

Mitsubishi MIM series

Industrial Modems

Instructions Manual

Draft

MIM-G01

MIM-A01

About this Manual

The texts, illustrations, diagrams and examples in this manual are only intended as aids to help explain the functioning, operation, use and programming of the Mitsubishi Industrial Modems (MIM).

If you have any questions regarding the installation and operation of the software described in this manual, please do not hesitate to contact your sales office or one of your Mitsubishi distribution partners.

You can also obtain information and answers to frequently asked questions from our Mitsubishi website under www.mitsubishi-automation.com.

MITSUBISHI ELECTRIC reserves the right to change the specifications of its products and/or the contents of this manual at any time and without prior notice.

**Instruction Manual
Industrial Modems MIM-A01 and MIM-G0
Art-No.: 165584**

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Security Advice

Intended Target Audience

This manual is aimed exclusively at suitably qualified electrical engineering specialists that are familiar with the safety standards required for electrical engineering and automation. The engineering, installation, commissioning, maintenance and testing of devices must only be carried out by qualified electrical technicians. Unless otherwise stated in this manual or other manuals, any intervention in the hardware and software of products must only be carried out by specialists.

Proper use

Mitsubishi Industrial Modems are only designed for use in the application fields described in this manual. Ensure that all the specifications stated in this manual are observed. Unqualified interventions in the hardware or software, and failure to observe the warnings stated in this manual or on the product may lead to serious injury or material damage. No liability is accepted in such cases and any warranty claims become invalid.

Safety instructions

The safety and accident prevention regulations specified for the application concerned must be observed during the engineering, installation, maintenance and testing of devices.

This manual contains special instructions that are important for the safe and proper handling of the device. The warning symbols of the individual instructions have the following meaning:



DANGER:

Means that there is a danger to the life and health of the user if the relevant safety measures are not taken.



ATTENTION:

Is a warning of possible damage to the device, software or other material damage if the relevant safety measures are not taken.

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1 Mitsubishi Industrial Modems at a glance

1.1 Mitsubishi Normal Modem GSM (MIM-G01)

The Mitsubishi Normal Modem GSM is a generic modem for industrial usage, e.g. for remote maintenance of PLCs. It needs a SIM card and logs on the mobile network like mobile phone. The Mitsubishi controller Alpha XL can - using this modem and a special functional block – sent the content of the text display as an SMS or e-mail. This modem has no memory for user data nor any automatic functions. It may be used for remotely accessing and maintaining the PLC, too. This manual describes mounting and installation of this modem.

1.2 Mitsubishi Super Modem 56k (MIM-A01)

The Mitsubishi Super Modem 56K for analogue fixed network 11Bit-Industrial-Modem is an industrial modem with a little memory for user data, providing - besides generic modem functions - the capability to transmit text messages over fixed network controlled by AT command.

- **SMS**
inside of the PSTN network and into the mobile network (carrier dependent)
- **Express E-Mail**
E-mail without the Internet, but directly via Telephone lines,
e.g. PLCs can exchange data using this way
- **E-Mail**
send and receive internet-E-Mail (SMTP/POP3)
- **Fax**
send text messages to fax machines

Command	Target	Text or data
AT+T SEND = "EMAIL;	To:Taskforce@example.com "	Tank 17 in house 5 empty!
AT+T SEND = "EXPRESS;	To: Taskforce+49-30-123456789"	Burner in house 6 defective!
AT+T SEND = "SMS;	To: 0177-3456678"	Cool storage temperature too high!
AT+T SEND = "FAX;	To: 0891-98745561"	Air conditioning system fan 17 defective!
AT+T HELP		Lists all Tixi message commands

Additionally you can use a Mitsubishi Super Modem 56k for remotely accessing and maintaining the PLC.

2 Equipment Versions

2.1 Modem Typ

	Normal Modem GSM	Super Modem 56k
Telephone network	GSM	Analogue fixed network/56K
Memory	—	30 – 100 kB SRAM
Sending of	SMS E-Mail (SMS-to-E-Mail-Gateway) Fax (Fax-to-Fax-Gateway)	SMS E-Mail Fax Express E-Mail
Triggered by	AT command	AT command
Modem functions		
Teleservice	Yes	Yes
Automatically Alarming	—	—
Remote switching	—	—
Available models	MIM-G01	MIM-A01

Tab. 1-1 Mitsubishi Industrial Modems at a glance

The Mitsubishi Normal Modem GSM requires, like any conventional modem, a software in the PC like a program for dial-up connection or for the sending and receiving of fax messages. A Mitsubishi Super Modem however sends all data by using simple AT commands. No additionally software is required in this case.

2.2 Teleservice via PC

A Mitsubishi Industrial Modem (MIM-A01, MIM-G01) can be used to handle the remote maintenance of several controllers via a telephone line or via the Internet. Program up- and download may be carried out via the Mitsubishi programming software (e.g. GX IEC Developer), while the connection therefore may be established via the Mitsubishi programming software



3 Mounting and Installation

3.1 Normal Modem GSM (MIM-G01)

The MIM-G01 is a GSM/GPRS mobile modem intended for transmission of data, SMS, e-mail and fax messages within the 900 MHz and 1800 MHz GSM mobile networks and complies to the high speed standard of GPRS Class 10. It is suitable for DIN-Rail mounting inside control boxes.

3.1.1 Interfaces and Connectors

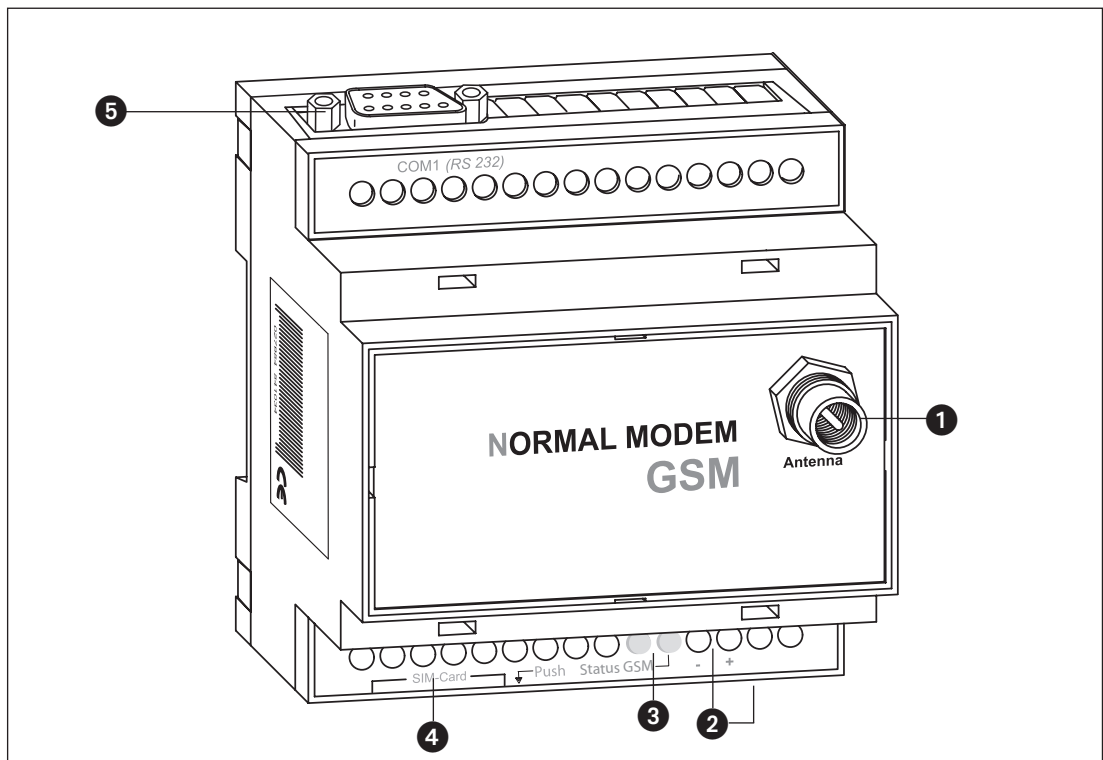


Fig. 3-1: Overview of all connectors of the Normal Modem GSM

Nr.	Description	Meaning
1	Antenna	Plug (FME) for Antenna cable (impedance: 50 Ω)
2	10...40VDC	Power supply (2 screw terminals) and power supply jack
3	LEDs	2 LEDs (Power and Line)
4	SIM-Karte	Power supply (2 screw terminals)
5	RS232 Interface	9 pin D-Sub jack

Tab. 3-2: Description of the connectors of the modems

NOTE

For connecting the modem to a PC, a 1:1 serial standard cable is to be used. For information to connect a PLC, refer to the PLC documentation.

3.1.2 Meaning of the LEDs

The MIM-G01 presents two LEDs, which indicate the devices current operating mode. After the power supply has been switched on, a self test will be executed. The end of this test is indicated by a acoustic signal (short beep). After the test, the device tries to make a connection to the GSM network. The green LED will flash slowly when the log in was successful.

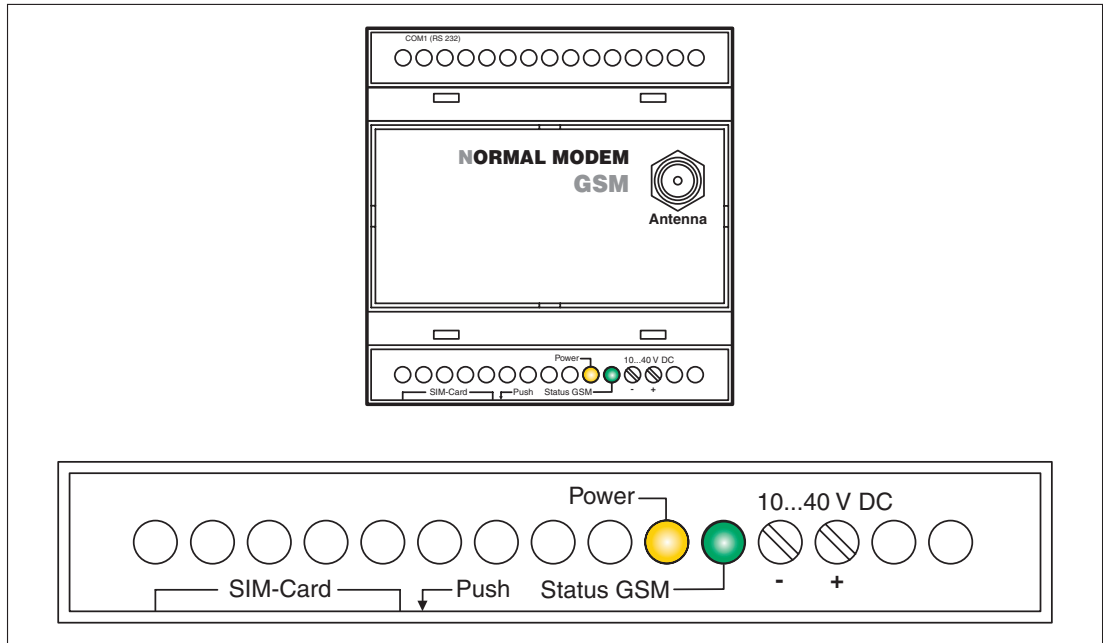


Fig. 3-2: LEDs on the MIM-G01

LED	Status	Meaning
Power (yellow)	Off	Device is switched off (power supply disabled)
	On	Device is switched on (power supply enabled)
Status GSM (green)	On	Device is not logged onto the GSM network
	Slowly flashing	Device is logged onto the GSM network
	Rapidly flashing	Device is logged onto the GSM network, and active connection is established

Tab. 3-3: Two LEDs are used to show the state of the modem

3.1.3 Connecting the GSM antenna

First of all find a suitable location for mounting the GSM antenna outside of the control cabinet.

Screw the antenna plug into the antenna socket on the front of the modem.

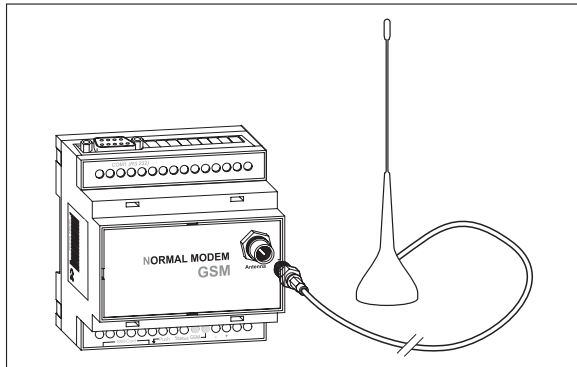


Fig. 3-4:

When fitting the antenna plug ensure that it is seated correctly. It should be possible to turn the threaded nut easily.

