

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	1 of 31

GNSS system for operating vehicles —
General specifications for the communication protocol and data
format of BD compatible vehicle terminal (DC600)

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File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	2 of 31

Content

1. Scope	5
2. Normative documents reference	5
3. Terms, definitions and abbreviations	5
3.1 Terms and definitions	5
3.1.1 Abnormal data communication link	5
3.1.2 Register	5
3.1.3 Logout	5
3.1.4 Authentication	5
3.1.5 Location reporting strategy	6
3.1.6 Location reporting program	6
3.1.7 Additional points report while turning	6
3.1.8 Answering strategy	6
3.1.9 SMS text alarm	6
3.1.10 Event item	6
3.2 Abbreviations	6
4. Protocol basis	6
4.1 Communication way	6
4.2 Data type	7
4.3 Transmission rules	7
4.4 Constitution of messages	7
4.4.1 Message structure	7
4.4.2 Flag bit	7
4.4.3 Header	7
4.4.4 Check code	8
5. Communication connection	8
5.1 Connection startup	8
5.2 Maintenance of connection	9
5.3 Connection disconnected	9

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	3 of 31

6. Message processing	9
6.1 TCP and UDP message processing	9
6.1.1 Messages mainly send from the platform	9
6.1.2 Messages mainly send from the terminal	9
6.1.2.1 The data communication link is normal	9
6.2 SMS message dispose	10
7. Protocol classification	10
7.1 Introduction	10
7.2 Terminal management protocol	10
7.2.1 Terminal registration/ logout	10
7.2.2 Terminal authentication	10
7.2.3 Set/query terminal parameters	10
7.2.4 Terminal control	10
7.3 Location and alarm protocol	11
7.3.1 Location information report	11
7.3.2 Location information query	11
7.3.3 Temporary location tracking control	11
7.3.4 Terminal alarm	11
7.4 Information protocol	11
7.4.1 Text information sending	11
7.4.2 Event setting and reporting	11
7.4.3 Questions	11
7.4.4 Information on-demand	11
8. Data format	12
8.1 Terminal general response	12
8.2 Platform general response	12
8.3 Terminal heartbeat	12
8.4 Terminal registration	12
8.5 Terminal registration response	13

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	4 of 31

8.6 Terminal authentication	13
8.7 Terminal parameter setting	14
8.8 Check terminal parameter	15
8.9 Check specified terminal parameters	15
8.10 Check terminal parameter response	15
8.11 Check terminal attribute	15
8.12 Check terminal attribute response	15
8.13 Location information report	17
8.14 Manually confirm alarm message	19
8.15 Send down text information	20
8.16 Send down terminal update packet	20
8.17 Notification of terminal upgrades results	21
8.18 Setting circle area	21
8.19 Delete circle area	23
8.20 Setting rectangle area	23
8.21 Delete rectangle area	24
8.22 Setting polygon area	24
8.23 Delete polygon area	25
8.24 Setting route	25
8.25 Delete route	26
8.26 Positioning data batch upload	27
8.27 Multimedia event information uploading	27
8.28 Multimedia data upload	28
8.29 Multimedia data upload response	28
8.30 Camera immediately taken command	28
8.31 Camera immediately taken command response	29
8.32 Retrieve of store multimedia data	30
8.33 Response of store multimedia data retrieves	30
8.34 Store multimedia data upload command	31
8.35 Single storage multimedia data retrieval uploads command	31

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	5 of 31

1. Scope

The specification provides communication protocol and data format between the road transport vehicle satellite positioning system beidou compatible vehicle terminal (hereinafter referred to as the terminal) and the supervising/monitoring platform (hereinafter referred to as the platform). Including protocol base, communication connection, message processing, protocol classification, illustration and data format.

This specification is applicable to the communication between the road transport vehicle satellite positioning system beidou compatible vehicle terminal and platform.

2. Normative documents reference

The following documents are essential for the application of this document. Reference file that has a date, only the date that is indicated is applicable to this document. The latest version (including all of the modifications) of the undated reference file is applicable to this document.

GB/T 2260 Code of administrative division of the People's Republic of China

GB/T 19056 Vehicle tachograph

JT/T 415-2006 Road transport e-government platform cataloging encoding rules

JT/T 794 Vehicle terminal technical requirements for road transport vehicle satellite positioning system

3. Terms, definitions and abbreviations

3.1 Terms and definitions

The following terms and definitions are applied to this document.

3.1.1 Abnormal data communication link

The wireless communication link is disconnected, or temporarily suspended (such as during the call process).

3.1.2 Register

The terminal sends message to the platform informing that it is installed on a certain vehicle.

3.1.3 Logout

The terminal sends message to the platform informing to remove it from the installed vehicle.

3.1.4 Authentication

When terminal connects to the platform, it sends a message to the platform to verify its identity.

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	6 of 31

3.1.5 Location reporting strategy

Timing/distance interval reporting or both.

3.1.6 Location reporting program

The rules of periodic reporting interval are determined according to relevant conditions.

3.1.7 Additional points report while turning

The terminal reports the location information when it is judged that the vehicle is changing direction. Sampling frequency is not less than 1Hz, car azimuth rate not less than 15°/s, and continues for at least more than 3s.

3.1.8 Answering strategy

The rules of answering incoming calls automatically or manually.

3.1.9 SMS text alarm

When terminal alarm, send text message by SMS.

3.1.10 Event item

Event items are preset by the platform to the terminal, which consists of event encoding and event names. The driver operates the terminal when encounters the corresponding event, and the trigger event report is sent to the platform.

