KEYMILE

User Manual

SELI8
seli8_r5a

G.703 (G.704), TDM services

XMC20

KEYMILE

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1 Preface

1.1 Precautions and Safety

Before you handle any equipment you must comply with the safety advices.

Adherence to the safety instructions ensures compliance with the safety requirements as defined in EN 60950 (Safety of Information Technology Equipment).

Please refer to the following document:

[202] Safety Instructions "Precautions and safety".

1.2 Symbols and Notations

This User Manual uses the following symbols:

Risk of operating trouble!
Indicates that an action may lead to operating trouble or loss of data.
→ Possible actions are given.

Please note:
Shows significant information.
→ Possible actions are given.

1.3 Interfaces and Circuit Categories

Table 1: **Electrical interfaces and circuit categories**

SELI8 interface	Circuit category according to EN 60950-1	Max. rating	
		Voltage	Current
Local power supply	TNV2	$< 72\ V_{DC}$	$< 0.15\ A$
ITU-T G.703 electrical interfaces	SELV	$< 3.3\ V_{peak}$	$< 10\ mA$

1.4   Document History

Table 2:   Document history

KEYMILE PEC	Date	XMC20 Release	Changes since previous version
LZTBU 372 110/1 RC	November 2015	R6B	Revision for the XMC20 system releases R4C and R6B
LZTBU 372 110/1 RB	March 2015	R6A	Revision for the XMC20 system release R6A
LZTBU 372 110/1 RA	February 2015	R4C	First revision for the XMC20 system release R4C

2 Introduction

2.1 General

This document describes the architecture and functions of the SELI8 unit and shows how this unit is commissioned and operated as part of the XMC20.

The SELI8 unit is a 1-slot wide service unit of XMC20 and provides 8 E1 (2 Mbit/s) interfaces according to ITU-T G.703. Traffic signals can be unstructured or structured according to ITU-T G.704.

The E1 interface of the SELI8 unit can be used as access interface to a high speed TDM network, e.g. the P12 signals from the E1 interfaces are transported over SDH.

Another application is in a TDM network where the SELI8 unit is used as a transport unit, e.g. the low bit rate data signals from a DTE are transported via structured P12 signals over the E1 interface.
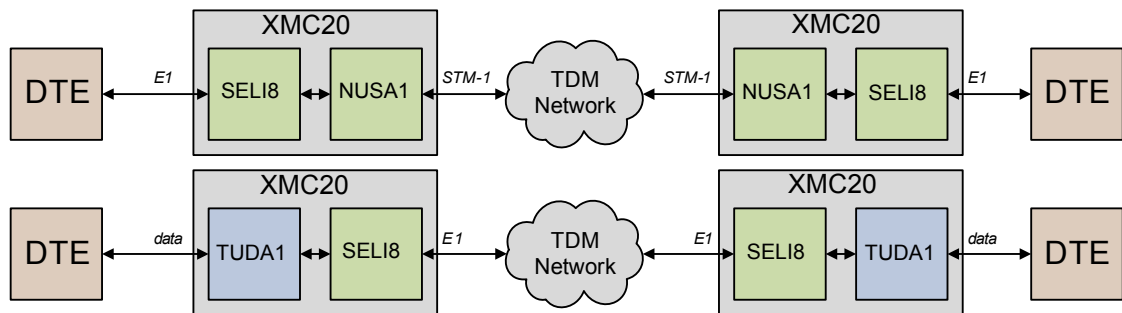
Figure 1:   SELI8 used as an access unit (top) and as a transport unit (bottom)

The SELI8 unit accesses the PBUS (XMC20 internal TDM bus) with P0-nc (n x 64 kbit/s) and P12 (2048 kbit/s) signals.

2.2　　　Unit View
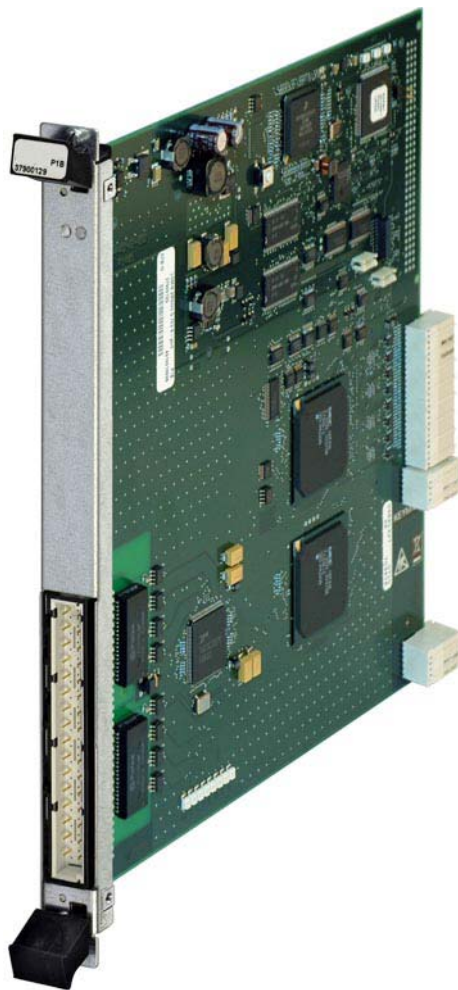
Figure 2:　　SELI8 unit view

Figure 2 "SELI8 unit view" shows the SELI8 unit hardware. On the front plate are two LEDs for unit- and traffic failure indication, and a connector for 8 E1 signals, based on the standard DIN 41 612.

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3 Functions and Specifications

3.1 Feature Licences

Part of the XMC20 functionality is subject to feature licences. For more information on feature licences please refer to [012] Release Note "XMC20" and to [915] Technical Bulletin "Feature Licences for XMC20".

3.2 SELI8 Function Overview

The SELI8 unit provides the following functions and supports the following standards:

Table 3:   Functions and specifications

Feature	Rating or standard	Release
Front interface	8 x E1 (2048 kbit/s) ITU-T G.703, ITU-T G.704	r1a
- Connector	DIN 41612	r1a
- Impedance	75 Ω asymmetrical or 120 Ω symmetrical, depending on the wiring of cables to the connector set	r1a
- Jitter	ITU-T G.823 (all modes)	r1a
	ETSI ETS 300 248 (terminated modes)	r1a
- Maximum cable lengths		
75 Ω with coaxial cables	390 m	r1a
120 Ω with balanced HF cables	180 m	r1a
PBUS access	8 x P12	r1a
- Transport modes	Transparent: transparent for clock and data	
	Clock Master: data transparent, retimed to the network element clock	
	Structured G.704 (PCM30, PCM30C, PCM31, PCM31C): P12 signal terminated, retimed to the network element clock	
	V5 uplink: P12 signal terminated, retimed to the network element clock, V5-specific Sa-bit handling	
- Cross connections	Flexible cross connections to any other XMC20 TDM unit on the P0-nc and P12 traffic layer	r2a
Synchronization sources for the network element	E1 port	r1a

Table 3:   Functions and specifications (continued)

Feature	Rating or standard	Release
Maintenance functions		r1a
- Loops	P12 front to front loop P12 back to back loop P0-nc front to front loop	
Protection		r3a
- SNCP	between any 2 P12 or P0-nc signals from the PBUS	
- SNCP protection modes	- 1+1 unidirectional, revertive - 1+1 unidirectional, non revertive - 1+1 bidirectional, revertive - 1+1 bidirectional, non revertive	
- LTP	between any 2 P0-nc signals from the PBUS, based on AIS detection	r5a
- LTP protection modes	- 1+1 unidirectional, revertive - 1+1 unidirectional, non revertive - 1+1 bidirectional, revertive - 1+1 bidirectional, non revertive - AIS supervision on the protected channel - AIS supervision on a pilot channel	r5a
- LTP timing	- AIS detection time: ≤ 1 s - Wait-to-restore time: 45 ± 3 s	r5a
Alarm reporting	ITU-T X.733 (1992) Information technology – open systems interconnection – systems management: Alarm reporting function	r1a
Performance monitoring		r1a
- ITU-T G.826	P12 layer	
- Layer specific events	P12 layer: - Line code violations - Positive slips - Negative slips	
Power consumption		r1a
- Power supply range V_{BAT}	refer to [201] System Description "XMC20"	
- Maximum current consumption, I_{VBAT} V_{BAT} = -48 V	0.1 A	
- Maximum total power requirement from battery, P_{TOT} V_{BAT} = nominal voltage	4 W	

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Table 3:   Functions and specifications (continued)

Feature	Rating or standard	Release
Mechanical parameters		r1a
- Construction practice	19 inch	
- Height of unit (1 HU = 44.45 mm)	6 HU	
- Width of unit (1 TE = 5.08 mm)	4 TE (1 slot)	
- Size of the PCB (H x D)	233 mm x 220 mm	
- Weight	360 grams	
- RoHS	Directive 2002/95/EC of the European Parliament and of the Council of 27.1.2003 on the Restriction of the use of certain hazardous substances in electrical and electronic equipment	
- WEEE	Directive 2002/96/EC of the European Parliament and of the Council of 27.1.2003 on waste electrical and electronic equipment	
Reliability		r1a
- Calculated MTTF at 35 °C (MIL-HDBK-217F)	121 years	
Emission	refer to [201] System Description "XMC20"	r1a
Immunity	refer to [201] System Description "XMC20"	r1a
Safety	refer to [201] System Description "XMC20"	r1a
Ambient conditions	refer to [201] System Description "XMC20"	r1a

4 Installation

4.1 Prerequisites

Before installing a SELI8 unit take care to follow the safety advice as listed in [202] Safety Instructions "Precautions and safety".

Valid combinations of hardware (HW) and embedded software (ESW) versions are given in [012] Release Note "XMC20".

For the installation of XMC20 HW
   refer to [301] User Guide "XMC25 Installation", or
   refer to [310] User Guide "XMC23 Installation", or
   refer to [322] User Guide "XMC22 Installation".

Please note:

The XMC22 subrack is not available in the system release R4C.

4.2 Slots for the SELI8 Unit

The SELI8 unit uses one slot in the XMC20 subrack.

In a XMC25, the SELI8 unit can be operated in any of the following slots:

1 … 10, 12 … 21.

In a XMC23, the SELI8 unit can be operated in any of the following slots:

7 … 10, 12 … 14.

Slot 11 is reserved for the COGE5 unit.

In a XMC22, the SELI8 unit can be operated in any of the following slots:

9 … 10, 12.

Slot 11 is reserved for the COGE5 unit.

In maximum 16 SELI8 units with all E1 ports enabled can be operated in XMC25. This configuration occupies the full PBUS capacity.

For more information regarding the PBUS access and the cross connections please refer to [314] User Guide "TDM Services and Cross Connections in XMC20".

4.3 Compatibility

4.3.1 XMC20 Units

SELI8 is compatible with any other XMC20 service unit with an ESW release of the XMC20 system release R6A or later. Please refer to [012] Release Note "XMC20".

4.3.2 Previous ESW Revisions

The SELI8 unit with ESW release seli8_r5a was first released for the XMC20 system release R4C. The ESW is compatible with the XMC20 system releases R6A and R6B.

