



UVR Series

Uncooled Thermal Imaging Module

User Manual

V1.0



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1. Product Introduction

1.1. Product Description

The UVR series of uncooled infrared thermal imaging modules offer three resolution options: 640×512, 384×288, and 256×192. The entire series employs high-frame-rate 12μm/WLP packaged VOx infrared detectors and high-performance infrared ISP chips. Characterized by high performance, compact size, lightweight design, low power consumption and cost-effectiveness, these thermal imaging modules meet the application requirements for SWaP (Size, Weight and Power/Price).

The entire UVR series is equipped with a shutterless algorithm for smooth, stutter-free operation and incorporates the latest thermal imaging processing algorithms to deliver exquisitely clear and detailed imagery. Additionally, these modules provide multiple digital interfaces (with customizable options available), enabling flexible integration with various intelligent processing platforms.

1.2. Product Features

- High frame rate
- Standard shutter-less algorithm
- High quality image display
- Higher cost-effectiveness
- Multiple customizable interfaces and extensible features

1.3. Application Scenarios

- UAV Search: photoelectric pod
- Portable Terminals:

Outdoor handheld devices, helmet-mounted night vision

- Security & Firefighting Inspection:

Industrial monitoring, perimeter scanning, inspection robots, fire early-warning, firefighting helmets

- Smart Integration:

ADAS (Advanced Driver Assistance Systems), smart home appliances

2. Product Selection

2.1. Model Identification Coding Standards

UR3	0019	F	SD
Serial name	Focal length of Lens	Focusing Method	Customized Interfaces
UVR2: 256*192 UVR3: 384*288 UVR6: 640*512	0000: without lens 0019: 19mm Lens 0035: 35mm Lens	N/F: no lens/fixed focus M/E: manual/electric Z: zooming	SD: SDI output CK: cameralink output AH: AHD output

2.2. Typical Model Selection

	UVR2	UVR3	UVR6
4mm Manual	UVR20004M	UVR30004M	UVR60004M
	42.01°×32.13°	59.88°×46.73°	87.66°×75.05°
5.3mm Manual	UVR20005M	UVR30005M	*
	32.32°×24.53°	46.99°×36.12°	*
7mm Manual	UVR20007M	*	UVR60007M
	24.75°×18.69°	*	57.50°×47.39°
9.1mm Manual	UVR20009M	UVR30009M	UVR60009M
	19.16°×14.43°	28.42°×21.50°	45.76°×37.31°
13mm Manual	UVR20013M	UVR30013M	UVR60013M
	13.48°×10.13°	20.10°×15.14°	32.91°×26.59°
15mm Manual	UVR20015M	*	*
	11.69°×8.78°	*	*
18mm Manual	*	UVR30018M	UVR60018M
	*	14.59°×10.97°	24.09°×19.37°
19mm Manual	UVR20019M	UVR30019M	UVR60019M
	9.24°×6.94°	13.83°×10.39°	22.85°×18.37°
25mm Fixed	UVR20025F	UVR30025F	UVR60025F
	7.03°×5.28°	10.53°×7.91°	17.46°×14.01°
35mm Fixed	*	UVR30035F	UVR60035F
	*	7.53°×5.65°	12.52°×10.03°
50mm Fixed	*	UVR30050F	UVR60050F
	*	5.28°×3.96°	8.78°×7.03°

2.3. Typical DRI Specifications

			1.7m×0.5m			4.6m×2.3m		
Lens	FOV		Detecting distance	Recognition distance	Identification distance	Detecting distance	Recognition distance	Identification distance
	640×512	384×288						
f4.6mm F1	79.7°×67.5°	53.2°×41.2°	256 m	128 m	64 m	588 m	294 m	147 m
f9.1mm F1	45.7°×37.3°	28.4°×21.5°	506 m	253 m	126 m	1163 m	581 m	291 m
f13mm F1	32.9°×26.5°	20.1°×15.1°	722 m	361 m	181 m	1161 m	831 m	415 m
f19mm F1	22.8°×18.3°	13.8°×10.3°	1056 m	528 m	264 m	2428 m	1214	607 m
f25mm F1	17.4°×14°	10.5°×7.9°	1389 m	694 m	347 m	3194 m	1597 m	799 m
F35mm F1	12.5°×10°	7.5°×5.6°	1944 m	972 m	486 m	4472 m	2236 m	1118 m

Note: The detection range, recognition range, and identification range mentioned above are estimated based on **Johnson's Criteria**, with pedestrians (1.7 × 0.5 m) and mid-size vehicles (4.6 × 2.3 m) as targets.

