

GM29

Technical Description



The product described in this manual conforms to the Radio and Telecommunication Terminal Equipment (R&TTE) directive 99/5/EC with requirements covering EMC directive 89/336/EEC and Low Voltage directive 73/23/EEC. The product fulfils the requirements according to 3GPP TS 51.010-1, EN 301 489-7 and EN60950.

SAR statement: This product is intended to be used with the antenna or other radiating element at least 20cm away from any part of the human body.

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First edition (June 2002)

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Publication number: LZT 123 7359 R1B

Printed in UK

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1. Introduction

1.1 Description

The dual band EGSM 900/1800MHz GM29 is a GSM/GPRS serial modem. The modem is a powerful and flexible device that can be used in a wide range of telemetry and telematics applications that rely on the remote exchange of data, voice, SMS or faxes via the GSM cellular network.

Small and lightweight, the GM29 has standard connectors and an integral SIM card reader making it easy and quick to integrate. As well as providing a standard RS232 serial communication interface the GM29 also has an audio interface allowing an analogue handset to be connected. When the GM29 is integrated into an external application, a wireless communications system is created.

A typical end-to-end system consists of a micro controller in an external application communicating, via the GM29 modem, with a remote terminal or host using the GSM network. The micro controller uses a set of AT commands to control the modem, and to set up the end-to-end communications link, via its 9-way RS232 serial interface.

GM29 serial modems are intended to be used by manufacturers, system integrators, application developers and developers of a wide range of equipment and business solutions, typically in the following fields:

- Security and alarms
- Vending
- Monitoring and control
- Utilities
- Fleet Management

1.2 Highlights

- Dual band, EGSM 900/1800MHz, GSM/GPRS serial modem
- Flexible plug-and-play device
- Data: GPRS, HSCSD, CSD, SMS
- Voice: full rate, enhanced full rate, half rate
- SMS: mobile-originated, mobile-terminated, cell broadcast
- Fax: Group 3, Classes 1 & 2
- RS232 9-way serial interface
- 5V - 32V d.c. input
- 4-wire audio connection
- Antenna connection (FME male)
- R&TTE type approved

1.3 Main Features and Services

The modem performs a set of telecom services (TS) according to GSM standard phase 2+, ETSI and ITU-T. The services and functions of the modem are implemented by issuing AT commands over the RS232 serial interface.

1.3.1 Types of Mobile Station

The GM29 is a dual band serial modem with the GSM radio characteristics shown in the table below.

GM29	GSM900	E-GSM900	GSM1800
Frequency Range (MHz)	TX: 890-915 RX: 935-960	TX: 880-890 RX: 925-935	TX: 1710-1785 RX: 1805-1880
Channel spacing	200kHz		200kHz
Number of channels	173 carriers *8 (TDMA) GSM: channels 1 to 124 E-GSM: channels 975 to 1023		374 carriers *8 (TDMA) DCS: channels 512 to 885
Modulation	GMSK		GMSK
TX phase accuracy	< 5° RMS phase error (burst)		< 5° RMS phase error (burst)
Duplex spacing	45MHz		95MHz
Receiver sensitivity at antenna connector	< -102dBm		< -102dBm
Transmitter output power at antenna connector	Class 4 2W (33dBm)		Class 1 1W (30dBm)
Automatic hand-over between GSM 900 and GSM 1800			

1.3.2 Short Message Service

The modem supports the following SMS services:

- Sending; MO (mobile-originated) with both PDU (protocol data unit) and text mode supported.
- Receiving; MT (mobile-terminated) with both PDU and text mode supported.
- CBM (cell broadcast message); a service in which a message is sent to all subscribers located in one or more specific cells in the GSM network (for example, traffic reports). This feature is network dependent.
- SMS STATUS REPORT according to GSM 03.40.
- SMS COMMAND according to GSM 03.40.

The maximum length of an SMS message is 160 characters when using 7-bit encoding. For 8-bit data, the maximum length is 140 characters. The modem supports up to 6 concatenated messages to extend this function.

1.3.3 Voice Calls

The GM29 offers the capability of mobile originated and mobile terminated voice calls, as well as supporting emergency calls. Multi-party, call waiting and call deflection features are available. Some of these features are network-operator specific.

For the inter-connection of audio, the modem offers a balanced 4-wire analogue interface. The GM29 has embedded echo cancellation and noise suppression for improved audio quality.

DTMF (Dual Tone Multi Frequency) is supported.