4.4 Connections and Cables

4.4.1 Front Connector of the SELI8 Unit
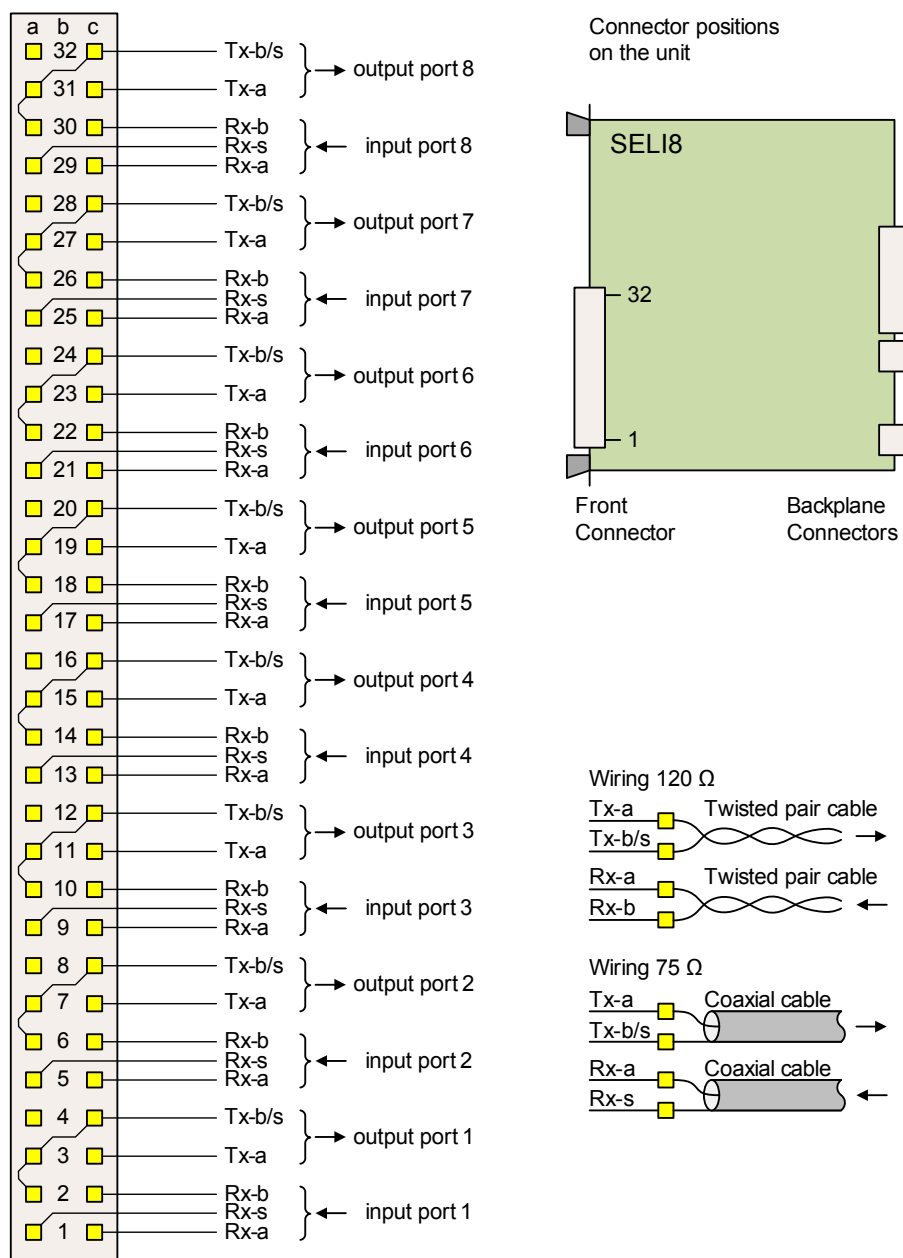
Figure 3:   Pin-out of the SELI8 front connector, front view

Table 4:   Pins of the E1 ports

Pin label	Description
a	Signal "a" for symmetrical cables (120 Ω signal termination) and centre lead for coaxial cables (75 Ω signal termination).
b	Signal "b" for symmetrical cables (120 Ω signal termination).

Table 4: **Pins of the E1 ports**

Pin label	Description
s	Shield for coaxial cables (75 Ω signal termination). The shield of symmetrical cables is not connected on the connector.

Pins without a signal designation are not connected.

Depending on the cable used, the wires are connected to the pins for the 120 Ω or the 75 Ω signal termination.

Table 5: **Wiring of the E1 ports**

Wiring	Termination
a, b	120 Ω signal termination
a, s	75 Ω signal termination

Please note:

The cables provided by KEYMILE are internally connected for 120 Ω (pins a, b) or for 75 Ω (pins a, s).

Please note:

In transmit direction the b and s signals are on the same pins.

Please note:

In transmit direction the b and s signals are available on three pins per port.

→ Avoid unintentional connections to the pins with the redundant outputs.

Risk of operating trouble!

E1 ports which are not connected at the remote end of the cable can cause cross talk. Cross talk onto such an open-ended cable can cause spurious alarms.

→ Set the administrative state of these ports to "down".

4.4.2 8 x 2 Mbit/s Cable 120 Ω

The 8 x 2 Mbit/s cable for 120 Ω symmetrical termination interfaces each E1 port of the SELI8 unit. It is an open ended twisted pair cable. The wires of this cable have to be terminated in an MDF provided by the customer. The length of the cable can be specified (minimum length 3 m).

Latching clips must be used to secure the cable to the SELI8 front connector.

For details on SELI8 cables, please refer to [506] User Manual "XMC20 cables".

4.4.3 8 x 2 Mbit/s Cable 75 Ω

The 8 x 2 Mbit/s cable for 75 Ω asymmetrical termination interfaces each E1 port of the SELI8 unit. It is an open ended twisted pair cable. The wires of this cable have to be terminated in an external customer provided adapter

box (twisted pair ↔ coaxial cable) or a corresponding connector field. The length of the cable can be specified (minimum length 3 m).

Risk of operating trouble!

Cables longer than 10 m might lead to malfunctions and loss of interoperability with third party equipment.

Due to the mismatching impedances of the termination and the cable the connection cable must be kept as short as possible.

→ The 75 Ω patch panel must be installed close to the subrack.

Please note:

The 75 Ω transmit and receive interfaces on the SELI8 unit are implemented balanced.

→ The shield must be grounded on the patch panel.

Latching clips must be used to secure the cable to the SELI8 front connector.

For details on SELI8 cables, please refer to [506] User Manual "XMC20 cables".

4.4.4 Fixing the Cables to the Cable Tray

When operating the SELI8 unit in a XMC25, the cable must be attached to the cable tray as shown in Figure 4 "Side view of the cable tray and the cable in XMC25".
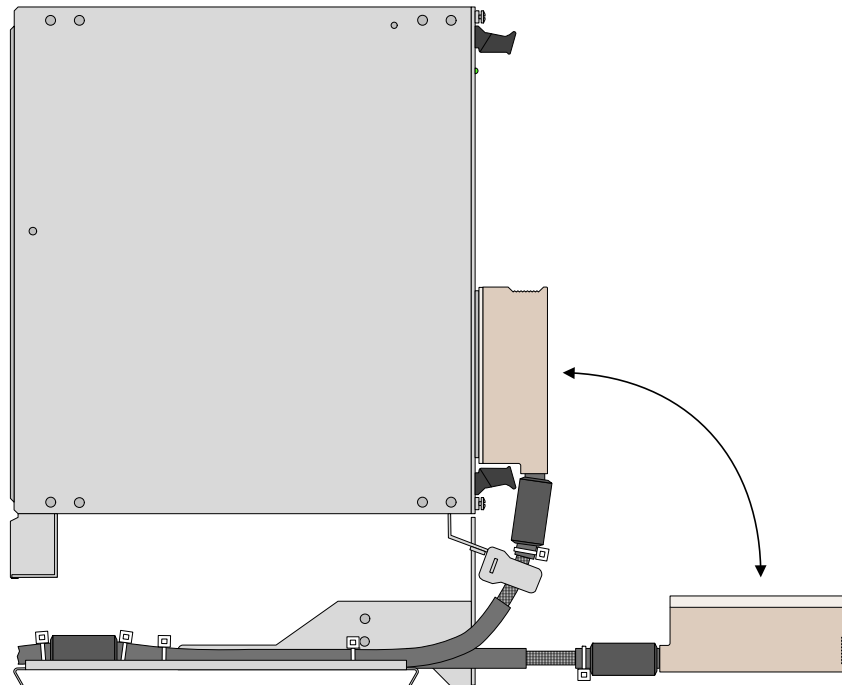

Figure 4: Side view of the cable tray and the cable in XMC25

When operating the SELI8 unit in a XMC23 or XMC22, the cable must be attached to the cable tray as shown in the Figure 5 "Top view of the cable tray and the cable in XMC23 and XMC22".
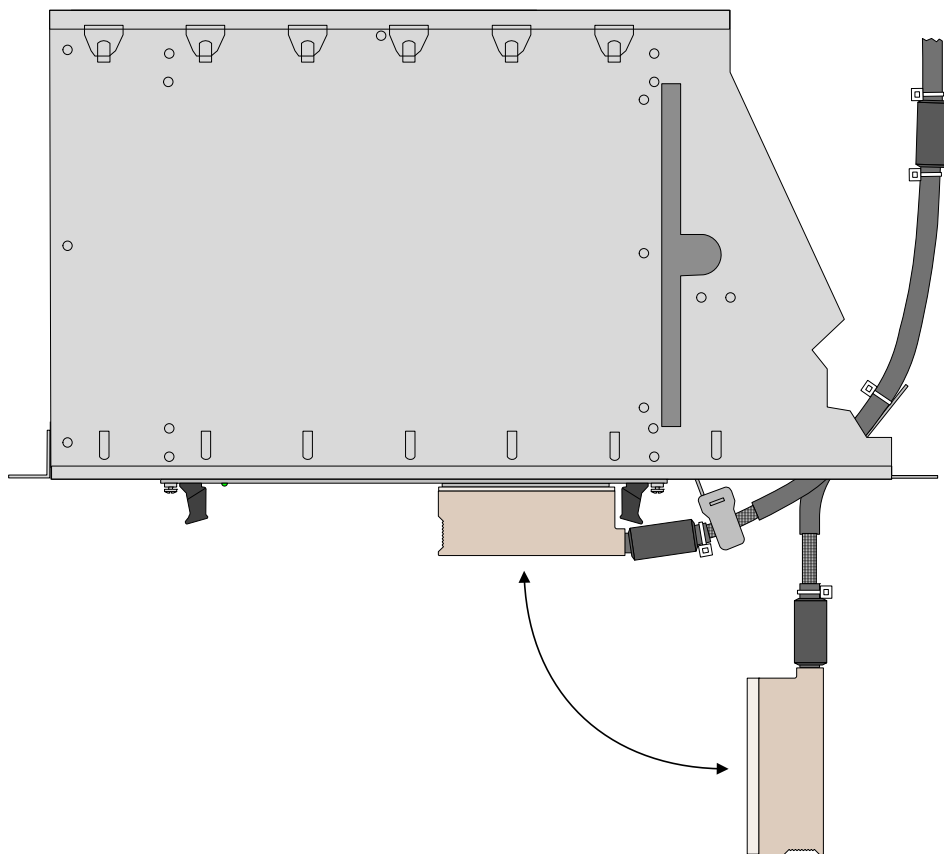
Figure 5: Top view of the cable tray and the cable in XMC23 and XMC22

5 Functional Description

This section gives the detailed functional description of the SELI8 unit as a P12 access unit in the XMC20 subrack.

5.1 P12 Termination Modes

The SELI8 unit provides different P12 termination modes for the E1 ports. The termination modes define

- the expected signal structure,
- the timing characteristics,
- the usage for a specific application, e.g. V5 uplink.

The SELI8 unit supports terminated and transparent P12 transport modes. Structured signals can be transported in a terminated mode or a transparent mode. Unstructured signals are transported in a transparent mode.

