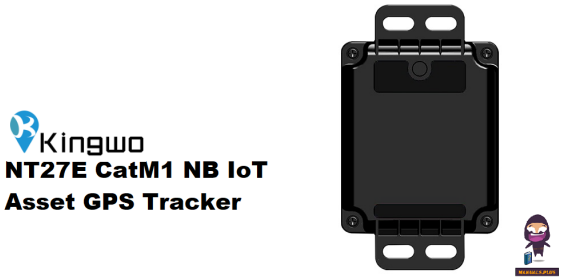

Kingwo NT27E CatM1 NB IoT Asset GPS Tracker User Manual

Contents

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Declaration

The contents of this manual is expected to be renewed from time to time without prior notice; the updated content will be added to the new version of this manual. KINGWO will improve or update the products or procedures described in the manual at any time. If there is a description of the product in the manual that does not match the actual product, the actual product shall prevail. KINGWO has the final interpretation rights of this manual.

Product Overview

Appearance

Enclosure	IP67 waterproof
Magnets	To stick the device to metal surface
Screw hole	To fix the device to non-metal surface
Power button	Inside the enclosure for hidden installation purpose, to turn on or turn off device
Light sensor	To detect removal alarm or activate the device from warehouse mode i nto normal mode, remove the sticker on the light sensor, when the devi ce expose to light, it will trigger a removal alarm or activate the device from warehouse mode
Temperature sensor	To measure the environment temperature
Motion sensor	To detect the motion or static status of the device, detect motion alarm and collision alarm
Bluetooth	Bluetooth ibeacon function

LED status

LED type	Event	Status
Cellular LED (Red)	Network connecting	0.2s on, 0.2s off
	Network connected	0.2s on, 1s off
	PDP activate success(APN correct)	0.2s on, 2s off
	Server connection success	0.2s on, 5s off
	Module restart	Solid on
Position LED(Green)	GPS position	Solid on
	LBS position	0.5 seconds on, 0.5 seconds off
	No position	Off
Note:LED can be turned off or on by using command : LED,0# LED,1#		

Product features summary

- Built in 20000mah batteries, it can last 10+ years if upload data once a day
- Multiple work modes: Regular, Clock, Track ,motion and static modes

- Alarms: Motion alarm, removal alarm, collision alarm
- Multiple position modes: GPS, LBS, AGPS
- Temperature monitor
- Battery level upload
- Weatherproof for outdoors assets monitor
- No wires and magnets for easy installation
- Jamming detection

Specification

Physical	Dimension	116*69*32mm L*W*H
	Weight	250±5g
Cellular	Communication module	Quectel BG95
	Frequency	Working frequency: Cat M1: LTE-FDD B2/B4/B12/B13 protocol: Embedded TCP/IP stack Sensitivity: -107dBm @850/900MHz -106dBm@1800/1900MHz Output power: Class 4 (2W)@850/900MHz Class 1 (1W)@1800/1900MHz
GPS		Channels: 50 Sensitivity: -147dBm Position accuracy:5-10m Accuracy: 5m CEP Cold start: <27s Hot start: <1s

Processor		ST
Motion sensor		DA260
Bluetooth		Bluetooth 5.0
Power	Battery	Disposable Lithium-ion battery and 3.6V 8100mAh and ultra-low discharge rate less than 1%, store one yea r below 25℃
	Power consumption	Average working current <100mA; Power save current 7uA;
	GSM antenna	Internal High Gain
	GPS antenna	Internal High Gain
	SIM	Microsim
	Indicator	3 status LEDs, Green: GPS, Battery level: Blue: Red: Celluar
Environmental Par ameter	Working Temperature	-30℃ ~ +80℃
	Humidity	5% ~ 95% (no fog)
	Ingress Protection Rating	IP67

Product Functions

Intelligent Work modes
The default work mode is the regular model: upload interval is one day one ping, the data packet information includes GPS status, longitude and latitude, cellular signal Strength, satellite numbers, battery level etc, there are multiple track modes available from the device, below is the explanation for work mode priorities:

- Track mode>Warehouse >Regular mode =Clock mode=Week mode= Motion and static mode
- The work mode which is equal can be replaced by each other and the last configuration

Track mode

Configuration	SMS Command	Remark
	ZZ,A,T1,T2# or MODE,1,T1,T2#	A 1- Enter
	For example: ZZ,300,60# (MODE,300,60#) indicates enter into track mode,	in track mode 0- Exi t track mode T1
	upload data each 300 seconds, track duration time is 60 mins ZZ,0# or MO DE,0# indicates exit	upload interval unit seconds
	track mode	value range
Set Track mode		30-300 seconds T2
		Track duration time Unit minutes
		value range
		5-57600 minutes
Exit track mode	ZZ,0# or MODE,0#	

Note:

1. Under track mode, GPS position is on priority, meanwhile LBS data will be captured each 30 seconds

2. Device will enter into power save mode if the device stops 5 minutes, GPS will be turned off, but it will keep a connection with the backend and upload packets according to the configured intervals

3. Under track mode, if the SIM card loosens, the network register fails or server failure happens, device will tur n off celluar and GPS for 30 minutes and then attempt connection, however, if the removal alarm is triggered dur ing this period, it will immediately attempt a connection.

