OpenMV-H7 A Python programmable machine vision camera.

1 Features

- 32-Bit Arm Cortex-M7 operating at 400MHz.
- High bandwidth 1MB SRAM / 2MB FLASH.
- Double-precision Floating Point Unit (FPU).
- Full DSP instructions, hardware JPEG encoding.
- 2 UARTs, 2 I2C, 1 SPI, 1 CAN, 3 TIM/PWM.
- 1 USB full speed (FS) for programming.
- 1 RGB LED and 2 IR LEDS on board.
- 1 uSD Card socket (supports up to 64GBs).
- High efficiency switching regulator (1A out).
- Low noise LDO for sensor analog supply.
- LiPo battery connector.
- Less than 150-mA power consumption.
- Modular sensor design supports multiple sensors:
  - OV7725 640x480.
  - MT9V034 (Global Shutter Sensor).
  - FLIR 1,2 and 3 thermal imaging sensors.

2 Description

The OpenMV cameras are low-power, Python3 programmable machine vision cameras that support an extensive set of image processing functions and neural networks. OpenMV cameras are programmed using a cross-platform IDE which allows viewing the camera's frame buffer, accessing sensor controls, uploading scripts to the camera via serial over USB (or WiFi/BLE if available).
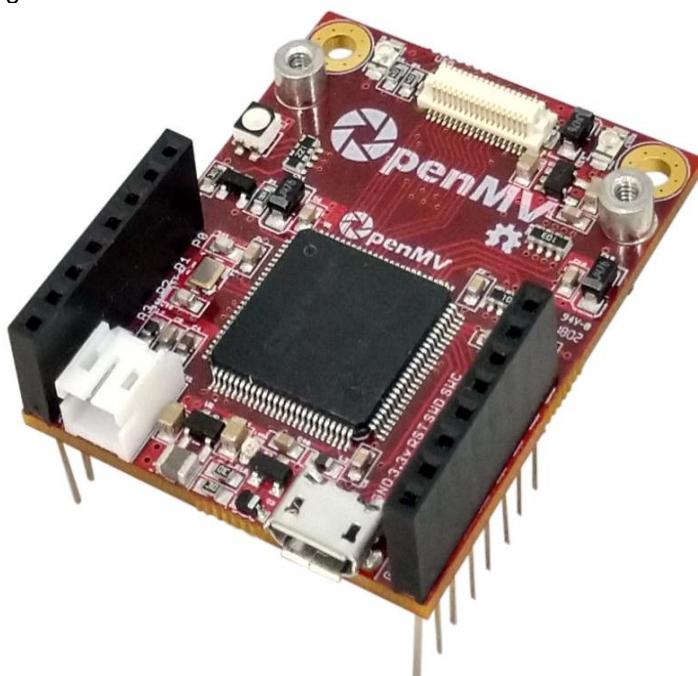
The OpenMV-H7 camera base board is based on the STM32H7 Arm Cortex-M7 MCU operating at 400MHz, and featuring 1MB SRAM, 2MB FLASH, FPU, DSP and a hardware JPEG encoder. The base board has a modular sensor design, decoupling the sensor from the camera. The modular sensor design enables the camera to support multiple sensors including OV7725, MT9V03x global shutter sensor and FLIR Lepton 1, 2 and 3 thermal sensors.

