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# Installation Manual

## NovaTec/TransNova® S3



Version 1.1 of Feb 22<sup>nd</sup>, 2010  
Subject to change without notice



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## 1.0 Introduction

Dear Customer,

we congratulate you for purchasing the NovaTec/TransNova® S3 (S3). You have made the decision for a Gateway which was developed and produced utilizing the newest technical standards available. The S3 is available in several versions and depending on the version provides the following interfaces: IP (SIP protocol), 2x BRI (each NT/TE configurable), 2x U<sub>PO</sub> (each NT/TE configurable, only Point to Point) and 2x analogue.

This installation manual describes the installation and the initial operation of the S3. You are advised to read the entire manual thoroughly before starting the installation step by step.

## 2.0 Security advice

- Do not install the S3 near to heaters or heating appliances and sources of electrical interferences such as fluorescent lamps and electric motors.
- Protect the S3 from dust, moisture, shock and vibration as well as direct sunshine.
- Make sure that no debris such as wire, cable ends, nails or small metal parts fall into the openings on the upper surface of the unit.
- The S3 cannot be used before the installation is professionally installed.
- Never use petrochemicals to clean the housing. For cleaning purposes, use a soft and dry cloth only.
- In case an internal component is obviously damaged through a malfunction in the power supply or whatever ie. through a damaged housing, please remove the S3 from the power supply **immediately**.
- In order to avoid material damage or injury to persons, never expose the S3 to water (rain) or excessive moisture.
- For safety reasons it is not allowed to alter the S3 neither construction- nor safety-related without prior explicit approval from NovaTec Kommunikationstechnik GmbH.
- NovaTec Kommunikationstechnik GmbH is not liable for damages resulting from any alterations. Particularly, repairs of all nature and any soldering on the PCB's are forbidden.
- The installation manual must always be delivered with the equipment when given to a third party.



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**Declaration of Conformity:**

NovaTec Kommunikationstechnik GmbH herewith declares, that the product NovaTec/  
TransNova® S3 conforms with the European Standards:

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

The appropriate declaration and documents are in the producers archives.



## 3.0 Preface

### 3.1 Product description

The S3 Gateway provides a connection between the IP-Network (SIP-Protocol) and the ISDN-Network resp. analogue terminal equipment. The S3 has both an IP-interface with Codecs for four B-channels, and depending on the version, either one or two ISDN-U<sub>p0</sub>-interfaces (Point-to-Point) and ISDN-BRI-interfaces, and two analogue a/b interfaces. The ISDN-interface can be configured either as master (Termination for ISDN terminal equipment) or as slave (ie. Connection for ISDN trunk lines or cross connection between telecommunication systems). Only analogue type terminal equipment can be connected to the analogue interface. The easiest method of determining the version is through the article number of the S3 unit to be found on the system label. The MAC address of the unit can also be found on the system label. Please find an overview of the versions in the table below:

Article-Number	IP-Interface (SIP) 4 B-Channels	S <sub>p</sub> -Interfaces	U <sub>p0</sub> -Interfaces	GPS-Receiver	analogue Interfaces
1F8000	1	2	0	0	0
1F8010	1	2	0	1	0
1F8015	1	2	0	1	2
1F8020	1	2	0	0	2
1F8025	1	1	0	0	2
1F8030	1	0	2	0	2
1F8040	1	0	0	0	2

Table 1: The NovaTec/TransNova® S3 versions

### 3.2 Scope of Delivery

Pos.	Quantity	Article
1	1	NovaTec/TransNova® S3
2	1	Power Supply and Cable
3	1	USB Cable
4	1	GPS Antenna (only for S3 versions with GPS modules)
5	1	Mounting Set
6	1	Short Instruction



## 3.2 Use of this Manual

This manual is divided into single capitals. The succession and the contents of the different capitals coincides with the succession of the tasks, necessary for the installation and initializing the S3. We therefore suggest reading the manual in its successive capitals as they are written, executing the tasks successively before moving on to another capital. You will install and initialize the S3 successfully if you follow the instructions in this manual as they are written.

## 3.3 Use of the Pictograms



**Instruction:**

Important instructions, which you should follow.

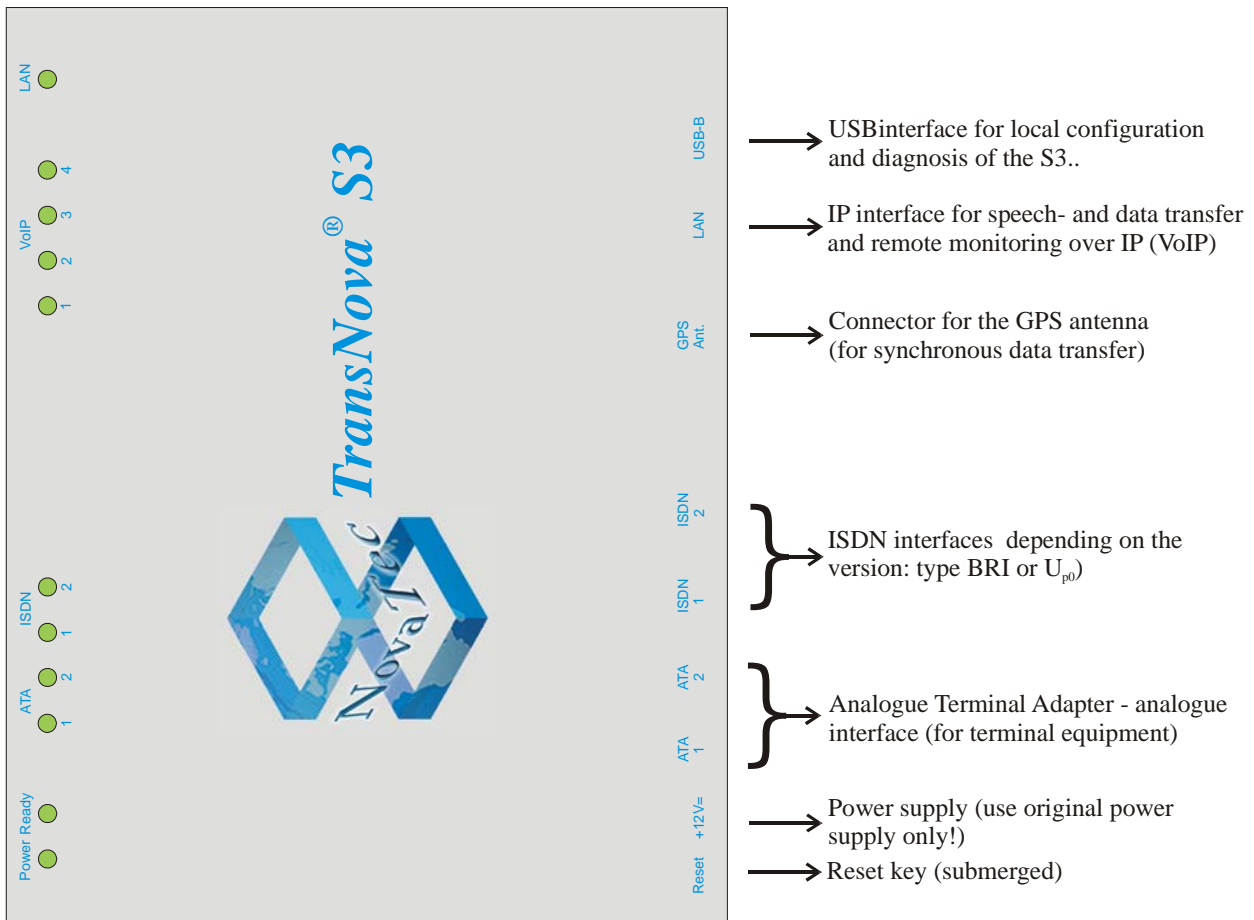


**Attention:**

Important information, which you should definitely follow, in order to avoid malfunctioning and eventual damage.

## 4.0 The NovaTec/TransNova® S3

The S3 can be used everywhere when it is necessary to convert interfaces. The S3 functions as a gateway between IP-, ISDN-U<sub>p0</sub>-, ISDN-BRI- and analogue interfaces. The S3 can therefore be operated i.e. behind the telecommunication system with a U<sub>p0</sub>-interface, to convert the signal in an analogue a/b interface. Furthermore the S3 can also be operated in a VoIP network, to convert the signal into a U<sub>p0</sub>-, BRI- or analogue a/b-interface, or to make these connections available for terminal equipment. The functionality of the S3 depends on the version you purchased (see table 1) and its configuration. The following picture shows an overview of all interfaces.

