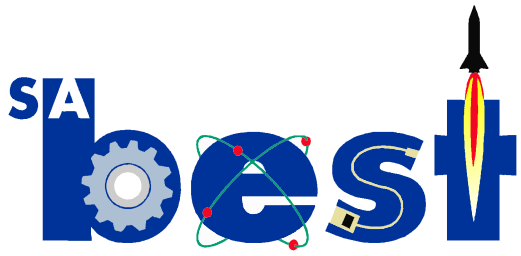


Gizmo Quickstart

September 15, 2025

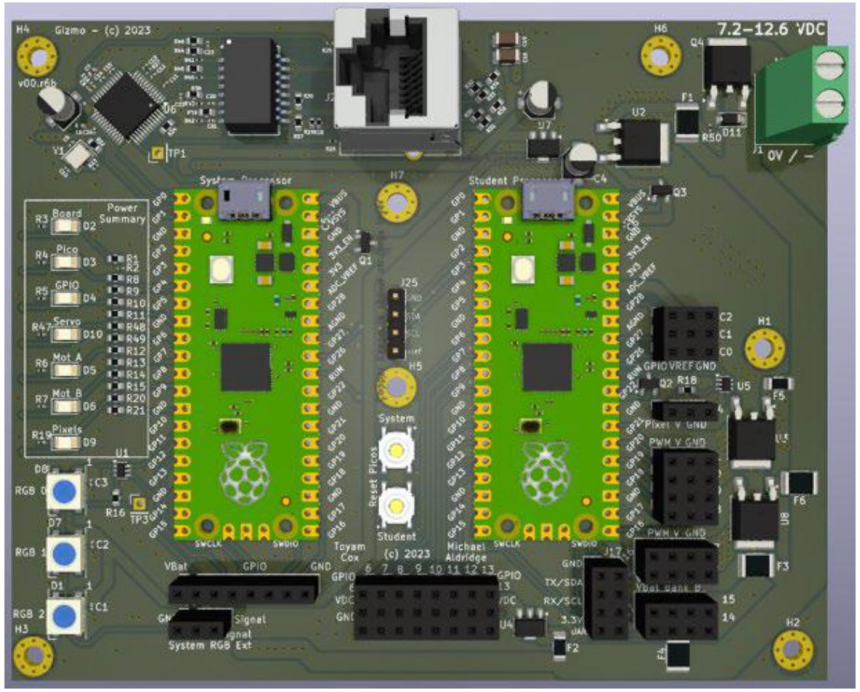
www.sabest.org

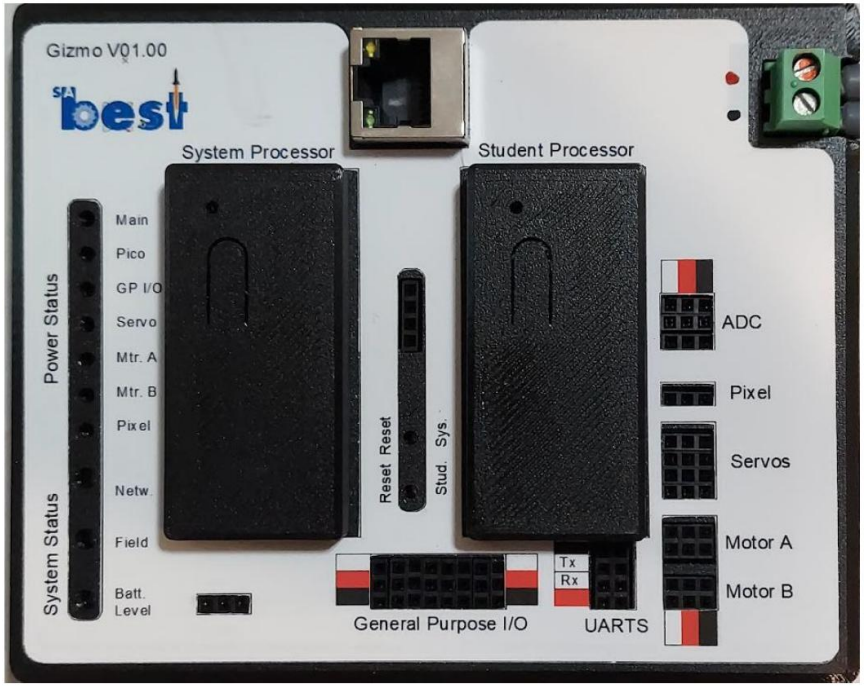
Outline

- What's a Gizmo?
- What's the Driver's Station
