

ThermalTronix

TT-18D-MPS Series

Quick Start guide

Warning

1

- Under no circumstances (on or off) to avoid the component detector window (without lens or lens) is directly aligned with the strong radiation source (such as the sun, laser, steel, etc.). So as not to cause irreversible damage to the detector, the detector may cause serious damage.
- In any case, you cannot touch the detector window, in order to avoid the occurrence of the detector window dirt, grease and electrostatic damage, etc., and should pay attention to the detector is installed in the lens protection against wear detector window, scratches and even rupture happening, the above will result in a serious decline in component performance, and may even cause damage to the components.
- This component is a high-precision optical products, so the use, storage, transport process and should be properly guarded, rough handling (such as product to fall, resulting in a collision detector, shell damage, caused by internal wiring assembly process fracture product moisture, rain, etc.) may result in component performance degradation, severe cases may result in component damage.
- Make sure the cable is connected and reliable control tooling, such as the control of tooling line is bad or error status under the boot may cause component damage, severe damage the detector.
- When the component installation and connection, should be prepared to control the line of tooling and tooling plate protection, otherwise static electricity may cause performance degradation components, severe cases may cause the component is not working properly.
- If the product is not working properly, please contact our service department. Do not disassemble or modify this component in any way.
- Please use meets the specifications of the power supply, or may cause the component is not working properly, will cause serious damage to the components.
- This component is designed to provide users with common components provide secondary development, so different from the whole product with full protective measures; the user must pay attention to the process of developing a secondary protection. Due to the above components causes damage, the company will not assume responsibility for free repair.

1. Summary

TT-18D-MPS module mainly used by customer system integration, provide customer DC4.7-5.3V the scope of the power input interface, UART port communication, BIT656 or standard timing 14-bit video signal transmission channel。 Easy for customer to use ARM、DSP、FPGA kind of platform seamless docking, rapid development。



