

Grove_DopplerRadar(BGT24LTR11)Radar module communication protocol v1.1

Document name:	Grove_DopplerRadar (BGT24LTR11) Radar module communication protocol v1.1
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1. Application of this manual

Grove-DopplerRadar (BGT24LTR11) radar module communication.

2. The composition of the radar communication protocol

Communication interface: UART

Communication settings:

Baud rate: 115200 bps

Data bit: 8bit

Stop bit: 1bit,

Parity bit: None

Motherboard: External controller that communicates with the radar module

Module: This Radar module

M-> R: Motherboard send message to Radar module

R-> M: Radar module send message to Motherboard

Composition:	Address Code	Instruction Code	Data length field	Data filed	Check Code
Occupied bytes:	2Bytes	1Bytes	2Bytes	Variable length	2Bytes

Address Code (occupies two bytes):

M->R: 0x55 0x2A

R->M: 0x55 0xA2

Instruction Code (occupies one byte):

M->R or R->M

0xC1-Query target detection information

0xC2-Report radar I / Q signal ADC value information

0xC3-Set the speed detection range

0xC4-Query the currently set speed detection range

0xC5-Set radar working mode

0xC6-Query radar working mode

Data length field (occupies two bytes):

M->R or R->M

Indicates the length of the data (including check code) immediately following, occupies two bytes, high-order first, low-order second

Data filed (Variable length):

M->R or R->M

Payload data, occupied bytes is determined by the data length field

Check Code (occupies two bytes):

M->R or R->M



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Checksum: The sum of all bytes from the Address Code to the data filed. Occupies two bytes, high order first, low order second

1.1 Query target detection information

1.1.1 Motherboard sending, module receiving

0x55 0x2A 0xC1 0x00 0x02 0x01 0x42

1.1.2 The module returns, the motherboard receives

0x55 0xA2 0xC1 0x00 0x05 0x02 0x07 0x02 0x01 0xC8

among them:

0x55 0xA2 Address code means the module returns to the motherboard

0xC1 Instruction code means query target detection information

0x00 0x05 Data length field indicates the data length

0x02 0x07 Data field indicates the target speed information (**occupies two bytes, high order first**) unit cm/s here is 519 cm/s

The 0x02 data field indicates that the detected event (**accounting for one byte**) is as follows:

0x02: It is detected that the target is approaching the radar

0x01: It is detected that the target is moving away from the radar

0x00: No target detected

0x01 0xC8 Check code means checksum

Note: When the radar working mode is in the **target detection mode**, when the radar detects the target, it will actively report the target detection information.

1.2 Report ADC value information of radar I / Q signal

1.2.1 The module returns, the motherboard receives

0x55 0xA2 0xC2 0x10 0x02 0x00 0x00 0x00..... 0xCC 0x0A

among them:

0x55 0xA2 Address code means the module returns to the motherboard

0xC2 Instruction code means to query the ADC value information of radar I / Q signal

0x10 0x02 Data length field indicates the data length. Here is 4096 + 2 check digits

0x00 0x00 0x00 ...

Data field indicates the ADC value of the radar I / Q signal

Each ADC value occupies two bytes, the I signal is in the first half, and the Q signal is in the second half.

0xCC 0x0A Check code means checksum



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1.3 Set the speed detection range

1.3.1 Motherboard sending, module receiving

0x55 0x2A 0xC3 0x00 0x06 0x02 0x09 0x01 0x03 0x01 0x57

among them:

0x55 0x2A Address code means that the motherboard sends to the module

0xC3 Instruction code indicates setting speed detection range

0x00 0x06 Data length field indicates the data length

0x02 0x09 Data field means set the maximum value of speed detection (**accounting for two bytes, high-order first**) unit cm/s, here is 521 cm/s

0x01 0x03 Data field indicates the minimum value of setting speed detection (**accounting for two bytes, high-order first**) unit cm/s, here is 259 cm/s

