NovaTec S20 NNM

Mounting and Installation

Version 1.1 from 04.04.2006

- Subject to change without notice -

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1.0 Preface

Dear Customer,

Congratulations on purchasing the Novatec S20 NNM. You have selected an electronic multiplexer and demultiplexer that has been developed and produced using the latest level of technology. We want to thank you for your decision.

The Novatec S20 NNM provides you with an appropriate number of BRA interfaces (S_0 interfaces) via its PRA interface (S_{2M}/E1 interface). This is achieved by assigning the B-channels of the PRA interface to the BRA interfaces. The system operates in either fixed line or switched connection mode and this can be defined through configuration.

This Mounting and Installation Handbook will enable you to install the Novatec S20 NNM to suit your technical environment. We would advise you to read this handbook carefully and to undertake the installation procedure step-by-step according to the instructions.

2.0 Safety Advice

- Do not install the Novatec S20 NNM near to heating systems such as radiators or in the vicinity of electric fields such as, for example, those generated by strip lighting and engines.

- Do not expose the Novatec S20 NNM to dust, damp, vibrations or direct sunlight.

- Take care that no wires, nails or similar objects fall through the ventilation slits.

- The Novatec S20 NNM cannot be used prior to proper installation.

- Never clean the housing with petrol, thinners or other solvents. Simply wipe it over with a soft, dry cloth.

- Should internal components of the system become visible following physical disturbance of the equipment, disconnect the Novatec S20 NNM from the electricity supply **immediately**.

- The system is equipped with appropirate mains safety plug for use with a 230 volt or 115 volt input.This plug should be connected to a mains safety socket or a DC power terminal.

- The Novatec S20 NNM can be operated using eihter a 230/115 volt power supply or a 48 volt DC power supply. The mains socket allocated to the Novatec S20 NNM should be independent and for the sole use of the Novatec S20 NNM.

- In order to prevent damage to person or property, never expose the Novatec S20 NNM to rain or other forms of moisture.

- For safety reasons, modifications to the construction or security engineering of the Novatec S20 NNM are forbidden unless express permission has been obtained from NovaTec Kommunikationstechnik GmbH.

- NovaTec Kommunikationstechnik GmbH will not be held liable for any damage whatsoever resulting from modifications to the equipment, especially those relating to repairs to and soldering on the electronic circuit board.

- Mounting and commissioning should only be undertaken by suitably qualified personnel (e.g. telecommunications technicians or engineers).

- Please follow the safety advice when inserting or repairing the system's Slide-in modules.

- The Novatec S20 NNM must be earthed via an earthing cable with a minimum cross-sectional area of 2.5 mm^2. Should installation or operational problems occur which are not covered in this handbook please contact NovaTec Kommunikationstechnik GmbH immediately.

- To ensure trouble free usage the Novatec S20 NNM must be installed according to this Mounting and Installation Handbook. The Novatec S20 NNM should be installed in a closed metallic cabinet.

- Before commencing installation, satisfy yourself that the relevant electricity circuits are voltage free and properly disabled to secure against them being accidentally switched on whilst work is underway.

- If the equipment is passed on to a third party this Mounting and Installation Handbook must accompany it.

Technologiepark 9, 33100 Paderborn, Germany

CE Mark:

The NNM meets the current requirements of the following European guidelines and their supplements:

Guideline	Name
89/336/EEC	EMC Directive
72/23/EEC	Low Voltage Directive (LVD)
93/68/EEC	CE-Marking Directive
	R&TTE

Conformity has been certified. The corresponding declarations and documents are deposited with the manufacturer.

Approval number:

NovaTec S20 NNM: PTL D300194L

3.0   General Information

3.1   Product Description

The Novatec S20 NNM is a processor controlled electronic multiplexer/demultiplexer. It enables up to 60 B-channels from PRA interfaces (S_{2M}/E1 interface) to be assigned to several BRA interfaces (S_0 interfaces). The Novatec S20 NNM can be used to undertake switched connection and fixed line applications simultaneously. The E-DSS1 protocol is observed when the Novatec S20 NNM is utilised for switched connections. An internal switched connection can be prevented through appropriate configuration.

3.2   Using the Handbook

This handbook is divided into chapters. The order and content of these chapters corresponds to the correct installation sequence and will lead you through the commissioning process for the Novatec S20 NNM. For this reason, we advise you to read the chapters according to the order in which they are written and to undertake and complete the corresponding activities as they occur. Only after this should you proceed to the next chapter. If you work in this manner the mounting and commissioning of the Novatec S20 NNM will be easily and successfully completed.

3.3   Use of Pictograms

Note:
Important information which you are advised to follow.

Attention:
Vital information which must be followed at all costs otherwise malfunction and resultant damage can occur.

4.0   Connection and Mounting

4.1   Safety Directions for Mounting

4.1.1   Mounting Site

*   The mounting site should preferably be located within the office or living area close to where the PC will be located. The NovaTec S20 NNM can also be installed in the cellar or attic as well as in other frost-, dust- and heat-free rooms.

*   Do not mount your NovaTec S20 NNM near to equipment with strong magnetic fields, for example, large mains transformers, machines, lifts or radio base stations for mobile phones.

*   The NovaTec S20 NNM is housed in 19" rack. This rack should be mounted in an appropriated cabinet or shelf. The desired cabinet or shelf must have a load capacity in line with the maximum weight of the corresponding system. There are suitable cabinets from NovaTec.

*   Do not lay the communications cable parallel to power lines.

*   The following regulations and master conditions (see 4.1.2) must be observed at all times.

*   When mounted there should be a minimum ground clearance of 50 cm between the base of the NovaTec S20 NNM and the ground.

*   The NovaTec S20 NNM system rack must be installed in a 19" housing or a 19" cabinet, which in the following be called system cabinet. The system cabinet must be closed all-around to avoid access to any part of the NovaTec S20 NNM system. The connecting and display parts in front of the NovaTec S20 NNM system are permitted to be accessed by service personal only. The front, encloser a door, must be locked to avoid unauthorized opening.

*   The system cabinet must meet the requirements of a fire enclosure in accordance to IEC 950.

- There must be a clearance of 1 HE (44 mm) above and below the NovaTec S20 NNM system rack. if there are racks installed, they are not allowed to cover more than 30% of the ventilation opening of the NovaTec S20 NNM.

- Installing the system cabinet you must take care that it cannot tip over or be moved unintentionally.

- Before changing the power supply, the system must be disconnected from the mains power supply. The power supply is not suitable for hotplug.

- After a failure of the NovaTec S20 NNM through operation of a protective device (fuse), the equipment is as long under voltage as it is connected to the mains power.

- If more than one NovaTec S20 NNM system are being installed in a 19" cabninet, don't connect more NovaTec S20 NNM systems to one multi socket-outlet than allowed by the building power supply wiring.

Cleaning

The NovaTec S20 NNM and connected terminal equipment should only be cleaned with a moistened cloth or an anti-static tissue. Ensure that no liquid enters the system.

Warning note

Your NovaTec S20 NNM is secured from the trunk line against power surges, for example lightning. Lines leaving the building must be equipped with coarse protection, for example, gas discharge elements.

Interference

Should interference occur, please contact your supplier or service technician.

4.1.2   Regulations and Master Conditions

Ventilation

Do not mount your NovaTec S20 NNM in a shallow unaired cupboard. Rising heat levels could damage the NovaTec S20 NNM.

Dust (DIN 40046 Part 47)

Do not install the NovaTec S20 NNM in a dusty location, for example, near sanding machines, circular- or band-saws.

Humidity (IEC 721 3K6)

The NovaTec S20 NNM must not be exposed to high humidity levels such as those found, for example, in washrooms, swimming pools, saunas or bathrooms.

Temperature

Your NovaTec S20 NNM should only be operated in dry rooms where the temperature remains beween 0° C und 40° C. For this reason, do not install your NovaTec S20 NNM in locations subject to direct sunlight or strong cold influences.

4.1.3   Mounting Directions

Please observe your general national safety regulations for telecommunications facilities (VDE 0800 in Germany) and electric power plant and equipment (VDE 0100 in Germany).

Fitting and mounting of electronic equipment must be undertaken by an appropriately qualified specialist only. Installation and commissioning of the NovaTec S20 NNM must only be undertaken by electronics personnel who possess the qualifications required by national safety regulations.

If possible mount your NovaTec S20 NNM in the immediate vicinity of the mains electricity supply for the building and a 230V socket.

Do not plug the NovaTec S20 NNM into the socket until all installation work has been completed.

Please lay the communications cable to the telephone sockets according to the standard national telecommunications cable regulations.

You are advised to use the communications cable Type J-Y (St) Y 2x2x0.6 mm for connecting every item of terminal equipment.

4.2 Scope of Delivery

The complete NovaTec S20 NNM system will be delivered in one box. It contains the following components:

Pos.	Qty.	Item
1	1	TransNova S20 NNM system
2	1	Maintenance and configuration CD

4.2.1 Opening the Package

The NovaTec S20 NNM is packaged and delivered in a 19" rack or as an array of 19" racks in a cabinet in a collapsible cardboard box or wooden box. On opening the box the first item you will see is this Mounting and Installation Handbook. On either side are the other components belonging to your package. Carefully take out all the components and finally lift out the NovaTec S20 NNM together with the side-cushioning. To do this it is imperative that you have a firm and secure hold as the system weighs approximately 15 kg.

4.2.2   Contents of the Package

On opening the package you will find within the cardboard box, the individual components as listed in Chapter 4.2. Please check that the contents of the cardboard box or wooden box are complete.
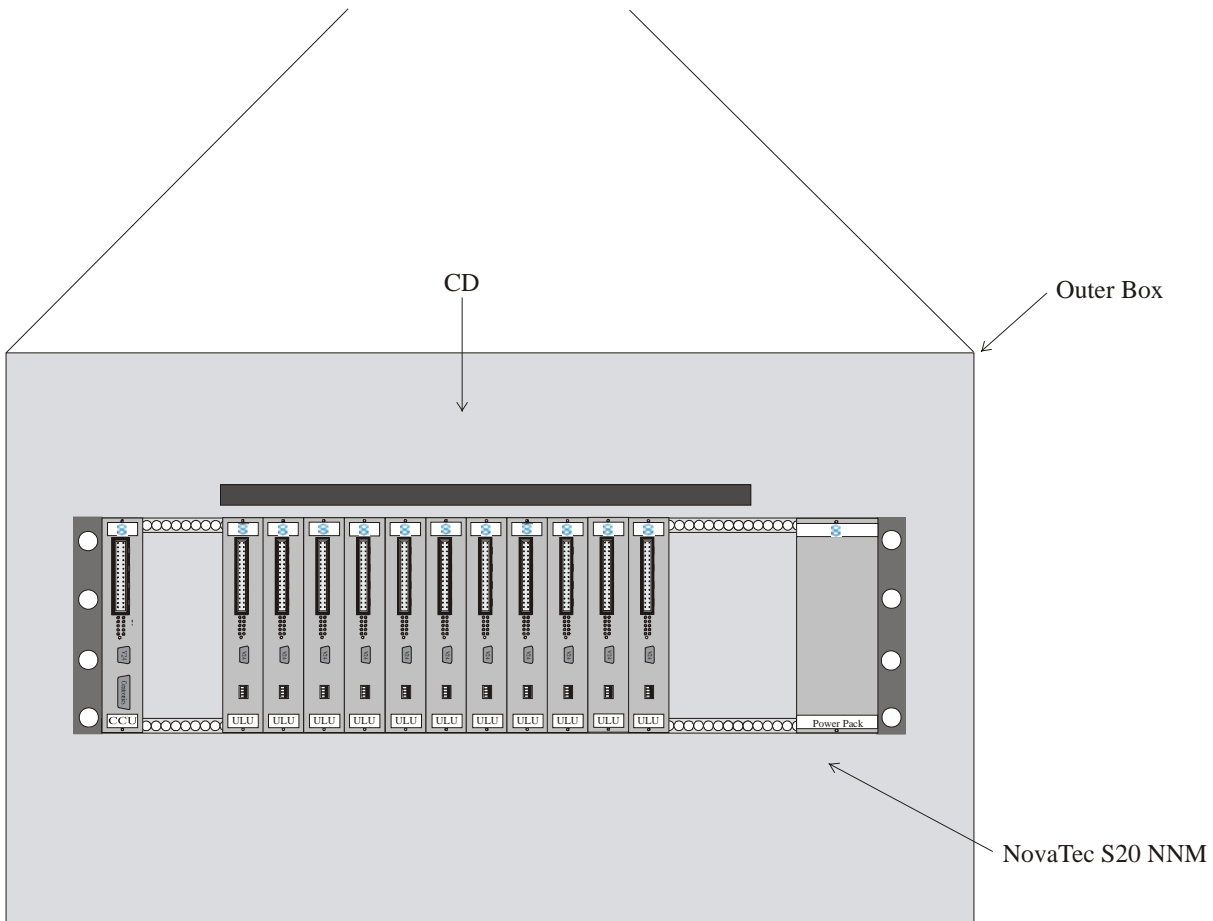
Picture 1: Contents of the package

4.3   Mounting

After the NovaTec S20 NNM has been removed from the box, select the desired location for mounting the system according to the criteria given in Chapter 4.1.1. The NovaTec S20 NNM contains a 19" rack into which the individual modules are to be inserted. Both the backplane and the mains power cord are already fitted to this rack.

4.3.1   Hanging up the 19" rack

The 19" rack shoud be properly mounted on a shelf or in a cabinet which contains special vertical bars with holes for the fixing screws. These bars can be purchased, marked with either metric or imperial measures. For this 19" rack you require bars with imperial measures. Insert the 19" rack into the shelf from the front and fit the appropriate screws into the holes on the vertical bars on the left and right side of the rack. After mounting check that the rack is securely seated with the shelving.

Fix the 19" rack to the bars using the appropriate screws

Slot 1 Slot 2 Slot 3 Slot 4 Slot 5 Slot 6 Slot 7 Slot 8 Slot 9 Slot 10 Slot 11 Slot 12 Slot 13 Slot 14 Slot 15 Slot 16 Slot 17

Vertical bars within the shelf or cabinet
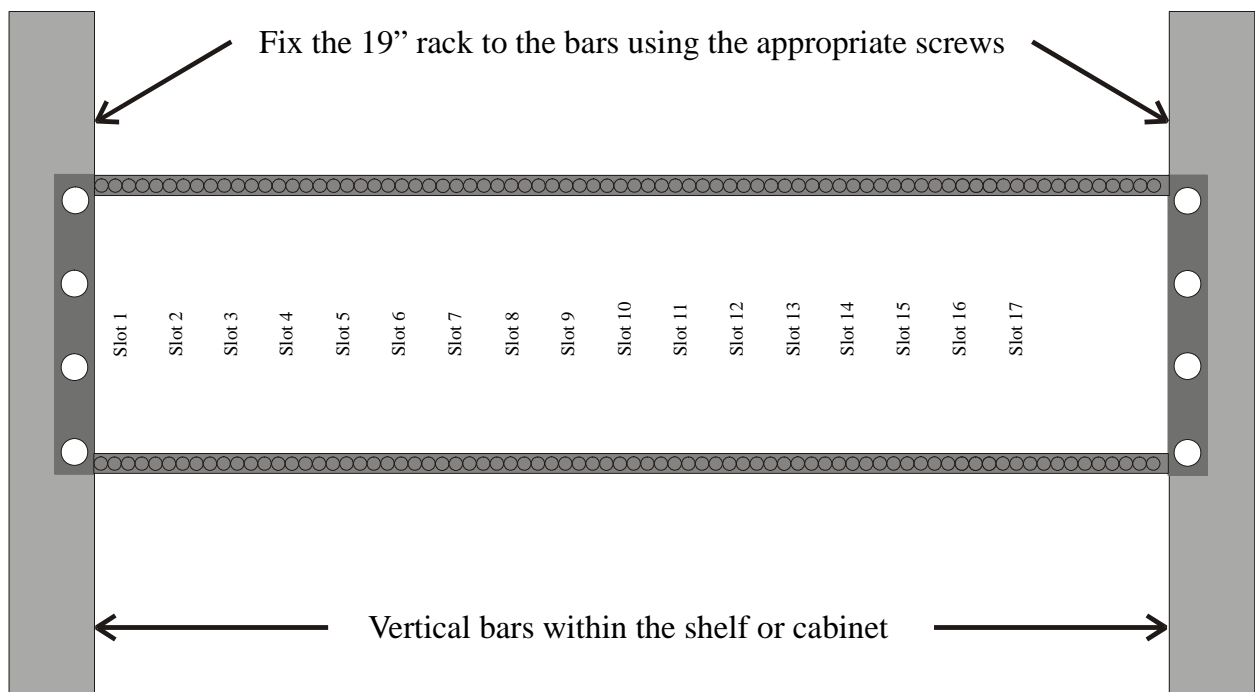
Picture 2: Mounting the 19" rack

4.4 Laying the Cabling

All conntections except the mains power cable and the earth cable are connected to the NovaTec S20 NNM from the front. The mains power cable is connected from the back using the cable that has already been fitted for this purpose. All local loops and extension lines area connected via special connectors located on the front panels of each of the slide-in modules. In order to avoid overheating the system, please ensure while laying the cabling that the air circulation is not obstructed.

