User Manual

ZDUE SyM² Communication Modules

ZDUE-PSTN-SyM², ZDUE-GPRS-SyM², ZDUE-LAN-SyM²

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Subject to technical modification

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Product No.: 815747, 815815, 815914

Firmware: from Version 1.053

Doc. No.: 8156AD002 Version 1.1

Classification of the Safety Precautions

This manual contains safety precautions that must be observed to protect your own personal safety and to prevent any damage to this or other equipment. The notes on your personal safety are marked with a warning triangle; notes referring to equipment or property damage only are not marked with a warning triangle. Depending on the seriousness of the hazard, the precautions are illustrated in the following order.

Danger

means that death or serious injury **will** result if the corresponding precautions are not taken.

Warning

means that death or serious bodily injury **could** result if the corresponding precautions are not taken.

Be Careful

with a warning triangle means that minor bodily injury could result if the corresponding precautions are not taken.

Be Careful

without a warning triangle means that equipment damage could result if the corresponding precautions are not taken.

Attention

means that an undesired result or situation could result if the information in the note is not observed.

Information

with an i-symbol gives general details and other useful information to simplify the work.

If more than one safety hazard is involved, the warning note with the highest hazard level will be indicated. If a warning referring to personal safety is indicated with the warning triangle, the same warning could also contain additional information on equipment damage.

General Information

The ZDUE SyM² Communication Modules complies with the European standard EN 62368, Safety of Information Technology Equipment.

Read the installation instructions carefully before using the device.

Keep the device out of reach of children, especially small children.

The ZDUE SyM² Communication Modules are not designed to be connected to IT systems for the electrical power supply.

The device may not be installed or operated outdoors or in damp areas.

Do not put the device into operation if connecting cables or the device itself are damaged.

Qualified Personnel

The respective device/system is only to be set up and operated in combination with this documentation. A device/system is only to be put into operation and operated by **qualified personnel**. Qualified personnel in the sense of the safety precautions in this documentation are persons who are authorized to put into operation, ground and mark devices, systems and electric circuits and systems according to the standards of safety engineering.

Intended Use

Please note the following:

Warning

The device is to be used only for the intended uses indicated in the spec sheets and in this document. The correct, safe operation of the product assumes proper transport, proper storage, set-up and assembly as well as careful operation and servicing.

Protection Against Contact

Warning

While in operation, the ZDUE-SyM² communication modules must be covered by a panel or an enclosure that offers sufficient protection against contact with dangerous voltages (e.g. a base module or an electrical cabinet).

External power supply

Use only an external power supply that also conforms to EN 62368. The output voltage of the external power supply must not exceed 48V DC. The output of the external power supply must be short-circuit proof.

Warning

The ZDUE SyM² Communication Modules may only be supplied via power supplies according to IEC/EN 62368-1

The ZDUE SyM² Communication Modules are designed for overvoltage category 2.

Note the section 1.4.

Cable Routing

Warning

The space between antenna/data lines and lines carrying dangerous voltages must be at least 10 mm.

Wireless Equipment (ZDUE-GPRS-SyM² only)

Warning

Never use the device in areas in which the use of wireless equipment is prohibited. The device contains a radio transmitter, which could interfere with the operation of such medical electronic equipment as **hearing** aids or pacemakers. A doctor or the manufacturer of such devices can provide more detailed information.

To avoid demagnetizing data media, do not store any diskettes, credit cards or other magnetic data media close to the device.

Antenna Installation

Warning

The recommended radiation limits of the German Commission on Radiological Protection (www.ssk.de) from 13/14 September 2001 must be observed.

Attention

When laying the antenna cable, be sure to adhere to the bend radiuses. If you do not adhere to the bend radiuses of the antenna cable, this will result in a deterioration in the quality of the transmission and reception attributes of the device. The minimum

bend radius must not be less than 5 times the cable diameter statically and 15 times the cable diameter dynamically.

Installation of an Outside Antenna

Be Careful

When installing an antenna outdoors, it is absolutely necessary that the antenna is installed properly by qualified technicians.

The outdoor antenna must be grounded to protect it against lightning strikes. The outdoor antenna shield must be reliably connected with the protective ground. The use of external protection circuits may be required.

The corresponding national installation guidelines must be followed for the installation process. In Germany, this is the VDE 0185 (DIN EN 62305) Parts 1 to 4 series of standards for buildings equipped with lightning protection systems and the VDE 0855 (DIN EN 60728-11) series of standards if there is no lightning protection system installed.

Connection Costs for GPRS

Be Careful

Please note that when a connection is only being (re-)set up, data packets incurring costs are exchanged during connection attempts to the other party (e.g. server switched off, wrong destination address, etc.) as well as to maintain the connection.

Radio Interference

Be Careful

ZDUE-GPRS-SyM² is a Class A device. Class A devices can cause radio interference in residential areas; in this case, the operator may be required to take the necessary measures.

About this document

Range of validity

The present user manual applies to the SyM² communication modules ZDUE-PSTN-SyM², ZDUE-GPRS-SyM², ZDUE-LAN-SyM².

Intended use

The modules must only be used for the use cases described in the data sheets and in this document. An appropriate transport, storage, installation and careful operation and maintenance are preconditions for the faultless and safe operation of the modules.

Purpose

This user manual contains all the information required for an application of the communication modules for the intended purpose. This includes:

- Provision of knowledge concerning characteristics, construction and function of the communication modules
- Information regarding possible dangers, their consequences and measures to prevent any danger
- Details concerning the performance of all work throughout the service life of the meters (parameterisation, installation, commissioning, operation, maintenance, shutting down and disposal)

Target group

The content of this user manual is intended for technically qualified personnel of energy supply companies, responsible for system planning, installation and commissioning, operation, maintenance, decommissioning and disposal of SyM² components.

Reference documents

SyM² Synchronous Modular Meter specifications (can be downloaded from www.sym2.org)

Firmware with Open Source GPL/LGPL
The ZDUE-SyM² device firmware contains open-source software under GPL/LGPL conditions. According to Section 3b in the GPL and Section 6b in the LGPL, we offer you the opportunity of downloading the source code. You will find the source code on the internet at www.neuhaus.de. The licensing conditions for the open-source software can also be found with the source code in the download file.

Firmware with OpenBSD
The ZDUE-SyM² device firmware includes parts of OpenBSD software. The use of OpenBSD software requires the printing of the following copyright notice:

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* LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
* OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
* SUCH DAMAGE.
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Table of contents

1 Description of unit

This chapter provides an overview of the design and functionality of the following ZDUE-SyM² communication modules:

- ZDUE-PSTN-SyM²
- ZDUE-GPRS-SyM²
- ZDUE-LAN-SyM²

1.1 SyM² concept

The SyM² concept is a manufacturer-independent technical specification which defines the state of the art in the area of load profile metering. Individual functional groups are realised as modules according to this concept and are interconnected for data transmission and power supply via a local interface. These modules can be installed in the base module or externally and are interconnected with standard Ethernet cables.

The concept contains the following modules:

- Base module (synchronous load profile meters for electricity)
- Communication modules
- Pulse emitting modules
- Network node module (with external power supply)

1.2 Functional overview of the communication modules

SyM² modules can be connected to a remote control centre with the communication modules. Communication modules generate and transmit all commands necessary for the communication of the central station with the base module.

A communication module features the following interfaces:

- Interface to the control centre (PSTN, GPRS or LAN)
- Interface to the local bus (Ethernet)
- Service interface (RS232) for its own parameterisation and for the parameterisation and operation of other SyM² modules.

1.2.1 Interface to control centre

ZDUE-SyM² communication modules are available with various transmission technologies for the connection of the SyM² measuring unit with the remote control centre.

PSTN

The ZDUE-PSTN-SyM² module is connected to the public telephone network and uses for its communication with the remote control centre an integrated analog modem with transmission rates of up to 28,800 bps.

When the module is ready (start-up completed), it waits for a call from the control centre.

GPRS

The ZDUE-GPRS-SyM² module uses GSM technology for wireless communication (9600 bps) with the remote control centre. It uses one of the following services:

- the CSD service (Circuit Switched Data) of the GSM network for a wireless dialled connection. When the module is ready (start-up completed), it waits for a call from the control centre.
- the GPRS service (General Packet Radio Service) of the GSM network to establish an IP communication via internet or a private intranet and to build a permanent connection over these networks to the remote control centre. For this, it uses the IP Telemetry Protocol according to E DIN 43863-4. The control centre must be equipped with a TAINY SwitchingCenter (TSC) or a different IPT master.

LAN

The ZDUE-LAN-SyM² module features a LAN interface for the communication with the remote control centre which either permits a direct connection to an Ethernet-LAN or to a DSL modem. The module establishes a permanent connection to the remote control centre. For this, it uses the IP Telemetry Protocol according to E DIN 43863-4. The control centre must be equipped with an TAINY SwitchingCenter (TSC) or a different IPT master.

1.3 Functionality

The communication modules ZDUE-PSTN-SyM², ZDUE-GPRS-SyM² and ZDUE-LAN-SyM² have the following characteristics:

- Plug&Play installation to local bus
- Power supply via Ethernet cable (Power-over-Ethernet)
- connect the SyM² measuring unit to a remote control centre via a wide area data connection
- provide a service interface locally for their own parameterisation and the parameterisation and operation of other SyM² modules
- Synchronisation of SyM² load profile meters
- can automatically access connected load profile meters and transmit their data to a control centre. Moreover, they read the device identification of the connected SyM² modules and transmit it to the control centre. For this, they employ the Push functions of the IP Telemetry protocol.
- Installation on the integrated mounting rail of the SyM² base module as well as externally on an individual mounting rails according to DIN EN 50022 outside the SyM² base module in a switchbox.

1.4 Local interface

Communication modules ZDUE-PSTN-SyM², ZDUE-GPRS-SyM² and ZDUE-LAN-SyM² have a local interface for the connection of SyM² modules.

100Base-T The interface is an Ethernet 100Base-T according to IEEE 802.3af. This is a standard for packet data transmission in LAN networks.

Transmission rate The maximum transmission rate is 100 Mbps.

Ethernet cable Standard Ethernet cables (CAT-5) can be used with the communication module.

Auto-MDI/X The LAN module supports Auto-Crossover on the LAN interface as well as on the local interface.

1.4.1 Functions of the local interface

Power over Ethernet (PoE) The ZDUE-SyM² communication module is powered by the base module or by the network node module via the local interface.

One SyM² base module can supply one ZDUE-SyM² communication module with power. The number of supported ZDUE-SyM² communication modules by a SyM²-NK/HS (e.g. by Landis + Gyr) module depends on the total configuration at the SyM²-NK/HS module.

ZDUE-GPRS-SyM² module:	Input voltage: 36 – 48 V DC*) Max. input current: 93 mA
ZDUE-PSTN-SyM² module:	Input voltage: 36 – 48 V DC*) Max. input current: 50 mA
ZDUE-LAN-SyM² module:	Input voltage: 36 – 48 V DC*) Max. input current: 60 mA

*) See also chapter 1.4.2 „Functions independent of supply voltage“.

Be Careful

PoE may damage interfaces of non-SyM² components. To avoid damages to interfaces of non-SyM² components (e.g. laptops), Ethernet cables must not have any PoE connectors. You can find the pin assignment in chapter 1.4.3 “RJ45 connection”. Remove or interrupt the PoE connections.

Please see also the installation and user instructions of the connected SyM² modules.

1.4.2 Functions independent of supply voltage

ZDUE-SyM² communication modules are powered by the base module or by the network node module via the local interface.

The supply voltage drops in case of overload on the local bus and the ZDUE-SyM² communication module switches to a power save mode in which the communication to the control centre is switched off, if the voltage falls below a certain threshold. Nevertheless, it is still possible to use the service interface in this mode.

Input voltage	Functions
> 41 V (typical)	All functions active
≤ 41 V (typical)	Connection to control centre deactivated
< 36 V (typical)	ZDUE-SyM² communication module switched off

1.4.3 RJ45 connection

The RJ45 socket of the local interface is located underneath the housing.

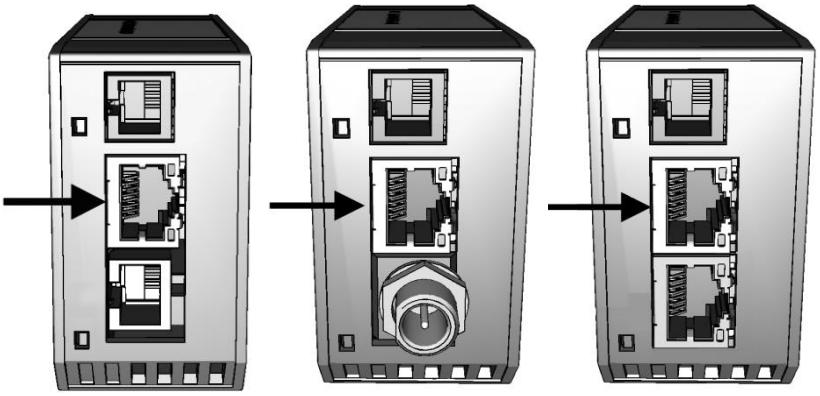
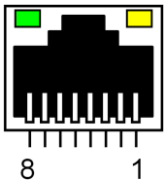


Figure 1 Local interface on PSTN, GPRS and LAN module

RJ45-LEDs The connector features two LEDs which indicate the following:

LED	State	Meaning
Green	Off Flashes On	No connection Connection is set up Connection active
Yellow	Off Flashes	No data transmission Data is being transmitted

Pin assignment



1 Tx+
2 Tx-
3 Rx+
4 PoE (VCC)
5 PoE (VCC)
6 Rx-
7 PoE (GND)
8 PoE (GND)

Figure 2 Pin assignment of the RJ45 socket

1.5 Service interface

1.5.1 Functions of the service interface

The service interface is used for the connection of a PC with parameterisation software or a mobile data acquisition device (MDE).

Data can be exchanged via the service interface between ZDUE-SyM² communication modules and other components of the SyM² metering installation.

The data exchange is performed with an SML protocol/SML-T protocol and OBIS/OBIS-T identifiers are used. Other protocols such as the internet protocol (TCP/IP) are not used on the service interface.

The service interface is a serial RS-232 interface. The SML data are simply transmitted over the serial interface. The transmission rate is set to 115,200 bps, the data format to 8N1.

1.5.2 RJ10 connection

The RJ10 socket of all three communication modules is located underneath the housing.

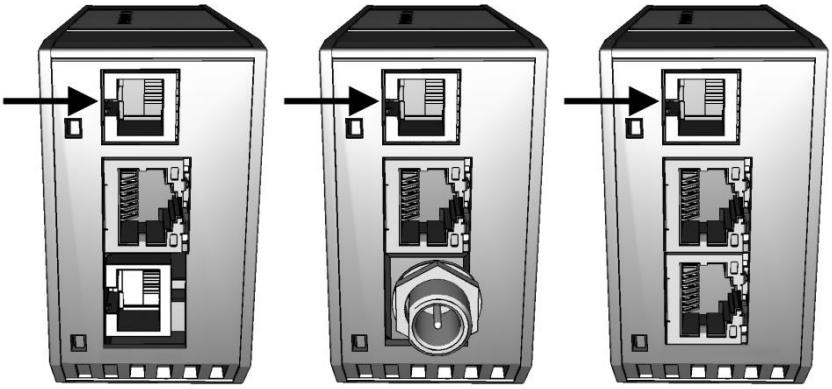
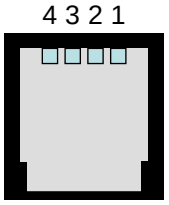


Figure 3 Service interface on PSTN, GPRS and LAN module

Pin assignment



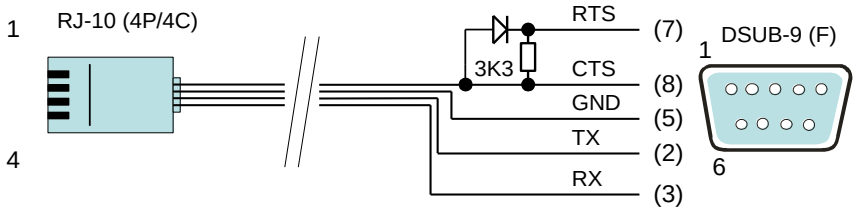
RJ-10 (4P/4C)

1 RTS/CTS
2 GND
3 TX
4 RX

Figure 4 Pin assignment of the RJ10 socket

Connecting cable

The following connecting cable is needed for the service interface:



RJ10	DSUB-9-pins (f)
1 – RTS/CTS	2 – RX (Input PC / MDE)
2 – GND	3 – TX (Output PC / MDE)
3 – TX	5 - GND
4 – RX	7 – RTS (Output PC / MDE)
	8 – CTS (Input PC / MDE)
	All other pins are not connected.

1.6 Telephone connection (only with ZDUE-PSTN-SyM² modules)

The socket for the public telephone line is located underneath the PSTN modules.

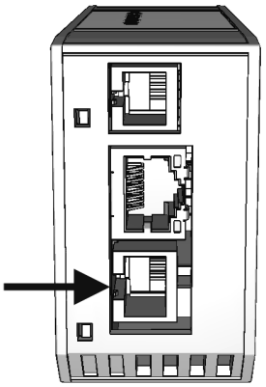
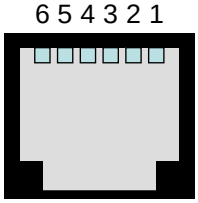


Figure 5 Telephone connector (RJ12) on the ZDUE-PSTN-SyM² module

Pin assignment



RJ-12 (6P/6C)

1 Not connected

2 a2-wire (to downstream telephone)

3 a-wire (to analog telephone network)

4 b-wire (to analog telephone network)

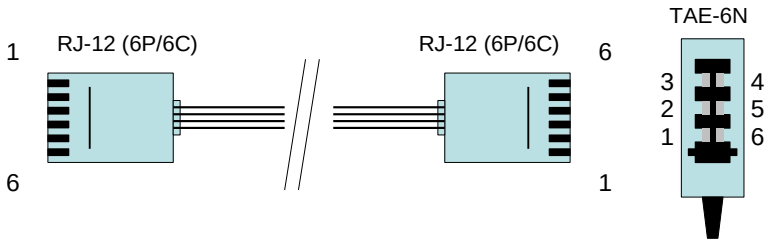
5 b2-wire (to downstream telephone)

6 Not connected

Figure 6 Pin assignment of the RJ12 socket

Connecting cable

Telephone connection cable with RJ12 connector or TAE-6N connector for telephone wall jack:



RJ12	TAE-6N connector
Not connected	a-wire
a2-wire	b-wire
a-wire	Not connected
b-wire	Not connected
b2-wire	b2-wire
Not connected	a2-wire

1.7 LAN connection (only with ZDUE-LAN-SyM² modules)

The LAN-socket of ZDUE-LAN-SyM² modules is located underneath the modules.

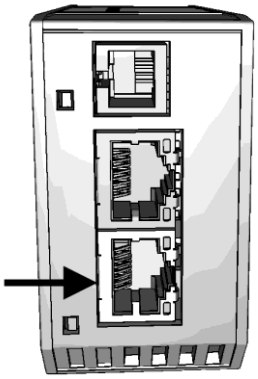


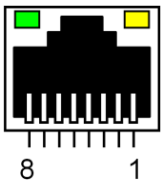
Figure 7 LAN connection (RJ45)

RJ45-LEDs

The LAN connector features two LEDs which indicate the following:

LED	State	Meaning
Green	Off	No Ethernet connection to the control centre
	Flashes	Setup of Ethernet connection to the control centre
	On	Ethernet connection to the control centre active
Yellow	Off	No data transfer on Ethernet interface to the control centre.
	Flashes	Data transfer on Ethernet interface to the control centre. (transmission / reception / data collisions)

Pin assignment



1 Rx+
2 Rx-
3 Tx+
4 Not connected
5 Not connected
6 Tx-
7 Not connected
8 Not connected

Figure 8 View into RJ45 socket

The LAN module supports Auto-Crossover on the LAN interface.

1.8 Connection examples

In each of the examples below, the communication module communicates with the control centre.

Connection of BM and KM

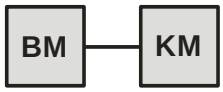


Figure 9 Base module (BM) and communication module (KM) are connected directly.

Connection of BM with IW and KM

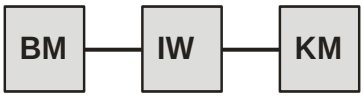


Figure 10 Connection variant between base module (BM), pulse emitting module (IW) and communication module (KM).

Connection of BM, NK, KM

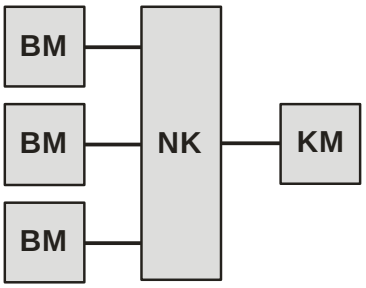


Figure 11 NK connects three base modules (BM) with one communication module (KM) via SyM²-NK (network node).

2 Mechanical construction

This chapter describes the mechanical construction of the communication modules ZDUE-PSTN-SyM², ZDUE-GPRS-SyM² and ZDUE-LAN-SyM².

2.1 Overview

The internal construction of the communication modules is not described here as there are no user-serviceable parts inside. Necessary service tasks must only be performed by authorised service centres. It is not necessary to open the communication modules apart from the insertion/exchange of a SIM card on a ZDUE-GPRS-SyM² module.

Housing The module housing consists of flame resistant plastic.

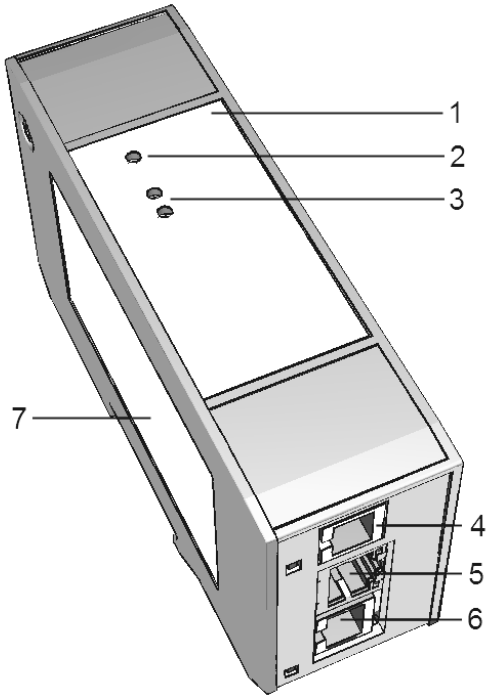


Figure 12 Communication module ZDUE-PSTN-SyM²

1 Type plate
2 Power-LED
3 Status-LEDs (Link, Rx/Tx)
4 Service interface
5 Local network connection
6 Communication with control centre: Telephone line
7 Power rating plate

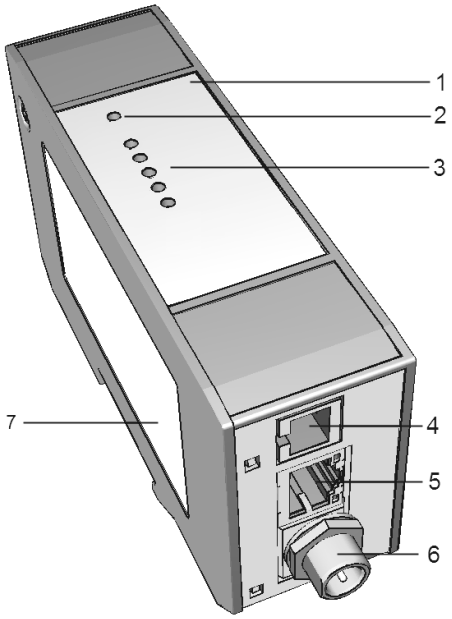


Figure 13 *Communication module ZDUE-GPRS-SyM²*

1 Type plate
2 Power-LED
3 Status-LEDs (GSM, Level, GPRS, Line, Rx/Tx)
4 Service interface
5 Local network connection
6 Communication with control centre: GSM/GPRS antenna
7 Power rating plate

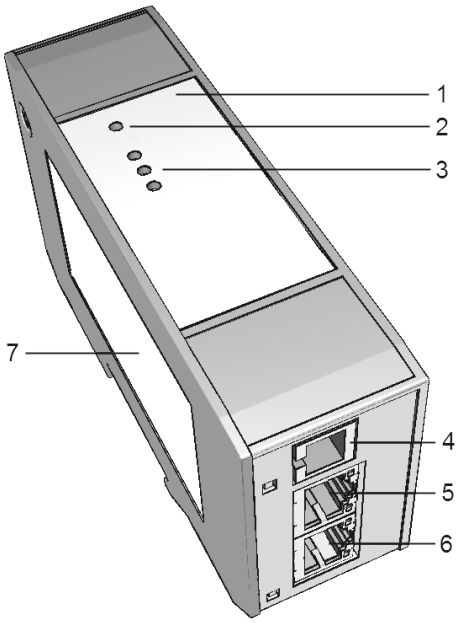


Figure 14 *Communication module ZDUE-LAN-SyM²*

1 Type plate
2 Power-LED
3 Status-LEDs (IP, Link, Rx/Tx)
4 Service interface
5 Local network connection
6 Communication with control centre: LAN
7 Power rating plate

3 Installation/Removal

This chapter describes the installation and connection of communication modules. In addition, the necessary steps for checking the connections, commissioning of the device and the final functional check are described as well as the de-installation.

Danger

Dangerous voltage! The electrical installations, to which the communication modules are connected, are dangerous as long as voltage is present. Contact with live components is dangerous to life. All safety instructions must be followed strictly.

3.1 SIM card insertion (only ZDUE-GPRS-SyM²-module)

ZDUE-GPRS-SyM² modules have to be equipped with a SIM card. The following instructions describe the insertion of a SIM card. This should preferably be performed before the modules are mounted.

ESD susceptible components

The module needs to be opened for the insertion of the SIM card. Disconnect the device from the supply voltage before you open it. Electrostatic discharges can damage the opened device. Therefore, always discharge the electrostatic charge of your body by touching an earthed surface (e.g. the metal casing of the switchboard).

1. Open the GPRS module by loosening the screw with a pozidrive screwdriver (size PZ2). Then, press the cover locking mechanism carefully inside with a suitable tool (small screwdriver) (see arrow), until the cover can be removed.

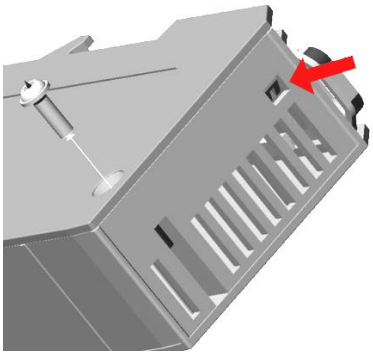


Figure 15 Open module: loosen screw and unlock cover

2. With your fingernail or a suitable object, push the upper part of the SIM card holder about 2 mm in the direction of the arrow to the left (see red arrow) so that the upper part can be folded up.

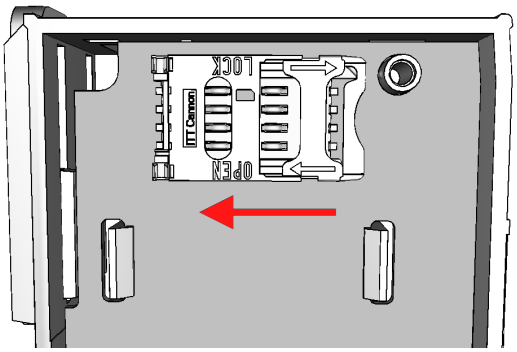


Figure 16 Release SIM card holder

3. Fold up the upper part of the SIM card holder so you can push the SIM card in.
4. Push the SIM card into the upper part of the SIM card holder so that the contact surface is on the bottom and the diagonal corner of the SIM card faces the front of the device, where the operating indicators are located.

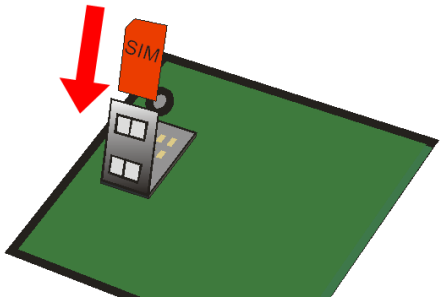


Figure 17 Insert SIM card

5. Push the SIM card in until the upper part of the SIM-CARD holder can be folded down again.
6. Press down the upper part of the SIM card holder. Make sure the diagonal corner of the SIM card is seated properly.
7. With your fingernail or a suitable object, push the upper part of the SIM card holder about 2 mm in the direction of the arrow to the right until the SIM cardholder is locked in place.

