

BRUCONTROL

Process Automation Made Personal

CraftBeerPi Transition to BruControl FAQ

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This FAQ is for CraftBeerPi users contemplating a transition to BruControl as a brewery control system. It provides an overview of the BruControl software application, hardware requirements, practical implementation considerations, and addresses some of the differences between the two systems.



Image courtesy [@GParkins](#)

Overview

Q: What is BruControl?

A: BruControl is a highly flexible process automation system which facilitates brewery monitoring, control, automation, data logging, and communication. The system employs two key components: an application (software) and microcontroller boards (hardware). The application serves as a central control center for any and all brewery operations including brewing, fermentation, refrigeration, dispensing, and cleaning. This application then communicates with one or more microcontroller boards (Arduino, for example) to handle the physical inputs and outputs with other devices. These boards, called “interfaces”, connect via USB, Wi-Fi, or Ethernet network and can be added and located throughout a brewery as needed.

Q: What is the main goal of BruControl?

A: Our main goal for BruControl is to give you the flexibility to build and use what you want, and to offer you a pathway for unlimited continued expansion as your brewing goals and needs change. For example, you could start with a single vessel manual control brewery, then add fermentation monitoring and control, then expand your brewery into a fully automated, multi-vessel system. BruControl's graphical user interface, I/O interfaces, and automation can be continually customized and refined as time goes on and your system expands. We want you to be able to add functionality without ever having to go backwards. Being fully flexible, BruControl does not place pre-defined restrictions on your systems – if you want a brewing rig that isn't confined to a MLT, HLT, and BK... no problem. In fact, you can implement whatever you can dream up, well beyond the normal formats of 1-3 vessels, infusion/recirculating, HERMs/RIMs/K-RIMs, sparge/no sparge, pump/gravity feed, immersion/counterflow cooling, etc.



Image courtesy [@Die_Beerery](#) and [LowOxygenBrewing.com](#)

Setup and Use

Q: How does I set up BruControl?

A: Five simple steps:

- i. Install and activate the application on a Windows computer.
- ii. Select and source an interface suited for the application.
- iii. Install and set up the BruControl firmware on that interface.
- iv. Add the interface in the application.
- v. Set up individual inputs and outputs on that interface.

From there, you can customize the graphical user interface, called a “Workspace” to represent your brewery’s functions.

Q: What special terminal command lines do I need to learn about?

A: None. There are no “sudosh”, no dependencies, no funky commands to copy and paste or files to edit. Everything is standard touching/clicking.

Q: Why does BruControl use microcontrollers for I/O (inputs/outputs)?

A: Interface microcontrollers are readily available, inexpensive, provide lots of inputs & outputs, and come in many different formats to suit individual needs. For example, two recommended interfaces are the Arduino MEGA, with ~45 I/O or the ESP32 with ~20 I/O and Wi-Fi connectivity. Both are available for approximately \$15 USD. In addition, microcontrollers are extremely reliable since they do not have a dynamic operating system. Operating systems and their applications sometimes crash and are not time-accurate, whereas microcontrollers rarely fail. In fact, we will go on record to say that if powered and integrated properly, a BruControl interface will never crash. Also, our interfaces are time accurate, so outputs will maintain duty cycle accuracy to within a millisecond or two. This can be important in certain applications like closed-vessel boil kettles or RIMs tube heating.

Q: What if I don't know how to program Arduino micro-controllers?

A: Whether you do or don't know how... it doesn't matter, because setting up the interfaces in BruControl requires no programming. You simply plug the interface in and run our Universal Firmware Installation tool to install the firmware and set up its parameters if connecting via network. After that, some interfaces, like those based on ESP32, can be updated over the air, which will allow you to update firmware in the future without needing to physically access it.

Q: What happens if the application and the interface disconnect from each other?

A: In BruControl, the I/O operations occur inside the interface, not in the application. For example, when a PID Device Element is set up in BruControl, that task is assigned to the interface, and it will operate that way until changed. Therefore, should a disconnection occur between the application and the interface (e.g. network power failure), the system will maintain a steady state until they automatically reconnect.

Q: Why does BruControl run on Windows? Can it run on a Raspberry Pi?

