MYK

# 1280×1024 Uncooled Infrared Thermal Imaging Core Module

Technical Product Document

*Source: MYK 1280×1024 Uncooled Infrared Thermal Imaging Core Module — User Manual, V1.0, 2026*

MYK Vision Co., Ltd.

# 1. Product Overview

The MYK is a high-performance uncooled infrared thermal imaging core module equipped with a 1280×1024 high-resolution infrared detector. It offers a large array format, high sensitivity, and excellent imaging performance, and is suitable for long-range observation, EO/IR payloads, security surveillance, and other infrared imaging system integration applications.

### Key Features

- High-resolution infrared imaging with a 1280×1024 detector
- Fast startup (≤7s) and stable operation
- Non-Uniformity Correction (NUC)
- 3D Noise Reduction (3DNR) and 2D Noise Reduction (2DNR)
- Dynamic Range Compression (DRC)
- Edge Enhancement (EE)
- Image Super-Resolution algorithm
- Shutterless operation supported
- Broad expansion capability: CameraLink / HDMI / USB 3.0 / GigE / MIPI / SDI / VPC

The module architecture comprises four functional blocks: Lens Assembly → Shutter Assembly → Detector Assembly → Signal/Image Processing → External Output Assembly. The shutter assembly uses an electromagnetic shutter for uniformity and short response time; the detector assembly uses an uncooled vanadium-oxide infrared detector; the signal/image processing assembly performs image algorithm processing, video display, and output.

# 2. Technical Specifications

## 2.1 Infrared Detector

| | |
|---|---|
| Detector Type | Uncooled vanadium oxide |
| Resolution / Pixel Spacing | 1280×1024 / 12μm |
| Wavelength | 8–14μm |
| NETD | ≤30mK @ F1.0, 25°C |

## 2.2 Image Processing

| | |
|---|---|
| Effective Pixels | 1280×1024 |
| Frame Rate | 25Hz / 30Hz / 50Hz |
| Digital Video Formats | YUV420 / YUV422 / RGB888 / RAW |
| Startup Time | ≤7s |
| Image Algorithms | NUC / DRC / DNS / DDE / SFFC |
| Super-Resolution Algorithm | Supported |
| Shutterless Operation | Supported |
| Pseudo-color Modes | Black Hot / White Hot / Pseudo-color |
| Electronic Zoom | 1x / 2x / 4x / 8x (center of diaphragm) |
| Mirror Image | Horizontal / Vertical / Diagonal |
| Image Brightness | Automatic / Manual |
| Image Contrast | Automatic / Manual |
| Compensation Model | Manual |

## 2.3 Physical Interface

| | |
|---|---|
| External Expansion Connector | 50-pin, BP040SB-50-0114-B-R0 |
| Recommended Mating Connector | BS040SB-50-0390-B-R0 |
| Communication Methods | TTL-232 / USB 3.0 |
| Digital Video Interface | DVP16 / BT.1120 / USB3.0 / MIPI-DSI-4LANE |
| Extended Components | USB3.0 / SDI / HDMI / GigE / CameraLink / VPC / MIPI-CSI-2LANE |

## 2.4 Power Interface

| | |
|---|---|
| Supply Voltage | DC 2.7V – 5.3V |
| Power Consumption | ≤1.2W @ 25Hz, 23±3°C (steady state) |
| Transient Power (Shutter Op.) | ≤3W, max duration < 1s |

## 2.5 Software

| | |
|---|---|
| Host Computer Application | Uncooled Infrared Camera Application — supports Windows 7/8/10/11 |
| Recommended Hardware | Intel i5 processor or higher |
| SDK | Windows and Linux (USB 3.0 supported) |

## 2.6 System Functions

| | |
|---|---|
| One-Click Parameter Restore | Supported |
| Menu Settings | Customizable |
| Menu Language | English |
| Picture-in-Picture (PIP) | Upper-left / upper-center / upper-right; PIP with reticle supported |
| Hot Spot Tracking | Supported |
| Reticle Types | 10 types |
| Reticle Brightness Levels | 10 levels |
| Reticle Colors | Red, Blue, Yellow, Black, White |
| Reticle Parameter Save | Type, brightness, and color settings savable |
| Zeroing | Supported |
| Buttons | ≥4 (Power, Menu, Customizable) |
| OLED Driver | $I^2C$ and 16-bit/24-bit parallel interfaces (Data Valid + control signals) driving MicroOLED MDP03 / MDP02, OLEDoS SVGA060, Sony ECX334A |

