SIEMENS

Information

Flexible Multiplexer FMX2R3.2

UMN:TED

A50010-A3-C701-1-7618

Important Notice on Product Safety

Elevated voltages are inevitably present at specific points in this electrical equipment. Some of the parts may also have elevated operating temperatures.

Non-observance of these conditions and the safety instructions can result in personal injury or in property damage.

Therefore, only trained and qualified personnel may install and maintain the system.

The system complies with the standard EN 60950-1 / IEC 60950-1. All equipment connected has to comply with the applicable safety standards.

The same text in German:

Wichtiger Hinweis zur Produktsicherheit

In elektrischen Anlagen stehen zwangsläufig bestimmte Teile der Geräte unter Spannung. Einige Teile können auch eine hohe Betriebstemperatur aufweisen.

Eine Nichtbeachtung dieser Situation und der Warnungshinweise kann zu Körperverletzungen und Sachschäden führen.

Deshalb wird vorausgesetzt, dass nur geschultes und qualifiziertes Personal die Anlagen installiert und wartet.

Das System entspricht den Anforderungen der EN 60950-1 / IEC 60950-1. Angeschlossene Geräte müssen die zutreffenden Sicherheitsbestimmungen erfüllen.

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Technical modifications possible.
Technical specifications and features are binding only insofar as
they are specifically and expressly agreed upon in a written contract.

Reason for Update

Details: First issue

Chapter/Section	Reason for Update

Issue History

Issue	Date of issue	Reason for Update

This document consists of a total of 382 pages. All pages are issue 1.

Contents

Illustrations

Tables

1 General Information

This manual, an overview about the components and their interworking in networks with the multiplexer FMX2R3.2 is given. Functions, commissioning, operation and maintenance of FMX2R3.2 are described in detail. The operation is done via the graphical user interface of the AccessIntegrator domain manager version 8.2 (ACI DM V8.2) or higher versions. For the ACI DM V8.2, there is a separate documentation available (see Section 1.3).

1.1 Structure of the Manual

The manual consists of the following Registers:

- Information
- Installation
- Commissioning
- Operation
- Maintenance.

Information — The register Information (UMN:TED) gives a general overview about applications and the structure of the FMX2R3.2 and its components. Shelves, ONUs (Optical Network Units) and plug-in units of FMX2R3.2 are described in detail, including technical data, controls and connector assignment. At the end of the document there is a complete product overview of all components, which can be plugged in the shelves or ONUs of the FMX2R3.2.

Installation — The FMX2R3.2 shelves are offered stand alone. They can be mounted in ETSI- or 19''-racks or shelters. The ONUs are compact devices, which can be mounted at the wall. The necessary information for that are contained in the register Installation (UMN:IMN).

Commissioning — The register Commissioning (UMN:ITMN) describes all the procedures and measurements for activating the installed system, including step-by-step instructions to commission the FMX2R3.2.

Operation — FMX2R3.2 is operated via the graphical user interface of the ACI Domain Manager version 8.3 or higher, which is described in separat manuals, see Section 1.3. The register Operation (UMN:OMN) offers a guide line to use the operating procedures for configuring the system and for creating connections.

Maintenance — The procedures which expedite the re-establishment of normal operating state after a malfunction has occurred in the FMX2R3.2 can be find out via the operating system by “Branch to Maintenance”. The register Maintenance (UMN:MMN) gives an overview of the possible malfunctions and contains a guideline for using of the “Branch to Maintenance”.

1.2 Typographical Conventions

In all sections of this manual, the following conventions are applied:

Style of Representation	Meaning
`Courier`	Inputs and outputs Example: Enter `LOCAL` as the server name `Command not found`
Italics	Variables Example: *name* can be up to eight letters long.
“Italics”	Variables fin procedures and title bas Example: “General NE Parameter. <*Network Element*#...>:CUC#...”
Boldface	Special emphasis Example: This name may **not** be deleted
“Quotation marks”	Labels on the user interface (e.g. windows, menu items, buttons) Example: Activate the “OK” button Make a selection in the “File” menu.
`<Courier>`	Key combinations Example: `<CTRL> <ALT>+<ESC>`
→	Successive menu items Example: “File” → “Close”
	Additional items of information
	Warnings at critical points in the activity sequence

Tab. 1.1 Typographical Conventions

1.3 Additional Documentation

In addition, following documentation are used:

- User Manual AccessIntegrator Domain Manager: UMN ACI DM TDM version V8.3, SIEMENS Kit No. A50010-T3-A819
- Depending on plugged components:
  - Crossconnect Multiplexer CMXC: UMN CMXC
    SIEMENS Ordering No. A50010-A3-C800-*-7619
  - 2-Mbit/s Line Terminating unit: UMN LE2 (FastLink)
    SIEMENS Ordering No. A50010-A3-K600-*-7619
  - Synchronous Multiplexer SMX1/4c: UMN SMX1/4c (FastLink)
    SIEMENS Ordering No. A50010-A3-K19-*-7619
  - Infrastructure: UMN Infrastructure (FastLink)
    SIEMENS Ordering No. Nr. A50010-A3-K419-*-7619
- Project (planning) documentation.

1.4 Protection Measures

This Section contains a summary of the most important requirements with regard to protection of people and equipment. It does not claim to be complete. The installation instructions listed are shown in detail in the relevant Installation Manuals.

All assembly, installation, operation and repair work may only be undertaken by properly trained and qualified personnel.
In the event of any injury (e.g. burns and acid burns) being sustained, seek medical help immediately.

1.4.1 Protection Against Excessive High Contact Voltages

When handling the power supply or working on it, observe the safety measures described in the specifications of the European Norm EN 50110, part 1 and part 2 (Operation of electrical Systems) and the valid national country specific standards.

Special warning labels on the shelves point to the dangers which can result from high contact voltages when they are not grounded.

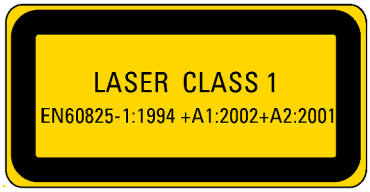
ACHTUNG	WARNING
HOHER BERÜHRUNGSSTROM Vor dem Anschluss an den Versorgungsstromkreis oder an das Telekommunikationsnetz unbedingt Erdverbindung herstellen	HIGH LEAKAGE CURRENT Earth connection essential before connecting supply or making telecommunication network connections

1.4.2 Protection Against Escaping Laser Light

When working on optical modules, note the regulations covering radiation safety on laser light units (EN 60825).

Modules equipped with laser light units carry the laser symbol.
The following points should be noted here:
For operation in closed systems the laser light units comply with Laser class 1, and such units can be identified by a stick on label as well as by a warning label.

Laser symbol



Warning label

To guard against any possible hazards, all optical transmitters are equipped with an automatic laser shutdown circuit. This trips if an input signal is missing at the relevant optical receiver, e.g. if the connection is interrupted.

Note, the laser safety shutdown must be always activated.

This preventive measure should also be followed to avoid any damage to health by making sure that escaping laser light is not directed towards the eye.

When breaking laser connections, the following procedure should be followed, despite the presence of the laser shutdown circuit:

- Pull out the plug-in unit about 5 cm
- Disconnect optical fiber
- Pull out unit completely.

1.4.3 Protection Against Fire in Racks or Housings

If FMX2R3.2 shelves are used in housing, the shelves must be performed the conditions for a fire protection housing according to DIN EN 60950.

To comply with fire protection standards as defined in DIN EN 60950, a protective plate (C42165-A320-C285) must be fitted into the floor of ETS and 19-inch standard racks. The rack must also meet the requirements of a fire-resistant housing as defined in DIN EN 60950.

1.4.4 Components Subject to Electrostatic Discharge

ESD
symbol

Slide-in units bearing this symbol are equipped with components subject to electrostatic discharge, that is to say the relevant safety provisions must be adhered to.

When packing or unpacking, touching pulling or plugging plug-in units bearing the ESD symbol, it is essential to wear a grounding bracelet, which should be grounded to a shelter or rack when working on it. This ensures that the units are not subject to electrostatic discharge.

Under no circumstances should the printed conductors or components of modules be touched. Take hold of modules by the edge only.

Once they have been removed, modules must be placed in the conductive plastic sleeves intended for them, and kept or dispatched in the special boxes or transport cases bearing the ESD symbol.

In order to avoid further damage to defective modules, they should be treated with the same degree of care as new ones.

Modules which are accommodated in a closed and intact housing are protected anyway.

European standard EN50082-1 provides information on the proper handling of components which are subject to electrostatic discharge.

1.4.5 Handling Modules (General)

When working with modules (slide-in units, power supply modules, subracks) the following points should be noted:

- Existing ventilation equipment must not be changed. The sufficient air circulation must not be obstructed.

Beware of rotating parts.

- When changing power supply modules you must switch off the fuse at the ac power connection. Damaged power connection cables for ac power operated systems are to be replaced by special leads supplied by the manufacturer.
- All slide-in units except for power supply modules can be removed or inserted with the power still applied. To remove and insert the units you should use the two levers fitted to the front of the unit. A type label is fixed to one of the two levers providing information on the hardware and software version of the unit.
- When inserting and removing subracks and when transporting them, take their weight into consideration.
- Cables may never be disconnected by pulling on the cable. Disconnection/connection may only be undertaken by pushing in/pulling out the connector involved.

1.4.6 Handling Optical Fiber Connectors and Cables

Optical connectors are precision-made components and must be handled accordingly. To ensure faultless functioning, the following points must be observed:

- The minimum bending radius for optical fibers is 30 mm!
- Mechanical damage to the surfaces of optical connectors impairs transmission quality by higher attenuation.
  - For this reason, do not expose the connectors to impact and tensile load.
  - Always fit optical fiber connectors with protective caps to guard them against mechanical damage and contamination. The protective dust caps should only be removed immediately prior to installation.
  - Once the protective dust caps have been removed, you must check the surfaces of the optical fiber connectors to ensure that they are clean, and clean them if necessary.
    For cleaning, the C42334-A380-A926 optical fiber cleaning tool or a clean, lint-free cellulose cloth or a chamois leather is suitable. Isopropyl alcohol can be used as cleaning fluid.

1.4.7 Protection against Foreign Voltages in the System

Two-level foreign voltage protection for the outdoor user lines is provided within the entire system (shelf or ONU and subscriber ports on the slide-in units).

For outdoor user lines, 420-V gas tube arresters are recommended. These can be installed in the MDF (Main Distribution Frame) of the ONU 30 FTTB or in an external MDF on the LSAs.

Sufficient protection against foreign voltages for outdoor subscriber lines are only given when appropriate protection elements are used.

With the ONU 20 FTTO, the protection elements are implemented on the terminal panel of the line card, if the line card provides outdoor ports, see technical data of the concerned line card (see Section 3).

1.4.8 Virus Protection

To prevent a virus infection you may not use any software other than that which is released for Operating System (TMN-OS based on Basis AccessIntegrator), Local Craft Terminal (LCT) and transmission system.

Even when exchanging data via network or external data carries (e.g. floppy disks) there is a possibility of infecting your system with a virus. The occurrence of a virus in your system may lead to a loss of data and breakdown of functionality.

The operator is responsible for protecting against viruses, and for carrying out repair procedures when the system is infected.

You have to do the following task:

- You have to check every data carrier (used data carriers as well as new ones) for virus before reading data from it.
- You must ensure that a current valid virus scanning program is always available. This program has to be supplied with regular updates by a certified software.
- It is recommended to make period checks against viruses in your OS.
- At the LCT it is recommended to integrate the virus scanning program into the start-up sequence.

1.5 CE Declaration of Conformity

The CE conformity of the product will be given if the construction and cabling is undertaken in accordance with the manual and the documents listed there in, e.g. mounting instructions, cable lists. Where necessary account should be taken of project-specific documents.

Deviations from the specifications or unstipulated changes during construction, e.g. the use of cable types with lower screening values can lead to violation of the CE requirements. In such case the conformity declaration is invalidated and the responsibility passes to those who have caused the deviations.

1.6 Environmental Passport

The aim of this environmental passport is to provide you with the most important environmentally-relevant information for this product. This means you can be sure that you have selected a supplier who develops, produces, packs and ships their products in an environmentally-compatible way.

Product origination process

Even at the product origination stage we pursue the aim of minimizing the adverse effects on the environment:

- We systematically record all product-related environmental requirements and take account of these both in the product definition and in its development.
- Protecting the environment is a matter of course in our day-to-day work. This includes minimizing the consumption of paper by using the latest technologies (e.g.

Internet, e-mail, database, 4:1 paper printouts) as well as multi-separation, heat insulation and intelligent use of energy.
- We coordinate all environmental activities via a certified environmental management system which complies with ISO 14001. It is checked in accordance with the German certification body DQS (Deutsche Gesellschaft für Zertifizierung von Managementsystemen mbH), quality and environment assessors. Certificate registration No.: 66749-01.

Naturally we at Siemens are conscious of the fact that expenditure for environmental protection measures must be kept within an economically justifiable framework. After all, we still want to offer you this product with a price/performance ratio which is attractive.

Manufacturing

Production facilities are equipped with the very latest, environmentally-friendly production machinery. Because of their minimal adverse effects on the environment these plants can be operated without the need for special permits or notification. However the appropriate measures for reducing emissions are still taken in accordance with the state of the art:
- Solder systems with condensate traps minimize both the deposition of solvents at the workstation and emissions into the atmosphere
- Our manufacturing processes are completely free of CFCs, volatile CHCs (chlorinated solvents) and toxic substances.
- The heat generated from producing compressed air will be used for heating walkable floor surfaces.
- Module production is practically waste-water-free since the use of low-residue fluxes obviates the need for cleaning processes.
- Far more than three quarters of all production waste is fed back into the secondary resources cycle. Only 0.5% of the production waste has to be disposed of as special waste.

Transport/shipping

The systems made by our company are shipped exclusively in environmentally-friendly packaging:
- pesticide-free wooden packing cases, collapsible, reusable
- Cardboard boxes
- Filling/stuffing: air cushions with polyethylene envelope
- “The Green Dot“ symbol for all packing for private end customers as a sign of our involvement in Germany’s dual system.

Energy consumption

Our products are designed in consideration to reduce the energy consumption without affecting the normal features (number of channels, techn. refinements etc.).

Power-down circuits also reduce energy consumption.

Taking back the product

Currently it is only possible to take back products when this has been regulated by prior contract agreements.

Waste disposal

Basically the systems from Siemens Wireline Access Networks are produced without any hazardous or forbidden substances such Cadmium, PCBs, CFCs or such like. Once

this product has reached the end of its useful life, it can be fraction separated and disposed of without hesitation in accordance with the current state of the art.

List of materials:

- Casing: Aluminum, steel, ABS plastic (flame-resistant)
  Surface coating only when this is required by the customer.
- Modules: Normal electronic components (disposal as "electronic waste"). The board material contains brominated flame retardants. The following are to be disposed of separately: Electrolytic capacitors, LCDs and mechanical components (heat sinks)
- Cable Copper
- Connectors: Gold, plastic
- Batteries: Lead-acid batteries, SW-controlled charge and discharge cycles considerably extend the life of today's lead acid batteries.

Special features of specific components are listed in the enclosed dismantling guide.

All information is provided on a voluntary basis and far exceeds that required by law. Should you have any other questions about our quality and environmental management, please send an e-mail to the following address:
horst.wild@icn.siemens.de

ICN Wireline Access Networks

Munich/Greifswald

2 System Description

2.1 Application

The flexible multiplexer FMX2R3.2 is a PCM30 system for building and extending flexible networks, and is suitable for linear, cascade and ring structures. It is intended mainly for use in corporate networks, but can also be used for subscriber-side termination of a V5.1/V5.2 access network.

Companies and administrations like railway operators and utilities operate corporate networks along oil or gas pipelines, railway tracks and radio links, which are used for monitoring and maintenance purposes. Due to the ongoing worldwide success of the Ethernet technology more and more control engineering components have been introduced with an Ethernet interface. FMX2R3.2 offers the possibility to use data interfaces based on Ethernet technology.

The FMX2R3.2 operates as terminal or drop/insert multiplexer for the following services:

- POTS, POTS with local battery
- ISDN-BA (S_0, U_{k0} with line code 4B3T or 2B1Q), also semipermanent
- Analog 2/4- wire transmission as leased lines or with E&M signaling
- V.24/V.35/V.36/RS530 and X.21 data transmission with subrates up to 30/31 × 64 kbit/s, G.703 with 30/31 × 64 kbit/s
- Data transmission with up to 30/31 × 64 kbit/s via Ethernet 10/100Base-T.

The features and properties of the multiplexer correspond to ITU-T Recommendation G.797. In the transmission network direction, it implements up to two 2-Mbit/s interfaces according to ITU-T G.703/9. The signaling codes are transmitted using CAS (Channel Associated Signaling). As a special signaling variant, FA signaling is also available.

Essential tasks of the multiplexer are:

- Multiplexing functions for speech and data signals.
- Provision of appropriate subscriber interfaces
- Control of subscriber interfaces with CAS or FA signaling.
  The CAS code frame corresponds to ITU-T Recommendation G.704/5.1.3.

Fig. 2.1 displays an example for an FMX2R3.2 corporate network:

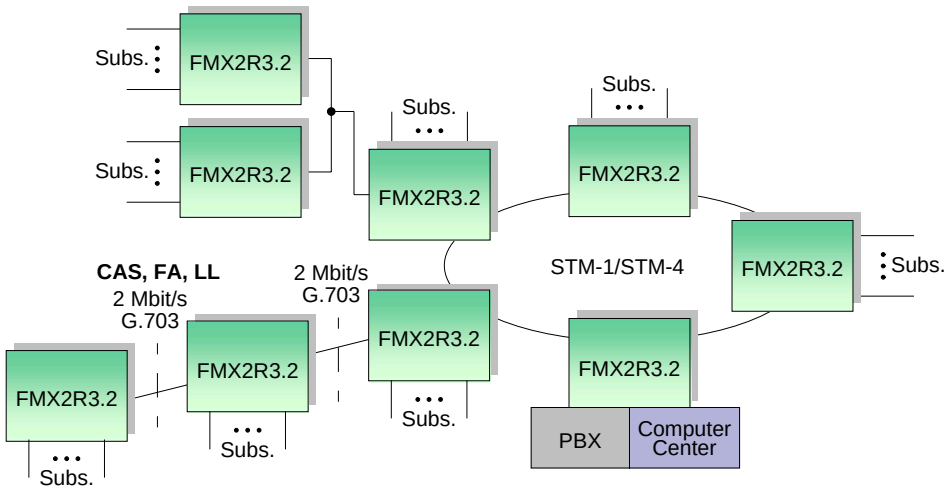


Fig. 2.1 FMX2R3.2 Corporate Network

Fig. 2.2 shows the typical application scenario, if FMX2R3.2 is used for monitoring and controlling along an oil pipeline. The FMX2R3.2 elements along the pipeline provide Ethernet interfaces for data transport between Ethernet based sensors, valves or similar and the maintenance centre.

The Ethernet interfaces alway work in mirror mode. The Ethernet traffic from the sensors is mapped into n x 64 kbit/s timeslots of an E1 link and transported to the next FMX2R3.2 station. The Ethernet interfaces of all sensors of the same FMX2R3.2 station and additionally all FMX2R3.2 stations along the pipeline operate together with their distant terminal in the centre as distributed L2 Ethernet switch. This is necessary because mapping of Ethernet traffic of each single sensor to its own dedicated 64-kbit/s timeslot would limit the maximum possible amount of Ethernet controlled devices to 31 for an E1 link. Furthermore Ethernet broadcast traffic encapsulated in the TDM link between FMX2R3.2 network elements is reduced to a minimum.

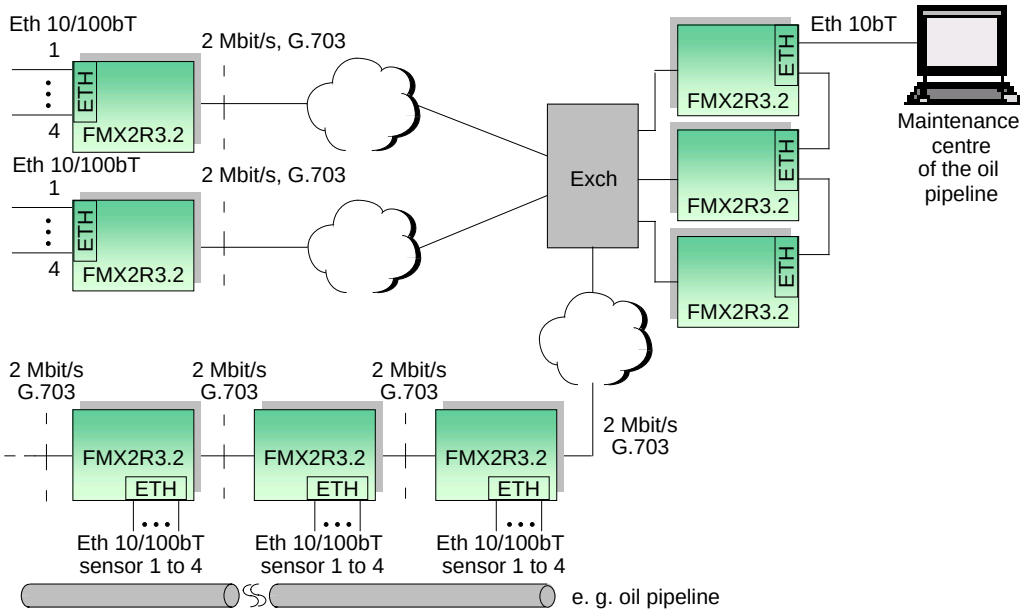


Fig. 2.2 Ethernet Switching via an FMX2R3.2 Network

For connection to the public switching network the channel-associated signaling is converted in V5.1/V5.2 protocols in conjunction with system module CMXII from FastLink, see Fig. 2.3.

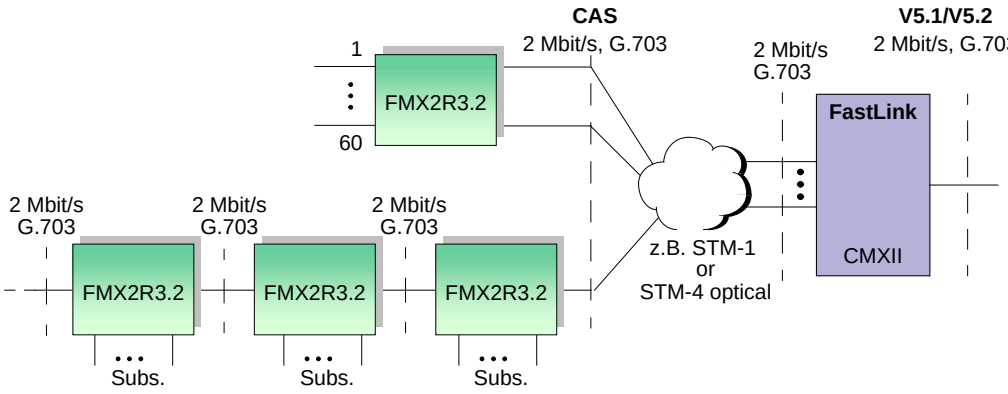


Fig. 2.3 Access via FMX2R3.2 Network to V5.1/V5.2 Exchange

Multiplexer FMX2R3.2 can be accomodated as follows:

- up to 2 x in FMX2S (Flexible Multiplexer Shelf)
- up to 2 x in MXS19C (Multiplexer Shelf 19'')
- in SNUS (Service Network Unit Shelf) in combination with the cross-connect multiplexer CMXC and the FastLink system module SMX1/4c
- in ONU 30 FTTB or
- in ONU 20 FTTO.

ONU 30 FTTB and ONU 20 FTTO each connect a multiplexer to the transmission network by means of a line termination unit (LTx). It is possible to cascade several ONUs or to operate two ONUs in a point-to-point connection for fixed analog or digital connections.

Network termination units which are connected to the multiplexer enable one or two data interfaces to access the subscriber directly. Network termination units for the basic access connect remote ISDN subscribers via U_{k0} (4B3T or 2B1Q) to the multiplexer.

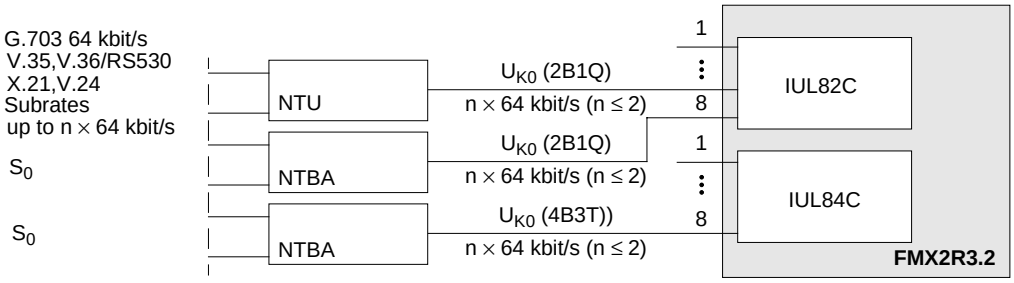


Fig. 2.4 Connecting the Network Termination Units to the Multiplexer

The multiplexer supports the following network termination units:

- Network termination unit NTU for interfaces in accordance with G.703 (64 kbit/s), V.24 (Subbit rates, 64 kbit/s), V.35, V.36, X.21 (subbit rates, 1 or 2 × 64 kbit/s), linked to the FMX2R3.2 via U_{k0}/2B1Q
- Network termination unit for basic access NTBA via U_{k0} (4B3T/2B1Q).

Operating modes of FMX2R3.2

The FMX2R3.2 multiplexer supports the following applications:

- Operating modes, chosen from
  - TMX2 × 30 terminal multiplexer, which contains two complete multiplexers
  - DIMX drop-insert multiplexer, with which individual channels of a signal which is connected between the two 2-Mbit/s ports of the multiplexer can be tapped off and inserted
  - TMX30(1+1) terminal multiplexer with 1+1 standby operation, which switches a 2-Mbit/s link to another on a fault

  The transmission capacity of the multiplexer in the TMX2×30 and DIMX operating modes is 60 channels each with 64 kbit/s, and in TMX30(1+1) operating mode it is 30 channels. The assignment of timeslots to the two 2-Mbit/s ports is independent of the channel plug-in unit positions in the multiplexer. If no signaling is transmitted, up to 31 or 62 channels each with 64 kbit/s are available.
- Port-to-port connections for V.24, V.35, V.36, RS530 or X.21 interfaces
- End-to-end protection on n × 64-kbit/s level for analog 2-wire/4-wire interfaces (with or without E&M) and for V.24, V.35, V.36, RS530, X.21 interfaces

- Broadcasting for POTS with local battery, analog 2-wire/4-wire leased lines and all digital interfaces
- Ethernet layer 2 switch
  - Ethernet over TDM mirror
  - Ethernet switch with 4 Ethernet ports and 1 or 2 TDM uplinks ports per module
  - 2 modules per CPF2 possible
  - TDM multiplexer as two times terminal or drop and insert mode
  - Data rate at TDM: 1 up to 31 time slots per E1 port
  - L2 switch support for multiple address data bases on a per port, for transparent router applications
  - 4 Ethernet 10/100 PHYs according to IEEE802.3 and 802.3x
  - Quality of service support with four traffic classes
  - Flow control and back pressure
  - automatic MDI/MDIX crossover
  - CLI interface for link status and control, statistic counters
- Digital conference and point-to-multipoint operation
- Voice channel in common frequency radio networks
  This application is realized using system modules FMX2R3.2 (with CUD and UAC68) and CMXC, see also user manual UMN CMXC.
  1+1 protection switching of n $\times$ 64-kbit/s and 2-Mbit/s signals is not supported in this case.
- IWU submodules of the CPF2 convert digital subscribers, which are connected at a given customer network with X.50/X.51 data structures, into one of the system-internal data structures V.110/X.30 or I.460[1)].
- Timer jobs for one or two complete channels over a maximum of two timeslots
  With end-to-end protection, a timer job can be set up for each subscriber port.
- Software-controlled configuration, operation and operation monitoring
  Suitable interfaces are present for connecting a local operating PC and for connecting to a TMN. Connected network termination units can be operated and monitored via the multiplexer.

