User Manual and Command list

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1 Preface

1.1 Document Purpose

This document was released to help you understand the characteristic of all Totemtek product, and explain how the device works.

This is fundamental document for all products, the difference in each product will be written in Quick start and datasheet document.

1.2 Reference

This document is supposed to work with other document or program. All related document or program listed below can be found in our online document library.

- 01 Datasheet – device technical specification (.pdf).
- 02 User Manual – (this document) A guide to help you understand the feature of the device and command list (.pdf).
- 03 Quick start – IO port connection reference and how to quick start the device(.pdf).
- 04 Protocol – data string from device to server and acceptable SMS/GPRS command(.pdf).
- 04 Configuration Guide– instruction on how to configure device (.pdf).
- 05 Configuration tool– configurator manager to read/save preset setting to device (.exe).

Online Document Library: Document online Library

1.3 Acronyms

AC/DC – Alternating Current/Direct Current;
VCC – Power supply;
ACK – Acknowledged, a response from sever to acknowledge the receipt of data;
GLONASS – Global Navigation Satellite System;
GNSS – Global Navigation Satellite System;
GPRS – General Packet Radio Service;
GPS – Global Positioning System;
GSM – Global System for Mobile Communications;
IO – Input/Output;
LED – Light Emitting Diode;
PCB – Printed Circuit Board;
SMS – Short Message Service;
PC – Personal Computer.

1.4 Compatibility

This document is compatible with the following Totemtek products:

- AT02
- AT04
- AT05
- AT07
- AT09

- AT08
- AT20

1.5 Safety

Do not disassemble the device. If the device is damaged, the power supply cables are not isolated or the isolation is damaged, before unplugging the power supply, do Not touch the device.

The device can be installed or dismounted only by qualified personnel.

all devices are not supposed to full charged before shipping out. We strongly recommend the device full of charge when device is working in beacon mode before installation.

To disconnect the device from the power supply, you need to disconnect the connector from the device or disconnect the wires from the vehicle's power supply.

Caution! If an incorrect type of battery is used for replacement, there is a high explosion risk.
Dispose of used batteries according to the environmental requirements.

Caution! All device come with initial password, we strongly recommend the client change the password once they have the package.

Caution! All device was not supposed to come with our latest firmware. Please consult our sales team for latest firmware.

1.5 Term of use

If any information you feel that is not correct, please contact our support team: support@totemtek.com;

1.6 Document History

Date	Version	Update
2019-11-26	3.0.1	First release.

2. Introduction

Totemtek ATxx series products are well designed tracking device which has variant version to cover different application and networking.it obtains the position by the GNSS receiver on board and transfers the coordinate with other information to target server via GPRS/3G/4G/NB IOT/CAT M1 networks.

ATxx series different variants as below:

- AT02: (tiny tracking device for package, kids), no IOs interface.
- AT04/3G/4G/CAT M1/NB-IOT: Basic motorbike tracker, waterproof enclosure with few IO port.
- AT05/3G: basic vehicle tracking device with more IO port and RS232 port.
- AT07/3G/4G/CAT M1/NB-IOT: full variant for different application.
- AT08/3G/4G/CAT M1/NB-IOT: long battery life unit with waterproof enclosure.
- AT09 2G/3G/4G: more IO input with RS232/RS485 interface.
- AT09 2G/3G with TPMS feature: monitor tire pressure and temperature.
- AT20 3G/4G/CAT M1/NB-IOT: long battery life with a huge solar panel for trailer vehicle.

Online comparison sheet: Product comparison sheet

3. Hardware interface

3.1 Power Input

The power range has been printed on the device sticker on the surface. The information can refer below too:

item	Power input range	Comply device list
1	USB phone charger 5V	AT02, AT08
2	Vehicle/motor bike 9V - 50V	AT04, AT05, AT05 3G
3	Vehicle/motor bike 9V - 50V	AT07, AT09

3.2 LED indicator

The LED on board is an indicator to show how the device works.

