

AT200V3 Vehicle Tracking Device

Version 3.x Hardware

User Guide



Document Version: 2.0
Device Hardware Version: 3.0+
Date: July 2017

Abbreviations

ADC	Analogue to Digital Converter
ASCII	American Standard Code for Information Interchange (computer character set)
BLE	Bluetooth Low Energy
BT	Bluetooth
CAN	Controller Area Network
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
MEMS	Micro Electro-Mechanical System
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
SV	Satellite Vehicle
TCP	Transmission Control Protocol (part of TCP/IP)
UDP	User Datagram Protocol
WGS84	World Geodetic System 1984 (global co-ordinate system used by GPS)

Product Overview

The AT200 is low-cost vehicle tracking device, housed in a compact plastic enclosure, with internal GNSS and GSM antennas. The AT200 incorporates the very latest technology, including a Cortex M3 ARM processor, Quectel M66 Quad Band GSM/GPRS modem with Bluetooth and EVA-M8M GNSS from ublox, supporting GPS, GLONASS, GALILEO and BeiBou. The AT200 operates from an external DC voltage source and has a 900mAh internal back-up battery, allowing operation for approx. 6 hours in continuous mode, or 6 days in low-power mode (hourly reporting). Interconnections are made with a single 16-way connector.

Features

The main features of the AT200 are highlighted below:

- Compact size
- Cortex M3 ARM Processor
- ublox EVA-M8M GNSS
- Quectel M66 QUAD band GSM/GPRS/Bluetooth modem
- Internal GSM and Bluetooth antennas - PIFA PCB trace, high-sensitivity
- Internal GNSS antenna, 10mm ceramic patch
- Low power consumption (near zero current drain when vehicle ignition is off)
- Bluetooth based driver ID / authentication / authorisation
- 3 axis accelerometer (2/8g)
- 2 digital inputs
- digital output
- RS232 Port
- Internal back-up battery, lithium-polymer, 900mAh
- Configuration by RS232, SMS or TCP/UDP
- Fast and reliable over the air firmware update
- Modular communications protocol X
- TCP or UDP mode
- Non-volatile storage for 2000 reports
- SDK available for rapid development of client customised applications
- Approved to: CE, 2004/104/EC

Technical Specifications¹

E-GSM/GPRS Modem:	2 Watts (E-GSM900 and GSM850 Class 4) 1 Watt (GSM1800 and GSM1900 Class 1) GPRS multi-slot class 10
GSM up-link (TX): Frequencies	824 – 849 MHz, 880 – 915 MHz, 1710 - 1785 MHz, 1850 – 1910 MHz
GSM down-link (RX): Frequencies	869 – 894 MHz, 925 - 960 MHz, 1805 - 1880 MHz, 1930 - 1990 MHz
GNSS Receiver:	ublox EVA-M8M GPS, GLONASS, GALILEO & BeiDou
L1 receiver:	72 channels
Position accuracy:	< 2.5m CEP
Receiver sensitivity:	-160dBm (tracking)
TTFF: Cold start	26 sec
Hot start	1 sec
Input voltage:	6 – 36 volts DC
Input Protection:	Reverse polarity, overvoltage
Internal Battery:	3.7V, 900mAh, lithium-polymer
Battery Life:	3 hours continuous operation 6 days operation in low-power mode
Data transfer modes:	GPRS (TCP/UDP)
Inputs/outputs:	2 digital inputs 1 digital output (low side MOSFET switch) RS232 serial port iButton input
Driver ID:	iButton / Dallas Key 1-wire
Current consumption:	TBA mA @ 13.8 VDC (typical) <20mA (sleep mode - without battery) <100uA (sleep mode - battery fitted)
Dimensions:	60 x 58 x 18 mm
Weight:	180g (with battery)
Ingress Protection:	N/A
Temperature:	
Operating	-20 to +60°C
Storage	-40 to +85°C
Connector:	Cvilux PN CP3516P2V00
Mating Connector:	Cvilux PN CP3516S0010
Product Approvals:	CE, 2004/104/EC

¹Specifications may change without notice.

Hardware Description



Overall Dimensions

60 x 58 x 18 mm

Back-up battery

Each AT200 is supplied with a 900mAh internal lithium-polymer back-up battery.

Basic electrical connections

A permanent connection to +12V/+24V vehicle power should be provided to the AT200 using the RED and BLACK wires, via a 1A fuse. If using a wired ignition-sense, connect this to digital input 1, again we recommend the use of a 1A fuse:

- | | | |
|------------|------------|----------|
| i. RED | +12 / +24V | 1A FUSED |
| ii. BLACK | GROUND | 1A FUSED |
| iii. WHITE | IGNITION | 1A FUSED |

All unused wires should be insulated to avoid undesired behaviour.

