SG-NS3/6 Thermal Imaging Camera

User's manual

Please peruse this User's Manual before using the module!

Warnings

- Avoid aiming the window (with lens or not) at extreme hi-temperature radiation source (such as the sun, molten steel, laser) in any cases (start/shut down), or the detector may be damaged.

- This module is a high-precise optoelectronics product, please protect properly during using、storage 、transportation, rough handling(such as drop 、 collision causing scathe to the detector outer cover, inner connecting wire rupture occurring in installation, being affected with damp、rain)is likely to incur module performance-reduction, even damage the module.

- Make it sure that the power control connection is reliable, if switch on the module when the power control wire is in bad connection, it will damage the thermal image camera or even the detector

- Make it sure that the connection of power control cable and data cable are reliable, otherwise it will damage the thermal image camera or even the detector.

- Should this product work abnormally, please contact the dealer or the nearest after-sale service center. Please don't dismantle or replace it in any manners.

- Please use the power supply according with product specifications or the module may work abnormally or even be damaged.

- Do not touch the PCB when the power is on.

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1 Preface

RAP3 module is a range of uncooled long-wave thermal imager suitable for a wide variety of application.The cameras operate without mechanical shutter and TEC,high sensitivity and high reliability.It with compact design make them lighter,smaller and more suitable for OEM and integration.Several focus lens for optional is ideal for applications.

2 Function Description

- Real-time image noise reduction, reduce image background noise.
- Image enhancement function, enhance small object detection ability.
- Brightness/Gain adjustable.
- 2X,3X,4X digital zoom in,or continuous zoom(step 0.1), optional
- Standard PAL format（75Ω）video output
- Cursor display
- Polarity switch
- Standard RS232.
- 6 Pseudo color

3 Unit Type

RAP3 thermal imaging module

4 Technical Specification

Items	Technical Specification		
Type		SG-NS3	SG-NS6
Detector characteristic	Detector	Uncooled VOX FPA	
	Array format/ Pixel pitch	384×288 / 12um	640x512/12um
	NETD	≤35mk@300K, 50HZ	
	Frame rate	50Hz	
	Spectral range	8~14um	
Image processing	Non-uniformity calibration	No shutter technology	
	Noise reduction	Digital filter	

	Image definition	768×576	
	Image frame rate	50Hz（PAL）/60Hz（NTSC）(Optional)	
Thermal imaging adjustment	Palette	Black/white hot, iron, rain bow 9 palettes	
	Mirror image	Horizontal/Vertical	
	Image zoom	×2，×3,×4 or continuous zoom(step 0.1), optional	
	Contrast adjustment	Auto/manual	
	Brightness adjustment	Auto/manual	
	Digital detail enhancement	Auto/manual	
	Picture-in-picture	yes	
	Cross cursor	Show/hide/shift	
Power	Working voltage range	DC: +2.9V~+6.5V	
	Typical working voltage	DC：3.6V	
	Power protection	Over-voltage/under-voltage/reverse-voltage protection	
	Power consumption	≤1.0W	≤1.1W
	Working temperature range	-40ºC~+60ºC	
	Storage temperature range	-45ºC~+65ºC	
	Humidity	5%～95% Non-condensing	
	Vibration&shock	Vibration：GJB 150-16　2.3.1	
		Shock：400G 0.1ms	
	Anti temperature impact	-5ºC/min（-40ºC~+60ºC）	
Physical parameter	Weight	＜32g	
	Dimension （ No lens and back cover）	28mm×28mm×24mm	
Interface	Power port	Yes	
	Serial port	RS-232	
	Analog video	BNC(75Ω)	
	Digital video output	RGB888	
	Keyboard	4 buttons keyboard	

