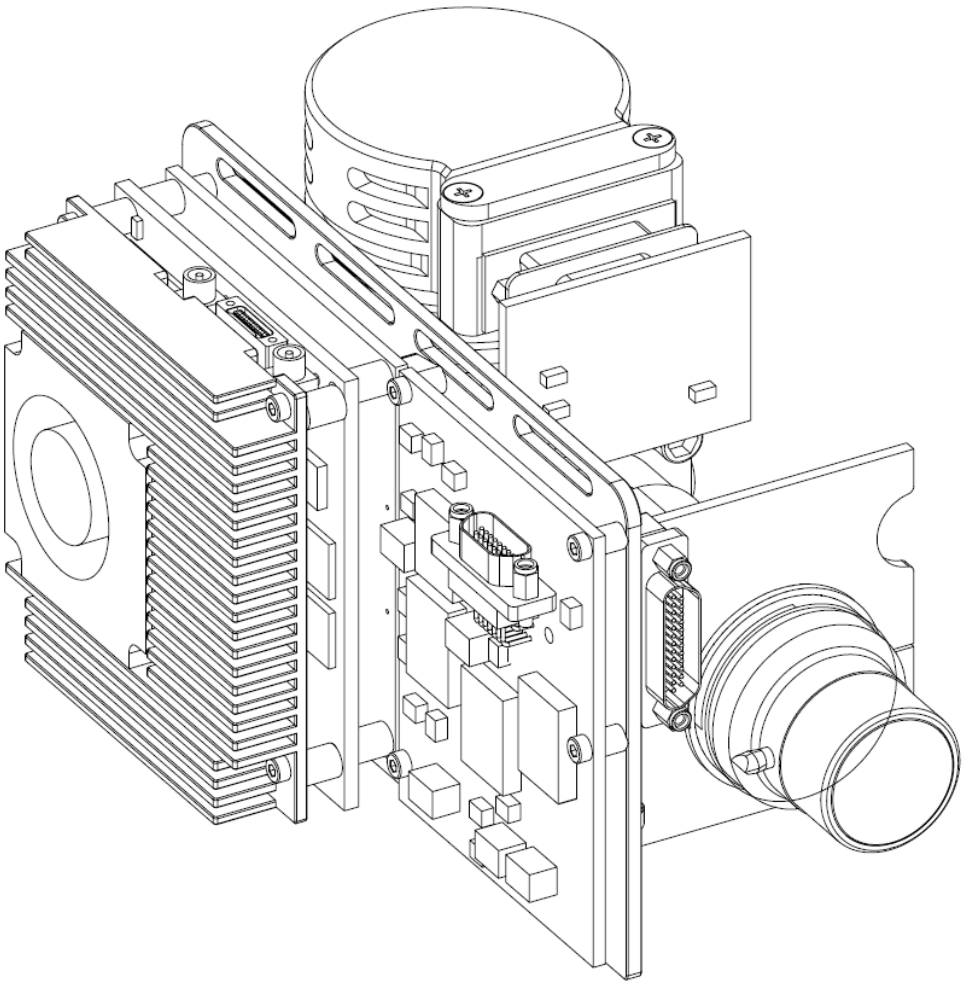
Standard 1280×1024 Mid-wave

Cooled Infrared Imaging Module

TECHNICAL DATA

V1.0



CONTENT

1. Brief Introduction

This standard type of Cooled Infrared Imaging Module is based on the 1280×1024 MW Cooled Infrared Detector and compatible with most similar types of IR detectors. It can transform the infrared radiation into visualized image. Rich functionalities and interfaces, compact size and low power consumption make it easy to use for the system integration and secondary development. It is utilized in various applications on the security & surveillance, border patrol, UAV load and R&D.

The Camera Includes,

- Cooled MW Infrared Detector 1 each
- AD Board 1 pc
- DB Board 1 pc
- Detector Interface Board 1 pc
- Cooler Driving Board 1 pc
- Power Supply Board 1 pc
- Internal Connection Cables 1 set

The main features and specifications are as below,

- Image Resolution: 1280×1024
- Pitch Size: 10um
- Spectral Range: 3~5 μm
- F number: 2/4
- NETD: ≤ 25mK or Detector Typical NETD+5mK
- Dimensions: 143.3mm×81.7mm×102.35mm
- Weight: ≤ 1Kg
- Max Frame Rate of Image Output: 25/50 Hz
- Video Output Interfaces: Camera Link and SDI (digital), others can be customized
- Image Output Type: 8-bit or 14-bit electable