1) Special documentation is available for the IWU sub modules (Prod. No. A50010-A3-H102-*-7619).

2.2 System Structure

2.2.1 Overview

The multiplexer includes the following units, see Fig. 2.5:

- A central unit drop/insert CUD
- Up to 6 line cards LC, of the following types:
  - SUB102 subscriber converter, a/b wire, subscriber side
  - SLX102 or SLX102E subscriber converter, a/b wire, switching side
  - SLB62 subscriber converter for local battery, a/b wire
  - UAC68 universal analog line card, 2/4-wire leased lines or with E&M
  - SEM106C 2-wire E&M converter[1)]
  - SEM108HC 4-wire E&M converter[1)]
  - LLA102/104C line card for analog 2-wire/4-wire leased lines
  - I8S0P ISDN line card, S_0 interface
  - IUL82C ISDN line card, U_{k0} interface 2B1Q
  - I4UK2NTP ISDN line card, U_{k0} interface 2B1Q, switching side
  - IUL84C ISDN line card, U_{k0} interface 4B3T
  - I4UK4NTP ISDN line card, U_{k0} interface 4B3T, switching side
  - DSC104C digital signal channel, 64 kbit/s, codirectional, G.703 interfaces
  - DSC6-n×64C digital signal channel, n × 64 kbit/s, G.703 interfaces
  - CPF2 digital signal channel
    with maximum of 4 interface modules for
    - subrates up to 31 × 64 kbit/s, V.24/V35/V36/RS530 or X.21 interfaces
    - protocol conversion X.50/X.51 to X.30/V.110/I.460
    with maximum of 2 interface modules, each interface module with
    - 4 Ethernet 10/100Base-T interfaces
  - CM64/2 (digital signal card, 2 Mbit/s channel multiplexer, G.703)
- Optionally a bus extension card BEC, if up to 12 line cards are connected to the CUD[2)].

The multiplexer is operated and monitored via the QD2 slave interface (QD2-S) of the central card, which is connected to a supervision unit.

1) only in MXS19C shelf and ONU 20 FTTO

2) only possible in the shelves FMX2S and MXS19C

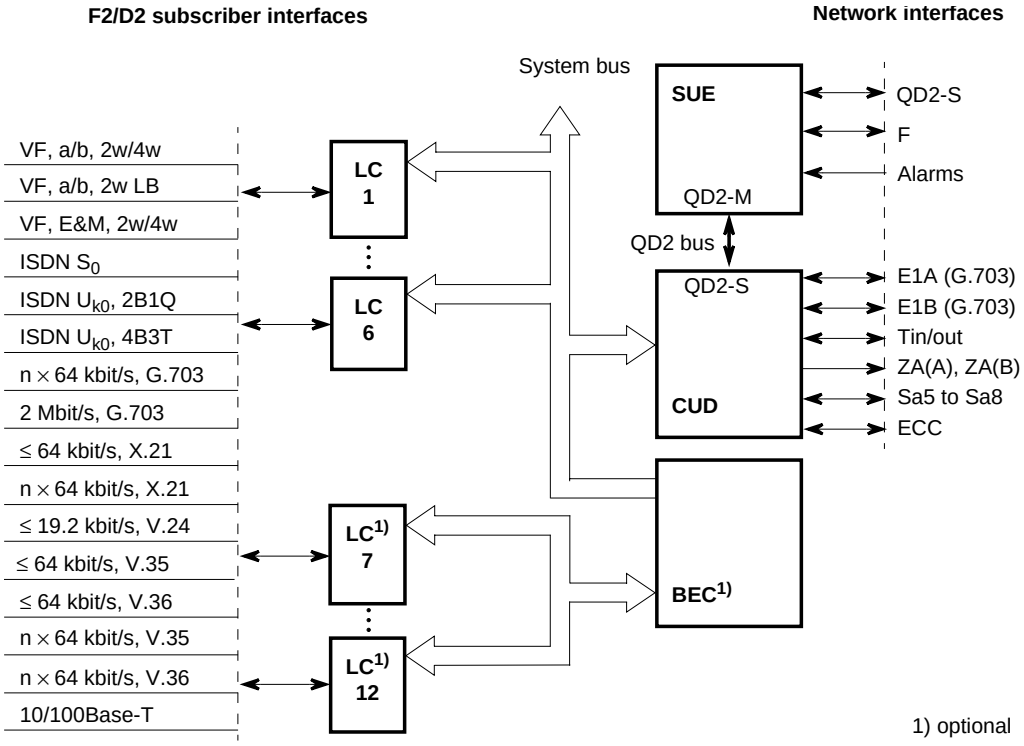


Fig. 2.5 Overview Circuit Diagram of Multiplexer

2.2.2 Central Unit CUD

The CUD forms the interface between the line cards of the multiplexer and the PCM signals at E1 ports E1A and E1B. In a synchronous network it operates as a Terminal Multiplexer or as a drop/insert multiplexer.

2.2.3 Bus Extension Card BEC

The BEC is used when more than 6 LCs are used:

- for full utilization of the 2-Mbit/s signal,
  since a few LCs have a limited number of interfaces,
- for a comprehensive range of different subscriber interfaces.

A CUD can operate 6 LCs without a BEC, with a BEC it can operate 12 LCs. The number of time slots of the 2-Mbit/s signal is not increased by a BEC. The BEC connects the system bus to a further 6 LC slots and supplies these LCs with the necessary voltages.

2.2.4 Units for Operation and Supervision

The operation and supervision units include:

- Supervision unit SUE (-B1) in shelves SNUS, FMX2S and MXS19C
- Supervision unit MSUE in the ONU 30 FTTB
- Supervision unit COSU in the ONU 20 FTTO
- Supervision unit OSU for synchronous or asynchronous transmission of control information for remote equipment
- SISA concentrator SISAK for asynchronous transmission of control information to remote equipment (can only be installed in shelf MXS19C).

For a DCN (Data Communication Network) these units implement a virtual concentrator (SISA-V) in each case. They possess QD2 slave and QD2 master interfaces for incorporating the FMX2R3.2 into a SISA communication network. For local operation an F-interface is available at the supervision units. The SUE can also signal external alarms (e.g. door contact, fan failure) to the operating system (OS).

2.2.5 Line Cards for Analog Services

2.2.5.1 Converter SUB102

The SUB102 subscriber converter provides 10 a/b interfaces and can be used for the following applications:

- Connection of conventional analog subscriber telephones or extension telephones to digital exchange
- Together with the SLX102/E for connection of conventional analog subscriber telephones or extension telephones to analog exchange or to an analog subscriber access of digital exchange.

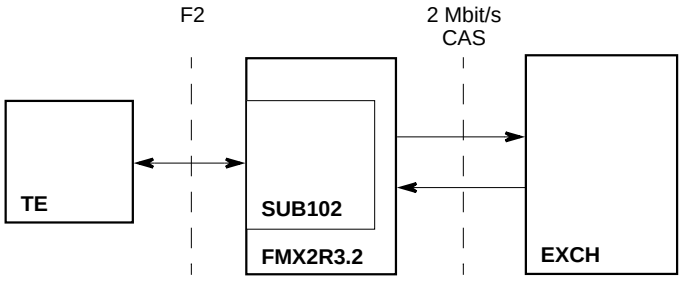


Fig. 2.6 Subscriber Access to Digital Exchange

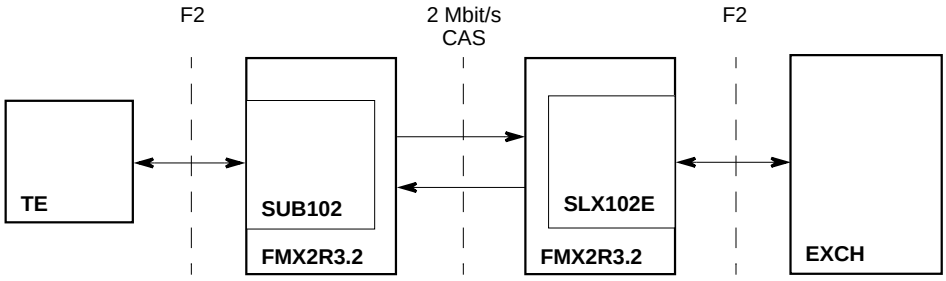


Fig. 2.7 Subscriber Access to Analog Exchange

2.2.5.2 Converters SLX102 and SLX102E

The SLX102 or SLX102E provides 10 a/b interfaces and, in conjunction with the SUB102, the SLX102/E connects conventional analog subscriber telephones or extension telephones to analog exchange or to an analog subscriber access of digital exchange, see Fig. 2.7. The grounding key function is transmitted for use in PABXs.

2.2.5.3 Converter SLB62

The SLB62 (2-wire LB) line card connects up to 6 analog subscriber terminals with a local battery power supply to the transmission network.

2.2.5.4 Universal Analog Unit UAC68

Universal analog line card UAC68 for 6 channels is used to provide either analog 2-wire or 4-wire interfaces with signaling (E&M operation) or without signaling (analog leased lines).

2.2.5.5 E & M Converter SEM106C

The SEM106C line card is used for connection of 10 VF signals in 2-wire operation to exchange or transmission equipment which operates with E&M signaling.

2.2.5.6 E & M Converter SEM108HC

The SEM108HC line card is used in the multiplexer for connection of 10 VF signals in 4-wire operation to exchange or transmission equipment which operates with E&M signaling.

2.2.5.7 Analog Leased Lines LLA102/104C

The analog leased line LLA102/104C with 10 channels is used to provide up to 10 analog leased lines within a digital transmission link for service-neutral transparent point-to-point transmission of information.

The channels can be operated with 2- or 4-wire interfaces.

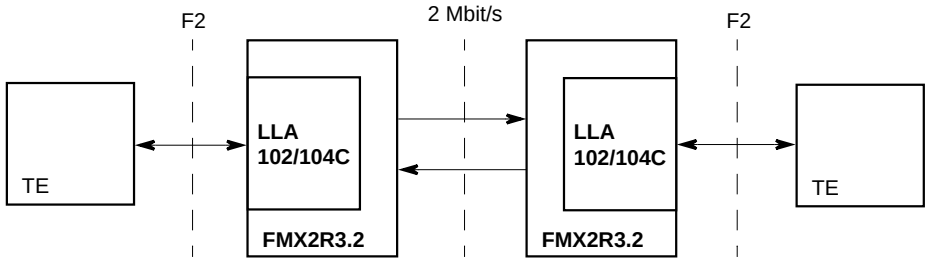


Fig. 2.8 LLA102/104C in Leased Lines with 2-Wire Interface

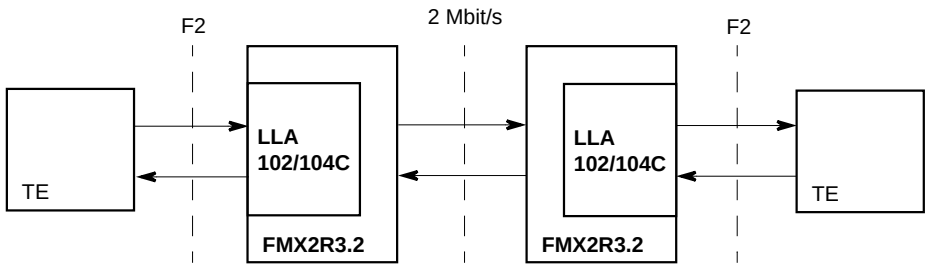


Fig. 2.9 LLA102/104C in Leased Lines with 4-Wire Interface

2.2.6 Line Cards for ISDN Services

2.2.6.1 ISDN Line Card I8S0P

The I8S0P unit enables an ISDN basic access to be established for remote subscriber terminal equipment or PBXs with S_0 port:

- With dial-up connections between exchange and remote subscriber terminal equipment or private branch exchanges with CAS (FMX2R3.2 specific, for lengthening from S_0 to U_{K0}) or FA signaling, Fig. 2.10 and Fig. 2.11.
- With leased lines between subscriber terminal equipment or private branch exchanges with FA signaling, Fig. 2.12.
- With leased lines in stand-alone mode, Fig. 2.13.

The I8S0P contains 8 independent S_0 interfaces according to ITU-T I.430 that are used in NT mode or in TE mode.

Dial-up connections with CAS signaling

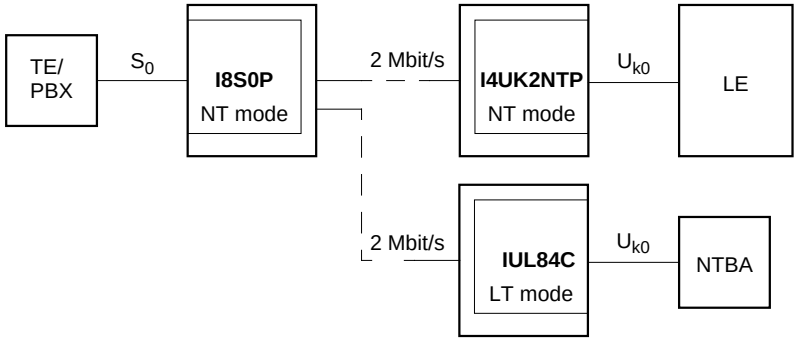


Fig. 2.10 I8S0P Dial-up Connection with CAS Signaling

Dial-up connections with FA signaling

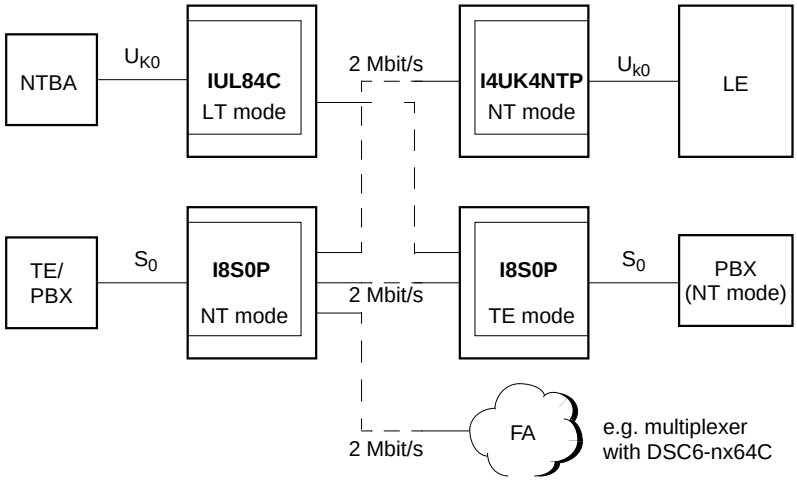


Fig. 2.11 I8S0P Dial-up Connection Using FA Signaling

Leased-line connections using FA signaling

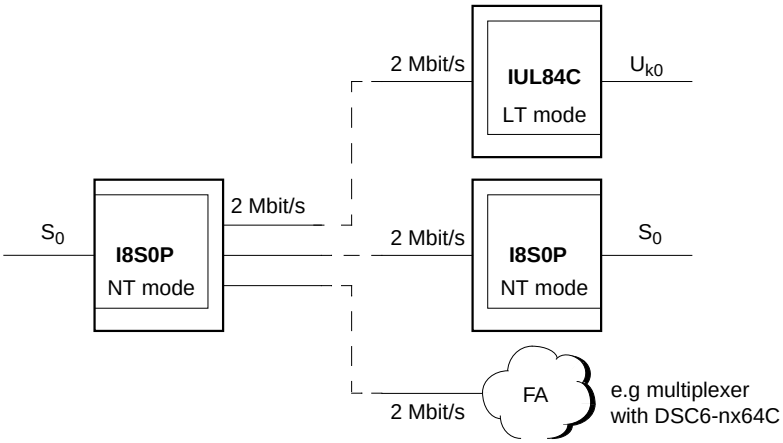


Fig. 2.12 I8S0P Leased-line Connections Using FA Signaling

Leased-line connections for stand-alone operation multiplexer

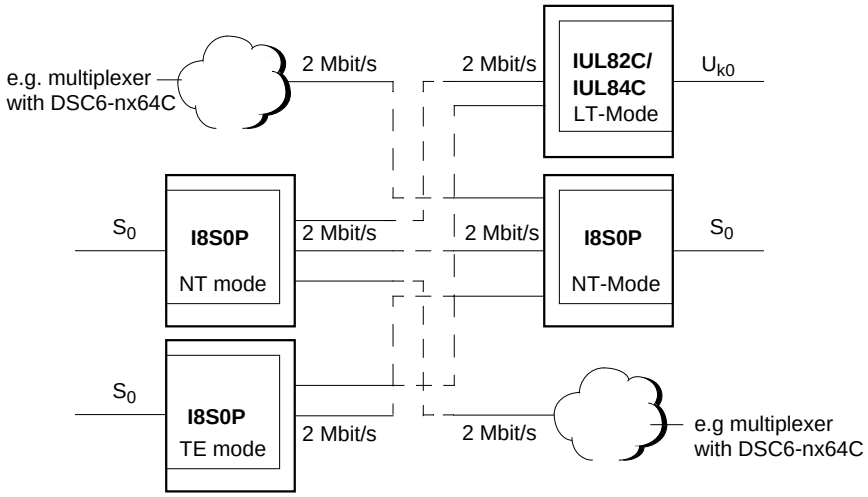


Fig. 2.13 I8S0P Leased-line Connections for Stand-alone Operation

2.2.6.2 ISDN Line Cards IUL82C and IUL84C

The IUL82C and IUL84C line cards with 8 U_{k0} interfaces are employed within digital transmission links between subscribers and switching equipment on the subscriber side when ISDN network termination units are to be connected to the multiplexer.

The IUL82C line card is used for 2B1Q code, while the IUL84C line card implements the 4B3T code.

This allows the following applications:

- Dial-up connections between exchange and subscriber terminal equipment with CAS signaling (FMX2R3.2 specific, in repeater mode)
  or with FA signaling (IUL84C only),
- Leased-line connections in stand-alone mode.

The U_{k0} ISDN interface conforms to standard TS 102 080. Data transmission is also possible in the format 128 kbit/s via the B1- and B2-channels of an ISDN line. The framing integrity of the 128-kbit/s connection is ensured. Connected NTBAs are fed per port with up to 1.1 W power as consumed at the NTBA.

Dial-up connections with CAS signaling

Together with unit I8S0P, the IUL82C or IUL84C operates in an dial-up connection with CAS signaling for lengthening from S_0 to U_{K0}, see Fig. 2.10. Additionally, the IUL82C, or IUL84C can be used as shown in Fig. 2.14:

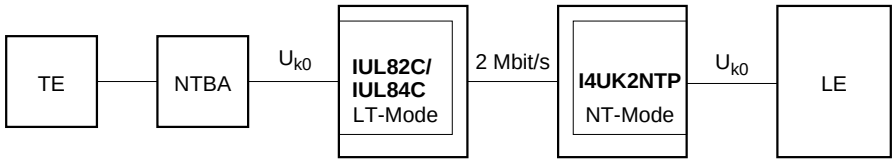


Fig. 2.14 Dial-up Connection of the IUL82C or IUL84C with CAS Signaling in Repeater Mode

Dial-up connections with FA signaling

Together with unit I8S0P, the IUL84C implements an dial-up connection with FA signaling by Fig. 2.11. Additionally, the IUL84C can be used as shown in Fig. 2.15:

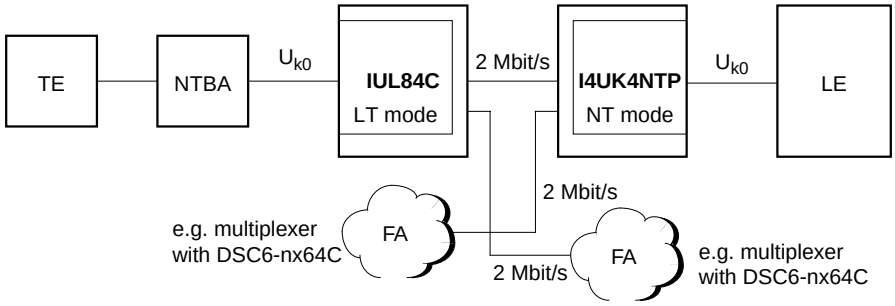


Fig. 2.15 Dial-up Connection of the IUL84C with FA Signaling

Leased-line connections with FA signaling

Together with unit I8S0P, the IUL84C implements an ISDN leased-line connection with FA signaling between U_{k0} and S_0, see Fig. 2.12 In addition to the leased-line connections shown in Fig. 2.12 the IUL84C can be used as shown in Fig. 2.16:

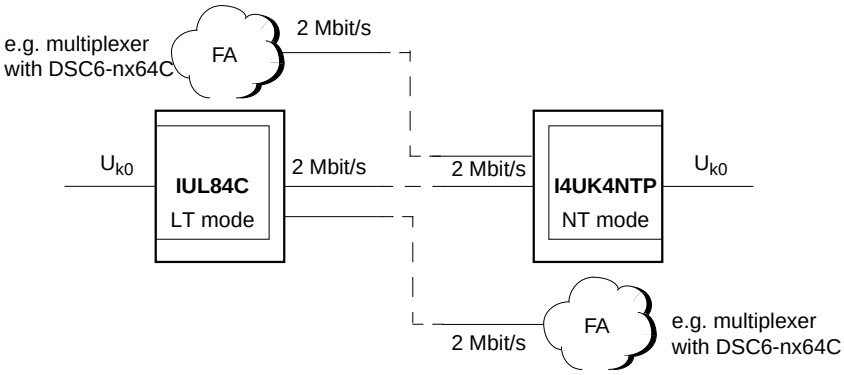


Fig. 2.16 Leased-Line Connections of the IUL84C with FA-Signaling

Leased-line connections in stand-alone mode

In conjunction with card I8S0P the IUL82C or IUL84C implements in stand-alone mode the conversion from S_0 to U_{k0} in an ISDN connection, see Fig. 2.13. In addition to the permanent connection shown in Fig. 2.13, the following applications can be implemented:

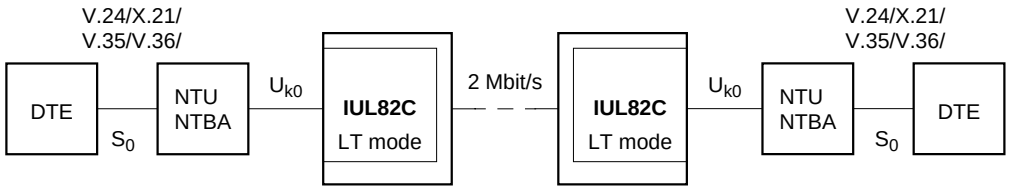


Fig. 2.17 Leased-Line Connections of the IUL82C in Stand-alone Mode

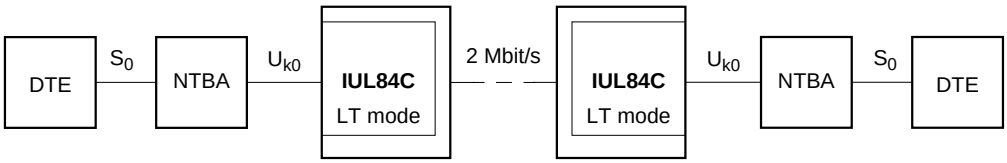


Fig. 2.18 Leased-Line Connection of the IUL84C in Stand-alone Mode

2.2.6.3 ISDN Line Cards I4UK2NTP and I4UK4NTP

ISDN line cards I4UK2NTP and I4UK4NTP with 4 U_{k0} interfaces provide the interface between multiplexer and ISDN switching equipment on the switching side. The data from the I4UK2NTP is transmitted using the 2B1Q code and the data from the I4UK4NTP is transmitted using the 4B3T code.

Dial-up connections with CAS signalling

Together with card I8S0P the I4UK2NTP implements in CAS dial-up connections conversion from U_{k0} to S_0, see Fig. 2.10.

With card IUL82C on the subscriber side, unit I4UK2NTP (exchange side) operates in the transmit-receive multiplexer, see Fig. 2.14.

Dial-up connections with FA signaling

Together with unit I8S0P, the I4UK4NTP implements in FA dial-up connections conversion of U_{k0} to S_0, see Fig. 2.11.

With the IUL84C (as a subscriber-side unit) the I4UK4NTP operates in the back-to-back multiplexer as a U_{k0} extension, see Fig. 2.15.

2.2.7 Line Cards for Digital Services

2.2.7.1 Digital Signal Unit DSC104C

The DSC104C (Digital Signal Channel) line card will be employed for the transmission of digital signals at a bit rate of 64 kbit/s. The unit incorporates 10 codirectional interfaces which conform to ITU-T Recommendation G.703. If a signal is being transmitted, signaling bits a, b, c, d are given the fixed values 1 1 0 1.

2.2.7.2 Digital Signal Unit DSC6-nx64C

Digital Signal Channel DSC6-nx64C provides 6 interfaces in accordance with ITU-T Recommendation G.703 and will be used for transmission of digital signals with bit rates of n × 64 kbit/s (n = 1 to 30/31).

There is the option of operating the 6 interfaces codirectionally (n = 1 to 8) or with centralized clock (n = 1). Two of the interfaces can also be switched over to contradirectional mode (n = 1 to 30/31).

If a signal is being transmitted, signaling bits a, b, c, d are given the fixed values 1 1 0 1.

2.2.7.3 Digital Signal Unit CM64/2

The CM64/2 line card is used for network branch to the 2-Mbit/s level. The CM64/2 combines any number of time slots and the associated signaling information (CAS) of the E1 ports (2 Mbit/s) of a multiplexer with a 2-Mbit/s signal.

2.2.7.4 Digital Signal Unit CPF2

The CPF2 is a universal digital signal channel unit for providing various local data interfaces (V.24, V.35, V.36, X.21), for connecting to X.50 or X.51 data networks as well as for data transmission via Ethernet.

The following interface modules are available:

Module	**Interfaces**	**Operating mode**	Bit rates
CIM-V.24	V.24	synchronous asynchronous	0.6 to 64 kbit/s and 128 kbit/s 0.3 to 38.4 kbit/s and 115.2 kbit/s
CIM-V.35	V.35	synchronous	0.6 to 56 kbit/s, n × 64 kbit/s (n ≤ 30 with CAS/ 31 without CAS)
CIM-V.36	V.35/RS530	asynchronous	0.3 to 38.4 kbit/s and 115.2 kbit/s
CIM-X.21	X.21		
CIM-nx64E	10/100Base-T		n × 64 kbit/s (n ≤ 30 with CAS/31 without CAS)

Tab. 2.1 Interface Modules for Use on the CPF2

There are 4 interfaces on the channel unit which will be implemented with four plug-in channel interface modules (CIM-V24, CIM-V35, CIM-V36 or CIM-X.21). The function, electrical interface and speed of the 4 ports can be configured individually and independently of each other.

Up to 2 Ethernet interface modules CIM-nx64E can be equipped per CPF2. Each CIM-nx64E module provides 4 Ethernet ports.

Beside the unlimited use of CIM-nx64E module in combination with all other CPF2-modules (CIM-V.24/-V.35/-V.36/-X.21) is possible via separate traffic. The number of line cards CPF2 is only limited by the shelf or ONU equipment rules.

2.2.7.5 Front Panel Connectors for the CPF2

Different front panel connectors are intended to simplify matters wiring of the CPF2 data interfaces with external data terminals, see also installation manual (UMN:IMN). The interfaces of the CPF2 are connected with the front panel connectors via special adapter cables.

