

S6412T

Thermal Imaging Module

Technical Data

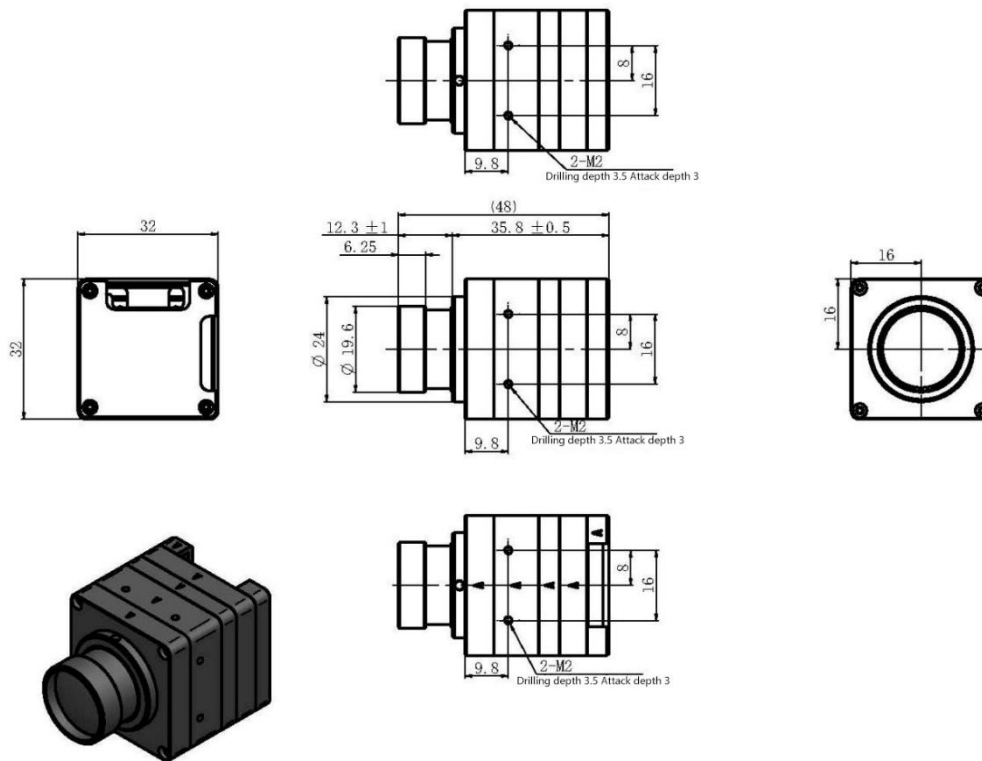


Suzhou Grand Sensor Inc.

1. Performance parameters

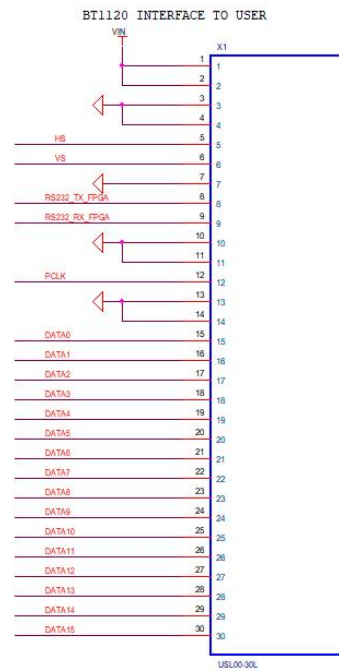
Items	Technical Specification		
Type	S6412T		
Detector characteristic	Detector	Uncooled Vox FPA	
	Array format/Pixel pitch	640x512 / 12um	
	NETD	≤50mk@300K, 50HZ	
	Frame rate	50Hz	
	Spectral range	8~14um	
Image processing	Non-uniformity calibration	shutter technology	
	Boot time	< 5s	
	Noise reduction	Digital filter	
	Image definition	768×576 (PAL)	
	Image frame rate	50Hz(PAL)/60Hz(NTSC)(Optional)	
Thermal imaging adjustment	Palette	Black/white hot, rain bow, etc.	
	Mirror image	Horizontal/Vertical	
	Image zoom	PAL display ×1-×4 (step 0.1), BT1120 no enlarge	
	Auto gain	Auto adjustment	
Power	Working voltage range	DC: +2.9V~+6.5V	
	Typical working voltage	DC: 5.5V	
	Power protection	Over-voltage/under-voltage/reverse-voltage protection	
	Power consumption	≤1.5W	
	Working temperature range	Business use:	-20°C~+60°C
		Special use:	-40°C~+60°C
	Storage temperature range	-45°C~+65°C	
	Humidity	5%~95% Non-condensing	
	Vibration&shock	Vibration: GJB 150-16 2.3.1	
		Shock: GJB 150-18	
Test 7 100g/6ms			
Anti temperature impact	-5°C/min (-40°C~+60°C)		
Physical parameter	Weight	< 32g	
	Dimension (No lens and back cover)	32mm×32mm×35mm	
Interface	Power port	Yes	
	Serial port	RS-232	
	Analog video	PAL	
	Digital video output	BT1120, (Customizable) RGB888, BT656, etc.	