- Power Consumption: ≤30W (steady-state), ≤40W (during cooling down)
- Cooling Down Time: ≤ 8 min (room temperature)
- Image Polarity: White Hot/ Black Hot
- Digital Detail Enhancement
- Image Contrast Enhancement
- Image Filtering and De-noising
- Image Integration: Auto/manual Modification on the integration time
- Internal Sync or External Sync
- Single and Two-point NUC, the correction parameters can be fixed
- Auto/Manual Dead pixels replacement
- Provides test images, such as gray level gradient, stripe target and checkerboard
- Analog image rollover, mirroring, freeze and digital zooming
- Crosshair overlay/remove
- Operating Temperature: -40~+60℃
- Storage Temperature: -55~+70℃
- Humidity: 0%~80%RH

Interfaces and Power Supply

- Digital Video Output: CameraLink@14bit, CameraLink@8bit or SDI 1080P@25Hz;
- Communication Interface: RS422
- External Sync: Differential LVDS or RS422
- Power Supply: 24V DC (nominal), 18~36V DC

2. Declarations

- The camera and imaging module cannot be used with the power supply out of the defined voltage range.
- Any disassembly on the camera and electronic boards without permission breaks the maintenance terms and conditions.
- Except the analog output, any hot-plugging on another connectors is prohibited.
- This documents is only related to the IR camera and the imaging module. For

further detailed information of the cooler, please refers to the cooler operation manual or contact the cooler manufacture.

3. Features

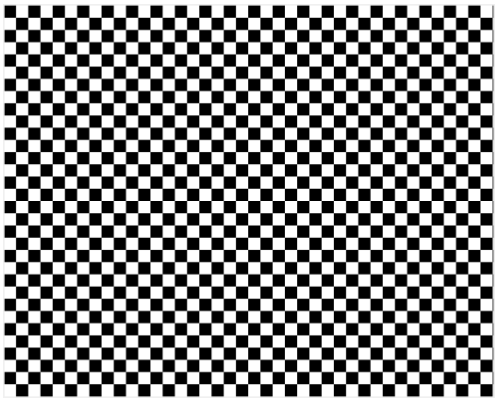
3.1. Image Output Gating

The module provides the feature of online gating on the real-time IR image and test images. Users can select the image output among 14-bit, 8-bit gray scale and test images. The analog and digital video interfaces are changed synchronously with the image output gating. This feature is also customizable.

There are 9 types of test images, including row gray level and its dynamic map, column gray level and its dynamic map, row 5-square target and its dynamic map, column 5-square target and its dynamic map, and also checkerboard.

Row gray level

Column gray level



Checkerboard

Fig 3-1 Examples of test images

3.2. Internal-sync and External-sync Output

The module provides the feature of internal-sync and external-sync output, which can be switched automatically or manually. When the module is working under the external-sync mode, the image will be output at the corresponding frame rate if the external-sync signal is detected. If not, the module will switch to internal-sync mode automatically. The frame rate of the external-sync signal is less than the maximum frame rate of the image output.

3.3. NUC and Dead Pixels Replacement

The module provides the feature of single and two-point Non-uniformity correction and dead pixels replacement. The default image is output after NUC and dead pixels replacement. If users change the infrared lens, the NUC should be executed again on the module together with the new lens. The correction parameters should also be saved accordingly.

3.4. Image Spatial Filtering

The module provides the feature of image spatial filtering. Users can open or close that filtering and modify the filtering coefficient. The smaller coefficient, the stronger filtering effect. This feature is default enabled. Generally, the module works properly under the default mode and relative parameters.

3.5. Display Modification on Image Output

The module provides the feature of display modification on image output. The image can be displayed at White hot or Black hot mode.

3.6. Image Orientation

The module provides the feature of image orientation adjustment. The image can be output with Mirror Horizontally or Mirror Vertically.

3.7. Brightness and Contrast Adjustment

The brightness and contrast of the image can be adjusted online.

3.8. Digital Detail Enhancement (DDE)

The module provides DDE feature. Users can adjust the image through the DDE level. The higher DDE level, the stronger enhancement effect.

3.9. Image Contrast Enhancement (ICE)

The module provides the feature of image contrast enhancement. Users can adjust the image contrast through the ICE level. The higher ICE level, the stronger enhancement effect.

