Skuttlebot
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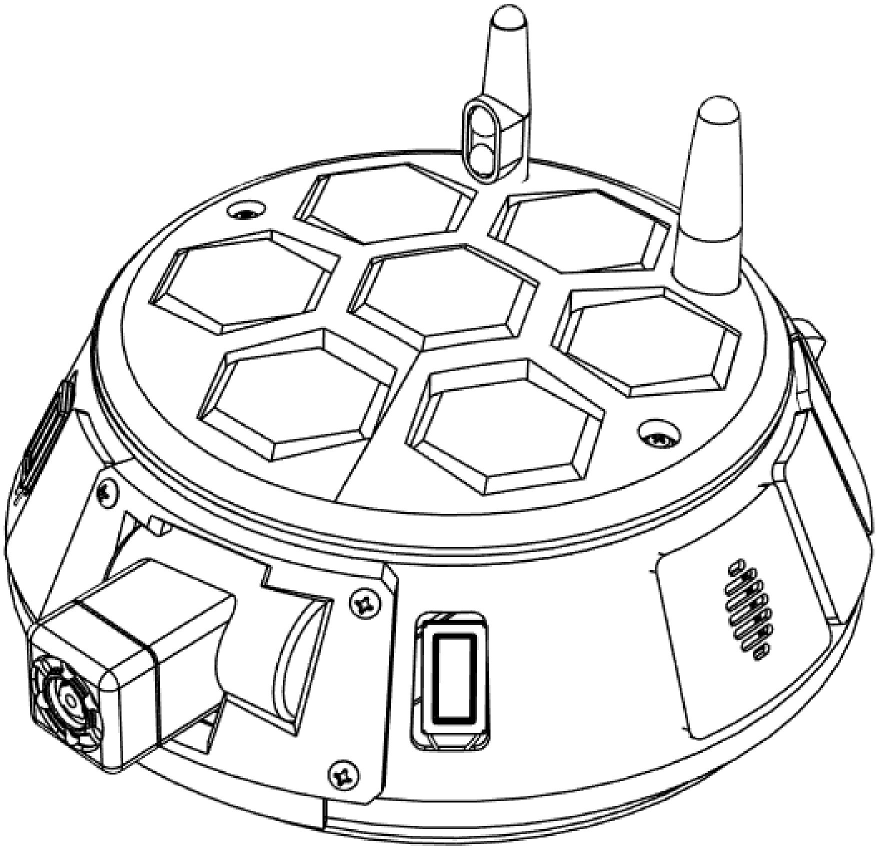
Skuttlebot Dev Kit Operations Manual



We’re so glad to have you join us in the development of Skuttlebot! This guide is meant to provide team specific information with regards to the Software pertaining to the Skuttlebot Command Unit- Dev Kit Assembly

What is Skuttlebot?

Our mission

Skuttlebot aims to create personal AIs that interact with the user through drones, ‘skuttling’ between devices. We seek to do this by creating both hardware and offboard software applications that can take advantage of existing systems resources. End result being an AI system that has the owners well-being at heart, able to be a lifelong companion as humanity enters its next wave of tech integration.

The team

We have a core team led by our leading mad scientist, but we also look strongly to the community to join us in the development of Skuttlebot. The reason for this, is that we strongly believe that AI development should and must be open to as many people as possible. We are developing the framework and the core OS but we encourage developers to create their own applications and subroutines. Our goal is to create an open marketplace for such apps, similar to many other devices.

Overview:

The following is the ‘how to’ pertaining to the Skuttlebot DevKit Version of the Command Module.

This assumes you have the assembled device and have already installed the software onto your PC.

This system is in Development and as such will have bugs, be prone to crashes, and other issues. This is normal, and there will be frequent updates which can be obtained using the SkuttleInstall.bat.

Startup

Hardware

To start up the device, simply turn on the powerswitch to power the onboard ESP-32. The system will then operate the last uploaded code. If the latest code from the Arduino folder has been updated, the device should first attempt to connect to the local WiFi server, using the credentials in the config.h file. At this phase the red LED on the ESP32 will blink 1 time periodically.

If unsuccessful, it will default to AP mode, creating its own server. At this point the LED will remain on. A smartphone or pc may connect to this access point by connecting to the ‘ESP32AP’ network using the password ‘password’. (these may be changed in the SkuttleWIFI.ino). Upon connecting, in any browser, go to the IP: 192.168.4.1. At this point, the credentials for the local WiFi may be entered. Once the device can connect, it will close the AP and proceed into normal operation.

During normal operation, the device sets up a series of websocket servers on port 80 and awaits a client. When a client is established communications are set up and the device will send a periodic heartbeat with basic information, while setting up listeners for commands from the PC.

Commands received from the PC are executed depending on the type of command, ranging from movement, audio, or video transmission.

Hardware Code

The Command Unit runs the Arduino based code from a central program, Skuttleshell.ino. It has various modules with descriptive naming.

Upon startup, The program initializes the WebServer on port 8080, with the sockets listening as Command, Camera and Sound pertaining to their namesake.

Its main loop consists largely of a simple loop of where it sends the last known command to the Skuttlemove module on a delay determined by ‘mintraval’. It then proceeds to check that status of any connections by invoking the maintenance module. It sends camera data if there is any, and checks for the presence of incoming updates.

Command listener is responsible for receiving, interpreting and acting on any commands from the PC and may invoke Skuttlemove if a movement command is received..

The Camera and Sound listeners only reacts to connect and disconnect messages.

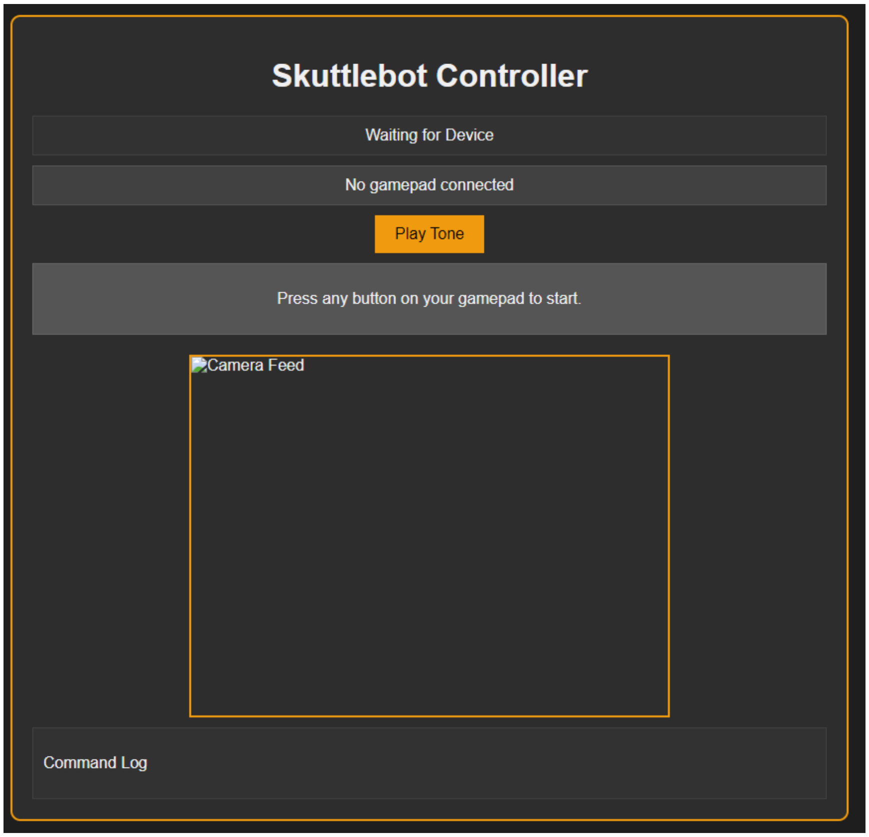
Heartbeat is a function periodically called from the maintenance function, first obtaining the current signal strength via the Signalchk module. It then transmits that information to the surrounding devices.

Handshake is invoked when a client connects to the websocket server, transmitting is mobile and ID information.

Maintenance, when invoked, checks the connection of a client and modulates the LED as appropriate.

PC

The PC side of the system uses an Electron based web application, consisting of a main, renderer, and preload, to communicate between the PC and command unit. When the SkuttleStart.bat is executed a GUI will come up as follows:



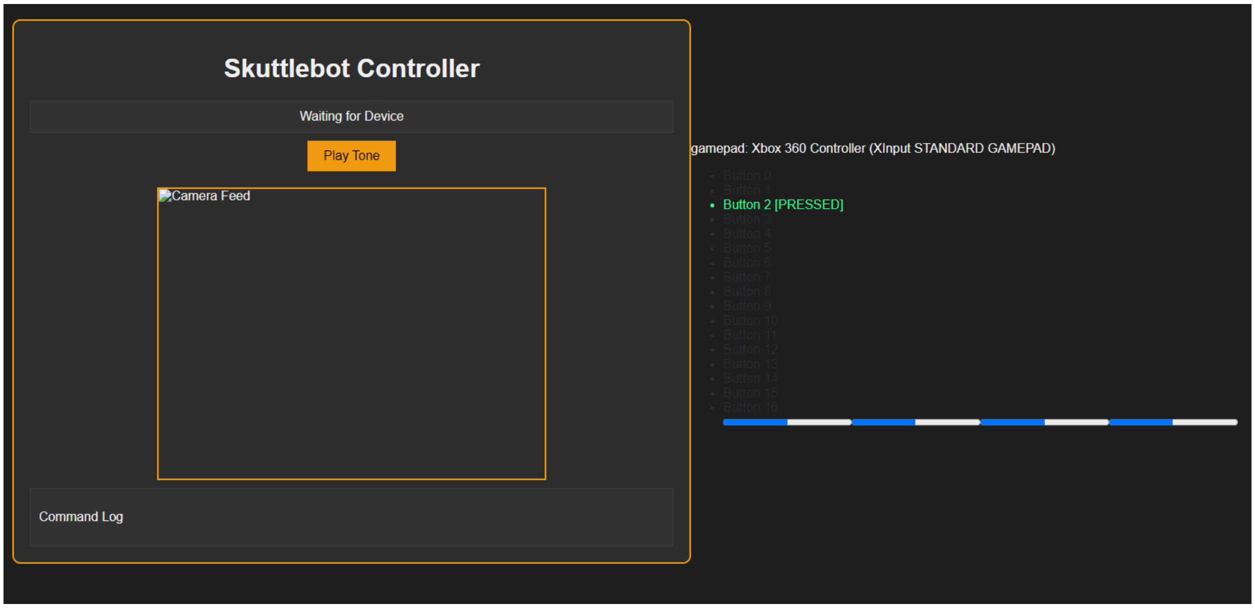
Skuttlebot Controller

Waiting for Device

No gamepad connected

Press any button on your gamepad to start.

At this point, the GUI will be both waiting for a controller and a server created by the command unit. When the controller is connected, and any button is pushed, the data from the controller will appear to the right and be transmitted to the command unit if available in real time.



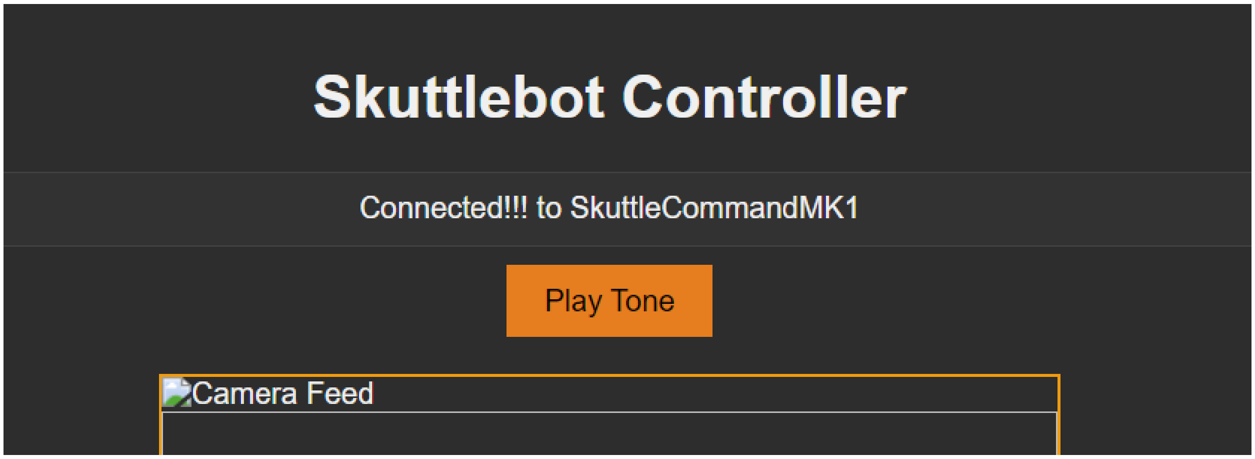
Skuttlebot Controller

Waiting for Device

gamepad: Xbox 360 Controller (XInput STANDARD GAMEPAD)

- Button 0
- