WWW.CRAFTBEERPI.COM
Brewing Controller

OFFICIAL BOARD 4.0

CraftBeerPi
Brewing Controller

Date	Release	Note
04/02/2020	1.0	First draft

Issued by

CHERRYPHILIP BREWING&TECHNOLOGIES

User Manual

Safety & Precaution

Ensure that the product is always used within the specifications

DO NOT use product close to flammable and explosive gas otherwise injury from explosion may occur

NEVER disassemble, modify, or touch any of the internal part to avoid electric shock or malfunctions

Relays can be working with High or Low Voltage, Please **DO NOT** use the relay over their life cycle and **DO NOT** exceed the rated load of the outputs **DO NOT** touch the terminals at least while power is being supplied. Doing so may occasionally result in injury due to electric shock

The board is sold as a DIY standalone component and people buying should take care of connecting and integrating with their own system. The manual connection diagram and short explanations but minimum expertise in electric circuit is needed.

The board is powered by **Low Voltage 12V** or **24V** by external supply, so you must be very careful, and all connections are at your own risk. If you are not familiar with electricity and power please ask a technician to help you. I'm not responsible for any damage or risk you can create

CBPi Exp V4.0 overview

1 Scope and Purpose

The purpose of this document is to describe the features of the board and to allow the correct functionality with the application software called **CraftBeerPi 4.0** or next versions. The document provides the support to configure the connection outputs with plugin proper or SW for all different use cases.

2 Characteristics

The **CBPi Exp v4.0** board has been designed to work with together with **Raspberry Pi (3B+** or **PI 4)** board and through Raspbian operative system you can load the **CraftBeerPi (3.0** or **4.0**) application to have a smart controller, able it to can be programmed and adapted to brewing and fermentation process.

Using a DIN rail support or electrical boxes enclosure **CBPi Exp v4.0** board, allowing to create a customized panel control.

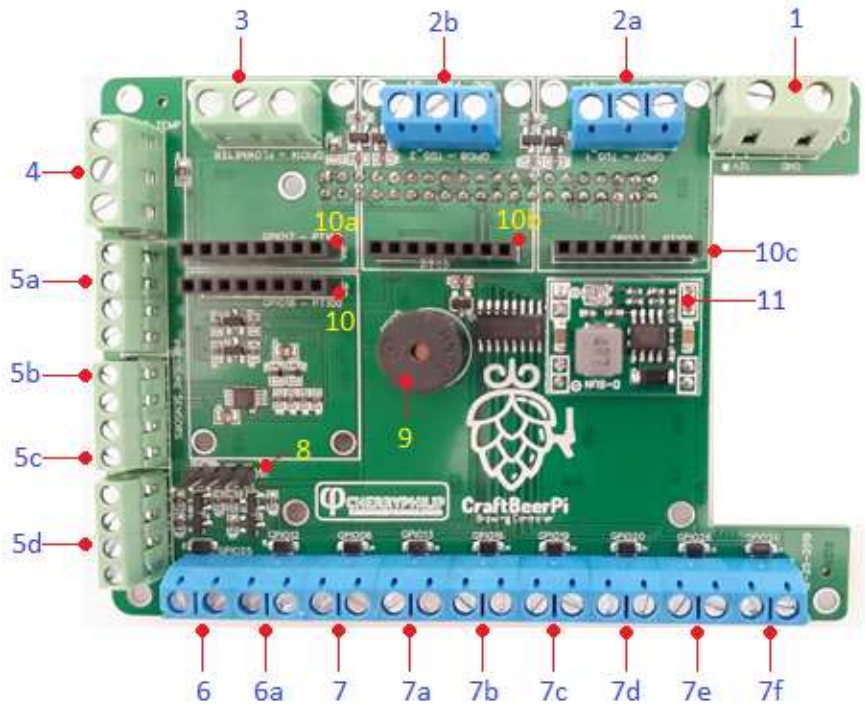
In term of technical characteristic, we have:

- All Independent channels (PID control, ON/OFF control with hysteresis
- 2x SSR Output @5V
- 7x SSR Output @12V
- 2x driver for TD5 pump (12V, PWM, GND)
- Up to 10x Digital temperature probe input
- 4x PT100 Analog temperature probe input (2,3 or 4 wires)
- 4x Pressure Sensors probe input (12V voltage supply)
- Up to 10x Dallas DS18B20
- 1x Flow Meter probe or Humidity sensor input
- Raspberry Pi 3 (or more) connector compatible
- WiFi & Bluetooth connection to remote server
- Buzzer events indication
- Buck converter to 5V for power supply and VIN up to 24V
- I^2C interface

CraftBeerPi (3.0 or **4.0**) can be interfaced by external monitor touch screen or by web socket (smartphone, laptop, desktop, tablet) that allow the user to control the brewing/fermentation process.