5 Interface

5.1 Electric Interface

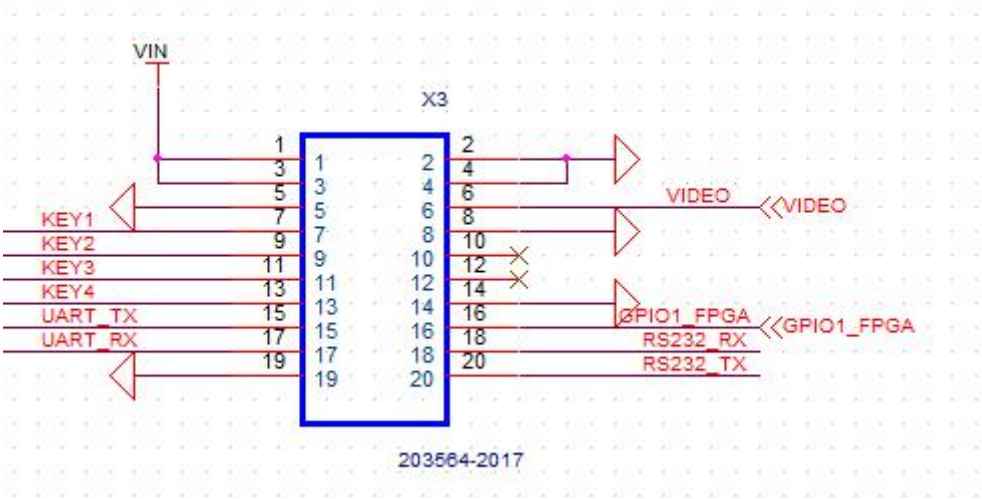


Figure 1

5.2 Detailed Explain：

PIN1,PIN3:DC power input（2.5V~5.5V）

PIN2,PIN4：Power GND

PIN5,PIN10,PIN14,PIN19,PIN20: Digital signal GND

PIN8:analog video GND

PIN6:analog video output(PAL　75Ω)

PIN7:KEY1(+)

PIN9:KEY2(M)

PIN11:KEY3(-)

PIN13:KEY4(reserved)

GPIO1_FPGA-GPIO3_FPGA is for reserved.

5.3 Interface Function Description：

Pin NO	Definition	Function	Pin NO	Definition	Function
1	VIN	Power input	2	PGND	Power ground
3	VIN	Power input	4	PGND	Power ground
5	DGND	Signal ground	6	Video	Analog video
7	KEY1(+)	Key +	8	VGND	Analog video ground

9	KEY2(-)	Key -	10	DGND	Signal ground
11	KEY3(M)	Key M	12	GPIO3_FPGA	Reserved IO
13	KEY4	Reserved key/IO	14	DGND	Signal ground
15	GPIO1_FPGA	Reserved IO	16	RS232_RX	RS232 receiver
17	GPIO2_FPGA	Reserved IO	18	RS232_TX	RS232 transmitter
19	DGND	Signal ground	20	DGND	Signal ground

OLED Port Definition

Pin	Signal Name	Note
1	VDD_DIG	1.8V
2	VDD_DIG	1.8V
3	VDD	3.3V
4	VDD	3.3V
5	GND	Ground
6	RESET	（BOOSTB）reset（grounded）
7	GND	Ground
8	GND	Ground
9	PCLK	Pixel Clock
10	HSYNC	Horizontal Sync
11	VSYNC	Vertical Sync
12	DVLID	Data Valid
13	D23	24bit data RGB 888 D［23:16］for R D［15:8］for G D［7:0］for B
14	D22	
15	D21	
16	D20	
17	D19	
18	D18	
19	D17	
20	D16	
21	D15	
22	D14	
23	D13	
24	D12	
25	D11	
26	D10	
27	D9	
28	D8	
29	VDDIOV	1.8V
30	D7	24bit data RGB 888
31	D6	
32	D5	
33	D4	

34	D3	
35	D2	
36	D1	
37	D0	
38	GND	Ground
39	GND	Ground
40	GND	Ground
41	VDDIOC	1.8V
42	CMD_SI	Ground
43	SCL_OLED	IIC
44	SDA_OLED	
45	IIC_ADDR	IIC address（grounded）

