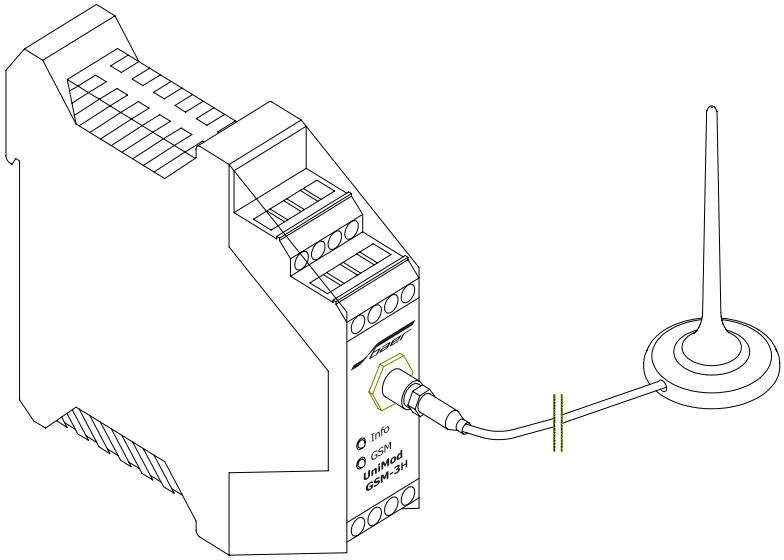
UniMod GSM-3H

Modem

Operation Manual E130006207063



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UniMod GSM-3H

The world-wide GSM radio networks (GSM = Global System for Mobile communication) provide besides digital voice communication the possibility to transmit data. In that operation mode is it possible to send fax, data (CSD: Circuit Switched Data connection), GPRS: General Packet Radio Service) and short messages (SMS). The universal radio modem UniMod GSM-3H is supposed for remote inquiry of measurement data of any kind, especially however for telecounting applications.

1. Requirements

The UniMod GSM-3H can be used in any GSM 900/1800/1900 MHz network with an arbitrary number of providers. It requires however the infrastructure for operating mobile stations with 2 Watt (EGSM900) or 1 Watt (GSM1800/1900) transmission power. The modem supports an interface for 3V SIM cards. For communication a SIM card with call number for 9600 Baud transmission is needed.

For the UniMod GSM-3H communication modules produced by internationally renowned companies are used. These companies update their software packages regularly and add or change features. The software releases are continuously checked by the development department, but no responsibility for this software releases can be take over except of warranty granted by the module producer.

2. Safety Precautions for the User

Aircraft safety

Cellular engines can interfere with an aircraft's navigation system and its cellular network. The use of UniMod GSM-3H on board aircraft is forbidden by law. Failure to comply with this prohibition may lead to temporary suspension or permanent cancellation of cellular engine services for the person who infringes this prohibition and/or to legal action against said person.

Environments with explosive substances

a) Users are advised not to use the device in automotive service stations.

b) Users are reminded of the necessity to comply with restrictions regarding the use of radio devices in fuel depots, chemicals plants and locations where explosives are ignited.

Non-ionising radiation

As is the case with other mobile radio transmitters, operating personnel are advised to use the device in the normal operating position only in order to ensure optimum performance and safety. Avoid touching the antenna.

Personnel

Installation and repairing should be done by experienced personnel only.

Connecting to other devices

In order to connect the UniMod GSM-3H to another device please read the device's operation manual to obtain detailed information about safety. Don't connect devices, which are not approved by manufacturer.

Precautions in the event of loss/theft of the Cellular Engine and the SIM card

If your UniMod GSM-3H, your SIM card or both go missing, notify your network operator immediately in order to avoid misuse.