3. Technical Specifications

Model	UVR2	UVR3	UVR6
IR Detector	VOx uncooled microbolometer		
Resolutions/pitch size	256×192@12μm	384×288@12μm	640×512@12μm
Spectral Range	8μm ~ 14μm		
NETD	≤40mK@F1.0 25℃		
Frequency	25/50Hz	30/60Hz	30/60Hz
Thermal Time Constant	<12ms		
Lens Options	4/5.3/9.1/13/15/19/25mm	4/7/9.1/13/19/25/35/50mm	
NUC Correction	Shutter/Shutter-less Algorithm Correction		
Brightness/Contrast Adjustment	0~100, optional		
Digital Zoom	1.0~8.0× Continuous (step size: 0.1)		
Image Mirroring	Vertical/Horizontal/Diagonal		
Polarity/Palette	White Hot/Black Hot/Various palettes supported		
Analog Video	PAL/NTSC		
Digital Video	DVP/BT656/USB2.0/MIPI		
Power Supply	5V DC		
Typical Power Consumption of USB Output	< 0.35W	< 0.42W	< 0.7W
Communication Interface	UART/I2C/USB2.0		
Size (without lens)	21mm×21mm×10.3mm (W×H×L)		
Weight (without lens)	< 7g		< 8.6g
Humidity	5%RH～95%RH, non-condensing		
Working Temperature	-40℃~+80℃		
Storage Temperature	-50℃~+85℃		
Vibration	6.06g, random vibration, all axes		
Shock	80g, 4ms, final peak sawtooth wave, three axes and six directions		
Extensible Features	PIP, AHD/SDI/cameralink output, Crosshairs, Hot tracking, 25/50Hz rating, Lens driving (zooming, electric and auto focusing)		

Note: All parameters above were measured under controlled laboratory conditions. Final product specifications and testing methodologies are subject to the official test report.

4. Standard Interfaces and Extensible Components

4.1. Standard Interfaces Specifications

1. Connector：

50PIN male connector, part No.: DF40C-50DP-0.4V(51)

