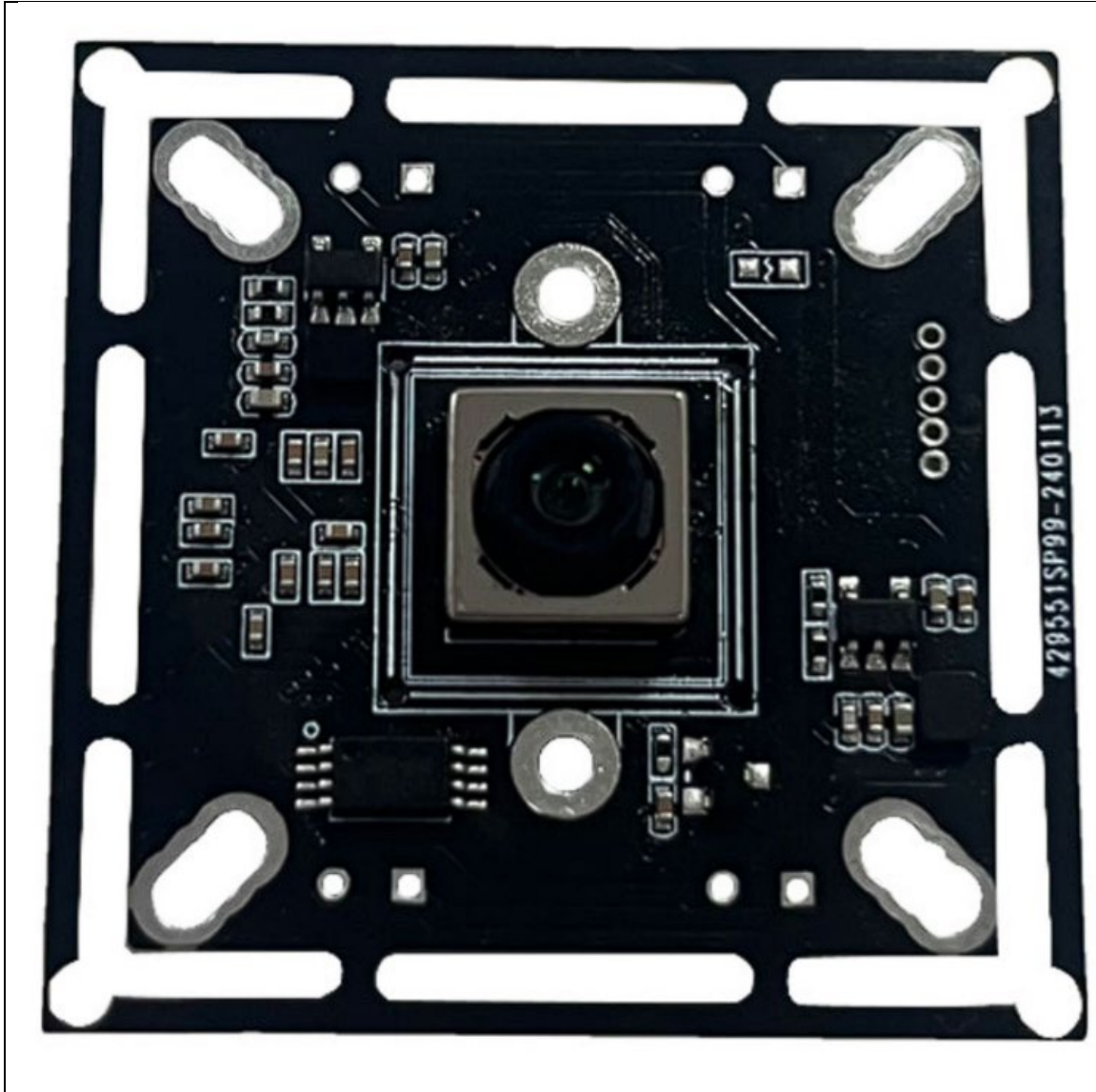


U20-CAM-32MPAF User Manual



1 Description

The U20-CAM-32MPAF is a professional-grade 32-megapixel USB2.0 UVC camera module built around the high-resolution CMOS sensor.

