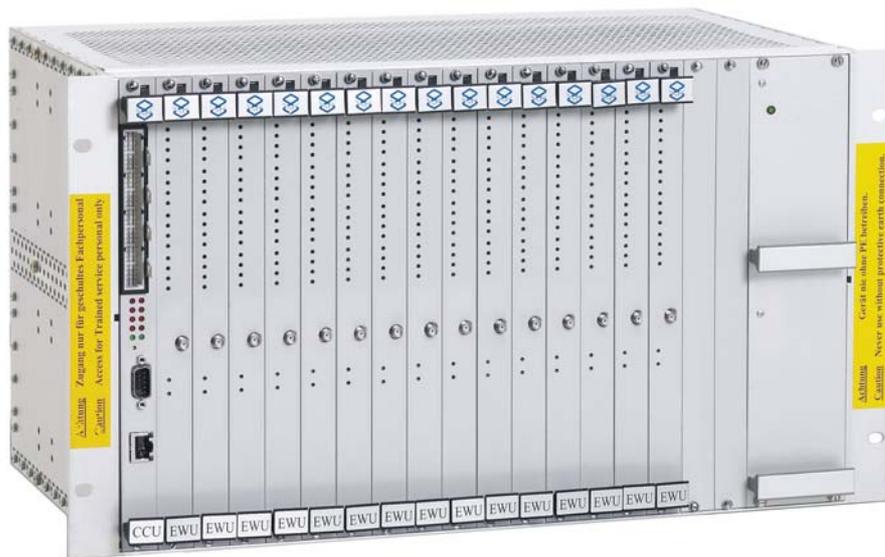


# NovaTec Mobile Gateway S20



## Mounting and Installation



Version 6.0 from 13.10.2005

**- Subject to change without notice -**



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## 1.0 Preface

Dear Customer,

Congratulations on purchasing the NovaTec Mobile Gateway S20. You have selected an electronic multiplexer and demultiplexer and GSM Gateway that had been developed and produced using the latest level of technology. We want to thank you for your decision.

The NovaTec Mobile Gateway S20 provides you with an appropriate number of BRA ( $S_0$  interfaces) or GSM interfaces via its PRA interfaces ( $S_{2M}$ /E1 interface). This is achieved by assigning the B-channels of the PRA interface to the BRA or GSM 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 Mobile Gateway S20 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 Mobile Gateway S20 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 Mobile Gateway S20 to dust, damp, vibrations or direct sunlight.
- Take care that no wires, nails or similar objects can fall through the ventilation slits.
- The NovaTec Mobile Gateway S20 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 Mobile Gateway S20 from the electricity supply **immediately**.
- The system is equipped with appropriate mains safety plug for use with a 230 volt, 115 volt or 48 volt DC input. This plug should be connected to a mains safety socket or the dc power terminal.
- The NovaTec Mobile Gateway S20 can be operated using either a 230/115 volt power supply or a 48 volt DC power supply. The mains socket allocated to the NovaTec Mobile Gateway S20 should be independent and for the sole use of the NovaTec Mobile Gateway S20.
- In order to prevent damage to person or property, never expose the NovaTec Mobile Gateway S20 to rain or other forms of moisture.



- For safety reasons, modifications to the construction or security engineering of the NovaTec Mobile Gateway S20 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 replacing the system's Slide-in modules.
- The NovaTec Mobile Gateway S20 as well as the pole of the outdoor antenna must be earthed via an earthing cable with a minimum cross-sectional area of 2.5 mm<sup>2</sup>. 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 Mobile Gateway S20 must be installed according to this Mounting and Installation Handbook. The NovaTec Mobile Gateway S20 should be installed in a closed metallic cabinet.
- Before commencing installation, ensure that the relevant electricity circuits are voltage free and properly disabled to avoid them being accidentally switched on whilst you are working.
- If the equipment is passed on to a third party this Mounting and Installation Handbook must accompany it.



Technologiepark9, 33100 Paderborn, Germany

**Declaration of Conformity:**

NovaTec Kommunikationstechnik GmbH. declare under own sole responsibility that the product NMG-S20 is in conformity with the provisions of the following european council directive:

1999/5/EC (R&TTE-Directive)

The corresponding declarations and documents are deposited at the manufacturer.

**Important Safety Requirements**

- Connecting the NMG-S20 to a public telecommunication network, follow the installation guide.
- Comply with relevant regulations, before radio stations put into operation
- Comply with relevant regulations of local network provider
- The Guideline must be handed over with the equipment



## 3.0 General Information

### 3.1 Product Description

The NovaTec Mobile Gateway S20 is a processor controlled electronic multiplexer/demultiplexer and Mobile Gateway. It enables a minimum of 60 B-channels of two PRA interfaces ( $S_{2M}$ /E1 interface) to be assigned to 30 BRA interfaces ( $S_0$  interfaces) or 60 Mobile channels. The NovaTec Mobile Gateway S20 can be used to undertake switched connection and fixed line applications simultaneously. The E-DSS1 protocol is observed when the NovaTec Mobile Gateway S20 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 Mobile Gateway S20. 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 you should proceed to the next chapter. If you work in this manner the mounting and commissioning of the NovaTec Mobile Gateway S20 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 Gateway S20 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 Mobile Gateway S20 near to equipment with strong magnetic fields, for example, large mains transformers, machines or lifts.
- The NovaTec Mobile Gateway S20 is housed in 19“ racks. These racks should be mounted in an appropriate cabinet or shelf.
- Do not lay the communications or antenna 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 mm between the base of the NovaTec Mobile Gateway S20 cabinet and the ground.
- The NovaTec Mobile Gateway S20 rack should be mounted in a closed cabinet to prevent contact. Please contact us for consultation.
- The NovaTec Mobile Gateway S20 must be installed in a 19“ housing or a 19“ cabinet. The system cabinet must be closed all-around to avoid access to any part of the NovaTec Mobile Gateway S20. The connection and display parts in front of the NovaTec Mobile Gateway S20 are permitted to be accessed by service Personnel only. The front enclosure, ideally a door, must be locked to avoid unauthorized access.
- 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 Mobile Gateway S20 system rack. If there are racks installed, they are not allowed to cover than 30% of the ventilation opening of the NovaTec Mobile Gateway S20.
- By Installation of the system cabinet you must take care that it cannot be tipped 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 Mobile Gateway S20 through operation of a protective device (fuse), the equipment is as still under voltage as long it is connected to the mains power.
- If more than one NovaTec Mobile Gateway S20 is being installed in a 19" cabinet, do not connect more NovaTec Mobile Gateway S20 system to multiple socket-outlets than allowed by the building power supply wiring regulations.



### **Cleaning**

The NovaTec Mobile Gateway S20 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 Mobile Gateway S20 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 Mobile Gateway S20 in a narrow non-ventilated cupboard. Rising heat levels could damage the NovaTec Mobile Gateway S20.

### **Dust (DIN 40046 Part 47)**

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

### **Humidity (IEC 721 3K6)**

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

### **Temperature**

Your NovaTec Mobile Gateway S20 should only be operated in dry rooms where the temperature remains between 0° C und 40° C. For this reason, do not install your NovaTec Mobile Gateway S20 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 Mobile Gateway S20 must only be undertaken by electronics personnel who possess the qualifications required by national safety regulations.**

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



**Do not plug the Novatec Mobile Gateway S20 into the socket until all installation work has been completed.**



**To prevent the system against lightning and atmospheric discharge interferences, the system should be protected with an appropriate suppressor (please contact NovaTec for more information).**

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



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 Mobile Gateway S20 system will be delivered in one cabinet in a large crate. It contains the following components:

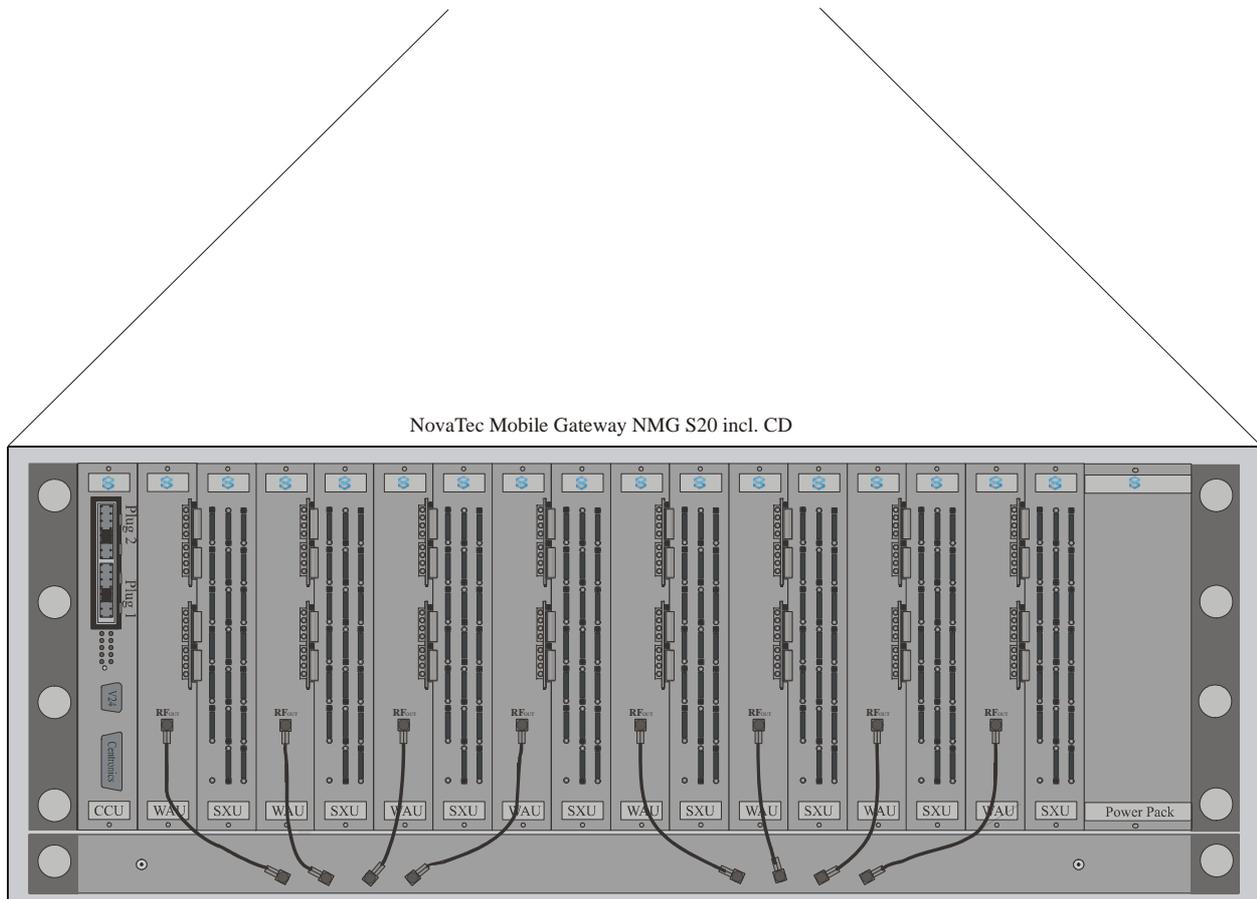
<b>Pos.</b>	<b>Qty.</b>	<b>Item</b>
1	1	NovaTec Mobile Gateway S20 system in a 19" rack or as an array of 19" racks in a cabinet
2	1	Maintenance and configuration CD
3	1	Optional Positions will be find on the Delivery Note (like Antenna, Mounting Sets, etc.

### 4.2.1 Opening the Package

The NovaTec Mobile Gateway S20 is packed and delivered in a collapsible cardboard box or wooden crate. On opening the crate the first item you will see is the cabinet. You will find this Mounting and Installation Handbook in the cabinet. The 19" racks and the slide in modules are already mounted according to your order.

## 4.2.2 Contents of the Package

In case of single unit delivery on opening the package you will find within the cardboard box. The individual components as listed in Chapter 4.2. In case of cabinet unit delivery you will find the system inside a wooden box. Please check that the contents of the cardboard box or wooden box are correct and complete according to the delivery note.



**Picture 1:** Contents of the package in fullsize configuration



## 4.3 Mounting

After the NovaTec Mobile Gateway S20 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 Mobile Gateway S20 is built in a 19" rack into which the individual modules are to be inserted. Both the backplane and the mains power cable are already fitted to this rack. A number of antenna cables between the WAU and the ACU are installed in accordance to the ordered configuration (number of mobile channels).

## 4.4 Laying the Cabling

All connections except the mains power cable and the earth cable are connected to the NovaTec Mobile Gateway S20 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, antennas and extension lines are 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

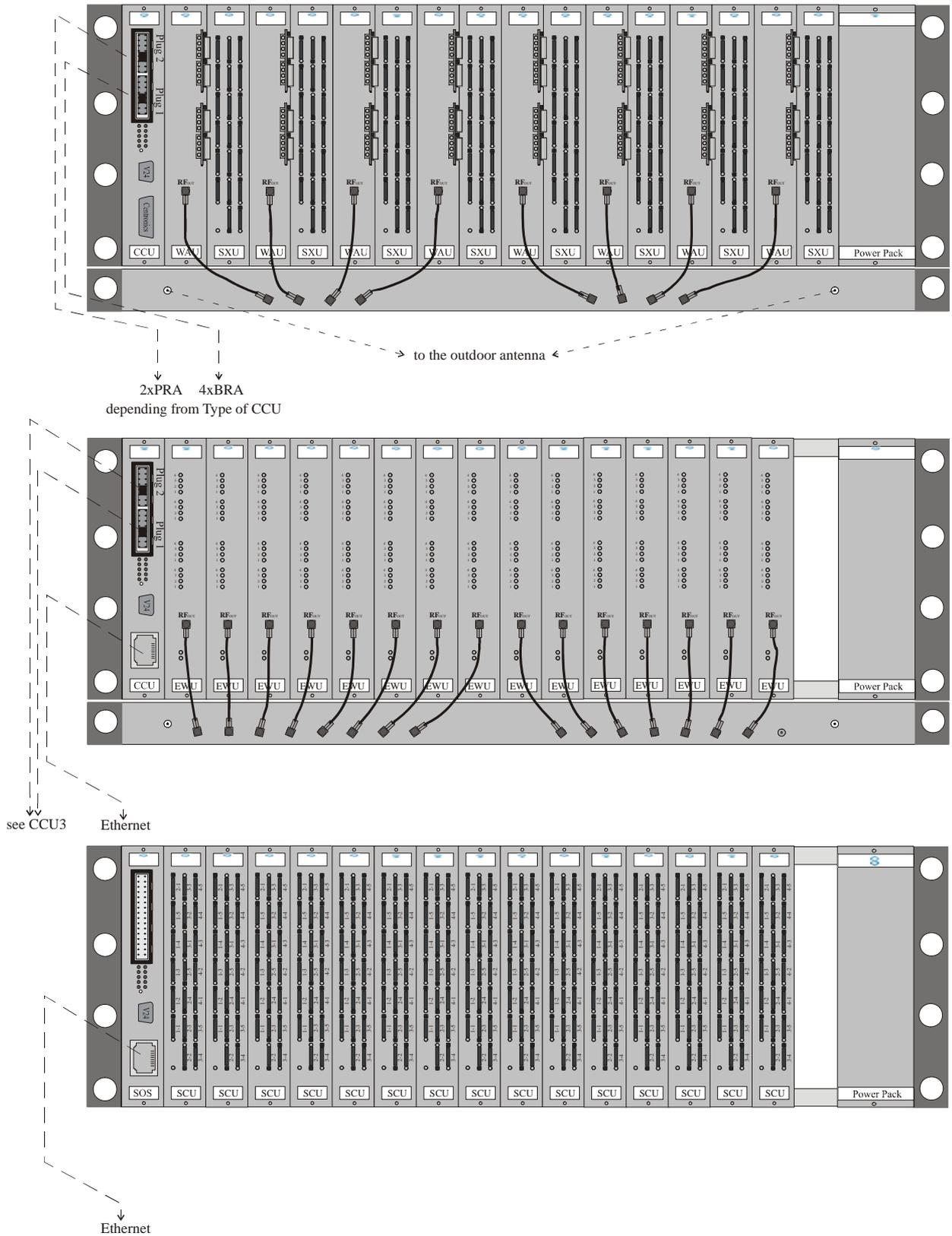
All lines that leave the system must be strain relieved at an appropriate place (see illustration in Picture 2). In the 19" System the cables are simply of fixed to the frame with a cable binder. You can therefore use any place on the frame. Each of the wires for the lines for the local loops and the terminal equipment interfaces are colour coded. The definition 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 of the CCU.



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 4.11).



**Picture 2:** Laying the cabling to the NovaTec Mobile Gateway S20



## 4.5 Internal Structure of the NovaTec Mobile Gateway S20

The NovaTec Mobile Gateway S20 is comprised of several different modules. All modules can be inserted into the 19" rack and then connected together at the rear of the rack via the backplane. The individual slots inside the system are clearly numbered on the backplane to ensure easy identification. The left slot is Slot 1 where only the CCU should be inserted. On the right, next to the CCU is Slot 2, and so on up 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 power supply for the whole rack. The slot designations (slot numbers) can be found on the front side of the back plane. The numbers can be seen on the back plane 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 four BRA interfaces, one Centronics and one RS232 interface. In addition the CCU provides a plug in space for either a four time BRA or a two time 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 Call-Back-Server (**CBS**) corresponds in the optical features the same as the CCU-3. When the system is being used with the Call-Back-Functionality, the corresponding required software CBS must be used. Installation guides for the CBS can be found in Chapter 5 of this handbook under CBS.

The **Sea-Of-Sims (SOS)** must be used in conjunction with the Sim-Server . The SOS corresponds in the optical features the same as the CCU 3. Operation of the NMG as Sim-Server requires the installation of the SOS software and one SCU must be installed in the system. Installation guides for the SOS can be found in Chapter 5 of this handbook under SOS.

The Wireless Access Unit (**WAU**) provides the access to the mobile network and contains:

- up to two daughter boards with two dual band engines each
- one 4 to 1 antenna combiner/multiplexer
- the electronic access to the backplane (hot plugable)

**Please note:** Never run the system without antenna! Do not leave any RF input without termination!

Each daughter board contains the SIM card reader, which is accessible via the front panel.



The **CAU** (if installed) is a Carrier Unit. This module offers three plug in spaces for expansion boards. Both BRA or PRA or a combination of both types of expansion boards can be inserted.

Usually the BRA interfaces are not provided with 42 Volts ISDN line power. 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 separate slide in 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 a slot in the rack.

The Antenna Combiner Unit (**ACU**) gathers the output of the WAU cards to one RF output. This RF output shall be connected to the next ACU input or directly to the outdoor antenna (the number of the possible cascade stages is location pendant. For more information please contact NovaTec). The ACU contains 4, 8 or 16 inputs. 15 inputs shall be connected to the RF outputs of the WAU's (in a 60 channel configuration) or should be terminated by RF termination resistors (please consult NovaTec).

**Please note:** Never run the system without antenna! Do not leave any RF input without termination!

The **SXU** is an additional module which is used in conjunction with the WAU. In this combination the SXU allows the number of Simcards per channel available to the WAU according to configuration parameters to be chosen between 1 and 5 Simcards per channel.

The Sim-Combiner-Unit (**SCU**) corresponds optically to the SXU. The Status Displays of the SCU are different than those on the SXU and are therefore also separately described. The SCU is only for operation with the NMG as a Simserver, and therefore requires the SOS software to be installed for this to be used.

The **EWU** contains four GSM mobile engines and four SIM card readers for each GSM-Channels. The front panel contains:

- One RF output to be connected to the ACU or to an appropriate antenna.
- One strain relief lug for the antenna cable.

The EWU contain four LEDs for each mobile engine and two LEDs for the EWU itself as Status-Display. The SIM card reader GSM-Channel can be inserted by SIM cards of different providers (multiple provider mode) at the same time or can be left without SIM card. Standard or prepaid SIM cards can be handled by the system at the same time.

The **ULU** is a Module that can supply 4 X U-Interfaces. On these interfaces endequipments with U-Interfaces can be connected. In combination with PT-Repeaters and PT-US it is then possible to operate end equipments with BRI Interfaces up to 24km away from the actual system.

The ULU is also available with powered interfaces therefore end equipments i.e. the PT can be powered over greater distances.



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 **DC4** is a power supply module. When Bri Interfaces are required for example for the use of ISDN telephones and these ISDN telephones require power supply over the BRI interface then a DC4 must be used within the system. For calculation purposes 8 X ISDN telephones with typically 2 watts each require the use of 1 X DC4.

The B-Channel-Unit (**BCU**) enables the connection of the system to one or more IP Network for using VOIP-Applications. This then gives the possibility to re-route Data or Speech that is received into the system via ISDN, GSM or IP to other already existing IP networks. The BCU is available as either a 4 Channel, 8 channel, 16 channel or 32 channel BCU. The Modules are not distinguishable from each other from a front. If the BCU is removed from the System a sticker can be found on the connectors on the Backplane with the Model number, hereby the individual variants of the BCU can be differentiated. Each BCU can be populated with a GPS receiver daughter board. This daughterboard is optional necessary to be used minimum one in a system, when the NovaTec S20 has no other Synchronisation Source and synchron data should be transferred via IP network (TDM over IP).

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  $S_{2M}$ -Interfaces available. On the other hand the PRI Plug-in card with the article number 1F5020-1/1 makes available only one  $S_{2M}$ -Interface.

PRI-Plug-in card (with optional Echo Cancelation)

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 ->  $S_{2M}$ -Add-on board with 2 PRI (ISDN 30) Interfaces

1F5100/1 ->  $S_{2M}$ -Add-on board with 1 PRI (ISDN 30) Interface

1F5100/1E ->  $S_{2M}$ -Add-on board with 1 PRI (ISDN 30) Interface on which echocancelling is active.



1F5100E -> S<sub>2M</sub>-Add-on board with 2 PRI (ISDN 30) Interfaces with echocancelling active on Interface 2

1F5100ER -> S<sub>2M</sub>-Add-on board with 2 PRI (ISDN 30) Interfaces with echocancelling active on Interface 2 and switch through for the 2nd S<sub>2M</sub> interface to the 1st when system is inactive.

These S<sub>2M</sub> (PRI ISDN 30) Add-on boards can be installed on the CCU3, CCU\_Light and the CAU.

1F5100R -> S<sub>2M</sub>-Add-on board with 2 PRI (ISDN 30) Interfaces with switch through for the 1st S<sub>2M</sub> 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 to carry on operating when the NovaTec is out of operation.

#### GSM-2 Plug-in-card

The GSM-2-plug in card can be used on the WAU. It supports the system with two GSM-Dual-Band interfaced with DTMF.

#### GPS-Receiver

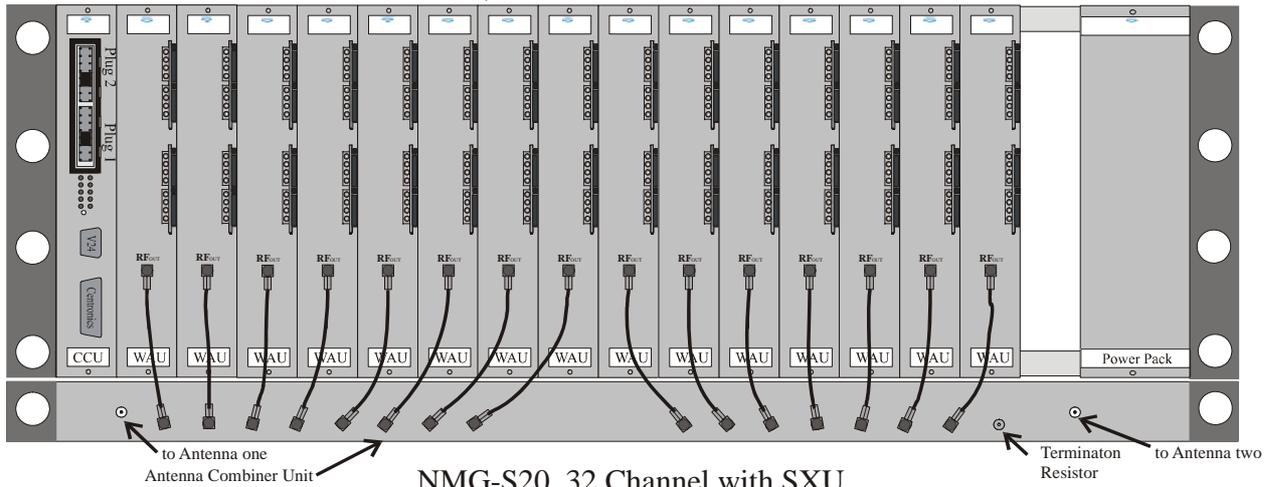
The GPS-Receiver is an plug-in card only for the BCU. it supports the system with an reference clock if no other reference clock source is available. In this case the system needs minimum one receiver on one BCU.