A: This is always the first question an RPi user will ask, because naturally the RPi is already in place. First, it is important to understand that when we created BruControl, we wanted to leverage a robust and proven platform which would provide expansion, interconnectivity, and reliability. We know Windows is loved by many and hated by some (okay, *most* Linux users), but we have found Windows 10 to be a rock-solid foundation for BruControl. We also believe that most people have a Windows computer available for use. BruControl is not resource intense, so will run successfully on an older computer or mini-PC. RPi systems have not demonstrated reliability given their SD card-based disk system. We also have the option to leverage advanced tools, such as a SQL server for back-end data storage. Finally, when costs of an RPi are compared to a PC in the context of an advanced brewery costing hundreds to thousands of dollars, the difference is truly negligible. As of this writing, Windows on ARM is showing promise, so if you have an RPi 4 with 4GB+ of memory, it may become a viable platform someday soon (SD disk should still be avoided).

Q: How are devices connected in BruControl?

A: Because we leverage microcontrollers, their pins typically each have multiple available input or output functions. BruControl leverages this ability, and the available I/O functions are listed in a document called the “Interface Wiring Map”. Therefore, when connecting a device, you simply select an interface pin that is compatible with that device. For example, if you want to drive an SSR, you select an interface pin marked as a “D”, for Digital I/O. Then, in the application, you add the “Device Element” which graphically represents that device. That is done by selecting the interface name, pin number (called “ports”), and the device type. In the example of the SSR, you could select “PID Control” to create a PID. You could also create as many of these as you have interfaces and pins for.

Q: What can I do with BruControl?

A: BruControl offers you three main functionalities: digital control panel, data monitoring/logging/communication, and automation. First, BruControl’s digital control panel, called a “Workspace”, is a fully customizable graphical user interface, so your build is specific to you and your goals, not a clone of anyone else’s. Workspaces contain on-screen “Elements” for devices, timers, alarms, variables, graphs, buttons & switches, etc. You can have multiple workspaces, each for example representing a different facet or function of the brewery. The Workspace and its Elements are all geared for touchscreen use and you can change them in terms of appearance, size, location, colors, backgrounds, etc. You then interact with these Elements by touching them directly or accessing their properties. For example, while brewing, if you want to change a PID’s target temperature, you simply touch that PID control element and change it using the built-in number pad. Second, data monitoring/logging/communication allows data to be generated, stored, graphed, manipulated, and optionally communicated to external devices via a Data Exchange protocol. Your data (up to 30 days) is stored in a database which is available for use by BruControl Graph Elements, so when a graph is created, the data is already there. For example, if you wanted to go back and review the prior two weeks of a fermenter’s temperature, you could do that instantly. This data is also available to other applications outside BruControl. Finally, brewery automation is provided through “Script” system. Scripts are straightforward, human readable sections of simple code, allowing you to affect nearly any facet of your brewery equipment. Scripting is BruControl’s most differentiated asset, as the user can automate any or all of the brewery operations. This could range from something as simple as activating an alarm when a temperature is reached, to a sophisticated hands-off fully automated brewery.

Q: What types of devices can BruControl control?

A: BruControl can integrate with the following:

- i. Digital inputs such as switches, buttons and sensors.
- ii. Digital outputs, such as valves, relays, motors/pumps, alarms, and igniters.
- iii. Analog inputs, from as proportional sensors like volume or flow sensors.
- iv. PWM/Analog outputs such as proportional devices like valves or motors.
- v. Counter inputs such as flow meters and encoders.

- vi. Temperature probe inputs such as 1-wire (DS18B20), RTD (Pt100/1000), thermistors (NTC/PTC), analog temp (LM/TMP's).
- vii. Tilt Hydrometers (requires ESP32 interface).

BruControl also natively provides I/O control algorithms such as PID Control, Duty Cycle (aka manual mode), Deadband Control, and Hysteresis Control.

Q: Does BruControl support “plug-ins” like CraftBeerPi?

A: You do not use or manage plug-ins in the same manner as CBPi does, as base functionality is already built in. However, there are two pathways for users to accomplish custom functions: Scripting and Data Exchange. As noted above, scripting gives you the ability to manage any facet of brewing automatically. Data Exchange provides the ability to exchange data with computers and controllers. For those looking to develop their own device solutions, users can write their own code on additional microcontrollers and pass data in and out of BruControl via Data Exchange.

Q: Does BruControl allow remote access via a web browser?

