Type	For customer
Date	2017/05
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Department	Engineering

Share Bike GPS+GPRS Smart Lock(Hardware) Air interface Protocol

Revision history:

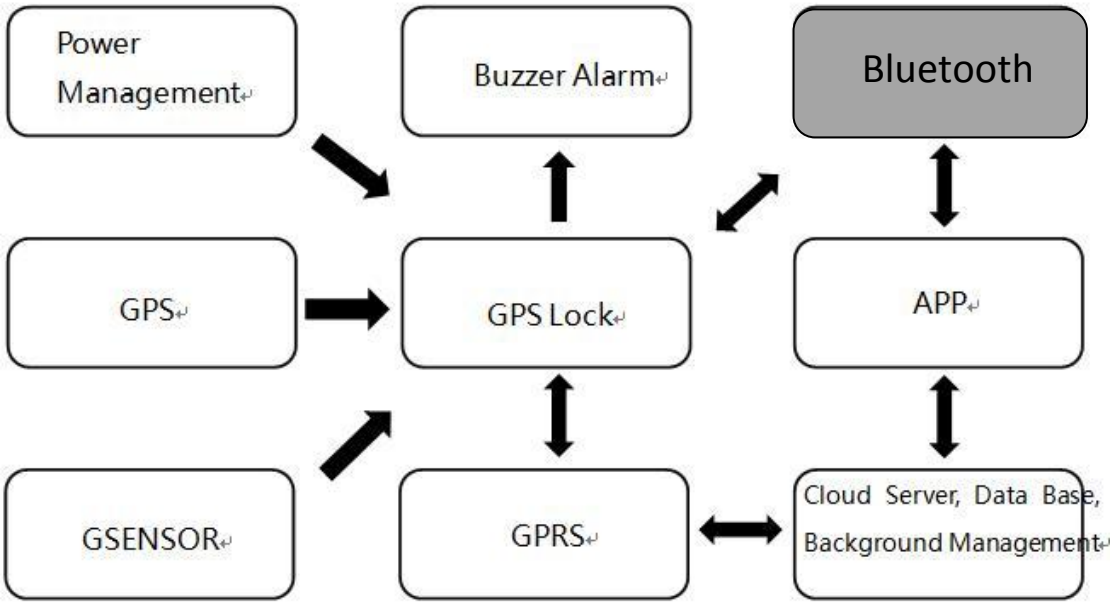
Version	Date	Revision description	Drafted by
V1.0	2016.08	Initial version	
V1.1	2016.08	Add Command head OXFF, optimized format	
V2.0	2016.09	Delete extra command	
V2.1	2016.09	Q0/H0 command, added battery report	
V2.2	2016.09	H0 command, added current lock status command	
V2.3	2016.09	Added L0, L1 command resend mechanism	
V2.4	2016.11	Added “Re” command response	
V2.5	2017.05	Added revision history and content and command head description	

Content

1. Functions Framework:

Includes the Server, Mobile APP, and the GPS Bike Lock(Terminal).

System Frame:



2. Communication connecting:

- ASCII Command character, all command characters are capital letter.
- The communication protocol is TCP-SOCKET between Lock and Server.
- The Lock sends a TCP connecting requests to Server, after connecting succeed, sends a Sign-in Packet Command to Server(Q0), and then sends a command each 4 minutes (Heartbeat Packet Command(H0), or other commands), for maintaining the connection of TCP.
- Heartbeat Packet Command includes Lock's time(Default), current battery, etc.

3. Command Data Format:

3.1 Device Type Identify Code(2 byte, according to specific hardware version**): ****

3.2 Server sends command to Terminal(Bike Lock)

Reserved Bits (2 bytes HEX): 0xFF,0xFF

Command Header (5 bytes): *CMDS

Device Type Identification Code (2 bytes): XX

Product Serial Number (15 bytes): YYYYYYYYYYYYYY

Server Time-Year/Month/Day/Hour/Min/Sec : YYMMDDHHMMSS

Command Code (2 bytes): CMDNUM

Command Value：datd1, data2.....