3. Power Supply Unit

External power supply:

- 12VDC, 2A

Attention:	**NEVER remove the interface modules or the SIM card when the device is powered! The card and especially it's contact pads can be damaged very easily by scratches or bending. Be careful when inserting or removing it.**

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4. Interfaces

Communication is possible with many standard protocols, like SCTM, LSV1, DLMS, IEC1107, IEC60870 (transparent reading) etc. The following interfaces are available now:

- RS232 (uses signals RxD, TxD, GND, DTR, DCD)
- RS485

5. Display

Two LED's display the current operating status of the modem and give information about the data transfer

- Info-LED information: LED on: modem is ready for operation (15 to 30 sec. after Power On)
- GSM-LED permanently off: power down mode
  600 ms on / 600 ms off: Limited Network Service: No SIM card inserted
  or no PIN entered, or network search in progress, or ongoing user authentication,
  or network login in progress
  75 ms on / 3 s off: IDLE mode: The mobile is logged to the network (monitoring
  control channels and user interactions). No call in progress
  permanently on: CSD call: Connection to remote party

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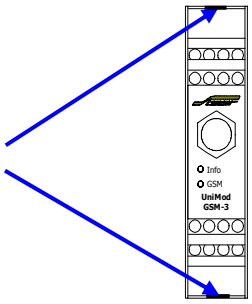
6. Installation Hints

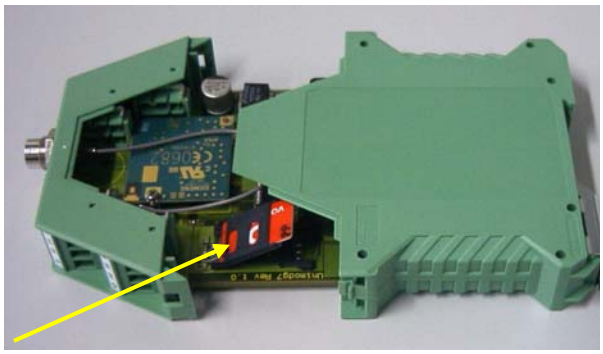
The installation must be done in a way, that even in the case of cable break no dangerous voltages are applied to touchable parts of the device including the antenna. This can be accomplished e.g. by using cable ties and appropriate shortening of the cables.

For installation insert the SIM card correctly and tighten it by using the clamp of the card reader:

1. First open the cover.



2. Open the clamp by shifting the slide in the arrow's direction (OPEN). After release you can open the lid and insert the SIM card as shown in the picture. Please note the position of the bevelled edge: it must point at the lower-right side. The golden contact pads have to point downwards.



3. Insert the card until the lid can be closed. The slide must be movable in this position. Please note the position of the bevelled edge. Now move the slide against the arrow's direction until it clicks into place and the lid is locked. The SIM card is now ready to use.
4. Close the cover.
5. After that connect the antenna to the UniMod GSM-3H using the FME plug.
   At last *(important!)* connect it to the supplying power.

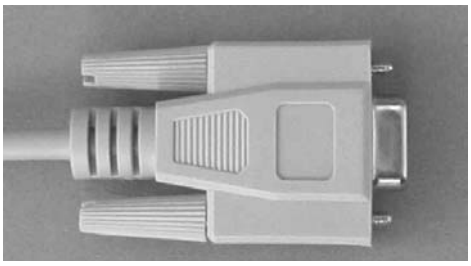
7. Programming the Modem

Before installing the modem it has to be programmed in order to meet the demands. The baud rate and data format for connecting the target device and the transmission mode and transmission rates must be adjusted. On delivery the following default parameters are active:

Data rate	9600 Baud (if not differently mentioned)
Data format	7, Even, 1 (if not differently mentioned)
S0=1	This parameter setting determines the number of rings (here 1) before automatic answering.
&D0	This parameter determines how the modem responds when circuit 108/2 (DTR) is changed from ON to OFF during data mode. With setting 0 the modem ignores DTR.
E0	This setting determines whether or not the modem echoes characters received from PC during command state. (0 = no echo)
Q0 V0	Information response: numeric code
+IPR=19200	Internal baud rate: **don't change this value!**
+CBST=7,0,1	The modem selects the bearer service with data rate 9600 Baud, asynchronous, non-transparent mode to be used when data calls are originated.

