MI0801 Camera Module Evaluation Kit Product Brief

MERIDIAN Innovation

High-Definition, Cost-Effective and Compact Development System for Thermal Imaging Camera
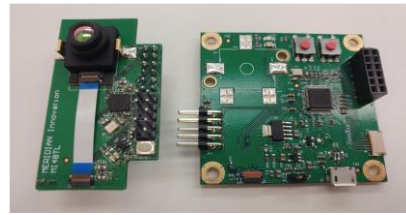
Powered by SenXor™, Meridian Innovation's patented innovative CMOS hybrid architecture, the MI0801 Camera Module Evaluation Kit (EVK) is a complete thermal array camera system from Meridian Innovation. The EVK consists of a MI0801 Camera Module together with the MI48A0 Thermal Image Processor Board mounted onto an External Interface Processor Board. The EVK is designed as an evaluation platform and connects via USB to the customer development PC. Other form factors and interfaces can be made available, to cater for specific applications.

Features	
Resolution	80 (H) x 62 (V)
IR Wavelength	8 - 14µm (Thermal LWIR)
Temperature accuracy	up to +/-1°C
Interface	USB
Data capture from standby	less than TBD ms
MI48A0 Thermal Image Processor Processing	Non-uniformity, Environmental temperature, Voltage correction Performs temporal and/or spatial filtering of thermal data
Power Consumption	Less than TBD mW
Real time calibration operation	Shutter-less, factory pre-calibrated
ITAR compliance	No control and export at 30Hz

| Applications	
Appliances	Fridge
	Microwave
	HVAC
Automation	Occupancy, people counting - Lighting control
	Electrical faults
	Fire door control, security and safety camera
Industrial	Thermal measurement devices
Security	Surveillance
	Fire Safety
	Baby monitor
Automotive	Autonomous driving
	Compartment occupancy
Medical	Thermography

System Overview

The MI0801 Camera Module has a completely digital interface and no shutter. The patented fabrication and VLWP packaging ensure low cost of ownership, enabling many new applications to exploit LWIR sensors.

It can be difficult to ascertain the "real world" performance of a thermal sensor from its device characteristics. So Meridian Innovation feels it is important to set the correct user expectation. Our devices are designed to be able to measure temperature of a black body to accuracy of +/-TBD or with a maximum deviation amongst detectors of less than TBD%.

The MI0801 Camera Module is conveniently clipped to the MI48A0 Thermal Image Processor board; It may be unclipped and remote mounted if required. Meridian Innovation developed the MI48A0 Thermal Image Processor Integrated Chip to greatly simplify system integration. Each module is factory calibrated, the MI48A0 Thermal Image Processor performs all the low-level computations and signal timing required to process the raw data from the MI0801 Camera Module, thus removing this burden from any external processors. This results in a very clean and streamline interface that is simple to implement and easy to understand and maintain, there is no need for the integrator to become an expert in thermal image processing.

The MI48A0 Thermal Image Processor Board is connected to the External Interface Processor board, which runs the user application. The code, as shipped, allows analysis of the system performance so that the customer engineering team can perform initial stage - fit for purpose evaluation. The interface between these boards is via a 12 pin 2.54mm pitch connector – P1. The output of the External Interface Processor board is via USB, allowing the resultant thermal image data to be displayed using a development PC. The EVK is powered from the USB, although an external 5V supply may also be utilised if required.