The termination modes of all E1 ports are configurable independently.

For more information regarding P12 termination modes, cross connections and CAS configuration please refer to [314] User Guide "TDM Services and Cross Connections in XMC20".

5.1.1 Terminated Transport Modes

An E1 port of the SELI8 unit can be configured to one of the following terminated transport modes:

- PCM30:
  Structured according to ITU-T G.704, with CAS, without CRC4.
- PCM30C:
  Structured according to ITU-T G.704, with CAS, with CRC4.
- PCM31:
  Structured according to ITU-T G.704, without CAS, without CRC4.
- PCM31C:
  Structured according to ITU-T G.704, without CAS, with CRC4.
  In the above terminated transport modes, the time slot 0 of the P12 signal is analysed in the receive direction (from the network interface) and regenerated in the transmit direction.
  Cross connection and protection switching (P0-nc SNCP/I) is established on the P0-nc (n x 64 kbit/s) traffic signal layer.

There are two specific termination modes used for the V5 application:

- V5 Uplink:
  Structured according to ITU-T G.704, with CRC4.
- V5 Uplink NCI:
  Structured according to ITU-T G.704, without CRC4.

The V5 uplink modes are application specific modes used together with the XMC20 V5 protocol converter unit PCOM1 or PCOM2. V5.x applications terminate the P12 signal and use all 5 Sa bits.
With V5.1 the Sa bits are fixed. With V5.2 Sa7 is used for the link identification control.

For terminated signals the following functions are available:
- CAS (PCM30, PCM30C)
  Support of channel associated signalling in time slot 16.
- CRC4 (PCM30C, PCM31C, V5 Uplink)
  Generation and evaluation of the CRC4 code in time slot 0.

5.1.2 Transparent Transport Modes

An E1 port of the SELI8 unit can be configured to one of the following transparent transport modes:
- Transparent:
  Transparent for clock and data.
  The P12 signal has an unknown structure.
  Cross connection and protection switching is established on the P12 (2 Mbit/s) traffic signal layer.

Please note:

The Transparent mode features clock transparent cross connections. That means that the signal is in a plesiochronous phase relationship with the NE timing source.

- Clock Master:
  Transparent for data.
  Unlike the Transparent mode, a clock master traffic signal is only cross connected transparently in terms of its structure. The P12 output signal is always resynchronized by the NE timing source. The input signal must be synchronous to the output signal in order to avoid bit slips.
  For details of the clock master mode, please refer to [314] User Guide "TDM Services and Cross Connections in XMC20".

5.2 Protection

5.2.1 Subnetwork Connection Protection

SELI8 supports 1+1 subnetwork connection protection (SNCP) for P12 and P0-nc signals.

P12 and P0-nc protection switching for signals from the network or aggregate side takes place on a tributary unit, e.g. SELI8. A P12 or P0-nc signal transported over the network is received e.g. on one or two STM14 units as a working and a protecting signal. The signal state of the working and protecting signal is brought via the PBUS to the SELI8 unit. The SELI8 unit performs the selection according to the signal states of the two signals.
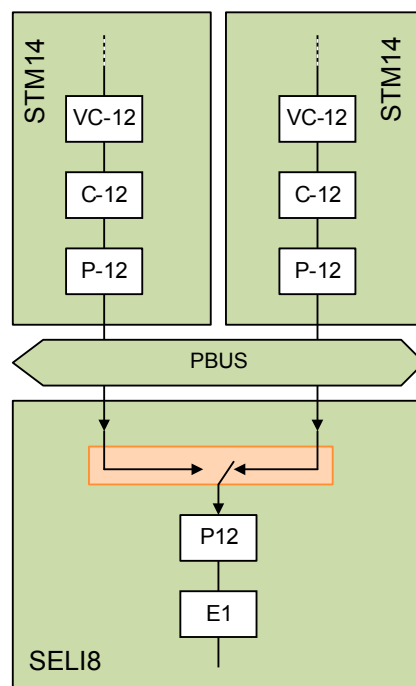
Figure 6:   P12 SNCP with two STM14 units

1+1 SNCP provides the following functions:
- The SELI8 unit selects the received signal from one of the two P12 or P0-nc signals and switches to the other P12 or P0-nc if this signal fails.
- The operation type can be revertive or non-revertive.
- The switching type can be unidirectional or bidirectional.
  The unidirectional protection switching uses no protocol. The bidirectional protection switching uses the remote defect indication (RDI) as switching criterion. This provides bidirectional protection switching also when only one direction of a bidirectional connection fails.
  The bidirectional switching type is only available for ports that are configured for one of the terminated transport modes.
- There is no restriction about the selection of working and protecting P12 or P0-nc.

P12 and P0-nc protection switching takes place in the P12/P0-nc cross connect function of the PBUS access circuit.

Protection switching action can be driven by two different request types:

- Traffic signal requests:
    - − Signal fail (SF).
    - − Signal degraded (SD).
- External command requests:
    - − Activated from the channel status dialogue.

Please note:

The protection parameters holdoff time and guard time are not available for P12 and P0-nc SNCP.

For details of the protection modes, types and switching criteria please refer to [314] User Guide "TDM Services and Cross Connections in XMC20".

5.2.2   Linear Trail Protection

The SELI8 unit supports the linear trail protection (LTP) for P0-nc signals, by analysing the signal content of a P0-nc channel for AIS (all-ones signal). Channel-AIS, together with the trail signal fail (TSF) and Trail Signal Degrade (TSD) of the P12 layer, is then used as protection switching criterion. The AIS switching criterion can be taken from any channel of the same E12 port, the so called pilot channel.

This feature is enabled by configuring the Linear Trail Protection parameter "Pilot Channel" at the AP: /unit-x/port-y/chan-z, Configuration - CTP to one of the previously configured channels.

Please note:

The LTP switching is only available on ports that are configured for one of the terminated P12 transport modes.

Please note:

A pilot channel is an ordinary channel, created on the SELI8 port and called chan-x.

Please note:

In a channel having more than one timeslot only the first timeslot is analysed for AIS.

→ A pilot channel should have only one timeslot.

Risk of operating trouble!

In a channel having more than one timeslot there is a risk that a TSF shorter than 125 μs will not switch over all time slots to the protecting channel.

→ In case of revertive operation type the protected signal will be disturbed during the wait-to-restore time.

→ In case of non-revertive operation type the protected signal will be disturbed until the next TSF, TSD or AIS is detected.

→ Use LTP only for channels with one timeslot.

In Figure 7 "Principle of P0-nc linear trail protection" channel-z uses the protection switching criteria

- − TSF/TSD of the P12 layer where the working channel-z is received,

- TSF/TSD of the P12 layer where the protecting channel-z is received,
- AIS of the working pilot channel, and
- AIS of the protecting pilot channel.

Channel-z uses the AIS switching criterion from the pilot channel.

In Figure 7 "Principle of P0-nc linear trail protection" the pilot channel uses the protection switching criteria

- TSF/TSD of the P12 layer where the working pilot channel is received,
- TSF/TSD of the P12 layer where the protecting pilot channel is received,
- AIS of the working pilot channel, and
- AIS of the protecting pilot channel.

The pilot channel uses no other pilot channel since the AIS switching criterion is taken from the pilot channel itself.
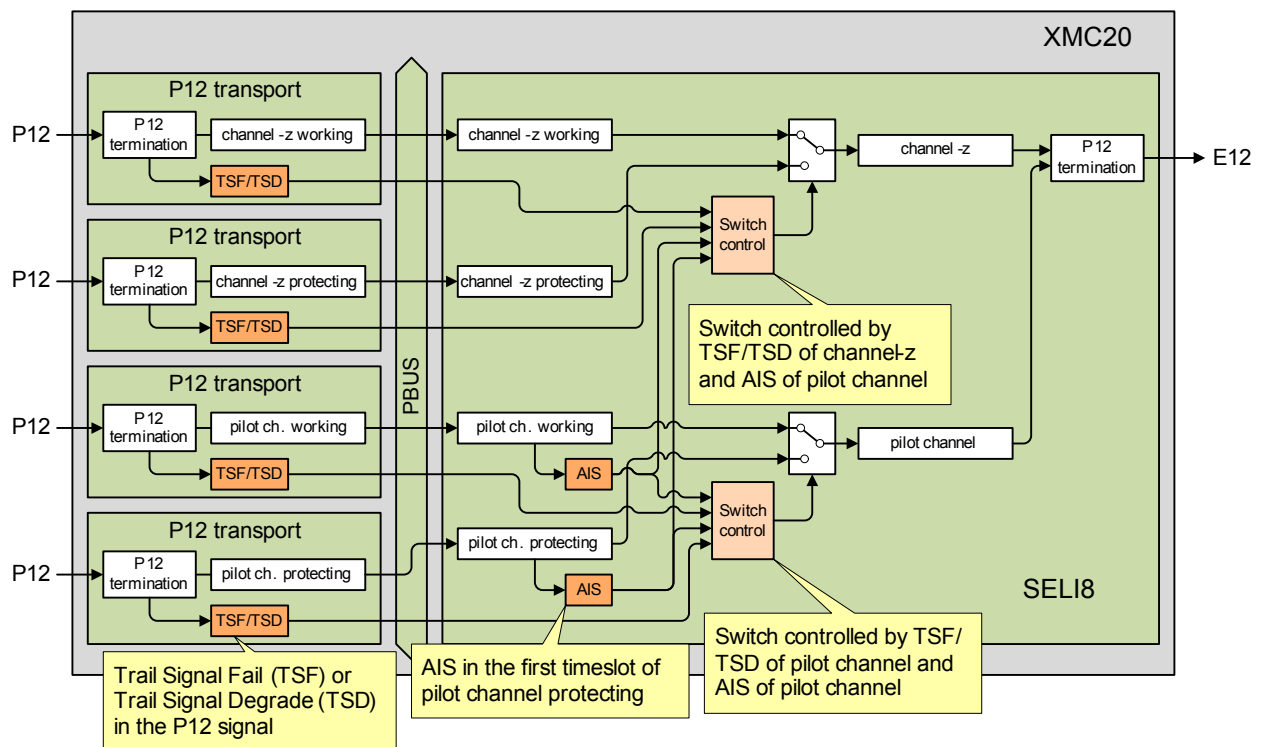
Figure 7:   Principle of P0-nc linear trail protection

1+1 LTP provides the following functions:

- The SELI8 unit selects the outgoing channel from a working and a protecting P0-nc channel and switches to the other P0-nc channel if the actually selected channel fails.
- The protection switching criteria are TSF, TSD and AIS. The TSF and AIS criteria are both indicated as "SF" in the channel status dialogue.
- The switching criteria TSF and TSD are taken from the P12 terminations of the working and the protecting channel.
  For the failures generating a TSF or TSD in a P12 termination function please refer to [314] User Guide "TDM Services and Cross Connections in XMC20".
- The switching criteria AIS are taken
  - from the first timeslot of the working and the protecting (user traffic) channel, or alternatively

- from the first timeslot of the working and the protecting pilot channel. The working channel takes the AIS criterion from the working pilot channel, the protecting channel takes the AIS criterion from the protecting pilot channel.

  The AIS failure detection time is ≤ 1 s.

- A pilot channel must be configured as the z-end of a protected connection and must be located on the same E12 port as the protected channel.

- The operation type can be revertive or non-revertive.

