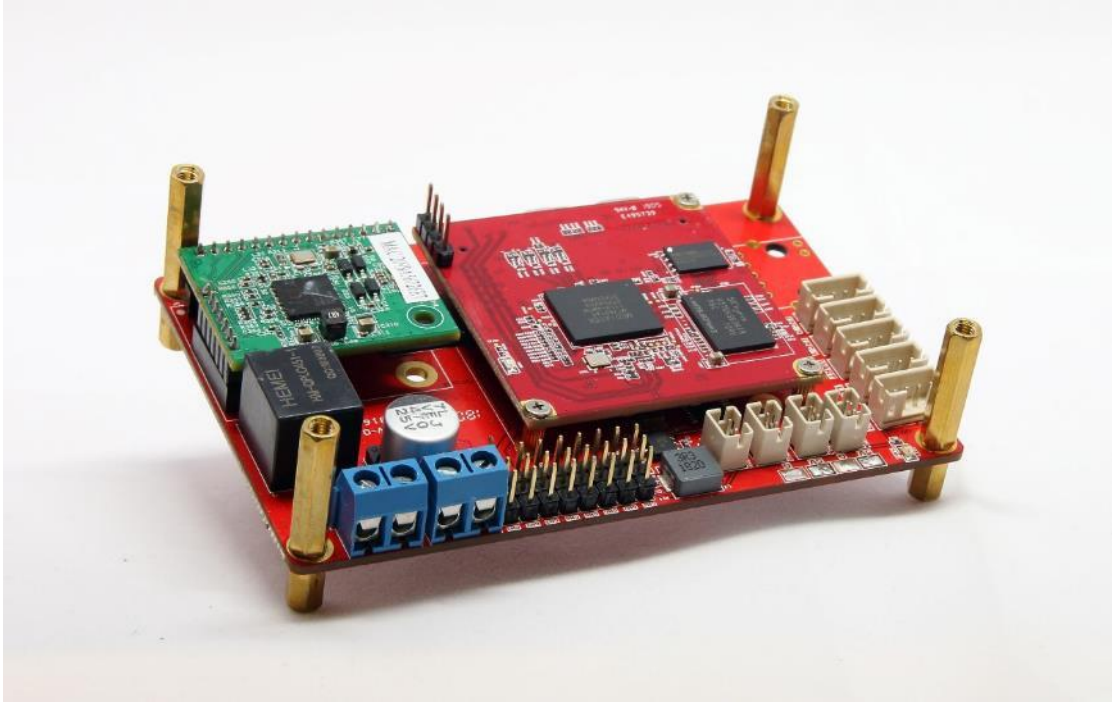


Baroque Control Board User Guide

ROVMAKER. LTD.

REVISION HISTORY			
Release	**Date**	**Author**	**Comments**
1.0	2018/05/15	Jenching Lee	1st Release

Introduction

Voyager II is an ROV based on Asgard. To make good use of space in Asgard, the ROV MAKER Team came up with its own control board instead of using single-board computers available on the market such as raspberry pi. The entire endeavor is called the Baroque project by the ROV MAKER team.

Having surveyed potential hardware solutions, the team narrowed down the choices to: (1) multimedia performance and (2) data routing delay. The team eventually chose the data routing delay and used the MIPS-based router for the Baroque control board.

The Baroque board adopts router chipset and its hardware has two versions: the ROV Baroque board and the reel Baroque board. The two kinds of Baroque boards can easily build up local network and provide better data routing speed. The on-board PLC (Power Line Control) module allows the ROV Baroque board and the reel Baroque board to communicate for as long as 100 meters. On the ROV tube side, you can save more space if co-working with ESC board. On the reel side, the Baroque board provides WIFI and RJ45 as two interfaces to connect a Notebook to an ROV.

The following are the specifications and features of Baroque. If you have any questions or concerns, please contact us at rovmaker@rovmaker.com.

ROV Baroque Board

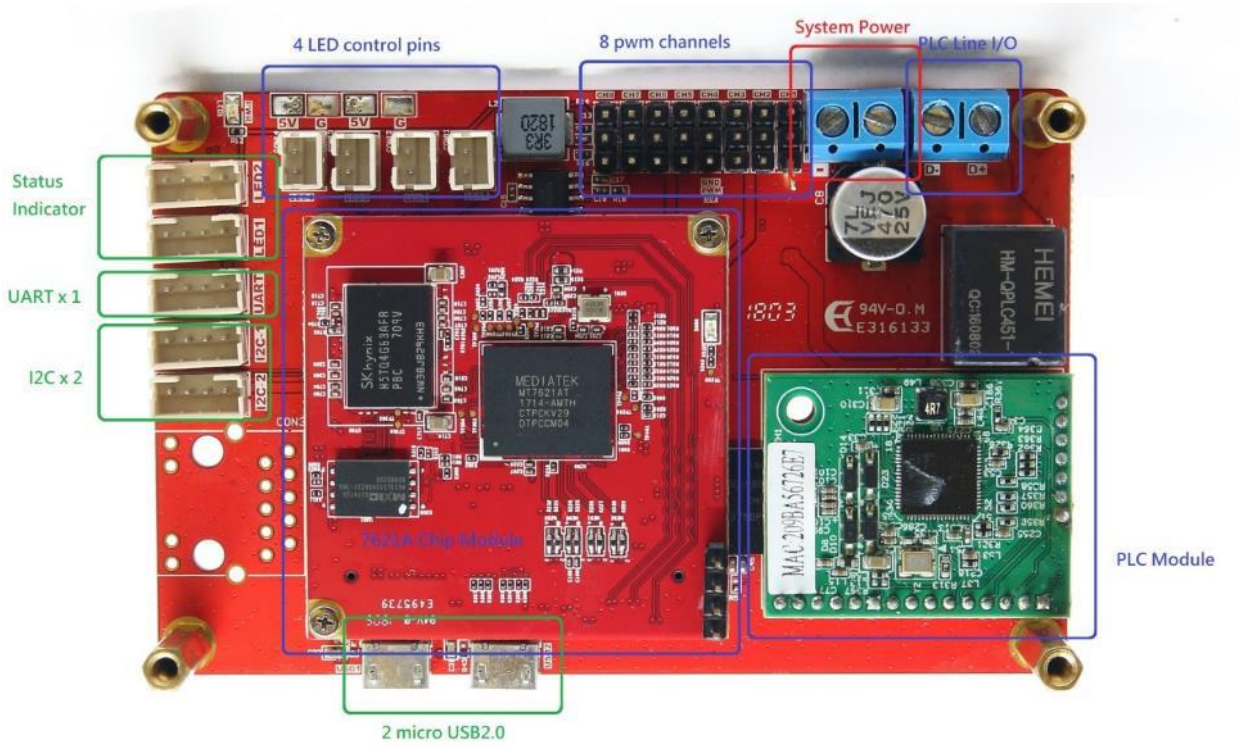
The ROV Baroque Board works as the control board of Voyager II. By executing relevant software and controlling the peripheral hardware, the board makes Voyager II the best underwater robot it can be.

