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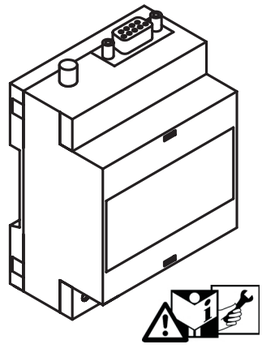
B1008.EN / 0907 www.gsm-control.biz

GsmTerminal-232
1008.00.00 GPRS MODEM
1008.03.00 GPRS MODEM + BATTERY

GsmTerminal-232 PY
1008.00.10 GPRS MODEM + PYTHON
1008.03.10 GPRS MODEM + PYTHON + BATTERY

GsmTerminal-232 GPS
1008.00.20 GPRS MODEM / GPS + PYTHON
1008.03.20 GPRS MODEM / GPS + PYTHON + BATTERY



python powered

EN USER GUIDE

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-232
Equipment type: GSM/GPRS modem

We declare on our sole responsibility, that the product described above, equipped with Telit GE863-QUAD or GE863-PY or GE863GPS module is in conformity with the essential requirements of the Directive 1999/5/EC.

The conformity with the essential requirements of the European Directive 1999/5/EC has been verified against the following standards:

- **ETSI EN 301 511 : v9.0.2**
- **CENELEC EN 60950 : 2001**
- **ETSI EN 301 489-1 : v.1.4.1**
- **ETSI EN 301 489-7 : v 1.2.1**

CE 0168

This unit is FCC approved as module to be installed in other devices and conform to the following US Directives:

- **FCC 47 Part 24**
- **FCC 47 Part 15**

NOTE: If the final product is intended for portable use, a new application and FCC is required. Manufacturers of mobile, fixed or portable devices incorporating this module are advised to clarify any regulatory questions and to have their complete product tested and approved for FCC compliance.
Interference statement:
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

Suisio, Italy February 26, 2007

FC RI7GE863G
RI7GE863L

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.

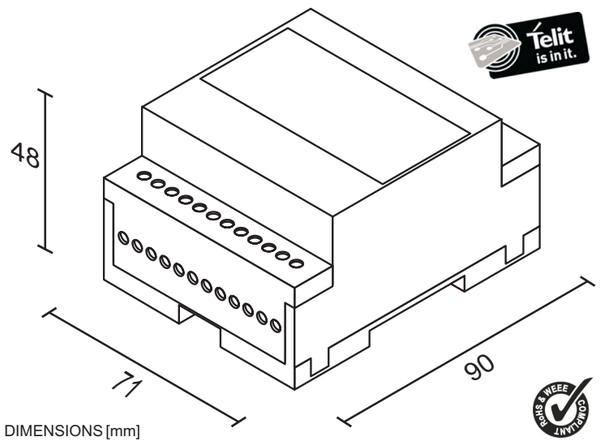
In order to prevent danger to life or property, it is the responsibility of the system designer to incorporate redundant protective mechanism appropriate to the risk involved.

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-232 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 quad 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. Optional GPS receiver available for L.B.S. application.
All interfaces are integrated in the housing.
The GsmTerminal-232 allows easy GPRS connections with embedded TCP/IP stack. The connections are suitable for use in domestic and industrial environments.
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 opional backup battery to operate for long time even during blackouts.



DIMENSIONS [mm]

PRODUCT FEATURES

Quad band GSM850 / EGSM900 / DCS1800 / PCS1900 with automatic band selection for data, sms, fax and voice applications.
Full Type Approved and compliant with ETSI GSM Phase 2+.

Output power:
- Class 4 (2W @ 850 MHz & 900 MHz)
  Class 1 (1W @ 1800 MHz & 1900 MHz)

Sensitivity:
- -107 dBm [typ.] @ 850/900 MHz
  -106 dBm [typ.] @ 1800/1900 MHz

Environment:
- operating temperature -30 to 80°C
  relative humidity 5 to 95% non-condensing

Enclosure:
- EN-50022 rail 4 modules, polycarbonate, UL94 -V0
  71 x 90 x 48 mm (W x H x D) / 180 g
  IP 40 (EN-60529 / IEC 529) properly fitted

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

GSM Data features:
- Transparent Asynchronous CSD up to 14400 bit/s
- Non transparent Asynchronous CSD up to 9600 bit/s
- V.110
- Fax group 3 Class 1

