**KLT** 

## KLT-G1M9+KLT-CMFL6007-IMX577 V1.0
## Ai Master Board + 12.3MP Sony IMX577 Fixed Focus Camera Module Development Kit



G1 IMX577
HX6007镜头模组

两组LED
补光灯接口
LEDS * 2 INTERFACE

滤光片
切换器接口
IR-CUT INTERFACE

开关机(A键)
ON/OF Key A

OK确认(B键)
Mode Key B



USB Type-C

滤光片 切换器接口
IR-CUT INTERFACE

G1 IMX577
HX6007镜头模组

微型高清接口
Micro HDMI Port

两组LED
补光灯接口
LEDS * 2 INTERFACE

TF存储卡
TF Card

www.KaiLapTech.com   sales@KaiLapTech.com   Tel: (852) 6908 1256   Fax: (852) 3017 6778

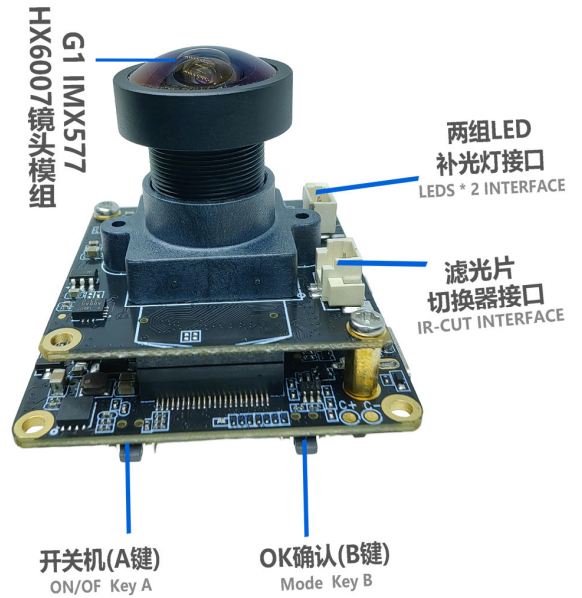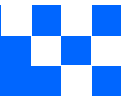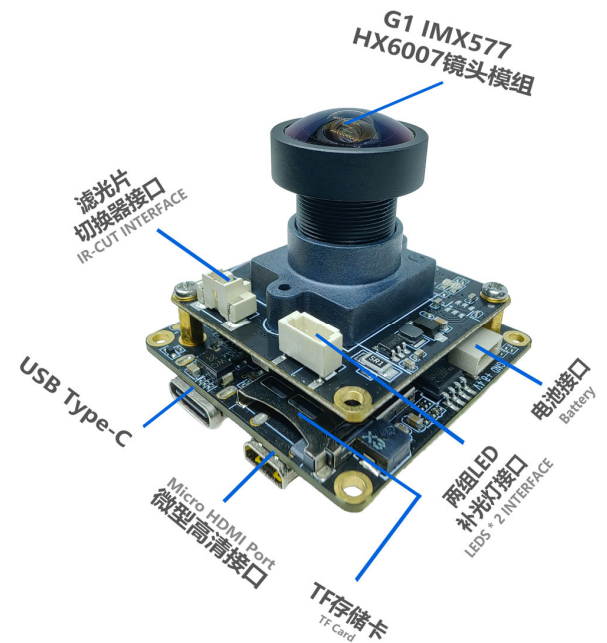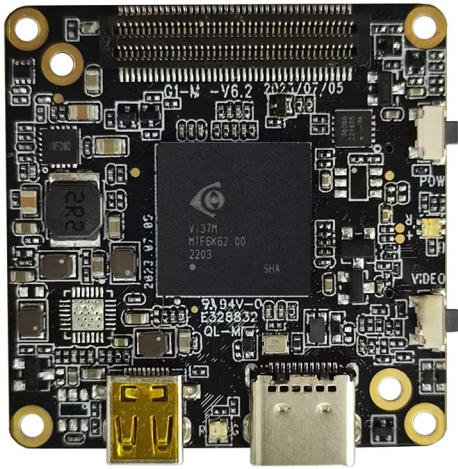# KLT-G1M9+KLT-CMFL6007-IMX577 V1.0
## Ai Master Board + 12.3MP Sony IMX577 Fixed Focus
## Camera Module Development Kit





G1 IMX577
HX6007镜头模组

滤光片
切换器接口
IR-CUT INTERFACE

电池接口
Battery

USB Type-C

两组LED
补光灯接口
LEDS * 2 INTERFACE

Micro HDMI Port
微型高清接口

TF存储卡
TF Card

## KLT-G1M9 V6.2
## iCatch V39 Ai-Powered Image Processing SoC Master Board



Front View
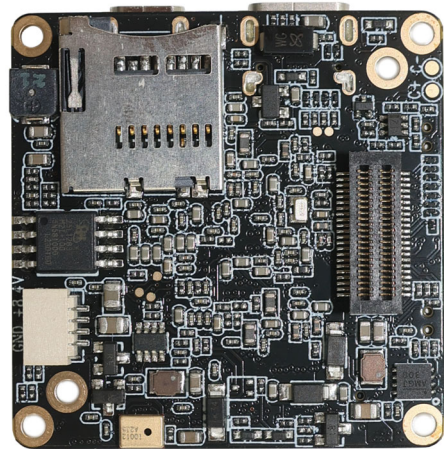


Back View

## Overview

Equipped with iCatch V39, built-in 2GB DDR3, supports up to 4K@60FPS (differential), 4K@30FPS, 1080P@120FPS H.264 encoded video. Onboard support Type-C, HDMI, TF memory card, recording, 2 control buttons, buzzer, battery power supply, etc.

This master board extension also supports WiFi, LCD display, CVBS, lens module, UART, I2C, SPI, PWM, MIC and other expansion interfaces. The board size is 38x38mm. Widely used in drones, mini DV, wearable devices, sports cameras, face recognition, USB cameras and other camera products.

## KLT-G1M9 V6.2

### iCatch V39 Ai-Powered Image Processing SoC Master Board

## Hardware Specifications

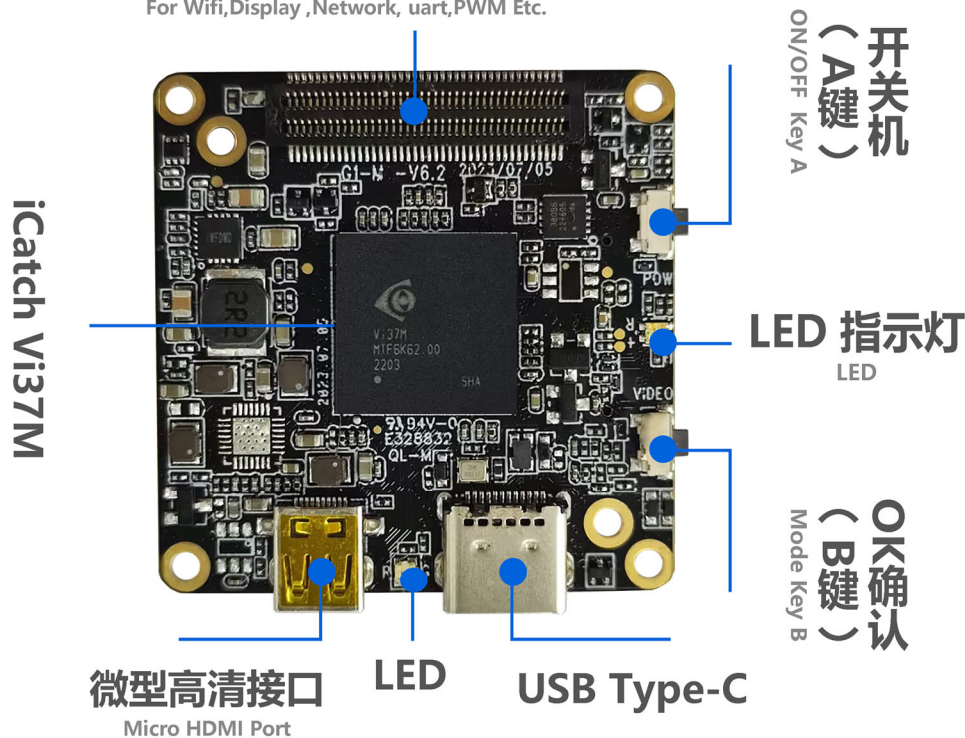| Model No. | KLT-G1M9 V6.2 |
|---|---|
| **Main Control Chipset (DSP)** | iCatch V39 |
| **Image Sensor Interface** | MIPI |
| **Battery Voltage** | 7.4V - 7.7V<br>High Voltage Lithium Battery |
| **Storage Type** | External TF Card, Supports 8GB - 512GB<br>Class 10 and Above, U3 is Recommended |
| **Type-C Port** | Type-C USB 5V<br>Connection to Computer USB Mode<br>Connection to PCCAM (Camera) Mode |
| **LED Indicator Type** | Three Color Light (Red, Green, Blue) |
| **2 Control Button Type** | Power Button (A), OK Button (B) |
| **Power Supply** | Supports 3 Power Supply Methods At The Same Time<br>(1) 5V USB to Type-C Port Power Supply<br>(2) 9V-24V WiFi Board or Network Port board Power Supply<br>(3) 6.8V-8.4V Battery Power Supply<br>(The 3-Axis Gimbal Version Does Not Support 5V USB) |
| **Operating Temperature** | -10°C to +60°C Without Housing |
| **Storage Temperature** | -20°C to +80°C |
| **Humidity** | 20% to 80% |
| **PCB Dimensions** | 38 x 38 mm |
| **PCB Screw Hole Spacing** | External (34mm x4), Internal (28mm x2) |
| **PCB Screw Hole Diameter** | 2 mm |
| **Optional Camera Configuration** | （1）KLT-G1M9 V6.2 + Camera<br>(2) KLT-G1M9 V6.2 + Camera + KLT-G1WF V6.3 WiFi Board<br>(3) KLT-G1M9 V6.2 + Camera + KLT-G1NK V6.3 Ethernet Board |
| **Supportive Image Sensors** | 13MP: IMX258<br>12MP: IMX377 OS21D40 IMX577 IMX386 IMX378<br>8MP: IM317<br>5MP: IMX335<br>2MP: IMX290 IMX385 |
| **Optional Extension Ports** | WiFi, Ethernet Network Port, Display, Audio IC,<br>Lens Module, UART, I2C, SPI, PWM, MIC, etc. |