- What's Binding?
- How to run your first program?
- How to run the default program?
- Resources
  - BESTedu Tutorials
  - Github Gizmo Mechatronics
  - Gizmo Guide
  - Github Discussions

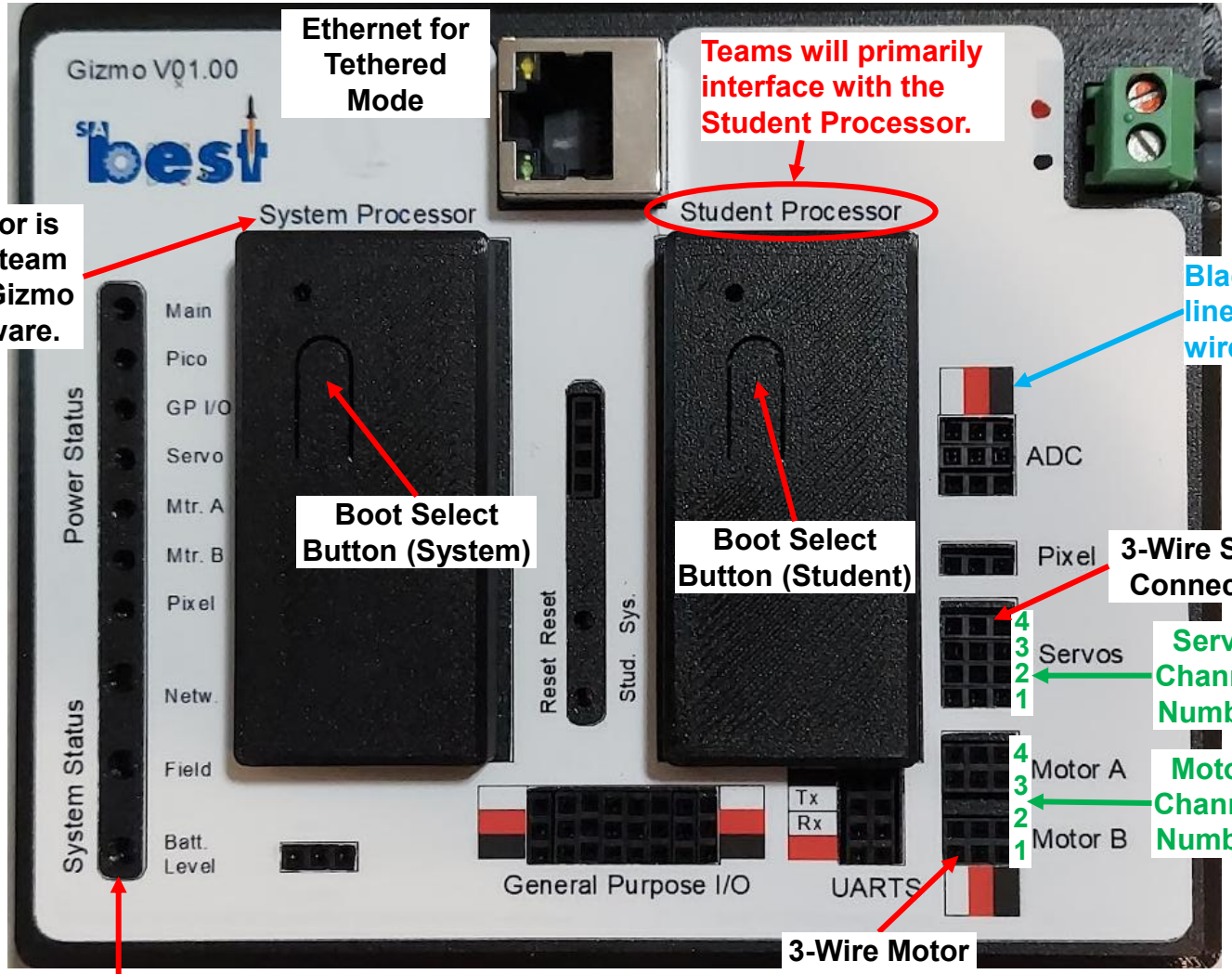
What's a Gizmo?