GPRS Data features:
- Class 10, Mobile Station 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)
- Concatenated SMSs
- Cell broadcast

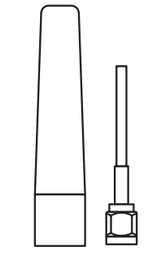
GSM Supplementary Services:
- Call Forwarding, Call Barring, Call Waiting, Call Hold
- Multiparty
- USSD (Unstructured Supplementary Services Data)
- Jamming detection

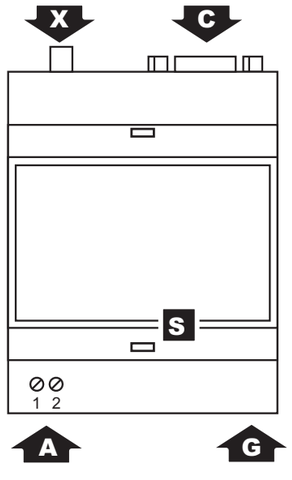
Additional Protocols:
- TCP/IP
- UDP
- SMTP
- FTP

GPS receiver (optional):
- SiRFstarIII™ 20 channels
- High sensitivity indoor reception (-159 dBm)
- Hot start < 2 seconds
- 200,000+ effective correlators

Additional features:
- Real Time Clock with Alarm management
- SIM Access Profile
- Optional Python interpreter (3Mb Flash + 1.5Mb RAM)

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)

C. EIA/RS232 interface
   Sub-D 9 pole

X. GSM antenna connector
   SMA/F

G. GPS antenna connector
   RG174 + SMA/F (optional)

S. GSM operation LED indicator
- OFF
  No power supply
- SLOW FLASH
  300ms ON / 2700ms OFF
  StandBy
  Registered full service
- QUICK FLASH
  500ms ON / 700ms OFF
  Module switched ON
  Network search
  Not registered or turning off
- ON
  PERMANENTLY
  Communication in progress

CAUTION !
Avoid excessive torque tightening the coaxial antenna jack.

POWER SUPPLY

Power supply: 8 ÷ 40 V DC polarity independent
6 ÷ 28 V AC
< 18 mA @ 12 V DC in low power mode (CFUN=5)
< 30 mA @ 12 V DC in standby mode, GPS OFF
< 60 mA @ 12 V DC in standby mode, GPS ON [2]
< 150 mA @ 12 V DC in communication mode, GPS OFF
< 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. Supply connection on terminal 1 and 2, bottom left side.
The power supply unit must meet the demands placed on SELV [3] circuits in accordance with EN60950. Overvoltages are suppressed by internal varistor.
The power supply must not be shared with other equipments: suggested power supply source is a simple 12VAC / 5...10VA transformer.
Maximum permissible connection length between device and supply source is 3 m.

[2] Including GPS antenna power supply current (20mA @ 3.5V)
[3] Safety Extremely Low Voltage

GSM ANTENNA

The antenna should be placed away from electronic devices or other antennas.
The recommended minimum distance between adjacent antennas, operating in a similar radio frequency band, is at least 50cm.
If signal strength is weak, it is useful to face a directional antenna at the closest radio base station. This can increase the strength of the signal received by the modem.
The modem's peak output power can reach 2W. RF field strength varies with antenna type and distance: at 10cm from the antenna the field strength may be up to 70V/m and at 1m it will have reduced to 7V/m. In general, CE products for residential and commercial areas and light industry can withstand a minimum of 3V/m.
The antenna must fulfil the following requirements:

Frequency Range	Standard QUAD BAND
Impedance	50 ohms
VSWR	< 3 : 1
Gain	< 3 dBi / > 1.5 dBi
Input power	> 2 W peak

GPS ANTENNA

An active GPS antenna must be connected to the RF interface, implemented as a 50Ω SMA female coaxial jack [G]. Power supply is provided by GsmTerminal-.
The antenna must fulfil the requirements given below:

Frequency Range	GPS/L1 1575.42 MHz
Power Supply	3...5 VDC
Impedance	50 ohms
Gain	3 dBi > gain > 1.5 dBi

