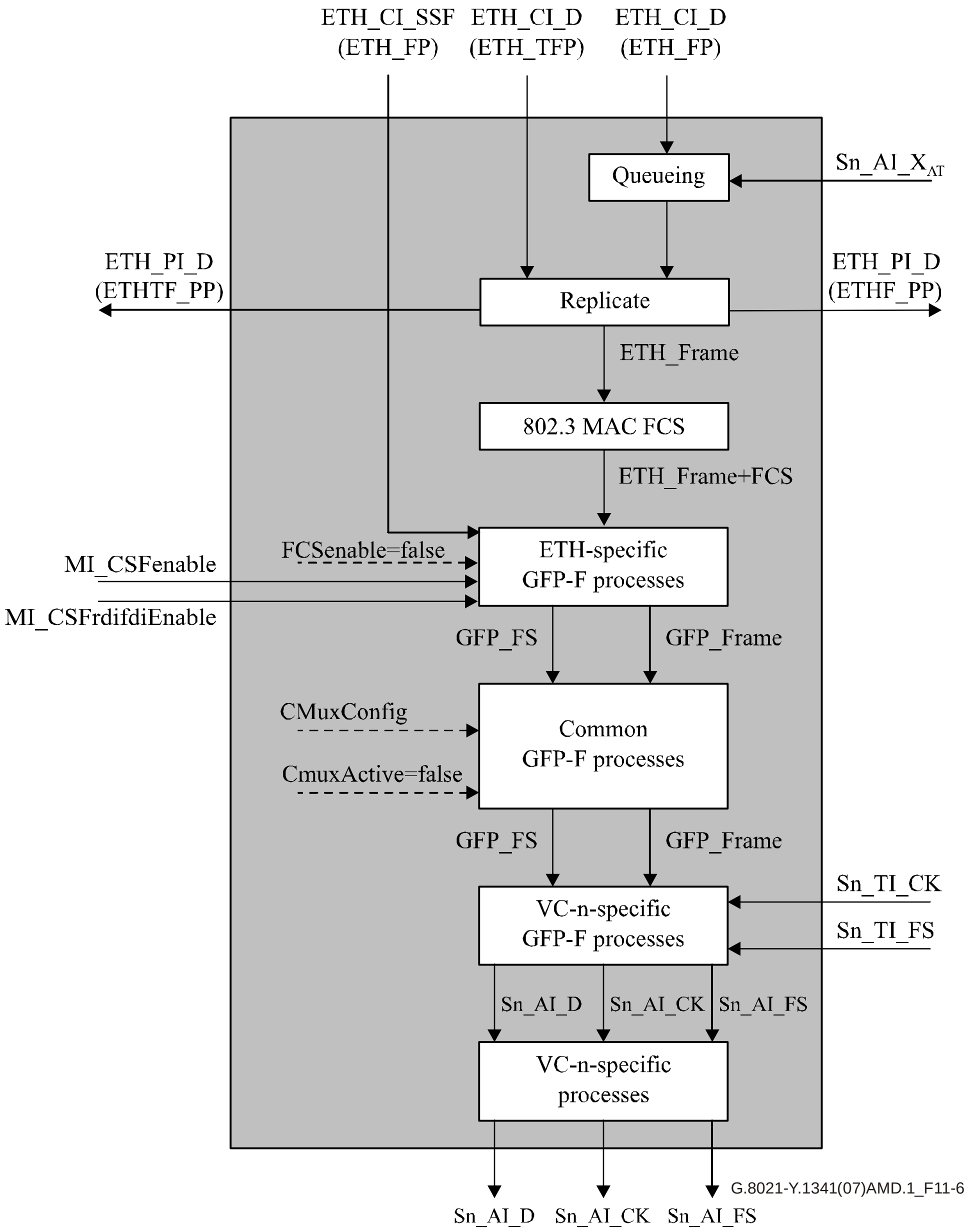
•••

Table 11-3 – Sn-X-L/ETH_A_So interfaces

Inputs	Outputs
ETH_TFP: ETH_CI_Data ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Sn-X-L_AP: Sn-X-L_AI_X_{AT} Sn-X-L_TI: Sn-X-L_TI_ClocK Sn-X-L_TI_FrameStart Sn-X-L/ETH_A_So_MI: Sn-X-L/ETH_A_So_MI_CSFEnable Sn-X-L/ETH_A_So_MI_CSFrdifdiEnable	Sn-X-L_AP: Sn-X-L_AI_Data Sn-X-L_AI_ClocK Sn-X-L_AI_FrameStart ETHF_PP: ETH_PI_Data ETHTF_PP: ETH_PI_Data

Processes

A process diagram of this function is shown in Figure 11-6.



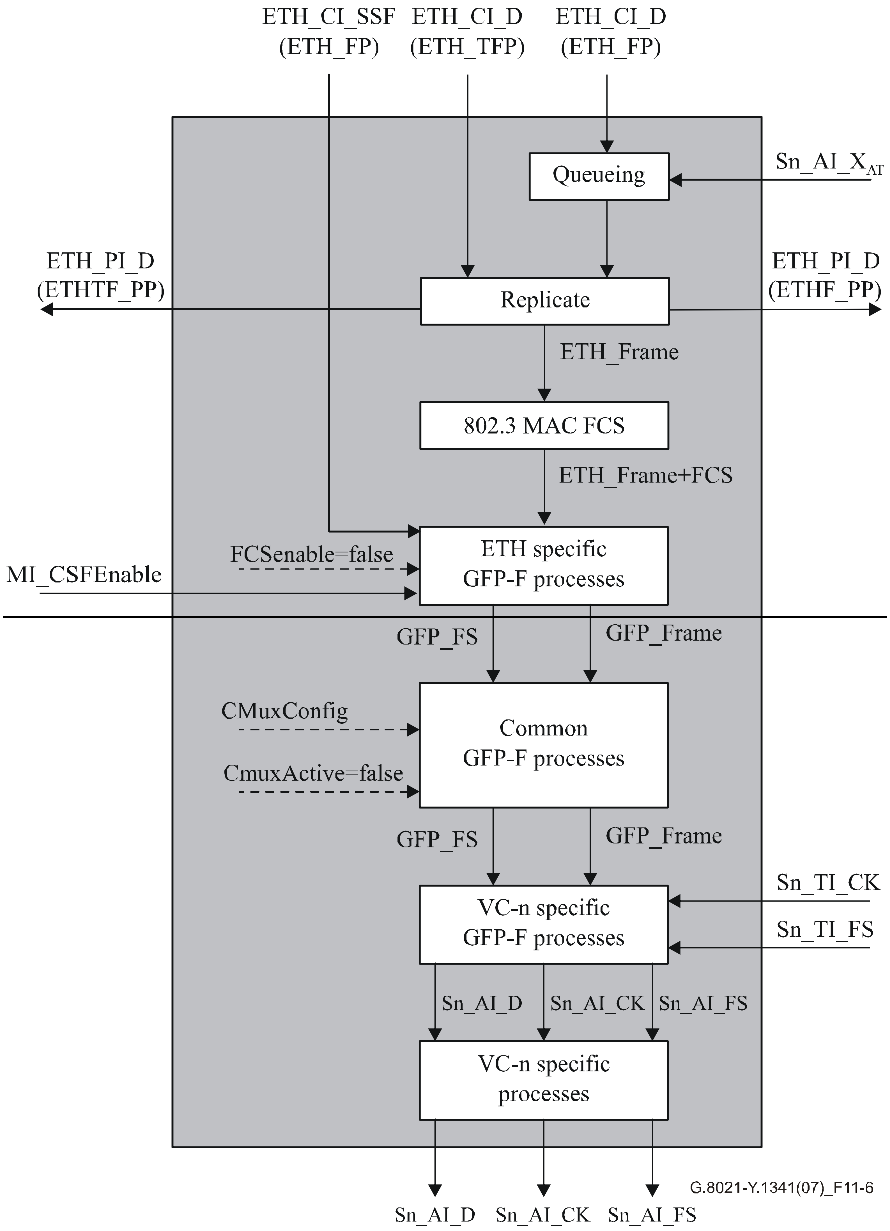


Figure 11-6 – Sn-X-L/ETH_A_So process diagram

See clause 11.1.1.1 for a description of Sn-X-L/ETH_A processes.

Defects None.

Consequent actions

aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable

aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable

aCSF-LOS ← CI_SSF and CSFEnable

~~None.~~

Defect correlations None.

Performance monitoring For further study.

…

Table 11-4 – Sn-X-L/ETH_A_Sk interfaces

Inputs	Outputs
Sn-X-L_AP: Sn-X-L_AI_Data Sn-X-L_AI_ClocK Sn-X-L_AI_FrameStart Sn-X-L_AI_TSF Sn-X-L_AI_X$_{AR}$ ETHF_PP: ETH_PI_Data ETHTF_PP: ETH_PI_Data Sn-X-L/ETH_A_Sk_MI: Sn-X-L/ETH_A_Sk_MI_FilterConfig Sn-X-L/ETH_A_Sk_MI_CSF_Reported Sn-X-L/ETH_A_Sk_MI_CSFrdifdiEnable	ETH_TFP: ETH_CI_Data ETH_CI_SSF ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Sn-X-L/ETH_A_Sk_MI: Sn-X-L/ETH_A_Sk_MI_AcSL Sn-X-L/ETH_A_Sk_MI_AcEXI Sn-X-L/ETH_A_Sk_MI_AcUPI Sn-X-L/ETH_A_Sk_MI_cPLM Sn-X-L/ETH_A_Sk_MI_cLFD Sn-X-L/ETH_A_Sk_MI_cUPM Sn-X-L/ETH_A_Sk_MI_cEXM Sn-X-L/ETH_A_Sk_MI_cCSF Sn-X-L/ETH_A_Sk_MI_pFCSError

Processes

See process diagram and process description in clause 11.1.1.2. The additional Sn-X-L_AI_X$_{AR}$ interface is not connected to any of the internal processes.

Defects

dPLM – See clause 6.2.4.2 of [ITU-T G.806].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← dCSF-FDI and CSFrdifdiEnable

NOTE 1 – XAR = 0 results in AI_TSF being asserted, so there is no need to include it as additional contributor to aSSF.

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

~~cUPM ← dUPM and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cCSF per clause 8.5.4.1.2 of [ITU-T G.806].~~

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pFCSError: Count of FrameCheckSequenceErrors per second.

NOTE 2 – This primitive is calculated by the MAC FCS check process.

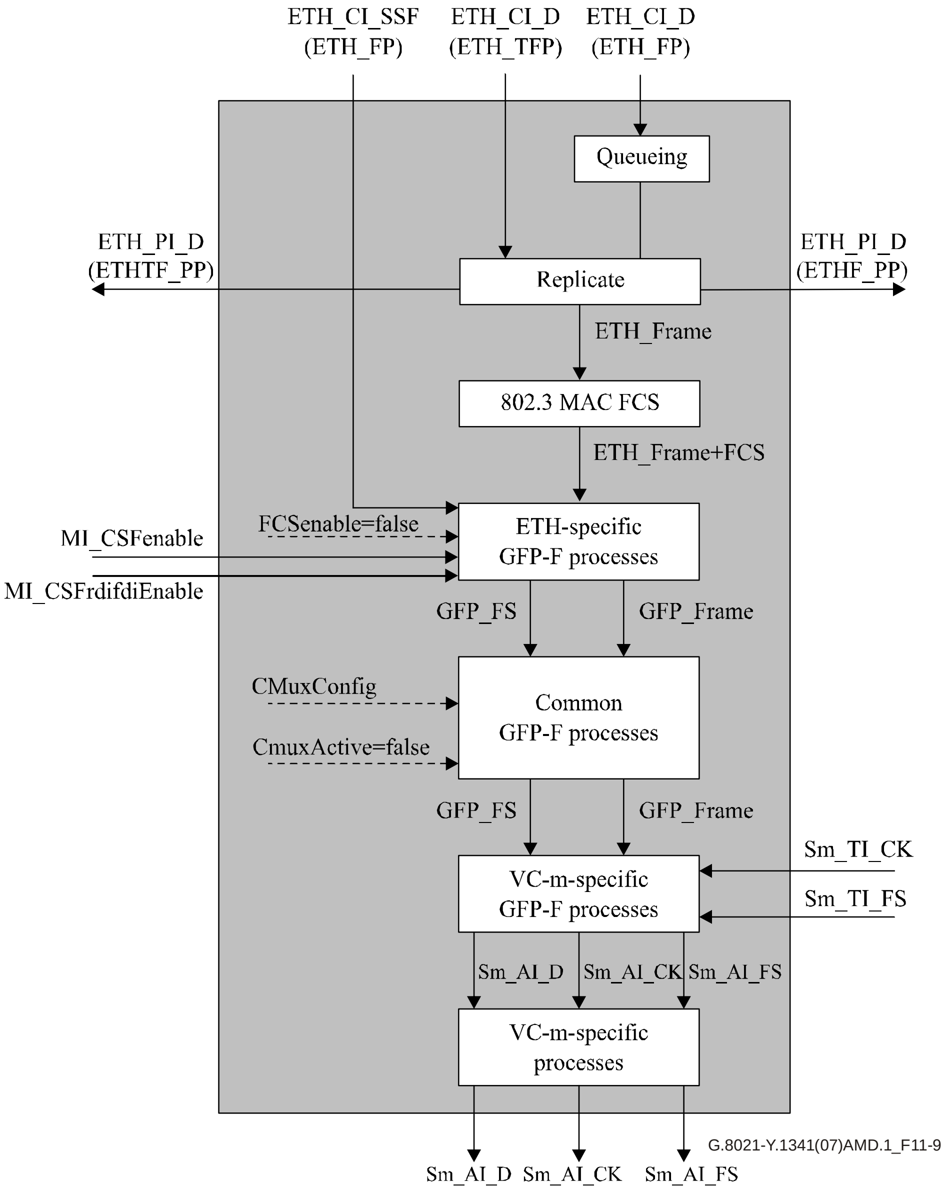
• • •

Table 11-5 – Sm/ETH_A_So interfaces

Inputs	Outputs
ETH_TFP: ETH_CI_Data ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Sm_AP: Sm_AI_X_{AT} Sm_TI: Sm_TI_ClocK Sm_TI_FrameStart Sm/ETH_A_So_MI: Sm/ETH_A_So_MI_CSFEnable Sm/ETH_A_So_MI_CSFrdifdiEnable	Sm_AP: Sm_AI_Data Sm_AI_ClocK Sm_AI_FrameStart ETHF_PP: ETH_PI_Data ETHTF_PP: ETH_PI_Data

Processes

A process diagram of this function is shown in Figure 11-9.


ETH_CI_SSF
(ETH_FP)
ETH_CI_D
(ETH_TFP)
ETH_CI_D
(ETH_FP)
Queueing
ETH_PI_D
(ETHTF_PP)
Replicate
ETH_PI_D
(ETHF_PP)
ETH_Frame
802.3 MAC FCS
ETH_Frame+FCS
FCSenable=false
MI_CSFenable
MI_CSFrdifdiEnable
ETH-specific
GFP-F processes
GFP_FS
GFP_Frame
CMuxConfig
CmuxActive=false
Common
GFP-F processes
GFP_FS
GFP_Frame
Sm_TI_CK
Sm_TI_FS
VC-m-specific
GFP-F processes
Sm_AI_D
Sm_AI_CK
Sm_AI_FS
VC-m-specific
processes
G.8021-Y.1341(07)AMD.1_F11-9
Sm_AI_D
Sm_AI_CK
Sm_AI_FS

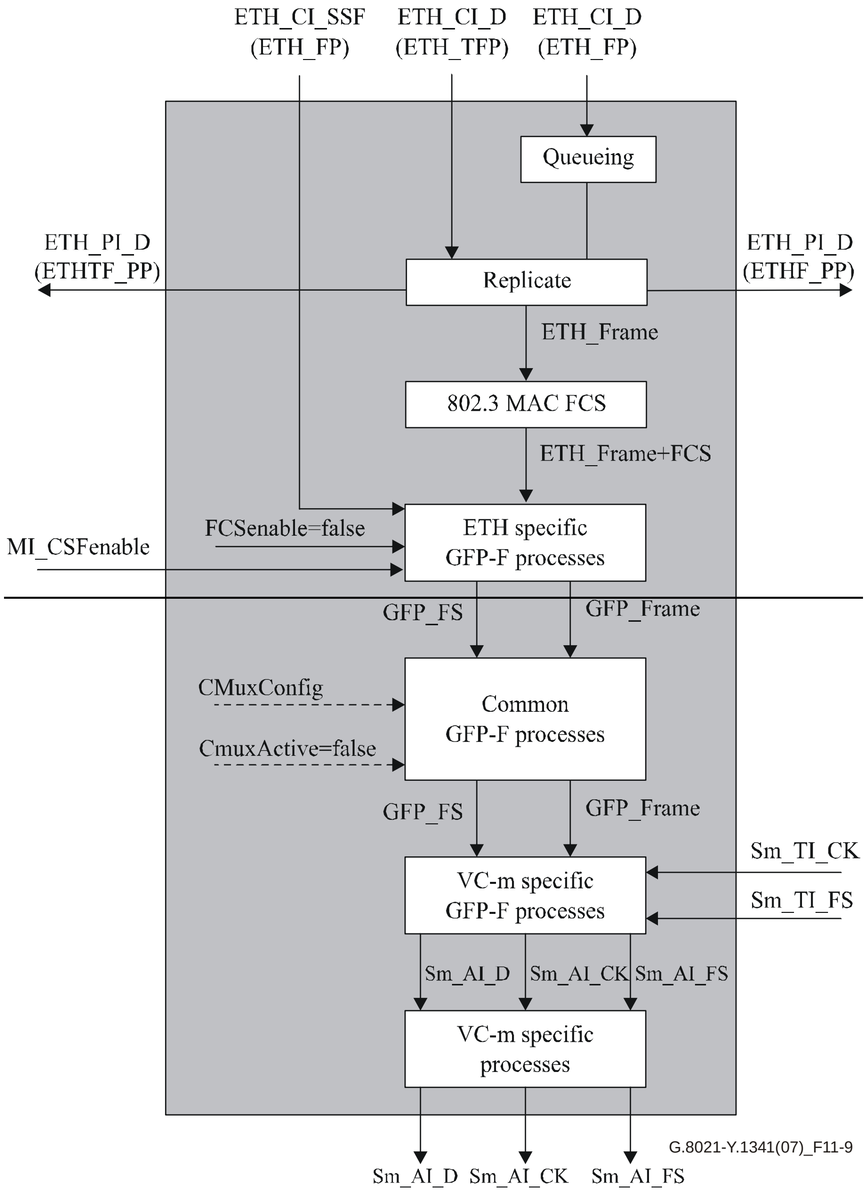


Figure 11-9 – Sm/ETH_A_So process diagram

• • •

Defects None.