4.4.1 Strain Relief and Positioning of the Cables

All lines that leave the system must be strain relieved at an appropriate place (see illustration in Picture 3). In the 19" System the cables are simply fixed to the frame with a cable binder. You can therefore use any place on the frame. Each of the wires of the lines for the local loops and the terminal equipment interfaces are colour coded. The meaning of each colour can be found in Chapter 4.11.

Take care that you begin with Pin 32 (Plug 2) when connecting the cabling to the trunk and terminal equipment interfaces.

Please decide as early as possible, whether you will connect the terminal equipment to the system in a bus structure or a star-shaped (Category 5) cabling format. If using a star-shaped cabling format, the relevant terminating resistors must be deactivated (see Chapter 4.12).
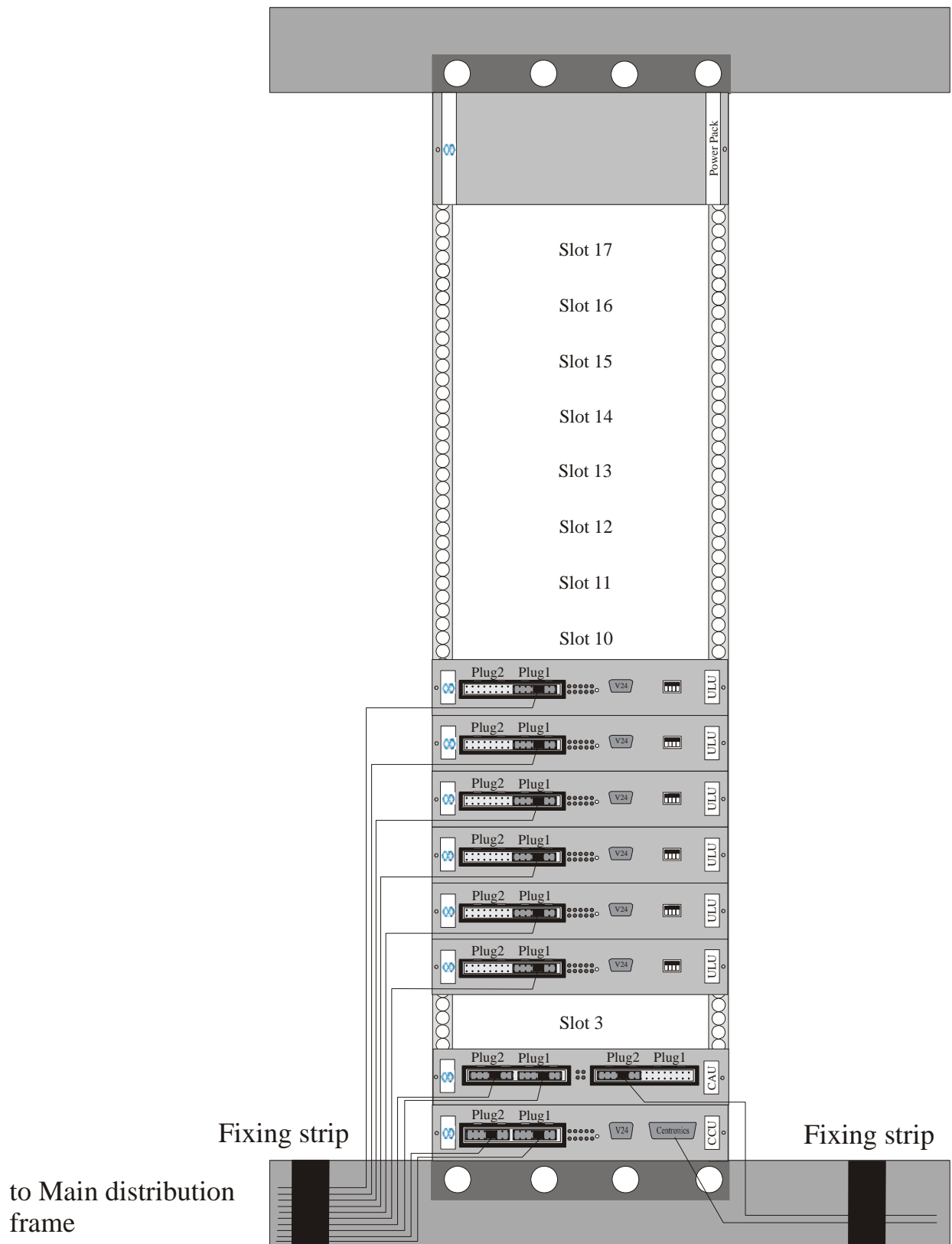
Picture 3: Laying the cabling to the NovaTec S20 NNM

4.5   Internal Structure of NovaTec S20 NNM

The NovaTec S20 NNM comprises several different modules. All modules can be inserted into the 19" rack and then connected together at the back of the rack. The individual slots inside the system are clearly numbered to ensure easy identification. The left slot is Slot 1 where only the CCU can be inserted. On the right next to the CCU is Slot 2, and so on to Slot 17. On the right-hand side of Slot 17 is the power supply slot. This slot is double the width of the others and accommodates the transformer for the power supply for the whole rack. The slot designations (slot numbers) can be found on the back of the printed circuit board (PCB). The numbers can be seen on the back of the PCB when viewed from the insertion side of the 19" rack

The CCU is a Central Control Unit and is the core of the system. The CCU provides you with four BRA interfaces, each with a Centronics and V.24/RS232 interfaces. In addition the CCU provides a slot for either a BRA or PRA expansion board.

The CCU Light corresponds to the CCU with the exception that the CCU Light has no BRI Interfaces..

The CCU-3 corresponds in the basic functions to the CCU. The difference is firstly that the CCU-3 has instead of the printer interface an ethernet interface, which can be either operated with 10MBit or 100Mbit. Also the CCU-3 does not have ISDN Interfaces on the board but can be equipped with either 2 PRI or 2 BRI boards. All Support-Functions, that are on the CCU-Light/CCU via V.24 or ISDN are still realisable and can be carried out via Ethernet on the CCU-3.

The CAU is a Carrier Unit. This module offers three slots for expansion board. Both BRA or PRA or a combination of both types of expansion board can be used.
The electricity supply for BRA interfaces is not provided by the NovaTec S20 NNM. If you want to connect a BRA interface to an item of terminal equipment that also needs a power supply from the BRA interface, it will be necessary to use a DC4. The DC4 is a seperate module, that will provide the necessary voltage to power terminal equipment connected to the BRA interface. This module is simply added to the existing modules by inserting it into the rack.

The ULU is a U line unit, that makes U_{K0} interfaces available. A choice of two different modules is provided. The 1F5010-2 module comes without a power supply on the U interface. If need to operate equipment that requires a power supply (e.g. a repeater) we suggest you select the 1F5010-2-LP module instead.

The PTI is a Module that can convert a BRI Interface to a U Interface. This would for example be required when a row of ISDN end equipments in a Star formation are terminated to a single point.
The following could be one solution: The PTI-SU in combination with the PT-US would be operated, If at the location no power supply socket was available the use of the PTI-SU-LP and the PT-US-LP would enable the power supply to be available to the equipment at greater distances.

The Plug-in cards are sub Modules that can be attached to various mainboard Modules. The Modules that can be equipped with Plug-in cards are the CCU, CCU-3 and CAU.

The following Plug-in cards are available at this time:

BRI-Plug-in card
The BRI-Plug-in card makes 4 additional BRA interfaces available.With the BRA Plug-in cards there are two different variants .The BRI Plug-in card with the article number 1F5021-2 only allows ISDN terminals to be attached. To the BRI Plug-in card with the article number 1F5020-2 ISDN terminals or ISDN local loops can be attached alternatively. The function of the proposed interface must be defined in the configuration.

PRI-Plug-in card
The PRI Plug-in card is likewise in two different variants available:
The PRI Plug-in card with the article number 1F5020-1 makes two S2M-Interfaces available. On the other hand the PRI Plug-in card with the article number 1F5020-1/1 makes available only one S2M-Interface.

PRI-Sub-Modul with Optional Echo Canceling
The PRI (ISDN 30) Module is available in 6 Variants:
By way of the Article number on the delivery notice can be seen which module is actually installed in the system.
The 6 variants are:
1F5100 -> S2M-Add-on board with 2 PRI (ISDN 30) Interfaces
1F5100/1 -> S2M-Add-on board with 1 PRI (ISDN 30) Interface
1F5100/1E -> S2M-Add-on board with 1 PRI (ISDN 30) Interface on which echocancelling is active.
1F5100E -> S2M-Add-on board with 2 PRI (ISDN 30) Interfaces with echocancelling active on Interface 1
1F5100ER -> S2M-Add-on board with 2 PRI (ISDN 30) Interfaces with echocancelling active on Interface 1 and switch through for the 2nd S2M interface to the 1st when system is inactive.
1F5100R -> S2M-Add-on board with 2 PRI (ISDN 30) Interfaces with switch through for the 1st S2M interface to the 2nd when system is inactive.
The Add-on board with the numbers 1F5100, 1F5100/1 and 1F5100R have no echocancelling functions.
The Add-on board with the numbers 1F5100/1E 1F5100E and 1F5100R have echocancelling functions on channel 1 (Recognisable by an „E" in the Article number).
The Add-on board with the numbers 1F5100ER and 1F5100R switch between Interface 1 to Interface 2 when the system is inactive, this allows for operated systems behind the NovaTec NNM to carry on operating when the NovaTec NNM is out of operation.
These S2M (PRI ISDN 30) Add-on boards can be installed on the CCu3, CCU_Light and the CAU.
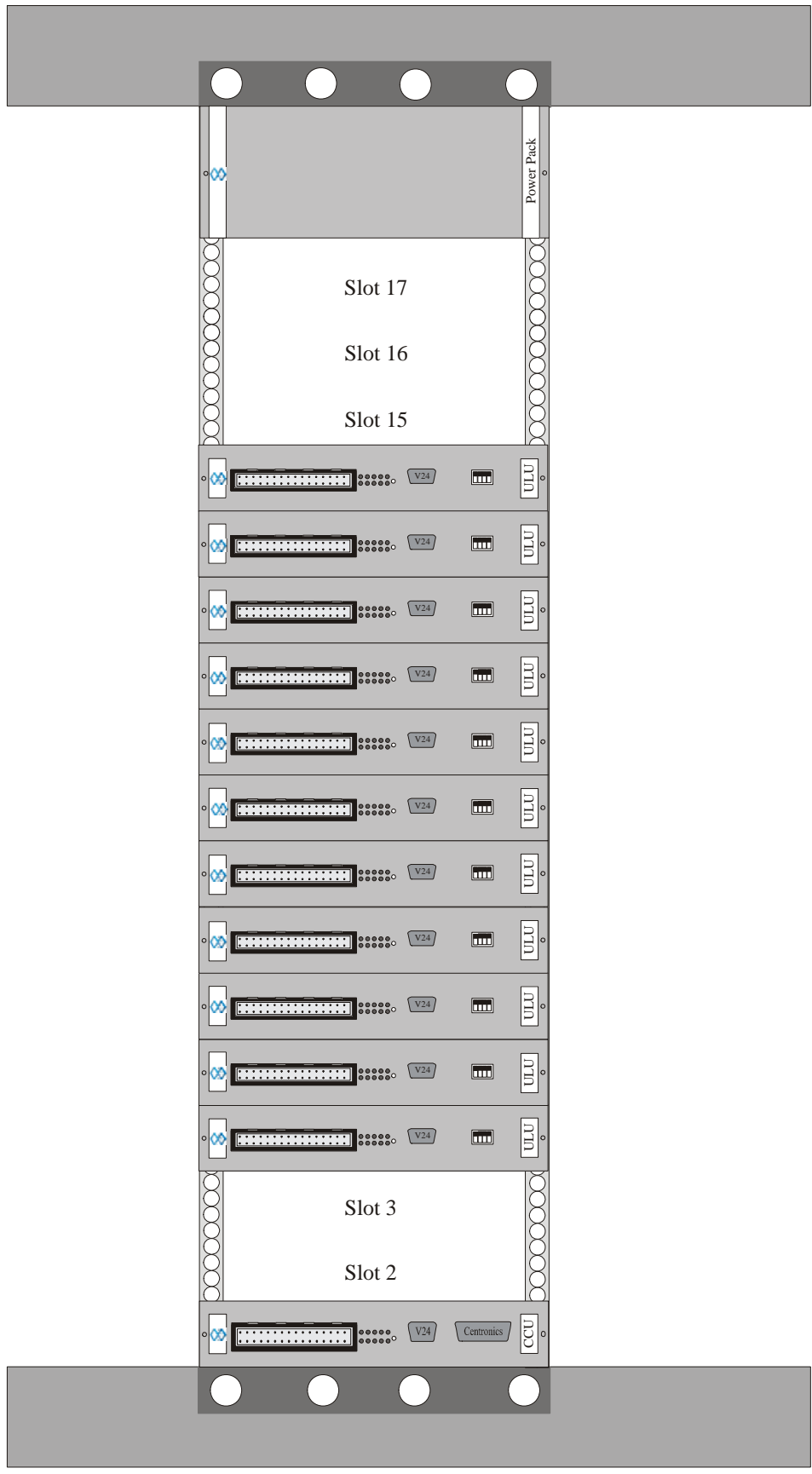
Picture 4: Internal construction of the NovaTec S20 NNM

4.6   Limitations of the NovaTec S20 NNM

The construction of the system architecture means that there are specific limits to the capabilities of the NovaTec S20 NNM. Exceeding these capabilities may have a range of consequences. First, the system configuration differentiates between a non-blocking NNM and a blocking NNM. With a non-blocking NNM, all B channels that are provided for the use with the modules can be utilised. A maximum of around 60 connections are available between two B channels. If the system is equipped with modules providing more than 120 B channels it is a blocking NNM. At no point in time can all these connections be used simultaneously.

The following tables describe the the expansion capabilities in detail and must adhered to.

The first table shows the expansion capabilities for a non-blocking NNM, the second table provides further information relevant to the blocking NNM.

The following table describes the expansion capabilities of the NovaTec S20 NNM. The values provided in the table provide parameters for the maximum expansion that can be undertaken.

