

GsmTerminal+A

INDUSTRIAL GSM MODEM
1010.01.00 EMBEDDED ANTENNA
1010.02.00 EMBEDDED ANTENNA + BACKUP BATTERY

GsmTerminal+X

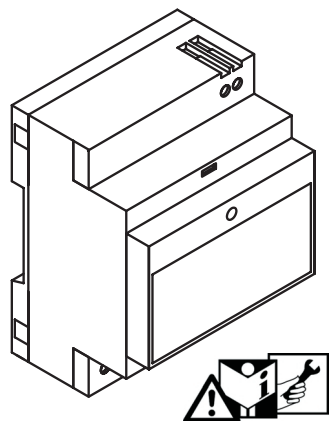
INDUSTRIAL GSM MODEM
1010.01.01 EXTERNAL ANTENNA
1010.02.01 EXTERNAL ANTENNA + BACKUP BATTERY

GprsTerminal+A

INDUSTRIAL GSM/GPRS MODEM
1010.01.10 EMBEDDED ANTENNA
1010.02.10 EMBEDDED ANTENNA + BACKUP BATTERY

GprsTerminal+X

INDUSTRIAL GSM/GPRS MODEM
1010.01.11 EXTERNAL ANTENNA
1010.02.11 EXTERNAL ANTENNA + BACKUP BATTERY



EN USER GUIDE

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DECLARATION OF CONFORMITY

R&TTE Directive 1999/5/EC

Company identification: Manufacturer: Contrive, Srl
Via Enrico Fermi 18 24040 Suisio Italy

Product identification: Brand: Contrive
Equipment name: GsmTerminal+ / GprsTerminal+
Equipment type: GSM/GPRS modem

We declare on our sole responsibility, that the product described above is in compliance with the essential requirements of the 1999/5/CE Directive:

- EN 301 511** GSM900/1800 essential requirements for mobile stations
 - Health and safety requirements pursuant to clause 3.1a:**
 - EN 60950-1** Safety of information technology equipment
 - Protection requirements concerning EMC clause 3.1b:**
 - EN 301 489-1** Electromagnetic compatibility
 - EN 301 489-7** ElectroMagnetic compatibility and Radio spectrum Matters Specific conditions for mobile and portable radio and ancillary equipments
 - EN 61326** ElectroMagnetic compatibility measurement, control and laboratory use
 - EN 55024** Information technology equipment - Immunity characteristics
 - Measures for the efficient use of the radio frequency spectrum clause 3.2:**
 - EN 300 607** Radio spectrum matters
- NOTE: Class B equipment (domestic) emission level applied.
Class A equipment (industrial) immunity level applied.

and all tests were carried out

Notified Body: EMCC DR. RAŠEK, GmbH
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91320 Elbermannstadt Germany

CE 0678

Suisio, Italy February 21, 2006

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SAFETY INFORMATION

- Do not install this unit near medical devices like pacemakers or hearing aids. This unit may interfere with the operation of these devices.
- Switch off this unit when flying. Secure it so that it cannot be switched on inadvertently.
- Do not install this unit near petrol stations, fuel depots, chemical plants or blasting operations when this unit can disturb the operation of technical equipment.
- Interference can occur if this unit is used near televisions, radios or personal computers.
- If the device is coming from a cold environment, then condensation can occur. Before starting operations, the device must be absolutely dry. Thus, an acclimatization period of at least three hours must be observed.
- 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 this unit.

This device should be installed only by qualified personnel. Carefully read the instruction manual in its entirety and keep it safe for future reference. It is essential to know the information and comply with the instructions given in the manual to ensure the fitting is installed, used and serviced correctly and safely.

This RF unit is not designed for and intended to be used in portable applications (within 20 cm or 8 inches of the body of the user) and such uses are strictly prohibited.

This unit is not authorized for use as critical component in life-support devices or systems unless a specific written agreement.

If incorrectly installed in a vehicle, the operation of GSM device could interfere with the correct functioning of vehicle electronics. Verification of the protection of vehicle electronics should form a part of the installation. Regulations must be considered to operate a vehicle's light or horn on public roads.