Consequent actions ~~None.~~

<u>aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable</u>

<u>aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable</u>

<u>aCSF-LOS ← CI_SSF and CSFEnable</u>

Defect correlations None.

Performance monitoring For further study.

11.1.3.2 VC-m/ETH adaptation sink function (Sm/ETH_A_Sk)

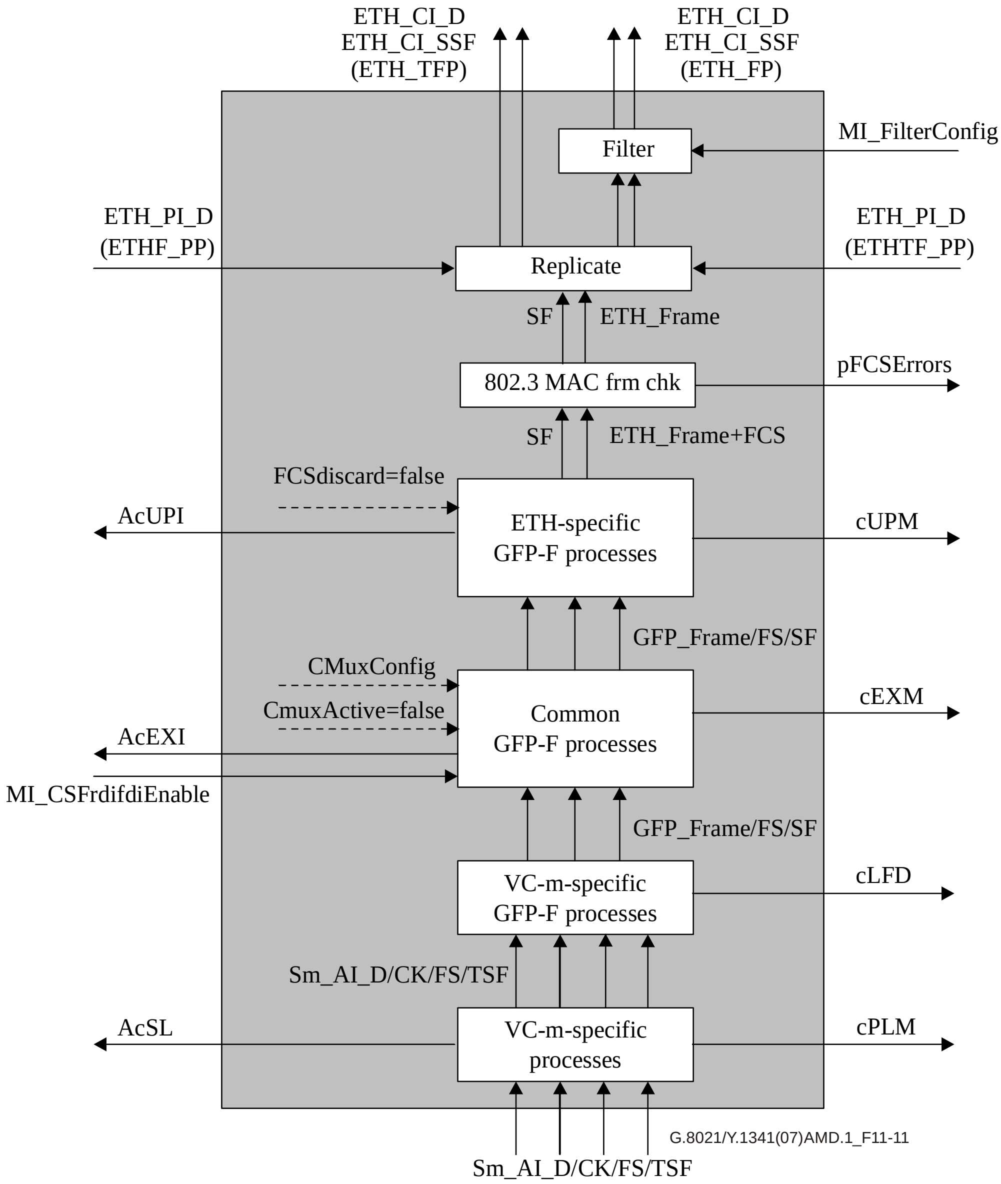
• • •

Table 11-6 – Sm/ETH_A_Sk interfaces

Inputs	Outputs
Sm_AP: Sm_AI_Data Sm_AI_ClocK Sm_AI_FrameStart Sm_AI_TSF ETHF_PP: ETH_PI_Data ETHTF_PP: ETH_PI_Data Sm/ETH_A_Sk_MI: Sm/ETH_A_Sk_MI_FilterConfig Sm/ETH_A_Sk_MI_CSF_Reported Sm/ETH_A_Sk_MI_CSFrdifdiEnable	ETH_TFP: ETH_CI_Data ETH_CI_SSF ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Sm/ETH_A_Sk_MI: Sm/ETH_A_Sk_MI_AcSL Sm/ETH_A_Sk_MI_AcEXI Sm/ETH_A_Sk_MI_AcUPI Sm/ETH_A_Sk_MI_cPLM Sm/ETH_A_Sk_MI_cLFD Sm/ETH_A_Sk_MI_cUPM Sm/ETH_A_Sk_MI_cEXM Sm/ETH_A_Sk_MI_cCSF Sm/ETH_A_Sk_MI_pFCSError

Processes

A process diagram of this function is shown in Figure 11-11.


ETH_CI_D
ETH_CI_SSF
(ETH_TFP)
ETH_CI_D
ETH_CI_SSF
(ETH_FP)
Filter
MI_FilterConfig
ETH_PI_D
(ETHF_PP)
Replicate
ETH_PI_D
(ETHTF_PP)
SF
ETH_Frame
802.3 MAC frm chk
pFCSErrors
SF
ETH_Frame+FCS
FCSdiscard=false
AcUPI
ETH-specific
GFP-F processes
cUPM
GFP_Frame/FS/SF
CMuxConfig
CmuxActive=false
AcEXI
Common
GFP-F processes
cEXM
MI_CSFrdifdiEnable
GFP_Frame/FS/SF
VC-m-specific
GFP-F processes
cLFD
Sm_AI_D/CK/FS/TSF
AcSL
VC-m-specific
processes
cPLM
G.8021/Y.1341(07)AMD.1_F11-11
Sm_AI_D/CK/FS/TSF

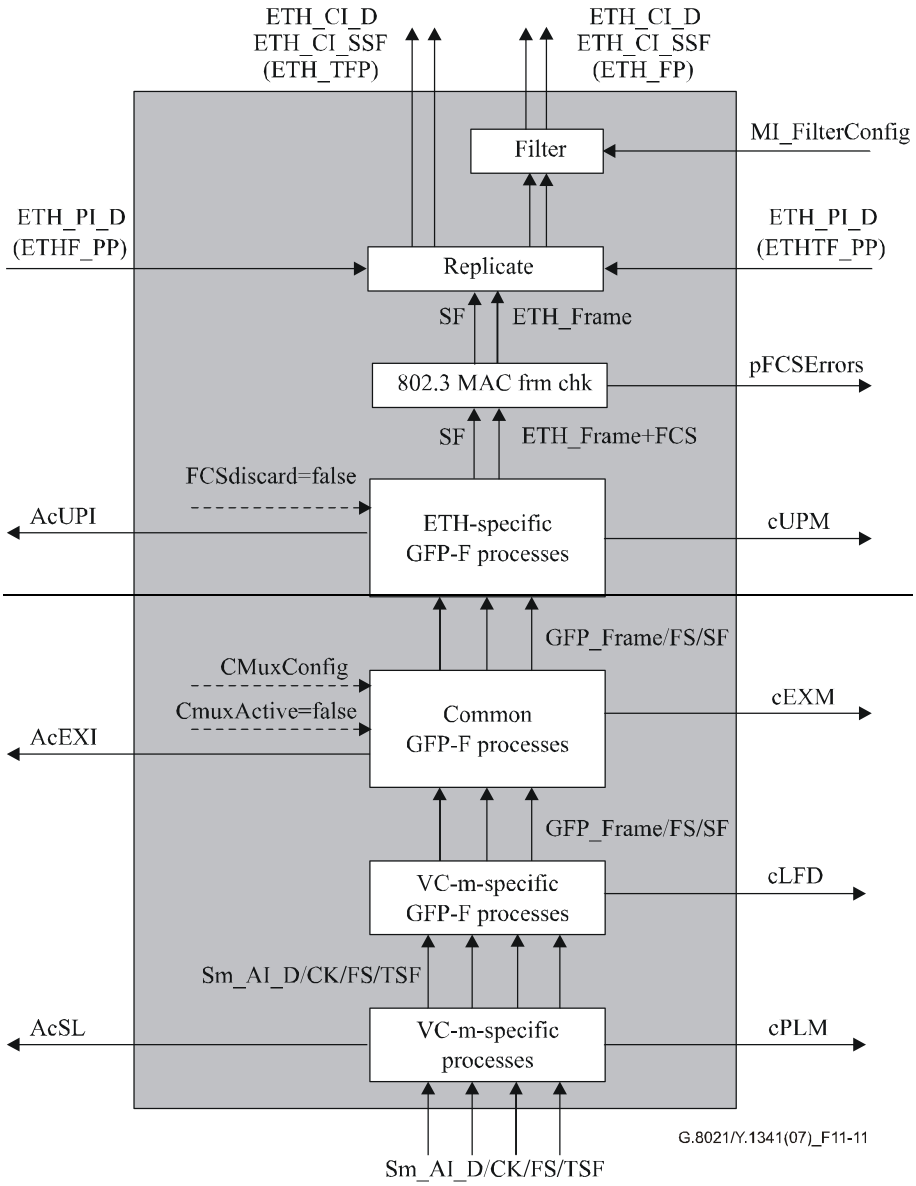


Figure 11-11 – Sm/ETH_A_Sk process diagram

Filter process

See clause 8.3.

Replicate process

See clause 8.4.

802.3 MAC FCS check process

See clause 8.7.

Ethernet-specific GFP-F sink process

See clause 8.5.4.1.2 of [ITU-T G.806]. GFP pFCS checking, GFP p_FCSError, p_FDis are not supported (FCSdiscard=false). The UPI value for frame-mapped Ethernet shall be expected (Table 6-3 of [ITU-T G.7041]). The Ethernet frames are extracted from the client payload information field of the GFP-F frames according to clause 7.1 of [ITU-T G.7041].

Common GFP sink process

See clause 8.5.3.2~~1~~ of [ITU-T G.806]. GFP channel multiplexing is not supported (CMuxActive=false).

VC-m-specific GFP sink process

See clause 8.5.2.2~~1~~ of [ITU-T G.806]. The GFP frames are demapped from the VC-m payload area according to clause 10.6 of [ITU-T G.707].

VC-m-specific sink process

V5[5-7] and K4[1]: The signal label is recovered from the extended signal label position as described in clause 8.2.3.2 of [ITU-T G.783] and clause 6.2.4.2 of [ITU-T G.806]. The signal label for "GFP mapping" in Table 9-13 of [ITU-T G.707] shall be expected. The accepted value of the signal label is also available at the Sm/ETH_A_Sk_MP.

Defects

dPLM – See clause 6.2.4.2 of [ITU-T G.806].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← dCSF-FDI and CSFrdifdiEnable

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

~~cUPM ← dUPM and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cCSF per clause 8.5.4.1.2 of [ITU-T G.806].~~

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pFCSError: Count of FrameCheckSequenceErrors per second.

NOTE – This primitive is calculated by the MAC FCS check process.

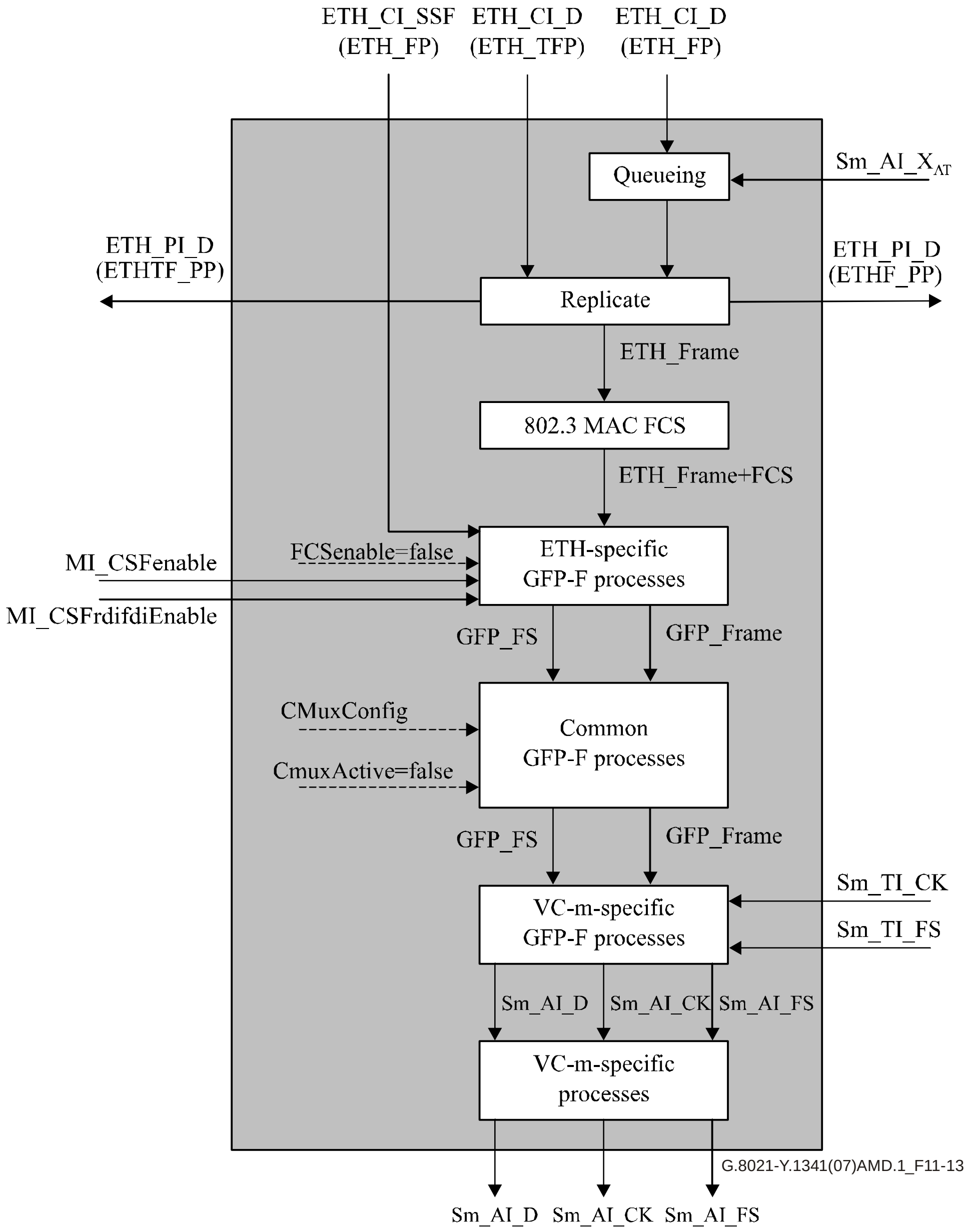
• • •

Table 11-7 – Sm-X-L/ETH_A_So interfaces

Inputs	Outputs
ETH_TFP: ETH_CI_Data ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Sm-X-L_AP: Sm-X-L_AI_X_{AT} Sm _TI: Sm_TI_ClocK Sm_TI_FrameStart Sm-X-L/ETH_A_So_MI: Sm-X-L/ETH_A_So_MI_CSFEnable Sm-X-L/ETH_A_So_MI_CSFrdifdiEnable	Sm-X-L_AP: Sm-X-L_AI_Data Sm-X-L_AI_ClocK Sm-X-L_AI_FrameStart ETHF_PP: ETH_PI_Data ETHTF_PP: ETH_PI_Data

Processes

A process diagram of this function is shown in Figure 11-13.


ETH_CI_SSF
(ETH_FP)
ETH_CI_D
(ETH_TFP)
ETH_CI_D
(ETH_FP)
Queueing
Sm_AI_X_AT
ETH_PI_D
(ETHTF_PP)
Replicate
ETH_PI_D
(ETHF_PP)
ETH_Frame
802.3 MAC FCS
ETH_Frame+FCS
MI_CSFenable
FCSenable=false
ETH-specific
GFP-F processes
MI_CSFrdifdiEnable
GFP_FS
GFP_Frame
CMuxConfig
Common
GFP-F processes
CmuxActive=false
GFP_FS
GFP_Frame
Sm_TI_CK
VC-m-specific
GFP-F processes
Sm_TI_FS
Sm_AI_D
Sm_AI_CK
Sm_AI_FS
VC-m-specific
processes
G.8021-Y.1341(07)AMD.1_F11-13
Sm_AI_D
Sm_AI_CK
Sm_AI_FS

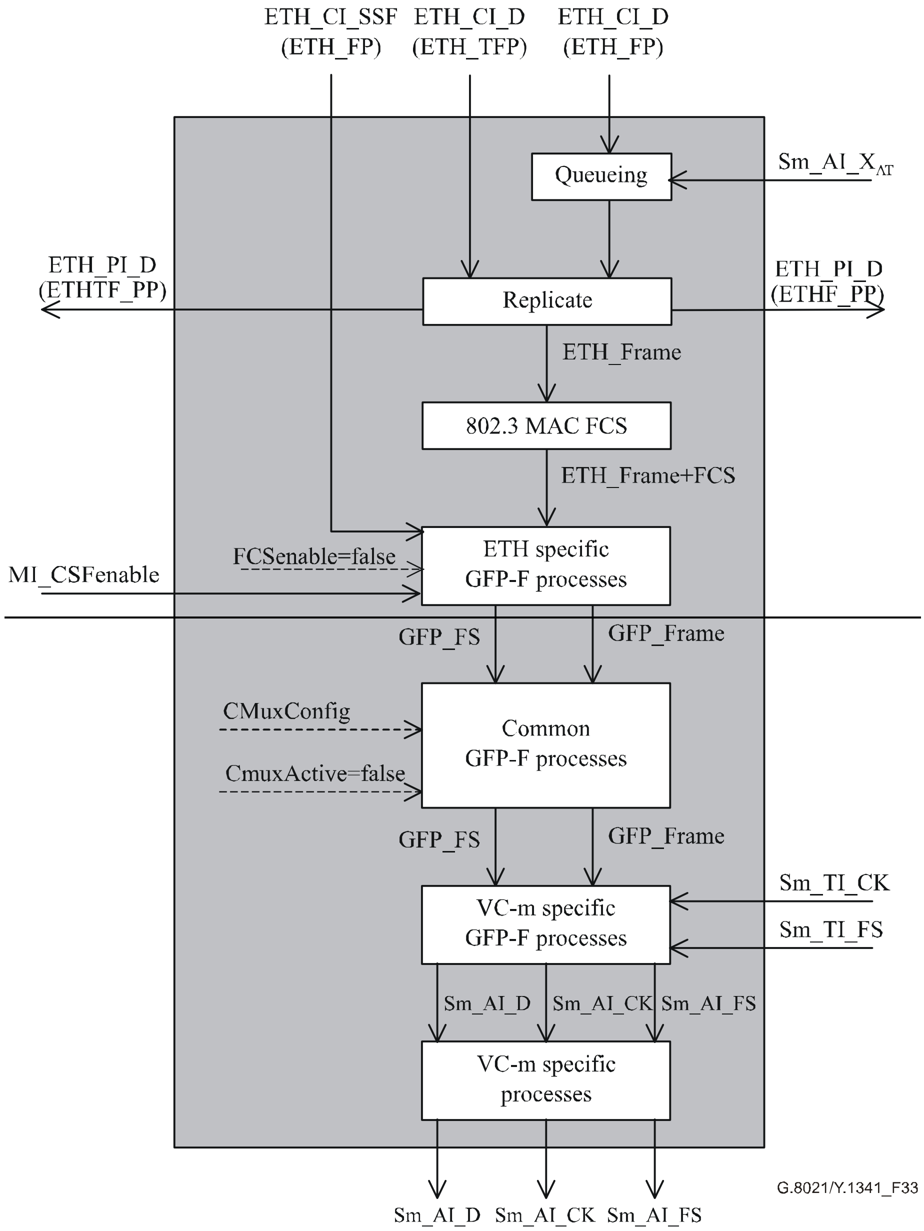


Figure 11-13 – Sm-X-L/ETH_A_So process diagram

See clause 11.1.3.1 for a description of Sm-X-L/ETH_A processes.