Red LED – Power Indicator		
Dark	Unit switched off or backup battery exhausted	
Light 0.1s, Dark 2.9s	No external power	
Light 1.5s, Dark 1.5s	Connected with external power	
Blue LED - GPS indicator		
Dark	Module did not power on (or in Sleep/Deep Sleep mode)	
Light 0.1s, Dark 2.9s	GPS fixed	
Light 1.5s, Dark1.5s	Searching for GPS signal	
Green LED - Communications Module indicator		
Dark	Module did not power on (or in Deep Sleep mode)	
Light 1s, Dark 4.0s	Initializing GSM connection	
Light 0.1s, Dark 2.9s	Connected with TCP after initializing	
Light 1.5s, Dark 1.5s	Connected without TCP after initializing	

Online reference video: How LED blinks

- CAUTION: AT05 2G unit red LED will always on once device has power on.

3.3 USB Port

USB port on board is an interface to help you capture the log of the device, change the pre-setting (APN, IP, Port..etc) and update the firmware of the device.

There are two kinds of USB protocol type in ATxx series product. Please refer before list:

item	USB Port Type	Comply device list
1	USB to serial port	AT02, AT04, AT05
2	USB(traditional USB, no driver needs)	AT05 3G and all model number above AT07,AT09

For item 1: USB to serial port is not a traditional USB cable. It has a bigger USB connector which has built a USB-serial chipset in it. In this case, the cable need to a driver before you plug into PC. The cable will come with the sample order, if you don't have this cable, please contact with our sales team.

For item 2: this is a normal USB cable, there is no driver needs for it.

Online reference video: difference between USB/USB to serial cable

3.4 Memory/Flash

Device builds an external flash (16Mb) to save the GPRS message. If the device in GSM blind area, all the GPRS message will save into the memory, and send in FIFO order.

Reference for the data can be stored inside the memory/flash for each device.

item	Maximum data stored	Comply device list
1	16000pcs	AT02,AT07,AT08,AT20
2	8000pcs	AT04,AT05,AT09

- CAUTION: heart beat package and response for GPRS command will not save into the memory.

3.5 3-Axis

Device has built 3 axis sensor on board, it's for movement detection purpose (sleep/deep sleep application). It cannot be used for harsh breaking so far.

3.6 IOs

3.61 Digital inputs

There are two kinds of digital input built on the unit: positive trigger input and negative trigger input. Two different input indicator can be found on device body sticker.

item	Input type	Indicator on label	Activate	deactivate	Input range	events
1	Positive input	DI x(+)	>3.3V		0 - 30 V	A specific GPRS/SMS message will send to target server once IO has activate or deactivate.
2	Negative input	DI x(-)	<1.0V			

- ACC is DI1(+) and a positive input. This input should connect with ACC of the vehicle. Some of the feature in

the device is combining with this input.

- SOS is negative input.

Online reference video: DI application reference

3.62 Analog inputs

Analog input is designed for collecting external power voltage. This collection will finally send to target server in ASCII in the GPRS message.

item	Input type	Indicator on label	Activate	deactivate	Input range	events
1	Analog input	ANI x	N/A	N/A	0 - 30 V	None. Raw data in GPRS string only

Online reference video: ANI application reference

3.63 Digital outputs

Digital output works with 3 working modes, all these working mode can be changed by the SMS/GPRS command or configurator (we recommend to change the setting by configurator). Below are the 3 working mode listed:

1. Control by firmware
2. Control by user
3. Off

item	Input type	Indicator on label	Activate	deactivate	Input range	events
1	Digital output	DO x(-)	Open drain	-	-	None. Raw data in GPRS string only

If device is working in 1. Control by the firmware, device will reject the command sent by user from SMS/GPRS (remote cut off engine..etc).

If you want to send command to cut the engine remotely, should switch to Control by user

Online reference video: DO application reference

3.64 1-Wire input

1 wire can support two applications: temperature detection or driver identification (same as RFID feature). Some of the unit has built two 1 wire input, it may able to support two temperature sensor with different firmware version. Please contact our sales team for more detailed information.

Online reference video：1 wire application reference

- CAUTION: some of device not come with this interface, please refer to the label sticker.

3.65 microphone/speaker

This interface is designed for two-way audio communication feature.

Online reference video: two way conversation reference

- CAUTION: some of device not come with this interface, please refer to the label sticker.

3.66 Serial port (RS232/RS485)

Serial port (RS232/RS485) doesn't build transparent transport mode. All the ports are coming with certain protocol. If you want to connect with a specific serial device, then you need to upgrade with different firmware to support certain serial device.

