

ATEUS[®] - STARGATE

User's Manual



Version: 5.1

Dear customer,

We congratulate you on purchasing your **ATEUS[®] - STARGATE** product. This new product was developed and produced with emphasis on maximum utility value, quality and reliability. Our wish is to make you satisfied with the STARGATE completely and for a long time.

! Important !

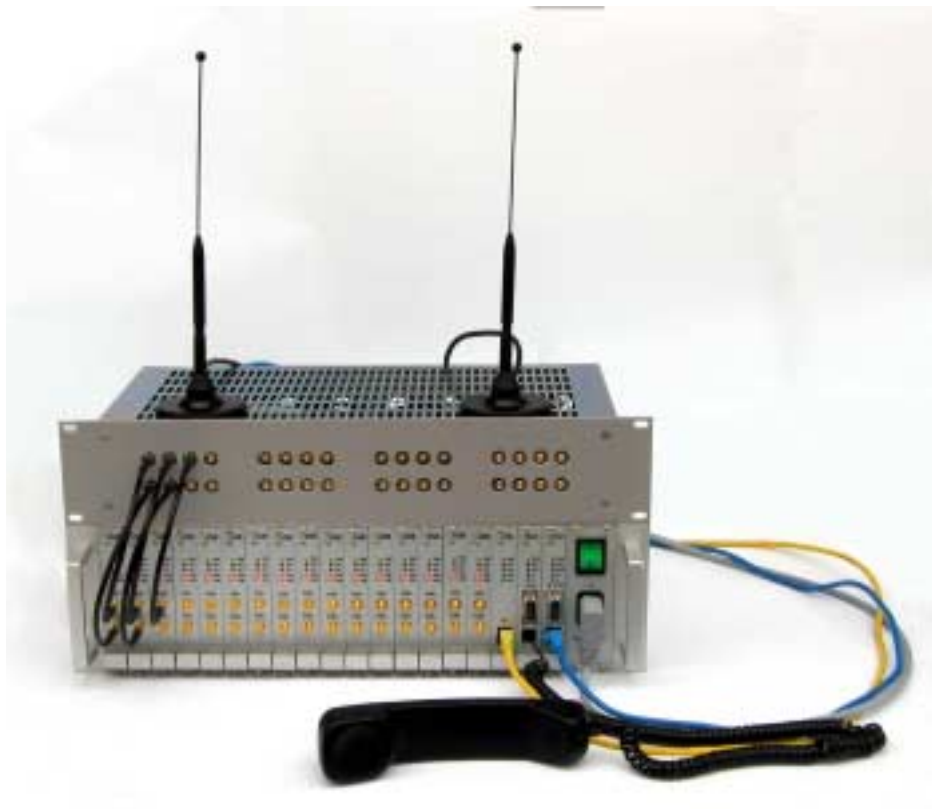
- The manufacturer is gradually improving the control program that is included in this product (referred to as firmware and bootware). The used ISP (In System Programming) technology gives you the possibility to store the most recent control program in your STARGATE by means of a standard computer. The most recent version of the program together with all that is necessary can be found in www.2n.cz and necessary instructions in the chapter “**Upgrading the control program**” of this manual. It is recommendable to use the most recent version of the program – thus, you will avoid unnecessary encounters with possible shortcomings that have been eliminated already.
- If you program parameters of your STARGATE by means of your computer, you will need the “STARGATE program“. You will find the most recent version of this programming tool in www.2n.cz as well.
- In www.2n.cz you will also find the most recent version of this manual in the popular PDF format. We recommend you to use it especially in connection with the control program upgrade since the new functions are explained here.
- Before you start installing this product, check whether the delivery is complete with the following packing list and read this manual thoroughly. The manufacturer cannot be held responsible for any damages that occurred due to incorrect use of this product in contradiction to this manual. The guarantee terms do not cover damages of the product caused by rough handling, incorrect storage or by exceeding the quoted technical parameters.
- Preliminary information about functions that are not available yet are differentiated by light grey background or by grey letters instead of black ones.

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ATEUS[®] - STARGATE

ATEUS[®] - STARGATE is a compact yet highly sophisticated system. It supports full remote supervision and configuration via an IP network, or using an external modem over a BRI-ISDN and analog line, or over a B channel in a PRI-ISDN trunk. The system has been designed and works with a lot of highly sophisticated functions, which make it fully client-oriented and highly reliable in cooperation with both GSM networks and ISDN. In addition, it provides full monitoring and comfortable configuration without functional limitations. Configuration alterations can be made without resetting, i.e. under full operation. Hot-swappable plug-in GSM boards, which can be swapped under full operation including SIM cards, are a matter of course. The use of up to four SIM cards per GSM module in combination with an intelligent SIM card switching tool and detailed statistics upgrade this system into a powerful LCR tool. A high product stability is achieved by the fact that the gateway is programmed in the ASM, i.e. OS-FREE system. Two independent 30MHz Philips microprocessors provide an error-free operation, high speed, automatic fault detection, and easy upgrade. The system also features easy installation, simple operation and easy replacement of defective parts - it is composed of plug-in boards that communicate along system buses independently. As already mentioned, the system allows for an easy detection of defective parts, automatic locking against use and easy replacement (hot-swap). Thanks to the above mentioned properties, the system can be installed and configured successfully within one hour!



ATEUS[®] - STARGATE

1. ATEUS[®] - STARGATE Description - General Design

1.1. 19" Subrack

1.1.1. Basic Dimensions

The system is integrated in a 19" subrack of the height of 3U and depth of 360mm. The front side is open, equipped with guides for plug-in boards with front panels – the panel including a mains switch is part of the subrack. In case not all GSM boards are plugged in, the free section of the front side must be covered with a fixed panel (fixed panels).

The back side is completely covered with a panel with a built-in ventilator, which is switched by a thermostat for higher reliability and longer life. An AC mains supply unit is located in front of the ventilator. The bottom and upper sides are covered with perforated sheet, the assembly flanges are provided with handrails.

The system bus is designed as a printed circuit board (PCB) with DIN connectors and fitted to the inner subrack carrier profiles.

1.1.2. Front Side Division

The subrack width is divided into an 8HP-wide mains panel and 19 4HP-wide modules in the following sequence (from right to left):

- 8HP fixed panel with a mains switch, fuse and mains cable socket;
- 4HP CPU board (must be included in any case);
- 4HP AUX board (must be included in any case);
- 4HP PRI boards (must be included in any case);
- 64HP GSM boards, i.e. 16 times 4HP (1 to 16 boards may be included).

1.2. Available Software for STARGATE

STARGATE program	- tool to configure and control STARGATE
STARGATE Accounter	- tool for automatic download of cdr info via IP connection
STARGATE Wizard*	- utility for easy basic parameter setting
CDR converter	- utility for cdr information conversion from text format into CSV format
SIM SN reader	- utility for reading of IMSI, SDID numbers of active SIM cards

1.3. Power Supply

1.3.1. Description

The system uses an industrial mains supply unit with primary voltage of 100-240VAC 50/60Hz and secondary voltage of 5V/30A with natural cooling and an auxiliary external ventilator, which is switched on automatically whenever the power supply temperature exceeds 70°C. The supply is designed with a 30% reserve even under the maximum load.

2. ATEUS[®] - STARGATE Description – Main Features

Quick unit start – being free of an operating system (programmed in the processor code), the system is completely ready to work within 30 seconds following its power on/restarting. Of course, the full function time of all GSM modules depends on the actual load and capacity of GSM networks to which the ATEUS - STARGATE is connected.

Intelligent call processing – the ATEUS - STARGATE is fully prepared to route PRI-ISDN outgoing calls into GSM networks and vice versa. A fully intelligent LCR (Least Cost Routing) function is the basic tool, allowing to route outgoing ISDN calls to GSM networks both by the called number prefix, and current date and time and GSM module load in the particular group. Functions taken over from dialers, which enable to replace a part or whole of the dialed number with another number, are a matter of course. Calls incoming from GSM networks can be ignored (the calling party hears the ringing tone), fully rejected (the calling party gets the busy tone), or received. In the last-named case, the DTMF dialing in combination with voice messages, or direct connection to the operator(s) can be selected. Using the ATEUS - STARGATE R.C.U. (see later), you can get a highly powerful routing tool, which contains so-called blacklist charts – barred numbers - and practically unlimited routing charts. This combination is extremely useful for installation sites with the so-called full telephone number carryover where a plenty of numbers come into being whose prefixes do not match the official prefixes of providers.

Selection of GSM module use – the ATEUS - STARGATE allows you to select one of three available ways of GSM module occupation: 1. Any outgoing call is set up via a GSM module according to the B channel used. This option helps transfer routing functions to a connected PBX router. 2. This mode allows to occupy GSM modules in groups cyclically, and 3. the last option helps select GSM modules in a group according to the number of minutes called (the counting mode can be predefined of course).

GSM-network friendly – the ATEUS - STARGATE allows to activate the automatic GSM module log-out in certain time intervals. Using this function you can log out and disable automatically unused GSM modules at defined time intervals. Since the time between the GSM module activation and readiness for work is roughly 10-25 seconds, a user-defined hot reserve is maintained, i.e. some GSM modules keep logged in. This means that any increase in the ATEUS – STARGATE load result in an automatic activation of other GSM modules so that the hot reserve be maintained. This feature also reduces the capacity of the GSM network to detect a unit and disconnect it from the mains.

High connection rate – since GSM networks are not quite reliable and show lack of capacity occasionally, the ATEUS - STARGATE is equipped with the automatic call forwarding to other GSM networks or call rejection (without call loss). This function uses the ISDN signaling protocol where a call SETUP message is sent to the ATEUS - STARGATE first. This message contains the called number and CLIP if necessary. Having received this message, the ATEUS – STARGATE can either:

- reject the call (the other party will route it to another device), – REJECT message including reasoning (CAUSE), or
- receive and connect the call – SETUP.ACK message.

The device on the other side awaits one of the above mentioned responses for 2 seconds. During this time, the ATEUS – STARGATE has to decide whether it is able to set up the call, tries to find a free GSM module and establish connection. If the selected GSM module is busy, it must find other free GSM modules. If it fails to find a free route, it rejects the call request. The CAUSE number is user-defined. If it succeeds, it receives and sets up the call.

Detailed statistics – provides a detailed overview of the count of incoming and outgoing calls and their successful connections. The statistic data can be displayed either globally for the whole ATEUS - STARGATE, or for the selected GSM provider, or the selected GSM module (SIM card). These data are generated automatically.

Detailed call information – the ATEUS – STARGATE can save information on completed calls automatically (CDR). Call information includes:

call beginning date and time

call type

I-FD : Not connected incoming call

I-OK : Successfully connected incoming call

O-FD : Unsuccessful outgoing call

O-OK : Successfully connected outgoing call

Relation end reasoning (CAUSE) sent to ISDN interface

Number of B channel used

Number of GSM module used

Number of GSM group used

Connection setup time

Call duration mmm:ss (max. 255:59)

Call cost (if pseudotariff metering is enabled)

Called number

CLIP

SIM card position number

SIM card IMSI or SCID

High number of connected calls – owing to a very short GSM call connecting (routing) time and intelligent call rerouting in the event of failure, the ATEUS - STARGATE features high call time per month (traffic volume of over 500,000 minutes/month). The connectivity depends on the ATEUS - STARGATE configuration and GSM network capacity of course.

SMS receive/send support – the ATEUS - STARGATE helps send and receive SMS in the PDU format. An intelligent SMS sending over a selected GSM network or module and automatic announcement of incoming SMS are a matter of course. With the R.C.U. it is possible to send ATEUS – STARGATE status info SMS.

Up to 8 GSM groups – you can define up to 8 independent SIM card groups in the system. For example, one GSM group can contain one provider's SIM cards.

Up to 32 GSM modules – the ATEUS - STARGATE is a modular system where 1 to 16 GSM boards with two GSM modules each can be installed. The GSM boards are hot-swappable, i.e. can be replaced easily during operation.

Up to 128 SIM cards – each GSM board contains 8 SIM card holders. However, two SIM cards are only connected to the GSM modules at one moment. An intelligent SIM card switching according to time, at random intervals, according to completed minutes or sent SMS enables a client-oriented approach. A defective SIM card blocking is a matter of course.

Worldwide use – GSM boards are currently available with four different GSM modules. Ericsson GM22,GM47 and Siemens TC35 modules are suitable for 900MHz and 1800MHz GSM networks, Ericsson GM48 for 850MHz and 1900MHz.

Two antennas per system only – Two receive/transmission antennas can be used in combination with an antenna splitter (see below) for all of up to 32 GSM modules.

Hot-swappable boards – as mentioned above, all GSM boards are hot-swappable. As a matter of course, the access to the GSM board can be restricted upon the user's request. This solution provides an easy SIM card replacement during operation.

PRI ISDN interface – is configurable in all available modes, i.e. as Network Termination (NT), or Terminal Equipment (TE). It can also be set as a Master (synchronization clock) or a Slave. Using PRI board switches you can easily select RX and TX directions – hence, you can use a cross-over or not-cross-over cable for the ATEUS - STARGATE <> PBX (Switch) connection.

Easy control and configuration – The ATEUS - STARGATE can be configured locally or remotely. To do this, you can employ the following types of connection:

- 2 local RS232 interfaces;
- remote control by an analog or ISDN modem connected to a defined RS232 interface. Automatic ATEUS - STARGATE detection and configuration capacities make the modem perfectly available.
- remotely via a 10baseT IP interface, using a simple Telnet protocol;
- remotely by the ATEUS - STARGATE RCU* via a 10/100baseT using SSH, SNMP, HTTP, HTTPS protocols;
- remotely by the in-band B channel in the PRI-ISDN interface**.

No SW is necessary for configuration - the ATEUS - STARGATE communicates through an RS232 interface and Telnet protocol using standard AT commands. However, high-quality software running under the Windows OS has been designed for user-friendly control and configuration.

Fault diagnostics is very simple too – the ATEUS - STARGATE informs of a fault both visually (by LEDs) and via any interface. A direct display of all processes on ISDN or IP layers is a matter of course too.

Quality control – you can check the quality of ATEUS - STARGATE calls any time by test calls (an analog headset connector is available for test calling into GSM networks or ISDN interface) or by-hearing of one of the two current call directions.

Quick and easy update – since the ATEUS - STARGATE is not bound to any operating system, any firmware updating is quick and comfortable and is made by the available software. Updating can be performed locally or remotely and the process is protected against unintentional disconnection. The updating process takes a few minutes and the existing configuration is retained.

** the ATEUS- STARGATE RCU is not included*

*** optional part*

3. ATEUS[®] - STARGATE Description – Plug-In Boards

3.1. CPU Board

3.1.1. Board Description

The CPU board contains a powerful processor system controlling the whole system. The board is designed on a 4-layer PCB of the size of 160x100mm. A simple serial interface COM1, an Ethernet connector (10Base-T), and 7 board status LED indicators are located on the front panel.

PWR LED	indicates board supply
INIT LED	indicates board initialization or error status
MEM LED	indicates call memory full (not shining=empty memory, blinking 1:1 memory is 50% full, shining = 100% full memory)
RX LED	indicates reception via COM1
TX LED	indicates transmission via COM1
LINK LED	indicates connection to Ethernet
ACT LED	indicates activity via Ethernet

3.1.2. COM1 Serial Interface Parameters

The COM1 interface is used as a local port for temporary connection of a PC (terminal) for installation and servicing purposes (and BOOTware loading into the processor) and permanent connection of the SMS server (supervision PC). It allows to provide local monitoring, configuration, tracing and firmware upgrade.

Transmission rate	57.6 kBd
Bit format	start, 8bit, stop (no parity)
Signals	RXD,TXD,RTS,CTS,GND

3.1.3. Lithium Battery Replacement



WARNING! Incorrect battery replacement may cause explosion. The battery can be replaced with a battery of the same or equivalent type only as recommended by the manufacturer. Handle used batteries as instructed by the manufacturer.

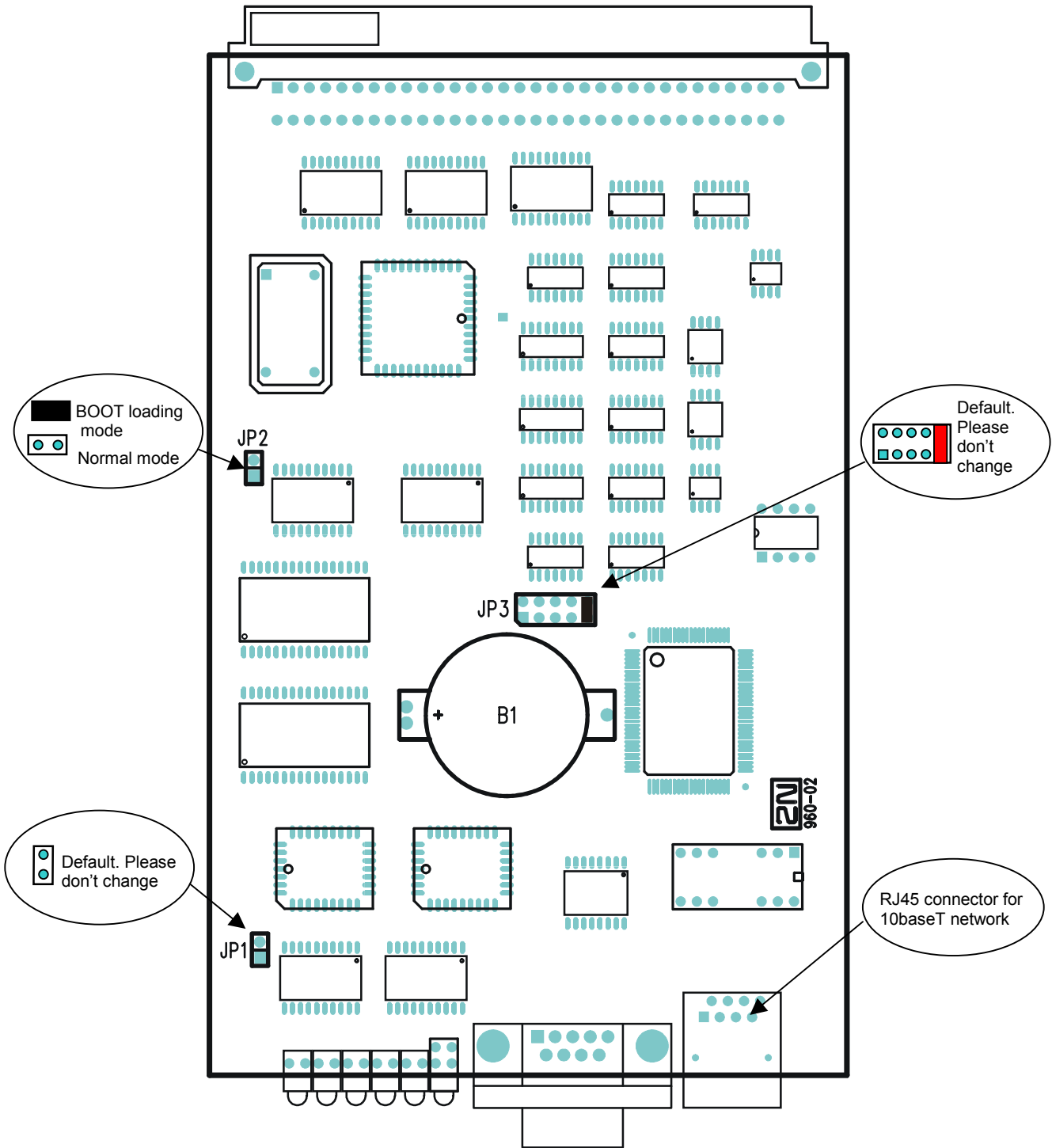
The lithium battery on the CPU board backs up the internal real time clock in case of supply power outage. Its average life is about three years, then it is advisable to replace it preventively. Replacing the lithium battery, be sure to turn the subrack power supply off using the mains switch and, having loosened two fitting screws, push the CPU board out. Remove the old battery from the holder using a suitable tool and insert a new one. Restore the original status taking the said steps in the opposite order. **Battery type: CR2430.**



WARNING! Never use metal tools for battery replacement; neither the new nor the old battery may be short-circuited! A short-circuit may result in battery damage or explosion!!!

