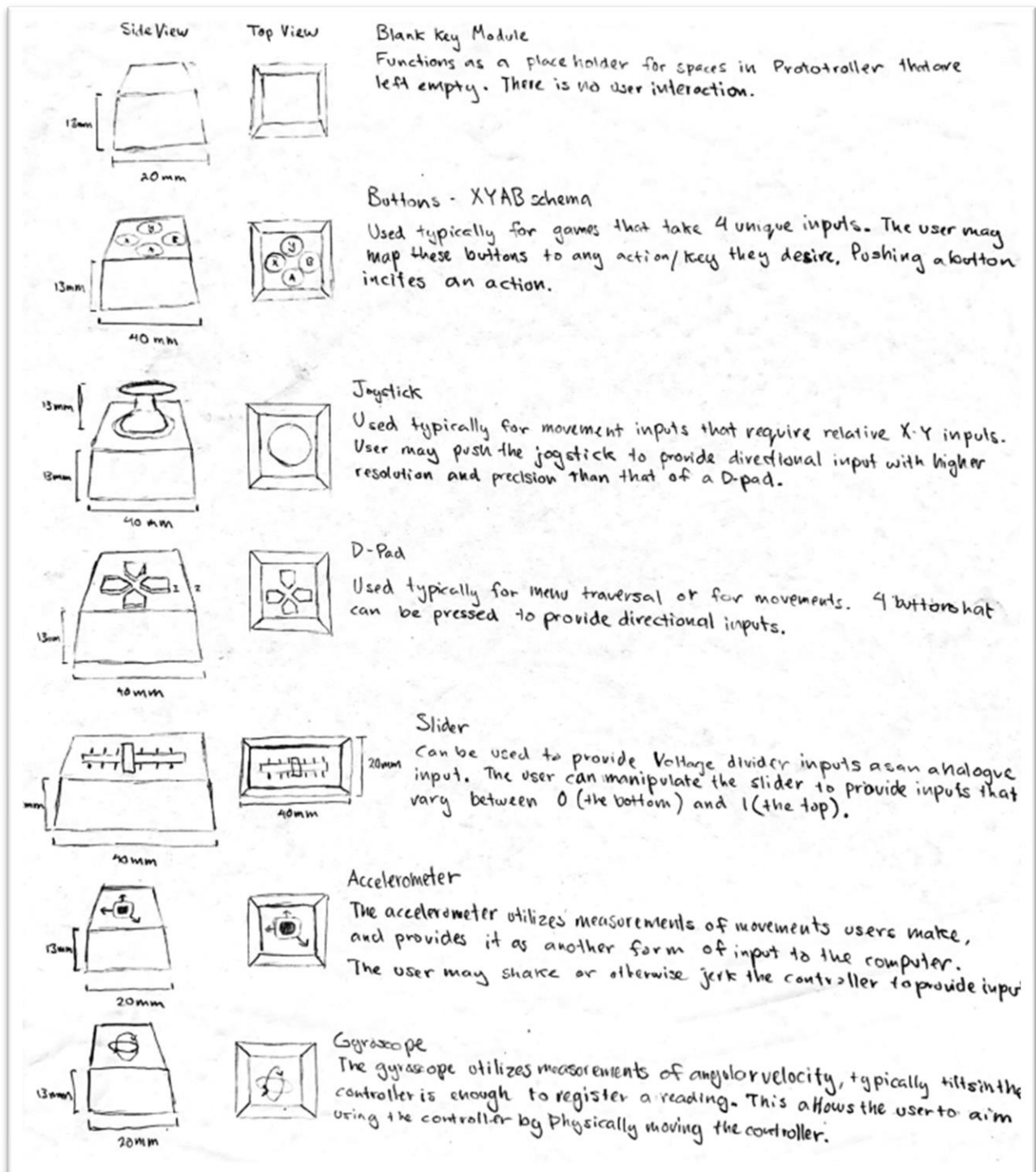
