

Abbreviations

ADC	Analogue to Digital Converter
ASCII	American Standard Code for Information Interchange (computer character set)
DC	Direct Current
FET	Field Effect Transistor
GIS	Geographic Information System
GPRS	General Packet Radio Service (part of GSM)
GPS	Global Positioning System
GSM	Global System for Mobile communication
IP	Internet Protocol (part of TCP/IP)
LED	Light Emitting Diode
NMEA	National Marine Electronics Association (defined a GPS output format)
OTA	Over the Air (remote configuration of devices)
PC	Personal Computer
PCB	Printed Circuit Board
PDU	Protocol Description Unit (describes a binary SMS format)
RFID	Radio Frequency Identification
SIM	Subscriber Identity Module
SMS	Short Message Service
SMSC	Short Message Service Centre
TCP	Transmission Control Protocol (part of TCP/IP)
WGS84	World Geodetic System 1984 (global co-ordinate system used by GPS)

Product Overview

The AT100 is a compact asset-tracking device, which utilises the GPS satellite system to determine location and the GSM/GPRS mobile telephony system for communication. User parameters are configured using a PC ASCII terminal or remotely by SMS or GPRS.

Various reporting modes are supported, as below:

- Real-time reporting via GPRS (TCP)
- SMS PDU mode – 3 reports per SMS
- Data logging only for download on demand

Power consumption is only 300mW (12.5mA at 24VDC) in continuous operation mode and less than 15mW in sleep mode. Autonomous battery powered applications (e.g. cargo tracking), will benefit from extended operating durations or smaller, lower cost battery solutions.

Dimensions are also world-beating, being almost identical to those of a Swan Vestas matchbox. Installation is simple and quick.

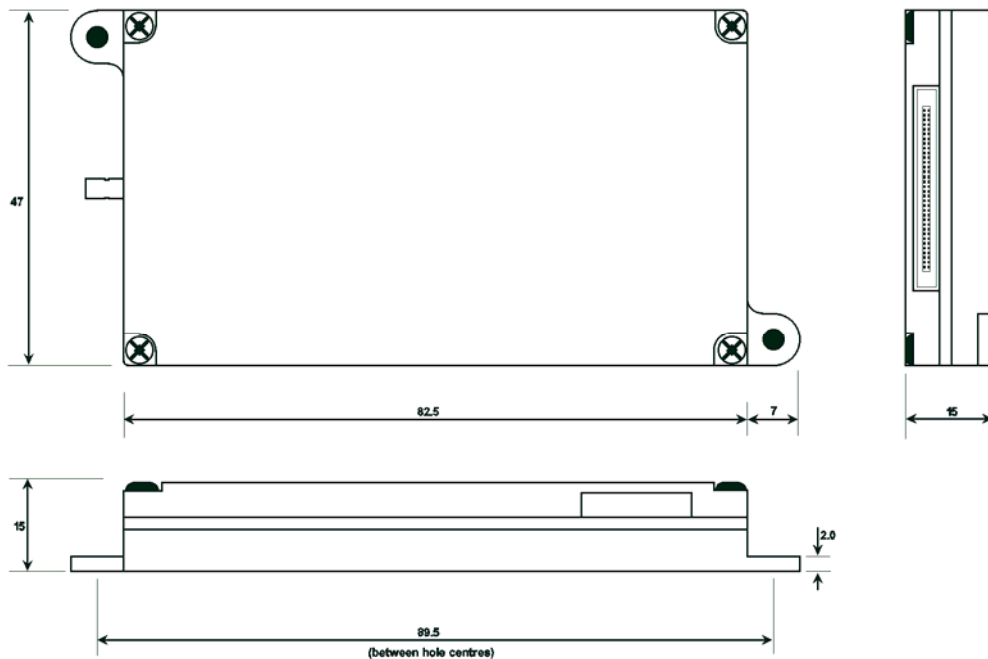
The AT100 incorporates the latest GPS technology from FastraX. In addition to the size and power efficiency benefits, many applications will benefit from tracking into marginal areas which were previously beyond typical GPS coverage.

When GSM communications are unavailable, data is stored to non-volatile flash memory for sending when communications resume (or downloading over GPRS upon request). The AT100 has sufficient on-board flash memory for storage of 6,000 individual reports.

The GSM modem is either a Wavecom or Telit module, both of which are quad band devices (850, 900, 1800 and 1900 MHz), and are capable of fully automatic international roaming.

Hardware Description

Dimensions



Power Supply

The AT100 operates from an internal lithium polymer battery, which is charged from an external voltage in the range of 6 to 30 VDC. The internal power conditioning incorporates over-voltage, reverse voltage and over-current protection (self-resetting fuse). We recommend the use of a 1.0A in-line fuse, fitted to both positive and ground lines of the power feeder cable.

Charging of the internal battery will shutdown if the input voltage drops to approx. 5.5VDC.

If the external voltage source is removed, the AT100 will continue to operate from the battery. Battery life is approximately 6 hours continuous operation or approximately 3 days in hourly reporting mode. The AT100 can be configured to switch to hourly reporting mode automatically whenever the external power is disconnected and immediately resume continuous operation when reconnected.

External input voltage and battery charge level are monitored by the AT100 and reported to the host server with each position report.

DC Input

Power is connected to the AT100 via the integral power lead, which is terminated with a 4 pin male connector (see below). The action of connecting the power cable causes the AT100 to switch on, by shorting the POWER_CTRL line to ground automatically. The power input cable also incorporates an IGNITION sense wire, to allow basic applications to be connected without the need for a data cable.

Typical Current Consumption	@ 5.5VDC	@ 13.8VDC	@24VDC
Continuous Mode	54mA	22mA	12.5mA

Connectors

GPS	SSMB jack
GSM	MCX jack
Power	MicroFit 3.0
Data	ST60-36P

Mating Parts

IMS 31.2410.021
IMS 1.01.1310.021
43025-0400 & 43030-0002
ST40X-36S-CV(80)

<http://www.imscs.com/>
<http://www.imscs.com/>
<http://www.molex.com/>
<http://www.hiroseeurope.com/>

Data Connector Pin Reference

Pin Number	Signal Name	Wire Colour	Termination
1	GND	black	DB9 pin 5
2	NMEA TXD	green	DB9 pin 2
3	GS64 TXD		
4	RESERVED		
5	NMEA RXD	dark blue	DB9 pin 3
6	GS64 RXD		
7	RESERVED		
8	GND	grey	
9	GND		
10	USBDP		
11	USBDN		
12	VUSB		
13	GS64 SERVICE		
14	GPS BOOT	yellow	
15	GPS RESET		
16	RESERVED		
17	RESERVED		
18	RESERVED		
19	RESERVED		
20	RESERVED		
21	LOAD SWITCH 2		
22	LOAD SWITCH 2		
23	LOAD SWITCH 1		
24	LOAD SWITCH 1		
25	GND		
26	GND		
27	ADC IN	pink	
28	GND		
29	GND		
30	GND		
31	DIGITAL INPUT 1	white	IGNITION SENSE
32	DIGITAL INPUT 2	orange	PANIC BUTTON
33	DIGITAL INPUT 3	light blue	
34	DIGITAL INPUT 4	purple	
35	DIGITAL INPUT 5	red	
36	DIGITAL INPUT 6	brown	

LED Indicators

GPS Status (green): Constant ON Searching for initial fix
 Flash (1Hz) GPS 3D navigation
 Constant OFF Lost GPS signal

GSM Status (blue): **Wavecom Version (HW Rev D/E):**
 Constant ON GSM ON, searching for network
 Flash (once/sec) GSM registered on network
 Constant OFF GSM Modem OFF

Telit Version (HW Rev H/J):
 Constant ON GSM ON, not charging
 Slow flash (once/sec) GSM ON, charging
 Slow flash (once/2 sec) GSM registered on network
 Constant OFF GSM Modem OFF

Installation of the GSM SIM card

The AT100 must be fitted with a SIM card to allow access to GSM/GPRS network services. The SIM card is installed in a small slot in the side of the AT100. Correct orientation of the SIM card is essential for correct operation. Push the SIM card into the slot until the edge is flush with the AT100 case. Removal of the SIM card requires the use of tweezers. Always remove the power from the AT100 before insertion or removal of the SIM.