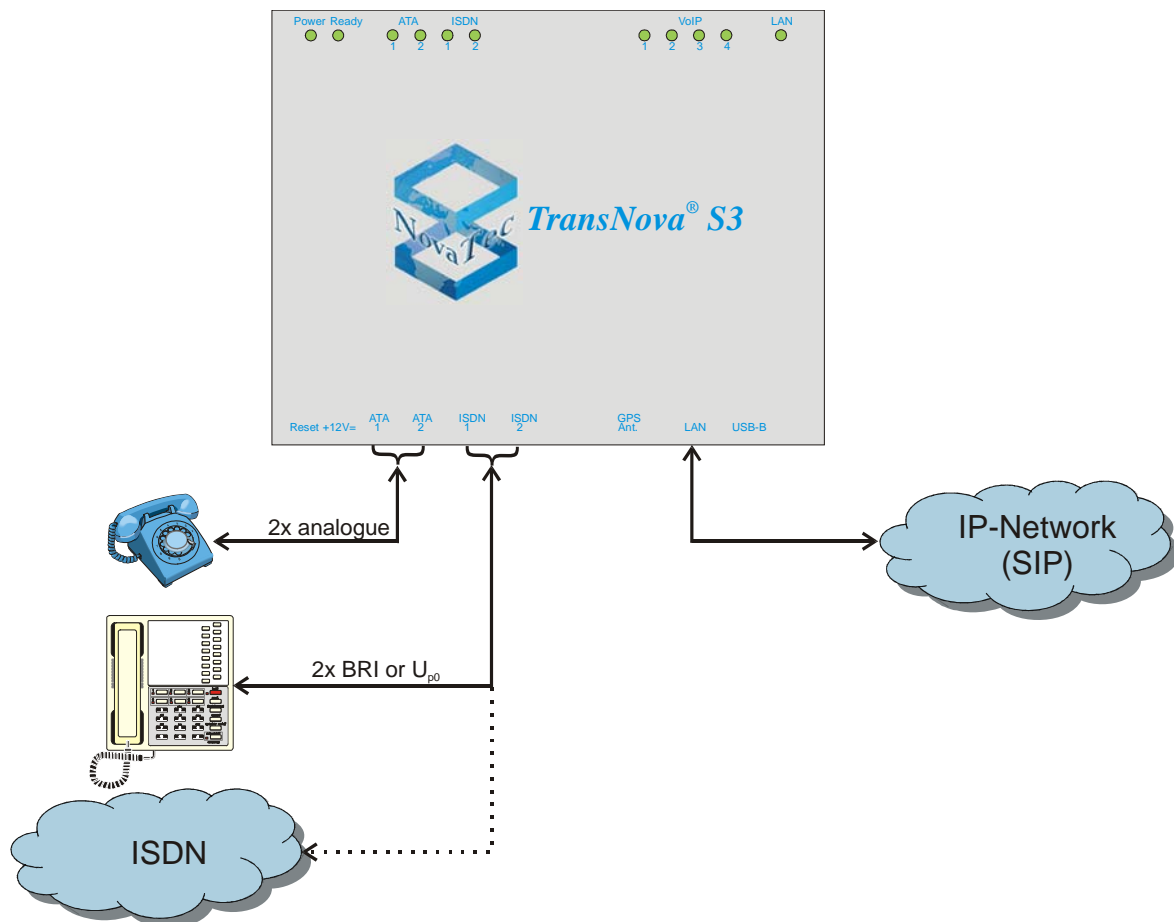


Picture 2: The S3 interfaces.



## 4.1 Integration of the S3

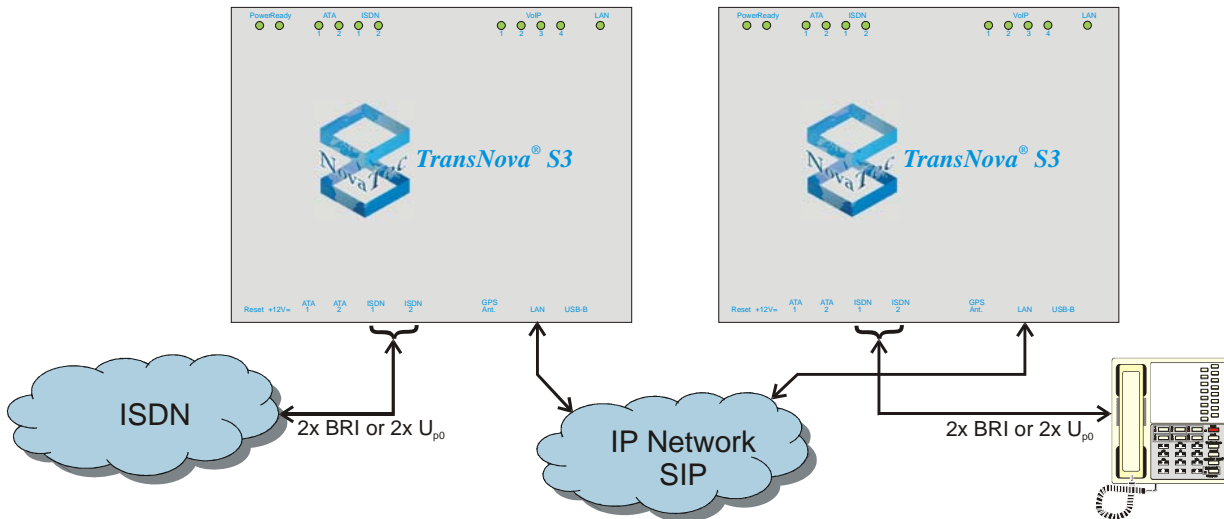
The S3 was developed to be embedded in existing networks in which interfaces are to be converted. The S3 is versatile and the version selected depends on the field of application. Picture 3 shows an overview of possible fields of applications of all versions. Please view table 1 in addition as well.



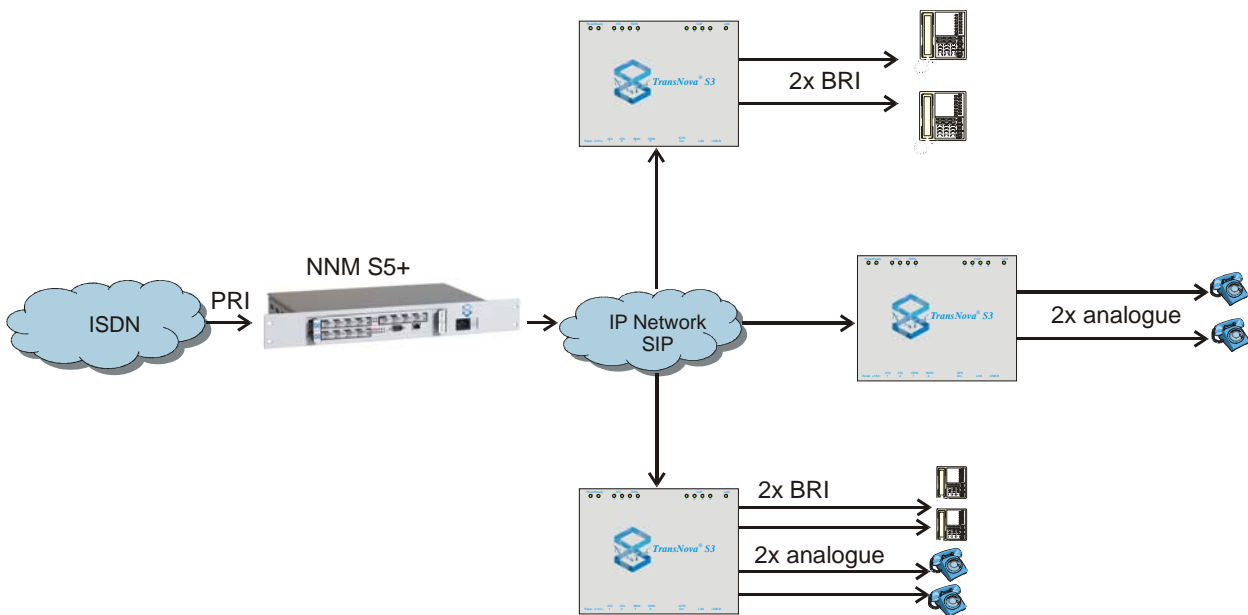
Picture 3: Integration of the S3 in an existing infrastructure