No complex software or hardware system is perfect.

Bugs are always present in a system of any size.

In order to prevent danger to life or property, it is the responsibility of the system designer to incorporate redundant protective mechanism appropriate to the risk involved.

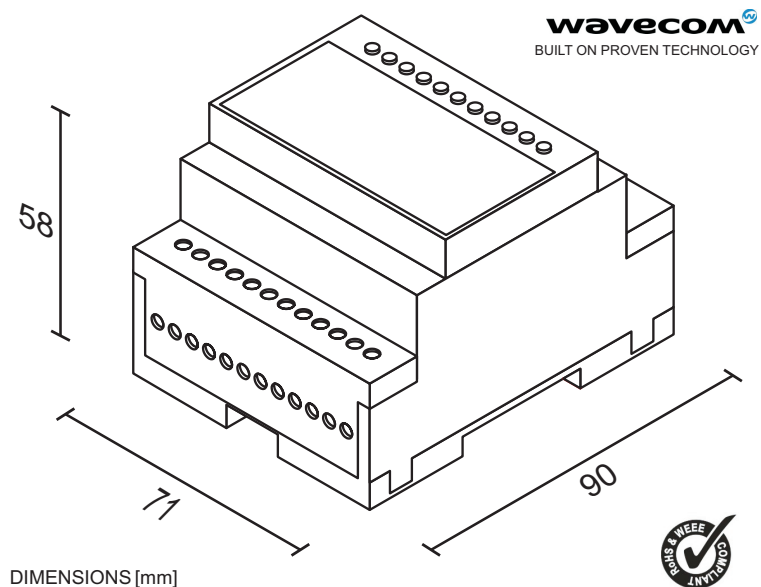
All units are 100% functionally tested. Specifications are based on characterisation of tested sample units rather than testing over temperature and voltage each unit.

CONTRIVE disclaims all liability for damage to the fitting or to other property or persons deriving from installation, use and maintenance that have not been carried out in conformity with this instruction manual, which must always accompany the fitting.

PRODUCT DESCRIPTION

The GsmTerminal+ is an industrial DIN rail GSM modem for the transfer of data, SMS and faxes in GSM networks. Industrial standard interface and an integrated SIM card reader mean it can be used rapidly, easily and universally as a dual band GSM terminal. Its performance bandwidth and the robust housing make it easier to quickly implement new applications in areas such as telemetry, telematics and remote control.

All interfaces are integrated in the housing. The connections are suitable for use in domestic and industrial environments. The GprsTerminal+ allows easy GPRS connections with embedded TCP/IP stack. To guarantee reliable operation even under difficult EMC conditions, the device has integrated surge protection on both power supply and interface line. Wide range power supply voltage AC/DC sources can be integrated with optional backup battery to operate for reasonable time even during blackouts.



PRODUCT FEATURES

Dual band EGSM900 and GSM1800 for data, sms, fax and voice applications
Full Type Approved and compliant with ETSI GSM Phase 2+

Output power: Class 4 (2W @ 900 MHz)
Class 1 (1W @ 1800 MHz)

Temperature: operating -20 to 55°C
storage and transport -30 to 85°C

Relative humidity: operating 5 to 95% non-condensing
storage & transport 5 to 95% condensation allowed outside

Enclosure: EN-50022 rail 4 modules, polycarbonate, UL94 -V0

Overall dimensions: mm 71 x 90 x 58 (W x H x D)

Weight: 180 g

Degree of protection: IP 40 (EN-60529 / IEC 529) properly fitted

VOICE / DATA / FAX / SMS

Voice features (GSM):

- Telephony, Emergency calls
- Full Rate, Enhanced Full Rate, Half Rate, Adaptive Multi Rate
- Echo cancellation and noise reduction
- Dual Tone Multi Frequency (DTMF) function
- Full duplex handsfree

GSM Data features:

- Circuit Switched Data Asynchronous transparent or non-transparent up to 14 400 bit/s
- Automatic Fax group 3 (Class 1 and Class 2)
- MNP2 error correction and V.42 bis data compression