4. Electrical Interfaces

4.1. Connector Definition

The connector definition and wiring instruction are as below,

1) type name: J30J-37ZKP, matching connector: J30J-37TJL. The definition as below,

Pin	Signal	Connecting pin/signal	Remark
1	P_I_24V+	Connecting with system	Power supply+, voltage range 18V~36V
20	P_I_24V+		
2	GND		Power supply -
21	GND		
3	CMD2_OUT0+		Camera Link Channel 0
22	CMD2_OUT0-		
4	CMD2_OUT1+		Camera Link Channel 1
23	CMD2_OUT1-		
8	DGND		Digital GND
5	CMD2_CLKOUT+		Camera Link CLK
24	CMD2_CLKOUT-		
6	CMD2_OUT2+		Camera Link Channel 2
25	CMD2_OUT2-		
7	CMD2_OUT3+		Camera Link Channel 3
26	CMD2_OUT3-		
9	RS422 TXD2+		IR RS422 Output2

Pin	Signal	Connecting pin/signal	Remark
28	RS422 TXD2-		
10	RS422 RXD2+		IR RS422 Input2
29	RS422 RXD2-		
27	DGND		Digital GND
11	RS422 TXD1+		IR RS422 Output1
30	RS422 TXD1-		
12	RS422 RXD1+		IR RS422 Input1
31	RS422 RXD1-		
13	DGND		Digital GND
14	Sync+		External-sync, differential LVDS or RS422
32	Sync-		
33	DGND		Digital GND
37	DGND		Digital GND
15	TMS		TMS
16	TCK		TCK
17	TDO		TDO
18	TDI		TDI
19	+3.3V		+3.3V
34	JZDJ_FOV0		Block control
35	JZDJ_FOV1		
36	NC		

2) SDI video connector: PP4, Type name: MCX_KWHD. The definition as below,

Pin	Signal	Connecting Pin/signal	Remark
1	SDI		Signal
2、3、4、5	AGND		GND

4.2. Camera Link Output Protocol

Camera Link Output is developed with TI DS90CR285MTD/NOPB. The 14-bit or 16-bit digital image is transferred according to the 16-bit×1 wiring definition of Base0 basic configuration refer to the Camera Link Standard 2.0. The wiring definition is as below. The data is from Camera_Data0 to Camera_Data15. Camera_LVAL is for effective row signal, Camera_FVAL is for effective frame signal, Camera_DVAL is for effective data signal and Camera_CLK is for pixel CLK signal.

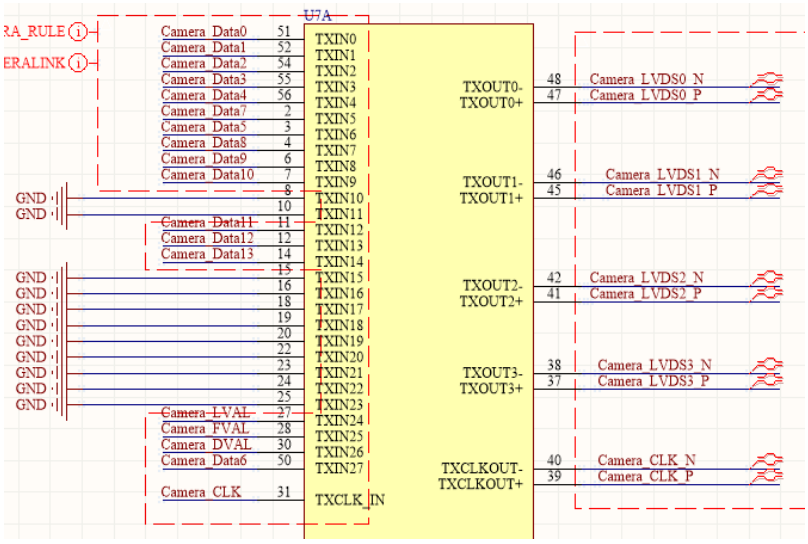


Fig 4-1 Camera Link Wiring Definition

As below, CLK=Camera_CLK, FVAL=Camera_FVAL, LVAL=Camera_LVAL, DVAL=Camera_DVAL, DATA=Camera_Data[0-13]. N is for effective pixel value of 1 frame, CLK is for pixel CLK, DATA is 1024 rows and the first row is in front. The data of each row has 1280 pixels. The data aligns to the top edge of CLK.