If you have your own serial port device and want to connect with our device, please contact with our sales team.

- CAUTION: some of device not come with this interface, please refer to the label sticker.

4. Firmware Feature

4.1 Schedule data interval

Device built with a smart logic for data interval. Firstly, you can decide to use Ignition on/off or movement to identify the vehicle is moving or stop.

After that, device will send three type messages (time interval message/distance message/angle message) when vehicle is moving.

Data string type	
AA	Time interval data`
AB	Angle data/veer data
AC	Distance data

And will send only one type message (time interval) when vehicle is stop.

All these setting can be configured in the configurator and command.

4.2 Working mode

There are two type working mode in Totemtek series device: standard and beacon, but not all devices have beacon mode inside.

Working mode	Support list
Beacon/standard	AT02, AT08,AT20
Standard only	AT04,AT05,AT07,AT09

- CAUTION: AT04/AT05 don't have sub working mode sleep/deep sleep.

When device is working in beacon mode, all power of external circuit will cut off to save the power of the battery. This means device will only work in a fixed time interval. It will not work up by movement, IO port or other alarm.

When device is working in standard mode, there are 3 sub mode under standard mode (normal/sleep/deep sleep).
Normal: cellular module, GPS module will always work.
Sleep: GPS module will turn off.

Deep sleep: cellular module, GPS module will turn off. In this case, device can not receive the command anymore

if device is in deep sleep.
Sleep/deep sleep modes are triggered by the movement of the device/vehicle. if vehicle not moves for a preset interval, device will go to these 2 sub modes.

Be noticed, deep sleep is totally different with beacon mode, in beacon mode, more external peripherals power will turn off. For example, the USB will turn off when device is in beacon mode (that means no log print in configurator anymore).

- CAUTION: AT02 will always work in beacon mode, AT08 and AT20 has both working mode.

4.3 Driver identification

Driver identification design to identity the correct driver to start the ignition. This feature relies on an optional accessory – relay. Make sure the relay connection is correct before you implement this feature.

If digital output works in this mode, that means the digital output controls by the firmware. Device will not accept the command from user.

4.4 Cut off engine

Device allow to send a SMS/GPRS command to shut off the engine remotely. Before you implement this feature, make sure the output is working in user control mode.

4.5 Over speeding

make sure the output is working in user control mode.

4.6 SMS alarm center

make sure the output is working in user control mode.

5. OTA

Contact our sales team to access online configurator to OTA and setting access remotely (read to release).

6. Command List

All the command can be sent by SMS or GPRS, and in configurator.

SMS command structure:

e.g.	*000000,002,cmnet,,#	
Header	*	Fixed header *
Password	000000	Initial password, fixed length 6 digitals.
Command content	002,cmnet,,	Command connect, flexible length.
End char	#	Fixed end char #

The GPRS command structure is totally different with SMS command structure. Please refer to the device communication protocol for the structure.

6.1 High frequency command list

Command No.	Command Description	Command Content	Remarks
*002	APN	002,APN,UserName,Password	APN [1,30] User Name: [1,20] Password: [1,20] SMS Example: *000000,002,cmnet,,#
*003	GPRS IP setting	003,ip,port,protocol,X	**IP (or DNS)**: [1,30]; **Port**: [1,5] **Protocol**= 0: TCP = 1: UDP **X** = 0: DNS; = 1: IP Example: *000000,003,hosting.totemtek.com,10086,0,0#
*006	Restart device	006	(sent by SMS. It works only when GSM module is in working status.) SMS Example: *000000,006#
*007	Initialize device	007	SMS Example: *000000,007#
*011	Clear inner memory	011	SMS Example: *000000,011#
012	Request coordinate	012	SMS Example: *000000,012# (works in SMS mode)
016	Digital output control	016,OutputNumber,state	**OutputNumber**: (A,B,C,D) **state**: (1 enable,0 disable) (only works in user define mode, or it will return format error) Example: *000000,016,B,1#
021	Request Google map link	021	SMS Example: *000000,021#
102	Data sending mode	102,move,distance,angel,rest	**move**: interval time when vehicle is moving [1, 99999] secs. **distance**: data sending by distance: [1, 99999] meters **angel**: data sending by angel: [1, 359] degree. **rest**: interval time when vehicle is powered off and not moving. [1, 99999] secs SMS Example: *000000,102,60,0,0,3600#
SET WORKING MODE FOR DIGITAL OUTPUT			
130	Set digital output1	130,mode	**Mode**= 0 default; for authorized driving; 1 defined by user; 2 disable it. SMS Example: *000000,130,1#
131	Set digital output2	131,mode	**Mode**= 0 default; for Buzzer controlling; if over speeding, it will trigger the buzzer; =1 defined by user; =2 disable it. SMS Example: *000000,131,1#
132	Set digital output3	132, mode	**Mode**= 0 default; for LED;