GPRS Data features: [1]

- Class 10, Class B
- Coding scheme: CS1 to CS4
- PBCCH (Packet Broadcast Control Channel) support

SMS features:

- SMS 160 characters text or PDU
- Point to point (MT/MO)
- Cell broadcast

GSM Supplementary Services:

- Call Forwarding, Call Barring, Call Waiting, Call Hold
- Multiparty
- USSD (Unstructured Supplementary Services Data)

Additional Protocols: [2]

- TCP/IP
- POP3
- SMTP
- FTP

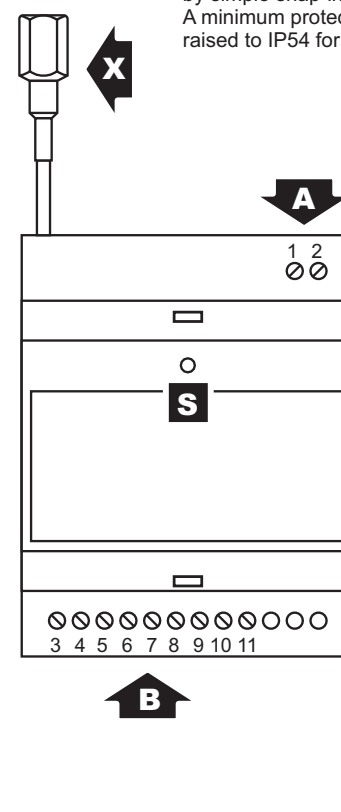
[1] GprsTerminal only

[2] GprsTerminal with embedded TCP/IP stack only

INSTALLATION

FITTING

This unit can be installed on any standard EN-50022 rail by simple snap-in. A minimum protection degree IP40 must be guaranteed, raised to IP54 for open-air application.



A. Power Supply input
2 x 2,5mm² (AWG14)

B. Input and output terminals
9 x 2,5mm² (AWG14)

X. External antenna (type X only)
RG174 + FME male jack

S. GSM operation LED indicator

- OFF
No power supply or download mode [3]
- ON PERMANENTLY
Module switched ON
Not registered on the network
- SLOW FLASH
200ms ON / 2s OFF
Module switched ON
Registered on the network
- QUICK FLASH
200ms ON / 600ms OFF
Module switched ON
Registered on the network
Communication in progress

[3] Following a specific procedure it's possible to download a software in the Flash memory of the GsmTerminal+. This option is reserved to advanced users.

POWER SUPPLY

Power supply: 8 + 40 V DC polarity independent
6 + 28 V AC
< 30 mA @ 12 V DC in standby mode
< 100 mA @ 12 V DC in communication mode
< 1 A @ 12 V DC max peak current
2 x 2.5 mm² (AWG14) screw connector

This unit can be supplied either by alternating or direct current, polarity independent, in a wide voltage range. Power supply connection on terminal 1 and 2, top right side. The power supply unit must meet the demands placed on SELV [3] circuits in accordance with EN60950.

The power supply must not be shared with other equipments: suggested power supply source is a simple 12VAC / 5VA transformer. The maximum permissible connection length between device and supply source is 3 m. Overvoltages are suppressed by internal varistor.

[3] Safety Extremely Low Voltage

ANTENNA

GsmTerminal+A

The embedded antenna is located under the front panel. This omnidirectional antenna can work properly if the front side of the device is not shielded by metallic frames (i.e.: the GsmTerminal+A is installed inside a metal cabinet).

GsmTerminal+X

An external dual-band antenna must be connected to the RF interface, implemented as a 50Ω FME male coaxial jack at the end of a short RG174 cable stub exiting from the top side of the device. The antenna must fulfil the requirements given below:

Frequency TX	880 to 915 MHz	1710 to 1785 MHz
Frequency RX	925 to 960 MHz	1805 to 1880 MHz
Impedance	50 ohms	
VSWR	RX max	1.5 : 1
	TX max	1.5 : 1
Polarization	Linear	
Typical gain	0 dBi in one direction at least	

We recommend a VSWR max of 1.5:1 although a VSWR max of 2:1 can be accepted without affecting performance and certification.