## KLT-G1M9 V6.2
### iCatch V39 Ai-Powered Image Processing SoC Master Board

## Photo Image Settings

| | |
|---|---|
| **Resolution** | 20MP, 13MP, 12MP, 10MP, 8MP, 5MP, 3MP, 2MP |
| **Time Lapse Photography** | OFF, 3S, 5S, 7S |
| **Continuous shooting** | OFF, 3-Shot, 7-Shot, 15-Shot, 30-Shot |
| **White Balance** | Auto, Sunny, Cloudy, Fluorescent, Incandescent |
| **Power Frequency** | 50Hz, 60Hz |
| **Exposure Compensation** | EV 0.0, EV 3.0, EV 7.0, EV 10.0,<br>EV 13.0, EV 17.0, EV 20.0,<br>EV -3.0, EV 17.0, EV -10.0, EV -13.0, EV -17.0, EV -20.0 |
| **Time Lapse Photo Interval** | OFF, 1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S,<br>13S, 15S, 20S, 25S, 30S, 40S, 1min |
| **Time Lapse Duration** | No Limit, 1min, 3min, 5min, 10min,<br>20min, 30min, 1hr, 2hr, 3hr, 5hr |
| **Photo Time Watermark** | OFF, Date, Date and Time |

Wifi、显示屏、网口、uart、PWM等扩展接口
For Wifi,Display ,Network, uart,PWM Etc.

开关机
（A键）
ON/OFF Key A

iCatch Vi37M

LED 指示灯
LED

微型高清接口
Micro HDMI Port

LED

USB Type-C

OK确认
（B键）
Mode Key B

## KLT-G1M9 V6.2
### iCatch V39 Ai-Powered Image Processing SoC Master Board

## Video Settings

| | |
|---|---|
| **Resolution** | 16:9 (4K, 2.7K, 1080P, 720P)<br>4:3 (1440P) Currently Only IMX377 Sensor Supports 1440P |
| **Frame Rate** | 24FPS, 25FPS, 30FPS, 48FPS,<br>50FPS, 60FPS, 120FPS, 240FPS |
| **Slow Motion Recording** | OFF, 4K2X, 1080P4X, 720P8X |
| **Fast Motion Recording** | OFF, 2X, 5X, 10X, 15X, 30X |
| **Automatic Recording** | OFF, ON |
| **Time Lapse Video Mode** | OFF, 1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S,<br>13S, 15S, 20S, 25S, 30S, 40S, 60S |
| **Time Lapse Duration** | No Limit, 1min, 3min, 5min, 10min,<br>20min, 30min, 1hr, 2hr, 3hr, 5hr |
| **Pre-recording** | OFF, ON<br>(for Option ON,5 Seconds of Video is Pre-recorded) |
| **EIS Anti-Shake** | OFF, ON |
| **Image Quality Enhancement** | Super Good,  Very Good,  Normal<br>(Referral to Actual Video Effect Quality, Not for Preview) |
| **Image Rotation** | Normal, Vertical, Horizontal (for Recorded Video) |
| **Recording Time** | No Limit, 1min, 5min |
| **Automatic Screen Off** | OFF, 60S, 180S, 300S |
| **Light Metering Mode** | Center, Multi-point, Single Point |
| **Video Recording File Time** | No Limit, 1min, 5min |
| **Loop Recording** | OFF, ON |
| **Recording Volume** | 0, 1, 2, 3 |
| **Video Time Watermark** | OFF, Date, Date and Time |

## KLT-G1M9 V6.2
### iCatch V39 Ai-Powered Image Processing SoC Master Board

## System Settings

| | |
|---|---|
| **Automatic Shut Down** | OFF, 1min, 3min, 5min, 10min, 15min |
| **USB Auto Power On** | Turn ON, Turn OFF |
| **Languages** | English, Simplified Chinese, Traditional Chinese (Select Language Through Configuration File in the Card) |
| **Button Touch Tone** | Turn ON, Turn OFF |
| **Automatically Turn On WiFi** | Turn ON, Turn OFF |
| **WiFi Frequency Bands** | 2.4GHz or 5GHz (Dual Band Single Channel) |
| **Display Brightness** | Low, Medium, High Brightness (for Touch Screen) |
| **Display Setting** | Conventional Display, Full Screen Display (for Touch Screen) |
| **Fill Light A (White Light)** | Auto, OFF, ON  (for Use with Fill Light Board) |
| **Fill Light B (Infrared Light)** | Auto, OFF, ON  (for Use with Fill Light Board) |
| **IR Cut Settings** | Auto, OFF, ON  (for Use with IR Cut Function Modules) |
| **Special Effects** | Original Image, Black and White, Natural, Negative, Warm Tones, Contrast (for Touch Screen) |
| **White Balance** | Auto, Sunny, Cloudy, Fluorescent, Incandescent |
| **Date and Time** | Year, Month, Day, Hour, Minute |
| **Format** | No, Yes |
| **Reset** | No, Yes |
| **Card Information** | Displays Video Card Capacity and Free Space |
| **Device Information** | Displays Firmware Version |

## Gimbal Functions and Settings

| | |
|---|---|
| **Gimbal Functions** | Centering, Calibration |
| **Sensitivity** | Follow Softly, Follow Sensitively |
| **Follow Mode** | Full Follow, Heading Follow, Heading and Pitch Follow |
| **Pitch Axis Control** | Turn ON, Turn OFF |

## KLT-G1M9 V6.2
## iCatch V39 Ai-Powered Image Processing SoC Master Board

## Camera Features

| | |
|---|---|
| **Continuous Shooting** | Long Press the OK Button (B) to Shoot Continuously, Release Button to Stop Shooting Continuously |
| **Snapshot** | During Recording, Long Press the OK Button (B) to Capture the Video. Release Button to Stop Snapshot |
| **HDMI Output Resolution** | 4K@30FPS  1080P@60FPS/30FPS  720P@60FPS |
| **Video Start and Stop Function** | Short Press the Power Button (A) to Pause or Continue Video Recording |
| **USB Camera Resolution** | H.264: 4K@30FPS, 1080P@120FPS, 720P@60FPS (Dependency on Sensor Type and UVC Protocol)<br><br>MJPG:  5760x3240@10FPS,  4000x3000@10FPS 4K@30FPS,  1080P@30FPS,  720P@30FPS YUY2:  480P@30FPS (Supports Modification of UVC Output on Configurations) |
| **USB Flash Drive** | USB Mode when Connected to Computer |
| **Inverted Mode** | By Placing a Configuration File in the Card, You Can Modify the Displayed or Captured file and Flip it 180 degrees |
| **WiFi Mode** | AP Mode, STA Mode Set WiFi Mode by Putting Configuration Files in the Card or Enter the Menu to Set This Item Through the Touch Screen |
| **Configuration IP Address** | By Placing a Configuration File in the Card, You Can Modify the IP and Gateway Address of the Camera. Default is Static IP.  Optional on Dynamic IP. |
| **RTSP Video Stream Address** | By Placing a Configuration File in the Card, You Can Modify the RTSP video stream address.  If There is No Configuration File in the Card, the Default Port is 554. |

## KLT-G1M9 V6.2

## iCatch V39 Ai-Powered Image Processing SoC Master Board

**USB Type-C Interface:**

This interface supports USB standard 5V power input, which can power the master board and charge the battery (recommended 7.4V-7.7V battery). Connecting to a computer can directly read files in the TF card and use it as a USB flash drive. It can also be used as a PCCAM USB camera.