1.3.4 Data

The modem supports the following data protocols:

- GPRS (General Packet Radio Service).
Modems are Class B terminals, which provide simultaneous activation and attachment of GPRS and GSM services. GM29 modems are GPRS class 8 (4+1) enabled devices, which are capable of transmitting in one timeslot per frame (up link), and receiving at a maximum of four timeslots per frame (down link).
- CSD (Circuit Switched Data).
GM29 modems are capable of establishing a CSD communication at 9.6kbps.
- HSCSD (High Speed Circuit Switched Data).
GM29 supports HSCSD class 2 (2+1) communication, with one timeslot per frame capacity in the up link and two timeslots per frame capacity in the down link.

1.3.5 Fax

The GM29 allows fax transmissions to be sent and received by commercial fax software installed on the application computer. Group 3 fax Classes 1 and 2 are supported.

1.3.6 Supplementary Services

- Call forwarding
- Call hold, waiting and multiparty
- Calling/called number identification
- Advice of charge
- USSD
- Alternate line service
- Customer service profile
- Preferred networks

- Operator selection
- Network registration
- Calling cards
- Call barring
- Call transfer

1.3.7 Serial Communication

The GM29 enables an end-to-end communication path to be established between the external telemetry/telematics application and a remote terminal or host, via the GSM network. Once a path has been set up, voice or data communication can take place. Serial data with flow control according to the RS232 signalling protocol operates between the modem and the external application.

Control of the GM29 is by the external application, via the RS232 serial interface, using a set of AT commands. The GM29 supports the full set of AT commands according to GSM 07.05 and GSM 07.07. It also supports an extended set of Ericsson proprietary AT commands to add extra functionality.

AT commands are used to operate the modem and have a broad range of functions including:

- configuring general parameters of the GM29;
- setting up and controlling communications to and from the GSM network;
- configuring the modem to communicate across the RS232 serial interface;
- and obtaining GSM network status information.

For more detail on the AT commands supported by the GM29 see “AT Command Summary”, page 27.

1.3.8 Interfacing with the GM29

The GM29 uses the following industry standard connectors to interface with the external application and the GSM network;

- RJ11 (plug-in power supply connector)
- RJ9 (handset audio connector)
- Integral SIM card reader
- FME male (antenna connector)
- Sub-D socket, 9 pin (RS232 serial port)

1.4 Service and Support

To contact customer support please use the details below:

Customer Support
Sony Ericsson Mobile Communications
Maplewood Building
Chineham Business Park
Basingstoke
RG24 8YB

E-mail: modules.support@sonyericsson.com
or
modules.info@sonyericsson.com

Information about Sony Ericsson and its products is available on the following web site:

<http://www.sonyericsson.com/M2M>

1.5 Precautions

The GM29 as a standalone item is designed for indoor use only. To use outside it must be integrated into a weatherproof enclosure. Do not exceed the environmental and electrical limits as specified in “Technical Data”, page 23.

1.6 Abbreviations

<i>Abbreviation</i>	<i>Explanations</i>
CBM	Cell Broadcast Message
CBS	Cell Broadcast Service
CSD	Circuit Switched Data
DCE	Data Circuit Terminating Equipment
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
EFR	Enhanced Full Rate
EMC	Electro-Magnetic Compatibility
ETSI	European Telecommunication Standards Institute
FR	Full Rate
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
HR	Half Rate
HSCSD	High Speed Circuit Switched Data

<i>Abbreviation</i>	<i>Explanations</i>
ITU-T	International Telecommunication Union - Telecommunications Standardisation Sector
ME	Mobile Equipment
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
PDU	Protocol Data Unit
RLP	Radio Link Protocol
RF	Radio Frequency
RTC	Real Time Clock
SIM	Subscriber Identity Module
SMS	Short Message Service
TA	Terminal Adapter
TE	Terminal Equipment
TS	Telecom Services

2. Mechanical Description

2.1 Overview

The pictures below show the mechanical design of the GM29 along with the positions of the different connectors and mounting holes. The GM29 case is made of durable PC/ABS plastic.