NOTES

Standard GSM antennas with an FME plug can be used. The GSM antenna is not supplied with the modem and can be ordered separately.

If the length of the antenna cable is not sufficient for your requirements you can use a suitable extension cable purchased as an accessory from a GSM outlet. Take into account the attenuation of these cables that will reduce the antenna gain and observe the relevant specifications of the manufacturer.

3.1.4 Inserting the SIM card

The SIM card of an mobile phone provider is necessary for the use of a GSM Modem.

To insert the SIM card in the modem, open the SIM card holder on the Mitsubishi Alarm Modem by pressing the small button on the right of the holder with a pen or a pointed object.

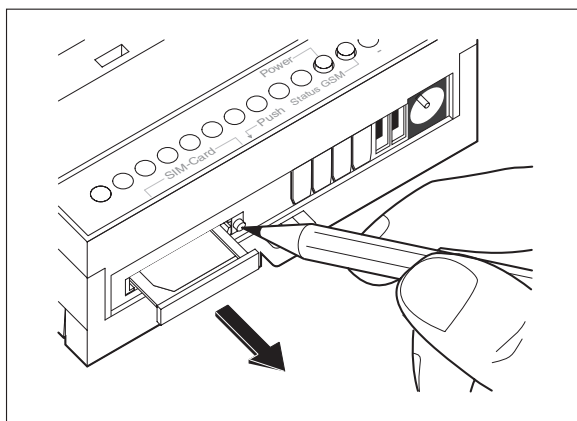
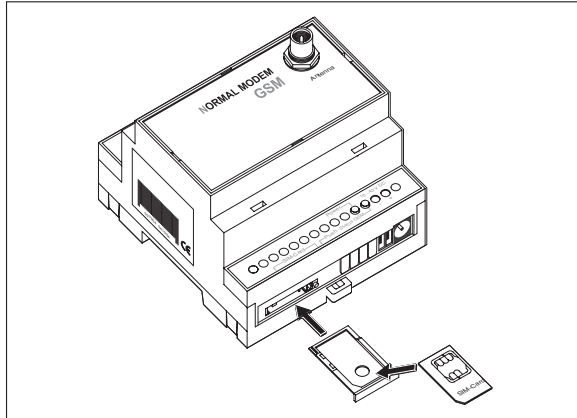


Fig. 3-3:

Push down the button until the card holder is released

You can now carefully pull out the card holder and insert your SIM card. Then push the SIM card holder back into the modem until it snaps into position.

**Fig. 3-5:**

Insert the SIM card with the contact side facing upwards and ensure that the card is seated correctly in the recess.

Then push the SIM card holder back into the modem until it snaps into position.

NOTE

If you plan to dial into your PLC via GSM, you will possibly need a SIM card and account with data service enabled. However, in some cases the modem may be capable of accepting data calls on a voice number after using the AT+CICB=0 command. For detailed information, contact your mobile service provider.

**ATTENTION:**

***The SIM card should only be removed when the modem is in power-off state.
The SIM card may become unusable if this warning is not observed.***

3.2 Super Modem 56k (MIM-A01)

The MIM-A01 is a PSTN modem intended for transmission of data, SMS, e-mail and fax messages by analog telephone networks and complies to the high speed standard of V.90 and 56k. It is suitable for DIN-Rail mounting inside control boxes.

3.2.1 Interfaces and Connectors

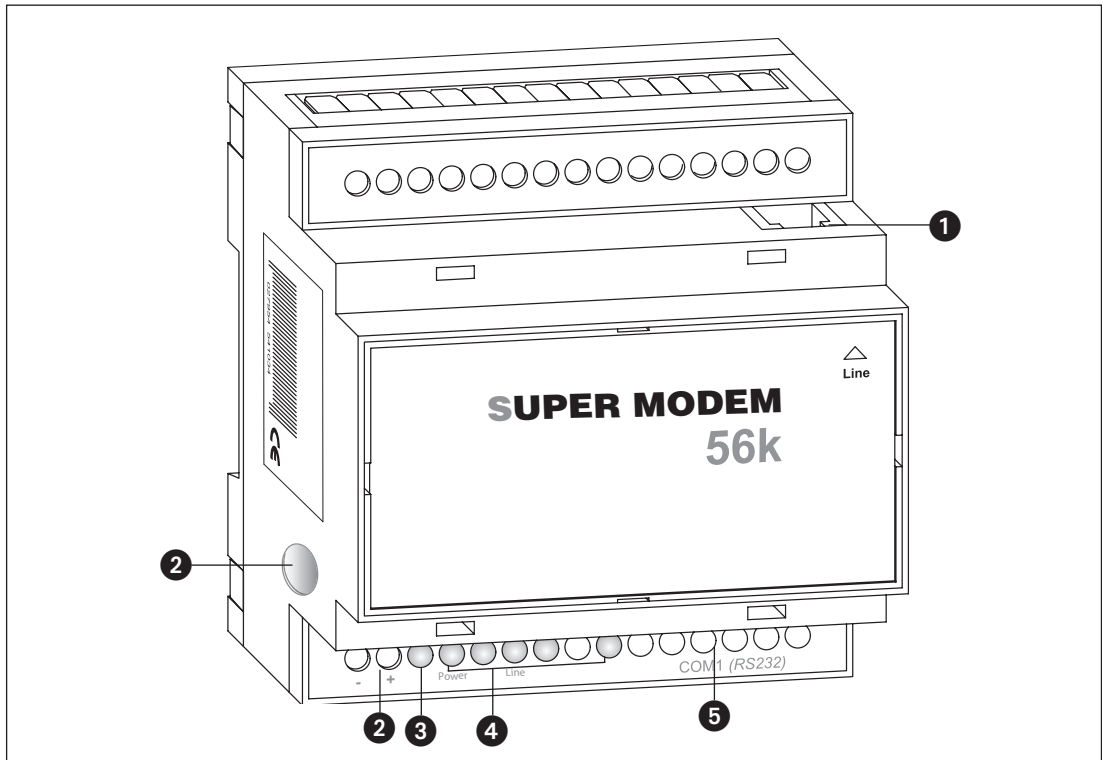


Fig. 3-6: Overview of all connectors of the Super Modems 56k

Nr.	Description	Meaning
①	Line	Telephone jack RJ11
②	10...30VDC	Power supply (2 screw terminals) and power supply jack
③	Service	Button
④	LEDs	LEDs (Power, Mail in, Line, Mail out und Modem Mode)
⑤	RS232 Interface	9pin D-Sub jack

Tab. 3-4: Description of the connectors of the Modems

NOTE

For connecting the modem to a PC, a 1:1 serial standard cable is to be used. For information to connect a PLC, refer to the PLC documentation.

3.2.2 Meaning of the LEDs

The MIM-A01 got five LEDs, which display the modems operating status. After the power supply has been switched on, a self test will be executed. The end of this test is indicated by a acoustic signal (short beep).

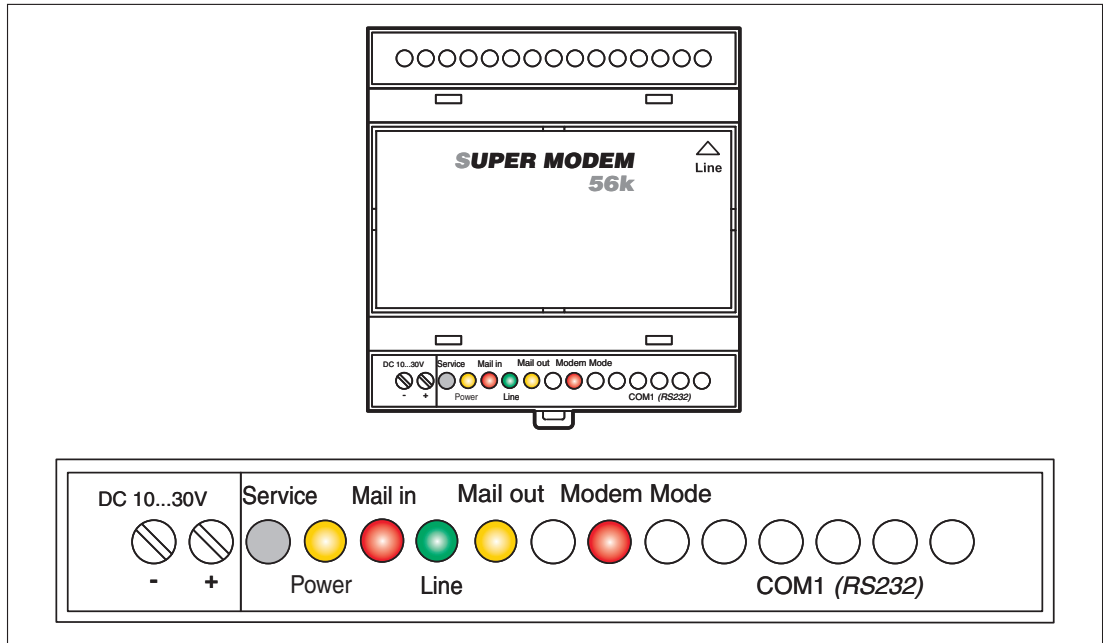


Fig. 3-7: LEDs on the MIM-A01

LED	Status	Meaning
Power (yellow)	Off	No power supply, device switched off
	On	Power supply active, device switched on
Mail in (red)	Off	No received message in memory
	On	Received message in memory
Line (green)	Off	No telephone connection active
	Flashes	Telephone connection becomes established
	On	Telephone connection successfully established
Mail out (yellow)	Off	No outgoing messages in memory
	On	Outgoing messages in memory
Modem Mode (red)	Off	Device is in Message Mode
	On	Device is in Modem Mode

Tab. 3-5: Five LEDs are used to show the state of the modem

3.2.3 Connection to the Telephone Network

Connection to telephone network (PSTN) is established via the included telephone cable and the "Line" jack of the MAM.



Fig. 3-8
 The Mitsubishi Super Modem 56k supports the a/b leads (3 and 4).

To get access to your Mitsubishi Super Modem 56k, the telephone number of the connection used must be known.

3.2.4 Testing the Telephone Connection

In order to check the telephone number of the connection used, plug an usual telephone into the appropriate socket and dial the number by another telephone, or from a mobile. If the telephone at the appropriate socket rings, the number is correct.

In order to check if the telephone connection supports the CLIP feature, dial from the appropriate connection to another telephone. If the calling number is shown at the called party end, the CLIP feature is supported.

If calls were successful in both directions, you can connect your Mitsubishi Super Modem. The modem is now ready to be called and receive messages.

3.2.5 Telephone Exchange System

When connecting to a telephone exchange (PABX), take care if an outside line prefix is necessary.

3.3 Mounting

Mount the modem by pushing or snap fitting it onto a DIN rail (top-hat rail 35 mm).

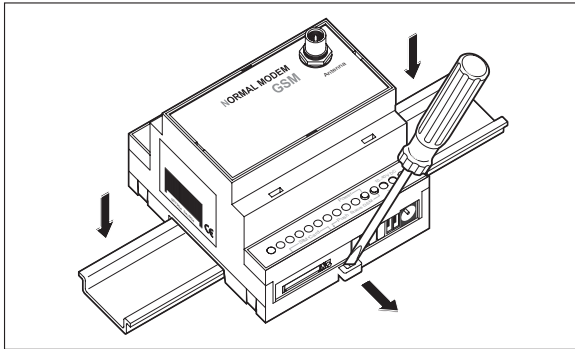


Fig. 3-9:

Pull out the black tab on the device using a screwdriver and so the device can snap fit to the DIN rail. You can remove the device from the rail in the same way. Ensure that the retaining mechanism of the modem snaps cleanly and securely into the DIN rail.