The USB interface retains one camera control serial port UART3 and one camera debugging serial port UART1 (the serial port function can be used with the G1-USB serial port debugging board).

**Connecting to the Computer USB Flash Drive Mode:**

Insert the TF card, connect the other end of the USB to the computer, and automatically enter the USB flash drive mode after booting by default.

**Connecting to the Computer PCCAM Mode:**

Insert the TF card, connect the other end of the USB to the computer, and automatically enter the USB flash drive mode after booting. Short press the OK button (A) to switch to PCCAM camera mode. (Right-click the computer "Computer", click the left button in the pop-up prompt box to enter "Management", "Device Manager", and you can see the name of the camera identified in "Image Device" camera. Open the camera tool "amcap.exe" to see the current device preview screen).
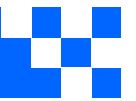
**Battery Power Supply:**

6.6V (low power shutdown) to 8.8V, 7.4-7.7V high-voltage and high-density batteries are recommended Special note: the battery power supply can support up to 12V; but this does not include the gimbal version, the stable power supply voltage of the gimbal version is 8V.
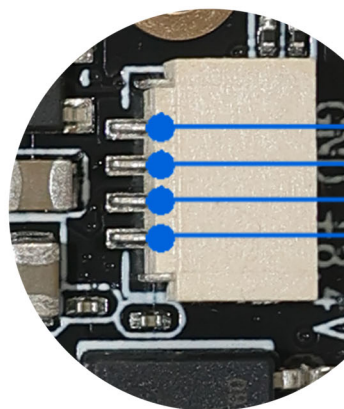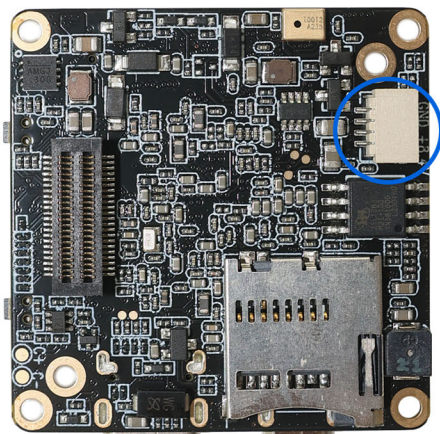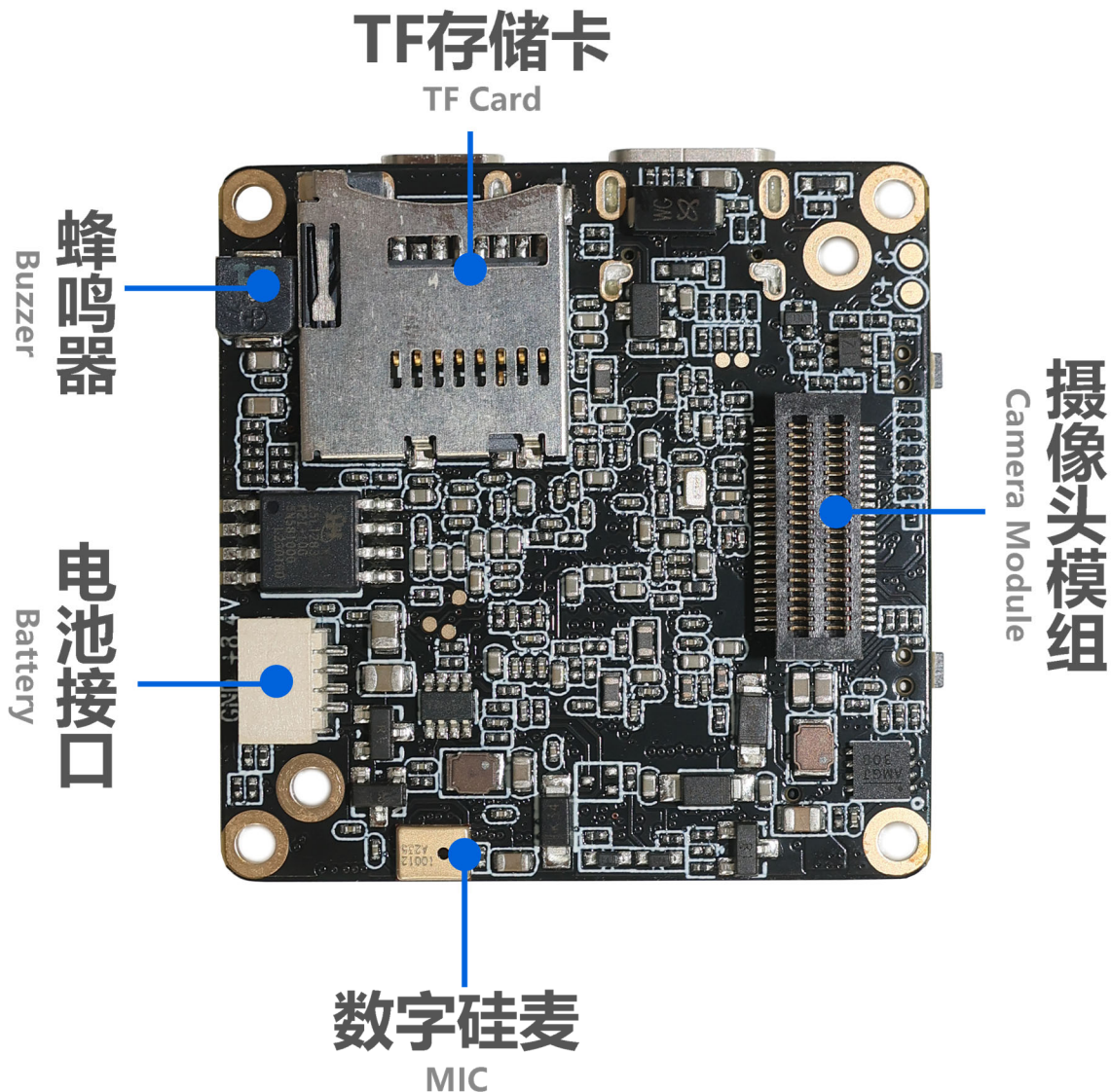
## KLT-G1M9 V6.2
## iCatch V39 Ai-Powered Image Processing SoC Master Board

**Charge the Battery:**

Use a power adapter (5V2A recommended) to charge the battery of the machine. The red light will be on during charging and the green light will be on when fully charged.

**Camera Module:**

This interface can be used to expand multiple MIPI sensors, IR-CUT function, LED fill light, serial port UART2, battery power output, micro three-axis gimbal and other functions.



TF存储卡
TF Card

蜂鸣器 / Buzzer

电池接口 / Battery

摄像头模组 / Camera Module

数字硅麦
MIC

## KLT-G1M9 V6.2
### iCatch V39 Ai-Powered Image Processing SoC Master Board

**Button Instructions:**

| Button | Mode or Status | Functional Operation |
|---|---|---|
| **Button A**<br>Power<br>Mode | Power ON / OFF | Long Press 1 Second Power ON / OFF |
| | Standby | Short Press on Switch Mode<br>Video Recording, Snapshot, Playback, Settings |
| | Setting Mode<br>(with Touch Screen) | Short Press to Scroll Down Menu<br>(After Pressing Button B to Enter Setting) |
| | Video Recording | Short Press to Pause or Continue Recording |
| **Button B**<br>Confirmation<br>OK<br>Video Recording | Standby | In Video Standby Mode, Long Press 3 Seconds<br>to Turn ON / OFF WiFi Mode.  Default WiFi is OFF.<br>In Video Recording Mode, Short Press to Start Recording<br>In Snapshot Mode, Short Press to Start Taking Photo<br>Long Press to Start Continue Shooting<br>Release to Stop Continue Shooting |
| | Video Recording | Short Press to Stop Recording and Save the File<br>Long Press 2 Seconds (Less than 4 Seconds) to Take<br>a Single Frame Shot, Release to Stop Taking Frame Shots<br>Long Press 5 Seconds to Take Continues Frame Shots,<br>Release to Stop Taking Frame Shots |
| | Setting Mode<br>(with Touch Screen) | Short Press to Confirm and Enter Setting Mode<br>Long Press 2 Seconds to Return<br>Double-Click to Switch Between Settings:<br>Photo / Video / System / 3-Axis Gimbal |
| | Playback Mode<br>(with Touch Screen) | Short Press to Scroll Up Menu<br>Double-Click to Play / Pause Video or Audio Files<br>Click 3 Times to Mark or Unmark Files.<br>If File is Marked, then the File is Locked and Not Erasable<br>Long Press to Prompt Option to Delete Current File<br>(Long Press to Delete, Short Press to Return)<br>After Entering, Long Press Again to Delete |
| | Shutdown | Press and Hold to Enter the USB Burning Mode |
| **Reset Function** | Standby or Working | Press Button A and B at the Same Time to Shutdown |

# KLT-G1M9 V6.2
## iCatch V39 Ai-Powered Image Processing SoC Master Board

**LED Indicator Description:**

| Functions | Color | Power On | Video Mode | Video Recording | Photo Mode | Photo Snapshot | Playback Mode | Setting Mode |
|---|---|---|---|---|---|---|---|---|
| LED Indicator | Red | Always On | Always On | Flashing | | | Always On | |
| | Green | | | | Always On | Flash Once | Always On | |
| | Blue | | | | | | Always On | Always On |

Note: When the device is powered without a TF card inserted, the function indicator light flashes yellow.