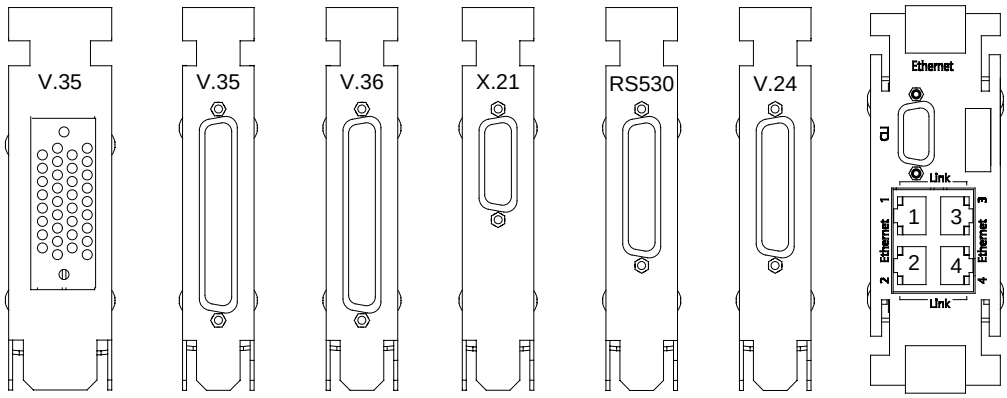


Fig. 2.19 CPF2 Front Panel Connectors

Front panel connectors	Ordering number
V.24	S42023-A862-S12
X.21	S42023-A862-S13
V.35 with Sub-D connection	S42023-A862-S14
V.36	S42023-A862-S15
RS 530	S42023-A862-S25
V.35	S42023-A862-S26
Ethernet 10/100Base-T	S42023-A862-S16

Tab. 2.2 CPF2 Front Panel Connectors

2.3 External Interfaces

E1 Interfaces

The E1 interfaces are on the CUD central unit drop/insert and conform to ITU-T Recommendation G.703. Each E1 interface has a transmission rate of 2 Mbit/s. By setting a switch, the interface can be terminated as desired with 120 Ω or 75 Ω.

F2/D2 Subscriber Interfaces

The F2/D2 subscriber interfaces are provided by the line cards. They are used to connect analog, digital and ISDN subscribers. The number of subscriber interfaces for each LC card type is different. For detailed information on the line cards, see Sections 2.2.5 to 2.2.7.

10/100 Base-T Ethernet Interfaces

The 10/100Base-T interfaces are provided from the Ethernet module on the line card CPF2. They are used to connect monitoring equipment with 10/100 Base-T interfaces, which data are transmitted via the time slot structure of a 2-Mbit/s signal. 4 Ethernet interfaces are available per Ethernet module, 2 modules can be equipped pre CPF2.

T3 Interface

The T3 interface is implemented by the central unit and conforms to ITU-T G.703/13. An external 2048-kHz clock is fed in via the T3in interface. The interface can be set to high or low resistance by a switch. The 2048-kHz clock, which is derived from the appropriate clock source, is output at the T3out interface, see Section 4.5.

QD2 Interface

The QD2 interface of the multiplexer is on the central unit and conforms to EIA RS485. It is in the form of a slave interface (QD2-S), and implements access to the FMX2R3.2 network element and to remote network termination units, see also Section 2.10.

ZA(A) and ZA(B) Interface

The interface signals an alarm in the direction of the central service observation equipment.

The ZA(A) interface is in the form of a normally closed contact. At the normally closed contact ZA(A), either A alarm (urgent) or S alarm (service) is output, and for both cases failure of the operating voltage. The ZA(B) interface is in the form of a normally open contact. It is used to signal B alarm (non-urgent).

Interface of ECC

Via the ECC interface of the CUD, a control signal can be derived from any timeslot of one of the E1 ports and inserted in the opposite direction. This timeslot can then no longer be used for information transmission. The ECC interface conforms to ITU-T Recommendation V.11.

i At the 64 kbit/s bit rate, no transparent data transmission is possible. The data signal must be transmitted using HDLC frames.

Sa Bit Interfaces

The Sa bit interfaces are designed according to the interface conditions of EIA RS485. Four Sa bit interfaces, Sa5 to Sa8, are available on the CUD.

One symmetrical signal line for the sending direction and one for the receiving direction can be connected for each Sa bit. The transmission speed is 0.6 kbit/s (signal distortion about 15 %) to 1.2 kbit/s (signal distortion about 30 %).

The following options for the data paths are available for all Sa bits on the CUD unit:

- Source for E1Aout: low-level / high-level / Sa*in / E1Bin / Sa*in ANDed with E1Bin,
- Source for E1Bout: low-level / high-level / Sa*in / E1Ain /Sa*in ANDed with E1Ain,
- Source for Sa*out: low-level / high-level / high-resistance / E1Ain / E1Bin / E1Ain ANDed with E1Bin.

If the option of frame synchronization of the CUD is used, the Sa bits are not available as a transmission channel. They are permanently set to “1” in the sent signal. The Sa bit interfaces are switched to high-resistance.

2.4 Internal Interfaces

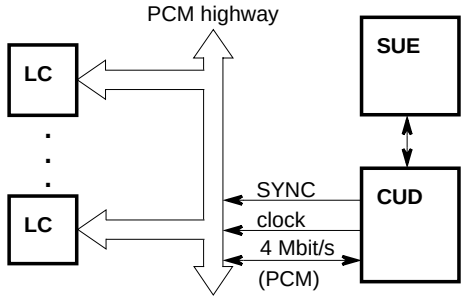
System Bus

The system bus is subdivided into the PCM highway and the LC bus. The line cards also receive their power supply via the system bus.

PCM Highway

The PCM highway forms the interface between the central unit and the various line cards for serial transmission of data channels and PCM-coded speech signals.

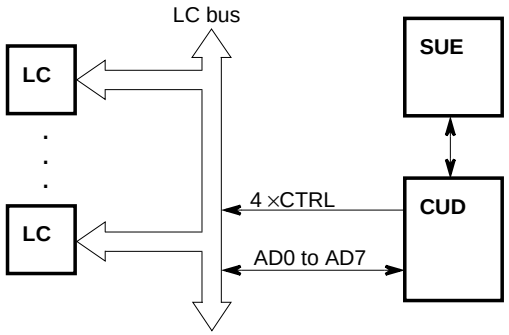
The sending and receiving signals of the PCM interface are synchronized by the same clock, but can be in any phase position in relation to each other as far as the frame clock is concerned. Both signal flow directions keep their own frame synchronization pulse.



LC bus

The LC bus is an 8-bit computer bus for transmission of control and signaling data between the central unit and the LCs.

The interface works on the master-slave principle, i.e. the central unit is the master and the LCs are the slaves. Irrespective of the division in the subrack, up to 12 line cards can be operated every 4 ms with one CUD central unit drop/insert.



2.5 Power Supply

The multiplexer is supplied with an input voltage of –48 V/–60 V.

Power supply modules on the central unit convert the –48 V/ –60 V input voltage into the necessary operating voltages, +5 V and –5 V, to supply the modules on the unit and LCs. The –48 V/ –60 V input voltage is protected by a 1 A replaceable fusible cartridge on the unit.

Additionally, the power supply of the central unit switches the UKZU voltage (–48 V/ –60 V) to the LCs, protected by a 2 A replaceable fusible cartridge.

3 Components

3.1 SNUS Subrack

The SNUS is a subrack in 19“ design, and can be adapted to the fitting conditions for the ETSI housing and racks using adapters.

In the shelf SNUS, the FMX2R3.2 multiplexer works on either a CMXC crossconnect, or an STM-1/STM-4 SDH feeder. Optionally, a line termination device which transmits 2 × 2 Mbit/s on one or two glass fibers, 2 x 2-Mbit/s signals SHDSL (2-wire/4-wire) or HDB3-coded (U_{K2}) on 2-core local loops, depending on the infrastructure, can also be used.

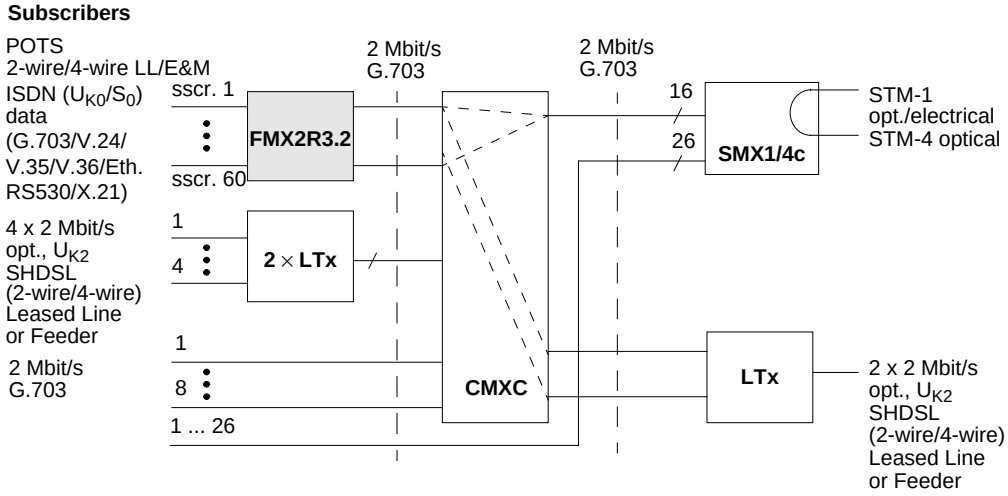


Fig. 3.1 Use of FMX2R3.2 Multiplexer in an SNU Shelf (Example)

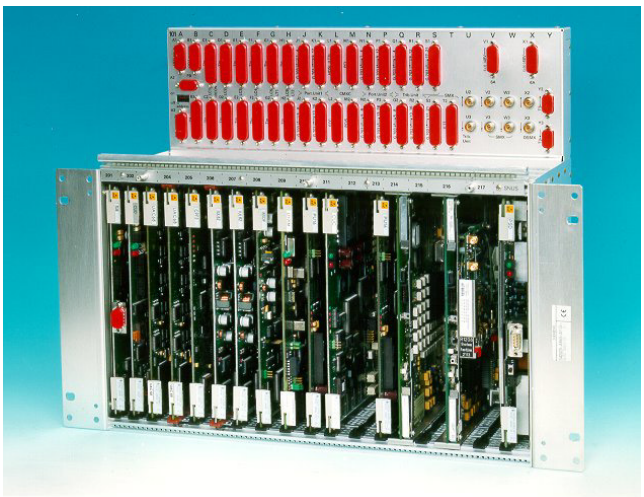


Fig. 3.2 Shelf SNUS (without Front Panel)

The subrack can accept units in double Eurocard format, and has a backplane board to connect the internal and external interfaces.

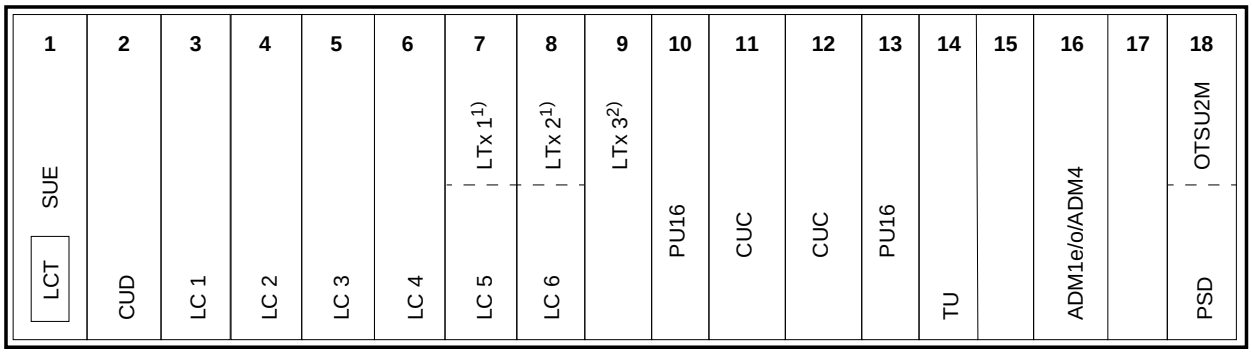
The SNUS is equipped with a terminal panel which provides all external interfaces via the corresponding sub-D connectors. The exceptions are the optical interfaces of the corresponding units which are only present on the units themselves. For mechanical routing of the optical fibers the SNUS is equipped with FO clips.

Different front panel connectors are intended to simplify matters wiring of the CPF2 data interfaces with external data terminals, which can be plugged into an external Main Distribution Field (MDF 180 or MDF 210), see UMN:IMN. For cabling the connectors in the terminal panel to the front panel connectors, the adapter cable S42023-A862-S11 has to be used.

Also the 4 ethernet interfaces of one CIM-nx64E module are accessible at a front panel connector. The connector also provides the RS232 interface. Also available at the front panel connector is a status LED.

3.1.1 Fitting

The SNUS has 18 slots, but only a maximum of 16 of these can be used at the same time.



1) LT2ME1/LTO
2) LT2ME1/LTO
3) internal 2-Mbit/s link to CUD, LTx 1 to LTx 3
4) internal 2-Mbit/s connection to SMX1/4c
5) 2-Mbit/s ports of ADM1o/ADM1e/ADM4
- - - optional fitting

Fig. 3.3 SNUS Equipping

For the two slots 207 and 208, into which both line cards and line termination units can be inserted, before the units are inserted the associated DIL switches must be checked, see Tab. 3.4 and Fig. 3.10.

FMX2R3.2 and LTx

Plug-in unit[1]	Plug-in place										Filter[5]	
	201	202	203	204	205	206	207	208	209	218		
Sub D in terminal panel at 2wire LC (a, b) or LTx			C1	D1	E1	F1	G1 G1	H1 H1	L1		V42256 -Z82-M1	V42256 -Z82-M2
Sub D in terminal panel at 4wire LC (c, d)			C2	D2	E2	F2	G2	H2				
SUE	×											
CUD		×										
UAC68			×	×	×	×	×	×			×	
SUB102			×	×	×	×	×	×				×
SLB62			×	×	×	×	×	×				×
LLA102/104C			×	×	×	×	×	×				
I8S0P			×	×	×	×	×	×				
I4UK2NTP			×	×	×	×	×	×			×	
IUL82C			×	×	×	×	×	×			×	
IUL84C			×	×	×	×	×	×			×	
I4UK4NTP			×	×	×	×	×	×			×	
CM64/2			×	×	×	×	×	×				
SLX102/E			×	×	×	×	×	×				×
DSC104C			×	×	×	×	×	×				
DSC6-nx64C			×	×	×	×	×	×				
CPF2[2]			×	×	×	×	×	×			×	
LT2ME1[3]							×[4]	×[4]	×			
LTO							×	×	×			
OTSU2M										×		

1) Pay attention to switch positions according at different equipping variants!
2) Modules for CPF2 that can be plugged: - CIM V.24, - CIM X.21, - CIM V.35, - CIM V.36, CIM-nx64E
3) Modules for LT2ME1: - Uk2mp, - SDSLmp, - SDSLop, - SDSL4op optionally with T4 module, - G703sh
4) On these slots, only one interface for copper transmission lines of each LT2ME1 is wired to the Sub D in terminal panel (means only one module - Uk2mp, - SDSLmp, - SDSLop, - SDSL4op, - G703sh)
5) Filter types according to LC types and to Sub D in terminal panel that must be plugged and screwed on

Tab. 3.1 SNUS FMX2R3.2 and LTx Equipping

CMXC

Interfaces/ Plug-in unit	Plug-in places			
	210	**211**	**212**	**213**
Port unit 1: G.703; 1 to 4/5 to 8	**J1/J2**			
Port unit 1: G.703: 9 to 12/13 to 16	**K1/K2**			
Port unit 2: G.703; 1 to 4/5 to 8				**N1/N2**
Port unit 2: G.703: 9 to 12/13 to 16				**P1/P2**
PCI/PCIS		**M1**	**M2**	
ECC		**L2**	**L2**	
PU16(1)	×			
CUC(1)		×		
CUC(2)			×	
PU16(2)				×

Tab. 3.2 SNUS CMXC Equipping

Feeder SMX1/4c

Interfaces/ Plug-in unit	Plug-in places		
	214	**216**	**218**
(+) (-) 48V (3W3)			**V1, X1**
V.11 interface		**T2**	
2-Mbit/s interface	**Q1, Q2, R1, R2, S1**	**S2**	
STM-1/STM-4 interface		**V2, V3, W2, W3**	
E3 interface	**U2, U3**		
ADM1o L-1.1		×	
ADM1o S-1.1		×	
ADM4o L-4.1		×	
ADM4o S-4.1		×	
ADM1E		×	
TC21E1	×		
TC21E1R	×		
TC1E3	×		
PSD			×

Tab. 3.3 SNUS SMX1/4c Equipping

3.1.2 Internal Connections

2-Mbit/s Connections

The internal wiring of the 2-Mbit/s connections is shown in Fig. 3.4.

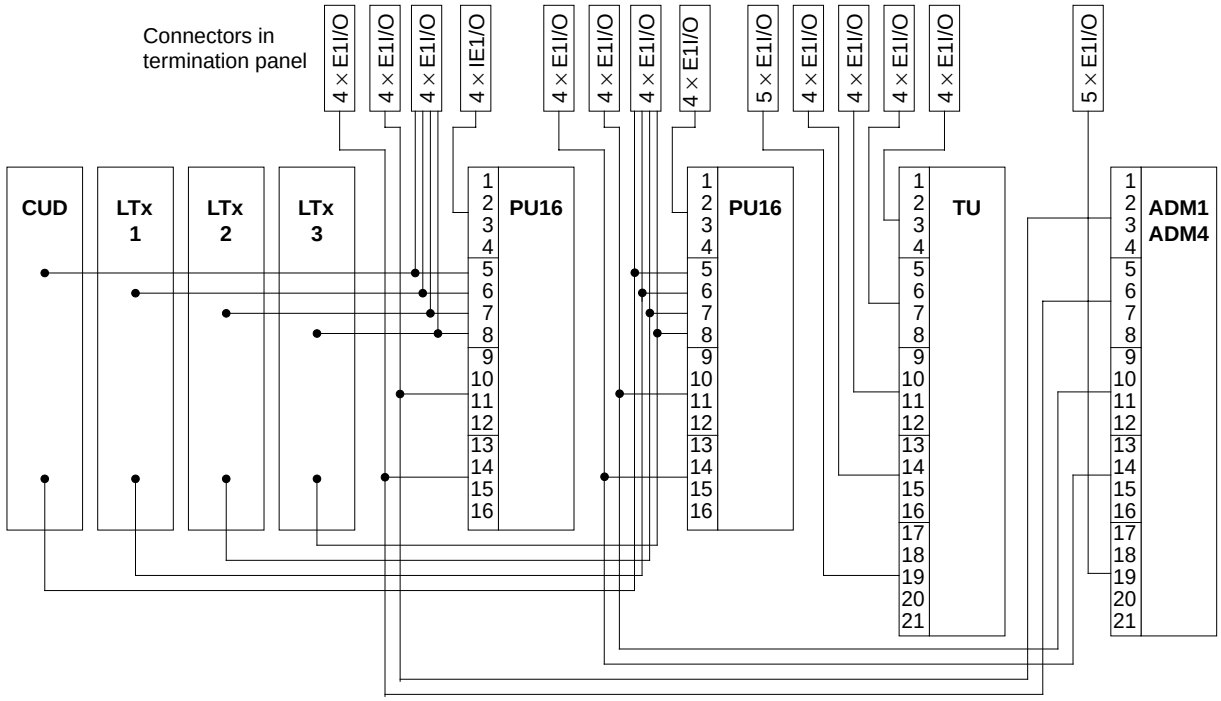


Fig. 3.4 SNUS Internal 2-Mbit/s Connections, Subrack fitted with SMX1/4c

PCI Connections

Of the 12 PCI interfaces of a CUC, the first 4 are fed to the left-hand PU16 (slot 10) as PCI (from the active CUC, slot 11) and as PCIS (from the redundant CUC, slot 12).

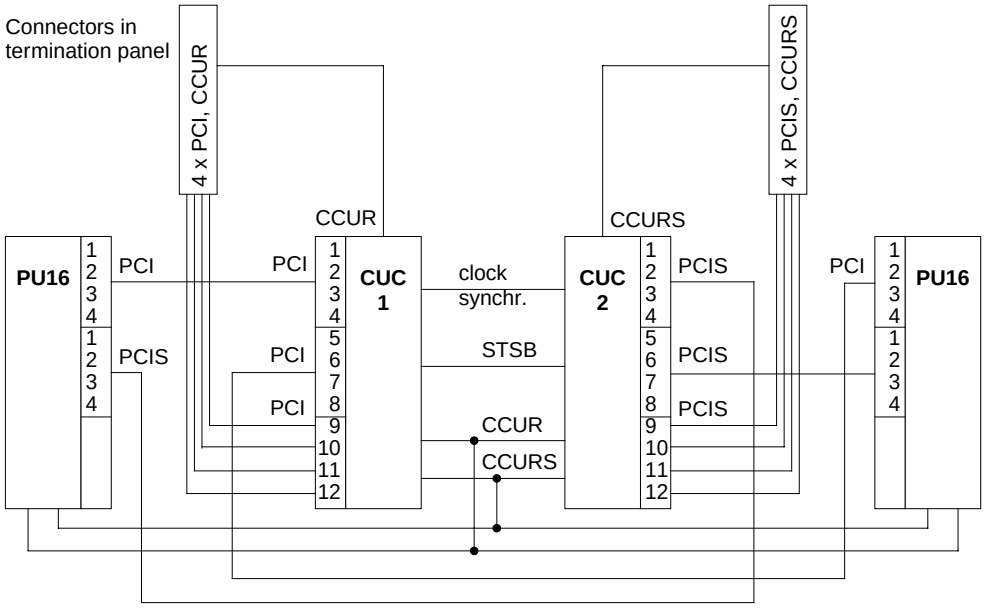


Fig. 3.5 SNUS Internal Wiring of PCI Interfaces

Interfaces 5 to 8 are wired analogously as active and redundant interfaces to the right-hand PU16 (slot 13). The changeover signals for these internal interfaces (CCUR from the active CUC, CCURS from the redundant CUC) are in asymmetrical form.

Interfaces 9 to 12 of the two CUCs are fed separately (active/redundant) to one D-sub connector each in the termination panel. The required changeover signals CCUR and CCURS for these external interfaces are in the form of symmetrical control lines, and also accessible in the connectors.

34-Mbit/s and STM-1 Connections

The internal 34-Mbit/s and STM-1 connections are shown in Fig. 3.6.

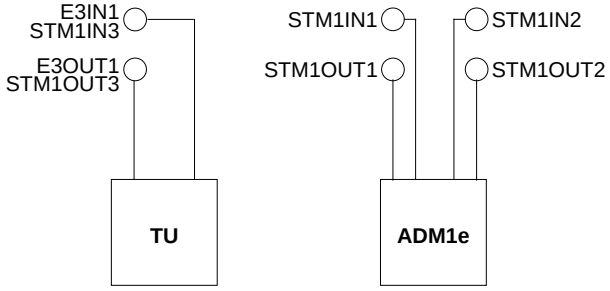


Fig. 3.6 SNUS Internal 34-Mbit/s and STM-1 Connections

3.1.3 Clock Synchronization

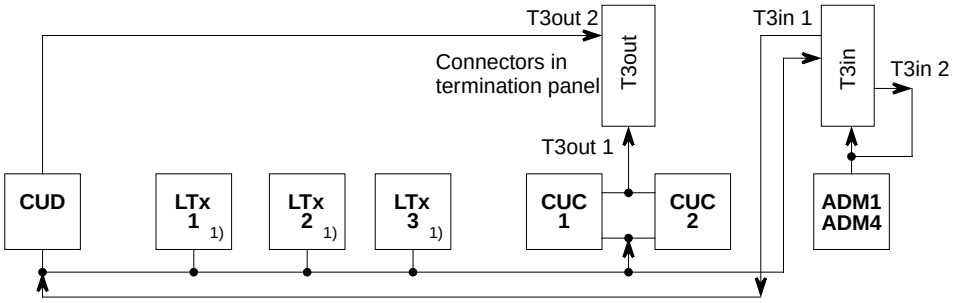


Fig. 3.7 SNUS Clock Distribution

Synchronous signals can be fed externally via connectors in the termination panel, and reach the ADM1/ADM4 as T3in 2 on CUD, LE2 and CUC units and as T3in 1. The subrack loops the T3in lines for onward connection to other subracks.

For synchronization purposes, T3out signals can be extracted from the CUCs (T3out 1) or CUD (T3out 2).

3.1.4 QD2 Access

The internal wiring for operation and monitoring is shown in Fig. 3.8.

The TMN access for the subrack is the QD2 slave connector in the termination panel. This leads to the QD2 slave port 1 of the SUE and to a changeover unit, which switches the internal QD2 bus to either the QD2 master port of the SUE (in standalone operation of the subrack) or parallel to the QD2 slave port 1 of the SUE (SNU operation).

The T terminals of the QD2 slave interface 1 of the SUE are also accessible in the QD2 slave connector.

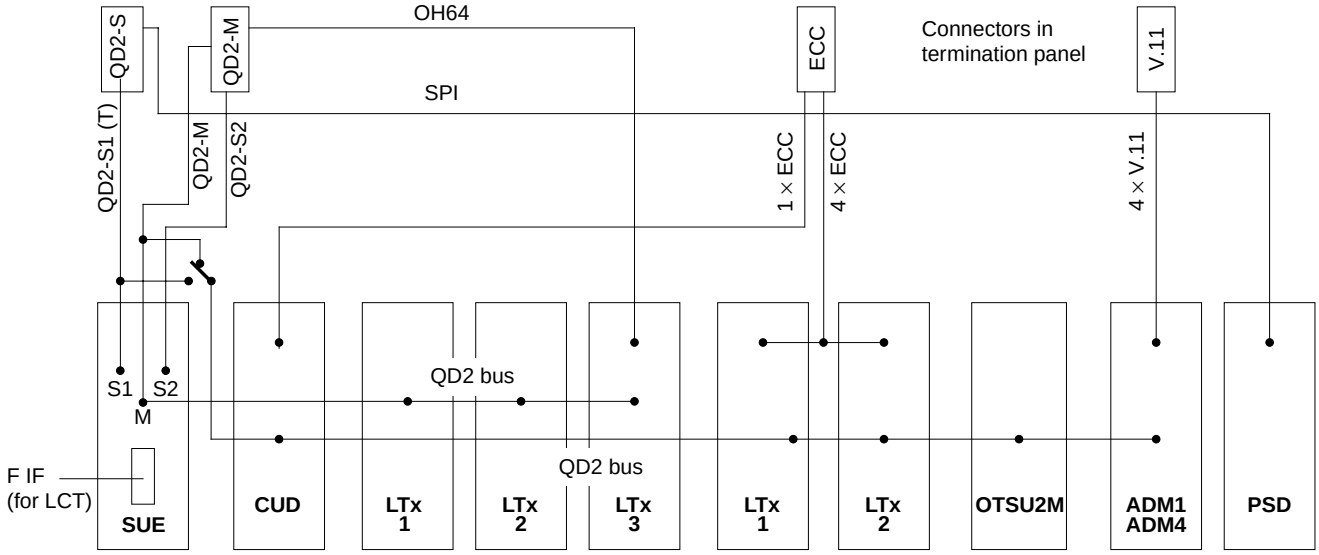


Fig. 3.8 SNUS QD2 Access

The following internal DCN channels can be used:

- ECC channel of CUD, 4 × ECC channels of CUC 1/CUC 2
  The ECC terminations of the two CUC positions are connected in parallel. Two of the four ECC interfaces are designed with clock transfer.
- Overhead channel of LTx on slot 3
- V.11 channel of ADM1/ADM4.

The QD2 slave port 2 of the SUE is in the QD2-M connector. Via this port, the DCN channel OH64 of the line termination unit LTx3 can be connected using an appropriately assigned connector.

3.1.5 Addressing

All units in this subrack, except SUE and CUD, are assigned slot addresses. For the addresses which are assigned to the slots, see Section 3.1.7.

The SISA address of the SUE is set using the DIL switch in the termination panel. The address of the CUD is set using the DIL switch in the backplane.

For line termination units in line card slots, some address bits are given by the coding of the line cards. This makes it necessary to change address bits to adapt the addressing, if line termination units are installed in these slots. The change is done using DIL switches in the backplane, see Section 3.1.7.