## 4.2 ISDN over IP

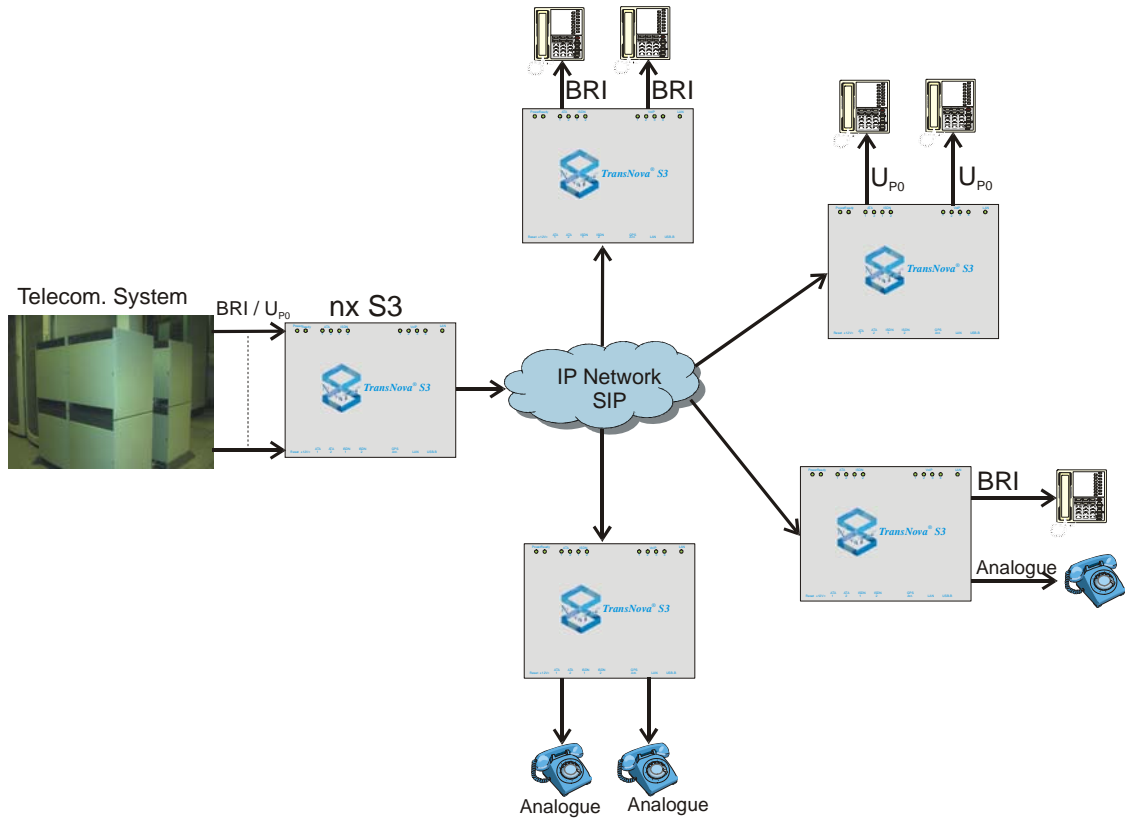
The ISDN interfaces in the S3 can be configured either as master (for connecting ISDN terminal equipment) or as slave (for connecting telecommunication systems or for cross connecting trunk lines). Thus the S3 can also be used to isolate a system via IP network. The pictures 4, 5 and 6 show examples. The ISDN features are transparently passed through and are entirely available on both sides.



Picture 4: Isolating ISDN interfaces via an IP network with the S3



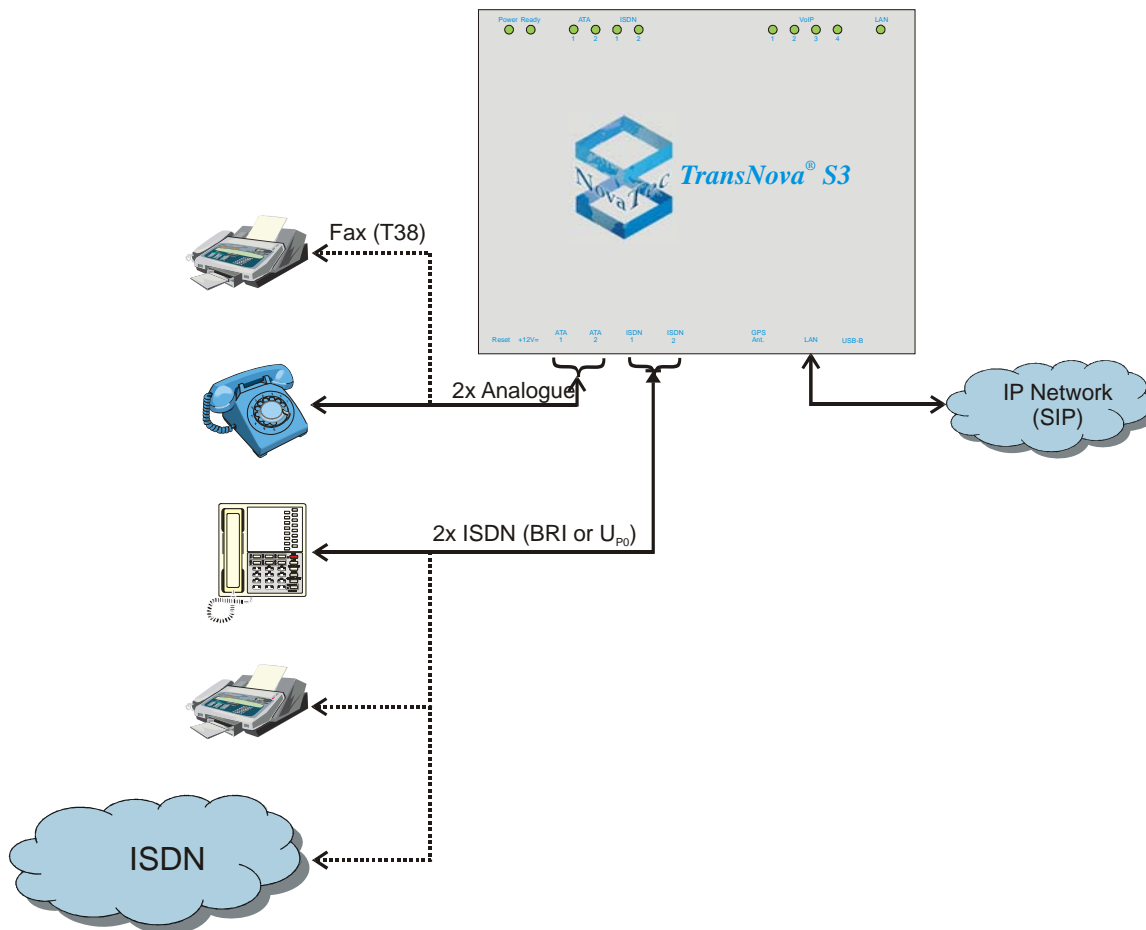
Picture 5: Example of an application S<sub>2M</sub> toBRI/analogue via IP with the S3



Picture 6: Example of an application of a telecommunication network via IP

## 4.3 Creating an ISDN resp. analogue Interface

The S3 can create an analogue interface for analogue terminal equipment respectively an ISDN interface ( $S_0$ - bzw.  $U_{P0}$ ) for ISDN terminal equipment or for the connection of ISDN trunk lines from a single SIP string. Even terminal equipment other than telephones, such as PC's equipped with ISDN cards or faxes can be used on the S3 with the support of the T38 protocol.