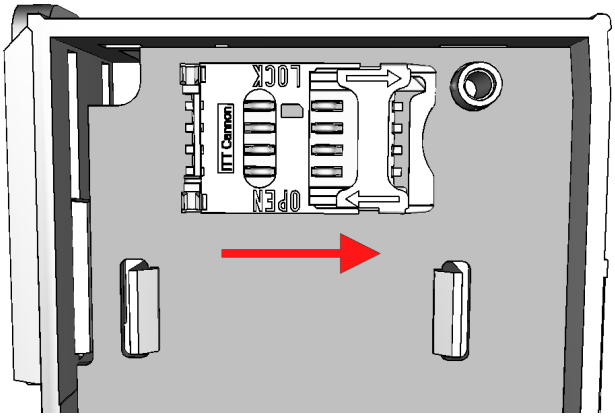


Figure 18 Lock SIM card holder

8. Close the housing again carefully with the housing cover so that the lock snaps in place.

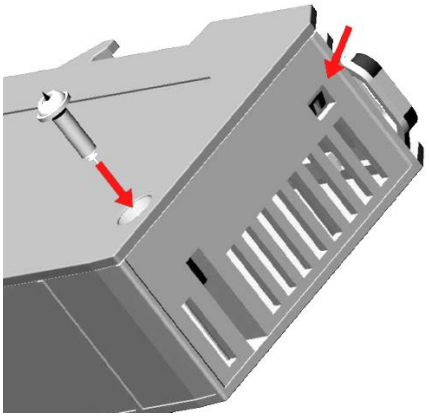


Figure 19 Close housing

9. Screw the housing back together.

3.2 ZDUE-PSTN-SyM², ZDUE-GPRS-SyM² or ZDUE-LAN-SyM² module mounting

1. Find a suitable mounting location for the module: Either a predetermined base module or an electrical cabinet with DIN rail.
2. Insert the communication module at the desired location. The following example shows the insertion into a base module.

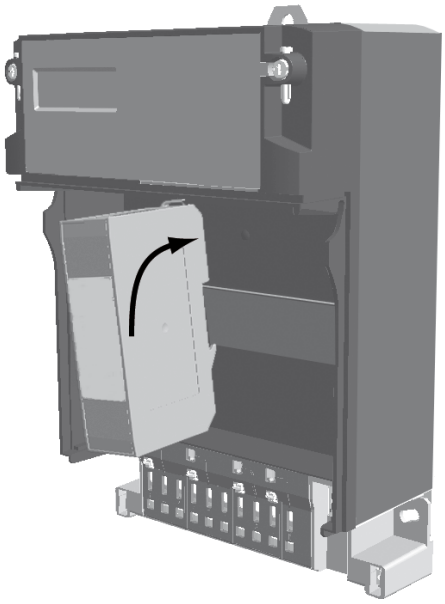


Figure 20 Simple module installation: First place the module down on the mounting rail and then swivel it upward until it latches

3. Now continue with the installation. The preconditions for the installation depend on the module:

   The installation of the PSTN module is described in chapter 3.3.

   The installation of the GPRS module is described in chapter 3.4.

   The installation of the LAN module is described in chapter 3.5.

3.3 PSTN: ZDUE-PSTN-SyM² module connection and commissioning

3.3.1 Preconditions

An analog telephone connection has to be present for the operation of the ZDUE-PSTN-SyM² module.

3.3.2 Connection, configuration and commissioning

Danger

Dangerous voltages! The voltage of the power supply needs to be switched on in order to operate the module. As long as the terminal cover is not mounted or the door of the electrical cabinet is open, it is possible to touch live parts. This is dangerous to life!

1. Connect the line socket of the ZDUE-PSTN-SyM² module to the telephone connection box with a telephone connection cable.

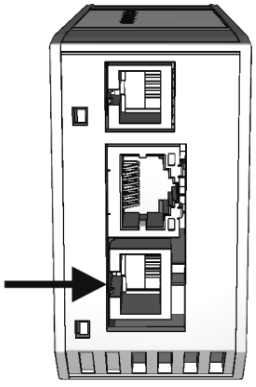


Figure 21 Telephone socket (RJ12)

2. Connect the module via local interface to the SyM² measuring unit by connecting the Ethernet cable to the RJ45 socket. No configurations or settings are necessary for the setup of the communication between the modules.

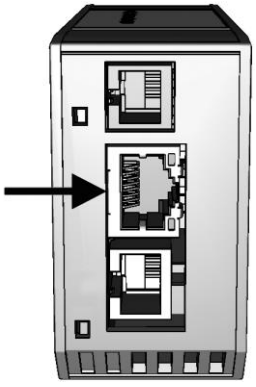


Figure 22 Socket of local interface

3. Ensure the PSTN module is powered (check LEDs of base or network node module) and a PoE compatible Ethernet cable is used (see chapter 1.4.3 „RJ45 “ for the pin assignment). In case the Power-LED is flashing, the configuration is faulty or there is a functional problem. Check the configuration according to the following section and remedy the issue or, should this not be possible, exchange the communication module.
4. Usually, a configuration in the field is not necessary as the delivered configuration already corresponds to the specific application. If the basic configuration needs to be modified or checked for your application: Connect a PC with a SyM² configuration software to the service interface of the GPRS module. Configure the module via service interface according to the instructions of the SyM² configuration software. Remove the connected PC.
5. Check the correct function of the data transmission and the LED status according to chapter 4.1.
6. After a successful functional check: If the communication module was installed **in a base module**, mount the terminal cover, swivel it down and fix it with the screws. Seal the terminal cover with two utility seals. For communication modules **in electrical cabinets**: Close the cabinet door.

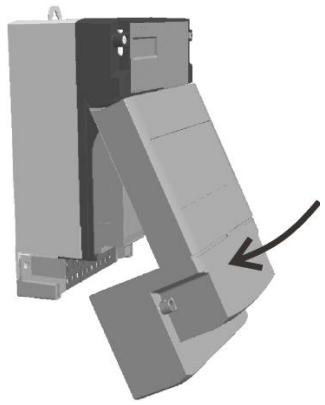


Figure 23 Insert top of terminal cover and swivel it down

3.4 GPRS: ZDUE-GPRS-SyM² module connection and commissioning

3.4.1 Preconditions

The following preconditions have to be met for a correct operation of the ZDUE-GPRS-SyM² module:

SIM card

A SIM card of the chosen GSM network provider must be in the module (see chapter 3.1). The SIM card must have been cleared for GPRS by the GSM network provider. The GPRS access data must be known:

- Access Point Name (APN)
- User name
- Password

CSD 9600 bps clearance

The SIM card must be cleared for the CSD service by your GSM network provider if you want to use the ZDUE-GPRS-SyM² module in GSM mode.

Antenna

An antenna adapted to the frequency bands of your chosen GSM network provider: 900 MHz or 1800 MHz, with an impedance of 50 Ω. The match (VSWR) of the antenna must be 1:2.5 or better. Operation of the ZDUE-GPRS-SyM² module is permitted according to European directive R&TTE with omni-directional antennas that have a gain that does not exceed 0 dBm.

Be Careful

Use only antennas from the accessories programme for the ZDUE-GPRS-SyM² module. Other antennas could interfere with product characteristics or even lead to defects.

3.4.2 Connection, configuration and commissioning

Danger

Dangerous voltages! The voltage of the power supply needs to be switched on in order to operate the module. As long as the terminal cover is not mounted or the door of the electrical cabinet is open, it is possible to touch live parts. This is dangerous to life!

1. Connect the antenna used to the ZDUE-GPRS-SyM² module with the FME socket (underneath the module).

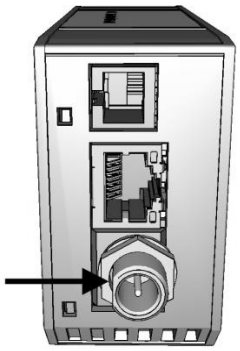


Figure 24 Antenna socket

2. Connect the module to the local interface of the SyM² measuring unit by plugging the Ethernet cable in the RJ45 socket. No configurations or settings are needed to setup the communication between modules.

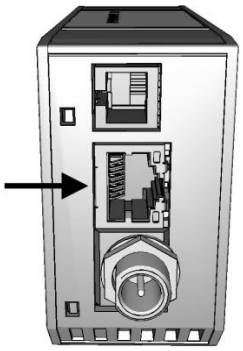


Figure 25 Socket of local interface

3. Ensure the GPRS module is powered via the local bus (check LEDs of the base module or the network node module). If the Power-LED is flashing, there is a problem. Check the configuration according to point 5. Replace the module if the Power-LED is not constantly lit despite a correct supply voltage and correct configuration.
4. Check the GSM level and optimize the antenna position. The Level-LED indicates the GSM level after startup:

   Off: GSM signal not sufficient (< –99 dBm)

   Flashes (0.5 s / 0.5 s): GSM signal weak (–99 ... –90 dBm)

   Flashes (0.2 s / 0.2 s): GSM signal sufficient (–89 ... –80 dBm)

   On: GSM signal good (> –80 dBm)

Antenna environment

Ensure the location where the antenna is mounted and the surrounding area are in a state comparable to normal operation conditions (e.g. doors and windows closed). There should not be any large metal objects (e.g. ferroconcrete) close to the antenna. Avoid locations with moving metal objects (e.g. cars in a garage).

5. Usually, a configuration in the field is not necessary as the delivered configuration already corresponds to the specific application. If the basic configuration needs to be modified or checked for your application: Connect a PC with a SyM² configuration software to the service interface of the GPRS module. Configure the module via service interface according to the instructions of the SyM² configuration software. See also chapter 6.1.

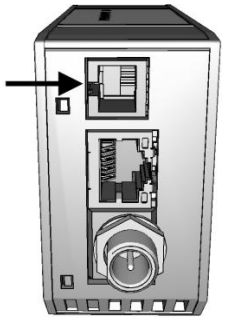


Figure 26 Service interface

6. Check the correct function of the data transmission and the LED status according to chapter 4.2.
7. After a successful functional check: If the communication module was installed **in a base module**, mount the terminal cover, swivel it down and fix it with the screws. Seal the terminal cover with two utility seals. For communication modules **in electrical cabinets**: Close the cabinet door.

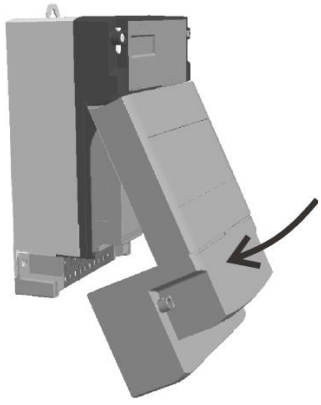


Figure 27 Insert top of terminal cover and swivel it down

3.5 LAN: ZDUE-LAN-SyM² module connection and commissioning

3.5.1 Preconditions

The following preconditions have to be met for a correct operation of the ZDUE-LAN-SyM² module.

Network connection

Connection without DHCP

The module can be connected to a network compatible with 10/100-BaseT-Ethernet. The following network data is needed if no DHCP is used:

- IP address for the device
- Subnet mask
- Address of the IP gateway
- Address of the DNS server
- Connecting cable

DSL modem

If the module is connected to a DSL modem:

- DSL modem with Ethernet interface and PPPoE protocol
- DSL connection with access to internet
- User name for the internet access
- Password for the internet access
- Connecting cable

3.5.2 Connection, configuration and commissioning

Danger

Dangerous voltages! The voltage of the power supply needs to be switched on in order to operate the module. As long as the terminal cover is not mounted or the door of the electrical cabinet is open, it is possible to touch live parts. This is dangerous to life!

1. Connect the Ethernet cable (connection to control centre).

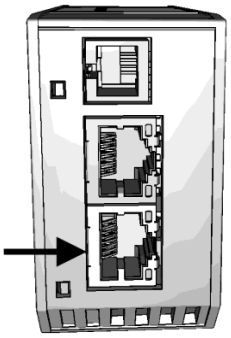


Figure 28 LAN socket

2. Connect the module via local interface to the SyM² measuring unit by connecting the Ethernet cable to the RJ45 socket. No configurations or settings are necessary for the setup of the communication between the modules.

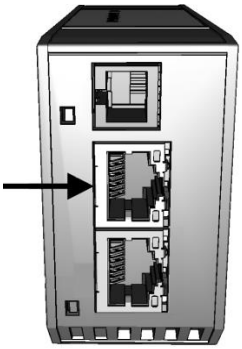


Figure 29 Socket of local interface

3. Ensure the GPRS module is powered (check LEDs of base or network node module) and a PoE compatible Ethernet cable is used. In case the Power-LED is flashing, the configuration is faulty or there is a functional problem. Check the configuration according to the following section and remedy the issue or, should this not be possible, exchange the communication module.
4. Usually, a configuration in the field is not necessary as the delivered configuration already corresponds to the specific application. If the basic configuration needs to be modified or checked for your application: Connect a PC with a SyM² configuration software to the service interface of the GPRS module. Configure the module via service interface according to the instructions of the SyM² configuration software. See chapter 6.1 „Parameterisation: General information“. Remove the connected PC.

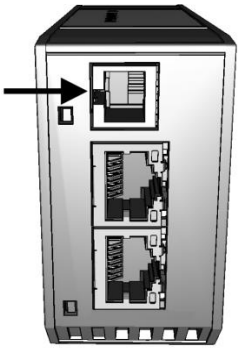


Figure 30 Service interface

5. Check the correct function of the data transmission and the LED status according to chapter 4.3.
6. After a successful functional check: If the communication module was installed **in a base module**, mount the terminal cover, swivel it down and fix it with the screws. Seal the terminal cover with two utility seals. For communication modules **in electrical cabinets**: Close the cabinet door.

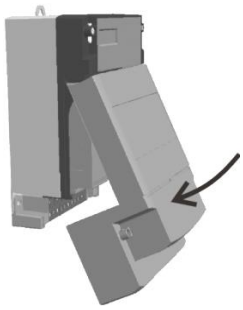


Figure 31 Insert top of terminal cover and swivel it down

3.6 Removing modules

Danger

Dangerous voltages! The connecting conductors close to the communication modules must be free from voltage when the modules are removed. It is dangerous to life to touch live parts.

Switch off the supply voltage and ensure that the voltage cannot be switched on by anyone unnoticed before completing the work.

The communication module is removed as follows:

1. **Modules in base module:** Remove the two utility seals from the terminal cover screws. Loosen the two screws and remove the terminal cover.

   Modules in electric cabinet: Open the cabinet door.

2. Remove all cables (interfaces etc.).

Be Careful

Do not remove plugs from sockets by pulling at the cable, as this could damage the cable or connectors.

3. Unlock each module with a screwdriver according to the figure below and remove the module. This procedure also applies to modules in electrical cabinets.

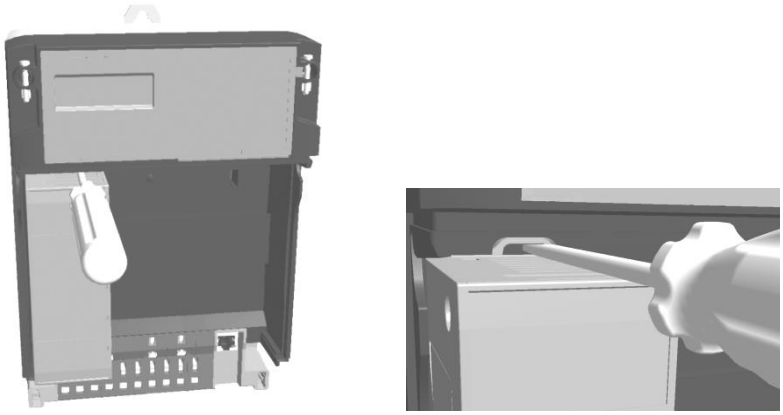


Figure 32 Unlock module with slight turning of screwdriver

4 Indicators

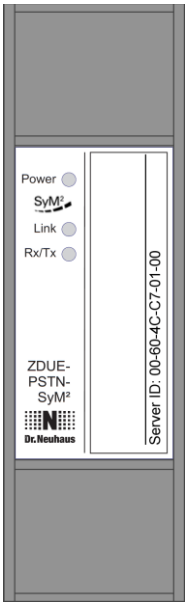
This chapter describes the function of the indicators of ZDUE-SyM² communication modules. ZDUE-SyM² communication modules do not have any keys.

4.1 PSTN: ZDUE-PSTN-SyM²

A PSTN communication module features three LEDs to indicate its operational state.

LEDs after power-on or restart

When the module is switched on or restarted, all LEDs show a running light which briefly stops at a particular LED and then continues. The start-up takes approximately one minute.



Power

Off: Module switched off

Flashes (0,5 s / 0,5 s): Error

On: Ready

Link

Off: No PSTN data transmission

Flashes (0.2 s / 0.2 s): Incoming PSTN call

On: PSTN data connection active

Rx/Tx

Off: No data transmission on the service interface or from/to control centre

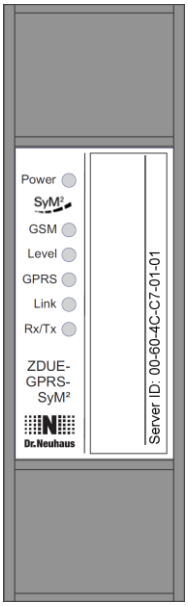
On ("flickering"): Data transmission from/to control centre as well as data transmission on the service interface

4.2 GPRS: ZDUE-GPRS-SyM²

A GPRS communication module features six LEDs to indicate its operational state.

LEDs after power-on or restart

When the module is switched on or restarted, all LEDs show a running light which briefly stops at a particular LED and then continues. The start-up takes approximately one minute.



Power

Off: Module switched off

Flashes (0.5 s / 0.5 s): Error, e.g. SIM or PIN error

On: Ready

GSM

Off: Not logged into GSM network

Flashes (0.2 s / 0.2 s): Logon is being performed

On: Logged into GSM network

Level

Off: GSM signal not sufficient (< –100 dBm)

Flashes (0.5 s / 0.5 s): GSM signal weak (–99 ... –90 dBm)

Flashes (0.2 s / 0.2 s): GSM signal sufficient (–89 ... –80 dBm)

On: GSM signal good (> –80 dBm)

GPRS

Off: Not connected to GPRS Access Point (APN)

Flashes (0.2 s / 0.2 s): Connection is being established

On: Connected to GPRS Access Point (APN)

Link

The function of the Link-LED depends on the mode (GSM or GPRS).

Off:	*In GSM mode:* No GSM data connection *In GPRS mode:* Not logged into IPT master
Flashes (0.2 s / 0.2 s):	*In GSM mode:* Incoming GSM call *In GPRS mode:* Login to IPT master is performed
On:	*In GSM mode:* GSM data connection active *In GPRS mode:* Logged into IPT master

Rx/Tx

Off: No data transmission on the service interface or from/to control centre

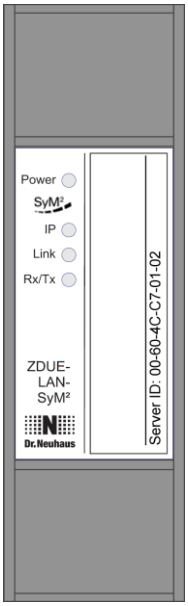
On ("flickering"): Data transmission from/to control centre as well as data transmission on the service interface

4.3 LAN: ZDUE-LAN-SyM²

A LAN communication module features four LEDs to indicate its operational state.

LEDs after power-on or restart

When the module is switched on or restarted, all LEDs show a running light which briefly stops at a particular LED and then continues. The start-up takes approximately one minute.



Power

Off: Module switched off

Flashes (0.5 s / 0.5 s): Error

On: Ready

IP

Off: Not linked to LAN/DSL

Flashes (0.2 s / 0.2 s): Connection is being established

On: Linked to LAN/DSL

Link

Off: Not logged into IPT master

Flashes (0.2 s / 0.2 s): Login to IPT master is performed

On: Logged into IPT master

Rx/Tx

Off: No data transmission on the service interface or from/to control centre

On ("flickering"): Data transmission from/to control centre as well as data transmission on the service interface

5 Maintenance and service

5.1 Maintenance

The communication modules are maintenance-free. There is no need to open communication modules after delivery except if the SIM card on the ZDUE-GPRS-SyM² module needs to be inserted/exchanged.

Danger

Danger of short-circuits! Never clean soiled communication modules under running water or with high pressure devices (ventilation slots). Penetrating water can cause short-circuits. If the device is heavily soiled, it should be dismantled, if necessary, and sent to an authorised service centre for cleaning.

5.2 Troubleshooting

This chapter describes the procedure after the appearance of operating faults.

Check the following points first if the LEDs are not lit or if the data exchange does not work:

1. Is the communication module connected correctly to the local bus and is voltage present (check Power-LEDs of BM or NK)?
2. Is the parameterisation of the module correct (check it with the SyM² tool)?
3. With GPRS modules: Has a SIM card been inserted and an antenna connected according to the instructions given? Is the GSM reception level sufficient?
4. Have the maximum ambient conditions as specified in the corresponding datasheet not been exceeded?

If none of the points listed above is the cause of the fault, perform a **reboot** first (disconnect and reconnect the local interface at the module). If a reboot does not solve the problem, the device should be disconnected, removed and sent to an authorised service centre (according to chapter 5.3 „Repairing communication modules“).

5.3 Repairing communication modules

Communication modules must only be repaired by an authorised service and repair centre (or manufacturer).

Adhere to the following procedure if a repair is necessary:

1. If installed, remove the communication module as described in section 3.6 “Removing modules” and fit a substitute device.
2. Describe the error found as exactly as possible and state the name and telephone number of the person responsible in case of inquiries.
3. Pack the base module to ensure it can suffer no further damage during transport. Preferably use the original packing if available. Do not enclose any loose components.
4. Send the base module to an authorised service and repair centre.

6 SyM² configuration

6.1 Parameterisation: General information

6.1.1 Overview

The ZDUE-SyM² communication modules can be parameterised locally over the service interface or remotely over the control centre connection.

Required parameter setting

The various ZDUE-SyM² communication modules require different parameter settings:

Module	**ZDUE-PSTN-SyM²**	**ZDUE-GPRS-SyM²**		**ZDUE-LAN-SyM²**
		CSD mode	GPRS mode	LAN mode
PSTN	Chap. 6.2.1	n/a	n/a	n/a
GSM	n/a	Chap. 6.2.2	Chap. 6.2.2	n/a
GPRS	n/a	n/a	Chap. 6.2.3	n/a
LAN/DSL	n/a	n/a	n/a	Chap. 6.2.4
IP Telemetry	n/a	n/a	Chap. 6.2.5	Chap. 6.2.5
Auto Sync Token	n/a	n/a	Chap. 6.3.1	Chap. 6.3.1
Push operation	n/a	n/a	Chap. 6.4	Chap. 6.4
Other	Chap. 0	Chap. 0	Chap. 0	Chap. 0

Parameter setting using OBIS-T and SML

Configuration is made over both the control centre connection and the service interface, using OBIS/OBIS T indicators and parameters that are transferred by SML protocol. This requires a software tool which is a component of the control centre software or a mobile data recording device (MDR), or it can be a special parameterisation software.

The Technical Reference chapter lists the data structures and parameters necessary to parameterise a ZDUE-SyM² communication module, query the status and operate the functions. The fundamentals can be read in the SyM² requirements specification and the SML protocol specification.

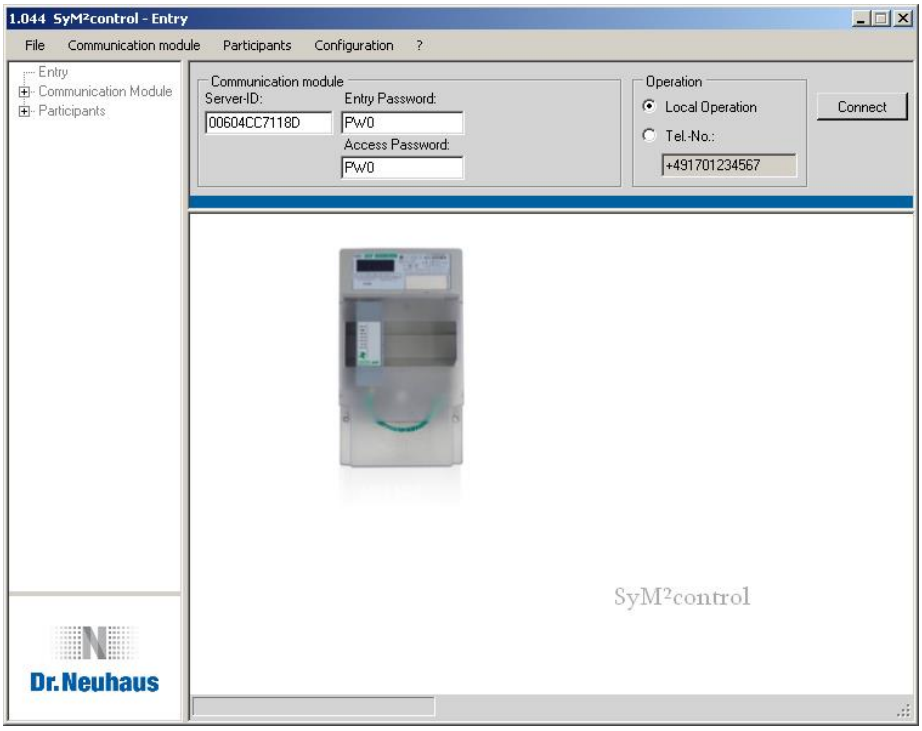
The functions and parameters of the ZDUE-SyM² communication modules are described in the chapters 6.2 to 6.8. Here you can find cross references to the data structures and parameters used.

SyM² configuration software for easy parameter setting

For parameter setting of the ZDUE-SyM² communication modules, Sagemcom Dr. Neuhaus GmbH offers the SyM² configuration software SyM²control.

Microsoft .NET is required

SyM²control can only be run if Microsoft .NET is installed on the PC.



With this software, a ZDUE-SyM² communication module can be parameterised locally over the service interface and remotely over the control centre connection.

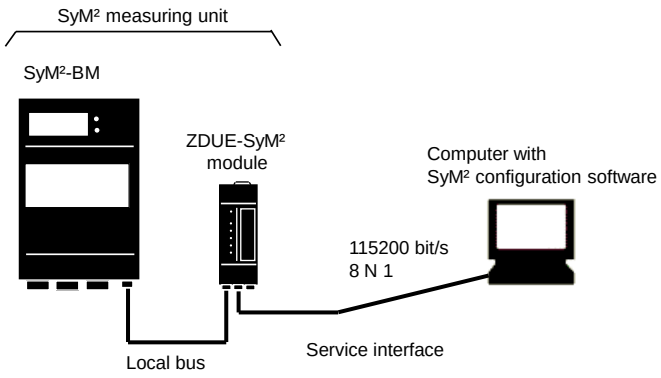
Installation

Start the program *setup.exe* on the data storage medium with the SyM²control configuration software installation to install the parameterisation program on a computer. The computer requires Windows XP SP2, Windows Vista or Windows 7 as operating system.

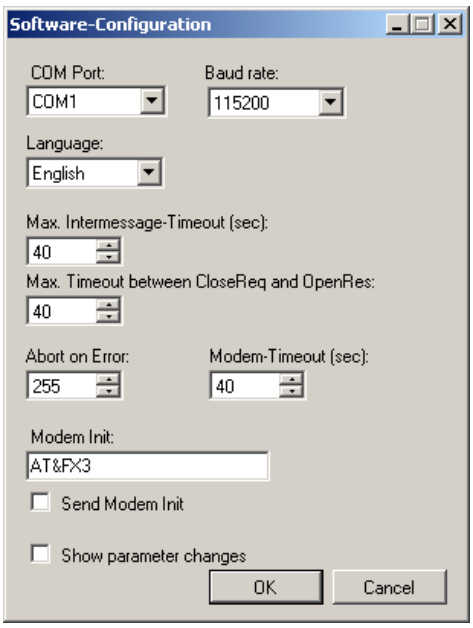
Follow the instructions of the Installation Assistant.

Connection to the service interface

Connect the computer, on which the SyM²control configuration software is installed, to the service interface of the ZDUE-SyM² communication module (see chapter 1.5).



After you start the SyM²control, carry out the following setting in the *Configuration* menu:



COM Port

Select the COM interface of the computer that is connected to the service interface.

Baud rate

Always use 115200 bps

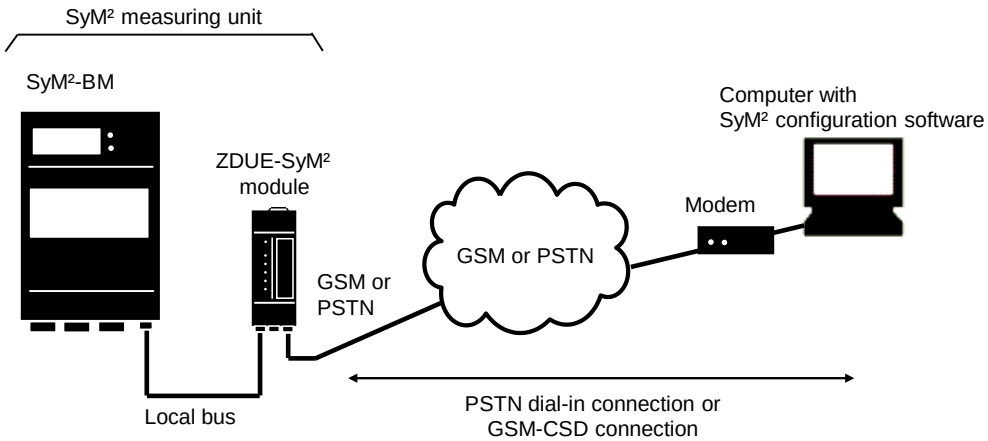
Max. intermessage timeout (sec); Max. timout between CloseReq and OpenRes (sec); Abort on error

Use the basic settings (40 sec; 40 sec; 255). If in the case of GPRS or LAN/DSL connections there are communication disturbances between the SyM² configuration software and the ZDUE-SyM² communication module (e.g. intercharacter timeouts), try to fix them by increasing the values for *Max. intermessage timeout; Max. timeout between CloseReq and OpenRes* and *Abort on error*.