Slot	Expansion board	Power supply	No power supply	Capability 1 (non blocking)					
				5 ULU	4 ULU	3 ULU	2 ULU	1 ULU	0 ULU
ULU	None	X		5	4	3	2	1	0
ULU	None		X						
CAU	BRA-4	X		0	1xCAU 0xBRA-4	1xCAU 1xBRA-4	1xCAU 2xBRA-4	2xCAU 3xBRA-4	2xCAU 4xBRA-4
CAU	BRA-4		X						
CAU	PRA-2		X	0	1	1	1	1	1
CAU	PRA-2		X						
CCU	BRA-4	X		0	1	1	1	1	1
CCU	BRA-4		X						
CCU	PRA-2		X	1	0	0	0	0	0
CCU	4xBRA on Board		X	X	X	X	X	X	X
DC4	If all BRA have power supply	X		1	1	2	2	3	3
Total	BRA interface			4	8	12	16	20	24
Total	U interface			20	16	12	8	4	0
Total	PRA interface			2	2	2	2	2	2

Please note:
If no CAU is in use within the NovaTec S20 NNM, the PRA expansion board will allways be located on the CCU. When a minimum of one CAU is in use, the PRA expansion board will be located on the CAU and a BRA expansion board will be inserted in the CCU. Where BRA interfaces with power supply are required the DC4 must be used. DC4 can provide a 16W (Watt) current. 2W (1W per item of terminal equipment) are calculated for each BRA interface. This means that one DC4 can provide the required electricity suppy for a maximum of 8 BRA interfaces. Should more BRA interfaces require a power supply, additional DC4s must be used.

Table: Slot / Expansion board / Mode vs. Capability 50% (blocking)

Slot	Expansion board	Power supply	No power supply	11 ULU	10 ULU	9 ULU	8 ULU	7 ULU	6 ULU	5 ULU	4 ULU	3 ULU	2 ULU	1 ULU	ULU
								Capability 50% (blocking)							
ULU	None	X													
ULU	None		X												
CAU	BRA-4	X		0	1xCAU 0xBRA-4	1xCAU 1xBRA-4	1xCAU 2xBRA-4	2xCAU 3xBRA-4	2xCAU 4xBRA-4	3xCAU 5xBRA-4	3xCAU 6xBRA-4	3xCAU 7xBRA-4	4xCAU 8xBRA-4	4xCAU 9xBRA-4	4xCAU 10xBRA-4
CAU	BRA-4		X												
CAU	PRA-2		X	0	1	1	1	1	1	1	1	1	1	1	1
CAU	PRA-2		X												
CCU	BRA-4	X		0	1	1	1	1	1	1	1	1	1	1	1
CCU	BRA-4		X												
CCU	PRA-2		X	1	0	0	0	0	0	0	0	0	0	0	0
	4xBRA on Board		X	X	X	X	X	X	X	X	X	X	X	X	X
DC4	If all BRA have power supply	X		1	1	2	2	3	3	4	4	5	5	6	6
Total	BRA interface			4	8	12	16	20	24	28	32	36	40	44	48
Total	U interface			44	40	36	32	28	24	20	16	12	8	4	0
Total	PRA interface			2	2	2	2	2	2	2	2	2	2	2	2
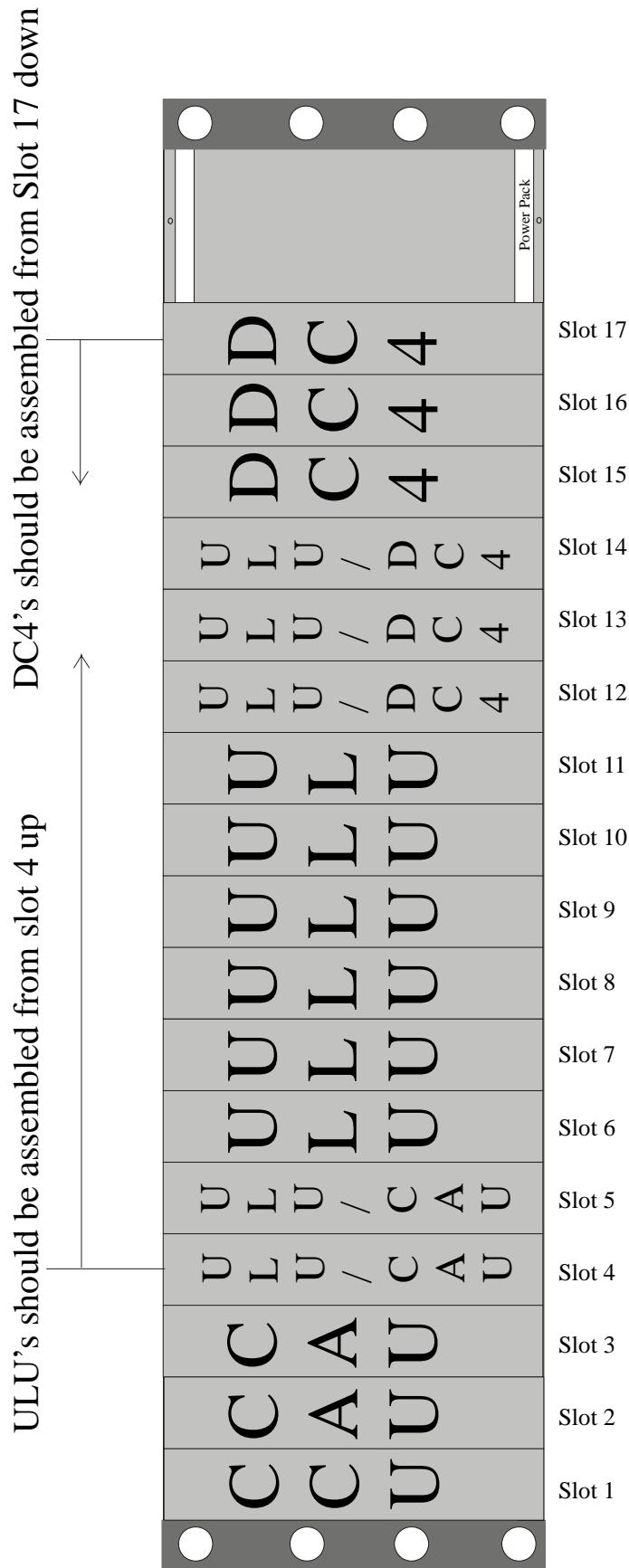
Pictrue 5: Expansion capabilities of NovaTec S20 NNM

4.7   NovaTec S20 NNM Connector Panel

All connections that are necessary for the NovaTec S20 NNM to operate are established via the plug-in connections on the connector panel. Therefore, only use officially authorised cables or those that we provide with the equipment. The following picture shows the connector panel of the NovaTec S20 NNM with the standard configuration.
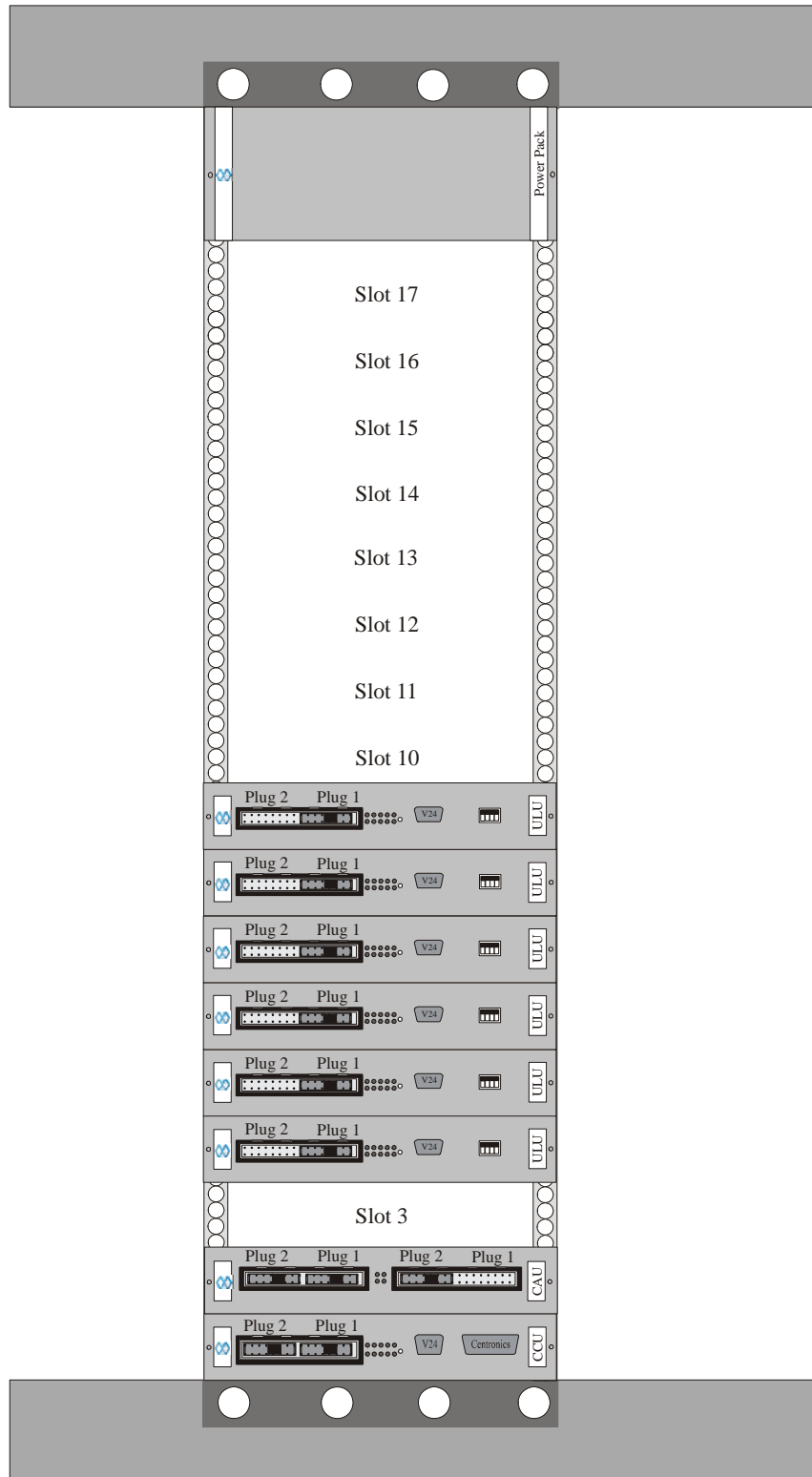
Picture 6: NovaTec S20 NNM connector panel

4.8   Earthing of the NovaTec S20 NNM

According to the German electrical engineering authority regulations, VDE 0800 Part 2, the NovaTec S20 NNM must be earthed through a fixed connection that cannot be disconnected. You will therefore require a separate green/yellow coloured wire with a minimum diameter of 2.5 mm^2. This earthing wire is not supplied with the equipment.

To prepare this earthing wire you will need a copper wire with a minimum cross-sectional area of 2.5 mm^2 and a ring cable lug with a 5 mm drilling hole. Identify a point in the building where building services are located and the NovaTec S20 NNM can be earthed. We recommend the potential equalisation bar of your building plant. Take care that the earthing cable is securely connected to the earthing point for your building plant. Next, ascertain the required length of the earthing cable according to the desired location of the NovaTec S20 NNM. After you have cut the cable to the correct length, the ring cable lug can be connected to one end of the cable and, if required, an appropriately sized cable lug can also be fitted to the other end of the cable.

The earthing cable must be connected to the earthing point of your building services first. On the back of the NovaTec S20 NNM there are a number of screw type terminals, of which three are marked "FPE". These are for the earth cable connections. As these screw type terminals are joined together on the back it does not matter which screw type terminal you use. After removing the screw insert the cable into screw type terminal. Then tighten the screw again. Next ensure that the earth cable is strain relieved using a cable binder at an appropriate place (e.g. in the cupboard or on the shelf). Please ensure, that your telecommunications system and all distributors are also earthed.

The following picture illustrates a correctly connected earth cable with an appropriate strain relief.

FPE

FPE

FPE

Power Pack

Cable binder

$4\ mm^2$ green/yellow
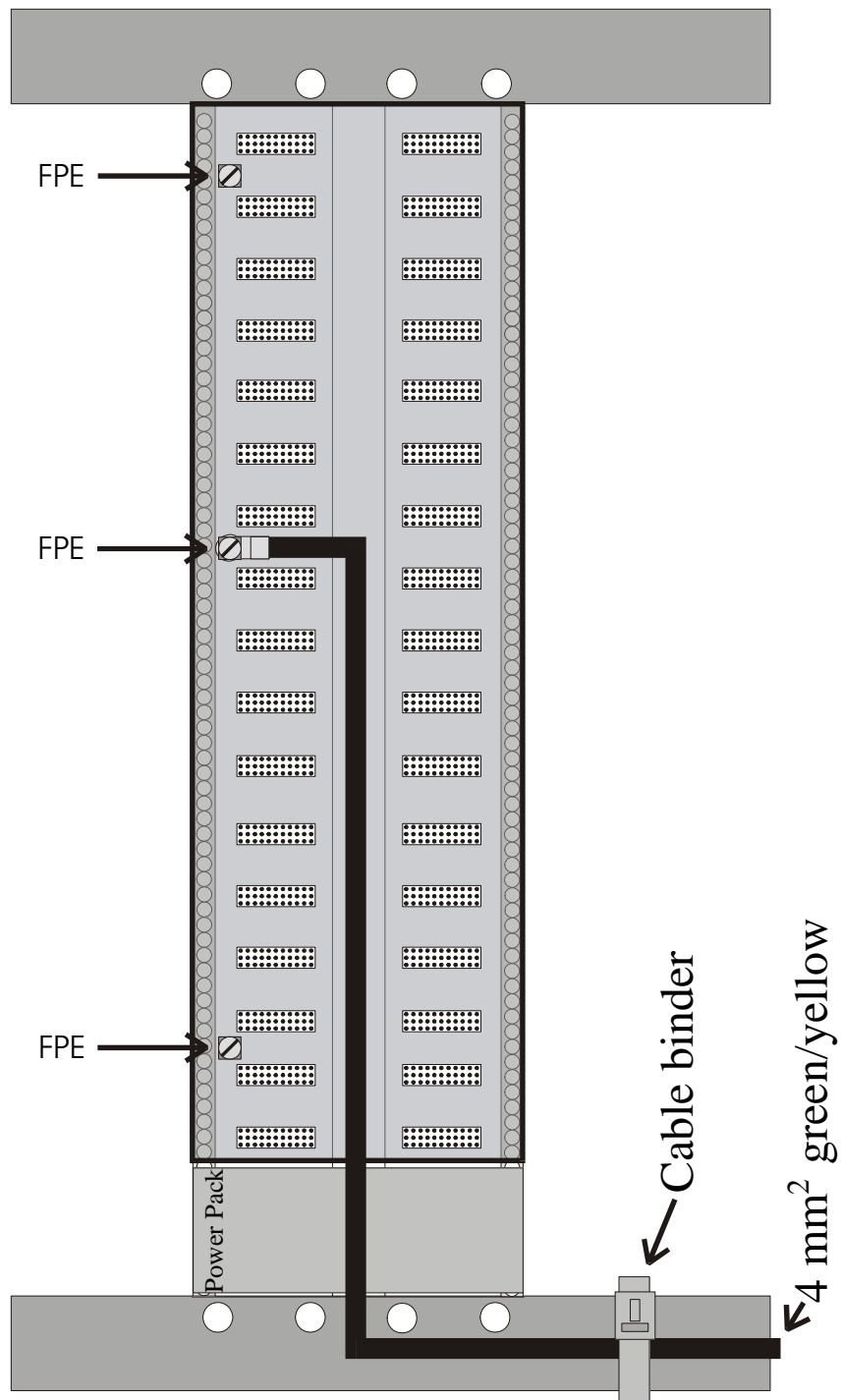
Picture 7: Connection of the earth cable to the NovaTec S20 NNM (viewed from back)

⚠ **Where more than one 19" rack is used, each must be earthed seperately and directly to the building's potential equalisation bar.**

4.9 Connecting the NovaTec S20 NNM

All trunk and terminal equipment interfaces on the NovaTec S20 NNM must be fed through a main distribution frame. This includes all lines from the trunk or NTPMs leading to terminal equipment.