Command Ends Code: #

3.3 Lock sends/backtrack Command to Server

Command Header (5 bytes)：*CMDR

Device Type Identification Code (2 byte, according to specific hardware version)： **

Product Serial Number (15 bytes)：YYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code (2 bytes)：CMDNUM

Command Value：datd1,data2.....

Command Ends Code: # + Line breaks character: '\n'

3.4 Server receives a response from the Lock End after the instruction is executed

Reserved Bits (2 bytes HEX)： 0xFF,0xFF

Command Header (5 bytes)：*CMDR

Device Type Identification Code (2 byte, according to specific hardware version)： **

Product Serial Number (15 bytes)：YYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code (2 bytes)：Re

Command Value：cmd (Commend code received from lock response, Example: L0、 L1、 G0 etc.)

Command Ends Code: # + Line breaks character '\n'

Example: (Reserved Bits ff(2 bytes HEX))：

0XFF,0XFF +*CMDS,XX,863158022988725,000000000000,Re,L0#<LF>

3.5 Description of the red part 2 Byte FF (Hex) of the Command head:

Corresponding Ascii code table for each character of the command head using

Charac	Decimal system	Hexadecimal	Remarks
0	48	0x30	
1	49	0x31	
2	50	0x32	
3	51	0x33	
4	52	0x34	
5	53	0x35	
6	54	0x36	
7	55	0x37	
8	56	0x38	
9	57	0x39	
	255	0xFF	The two FF before command header represent 0XFF
*	42	0x2A	
C	67	0x43	
M	77	0x4D	
D	68	0x44	
S	83	0x53	
R	82	0x52	
,	44	0x2C	
#	35	0x23	

4. Communication Instructions(Foundations Instructions):

Remarks: Green part is basic function instruction of current GPS horseshoe lock , The command can be added as per customized function needs.

4.1 Device Sign-in Command/Instruction **Q0** (Device - > Server)
4.2 Heartbeat Packet **H0** (Device -> Server)
4.3 Locating Command **D0** (Device < - > Server)
4.4 Unlocking Command **L0** (Device < - > Server)
4.5 Locking report to Server Command **L1** (Device < - > Server) (below command is not available in current version)
4.6 Get Lock battery power, GPRS signal strength, lock status, alarm status command S5 (Device <->Server)
4.7 Buzzer finding bike prompt command S8 (Device <-> Server)
4.8 Firmware Version Query Command G0 (Device <-> Server)
4.9 Alarm command W0(Device < - > Server)
4.10 Read ICCID code Command I0 (Devide < - > Server)

5. Communications Command Illustration (Basic Instructions):

5.0 Sign-in Command Q0

Functions Illustration :for bicycle lock sign-in Server;

5.0.1 Server -> bicycle lock : non

5.0.2 bicycle lock -> Server:

*CMDR, XX, YYYYYYYYYYYYYYY,YYMMDDHHMMSS,Q0, batv#

Command Header : *CMDR

Device Type Identification Code (2 bytes) : XX

Device IMEI Number : YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec : YYMMDDHHMMSS

Command Code : Q0

Command value: batv represents the battery voltage of the lock (Example: 412 means 4.12V)

Example:

*CMDR, XX, 863158022988725,161201150000,Q0, 412#<LF>

5.1 Heartbeat Packet H0

Functions illustration: for maintaining the connection between bicycle lock and Server;

5.2.1 Server -> bicycle lock: none

5.2.2 bicycle lock -> Server:

*CMDR, XX, YYYYYYYYYYYYYYY,YYMMDDHHMMSS,H0,status,batv#

Command Header : *CMDR

Device Type Identification Code (2 bytes) : XX

Device IMEI Number : YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec : YYMMDDHHMMSS

Command Code : H0

Command Value: status means the lock status value

Command value: batv represents the battery voltage of the lock (Example: 412 means 4.12V)

Example:

*CMDR,OM,863158022988725,161201150000,H0,0,412#<LF>

5.2 Locating Command D0 (For now, bicycle lock will upload position automatically in specified situation)

Functions illustration: for when alarm/locking processing, locating the bicycle position and upload to Server;

