UBOT

OEM Smart Camera - Datasheet

Revision History

	Date	Document Revision	Changes
1	26 Aug 2019	Rev. V1.0	Initial version

Table of Contents

1. Introduction

1.1 Overview

UBOT is a powerful, compact machine vision smart camera. It runs on a high-speed quad-core intel processor capable of running image processing algorithm & user application. The smart camera is modular, giving customers the option to choose the features like lens, filter, lighting, image sensor, connectivity interfaces and HDMI display as per their needs. Along with camera hardware, software development framework is provided with project templates and example codes to ease application development.

1.2 Key Features

- Compact Design
- Self-contained Machine Vision Camera System
    - Quad Core processor up to 1.8 GHz
    - Inbuilt memory for application
    - Configurable lens, filter, lighting
    - Integrated strobe light control
    - High speed Isolated IOs for trigger & control
    - Gigabit Ethernet, USB/RS232
    - OpenCV library support
    - Web server for easy configuration.
    - User application in C++
- Direct technical support

1.3 Application Areas

Fruit & Nut Grading / Sorting	Bar Code / QR Code Inspection	Label / Packaging Inspection	Color Registration Control System

2. Technical Specification

	1.2 Megapixel	6 Megapixel
Image Sensor & Optics		
Resolution	1280 x 960	3072 x 2048
Pixel Size	3.75 µm	2.4 um
Shutter Type	Global Shutter	Global Reset shutter
Frame Rate @ Full Resolution	54 FPS	20 FPS
Exposure time	30 us	24 us
Sensor	Onsemi	Sony

Format	Color (10 bit)	
Optical Format	⅓ inch	1/1.8 inch
Filter	Default UV filter	
Filter Diameter	58mm	
Lens Focal Length	As per the requirement	
Lens Mount Type	C, CS mount	

Integrated Lighting

LED Color	High Brightness White LED
LED Strobe Control	24V DC, 1A (max.)

Embedded Processor and Memory

Processor	Quad-core processor up to 1.8 GHz
RAM	2/4 GB LPDDR3
Internal Storage Memory	16/32GB eMMC
Power Supply	24 VDC / 1.5A (250mA typical)
Power Consumption	Min. 3W | Avg. 6W | Max. 8W

Connectivity & Interfaces

Digital Input (1x) (Opto-isolated)	On State Current 10mA ON State Voltage 12 - 24V | 27V Max. OFF State Voltage 4V Max. Reverse Voltage Protected Min. Pulse Width 300 nSec
Digital Output (2x) (Opto-isolated)	2 x 24V / 180mA (per channel) (Source / Sink | Max. Toggle Freq 400Hz)
Gigabit Ethernet	1x (10 / 100 / 1000 Mbps)
RS232	1x (upto 115200 bps)
Other Peripherals (* Pro Version)	HDMI Full HD | USB 2.0

Application Development

Operating System (OS)	Linux
Open Source Image processing libraries	OpenCV, etc.
User Application	Eclipse IDE template project | C++ example codes for quick start
Web GUI	Display and control via web interface Template providing a framework for extension of parameters

Mechanical

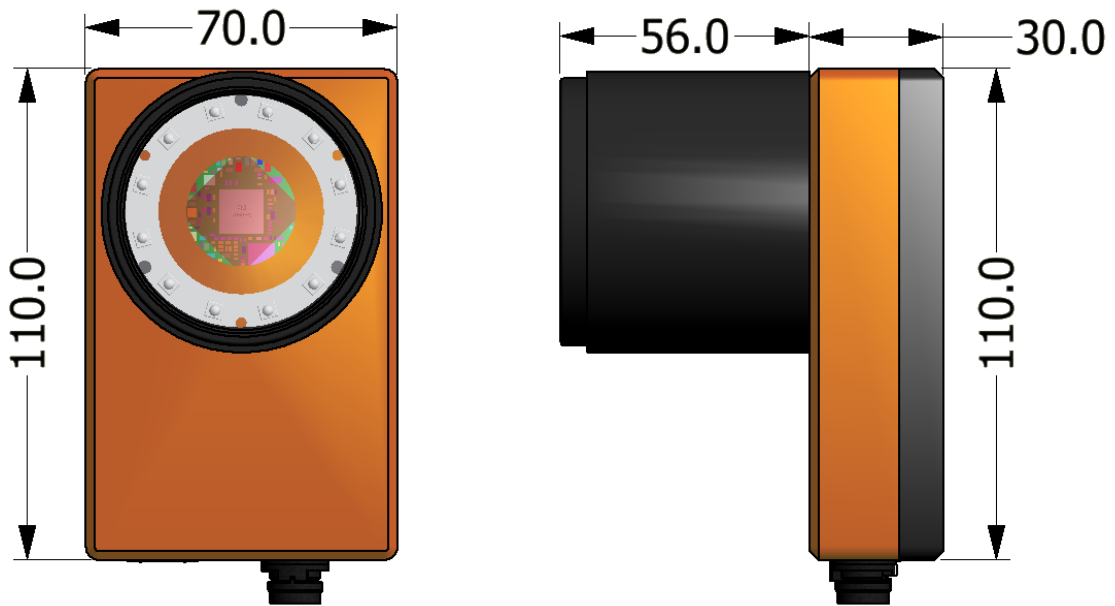| Enclosure	Rugged Industrial Design
Dimensions	110mm x 70mm x 86mm (including lens & its protection cover)

Weight	
Environment Parameters	
Temperature Range	0 - 60 Degree C

NOTE:

We can customize camera hardware, software based on the requirement like dual image sensor, high resolution image sensor, lighting, filters, etc.