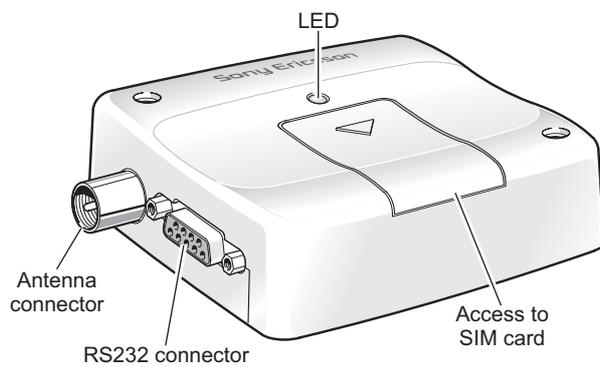


Figure 2.1 GM29 viewed from the left side

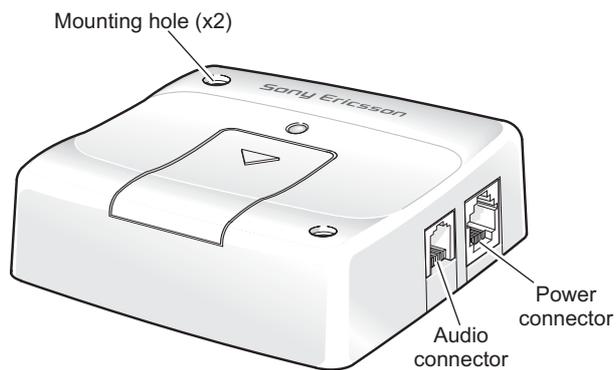
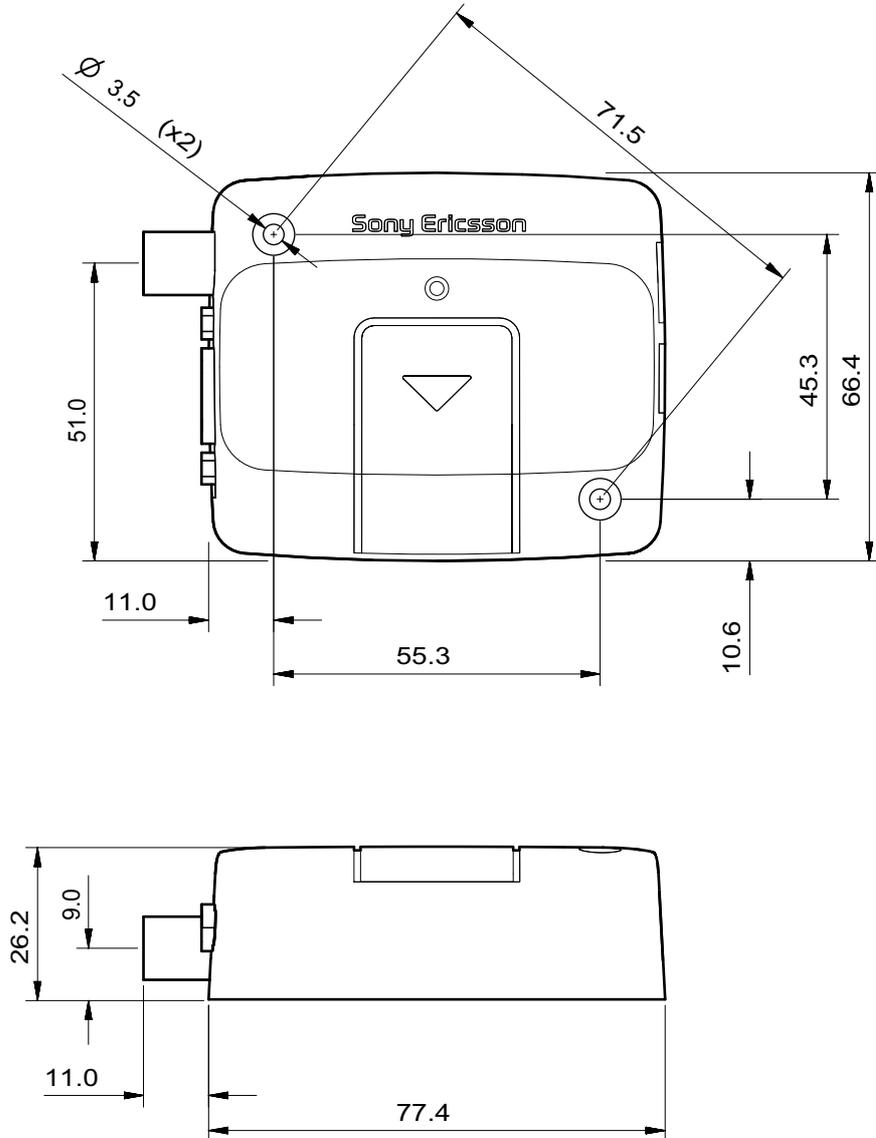


Figure 2.2 GM29 viewed from the right side

2.2 Physical Dimensions



Measurements are given in millimetres. See also “Technical Data”, page 23.

3. Electrical Description

All electrical connections to the GM29 are protected in compliance with the standard air (4kV) and contact (8kV) discharge ESD tests, of EN 301 489-1.