5.2.1 Server -> bicycle lock:

*CMDS,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,D0#

Reserved Bits：0xFF,0xFF

Command Header：*CMDS

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYYY

Server Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code: D0

Command Value: none

Example: (Red part is reserved bits 2 Byte - ff(HEX))：

0XFF,0XFF + *CMDS,XX,863158022988725,000000000000,D0#<LF>

5.2.2 bicycle lock -> Server:

*CMDR,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,D0, locationdata#

Command Header：*CMDR

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code：D0

Command Value： Locationdata is the responsed GPS data

Example:

*CMDR,XX,863158022988725,000000000000,D0,0,124458.00,A,2237.753
14,N,11408.62621,E,0.066,,151216,,,A#<LF>

5.2.3 GPS Data format analysis

*CMDR,XX,863158022988725,000000000000,D0,0,<1>,<2>,<3>,<4>,<5>,<6>,<7>,<8>,<9>,<
10>,<11>,<12>#

<1> UTC Time, hhmmss(HHMMSS) fomat
<2> Positioning status, A = active positioning, V = invalid positioning
<3> Latitude ddmm.mmmm (degrees) format (the front 0 will also be transmitted)
<4> Latitude hemisphere N (northern hemisphere) or S (southern hemisphere)
<5> Longitude dddmm.mmmm (degrees) format (the front 0 will also be transmitted)
<6> Longitude hemisphere E (longitude) or W (west)
<7> Ground rate (000.0 to 999.9, the front 0 will also be transmitted)
<8> Ground heading (000.0 ~ 359.9 degrees, with true North as the reference, the front 0 will also be transmitted)
<9> UTC date, ddmmyy (day / month) format
<10> magnetic declination (000.0 ~ 180.0 degrees, the front 0 will also be transmitted)
<11> Magnetic declination direction, E (east) or W (west)
<12> mode indication (A = autonomous positioning, D = differential, E = estimate, N = data is invalid)

5.3 Unlocking/locking Command **L0 (**The current horseshoe lock is only remotely unlocked without remote locking**)**

Functions illustration: for unlocking/locking;

5.3.1 Server -> bicycle:

*CMDS,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,L0,onoff# Reserved Bits：0xFF,0xFF

Command Header：*CMDS

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYYY

Server Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Value：

Onoff: unlock（0）/lock（1）

Terminal Command Execute illustration:

Terminal unlock/lock then after receiving the Command.

Example: (Red part is reserved bits 2 Byte - ff(HEX))：
0XFF,0XFF + *CMDS,XX,863158022988725,000000000000,L0,0#<LF>

5.3.2 bicycle lock-> Server：

*CMDR,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,L0,onoff#
Command Header: *CMDR

Device Type Identification Code (2 bytes)： XX

Device IMEI Number: YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec :YYMMDDHHMMSS

Command Code: L0

Command Value: Onoff: unlock (0) /lock(1)

Terminal Command Execute illustration:
Terminal unlock/lock then after receiving the Command.(The bicycle lock is only for unlocking, lock by manual)
Example:
*CMDR,OM,863158022988725,161201150000,L0,0#<LF>

5.4 Bicycle locked information uploading L1
Functions illustration: for lock body reporting bicycle locked to Server;
5.4.1 Server -> bicycle lock: none

5.4.2 Bicycle lock -> Server:
*CMDR,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,L1#

Command Header: *CMDR

Device Type Identification Code (2 bytes): XX

Device IMEI Number: YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec: YYMMDDHHMMSS

Command Code: L1

Command Value: none
Example:
*CMDR,OM,863158022988725,161201150000,L1#<LF>

5.5 Get Terminal Lock Battery power, GPRS signal strength, lock status, alarm status command S5
Function instruction: Used for obtaining basic status info of the smart lock；
5.5.1 Server -> Bike lock：
*CMDS,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,S5#
Reserved Bits：0xFF,0xFF

Command Header：*CMDS

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYY

Server Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code: S5

Command Value: none

Example: (Red part is reserved bits 2 Byte - ff(HEX))：

0XFF,0XFF + *CMDS,XX,863158022988725,000000000000,S5#<LF>

5.5.2 Bike lock -> Server：

*CMDR,XX,YYYYYYYYYYYYYY,YYMMDDHHMMSS,D0,batv,csq,R,lock,warning#

Command Header：*CMDR

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code：S5

Command value:

batv: represents the battery voltage value(344 ~ 420) of the lock (Example: 412 means 4.12V)

csq: represents the GPRS signal value of the lock(0 ~ 31)