Dispose of used batteries in accordance with applicable regulations, put them in a recycling yard, for example.

3.1.4. Configuration Jumpers



There are three configuration jumpers on the CPU board. Jumper JP1 is intended for a change of the board addressing and is not used at present. Jumper JP2 is designed for processor switching into the BOOTware loading mode. It need not be applied during a common firmware upgrade. The field of five jumpers JP3 helps you set the processor mode. By default, jumpers JP1 and JP2 are disconnected, and pins 9 and 10 are connected to jumper JP3 (see Figure).

3.2. AUX Board

3.2.1. Board Description

The AUX board contains a switching array and system of voice messages, controlled by an independent processor system separated from the system bus. The AUX port is used for making testing calls or recording voice messages. The input amplifier is designed for an electret microphone, the output amplifier for 150ohm earphones. The board is designed on a 4-layer PCB of the size of 160x100mm. A serial interface COM2, microtelephone or headphone connector, and 5 board status indicators lead to the front panel.

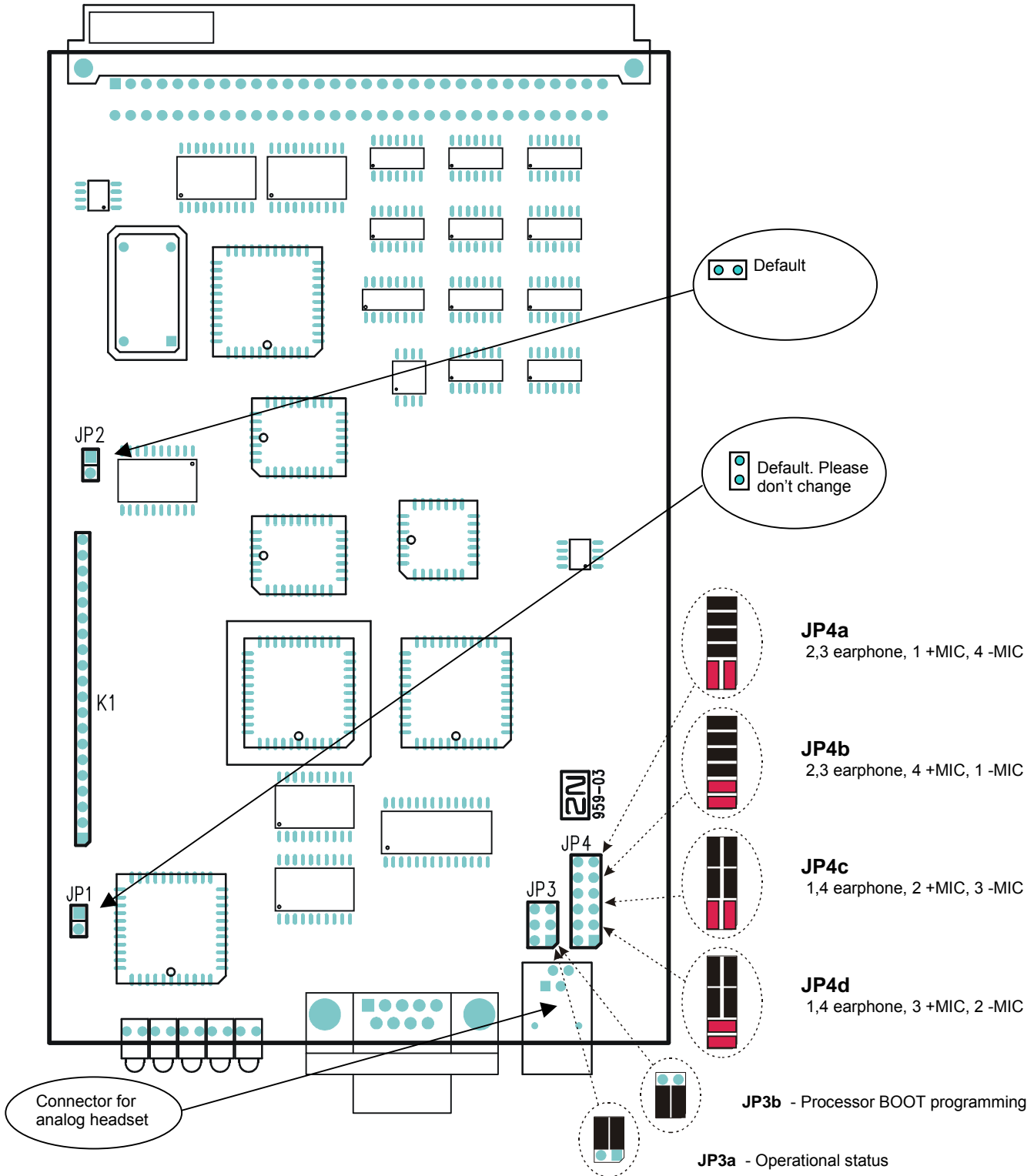
PWR LED	Indicates board supply
Lights on	Switched on
Lights off	Switched off
Blinking	Board in sleep mode
INIT LED	Indicates board initialization or error status
Blinks	Indicates the initialization of the board
Lights on (45 sec)	Indicates duplication of the new firmware
Lights on (still)	Board initialization failure
AUX LED	indicates activity on AUX port
Lights on	Waiting for incoming call (AT!W...)
Blinks	Indicates the call through the testing AUX interface
Lights off	The testing interface on-hooked.
Rx LED	indicates reception via COM2
Tx LED	indicates transmission via COM2

3.2.2. COM2 Serial Port Parameters

The COM2 interface is used a supervision port for remote connection of a PC (terminal) using ISDN or analog modem (also for BOOTware loading into the AUX board processor). It allows to provide remote monitoring, configuration, tracing and firmware upgrade.

Transmission rate	57.6 kBd
Bit format	start, 8bit, stop (no parity)
Signals	complete 9-pin wiring

3.2.3. Configuration Jumpers



There are four configuration jumpers on the AUX board. Jumper JP1 is intended for a change of the board addressing and is not used at present. The field of jumpers JP3 helps you redirect the COM2 interface for BOOT program loading. The jumper field JP4 is used for setting the AUX interface to correspond with the microtelephone or headphone configuration. Connector K1 is intended for servicing purposes only and may not be used. By default, jumpers JP1 and JP2 are disconnected, jumper JP3 is connected as shown in Fig. JP3a and jumper JP4 as shown in Fig. JP4a.

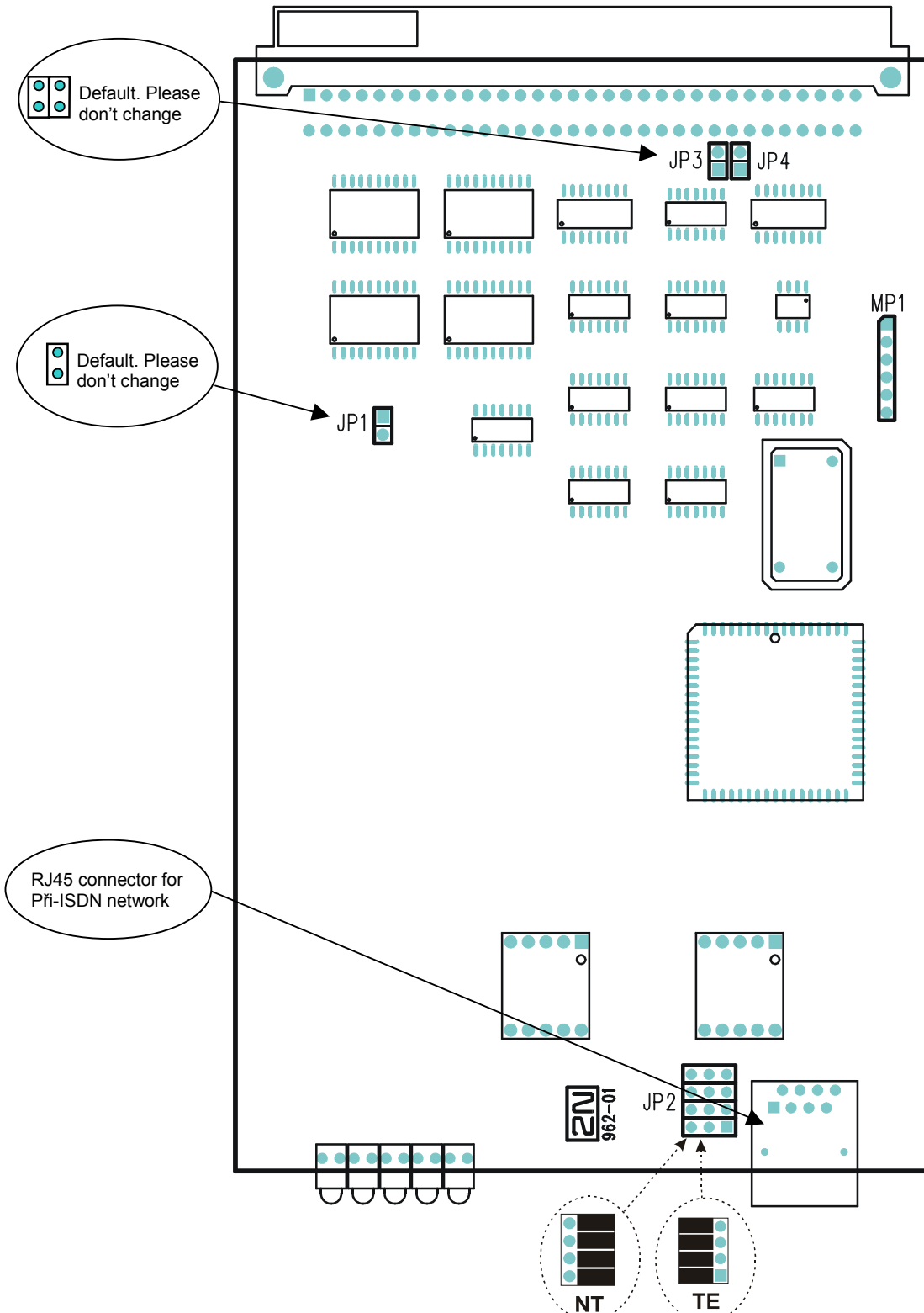
3.3. PRI Board

3.3.1. Board Description

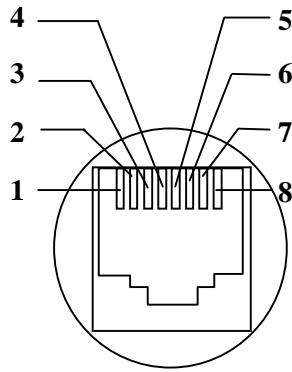
The PRI board contains an ISDN interface and PCM bus timing circuits. The interface can work in the MASTER or SLAVE mode. The output can be configured as TERMINAL or NETWORK by jumpers. The board is designed on a 4-layer PCB of the size of 160x100mm. A PRIMARY ISDN interface and 5 board status indicators are located on the front panel.

PWR LED	Indicates board supply
Lights on	Switched on
Lights off	Switched off
INIT LED	Indicates board initialization or error status
Blinks	Indicates the initialization of the board
Lights on (still)	Board initialization failure
LAY3 LED	indicates layer 3 status
Lights on	active call or channel restart
Lights off	No call through PRI ISDN
LAY2 LED	indicates layer 2 status
Lights on	Established
Lights off	Not established
Blinking	Not established
LAY1 LED	indicates layer 1 status
Lights on	synchronized
Lights off	Not synchronized (disconnected)
Blinking slowly	No frame synchronization
Blinking quickly	No multi-frame synchronization

3.3.2. Configuration Jumpers

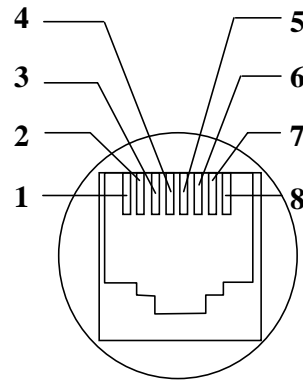


There are four configuration jumpers on the PRI board. Jumper JP1 is intended for a change of the board addressing and is not used at present. Jumper JP2 is used for hardware switching of the PRI ISDN connector into the TE or NT configuration. This operation means only swapping of the transmitting and receiving connector pairs, the interface configuration must be made by software. Jumpers JP3, JP4 and connector MP1 are intended for servicing purposes only and may not be used. By default, jumpers JP1, JP3, and JP4 are disconnected and jumper JP2 is connected as TE.



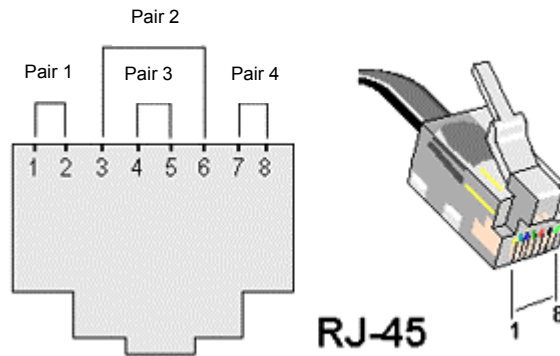
- 1 RX
- 2 RX
- 3 Not used
- 4 TX
- 5 TX
- 6 Not used
- 7 Not used
- 8 Not used

Fig.: contacts of TE connectors

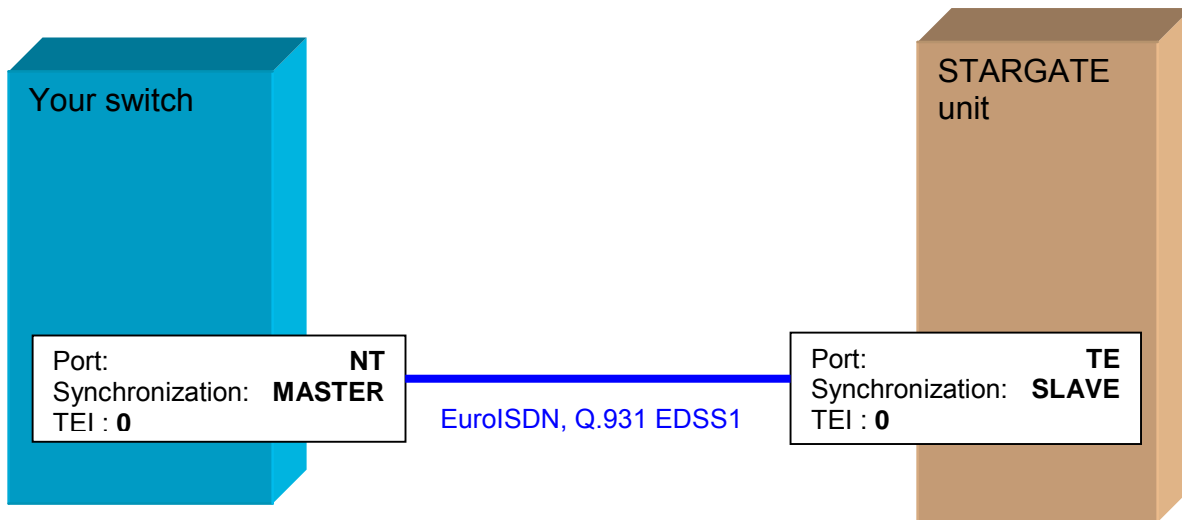


- 1 TX
- 2 TX
- 3 Not used
- 4 RX
- 5 RX
- 6 Not used
- 7 Not used
- 8 Not used

Fig.: contacts of NTconnectors



Best way how to connect STARGATE unit to your telecomm. site:



** port mode (NT, TE) and Synchronization (MASTER, SLAVE) must be different on the switch than on the STARGATE! TEI management number must be same on both equipment units!*

3.4. GSM Board

3.4.1. Board Description

- In STARGATE you can use three types of GSM boards (with various GSM modules):
 - GSM board with two modules Ericsson GM22 and two SIM holders.
 - GSM board with two modules Ericsson GM47(8) and eight SIM holders*.
 - GSM board with two modules Siemens TC35 and eight SIM holders.

These GSM board you can use in STARGATE together.

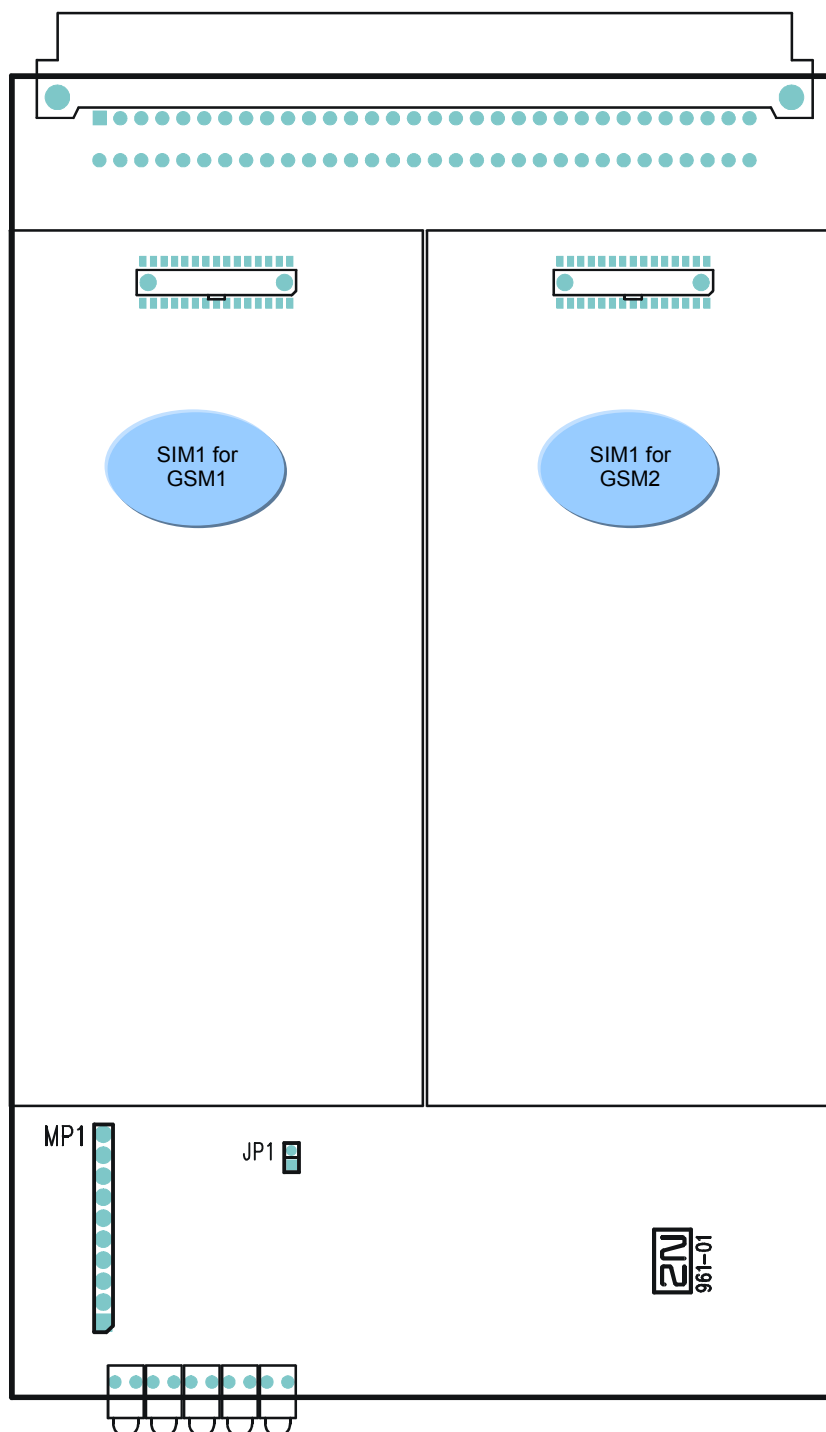
The GSM board contains two GSM modules, circuits for their connection to the PCM bus, and DTMF receivers. The board is designed on a 4-layer PCB of the size of 160x100mm. Pins 1 and 32 are approximately 1 mm longer in the GSM board system connector and are used for “hot swap” power feeding, allowing to push the board in and out even during operation. This feature is handy especially for installation or SIM card replacement. Two FME antenna connectors (for GSM boards with modules GM22) or two SMA antenna connectors (for GSM boards with modules TC35 and GM47(8)) and 5 board status indicators are located on the front panel.

Possible statuses of indication LED diodes (units with firmware 02.09.xx and higher):

PWR LED	Indicates board supply
Lights on	Switched on
Lights off	Switched off
Blinking	Board in sleep mode
INIT LED	Indicates board initialization or error status
Blinking	Indicates the initialization of the desk
Lights on (still)	Board initialization failure
SLP LED	Not used
GSM1 LED	indicates GSM 1 module status
GSM2 LED	indicates GSM 2 module status
Lights on	Proceeding call
Lights off	Unused GSM module
Blinking slowly	Module is terminating of call (2 seconds)
Blinking quickly	Log in GSM network / initialization of SIM card
GSM1 LED	indicates GSM 1 module status
GSM2 LED	indicates GSM 2 module status
Lights on	GSM module is blocked or initializing
Blinking quickly	GSM module is powered off

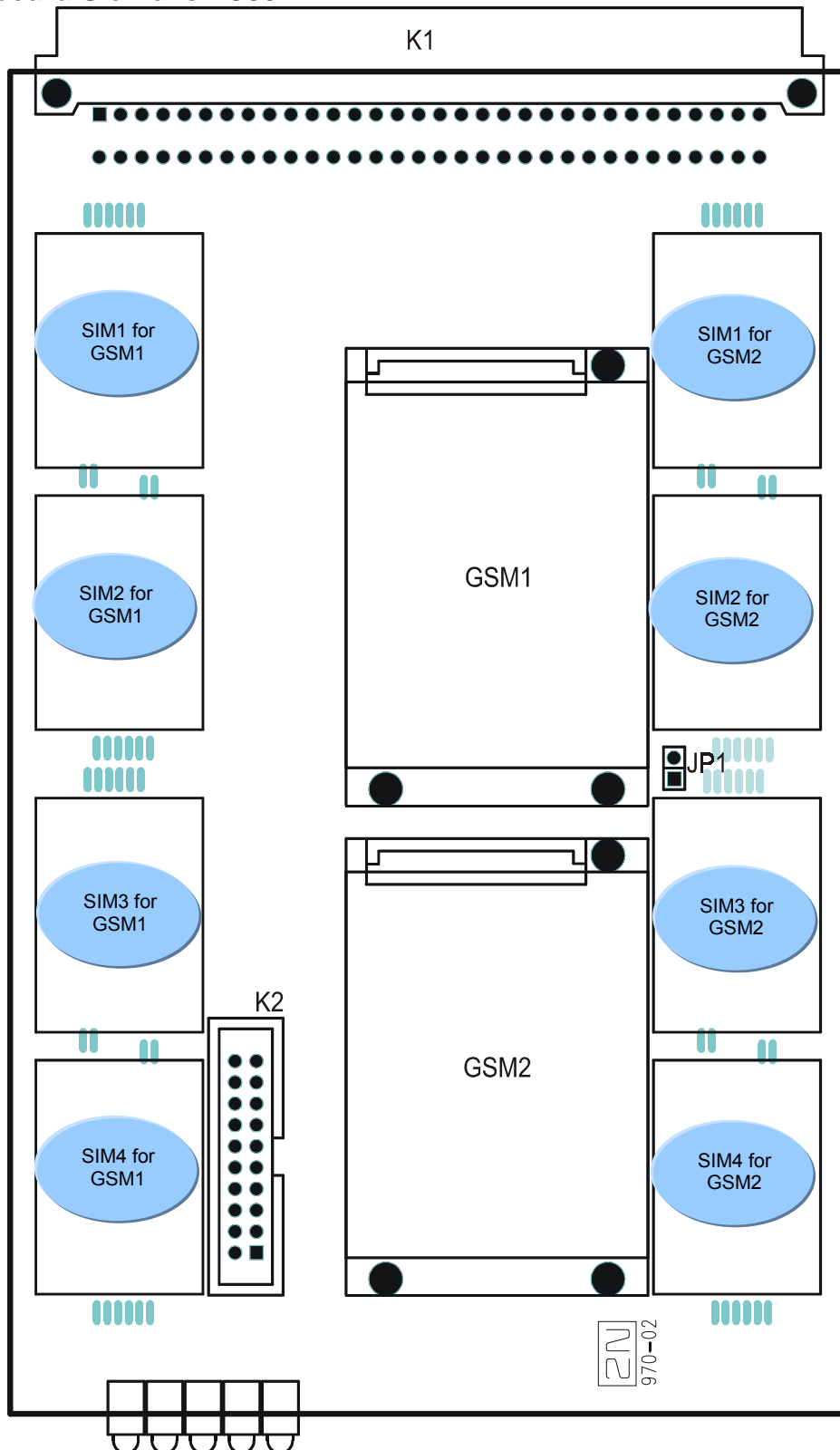
3.4.2. Configuration Jumpers

3.4.2.1 GSM board Ericsson GM22



There is just one configuration jumper on the GSM board. Jumper JP1 is intended for a change of the board addressing and is not applied at present. Connector MP1 is designed for servicing purposes only and may not be connected. Jumper JP1 is disconnected by default.

3.4.2.2 GSM board Siemens TC35



There is just one configuration jumper on the GSM board. Jumper JP1 is intended for a change of the board addressing and is not applied at present. Connector K2 is designed for servicing purposes only and may not be connected. Jumper JP1 is disconnected by default.

4. Antenna Splitter

4.1. Splitter description



Dual-Band Antenna Splitter

Antenna splitter is the passive unit suitable for GSM gateways. It can combine maximum 32 antenna inputs to two antennas outputs. Antenna splitter saves antenna cable, number of outdoor antennas and mounting space on the roof.

As a passive unit it inserts the loss between antenna and the equipment. Splitter configuration depends on signal level at concrete placing and number of using directions or GSM providers.

Splitter is configured with two basic units:

- four inputs and one output splitter block
- two inputs and one output splitter block

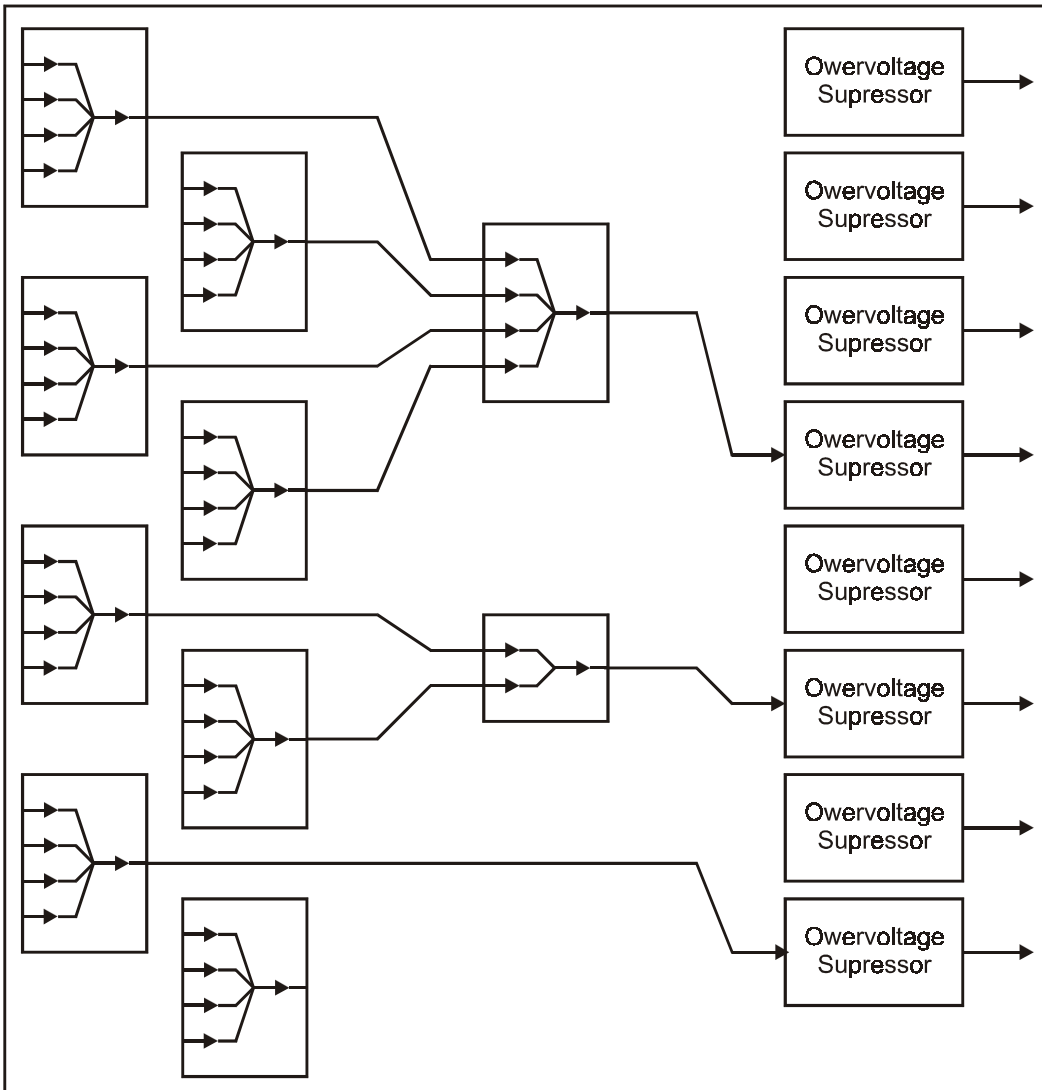
4.1.1. Standard configurations

NUMBER OF INPUTS	NUMBER OF OUTPUTS	INPUT – OUTPUT INSERTION LOSS	UNIT HIGH
32	2	< 15 dB	2U
32	4	< 11 dB	2U
32	8	< 8 dB	2U
16	1	< 15 dB	1U
16	2	< 11 dB	1U
16	4	< 8 dB	1U
12	3	< 8 dB	1U

4.1.2. Technical parameters

Parameters	Value	Notice
Connector type		
Input connector	SMA type, female	
Output antenna connector	N type, female	
RF parameters		
Impedance	50 OHM	
Frequency	850 – 1900 MHz	
Insertion loss	< 8, 11, 15 dB	According configuration
Isolation between two channels	> 20 dB	
Output over voltage protection		
Device type	Gas protector	
Protected voltage level	90 V	
Peak current	10 KA	
Insertion loss	0.2 dB	

Schematics block diagram



5. Directional Antenna

Directional antenna basic parameters:

Type	CPY 9214
Number of elements	14
Frequency	824 – 896, 1770 – 1880 MHz
Gain	9.5 dB / 13 dB
Cable	RG 58, 10m
V.S.W.R	< 1.5 : 1
Connector	N type, male



Directional antenna



Fig.:The example of the right installation of directional antennas



Warning:
The antenna has to be placed according to safety rules of overvoltage protection and grounding.

6. Discreet Antenna

Discreet antenna basic parameters:

Type	Car antenna
Frequency	900/1800 MHz
Gain	3dB
Cable	Coax cable 174A (5 m)
Connector	SMA (male)



Discreet antenna

7. ATEUS - STARGATE RCU

ATEUS-STARGATE RCU is optional part

The main purpose of the RCU (Remote Control Unit) is to integrate services that need not necessarily be incorporated in the ATEUS – STARGATE (not affecting its function directly) but are required by major clients. What is ATEUS – STARGATE RCU? It is an industrial PC version running under the Linux OS V. RedHat 7.3. This operating system was selected for its stability and security. What does this PC offer?



This PC system can be fully integrated into clients' control centers (or, with respective configuration, easily supervised by the 2N Telecommunications remote control center). To support this, we name services that are rendered by this PC system:

- One R.C.U. allows to control up to eight ATEUS – STARGATE units.
- The integrated firewall provides safe connection both to client LANs/WANs and the Internet.
- A secured SSH protocol is used to provide direct communication with the PC, enabling direct "tunneling"



of commands to the selected ATEUS – STARGATE unit.

- The system keeps storing information on completed calls (cdr info) and any PRI-ISDN communication (this information is accessible through the web interface or SSH protocol).
- A web server (Apache) is integrated, which helps the user find, through the Internet browser, the current status of connected ATEUS – STARGATE units, store cdr info, statistic data and PRI-ISDN communication data. The web interface is equipped with a user-friendly interface (see the figure) and provides the user with a quick access to current status information.
- Separately, the web allows to fully configure all STARGATE units connected (the communication runs via a HTTP protocol).
- The integrated SNMP agent is another remote control tool for ATEUS – STARGATE, which helps evaluate automatically the STARGATE status and send errors, if any, to the selected destination using the SMNP trap.
- Automatic sending of information by SMS or E-mail messages on current statuses or errors of ATEUS – STARGATE units is a matter of course.
- Another relevant option is the use of a function integrated in the ATEUS – STARGATE – the so-called External Routing. If this function is enabled, an LCR database is installed in the R.C.U. with a practically unlimited capacity. Upon an incoming call from the PRI-ISDN interface, the STARGATE unit inquires the R.C.U. for call direction. The R.C.U. uses the installed number database to select (or bar) the call direction. In case the R.C.U. fails to respond within a defined timeout, the STARGATE determines the direction using its internal LCR.
- The support of SMTP and POP protocols allows the R.C.U. to send info E-mail messages to selected destinations and work as an SMS server where messages are sent in the defined format by E-mail.



The ATEUS – STARGATE R.C.U. is installed quite automatically using a booting CD, which contains the full OS and all necessary installations.

This solution ensures a trouble-free and relatively quick (max. 1.5 hours) installation.

The above mentioned features have relatively low hardware requirements but the basic HW must be as follows*:

CPU: Intel Pentium 4 2GHz and more

RAM: 256 MB or 512MB with active external routing

HDD: 20GB EIDE/ATA100(133) 7200 rev./s.