Equipped with a F2.0 aperture, 3.432 mm focal length, 88° DfOV low-distortion lens, it delivers natural field of view with excellent edge-to-edge sharpness and minimum optical distortion — ideal for surveillance, industrial inspection, document scanning, video conferencing, medical imaging, AI vision and high-speed motion analysis applications.

Thanks to the large pixel size and advanced technology, it offers class-leading low-light sensitivity, ultra-low read noise and outstanding dynamic range.

Fully UVC compliant over USB 2.0, truly driver-free plug-and-play on Windows, Linux, Android, macOS, Raspberry Pi, Jetson, Rockchip and all major embedded platforms. Rock-solid 6528×4896@5fps with zero frame drops.

2 Key Features

1. High-Resolution 32MP Sensor – 1/2.8" CMOS, 1.12μm pixel, superior low-light & dynamic range
2. True 6528×4896@5fps rock-solid performance on USB2.0
3. True USB2.0 UVC Plug-and-Play – High Speed USB2.0, no drivers needed
4. Ultra-fast AF autofocus
5. Industrial-grade 38×38 mm board, 4×M2.5 mounting holes (32 mm centers), wide temperature range
6. 88° Low-Distortion Lens – 3.432 mm F2.0, DfOV 88°, TV distortion < 1.5%, bright & sharp corner-to-corner

3 Specifications

3.1 Sensor & Image Quality

Parameter	Specification
Image Sensor	High-Resolution CMOS Sensor
Sensor Size	1/2.8" (diagonal ~9 mm)
Active Pixels	6528 × 4896 (32 Megapixels)
Pixel Size	1.12 μm × 1.12 μm

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Dynamic Range	82 dB
SNRmax	40 dB (typical)
Minimum Illumination	0.01 lux (color)

3.2 Focus & Optics

Parameter	Specification
Focus Type	AF (Auto Focus)
Focal Length	3.432 mm
Aperture	F2.0
Diagonal FOV (DFoV)	88° (±3–5°)
Horizontal FOV (HFOV)	~76°
Vertical FOV (VFOV)	~58°
Optical Distortion	< 1.5% (TV distortion)
Relative Illumination	≥ 70%
Lens Mount	M12 × P0.5 (with IR-cut filter)
Shutter Type	Rolling Shutter

3.3 Video Output & Performance

Resolution	MJPEG fps	YUY2 fps
6528×4896	5 fps	N/A
4624×3468	10 fps	N/A
4608×3456	10 fps	N/A
4160×3120	10 fps	N/A
3840×2160	30 fps	N/A
3264×2448	10 fps	N/A
2592×1944	10 fps	N/A
2048×1536	10 fps	N/A
1920×1080	30 fps	5 fps
1600×1200	10 fps	5 fps
1280×720	30 fps	10 fps
800×600	10 fps	10 fps
640×480	10 fps	10 fps

3.4 Interface & Controls

Parameter	Specification
Interface	USB 2.0 (5 PIN 1.25MM Socket)
Protocol	UVC (driver-free)
Adjustable Parameters	Brightness, Contrast, Saturation, Sharpness, Gamma, White Balance, Exposure, Gain, Flip, Mirror, etc.

3.5 Power & Electrical

Parameter	Specification
Power Supply	USB 5V bus power
Operating Current	<200 mA
Standby Current	≤10 mA