Defects None.

Consequent actions ~~None.~~

aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable

aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable

aCSF-LOS ← CI_SSF and CSFEnable

Defect correlations None.

Performance monitoring For further study.

…

Table 11-8 – Sm-X-L/ETH_A_Sk interfaces

Inputs	Outputs
Sm-X-L_AP: Sm-X-L_AI_Data Sm-X-L_AI_ClocK Sm-X-L_AI_FrameStart Sm-X-L_AI_TSF Sm-X-L_AI_X_{AR} ETHF_PP: ETH_PI_Data ETHTF_PP: ETH_PI_Data Sm-X-L/ETH_A_Sk_MI: Sm-X-L/ETH_A_Sk_MI_FilterConfig Sm-X-L/ETH_A_Sk_MI_CSF_Reported Sm-X-L/ETH_A_Sk_MI_CSFrdifdiEnable	ETH_TFP: ETH_CI_Data ETH_CI_SSF ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Sm-X-L/ETH_A_Sk_MI: Sm-X-L/ETH_A_Sk_MI_AcSL Sm-X-L/ETH_A_Sk_MI_AcEXI Sm-X-L/ETH_A_Sk_MI_AcUPI Sm-X-L/ETH_A_Sk_MI_cPLM Sm-X-L/ETH_A_Sk_MI_cLFD Sm-X-L/ETH_A_Sk_MI_cUPM Sm-X-L/ETH_A_Sk_MI_cEXM Sm-X-L/ETH_A_Sk_MI_cCSF Sm-X-L/ETH_A_Sk_MI_pFCSError

Processes

See process diagram and process description in clause 11.1.1.2. The additional Sm-X-L_AI_X_{AR} interface is not connected to any of the internal processes.

Defects

dPLM – See clause 6.2.4.2 of [ITU-T G.806].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← dCSF-FDI and CSFrdifdiEnable

NOTE 1 – XAR = 0 results in AI_TSF being asserted, so there is no need to include it as additional contributor to aSSF.

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

~~cUPM ← dUPM and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cCSF per clause 8.5.4.1.2 of [ITU-T G.806].~~

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pFCSError: Count of FrameCheckSequenceErrors per second.

NOTE 2 – This primitive is calculated by the MAC FCS process.

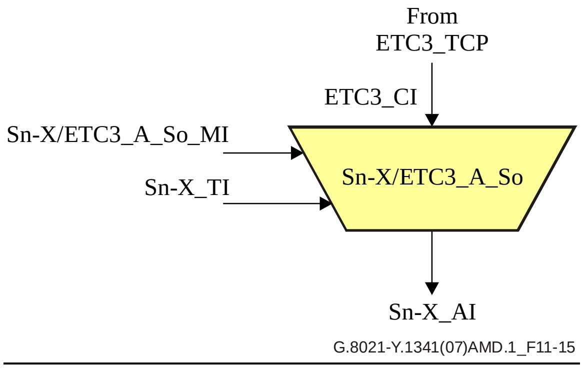
11.2 SDH/ETC adaptation functions (Sn4-X/ETC3_A)

11.2.1 VC-n4/ETC3 adaptation source function (Sn4-X/ETC3_A_So)

This function maps ETC_CI information from an ETC3 onto an Sn4-X_AI signal (n = 3, 4). This mapping is currently only defined for X = 7 for VC-4 and X = 22 for VC-3.

Data at the Sn4-X_AP is a VC-n4-Xv, having a payload as described in [ITU-T G.707], but with indeterminate POH bytes: J1, B3, G1.

Symbol



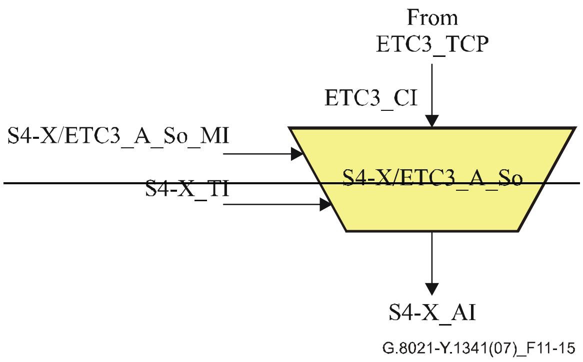


Figure 11-15 – Sn4-X/ETC3_A_So symbol

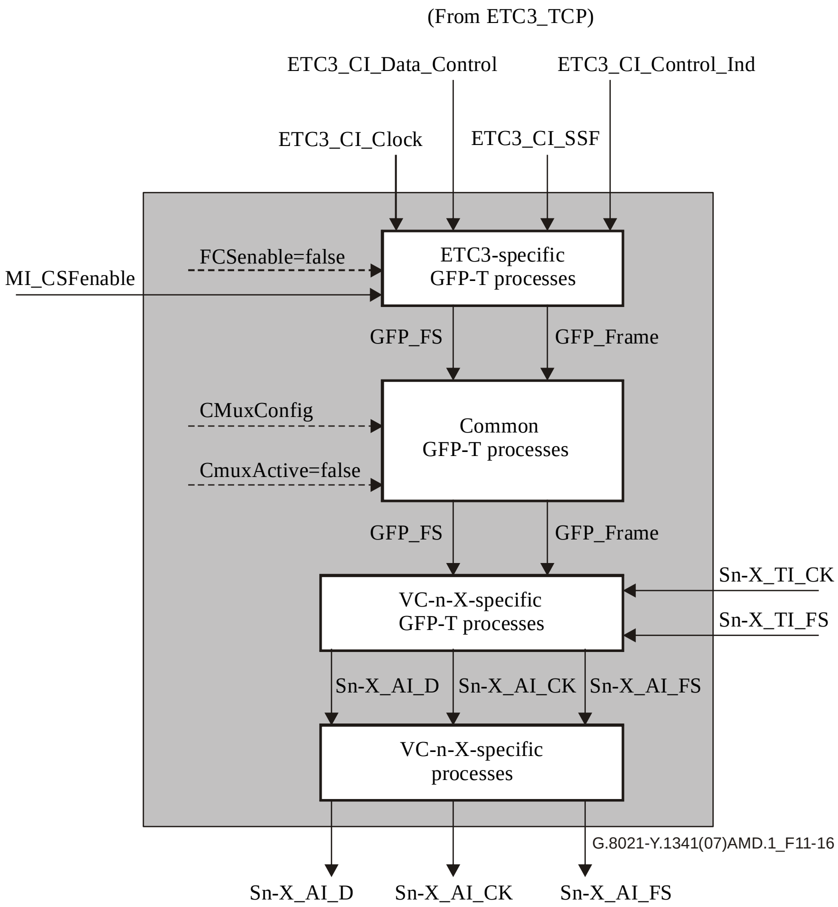
Interfaces

Table 11-9 – Sn4-X/ETC3_A_So interfaces

Inputs	Outputs
ETC3_TCP: ETC3_CI_Data_Control ETC3_CI_Clock ETC3_CI_Control_Ind ETC3_CI_SSF Sn4-X_TP: Sn4-X_TI_Clock Sn4-X_TI_FrameStart Sn4-X/ETC3_A_So_MP: Sn4-X/ETC3_A_So_MI_CSFEnable	Sn4-X_AP: Sn4-X_AI_Data Sn4-X_AI_Clock Sn4-X_AI_FrameStart

Processes

A process diagram of this function is shown in Figure 11-16.



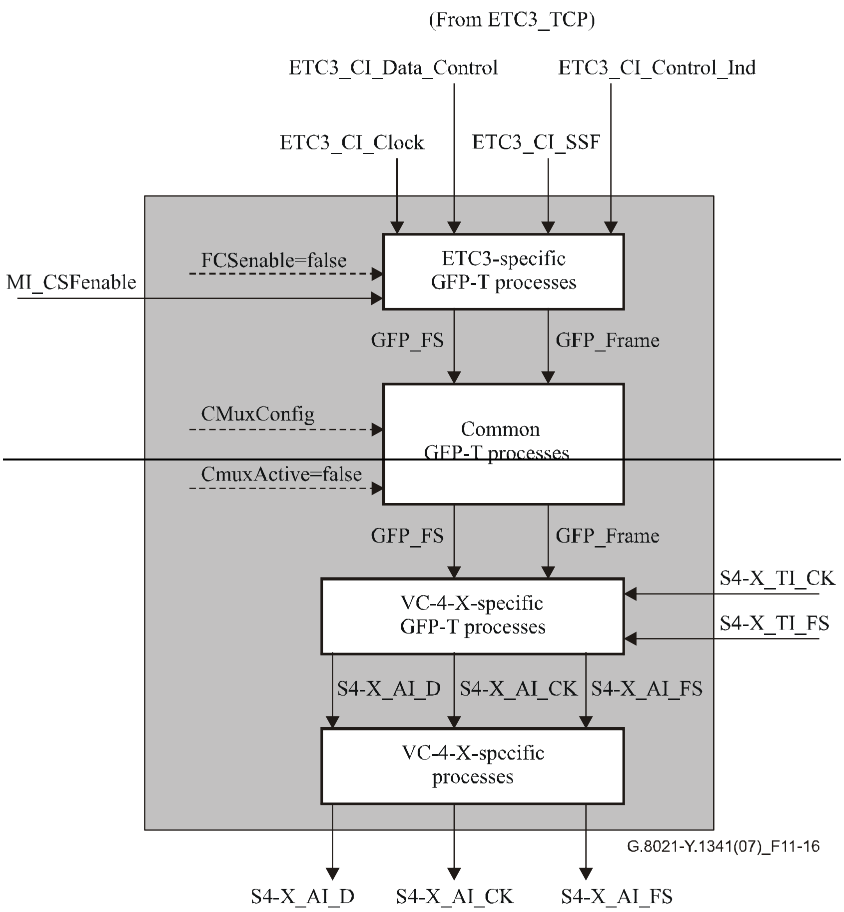


Figure 11-16 – Sn4-X/ETC3_A_So process diagram

Ethernet specific GFP-T source process

See clause 8.5.4.2.1 of [ITU-T G.806]. GFP pFCS generation is disabled (FCSenable=false). The UPI value for transparent Gb Ethernet shall be inserted (Table 6-3 of [ITU-T G.7041]). The Ethernet codeword information is inserted into the client payload information field of the GFP-T frames according to clause 8 of [ITU-T G.7041].

Response to ETC3_CI_SSF is according to the principles in clauses 8.3 and 8.3.4 of [ITU-T G.7041] and Appendix VIII of [ITU-T G.806]. Details are for further study.

Common GFP source process

See clause 8.5.3.1 of [ITU-T G.806]. GFP channel multiplexing is not supported (CMuxActive=false).

VC-n4-X-specific GFP source process

See clause 8.5.2.1 of [ITU-T G.806]. The GFP frames are mapped into the VC-4n-X(n = 3, 4) payload area according to clause 10.6 of [ITU-T G.707].

VC-n4-X-specific source process

C2: Signal label information is derived directly from the adaptation function type. The value for "GFP mapping" in Table 9-11 of [ITU-T G.707] is placed in the C2 byte position.

NOTE – For Sn4-X/ETC3_A_So, the H4, K3, F2, and F3 bytes are undefined at the Sn4-X_AP output of this function (as per clause 12 of [ITU-T G.783]).

Defects None.

Consequent actions None.

aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable

aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable

aCSF-LOS ← CI_SSF and CSFEnable

Defect correlations None.

Performance monitoring For further study.

11.2.2 VC-n4-X/ETC3 adaptation sink function (Sn4-X/ETC3_A_Sk)

This function extracts ETC3_CI information from the Sn4-X_AI signal (n = 3, 4), delivering ETC3_CI to the ETC3_TCP. This mapping is currently only defined for X = 7 for VC-4 and X = 22 for VC-3.

Data at the Sn4-X_AP is as described in [ITU-T G.707].

Symbol

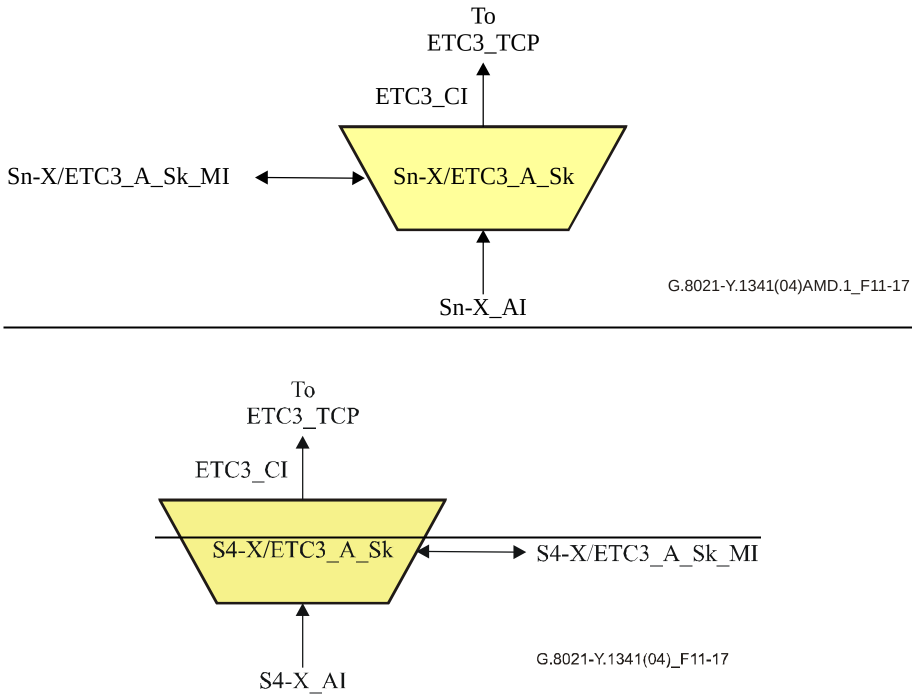


Figure 11-17 – Sn4-X/ETC3_A_Sk symbol

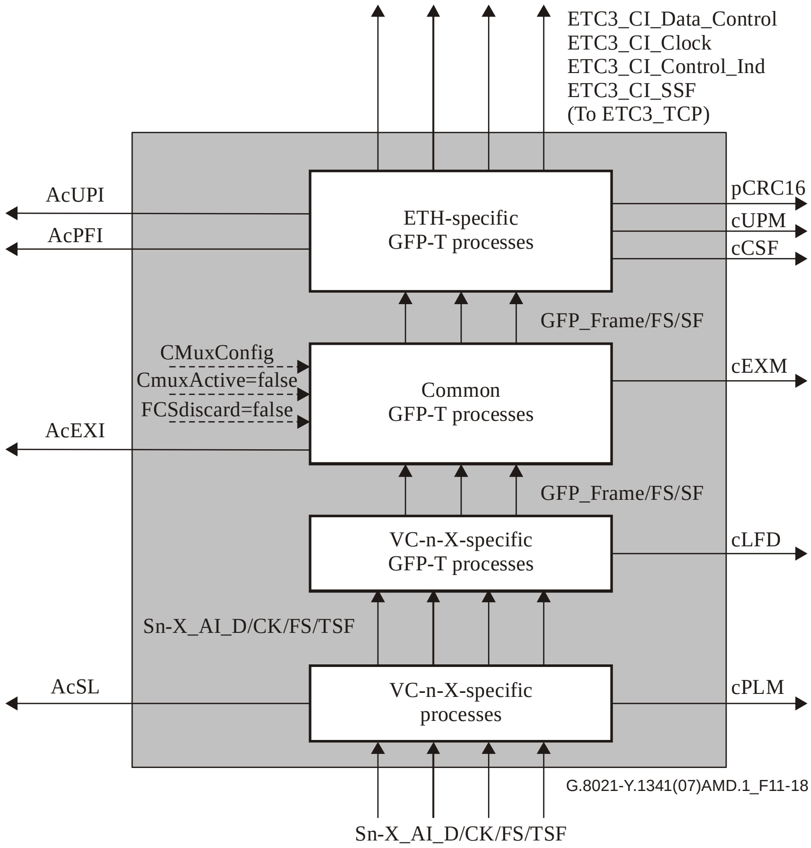
Interfaces

Table 11-10 – Sn4-X/ETC3_A_Sk interfaces

Inputs	Outputs
Sn4-X_AP: Sn4-X_AI_Data Sn4-X_AI_ClocK Sn4-X_AI_FrameStart Sn4-X_AI_TSF Sn4-X/ETC3_A_Sk_MI: Sn4-X/ETC3_A_Sk_MI_CSF_Reported	ETC3_TCP: ETC3_CI_Data_Control ETC3_CI_Clock ETC3_CI_Control_Ind ETC3_CI_SSF Sn4-X/ETC3_A_Sk_MI: Sn4-X/ETC3_A_Sk_MI_AcSL Sn4-X/ETC3_A_Sk_MI_AcEXI Sn4-X/ETC3_A_Sk_MI_AcPFI Sn4-X/ETC3_A_Sk_MI_AcUPI Sn4-X/ETC3_A_Sk_MI_cPLM Sn4-X/ETC3_A_Sk_MI_cLFD Sn4-X/ETC3_A_Sk_MI_cUPM Sn4-X/ETC3_A_Sk_MI_cEXM Sn4-X/ETC3_A_Sk_MI_cCSF Sn4-X/ETC3_A_Sk_MI_pCRC16Errors

Processes

A process diagram of this function is shown in Figure 11-18.