CD-ROM: Standard EIDE CD-ROM drive

Standard Ethernet adapter for PCI slot (100BaseT)

Motherboard: A high-quality motherboard with integrated graphic card and Ethernet mains adapter (100BaseT)

**The ATEUS-STARGATE RCU is available including hardware.*

8. ATEUS[®] - STARGATE Installation

8.1. STARGATE Installation Conditions

The following conditions must be met during STARGATE installation:

- appropriate location (enough free space);
- GSM signal intensity (minimum signal level: **-80db**). As GSM signal intensity meter you can use NETmonitor on some mobile phone (e.g. Nokia)
- un-overloadable GSM cells into which GSM gate modules are logged;
- no strong electromagnetic radiation on the STARGATE installation site;
- the ISDN PRI connection must be configured properly and meet ITU-T Q.931-EDSS1 or QSIQ and related recommendations.

8.2. Potential GSM Network Problems

The STARGATE works reliably even under a 100% load. The following problems may be caused by GSM networks:

1. The STARGATE GSM modules cannot log in, log in slowly or log out occasionally. This problem can have two causes:
 - The GSM signal level is low – the recommended minimum signal level is approximately -80dB, if lower, the GSM antenna location must be changed.
 - The GSM cell into which the modules try to log is overloaded – if you use directional antennas, you can direct them to more GSM cells than one. The possibility to choose a cell by directing your antenna is considerably limited or eliminated in municipal or densely populated areas where multiple signal reflections occur. It is also difficult to select a cell where the cells lie in a straight line before and behind the antenna. If no selection can be made, you have to use another available GSM provider. **CAUTION!** You are recommended to use 32 channels at most on one installation site (one STARGATE) for one GSM provider to avoid GSM network overload problems on the installation site.
2. One of the GSM modules is permanently logged-out or fails to receive incoming calls – this problem indicates a GSM network overload due to heavy traffic. You can eliminate this problem by the above mentioned solutions or extend the “relaxing time“ – i.e. the delay between two calls via one GSM module (the recommended value is 2 seconds). In case any of the GSM modules cannot log in the network even after reset, your GSM provider may have located the SIM card but refused to log it in the network because either too many calls are made using this card, or the SIM card keeps logged in the same GSM cell and the same GSM module for too long. This problem can be solved by occasional replacement of SIM cards between modules.

8.3. STARGATE Installation

- Place the STARGATE into an environment that corresponds with its working conditions.
- Configure the STARGATE properly using the configuration software included.
- The STARGATE mains supply must be backed-up and overvoltage protected.
- For a more comfortable gateway administration, it is advisable to have one of available remote control tools on site (ISDN line, analog line, Ethernet).

8.3.1. STARGATE Control Ways

The STARGATE can be supervised and controlled locally or remotely as follows:

- A. Local control using a PC connected by a standard serial cable available with the STARGATE .
- B. Remote control using an analog or ISDN modem connected to the STARGATE COM2 (the modem initialization commands have to be selected correctly – refer to STARGATE configuration>STARGATE program).
- C. Remote control over the IP network using a standard Telnet protocol, or SNMP*, HTTP*, HTTPS* protocols. Here, be sure to set the IP address and IP mask properly – refer to STARGATE configuration>STARGATE program).
- D. Remote control via B-channel of PRI connection

**This function is optional function (with RCU)*

8.3.2. STARGATE Configuration

The STARGATE can be configured by any of the following two ways:

- A. using AT commands (refer to Appendix A);
- B. using the STARGATE program.
- C. using the STARGATE wizard (for settings basic parameters)*

**actually not available.*

A PC can be used for both the ways, either locally (via a serial cable), or remotely with a modem, using the Telnet protocol over IP, or via B-channel.

Since the STARGATE is constantly upgraded, you are advised to use the latest STARGATE software firmware versions.

9. STARGATE Program User Manual

9.1. STARGATE Program Installation

ATEUS® - STARGATE includes an installation CD with the STARGATE program installation. After the CD is inserted in your PC CD-ROM (or the diskette is inserted in your PC diskette drive), the installation will start. If you have not selected the automatic running of CD after insertion (or use diskettes), run the installation program to start the installation. Wait until the installation is completed.

**) The program can be run under the MS Windows 95 OSR2/98/ME/2000/XP OS only.*

9.2. STARGATE Program Running

When the installation is complete, run the program by clicking on the "STARGATE program" in your PC menu, clicking on the icon on your desktop, or running the "**STARGATE program.exe**" file, which you can find on the appropriate location installed by you using any file explorer, commander or browser.

Having run the program, you can use:

- **the main menu**
- **the button bar menu** (included in the main menu too)
- **the card (folder) menu**

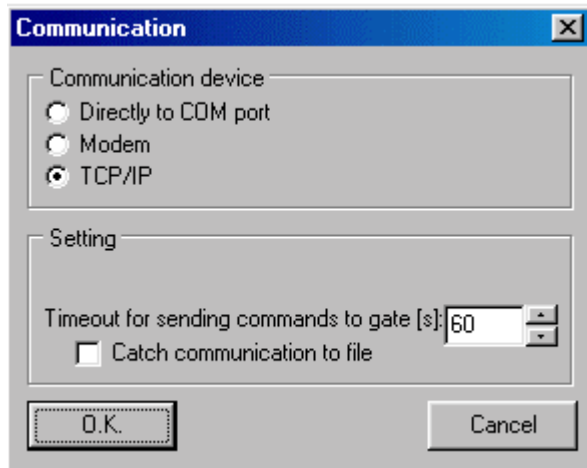
the Topics with configuration items

the Alphabetical Glossary with configuration items arranged in the alphabetic order

- **a window for configuration item editing**



9.3. ATEUS[®] - STARGATE – PC Connection



When the program is running, communication with the gateway has to be established for settings. This is done by selecting the "Setting > Communication" menu items. The basic setting is shown in the figure. For more details see section 9.4.4.

The "Gateway > Connect gateway" menu or the "Connect gateway" icon on the button bar can be used for gateway connection and gateway-PC communication establishing.

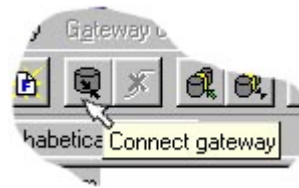


Fig.: Connect Gateway Button

Select the "Modem" function only for remote gateway supervision using a connected modem. You can use a standard RS232* interface or Ethernet 10baseT (Telnet) connection for the STARGATE -PC communication.

**The STARGATE port transmission rate is ALWAYS 57.600bps.*

Note: If you have more gateways than one, then follow the gateway communication instructions included in section 9.4.2.

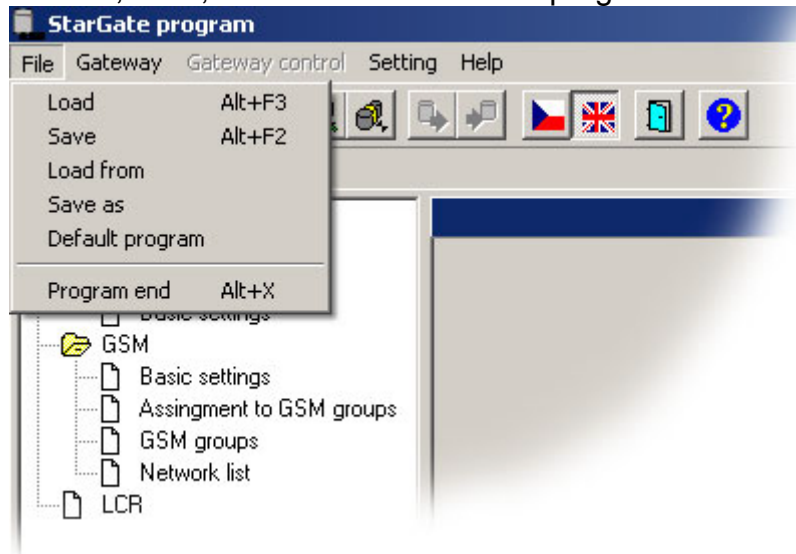
9.4. Main Menu and Button Bar

The following menus are available here:

- File** - for physical work with the configuration file
(for saving, loading see 6.4.1)
- Gateway** – for physical gateway operations (one or more gateways)
(for connection, disconnection, etc. see 9.4.2)
- Gateway control** – gateway operation commands
(for diagnostics, reset, DISA, etc. see 9.4.3)
- Setting** – communication and language selections
- Help** – work with help.

9.4.1. File Menu

Using this menu, you can work with the **config.cfg** gateway configuration file or default configuration file, i.e. load, save, ... Contains an item for program end too.



- **Load** – loads the last-saved configuration file from the STARGATE program directory. Or requires loading of default settings upon first run.
- **Save** – saves the current settings into the file, the STARGATE program directory (or into a folder defined in the List of gateways – refer to 9.4.2).
- **Load from** – loads a file from a folder selected by you.
- **Save as** – saves a file into a folder selected by you.
- **Default settings** – loads the preset default configuration.
- **Program end** – terminates the program.

9.4.2. Gateway Menu

Used for connecting / disconnecting the gateway. You can select a gateway from the List of gateways if you use remote control.



Fig.: Gateway Menu

- **Connect gateway** – connects the STARGATE with your PC and establishes mutual communication via an RS232 serial interface or using the Telnet protocol.
Note: The gateway must be connected and the "Setting > Communication" items have to be selected properly.

- **Disconnect gateway** – disconnects the gateway and discontinues its communication with your PC.

If you communicate with more gateways than one, you are advised to have each configuration file in a different directory to avoid unintentional rewriting of the configuration file by another gateway configuration. To do this, use the following menu:

Multi-gateway menu:

- **Select gateway from list** – select a gateway (directory with the configuration file) to be connected to the PC.
- **Connect gateway from list** – get connected to the selected gateway.
- **List of gateways** – edit the list of gateways including directories.
- **Terminal** – select the command-type control and work with the ISDN GSM gateway (refer to Appendix A, p. 11).

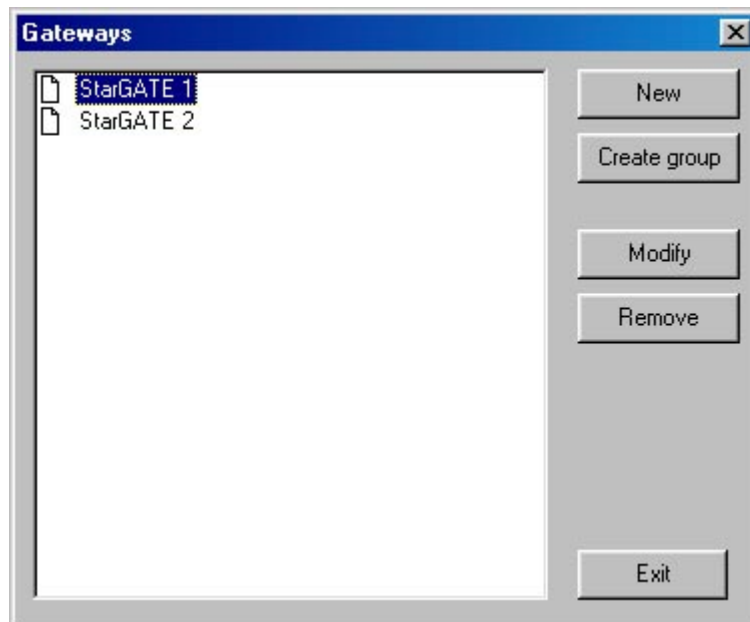


Fig.: List of Gateways

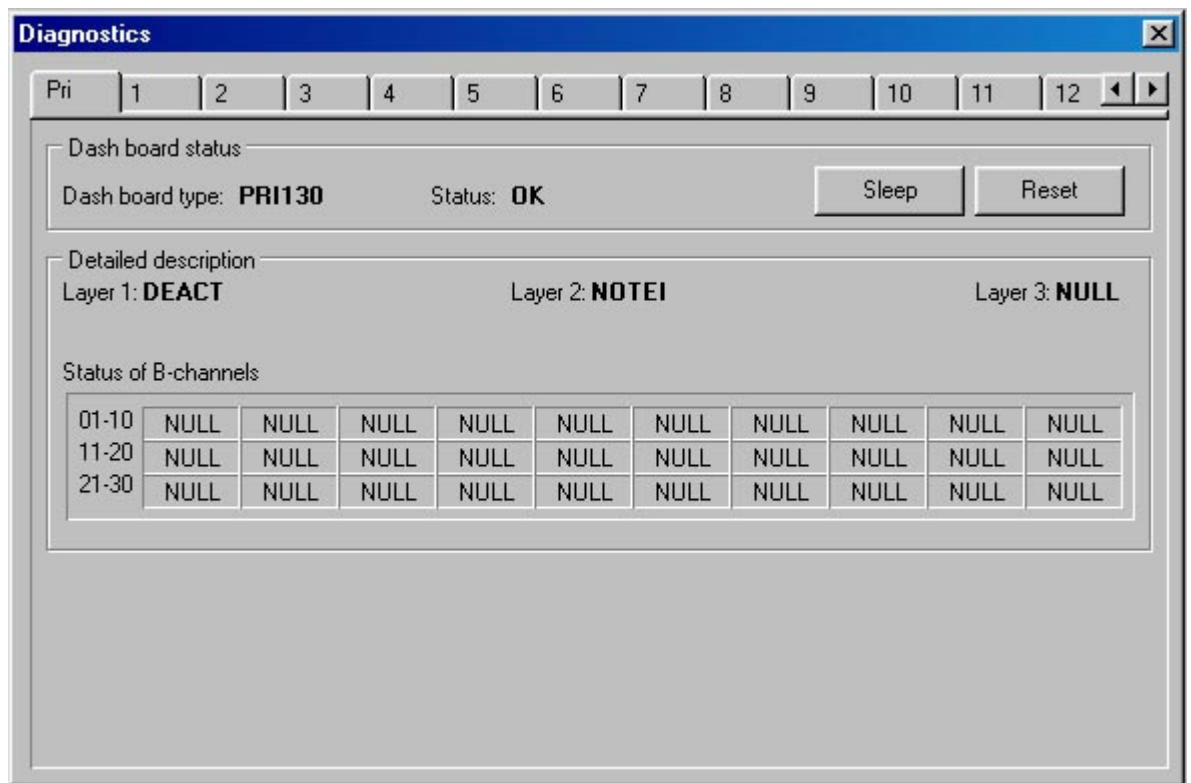
9.4.3. Gateway Control Menu

Contains commands for the STARGATE (available only if the STARGATE is connected).

- **Diagnostics** – information on boards (GSM modules and PRI board), contains 17 cards whose numbers correspond to those of STARGATE positions (00=PRI board).

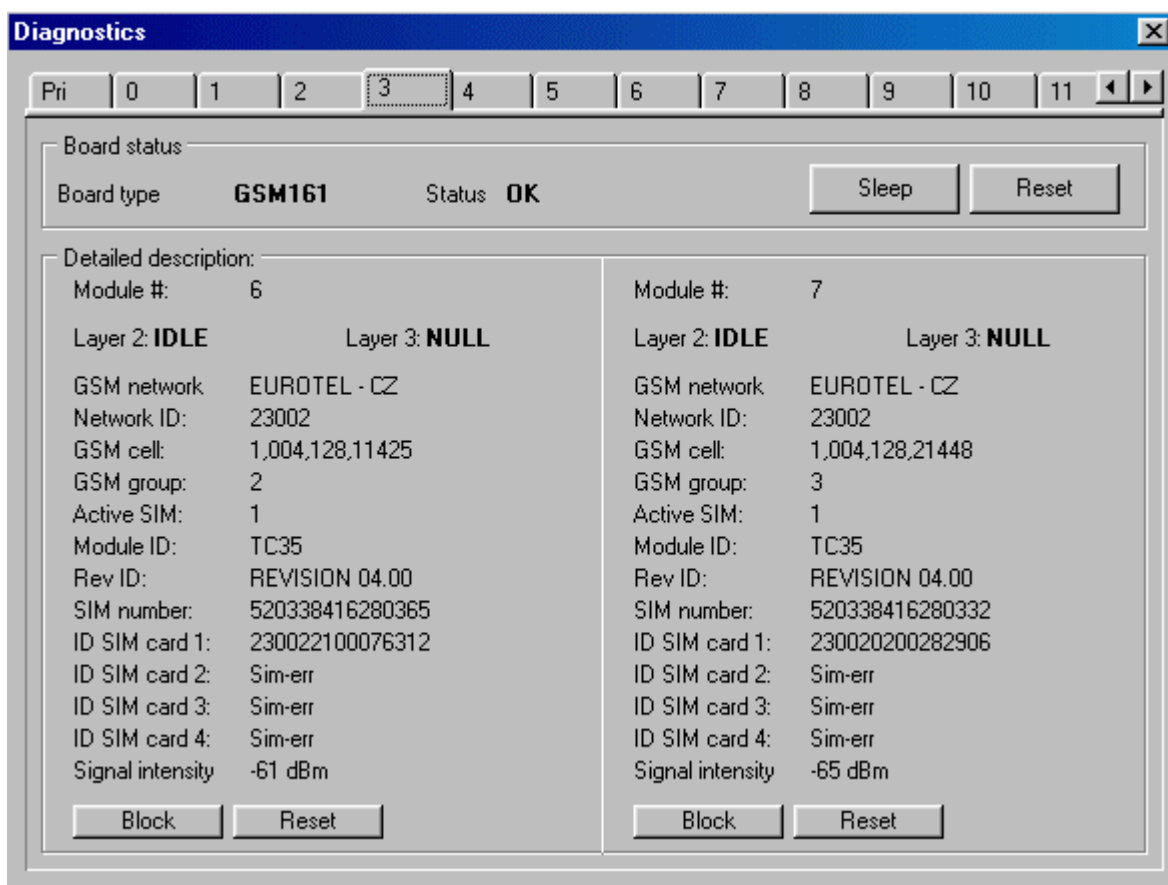
PRI board – contains information on statuses of PRI ISDN layers and occupation of B-channels.

- Board status
- Layer status
- Status of B-channels



GSM board – includes information on statuses and types of GSM modules on the GSM board.