3.6 Environmental & Physical

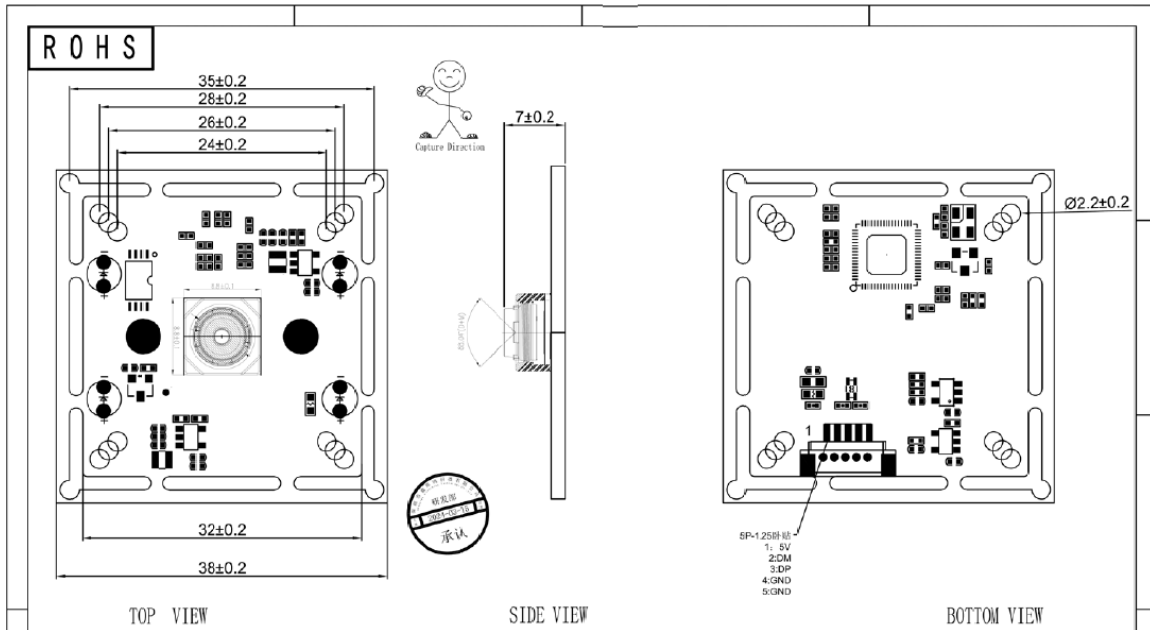
Parameter	Specification
Operating Temperature	-20°C to +60°C
Storage Temperature	-20°C to +85°C
PCB Dimensions	38 × 38 mm
Mounting Holes	4 × M2.5 (32 mm centers)
Total Height	≈25 mm (lens included)
Weight	≈15–20 g

3.7 Compatibility

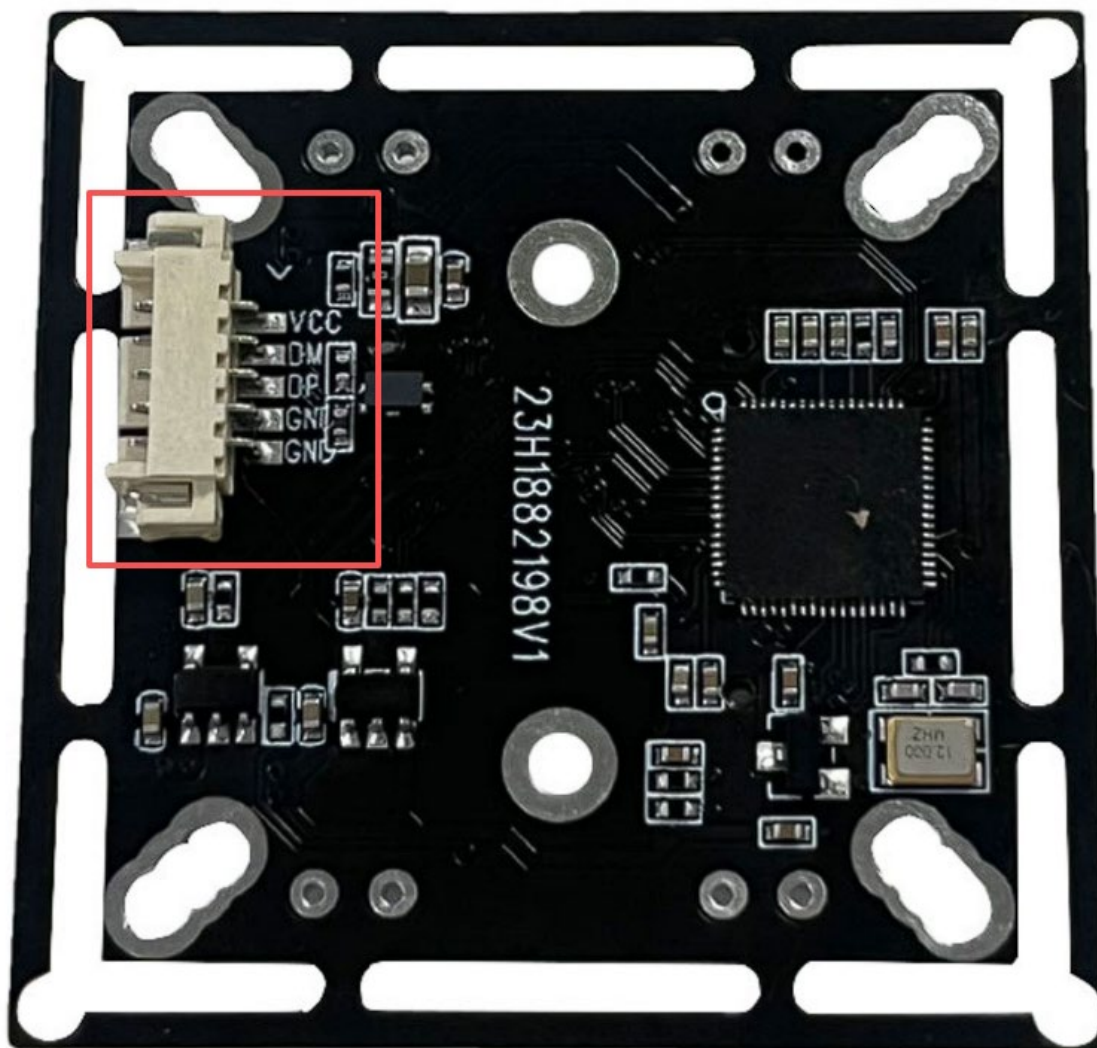
Parameter	Specification
Supported OS	Windows XP/Vista/7/8/10/11 Linux (UVC kernel 2.6.26+) macOS 10.4.8+ Android 4.0+ with UVC support Raspberry Pi, Jetson Nano/Xavier/Orin, Rockchip RK series, NVIDIA Orin, etc.

