

SIEMENS

Edge Speed ES75

User Guide



www.siemens.cz/wm

be inspired

Wireless
Modules

Safety information

Radio devices have limitations in the vicinity of electronic devices:



- Switch the modem off when you are in a hospital or near medical devices like pacemakers or hearing aids. The modem may interfere with the operation of these devices.



- Switch the modem off when flying. Secure it so that it cannot be switched on inadvertently.



- Switch the modem off when you are near petrol stations, fuel depots, chemical plants or blasting operations. The modem can disturb the operation of technical equipment.



- Interference can occur if the device is used near televisions, radios or PCs.
- In order to avoid possible damage, we recommend that you only use the specified accessories. These have been tested and shown to work well with the modem. However, the warranty does not cover these accessories.

The warranty does not apply in the event of improper use.

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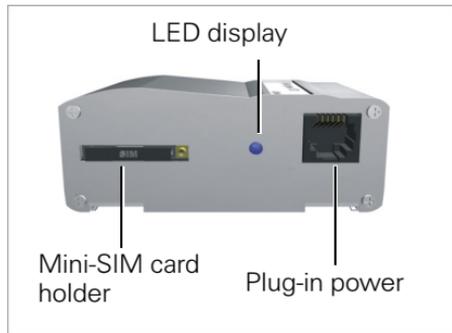
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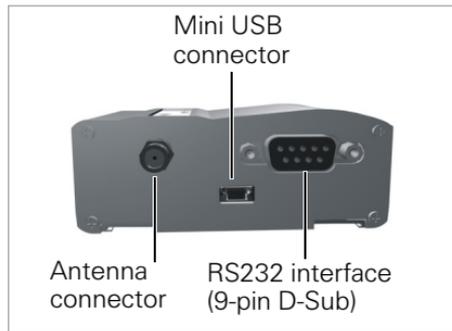
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Overview

Front view



Rear view



Product description

The ES75 modem is a compact GSM/GPRS/EDGE modem for the transfer of data, SMS and faxes in GSM networks. The ES75 modem supports the EDGE standard and thus permits a far higher data transmission rate up to 384 kbps. Packet-oriented data transmission and a permanent online connection enable rapid data access and transmission rates. Industrial standard interfaces and an integrated SIM card reader mean it can be used rapidly, easily and universally as a quad band GSM/GPRS modem. Its performance band width and the robust housing make it easier to quickly implement new applications in areas such as telemetry and telematics.

The features, functions and interfaces of the modem ES75 are described below.

The functionality of the modem corresponds to the features of the MC75 module, to which a SIM card reader, an RS232 interface, an mini USB interface and a greater supply voltage range have been added.

All the external interfaces of the modem are integrated permanently in the housing. The plug-in connections are standardised and suitable for use under vibration.

Product description

- Highlights**
- Quad-band GSM 850/900/1800/1900
 - Data, SMS and fax
 - R&TTE approval, GCF approval
 - Easy to integrate
 - Industrial interfaces
 - LED display
 - Wide input voltage range
 - Highly compact, light and powerful
 - GPRS multi-slot class 12
 - EGPRS multi-slot class 10
 - SIM application tool kit

- Applications**
- Fleet management
 - Teleservice
 - Security systems
 - Telematics
 - Telemetry
 - Remote monitoring
 - Remote meter reading
 - Vending machines
 - Mobile office

Features

- Product data**
- Quad-band 850/900/1800/1900 MHz
 - Certified in accordance with GSM phase 2/2+
 - Output performance:
 - Class 4 (2 W) for EGSM850
 - Class 4 (2 W) for EGSM900
 - Class 1 (1 W) for GSM1800
 - Class 1 (1 W) for GSM1900
 - Class E2 for EGSM850 8-PSK
 - Class E2 for EGSM900 8-PSK
 - Class E2 for EGSM1800 8-PSK
 - Class E2 for EGSM1900 8-PSK
 - Control via AT commands
 - Input voltage range +8 V ... +30 V
 - Dimensions: 53 x 76 x 31 mm
 - Weight: approx. 110 g
 - GPRS multi slot class 12
 - Full PBCCH support
 - EGPRS multi slot class 10
 - Mobile station class B
 - SIM application tool kit