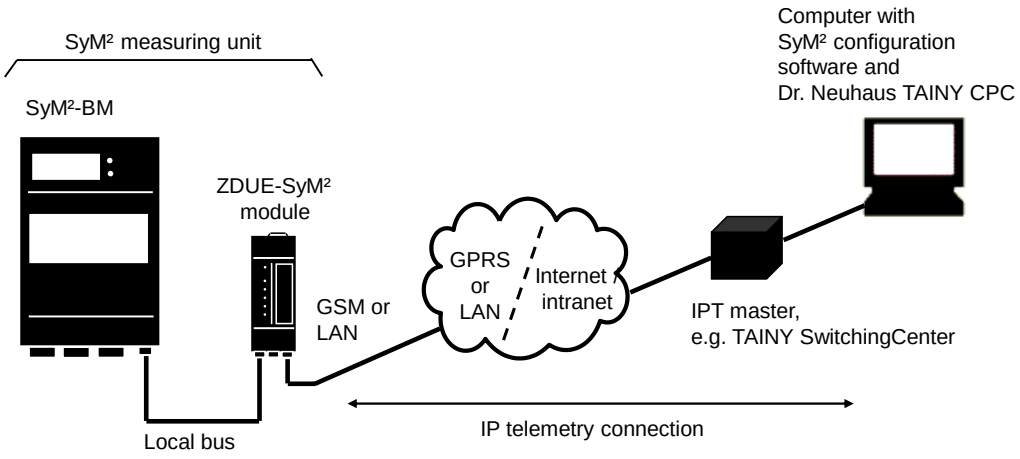
Show parameter changes

If this checkbox is set active, the tool shows a warning message, before parameter changes are sent to the ZDUE-SyM² communication module.

Connection over the control centre connection, a PSTN connection or a CSD connection



Connection over the control centre connection over IPT master



To connect the computer with the SyM² configuration software to a ZDUE-SyM² communication module over an IPT connection, an IPT-COM-port driver (e.g. TAINY ComPortClient by Sagemcom Dr. Neuhaus GmbH) is required.

Sending Modem Init

If you want to remotely operate the ZDUE-SyM² communication module using the control centre connection, you can enter AT commands to initialise the modem here. The commands are transmitted to the modem before the telephone number if the check mark for *Sending Modem Init* is set.

Modem Timeout

You can specify here how long the SyM² configuration software is supposed to wait for a response from the connected modem. Only change the factory setting of 40 s if there are problems with modem initialisation. First, check all other software settings and the correct connection of the modem.

6.1.2 Addressing

Addressing in SML protocol

Each SyM² module is uniquely identified with its server ID. The server ID is printed on the front of each SyM² module. For the SML files and SML messages, it must be added according to the SML protocol.

SML files

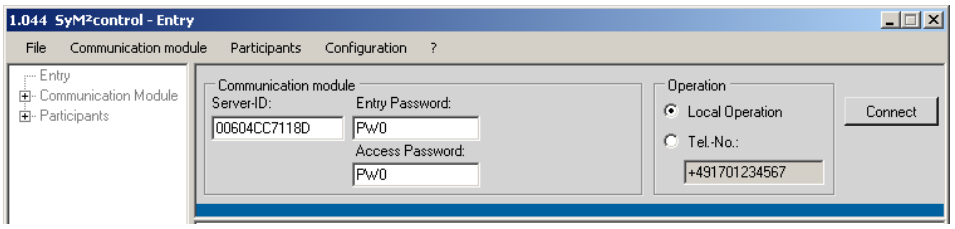
SML files that are sent via a ZDUE-SyM² communication module to connected SyM² modules or are directed to the ZDUE-SyM² communication module itself must be addressed to the server ID of the ZDUE-SyM² communication module.

SML messages

The SML messages contained in the SML files must contain the server ID of the SyM² module to which they are addressed.

Enter server ID using SyM² configuration software

View of SyM² configuration software



Enter the server ID of the ZDUE-SyM² communication module here that you want to operate with the software.

The server ID consists of 12 numbers or letters. No separators are entered. Capital and small letters are not differentiated in the server ID. The SyM² configuration software accepts only capital letters.

Example: 00604CC7118D

6.1.3 Entry and access password

The password modification is described in chapter 6.6.3.

Default password

The default password is PW0.

Function

Access to a SyM² measuring unit over the ZDUE-SyM² communication control centre connection can be protected with an entry password in the ZDUE-SyM² communication module. If an entry password is parameterised, only those SML files are accepted for which the correct entry password was specified in the SML file. No password is required for access over the service interface.

Access to important parameters of the ZDUE-SyM² communication module can also be protected with an access password. This must be contained in the corresponding SML messages to the ZDUE-SyM² communication module. See also chapter 6.6.3.

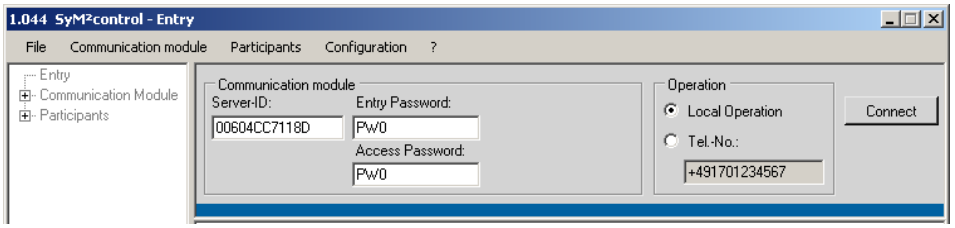
Entry and access passwords in SML protocol

Entry and access passwords must be added for SML files or SML messages according to the SML protocol.

Control passwords in broadcast messages are passed on by the ZDUE-SyM² communication module to the connected participants. Normally, that results in negative attentions. For that reason, control passwords must be avoided in broadcast messages.

Entering passwords using SyM² configuration software

View of SyM² configuration software



Entry Password

Enter the entry password of the ZDUE-SyM² communication module here that you want to operate with the software. The entry password is needed only if operation takes place via the control centre connection of the ZDUE-SyM² communication module.

Caution

In case of operation via the service interface, no entry password is required.

Access password

Enter here the access password of the ZDUE-SyM² communication module that you want to operate with the software.

Individual access passwords

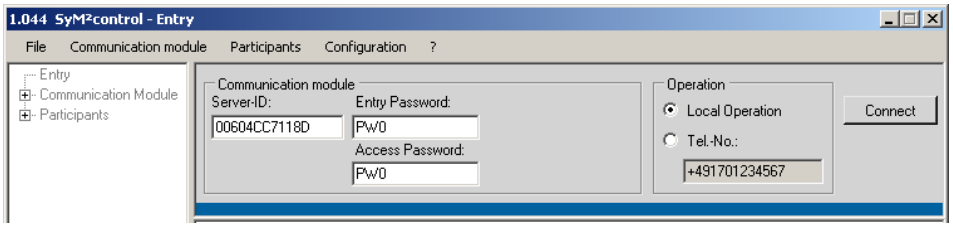
The access password applies only for the addressed ZDUE-SyM² communication module. The other modules connected to the ZDUE-SyM² communication module have their own control passwords.

6.1.4 Connecting SyM² configuration software to ZDUE-SyM² communication modules

Function

The computer with the SyM² configuration software can be connected to the ZDUE-SyM² communication module locally over the service interface or remotely over the control centre connection.

View of SyM² configuration software



Local Operation

Choose this setting when the PC with the SyM² configuration software is connected to the service interface of the ZDUE-SyM² communication module.

Tel. No.

Choose this setting when the computer with the SyM² configuration software is connected to the ZDUE-SyM² communication module remotely over the control centre connection.

The entry depends on the type of the ZDUE-SyM² communication module to be operated with the SyM² configuration software:

If it is a ZDUE-PSTN-SyM² module, enter here the number of the telephone line to which the ZDUE-PSTN-SyM² module is connected.

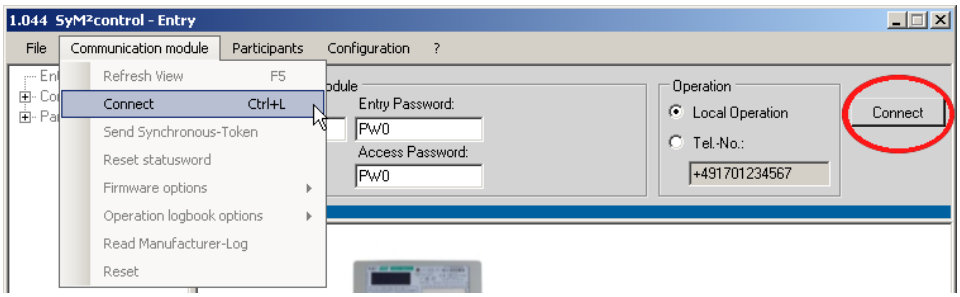
If it is a ZDUE-GPRS-SyM² module and you want to reach the device over a CSD data call, enter here the data telephone number of the SIM card that is inserted in the ZDUE-GPRS-SyM² module.

If it is a ZDUE-GPRS-SyM² module and you want to reach the device over GPRS and IP Telemetry, enter here the virtual telephone number assigned to the ZDUE-GPRS-SyM² module at the IPT master.

If it is a ZDUE-LAN-SyM² module, specify here the - likewise - virtual telephone number assigned to the ZDUE-GPRS-SyM² module at the IPT master.

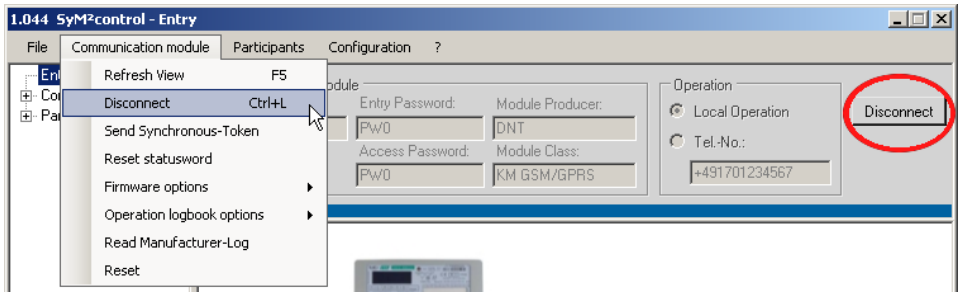
Establishing a connection

View of SyM² configuration software



In the *Communication Module* menu, select the *Connect* option or click the *Connect* button to establish the data connection to the ZDUE-SyM² communication module.

Disconnect



In the *Communication Module* menu, select the *Disconnect* option or click the *Disconnect* button to disconnect the data connection to the ZDUE-SyM² communication module again.

6.1.5 Module Class and Module Producer

Module class

Data structure and parameters, see chapter 7.1.

The module class of the ZDUE-SyM² communication module is output:

- Communication module of type PSTN (81 81 C7 82 46 FF)
- Communication module of type GSM/GPRS (81 81 C7 82 47 FF)
- Communication module of type LAN/DSL (81 81 C7 82 48 FF)

Module producer

Data structure and parameters, see chapter 7.1.

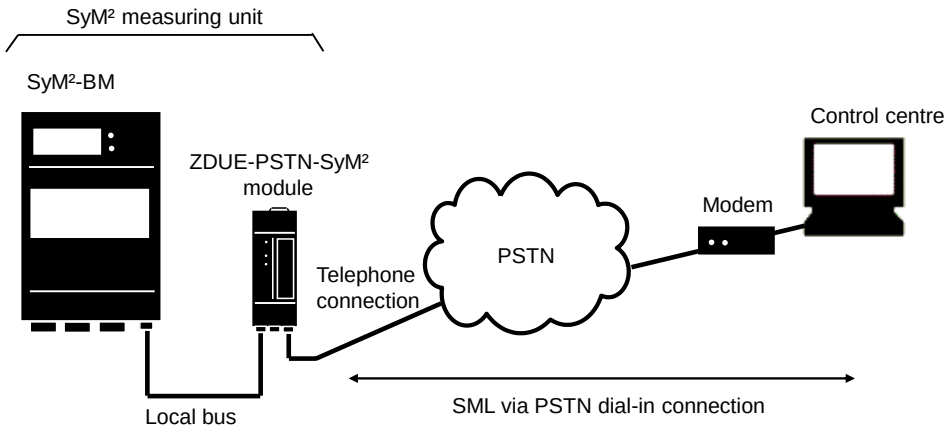
The FLAG manufacturer identifier of the ZDUE-SyM² communication module is output.

6.2 Parameterisation of interface to control centre

6.2.1 PSTN version

The ZDUE-PSTN-SyM² module is equipped with an analog modem, which achieves transfer rates up to 28800 bps. The ZDUE-PSTN-SyM² module is connected to an analog telephone line.

If you use a ZDUE-PSTN-SyM² module, parameterise the PSTN connection according to the instructions in this chapter.



After achieving operational readiness, the ZDUE-PSTN-SyM² module waits for a call from the control centre.

An incoming call is automatically accepted, depending on the parameter setting.

The caller must use an analog modem or a GSM modem (CSD).

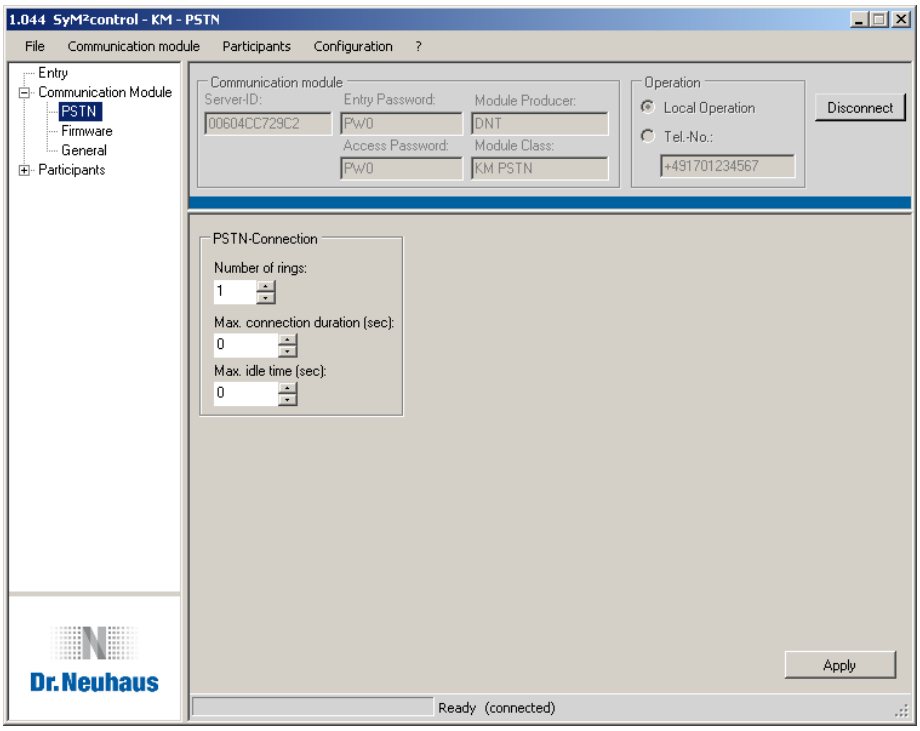
The ZDUE-PSTN-SyM² module supports the following operating modes:

- data transfer according to ITU-T V.22bis, V.32, V.32bis and V.34
- Fault correction according to MNP4 and V.42
- Data compression according to MNP5 and V.42bis

The operating modes are automatically negotiated with the calling modem. Connections with switched-off fault correction and switched-off data compression are supported.

The SML- and SML-T protocols are transferred over the analog modem connection.

View of SyM² configuration software



PSTN connection

Number of rings

➲ Data structure and parameters, see chapter 7.5.

The *Number of rings* parameter establishes how many rings the ZDUE-PSTN-SyM² module waits for before answering an incoming call.

Choose between 1 and 10 call signs.

If the parameter is set to 0, automatic answering is switched off.

Call answering deactivated

If automatic answering is switched off, the ZDUE-PSTN-SyM² module can no longer be reached over the control centre connection.
The ZDUE-PSTN-SyM² module can then only be operated via the service interface.

Factory setting: 1 (call sign)

Max. connection duration (sec)

➲ Data structure and parameters, see chapter 7.5.

This parameter establishes the maximum duration of a data connection between the control centre and ZDUE-PSTN-SyM² module. After this time has passed, the ZDUE-PSTN-SyM² module automatically ends the connection, regardless of whether data is still being transferred between the control centre and ZDUE-SyM² communication module.

Choose between 60 and 10000 seconds.

If the parameter is set to 0, the function is switched off. The connection is not disconnected.

Factory setting: 0 (Off)

Max. idle time (sec)

➲ Data structure and parameters, see chapter 7.5.

This parameter establishes the maximum idle time of a data connection between the control centre and ZDUE-PSTN-SyM² module. Idle means that no data are exchanged between the control centre and ZDUE-PSTN-SyM² module over the existing data connection. If the maximum idle time is reached, that is, if no data were exchanged during the time period parameterised here, the ZDUE-PSTN-SyM² module breaks off the connection.

Choose between 10 and 10000 seconds.

If the parameter is set to 0, the function is switched off. The connection is not disconnected even with a longer idle time.

Factory setting: 0 (Off)

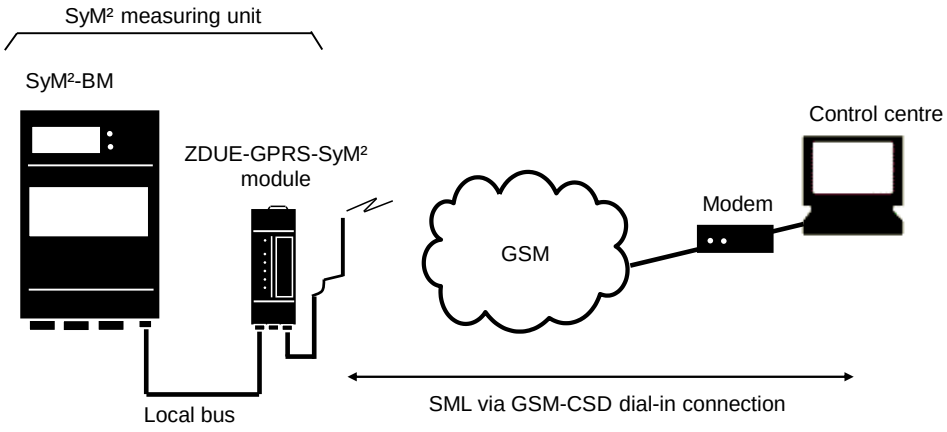
6.2.2 GSM version

The ZDUE-GPRS-SyM² module is equipped with a GSM wireless modem, which permits wireless communication with 9600 bps.

If you use a ZDUE-GPRS-SyM² module in CSD mode, parameterise the CSD connection according to the instructions in this chapter.

Some of these settings are needed even with a GPRS connection.

Further, a series of parameters are explained that give information on the condition of the connection.



After achieving operational readiness, the ZDUE-GPRS-SyM² module in CSD mode waits for a call from the control centre. An incoming call is automatically accepted as a CSD data call, depending on the parameter setting. That applies also if there is a GPRS connection to the control centre. In this case, the incoming call interrupts the GPRS connection. After the end of the CSD data call, the GPRS connection is automatically rebuilt.

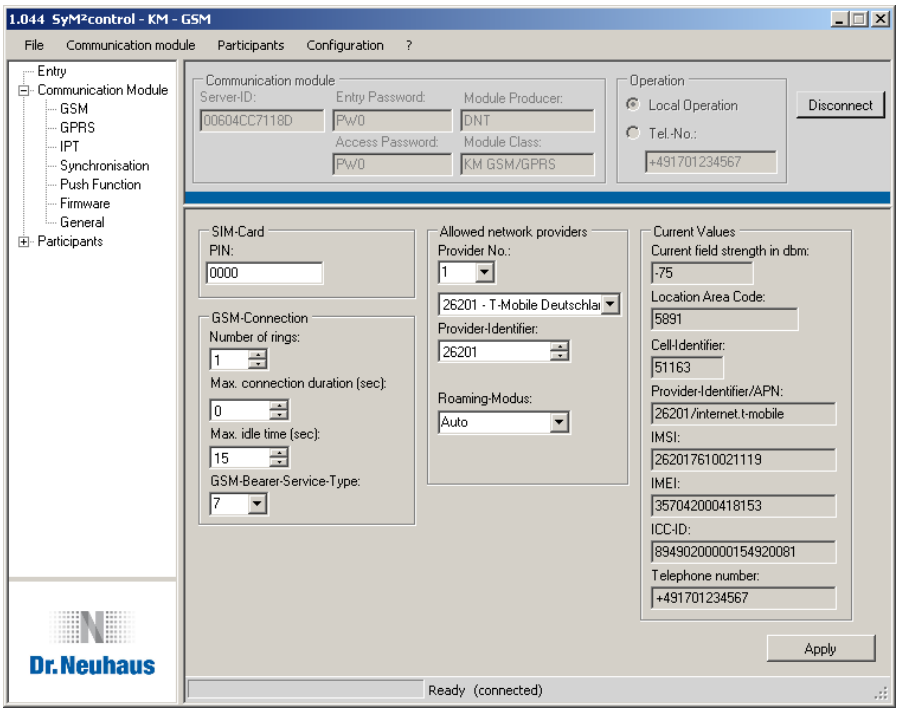
The caller must use an analog modem or a GSM modem (CSD) and call the data telephone number of the SIM card of the ZDUE-GPRS-SyM² module. The module supports single numbering, i.e. it does not make a difference whether the voice, fax or data calling number of the SIM card is called. The data calling number should be used if the SIM card has one.

The ZDUE-GPRS-SyM² module supports the following CSD operating modes:

- CSD 9600 bps
- RLP; non-transparent

The operating modes are automatically negotiated with the calling modem or the GSM network.

View of SyM² configuration software



SIM card

PIN

➲ Data structure and parameters, see chapter 7.6.

Enter the PIN for your SIM card here. You will receive the PIN from your network provider.

The ZDUE-GPRS-SyM² module also works with SIM cards that have no PIN; in this case, enter ***NONE***.

An incorrect PIN can be entered twice in sequence. After that, the SIM card is blocked (PUK status) and can only be unblocked through input of a PUK. For this you need a GSM end device that supports entry of the PUK, e.g. a mobile phone. You receive the PUK from your GSM network provider.

Factory setting: NONE (No PIN specified)

Allowed Network Providers

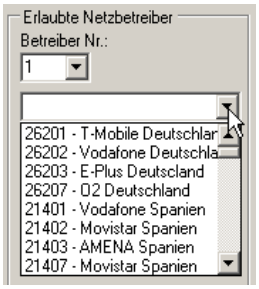
The ZDUE-GPRS-SyM² module can log itself only into GSM networks that have been enabled on the SIM card as home network or GSM network of roaming partners of suppliers of the SIM card. If the ZDUE-GPRS-SyM² module finds the home network, it logs itself into this network. If the ZDUE-GPRS-SyM² module cannot find the home network, it searches for the networks of roaming partners.

Provider No.

➲ Data structure and parameters, see chapter 7.7.

Check whether the profile described in chapter 6.2.3 is already present. If not, create one according to the instructions in chapter 6.2.3.

Select here an entry in the list of the network providers.



Provider identifier

➲ Data structure and parameters, see chapter 7.7.

Assign an admissible network provider to the provider no. The network provider is defined with its provider identifier consisting of a combination of MCC and MNC. Select a provider in the list or enter the combination of MCC and MNC.

List with examples:

MCC	MCN	User Identifier	Network provider
262	01	26201	T-Mobile (Germany)
262	02	26202	Vodafone (Germany)
262	03	26203	E-PLUS (Germany)
262	07	26207	O2 (Germany)
232	03	23203	T-Mobile (Austria)
232	05	23205	Connect Austria One (Austria)
232	07	23207	Telering (Austria)
232	10	23210	Hutchinson 3 G Austria (Austria)
228	01	22801	Swisscom NATEL (Tele2, 3G Mobile)
228	02	22802	TDC Switzerland AG (Sunrise)
228	03	22803	Orange (Switzerland)

In the Internet, there are lists with the MCC/MCN of the network providers. Search according to key words: MCC MCN GSM

Factory setting: Empty; no provider identifiers are specified in the device.

Roaming mode

➲ Data structure and parameters, see chapter 7.6.

The behaviour of the ZDUE-GPRS-SyM² module in dealing with networks of roaming partners can be set over the parameter mode:

Mode SIM The ZDUE-GPRS-SyM² module works down the list of allowed network providers that are stored on the SIM card. First, the home network is searched for, then the roaming partners. The search continues until one of the networks is found.

Mode LIST The ZDUE-GPRS-SyM² module works down the list of allowed network providers that can be manually entered in the ZDUE-GPRS-SyM² module. The list can contain up to 10 entries. Every entry consists of the provider no. and provider identifier. The search continues until one of the stored networks is found.

Mode AUTO

The ZDUE-GPRS-SyM² module works down the list of allowed network providers that can be manually entered in the ZDUE-GPRS-SyM² module (see mode LIST). If none of the saved networks is found, the search is extended to the networks stored on the SIM card. The search continues until one of the stored networks is found.

Factory setting: 2

GSM Connection

Number of rings

➲ Data structure and parameters, see chapter 7.6.

The *Number of rings* parameter establishes how many rings the ZDUE-GPRS-SyM² module waits for before answering an incoming call.

You can choose between 1 and 10 call signs. If the parameter is set to 0, automatic answering is switched off.

Call answering deactivated

If automatic answering is switched off, the ZDUE-GPRS-SyM² module can no longer be reached over the control centre connection.
The ZDUE-GPRS-SyM² module can then only be operated via the service interface.
For a ZDUE-GPRS-SyM² module, you should set the Number of Rings parameter to a value of < 5 rings. Many GSM networks stop trying to connect when a participant does not pick up after 5 or 6 rings. Also deactivate any mailbox that might have been set up for the GSM connection.

Factory setting: 1 (call sign)

Max. connection duration (sec)

➲ Data structure and parameters, see chapter 7.6.

The parameter establishes the maximum time period of a CSD connection between the control centre and ZDUE-GPRS-SyM² module. After this time has passed, the ZDUE-GPRS-SyM² module automatically ends the connection, regardless of whether data are still being transferred between the control centre and ZDUE-GPRS-SyM² module. If a GPRS connection is parameterised, it is automatically re-established.

Choose between 60 and 10000 seconds.

If the parameter is set to 0, the function is switched off. The connection is not disconnected.

Factory setting: 0 (off)

Max. idle time (sec)

➲ Data structure and parameters, see chapter 7.6.

The parameter establishes the maximum idle time of a data connection between the control centre and ZDUE-GPRS-SyM² module. Idle means that no data are exchanged between the control centre and ZDUE-GPRS-SyM² module over the existing data connection. If the maximum idle time is reached, that is, if no data were exchanged during the time period parameterised here, the ZDUE-GPRS-SyM² module breaks off the connection. If a GPRS connection is parameterised, it is automatically re-established.

Choose between 10 and 10000 seconds.

If the parameter is set to 0, the function is switched off. The connection is not disconnected even with a longer idle time.

Factory setting: 0 (off)

GSM Bearer Service Type

➲ Data structure and parameters, see chapter 7.6.

The parameter determines the operating mode of the CSD connection. The following values can be set:

Value	Operating mode
0	Automatic negotiation of the operating mode
7	9600 bpsec (V.32)
71	9600 bpsec (V.110)

Caution

Changing the factory setting can result in the ZDUE-GPRS-SyM² module no longer being reachable.

Factory setting: 7 (9600 bps (V.32))

Current Values

The ZDUE-GPRS-SyM² module provides a range of information on the GSM network into which it is logged and on the SIM card used.

Caution

The ZDUE-GPRS-SyM² module regularly updates these values internally, if there is a connection.
Select the action *Update view* in menu *communication module* to display the current values.

Current field strength in dBm

➲ Data structure and parameters, see chapter 7.9.

This displays the field strength of the GSM network at the antenna of the ZDUE-GPRS-SyM² module into which the ZDUE-GPRS-SyM² module is logged.

The values are given in the unit dBm:

Value	Field strength	Level-LED
> –80 dBm	GSM signal good	On
–89 ... –80 dBm	GSM signal sufficient	Flashes (0,5 s on; 0,5 s off)
–99 ... –90 dBm	GSM signal weak	Flashes (0,2 s on; 0,2 s off)
< –99 dBm	GSM signal not sufficient	Off

Caution

Observe the instructions in chapter 3.4.2 for installation and selection of the antenna.