Note: The AT100 requires a 3V SIM card.

For normal operation, the SIM password should be disabled. This can be achieved by inserting the new SIM card into a GSM handset and using the appropriate menu functions. Note that you must know the SIM security code, which is normally supplied with the SIM card.

If you wish to run the AT100 with the SIM password enabled, then please contact Astra Telematics for advice.

Application Configuration

The AT100 has a very versatile set of features to facilitate detailed customisation.

Programming with an ASCII Terminal

Custom configuration of the AT100 is best achieved via a serial interface to a PC (Windows 95/98/NT/2000). It is possible to use any PC or ASCII terminal program (e.g. HyperTerminal, ProComm, Com7 etc.) and enter the commands using an NMEA style command protocol. Terminal settings are 4800 baud, 8 data bits, no parity and no flow control. NMEA terminal commands are described in the AT100 NMEA Command Reference document.

How to Start a HyperTerminal Session

To open a HyperTerminal session, go to the Windows Start Menu and select:

Start – Programs – Accessories – Communications – HyperTerminal

Double click on the Hypertrm.exe icon and enter a name for the session (e.g. AT100 Terminal). Select “Direct to COM1” or “Direct to COM2” from the bottom field of the “Connect To” dialogue box. Now select “4800” bits per second and “None” for Flow Control. Select OK and the terminal session will start. Note that the AT100 does not echo typed characters, so it is also useful to enable the “echo typed characters locally” option from the Properties – Settings – ASCII Setup menu. These settings can be saved by selecting the appropriate option before closing the session.

Using the NMEA Commands

If the AT100 is running, you will see NMEA data and optionally diagnostic information displayed to the terminal. It is now possible to view or change existing parameters using the \$PARM NMEA style commands. All commands start with “\$PARM” followed by a comma and the command itself. Arguments follow the command after a further comma. Commands submitted without arguments are treated as queries, in which case, the AT100 responds with the current value for that parameter.

Examples:

\$PARM, DIST, 3000 set Minimum Distance Moved to 3km

\$PARM, MODE query current value of GSM Mode

\$PARM, MODE, 4*2E GSM Mode = 4 (GPRS), value after the asterisk is a checksum

TIP: Save frequently used commands as text files and send using the HyperTerminal Transfer – Send Text File option. Several commands can be saved in a single text file if you enter approx. 15 carriage returns (i.e. press ENTER) between commands.

Please refer to the AT100 NMEA Command Reference document for a full description of the NMEA Command features.

Over the Air Programming

Once deployed the application parameters can be modified over-the-air, by GPRS or SMS. All parameters can be modified OTA. In addition, there are some additional features which can be activated by OTA command (e.g. unit status check).

OTA commands use the same 4 character codes as the NMEA commands used in terminal mode. However, the command syntax is different. Each command starts with an asterisk (*) and ends with a hash (#). Multiple commands can be appended into a single SMS or TCP packet, up to a maximum of 8 commands or 160 characters. Commands must be in uppercase characters, but arguments need not be.

Arguments are specified using an equals (=) after the command. The syntax is:

```
*<command1>=<value1>#*<command2>=<value2>#
```

e.g. to set distance reporting to 5km and GPS timeout to 3 minutes:

```
*DIST=5000#*GPST=180#
```

There is an OTA PIN code feature, which can be used to prevent unauthorised reconfiguration OTA. The PIN code is specified using the PASS command. This can be done with a PC terminal in NMEA command mode (NMEA Command Reference for details). The PASS code can be set OTA, but if PASS is non-zero, the correct current PASS code must be supplied before the new value. By default, PASS is set to zero, which disables OTA PIN code requirement. If PASS is set to any other value, the correct value must be specified with each OTA command. The PASS parameter must be the first command in the sequence.

e.g. to change distance reporting, when current PASS code is set to 12345:

```
*PASS=12345#*DIST=1500#
```

e.g. to change PASS code from 12345 to 5678:

```
*PASS=12345#*PASS=5678#
```

Only commands which change parameters require the PIN code. The PIN code is never required for commands such as POLL, PARA? and STAT? which simply request information or actions.

Over The Air Commands

All application parameters described in the following section can be set OTA using the syntax described in the previous section – Over The Air Programming. In addition to these parameters, there are a number of commands which can be sent OTA to request certain actions and perform diagnostics. These commands are described below.

Erase Logged Reports (ELOG)

Position Reports are stored to non-volatile flash memory when GSM/GPRS network coverage is unavailable or when GSM Mode is set to LOG ONLY. These reports are preserved when power is removed from the AT100. Reports are stored in a circular buffer of approx. 5,000 capacity, the oldest reports eventually getting overwritten by the latest. The reports are cleared only by sending or by issuing the ELOG command. From firmware version 1.40, the ELOG command can be used with an argument to specify a number of reports to delete from the oldest part of the buffer.

Erase Reports from Current Report Buffer (ELIV)

The ELIV command is used to clear report data from the current queue. This will be a maximum of 8 reports and will be the oldest data stored, since the AT100 reports in chronological order. The ELIV command can be used in cases where invalid or corrupt data is clogging the message queue from some unknown reason.

Erase All Internal Geofences (EGEO)

Erases all internal geofences.

GSM Modem Soft Reset (RSET)

Most problems should be handled automatically from within the AT100 application firmware. However, you may occasionally be able to clear unspecified GPRS errors by resetting the GSM modem using the RSET command.

GSM Modem Hard Reset (HSET)

As per the RSET command, but rather than simply resetting the modem, the HSET command will cause the modem to be turned off and then back on again.

GPS Processor Reboot (RBUT)

The RBUT command should never be required and is provided as a last resort for attempting to resolve unspecified GPS errors.

GPS Navigation Restart (RNAV)

The RNAV command should never be required and is provided as a last resort for attempting to resolve unspecified GPS errors.

Output Enable/Disable (OUT1. OUT2)

The OUT 1 and OUT2 commands are used with an argument of either 1 or zero to enable or disable the AT100 load switches.

Immobilise (IMOB)

Intended for use when immobilising a vehicle in the safest possible scenario. The IMOB command will enable both load switches to the ON state as soon as the vehicle is stationary.

Position Update Request (POLL)

Request a position update report to be sent immediately from the AT100.

Load Firmware Update (LOAD)

Please refer to the AT100 Reporting Protocols document for details of the mechanism for updating the AT100 firmware over GPRS.

Status Check (STAT?)

Requests the AT100 to respond with current status information. Useful for diagnosing problems with GPS, GPRS and host server issues. See Appendix G for details.

Parameter Check (PARA?)

Requests the AT100 to respond with current application parameter settings. See Appendix F for details.

A summary of all supported OTA commands is given in appendix A.

Application Parameters

GPRS Access Point Address (APAD)

When using GPRS mode, it is necessary to set the access point details for the specific network being used. This information should be supplied by your GSM Network Operator or Service Provider. A list of GPRS access point addresses, usernames and passwords for most GSM operators is given in Appendix E.

GPRS Access Point Username (APUN)

See above.

GPRS Access Point Password (APPW)

See above.