## 2.7 Physical Parameters

| Parameter | Bare Core (Fixed 14/19/25/35mm) | Extended Config (50mm+ / Motorized / Zoom) |
|---|---|---|
| Mechanical Dimensions | 38 × 39 × 28 mm | 68 × 69 × 24.7 mm |
| Weight | 65 ± 3g | 88.5 ± 3g |

| | |
|---|---|
| Lens Configuration | Athermalized Fixed Focus: 14/19/25/35/50/100mm; Motorized Focus: 75/100/150mm; Continuous Zoom: 25–75 / 28–90 / 30–180 / 25–225 / 30–300mm |
| Shutter Assembly | Available as an option |
| Waterproof / Dustproof | Lens front window: IP67 |

## 2.8 Environmental Specifications

| | |
|---|---|
| Operating Temperature | -40°C to +70°C |
| Storage Temperature | -45°C to +85°C |
| Humidity | 5%–95% RH, non-condensing |
| Vibration | 5.35g, random vibration, 3 axes |
| Shock (with shutter) | Half-sine pulse, 40g / 11ms, X-axis, 3 times |
| Shock (without shutter) | 500g @ 1ms (without lens) |

## 2.9 Certifications & Warranty

| | |
|---|---|
| Certifications | RoHS 2.0 / REACH |
| Warranty | One-year product warranty (per company's official warranty policy) |

# 3. Optical Configuration

DLC = Hard Carbon Film coating; HD = Hard Protective Film coating. All resolutions 1280×1024. Lens front window protection IP67 unless noted.

| Focal Length | Focus Method | Coating | F/# | FOV (H×V, ±5%) |
|---|---|---|---|---|
| 14mm | Athermalized Fixed | DLC | 1.2 | 62.4° × 50° |
| 19mm | Athermalized Fixed | HD | 1.2 | 44° × 35.8° |
| 25mm | Athermalized Fixed | HD | 1 | 34.2° × 27.6° |
| 35mm | Athermalized Fixed | HD | 1 | 24.7° × 20° |
| 50mm | Athermalized Fixed | HD | 1 | 17.5° × 14° |
| 100mm | Athermalized Fixed | HD | 1 | 8.8° × 7.0° |
| 75mm | Motorized Focus | DLC | 1 | 11.7° × 9.4° |
| 100mm | Motorized Focus | HD | 1 | 8.8° × 7.0° |
| 150mm | Motorized Focus | DLC | 1 | 5.9° × 4.7° |
| 25–75mm | Continuous Zoom | DLC | 0.95–1.2 | 36°×28.6° / 11.5°×9.2° |
| 28–90mm | Continuous Zoom | DLC | 1.22–1.25 | 30.7°×24.8° / 9.8°×7.8° |
| 30–180mm | Continuous Zoom | DLC | 0.9–1.2 | 28.7°×23.1° / 4.9°×3.9° (IP67 rating: P67) |
| 25–225mm | Continuous Zoom | DLC | 0.95–1.5 | 35.7°×28.4° / 3.8°×3.1° |
| 30–300mm | Continuous Zoom | DLC | 1.0–1.2 | 28.72°×23.15° / 2.93°×2.35° |

# 4. Interface Description

## 4.1 Power Requirements

Steady-state power consumption is ≤1.2W @ 5V, 25Hz, 23±3°C. Transient consumption during shutter operation is ≤3W for under 1 second. When using an expansion board, supply voltage range at the core module terminal is DC 2.7V–5.3V; sufficient margin should be reserved to avoid abnormal startup or operation from insufficient supply capacity.

## 4.2 Hardware Interface — 50-Pin Configurations

The bare core module exposes a 50-pin external interface (connector BP040SB-50-0114-B-R0; mating connector BS040SB-50-0390-B-R0) covering power I/O, digital video, TTL-232 serial, USB 3.0, independent I/O, and other functions. The 50-pin interface has three factory-configurable hardware layouts:

- Configuration 1: DVP16 / BT.1120 / USB3.0 / MIPI-DSI-4LANE, with Standby and Reset modes
- Configuration 2: RGB888 mode (24-line parallel output)

Output interface and digital format (YUV/RAW) are switchable via the "Uncooled Infrared Camera Application" or by firmware upgrade.