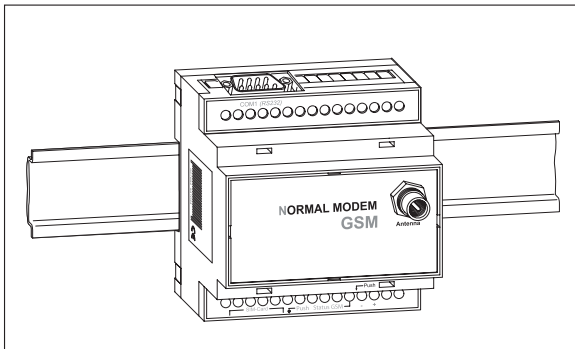


Fig. 3-10:

Modem mounted on the DIN rail



ATTENTION:

- *The device must only be used in rooms that are dry and clean. Protect the device from humidity, water splashes or heat.*
- *Do not subject the device to severe vibration.*



DANGER:

- *The device must not be used in environments containing flammable gases, fumes or dust.*

4 Power supply

After all installation steps are completed, switch on the power supply to the Mitsubishi Alarm Modem. The modem got two power supply connectors: Two screw terminals and a power supply jack (pin diameter 2,1 mm, inner diameter 6 mm).



ATTENTION:

Power U = 10 – 40V DC! for Mitsubishi Normal Modem (MIM-G01)

Power U = 10 – 30V DC! for Mitsubishi Super Modem (MIM-A01)

Ensure the correct polarity of the power supply terminals.

NOTE

In order to avoid the interference from power supply units or other interference sources, DC cables should not be installed in the direct vicinity of AC cables.



DANGER:

- ***Use leads with sufficient diameter only.***
- ***Do not use flexible leads with soldered tips.***
- ***Watch the polarity and the specification of the power supply.***
(MIM-G01=10 – 40VDC, max. 0.7 A, Power supply jack: pin = positive)
(MIM-A01=10 – 30VDC, max. 0.7 A, Power supply jack: pin = positive)
- ***In order to avoid damages, fasten the terminal screws with a torque momentum of 0.5 ... 0.6Nm.***
- ***When using the power supply jack, make sure the plug got an pin diameter of 2.1mm and inner diameter of 6mm.***
- ***Wiring must be done with power off only.***

5 Operation

If you have followed the steps in the chapters 3 and 4, your modem is ready for operation.

5.1 MIM-G01

The MIM-G01 presents two LEDs, which indicate the devices current operating mode. After the power supply has been switched on, a self test will be executed. The end of this test is indicated by a acoustic signal (short beep). After the test, the device tries to make a connection to the GSM network. The green LED will flash slowly when the log in was successful..

5.2 MIM-A01

The MIM-A01 presents five LEDs, which indicate the devices current operating mode. After the power supply has been switched on, a self test will be executed. The end of this test is indicated by a acoustic signal (short beep).

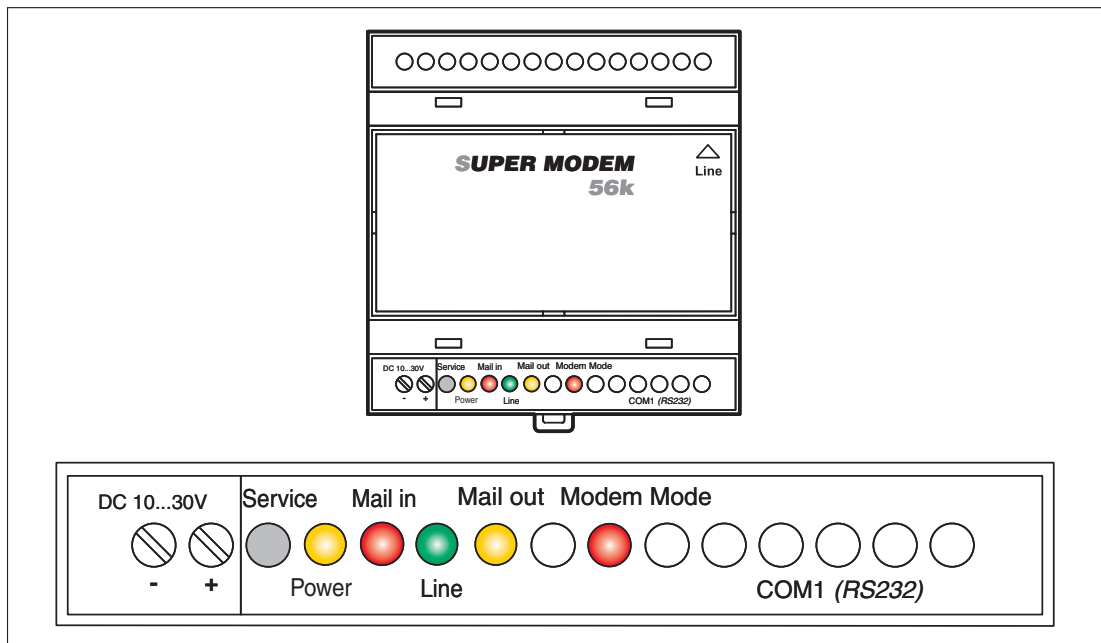


Fig. 5-1: LEDs on MIM-A01

Power (yellow)	Mail in (red)	Line (green)	Mail out (yellow)	Modem Mode (red)	
●			●		Starting self test
●	●	●	●	●	Testing LEDs
●			(((●))) Flashes		Testing memory
●				●	Modem is fully operational
					Duration: approx. 12 sec

Tab. 5-1: LEDs during the self-test

6 Configuration

6.1 MIM and Mitsubishi ALPHA XL

Configuration of the Industrial Modems is done via the Mitsubishi Alpha Programming Software (SW0D5-ALVLS-EUL). Detailed information on selecting the modem and setting parameters is to be found within the Mitsubishi Alpha XL manuals at <http://www.mitsubishi-automation.com>

Alpha XL - Communication Manual
Alpha Software - Software Manual

Art. No. 146564
Art. No. 126017

This AT init string is to be used when connecting an "Alpha XL" to the "MIM-G01":
ATEOS0=2&S0 ; +IFC=0 , 0 ; +CMEE=1 ; +IPR=9600 ; +CICB=0 ; &W

This AT init string is to be used when connecting an "Alpha XL" to the "MIM-A01":
ATEOS0=2Q1+D0\Q0\J0&W

The following chapters will show the most important settings.

6.1.1 Project Settings

Load the PLC project into the Alpha Programming Software and adjust some basic settings. Therefore, in the menu bar click

Options > GSM and serial communication

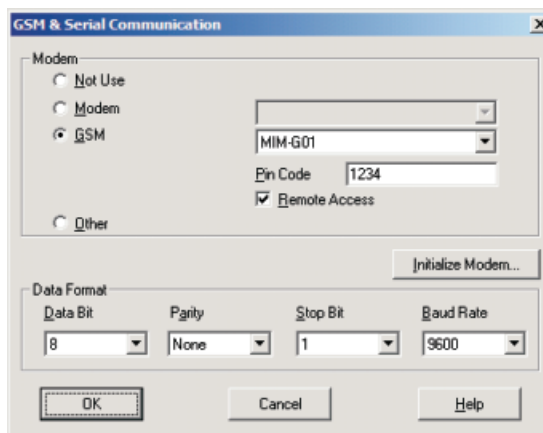


Fig. 6-1:
GSM and serial communication

In the area **Modem**, select either **GSM** (for MIM-G01) or **Modem** (MIM-A01) and choose the name of the modem in use from the list provided on the right (see figure above).

NOTE

If this modem type is not present within the list, you may add it by yourself; detailed information on that is to be found within chapter 6.1.3.

If you use a MIM-A01 Modem, click on **OK** to exit configuration.

If you use a MIM-G01 Modem, enter the SIM PIN into the appropriate input field and enable the „Remote Access“ checkbox, in case you want to remotely access the PLC. The **Data format** should be 8 bits, no parity and 1 stop bit (8N1) with a speed of 9600 baud. Click on **OK** to exit configuration.

6.1.2 Function Block SMS send

For sending SMS, add a function block **GSM/SMS** is to be added to your PLC project. (Detailed information is to be found within the Alpha XL Communication manual.)

Double-click the **GSM function block** in order to configure it.

In the window that opens, click **Setting** and enter these data:

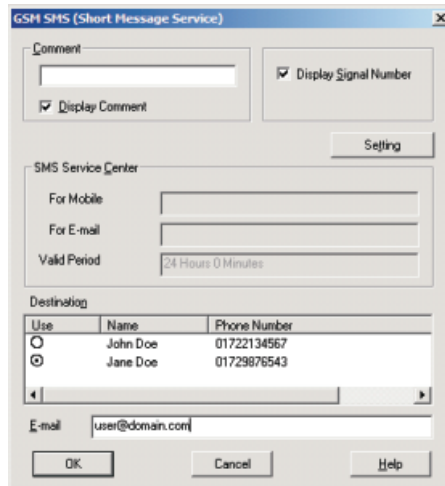


Fig. 6-3:
GSM SMS (Short Message Service)

Now enter the following data:

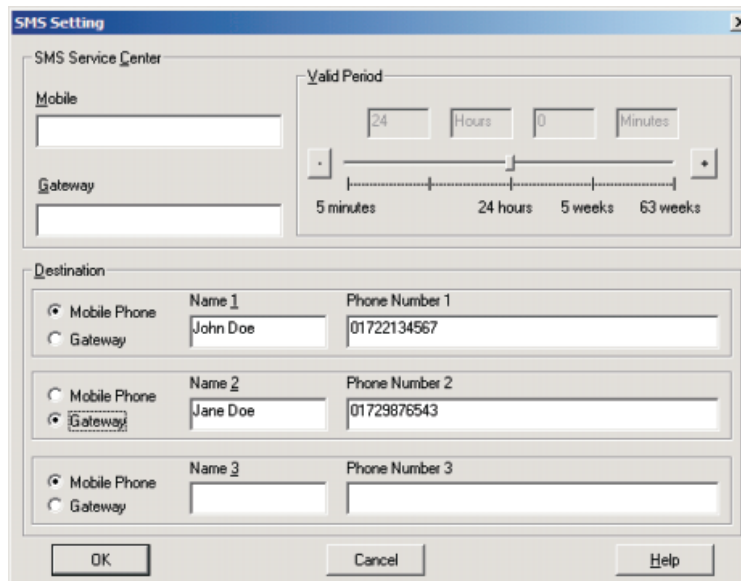


Fig. 6-2:
SMS Setting

SMS Service Center:

Enter the SMSC number within the upper field; this number may be obtained from your service provider. If you want to send e-mail as well, enter the e-mail gateway number of your service provider, too.

Recipient:

Enter several recipients with name and number here. Enable the **Mobile Phone** button for SMS and **Gateway** for e-mail.

Click on **OK** to return to the previous menu. Select one of the recipients here.

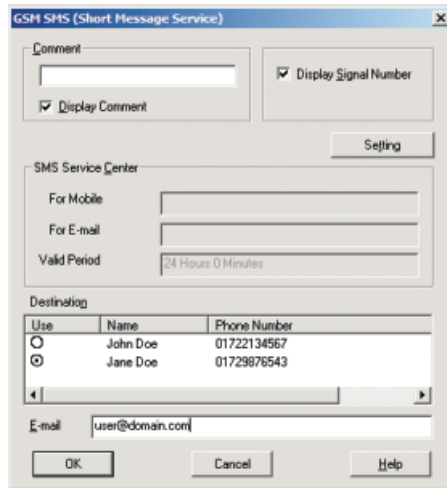


Fig. 6-4:
GSM SMS (Short Message Service)

NOTE

If you selected **Gateway** instead of **Mobile Phone**, you may enter an e-mail address for this user. Note that the appropriate number must be provided at the **Gateway** entry field with SMS preferences.

Click on **OK** to finish the configuration of the GSM function block.

6.1.3 PLC Connection

Connect the RS232 jack to the ALPHA XL, using the GSM-CAB. If done so, plug the power supply into the appropriate terminal.

NOTE

Make sure the SIM card is inserted correctly and power on both the devices. In case the PIN is set correctly, the MIM-G01 will connect to the PLC and logs onto the GSM network.

The Modem is now ready to send messages. As soon as a GSM feature of the PLC project is activated, the Modem dials into the SMSC provided and sends the display content as SMS. (Detailed information is to be found within the Mitsubishi Communication manual.)

In case the modem type does not exist in the selection list of the **GSM and serial communication** of the SW0D5-ALVLS-EUL software, it must be added manually.