- Certification**
- R&TTE approval
 - GCF approval

- SMS**
- Point-to-point MT and MO
 - SMS cell broadcast
 - Text and PDU mode
 - Transmission of SMS alternatively over CSD or GPRS

Features

- Data**
- CSD up to 14.4 kbps
 - USSD
 - Non-transparent mode
 - V.110, RLP
 - GPRS: max. 384 kbps (downlink)
 - Coding scheme CS 1, 2, 3, 4
 - PPP-stack

- Fax**
- Group 3, class 1

- Supplementary services**
- Phone book
 - Multiparty

- External interfaces**
- Connector for plug-in power supply unit
 - SIM card holder
 - Antenna connector SMA
 - RS232 interface (V.24/V.28 on the Sub-D socket)
 - Mini USB 2.0 interface

- Accessories** Antenna, SIM cards, power supply units, RS232 cables, USB cables

Installation

Package contents / scope of delivery

ES75 modem

- Package unit:
- ES75 modem
- CD with user guide and installation software
- Start up guide
- Power supply
- Antenna
- USB, RS 232 cables

Safety and installation information

- Connect a fast 1.25 A fuse to the incoming line for the positive supply voltage to protect the modem.
- If a power supply unit is used to supply the modem, it must meet the demands placed on SELV circuits in accordance with EN60950. When using batteries and accumulators, adhere to the relevant regulations.
- The maximum permissible connection length between the modem and the supply source is 3 m.
- Your supplier will be pleased to provide you with a detailed technical description and technical support for the SIEMENS modem.

Interface description

The following interfaces are available on the modem:

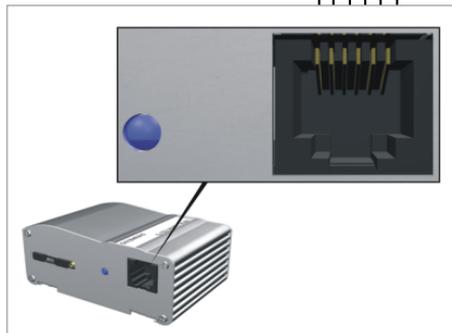
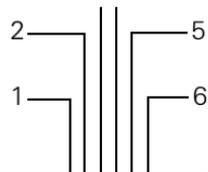
- Connector for the plug-in power supply unit
- SIM card holder
- Antenna connector SMA
- RS232 interface (V.24/V.28 on the D-Sub socket)
- Mini USB 2,0 interface

Plug-in power supply unit

The modem receives its power supply in a wide voltage range (+8 V ... +30 V) via the power supply connectors. Two additional control lines are used for switching the modem on/off (resetting). The connection is implemented by a 6-pin Mini-Western connector.

unit

1 +
2 free
3 PD_IN
4 IGT_IN



Interface description

Purpose of the connectors/connections

| Signal name | PIN | I/O | Description | Parameters |
|-------------|-----|-----|---|---|
| + | 1 | I | Positive supply voltage connection | +8 V ... +30 V max. 33 V for 1 min |
| | 2 | | Free | |
| PD_IN | 3 | I | Reset input <i>high active</i> | $U_{IH} > +5\text{ V}$ ($> 3.5\text{ s}$) $U_{IL} < +2\text{ V}$ |
| IGT_IN | 4 | I | Ignition input <i>high active</i> | $U_{IH} > +5\text{ V}$ ($> 200\text{ ms}$) $U_{IL} < +2\text{ V}$ |
| | 5 | | Free | |
| GND | 6 | I | Negative supply voltage connection Reference potential for PD_IN and IGT_IN | 0 V |

Use and operation

The power supply is implemented by the **+** and the GND wire. To switch the modem on, proceed as follows:

- Either activate the DTR control line via the RS232 interface
- Or connect IGT_IN to **+**. This connection has already been set up in the specified plug-in power supply unit below, see "Voltages dips and interruptor" on page 13.

Interface description

Polarity reversal protection

Polarity reversal protection is implemented by means of a power diode. The diode has a reverse voltage of 400 V.

Overvoltage protection

Overvoltages are suppressed by a Zener diode after the polarity reversal protection diode.

Fuses

A permanently installed, non-replaceable fuse in the modem ensures electrical safety in the event of faults. Connect a fast 1.25 A fuse to the supply line of the positive supply voltage for general protection of the modem, see "Safety and installation information" on page 9.

