The Firefly Panels Explained

To be able to offer a dynamic experience where different sensors and actuators can be attached to the firefly board a panels system with an interpreter was devised to deal with the complexity of the many use cases.
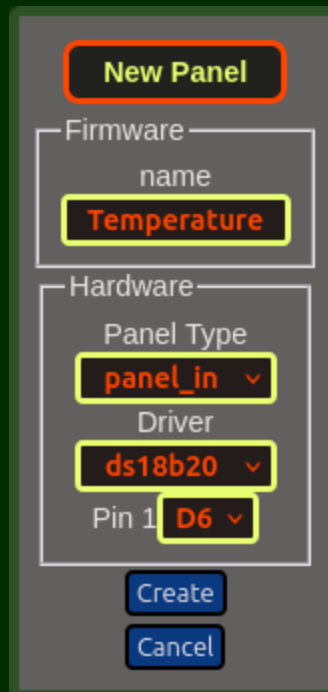
Here follows an explanation of the different panels that can be created on the Firefly web interface.
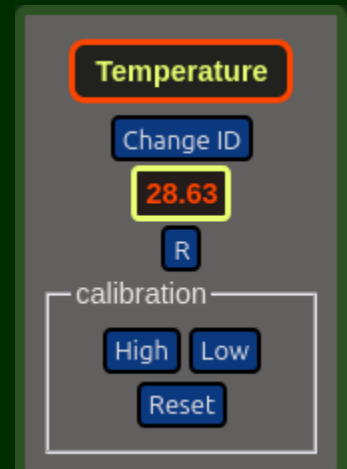
The New Panel Dialog

To create a new panel use the button in the System Panels section:

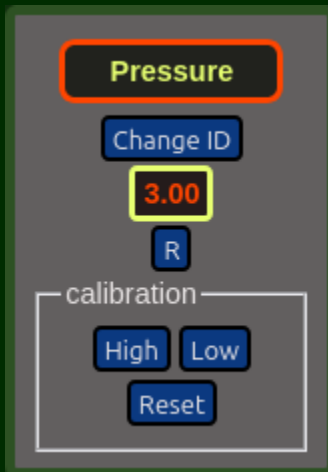*The New Panel button brings up the New Panel dialog shown at the center.*

In this dialog you can select the name and type of panel to create, the driver and if needed the pins.

This is the Panel created by the dialog on the left.

List of User Panels

Panel_in

This is a general container that can accept many inputs and provides a calibration interface. This panel needs to specify the driver to use with it depending on the input hardware used. The options are:

Input Interfaces:
- **BMP180**: Atmospheric Pressure sensor (I2C)
- **DS18B20**: Temperature sensor (OneWire)
- **HX711**: Weight sensor
- **DHT11**: Temperature and humidity sensor
- **AnalogIn**: Analog input
- **Digital In**: Digital input
- **US_sensor**: Ultrasound distance sensor
- **IR_snsor**: Infra Red Receiver
- **RPM Counters**: For liquid flow sensors, RPM hall effect sensors, etc.
- **Digital Inputs**: General digital input handling

Once a Driver is selected is necessary to specify one or two pins depending on the kind of input.
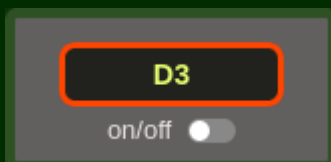
Panel_out
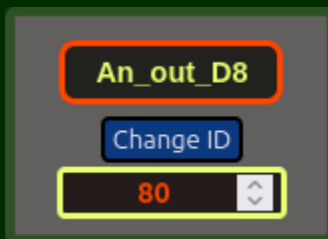
This is similar to panel_in but for outputs you can input the desired output or use the panel title as a variable in the programs, if you select this panel you have this Drivers:
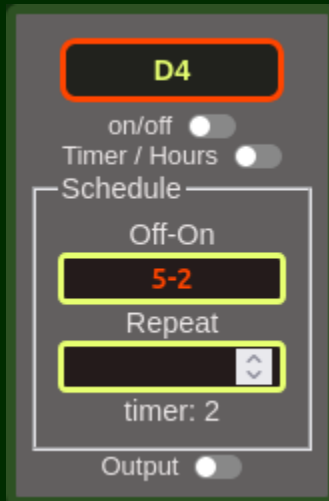
Output Interfaces:
- **Digital Output**: For controlling relays, LEDs, actuators, etc.
- **Servo**: For controlling servo motors
- **Analog Output**: Implements PWM on specific pins

The Set panel:

Its use is to attach a Digital Output to this panel, it can be controlled by the web interface and it can be also switched on an off by other panels.