Therefore select **New** as modem type. Then click on **Initialize Modem...** and within the next dialog, enter this string for modem init:

MIM-G01

```
ATE0S0=2&S0 ; +IFC=0,0 ; +CMEE=1 ; +IPR=9600 ; +CICB=0 ; &W
```

MIM-A01

```
ATE0S0=2Q1+D0\Q0\J0&W
```

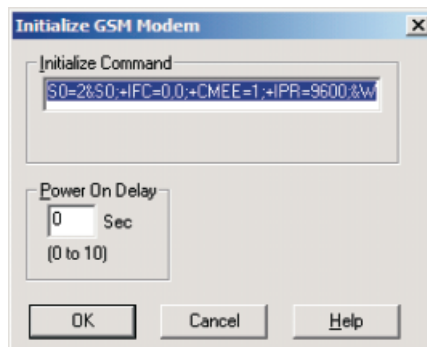


Fig. 6-5:
Initialisation of a GSM Modem

NOTE

The entered initialize command may not be displayed in full length in the input area.

Click on OK to return to the previous dialogue and continue configuration, as described in 6.1.1.

6.2 MIM and Mitsubishi MELSEC FX

The modem may be operated along with MELSEC FX in two ways: As GSM modem for "FX Messenger" or as modem for FX remote access.

6.2.1 MIM-G01 and FX Messenger

In order to connect the MIM-G01 to a FX1S Messenger, the modem must be initialized with the following init string, which sets the handshake mode (no handshake will be executed) and the transmission speed (19200 bps).

```
MIM-G01
AT+IFC=0,0;+IPR=19200;&W
```

The modem is to be connected to the RS232-BD of the FX Messenger via standard RS232 cable. Detailed information on configuring the FX messenger is to be found in the FX Messenger Manual.

6.2.2 MIM for FX Remote Access

Detailed information on correct modem selection and the necessary parameters are to be found within the Mitsubishi Manuals at <http://www.mitsubishi-automation.com>

GX IEC Developer – Reference Manua	Art. No. 043596
FX Communications User Manual	Art. No. 070143
GX Developer – Operating Manual	Art. No. 160262

When using FX along with MIM-G01, we do recommend this init string:
AT+WRST=1,"024:03";+IPR=9600;+IFC=0,0;+ICF=5,1;E1V1Q1S0=2&W

The init string recommended for using the FX along with the MIM-A01, is as follows:
AT%CO"H0E0Q1V1S0=2&D0+K0&W+TFORMAT="7E1";+TBAOD="9600"

6.3 Connection to other Mitsubishi Products

The Industrie-Modems may be used along with the A and Q series of Mitsubishi PLCs, as well as for accessing E-Terminals.

Detailed information on correct modem selection and the necessary parameters are to be found within the Mitsubishi Manuals at <http://www.mitsubishi-automation.com> as well as well as in the E-Terminal manuals at <http://www.e-terminals.com>.

6.4 RS 232-Transparent-Mode (TransMode)

The section is only valid for the Mitsubishi Super Modem (MIM-A01).

The TransMode allows the remote control of a control unit (PLC) or another RS-232 device via a Mitsubishi Super Modem as if you were sitting near the device and connected locally via RS 232. All commands that you can give to this device via the local RS 232 interface can also be issued via TransMode from any telephone connection or via GSM modem.

Dial-in access can be password-protected.

An application of the TransMode command, for example, would be the control and configuration of a technical system that is connected to the Mitsubishi Super Modem via an RS232 interface.

To use the TransMode, do the following:

- ① Configure the Mitsubishi Super Modem using the TransMode command
- ② Connect your Mitsubishi Super Modem to the device you want to control remotely.
To do so you will need a null modem cable (usually plug-plug), for example, the "Blue Adapter".
- ③ Test the remote dial-in with a Mitsubishi Super Modem or another modem using a terminal program (dial-in of the Mitsubishi Super Modem).
- ④ The Login command for the selected Mitsubishi Super Modem must be entered **within 5 seconds** of the modem connecting (see section 6.4.3). The RS 232 is then connected to both modems.
- ⑤ Control your remote device.
All data that you send from the PC to the local modem is transmitted over the telephone line to the Mitsubishi Super Modem AT and from this modem to the connected device via RS 232. You can operate the connected device as if you were directly sitting in front of it.
- ⑥ Close the connection by
 - hanging up by the caller modem
 - optional timeout in the Mitsubishi Super Modem when no more data is coming (default: 75 seconds)

6.4.1 Time delays during modem transmissions

A remote connection and data conversion in both modems lead to delays in the runtime of data from PC to the control unit in comparison to a direct local connection via an RS 232 cable. Some configuration programs for control units expect a response within a few milliseconds. Errors can occur in these programs. Ask the manufacturer of these programs and control units how the timeout for the communication with the control unit can be increased to, for example, 500 ms.

6.4.2 TransMode Command

AT+T SEND="TransMode; ..."	
AT+T SEND="TransMode; Enabled:Enabled;Password: Password; Format: Format; Handshake:Handshake; Keep:timeout; Baudrate: RS232Speed; Com:Port"	
Switches the RS 232 to a connected device during dial-in from the outside so that the device can be controlled remotely.	
Enabled	Sets theTransMode to active (On) or inactive (Off).
Password	Access password This protects your Mitsubishi Super Modem AT from unauthorized dial-in and thus protects the connected control unit from being used by unauthorized persons. When no password is indicated (default: empty) and AT+T Answer="On" , anything can be selected.
format	Data format of the RS232 interface. Notation: DatabitsParityStopbits . Default: 8N1.
handshake	Handshake protocol for the RS 232. Values: None, RTSCTS, XONXOFF
timeout	Idle timeout - Sets how long the connection remains available in case no more data is transmitted. The default value is 75 seconds. A value of 0 switches this function off, that is, the Mitsubishi Super Modem will not end the connection even if no more data is coming
RS232Speed	Data speed on the RS 232 between the Mitsubishi Super Modem and device connected to it. Default value: 115,200 Baud.
Port	Remote interface to connect to.
Example:	The Mitsubishi Super Modem is configured for the TransMode: AT+T SEND="TransMode; Password:sesam; Format:8N1; Handshake:None; Keep:20; Baudrate:9600; Enabled:On; Com:MB"
When a call is being received, the Tixi modem connects the RS 232 to the connected device. All data is now transmitted in both directions as if the devices were connected directly.	

6.4.3 TransMode Login Command

To use the TransMode of the Mitsubishi Super Modem, these prerequisites must be met

- The Mitsubishi Super Modem must be connected to a working telephone connection. That means you must be able to call it. (check first using a telephone)
- Call answering on the Mitsubishi Super Modem must be activated (AT+T Answer="On").
- The Mitsubishi Super Modem must first be configured using the TransMode command.

For access to a PLC connected to a Mitsubishi Super Modem a log in to the Mitsubishi Super Mode via a modem connection is required. Use a Mitsubishi Super Modem or any other modem for this purpose.

Send the login command for the TransMode command at the latest five seconds after CONNECTING.

There are two possibilities for the login command, which are described as follows.

Login without parameters

[password] Login with password
[] Login without password

Login with password and parameters

[password; Format:format; Handshake:handshake; Keep:timeout; Baudrate:RS232Speed]

For a description of the parameters, see Section 6.4.2

The configuration of the Mitsubishi Super Modem should be done locally during set-up, tested and only then approved for remote dial-in.

The remote modification of the parameters overwrites the previously configured – and tested - parameters

The remote modification of the parameters should only be used if it is absolutely necessary.

It can also be used to exclude possible local modifications.

7 Technical Data

Main Features

Features	MIM-G01	MIM-A01
Fax	Via Fax-to-Fax-Gateway	Send text messages to fax machines
SMS	Send and receive SMS (GSM and GPRS Mode)	Send and receive SMS
E-Mail	Via SMS-to-E-Mail-Gateway	Send and receive E-Mail (SMTP/POP3)
Express-E-Mail	—	Send and receive E-Mail via secure telephone connection, with immediate delivery and without internet
Remote Control	—	Remotely control your PLC via a telephone connection

Tab. 7-1: Main Features

System Architecture

Features	MIM-G01	MIM-A01
CPU	—	32 Bit RISC-processor
Program Memory	—	Max 1 MB Flash-ROM
Data Memory	—	30...100 kB SRAM

Tab. 7-2: System Architecture

Telephone- /GSM Network



Features	MIM-G01	MIM-A01
Network	GSM/GPRS, Dual Band, 900/1800 MHz	Analog telephone line jack (a/b interface), RJ11
GPRS- Features	GPRS multi slot Class 10, GPRS mobile station Class B, Coding Schemes CS1, 2, 3, 4, complies to SMG31bis	—
GSM Features	Call Forwarding, Call Barring, Multiparty, Call Waiting, Call Hold, Calling Line Identity, Advice of Charge, USSD, Close User Group	—
Antenna Jack	FME (male), Coaxial, Impedance 50 Ω, Rec.Freq. 925...960 MHz 1805...1880 MHz SendingFreq. 880...915 MHz 1710...1785 MHz Capacity 2 W at 900 MHz 1 W at 1800 MHz	—
Data Transmission	300 – 14,4 kbps async., transparent / not transparent, ITU-T (V.21, V.22, V.22bis, V.26ter, V.32, V.34, V110)	300bps - 56kbps ITU-T (V.90, V.34+, V.32bis, V.32, V.22bis, V.22, V.21), Bell 212A, Bell103
Fax Transmission	Fax Group 3 / Class 1 and 2. 2400 bps – 14,4 kbps ITU-T (V.17, V.29, V.27ter) Data Compression: MNP2, V.42bis	Fax Group 3 / Class 1 2400bps - 14,4kbps, ITU-T (V.17, V.29, V.27ter, V.21 ch2)
Error Correction/ Data Compression	MNP ⁿ , V.42bis	V.42 / MNP 2-4, V.42bis / MNP5

Tab. 7-3: Telephone- /GSM Network

Firmware

Features	MIM-G01	MIM-A01
Operating System	—	Commercial RTOS (real-time multitasking operating system) with C++ abstraction layer
File System	—	Commercial DOS-compliant flash file system with C++ abstraction layer

Tab. 7-4: Firmware
General Data

Features	MIM-G01	MIM-A01																								
Power Supply	10...40VDC, max. 0.7A (2-pin screw terminal 2.5mm ²) and jack (pin diameter = 2.1mm, inner diameter = 6mm)	10...30VDC, max. 0.7A, screw terminals 2.5mm ² and power supply jack (pin diameter = 2.1mm, inner diameter = 6mm)																								
LED Signals	Power and Status GSM	Power, Mail in, Line, Mail out, Modem Mode																								
Controls	—	Service-Button																								
Allowed Temperature	Operation: 0...+50°C, Storage: -30...+70°C																									
Allowed Humidity	5...95% relative humidity, non-condensing																									
Protection Level	IP20																									
Soiling Protection	2																									
RS 232	RS 232 nach ITU-T V24, V28, Hardware Handshake Baudrate: 300 – 115.200 bps, 300 – 115.200 bps with Autobauding 9-pin D-Sub Jack (female)																									
	<table border="0"> <thead> <tr> <th>Signal line</th> <th>Pin</th> <th>Signal line</th> <th>Pin</th> </tr> </thead> <tbody> <tr> <td>TX CT103</td> <td>3</td> <td>DSR CT107</td> <td>6</td> </tr> <tr> <td>RX CT104</td> <td>2</td> <td>DTR CT108-2</td> <td>4</td> </tr> <tr> <td>RTS CT105</td> <td>7</td> <td>DCD CT109</td> <td>1</td> </tr> <tr> <td>CTS CT106</td> <td>8</td> <td>RI CT125</td> <td>9</td> </tr> <tr> <td>GND CT102</td> <td>5</td> <td></td> <td></td> </tr> </tbody> </table>	Signal line	Pin	Signal line	Pin	TX CT103	3	DSR CT107	6	RX CT104	2	DTR CT108-2	4	RTS CT105	7	DCD CT109	1	CTS CT106	8	RI CT125	9	GND CT102	5			
Signal line	Pin	Signal line	Pin																							
TX CT103	3	DSR CT107	6																							
RX CT104	2	DTR CT108-2	4																							
RTS CT105	7	DCD CT109	1																							
CTS CT106	8	RI CT125	9																							
GND CT102	5																									
Conformity	Standards:  EN55022 (9:2003), EN55024 (10:2003) EN301489-1/7 (2000 GSM) EN60950 3GPP TS 51.010-1 (9:2002, v5.0.0.0) GCF-CC (10:2002, v3.8.1)	Standards:  EN55022 (9:2003), EN55024 (10:2003) EN60950 R&TTE policy TS 103021																								
Extra Features	Software upgrade, Voice and DTMF Capable	Software upgrade, Voice and DTMF Capable																								
Case/Mounting	DIN-Rail 35mm (EN50022), vertically or horizontally																									
Dimensions	Width: 88mm x Height: 58mm x Depth: 91mm (without antenna connection)																									
Weight	190 g	180 g																								