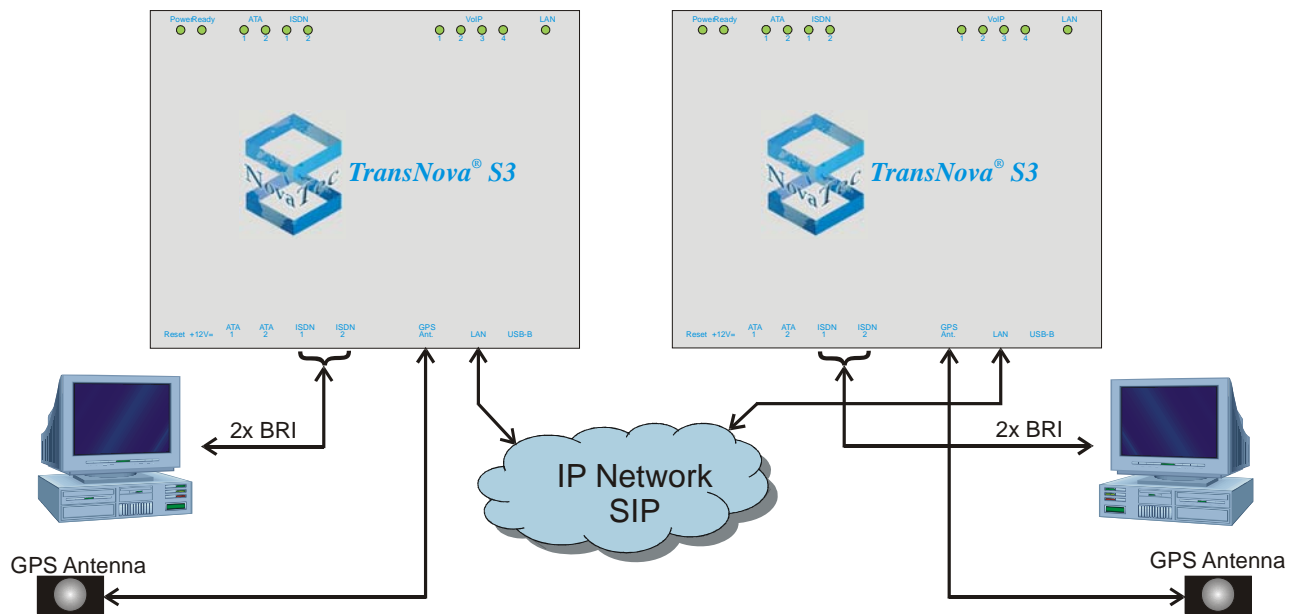


Picture 7: Creating ISDN resp. analogue interfaces from a single SIP string



## 4.4 Synchronous Data Transfer

In certain applications such as videoconferencing (systems) it is necessary to transmit data synchronously between two locations. The S3 with GPS module (S3 article numbers 1F8010 or 1F8015) is necessary for this application. Two S3's each equipped with a GPS antenna is necessary for a synchronous data transfer between the two locations. Make sure that an adequate signal strength is available where the S3's are located. The GPS antenna is watertight and can be mounted on the outside window sill without hesitation. When installing the antenna please take into consideration that under certain circumstances it may take up to 15 minutes before the GPS receiver has found enough satellites to home on to, and thus provide a synchronisation signal. The signal strength of the GPS receiver (synchron/asynchron) can be checked with the Trace-Info-Client.

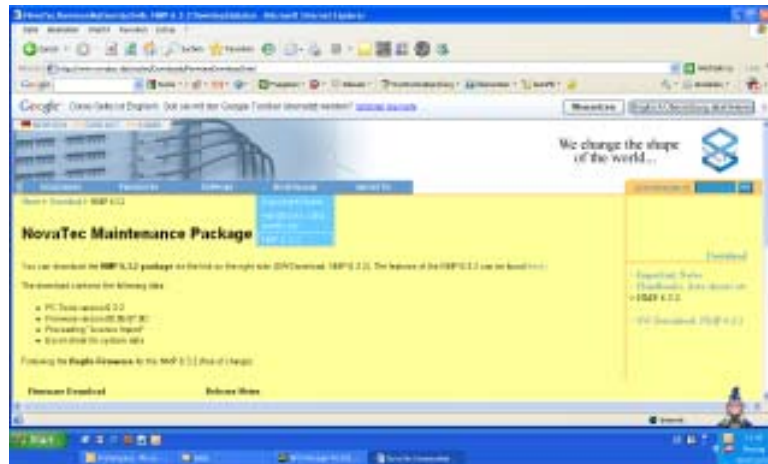


Picture 8: Synchronous data transfer with the S3



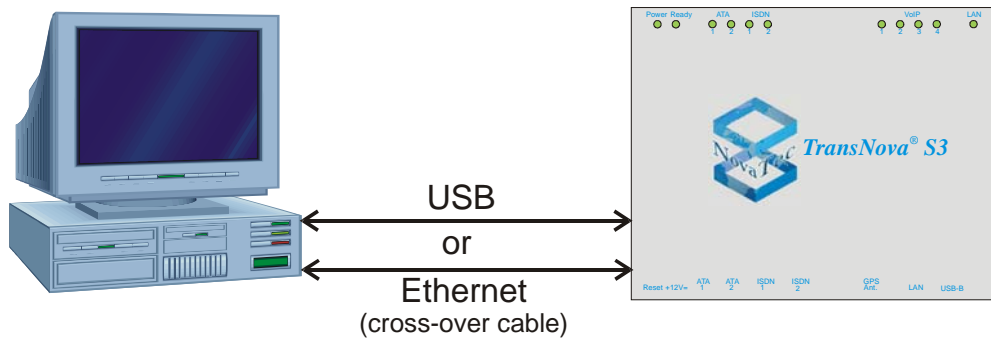
## 5.0 Configuration

The S3 needs to be configured before installation. A PC with the Microsoft Windows® XP, Vista or NT computer programme is necessary. Download the PC tools from [www.novatec.de](http://www.novatec.de) > Download > NMP x.x.x.



Picture 9: Download from [www.novatec.de](http://www.novatec.de)

Install the software with the setup.exe file(folder: NovaTec\_NMP\_x.x.x.zip).Follow the instructions on your PC monitor. Extensive information on the different software categories can be called up with key „F1“. The initial installation of the S3 can be started by simply connecting the system to the delivered power supply.



Picture 10: Connection for the configuration of the S3

A configuration data base file is created (.mdb) with the users interface, this is created from the configuration surface and then stored onto the computer. After this is done, connect the computer to the S3 via an USB or an Ethernet cable (cross-over cable). The default IP address of the S3 is: **192.168.127.254**. The configuration surface transfers the data base file to the target system (S3). After the data base file has been tranfered to the target system the system reboots, if necessary, and afterwards is ready for use according to the configuration. In case that the S3 is in default mode after the restart the data base file was damaged. The LED´s show the operating condition of the system. When the system is in default mode, please reconnect the S3 to the computer, correct the configuration and transfer the altered data base file to the system once more.

**To reset the S3 to factory defaults please press the reset button twice.**



As a standard, NovaTec delivers all systems with the latest firmware. Should you have an older firmware version and would like to upgrade\* your system(s), please download the PC tools from [www.novatec.de](http://www.novatec.de) > Support > Firmware and Software and save the firmware (file FW\_“Version Number“\_TI\_Client) on your PC. Then follow these steps:

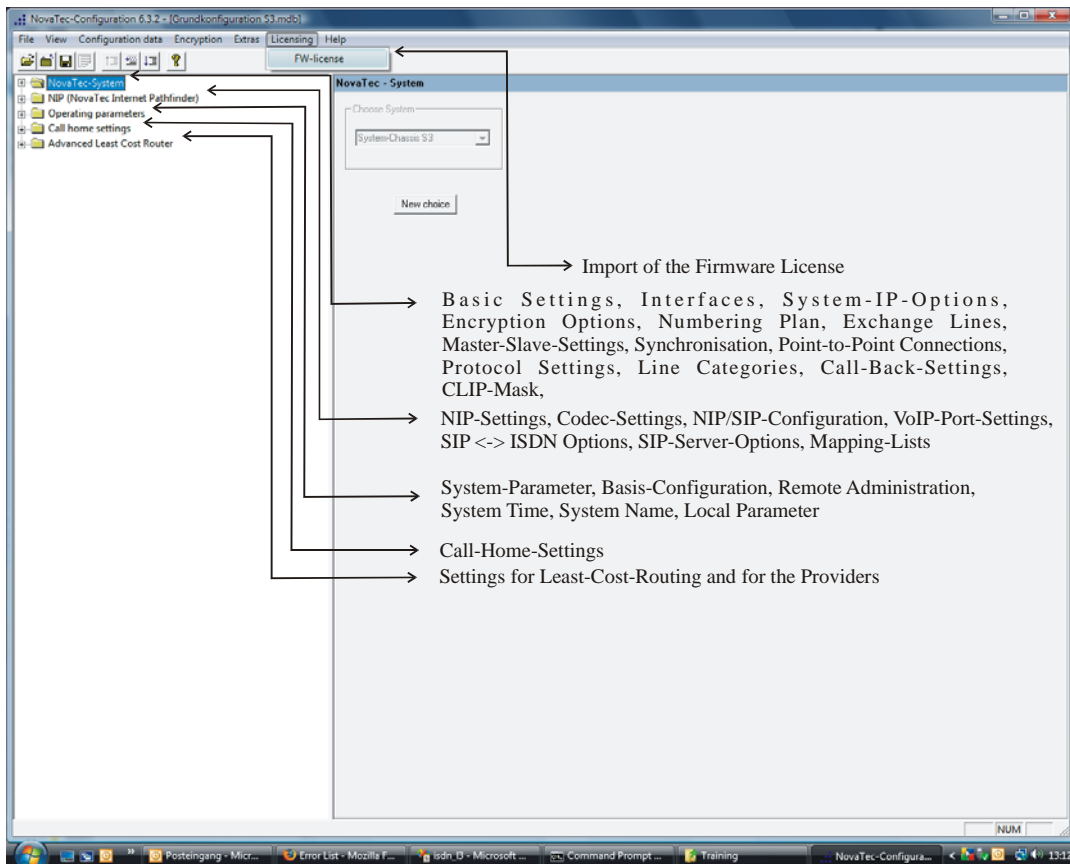
FW update with the Trace Info Client (per USB or V.24):