			=1 defined by user; = 2 disable it. SMS Example: *000000,132,1#
133	Set digital output4	133,mode	**Mode**=0 default; for LED; =1 defined by user; =2 disable it. SMS Example: *000000,133,1#

6.2 Full command List

No.	Command Description	Command Content	Remarks
001	SIM PIN	001,PinCode	PIN code should <=4 digitals numbers
*002	APN	002,APN,UserName,Password	APN [1,30] User Name: [1,20] Password[1,20]
*003	GPRS IP setting	003,ip,port,protocol,X	**IP (or DNS)**: [1,30]; **Port**: [1,5] **Protocol**= 0: TCP = 1: UDP **X** = 0: DNS; = 1: IP
$004	OTA upgrade	004	
$005	OTA disable	005	
*006	Restart device	006	*@@@@@@,006#（sent by SMS. It works only when GSM module is in working status.）
*007	Initialize device	007	*000000,007#
008	Read parameter of each command	008,X	X means command number. Read APN: 008, 002
*011	Clear inner memory	011	*000000,011#
012	Request coordinate	012	*000000,012#（works in sms mode）
013	Request the configuration	013	*000000,013#(works only in configuration software and through gprs), kindly note the command format in configuration software and gprs is different.
014	Change password	014,new_password	*000000,014,$$$$$$# password: 6 digits
016	Digital output control	016,OutputNumber,state	**OutputNumber**: (A,B,C,D) **state**: (1 enable,0 disable) (only works in user define mode, or it will return format error)
018	Set mileage	018	Reserved, no effect if device receives this command.
019	Set ACK	019,state	**State**: (0 enable,1 disable) AT04/05 should always enable ACK.
021	Request Google map link	021	
051	Set sensitivity of 3D sensor	051,SenseValue	**SenseValue**: sensitivity value[1, 30]
052	set the ID of device	052,ID	**ID**: letter and number, 1 to 17 digits
053	manage iButton/RFID	053,SequenceNumber,State,Content	**SequenceNumber**: 01-100 **State**: 0, enable it; 1, disable it

	number		(set iButton/RFID number by setting state 1; erase iButton/RFID number by setting state 0.) **Content**: iButton number. 16 digits required. e.g., erase the 1st iButton/RFID number, you can set like this: *000000,053,1,1,0000000000000000# or even not type the iButton/RFID number: *000000,053,1,1,# (but don't forget the comma"," at the end)
054	Set DNS	054，DNS1,DNS2	
056	Request firmware version	056	
058	Set Ibutton/RFID ID	058,State,Content	**State**: 0, enable it; 1, disable it (set iButton/RFID number by setting state 1; erase iButton/RFID number by setting state 0.) **Content**: iButton number. 16 digits required. i.e. erase the an iButton/RFID number 12345678, you can set like this: *000000,058,1,0000000012345678#
*101	Set GSM Band	101,GSMBand	**GSMBand** =0: 900/1800 =1: 850/1900 =2: 850/900/1800/1900
102	Data sending mode	102,move,distance,angel,rest	**move**: interval time when vehicle is moving [1, 99999] secs. **distance**: data sending by distance: [1, 99999] meters **angel**: data sending by angel: [1, 359] degree. **rest**: interval time when vehicle is powered off and not moving. [1, 99999] secs
103	Set the sleep mode	103,mode,time	**mode**=0: no sleep mode =1: sleep mode. GPS module turned off, GSM module are turned on and only heartbeat and alarm data available. =2; deep sleep mode. no data generated, and both GPS module and GSM/3G module turned off. **time**: time after which device gets into sleep mode: [1, 9999]. device will wake up from sleep mode if tremble is intense.
104	Set over speeding alarm	104,state,OverSpeed	**state** =0: enable, =1: disable **OverSpeed**: over speeding value: [1-999] meter
105	Set the phone numbers for call	105, state,Num1,Num2,Num3	**state** =0: enable, (if no settings for Num1, Num2 and Num3, then device