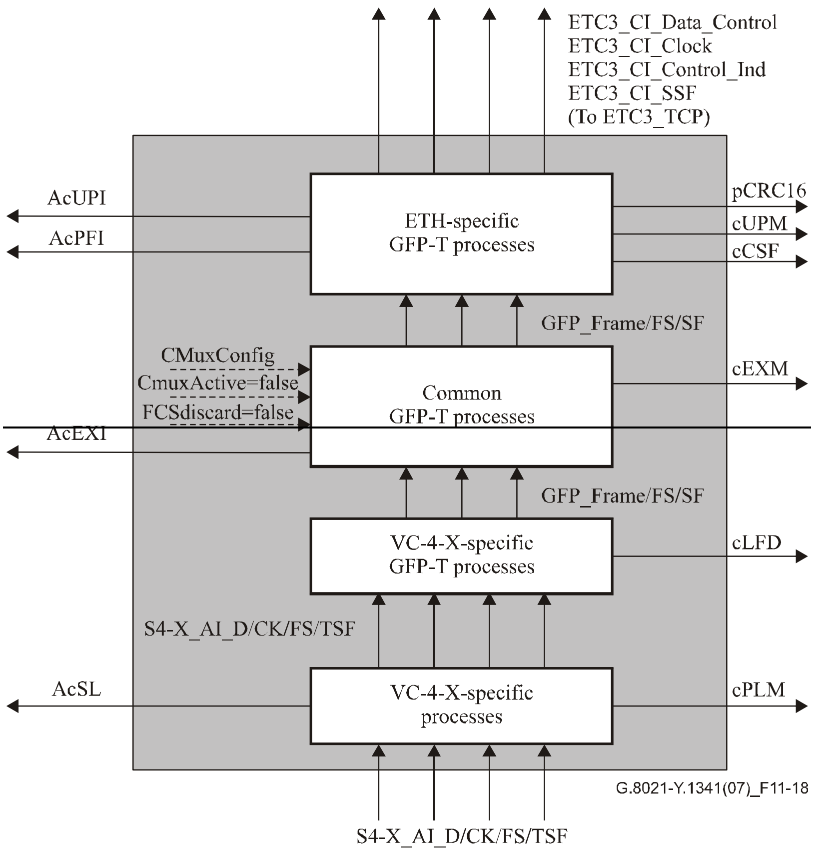


Figure 11-18 – Sn4-X/ETC3_A_Sk process diagram

Ethernet-specific GFP-T sink process

See clause 8.5.4.2.2 of [ITU-T G.806]. GFP pFCS checking and GFP p_FCSError, are not supported (FCSdiscard=false). The UPI value for Transparent Gb Ethernet shall be expected (Table 6-3 of [ITU-T G.7041]). Frames discarded due to incorrect PFI or UPI values shall be counted in _pFDis. Errors detected in a received superblock are reported as a _pCRC16Error. If ECenable=true, then single transmission channel errors in the superblock shall be corrected using the superblock CRC-16. The Ethernet codeword information is extracted from the client payload information field of the GFP-F frames according to clause 8 of [ITU-T G.7041].

Common GFP sink process

See clause 8.5.3.2~~1~~ of [ITU-T G.806]. GFP channel multiplexing is not supported (MI_CMuxActive=false). Frames discarded due to EXI mismatch or errors detected by the tHEC shall be counted in _pFDis.

VC-n~~4~~-X-specific GFP sink process

See clause 8.5.2.2 of [ITU-T G.806]. The GFP frames are demapped from the VC-n~~4~~-X payload area according to clause 10.6 of [ITU-T G.707].

VC-n~~4~~-X-specific sink process

C2: The signal label is recovered from the C2 byte as per clause 6.2.4.2 of [ITU-T G.806]. The signal label for "GFP mapping" in Table 9-11 of [ITU-T G.707] shall be expected. The accepted value of the signal label is also available at the Sn-X/ETC3~~Sn/ETH~~_A_Sk_MP.

Defects

dPLM – See clause 6.2.4.2 of [ITU-T G.806].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF – See clause 6.2.6.4 of [ITU-T G.806].

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

~~cUPM ← dUPM and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

cCSF per clause 8.5.4.2.2 of [ITU-T G.806].

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pCRC16Errors: Count of superblock CRC-16 errors per second:

_pFDis = sum (n_FDis_tHEC + n_FDis_eHEC_EXI + n_FDis_PTI_UPI)

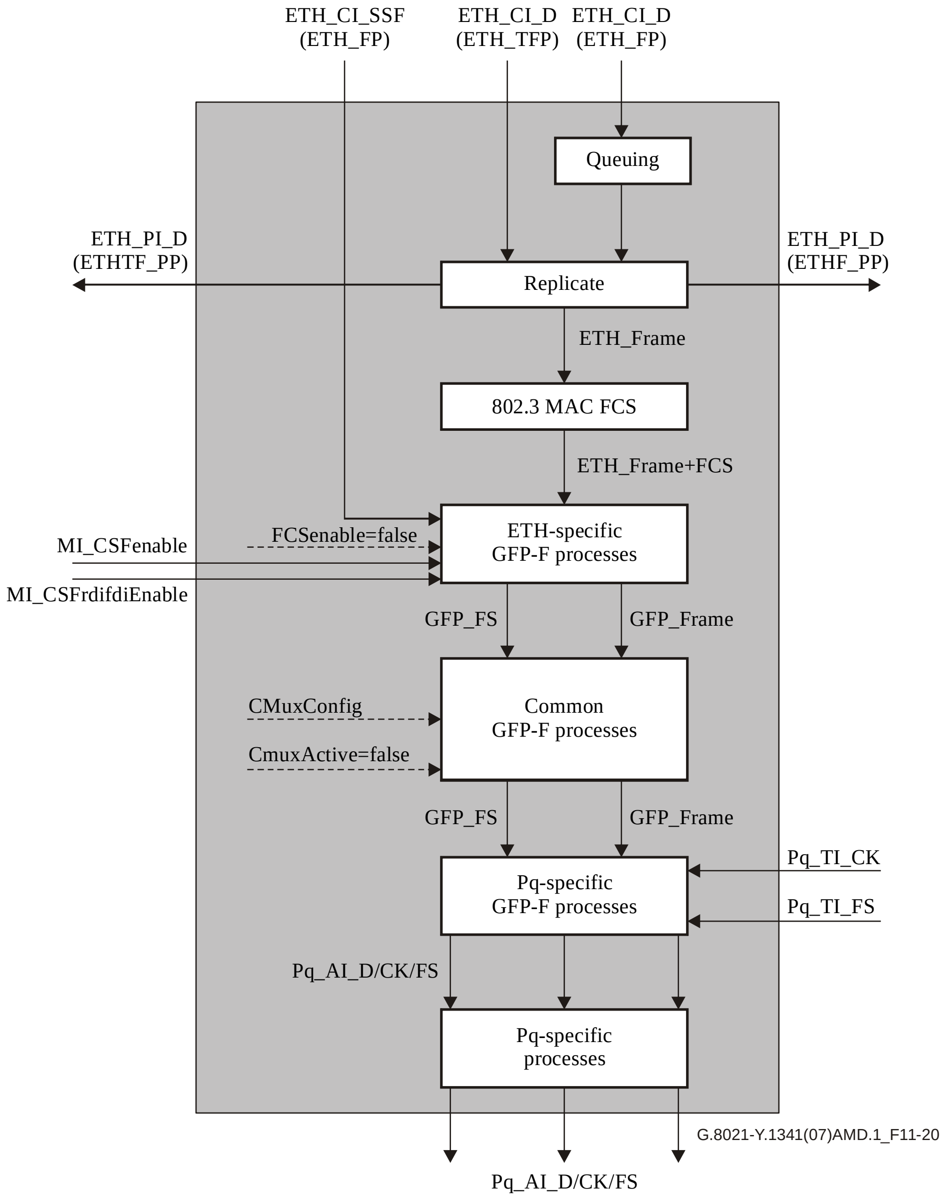
• • •

Table 11-11 – Pq/ETH_A_So interfaces

Inputs	**Outputs**
ETH_TFP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_FP: ETH_CI_Data ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Pq_TP: Pq_TI_ClocK Pq_TI_FrameStart Pq/ETH_A_So_MP: Pq/ETH_A_So_MI_CSFEnable Pq/ETH_A_So_MI_CSFrdifdiEnable	Pq_AP: Pq_AI_Data Pq_AI_ClocK Pq_AI_FrameStart ETHF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ETHTF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE

Processes

A process diagram of this function is shown in Figure 11-20.


ETH_CI_SSF
(ETH_FP)
ETH_CI_D
(ETH_TFP)
ETH_CI_D
(ETH_FP)
Queuing
ETH_PI_D
(ETHTF_PP)
ETH_PI_D
(ETHF_PP)
Replicate
ETH_Frame
802.3 MAC FCS
ETH_Frame+FCS
MI_CSFenable
FCSenable=false
ETH-specific
GFP-F processes
MI_CSFrdifdiEnable
GFP_FS
GFP_Frame
CMuxConfig
Common
GFP-F processes
CmuxActive=false
GFP_FS
GFP_Frame
Pq_TI_CK
Pq-specific
GFP-F processes
Pq_TI_FS
Pq_AI_D/CK/FS
Pq-specific
processes
G.8021-Y.1341(07)AMD.1_F11-20
Pq_AI_D/CK/FS

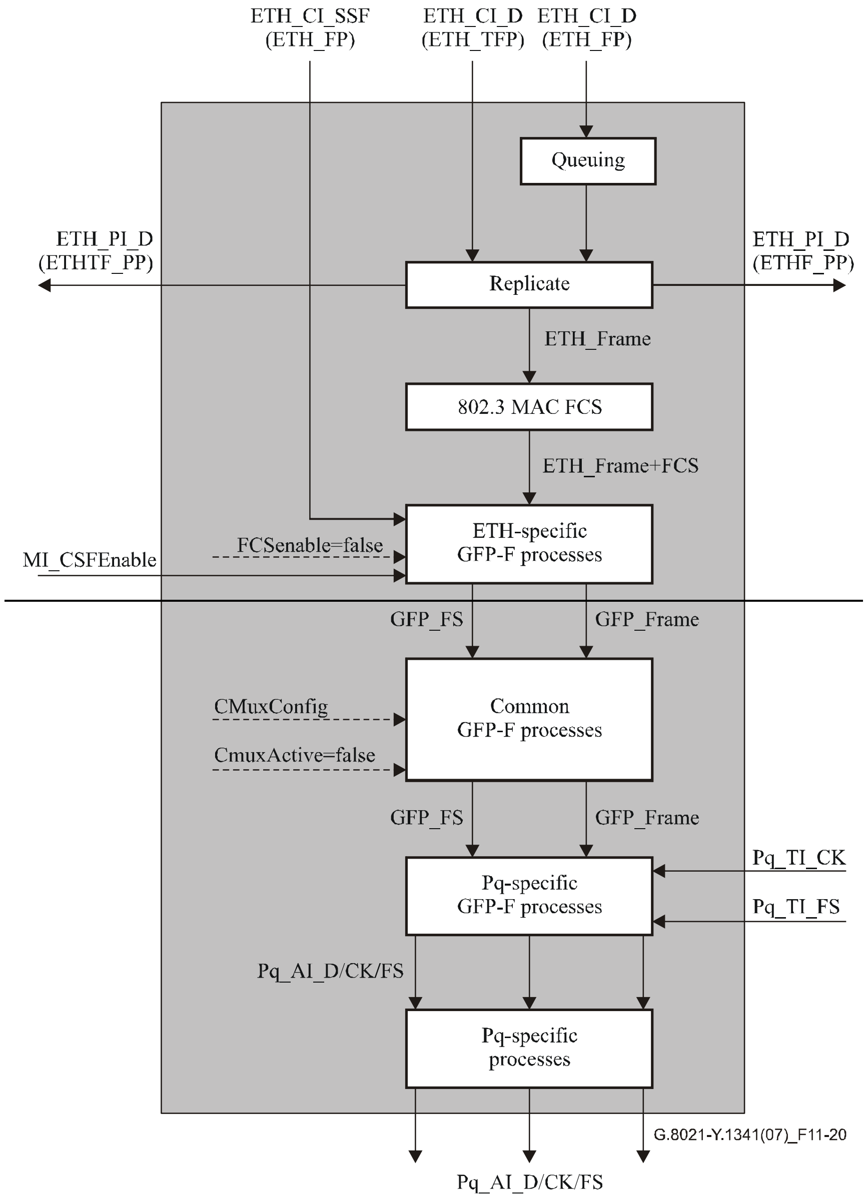


Figure 11-20 – Pq/ETH_A_So process diagram

…

Defects None.

Consequent actions ~~None.~~

aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable

aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable

aCSF-LOS ← CI_SSF and CSFEnable

Defect correlations None.

Performance monitoring For further study.

11.4.1.2 Pq/ETH adaptation sink function (Pq/ETH_A_Sk)

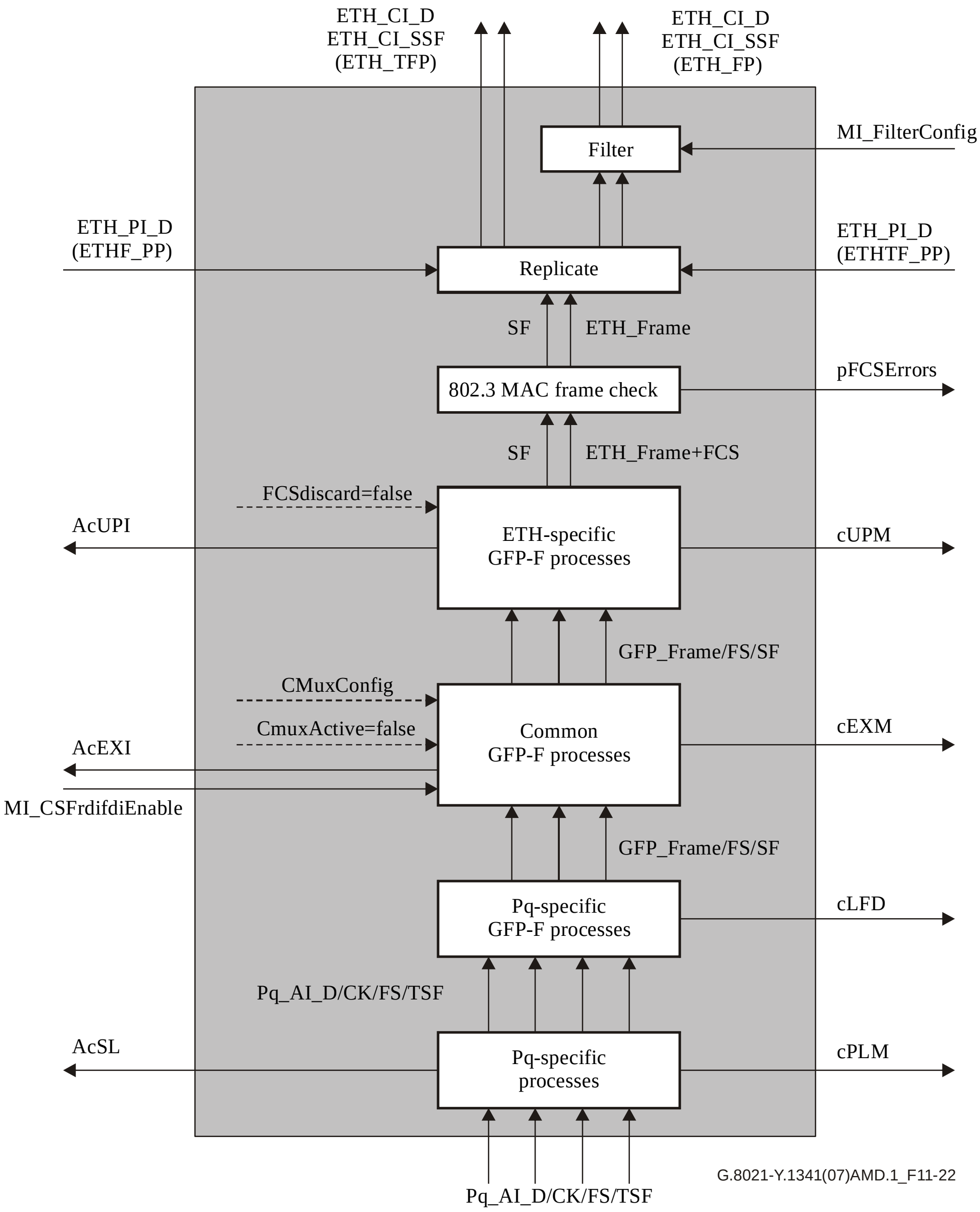
…

Table 11-12 – Pq/ETH_A_Sk interfaces

Inputs	Outputs
Pq_AP: Pq_AI_Data Pq_AI_ClocK Pq_AI_FrameStart Pq_AI_TSF ETHF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ETHTF_PP: ETH_PI_D ETH_PI_P Pq/ETH_A_Sk_MP: Pq/ETH_A_Sk_MI_FilterConfig Pq/ETH_A_Sk_MI_CSF_Reported Pq/ETH_A_Sk_MI_CSFrdifdiEnable	ETH_TFP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Pq/ETH_A_Sk_MP: Pq/ETH_A_Sk_MI_AcSL Pq/ETH_A_Sk_MI_AcEXI Pq/ETH_A_Sk_MI_AcUPI Pq/ETH_A_Sk_MI_cPLM Pq/ETH_A_Sk_MI_cLFD Pq/ETH_A_Sk_MI_cUPM Pq/ETH_A_Sk_MI_cEXM Pq/ETH_A_Sk_MI_cCSF Pq/ETH_A_Sk_MI_pFCSError

Processes

A process diagram of this function is shown in Figure 11-22.