1. Start Network Services
2. A blue triangle appears in the Windows System Tray
3. Right-click on the triangle and select "Settings"
4. Activate the option "Use COM Port" and set the COM port of your PC resp. the USB interface
5. Start the Trace Info Client
6. Click "Settings"
7. Make the following entries: „Hostname“: "localhost" and "Port": "800". Confirm with "OK"
8. Click "Connect"
9. Enter "technik" for "Username" and enter the password of the target system (the delivery status is without password, thus the box can remain empty)
10. Select "V.24 / USB" in the "Network" box and confirm with "OK"
11. New flags appear in the Trace Info Client when the connection is made
12. Click the flag "Diagnosis"
13. Click the button "Firmware" and select the FW file that you wish to transfer to the target system
14. The FW is uploaded, a progress window appears
15. The FW is target system resident. The message "Updating Firmware on Target" appears. Do not switch off the system as long as this message is shown. Otherwise the system does not function after the reset!!!
16. A message appears saying that the update was successful and that a system reset is necessary
17. Click "Systemreset" (without the system reset the system does not accept the new firmware and still runs with the old one)

\*Please ask our sales team for an offer for the firmware upgrade.



The following mask appears after the configuration surface is started:



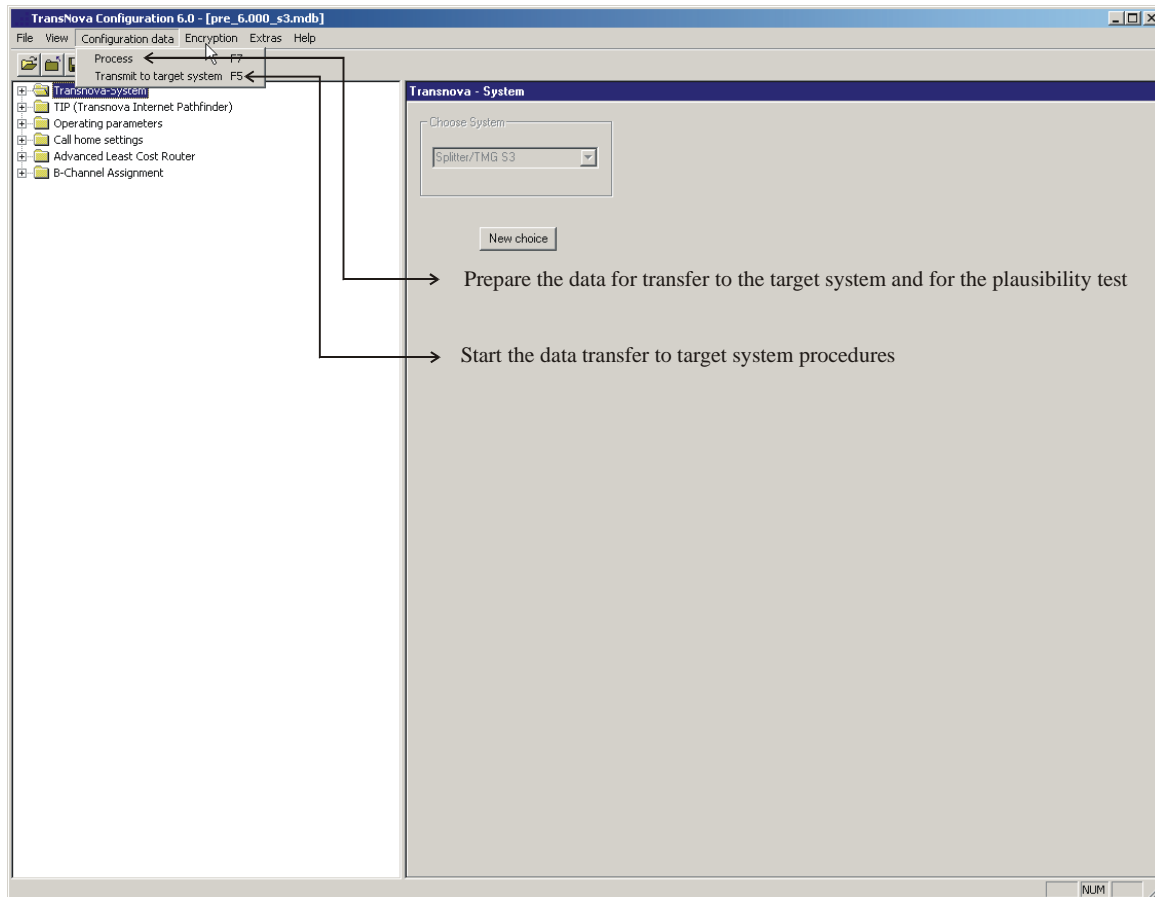
Picture 11: The configuration surface mask

Please do all configuration settings for the system at this level. A connection to the target system is not necessary when the configuration surface mask is selected, thus the necessary settings can also be made „Offline“. A help text (key „F1“) providing further information on the configuration parameters is at your disposal in all sub menus. Please be aware that there is no „store“ function available as known from lots of Windows® applications: all actions take effect as soon as a parameter is entered or altered. Thus we recommend you to make a copy of your configuration file (.mdb) before you start with the alterations. This copy can be made with Windows® board tools, or with the function „Close and Copy to file ....“ in the configuration surface mask under the menu item „File“.

### Load the firmware license into the configuration:

1. Select the menu item „Licensing/FW-License“
2. Select the license file that you received from NovaTec for the respective target system/target group
3. Process the configuration data
4. Transfer the configuration to the target system

You receive the license from NovaTec via email. The license is also needed for configuration alterations: keep it in safe custody!