3.2 Abbreviations

The following abbreviations are applied to this document.

APN-- access point name

GZIP-- GNU zip

LCD-- liquid crystal display

RSA-- An asymmetric cryptographic algorithm (developed by Ron Rivest, Adi Shamirh and Len Adleman, RSA named from the first letter of the three people's name).

SMS-- short message service

TCP-- transmission control protocol

TTS-- text to speech

UDP-- user datagram protocol

VSS-- vehicle speed sensor

4. Protocol basis

4.1 Communication way

The communication way of this protocol should comply with the relevant provisions of JT/T 794. Communication protocol is either TCP or UDP, the platform serves as the server and the terminal as the client. When the data communication link is abnormal, the terminal can communicate by SMS message.

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	7 of 31

4.2 Data type

The data types used in the protocol message are shown in table 1:

Table 1: data type

Data type	Descriptions and requirements
BYTE	No symbol single byte integer (bytes, 8 bits)
WORD	No symbol double byte integer (word, 16 bits)
DWORD	No symbol four-byte integer (double word, 32 bits)
BYTE[n]	n bytes
BCD[n]	8421 code, n bytes
STRING	GBK encode, if no data, set blank

4.3 Transmission rules

The protocol uses the network byte sequence of big-endian to deliver the word and double word.

The transmission agreement is as follow:

--BYTE: transmitted in the form of byte stream;

--WORD: transmit the high 8 bits first, then the low 8 bits;

--DWORD: transmit the high 24 bits first, then the high 16 bits, at last the low 8 bits.

4.4 Constitution of messages

4.4.1 Message structure

Each message is made up of flag bit, header, message body and check code, the message structure diagram is shown in figure 1:

Flag bit	Header	Message body	Check code	Flag bit
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Figure 1: message structure diagram

4.4.2 Flag bit

Use 0x7e to represent, if 0x7e appears in the check code, header and message body, it is to be escaped. The escape rules are defined as follows:

0x7e ← → 0x7d follows by a 0x02;

0x7d ← → 0x7d follows by a 0x01.

The escape process is as follows:

When sending message: message encapsulation → calculate and fill the check code → escape;

When receiving message: escape restore → validate check code → message parse.

e.g.:

Sending a data package of 0x30 0x7e 0x08 0x7d 0x55, the package is encapsulated as follows:
0x7e 0x30 7d 0x02 0x08 0x7d 0x01 0x55 0x7e.

4.4.3 Header

The header content is shown in table 2:

Table 2: Header content

Starting byte	Field	Data type	Descriptions and requirements
0	Message ID	WORD	
2	Message body attribute	WORD	See figure 2 for the message body attribute format structure diagram.
4	Terminal	BCD[6]	Converse according to the terminal's own mobile phone

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	8 of 31

	phone number		number after installation. Add number in the front if the mobile phone number is less than 12 bits, the mainland phone number add 0, and the Hong Kong, Macao and Taiwan is based on their domain code.
10	Message serial number	WORD	Loop accumulates from 0 according to sending sequence.
12	Message package encapsulation item		If the relevant identification bit in the message body attribute determines the message sub-packageing, this item has content, otherwise it is not.

The message body attribute format structure diagram is shown in figure 2:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reserve		Sub-package	Data encryption way			Length of the message body									

Figure 2: message body attribute format structure diagram

Data encryption way:

- bit 10~bit 12 is data encryption identification bit;
- When all the three bits are 0, indicates that the message body is not encrypted;
- When the tenth bit is 1, indicates the message body is encrypted by the RSA algorithm;
- Others reserved.

Sub-package:

When the 13th bit in the message body attribute is 1, indicates the message body is a long message, sub-package delivery. The specific sub-packageing information is determined by the message package encapsulation item. If the 13th bit is 0, there's no message package encapsulation item field in the message header.

The message package encapsulation item is shown in table 3:

Table 3: message package encapsulation item

Starting byte	Field	Data type	Descriptions and requirements
0	Total number of packages	WORD	The total number of packages after sub-packageing
2	Package No.	WORD	Starting from No.1

4.4.4 Check code

The check code refers to a byte from the beginning of the header, exclusive or with the next byte until the previous byte of the check code.

5. Communication connection

5.1 Connection startup

Data daily connections between terminals and platforms can be either TCP or UDP. Terminal should connect with the platform as soon as it reset, and then send terminal authenticate message to the platform for authentication immediately after the connection is established.

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	9 of 31

5.2 Maintenance of connection

After connection establishment and terminal authentication succeed and in the absence of normal data packages, the terminal should periodically send a terminal heartbeat message to the platform, the platform receives and sends the platform general reply message to the terminal. The sending period is specified by the terminal parameter.

5.3 Connection disconnected

Both the platform and the terminal can be disconnected according to the TCP protocol, and both platform and terminal should actively judge whether the TCP connection is disconnected.

Method of the platform determining the connection is disconnected:

- According to the TCP protocol, the terminal active disconnects is determined;
- A new connection is established from the same identity terminal indicating that the original connection has disconnected;
- Not receiving the message from the terminal within a certain amount of time, such as the terminal heartbeat.

Method of the terminal determining the connection is disconnected:

- According to the TCP protocol, the terminal active disconnects is determined;
- The data communication link is disconnected;
- The data communication link is normal, after reaching the retransmission times it still hasn't received a response.