Typical Camera Module Evaluation Kit configuration

MI0801 Camera Module

MI48A0 Thermal Image Processor Board

External Interface Processor Board

USB 2.0 To PC
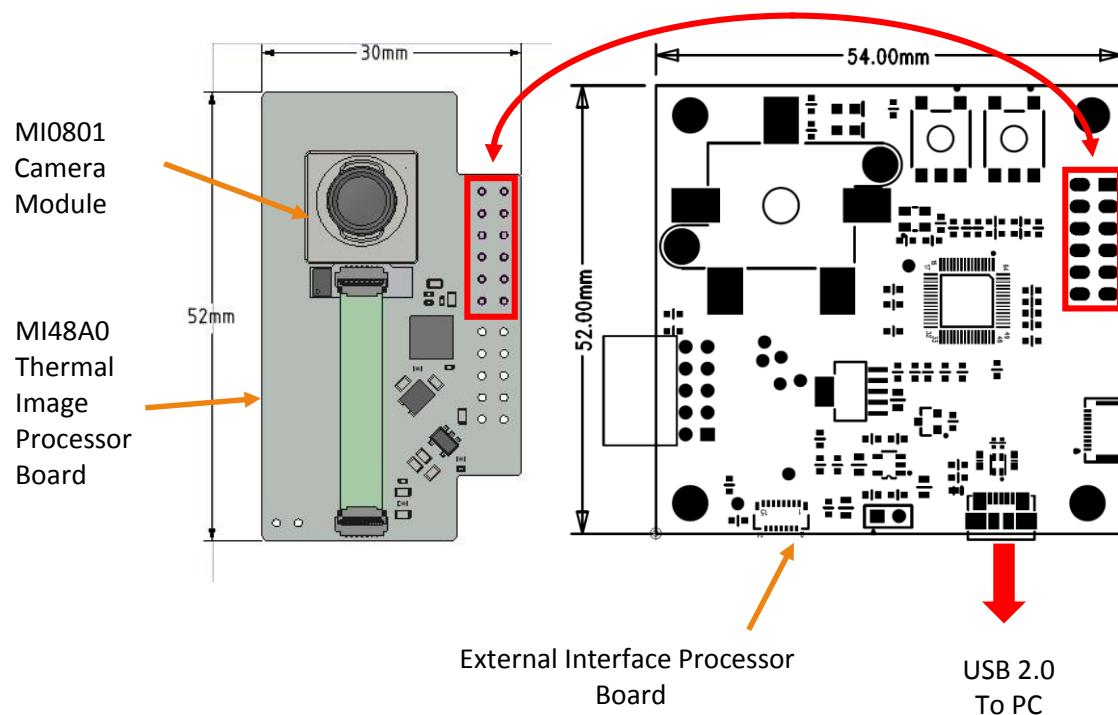
Key Specification

Detector	MI0801 Camera Module	Thermal LWIR
	IR Wavelength	8 - 14µm
	Array size	80 (H) x 62 (V)
	Detector pitch	45µm (H) x 45µm (V)
	Maximum frame rate	30 FPS
	Max scene temperature range*	-40°C to 1000°C
	NETD *(Ge Lens)	TBD
	Number of dead detectors	1%
	Accuracy*	TBD
Environmental	Operating temperature	-20 - 85°C
	Storage temperature	-40 - 85°C
	Altitude (pressure)	TBD kpa
	Relative Humidity	TBD %
	Shock	TBD
Interface	Power supply	5V
	Power Consumption*	200mW (Camera Module & MI48A0 Thermal Image Processor)
	Host interface	USB 2.0
Mechanical	Evaluation Kit size	54mm x 52mm x TBDmm
	Evaluation Kit weight	TBD g

*Note: Number to be confirmed.

Software

There are 2 software packages supplied. The first is the Meridian Innovation analysis software which comes pre-loaded onto the External Interface Processor board, the second is the EVK graphical User Interface (GUI) code that runs on the customer's development PC. This EVK allows customer to not only evaluate the MI0801 Camera Module/MI48A0 Thermal Image Processor with the supplied software, it also allows the customer to develop additional interface and application code, allowing them to fully test any proposed design before porting it to the final embedded host.

MI48A0 Thermal Image Processor functionality

The MI48A0 Thermal Image Processor performs several low-level processing functions on data from the MI0801 Camera Module: The processing functions available are:

❑ Device setup/monitoring and error reporting
❑ Device temperature compensation
❑ Device voltage compensation
❑ Non-uniform correction of the thermal image
❑ Dead detector correction
❑ Temporal filtering
❑ Frame rate control

The MI48A0 Thermal Image Processor has the following interfaces for the External Interface Processor (host processor) to control and read out an image.