#### SIM-Reader Plug-in card

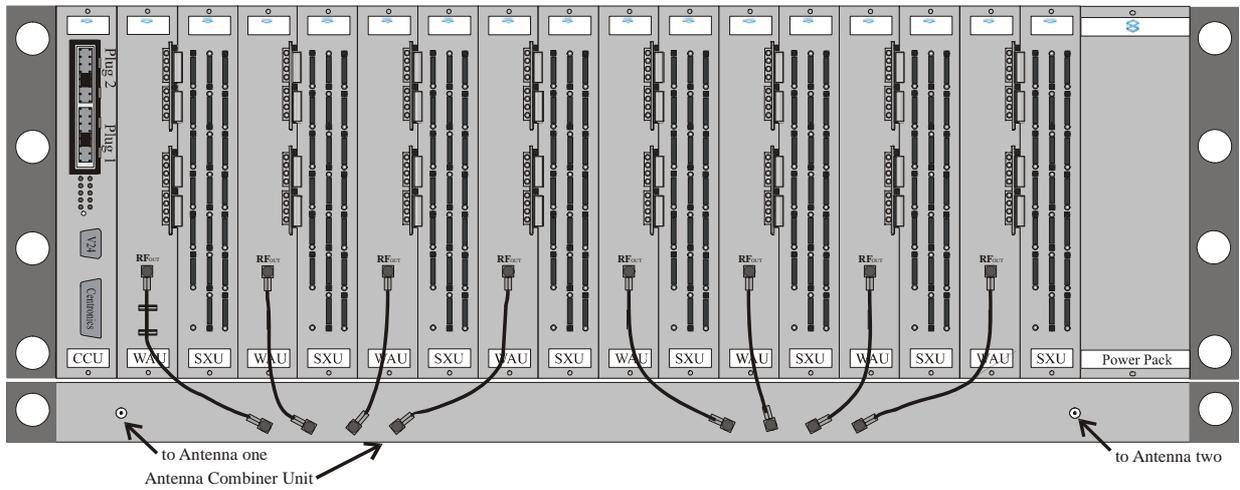
The SIM-Reader Plugin-in card is an Sub-Modul only for the EWU. It supplies the EWU with 16 Sim-Card-Reader ( 4 for each GSM-Channel of the EWU) and will be needed, for lokal SIM-Cards. For Applications with SIMs in SIM-Server only the SIM-Reader Plug-in card is not necessary.



NMG-S20, 60 Channel without SXU.



NMG-S20, 32 Channel with SXU.



Picture 3: Internal Structure of the NovaTec Mobile Gateway S20



## 4.6 Limitation of the NovaTec Mobile Gateway S20

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

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

The first table shows the expansion capabilities for a non-blocking NovaTec Mobile Gateway S20, the second table provides further information relevant to the blocking NovaTec Mobile Gateway S20.



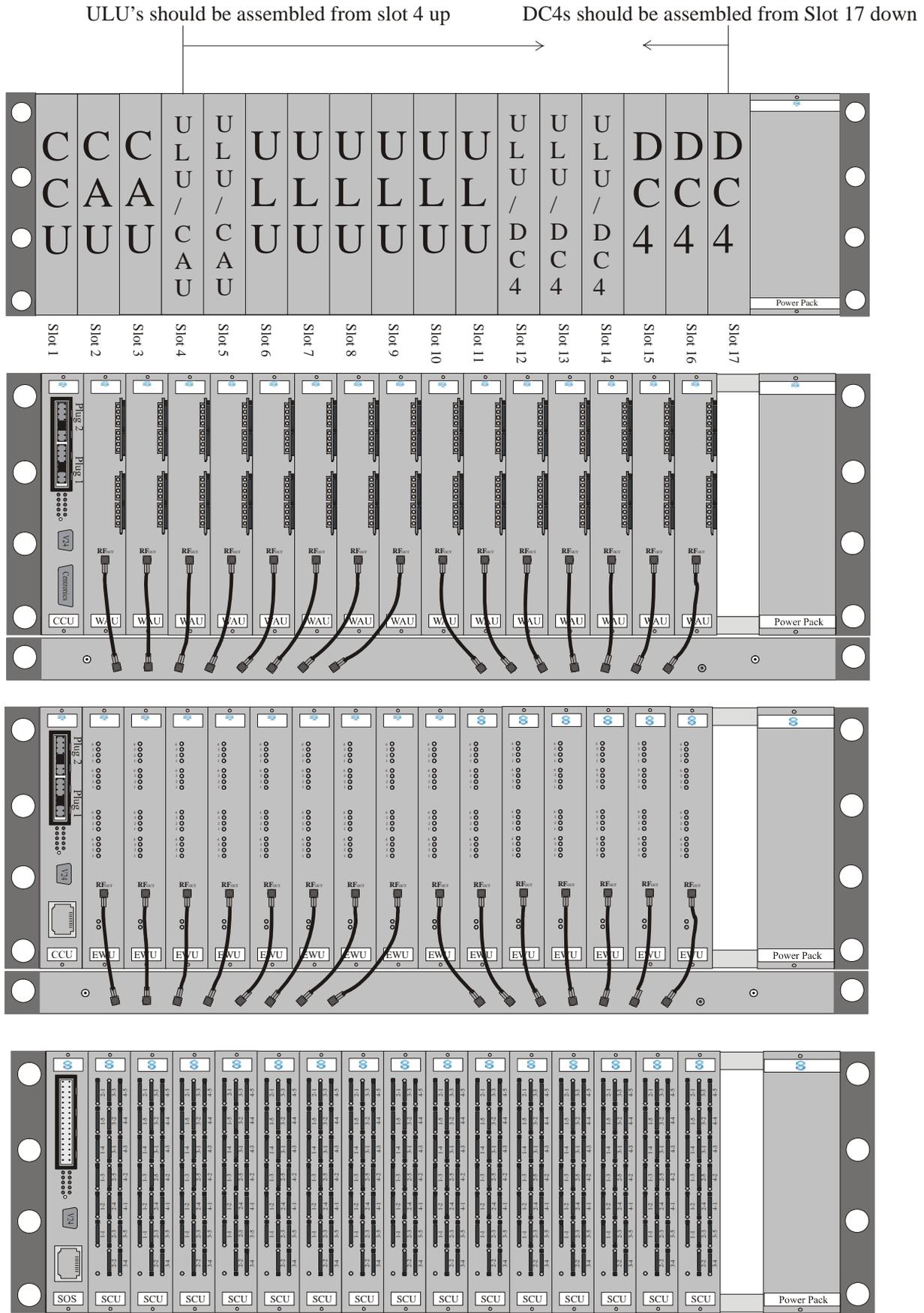
The following table describes the expansion capabilities of the NovaTec Mobile Gateway S20. The values provided in the table are parameters for the maximum expansion that can be undertaken. If you are intending to use the NovaTec Mobile Gateway S20 as a fixed mobile PABX, then you can combine the WAU modules with ULU for U interfaces and CAUs for the S/T interfaces. For more information please see NovaTec Splitter S20 Handbook. Please note that each WAU slide in card contains up to two mobile engines daughter boards. Each daughter board also contains two mobile engines.

Slot	Expansion board	Mode		Capability 1 (non blocking)									
		Power supply	No power supply	0 ULU	5 ULU	4 ULU	3 ULU	2 ULU	1 ULU	0 ULU			
<b>ULU</b>	None	X											
	None		X										
<b>CAU</b>	BRA-4	X		0	0	1	1	1	1	1	1	1	0
	BRA-4		X	0	0	1	1	1	1	1	1	1	0
	PRA-2		X	0	0	1	1	1	1	1	1	1	0
	PRA-2		X	0	0	1	1	1	1	1	1	1	0
<b>CCU</b>	BRA-4	X		0	0	1	1	1	1	1	1	1	0
	BRA-4		X	0	0	1	1	1	1	1	1	1	0
	PRA-2		X	1	1	0	0	0	0	0	0	0	0
<b>DC4</b>	4xBRA on Board			X	X	X	X	X	X	X	X	X	X
	If all BRA's have power supplies	X		1	1	2	2	3	3	3	3	3	4
<b>WAU or EWU</b>	GSM-2			15	1	1	1	1	1	1	1	1	1
	BRA interface			4	8	12	16	20	24	28	28	28	28
<b>Total</b>	U interface			0	20	16	12	8	4	0	0	0	0
	PRA interface			2	2	2	2	2	2	2	2	2	2
	Mobile channels			60	4	4	4	4	4	4	4	4	4

**Please note:**

If no CAU is in use within the NovaTe Mobile Gateway S20, the PRI expansion board will always be located on the CCU or CCU-3. On the first CAU in use, the PRA expansion board will be located on the CAU and a BRA expansion board will be inserted in to the CCU. If BRA interfaces with remote power supply (phantom powering) are required the DC4 must be inserted. DC4 can provide 16W (watt) power. 2W (1W per terminal equipment) are provided into each BRA interface. This means that one DC4 provides the power for 8 BRA interfaces. Should more BRA interfaces require a power supply, additional DC4s must be installed.





**Pictrue 4:** NovaTec's proposal for the expansion capabilities  
NovaTec Mobile Gateway S20



Further details for the installation of Modules:

CCU and CCU-Light

The CCU and CCU-Light can be used in principle only in Slot 1

CCU-3

The the CCU-3 is preferably used in Slot 1. If the CCU-3 is used in the range Slot 2 to Slot 16, this CCU-3 cannot serve further modules in the system. This is usually when e.g. if a second NovaTec is used in form an individual CCU-3 (e.g. Splitter) within an existing NovaTec S20.

This CCU-3 would then operate autonomously.

A CCU-3 may only be used in Slot 17, if no CCU-3 is in Slot 16. Each CCU-3 must possess its own IP address

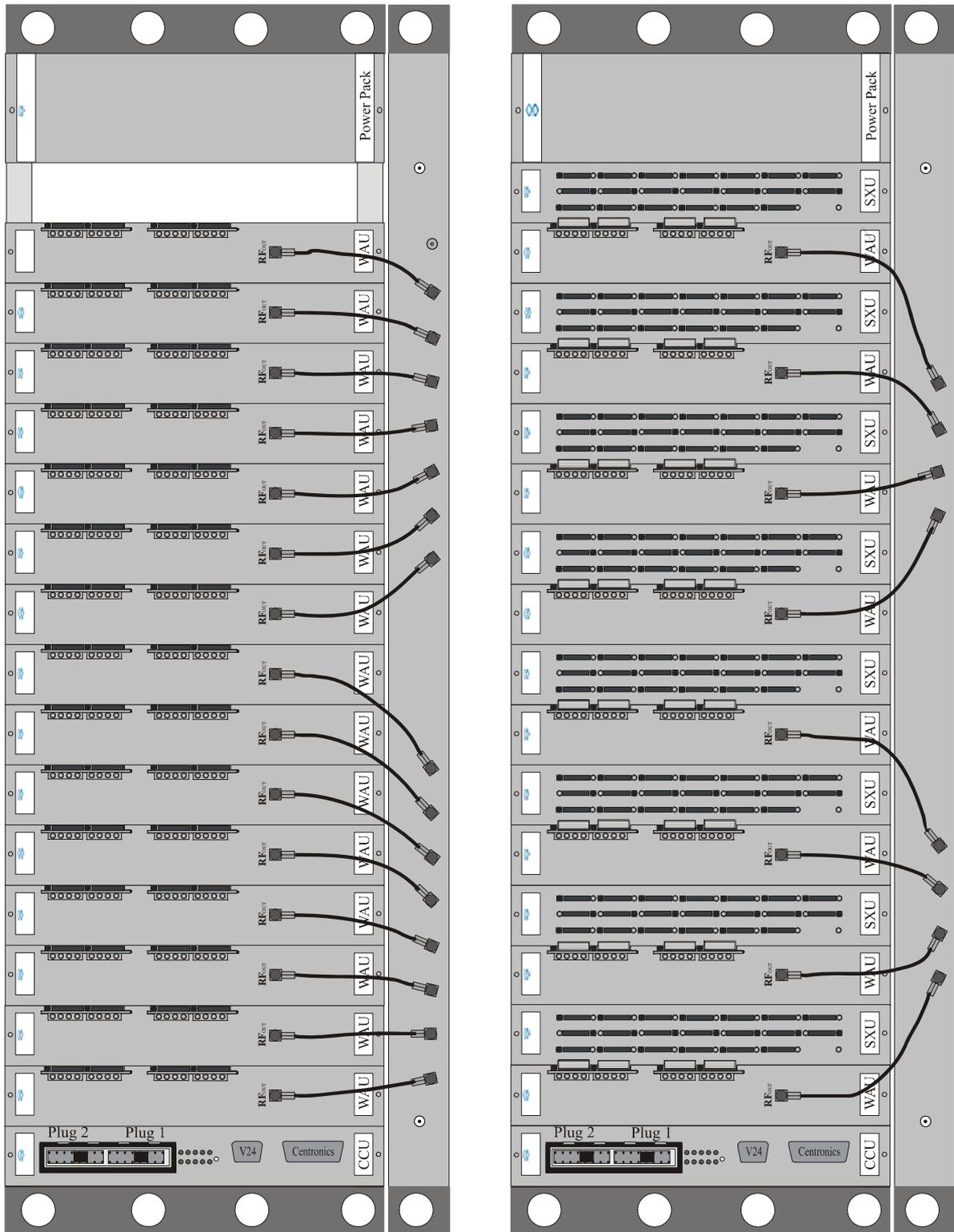
CBS, SOS

For these modules the same applies as to the CCU-3.



## 4.7 NovaTec Mobile Gateway S20 Connector Panel

All connections that are required to operate the NovaTec Mobile Gateway S20 are established via the plug-in connectors on the front panel. Therefore, only use officially authorised cables or those that we provide with the equipment. The following illustration shows the front panel of the NovaTec Mobile Gateway S20 with the standard configuration for 60 channels without SXU respectively 32 Channels with SXU.



Picture 5: NovaTec Mobile Gateway S20 connector panel



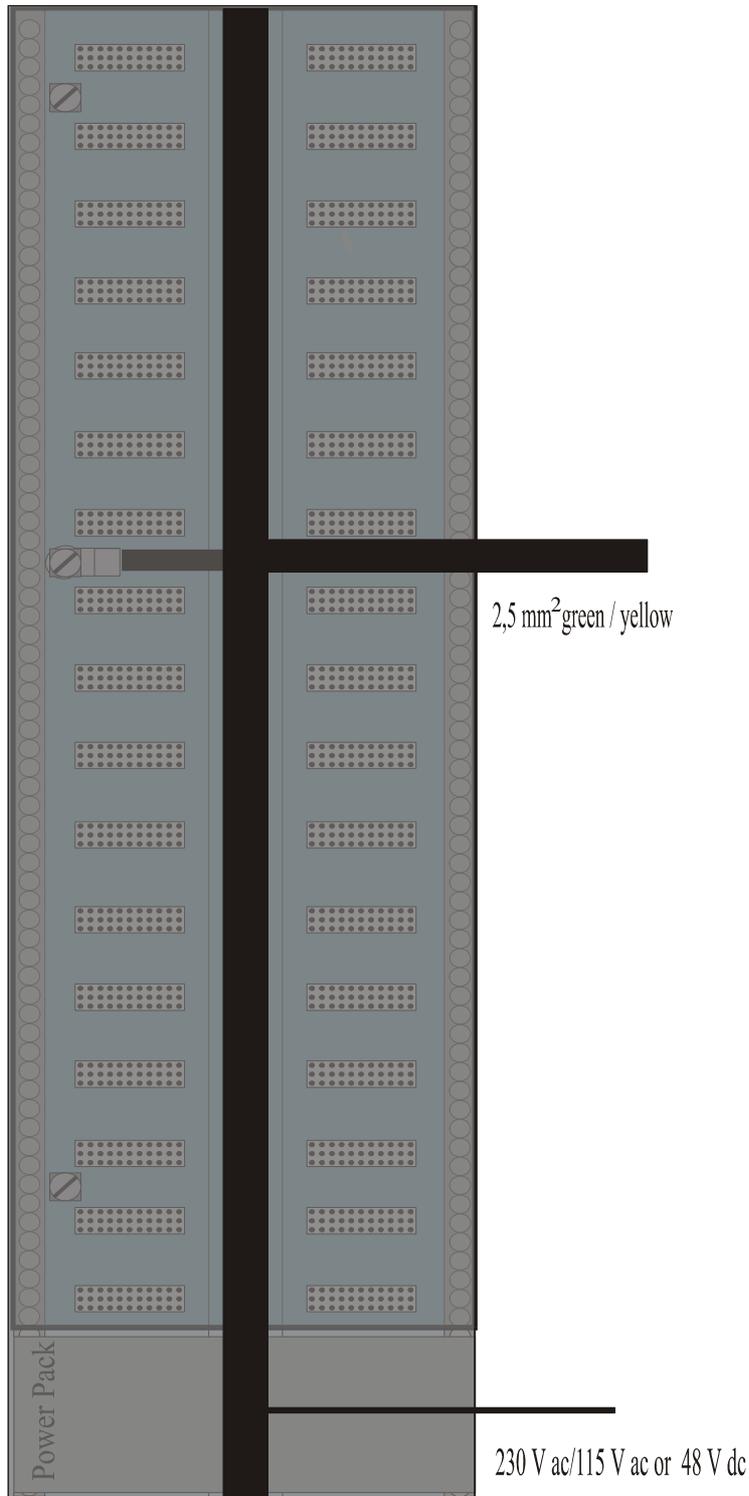
## 4.8 Earthing the NovaTec Mobile Gateway S20

According to the German electrical engineering authority regulations, VDE 0800 Part 2, the NovaTec Mobile Gateway S20 must be earthed through a fixed connection that cannot be disconnected. You will therefore find a separate green/yellow coloured cable with a minimum diameter of 2.5 mm<sup>2</sup> on the rear of the NovaTec Mobile Gateway S20.

Identify a point in the building where building services are located and the NovaTec Mobile Gateway S20 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.

The earthing cable must be connected to the earthing point of your building services. Please ensure, that your telecommunications system and all distributors are also earthed.

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



**Picture 6:** Connection of the earth cable to the NovaTec Mobile Gateway S20 (viewed from rear)



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



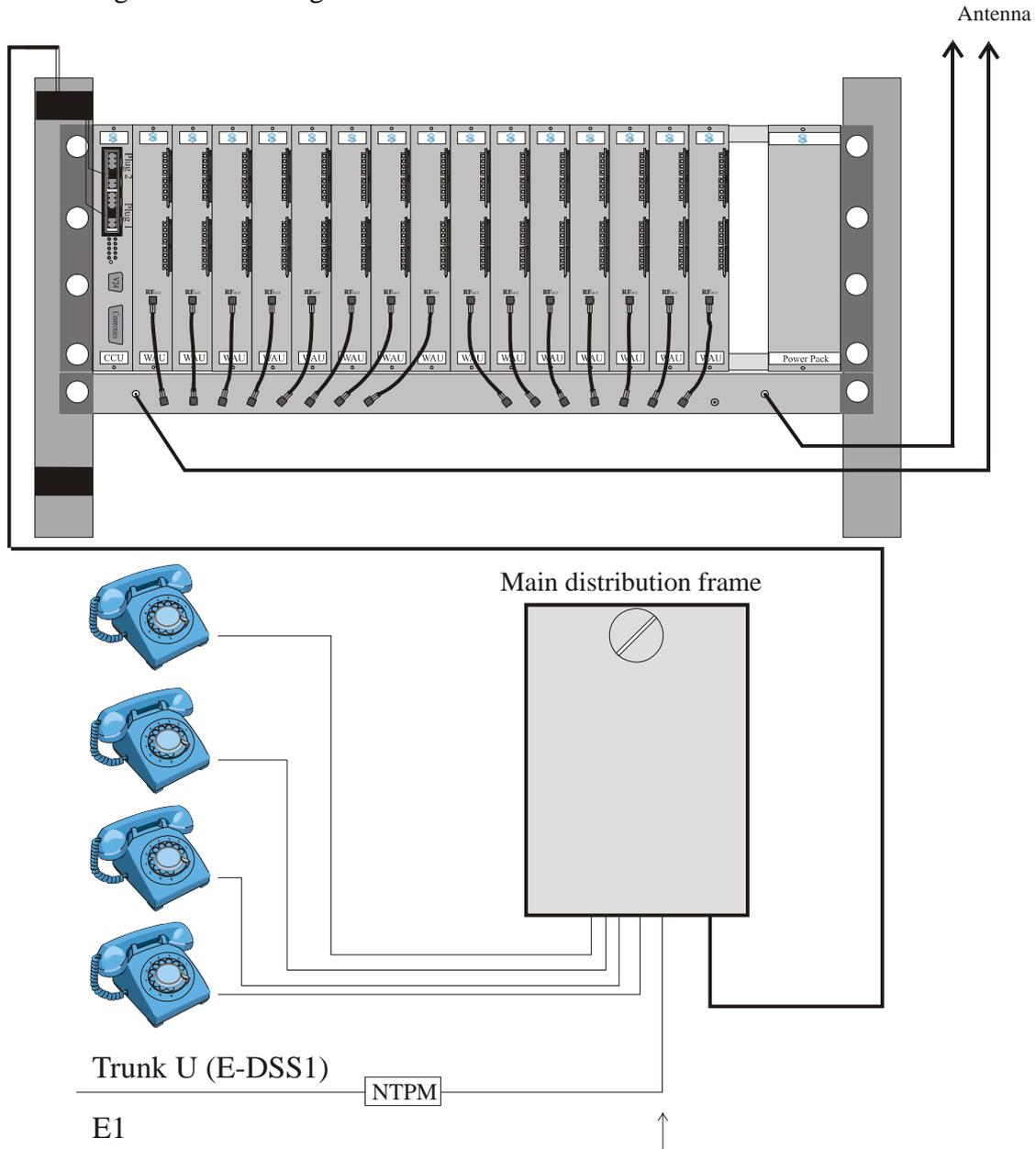
## 4.9 Connecting the NovaTec Mobile Gateway S20

In case of delivery in a cabinet by NovaTec, all trunk and terminal equipment interfaces on the NovaTec Mobile Gateway S20 are fed through a main distribution frame or a patch panel. This includes all lines from the trunk or subscriber to the NovaTec Mobile Gateway S20 and the lines from NovaTec Mobile Gateway S20 to the switch.