- Microprocessor (brain)
- System Processor runs firmware
- Student Processor runs your program

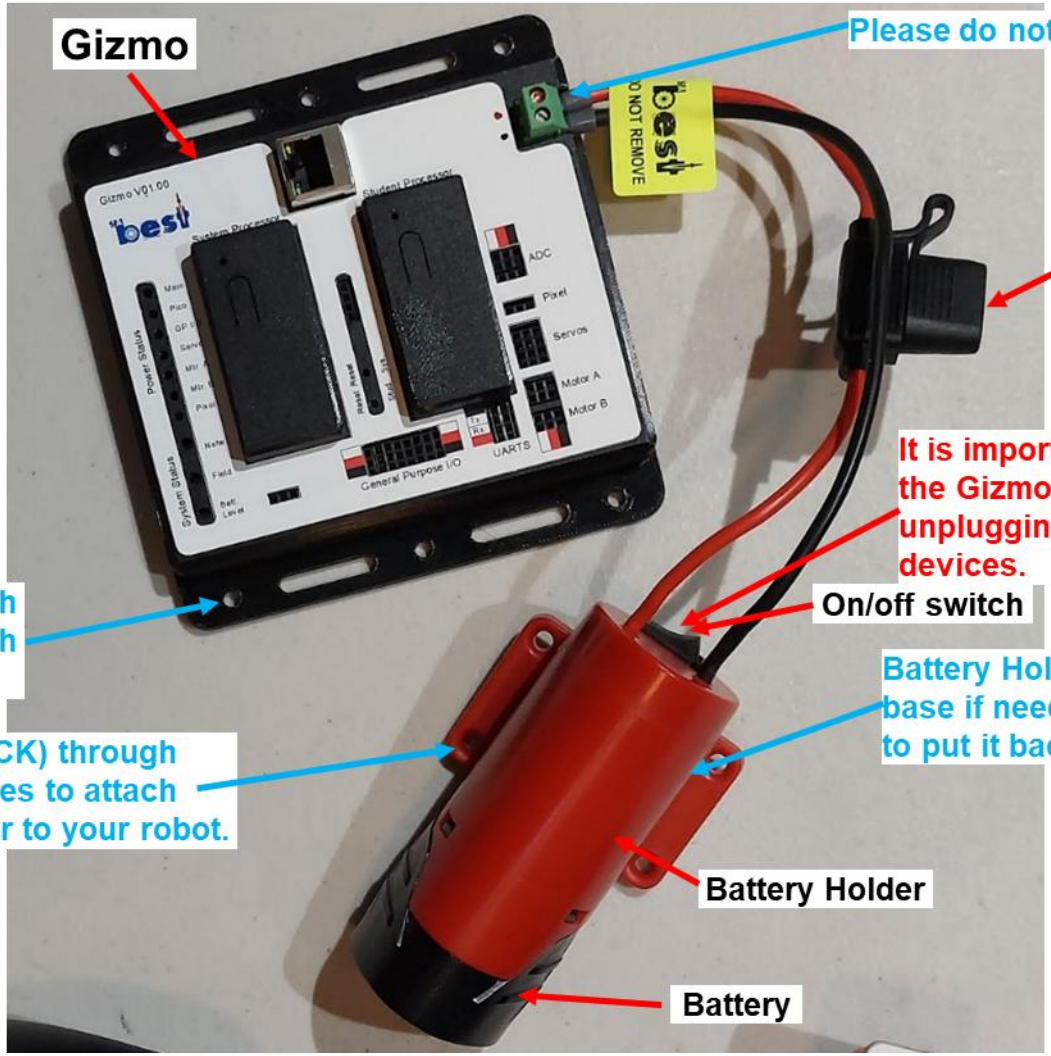




What's a Gizmo?