4 Hardware

4.1 Size Information



4.2 Pins Out



5pin-1.0mm

PIN	Signal Name	Description
1	VCC	5V Power
2	DM	USB2.0 Data+
3	DP	USB2.0 Data-
4	GND	GND
5	GND	GND

5 Software

Category	Software/Tool	Link & Description
GUI Viewers	gucvview	https://gucvview.sourceforge.net/ The most classic & stable Linux UVC viewer, full controls, recording, rock-solid
GUI Viewers	QtCAM	https://github.com/econsystems/QtCAM Beautiful modern Qt interface, best for 4K/8K high-res modules, excellent color tuning
GUI Viewers	Cheese	https://wiki.gnome.org/Apps/Cheese Simple GNOME webcam app – perfect for quick photos/videos
CLI / Debug Tools	v4l2-ctl (v4l-utils)	https://linuxtv.org/wiki/index.php/V4l-utils The #1 must-have tool – query formats, adjust every UVC control (exposure, focus, WB, etc.)
CLI Snapshot	fswebcam	https://www.sanslogic.co.uk/fswebcam/ One-line photo capture, banners, timestamps, overlays
Streaming Server	mjpg-streamer	https://github.com/jacksonliam/mjpg-streamer Still the king in 2025 – ultra-low latency MJPEG/HTTP stream, Raspberry Pi favorite
Surveillance / NVR	Motion / MotionEye	https://github.com/Motion-Project/motion Best motion-detection recording system + beautiful web UI (MotionEye)
Surveillance / NVR	ZoneMinder	https://zoneminder.com/ Professional-grade NVR, supports hundreds of cameras, ONVIF, AI detection

BUELEC	U20-CAM-32MPAF 32MP USB2.0 UVC camera module
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Development Libraries	libuvc	https://github.com/libuvc/libuvc Cross-platform UVC core library (C) – foundation of OpenCV, ROS, AndroidUSBCamera
Android Development	AndroidUSBCamera	https://github.com/jiangdongguo/AndroidUSBCamera Best Android UVC library in 2025 – multi-cam preview/recording, zero lag
Universal Recording/Transcoding	FFmpeg	https://ffmpeg.org/ God-tier tool – record raw UVC stream with one command, any format conversion
Computer Vision / AI	OpenCV	https://opencv.org/ VideoCapture(0) instantly opens any UVC camera for AI/projects

6 Packing List

1 × U20-CAM-32MPAF camera module

1 × 1 meter USB2.0 cable

(Optional: 2 m / 3 m / 5 m shielded cable, tripod adapter, acrylic case)

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