Tab. 7-5: General Data

7.1 Dimensions

7.1.1 MIM-G01

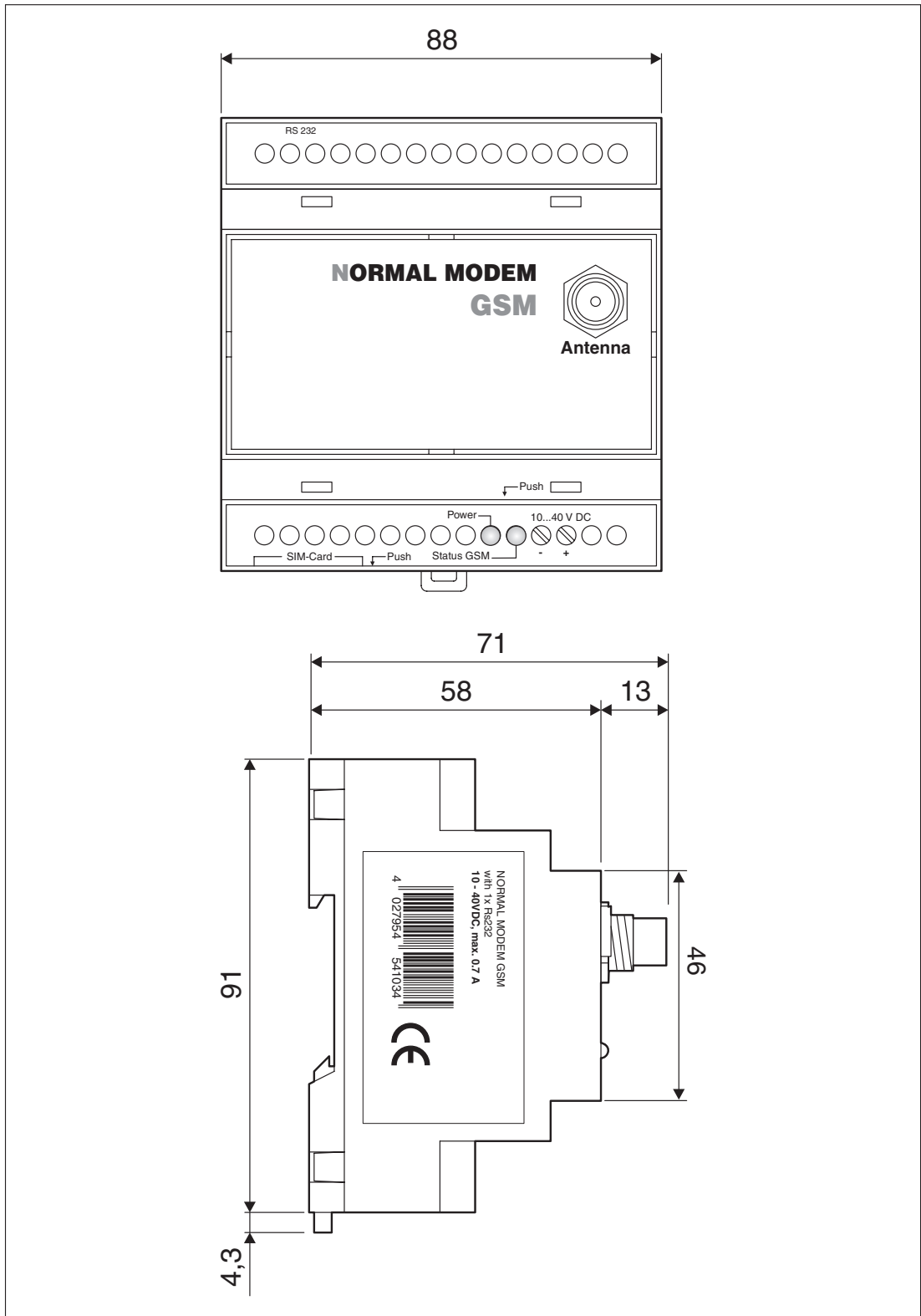


Fig. 7-1: Dimensions

7.1.2 MIM-A01

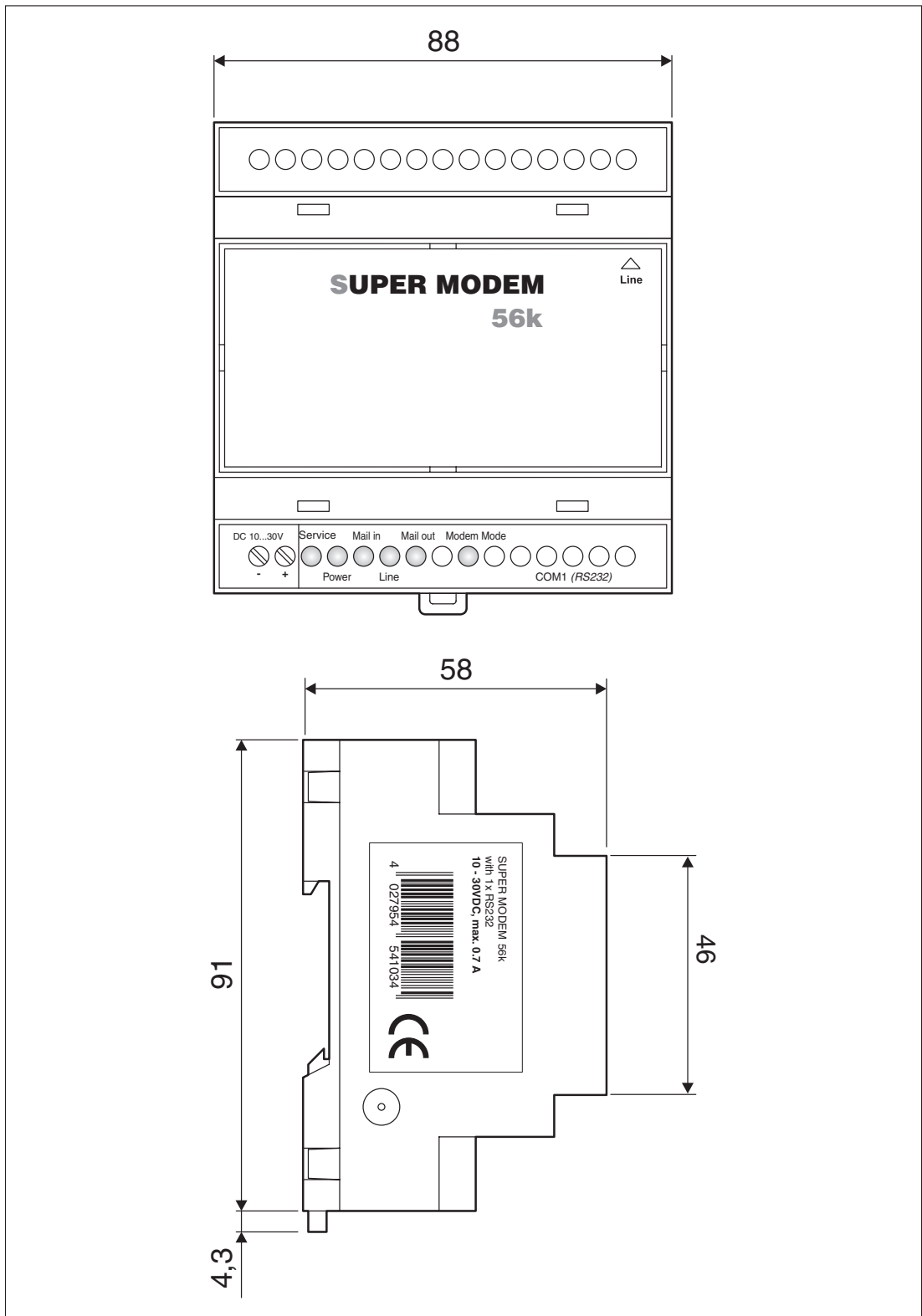


Fig. 7-2: Dimensions

8 Appendix

8.1 AT Commands MIM-G01

This chapter describes the most important MIM-G01 AT modem commands. Detailed information on these may be obtained from www.mitsubishi-automation.de.

8.1.1 Important AT Commands

+CPIN – PIN

This command requests the PIN status and enters the PIN/PUK.

Command	Possible answers
AT+CPIN?	+CPIN: READY PIN OK or not necessary +CPIN: SIM PIN PIN required +CPIN: SIM PUK PUK1 required +CPIN: SIM PIN2 PIN2 required +CPIN: SIM PUK2 PUK2 required +CME ERROR: <err> SIM error
AT+CPIN=<pin> Note: enter PIN	OK
AT+CPIN=<puk>,<pin> Note: enter PUK and new PIN	OK

Tab. 8-1: +CPIN – PIN

Defined parameters:

<pin> 4...8 digit PIN

<puk> 8 digit PUK

+CSQ – Signal Quality

This Command requests the signal quality.

Command	Possible answers
AT+CSQ	+CSQ: <rssi>,<ber> OK Note: <rssi> and <ber> see below

Tab. 8-2: +CSQ – Signal Quality

Defined parameters:

<rssi> :

0: -113 dBm or less

1: -111 dBm

30: -109 ... -53 dBm

31: -51dBm or more

99: unknown or not recognizable

<ber> :

0...7: RXQUAL value

99: unknown or not recognizable

+CNUM – Own Number

This Command sets the own number (MSISDN) of the SIM card for any service.

Command	Possible answers
AT+CNUM Note: request MSISDNs	+CNUM : <alpha1>, <number1>, <type1> <CR><LF> +CNUM : <alpha2>, <number2>, <type2>....

Tab. 8-3: +CNUM – Own Number

Defined parameters:

<alphax> name for the number <numberx>
 <numberx> number in format determined by <typex>
 <typex> type of adresse-byte in integer format

Example:

+CNUM : "Phone", "0612345678", 129
 +CNUM : "Fax", "0687654321", 129

+CSCA – SMS Center Number

This Command requests or changes the SMSC number saved on the SIM card.

Command	Possible answers
AT+CSCA? Note: request SMSC number	+CMS ERROR: 330 Note: service center unknown +CMS <number> Note: number of SMSC
AT+CSCA="<number>" Note: save Service Center number	OK

Tab. 8-4: +CSCA – SMS Center Number

Defined parameters:

<number> SMSC number

+IPR – Baudrate

This Command sets baudrate of serial interface.

Command	Possible answers
AT+IPR?	+IPR: <rate> OK
AT+IPR=<rate> Note: disable autobauding and set given baudrate.	OK

Tab. 8-5: +IPR – Baudrate

Defined parameters:

<rate> Data rate in bps (0 = Autobauding)

+ICF – Data Format

This Command sets data format of serial interface.

Command	Possible answers
AT+ICF?	+ICF: <format>,<parity> OK Note: current values
AT+ICF=<format>,<parity>	OK

Tab. 8-6: *+ICF – Data Format*

Defined parameters:

<format>	<parity>	<format>	<parity>
1: 8 Data 2 Stop	0: Odd	4: 7 Data 2 Stop	3: Space
2: 8 Data 1 Parity 1 Stop	1: Even	5: 7 Data 1 Parity 1 Stop	4: None
3: 8 Data 1 Stop	2: Mark	6: 7 Data 1 Stop	

If <format> is 1, 3, 4 or 6, <parity> will be ignored

+IFC – Flow Control

This Command determines flow control on serial interface.