			doesn't answer any numbers; if numbers set for Num1, Num2 and Num3, device will answer the call from Num1, Num2 and Num3) =1: disable. Means any numbers can call and listen in. digits of phone number(Num1, Num2, Num3): [6, 25] Can set at most three phone numbers: Num1, Num2, Num3. e.g., ● set one number:*000000,105,0,18675642745,,# ● set three number:*000000,105,0,123456,123457,123458# ● any numbers can be answered by device: *000000,105,1,,,# ● set no any numbers can be answered: *000000,105,0,,,#
106	enable GEO fence alarm	106,in_GEO,out_GEO	**in_GEO** =0: alarm for entering into geo fence; =1: disable it. **out_GEO** =0: alarm for out of geo fence; =1: disable it.
107	Set GEO fence alarm location and scope	107,radius,CenterLat,CenterLon	**radius**: GEO radius: [1, 9999]meter **CenterLat**: Latitude must be 9 digits. e.g., 2837.7172, (in degree+minute format) **CenterLon**: Longitude, must be 9 digits. e.g., 07722.6363. (in degree+minute format)
ENABLE / DISABLE SMS FUNCTIONS (from command 108 to 122) e.g., SMS SOS(command 111) enabled, if SOS button pressed, device will send sms alarm to preset cellphone number; if disabled, no sms for SOS alarm to preset cellphone number			
108	GPS antenna disconnect alert	108,mode	**mode**=0 enable it; =1 disable it.
109	External power disconnect alert	109,mode	**mode**=0 enable it; =1 disable it.
110	SMS TOW alarm	110,mode	**mode**=0 enable it; =1 disable it.
111	SOS	111,mode	**mode**=0 enable it; =1 disable it.
112	SMS Geo In	112,mode	**mode**=0 enable it; =1 disable it.
113	SMS Geo Out	113,mode	**mode**=0 enable it; =1 disable it.
114	SMS IN1_ON	114,mode	**mode**=0 enable it; =1 disable it.

115	SMS IN1_OFF	115,mode	**mode**=0 enable it; =1 disable it.
116	SMS IN2_ON	116,mode	**mode**=0 enable it; =1 disable it.
117	SMS IN2_OFF	117,mode	**mode**=0 enable it; =1 disable it.
118	SMS IN3_ON	118,mode	**mode**=0 enable it; =1 disable it.
119	SMS IN3_OFF	119, mode	**mode**=0 enable it; =1 disable it.
120	SMS Low battery	120, mode	**mode**=0 enable it; =1 disable it.
121	SMS IN4_ON	121,mode	**mode**=0 enable it; =1 disable it.
122	SMS IN4_OFF	122,mode	**mode**=0 enable it; =1 disable it.
123	set the phone number for receiving alarms by sms	123,PhoneNumber	**PhoneNumber**: cell number, (<= 25digits)
141	Set interval time for OBD data, harsh acceleration and harsh brake.	141,interval_OBD,acceleration ,brake	**Interval_OBD:** [0, 999999] unit: seconds; if =0, means no OBD data sent out. **Acceleration:** [20, 100] unit: m/s^2*10 **Brake:** [20, 100] unit: m/s^2*10
ENABLE / DISABLE DIGITAL INPUT FUNCTIONS(from command 125 to 134) e.g., IN1 enabled, if IN1 triggered, device will process the IN1 triggered; if IN1 disabled, no any actions taken by device as if IN1 defective			
125	Set IN1	125,mode	**mode**=0 enable it; =1 disable it.
126	Set IN2	126,mode	**mode**=0 enable it; =1 disable it.
127	Set IN3	127,mode	**mode**=0 enable it; =1 disable it.
128	Set IN4	128,mode	**mode**=0 enable it; =1 disable it.
129	Set SMS SOS	129,mode	**mode**=0 enable it; =1 disable it.
SET WORKING MODE FOR DIGITAL OUTPUT			
130	Set digital output1	130,mode	**Mode**= 0 default; for authorized driving; 1 defined by user; 2 disable it.
131	Set digital output2	131,mode	**Mode**= 0 default; for Buzzer controlling; if over speeding, it will trigger the buzzer; =1 defined by user; =2 disable it.
132	Set digital output3	132, mode	**Mode**= 0 default; for LED; =1 defined by user; = 2 disable it.
133	Set digital output4	133,mode	**Mode**=0 default; for LED;