The modem uses the following industry standard connectors:

- RJ11 6-way (power connector)
- RJ9 4-way (handset connector)
- SIM card reader
- FME male coaxial jack (antenna connector)
- Sub-D socket, 9 pin (RS232 serial port)

3.1 Power Connector

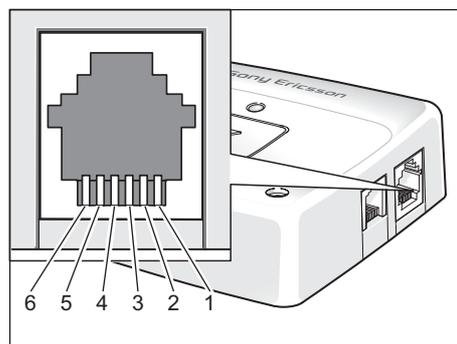
An RJ11 6-way connector, as shown and described below, serves as a means of supplying and controlling d.c. power to the modem.

The supply voltage, VCC, required by the modem is in the range 5 V - 32 V d.c. Application of the supply voltage does not switch the modem on. To do so an additional active-high control signal, TO_IN, must be applied for > 0.2 s.

A second active-high control signal, HR_IN, can be used to switch the modem off when applied for 1 - 2 seconds, or can be used to perform a hardware reset when applied for > 3.5 s.

TO_IN and HR_IN are referenced to GND (pin 6 on the connector).

VCC and GND are reverse polarity and overvoltage protected.



1 VCC	3 HR_IN	5 n/c
2 n/c	4 TO_IN	6 GND

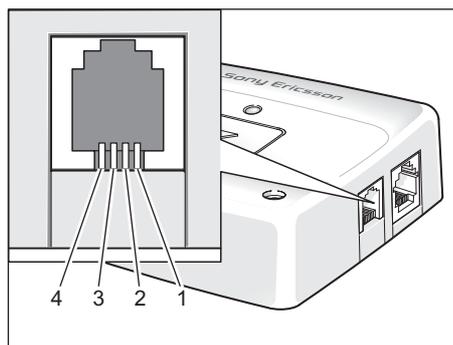
The power connector electrical characteristics are listed below:

Pin	Signal	Dir	Limits	Description
1	VCC	I	5 - 32V	Positive power input
2	-	-	-	No connection
3	HR_IN	I	-0.5 - 32V	Active high control line used to switch off or reset the modem $V_{IH} > 5V$, $V_{IL} < 2V$ Power off: $1s < t < 2s$ Hard reset: $t > 3.5s$
4	TO_IN	I	-0.5 - 32V	Active high control line used to switch on the modem $V_{IH} > 5V$, $V_{IL} < 2V$ Power on: $t > 0.2s$
5	-	-	-	No connection
6	GND	I	-	Negative power (ground) input and return path for TO_IN and HR_IN

3.2 Audio Connector

A 4-way RJ9 connector, as shown below, allows a telephone handset to be plugged into the modem, giving access to the microphone and earpiece signals. The connector may also be used to drive other analogue audio sub-systems or devices.

The GM29 is configured to work with a range of handsets. If necessary, changes can be made to the characteristics of the audio interface by sending the modem appropriate AT commands.



1 MICN 3 BEARP
 2 BEARN 4 MIPC

Audio signal descriptions are listed below:

<i>Pin</i>	<i>Signal</i>	<i>Dir</i>	<i>Description</i>
1	MICN	I	Microphone negative input
2	BEARN	O	Earpiece negative output
3	BEARP	O	Earpiece positive output
4	MICP	I	Microphone positive input

MICP and MICN are balanced differential microphone input signals. These inputs are compatible with an electret microphone.

BEARP and BEARN are the speaker output signals. These are differential-mode outputs. The electrical characteristics are given in the table below.

<i>Parameter</i>	<i>Limit</i>
Output level (differential)	$\geq 4.0V_{pp}$
Output level (dynamic load = 32Ω)	$\geq 2.8V_{pp}$
Distortion at 1 kHz and maximum output level	$\leq 5\%$
Offset, BEARP to BEARN	$\pm 30mV$
Ear-piece mute-switch attenuation	$\geq 40dB$

The following table shows the ear piece impedances that can be connected to BEARP and BEARN.

<i>Ear piece model</i>	<i>Impedance</i>	<i>Tolerance</i>
Dynamic ear piece	$[32\Omega + 800\mu H] // 100pF$	$\pm 20\%$
Dynamic ear piece	$[150\Omega + 800\mu H] // 100pF$	$\pm 20\%$
Piezo ear piece	$1k\Omega + 60nF$	$\pm 20\%$

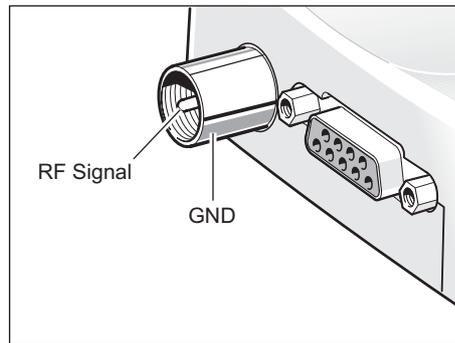
16 independent audio filters (8 transmit and 8 receive) determine the frequency/gain response characteristics of the audio interface. The gain characteristics of each of the Tx and Rx filters can be customised using AT commands to optimise and match the performance of the audio interface to a particular handset or audio sub-system.