Time Sequence

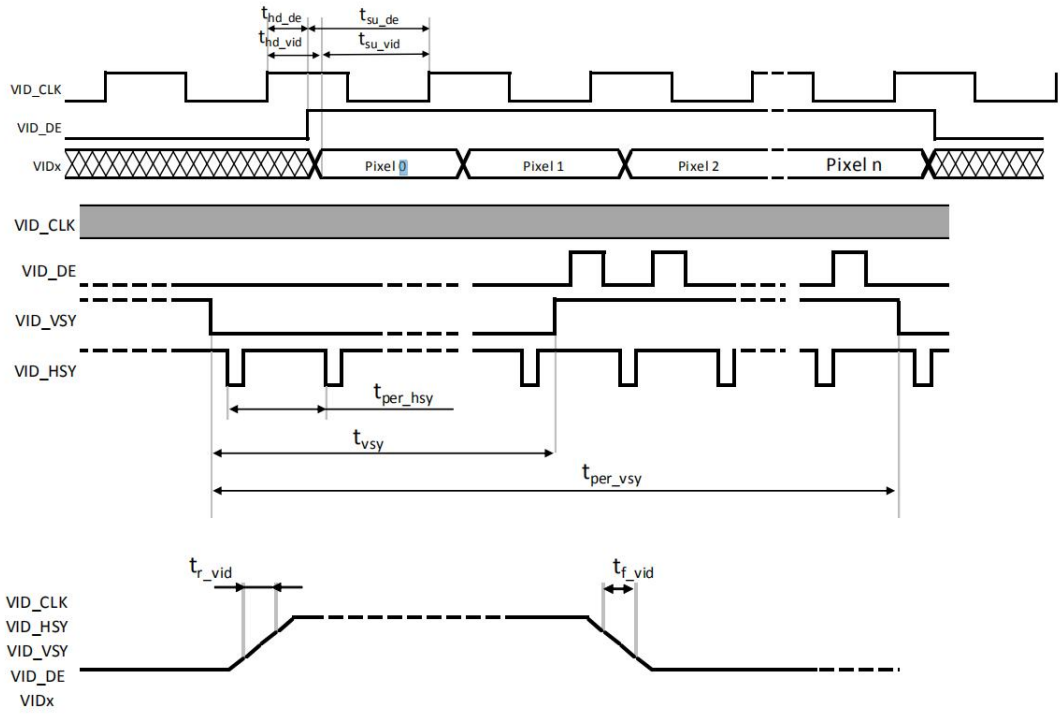


Figure2

5.4 Integration suggestion

5.4.1 Optical Lens Cleaning

The optical lens exposed outside all time when we operating cameras. Keep optical lens cleaning is necessary.

Cleaning suggestion:

- Blow the lens glass by using blowing ball to blow away dust;
- Use lens cleaning wipes to wipe the glass surface;
- Use lens brush to brush away residuum.

5.4.2 System Integration and Maintenance

- Add Germanium glass on housing is suggestion.
- Add Power on/off button is suggestion.
- Add operation keys for field maintenance is suggestion.

6 Operation Description

6.1 Operation

- Keep connector in good connection, check it carefully and then turn on the power supply.
- During booting, the image might have some interference is normal.
- Within 15 seconds after booting, the image may not uniformity, it's the preheat of focal plane array.
- After using the camera please turn off the power supply.

6.2 Keyboard

6.2.1 The keyboard display as follows:

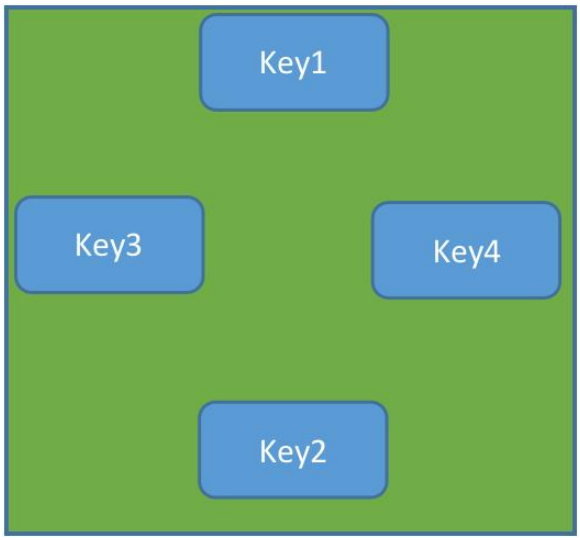


Figure 3

KEY1=KEY "+", KEY2=KEY "-",KEY3=KEY "M",KEY4=KEY "F"