6. Message processing

6.1 TCP and UDP message processing

6.1.1 Messages mainly send from the platform

All the messages mainly send from the platform require terminal responses. The responses are divided into general responses and specific responses, which are decided by the specific functions. After the sender waiting timeout should resend the message. The response timeout period and resend times are specified by the platform parameters. Formula of calculating the response timeout period after resend is shown in formula (1):

$$T_{N+1} = T_N \times (N+1) \quad \dots\dots\dots (1)$$

In the formula:

- T_{N+1} --Timeout period after each resend;
- T_N --The previous response timeout period;
- N --Resend times.

6.1.2 Messages mainly send from the terminal

6.1.2.1 The data communication link is normal

When the data communication link is normal, all the messages mainly send from the terminal require platform responses. The responses are divided into general responses and specific responses, which are decided by the specific functions. After the terminal is waiting timeout should resend the message. The response timeout period and resend times are specified by the platform parameters. The timeout period after resend is calculating according to formula (1). The key alarm message sent from the terminal will be stored if it is not received after the resend times is reached. Before sending other messages, it will send the stored key alarm message.

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	10 of 31

6.1.2.2 The data communication link is abnormal

When the data communication link is abnormal, the terminal should store the location information report that needs to be sent.

6.2 SMS message dispose

When the terminal communication mode is switched to the SMS message mode from GSM network, the PDU eight bit encoding method is adopted. For messages that more than 140 bytes should be sub-packageed according to the SMS service specification of GSM network.

The response, resend and store mechanism of SMS messages is the same as 6.1 while response timeout period and resend times should according to parameter ID0x0006 and 0x0007 related set values in table 10.

7. Protocol classification

7.1 Introduction

The protocol is described by functional classification as follow. If there's no special mention, the TCP communication is the default. The communication protocol between the vehicle terminal and the external equipment is shown in appendix A. The message comparison table of the message name and message ID in the protocol is shown in appendix B.

7.2 Terminal management protocol

7.2.1 Terminal registration/ logout

In the unregistered state, the terminal should be registered first. The terminal will receive the authentication code and store it after registration, the authentication code will be used when the terminal log in. Before the vehicle needs to be removed or replaced, the terminal should logout and cancels the corresponding relationship between the terminal and the vehicle.

If the terminal chooses to send the terminal registration and terminal logout by SMS, the platform should send response to the terminal registration via SMS, and send platform general response to the terminal logout by SMS.

7.2.2 Terminal authentication

After the registration of the terminal, each time after connected with the platform, should authenticate immediately. The terminal shall not send any other information before authentication success.

The terminal authentication via sending terminal authentication message, the platform responds platform general response message.

7.2.3 Set/query terminal parameters

The platform sets the terminal parameters by sending the terminal parameter message, and the terminal responds terminal general response message. The platform queries the terminal parameters by sending query terminal parameters, terminal responds query terminal parameter response message.

7.2.4 Terminal control

The platform controls the terminal by sending terminal control message, the terminal responds terminal general response message.

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	11 of 31

7.3 Location and alarm protocol

7.3.1 Location information report

The terminal will periodically send the location information report based on the parameters. According to the parameter control, the terminal can report the location information when the vehicle is turning.

7.3.2 Location information query

The platform queries the message by sending location information; query the location information of the car terminal, terminal query response message by responds location information.

7.3.3 Temporary location tracking control

The platform start/stop location tracking by sending temporary location tracking control. Location tracking requires period report at the specified time interval before the terminal stop, the terminal responds terminal general response message.

7.3.4 Terminal alarm

When the terminal determines the alarm condition is met, the location information will be reported. Set the corresponding alarm sign in the location report, the platform can be used for alarm processing by responds the platform general response message.

Each alarm type is described in the location information report message body. Alarm sign maintained to the alarm condition is removed should send location information report message immediately, to clear the corresponding alarm signs.

7.4 Information protocol

7.4.1 Text information sending

The platform sends out messages by sending text messages and notifies the driver in the specified way. The terminal responds terminal general response message.

7.4.2 Event setting and reporting

The platform sets the message by sending events, store the event list in the terminal, after encountering corresponding event, the driver can enter the event list interface to select and terminal send event report message to the platform.

Setting message by events requires the terminal to responds the terminal general response message. Event report message requires the platform to responds platform general response message.

7.4.3 Questions

The platform sends out message by sending questions, sends questions with candidate answers to the terminal and the terminal shows immediately. The terminal sends question response message to the platform after the driver selected.

Sends out question messages, requires terminal to responds terminal general response message.

7.4.4 Information on-demand

The message setting of the platform is set by sending message of menu on demand and platform send information on demand item list to the terminal for storage. Drivers can choose to select request/cancel corresponding information services via menu, after selection the terminal send request/cancel message to the platform. After the information service is requested it will receive information service message from the platform periodically such as news, weather forecast, etc. The information on-demand menu sets the message requires the terminal responds terminal

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	12 of 31

general response message. Information on-demand/cancel message requires the platform responds platform general response message. Information service message requires the terminal responds terminal general response message.

8. Data format

8.1 Terminal general response

Message ID: 0x0001.

Terminal general response message body data format is shown in table 4.

Table 4: Terminal general response message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Response serial number	WORD	The serial number of the corresponding platform message
2	Response ID	WORD	The ID of the corresponding platform message
4	Result	BYTE	0: success/ok; 1: failure; 2: incorrect information; 3: not supporting

8.2 Platform general response

Message ID: 0x8001.

Platform general response message body data format is shown in table 5.

Table 5: Platform general response message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Response serial number	WORD	The serial number of the corresponding terminal message
2	Response ID	WORD	The ID of the corresponding terminal message
4	Result	BYTE	0: success/ok; 1: failure; 2: incorrect information; 3: not supporting; 4: alarm processing confirmation

8.3 Terminal heartbeat

Message ID: 0x0002.