Location Area Code

➲ Data structure and parameters, see chapter 7.9.

This displays the location area code (LAC) of the group of GSM base stations in which the ZDUE-GPRS-SyM² module is logged. If the ZDUE-GPRS-SyM² module is not logged into the GSM network, no value is specified.

Cell Identifier

➲ Data structure and parameters, see chapter 7.9.

This displays the identifier (Cell ID) of the GSM cell in which the ZDUE-GPRS-SyM² module is logged. If the ZDUE-GPRS-SyM² module is not logged into the GSM network, no value is specified.

Provider Identifier/APN

➲ Data structure and parameters, see chapter 7.9.

The display shows the identifier of the network operator (MCC/MCN) into which the ZDUE-GPRS-SyM² module is logged as well as its APN. If the ZDUE-GPRS-SyM² module is not logged into the GSM network, no value is specified.

IMSI

➲ Data structure and parameters, see chapter 7.9.

This displays the IMSI (= ***I****nternational* ***M****obile* ***S****ubscriber* ***I****dentifier*) stored on the SIM card. The IMSI is assigned to the participant contract between the SIM card user and the network provider.

IMEI

➲ Data structure and parameters, see chapter 7.9.

This displays the IMEI (= ***I****nternational* ***M****obile* ***E****quipment* ***I****dentifier*), the article and serial number, unique worldwide, that is assigned to this individual ZDUE-GPRS-SyM² module.

ICC-ID

➲ Data structure and parameters, see chapter 7.9.

This displays the ICC-ID (= ***I****ntegrated* ***C****ircuit* ***C****ard* ***I****dentifier*), the article and serial number, unique worldwide, that is assigned to the SIM card in the ZDUE-GPRS-SyM² module.

Telephone number

➲ Data structure and parameters, see chapter 7.9.

This displays your own telephone number that is stored on the SIM card. If your telephone number is not on the SIM card, the display remains empty (empty string).

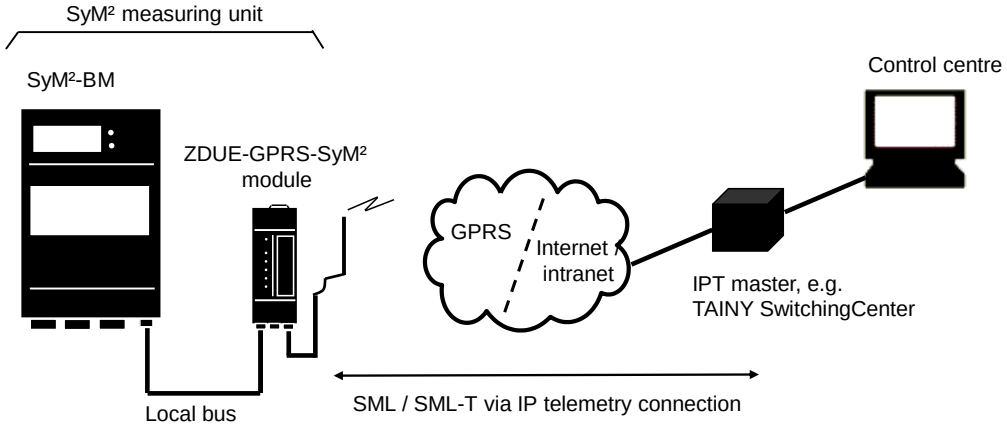
6.2.3 GPRS version

The GSM wireless modem in the ZDUE-GPRS-SyM² module also permits IP communication over GPRS.

If you use a ZDUE-GPRS-SyM² module in the GPRS mode, parameterise the GPRS connection according to the instructions in this chapter.

Note that you must also make the parameter settings in accordance with chapter 6.2.2 and chapter 6.2.5.

Further, a series of parameters are explained that give information on the condition of the connection.



With the corresponding configuration, the ZDUE-GPRS-SyM² module automatically logs itself on to the GPRS service of a GSM network when switched on or after a restart. Then it builds a connection to the APN (access point name) and so is connected with the Internet or a private intranet with GPRS connection.

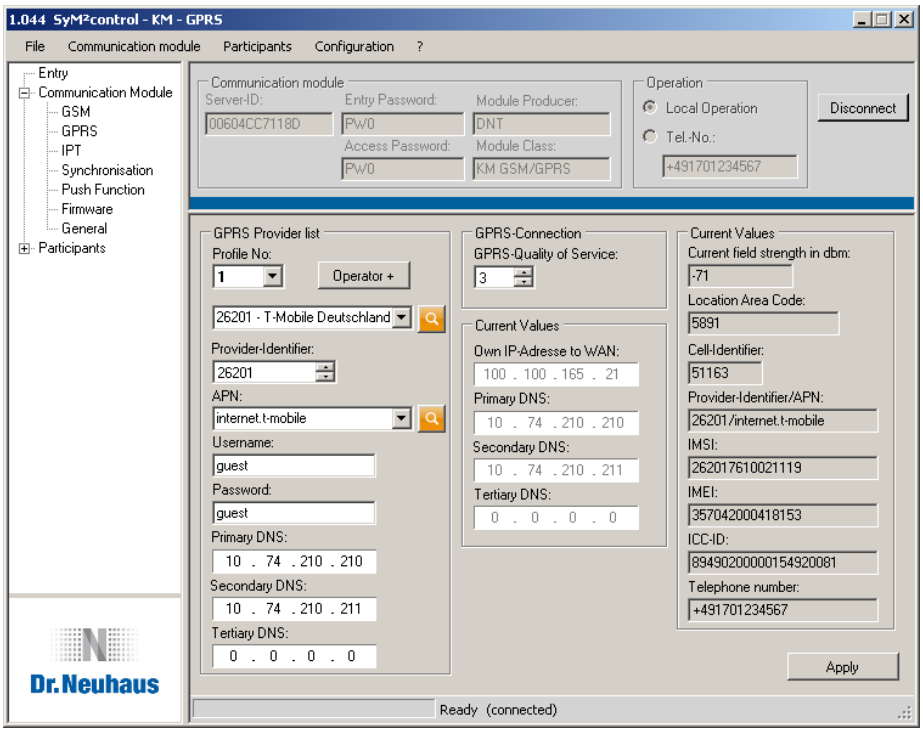
With this connection, the GPRS connection module then establishes an IPT connection (IPT=DIN standard for *IP Telemetry*).

The GPRS function of the ZDUE-GPRS-SyM² module is activated only when an APN is entered in the parameter setting and the address to the IPT master is set (not 0.0.0.0). Otherwise, the ZDUE-GPRS-SyM² module only operates in CSD mode.

A prerequisite for the GPRS mode is that the ZDUE-GPRS-SyM² module has successfully logged into a GSM network. For this to occur, the parameters for the GSM version must be set in accordance with chapter 6.2.2.

Even during an active GPRS connection, call answering works for GSM data calls (CSD). In this case, the GPRS connection is interrupted for the time period of the GSM data call and then built up again.

View of SyM² configuration software



GPRS provider list

Each GPRS network provider has its own access data for the GPRS service.

Using the network provider identifier of the inserted SIM card, the ZDUE-GPRS-SyM² module automatically selects the correct profile with access data. A profile with this access data must first be created.

Profile No.

You can store 10 profiles with the respective GPRS access data from GSM network providers. Each profile consists of the following parameters:

- Network Provider Identifier
- APN
- GPRS User name
- GPRS Password
- Primary DNS (optional)
- Secondary DNS (optional)
- Tertiary DNS (optional)

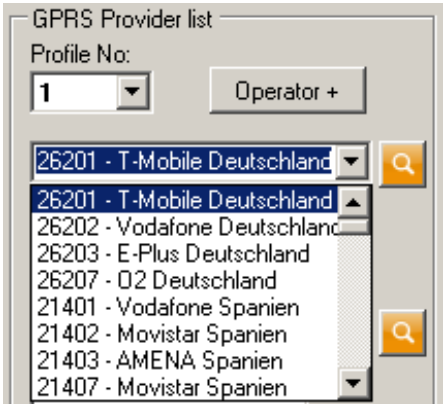
Provider identifier

➲ Data structure and parameters, see chapter 7.8.

Enter here the network provider identifier for which this profile is to be activated, e.g. 26201 for T-Mobile (see also chapter 6.2.2, Network Provider Identifier).

If the network provider identifier of the SIM card agrees with the network provider identifier from the profile, the other access data from this profile are used.

You can select from a list of preset providers or manually enter a provider and the GPRS access data.



APN

➲ Data structure and parameters, see chapter 7.8.

Enter here the transition from GPRS to the Internet or intranet.

You can find the APN (access point name) in your GSM/GPRS network provider's documentation, on your provider's Website, or ask your provider's hotline.

Example: *internet.t-mobile*

User name

➲ Data structure and parameters, see chapter 7.8.

Enter here the user name for GPRS. Some GSM/GPRS network operators do not use access control with user names and/or passwords. In this case enter *guest* in the corresponding box.

Password

➲ Data structure and parameters, see chapter 7.8.

Enter here the password for GPRS. Some GSM/GPRS network operators do not use access control with user names and/or passwords. In this case enter *guest* in the corresponding box.

Primary DNS, Secondary DNS, Tertiary DNS

➲ Data structure and parameters, see chapter 7.8.

Enter here the IP address of the primary DNS (= *Domain Name Server*), of the secondary DNS and of the tertiary DNS.

You can find the IP addresses of the DNS in your GSM/GPRS network provider's documentation, on your provider's Website, or ask your provider's hotline.

If no primary DNS is parameterised, the ZDUE-GPRS-SyM² module uses the IP addresses assigned by the GPRS service.

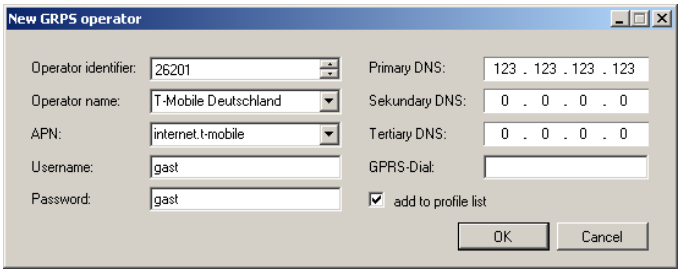
The DNS are needed if the NTP servers are addressed via a host name and not via an IP address (See chapter 6.3.1).

Factory setting:

Profile	User Identifier	APN	User name	User password	1., 2., 3. DNS
1	26201 (T-Mobile)	internet.t-mobile	guest	guest	None
2	26202 (Vodafone)	web.vodafone.de	guest	guest	None
3	26203 (e-plus)	internet.eplus.de	eplus	gprs	None
4	26207 (O2)	internet	guest	guest	None
5-10	No entries in the factory setting	None = No DNS entered; DNS are obtained automatically.			

Operator + button

When you click the *Operator* + button a dialog opens which enables you to add a new GPRS provider to the provider list of *SyM²control*.



Clicking the *OK* button the entered new values are stored in provider list of *SyM²control*. Then it is possible to select the new configuration and to apply it to the GPRS connection (refer to Provider Identifier (APN)).

Please observe, that the selected operator identifier must be the operator identifier of the chosen network operator.

Current Values

The ZDUE-GPRS-SyM² module provides a range of information on the GSM network into which it is logged and on the SIM card used.

Note

The ZDUE-GPRS-SyM² module regularly updates these values internally. Select the action *Update view* in menu *communication module* to view the current values.

Current field strength in dBm

➲ Data structure and parameters, see chapter 7.9.

This displays the field strength of the GSM network at the antenna of the ZDUE-GPRS-SyM² module into which the ZDUE-GPRS-SyM² module is logged. The values are given in the unit dBm:

Value	Current Field Strength
> –80 dBm	GSM signal good
–89 ... –80 dBm	GSM signal sufficient
–99 ... –90 dBm	GSM signal weak
< –99 dBm	GSM signal insufficient

Observe antenna instructions

Observe the instructions in chapter 3.4.2 for installation and selection of the antenna.

Location Area Code

➲ Data structure and parameters, see chapter 7.9.

This displays the location area code (LAC) of the group of GSM base stations in which the ZDUE-GPRS-SyM² module is logged. If the ZDUE-GPRS-SyM² module is not logged into the GSM network, no value is specified.

Cell Identifier

➲ Data structure and parameters, see chapter 7.9.

This displays the identifier (Cell ID) of the GSM cell in which the ZDUE-GPRS-SyM² module is logged. If the ZDUE-GPRS-SyM² module is not logged into the GSM network, no value is specified.

Provider Identifier/APN

➲ Data structure and parameters, see chapter 7.9.

The display shows the identifier of the network operator (MCC/MCN) into which the ZDUE-GPRS-SyM² module is logged as well as its APN. If the ZDUE-GPRS-SyM² module is not logged into the GSM network, no value is specified.

IMSI

➲ Data structure and parameters, see chapter 7.9.

This displays the IMSI (= ***I****nternational* ***M****obile* ***S****ubscriber* ***I****dentifier*) stored on the SIM card. The IMSI is assigned to the participant contract between the SIM card user and the network provider.

IMEI

➲ Data structure and parameters, see chapter 7.9.

This displays the IMEI (= ***I****nternational* ***M****obile* ***E****quipment* ***I****dentifier*), the article and serial number, unique worldwide, that is assigned to this ZDUE-GPRS-SyM² module.

ICC-ID

➲ Data structure and parameters, see chapter 7.9.

This displays the ICC-ID (= ***I****ntegrated* ***C****ircuit* ***C****ard* ***I****dentifier*), the article and serial number, unique worldwide, that is assigned to the SIM card in the ZDUE-GPRS-SyM² module.

Telephone number

➲ Data structure and parameters, see chapter 7.9.

This displays your own telephone number that is stored on the SIM card. If your telephone number is not on the SIM card, the display remains empty (empty string).

Own IP address to WAN

➲ Data structure and parameters, see chapter 7.9.

The own IP address to the WAN is automatically obtained by the GPRS for GPRS connections. The GPRS assigns either a dynamic IP address or, if agreed with the network provider, a fixed IP address.

Primary DNS, Secondary DNS, Tertiary DNS

➲ Data structure and parameters, see chapter 7.9.

The IP addresses of the DNS used are displayed. This can be those set in the profile or those assigned by the GPRS service.

GPRS Connection

GPRS - Quality of Service

➲ Data structure and parameters, see chapter 7.6.

The *Quality of Service* parameter defines behaviour when establishing the connection to the IPT master after a restart or interruption. The Quality of Service parameter determines whether a fast reconnection is desired. A fast reconnection normally requires frequent attempts and results in an increased amount of data. This can generate high costs.

Infrequent attempts at connecting lower the amount of data and the related costs, but delay reconnection.

Connection takes place in three steps:

- Step 1: Logging into the GSM network
- Step 2: Connecting to the APN of the GPRS
- Step 3: Connecting to the IPT master

Only when one step has been completed successfully is the next step initiated.

Value	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
GSM_RECONNECT_DELAY	0	1	2	5	8	10	12	20	30	60
GSM_CONNECT_ATTEMPTS	1	5	3	3	3	2	1	1	1	1
GPRS_RECONNECT_DELAY	0	1	2	5	8	10	12	20	30	60
GPRS_CONNECT_ATTEMPTS	1	5	3	3	3	2	1	1	1	1
IPT_RECONNECT_DELAY	0	1	2	5	8	10	12	20	30	60
IPT_CONNECT_ATTEMPTS	1	5	3	3	3	2	1	1	1	1

The delay for GSM_RECONNECT_DELAY, GPRS_RECONNECT_DELAY and IPT_RECONNECT_DELAY is specified in minutes in each case

The values in the table above have an effect on the following flow diagrams.

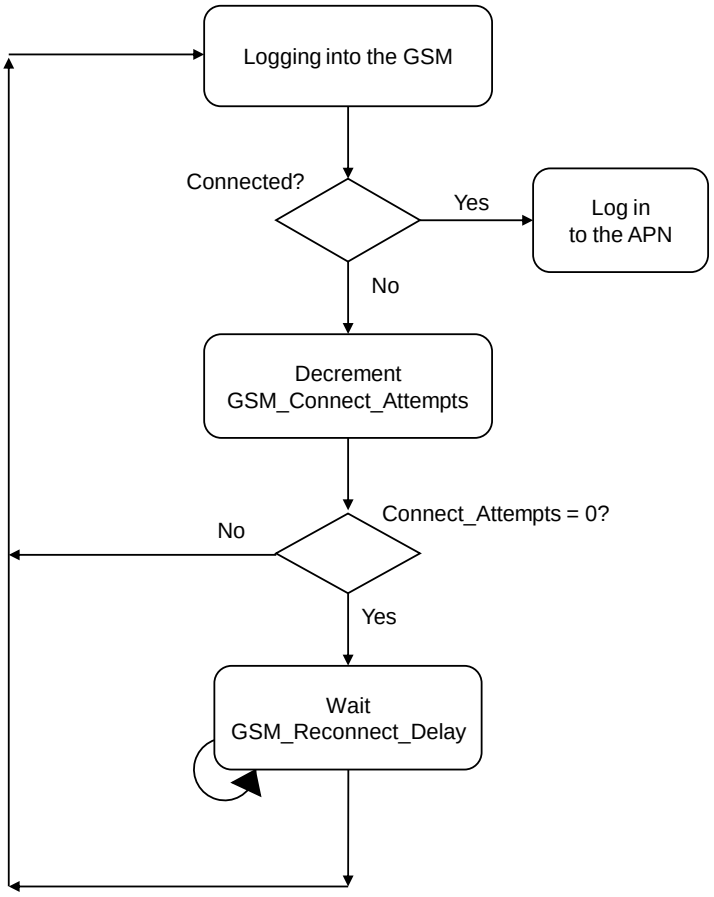
If the Quality of Service parameter is set to zero, reconnection takes place using the parameters

- IPT Connection – Number of Repetitions or
- IPT Connection – Waiting Time,

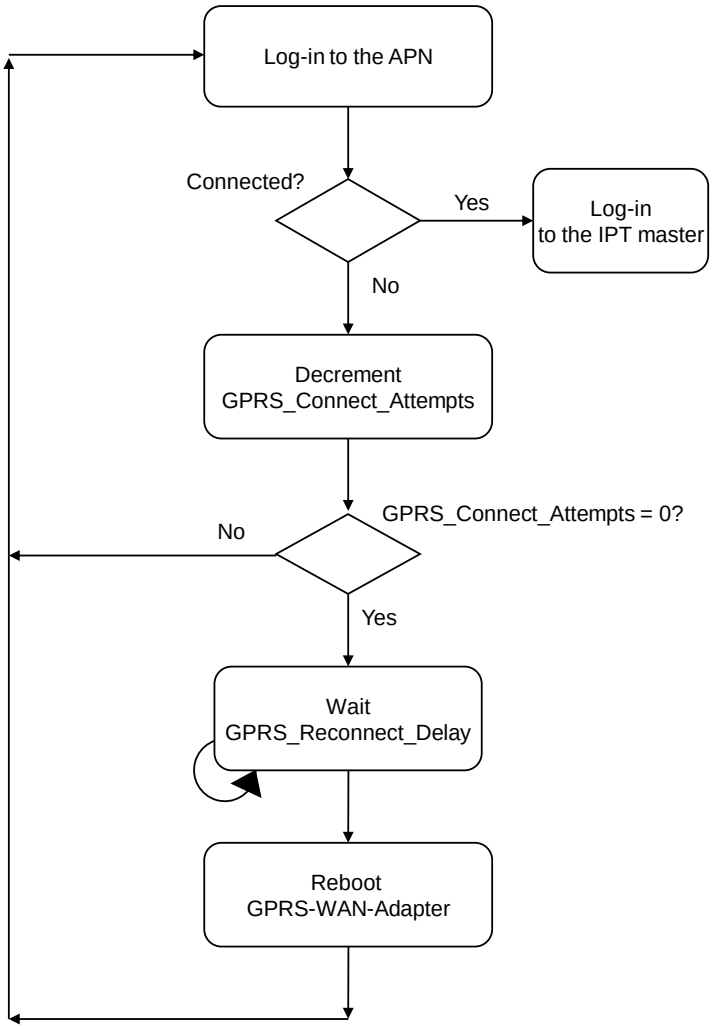
see chapter 6.2.5.

Factory setting: 3

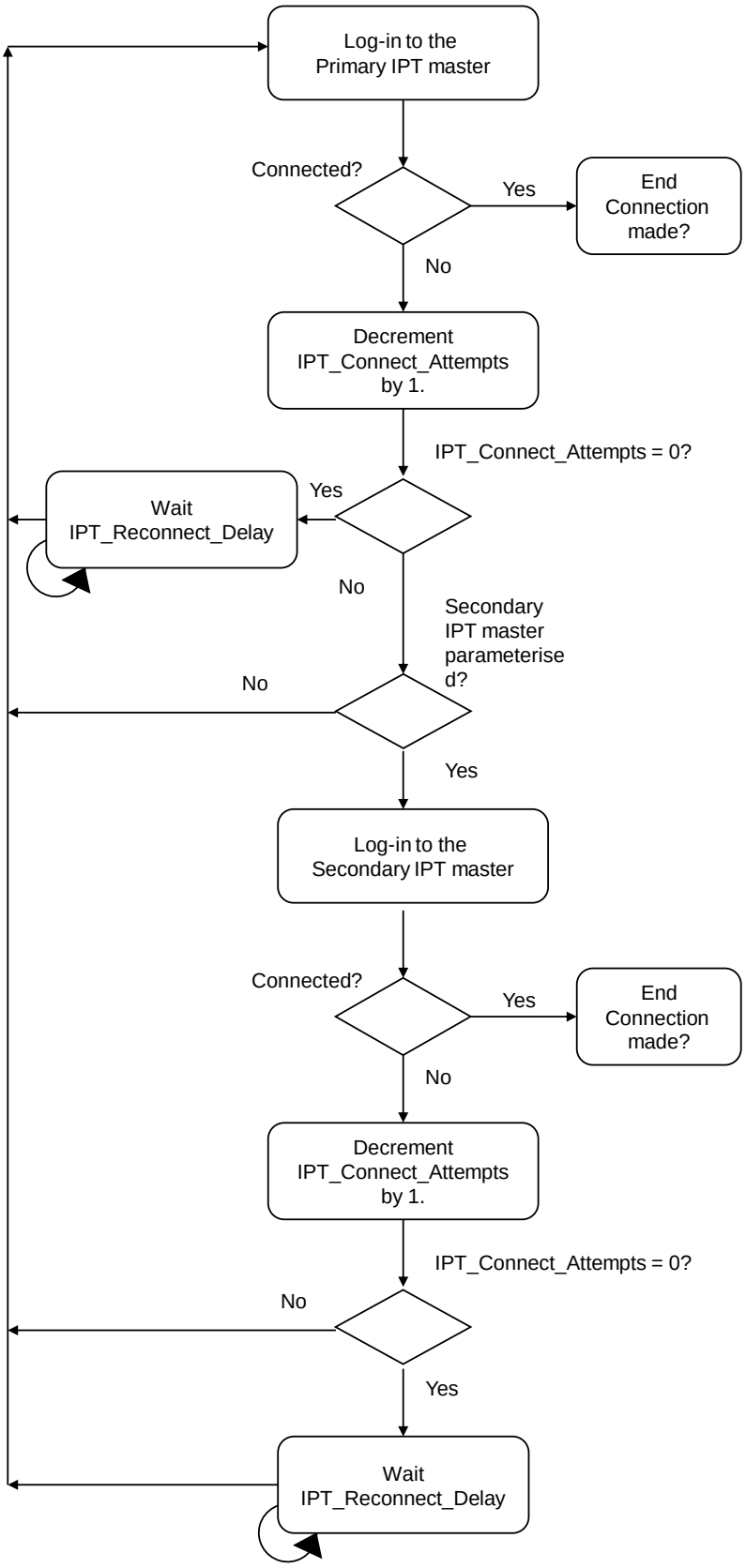
Step 1: Logging into the GSM network



Step 2: Connecting to the APN of the GPRS



Step 3: Connecting to the IPT master



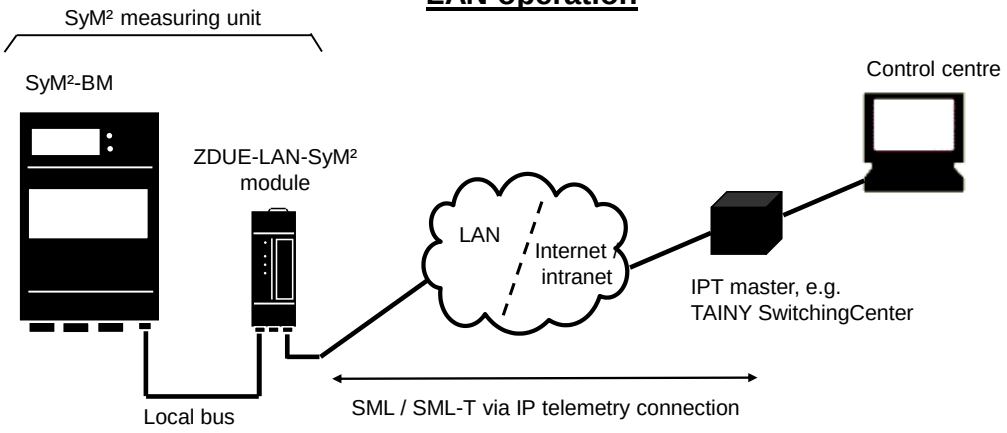
6.2.4 LAN/DSL version

The ZDUE-LAN-SyM² module is equipped with a LAN interface, which optionally permits direct connection to an Ethernet LAN or a DSL modem.

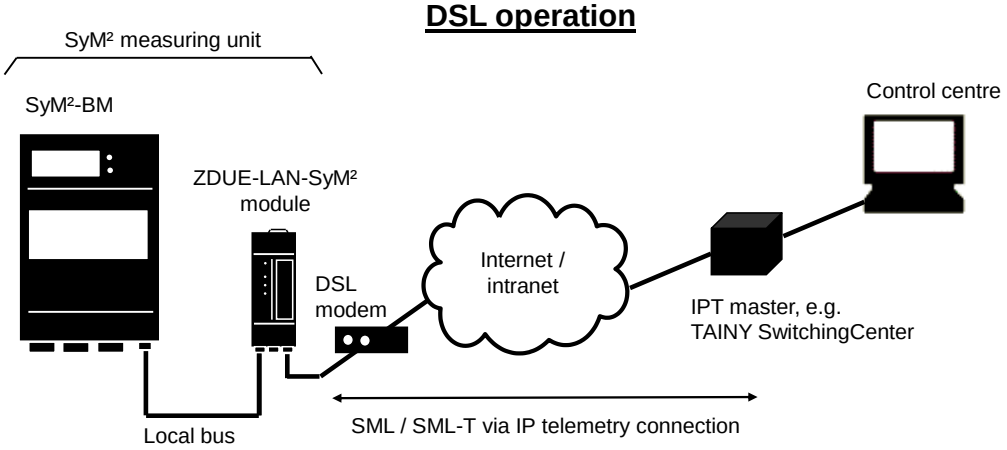
For parameter setting of the control centre connection of the ZDUE-LAN-SyM² module, follow the explanations in this chapter. Note that you must also make the parameter settings in accordance with chapter 6.2.5.

Further, a series of parameters are explained that give information on the condition of the connection.

LAN operation



DSL operation

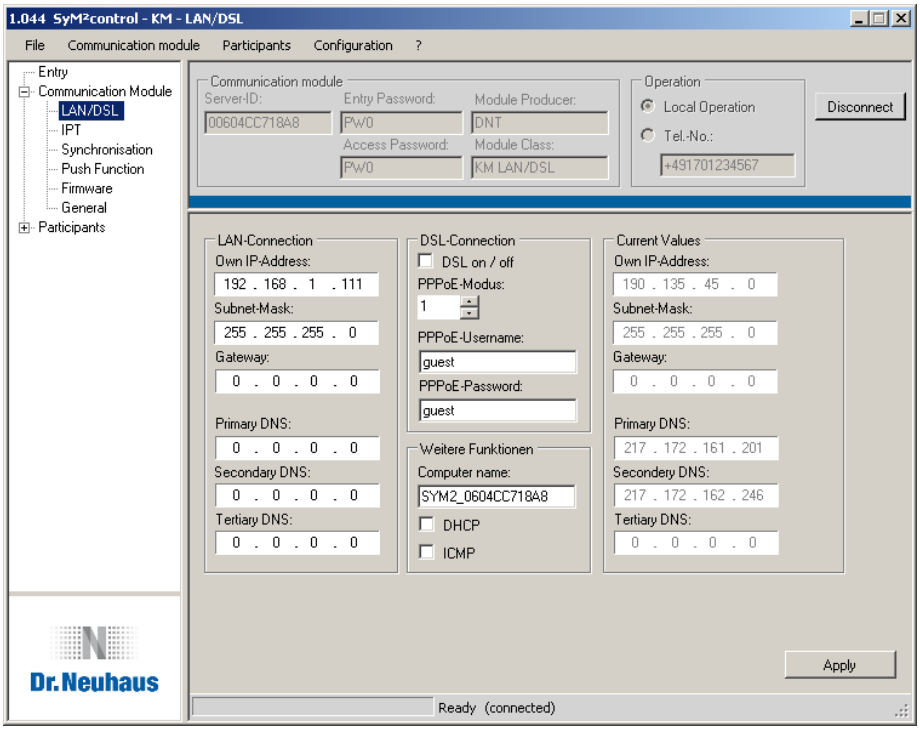


The ZDUE-LAN-SyM² module in the LAN mode is connected directly to an IP router and, with corresponding configuration, automatically logs on to the LAN when it is switched on or after a restart and so is connected to the Internet or to a private intranet.