### 4.2.1 DVP16 / BT1120 / USB3.0 / MIPI — Key Points

- USB 3.0 supports YUV422 or YUV420 format output
- MIPI-DSI supports RGB888 format output only
- DVP16/BT1120 provide progressive-scan digital output only (no interlaced mode); TTL serial communication level
- MIPI supports DSI-4LANE mode, primarily for transmitting pixel data to display devices

Selected pin functions (50-pin, DVP16/BT1120/USB3.0/MIPI configuration):

| Pin | Signal | Dir. | Level | Description |
|---|---|---|---|---|
| 1 | UART4_TXD | O | 3.3V | User Communication UART |

| Pin | Signal | Dir. | Level | Description |
|---|---|---|---|---|
| 2 | UART4_RXD | I | 3.3V | User Communication UART |
| 5/6 | UART3_TX/RX, I2C4_SDA/SCL | I/O | 3.3V | UART / I2C |
| 9/11/12/13/14/15 | TYPEC RX/TX diff. pairs | I/O | 3.3V | USB 3.0 differential signals |
| 19–23 | DVP15/DVP10/HSYNC/DVP11/VSYNC | O | 1.8V | DVP data & sync lines |
| 24–36 | MIPI D0–D3 P/N, CLK P/N ↔ DVP0–14 | O | 1.8V | Shared MIPI / DVP / BT1120 data lines |
| 39 | DATA_OUT_CLK | O | 1.8V | DVP / BT.1120 clock |
| 40 | STANDBY / RESET | I | 1.8V | Mode select (hardware-multiplexed; default STANDBY) |
| 46/48 | POWER_IN | VIN | 2.7–5.3V | Power input |
| 7/10/18/37/38/41/45/47 | DGND | GND | 0V | Power / signal ground |
| 17/43/44/49 | GPIO | I/O | 3.3V | Reserved GPIO |
| 3/4/8/16/42/50 | NC | — | — | Not connected — must be left floating |

*Note: signal direction "O" = output, "I" = input; "NC" pins must not be used and should be left floating.*

### 4.2.2 RGB888 (24-line interface)

An alternate hardware configuration exposes DVP0–DVP23 as parallel RGB888 data lines (pins 8, 11–16, 19, 20, 22, 24–36, 40) alongside DVP_HSYNC/VSYNC (pins 21/23), DATA_OUT_CLK (pin 39), UART/I2C (pins 1,2,5,6), power (46/48) and grounds. Motorized focus and continuous zoom lenses cannot be used with the RGB interface.

## 4.3 Digital Video

Direct digital video output formats are YUV422 (UYVY), YUV420 Plane, or RGB888. USB 3.0 outputs YUV422 or YUV420; MIPI-DSI outputs RGB888 only; DVP/other interfaces output YUV422 only; hardware RGB888 configuration outputs RGB888 only. Progressive scan only (no interlaced mode); only frame-by-frame transmission is supported.

- YUV422 output sequence: Cb, Y, Cr, Y (or Y, Cb, Y, Cr)
- YUV420 output sequence: Y first, followed by U or V

### Resolution / Parameter-Line Support

| | |
|---|---|
| YUV or RAW (max) | 1280×1024, effective 1280×1024 |
| YUV/RAW + Parameter Lines — USB | Max 1280×1025 (1 parameter line) |
| YUV/RAW + Parameter Lines — DVP16/BT1120 | Max 1280×1026 (2 parameter lines) |
| Y16+YUV+Parameter Lines — USB 3.0 | Max 1280×2049 (1 parameter line) |
| Y16+YUV+Parameter Lines — DVP16/BT1120 | Max 1280×2050 (2 parameter lines) |
| MIPI-DSI | Does not support parameter-line mode |

### Digital Video Clock Overview (MHz)

| Digital Source (1280×1024, DVP 16-bit) | 25Hz | 30Hz | 50Hz |
|---|---|---|---|
| Y16 | 43.18 | 43.21 | 74.98 |
| Y16 + Parameter Lines | 43.18 | 43.21 | 74.98 |
| YUV422 | 43.18 | 43.21 | 74.98 |
| YUV422 + Parameter Lines | 43.18 | 43.21 | 74.98 |

| Digital Source (1280×2048, DVP 16-bit) | 25Hz | 30Hz | 50Hz |
|---|---|---|---|
| Y16 + YUV422 | 86.36 | N/A | N/A |
| Y16 + YUV422 + Parameter Lines | 86.36 | N/A | N/A |

Parameter line format (DVP16): Head1[15:0], Head2[15:0], Para1[15:0], Para2[15:0] … Para40[15:0], End1[15:0], End2[15:0].