Terminal heartbeat data message body is null.

8.4 Terminal registration

Message ID: 0x0100.

Terminal registration message body data format is shown in table 7.

Table 7: Terminal registration message body data format

Starting byte	Field	Data type	Descriptions and requirements
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File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	13 of 31

0	Province domain ID	WORD	Indicate the province where the terminal is installed, 0 is reserved, the default value is taken from the platform. The province domain ID adopts the first two of the six administrative division code specified in GB/T 2260.
2	City and county domain ID	WORD	Indicate the city and county where the terminal is installed, 0 is reserved, the default value is taken from the platform. The province domain ID adopts the last four of the six administrative division code specified in GB/T 2260.
4	Manufacturer ID	BYTE[5]	5 bytes, terminal manufacturer code
9	Terminal type	BYTE[20]	20 bytes, the terminal type is defined by the manufacturer, when the digit isn't sufficient, append '0X00'.
29	Terminal ID	BYTE[7]	7 bytes, consists of capital letters and numbers, the terminal ID is defined by the manufacturer, when the digit isn't sufficient, append '0X00'.
36	License plate color	BYTE	License plate color, according to 5.4.12 in JT/T415-2006. When the license hasn't registered, set the value as '0'.
37	VIN	STRING	When the license plate color is 0, indicates vehicle VIN (vehicle Identification Number); otherwise indicates the license plate issued by the public security traffic management department.

8.5 Terminal registration response

Message ID: 0x8100.

Terminal registration response message body data format is shown in table 8.

Table 8: Terminal registration response message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Response serial number	WORD	The serial number of the corresponding terminal registration message
2	Result	BYTE	0: success; 1: vehicle has already been registered; 2: there's no specified vehicle in database; 3: terminal has already been registered; 4: there's no specified terminal in database
3	The authentication code	STRING	The field is only display after success

8.6 Terminal authentication

Message ID: 0x0102.

Terminal authentication message data format is shown in table 9.

Table 9: Terminal authentication message data format

Starting byte	Field	Data type	Descriptions and requirements
0	The authentication code	STRING	The terminal report authentication code after reconnect.

8.7 Terminal parameter setting

Message ID: 0x8103.

Terminal parameter setting message body data format is shown in table 10.

Table 10: Terminal parameter setting message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Total number of parameters	BYTE	
1	Parameter item list		Parameter item format is shown in table 11

Table 11: Terminal parameter item data format

Starting byte	Data type	Descriptions and requirements
Parameter ID	DWORD	Definition and instruction of parameter ID is shown in table 12
Length of parameter	BYTE	
Value of parameter		If it is multi-valued parameter, a number of parameters of a same ID are used in the message, such as dispatch center phone number

Table 12: Terminal parameter setting definition and instruction of each parameter

Parameter ID	Data type	Descriptions and requirements
0x0001	DWORD	Terminal heartbeat sending interval, unit is second (s)
0x0027	DWORD	Report time intervals during dormancy, unit is second (s), >0
0x0029	DWORD	Report time intervals when default, unit is second (s), >0
0x0030	DWORD	Angle of the inflection point, <180
0x0050	DWORD	Alarm blocked field, corresponding to the alarm sign in the position information report message, the corresponding alarm is blocked when the corresponding field is 1
0x0055	DWORD	The highest speed, unit is km/h
0x0056	DWORD	The duration of over-speed, unit is second (s)
0x0057	DWORD	Continuous driving time limit, unit is second (s)
0x0058	DWORD	Accumulated driving time of the same day, unit is second (s)
0x0059	DWORD	Minimum rest time, unit is second (s)
0x005A	DWORD	Maximum parking time, unit is second (s)
0x005B	WORD	The difference between over-speed alarm and warning, unit is 1/10Km/h
0x005C	WORD	The difference between fatigue driving alarm and warning, unit is second (s), >0

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	15 of 31

8.8 Check terminal parameter

Message ID: 0x8104.

Check terminal parameter message body is null.

8.9 Check specified terminal parameters

Message ID: 0x8106.

Check specified terminal parameters message body data format is shown in table 15, terminal use 0x0104 instructions for response.

Table 15: Check specified terminal parameters message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Total number of parameter	BYTE	Total number of parameter is n
1	Parameter ID list	BYTE[4*n]	Arrange in order of parameter, e.g. 'parameter ID1 parameter ID2 ... parameter IDn'

8.10 Check terminal parameter response

Message ID: 0x0104.

Check terminal parameter response message body data format is shown in table 16.

Table 16: Check terminal parameter response message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Response serial number	WORD	Check message serial number of corresponding terminal parameter
2	Number of response parameter	BYTE	
3	Parameter item list		Parameter item format and definition is shown in table 10

8.11 Check terminal attribute

Message ID: 0x8107.

Check terminal attribute message body is null.

8.12 Check terminal attribute response

Message ID: 0x0107.

Check terminal attribute response message body data format is shown in table 20.