This configuration allows for reading standard counters according to VDEW2 (IEC1107, IEC62056-21). If you want to change this parameters, you need a PC with terminal software (e.g. Windows HyperTerminal, Telix etc.). Moreover experiences with the Hayes AT modem command set are very recommended.

To establish connection between PC and modem you have to use a parametering adapter with 9 pole plug (Standard RS232, Order No.: #4301).



Now you have to set your parameterisation program UniModSet to the fixed, local data rate and data format of the UniMod GSM-3H. (Default values: 9600 Bit/sec, 7,E,1) Use one of the AT commands (e.g. ATS0?, ATI, AT&V) in order to check whether the modem answers. If you see the answer on the screen, the interface is working correctly.

Note: Simply typing „AT“ does not result in an answer, because the modem is by default programmed not to send messages and echoes (Parameters ATQ1 and ATE0).

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Following some examples of AT commands (the answers depend upon the respective firmware version):

Request	Answer	Description
AT&V	ACTIVE PROFILE: E0 Q0 V1 X4 &C1 &D2 &S0 \Q3 S0:001 S3:013 S4:010 S5:008 S6:000 S7:060 S8:000 S10:002 S18:000 +CBST: 7,0,1 +CRLP: 61,61,78,6 +CR: 0 +FCLASS: 0 +CRC: 0 +CMGF: 1 +CSDH: 0 +CNMI: 0,0,0,0,1 +ILRR: 0 +IPR: 19200 +CMEE: 0 ^SMGO: 0,0 +CSMS: 0,1,1,1 ^SACM: 0,"000000","000000" ^SCKS: 0,1 +CREG: 0,1 +CLIP: 0,2 +CAOC: 0 +COPS: 0,0,"E-Plus" +CGSMS: 3	Inquires current configuration
ATI	SIEMENS MC55 REVISION xx.xx	Requests product information
AT+CPIN?	code OK	SIM card inquiry (code = ERROR: no/faulty SIM card code = +CPIN: SIM PIN: waiting for PIN code = +CPIN: READY: PIN active)
AT+CPIN="n"	OK	Enter PIN, switches modem active. e.g. AT+CPIN="1234" (if PIN is 1234)
AT+CLCK="SC",0,"n"	OK	Disable PIN lock after power off. (n = PIN) e.g. AT+CLCK="SC",0,"1234" **Attention: First enter PIN using AT+CPIN.**
AT+COPS?	+COPS: 0,0,"Bearer" OK	Inquire bearer service. Will be shown only, when SIM card is active and antenna connected.
AT+COPS=?	+COPS: (2,"E-Plus",,"26203"), (3,"Vodafone.de",,"26202"), (3,"o2 - DE",,"26207"), (3,"T-Mobile D",,"26201"),,(0-4),(0,2)	List of available bearer services.
AT+CBST=s,n,e	OK	Choose transmission mode (speed s=1 for 300 Bit/sec V.21, s=2 for 1200 V.22, s=3 for 1200/75 V.23, s=4 for 2400 V.22bis, s=5 for 2400 V.26ter, s=6 for 4800 V.32, s=7 for 9600 V.32, s=65 for 300 V.110, s=66 for 1200 V.110, s=68 for 2400 V.110, s=70 for 4800 V.110, s=71 for 9600 V.110), (name n=0 for asynchronous mode), (element e=0 for transparent oder e=1 for non transparent transmission) e.g.. at+cbst=7,0,1 (for 9600 Bit/sec V.32, asynchronous mode, non transparent)