3.1.6 Power Supply

The –48 V input voltages are fed via two separate 3W3 plugs in the termination panel. The positive poles of both voltages are connected to each other and to the backplane, via a common filter and protection device, as the operating ground GND. The negative poles of both voltages are filtered separately, and supply the units in the subrack as MUP1 and MUP2. They are fed separately to the SUE, PSD, and PU16 and connected to the units with reserve. For CUD, OTSU2M and the line termination units, reserve diodes are arranged on the backplane. The CUC units are each connected to one of the two voltages.

The line cards receive the required secondary voltages +5 V and –5 V from the CUD, and also, after protection on the CUD, the KZU voltage (MUKZU).
The PSD supplies the SMX1/4c with the secondary voltages +5 V and –5 V.

Without forced ventilation and with homogeneous distribution of heat sources in the subrack, about 105 W of power dissipation (1.25 W per 5.08 mm of basic grid) are permitted.

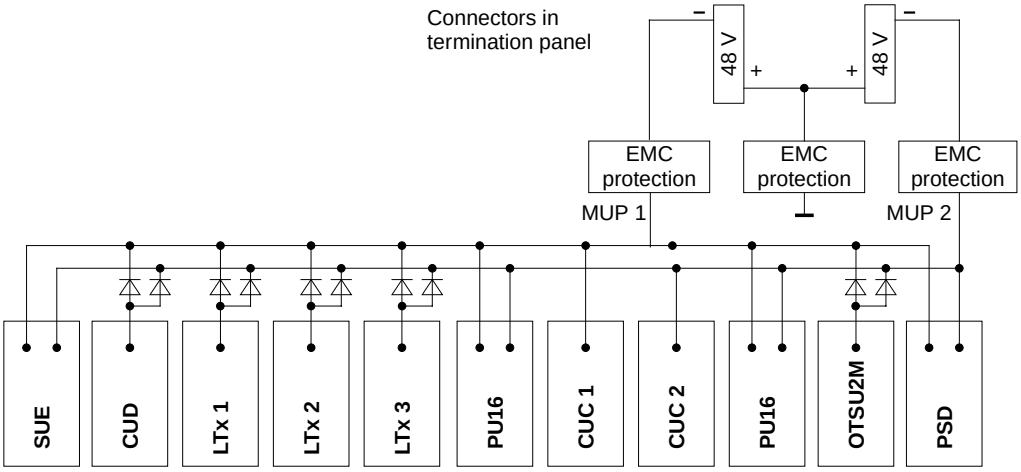


Fig. 3.9 SNUS Power Supply

3.1.7 Switch Settings

DIL switch settings according equipping

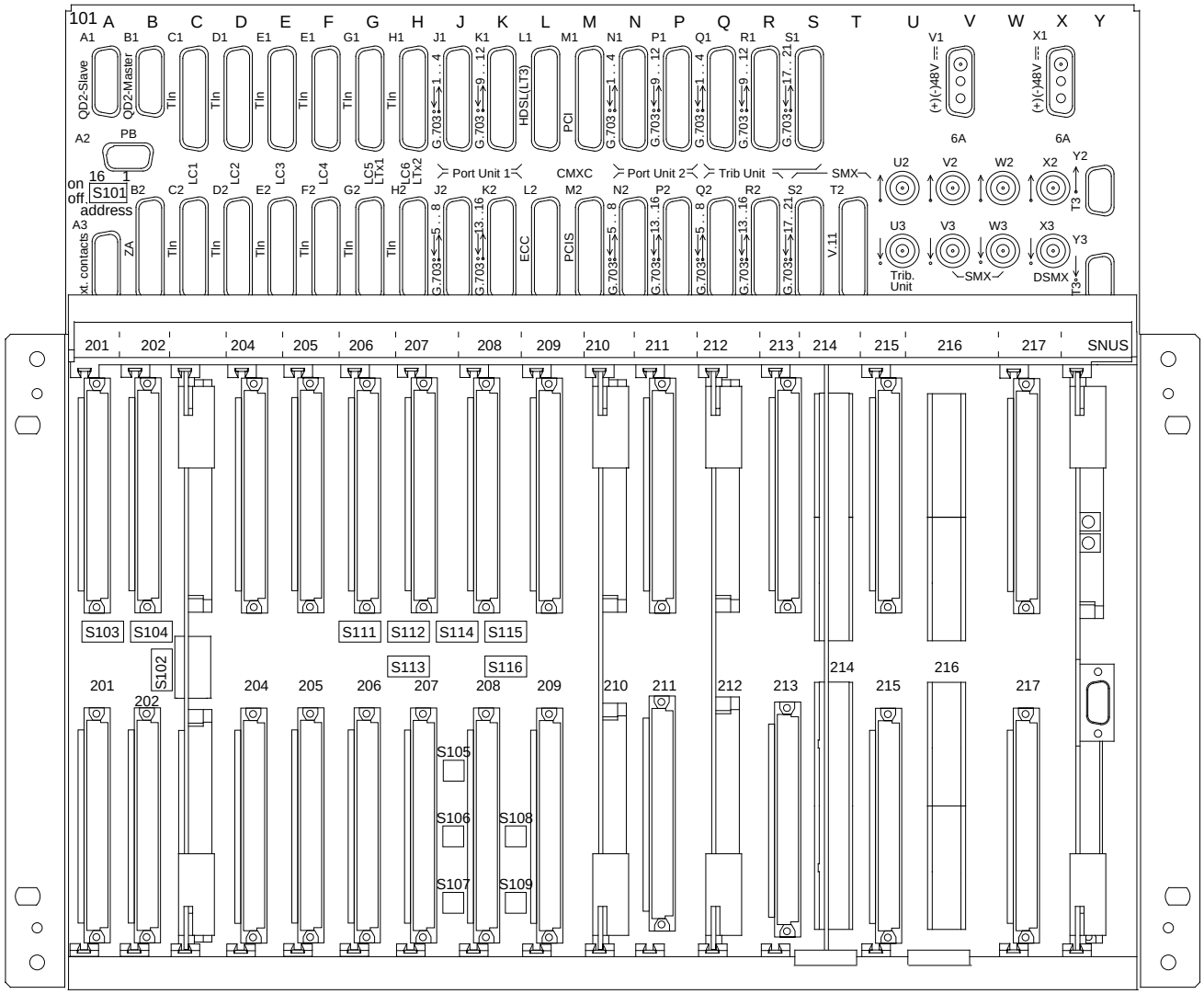


Fig. 3.10 SNUS Front View without Front Panel

The equipping options are contained in Section 3.1.1.

The following points must be taken into account:

Before slots 207 and 208 are equipped, the DIL switches on the backplane must be set accordingly to determine whether an LC of the FMX2R3.2 or an LTx module is to be equipped. DIL switches S111, S112, S113 and also S105, S106 and S107 must be set for slot 207 and S114, S115, S116 and also S108 and S109 for slot 208 according to the following table.

Slot	Equipping with LC of the FMX2R3.2	Equipping with the LTx module
207	- S111 to S113, all slider switches of the DIL switches on “OFF” - S105 to S116, all slider switches of the DIL switches on “ON” - S107, all slider switches of the DIL switch on “OFF”	- S111 to S113, all slider switches of the DIL switches on “ON” - S105 to S116, all slider switches of the DIL switches on “OFF” - S107, all switches of the DIL switch on “ON”
208	- S114 to S116, all slider switches of the DIL switches on “OFF” - S108, all slider switches of the DIL switch on “ON” - S109, all switches of the DIL switch on “OFF”	- S114 to S116, all switches of the DIL switches on “ON” - S108, all switches of the DIL switch on “OFF” - S109, all switches of the DIL switch on “ON”

Tab. 3.4 SNUS DIL Switch Settings

Addresses

The SISA addresses of all units in this subrack are assigned to the backplane as follows:

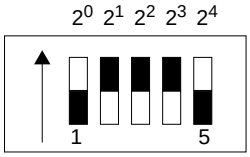
Unit	In slot	QD2 address	Slot address (connected and fixed)
SUE	201	Is set using DIL switch S101 in the terminal panel of the SNUS, see Fig. 3.11 and Fig. 3.10. 5Bit = 1 to 30	5 bit = 3 (K0...K4 shelf model)
CUD	202	Is set using DIL switch S102 on the backplane of the SNUS, see Fig. 3.10. 5Bit; here only 1 to 8 usable	SEL_0 = GND SEL_1 = GND
Line cards 1-6	203 to 208		4 bit = 1 to 6
LTx1[1) 2)]	207	Fixed (5 bit) = 7	
LTx2[1) 2)]	208	Fixed (5 bit) = 8	
LTx3[2)]	209	Fixed (5 bit) = 9	
PU16(1)	210		5 bit = 10
CUC(1)	211	Fixed (5 bit) = 13	5 bit = 11
CUC(2)	212	Fixed (5 bit) = 13	5 bit = 12
PU16(2)	213		5 bit = 13
ADM (SMX)	216	Fixed (5 bit) = 16	
Trib.Unit	214		
PSD	218		5 bit = 18
OTSU_2M	218	Fixed (5 bit) = 18	

1) LTO, LTCOH, LT2ME1

2) If an LTx unit instead of a line card is equipped in slots 207 or 208, the slot must be configured accordingly (with DIL switches S106 and S107 for slot 207 or with DIL switch S109 for slot 208). Switches S105 and S108 must always be switched, see Fig. 3.10.)

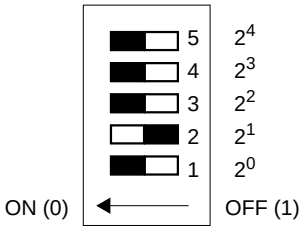
Tab. 3.5 SNUS Units and Addressing

DIL Switch S101 for SUE address



ON = LOW = log 0
Example:
Switch 1 on OFF corresponds to $2^0 = 1$
Switch 5 on OFF corresponds to $2^4 = 16$
Corresponds to address 17 for the SUE

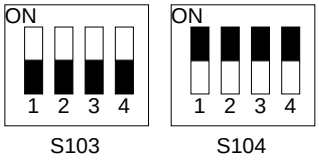
DIL Switch S102 for CUD address



ON = LOW = log 0
Example:
Switch 2 on OFF corresponds to $2^1 = 2$
Corresponds to address 2 for the CUD

TMN connection of the SNUS

Delivery state:
all slides at S103 are switched to “OFF” (to bottom) and at S104 all slides are switched to “ON” (to top), it means supervision of the SNUS by SUE (stand alone, without COMPS2 and without OSU)



3.1.8 Connector Assignment

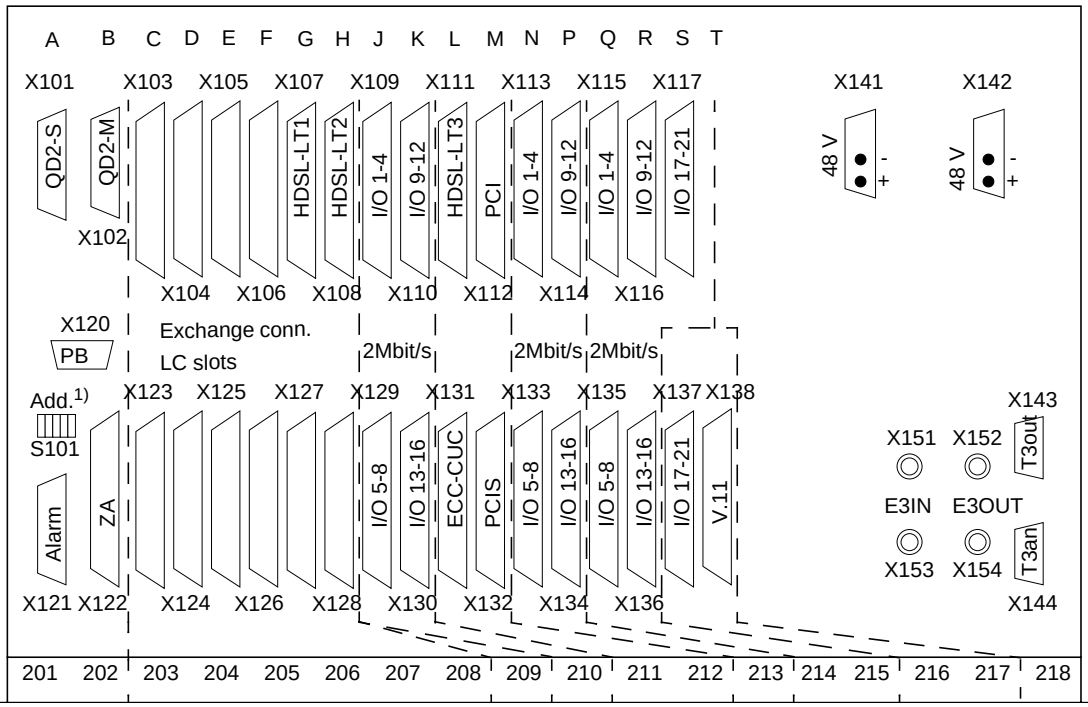


Fig. 3.11 SNUS Connector Assignment

The possible equipping variants are shown in Tab. 3.1 to Tab. 3.3.

Power Supply Connectors X141 and X142

Pin	X141	X142
1		
2	-48V (MUP1)	-48V (MUP2)
3	+48V (GND)	+48V (GND)

Tab. 3.6 SNUS Connectors X141 and X142

Coaxial Jack X151

X151: E3IN1 X152: E3OUT1 (interface 34 Mbit/s from Tributary Unit)

QD2 (X101 and X102) and Alarm Inputs (X121)

Pin	X101 QD2 slave	X102 QD2 master	X121 Alarm inputs
1	GND_S	GND_S	GND_S
2	QD2S1 OUT a	QD2M IN a	AIN1
3	QD2T1 OUT a		AIN3
4	QD2S1 IN a	QD2M OUT a	AIN5
5	QD2T1 IN a		AIN7
6			
7	DAT		
8	GND	GND	GND
9	QD2S1 OUT b	QD2M IN b	AIN2
10	QD2T1 OUT b		AIN4
11	QD2S1 IN b	QD2M OUT b	AIN6
12	QD2T1 IN b		AIN8
13			
14	NRST		
15	CLK		

Tab. 3.7 SNUS 15-Contact Jacks X101, X102 and X121

Signal Abbreviations

GND	Operation ground
GND-S	Shielded ground
QD2SIN_A1, B1 QD2SOUT_A1, B1	Slave 1 from the SUE
QD2SIN_A2, B2 QD2SOUT_A2, B2	Slave 2 from the SUE
QIN_A/B, QOUT_A/B	Master from the SUE
QD2TIN_A, B QD2TOUT_A, B	T-connections of slave1 from the SUE

DAT, CLK, NRST	SPI connections to the OSU for temperature monitoring
A1P...A8P	Alarm inputs of the SUE
AM	Negative operating voltage for alarm contacts
O64IN_A/B, O64OUT_A/B	Overhead 64 kbit/s from LTx, plug-in place 209

T3-Interfaces X143 and X144

Pin	X143 Connector T3out	X144 Connector T3in
1	GND_S	GND_S
2	T3 OUT1 a	T3 IN1 a
3		T3 OUT1 a
4	T3 OUT2 a	T3 IN2 a
5		T3 OUT2 a
6	T3 OUT1 b	T3 IN1 b
7		T3 OUT1 b
8	T3 OUT2 b	T3 IN2 b
9		T3 OUT2 b

Tab. 3.8 SNUS 9-Contact Jacks X120, X143 and X144

Signal Abbreviations

GND	Operation ground
GND-S	Shielded ground
T3OUT_A1,.T3OUT_B1	T3 output from the CUC plug-in places
T3OUT_A2, T3OUT_B2	T3 output from the CUD
T3 IN1 a, T3 IN1 b	T3in1 input to the CUD-, LTx- and CUC plug-in places
T3 OUT1 a, T3 OUT1 b	T3in1 output for forwarding
T3 IN2 a, T3 IN2 b	T3in2 input to the ADM
T3 OUT2 a, T3 OUT2 b	T3in2 output for forwarding

ZA-Contacts (X122), ECC of CUC/CUD (X131), V.11 of ADM (X138) and External PCI-Interfaces of CUC (X112 and X132)

Pin	X122 ZA-contacts	X131 ECC of the CUCs	X138 V.11 of the ADM	X112 External PCI interfaces of the CUC1	X132 External PCI interfaces of the CUC2
1	GND_S	GND_S	GND_S	GND_S	GND_S
2		EIN_A1	V11ETXD_A1	PCI_D_P9	PCIS_D_P9
3	ZAA2	EOUT_A1	V11ETXD_B1	PCI_U_P9	PCIS_U_P9
4	ZAA3	ET_A1	V11ERXD_A1	GND	GND
5	ZAA4	EIN_A2	V11ERXD_B1	PCI_D_P10	PCIS_D_P10
6	ZAA5	EOUT_A2	V11ETXD_A2	PCI_U_P10	PCIS_U_P10
7	ZAA6	ET_A2	V11ETXD_B2	GND	GND
8	ZAA7	EIN_A3	V11ERXD_A2	PCI_D_P11	PCIS_D_P11
9	ZAA8	EOUT_A3	V11ERXD_B2	PCI_U_P11	PCIS_U_P11
10	ZAA9	EIN_A4	V11ETXC_A	GND	GND
11		EOUT_A4	V11ETXC_B	PCI_D_P12	PCIS_D_P12
12		EINCUD_A	V11ERXC_A	PCI_U_P12	PCIS_U_P12
13	GND	EOUTCUD_A	V11ERXC_B	CCUR_A	CCURS_A
14	ZAB1	EIN_B1	V11WTXD_A1	PCI_D_N9	PCIS_D_N9
15	ZAB2	EOUT_B1	V11WTXD_B1	PCI_U_N9	PCIS_U_N9
16	ZAB3	ET_B1	V11WRXD_A1	GND	GND
17	ZAB4	EIN_B2	V11WRXD_B1	PCI_D_N10	PCIS_D_N10
18	ZAB5	EOUT_B2	V11WTXD_A2	PCI_U_N10	PCIS_U_N10
19	ZAB6	ET_B2	V11WTXD_B2	GND	GND
20	ZAB7	EIN_B3	V11WRXD_A2	PCI_D_N11	PCIS_D_N11
21	ZAB8	EOUT_B3	V11WRXD_B2	PCI_U_N11	PCIS_U_N11
22	ZAB9	EIN_B4	V11WTXC_A	GND	GND
23		EOUT_B4	V11WTXC_B	PCI_D_N12	PCIS_D_N12
24		EINCUD_B	V11WRXC_A	PCI_U_N12	PCIS_U_N12
25	GND	EOUTCUD_B	V11WRXC_B	CCUR_B	CCURS_B

Tab. 3.9 SNUS Connectors X122, X131, X138, X112 and X132

Signal Abbreviations

GND	Operation ground
GND-S	Shielded ground
Index 1	SUE
Index 2	CUD
Index 3...5	LTx plug-in places
Index 6, 7	CUCs
Index 8	PSD
Index 9	OTSU2M
EAN/AB_A/B1 to A/B4	ECC1 to ECC4 of both CUCs

EAN/ABCUD_A/B	ECC of the CUD
V11E	East
V11W	West
TXC	Transmit clock
RXC	Receive clock
PCIS_D_Py/Ny (y = 1 to 12)	Output from the CUC
PCIS_U_Py/Ny (y = 1 to 12)	Input from the CUC

Line cards (X103 to X108 and X123 to X128) and LTx (X107, X108 and X111)

	Line cards		LTx1 to LTx3
Pin	**X103 to X108**	**X123 to X128**	**X107, X108 and X111**
1	GND	GND	GND_S
2	LC(y)A1_A1	LC(y)C1_A13	H1B2 (E1IN_B2)[1)]
3	LC(y)A3_A2	LC(y)C3_A14	
4	LC(y)A7_A3	LC(y)C9_A15	H2B2 {E1OUT_B2}[1)]
5	LC(y)A11_A4	LC(y)C13_A16	
6	LC(y)A13_A5	LC(y)C17_A17	
7	LC(y)A19_A6	LC(y)C19_A18	H2B1 {E1OUT_B1}
8	LC(y)A23_A7	LC(y)C23_A19	
9	LC(y)A25_A8	LC(y)C25_A20	
10	LC(y)A29_A9	LC(y)C29_A21	
11	LC(y)A31_A10	LC(y)C31_A22	
12	LC(y)A15_A11	LC(y)C7_A23	
13	LC(y)A17_A12	LC(y)C15_A24	
14	LC(y)A2_B1	LC(y)C2_B13	H1A2 (E1IN_A2)[1)]
15	LC(y)A4_B2	LC(y)C4_B14	
16	LC(y)A8_B3	LC(y)C10_B15	H2A2 {E1OUT_A2}[1)]
17	LC(y)A12_B4	LC(y)C14_B16	
18	LC(y)A14_B5	LC(y)C18_B17	
19	LC(y)A20_B6	LC(y)C20_B18	H2A1 {E1OUT_A1}
20	LC(y)A24_B7	LC(y)C24_B19	
21	LC(y)A26_B8	LC(y)C26_B20	
22	LC(y)A30_B9	LC(y)C30_B21	
23	LC(y)A32_B10	LC(y)C32_B22	
24	LC(y)A16_B11	LC(y)C8_B23	H1A1 {E1IN_A1}
25	LC(y)A18_B12	LC(y)C16_B24	H1B1 (E1IN_B1)

1) The 2. interface exists only at X111

Modules of the LT2ME1				
Signal	**G703**	**Uk2**	**SDSL**	**T4[2)]**
H1A1	E1IN_A1	E1IN_A1	SHDSL_A1	T4out_A
H1B1	E1IN_B1	E1IN_B1	SHDSL_B1	T4out_B
H2A1	E1OUT_A1	E1OUT_A1	SHDSL_C1[2)]	
H2B1	E1OUT_B1	E1OUT_B1	SHDSL_D1[2)]	
H1A2	E1IN_A2	E1IN_A2	SHDSL_A2	T4out_A
H1B2	E1IN_B2	E1IN_B2	SHDSL_B2	T4out_B
H2A2	E1OUT_A2	E1OUT_A2	SHDSL_C2[2)]	
H2B2	E1OUT_B2	E1OUT_B2	SHDSL_D2[2)]	

2) only with SDSL4op

Tab. 3.10 SNUS Connectors X103 to X108, X123 to X128, X103, X123, X107, X108 and X111

Signal Abbreviations

GND	Operation ground
GND-S	Shielded ground
(y) y = 1...6	For LC1...LC6
e.g. LC2C1_A13	Signal from pin C1 of the line card 2 A-wire from channel 13

Interfaces 2 Mbit/s G.703
(PU16/1: X109, X129, X110, X130 and PU16/2: X113, X133, X114, X134)

	Interfaces 2 Mbit/s G.703			
Pin	X109/X113	X129/X133	X110/X114	X130/X134
1	GND_S	GND_S	GND_S	GND_S
2	E1 OUT1 a	E1 OUT5 a	E1 OUT9 a	E1 OUT13 a
3	E1 IN1 a	E1 IN5 a	E1 IN9 a	E1 IN13 a
4	E1 OUT2 a	E1 OUT6 a	E1 OUT10 a	E1 OUT14 a
5	E1 IN2 a	E1 IN6 a	E1 IN10 a	E1 IN14 a
6	E1 OUT3 a	E1 OUT7 a	E1 OUT11 a	E1 OUT15 a
7	E1 IN3 a	E1 IN7 a	E1 IN11 a	E1 IN15 a
8	E1 OUT4 a	E1 OUT8 a	E1 OUT12 a	E1 OUT16 a
9	E1 IN4 a	E1 IN8 a	E1 IN12 a	E1 IN16 a
10				
11				
14	E1 OUT1 b	E1 OUT5 b	E1 OUT9 b	E1 OUT13 b
15	E1 IN1 b	E1 IN5 b	E1 IN9 b	E1 IN13 b
16	E1 OUT2 b	E1 OUT6 b	E1 OUT10 b	E1 OUT14 b
17	E1 IN2 b	E1 IN6 b	E1 IN10 b	E1 IN14 b
18	E1 OUT3 b	E1 OUT7 b	E1 OUT11 b	E1 OUT15 b
19	E1 IN3 b	E1 IN7 b	E1 IN11 b	E1 IN15 b
20	E1 OUT4 b	E1 OUT8 b	E1 OUT12 b	E1 OUT16 b
21	E1 IN4 b	E1 IN8 b	E1 IN12 b	E1 IN16 b
24				
25				

Tab. 3.11 SNUS Connectors X109, X110, X 113, X114, X129, X130, X133, X134

The interfaces from X129 are port 5 to 8 of the PU16/1 in Slot 210 and are internal connected to the first 2-Mbit/s interface of the CUD place and of the 3 LTx plug-in places. The interfaces from X110 are port 9 to 12 and are internal connected with the ADM. The interfaces from X130 are port 13 to 16 and are internal connected with the ADM.

The interfaces from X133 are Port 5 to 8 of the PU16/2 in Slot 213 and are internal connected to the second 2-Mbit/s interface of the CUD and of the 3 LTx plug-in places.

The interfaces from X114 are port 9 to 12 and are internal connected with the ADM.
The interfaces from X134 are port 13 to 16 and are internal connected with the ADM.