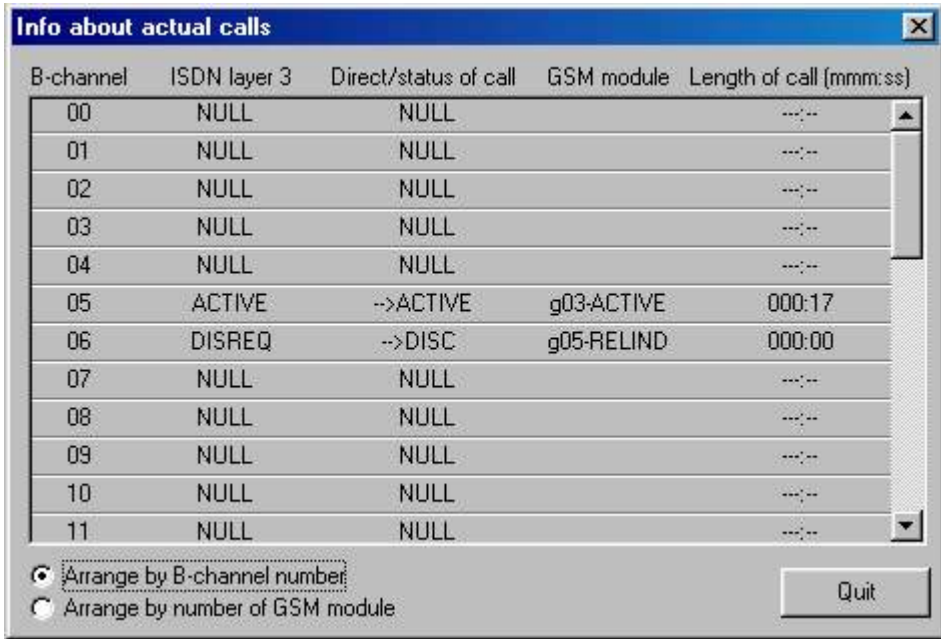
- **Board type** – type of GSM board (GSM160=board with GM22 GSM modules; GSM161=board with TC35 GSM modules; GSM162=board with GM47(8) GSM modules)
- **Layer 2,3** – status of the module communication layers.
- **GSM network** – name of the network the module is currently logged in.
- **Network ID** – identification number of the network the module is currently logged in.
- **GSM cell** – identification number of the GSM cell the module is currently logged into.
- **GSM group** – number of actual GSM group.
- **Active SIM** – Number of active SIM card on this GSM module.
- **Module ID** - International identification number of the GSM module.
- **Rev ID** – GSM module firmware revision number.
- **SIM Number** – SIM card serial number.
- **ID SIM card**– International identification number (IMSI) of SIM card.
- **Signal intensity** – the current signal level in the network the module is logged in (minimum value = -113 db – the module is logged out).
- **Sleep** button – used for conversion of selected desk into sleep mode
- **Block** button – block of selected GSM module (unavailable for outgoing and incoming calls).
- **Reset** button – hardware reset of board, or GSM module



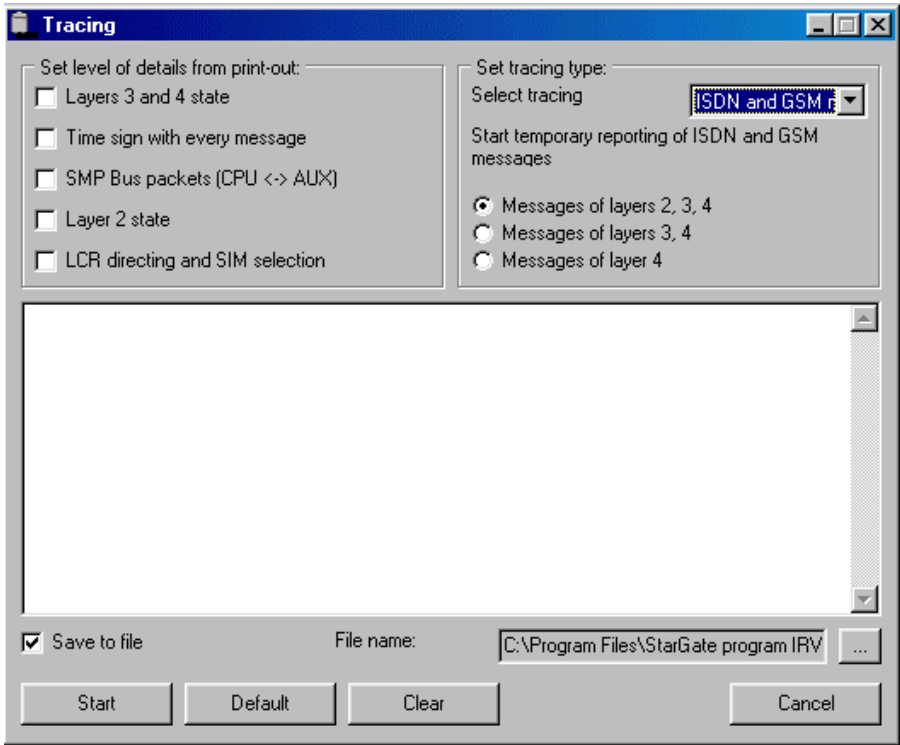
Every card features the “Sleep” (transition into the sleep mode – the boards does not receive any new calls or SMS and completes correctly the current calls or SMS) and „Reset“ (board reset) buttons.

If a board is not inserted in the STARGATE , this position (number) shows the „none“ board status.

- **Info on actual calls** – Information on currently made calls. This information can be arranged according to the GSM module number or PRI ISDN B-channel number.



- **Connection status** – status of all possible remote/local STARGATE control ports.
- **Buffer status** – current buffer status (CDR). The maximum capacity is 511 calls.
- **Tracing** – item for storing traces from ISDN/IP layers.



- **Export statistics** – used for storing and clearing of statistic data from the STARGATE connected. For a detailed description of statistic data refer on page 62.

- **Data into gateway** – sends and saves the configuration file into the gateway, the program then resets the gateway – for internal configuration updating – and saves the config.cfg file into the STARGATE program folder (or a folder pre-defined by you if you use the "Multi-gateway menu" options).
- **Reset** – resets the gateway and initializes all STARGATE boards (the gateway communication is not discontinued but all current calls and SMS to be sent are terminated!).
- **Factory reset** – resets the gateway, selecting the factory settings for the STARGATE . The gateway communication is not discontinued upon this command.
- **Upload firmware** – uploads the firmware into the gateway.

FIRMWARE uploading procedure:

- Prepare the firmware-containing file into a folder selected by you (*Pxxxx-V-xx.xx.xx.bin*).
- Select "Upload firmware" and open this file.
- The program now automatically uploads your new firmware – the gateway is reset during this procedure (thus discontinues all current calls and SMS). Do not interrupt the program during this procedure to avoid errors in firmware uploading – otherwise the gateway might stop working!

If the procedure of uploading firmware was terminated, please reset the gateway and re-load the STARGATE program and try to upload firmware again.

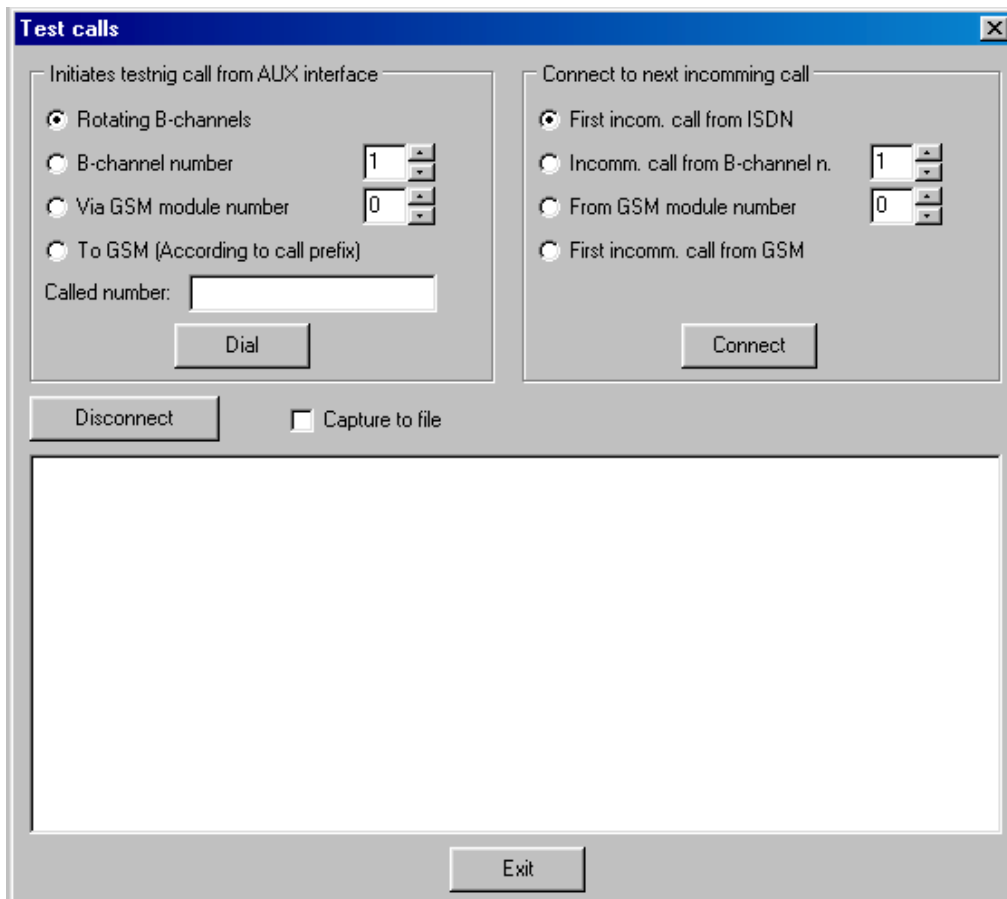
- **Upload Bootware** – uploads new bootware into the STARGATE .

Bootware uploading procedure:

This procedure can do only engineers from 2N Telekomunikace company.

CAUTION!: Be sure to use original and undamaged firmware files for the firmware upload to avoid gateway function problems! For the latest firmware version see our websites (www.2n.cz).

- **Time and date** – sets time and date in the gateway.
- **Change username and password** – sets username and password for access to STARGATE via TELNET.
- **Download trace** – saves the gateway operation and error records on the disk.
- **Save call data** – saves records on calls on the disk (the records will remain in the STARGATE),
- **Save call data and delete** – saves records on calls on the disk and clears the call memory.
- **Voice message** – Used for loading / clearing of introductory messages when the incoming DTMF function is activated. The analog AUX input has to be used for loading.
- **Test calls** – testing calls with help of analog AUX interface.



- **Initiates testing call from AUX interface** – Outgoing call from analog AUX interface
- **Connect to first incom. Call** – Automatic connection of the first incoming call from the selected interface.

9.4.4. Setting Menu

Contains the communication setting (**see section 9.3**) and program language menus.

Communication






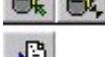





- **Direct to COM port** – Program communication through serial interface RS232
- **Modem** – Communication through connected modem.
- **TCP/IP** – Communication through TELNET protocol through Ethernet.
- **Transmission rate** – the recommended and default value is 57.600bps.

9.4.5. Help Menu

Contains a help to the ISDN GSM program, instructions for use of the help and details on the program version.

9.4.6. Button Bar

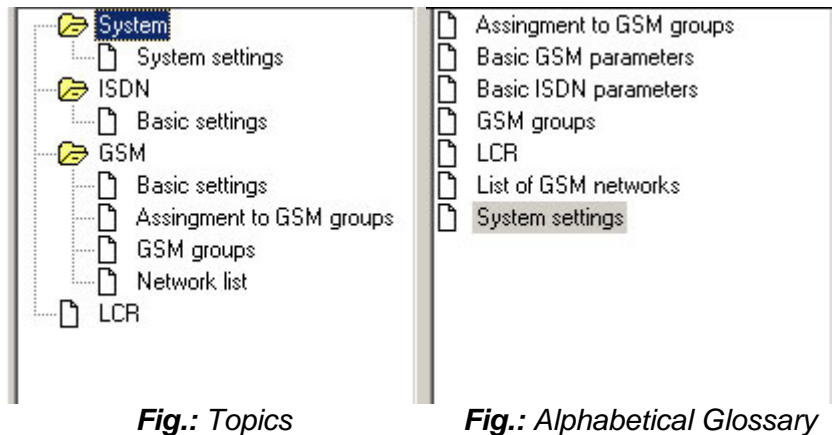


- | | |
|---|---|
|  | – upload configuration file |
|  | – save configuration file |
|  | – upload default settings |
|  | – connect gateway |
|  | – disconnect gateway |
|  | – select gateway from list and connect gateway selected from list |
|  | – download settings from the gateway |
|  | – upload settings to the gateway |
|  | – select language |
|  | – program end |
|  | – help |

9.5. Configuration

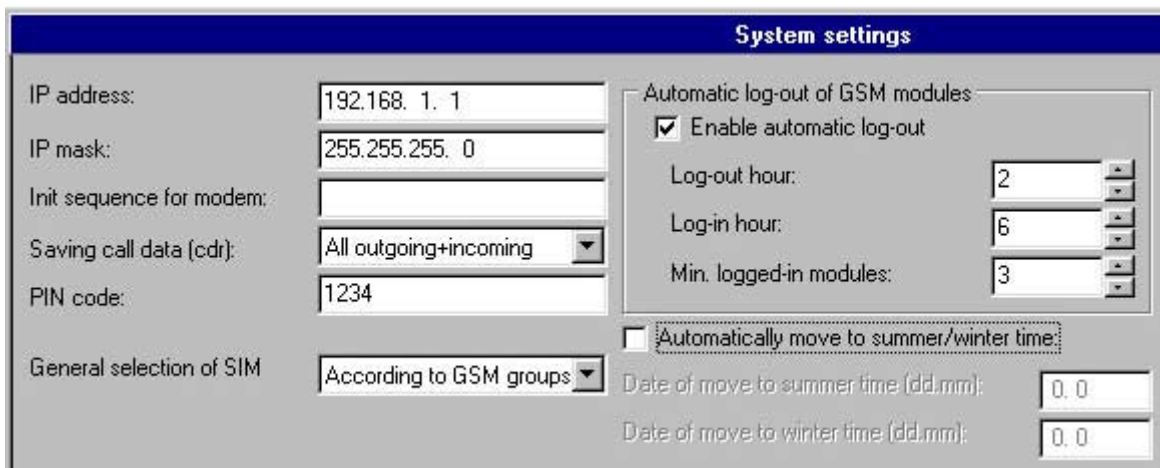
As already mentioned, the program includes the "Topics" and "Alphabetical glossary" folder menus. These menus contain identical items (as shown in the figures below) and it depends on the user which menu he or she chooses for easy orientation. You can set ISDN GSM gateway parameters in these menus.

9.5.1. Topics and Alphabetical Glossary



9.5.2. System

9.5.2.1 System settings



This window allows you to set the basic parameters of your STARGATE .

- **IP address** – IP address of the STARGATE Ethernet port.
- **IP mask** – STARGATE port IP address mask.
- **Init sequence for modem** – an AT command sent by the STARGATE via COM2 when it detects a connected modem.
- **Record calls** – records information on calls.
 - **No calls** – the gateway does not record any call information.
 - **Successful outgoing** – gateway records information of all successfully connected outgoing calls
 - **Successful outgoing+incoming** – gateway records information of all successfully connected outgoing+incoming calls.
 - **All outgoing** – the gateway records information on all outgoing calls.

- **All outgoing+incoming** – the gateway records information on all outgoing and incoming calls.
- **Master PIN** – the PIN code that the gateway tries to enter if a SIM card with active PIN is inserted (this item has no meaning if a SIM card without active PIN is used).
- **General selection of SIM cards** – selection of SIM card after start/restart of STARGATE
 - **According to GSM groups** –SIM card will be selected by GSM group settings.
 - **SIM cards in slot X** – after start/restart will be chosen SIM card in holder X (In case that setting in GSM group is different, SIM will be automatically switched according to GSM group settings)
- **Automatic logout of GSM modules** This function is used for automatic log out of modules in selected time. If logged in modules are occupied by a call, the logged out modules log again in to the net automatically. If the traffic decreases, the modules log out again from the network at random intervals
 - **Enable automatic logout** – Permission / prohibition of this function.
 - **Logout Hour** –The time when modules start to log out randomly from the GSM network
 - **Login Hour** – The time when the modules start to log in again to the GSM network
 - **Min. logged-in modules** – The minimal number of GSM modules that remain logged in.
- **Automatically move to summer/winter time** – for automatic switch summer/winter time

9.5.3. ISDN

9.5.3.1 Basic settings

PRI ISDN connection settings.

The screenshot shows the 'Basic ISDN parameters' configuration window. The 'ISDN' tab is active. The settings are as follows:

Parameter	Value
ISDN PRI port type	TE
Synchronization	Slave
TEI address	0
Assignment of B-channels	Locked

Under the 'Error ISDN causes' section:

Error Cause	Value
Few digits on OVERLAP dial mode	102
Restricted number prefix	21
Selected module/GSM group is not ready	41
No module/GSM group is ready	42

Additional settings:

- Allow delete of statistics on PRI every month
- 1 . day in month delete

ISDN

Type of ISDN PRI port - defines the type of the ISDN port on the STARGATE ISDN board. ISDN PRI is a point-to-point connection. The gateway must have an opposite port type than the device it is connected to*.

Synchronization – selects the device to transmit the synchronization clock.

- **Master** – the gateway sends the synchronization clock, the connected device must be set to receive the synchronization clock.
- **Slave** – the gateway receives the synchronization clock from the connected device.

TEI management – gateway identification address (0 by default, 62 max.)

Assignment of B-channels – defines how the gateway shall route outgoing calls to the GSM network.

- **Cyclical** – the gateway routes outgoing calls according to pre-defined groups (prefixes). The GSM modules are assigned to the groups automatically according to the GSM provider (GSM network number). If more GSM modules (SIM cards) are assigned to a group for outgoing calls, these GSM modules are occupied gradually in a rotating way (1. > 2. > 3. > 4. > 1. > 2. ...)
- **Locked** – the gateway does not provide intelligent outgoing call routing. Calls on the x-th B-channel are made via the x-th GSM module. However, it is necessary to define and select so many GSM groups as there are SIM card types in the gateway.
- **According to credit** – the gateway routes calls as in the rotating mode but selects the GSM modules according to the lowest number of called minutes instead of cyclically.