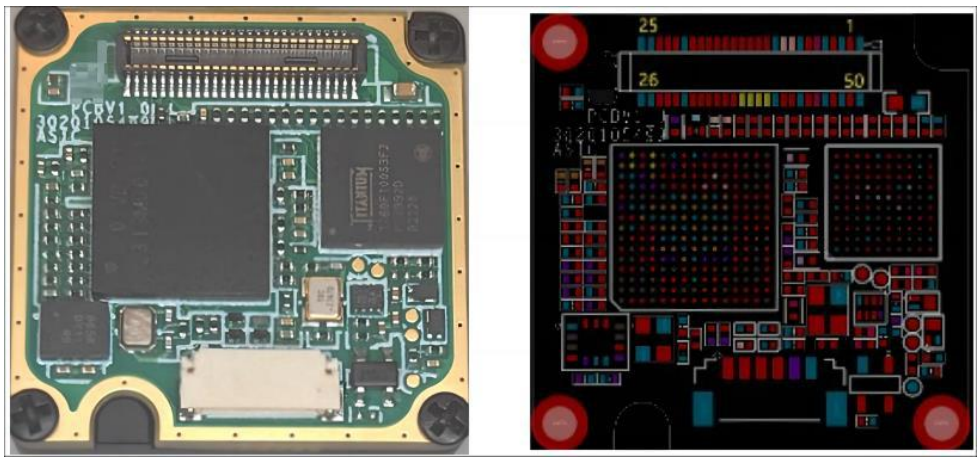


Fig. 4-1 Standard Interface Board Pinout Diagram 1

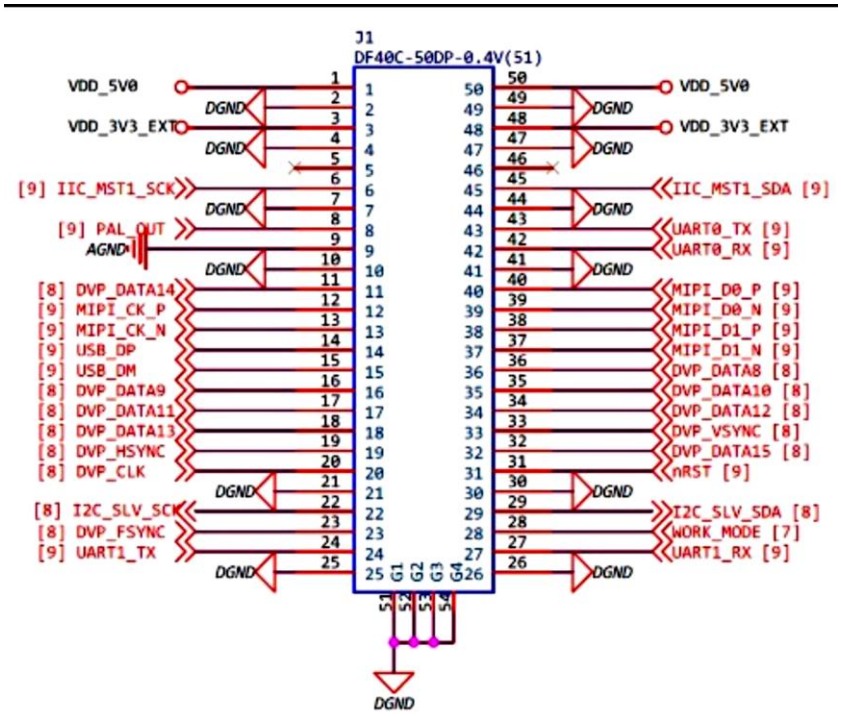


Fig. 4-2 Standard Interface Board Pinout Diagram 2

Table 4-1 HIROSE50 Connect Pinout Definition

Pin No.	Pin Definition	Type	Specification
20, 33, 19, 32, 11, 18, 34, 17, 35, 16, 36	DVP_CLK DVP_VSYNC DVP_HSYNC DVP_DATA15~8	Output	DVP Data Signal DATA15: MSB DATA8: LSB
12, 13, 40, 39, 38, 37	MIPI_CK_P/N MIPI_D0_P/N MIPI_D1_P/N	Output	2lane MIPI Data Signal
14, 15	USB_DP USB_DM	Output	USB2.0 Data Signal
8, 9	PAL_OUT AGND	Output	Analog Output Signal Analog Output Ground
43, 42	UART0_TX UART0_RX	Output	Universal asynchronous receiver/transmitter pins for control module use.
24, 27	UART1_TX UART1_RX	I/O	Universal asynchronous receiver/transmitter pins for debugging, which can print the module's operating logo. They can also be used as general I/O.
22, 29	I2C_SLV_SCK I2C_SLV_SDA	I/O	Clock pin of IIC slave Data pin of IIC slave
6, 45	IIC_MST1_SCK IIC_MST1_SDA	I/O	Clock pin of IIC master Data pin of IIC master
23	DVP_FSYNC	I/O	It is an external synchronous input signal of the module, not a DVP synchronous output signal, and can also be used as a general I/O.
28	WORK_MODE	Input	Enter to update mode; Active high; Leave floating if unused.
31	Nrst	Input	Enter to reset mode; Active low; Leave floating.
1, 50	VDD5.0	Power	External power input 5 V, and the module can operate normally with only 5 V power supply.
3, 48	VDD3.3	Power	External power input 3.3 V, it is only reserved and does not require power supply.
2, 4, 7, 10, 21, 25, 26, 30, 41, 44, 47, 49	DGND	Power	GROUND
5, 46	NC	NC	Not Available

Note 1: Pin numbering sequence in the table corresponds to the order of pin names.

Note 2: Default voltage for DVP and I²C slave interfaces is 1.8V, configurable to 3.3V via command.

Note 3: UART0, UART1, and I²C master interfaces operate at a fixed 3.3V voltage (non-switchable).

Note 4: This hardware description is for reference only during selection. Contact technical support for detailed hardware development documentation.

Note 5: CVBS supports Black Hot/White Hot switching only.

4.2. CVBS Interface Specification

1. Connector:

Vertical-mount 1.25mm 5-pin socket connector adopted.