Signal Abbreviations

GND	Operation ground
GND-S	Shielded ground
E1 OUTy a and b (y = 1 to 16)	A and B wire output 2 Mbit/s G.703 from port y
E1 INy a and b (y = 1 to 16)	A and B wire input 2 Mbit/s G.703 from port y

Interfaces 2 Mbit/s G.703
(TU: X115, X116, X117, X135, X136 and ADM: X137)

	Interfaces 2 Mbit/s G.703					
Pin	**X115**	**X135**	**X116**	**X136**	**X117**	**X137**
1	GND_S	GND_S	GND_S	GND_S	GND_S	GND_S
2	E1 OUT22 a	E1 OUT26 a	E1 OUT30 a	E1 OUT34 a	E1 OUT38 a	E1 OUT17 a
3	E1 IN22 a	E1 IN26 a	E1 IN30 a	E1 IN34 a	E1 IN38 a	E1 IN17 a
4	E1 OUT23 a	E1 OUT27 a	E1 OUT31 a	E1 OUT35 a	E1 OUT39 a	E1 OUT18 a
5	E1 IN23 a	E1 IN27 a	E1 IN31 a	E1 IN35 a	E1 IN39 a	E1 IN18 a
6	E1 OUT24 a	E1 OUT28 a	E1 OUT32 a	E1 OUT36 a	E1 OUT40 a	E1 OUT19 a
7	E1 IN24 a	E1 IN28 a	E1 IN32 a	E1 IN36 a	E1 IN40 a	E1 IN19 a
8	E1 OUT25 a	E1 OUT29 a	E1 OUT33 a	E1 OUT37 a	E1 OUT41 a	E1 OUT20 a
9	E1 IN25 a	E1 IN29 a	E1 IN33 a	E1 IN37 a	E1 IN41 a	E1 IN20 a
10					E1 OUT42 a	E1 OUT21 a
11					E1 IN42 a	E1 IN21 a
12						
13						
14	E1 OUT22 b	E1 OUT26 b	E1 OUT30 b	E1 OUT34 b	E1 OUT38 b	E1 OUT17 b
15	E1 IN22 b	E1 IN26 b	E1 IN30 b	E1 IN34 b	E1 IN38 b	E1 IN17 b
16	E1 OUT23 b	E1 OUT27 b	E1 OUT31 b	E1 OUT35 b	E1 OUT39 b	E1 OUT18 b
17	E1 IN23 b	E1 IN27 b	E1 IN31 b	E1 IN35 b	E1 IN39 b	E1 IN18 b
18	E1 OUT24 b	E1 OUT28 b	E1 OUT32 b	E1 OUT36 b	E1 OUT40 b	E1 OUT19 b
19	E1 IN24 b	E1 IN28 b	E1 IN32 b	E1 IN36 b	E1 IN40 b	E1 IN19 b
20	E1 OUT25 b	E1 OUT29 b	E1 OUT33 b	E1 OUT37 b	E1 OUT41 b	E1 OUT20 b
21	E1 IN25 b	E1 IN29 b	E1 IN33 b	E1 IN37 b	E1 IN41 b	E1 IN20 b
22					E1 OUT42 b	E1 OUT21 b
23					E1 IN42 b	E1 IN21 b
24						
25						

Tab. 3.12 SNUS Connectors X115 to X117, X135 to X137

Signal Abbreviations

GND	Operation ground
GND-S	Shielded ground
E1 OUTy a and b (y = 22 to 42)	A and B wire output 2 Mbit/s G.703 from port 1 to 21 of the TU
E1 INy a and b (y = 22 to 42)	A and B wire input 2 Mbit/s G.703 from port 1 to 21 of the TU
E1 OUTy a and b (y = 17 to 21)	A and B wire output 2 Mbit/s G.703 from port y of ADM
E1 INy a and b (y = 17 to 21)	A and B wire input 2 Mbit/s G.703 from port y of ADM

D-Sub connectors X103 to X108 and X123 to X128 depending on the line card

	CPF2		UAC68		SUB102, SLX102/E	SLB62
Pin	X103 to X108	X123 to X128	X103 to X108	X123 to X128	X103 to X108	X103 to X108
1	GND	GND	GND	GND	GND	GND
2	SN0_AN_A	SN2_AN_A	F2IN_A1	F2IN_A4	SB_A1	SB_A1
3	SN0_CNTL_A	SN2_CNTL_A	F2OUT_A1	F2OUT_A4	SB_A2	
4	SN0_AB_A	SN2_AB_A	F2IN_A2	F2IN_A5	SB_A3	SB_A2
5	SN0_XCLK_A	SN2_XCLK_A	F2OUT_A2	F2OUT_A5	SB_A4	SB_A3
6	SN0_IND_A	SN2_IND_A	F2IN_A3	F2IN_A6	SB_A5	
7	SN0_SCLK_A	SN2_SCLK_A	F2OUT_A3	F2OUT_A6	SB_A6	SB_A4
8	SN1_AB_A	SN3_AB_A	S2IN_A1	S2IN_A4	SB_A7	
9	SN1_AN_A	SN3_AN_A	S2OUT_A1	S2OUT_A4	SB_A8	SB_A5
10	SN1_CNTL_A	SN3_CNTL_A	S2IN_A2	S2IN_A5	SB_A9	
11	SN1_XCLK_A	SN3_XCLK_A	S2OUT_A2	S2OUT_A5	SB_A10	SB_A6
12	SN1_IND_A	SN3_IND_A	S2IN_A3	S2IN_A6		
13	SN1_SCLK_A	SN3_SCLK_A	S2OUT_A3	S2OUT_A6		
14	SN0_AN_B	SN2_AN_B	F2IN_B1	F2IN_B4	SB_B1	SB_B1
15	SN0_CNTL_B	SN2_CNTL_B	F2OUT_B1	F2OUT_B4	SB_B2	
16	SN0_AB_B	SN2_AB_B	F2IN_B2	F2IN_B5	SB_B3	SB_B2
17	SN0_XCLK_B	SN2_XCLK_B	F2OUT_B2	F2OUT_B5	SB_B4	SB_B3
18	SN0_IND_B	SN2_IND_B	F2IN_B3	F2IN_B6	SB_B5	
19	SN0_SCLK_B	SN2_SCLK_B	F2OUT_B3	F2OUT_B6	SB_B6	SB_B4
20	SN1_AB_B	SN3_AB_B	S2IN_B1	S2IN_B4	SB_B7	
21	SN1_AN_B	SN3_AN_B	S2OUT_B1	S2OUT_B4	SB_B8	SB_B5
22	SN1_CNTL_B	SN3_CNTL_B	S2IN_B2	S2IN_B5	SB_B9	
23	SN1_XCLK_B	SN3_XCLK_B	S2OUT_B2	S2OUT_B5	SB_B10	SB_B6
24	SN1_IND_B	SN3_IND_B	S2IN_B3	S2IN_B6		
25	SN1_SCLK_B	SN3_SCLK_B	S2OUT_B3	S2OUT_B6		

Tab. 3.13 SNUS Connectors X103 to X108, X123 to X128 (Part 1)

Pin	I8S0P		I4UK2NTP, I4UK4NTP	IUL82C, IUL84C
	X103 to X108	X123 to X128	X103 to X108	X103 to X108
1	GND	GND	GND	GND
2	S0A1	S0A5	Uk0_A1	D2A1
3	S0C1	S0C5		D2A2
4	S0A2	S0A6	Uk0_A2	D2A3
5	S0C2	S0C6		D2A4
6	S0A3	S0A7		D2A5
7	S0C3	S0C7	Uk0_A3	D2A6
8	S0A4	S0A8		D2A7
9	S0C4	S0C8		D2A8
10				
11			Uk0_A4	
12				
13				
14	S0B1	S0B5	Uk0_B1	D2B1
15	S0D1	S0D5		D2B2
16	S0B2	S0B6	Uk0_B2	D2B3
17	S0D2	S0D6		D2B4
18	S0B3	S0B7		D2B5
19	S0D3	S0D7	Uk0_B3	D2B6
20	S0B4	S0B8		D2B7
21	S0D4	S0D8		D2B8
22				
23			Uk0_B4	
24				
25				

Tab. 3.14 SNUS Connectors X103 to X108, X123 to X128 (Part 2)

	CM64/2		DSC104C		DSC6-nx64C	
Pin	X103 to X108	X123 to X128	X103 to X108	X123 to X128	X103 to X108	X123 to X128
1	GND	GND	GND	GND	GND	GND
2			D2OUT_A1	D2IN_A1	D2OUT_A1	
3			D2OUT_A2	D2IN_A2	T21_A1	D2IN_A1
4			D2OUT_A3	D2IN_A3	T22_A1	
5			D2OUT_A4	D2IN_A4	D2OUT_A2	D2IN_A2
6			D2OUT_A5	D2IN_A5	T21_A2	
7			D2OUT_A6	D2IN_A6	T22_A2	D2IN_A3
8			D2OUT_A7	D2IN_A7	D2OUT_A3	D2IN_A4
9			D2OUT_A8	D2IN_A8	D2OUT_A4	D2IN_A5
10			D2OUT_A9	D2IN_A9	D2OUT_A5	D2IN_A6
11			D2OUT_A10	D2IN_A10	D2OUT_A6	TIN_A
12						
13						
14	F2IN_A	F2IN_B	D2OUT_B1	D2IN_B1	D2OUT_B1	
15	F2OUT_A	F2OUT_B	D2OUT_B2	D2IN_B2	T21_B1	D2IN_B1
16		YOUT1_B	D2OUT_B3	D2IN_B3	T22_B1	
17	YOUT2_A	YOUT2_B	D2OUT_B4	D2IN_B4	D2OUT_B2	D2IN_B2
18	YOUT3_A	YOUT3_B	D2OUT_B5	D2IN_B5	T21_B2	
19	YOUT4_A	YOUT4_B	D2OUT_B6	D2IN_B6	T22_B2	D2IN_B3
20	YIN1_A	YIN1_B	D2OUT_B7	D2IN_B7	D2OUT_B3	D2IN_B4
21	YIN2_A	YIN2_B	D2OUT_B8	D2IN_B8	D2OUT_B4	D2IN_B5
22	YIN3_A	YIN3_B	D2OUT_B9	D2IN_B9	D2OUT_B5	D2IN_B6
23	YIN4_A	YIN4_B	D2OUT_B10	D2IN_B10	D2OUT_B6	TIN_B
24						
25						

Tab. 3.15 SNUS Connectors X103 to X108, X123 to X128 (Part 3)

3.1.9 Technical Data

3.1.9.1 Environmental Conditions

Environmental conditions	acc. to ETS 300 019 (1992)
Operation	Class 3.1 acc. to ETS 300 019-1-3, (+5 °C to +40 °C)
Transport	Class 2.3 acc. to ETS 300 019-1-2, (–40 °C to +70 °C)
Storage	Class 1.3E acc. to ETS 300 019-1-1, (–45 °C to +45 °C)
Product safety	acc. to EN 60950-1

3.1.9.2 Foreign Voltage Protection

Protection against external voltages on the outdoor subscriber lines (OTC applications) is implemented in 2 stages within the entire system. For further information see Section 1.4.7 and UMN:IMN.

Classification for external voltage protection acc. to	EN 300 386 V1.3.2 (05/2003)
ITC applications according ITU-T	K.20 (07/2003), basic[1)] level
OTC applications according ITU-T	K.45 (07/2003), basic[1)] level

1) On enquiry, some line cards can also be used according enhanced level.

Compliance with the earth conditions according ITU-T	
Indoor applications (inside subscriber building)	K.31 (03/1993)
ITC applications (inside telecommunication building)	K.27 (05/1996)
Outdoor applications (remote electronic sites)	K.35 (05/1996)

Units, which are not meet the requirements above, contain specific information about the foreign power protection, see technical data of the line cards.

3.1.9.3 Power Supply

Rated input voltage	–48 V /–60 V
Permissible voltage range	–36 V to –72 V

3.2 FMX2S Subrack

The FMX2S is a subrack in 19“ construction, and can be adapted to the fitting conditions for the ETSI housing and racks using adapters.

Shelf FMX2S serves to accommodate the units of up to FMX2R3.2 multiplexers, up to 6 x 2-Mbit/s line terminating units LTx as well as supervision unit SUE.

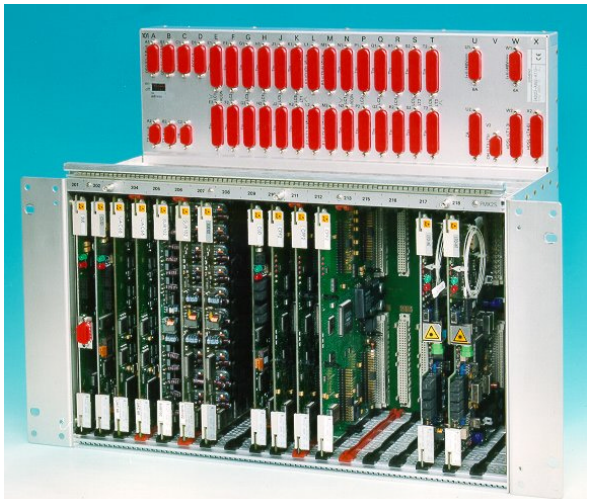


Fig. 3.12 Shelf FMX2S (without Front Panel)

The subrack can accept units in double Eurocard format, and has a backplane board to connect the internal and external interfaces.

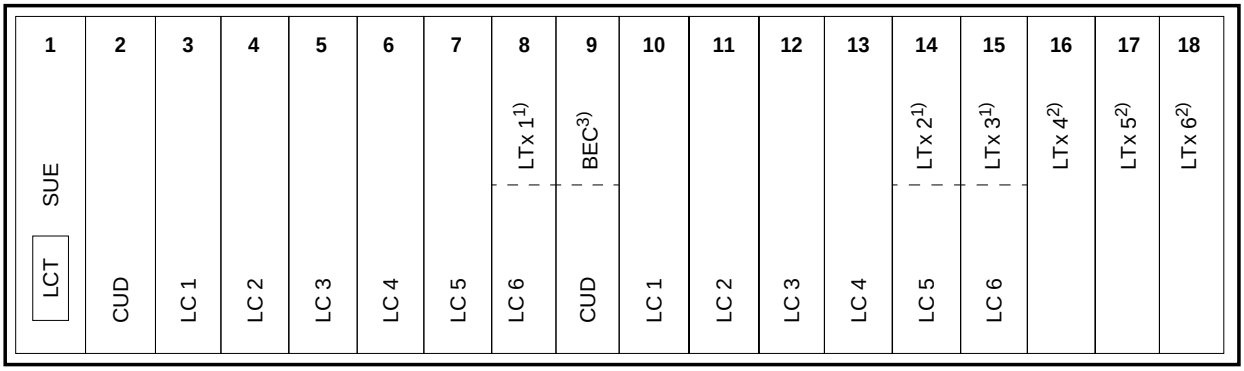
The FMX2S is equipped with a terminal panel which provides all external interfaces via the corresponding sub-D connectors. The exceptions are the optical interfaces of the corresponding units which are only present on the units themselves. For mechanical routing of the optical fibers the FMX2S is equipped with FO clips.

Different front panel connectors are intended to simplify matters wiring of the CPF2 data interfaces with external data terminals, which can be plugged into an external Main Distribution Field (MDF 180 or MDF 210), see UMN:IMN. For cabling the connectors in the terminal panel to the front panel connectors, the adapter cable S42023-A862-S11 has to be used.

Also the 4 ethernet interfaces of one CIM-nx64E module are accessible at a front panel connector. The connector also provides the RS232 interface. Also available at the front panel connector is a status LED.

3.2.1 Fitting

The FMX2S has 18 slots, which are fitted in the following way:



1) LT2ME1/LTO
2) LT2ME1/LTO
3) optionally, if more than 6 LCs are to be connected to the CUD (slot 2)
- - optional fitting

Fig. 3.13 FMX2S Equipping

For slots 8, 14 and 15, into which both channel cards and line termination units can be inserted, before the units are inserted the associated DIL switches must be checked, see Section 3.2.6.

Plug-in unit[1)]	**Plug-in place**																	**Filter[4)]**	
	201	**202**	**203**	**204**	**205**	**206**	**207**	**208**	**209**	**210**	**211**	**212**	**213**	**214**	**215**	**216**	**217**	**218**	**V42256-Z82-M1**	**V42256-Z82-M2**
LC/LTx			**LC1-1**	**LC2-1**	**LC3-1**	**LC4-1**	**LC5-1**	**LC6-1 LTx1**		**LC1-2**	**LC2-2**	**LC3-2**	**LC4-2**	**LC5-2 LTx2**	**LC6-2 LTx3**	**LTx4**	**LTx5**	**LTx6**		
Sub-D 2-wire (a, b) or LTx			**E1**	**E1**	**G1**	**H1**	**J1**	**K1**		**N1**	**P1**	**Q1**	**R1**	**S1**	**T1**		**M1**	**M1**		
Sub-D 4-wire (c, d) or LTx			**E2**	**F2**	**G2**	**H2**	**J2**	**K2 L2**		**N2**	**P2**	**Q2**	**R2**	**S2 L2**	**T2 M2**	**M2**				
SUE	×																			
CUD		×							×											
BEC									×											
UAC68			×	×	×	×	×	×		×	×	×	×	×	×				×	
SUB102			×	×	×	×	×	×		×	×	×	×	×	×					×
SLB62			×	×	×	×	×	×		×	×	×	×	×	×					×
LLA102/104C			×	×	×	×	×	×		×	×	×	×	×	×					×
I8S0P			×	×	×	×	×	×		×	×	×	×	×	×					
I4UK2NTP			×	×	×	×	×	×		×	×	×	×	×	×				×	
IUL82C			×	×	×	×	×	×		×	×	×	×	×	×				×	

Tab. 3.16 FMX2S Equipping

Plug-in unit[1]	Plug-in place																		Filter[4]	
	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218		
LC/LTx			LC1-1	LC2-1	LC3-1	LC4-1	LC5-1	LC6-1 LTx1		LC1-2	LC2-2	LC3-2	LC4-2	LC5-2 LTx2	LC6-2 LTx3	LTx4	LTx5	LTx6	V42256-Z82-M1	V42256-Z82-M2
Sub-D 2-wire (a, b) or LTx			E1	E1	G1	H1	J1	K1		N1	P1	Q1	R1	S1	T1		M1	M1		
Sub-D 4-wire (c, d) or LTx			E2	F2	G2	H2	J2	K2 L2		N2	P2	Q2	R2	S2 L2	T2 M2	M2				
IUL84C			×	×	×	×	×	×		×	×	×	×	×	×				×	
I4UK4NTP			×	×	×	×	×	×		×	×	×	×	×	×				×	
CM 64/2			×	×	×	×	×	×		×	×	×	×	×	×					
SLX102/E			×	×	×	×	×	×		×	×	×	×	×	×					×
DSC104C			×	×	×	×	×	×		×	×	×	×	×	×					
DSC6nx64C			×	×	×	×	×	×		×	×	×	×	×	×					
CPF2[3]			×	×	×	×	×	×		×	×	×	×	×	×				×	
LT2ME1								×[2]						×[2]	×[2]	×	×	×		
LTO								×						×	×	×	×	×		

1) Pay attention to switch positions at equipping variants!
2) On these slots, only one module for copper transmission lines can be equipped:- Uk2mp, - G703sh, -SDSLmp, SDSLop, -SDSL4op, T4 module can be plugged optionally on plug-in places 216 to 218
3) Up to 4 modules for CPF2: -CIM V.24, CIM X.21, CIM V.35, CIM V.36, up to 2 modules CIM-nx64E
4) Filter types according to LC types that must be plugged and screwed on to Sub D in terminal panel

Tab. 3.16 FMX2S Equipping (Cont.)

3.2.2 Clock Synchronization

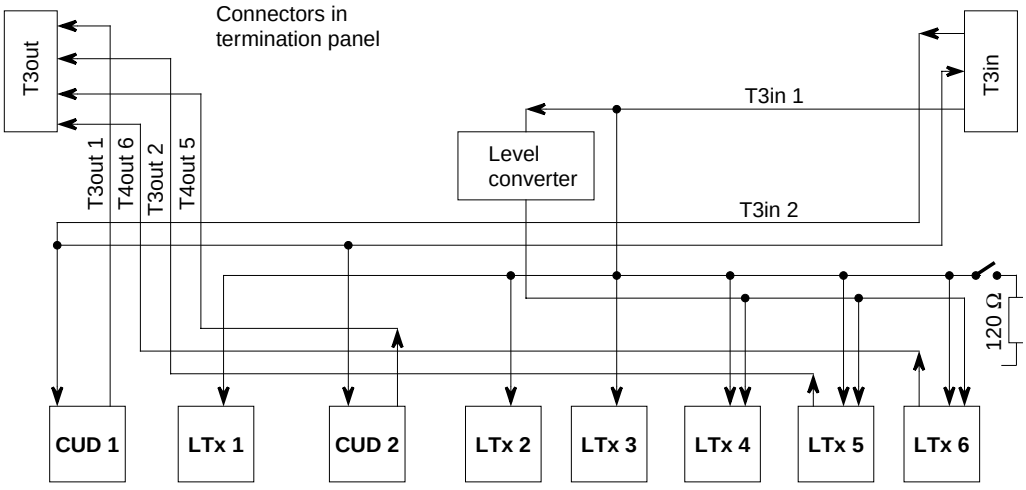


Fig. 3.14 FMX2S Clock Distribution

A 2.048 MHz clock can be fed to T3in1 and T3in2 via a D-sub plug in the termination panel. The T3in1 clock supplies the line termination units and a level converter on the backplane. A loop T3in2 supplies the two CUDs with the 2.048 MHz clock and passes the clock on to external facilities.

At another D-sub connector in the termination panel, T3out can be extracted from the two CUDs, and T4out from LTx slots 5 and 6.

3.2.3 QD2 Access

The internal wiring for operation and monitoring is shown in Fig. 3.15.

The TMN access for the subrack is the QD2 slave plug in the termination panel. This leads to the QD2 slave port 1 of the SUE. The T terminals of the SUE are also accessible in the QD2 slave connector.

The internal QD2 bus can be connected via switches either to the QD2 master port of the SUE (in standalone operation of the subrack) or to QD2 access, e.g. from COMPS2 within an ONU or SNU. In standalone operation, the QD2 bus connects the QD2 slave interfaces of the FMX2R3.2 to the QD2 master interface of the SUE supervision unit.

The QD2 slave port 2 is in the QD2-M connector. Via this port, one of the internal control channels can be connected using an appropriately assigned connector.

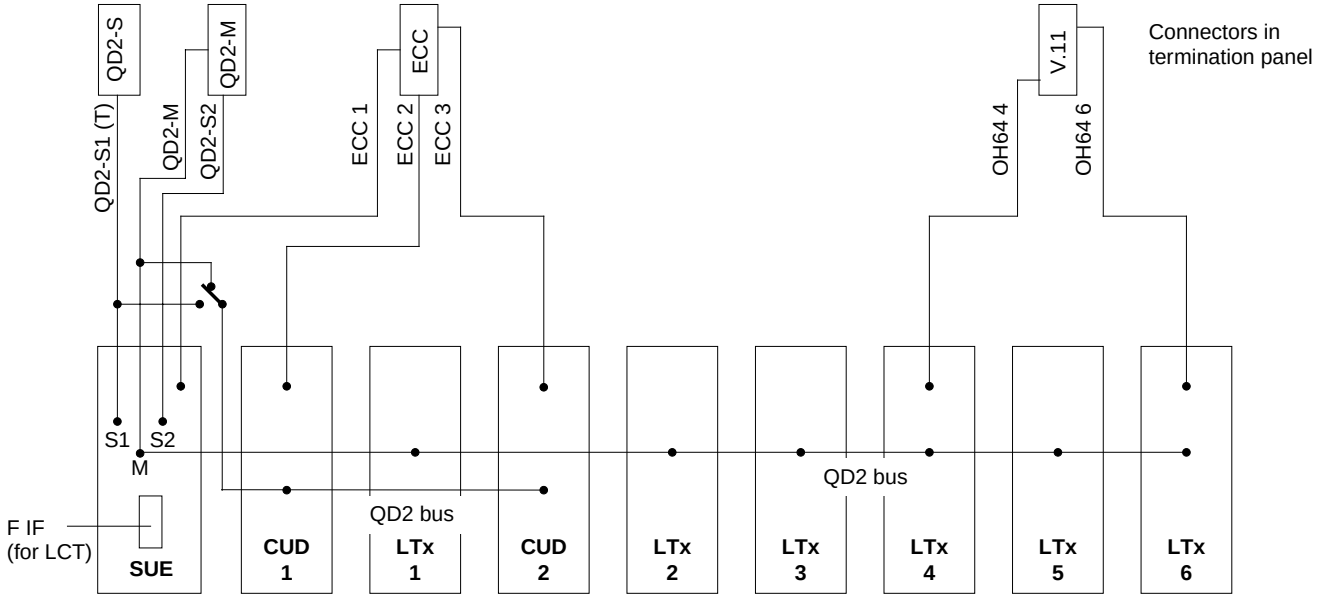


Fig. 3.15 FMX2S QD2 Access

The following internal control channels can be used:

- ECC channels of SUE and CUD
  - ECC 1 of SUE
  - ECC 2 of CUD 1 (slot 2)
  - ECC 3 of CUD 2 (slot 9)
- OH64 overhead channels of LTx 4 (slot 16) and LTx 6 (slot 18)

3.2.4 Addressing

All units in this subrack, except SUE and CUD, are assigned slot addresses. For the addresses which are assigned to the slots, see Section 3.2.6.

The SISA address of the SUE is set using the DIL switch in the termination panel.

The addresses of the CUDs are set using the DIL switch in the backplane.

For line termination units in line card slots, some address bits are given by the coding of the line cards. This makes it necessary to change address bits to adapt the addressing, if line termination units are installed in these slots. The change is done using DIL switches for fitting LCs or LTx, see Section 3.2.6.

3.2.5 Power Supply

The –48 V input voltages are fed via two separate 3W3 plugs in the termination panel. The positive poles of both voltages are connected to each other and to the backplane, via a common filter and protection device, as the operating ground GND. The negative poles of both voltages are filtered separately, and supply the units in the subrack as MUP1 and MUP2.

Whereas the SUE can be fed via its own reserve diodes from both voltages, the input voltages for the CUD and the line termination units are applied to the two voltages MUP1 and MUP2 via reserve diodes on the backplane.

The line cards receive the required secondary voltages +5 V and –5 V from the CUD or BEC, and also, after protection on the CUD or BEC, the KZU voltage (MUKZU).

Without forced ventilation and with homogeneous distribution of heat sources in the subrack, about 105 W of power dissipation (1.25 W per 5.08 mm of basic grid) are permitted.