2

2. Camera description (standard configuration)

Standard configuration provide a 26 pin connector camera without lens



Fig.1 Standard configuration

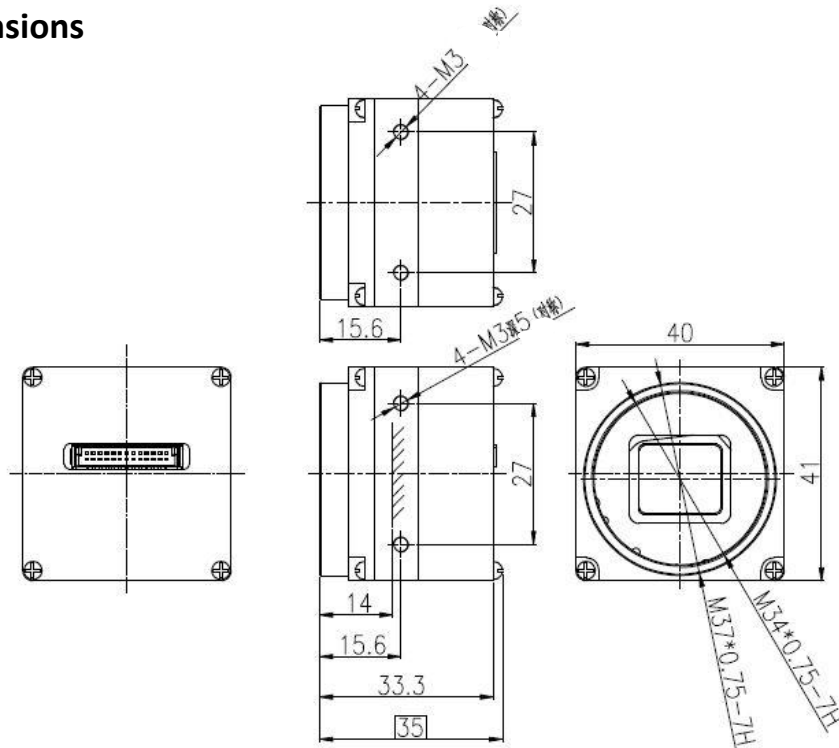
3. Specifications

Items		<i>ThermalTronix</i>	
		TT-1880D-MPS	TT-1840D-MPS
Detector characteristics	Detector type	Uncooled FPA micro-bolometer	
	Array size	384×288	640×480
	Pixel	17um / 25um	17um
	Spectral range	8 ~ 14um	
	Temp control	TEC	
	NETD	≤60mK (f/1,300K,25-50Hz)	
	Thermal time constant	≤5ms	
Image characteristics	Frame rate	50Hz	
	Display resolution	768×576	640×480
	Analog video output	PAL	
	Digital Video (optional)	14-bit/8-bit(BT656)	
	Gain/Brightness adjustment	Manual brightness/gain; auto brightness/manual gain; auto brightness/gain	
	Digital zoom	X1/X2/X3/X4	
	Calibration	Manual and Auto	
System characteristics	Communication Protocol	PELCO-D	
	Image Enhancement	YES, enhance the ability to detect the small object	
	Image Filter	YES, Digital filter	
	Polarity inversion	White/black hot mode	
Power supply	External power	DC 5V±0.2V	
	Power consumption	≤1.8W (normal atmospheric temp)	≤2W (normal atmospheric temp)
Electrical interface	Power interface	YES	
	Analog video output	YES	
	Digital Video output	14bit	
	Serial port	TTL 3.3V UART	
Environment	Operation temperature	-15°C ~ +50°C (Can expanded to -40°C ~ +60°C)	
	Storage temperature	-40°C ~ +70°C	
	Humidity	5~95% , Non condensing	
physical characteristics	Size (mm)	W40mm× H41mm× D35mm	
	Weight	≤76g (including housing、 shutter)	
	Lens mount interface	M34×0.75 ;screw thread	
	Mechanical interface	2×M3 (four sides); screw hole	
	Electrical connector	26 pins connector (including cable)	

4. Electrical Interface for 26 pin connector

Pin	Signal name	Definition	Remark
1	FPGA_CLK	Digital video clock (1.8V)	1.8V
2	FPGA_VSYNC	Digital video field synchronization	1.8V
3	FPGA_HSYNC	Digital video line synchronization	1.8V
4	FPGA_D13	Digital signal	1.8V
5	FPGA_D11	Digital signal	1.8V
6	FPGA_D9	Digital signal	1.8V
7	FPGA_D7	Digital signal	1.8V
8	FPGA_D5	Digital signal	1.8V
9	FPGA_D3	Digital signal	1.8V
10	UART_RX	TTL3.3V(RX)	3.3V
11	NC		
12	UART_TX	TTL3.3V(TX)	3.3V
13	NC		1.8V
14	POWER_IN_	Power positive	5V
15	DGND	Power ground	1.8V
16	FPGA_D12	Digital signal	1.8V
17	FPGA_D10	Digital signal	1.8V
18	FPGA_D8	Digital signal	1.8V
19	FPGA_D6	Digital signal	1.8V
20	FPGA_D4	Digital signal	1.8V
21	FPGA_D2	Digital signal	1.8V
22	FPGA_D1	Digital signal	1.8V
23	FPGA_D0	Digital signal	1.8V
24	VGND	Analog video ground	
25	I/O	Reserved	1.8V
26	ACMP1	Analog video signal	

5. Dimensions



5

6. Functions

6.1 Source

The system power supply voltage infrared imaging for DC 4.7-5.3V。

⚠ Note: Voltage exceeds the normal power supply range may damage the instrument.

6.2 Video

Infrared thermal imager output analog video signal, video to PAL, video amplitude $1.1 \pm 0.2V$.

6.3 UART

Infrared thermal imager communication through UART (TTL3.3V) Interface。 In TxD and RxD:

1=2.7V~3.3V logic; 0=0~0.7V logic。

The communication baud rate, adjustable。

Baud rate adjustment range: 300/600/1200/2400/4800/9600/14400/19200/

38400/57600/115200。

Protocol: PELCO-D。

Communication Format:

communication rate	2400 bps (default)
verification mode	NA
start bit	1 bit
data bit	8 bit
stop bit	1 bit

6.4 UART ORDER

Order format:

The command identifier	address code	Data1	Data2	Data3	Data4	check code
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- 1) The command identifier : 0xFF;
- 2) Address code: 0x00~0x3F, default: 0x02;
- 3) check code: (address code) + (Data1) + (Data2) + (Data3) + (Data4)。

C key command:

0xFF	address code	0x02	0x00	0x00	0x00	check code
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Execution: the component of the single point correction。

F key command:

0xFF	Address code	0x40	0x00	0x00	0x00	Check code
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Execution: enter the manufacturer menu。

M key command:

0xFF	Address code	0x04	0x00	0x00	0x00	Check code
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Implementation: to switch between each menu item。