The ZDUE-LAN-SyM² module in the DSL mode is connected directly to an Ethernet interface and, with corresponding configuration, automatically logs on to the LAN when it is switched on or after a restart and so is connected to the Internet or to a private intranet.

With this connection, the ZDUE-LAN-SyM² module then establishes an IPT connection (IPT=DIN standard for *IP Telemetry*) in the LAN and DSL mode.

View of SyM² configuration software



DSL connection

DSL on / off

➲ Data structure and parameters, see chapter 7.10.

Set the check mark if the ZDUE-LAN-SyM² module is connected to a DSL modem (DSL mode). The ZDUE-LAN-SyM² module then starts the PPPoE protocol for communication with the DSL modem.

Do not set the check mark if the ZDUE-LAN-SyM² module is connected to an IP router (LAN mode).

Factory setting: False (= LAN mode)

PPPoE mode

➲ Data structure and parameters, see chapter 7.10.

Reserved

PPPoE user name

➲ Data structure and parameters, see chapter 7.10.

The *PPPoE user name* parameter is effective only in DSL mode.

Enter the user name to establish the DSL connection. You receive the user name from your DSL connection provider or your Internet services provider.

Factory setting: guest

PPPoE password

➲ Data structure and parameters, see chapter 7.10.

The *PPPoE password* parameter is effective only in DSL mode.

Enter the password to establish the DSL connection. You receive the password from your DSL connection provider or your Internet services provider.

Factory setting: guest

LAN Connection

Own IP address

➲ Data structure and parameters, see chapter 7.10.

Enter here the IP address under which the ZDUE-LAN-SyM² module can be reached.

Note

With DSL mode or when DHCP is used, the own IP address is automatically assigned via LAN or DSL. In this case, do not enter any values. Entered values are ignored.

Factory setting: 0.0.0.0

Own Subnet Mask

➲ Data structure and parameters, see chapter 7.10.

Enter here the subnet mask of the ZDUE-LAN-SyM² module to the LAN or DSL modem.

Note

With LAN mode and use of DHCP, the own subnet mask is automatically assigned via LAN. In this case, do not enter any value. Entered values are ignored.

Factory setting: 255.255.255.0

Gateway

➲ Data structure and parameters, see chapter 7.10.

Enter here the Gateway IP of the ZDUE-LAN-SyM² module to the LAN or DSL modem.

Note

With LAN mode and use of DHCP, the own gateway IP is automatically assigned via LAN. In this case, do not enter any value. Entered values are ignored.

Factory setting: 0.0.0.0

Primary DNS, Secondary DNS, Tertiary DNS

➲ Data structure and parameters, see chapter 7.10.

Enter here the IP address of the primary DNS (= *Domain Name Server*), of the secondary DNS and of the tertiary DNS.

The IP addresses of the DNS do not have to be entered if the ZDUE-LAN-SyM² module gets these addresses from a DHCP server in the LAN. In this case, do not enter any values.

Note

Entered values are ignored.

The DNS are needed if the NTP servers are addressed via a host name and not via an IP address (see chapter 6.3.1).

Factory setting: 0.0.0.0 (primary, secondary, tertiary DNS)

Additional Functions

Computer name

➲ Data structure and parameters, see chapter 7.10.

Enter here a computer name for the ZDUE-LAN-SyM² module.
Use, for example, the server ID as computer name.

Factory setting: NONE (= no entry)

DHCP

➲ Data structure and parameters, see chapter 7.10.

This parameter is only effective when the DSL mode is switched off.

Set the check when you use a DHCP server and the ZDUE-LAN-SyM² module gets its own IP address, subnet mask, DNS addresses assigned automatically from a DHCP server in the LAN.

Factory setting: True (DHCP on)

ICMP

➲ Data structure and parameters, see chapter 7.10.

Enter how the ZDUE-LAN-SyM² module should react to ICMP ping packets, which it receives over the LAN or DSL connection.

When you set the check mark, the ZDUE-LAN-SyM² module answers the ICMP ping packets.

If you do not set the check mark, the ICMP ping packets are not answered but discarded.

Factory setting: False (= no ICMP)

Note

Activation of the ICMP function entails the risk of increased communication costs and a blocking of the control centre connection, since each received ping packet is answered.

Current Values

The currently used values of the following parameters are displayed:

➲ Data structure and parameters, see chapter 7.11.

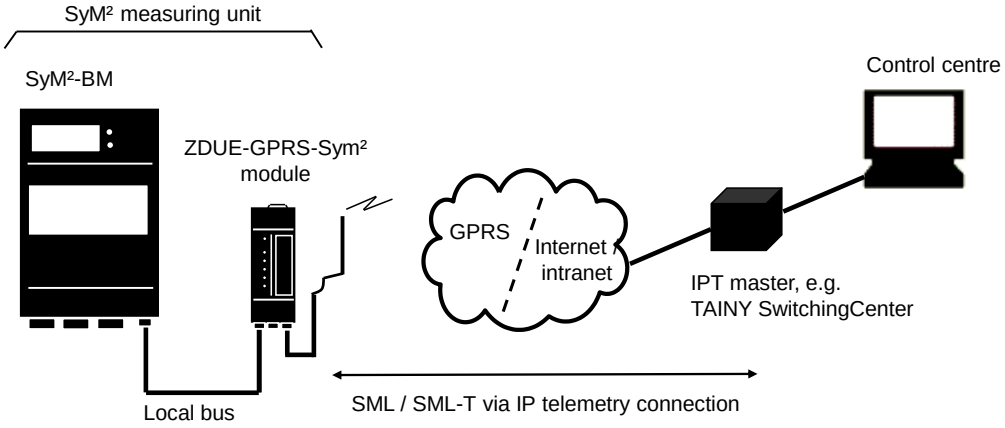
- Own IP address
- Own subnet mask
- Gateway
- Primary DNS, Secondary DNS, Tertiary DNS

6.2.5 IP Telemetry connection

The ZDUE-GPRS-SyM² module in the GPRS mode and the ZDUE-LAN-SyM² module use the IP Telemetry protocol (IPT) for the connection to the remote control centre.

For parameter setting of the IP Telemetry connection, follow the explanations in this chapter.

Further, a series of parameters are explained that give information on the condition of the connection.

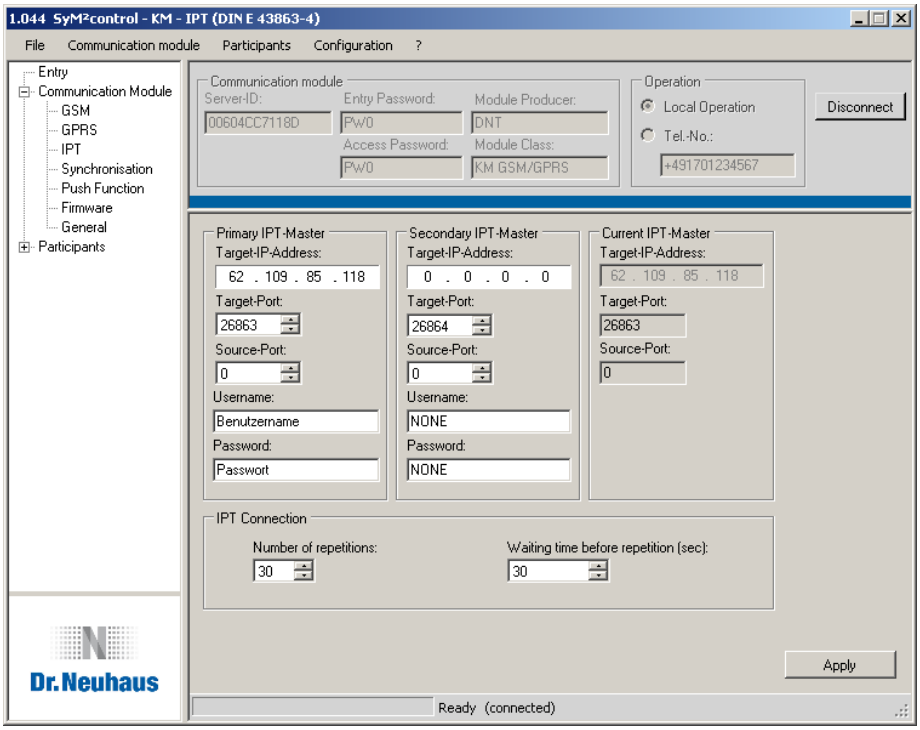


As soon as the connection to the Internet or intranet is established via GPRS, LAN or DSL, the ZDUE-GPRS-SyM² module or the ZDUE-LAN-SyM² module establishes an IP Telemetry connection according to E DIN 43863-4 to the parameterised IP Telemetry master. For this, an access must be set up at the IP Telemetry master (e.g. TAINY SwitchingCenter). Logon is made using password and user name.

The logon can be rejected by the IP Telemetry master if the master is full. In this case, the ZDUE-SyM² communication modules can log on to a secondary IP-T master.

The control centre is also connected to the IP Telemetry master.
The communication between communication module and control centre thus takes place over the IPT master.

View of SyM² configuration software



Primary and secondary IPT master

Target IP address

➲ Data structure and parameters, see chapter 7.12.

Enter here the public IP address under which the primary or secondary IPT master can be reached.

Factory setting: Primary: 0.0.0.0; Secondary: 0.0.0.0

Target port

➲ Data structure and parameters, see chapter 7.12.

Enter here the port number under which the primary or secondary IPT master can be reached.

Factory setting: Primary: 0; Secondary: 0

Source port

➲ Data structure and parameters, see chapter 7.12.

Enter here the number of the IP port at the ZDUE-GPRS-SyM² module or ZDUE-LAN-SyM² module, from which the IP Telemetry connection is established to the IPT master.

If the value 0 is entered, the ZDUE-GPRS-SyM² module or ZDUE-LAN-SyM² module selects the source port for each connection freely again.

Factory setting: Primary: 0; Secondary: 0

User name

➲ Data structure and parameters, see chapter 7.12.

Enter here the user name for authentification at the primary or secondary IPT master.

Factory setting: Primary, secondary: NONE (= no entry)

Password

➲ Data structure and parameters, see chapter 7.12.

Enter here the user name for authentication at the primary or secondary IPT master.

Factory setting: Primary, secondary: NONE (= no entry)

Current IPT master

The following parameters of the currently used IPT master are displayed:

➲ Data structure and parameters, see chapter 7.13.

- Current target IP address
- Current target port
- Current source port

IPT Connection

Number of repetitions

➲ Data structure and parameters, see chapter 7.12.

Enter here the number of tries to reconnect an interrupted IPT connection.

For the ZDUE-GPRS-SyM² module, this parameter is only used when the Quality of Service parameter (see chapter 6.2.3) is set to 0.

Factory setting: 30

Waiting time before repetition (sec)

➲ Data structure and parameters, see chapter 7.12.

Enter here the waiting time between tries to reconnect an interrupted IPT connection.

For the ZDUE-GPRS-SyM² module, this parameter is only used when the Quality of Service parameter (see chapter 6.2.3) is set to 0.

Factory setting: 30 seconds

6.3 Synchronisation

To synchronise the load profile collectors of a SyM² measuring unit, the ZDUE-SyM² communication module sends synchronous tokens onto the local bus.

Enter here the function for dispatching the synchronous token.

Function

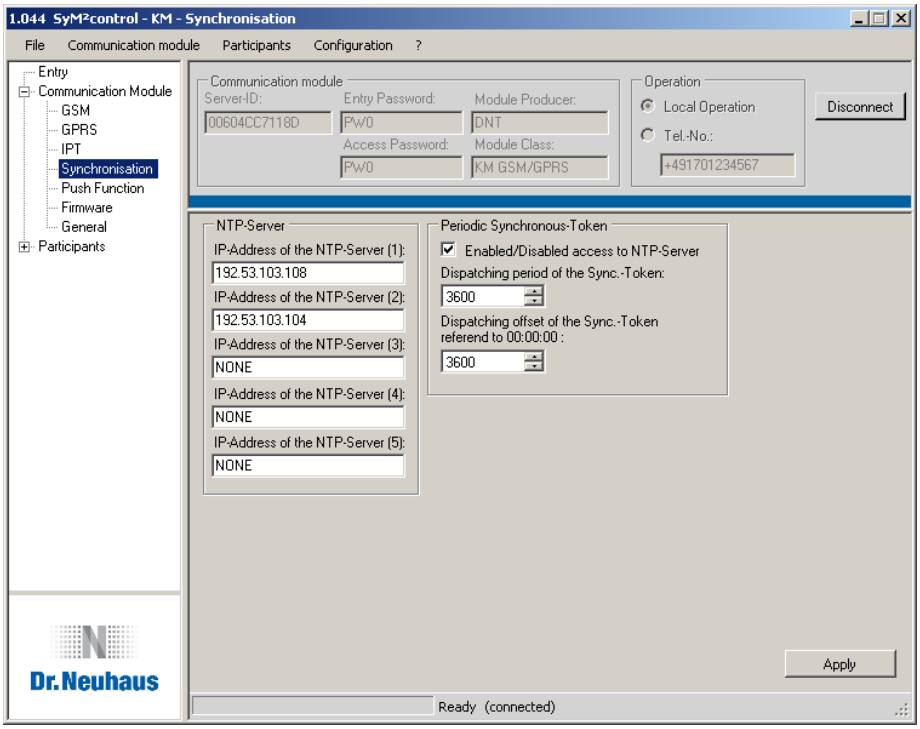
The ZDUE-SyM² communication module uses the synchronous token either after receiving a corresponding command or automatically as a periodic synchronous token.

The periodic synchronous token is sent only by ZDUE-SyM² communication modules that have access to an NTP server. Only the ZDUE-GPRS-SyM² module and ZDUE-LAN-SyM² module support access to NTP servers.

For synchronisation, the ZDUE-SyM² communication modules dispatches, with the synchronous token, the number of seconds still needed until the next synchronisation point (the next full hour).

6.3.1 Automatic dispatching of synchronous tokens

View of SyM² configuration software



NTP server

To establish the time reference (see chapter 6.8.2) and to automatically dispatch synchronous tokens, the ZDUE-SyM² communication module requires an exact time specification. The ZDUE-PSTN-SyM² module and ZDUE-GPRS-SyM² module in the GSM mode receive the exact time specification from the control centre. The ZDUE-LAN-SyM² module and ZDUE-GPRS-SyM² module in the GPRS mode obtain the exact time independently over their connection to the Internet or intranet from one or more NTP servers (NTP = Network Time Protocol). Due to the time delays over TCP/IP connections, the ZDUE-LAN-SyM² module and ZDUE-GPRS-SyM² module in the GPRS mode cannot obtain the exact time directly from the control centre.

IP address of the NTP server (1-5)

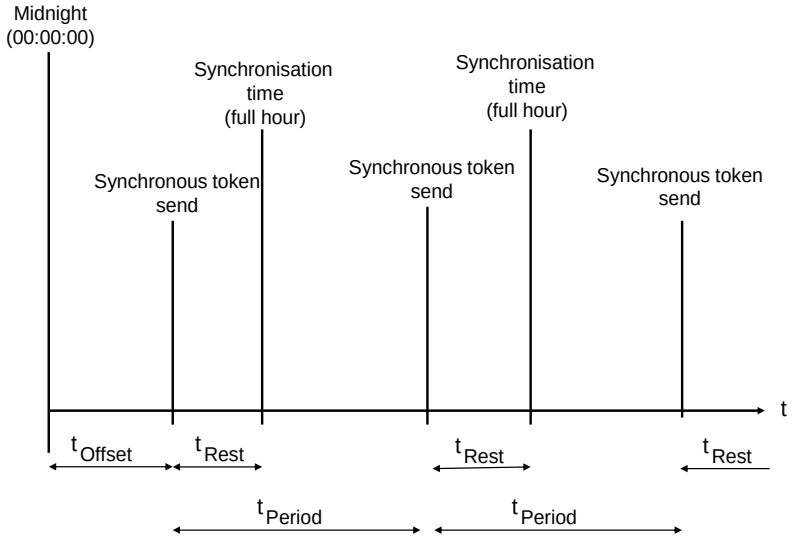
➲ Data structure and parameters, see chapter 7.14.

Enter here the IP addresses or host names of up to 5 NTP servers. First, the attempt is made to obtain the time from the first NTP server; if this fails, the next NTP server is tried.

In accordance with the Internet standards, port 123 is always used for NTP

Periodic Synchronous Token

Chronological sequence



t-Offset is the time the ZDUE-SyM² communication module waits to dispatch the first synchronous token after establishing operational readiness. The offset refers to midnight (00:00:00).

t-Period is the period of time between two synchronous tokens.

t-Rest is the period of time between dispatching of the synchronous token and the next synchronisation time (next full hour). t-Rest is transferred in the synchronous token.

Enabled/disabled access to NPD server

➲ Data structure and parameters, see chapter 7.14.

Enter here whether the ZDUE-GPRS-SyM² module and ZDUE-LAN-SyM² dispatch periodic synchronous tokens *(set check mark)* or not *(do not set check)*.

Factory setting: Deactivated (= no periodic synchronous token)

Dispatching period of the sync token ($t_{Periode}$)

➲ Data structure and parameters, see chapter 7.14.

Enter here the period for dispatching the synchronous token.

Normally, dispatching of the synchronous token and thus synchronisation on the registration period takes place once per day (86400 seconds).

Factory setting: 86400 (seconds)

Dispatching offset of the sync. token (t_{Offset})

➲ Data structure and parameters, see chapter 7.14.

Enter here the dispatching offset of the 1st synchronous token after the ZDUE-SyM² communication module is switched on (reference to 00:00:00)

Factory setting: 500 (seconds)

6.3.2 Synchronous token triggered by the control centre

Function

Sending of the synchronous token by the ZDUE-SyM² communication module can also be triggered by the control centre. The control centre sends a request for dispatching the synchronous token to the ZDUE-SyM² communication module. The order message of the control centre contains the remaining t-Rest to the next synchronisation time.

The request message to the ZDUE-SyM² communication module for triggering the synchronous token must contain the access password of the ZDUE-SyM² communication module.

The request message can be sent to the ZDUE-SyM² communication module over the control centre connection and the service interface.

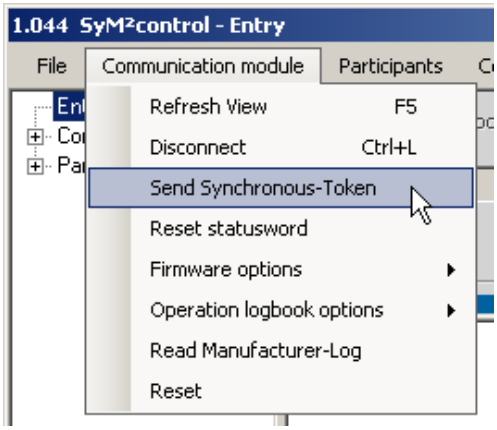
This function is supported by all ZDUE-SyM² communication modules.

Send Synchronous Token

➲ Data structure and parameters, see chapter 7.18.

With the *SyM²control*, a command for sending the synchronous token can be sent to the ZDUE-SyM² communication module.

In the *Communication module* menu, select the *Send synchronous token* submenu.



As a check, the next synchronisation time (next full hour) and the time (remaining time) until the synchronisation time are displayed.

With Yes, you send the order message to the ZDUE-SyM² communication module; with No, you cancel the procedure.

If the ZDUE-SyM² communication module has access to an NTP server, the ZDUE-SyM² communication module calculates, from the NTP time, the time remaining to the next synchronisation time (full hour) and uses this calculated remaining time.

6.4 Push operation

6.4.1 Function

The Push mode is supported only by ZDUE-SyM² communication modules that are connected to their control centre by IP Telemetry protocol. The ZDUE-GPRS-SyM² module and ZDUE-LAN-SyM² module can establish IP Telemetry connections.

In the Push mode, the ZDUE-SyM² communication module independently obtains the data from the SyM² measuring unit in a push process and transmits it to the control centre. The push channel of the IP Telemetry protocol is used to transmit the data to the control centre. Up to 32 different push processes can be parameterised.

Type to push process

The ZDUE-SyM² communication modules support three different types of push processes:

Auto load profile

In a push process of the type "Auto load profile", the ZDUE-SyM² communication module queries the load profile from the connected SyM² base module and sends it together with the time reference to the parameterised push target. The version "Auto load profile" can only be used if exactly one SyM² base module is connected to the ZDUE-SyM² communication module. In this case, manual setting of additional parameters is not necessary. If several SyM² basic modules are connected to a communication module, the "Addressed Profile" version must be used. The push of the auto load profile takes place periodically. If the ZDUE-SyM² communication module recognises several SyM² basic modules, the auto load profile is deactivated.

The load profile for the completed push interval is always selected as the range for the load profile to be periodically sent.

Addressed Profile

In the "Addressed Profile" version, the measurement variable of a SyM² base module can be selected; this variable is read out as a load profile by the ZDUE-SyM² communication module and then transferred to the push target. Base module and measurement variable are defined via the Server ID parameter of the push source and identifier of the measurement variable. The push of the addressed profile takes place periodically.

The profile for the completed push interval is always selected as the range for the profile to be periodically sent.

Installation parameters

In the push of the installation parameters, the ZDUE-SyM² communication module calls on the SyM² modules connected to the local bus by broadcast to identify themselves. The answers are then transmitted to the parameterised push target. The push of the installation parameters is event-driven. The event is triggered one minute after reaching operational readiness with the following limitation if the ZDUE-SyM² communication module was previously switched off completely. If the ZDUE-SyM² communication module was in the "High Priority Operation" mode, see chapter 1.4.2, before reaching operational readiness, the push of the installation parameters does not occur.

The following parameters are transmitted to the push target:

- IP address to the WAN of the ZDUE-SyM² communication module
- Server IDs of the recorded SyM² base modules
- Server IDs of the recorded external load profile collector

Caution

The process for recording the data cannot ensure that all SyM² modules connected to the local bus are recognised.

Sequence of push processes of the type auto load profile and addressed profile

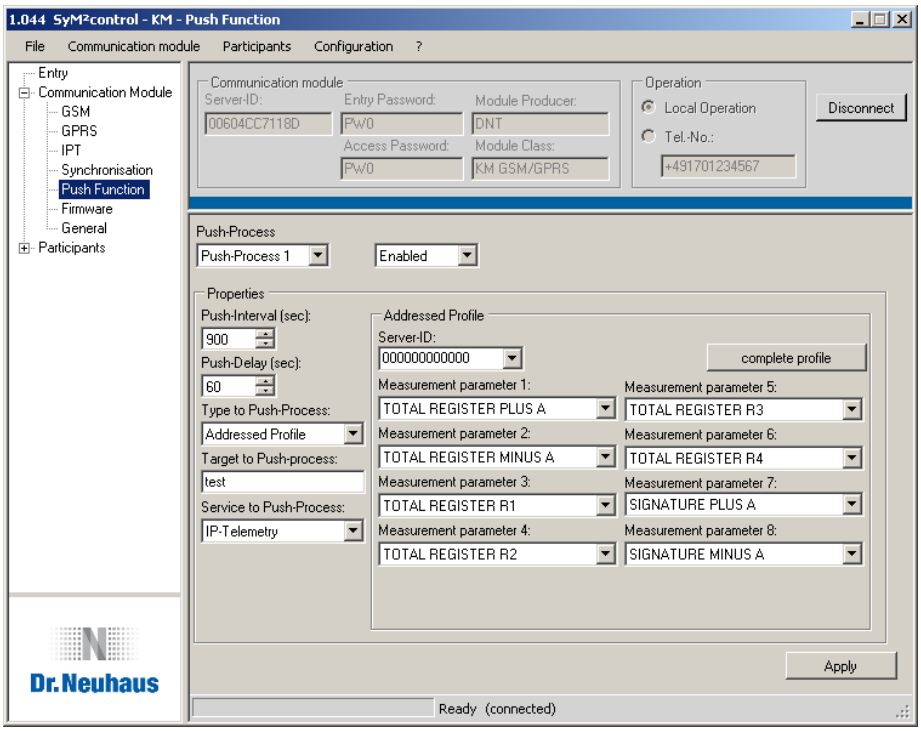
The push processes of the type auto load profile or addressed profile with the "load profile Reading" action are only possible if the ZDUE-SyM² communication module has access to an NTP server.

Push processes of the type auto load profile or addressed profile consist of the following steps:

1. Automatic production of the time reference (see 7.18.1)
2. composition of the SML file to be sent by push, whereby the previously obtained time information and the load profile to be sent must be recorded in it;
3. sending of the created SML file.

If the time reference cannot be produced, e.g. because the NTP server cannot be reached, the load profile is sent without time reference.

View of SyM² configuration software



6.4.2 Push (auto load profile and addressed profile)

Push process

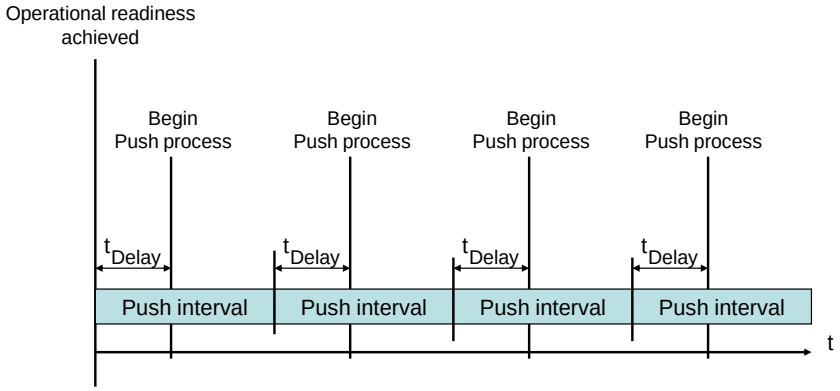
➲ Data structure and parameters, see chapter 7.15.

Choose here the number of the push process to be parameterised.

You can define up to 32 push processes. Choose whether the push process should be activated or deactivated.

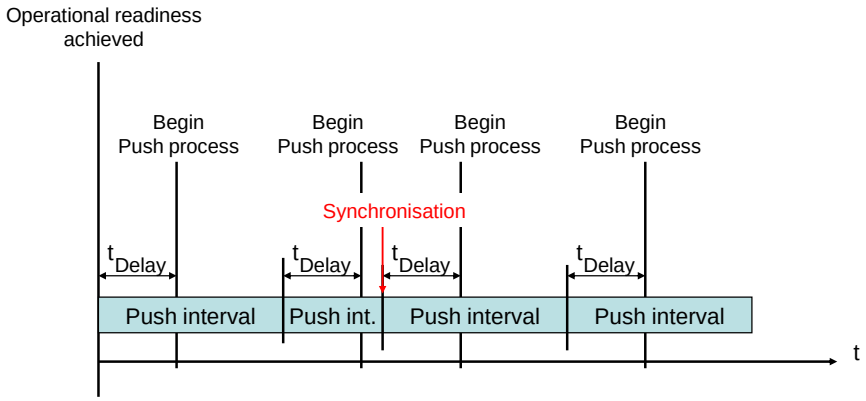
Time response of periodic push processes (after operational readiness is established)

The push processes for the auto load profile and the addressed profile are interval-controlled. A push interval is started when operational readiness of the ZDUE-SyM² communication module has been achieved. Operational readiness is achieved when the power supply of the ZDUE-SyM² communication module is established and remote communication to the push target available.



Time response of periodic push processes (for synchronisation)

With each recognised synchronous token, its content newly establishes the start point for the push interval.



Push interval (sec)

➲ Data structure and parameters, see chapter 7.15.

Enter here the push interval in seconds.

Push delay (sec)

➲ Data structure and parameters, see chapter 7.15.

Enter here the push delay in seconds.

Type to push process

➲ Data structure and parameters, see chapter 7.15.

Choose Auto load profile or Addressed Profile.

For the push process of type Addressed Profile, list elements should also be transferred that contain the server ID of the push source and the OBIS identifier of the measurement variable.

Target to push process

➲ Data structure and parameters, see chapter 7.15.

Enter here the IPT push target for the push process at the control centre that is connected to the IPT master and set up there.

Service to push process

➲ Data structure and parameters, see chapter 7.15.

Enter here the service used for the push. Currently only IP Telemetry is supported.

Server ID (only for *addressed profile* and *addressed registers*)

➲ Data structure and parameters, see chapter 7.15.