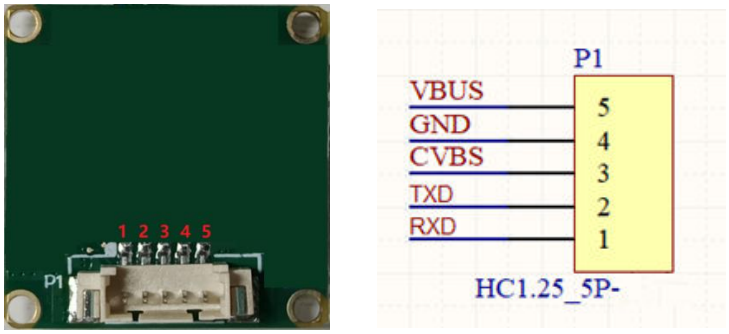


Fig. 4-3 CVBS Interface Board Pinout Diagram

2. Pinout Definition:

Table 4-2 1.25mm-5P Connector Pinout Definition

Pin No.	Pin Definition	Type	Specification
1	RXD	Input	UART, 3.3V logic level
2	TXD	Output	
3	CVBS	Output	Analog Video, PAL
4	GND	Power	GROUND
5	VBUS	Power	Power Supply, 5V

Note: CVBS supports Black Hot/White Hot switching only.

4.3. USB Interface Specification

1. Connector:

Vertical-mount Type-C receptacle or 1.0mm 4-pin socket connector options available.

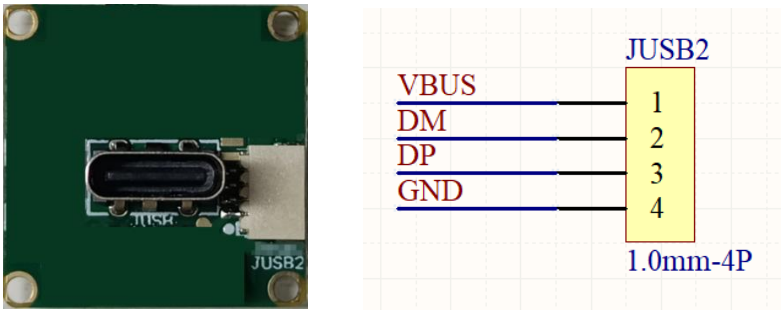


Fig. 4-4 USB Interface Board Pinout Diagram

2. Pinout Definition:

Table 4-3 1.0mm-4P Connector Pinout Definition

Pin No.	Pin Definition	Type	Specification
1	VBUS	Power	USB Power Supply 5V
2	USB_DM	Output	USB2.0 Data Signal
3	USB_DM	Output	
4	GND	Power	GROUND

Note 1: USB 2.0 interface with UVC (USB Video Class) protocol – driver-free operation.

Note 2: UR2 supports max frame rates of 25/50Hz; UR3 supports 30/60Hz.

Note 3: Due to bandwidth limitations, UR6 only supports 30Hz frame rate.

4.4. MIPI Interface Specification

1. Connector:

SFW15R-1STE1LF, utilizing 1.0mm pitch 15-pin FPC cable for interconnection.

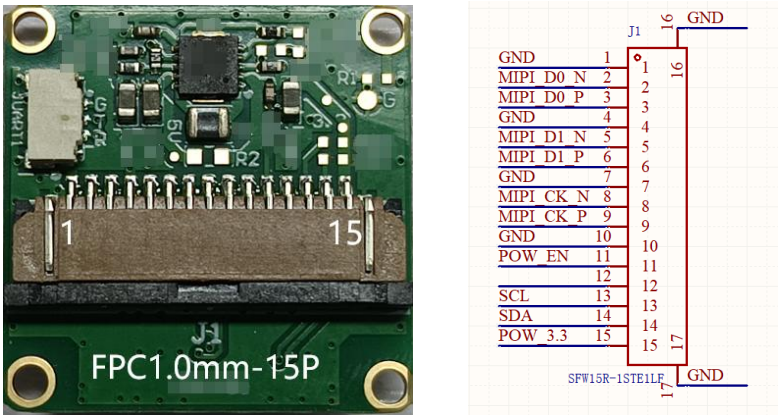


Fig. 4-5 MIPI Interface Board Pinout Diagram

2. Pinout Definition:

Table 4-4 MIPI Connector Pinout Definition

Pin No.	Pin Definition	Type	Specification
1	GND	Power	GROUND
2	MIPI_D0_N	Output	MIPI Data Signal
3	MIPI_D0_P	Output	
4	GND	Power	GROUND
5	MIPI_D1_N	Output	MIPI Data Signal
6	MIPI_D1_P	Output	
7	GND	Power	GROUND
8	MIPI_CK_N	Output	MIPI Data Signal
9	MIPI_CK_P	Output	
10	GND	Power	GROUND

11	POW_EN	Input	Power-enabled signal: Active-high logic. Leave floating when unused.
12	NC		Leave floating
13	SCL	I/O	Default logic level: 1.8V, configurable to 3.3V.
14	SDA	I/O	
15	POW_3.3	Power	Power supply, 3.3-5V

4.5. AHD Interface Specification

1. Connector:

Vertical-mount 1.25mm 5-pin socket connector adopted.

