Long-term ephemeris (LTE) use document of Zhongke Microelectronics

V1.0.0.0

2019-05-30

Document description

file name	Long-term ephemeris (LTE) use document of Zhongke Microelectronics
Document summary	Describes the use of the long-term ephemeris LTE function of Zhongke Microelectronics in detail
version number	V1.0.0.0
date	2019.05.30
new version update	
V1.0.0.0	2019.05.30 First edition

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1. Interaction between client and server

The client uses this protocol to send a request for long-term ephemeris data to the server. After the server receives it, it directly issues the long-term

Ephemeris data. The request information is in text format.

Example of requested information: user=xxxxx;pwd=xxxxx;cmd=lte;days=3;

Key value	unit	Optionality	Remark
user	String	must	User account name. Must be an email address.
pwd	String	must	password. The AGNSS user provides the user name to the server, and the The server generates a password and sends it to the user.

cmd	String	Optional	lte: Long-term ephemeris model.
days	String	Optional	Only valid in lte mode. The unit is day.
			Currently supports 1-day and 3-day ephemeris validity periods.

Note that the long-term ephemeris data itself does not contain the time and position information provided to the receiver.

The main content of long-term ephemeris data is to start from the time period (accurate to the hour) when the customer initiates the request.

GPS satellite data information inside.

Currently, the validity period of long-term ephemeris data is divided into two types: 1 day/3 days. As the validity period of the long-term ephemeris increases, the amount of

It also becomes bigger.

Long-term ephemeris validity period length	1 day	3 days
Data volume (approximate)	9,300Bytes	23,300Bytes

When customers request data, they need to prepare enough storage space according to the size of the requested data.

The interactive operation steps between the client and the server are roughly as follows:

1. The client sends the request information to the server.

2. The server sends long-term ephemeris data to the client, and the client stores the data while receiving it.

2. Long-term ephemeris data transmission process

After the user client MCU receives the long-term ephemeris data from the server, it needs to interact with the GNSS receiver.

Letter in order to complete the transmission process of the long-term ephemeris. For the information format transmitted in this process, see section 4 for details.

The data transmission process is introduced in text form as follows:

1. The client MCU sends the AID_LTE_REQ command to the receiver.

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2. The receiver receives the command, stops the navigation function, enters the data receiving mode, and sends an ACK message to the MCU. like

   If the reception fails, the receiver will send a NACK command to the MCU, at this time the MCU should resend AID_LTE_REQ

   Order.

3. After receiving the ACK message, the client MCU sends long-term ephemeris data to the receiver.

4. The receiver receives the long-term ephemeris data, stores it in FLASH, and sends an ACK message to the MCU at the same time. If the

   If the process fails, the receiver will send a NACK message. At this time, the MCU needs to resend the long-term ephemeris data packet.

5. After sending the long-term ephemeris data, the client MCU sends the AID_LTE_END command to the receiver.

6. After the receiver receives the AID_LTE_END command, it performs a restart operation to restore the navigation function. Long-term ephemeris

   The data transfer process is complete.

The diagram of the data transmission process is as follows.

Client MCU   GNSS receiver

Ready to receive
LTE data

Receive LTE data packet
And store

3. Long-term ephemeris status query statement

Send a text command $PCAS06,L*67\r\n to the receiver, and the receiver will return a message indicating the current long-term ephemeris

Text information about the status. After the long-term ephemeris transmission is completed and the receiver is restarted, the user can check the stored long-term ephemeris

State to check.

Examples of statements are as follows:

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$GPTXT,01,01,02,LT=10,2055,379800,2056,34200*5A\r\n

The end time of the long-term ephemeris validity period, GPS seconds within a week

End time of long-term ephemeris validity period, GPS week number

Long-term ephemeris validity period start time, GPS seconds within a week

Long-term ephemeris validity period start time, GPS week number

Long-term ephemeris validity period. 4 corresponds to 1 day, 10 corresponds to 3 days

4. Long-term ephemeris data protocol

This part specifies the protocol content of the interactive communication between the user client MCU and the GNSS receiver. Introduced in this section

All of the communication protocols are in binary data format, which is expressed in hexadecimal format in this document.

Among them, the LTE request command and the LTE end command need to be generated by the user client MCU. At the same time, the client MCU needs

Only by identifying the ACK and NACK information output by the receiver can the data transmission process described in section 2 be completed.

4.1 LTE request command

Message AID_LTE_REQ

describe	Send instructions for long-term ephemeris data request. It is sent by the host computer, and the receiver opens the "long-term ephemeris data connection" after receiving it. "Receive" mode.
type	enter

Annotation

information	head	Length (bytes)	Identifier	Payload	Checksum
structure	0xBA 0xCE	0	0x0B 0x06	0	4 Bytes

4.2 LTE transmission end command

Message AID_LTE_END

describe	The end of data transmission. It is sent by the host computer, and the "long-term ephemeris data reception" mode is closed after the receiver receives it.
type	enter

Annotation

information	head	Length (bytes)	Identifier	Payload	Checksum

structure	0xBA 0xCE	0		0x0B 0x09	0	4 Bytes

4.3 ACK message

Information ACK-ACK

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describe	Respond to the information received correctly
type	Reply

Annotation

information	head	Length (bytes)	Identifier	Payload	Checksum
structure	0xBA 0xCE	4	0x05 0x01	See the table below	4 Bytes

Payload content

character Offset	data type	Proportion Zoom	name	Unit	description
0	U1	-	clsID	-	Types of information received correctly
1	U1	-	msgID	-	The number of the correct received message
2	U2	-	res	-	Reserve

4.4 NACK message

Information ACK-NACK

describe	Responding to a message that was incorrectly received
type	Reply

Annotation

information	head	Length (bytes)	Identifier	Payload	Checksum
structure	0xBA 0xCE	4	0x05 0x00	See the table below	4 Bytes

Payload content

character Offset	data type	Proportion Zoom	name	Unit	description
0	U1	-	clsID	-	Type of incorrectly received information
1	U1	-	msgID	-	The number of the message received incorrectly
2	U2	-	res	-	Reserve

5. Precautions for use

1. Long-term ephemeris information does not need to be requested from the server every time the power is turned on. Users can request data according to The validity period is to judge the renewal cycle. If you have applied for 3 days of long-term ephemeris data, you can wait until the 3rd day to ask again begging. And so on. Users can use their own timing method to request data periodically.

2. The long-term ephemeris data obtained from the server only contains the ephemeris information of GPS satellites. For no history at all The receiver of the information needs to obtain the accurate time (including the date) to be able to locate. If the receiver uses RTC internally

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Recording time and keeping reliable initial position information of the receiver will speed up the positioning speed.

3. The long-term ephemeris improves the receiver's first start-up time (TTFF), mainly because it eliminates the need to obtain data from the Internet when powering on.

According to the time. Since the long-term ephemeris does not provide assistance to position and time, its positioning time under good satellite signals,

It is consistent with the power-off start time of the receiver, and is slower than the full assist mode start of the online AGNSS, and the hot start

Moving time.