I^2C - **Control interface**: Reads/writes the Control status registers inside the MI48A0 Thermal Image Processor. It can be used to start and stop frame capture, processing setting and calibration information. Two alternative I^2C addresses are supported, allowing 2 MI48A0 Thermal Image Processors to be controlled by a single host. The selection is configured by the ADDR pin.
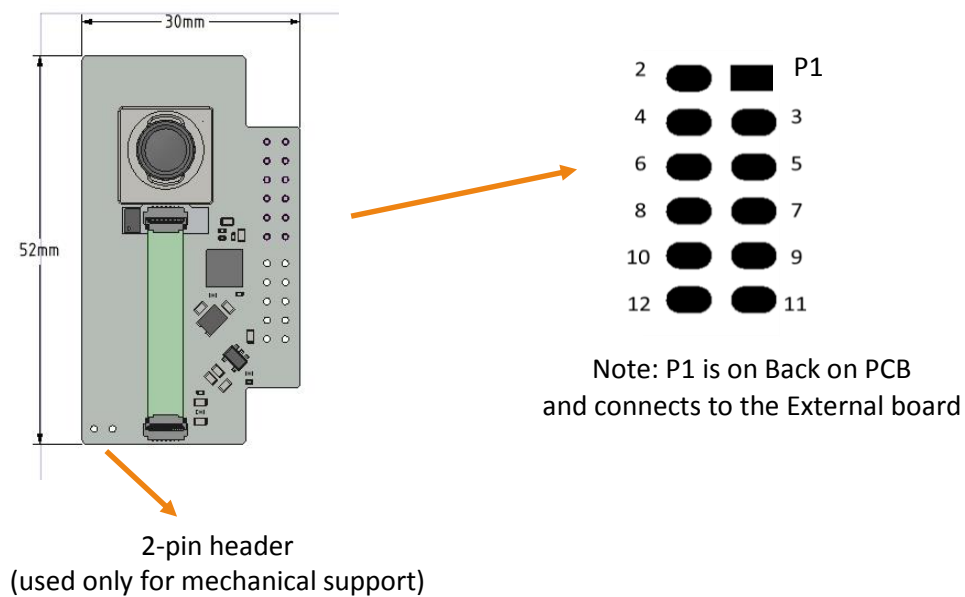
SPI - Frame interface: Used for continuous flow of the corrected thermal image data and real time information. This interface has a DATA_READY signal which is used as an interrupt to the EVK board (host processor).

MI48A0 Thermal Image Processor board – interface to External board

Group	Signal	Description	Pin
Power	5V	+5V supply	10
	GROUND	Ground	9
SPI	SPI_MISO	SPI – Master In Slave Out	4
	SPI_MOSI	SPI - Master Out Slave In	3
	SPI_CLK	SPI - Clock	2
	SPI_SS	SPI – Slave Select	1
I2C	SCK	I2C Clock	6
	SDA	I2C Data	7
Control	nRESET	Active low reset	12
	DATA_READY	Active high signal indicating new data is ready on SPI	5
	ADDR	Select I2C address	11

NOTES:
- The SPI and I2C interfaces on the MI48A0 Thermal Image Processor are both slave devices.
- nRESET is not routed on the current MI48A0 Thermal Image Processor board design
- A 2-pin header is also used for mechanical stability (no electrical connection)


Note: P1 is on Back on PCB
and connects to the External board

2-pin header
(used only for mechanical support)

Graphical User Interface (GUI)

The GUI allows the user to:

- ❑ Setup the mode required for the camera module (for example low power)
- ❑ Configure:
  - • Frame rate setting
  - • AGC setting
  - • Temporal filtering setting
  - • Spatial filtering setting
  - • Temperature Visualization
- ❑ In addition, the GUI reports Firmware version and allows display of live thermal image (colorized) and status/error information

Typical GUI screen
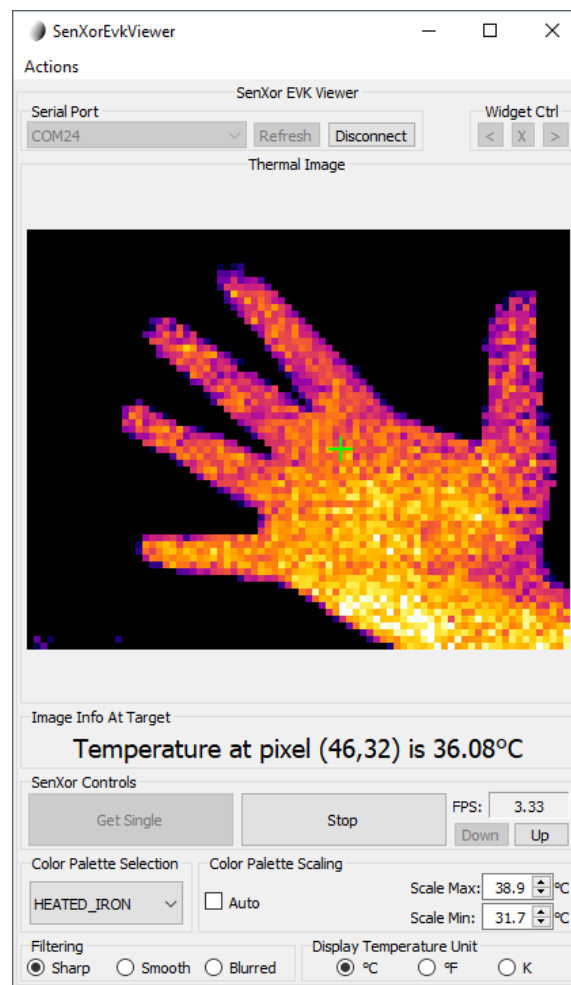
Ordering information

The EVK is currently available in engineering sample. Order can be made on the Meridian Innovation official website.