Command	Possible answers
AT+IFC?	+IFF: <DCE_by_DTE>,<DTE_by_DCE> OK Note: current values
AT+IFC=<DCE_by_DTE>,<DTE_by_DCE>	OK

Tab. 8-7: *+IFC – Flow Control*

Defined parameters:

< DCE_by_DTE >	< DTE_by_DCE >
0: none	0: none
2: RTS	2: CTS

+COPS – GSM Network

This command requests accessible networks and sets the GSM home network.

Command	Possible answers
AT+COPS? Note: request current network	+COPS: <mode>,<format>,<oper> OK
AT+COPS=? Note: request list of available networks	+COPS: (<stat>,"long <oper>","short <oper>","numeric <oper>") OK
AT+COPS=0 Note: logon to the home network	OK Note: successful
AT+COPS=<mode>,<format>,<oper> Note: set network	OK Note: successful

Tab. 8-8: +COPS – GSM Network

Defined parameters:

<mode>

- 0: automatic (standard)
- 1: manual
- 2: logoff; device is logged off until <mode>=0 or 1 is selected.
- 3: writes <format> (for output with AT+COPS?)
- 4: manual / automatic (<oper> required)

<format>

- Format of <oper> parameters
- 0: long alphanumeric format
- 1: short alphanumeric format
- 2: numeric format (standard) and <stat>
- Status of <oper>

<stat>

- 0: unknown
- 1: available
- 2: active

<oper>: Service Provider ID

- long alphanumeric format: 16 chars
- short alphanumeric format: 8 chars
- numeric format (standard) and <stat>: 5 chars

+CMGS – Send SMS

The Command sends SMS.

Command	Possible answers
AT+CMGS= <da><CR> text entry<Strg-Z / ESC >	+CMGS: <mr> OK Note: transmitted ok

Tab. 8-9: +CMGS – Send SMS

For sending the message, <Strg-Z> (ASCII 26) must be entered. The text may contain any character except <Strg-Z> and <ESC> (ASCII 27).

Defined parameters:

<da>

Recipient number

<mr>

message reference number, (will be counted up automatically) (Ring buffer, 0-255)

8.1.2 Overview of AT-Commands

Service Commands

Command	Description
+CLIR	Calling Line Identification (Transmission of the phone number)
+CLIP	Calling Line Identification (Display of the phone number of the caller)
+COLP	Connected Line Identification
+CAOC	Advice Of Charge
+CACM	Accumulated Call Meter
+CAMP	Accumulated Call Meter Maximum
+CPUC	Price Per Unit and Currency Table
+CHLD	Supplementary Services
+CLCC	List Current Calls
+CSSN	Service Notifications
+CUSD	Supplementary Service Data
+CCUG	Closed User Group

Tab. 8-10: Service Commands

V24-V35 Commands

Command	Description
+IPR	Fixed DTE Rate
+ICF	DTE-DCE Character Framing
+IFC	DTE-DCE Local Flow Control
&C	Set DCD Signal
&D	Set DTR Signal
&S	Set DSR Signal
O	Back to Online Mode
Q	Result Code Suppression
V	DCE Response Format
Z	Default Configuration
&W	Save Configuration
&T	Auto-Tests
E	Echo
&F	Restore Factory Settings
&V	Display Configuration
I	Request Identification Information
A/	Repeat Last Command

Tab. 8-11: V24-V35 Commands

Dial Commands

Command	Description
D	Dial command
H	Hang-up Command
A	Answer a Call
+CEER	Extended Error Report
+VTD, +VTS	DTMF Signals
ATDL	Redial Last Telephone Number
AT%Dn	Automatic Dialing with DTR
ATSO	Automatic Answer
+CICB	Incoming Call Bearer

Tab. 8-12: Dial Commands**General Commands**

Command	Description
+CGMI	Manufacturer Identification
+CGMM	Request Model Identification
+CGMR	Request Revision Identification
+CGSN	Product Serial Number
+CSCS	Select TE Character Set
+CIMI	Request IMSI
+CCID	Card Identification
+GCAP	Capabilities List
+CPOF	Power Off
+CFUN	Set Phone Functionality
+CPAS	Phone Activity Status
+CMEE	Report Mobile Equipment Errors
+CKPD	Keypad Control
+CCLK	Clock management
+CALA	Alarm management

Tab. 8-13: General Commands**Network**

Command	Description
+CSQ	Signal Quality
+COPS	Operator Selection
+CREG	Network Registration
+WOPN	Read Operator Name
+CPOL	Preferred Operator List

Tab. 8-14: Network**Security**

Command	Description
+CPIN	Enter PIN
+CPIN2	Enter PIN2
+CPINC	PIN Remaining Attempt Number
+CLCK	Facility Lock
+CPWD	Change Password

Tab. 8-15: Security

Phonebook

Command	Description
+CPBS	Select Phone Book Memory
+CPBR	Read Phone Book Entries
+CPBF	Find Phone Book Entries
+CPBW	Write Phone Book Entry
+CPBP	Phone Book Phone Search
+CPBN	Move Action in Phone Book
+CNUM	Subscriber Number
+WAIP	Avoid Phone Book Init

Tab. 8-16: Phonebook**SMS Commands**

Command	Description
+CSMS	Select Message Service
+CNMA	New Message Acknowledgement
+CPMS	Preferred Message Storage
+CMGF	Preferred Message Format
+CSAS	Save Settings
+CRES	Restore Settings
+CSDH	Show Text Mode parameters
+CNMI	New Message Indication
+CMGR	Read Message
+CMGL	List Message
+CMGS	Send Message
+CMGW	Write Message to Memory
+CMSS	Send Message from Storage
+CSMP	Set Text Mode Parameters
+CMGD	Delete Message
+CSCA	Service Center Address
+CSCB	Select Cell Broadcast Message
+WCBM	Cell Broadcast Message IDs
+WMSC	Message Status Modification
+WMGO	Message Overwriting

Tab. 8-17: SMS Commands**Data Commands**

Command	Description
+CBST	Bearer Type Selection
+FCLASS	Select Mode
+CR	Service Reporting Control
+CRC	Cellular Result Codes
+ILRR	DTE-DCE Local Rate Reporting
+CRLP	Radio Link Protocol Parameters
+DOPT	Others Radio Link Parameters
%C	Select Data Compression
+DS	V42 bis Data Compression
+DR	V42 bis Data Compression Report
\N	Select Data Error Correcting Mode

Tab. 8-18: Data Commands

Fax Commands CLASS1

Command	Description
+FTM	Transmit Speed
+FRM	Receive Speed
+FTH	HDLC Transmit Speed
+FRH	HDLC Receive Speed
+FTS	Stop Transmission and Wait
+FRS	Receive Silence

Tab. 8-19: Fax Commands CLASS1**Fax Commands CLASS2**

Command	Description
+FDT	Transmit Data
+FDR	Receive Data
+FET	Transmit Page Punctuation
+FPTS	Page Transfer Status Parameters
+FK	Terminate Session
+FBOR	Page Transfer Bit Order
+FBUF	Buffer Size Report
+FCQ	Copy Quality Checking
+FCR	Capability to Receive
+FDIS	Current Sessions Parameters
+FDCC	DCE Capabilities Parameters
+FLID	Local ID String
+FPHCTO	Page Transfer Timeout Parameter

Tab. 8-20: Fax Commands CLASS2**Special AT Commands**

Command	Description
+CCED	Cell Environment Description
+CCED	Automatic RxLev Indication
+WIND	General Indications
+ADC	Analog Digital Converter
+CMER	Mobile Equipment Event Reporting
+WLPR	Read Language Preference
+WLPW	Write Language Preference
+WIOR	Read GPIO Value
+WIOV	Write GPIO Value
+WAC	Abort Command
+WTONE	Play Tone
+WDTMF	Play DTMF Tone
+WDWL	Wavecom Downloading
+WVR	Wavecom Voice Rate
+WDR	Data Rate
+WHWV	Hardware Version
+WDOP	Date Of Production
+WSVG	Wavecom Select Voice Gain
+WSTR	Wavecom Status Request
+WSCAN	Wavecom Scan
+WRIM	Ring Indicator Mode
+W32K	Power saving mode

Tab. 8-21: Special AT Commands

8.2 AT Commands MIM-A01

8.2.1 Overview of AT Commands

Commands can be entered alone or in strings, and they must be preceded - except the A/ command - by the character sequence AT (or at) and ended with the content of the S3 register, which usually is <CR/LF>. For example:

```
ATX1<CRLF>
ATQ0<CRLF>
```

The maximum length of a command line is 80 characters. If more commands are issued, the modem responds with an error message. The commands can be sent with or without spaces between commands and in upper-case or lower-case letters. The following commands produce the same results:

```
ATX1QODP12345<CRLF>
At X1 Q0 Dp 12345<CRLF>
```

Use the Backspace key to delete errors.

In this summary and the following descriptions, the preceding AT sequence is not listed.

Command	Description
A	Answer mode
A/	Repeat last command
B	Select ITU-T or Bell
D	Dial command
E	Command mode echo
H	Switch hook control
I	Identification/checksum option
L	Speaker volume control
M	Speaker control
N	Select data rate handshake
O	Go online
P	Select pulse dialing
Q	Result code display control
S	Select an S register
T	Select tone dialing
+TFORMAT	Data format at the serial interface
+TBAUD	Baud rate of the serial interface
V	Result code form
W	Response code data rate
X	Result code type
Z	Recall stored profile
+++	Escape Sequence to return temporarily to Command mode
&C	DCD (data carrier detect) option
&D	DTR (data terminal ready) option
&F	Load factory defaults
&G	Guard tone option (1200 bps and 2400 bps only)
&K	Select serial port flow control
&P	Dial pulse ratio
&S	DSR (data set ready) option
&U	Disable Trellis coding
&V	View active and stored profiles
&W	Store active profile
&Y	Select stored profile on power-up

Tab. 8-22: Overview of AT Commands (1)

Command	Description
&Z	Store telephone number (up to 30 digits) to location 'n' (0-3)
%E	Auto-retrain control
%G	Rate renegotiation
-C	Generate data mode calling tone
+ES	Error control selection
+MS	Modulation selection
*NC	CallerID settings
+VCID	Country code setting
@D	Accept a new firmware image to flash

Tab. 8-23: Overview of AT Commands (2)

8.2.2 AT Command Descriptions

This chapter describes the most important AT commands of the modem. The values marked with an asterisk (*) are the default values.

+TFORMAT - Sets the data format

Sets the data format of the serial interface.

+TFORMAT="Dataformat"

Dataformat: DatabitsParityStopbits

Databits: 8, 7

Parity: N (none), O (odd), E (even), X (auto-detection, default)

Stopbits: 1, 2

+TBAUD - Set the baudrate

Sets the baud rate of the serial interface.

+TBAUD="Baudrate"

Baudrate: AUTO (default), 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400

&K - Select Serial Port Flow Control

This command specifies the DTE-to-modem flow control. Software flow control uses the characters XOFF (13h) and XON (11h) to stop and start data transmission, respectively, both to and from the DTE. Bidirectional hardware flow control uses RTS/CTS to stop and start data from the modem

&K0 Disables flow control

&K3* Bi-directional hardware flow control - RTS/CTS

&K4 XON/XOFF software flow control

&D - DTR (Data Terminal Ready) Option

This command controls how the modem responds to DTR. After toggling DTR, the host should wait 200 ms before modifying the UART registers or sending a new command to the modem. This is done because the modem does not send an 'OK' message to indicate it has performed the requested function.

&D0 The modem ignores DTR.

&D1 The modem switches from data to command mode when an on-to-off transition of DTR occurs.

&D2* An on-to-off transition of DTR causes the modem to go on-hook (hang up). While DTR is off, auto-answer is disabled.

&D3 An on-to-off transition of DTR reinitializes the modem. The reinitialize procedure performs the same function as a power-up reset, except that the UART registers are not reconfigured.

D - Dial Command

This command causes the modem to immediately go off-hook as an originating modem and dial a telephone number with corresponding dial modifiers. Dial modifiers are parameters that define how the modem should dial the telephone number.

Dial Modifiers

0-9	Dialling Digits
A, B, C, D, *, #	Tone Dial Characters
P	Pulse Dial: configures the modem to use pulse dialling to dial a telephone number.
R	Reverse Originate Mode: places the modem in answer mode. This modifier should be the last character in the Dialling string (for example,

ATDT 12345678R). After dialling the telephone number, the modem goes into data modem answer mode instead of originate mode.