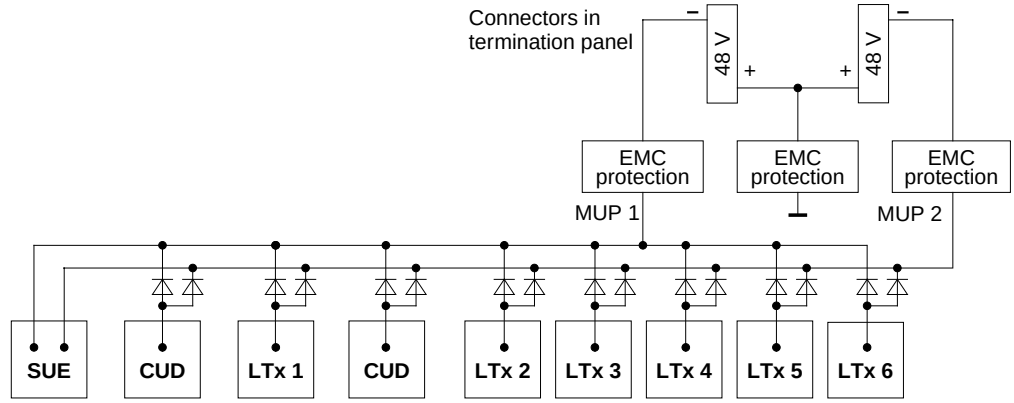


Fig. 3.16 FMX2S Power Supply

3.2.6 Switch Settings

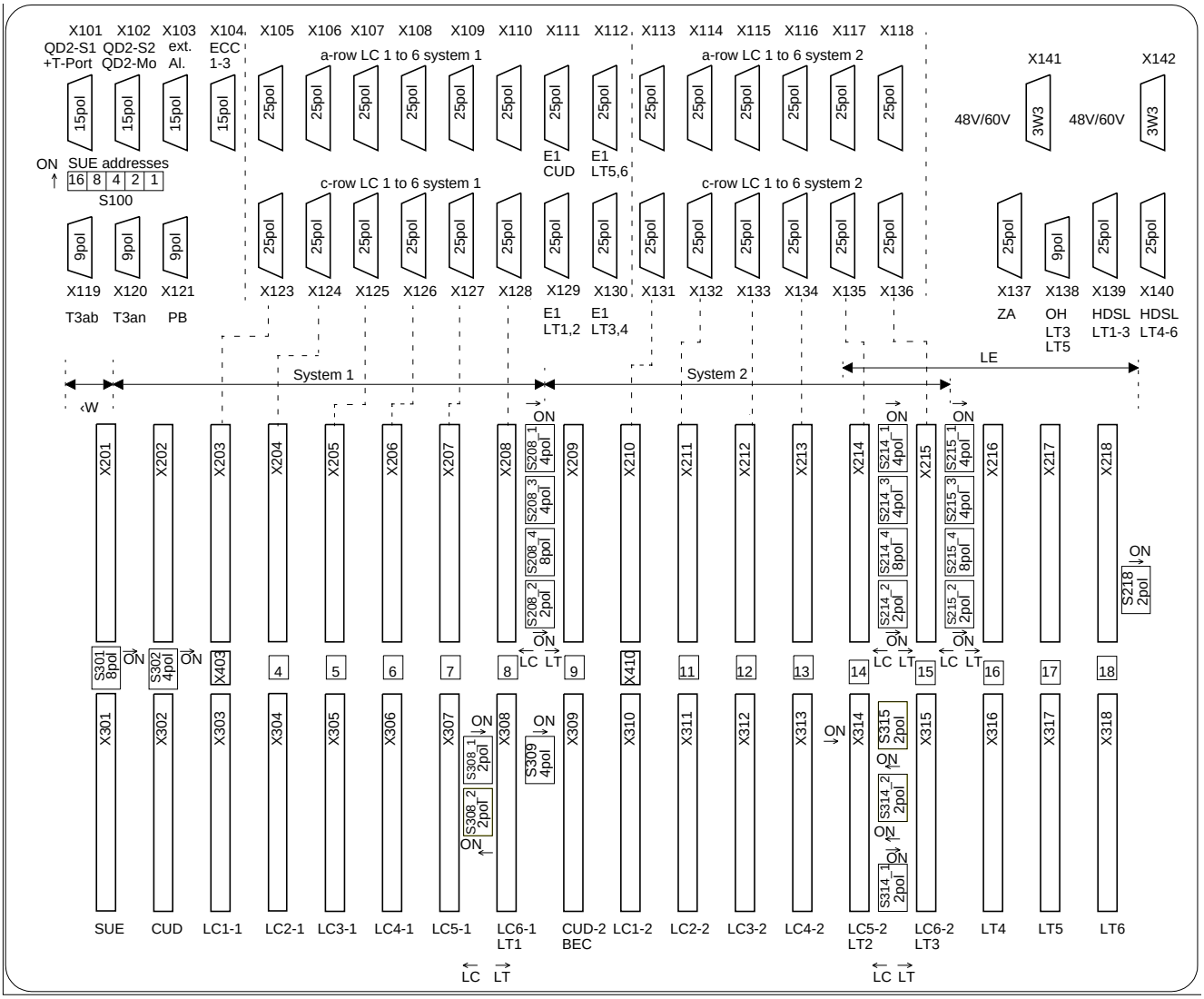


Fig. 3.17 FMX2S Front View without Front Panel

Switch Adaptation to the Equipment in the FMX2

Switch	What is switched	Contacts	Position, see also Fig. 3.17
S100	ADR SUE: I4, I3, I2, I1, I0	5-pin	In the terminal panel
S301	QD2S-IN-OUT-A-B [ONU/standalone]	8-pin	Between X201 and X301
S302	ADR CUD1: A4_1 = GND, A3_1, A2_1, A1_1, A0_1	4-pin	Between X202 and X302
S208_1	LC6*/LTx1*/QD2M	4-pin	To the right of X208,above
S208_2	LC6*/LTx1*/T3IN	2-pin	To the right of X208,below
S208_3	LC6*/LTx1*/SHDSL	4-pin	To the right of X208,center
S208_4	LC6*/LTx1*/2MBit	8-pin	To the right of X208,center
S308_1	ADR1A0	2-pin	To the right of X307
S308_2	(PB2/LTK1) PB2LTK11	2-pin	To the right of X307
S309	ADR CUD2: A4_2 = GND, A3_2, A2_2, A1_2, A0_2	4-pin	Between X308 and X309
S214_1	LC5*/LTx2*/QD2M	4-pin	To the right of X214,above
S214_2	LC5*/LT2*/T3IN	2-pin	To the right of X214,below
S214_3	LC5*/LT2*/SHDSL	4-pin	To the right of X214,center
S214_4	LC5*/LT2*/2MBit	8-pin	To the right of X214,center
S314_1	ADR0A4	2-pin	To the right of X314,below
S314_2	(PB2/LTK1) PB2LTK12	2-pin	To the right of X314,center
S215_1	LC6*/LT3*/QD2M	4-pin	To the right of X215,above
S215_2	LC6*/LT3*/T3IN	2-pin	To the right of X215,below
S215_3	LC6*/LT3*/SHDSL	4-pin	To the right of X215,center
S215_4	LC6*/LT3*/2MBit	8-pin	To the right of X215,center
S315	(PB2/LTK1) PB2LTK13	2-pin	To the right of X314,above
S218	T3INA/B_1, 120 Ohm termination	2-pin	To the right of X218

Tab. 3.17 FMX2S Overview of the Switches

Backplane Addressing of the Units

All units in this subrack are assigned addresses via the backplane:

Address setting	Unit model			
	SUE	CUD1	CUD2	LT
Address type	Variable	Variable	Variable	Fix, slot address
Address width	5 Bit	5 bit (MSB on GND	5 Bit (MSB on GND	
Address type	QD2 (SISA) address	Unit address	Unit address	Unit address

Tab. 3.18 FMX2S Address Settings for the Units

Address setting	Unit model			
	SUE	CUD1	CUD2	LT
Address switch	S100 in the terminal panel	S302 in the terminal panel	S309 in the terminal panel	None
As-delivered condition	0-0-1-0-0	(stand-alone) 0-0-0-1-0	(stand-alone) 0-1-0-0-1	-

Tab. 3.18 FMX2S Address Settings for the Units

Switching Over Addresses for Slots 208, 214 and 215

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Important advice for LTx addresses.
Since line cards and LTXs can be inserted into slots 208, 214 and 215, addresses must also be switched here manually, in order to ensure the correct address detection.

Slot 208

The following applies to slot 208 (also see Fig. 3.17):

- Address switch S308_1 for LTx operation set to 'ON' (right)
- Address switch S308_1 for LC operation set to 'OFF' (left)

Slot 214

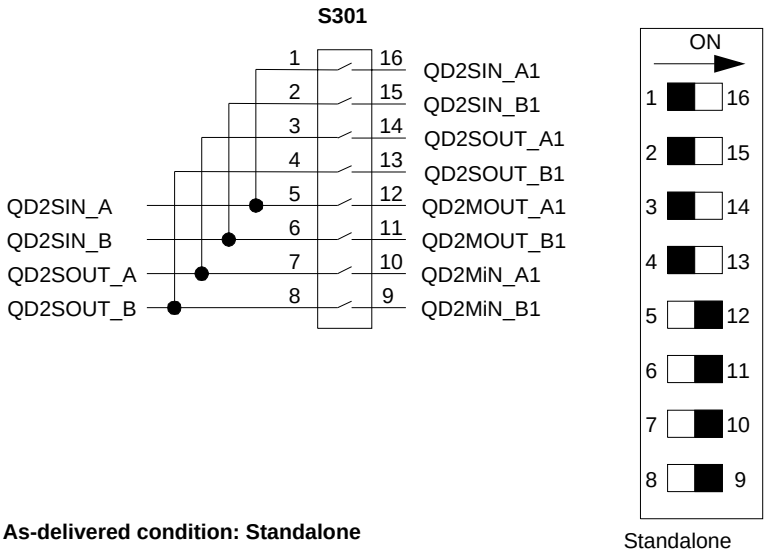
The following applies to slot 214 (also see Fig. 3.17):

- Address switch S314_1 for LTx operation set to 'ON' (right)
- Address switch S314_1 for LC operation set to 'OFF' (left)

Slot 215

- No address switching is necessary for slot 215.

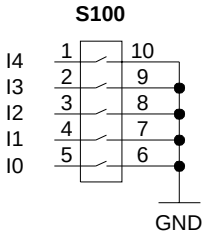
S301: FMX2S Operating Mode

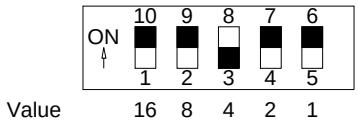


As-delivered condition: Standalone

Standalone

S100: SUE Address

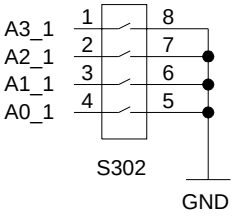




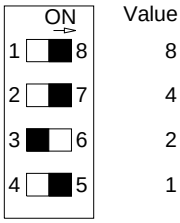
Example: Address = 4

As-delivered condition: Address 4

S302: CUD Address Switch in the 1st System



Closed = 'ON'

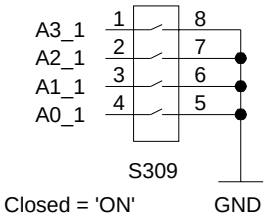


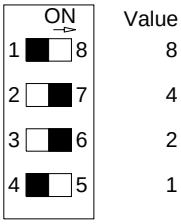
Example: Address = 2

Address A4_1 (16) is on GND!

As-delivered condition: Address 2

S309: Switch for the CUD Address in the 2nd System



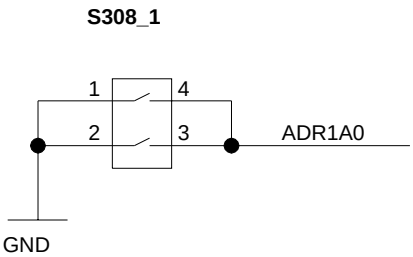


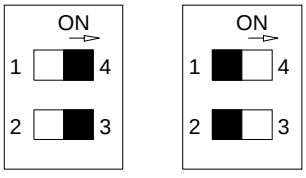
Example: Address = 9

Address A4_2 (16) is on GND!

As-delivered condition: Address 9

S308_1: Address Adaptation for LC/LTx Equipping in Slot 208





As-delivered condition: LC

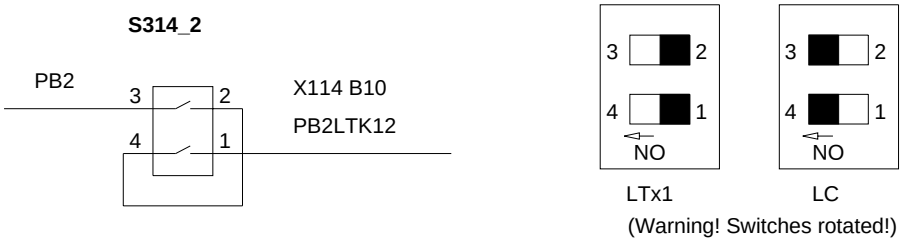
S308_2: Switching Internal Signals for LTx Shelf in Slot 208

As-delivered condition: LC Switching for LC 6-1 (PB2) or LTx1 (LTK1) in slot 8

S314_1: Address Adaptation for LC /LTx Equipping in Slot 214

As-delivered condition: LC Switching for addresses for LC 5-2 or LTx2 in slot 14

S314_2: Switching Internal Signals if LTx is Used in Slot 214



As-delivered condition: LC Switch-over LC 5-2 (PB2) or LTx2 (LTK1) in slot 14

S315: Switching Internal Signals if LTx is used in Slot 215

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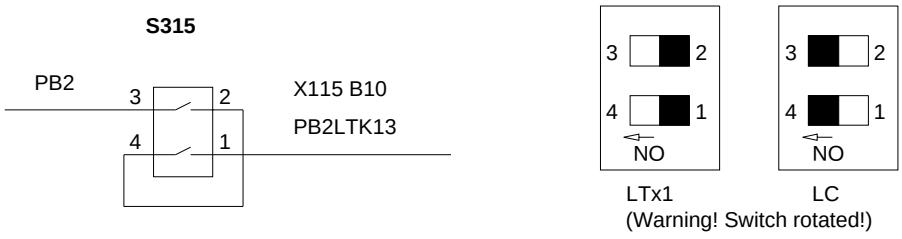
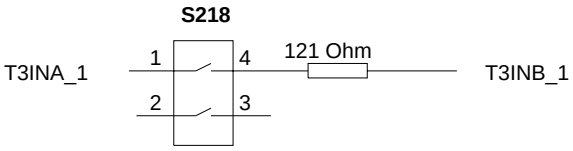
Warning!
The switch is used to switch over internal signals.
If an LTx is used in slot 215, it must always be open!

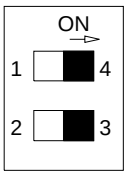


As-delivered condition: LC Switch over LC 6-2 (PB2) or LTx3 (LTK1) in slot 15

S218: T3in Terminator with 120 Ohm



120 Ohm termination closed = ON
As-delivered condition: Open



120 Ohm

S208_1: Adapting to LC /LTx Equipping in Slot 208

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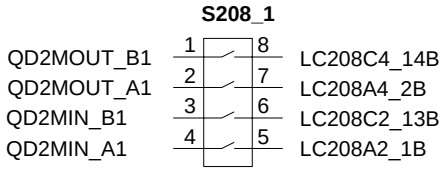
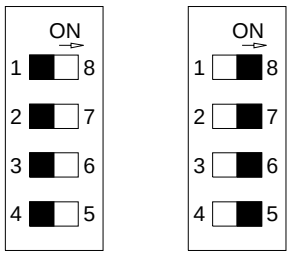
Warning!
If LTxs are used in slots 208, 214 and 215 (slots for LTx 1, LTx 2 and LTx 3), no lines may be connected to the 25-pin X110, X117 and X118 sub-D-connectors and likewise to X128, X135 and X136. This sometimes leads to the failure of the entire QD2 bus.



Separation of sub-D LC and QD2 bus;
If LC is used (open)
If LTx is used, closed = 'ON'
As-delivered condition: LC



S214_1: Adapting to LC /LTx Equipping in Slot 214

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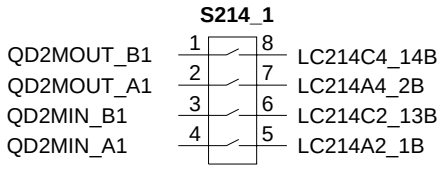
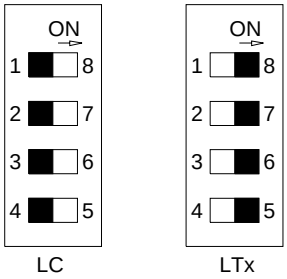
Warning!
If LTxs are used in slots 208, 214 and 215 (slots for LTx 1, LTx 2 and LTx 3), no lines may be connected to the 25-pin X110, X117 and X118 sub-D-connectors and likewise to X128, X135 and X136. This sometimes leads to the failure of the entire QD2 bus.



Separation of sub-D LC and QD2Bus;
if LC is used (open)
if LTx is used, closed = 'ON'
As-delivered condition: LC



S215_1: Adapting to LC /LTx Equipping in Slot 215

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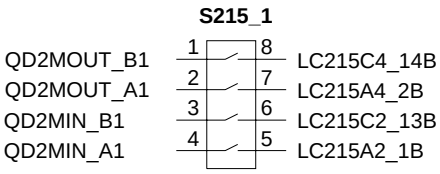
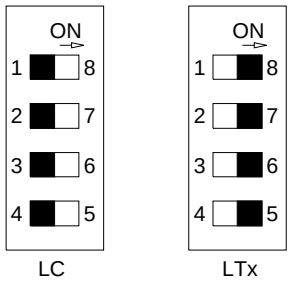
Warning!
If LTxs are used in slots 208, 214 and 215 (slots for LTx 1, LTx 2 and LTx 3), no lines may be connected to the 25-pin X110, X117 and X118 sub-D-connectors and likewise to X128, X135 and X136. This sometimes leads to the failure of the entire QD2 bus.

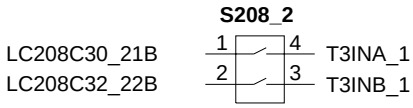


Separation sub-D LC and QD2 bus;

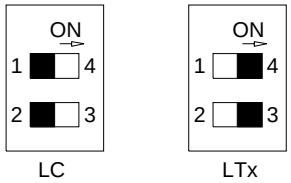
If LC is used (open)
If LTx is used, closed = 'ON'
As-delivered condition: LC



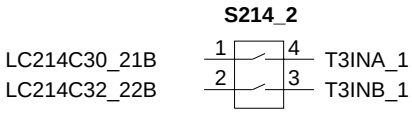
S208_2: Adapting to LC/LTx Equipping in Slot 208 (T3 clock feed)



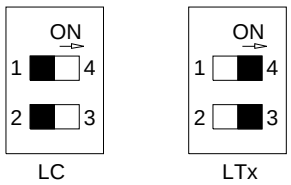
Separation of sub-D LC and T3INA/B_1 if LTx is used
LC: Open
LTx1: Closed = 'ON'
As-delivered condition: LC



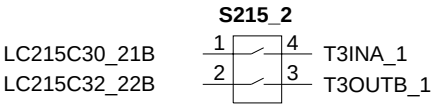
S214_2: Adapting to LC /LTx Equipping in Slot 214 (T3 clock feed)



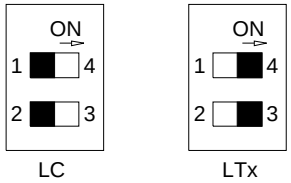
Separation of sub-D LC and T3INA/B_1 if LTx is used
L: Open
LTx1: Closed = 'ON'
As-delivered condition: LC



S215_2: Adapting to LC /LTx Equipping in Slot 215 (T3 clock feed)



Separation of sub-D LC and T3INA/B_1 if LTx is used
LC: Open
LTx1: Closed = 'ON'
As-delivered condition: LC



S208_3: Adapting to LC /LTx Equipping in Slot 208

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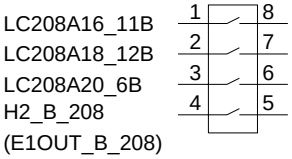
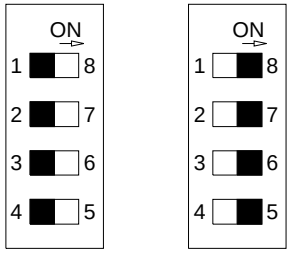
Warning!
If slot 208 is equipped with the LC card, the switch must be open to exclude any mutual faults in the X139 (SHDSL) and X110 (LC 6, system 1) sub-D-connectors.

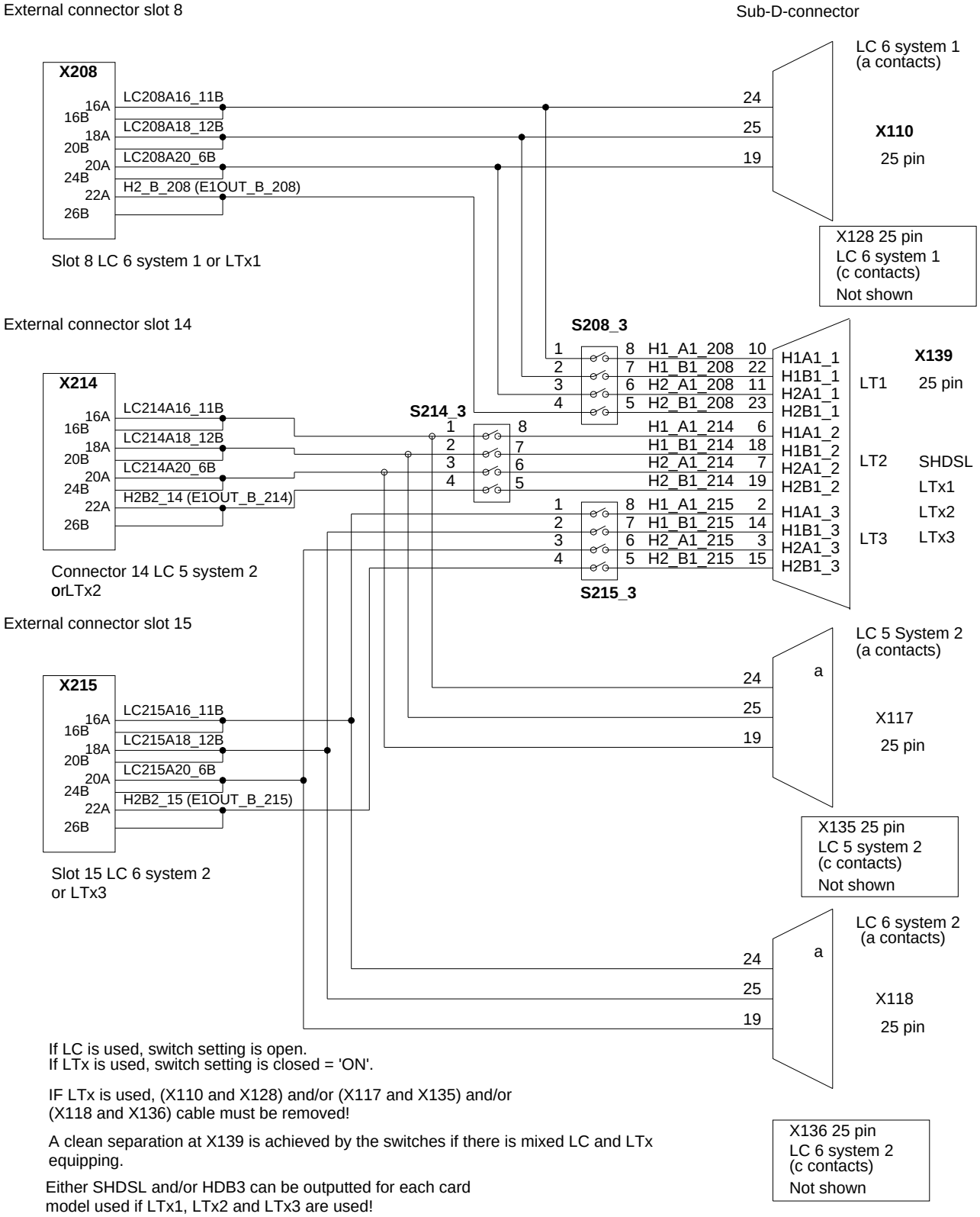
S208_3





If LC is used (open)
If LTx is used, closed = 'ON'
Switch separates lines from slot 208 to the X139 sub-D-connector (LTx1, LTx2, LTx3) f¸r SHDSL. (If equipped with LC
As-delivered condition: LC

Overview of Switches S208_3, S214_3 and S215_3



If LC is used, switch setting is open.
If LTx is used, switch setting is closed = 'ON'.

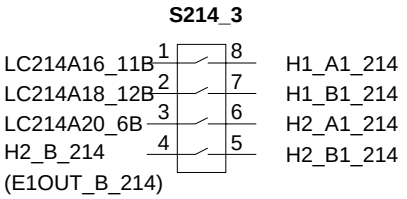
IF LTx is used, (X110 and X128) and/or (X117 and X135) and/or (X118 and X136) cable must be removed!

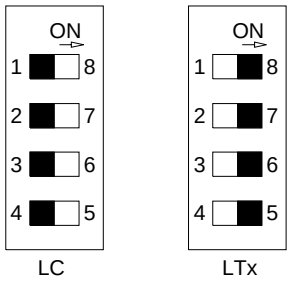
A clean separation at X139 is achieved by the switches if there is mixed LC and LTx equipping.

Either SHDSL and/or HDB3 can be outputted for each card model used if LTx1, LTx2 and LTx3 are used!

S214_3: Adapting to LC /LTx Equipping in Slot 214

Warning!
If slot 214 is equipped with the LC card, the switch must be open to exclude mutual faults at the X139 (SHDSL) and X117 (LC 5, system 2) sub-D-connectors.

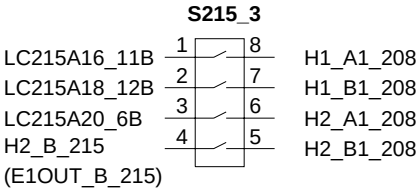


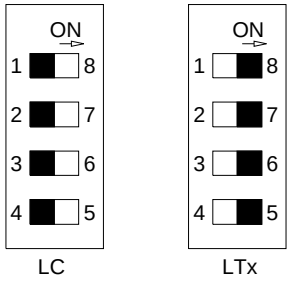


If LC is used (open)
If LTx is used, closed = 'ON'
Separates lines from slot 214 to sub-D-connector X139 (LTx1, LTx2, LTx3) for SHDSL. (If equipped with LC)
As-delivered condition: LC

S215_3: Adapting to LC/LTx Equipping in Slot 215

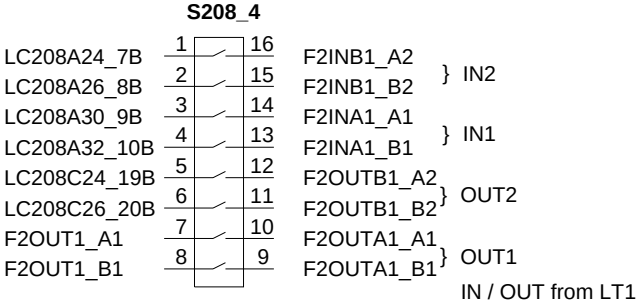
Warning!
If slot 215 is equipped with the LC card, the switch must be open to exclude mutual faults at the X139 (SHDSL) and X118 (LC 5, system 2) sub-D-connectors.

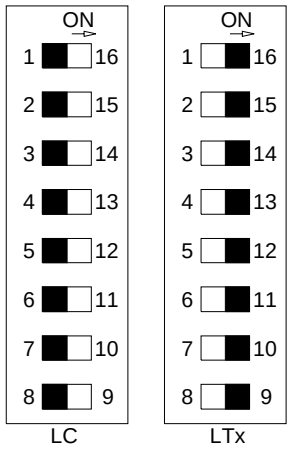




If LC is used (open)
If LTx is used, closed = 'ON'
Separates lines from slot 215 to the X139 sub-D-connector (LTx1, LTx2, LTx3) for SHDSL. (If equipped with LC)
As-delivered condition: LC

S208_4: Adapting to LC/LTx Equipping in Slot 208

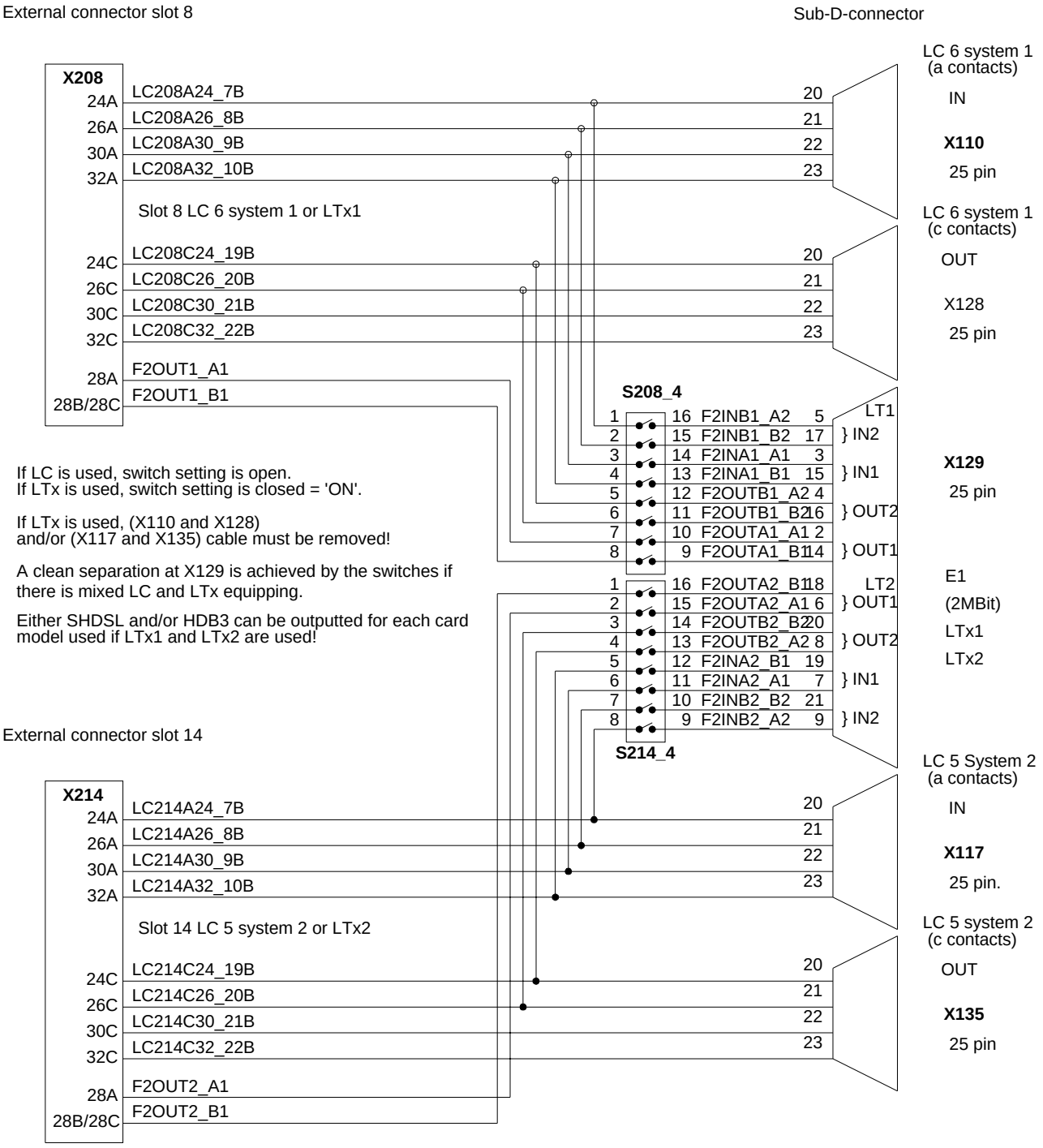




If LC is used (open)
If LTx is used, closed = 'ON'
Separates lines from slot 208 to sub-D-connector X129 (LTx1, LTx2) for 2MBit (E1). (If equipped with LC)
As-delivered condition: LC

Warning!
IF slot 208 is equipped with LC, the switch must be open to exclude mutual faults at the X129 (2Mbit-E1), X110 and X128 sub-D-connectors (both LC 6, system 1).