The DC impedance is floating but there is no problem when using antennas that present a short to ground.

SIM CARD

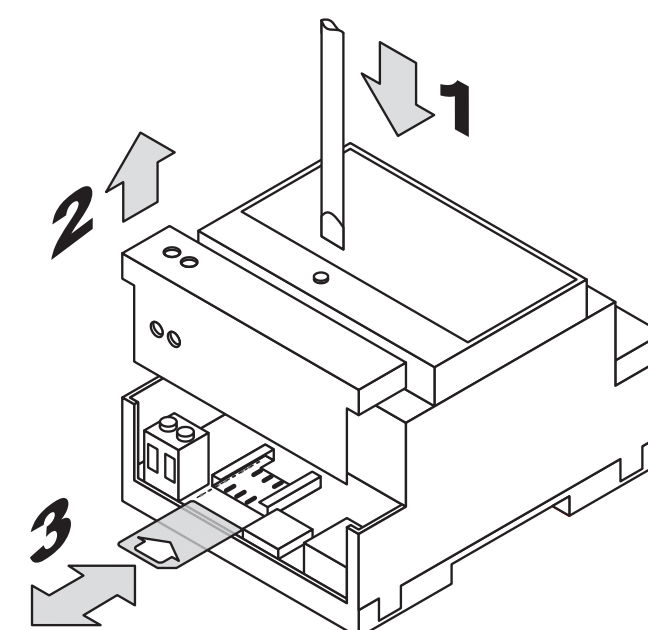
The SIM card receptacle is intended for 3V SIM cards in accordance with GSM 11.12 phase 2+ to operate the GsmTerminal+. The SIM card must be inserted in the cardholder to put the unit into operation.

Make sure that there is no voltage applied to GsmTerminal+. Disconnect also the backup battery, if any.

Following the figure below:

1. Unlock the top cover using a small screwdriver.
2. Slide up the top lid.
3. Insert the SIM card in the receptacle, contacts must be on the bottom side.

Do not operate the unit without top cover, once the SIM card has been inserted replace the top lid and then connect power supply to GsmTerminal+. To remove the SIM card repeat operations 1 and 2, gently pull the SIM card out.



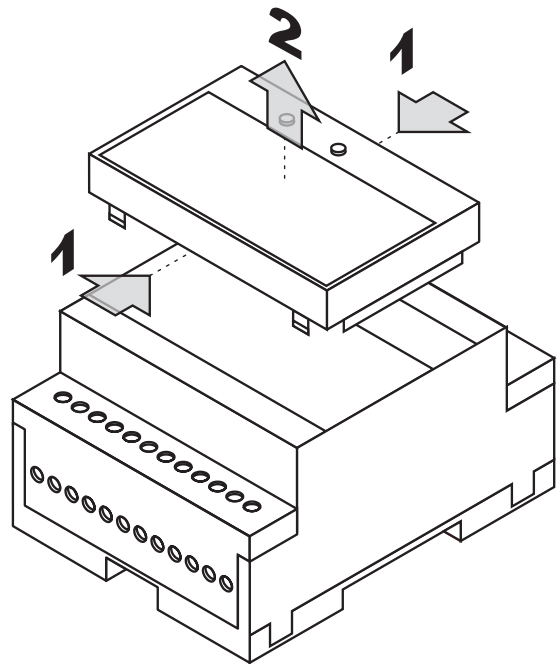
ACCESS INSIDE

Audio connector and optional backup battery are located inside the unit.

Before to open the unit disconnect power supply and all live circuits that may be connected.