⚠️ **All lines leaving the building must have a coarse protection to guard against power surges due to thunderstorms.**

The following structural diagram illustrates the connection of these lines:

Main distribution frame

Trunk U (E-DSS1)

NTPM

E1
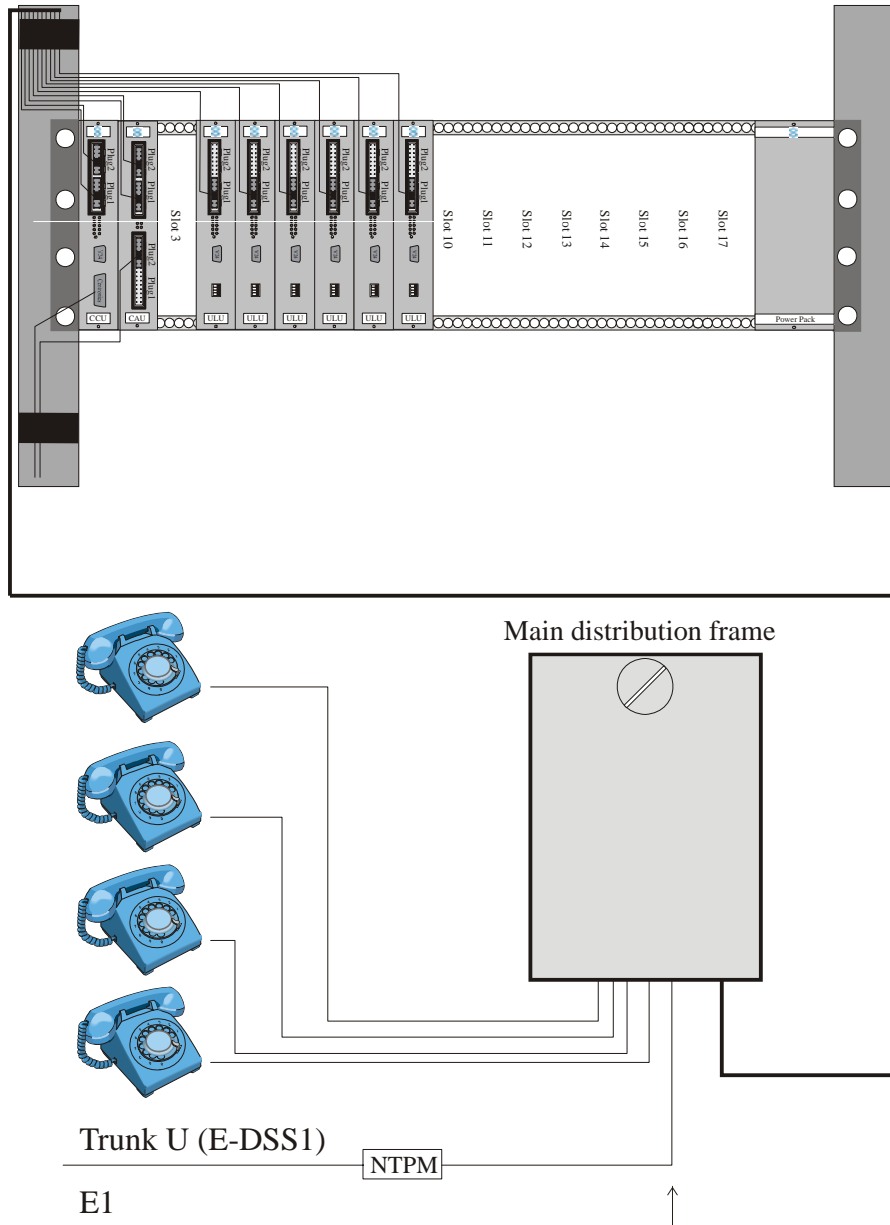
Important:
Before commencing installation please note
Chapter 5.1.2

Picture 8: Structure of line connections to the NovaTec S20 NNM

4.10 NovaTec S20 NNM Terminal Equipment Interface

This chapter describes the physical assembly of the NovaTec S20 NNM terminal equipment interface. Furthermore, the number of wires and their assignments are given for each type of interface.

4.10.1 The BRA Interface

The BRA interface is a digital 4-wire interface. This 4-wire interface comprises two pairs of wires. One pair of wires realizes the datastream for the transmission direction and the other pair is dedicated to the receiving direction. The individual wires in each pair of wires are differentiated as wire A and wire B. Each BRA interface consists of the following four wires:

Transmit A
Transmit B
Receive A
Receive B

When connecting terminal equipment to the NovaTec S20 NNM ensure that the BRA interface wires are not accidentally switched.

4.10.2 The PRA Interface

The PRA interface is a digital 4-wire interface. This 4-wire interface comprises two pairs of wires. One pair of wires realizes the datastream for the transmission direction and the other pair is dedicated to the receiving direction. The end of non used interfaces must be terminated in the main distribution frame. The individual wires in each pair of wires are differentiated as wire A and wire B. Each PRA interface consists of the following four wires:

Transmit A
Transmit B
Receive A
Receive B

When connecting terminal equipment to the NovaTec S20 NNM ensure that the PRA interface wires are not accidentally switched.

4.10.3   The U Interface

The U interface is a digital 2-wire interface. This 2-wire interface comprises two wires that are interchangeable during installation. During operation of the 1F5010-2-LP (identifyable through the yellow warning sticker on the front) the U interface is powered with a **115 Volt** voltage. This voltage is provided to supply, for example, a repeater with power. The U interface comprises the following two wires:

Wire A
Wire B

Warning: High Voltage!
Please comply with the safety regulations when working on the powered U interface!

## 4.11 Pin Assignment for Connections to the NovaTec S20 NNM

This chapter describes the signal assignment for all NovaTec S20 NNM plug connections. This information will enable you to plug all your terminal equipment into the NovaTec S20 NNM.

☞ For directionally orientated signals the given signal direction is always described from the perspective of the NovaTec S20 NNM.

4.11.1 CCU Pin Assignment

The contact pins in the plug are arranged in two rows (Row A and Row C) with each row providing 32 contacts. As this plug is only equipped with every second contact there are 16 contacts per row and the contacts in each row are numbered from 2 to 32. The following picture shows this in detail.
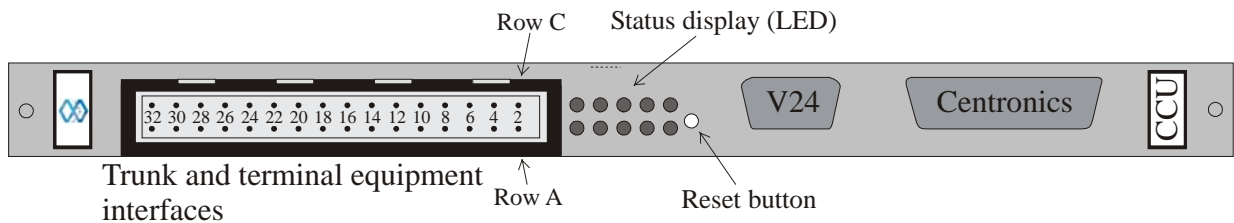
Picture 9: CCU pin assignment

The majority of the 32 contacts are assigned with a signal. The following table shows the signal assignment of the plug and the position of the coding switch in detail.
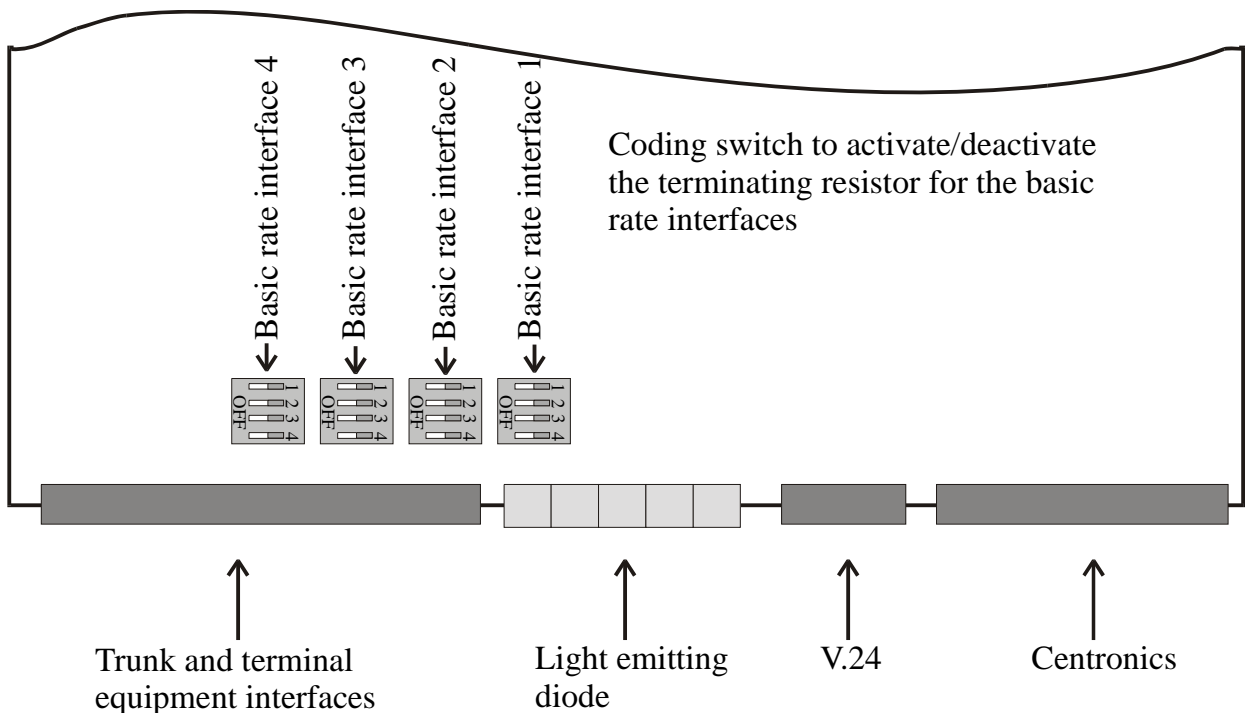
Picture 10: Positioning of the CCU coding switch

V.24 interface signal assignment

Pin	Signal name	Signal direction relating to the CCU
1	Unassigned	
2	Receive data	Input
3	Transmit data	Output
4	Data terminal ready	Output
5	System ground	----------
6	Data set ready	Input
7	Request to send	Output
8	Clear to send	Input
9	Unassigned	

Centronics interface signal assignment

Pin	Signal name	Signal direction relating to the CCU
1	Strobe	Output
2	Data bit 0	Output
3	Data bit 1	Output
4	Data bit 2	Output
5	Data bit 3	Output
6	Data bit 4	Output
7	Data bit 5	Output
8	Data bit 6	Output
9	Data bit 7	Output
10	Acknowledge	Input
11	Busy	Input
12	Paper end	Input
13	Select	Input
14	Autofeed	Output
15	Error	Input
16	Initialise	Output
17	Select in	Output
18	Signal ground	---------
19	Signal ground	---------
20	Signal ground	---------
21	Signal ground	---------
22	Signal ground	---------
23	Signal ground	---------
24	Signal ground	---------
25	Signal ground	---------

CCU trunk and terminal equipment interface

Plug	Interface		Signal	Line colour	Row	Contact
1	BRA	1	Transmit A	white	A	2
	BRA		Transmit B	brown	C	2
	BRA		Receive A	green	A	4
	BRA		Receive B	yellow	C	4
	BRA	2	Transmit A	grey	A	6
	BRA		Transmit B	pink	C	6
	BRA		Receive A	blue	A	8
	BRA		Receive B	red	C	8
	BRA	3	Transmit A	black	A	10
	BRA		Transmit B	violet	C	10
	BRA		Receive A	grey/pink	A	12
	BRA		Receive B	red/blue	C	12
	BRA	4	Transmit A	white/green	A	14
	BRA		Transmit B	brown/green	C	14
	BRA		Receive A	white/yellow	A	16
	BRA		Receive B	yellow/brown	C	16
2	PRA	5	Transmit A	white	A	18
	PRA		Transmit B	brown	C	18
	PRA		Receive A	green	A	20
	PRA		Receive B	yellow	C	20
	PRA	6	Transmit A	white	A	22
	PRA		Transmit B	brown	C	22
	PRA		Receive A	green	A	24
	PRA		Receive B	yellow	C	24
	Free				A	26
	Free				C	26
	Free				A	28
	Free				C	28
	Free				A	30
	Free				C	30
	Free				A	32
	Free				C	32

If a BRA expansion board is inserted into the PRA slot on the CCU, the front cover signal assignment for Plug 2 also applies for Plug 1.

4.11.2   CCU-Light Pin Assignment

The CCU Light cannot be differentiated outwardly from the CCU. Only after taking out the CCU Light from the chassis, you will find a label at one end of the two plugs on the rear wall, with the appropriate signature of the Modules.
The function mode and the interfaces corresponds of the CCU to those on the CCU light only with the difference that the CCU Light does not possess BRA interfaces on board. The place for a plug-on card, which is usually equipped with a PRA Plug-in card, is also available on the CCU Light the present signal allocation corresponds to the CCU, whereby the pins of Plug1 are not occupied.
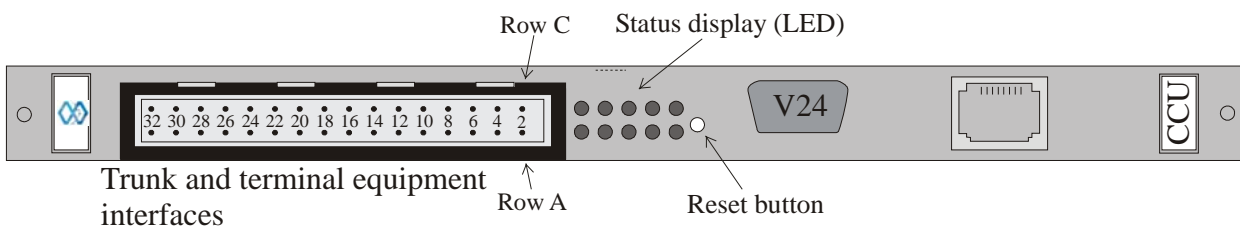
4.11.3   CCU-3 Pin Assignment

The CCU-3 is an advancement of the existing CCU. The connector pinning of the CBS, SOS and CCU-3 are identical.

With the CCU-3 newer and faster processors are used, which accelerates the boot procedure primarily. Additionally the CCU does not possess a Centronics interface instead in its place is an Ethernet interface, which can be operated both with 10 MBit and with 100 Mbit. All remote support functions e.g. configuration of the system or diagnosis are thus over the Ethernetschnittstelle and via IP possible. Furthermore the CCU offers not one place for a plug-on cards but for two. The places for the plug-on cards are marked on the printed circuit board with Submodul_1 and Submodul_2

The connections for the Submodul_1 are marked on the front screen with Plug 1 and for the Submodul_2 with Plug 2 (see for this pin allocation CCU).

In the chapter for CAU is described, how the terminal resistances of the plug-on maps can be deactivated.


Picture 10a: CCU-3 pin assignment

4.11.4 CAU Pin Assignment

The contact pins in the plug are arranged in two rows (Row A and Row C) with each row providing 32 contacts. As this plug is only equipped with every second contact there are 16 contacts per row and the contacts in each row are numbered from 2 to 32. The following picture shows this in detail.