Caution! Be sure to select the GSM groups according to available providers while selecting the Assignment of B-channels=locked!

**) If you do not have the appropriate crosses/non-crossed interconnection cable (depending on the configuration of the equipment connected to the STARGATE), you can re-set the gateway PRI board jumpers to achieve functional connection.*

- **Error ISDN causes** – Definition of causes sent to PRI ISDN (in the ReleaseComplete) whenever an incoming call from PRI ISDN is rejected.
 - **Few digits on OVERLAP dial mode** – Rejection of an incoming call that does not meet the required number length (default cause: 102-Timeout).
 - **Disallowed dial number prefix** – Rejection of an incoming call whose prefix does not match any of the prefixes defined for GSM groups (default cause: 21-Reject)
 - **Selected module/GSM group are not ready** – Rejection of an incoming call because no free module has been found in the particular GSM group (the assigned GSM module is not available for the „Locked Channels“ mode) and no other preferred GSM groups have been selected (default cause: 41-Tempfail).
 - **Selected module/GSM groups are not ready** – Rejection of an incoming call because no free module has been found in the defined GSM group + preferred groups have been selected for overflow but no free outgoing GSM module has been found here (default cause: 42-Swcongest).

- **Allow delete of statistics on PRI every month** - Allow/Restrict automatic reset of PRI statistic every x. day in month.

9.5.4. GSM

9.5.4.1 Basic settings

Settings of basic parameters of GSM.

The screenshot shows a configuration window titled "Basic GSM parameters". It is divided into several sections:

- Number of digits dialed from ISDN:** Minimum: 9, Maximum: 9, Waiting time for next digit [s]: 3.
- List of holiday days:** An empty list box with "Add" and "Delete" buttons below it.
- Call delay [s]:** A spinner box set to 2.
- DTMF numbers: Delay:** A spinner box set to 1.
- Clip:** A dropdown menu.
- Voice param. of Ericsson GSM modules:** Transmission vol. and Reception vol. sliders, both set to 0 dB.
- Voice param. of Siemens GSM modules:** Transmission vol. and Reception vol. sliders, both set to 0 dB.

- **Number of digits dialed from ISDN** – sets outgoing ISDN dialings into GSM networks.
 - **Maximum** – the maximum number of digits to be dialed into a GSM network. Any dialing longer than or equal to this parameter is dialed automatically (without waiting time).
 - **Minimum** – the minimum number of digits to be dialed into the GSM network.
 - **Waiting for next digit** – time (in seconds) for the STARGATE to wait for the next dialed digit. After this timeout, the number is dialed automatically into the GSM network.
- **Voice parameters of Ericsson/Siemens GSM modules** – sets parameters of GSM modules.
 - **Receive/Transmit level** – selects the receive/transmit volume. Caution! We recommend you to keep the default value to avoid negative effects upon other transmission parameters, such as echo. Do not change these settings unless absolutely necessary.
- **Call delay** - the minimum timeout between the end of a call and the beginning of another outgoing call for one GSM module (Incoming and outgoing calls are not rejected during this timeout). The optimum time is 2 seconds. Unless absolutely necessary, do not change the default value to avoid system instability.
- **CLIP** - Prefix with is added in front of incoming CLIP from GSM after first char "+" was deleted. (+ - add char "+" in case that missing, 00 – remove char "+" and add prefix "00", empty – only remove char "+")
- **DTMF number** – sets sensitivity of DTMF receiver from GSM network. Parameter "delay" means 10*miliseconds which is added to default value 20ms. The total time is minimal delay between two DTMF chars.

9.5.4.2 Assignment to GSM groups

Table of assignment GSM modules to Outgoing (PRI>GSM) and to Incoming (GSM>PRI) GSM groups. (0. and 1. GSM module is in first GSM board position – on left side next to PRI board)

Assignment to GSM groups			
Outgoing:		Incoming:	
GSM module	Assignment of GSM groups	GSM module	Assignment of GSM groups
0. GSM module :	1. GSM group	0. GSM module :	1. GSM group
1. GSM module :	1. GSM group	1. GSM module :	1. GSM group
2. GSM module :	1. GSM group	2. GSM module :	1. GSM group
3. GSM module :	1. GSM group	3. GSM module :	1. GSM group
4. GSM module :	1. GSM group	4. GSM module :	1. GSM group
5. GSM module :	1. GSM group	5. GSM module :	1. GSM group
6. GSM module :	1. GSM group	6. GSM module :	1. GSM group
7. GSM module :	1. GSM group	7. GSM module :	1. GSM group
8. GSM module :	2. GSM group	8. GSM module :	1. GSM group
9. GSM module :	2. GSM group	9. GSM module :	1. GSM group
10. GSM module :	2. GSM group	10. GSM module :	1. GSM group

9.5.4.3 GSM Outgoing Groups

Settings of GSM outgoing groups (and SIM cards*). In this section you can set all rules for each SIM card in system for outgoing call from ISDN PRI to GSM networks.

GSM outgoing groups	
GSM group 1 GSM group 2 GSM group 3 GSM group 4 GSM group 5 GSM group 6 GSM group 7	
Mode of switching SIM card	By time and limit; then SIM 1
Disconnect call:	Never
Delay for send CONNECT [s]:	0
Day of delete statistics in group:	1 (0 = off)
Timeout for send ALERTING [s]:	5 (0 = off)
SIM 1 SIM 2 SIM 3 SIM 4	
Network number	
CLIR	Enabled (CLIP-off)
Max. of called minutes	0
Number of SMS messages	0
Day of restore call limit and delete statistics	1 (0 = off)
Time of use SIM	From: 00:00 To: 24:00
	<input checked="" type="checkbox"/> Enable on weekends <input type="radio"/> Use the above set time <input type="radio"/> Use whole weekend
First count :	1
Next count :	1

*placement of SIM holders on GSM boards you find in the section GSM board in this manual

- Mode of switching SIM card** – method, how SIM cards will be switched in selected GSM group.
- **SIMX** - active will be the SIM card in position X
 - **OFF** – SIM cards in GSM group is switched-off.

- **By time** – SIM cards will be switched according to time and day (see below “Time of use SIM”)
- **Random** – SIM cards will be switched at random time (length of this time will be generated between two times in parameter “Interval of change SIM card” (see below)
- **By time and limit; then SIM 1** – SIM cards will be switched according to time and day and credit. In case that all SIM card have no credit (counters are empty), the SIM card in position one will be activated.
- **Random and libit ; then SIM 1** – SIM cards will be switched at random time and by credit. In case that all SIM card have no credit (counters are empty), the SIM card in position one will be activated

Disconnect call :

- **Never** – Call wont be never disconnect (in case that time of use or limet is exceeded). The switch to another SIM card will be allowed after call hung-up)
- **SIM limit exceeded** – The call will be disconnected immediatly when the SIM card’s call limit is exceeded.
- **Switch to another SIM card** - The call will be disconnected immediatly when the SIM card will be out of time of use.

Day of delete statistics in group - x. day in month when the statistctics of the GSM group will be deleted.

Delay for send CONNECT (s) – Delay for send ISDN message CONNECT to ISDN PRI interface (in case that STARGATE is building call from ISDN to GSM).

Timeout for send ALERTING(s) – Timeout for send the ISDN message ALERTING to ISDN PRI interface (in case that STARGATE is building call from ISDN to GSM). 0= switched off

Bookmarks SIM1- SIM4 – In these bookmarks is necessary right set-up parameters of each SIM card..

Network number – ID code of SIM card’s home GSM network. (optional parameter, only for verification)

- **CLIR** – This parameter decides whether the gateway SIM card subscriber number shall be dialed into the GSM network or not. All STARGATE outgoing calls present the calling line numbers as inserted in the SIM card in the STARGATE. Technically, it is impossible to transfer number information from the ISDN into the GSM network (the opposite function is supported, i.e. all ISDN subscribers can see the GSM calling number). Hence, it is mostly purposeful to restrict the calling line identification (activate CLIR) to avoid problems with backcalls to the gateway in the case of a missed GSM call, for example. Select this parameter for each GSM group separately.
 - **Default** - settings according your GSM provider’s network.
 - **Enabled (CLIP-off)**** – The CLIR function is activated, no numbers are sent to the GSM network. **CAUTION!** Your GSM provider must support **and activate** this service! If not, the number will still be sent to the network and outgoing calls will be impossible with some providers.

Disabled (CLIP-on) - the CLIR function is disabled, numbers are sent. Your GSM provider must support and activate this service! If not, the number will still be sent to the network and outgoing calls will be impossible with some providers.

**Some GSM network (SIM cards) not support activation CLIR via GM22 GSM modules, in status window you will see Network: clirr-err.

Number of called minutes – Time call limit for one month for the SIM card.

Number of SMS messages – Number of SMS messages sent via the SIM card / one month.

Day of restore limits – Day, when counters “time call limit” and “SMS” will be reset to zero (1 to 31).

First count – length of first count. After this timeout Stargate uses parameter “next count” to calculate the length of the call. (1 to 250 seconds).

Next count – length of next counts (1 to 250 seconds) . Both parameters are for mode of assignment B-channels=According to credit, no for CDR info.

Time of use SIM – Interval of using selected SIM card. Caution!: If parameter “Time of use will be overlapped by another SIM (in one GSM group) – in this case can come about unspecified switching of SIM cards – can be selected another SIM cards !

Unlock on weekends – Permission/prohibition of this group during weekends (Saturday, Sunday)

Interval of change SIM card – in this interval hours:minutes will be randomly switched SIM card. (SIM card will be switched after proceeding call hang-up).

9.5.4.4 GSM Incoming groups

Settings for incoming calls from GSM networks to PRI ISDN interface.

The screenshot shows a software interface for configuring GSM incoming groups. The main window is titled "GSM Incoming groups" and contains four tabs labeled "GSM group 1", "GSM group 2", "GSM group 3", and "GSM group 4". The "GSM group 1" tab is active. The configuration options include a "Mode" dropdown menu set to "Reject incoming calls", and four numeric input fields: "Minimum digits in DTMF" (3), "Maximum digits in DTMF" (3), "Timeout while inputing DTMF digits[s]" (10), and "Day of deleting incoming statistics" (1). A note "(0=off)" is present below the last field. To the right is a list box titled "Seznam volaných čísel" (List of dialed numbers) which is currently empty. At the bottom right of the list box are "Add" and "Remove" buttons.

Incoming calls to ISDN – setting of the method how STARGATE will processes incoming calls from GSM network and route to PRI ISDN interface.

Mode – mode, how STARGATE is answering to incoming calls from GSM network.

- **Reject incoming calls** - by selecting this item you barring GSM incoming calls (the calling subscriber gets the busy tone*).
- **Ignore incoming calls** – by selecting this item you ignore GSM incoming calls (but - the calling subscriber gets the ringing tone).
- **Receive incoming calls + voice message** – incoming calls will be routed to ISDN interface according to following parameters.
- **Receive incoming calls + dialtone** – incoming calls will be routed to ISDN interface.

Minimum digits in DTMF – Minimum of DTMF digits in DTMF dial-in

Maximum digits in DTMF – Maximum number of digits to be DTMF-dialed for incoming calls. After the last DTMF dialing, which is the maximum, an ISDN call is made automatically with the currently selected DISA (or DTMF prefix if necessary).

Timeout while imputing DTMF digits(s) – time (in seconds) for the STARGATE to wait for the first and next DTMF digit. After this timeout, either the DTMF number received so far is dialed into the ISDN or, if no DTMF digit is dialed, a number is dialed from the “List of dialed numbers”.

List of called numbers - list of numbers to dialed automatically gradually (in the case of unavailability or busy) if no DTMF dialing (DISA) is made.

9.5.4.5 Network list

Tables of prefixes for GSM operators.

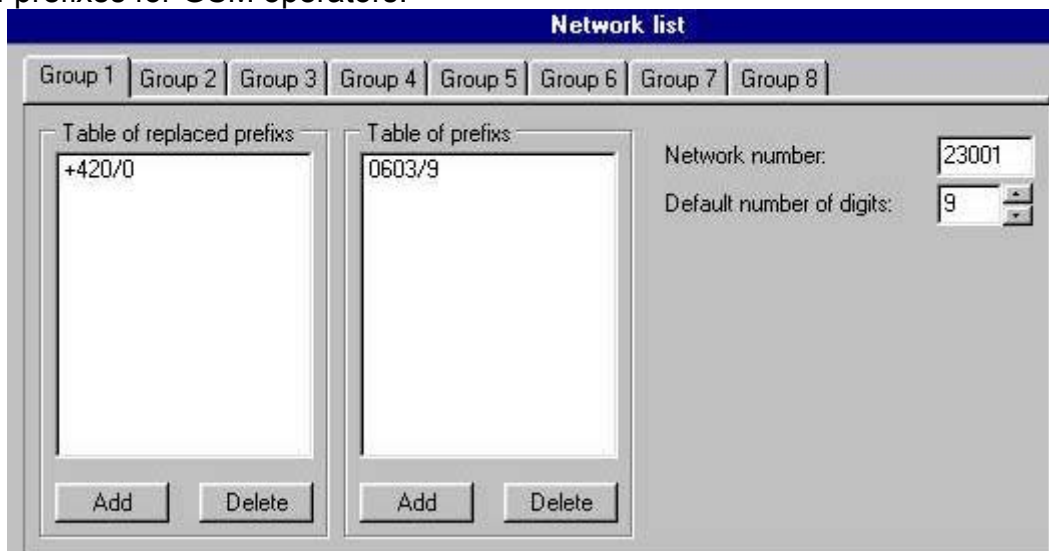


Table of replaced prefixes – table of prefix, that are to replaced (in outgoing call from PRI ISDN to GSM) to another prefixes (e.g. +420 replaced by 0)*

**this change will be made before find right prefix in table of prefixes!*

Table of prefix – table of called prefixes from PRI ISDN. At filling-in this table you can set the length of called number. In case that this parameter you didn't fill-in, STARGATE use parameter „Default number of digits“

Network number – ID number of GSM network for these prefixes*

*this parameter will be used in higher version of firmware for pseudotariffication. Please fill-in this parameter.

9.5.4.6 LCR



Table of outgoing Least cost routing (LCR). Each outgoing call from PRI ISDN will be routed to GSM according to this table. STARGATE at each call check line to line and in case that called prefix is same as prefix in network list and actual time is time limitation limits, call will be routed via defined GSM group(s).

Network list number – number of “Network list”

Time limitation – validity time of this line

Weekend – parameter determining if these line is valid on weekends and holidays.

Groups - Destination GSM group(s) for outgoing call to GSM (in case that first GSM group will be unavailable, call will be re-routed via next GSM group, or cancelled (without setup ACK))

10. STARGATE Accounter program

The program for remote automatic download cdr information from up to 8* STARGATE units via IP connection (TELNET).

**only accounter for Windows, for OS Linux is one script for one STARGATE unit.*

10.1. STARGATE Accounter Program Installation

ATEUS® - STARGATE includes an installation CD with the STARGATE Accounter program installation. After the CD is inserted in your PC CD-ROM (or the diskette is inserted in your PC diskette drive), the installation will start. If you have not selected the automatic running of CD after insertion (or use diskettes), run the installation program to start the installation. Wait until the installation is completed.

**) The program can be run under the MS Windows 95 OSR2/98/ME/2000/XP OS only.*

****) For OS LINUX you can use 2N-accounter script*

10.2. STARGATE Accounter Program Running

When the installation is complete, run the program by clicking on the "STARGATE Accounter program" in your PC menu, clicking on the icon on your desktop, or running the "**STARGATE Accounter.exe**" file, which you can find on the appropriate location installed by you using any file explorer, commander or browser.

If you want to use this function on OS Linux you have to use special script with these functions.

How to install STARGATE Accounter script in OS LINUX:


- Unzip file: `unzip Linux-accounter.tar.gz`
- "Untar" file: `tar xvf Linux-accounter.tar`
- after it you will have directory: Linux-accounter
- Inside this directory, you run file "install" : `./install`
- Script for connect, download cdr and save it to file with format yyyy-mm-dd has name "2N-accounter". (run type `tyca` command `./2Naccounter`)
- File "run-2N-accounter" will configure Linux utility "cron" to every 20 min run script 2N-accounter. (to run type command `./setup-cron`). (Setup will modify Linux CRON program)
- Please, before run file, you must configure IP address, username and password in script "accounter.pl"
- previous files and files with cdr info and log file you find in directory: `/usr/bin/accounter`
log file- `accounter.log`
cdr info file- `yyyy-mm-dd`

10.3. Description of STARGATE Accounter program

Program is dedicated for automatic downloading and saving cdr info about calls made via ATEUS® STARGATE and their savings in the text files. The communication with STARGATE is established in chosen times moments via Ethernet with help of Telnet protocol (port 23) or via connected ISDN modem.