### 4.3.1 Parallel 16-bit (DVP16) Timing — Without Parameter Lines

| Parameter | 25Hz | 25Hz (2048H) | 30Hz | 50Hz |
|---|---|---|---|---|
| Resolution | 1280×1024 | 1280×2048* | 1280×1024 | 1280×1024 |
| DIGITAL_CLK | 43.18 MHz | 43.18 MHz | 43.21 MHz | 74.98 MHz |
| TLine | 31.50 µs (1360 CLK) | 15.75 µs (1360 CLK) | 31.48 µs (1360 CLK) | 18.89 µs (1416 CLK) |
| TLine_Valid | 29.64 µs (1280 CLK) | 14.82 µs (1280 CLK) | 29.62 µs (1280 CLK) | 17.01 µs (1280 CLK) |
| TFrame | 40 ms (1270 Line) | 40 ms (2540 Line) | 33.33 ms (1059 Line) | 20 ms (1059 Line) |
| TField_Valid | 32.25 ms (1024 Line) | 32.25 ms (2048 Line) | 32.23 ms (1024 Line) | 19.34 ms (1024 Line) |

**NH=2048 (dual-height Y16 mode) uses the same 43.18 MHz clock as standard 25Hz.*

### 4.3.1 DVP16 Timing — With Parameter Lines (3 rows)

| Parameter | 25Hz (1024H) | 25Hz (2048H) | 30Hz | 50Hz |
|---|---|---|---|---|
| DIGITAL_CLK | 43.18 MHz | 43.18 MHz | 43.21 MHz | 74.98 MHz |
| TLine | 31.50 µs (1360 CLK) | 15.75 µs (1360 CLK) | 31.48 µs (1360 CLK) | 18.89 µs (1416 CLK) |
| TFrame | 40 ms (1270 Line) | 40 ms (2540 Line) | 33.33 ms (1059 Line) | 20 ms (1059 Line) |
| TField_Valid | 32.31 ms (1026 Line) | 32.28 ms (2050 Line) | 32.29 ms (1026 Line) | 19.38 ms (1026 Line) |

### 4.3.2 BT.1120 Interface

- Data format: YCb, YCr, YCb, YCr…
- Progressive scan only; no interlaced mode
- Clock configurable per resolution; frame-based transmission only (no split-field transmission)
- Uses BT.1120 embedded synchronization (EAV/SAV codes with F/V/H bits)

### 4.3.3 MIPI-DSI-4lane Interface

Outputs images via the DSI-4lane interface in RGB888 format only. Each pixel = R, G, B components, 8 bits each, packed per the MIPI-DSI long-packet structure (packet header: data type, virtual channel, word count, ECC; payload: pixel data; packet footer: checksum).

# 5. Expansion Components

The core module can be paired with expansion boards for additional industrial interfaces.

## 5.1 USB 3.0 Expansion Board

| | |
|---|---|
| Interface | Standard Type-C |
| Power Consumption | ≤200mW @ 5V (TBD) |
| UART Baud Rate | 115200, no parity, 8 data bits, 1 stop bit |
| Protocol | UVC video transmission |
| Hot-plug | USB port hot-plug protection supported |
| Driver | No driver needed on Windows 10/7/XP; driver required for company host software |

## 5.2 SDI Expansion Board

| | |
|---|---|
| Interface | HD-SDI / 3G-SDI |
| Max Resolution | 1080P @ 50/60Hz |
| Power Consumption | ≈0.6W |

## 5.3 HDMI Expansion Board

| | |
|---|---|
| Interface | Standard HDMI |
| Power Consumption | ≤350mW @ 5V (TBD) |
| Features | Control/configuration functions; high-definition video transmission |

## 5.4 GigE Expansion Board

| | |
|---|---|
| Interface | GigE (Gigabit Ethernet) |
| Power Consumption | ≤900mW @ 5V (TBD) |
| Standard | GigE Vision |
| Features | High-speed image acquisition and transmission; longer transmission distance |

## 5.5 CameraLink Expansion Board

| | |
|---|---|
| Interface | Standard CameraLink |
| Power Consumption | ≤250mW @ 5V |
| Features | High-speed video transmission, strong anti-interference, multi-frame buffering |

## 5.6 VPC Expansion Board

Video processing/connector expansion board (interface and power details per the separate VPC Expansion Component documentation).