The ROV Baroque Board consists of the following components.

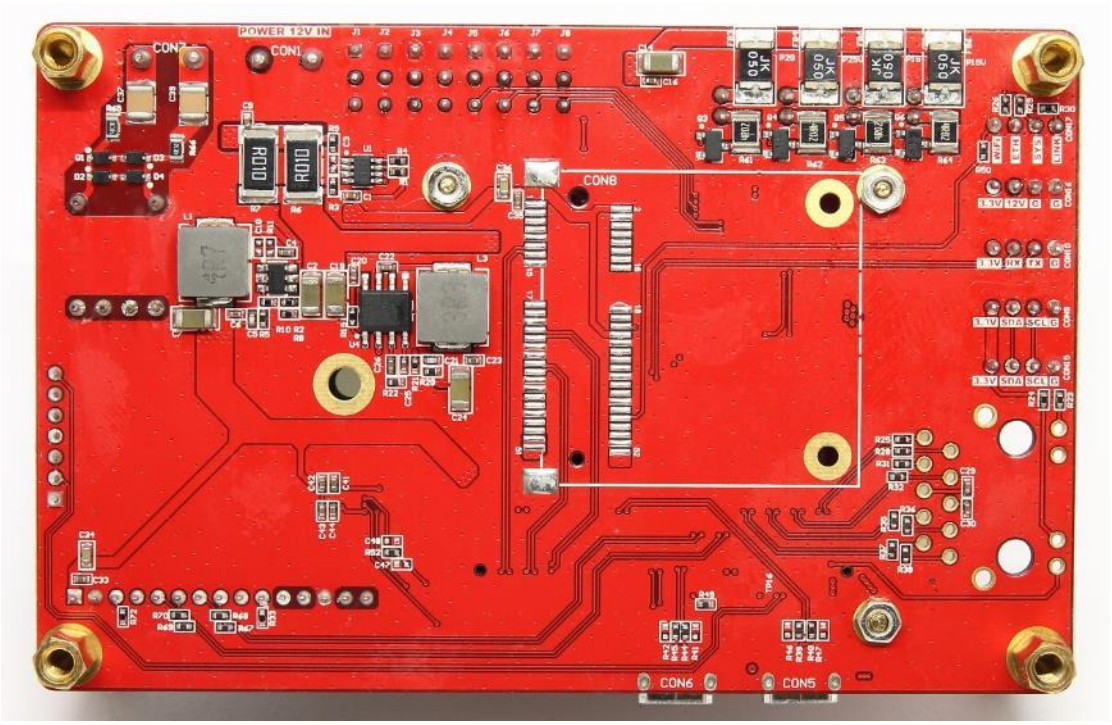
- 7621A Chip Module
  - 7621A MIPS Dual CPU @800 Mhz
  - DDR3 512MB
  - SPI Flash 64MB
- eMMC 8GB
- USB 2.0 x2
- UART x1
- I2C x 2
- PLC Module x 1
- PWM Channel x 8
- Power Monitor (INA219A)
- LED control Pins x 4 (PWM signal based)
- PLC Line I/O (connected to Twisted pair or Neutral Buoyant Line)
- Status Indicators (WIFI /PLC status indicators)

The working voltage of the ROV Baroque board is between 5-18 Voltage. The board has built-in OpenWrt work as the Operating System and is installed with node.js and Janus Gateway software module. But the ROV client-server software of VoyagerII is not built-in.