SIM CARD

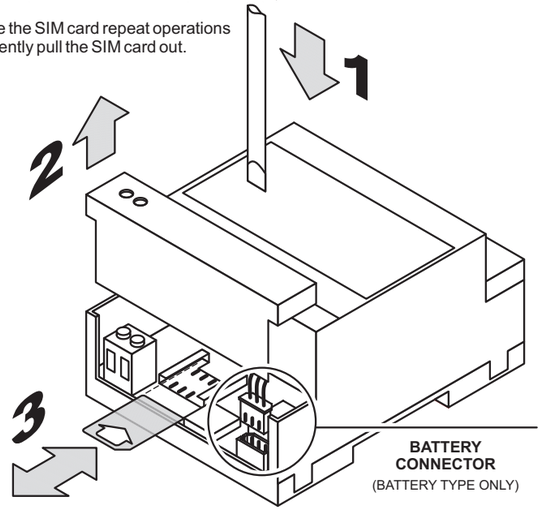
The SIM card receptacle is intended for 3V SIM cards in accordance with GSM 11.12 phase 2+ to operate the GsmTerminal-232.
The SIM card must be inserted in the cardholder to put the unit into operation.

Make sure that there is no voltage applied and GsmTerminal-232 is turned off:

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-232.

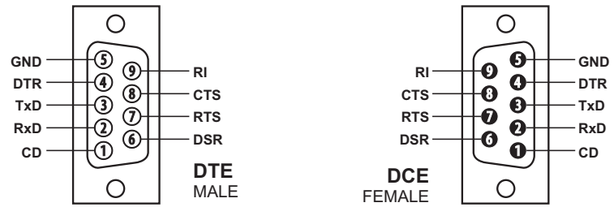
To remove the SIM card repeat operations 1 and 2, gently pull the SIM card out.



DCE → DTE INTERFACE

Communication: RS-232 (DCE)
2400 ... 57600 bit/s (autobaud)
115200 bit/s (fixed baud rate)
7/8 data bits, 1/2 stop bits, 1 parity bit, 10/11 bit char length
Software handshake, Hardware handshake
Sub-D 9 female

GsmTerminal-232 is a DCE (Data Communication Equipment).
The EIA232 interface is the interface for the application software and the connection to DTE (Data Terminal Equipment).
Circuit type SELV, max 15 m length, shielding not required.
The customer application communicates with GsmTerminal-232 by means of AT cellular commands.



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

BACKUP BATTERY

A Lithium-Ion battery pack is available to keep the device working without main power supply. The unit can work with or without battery.
The battery charges automatically while the device is powered from main power supply and cannot be overcharged, for that reason the modem cannot be switched off (`AT+SHDN`) while supplied from external supply.
Disconnect the battery if you will not be using the unit for a long time or if you want to turn-off the unit completely.

BATTERY TYPE: BK053450A (special package)

Nominal Voltage	3.7V
Nominal Capacity:	900 mAh @ 20°C
Charging Temperature:	0...45°C
Discharging Temperature:	-20...60°C
Relative Humidity:	65% ±20%
Cycle Life:	> 80% initial capacity after 300 cycles
Retention Capacity:	> 90% after 20 days @ 25°C

Battery status is available through specific AT commands.

`AT+CBC` command returns the current battery status in the format:

`+CBC:<bcs>,<bcl>` where:

`<bcs>`
- `0` device powered by the battery
- `1` battery connected and charger is being powered
- `2` device does not have battery connected
- `3` recognized powered fault, calls inhibited

`<bcl>`
- `0` battery exhausted or no battery connected
- `25` battery charge remaining is estimadet to be 25%
- `50` battery charge remaining is estimadet to be 50%
- `75` battery charge remaining is estimadet to be 75%
- `100` battery is fully charged

`AT#CBC` command returns the current battery status in the format:

`+CBC:<chargerState>,<batteryVoltage>` where:

`<chargerState>`
- `0` charger supply not connected
- `1` charger supply connected and charging
- `2` charge supply connected and charger completed

`<batteryVoltage>` battery voltage (375 means 3.75V).
real battery voltage only if charger supply is not connected

Use `AT+CFUN` command to select the level of functionality of the device: reducing power consumption during the idle time a longer standby time wil be allowed. A device with embedded battery will turn on completely once supplied through the main power supply.

The newer LiIon 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.