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

The following structural diagram illustrates the connection of these lines:



**Important:**  
Before commencing installation please note  
Chapter 5.2

**Picture 7:** Structure of line connections to the NovaTec Mobile Gateway S20



## **4.10 NovaTec Mobile Gateway S20 Terminal Equipment Interface**

This chapter describes the physical assembly of the NovaTec Mobile Gateway S20 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 Mobile Gateway S20 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 is comprised of 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. The end of non used lines must be terminated in the main distribution frame. Each PRA interface consists of the following four wires:

Transmit A  
Transmit B  
Receive A  
Receive B

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



### **4.10.3 The Antenna**

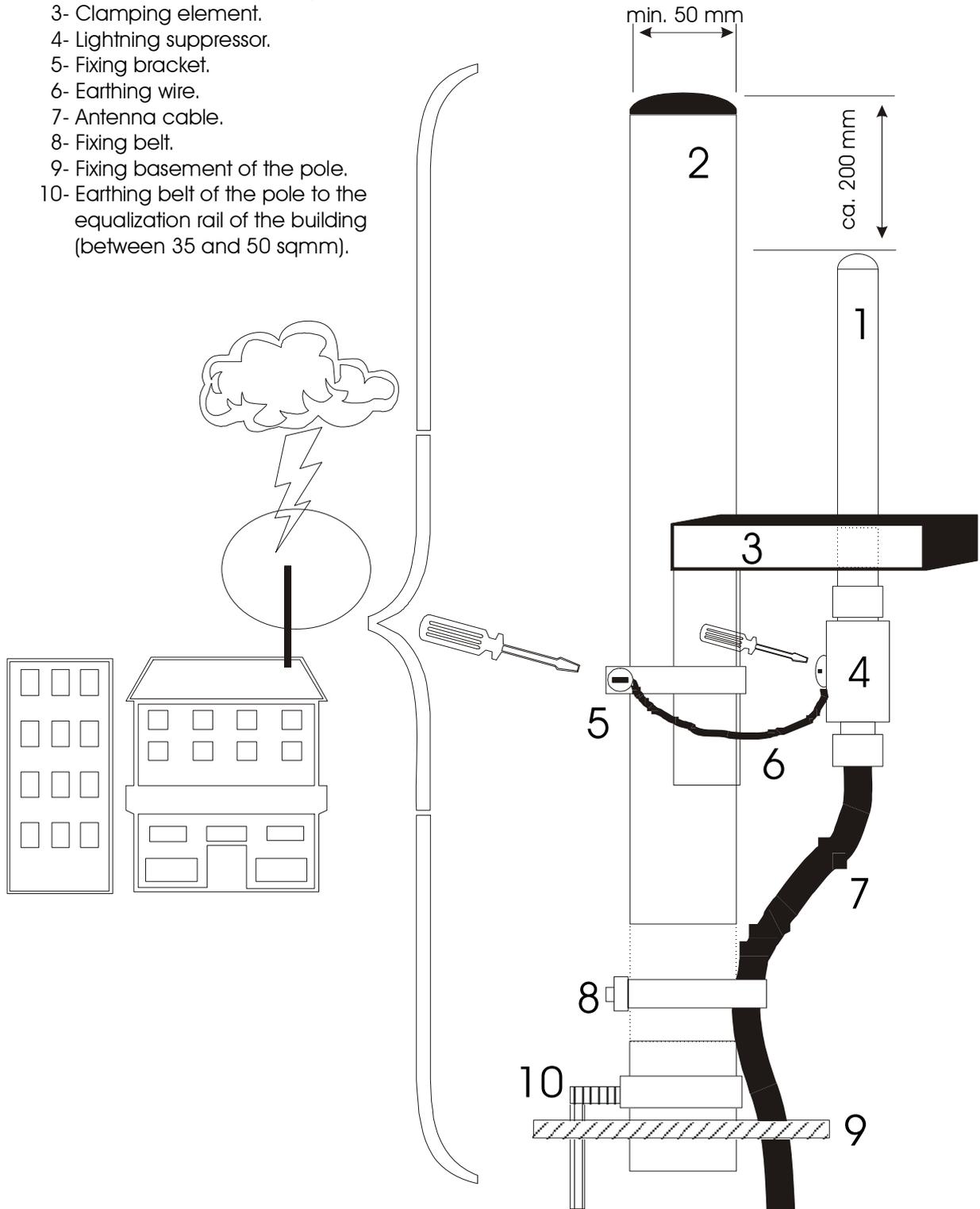
The RF output on the front panel of the WAU or EWU must be connected to an Antenna Combiner Unit (ACU) by shielded coax cables. The outdoor antenna should be connected to the RF output of the ACU.

The type of the coax cable connected to the RF output of the ACU is configuration dependent. If a long distance is required (cable length more than 10 meters) other cable types must be used.

For more information please contact the support center of NovaTec.

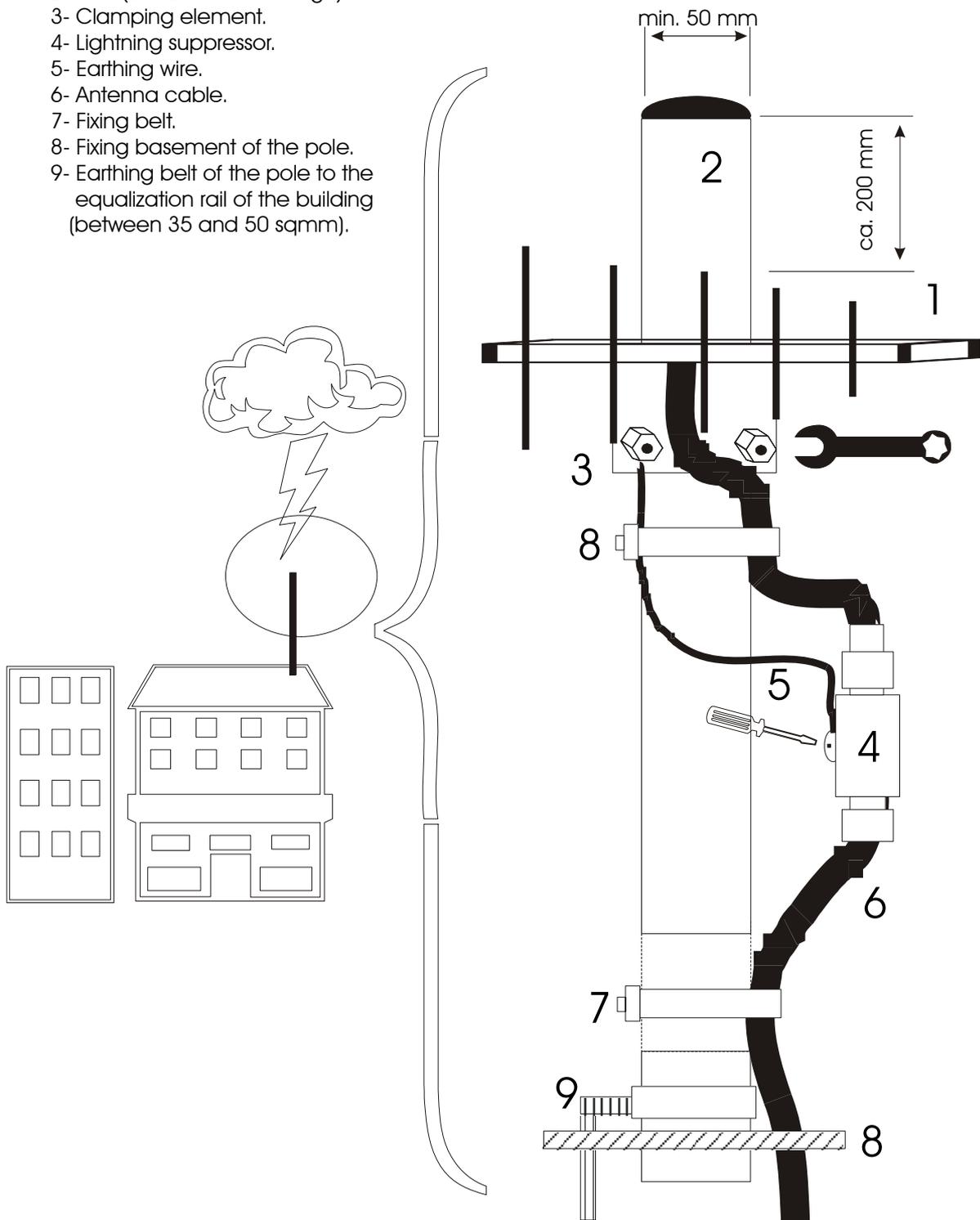
#### 4.10.4 Installing instructions of the outdoor antenna

- 1- The ground plane antenna.
- 2- Pole (ca. 2 to 3 meter high).
- 3- Clamping element.
- 4- Lightning suppressor.
- 5- Fixing bracket.
- 6- Earthing wire.
- 7- Antenna cable.
- 8- Fixing belt.
- 9- Fixing basement of the pole.
- 10- Earthing belt of the pole to the equalization rail of the building (between 35 and 50 sqmm).



**Picture 8:** Installation of the ground plane antenna

- 1- The directional antenna.
- 2- Pole (ca. 2 to 3 meter high).
- 3- Clamping element.
- 4- Lightning suppressor.
- 5- Earthing wire.
- 6- Antenna cable.
- 7- Fixing belt.
- 8- Fixing basement of the pole.
- 9- Earthing belt of the pole to the equalization rail of the building (between 35 and 50 sqmm).



**Picture 9:** Installation of the directional antenna

## 4.11 Pin Assignment for Connections to the NovaTec Mobile Gateway S20

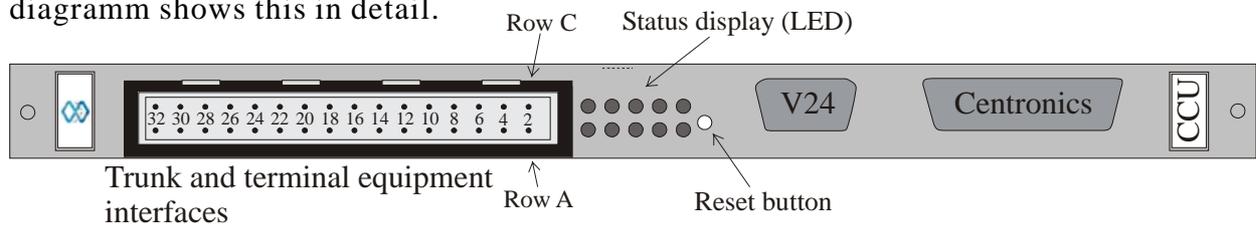
This chapter describes the signal assignment for all NovaTec Mobile Gateway S20 plug connections. This information will enable you to plug all your terminal equipment into the NovaTec Mobile Gateway S20.



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

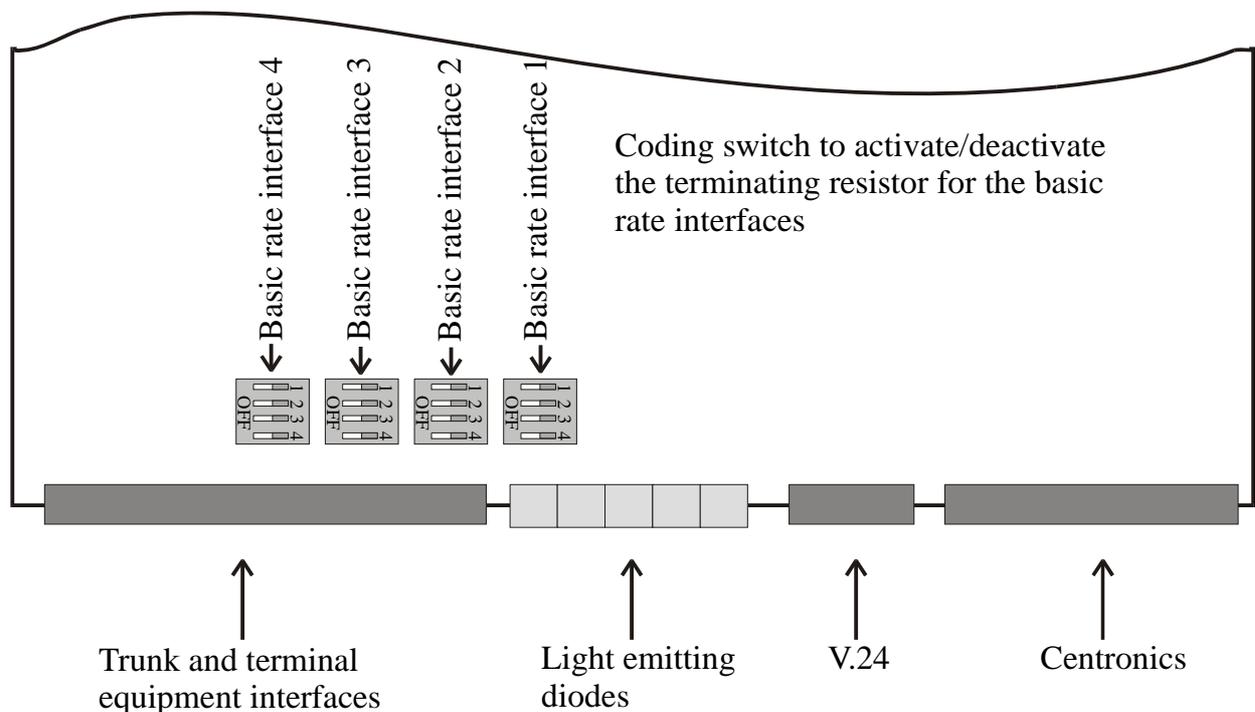
### 4.11.1 CCU Pin Assignment

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 diagram shows this in detail.



**Picture 10:** 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 11:** Positioning of the CCU coding switch



### V.24/RS232 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	Initialize	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.

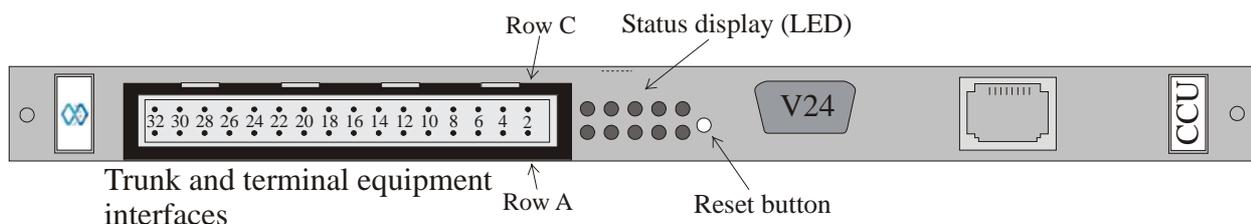
### 4.11.3 CCU-3 Pin Assignment

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 12:** CCU-3 pin assignment

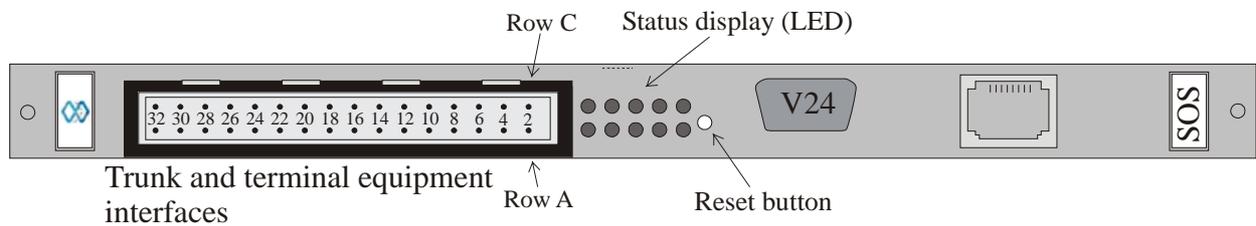
## 4.11.4 SOS Pin Assignment

Sea-Of-Sims (SOS) is the core of the system for using the NMG as Sim-Server. For this case are one or more SCU's required.

The SOS supports an Ethernet interface, which can be operated with 10 MBit or 100 Mbit. All remote support functions e.g. configuration of the system or diagnosis are thus over the Ethernetinterface and via IP possible. Furthermore the SOS offers two places for plug-on cards. 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 SOS).

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



**Picture 13:** SOS pin assignment

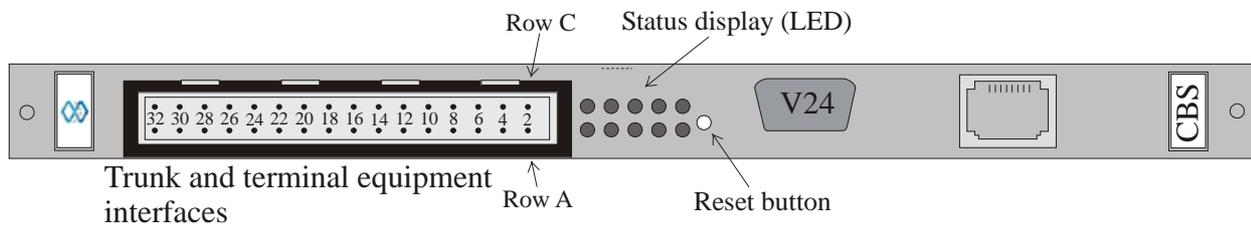
## 4.11.5 CBS Pin Assignment

Call-Back-Server (CBS) is the core of the system for using the system as Call-Back-Server.

The CBS supports an Ethernet interface, which can be operated with 10 MBit or 100 Mbit. All remote support functions e.g. configuration of the system or diagnosis are thus over the Ethernet interface and via IP possible. Furthermore the SOS offers two places for plug-on cards. 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 CBS).

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



**Picture 14:** CBS pin assignment



### **4.11.6 WAU front panel Assignment**

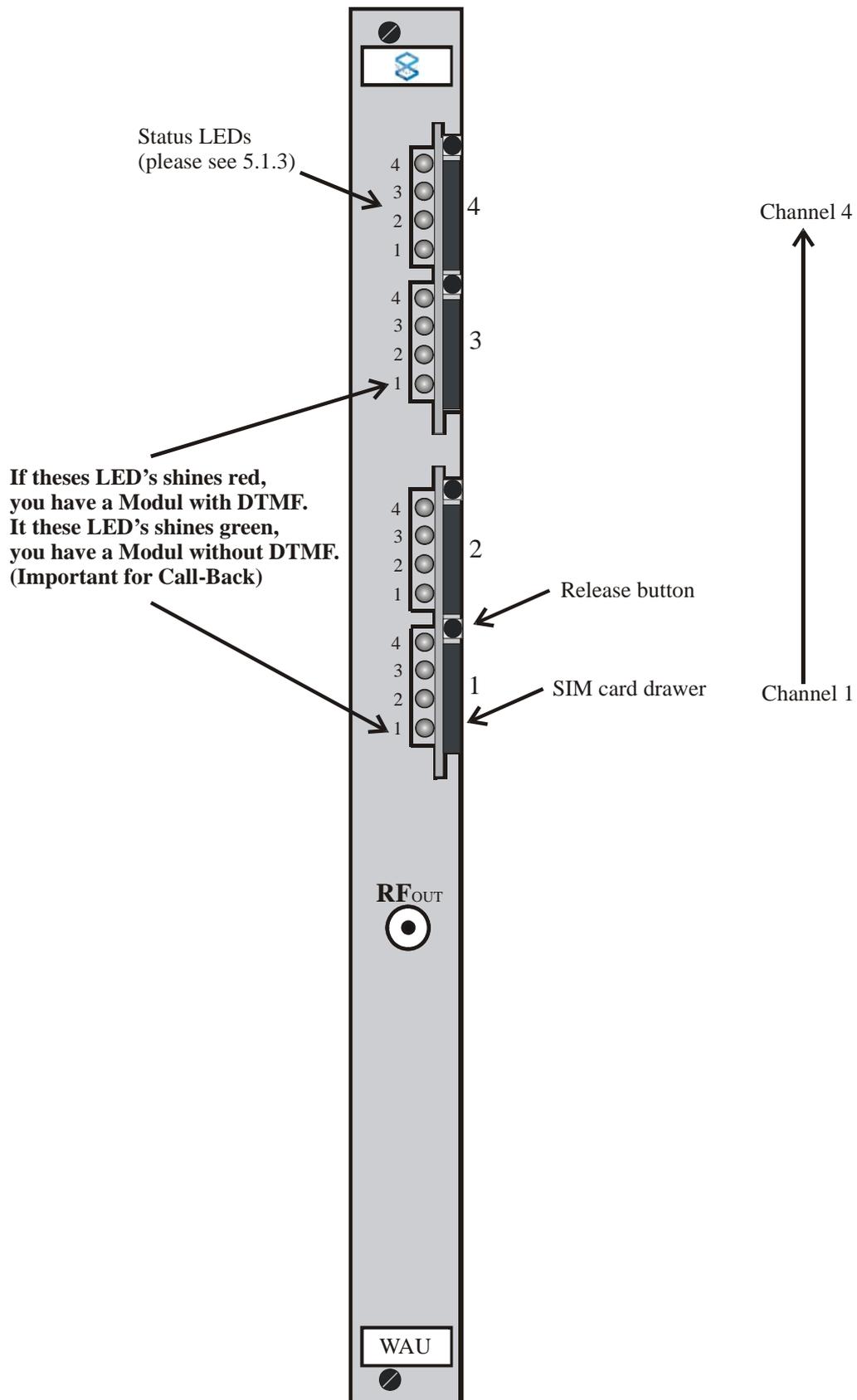
The WAU contains the mobile engines and the SIM card readers. The front panel contains:

- One RF output to be connected to the ACU or to an appropriate antenna.
- One strain relief lug for the antenna cable.
- WAU can be mounted with up to two mobile engine daughter cards with two engines each.

The mobile engine daughter cards contain the SIM card reader and 4 LEDs for each mobile engine. The SIM card reader of each daughter card can be inserted by SIM cards of different providers (multiple provider mode) at the same time or can be left without SIM card. Standard or prepaid SIM cards can be handled by the system at the same time.

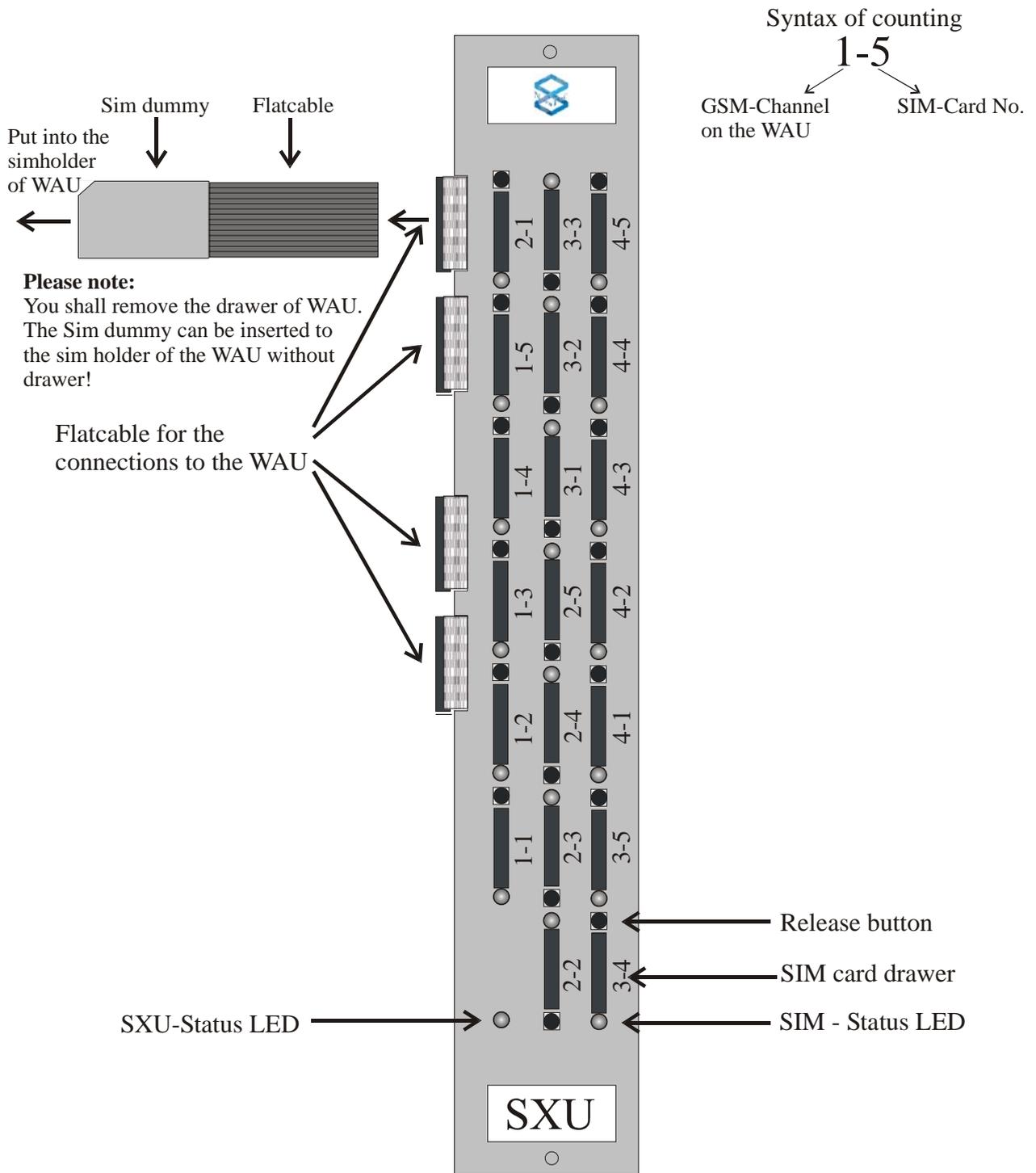
#### **Mounting/dismounting of the SIM cards:**

- 1- push the release button (see picture 15) with a hard sharp pointed object to release the drawer. Remove the drawer completely.
- 2- Insert the SIM card into the drawer in the correct position (please note that the marked corners of the SIM card and the drawer should be in the same position).
- 3- Push the drawer with the SIM card into the appropriate slot, with the contacts of the SIM card pointing to the LEDs.
- 4- For all other channels please go through the same procedure.
- 5- Then configure the SIM card into the system with the configuration software.



**Picture 15:** WAU front panel assignment and placing of the SIM-Cards

### 4.11.7 SXU front panel Assignment



**Picture 16:** SXU front panel assignment and placing of the SIM-Cards



## 4.11.8 The Module Sim Card Multiplexer SXU

Each Sim Card Multiplexer enables for all 4 GSM channels of WAU the multiplexing of 5 Sim Card readers, for each GSM Channel.

On the front of the Sim Card Multiplexer are located 4 plug-in connections and 20 Sim Card holders. The 4 plug-in connectors establish the connection to the GSM Modules.