**Buzzer Sound Description:**

| Operation Mode | Power On | Power Off | Switching Mode | Start Video Recording | Start Stop Recording | Photo Snapshot | Menu Setting | Menu Scroll Down | Exit Menu Setting |
|---|---|---|---|---|---|---|---|---|---|
| Buzzer Sound | 3 Beeps | 5 Beeps | 1 Beep | 1 Beep | 2 Beeps | 1 Beep | 1 Beep | 1 Beep | 1 Beep |

Special Note: When the touch screen is not in use, you can modify the setting parameters through the configuration file. Put the configuration file, such as "CameraConfig_G1A.ini" (the specific configuration file name will vary depending on the lens module) in the root directory of the TF card, and you can modify the corresponding function options in the configuration file. After saving the changes, shut down the machine and restart it to take effect.
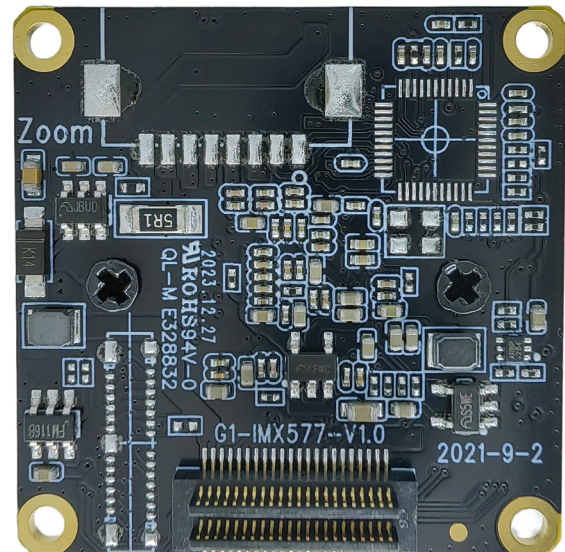
# KLT-CMFL6007-IMX577 V1.0
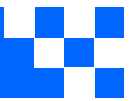## 112.3MP Sony IMX577 Fixed Focus Camera Module
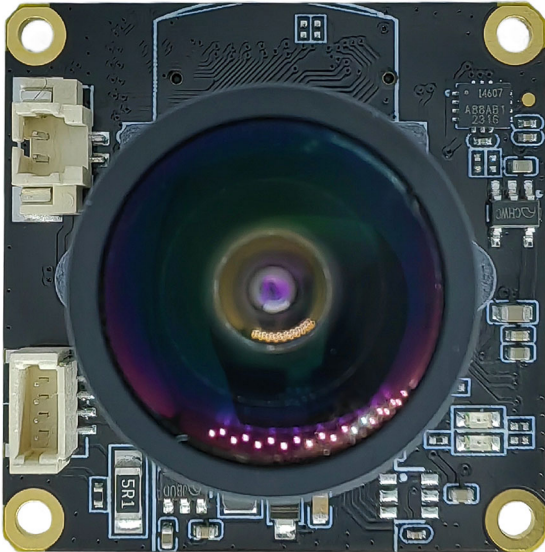


Front View



Back View

## Overview

The KLT-CMFL6007-IMX577 V1.0 camera module uses the Sony IMX577 high-quality CMOS image sensor, which has a diagonal of 7.857mm (1/2.3 type) CMOS image sensor, a pixel size of 1.55um, a color square pixel display, an effective pixel of 12 megapixels, and a high-definition image. When used with the master board, it can support 12MP high-definition photos, and can support up to 4K@60FPS (differential), 4K@30FPS video shooting.

Used with the master board, the coaxial cable is used to connect the main board or by directly plug in. The board frame size is 32x32mm, and the size from the top of the module lens to the PCB board surface is 23mm.

# KLT-CMFL6007-IMX577 V1.0
## 112.3MP Sony IMX577 Fixed Focus Camera Module

## KLT-CMFL6007-IMX577 V1.0
### 112.3MP Sony IMX577 Fixed Focus Camera Module

## Specifications

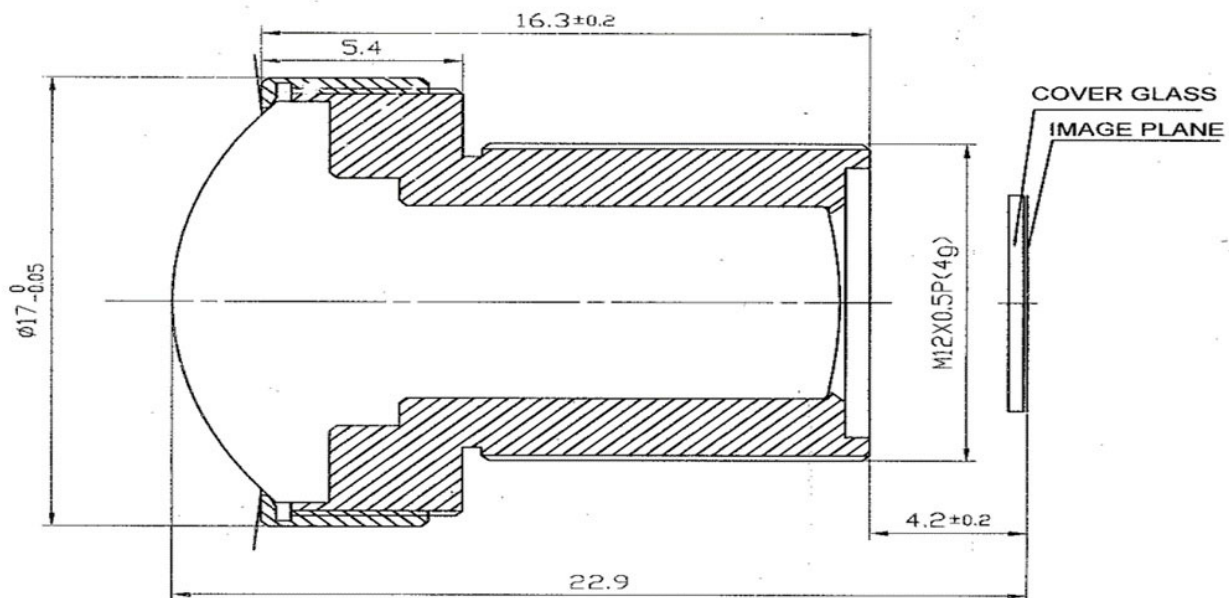| Model No. | KLT-CMFL6007-IMX577 V1.0 |
|---|---|
| Image Sensor | IMX577 |
| Image Sensor Type | CMOS |
| Effective Pixels | 12.3 Megapixels |
| Sensor Size | 1/2.3" |
| Pixel Size | 1.55 um x 1.55 um |
| Video Frame Rate | 4K@24/25/30/FPS, 4K@48/50/60FPS (Differential)<br>2.7K@24/25/30/48/50/60FPS<br>1080P@24/25/30/48/50/60/120FPS<br>720P@24/25/30/48/50/60/120/240FPS |
| Video Slow Motion | OFF, 4K2X, 1080P4X, 720P8X |
| Photo Resolution (with Master Board) | 20MP (5200x3900) (Differential)<br>13MP (4160x3120) (Differential)<br>12MP (4000x3000)<br>10MP (3648x2736)<br>8MP (3264x2448)<br>5MP (2592x1944)<br>3MP (2048x1536)<br>2MP (1920x1080) |
| Operating Temperature | -10°C to +60°C |
| Storage Temperature | -20°C to +80°C |
| Humidity | 20% to 80% |
| PCB Dimensions | 32 x 32 mm |
| Module Size | 32 x 32 x 24 mm |
| PCB Screw Hole Spacing | 28 x 28 mm |
| PCB Screw Hole Diameter | 2 mm |
| Lens Mount Screw Diameter | 1.6 mm |