TCP Acknowledgment Timeout (TCPT)

This parameter specifies the maximum number of seconds that the AT100 device will wait for the host to send the ACK code in response to sending a report. The default value is 30 seconds. A value of zero will disable the acknowledgment feature.

TCP Socket Mode (TCPM)

Specifies whether to close the TCP socket after each transaction or leave open. A value of 1 means that the socket will be closed each time and a value of zero results in the socket being left open. From firmware version 4.72, it is possible to specify a TCP keepalive time in minutes using the TCPM command, as follows:

```
*TCPM=<mode>,<keepalive>#
```

```
$PARM,<mode>,<keepalive>
```

Where <mode> is the TCP socket close mode (as before) and <keepalive> is the TCP socket keepalive interval in minutes. Note that the keepalive parameter is optional with the TCPM command, hence the previous implementation is supported.

TCP Host IP Address (IPAD)

When using GPRS mode, the host server must provide a TCP socket with a static (public) IP address. This address should be entered (without the port number). Alternatively, a hostname can be accepted for the IPAD parameter (from firmware 4.53), in which case the GPRS network service provider will provide the DNS look-up to resolve the hostname to an IP address. Maximum hostname length is 64 characters.

TCP Host Port Number (PORT)

The port number for the TCP host, as required for GPRS mode.

PTDM Host IP Address (IPAD2) – from firmware 4.50

Host IP address or hostname to be used in Pass Through Data Mode. Maximum hostname length is 64 characters. Please refer to the appropriate Application Note for further details.

PTDM Host Port Number (PORT2) – from firmware 4.50

Port number to be used in Pass Through Data Mode. Please refer to the appropriate Application Note for further details.

PTDM Pass Through Data Mode

Pass through data mode enable. Set this parameter to 1 to enable Pass Through Data Mode. Please refer to the appropriate Application Note for further details.

GSM Mode (MODE)

This parameter is used to select operation modes:

- GPRS TCP Mode
- GPRS UDP Mode – *not yet implemented*
- SMS PDU Mode
- SMS Text Mode
- Data logging mode (for download on-demand)

Please refer to the AT100 Communication Protocol documentation for details of reporting mode options.

Reporting Level (REPL)

This parameter is a bitfield (2 bytes) which can be used to enable/disable certain types of report based on their reason code. The bits are defined to match the reason bytes in the protocol C report, as below:

BIT	REASON	DECIMAL VALUE
0	Timed	1
1	Distance	2
2	Position on demand	4
3	Geofence	8
4	Panic	16
5	External input change	32
6	Journey start	64
7	Journey stop	128
8	Heading change	256
9	Low battery	512
10	External power	1024
11	Idling start	2048
12	Idling end	4096
13	Idling ongoing	8192
14	Alarm	16384
15	Speed overthreshold	32768

A value of 65535 (0xffff) will enable all reports. To enable a limited set of reports, add the corresponding decimal value for each reason required to get the appropriate value for REPL.

For example, to enable TIMED, DISTANCE, JOURNEY START and JOURNEY STOP:

$$\text{REPL} = 1 + 2 + 64 + 129 = 196$$

SMS Server phone number (SERV)

This is the delivery destination for SMS position reports. The SMS reports are typically sent to a GSM modem, which is connected to a PC and GIS server application. In this case, the server number should be that of the modem connected to the GIS server. The number should be entered in international format (e.g. +447979123456). If you are using the Astra Telematics Bureau or web tracking services, then this number will be set to one of our server numbers, and should not be changed. If your application is configured to use GPRS mode and you do not require a fallback to SMS mode, the Server Phone Number should be set to "NONE".

Alarm phone number (ALRM)

This is the delivery destination for alarm text messages sent via SMS. These are typically sent to a GSM handset (mobile telephone). The number should be entered in international format (e.g. +447979123456). Alarm text messages are sent for Panic, Alarm and Low battery events.

SMSC number (SMSC)

Each GSM network has a unique number for receiving SMS messages into the network switching centre. This unique number is known as the SMS centre or SMSC number. If the SMSC number is stored on the SIM card, it will not be necessary to enter this parameter, as the AT100 will read the number from the SIM. If the SMSC number is not available on the SIM, the correct number must be entered into the AT100 before SMS messages can be sent via the GSM network. If you do not know the correct SMSC number, your GSM network support staff should be able to advise (otherwise, please contact Astra Telematics for advice). The SMSC number need never again be changed (unless you change the SIM card to a new network operator), even when roaming on other GSM networks.

Note: in almost all cases, it is **not** necessary to enter an SMSC number

Roaming Enable (ROAM)

This parameter can be used to disable network roaming, as a means of controlling GSM network running costs. A value of zero will disable network roaming. The ROAM parameter can also be used to allow reporting at a reduced rate when roaming. A value of greater than 1 will cause the reporting intervals (DIST, HEAD, STIM and JTIM) to be extended by the specified value of ROAM. For example, when ROAM is set to 2, all of the reporting intervals are doubled, so that the reporting rate will be approximately half as much as when using the home GSM network operator. The default setting for ROAM is 1, which enables normal reporting on either home or roaming networks.

SMS Monthly Usage Limit (SMSL)

This parameter can be used to control SMS costs by setting a monthly limit on the number of SMS which may be sent from the AT100. A value of zero will disable the Monthly SMS Limit feature.

Distance Reporting Interval (DIST)

Distance based reporting interval in metres. This feature can be disabled by setting Minimum Distance Moved to zero.

Heading Reporting Threshold (HEAD)

The objective of this feature is to provide a vehicle trace which closely follows the actual route, but with the minimum of position update reports. In broad terms, the system provides fewer updates whilst driving in a straight line (e.g. motorways), but increases the number of updates whilst negotiating corners (e.g. city/town driving). Heading based reporting can be disabled, by setting HEAD to zero.

Stationary Timed Message Interval (STIM)

This parameter defines the maximum time interval between position update reports whilst stationary. The appropriate value for Stationary Timed Interval will depend on the user application. A typical value is 60 minutes. Setting the Stationary Timed Message Interval to zero will disable time based reports whilst stationary.

Journey Timed Message Interval (JTIM)

This parameter defines the maximum time interval between position update reports whilst in a journey. A journey is defined by GPS (i.e. when moving) when IGNM is set to zero or by the IGNITION SENSE input when IGMN is set to 1. The appropriate value for Journey Timed Interval will depend on the user application. This reporting mode is disabled in the factory setting, because most applications require only distance and heading based reports whilst in a journey. Setting the Journey Timed Message Interval to zero will disable time based journey reports.

Idle Mode Timed Message Interval (ITIM) – from firmware version 4.0

This parameter defines the maximum time interval between position update reports when a vehicle is idling. Idling mode is initiated after a period of stationary time (see IDLE parameter) whilst the ignition is on. Setting the Idle Mode Timed Message Interval to zero will disable time based idle mode journey reports.

Idle Mode Threshold (IDLE) – from firmware version 4.0

A vehicle is defined as being in Idle Mode when a vehicle is stationary for a specific length of time whilst the ignition is on. Idle Mode ends once the vehicle starts moving again. This parameter defines the length of time (in seconds) that a vehicle must be stationary before Idle Mode is initiated. Note that Idle mode start reports, timed reports and end reports are sent to the host application, hence an excessively low value for IDLE can result in increased reporting. The default value for IDLE is 180 seconds.

Overspeed Speed Threshold (OSST) – from firmware version 4.1

The AT100 can be configured to report over-speed events, which are defined as exceeding a given speed for a given amount of time. The OSST parameter defines the overspeed threshold in kmh. In order to trigger an overspeed event, the vehicle must travel in excess of OSST kmh for a period of OSHT seconds (see below). Further overspeed events cannot be triggered until OSIT seconds have elapsed and vehicle speed has fallen below the OSST threshold. A value of zero for OSST will disable overspeed events/reports.