ETH_CI_D
ETH_CI_SSF
(ETH_TFP)
ETH_CI_D
ETH_CI_SSF
(ETH_FP)
Filter
MI_FilterConfig
ETH_PI_D
(ETHF_PP)
Replicate
ETH_PI_D
(ETHTF_PP)
SF
ETH_Frame
802.3 MAC frame check
pFCSErrors
SF
ETH_Frame+FCS
FCSdiscard=false
AcUPI
ETH-specific
GFP-F processes
cUPM
GFP_Frame/FS/SF
CMuxConfig
CmuxActive=false
AcEXI
Common
GFP-F processes
cEXM
MI_CSFrdifdiEnable
GFP_Frame/FS/SF
Pq-specific
GFP-F processes
cLFD
Pq_AI_D/CK/FS/TSF
AcSL
Pq-specific
processes
cPLM
Pq_AI_D/CK/FS/TSF
G.8021-Y.1341(07)AMD.1_F11-22

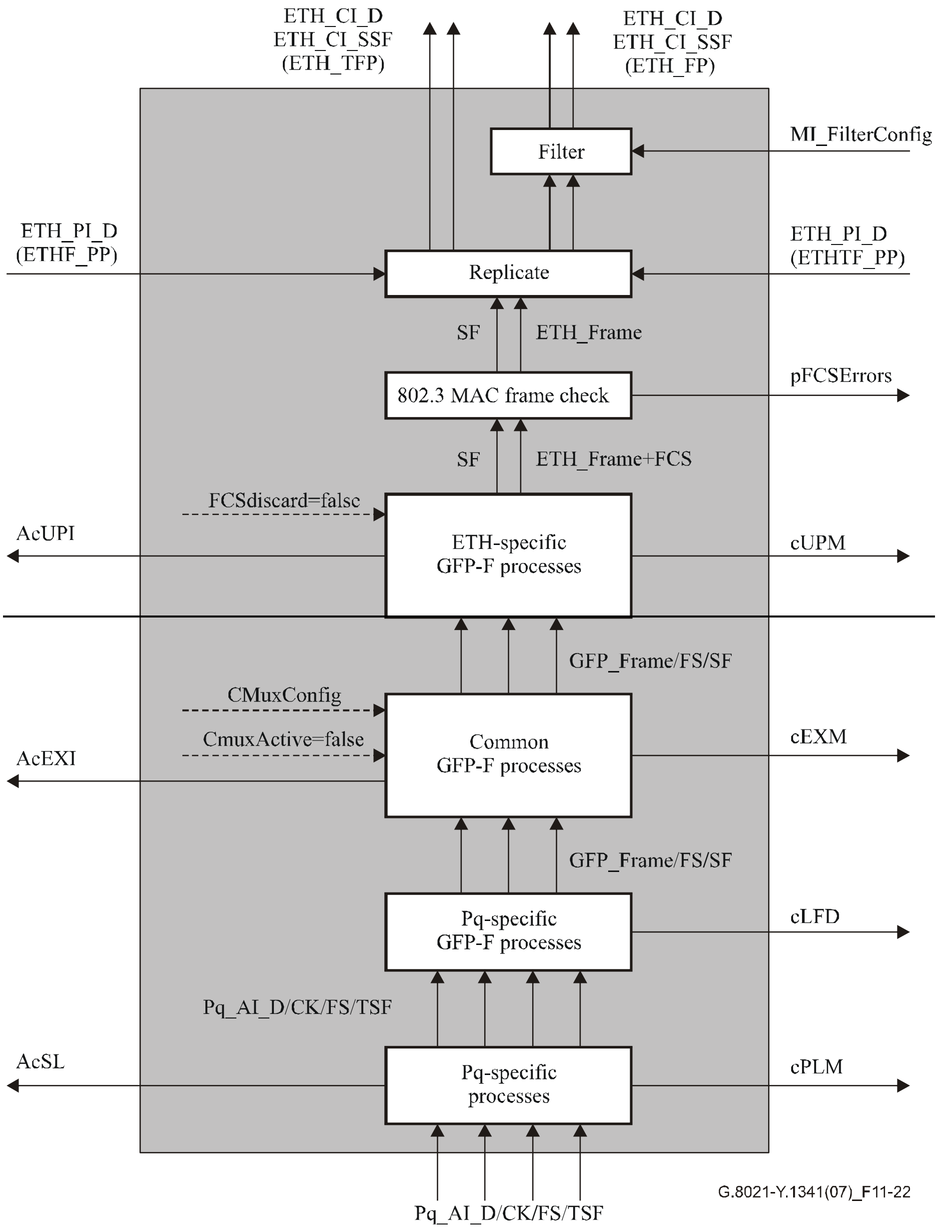


Figure 11-22 – Pq/ETH_A_Sk process diagram

• • •

Defects

dPLM – See clause 6.2.4.2 of [ITU-T G.806].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

NOTE 2 – dPLM is only defined for q = 31s. dPLM is assumed to be false for q = 11s, 12s, 32e.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← dCSF-FDI and CSFrdifdiEnable

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

~~cUPM ← dUPM and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cCSF per clause 8.5.4.1.2 of [ITU-T G.806].~~

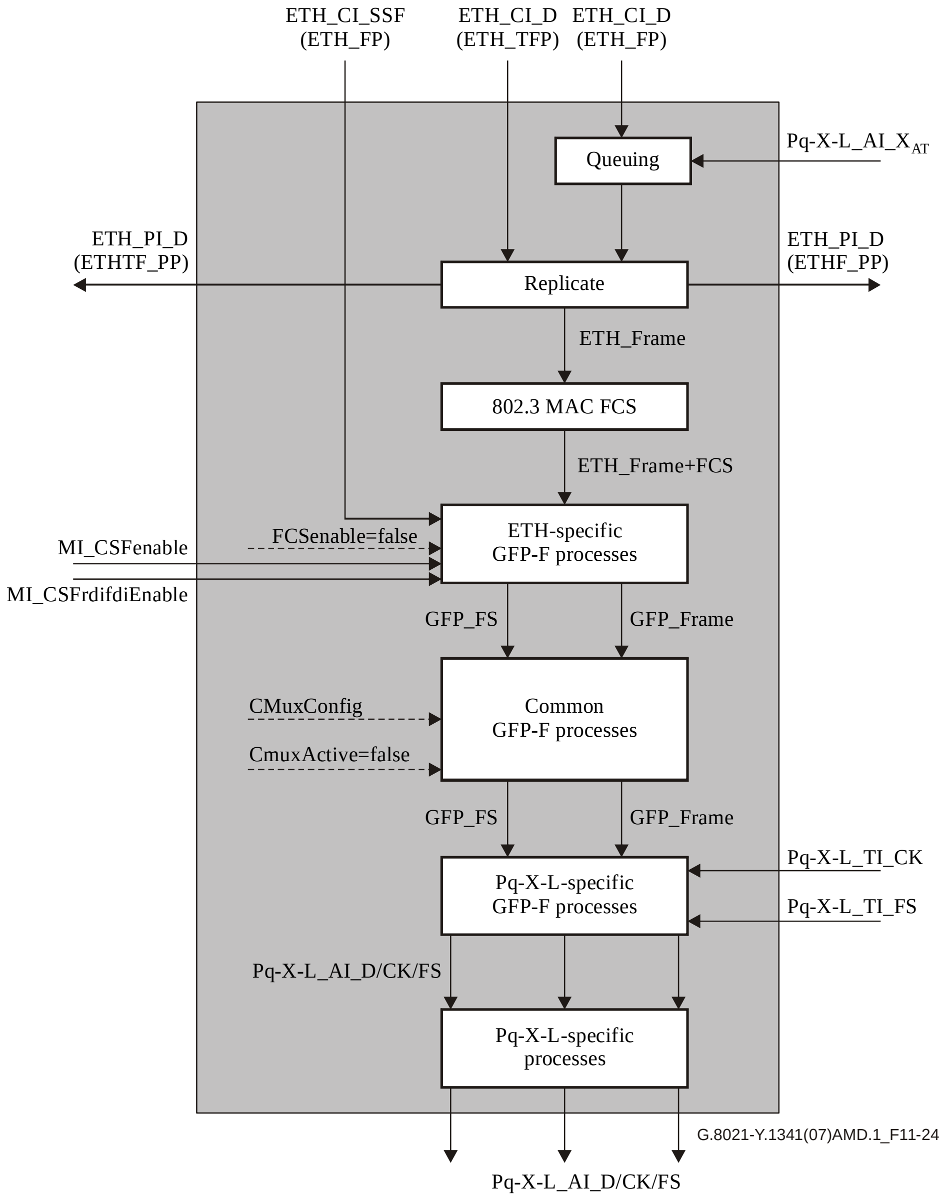
•••

Table 11-13 – Pq-X-L/ETH_A_So interfaces

Inputs	Outputs
ETH_TFP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Pq-X-L_AP: Pq-X-L_AI_X_{AT} Pq-X-L_TP: Pq-X-L_TI_ClocK Pq-X-L_TI_FrameStart Pq-X-L/ETH_A_So_MP: Pq-X-L/ETH_A_So_MI_CSFEnable Pq-X-L/ETH_A_So_MI_CSFrdifdiEnable	Pq-X-L_AP: Pq-X-L_AI_Data Pq-X-L_AI_ClocK Pq-X-L_AI_FrameStart ETHF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ETHTF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE

Processes

A process diagram of this function is shown in Figure 11-24.


ETH_CI_SSF
(ETH_FP)
ETH_CI_D
(ETH_TFP)
ETH_CI_D
(ETH_FP)
Queuing
Pq-X-L_AI_X_AT
ETH_PI_D
(ETHTF_PP)
Replicate
ETH_PI_D
(ETHF_PP)
ETH_Frame
802.3 MAC FCS
ETH_Frame+FCS
FCSenable=false
MI_CSFenable
ETH-specific
GFP-F processes
MI_CSFrdifdiEnable
GFP_FS
GFP_Frame
CMuxConfig
Common
GFP-F processes
CmuxActive=false
GFP_FS
GFP_Frame
Pq-X-L_TI_CK
Pq-X-L-specific
GFP-F processes
Pq-X-L_TI_FS
Pq-X-L_AI_D/CK/FS
Pq-X-L-specific
processes
G.8021-Y.1341(07)AMD.1_F11-24
Pq-X-L_AI_D/CK/FS

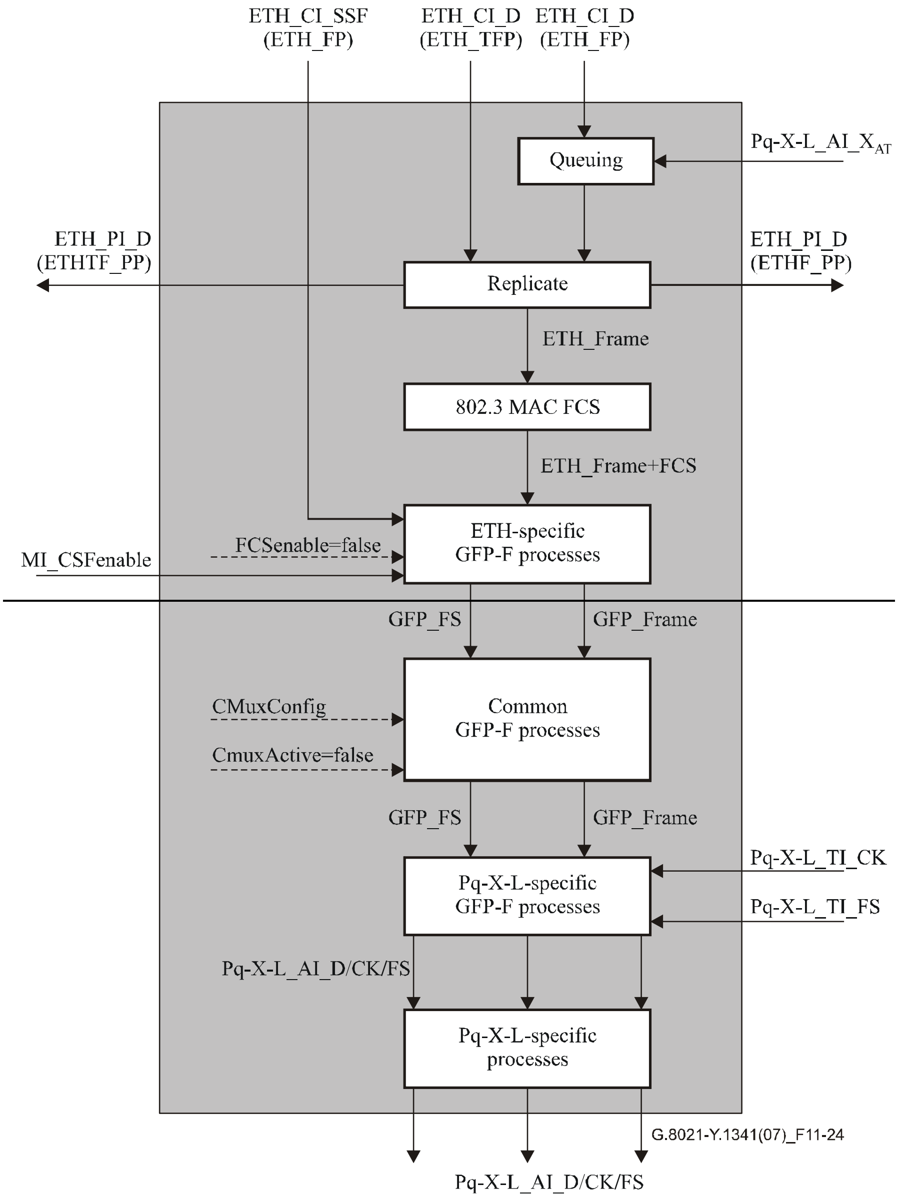


Figure 11-24 – Pq-X-L/ETH_A_So process diagram

…

Defects None.

Consequent actions ~~None.~~

aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable

aCSF-RDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable

aCSF-LOS ← CI_SSF and CSFEnable

Defect correlations None.

Performance monitoring For further study.

11.4.2.2 LCAS-capable Pq-Xv/ETH adaptation sink function (Pq-X-L/ETH_A_Sk)

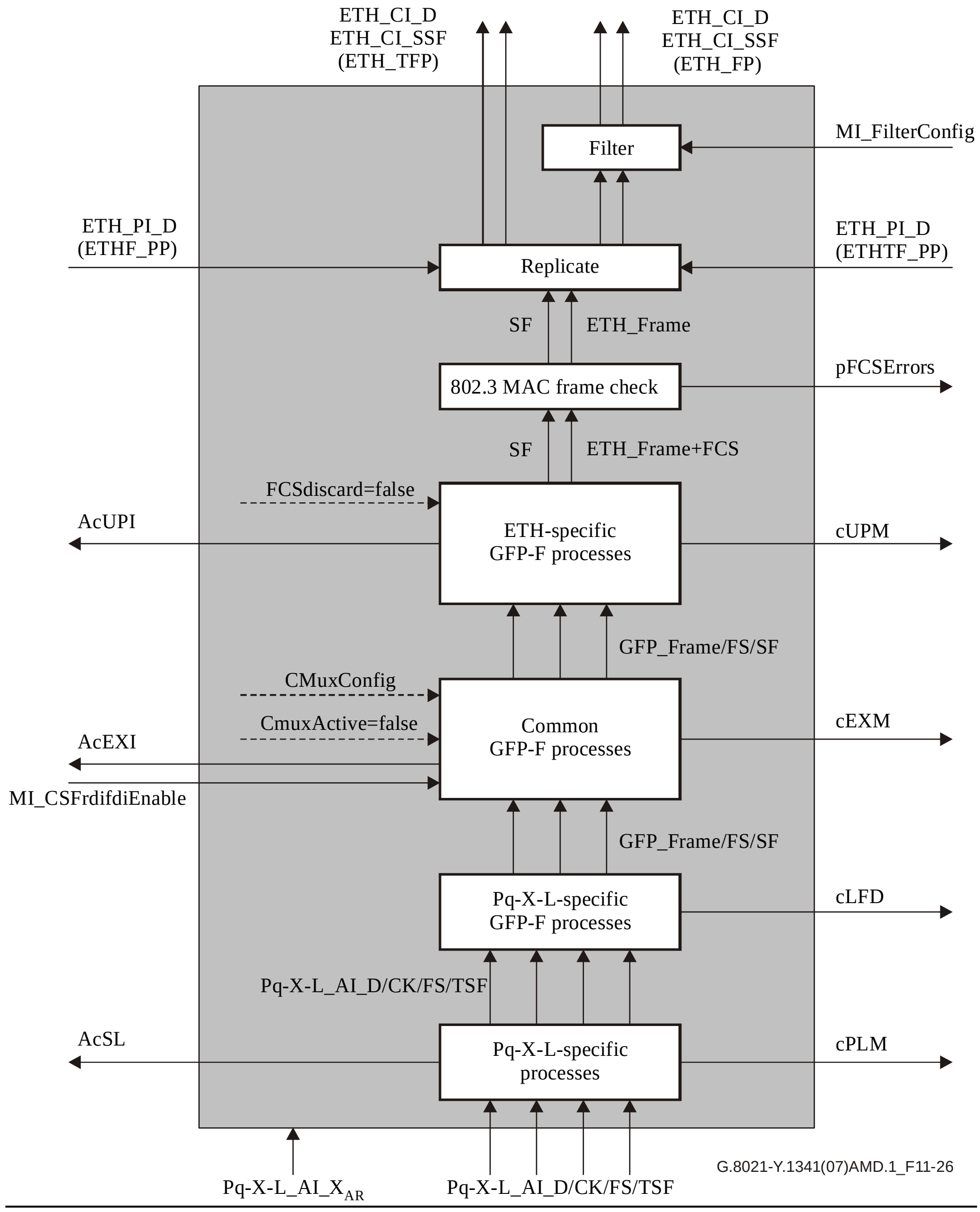
…

Table 11-14 – Pq-X-L/ETH_A_Sk interfaces

Inputs	Outputs
Pq-X-L_AP: Pq-X-L_AI_Data Pq-X-L_AI_ClocK Pq-X-L_AI_FrameStart Pq-X-L_AI_TSF Pq-X-L_AI_X_{AR} ETHF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ETHTF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE Pq-X-L/ETH_A_Sk_MP: Pq-X-L/ETH_A_Sk_MI_FilterConfig Pq-X-L/ETH_A_Sk_MI_CSF_Reported Pq-X-L/ETH_A_Sk_MI_CSFrdifdiEnable	ETH_TFP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi Pq-X-L/ETH_A_Sk_MP: Pq-X-L/ETH_A_Sk_MI_AcSL Pq-X-L/ETH_A_Sk_MI_AcEXI Pq-X-L/ETH_A_Sk_MI_AcUPI Pq-X-L/ETH_A_Sk_MI_cPLM Pq-X-L/ETH_A_Sk_MI_cLFD Pq-X-L/ETH_A_Sk_MI_cUPM Pq-X-L/ETH_A_Sk_MI_cEXM Pq-X-L/ETH_A_Sk_MI_cCSF Pq-X-L/ETH_A_Sk_MI_pFCSError

Processes

A process diagram of this function is shown in Figure 11-26.