Trunk and terminal equipment interfaces 2   Trunk and terminal equipment interfaces 1
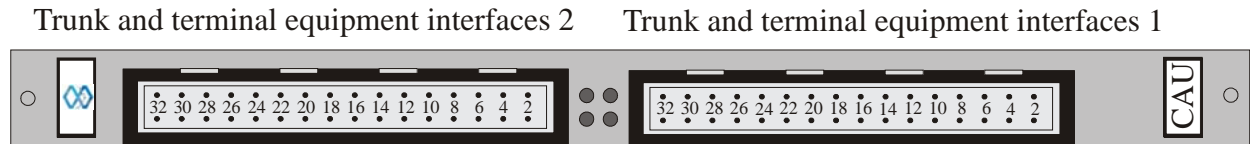
Picture 11: CAU pin assignment

Coding switch to activate/deactivate the terminating resistor for basic rate interfaces

Terminal equipment interfaces 2   Light emitting diode   Terminal equipment interfaces 1
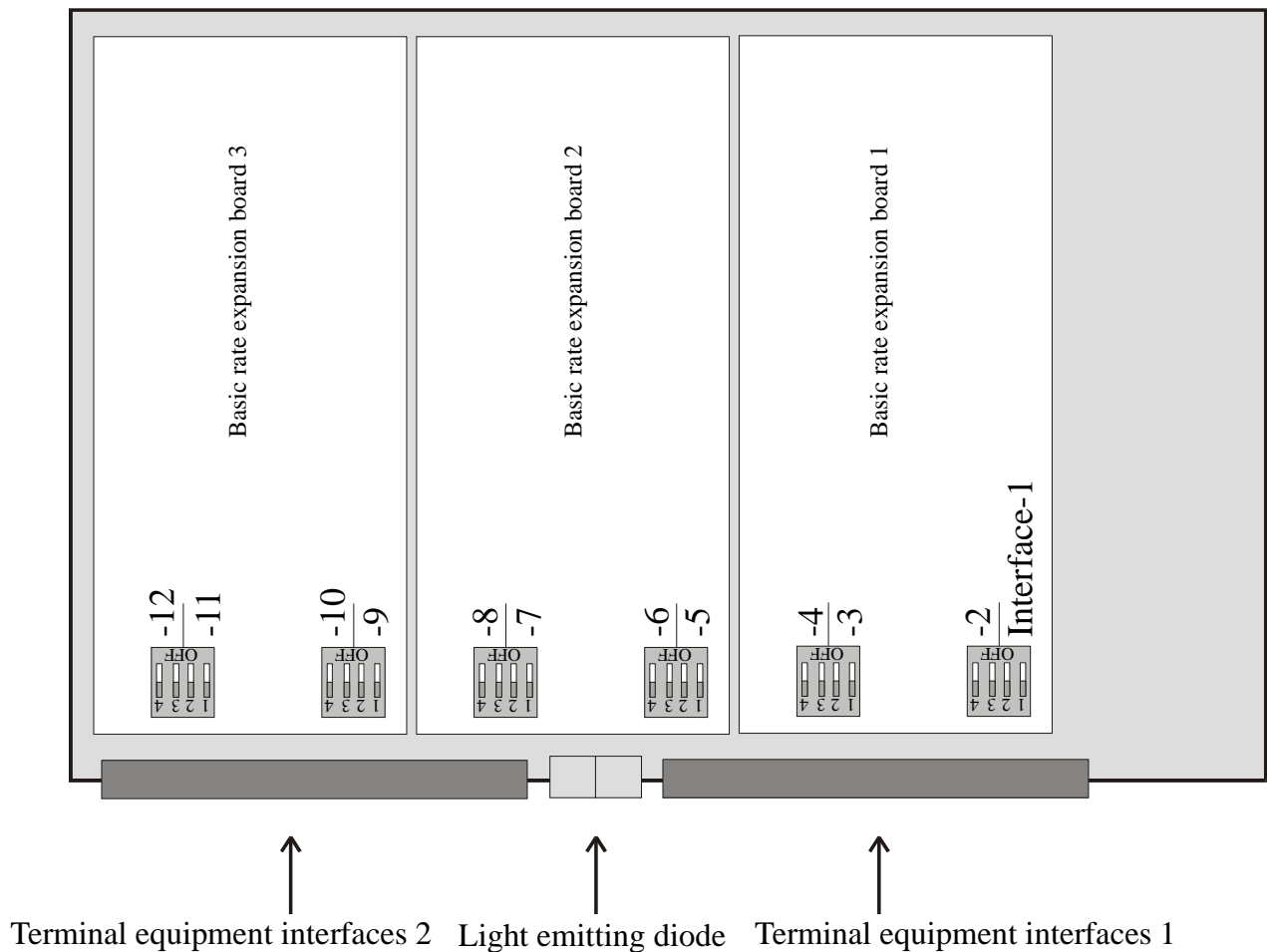
Picture 12: Positioning of the CAU coding switch

CAU terminal equipment interface 1

Plug	Interface		Signal	Line colour	Row	Contact
1	Free			white	A	2
	Free			brown	C	2
	Free			green	A	4
	Free			yellow	C	4
	Free			grey	A	6
	Free			pink	C	6
	Free			blue	A	8
	Free			red	C	8
	Free			black	A	10
	Free			violet	C	10
	Free			grey/pink	A	12
	Free			red/blue	C	12
	Free			white/green	A	14
	Free			brown/green	C	14
	Free			white/yellow	A	16
	Free			yellow/brown	C	16
2	BRA	1	Transmit A	white	A	18
	BRA		Transmit B	brown	C	18
	BRA		Receive A	green	A	20
	BRA		Receive B	yellow	C	20
	BRA	2	Transmit A	grey	A	22
	BRA		Transmit B	pink	C	22
	BRA		Receive A	blue	A	24
	BRA		Receive B	red	C	24
	BRA	3	Transmit A	black	A	26
	BRA		Transmit B	violet	C	26
	BRA		Receive A	grey/pink	A	28
	BRA		Receive B	red/blue	C	28
	BRA	4	Transmit A	white/green	A	30
	BRA		Transmit B	brown/green	C	30
	BRA		Receive A	white/yellow	A	32
	BRA		Receive B	yellow/brown	C	32

CAU terminal equipment interface 2

Plug	Interface		Signal	Line colour	Row	Contact
1	BRA	**5**	Transmit A	white	A	2
	BRA		Transmit B	brown	C	2
	BRA		Receive A	green	A	4
	BRA		Receive B	yellow	C	4
	BRA	**6**	Transmit A	grey	A	6
	BRA		Transmit B	pink	C	6
	BRA		Receive A	blue	A	8
	BRA		Receive B	red	C	8
	BRA	**7**	Transmit A	black	A	10
	BRA		Transmit B	violet	C	10
	BRA		Receive A	grey/pink	A	12
	BRA		Receive B	red/blue	C	12
	BRA	**8**	Transmit A	white/green	A	14
	BRA		Transmit B	brown/green	C	14
	BRA		Receive A	white/yellow	A	16
	BRA		Receive B	yellow/brown	C	16
2	BRA	**9**	Transmit A	white	A	18
	BRA		Transmit B	brown	C	18
	BRA		Receive A	green	A	20
	BRA		Receive B	yellow	C	20
	BRA	**10**	Transmit A	grey	A	22
	BRA		Transmit B	pink	C	22
	BRA		Receive A	blue	A	24
	BRA		Receive B	red	C	24
	BRA	**11**	Transmit A	black	A	26
	BRA		Transmit B	violet	C	26
	BRA		Receive A	grey/pink	A	28
	BRA		Receive B	red/blue	C	28
	BRA	**12**	Transmit A	white/green	A	30
	BRA		Transmit B	brown/green	C	30
	BRA		Receive A	white/yellow	A	32
	BRA		Receive B	yellow/brown	C	32

If each of the CAU slots, 1-3, are equipped with a PRA card, only the first two interfaces of the respective plugs are assigned with a signal (see CCU signal assignment).

4.11.5   ULU Pin Assignment

The contact pins in the plug are arranged in two rows (Row A and Row C) with each row providing 32 contacts. As this plug is only equipped with every second contact there are 16 contacts per row and the contacts in each row are numbered from 2 to 32. The following picture shows this in detail.
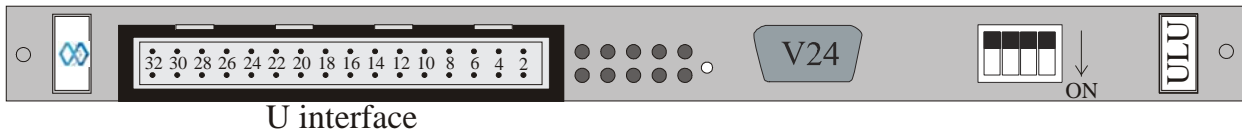
U interface

Picture 13:   ULU Pin Assignment

The following table shows the signal assignment of the plug in detail:

Signal assignment for the V.24/RS232 interface

Pin	Signal name	Signal direction relating to the ULU
1	Unassigned	
2	Receive data	Input
3	Transmit data	Output
4	Data terminal ready	Output
5	System ground	----------
6	Data set ready	Input
7	Request to send	Output
8	Clear to send	Input
9	Unassigned	

Plug	Interface	Line	Signal	Line colour	Row	Contact
1	U	1 1	Wire A	white	A	2
	U		Wire B	brown	C	2
	free			green	A	4
	free			yellow	C	4
	U	2 2	Wire A	grey	A	6
	U		Wire B	pink	C	6
	free			blue	A	8
	free			red	C	8
	U	3 3	Wire A	black	A	10
	U		Wire B	violet	C	10
	free			grey/pink	A	12
	free			red/blue	C	12
	U	4 4	Wire A	white/green	A	14
	U		Wire B	brown/green	C	14
	free			white/yellow	A	16
	free			yellow/brown	C	16
2	free			white	A	18
	free			brown	C	18
	free			green	A	20
	free			yellow	C	20
	free			grey	A	22
	free			pink	C	22
	free			blue	A	24
	free			red	C	24
	free			black	A	26
	free			violet	C	26
	free			grey/pink	A	28
	free			red/blue	C	28
	free			white/green	A	30
	free			brown/green	C	30
	free			white/yellow	A	32
	free			yellow/brown	C	32

4.11.6 Signal Assignment of the Telecommunications Sockets

This chapter describes the signal assignment of the telecommunications sockets. This information is necessary to enable you to connect the terminal equipment plugs in accordance with the signal assignment.

RJ11	RJ12	RJ45[#]
1...4	1....6	1.........8
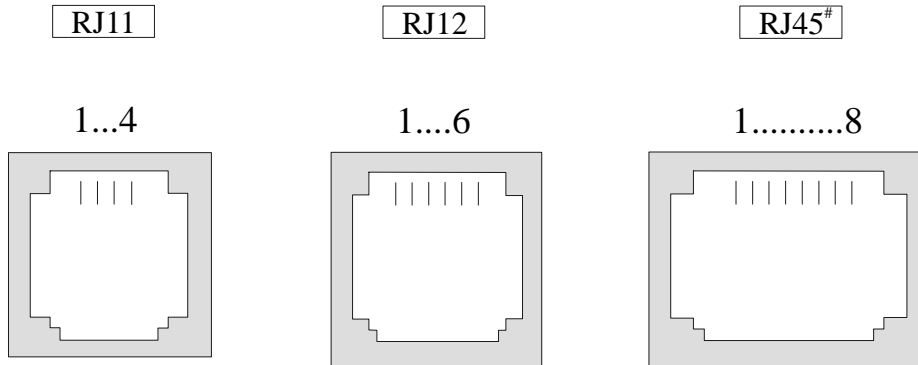
Picture 14: External view of the telecommunications sockets
   *Only avaiable in a delivery within cabinet

BRA interface	
Signal	Contact pin in the RJ45 respect. RJ9 or RJ11 socket
Receive A	3
Transmit A	4
Transmit B	5
Receive B	6
U interface	
U wire A	2 or 3 respectively
U wire B	3 or 4 respectively

Standard signal aasignment of RJ Sockets				
Pin	PRA interface RJ45 (view on NT)	BRA interface RJ45 (view on NT)	U interface RJ12	U interface RJ11
1	Transmit A	not used	not used	not used
2	Transmit B	not used	not used	U wire A
3	not used	Receive A	U wire A	U wire B
4	Receive A	Transmit A	U wire B	not used
5	Receive B	Transmit B	not used	
6	not used	Receive B	not used	
7	Power supply if necessary	not used		
8	Power supply if necessary	not used		
Signal Assignment on the TMG patchpanel (if used)				
Pin	PRA interface RJ45	BRA interface RJ45	U interface RJ12	U interface RJ11
1	not used	not used	not used	not used
2	not used	not used	not used	U wire A
3	Transmit A	Transmit A	U wire A	U wire B
4	Receive A	Receive A	U wire B	not used
5	Receive B	Receive B	not used	
6	Transmit B	Transmit B	not used	
7	not used	not used		
8	not used	not used		

4.12 Connecting the Interfaces

This chapter describes how the respective interfaces of the NovaTec S20 NNM must be wired and connected together with activities requiring particular care and attention.

4.12.1 Connection of ISDN Terminal Equipment to the BRA Interface

Up to two items of terminal equipment can be connected to every NovaTec S20 NNM BRA interface. The interface consists of 4 wires that must not be inter-changed. The maximum length of these wires is approximately 220 m. The end of the line that is not connected to the NovaTec S20 NNM must be terminated with 2 x 100 ohms. The following illustration shows the wiring and corresponding limiting values in this context.
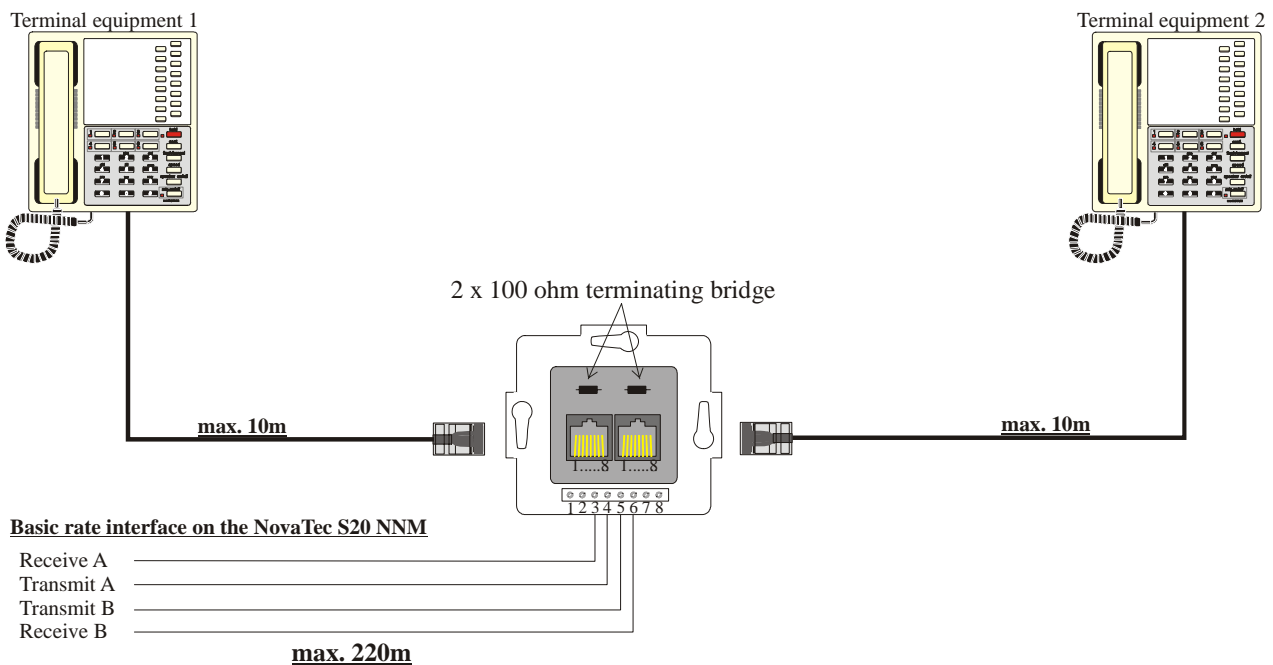
Picture 15: Terminal equipment connection to an ISDN socket (passive bus)

