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DC600 Communication Protocol of Road Transport Vehicle Active Safety Intelligent Prevention and Control System

Content

1 Range	3
2 Normative reference document	3
3 Abbreviations	3
4 Protocol basis for video terminal and platform	3
4.1 Protocol basis	3
4.2 Parameter setting query instruction	5
4.3 Querying parameter instruction	6
4.4 Alarm instruction	6
4.4.1 Advanced driver assistance system alarm	7
4.4.2 Driver status monitoring system alarm	8
4.5 Alarm attachment upload instruction	9
4.6 Alarm attachment upload	10
4.6.1 Vehicle status data record file	11
4.6.2 Alarm attachment information message	12
4.7 File information upload	13
4.8 File data upload	13
4.9 File upload completed message	14
4.10 File upload completed message response	15

1. Range

The protocol is a supplement and extension of JT/T 808-2013 "Road transport vehicle satellite positioning system BeiDou compatible vehicle terminal communication protocol technical regulations", which stipulates the active safety intelligent prevention and control system vehicle terminal (hereinafter referred to as the terminal) and monitoring platform (hereinafter referred to as the platform), the communication protocol between vehicle terminal and external device, including the protocol basis, message definition and data format.

2. Normative reference document

The following documents are essential for the application. For dated references, the date-only version applies to this document. For undated references, the latest version (including all modification points) applies to this document.

JT/ T808 Road transport vehicle satellite positioning system terminal communication protocol and data format.

JT/T 1078-2016 Road transport vehicle satellite positioning system video communication protocol.

GB/T 26773-2011 Technical requirements and test methods for transport vehicle driving hazard warning system.

JT/T 883-2014 Intelligent Transportation system lane departure alarm system performance requirements and detection methods.

3. Abbreviations

The following terminology and definition apply to this document.

ADAS: Advanced Driver Assistant System

DSM: Driving State Monitoring

4. Protocol basis for video terminal and platform

4.1 Protocol basis

For the classification of packets, refer to Section 4.3 of JT/T 1078-2016.

The communication connection mode of the protocol message is in accordance with the requirements of Chapter 5 of JT/T 808-2011.

The protocol stipulates that the message processing mechanism of data messages is in accordance with the requirements of Chapter 6 of JT/T 808-2011.

The protocol stipulates that the encryption mechanism of data packets is in accordance with the requirements of Chapter 7 of JT/T808-2011.

The communication between the platform and the terminal in the protocol shall meet the following requirements:

- Unless expressly agreed, all messages should be answered.
- If no specific reply message is specified, the universal response shall be adopted.

- For subcontracted messages, each subcontracted message should be answered packet-by-packet.

4.2 Parameter setting and query instruction

Table 4-8 Parameter format

Field data	Type	Description and requirements
Parameter ID	DWORD	The definition and description of parameter ID, refer to Table 4-5
Parameter length	BYTE	
Parameter value		

Table 4-9 Setting parameters description and definition

Parameter ID	Data type	Description and requirements
OxF364		The parameters of advanced Driver assistance system, refer to table 4-10
OxF365		The parameters of driver status monitoring system, refer to Table 4-11

Table 4-10 The parameters of advanced Driver assistance system

Start byte	Field	Data type	Description
11	Alarm Status	DWORD	Alarm Status, 0 means off, 1 means on bit0: Obstacle detection first-level alarm bit1: Obstacle detection second-level alarm bit2: Frequent lane change first-level alarm bit3: Frequent lane change second-level alarm bit4: Lane departure first-level alarm bit5: Lane departure second-level alarm bit6: Forward collision first-level alarm bit7: Forward collision second-level alarm bit8: Pedestrian collision first-level alarm bit9: Pedestrian collision second-level alarm bit10: Vehicle too close second-level alarm
31	Lane departure alarm level speed threshold	BYTE	The unit is km/h. The value range from 0 to 220, and default value is 50. It means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm. 0 indicates that no recording , and 0xFF indicates that no parameter is modified.
	Forward		The unit is km/h. The value range from 0 to

36	collision alarm speed threshold	BYTE	220, and default value is 50, it means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm. 0xFF indicates that the parameter is not modified.
41	Pedestrian collision alarm Enable speed threshold	BYTE	The unit is km/h. The value range from 0 to 220, and default value is 50. when the value is lower than the threshold, it has an alarm. When the value is higher the threshold,the function is turn off. 0xFF indicates that the parameter is not modified.
46	Vehicle distance monitoring alarm level speed threshold	BYTE	The unit is km/h. The value range from 0 to 220, and default value is 50, it means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm. 0xFF indicates that the parameter is not modified.