2. Dimensions



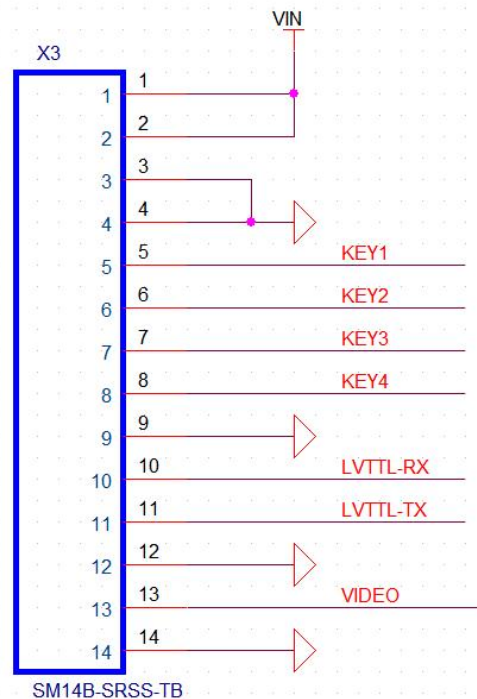
3. Definition and description of each interface on Power board

3.1 BT1120 introduction



Pin	Signal Name	Note
1, 2	VIN	power input, typical value +5.5V
3, 4,7,10,11,13,14	GND	Power and signal ground
5	HS	bt1120 line sync
6	VS	bt1120 frame sync
8	RS232_TX_FPGA	UART send
9	RS232_RX_FPGA	UART receive
15	DATA0	bt1120 data signal, 16bit, DATA0---LSB, DATA15---MSB
16	DATA1	
17	DATA2	
18	DATA3	
19	DATA4	
20	DATA5	
21	DATA6	
22	DATA7	
23	DATA8	
24	DATA9	
25	DATA10	
26	DATA11	
27	DATA12	
28	DATA13	
29	DATA14	
30	DATA15	

3.2 14pin header introduction



Pin	Signal Name	Note
1, 2	VIN	power input, typical value 2.9-6.5V
3, 4,9,12,14	GND	Power and signal ground
5	KEY1	button +
6	KEY2	button M
7	KEY3	button -
8	KEY4	Reserved
10	LVTTL-RX	RS232 receive
11	LVTTL-TX	RS232 send
13	VIDEO	PAL output

4. Communication protocol

4.1 Serial port settings

Baud rate	Transmission format			Check method
115200bps	8bit data bit	1bit start bit	1bit stop bit	No verification

Note: For each byte of information, the least significant bit (LSB) is transmitted first.