ETH_CI_D
ETH_CI_SSF
(ETH_TFP)
ETH_CI_D
ETH_CI_SSF
(ETH_FP)
Filter
MI_FilterConfig
ETH_PI_D
(ETHF_PP)
Replicate
ETH_PI_D
(ETHTF_PP)
SF
ETH_Frame
802.3 MAC frame check
pFCSErrors
SF
ETH_Frame+FCS
FCSdiscard=false
AcUPI
ETH-specific
GFP-F processes
cUPM
GFP_Frame/FS/SF
CMuxConfig
CmuxActive=false
AcEXI
Common
GFP-F processes
cEXM
MI_CSFrdifdiEnable
GFP_Frame/FS/SF
Pq-X-L-specific
GFP-F processes
cLFD
Pq-X-L_AI_D/CK/FS/TSF
AcSL
Pq-X-L-specific
processes
cPLM
Pq-X-L_AI_X_AR
Pq-X-L_AI_D/CK/FS/TSF
G.8021-Y.1341(07)AMD.1_F11-26

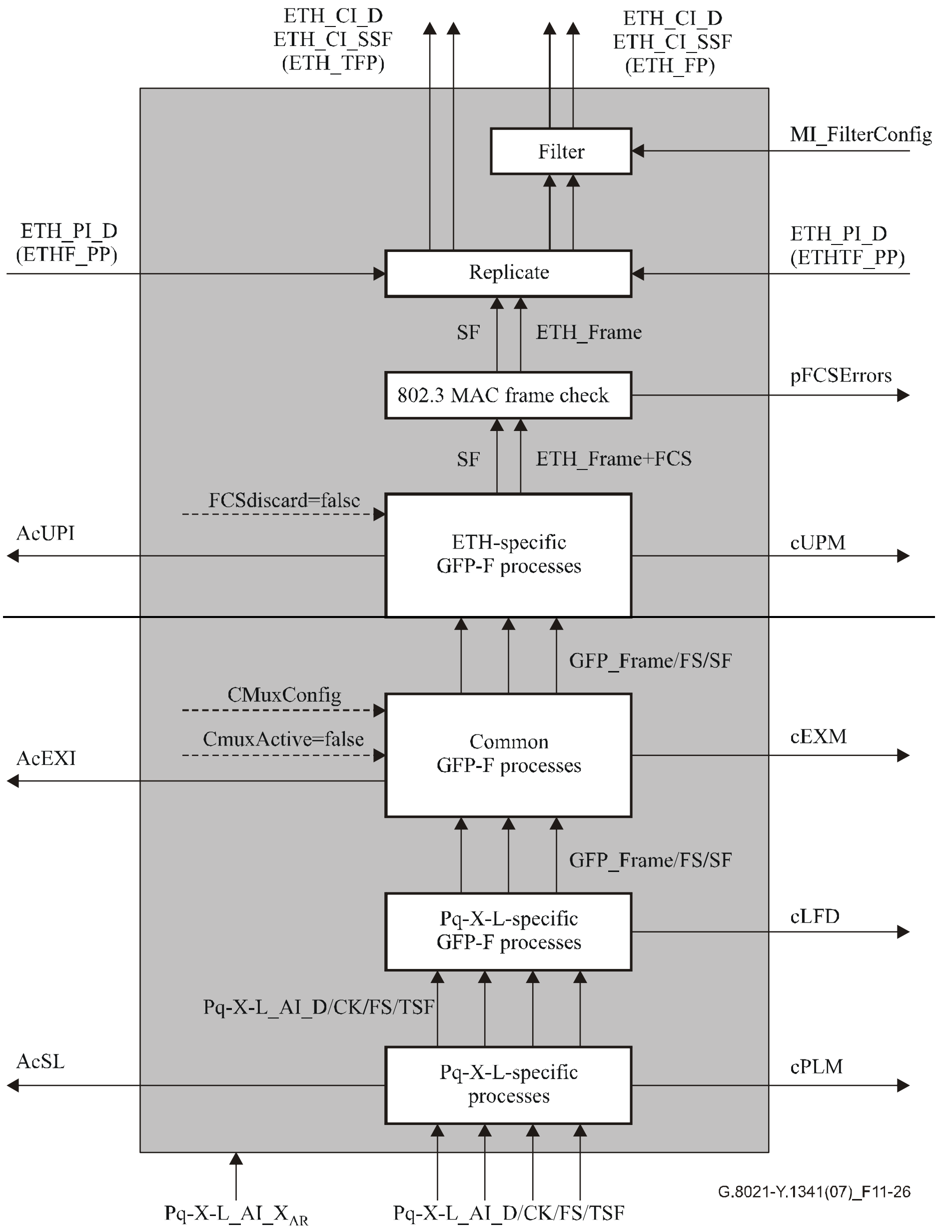


Figure 11-26 – Pq-X-L/ETH_A_Sk process diagram

…

Defects

dPLM – See clause 6.2.4.2 of [ITU-T G.806].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

NOTE 2 – dPLM is only defined for q = 31s. dPLM is assumed to be false for q = 11s, 12s, 32e.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← dCSF-FDI and CSFrdifdiEnable

NOTE 3 – X_{AR}=0 results in AI_TSF being asserted, so there is no need to include it as additional contributor to aSSF.

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

~~cUPM ← dUPM and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cCSF per clause 8.5.4.1.2 of [ITU-T G.806].~~

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pFCSError: Count of FrameCheckSequenceErrors per second.

NOTE 4 – This primitive is calculated by the MAC FCS check process.

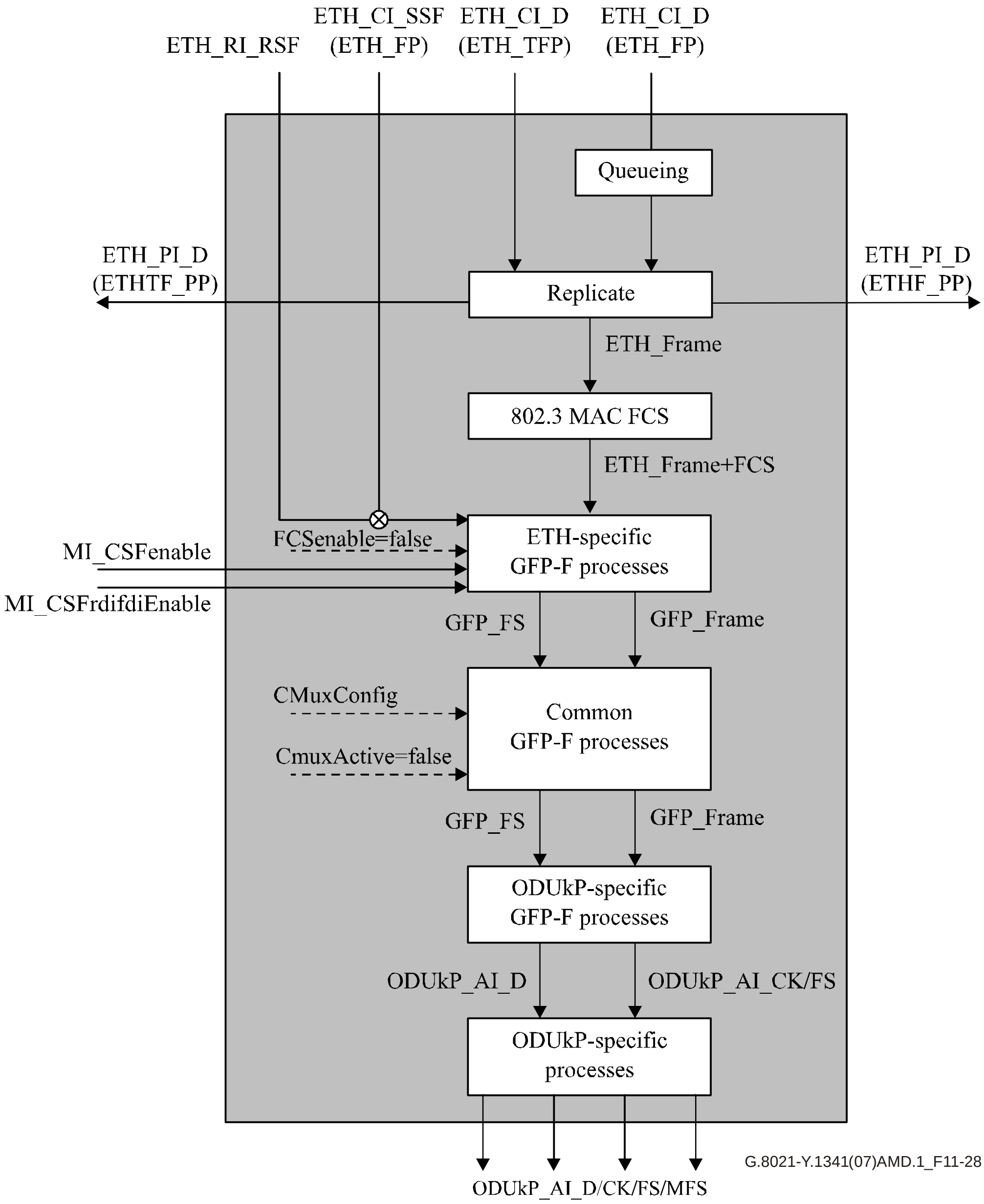
• • •

Table 11-15 – ODUkP/ETH_A_So interfaces

Inputs	Outputs
ETH_TFP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi ETH_RP: ETH_RI_RSF ODUkP/ETH_A_So_MI: ODUkP/ETH_A_So_MI_Active ODUkP/ETH_A_So_MI_CSFEnable ODUkP/ETH_A_So_MI_CSFrdifdiEnable	ODUkP_AP: ODUkP_AI_Data ODUkP_AI_Clock ODUkP_AI_FrameStart ODUkP_AI_MultiframeStart ETHF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ETHTF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE

Processes

A process diagram of this function is shown in Figure 11-28.


ETH_RI_RSF
ETH_CI_SSF
(ETH_FP)
ETH_CI_D
(ETH_TFP)
ETH_CI_D
(ETH_FP)
Queueing
ETH_PI_D
(ETHTF_PP)
Replicate
ETH_PI_D
(ETHF_PP)
ETH_Frame
802.3 MAC FCS
ETH_Frame+FCS
MI_CSFenable
FCSenable=false
ETH-specific
GFP-F processes
MI_CSFrdifdiEnable
GFP_FS
GFP_Frame
CMuxConfig
Common
GFP-F processes
CmuxActive=false
GFP_FS
GFP_Frame
ODUkP-specific
GFP-F processes
ODUkP_AI_D
ODUkP_AI_CK/FS
ODUkP-specific
processes
ODUkP_AI_D/CK/FS/MFS
G.8021-Y.1341(07)AMD.1_F11-28

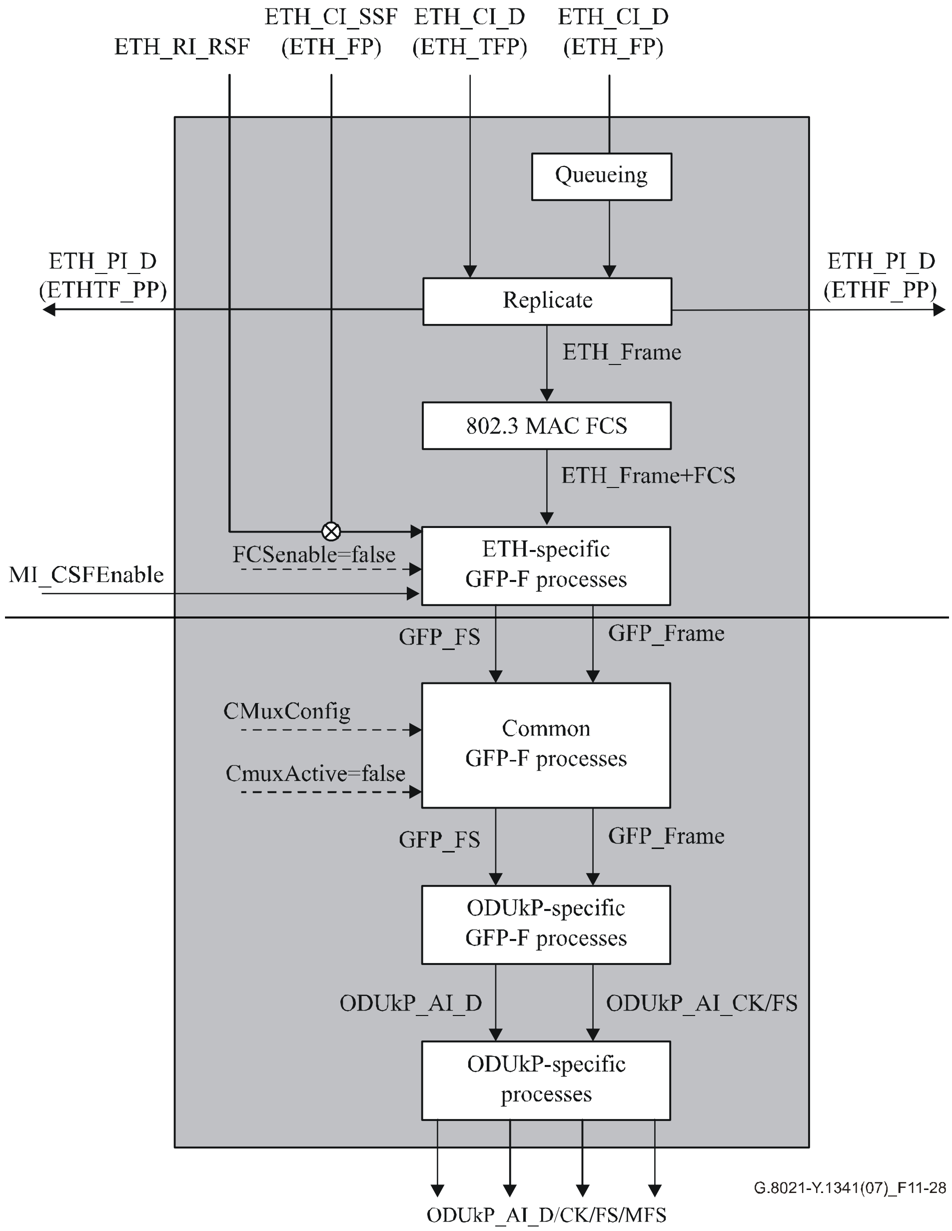


Figure 11-28 – ODUkP/ETH_A_So process diagram

• • •

Defects None.

Consequent actions ~~None.~~

<u>aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable</u>

<u>aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable</u>

<u>aCSF-LOS ← CI_SSF and CSFEnable</u>

Defect correlations None.

Performance monitoring For further study.

11.5.1.2 ODUk/ETH adaptation sink function (ODUkP/ETH_A_Sk)

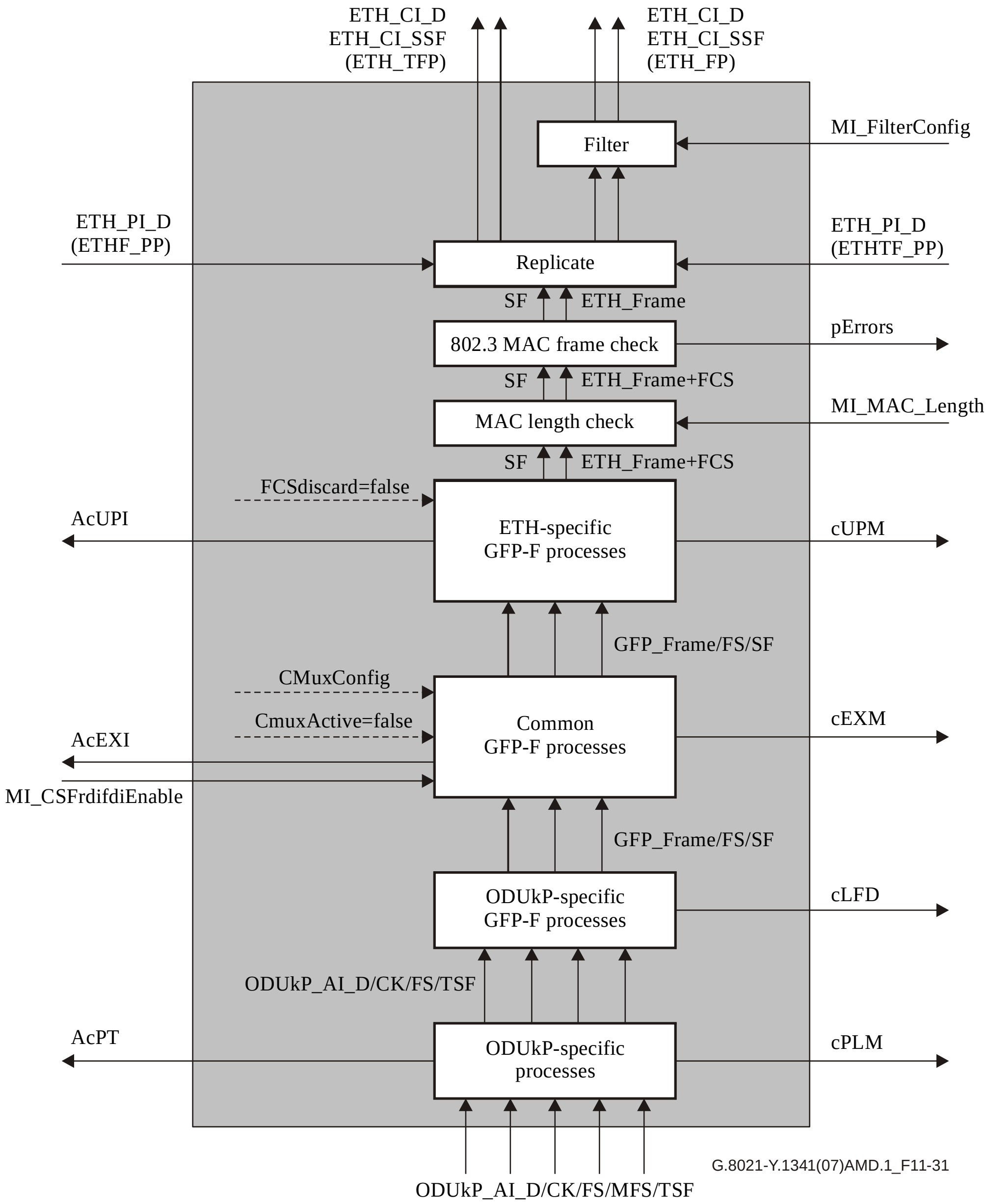
• • •

Table 11-16 – ODUkP/ETH_A_Sk interfaces

Inputs	Outputs
ODUkP_AP: ODUkP_AI_Data ODUkP_AI_ClocK ODUkP_AI_FrameStart ODUkP_AI_MultiframeStart ODUkP_AI_TSF ETHF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ETHTF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ODUkP/ETH_A_Sk_MI: ODUkP/ETH_A_Sk_MI_Active ODUkP/ETH_A_Sk_MI_FilterConfig ODUkP/ETH_A_Sk_MI_CSF_Reported ODUkP/ETH_A_Sk_MI_MAC_Length ODUkP/ETH_A_Sk_MI_CSFrdifdiEnable	ETH_TFP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi ETH_RP: ETH_RI_RSF ODUkP/ETH_A_Sk_MI: ODUkP/ETH_A_Sk_MI_AcPT ODUkP/ETH_A_Sk_MI_AcEXI ODUkP/ETH_A_Sk_MI_AcUPI ODUkP/ETH_A_Sk_MI_cPLM ODUkP/ETH_A_Sk_MI_cLFD ODUkP/ETH_A_Sk_MI_cUPM ODUkP/ETH_A_Sk_MI_cEXM ODUkP/ETH_A_Sk_MI_cCSF ODUkP/ETH_A_Sk_MI_pFCSErrors

Processes

A process diagram of this function is shown in Figure 11-31.