  In case of revertive operation type

  - the working channel is the preferred channel, i.e. has higher priority.
  - the SELI8 unit inserts an AIS into the protected channel (in forward direction) at every protection switching event for a duration of 0.2 … 1.0 s.
  - The wait-to-restore time is fixed with a duration of 45 ± 3 s.
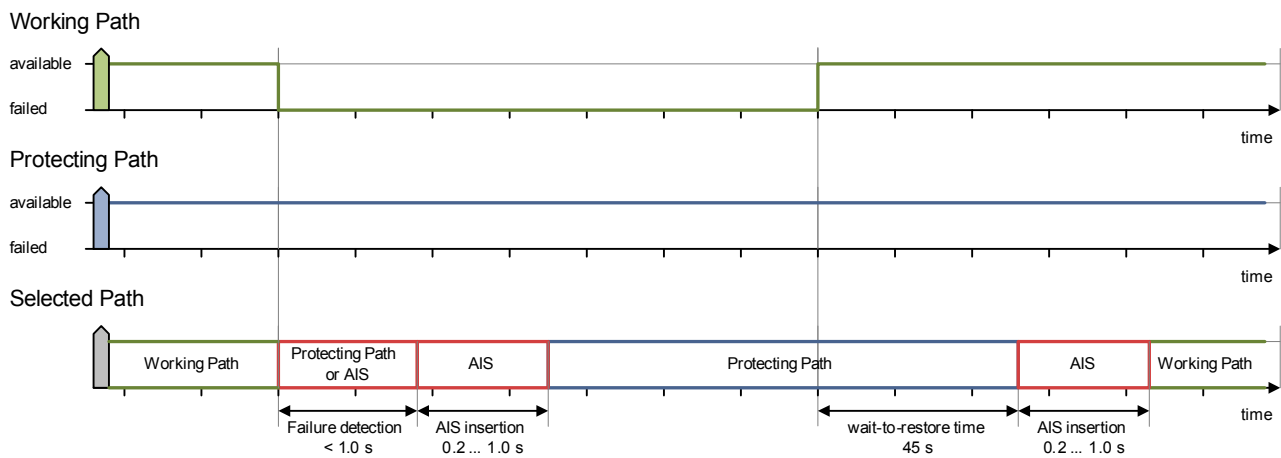
Figure 8:   Revertive protection switching

In case of non-revertive operation type

- the protected channel must have one timeslot, i.e. non-revertive operation is not supported for P0-nc channels with n > 1.
- the SELI8 unit inserts no AIS into the protected channel.
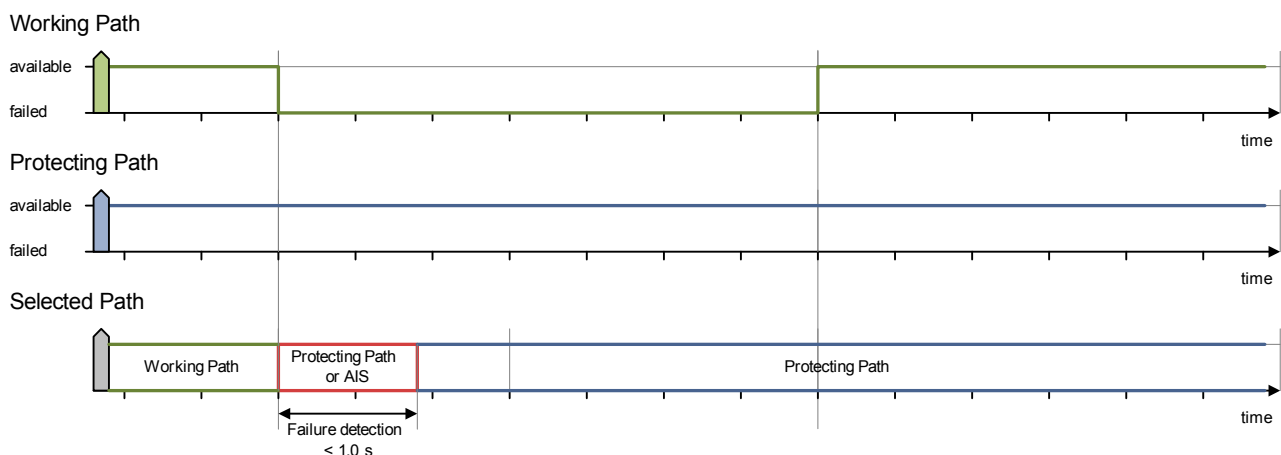
Figure 9:   Non-revertive protection switching

- There is no restriction about the selection of working and protecting P0-nc channel.

Protection switching action can be driven by two different request types:
- Traffic signal requests:
  - TSF (highest priority)
  - TSD
  - AIS (lowest priority)
- External command requests:
  - Activated from the channel status dialogue.

Please note:

The protection parameters holdoff time and guard time are not available for P0-nc LTP.

5.2.2.1   Application without separate pilot channel
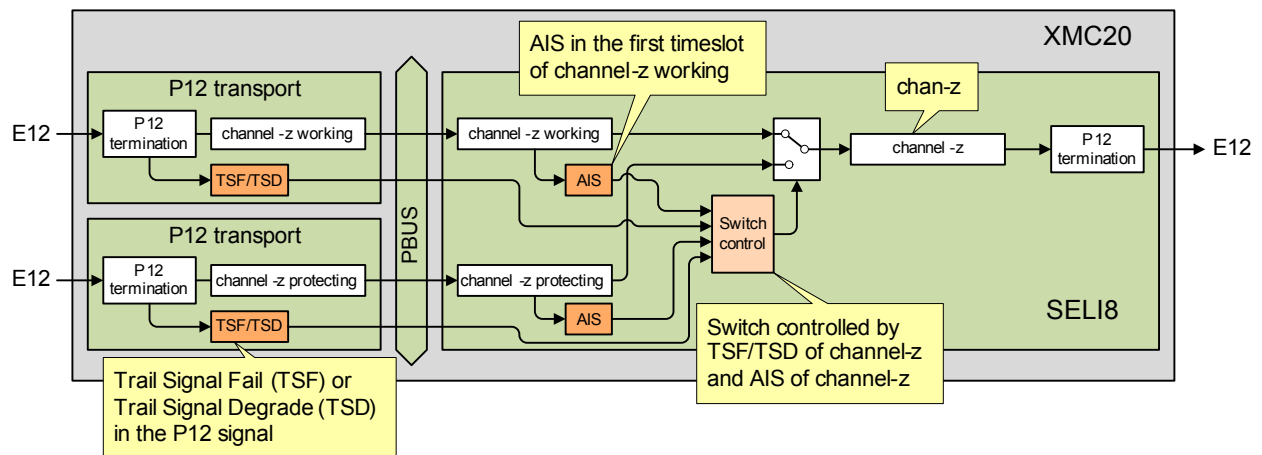
Figure 10:   LTP without pilot channel

In an application without using a separate pilot channel for the AIS supervision, the first timeslot of the user traffic signal is supervised for AIS. The user traffic signal transported in channel-z must not have AIS as a valid pattern. Otherwise random protection switching events could occur.

Configure the "Pilot Channel" parameter in the AP: /unit-x/port-y/chan-z, Configuration - CTP to "chan-z", i.e. to the protected channel.

5.2.2.2 Application with separate pilot channel
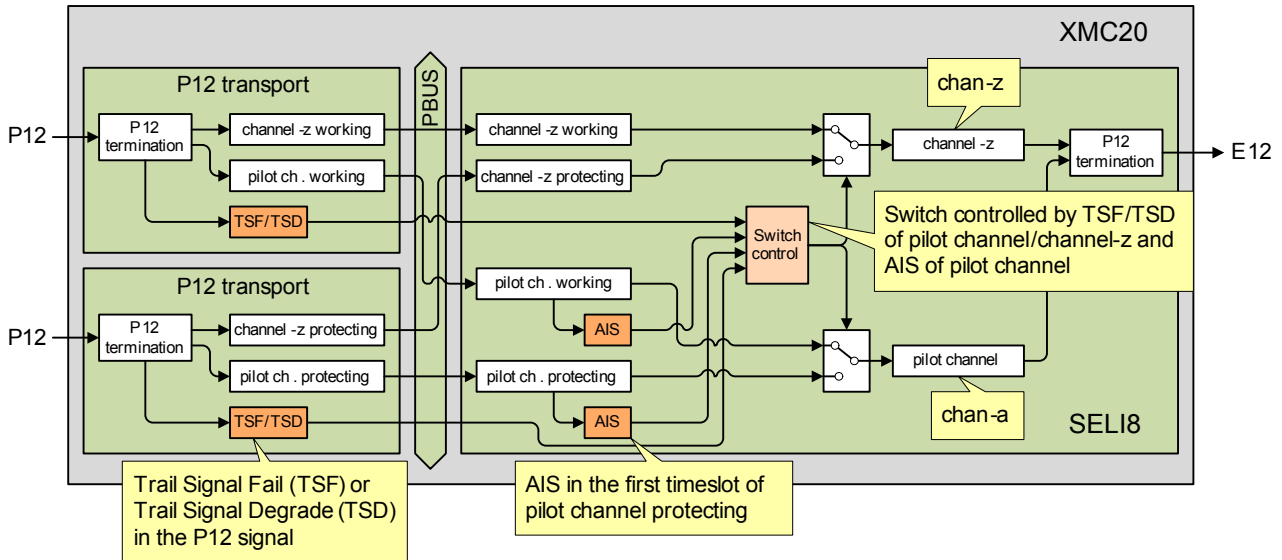
Figure 11:   LTP with pilot channel

In an application using a separate pilot channel for the AIS supervision, the user traffic signal transported in channel-z can have an arbitrary content. The traffic signal transported in the pilot channel must not have AIS as a valid pattern. Otherwise random protection switching events could occur.

Please note:

The switch control function in Figure 11 "LTP with pilot channel" is shown only once but in reality the function is available twice, once for the protected channel and once for the pilot channel.

→ When both "Pilot Channel" parameters of the protected channel and the pilot channel are configured the same, the two switch control functions behave identically.

The working channel-z and the working pilot channel must be transported through the TDM network using the same P12 signal as shown in *Figure 11 "LTP with pilot channel"*.

The protecting channel-z and the protecting pilot channel must be transported through the TDM network using the same P12 signal as shown in *Figure 11 "LTP with pilot channel"*.

Risk of operating trouble!

When using different P12 signals for the working channel-z and the working pilot channel or for the protecting channel-z and the protecting pilot channel, disparate failure states of the channel-z and the pilot channel will lead to uncoordinated protection switch events.

Configure the "Pilot Channel" parameter in the AP: /unit-x/port-y/chan-z, Configuration - CTP to "chan-a", i.e. to the pilot channel.

Configure the "Pilot Channel" parameter in the AP: /unit-x/port-y/chan-a, Configuration - CTP to "chan-a", i.e. also to the pilot channel.

6 Commissioning

In this section, you will find a commissioning example of the SELI8 unit for the transport of PDH traffic.

Please refer to [355] User Manual "ECST" for details on the general GUI aspects, and refer to [302] User Guide "XMC25/XMC23/XMC22" for specific characteristics of the XMC20.

6.1 Commissioning of an E1 Port

6.1.1 Prerequisites

Before starting the commissioning of an E1 port on the SELI8 unit, the following prerequisites need to be fulfilled:

6.1.1.1 COGE5 unit

In a XMC20, a COGE5 needs to be in operation in slot 11 of the XMC20 subrack.

6.1.1.2 SELI8 unit

The SELI8 service unit is inserted into a slot of the XMC20 subrack. Available slots are listed in section 4.2 Slots for the SELI8 Unit (on page 13).

A valid ESW is installed on the SELI8 unit. For the management of ESW, refer to [355] User Manual "ECST". For details about compatible ESW versions, refer to [012] Release Note "XMC20".