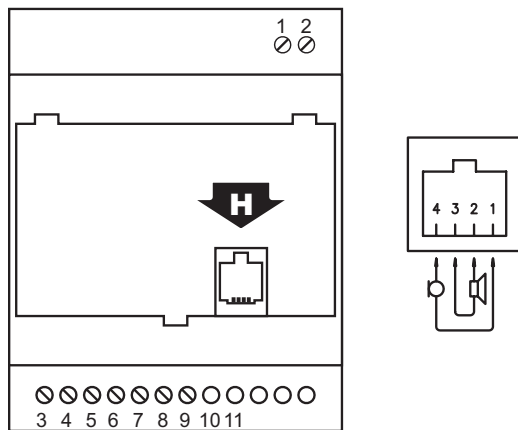
The front cover must be removed to access the inside of the unit:

1. Push with two fingers on top and bottom sides of front cover to release it.
2. Pull the front cover and keep it in a safe place.



HANDSET

Remove the front cover following above instructions to access the RJ11 4 pin modular jack audio interface [H].



The pin assignment usually suitable for ordinary desktop telephone handset:

- 1 ■ MICROPHONE NEGATIVE INPUT
- 2 ■ SPEAKER POSITIVE OUTPUT
- 3 ■ SPEAKER NEGATIVE OUTPUT
- 4 ■ MICROPHONE POSITIVE INPUT

Open up the handset to check if the microphone and receiver are wired correctly to the required pins, if not, re-wire internal connections of the handset.

Verify the polarity of Electret condenser microphone capsule, the DC bias voltage required is supplied by GsmTerminal+ (2V-0,5mA): it does not work if reversed. The gain of the input is internally adjusted and can be tuned from 30 dB (43.8 mV_{MAX}) to 51dB (3.9mV_{MAX}) using AT+VGT command.

The impedance of the microphone has to be around 2 kohms. A speech filter is active on this audio interface.

Speaker terminals are wired to the handset's receiver. There is no requirement on polarity.

Output is a push-pull amplifier and can be loaded down to 150 ohms and up to 1 nF. Output gain is internally adjusted and can be tuned from -26 dB (69mV_{RMS} @ 32 ohms) to +2 dB (1.74V_{RMS} @ 150ohms) using AT+VGR command.

Select audio path with AT+SPEAKER=1 and make GSM voice call by sending the dial up AT command from the DTE. After connection, you should hear voice of the called party from the earpiece and the called party can hear your voice. Using devices with embedded antenna some noise can be introduced into the audio path, in such cases it's better to use X-type devices.

CARE AND MAINTENANCE

Your GsmTerminal is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestion below will help you to enjoy this product for many years.

- Do not expose the unit to any extreme environment where the temperature or humidity are out of operating range.
- Do not use or store the unit in dusty or dirty areas. Its moving parts (SIM holder for example) can be damaged.
- Do not use chemical cleaning agent on the unit or the SIM card.
- Do not attempt to disassemble the unit or remove any part or label. There are no user serviceable parts inside.
- Do not expose the unit to water, rain or spilt beverages. It is not waterproof.
- Do not abuse the unit by dropping, knocking or violently shaking it. Rough handling can damage it.
- Do not place the unit alongside computer discs, credit or travel cards or other magnetic media. The information contained on these devices may be affected.
- This unit is under your responsibility. Please treat it with care respecting all local regulations. It is not a toy. Therefore, keep it in a safe place at all times and out of the reach of childrens.
- Treat the SIM card with the same care as your credit card: do not bend or scratch or expose it to static electricity.
- Try to remember your unlock and PIN codes. Become familiar with and use the security features to block unauthorized use and theft.

Both fixed and mobile applications are allowed, as defined below:

Fixed means that the device is physically secured at one location and is not able to be easily moved to another location.

Mobile means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter's antenna and the body of the user or nearby persons.

Do contact an authorized service center in the unlikely event of a fault in the unit.