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AT&F	OK	Set all parameters to factory defaults. **Attention: Data rate and data format will be changed to 19200 Bit/sec, 8, N, 1. Adjust parameters of terminal program respectively.**
ATS0=n	OK	This parameter setting determines the number of rings (0 to 255) before automatic answering. e.g. ATS0=1 (Modem answers after first ring) **Attention: ATS0=0 disables automatic answering!**
ATS0?	1 OK	Returns the number of rings before automatic answering.
ATE0	OK	This disables the modem to send echoes of characters received from PC during command state.
ATQ1	(no answer)	This parameter setting disables transmission of result codes to the PC. Information text transmitted in response is not affected by this setting.
AT&W	(no answer because of ATQ1)	Saves the current parameter setting in the user-defined profile. This settings are active after every resumption of power supply.

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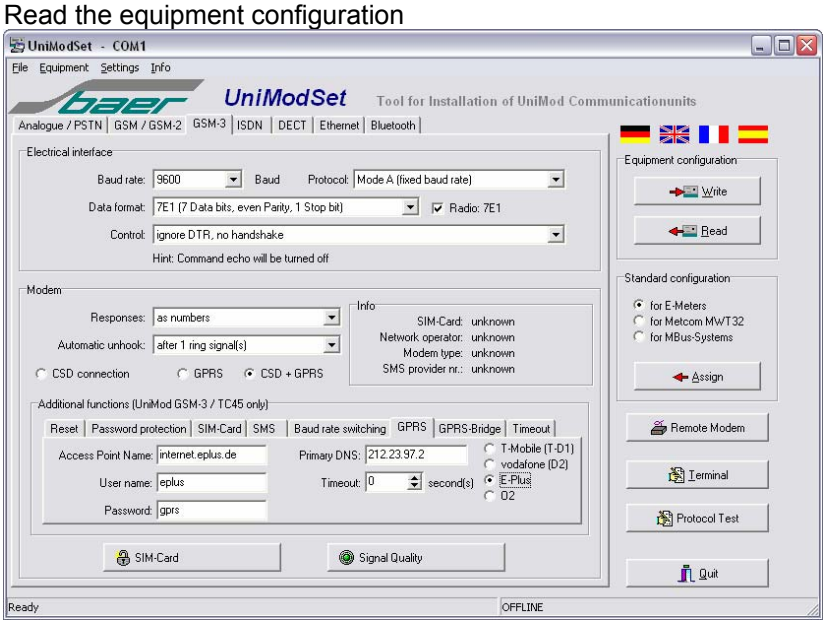
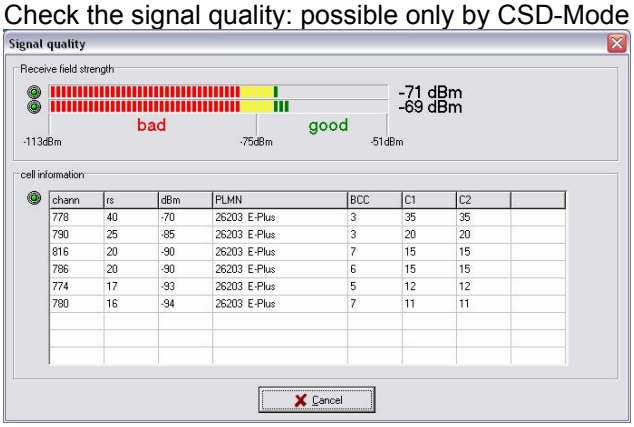
Example:

- Establish connection PC to modem (e.g. using the parametering adapter)
- Insert SIM card
- Switch on UniMod GSM-3H, wait 15 to 30 sec: till first LED is on
- Start the UniModSet software
- Read the equipment configuration



- Adjust the parameter
- Write the configuration
- Check the signal quality: possible only by CSD-Mode



Testing the connection

For easier diagnosis of connection problems it is possible to display extended result codes for incoming call indication. In order to do this the following steps are necessary:

- Activate result codes: Enter „ATQ0“, Modem reply: OK.
- Activate extended result codes: „AT+CRC=1“, Modem reply: OK. („AT+CRC=0“ switches the extended codes off)
- Call UniMod GSM-3H via data service (use appropriate telephone number). Watch incoming call using terminal program. Possible messages:
  +CRING: REL ASYNC incoming call has been correctly transmitted. That’s OK.
  +CRING: VOICE incoming call has been transmitted via „voice“ mode. Call rejected by modem.
  +CRING: FAX incoming call has been transmitted via „fax“ mode. Call rejected by modem.