			=1 defined by user; =2 disable it.
134	Set fuel sensors data reading	134,InputNum,mode,DataFormat,Low,High	**InputNum=** 1 analog input1; = 2 analog input2; = 3 analog input3; = 4 analog input4; **Mode**=0 Enable in default; it will read data from analog input. =1 disable; it doesn't read data from analog input. **DataFormat** : 0 data in real value; : 1 data in percent; **Low**: lowest data [0, 60000] mV; **High**: highest data [0, 60000]mV;
	e.g., if your fuel sensors volt output is 0v to 5v, and you want to set fuel data shown in percent, and analog input 1 connected to fuel sensor, you can set like:		
135	Set server response time & heartbeat time	135,ServerResponse,Heartbeat	**ServerResponse**: [0, 60] second **HeartBeat**: [0, 999] second
136	Set distance for tow alarm	136,distance	**Distance**:[0, 5000] meter
140	Switch for data interval change by engine or tremble staus	140,switch	**Switch**=0: data interval changes by tremble status. =1: data interval changes by engine status.
	If you set 0 in 140 command, means device defines moving or parking by trembles: trembles(detected by 3d accelerometer and speed), it's moving; no trembles(detected by 3d accelerometer and speed),, it's parking. If you set 1 in 140 command, means device defines moving or parking by engine on /off: engine on(detected by digital		
141	Set OBD, harsh acceleration and harsh brake	141,time,acc,brake	**time**=[0,99999]: device sends OBD data in the interval of time **acc**= [20,100]: 30 in default. Set value for harsh acceleration event **brake**=[20,100]:30 in default. Set value for harsh brake event.
142			
143	Tremble sensor data alarm	143,mode	**Mode: 0 = enable.** (tremble alarm 40 alarm type enabled) **1 = disable.** (tremble alarm 40 alarm type disabled)
144	Set temperature alarm value	144, tempID,mode,Low,High	**tempID** =1**;** temperature sensor A (related to 1-Wire-T in label) =2**;** temperature sensor B (related to 1-Wire-T in label) **Mode** =0**,** temperature alarm enabled. =1, temperature alarm disabled. **Low:** low alarm value (unit: ˚C) [-55 ˚C to 125 ˚C] **High:** High alarm value (unit: ˚C) [-55 ˚C to 125

			˚C] **e.g.,** *000000,2,0,-2,50# enable temperature B sensor alarm, low temperature at -2 degree, high temperature at 50 degree
145	Reboot GPS module	145	Reboot GPS module, just in case sometimes we received some wrong coordinate information.
200	Request IMSI	200	IMSI ： International Mobile Subscriber Identification Number
201	Request CCID	201	**SIM CCID**
203	Set dual IP in the firmware	203,ip,port,protocol,X	
230	Set time for idle alert	230,Time	**Time:** [0,250] minute If digital input1 is triggered (means engine on), and speed is zero(not moving), the two conditions last certain time, the idle alert will be generated.
300	Time to reboot device	300,time	Time in mins
Set TPMS function(this section suitable for AT09 with TPMS feature only)			
301	Set tire pressure ID	301,X,ID	X：1-42 ID=8 byte e.g., *000000,301,01, 1C9E8ED9#
303	Time to send tire pressure data to server	303,X	Unit：s
801	Device sends one sms to the typed phone number	801,CellNumber	Text message: "Read SIM Serial Number" CellNumber： Cellphone number. Device will send a sms to this number
Picture Taking function			
802	Take image	802	Device will take 1 image and send to server by gprs
803	Image pixel setting	803,pixel	**Pixel** =0: 320*240; =1: 648*480;
997	Send a RFID test data, ID number is 12345678	997	
998	Send a SOS data	998	
999	Send a normal AA data	999	

---------- **END** ----------