Table 20: Check terminal attribute response message body data format

Starting byte	Field	Data type	Descriptions and requirements
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File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	16 of 31

0	Terminal type	WORD	<p>bit0, 0: passenger vehicles are not applicable, 1: passenger vehicles are applicable;</p> <p>bit1, 0: dangerous goods vehicles are not applicable, 1: dangerous goods vehicles are applicable;</p> <p>bit2, 0: ordinary freight vehicles are not applicable, 1: ordinary freight vehicles are applicable;</p> <p>bit3, 0: rental cars are not applicable, 1: rental cars are applicable;</p> <p>bit6, 0: hard disk video is not supported, 1: hard disk video is supported;</p> <p>bit7, 0: all-in-one machine, 1: split machine</p>
2	Manufacturers ID	BYTE[5]	5 bytes, terminal manufacturer code
7	Terminal model	BYTE[20]	20 bytes, this terminal model is determined by manufacturer, when the digit isn't sufficient, append '0X00'
27	Terminal ID	BYTE[7]	7 bytes, consists of capital letters and numbers, this terminal ID is determined by manufacturer, when the digit isn't sufficient, append '0X00'
42	Terminal SIM card ICCID	BCD[10]	Terminal SIM card ICCID number
52	Length of the terminal hardware version No.	BYTE	n
53	The terminal hardware version No.	STRING	
53+n	Length of the terminal firmware version No.	BYTE	m
54+n	The terminal firmware version No.	STRING	
54+n+m	GNSS module attribute	BYTE	<p>bit0, 0: GPS positioning is not supported, 1: GPS positioning is supported;</p> <p>bit1, 0: Beidou positioning is not supported, 1: Beidou positioning is supported;</p> <p>bit2, 0: GLONASS positioning is not supported, 1: GLONASS positioning is supported;</p> <p>bit3, 0: Galileo positioning is not supported, 1: Galileo positioning is supported</p>

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	17 of 31

55+n+m	Communication module attribute	BYTE	bit0, 0: GPRS communication is not supported, 1: GPRS communication is supported; bit1, 0: CDMA communication is not supported, 1: CDMA communication is supported; bit2, 0: TD-SCDMA communication is not supported, 1: TD-SCDMA communication is supported; bit3, 0: WCDMA communication is not supported, 1: WCDMA communication is supported; bit4, 0: CDMA2000 communication is not supported, 1: CDMA2000 communication is supported; bit5, 0: TD-LTE communication is not supported, 1: TD-LTE communication is supported; bit7, 0: other communication way is not supported, 1: other communication way is supported
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8.13 Location information report

Message ID: 0x0200.

Location information report message body is composed of location basic information and location additional information item list, the message structure diagram is shown in figure 3:

Location basic information	Location additional information item list
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Figure 3: Location report message structure diagram

Location additional information item list is composed of each location additional information items or not, it's determines by the length field in the header.

Location basic information data format is shown in table 23.

Table 23: Location basic information data format

Starting byte	Field	Data type	Descriptions and requirements
0	Alarm sign	DWORD	Definition of alarm sign bit is shown in table 24
4	Status	DWORD	Definition of status bit is shown in table 25
8	Latitude	DWORD	Unit is degree, times the sixth power of 10, accurate to one millionth degree
12	Longitude	DWORD	Unit is degree, times the sixth power of 10, accurate to one millionth degree
16	Altitude	WORD	Altitude, unit is meter (m)

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	18 of 31

18	Speed	WORD	1/10km/h
20	Direction	WORD	0-359, due north is 0, clockwise
21	Time	BCD[6]	YY-MM-DD-hh-mm-ss (GMT+8 time, the time involved in this standard is in this time zone)

Table 24: Definition of alarm sign bit

Bit	Definition	Processing specification
0	1: Emergency alarm, trigger after triggering alarm switch	Zero clearing after receive the response
1	1: Over speed alarm	The sign is maintained until the alarm condition is relieved
2	1: Driving alarm malfunction	The sign is maintained until the alarm condition is relieved
3	1: Risk warning	Zero clearing after receive the response
13	1: Over speed warning	The sign is maintained until the alarm condition is relieved
14	1: Fatigue driving warning	The sign is maintained until the alarm condition is relieved
18	1: The accumulated over speed driving time of the day	The sign is maintained until the alarm condition is relieved
19	1: Timeout parking	The sign is maintained until the alarm condition is relieved
20	1: Enter and exit the area	Zero clearing after receive the response
21	1: Enter and exit the route	Zero clearing after receive the response
22	1: The driving time of the route is not enough/too long	Zero clearing after receive the response
23	1: Off track alarm	The sign is maintained until the alarm condition is relieved

Noted: The location information should be reported as soon as alarm and warning occurs.

Table 25: Definition of status bit

Bit	Status
0	0: ACC off; 1: ACC on
1	0: Not positioning; 1: Positioning
2	0: North latitude; 1: South latitude
3	0: East longitude; 1: West longitude

Noted: The location information should be reported as soon as status changes.

Location additional information item format is shown in table 26.

Table 26: Location additional information item format

Field	Data type	Descriptions and requirements
Additional information ID	BYTE	1-255
Length of additional information	BYTE	

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	19 of 31

Additional information		Definition of additional information is shown in table 27
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Table 27: Definition of additional information

Additional information ID	Length of additional information	Descriptions and requirements
0x01	4	Mileage, DWORD, 1/10km, corresponding to the odometer reading of the car
0x11	1 or 5	Over speed alarm additional information is shown in table 28
0x12	6	Enter and exit the area/route alarm additional information is shown in table 29
0x13	7	The driving time of the route is not enough/too long alarm additional information is shown in table 30
0x25	4	Expand vehicle signal status bit, definition is shown in table 31
0x30	1	BYTE, strength of wireless communication network signal
0x31	1	BYTE, GNSS positioning satellite number

Table 31: Expand vehicle signal status bit

Bit	Definition
2	1: Right indicator signal
3	1: Left indicator signal

8.14 Manually confirm alarm message

Message ID: 0x8203

Manually confirm alarm message body data format is shown in table 35.