Unusual reaction using "7" data bits and "Even Parity" during data retrieval.

Depending on certain circumstances (software configuration, hardware configuration of the PC, connection of the modem to the PC, operating system,...) the communication software of your application might issue a message like: wrong parity. In the most cases a switch of the UniMod GSM-3H data format from "7E1" to "8N1" is able to bring fast and easy help. Using this configuration data retrieval from most meters is possible in the format "7E1" and "8N1". If there are any further questions we are happy to help you.

8. Signal Quality

Check the signal quality and show it by Info-LED(■: LED on / □: LED off):

Info-LED	Description
■ ■■ ■■■ ■■■■ ■■■■■	Bad signal quality, transmission error possible; Low signal quality; Medium signal quality; Good signal quality; Very good signal quality;
■■■■■■■■	Dauerlicht: Kommunikation auf der Schnittstelle, keine Anzeige der Signal-stärke.

Note: During the connection and 60 seconds after it is the signaling disabled!

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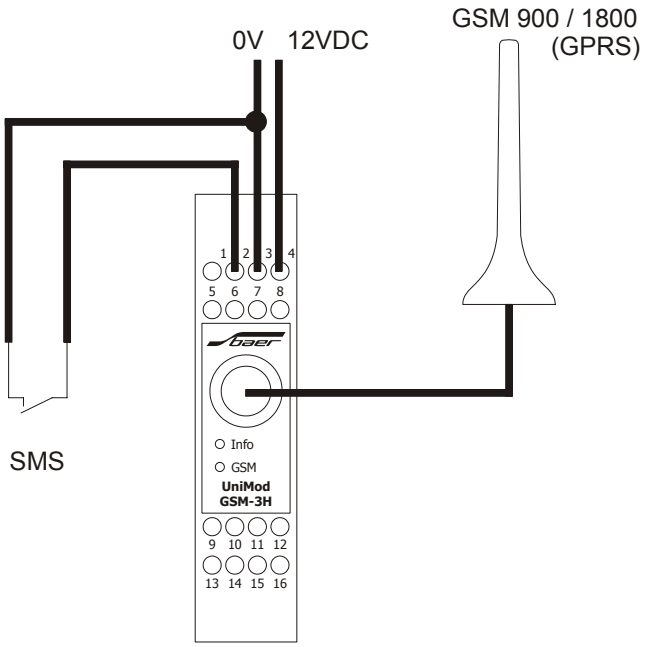
9. SMS

Optional it is possible to activate SMS. This function is monitoring of on/off state changes of SMS-Input (terminal 2 and 3).

Example:



Note: Maximum one SMS per 10 seconds.