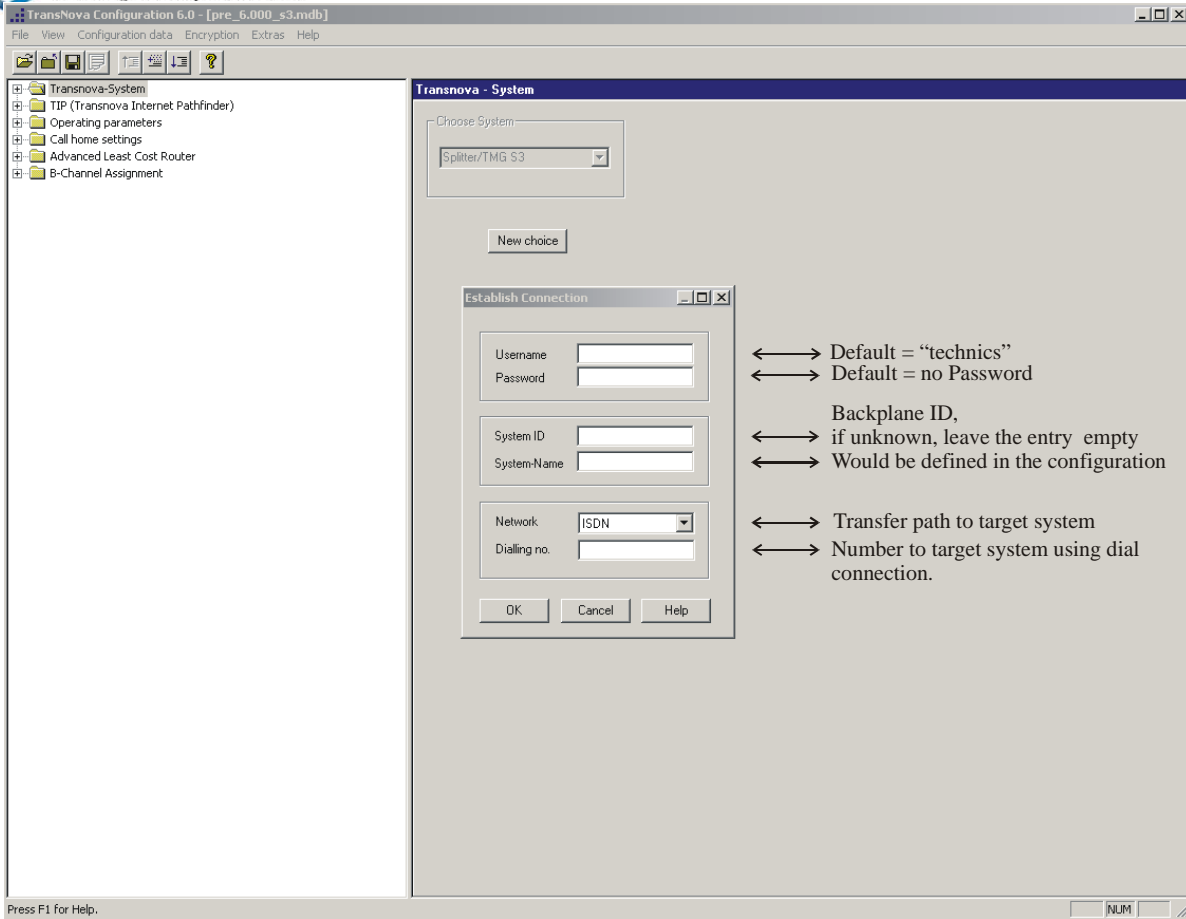


Picture 12: Processing and transferring the data

The data must be processed before it is transferred. This is initialized by selecting the „Process“ function found under the pull-down menu or by pressing the „F7“ key. This process merely triggers off a plausibility check of the configuration. When the processing is not successfully done the data cannot be transferred to the target system. If a failure in the configuration is detected by the plausibility check then a corresponding report regarding the failure appears.

After a successful data processing, the data can be transferred to the target system using the „Transmit to target system“ function or by keying in F5.

The key „**Extras/Save Config**“ exists in the configuration surface mask. We advise pressing this key. Thus the configuration data is not only stored as packed data to the target system but also in its original form. This results in a significant extension of the configuration transmission time but on the other hand enables you to download the original configuration data from the target system in case that you want to log onto the S3 system using a foreign PC on which the configuration data for the target system is not stored.



Picture 13: Transferring the data to the target system

When the data is transferred to the target system a dialog check appears after a security check with the following entry possibilities:

**User name**

The Username is „Technik“ and cannot be altered.

The configuration data is not transferred, when a new user name which is unknown to the system is entered before having done the data transfer.

**Password**

This is also entered resp. altered with the Trace-Info-Client. The system has no password in the delivery state, this must be defined by the user for the first time. The configuration data is not transferred, when a password which is unknown to the system is entered before having done the data transfer.

**System ID**

Is the number printed on the back plane of your system, this number is nonrecurring and has world wide significance and can be found in the Trace-Info-Client, from which the information can be extracted. If the ID is not know then please leave the entry box empty.

**System-Name**

Every system can be given its own name, ie. in order to differentiate from which system a configuration originated. If the systems have no names then leave the entry box empty.

**Network**

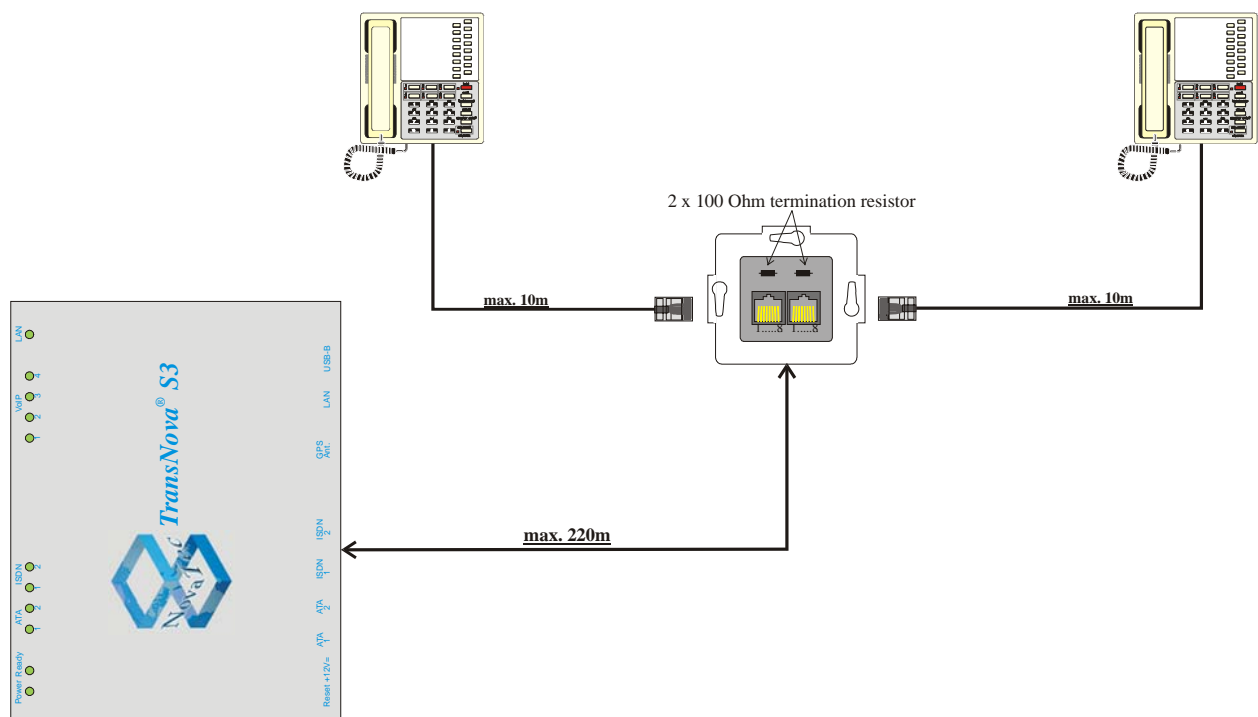
The user can decide on which path the configuration programme tranfers the data to the target system. Paths available :- V.24/USB, ISDN and TCP/IP. If ISDN is the choice then „Dialling no.“ appears in the entry box. The calling number of the target system is necessary.



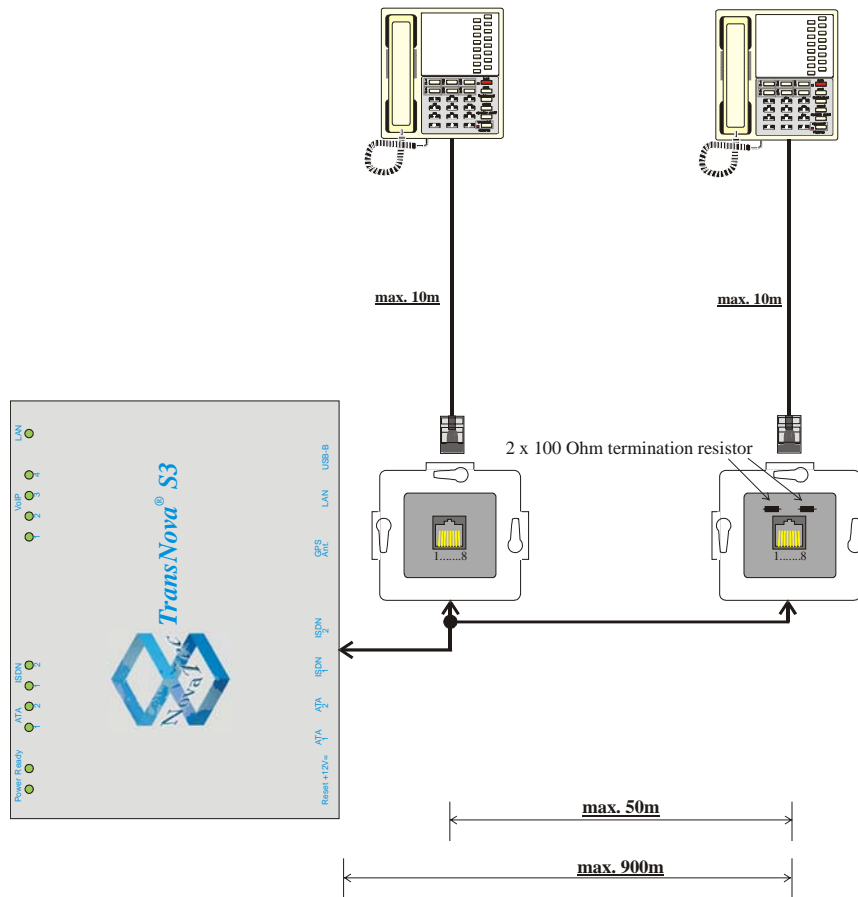
## 5.1 Installation

Once the S3 gateway is configured the system can be installed at its location with the Plug-and-Play-Principle. Without prior configuration the S3 retains its default IP address and thus it may happen that you have no remote access to it within your IP network. **Please take extra care when designating the IP-addresses of the routers and firewalls.**