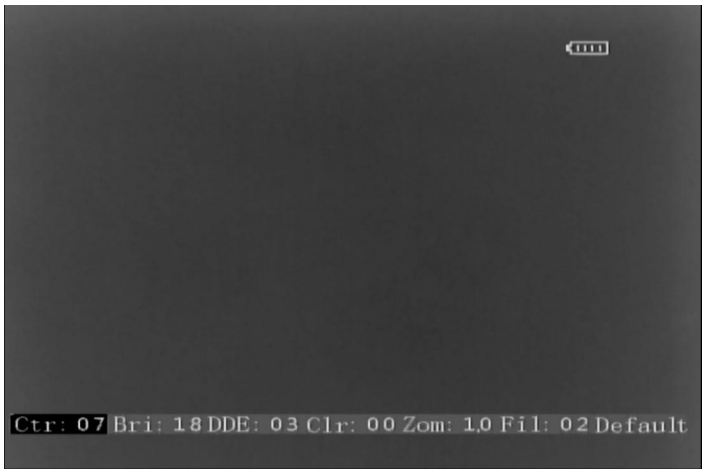
Key function description：

KEY M: Display Menu 1; switch between parameters;press for 3 seconds, hide menus

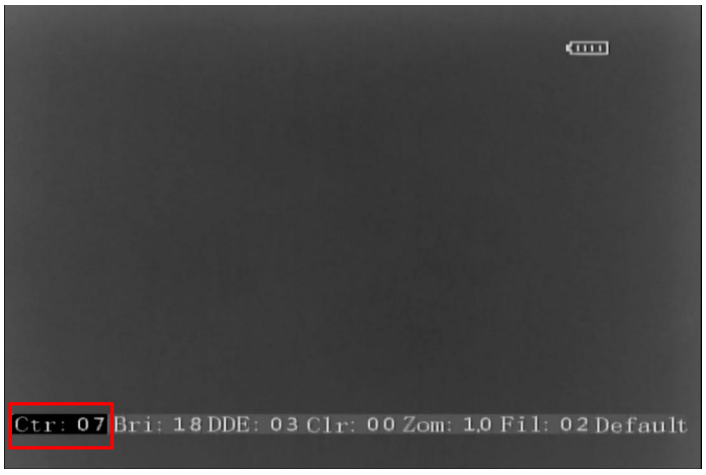
KEY F: Switch Menu1 to Menu 2

KEY +/-: Adjust parameter

6.2.2 After turn on the power, press KEY M to get into Menu 1;

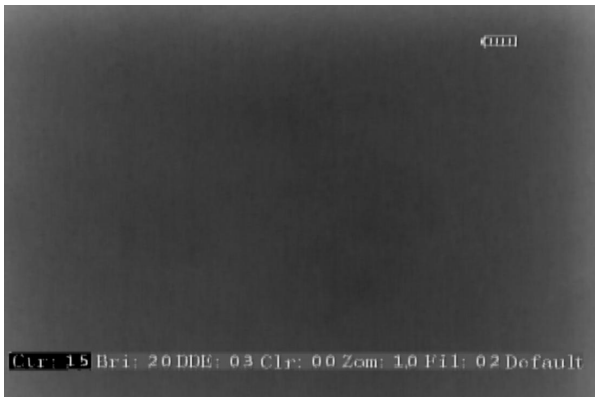


Press KEY M to choose the parameters which need adjust; the chosen parameter will have a background color(below parameter in red frame has chosen, the red frame will not showed in picture) ; parameter can be adjusted through press key+/-

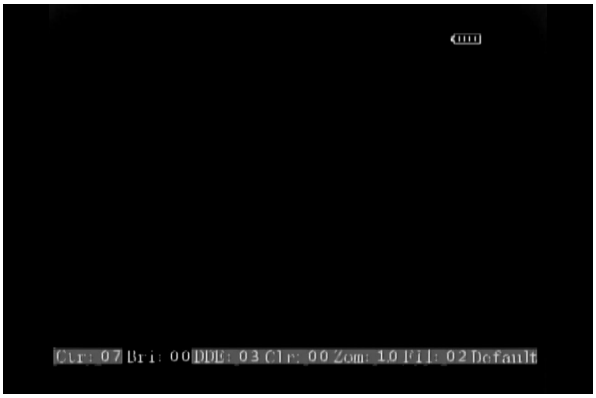


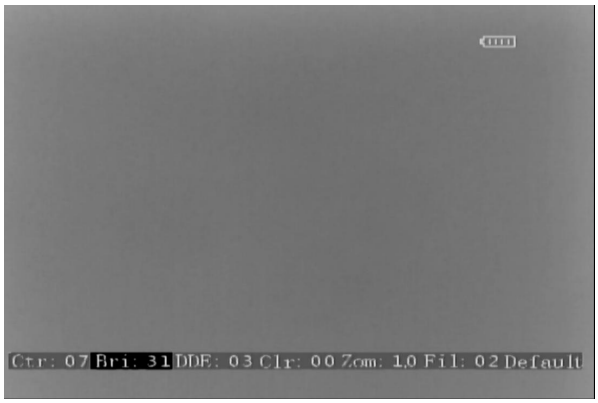
Below are 7 options in Menu 1:

- Ctr:Contrast Adjustment, adjust by KEY + and KEY -,the range is (0～15)

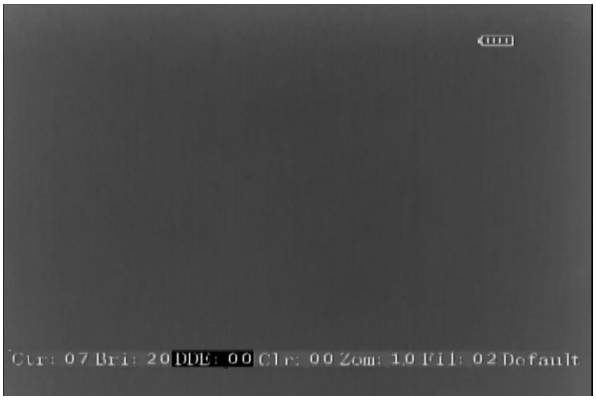


- Bri:Brightness Adjustment, adjust by KEY + and KEY -,the range is (0～31)

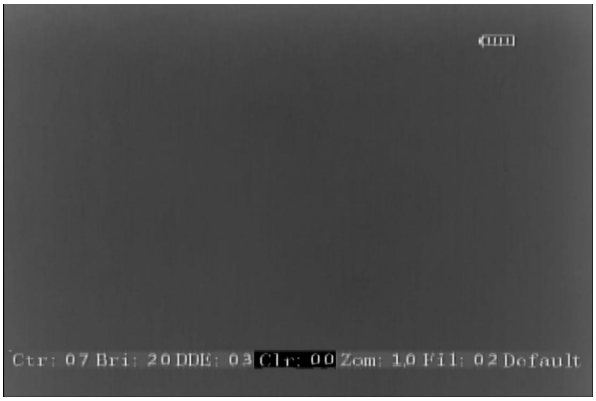


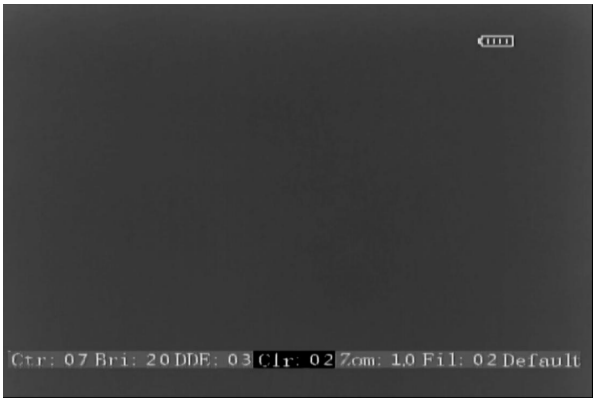


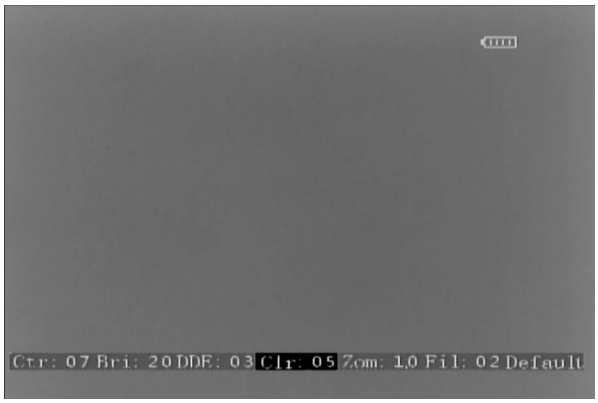
- DDE:Detail Enhancement Adjustment, adjust by KEY + and KEY -,the range is (0～15)



- Clr:Pseudo Color Switch, press KEY+ and KEY- to choose 6 different color pattern