+ key command:

0xFF	Address code	0x00	0x80	0x00	0x00	Check code
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Execution: add menu item parameters。

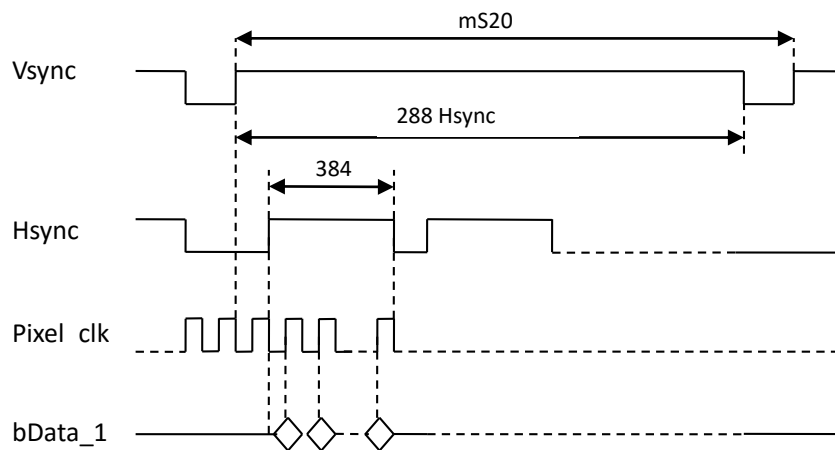
- key command:

0xFF	Address code	0x01	0x00	0x00	0x00	Check code
------	--------------	------	------	------	------	------------

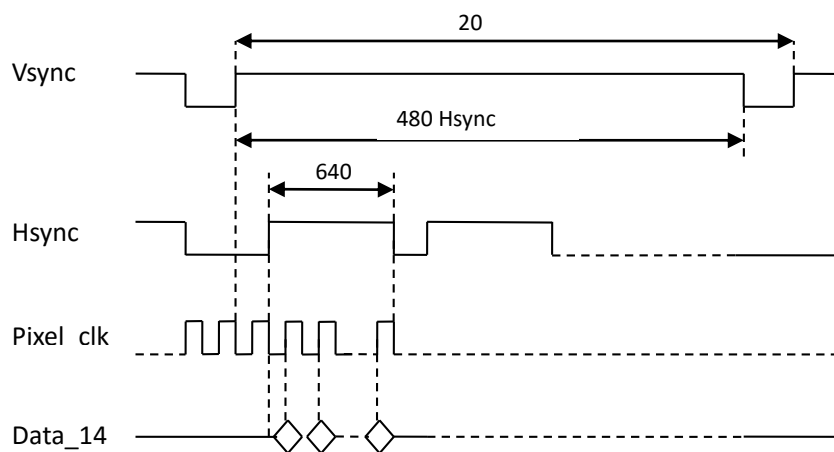
Execution: the menu item parameter cut down。

6.5 Digital video (14-bit)

TT-18D-MPS provide 14-bit digital video output, its original data after two point calibration, easy of secondary development。 Electric level is 1.8V。 Below is timing diagram:



TT-1880D-MPS timing diagram



TT-1840D-MPS timing diagram

7. Standard + Features board configuration (for demonstration)

7.1 Components list

Below is the components list for demonstrating analog video output and control by keyboard

1	Camera	With 25mm manual focus lens for demonstration
2	Feature board	
3	Camera interface cable	26pin; Two heads
4	Power adapter	DC 5V; Red alligator clips is 5V+, black alligator clips is ground.