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10. Technical Data

Housing:	Top hat rail installation (according to DIN EN 50022)	
Degree of protection:	IP20 (IEC)	
Dimensions:	W = 22,5 mm, H = 99 mm, D = 114,5 mm	
Protection class:	2	
Supply voltage:	12VDC, 2A	
Power consumption:	4 VA max.	(depends upon supply voltage, kind of interface module and operating status of transmission unit)
Interfaces:	Pluggable modules; available are: - RS232 (supports signals RxD, TxD, GND, DTR, DCD) RTS and CTS bridged - RS485 2-wires	
SMS input	3VDC	
Display:	2 LED's: GSM, Info	
GSM unit:	Cellular Engine Siemens MC55 with 3V SIM-Card interface	
GSM band:	Tri-Band EGSM900 and GSM1800/1900 (GSM Phase 2/2+)	
GPRS:	Multi-slot class 10: downlink 4 timeslots, uplink 2 timeslot	
Transmission rate remote modem to UniMod:	9600 bit/sec (V.32 / V.110), 7 / 8 data bits, asynchronous	
Transmission rate UniMod to connected device:	300 to 19200 bit/sec (fixed baud rate) optionally: mode B and C according IEC1107 (IEC62056-21)	
Data format:	7E1, 8N1, 8E1, ...	
Output power:	2W (Class 4) for EGS900 MHz 1W (Class 1) for GSM1800/1900 MHz	
Sensitivity:	-104 dBm (demand for normal mobile station)	
Antenna jack	50Ω FME	
Software-Interface:	Hayes Standard-AT, GSM 07.07, GSM 07.05	
References:	European Telecommunications Standards Institute, http://www.etsi.org	
License:	CE0682	
Extent of delivery:	- UniMod GSM-3H - Standard antenna (length of cable about 2,6m) - Operation manual	
Accessories:	- RS232 cable for parametering (#4301) - Antenna for special purposes - Additional interface modules - Software UniModSet	

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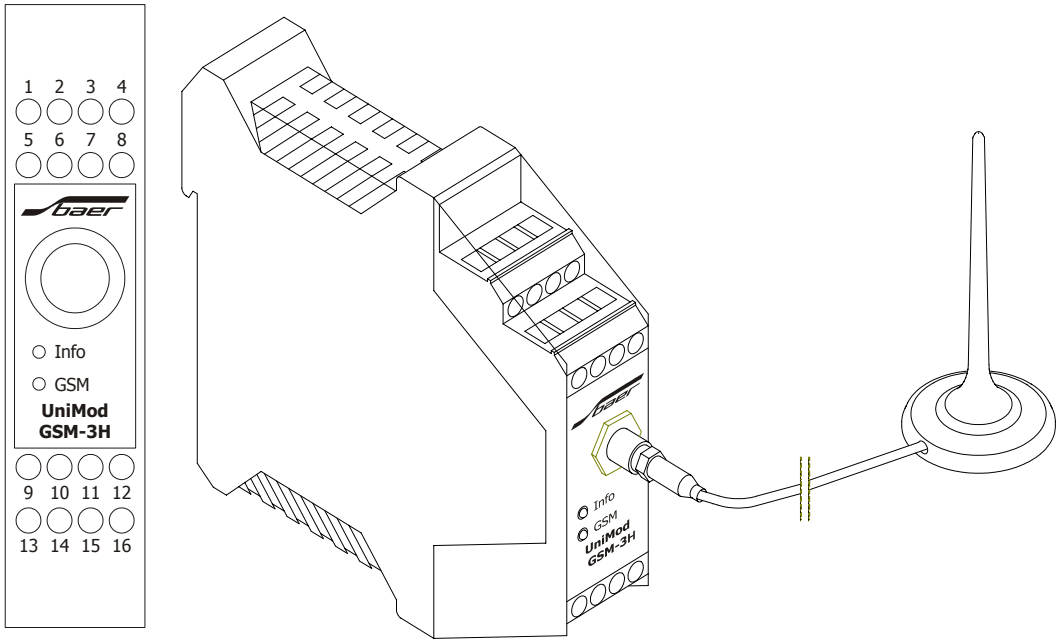
11. Terminal Block



1	Output (+3VDC)	5	-	9	RS485: –B	13	RS232: RxD
2	SMS-Input (+3VDC)	6	-	10	RS485: +A	14	RS232: DCD
3	Power supply: 0VDC (GND)	7	-	11	RS232: GND	15	RS232: TxD
4	Power supply: +12VDC	8	-	12	-	16	RS232: DTR

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12. Schematic Drawing