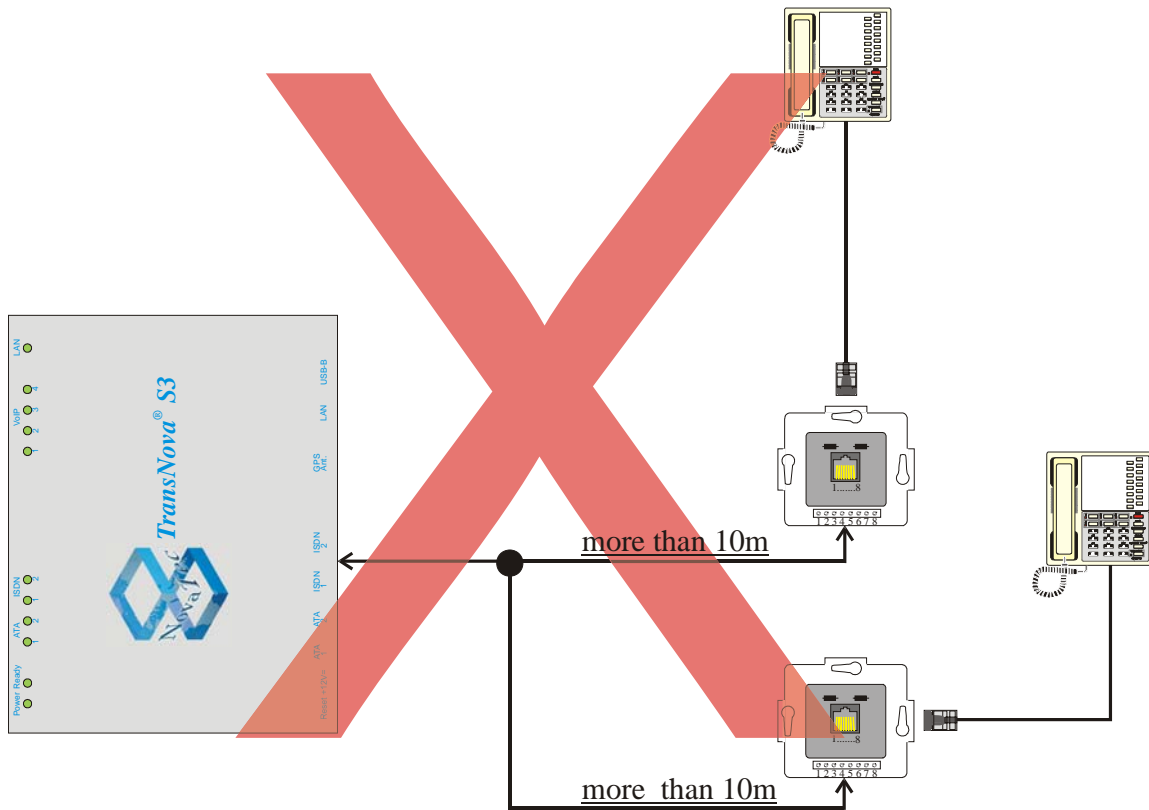
Only analogue terminal equipment is connected to the analogue interfaces. Configuration dependant NT's and TE's can be connected to the  $U_{p0}$  and BRI interfaces. The BRI interfaces have internal termination resistors, therefore it is only necessary to connect resistors at the termination point resp. to activate the available resistors in case of cross connected telecommunication networks. Connecting the BRI interfaces in star-shaped form is **not** possible. The maximum range for the BRI interfaces in the various operation modes can be found in the paragraph „Technical Data“. For configuration amendments after the installation is done, you do not need to deinstall the S3. For such purposes you can dial into the S3 with your PC via IP, conventional telephone network or USB connection. Simply dial in on the system, for instance to check the status or test the interface or to transfer an updated configuration.



Picture 14: BRI line termination (passive bus)



Picture 15: BRI interface (extended passive bus) cross connection system termination



Picture 16: Incorrect cabling of the BRI interface

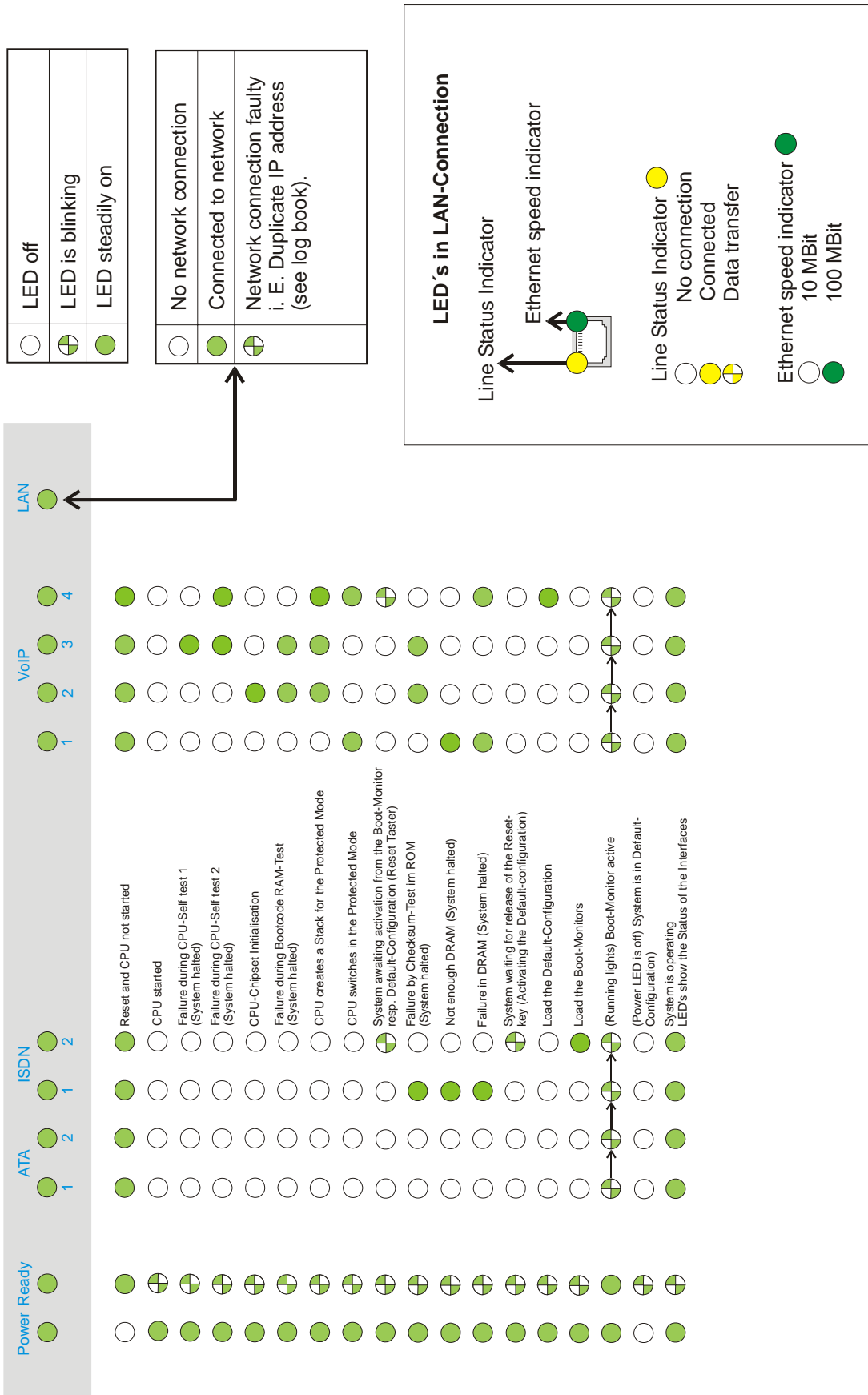


## 5.2 Status indication

The S3 status indication is basically arranged in two categories: the boot phase and the operating phase. Many test steps are run during the boot phase, this can be partially followed as the LEDs blink alternately. Some tests are so fast that the blinking of the LEDs is not noticeable. If a test step is not successful the system either stops in the test phase or the system restarts. In this case please call the NovaTec support.

