

Radar Protocol Class

Radar multitarget serial communication
protocol v1.4

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1. Application of This Tool

It is suitable for radar system test and practical application.

2. Communication Mode

UART serial communication | baud rate: 9600 (default) | data bit: 8 | parity: no | stop bit: 1

3. Definition of Serial Port Protocol

Calibration method:

XOR check

Address code:

Address code sent by upper computer and received by radar

Address code sent by radar and received by upper computer

Instruction code:

0xc1 switch radar command

0xC2 - set baud rate

0xc3 query radar detection results

0xc4 query software and hardware version

Frame definition

Frame definition without parameters of instruction code:

<p>The first and second byte is the address code, where:</p> <p>The first byte is fixed to 0x55</p> <p>If the second byte is 0x5a, it means the upper computer sends; if it is 0xa5, it means radar transmission</p>	<p>The third byte is the data length: it indicates how many bytes of data are followed, and the maximum value is 255</p>	<p>The fourth byte is the instruction code</p>	<p>The fifth byte is the check sum:</p> <p>The calculation method is the XOR of byte by byte from data length to instruction code</p>
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Frame definition with parameters of instruction code:

<p>The first and second byte is the address code, in which: the first byte is fixed as 0x55</p> <p>If the second byte is 0x5a, it means the upper computer sends; if it is 0xa5, it means radar transmission</p>	<p>The third byte is the data length: it indicates how many bytes of data are followed, and the maximum value is 255</p>	<p>The fourth byte is the instruction code</p>	<p>The 5th to nth byte: indicates the parameters of the instruction code. If the parameter contains double byte data, the high byte is sent first, and then the low byte is sent</p>	<p>The N + 1 byte</p> <p>For XOR check, calculation method: XOR of byte by byte from data length to nth byte</p>
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Inquiry protocol

A. Upper computer transmitting and radar receiving:

Address code (2 bytes)	Data length	Instruction code	Check
0x55 0x5A	0x02	0xC3	0xC1

Check code: data length ^ instruction.

B. Radar transmission, host computer receiving: radar transmission frame composition:

Address code (0x55, 0xa5) + data length (accounting for 1 byte, indicating the data length after) + instruction code (0xc3) + total number of targets (accounting for 1

byte, indicating the total number of targets detected this time. Note: the radar of this model can detect 3 targets at most) + data information of each target (number of each target)

8 bytes of information) + reserved byte (1 byte) + radar shutdown prompt (1 byte) + verification (1 byte)

Composition of target data information: Target ID (1 byte) + distance (2 bytes) + speed (2 bytes) + angle (1 byte)+Signal strength (2 bytes)

Distance, speed, angle and signal strength:

These four groups of data are set according to the product properties. If there is no such parameter, set it to 0.

The unit of distance is 16 bit unsigned short, unit: cm

The speed data is 16 bit signed short, positive number is close, negative number is far away, unit: cm / s

Angle data adopts 8-bit signed char, unit: Degree (°), range: - 90 ° ~ 90 °; refer to antenna direction definition for details.

The signal strength adopts 16 bit unsigned short, and the larger the value, the stronger the signal, in dB.

For example:

1. The total number of radar detected frames is as follows:

Address code (2Byte)	Data length	Instruction code (1Byte)	Total target	Retain (1 Byte)	Radar off prompt (1byte: 0 on, 1 off)	Check (1Byte)
0x55 0xA5	0x05	0xC3	0x00	0x00	0x00	0xC6

2. The total number of targets detected is 1, the target distance is 80cm, the speed is 20cm / s, the angle is + 20 ° and the signal strength is 25dB. If the radar is in the on state, the frames sent by the radar are as follows:

Address code (2Byte)	Data length	Instruction code (1Byte)	Total target	Target ID	Distance	Speed (2Byte)	Angle (1Byte)
0x55 0xA5	0x0D	0xC3	0x01	0x01	0x00,0x50	0x00,0x14	0x14

Signal Intensity	Retain (1 Byte)	Radar off prompt (1byte: 0 on, 1 off)	Check (1Byte)
0x00, 0x19	0x00	0x00	0xD2