Table 35: Manually confirm alarm message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Alarm message serial number	WORD	Alarm message serial number needs to be confirmed manually, 0 for all messages of

			this type of alarm
2	Manually confirm alarm type	DWORD	Definition is shown in table 36

Table 36: Definition of manually confirm alarm type

Bit	Definition
0	1: Confirm emergency alarm
1-2	Reserve
3	1: Confirm risk warning
4-19	Reserve
20	1: Confirm enter and exit area alarm
21	1: Confirm enter and exit route alarm
22	1: Confirm driving time of route not enough/too long alarm
23-26	Reserve
27	1: Confirm vehicle illegal ignition alarm
28	1: Confirm vehicle illegal displacement alarm
29-31	Reserve

8.15 Send down text information

Message ID: 0x8300.

Send down text information message body data format is shown in table 37.

Table 37: Send down text information message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Sign	BYTE	Definition of text information sign bit is shown in table 38
1	Text information	STRING	The maximum is 1024 bytes, coded by GBK

Table 38: Definition of text information sign bit

Bit	Sign
0	1: Emergency
1	Reserve
2	1: Display by terminal displayer
3	1: Terminal TTS reading
4	1: Display by advertising screen
5	0: Central navigation information; 1: CAN fault code information
6-7	Reserve

8.16 Send down terminal update packet

Message ID: 0x8108.

Send down terminal update packet message body data format is shown in table 21. The terminal uses a general response for the command to verify that the upgrade packet data is received correctly.

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	21 of 31

Table 21: Send down terminal update packet message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Upgrade type	BYTE	0: terminal, 12: road transport certificate IC card reader, 52: Beidou satellite positioning module
1	Manufacturer ID	BYTE[5]	Manufacturer serial number
6	Length of version No.	BYTE	n
7	Version No.	STRING	
7+n	Length of upgrade packet	DWORD	Unit is byte
11+n	Upgrade packet		

8.17 Notification of terminal upgrades results

Message ID: 0x0108.

Terminal uses this command to notify monitoring center after upgrade completes and reconnects.

Notification of terminal upgrades results message body data format is shown in table 22.

Table 22: Notification of terminal upgrades results message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Upgrade type	BYTE	0: terminal, 12: road transport certificate IC card reader, 52: Beidou satellite positioning module
1	Upgrade result	BYTE	0: success, 1: failure, 2: cancel

8.18 Setting circle area

Message ID: 0x8600.

Setting circle area message body data format is shown in table 56

Noted: This message protocol

Table 56: Setting circle area message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Setting attribute	BYTE	0: Upgrade area; 1: Append area; 2: Modify area
1	Total number of areas	BYTE	
2	Area item		Content of circle area's area item data format is shown in table 57

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	22 of 31

Table 57: Content of circle area's area item data format

Starting byte	Field	Data type	Descriptions and requirements
0	Area ID	DWORD	
4	Area attribute	WORD	Definition of area attribute is in table 58
6	Latitude of central point	DWORD	The unit of latitude is degree, times the sixth power of 10, accurate to one millionth degree
10	Longitude of central point	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
14	Radius	DWORD	Unit is meter (m), route is the turning point to the next turning point
18	Starting time	BCD[6]	YY-MM-DD-hh-mm-ss, this field is null if the 0 bit of the area attribute is 0
24	Ending time	BCD[6]	YY-MM-DD-hh-mm-ss, this field is null if the 0 bit of the area attribute is 0
30	Maximum speed	WORD	Km/h, this field is null if the 1 bit of the area attribute is 0
32	Over speed duration	BYTE	Unit is second(s) (similar expression in the area, same modify as before), this field is null if the 1 bit of the area attribute is 0

Table 58: Definition of area's area attribute

Bit	Sign
0	1: Area time
1	1: Speed limit
2	1: Alert to driver when enter the area
3	1: Alert to the platform when enter the area
4	1: Alert to driver when exit the area
5	1: Alert to the platform when exit the area
6	0: North latitude; 1: South latitude
7	0: East longitude; 1: West longitude
8	0: Open doors allowed; 1: Open doors forbidden
9-13	Reserve
14	0: Open communication module when enter the area; 1: Close communication module when enter the area
15	0: Not collect GNSS detailed location data when enter the area; 1: Collect GNSS detailed location data when enter the area

8.19 Delete circle area

Message ID: 0x8601.

Delete circle area message body data format is shown in table 59.

Table 59: Delete circle area message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Number of areas	BYTE	The number of areas in this message is no more than 125. Multiple messages are recommended if more than 125. 0 stands for delete all the circle areas
1	Area ID1	DWORD	
	DWORD	
	Area IDn	DWORD	

8.20 Setting rectangle area

Message ID: 0x8602.

Setting rectangle area message body data format is shown in table 60.

Table 60: Setting rectangle area message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Setting attribute	BYTE	0: Upgrade area; 1: Append area; 2: Modify area
1	Total number of areas	BYTE	
2	Area item		Rectangle area's area item data format is shown in table 61

Table 61: Rectangle area's area item data format

Starting byte	Field	Data type	Descriptions and requirements
0	Area ID	DWORD	
4	Area attribute	WORD	Definition of area attribute is in table 58
6	Latitude of top left point	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
10	Longitude of top left point	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
14	Latitude of bottom right point	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
18	Longitude of bottom right point	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
22	Starting time	BCD[6]	Same as the time range setting of circle area
28	Ending time	BCD[6]	Same as the time range setting of circle area

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	24 of 31

34	Maximum speed	WORD	Unit is km/h, this field is null if the 1 bit of area attribute is 0
36	Over speed duration	BYTE	Unit is second (s), this field is null if the 1 bit of area attribute is 0

8.21 Delete rectangle area

Message ID: 0x8603.