It is possible to connect up to 12 ISDN sockets to each NovaTec S20 NNM BRA interface. These sockets are simply connected in parallel configuration. A maximum of two items of terminal equipment can be connected to each NovaTec S20 NNM BRA interface at any time even if more ISDN sockets are mounted. The terminating resistor must be located only in the last socket. The following illustration shows the wiring of several sockets in this context.
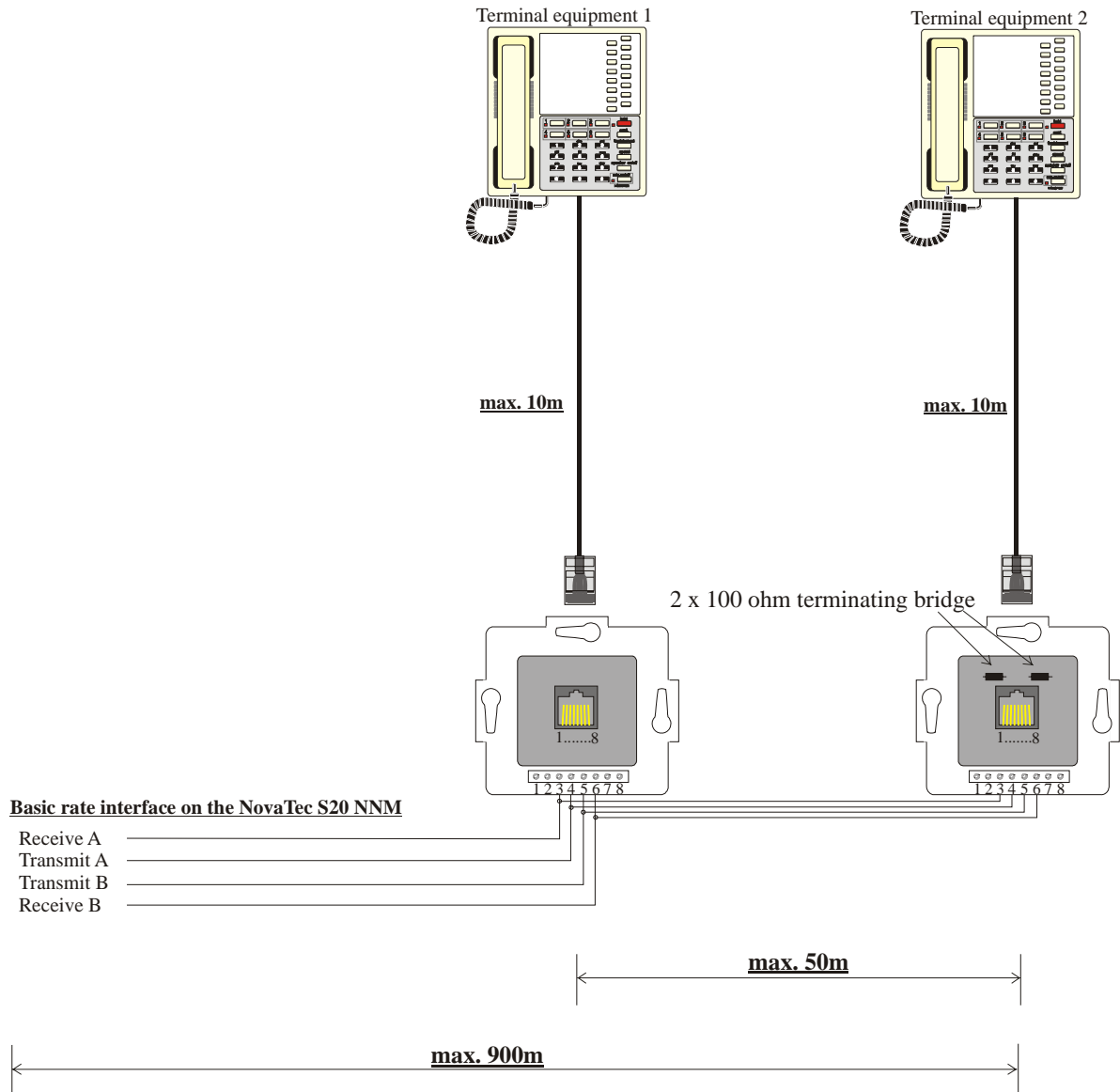
Picture 16: Multiple items of terminal equipment connected to several ISDN sockets (extended passive bus)

4.12.2   Star-shaped (Category 5) Cabling Connection

If your building services operates using a star-shaped cabling format, the terminating resistors in your NovaTec S20 NNM must be deactivated. This deactivation must be undertaken separately for every port concerned. In order to do this, first determine on which of the NovaTec S20 NNM modules the one or more terminating resistors must be deactivated. The following illustration gives an example of how a star-shaped cabling connection could be applied.
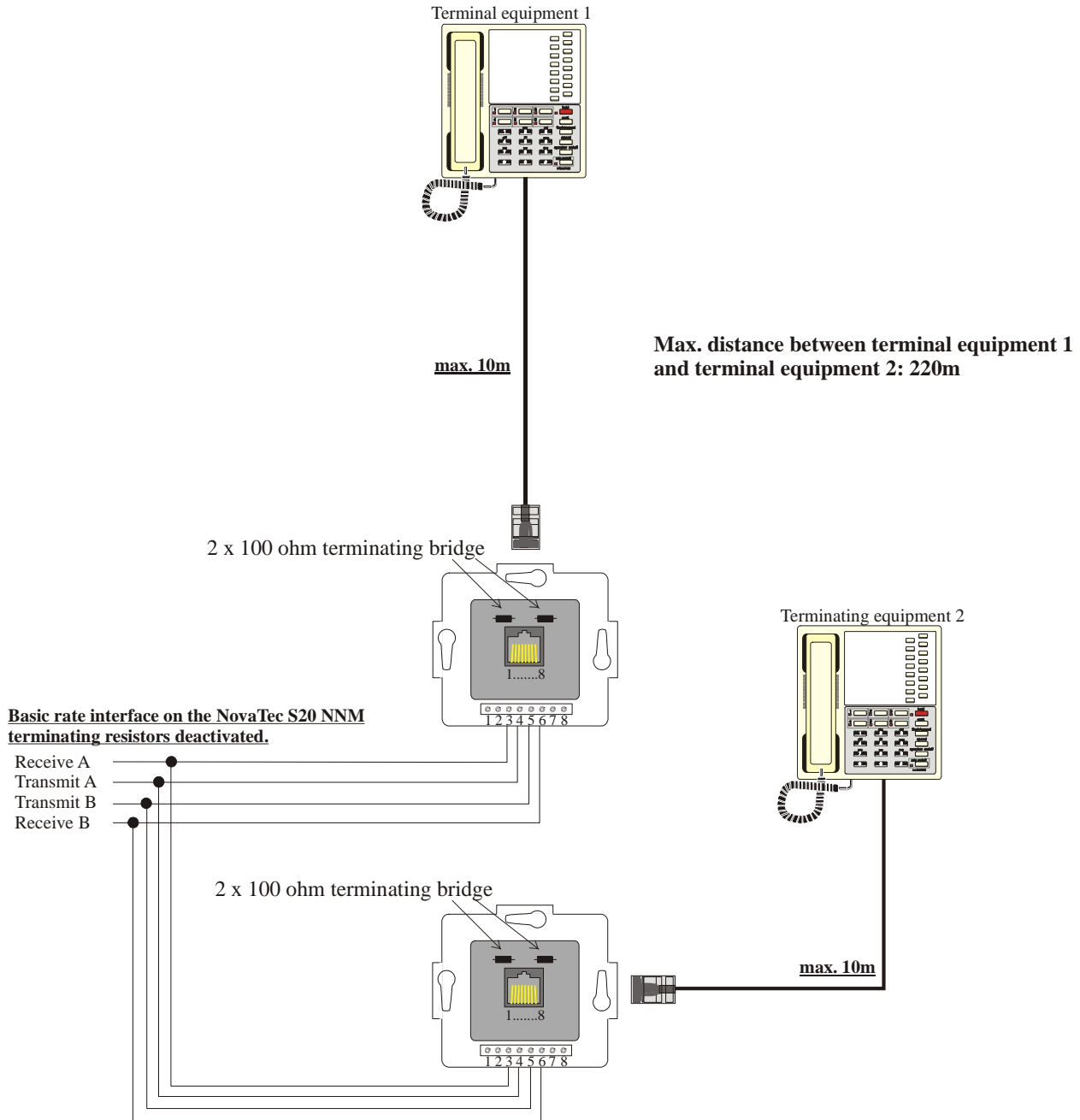
Picture 17: Star-shaped cabling for a BRA interface

NovaTec S20 NNM, Mounting and Installation

To deactivate the terminating resistors please follow these instructions:

Remove the selected module from the system. On the upper and lower corner of each front cover is a flexible handle with a screw next to it. Loose this screw. You can then remove the module by moving both handles outwards (see Picture 18).

On each module there are several coding switches which will enable you to deactivate or activate the terminating resistors for each interface. These switches are grouped in blocks of four switches, whereby every pair of switches is dedicated to one interface. This means that the switches numbered 1 and 2 form an interface and the switches numbered 3 and 4 form another interface. The two switches for any particular interface must always be set in the same position. When the switches are in the "Off " position the terminating resistors are deactivated.

The illustrations on pages 29 and 33 show you the position of these blocks of coding switches. Next, please identify for which interface you must deactivate the terminating resistors. Please use the illustrations on pages 29 and 33 to assist you in identifying and repositioning the respective coding switches to the "Off " position. The terminating resistors need only be deactivated when using a star-shaped installation (see page 42).

On delivery, all terminating resistors are activated.
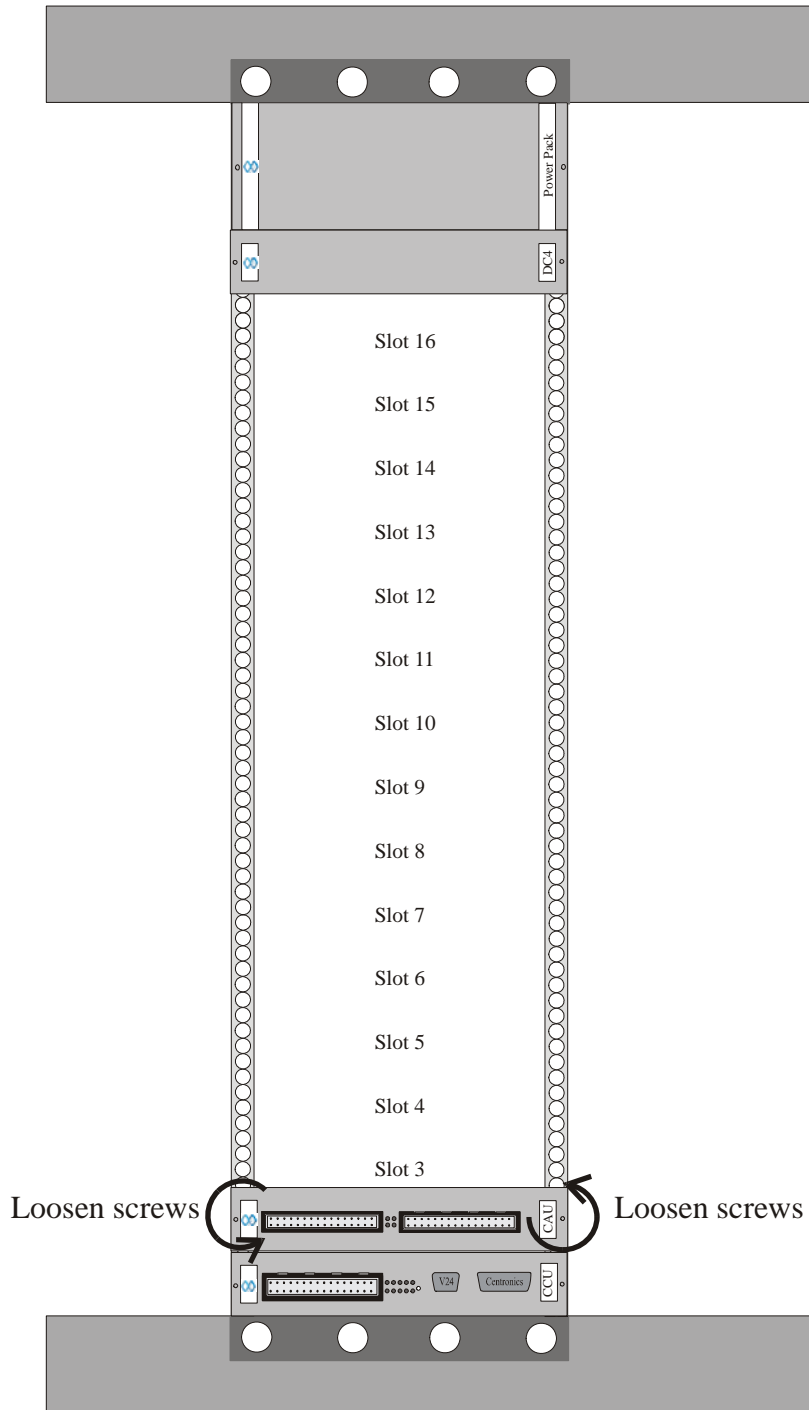
Picture 18: Removing a Module from the NovaTec S20 NNM.

4.12.3   Connecting the PT-US to the ULU

The ULU contains four U interfaces. One U interface is a two-wire interface, where both wires are interchangeable.