6.1.1.3 ECST

ECST needs to be installed on a PC, and a management connection from the ECST to the XMC20 needs to be up and running. For details about the installation and operation of the ECST, please refer to [355] User Manual "ECST" and [354] Quick Guide "ECST".

The amount and accessibility of operations depend on the user profile with which you are logged in. For more information, please refer to [323] User Guide "Management Communication".

6.1.1.4 PETS

The PETS on the XMC20 network element must be configured to an appropriate synchronization clock source, i.e. a clock source traceable to a PRC.

For the PETS configuration refer to [314] User Guide "TDM Services and Cross Connections in XMC20".

6.1.2 Configuration of an E1 Port

For the configuration of the E1 port, the following steps have to be performed.

E1 port configuration This action list shows step by step how to configure an E1 port. The E1 port will use the Transparent mode for the P12 transport and will be connected to another E1 port on the same SELI8 unit.

The following assumptions and identifiers are used:
– The SELI8 unit is assumed to be plugged in slot 5 of the XMC25.
– The SELI8 unit is assigned.
– The E1 port created has the identifier port-1 and transports a transparent P12 signal.
– The P12 signal from port-1 is connected to port-2.

Configure the port-1 general parameters

Proceed as follows:

1. Navigate to the port configuration dialogue:
   - AP:/unit-5/port-1, Configuration - General.

2. Select the port termination mode:
   - Mode = Transparent.

3. Disable the bidirectional protection switching:
   - Bidirectional = false

4. Execute "Apply".

Configure the port-1 synchronization parameters

Proceed as follows:

1. Navigate to the port configuration dialogue:
   - AP:/unit-5/port-1, Configuration - Synchronization.

2. Do not use a synchronization method:
   - Method = None.

3. Execute "Apply".

Create a channel on port-1

Proceed as follows:

1. Navigate to the port configuration dialogue:
   - AP:/unit-5/port-1, Configuration - Channels.

2. Create a P12 CTP:
   - execute "Create Channel…",

   → The "Create Channel" dialogue opens.

3. Configure the CTP:
   - Index = 1,
   - execute "OK".

Result: The E1 port is configured.

Configure port-2 **Proceed as follows:**

1. Configuration analogue to port 1.

Create cross connections **Proceed as follows:**

1. Configure the cross connection from the port 1 CTP to the port 2 CTP on the SELI8 unit.

2. Select the "Cross connections" view of the ECST.
   - Click on the "Connection Wizard" button:
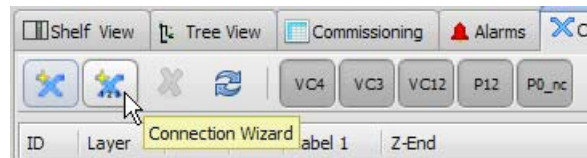
   - The "Create TDM Connection" dialogue opens.

3. Set the connection parameters:
   - Layer Rate = P12.
   - Directionality = Bidirectional.
   - Protected = No.
   - Label 1 = <anyName>.
   - Label 2 = <anyName>.
   - Number = 1.

4. Execute "Next ->".

5. Select the Z-End CTP:
   - Select the SELI8 unit, port-1, chan-1.

6. Execute "Next ->".

7. Select the A-End CTP:
   - Select the SELI8 unit, port-2, chan-1.

8. Execute "Create".

Result: The bidirectional cross connection is configured.

Activation **Proceed as follows:**

1. Set the administrative state of the port-1 to up
   AP:/unit-5/port-1, Main - Admin And Oper Status:
   - Set Administrative Status to "Up".

2. Execute "Apply".

   → The "Operational Status" changes to "Up".

3. Set the administrative state of the port-2 to up
   AP:/unit-5/port-2, Main - Admin And Oper Status:
   - Set Administrative Status to "Up".

4. Execute "Apply".

   → The "Operational Status" changes to "Up".

Result: The E1 ports are activated.
End of instruction

7 Operation and Maintenance

This section gives an overview of operational and maintenance aspects of the SELI8 unit.

Please note:

The operation functions described in this section assume a correctly configured and operational SELI8 unit.

7.1 Unit optical Indicators

LEDs on the front of the SELI8 unit are used to indicate to the user the alarm status summary of the unit and of the network traffic signals.
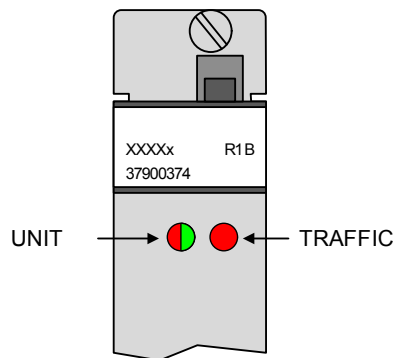
Figure 12:   Fault indication LEDs on the SELI8 unit

Table 6:   LED signalling on SELI8

LED name	Colour	State	Meaning
UNIT	Red	Failure	Unit is not in service. The unit is not able to provide the requested function due to - equipment failure (total breakdown), - mismatch of HW and SW. Recovery from this error situation is done usually by replacement of unit HW or ESW.
	Green / Red (blinking 1 Hz)	Booting or waiting	Unit has not been taken in service yet or the unit has not been provisioned. Recovery from this situation is done by taking this unit into service with ECST.
	Green	Running	Unit is up and running, it is ready to provide the required service.
	Off	Failure	System is not powered or outage of power supply on unit or outage of LED.
TRAFFIC	Red	Failure	One or more active failures on the unit, independent of the severity. More detailed information is provided by ECST.
	Off	Normal	Normal (error free) operation.

7.2 Loops

The SELI8 unit offers as a maintenance feature to apply P12 loops in the E1 port access point.

The SELI8 unit offers as a maintenance feature to apply P0_nc loops in the channel access points.

Please note:

Activated loops generate the "maintenance function active (MFA)" alarm.

Please note:

When applying a loop the operational state of the access point changes to "Testing".

Please note:

P12 and P0-nc loops are not treated as configuration parameters and are not stored in the configuration.

→ They are permanent until they are deactivated manually or by a unit restart or by a power reset.

7.2.1 E1 port Loops

The available loops on the E1 port access point are shown in the figure below:

- Front To Front,
  Loops the received P12 signal back towards the E1 interface. AIS is transmitted in direction to the PBUS. For P12 signals in terminated mode, AIS is sent on all data time slots.
- Back To Back.
  Loops the outgoing P12 signal back to the PBUS. AIS is transmitted in the direction of the E1 interface.

Only one loop can be active at the same time.
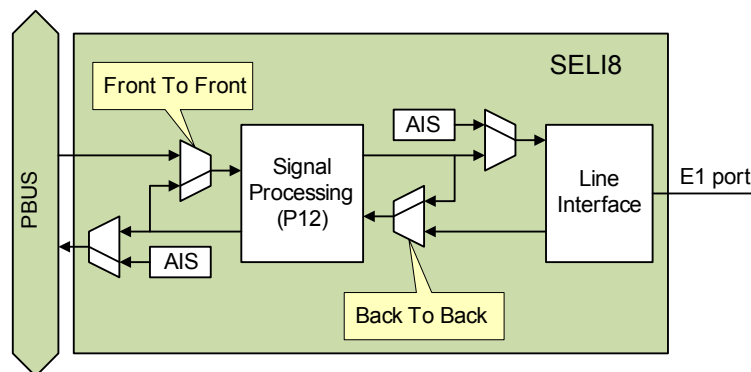
Figure 13: Loops on the E1 port access point

7.2.2   Channel loop

The available loop on the channel access point of an E1 port is shown in the figure below:

- Front To Front.
  Loops the received P12 or P0-nc channel signal back towards the E1 interface. The loop is transparent, i.e. no AIS is transmitted in direction to the PBUS.
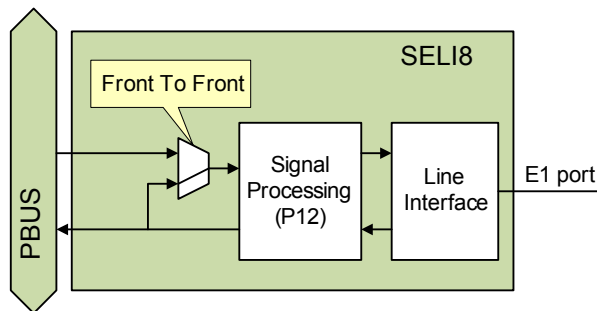
Figure 14:   Loop on the channel access point

Please note:

To be able to activate a diagnostic loop the channel CTP must be the source (a-End) of a configured connection.

7.3 Maintenance

7.3.1 Inventory Data

It is possible to read inventory data from the SELI8 unit via the ECST with the following access point:

AP: /unit-x, Main - Inventory.

7.3.2 Unit ESW Download

It is possible to update the embedded software (ESW) of the SELI8 unit via software download.

Please refer to [355] User Manual "ECST" for the description of the ESW download.

Risk of operating trouble!

The assignment of new embedded software restarts the SELI8 unit.

Thus, the installation of new ESW on the unit affects all traffic functions of the SELI8 unit.

8 User Interface Reference

This section gives a complete reference of the managed objects, properties, and commands of the SELI8 service unit as far as these are not covered in the generic descriptions in [302] User Guide "XMC25/XMC23/XMC22".

For a description on how to configure and bring into operation the SELI8 unit and its main functions, please refer to section 6 Commissioning (on page 27).

8.1 Introduction

Below, you will find a detailed description of all the configuration parameters and operations belonging to the managed objects model (MOM) for the SELI8 service unit.

Figure 15 "MOM (managed object model) of the SELI8 unit" shows the access point (AP) tree for the SELI8 unit with its managed objects.
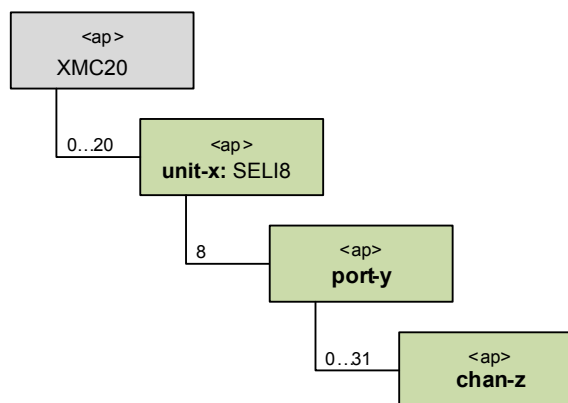
Figure 15:   MOM (managed object model) of the SELI8 unit

With these managed objects (MOs) the following functions are covered:

Table 7:   Managed objects (MOs) for SELI8

MO	Description of the management functions
unit-x: SELI8 Rxx (seli8_r5a)	Restart of the unit, management of the unit ESW, labelling, indication of the equipment status, display of inventory data, presentation of logbooks. The detailed properties are described in section 8.2 AP: / unit-x: SELI8 (on page 36).
port-y	Management of the E1 ports. Configuration of the termination mode and channel creation and deletion, performance monitoring parameters, diagnostic loop activation.
chan-z	Channels are the connection termination points (CTP) for the P0-nc and P12 traffic signal cross connections. For the configuration of cross connections please refer to [314] User Guide "TDM Services and Cross Connections in XMC20"

For each of the managed objects, properties and commands, the GUI "Tree Views" are given.

This reference section comprises the management functions:
- Overview,
- Main,
- Configuration,
- Fault Management,
- Performance Management, and
- Status.

Most of the APs only offer a part of the management functions listed above.