Overspeed Hold Time (OSHT) – from firmware version 4.1

Defines the period of time (in seconds) that a vehicle must exceed OSST kmh to trigger an overspeed event.

Overspeed Inhibit Time (OSIT) – from firmware version 4.1

Defines the minimum time between overspeed events. Once an overspeed event has occurred, further overspeed events cannot be triggered until OSIT seconds have elapsed.

Ignition Mode (IGNM)

This parameter defines the function of the IGN input, as follows:

IGNM value	Start/Stop Reports	Power Down when IGN off?
0	based on GPS	NO
1	based on IGN input	NO
2	based on IGN input	YES

STOP Report Delay (STPD)

When IGNM is set to zero (see above), the AT100 will determine journey START and STOP events from GPS. A STOP event will occur after the vehicle has remained stationary for a pre-determined time. The length of stationary time necessary to trigger a STOP report is dictated by the STPD parameter.

Temperature Monitoring Mode (TEMP)

The AT100 is capable of reading temperature data from an external temperature recorder, over the NMEA serial port. Currently, two types of temperature recorder are supported, the DataCOLD DC500 and the Transcan 2. Please refer to the appropriate application notes for details of how to configure these applications.

GPS Timeout (GPST)

If a GPS fix is unavailable for the specified GPS Timeout Interval, a report will be sent to the host server indicating loss of GPS and giving the last known position. An SMS alert will be sent to the Alarm Phone Number, if one is defined. GPS Timeout reports can be disabled by setting GPST to zero.

GPS Maximum Estimated Location Error (GPSL) – from firmware 1.60 / 2.28

Defines the maximum permissible estimated location error for an acceptable GPS fix. Please refer to the GPS Quality application note for further details.

GPS Maximum Estimated Speed Error (GPSS) – from firmware 1.60 / 2.28

Defines the maximum permissible estimated speed error for an acceptable GPS fix. Please refer to the GPS Quality application note for further details.

GPS Maximum Figure of Merit (GPSM) – up to firmware 1.59 / 2.27

The GPS Figure of Merit is an indicator of reliability and stability for the calculated position. The value is related to the standard deviation position in metres, although this parameter is not specified in metres. A lower value indicates a good quality result. Increasing this value may give GPS coverage in more marginal areas, but at the expense of accuracy. Decreasing this value will improve the reliability and accuracy of the processed fixes, but may result in loss of GPS in areas marginal coverage. Examples of marginal coverage are when located in cities (surrounding tall buildings) or when the GPS antenna is installed with limited view of the sky (e.g. in a car windscreen or dashboard). For further information, please refer to the GPS Quality Application Note.

GPS Maximum Dilution of Precision (GPSD) – up to firmware 1.59 / 2.27

The Dilution of Precision (DoP) is an indicator of how the SV geometry has affected the fix quality, with lower values corresponding to better geometry and therefore more reliable fixes. As with GPSM, increasing this value may give GPS coverage in more marginal areas, but at the expense of accuracy. Decreasing this value will improve the reliability and accuracy of the

processed fixes, but may result in loss of GPS in areas marginal coverage. For further information, please refer to the GPS Quality Application Note.

GPS Altitude Aiding Enable (GPSA) – up to firmware 1.59 / 2.27

It is possible to get an estimated location in otherwise poor GPS conditions by assuming the altitude of the GPS receiver. Fixes generated in this way are sometimes referred to as 2D fixes. Fixes with altitude aiding are rejected by default, but they can be accepted and used in the AT100 application by setting the GPSA parameter to 1. For further information, please refer to the GPS Quality Application Note.

GSM Cell ID Mode (CLID)

Set the level of GSM Cell ID reporting

<cell-id-mode>	0: Never report Cell ID information
	1: Report Cell ID information only when no GPS fix
	2: Report GSM Cell ID information always

Debug Level (DEBUG)

Set the level of debug information which is displayed in the NMEA serial output.

<debugmode>	0: Only NMEA output on serial port 1
	1: Display errors only
	2: Display normal diagnostic information
	3: Display extended diagnostic information

OTA Programming PIN Code (PASS)

If the value of PASS is non-zero, over the air commands must include the correct PIN code, otherwise they will be rejected. Valid PIN codes are from 1 to 65535. Setting PASS to zero disables the PIN code. The PASS command must be the first command sent in the series of OTA commands. The PASS code can be changed OTA by submitting the correct current value, followed by the new value in a later command. Only commands which change parameters require the PIN code.

LED Mode (LEDM) – not yet implemented

This parameter can be used to disable the status LED indicators, for more discreet operation. A value of zero will disable the LEDs and a value of 1 will enable them.

Load Switch Output Defaults (LSOD)

Bitfield which is used to define the power on default states of the 2 load switches. Bit zero defines the state of switch 1, bit 1 defines switch 2.

TCP Acknowledge Timeout (TCPT)

Please refer to the AT100 Reporting Protocols document for details of this parameter.

Geofences (LATx, LONx, RADx, TYPx)

Device based geofences can be configured using the OTA commands LATx, LONx, RADx and TYPx or by using the NMEA command \$PARM,GEOF as outlined below:

\$PARM,GEOF,<index>,<type>,<radius>,<latitude>,<longitude>

<index>	0 – 99	geofence index
<type>	0 – 3	geofence type:
		0 disabled
		1 alarm on entry
		2 alarm on exit
		3 alarm on both entry/exit
<radius>	20 – 65535	geofence radius in metres
<latitude>	-90.0 - +90.0	geofence centre point latitude, WGS84 decimal degrees
<longitude>	-180.0 - +180.0	geofence centre point longitude, WGS84 decimal degrees

Entering the command with index argument only will echo back the existing geofence settings.

RFID Site Code (RFSC) – from firmware version 3.0

This parameter is used to enable driver ID using Wavetrend RFID tags and L-RX300 reader. Please refer to the appropriate Application Note for further details of this feature.

iButton Mode (IBTN) – from firmware version 4.1

This parameter is used to enable driver ID using an iButton and Link45 reader. Please refer to the appropriate Application Note for further details of this feature.

Geofences (GEOF) – from firmware version 2.68/4.88

Device geofences can be configured and queried using the following command:

`$PARAM,GEOF,<index>,<type>,<radius>,<latitude>,<longitude>`

where:

<index>	geofence index, range 0-99
<type>	geofence type, range 0-3
<radius>	geofence radius in metres, range 20-65535
<latitude>	WGS84 decimal degrees, range -90.0 to +90.0 (6 decimal places)
<longitude>	WGS84 decimal degrees, range -180.0 to +180.0 (6 decimal places)

Command with index argument only will echo back the existing geofence settings

Digital Inputs

The AT100 has 6 digital inputs, 3 of which are dedicated and the other 3 are free to be utilised as required for any given application.

Digital Input	Application	Features
1	IGNITION Sense	Controls journey start/stop reports
2	PANIC button	Triggers a PANIC report
3	GENERIC	
4	GENERIC	
5	GENERIC	
6	GENERIC	

These inputs are constantly monitored in all modes (including sleep mode). Any change in state of any input will trigger an update report to be sent to the host server. The state of all inputs and outputs is reported with each position report.

Hardware Issues

All Input/output features of the AT100 are provided via the 36 pin Hirose connector. Details of the required mating connector are given at the start of this document.

Inputs are opto-coupled and de-bounced internally. All inputs will default to a LOW state due to the design of the opto-coupler. Inputs can be driven from sources up to 30V.