Any equipment with an U interface e.g. telephones, repeaters etc. can be connected and operated from this U interface. In situations where you need an U interface for spanning long distances to terminal equipment or where BRA interfaces are required, we recommend you to use a PT-US.
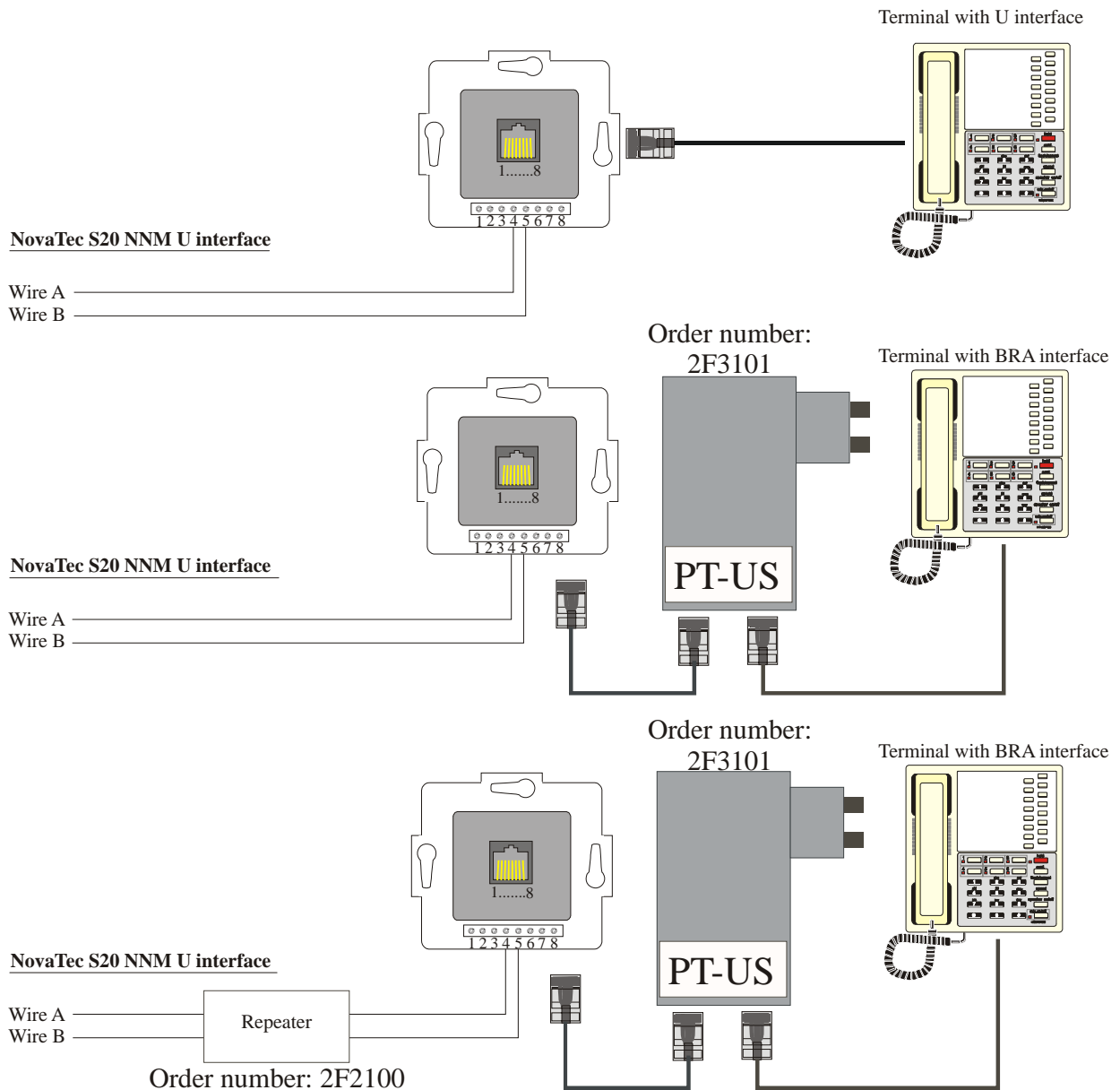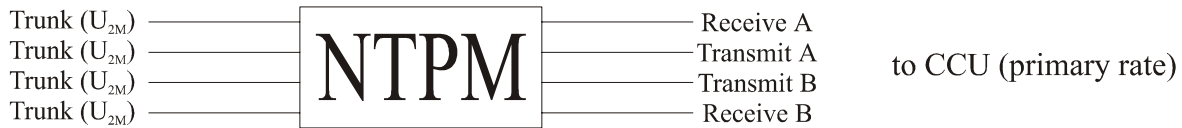

Picture 19:   Connecting one PT-US to the ULU

4.12.4 Trunk Line Connections to the CCU

A trunk line must be held on an NTPM. This NTPM provides you with a PRA interface. These types of PRA interface trunk lines can only be used in conjunction with the CCU and CAU dependent configurations of the NovaTec S20 NNM. If your NovaTec S20 NNM has an integrated U interface, an NTPM is not necessary and you can connect your trunk line directly to the respective interface of the system.

Trunk (U_{2M}) ———————— Receive A
Trunk (U_{2M}) ———— NTPM ———— Transmit A   to CCU (primary rate)
Trunk (U_{2M}) ———————— Transmit B
Trunk (U_{2M}) ———————— Receive B

Picture 20: Connecting a trunk line to the NovaTec S20 NNM

5.0 Commissioning

Before you put the NovaTec S20 NNM into operation, you should have undertaken all steps described in this handbook. This means, that you have connected the earth line, the trunk lines and the terminal equipment.Commissioning takes place when the plug is inserted into the designated three pin socket. Assuming the NovaTec S20 NNM has been configurated, it is ready for use after booting for approximately 2 minutes.

5.1 Status Displays on the NovaTec S20 NNM

Each individual module has light emitting diodes located on the front panel which indicate the operational mode. These displays mainly serve to assist diagnosis in cases of disturbance or to monitor the functions of the NovaTec S20 NNM.

5.1.1 Status Displays on the CCU and CCU-Ligth

The CCU status displays allow you to follow the individual diagnosis steps during the booting phase on commencing operational mode. You can also see when the system is in default mode due to missing configurations. Thus, you can recognize all possible stages of operation by observing the light emitting diodes on the CCU.

Upon connecting the NovaTec S20 NNM to the voltage supply, the system undertakes a processor test followed by a RAM- and firmware test. When there is a valid configuration, the system then moves into operational mode. In cases where there is no configuration, the system starts up in the default configuration. This means that only the first BRA interface of the CCU is being activated. The operational mode "Boot monitor active" can only be activated by a service technician using a PC connected to the NovaTec S20 NNM.

If the NovaTec S20 NNM starts in the default configuration, a valid configuration must be transmitted through downloading. Downloading can be undertaken either in situation, via the V.24 or ISDN interfaces, or remotely via the public telecommunications network. After downloading is completed, the system resets itself and starts up using the previously transmitted configuration. At the first commissioning, the system commences with a test configuration that is used by the supplier as a quality control check. For this reason it is imperative that the download procedure is undertaken.

If a modified configuration is being transmitted during the running operation, the level of changes will determine whether or not the system undertakes a restart. As a precaution, you should undertake the download procedure at a time that avoids high levels of data transmission activity because connections will be interrupted should the system require a restart.
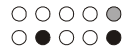
Status indicator (LED)

V24   Centronics   CCU

Reset button

LED 8 7 6 5
●●●●● Ready
●●●●● Power
LED 4 3 2 1

○ LED is off

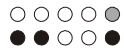● LED is flashing intermittently

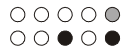● LED is constantly on

Reset and CPU not yet started
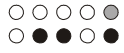
CPU started

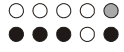Error during CPU self-test 1 (system stops)

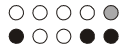Error during CPU self-test 2 (system stops)
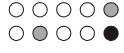
CPU-Chipset initialising

Error during bootcode RAM-test (system stops)

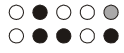CPU creates the stack for switching to protected mode
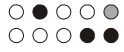
CPU switches to protected mode
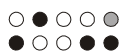
CCU-Hardware is not released (system stops)

System is waiting for the boot monitor respectively the default configuration
(if you press the reset button now, system starts in default configuration)

Error within checksum test of the boot ROM (system stops)

There is not enough DRAM mounted (system stops)

Error in DRAM (system stops)

System is waiting for release of the reset button after the system has noticed the default
configuration started
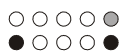
Loading the default configuration
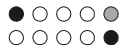
Loading the boot monitor

(Sequentially flashing light, turning from left to right.) Boot monitor active

(Power - LED is off) System is in default configuration

System is in operation

The LED 1-8 shows the status of the interfaces.

Picture 21:   CCU status display

After the boot process the status of each individual line interface of CCU is displayed by the status of the LED. If the layer one of an interface is activated, the appropriate LED turns steady on. In case the layer one of the interface is deactivated so the LED turns off.
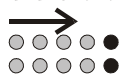
The CCU contains 4 ISDN BRI / S interfaces on board and a plug in space for one daughter board. Die LED status of the CCU is dependent of the daughter board placed and configured into it. The following table shows the status and the meaning of the LEDs of the CCU in normal mode (non default mode):

Interface	LED	Line status	LED status
1	1	Layer one active	LED is on
		Layer one inactive	LED is off
2	2	Layer one active	LED is on
		Layer one inactive	LED is off
3	3	Layer one active	LED is on
		Layer one inactive	LED is off
4	4	Layer one active	LED is on
		Layer one inactive	LED is off
BRI / S_0 daughter board is placed			
5	5	Layer one active	LED is on
		Layer one inactive	LED is off
6	6	Layer one active	LED is on
		Layer one inactive	LED is off
7	7	Layer one active	LED is on
		Layer one inactive	LED is off
8	8	Layer one active	LED is on
		Layer one inactive	LED is off
PRI / S_{2M} daughter board is placed			
5	5	Layer one active	LED is on
		Layer one inactive	LED is off
6	6	Layer one active	LED is on
		Layer one inactive	LED is off
/	7	n. c.	n. c.
/	8	n. c.	n. c.

5.1.2　Status displays on the CCU-3

The Status displays for the CCU-3, CBS and SOS are identical.
The CCU-3 status display allows you to follow the individual diagnosis steps during the booting phase on commencing operational mode. You can also see when the system is in default mode due to missing configurations. Thus, you can recognize all possible stages of operation by observing the light emitting diodes on the CCU-3.
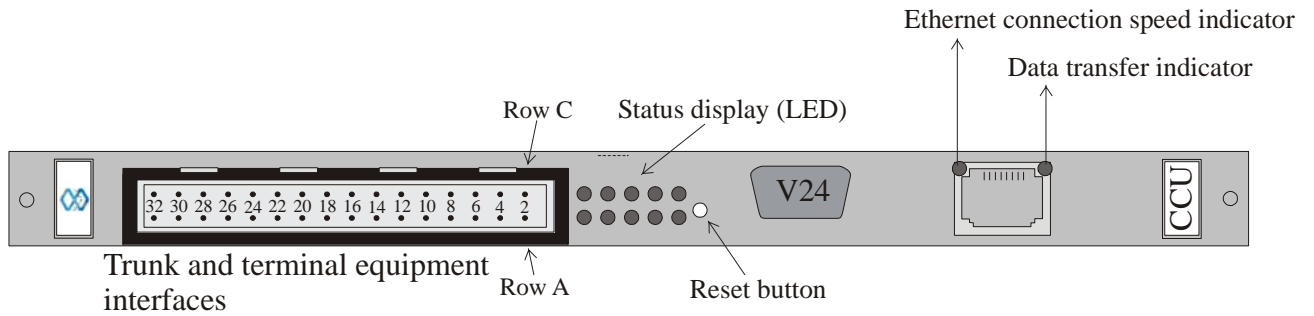
Upon connecting the NovaTec S20 NNM to the main supply, the system undertakes a processor test followed by a RAM- and firmware test. When there is a valid configuration, the system then moves into operational mode. In cases where there is no configuration, the system starts up in the default configuration (Power-LED is off). This means that only the first two BRA interfaces and the first PRA interface of the CCU-3 is being activated. The operational mode "boot monitor active" can only be activated by a service technician using a PC connected to the V.24/RS232 interface of the CCU in the NovaTec S20 NNM.

If the NovaTec S20 NNM starts in the default configuration, a valid configuration must be transmitted through downloading. Downloading can be undertaken either locally, via the V.24, ISDN interfaces or IP, or remotely via the public telecommunications network. After downloading is completed, the system resets itself and starts up using the previously transmitted configuration. At the first commissioning, the system commences with a test configuration that is used by the supplier as a quality control check. For this reason it is imperative that the download procedure is undertaken.

If a modified configuration is being transmitted during the running operation, the level of changes will determine whether or not the system undertakes a restart. As a precaution, you should undertake the download procedure at a time that avoids high levels of data transmission activity because connections will be interrupted should the system require a restart.

After the boot process the status of each individual line interface of CCU-3 is displayed by the status of the LED. If the layer one of an interface is activated, the appropriate LED turns steady on. In case the layer one of the interface is deactivated so the LED turns off.

The CCU-3 contains two plug in space for one daughter board and an ethernet interface. The LED status of the CCU is dependent of the daughter board placed and configured into it. The following table shows the status and the meaning of the LEDs of the CCU in normal mode (non default mode):

Ethernet connection speed indicator

Data transfer indicator

Row C   Status display (LED)

| 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 | V24 | CCU |

Trunk and terminal equipment interfaces

Row A

Reset button

LED 8 7 6 5
● ● ● ● ● Ready
● ● ● ● ● Power
LED 4 3 2 1

○	LED is off
◐	LED is flashing intermittently
●	LED is constantly on

Picture 21a: CCU-3 status display

Ethernet connection speed indicator

Off   no active connection to a network
green   10 MBit connection active
orange   100 MBit connection active

Data transfer indicator

Off   no Data Transfer between CCU-3 and Host
yellow   Receiving or Transmitting Data's

The IP-adress for the CCU-3 in default mode is: 192.168.127.254

5.1.3 Status Displays on the CAU

The Status of the CAU is shown by four LED's. The LED's 1-3 show the status of the expansion boards on the CAU. If there is a match between the placed expansion board and the appropriate system configuration, the belonging LED will light up after booting of the system. If there is a mismatch the LED will not light up after booting of the system.
The LED 1 belongs to the expansion place one and LED 2 to the expansion place two and the LED 3 to the expansion place three (see Picture 22).
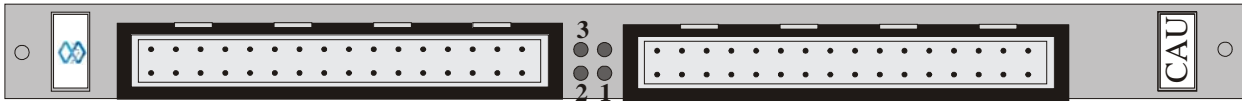
Picture 22: Status displays on the CAU

5.1.4 Status Displays on the ULU

The uP LED displays by flashing that the processor is in operation. The Power LED shows by continuous shining that all switches of the coding switch are in the on position, layer 1 is ready and the remote power supply of all U interfaces (module 1F5010-2-LP only) is activated.

The status of layer 1 can be identified for each interface independently (see picture 23) at the two red LED's which are placed next to each other. The left LED (Picture 23: lower one) communicates the status of layer 1 for the S_0 interface and the right one (Picture 23: upper one) for the U interface. When layer 1 is activated the LED's are continuous shining. In case of an error they are flashing and the Ready LED extinguishes. Is for example layer 1 of an U interface out of action the concerned U LED is flashing and the Power LED is off.

When there is for example a short-circuit at the U interface, the LED of the concerned interface and the Ready LED starts flashing (module 1F5010-2-LP only).

In operation condition the uP LED flashes continuously. The Ready LED and both LED's of the activated interfaces are continuously shining. When there are one or more lines deactivated by the coding switch the belonging LED's are off.