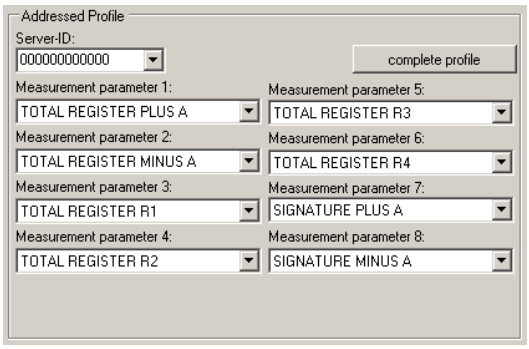
Parameterise here the server ID of the base module or of the external load profile collector whose data is to be transferred with the push process.

Addressed Profile

Measurement parameters (only for *addressed profile*)

➲ Data structure and parameters, see chapter 7.15.

Parameterise here up to eight measured values that are to be transferred with the push process. The *complete profile* button fills all entries automatically.

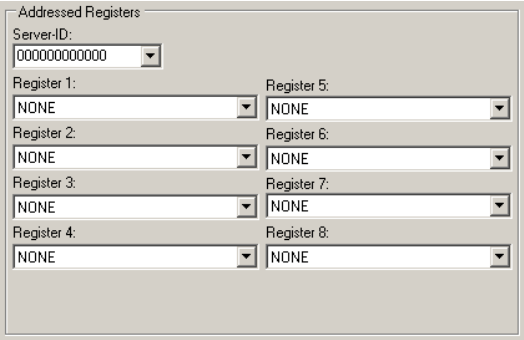


Addressed Register

Measurement parameters (only for *addressed profile*)

➲ Data structure and parameters, see chapter 7.15.

Parameterise here up to eight register values that are to be transferred with the push process.



Action in case of malfunctions

Push processes do the following in case of faults on the remote traffic route or faults in operational readiness:

- While the fault condition or lack of operational readiness exists, if one or more push processes was not performed, the last of the unperformed push processes is redone.
- If the unperformed push process is a periodic process, the time periods to be used with the redone push process are set to cover the period starting with the end of the last successful push process up to the current time. The time interval to be queried is in fact extended.

If the answer of a push source is missing, push processes do the following:

- The ZDUE-SyM² communication module does not generate an error message. The message, which might be awaited at a centre, does not arrive.
- With the next push process, the lost time period is automatically retrieved.

6.4.3 Push (Installation parameters)

IPT Push Process Number

➲ Data structure and parameters, see chapter 7.15.

Choose here the number of the push process to be parameterised.

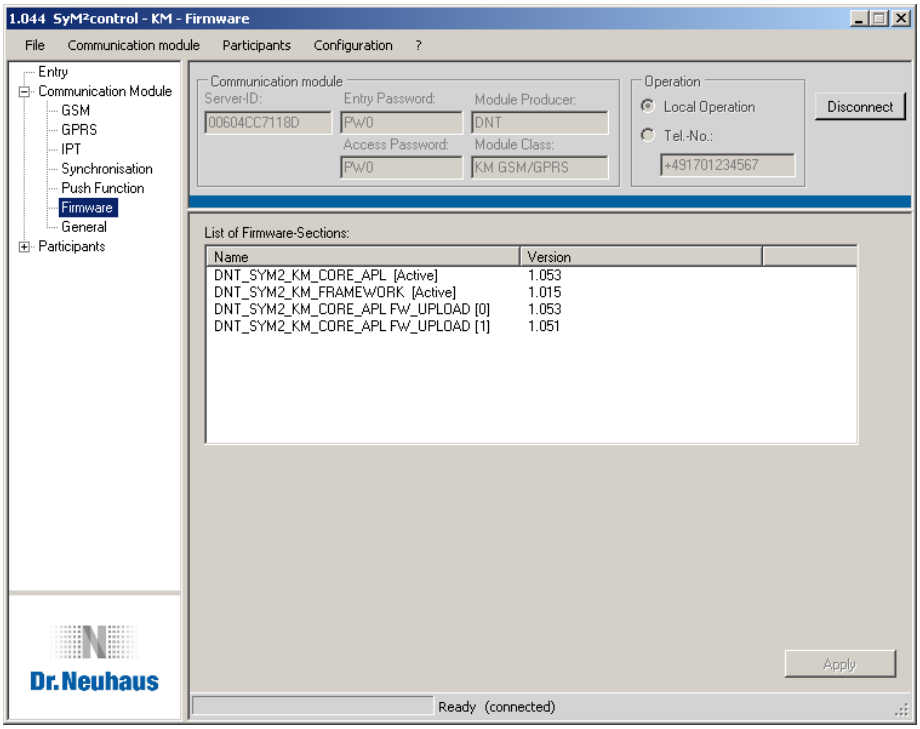
Type of push process

➲ Data structure and parameters, see chapter 7.15.

Choose the installation parameters.

6.5 Firmware

The firmware contains the fundamental programming of the ZDUE-SyM² communication modules and consists of several components.



List of firmware sections

➲ Data structure and parameters, see chapter 7.2.

A list of firmware components in the ZDUE-SyM² communication module is displayed.

Firmware components not marked with "_Upload[x]" are currently active.

"_Upload[0]" identifies the last loaded firmware version.

"_Upload[1]" identifies the second-to-last loaded firmware version.

Version

➲ Data structure and parameters, see chapter 7.2.
The version numbers of the firmware components in the ZDUE-SyM² communication module are displayed.

Firmware Update

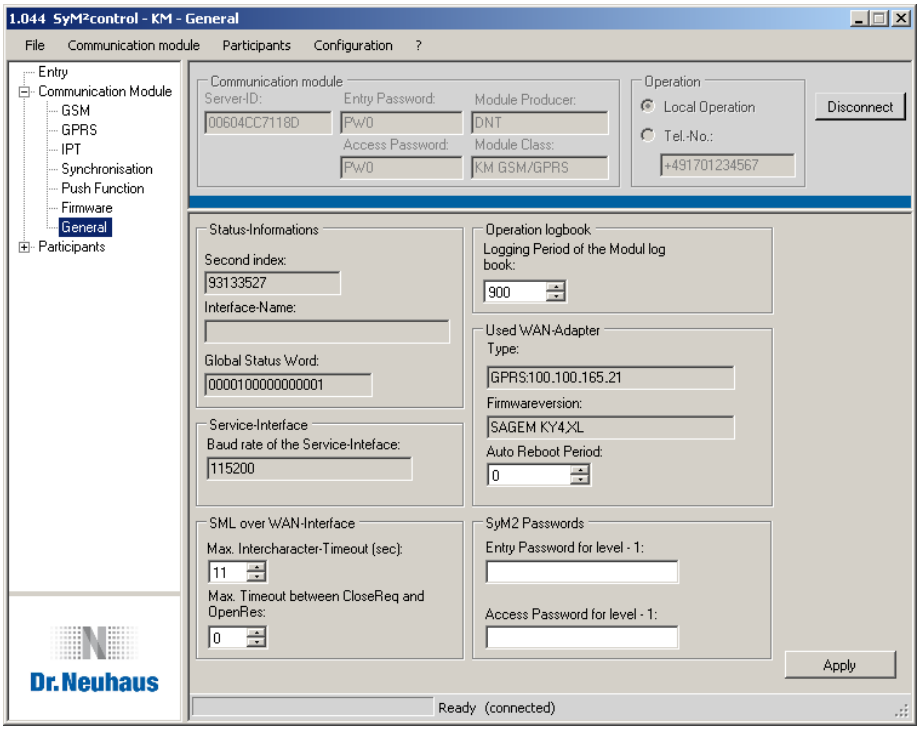
It is possible to update the firmware of the ZDUE-SyM² communication modules.

See chapter 6.7.5 “Firmware Options”.

6.6 Other

Enter here various special functions and view status parameters.

View of SyM² configuration software



6.6.1 Operating Seconds Index, Global Status Word, Interface Name

Status Information

Second index

➲ Data structure and parameters, see chapter 7.17.

The *second index* counts the operating time of the ZDUE-SyM² communication module in seconds. The *second index* starts after initialisation of the ZDUE-SyM² communication module as a result of a reboot and stops with a reboot or when the power supply is cut off.

In operation, the status of the *second index* is stored permanently at least every 15 seconds. After a reboot, the status of the *second index* falls back to the last permanently stored value.

Interface Name

➲ Data structure and parameters, see chapter 7.17.

A list of the interfaces available in the ZDUE-SyM² communication modules is output.

Global Status Word

➲ Data structure and parameters, see chapter 7.17.

The global status word is binary coded and provides information on various functions of the ZDUE-SyM² communication module.

Meaning for ZDUE-PSTN-SyM² module:

Status word bit	Meaning
Bit 0	Always set to 1
Bit 1 …7	Always set to 0
Bit 8	Set to '1‘ if a 'fatal error‘ has been detected. Reset only by SML command by writing with '0‘
Bit 9	Set to '1‘ if a reboot has been performed due to a detected internal fault. Reset only by SML command by writing with '0‘
Bit 10	0: PSTN connection exists 1: PSTN connection does not exist
Bit 11	0: Voltage detected on the telephone line 1: Voltage not detected on the telephone line
Bit 12…63	Always set to 0

Meaning for ZDUE-GPRS-SyM² module in the GSM mode:

Status word bit	Meaning
Bit 0	Always set to 1
Bit 1 …7	Always set to 0
Bit 8	Set to '1‘ if a 'fatal error‘ has been detected. Reset only by SML command by writing with '0‘
Bit 9	Set to '1‘ if a reboot has been performed due to a detected internal fault. Reset only by SML command by writing with '0‘
Bit 10	0: CSD connection exists 1: CSD connection does not exist
Bit 11	0: GSM network detected 1: GSM network not detected
Bit 12	0: Logged into the GSM network 1: Not logged into GSM network
Bit 13…63	Always set to 0

Meaning for ZDUE-GPRS-SyM² module in the GPRS mode:

Status word bit	**Meaning**
Bit 0	Always set to 1
Bit 1 …7	Always set to 0
Bit 8	Set to '1‘ if a 'fatal error‘ has been detected. Reset only by SML command by writing with '0‘
Bit 9	Set to '1‘ if a reboot has been performed due to a detected internal fault. Reset only by SML command by writing with '0‘
Bit 10	0: Connection to the APN exists 1: Connection to the APN does not exist
Bit 11	0: GSM network detected 1: GSM network not detected
Bit 12	0: Logged into the GSM network 1: Not logged into GSM network
Bit 13	0: Logged in at the IPT master 1: Not logged in at the IPT master
Bit 14…63	Always set to 0

Meaning for ZDUE-LAN-SyM² module:

Status word bit	**Meaning**
Bit 0	Always set to 1
Bit 1 …7	Always set to 0
Bit 8	Set to '1‘ if a 'fatal error‘ has been detected. Reset only by SML command by writing with '0‘
Bit 9	Set to '1‘ if a reboot has been performed due to a detected internal fault. Reset only by SML command by writing with '0‘
Bit 10	0: DHCP and/or PPPoE parameter recorded 1: DHCP and/or PPPoE parameter not recorded
Bit 11	0: Ethernet link exists 1: Ethernet link does not exist
Bit 12	Always set to 0
Bit 13	0: Logged in at the IPT master 1: Not logged in at the IPT master
Bit 14…63	Always set to 0

6.6.2 SML over WAN interface (time response)

SML time response on the interface to the control centre

Max. intercharacter timeout (sec)

➲ Data structure and parameters, see chapter 7.4.

The parameter determines the maximum intercharacter timeout (sec.) on the WAN interface. Change the factory setting only if there are problems with communication on the control centre connection.

Factory setting: 20 (seconds)

Max. timeout between CloseReq and OpenRes

➲ Data structure and parameters, see chapter 7.4.

The parameter determines the maximum timeout between SML_CloseReq and SML_OpenRes (sec.) on the WAN interface. Change the factory setting only if there are problems with communication on the control centre connection.

Factory setting: 30 (seconds)

SML time response on the service interface and local bus

The Maximum Intercharacter Timeout and the Maximum Timeout between SML_CloseReq and SML_OpenRes are also monitored on the local bus and service interface. The values are fixed in the program and cannot be parameterised:

Maximum Intercharacter Timeout:

- 10 seconds on the local bus
- 15 seconds on the service interface

Maximum Timeout between SML_CloseReq and SML_OpenRes:

- 10 seconds on the local bus
- 15 seconds on the service interface

6.6.3 SyM² passwords (entry protection, access protection)

Entry protection

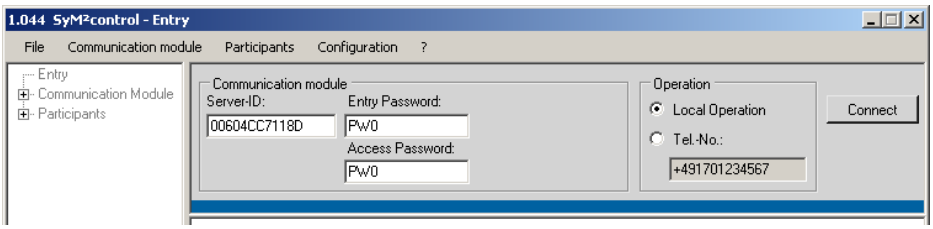
Access to a SyM² measuring unit on the data connection to the control centre is protected with an entry password. ZDUE-SyM² communication modules test this entry password on this interface. The entry password must be transferred with each SML file in the direction of an SyM² measuring unit. If the entry password is correct, the received SML file is processed further by the ZDUE-SyM² communication module. If the entry password is incorrect, the SML file is rejected and the ZDUE-SyM² communication module sends an attention message to the sender

Service interface and local bus do not require password

The entry password is not checked for SML files received by a ZDUE-SyM² communication module over the service interface or the local bus.

Note

If you change the entry or the access password and dispatch it to the connected ZDUE-SyM² communication module, the connection between the SyM² configuration software and the ZDUE-SyM² communication module is interrupted. Before the connection can be re-established, you have to enter the new passwords as new access data for the connection.



Entry password

➲ Data structure and parameters, see chapter 7.17.

Enter here the entry password. The following ASCII characters may be used:

! " # $ % & ' ( ) * + , . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] ^ _ ` a b c d e f g h I j k l m n o p q r s t u v w x y z { | } ~

Factory setting: PW0

Access protection

In principle, access to functions and parameters of a SyM² module is restricted by password. The access password is transmitted as part of the SML messages. Each SyM² module rejects SML messages if the password in the SML message does not agree with the stored password in the SyM² module. The various SyM² modules of a SyM² measuring unit can use different access passwords simultaneously.

No password is needed for access to some functions and parameters, in variance from the basic principle. In the case of ZDUE-SyM² communication modules, the information on producer and device type can be queried without password. Likewise, no access password is required for firmware download and to activate the firmware.

Access password

➲ Data structure and parameters, see chapter 7.17.

Enter here the access password. The following ASCII characters may be used:

! " # $ % & ' ( ) * + , . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] ^ _ ` a b c d e f g h I j k l m n o p q r s t u v w x y z { | } ~

Factory setting: PW0

6.6.4 Operation logbook

➲ Data structure and parameters, see chapter 7.17.

The ZDUE-GPRS-SyM² module can periodically write status information into the operation logbook, see 7.20.

This parameter determines in what time intervals such an entry should be made.

If the parameter is set to 0, no periodic entries are made in the operation logbook.

Factory setting: 900 (seconds)

6.6.5 Used WAN adapter (Type, Firmware version, Auto reboot period)

The ZDUE-SyM² communication modules are internally modular. The WAN adapter is the functional block of a ZDUE-SyM² communication module, which establishes the connection to the control centre.

For the ZDUE-PSTN-SyM² module, the WAN adapter is an analog modem, for the ZDUE-GPRS-SyM² module a GSM wireless modem and for the ZDUE-LAN-SyM² module an Ethernet adapter.

Type

➲ Data structure and parameters, see chapter 7.3.

The type of the used WAN adapter is displayed (only ZDUE-PSTN-SyM² module and ZDUE-GPRS-SyM² module).

Firmware version

➲ Data structure and parameters, see chapter 7.3.

The firmware version of the used WAN adapter is displayed (only ZDUE-PSTN-SyM² module and ZDUE-GPRS-SyM² module).

Auto reboot period

➲ Data structure and parameters, see chapter 7.4.

To prevent unplanned interruptions of the control centre connection or unreachability of the ZDUE-SyM² communication modules, a periodic reboot of the WAN adapter can be parameterised. After the reboot, the ZDUE-SyM² communication module re-establishes the connection to the control centre or is ready to call again.

If a connection to the control centre is present, automatic reboot is delayed until the connection is ended. After this delay, the original time pattern is re-established.

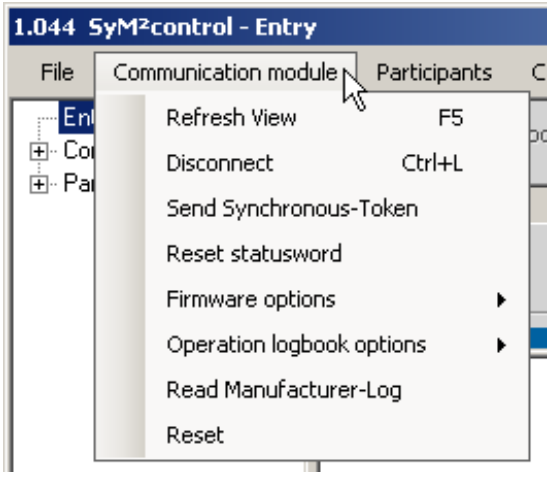
Enter the period (in seconds) after which the WAN adapter is rebooted. A typical value is 24 hours (86400 seconds.)

If set to 0, no automatic reboot takes place

Factory setting: 86400 (seconds)

6.7 Communication module actions

The menu *Communication Module* combines various operating functions of a ZDUE-SyM² communication module:



6.7.1 Send Synchronous Token

Information on the synchronous token can be found in chapter 6.3.2.

6.7.2 Operation logbook options

Function

Important operation events of the ZDUE-SyM² communication module are stored in the operation logbook.

All ZDUE-SyM² communication modules write status information into the operation logbook when one of the established events occurs.

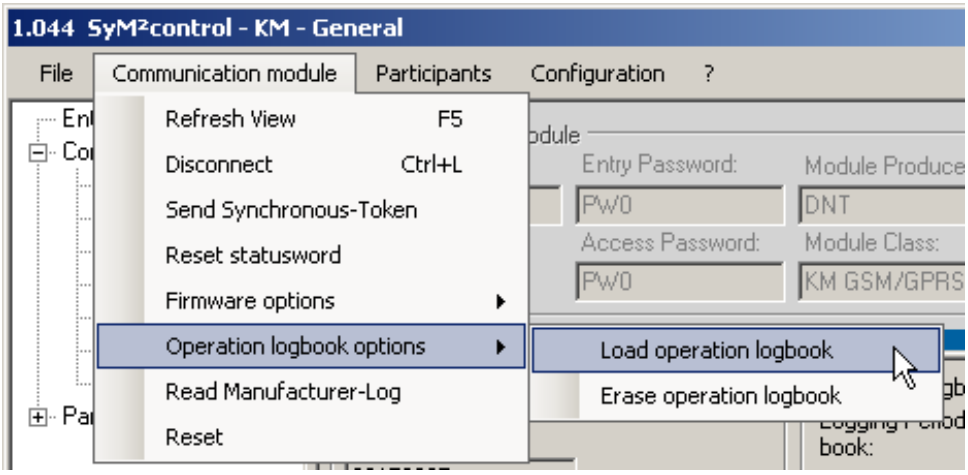
If correspondingly parameterised, the ZDUE-GPRS-SyM² modules also write periodic entries in the logbook.

Logbook information

The following information is recorded in the operation logbook periodically (only ZDUE-GPRS-SyM² module) or in case of an event (all ZDUE-SyM² communication modules):

- Status of the operating seconds index
- Status word
- Triggering event
- Peer address (source of the event)
- Only for GSM/GPRS: Current field strength
- Only for GSM/GPRS: Cell Identifier
- Only for GSM/GPRS: Location Area Code
- Only for GSM/GPRS: Current provider identifier

You can find a list of the events that trigger logbook entries in chapter 7.21.



Load operation logbook

➲ Data structure and parameters, see chapter 7.20.
Choose *Load operation logbook* to transfer the operation logbook from the ZDUE-SyM² communication module to the computer.

Select the time period of the operating seconds index and the information to be loaded.

SyM²control converts the coded information into plain text messages.

The operation logbook is saved on the computer as a CSV file and can be opened with Excel, for example.

Erase Operation Logbook

➲ Data structure and parameters, see chapter 7.20.
Choose *Erase Operation Logbook* to delete the operation logbook in the ZDUE-GPRS-SyM² module.

6.7.3 Read manufacturer log

This is a function for customer services to provide support for the ZDUE-SyM² communication module.

Important log data and current device settings which might be useful for troubleshooting are saved in the manufacturer log file.

If customer services ask you for the manufacturer log in case of problems, load the log onto your PC by selecting *Read manufacturer log* in the menu *Communication module*. Send the log file to customer services.

Caution

The *manufacturer log* contains, among other things, the entire parameter set of the ZDUE-SyM² communication module including all user names and passwords.

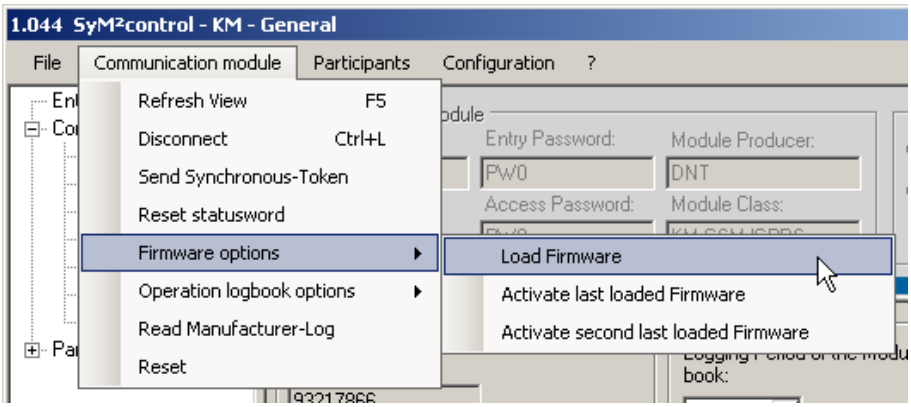
6.7.4 Reset

➲ Data structure and parameters, see chapter 7.19.

Choose *Reset* to send the order for a new start to the ZDUE-SyM² communication module.

6.7.5 Firmware Options

Choose *Firmware Options* to manage the firmware of the ZDUE-SyM² communication module.



Load firmware

➲ Data structure and parameters, see chapter 7.16.

Choose *Load firmware*, to load a new firmware into the ZDUE-SyM² communication module.

Select the file with the new firmware and start the transmission of the firmware to the device.

Example: DNT_815x_CORE_V1.00.SML

Activate New Firmware/Activate Previous Firmware

➲ Data structure and parameters, see chapter 7.16.

The ZDUE-SyM² communication module can store 2 firmware versions at the same time,

- last loaded firmware (marked with Upload 0)
- second to last loaded firmware (marked with Upload 1)

When downloading firmware, this becomes the last loaded firmware The previously last loaded firmware becomes the second last loaded firmware.

To activate one of the two firmwares, choose, in the *Communication Module menu, Firmware Options*

- Activate Last Loaded Firmware or
- Activate Second Last Loaded Firmware.
- Currently active Firmware is marked.

6.8 Participants

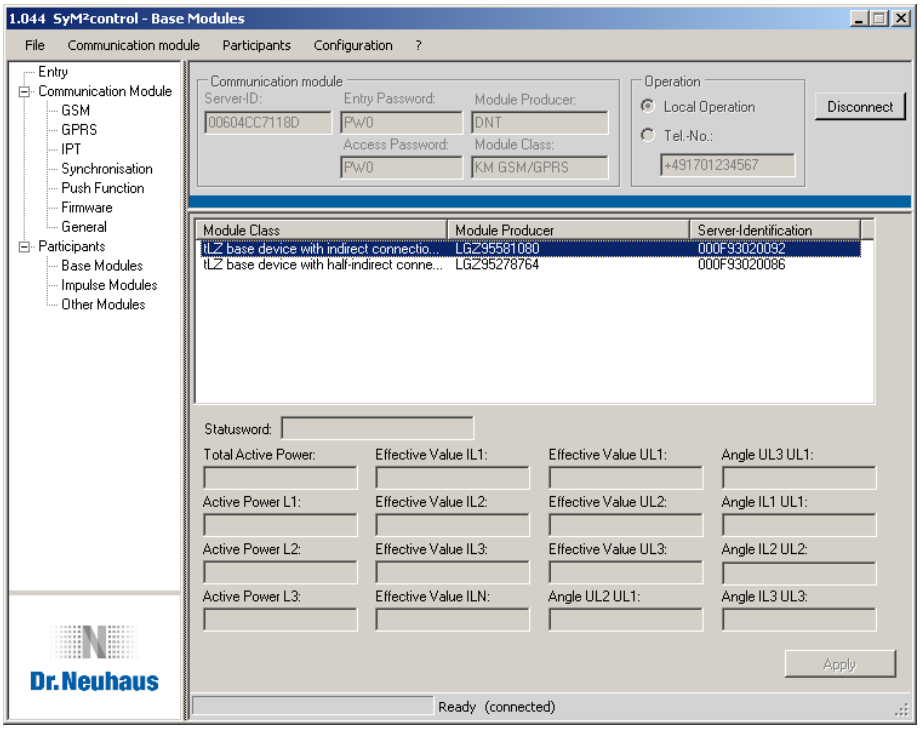
Participants are SyM² components that are connected to the ZDUE-SyM² communication module via the local bus.

The SyM² configuration software automatically sends an order for participant search to the ZDUE-SyM² communication module.

Located under the *Participants* menu option are various functions for operating the connected SyM² modules.

6.8.1 Participant Search

Function



➲ Data structure and parameters, see chapter 7.1.

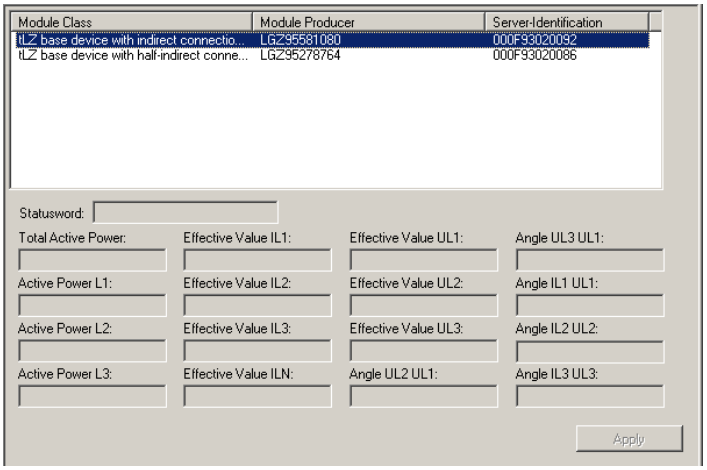
SyM²control automatically sends an order for module identification to the ZDUE-SyM² communication module. This passes the order on to the local bus. The participants on the local bus answer with their device identification.

SyM²control displays the participants that have answered the order for device identification.

In the *Participants* menu, actuate the menu option *Export Table of Participants* to save the list of participants in the local bus in a CSV file.

Base modules

The base modules connected to the ZDUE-SyM² communication module over the local bus are displayed.



Module class

Module class of the base module corresponding to the SyM² coding

Module producer

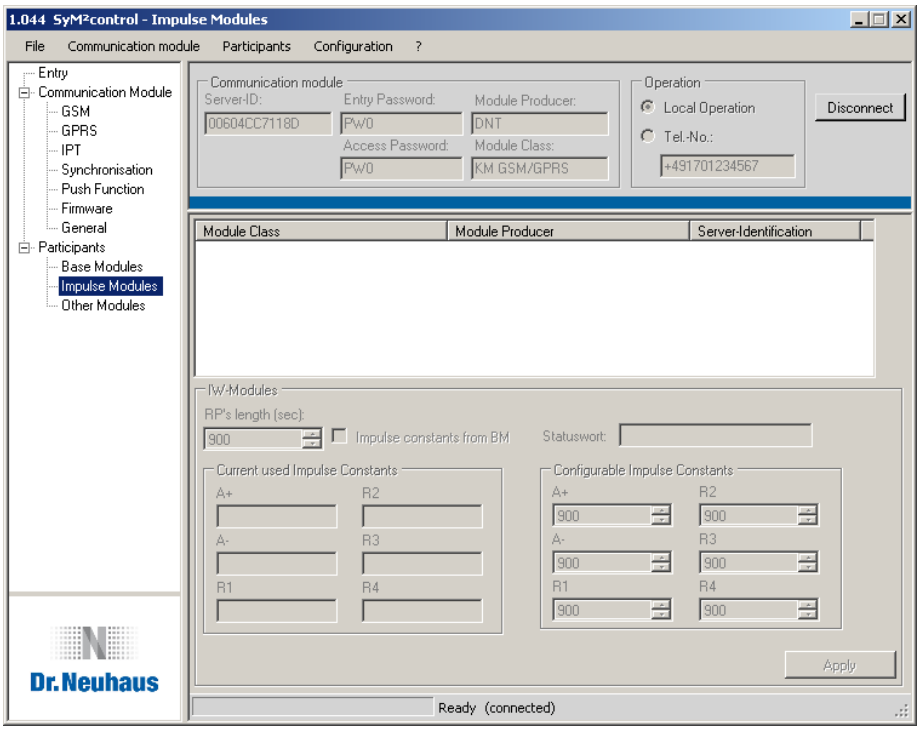
Base module producer (FLAG identifier)

Server identification

Server ID of the base module

Impulse modules

The pulse transmission modules (IW modules) connected to the ZDUE-SyM² communication module over the local bus are displayed.