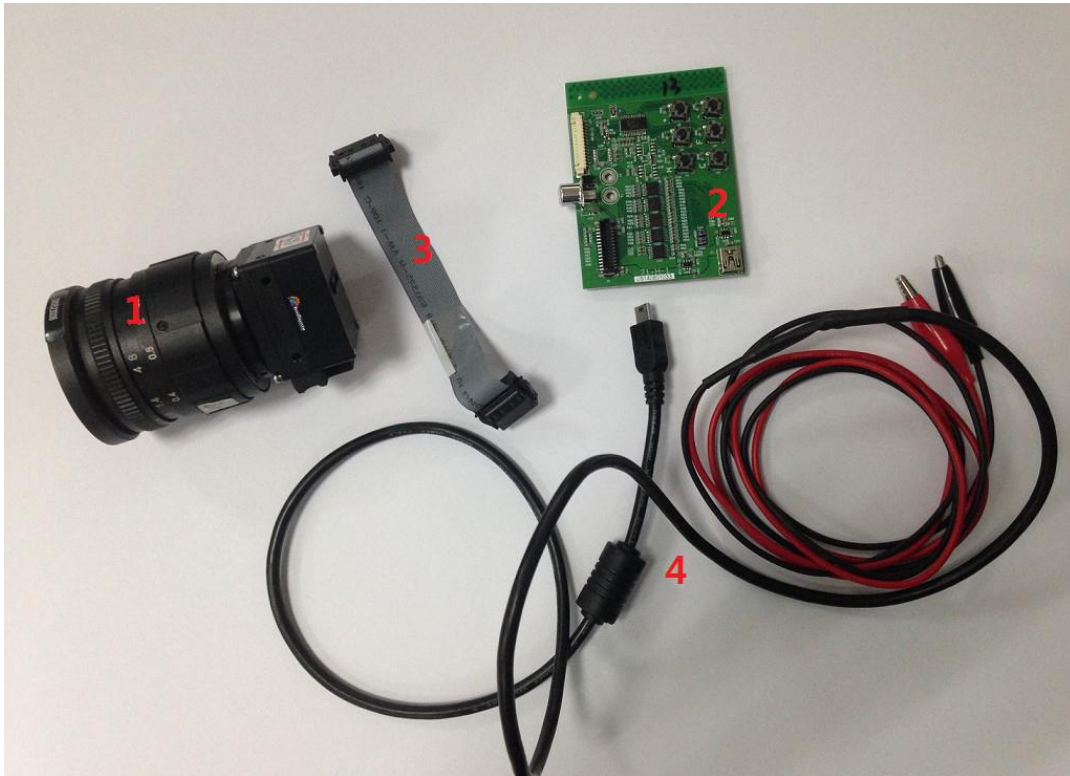


Fig.2 Components overview

7.2 Connection diagram

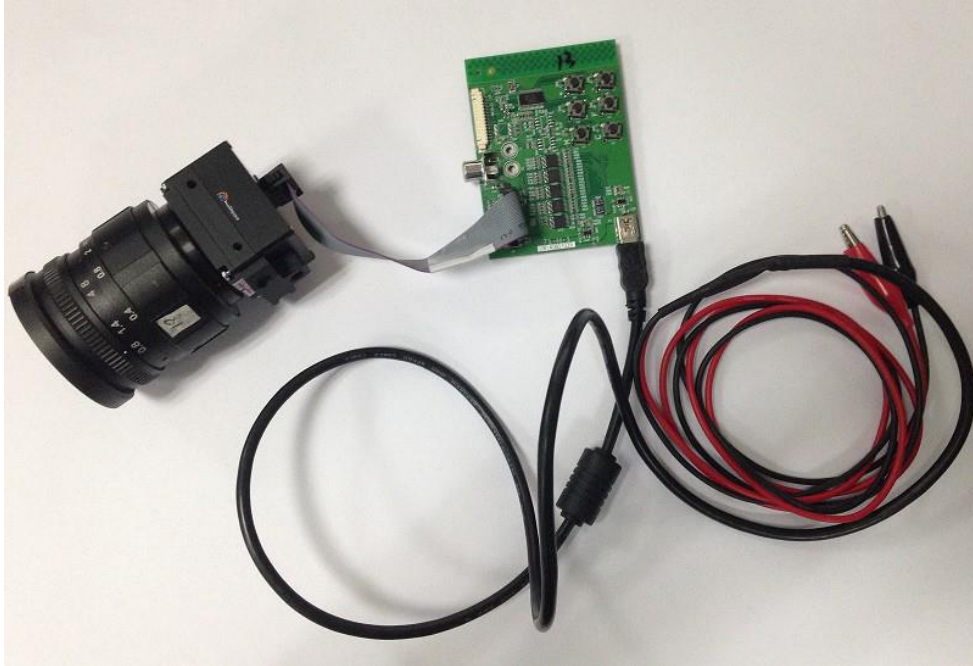


Fig.3 Connection diagram

7.3 Introduction of feature board

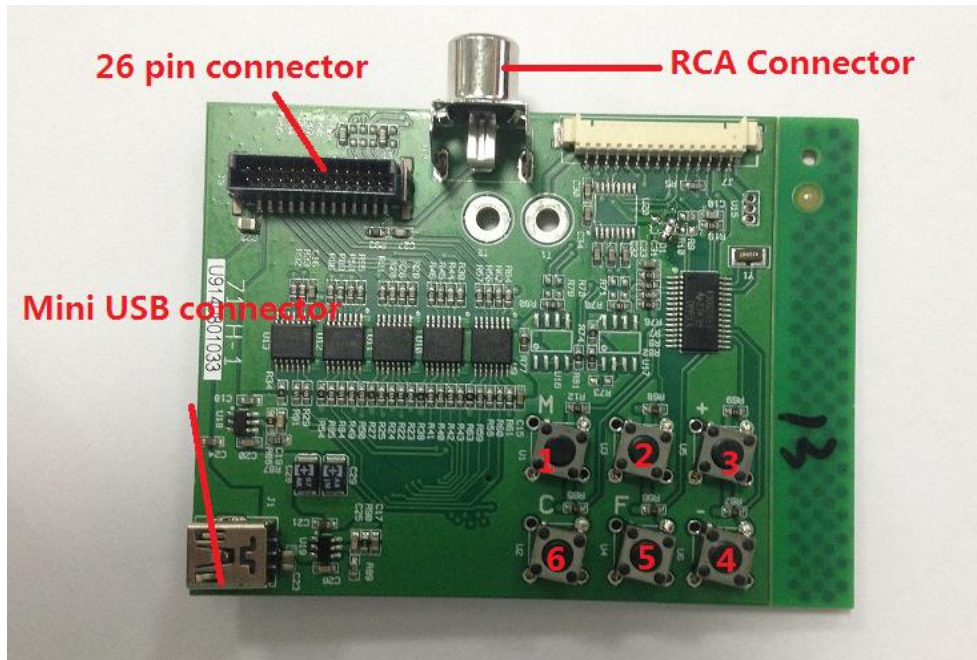


Fig.4 Feature board configuration

Introduction of feature board configuration

Num.	Item	Function
1	RCA connector	Analog video output
2	26 pin connector	Connect with camera
3	Mini USB connector	DC 5V power input
4	Key 1 (M button)	Enter the menu* or move the cursor from up to down
	Key2	Change the baud rate of the board Note: Once press this button, the keyboard is out of control, restart the camera to restore the settings
	Key3 (“+” button)	when there is a menu, modify the option or increase the value