3. The total number of detected targets is 2. The first target has a distance of 80cm, a speed of 20cm / s, an angle of + 20 ° and a signal strength of 25dB. The distance of the second target is 300cm, the velocity is - 80cm / s, the angle is - 40 ° and the signal strength is 40dB. The radar is in the on state, then the frames sent by the radar are as follows:

Address code (2Byte)	Data length (1Byte)	Instruction code (1Byte)	Total target (1Byte)	Target ID (1Byte)	Distance (2Byte)	Speed (2Byte)	Angle (1Byte)
0x55 0xA5	0x15	0xC3	0x02	0x01	0x00,0x50	0x00,0x14	0x14

Signal Intensity (2Byte)	Target ID	Distance (2Byte)	Speed (2Byte)	Angle (1Byte)	signal intensity (2Byte)	retain (1 Byte)
0x00, 0x19	0x02	0x01, 0x2C	0xFF, 0x	0xD8	0x00, 0x28	0x00

Radar off prompt (1byte: 0 on, 1 off)	check (1Byte)
0x00	0x0C

4. The total number of detected targets is 3. The first target has a distance of 80cm, a speed of 20cm / s, an angle of + 20 ° and a signal strength of 25dB. The second target has a distance of 300cm, a velocity of - 80cm / s, an angle of - 40 ° and a signal strength of 40dB. The third target has a distance of 500cm, a speed of 120cm / s, an angle of 80 ° and a signal strength of 30dB. The radar is in the on state, and the frames sent by the radar are as follows:

Address code (2Byte)	Data length (1Byte)	Instruction code (1Byte)	Total target (1Byte)	Target ID (1Byte)	Distance (2Byte)	Speed (2Byte)	Angle (1Byte)
0x55 0xA5	0x1D	0xC3	0x03	0x01	0x00,0x50	0x00,0x14	0x14

signal intensity (2Byte)	Target ID (1Byte)	Distance (2Byte)	Speed (2Byte)	Angle (1Byte)	signal intensity (2Byte)	Target ID (1Byte)	Distance (2Byte)
0x00, 0x19	0x02	0x01, 0x2C	0xFF, 0	0xD8	0x00, 0x28	0x03	0x01, 0xF4

Speed (2Byte)	Angle (1Byte)	signal intensity (2Byte)	retain (1 Byte)	Radar off prompt (1byte: 0 on, 1 off)	check (1Byte)
0x00, 0x78	0x50	0x00, 0x1E	0x00	0x00	0xC5

Radar off prompt: If the radar is off at the time of query, the byte is 1.

Turn on / off radar protocol

Host computer transmitting and radar receiving:

Function	Address code	Data length	Instruction code	Switch command	check
Turn on the	0x55 0x5A	0x03	0xC1	0x01	0xC3

Function	Address code	Data length	Instruction code	Switch command	check
Turn off	0x55 0x5A	0x03	0xC1	0x00	0xC2

Radar transmitting and host computer receiving:

Function	Address code (2Byte)	Data length	Instruction code	on or off status	check
Radar status on	0x55 0xA5	0x03	0xC1	0x01	0xC3

Function	Address code (2Byte)	Data length	Instruction code	on or off status	check
Radar status off	0x55 0xA5	0x03	0xC1	0x00	0xC2

Set baud rate protocol

Host computer transmitting and radar receiving:

Function	Address code (2Byte)	Data length	Instruction code	Baud rate	check
Set baud rate 115200	0x55 0x5A	0x03	0xC2	0x01	0xC0

Radar transmitting and host computer receiving:

Function	Address code (2Byte)	Data length	Instruction code	Baud rate	check
Answer setting baud	0x55 0xA5	0x03	0xC2	0x01	0xC0

Corresponding relationship between number and baud rate:

0x01	115200
0x02	57600
0x03	38400
0x04	28800
0x05	19200
0x06	14400
0x07	9600
0x08	4800
0x09	2400
0x0A	1200

Query software and hardware version protocol

Host computer transmitting and radar receiving:

Function	Address code	Data length	Instruction code	check
Check software	0x55 0x5A	0x02	0xC4	0xC6

Radar transmitting and host computer receiving:

Function	Address code (2Byte)	Data length	Instruction code	Hardware version	Software version	retain	check
Send software	0x55 0xA5	0x05	0xC4	0x0C	0x03	0x00	0xCE