Table 4-11 Parameters of the driver status monitoring system

Start byte	Field	Data type	Description
11	Alarm Status	DWORD	Alarm Status, 0 means off, 1 means on
26	Fatigue driving alarm speed threshold	BYTE	The unit is km/h. The value range from 0 to 220, and default value is 50, it means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm. 0xFF indicates that the parameter is not modified.
30	Call alarm speed threshold	BYTE	The unit is km/h. The value range from 0 to 220, and default value is 50, it means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm. 0xFF indicates that the parameter is not modified.
34	Smoking alarm speed threshold	BYTE	The unit is km/h. The value range from 0 to 220, and default value is 50, it means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm.

			0xFF indicates that the parameter is not modified.
38	Distracted driving alarm speed threshold	BYTE	The unit is km/h. The value ranges from 0 to 220, the default value is 50, it means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm. 0xFF indicates that the parameter is not modified.
42	Abnormal driving behavior speed threshold	BYTE	The unit is km/h. The value range from 0 to 220, and default value is 50, it means that when the vehicle speed is higher than the threshold, it is a second-level alarm, otherwise it is a first-level alarm. 0xFF indicates that the parameter is not modified.

4.3 Querying parameter instruction

Query parameter instructions are 0x8103/0x8106 defined in 8.8 of JT/T 808-2011.

Query the specified terminal parameter message body data format in JT/T 808-2011 Table 15.

The terminal responds with instruction 0x0104.

4.4 Alarm instruction

The alarm upload is reported at the same time as the location information. It is the additional information reported by 0x0200 location information and extends the definition table of additional information in Table 20 of JT/T808-2011. Additional information Extended definitions are listed in Table 4-14.

Table 4-14 Additional information definition table extensions

Additional information ID	Additional information length	Description and requirements
0x64		Advanced driver assistance system alarm information, definition in Table 4-15
0x65		Driver status monitoring system alarm information, definition in Table 4-17

4.4.1 Advanced driver assistance system alarm

Table 4-15 The data format of advanced driver assistance alarm information

Start byte	Field	Data length	Description and requirements
0	Alarm ID	DWORD	According to the alarm sequence, the cycle

			accumulates from 0, without distinguishing the alarm type.
4	Flag status	BYTE	0x00: Unavailable 0x01: Start flag 0x02: End flag This field is only applicable to alarms or events with start and end flag. If the alarm type or event type does not have start and end flag, this field is unavailable, please enter 0x00.
5	Alarm/event type	BYTE	0x01: Forward collision alarm 0x02: Lane departure alarm 0x03: Vehicle too close alarm 0x04: Pedestrian collision alarm 0x05: Frequent lane change alarm 0x06: Road sign out of limit alarm 0x07: Obstacle alarm 0x08 to 0x0F: User-defined 0x10: Road sign recognition event 0x11: Actively capture the event 0x12 to 0x1F: User-defined
6	Alarm level	BYTE	0x01: First-level alarm 0x02: Second-level alarm
7	Speed of preceding vehicle	BYTE	The unit is Km/h. It range from 0 to 250, and It is valid when alarm types are 0x01 and 0x02.
8	Preceding vehicle/pedestrian distance	BYTE	The unit is ms, it range from 0 to 100. The parameter is valid only when the alarm type is 0x01, 0x02, or 0x04.
9	Deviation type	BYTE	0x01: Left side deviation 0x02: Right side deviation it's valid only when the alarm type is 0x02.
10	Road sign identification type	BYTE	0x01: Speed limit flag 0x02: Height limit flag 0x03: Weight limit flag It's valid only when the alarm types are 0x06 and 0x10.
11	Road sign identification data	BYTE	It identifies the road sign data.
12	Speed	BYTE	The unit is Km/h. It ranges from 0 to 250.
13	Altitude	WORD	Altitude, the unit is m.