Ignition Input

The function of the ignition input is determined by the value of the IGNM parameter. If IGNM is greater than zero, the ignition input is used for journey START and STOP reports. If IGNM is 2, the AT100 will power down 5 minutes after the ignition is turned OFF and wake up when the ignition is turned ON.

Panic Input

A Panic Alarm is triggered by a low to high transition on the panic input. This causes a position report with Panic bit set in the Reason byte. If an ALRM number is defined, a text SMS is sent to this number.

Load Switches

The AT100 can be used to control an external load, using the built in load switch. This FET switch can be used to switch a load of up to 1A absolute maximum. The load switch uses 2 pins of the 36 way data connector and it is essential that both pins are used to allow the maximum drive current without the risk of damage to the AT100. The default state of the load switch is defined by the LSOD parameter (see earlier in this document).

Message Format

Please refer to the AT100 Message Protocol document for full details of SMS and GPRS message formatting.

Troubleshooting Guide

If you are experiencing problems in getting your AT100 application up and running, please run through the following check list. If the following diagnostics do not resolve your application problems, then please contact your local Astra Telematics representative for support. If at all possible, please ensure that you have run through the following checks before calling for technical support, as the information gained will be of great assistance to the support engineer.

Problem	Possible Causes
Will not power up (LEDs stay off)	<ol style="list-style-type: none"> 1. Voltage and polarity of power source? 2. Fuse? 3. Ensure that GPS Boot wire is not shorted to GND
Blue LED does not flash (stays ON)	<ol style="list-style-type: none"> 1. Is SIM card is inserted correctly (see p.6) 2. Ensure SIM has PIN code disabled 3. GSM antenna? 4. Network coverage availability? 4. Contamination or damaged connector?
Green LED does not flash	<ol style="list-style-type: none"> 1. GPS antenna connected? 2. GPS antenna placed with 'view' of the sky? 3. GPS antenna suitable for 3.3V operation? 4. Contamination or damaged connector? 5. Faulty GPS antenna?
LEDs both flashing, but latest device location has not appeared on the host application	<ol style="list-style-type: none"> 1. Device configured on system with correct IMEI? 2. Device configured with correct GPRS and/or SMS protocols? 3. Correct GPRS Access Point settings on AT100? 4. Correct IPAD and PORT settings on AT100? 5. Send *STAT?# command to check unit status 6. Send *PARA?# command to check unit settings
STAT? response ERROR code 1	(GPS Timeout) <ol style="list-style-type: none"> 1. Check position of vehicle with respect to GPS availability (view of the sky). 2. Check GPS antenna an installation
STAT? response ERROR code 2	(GPRS attach failed) <ol style="list-style-type: none"> 1. SIM card GPRS enabled? 2. Network service/coverage?
STAT? response ERROR code 4	(Failed to open TCP Socket) <ol style="list-style-type: none"> 1. Check IPAD and PORT setting with *PARA?# 2. Check that service provider is online
STAT? response ERROR code 5	(Failed to get acknowledgment to GPRS report) <ol style="list-style-type: none"> 1. Check that service provider is online

Troubleshooting Notes:

1. Correct connections:

GPS antenna (RED sleeve)	⇒	SSMB (centre connector)
GSM antenna (BLUE sleeve)	⇒	MCX (right hand side)
Power connector	⇒	red & black wire tail (right hand side)

2. DC power applied:

The AT100 operates from a DC power source in the range 6 to 30VDC. Maximum current demand will depend on the voltage used, from approx 0.5A at the lower voltage range to approx 150mA at the higher end of the voltage range.

If power is correctly applied, the front panel LEDs will illuminate, approximately 2 seconds after applying power to the unit. Note that the LEDs only flash when a GPS fix and GSM network registration is available.

If the LEDs do not light within 5 seconds of applying power, please check the voltage and polarity of the DC power source.

3. SIM card installed

The AT100 requires a GSM SIM card to be installed before operation. The SIM card **PIN request feature must be disabled** for operation with a AT100.

If the SIM card is missing, invalid or incorrectly fitted, an error message will be displayed on the debug terminal during start up and initialisation of the GSM modem. See below for instructions on how to view the debug information.

4. Host Server details properly set

For GPRS mode, it is necessary to set the Host Server IP Address (IPAD) and Port Number (PORT) to those of your tracking service provider. Please contact your service provider for the correct IPAD and PORT settings.

The GSM Server Number (SERV) is the destination telephone number for delivery of SMS format reports. If you are using SMS mode or require SMS mode as a fallback to GPRS mode (i.e. sends SMS reports if GPRS fails), then this should be set to the GSM number of your tracking service provider. If using GPRS mode and you do not require fallback to SMS, the GSM Server Number should be set to "NONE".

5. GPRS Access Point settings for your chosen network

For GPRS mode, it is necessary to set the Network Access Point details to those of your GSM network service provider. There are 3 parameters:

Access Point Address	APAD
Access Point Username	APUN
Access point Password	APPW

The correct settings for most GSM networks worldwide can be found in Appendix E of this document.

6. GPS and GSM status LEDs

These are a useful indication of basic operational status.

The blue LED indicates GSM status and should start flashing approx. 15-30 seconds after power on. If the blue LED remains on constantly, check network coverage, antenna and SIM card.

The green LED indicates GPS status and should normally start flashing within 30-180 seconds after power on. If the green LED remains on constantly, check that the GPS antenna is connected and deployed with a clear view of the sky.

7. Antennas are suitably placed

The most critical element here is the GPS antenna. This must ideally be placed outside with a clear and unobstructed line of sight to the sky. It may be possible to get a GPS fix from the window of a building or vehicle, but this will be unreliable and less accurate than when the antenna is in the open.

The GSM antenna must be able to receive GSM network coverage. You may be able to check this by looking at the signal strength on your mobile telephone handset.

8. AT100 debugger error messages

The AT100 provides output debugging information in RS232 ASCII format (4800, 8 bits, 1 stop, no parity, no flow control). The information displayed via the debugger is invaluable for troubleshooting by the end-user or via Astra Telematics technical support. The information contained in this text output will describe the unit parameters and highlight any application problems or errors.

To use this feature, apply power to the AT100 and connect to the PC using the serial lead supplied (red port). Open a HyperTerminal session at 4800 baud, no flow control. Instructions for creating a HyperTerminal session are given earlier in this document.

Once you have the debugger up and running, check the text for error messages that may help you decide where the problem lies. If you are still unsure about the problem, you can save a short section of the debug text and e-mail to Astra Telematics for prompt technical support. To save the text, go to the "transfer" menu at the top of HyperTerminal and choose the "Capture Text" option. A dialogue box will be displayed - enter a suitable filename for the debug text (e.g. c:\my documents\AT100log.txt). Now that you are saving to a file, power up the AT100 and place antennas in a suitable position. Leave the system running for around 30 minutes and then terminate the file by again selecting "transfer", "Capture text" and "stop". Send the file to support@gps-telematics.co.uk or to your local Astra Telematics representative for advice about your application problem.