4.2 Movement component command message format

4.2.1 Movement receiving command format

Frame header	Command	Additional	Data length	Reserved	Check Digit	Data area
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	byte	command byte				
0xeb, 0x90	0x00-0xFF	0x00-0xFF	Data length	area null	Sum check	Data
2 byte	1 byte	1 byte	4 byte	1 byte	1 byte	2-N byte

Note: Multi-byte data is little-endian aligned

4.2.2 Movement return command format

Frame header	Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
0xeb, 0x90	0x00-0xFF	0x00-0xFF	Data length	area null	Sum check	Data
2 byte	1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: 1. Multi-byte data are aligned at little end; 2. Only setting commands return the receiving status, and read commands directly return the read data without returning the receiving status; 3 The command word in the command format returning status is the same as The command word in the setting command is the same; 4. There are two return states, "0" means success, and "255" means unsuccessful.

4.2.3 Command format of other movement components

Zoom parameter (short command)

Frame header	Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
0xeb 0x90	0x0b	00	02 00 00 00	00	Sum check	xx 00
2 byte	1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The data area xx is the magnification, the value is 0x00-0x07, and the default is 0x00.

Pseudo-color parameters (short command)

Frame header	Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
0xeb 0x90	0x0c	00	02 00 00 00	00	Sum check	xx 00
2 byte	1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The data area xx is the pseudo-color selection gear, 0x00 is white hot, 0x01 is black hot, 0x02, 0x03, etc. correspond to the corresponding pseudo-color format, and the default is 0x00.

Contrast parameter (short command)

Send	Frame header	Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
	0xeb 0x90	0x0d	00	02 00 00 00	00	Sum check	xx 00
	2 byte	1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The data area xx is the contrast level, the value is 0x00-0x0f, and the default is 0x04.

Brightness parameter (short command)

Frame header	Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
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0xeb	0x90	0x0e	00	02 00 00 00	00	Sum check	xx 00
2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The data area xx is the brightness level, the value is 0x00-0x1f, and the default is 0x10.

Digital detail enhancement parameters (short command)

Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
0xeb	0x90	0x14	00	02 00 00 00	00	Sum check	xx 00
2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The data area xx is the digital detail enhancement gear, the value is 0x00-0x0f, and the default is 0x03.

Filter parameters (short command)

Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
0xeb	0x90	0x16	00	02 00 00 00	00	Sum check	xx 00
2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The data area xx is the filter gear, the value is 0x00-0x0f, and the default is 0x02.

Picture-in-picture parameters (short command)

Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
0xeb	0x90	0x28	00	02 00 00 00	00	Sum check	xx 00
2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The value of xx in the data area is 0x00, which means hidden picture-in-picture, and 0x01 means that picture-in-picture is displayed.

Correction control (short command)

Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
0xeb	0x90	0x2F	00	02 00 00 00	00	Sum check	xx 00
2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The value of xx in the data area is 0x01, which means correction is requested.

Get the maximum temperature and corresponding position (long command)

Send	Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
	0xeb	0x90	0x47	0x00: lowest 0x01: highest 0x02: average 0x03: All	02 00 00 00	00	Sum check	xx 00

	2 byte	1 byte	1 byte	4 byte	1 byte	1 byte	2 byte
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	Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
Receive	0xeb	0x90	0x47	0x00: lowest 0x01: highest 0x02: average	06 00 00 00	0	Sum check	A total of 6 bytes, the first two bytes represent the temperature, a signed number; the middle two bytes represent the position abscissa; the last two bytes represent the position ordinate
				0x03: All	0e 00 00 00			The order is the lowest temperature, the lowest temperature abscissa, ordinate, the highest temperature, the highest temperature abscissa, the ordinate and the average temperature.
	2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The actual temperature is equal to the received temperature value divided by 10.

Get the center point temperature (short command)

	Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
Send	0xeb	0x90	0x46	00	02 00 00 00	00	Sum check	01 00
	2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

	Frame header		Command byte	Additional command byte	Data length	Reserved	Check Digit	Data area
Receive	0xeb	0x90	0x46	00	02 00 00 00	00	Sum check	xx xx
	2 byte		1 byte	1 byte	4 byte	1 byte	1 byte	2 byte

Note: The temperature value is a 16-bit signed number, and the actual temperature is equal to the received temperature value divided by 10.