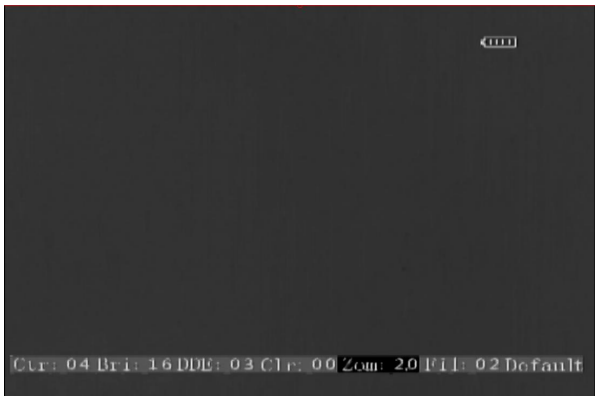




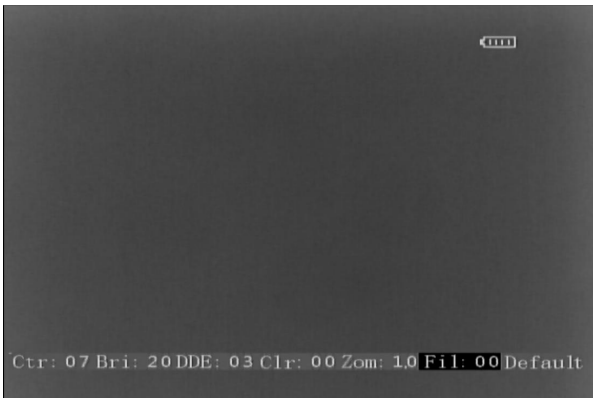


- Zom:Zoom Adjustment, press KEY+ and KEY- to choose

  *1=original 2=zoom*2 3=zoom*3 4=zoom*4



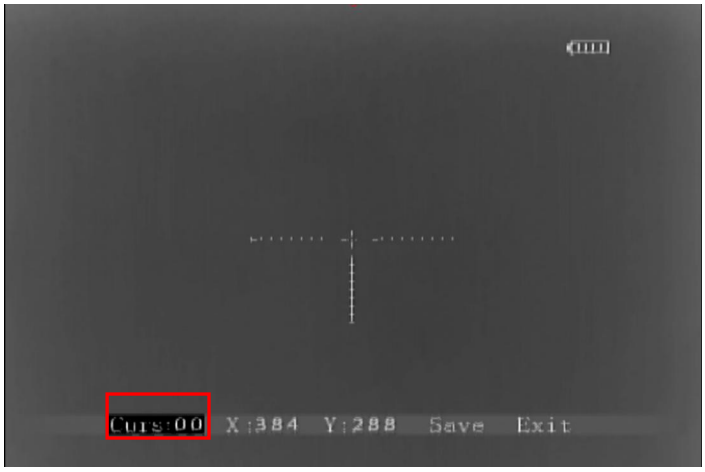
- Fil:Wave Filtering Adjustment, adjust by KEY + and KEY -,the range is (0～15)



- Default:Restore Default, restore factory default settings,press M

Press KEY F to get into Menu 2, press KEY F again will back to Menu1;

In Menu2, press KEY M to choose parameters which need adjust; the chosen parameter will have a background color(below parameter in red frame has chosen, the red frame will not showed in picture) ; parameter can be adjusted through press key+/-