WARNINGS

- Danger of explosion if the battery is incorrectly replaced or removed.
- Replace only with an original battery pack.
- Do not reverse the positive (+) and negative (-) terminals.
- Do not short-circuit the positive (+) and negative (-) terminals.

CAUTIONS

- Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- If the battery leaks, and the electrolyte get into the eyes. Do not rub eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, it may injure eyes or cause a loss of sight.
- If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device and stop using it.

INTERFACE STYLE

GsmTerminal- can be configured to use all AT interfaces available on Telit engines by means of the specific AT command:

`AT#SELINT=<v>` where:

`<v>`
- `0` typical interface available on GM862-GSM, GM862-GPRS
- `1` typical interface available on GM862-PCS, GM862-PYTHON, QUAD-PY, TRIZIUM, GE863-QUAD
- `2` typical interface available on GE864, GC864, ALL GPS PRODUCTS

Refer to the AT Commands reference guide for the full command description.

QUICK START

Insert a valid SIM card and verify that the antenna is connected. Connect a PC running a terminal emulation program. GsmTerminal- is factory set to autobaud.

Send an AT command to make the device set the right speed and character format:
`AT<cr>` and wait for response `OK`
If no response is received within the timeout period of 200 ms, retry.

after this initial command, it is advisable to fix the port rate:
`AT+IPR=<rate><cr>` and wait for response `OK`
rate is the port speed and can be:
300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.

Enable the extended error result codes:
`AT+CMEE=<format><cr>` and wait for response `OK`
`<format>` `0` numeric format
`1` verbose format

Query SIM presence and status:
`AT+CPIN<cr>` and wait for response:
`+CPIN: SIM PIN` SIM found and PIN is required to continue operations
`+CPIN: SIM PUK` SIM found and SIM PUK is required
`+CPIN: READY` SIM found and no PIN is required to proceed
`+CME ERROR: 10` SIM not present
`+CME ERROR: 13` SIM defect
`+CME ERROR: 14` SIM busy
`+CME ERROR: 15` SIM is wrong type (it must be a GSM SIM card)

Provide SIM PIN (only if required):
`AT+CPIN=****<cr>` and wait for response `OK`
where `****` stands for the SIM PIN code (e.g. 1234)
When receiving the ERROR message, repeat query SIM presence and status since after 3 failed attempts SIM PIN is not anymore requested: you must provide SIM PUK instead (AT Commands reference guide for full command description).

Query network status:
`AT+CREG<cr>` and wait for response:
`+CREG: 0,0` / `+CREG: 1,0` No GSM/DCS network is found
`+CREG: 0,1` / `+CREG: 1,1` Mobile is registered on its home network
`+CREG: 0,2` / `+CREG: 1,2` Mobile is waiting for network registration
`+CREG: 0,3` / `+CREG: 1,3` Network(s) found but registration not allowed
`+CREG: 0,4` / `+CREG: 1,4` Mobile is in an unknown network status
`+CREG: 0,5` / `+CREG: 1,5` Mobile is registered in roaming

Check the received signal quality:
`AT+CSQ<cr>` and wait for response: `+CSQ: <rssi>,<ber>`
the value of `<rssi>` parameter reported should be more than 10
`<rssi>` 99 means no signal available

To place a CSD Data call (not GPRS) set the device in data mode:
`AT+FCLASS=0<cr>` and wait for `OK` response
Stored in memory: no need to repeat if +FCLASS setting is not changed.

Set the desired modulation and speed for the connection:
`AT+CBST=<mod>,0,<ce><cr>` and wait for `OK` response
(AT Commands Manual for full command description).

Dial a given phone number:
`ATD <PhoneNumber><cr>` and wait for response:
`CONNECT 9600` The called modem is now on line
`BUSY` The line called is busy
`NO ANSWER` The receiver did not answer the call
`NO CARRIER` The modem handshaking has not been successful

Once data transfer has been completed, hang up the data call:
`ATH<cr>` and wait for response `NO CARRIER`

Before to send SMSs, the device has to be properly set up.
Select SMS format type:
`AT+CMGF=<mode><cr>` and wait for response `OK`
where `<mode>` is the SMS format type `0`=PDU `1`=Text
This setting is stored and remains until the device is turned off.