After switching on the System, every ULU starts an on board diagnosis. During this procedure the system tests all internal components of the U and then all internal components of the S interfaces. Is there an error detected the concerned ULU is executing a reset and then starting a new test. If the fifth trial is not succesful the test stops and a failure code appears at the LED's. Is the EPROM test negative, there will be not further test, the system stops and a failure code appears at the LED's.
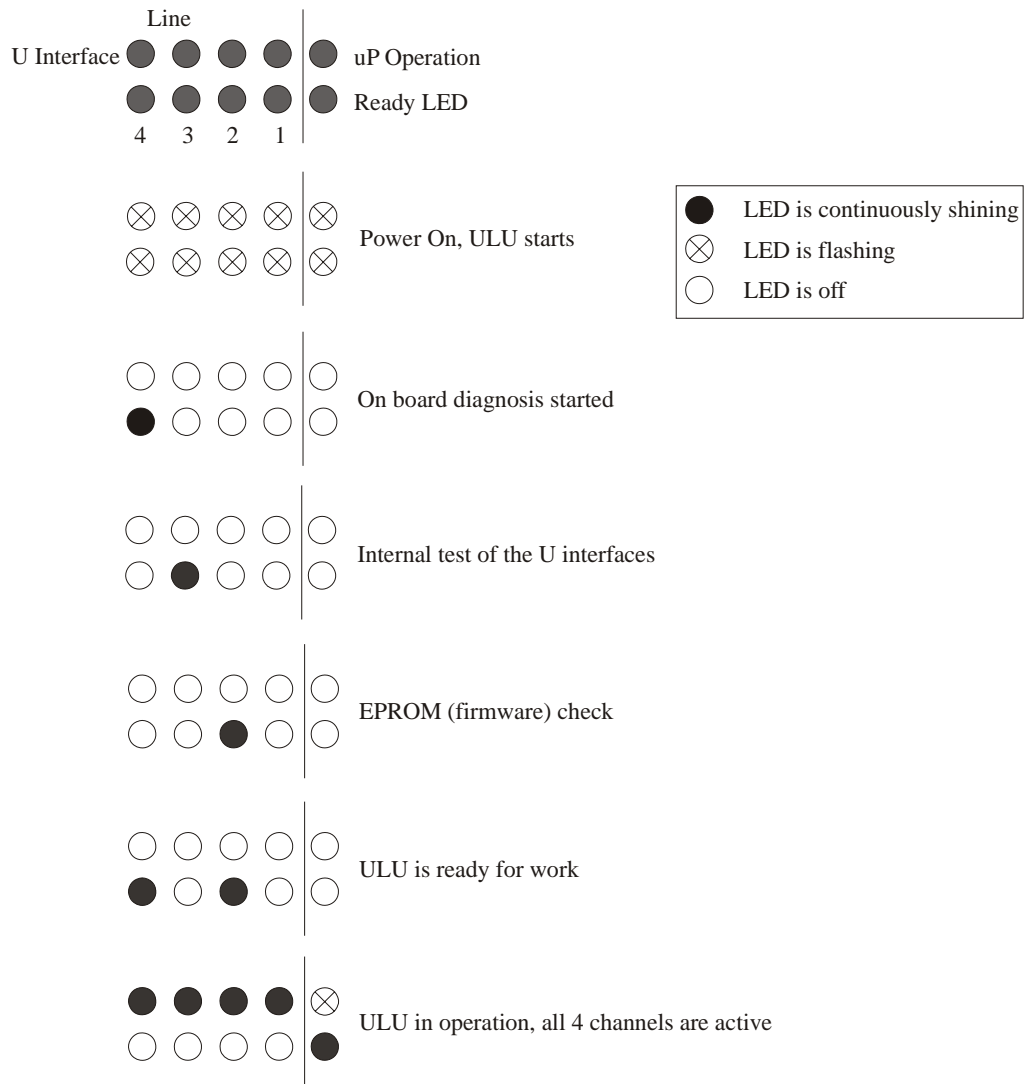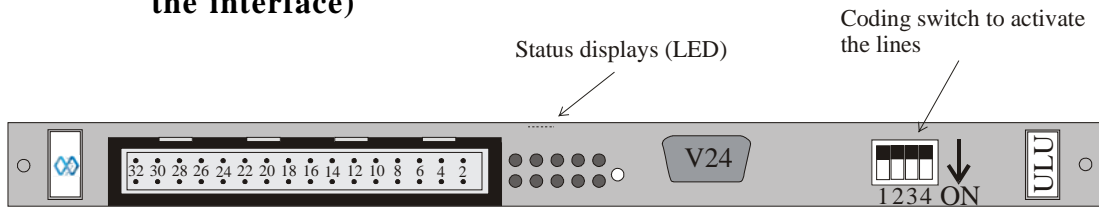
After starting the system the remote power supply of the U interfaces will be switched on after approximately 1 minute (this is only concerning the module 1F5010-2-LP, visible by the caution label at the front panel of the board). Is the ULU inserted in a system which is actually in operation mode, the remote power supply of the U interfaces will also be activated after approximately 1 minute. But if you activate a channel after starting the system by the coding switch, the power supply of the U interface will be switched on immediately.

Only concerning PTI-SU with power supply at the U interfaces (1F5010-2-LP):

⚠ **The U interface is powered by an internal power supply of 115V. Observe for this reason all precautions for personal protection (switch off the system, seperate the interface from the system and deactivate the interface)**

Status displays (LED)

Coding switch to activate the lines

```
32 30 28 26 24 22 20 18 16 14 12 10 8  6  4  2     V24      1234 ON     ULU
```

Line

U Interface ● ● ● ● | ● uP Operation
            ● ● ● ● | ● Ready LED
            4 3 2 1

⊗ ⊗ ⊗ ⊗ | ⊗   Power On, ULU starts
⊗ ⊗ ⊗ ⊗ | ⊗

● LED is continuously shining		
⊗ LED is flashing		
○ LED is off		

○ ○ ○ ○ | ○   On board diagnosis started
● ○ ○ ○ | ○

○ ○ ○ ○ | ○   Internal test of the U interfaces
○ ● ○ ○ | ○

○ ○ ○ ○ | ○   EPROM (firmware) check
○ ○ ● ○ | ○

○ ○ ○ ○ | ○   ULU is ready for work
● ○ ● ○ | ○

● ● ● ● | ⊗   ULU in operation, all 4 channels are active
○ ○ ○ ○ | ●

Picture 23: Status displays on the ULU

5.2 Features of the Default Configuration

When a valid system configuration cannot be found following a system start, the NovaTec S20 NNM will always start in the default configuration. In these circumstances, as a client, you will retain use of the telephones, for limited applications, until a valid configuration has been defined. Being aware of this feature will enable you to take precautions against losing communication with the outside world while your system is in default mode.

Description of the default configuration:

Module	Interface	Description	Port ID	Master/ Slave	Trunk/ Subscriber	PzP	PMP
CCU	1	BRA	F100	Slave	Trunk	X	
CCU	2	BRA	F101	Slave	Trunk		X
CCU	4	BRA	F903	Master	Subscriber		X
CCU Sub Module	5	PRA	F400	Slave	Trunk	X	

Default-IP-Adresses

On the CCU-3 there is a difference between the default modes. If the modul went into default-mode and the reson was a faulty or missing configuration, the modul starts up with the last known IP-Adress, Netmask, DNS-IP and Gateway-IP.
If the reason for the default-mode is an user Reset-Switch or the trace-info client, then the modul starts up with the IP-Adress: **192.168.127.254**

In any case, if the IP-Adress is unknown, you can use Network-Monitors (for example Ethereal) to find out the IP-Adress. Using the Network-Monitors on your own risk.

5.3   Alarm Contacts

On the rear of the backplane, you will find terminals to alarm contacts. This alarm contacts are switched by relais. There are a pair of relais contacts available. One contact is switched as a closer and one as an opener to the terminal. During normal operation the terminals A and B are closed and the terminals C and D opened. In a fault situation it is vice versa. The relais contacts are specified for a maximum switching voltage of 100 Vdc and a maximum switching current of 1 A. The maximum allowed switching power is 30 W.

The alarm contacts are activated by the following cause:

·   power failure of the NovaTec NNM S20
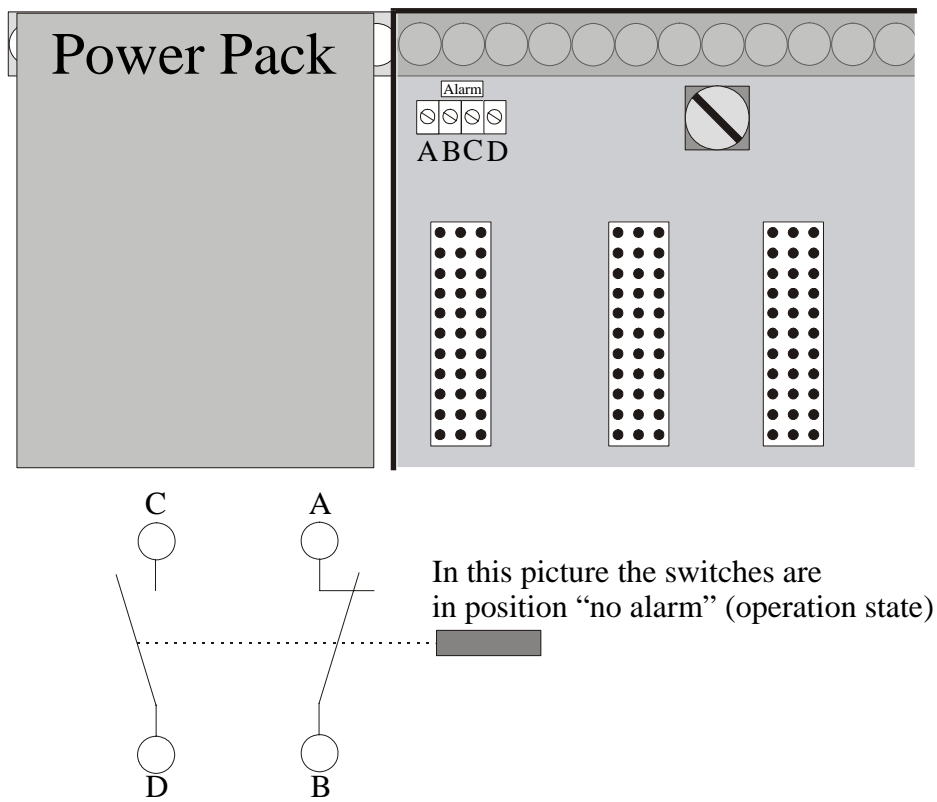
Picture 24:   Alarm Contacts

5.4 Installing the Configuration Software

To install the configuration software, please connect a personal computer to the V.24/RS232/ /IP interface of the CCU or CCU-3 using the cord.

The set up program is designed for a PC operating with Microsoft Windows 2000/XP or NT. To initiate the configuration program, please insert the Setup CD and start Setup.EXE. Please follow the instructions displayed on the screen.

You can call up an on-screen topic related help text which provides further information, by pressing F1 on the keyboard of your PC.

Following installation of the NovaTec S20 NNM configuration program, a systems inquiry will ask whether the necessary components of Microsoft DAO Version 3.5 and ODBC Version 3.2 are installed. If these components are already installed on your computer, you do not need to install them from the CD.

To check this, click on **Office** and then on the **System Control** and **Software**. If DAO is already installed on your PC, it will be indicated here. If this is not the case, please install it from the installtion CD.

During installation of the required components from DAO and ODBC 3.2 it is possible that problems may occur. These problems are mainly caused by incorrectly installed or deinstalled programs which disturb files in the system folder of Windows 2000/XP/NT. This will be indicated through the error message, "Error while opening the databank". If this is the case, please follow the following procedure:

- De-install the TMG configuration programs
- Close all applications and tasks
- Re-execute the set up program
- Install the DAO and ODBC with minimal components
- If this does not resolve the problem, install the DAO manually, by executing the program SETUP in the folder DAO\DISK1.

Installation of the Electronic Data Transfer Adapter and TCP/IP

To enable you to transmit data to the NovaTec S20 NNM, the electronic data transfer adapter and the network protocol TCP/IP must be installed. To do this, undertake the following steps:

- Click on **Start** on the task bar.

- Select **System control**.

- Open the **Network** icon in the system control window.

- Previously installed components will be registered under "Configuration".

- The **Electronic Data Transfer Adapter** and **TCP/IP** should appear here. If this is not the case, please click on the "Add" button and then on "Network Board" and "Add".

- Now select the network card "Electronic Data Transfer Adapter" and confirm this with O.K.

- If your PC operates without a network, you can remove all components except for the electronic data transfer adaptor. If in doubt, leave all components activated.

- Next, make your selection under "Network Component Type" and using **Add** insert **Microsoft** as the supplier and **TCP/IP** for the network protocol. Confirm with O.K.
- For this procedure you need your Windows 2000/XP/NT installation CD.

Transmission of Configuration Data

Preparation of Configuration Data

Before transmitting the configuration to the NovaTec S20 NNM, the data must be processed. First, click on the menu **Configuration data**. Then select **Process**. The current configuration is now being processed. This procedure can take a couple of minutes.

NovaTec Network Services (Network Services)

To enable the configuration data to be transmitted to the NovaTec S20 NNM, you must start **the Network Services** first. To do this, select **Network Services** in your installation folder.

Transmission of the Configuration Data

After the configuration data has been successfully processed, it can be transmitted to the NovaTec S20 NNM. To do this go to **Configuration data** and select the item **Transfer to Target System**. Then go to the **Transfer Options** window and select the button **Transfer New Configuration to Target System** and **Reboot Target system if reconfiguration is not possible.**

Please enter your password and username in the following window. On delivery, there is no password and the username **Technik** should be entered.

Change of password
Please enter the username in the appropriate field and then enter the old password followed by a semi-colon (;), then the new password, another semi-colon (;) and then the new password again, for confirmation purposes.

Example:
Old password: old
New password: new
You enter: old;new;new

Should you forget your password, you can enter the NovaTec S20 NNM with the user name **Technik** and the password **NoPassWd**. Please note that under these circumstances, all data in the NovaTec S20 NNM will be automatically deleted, necessitating a new download from the PC. For automatic remote maintenance, please ask for the network management system.

Local Maintenance via V.24/RS232

Adjustment of the Programming Interface

To connect to the system using the COM port please select "V.24" from "Network" in the "Establish Connection" window. The default COM port is COM2. If you like to use a different COM port for programming then you can change this setting using the Network Services.

Please start the Network Services if not already running. Right click on the blue icon in the Windows system tray and select "Settings" from the upcoming context menu. Under the "COM port settings" you can enable and disable the COM port (for use by NovaTec software), select a different COM port and select the baud rate for the COM port. Please always select 38400.

Remote Maintenance via ISDN

Requests to the ISDN card

To obtain remote maintenance services via ISDN a ISDN card that supports CAPI 2 version 2.0 or higher is required. This must be fully installed on your PC. Please install the ISDN card according to the manufacturers installation guidelines.

For correct operation we propose and support the AVM-Fritz-Card only. After successful installation please go to the "Establish Connection" window and select "ISDN" from the "Network" options. Then enter the phone number of the NovaTec S20 NNM 0 in the field "Dialling no." and click on OK.

Should you wish to operate the NovaTec S20 NNM from a terminal equipment interface, please enter the phone number followed by a /TE. To be able to connect via ISDN the option "Activate ISDN (CAPI 2.0 installed)" must be activated in the Network Services settings.

There is a readme file on the CD to provide you with additional information for the installation process. For further information you can open the on-line help on the CD by double-clicking on the help icon or using the F1 button.

There is also a prepared standard configuration mdb file available on the CD for fast and easy start of the system.

Remote Maintenance via IP

Please make sure that the NovaTec S20 NNM that you want to configure is connected to the same network as the computer and that you have the necessary access rights
If this is not the case and the NovaTec S20 NNM is outside of your LAN then you need a computer with internet capabilities.
If the CCU is in the Default status the IP Address for the CCU3 is 192.168.127.254
For configuration of the computer Please ask your System administrator

6.0   Technical Data

Mechanical Data	
Dimensions (WxHxL)	480 mm x 265 mm x 220 mm
Weight (Housing + power pack + CCU)	min. 7 kg (15,8 kg when fully constructed)
Method of suspension	with screws in a dedicated 19" rack
Construction	Modular comprising slot-in modules and sub-modules

Electrical Data	
Power supply	230 V~ (115 V~) ±10%, 47-400 Hz or 48 V=
Power Input	506 VA (2,2 A) at 230 V; 483 VA (4,2 A) at 115 V
Connection	Power line with 3-pin plug (at 230V~ and 115 V~)
Earth	Separate earth via min. 2.5 mm^2 earth line
Overvoltage protection	Internal secondary protection
Interfaces (basic configuration, S20 with one CCU only)	1 x V.24 1 x Centronics 4 x ISDN-BRA, E-DSS1 2 x ISDN-PRA E-DSS1 1 x Ethernet according IEEE 802.3/802.3u (CCU-3 only)

BRA interface (S$_0$ interface)	In accordance with CTR 3, TBR3, ITAAB
	Supply: 40 V, 50 mA using the DC4 module
	Supply: 0 V excluding DC4
	Range: max. 220 m (passive Bus)
	         max. 900 m (extended passive Bus)
	         max. 1000 m (Point to Point)

PRA interface (S$_{2M}$ interface)	In accordance with CTR 4 A1, 98/520/EG Range: 1000 m using a 0.6 mm diameter cable
U interface (U$_{K0}$ interface)	In accordance with ANSI T1.601, CTR 3, TBR 3 Supply: 0 V (1F5010-2) / 110 V ± 5 V, 25 mA (1F5010-2-LP) Range: max. 8000 m using a 0.6 mm diameter cable max. cable attenuation 40 dB/40 kHz

Environmental Specifications	
Storage and Transport	-20° Celsius to +90° Celsius 0% to 95% relative humidity (not condensing)
Operation	+5° Celsius to +40° Celsius 0% to 95 % relative humidity (not condensing)