If the system is in the default configuration, a valid configuration must be transferred from the computer to the system.

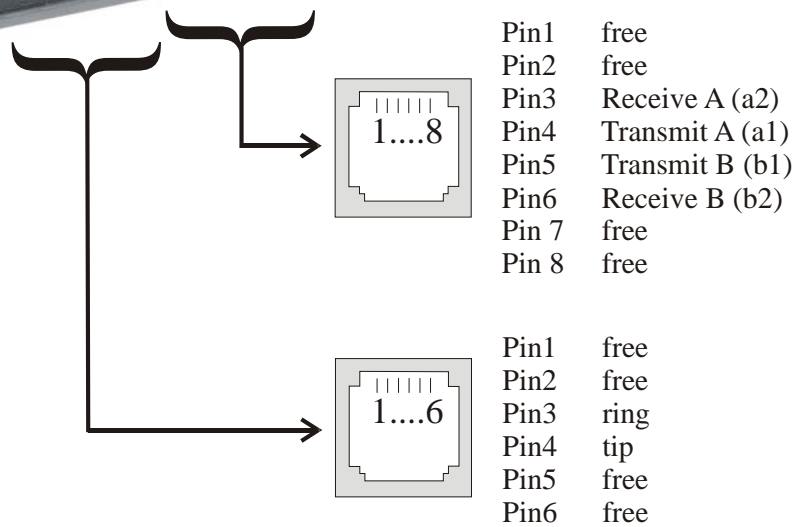
If the system is in operation, the LEDs show the operation status of the respective interface. If the ATA- resp. VoIP interface LEDs are steady on, then a call is active via the respective interface. If the ISDN LED is steady on, then an ISDN terminal equipment is connected and the layer 1 is active.



Picture 17: Status indication of the S3 LEDs during the boot phase



### 5.3 Signal designation of the interfaces



Picture 18: Signal designation of the interfaces



## 6.0 Technical Data

Mechanical Data	
Width x Depth x Height	Desktop / wall-mounted chassis: 211 mm x 155 mm x 40 mm
Weight	1 to 2 kg (depending on version)
Fastening method	Wall-mounted chassis: wall holders
Construction	Several options
Electrical Data	
Power Supply	90 to 264 V~ ; 47 to 63 Hz
Power Input	1 A max.
Electrical Supply	Rubber connector (IEC 320)
Overvoltage Protection	Internal overvoltage protection
Available Interfaces (depending on version)	<ul style="list-style-type: none"><li>• Serial via USB</li><li>• 1 x Ethernet according IEEE 802.3/802.3u</li><li>• ISDN BRI, EDSS1</li><li>• ISDN U<sub>PO</sub>, EDSS1*</li><li>• Analogue*</li></ul>
BRI Interface	<ul style="list-style-type: none"><li>• According CTR 3, TBR 3, ITAAB</li><li>• Supply: external with USS (feeding unit)</li><li>• Range: max. 220 m (passive bus) max. 900 m (extended passive bus) max. 1000 m (point-to-point)</li></ul>
Analogue Interface*	<ul style="list-style-type: none"><li>• Automatic identification between IWV and MFV (ETSI Standards ETSI ES 201 235-1,2 V1.1.1)</li><li>• Range up to 10,000 m (depending on cable type)</li><li>• High ringing voltage with up to 5 US REN (Ringer Equivalent Number) according AT&amp;T / 125 V Peak ringing voltage and protection from temperature rise</li><li>• Adjustment of the line impedance for 15 countries (Austria, ..., Germany, ..., USA)</li><li>• Caller ID after Bellcore/Telcordia GR-30-CORE <u>Bell202 FSK</u> CID Coding and ETSI 300-659-1/2/3 V1.3.1 <u>V.23 FSK</u> Coding for transmission of CID</li><li>• Call charge pulse is 12/16 kHz configurable</li><li>• Modem standards up to V.90</li><li>• Fax standards up to V.34</li><li>• Fax/Modem/Speech identification (Fax/Modem Switch)</li></ul>
IP Interface	<ul style="list-style-type: none"><li>• SIP 2.0 → RFC3261</li><li>• ITU V.110 → Data interface between ISDN, IP</li><li>• TLS and sRTP</li><li>• Option: GPS receiver for synchronisation</li></ul>



<b>Electrical Data</b>	
Clock Accuracy	<p>Clock accuracy <b>without</b> GPS synchronisation:</p> <ul style="list-style-type: none"> <li>• Worst Case: +/- 30 ppm</li> <li>• Temp. Drift: +/- 30 ppm at -0°C to +70°C</li> <li>• Pull Range: +/- 100 ppm</li> </ul> <p>Clock accuracy <b>with</b> GPS synchronisation:</p> <ul style="list-style-type: none"> <li>• Long period (2 days) measurement: +/- 0.5 ppm (5 * 10<sup>-7</sup>)</li> <li>• Measured maximum short time variations caused by the GPS receiver: +/- 2 ppm (2 * 10<sup>-6</sup>)</li> <li>• Worst Case and guaranteed: +/- 5 ppm (5 * 10<sup>-6</sup>)</li> </ul>
Encryption	<ul style="list-style-type: none"> <li>• SRTP according RFC3711 and RFC4711 (AES-CM-128 / HMAC-SHA1-32)</li> <li>• TLS Version 1.0 according RFC2246 and RFC3268 Key Agreement: RSA and Diffie Hellmann Cipher Suite: AES, DES and 3DES Certificate: X509v3 Hash Functions : SHA and MD5</li> </ul>
Codec and Speech Compression	<ul style="list-style-type: none"> <li>• G.711 incl. Annex I (BFI) and Annex II (VAD/CNG)</li> <li>• G.726 incl. VAD/CNG, BFI error concealment and payload support RTP according "RFC 3551"</li> <li>• G.728, 16 kbit/s</li> <li>• G.729 A/B, 8 kbit/s</li> <li>• Fax Relay, T.38 support V.21, V.27ter, V.29 and V.17</li> <li>• 30 ms Voice Packet size (all Codecs, upstream)</li> <li>• Adaptive/ Fixed Jitter Buffer maximal 200 msec</li> <li>• Jitter Buffer inband Modem Support</li> <li>• RTP/SRTP Protocol Support according to RFC3550 and RFC3711</li> <li>• Payload Byte Counter (H248.1 Annex E)</li> </ul>
Analogue Signalling	<ul style="list-style-type: none"> <li>• The Near Line Echo Canceller (16 msec) is compatible with applicable ITU-T G.165 and G.168 standards.</li> <li>• Caller ID Sender (CIDS), V.23 and Bel202</li> <li>• Caller ID Receiver (CIDR), V.23 and Bel202</li> <li>• DTMF/AT Generator</li> <li>• DTMF Receiver (DTMFR) ) according to ITU-T Q.23.</li> <li>• Universal Tone Generator (UTG)</li> <li>• Universal Tone Detector (UTD) according to ITU-T V.8</li> <li>• Text Phone V.18 A Detector</li> <li>• Call Progress Tone Detector (CPTD)</li> <li>• Answering Tone Detector (ATD)</li> <li>• Digital Identification Signal (DIS) V.21 Detector</li> <li>• DTMF Event Support according to RFC2833</li> </ul>
<b>Environmental Specifications</b>	
Storage and Transport	-20° C to +90° C 0% to 95% relative humidity (not condensing)
Operation	+5° C to +40° C 0% to 95% relative humidity (not condensing)
Heat Loss	30 J
Max./Min. Temperature	0 to 40° C

not available with TransNova<sup>®</sup> S3 (Cisco VG-2BRI)