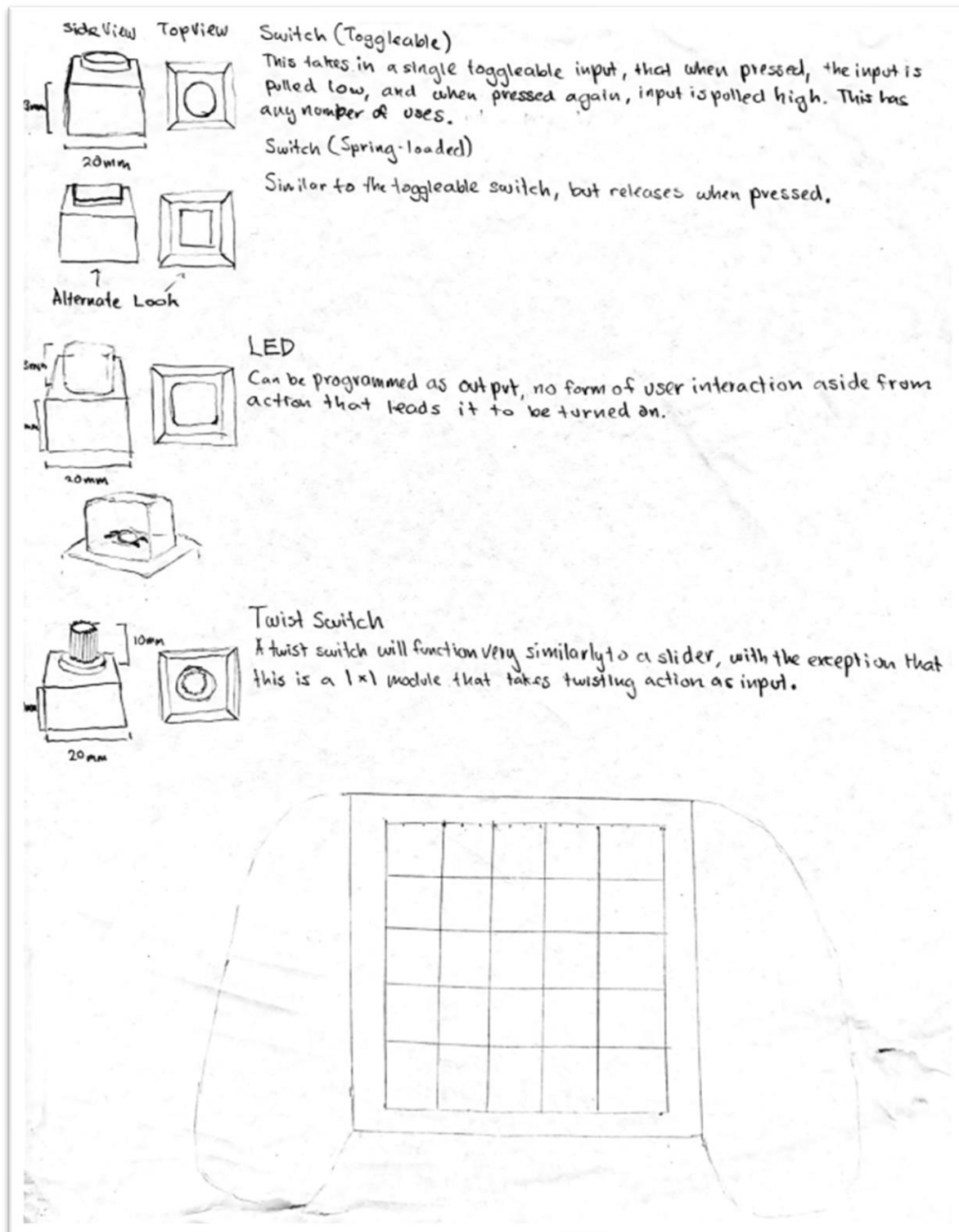