Check (or set) SMS Service Centre number:
`AT+CSCA?<cr>` (AT Commands Manual for full command description).

A new SMS can be sent directly to the network:
`AT+CMGS="<da>"<cr>`
where `<da>` is the destination address (phone number)
wait for prompt ">"
enter SMS text (MAX 160 characters), close with `CTRL-Z` char (0x1A hex) or abort with `ESC` char (0x1B hex) and wait for response:
`ERROR` Some error occurred
`+CMS ERROR: 330` SMSC address unknown
`+CMS ERROR: 41` Temporary Failure, maybe the device isn't registered
`+CMGS: <mr>` Message has been successfully sent
`<mr>` represents the message reference number

GPS features are available through GSM modem interface (Controlled Mode).
Turn off the GPS receiver: `AT$GPSP=<0>`
Turn on the GPS receiver: `AT$GPSP=<1>`

GPS receiver needs an active antenna that could be supplied by the module:
Antenna supplied by the modem: `AT$GPSAT=<0>` (default)
Antenna not supplied by the module: `AT$GPSAT=<1>`

Query the acquired position of the GPS receiver:
`AT$GPSACP` and wait for response:
`$GPSACP: <UTC>,<lat>,<lon>,<hdop>,<alt>,<fix>,`
`<cog>, <spkm>,<spkn>,<date>,<nsat>`

FACTORY PROFILE

GsmTerminal- stores the values set by several commands as profiles in the internal non volatile memory (NVM), allowing to remember this setting even after power off. There are two user customizable profiles and one factory profile in the NVM of the device: by default the device will start with user profile 0 equal to factory profile.

`&W` is used to save the actual values of both sections into the NVM user profile.
`&Y` instructs the device to load at start-up only the base section
`&P` instructs the device to load at start-up the full profile: base+extended sections
`&F` resets to factory profile values only the command of the base section
`&F1` resets to factory profile values the full set of base + extended section

The values set by following commands are stored in the profile base section:

GSM DATA MODE:	+CBST
AUTOBAUD:	+IPR
COMMAND ECHO:	E
RESULT MESSAGES:	Q
VERBOSE MESSAGES:	V
EXTENDED MESSAGES:	X
FLOW CONTROL OPTIONS:	&K, +IFC
CTS (C106) OPTIONS:	&B
DSR (C107) OPTIONS:	&S
DTR (C108) OPTIONS:	&D
DCD (C109) OPTIONS:	&C
RI (C125) OPTIONS:	\R
POWER SAVING:	+CFUN
DEFAULT PROFILE:	&Y0
S REGISTERS:	S0;S1;S2;S3;S4;S5;S7;S12;S25;S30;S38
CHARACTER FORMAT:	+ICF

The values set by following commands are stored in the profile extended section:

+CRC,	+FCLASS,	+DR,	+ILRR,	+CR,	+CSNS,
+CRLP,	+CNMI,	+CMEE,	+CSMP,	+CSDH,	+CSCB,
+CSSN,	+CUSD,	+CALM,	+CRSL,	+CMUT,	+CAOC,
+CREG,	+CLIP,	+CLIR,	+CMGF,	+CCWA,	+CLVL,
#QSS,	#ACAL,	#SMOV,	#HFMICG,	#HSMICG,	#CAP,
#CODEC	#SHFEC,	#SRS,	#STM,	#SRP	#SHFSD,
#NITZ,	#SKIPESC	#I2S1			

The values set by following commands are always stored in NVM, independently from the profile (unique values):

#SELINT,	+COPS,	+CGCLASS,	+CGDCONT,	+CGQMIN,	#BND,
+CGQREQ,	#COPSMODE,	#DIALMODE			

The values set by following Enhanced Easy GPRS commands are stored in NVM with `#SKTSAV` and reset with `#SKTRST` commands, independently from the profile:

#USERID,	#PASSW,	#PKTSZ,	#DSTO,	#SKTTO,	#SKTSET
#SKTCT					

The values set by following Email management commands are stored in NVM with `#ESAV` and reset with `#ERST` commands, independently from the profile:

#ESMTP,	#EADDR,	#EUSER,	#EPASSW

CARE AND MAINTENANCE

Your GsmTerminal is the product of advanced engineering, design and craftmanship 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 umidity 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 violenty shacking 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 unautorized 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.