The order of appearance of the management function descriptions is in accordance with the APs in the ECST AP tree and the availability of the management functions of each AP.

In the tables of the sections below, the parameter default values for properties are <u>underlined</u>.

Please note:

For better legibility of numbers in this user guide, inverted commas are used when the number's size exceeds three digits (e.g. 40'000). In parameter entry fields of the ECST, these inverted commas must not be entered. Instead, the numbers are entered without these inverted commas (e.g. 40000).

Please note:

Screenshots presented in this reference are examples and show configurations or data that may not correspond to the view you see when managing your XMC20 equipment.

KEYMILE

8.2 AP: / unit-x: SELI8

8.2.1 AP: / unit-x, Overview

For a description of the
- − "Overview - Alarms",
- − "Overview - Cross Connections",
- − "Overview - Timeslot Allocation", and
- − "Overview - Unused Channels"

management functions, please refer to [302] User Guide "XMC25/XMC23/XMC22".

8.2.2 AP: / unit-x, Main

For a description of the
- − "Main - General",
- − "Main - Equipment",
- − "Main - Inventory",
- − "Main - Logbooks", and
- − "Main - Software"

management functions, please refer to [302] User Guide "XMC25/XMC23/XMC22".

8.2.3 AP: / unit-x, Fault Management

For the a description of the general aspects of the
- − "Fault Management - Status", and
- − "Fault Management - Configuration"

management functions, please refer to [302] User Guide "XMC25/XMC23/XMC22". The following table lists the fault causes of the current AP.

Table 8:   AP: / unit-x, Fault Management

ID	Fault Cause	Event Type	Traffic Affecting	Default Severity	Description
SWM	Software Mismatch	Equipment Alarm	☐	Minor	The running ESW does not match the assigned ESW.
SSWNA	Scheduled Software Not Available	Equipment Alarm	☐	Minor	The ESW that is scheduled for installation is not available on the unit. Make sure that the ESW is downloaded to the unit.
SWIN	Software Incompatible With Network Element	Equipment Alarm	☑	Major	The running ESW is not compatible with the version required by the NE type or version.

KEYMILE

Table 8:   **AP: / unit-x, Fault Management (continued)**

ID	Fault Cause	Event Type	Traffic Affecting	Default Severity	Description
PRC	PBUS Resource Conflict	Processing Error Alarm	☑	Major	The PBUS access circuit of another TDM unit in the subrack is defective. Remove or unassign the other TDM units in the subrack one by one until the alarm is cleared. Replace the defective unit.
EQM	Equipment Malfunction	Equipment Alarm	☐	Critical	The SELI8 controller detects any anomalies on the unit, e.g. a voltage is missing, a chip does not respond, etc.
HWIC	Hardware Incompatible With Configuration	Equipment Alarm	☑	Major	The plugged HW is not compatible with the unit configuration HW stored in the database. You may need to change the HW or re-create the configuration for the unit.
SWIC	Software Incompatible With Configuration	Equipment Alarm	☑	Major	The ESW running on the unit is not compatible with the unit configuration stored in the database. You may need to upgrade, or downgrade the ESW, or re-create the configuration with the currently running ESW.
GSW	General Software Alarm	Equipment Alarm	☐	Major	An ESW internal error has been detected that might inhibit the ESW from running correctly.
MFA	Maintenance Function Active	Communication Alarm	☑	Warning	A maintenance function has been activated by the operator.
UNAV	Unit Not Available	Equipment Alarm	☑	Critical	The unit that is configured is either not plugged or not recognized due to a failure.
NSW	No Application Software	Equipment Alarm	☑	Major	There is no application ESW installed on the unit, or the application ESW has not yet finished its boot process.
UNAS	Unit Not Assigned	Equipment Alarm	☐	Warning	The unit is not assigned and cannot be configured. To assign the unit, execute the "Assign" command in the "Main" function of the unit.
UIC	Unit Incompatible	Equipment Alarm	☑	Major	The inserted unit is not compatible with the assigned unit.
PWRSVE	Battery Power Saving	Equipment Alarm	☑	Critical	Power saving is active on the unit, i.e. it is kept in the "reset" state during battery power backup.

8.3 AP: / unit-x / port-y

8.3.1 AP: / unit-x / port-y, Overview

For a description of the
- − "Overview - Alarms",
- − "Overview - Cross Connections",
- − "Overview - Timeslot Allocation", and
- − "Overview - Unused Channels"

management functions, please refer to [302] User Guide "XMC25/XMC23/XMC22".

8.3.2 AP: / unit-x / port-y, Main

8.3.2.1 AP: / unit-x / port-y, Main - General

For a description of the
- − "Main - General"

management function, please refer to [302] User Guide "XMC25/XMC23/XMC22".

8.3.2.2 AP: / unit-x / port-y, Main - Admin And Oper Status
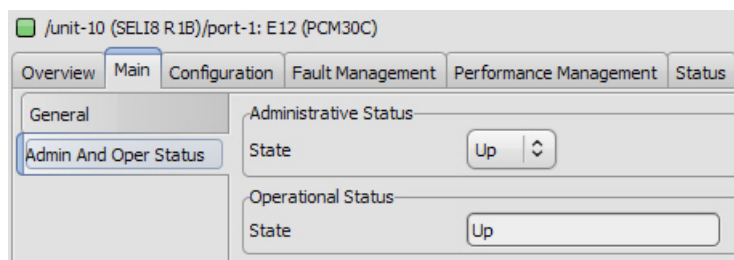
Table 9:   AP: / unit-x / port-y, Main - Admin And Oper Status

Operation Name	Parameter Name	Range	Description / Details
Administrative Status	State	Up	Set the IETF administrative status of the port.
		Down	
Operational Status	State	Up	Display of the IETF operational status of the port.
		Down	
		Testing	
		Unknown	
		Dormant	
		Not Present	
		Lower Layer Down	

8.3.3 AP: / unit-x / port-y, Configuration

Please note that the fields for some of the configuration parameters are context sensitive. Configuration parameters that are not available due to a higher-ranking configuration parameter are indicated as "NA" (not available) or "None".

The steering parameters for the port configuration are

- Termination Mode
- Synchronization Method

The configuration strategy to be followed is from the uppermost tab (General) to the lowermost tab (Channel), and on the tabs from the top parameter downwards.

After the parameter configuration of a higher-ranking parameter press the "Apply" button to assign the applicable values to the lower-ranking parameters.

8.3.3.1 AP: / unit-x / port-y, Configuration - General
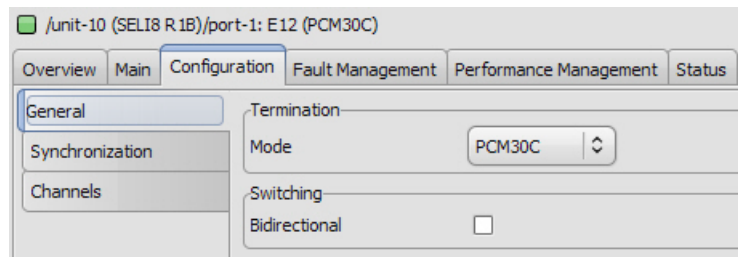
Table 10: AP: / unit-x / port-y, Configuration - General

Operation Name	Parameter Name	Range	Description / Details
Termination	Mode	Transparent	Clock and data transparent. Unstructured 2048 kbit/s signal.
		Clock Master	Transparent data, clock locked to PETS. Unstructured 2048 kbit/s signal.
		PCM30	Terminated with CAS, without CRC4. ITU-T G.704 structured 2048 kbit/s signal.
		PCM30C	Terminated with CAS and CRC4. ITU-T G.704 structured 2048 kbit/s signal.
		PCM31	Terminated without CAS or CRC4. ITU-T G.704 structured 2048 kbit/s signal.
		PCM31C	Terminated without CAS, with CRC4. ITU-T G.704 structured 2048 kbit/s signal.
		V5 Uplink	Transport mode for V5 links. The 5 Sa bits (timeslot 0, spare bits Sa4 … Sa8) support V5.x applications. This uplink uses CRC4.
		V5 Uplink NCI	Transport mode for V5 links. The 5 Sa bits (timeslot 0, spare bits Sa4 … Sa8) support V5.x applications. This uplink does not offer CRC4.

Table 10: **AP: / unit-x / port-y, Configuration - General (continued)**

Operation Name	Parameter Name	Range	Description / Details
Switching	Bidirectional	☑	In the bidirectional mode the path selector is controlled by the failure state of the working and the protecting paths and by the remote selector state. In the bidirectional switching mode the local and the remote path selectors are synchronized to select both the same path, i.e. both select the working path or both select the protecting path. Please refer to [314] User Guide "TDM Services and Cross Connections in XMC20" for a description of the switching criteria.
		☐	In the unidirectional mode the path selector is controlled by the failure state of the working and the protecting paths.

Risk of operating trouble!

Changing the P12 termination mode results in most cases in incompatible layer rates or number of timeslots.

→ The channel with its CTP and the assigned connections are deleted automatically and must be newly created.

→ Please refer to [314] User Guide "TDM Services and Cross Connections in XMC20", section 4.2.2.

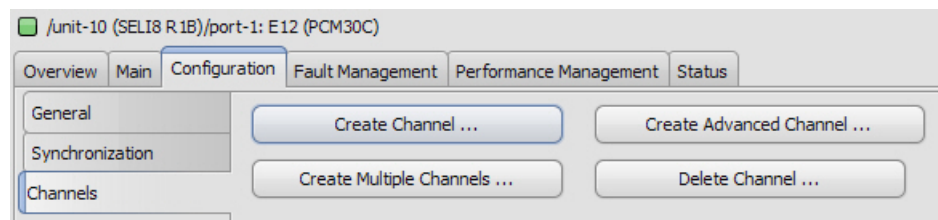**8.3.3.2** **AP: / unit-x / port-y, Configuration - Synchronization**

Table 11:   AP: / unit-x / port-y, Configuration - Synchronization

Operation Name	Parameter Name	Range	Description / Details
Synchronization	Method	None	Do not use a synchronization method
		SSM-Sa4	Use the selected Sa bit in time slot 0 for the transport of the synchronization status message (SSM). These parameter values are only available with the termination modes "PCM30C" and "PCM31C".
		SSM-Sa5	
		SSM-Sa6	
		SSM-Sa7	
		SSM-Sa8	
		SSI-Sa5	Use the Sa5 bit in time slot 0 for the transport of the synchronization status indication (SSI). The SSI method is KEYMILE proprietary and is compatible with the UMUX. This parameter value is only available with the termination modes "PCM30", "PCM30C", "PCM31" and "PCM31C".
QL Transmission	Source	ESI-1	Synchronization sources are all the PDH clock sources as they are configured at the AP: /ne, Configuration - PETS
		ESI-2	
		\<PDH Clock Source 1\>	
		\<PDH Clock Source 2\>	
		\<PDH Clock Source 3\>	
		\<PDH Clock Source 4\>	
		Internal	
	Usage	NA	No synchronization method has been selected.
		CanBeUsed	Transmit the QL value of the selected synchronization source
		DoNotUse	Transmit the QL value 15, i.e. indicating that the traffic signal cannot be used as a synchronization source.

Please note:

For more information regarding quality level handling please refer to [314] User Guide "TDM Services and Cross Connections in XMC20".

8.3.3.3   AP: / unit-x / port-y, Configuration - Channels

/unit-10 (SELI8 R 1B)/port-1: E12 (PCM30C)

| Overview | Main | Configuration | Fault Management | Performance Management | Status |

General

Synchronization

Channels

Create Channel ...   Create Advanced Channel ...