Delete rectangle area message body data format is shown in table 62.

Table 62: Delete rectangle area message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Number of areas	BYTE	The number of areas in this message is no more than 125. Multiple messages are recommended if more than 125. 0 stands for delete all the circle areas
1	Area ID1	DWORD	
	DWORD	
	Area IDn	DWORD	

8.22 Setting polygon area

Message ID: 0x8604.

Setting polygon area message body data format is shown in table 63.

Table 63: Setting polygon area message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Area ID	DWORD	
4	Area attribute	WORD	Definition of area attribute is in table 58
6	Starting time	BCD[6]	Same as the time range setting of circle area
12	Ending time	BCD[6]	Same as the time range setting of circle area
18	Maximum speed	WORD	Unit is km/h, this field is null if the 1 bit of area attribute is 0
20	Over speed duration	BYTE	Unit is second (s), this field is null if the 1 bit of area attribute is 0
21	Total vertex number of the area	WORD	
23	Vertex item		Vertex item of polygon area data format is shown in table 64

Table 64: Vertex item of polygon area data format

Starting byte	Field	Data type	Descriptions and requirements
0	Vertex latitude	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
4	Vertex longitude	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth

			degree
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8.23 Delete polygon area

Message ID: 0x8605.

Delete polygon area message body data format is shown in table 65.

Table 65: Delete polygon area message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Number of areas	BYTE	The number of areas in this message is no more than 125. Multiple messages are recommended if more than 125. 0 stands for delete all the circle areas
1	Area ID1	DWORD	
	DWORD	
	Area IDn	DWORD	

8.24 Setting route

Message ID: 0x8606.

Setting route message body data format is shown in table 66.

Table 66: Setting route message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Route ID	DWORD	
4	Route attribute	WORD	Route attribute data format is shown in table 67
6	Starting time	BCD[6]	Same as the time range setting of circle area
12	Ending time	BCD[6]	Same as the time range setting of circle area
18	Total number of the route's turning point	WORD	
20	Turning point item		Turning point item of route data format is shown in table 68

Table 67: Route attribute data format

Bit	Sign
0	1: Area time
1	Reserve
2	1: Alert to driver when enter the route
3	1: Alert to the platform when enter the route
4	1: Alert to driver when exit the route
5	1: Alert to the platform when exit the route
6-15	Reserve

Table 68: Turning point item of route data format

Starting byte	Field	Data type	Descriptions and requirements
0	Turning point ID	DWORD	
4	Route ID	DWORD	
8	Turning point latitude	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
12	Turning point longitude	DWORD	The unit of longitude is degree, times the sixth power of 10, accurate to one millionth degree
16	Width of the route	BYTE	Unit is meter (m), route is the turning point to the next turning point
17	Route attribute	BYTE	Route attribute data format is in table 69
18	The threshold of route driving time too long	WORD	Unit is second (s), this field is null if the 0 bit of area attribute is 0
20	The threshold of route driving time not enough	WORD	Unit is second (s), this field is null if the 0 bit of area attribute is 0
22	Maximum speed of the route	WORD	Unit is km/h, this field is null if the 1 bit of area attribute is 0
24	Over speed duration of the route	BYTE	Unit is second (s), this field is null if the 1 bit of area attribute is 0

Table 69: Route attribute data format

Bit	Sign
0	1: Driving time
1	1: Speed limit
2	0: South latitude; 1: North latitude
3	0: East longitude; 1: West longitude
4-7	Reserve

8.25 Delete route

Message ID: 0x8607.

Delete route message body data format is shown in table 70.

Table 70: Delete route message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Number of route	BYTE	The number of routes in this message is no more than 125. Multiple messages are recommended if more than 125. 0 stands for delete all the circle routes
1	Route ID1	DWORD	
	DWORD	

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	27 of 31

	Route IDn	DWORD	
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8.26 Positioning data batch upload

Message ID: 0x0704.

Positioning data batch upload data format is shown in table 76.

Table 76: Positioning data batch upload data format

Starting byte	Field	Data type	Illustration
0	Numbers of data item	WORD	Including numbers of location report data item, >0
1	Type of location data	BYTE	0: Normal location batch report; 1: Blind area report
2	Location report data item		Definition is shown in table 77

Table 77: Location report data item data format

Starting byte	Field	Data type	Illustration
0	Length of location report data body	WORD	Length of location report data body, n
2	Location report data body	BYTE[n]	Definition is shown in 8.18 location information report

8.27 Multimedia event information uploading

Message ID: 0x0800.

Multimedia event information uploading data format is shown in table 80.

Table 80: Multimedia event information uploading data format

Starting byte	Field	Data type	Descriptions and requirements
0	Multimedia data ID	DWORD	>0
4	Multimedia type	BYTE	0: Image; 1: Audio; 2: Video
5	Multimedia format code	BYTE	0: JPEG; 1: TIF; 2: MP3; 3: WAV; 4: WMV; others reserve
6	Event item code	BYTE	0: Platform sends down command; 1: Timing action; 2: Robbery alarm triggered; 3: Collision rollover alarm triggered; 4: Door open photos; 5: Door close photos; 6: Doors from open to close, speed from <20km to over 20km; 7: Fixed distance photos; Others reserve
7	Channel ID	BYTE	

8.28 Multimedia data upload

Message ID: 0x0801.

Multimedia data upload message body data format is shown in table 81.