The allowable range of the gain parameter for each RX and TX DSP filter is -11 to +9 dB.

The factory default settings for the DSP filters provide optimised performance for the recommended handset accessory.

3.3 Antenna Connector

The antenna connector allows transmission of radio frequency (RF) signals between the modem and an external customer-supplied antenna. The modem is fitted with a 50 Ω , FME male coaxial jack as shown below.

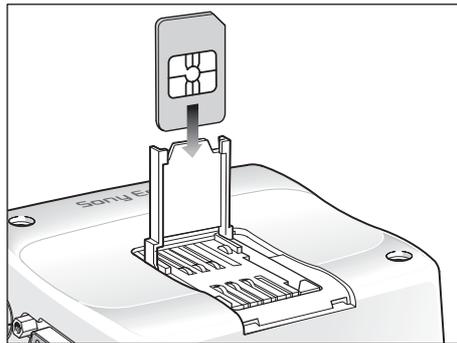
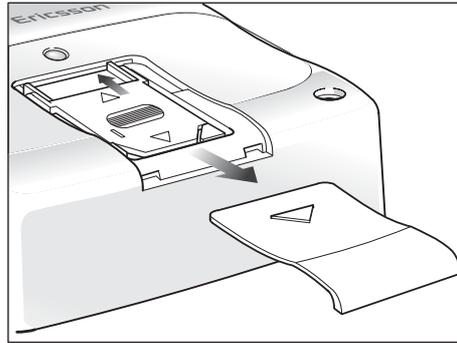


The table below shows the antenna electrical characteristics:

<i>Parameter</i>	<i>Limit</i>	<i>Description</i>
Nominal impedance	50 Ω (SWR better than 2.5:1)	
Output Power	2 Watt peak (Class 4)	Extended GSM900
	1 Watt peak (Class 1)	GSM 1800
Static Sensitivity	Better than -102dBm	Extended GSM900
	Better than -102dBm	GSM 1800

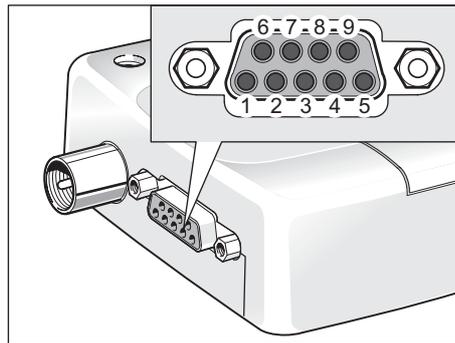
3.4 SIM Card Reader

The GM29 is fitted with a SIM card reader designed for 3 V and 5 V SIM cards. It is the flip-up type which is lockable in the horizontal position and is accessed through a removable panel as shown below.



3.5 RS232 Serial Port

The modem supports a standard RS232 serial interface (EIA/TIA 574) via its 9 pin Sub-D connector, shown below. In line with serial communication terminology the GM29 serial modem should be considered as the *data circuit-terminating equipment* (DCE) and the external application or computer as the *data terminating equipment* (DTE).



1 DCD	4 DTR	7 RTS
2 RD	5 GND	8 CTS
3 TD	6 DSR	9 RI

The electrical characteristics of the serial port signals are shown below:

Pin	Signal	Dir	Voltage levels	Description
1	DCD	O	> +4V < -4V	Data carrier detect
2	RD	O	> +4V < -4V	Received data
3	TD	I	> 2V < 0.8V	Transmitted data
4	DTR	I	> 4V < 0.8V	Data terminal ready
5	GND	-	0V	Ground connection
6	DSR	O	> +4V < -4V	Data set ready
7	RTS	I	> 2V < 0.8V	Request to send
8	CTS	O	> +4V < -4V	Clear to send
9	RI	O	> +4V < -4V	Ring indicator

3.5.1 Serial Data

The modem supports the standard data character format of 1 start bit, 8 bit data, no parity plus 1 stop bit, in total 10 bits per character.

3.5.2 Serial Data Signals - RD, TD

The default baud rate is 9.6kbps, however higher bit rates up to 460kbps are supported and can be set by AT commands. At start-up the GM29 transmits and receives data at the default rate of 9.6kbps in either standard AT mode or binary mode (the first received data - AT or binary format - determines the operating mode).