The 20 Sim Card holders are distributed on 2 printed circuit boards, On the main board there are six and a further 14 are located on an expansion board.

Two versions of the SXU are currently in Production, SXU differs from the SXU only by the channel number allocation (see Picture 16 and 17)

On a NMG S20 with 30 channels the SXU's are in alternate positions with the WAU's on a 1 to 1 basis and in this case the ACU2 must be affixed to the bottom of the mounting shelf/Rack.

On a NMG S20 with 60 Channels two racks are needed. The two CCU's one in each rack are connected together via an interchange E1 interface. Two E1s are provided for the traffic. The two E1s behave as one Unit for the network.

The SXU's and WAU's are connected together via a flat cable connector directly from the SXU to the Sim holder of the appropriate WAU, with the Sim Cards being then held within the SXU Sim Card Slots

## 4.11.9 The Sim Card Holder

### **Please note:**

Only Sim cards with a voltage of 3V are supported on the frontpanel of SXU.

The LED signals which Sim cardholder is currently active, and also in which Sim cardholder an operational Sim card is held and if an error has occurred (Software).

Each Sim Card holder is allocated an LED which shows the status of the Sim Card holder.

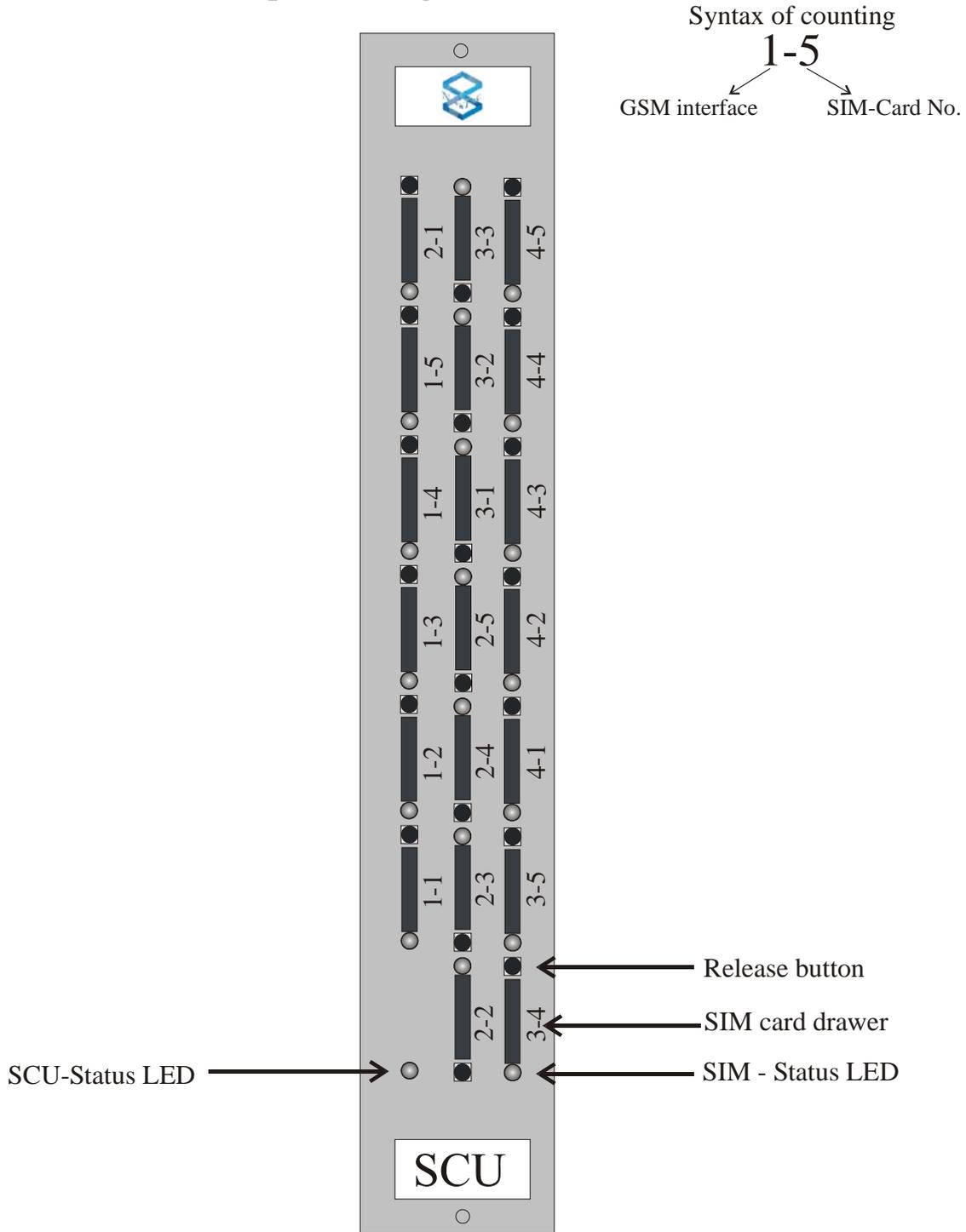
Sim Card holders are accessed via the insertion of a suitable pointed instrument in the yellow release button, the drawer is then completely removeable for the insertion of the Sim Card

Insert the Sim Card into the drawer in the correct position, (marked corner of the Sim Card should match the marked corner of the drawer)

Push the drawer and Sim Card into the appropriate slot, with the contacts of the Sim Card pointing towards the LED's

Configuration of the Sim Cards can then go ahead.

### 4.11.10 SCU front panel Assignment



**Picture 17:** SCU front panel assignment and placing of the SIM-Cards



#### **4.11.11 The Module Sim Combiner Unit**

Each Sim-Combiner-Unit (SCU) can hold up to 20 Sim-Cards. These 20 Sim-Cards are logically organised in 4 Groups each with 5 Sim Cards. Each group is assigned to a GSM channel in the Sim Client by way of configuration

#### **4.11.12 The Sim Card Holder**

**Please note:**

Only Sim cards with a voltage of 3V are supported on the frontpanel of SCU.

Each Sim Card holder is allocated an LED which shows the status of the Sim Card holder.

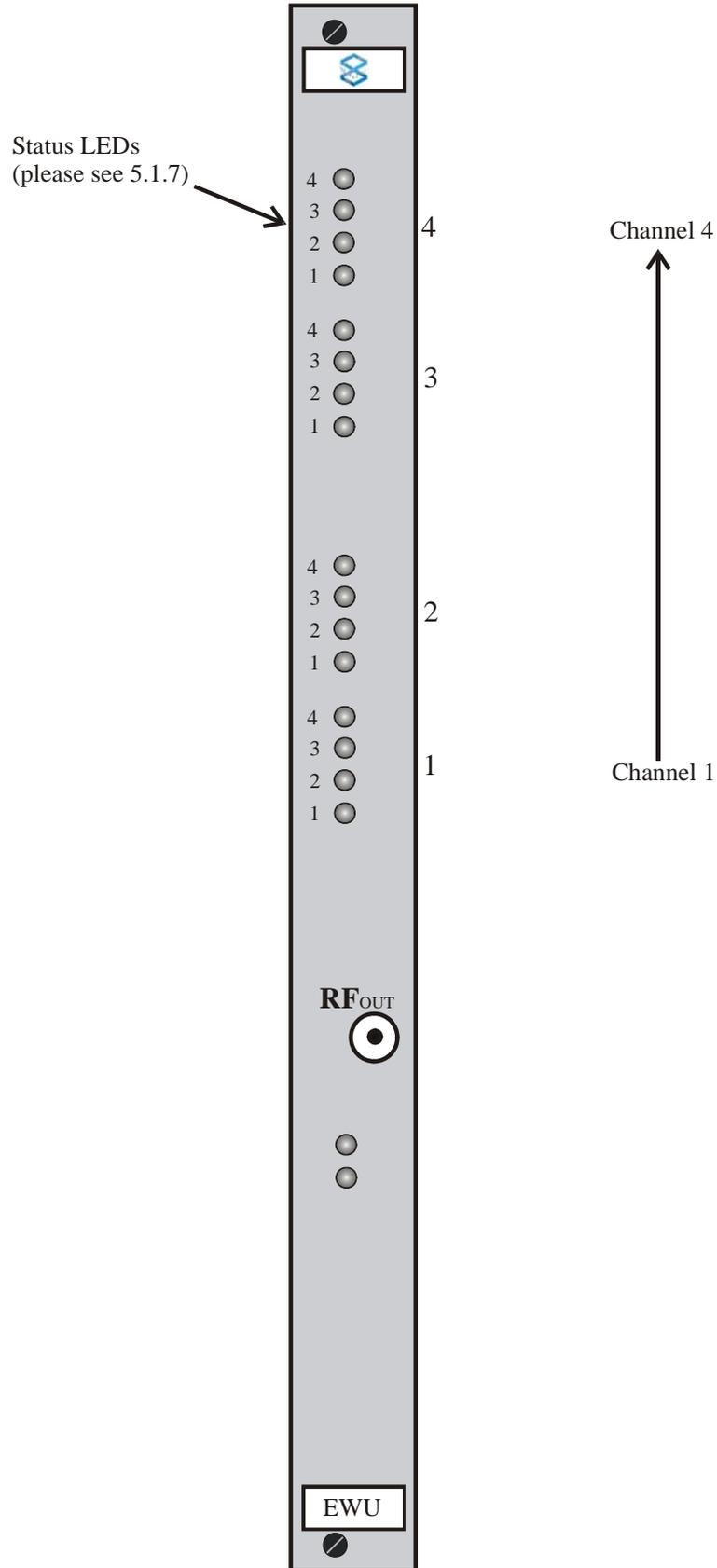
Sim Card holders are accessed via the insertion of a suitable pointed instrument in the yellow release button, the drawer is then completely removeable for the insertion of the Sim Card

Insert the Sim Card into the drawer in the correct position, (marked corner of the Sim Card should match the marked corner of the drawer)

Push the drawer and Sim Card into the appropriate slot, with the contacts of the Sim Card pointing towards the LED's

Configuration of the Sim Cards can then go ahead.

### 4.11.13 EWU front panel Assignment



Picture 18: EWU front panel assignment



The EWU contains four GSM mobile engines and four SIM card readers for each GSM-Channels. The front panel contains:

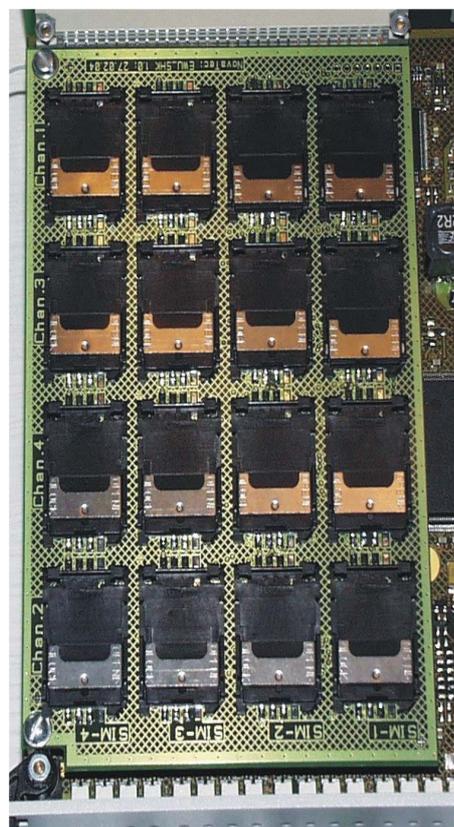
- One RF output to be connected to the ACU or to an appropriate antenna.
- One strain relief lug for the antenna cable.

The EWU contain four LEDs for each mobile engine and two LEDs for the EWU itself as Status-Display. The SIM card reader GSM-Channel can be inserted by SIM cards of different providers (multiple provider mode) at the same time or can be left without SIM card. Standard or prepaid SIM cards can be handled by the system at the same time.

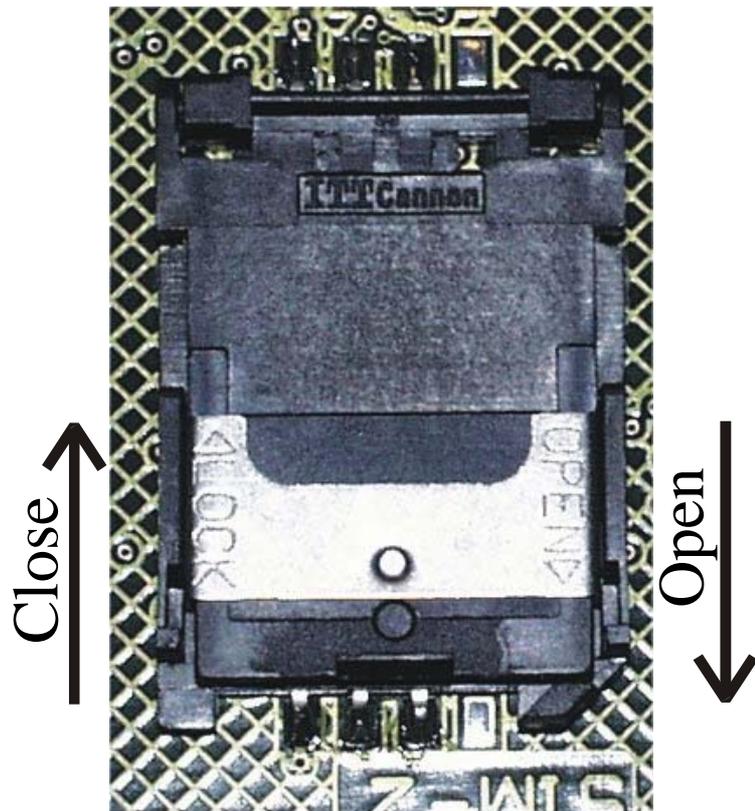
### Mounting/dismounting of the SIM cards:

- 1- Unscrew the two screws found top and bottom of the front panel and pull the insert card out of the system. On this Module you will find the Sim Card Holders. On the Edge of the Circuit board you will find the inscription to show which Sim Card (SIM-1 to SIM 4) should be associated with which GSM Channel (Chan.1 to Chan.4) (Picture 19).
- 2- Open the Sim Card Holder, by pushing the Metal fastener 2mm outwards, and then unclip the Sim Card Holder (Picture 20 and 21)
- 3- Insert the Sim Card as shown in Picture 22 into the unclipped upperside of the Sim Card Holder, Reclip the Sim Card Holder down and secure with the metal fastener
- 4- For all other channels please go through the same procedure.

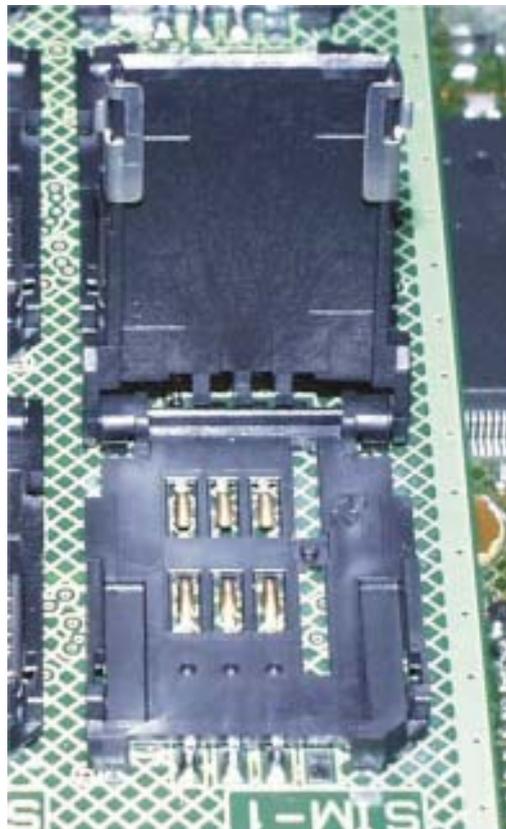
**Important Note: All Simcard readers are to be in the locked position before the EWU is inserted into the NMG**



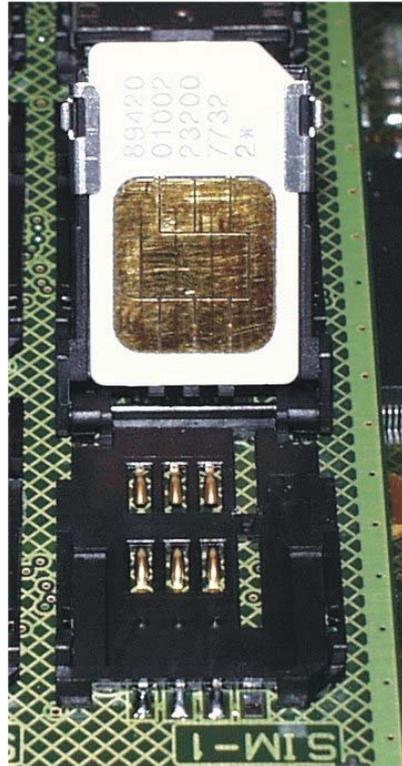
**Picture 19:** Sim card reader on EWU



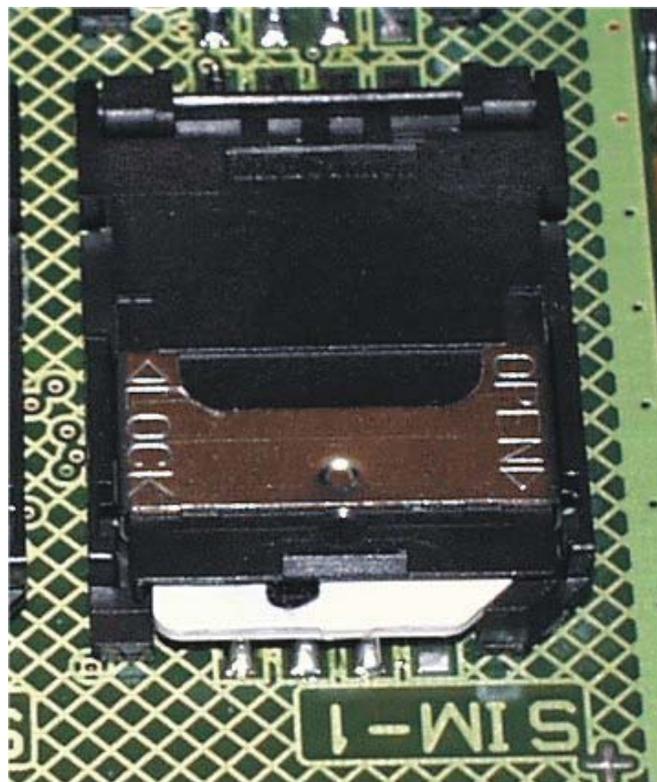
**Picture 20:** Handling the Sim card reader on EWU



**Picture 21:** OpenSim card reader on EWU



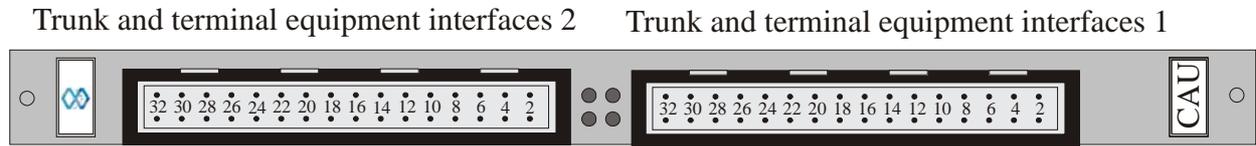
**Picture 22:** Placed SIM-Card



**Picture 23:** Placed SIM-Card in closed holder

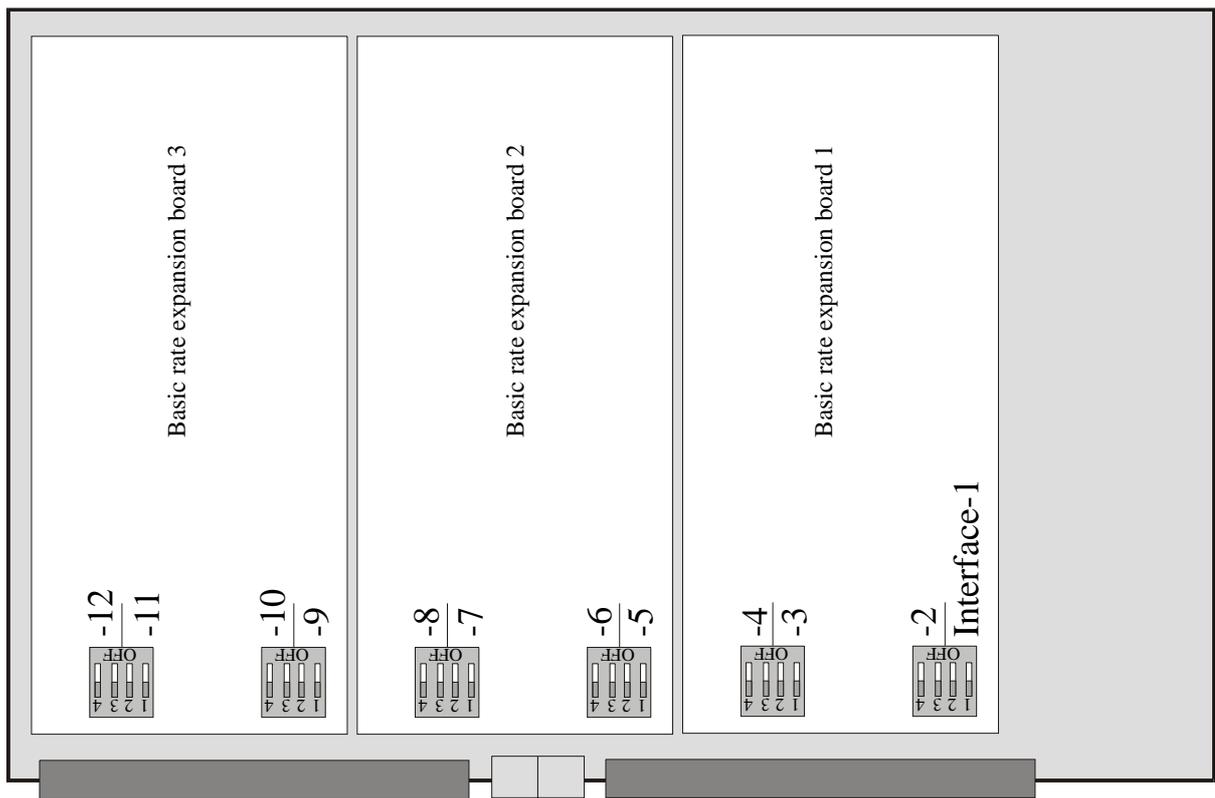
### 4.11.14 CAU Pin Assignment

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.



**Picture 24:** CAU pin assignment

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



Terminal equipment interfaces 2      Light emitting diodes      Terminal equipment interfaces 1

**Picture 25:** Positioning of the CAU coding switch



### CAU terminal equipment interface 1

Plug	Interface	Signal	Line colour	Row	Contact	
<b>1</b>	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	
<b>2</b>	BRA	<b>1</b>	Transmit A	white	A	18
	BRA		Transmit B	brown	C	18
	BRA		Receive A	green	A	20
	BRA		Receive B	yellow	C	20
	BRA	<b>2</b>	Transmit A	grey	A	22
	BRA		Transmit B	pink	C	22
	BRA		Receive A	blue	A	24
	BRA		Receive B	red	C	24
	BRA	<b>3</b>	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	<b>4</b>	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

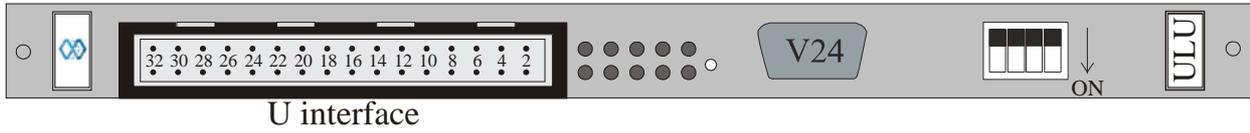
Plug	Interface		Signal	Line colour	Row	Contact
1	BRA	5	Transmit A	white	A	2
	BRA		Transmit B	brown	C	2
	BRA		Receive A	green	A	4
	BRA		Receive B	yellow	C	4
	BRA	6	Transmit A	grey	A	6
	BRA		Transmit B	pink	C	6
	BRA		Receive A	blue	A	8
	BRA		Receive B	red	C	8
	BRA	7	Transmit A	black	A	10
	BRA		Transmit 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 plugs in spaces 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).