Prototroller Design Mockup

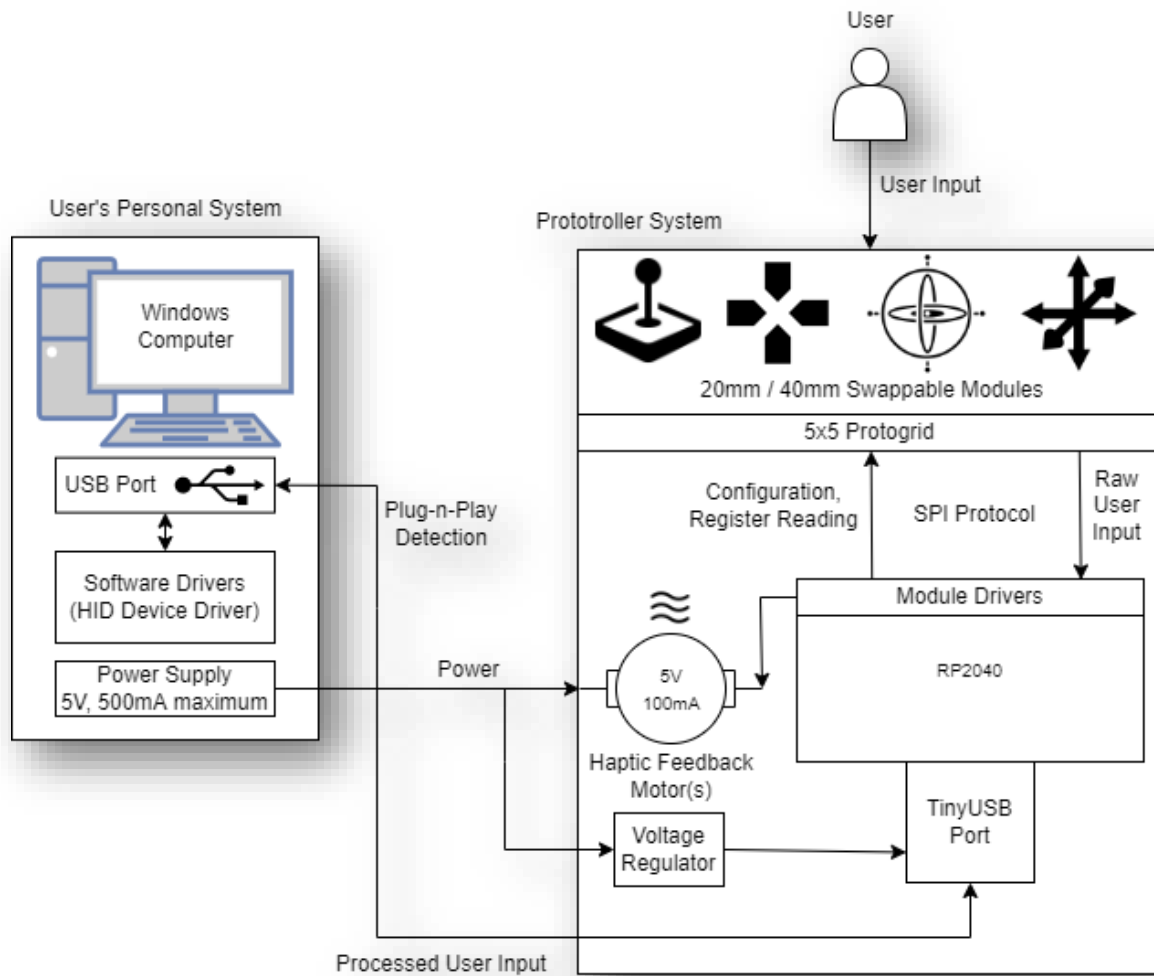
Interfaces





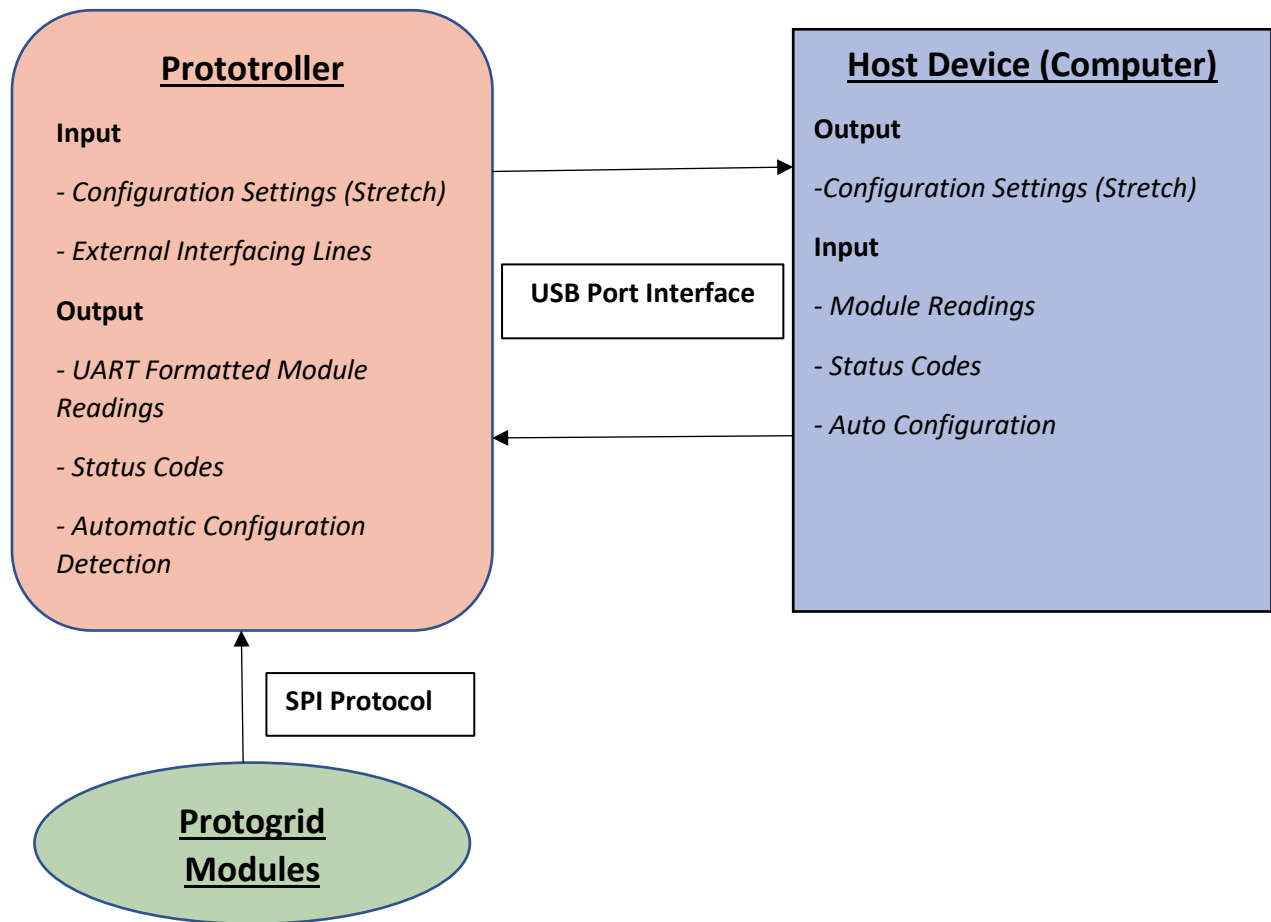
The primary user interface will be physical interaction with various I/O modules snapped onto the Prototroller, which are sketched and described above. This includes active interaction with modules like joysticks, as well as passive interaction with modules like the accelerometer and gyroscope.