## KLT-CMFL6007-IMX577 V1.0
### 112.3MP Sony IMX577 Fixed Focus Camera Module

## Lens Specifications

| | |
|---|---|
| **Lens Model No.** | HX6007 |
| **EFL (Focal Length)** | 2.70 mm |
| **BFL** | 5.03 mm |
| **TTL (Total Length)** | 22.90 mm |
| **IR Coating** | T=50%@650nm +/- 10nm |
| **F. No.** | 2.8 |
| **Lens Barrel Thread** | M12 x P0.5 |
| **Lens Construction** | 8G + 1E |
| **Diagonal View Angle (DFOV)** | 170° (DFOV) |
| **Horizonal View Angle (HFOV)** | 130° (HFOV) |
| **Vertical View Angle (VFOV)** | 96.7° (VFOV) |
| **Distortion** | <1.0% |
| **Relative Illumination** | >72% |
| **Lens Operating Temperature** | -10°C to +60°C |
| **Lens Storage Temperature** | -20°C to +80°C |

## Lens Drawing
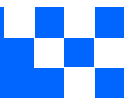
## KLT-CMFL6007-IMX577 V1.0
## 112.3MP Sony IMX577 Fixed Focus Camera Module



滤光片切换器接口
IR-CUT INTERFACE

两组LED补光灯接口
LEDS * 2 INTERFACE
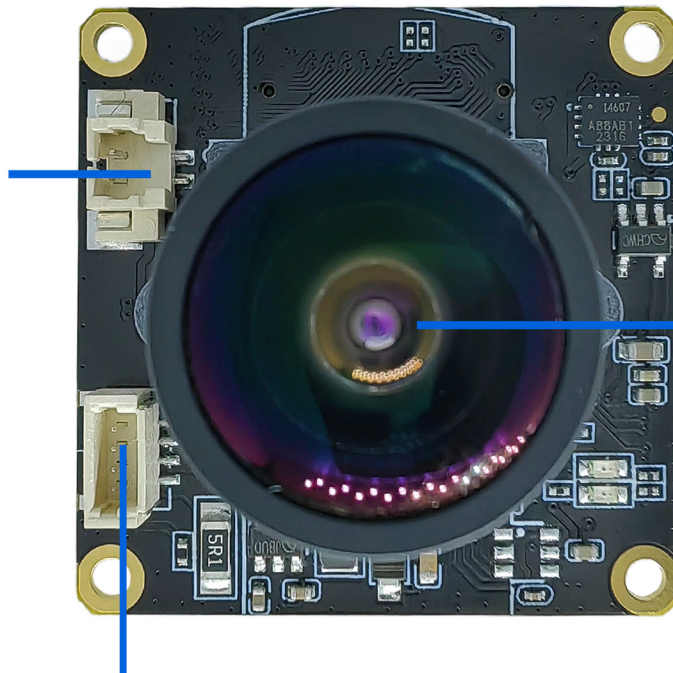
G1-IMX577 HX6007
V1.0镜头模组

## KLT-CMFL6007-IMX577 V1.0
## 112.3MP Sony IMX577 Fixed Focus Camera Module
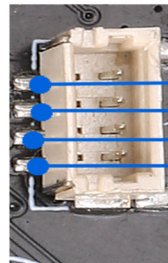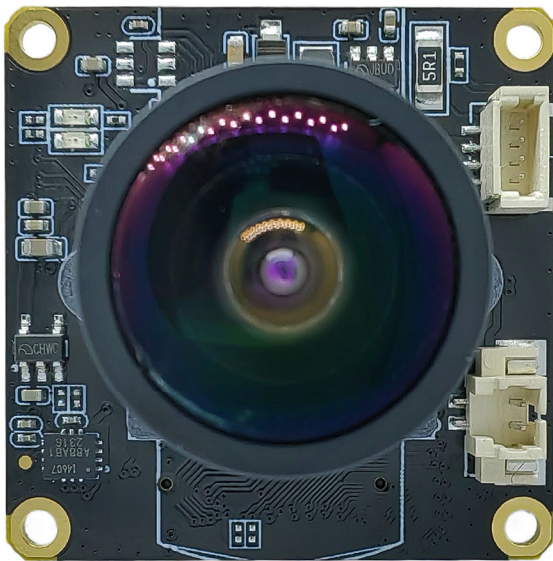


LED B -
LED B +
LED A -
LED A +

IR-CUT -
IR-CUT +

Special Note:

The two sets of fill light interfaces support the expansion of infrared light and white light boards to provide fill light for the device. If you need the fill light function, you need to add the KLT-LEDP V2.0 White and Infrared Light LED Plate.

When used with the IR cut filter lens, the infrared light can be switched automatically or manually, making videos and photos clearer at night.
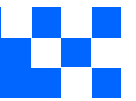
## KLT-CMFL6007-IMX577 V1.0
## 112.3MP Sony IMX577 Fixed Focus Camera Module

通过板对板连接器连接G1主板
支持Sensor、IR-CUT、LED等
Connect Sensor、IR-CUT、LED etc.

**SONY**
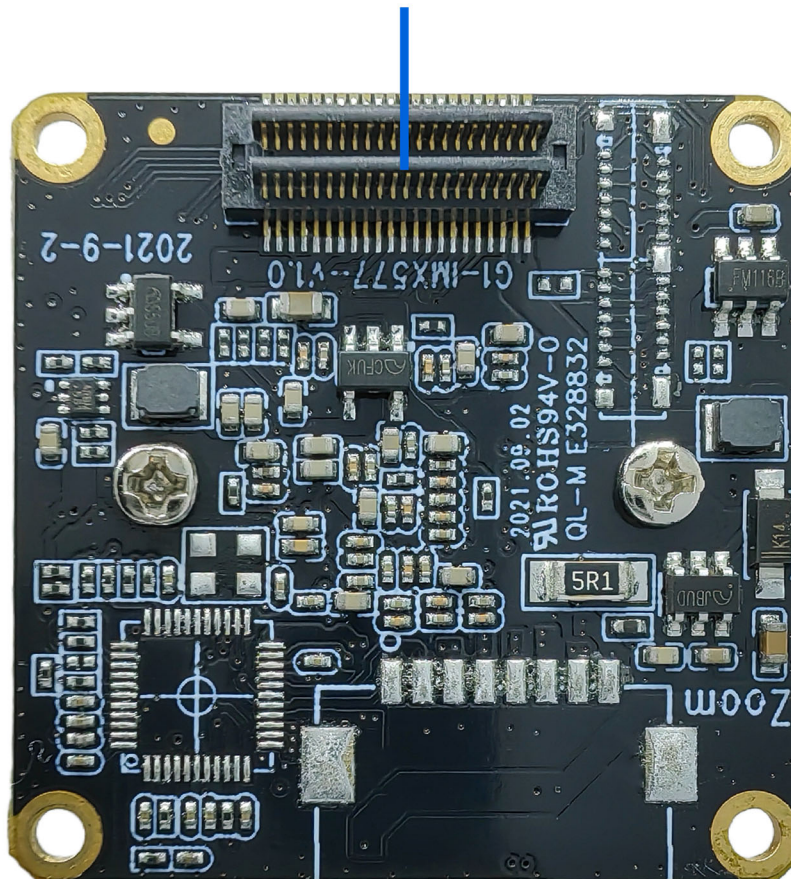
# [Product Information]

Ver.1.0

# IMX577-AACK

Diagonal 7.857 mm (Type 1/2.3) 12.3 Mega-Pixel CMOS Image Sensor with Square Pixel for Color Cameras

## Description

The IMX577-AACK is a diagonal 7.857 mm (Type 1/2.3) 12.3 Mega-pixel CMOS active pixel type stacked image sensor with a square pixel array. It adopts Sony's Stacked CMOS Image Sensor technology to achieve high speed image capturing by column parallel A/D converter circuits and high sensitivity and low noise image (comparing with conventional CMOS image sensor) through the backside illuminated imaging pixel structure. R, G, and B pigment primary color mosaic filter is employed. It equips an electronic shutter with variable integration time. It operates with three power supply voltages: analog 2.8 V, digital 1.05 V and 1.8 V for input/output interface and achieves low power consumption.

In addition, this product is designed for use in consumer use camcorder. When using this for another application, Sony Semiconductor Solutions Corporation does not guarantee the quality and reliability of product. Therefore, don't use this for applications other than consumer use camcorder.

In addition, individual specification change cannot be supported because this is a standard product.

Consult your Sony Semiconductor Solutions Corporation sales representative if you have any questions.