Table 81: Multimedia data upload message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Multimedia ID	DWORD	>0
4	Multimedia type	BYTE	0: Image; 1: Audio; 2: Video
5	Multimedia format code	BYTE	0: JPEG; 1: TIF; 2: MP3; 3: WAV; 4: WMV; others reserve
6	Event item code	BYTE	0: Platform send down command; 1: Timing action; 2: Robbery alarm triggered; 3: Collision rollover alarm triggered; others reserve
7	Channel ID	BYTE	
8	Location information report (0x0200) message body	BYTE[28]	Represents the location basic information data of multimedia data
36	Multimedia data packet		

8.29 Multimedia data upload response

Message ID: 0x8800.

Multimedia data upload response message body data format is shown in table 82.

Table 82: Multimedia data upload response message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Multimedia ID	DWORD	>0, no subsequent field if all packets are received
4	Total number of resend packet	BYTE	n
5	Resend packet ID list	BYTE[2*n]	Arranged according to the serial number of the resend packet

8.30 Camera immediately taken command

Message ID: 0x8801.

Camera immediately taken command message body data format is shown in table 83.

Table 83: Camera immediately taken command message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Channel ID	BYTE	>0
1	Taken command	WORD	0 for stop taking pictures; 0xFFFF for record; others for numbers of photo
3	Taken interval/recording time	WORD	Second, 0 stands for take photos at minimum intervals or recording

5	Saving sign	BYTE	1: Store; 0: Real-time upload
6	Resolution ^a	BYTE	0x01: 320*240; 0x02: 640*480; 0x03: 800*600; 0x04: 1024*768; 0x05: 176*144;[Qcif]; 0x06: 352*288; [Cif]; 0x07: 704*288; [HALF D1]; 0x08: 704*576; [D1]
7	Quality of image/video	BYTE	1-10, 1 for minimum quality loss, 10 for maximum compression ratio
8	Brightness	BYTE	0-255
9	Contrast	BYTE	0-127
10	Saturation	BYTE	0-127
11	Chroma	BYTE	0-255
^a If the terminal does not support the resolution required by the system, the nearest resolution is taken and uploaded.			

8.31 Camera immediately taken command response

Message ID: 0x0805.

Camera immediately taken command response message body data format is shown in table 84. This command is used to respond to the camera immediately taken command 0x8801 sent by the monitoring center.

Table 84: Camera immediately taken command response message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Response serial number	WORD	Message serial number of the corresponding platform camera immediately taken command
2	Result	BYTE	0: Successful; 1: Failure; 2: Channel not support. The following fields are valid only when the result=0
3	Number of multimedia ID	WORD	n, the number of taken photo successful multimedia
4	List of multimedia ID	BYTE[4*n]	

File Name	DC600 GPRS Communication protocol	Ver.	1.0
Update	2024-05-15	Page	30 of 31

8.32 Retrieve of store multimedia data

Message ID: 0x8802.

Retrieve of store multimedia data message body data format is shown in table 85.

Noted: The start/end time is set to 00-00-00-00-00-00 if not according to the time interval.

Table 85: Retrieve of store multimedia data message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Multimedia type	BYTE	0: Image; 1: Audio; 2: Video
1	Channel ID	BYTE	0 stands for all channel of retrieve this type of media
2	Event item code	BYTE	0: Platform send down command; 1: Timing action; 2: Robbery alarm triggered; 3: Collision rollover alarm triggered; others reserve
3	Starting time	BCD[6]	YY-MM-DD-hh-mm-ss
9	Ending time	BCD[6]	YY-MM-DD-hh-mm-ss

8.33 Response of store multimedia data retrieves

Message ID: 0x0802.

Response of store multimedia data retrieves message body data format is shown in table 86.

Table 86: Response of store multimedia data retrieves message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Response serial number	WORD	Serial number of corresponding multimedia data retrieve message
2	Total item number of multimedia data	WORD	Total item number of multimedia data that meet the retrieve condition
4	Retrieve item		Multimedia retrieve item data format is shown in table 87

Table 87: Multimedia retrieve item data format

Starting byte	Field	Data type	Descriptions and requirements
0	Multimedia ID	DWORD	>0
4	Multimedia type	BYTE	0: Image; 1: Audio; 2: Video
5	Channel ID	BYTE	
6	Event item code	BYTE	0: Platform send down command; 1: Timing action; 2: Robbery alarm triggered; 3: Collision rollover alarm triggered; others reserve
7	Location information report (0x0200) message body	BYTE[28]	Represents the location basic information data of the initial moment of shooting or recording

8.34 Store multimedia data upload command

Message ID: 0x8803.

Store multimedia data upload command message body data format is shown in table 88.

Table 88: Store multimedia data upload command message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Multimedia type	BYTE	0: Image; 1: Audio; 2: Video
1	Channel ID	BYTE	
2	Event item code	BYTE	0: Platform send down command; 1: Timing action; 2: Robbery alarm triggered; 3: Collision rollover alarm triggered; others reserve
3	Starting time	BCD[6]	YY-MM-DD-hh-mm-ss
9	Ending time	BCD[6]	YY-MM-DD-hh-mm-ss
15	Delete sign	BYTE	0: Reserve; 1: Delete

8.35 Single storage multimedia data retrieval uploads command

Message ID: 0X8805.

Single storage multimedia data retrieval uploads command message body data format is shown in table 90.

Table 90: Single storage multimedia data retrieval uploads command message body data format

Starting byte	Field	Data type	Descriptions and requirements
0	Multimedia ID	DWORD	>0
4	Delete sign	BYTE	0: Reserve; 1: Delete