M500 ***Thermal Imaging Camera***

Communication protocol

V2.0

Sun Creative Technologies Inc

1. Communication channel description

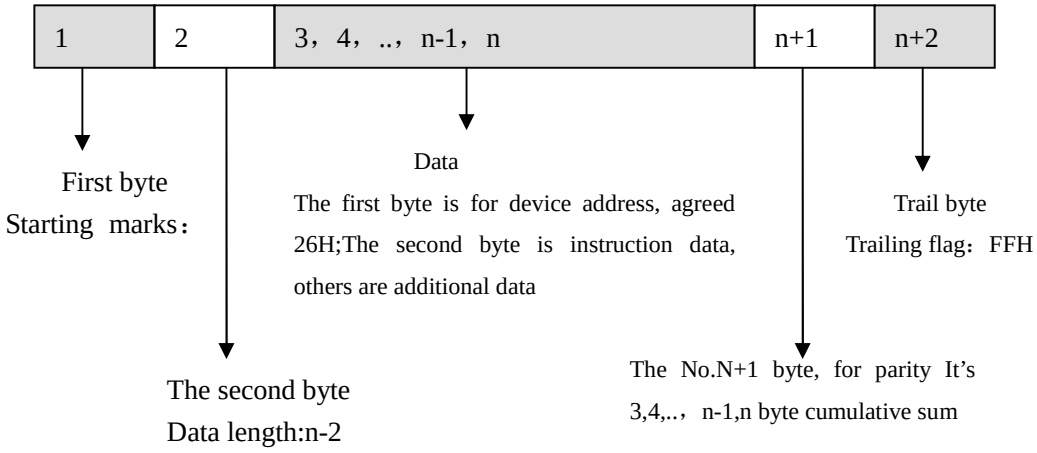
The thermal imaging camera date transmitted to computer in the mode of asynchronous serial communication,the hardware interface is RS232,the hardware parameter in following:

Baud rate: 19200 bps
Start bit:1 bit
Stop bit:1 bit
Parity Check: None
Data bit:8 bit

2. Communication protocol software description

2.1PC send commands to thermal imaging camera via serial port to control the thermal imaging camera.The communication command sending comply with agreed packet format.

2. 2 Agreed packet data format：



（1）Starting marks: 1 Byte，F0H in hexadecimal notation；

（2）Data length: 1 Byte，X；

（3）Data：The number of length bytes data;

（4）Check sum：The cumulative sum of length bytes data lower's 8 bits;

（5）Trailing flag:1 byte，FFH in hexadecimal notation；

（6）In data packet, except starting marks and trailing flag, it means that from the 2nd to the N+1 bit date, if key data F0H,FFH or F5H occurred, it should be replaced by F5H 00H,F5H 0FH,F5H 05H for sending.

（7）In data packet the date length is count valid date only, it means that the escape character is not necessary and forbid to add on.

3. Communication protocol commands list-PC commands

Commands data packet name	Device address	Command identifier	**Additional data**	**Comments**
Status enquiry	26H	00H		Feedback
Polarity setting	26H	01H	One byte 00H is white hot; 0FH is black hot.	
Zoom in	26H	02H	One byte.00H:Normal ; 02H :2X zoom in; 04H:4X zoom in	
Auto mode setting	26H	03H	One byte,01H:Fixed gain(contrast), 02H:Auto gain	
Video contrast setting	26H	04H	One byte, 0~100.	
Video contrast increase setting	26H	05H		
Video contrast decrease setting	26H	06H		
Image mirror	26H	07H	One byte 00H No mirror , 01H Left/right mirror , 02H up/down mirror , 03H left/right, up/down mirror	
video brightness setting	26H	09H	One byte, 0~100.	
Video brightness increase setting	26H	0AH		
Video brightness decrease setting	26H	0BH	.	
Cursor display/hide	26H	0CH	One byte,00H is hide, 01H is display	
Cursor move byX-axis	26H	0DH	Two bytes.first byte: direction.00H isX+,01H is X- Second byte:moving step size,1~255	
Cursor move by Y-axis	26H	0EH	Two bytes.first byte:direction.00H is Y-,01H is Y+ Second byte:moving step size,1~255	
Cursor move to the set position	26H	0FH	Four bytes.The first and second bytes isX-axis,the third and forth bytes is Y-axis	
Save cursor position	26H	10H		
System reset	26H	80H		Camera restore to default

Agreed device address is 26H

4. Communication commands list-Camera response commands

The thermal imaging camera is not able to send date out directly, it only send date response when it get "status enquiry" the response date packet comply with "communication date packet agreement".

Response data name	Device address	Command identifier	Additional data
Status enquiry	26H	00H	First byte: B0: Polarity mark, 0 for white hot, 1 for black hot; B2,B1: Zoom in setting, 0 Normal image, 1 2X zoom in, 2 4X zoom in; B4,B3: Auto mode setting, 0 for mode 0, 1 for mode 1,2 for mode 2; B6,B5:image mirror. 0 No mirror, 1 Left/right mirror, 2 up/down mirror, 3 left/right, up/down mirror Others are reserved bits, Set as 0. Second byte: Video contrast Third byte: video brightness
Feedback	26H	00H or the received command	One byte. 00H: command correct 01H: check code error 02H: command identifier error 03H: attached file error or out of range 04H: data send interval too long, the feedback command identifier is 00H 05H:data packet format error. feedback command identifier is 00H

5. Communication commands list for reference

The camera device code is 26H:

（1） Status enquiry: F0 02 26 00 26 FF
（2） Polarity setting（White hot): F0 03 26 01 00 27 FF
（3） Polarity setting（Black hot): F0 03 26 01 0F 36 FF
（4） Zoom in（Normal): F0 03 26 02 00 28 FF
（5） Zoom in（2X zoom): F0 03 26 02 02 2A FF
（6） Zoom in（4X zoom): F0 03 26 02 04 2C FF
（7） Auto mode setting（Auto Gain): F0 03 26 03 02 2B FF
（8） Auto mode setting（Fixed Gain): F0 03 26 03 01 2A FF
（9） Video contrast setting: F0 03 26 04 0F 39 FF
（10）Video contrast increasing setting: F0 03 26 05 04 2F FF

（11）Video contrast decreasing setting: F0 03 26 06 04 30 FF
（12）System reset：F0 02 26 80 A6 FF
（13）Video brightness setting: F0 03 26 09 0F 3E FF
（14）Video brightness increasing setting: F0 02 26 0A 30 FF
（15）Video brightness decreasing setting:F0 02 26 0B 31 FF
（16）Cursor X- move: F0 04 26 0D 00 01 34 FF
（17）Cursor X+ move: F0 04 26 0D 01 01 35 FF
（18）Cursor Y- move: F0 04 26 0E 00 01 35 FF
（19）Cursor Y+ move: F0 04 26 0E 01 01 36 FF
（20）Save cursor position:F0 02 26 10 36 FF
（21）Image mirror (original): F0 03 26 07 00 2D FF
（22）Image mirror(left/right): F0 03 26 07 01 2E FF
（23）Image mirror(up/down): F0 03 26 07 02 2F FF
（24）Image mirror(total): F0 03 26 07 03 30 FF