A: We have short-term plans to build in a web server so BruControl can be accessed via a standard browser. However, we haven't yet found an urgent need as users accessing it remotely successfully do so using remote desktop solutions like Windows Remote Desktop, TeamViewer, Chrome Desktop, or VNC, most of which support multiple platforms such as Windows, Mac, Linux, iOS (iPhone or iPad), Android. Using these solutions, even an RPi can access the Windows computer running BruControl very successfully.



Image courtesy [@GParkins](#)

Scripting

Q: What can I do with BruControl's Scripting and how does it compare to CBPi's brew steps?

A: Scripting is provided to empower you to automate any or all of your brewery processes. With respect to brewing automation, scripting is much more powerful than “step-based” brewing

automation as used in CBPi. Scripting can handle basic tasks like boil-over prevention to medium ones like electronic auto-sparging, to advanced ones like gravity dependent spunded pressure fermentations. We recommend you take a look at the User Manual on the BruControl website, but scripting includes statements and methods for: sections & goto's, delays and waits, variables, element properties, if/else conditions, subroutines, boolean logic, workspace display, and script execution. Scripts can automatically run at startup and can start and stop other scripts. Multiple scripts can run simultaneously to create a multi-tasked control system. In fact, you could have scripts running concurrently that handle brewing, fermenting, dispensing, and cleaning, all at the same time.

Q: Scripting sounds interesting but what if I am not a programmer?

A: First, keep in mind that you can first run BruControl as a digital control panel that is fully controlled by you and uses no scripting. Then as you look add levels of automation, then you can start to add some scripts. Many examples are available online and in the User Manual, and you can always write and test scripts in small sections at a time. We designed scripting to blend ease of use for non-programmers and power for those looking to fully automate their brewing operations. We wrote it for people, not Watson. Here is an example: "Mash Tun PID" Target = 152. Do we need to explain what that means? Probably not! Most users pick up scripting quickly and have fun doing it, so as they say, "Trust the process!"



Image courtesy [@Die_Beerery](#) and [LowOxygenBrewing.com](#)

Costs

Q: Why does BruControl cost money?

A: Ahh, the big one! We get it... it bugs us too when we have to pay for software. There are two primary reasons BruControl is not offered as freeware. First, we aim to deliver a quality solution for users. Doing so entails costs for development which simply could not be supported without funding. The dollars we receive are fully devoted to further development in both software and

hardware. Second, unlike community-based support, BruControl includes guidance and support for users as they plan, build, and operate their systems. Of course, this includes a comprehensive User Manual. But more importantly, we are accessible if you have an issue or question. And if there is a bug in the application or firmware, we are accountable to you as a customer – because by purchasing our solution, we have effectively entered into a partnership. We do recognize that many brewers operate on a tight budget. However, we believe the cost of BruControl is low when compared to total cost of an advanced brewery. We believe BruControl will save you time because the setup is relatively fast and easy. Also, as an integrated solution, it provides you a long pathway for upgrades, so you won't need to ditch a partial solution and start over.

Q: What is the cost to upgrade to new versions, and how long do BruControl licenses last?

A: We have no plans to charge for any upgrades. V1.0 users were able to upgrade to v1.1 at no cost, and v1.2 will be the same. We also publish firmware with improvements and fixes without cost. Also, our goal is for licenses to last forever. When you purchase a license, you should expect it to last you a long time and never be charged again. We are about doing the right thing and keeping our users happy – a few bucks is not worth breaking that trust. We also don't penalize you for license upgrades, so if you want to start basic, then expand, you can do it at no additional cost beyond the difference in the licenses.

Q: What is the difference between the Basic, Advanced, and Professional versions?

A: BruControl Basic allows for communication with one interface, connected via USB cable. BruControl Advanced allows for communication with multiple interfaces, connected either via USB or via network (Ethernet or Wi-Fi). BruControl Professional includes our Data Exchange functions, which allows for data to be passed into and out of the application to other third-party applications.



Image courtesy [@crane](#)

Adoption

Q: Can I try it before I buy it?

A: Not yet... but we guarantee that if you are dissatisfied for any reason, we will issue a full refund. To date, we are proud to say we have never been asked!

Q: Ok, I'll give it a go... how do I get started?

A: First, we recommend you do some more research. Look through our website, including the demo video and the [User Manual](#). Review the [BruControl thread on HomeBrewTalk](#), as well as other BruControl builds in the Automated Brewing forum there. Then, determine some key requirements: Do you have a Windows computer available? How will it connect to the interface (USB, Ethernet, or Wi-Fi)? What interface will you prefer (see the "Interface Overview" in the appendix of the User Manual)? Note that most interfaces will successfully swap out with the RPi. At any point, if you have any questions or concerns, contact us via email below. We always reply within few hours!