S = n	Dial NVRAM Telephone Number: causes the modem to dial a telephone number previously stored in the NVRAM with the AT&Zn=x command.
T	Tone Dial: configures the modem to use DTMF tones to dial a telephone number.
W	Wait for Dial Tone: causes the modem to look for dial tone for a specified amount of time. If dial tone or the amount of time specified by the S6 register times out, the modem processes the next command in the dial string. If a busy signal is detected, the modem responds to the DTE with a busy response code and then enters off-line command mode.
<space> - ()	Ignored by Modem: these four characters are ignored by the modem. Spaces also may be included in the dial string to separate area codes and numbers.
L	Dials the last number used for dialling.

E - Command Mode Echo

This command selects whether the modem echoes AT commands back to the host in either online or off-line command mode.

E0	Echo disabled
E1*	Echo enabled

H - Switch Hook Control

This command controls the telephone line relay (OHREL*) and causes the modem to either hang up or pick up the telephone line. The H command can be issued only after the escape sequence has been entered.

H0*	Hang up telephone line (go on-hook)
H1	Pick up telephone line (go off-hook)

Q - Result Code Display Control

This command selects whether the modem sends result codes to the DTE.

Q0*	Result codes enabled
Q1	Result codes disabled

X - Result Code Type

This command determines which modem result codes are enabled. Additionally, this command specifies whether busy and dial tone detection are enabled or disabled.

X3	Result codes 0-5, 7, 10 and above enabled. Busy detect enabled and dial tone detect disabled
X4*	Result codes 0-7, 10 and above enabled. Busy and dial tone detect enabled.

&W - Store Active Profile

This command causes the modem to store a subset of the active profile command and S-register configurations into the NVRAM user profile 'n'.

&W0* Store in user profile 0

&W1 Store in user profile 1

+VCID - Caller ID Settings

The +VCID=n command controls the reporting and presentation of data associated with the Caller ID services.

+VCID0 don't display CallerID

+VCID1 display CallerID

Additional and detailed information on AT commands are to be found within the Mitsubishi manuals at www.mitsubishi-automation.de.

8.2.3 Overview of S-Registers

The modem holds S registers, which allow to check and store the active configuration. Some S-registers are stored in non-volatile memory (NVRAM), which can be interrogated with Z, &Y, and &W commands. The values of most S-registers can be modified using AT commands.

Register	Function	Default	Range
S0	No. of rings to auto-answer on	0	0-255
S1	Ring count	0	0-255
S2	Escape character	43	0-127
S3	Carriage Return Character	13	0-127
S4	Line feed character	10	0-127
S5	Backspace character	8	0-32, 127
S6	Wait before dialing	2	2-255
S7	Wait for carrier	60	0-100
S8	Pause time for dial modifier	2	0-255
S9	Carrier recovery time	6	1-255
S10	Lost carrier hang up delay	14	0-255
S12	Guard Time	50	0-255
S14	Bit-mapped options (echo, modem responses, tone/pulse dialing)	138	—
S21	Bit-mapped options (serial interface)	48	—
S22	Bit-mapped options (speaker, modem responses)	118	—
S23	Bit-mapped options (interface speed, parity, guard tone)	none	—
S25	Detect DTR change	5	0-255
S33	Sleep mode timer	0	0-90
S37	Maximum line speed attempted	0	0-35

Tab. 8-24: Overview of S-Registers

8.2.4 Message Commands

In Message Mode, you can send this extended command set to the modem.
If you use this command in Modem Mode, an error will occur.

Overview of the Commands

Overview of the Commands

AT+T Send="All; ..."	sets general send parameters
AT+T Send="SMS; ..."	sends an SMS message (depending on device)
AT+T Send="Fax; ..."	sends a fax (depending on device)
AT+T Send="EMail; ..."	sends an Internet e-mail
AT+T Send="POP3; ..."	retrieves Internet e-mail from provider
AT+T Send="Express; ..."	sends an Express E-Mail

Control and Configuration

AT+T Send?	displays the current configuration
AT+T List	displays a list of the messages received
AT+T Read	displays received messages
AT+T Delete	deletes received messages
AT+T Time	sets the system time
AT+T Time?	displays the system time
AT+T Echo	switches the local echo on or off
AT+T Verbose	switches comprehensive feedback on or off
AT+T Speaker	sets the sound level of the modem speaker
AT+T Answer	switches the call receipt on or off
AT+T Erase	resets the modem (factory default)
AT+T Redial	sets the number of redial attempts (default=0)
AT+T RedialDelay	defines the delay time between redial attempts (default=90)
AT+T DialRules	defines dial method and dial tone detection
AT+T Mode	switches between modem mode and Message Mode
AT+T Help	displays an overview of the extended commands
AT+T Format	defines data format on serial interface

Remote Dial-In

AT+T Send="TransMode; ."	Remote dial-in to a Tixi modem and transparent mode via the RS 232 connection to the connected control unit
--------------------------	---

8.2.5 AT+T Send - Sending SMS, E-Mail, Fax and Express E-Mail Messages

Setting General Message Parameters

AT+T Send="All;..."	
AT+T Send="ALL; DialPrefix:nnn; ModemName:Name; ModemNumber:number End:char"	
This command sets the parameters that are common to all types of messages; no message is sent.	
No message text can be entered after this command!	
nnn:	Getting an Outside Line Prefix If you are using the modem on a system where a prefix is needed to get an outside line, enter it here. Enter characters which can be dialed (0-9,*,#, comma) only. If no prefix is needed to get an outside line, you can leave out this parameter.
Name:	When sending fax messages, this name is used in the header of the fax sent and as sender ID when sending Express E-Mails. A maximum of 16 alphanumeric characters is allowed.
Number:	Number of the telephone line to which your Tixi modem is connected. This number must be entered in international format: +49-30-1234567. This number is used in the headers of fax messages and is listed as the sender for Express E-Mails.
Char:	Defines the character that closes the message and starts sending. (default: <STRG>+<Z>)
Example: Enter the external call prefix "0", the modem name "John Doe Inc, modem 2" and the telephone number "+44-20-1234567": <pre>AT+T Send = "All; DialPrefix:0; ModemName: John Doe Inc, modem 2; ModemNumber: +44-20-1234567"</pre>	

Sending a Fax

AT+T Send="Fax;..."	
AT+T Send="Fax; Dial: number" >SubjectText >MessageText line#1 >MessageText line#n ><CTRL>+<Z>	
This command sends a text message as fax or sets the parameters. When you have closed the command line with <CR/LF>, the modem displays a prompt (>) where you can specify the subject line you want in your fax message. The message text is entered in subsequent lines. To close this message, press the keys <CTRL>+<Z>.	
If you skip the message text, the parameters are saved for later use until replaced by new parameters.	
Number:	The recipients fax number. Enter characters which can be dialed (0-9,*,#, comma) only.
SubjectText:	This is the first line of the message text. It forms the subject line of the fax message.
MessageText line#1...n:	Other lines of the message text. Each line is entered at the prompt character displayed by the modem and closed by <CR/LF>. During sending the modem does an automatic line break after 75 characters by itself. The message text must not contain umlauts.
Example: <pre>AT+T Send="Fax; Dial: 40578747" >Hello Paul >This is the important message sent by fax. > >See you. ><CTRL>+<Z> Short modem reply: OK</pre>	

Sending an SMS Message

AT+T Send="SMS;..."	
AT+T Send="SMS; To: recipient; ServiceCentreNumber: SCNumber; Type: Protocol" >MessageText ><CTRL>+<Z>	
<p>This command sends an SMS message or sets the parameters.</p> <p>When you close the command line by pressing <ENTER> (<CR/LF>), the modem displays a prompt (>) where you enter the message text on one line.</p> <p>To end and send the message, press <ENTER> and then<CTRL>+<Z>.</p> <p>If you skip the message text, the parameters are saved for later use until replaced by new parameters.</p>	
SCNumber:	The relevant SMS service centre number. This parameter must also be set when receiving SMS messages because incoming SMS calls are recognized using this number. Enter characters which can be dialled (0-9,*,#, comma) only.
Recipient:	Number of person receiving the SMS message - in most cases a mobile phone number.
Protocol:	Protocol of the relevant SMS service centre. Valid values are: D1_TAP Sending SMS via D1-SMSC (for example, D1 mobile phone) D2_UCP Sending SMS via D2-SMSC (for example, D2 mobile phone) Mobilkom_A_TAP Sending SMS via Mobilcom Austria (A1) PSTN Sending SMS Messages via PSTN-SMSC
<p>If not indicated otherwise, the protocol supported by the host of the recipient call number is automatically used. (Germany only)</p>	
MessageText:	At the prompt, enter the SMS text and finish by pressing ENTER. A maximum of 160 characters may be used for the text of an SMS, including <CR/LF>. Enter the SMS text as consecutive text in one line. The message text must not contain umlauts.(The <CR/LF> character is created by pressing the ENTER key)
Example:	
a) The send command configures all necessary parameters and an SMS message is sent:	
<pre>AT+T Send="SMS; To:071365776; ServiceCentreNumber:0193010" >The message text follows here. ><CTRL>+<Z></pre> <p><i>Comprehensive modem reply:</i></p> <pre>+T Send: sending message * StartTime: 2001/10/30,09:42:13 * EndTime: 2001/10/30,09:42:26 * SMSC Time: 2001/10/30,09:42:48 OK</pre>	
b) The send command uses the configured parameters (incl. receiver number) and an SMS message is sent:	
<pre>AT+T Send="SMS;" >The message text follows here. ><CTRL>+<Z></pre> <p><i>Short modem reply:</i></p> <pre>OK</pre>	

Sending an Express E-Mail

AT+T Send="Express;..."

```
AT+T Send="Express; To: Recipient; Dial: Number;From: Sender"
>Subject
>MessageText line#1
>MessageText line#n
><CTRL>+<Z>
```

This command sends an Express E-Mail or sets the parameters. When you have closed the command line with <CR/LF>, the modem displays a prompt (>) where you can specify the subject line you want in your e-mail. The actual message text is entered in the subsequent lines. To close this message, press <CTRL>+<Z>.

If you skip the message text, the parameters are saved for later use until replaced by new parameters.

Number:	This is the number that must be dialled to connect to the recipient. Enter the number exactly as it is to be dialled, including all country or area codes. Leave out the external call prefix that was indicated in the general parameters.
Recipient:	Express E-Mail address of the recipient, for example, PAUL+49-30-1234567. This is inserted in the To: field in the header of the Express E-Mail.
Sender:	Express E-Mail address of the sender, for example, OTTO+49-30-7654321. This is inserted in the From: field in the header of the Express E-Mail.
Subject:	Subject line of the message. This is always generated from the first line that is entered after the prompt.
MessageText line#n	Other lines of the message text. Each line is entered at the prompt displayed by the Tixi modem and closed by <CR/LF>. During sending the modem does an automatic line break after 75 characters by itself. The message text must not contain umlauts

Example:

The send command configures all necessary parameters and sends an Express E-Mail:

```
AT+T Send="Express; Dial: 1234567; From: JOHN+44-20-7654321;
To: PAUL+44-20-1234567"
>Hello Paul,
>The fan in room 123 in house 12 is not working.
>
>Regards, John.
><CTRL>+<Z>
```

Short modem reply:

```
OK
```

Sending Internet E-Mail (SMTP)

AT+T Send="Email;..."	
<pre>AT+T Send="Email; To: Recipient; Dial: Number; From: Sender; Flags: flag PPPUser: User; PPPPassword: Password; SMTPMailServer: SMTPServer" >Subject >MessageText line#1 >MessageText line#n ><CTRL>+<Z></pre>	
<p>This command sends an Internet e-mail or sets the parameters.</p> <p>After closing the command line using <CR/LF>, your Tixi modem displays a prompt (>) where you can specify the subject line.</p> <p>The actual message text is entered in the subsequent lines.</p> <p>To close this message, press <CTRL>+<Z>.</p> <p>If you skip the message text, the parameters are saved for later use until replaced by new parameters.</p>	
Number:	Dialup number of the Internet service provider. Enter characters which can be dialled (0-9,*,#, comma) only.
Sender:	Internal e-mail address of the message sender, for example, paul@example.com. This address is used for the From: field of the outgoing message.
Recipient:	Internet e-mail address of the message recipient, recipient otto@example.net. This address is used for the To: field of the outgoing message.
flag:	Enter "PbS" here if POP-before-SMTP is to be used. (otherwise you can omit the parameter.)
User:	PPP user name to dial into the Internet service provider.
Password:	PPP password.
SMTPServer:	Name or address of the SMTP server that is to send the message, for example, mail.provider.com.
Subject:	Subject line of the e-mail. This is always generated from the first line that is entered after the prompt.
MessageText line#1...n:	Other lines of the e-mail text. Each line is entered at the prompt character displayed by the modem and closed by <ENTER>. The message text must not contain umlauts.
Example:	
An Internet e-mail is sent:	
<pre>AT+T Send="EMail; Dial: 0191011; From: user@example.com; To: info@example.net; PPPUser: 00012345678445566; PPPPassword: Rose; SMTPMailServer: smtp.t-online.de" >Hello Paul, >This is the important message sent by e-mail. ><CTRL>+<Z></pre>	
Short modem reply:	
OK	