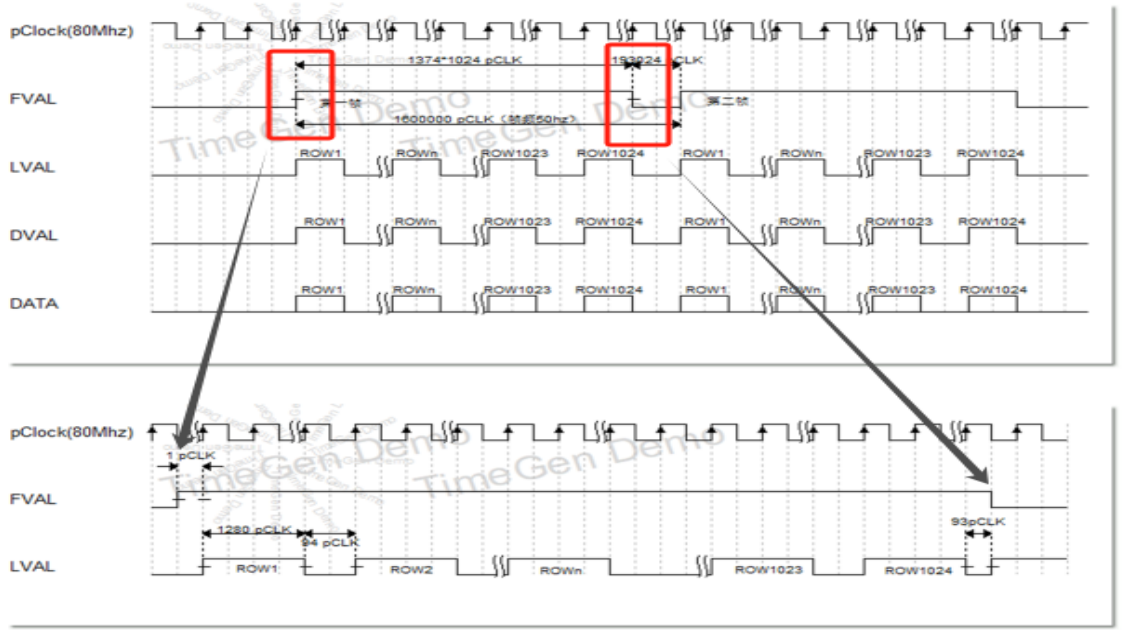


Fig 4-2 Camera Link Timing

4.3. RS422 Protocol

The module can be controlled through RS422 interface. The RS422 is in accordance with below information. The default RS422 setup is,

Baud Rate 115200, 8bits data, 1 start bit, 1 stop bit, even parity bit.

4.4. SDI Video Output

The default output resolution of SDI video is 1080P, with the effective display area being the 1280×1024 area in the center of the screen, while the remaining part is filled with a black background.

4.5. External-sync Interface

The external-sync interface is differential LVDS or RS422 upon request in advance.

5. Command Words

The module is controlled through RS422 interface. It doesn't send out any information, but only receives the information from the outside host machine. When receiving the command words in accordance with the protocol, the module executes the command and feedbacks the results.

The communication command words are also customizable.