15	Latitude	DWORD	The unit is the degree, the latitude multiplied by 10 to the sixth, and accurate to one part per million.
19	Longitude	DWORD	The unit is the degree, the longitude multiplied by 10 to the sixth, and accurate to one part per million.
23	Date and time	BCD[6]	YY-MM-DD-hh-mm-ss (GMT+8)
29	Vehicle status	WORD	In able 5-9
31	Alarm sign number	BYTE[16]	Alarm identification number in table 4-16

Table 4-16 Alarm sign number format

Start byte	Field	Data length	Description
0	Terminal ID	BYTE[7]	7 bytes, It is composed of capital letters and numbers.
7	Time	BCD[6]	YY-MM-DD-hh-mm-ss (GMT+8)
13	Serial number	BYTE	The serial number of the alarm at the same time, which starts from 0 and accumulates.
14	Number of attachments	BYTE	It indicates the number of attachments corresponding to the alarm.
15	Reserved	BYTE	

4.4.2 Driver status monitoring system alarm

Table 4-17 The data format of driving status monitoring system alarm information

Start byte	Field	Data length	Description and requirements
0	Alarm ID	DWORD	According to the alarm sequence, the cycle accumulates from 0, without distinguishing the alarm type.
4	Flag status	BYTE	0x00: Unavailable 0x01: Start flag 0x02: End flag This field is only applicable to alarms or events with start and end flag. If the alarm type or event type does not have start and end flag, this field is unavailable, enter 0x00.
5	Alarm/Event type	BYTE	0x01: Fatigue driving alarm 0x02: Calling alarm 0x03: Smoking alarm 0x04: Distracted driving alarm

			0x05: Driver abnormal alarm 0x06 to 0x0F: User-Defined 0x10: Auto capture event 0x11: Driver change event 0x12 to 0x1F: User-defined
6	Alarm level	BYTE	0x01: First-level alarm 0x02: Second-level alarm
7	Fatigue level	BYTE	It ranges from 1 to 10. A larger value indicates more severe fatigue, and is only valid when the alarm type is 0x01.
8	Reserved	BYTE[4]	Reserved
12	Speed	BYTE	The unit is Km/h. It ranges from 0 to 250.
13	Altitude	WORD	Altitude, the unit is m.
15	Latitude	DWORD	The unit is the degree, the latitude multiplied by 10 to the sixth, and accurate to one part per million.
19	Longitude	DWORD	The unit is the degree, the longitude multiplied by 10 to the sixth, and accurate to one part per million.
23	Date and time	BCD[6]	YY-MM-DD-hh-mm-ss (GMT+8)
29	Vehicle status	WORD	In able 5-9
31	Alarm sign number	BYTE[16]	Alarm identification number in table4-16

4.5 Alarm attachment upload instruction

Message ID: 0x9208

Packet type: signalling data packet.

After receiving the alarm/event information with attachments, the platform sends the instruction with attachments to the terminal. Instruction message body data format Table 4-21.

Table 4-21 File upload instruction data format

Start byte	Field	Data type	Description and requirements
0	Attachment server IP address length	BYTE	Length k
1	Attachment server IP address	STRING	Server IP address

1+k	Attachment server port (TCP)	WORD	Server port when TCP is used for transmission
3+k	Attachment server port (UDP)	WORD	Server port when UDP is used for transmission
5+k	Alarm flag	BYTE[16]	Alarm identification numbers definition Table 4-16
21+k	Alarm number	BYTE[32]	The platform assigns unique alarm number
53+k	Reserved	BYTE[16]	

After the terminal receives the alarm attachment from platform, it will send a universal response message to the platform.