### 4.11.15 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.



**Picture 26:** ULU Pin Assignment

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

Signal assignment for the V.24/RS232 configuration and data 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	5	1		white	A	18
	free				brown	C	18
	free				green	A	20
	free				yellow	C	20
	free	6	2		grey	A	22
	free				pink	C	22
	free				blue	A	24
	free				red	C	24
	free	7	3		black	A	26
	free				violet	C	26
	free				grey/pink	A	28
	free				red/blue	C	28
	free	8	4		white/green	A	30
	free				brown/green	C	30
	free				white/yellow	A	32
	free				yellow/brown	C	32

## 4.11.16 PTI Pin Assignment

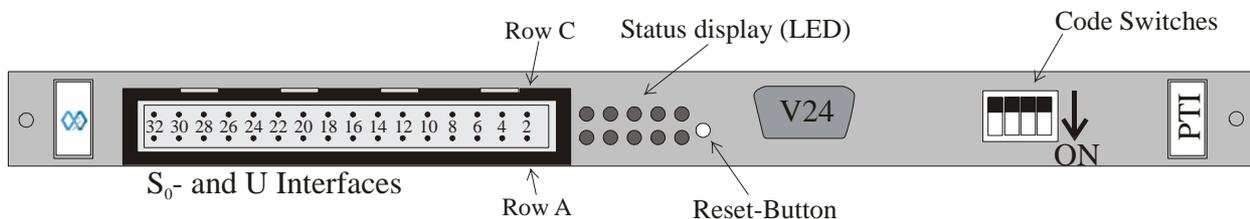
This chapter describes the signal assignment for all PTI plug connections.



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

### PTI-SU 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 27:** PTI pin assignment

### V.24 interface signal assignment

Pin	Signal name	Signal direction relating to the PTI-SU
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	



PTI-SU, S<sub>0</sub> and U<sub>0</sub> interfaces, directionally orientated signals the given signal is always described from the perspective NovaTec S20.

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	S <sub>0</sub>	5	1	Transmit A	white	A	18
	S <sub>0</sub>			Transmit B	brown	C	18
	S <sub>0</sub>			Receive A	green	A	20
	S <sub>0</sub>			Receive B	yellow	C	20
	S <sub>0</sub>	6	2	Transmit A	grey	A	22
	S <sub>0</sub>			Transmit B	pink	C	22
	S <sub>0</sub>			Receive A	blue	A	24
	S <sub>0</sub>			Receive B	red	C	24
	S <sub>0</sub>	7	3	Transmit A	black	A	26
	S <sub>0</sub>			Transmit B	violet	C	26
	S <sub>0</sub>			Receive A	grey/pink	A	28
	S <sub>0</sub>			Receive B	red/blue	C	28
	S <sub>0</sub>	8	4	Transmit A	white/green	A	30
	S <sub>0</sub>			Transmit B	brown/green	C	30
	S <sub>0</sub>			Receive A	white/yellow	A	32
	S <sub>0</sub>			Receive B	yellow/brown	C	32

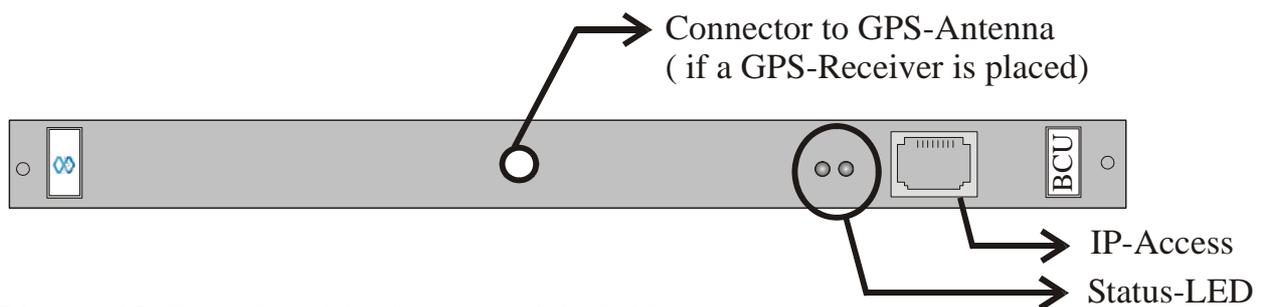
### 4.11.17 BCU Pin Assignment

The B-Channel-Unit (BCU) enables the VOIP/IP connectivity of the NovaTec S20. The BCU includes the vocoder and the elastic buffer for the voice compression and Jitter compensation for the IP Package trip. BCU handles the RTP and RTCP for the VOIP applications.

The BCU is available in 4 variants:

- 1F7000 -> BCU-4 with 4x vocoder
- 1F7001 -> BCU-8 with 8x vocoder
- 1F7002 -> BCU-16 with 16x vocoder
- 1F7003 -> BCU-32 with 32x vocoder

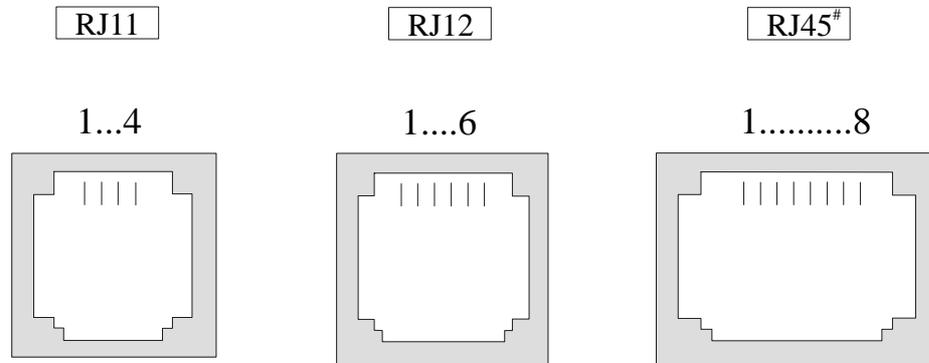
The Moduls are not distinguishable from the front. If the BCU is removed from the System a sticker can be found on the connectors to the backplane with Model number, hereby the individual variants of the BCU can be differentiated or if a connection is made via the Trace-Info-Client this can be also be used for distinguishing between models. The BCU has a Ethernet connection, two status LED and a connection of a GPS antenna and a Sub-Modul-Place for the GPS-Receiver.



**Picture 28:** Front Panel Assignment of the BCU.

### 4.11.18 Signal Assignment of the Telecommunications Sockets

This chapter describes the signal assignment of the telecommunications sockets in the field and at the patch panel (Only available in a delivery within cabinet) of the NovaTec Mobile Gateway S20. This information is necessary to enable you to connect the terminal equipment plugs in accordance with the signal assignment.



**Picture 29:** External view of the telecommunications sockets  
#: The patch panel provides only RJ45



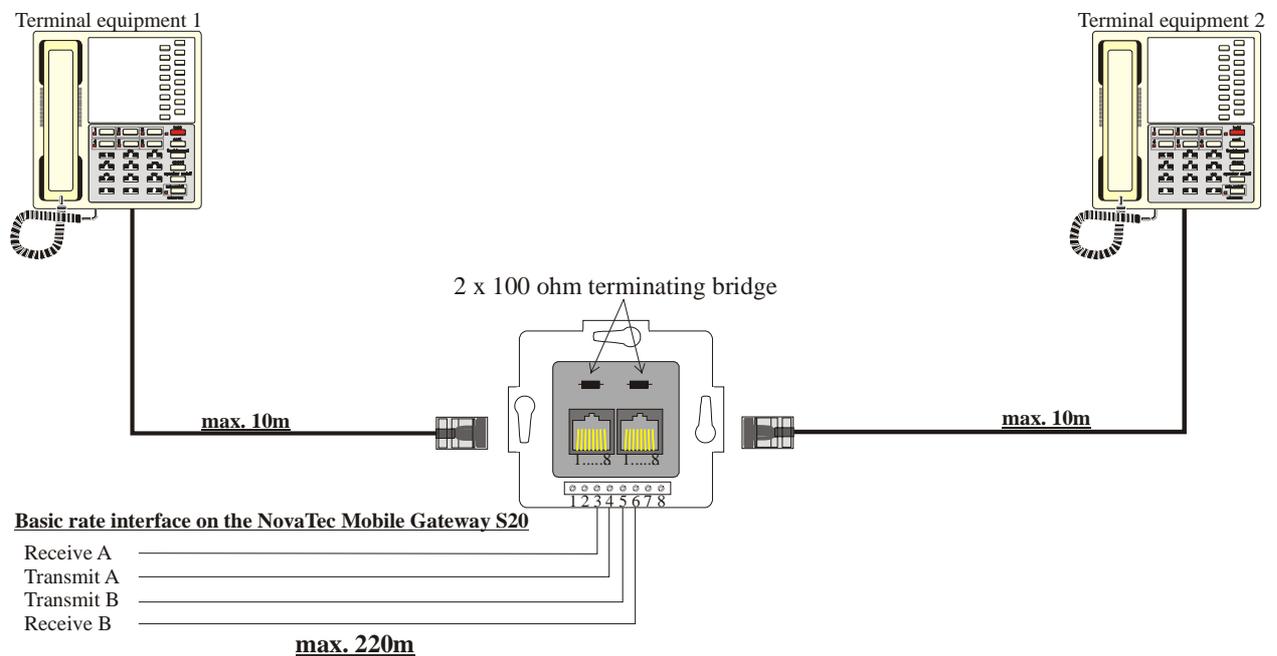
<b>Standard signal assignment of RJ sockets</b>				
Pin	PRA interface RJ45 (view on NT)	BRA interface RJ45 (view on NT)	U interface RJ12	U interface RJ11
1	Transmit A	not used	not used	not used
2	Transmit B	not used	not used	U wire A
3	not used	Receive A	U wire A	U wire B
4	Receive A	Transmit A	U wire 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		
<b>Signal assignment on the NovaTec patch panel (if used)</b>				
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 Mobile Gateway S20 must be wired and connected together with activities requiring particular care and attention.

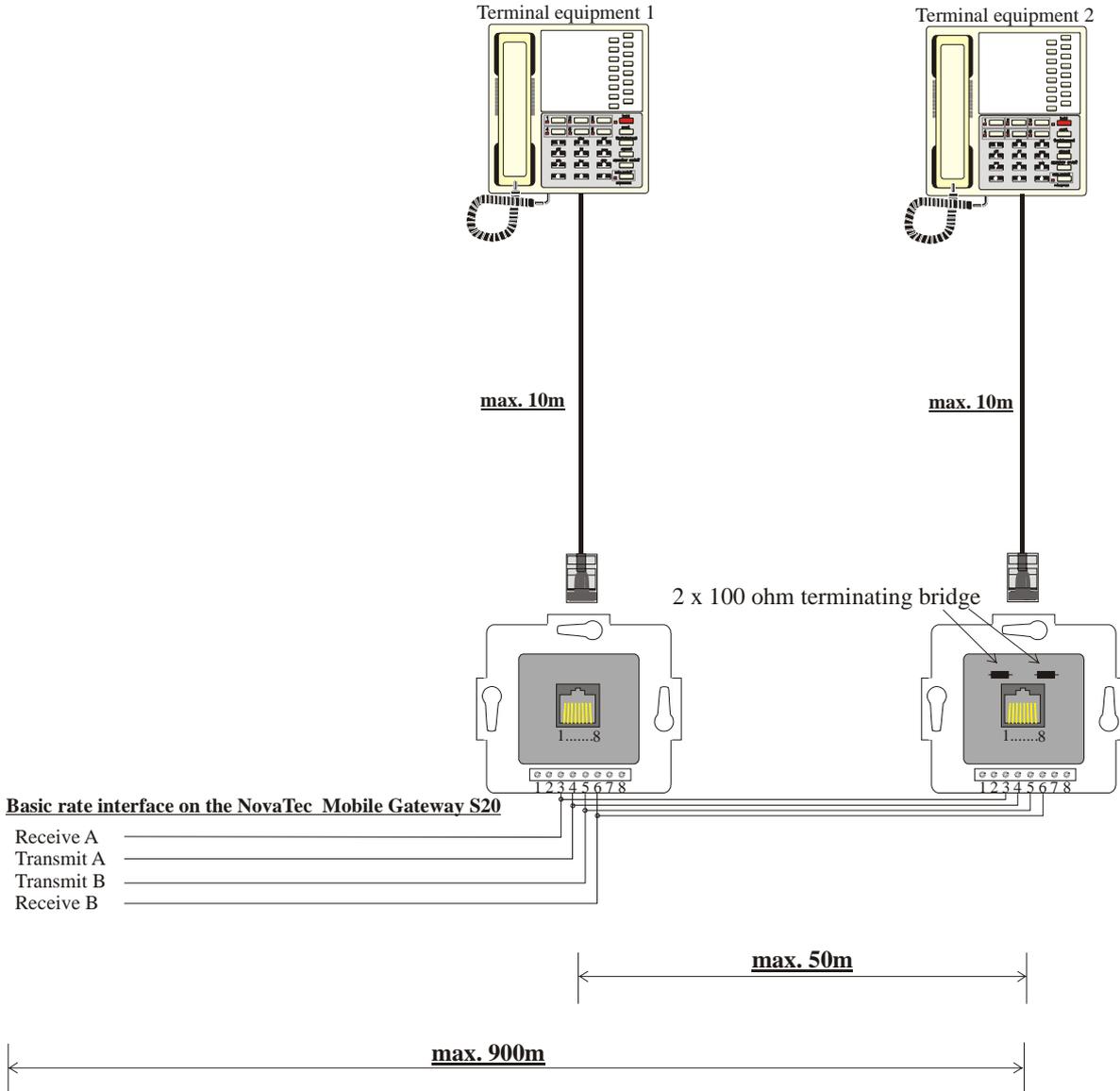
### 4.12.1 Connection of ISDN Terminal Equipment to the BRA Interface

Up to two items of terminal equipment can be connected to every NovaTec Mobile Gateway S20 (as a PABX) BRA interface. The interface consists of 4 wires that must not be interchanged. The maximum length of these wires is approximately 220 m. The end of the line that is not connected to the NovaTec Mobile Gateway S20 must be terminated with 2 x 100 ohm. The following illustration shows the wiring and corresponding limiting values in this context.



**Picture 30:** Terminal equipment connection to an ISDN socket (passive bus)

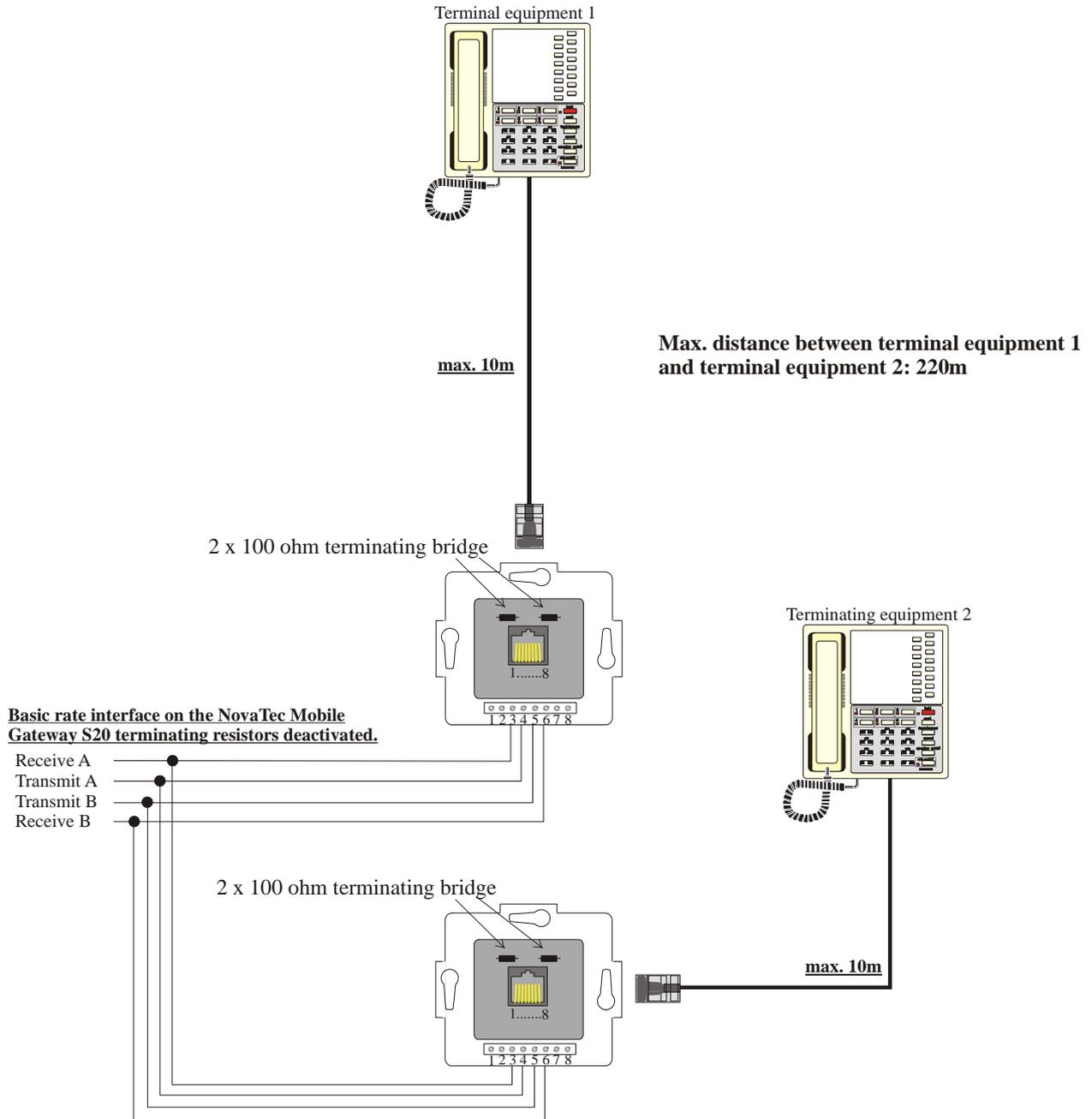
It is possible to connect up to 12 ISDN sockets to each NovaTec Mobile Gateway S20 BRA interface. These sockets are simply connected in parallel configuration. A maximum of two items of terminal equipment can be connected to each NovaTec Mobile Gateway S20 BRA interface at the same time even if more 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 31:** 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 cabling operates using a star-shaped cabling format, the terminating resistors in your NovaTec Mobile Gateway S20 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 Mobile Gateway S20 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 32: Star-shaped cabling for a BRA interface



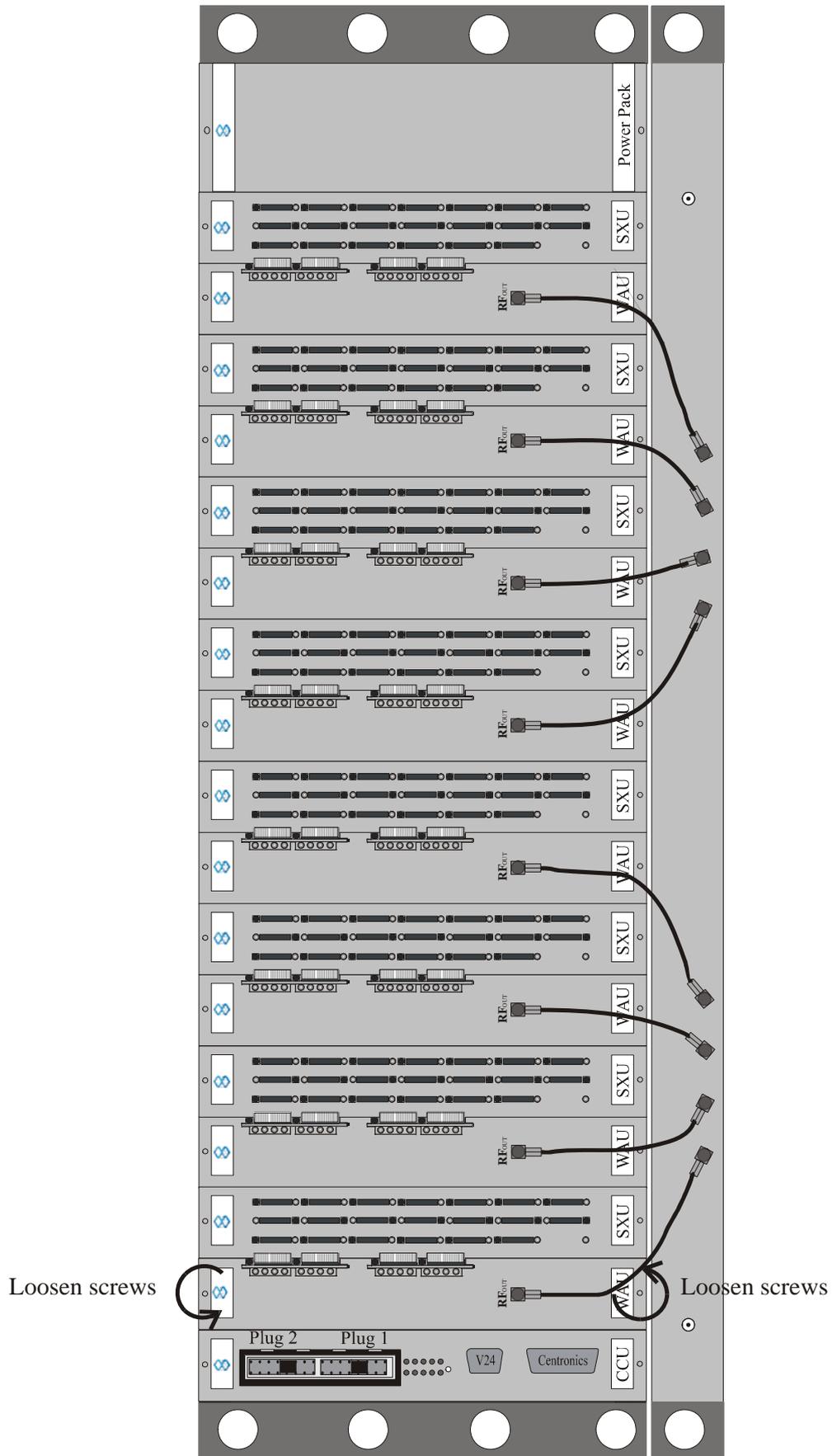
To deactivate the terminating resistors please follow these instructions:

Remove the selected module from the system. On the upper and lower corner of each front panel 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 30).

On each module (CCU, CCU-Light, CCU-3 and CAU only) 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 33 and 46 shows 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 33 and 46 to assist you in identifying and repositioning the respective coding switches to the “Off ” position. The terminating resistors only have to be deactivated when using a star-shaped installation (see page 56).

On delivery, all terminating resistors are activated.

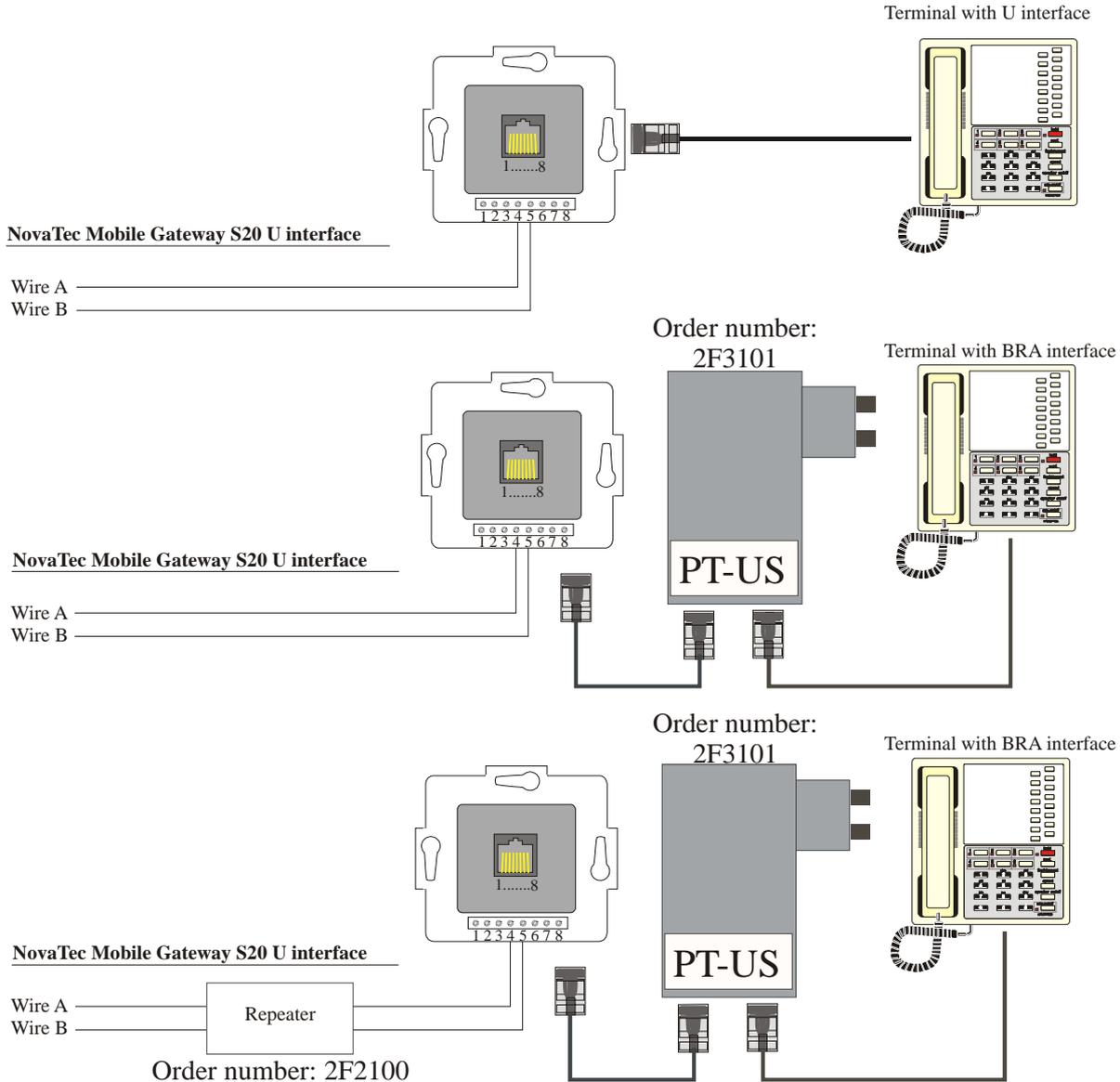


**Picture 33:** Removing a Module from the NovaTec Mobile Gateway S20

### 4.12.3 Connecting the Terminals 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 a U interface for long distances to the terminal equipment or where BRA interfaces are required, we recommend you to use a PT-US.

