Date: 2008/3/4 **By: James Lin / SW Engineer**

Communication Specification

Model: DG100/BT-335/BT-338X

Product Application GPS data logger

Revision History

Version	Change History	Issue Date	Remark
0.1	Initiation	Jan 30,2007	Preliminary
0.2		Feb 5, 2007	Preliminary
0.3		Aug 7,2007	
0.4	Add the the header of track file	Aug 14,2007	

GlobalSat Technology Corporation
16F., NO.186, Jian-Yi Road, 235 Chung Ho City,
Taipei Hsien, Taiwan, R.O.C.
Tel: +886-2-8226-3799 Fax: +886-2-8226-3899

The Format of communication between PC software and Data Logger

1. General Format & Rules

1.1 For Sending Format

The general format of communication sent to Data Logger is:

Start Sequence	Payload Length	Payload	Message Checksum	End Sequence
0xA0,0xA2	Two-bytes	Up to 1023	Two-bytes	0xB0,0xB3

1.2 For Returning Format

The general format of communication received from Data Logger is:

Start Sequence	Payload Length	Payload	Message Checksum	End Sequence
0xA0,0xA2	Two-bytes	Up to 1023	Two-bytes	0x0D,0x00

Note:

All information from/to Data Logger is Big-Endian.

The information exchanged between PC software and Data Logger is located in the **PAYLOAD field**.

For RETURNED COMMAND, the length of PAYLOAD is ignored.

1.3 How to calculate checksum

Assume **PAYLOAD** is a array that is transmitted, and **PAYLOAD_LEN** is the length of this array:

```
Checksum = PAYLOAD [0];
For ( i =1; I < PAYLOAD_LEN; i++)
{
      Checksum = Checksum + PAYLOAD [i];
}

Checksum = Checksum & (2^15 – 1);
```

1.4 Payload Format

The exchange data format used in DG is:

Command ID	Parameter
One-byte	n-bytes value

2. Communication Interface

2.1 Get Configuration

Send Command:

Command ID	Parameter
0xB7	None

Return Value:

Command ID	Parameter
0xB7	44-bytes value

Parameter description:

Information Type	Speed Threshold Flag	Speed Threshold	Distance Threshold flag	Distance Threshold
Byte 0	Byte 1	Byte 2 – byte 5	Byte 6	Byte7-byte10
Time Interval 1	Time Interval 2	Time Interval 3	Not used	Not used
Byte11-byte14	Byte15-byte18	Byte19-byte22	Byte23	Byte 24
Interval by time1/distance1 flag	Interval by time2/distance2 flag	Interval by time3/distance3 flag	Interval by distance1	Interval by distance2
Byte25	Byte26	Byte27	Byte28-byte31	Byte32-byte35
Interval by distance3	Not used	Memory usge	Not used	Not used
Byte36-byte39	Byte40	Byte41	Byte42	Byte43

Note:

The unit of time is seconds.

The unit of distance is meter.

The value of flag: 0 is DISABLE, 1 is ENABLE.

Information type: 0: position only, 1: position, speed and date/time, 2: position, speed, date/time and altitude.

2.2 Set Configuration

Send Command:

Command ID	Parameter
0xB8	41-bytes value

Parameter description:

Information Type	Speed Threshold Flag	Speed Threshold	Distance Threshold flag	Distance Threshold
Byte 0	Byte 1	Byte 2 – byte 5	Byte 6	Byte7-byte10
Time Interval 1	Time Interval 2	Time Interval 3	Not used	Not used
Byte11-byte14	Byte15-byte18	Byte19-byte22	Byte23	Byte 24
Interval by time1/distance1 flag	Interval by time2/distance2 flag	Interval by time3/distance3 flag	Interval by distance1	Interval by distance2
Byte25	Byte26	Byte27	Byte28-byte31	Byte32-byte35
Interval by distance3	Not used, set to 0x01			
Byte36-byte39	Byte40			

Return Value:

Command ID	Parameter
0xB7 or 0xB8	4-bytes value

Parameter description:

Result
Byte 0-byte3

Note:

If it is OK, result = 1.