Device Information

PART NUMBER	BODY SIZE (NOM)
OPENMV-H7	1.4 in x 1.75 in

3 Applications

- Home automation.
- Robot guidance.
- Industrial Applications.
- Surveillance Applications.
- Object detection and tracking.
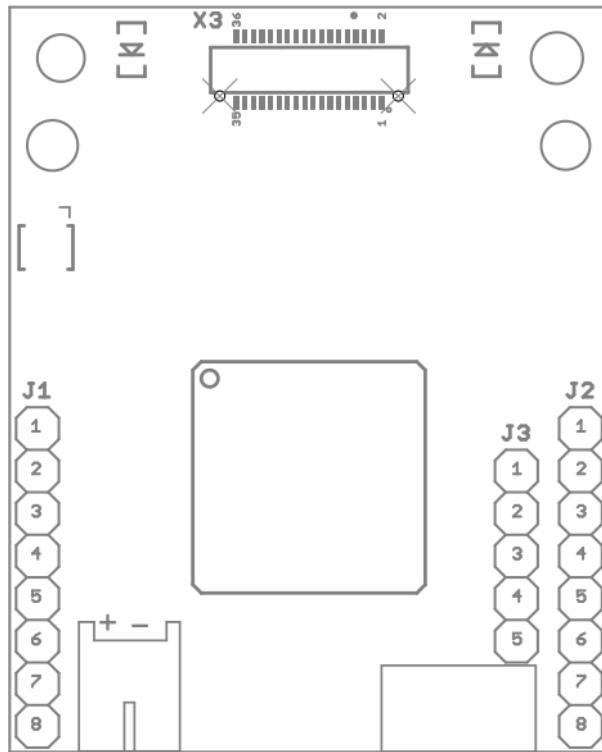
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4   Pin Configurations and Functions

Pin Functions

Pin			Description
Header	**No**	**Name**	
J1 Pin Configuration			
J1	1	P0	UART1 RX – TM1 CH3N – SPI 2 MOSI
	2	P1	UART1 TX – TM1 CH2N – SPI 2 MISO
	3	P2	CAN2 TX – TM1 CH1N – SPI 2 SCLK
	4	P3	CAN2 RX – SPI 2 SS
	5	P4	TIM2 CH3 – I2C 2 SCL – UART 3 TX
	6	P5	TIM2 CH4 – I2C 2 SDA – UART3 RX
	7	P6	TIM2 CH1 – DAC – ADC
	8	3.3	3.3V Rail (250 mA Supply MAX).
J2 Pin Configuration			
J2	1	RST	Reset (Connect to GND to reset).
	2	BOOT	Boot 0 (Connect to 3.3V for DFU mode).
	3	SYN	Frame synchronization pin (Use to frame sync cams).
	4	P9	Servo3 – TIM4 CH3
	5	P8	Servo2 – TIM4 CH2 – I2C4 SDA
	6	P7	Servo1 – TIM4 CH1 – I2C4 SCL
	7	VIN	VIN (3.6V – 5V).
	8	GND	GND Rail
J3 Pin Configuration			
J3	1	SWC	Serial wire debug clock.
	2	SWD	Serial wire debug data.
	3	RST	Reset (active low).
	4	3.3V	3.3V rail (500 mA Supply MAX)
	5	GND	GND rail