DEFAULT SETTINGS

It's possible to read current settings from the unit by means of AT&V command. A device with factory settings will return:

```
Q:0 V:1 S0:000 S2:043 S3:013 S4:010 S5:008
+CR:0 +CRC:0 +CME:0 +CBST:0,0,1
+SPEAKER:0 +ECHO:0,1 &C:1 &D:2 %C:0
+IPR:115200 +ICF:3,4 +IFC:2,2

Q:0          Result codes NOT suppressed
V:1          Verbose mode

S0:000      Auto answer disabled
S2:043      Character for escape sequence (+)
S3:013      Command line termination character (Cr)
S4:010      Response formatting character (Lf)
S5:008      Command line editing character (BS)

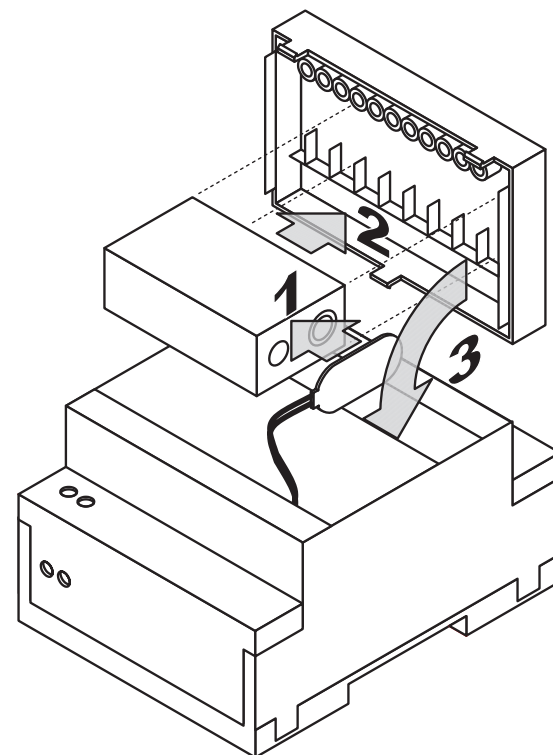
+CR:0       Extended reports disabled
+CRC:0      Extended result codes disabled
+CME:0      Extended error indication disabled
+CBST:0,0,1 Bearer autoabuding, async, transparent
+SPEAKER:0 Speaker out disabled (routed to unimplemented circuit 1)
+ECHO:0,1   Echo cancellation disabled
&C:1        Carrier detect indication
&D:2        Call released when DTR drop to OFF
%C:0        Data compression disabled (no V24 bis)

+IPR:115200 115200 baud
+ICF:3,4     8 data 1 stop No parity
+IFC:2,2     RTS / CTS (Hardware handshake)
```

Each setting can be modified with specific AT command. This and many other settings related to active profile can be written to internal non volatile memory by means of command AT&W. The command AT&F will restore the factory settings, overwriting any profile previously set with command AT&W.

BACKUP BATTERY

If the unit is provided with UPS feature, a backup battery can be installed to keep the device working even during blackouts. Once the front cover has been removed:



1. Clip the battery to available connector
This connector must be isolated when operating without backup battery.
2. Push the battery into retainer lids located under front cover.
3. Replace the front cover to close the unit.

Use only NiMH rechargeable batteries 8.4V or 9.6V type.

The newer NiMH batteries are less harmful to the environment, have a longer life, and contain recyclable materials. Recycling options available in your local area should be considered when disposing of this product. Do not dispose of in fire.

**WHEN USING BATTERIES AND ACCUMULATORS
ADHERE TO RELEVANT REGULATIONS**

QUICK START

Connect a personal computer running a terminal emulation program or any other DTE to the serial interface providing the factory default communication settings:

- 115200 bit/s, 8 databits, 1 stop bit and no parity. (AT+IPR and AT+ICF commands to edit settings).
- RTS / CTS flowcontrol enabled (AT+IFC command to edit settings).
Hard or soft flowcontrol MUST be enabled when using high speed rates.