Serial Data From Modem (RD)

RD is an output signal that the modem uses to send data to the application.

Serial Data To Modem (TD)

TD is an input signal, used by the application to send data to the modem.

3.5.3 Control Signals - RTS, CTS, DTR, DSR, DCD, RI

RTS and CTS are capable of transmitting at 1/10th of the data transmission speed for data rates up to 460kbps (byte-oriented flow control mechanism).

Request to Send (RTS)

Used to condition the DCE for data transmission. The default level is high by internal pull up.

The exact behaviour of RTS is defined by an AT command. Software or hardware control can be selected. Hardware flow is the default control.

The application must pull RTS low to communicate with the modem. The modem will respond by asserting CTS low, indicating it is ready for communication.

Clear To Send (CTS)

CTS indicates that the DCE is ready to transmit data. The default level is high. You can define the exact behaviour of CTS through an AT command, and can select software or hardware flow control.

Data Terminal Ready (DTR)

DTR indicates that the DTE is ready to transmit and receive data. It also acts as a hardware ‘hang-up’, terminating calls when switched high. The signal is active low. You can define the exact behaviour of DTR with an AT command.

Data Set Ready (DSR)

An active DSR signal is sent from the modem to the application (DTE) to confirm that a communications path has been established. DSR has two modes of operation, settable using the AT command AT&S.

Data Carrier Detect (DCD)

DCD indicates that the DCE is receiving a valid carrier (data signal) when low. You can define the exact behaviour of DCD with an AT command.

Ring Indicator (RI)

RI indicates that a ringing signal is being received by the DCE when low. You can define the exact behaviour or RI with an AT command.

3.6 Real Time Clock

The GM29 contains a real time clock (RTC) to maintain accurate timekeeping and to enable “timestamping” of messages.

The RTC is powered all the time that the modem is turned on. When the modem is powered off, a stored energy device within the GM29 provides back-up power to maintain the RTC for at least 7 hours.

3.7 Software Updates

It is possible and sometimes necessary to update the GM29 software. Updates must be carried out by a Sony Ericsson approved technician. Please contact your supplier for details (see “Service and Support”, page 9).

4. Operation

4.1 Switching On the Modem

There are two ways to switch on the modem, once power is applied.

- either assert TO_IN high for > 0.2s;
- or activate the RS232 control line DTR, high for > 0.2s.

The modem is fully operational after 4 seconds. Logging onto a network may take longer than this and is outside the control of the modem.

The modem can be configured to start up at the time power is applied by permanently tying power connector signals TO_IN (pin 4) and VCC (pin 1) together. In this case DTR must be used to switch the modem on again after it has been switched off or reset, while power is still applied.

4.2 Switching Off the Modem

There are two ways to switch off the modem as described below:

- either use the appropriate AT command;
- or assert HR_IN high for 1 - 2 seconds. A delay of up to 10s is experienced as the modem logs off the network.

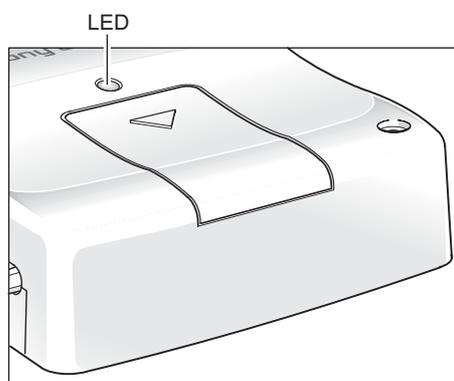
4.3 Resetting the Modem

A full system reset, independent of the status of the software, may be applied to the modem as follows:

- assert HR_IN high for > 3.5s.

4.4 Operating States/LED

The modem has a green LED, as depicted below, which is used to indicate various operating states. These states are described in following table.



<i>Operating state</i>	<i>LED</i>
After switching on the modem	On after 4s
Switch off or power removed	Off
Standby or talk	Flashing
No network, network search, no SIM card, no PIN entered	On

5. Technical Data

Data Features

CSD	Up to 9.6kbps, transparent and non-transparent
HSCSD (2+1)	Up to 19.2kbps
GPRS Class B (4+1) - P channels - Coding schemes CS1 - CS4	85.6kbps (subject to network support and terminal location)
GSM	07.10 multiplexing protocol

Short Message Service Features

SMS	Text and PDU
	Point to point (MT/MO)
	Cell broadcast
	concatenation of up to 6 SMS

Voice Features

Full Rate, Enhanced Full Rate and Half Rate (FR/EFR/HR)
Echo Cancellation and Noise Reduction
Dual Tone Multi Frequency (DTMF)