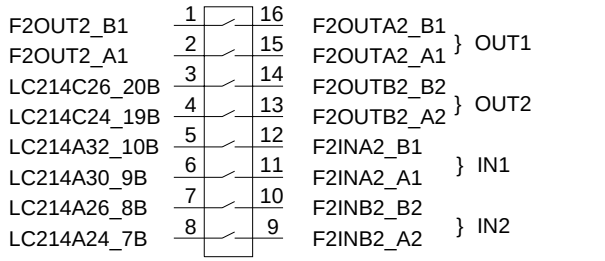
Overview of the S208_4 and S214_4 Switches



S214_4: Adapting to LC /LTx Equipping in Slot 214

Warning!
If slot 214 is equipped with LC, the switch must be open to exclude faults to the X129 (2Mbit-E1), X117 and X135 sub-D-connectors (both LC 5, system 2).

S214_4

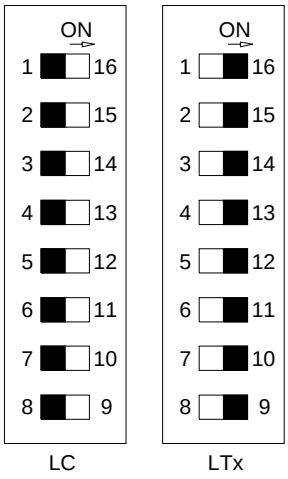


If LC is used (open)
If LTx is used, closed = 'ON'

IN / OUT from LT2

Separates lines from slot 214 to sub-D-connector X129 (LTx1, LTx2) for 2MBit (E1). (If equipped with LC)

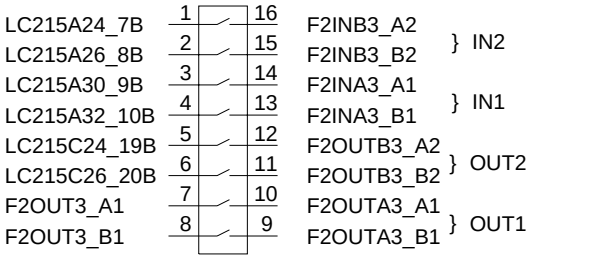
As-delivered condition: LC



S215_4: Adapting to LC /LTx Equipping in Slot 215

Warning!
IF slot 215 is equipped with the LTx card, the switch must be open to exclude mutual faults to the X130 (SHDSL), X118 and X136 (LC 6, system 2) sub-D-connectors.

S215_4

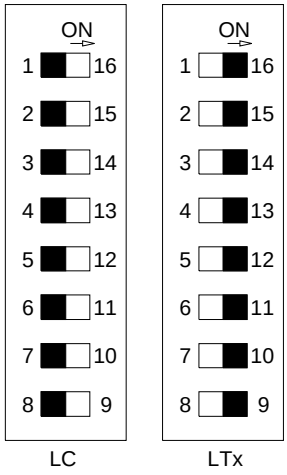


If LC is used (open)
If LTx is used, closed = 'ON'

IN / OUT from LT3

Separates lines from slot 214 to sub-D-connector X129 (LTx3, LTx4) for 2MBit (E1). (If equipped with LC)

As-delivered condition: LC



3.2.7 Connector Assignment

LC-Connectors (General)

Pin	Assignment (A)	Assignment (C)	Remark			
1	GND	GND	This is valid for system 1:			
2	LC(Y)A1-1A	LC(Y)C1_13A			Row C	Row A
3	LC(Y)A3-2A	LC(Y)C3_14A	Comes from:		Sub-D	Sub-D
4	LC(Y)A7-3A	LC(Y)C9_15A	LC1 / 1 / X203	Y = 203	X123	X105
5	LC(Y)A11-4A	LC(Y)C13_16A	LC2 / 1 / X204	Y = 204	X124	X106
6	LC(Y)A13-5A	LC(Y)C17_17A	LC3 / 1 / X205	Y = 205	X125	X107
7	LC(Y)A19-6A	LC(Y)C19_18A	LC4 / 1 / X206	Y = 206	X126	X108
8	LC(Y)A23-7A	LC(Y)C23_19A	LC5 / 1 / X207	Y = 207	X127	X109
9	LC(Y)A25-8A	LC(Y)C25_20A	LC6 / 1 / X208	Y = 208	X128	X110
10	LC(Y)A29-9A	LC(Y)C29_21A	System 2			
11	LC(Y)A31-10A	LC(Y)C31_22A	Comes from:		Sub-D	Sub-D
12	LC(Y)A15-11A	LC(Y)C7_23A	LC1 / 2 / X210	Y = 210	X131	X113
13	LC(Y)A17-12A	LC(Y)C15_24A	LC2 / 2 / X211	Y = 211	X132	X114
14	LC(Y)A2-1B	LC(Y)C2_13B	LC3 / 2 / X212	Y = 212	X133	X115
15	LC(Y)A4-2B	LC(Y)C4_14B	LC4 / 2 / X213	Y = 213	X134	X116
16	LC(Y)A8-3B	LC(Y)C10_15B	LC5 / 2 / X214	Y = 214	X135	X117
17	LC(Y)A12-4B	LC(Y)C14_16B	LC6 / 2 / X215	Y = 215	X136	X118
18	LC(Y)A14-5B	LC(Y)C18_17B	This is valid for system 1:			
20	LC(Y)A20-6B	LC(Y)C24_19B			Row C	Row A
21	LC(Y)A24-7B	LC(Y)C26_20B	Comes from:		Sub-D	Sub-D
22	LC(Y)A26-8B	LC(Y)C30_21B	LC1 / 1 / X203	Y = 203	X123	X105
23	LC(Y)A30-9B	LC(Y)C32_22B	LC2 / 1 / X204	Y = 204	X124	X106
24	LC(Y)A32-10B	LC(Y)C8_23B	LC3 / 1 / X205	Y = 205	X125	X107
25	LC(Y)A16-11B	LC(Y)C16_24B	LC4 / 1 / X206	Y = 206	X126	X108

(Y) must be replaced by the respective number of connector!
LC1to LC6 correspond to the LC plug-in places 1 to 6
A-Row from X105, X106, X107, X108, X109, X110, X113, X114, X115, X116, X117, X118
C-Row from X123, X124, X125, X126, X127, X128, X131, X132, X133, X134, X135, X136

Tab. 3.19 FMX2S LC Connectors (General)

If LTx are used on the plug-in places 208, 214 and 215 (plug-in places for LTx1, LTx2 and LTx3), it is not allowed to connect lines on the 25-contact Sub-D-Jacks X110, X117 and X118 and on X128, X135 and X136.

LC connectors A-row part 1

PIN	General	DSC6-nx64C	DSC104C	I4UK4NTP / I4UK2NTP	UAC68
1	GND	GND	GND	GND	GND
2	LC(Y)A1_1A	D2OUTA1	D2OUTA1	UK0a1	F2IN_A1
3	LC(Y)A3_2A	T21A1	D2OUTA2		F2OUT_A1
4	LC(Y)A7_3A	T22A1	D2OUTA3	UK0a2	F2IN_A2
5	LC(Y)A11_4A	D2OUTA2	D2OUTA4		F2OUT_A2
6	LC(Y)A13_5A	T21A2	D2OUTA5		F2IN_A3
7	LC(Y)A19_6A	T22A2	D2OUTA6	UK0a3	F2OUT_A3
8	LC(Y)A23_7A	D2OUTA3	D2OUTA7		S2IN_A1
9	LC(Y)A25_8A	D2OUTA4	D2OUTA8		S2OUT_A1
10	LC(Y)A29_9A	D2OUTA5	D2OUTA9		S2IN_A2
11	LC(Y)A31_10A	D2OUTA6	D2OUTA10	UK0a4	S2OUT_A2
12	LC(Y)A15_11A				S2IN_A3
13	LC(Y)A17_12A				S2OUT_A3
14	LC(Y)A2_1B	D2OUTB1	D2OUTB1	UK0b1	F2IN_B1
15	LC(Y)A4_2B	T21B1	D2OUTB2		F2OUT_B1
16	LC(Y)A8_3B	T22B1	D2OUTB3	UK0b2	F2IN_B2
17	LC(Y)A12_4B	D2OUTB2	D2OUTB4		F2OUT_B2
18	LC(Y)A14_5B	T21B2	D2OUTB5		F2IN_B3
19	LC(Y)A20_6B	T22B2	D2OUTB6	UK0b3	F2OUT_B3
20	LC(Y)A24_7B	D2OUTB3	D2OUTB7		S2IN_B1
21	LC(Y)A26_8B	D2OUTB4	D2OUTB8		S2OUT_B1
22	LC(Y)A30_9B	D2OUTB5	D2OUTB9		S2IN_B2
23	LC(Y)A32_10B	D2OUTB6	D2OUTB10	UK0b4	S2OUT_B2
24	LC(Y)A16_11B				S2IN_B3
25	LC(Y)A18_12B				S2OUT_B3

Tab. 3.20 FMX2S Connectors X105 to X110, X113 to X118 (Part 1)

LC connectors A-row part 2

PIN	General	CPF2	SLX102/E	CM64/2
1	GND	GND	GND	GND
2	LC(Y)A1_1A	SN0_AN_A	SB-A1	
3	LC(Y)A3_2A	SN0_CNTL_A	SB-A2	
4	LC(Y)A7_3A	SN0_AB_A	SB-A3	
5	LC(Y)A11_4A	SN0_XCLK_A	SB-A4	
6	LC(Y)A13_5A	SN0_IND_A	SB-A5	
7	LC(Y)A19_6A	SN0_SCLK_A	SB-A6	
8	LC(Y)A23_7A	SN1_AB_A	SB-A7	
9	LC(Y)A25_8A	SN1_AN_A	SB-A8	
10	LC(Y)A29_9A	SN1_CNTL_A	SB-A9	
11	LC(Y)A31_10A	SN1_XCLK_A	SB-A10	
12	LC(Y)A15_11A	SN1_IND_A		
13	LC(Y)A17-12A	SN1_SCLK_A		
14	LC(Y)A2_1B	SN0_AN_B	SB-B1	F2IN_A
15	LC(Y)A4_2B	SN0_CNTL_B	SB-B2	F2OUT_A
16	LC(Y)A8_3B	SN0_AB_B	SB-B3	
17	LC(Y)A12_4B	SN0_XCLK_B	SB-B4	YOUT2_A
18	LC(Y)A14_5B	SN0_IND_B	SB-B5	YOUT3_A
19	LC(Y)A20_6B	SN0_SCLK_B	SB-B6	YOUT4_A
20	LC(Y)A24_7B	SN1_AB_B	SB-B7	YIN1_A
21	LC(Y)A26_8B	SN1_AN_B	SB-B8	YIN2_A
22	LC(Y)A30_9B	SN1_CNTL_B	SB-B9	YIN3_A
23	LC(Y)A32_10B	SN1_XCLK_B	SB-B10	YIN4_A
24	LC(Y)A16_11B	SN1_IND_B		
25	LC(Y)A18-12B	SN1_SCLK_B		

Attention! YOUT1_A from CM64/2 is not laid to the Sub-D-jack!

Tab. 3.21 FMX2S Connectors X105 to X110, X113 to X118 (Part 2)

LC connectors A-row part 3

PIN	General	I8S0P	SLB62	SUB102	IUL82C, IUL84C
1	GND	GND	GND	GND	GND
2	LC(Y)A1_1A	S0A1	F2A1	SB_A1	D2A1
3	LC(Y)A3_2A	S0C1		SB_A2	D2A2
4	LC(Y)A7_3A	S0A2	F2A2	SB_A3	D2A3
5	LC(Y)A11_4A	S0C2	F2A3	SB_A4	D2A4
6	LC(Y)A13_5A	S0A3		SB_A5	D2A5
7	LC(Y)A19_6A	S0C3	F2A4	SB_A6	D2A6
8	LC(Y)A23_7A	S0A4		SB_A7	D2A7
9	LC(Y)A25_8A	S0C4	F2A5	SB_A8	D2A8
10	LC(Y)A29_9A			SB_A9	
11	LC(Y)A31_10A		F2A6	SB_A10	
12	LC(Y)A15_11A				
13	LC(Y)A17_12A				
14	LC(Y)A2_1B	S0B1	F2B1	SB_B1	D2B1
15	LC(Y)A4_2B	S0D1		SB_B2	D2B2
16	LC(Y)A8_3B	S0B2	F2B2	SB_B3	D2B3
17	LC(Y)A12_4B	S0D2	F2B3	SB_B4	D2B4
18	LC(Y)A14_5B	S0B3		SB_B5	D2B5
19	LC(Y)A20_6B	S0D3	F2B4	SB_B6	D2B6
20	LC(Y)A24_7B	S0B4		SB_B7	D2B7
21	LC(Y)A26_8B	S0D4	F2B5	SB_B8	D2B8
22	LC(Y)A30_9B			SB_B9	
23	LC(Y)A32_10B		F2B6	SB_B10	
24	LC(Y)A16_11B				
25	LC(Y)A18_12B				

Tab. 3.22 FMX2S Connectors X105 to X110, X113 to X118 (Part 3)

LC connectors C-row part 1

PIN	General	DSC6-nx64C	DSC104C	I4UK4NTP / I4UK2NTP	UAC68
1	GND	GND	GND		GND
2	LC(Y)C1_13A		D2INA1		F2IN_A4
3	LC(Y)C3_14A	D2INA1	D2INA2		F2OUT_A4
4	LC(Y)C9_15A		D2INA3		F2IN_A5
5	LC(Y)C13_16A	D2INA2	D2INA4		F2OUT_A5
6	LC(Y)C17_17A		D2INA5		F2IN_A6
7	LC(Y)C19_18A	D2INA3	D2INA6		F2OUT_A6
8	LC(Y)C23_19A	D2INA4	D2INA7		S2IN_A4
9	LC(Y)C25_20A	D2INA5	D2INA8		S2OUT_A4
10	LC(Y)C29_21A	D2INA6	D2INA9		S2IN_A5
11	LC(Y)C31_22A	TINA	D2INA10		S2OUT_A5
12	LC(Y)C7_23A				S2IN_A6
13	LC(Y)C15_24A				S2OUT_A6
14	LC(Y)C2_13B		D2INB1		F2IN_B4
15	LC(Y)C4_14B	D2INB1	D2INB2		F2OUT_B4
16	LC(Y)C10_15B		D2INB3		F2IN_B5
17	LC(Y)C14_16B	D2INB2	D2INB4		F2OUT_B5
18	LC(Y)C18_17B		D2INB5		F2IN_B6
19	LC(Y)C20_18B	D2INB3	D2INB6		F2OUT_B6
20	LC(Y)C24_19B	D2INB4	D2INB7		S2IN_B4
21	LC(Y)C26_20B	D2INB5	D2INB8		S2OUT_B4
22	LC(Y)C30_21B	D2INB6	D2INB9		S2IN_B5
23	LC(Y)C32_22B	TINB	D2INB10		S2OUT_B5
24	LC(Y)C8_23B				S2IN_B6
25	LC(Y)C16_24B				S2OUT_B6

Tab. 3.23 FMX2S Connectors X123 to X128, X131 to X136 (Part 1)

Double assignments

Pin 7 Sub-D-A and Pin 20 Sub-D-C	Pin 19 Sub-D-A and Pin 21 Sub-D-C
E1OUT2_A	E1OUT2_B

LC connectors C-row part 2

PIN	General	CPF2	SLX102/E	CM64/2
1	GND	GND	n.b.	GND
2	LC(Y)C1_13A	SN2_AN_A		
3	LC(Y)C3_14A	SN2_CNTL_A		
4	LC(Y)C9_15A	SN2_AB_A		
5	LC(Y)C13_16A	SN2_XCLK_A		
6	LC(Y)C17_17A	SN2_IND_A		
7	LC(Y)C19_18A	SN2_SCLK_A		
8	LC(Y)C23_19A	SN3_AB_A		
9	LC(Y)C25_20A	SN3_AN_A		
10	LC(Y)C29_21A	SN3_CNTL_A		
11	LC(Y)C31_22A	SN3_XCLK_A		
12	LC(Y)C7_23A	SN3_IND_A		
13	LC(Y)C15_24A	SN3_SCLK_A		
14	LC(Y)C2_13B	SN2_AN_B		F2IN_B
15	LC(Y)C4_14B	SN2_CNTL_B		F2OUT_B
16	LC(Y)C10_15B	SN2_AB_B		YOUT1_B
17	LC(Y)C14_16B	SN2_XCLK_B		YOUT2_B
18	LC(Y)C18_17B	SN2_IND_B		YOUT3_B
19	LC(Y)C20_18B	SN2_SCLK_B		YOUT4_B
20	LC(Y)C24_19B	SN3_AB_B		YIN1_B
21	LC(Y)C26_20B	SN3_AN_B		YIN2_B
22	LC(Y)C30_21B	SN3_CNTL_B		YIN3_B
23	LC(Y)C32_22B	SN3_XCLK_B		YIN4_B
24	LC(Y)C8_23B	SN3_IND_B		
25	LC(Y)C16_24B	SN3_SCLK_B		

Tab. 3.24 FMX2S Connectors X123 to X128, X131 to X136 (Part 2)

LC connectors C-row part 3

PIN	General	I8S0P	SLB62	SUB102	IUL82C, IUL84C
1	GND	GND	Not used	Not used	Not used
2	LC(Y)C1_13A	S0A5			
3	LC(Y)C3_14A	S0C5			
4	LC(Y)C9_15A	S0A6			
5	LC(Y)C13_16A	S0C6			
6	LC(Y)C17_17A	S0A7			
7	LC(Y)C19_18A	S0C7			
8	LC(Y)C23_19A	S0A8			
9	LC(Y)C25_20A	S0C8			
10	LC(Y)C29_21A				
11	LC(Y)C31_22A				
12	LC(Y)C7_23A				
13	LC(Y)C15_24A				
14	LC(Y)C2_13B	S0B5			
15	LC(Y)C4_14B	S0D5			
16	LC(Y)C10_15B	S0B6			
17	LC(Y)C14_16B	S0D6			
18	LC(Y)C18_17B	S0B7			
19	LC(Y)C20_18B	S0D7			
20	LC(Y)C24_19B	S0B8			
21	LC(Y)C26_20B	S0D8			
22	LC(Y)C30_21B				
23	LC(Y)C32_22B				
24	LC(Y)C8_23B				
25	LC(Y)C16_24B				

Tab. 3.25 FMX2S Connectors X123 to X128, X131 to X136 (Part 3)

Connectors X101 to X104 (SUE and ECC of CUDs)

PIN	QD2 slave1 and T-Port of the SUE X101	QD2 slave2 and QD2-M of the SUE X102	Alarm inputs of the SUE X103	ECC of the SUE and CUDs X104
1	GND_S	GND_S	GND_S	GND_S
2	QD2S1 OUT a	QD2M IN a	AIN1	ECC2 IN a
3	QD2T1 OUT a	QD2S2 OUT a	AIN3	ECC1 IN a
4	QD2S1 IN a	QD2M OUT a	AIN5	ECC2 OUT a
5	QD2T1 IN a	QD2S2 IN a	AIN7	ECC1 OUT a
6				ECC3 IN a
7				ECC3 OUT a
8	GND	GND	GND	GND
9	QD2S1 OUT b	QD2M IN b	AIN2	ECC2 IN b
10	QD2T1 OUT b	QD2S2 OUT b	AIN4	ECC1 IN b
11	QD2S1 IN b	QD2M OUT b	AIN6	ECC2 OUT b
12	QD2T1 IN b	QD2S2 IN b	AIN8	ECC1 OUT b
13				ECC3 IN b
14				ECC3 OUT b
15			AM	

Tab. 3.26 FMX2S Connectors X101 to X104

Signal Abbreviations

GND	Operation ground
GND-S	Shielded ground
QD2SIN_A1, B1, QD2SOUT_A1, B1	Slave 1 from the SUE
QD2SIN_A2, B2, QD2SOUT_A2, B2	Slave 2 from the SUE
QD2MIN A, B, QD2MOUT A, B	Master interface from the SUE
QD2TIN_A, B, QD2TOUT_A, B	T-connections of slave1 from the SUE
AIN1...AIN8	Alarm inputs of the SUE
AM	Negative operating voltage for alarm contacts
ECC1 IN A, B, ECC1 OUT A, B	ECC from the SUE
ECC2 IN A, B, ECC2 OUT A, B	ECC from the CUD 1, plug-in place 202
ECC3 IN A, B, ECC3 OUT A, B	ECC from the CUD 2, plug-in place 209

Connectors X119, X120, X121 and X138 (T3, OH)

PIN	T3out X119	T3in X120	 X121	Overhead (LTx4 and LTx6) X138
1	GND_S	GND_S	GND_S	GND_S
2	T3 OUT a1	T3 IN a2	PB0	O64 OUT a1
3	T4 OUT a5	T3 OUT a3	PB2	O64 IN a1
4	T3 OUT a2	T3 IN a1		O64 OUT a2
5	T4 OUT a6			O64 IN a2
6	T3 OUT b1	T3 IN b2	PB1	O64 OUT b1
7	T4 OUT b5	T3 OUT b3	PB3	O64 In b1
8	T3 OUT b2	T3 IN b1		O64 OUT b2
9	T4 OUT b6			O64 IN b2

Tab. 3.27 FMX2S Connectors X119 to X121 and X138

Signal Abbreviations

GND-S	Shielded ground
T3OUT_A1, B1	T3 output from the CUD1 plug-in places 2
T3OUT_A2, B2	T3 output from the CUD2 plug-in places 9
T3 IN a2, b2, T3 OUT a3, b3	T3-loops input or output CUD1
T4 OUT a5, T4 OUT b5	T3-output from LTx5 plug-in place 17
T4 OUT a6, T4 OUT b6	T3-output from LTx6 plug-in place 18
T3 IN a1, T3 IN b1	T3-input to LT-plug-in places
O64 OUT a1...O64 IN b1	Overhead LTx4, plug-in place 16
O64 OUT a2...O64 IN b2	Overhead LTx6, plug-in place 18

Connectors X139 and X140 (line interfaces)

PIN	LTx places 1, 2, 3 X139	LTx places 4, 5, 6 X140
1	GND_S	GND_S
2	H1A1_3	H1A1_6
3	H2A1_3	H2A1_6
4		H1A2_6
5		H2A2_6
6	H1A1_2	H1A1_5
7	H2A1_2	H2A1_5
8		H1A2_5
9		H2A2_5
10	H1A1_1	H1A1_4
11	H2A1_1	H2A1_4
12		H1A2_4
13		H2A2_4
14	H1B1_3	H1B1_6
15	H2B1_3	H2B1_6
16		H1B2_6
17		H2B2_6
18	H1B1_2	H1B1_5
19	H2B1_2	H2B1_5
20		H1B2_5
21		H2B2_5
22	H1B1_1	H1B1_4
23	H2B1_1	H2B1_4
24		H1B2_4
25		H2B2_4

Signal	Module G.703	Module U_{k2}	Module SDSL	Module T4[1)]
H1A1	E1IN_A1	E1IN_A1	SHDSL_A1	T4ab_A
H1B1	E1IN_B1	E1IN_B1	SHDSL_B1	T4ab_B
H2A1	E1OUT_A1	E1OUT_A1		
H2B1	E1OUT_B1	E1OUT_B1		
H1A2	E1IN_A2	E1IN_A2	SHDSL_A2	T4ab_A
H1B2	E1IN_B2	E1IN_B2	SHDSL_B2	T4ab_B
H2A2	E1OUT_A2	E1OUT_A2		
H2B2	E1OUT_B2	E1OUT_B2		

1) only with SDSL4op

Tab. 3.28 FMX2S Connectors X139 and X140

Signal Abbreviations

GND-S	Shielded ground
H1A1_y, H1B1_y H2A1_y, H2B1_y (y = 1...6)	Interface 1 from LTx1...LTx6
H1A2_y, H1B2_y H2A2_y, H2B2_y (y = 1...6)	Interface 2 from LTx1...LTx6
e.g. H1A2_5...H2B2_5	Interface 2 from 5. LTx place

Connectors X111, X112, X129, X130 (2 Mbit/s G.703 CUD plug-in place 2, LTx)

PIN	CUD place 2 X111	LTx5, LTx6 X112	LTx1, LTx2 X129	LTx3, LTx4 X130	Remark
1	GND_S	GND_S	GND_S	GND_S	E1 OUT81 a/b: output of the 1. interface of LTx1 E1 IN81 a/b: input of the 1. interface of LTx1 E1 OUT82 a/b: output of the 2. interface of LTx1 E1 IN82 a/b: input of the 2. interface of LTx1 E1 OUT151 a/b: output of the 1. interface of LTx2 E1 IN151 a/b: input of the 1. interface of LTx2 E1 OUT152 a/b: output of the 2. interface of LTx2 E1 IN152 a/b: input of the 2. interface of LTx2 E1 OUT31 a/b: output of the 1. interface of LTx3 E1 IN31 a/b: input of the 1. interface of LTx3 E1 OUT32 a/b: output of the 2. interface of LTx3 E1 IN32 a/b: input of the 2. interface of LTx3 E1 OUT41 a/b: output of the 1. interface of LTx4 E1 IN41 a/b: input of the 1. interface of LTx4 E1 OUT42 a/b: output of the 2. interface of LTx4 E1 IN42 a/b: input of the 2. interface of LTx4E1 E1 OUT181 a/b: output of the 1. interface of LTx5 E1 IN181 a/b: input of the 1. interface of LTx5 E1 OUT182 a/b: output of the 2. interface of LTx5 E1 IN182 a/b: input of the 2. interface of LTx5 E1OUT191 a/b: output of the 1. interface of LTx6 E1IN191 a/b: input of the 1. interface of LTx6 E1OUT192 a/b: output of the 2. interface of LTx6 E1IN192 a/b: input of the 2. interface of LTx6
2	E1 OUT21 a	E1 OUT181 a	E1 OUT81 a	E1 OUT31 a	
3	E1 IN21 a	E1 IN181 a	E1 IN81 a	E1 IN31 a	
4	E1 OUT22 a	E1 OUT182 a	E1 OUT82 a	E1 OUT32 a	
5	E1 IN22 a	E1 IN182 a	E1 IN82 a	E1 IN32 a	
6	E1 OUT91 a	E1 OUT191 a	E1 OUT151 a	E1 OUT41 a	
7	E1 IN91 a	E1 IN191 a	E1 IN151 a	E1 IN41 a	
8	E1 OUT92 a	E1 OUT192 a	E1 OUT152 a	E1 OUT42 a	
9	E1 IN92 a	E1 IN192 a	E1 IN152 a	E1 IN42 a	
10					
11					
12					
13					
14	E1 OUT21 b	E1 OUT181 b	E1 OUT81 b	E1 OUT31 b	
15	E1 IN21 b	E1 IN181 b	E1 IN81 b	E1 IN31 b	
16	E1 OUT22 b	E2 OUT182 b	E1 OUT82 b	E1 OUT32 b	
17	E1 IN22 b	E2 IN182 b	E1 IN82 b	E1 IN32 b	
18	E1 OUT91 b	E1 OUT191 b	E2 OUT151 b	E2 OUT41 b	
19	E1 IN91 b	E1 IN191 b	E2 IN151 b	E2 IN41 b	
20	E1 OUT92 b	E2 OUT192 b	E2 OUT152 b	E2 OUT42 b	
21	E1 IN92 b	E2 IN192 b	E2 IN152 b	E2 IN42 b	
22					
23					
24					
25					

Tab. 3.29 FMX2S Connectors X111, X112, X129 and X130

Connector X137 (ZA-contacts)

Assignment	PIN	PIN	Assignment	Remark
GND_S	1			Shielded ground
	2	14	ZA_301	ZA contact from SUE
ZAA_302	3	15	ZAB_302	ZA contact from CUD, plug-in place 2
ZAA_309	4	16	ZAB_309	ZA contact from CUD, plug-in place 9
ZAA_308	5	17	ZAB_308	ZA contact from LT1, plug-in place 8
ZAA_314	6	18	ZAB_314	ZA contact from LT2, plug-in place 14
ZAA_315	7	19	ZAB_315	ZA contact from LT3, plug-in place 15
ZAA_316	8	20	ZAB_316	ZA contact from LT4, plug-in place 16
ZAA_317	9	21	ZAB_317	ZA contact from LT5, plug-in place 17
ZAA_318	10	22	ZAB_318	ZA contact from LT6, plug-in place 18
	11	23		
	12	24		
GND	13	25	GND	Operation ground

Tab. 3.30 FMX2S Connector X137

Connectors X141, X142 (power supply connectors)

X141		X142	
	1		1
– 48 V (MUP 1)	2	– 48 V (MUP 2)	2
+ 48 V (GND)	3	+ 48 V (GND)	3

Tab. 3.31 FMX2S Connectors X141 and X142

3.2.8 Technical Data

3.2.8.1 Environmental Conditions

Environmental conditions	acc. to ETS 300 019 (1992)
Operation	Class 3.1 acc. to ETS 300 019-1-3, (+5 °C to +40 °C)
Transport	Class 2.3 acc. to ETS 300 019-1-2, (–40 °C to +70 °C)
Storage	Class 1.3E acc. to ETS 300 019-1-1, (–45 °C to +45 °C)
Product safety	acc. to EN 60950-1

3.2.8.2 Foreign Voltage Protection

Protection against external voltages on the outdoor subscriber lines (OTC applications) is implemented in 2 stages within the entire system. For further information see Section 1.4.7 and UMN:IMN.