Module class

Module class of the IW module corresponding to the SyM² coding

Module producer

Producer of the IW module (FLAG identifier)

Server identification

Server ID of the IW module

Other modules

Other SyM² modules that are connected to the ZDUE-SyM² communication module over the local bus and react to a command for device identification, e.g. other communication modules.

Module class

Module class of the SyM² module, corresponding to the SyM² coding.

Module producer

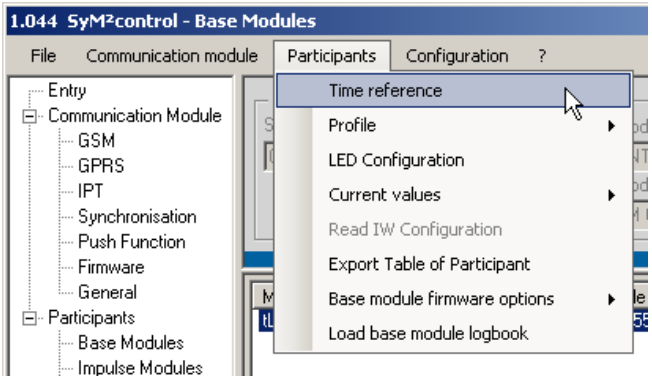
Producer of the SyM² module (FLAG identifier).

Server identification

Server ID of the SyM² module.

6.8.2 Operate base module (time reference, load profile, etc.)

The *SyM²control* configuration software permits operation of various functions in connection with connected base modules via the *Participants* menu:



Please observe to select a base module in the *Base modules* dialog before performing an operation.

Time reference

➲ Data structure and parameters, see chapter 7.18.1.

To establish the time reference, the second index of a base module is read out and set in relation to the current time.

The current time (for the SyM² configuration software, the time of the computer) is sent to the ZDUE-SyM² communication modules with the SML command to establish the time reference.

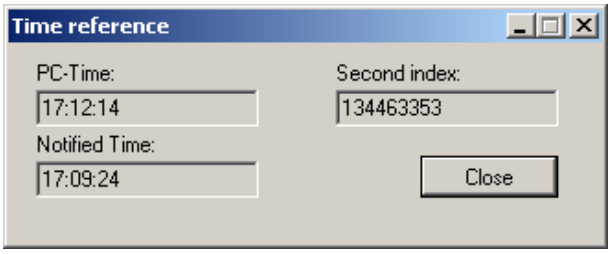
The ZDUE-SyM² communication module then queries the second index of the base module.

After receiving the answer of the base module, the ZDUE-SyM² communication module answers the SML command to establish the time reference with the second index and the current time.

If the ZDUE-SyM² communication module has a connection to an NTP time server, the ZDUE-SyM² communication module sends back the NTP time as current time, otherwise the time it received with the command.

Choose a base module from the list of displayed participants and activate the *Time reference* submenu in the *Participants* menu.

The SyM² configuration software displays the answer of the SyM² communication module as follows:



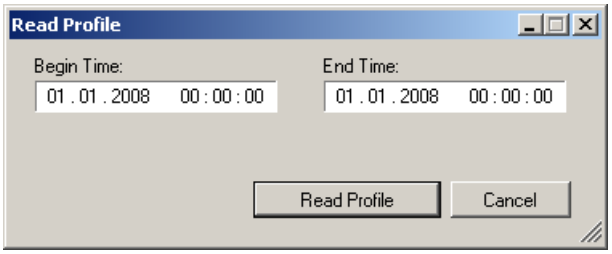
If a time is displayed as notified time, it is the NTP time determined by the ZDUE-SyM² communication module. If the ZDUE-SyM² communication module does not have the NTP Time, the SyM²-configuration software displays "No NTP Time".

Profile

➲ Documentation of the load profile collector

The load profile in the base module is read out via the ZDUE-SyM² communication module.

Choose a base module from the list of displayed participants and activate the *Profile* submenu in the *Participants* menu.



Enter the *Begin time* and *End time* of the load profile to be read out and click the *Read profile* button. The load profile is read out of the base module and stored in both a CSV file (*.csv) and in an SML file (*.sml). Enter the respective storage location.

Erase profile

➲ Documentation of the load profile collector

The load profile in the base module is deleted via the ZDUE-SyM² communication module.

Select a base module from the list of displayed participants and activate the *Erase Profile* submenu in the *Participants* menu.

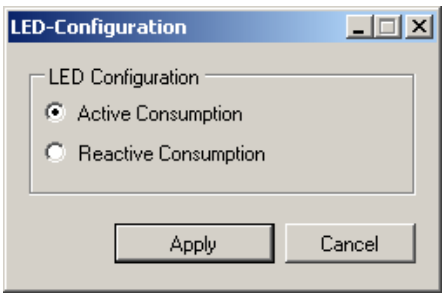
The load profile in the base module is deleted.

LED configuration

➲ Documentation of the base module

Through the ZDUE-SyM² communication module, you can select whether the LED on the base module refers to the active consumption or the reactive consumption.

Select a base module from the list of displayed participants and activate the *LED Configuration* submenu in the *Participants* menu.



Choose between Active Consumption and Reactive Consumption and actuate the *Apply* button.

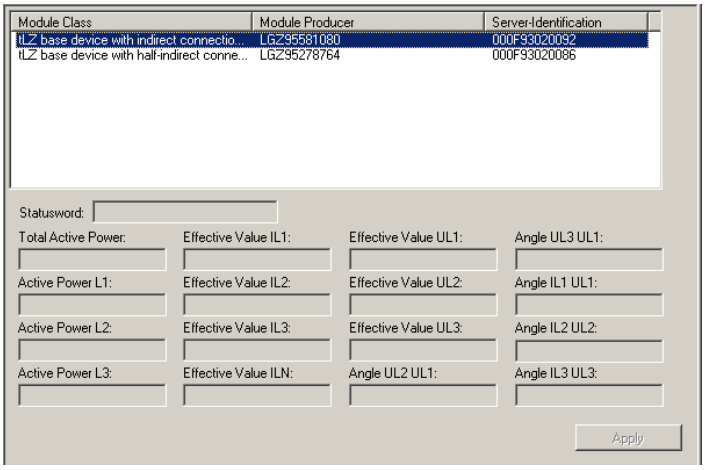
Readout of current values

➲ Documentation of the base module

With the ZDUE-SyM² communication module, you can read various current values from the base module.

Select a base module from the list of displayed participants and activate the *Read current values* submenu in the *Participants* menu.

The current values are read out of the base module and stored in a CSV file. Enter the respective storage location.



Then the current values are displayed under the list of displayed participants.

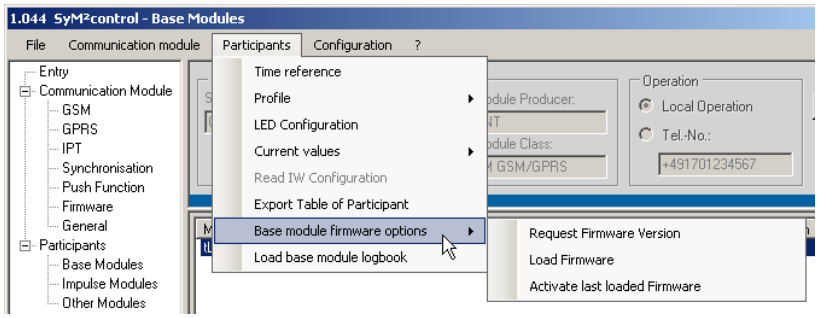
Export table of participants

➲ Data structure and parameters, 7.1.

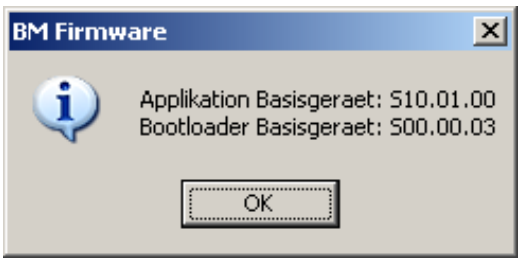
Use this function to store the list of participants connected to the ZDUE-SyM² communication Modul (base modules, IW modules, other modules) as a table in a file.

Base module firmware options

➲ Documentation of the base module



Use the function *Request Firmware version* to readout the active firmware version of the selected base module.



Use the function *Load Firmware* to upload a new firmware into the selected base module.

Use the function *Activate last loaded Firmware* to activate the loaded Firmware.

Load base module logbook

➲ Documentation of the base module

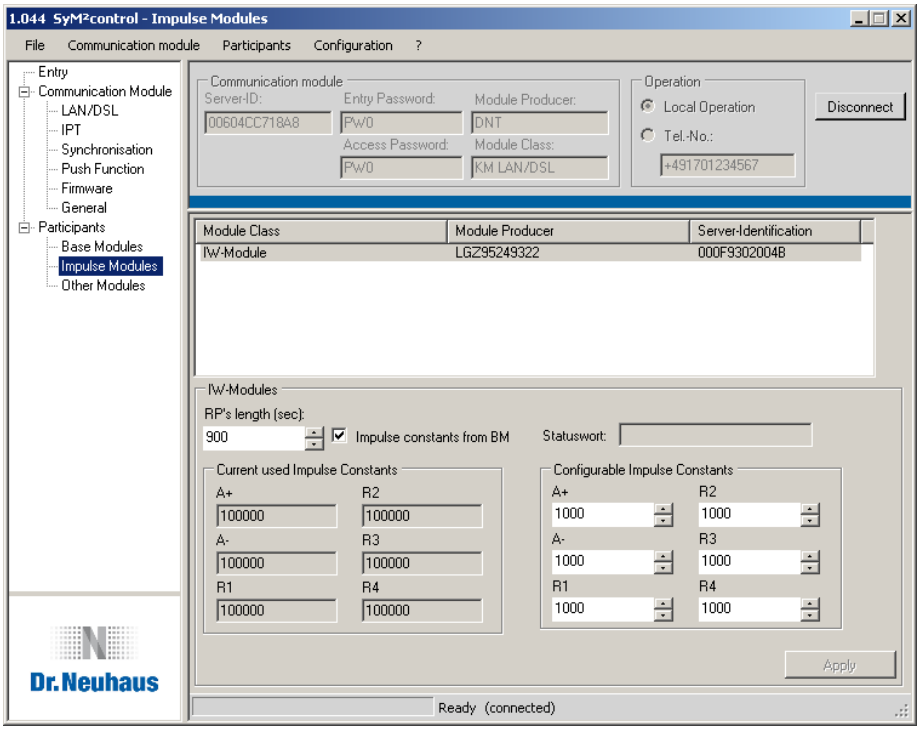
Use the function *Load base module logbook*, to readout the logbook of the base module and to store it into a file.

6.8.3 Operate pulse transmission modules (IW)

➲ Documentation of the IW module

With the ZDUE-SyM² communication module, you can readout and set the length of the registration period as well as the impulse constants of the pulse transmission module.

Choose an IW module from the list of displayed participants and activate the *Read IW Configuration* submenu in the *Participants* menu.



Then the currently used impulse constants are displayed.

With *Apply*, the set values are transferred to the IW module.

7 Parameter and data structures

7.1 Unicast and broadcast addressing

The ZDUE-SyM² communication modules support both SML files that are sent as Unicast to a defined server ID via TCP/IP and SML files that are addressed as Broadcast.

Mixed-addressed SML files are not processed by ZDUE-SyM² communication modules, that is, a Unicast-adressed SML file must not contain Broadcast-addressed SML messages and vice versa. The answer is an attention message.

7.2 Data structure for device identification query, reply

See chapters 6.1.5 and 6.5.

The query/reply for the device identification takes place according to the process for communication modules described in the SyM² Requirements Specification.

The following data structure is used:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for the device identification reply.	81 81 C7 82 01 FF	Not present	Exactly one element in accordance with the items 2 to 5 of this table.
2	Branch element in the tree. Module class.	81 81 C7 82 02 FF	Octet String	Not present
3	Branch element in the tree. Module producer	81 81 C7 82 03 FF	Octet String	Not present
4	Branch element in the tree. Server ID	81 81 C7 82 04 FF	Octet String	Not present
5	Branch element in the tree. Contains the list of firmware sections with their versions.	81 81 C7 82 06 FF	Not present	One or more elements after item 6 of this table.
6	Branch element in the tree. Contains the information on a firmware section.	81 81 C7 82 07 NN	Not present	One element after item 7 and thereafter one element of item 8 of this table
7	Branch element in the tree. Contains the producer-specific name for a firmware section.	81 81 C7 82 08 FF	Octet String	Not present
8	Branch element in the tree. Contains the producer-specific version number for a firmware section.	81 81 00 02 00 00	Octet String	Not present

7.3 Data structure for WAN status request

See chapter 0.

With the SML command „GetProcParameterRequest“, the ZDUE-SyM² communication modules allow access to the following data of the WAN interface via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for the retrieval of the WAN status	81 04 00 06 00 FF	Not present	Exactly one branch element after item 2 - 3.
2	Branch element in the tree Type, coded as ASCII string, for the used WAN adapter.	81 04 00 00 01 00	Octet String	Not present
3	Branch element in the tree Firmware version, coded as ASCII string, for the used WAN adapter.	81 04 00 02 00 00	Octet String	Not present

The items can be read from level “0”. They cannot be modified.

7.4 Data structure for WAN parameter reading/setting

See chapter 0.

With the SML commands „GetProcParameterRequest“ and „SetProcParameterRequest“, the ZDUE-SyM² communication modules allow the access to the following data of the WAN interface via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for the reading/setting of WAN parameter	81 04 00 07 00 FF	Not present	Exactly one branch element after item 2 – 4.
2	Branch element in the tree Period for the automatic restart of the control centre connection	81 04 27 32 03 01	Unsigned32	Not present
3	Branch element in the tree Maximum intermessage timeout See chapter 0.	81 42 64 3C 01 01	Unsigned8	Not present
4	Branch element in the tree Maximum timeout between SML_CloseReq and SMS_OpenRes See chapter 0.	81 42 64 3C 01 02	Unsigned8	Not present

The items can be read from level “0”. They can be modified from level “1”.

7.5 Data structure for PSTN parameter reading/setting

See chapter 0.

With the SML commands „GetProcParameterRequest“ and „SetProcParameterRequest“, the ZDUE-PSTN-SyM² modules allow the access to the following data of the PSTN interface via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for the reading/setting of PSTN parameter	81 04 01 07 00 FF	Not present	Exactly one branch element after item 2 to 4
2	Branch element of the tree Maximum Connection Duration	81 04 27 32 01 01	Unsigned16	Not present
3	Branch element of the tree Maximum idle time	81 04 27 32 02 01	Unsigned16	Not present
4	Branch element of the tree Call answered	81 04 31 32 01 01	Unsigned8	Not present

The items can be read from level “0”. They can be modified from level “1”.

7.6 Data structure for GSM parameter reading/setting

See chapter 6.2.2 and 6.2.3

With the SML commands „GetProcParameterRequest“ and „SetProcParameterRequest“, the ZDUE-GPRS-SyM² modules allow the access to the following data of the GSM/GPRS interface via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for the reading/setting of GSM parameter	81 04 02 07 00 FF	Not present	Exactly one branch element after item 2 – 8.
2	Branch element in the tree PIN	81 04 00 32 01 01	Octet String	Not present
3	Branch element in the tree Roaming-Modus	81 04 00 32 04 01	Unsigned8	Not present
4	Branch element in the tree GSM Bearer Service Type	81 04 00 32 08 01	Unsigned8	Not present
5	Branch element in the tree GSM Quality of Service	81 04 00 32 09 01	Unsigned8	Not present
6	Branch element in the tree Maximum connection time	81 04 27 32 01 01	Unsigned16	Not present
7	Branch element in the tree Maximum idle time	81 04 27 32 02 01	Unsigned16	Not present
8	Branch element in the tree Call answered	81 04 31 32 01 01	Unsigned8	Not present

Reading of the elements of items 1, 3-8 is allowed from level "0". Item 2 cannot be read. Setting of the items is allowed from level "1".

7.7 Datastructure with a list of permitted GSM/GPRS providers

See chapter 6.2.2.

With the SML commands „GetProcParameterRequest“ and „SetProcParameterRequest“, the ZDUE-GPRS-SyM² modules allow the access to the following items:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree with a list of the permitted GSM/GPRS providers	81 04 0D 06 00 FF	Not present	List according to OBIS-T with at least one entry according to item 2.
2	Branch element in the tree. Provider identifier	81 04 0D 06 00 NN NN corresponds to the provider ID (01 … FE)	Unsigned32	Not present

Reading of the elements of items 1-9 is allowed from level "0".
Setting of the elements of items 2-9 is allowed from level "1".

7.8 Data structure for transport of provider-independent GPRS-parameter

See chapter 6.2.3

With the SML commands „GetProcParameterRequest“ and „SetProcParameterRequest“, the ZDUE-GPRS-SyM² modules allow the access to the following items:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transport of the provider-dependent GPRS parameters	81 04 0D 07 00 FF	Not present	NN entries of item 2 and its branch elements.
2	Branch element in the tree Provider identifier (APN)	81 04 0D 07 00 NN	Unsigned32	Entries of positions 3 to 9 of this table, if necessary.
3	Branch element in the tree Username	81 04 61 3C 01 FF	Octet String	Not present
4	Branch element in the tree Password	81 04 61 3C 02 FF	Octet String	Not present
5	Branch element in the tree APN	81 04 61 3C 03 FF	Octet String	Not present
6	Branch element in the tree PDP context Not used	81 04 61 3C 04 FF	Octet String	Not present
7	Branch element in the tree Primary DNS server	81 48 17 07 04 FF	Unsigned32	Not present
8	Branch element in the tree Secondary DNS server	81 48 17 07 05 FF	Unsigned32	Not present
9	Branch element in the tree Tertiary DNS server	81 48 17 07 06 FF	Unsigned32	Not present

Reading of the elements of items 1-9 is allowed from level "0".
Setting of the elements of items 2-9 is allowed from level "1".

7.9 Data structure for transport of the dynamic GSM/GPRS parameters

See chapter 6.2.2 and 6.2.3

The ZDUE-GPRS-SyM² module allows by SML order "GetProcParameterRequest" access to the following characteristics via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transport of the dynamically set provider-dependent GPRS parameters.	81 04 0D 08 00 FF	Not present	Entries of items 2 to 14, if present.
2	Branch element in the tree Provider identifier (APN)	81 04 0D 07 00 00	Unsigned32	Not present
3	Branch element in the tree Provider Identifier (network)	81 04 0D 06 00 00	Unsigned32	Not present
4	Branch element in the tree Own IP Address	81 48 17 07 00 00	Unsigned32	Not present
5	Branch element in the tree Current primary DNS server	81 48 17 07 04 00	Unsigned32	Not present
6	Branch element in the tree Current secondary DNS server	81 48 17 07 05 00	Unsigned32	Not present
7	Branch element in the tree Current tertiary DNS server	81 48 17 07 06 00	Unsigned32	Not present
8	Branch element in the tree Cell Identifier	81 04 1A 07 00 00	Unsigned 16	Not present
9	Branch element in the tree Location Area Code	81 04 17 07 00 00	Unsigned 16	Not present
10	Branch element in the tree Current Field Strength	81 04 2B 07 00 00	Integer 16	Not present
11	Branch element in the tree IMSI	81 04 00 00 04 01	Octet String	Not present
12	Branch element in the tree IMEI	81 04 00 00 03 00	Octet String	Not present
13	Branch element in the tree ICC-ID	81 04 00 00 05 01	Octet String	Not present
14	Branch element in the tree Telephone number	81 04 00 00 02 01	Octet String	Not present

7.10 Data structure for transport of LAN/DSL parameters

See chapter 6.2.4.

The ZDUE-GPRS-SyM² module allows by SML order "GetProcParameterRequest" and "SetProcParameterRequest" access to the following characteristics via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transport of the LAN/DSL parameters	81 48 17 07 00 FF	Not present	Entries of items 2 to 14, if present.
2	Branch element in the tree Computer Name	81 48 00 00 00 00	Octet String	Not present
3	Branch element in the tree Primary DNS server	81 48 17 07 04 01	Unsigned32	Not present
4	Branch element in the tree Secondary DNS server	81 48 17 07 05 01	Unsigned32	Not present
5	Branch element in the tree Tertiary DNS server	81 48 17 07 06 01	Unsigned32	Not present
6	Branch element in the tree Own IP Address	81 48 17 07 00 01	Unsigned32	Not present
7	Branch element in the tree Own Subnet Mask	81 48 17 07 01 01	Unsigned32	Not present
8	Branch element in the tree Own Gateway IP	81 48 17 07 02 01	Unsigned32	Not present
9	Branch element in the tree DHCP True = On; False = Off	81 48 00 32 02 01	Boolean	Not present
10	Branch element in the tree DSL mode True = DSL; False = LAN	81 48 00 32 03 01	Boolean	Not present
11	Branch element in the tree ICMP True = On; False = Off	81 48 31 32 07 01	Boolean	Not present
12	Branch element in the tree PPPoE Username	81 04 62 3C 01 01	Octet String	Not present
13	Branch element in the tree PPPoE Password	81 04 62 3C 02 01	Octet String	Not present
14	Branch element in the tree PPPoE Mode	81 04 62 3C 03 01	Unsigned8	Not present

7.11 Data structure for transport of dynamically set LAN/DSL parameters

See chapter 6.2.4.

The ZDUE-GPRS-SyM² module allows by SML order "GetProcParameterRequest" access to the following characteristics via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transport of the dynamically set LAN/DSL parameters	81 48 0D 06 00 FF	Not present	Entries of items 2 to 7, if present.
2	Branch element in the tree Primary DNS server	81 48 17 07 04 00	Unsigned32	Not present
3	Branch element in the tree Secondary DNS server	81 48 17 07 05 00	Unsigned32	Not present
4	Branch element in the tree Tertiary DNS server	81 48 17 07 06 00	Unsigned32	Not present
5	Branch element in the tree Own IP Address	81 48 17 07 00 00	Unsigned32	Not present
6	Branch element in the tree Own Subnet Mask	81 48 17 07 01 00	Unsigned32	Not present
7	Branch element in the tree Gateway IP address	81 48 17 07 02 00	Unsigned32	Not present

Reading of the elements of items 1-7 is allowed from level "0".

Setting of the elements is not possible.

7.12 Data structure for IPT parameter reading/setting

See chapter 6.2.5.

With the SML commands „GetProcParameterRequest“ and „SetProcParameterRequest“, the ZDUE-GPRS-SyM²and ZDUE-LAN-SyM² modules allow the access to the following IP Telemetry connection items:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for reading/writing IPT parameter	81 49 0D 07 00 FF	Not present	Exactly one branch element after item 2, 8, 14 and 15.
2	Branch element in the tree Root primary IPTparameter	81 49 0D 07 00 01	Not present	Exactly one branch element after item 3 – 7.
3	Branch element in the tree Target IP address	81 49 17 07 00 01	Unsigned32	
4	Branch element in the tree Target port	81 49 1A 07 00 01	Unsigned16	
5	Branch element in the tree Source port	81 49 19 07 00 01	Unsigned16	
6	Branch element in the tree User name	81 49 63 3C 01 01	Octet String	
7	Branch element in the tree Password	81 49 63 3C 02 01	Octet String	
8	Branch element in the tree Root secondary IPT parameter	81 49 0D 07 00 02	Not present	Exactly one branch element after item 9 – 13.
9	Branch element in the tree Target IP address	81 49 17 07 00 02	Unsigned32	
10	Branch element in the tree Target port	81 49 1A 07 00 02	Unsigned16	
11	Branch element in the tree Source port	81 49 19 07 00 02	Unsigned16	
12	Branch element in the tree User name	81 49 63 3C 01 02	Octet String	
13	Branch element in the tree Password	81 49 63 3C 02 02	Octet String	
14	Branch element in the tree Waiting time until repetition in case of malfunctioning TCP/IP communication	81 48 27 32 06 01	Unsigned8	
15	Branch element in the tree Number of repetitions in case of malfunctioning TCP/IP communication	81 48 31 32 02 01	Unsigned32	

Reading of the items is allowed from level "0".

Setting of the items is allowed from level "1".

7.13 Data structure for IPT status request

See chapter 6.2.5.

With the SML commands „GetProcParameterRequest“ and „SetProcParameterRequest“, the ZDUE-GPRS-SyM² and ZDUE-LAN-SyM² modules allow the access to the following IP Telemetry connection items:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for the request of the IPT status	81 49 0D 06 00 FF	Not present	Exactly one branch element after item 2 – 4.
2	Branch element in the tree Target IP address	81 49 17 07 00 00	Unsigned32	
3	Branch element in the tree Target port	81 49 1A 07 00 00	Unsigned16	
4	Branch element in the tree Source port	81 49 19 07 00 00	Unsigned16	

Reading of the elements is allowed from level "0".
Setting of the elements is not possible.

7.14 Data structure with reply/for setting the NTP parameters

See chapter 6.3.1

The ZDUE-GPRS-SyM² and the ZDUE-LAN-SyM² modules allow with the SML commands "GetProcParameterRequest" and "SetProcParameterRequest" access to the following characteristics via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree with the NTP parameters.	81 81 C7 88 01 FF	Not present	Exactly one branch element after item 2 and item 4 to 7 of this table.
2	Branch element in the tree. IP addresses / host names of the NTP server	81 81 C7 88 02 FF	Octet String	No or 1 to 5 elements according to item 3 of this table.
3	Branch element in the tree. IP addresses / host name of the NTP server (1-5)	81 81 C7 88 02 NN NN bestimmt den NTP-Server (1-5)	Octet String	Not present
4	Branch element in the tree. Port-No. of the NTP service Set fixed to port 123.	81 81 C7 88 03 FF	Unsigned16	Not present
5	Branch element in the tree. Period	81 81 C7 88 04 FF	Unsigned32	Not present
6	Branch element in the tree. Offset	81 81 C7 88 05 FF	Unsigned32	Not present
7	Branch element in the tree. Periodic synchronous token on/off ON = True; Off = False	81 81 C7 88 06 FF	Boolean	Not present

Setting of item 4 (Port-No. of the NTP service) is not permitted!

7.15 Data structures for push processes

See chapter 6.4

7.15.1 Data structure for the characteristics of a push process

The ZDUE-GPRS-SyM² and the ZDUE-LAN-SyM² modules allow with the SML commands "GetProcParameterRequest" and "SetProcParameterRequest" access to the following characteristics via the data structure:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transport of the characteristics of push processes.	81 81 C7 8A 01 FF	Not present	List according to OBIS-T with at least one entry corresponding to item 2.
2	Branch element of the tree IPT Push Process Number Mit NN = 01 … 20	81 81 C7 8A 01 NN	Not present	As list elements, the entries of items 3 to 7 are allowed See (1)
3	Branch element in the tree. Push Interval 0 = event-oriented	81 81 C7 8A 02 FF	Unsigned32	Not present
4	Branch element in the tree. Push delay	81 81 C7 8A 03 FF	Unsigned32	Not present
5	Branch element in the tree. Push source See type of the push source	81 81 C7 8A 04 FF	Octet String	See type of the push source
6	Branch element in the tree. IPT Push Target	81 47 17 07 00 FF	Octet String	Depending on the target possibly present.
7	Branch element in the tree. Contains the service for the push process.	81 49 00 00 10 FF	Octet String	Not present

(1) If no list element is specified, the push process should be deleted/is not present. As soon as at least one list element is specified, the push process is present or a new one is created.

7.15.2 Type of push source

Item	Push source	Coding	Specifications on the push source
1	Auto load profile This push source can only be used in connection with periodic push processes.	81 81 C7 8A 41 FF	In this version, the 'List Elements‘ field remains empty.
2	Addressed Profile This push source can only be used in connection with periodic push processes.	81 81 C7 8A 42 FF	See data structure for addressing a specific push source.
3	Installation parameters This push source can only used in connection With event-oriented push processes.	81 81 C7 8A 43 FF	The installation parameters to be sent are specified over the 'List Elements‘ field (see Data structure for transport of the installation parameters) At least one element of this table must be specified.