Systems



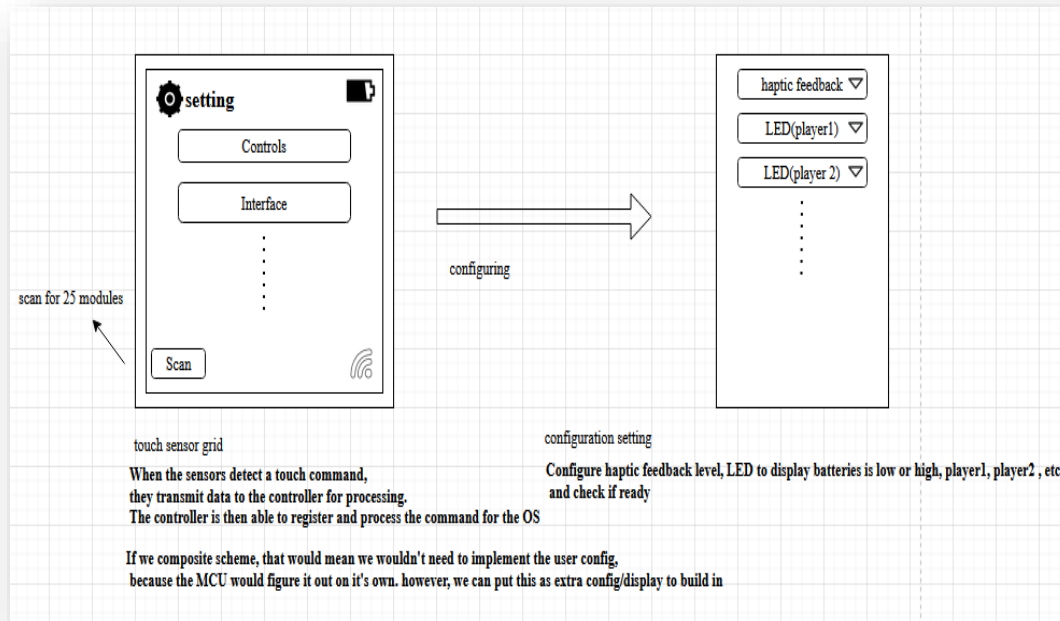
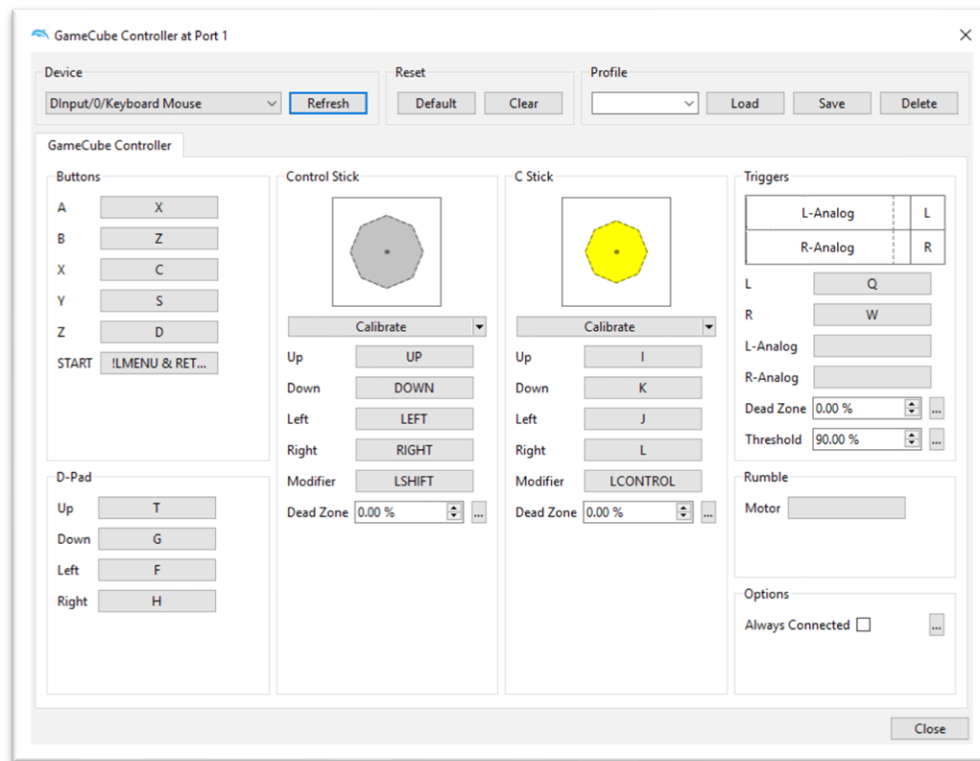
The two main systems at play include the user's host machine, running the Windows operating system, and the Prototroller physical artifact. Within the Prototroller, the relevant systems are for power regulation and communication with the modules on the Protogrid.