# 6. Mechanical Installation Guidelines

## 6.1 Image Orientation

Cores shipped with lenses output clear images directly; installation orientation relative to the full system must preserve correct image polarity (indicated by an icon in the 2D structural drawing). Cores shipped without lenses require a properly configured lens for correct imaging. The default configuration uses a conventional infrared lens with one-time image inversion. The detector's first-row, first-column pixel is marked "(1,1)" to verify orientation.

## 6.2 Installation Space

Optical tolerance compensation and structural accumulated tolerances make overall system length tolerance relatively large — reserve sufficient margin in mechanical design (reference dimensions: overall length 52.3±1mm, lens-to-flange 28.8±1mm, flange thickness 8±0.3mm, mounting hole spacing 12±0.1mm, verification depth 4mm).

## 6.3 Installation Methods & Torque

- Structural clamping: use larger contact surfaces, avoid rigid double-side contact; recommended single-side pressure ≤20N
- Screw fastening: engagement length ≥4 threads; do not exceed max specified screw depth; tighten in diagonal-cross sequence (e.g., 1→3→2→4), gradually — never fully tighten one screw first
- Pre-tighten at low torque, then re-tighten to the recommended torque value using a torque wrench/screwdriver
- Disassembly/reassembly of the imaging core is not recommended

### Recommended Tightening Torque — Complete System Fastening (Screws to Structural Components)

| Thread Spec | M1.2×0.25 | M1.4×0.3 | M1.6×0.35 | M2.0×0.4 | M2.5×0.45 | M3.0×0.5 |
|---|---|---|---|---|---|---|
| Torque | 4cN·m±15% | 6cN·m±15% | 9cN·m±15% | 18cN·m±15% | 36cN·m±15% | 63cN·m±15% |

### Recommended Tightening Torque — Screws Directly Fastened to PCB

| Thread Spec | M1.2×0.25 | M1.4×0.3 | M1.6×0.35 | M2.0×0.4 | M2.5×0.45 | M3.0×0.5 |
|---|---|---|---|---|---|---|
| Torque | 2cN·m±15% | 3cN·m±15% | 4.5cN·m±15% | 9cN·m±15% | 18cN·m±15% | 32cN·m±15% |

# 7. Safety Instructions

## 7.1 Warnings

- Disconnect power before wiring, installation, or maintenance; do not operate while powered on
- Do not exceed the connected power adapter's total load capacity across multiple modules — risk of overheating/fire
- On smoke, unusual smell, or abnormal noise, immediately disconnect power and contact the supplier
- Do not disassemble or modify without authorization — voids warranty

## 7.2 Cautions

- Do not point the module at high-energy radiation sources (sun, molten materials, laser beams)
- Standard models: target observation temperature must stay below 600°C; use customized models for higher temperatures
- Follow the mechanical installation guide and specified screw torque
- Avoid strong vibration, impact, and magnetic interference; do not install in unstable or shock-prone locations
- Operating range: -40°C to +70°C; relative humidity ≤95%
- Avoid prolonged direct sunlight, poor ventilation, or proximity to heaters
- Avoid frequent power cycling — allow ≥30 seconds between shutdown and restart
- Do not hot-plug/unplug the 50-pin connector while powered on
- Do not touch the lens optical surface directly or scratch it; clean only with a soft dry cloth

# 8. Related Documentation

- S Version Upstream and Downstream Communication Protocol (UART protocol detail)
- 2D and 3D Mechanical Structure Drawings
- USB 3.0 / SDI / HDMI / GigE / CameraLink Expansion Component User Manuals
- Driver Installation Manual

*Note: Product specifications and parameters are subject to change without prior notice due to continuous product improvement. All rights reserved by MYK Vision Co., Ltd.*