3. Dimensions & Mounting

3.1 Dimensions
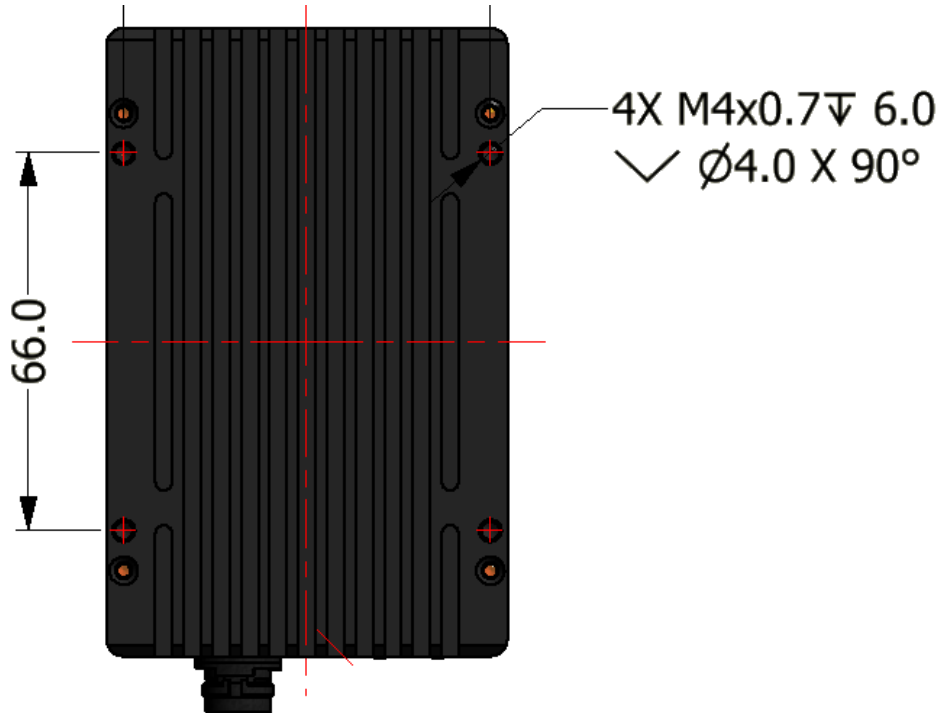

All Dimensions are in mm
Fig 1. UBOT Dimensions (mm)

3.2 Mounting

4X M4x0.7 ▼ 6.0
∨ Ø4.0 X 90°

66.0

Fig 2. UBOT Back Side Mounting(mm)

4. Cables & Connectors

4.1 Gigabit Ethernet Cable and Pinout

Gigabit Ethernet cable has circular connector (Male) at one end and a standard RJ45 jack at the other end. Standard cable length is 3 meter.
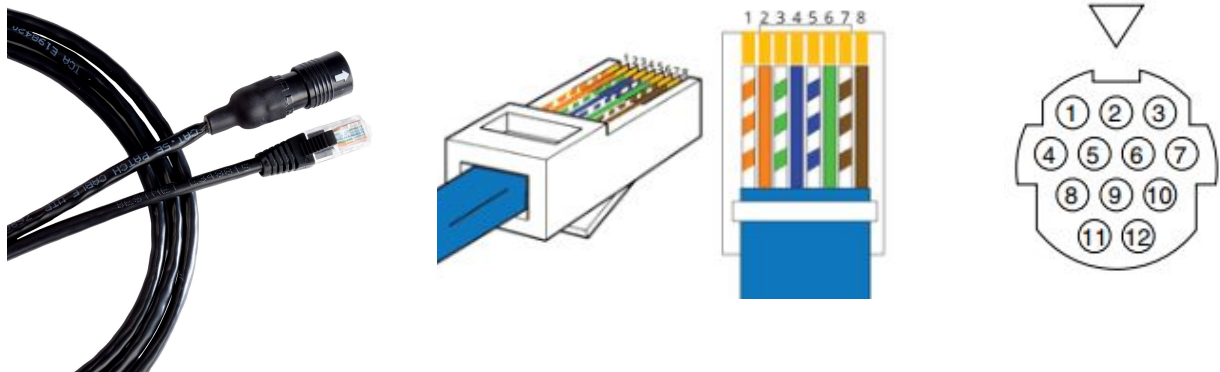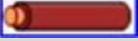