Fax Features

Group 3
Class 1 and 2

Data Storage

SMS storage capacity	40 in ME In addition, the unit can handle as many SMS as the SIM can store
Phone book capacity	100

Power Supply

Supply voltage range	5 - 32V d.c.
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Average Power Consumption

		<i>Idle Mode</i>	<i>Transmit/Operation</i>
GSM900	Voice/CSD	<15mA	<250mA (<2A peak)
	Data (GPRS 4+1)	<15mA	<350mA (<2A peak)
GSM1800	Voice/CSD	<15mA	<250mA (<1.75A peak)
	Data (GPRS 4+1)	<15mA	<350mA (<1.75A peak)

Note! The power consumption during transmission is measured at maximum transmitted power.

Radio Specifications

Frequency range	GM29: EGSM 900MHz and 1800MHz (dual band)
Maximum RF output power	2W (900MHz) and 1W (1800MHz)
Antenna impedance	50Ω
Static sensitivity	Better than -102dBm

Audio Specifications

<i>Parameter</i>	<i>Limit</i>
Output level (differential)	$\geq 4.0V_{pp}$
Output level (dynamic load = 32Ω)	$\geq 2.8V_{pp}$
Distortion at 1 kHz and maximum output level	$\leq 5\%$
Offset, BEARP to BEARN	$\pm 30mV$
Ear-piece mute-switch attenuation	$\geq 40dB$

<i>Ear piece model</i>	<i>Impedance</i>	<i>Tolerance</i>
Dynamic ear piece	$[32\Omega + 800\mu H] // 100pF$	$\pm 20\%$
Dynamic ear piece	$[150\Omega + 800\mu H] // 100pF$	$\pm 20\%$
Piezo ear piece	$1k\Omega + 60nF$	$\pm 20\%$

SIM Card Reader

Voltage type	Support for 3 V and 5 V SIM cards
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Electrical Connectors and LED

Plug-in power supply connector	RJ11 6-way
Handset audio connector	RJ9 4-way
Antenna connector	FME male
RS232 port	Sub-D socket, 9 pin
LED	Green

Mechanical Specification

Length	77.4mm
Width	66.4mm
Height	26.2mm
Weight	<130g

Environmental specifications

Operating temperature range	-25°C to +55°C
Storage temperature range	-40°C to +85°C
Relative humidity	5 - 95%, non-condensing
Stationary vibration, sinusoidal	Displacement: 7.5mm Acceleration amplitude: 20m/s ² and 40m/s ² Frequency range: 2-8Hz, 8-200Hz, 200-500Hz
Stationary vibration, random	Acceleration spectral density (m ² /s ²): 0.96, 2.88, 0.96 Frequency range: 5-10Hz, 10-200Hz, 200-500Hz, 60min/axis
Non-stationary vibration, including shock	Shock response spectrum I, peak acceleration: 3 shocks in each axis and direction; 300m/s ² , 11ms Shock response spectrum II, peak acceleration: 3 shocks in each axis and direction; 1000m/s ² , 6ms
Bump	Acceleration: 250m/s ²
Free fall transportation	1.2m
Rolling pitching transportation	Angle: ±35degrees; period: 8s
Static load	10kPa
Low air pressure/high air pressure	70kPa/106kPa

Certification

Directive 1999/5/EC	EMC: EN 301 489-1
	EMC: EN 301 489-7
	Safety: EN 60950
	GSM 3GPP TS 51.010-1
Tested according to GCF-CC	

6. AT Command Summary

The AT standard is a line-oriented command language. AT is an abbreviation of ATtention and it is always used to start sending a command line from the terminal equipment (TE) to the terminal adaptor (TA).

The command line consists of a string of alphanumeric characters. It is sent to the modem to instruct it to perform the commands specified by the characters.

As the list of AT commands supported occasionally changes, it is wise to check the latest listing with Sony Ericsson before starting any software development (see “Service and Support”, page 9).

Control and Identification

Subscriber information	AT+CNUM, AT+CIMI, AT*ESNU
Product and release information	AT+CGMI, AT+CGMM, AT+CGMR, AT+CGSN
Generic information and settings	AT, AT*, AT+CLAC, ATI, AT+CSCS, AT&F, AT&W, ATZ, AT+WS46, AT*E2SSN
Security and locks	AT*E2SSD, AT*EPEE, AT+CPIN
Product functionality	AT+CFUN

Call Control

General call control	ATA, ATD, ATL, ATH, ATP, ATT, ATX, AT+CHUP, AT+CMOD, AT+CVHU, AT+CR, AT+CRC
DTMF	AT+VTS
Data commands	ATO, AT+CRLP, AT*E2ESC