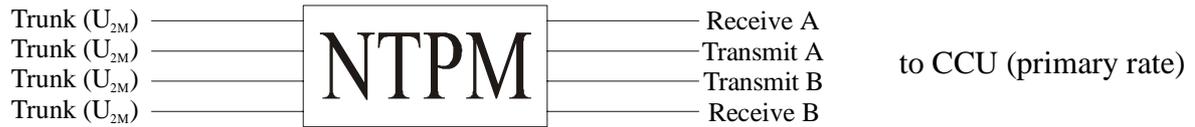


**Picture 34:** Connecting one PT-US to the ULU



#### 4.12.4 Trunk Line Connections to the CCU

A trunk line must be held on an NTPM or an PABX. This NTPM or PABX 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 Mobile Gateway S20. If your NovaTec Mobile Gateway S20 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. The trunk lines are patched to a signed RJ45 plug within the system patch panel (only available in devices with cabinet) in the cabinet.



**Picture 35:** Connecting a trunk line to the NovaTec Mobile Gateway S20



## 5.0 Commissioning

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

### 5.1 Status Displays on the NovaTec Mobile Gateway S20

Each individual module has light emitting diodes located on the front panel which indicates the operational mode. This display mainly serves to assist diagnosis in cases of problems or to monitor the functions of the NovaTec Mobile Gateway S20.

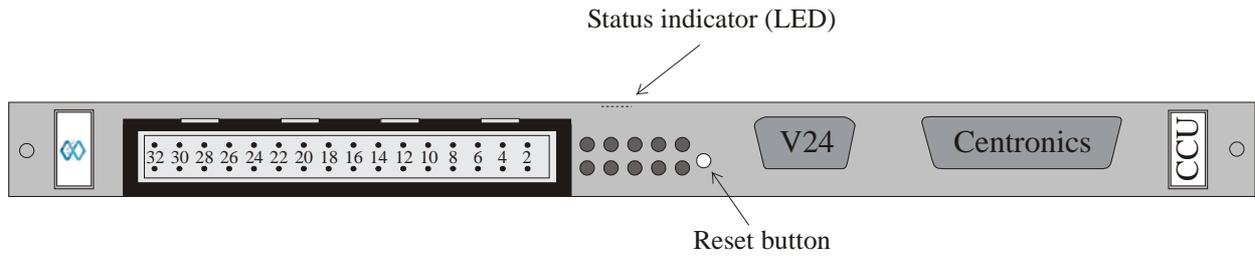
#### 5.1.1 Status Displays on the CCU and CCU-Light

The CCU 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.

Upon connecting the NovaTec Mobile Gateway S20 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 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 Mobile Gateway S20.

If the NovaTec Mobile Gateway S20 starts in the default configuration, a valid configuration must be transmitted through downloading. Downloading can be undertaken either locally, 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.



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

●●●●●○ 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 initializing

○○○○● 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 and after the system has noticed this the default configuration starts

○○○○● 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.

- LED is off
- LED is flashing intermittently
- LED is constantly on

**Picture 36:** 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):

<b>Interface</b>	<b>LED</b>	<b>Line status</b>	<b>LED status</b>
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 <sub>0</sub> 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 <sub>2M</sub> 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 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. (see also Picture 36)

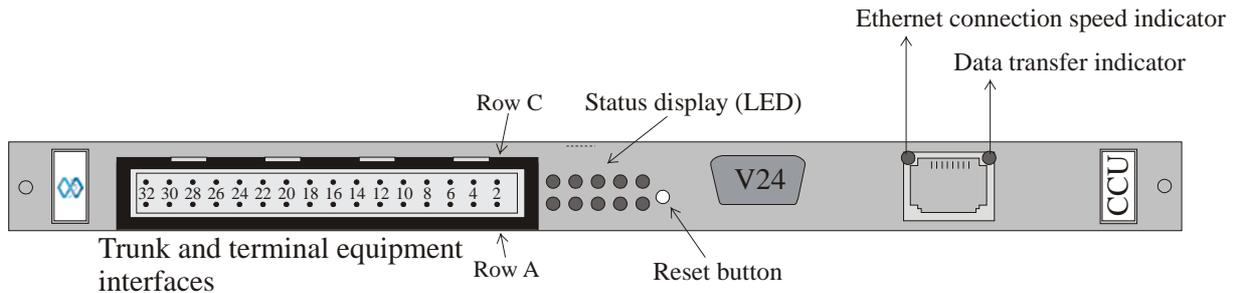
Upon connecting the NovaTec S20 to the main supply, the system undertakes a processor test followed by a RAM- and firmware test. When there is a valid configuration, the system then moves into operational mode. In cases where there is no configuration, the system starts up in the default configuration (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.

If the NovaTec S20 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):



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

- ● ● ● ● ● ● ● 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 initializing
- ○ ○ ○ ● ● 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 and after the system has noticed this the default configuration starts
- ○ ○ ○ ● ● 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

**Ethernet connection speed indicator**  
 Off no active connection to a network  
 green 10 Mbit connection active  
 orange 100 Mbit connection active  
 flashing Error detected, see Logbook for further informations

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

**IP-Adress in default mode: 192.168.127.254**

- LED is off
- LED is flashing intermittently
- LED is constantly on

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

**Picture 37:** CCU-3 status display



Interface	LED	Line status	LED status
BRI / S <sub>0</sub> daughter board is placed (Place 1)			
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
PRI / S <sub>2M</sub> daughter board is placed (Place 1)			
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	n. c.	n. c.
4	4	n. c.	n. c.
BRI / S <sub>0</sub> daughter board is placed (Place 2)			
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 <sub>2M</sub> daughter board is placed (Place 2)			
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.

**Note:**

When an PRI-Plug-in card with only one PRI-Interface is used, 2 and/or. 6 are not occupied.



### 5.1.3 Status displays on the Sea-Of-Sims (SOS)

The SOS 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 SOS. (see also Picture 38)

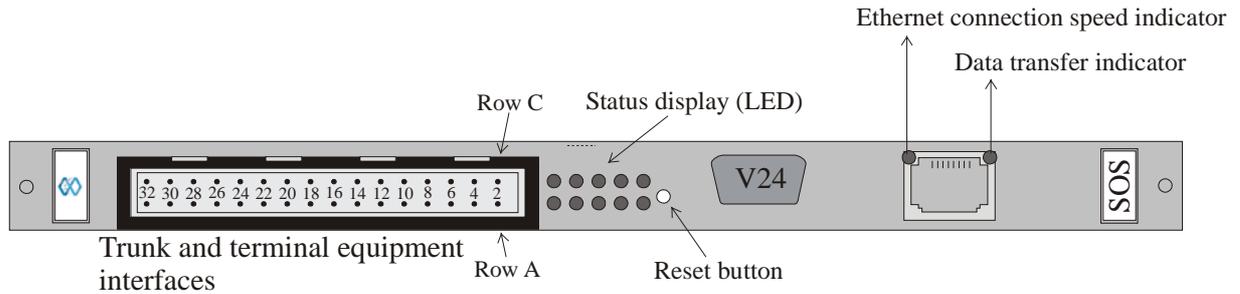
Upon connecting the NovaTec S20 to the main supply, the system undertakes a processor test followed by a RAM- and firmware test. When there is a valid configuration, the system then moves into operational mode. In cases where there is no configuration, the system starts up in the default configuration (Power-LED is off). This means that only the first two BRA interfaces and the first PRA interface of the SOS is being activated and the Ethernet-Interface works with the last known IP-Adress. Has the Modul set into default mode by using the Reset-Switch or Trace-Info-Client, then the SOS starts also in default mode but with the IP-Adress **192.168.127.254**.

If the NovaTec S20 starts in the default configuration, a valid configuration must be transmitted through downloading. Downloading can be undertaken via the IP interface. 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 SOS 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 SOS contains two plug in space for one daughter board each and an ethernet interface. The LED status of the SOS 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 SOS in normal mode (non default mode):



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

**Ethernet connection speed indicator**  
 Off no active connection to a network  
 green 10 Mbit connection active  
 orange 100 MBit connection active  
 flashing Error detected, see Logbook for further informations

**Data Transfer indicator**  
 Off no Data Transfer between SOS and Host  
 yellow Receiving or Transmitting Data's

**IP-Adress in default mode: 192.168.127.254**

- ● ● ● ●  
● ● ● ● ● 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 initializing
- ○ ○ ○ ●  
○ ● ● ○ ● Error during bootcode RAM-test (system stops)
- ○ ○ ○ ●  
● ● ● ○ ● CPU creates the stack for switching to protected mode
- ○ ○ ○ ●  
● ○ ○ ● ● CPU switches to protected mode
- ○ ○ ○ ●  
○ ● ○ ○ ● SOS-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 and after the system has noticed this the default configuration starts
- ○ ○ ○ ●  
● ○ ○ ○ ● 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

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

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

Picture 38: SOS status display



Interface	LED	Line status	LED status
BRI / S <sub>0</sub> daughter board is placed (Place 1)			
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
PRI / S <sub>2M</sub> daughter board is placed (Place 1)			
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	n. c.	n. c.
4	4	n. c.	n. c.
BRI / S <sub>0</sub> daughter board is placed (Place 2)			
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 <sub>2M</sub> daughter board is placed (Place 2)			
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.

**Note:**

When an PRI-Plug-in card with only one PRI-Interface is used, 2 and/or. 6 are not occupied.



### 5.1.4 Status displays on the Call-Back-Server (CBS)

The CBS 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 CBS. (see also Picture 39)

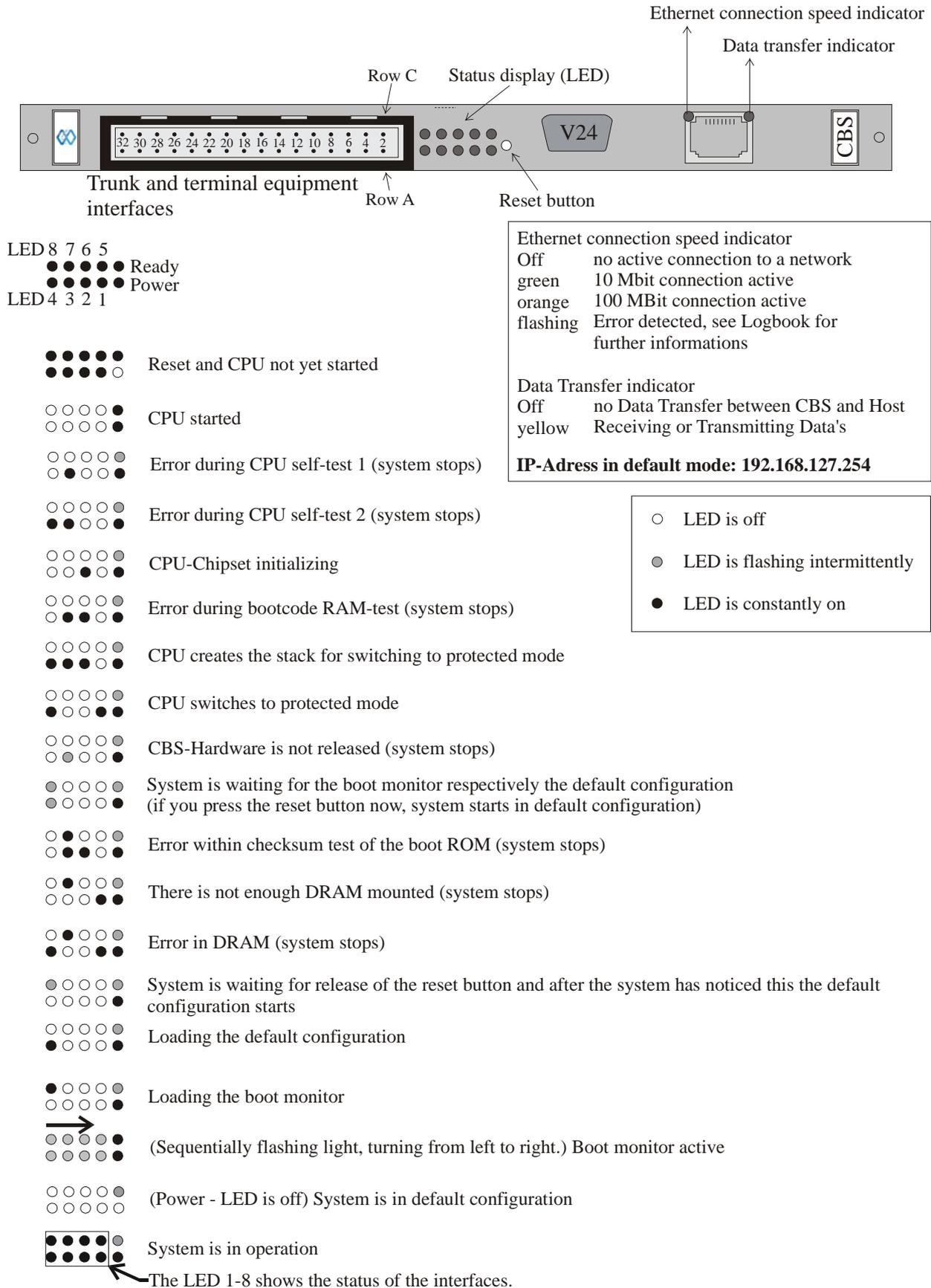
Upon connecting the NovaTec S20 to the main supply, the system undertakes a processor test followed by a RAM- and firmware test. When there is a valid configuration, the system then moves into operational mode. In cases where there is no configuration, the system starts up in the default configuration (Power-LED is off). This means that only the first two BRA interfaces and the first PRA interface of the CBS is being activated and the Ethernet-Interface works with the last known IP-Adress. Has the Modul set into default mode by using the Reset-Switch or Trace-Info-Client, then the CBS starts also in default mode but with the IP-Adress **192.168.127.254**.

If the NovaTec S20 starts in the default configuration, a valid configuration must be transmitted through downloading. Downloading can be undertaken via the IP interface. 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 CBS 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 CBS contains two plug in space for one daughter board each and an ethernet interface. The LED status of the CBS 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 CBS in normal mode (non default mode):



Picture 39: status display



Interface	LED	Line status	LED status
BRI / S <sub>0</sub> daughter board is placed (Place 1)			
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
PRI / S <sub>2M</sub> daughter board is placed (Place 1)			
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	n. c.	n. c.
4	4	n. c.	n. c.
BRI / S <sub>0</sub> daughter board is placed (Place 2)			
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 <sub>2M</sub> daughter board is placed (Place 2)			
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.

**Note:**

When an PRI-Plug-in card with only one PRI-Interface is used, 2 and/or. 6 are not occupied.



## 5.1.5 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 35) via the 4 LED's which are positioned next to the  $\mu$ P LED. The lower LEDs have no meaning and are not connected. The upper LEDs show the layer one status of each individual line of the board. (see Picture 35). 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 or ready 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 start flashing (module 1F5010-2-LP only).

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

After switching on the System, every ULU starts an on board diagnosis. During this procedure the system tests all components of the U interface and then all other internal components. If there is an error detected the concerned ULU executes a reset and then starts a new test. If the fifth trial is not succesful the test stops and a error code appears on the LED's. Is the EPROM test negative, there will not be a further test, the system stops and a error code appears on the LED's.

After starting the system the remote power supply of the U interfaces will be switched on after approximately 1 minute (this only concerns 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)**



### 5.1.6 Status Displays on the CAU

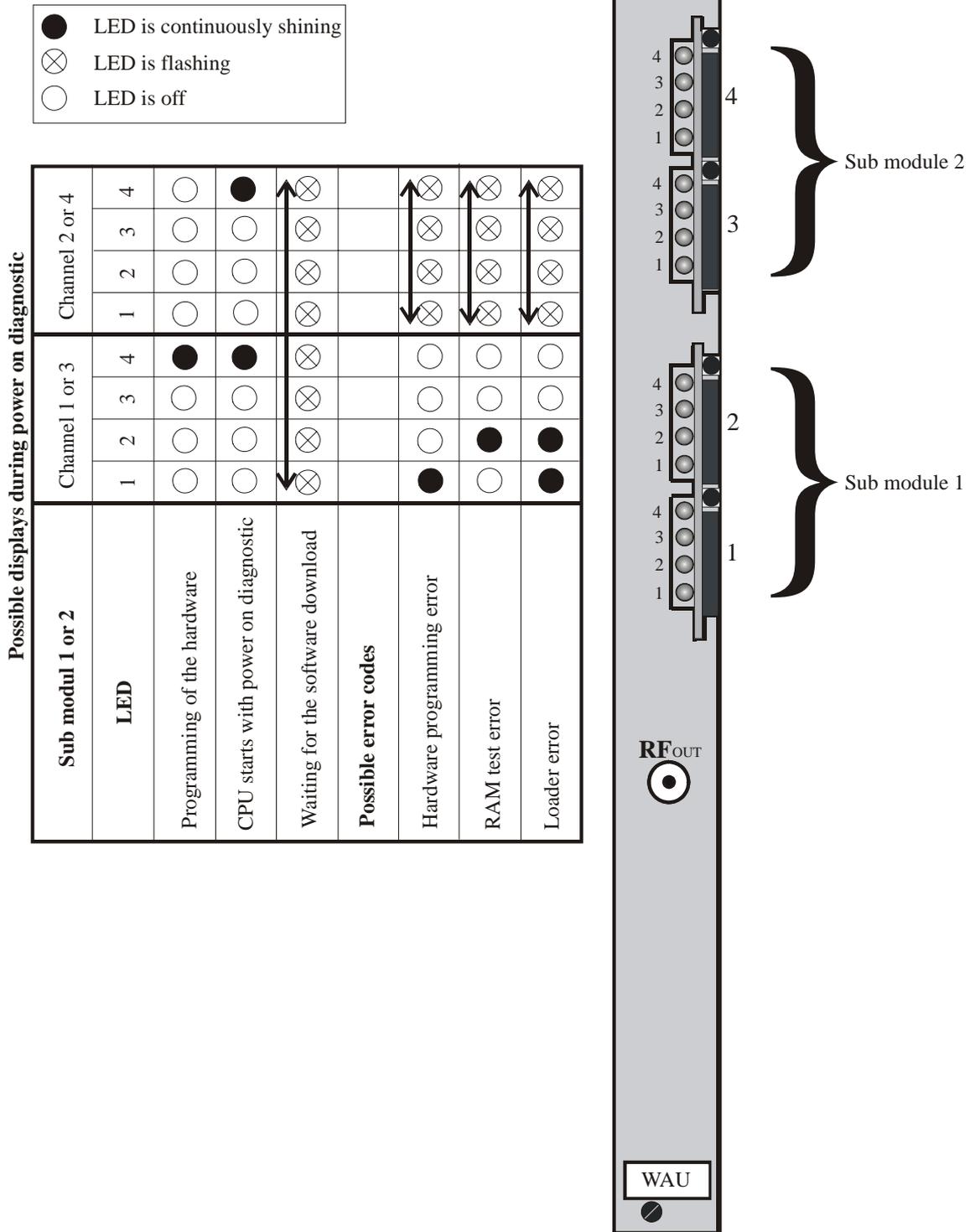
The Status of the CAU is shown by four LED's. The LED's 1-3 show the status of the expansion boards on the CAU. If there is a match between the placed expansion board and the appropriate system configuration, the associated LED will light up after booting of the system. If there is a mismatch the LED will not light up after booting of the system. The LED 1 is associated to the expansion slot one and LED 2 to the expansion slot two and the LED 3 to the expansion slot three (see Picture 41).



**Picture 41:** Status displays on the CAU

### 5.1.7 Status Displays on the WAU

The LEDs located on the sub modules show the status of the WAU in two stages. The first stage is after the power on reset of the system or after sliding the WAU into the back plane. The second stage is after the download of the configuration into the sub modules. For the first stage the following status is reported:



**Picture 42:** Status displays on the WAU during power on diagnostic

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

LED status after card boot and diagnostic

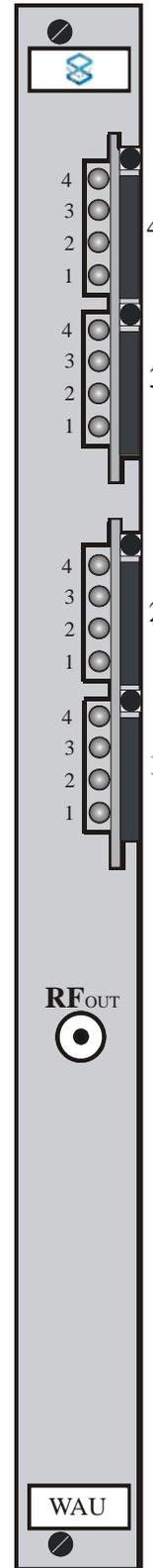
	LED 4	LED 3	LED 2	LED 1
The Module is in the loading or configuration stage	⊗	○	○	○
Configuration loaded, but the SIM is missing	○	⊗	○	○
- Configuration o.k. - SIM o.k. - PIN failed	⊗	⊗	○	○
- Configuration o.k. - SIM o.k. - PIN wrong	○	○	⊗	○
- No provider available - To low receive level - To high bit error rate	⊗	○	⊗	○
- Card is empty or not released	○	⊗	⊗	○
- Hardware trouble: - The GSM engine causes error; - The UARTs cause error; - There is or are some minor malfunctions which does not allow the normal operation.	⊗	⊗	⊗	○

LED status during running mode

	LED 4	LED 3	LED 2	LED 1
Field level 13% - 25% of max.	○	○	○	● ⊗
Field level 26% - 50% of max.	○	○	●	● ⊗
Field level 51% - 75% of max.	○	●	●	● ⊗
Field level 76% - 100% of max.	●	●	●	● ⊗

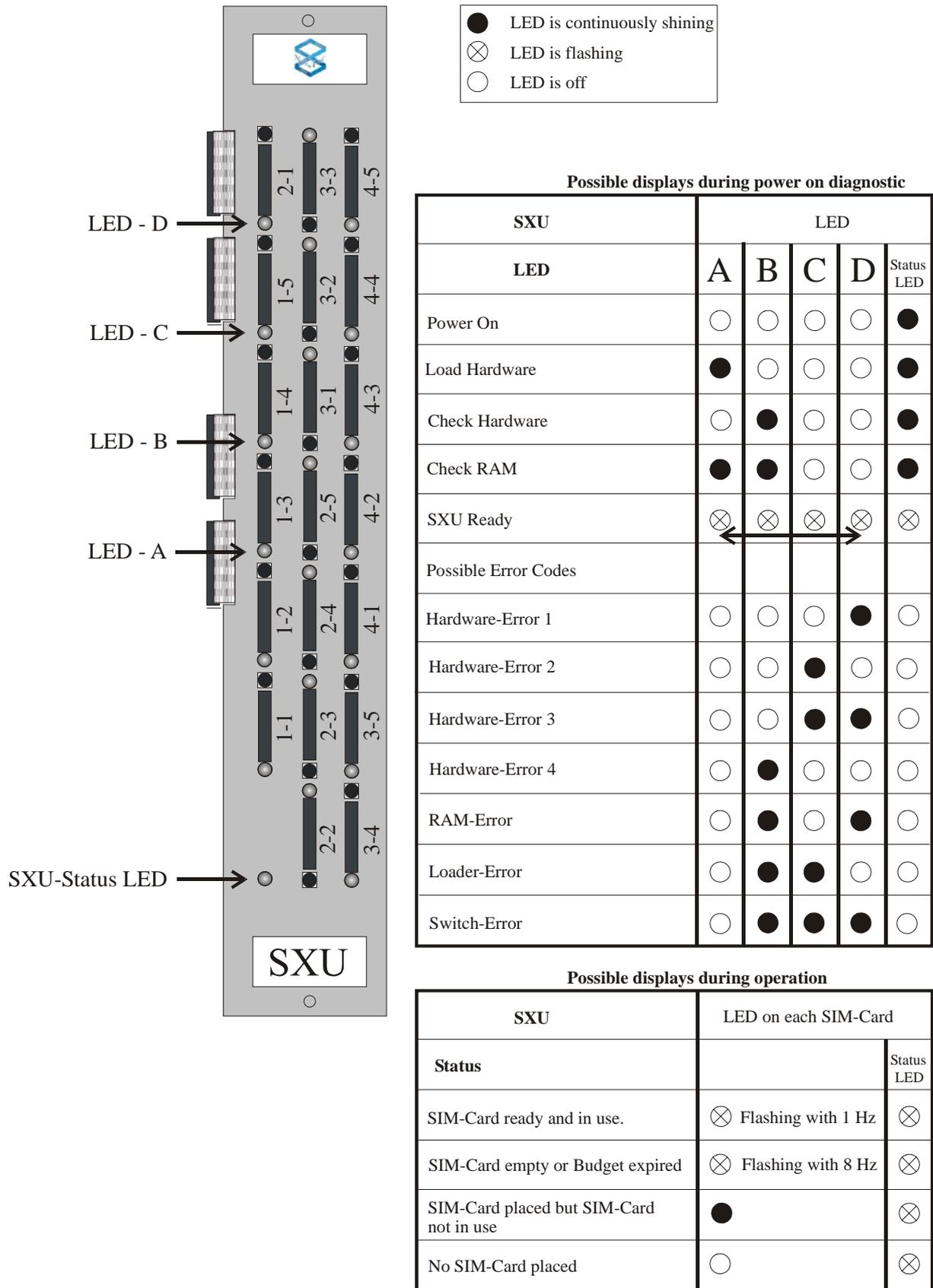
The signal level indication is steady on in running mode and shows the ratio of the receive signal level to the maximum possible receive signal level in percentage.