Appendix A – Over the Air Commands and Programmable Parameters

Name	Description	Command	Units/Format	Default	Range
SMS Server phone number	Destination for SMS based reports	*SERV=int#	International	+447800120723	N/A
Alarm phone number	Destination for alarm text message	*ALRM=int#	International	none	N/A
SMSC number	SMSC number for GSM network being used	*SMSC=int#	International	+44973100973	N/A
GPRS Access Point Server	Server name specified by GPRS network	*APAD=string#	Text	Mobile.o2.co.uk	0 - 32 chars
GPRS Access Point Username	Username specified by GPRS network	*APUN=string#	Text	Web	0 - 32 chars
GPRS Access Point Password	Password specified by GPRS network	*APPW=string#	Text	Password	0 - 32 chars
Host TCP Server IP Address	Host IP Address for receipt of TCP packets	*IPAD=string#	IP address	195.11.204.84	64 chars
Host TCP Port Number	Host IP Port for receipt of TCP packets	*PORT=int#	Port number	90	0 - 65535
PTDM TCP Server IP Address	PTDM IP Address for receipt of pass thru data	*IPAD2=string#	IP address	NONE	64 chars
PTDM TCP Port Number	PTDM Port for receipt of pass thru data	*PORT2=int#	Port number	0	0 - 65535
Back-up Server IP Address	Host IP Address of alternative server	*IPA2=string#	IP address	NONE	15 chars
Back-up TCP Port Number	Host IP Port number for alternative server	*PRT2=int#	Port number	0	0 - 65535
GSM mode	Primary GSM Communication Mode	*MODE=int#	single digit	7 = GPRS TCP "A"	1 - 7
Roaming enable	Enable or disable GSM network roaming	*ROAM=int#	integer	1	0 - 1
Distance reporting interval	Distance based reporting interval	*DIST=int#	metres	100 metres	0 - 65525
Heading reporting threshold	Heading based reporting threshold	*HEAD=int#	degrees	45 degrees	0 - 180
Stationary timed reporting	Time interval for reporting when stationary	*STIM=int#	minutes	60 minutes	0 - 65535
Journey timed reporting	Time interval for reporting when in a journey	*JTIM=int#	minutes	0	0 - 65535
Overspeed Threshold	Overspeed speed threshold in kmh	*OSST=int#	kmh	0	0-512
Overspeed Hold Time	Overspeed hold time in seconds	*OSHT=int#	seconds	0	0 - 65535
Overspeed Inhibit Time	Overspeed inhibit time in seconds	*OSIT=int#	seconds	0	0 - 65535
Idle mode timed reporting	Time interval for reporting when in Idle Mode	*ITIM=int#	minutes	0	0 - 65535
Idle mode start threshold	Stationary time before Idle Mode is initiated	*IDLE=int#	seconds	180	0 - 65535
Journey stop report delay time	Stationary time before sending a STOP report	*STPD=int#	seconds	180	0 - 65535
GPS Max Figure of Merit	Maximum acceptable GPS Figure of Merit	*GPSM=int#	metres	5000	1 - 50000
GPS Max Dilution of Precision	Maximum acceptable GPS Dilution of Precision	*GPSD=int#	N/A	25000	1 - 50000
GPS Altitude Aiding Enable	Enables use of GPS fixes with altitude aiding (2D)	*GPSA=int#	boolean	0	1 or 0
GPS Timeout Interval	Time with no GPS before entering GPS Timeout	*GPST=int#	Seconds	300	0 - 65535
Ignition Mode	Determine functionality of IGN input	*IGNM=int#	Single digit	1	0 - 2
OTA Password	Prevents unauthorised OTA reconfiguration	*PASS=int#	integer	0 (disabled)	0 - 65535
Set Output Value	Set or Clear a digital output	*OUTx=int#	integer	N/A	1 or 0
Immobilise Vehicle	Switched both load switches on when stationary	*IMOB#	N/A	N/A	N/A
Geofence – latitude	WGS84 decimal latitude for centre of geofence	*LATxx=float#	Floating point	0	-90 to +90
Geofence – longitude	WGS84 decimal longitude for centre of geofence	*LONxx=float#	Floating point	0	-180 to +180
Geofence – radius	Radius of geofence	*RADxx=int#	integer	0	0 - 65535
Geofence – type	Type of geofence – alarm on entry/exit/both	*TYPxx=int#	integer	0	0 - 3

Position on demand	Request the AT100 to send latest position	*POLL#	N/A	N/A	N/A
Debug level	Set level of debug information on NMEA output	*DBUG=int#	Single digit	2	0 - 4
Cell ID Reporting Mode	Defines level of GSM Cell ID reporting	*CLID=int#	Integer	0	0-2
TCP Acknowledge Timeout	Time to wait for packet ACK from TCP server	*TCPT=int#	Seconds	10	0 - 20
TCP Socket Mode	Specifies whether to close socket or leave open	*TCPM=int#	Boolean	1	1 or 0
Cell ID Mode	Specifies sending of network Cell-ID data	*CLID=int#	Integer	0	0 - 2
RFID Site Code	Enable RFID Mode and specified client Site Code	*RFSC=int#	Integer	0	0 - 16777215
IBTN iButton Mode	Enable Driver ID using iButton and Link45	*IBTN=int#	Integer	0	1 or 0
PTDM Pass Thru Data Mode	Enables Pass Through Data Mode	*PTDM=int#	Integer	0	1 or 0
Network Roaming Protection	Prevents or reduces reporting whilst roaming	*ROAM=int#	factor	1	0 - 100
Load Firmware Update	Loads revised firmware from specified server	Please refer to the AT100 Firmware Update App Note for details			
Temperature Recorder Mode	Enable external temperature recorder interface	*TEMP=int#	Integer	0	0 - 2
Get parameters ¹	Sends current values for all user parameters	*PARA?#	N/A	N/A	N/A
Get device status ²	Returns latest GPS information + error codes	*STAT?#	N/A	N/A	N/A
Erase all stored reports	Deletes the position data stored in flash memory	*ELOG#	N/A	N/A	N/A
Erase partial report data	Deletes a specified number of reports from flash	*ELOG=int#	No. of reports	N/A	N/A
Erase Current Report Queue	Deletes the oldest 8 reports from the queue	*ELIV#	N/A	N/A	N/A
Modem soft reset	Modem software reset	*RSET#	N/A	N/A	N/A
Modem hard reset	Modem hardware reset	*HSET#	N/A	N/A	N/A
GPS reboot	GPS processor reboot	*RBUT#	N/A	N/A	N/A
GPS navigation restart	Restarts GPS navigation	*RNAV#	N/A	N/A	
Erase all geofences	Deletes all geofences	*EGEO#	N/A	N/A	N/A

Multiple SMS commands can be combined in one message (e.g. *GPSI=60#*STIM=30*MODE=3#)

All parameters changed OTA are automatically saved to non-volatile memory

Notes:

1. See appendix F for format of PARA? response.
2. See appendix G for format of STAT? response.

Appendix B Example of serial debugger text

GPS Hardware rev. 0 manufactured by Fastrax ltd
iSuite03 software 3.31.6151 (c) Copyright Fastrax ltd.
Firmware build 3.31.6090 licensed to Astra Telematics Limited

Version: 4.41 09/01/09

* APPLICATION PARAMETERS *

IMEI: 359449009004652

SERV: NONE

SMSC: NONE

IPAD: 192.101.89.100

PORT: 90

TCPM: 0

TCPT: 30

APAD: mobile.o2.co.uk

APUN: web

APPW: password

MODE: 4

GPST: 300

GPSL: 3000

GPSS: 1500

DIST: 3000

HEAD: 45

STPD: 180

STIM: 60

JTIM: 5

ITIM: 0

IDLE: 180

OSST: 120

OSHT: 10

OSIT: 300

IGNM: 1

DEBUG: 0

ROAM: 1

REPL: 5

SMSL: 20

CLID: 0

RFSC: 0

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

SIM OK

MODEM ON

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

\$GPRMC,143715.85,V,5318.3180,N,00222.4020,W,0.00,0.0,211106,3.3,W,N*11

Registered on Network

GSM network: O2 - UK

\$GPRMC,184143.67,A,5318.3155,N,00222.4028,W,0.00,0.0,211106,3.3,W,A*0B

\$GPRMC,184144.67,A,5318.3153,N,00222.4026,W,0.00,0.0,211106,3.3,W,A*04

POWER ON

I/O EVENT

Sending Report to CommTask

OK

battery 65%

OK

Ext volts: 0.00

reports queued = 1

reports in ffs = 0
OK
GPRS Attached
OK
not connected

Connecting...
OK
connected
CONNECT
sending 39 bytes
ACK
Sending ETX
OK

Appendix C Notes on Safety

GSM devices are not approved for use on aircraft. Operation may cause interference to the critical aircraft systems and disruption to the cellular network. It may also be illegal.