The ROV Baroque Board: **Front View**

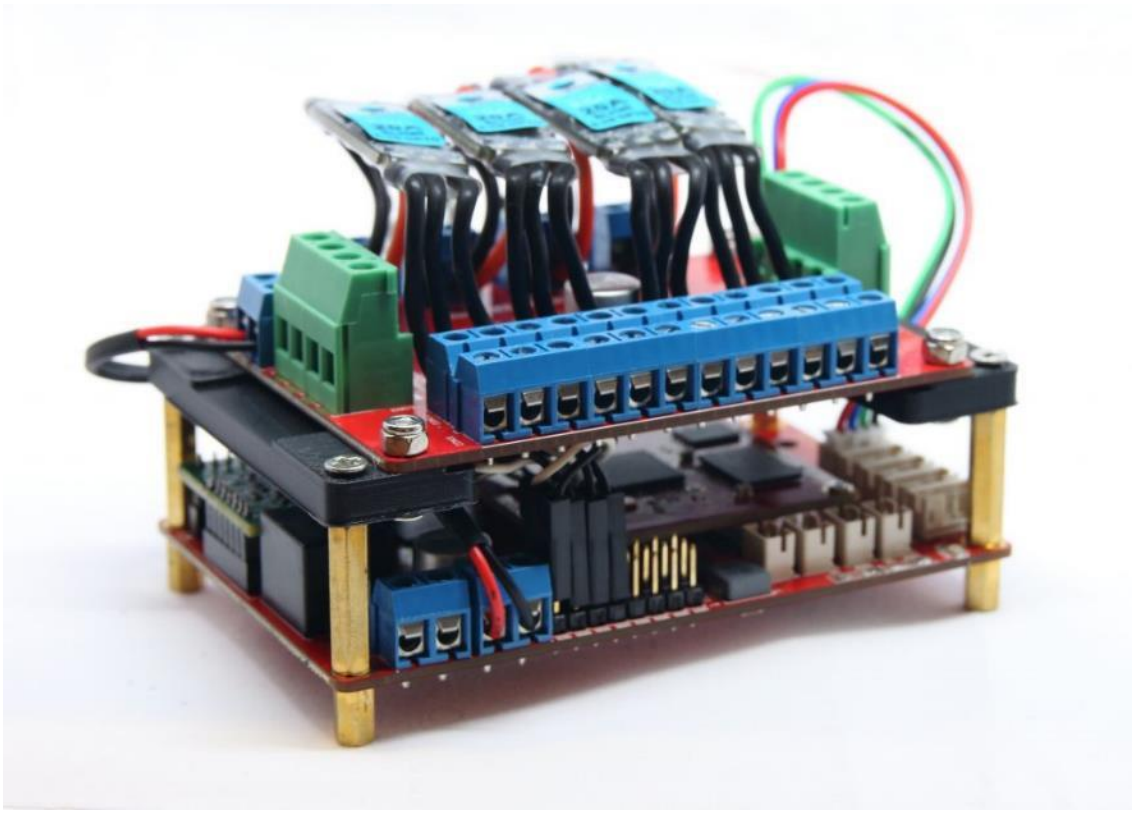


The ROV Baroque Board: **Back View**



The RJ45 and WIFI mini-PCIE component is not available since it is not used in the ROV side.

To maximize the efficiency of the electronic speed controller (ESC), ROV MAKER has also developed its own ESC control board, supporting up to 4 ESCs. The ESC control board also integrates power monitor ICs. The Baroque board can monitor the voltage and current through I2C. The ESC control board helps save much space in the ROV waterproof Tube.



Reel Baroque Board

The Reel Baroque Board works as the control board of the reel. Its main function is to bridge the signals between the ROV and the notebook or tablet.

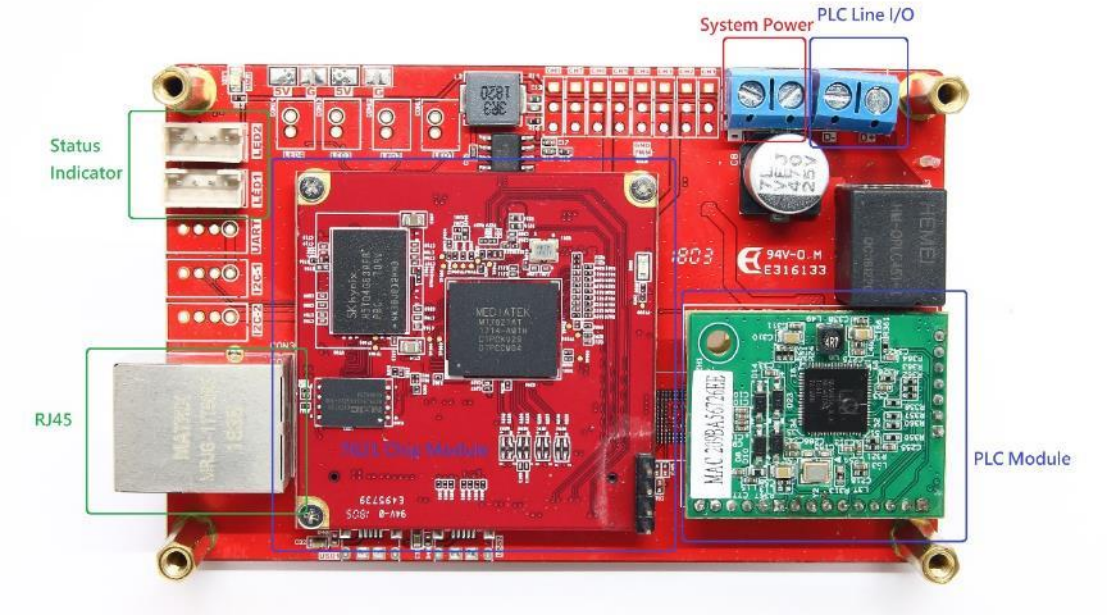
The Reel Baroque Board is composed of the following components.

- 7621A Chip Module
  - 7621A MIPS Dual CPU @800 Mhz
  - DDR3 512MB
  - SPI Flash 64MB
- PLC Module x 1
- Power Monitor (INA219A)
- PLC Line I/O (connected to Twisted pair or Neutral Buoyant Line)
- Status Indicators (WIFI /PLC status indicators)