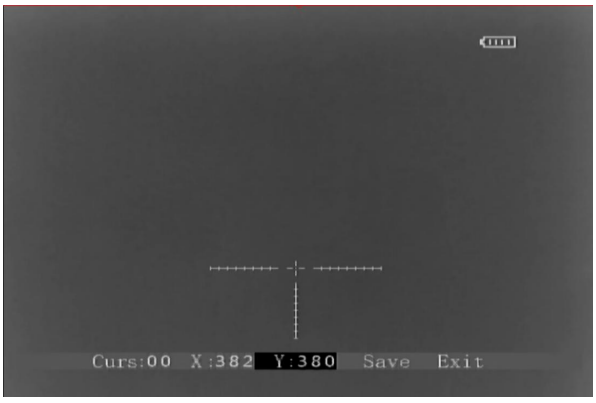


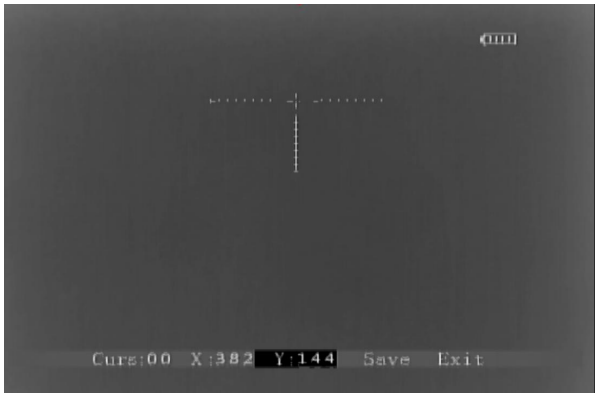
Below are 5 options in Menu 2

- Curs:Cross Cursor Pattern (Only one pattern at present)

- X:Horizontal position of the cursor center;trigger KEY + and KEY - to move horizontal, the range is(124～640)

- Y:Vertical position of the cursor center;trigger KEY + and KEY - to move vertical,the range is(144～475)

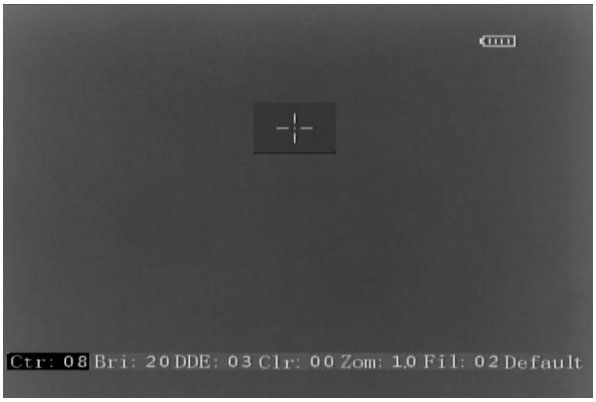




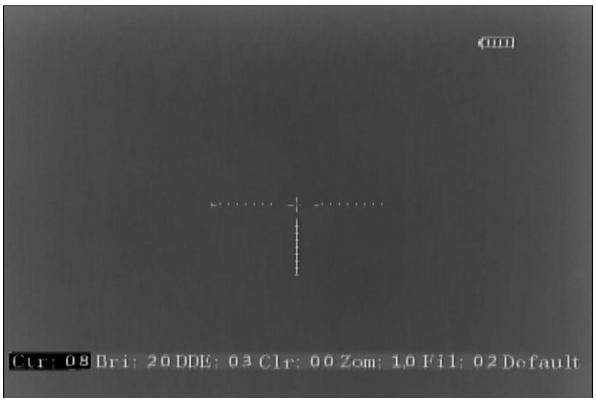
- Save: Save the cursor center position
- Exit: Exit Menu

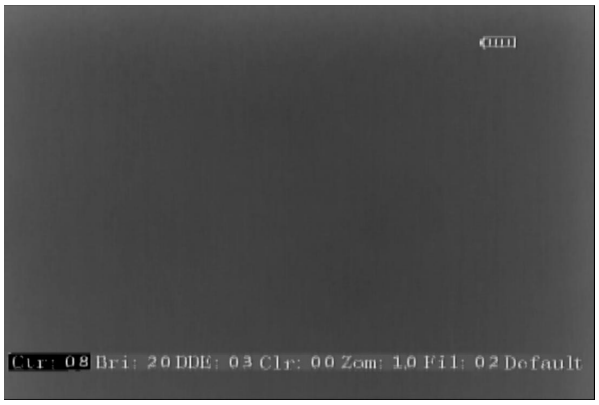
6.2.3 Shortcut Buttons

- Press button “M” and “+” simultaneously: Online blind pixels compensation；
- Press button “M” and “-” simultaneously：Display/Hide PiP；



- Press button “+” and “-” simultaneously：Display/Hide cross cursor；





6.2.4 Menu on display, press KEY M for 3 seconds, menus will be hided

7 Operation note

7.1The brightness and Gain

The thermal imaging module is able to auto adjust brightness and Gain according to different background when high temperature object enter into FOV.

7.2 About power supply.

The standard working voltage range for the module is 2.5-5.5V, the power supply voltage out of this range may trigger over voltage protection function, and the module would turn off automatically. Please check the power supply and turn on again.
Ten seconds interval for turn on/off the module is suggestion, to make sure the protective circuit turn off.