GSM based devices should be switched off at refuelling points and in hospitals.

Please observe restrictions on the use of radio based equipment in certain fuel depots, chemical plants or where blasting operations are in progress.

There may be a hazard associated with the operation of GSM based devices close to personal medical devices such as pacemakers and hearing aids. Please consult the manufacturer of the medical device to determine if it is adequately protected.

If incorrectly installed in a vehicle, the operation of a GSM device could interfere with the vehicle electronics. To avoid such problems, please ensure that the device is installed by qualified personnel.

Appendix D Care and Maintenance

The AT100 is a product of advanced engineering and should be treated with care. The guidelines below will ensure many years of reliable service from your AT100:

1. Do not expose the AT100 to extremes of temperature, humidity or vibration. In harsh environments, measures should be taken to ensure protection.
2. Do not attempt to disassemble the AT100. There are no user serviceable parts inside.
2. Do not expose the AT100 to water, rain or spillages. It is not waterproof.
4. The AT100 uses miniature connectors to help achieve its world beating small dimensions. These connectors are reliable when used with care. Please avoid excessive mating cycles and rough handling.
5. Please avoid placing close to magnetic devices, as these may interfere with the operation of the AT100.
6. Likewise GSM devices may cause damage to computer discs, credit cards and other magnetic media.

Appendix E – GPRS Access Point Reference

Country	Network	APN	Username	Password
Australia	Optus	internet	[guest]	[guest]
Australia	Telstra	telstra.internet	[guest]	[guest]
Australia	Vodafone	vfinternet.au	[guest]	[guest]
Austria	Max Online (Business) (Metro)	gprsinternetbusiness.ggprsm etro	GPRS	[blank]
Austria	Mobilkom A1	a1.net	gprs@a1plus.at	[blank]
Austria	OneNet	web.one.at	[supplied]	[supplied]
Austria	tele.ring	web	web@telering.at	web
Belgium	Mobistar	web.pro.be	mobistar	mobistar
Belgium	Orange	orangeinternet	[guest]	[guest]
Belgium	Proximus (Inter) (Intra)	internet.proximus.be intraprox.be	[guest]	[guest]
Brazil	TIM	tim.br	tim	tim
Canada	Fido	internet.fido.ca	fido	fido
Canada	Rogers AT&T	internet.com	wapuser1	wap
Chile	Entel PCS	imovil.entelpcs.cl	entelpcs	entelpcs
China	China Mobile	cmnet	[guest]	[guest]
China	China Unicom	[none]	[guest]	[guest]
Croatia	VIPNET	gprs.vipnet.hr	[guest]	[guest]
Czech Republic	Cesky Mobil CM Prepay	internet cinternet	[guest]	[guest]
Czech Republic	Eurotel	internet	[guest]	[guest]
Czech Republic	Oscar	internet	wap	wap
Czech Republic	Paegas (Internet) (Profil)	internet.click.cz profil.click.cz	[guest]	[guest]
Denmark	Orange	web.orange.dk	[guest]	[guest]
Denmark	Sonofon	[none]	[guest]	[guest]
Denmark	TDC	internet	[guest]	[guest]
Estonia	EMT	internet.emt.ee	[guest]	[guest]
Estonia	RLE	internet	[guest]	[guest]
Finland	Dna	internet	[guest]	[guest]
Finland	Radiolinja	internet	[guest]	[guest]
Finland	Sonera	internet	[guest]	[guest]
France	Bouygues B2Bouygtel	ebouygtel.com b2bouygtel.com	[guest]	[guest]
France	Orange	orange.fr	orange	orange
France	Orange MIB	orange-mib	mportail	mib
France	SFR	websfr	[guest]	[guest]
Germany	D1	internet.t-d1.de	[guest]	[guest]
Germany	D2 Vodafone	web.vodafone.de	[guest]	[guest]
Germany	E-Plus (pay as you go)	internet.eplus.de	eplus	gprs
Germany	E-Plus (contract)	internet.eplus.de	(from E-Plus)	(from E-us)
Germany	O2 (ViagInterkom)	internet	[guest]	[guest]
Germany	Quam	quam.de	quam	quam
Greece	Cosmote	internet	[guest]	[guest]
Greece	Telestet	gnet.b-online.gr	MSISDN, e.g. 3093XXXXXXX	24680

Country	Network	APN	Username	Password
Hong Kong	CSL	internet	[guest]	[guest]
Hong Kong	New World	internet	[guest]	[guest]
Hong Kong	Orange	web.orangehk.com	[guest]	[guest]
Hong Kong	People	internet	[guest]	[guest]
Hong Kong	SmarTone	internet	[guest]	[guest]
Hong Kong	Sunday	internet	[guest]	[guest]
Hungary	Pannon	net	[guest]	[guest]
Hungary	Vodafone	internet.vodafone.net	vodawap	vodawap
Hungary	Westel	internet	[supplied]	[supplied]
India	BPL	bplgprs.com	bplmobile	[blank]
India	Orange	portalnmms	[guest]	[guest]
Indonesia	IM3	www.indosat-m3.net	gprs	im3
Ireland	O2 (contract)	open.internetpp.internet	gprs	gprs
Ireland	Vodafone	isp.vodafone.ie	vodafone	vodafone
Italy	Blu	INTERNET	[guest]	[guest]
Italy	Omnitel	web.omnitel.it	[guest]	[guest]
Italy	TIM	wap.tim.it	WAPTIM	[none]
Italy	Wind	internet.windinternet.windbiz	[guest]	[guest]
Jersey	(See UK)			
Lebanon	Cellis FTML	internet.ftml.com.lb	plugged	plugged
Lithuania	Bite GSM	banga	[guest]	[guest]
Lithuania	Omnitel	gprs.omnitel.net	[guest]	[guest]
Luxembourg	LUXGSM	web.pt.lu	[guest]	[guest]
Malaysia	DIGI	diginet	[guest]	[guest]
Malaysia	Maxis	internet.gprs.maxis	[guest]	[guest]
Malaysia	Timecel	timenett.com.my (timenet.com.my?)	[guest]	[guest]
Malaysia	TM Touch	internet	[guest]	[guest]
Netherlands	KPN Mobile	internet	KPN	gprs
Netherlands	O2	internet	[guest]	[guest]
Netherlands	T-Mobile (Ben) active	internet-act	[guest]	[guest]
Netherlands	Vodafone	web.vodafone.nl	Vodafone	Vodafone
New Zealand	Vodafone	www.vodafone.net.nz	[guest]	[guest]
Norway	Netcom	[none]	[guest]	[guest]
Norway	Telenor Mobil Djuice	wap	dj	dj
Philippines	Globe	www.globe.com.ph	globe	globe
Philippines	Smart	internet	[guest]	[guest]
Poland	ERA	[none]	erainternet	erainternet
Poland	Polkomtel	www.plusgsm.pl	[guest]	[guest]
Portugal	Optimus	internet	[guest]	[guest]
Portugal	TMN	internet	[guest]	[guest]
Portugal	Vodafone (Telecel)	internet.vodafone.pt	[guest]	[guest]
Russia	MTS	internet.mts.ru	mts	mts
Singapore	M1	mobilenet	[guest]	[guest]
Singapore	SingTel	internet	[guest]	[guest]
Singapore	Starhub	shwapint	[guest]	[guest]
Slovakia	Eurotel	internet	[guest]	[guest]
Slovakia	Orange	internet	[guest]	[guest]
Slovenia	Mobitel (Internet) (Internet Pro)	internet internetpro	[guest]	[guest]
Slovenia	Simobil	[none]	[guest]	[guest]
Spain	Amena	amenawap	CLIENTE	AMENA