3.GPS will wake up if motion is detected in power save mode.

Warehouse mode

Configuration	SMS Command	
Set storage mode	STORAGE,T#	T Upload

	For example: STORAGE,2880# indicates enter into storage mode, upload d ata each 2880 minutes	interval Unit: Minutes Value range: 2880-43200 minutes 2-30 days
Exit storage mode	STORAGE,0#	
Note: **This mode is designed for power save purpose before the devices goes to field:** 1.Under warehouse mode, if light sensor triggered, device will exit warehouse mode 2. Under warehouse mode, if other work mode has been configured, device will exit warehouse mode 3. Under warehouse mode, device can't be wake up by vibration 4. Under warehouse mode, use command STORAGE,0# to exit warehouse mode		

Regular upload mode (Recommended)

Configuration	SMS Command	
Set regular upload mode	HX,T# or MODE,0,T# For example HX,1440# or MODE,0,1440# indicates upload each 1400 minutes (24 hours)	T Upload interval Unit: Minutes Value range: 5-43200min utes 2-30 days
Exit storage mode	STORAGE,0#	
Note: Default setting is wake up each 1440 minutes(24 hours) Fixed upload mode can't be waked up by motion		

Clock mode

Configuration	SMS Command	
Set clock mode	MODE, 4, N, T1, T2..TN#	T1-TN is time

	For example MODE,4,3,0800,1400,2100##	point, format is HH MM, for example, 0 800 indicates 08:00
Delete clock mode and return to fix upload	WAKEUP,#	
Note: Time interval between each two clocks should be no less than 5 minutes Clock mode can’t be wake up by motio n		

Week mode

Configuration	SMS Command	
		T1=1:Monday,
		T1=137
	MODE,3,T1,T2#	indicates
	For example	Monday,
Set week mode	MODE,3,246,09:00# indicates	Wednesday
	wake up at 9:00am at Tuesday,	and Sunday
	Thursday and Saturday	T2 indicates
		wake up
		point , format
		is HH:MM
Note: Clock mode can’t be wake up by motion		

Configuration	SMS Command	
Set motion and static mode	MODE,6,T1,T2,A# or MS, T1,T2,A# For example: MODE,6,60,300,1# Indicates upload interval in motion status is 60 minutes, upload interval in static status is 300 minutes, motion alarm on	T1:Upload interval in motion status , value 5-43200 minutes T2: Upload interval in static status, value 5-43200 minutes or set clock mode, format (HH:MM) A:Motion

		Alarm on, 0:Motion Alarm off

Motion and static mode

Configuration	SMS Command	
Set motion and static mode	MODE,6,T1,T2,A# or MS, T1,T2,A# For example: MODE,6,60,300,1# Indicates upload interval in motion status is 60 minutes, upload interval in static status is 300 minutes, motion alarm on	T1:Upload interval in motion status , value 5-43200 minutes T2: Upload interval in static status, value 5-43200 minutes or set clock mode, format (HH:MM) A:Motion Alarm on, 0:Motion Alarm off
Note: The device can’t be waked up by vibration while in motion mode Device can be waked up by vibration while in static mode After waking up, there should be 3-second vibration in 6 seconds, the device will turn on the cellular module and upload the data packet, otherwise, it would enter into sleep mode again and maintain the previous configuration parameters		

AGPS

When the device successfully registers on the network, AGPS is available to speed up the position speed and improve the position accuracy.

LBS
If the device enters into the blind zone and GPS cannot be fixed, the device will switch to the LBS position, LBS provides the reference location which might not be accurate

Blind data storage
When the device enter into blind zone when in sleep mode, it will store the trace data according to the preconfigured time interval and it will upload the data in the blind zone to the backend when the cellular network recovers

Temperature detection
The device's built-in temperature sensor, it detects the temperature once the device is turned on, and then will read it every 16 seconds. The temperature accuracy 95%.

OTA commands from backend
Since the wake-up of the device is normally short before enter into sleep mode, it is hard to receive SMS, to ensure the command is sent efficiently, we suggest an OTA command to be sent from the platform, when the device is online, the backend will automatic send this command, to make sure the commands is properly received.

Strong Magnetic and waterproof function
NT07E is with built-in with super strong magnet that can firmly stick the device to the metal surface, it is easy to install and conceal, and the device is with waterproof function, which can be installed on any assets that are outdoors.