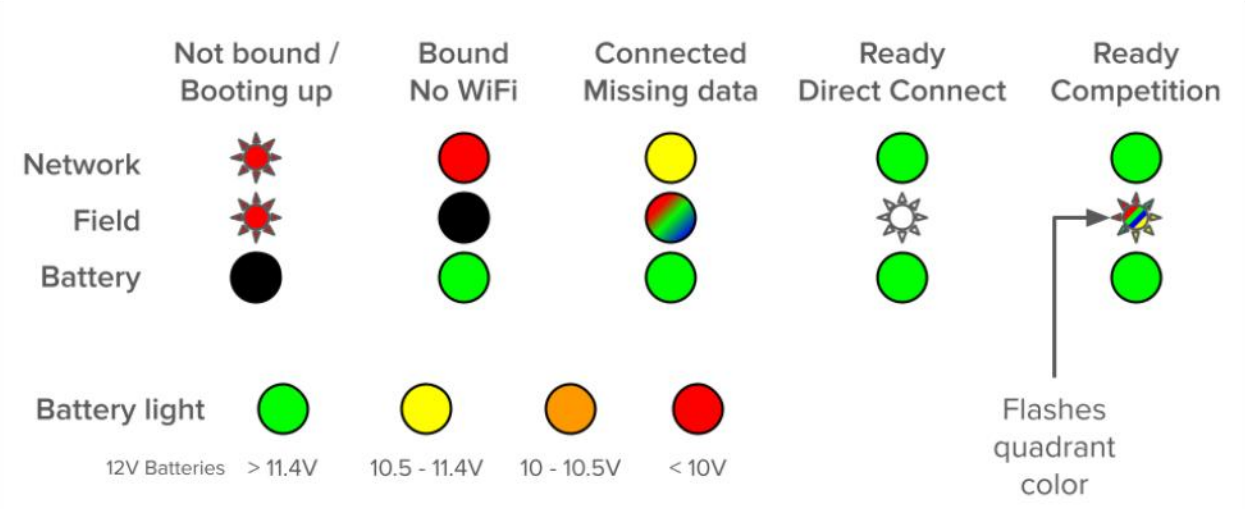


What's a Gizmo?



What's a Gizmo?

- **Power System Lights – on is normal, off means a problem with that system/component**
  - **Main Power (Orange)** **Pico Power (White)**
  - **GPIO Power (Blue)** **Servo Power (Green)**
  - **Motor Bank A (Yellow)** **Motor Bank B (Red)**
  - **Student NeoPixel Power (Red-Orange)**
- **System Status Lights**



What's the Driver's Station?

5V Power Bank

DS

Small USB cable Type-A to Micro-B

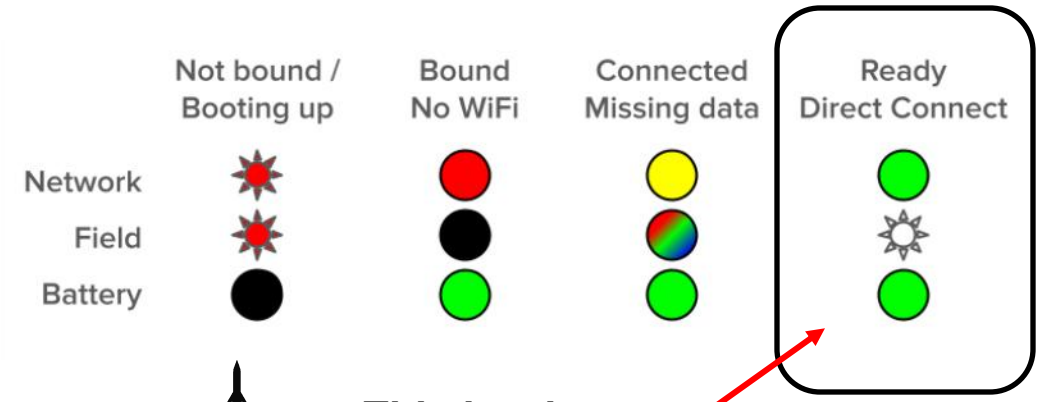
This is the most reliable USB port for the Joystick Controller

Switch must be in D position!!