4.6 Alarm attachment upload

4.6.1 Vehicle status data record file

The vehicle status data is recorded as a binary file, which records the vehicle status data in the form of continuous data blocks. Data blocks format in Table 4-22

Table 4-22 Vehicle status data blocks format

Start byte	Field	Data type	Description and requirements
0	Total Number of data blocks	DWORD	Total number of data blocks in the record file
4	Serial number of the current data block	DWORD	Serial number of the current data block in the record file
8	Alarm flag	DWORD	Refer to Table 24 of JT/T 808-2013
12	Vehicle status	DWORD	Refer to Table 25 of JT/T 808-2013
16	Latitude	DWORD	The unit is the degree, the latitude multiplied by 10 to the sixth, and accurate to one part per million.
20	Longitude	DWORD	Latitude values in degrees multiplied by the sixth power of 10 to the nearest millionth of a degree.
24	Altitude	WORD	Altitude, the unit is the meter.
26	Speed	WORD	1/10km/h
28	Direction	WORD	0-359, due north is 0, clockwise
30	Time	BCD[6]	YY-MM-DD-hh-mm-ss (GMT+8)
36	X axis acceleration	WORD	The unit is g. It's multiplied by 10 to the power of two second, and accurate is to one percent of g.
38	Y axis acceleration	WORD	The unit is g. It's multiplied by 10 to the power of two second, and accurate is to one percent of g.
40	Z axis	WORD	The unit is g. It's multiplied by 10 to the power

	acceleration		of two second, and accurate is to one percent of g.
42	X axis angular velocity	WORD	The unit is degree per second. It's multiplied by 10 to the power of two second, and accurate is to one percent of degree per second.
44	Y axis angular velocity	WORD	The unit is degree per second. It's multiplied by 10 to the power of two second, and accurate is to one percent of degree per second
46	Z axis angular velocity	WORD	The unit is degree per second. It's multiplied by 10 to the power of two second, and accurate is to one percent of degree per second.
48	Pulse speed	WORD	1/10km/h
50	OBD speed	WORD	1/10km/h
52	Gear status	BYTE	0: Neutral 1-9: Gear position 10: Reverse 11: Parking
53	Accelerator pedal value	BYTE	Range 1-100, unit is %
54	Brake pedal value	BYTE	Range 1-100, unit is %
55	Brake status	BYTE	0: No brake 1: Brake
56	Engine speed	WORD	Unit: RPM
58	Steering wheel angle	WORD	The Angle at which the steering wheel turns. Clockwise is positive, and counterclockwise is negative.
60	Turn signal status	BYTE	0: No turn signal 1: Left turn signal 2: Right turn signal
61	Reserved	BYTE[2]	
63	Check bit	BYTE	The sum of the first character to the character before the check bit, and take the lower 8 bits of sum as the check code.

4.6.2 Alarm attachment information message

Message ID: 0x1210.

Packet type: signalling data packet.

The terminal connects to the attachment server according to the attachment upload command and sends an alarm attachment information message to the server, with the message body

data format check Table 4-23.

Table 4-23 Alarm attachment information message data format

Start byte	Field	Data length	Description and requirements
0	Terminal ID	BYTE[7]	7 bytes, it consists of capital letters and digits, this terminal ID is defined by manufacturer, when the number of bits is insufficient, add "0x00"
7	Alarm flag	BYTE[16]	Alarm identification numbers definition Table 4-16
23	Alarm number	BYTE[32]	The platform assigns unique alarm number
55	Information type	BYTE	0x00: Normal alarm file information 0x01: Update alarm file information
56	Attachment number	BYTE	The number of attachments is associated with alarm.
57	Attachment information list		Table 4-24

After receiving the alarm attachment information message that uploaded by the terminal, the attachment server sends a universal response message to the terminal. If the connection between the terminal and the attachment server is abnormally disconnected during the upload of the alarm attachment, the alarm attachment information message needs to be re-sent when the link is restored

The attached file in the message was not uploaded and was interrupted during transmission.