## Features

◆ Back-illuminated and stacked CMOS image sensor
◆ Digital Overlap High Dynamic Range (DOL-HDR) mode with raw data output.
◆ High signal to noise ratio (SNR).
◆ Full resolution @60 frame/s (Normal), 4K2K @60 frame/s (Normal), 1080p @240 frame/s
  Full resolution @40 frame/s (12 bit Normal), Full resolution @30 frame/s (DOL-HDR, 2 frame)
◆ Output video format of RAW12/10/8, COMP8.
◆ Power Save Mode with MIPI ULPS operation
◆ Pixel binning readout and V sub-sampling function.
◆ Independent flipping and mirroring.
◆ Input clock frequency 6 to 27 MHz
◆ CSI-2 serial data output (MIPI 2lane/4lane, Max. 2.1 Gbps/lane, D-PHY spec. ver. 1.2 compliant)
◆ 2-wire serial communication.
◆ Two PLLs for independent clock generation for pixel control and data output interface.
◆ Defect Pixel Correction (DPC)
◆ Ambient Light Sensor (ALS)
◆ Fast mode transition. (on the fly)
◆ Dual sensor synchronization operation (Multi camera compatible)
◆ 7 k bit of OTP ROM for users.
◆ Built-in temperature sensor
◆ 10-bit/12-bit A/D conversion on chip
◆ Horizontal Low Power Analog Cropping
◆ Window Scanning mode
◆ 92-pin high-precision ceramic package

Sony reserves the right to change products and specifications without prior notice.
Sony logo is a registered trademark of Sony Corporation.

## Device Structure

◆ CMOS image sensor
◆ Image size                          Diagonal 7.857 mm (Type 1/2.3)
◆ Total number of pixels            4072 (H) × 3176 (V) approx. 12.93 M pixels
◆ Number of effective pixels        4072 (H) × 3064 (V) approx. 12.47 M pixels
◆ Number of active pixels           4056 (H) × 3040 (V) approx. 12.33 M pixels
◆ Chip size                          7.564 mm (H) × 5.476 mm (V)
◆ Unit cell size                     1.55 µm (H) × 1.55 µm (V)
◆ Package                            92 pin LGA

## Image Sensor Characteristics

(Tj = 60 °C)

| Item | | Value | Remarks |
|---|---|---|---|
| Sensitivity (F2.8) | Min. | 250 LSB | 1/120 s integration |
| Saturation signal | Min. | 1023 LSB | |

## Basic Drive Mode

| Drive mode | Number of active pixels | Maximum frame rate [frame/s] | Output interface | ADC [bit] |
|---|---|---|---|---|
| Full (4:3) (Normal) | 4056 (H) × 3040 (V) approx. 12.33 M pixels | 60 | CSI-2 | 10 |
| | | 43 | CSI-2 | 12 |
| Full (4:3) (DOL-HDR) | 4056 (H) × 3040 (V) approx. 12.33 M pixels | DOL 2 frame : 30 DOL 3 frame : 15 | CSI-2 | 10 |
| Full (16:9) 4K2K (Normal) | 4056 (H) × 2288 (V) approx. 9.28 M pixels | 79 | CSI-2 | 10 |
| Full (16:9) 4K2K (DOL-HDR) | 4056 (H) × 2288 (V) approx. 9.28 M pixels | DOL 2 frame : 39 DOL 3 frame : 19 | CSI-2 | 10 |
| Full (4:3) Binning (Normal) | 2028 (H) × 1520 (V) approx. 3.08 M pixels | 178 | CSI-2 | 10 |
| Full (16:9) Binning 1080P (Normal) | 2028 (H) × 1112 (V) approx. 2.26 M pixels | 241 | CSI-2 | 10 |
| Full (16:9) Binning 720P (Normal) | 1352 (H) × 740 (V) approx. 1.00 M pixels | 241 | CSI-2 | 10 |
| Full (16:9) Scaling 1080P (Normal) | 2028 (H) × 1144 (V) approx. 2.32 M pixels | 79 | CSI-2 | 10 |
| Full (16:9) Scaling 720P (Normal) | 1352 (H) × 762 (V) approx. 1.03 M pixels | 79 | CSI-2 | 10 |

KLT

**Cameras Applications**
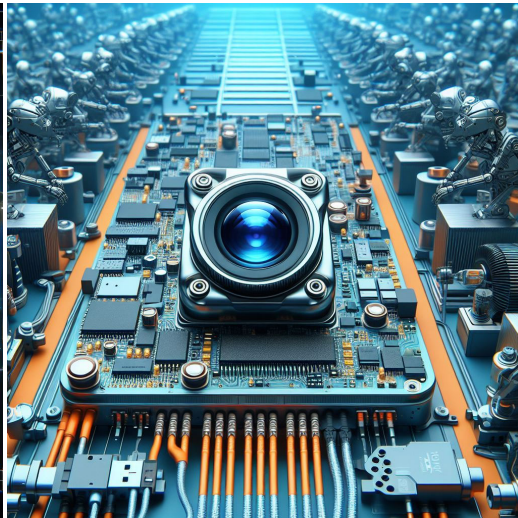
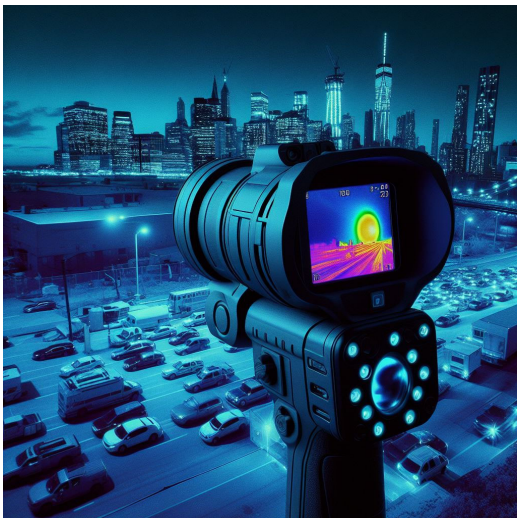

Automotive Driver Pilot

Live Streaming

Video Conference

Eye Tracker Biometric Detection

Machine Vision

Agricultural Monitor

Night Vision Security
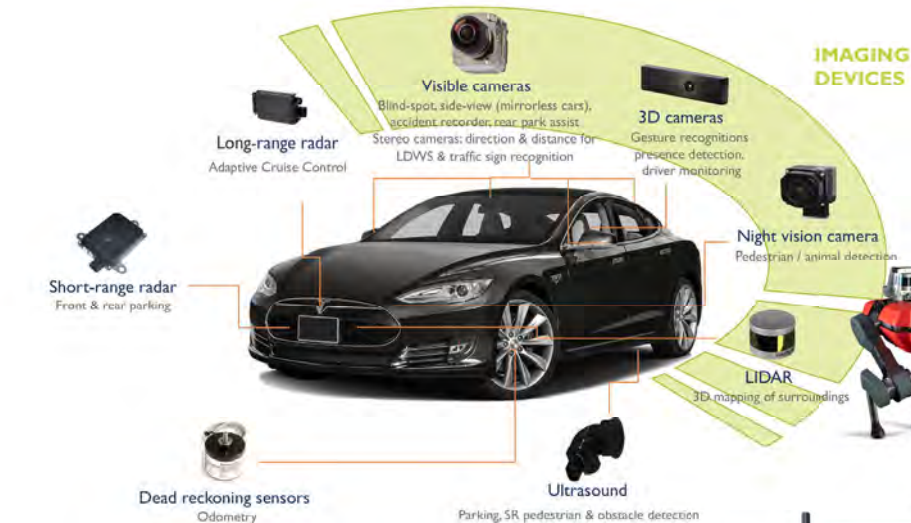
Drone and Sports Eagle Eyes
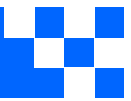
Interactive Pet Camera