Classification for external voltage protection acc. to	EN 300 386 V1.3.2 (05/2003)
ITC applications according ITU-T	K.20 (07/2003), basic[1)] level
OTC applications according ITU-T	K.45 (07/2003), basic[1)] level

1) On enquiry, some line cards can also be used according enhanced level.

Compliance with the earth conditions according ITU-T	
Indoor applications (inside subscriber building)	K.31 (03/1993)
ITC applications (inside telecommunication building)	K.27 (05/1996)
Outdoor applications (remote electronic sites)	K.35 (05/1996)

Units, which are not meet the requirements above, contain specific information about the foreign power protection, see technical data of the line cards.

3.2.8.3 Power Supply

Rated input voltage	–48 V /–60 V
Permissible voltage range	–36 V to –72 V

3.3 MXS19C Subrack

3.3.1 Structure

The shelf MXS19C can only be mounted in racks, shelter or housings according to installation conditions of IEC 60297, the mounting width of MXS19C mechanics does allow the installation in 19” racks.

There is no terminal panel. The shelf contains no front access connector panel, the connections will be realized via rear side located delivery connectors, see Fig. 3.18.

The shelf MXS19C can be equipped with plug-in units, realizing the following functions:

- FMX2R3.2
  - Central unit CUD
    The CUD requires the FMX2R3.2 load.
  - Narrowband linecards for voice, data and ISDN services
- Line termination units, feeder or leased lines
  - Access via copper cables with units LT2ME1for up to 16 E1 interfaces
  - Access via optical fiber (units LT2ME1, LTO/LT or LTO/NT) for up to 16 E1 interfaces.

The shelf MXS19C supports in maximum 120 subscriber ports that can be controlled by one or two CUDs.

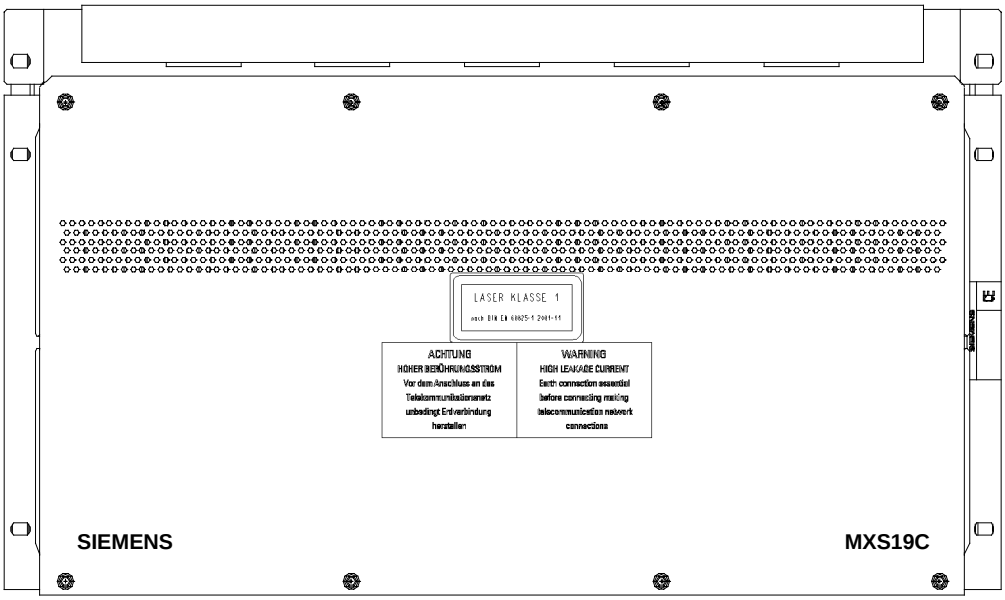


Fig. 3.18 Shelf MXS19C with Front Cover

If line termination units with optical modules (LTO/LT or LTO/NT) are equipped in the MXS19C shelf, the shelf can be supplemented with a glass fiber guide. This guide will be mounted immediately above the MXS19C shelf on the rack spars. The glass fibers of optical line termination units are guided upwards over a holding device. The central front cover can be removed without any release of the glass fiber connections.

The backplane of MXS19C contains an EEPROM to support remote inventory data. The magament access will be realized by an internal SUE located on slot 201.

Different front panel connectors are intended to simplify matters wiring of the CPF2 data interfaces with external data terminals, which can be plugged into an external Main Distribution Field (MDF 180 or MDF 210), see UMN:IMN. For cabling the transfer connectors to the front panel connectors, the adapter cable S42023-A799-S18 has to be used.

Also the 4 ethernet interfaces of one CIM-nx64E module are accessible at a front panel connector. The connector also provides the RS232 interface. Also available at the front panel connector is a status LED.

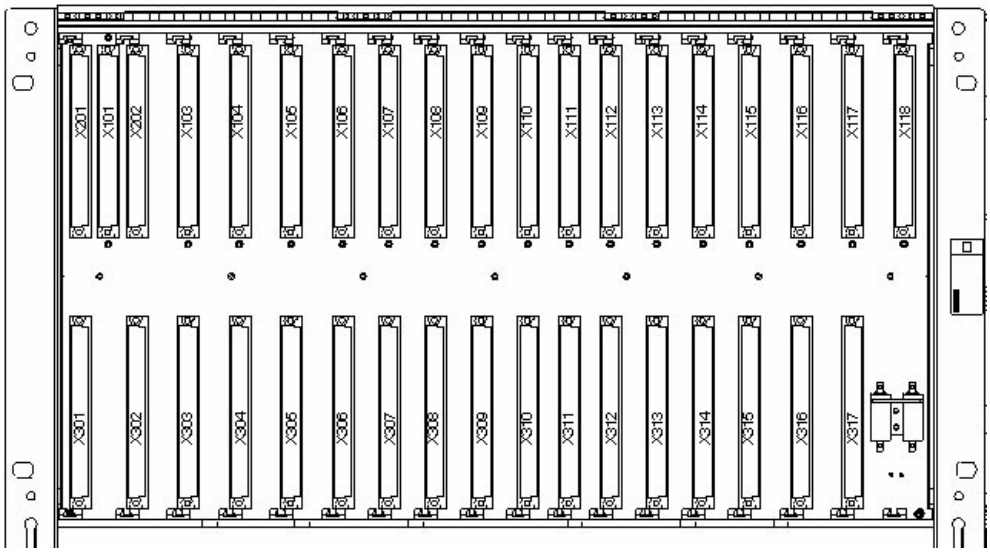


Fig. 3.19 MXS19C Front View without Front Cover, Unequipped

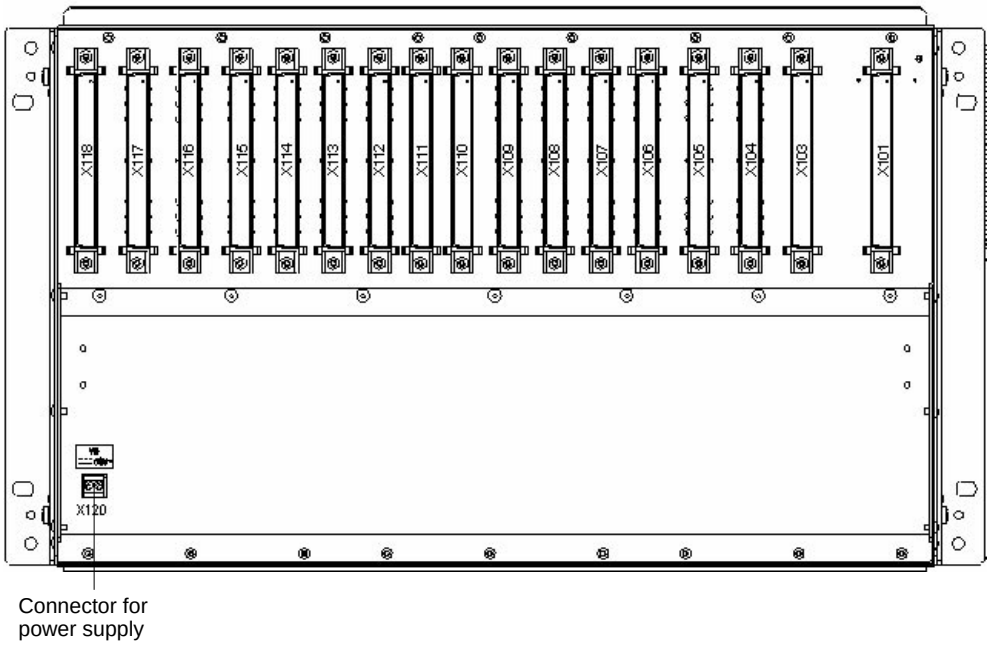


Fig. 3.20 MXS19C Rear View

3.3.2 Fitting

The MXS19C has 18 slots, which are fitted in the following way:

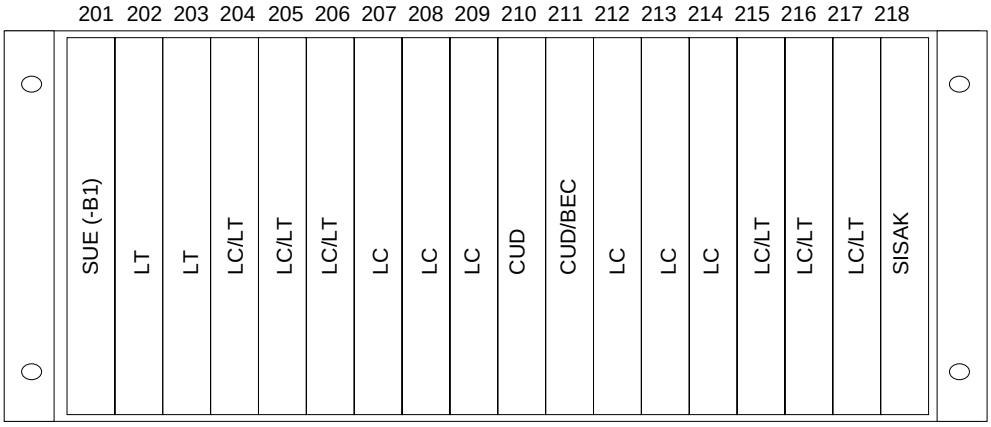


Fig. 3.21 MXS19C Equipping

Plug-in unit	Plug-in place																	
	201	**202**	**203**	**204**	**205**	**206**	**207**	**208**	**209**	**210**	**211**	**212**	**213**	**214**	**215**	**216**	**217**	**218**
SUE (-B1)	×																	
CUD										×2)	×2)							
BEC											×							
SUB102				×	×	×	×	×	×			×	×	×	×	×	×	
SLX102/E				×	×	×	×	×	×			×	×	×	×	×	×	
UAC68				×	×	×	×	×	×			×	×	×	×	×	×	
SLB62				×	×	×	×	×	×			×	×	×	×	×	×	
SEM106C				×	×	×	×	×	×			×	×	×	×	×	×	
SEM108HC				×	×	×	×	×	×			×	×	×	×	×	×	
LLA102/104C				×	×	×	×	×	×			×	×	×	×	×	×	
I8S0P				×	×	×	×	×	×			×	×	×	×	×	×	
I4UK2NTP				×	×	×	×	×	×			×	×	×	×	×	×	
IUL82C				×	×	×	×	×	×			×	×	×	×	×	×	
I4UK4NTP				×	×	×	×	×	×			×	×	×	×	×	×	
IUL84C				×	×	×	×	×	×			×	×	×	×	×	×	
CPF2[4)]				×	×	×	×	×	×			×	×	×	×	×	×	
DSC6nx64C				×	×	×	×	×	×			×	×	×	×	×	×	
DSC104C				×	×	×	×	×	×			×	×	×	×	×	×	
LTO/LT		×	×	×	×	×1)									×	×	×	
LTO/NT		×	×	×	×	×1)									×	×	×	
LT2ME1[3)]		×	×	×	×	×									×	×	×	
SISAK																		×

1) If the LTO is plugged into slot 206 it is not possible to use the neighboring slot 207
2) The central units CUD required the FMX2R3.2 load.
3) Pluggable modules of the LT2ME1: UK2mp, G703sh, SDSLmp, SDSLop, SDSL4op optionally with T4 module
4) Pluggable modules of the CPF2: CIM V.24, CIM X.21, CIM V.35, CIM V.36, CIM-nx64E

Tab. 3.32 MXS19C Equipping

3.3.3 E1 Interfaces

Each CUD contains two E1 interfaces. The E1 interfaces of both CUDs can be accessed at connector X110, which is located on the rear side connector panel. The impedances of the E1 interfaces are adjustable by switches on the CUD between 120 Ω balanced and 75 Ω unbalanced.

The E1 interfaces of line termination units on the slot delivery connectors have to be connected with an external distribution frame via special cables, see Section 3.3.4.

To connect the 2-Mbit/s signals with 75 Ω coax cable, the b pin should be connected to the shield of the coax cable (GND). It is necessary that no cable shield is connected to the shield of the grip plate, because the voltage potential of the grip plate shield is GND_S.

For cross connection of the unbalanced cable or for changing from balanced to unbalanced cable it is advisable to use the Coax Distribution Field (CDF) S42023-A890-A75.

3.3.4 Line Termination Interfaces

The slots 202, 203, 204, 205, 206, 215, 216 and 217 can be equipped with line termination units. The backplane of the MXS19C supports any connections on these slots to the management interfaces. All needed connections are realized inside the shelf.

Each LTx and combined LC/LTx slot contains two 4-wire interfaces (E1 interfaces), which can be used for the different balanced line interfaces (SHDSL, U_{k2}). The interfaces, available on the connectors X103, X104, X105, X106, X115, X116, and X117, have to be connected according to the pin assignment of the line termination unit.

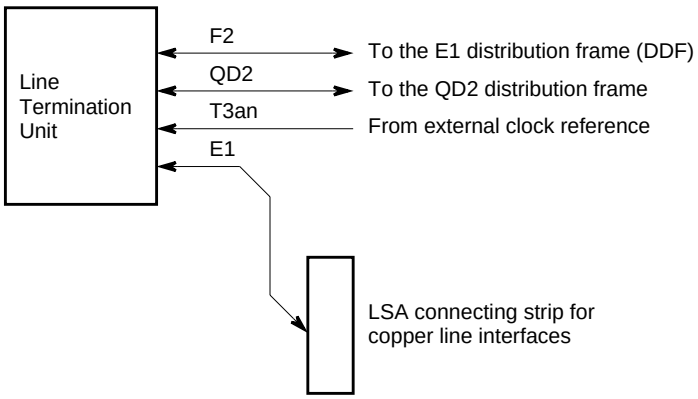


Fig. 3.22 External Interfaces of the Line Termination Units

3.3.5 Elektro Magnetic Compatibility

The following Table summarizes the possibilities to minimize EMC disturbances per slot.

Line card/LTx	Shielded subscriber cable	Unshielded subscriber cable	With EMC planar filter	Without EMC planar filter
I8S0P	x		x	
CPF2	x		x	
DSC6nx64C	x		x	
DSC104C	x		x	
LTO	x			x
LT2ME1	x			x
UAC68		x	x	
SUB102		x	x	
SLX102/E		x	x	
SLB62		x	x	
SEM106C		x	x	
SEM108HC		x	x	
LLA102/104C		x	x	
IUL82C		x	x	
IUL84C		x	x	
I4UK2NTP		x	x	
I4UK4NTP		x	x	
SUE	x			x
SISAK	x			x
CUD	x			x

Tab. 3.33 Minimization of EMC Disturbances

Only for LT slots it is not necessary to equip the DIN 41612 connector with an EMC planar filter because at these slots a shielded subscriber cable is used.

If a line card on the combined slots is used an EMC planar filter set, part number S50034-H2-A1 can be equipped on the DIN 41612 connector in order to minimize EMC disturbance.

3.3.6 Taktsynchronisation

In principle, the FMX2R3.2 will be operated synchronously. A plesiochronous operating mode is not possible. An internal clock source will be need for alarming purposes (AIS).

The system clock of the multiplexer and the LTx will be derived from one of the following clock sources:

- One of the two E1 receive signals
- The external reference clock T3in
- An internal free-running oscillator on CUD.

The distribution of the clock information to the peripheral linecards will be realized over the PCM highway. The frame alignment on the peripheral units will be established by elastic stores.

The MXS19C provides a balanced clock input T3in via the common delivery connector X101 for the T3 reference clock 2.048 MHz according to ITU-T G.703/13. By using the external reference clock T3in, both CUDs will be synchronized.

Both CUDs can derive a synchronization clock T4 from their receive signal to synchronize other functional units. The balanced clock signals T4_1 and T4_2 are connected on the delivery connector X101.

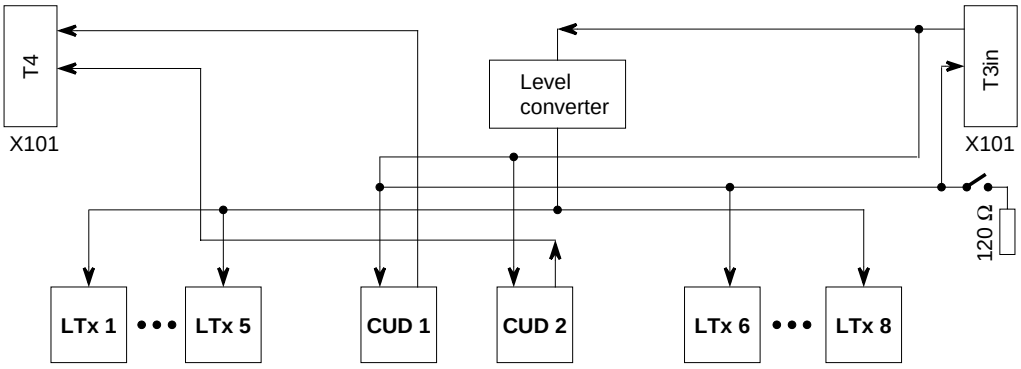


Fig. 3.23 MXS19C Clock Distribution

3.3.7 QD2 Access

The internal wiring for operation and monitoring is shown in Fig. 3.24.

The TMN access for the subrack is the QD2 slave interface on connector X101. This leads to the QD2 slave port 1 of the SUE. The T terminals of the QD2 slave interface 1 of the SUE are also accessible in the QD2 slave connector. The SUE will be addressed via a DIL switch on the backplane.

The multiplexer, including the various line cards, forms the network element FMX2R3. TMN access to the FMX2R3 is via the QD2 slave interface of the central unit with bitrates of 9.6 kbit/s or 64 kbit/s autodetect. The network element is fix addressed by backplane coding, with five bits for the CUD central unit.

It is possible to share the linecards in the shelf to two network elements FMX2R3 by equipping a second central unit CUD. In this case, each CUD takes over the control of the half from the shelf. The QD2 slave ports of both CUDs are switched in parallel, each CUD has its own QD2 address.

If one multiplexer with more than 6 line cards is needed, a BEC can be plugged-in at the second CUD slot. This BEC connects automatically the both PCM busses and feeds the line cards on the right hand side of the shelf with voltage.

The internal QD2 bus is a 4-wire interface based on EIA RS485. The master of the internal QD2 bus can be a SISAV, located outside of the MXS19C, e.g. the OSU in a COMPS2 shelf, or it is the SUE plugged into the MXS19C. By using the QD2 switches S2 and S3 the internal QD2 bus can be connected to the QD2 master port of the SUE (S2 open, S3 closed) or to the QD2 slave port of the MXS19C (S2 closed, S3 open).

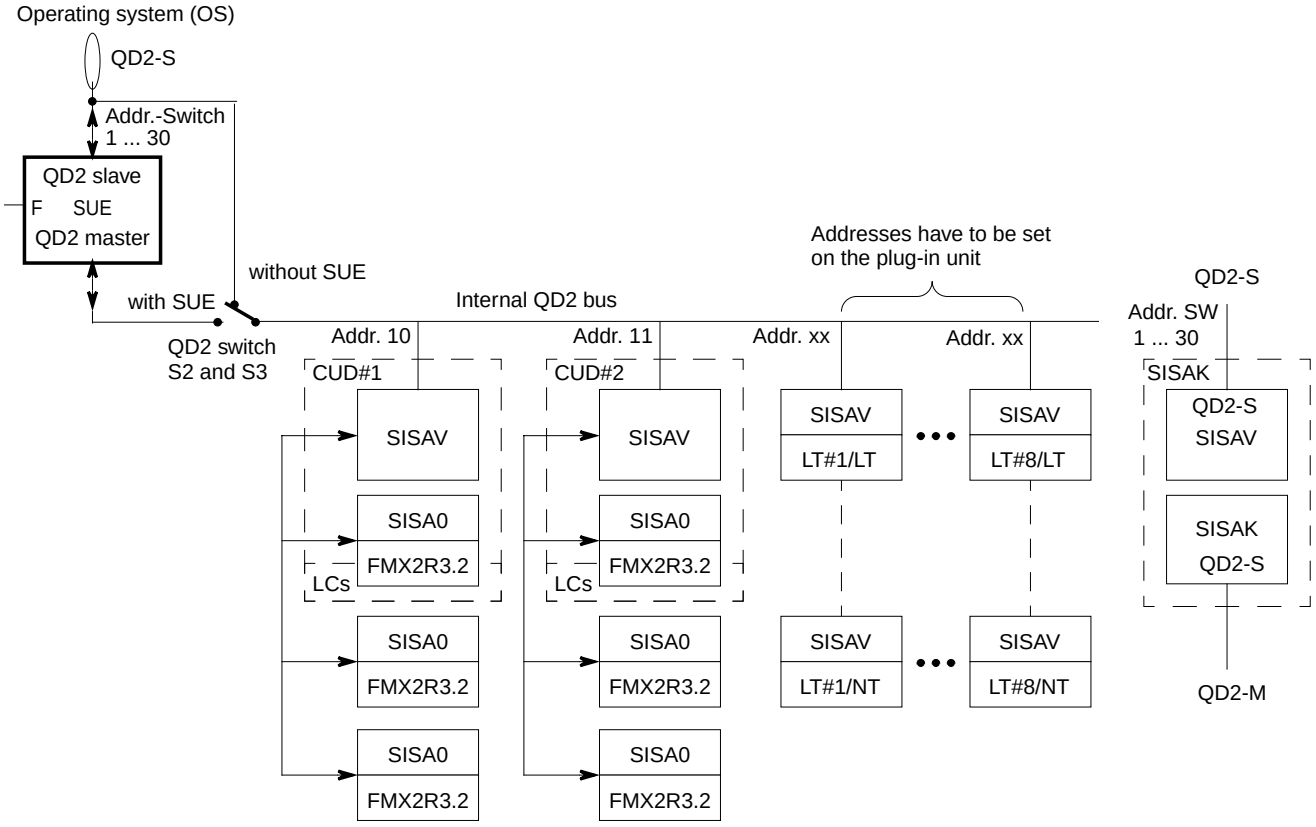


Fig. 3.24 MXS19C QD2 Access

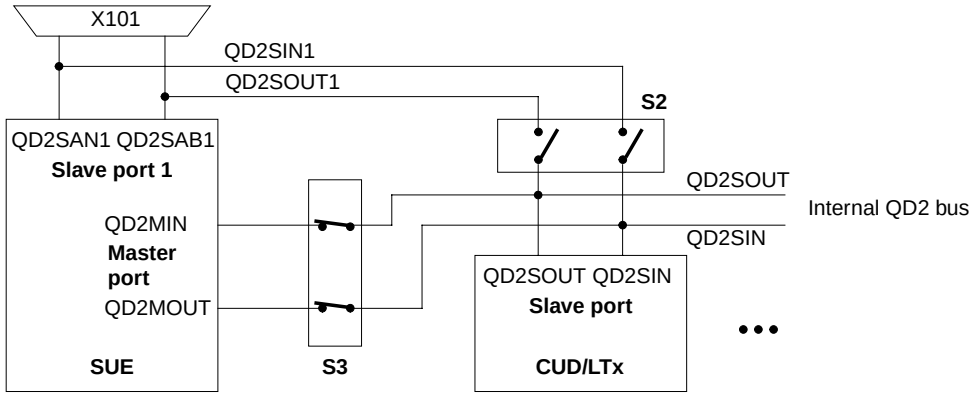


Fig. 3.25 QD2 Bus Switch-over

If the QD2 interface of the SISAK should be used, an external cable connection is necessary according to general cabling plan, see also Section 5.7.

The CUD can decouple an embedded control channel (ECC), which can be used for transmission of management data. The ECC interfaces of both CUDs are led to the connector X101, where a connection to the SISAK can be established. A configured 64-kbit/s time slot of one of the 4 possible E1 ports must be connected to the ECC port.

The shelf can be local operated via the F-interface of the SUE. The interface is accessible after removing the front cover.

3.3.8 Addressing

All units in this shelf, except SUE and SISAK, are assigned the slot addresses as QD2 addresses. For the addresses which are assigned to the slots, see Tab. 3.34.

The SISA address of the SUE is set using the DIL switch S101 in the backplane.

For line termination units in line card slots, some address bits are given by the coding of the line cards. This makes it necessary to change address bits to adapt the addressing, if line termination units are installed in these slots. The change is done using DIL switches, see UMN:LE2.

Unit	Plug-in place	Slot address (fix)	QD2 address
SUE	201		DIL switch S101 on the backplane of the shelf, see Fig. 3.27, 5 bit = 1 to 30
LTx#1	202	12	12
LTx#2	203	13	13
LC#1	204	1	-
LTx#3	204	16	16
LC#2	205	2	-
LTx#4	205	1	1
LC#3	206	3	-
LTx#5	206	17	17
LC#4	207	4	-
LC#5	208	5	-
LC#6	209	6	-
CUD	210	10	10
CUD/BEC	211	11	11
LC#7	212	1	-
LC#8	213	2	-
LC#9	214	3	-
LC#10	215	4	-
LTx#6	215	8	8
LC#11	216	5	-
LTx#7	216	24	24
LC#12	217	6	-
LTx#8	217	9	9
SISAK	218		set with LCT, see UMN:ITMN

Tab. 3.34 MXS19C Plug-in Units and Addresses