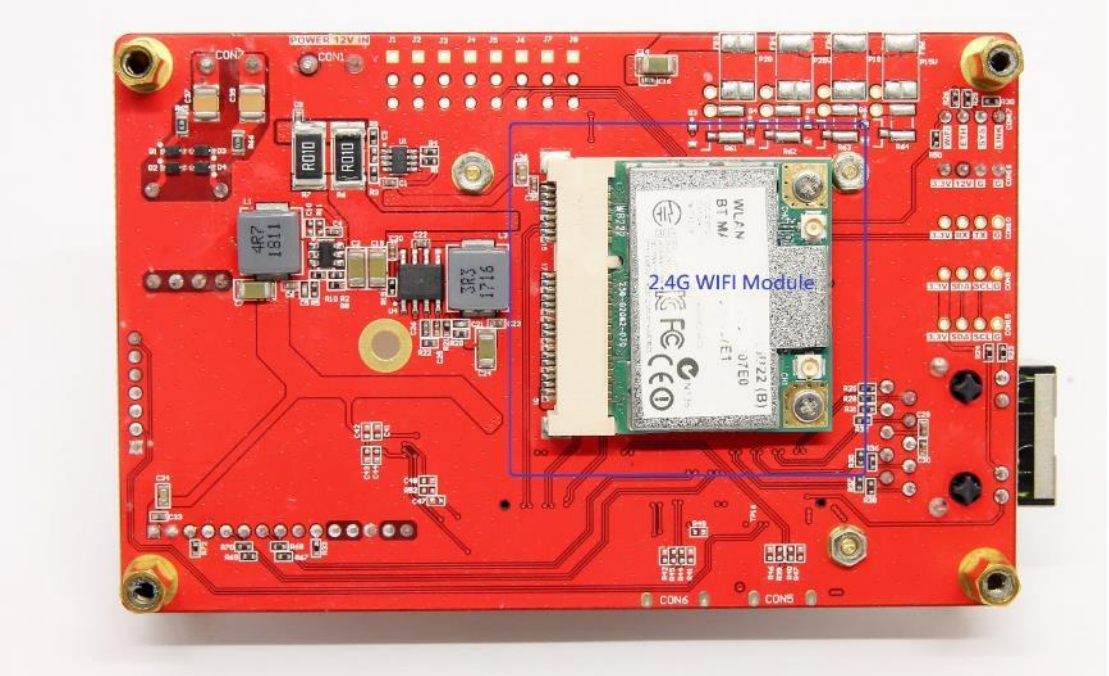
The working voltage of the Reel Baroque board is between 5-18Voltage

The ROV Baroque Board has built-in OpenWrt as the Operating System.

The REEL Baroque Board: Front View



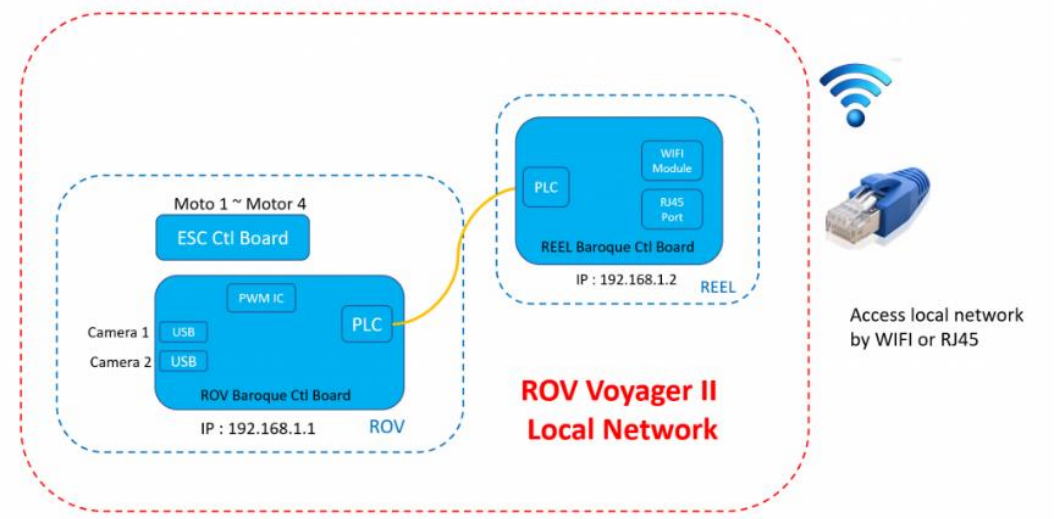
The REEL Baroque Board: Back View

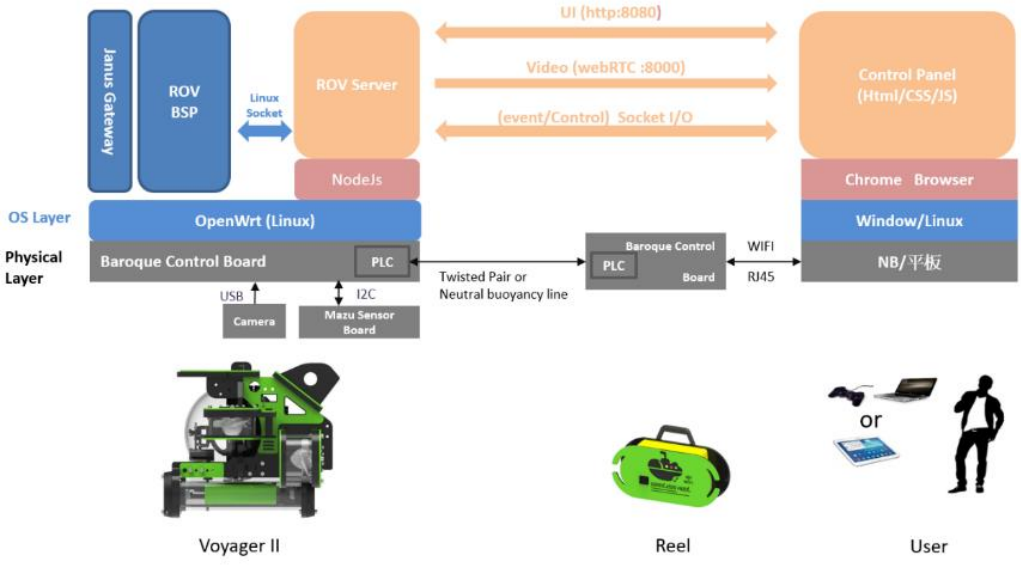


Application: ROV-REEL Configuration

The Baroque control board integrates the Power Line Communication (PLC) module, which uses a power line and can transmit network data farther than the conventional ethernet line. Thanks to the PLC on board, the ROV Baroque control board and the Reel Baroque boards can build a local network by twisting a pair of neutral buoyancy lines. The transmission is capable of traveling as far as 100 meters.