Retrieving Internet E-Mail (POP3)

AT+T Send="POP3;..."	
<pre>AT+T Send="POP3; Dial: Number; PPPUser: ISP user; PPPPassword: ISP-PW; Flags:Flag; Username: Mailbox; Password: MailPW; POP3MailServer: POP3server" >START ><CTRL>+<Z></pre>	
<p>This command tests the specified mailbox (POP3) and starts retrieving email, if necessary. Each fully downloaded message is deleted from the POP3 server. If e-mails are stored in the memory of the modem, the red Mail-in LED on the modem lights up.</p> <p>IMPORTANT! Because this is a send command, a prompt also appears here after you enter the command. To start retrieving e-mail, press ENTER followed by CTRL+Z. If you press ESC the parameters are saved but no POP3 query will be executed.</p>	
Number:	Access number of the Internet service provider. Enter characters which can be dialled (0-9,*,#, comma) only.
ISP user:	PPP user name to dial into the Internet provider.
ISP-PW:	PPP password.
Flag:	If you indicate "d", the messages will not be deleted by the server after they are retrieved.
Mailbox:	User name of the mailbox (POP3) for logging into the mail server.
MailPW:	Mailbox password.
POP3serve:	Host name or IP address of the POP3 mail server that holds the message, for example, mail.example.com.
Example:	
<p>The mailbox Smith (password: John) is retrieved from the mail server mail.provider.com. For PPP login, the user name JSmith and password Petsname are used:</p> <pre>AT+T Send = "POP3; Dial: 2345678; PPPUser: JSmith; PPPPassword: Petsname; Username: Smith; Password: John; POP3MailServer: mail.example.com" >START ><CTRL>+<Z></pre> <p><i>Modem reply:</i></p> <pre>OK * DetectedMails: Number1 Number of messages detected in the mailbox * DetectedSize: Size1 Size of detected messages * ReceivedMails: Number2 Number of received messages * ReceivedSize: Size2 Size of messages received</pre> <p>Since the configuration parameters are only necessary when you first configuration and are optional after this, you can start continuous mail retrieval with the following short command:</p> <pre>AT+T Send = "POP3" ><CTRL>+<Z></pre>	

8.2.6 Message Commands

AT+TList - Displaying Received Messages

AT+T List = "type"	
Displays a list of all received messages of the indicated message type.	
Type :	The type of the messages to be displayed. The following types are supported:
<i>ALL</i>	All messages
<i>SMS</i>	SMS (mobile and PSTN).
<i>Express</i>	Express E-Mail
<i>EMail</i>	Internet e-mail.
Response:	
<pre>+Tlist=Entry#1, type#1, time#1 +Tlist=Entry#2, type#2, time#2 ... +Tlist=Entry#n, type#n, time#n OK</pre>	
Entry#n :	Number of the entry. The corresponding message can be referenced with this number to read it out or delete it.
Type#n :	Message type of the nth entry in the list.
Time#n :	Time stamp of the corresponding message. It is generated by the Modem when the message has been received completely.
Example:	
<pre>AT+T List="ALL" Show all received messages. Modem reply: +T List=11,SMS,2001/10/7,12:05:55 +T List=12,SMS,2001/10/7,12:10:16 +T List=21,Express,2001/10/7,12:22:27 OK</pre>	
<pre>AT+T List="SMS" All received SMS messages are shown. Modem reply: +T List=11,SMS,2001/10/7,12:05:55 +T List=12,SMS,2001/10/7,12:10:16 OK</pre>	

AT+T Delete - Deleting a Stored Message

AT+T Delete=Number.	
Deletes the message with the indicated number from the memory of the modem.	
Number :	Number of the message to be deleted. This number can be determined through the List command. To delete the first stored message (that is the oldest), enter a 0 (zero) as the number.
Example:	
A message with the number 11 will be deleted:	
<pre>AT+T Delete=11 Modem reply: OK</pre>	

AT+T Read - Reading a Stored Message

AT+T Read=Number..	
Lists the message with the indicated ID from the memory of the modem. The message is not deleted and can be read as often as you want.	
Number:	Number of the message to be read. This number can be determined using the List command. To read the first stored message (that is the oldest), enter a 0 (zero).
Response:	
<i>Short response (AT+T Verbose="Off"):</i>	
+T Read= number, type, time	
*message	
OK	
<i>Comprehensive response (AT+T Verbose="On"):</i>	
+T Read: Number, type, time	
"ParameterList"	
*message	
OK	
Message:	Text of the message. Each text line of the stored message begins with *
ParameterList:	Additional Parameters - depending on message type.
Number:	Number of the message to be read.
Type:	SMS, Express E-Mail or Internet e-mail
Time:	Time stamp of the message is set after successful receipt from the Tixi AT Modem.
Example:	
An SMS message with the number 11 is read out:	
AT+T Read = 11	
Modem reply:	
+T Read: 11, SMS, 2001/10/07,12:05:55	
"From:071346768422; TimeStamp:2001/10/07,12:05:37"	
*That is a message from Hans!	
OK	

8.2.7 Modem Commands

AT+T Answer - Setting the Response Behaviour

AT+T Answer="OnOff"	
Switches the modem's call answering on or off. This is necessary to receive messages.	
<i>OnOff:</i>	
<i>On</i>	Call answering on (default)
<i>Off</i>	Call answering off
Example:	
Switch off the call answering	
AT+T Answer="Off"	
<i>Modem reply:</i>	
OK	
AT+T Answer?	
Displays the active answer setting.	
AT+T Answer?	
<i>Modem reply:</i>	
+T Answer: "On"	
OK	

AT+T Time - Setting the System Time

AT+T Time="time"	
Sets the system time for the modem which is used for internal time stamp, date fields for SMTP messages and fax headers. The internal system time must be set for all modems:	
<ul style="list-style-type: none"> - after initial connection - after time changes (normal/summer time) - when using in other countries/time zones - after disconnecting from power supply, or power loss 	
Check the time from the controlling application as needed and set, if necessary.	
<i>Zeit:</i> Format of the system time to be set:	
YYY/MM/DD, hh:mm:ss, time zone	
YYYY:	year (1980...2036)
MM:	month (01...12)
DD:	day (01..31)
hh:	hour (00..23)
mm:	minute (00...59)
ss:	second (00...59)
Time zone:	Time zone in which the modem is located. The value gives the difference from GMT with this syntax: +/-HHMM (for example, +0100 for CET).
Example:	
The system time of the modem is set at 24.1.2003, 12:16:00 CET:	
AT+T Time="2003/01/24, 12:16:00, +0100"	
<i>Modem reply:</i>	
OK	

Reading the Current System Time

AT+T Time?
Displays the system time of the modem
<pre> AT+T Time? Modem reply: +T Time: 2003/1/24,12:17:00,+0100 OK </pre>

AT+T Echo - Switching the Echo On or Off

AT+T Echo="OnOff"				
Switches the echo for keyboard input on or off.				
<p>OnOff:</p> <table> <tr> <td><i>On</i></td> <td>Echo switched on (default)</td> </tr> <tr> <td><i>Off</i></td> <td>Echo switched off</td> </tr> </table>	<i>On</i>	Echo switched on (default)	<i>Off</i>	Echo switched off
<i>On</i>	Echo switched on (default)			
<i>Off</i>	Echo switched off			
<p>Example:</p> <pre> AT+T Echo="On" Modem reply: OK </pre>				
AT+T Echo?				
Displays the active echo setting.				
<pre> AT+T Echo? Modem reply: +T Echo: "On" OK </pre>				

AT+T Verbose - Switching Comprehensive Responses On or Off

AT+T Verbose="OnOff"				
Switches the comprehensive responses of the modem on or off.				
<p>OnOff:</p> <table> <tr> <td><i>On</i></td> <td>Switch on comprehensive responses (default)</td> </tr> <tr> <td><i>Off</i></td> <td>Switch off comprehensive responses</td> </tr> </table>	<i>On</i>	Switch on comprehensive responses (default)	<i>Off</i>	Switch off comprehensive responses
<i>On</i>	Switch on comprehensive responses (default)			
<i>Off</i>	Switch off comprehensive responses			
<p>Example:</p> <pre> AT+T Verbose="On" Modem reply: OK </pre>				
AT+T Verbose?				
Displays the active response setting.				
<pre> AT+T Verbose? Modem reply: +T Verbose: "On" OK </pre>				

AT+T Mode - Activating Modem Mode or Message Mode

AT+T Mode="Mode"	
Sets the operating mode of the modem.	
ModemMode:	The modem works like a "normal" modem. The standard Hayes AT commands are applicable. The Message Mode commands are not applicable. The red Modem Mode LED lights up.
MessageMode:	The automatic functions of the Tixi AT Modem are activated and effective. This mode must be activated, otherwise the message commands described here may not be used! The standard Hayes AT commands are not applicable. The Modem Mode LED is switched off.
Mode :	ModemMode (default) MessageMode
Example:	
AT+T Mode="MessageMode" activates Message Mode.	
<i>Modem reply: OK (the Modem Mode LED turns off)</i>	
Use also:	AT+T Mode? shows the current mode and AT+T Mode=? shows the possible modes

AT+T Help - Showing a Command Overview

AT+T Help
Gives an overview of the instruction set of the Mitsubishi Super Modem. In this way you can access the most important information at any time when working with the Tixi modem even when the manual is not available

AT+T Erase - Resetting the Modem

AT+T Erase
Use this command to reset the modem. The modem is reset, all user-defined settings are deleted and the device returns to its factory default settings.

AT+T Redial

AT+T Redial
Sets the number of automatic redial attempts.
Redials 0 . . . 9 (default=0)
Example:
AT+T Redial="3"
<i>Modem reply: OK</i>
AT+T Redial?
Displays the configured number of automatic redials.
AT+T Redial?
<i>Modem reply:</i>
+T Redial:"3"
OK

AT+T RedialDelay

AT+T RedialDelay	
Sets the time to wait between redial attempts.	
Delay	60...600 delay in seconds (default=90)
Example: AT+T RedialDelay="120" Modem reply: OK	
AT+T RedialDelay?	
Displays the time to wait between redials.	
AT+T RedialDelay? Modem reply: +T RedialDelay: "90" OK	

AT+T DialRules - Dial Method, Dial Tone Detection

AT+T DialRules="DialMethod,DialTone"	
Defines dial method and dial tone detection rules.	
DialMethod:	
Tone:	Tone dialing (MFV) (default)
Pulse:	Pulse dialing IWV
DialTone:	
NoWaitForDialTone:	device doesn't wait for a dial tone (ATX3)
WaitForDialTone:	device does wait for a dial tone (ATX4)
Example: AT+T DialRules="Tone,NoWaitForDialTone" Modem reply: OK	
AT+T DialRules?	
Shows settings of dial method and dial tone detection.	
AT+T DialRules? Modem reply: +T DialRules: "Tone,NoWaitForDialTone" OK	

AT+ T Speaker - Adjusting the Modem Speaker Volume**AT+T Speaker="Volume"**

Sets the volume level of the modem speaker.

Volume:

Volume	switches the speaker off
Min	low volume level (default)
Middle	medium volume level
Max	maximum volume level

Example:

```
AT+T Speaker="Middle"
Modem reply: OK
```

AT+T Speaker?

Displays the speaker settings.

```
AT+T Speaker?
Modem reply:
+T Speaker: "Off"
OK
```

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