ETH_CI_D
ETH_CI_SSF
(ETH_TFP)
ETH_CI_D
ETH_CI_SSF
(ETH_FP)
Filter
MI_FilterConfig
ETH_PI_D
(ETHF_PP)
ETH_PI_D
(ETHTF_PP)
Replicate
SF
ETH_Frame
802.3 MAC frame check
pErrors
SF
ETH_Frame+FCS
MAC length check
MI_MAC_Length
SF
ETH_Frame+FCS
FCSdiscard=false
AcUPI
ETH-specific
GFP-F processes
cUPM
GFP_Frame/FS/SF
CMuxConfig
CmuxActive=false
AcEXI
Common
GFP-F processes
cEXM
MI_CSFrdifdiEnable
GFP_Frame/FS/SF
ODUkP-specific
GFP-F processes
cLFD
ODUkP_AI_D/CK/FS/TSF
AcPT
ODUkP-specific
processes
cPLM
G.8021-Y.1341(07)AMD.1_F11-31
ODUkP_AI_D/CK/FS/MFS/TSF

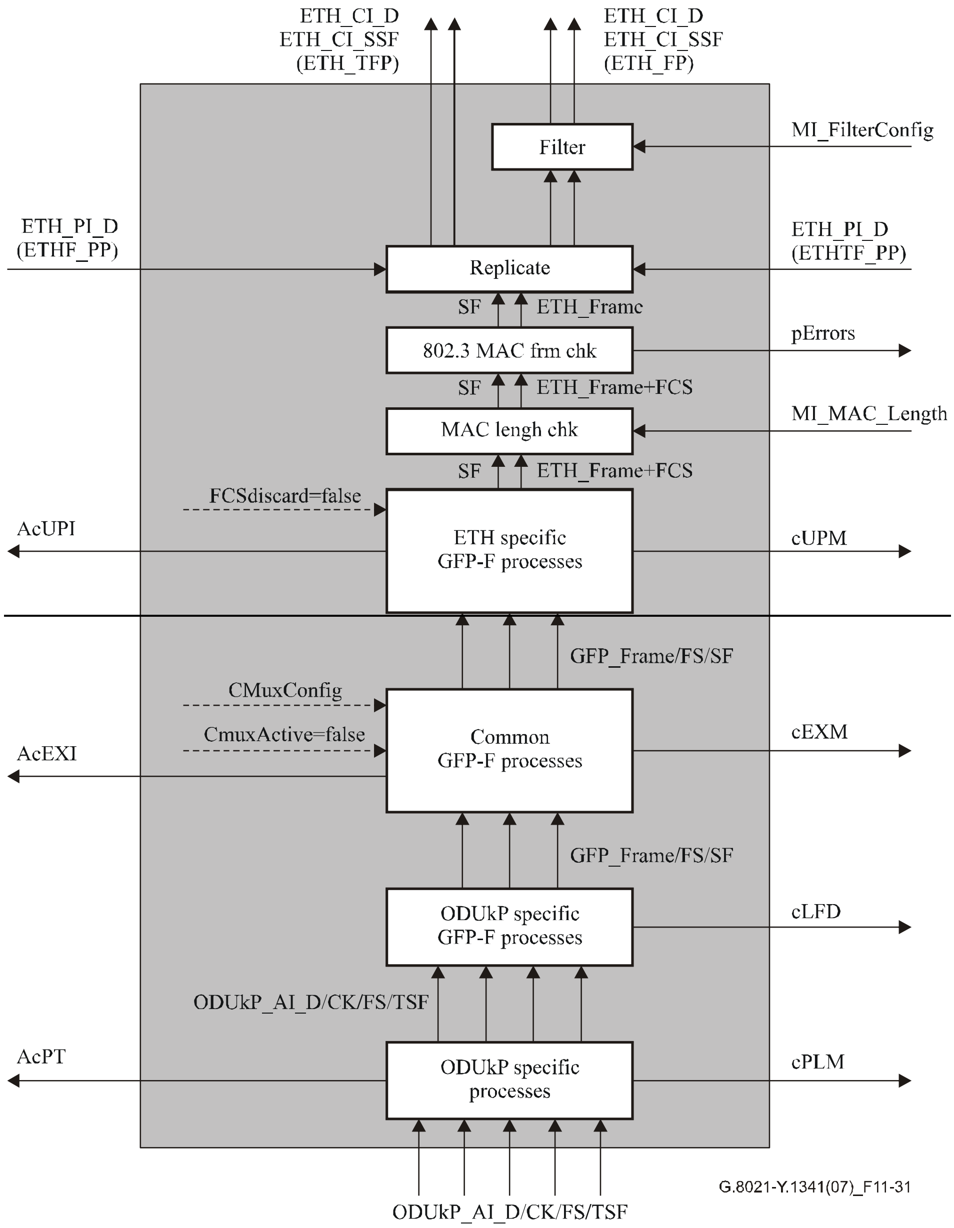


Figure 11-31 – ODUkP/ETH_A_Sk process diagram

…

Defects

dPLM – See clause 6.2.4.1 of [ITU-T G.798].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← CSF-FDI and CSFrdifdiEnable

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cPLM ← dPLM and (not AI_TSF)

cLFD ← dLFD and (not dPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

~~cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)~~

~~cCSF ← dCFS and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported~~

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pFCSErrors: Count of FrameCheckSequenceErrors per second.

NOTE – This primitive is calculated by the MAC FCS check process.

11.5.2 LCAS-capable ODUk-Xv/ETH adaptation functions (ODUkP-X-L/ETH_A; k = 1,2,3)

11.5.2.1 LCAS-capable ODUk-Xv/ETH adaptation source function (ODUkP-X-L/ETH_A_So)

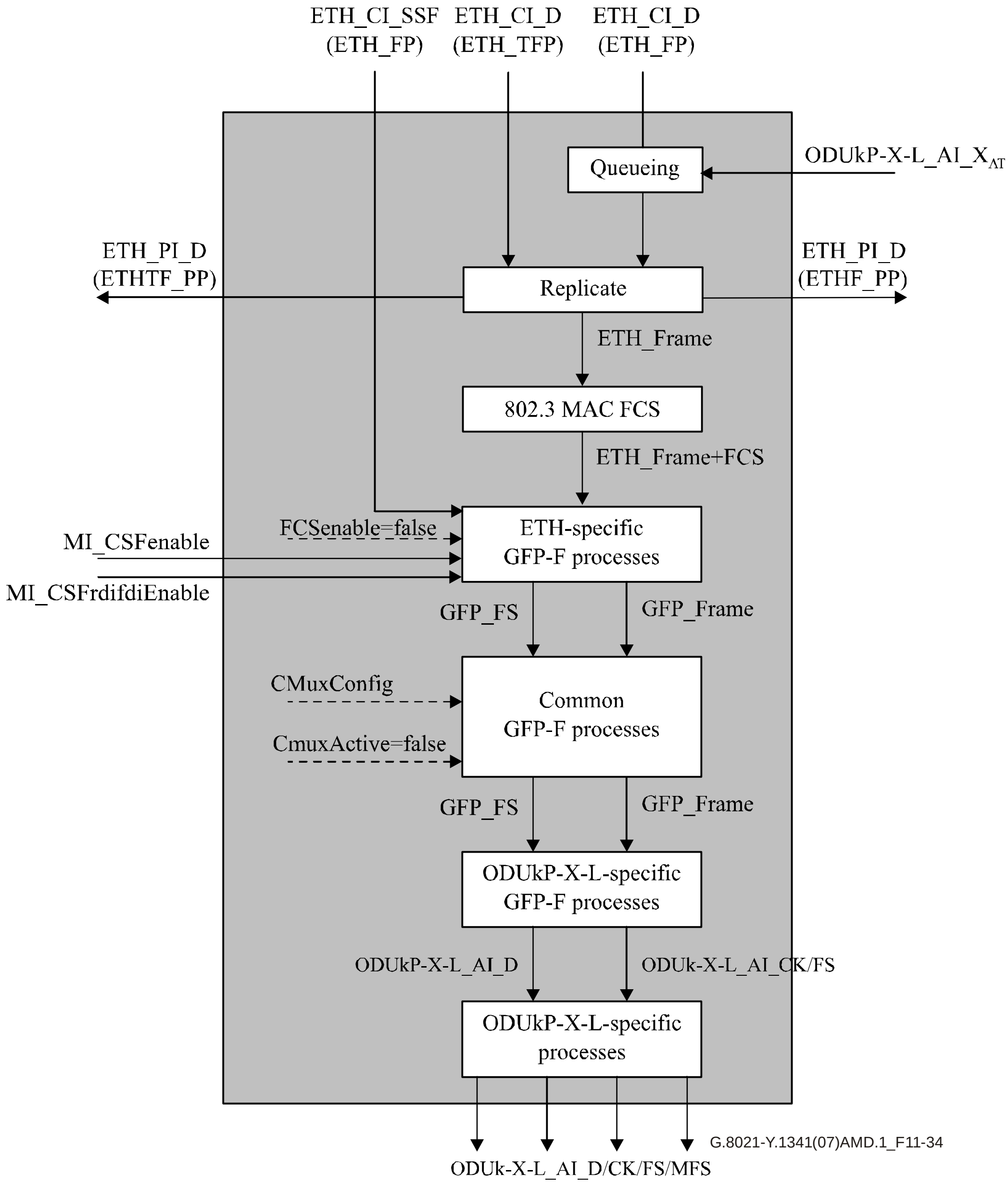
• • •

Table 11-17 – ODUkP-X-L/ETH_A_So interfaces

Inputs	Outputs
ETH_TFP: ETH_CI_D ETH_CI_DE ETH_CI_P ETH_FP: ETH_CI_D ETH_CI_DE ETH_CI_P ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi ODUkP-X-L_AP: ODUkP-X-L_AI_X_{AT} ODUkP-X-L/ETH_A_So_MI: ODUkP-X-L/ETH_A_So_MI_Active ODUkP-X-L/ETH_A_So_MI_CSFEnable ODUkP-X-L/ETH_A_So_MI_CSFrdifdiEnable	ODUkP-X-L_AP: ODUkP-X-L_AI_Data ODUkP-X-L_AI_ClocK ODUkP-X-L_AI_FrameStart ODUkP-X-L_AI_MultiframeStart ETHF_PP: ETH_PI_D ETH_PI_DE ETH_PI_P ETHTF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE

Processes

A process diagram of this function is shown in Figure 11-34.


ETH_CI_SSF
(ETH_FP)
ETH_CI_D
(ETH_TFP)
ETH_CI_D
(ETH_FP)
Queueing
ODUkP-X-L_AI_XAT
ETH_PI_D
(ETHTF_PP)
Replicate
ETH_PI_D
(ETHF_PP)
ETH_Frame
802.3 MAC FCS
ETH_Frame+FCS
FCSenable=false
MI_CSFenable
MI_CSFrdifdiEnable
ETH-specific
GFP-F processes
GFP_FS
GFP_Frame
CMuxConfig
CmuxActive=false
Common
GFP-F processes
GFP_FS
GFP_Frame
ODUkP-X-L-specific
GFP-F processes
ODUkP-X-L_AI_D
ODUk-X-L_AI_CK/FS
ODUkP-X-L-specific
processes
G.8021-Y.1341(07)AMD.1_F11-34
ODUk-X-L_AI_D/CK/FS/MFS

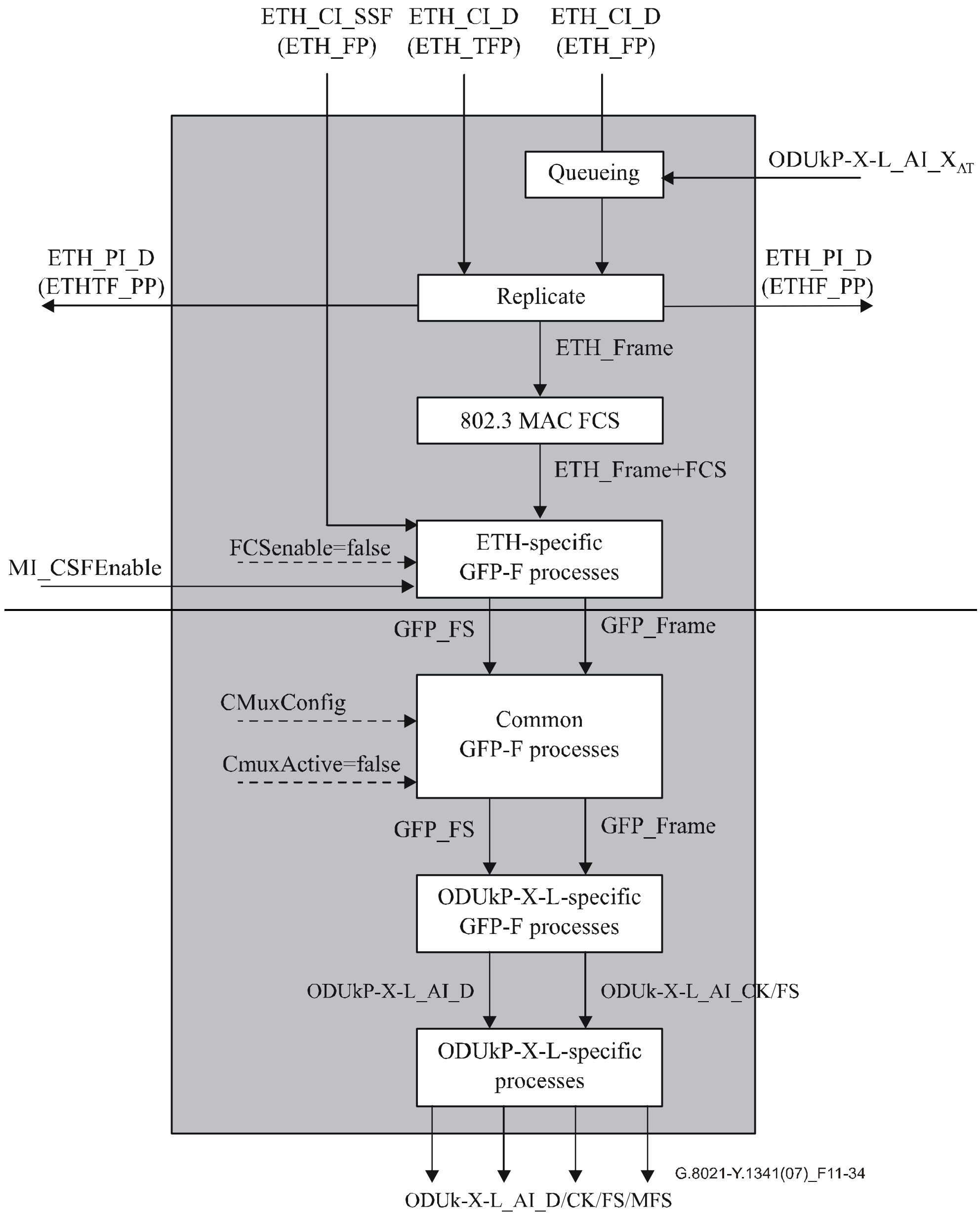


Figure 11-34 – ODUkP-X-L/ETH_A_So process diagram

• • •

Defects None.

Consequent actions ~~None.~~

<u>aCSF-RDI ← CI_SSFrdi and CSFrdifdiEnable and CSFEnable</u>

<u>aCSF-FDI ← CI_SSFfdi and CSFrdifdiEnable and CSFEnable</u>

<u>aCSF-LOS ← CI_SSF and CSFEnable</u>

Defect correlations None.

Performance monitoring For further study.

11.5.2.2 LCAS-capable ODUk-Xv/ETH adaptation sink function (ODUkP-X-L/ETH_A_Sk)

• • •

Table 11-18 – ODUkP-X-L/ETH_A_Sk interfaces

Inputs	Outputs
ODUkP-X-L_AP: ODUkP-X-L_AI_Data ODUkP-X-L_AI_ClocK ODUkP-X-L_AI_FrameStart ODUkP-X-L_AI_MultiframeStart ODUkP-X-L_AI_TSF ODUkP-X-L_AI_X_{AR} ETHF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ETHTF_PP: ETH_PI_D ETH_PI_P ETH_PI_DE ODUkP-X-L/ETH_A_Sk_MI: ODUkP-X-L/ETH_A_Sk_MI_Active ODUkP-X-L/ETH_A_Sk_MI_FilterConfig ODUkP-X-L/ETH_A_Sk_MI_CSF_Reported ODUkP-X-L/ETH_A_Sk_MI_CSFrdifdiEnable	ETH_TFP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_FP: ETH_CI_D ETH_CI_P ETH_CI_DE ETH_CI_SSF ETH_CI_SSFrdi ETH_CI_SSFfdi ODUkP-X-L/ETH_A_Sk_MI: ODUkP-X-L/ETH_A_Sk_MI_AcVcPT ODUkP-X-L/ETH_A_Sk_MI_AcEXI ODUkP-X-L/ETH_A_Sk_MI_AcUPI ODUkP-X-L/ETH_A_Sk_MI_cVcPLM ODUkP-X-L/ETH_A_Sk_MI_cLFD ODUkP-X-L/ETH_A_Sk_MI_cUPM ODUkP-X-L/ETH_A_Sk_MI_cEXM ODUkP-X-L/ETH_A_Sk_MI_cCSF ODUkP-X-L/ETH_A_Sk_MI_pFCSError

Processes

See process diagram and process description in clause 11.5.1.2. The additional ODUkP-X-L_AI_X_{AR} interface is not connected to any of the internal processes.