This design makes ROV DIY easy and is the basis for inventing VoyagerII.





Built-in Software

The ROV Baroque Board

Package	Version	Description
Openwrt	15.05	a Linux operating system targeting embedded devices
Janus Gateway	0.2.2	a WebRTC Server developed by Meetecho conceived to be a general purpose one
Gstreamer	1.0	an extremely powerful and versatile framework for creating streaming media applications.
NodeJs	0.10.25	a server-side platform built on Google Chrome's JavaScript Engine (V8 Engine).

The REEL Baroque Board

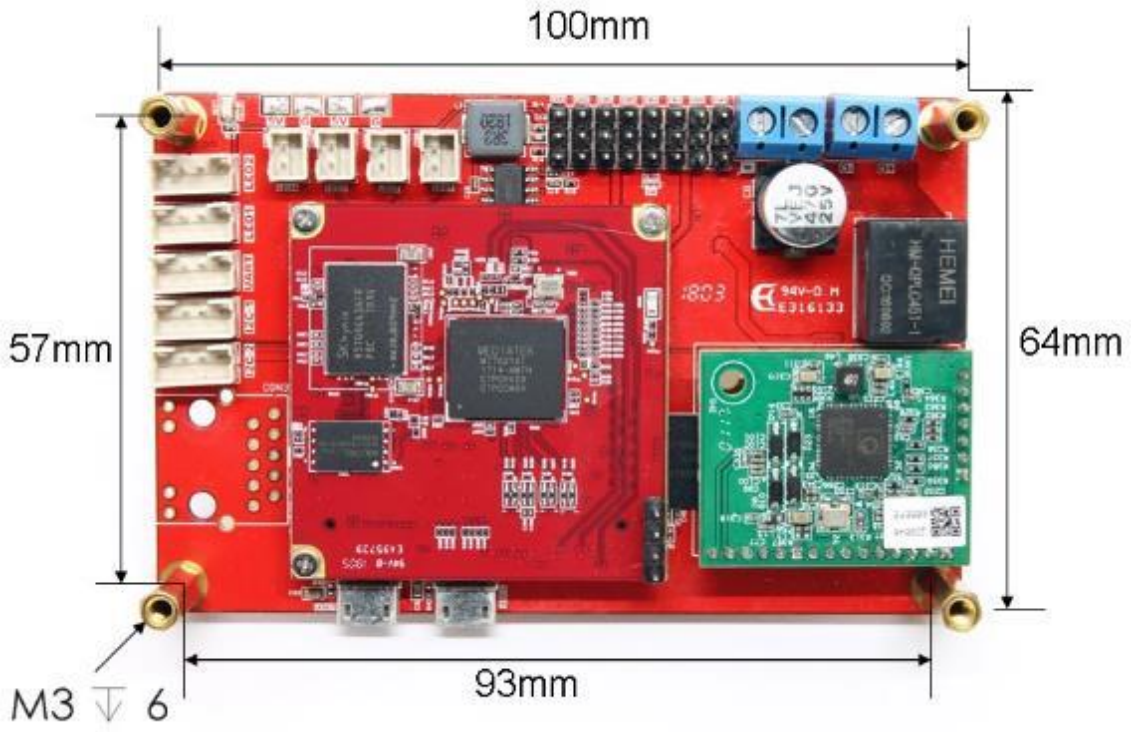
Package	Version	Description
Openwrt	15.05	Linux operating system targeting embedded devices
Power Monitor	1.0	Driver developed by ROVMAKER. LTD. It will report the voltage and current periodically to ROV Baroque board by Linux socket

Recommended Operation Conditions

Parameters	***Min***	***Typ.***	***Max***	***Unit***
Supply Voltage	5	12	18	V
Power	1	50	70	Walt
Temperature	0	27	40	ºC