Follow the steps below to get the unit up and running as quickly as possible:

- Insert a valid SIM card.
- Verify that the correct services are enabled. (e.g. incoming and outgoing DATA service, SMS service center, FAX service).
- For X-types devices make sure that the antenna is connected.
- Verify that the antenna is placed in the best position possible.
- Connect the battery, if any.
- Power on the unit and make sure that the PIN code of the SIM card is disabled either with the help of a mobile phone or with the command AT+CLCK. If the PIN code should be enabled make sure to enter the correct PIN code with the command AT+CPIN.
- After entering the PIN some SIM user data files are loaded into the device. Please be aware that it might take some time to read a large phonebook.
- Check that the the GSM operation led indicator [S] is flashing, this means that the unit has a connection to network and that it is registered.
- Verify the registration status by means of AT+CREG? command:
+CREG:0,0 means not registered
+CREG:0,1 means registered with Home Network
+CREG:0,5 means registered roaming
- Check the received signal quality by means of AT+CSQ command: the value of the first parameter reported from the +CSQ command should be more than 10. +CSQ:99 means no signal available.
- Configure the unit with appropriate commands as needed in the specific application.

Commands always start with AT (which means ATtention) and finish with a <CR> character (carriage return).

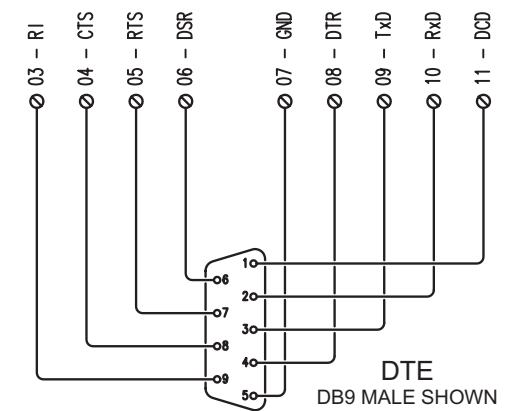
Responses start and end with <CR><LF> (except for the ATV0 DCE response format) and the ATQ1 (result code suppression) commands.

- If command syntax is incorrect, the "ERROR" string is returned.
 - If command syntax is correct but transmitted with wrong parameters, the +CME ERROR:<Err> or +CMS ERROR:<SmsErr> string is returned with adequate error codes if CME was previously set to 1. By default, CME is set to 0, thus the error message is only "ERROR".
 - If the command line has been executed successfully, an "OK" string is returned.
- In some cases, such "AT+CPIN?" or (unsolicited) incoming events, the product does not return the "OK" string as a response.

DCE → DTE INTERFACE

Communication: RS-232 (DCE)
300 ... 115200 bit/s
7/8 data bits, 1/2 stop bits, 1 parity bit, 10/11 bit char length
Software handshake, Hardware handshake
9 x 2.5 mm² (AWG14) screw connector

GsmTerminal+ / GprsTerminal+ is a DCE (Data Communication Equipment). The EIA232 interface is the interface for the application software and the connection to DTE (Data Terminal Equipment). The EIA232 interface is implemented as a 9 pole screw connector. Circuit type SELV, max 15 m length, shielding not required. The customer application communicates with GsmTerminal+ by means of AT cellular commands. AT commands manual is available for download at www.gsm-control.biz.



PIN	DB9	DB25	V.24	RS-232	SIGNAL	I/O	DESCRIPTION	PARAMETERS
11	1	8	109	CF	DCD	0	DATA CARRIER DETECT	> +5.0V HIGH = ACTIVE < -5.0V LOW
10	2	3	104	BB	RxD	0	RECEIVE DATA	> +5.0V HIGH = LOGIC 0 < -5.0V LOW = LOGIC 1
9	3	2	103	BA	TxD	I	TRANSMIT DATA	> +2.4V HIGH = ACTIVE < +1.5V LOW
8	4	20	108	CD	DTR	I	DATA TERMINAL READY	> +2.4V HIGH = ACTIVE < +1.5V LOW
7	5	7	101	AB	GND	-	SIGNAL GROUND	0 V
6	6	6	107	CC	DSR	0	DATA SET READY	> +5.0V HIGH = ACTIVE < -5.0V LOW
5	7	4	105	CA	RTS	I	REQUEST TO SEND	> +2.4V HIGH = ACTIVE < +1.5V LOW
4	8	5	106	CB	CTS	0	CLEAR TO SEND	> +5.0V HIGH = ACTIVE < -5.0V LOW
3	9	22	125	CE	RI	0	RING INDICATOR	> +5.0V HIGH = ACTIVE < -5.0V LOW