Networking



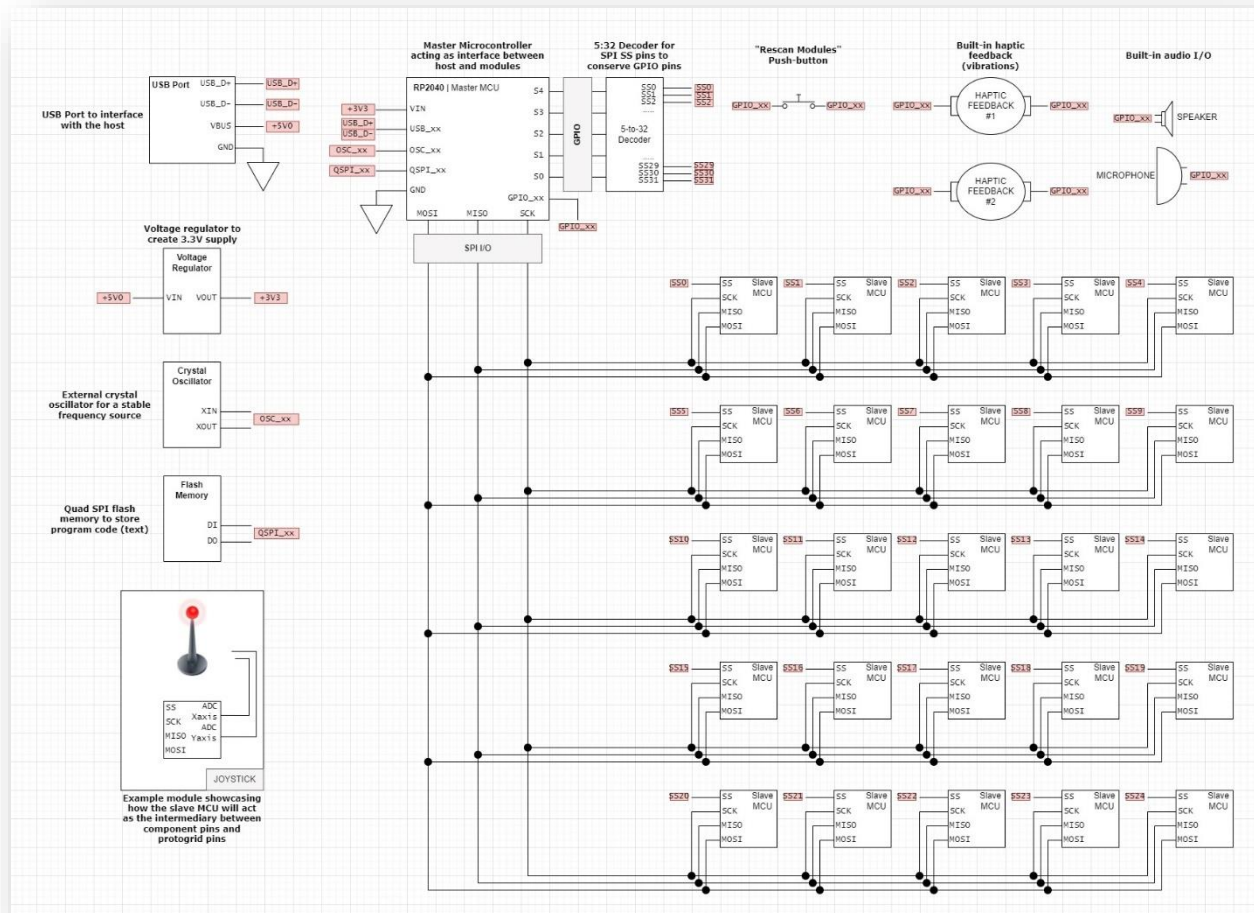
The Prototroller and Host Device form a Personal Area Network (PAN). Standardized modules such as a joystick or a button will be communicated to/from the host using TinyUSB as a HID, requiring no additional software drivers to be installed on the host device. For more complicated modules, software drivers would need to be utilized on the host machine.

Storyboards



A stretch goal for the project is to include a software interface like the Dolphin Emulator's controller mapping configuration system (shown above). This will grant the user greater control over calibration and remapping of module inputs. A preliminary storyboard demonstrating this is shown.

Draft Schematics



Major hardware components include the RP2040 Microcontroller Master and the associated elements: power/voltage regulator, flash storage, crystal oscillator, and I/O. Modules snapped to the Protogrid communicate with the master using SPI when selected to do so. The Protogrid will consist of $5 \times 5 = 25$ maximum modules. To conserve GPIO pins the Slave Select (SS) pins are wired to a 5-to-32 decoder. The USB port provides +5V, GND, and data lines. A push-button allows the user to initiate a rescan of the Protogrid. Built-in I/O such as haptic feedback and audio are hard-wired to the master.