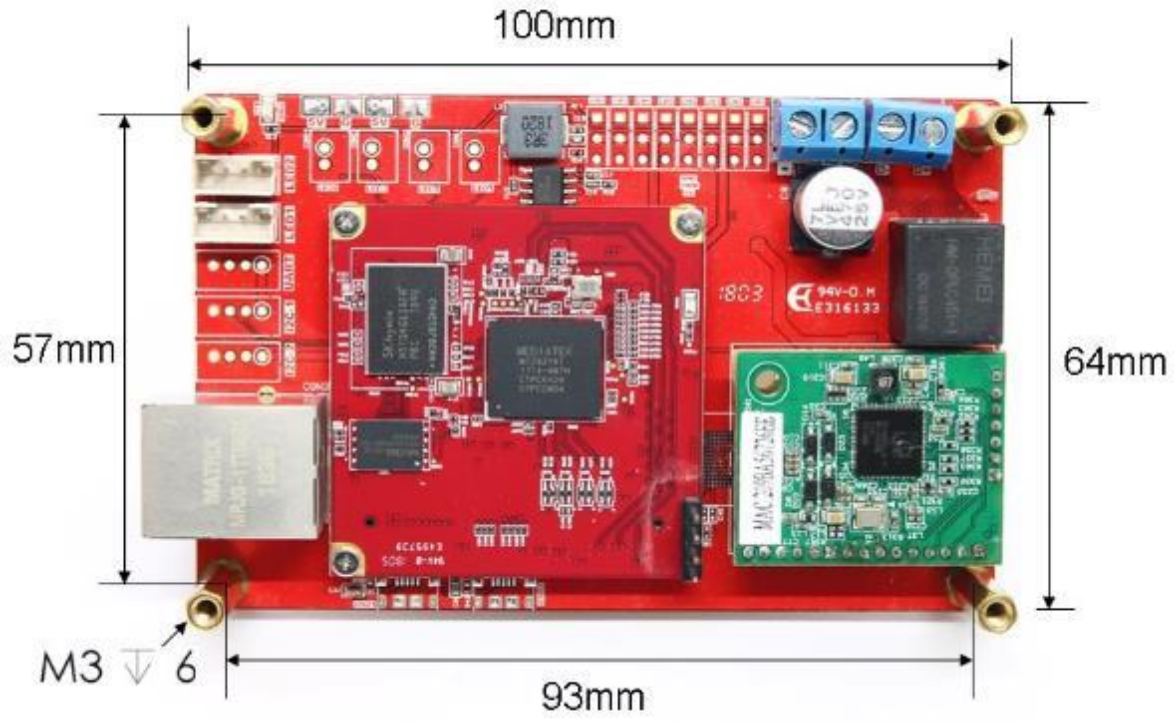
Mechanical Information

The ROV Baroque Board



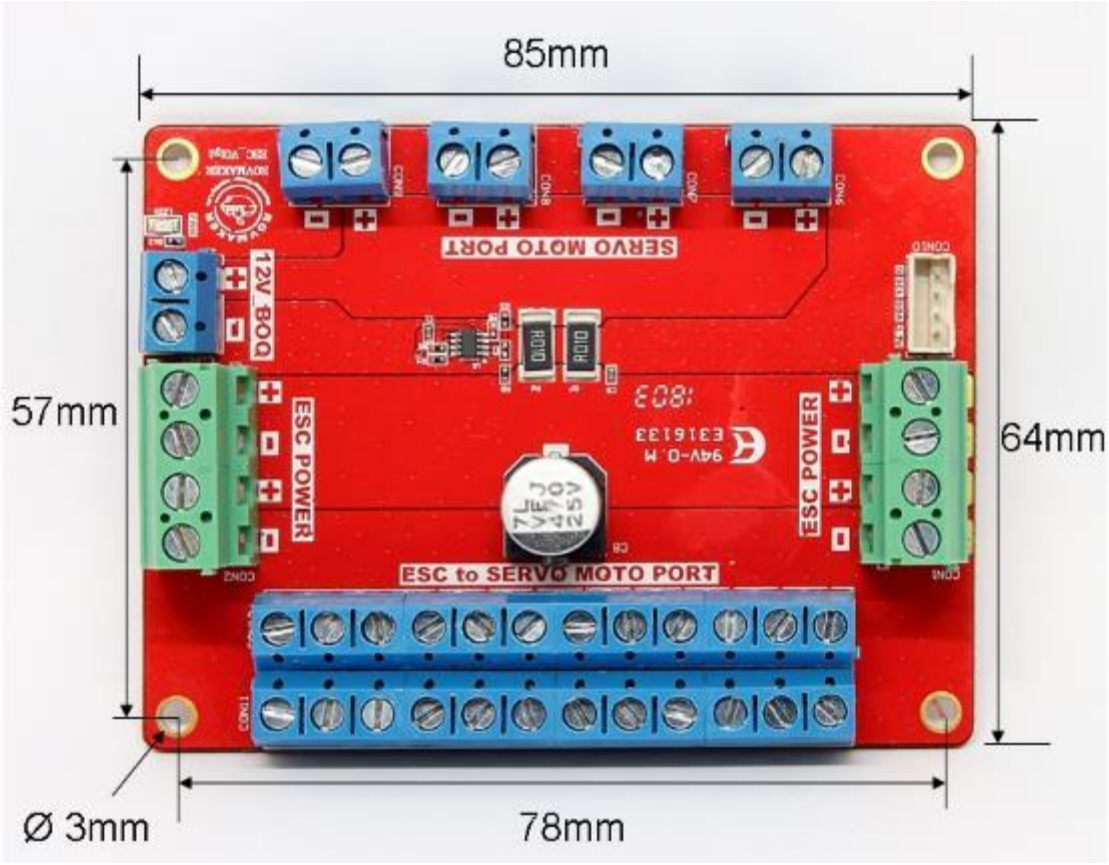
Mechanical Information

The Reel Baroque Board



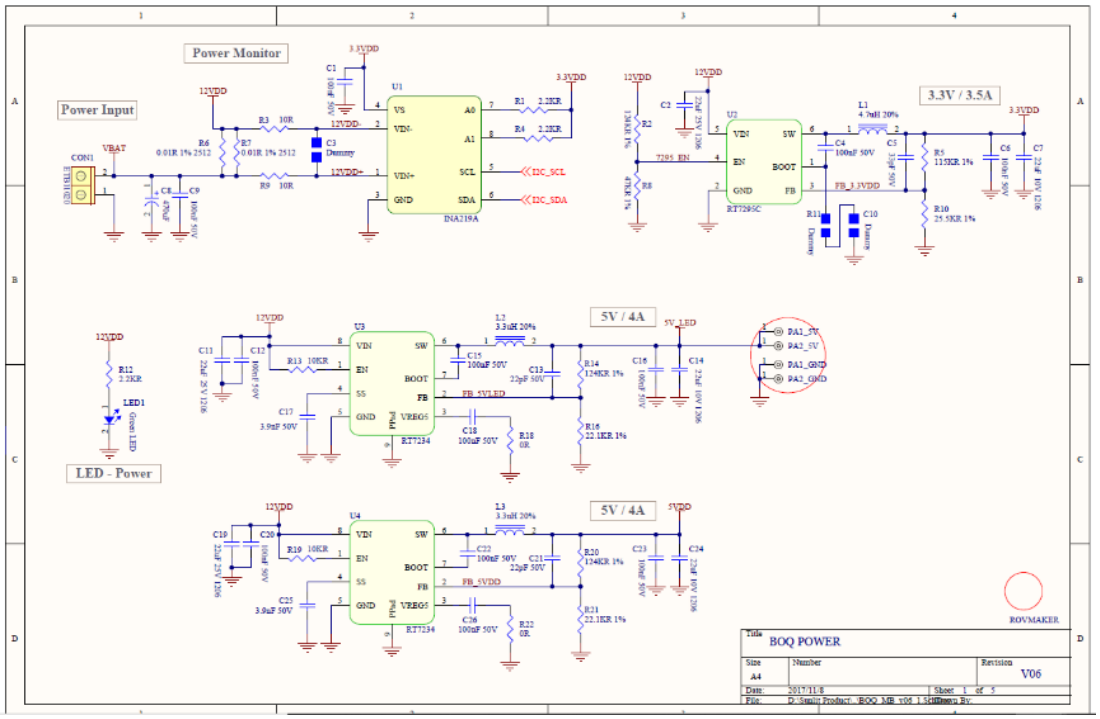
Mechanical Information