7.15.3 Data structure for addressing a specific push source

Item	Characteristic/Property	Identifier	Type	List Elements
1	Branch element in the tree for transport of the address of a push source. Contains the server ID for the push source.	81 81 C7 8A 81 FF	Octet String	At least one or more entries after item 2 of this table.
2	Branch element in the tree for transport of the identifier ("channel") of a push source. Contains the branch elements with the OBIS-identifiers of the (measurement) variables to be delivered by the push source.	81 81 C7 8A 82 FF	Octet String	At least one or more entries after item 3 of this table.
3	Branch element in the tree for transport of the identifier ("channel") of a push source. Contains the OBIS identifier of the (measurement) variable to be delivered by the push source. Mit NN = 01 … 05	81 81 C7 8A 82 NN	Octet String	Not present

7.15.4 Data structure for transport of the installation parameters

Item	Characteristic/Property	Identifier	Type	List Elements
1	Branch element in the tree for transport of the installation parameters: IP address to the WAN	81 81 C7 82 81 FF	Unsigned32	Not present
2	Branch element in the tree for transport of the installation parameters: Server ID for the first SyM² basic module.	81 81 C7 82 82 01	Octet String	Not present
3	Additional entries in accordance with the above item (max. 60)	81 81 C7 82 82 02 81 81 C7 82 82 03 u.s.w	Octet String	Not present
4	Branch element in the tree for transport of the installation parameters: Server ID for the first external load profile collector.	81 81 C7 82 C2 01	Octet String	Not present
5	Additional entries in accordance with the above item (max. 60)	81 81 C7 82 C2 02 81 81 C7 82 C2 03 u.s.w.	Octet String	Not present

7.16 Data structures for managing and updating the firmware

See chapter 6.5 and 6.7.5

Management and update of the firmware takes place according to the processes described in the SyM² Requirements Specification. The following data structures are thereby used:

7.16.1 Data structure for transport of firmware

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root-element of the tree for transport of firmware.	81 81 C7 81 01 FF	Not present	Elements item. 2 and item. 3 of this table followed by at least one or more elements after item 4 of this table.
2	Branch element in the tree. Contains the name of the binary to be loaded.	81 81 00 02 00 02	Octet String	Not present
3	Branch element in the tree. Number of the message.	81 81 00 02 00 05	Unsigned32	Not present
4	Branch element in the tree. Signatur for authorisation (NN must be formed for the first list element starting with 01)	81 81 00 02 01 NN	Octet String	Element 1: See item 5 Element 2: See item 6
5	Branch element in the tree. Contains the block number to which the binary to be loaded is directed.	81 81 00 02 02 FF	Unsigned32	Not present
6	Branch element in the tree. Contains the binary to be loaded.	81 81 00 02 03 FF	Octet String	Not present

7.16.2 Data structure for activation of the firmware

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree Transmission of the command: ‘Activate Firmware‘	81 81 C7 83 82 07	Not present	Exactly one element after item 2 of this table.
2	Branch element in the tree. Contains the index of the binary to be activated	81 81 C7 83 83 01	Unsigned8	

7.16.3 Data structure for status query of a firmware download (request)

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transmission of command: Status request of the firmware download.	81 81 00 02 00 01	Not present	Not present

7.16.4 Data structure for status query of a firmware download (response)

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transmission of the reply.	81 81 00 02 00 01	Not present	Exactly one branch element after item 2 to 4 of this table
2	Branch element of the tree Firmware name	81 81 00 02 00 02	Octet String	Not present
3	Branch element of the tree Number of all messages for transfer of the binary	81 81 00 02 00 03	Unsigned32	Not present
4	Branch element of the tree Number of the last successfully transferred message of the binary	81 81 00 02 00 04	Unsigned32	Not present

7.16.5 Data structure for initialisation of the firmware download (request)

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transfer of the command: Order for the start of a firmware download	81 81 00 02 00 01	Not present	Exactly one branch element after item 2 to 4 of this table
2	Branch element of the tree Firmware name	81 81 00 02 00 02	Octet String	Not present
3	Branch element of the tree Number of blocks	81 81 00 02 00 03	Unsigned32	Not present
4	Branch element of the tree Number of the last successfully transferred message of the binary Always 0 with SET structure	81 81 00 02 00 04	Unsigned32	Not present

7.17 Parameters for general communication module functions

See chapter 0

The ZDUE-SyM² communication module allows with the SML commands "GetProcParameterRequest" and "SetProcParameterRequest" access to the characteristics of the following functions and parameters via the data structure:

Item	Parameters	Identifier	Type	Access
1	Operating seconds index See chapter Other	00 00 60 08 00 FF	SML_Time	Read (0)
2	Global Status Word See chapter Other	81 00 60 05 00 00	Unsigned64	Write (1) Read (0)
3	Interface Names See chapter Other	81 KK 00 00 01 00 KK = 01, 03, 04	Octet String	Read (0)
6	Entry Password	81 42 00 3C 02 01	Octet String	Write (1)
7	Access password	81 42 00 3C 02 02	Octet String	Write (1)
8	Period for the recording of the operating log (GSM/GPRS) Special values: ‚0' = switched off. ‚-1' = delete	81 81 27 32 07 01	Integer16	Write (1) Read (0)

7.18 Data structure for triggering a synchronous token

See chapter 6.3.2.

The order for triggering a synchronous token takes place according to the process for communication modules described in the SyM² Requirements Specification. The following data structure is used:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree Synchronous token	81 81 C7 83 82 03	Not present	Exactly one element after item 2 of this table.
2	Branch element of the tree Remaining time (seconds) until the next synchronisation time	81 81 C7 83 83 01	Unsigned32	Not present

7.18.1 Data structures for producing the time reference

See chapter 6.8.2.

Production of the time reference takes place according to the processes described in the SyM² Requirements Specification. The following data structures are thereby used:

Order for production of the time reference

The time reference between second index and time is produced through writing via "SetProcParameterRequest" with specification of the command "81 81 C7 83 82 08".

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree Order for production of the time reference	81 81 C7 83 82 08	Not present	Exactly one branch element after item 2 to 3 of this table.
2	Branch element of the tree Server ID for selection of the data source.	81 81 C7 83 83 01	Octet String	Not present
3	Branch element of the tree Time	81 81 C7 83 83 02	SML_Time	Not present

Reply to production of the time reference

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree Command reply to the order for production of the time reference	81 81 60 08 00 FF	Not present	Exactly one branch element after item 2 to item 5 of this table
2	Branch element of the tree Server ID of the data source	81 81 C7 82 04 FF	Octet String	Not present
3	Branch element of the tree Time	81 81 60 08 00 01	SML_Time	Not present
4	Branch element of the tree Second index	00 00 60 08 00 FF	SML_Time	Not present
5	Branch element of the tree Time value changed FALSE = Time value has not been changed, TRUE = Time value has been changed	81 81 60 08 00 02	Boolean	Not present

7.19 Data structure for triggering a reboot

See chapter 6.7.4

Triggering of a reset (reboot) takes place according to the process described in the SyM² Requirements Specification. The following data structure is used:

Item	Characteristic/Property	Identifier	Type	List Elements
1	Root element of the tree for transfer of the command: 'Reset'	81 81 C7 83 82 01	Not present	Not present

7.20 Data structures for the operation logbook

See chapter 6.7.2

The operation logbook is transported by the SML message "GetProfileListResponse". For the query, an indicator list is used whose content designates the specific logbook entries to be delivered. See SyM² Requirements Specification.

7.21 Entries in the operation logbook

ZDUE-GPRS-SyM²

Bits 31-24 **Source**	**Bits 23-20** **Level**	**Bits 19-8** **res.**	**Bits 7-0** **E.-No.**	**Event**	**Bit-No., Bit 31 <-> MSB** **Meaning**
0x00	0x8	0x000	0x00	Timer	Cyclical logbook entry
0x00	0x1	0x000	0x01	Network return	Supply to the module is available again
0x00	0x1	0x000	0x02	Power failure	Supply to the module is no longer available (the entry might take place after the next network return)
0x00	0x1	0x000	0x03	Firmware activation	The event is entered as the first entry in the operation logbook after successful activation of a loaded firmware
0x00	0x8	0x000	0x04	Periodic reset	Period. module/modem reset taking place
0x00	0x8	0x000	0x05	Watchdog	Watchdog appeared
0x00	0x8	0x000	0x06	Sync. token generated	Synchronous generated and sent by communication module
0x00	0x8	0x000	0x07	Sync. token passed through	Synchronous token received by the WAN interface and passed on over the local bus
0x01	0x1	0x000	0x08	Local bus available	Device recognises Ethernet link at the local bus
0x01	0x1	0x000	0x09	Local bus not available	Ethernet link at the local bus no longer present
0x04	0x1	0x000	0x08	WAN available	Module recognises GSM network
0x04	0x1	0x000	0x09	WAN not available	Wireless network not detected
0x04	0x1	0x000	0x0A	Wireless network dial-in	GSM module was not able to dial in successfully to the GSM wireless network

Bits 31-24 Source	Bits 23-20 Level	Bits 19-8 res.	Bits 7-0 E.-No.	Event	Bit-No., Bit 31 <-> MSB Meaning
0x04	0x1	0x000	0x0B	Wireless network log-out	GSM module has logged itself out of the GSM wireless network
0x04	0x1	0x000	0x0C	Wireless network drop	GSM module has been dropped from the GSM wireless network
0x48	0x4	0x000	0x0A	IP access taking place	Point-to-point connection to the provider has occurred
0x48	0x4	0x000	0x0D	IP access rejected	Point-to-point connection to the provider has been rejected
0x48	0x4	0x000	0x0C	IP access terminated	Point-to-point connection was ended by provider
0x48	0x4	0x000	0x0B	IP access ended	Point-to-point connection was ended by communication module
0x48	0x4	0x000	0x0E	IP access lost	IP access unexpectedly cancelled
0x49	0x7	0x000	0x0A	AL access taking place	Connection to service has been built up
0x49	0x7	0x000	0x0D	AL access rejected	Connection to service rejected
0x49	0x7	0x000	0x0C	AL access terminated	Connection to service ended by provider
0x49	0x7	0x000	0x0B	AL access ended	Connection to service was ended by communication module
0x49	0x7	0x000	0x0E	AL access lost	Connection to service unexpectedly terminated
0x4A	0x7	0x000	0x0A	AL access taking place	Connection to service has been built up (NTP)
0x4A	0x7	0x000	0x0D	AL access rejected	Connection to service rejected (NTP)
0x4A	0x7	0x000	0x0C	AL access terminated	Connection to service ended by provider (NTP)
0x4A	0x7	0x000	0x0B	AL access ended	Connection to service was ended by communication module (NTP)
0x4A	0x7	0x000	0x0E	AL access lost	Connection to service unexpectedly terminated (NTP)
0x42	0x8	0x000	0x0A	Connection is taking place	Start of data traffic between applications (WAN/SRV: SML_OpenRequest)
0x42	0x8	0x000	0x0B	Connection ended	Start of data traffic between applications (WAN/SRV: SML_OpenRequest)

ZDUE-LAN-SyM²

Bits 31-24 Source	Bits 23-20 Level	Bits 19-8 res.	Bits 7-0 E.-No.	Event	Bit-No., Bit 31 <-> MSB Meaning
0x00	0x8	0x000	0x00	Timer	Cyclical logbook entry
0x00	0x1	0x000	0x01	Network return	Supply to the module is available again
0x00	0x1	0x000	0x02	Power failure	Supply to the module is no longer available (the entry might take place after the next network return)
0x00	0x1	0x000	0x03	Firmware activation	The event is entered as the first entry in the operation logbook after successful activation of a loaded firmware
0x00	0x8	0x000	0x04	Periodic reset	Periodic module/modem reset taking place
0x00	0x8	0x000	0x05	Watchdog	Watchdog appeared
0x00	0x8	0x000	0x06	Synchronous token generated	Sync. token generated and sent by communication module
0x00	0x8	0x000	0x07	Synchronous token passed through	Synchronous token received by the WAN interface and passed on over the local bus
0x04	0x1	0x000	0x08	WAN available	Ethernet link (WAN) present
0x04	0x1	0x000	0x09	WAN not available	Ethernet link (WAN) no longer present
0x01	0x1	0x000	0x08	Local bus available	Device recognises Ethernet link at the local bus
0x01	0x1	0x000	0x09	Local bus not available	Ethernet link at the local bus no longer present
0x48	0x4	0x000	0x0A	IP access taking place	Point-to-point connection to the provider has occurred (IP)
0x48	0x4	0x000	0x0D	IP access rejected	Point-to-point connection to the provider has been rejected (IP)
0x48	0x4	0x000	0x0C	IP access terminated	Point-to-point connection was ended by provider (IP)
0x48	0x4	0x000	0x0B	IP access ended	Point-to-point connection was ended by communication module (IP)
0x48	0x4	0x000	0x0E	IP access lost	IP access unexpectedly cancelled (IP)
0x49	0x7	0x000	0x0A	AL access taking place	Connection to service has been built up (IPT)
0x49	0x7	0x000	0x0D	AL access rejected	Connection to service rejected (IPT)
0x49	0x7	0x000	0x0C	AL access terminated	Connection to service ended by provider (IPT)
0x49	0x7	0x000	0x0B	AL access ended	Connection to service was ended by the communication module (IPT)
0x49	0x7	0x000	0x0E	AL access lost	Connection to service unexpectedly terminated (IPT)
0x4A	0x7	0x000	0x0A	AL access taking place	Connection to service has been built up (NTP)

Bits 31-24 Source	Bits 23-20 Level	Bits 19-8 res.	Bits 7-0 E.-No.	Event	Bit-No., Bit 31 <-> MSB Meaning
0x4A	0x7	0x000	0x0D	AL access rejected	Connection to service rejected (NTP)
0x4A	0x7	0x000	0x0C	AL access terminated	Connection to service ended by provider (NTP)
0x4A	0x7	0x000	0x0B	AL access ended	Connection to service was ended by the communication module (NTP)
0x4A	0x7	0x000	0x0E	AL access lost	Connection to service unexpectedly terminated (NTP)
0x42	0x8	0x000	0x0A	Connection is taking place	End of the data traffic between the applications (WAN/SRV: SML_OpenRequest)
0x42	0x8	0x000	0x0B	Connection ended	End of the data traffic between the applications (WAN/SRV: SML_OpenRequest)

ZDUE-PSTN-SyM²

Bits 31-24 Source	Bits 23-20 Level	Bits 19-8 res.	Bits 7-0 E-No.	Event	Bit-No., Bit 31 <-> MSB Meaning
0x00	0x8	0x000	0x00	Timer	The set interval (for cyclical logbook entries) has expired since the last event
0x00	0x1	0x000	0x01	Network return	Supply to the module is available again
0x00	0x1	0x000	0x02	Power failure	Supply to the module is no longer available (the entry might take place after the next network return)
0x00	0x1	0x000	0x03	Firmware activation	The event is entered as the first entry in the operation logbook after successful activation of a loaded firmware
0x00	0x8	0x000	0x04	Periodic reset	Periodic module/modem reset taking place
0x00	0x8	0x000	0x05	Watchdog	Watchdog appeared
0x00	0x8	0x000	0x06	Synchronous token generated	Synchronous generated and sent by communication module
0x00	0x8	0x000	0x07	Synchronous token passed through	Synchronous token received by the WAN interface and passed on over the local bus
0x04	0x1	0x000	0x08	WAN available	Modem detects TAE voltage
0x04	0x1	0x000	0x09	WAN not available	TAE voltage not detected
0x01	0x1	0x000	0x08	Local bus available	Device recognises Ethernet link at the local bus
0x01	0x1	0x000	0x09	Local bus not available	Ethernet link at the local bus no longer present
0x42	0x8	0x000	0x0A	Connection is taking place	Start of data traffic between the applications (WAN/SRV: SML_OpenRequest)
0x42	0x8	0x000	0x0B	Connection ended	End of the data traffic between the applications (WAN/SRV: SML_OpenRequest)

8 Disposal

The components used in communication modules are largely separable and can therefore be taken to the relevant disposal or recycling point.

RoHS conformity

Sagemcom Dr. Neuhaus GmbH ZDUE-SyM² communication modules fulfil the requirements of the RoHS directive (Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment, EC directive 2002/95/EC).

Disposal and environmental protection regulations

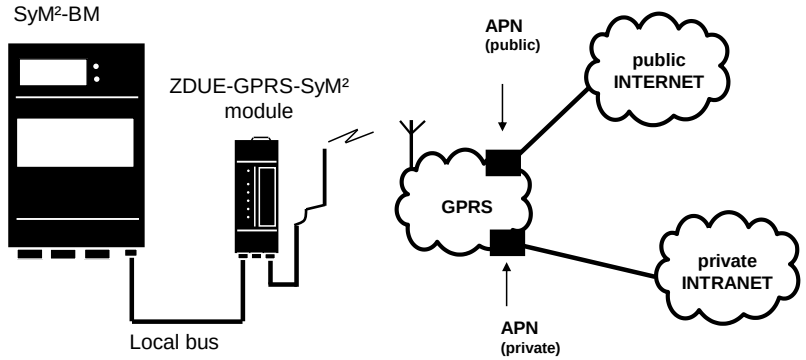
For the disposal of communication modules, observe the local disposal and environmental protection regulations in effect without fail.

Components	Disposal
Printed circuit boards, LEDs, LCD-display	Electronic waste: disposal according to local regulations.
Metal parts	Sorted and taken to collective materials disposal point.
Plastic components	Sorted and taken to recycling (regranulation) plant or if no other possibility to refuse incineration.

9 Glossary

APN (Access Point Name)

Trans-network connections, e.g. from the GPRS network to the Internet, are created in the GPRS network via so-called APNs.



An end device that wants to establish a connection via the GPRS network specifies an APN to indicate which network it wants to be connected to: the Internet or a private company network that is connected via a dedicated line.

The APN designates the transfer point to the other network. It is communicated to the user by the network operator.

Auto crossover

LAN components are connected to each other with Ethernet cables. The plugs of these cable are either wired one-to-one (patch cable) or cross-wired (cross-over cable). If a LAN component supports auto crossover, the component automatically recognises whether the cable is a crossover cable or a patch cable and adjusts itself accordingly. Both cable types can be used without manual intervention.

Auto-MDI/X

See Auto crossover.

Client / Server

In a client/server environment, a server is a program or computer that receives queries from a client program or client computer and answers them.

In data communication, a computer that establishes a connection to a server (or host) is also referred to as a client. That means that the client is the computer that is calling and the server (or host) is the one being called.

CSD 9600

CSD (9600) stands for Circuit Switched Data or dial-in data connection. Here a connection is created between two participants (end points of the connection), similar to a telephone call over a public telephone network. User 1 dials the telephone number of user 2. The network signals to user 2 that there is a call, user 2 accepts the call and the network establishes the connection until one of the users terminates the connection again.

In a GSM network this service is called CSD, and allows data transmission at 9600 bit/s or 14400 bit/s, with transmission being either secured or unsecured. Possible connections are GSM modem to GSM modem, analog modem to GSM and ISDN modem to GSM modem.

Datagram

In the transmission protocol TCP/IP, data are sent in the form of data packets, the so-called IP datagrams. An IP datagram has the following structure:

1. IP header
2. TCP/UDP header
3. Data (Payload)

The IP Header contains:

- the IP address of the sender (source IP address)
- the IP address of the recipient (destination IP address)
- the protocol number of the protocol of the next higher protocol layer (according to the OSI layer model)
- the IP Header Checksum for checking the integrity of the header upon receipt.

TCP/UDP Header contains the following information:

- the port of the sender (source port)
- the port of the recipient (destination port)
- a checksum for the TCP Header and a few items of information from the IP Header (source and destination IP addresses, etc.)

DHCP

The Dynamic Host Configuration Protocol (DHCP) performs automatic dynamic assignment of IP addresses and other parameters in a network. The Dynamic Host Configuration Protocol uses UDP. It was defined in RFC 2131 and was assigned the UDP ports 67 and 68. DHCP uses the client-server method, in which the client is assigned the IP addresses by the server.

DNS

Addressing in IP networks is always by means of IP addresses. It is generally preferable, however, to specify the addressing in the form of a domain address (i.e. in the form www.abc.xyz.de). If the addressing is by means of the domain address, then the sender first sends the domain address to a domain name server (DNS) and gets back the associated IP address. Only then does the sender address its data to this IP address.

DSL

The term Digital Subscriber Line represents several transmission standards for the bit transmission layer, with which data is transmitted and received with high transmission rates (up to 210 Mbps) via simple copper wires (access line or telephone independent lines).

GPRS

GPRS is the abbreviation for "General Packet Radio Service", a data transmission system of GSM2+ mobile phone systems. GPRS systems use the base stations of GSM networks as their wireless equipment, and their own infrastructure for coupling to other IP networks, such as the Internet. Data communication is packet-oriented; the Internet Protocol (IP) is used. GPRS provides data rates of up to 115.2 Kbit/s.

GSM

GSM (= Global System for Mobile Communication) is a standard that is used worldwide for digital mobile phone networks. In addition to the voice service for telephone calls, GSM supports various data services, such as fax, SMS, CSD and GPRS. Depending on the legal requirements in the various countries, the frequency bands 900 MHz, 1800 MHz or 850 MHz and 1900 MHz are used.

IARP

IARP (Inverse Address Resolution Protocol) is used to determine the IP address of the owner of a particular MAC address within an Ethernet IP network.

Subscriber A knows the MAC address of subscriber B.

To establish a TCP/IP connection to subscriber B, subscriber A needs the IP address of subscriber B.

To find out the IP address of subscriber B, subscriber A sends an IARP request to the MAC address of subscriber B. Subscriber B replies with his IP address.

IM

Pulse transmission module. The pulse transmission module is the link between the future-oriented SyM² system and conventional systems. It transforms the base module's metering data to energy proportional pulses for all quadrants and sends them out via six switched outputs. An additional switched output signals the begin of a registration period.

Intranet

An intranet is a private IP network of varying size. For example, the IP network of a company is an intranet, as are several networked private computers.

In contrast, the Internet is a public network. Intranet and Internet should only be connected to each other through protective facilities, such as a firewall.

IP packet

See Datagram

IP Telemetry

IP Telemetry according to E DIN 43863-4 is a protocol for transmission of telemetry data over IP networks. It is optimised to add just a few control data items to the data in use and allows clients to work with dynamically provided IP addresses.

The IP Telemetry client first build up a TCP/IP connection to the IP Telemetry master. Then the IP Telemetry client logs on to the IP Telemetry master with user name and password.

If log-on is successful, control data and data in use can be exchanged. All data are encrypted. Control data are differentiated from data in use through an additional escape sequence.

IP address

Every host or router in the Internet/intranet has a unique IP address (IP = Internet Protocol). The IP address is 32 bits (= 4 bytes) long, and is written as 4 numbers (each in the range from 0 to 255), which are separated from each other by dots.

An IP address has 2 parts: the network address and the host address.

All hosts of a network have the same network address, but different host addresses. Depending on the size of the network in question - a distinction is made between networks of Class A, B and C - the two address components may be of different sizes:

	1st byte	**2nd byte**	**3rd byte**	**4th byte**
Class A	Netw. addr.	Netw. addr.		
Class B	Netw. addr.		Netw. addr.	
Class C	Netw. addr.			Netw. addr.

It can be seen from the first byte of the IP address whether the IP address designates a network of Class A, B or C. The following definitions apply:

	Value of the 1st byte	Bytes for the network address	Bytes for the host address
Class A	1–126	1	3
Class B	128–191	2	2
Class C	192–223	3	1

If you do the arithmetic, you can see that there can be a maximum of 126 Class A networks worldwide, and each of these networks can comprise a maximum of 256 x 256 x 256 hosts (3 bytes of address space).
There can be 64 x 256 Class B networks, each of which can contain up to 65,536 hosts (2 bytes of address space: 256 x 256). There can be 32 x 256 x 256 Class C networks, each of which can contain up to 256 hosts (1 byte of address space).

Location Area Code

A location area is a group of adjacent GSM base stations that are connected to each other to make it easier to locate and signal calls to a GSM end device, such as the ZDUE-GPRS-SyM² module. The group can comprise between 10 and 100 GSM base stations. Each of these groups has an identifier that is unique worldwide (Location Area Code = LAC)

Local bus

SyM² modules of a SyM² measuring unit communicate with each other via the local bus. The local bus is an Ethernet network in which TCP/IP and UDP/IP are used as communication protocols.

The addition of further participants to the SyM² measuring unit, such as additional base modules, is possible without switching off the measuring unit. No configuration of the SyM² modules is required for connection to the local bus.

Issue of the IP addresses required for TCP/IP and UDP/IP is done automatically. After switch-on, each SyM² module first freely selects an IP address and checks whether another bus participant already uses this IP address. If the IP address is still free, the SyM² module keeps this IP address; if the IP address has already been issued, the SyM² module chooses a new IP address and checks again whether it is already used. The process is continued until a free IP address is found.

Over the local bus, SyM² supplemental modules, such as IW modules and communication modules, are also supplied with power. For this, a process based on Power-over-Ethernet is used.

MCC/MNC

The MCC (Mobile Country Code) and MNC (Mobile Network Code) are an identifier, unique worldwide, for a mobile telephone network.

The MCC is three characters long, the MNC two or three characters.

There are several Websites in the Internet with the MCC/MNC of various countries and network providers.

Network mask/ Subnet mask

A company network with access to the Internet is normally officially assigned only a single IP address, e.g. 134.76.0.0. In this sample address, it can be seen from the 1st byte that this company network is a Class B network, i.e. the last 2 bytes can be used freely for host addressing. Arithmetically that represents an address space of 65,536 possible hosts (256 x 256).

Such a huge network is not very practical. It is necessary here to form sub-networks. This is done using a subnet mask. Like an IP address, this is a field 4 bytes long. The value 255 is assigned to each of the bytes that represent the network address. The main purpose of this is to "hide" a part

	of the host address range in order to use it for the addressing of subnetworks. For example, in a Class B network (2 bytes for the network address, 2 bytes for the host address), by means of the subnet mask 255.255.255.0, it is possible to take the 3rd byte, which was actually intended for host addressing, and use it now for subnet addressing. Arithmetically that means that 256 subnets with 256 hosts each could be created.
NK	Network node module. Additional modules can be connected with each other via the local bus and the network node module. Moreover, the module is used to supply the base module and further SyM² modules with power.
NTP	NTP (Network Time Protocol) is an IP protocol in which the exact time is obtained from a time server over an IP network. Time servers are normally coupled on normal time and provide the world time (UTC) with very high precision. The Network Time Protocol uses special algorithms to calculate the run times on the transmission links through several sequential queries.
Port number	The Port Number field is a 2-byte field in UDP and TCP headers. The assignment of port numbers serves to identify various data flows that are processed simultaneously by UDP/TCP. The entire data exchange between UDP/TCP and the application processes takes place via these port numbers. The assignment of port numbers to application processes is performed dynamically and randomly. Fixed port numbers are assigned for certain frequently-used application processes. These are called Assigned Numbers.
Power-over-Ethernet	Power-over-Ethernet is a technology in which, in addition to data, the power supply to the LAN components is also carried over the Ethernet cable with which the Ethernet LAN components are connected to each other. Conductors of the Ethernet cable that are not needed for data transfer are used for this.
PPPoE	Acronym for Point-to-Point Protocol over Ethernet. It is based on the standards PPP and Ethernet. PPPoE is a specification for connecting users to the Internet via Ethernet using a jointly used broadband medium such as DSL, Wireless LAN or cable modem.
Protocol, Transfer protocol	Devices that communicate with each other must use the same rules. They have to "speak the same language". Such rules and standards are called protocols or transfer protocols. Frequently used protocols include IP, TCP, PPP, HTTP and SMTP. TCP/IP is the umbrella term for all protocols that are based on IP.
Server ID	The server ID is the unique address of every SyM² module. The server ID corresponds to the MAC address of the local bus of a SyM² module. For components without local bus (e.g. MDE or control centre), the server ID is formed in different ways, but is always unique.
Service provider	Supplier, company or institution that gives users access to the Internet or to an online service.
SML	SML (= Smart Message Language) is a communication protocol for applications in the environment of data procurement and parameter setting of devices. Data used are packaged for transport in SML messages, which in turn are merged into SML files. SML files are thereby independent of transport mechanism. They can be transferred by e-mail, modem connection or IP Telemetry. SML files can appear as SML order file, SML reply file, or SML combi-file.

	An SML message is either a request message or a response message. Depending on the task, SML defines various message types. For transmission of SML messages over unsecured connections, there is the SML transport protocol (SML-T). With SyM², this protocol is used in all interfaces.
TCP/IP (Transmission Control Protocol/ Internet Protocol	Network protocol that is used to connect two computers on the Internet. IP is the basic protocol. UDP builds on IP, and sends individual packets. These can arrive at the recipient in a different sequence from the one they were sent in, or they can even get lost. TCP serves to secure the connection, and ensures, for example, that the data packets are forwarded to the application in the right sequence. UDP and TCP provide, in addition to the IP addresses, port numbers between 1 and 65535, which can be used to distinguish the various services. A number of additional protocols are based on UDP and TCP, such as HTTP (Hyper Text Transfer Protocol), HTTPS (Secure Hyper Text Transfer Protocol), SMTP (Simple Mail Transfer Protocol), POP3 (Post Office Protocol, Version 3), DNS (Domain Name Service). ICMP builds on IP, and contains control messages. SMTP is an e-mail protocol based on TCP. IKE is an IPsec protocol based on UDP. ESP is IPsec protocol based on IP. On a Windows PC, WINSOCK.DLL (or WSOCK32.DLL) handles both of these protocols. (→ Datagram)
UDP	See TCP/IP.

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