In a connection mode the signal level indications LED4, LED3 and LED2 keep steady on and the LED1 starts to flash.



**Picture 43:** Status displays on the WAU after Power-On diagnostic

### 5.1.8 Status Displays on the SXU



**Picture 44:** Status displays on the SXU



### **5.1.8.1 Diagnostics and Status Indications**

The Illustration shows the Front view of the SXU. The Numbers on the Sim Card holders represent the Channel affiliation and the SIM Card holder number. Therefore (1;3) represents Channel 1 and Sim Card holder number 3. The Letters mark the Light diodes.

The table (Picture 29) gives the allocation of the light emitting diodes (LED's) in correspondance to the SIM Card holders

### **5.1.8.2 Diagnostics and Status Indications during the start-up phase**

During the start-up phase of the SXU the 4 LED's (A, B, C, D), which would in normal operation be designated for the SIM card holders, are used for status information. The status-LED is now used for the systemcondition.

### **5.1.8.3 Alarm error messages during the start-up phase**

If an error arises during the start-up phase of the SXU, the 4 LED's (A, B, C, D) will be used to show the error. The Status-LED will be used to show the system condition.

### **5.1.8.4 Status Indication in normal operation**

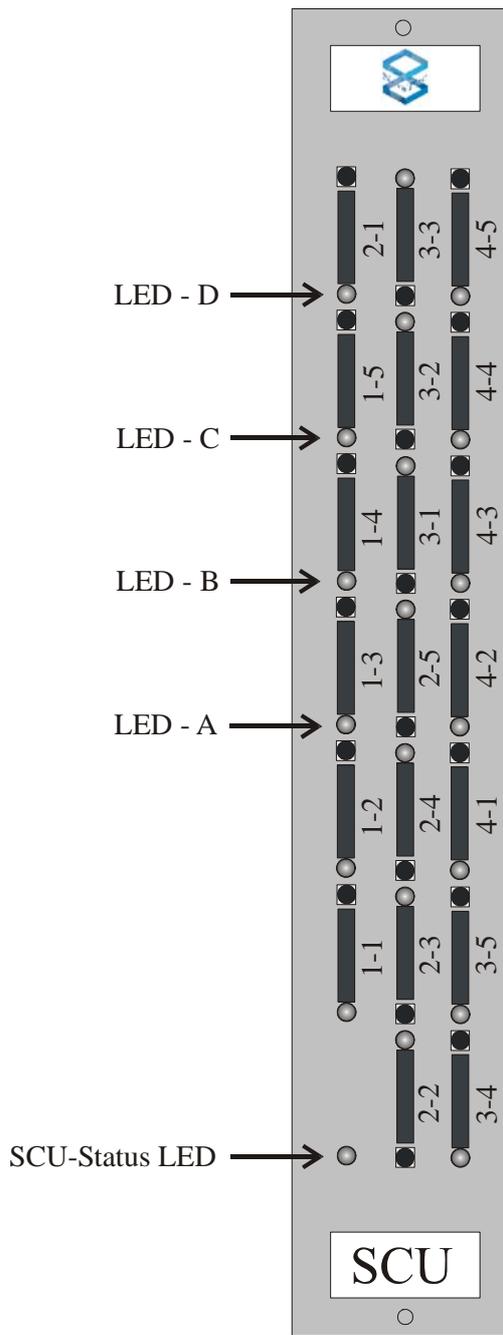
In normal operation the Status-LED will flash. If a Sim Cardholder is in use, the appropriate assigned LED will light. All other LED's are off.

The forgoing table shows the allocation of the LED's to SIM Cardholders.

### **5.1.8.5 Status Indications during normal operation**

When the Sim Card is inserted and the Card is in operation	LED slow flashing
When the Sim Card is not inserted or the budget is expired	LED fast flashing
When no Sim Card is inserted	LED not lit
When the Sim Card is inserted but not selected	LED permanently lit

### 5.1.9 Status Displays on the SCU



- LED is continuously shining
- ⊗ LED is flashing
- LED is off

Possible displays during power on diagnostic

SCU	LED					Status LED
	A	B	C	D		
Power On	○	○	○	○	○	●
Load Hardware	●	○	○	○	○	●
Check Hardware	○	●	○	○	○	●
Check RAM	●	●	○	○	○	●
SXU Ready	○	○	○	○	○	●
Possible Error Codes						
Hardware-Error 1	○	○	○	●	○	○
Hardware-Error 2	○	○	●	○	○	○
Hardware-Error 3	○	○	●	●	○	○
Hardware-Error 4	○	●	○	○	○	○
RAM-Error	○	●	○	●	○	○

Possible displays during operation

SCU	LED on each SIM-Card		Status LED
Status			
SIM-Card Successfully read and the data transferred to Client	⊗	Flashing with 1 Hz	●
Reading from SIM-Card	⊗	Flashing with 8 Hz	●
SIM-Card o. k.	●		●
No SIM-Card placed or SIM-Card damaged	○		●

Picture 45: Status displays on the SCU



For operation of a SIM-Server two NMG systems are required, the SIM-Server and the SIM-Client. The Sim-Client will be equipped with a CCU-3 and EWU's . This realises the NMG's access to the GSM Network. The SIM-Server consists of at least one SCU and the SOS. The SCU serves as a carrier for the SIM-Cards.

The IP interface of the CCU-3 of the NMG is network with the IP interface of the SOS of the Sim server over the Internet. Thus it is ensured that the EWU has access to the data of the Sim Cards in the SCU and is able to use this data.

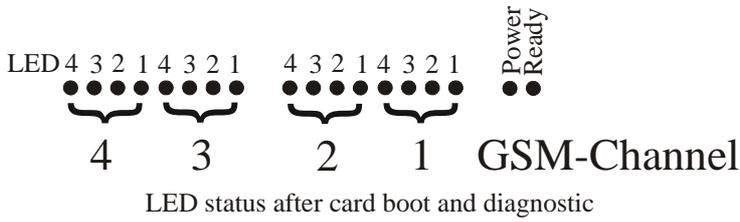
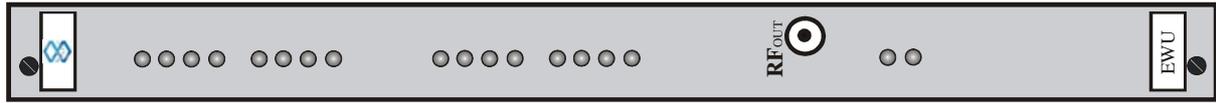
The NMG can also be equipped with WAU's, although the WAU's have no remote access to the SIM-cards within the Sim-Server.

The Sim Client requests data of the Sim Card selected by the Sim server. This data is transmitted from the Sim server to the Sim Client and used for the connection establishment.

With the start-up of the SIM server the SCU accomplishes first an on board diagnosis. After this is completed, the assigned Sim Cards are identified, in which a part of the data is read (fast flashing LED's at the respective drawer signify this).

If the Sim Client requests the complete data of the Sim card , these will be completely read by the Sim server. This complete read out can take up to 20 - 40 seconds depending on the contents of the Sim Card, you should ensure that no Telephone book or SMSs are stored on the Sim card as this will prolong the readout and the loading time. After the complete readout of the Sim Card the data will be transferred from the Sim server to the Sim Client for its further use.





- LED is off
- ◐ LED is flashing intermittently
- LED is constantly on

LED status after card boot and diagnostic

	LED 4	LED 3	LED 2	LED 1
The Module is in the loading or configuration stage	◐	○	○	○
Configuration loaded, but the SIM is missing	○	◐	○	○
- Configuration o.k. - SIM o.k. - PIN failed	◐	◐	○	○
- Configuration o.k. - SIM o.k. - PIN wrong	○	○	◐	○
- No provider available - To low receive level - To high bit error rate	◐	○	◐	○
- Card is empty or not released	○	◐	◐	○
- Hardware trouble: - The GSM engine causes error; - The UARTs cause error; - There is or are some minor malfunctions which does not allow the normal operation. - IMEI not valid	◐	◐	◐	○

LED status during running mode

	LED 4	LED 3	LED 2	LED 1
Field level 13% - 25% of max.	○	○	○	●
Field level 26% - 50% of max.	○	○	●	●
Field level 51% - 75% of max.	○	●	●	●
Field level 76% - 100% of max.	●	●	●	●

The signal level indication is steady on in running mode and shows the ratio of the receive signal level to the maximum possible receive signal level in percentage.  
In a connection mode the signal level indications LED4, LED3 and LED2 keep steady on and the LED1 starts to flash.

**Picture 47:** Status displays on the EWU after Power-On diagnostic



## 5.1.11 Status displays on the PTI

At the face plate PTI has light emitting diodes which indicate the operational mode. These light emitting diodes are splitted into two functional sections. The green light emitting diodes indicates operation condition of the processor (Ready LED) and the power supply on the U interfaces (Power LED). The red light emitting diodes indicates the state of layer 1 for every channel of the  $S_0$  and U interface.

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 1F3201-LP only) is activated.

The status of layer 1 can be identified for each interface independently at the two red LED's which are placed next to each other. The left LED (Picture 41: lower one) communicates the status of layer 1 for the BRA interface and the right one (Picture 41: 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.

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.

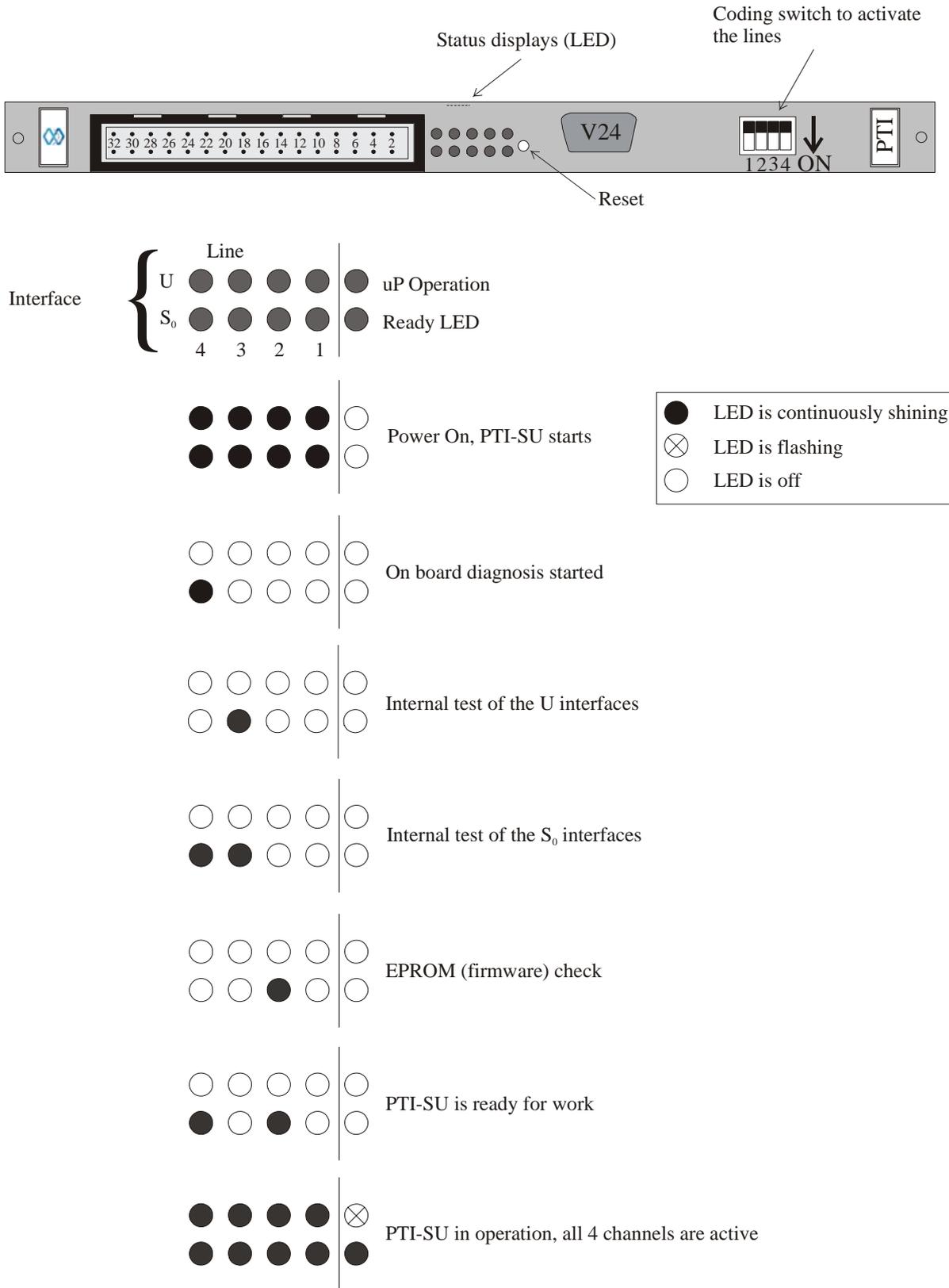
After switching on the System, every PTI-US starts an on board diagnosis. During this procedure the system tests all internal components of the U and then all internal components of the S interfaces. Is there an error detected the concerned PTI-SU is executing a reset and then starting a new test. If 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 no 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 1F3201-LP, visible by the caution label at the front panel of the board). Is the PTI-SU 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. **To actualize the Status-Display press the Reset-Button.**

There is no power supply to the BRA interfaces on the PTI-US (2F3601).



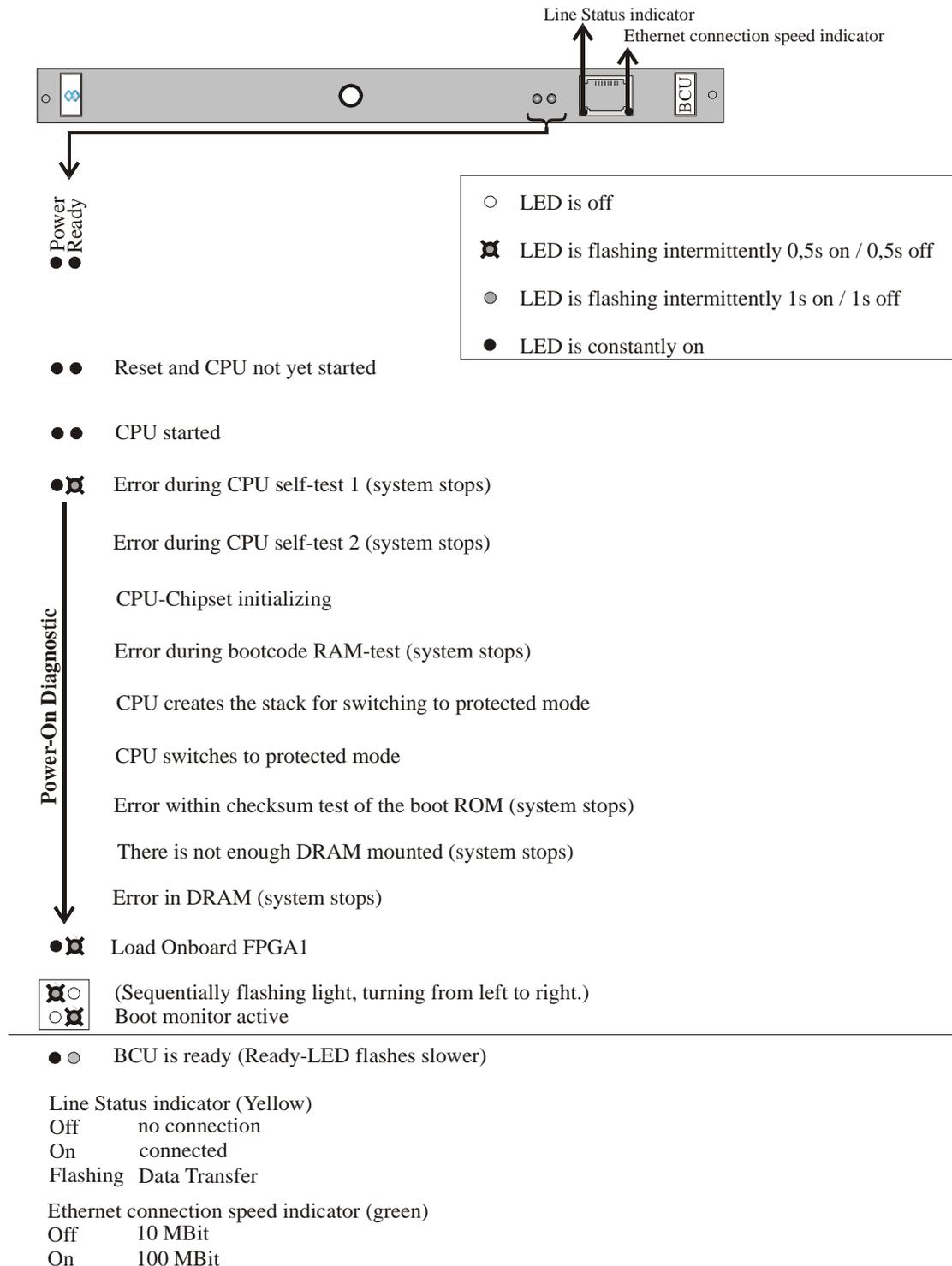
**Only concerning PTI-SU with power supply at the U interfaces (1F3201-LP):**  
**The U interface is powered by an internal power supply of 115V. Observe for this reason all precautions for personal protection (switch off the system, seperate the interface from the system and deactivate the interface).**



**Picture 48:** Status displays of the PTI

## 5.1.12 Status displays of the BCU

The LEDs show the status of the BCU in two stages. The first stage is after the power on reset of the system or after sliding the BCU into the back plane. The CPU starts an Power-On Diagnostic with several Steps (see Picture 45). If a fault happen, the CPU stops and shows the Error Message on the Front with the LED's. (Ready LED flashes with 0,5 s on/off). After 3 Sekonds the CPU starts again. If the Power-On Diagnostic passes, the BCU loads the configuration from the system and switch into the operating mode. The second stage is after the download of the configration into the module. For both stages the following status is reported:



**Picture 49:** Status displays of the BCU



## 5.2 Features of the Default Configuration

When a valid system configuration cannot be found following a system start, the NovaTec Mobile Gateway S20 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:

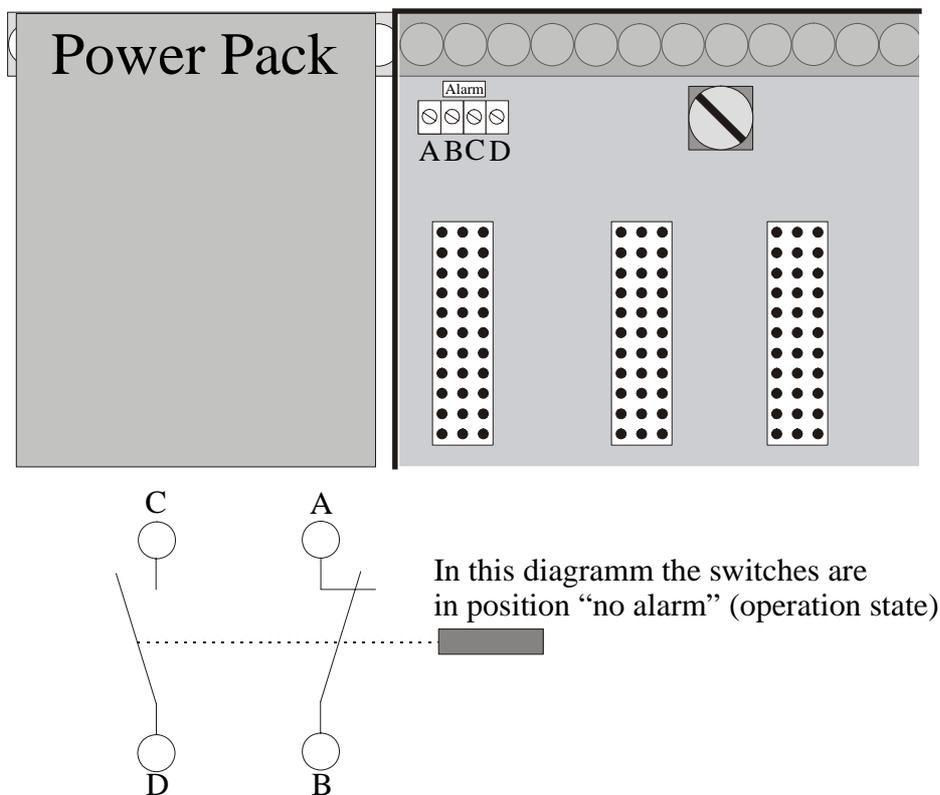
<b>Modul</b>	<b>Interface</b>	<b>Description</b>	<b>Port ID</b>	<b>Master/ Slave</b>	<b>Trunk/ Subscriber</b>	<b>PzP</b>	<b>PMP</b>
CCU	1	BRA	F100	Slave	Trunk	X	
CCU	2	BRA	F101	Slave	Trunk		X
CCU	4	BRA	F903	Master	Subscriber		X
CCU Sub- Modul	5	PRA	F400	Slave	Trunk	X	

### 5.3 Alarm Contacts

On the rear of the backplane, you will find terminals to alarm contacts. These alarm contacts are switched by relays. There are a pair of relays 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 relay 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 Mobile Gateway S20



**Picture 50:** 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 Mobile Gateway S20 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 installation 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 NovaTec 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 Mobile Gateway S20, 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 NMG, 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 Mobile Gateway S20, 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 Mobile Gateway S20. 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 Mobile Gateway S20 with the user name **Technik** and the password **NoPassWd**. Please note that under these circumstances, all data in the NovaTec Mobile Gateway S20 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.

## **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 Mobile Gateway S20 in the field "Dialling no." and click on OK.

Should you wish to operate the NMG 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 NMG 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 NMG 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

## **5.5 Remarks to Callback Configuration**

With the Fixed Net Callback application, two NovaTec systems are used. One system takes the role of the client and the other one of the server.

The client is installed behind or before the switch of the End customer. IT has the task of recognizing call back calls and passing them on to the server.