GlobalSat Technology Corporation
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2.3 Get Track file header

Send Command:

Command ID	Parameter
0xBB	2-bytes value

Parameter description:

The index of the first train file in this iteration
Byte 0-byte1

Return Value:

Command ID	Parameter
0xBB	(12*N+4)-bytes value

Note:

N is the number of track file headers

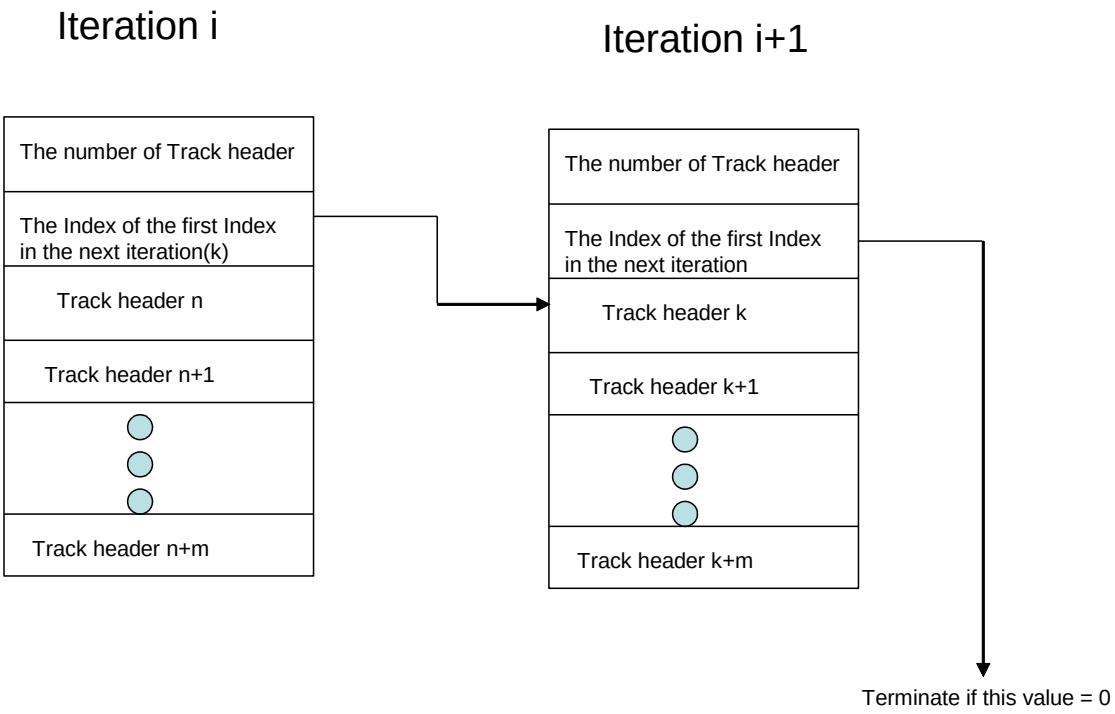
Parameter description:

The number of track file headers returned (assume it is N)	The index of the next track file can be got	The track file header
Byte 0-byte1	Byte2-byte3	Byte4- byte(12*N+3)

Note:

Continue to call the function until N = 0. The index of the first track file in this iteration is the index of the next track file returned in last iteration. The index of the first track file is 0 in the first iteration. Refer the flow chart shown in the next page.