Logitech Joystick Controller

What is Binding?

- Binding pairs your DS with your Gizmo so they can talk to each other
- <u>Binding was already done for the DS/Gizmo combinations in your SA BEST RKs.</u>
- If you need to repeat the binding for any reason, procedure is detailed in the “2025 SA BEST Visual Kit Reference” document, available in your Workflow.
- Binding is the only time your team should have any reason to access the system processor.

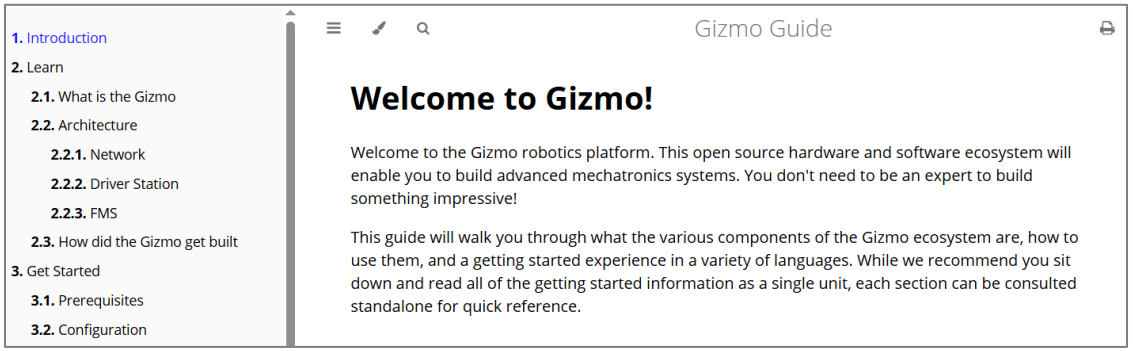


This is what you should have

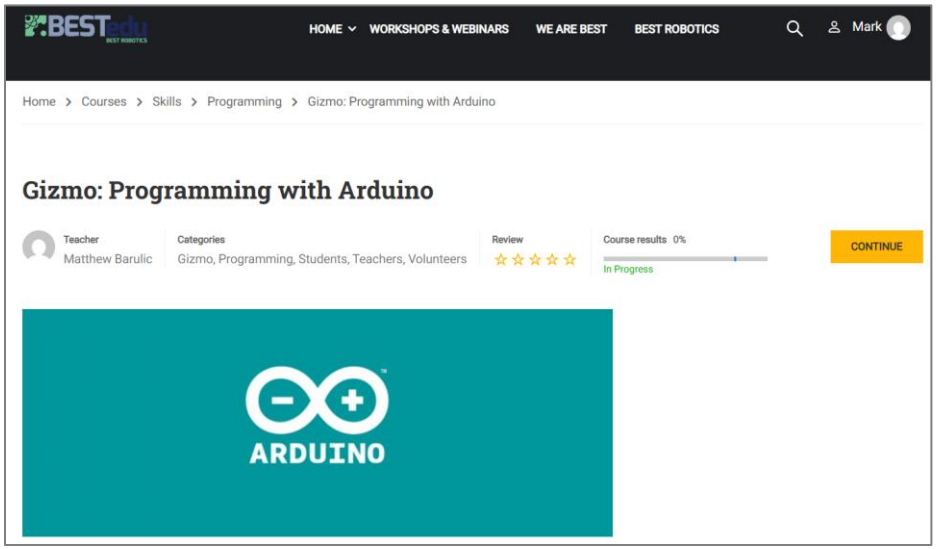
Binding is described online in various locations but the following “2025 SA BEST Visual Kit Reference” the is the most reliable

How to run your first program?

Gizmo Github
"Gizmo Guide"



BESTedu Website



How to run your first program?