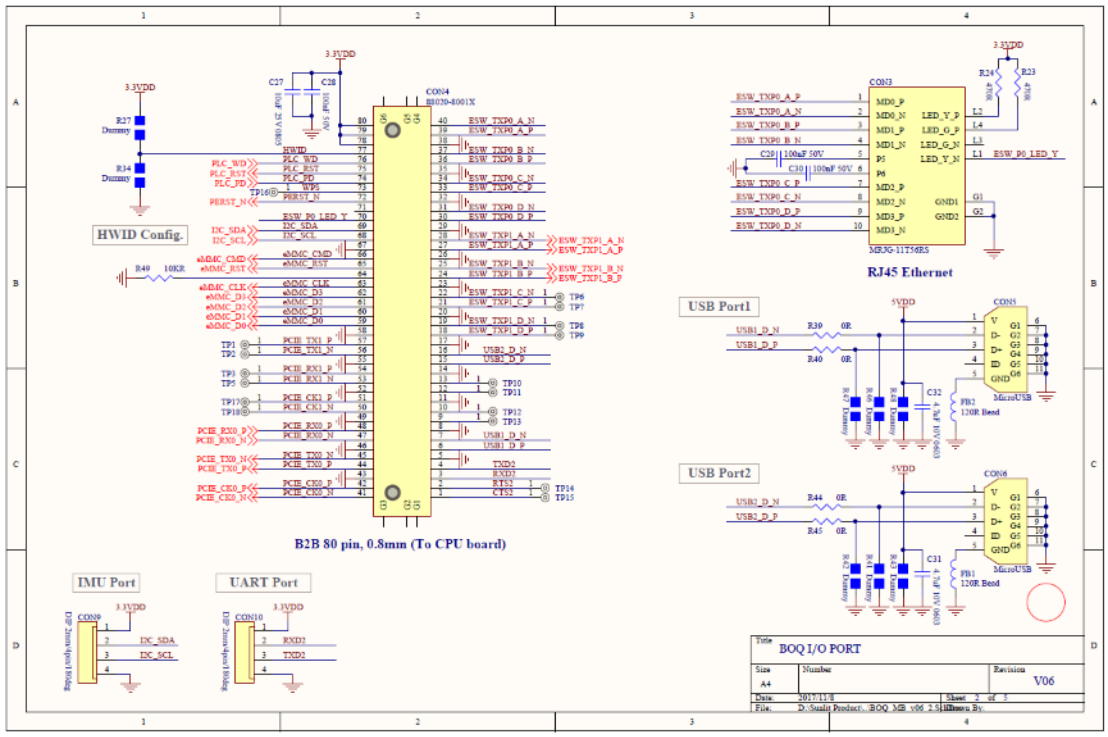
The ESC Control Board

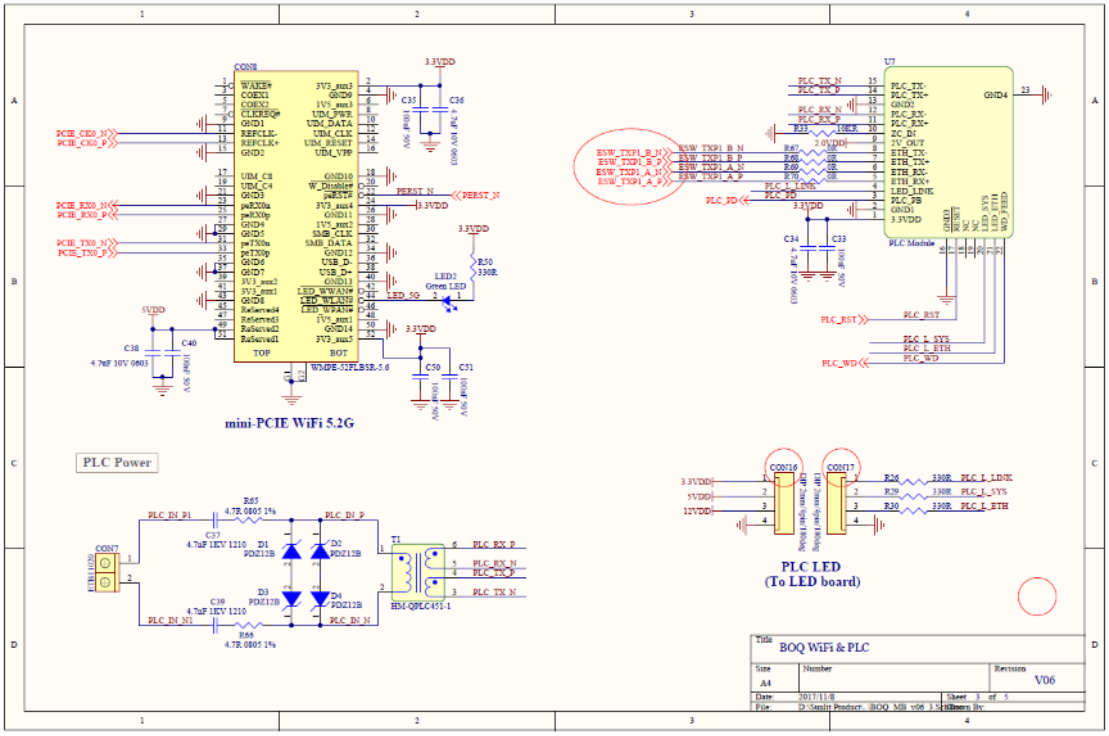


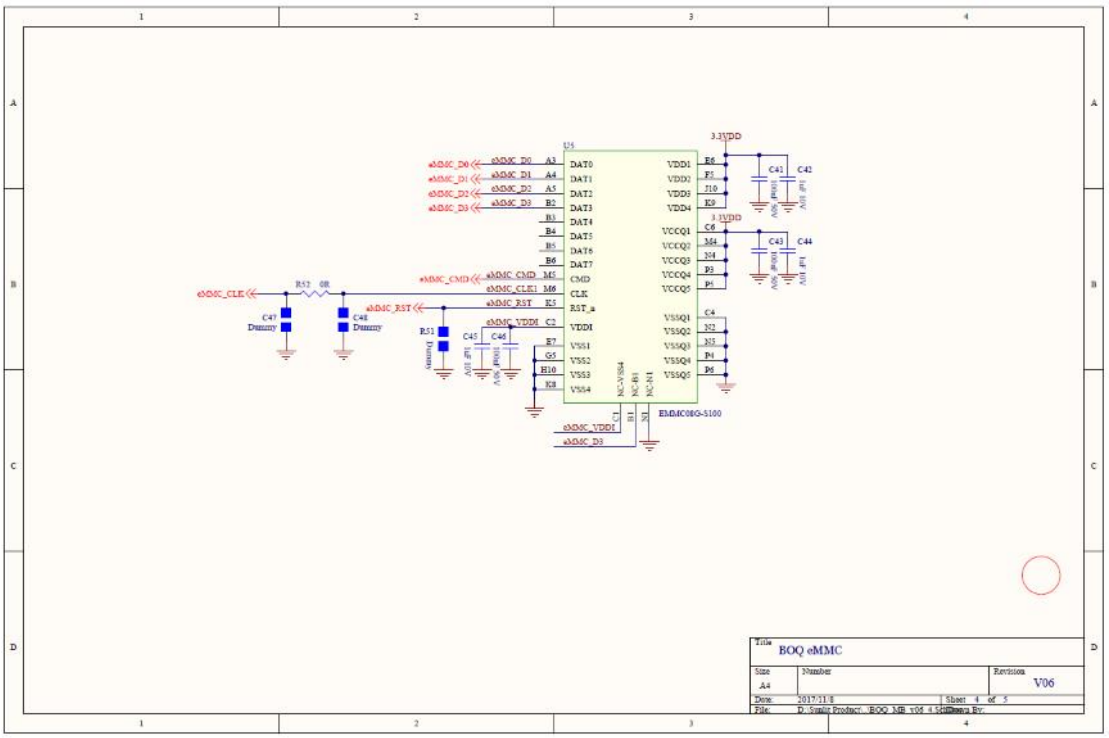
Electronic Schematic

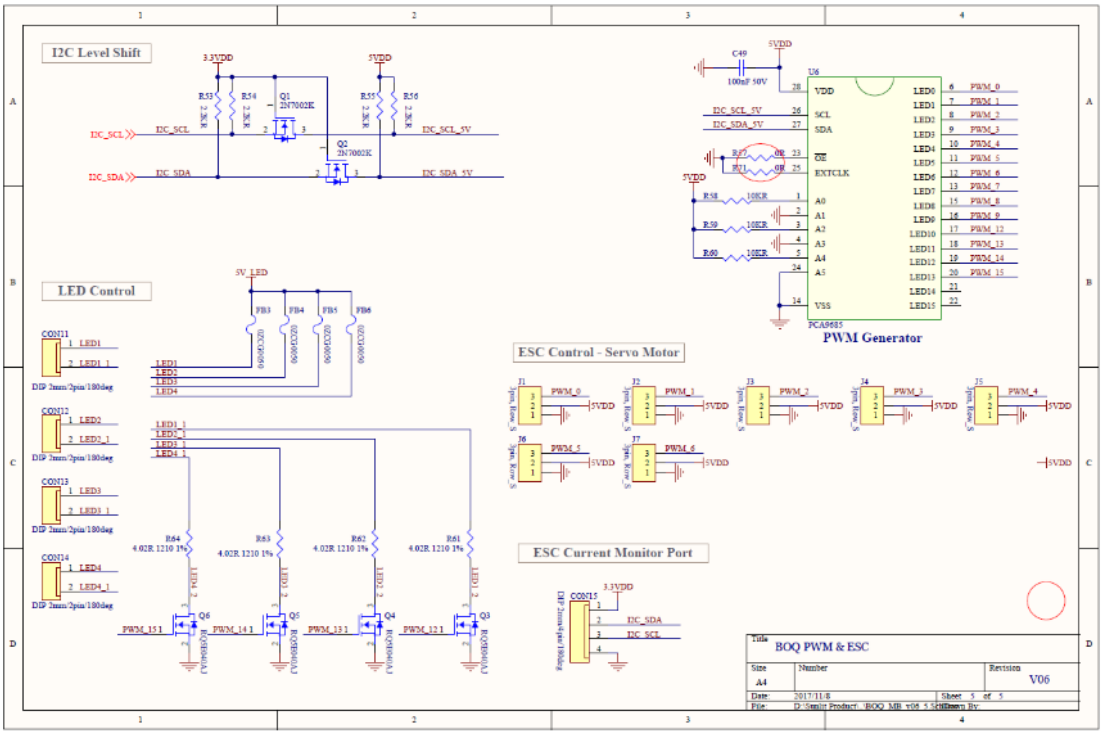
The information regarding Schematic of the Baroque control Board is available through this link or diagrams below:






mini-PCIE WiFi 5.2G
PLC Power
PLC LED
(To LED board)
BOQ WiFi & PLC
V06


BOQ eMMC
V06


I2C Level Shift
LED Control
ESC Control - Servo Motor
ESC Current Monitor Port
PWM Generator
BOQ PWM & ESC
V06