6. Dimensions

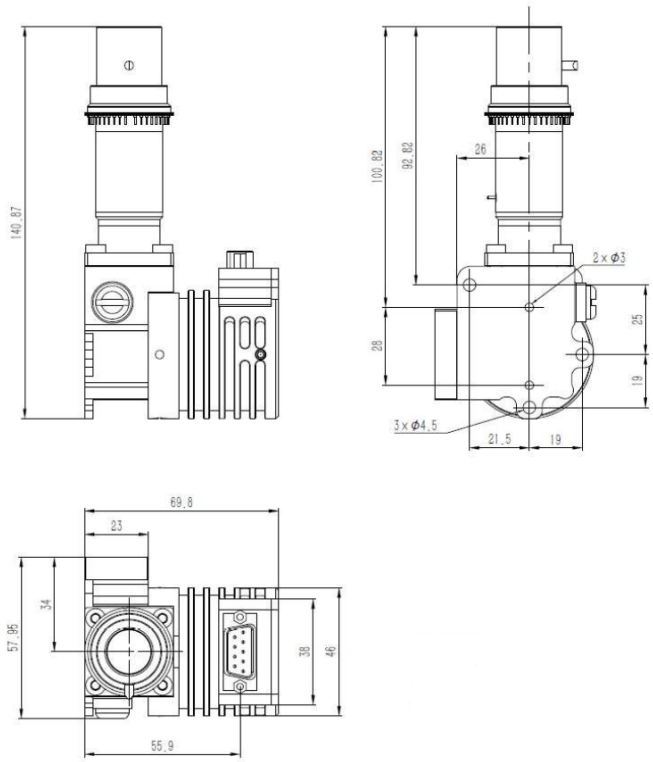


Fig 6-1 Dimensions of 1280×1024 detector

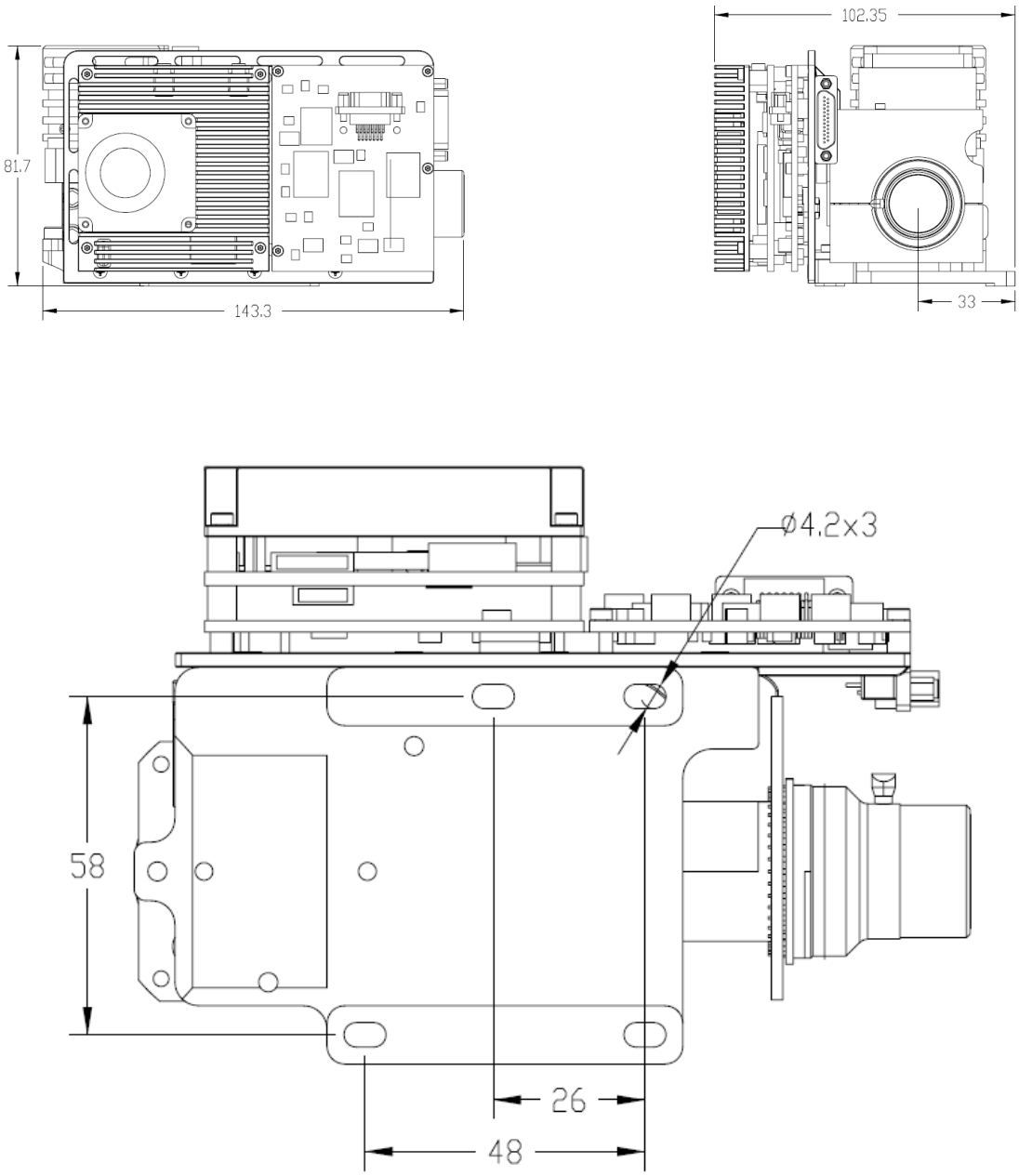


Fig 6-2 Dimensions of 1280×1024 IR imaging module