3 Identification parts

The picture below is explained the identification parts of the new **CBPi Exp v4.0**:



1: Screw terminal for Power Supply input (7V – 24V), 12V recommended.

2 & 2a: Screw terminals for TD5 pumps

3: Screw terminal for flowmeter probe or humidity sensor

4: Screw terminal for Digital temperature probe (Dallas DS18B20)

5 – 5d: Screw terminals for Pressure sensors

6 – 6a: Screw terminals for 6x SSRs outputs (work at 5V signal)

7 – 7f: Screw terminals for 6x SSRs outputs (work at 12V signal)

8: Header male pin for I^2C

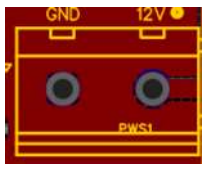
9: Buzzer

10-10c: Header pins for MAX31862 module (PT100 2, 3 or 4 wires)

11: Buck converter module

4 Screw terminal details

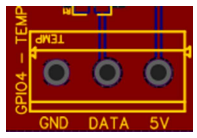
To avoid misunderstanding with the labeling, we report the details below:



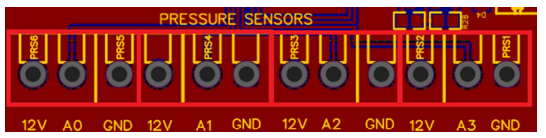
1: VIN

2a & 2b: TD5 pump

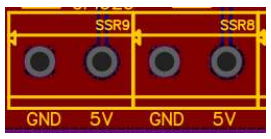
3: FlowMeter



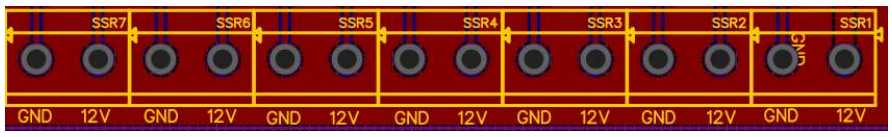
4: DS18B20



5a – 5d: pressure sensors outputs



6 & 6a: SSR outputs@5V



7 – 7f : SSR outputs @12V

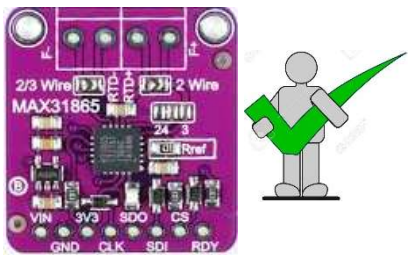
8: I2C ouputs

5 General Purpose In/Output Identification

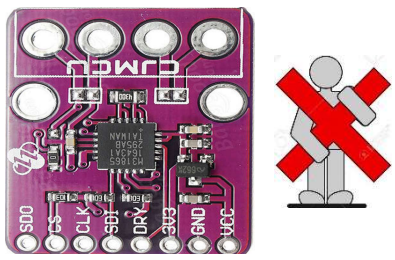
GPIO	ID terminal	Function	CBPI Plugin
GPIO21	SSR1	SSR 12V	PID - ON/OFF - PWM
GPIO26	SSR2	SSR 12V	PID - ON/OFF - PWM
GPIO20	SSR3	SSR 12V	PID - ON/OFF - PWM
GPIO19	SSR4	SSR 12V	PID - ON/OFF - PWM
GPIO16	SRR5	SSR 12V	PID - ON/OFF - PWM
GPIO13	SRR6	SSR 12V	PID - ON/OFF - PWM
GPIO06	SRR7	SSR 12V	PID - ON/OFF - PWM
GPIO12	SRR8	SSR 5V	PID - ON/OFF - PWM
GPIO25	SRR9	SSR 5V	PID - ON/OFF - PWM
GPIO27	PT1	MAX31865	PT100
GPIO23	PT2	MAX31865	PT100
GPIO17	PT3	MAX31865	PT100
GPIO18	PT4	MAX31865	PT100
GPIO14	FLW1	FLOWMETER	FLOWMETER
GPIO04	TMP1	TEMPERATURE	ONE-WIRE
GPIO05	BZR	BUZZER	
GPIO07	05	TD5 PUMP	12V – 5V_PWM - GND
GPIO06	06	TD5 PUMP	12V – 5V_PWM - GND

6 Warning

Please take note that the MAX31865 module wiring has been done starting from a specific part number, model and specification are reported below:



Module compatible with CBPi Exp v4 board.



This module having incorrect pinout order

7 Pressure Sensor

Most pressure level sensors have a normal 3 lines (VCC, GND, SIG) and provide an analog output (SIG 0V to 5V). Raspberry pi does not have any Analog input but the new board include an ADC converter 16bit so your readings will be highly accurate. **Some pressure sensors working Voltage up to 5V, others up to 12V/24V**.

Pressure sensor type 1

Pressure sensor type 2