Country	Network	APN	Username	Password
Spain	Telefonica (Movistar)	movistar.es	movistar	movistar
Spain	Vodafone (was Airtel)	airtelnet.es	vodafone	vodafone
Sweden	Europolitan	[none]	[guest]	[guest]
Sweden	Telia	online.telia.se	[guest]	[guest]
Sweden	Vodafone	[none]	[guest]	[guest]
Switzerland	Orange	internet	[guest]	[guest]
Switzerland	Sunrise	internet	internet	internet
Switzerland	Swisscom	gprs.swisscom.ch	[guest]	[guest]
Thailand	AIS	internet	[guest]	[guest]
Thailand	DTAC	www.dtac.co.th	[guest]	[guest]
Turkey	Türkcell	[none]	[guest]	[guest]
UK	Jersey Telecom	pepper	[blank]	[blank]
UK	O2	mobile.o2.co.uk	web	password
UK	Orange (contract)	orangeinternet	[guest]	[guest]
UK	Orange JustTalk	payginternet	[guest]	[guest]
UK	T-Mobile	general.t-mobile.uk	User	mms
UK	Vodafone	internet	web	web
USA	AT&T	proxy	[guest]	[guest]
USA	Cingular (With acceleration)	isp.cingular	ISPDA@CINGULARGPRS.COM	CINGULAR1
USA	Cingular (NO acceleration)	isp.cingular	ISP@CINGULARGPRS.COM	CINGULAR1
USA	T-Mobile (Internet)	internet2.voicestream.com	[guest]	[guest]
USA	T-Mobile (VPN)	internet3.voicestream.com	[guest]	[guest]

Device Parameter Check *PARA?#

The PARA? command is used to query user configuration parameters from a AT100. Like any OTA command, it can be sent in SMS or TCP mode, but is most often used in TCP mode by the host application to confirm or synchronise device configuration with system settings. The AT100 response contains various information fields, separated by semi-colons, as below:

The PARA? response packet has been extended in later firmware releases to include additional (i.e. new) parameters. Please check your device firmware or reporting protocol and refer to the appropriate table below. As a general guide, all hard revision D/E devices (IMEI starting 01100900) use protocol A and the earlier PARA? format. Rev H devices (IMEI starting 35944900) shipped during 2008 also use protocol A, with Protocol C being a client option from January 2009.

Protocol "C" PARA? Response Format (firmware 4.xx and later):

PARA:	Fixed packet header
Software version number	Floating point number
SERV SMS host number	International format telephone number
IPAD primary TCP IP address	TCP IP address
PORT primary TCP port number	TCP port number - integer
APAD access point address	Text string
APUN access point username	Text string
APPW access point password	Text string
GPST GPS timeout interval	Integer
DIST distance report value (metres)	Integer
HEAD heading change report value (degrees)	Integer
JTIM in-journey timed reporting interval (minutes)	Integer
STIM stationary timed report interval (minutes)	Integer
ITIM idling timed report interval (minutes)	Integer
IDLE idle mode start threshold (seconds)	Integer
STPD stop report delay (seconds)	Integer
OSST overspeed threshold (kmh)	Integer
OSHT overspeed hold time (sec)	Integer
OSIT overspeed inhibit time (sec)	Integer
MODE GSM reporting mode	Integer
SMSL maximum monthly SMS usage	Integer
IGNM ignition mode	Integer
GPSL maximum GPS location error	Integer
GPSS maximum GPS speed error	integer
ROAM network roaming enable	integer
TCPT TCP mode timeout (seconds)	Integer
TCPM TCP socket mode	Integer
TEMP Temperature recorder mode	Integer
RFSC RFID Site Code	Integer
IBTN iButton Mode	Integer
GSM network operator name	Text string (max 12 chars)
GSM own telephone number	Text string (max 15 chars)

Note: please see next page for PARA? response format used in earlier firmware

Protocol “A” PARA? Response Format (firmware prior to 4.xx):

PARA:	Fixed packet header
Software version number	Floating point number
SERV SMS host number	International format telephone number
IPAD primary TCP IP address	TCP IP address
PORT primary TCP port number	TCP port number - integer
APAD access point address	Text string
APUN access point username	Text string
APPW access point password	Text string
GPST GPS timeout interval	Integer
DIST distance report value	Integer
HEAD heading change report value	Integer
JTIM in-journey timed reporting interval	Integer
STIM stationary timed report interval	Integer
STPD stop report delay	Integer
MODE GSM reporting mode	Integer
SMS maximum monthly usage	Integer
IGNM ignition mode	Integer
GPST maximum GPS figure of merit	integer
ROAM network roaming enable	integer
IPA2 secondary TCP IP address	TCP IP address or “NONE” if disabled
PRT2 secondary TCP port number	TCP port number – integer
TCPT TCP mode timeout	Integer
TEMP Temperature recorder mode	Integer
GSM network operator name	Text string (max 12 chars)
GSM own telephone number	Text string (max 15 chars)

Appendix G – STAT? Response Format

The response to an over the air status request is an ASCII text packet with variable length fields, separated by semi-colons. In TCP mode, the response goes to the defined IPAD/PORT host and in SMS mode the response goes to the sender of the command (hence it is OK to disable the command acknowledgment using *NACK#).

STATUS:	Fixed packet header
AT100 serial number	15 digit IMEI number (serial number of device)
Software version number	Floating point number
Date of the last GPS fix	dd/mm/yy
Time of the last GPS fix	hh:mm:ss
Latitude of the last GPS fix	Floating point – decimal degrees
Longitude of the last GPS fix	Floating point - decimal degrees
Speed of the last GPS fix	integer - kmh
Heading of the last GPS fix	Integer - degrees
External Input voltage	Floating point - volts
Battery Level Percentage	integer
Number of reports stored in flash	integer
SMS used this month/monthly limit	Integer/integer
Network Roaming	“H” for home network and “R” when roaming
GPS timeout error	Boolean (1 if TRUE and 0 if FALSE)
Modem GPRS attach error	Boolean
Modem GPRS connect error	Boolean
Modem TCP socket error	Boolean
Modem TCP acknowledgment error	Boolean

Notes on error codes:

1. GPS timeout

No GPS fix has been returned for the specified timeout period (GPST). Could be an indication of an antenna fault or simply that the vehicle is parked in covered area (e.g. underground car park).

2. Modem GPRS attach fail

Can be simply due to GSM network coverage, but persistent attach failure is an indication that the GSM SIM card is not enabled for GPRS.

3. Modem GPRS connect fail

If the modem is attached, but not connected, this is usually caused by incorrect GPRS access point settings (APAD, APUN and APPW). See appendix E for a list of access point details for most networks.

4. Modem TCP socket error

The modem has failed to open a socket on the specified IP address and port number. Can be caused by incorrect TCP address settings (IPAD, PORT), a fault at the host server or even wider internet problems.

5. Modem TCP acknowledgment fail

This error code indicates that the AT100 can proceed all the way to open a socket and deliver the report packet, but does not get the normal acknowledgment response from the host TCP application. This is normally caused by a fault at the host end.