	Key4 (“-” button)	when there is a menu, modify the option or reduce the value
	Key5 (“F” button)	Active engineer setup menu; Do not Open to end-user
	Key6 (“C” button)	Calibration

8 Operating main menu

Connect the cables as Fig.3 (connection diagram), analog video transmit from RCA connector to external display, power on, adjust the focus to make the image sharp. Press Key 1(M button) to active the main menu, press Key 1(M button) again to move the cursor from up to down, press Key3(“+”button) and Key4(“-”button) to modify the option

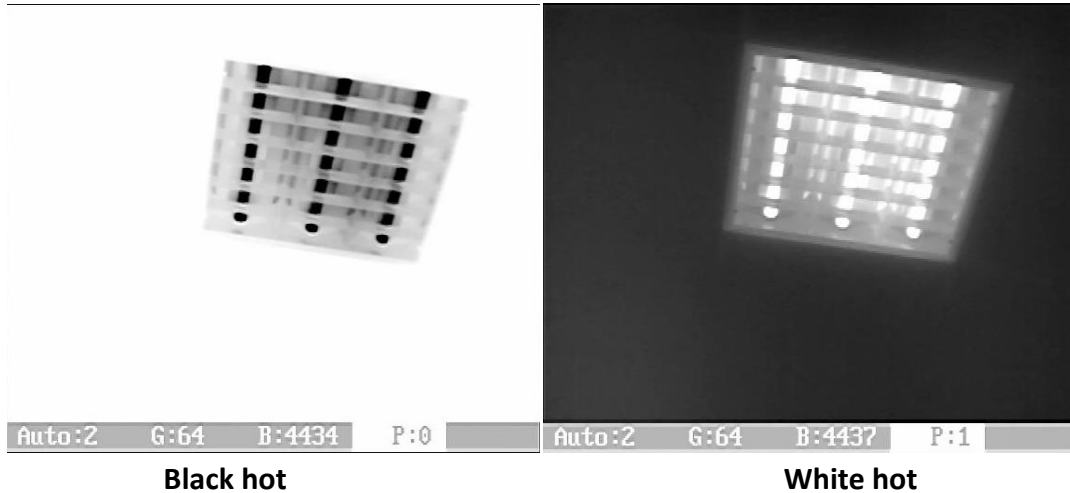


Main menu

- 1. Auto: X** Image adjust mode
 - 0: manual brightness, manual gain mode
 - 1: auto brightness, manual gain mode