Audio Control

Audio profile modification	AT*E2EAMS
Audio profile manipulation	AT*EALR, AT*EAMS, AT*EARS, AT*ELAM, AT*EMIR, AT*EMIC, AT*EXVC, AT*E2APR
DSP filter settings	AT*E2DSPRX, AT*E2DSPTX

Network Services

Alternate line service (ALS)	AT*EALS, AT*ELIN, AT*ESLN
Customer service profile	AT*ECSP
Call forwarding	AT+CCFC, AT*EDIF
Calling/called number identification	AT+CLIP, AT+CLIR, AT*EIPS, AT+COLP
Preferred networks	AT*EPNR, AT*EPNW
Advice of charge	AT+CACM, AT+CAMM, AT+CAOC, AT+CPUC
Calling cards	AT*ESCN
Call hold, waiting and multiparty	AT+CCWA, AT+CHLD
Operator selection	AT+COPS
Network registration	AT+CREG
USSD	AT+CUSD, AT+CSSN, AT*E2SSI
Security and locks	AT+CLCK, AT+CPWD, AT*ECPI
Service provider indication	AT*E2SPN

Settings

Resetting	AT*EMAR
ME status information	AT*ECAM, AT+CSQ, AT+CIND, AT+CPAS, AT+CMER
Error control	AT+CMEE, AT+CEER

Short Message Service and Cell Broadcast

Settings	AT+CPMS, AT+CRES, AT+CSAS, AT+CSCA, AT+CSMS, AT+CNMI, AT+CSDH, AT+CSMP, AT+CGSMS
SMS command	AT+CMGC
Read/write SMS	AT+CMGD, AT+CMGW, AT+CMGL, AT+CMGR
Send SMS	AT+CMGS, AT+CMSS
Format	AT+CMGF
Broadcast message type	AT+CSCB

Phonebook

Read/write/find	AT+CPBS, AT+CPBR, AT+CPBW, AT+CPBF
Groups	AT*ESAG, AT*ESCG, AT*ESDG, AT*ESDI, AT*ESGR
Settings	AT+E2PBCS

Clock

Time and date	AT+CCLK, AT+CTZU, AT*EDST
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Interface Commands

Flow control	AT&C, AT&D, AT+IFC, AT+IPR
S registers	ATS0, ATS10, ATS2, ATS3, ATS4, ATS5, ATS6, ATS7, ATS8
Response control	AT+ILRR, ATE, ATV, ATQ, AT+CSCS
07.10 Multiplexing	AT+CMUX
DSR mode selection	AT&S
Format	AT+ICF

Data - GPRS

PDP context activation	AT+CGACT
GPRS attachment	AT+CGATT
Enter data state	AT+CGDATA
Define PDP context	AT+CGDCONT
GPRS event reporting	AT+CGEREP
Show PDP address	AT+CGPADDR
Quality of service profile (Minimum Acceptable)	AT+CGQMIN
Quality of service profile (Requested)	AT+CGQREQ
GPRS network registration status	AT+CGREG

Data - CSD and HSCSD

Radio Link Protocol	AT+CRLP
Parameter report	AT+CHSR

Upgrading	AT+CHSU
Service type	AT+CBST
Parameters	AT+CHSC, AT+CHSD
Configuration	AT+CHSN

Network Information

Cell information	AT*E2CD
Engineering mode	AT*E2EMM, AT*E2NBTS

SIM Application Toolkit

Set up call	AT*E2STKC
Display text	AT*E2STKD
Get inkey	AT*E2STKG
Get input	AT*E2STKI
Select item	AT*E2STKL
Set up menu	AT*E2STKM
Envelope (Menu Selection)	AT*E2STKN
Application toolkit settings	AT*E2STKS
Control	AT*E2STKTO

Fax

Interface data rate	AT*E2FAX
Low level commands	AT+FAA, AT+FBADLIN, AT+FBADMUL, AT+FBOR, AT+FBUG, AT+FCIG, AT+FCLASS, AT+FCQ, AT+FCR, AT+FDCC, AT+FDFFC, AT+FDIS, AT+FDR, AT+FDT, AT+FECM, AT+FET, AT+FK, AT+FLID, AT+FLNFC, AT+FLPL, AT+FMDL?, AT+FMFR?, AT+FMI?, AT+FMINSPI, AT+FMM?, AT+FMR?, AT+FPHCTO, AT+FPPTS, AT+FRBC, AT+FREL, AT+FREV?, AT+FRH, AT+FRM, AT+FRS, AT+FSPL, AT+FTBC, AT+FTH, AT+FTM, AT+FTS, AT+FVRFC, AT+FWDFC