Fig 3. RJ45 & Circular Connector

Table 1. Gigabit Ethernet Cable Connectors Pinout

Circular Connector Pin No.	RJ45 Connector Pin No.	Signal Name Cable Wire Color
1	3	White & Green
2	6	Green
3	1	White & Orange
4	4	Blue
5	5	White & Blue
6	2	Orange
7	7	White & Brown
8	8	Brown

4.2 Power & IO Cable and Pinout

Power & IO Cable has circular connector (Female) at one end and a standard DB-15 connector (Male) at the other end. Standard cable length is 3 meters.
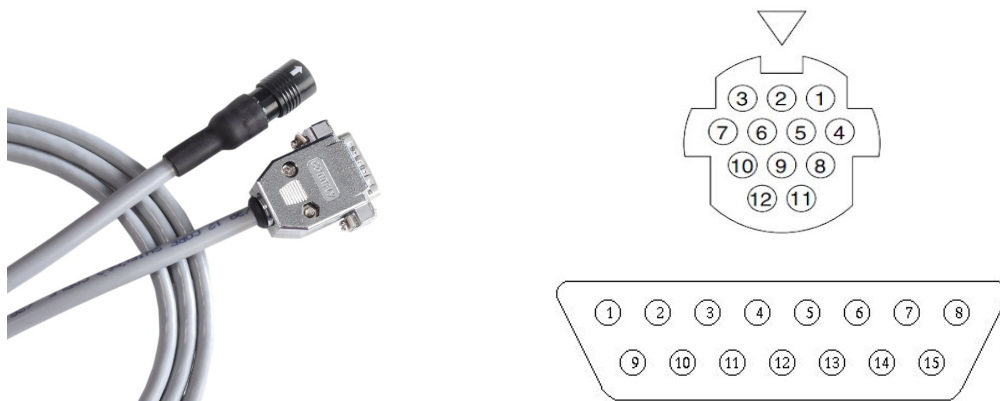

Fig 4. Power & I/O Circular Connector | DB - 15

Table 2. Power & IO Cable Connectors Pinout

Circular Connector Pin No.	DB-15 Connector Pin No.	Signal Name

1	4	INPUT 1 (TRIG)
2	7	OUTPUT Source / Sink
3	15	OUTPUT 2
4	12	IO GND
5	11	INPUT 2
6	8	OUTPUT 1
7	13	RS232 TX
8	3	SHIELD
9	6	RS232 RX
10	5	DGND
11	1	Camera 24V
12	2	Camera GND

5. Application Software Framework

UBOT's well designed software framework helps customers get started with application quickly.

5.1 Software Features

As soon as UBOT camera is out of the box, the following features are available through any web-browser:

1. Images will stream from camera and displayed on the web-browser page
2. Configure image sensor parameters:
   - Increase or decrease Exposure Time
   - Enable or disable Auto-Exposure
   - Change Image Boundaries (start x, y, width, height)
   - Increase / decrease Gain
   - Enable / disable Auto-Gain
   - Enable trigger mode (as opposed to continuous capture mode)
3. Adjust the strobe light configurations:
   - Enable / disable strobe
   - Enable / disable manual strobe ON time
   - Set strobe ON time
4. Configure network details:
   - Change IP Address, IP Subnet Mask, Gateway
5. A sample application would be running on the camera

5.2 Software Architecture

To aid quick application development, Baluns provides project template, to which you one can add existing proprietary image processing algorithm or develop image processing code based on OpenCV or even you can add any other open source library of their choice. Eclipse IDE is used for development. Application developers can use C++ language.

Camera & user application configuration can be achieved by inbuilt web-server/web-browser setup. Camera configuration options are mentioned in the previous section. Configuration for application parameters such as threshold, kernel size, etc. can be added in a few simple steps.

In case of use of application running on the PC side, control and monitoring can be achieved with TCP connection. Application development requires a Linux PC.

A getting started session would be provided to any new developer to ensure smooth setup and quick getting started with the application development.

6. Smart Camera Variants

Following standard and pro variants are readily available. We also design and manufacture customized Smart Camera based on our UBOT platform.

Sr. No.	Smart Camera Variant	Model Number	Details
1	1.2 Megapixel Standard	UB12STD	1.2 Megapixel resolution, Gigabit Ethernet, RS232, 4x IOs and other standard features
2	1.2 Megapixel Pro	UB12PRO	1.2 Megapixel, Gigabit Ethernet, 4x IOs, **Additional - USB2.0, HDMI Display Output**
3	6 Megapixel Standard	UB60STD	6 Megapixel resolution, Gigabit Ethernet, RS232, 4x IOs and other standard features
4	6 Megapixel Pro	UB60PRO	6 Megapixel, Gigabit Ethernet, 4x IOs, **Additional - USB2.0, HDMI Display Output**

7. Recommended Accessories

Sr. No.	Accessory Item	Details
1.	24V DC Power Adapter	Power adapter for powering the camera

2.	Lens	INeed to be purchased separately as per the requirement, our engineers can help in selecting the right lens

Disclaimer

Technical specifications are subject to change without notice.