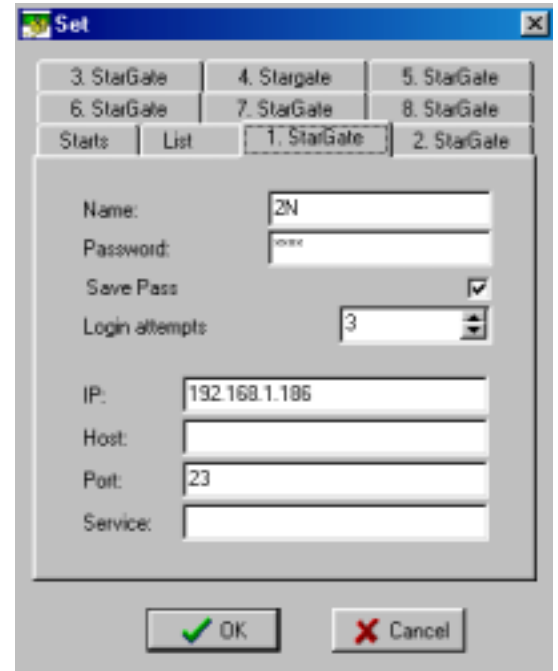
10.4. Set-up STARGATE Accounter program

By starting STARGATE Accounter program click on icon  for setting of the program. Here you have options set in individual flags:

- **Starts** – setting of individual times, when the program will automatically save cdr info from STARGATE + selection of the method of saving in the files.
 - **A Time** : 1 time of automatic saving
 - **B Time** : 2. time of automatic saving
 - **C Time** : 3. time of automatic saving
 - **Repeatedly** : Will automatically save cdr each xx minutes (if set for 0, this method is off)
 - **At start program** : Automatic save of cdr by start of the program
 - **Only one file** : If marked, program saves cdr info in one file (Dddmmyy.cdr), if not marked , he differentiate following the method of saving (1 time – file DddmmyyASGx.cdr, 2 time –file DddmmyyB.cdr,3 time – file DddmmyyCSGX.cdr, Repeatedly – DddmmyySGx.cdr, At start- file DddmmyyASGx.cdr)
 - **Use** : Activation of this flag
- **List** – number of lines that will be represent in the status window.
- **Login** – Log in name, password.
 - **Name** : Log in name in the SG
 - **Password** : Log in password in the SG
 - **Save pass** : Saving of the log in password foe next start of the program
 - **Login attempts** : Number of trials of the program by automatic log in.

Make sure that user's password and name are identical with n and p which are saved in connecting STARGATE. By invalid n or p the program will ask for valid characteristics.

- **TCP/IP** – Parameters for connecting of the program to the SG
 - **IP** : IP address of connecting SG (enter in the right form ! e.g:192.168.50.2)
 - **Host** : Network name connecting SG (available in higher versions of the firmware - for the present time do not fill out please)
 - **Port** : Number of the remote data port for communication via TELNET (standard 23).
 - **Service** : Title of the protocol – DO NOT FILL OUT !



10.5. Settings of the STARGATE Accounter program

The name of the file in which the program is saving the CDR is derived from actual date (set on PC on which is running) in following form:

DddmmyySGx.cdr (dd – day; mm- month; yy-year; x – no. Of STARGATE unit)

In case you have off option "Only one file" the program is saving this info in more files with deference of the last letter.

E.g. D120202A.cdr is file generated at 12.2.2002 and data were saved via automatic saving in "A.Time" of the time.

Along files with cdr info is program saving it the file "**accounter.log**" info about individual conditions of the program (if the downloading was successful and etc.)

11. Appendix A - AT Commands for STARGATE Communication

11.1. Basic Commands

11.1.1. System Information

ATI3	Firmware version and copyright
ATI4	Factory number

System status

AT&S	Status of all inserted boards
AT&Spr	Detailed status of PRI ISDN board
AT&Sax	Detailed status of AUX board
AT&Sxx	Detailed status of xx. GSM board (xx=00-15)
AT&S=Info	Detailed status of oe param. on all boards (info=name of parameter, which you want to show)
AT&U	Status of logged users on all interfaces
AT!Q	Status of memory log buffer
AT&XC	Status of all proceeding calls
AT&XP	Status of all proceeding calls (sorted by number of B-channel)
AT&XG	Status of all proceeding calls (sorted by number GSM module)
AT&M0	Turning off ANSI terminal color usage
AT&M1	Turning on ANSI terminal color usage
AT&M9	Turns on MATRIX (for testing load of transfer connection)

Statistics

AT&T	Statistics of calls via PRI interface
AT&TIN	Statistics of incoming calls via GSM modules
AT&TOUT	Statistics of outgoing calls via GSM modules
AT&T##	Statistics of calls via SIM cards of ##. GSM module
AT%TPR=mi,ci,mo,co	Setting of statistics via PRI
AT%TG0=mi,ci,0,0	Setting of statistics of incom. calls via all GSM modules in GSM group 0
AT%TG#=mi,co,ri,ro	Settings of statistics of GSM group no. #
AT%TGALL=mo,co,ri,ro	Settings of statistics of all GSM groups
AT%T##=#,mi,ci,si,mo,co,so	Settings of statistics of SIM card no. # of GSM module no. ##
AT%T##=ALL,mi,ci,si,mo,co,so	Settings of statistics of all SIM cards of GSM module no. ##
AT%TALL=ALL,mi,ci,si,mo,co,so	Settings of statistics of all SIM cards of all GSM modules
<i>Description of parameters:</i>	Mi/mo > Minutes of incom./outg. calls Ci/co > number of connected incom./outg. Calls Ri/ro > number of re-routed incom/outg. Calls in group Si/so > number of received/sent SMS messages
! When you change these parameters, all another counters will be resets!!	

GSM modules

AT&Qxx	Received GSM signal level (xx=00-15)
AT&QALL	Received GSM signal level from all GSM modules

AT&Gxx=atcmd	Send command for AT commands directly into GSM module AT&Gxx=at+cnum – SIM card telephone number AT&Gxx=at+cpin="xxxx" – PIN entering AT&Gxx=at+clck="sc",1"xxxx" - PIN request enable AT&Gxx=at+clck="sc",0"xxxx" - PIN request disable
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Log file

AT&L	Log file listing (STARGATE awaits pressing of the Space bar after every 20 lines)
AT&C	Call file listing (STARGATE awaits pressing of any key after every 20 lines)
AT&CR	Call file listing and deleting (STARGATE awaits pressing of the key "#" for delete this line /with info about call/ form memory and send next line)

11.2. Configuration Commands

11.2.1. Status Information

AT&V	Overview of all system settings
AT&VI	Overview of PRI ISDN settings
AT&V0	Overview of basic GSM settings
AT&V#	Overview of #-th GSM group settings (#=1-8)
AT&VALL	Overview of all GSM group settings
AT&N#	Overview of parameters of network list no. # (#=1-8)
AT&NALL	Overview of parameters of all network lists
AT&R	Overview of LCR lines

11.2.2. Default Reset

AT&FRES	Reset with gateway factory settings
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11.2.3. System Settings

AT%S70=x.x.x.x	STARGATE IP address
AT%S71=x.x.x.x	IP address mask
AT%S81=	Initialization string for setting of mode connected to the gateway COM2
AT%S90=x	Type of assignment of B-channels to GSM modules (0-rotating; 1-locked; 2-according to credit)
AT%S91=x	Way of call information recording (0- no record; 1- successfully connected outgoing call; 2- successfully connected incoming calls; 3- successfully connected incoming and outgoing calls; 5- all outgoing calls; 6- all incoming calls; 7-all incoming+outgoing calls)
AT%S93=x	Global selection of SIM card (0= according to GSM group, 1-4= number of SIM holder)
AT%S98=xxxx	PIN code for SIM cards inserted in the gateway
AT%S99= dd.mm.yy.w/hh:mm:ss	Gateway date and time settings
AT%X00=hout,hin,min	Automatic logout of GSM modules

	hout ...hour when the modules start to log out randomly hin ...hour when the modules start to log in randomly min ...minimal number of modules in the group (2..15) which remains always logged in
AT%X80=name/pass	User name/password for access via IP port (this parameter is only write only- you can't see its value)

11.2.4. System control

AT&Bxx=DOWN	Transfer of GSM board No. xx into the sleep mode
AT&BPR=DOWN	Transfer of PRI board into the sleep mode
AT&BALL=DOWN	Transfer of all GSM boards into the sleep mode
AT&Bxx=RESET	Reset of GSM board No. xx
AT&BPR=RESET	Reset of PRI board
AT&BALL=RESET	Reset of all GSM boards
AT&BSYS=RESET	Reset of STARGATE
AT&Qxx=RESET	Reset of GSM module No xx
AT&Qxx=BLOCK	Block of GSM module No xx

11.2.5. ISDN PRI Board Settings

AT%I00=	ISDN PRI port type (TE/S ; TE/M ; NT/S ; NT/M)
AT%I01=	TEI ISDN PRI connections (0-63)
AT%I02=ppp,ppp,ppp...	List of numbers dialed in incoming calls from GSM (max. 63 characters, numbers are separated with a comma)
AT%I03=ppp	Prefix to be sent before tone dialing
AT%I05=c1,c2,c3,c4	Number of causes sent to PRI ISDN (in the ReleaseComplete) whenever an incoming call from PRI ISDN is rejected.
AT%I08=mode,min,max,tout	Incomming calls from GSM to ISDN Mode : 0 – reject 1 – ignore calls 2 – accept calls and send voice message 3 – accept calls and send dial tone

Basic GSM settings

AT%G00=rr,gggggg,gggggg,gggggg,ggggg,gggggg,gggggg	g,r=Number of GSM group for each GSM module
AT%G01=mode,atms,atfs	Voice processing settings (for GM22 GSM modules only) mode – algorithm (0-none, 1-semiduplex, 2-fullduplex) atms,atfs – transit, receive gain (3=+5db, 1=+2.5db, 0=0db, 2=-2.5db, 4=-5d)
AT%G02=mode,atms,atfs	Voice processing settings (for TC35 GSM modules only) mode – algorithm (2-echo canceler) atms,atfs – transit, receive gain (3=+5db, 1=+2.5db, 0=0db, 2=-2.5db, 4=-5d)
AT%G06=mmdd,...mmdd...	List of holiday days (mm-month;dd-day) max

	length of line is 63 chars!
AT%G07=mmdd,...mmdd	Net list of holiday days
AT%G08=delay,min,max,tout	Parameters of dial from ISDN to GSM delay – relax delay between calls min – minimal length of number dialed from ISDN max – maximal length of number dialed from ISDN tout – delay between ial digits

GSM settings (x-GSM group)

AT%G#0=sim	Mode of switching SIM card sim> 0- OFF – group is turn-off 1-4 – SIM card no. 1-4 5 – switching by time 6 – switching by random time
AT%G#1=netid,clir,min,sms,sec,sec2,pseudo	Basic parameters of SIM card in slot 1 netid-network number clir – 0=default,1=enabled,2=disabled min – maximal number of minutes called sms – maximal number of SMS sent sec – min length of call (no for cdr info) sec2 – accuracy of measurement length of call (no for cdr info) pseudo – default = 0
AT%G#2=netid,clir,min,sms,sec,sec2,pseudo	Basic parameters of SIM card in slot 2
AT%G#3=netid,clir,min,sms,sec,sec2,pseudo	Basic parameters of SIM card in slot 3
AT%G#4=netid,clir,min,sms,sec,sec2,pseudo	Basic parameters of SIM card in slot 4
AT%G#5= from/to[/from,to/w+]	Time intervals for use SIM card in slot 1, one or two intervals (from=to=hh:mm), w+(w-) parameter „w+“ (all weekend) or „w-“, (no weekend) for enabled/disabled SIM on weekends. In case that AT%G#0=6 from/to= min/max limit for generate random time for switch SIM.
AT%G#6= from/to[/from,to/w+]	Time intervals for use SIM card in slot 2
AT%G#7= from/to[/from,to/w+]	Time intervals for use SIM card in slot 3
AT%G#8= from/to[/from,to/w+]	Time intervals for use SIM card in slot 4

List of Networks

AT%N#0=op/np,... op/np	List of prefixes replaced by new prefixes (#-number of netlist; op-old prefix;np-new prefix)
AT%N#1=pr/n,...pr/n	List of prefix dialed for ISDN (will be use for LCR table) pr=prefix n=length of number (parameter /n is optional)
AT%N#2..7=pr/n,... pr/n	Next 7 list of prefixes dialed for ISDN
AT%N#9=net,max	Net-network number, max-default length of number dialed from ISDN

LCR	
AT&R	Table of LCR
AT%R##=net, hh:mm/hh:mm/w* ,gr	Settings of line ## (0..63) of LCR table net – number of Network list (0..8) hh:mm/hh:mm/w* – time limitation for use this line gr – GSM group numbers

Commands for Testing via AUX	
AT!SPxx=dial	Initiates testing call from AUX interface (xx is the called interface): 1..15, 17-31 B-channel 32-rotaring B-channel
AT!SGxx=dial	Initiates testing call from AUX interface (xx is the called interface): 00..31 GSM module 32- to GSM via GSM module according to call prefix
AT!WPxx	Connects the following call from interface xx to interface AUX. 1..15, 17-31 from B-channel no. 32 first incoming call from ISDN
AT!WGxx	Connects the following call from interface xx to interface AUX. 00..31 from GSM no. 32 first incoming call from GSM
AT!D	Terminates call on AUX interface

Commands for Tracing*	
AT!RE	Start tracing of error messages active interface.
AT!Lx	Start tracing of LAN & Telnet on layer x x=2 – Layers IP, TCP, Telnet x=3 – Layers TCP, Telnet x=4 – Layer Telnet
AT!Rx	Start tracing of ISDN PRI & GSM on layer x x=1 – Layers 1,2,3,4 x=2 – Layers 2,3,4 x=3 – Layers 3,4 x=4 – Layer 4
AT!RR	Start tracing (AT!R2) to COM1 interface
AT!RX	Stop tracing (AT!R2) to COM1 interface

* Tracing can run only via one port !!

Commands for sending and receiving SMS messages	
AT!G=A6	Start low-level controlling for SMS messages (can run only on one port)
AT!G=55	Stop low-level controlling on used port
	Controlling SMS messges
AT^SX=ch	...(sms listing) request to list of all SMS messages and status confirmations saved on SIM card. Possible answers:: *smserr (busy,list) or *smsinc (ix=1..255) for each saved SMS or status SMS , end of list or empty SIM card - *smsinc (ix=0).
AT^SR=ch,ix	...(sms read) request to read SMS message or SMS status saved on SIM card. Possible answers: *smserr (busy,read) or *smspdu
AT^SD=ch,ix	...(sms delete) request to delete SMS message (or SMS

	status message). Possible answers: *smserr (busy,delete) or *smsdel
AT^SM=ch,len,pdu,csum	...(sms to module) request to send message via GSM modul 0..31 or via any GSM module (ch=32). Possible answers: *smserr (busy,write) or *smsout
AT^SG=grp,len,pdu,csum	...(sms to group) request to send SMS message via GSM group 1..8. Possible answers: *smserr (busy,write) or *smsout
	Messages from STARGATE unit
*smsinc: ch,ix,sts	... SMS message was received and saved to SIM card: <ul style="list-style-type: none"> • Ch ...GSM module number 0..31 • Ix ...index number of saved SMS messages 0..255 • Sts ...status of SMS message
*smsrep: ch,ix	...SMS status confirmation was received and saved to SIM card (this message is only for GSM modules TC35 and GM47)
*smsout: ch,ix,ref	...SMS message was sent and didn't saved to SIM card: Ref ...reference number of sent SMS 0..255 (will be used in SMS status confirmation message)
*smspdu: ch,ix,sts,len,pdu,csum	...content of SMS message od status confirmation: <ul style="list-style-type: none"> • Len ...length of SMS message (number of bytes in pdu) • Pdu ...content message in PDU format • Csum ...Checksum of all PDU bytes (2 hexa digits) calculated without carry
*smsdel: ch,ix	SMS message or status confirmation was deleted from position ix
*smserr: ch,ix,req,err	response to error command: <ul style="list-style-type: none"> • Req ...required GSM module or GSM group • Err ...error code (6=busy, 40=write, 41=read, 42=delete, 43=list)

12. APPENDIX B – LIST OF ALL STATUS CODES

12.1.1. Plug-In Boards

<i>Board Types</i>		
ID	Name	Description
0	NONE	(no board)
1	CPU111	(CPU board is not displayed)
2	PRI130	1x PRI port NT/TE
3	GSM160	2x GSM Ericsson GM22 module + 2x SIM
4	AUX120	Switch matrix, voice message generator and AUX port
5	GSM161	2x GSM Siemens TC35 module + 8x SIM

<i>Board Types</i>			
ID	Name	Description	What Follows
0	INIT	HW board reset and init of respective SW parts in progress	OK/CHECK
1	ERROR	Board in wrong slot or defective board HW	board reset
2	POWER	Only upon system power on or AT!Bxx=RESET command	DETECT
3	OK	Rest status, HW is working on board (full operation)	DISC
4	UNDEF	Empty slot	DETECT
5	CHECK	Board firmware check (AUX only)	ERASE
6	ERASE	Board firmware erasing (AUX only)	PROF
7	PROG	New board firmware loading (AUX only)	OK
8	DETECT	New board plug-in detected	INIT
9	DOWN	Frozen status, HW is working on board but no new calls are started	board reset
10	MODEM0	Parameter S80 sent to modem (AUX only)	MODEM1
11	MODEM1	Parameter S81 sent to modem (AUX only)	OK
12	DISC	Board plug-out detected	UNDEF

12.1.2. ISDN Layer Statuses

<i>ISDN Layer 1 Statuses</i>		
ID	Name	Description
0	DEACT	Deactivation – no signal received
1	ACTIVE	Activation – full synchronization achieved (frame,multiframe,crc)
2	SIGNAL	Signal received – no synchronization
3	SYNC	Signal received – only partial synchronization (frame)

ID	Name	Name According to Q.921
0	NOTEI	TEI Unassigned
1	AWTEI	Assigned Awaiting TEI
2	AWTEST	Establish Awaiting TEI
3	OKTEI	TEI Assigned
4	AWEST	Awaiting Establishment
5	AWREL	Awaiting Release
6	OKEST	Multiple Frame Established
7	TIMREC	Timer Recovery

ISDN Layer 3 Statuses				
ID	Name	Name According to Q.931	NT Description	TE Description
0	NULL	Null	Rest status, ready for call	
1	CINIT	Call Initiated	Call from PRI indicated	Call to PRI started
2	OVSEND	Overlap Sending	Gradual dialing receiving	Gradual dialing sending
3	OPROC	Outgoing Call Proceeding	Dialing from PRI terminated	Dialing to PRI terminated
4	CDELIV	Call Delivered	Call from PRI ringing	Call to PRI ringing
6	CPRES	Call Present	Call to PRI started	Call from PRI indicated
7	CRECV	Call Received	Call to PRI ringing	Call from PRI ringing
8	CONREQ	Connect Request	Call to PRI answered	Call from PRI answered
9	IPROC	Incoming Call Proceeding	Dialing to PRI terminated	Dialing from PRI terminated
10	ACTIVE	Active	Connected call	
11	DISREQ	Disconnect Request	End of call from PRI	End of call to PRI
12	DISIND	Disconnect Indication	End of call to PRI	End of call from PRI
19	RELREQ	Release Request	Channel release request	
25	OVRECV	Overlap Receiving	Gradual dialing sending	Gradual dialing receiving
61	RSTREQ	Restart Request	Channel restart request sent	
62	RSTART	Restart	Channel restart request received	