R: Reserved parameter

lock: Current lock status(1 - Lock/ 0 - Unlock)

warning: The lock alarming info(Reserved parameters)

Example:

*CMDR,XX,863158022988725,000000000000,S5,412,31,00,1,0#<LF>

5.6. *Buzzer alarm look*ing for bike command S8

Function instruction: Used for obtaining basic status info of the smart lock;

5.6.1 Server -> Bike lock ：

*CMDS,XX,YYYYYYYYYYYYYY,YYMMDDHHMMSS,S8,btime,recive#

Reserved Bits：0xFF,0xFF

Command Header：*CMDS

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYY

Server Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code: S8

Command Value:
btime: The number of seconds the buzzer alarm rings
recive: Reserved parameters

Example: (Red part is reserved bits 2 Byte - ff(HEX))：
0XFF,0XFF + *CMDS,XX,863158022988725,000000000000,S8,5,0#<LF>

5.6.2 Bike lock -> Server：

*CMDR,XX,YYYYYYYYYYYYYY,YYMMDDHHMMSS,D0,batv,csq,R,lock,warning#

Command Header：*CMDR

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code：S8

Command value:
btime: The number of seconds the buzzer alarm rings
recive: Reserved parameters

Example:
*CMDR,XX,863158022988725,000000000000,S8,005,000#<LF>

5.7 Firmware Version Query Command G0

Function Instruction: Used for firmware version and Compile date inquire

5.7.1 Server -> Bike lock ：

*CMDS,XX,YYYYYYYYYYYYYY,YYMMDDHHMMSS,G0#

Reserved Bits：0xFF,0xFF

Command Header：*CMDS

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYY

Server Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code: G0

Command Value: none

Example: (Red part is reserved bits 2 Byte - ff(HEX))：

0XFF,0XFF + *CMDS,XX,863158022988725,000000000000,G0#<LF>

5.7.2 Bike lock -> Server：

*CMDR,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,G0,ver,date#

Command Header：*CMDR

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code：G0

Command value:

ver: Version

date: Compile date

Example:

*CMDR,XX,863158022988725,000000000000,G0,V1.0,May 17 2017#<LF>

5.8 Alarming Command W0

Function Description: for the bike lock in a period of time was a continuous percussion to the server alarm;

5.8.1 Server -> Lock: None

5.8.2 Lock -> Server

*CMDR,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,W0,wval#

Command header (ASCII)： *CMDR

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code: W0

Command Value: wval represent alarming status, 1: Alarming, 0: not alarming

Example: *CMDR,XX,863158022988725,000000000000,W0,1#<LF>

5.9 Query the ICCID of the SIM card I0

Function description: Used for query the ICCID code of the SIM card;

5.9.1 Server-> Lock:

*CMDS,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,I0#

Reserve Bits (HEX)： 0xFF,0XFF

Command header (ASCII)： *CMDS

Device Type Identification Code (2 bytes)：XX

Device IMEI Number：YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec：YYMMDDHHMMSS

Command Code: I0

Command Value: None

Example: (Red part is reserved bits 2 Byte - ff(HEX)):

0XFF,0XFF + *CMDS,XX,863158022988725,000000000000,I0#<LF>

5.9.2 Lock -> Server:

*CMDR,XX,YYYYYYYYYYYYYYY,YYMMDDHHMMSS,I0,iccidnum#

Command header (ASCII): *CMDR

Device Type Identification Code (2 bytes): XX

Device IMEI Number：YYYYYYYYYYYYYYY

Local Time-Year/Month/Day/Hour/Min/Sec(current version is with 0 for all)：YYMMDDHHMMSS

Command Code: I0

Command Value: None

iccidnum: ICCID code of the SIM card

Example：

*CMDR,XX,863158022988725,000000000000,I0,098602B5191690195340#<LF>

Remarks：

* This Protocol is customized by clients 's requirement for specified product functions;

* This Protocol's some parts with details would be adjusted or modified according to practical operating situation.