**www.KaiLapTech.com   sales@KaiLapTech.com   Tel: (852) 6908 1256   Fax: (852) 3017 6778**

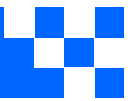*your BEST camera module partner*

**Cameras Applications**

**Camera Module Pinout Definition Reference Chart**

| OmniVision  Sony  Samsung  On-Semi  Aptina  Himax  GalaxyCore  PixArt  SmartSens  Sensors | |
|---|---|
| **Pin Signal** | **Description** |
| DGND  GND | ground for digital circuit |
| AGND | ground for analog circuit |
| PCLK  DCK | DVP PCLK output |
| XCLR  PWDN  XSHUTDOWN  STANDBY | power down active high with internal pull-down resistor |
| MCLK  XVCLK  XCLK  INCK | system input clock |
| RESET  RST | reset  active low with internal pull-up resistor |
| NC  NULL | no connect |
| SDA  SIO_D  SIOD | SCCB data |
| SCL  SIO_C  SIOC | SCCB input clock |
| VSYNC  XVS  FSYNC | DVP VSYNC output |
| HREF  XHS | DVP HREF output |
| DOVDD | power for I/O circuit |
| AFVDD | power for VCM circuit |
| AVDD | power for analog circuit |
| DVDD | power for digital circuit |
| STROBE  FSTROBE | strobe output |
| FSIN | synchronize the VSYNC signal from the other sensor |
| SID | SCCB last bit ID input |
| ILPWM | mechanical shutter output indicator |
| FREX | frame exposure / mechanical shutter |
| GPIO | general purpose inputs |
| SLASEL | I2C slave address select |
| AFEN | CEN  chip enable  active high on VCM driver IC |
| **MIPI Interface** | |
| MDN0  DN0  MD0N  DATA_N  DMO1N | MIPI 1st data lane negative output |
| MDP0  DP0  MD0P  DATA_P  DMO1P | MIPI 1st data lane positive output |
| MDN1  DN1  MD1N  DATA2_N  DMO2N | MIPI 2nd data lane negative output |
| MDP1  DP1  MD1P  DATA2_P  DMO2P | MIPI 2nd data lane positive output |
| MDN2  DN2  MD2N  DATA3_N  DMO3N | MIPI 3rd data lane negative output |
| MDP2  DP2  MD2P  DATA3_P  DMO3P | MIPI 3rd data lane positive output |
| MDN3  DN3  MD3N  DATA4_N  DMO4N | MIPI 4th data lane negative output |
| MDP3  DP3  MD3P  DATA4_P  DMO4P | MIPI 4th data lane positive output |
| MCN  CLKN  CLK_N  DCKN | MIPI clock negative output |
| MCP  CLKP  MCP  CLK_P  DCKN | MIPI clock positive output |
| **DVP Parallel Interface** | |
| D0  DO0  Y0 | DVP data output port 0 |
| D1  DO1  Y1 | DVP data output port 1 |
| D2  DO2  Y2 | DVP data output port 2 |
| D3  DO3  Y3 | DVP data output port 3 |
| D4  DO4  Y4 | DVP data output port 4 |
| D5  DO5  Y5 | DVP data output port 5 |
| D6  DO6  Y6 | DVP data output port 6 |
| D7  DO7  Y7 | DVP data output port 7 |
| D8  DO8  Y8 | DVP data output port 8 |
| D9  DO9  Y9 | DVP data output port 9 |
| D10  DO10  Y10 | DVP data output port 10 |
| D11  DO11  Y11 | DVP data output port 11 |

**Camera Reliability Test**

| Reliability Inspection Item | | Testing Method | Acceptance Criteria |
|---|---|---|---|
| **Category** | **Item** | | |
| **Environmental** Storage Temperature | High 60°C 96 Hours | Temperature Chamber | No Abnormal Situation |
| | Low -20°C 96 Hours | Temperature Chamber | No Abnormal Situation |
| Operation Temperature | High 60°C 24 Hours | Temperature Chamber | No Abnormal Situation |
| | Low -20°C 24 Hours | Temperature Chamber | No Abnormal Situation |
| Humidity | 60°C 80% 24 Hours | Temperature Chamber | No Abnormal Situation |
| Thermal Shock | High 60°C 0.5 Hours Low -20°C 0.5 Hours Cycling in 24 Hours | Temperature Chamber | No Abnormal Situation |
| **Physical** Drop Test (Free Falling) | Without Package 60cm | 10 Times on Wood Floor | Electrically Functional |
| | With Package 60cm | 10 Times on Wood Floor | Electrically Functional |
| Vibration Test | 50Hz X-Axis 2mm 30min | Vibration Table | Electrically Functional |
| | 50Hz Y-Axis 2mm 30min | Vibration Table | Electrically Functional |
| | 50Hz Z-Axis 2mm 30min | Vibration Table | Electrically Functional |
| Cable Tensile Strength Test | Loading Weight 4 kg 60 Seconds Cycling in 24 Hours | Tensile Testing Machine | Electrically Functional |
| **Electrical** ESD Test | Contact Discharge 2 KV | ESD Testing Machine | Electrically Functional |
| | Air Discharge 4 KV | ESD Testing Machine | Electrically Functional |
| Aging Test | On/Off 30 Seconds Cycling in 24 Hours | Power Switch | Electrically Functional |
| USB Connector | On/Off 250 Times | Plug and Unplug | Electrically Functional |

# CMOS CAMERA MODULES

**Camera Inspection Standard**

| Inspection Item | | | Inspection Method | Standard of Inspection |
|---|---|---|---|---|
| Category | | Item | | |
| Appearance | FPC/ PCB | Color | The Naked Eye | Major Difference is Not Allowed. |
| | | Be Torn/Chopped | The Naked Eye | Copper Crack Exposure is Not Allowed. |
| | | Marking | The Naked Eye | Clear, Recognizable (Within 30cm Distance) |
| | Holder | Scratches | The Naked Eye | The Inside Crack Exposure is Not Allowed |
| | | Gap | The Naked Eye | Meet the Height Standard |
| | | Screw | The Naked Eye | Make Sure Screws Are Presented (If Any) |
| | | Damage | The Naked Eye | The Inside Crack Exposure is Not Allowed |
| | Lens | Scratch | The Naked Eye | No Effect On Resolution Standard |
| | | Contamination | The Naked Eye | No Effect On Resolution Standard |
| | | Oil Film | The Naked Eye | No Effect On Resolution Standard |
| | | Cover Tape | The Naked Eye | No Issue On Appearance. |
| Function | Image | No Communication | Test Board | Not Allowed |
| | | Bright Pixel | Black Board | Not Allowed In the Image Center |
| | | Dark Pixel | White board | Not Allowed In the Image Center |
| | | Blurry | The Naked Eye | Not Allowed |
| | | No Image | The Naked Eye | Not Allowed |
| | | Vertical Line | The Naked Eye | Not Allowed |
| | | Horizontal Line | The Naked Eye | Not Allowed |
| | | Light Leakage | The Naked Eye | Not Allowed |
| | | Blinking Image | The Naked Eye | Not Allowed |
| | | Bruise | Inspection Jig | Not Allowed |
| | | Resolution | Chart | Follows Outgoing Inspection Chart Standard |
| | | Color | The Naked Eye | No Issue |
| | | Noise | The Naked Eye | Not Allowed |
| | | Corner Dark | The Naked Eye | Less Than 100px By 100px |
| | | Color Resolution | The Naked Eye | No Issue |
| Dimension | | Height | The Naked Eye | Follows Approval Data Sheet |
| | | Width | The Naked Eye | Follows Approval Data Sheet |
| | | Length | The Naked Eye | Follows Approval Data Sheet |
| | | Overall | The Naked Eye | Follows Approval Data Sheet |