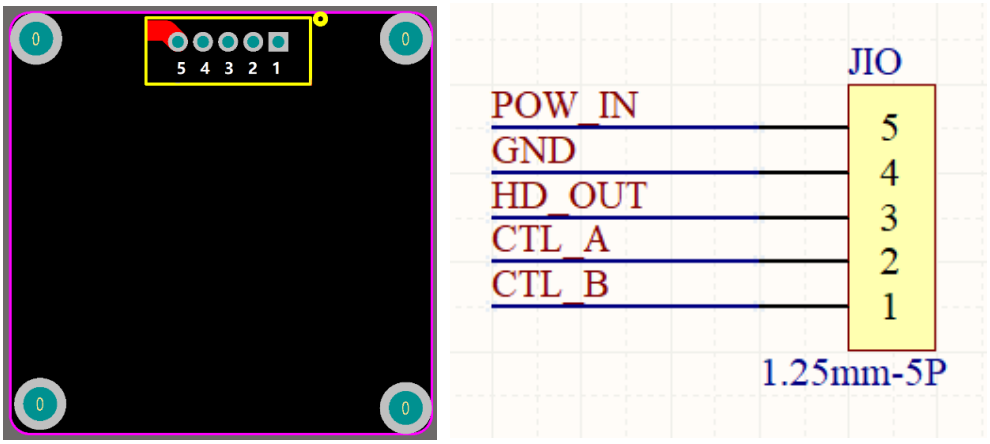


Fig. 4-6 AHD Interface Board Pinout Diagram

2. Pinout Definition:

Table 4-5 1.25mm-5P Connector Pinout Definition

Pin No.	Pin Definition	Type	Specification
1	CTL_B	I/O	I/O, 3.3V logic level
2	CTL_A	I/O	
3	HD_OUT	Output	AHD High-definition Analog Video, CVBS customizable
4	GND	Power	GROUND
5	POW_IN	Power	Power supply, 6-28V

Note 1:

Supports AHD output with formats including 1080P25, 1080P30, etc., compatible with in-vehicle displays.

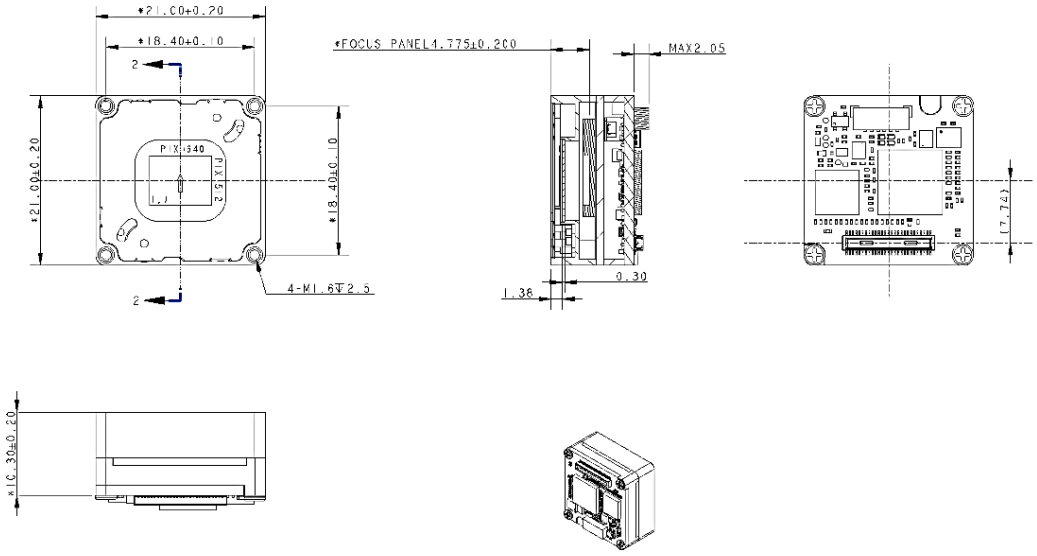
Note 2: CVBS output is customizable, featuring pseudo-color night vision.

Note 3: CTL_A/CTL_B pins support functions customization.

(e.g., UART communication or button controls).

5. Typical Structural Size

5.1. UVR6 without lens



5.2. UVR6 with 25mmF1.0 lens