2: auto brightness, auto gain mode

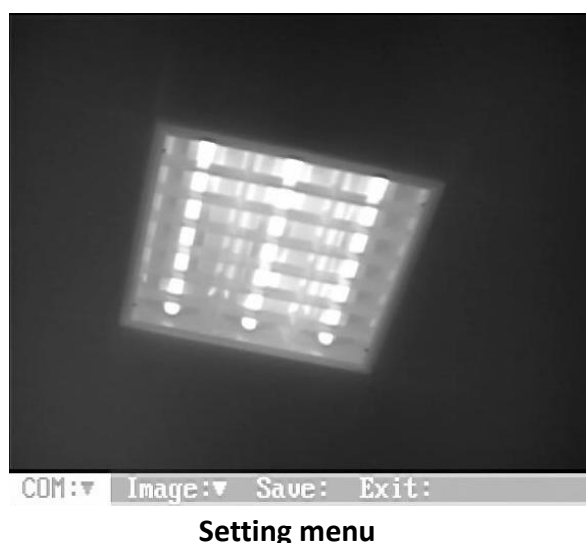
- 2. **G** Stands for Gain
- 3. **B** Stands for Brightness
- 4. **P** Stands for Polarity (white/black hot), refer to the image below
 0: black hot 1: white hot



- 5. **Z** Digital zoom (X1/X2/X3/X4)
- 6. **Setting:** Press Key3 (“+”button) or Key4 (“-”button) to enter setting menu
- 7. **Exit:** Press Key3 (“+”button) or Key4 (“-”button) to exit the menu

9 Operating setting menu

Active the main menu, choose “setting” option to access into setting menu



1. COM Set the communication configuration



Communication configuration

2. Image Set the image display configuration



Image configuration menu

Image display configuration

Item	Description	Function
FI	Filter the image noise	Y: enable filter function N: disables filter function
Freeze	Freeze the image	
VE		Y:Flips the image from top to bottom
HO		Y:Flips the image from left to right

Auto Cali	Auto calibration period	L: 5 minutes M:8 minutes H:10 minutes N:turn auto calibration off Note: the camera will perform auto calibration every 1 minute in the first ten minutes after power on
0	Calibration	In: Performs calibration through built-in shutter Out: Performs calibration through external uniformity object
Exit		Exit the menu

3. Save: Save changes

4. Exit: Exit the setting menu

10 Factory menu

Press “F” button will activate factory menu password dialog, press any buttons 6 times (except correct passwords), popup “error “message, password dialog disappeared

Input “+” button, “-“ button, “M” button, “C” button, “+” button, “-“ button to enter factory menu

Note: 1. The menu premise: without any menu item into the popup.

2. Manufacturers adjust parameter, only for professional, otherwise, may cause component does not work.

Factory menu			
primary menu	System menu	Area menu (manufactures adjust)	Debug menu
System ▼	Gain: the default 68, automatically adjust the gain offset 2	Zone description: X	Rectify: Y/N, default N
Partition ▼	Bright: the default 68, automatically adjust the brightness offset 2	Reset time: XXX	Gray scale display: Y/N, default N
Area ▼	BenDi: automatically adjust the default 100, 2 of small temperature difference target gain limit vaule	VS: xxxx	TE (temperature): Y/N, default N
Exit:	DisMode: 0, factory adjust	VF: xxxx	Automatic region (AUTOG): Y/N, default N
	FPA_Gain: 10pf, factory adjust	Vtemp: xxxx	Language (LanTyp): English
	LHold: 14, factory adjust	dot:	version:
	High temperature: 50/55, factory adjust	deuce:	Exit:
	Low temperature: 10, factory adjust	switch: Y	
	Delay time: 10, factory adjust	threshold: 0	
	E: the default 0 (off), automatically adjust the 2 small target enhancement extant	The lookup field number : 32	
	E1: default 128, The enhancement in open condition, the overall offset	The lookup field number : 1	
	save:	Seek:	
	Exit:	Load:	
		Save:	
		Quit:	