- Gizmo speaks a few languages…

- Today, we are using Arduino IDE and programming in C++
- Arduino Website (for reference)
- Download Arduino IDE → Arduino IDE Download
- Install Arduino IDE

Installing the Pico Board Support Package

1. **In the Arduino IDE, select File -> Preferences…**
2. **Select the blue button  next to "Additional boards manager URLs".**
3. **Copy and paste this URL into the textbox:**
   https://github.com/earlephilhower/arduino-pico/releases/download/global/package_rp2040_index.json
4. **Click "OK" to close the URLs dialog.**
5. **Click "OK" to close the Preferences window.**
6. **Open the board manager by selecting the board icon  in the Activity Bar.**
7. **Search for "Pico".**
8. **Find the entry for "Raspberry Pi Pico/RP2040 by Earle Philhower" and click the "Install" button.**
9. **Wait for the notification in the lower right indicating installation success.**

Installing the Gizmo Library

1. Open the library manager by clicking the library icon  in the Activity Bar.
2. Search for “Gizmo”.
3. Find the entry for “Gizmo by M. Aldridge” and click the “Install” button.
4. Wait for the notification in the lower right indicating installation success.

Running BLINK and Connecting Student Processor

1. File -> Examples -> 0.1 Basics -> Blink
2. Tell Arduino IDE which board we are using…

   Tools -> Board -> Raspberry Pi Pico/RP2040 -> Raspberry Pi Pico
3. The first time you program with Arduino you must follow this process…
   a. Hold down the Boot Select button on the Student Processor while you plug in the USB cable into the Student Processor
   b. Once plugged in, let go of the Boot Select button
   c. You should now see a window pop-up that shows a new Drive labeled “RPI-RP2”
   d. In the Arduino IDE click on the board selection drop-down
   e. Find entry for UF2_Board and click
   f. In pop-up “Select Other Board and Port” search “Raspberry Pi Pico” and select
   g. Click OK… Board selection drop-down should now be bold
4. You can now compile and upload

Communicate with Gamepad

1. File -> Examples -> Gizmo (scroll to bottom) -> JoystickDebug

```
18    gizmo.refresh();
19
20    Serial.printf("Axis Data: %i %i %i %i %i %i; ",
21                  gizmo.getAxis(GIZMO_AXIS_LX),
22                  gizmo.getAxis(GIZMO_AXIS_LY),
23                  gizmo.getAxis(GIZMO_AXIS_RX),
24                  gizmo.getAxis(GIZMO_AXIS_RY),
25                  gizmo.getAxis(GIZMO_AXIS_DX),
26                  gizmo.getAxis(GIZMO_AXIS_DY)
27                  );
28  Serial.printf("Button Data: %i %i %i %i %i %i %i %i %i %i %i %i",
29                gizmo.getButton(GIZMO_BUTTON_BACK),
30                gizmo.getButton(GIZMO_BUTTON_START),
31                gizmo.getButton(GIZMO_BUTTON_LEFTSTICK),
32                gizmo.getButton(GIZMO_BUTTON_RIGHTSTICK),
33                gizmo.getButton(GIZMO_BUTTON_X),
34                gizmo.getButton(GIZMO_BUTTON_Y),
35                gizmo.getButton(GIZMO_BUTTON_A),
36                gizmo.getButton(GIZMO_BUTTON_B),
37                gizmo.getButton(GIZMO_BUTTON_LSHOULDER),
38                gizmo.getButton(GIZMO_BUTTON_RSHOULDER),
39                gizmo.getButton(GIZMO_BUTTON_LT),
40                gizmo.getButton(GIZMO_BUTTON_RT)
41                );
```

Go to serial monitor to see output

How to run the default program?

1. File -> Examples -> Gizmo (scroll to bottom) -> BestDefaultProgram

Resources

1. BESTedu Tutorials (for Students) – Gizmo: Getting Started and Gizmo: Programming in Arduino
2. Github Gizmo Mechatronics – Lots of info… way more than an average user needs
3. Gizmo Guide – Hosted through Github. A good place to start. Skip chapter on Field Management System (FMS).
4. Github Discussions – Forum for questions

Good Luck!