0x01 0x57 Check code means checksum

1.3.2 The module returns, the motherboard receives

0x55 0xA2 0xC3 0x00 0x06 0x02 0x09 0x01 0x03 0x01 0xCF

1.4 Query the currently set speed detection range

1.4.1 Motherboard sending, module receiving

0x55 0x2A 0xC4 0x00 0x02 0x01 0x45

1.4.2 The module returns, the motherboard receives

0x55 0xA2 0xC4 0x00 0x06 0x02 0x09 0x01 0x03 0x01 0xD0

among them:

0x55 0xA2 Address code means the module returns to the motherboard

0xC4 Instruction code means to query the currently set speed detection range

0x00 0x06 Data length field indicates the data length



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0x02 0x09 Data field indicates the maximum value of the set speed detection (**accounting for two bytes, high-order first**) unit cm/s, Here is 521 cm/s

0x01 0x03 Data field indicates the minimum value of the set speed detection (**accounting for two bytes, high-order first**) unit cm/s, Here is 259 cm/s

0x01 0xD0 Check code means checksum

Note: When the target is within the set speed range, the radar will recognize the target.

1.5 Set the radar working mode

1.5.1 Motherboard sending, module receiving

0x55 0x2A 0xC5 0x00 0x03 0x00 0x01 0x47

among them:

0x55 0x2A Address code means that the motherboard sends to the module

0xC5 Instruction code means to set the radar working mode

0x00 0x03 Data length field indicates the data length

0x01 Data field indicates the radar working mode (**occupies one byte**) as follows:

0x01: report ADC value mode of radar I / Q signal

0x00: detection target mode

0x01 0x47 Check code means checksum

1.5.2 The module returns, the motherboard receives

0x55 0xA2 0xC5 0x00 0x03 0x01 0x01 0xBF

1.6 Query radar working mode

1.6.1 Motherboard sending, module receiving

0x55 0x2A 0xC6 0x00 0x02 0x01 0x47

1.6.2 The module returns, the motherboard receives

0x55 0xA2 0xC6 0x00 0x03 0x00 0x01 0xC0

among them:

0x55 0xA2 Address code means the module returns to the motherboard



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0xC6 Instruction code means to query the radar working mode

0x00 0x03 Data length field indicates the data length

0x00 Data field indicates that the detected event (**accounting for one byte**) is as follows:

0x01: report ADC value mode of radar I / Q signal

0x00: detection target mode

0x01 0xC0 Check code means checksum

Description:

The radar works in the detection target mode by default.

When the radar works in the mode of reporting the ADC value of the radar I / Q signal: the radar only reports the ADC value information of the radar I / Q signal and does not report the target detection information.

When the radar is working in the target detection mode: the radar only reports target detection information and does not include the ADC value information of the radar I / Q signal.

1.7 Set radar trigger threshold

1.7.1 Motherboard sending, module receiving

0x55 0x2A 0xC7 00x00 0x06 0x00 0x00 0x04 0x00 0x01 0x50

1.7.2 The module returns, the motherboard receives

0x55 0xA2 0xC7 0x00 0x06 0x00 0x00 0x04 0x00 0x01 0xC8

among them:

0x55 0xA2 Address code means the module returns to the motherboard



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0xC7 Instruction code means to set the radar trigger threshold

0x00 0x06 Data length field indicates the data length

0x00 0x00 0x04 0x00 data field represents the set radar trigger threshold (**4 bytes, high order first**) here is 1024

0x01 0x50 Check code means checksum

1.8 Query the currently set radar trigger threshold

1.8.1 Motherboard sending, module receiving

0x55 0x2A 0xC8 0x00 0x02 0x01 0x49

1.8.2 The module returns, the motherboard receives

0x55 0xA2 0xC8 0x00 0x06 0x00 0x00 0x04 0x00 0x01 0xC9

among them:

0x55 0xA2 Address code means the module returns to the motherboard

0xC8 Instruction code means to set the radar trigger threshold

0x00 0x06 Data length field indicates the data length

0x00 0x00 0x04 0x00 Data field represents the set radar trigger threshold (**4 bytes, high order first**)

Here is 1024

0x01 0xC9 Check code means checksum

3, Update history

Version	Updates	Author	Update date
V1	Add radar communication protocol description	SHH	2019-10-10
V1.1	Added radar trigger threshold setting	SHH	2019-11-04