ISDN Layer Management Statuses		
ID	Name	Description
0	INIT	Initialization upon PRI board reset
1	IDLE	Activation – rest status, necessary for layers 2 and 3
2	DISC	Deactivation

12.1.3. GSM Layer Statuses

GSM Layer 2 Statuses			
ID	Name	Description	What Follows
0	INIT	GSM module initialization start	PINREQ
1	SIM0	Module switch to internal SIM card	INIT
2	PINREQ	Module PIN request	PINSET
3	PINSET	PIN value sensing to module	INFO
4	BLOCK	Module blocked temporarily or permanently (see Layer 2 information)	INIT
5	SETUP	Module configuration running	IDLE
6	SLEEP	Module sleep running (transition to BLOCK status)	BLOCK
7	NWAIT	Awaiting GSM log-in	SETUP
8	IDLE	Rest status, can start/receive call, execute AT&G command	CALL/CMD
9	CALL	Call running (call establishing, connected call, call end)	IDLE
10	CMD	Communicating with module upon AT&G command	IDLE
13	INFO	Information loading from module and SIM card	NWAIT

GSM Layer 2 Info for BLOCK Status

ID	Name	Description
41	(block)	Blocked by AT&G command, terminated by module, board or system reset
42	Netw-reg	GSM log-in refused (not activated SIM), next attempt in 5..60 minutes
43	Clir-err	CLIR activation request refused, next attempt in 2..10 minutes
44	Mod-err	Defective or not connected GSM module, next attempt in 2 minutes
45	Pin-err	Wrong PIN, permanently in BLOCK status
46	Sim-err	Defective or not inserted SIM card, next attempt in 2 minutes
47	Log-out	Temporarily logged-out according to parameter X00
48	Puk-req	SIM card requires PUK

GSM Layer 3 Statuses

ID	Name	Description
0	NULL	Rest status, ready for call
1	CINIT	Request of call to GSM (from Layer 4)
3	OPROC	Call to GSM is connected
4	CDELIV	Call to GSM is ringing
6	CPRES	Indication of call from GSM (from Layer 2)
7	CRECV	Call from GSM is ringing on ISDN interface
9	IPROC	Call from GSM is processed by ISDN interface
10	ACTIVE	Connected call
11	DISREQ	Disconnection request (to Layer 2)
12	DISIND	Indication of disconnection (from Layer 2)
19	RELREQ	Module release for another call (to Layer 2)
25	OVRECV	Reading of DTMF dialing from GSM (from Layer 2)
38	RELIND	Indication of module release (from Layer2)

12.1.4. Link Layer Statuses

Layer 4 Statuses

ID	Name	Description
0	NULL	Rest status, ready for call
1	MORE	Call request received from GSM or ISDN, awaiting further dialing or timeout
2	SETUP	Call request sent to opposite interface
3	PROC	Call request confirmed, awaiting call answer
4	ACTIVE	Connected call
5	DISC	Call disconnection in progress

12.1.5. Command Shell Statuses

Command Shell Statuses

ID	Name	Description
0	IDLE	Rest status, awaiting AT commands
1	REQUEST	Communication with GSM module upon AT&G command is displayed
2	REPORT	Active tracing
3	LOGFILE	Content of log file is being written out
4	CALLFILE	Content of call file is being written out
5	CALLREAD	Call file records are read
6	AUTOFILE	Content of incoming call autorouting chart is being written out
7	QUERY	(not used so far)
8	SCREEN	(not used so far)
9	MATRIX	Active matrix screensaver
10	FUNCFILE	Content of debug file is being written out
11	LCRFILE	(not used so far)

TelNet Layer Statuses

ID	Name	Description
0	LOGOUT	User logged-out
1	LOGIN	User is entering name
2	PASSW	User is entering password
3	IDLE	User logged-in

12.1.6. Records of Events and Calls

Record Type in Log File

ID	Name	Description
0	POWER	System power on, power off or reset
1	INIT	Initialization of EEPROM (configuration) or flash (upgrade)
2	HW-ERR	HW error of plugged-in board
3	SYSERR	System error (memory error, etc.)
4	BRDIN	Board plugged-in
5	BRDOUT	Board plugged-out
6	BRDRES	Board reset using AT!B command
8	L1-ERR	PRI port layer 1 error (ISDN1)
9	L2-ERR	PRI port layer 2 error (ISDN2)
10	L3-ERR	PRI port layer 3 error (ISDN3)
12	G2-ERR	GSM module layer 2 error (gate2)
13	G3-ERR	GSM module layer 3 error (gate3)
14	C4-ERR	Link layer error (call4)

Record Type in Call File

ID	Name	Description
0	I-FD	Not connected incoming call attempt
1	I-OK	Connected incoming call
8	O-FD	Not connected outgoing call attempt
9	O-OK	Connected outgoing call

12.2. Abbreviations in Tracing

12.2.1. Identification of Channels and Processes

With tracing activated, internal system messages (transmitted between processes), messages received on and sent to the PRI port, and AT commands and replies sent to GSM modules are written out. The listing of a message related to a specific call starts with the B-channel and GSM module numbers and an arrow showing the message direction. A right arrow (→) means a message received on the interface (PRI, GSM, LAN) or a message directed from the process of a lower layer to the process of a higher layer (indication, confirmation). A left arrow (←) designates a message sent to the interface (PRI, GSM, LAN) or a message directed from the process of a lower layer to the process of a lower layer (request, response). The message type (layer 3 messages are shifted by a space to the right, layer 4 messages by two spaces to the right) and the message content follow.

12.2.2. ISDN Messages

Typically Used ISDN Messages (Q.931)					
ID	Name	Whole Name	ID	Name	Whole Name
000h	!alertin	Alerting	04Dh	!release	Release
001h	!callproc	Call proceeding	04Eh	!restack	Restart acknowledge
002h	!progress	Progress	05Ah	!relcompl	Release complete
003h	!setup	Setup	062h	!facility	Facility
005h	!connect	Connect	06Eh	!notify	Notify
007h	!setack	Setup acknowledge	075h	!stsenq	Status enquiry
00Dh	!connack	Connect acknowledge	07Bh	!info	Information
00Fh	!disconn	Disconnect	07Dh	!status	Status
046h	!restart	Restart			

Typically Used ISDN Elements (Q.931)					
ID	Name	Whole Name	ID	Name	Whole Name
004h	BEA	Bearer capability	04Ch	CTN	Connected party number
008h	CAU	Cause	04Dh	CTS	Connected party subaddress
010h	CID	Call identity	06Ch	CGN	Calling party number
014h	CST	Call state	06Dh	CGS	Calling party subaddress
018h	CHA	Channel identification	070h	CDN	Called party number
01Ch	FAC	Facility	071h	CDS	Called party subaddress
01Eh	PRG	Progress indicator	079h	RST	Restart indicator
020h	NTW	Network-spec facility	07Ch	LCO	Low layer compatibility
027h	NOT	Notification indicator	07Dh	HCO	High layer compatibility
028h	DSP	Display	07Eh	USR	User-user
029h	DAT	Date/time	07Fh	ESC	Escape for extension
02Ch	KEY	Keypad facility	0A1h	SEC	Sending complete

Typically Used ISDN Elements - Cause (Q.850)		
ID	Name	Whole Name
1	Unassnumb	Unassigned number
6	Unaccchan	Channel unacceptable
16	Clear	Normal call clearing
17	Userbusy	User busy
21	Reject	Call rejected
27	Destout	Destination out of order
28	Invformat	Invalid number format
30	Stsenqresp	Response to StatusEnquiry
31	Normal	Normal, unspecified
34	Noanychan	No channel available
41	Tempfail	Temporary failure
42	Swcongest	Switching equipment congestion
44	Noreqchan	Requested channel not available
65	Nobearer	Bearer capability not implemented
81	Callref	Invalid call reference value
88	Dest	Incompatible destination
96	Elemmiss	Mandatory information element is missing
97	Message	Message type non-existent or not implemented
99	Element	Information element / parameter non-existent or not implemented
100	Elemerror	Invalid information element contents
101	Incness	Message not compatible with call state
102	Timeout	Recovery on timer expiry
127	Undefined	Interworking, unspecified

12.2.3. LOG File events

Typ	Text	Description
POWER	[Power on]	System switched on
	[Power off]	System switched off
	[Warm boot]	Restart of system, unknown cause
	[Watchdog]	Restart of system by watchdog
	[BKPT code]	CPU error: break code detected
	[Stack error]	CPU error: stock integrity failure
	[Divided by zero]	CPU error: dividing by zero
	[RET1 code]	CPU error: illegal using of instruction reti
	[NMI intr]	CPU error: wrong interrupt
	[VOID intr]	CPU error: wrong interrupt
	[Upgrade reset]	Start of upgrade firmware procedure
	[Software reset]	Reset by AT commads (at&fres...)
INIT	Eeprom	Initialization of eeprom (configuration)
	Flash	Initialization of flash memory (firmware)
HW-ERR		(##...address of chip, RD...read value WR...expected value)
	Codec ##,RD/WR	Error in initialization of codec on GSM,AUX board
	COM2 #####,RD/WR	Error in initialization of COM2 on AUX board
	Duart #####,RD/WR	Error in initialization of serial controller on GSM board
	Hscx #####,RD/WR	Error in initialization od HDLC controller on AUX board
	Pri #####,RD/WR	Error in initialization od PRI controller
SYSEERR	User stack error!	SW error: stock integrity failure
BRDIN	#08 TYP STS	the board inserted (number of gsm board, type, status)
BRDOU T	#08 TYP STS	the board disconnected
BRDRES	#08 TYP STS	Reset the board by AT command
	ALL GSM RESET CMD	Reset of all GSM boards by AT command
	SYSTEM RESET CMD	Reset of system by command at&bsys
L1-ERR		(reserved)
L2-ERR		Error of 2. ISDN layer by Q.921
	A: unsol.RX(F)	Received packed RR,RNR,REJ with unexpected bit F=1
	B: unsol.DM(F)	Received packed DM with unexpected bit F=1
	C: unsol.UA(F)	Received packed UA with unexpected bit F=1
	D: unsol.UA(-)	Received packed UA with unexpected bit F=0
	E: unsol.DM(-)	Received packed DM with unexpected bit F=0
	F: peer re-est	Received packed SABME in status OKEST
	G: repeated SABME	Repeated unsuccessful send of packet SABME
	H: repeated DM	Repeated unsuccessful send of packet DM
	I: failed (TIMREC)	Unsuccessful breaking-up of status TIMREC
	J: N(R) error	Received wrong value N(R) – numbering of packets
	K: recv.FRMR	Received packed FRMR (information about error)
	L: undef.frame	Received unknown type packed
	M: (l field)	Received wrong l-packet (numbered packet)
	N: frame size	Received packed with wrong length
	O: N201 error	Value N201 was exceeded (max. length of packet)
L3-ERR	tout sts # (p##)	Error of 3. layer isdn: timeout in status # on channel p##
G2-ERR	ATD/ERROR init (g##)	Error of 2. layer isdn: restart of module g## after rejected command ATD by GSM network
	GSM Cause 150 (g##)	Error of 2. layer isdn: restart of modulu g## after cause 150 was received (call barred by GSM network)
G3-ERR	tout sts # (g##)	Error of 3. layer isdn: timeout in status # on module g##
C4-ERR	tout sts # (p##/g##)	Error of 4. connecting layer: timeout in status # on call between channel p## and GSM modulem g##

13. Appendix C - Description of cdr line

Example of successfully connected call:

```
** 31.07.02/11:07:53 O-OK CAU-016 aux/g02 GRP-1 0:23 001:40 00000.00
0608218005 45456060 1/8942019636000065750
```

- **1. column:** **
- **2. column:** date/time of start the call
- **3. column:** type of call
 - I-FD : Unconnected attempt of incoming call (It will be implemented at higher version of the firmware)
 - I-OK : Successfully connected incoming call (It will be implemented at higher version of the firmware)
 - O-FD : Unconnected attempt of outgoing call
 - O-OK : Successfully connected outgoing call
- **4. column:** CAUSE sent to ISDN
- **5. column:** number of used B-channel/number of used GSM module
- **6. column:** used GSM group
- **7. column:** time of establishing call
- **8. column:** duration of call mmm:ss (max. 255:59) or error cause for unconnected calls
- **8. column:** cost of call (will be implemented in higher version of firmware)
- **9. column:** called number
- **10. column:** caller number
- **11. column:** number of slot/IMSI* of used SIM card

*with GSM modules GM22(47) is here IMSI, with TC35 GSM module STARGATE writing serial number of SIM card.

14. Appendix D - Description of statistics

[Statistic of calls on PRI and in groups]

pri/grp (reset)	minutes	hhhh:mm:ss	calls	reject	failed	c.off	errors
#pr out (1.03)	1303	21:43:07	521	1	24	147	2
#pr inc (1.03)	41	0:41:28	24	0	6	1	0

[Statistic of calls on PRI and in groups]

gsm (reset)	minutes	hhhh:mm:ss	calls	reject	failed	red.in	redout
#i1 inc (31.12)	0	0:00:00	0	0	0	0	0
#i2 inc (31.12)	0	0:00:00	0	0	0	0	0
#i3 inc (31.12)	0	0:00:00	0	0	0	0	0
#i4 inc (31.12)	0	0:00:00	0	0	0	0	0
gsm (reset)	minutes	hhhh:mm:ss	calls	reject	failed	red.in	redout
#g1 out (31.12)	0	0:00:00	0	0	0	0	0
#g2 out (31.12)	0	0:00:00	0	0	0	0	0
#g3 out (31.12)	0	0:00:00	0	0	0	0	0
#g4 out (31.12)	0	0:00:00	0	0	0	0	0
#g5 out (31.12)	0	0:00:00	0	0	0	0	0
#g6 out (31.12)	0	0:00:00	0	0	0	0	0

```
#g7 out (31.12)    0  0:00:00    0  0  0  0  0
#g8 out (31.12)    0  0:00:00    0  0  0  0  0
```

[Statistic of incoming calls on all modules]

modules	brd	minutes	hhhh:mm:ss	calls	smSES	minutes	hhhh:mm:ss	calls	smSES
#00 #01	00	0	0:00:00	0	0	0	0:00:00	0	0
#02 #03	01	0	0:00:44	1	0	16	0:16:37	10	0
#04 #05	02	14	0:14:15	7	0	5	0:05:31	3	0
#06 #07	03	4	0:04:21	3	0	0	0:00:00	0	0
#08 #09	04	0	0:00:00	0	0	0	0:00:00	0	0
#10 #11	05	0	0:00:00	0	0	0	0:00:00	0	0
#12 #13	06	0	0:00:00	0	0	0	0:00:00	0	0

*each line is for two GSM modules

[Statistic of calls on GSM module #0]

sim/dir	net/grp	minutes	hhhh:mm:ss	calls	reject	failed	c.offS	smSES
#1	inc /1	14	0:14:15	7	0	2	9	0
#2	inc /1	0	0:00:00	0	0	0	0	0
#3	inc /1	0	0:00:00	0	0	0	0	0
#4	inc /1	0	0:00:00	0	0	0	0	0
#1	out /1	439	7:19:51	177	0	6	44	0
#2	out /1	0	0:00:00	0	0	0	0	0
#3	out /1	0	0:00:00	0	0	0	0	0
#4	out /1	0	0:00:00	0	0	0	0	0

- Pri/grp : type of calls
- Reset : Date of last reset the statistics
- Minutes : Number of minutes
- Hhhh:mm:ss : Same number converted to time
- Calls : Number of calls
- SMSes : Number of sent SMS messages
- Reject: number of unconnected calls (no available any free GSM module-call rejected with cause 41(42))
- Failed: number of unconnected calls (rejected by GSM network)
- C.offS: number of unconnected calls (terminated by calling party)
- Errors: number of unconnected calls (wrong requests - dialled prefix etc.)
- Red.in: number of connected calls (rerouted to this GSM group)
- Redout: number of connected calls (rerouted to another GSM group)

15. Appendix D - Technical Conditions for STARGATE Installation

15.1. Subrack

Dimensions (W x H x D)	482 x 133 x 360 mm (84HP x 3U x 360 mm)
Weight (full configuration)	9,800 g
Power supply	100-240V AC / 50-60Hz
Power input	max. 230VA

15.2. GSM

Mobile network type	GSM phase II
Transmission output per channel	900MHz / 2W, 1800MHz / 1W or 850MHz / 2W, 1900MHz / 1W
SIM cards	plug-in small 3V or 5V
VF connector	GSM boards with GM22 modules -FME 50ohm GSM boards with TC35,GM47(8) modules – SMA 50ohm
Length of antenna cable (RG58)	Max. 20m

15.3. PRI Interface

Interface	ISDN PRI
Signaling	Q.931-EDSS1, QSIG
Type (NT or TE)	NT/TE
TEI number	0 – 63
Clock (master or slave)	Master/Slave
Connector RJ 45, Rxpin, Txpin	Switchable RJ45 (Rx-3,6 Tx-4,5 / Rx-4,5 Tx-3,6)
D channel timeslot	16

15.4. Temperature

Working temperature range	0°C to + 50°C
Relative humidity	max. 95% at 40°C
Air – condition	optional

15.5. Remote Control Line types

Type of line	Serial line (COM1,2), Analog modem (COM2), ISDN modem (COM2), Ethernet 10baseT
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Use the product as designed and manufactured and in accordance with these instructions for use.

The manufacturer reserves the right to modify the product in order to improve its qualities.

The *ATEUS*[®] - GSM GATEWAY COMPACT contains no environmentally harmful components. When the product's service life is exhausted and you find no other application for it, dispose of it in accordance with applicable legal regulations.