GlobalSat Technology Corporation
16F., NO.186, Jian-Yi Road, 235 Chung Ho City,
Taipei Hsien, Taiwan, R.O.C.
Tel: +886-2-8226-3799 Fax: +886-2-8226-3899



Header Format:

Byte0-Byte3: Time=>32 bit integer:
Value: HHMMSS
Byte4-Byte7: Date=>32 bit integer
Value:YYMMDD
Byte8-Byte11: The index of file=>32 bit integer

For example:
Time: 17:10:10, the value is 171010
Date: 2006/12/13, the value is 061213

2.4 Get a track file

Send Command:

Command ID	Parameter
0xB5	2-bytes value

Parameter description:

The index of the track file
Byte 0-byte1

Return Value:

The track file is return in two sessions, so the two sessions should be combined together to parse data.

Command ID	Parameter
0xB5	1024-bytes value

Parameters:

Track file
Byte 0-byte1023

Note:

The End sequence for this command is 6-bytes values.

Parse track records in a track file:

1. Get the parameter(1032-bytes value) from two sessions
2. Strip the GPS information from the parameter(1024-bytes value, byte0-byte1023)
3. Combine two 1024-bytes value then parse GPS information:
4. The format of a track file will like as:

Track record 1	Track record 2	Track record 3 … Track record n
Byte 0-byte31	Byte32-byteM	byteM-byte2047

The format of the first track record must be FORMAT C (32 bytes). The format of other track records in this track file is decided by the field “STYLE” of the first track record.

There are three formats for storing track records:

a. Position only(8 bytes):

Latitude	Longitude
Byte 0-byte3	Byte4-byte7

b. Position, date/time and speed(20 bytes):

Latitude	Longitude	UTime	UDate	Speed
Byte 0-byte3	Byte4-byte7	Byte8-byte11	Byte12-byte15	Byte16-byte19

c. Position, date/time, speed and altitude(32 bytes):

Latitude	Longitude	UTime	UDate	Speed
Byte 0-byte3	Byte4-byte7	Byte8-byte11	Byte12-byte15	Byte16-byte19
Altitude	Not used	Style		
Byte20-byte23	Byte24-byte27	Byte28-byte31		

Note:

The format of all fields are described as following, and the type of all fields are number.

Latitude: ddmmmmm, N/S indicator: N: if this field > 0, S: if this field < 0

Longitude: dddmmmmm, E/W indicator: E: if this field >0, W: if this field >0

UTime: hhmmss

UDate: ddmmyy

Speed: (km/hour) * 100

Altitude: (meter)*10000

Style: 0: Position only, 1: Position, date/time and speed, 2: Position, date/time, speed and altitude

Example: How the get the track record?

The raw data (HEX format) is like that: it is FORMAT C

0026239B00B95F380001B2070001D97600000000000000000000000100000002

So parsing:

(0026239B)(00B95F38)(0001B1A1)(0001D912)(00000064)(00006400)(00000001)(00000002)

Latitude = 0x0026239B = 2499483 =>24^{o}99.483

Longitude=0x00B95F38=12148536=>121^{o}48.536

UTime=0x0001B1A1=111009 =>11:10:09(hour:minute:second)

UDate=0x0001D912=121106=>2006/11/12

Speed=0x00000064=100=> 1 (km/hour)

Altitude=0x00006400=25600=> 2.56 meter

Style=0x0000002 =>Format C

2.5 Delete All track files

Send Command:

Command ID	Parameter
0xBA	0xFF,0xFF

Return Value:

Command ID	Parameter
0xBA	4-bytes value

Parameter description:

Result
Byte 0-byte3

Note:

Result = 1, it is OK.

2.6 Get the ID of DG

Send Command:

Command ID	Parameter
0xBF	None

Return Value:

Command ID	Parameter
0xBF	8-bytes value

Parameter description:

ID of DG100
Byte 0-byte7

2.7 Set the ID of DG

Send Command:

Command ID	Parameter
0xC0	8-bytes value

Return Value:

Command ID	Parameter
0xC0	4-bytes value

Parameter description:

Result
Byte 0-byte3

Note:

1. **one byte represents a digit(0-9), so there 8 bytes for 8 digits.**
2. **Result = 1, then the save action is OK**