Interface description

Interference immunity

- The cable length must not exceed 3 m
- Current carrying capacity < 1.5 A (Western modular jack)
- Nominal signal range: 0 ... +30 V
- Max. load current 1.5 A
- Electrical fast transient burst requirements in accordance with ETS 300-342-1
- Surge immunity requirements in accordance with ETS 300-342-1
- Electrostatic discharge requirements in accordance with ETS 300-342-1
- Immunity RF common mode 0.15 – 80 MHz in accordance with ETS 300-342-1
- Transients and surges in a vehicular environment
- Voltages dips and interruptor

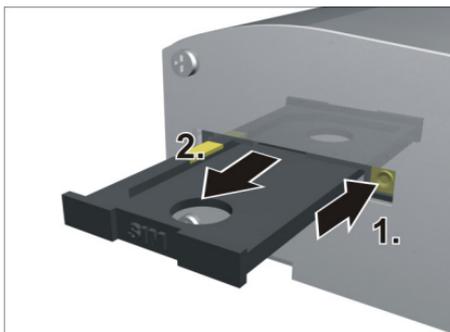
Interface description

SIM card connector

The connector is intended for 3 V SIM cards in accordance with GSM 11.12 phase 2 to operate the modem.

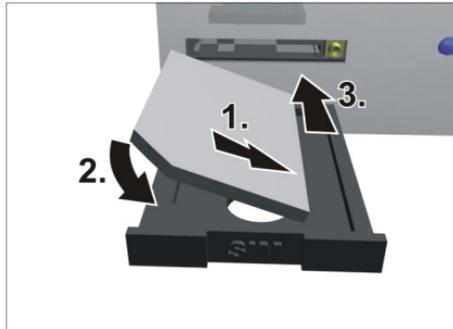
The SIM card (3 V type) must be inserted in the card holder to put the modem into operation.

1. Make sure that there is no voltage applied to the modem.
2. Operate the eject mechanism (yellow pin next to the card holder) to open the card holder by pressing it down with a pen, for example.



Interface description

3. Insert the SIM card in the SIM card holder and push it back into the housing.



Interface description

Purpose of the connectors/connections

| Signal name | PIN | I/O | Description of the GSM module connectors | Parameters |
|-------------|-----|-----|--|--|
| CCIN | 24 | I | Input for detection of the SIM card; <i>high active</i> | $R_i = 100 \text{ k}\Omega$ to GND $U_{iLmax} = 0.4 \text{ V}$ @ $I = 0.1 \text{ mA}$ $U_{iHmin} = 1.95 \text{ V}$ $U_{iHmax} = 3.3 \text{ V}$ |
| CCRST | 25 | O | Restart | $R_0 = 220 \Omega$ |
| CCIO | 26 | I/O | Date input/output | Input: $R_i \geq 1 \text{ M}\Omega$ Output: $R_0 = 220 \Omega$ |
| CCCLK | 27 | O | Clock | $R_0 = 220 \Omega$ |
| CCVCC | 28 | O | Supply voltage | $CCVCC_{min} = 2.84 \text{ V}$ $CCVCC_{max} = 2.96 \text{ V}$ $I_{max} = 50 \text{ mA}$ |
| CCGND | 29 | X | | |

Use and operation

A SIM card holder from Molex with a SIM_IN contact is used. Only when the card holder is inserted is the switched closed.

The card can only be replaced when the GSM engine is in the POWER DOWN state.

Interference immunity

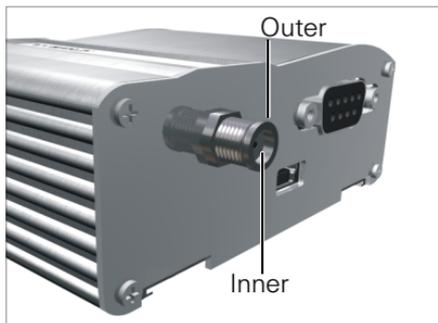
Electrostatic discharge requirements in accordance with ETS 300-342-1

Interface description

Antenna connector
SMA A quad band antenna (GSM 850/900/1800/1900) can be connected to the RF interface. The connection is implemented as a 50 Ω SMA coaxial jack.