Q: How would I wire in an interface in place of the RPi?

A: Depending on your existing control enclosure, your options will be different. If you have an RPi that is wired to its downstream devices (e.g. SSR's, relays, sensors, etc.), then you could simply swap these directly. For example, you could replace the RPi temporarily by reconnecting those wires from the RPi GPIO header to the pins on an ESP32 Development Board. Both are 3V, both run off a 5V micro-USB power connector. If you have a control board "hat" mounted to your RPi, then leveraging this would require removing the control board off the RPi and adding individual wires from the interface directly to the hat.

For an in-depth list of user experiences, browse the [BruControl thread on Homebrew Talk](#). There are several threads there which document individual BruControl builds in detail.

Contact BruControl at info@brucontrol.com with any questions or concerns.

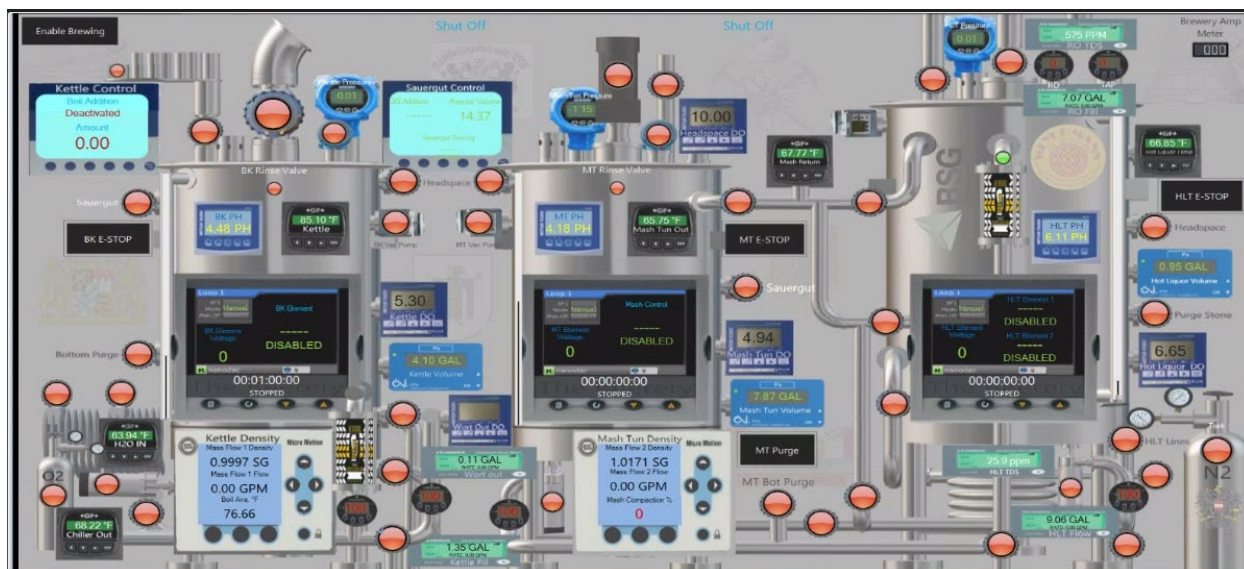


Image courtesy [@Die Beerery](#) and [LowOxygenBrewing.com](#)

Brewing

Brewer

Recipe Name

Poseur Pumpkin Ale

Original Gravity

1.055

BrewActive

Step Control

BK

BK PID

DISABLED

DISABLED

BK Element

MLT

DISABLED

BK Element Select

HLT Element Select

HLT

HLT PID

DISABLED

DISABLED

HLT Element

HX

Wort Pump

Water Pump

Brew Start Btn

Mash In Temp	Strike Water Amount	Pre-Boil Volume	Post-Boil Volume	End of Mash Runnings	Pre-Boil Gravity	System Step
155.00	3.810	7.190	5.500	1.045	1.055	Brewer setup
Mash Out Temp	Sparge Water Amount	Mash Timer	Sparge Timer	Boil Timer	Mash pH	Step Timer
168.00	4.520	01:00:00	00:30:00	01:00:00	0.0	00:00:00:04 STOPPED

Waiting for brewer. Check elements, devices, recipe, and equipment.

Image courtesy [@muhteeus](#)