5 Electrical Characteristics

5.1 Absolute Maximum Ratings[1]

SYMBOL	RATINGS	MIN	MAX	UNIT
V_{IN}	External input supply voltage range.	3.6	5.5	V
V_{OUT}	External output supply voltage range.		3.3	
$V_{I/O}$	Input voltage range on ADC/DAC pins.	-0.3	4.0	
	Input voltage range on any other pins.	-0.3	7.3	
I_{OUT}	External output supply current range.		600	mA
$I_{I/O}$	Output current sunk by any I/O and control pin		20	
	Output current sourced by any I/O and control pin		-20	
$\Sigma I_{I/O}$	Total output current sunk by all I/Os and control pins		140	mA
	Total output current sourced by all I/Os and control pins		140	
T_J	Junction temperature.		125	°C
T_{stg}	Storage temperature.	-65	150	
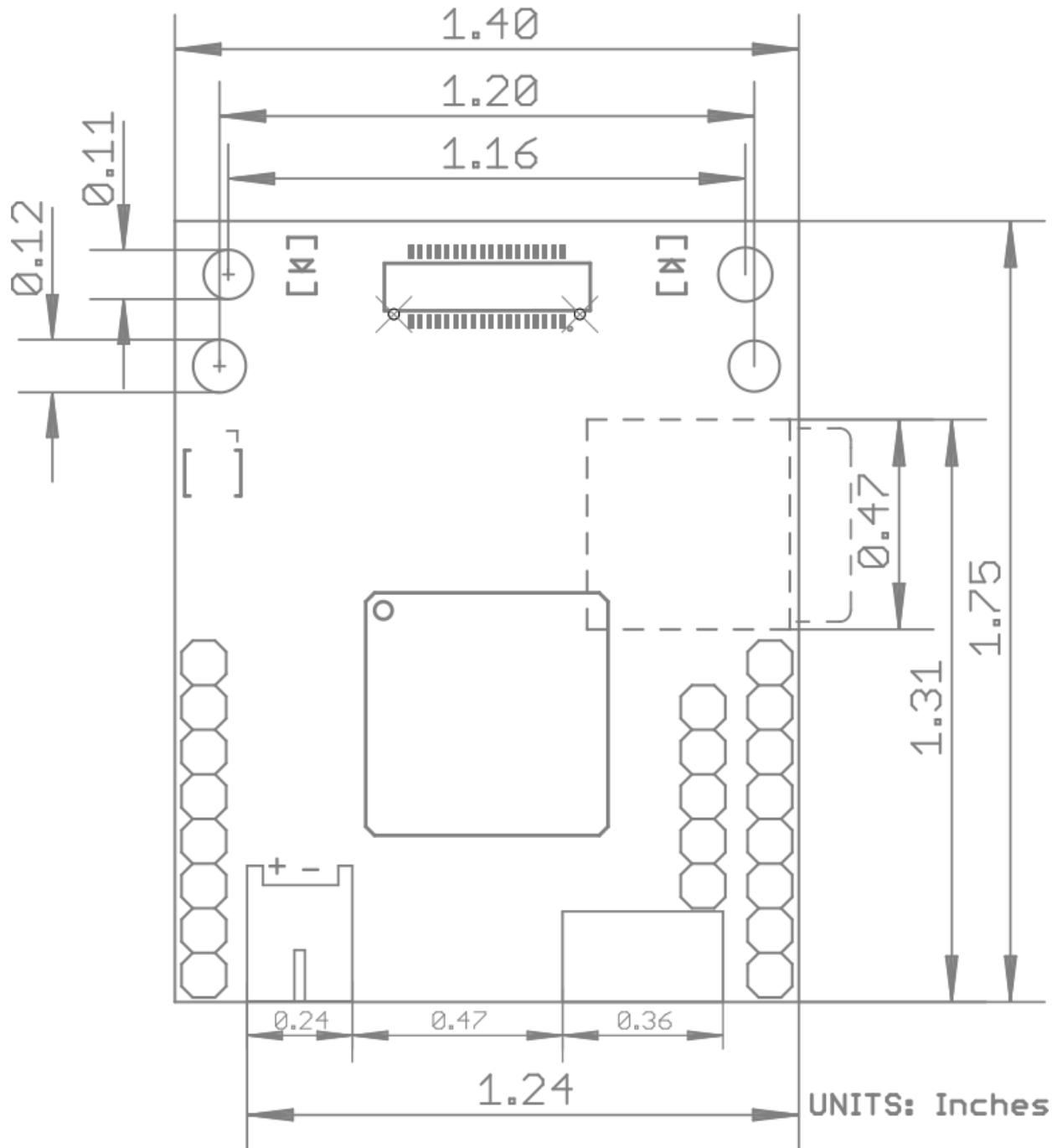
5.2 Recommended Operating Conditions

SYMBOL	RATINGS	MIN	MAX	UNIT
V_{IN}	External input supply voltage range.	3.6	5.0	V
V_{OUT}	External output supply voltage range.		3.3	
$V_{I/O}$	Input voltage range on ADC/DAC pins.	-0.3	3.6	
	Input voltage range on any other pins.	-0.3	5.0	
I_{OUT}	External output supply current range.		500	mA
T_J	Junction temperature.	-40	125	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

6   Mechanical Information

The following information is the most current data available for the designated device. This data is subject to change without notice and without revision of this document.

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