Timer Panel (timer mode)

This panel can be attached to any digital output that needs timing functionality.

In this image the selector is set to Timer, in this mode the numbers entered indicate the period in seconds that the output is off and on respectively.

If repeat is left blank or 0 means forever, otherwise you can set how many repetitions you want before it stops.

In the Edit Box you can enter more than one pair of numbers for periods of off and on times for example 3600-60-30-120 every hour will turn on for 60 seconds, off for 30 and on again for 120 seconds.
The Output selector can also be used to manually switch the output on or off.

Timer Panel (Time of the Day mode)
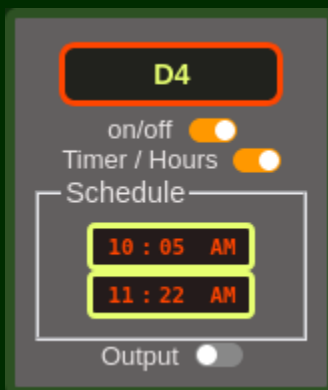
Switching the Timer / Hours selector to the Hours position puts the timer in Time of the Day mode, in this case you input the On and Off absolute times for the output.
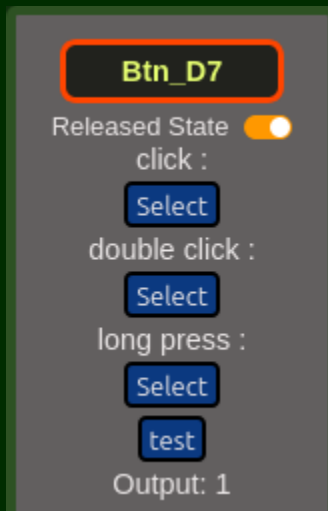
Push Button Panel

This panel manages physical push buttons and allows to bind 3 different triggers with any virtual button from another panel to trigger that action.

The released state selector allows to account for different configurations for push buttons tied to +Vcc or GND, please select the appropriate released state for the push button to function properly.

Once you click in the select button corresponding with the action you want to set the cursor becomes a crosshair and the next button or panel you click on is going to be assigned to that particular push button action.

The Program Panel

This Panel has a text box with a simple interpreter that can process a very basic set of instructions, this is a list of Keywords that can be used:

Numbers

Panel names

User Variables

Arithmetic: + - * / ( ) =

Binary: & |

Comparison: > < is

Conditional: if else

When the run selector is ON, the program executes every 100 ms. Sometimes is desired to run a program just once to achieve this the last line of the program must set the program to 0 to switch it of. In the given example by setting the last line to "task=0;" will shut off the program effectively making it just run once.

Program panels can also start other program panels by setting their value to 1 to start running the program. This functionality allows for some logic that wouldn't be possible given the simplicity of the interpreter.
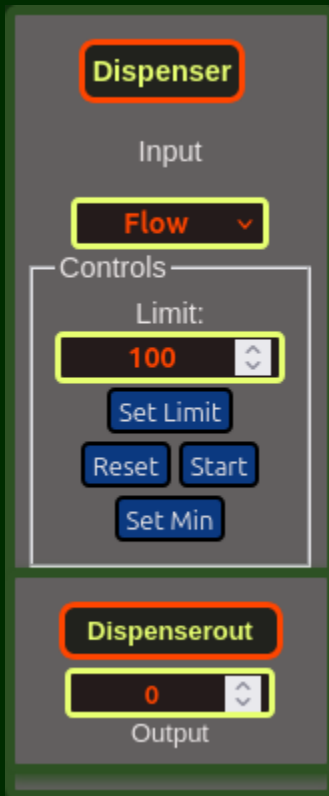
The Flow Control Panel

This panel can manage any kind of sensor that relates electrical pulses with a physical quantity, for example odometers, flow sensors, etc.

Its a Panel_in with a flow Driver, for the calibration process just Reset the counter clicking on the R button, then bring the counter up to a known quantity for example for a flow sensor fill up a container with a know capacity , press the calibration High button and input that capacity.

The Dispenser Panel

This is a special panel that acts as an authomatic dispenser, on creation this panel takes a pin that is driven by a PWM signal that can be used to drive dispenser mechanism motors, pumps, etc while the input can be any other created panel such as weight sensors or level sensors.

On pressing the Start button the PWM output is going to go on 100%. Upon reaching 90% of the Limit parameter is going to go to a PWM setting between 100% and the min set level. Once it reaches 95% it goes into the min set level. This is done to avoid overshooting in some systems. Once the input reaches the limit the output stops.

To set the min speed type the speed in the Output edit box and once you are happy with the minimum setting press the Set Min button.