For a full table of AT200 connections please see page 8.

Power requirements

The AT200 operates from a DC Voltage between 6 and 36 Volts. We recommend that a permanent 'live' power source is used to supply the AT200. If current drain is of concern, please refer to the power down options which can be specified with the IGMN command.

SIM installation

The SIM should be inserted in the slot at the rear of the device (with plastic enclosure fitted). The image on the device gives guidance for correct orientation. Note that the AT200 powers up when the SIM is fitted. For shipping with SIM fitted, we suggest extracting the SIM a few millimetres to power off the device.



Status LEDs

GPS Status (green):	Constant ON	Searching for initial fix
	Double Flash @ 1Hz	GPS 3D navigation
	Slow Flash @ 0.2Hz	Lost GPS navigation
GSM Status (blue):	Flash @ rate 1 per sec	GSM ON
	Flash @ rate 1 per 2 sec	GSM registered on network
	Constant OFF	GSM Modem OFF

Mounting

We recommend mounting the AT200 by either of the following methods:

- Double sided foam adhesive tape, using de-greaser / solvent on the vehicle surface
- Secure to vehicle using a cable tie, 5.0mm width to suit the cable tie guides on the device

Orientation

For optimum GPS performance, please mount the AT200 with the 'SKY SIDE' facing the sky.

Interconnections

All connections to the AT200 are provided by a single 16-way connector.

AT200 Pin Applications and Colour Code

Pin	Function	Wire colour
1	JTMS	
2	JTDI	
3	RS232-TXD	GREEN
4	VIN 7 - 36 VDC	RED
5	DIGITAL INPUT 1	WHITE
6	DIGITAL OUTPUT	YELLOW
7	JTCK	
8	JTRST	
9	JTNRST	
10	JTDO	
11	RS232-RXD	BLUE
12	GND	BLACK
13	DIGITAL INPUT 2	BROWN
14	IBUTTON	GREY
15	VDD-DIG	ORANGE
16	GND	

Digital Inputs

Digital inputs 1 and 2 are suitable for use in 'power-take-off' applications and can be connected directly to 12/24V vehicle circuits.

Digital Output

The AT200 is capable of switching an external load of up to 30V, 0.5A using a MOSFET Low Side Switch, which must be used to switch the GND side of the load. The use of a 1A in-line fuse with these switches is essential to prevent any damage through fault scenarios.

Integrated Accelerometer

The AT200 has a built in 3 axis MEMS accelerometer that operates in the range $\pm 2g$ and is used to measure driver behaviour (acceleration and braking) during normal driving conditions.

The accelerometer also allows the AT200 to wake from sleep on movement, with configurable thresholds. Please refer to the \$MEMS parameter for more details.

iButton (Dallas Key) Interface

This can be used to read iButton devices for the purpose of Driver Identification. See the Driver ID Application Note for more details of how to use this feature.

Configuration

The AT200 shares a common set of configuration commands with our other devices. Please refer to our Generic Device Configuration Reference for details.

Electrical Parameters

Operating Conditions

Parameter	Min	Max	Units
Power Supply Input Voltage	+6	+36	V
Digital Input High Voltage Threshold	+5.0	-	V
Digital Input Low Voltage Threshold	-	+2.0	V
Digital Output Maximum Voltage	-	+30.0	V
Digital Output Maximum Current	-	0.5	A

Absolute Maximum Ratings

Parameter	Min	Max	Units
Power Supply Input Voltage	-32	+38	V
Voltage on Digital 1-2	-32	+32	V
Voltage on RS232 RX	-25	+25	V
Voltage on RS232 TX	-13	+13	V
Voltage on iButton/Dallas Interface	-5	+5	V
Current sunk by MOSFET low side switches		500	mA
Voltage rating of MOSFET switches	-	+30.0	V
Storage Temperature	-40	+85	°C
Operating Temperature (without battery)	-20	+60	°C
Operating Temperature (with battery)	0	45	°C

Typical Power Consumption

Operating Mode	Current @ 13.8V	Current @ 27.6V	Power Consumption
Fully Operational	25mA	14mA	< 400mW
Battery charging	500mA	275mA	< 7W
Sleep (no battery)	0.5mA	0.3mA	7mW
Sleep (with battery)	< 10uA	< 10uA	0.1mW

Environmental Specifications

Parameter	Specification
Storage temperature	-40 to +85 °C
Operating temperature (no battery)	-20 to +60 °C
Operating temperature (with battery)	0 to +45 °C (note: no charging below 0°C)
Ingress Protection	N/A
Vibration, broadband random	Complies with IEC60068-2-64
Shock	Complies with IEC60068-2-64
Humidity	N/A