Create Multiple Channels ...   Delete Channel ...

"Create Channel" and "Create Multiple Channels" dialogues:

The "Create Advanced Channel" command displays the created channel:

"Delete Channel" dialogue:

Table 12: AP: / unit-x / port-y, Configuration - Channels

Operation Name	Parameter Name	Range	Description / Details
Create Channel …			Open the ECST dialogue to create one or more channels. A channel is a connection termination point (CTP) used as a starting or ending point of a cross connection.
Create Channel	Index	0 … 32	The channel index is used to identify the channel. 0 is a reserved value used for the auto-assignment of a channel index: The auto-assigned index is the highest existing index number + 1. In the ECST the default value is the autoassigned index number.
	Layer Rate	P12	Unstructured 2048 kbit/s. Automatically selected when the termination mode is configured to "Transparent" or "Clock Master".
		P0_nc	Structured n x 64 kbit/s. Automatically selected when the termination mode is configured to "PCM30", "PCM30C", "PCM31", "PCM31C", "V5 Uplink" or "V5 Uplink NCI".
	n	1 … 32	Number of consecutive timeslots (valid for P0_nc only). If the structured P12 signal, the channel is belonging to, uses CAS the timeslot 16 will be skipped automatically, e.g. a channel with n = 19 and start timeslot 1 will occupy timeslots 1 to 15 and 17 to 20 in a PCM30 signal. The default value is the maximum of available timeslots.

Table 12: AP: / unit-x / port-y, Configuration - Channels (continued)

Operation Name	Parameter Name	Range	Description / Details
	Start Timeslot	0 … 31	First timeslot of the first channel in the structured P12 signal (valid for P0_nc only). The minimum valid parameter value is 1
Create Advanced Channel …			Open the ECST dialogue to create one channel with non-consecutive time slots in the structured P12 signal. The termination mode must be configured to "PCM30", "PCM30C", "PCM31" or "PCM31C".
Create Advanced Channel	Index	0 … 32	The channel index is used to identify the channel. 0 is a reserved value used for the auto-assignment of a channel index: The auto-assigned index is the highest existing index number + 1. In the ECST the default value is the autoassigned index number.
	Timeslot(s)	<Timeslot range>	Configure the time slots to be used. A range of consecutive time slots is defined by "..", e.g. "5..9". Different ranges are separated by ",", e.g. "1, 4, 5..9, 31" If the structured P12 signal, the channel is belonging to, uses CAS the timeslot 16 must not be used, i.e. a range must be split so that it does not include the timeslot 16, e.g. "1..15", "17..31".
Create Multiple Channels …			Open the ECST dialogue to create one or more channels. The termination mode must be configured to "PCM30", "PCM30C", "PCM31" or "PCM31C".
Create Multiple Channels	Start Index	0 … 32	The start index is the channel index of the first channel. 0 is a reserved value used for the auto-assignment of a channel index: The auto-assigned index is the highest existing index number + 1. In the ECST the default value is the autoassigned index number.
	Number Of Channels	1 … 32	Number of channels to be created. If the configured number of channels to be created is higher than the available number of unused time slots, the ECST creates no channel, and displays a corresponding error message.
	n	1 … 32	Number of consecutive timeslots. If the structured P12 signal, the channel is belonging to, uses CAS the timeslot 16 will be skipped automatically, e.g. a channel with n = 19 and start timeslot 1 will occupy timeslots 1 to 15 and 17 to 20 in a PCM30 signal. The default value is the maximum of available timeslots. The start timeslot of the first channel is the lowest available timeslot number.
Delete Channel …			Open the ECST dialogue to delete one or all channels.

Table 12:   AP: / unit-x / port-y, Configuration - Channels (continued)

Operation Name	Parameter Name	Range	Description / Details
Delete Channel	Delete Channel	All	Delete all channels. All connections assigned to the channels will be deleted also.
		chan-1 … chan-31	Delete a channel. All connections assigned to the channel will be deleted also.

8.3.4   AP: / unit-x / port-y, Fault Management

For the a description of the general aspects of the
- "Fault Management - Status", and
- "Fault Management - Configuration"

management functions, please refer to [302] User Guide "XMC25/XMC23/XMC22". The following table lists the fault causes of the current AP.

Table 13:   AP: / unit-x / port-y, Fault Management

ID	Fault Cause	Event Type	Traffic Affecting	Default Severity	Description
LOS	Loss Of Signal	Communica-tion Alarm	☑	Major	Loss of incoming E1 signal.
LOF	Loss Of Frame	Communica-tion Alarm	☑	Major	Loss of frame synchronization on the incoming P12 signal.
AIS	AIS Received	Communica-tion Alarm	☑	Minor	AIS detected on the incoming P12 signal.
LOCM	Loss of CAS MF	Communica-tion Alarm	☑	Major	Loss of CAS multiframe alignment on the incoming P12 signal.
BERE3	BER > 1E-3	Communica-tion Alarm	☑	Major	Bit error ratio >10E-3 on the incoming E1 signal calculated from bipolar violations (code errors).
BERE5	BER > 1E-5	Communica-tion Alarm	☐	Minor	Bit error ratio >10E-5 on the incoming E1 signal calculated from bipolar violations (code errors).
DEG	Degraded Signal	Communica-tion Alarm	☐	Major	BER > 10^{-3} on the incoming P12 signal from TS0 errors (CRC4 disabled), or BER > 10^{-5} on the incoming P12 signal calculated using CRC4 block errors (CRC4 enabled).
NCI	Non CRC4 Interworking	Communica-tion Alarm	☐	Warning	The CRC4 monitoring function is disabled due to a disabled CRC4 function at the remote equipment.
RDI	Remote Defect Indica-tion	Communica-tion Alarm	☐	Minor	The far end equipment has one or more of the following defects: Hardware fault, AIS received, BER > 1E-3, loss of frame, loss of signal.
RLOCM	Remote Loss of CAS MF	Communica-tion Alarm	☐	Minor	Loss of CAS multiframe alignment on the incoming P12 signal at the remote equipment.
RNCI	Remote Non CRC4 Interworking	Communica-tion Alarm	☐	Minor	"Non CRC4 interworking" alarm at the remote equipment.

Table 13:   AP: / unit-x / port-y, Fault Management (continued)

ID	Fault Cause	Event Type	Traffic Affecting	Default Severity	Description
FDPF	Far End Degraded Performance	Quality Of Service Alarm	☐	Warning	ES ≥ 432 or SES ≥ 22 over a 24 hour interval at the far end. The alarm status is reset after a 24 hour interval with ES = 0 and SES = 0. The alarm can be cleared by resetting the corresponding PM alarm counter.
FUPF	Far End Unacceptable Performance	Quality Of Service Alarm	☐	Warning	ES ≥ 150 or SES ≥ 15 over a 15 min. interval at the far end. The alarm status is reset after a 15 min. interval with ES ≤ 3 and SES = 0. The alarm can be cleared by resetting the corresponding PM alarm counter.
NDPF	Near End Degraded Performance	Quality Of Service Alarm	☐	Warning	ES ≥ 432 or SES ≥ 22 over a 24 hour interval at the near end. The alarm status is reset after a 24 hour interval with ES = 0 and SES = 0. The alarm can be cleared by resetting the corresponding PM alarm counter.
NUPF	Near End Unacceptable Performance	Quality Of Service Alarm	☐	Warning	ES ≥ 150 or SES ≥ 15 over a 15 min. interval at the near end. The alarm status is reset after a 15 min. interval with ES ≤ 3 and SES = 0. The alarm can be cleared by resetting the corresponding PM alarm counter.
MFA	Maintenance Function Active	Communication Alarm	☑	Warning	This alarm appears if a manual change in the status/maintenance function has been done. E.g. applying a loop.

8.3.5   AP: / unit-x / port-y, Performance Management

For the a description of the general aspects of the performance management (PM) functions, please refer to [302] User Guide "XMC25/XMC23/XMC22".

The PM parameters are presented in different groups. The following counter groups are available for the SELI8 ports:

- "G.826" group, see section 8.3.5.1 AP: / unit-x / port-y, Performance Management - G.826 (on page 46).
- "P12 Events" group, see section 8.3.5.2 AP: / unit-x / port-y, Performance Management - P12 Events (on page 46).

The following counter intervals are available, depending of the counter group:

Table 14:   PM counter interval availability

Counter interval	G.826	P12 Events
User Counter	yes	yes
History 15min	yes	yes
History 24h	yes	yes
Alarm 15min	yes	no
Alarm 24h	yes	no

8.3.5.1 AP: / unit-x / port-y, Performance Management - G.826

Table 15:   PM group: G.826

PM parameter	Description
Near End BBE	Near end count of Background Block Errors.
Near End ES	Near end count of Errored Seconds.
Near End SES	Near end count of Severely Errored Seconds.
Near End UAT	Near end count of Unavailable Time.
Far End BBE	Far end count of Background Block Errors.
Far End ES	Far end count of Errored Seconds.
Far End SES	Far end count of Severely Errored Seconds.
Far End UAT	Far end count of Unavailable Time.
Path UAT	Path UAT is the UAT of the near end or the far end.

8.3.5.2 AP: / unit-x / port-y, Performance Management - P12 Events

Table 16:   PM group: P12 Events

PM parameter	Description
Line Code Violations	Near end bipolar violations (HDB3 line code errors).
Positive Slips	Near end positive frame slips. The counter for positive frame slips is incremented when the clock of the NE runs faster than the clock provided via the ITU-T G.704 framed 2 Mbit/s traffic signal.
Negative Slips	Near end negative frame slips. The counter for negative frame slips is incremented when the clock of the NE runs slower than the clock provided via the ITU-T G.704 framed 2 Mbit/s traffic signal.

8.3.6 AP: / unit-x / port-y, Status

8.3.6.1 AP: / unit-x / port-y, Status - Maintenance

Table 17: AP: / unit-x / port-y, Status - Maintenance

Operation Name	Parameter Name	Range	Description / Details
Maintenance	Loops	None	No loop active. Refer to section 7.2 Loops (on page 31)
		Front To Front	The incoming signal from the E1 port is looped back towards the E1 port. The loop is removed when the configuration is restored or the port administrative state is set to down.
		Back To Back	The outgoing signal towards the E1 port is looped back towards the backplane. The loop is removed when the configuration is restored or the port administrative state is set to down.
	MF State	OK	The CRC4 monitoring function is active. Note that the CRC4 multiframe alignment state is read only.
		Non CRC Interworking	The CRC4 monitoring function is disabled due to disabled CRC4 at the remote equipment. If the CRC4 multiframe alignment is in the NCI state no further automatic search is done. A new search for CRC4 multiframe alignment must be initiated manually with the "Force CRC4 Multi-frame Search" command (see below).
		None	The port is configured without CRC4 monitoring.
Force CRC4 Multi-frame Search			Trigger a new attempt for the CRC4 multiframe alignment. To check the result of the new attempt, you have to press the "Refresh" button.

Please note:

During maintenance an NCI Alarm (non-CRC4 interworking) can appear. If this alarm is active, and it is known that the other equipment now sends the CRC4 multiframe, the following procedure can clear the alarm:

→ Perform a "Force new search" in the CRC4 MFA status of the P12 layer, or

→ Disable CRC4 and re-enable the CRC4.