After contacting the server, the call will stay in an ALERTING state i.e. ringing. The call will stay in this stage until either the caller has aborted the call, i.e. laid down the receiver or until the call back has been received by the client. The client recognizes the callback call and established the connection between the two parties.

The server waits for incoming call back calls. When a call back call is received and the server has checked the call is approved (permissions, routing etc.) the call back call and the target (dialled) number will be started simultaneously. When the target telephone rings the incoming call activation call from the client will be disconnected. The call costs will then be invoiced with the server end and not with the client.

Generally each NovaTec Splitter/NMG can take over both the role of the client, however the server must be installed with the SOS board .

The ISDN network between clients and server must however fulfill certain technical requirements.

The Requirements depend on the used call back mode on the client side.

Requirements in the **Subaddress Mode**



The Network must pass through the CALPS (Calling Party Subaddress) from the Client to the Server.

- The Network must pass through the CLIP of the caller from the Client to the Server
- The Network must pass through the CALPS (Calling Party subaddress) from the Server to the Client
- The Server must make available a 1 or 2 digit DDI-Range, so the Index of the Call back Call can be sent to the Server as a DDI

#### Requirements in the **User-to-User** Mode

- the network must let the user to user IE through (in the setup message, corresponding to UUS1-Service ) from the Client to the server
- The Network must pass through the CLIP of the caller from the Client to the Server
- the network must let the user to user IE through (in the setup message, corresponding to UUS1-Service ) from the server to the Client
- The Server must make available a 1 or 2 digit DDI-Range, so the Index of the Call back Call can be sent to the Server as a DDI

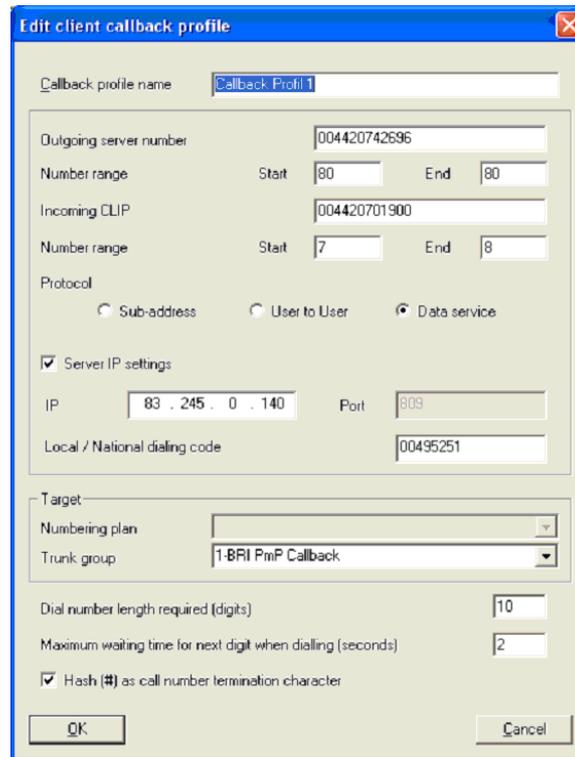
#### Requirements in the **Data Service** Mode

- The Network must pass through CALPS (Calling Party Subaddress) from Client to the Server For this purpose in this mode the service data is signalled
- The Network must pass through the CLIP of the caller from the Client to the Server
- In the information element Bearer Capability the service data between Server and Client is signalled in both directions signaled between servers and Client in both directions This signaling may not be
- The Network must pass through the CLIP of the Server from the Server to the client.
- The Server must make available a 1 or 2 digit DDI Range, so the Index of the Call Back call and the service of the original call can be sent to the Server as a DDI.

Requirements when using the IP as a “fallback” or when the above services are not available

- The server system must be “visible” to the client via TCP/IP. This means that the company network and or firewall must be sent up to allow incoming connections to the NMG system using port 809. This may include IP-Masqucrading, and port forwarding for the NovaTec system.
- The server (SOS) must be correctly installed with valid IP information (IP address, Mask, DNS etc.

## Configuration of the Clients



All Callback settings are carried out over Profiles, and as always all Profiles are first given a Profile name.

On the Client you should choose „New Client“ to create a new Client profile.

Under „Outgoing server number“ the telephone number of the Servers should be given. Here the start and the end of the telephone number range for the outgoing calls to the server should be entered.

Under „Incoming CLIP“ the Server number that the Client receives for a Call back call should be entered. The Telephone number range should include the incoming call number from the server. Normally the values for the outgoing calls and the callback calls should agree, if this is not the case or not possible due to technical reasons, different values may be configured.

Under „Protocol“ it would be chosen between Sub-address, User-To-User or Data Service. As mentioned earlier Subaddressing is the first choice as no extra costs are incurred (at least not with Deutsche Telecom AG). In some countrys the Subadress will only come through when the Service data is Signalled (e.g. South Africa). In this case the Protocol „Data Service“ should be chosen.

If the Data is to be transmitted over IP then the **Server IP settings** should be activated. Under IP the correct IP Address of the Server should be entered. Port 809 is permanently preconfigured. Under Local / National dialing code the international dialling code should be entered e.g. :

Paderborn Germany 00495251

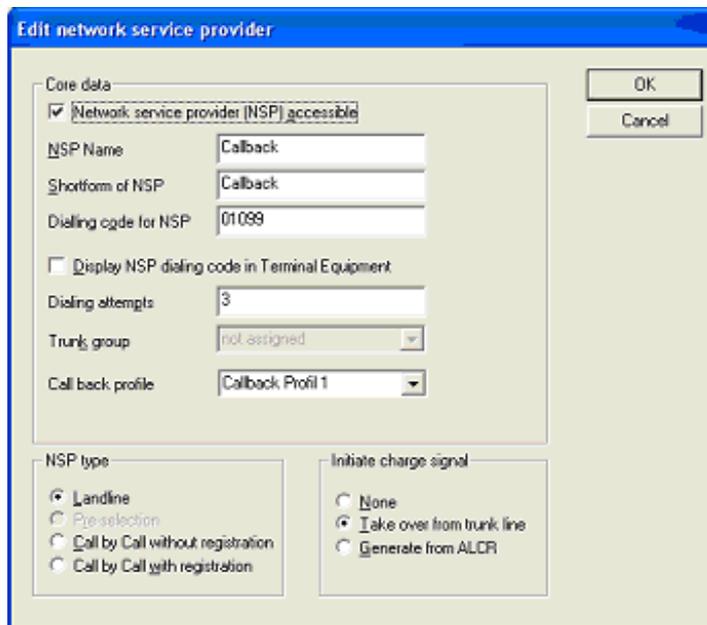
Hamburg Germany 004940

Under „Target“ the routing settings are made. Here it must be guaranteed that the Client can find the Interface where the Server can be reached. (the **Actual dialled number** plays no role for the Routing!) The routing can either be over a Trunk group or the routing can be over a Call numbering plan. It must be guaranteed that the Servernumber is in the Call numbering plan, if this is not so then Callback is not possible.

The Settings „Dial number Length required“, „Maximum waiting time for next digit when dialing“ and „Hash (#) as call number termination character“ drive the Call planning on Callback. Because the actual dialled number is not the number that is sent, but sent within the Subaddress, User-To-User or Data service Information, The dialling must follow as a Block dial. I.e. the Client must know when the call number is complete. The call number is considered as complete if:

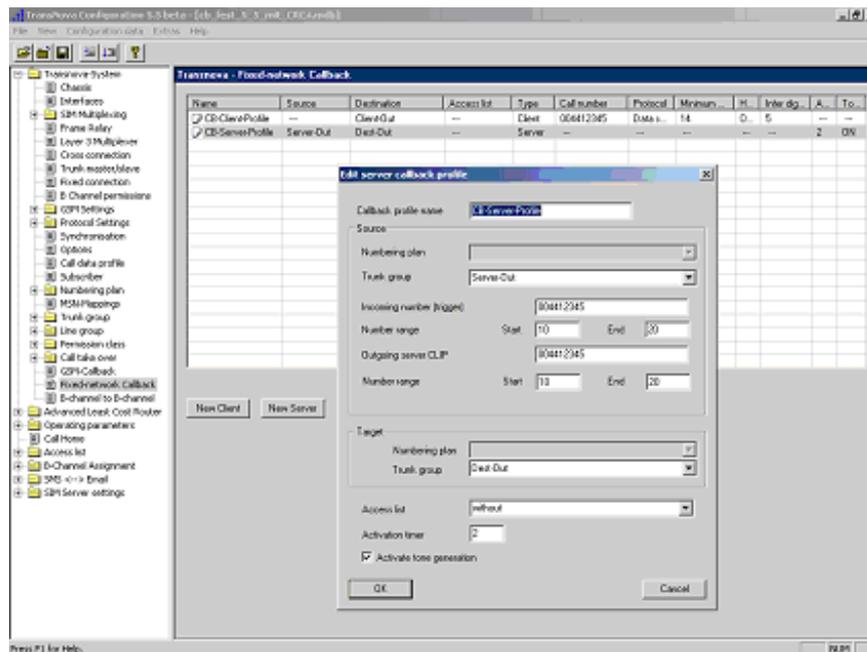
- The number of dialled digits match the number within the settings for „Dial number Length required“. In the case of Block dial where more digits are received, these will also be sent, the Number as Block dial will not be shortened.
- Since the last receipt of a digit corresponding to the „Maximum waiting time for next digit when dialing“ is exceeded This time would be given in seconds
- A Hash Sign (#) as call digit is received and the Option „Hash (#) as call number termination character“ is activated.
- The Information element „Sending Complete“ is received.

It is naturally very important that the Callback profile must be addressed either in the call number plan directly or in the LCR – module.



If the call is routed over the LCR module the Hash sign (#) will not be accepted by the LCR Module and the connection will be terminated with Cause 1 (unknown called number).

## Configuration of the Servers



The Server Profiles are made by clicking on „New Server“.

The server profile is exactly the opposite of the Client. The server number and the call number range are entered. I.e. under “Incoming Number” it is expected that the Servernumber will be given as the target number in the activation call. The expected call number range is entered under it.

The „Outgoing Server CLIP“ gives the Number that the Server in the Callback Call sends as CLIP. The outgoing extension number will be configured among this.

When a call comes in, the incoming extension number will be converted into the outgoing extension number.

Example:

The Incoming extension numbers are 10 to 20 and the outgoing extension numbers are 50 to 60. The extensions will be converted as follows:

10 à 50, 11 à 51, 12 à 52, 13 à 53 etc.

On the Server there is a source and target routing, with which the analog to the Client in either case a Linegroup or a Dialling plan can be chosen.

In the settings for the „Source“ it must be guaranteed that a route back to the caller can be found. I.e. the callers number and (not the switches number) must be in the Dialling plan.

On the setting for the “Target“ it must be guaranteed that the route to the target number can be found. I.e. The Original Target number (the originally dialled number, not that of the Callback Server) must be in the Dialling Plan.

The call will fail if one or the other routes can not be found.

Under „Access list“ a permission class or access restriction/white list can be chosen. Only callers on this list can use the Callback functions. In the case where the setting „Without“ is configured all subscribers can use the Callback Service.



The Fields „Activation timer“ and „Activate tone generation“ steer the behaviour of the Server on an incoming call. The Server will wait however many seconds are given under the „Activation timer“ Settings, before the call to the Target called number and the Callback call are activated. During this time the Caller will hear either nothing or if the „Activate tone“ generation is activated, a alerting Tone.

It can happen that the Server connects several Subscribers, In this case the Server requires more Profiles .

**Example:**

When the Client is installed in Germany:

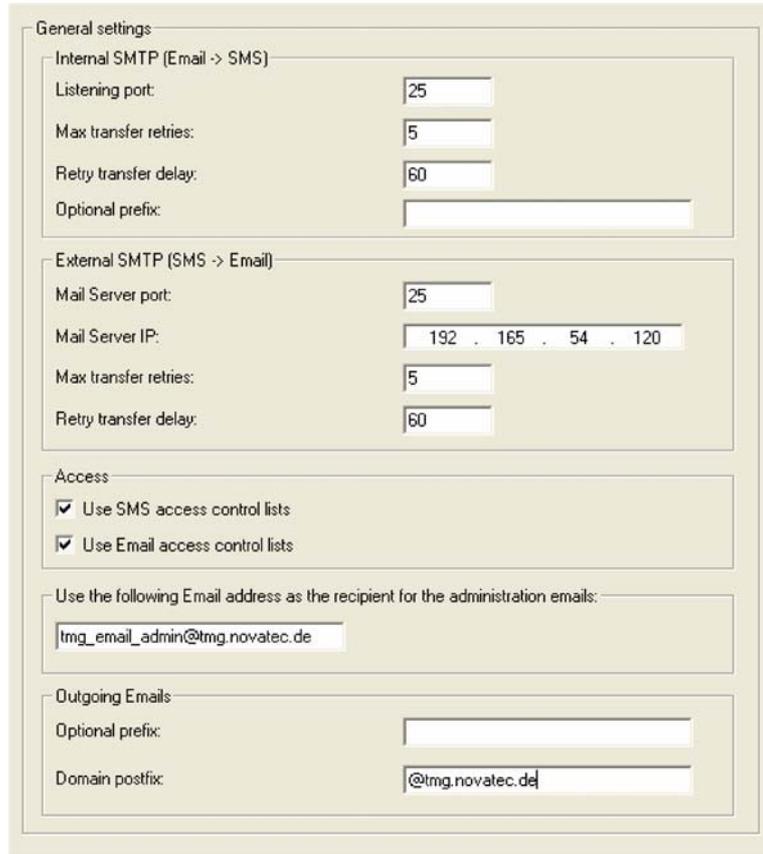
The Server needs a Profile where the Incoming number (Trigger) and Outgoing Server Clip is configured as 0044123456 (00 Prefix for International)

When the Client is installed in SA, the Numbers should be configured so: 0944123456 (09 Prefix for International in SA).

## 5.6 Remarks to SMS to E-Mail Configuration

### SMS Email

On this page the various options that affect both email and **SMS** messaging are present.



The screenshot shows a configuration page with several sections:

- General settings:**
  - Internal SMTP (Email -> SMS):**
    - Listening port: 25
    - Max transfer retries: 5
    - Retry transfer delay: 60
    - Optional prefix: (empty)
  - External SMTP (SMS -> Email):**
    - Mail Server port: 25
    - Mail Server IP: 192 . 165 . 54 . 120
    - Max transfer retries: 5
    - Retry transfer delay: 60
- Access:**
  - Use SMS access control lists
  - Use Email access control lists
- Use the following Email address as the recipient for the administration emails:**
  - tmg\_email\_admin@tmg.novatec.de
- Outgoing Emails:**
  - Optional prefix: (empty)
  - Domain postfix: @tmg.novatec.de

#### Internal SMTP (Email -> SMS)

##### Previous Start Next

##### Listening port

This is the port in which the system internal **SMTP** server listens for incoming mails from the corporate **SMTP** server. Normally the standard port (25) is the appropriate value, however the **NMG** system administrator has the opportunity to change this if required

##### Max transfer retries

This value sets the maximal amount of times the system will try to re-send a **SMS** on failure. Once this limit is reached, the system will cancel the operation, and the sender will receive a email informing him/her of this failure

##### Retry transfer delay

This is the time span the system uses between each attempt to send an **SMS** message on failing on the initial attempt. The standard value is 60 minutes (1 hour). The smallest possible time span is 1 minute, the largest is 1440 minutes (24 hours)

##### Optional prefix

This prefix may be used when sending a email to an mobile recipient. Some mail clients do not allow a mobile phone number as a valid email address, therefore this prefix can be used to overcome this. The prefix will be cut off by the **NMG** system (before passing through the **SMS alias lists**).



## External SMTP (SMS -> Email)

### Mail server port

This is the port that the corporate SMTP server „listens“ on. The NMG system sends emails to the corporate SMTP server via this port. The preset value (25) is normally the standard setting. If the corporate SMTP server has another value set, then change this value to that of the corporate SMTP server. If this value is incorrectly set, then the NMG system cannot send emails.

### Mail server IP

This is the IP address of the corporate SMTP server. This value **MUST** be set correctly. If this is not the case, then the NMG system cannot send emails. The IP address can be obtained from your system administrator.

### Max transfer retries

This value sets the maximal amount of times the system will try to re-send a email on failure. Once this limit is reached, the system will cancel the operation.

### Retry transfer delay

This is the time span the system uses between each attempt to send an email on failing on the initial attempt. The standard value is 60 minutes (1 hour). The smallest possible time span is 1 minute, the largest is 1440 minutes (24 hours).

### Access

#### Use SMS access control lists

Activate this option if you wish to control which mobile users have access to the SMS to email service. If this option is activated and you have not defined any SMS access lists, or assigned them to the GSM channels, then this option has no influence on the access to the service (i.e. as if the option were disabled). To create, edit or assign SMS access lists, this option must be enabled.

#### Use Email access control list

Activate this option if you wish to control which email addresses have access to the Email to SMS service. If this option is activated and you have not defined a email access list, then no-one has access to the Email to SMS service. To create, edit or delete entries in the email access list this option must also be enabled.

#### Use the following Email address as the recipient for administration emails

When administering the system via email, the emails must be sent to this email address. This is **NOT** an optional setting. This must be a valid email address recognized by the corporate SMTP server. If this is not the case, then email administration will not be available.

### Outgoing Emails

#### Optional prefix

Here you may enter an optional prefix that will be added to the email address of the sender

#### Domain postfix

Here you must enter the Domain of your mail server. This setting is not optional.

#### Note

To allow the use of the SMS<->Email functions, the GSM profiles must be explicitly set to allow the sending of SMS messages. If this is not the case, then the messages cannot be sent.

#### Testing the SMS - Email Server

To test the function of the SMS - Email Server, you can connect to the server using a telnet session, and simulate the sending of an email via SMS. Here is a short example of this procedure.

telnet

192.168.127.56 25

HELO SOFT8

MAIL FROM: phbe@novatec.de

RCPT TO: 01705202222@nmg.novatec.de

DATA

Hi Phil, how is the help coming on?

(dependant on the telnet client being used, the signaling of the end of data may be CTRL++, or <enter>.<enter>)

QUIT



### Explanation

The telnet session is opened and connects to the server at **192.168.127.56** using port **25**. The **HELO SOFT8**

lets the server know who is contacting it.

The **MAIL FROM: phbe@novatec.de** is the sender information the server requires. The **RCPT TO: 01705202222@nmg.novatec.de** is the recipient of the email,

in this case a mobile number. The **DATA** is the actual payload that is sent via SMS to the recipient.

After signaling the end of the **DATA** section, the quit ends the telnet session. If the server is correctly set up, then the recipient will receive an SMS. Also, dependant on the settings under **Email settings**, the sender

**(phbe@novatec.de)** may receive confirmation of the sending of the SMS.

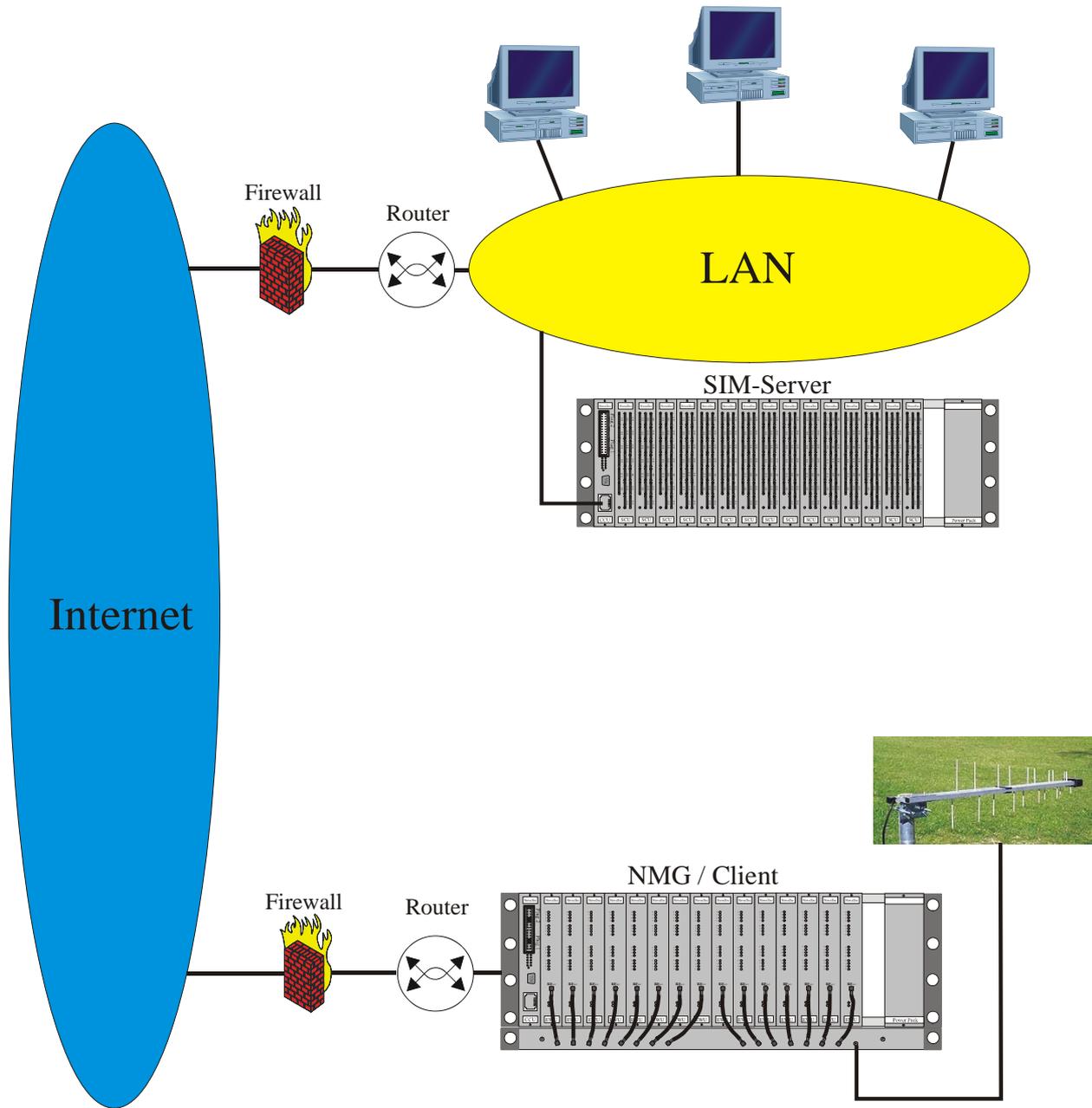
### Considerations

Due to the many various mail server setups and servers that are available (MS Exchange, Linux/Unix MailTo, Lotus Notes etc) this is just a brief and general overview on how to integrate the NovaTec SMS <-> Email application into an existing environment.

Within the company network, a unambiguous domain name should be given to identify the NMG system within the network, in the above example it is **nmg.novatec.de**.

This domain name should be mapped to the IP address that has been setup. The „main“ mail server should be setup to forward any mails with the domain postfix **nmg** to the NovaTec system. This allows the use of the SMS<->Email application without any changes to the mail clients within the company.

## 5.7 Remarks to SIM-Server installation



Picture 51: SIM-Server installation



## 6.0 Technical Data

<b>Mechanical Data</b>	
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	central screws in a dedicated 19" rack
Construction	Modular comprising slot-in modules and sub-modules

<b>Electrical Data</b>	
Power supply	230 V~ (115 V~) $\pm 10\%$ , 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 230 V~ and 115 V~)
Earth	Separate earth via min. 2.5 mm <sup>2</sup> 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 <sub>0</sub> -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 <sub>2M</sub> -interface)	In accordance with CTR 4 A1, 98/520/EG Range: 1000 m using 0.6 mm diameter cable
U interface (U <sub>K0</sub> -interface)	In accordance with ANSI T1.601, CTR 3, TBR 3 Supply: 0 V (1F5010-2) / 110 V $\pm 5$ V, 25 mA (1F5010-2-LP) Range: max. 8000 m using 0.6 mm diameter cable max. cable lose 40 dB/40 kHz
GSM interface According to the following standards Output Power 900MHz Output Power 1800 MHz Speech codec	GSM class Small MS Dual Band EGSM900 and GSM1800 (GSM Phase 2+) Class 4 (2W) for EGSM900 Class 1(1W) for GSM1800 Half Rate (ETS 06.20) Full Rate (ETS 06.10) Enhanced Full Rate (ETS 06.50 / 06.60 / 06.80)
IP-Interface	SIP 2.0 -> RFC3261 ITU V.110 -> Data Interface between ISDN, IP and GSM
<b>Environmental Specifications</b>	
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)