Table 4-24 Alarm attachment message data format

Start byte	Field	Data length	Description and requirements
0	File name length	BYTE	Length k
1	File name	STRING	File name string
1+k	File size	DWORD	Size of current file

File name rules as below:

< File type > _ < channel number > _ < alarm type > _ < serial number > _ < alarm number > . < suffix >

The fields are defined as follows:

File type: 00 -- Image; 01 -- Audio; 02 -- Video; 03 -- text; 04 -- Other.

Channel number: 0 to 37 indicates the video channel defined in Table 2 of the JT/T 1076 standard.

64 indicates the video channel of the ADAS module.

65 indicates the DSM module video channel.

If the attachment is not related to the channel, fill in 0 directly.

Serial number: It is used to distinguish the file serial number of the same channel and the same type.

Alarm number: The platform assigns unique alarm number.

Suffix: image file is jpg or png, audio file is wav, video file is H 264, text file is bin.

After receiving the alarm attachment information instruction of the terminal, the attachment server will send a universal response message to the terminal.

Message ID: 0x1211.

Packet type: signalling data packet.

After the terminal sends the alarm attachment information instruction to the attachment server and gets the respond, it will send the attachment file information to the attachment server.

Message body data format in Table 4-25

4.7 File information upload

Table 4-25 Attachment file information message data format

Start byte	Field	Data length	Description and requirements
0	File name length	BYTE	File name Length l
1	File name	STRING	File name
1+l	File type	BYTE	0x00: picture 0x01: Audio 0x02: Video 0x03: Text 0x04: Other
2+l	File size	DWORD	The size of the currently uploaded file.

After receiving the attachment file information instruction from the terminal, the attachment server will send a universal response message to the terminal.

4.8 File data upload

Packet type: Code stream data packet.

After the terminal sends the file information upload instruction to the attachment server and receives the response, then it sends the file data to the attachment server.

Data packet format definition in Table 4-26

Table 4-26 Data packet format definition

Start byte	Field	Data length	Description and requirements
0	Frame header identification	DWORD	Fixed is 0x30 0x31 0x63 0x64
4	File name	BYTE[50]	File name
54	Data offset	DWORD	Data offset of the currently transferred file
58	Data length	DWORD	Data length
62	Data body	BYTE[n]	The default length is 64 KB. When the file size is smaller than 64 KB, it is the actual length.

The attachment server does not need to respond when receiving the data stream of the terminal.

4.9 File upload completed message

Message ID: 0x1212.

Packet type: Signaling data packet.

When the terminal sends a file data to the attachment server successfully, it will send a completed message to the attachment server.

Message body data format Table 4-27

Table 4-27 File upload completed message body data format

Start byte	Field	Data length	Description and requirements
0	File name length	BYTE	1
1	文件名称 File name	STRING	File name
1+l	File type	BYTE	0x00: picture 0x01: Audio 0x02: Video 0x03: Text 0x04: Other
2+l	File size	DWORD	The size of the currently uploaded file.

Message ID: 0x9212.

Packet type: Signalling data packet.

When receiving the file completed message of the terminal, the attachment server will send a response message to the terminal.

Respond message body data format Table 4-28.

4.10 File upload completed message response

Table 4-28 File upload completed message response data format

Start byte	Field	Data length	Description and requirements
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0	File name length	BYTE	l
1	File name	STRING	File name
1+l	File type	BYTE	0x00: picture 0x01: Audio 0x02: Video 0x03: Text 0x04: Other
2+l	Upload result	BYTE	0x00: Finished 0x01: Supplement upload
3+l	The number of supplementary upload data packets	BYTE	The number of supplementary upload data packets, when it don't need to supplement upload, the value is 0.
4+l	List of supplementary upload data packets		In Table 4-29

Table 4-29 Data format of supplementary data packets

Start byte	Field	Data length	Description and requirements
0	Data offset	DWORD	Data offset of supplementary file
1	Data length	DWORD	Data offset of data length

If the data needs to be supplement upload, the terminal must upload through file data packets. Until the file data is sent successfully, then upload data completion information. After all files are sent, the terminal disconnects from the attachment server.

If you have any other questions, please send an email to info@istartek.com, we are happy to serve you.