8.3.6.2 AP: / unit-x / port-y, Status - QL

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Table 18:   AP: / unit-x / port-y, Status - QL

Operation Name	Parameter Name	Range	Description / Details
Clock Quality	Received QL	Unknown	The synchronization method "None" has been configured.
		Do Not Use	Received SSM value = 15. The received SSI value = 0 is interpreted as "Do Not Use" and gets the QL = 15 assigned.
		1 … 14	Display of the received SSM value < 15. The received SSI value = 1 is interpreted as "Can Be Used" and gets the QL = 13 assigned.
	Transmitted QL	Unknown	The synchronization method "None" has been configured.
		Do Not Use	The "Do Not Use" quality level is transmitted as SSM value = 15, or as SSI value = 0.
		1 … 14	Display of the transmitted SSM value < 15. The transmitted SSI value = 1 is displayed as QL = 13.

8.4 AP: / unit-x / port-y / chan-z

8.4.1 AP: / unit-x / port-y / chan-z, Overview

For a description of the
- − "Overview - Alarms",
- − "Overview - Cross Connections", and
- − "Overview - CTP"

management functions, please refer to [302] User Guide "XMC25/XMC23/XMC22".
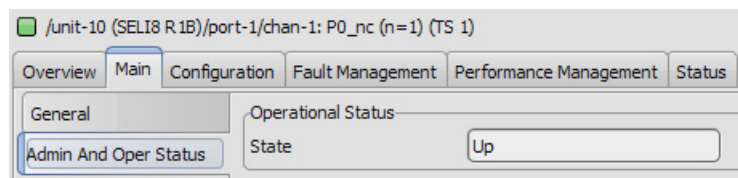
8.4.2 AP: / unit-x / port-y / chan-z, Main

8.4.2.1 AP: / unit-x / port-y / chan-z, Main - General

For a description of the
- − "Main - General"

management function, please refer to [302] User Guide "XMC25/XMC23/XMC22".

8.4.2.2 AP: / unit-x / port-y / chan-z, Main - Admin And Oper Status

Table 19: AP: / unit-x / port-y / chan-z, Main - Admin And Oper Status

Operation Name	Parameter Name	Range	Description / Details
Operational Status	State	Up	Display of the IETF operational status of the channel.
		Down	
		Testing	
		Unknown	
		Dormant	
		Not Present	
		Lower Layer Down	

8.4.3 AP: / unit-x / port-y / chan-z, Configuration

8.4.3.1 AP: / unit-x / port-y / chan-z, Configuration - CTP

Please note:

All parameters of layer rate, number of time slots and time slot allocation are read only.

→ To change a parameter the channel has to be deleted and newly created with the modified parameters.

Table 20: AP: / unit-x / port-y / chan-z, Configuration - CTP

Operation Name	Parameter Name	Range	Description / Details
CTP Configuration	Layer Rate	P12	Unstructured 2048 kbit/s.
		P0_nc	Structured n x 64 kbit/s.
	n	0 … 2 characters	Number of channel timeslots (valid for P0_nc only).
	Timeslot(s)	0 … 64 characters	Occupied timeslots in the structured P12 signal (valid for P0_nc only).
Connected to CTPs	Remote CTP	<MO address>	Address string of a connections remote end. Without a connection the parameter is empty
	Connection Index	0 … 65"535	Index of a connection assigned to the channel. Without a connection the parameter is empty
	Directionality	Bidirectional	Directionality of the connection.
		Unidirectional	

Table 20:   AP: / unit-x / port-y / chan-z, Configuration - CTP (continued)

Operation Name	Parameter Name	Range	Description / Details
	Local Role	z-End	The channel is the ending point of a connection. Please refer to [314] User Guide "TDM Services and Cross Connections in XMC20"
		a-End Working	The channel is the working starting point of a protected or unprotected connection.
		a-End Protecting	The channel is the protecting starting point of a protected connection.
	Remote Role	z-End	The CTP at the connections remote end is the ending point of a connection. Please refer to [314] User Guide "TDM Services and Cross Connections in XMC20"
		a-End Working	The CTP at the connections remote end is the working starting point of a protected or unprotected connection.
		a-End Protecting	The CTP at the connections remote end is the protecting starting point of a protected connection.
z-End Configuration	Revertive Protection Switching	☑	Enable revertive protection switching.
		☐	The z-End will preferably select the working a-End. Non-revertive protection switching is only available for channels with the number of timeslots n=1. Non-revertive protection switching for n>1 will be available in a future release.
	CAS AIS Supervision	☑	Use CAS AIS as protection switching criterion.
		☐	CAS AIS supervision is only applicable with P0-nc.
	Switch-Over Logging	☑	Enable the logging of the protection switch-over events.
		☐	
Linear Trail Protection	Pilot Channel	None	Linear Trail Protection is disabled, i.e. no channel is supervised for AIS.
		chan-1 … chan-z	Enable Linear Trail Protection. Select the channel to be supervised for AIS. AIS supervision is only applicable with P0-nc channels. The selection box shows all created P0-nc channels. For further information please refer to section 5.2.2 Linear Trail Protection (on page 22).

Please note:

The z-End of a protected connection shows two entries in the "Connected to CTPs" table, one for the working and one for the protecting path.

8.4.4   AP: / unit-x / port-y / chan-z, Fault Management

For the a description of the general aspects of the
- "Fault Management - Status", and
- "Fault Management - Configuration"

management functions, please refer to [302] User Guide "XMC25/XMC23/ XMC22". The following table lists the fault causes of the current AP.

Table 21: AP: / unit-x / port-y / chan-z, Fault Management

ID	Fault Cause	Event Type	Traffic Affecting	Default Severity	Description
MFA	Maintenance Function Active	Communication Alarm	☑	Warning	A maintenance function has been activated by the operator from the channel status.
TSF	Trail Signal Failure	Communication Alarm	☑	Major	Trail signal fail (TSF) from the P12 transport unit is active, or CAS AIS active (only available if CAS is enabled). In a protected connection the working AND the protecting path have failed.
RTSF	Redundant Trail Signal Failure	Communication Alarm	☑	Minor	Trail signal fail (TSF) from the P12 transport unit is active, or CAS AIS active (only available if CAS is enabled). In a protected connection the working OR the protecting path has failed. In an unprotected connection this fault cause is not applicable.

Please note:

The monitoring of the TSF and RTSF alarms is disabled by default.

8.4.5 AP: / unit-x / port-y / chan-z, Performance Management

For the a description of the general aspects of the performance management (PM) functions, please refer to [302] User Guide "XMC25/XMC23/XMC22".

The PM parameters are presented in different groups. The following counter group is available for the SELI8 channels:

- "Protection" group, see section 8.4.5.1 AP: / unit-x / port-y / chan-z, Performance Management - Protection (on page 53).

The following counter intervals are available:

Table 22: PM counter interval availability

Counter interval	Protection
User Counter	yes
History 15min	yes
History 24h	yes
Alarm 15min	no
Alarm 24h	no

8.4.5.1 AP: / unit-x / port-y / chan-z, Performance Management - Protection

Table 23: PM group: Protection

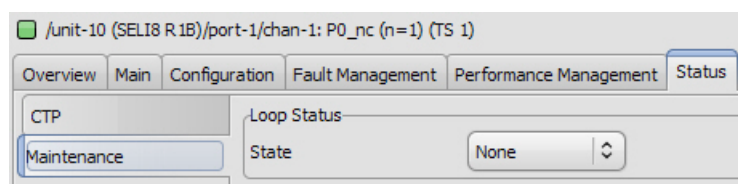| PM parameter	Description
Switch-Over	The protection switch-over count gives information about the number and distribution of protection switching events.

8.4.6 AP: / unit-x / port-y / chan-z, Status

8.4.6.1 AP: / unit-x / port-y / chan-z, Status - CTP

Table 24: AP: / unit-x / port-y / chan-z, Status - CTP

Operation Name	Parameter Name	Range	Description / Details
Trail Status	Working Trail, Remote CTP	<MO Address>	Managed object address of the CTP (connection termination point) where the P12 or P0-nc signal is connected to, e.g. /unit-21/port-1/chan-1.
	Working Trail, Status	OK	No failure on the received signal.
		SF	Signal Fail status on the received signal.
		CAS AIS	CAS AIS status in the received signal, i.e. an all '1' signal in time slot 16.
		SD	Signal Degraded status on the received signal.
		Not Available	The status of the received signal is not available, e.g. when the CTPs role is a-end in a unidirectional connection.
	Protecting Trail, Remote CTP	<MO Address>	Managed object address of the CTP (connection termination point) where the P12 or P0-nc signal is connected to, e.g. /unit-21/port-2/chan-1.

Table 24: AP: / unit-x / port-y / chan-z, Status - CTP (continued)

Operation Name	Parameter Name	Range	Description / Details
	Protecting Trail, Status	OK	No failure on the received signal.
		SF	Signal Fail status on the received signal.
		CAS AIS	CAS AIS status in the received signal, i.e. an all '1' signal in time slot 16.
		SD	Signal Degraded status on the received signal.
		Not Available	The status of the received signal is not available, e.g. when the CTPs role is a-end in a unidirectional connection.
	Active Trail	Working	The trail from the a-end working remote CTP has been selected.
		Protecting	The trail from the a-end protecting remote CTP has been selected.
		Protecting/Wait-To-Restore	In case of LTP revertive protection switching the selector is waiting to switch back to the restored a-End working remote CTP.
		Not Available	There is no active trail.
External Request	Request	Release	Automatic trail selection.
		Force Working	Force the selector to use the trail from the a-end working remote CTP.
		Force Protecting	Force the selector to use the trail from the a-end protecting remote CTP.
		Manual Working	Prefer the trail from the a-end working remote CTP. Use this trail only if the fault status is not worse than the fault status of the protecting trail.
		Manual Protecting	Prefer the trail from the a-end protecting remote CTP. Use this trail only if the fault status is not worse than the fault status of the working trail.

8.4.6.2 AP: / unit-x / port-y / chan-z, Status - Maintenance

Table 25: AP: / unit-x / port-y / chan-z, Status - Maintenance

Operation Name	Parameter Name	Range	Description / Details
Loop Status	State	None	Deactivate any loop.
		Front To Front	Activate the Front-to-front loop. For more information refer to section 7.2 Loops (on page 31).

➡ **Please note:**

The channel CTP must have a cross connection configured, otherwise the loop cannot be activated.

9 Annex

9.1 Associated XMC20 Documents

Any version(s) and/or release(s) indicated with the below listed document titles identify the specific state of the software and/or feature set at the creation time of the present document. If the present document is published as part of a document collection, the hyperlinks might open a document valid for a newer version/release. That updated version is valid in the context of all units and features described in the document collection.

Please note:

For the HTML-based documentation site there are no interdocument hyperlinks realized yet.

→ Please find the required document via the navigation tree on the left.

[012] Release Note "XMC20"

[201] System Description "XMC20"

[202] Safety Instructions "Precautions and safety"

[301] User Guide "XMC25 Installation"

[310] User Guide "XMC23 Installation"

[322] User Guide "XMC22 Installation"

[302] User Guide "XMC25/XMC23/XMC22"

[323] User Guide "Management Communication"

[354] Quick Guide "ECST"

[355] User Manual "ECST"

[314] User Guide "TDM Services and Cross Connections in XMC20"

[340] Quick Guide "TDM Services over PDH/SDH"

[447] User Manual "COGE5, COGE5-F co5ne_r2, co5un_r2"

[506] User Manual "XMC20 cables"

[915] Technical Bulletin "Feature Licences for XMC20"

9.2 Technical Support

Please refer to the KEYMILE Extranet (via http://www.keymile.com) for support contact information.

9.3 Product Training

Training courses are available for a wide range of KEYMILE products and applications.

For contact information, course descriptions, locations and dates, go to the Website: http://www.keymile.com, then search for "product training".