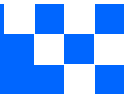## KLT Package Solutions

KLT Camera Module
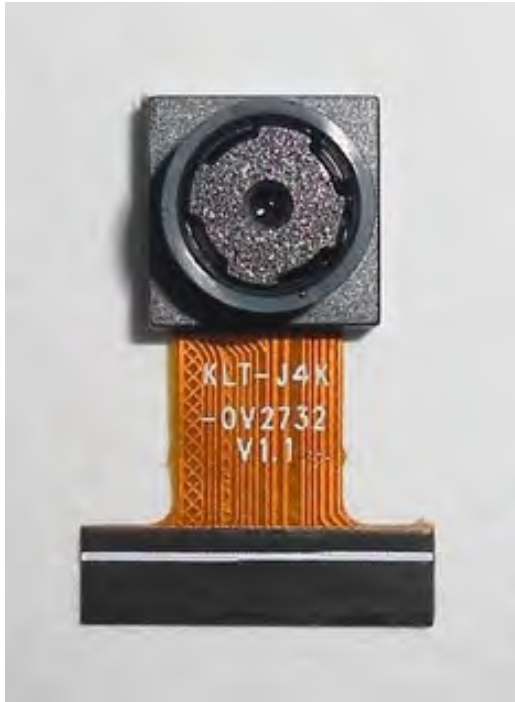


Complete with Lens Protection Film



Tray with Grid and Space



Place Cameras on the Tray

*your BEST camera module partner*
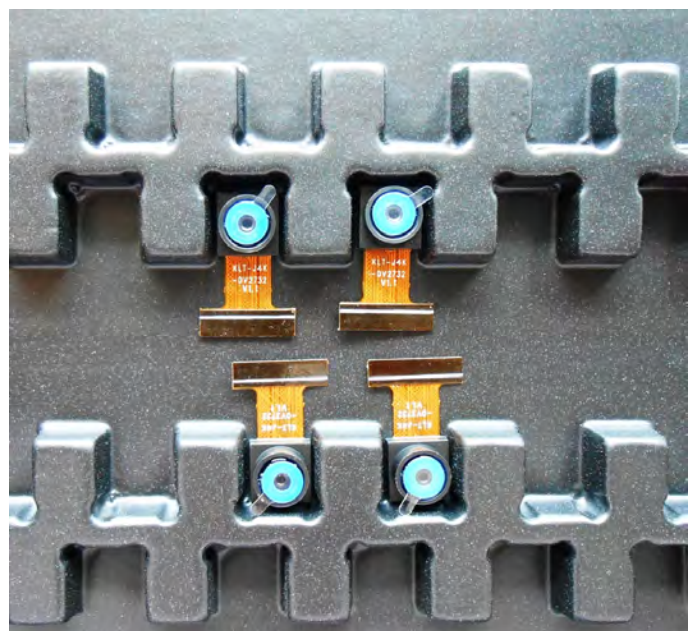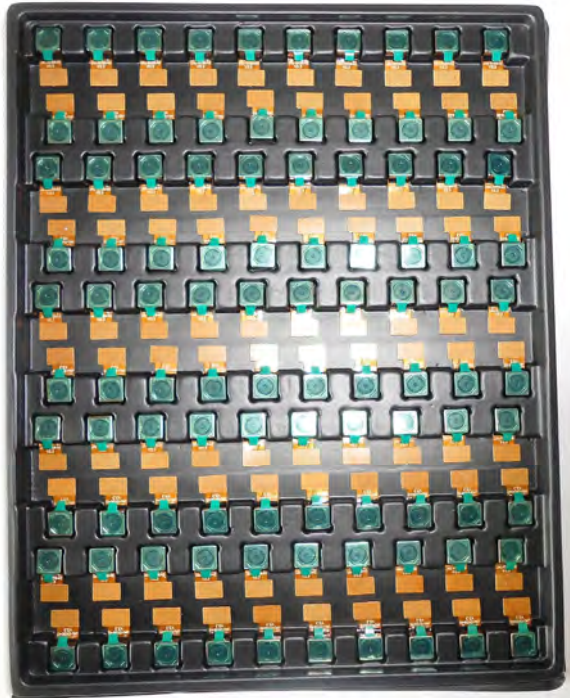
## Camera Modules Package Solution

Full Tray of Cameras



Cover Tray with Lid



Put Tray into Anti-Static Bag



Vacuum the Anti-Static Bag



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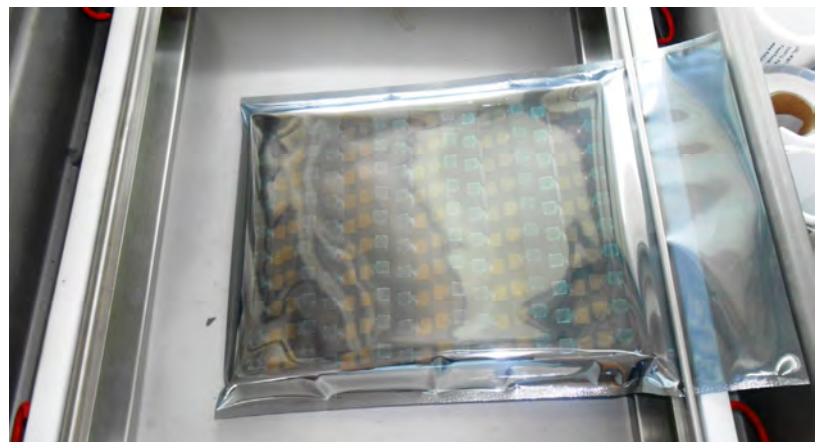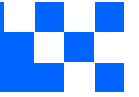
# Camera Modules Package Solution

## Sealed Vacuum Bag with Labels
### 1. Model and Description  2. Quantity  3. Shipping Date  4. Caution



KLT-J4K-OV2732 V1.1
OV2732, MIPI & Parallel
Fixed Focus, 67.4 Degree
www.KaiLapTech.com

100
PIECES

Shipping Date
10  August  2017

CAUTION
STATIC SENSITIVE DEVICES
NOT TO BE HANDLED
BY UNAUTHORISED
PERSONNEL

# Large Order Package Solution

Place Foam Sheets Between Trays

Foam Sheets are Slightly Larger than Trays

Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting Box

## Small Order Package Solution

Place Foam Sheets and Trays into Small Box

Foam Sheets are Nicely Fitting the Small Box

Package in Small Box for Shipment

Place Small Boxes into Larger Box

# CMOS CAMERA MODULES

## Carbon Box Package Solution

Seal the Carbon Box                    Final Package Labelled Box





**Carbon Box Ready for Shipment**
**1. Delivery Address and Phone No. 2. Box No. and Ship Date  3. Fragile Caution**



Please deliver to:

**Kai Lap Technologies Group Ltd.**

Kai Lap Technologies Group Ltd.
64-66A Sha Tsui Road, Tsuen Wan
HONG KONG

Attn: Sharon Chan
Phone: + 852 6908 1256

**KLT** KLT Camera Modules
www.KaiLapTech.com

PKG:

# 1 of 1

10 August 2017
MADE IN CHINA

**KLT** KLT Camera Modules
www.KaiLapTech.com

**fragile**
HANDLE WITH CARE

**www.KaiLapTech.com   sales@KaiLapTech.com   Tel: (852) 6908 1256   Fax: (852) 3017 6778**

# Sample Order Package Solution

Place Sample into Small Anti-Static Bag          Place Connectors into Small Ant-Static Bag

## Sample Labels on the Small Bag
## 1. Camera Module or Connector Model 2. Shipping Date and Quantity 3. Caution

KLT-J4K-OV2732 V1.1
OV2732, MIPI & Parallel
Fixed Focus, 67.4 Degree
www.KaiLapTech.com

Shipping Date
10 August 2017

CAUTION
STATIC SENSITIVE
DEVICES
NOT TO BE HANDLED
BY UNAUTHORISED
PERSONNEL

FH12-24S-0.5SH
Mating Connector for
KLT-J4K-OV2732 V1.0
www.KaiLapTech.com

10
PIECES

CAUTION
STATIC SENSITIVE
DEVICES
NOT TO BE HANDLED
BY UNAUTHORISED
PERSONNEL

# Connectors Large Order Package Solution

### Connectors in a Wheel



### Label Connectors in the Wheel



### The Wheel is Perfectly Fitting the Box



### Connectors Box Ready for Shipment

**Company Kai Lap Technologies (KLT)**

Kai Lap Technologies Group Limited. (KLT) was established in 2009, a next-generation technology driven manufacturer specialized in research, design, and produce of audio and video products. KLT is occupying 20,000 square feet automated plants with 100 employees of annual throughput 30,000,000 units cameras.

KLT provides OEM, ODM design, contract manufacturing, and builds the camera products. You may provide the requirements to us, even with a hand draft, our sales and engineering work together to meet your needs. We consider ourselves your last-term partner in developing practical and innovative solutions.

Our team covers everything from initial concept development to mass produced product. KLT specializes in customized camera design, raw material, electronic engineering, firmware/software development, product testing, and packing design. Our experienced strategic supply systems offer a robust and dependable manufacturing capacity for orders of various sizes.
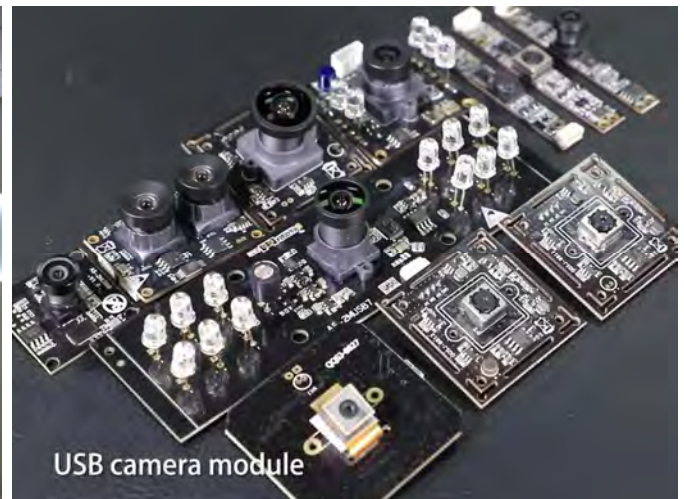
**Limited Warranty**

KLT provides the following limited warranty if you purchased the Product(s) directly from KLT company or from KLT's website, www.KaiLapTech.com. Product(s) purchased from other sellers or sources are not covered by this Limited Warranty. KLT guarantees that the Product(s) will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date you receive the product ("Warranty Period").

For all Product(s) that contain or develop material defects in materials or workmanship during the Warranty Period, KLT will, at its sole option, either: (i) repair the Product(s); (ii) replace the Product(s) with a new or refurbished Product(s) (replacement Product(s) being of identical model or functional equivalent); or (iii) provide you a refund of the price you paid for the Product(s).

This Limited Warranty of KLT is solely limited to repair and/or replacement on the terms set forth above. KLT is not reliable or responsible for any subsequential events.

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**KLT Strength**

Powerful Factory



Professional Service



Promised Delivery