Outer

Antenna connector



Purpose of the connectors/connections

| Signal name | PIN | I/O | Description |
|-------------|-------|-----|------------------|
| RF | Inner | I/O | RF input/output |
| GND | Outer | X | Frame connection |

Interface description

Transmission type and method

- Digitally modulated RF burst signal
- GMSK in accordance with GSM05.04
- Half duplex
- Bidirectional

Interference immunity

- Electrostatic discharge requirements in accordance with ETS 300-342-1
- Electrical fast transient burst requirements (cable is >3 m)
- Surge immunity requirements not specified
- Electrostatic discharge requirements in accordance with ETS 300-342-1
- Immunity RF common mode 0.15 – 80 MHz in accordance with ETS 300-342-1

Interface description

RS232 interface The RS232 interface is the interface for the application software and the connection to the PC. The customer application communicates with the modem or the GSM/GPRS engine by means of AT cellular commands. The RS232 interface is implemented as a 9-pin D-Sub socket with a screw fitting.

RS232 interface – 9-pin D-Sub



Interface description

Purpose of the connectors/connections

| Signal name | PIN | I/O | Description | Parameters |
|-------------|-----|-----|--|---|
| DCD | 1 | O | The functions correspond to those of a serial interface on the basis of a V.24 protocol. | active high > 5 V low < -5 V |
| RXD | 2 | O | | logical 1 = low < -5 V logical 0 = high > +5 V |
| TXD | 3 | I | | active high > 2.4 V low < 1.8 V |
| DTR | 4 | I | | active high > 2.4 V low < 1.8 V |
| GND | 5 | | | 0 V |
| DSR | 6 | O | | active high > 5V low < -5 V |
| RTS | 7 | I | | active high > 2.4 V low < 1.8 V |
| CTS | 8 | O | | active high > 5 V low < -5 V |
| RI | 9 | O | | active high > 5 V low < -5 V |

Use and operation

In order to control the modem and transfer data, the customer application (e.g. host computer) is connected via the RS232 cable.

Interface description

Interference immunity

- The connecting cable must not exceed 1.8 m in length.
- Nominal signal range: ± 15 V
- Max. load current 1 A
- Electrical fast transient burst requirements not specified
- Surge immunity requirements not specified
- Electrostatic discharge requirements in accordance with ETS 300-342-1
- Immunity RF common mode 0.15 – 80 MHz in accordance with ETS 300-342-1

Interface description

Mini USB interface The Mini USB interface is the interface for the application software and the connection to the PC. The customer application communicates with the modem or the GSM/GPRS engine by means of AT cellular commands. The Mini USB interface is implemented as a 5-pin mini USB socket.



| Signal name | PIN | I/O | Description | Parameters |
|---------------|-----|-----|-------------|---------------------------------------|
| VBUS | 1 | | | $4,75 < \text{VBUS} < 5,25 \text{ V}$ |
| D+ | 2 | | | Data + |
| D- | 3 | | | Data - |
| not connected | 4 | | | |
| GND | 5 | | | 0 V |

Startup

Before startup, the components required for your application must be connected. The SIM card must be inserted in a deenergized state.

The modem is ready for operation when supply voltage is applied and the ignition line is activated. If the recommended plug-in power supply unit is used, the ignition line is already connected to the supply voltage line, and the modem is thus immediately switched to the active state. It starts the network search and registers with network operator. Please read the following conditions for switching the modem on and off:

Switching on modem

Simply applying supply voltage (+ to pin 1 and GND to pin 6) alone is not enough to switch on the modem.

It can be switched on in two different ways:

Activation of the IGT_IN ignition signal on the power supply connection

The switching regulator is switched on with the IGT_IN = high signal. When the switching regulator is switched on, VBAT is generated as the operating voltage for the GSM/GPRS module. This still does not activate the GSM/GPRS module. Triggered by VBAT, a transistor switch generates the IGT ignition signal with a delay of approx. 100 ms for the GSM/GPRS module. Only then is it switched on. (It exits the POWER DOWN operating state.)

Startup

In its energized state, the GSM/GPRS module provides the supply voltage (VDD). VDD ensures that the switching regulator remains on, even when its closing condition is lost (i.e. IGT_IN = low).

Explanation:

VBAT = operating voltage for the module

VDD = supply voltage from the module

Activation of the RS232 or USB control line DTR

The modem can be switched on in the same way as via IGT_IN by activating the RS232 control line DTR (high signal).

Note

The modem is switched on immediately using the recommended plug-in power supply unit (see the above explanation on startup).