Position Priority

GPS>LBS
Turn on the GPS module immediately after the device wakes up, and report the position after GPS positioning or timeout;

GPS>LBS
When the number of hotspots>=2, the GPS module will not be turned on;

LBS GPS OFF
The GPS module is not turned on after the device wakes up. When the number of hotspots>=2, the positioning package will be reported immediately;

GPS LBS OFF
Turn on the GPS module immediately after the device wakes up, and report the positioning package after GPS positioning or timeout;

GPS LBS OFF
When the number of hotspots>=2, the GPS module will not be turned on;

AGPS
When the device successfully registers on the network, AGPS is available to speed up the position speed and improve the position accuracy

History data upload and Delete function

- **Command** BLIND,A# A=1 OFF A=0 ON

- **Clear command**:CLR,BLIND#
- More than 128 positions can be saved, the blind zone data read is first-in-first-out;

Early sleep mode
In order to reduce the power consumption, the device will not continue to work and directly enter the sleep state under that abnormal status: The device does not recognize the SIM card; Cellular module resets 6 times continuously; Device resets 6 times continuously; Failed to connect to the server (single IP 3 times, dual IP 2 times each); No response from server after sending upload data three times in a row. VCC voltage is lower than 2.9V; After VCC is lower than 2.7V or devices resets 6 times continuously, if the upload interval is less than 60 minutes, the sleep time will be changed to 60 minutes in mandatory ;

Low Voltage Shutdown
The device will immediately enter the low-power mode and will not wake up;

- VCC voltage is lower than 2.7V;
- VCC voltage is lower than 2.9V and the device has been continuously reset 6 times and the power is <=2%;

Connection timeout
Normally the maximum duration time of each wake-up of the device is 15 minutes.

Network and Bands lock

- Command SEARCH, P[BandNBiot BandCAT M1]
  - P: Network priority
  - P=1 Lock GSM
  - P=2 Nbiot Priority CAT-M Second GSM final
  - P=3 CAT-M Priority GSM Second NB OFF , Defaulted
  - P=4 Lock CAT-M
  - P=5 Nbiot Priority GSM Second CAT-M OFF
  - P=6 CAT-M Priority NB Second GSM OFF
  - P=7 Nbiot Priority CAT-M Second GSM OFF
- **BandNBiot:** Nbiot Bands; ALL-Bands Multiple bands are separated by half-width commas, for example B1,B3, B5
- **BandCAT-M1**: CAT-M1 Bands; ALL-Bands Multiple bands are separated by half-width commas, foexamplemp: B1, B 5 When setting this parameter, please restart the device to make it executed.

APN Auto Adapt
The device has APN adapt features howeverr, if APN is not in the APN adapt list, APN configuration is required.

BEACON

- **Command** IBEACON,uuid, major, minor,rssi#
- **UUID:** 32 bytes, Composed of 0-9, A-F, a-f, default: 0000ffa06da44e50a375bade13be6daa
- **Major:** Ibeacon group code, default 1, value range 0-65535
- **Minor** beacon code default 0 value range 0-65535
- **Rssi:** Signal strength at a distance of 1M, default -59, value range 0-255 The device is equipped with a Bluetooth chip, and it broadcasts beacon BLE information regularly after power on, and the distance can be

checked through the Apple beacon APP;

Functions

Removal alarm
There is a high sensitive light sensor at the bottom, if the device is tampered, either the device is working or in sleep mode, it will be activated and enter into anti-removal status and switch on anti-removal alarm, and report the alarm info to the backend or preset phone number. Command FALL,A#

- A=3 Turn on the removal alarm, and only report data once,as defaulted.
- A=2 Turn on the removal alarm, tracking for 15 minutes, once every 300 seconds
- A=1 Turn off the removal alarm function
- A=0 Turn on the removal alarm function, tracking for 60 minutes, once every 60 seconds

Motion alarm
The motion is in static mode and the motion alarm is turned on, and the motion alarm will be reported following the positioning after being awakened by motion;

GPS receiver failure alarm
When the GPS module is turned on, there is no GPS data output for 90 seconds, and the GPS receiver failure alarm will be reported

G-sensor failure alarm
If Gsensor I2C initialization failed, it will report motion sensor failure with position packets

Collision Alarm
Command COLLISION,A# Value Range 0-8000mg When the acceleration change value exceeds A, the device immediately wakes up and reports a collision alarm, please note collision alarm won’t work if the device is in motion and static mode as well as warehouse mode.

Installation guide

Setup and debugging

SIM card installation
Unscrew the top cover of the device, insert the prepared SIM card into the SIM card holder, and then confirm that the SIM card button is well placed. Please make sure that the SIM card has data service available in advance and note down the SIM card number.

Main unit power on
After installing the SIM card, turn the battery switch to the ON position. When the red light starts to blink, indicating that the device is powered on.

