Shenzhen Hi-Link Electronic Co., Ltd

HLK-LD6002
Communication Protocol

Respiratory heart rate detection

CONTENT

1. Application project

For different application projects, all the messages related to TF frames are listed for user reference and analysis. For the message class appearing in the document and the message data bits, they are equipped corresponding to the actual project.

1.1. Respiratory + heart rate detection items

Message Type: Report the phase test result of 0x 0A13

Message type is 0x0A13, supporting only one-way data transfer mode.

The radar sends the data to the upper computer					
form	Byte number	fundamental type	frame structure	Example frames	The frame meaning
SOF	1 byte	uint8	Start frame	01	Used to output the total phase, heartbeat phase, respiratory phase results.
ID	2 byte	uint16	frame ID	00 00	
LEN	2 byte	uint16	Data frame length	00 04	
TYPE	2 byte	uint16	frame type	0A 13	
HEAD_CKSUM	1 byte	uint8	Head checksum	\	
DATA	4 byte	float	[total phase]	\	
DATA	4 byte	float	[breath phase]	\	
DATA	4 byte	float	[heart phase]	\	
DATA_CKSUM	1 byte	uint8	Data checksum	\	

Message Type: Report the breath rate test result of 0x0A14

Message type is 0x0A14, supporting only one-way data transfer mode.

The radar sends the data to the upper computer					
form	Byte number	fundamental type	frame structure	Example frames	The frame meaning
SOF	1 byte	uint8	Start frame	01	To report the respiratory rate test results.
ID	2 byte	uint16	frame ID	00 00	
LEN	2 byte	uint16	Data frame length	00 04	
TYPE	2 byte	uint16	frame type	0A 14	
HEAD_CKSUM	1 byte	uint8	Head check and	\	
DATA	4 byte	float	[rate]	\	
DATA_CKSUM	1 byte	uint8	Data verification and	\	

Message type: Report the heartbeat rate, test result 0x0A15

Message type is 0x0A15, supporting only one-way data transfer mode.

The radar sends the data to the upper computer					
form	Byte number	fundamental type	frame structure	Example frames	The frame meaning
SOF	1 byte	uint8	Start frame	01	Used to report the heartbeat phase test results.
ID	2 byte	uint16	frame ID	00 00	
LEN	2 byte	uint16	Data frame length	00 04	
TYPE	2 byte	uint16	frame type	0A 15	
HEAD_CKSUM	1 byte	uint8	Head checksum	\	
DATA	4 byte	float	[rate]	\	
DATA_CKSUM	1 byte	uint8	Data checksum	\	

Message Type: Report the detection target distance of 0x0A16

Message type is 0x0A16, supporting only one-way data transfer mode.

The radar sends the data to the upper computer					
form	Byte number	fundamental type	frame structure	Example frames	The frame meaning
SOF	1 byte	uint8	Start frame	01	To report the detection distances.
ID	2 byte	uint16	frame ID	00 00	
LEN	2 byte	uint16	Data frame length	00 04	
TYPE	2 byte	uint16	frame type	0A 16	
HEAD_CKSUM	1 byte	uint8	Head checksum	\	
DATA	4 byte	Uint32	[flag]	\	
DATA	4 byte	float	[range]	\	
DATA_CKSUM	1 byte	uint8	Data checksum	\	

Note: When flag as 1, the output distance (unit: cm)

If the flag is 0, no distance is output

A, the following is the data conversion of the DATA-bit:

Convert to float: for example, [rate] bit 0x66,0x66,0xA2,0x41, first spell uint32 bit shaping, because the TF frame Data bit small end order, so the value is 0x 41A26666, and then float type strong turn, the final result is: 20.3.

```
1. int  main(void )
2. {
3. unsigned int  param = 0x 41A 26666;
4. float  res = *(float  *)&param ;
5.
6. printf("data: %f\n", res);
7. return  0;
8. }
```

B, The following is the analysis of each CKSUM:

HEAD _ CKSUM: TF frame header checksum [Starting from the first byte to the previous byte of the HEAD CKSUM bit]

DATA _ CKSUM: TF data test and [The first byte of DATA to the last byte of the DATA CKSUM bit]

The method c code for calculating C KSUM is as follows:

```
unsigned char  getCksum(unsigned char  *data, unsigned char  len)
{
unsigned char  ret = 0;

for  (int  i = 0; i < len; i++)
ret = ret ^ data[i];

ret = ~ret;

return  ret;
}
```

2. Programming interface

2.1. Encode the TF message

void tinyFramefTx(TF_TYPE type, uint8 *data, TF_LEN len);

Where type is the sending data type, the u int16 type, such as the personnel detection data result report, the data type is 0x0A10. See 4.2.1.6 for details

Uint8 * Data is the address that sends the data.

Len is the length of the sent data, the u int16 type.

2.2. Decode the TF message

TinyFrameRx tinyFramefRx(void);

After successfully receiving the message, the received data is returned to a variable of the TinyFrameRx type.

2.3. Example code

If you want to analyze the demo of TF frame data (including C message in Linux environment and Python language demo) in Keil µVision5 environment, you can directly communicate with the sales.

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