Switching off / resetting the modem

The modem can be switched off in two different ways:

Using a software command by means of an AT command

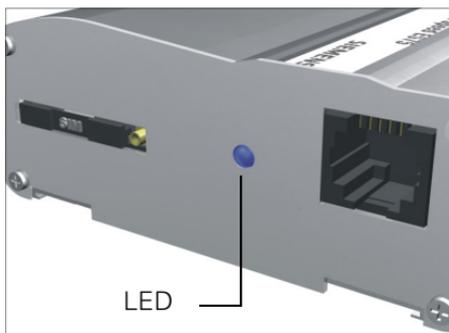
A software shutdown via an AT command is always advisable for a controlled shutdown of the modem. In this case, the GSM/GPRS module signs off before the watchdog condition results in the specific switching off of the supply voltages.

Startup

Activation of the PD_IN reset signal on the power supply connection

The POWER DOWN line on the GSM/GPRS module is connected to the watchdog input pin of the power supply ASIC, which can only be switched off by changing the watchdog condition. To do this, the PD_IN modem reset line is active (high) for at least 3.5 s. This results in immediate, "hard" disconnection, with the modem unable to sign off correctly from the base station in the STANDBY and TALK operating states . In the case of this hardware shutdown, the software is no longer able to respond before the voltage is switched off. This corresponds to a direct, unannounced disconnection of the operating voltage. In the application you can switch off or reset the module without interrupting the input voltage supply.

Operating states / LED



The LEDs display the following operating states of the modem:

| Operating state | LED |
|--|---|
| After connecting the plug-in power supply unit | On for 2 s |
| POWER DOWN | Off |
| – Network search or – no SIM card is inserted or – no PIN is entered (via PC) or – no GSM or GPRS network is available | Flashes rapidly |
| STANDBY GPRS-Network (Context activated) | Flashes slowly (2 times) |
| Data-Transfer | flicker (flashes fast during the data transfer) |

Operating states / LED

Note:

Usually, the network search takes only a few seconds till the modem is registered. If the flashing continues, this means that no SIM card is inserted, no PIN number is entered or no GSM network is available.

POWER DOWN

Once the operating voltage is applied (+ and GND), the modem is in the POWER DOWN state.

The operating voltage for the GSM/GPRS module is disconnected (the switching regulator is off). In other words, the software of the GSM module is not active.

A transition to the POWER DOWN state always occurs in the following circumstances:

- When the modem (module) is shut down by means of AT commands (e.g. sleep mode).
- When the external reset line is active.

Operating states / LED

Network search (no SIM card, no PIN number, no GSM network)

In the network search state, the modem searches for a GSM/GPRS network. All the components in the GSM/GPRS modem (module) that are not required are shut down in several stages by the energy-saving software.

This state is reached:

- From the POWER DOWN state: by an active ignition (on) signal at the power supply connection or
- From the STANDBY state: when the network is lost (out of range)

Operating states / LED

| | |
|-------------------------------------|---|
| Standby ES75 modem | modem is ready for GPRS data transfer, but no data is currently sent or received. Power consumption depends on network settings and GPRS configuration (e.g. multislot settings). |
| Data Transfer ES75 modem | GPRS data transfer in progress. Power consumption depends on network settings (e.g. power control level), uplink / downlink data rates and GPRS configuration (e.g. used multislot settings). |

AT command control

The modem is controlled and programmed by means of AT commands. The AT command structure corresponds to the MC75 module used. The AT commands can be obtained from the ICM WM home page: www.siemens.com/wm.

SW update

A SW update for the modem takes place via the RS232 interface or the SIM interface. These interfaces must be designed in such a way that the upgrading of the modem is integrated in the application. The software can be obtained from the ICM WM home page. The SW package is self-unpacking and menu-driven.

Certification / maintenance

Certification Hereby, Siemens Information and Communication Mobile, declares that the cellular engine MC75 modem described in this manual is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC (R&TTE). The Declaration of Conformity (DoC) has been signed. In case of need, a copy of the original DoC can be made available via your distributor or system integrator.

- Maintenance tips**
- Treat the SIM card with the same care as your credit card. Do not bend or scratch the SIM card or expose it to static electricity.
 - Wipe the modem housing with a moist or antistatic cloth. Do not use a chemical cleaning agent.

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Switching on 23



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