ODUkP-X-L-specific sink process

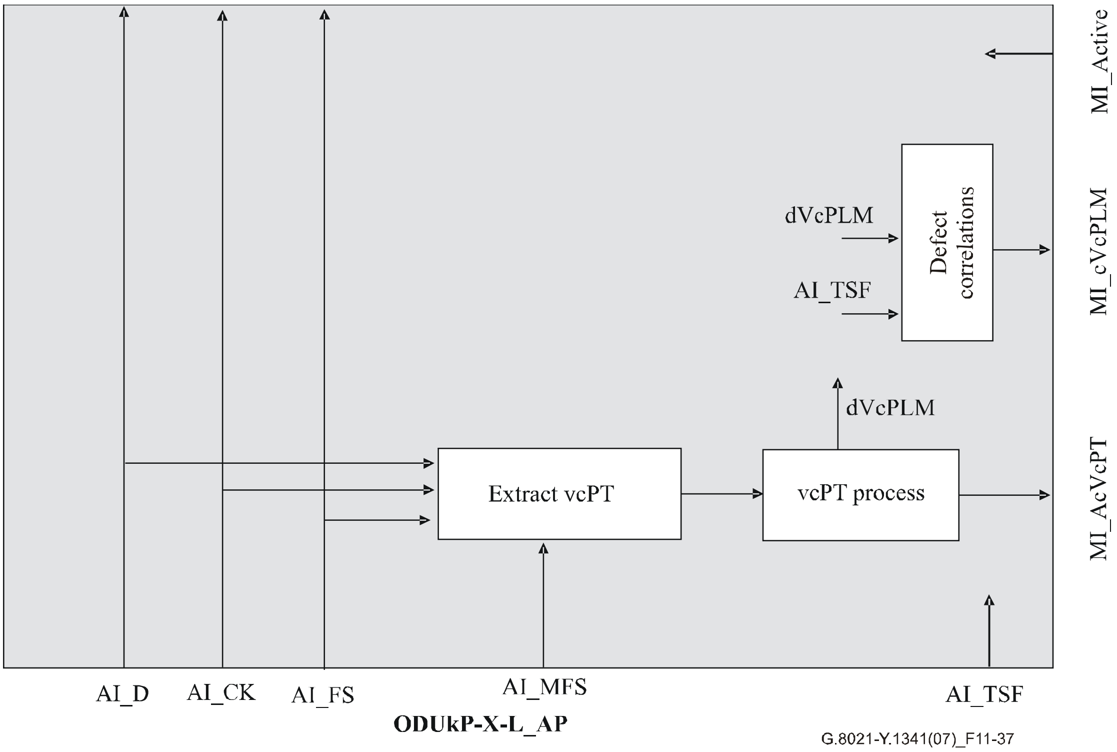


Figure 11-37 – ODUkP-X-L-specific sink processes

PT: The function shall extract the vcPT byte from the PSI overhead as defined in clause 8.7.3 of [ITU-T G.798]. The payload type value for "GFP mapping" in clause 18.1.2.2 of [ITU-T G.709] shall be expected. The accepted PT value is available at the MP (MI_AcPT) and is used for PLM defect detection.

RES: The value in the RES bytes shall be ignored.

Defects

dVcPLM – See clause 6.2.4.2 of [ITU-T G.798].

dLFD – See clause 6.2.5.2 of [ITU-T G.806].

dUPM – See clause 6.2.4.3 of [ITU-T G.806].

dEXM – See clause 6.2.4.4 of [ITU-T G.806].

dCSF-LOS – See clause 8.8.6.2.

dCSF-RDI – See clause 8.8.6.2.

dCSF-FDI – See clause 8.8.6.2.

Consequent actions

The function shall perform the following consequent actions:

aSSF ← AI_TSF or dVcPLM or dLFD or dUPM or dEXM or dCSF-LOS

aSSFrdi ← dCSF-RDI and CSFrdifdiEnable

aSSFrdi ← dCSF-FDI and CSFrdifdiEnable

NOTE 1 – X_{AR} = 0 results in AI_TSF being asserted, so there is no need to include it as additional contributor to aSSF.

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause (see clause 6.4 of [ITU-T G.806]). This fault cause shall be reported to the EMF.

cVcPLM ← dVcPLM and (not AI_TSF)

cLFD ← dLFD and (not dVcPLM) and (not AI_TSF)

cUPM ← dUPM and (not dEXM) and (not dPLM) and (not dLFD) and (not AI_TSF)

cEXM ← dEXM and (not dPLM) and (not dLFD) and (not AI_TSF)

cCSF ← (dCFS-LOS or dCSF-RDI or dCSF-FDI) and (not dEXM) and (not dUPM) and (not dPLM) and (not dLFD) and (not AI_TSF) and CSF_Reported

~~cUPM ← dUPM and (not dVcPLM) and (not dLFD) and (not AI_TSF)~~

~~cEXM ← dEXM and (not dUPM) and (not dVcPLM) and (not dLFD) and (not AI_TSF)~~

~~cCSF per clause 8.5.4.1.2 of [ITU-T G.806].~~

Performance monitoring

The function shall perform the following performance monitoring primitives processing. The performance monitoring primitives shall be reported to the EMF.

pFCSError: Count of FrameCheckSequenceErrors per second.

NOTE 2 – This primitive is calculated by the MAC FCS check process.

• • •

Appendix II

AIS/RDI mechanism for an Ethernet private line over a single SDH or OTH server layer

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

In order to address fault notification for failures in either the access links or within the SDH/OTH server layer, the following functionality is required:

a) Convey fault notification for an access link failure from one side of the network to the other.

b) Convey fault notification for an SDH/OTH server layer failure to the access links.

[ITU-T G.7041] defines client management frames (CMFs) for conveying information about the client signal from an ingress edge NE to the egress edge NE. Defined CMF ~~indications~~ signals are client signal fail (CSF), client forward defect indication (FDI) and ~~remote~~ client reverse defect~~fail~~ indication (RD~~F~~I) implementing the remote fail indication mechanism.

[ITU-T G.806] defines the equipment functional details of the CSF and RFI mechanisms.

This Recommendation defines the Ethernet-specific equipment functional details for the CSF and RFI mechanisms.

The combination of the above three Recommendations provides the functionality required by a) and b).

~~That~~ In addition, this basic functionality can be further enhanced to support fault notification for the Ethernet client by using Ethernet physical layer defect signals shown in Appendix VI of [ITU-T G.7041] or by means of Ethernet OAM. For example, use of the IEEE 802.3ah clause 57 (EFM OAM) link fault flag in conjunction with the GFP-F CMF CSF and RFI indications.~~,~~ This is ~~as~~ illustrated in the scenario below.

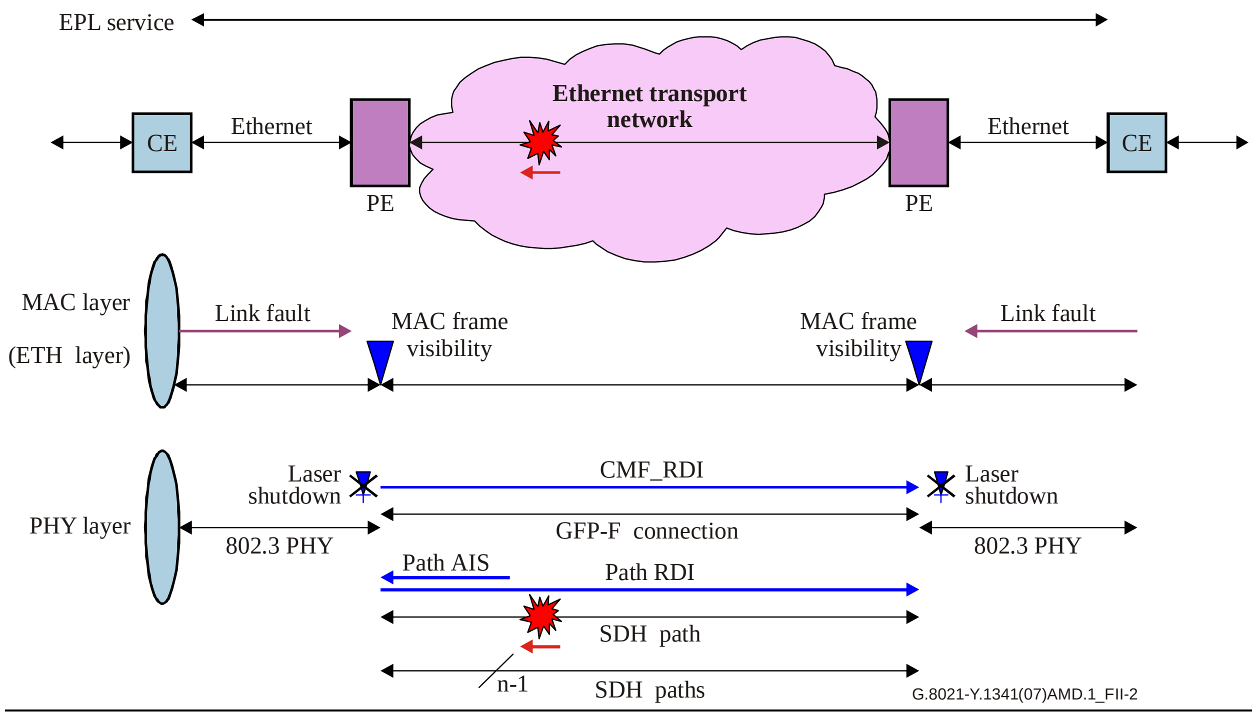
A simplifying assumption ~~can be~~was made regarding the conditioning of the Ethernet access links on either side of the SDH/OTH transport network. For an EPL application, the access link is specific to a single service, and since an Ethernet service is bidirectional, a fault in either direction should result in the access link being conditioned as "failed".

The following fault scenarios and accompanying figures illustrate ~~the proposed~~this example of interworking ~~of~~ the EFM OAM link fault flag with the GFP-F CMF CSF and RFI indications to appropriately condition the Ethernet access links. Only unidirectional faults are considered, the scenarios can be combined per the superposition principle to describe bidirectional faults. Further, only an SDH server layer is shown in the examples. CE = customer edge. PE = provider edge.

• • •

Scenario 2

In Figure II.2 a unidirectional fault occurs westbound on the server layer within the carrier network.



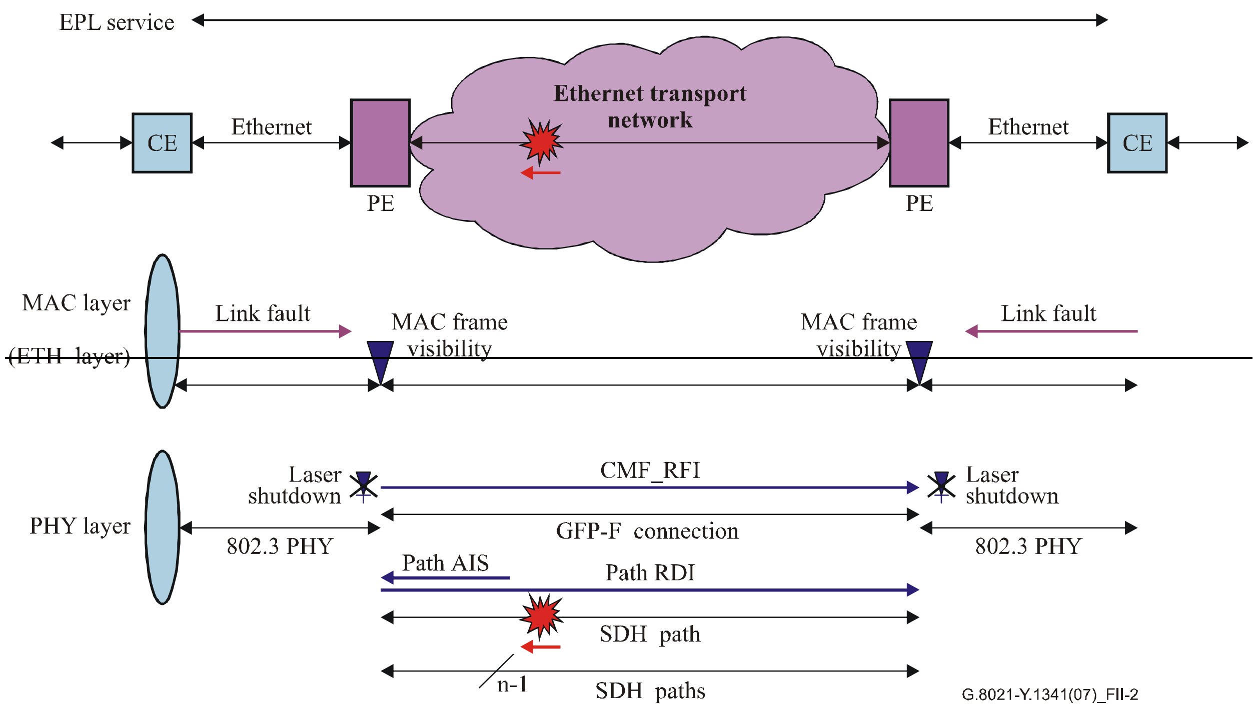


Figure II.2 – Fault within carrier network

- An NE in the carrier network detects the failure of one of the member paths of a VCAT group:
  - – SDH path AIS is generated downstream on the affected path.
- The west PE detects SDH Path AIS:
  - – SDH path RDI is generated back into the network on the associated path.
  - – GFP-F CMF RD~~F~~I is generated back into the network.
  - – If there is no network_ETH_AIS indication available, the laser (or electrical driver) is shut down.
- The west CE detects loss of signal:
  - – 802.3ah OAM sends link fault upstream, interspersed with idles.
  - – Idles are sent towards the enterprise.
- The east PE detects the GFP-F CMF RD~~F~~I indication:
  - – If there is no network_ETH_RDI indication available, the laser (or electrical driver) is shut down.
- The east CE detects loss of signal:
  - – 802.3ah OAM sends link fault upstream, interspersed with idles.
  - – Idles are sent towards the enterprise.

Note that for a network failure affecting all member paths of ~~the~~ a VCAT group (where LCAS is not supported), the same steps above apply with the addition of SDH path AIS and RDI being sent on all the member paths.

Scenario 3

In Figure II.3 a unidirectional fault occurs on the west access link towards the enterprise network.

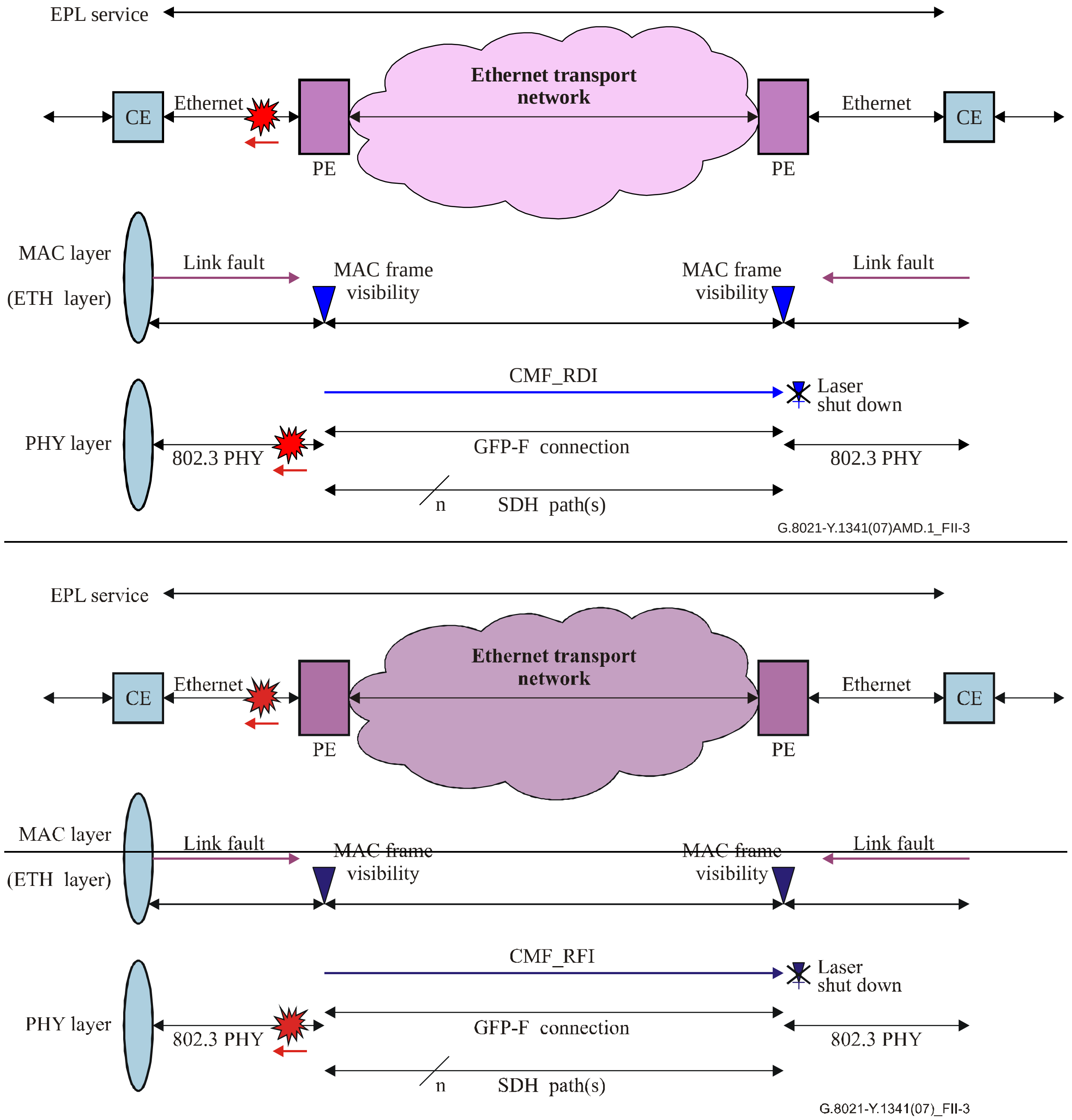


Figure II.3 – Fault on egress

- The west CE detects loss of signal:
  - 802.3ah OAM sends link fault upstream, interspersed with idles.
  - Idles are sent towards the enterprise.
- The west PE detects the link fault indication:
  - GFP-F CMF RD~~F~~I indication is sent into the network.
  - Idles are sent towards the CE.

- The east PE detects the GFP-F CMF RDFI indication:
  - If there is no network_ETH_RDI indication available, the laser (or electrical driver) is shut down.
- The east CE detects loss of signal:
  - 802.3ah OAM sends link fault upstream, interspersed with idles.
  - Idles are sent towards the enterprise.

Note that a PE only reacts to the reception of a link fault indication when there are no other conditioning alarms (i.e., the PE takes no further conditioning action when it receives a link fault indication in response to having shut down its own egress laser).

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