Major parameter setting by SMS or SSCOM tool

SMS list

APN,apn,user,pwd#	Set APN, User name and password For example: APN, CMNET, internet, internet# APN: CMNET Username: internet Password: internet APN,CMNET# APN:CMNET User name: Null Password:Null
IP and port	Set IP, port and communication type of primary server, For example: IP,119.23.233.52,6000,1# Set the primary server IP:119.23.233.52 port 6000 communication type:TCP

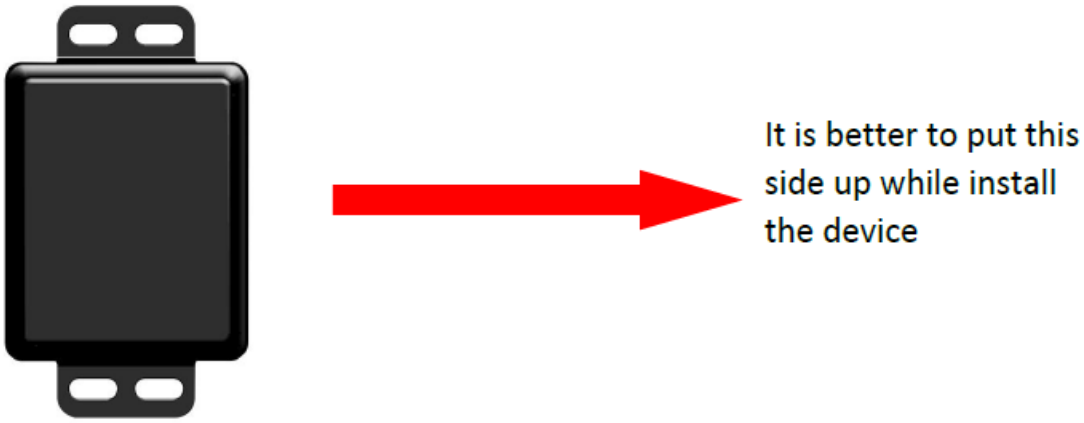
	IP,www.365qczx.com,6000,0# Set the primary server domain:**www.365qczx.com** Port 6000 communication type UDP
HX,<T>#	Sleep mode return interval, default 1440 minutes, that is, 24 hours t: wake-up time, unit: minutes range: 5-43 200 minutes for example: hx,120#
ZZ,A,[,T1,T2]#	Track mode A: A=1,Enter track mode A=0 Exit track mode T1: upload interval in track mode unit seconds Range 5-300 seconds T2:The continue track time in track mode Unit Minutes Range 5-57600 minutes
WAKEUP,T1[,T2[,T3[,T4]]]#	Latency mode sets a multipoint return parameter, up to four points in time T1…T4: A point in time, such as 0830 for 08:30 in the morning
FALL,A#	A=3 Switch on removal alarm, do not track, defalut value A=2 Switch on removal alarm, track 15 mins, 300 seconds once A=1 Switch off removal alarm A=0 Swtich on removal alarm, track 60 minutes, 60 seconds once
UTC,TTTT#	Set time zone, unit minute ,default UTC+8:00

STORAGE,T#	Storage mode return interval, default is 0, that is, turn off t: wake-up time, unit: minute value range: 2880-43200 minutes for example: storage,10080
MS,m,s#	Motion static detection mode, m: return interval during motion, default 60 minutes, value range 5-43 200 minutes s: static return interval, default 720 minutes, value range 5 43 200 minutes For example: m s,120,1440—return interval during motion is 120 minutes and static retur n interval is minutes.
*11*4#	Query communication status of the device
*22*1#	Device resume to factory setting
*22*4#	Restart the device
*77*0 number#	Set center number 1
*77*2 number#	2 Set number 2

SSCOM configuration

Com tool download link and follow up the guide for configuration: **http://dl.vodofo.com/KingwoTool20220218.rar**

Mounting recommendations



- The bottom of the tracker is fitted with a powerful magnet, please put the tracker directly on a metal surface or mount the device with screws to the surface without metals.
- Please do not put a tracker in the metal environment which will affect the GPS signal.

Safety Information

- Don’t disassemble the device by yourself
- Avoid strong humidity, direct sunlight, and high temperature
- Don’t use on airplane

FCC WARNING

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum 20cm distance between the radiator and your body: Use only the supplied antenna

Documents / Resources

	Kingwo NT27E CatM1 NB IoT Asset GPS Tracker [pdf] User Manual 2AUVX-NT27E, 2AUVXNT27E, NT27E CatM1 NB IoT Asset GPS Tracker, NT27E, CatM1 NB IoT Asset GPS Tracker, NB IoT Asset GPS Tracker, IoT Asset GPS Tracker, Asset GPS Tracker, GPS Tracker, Tracker

References

- dl.vodofo.com/KingwoTool20220218.rar
- 365qczx.com
- User Manual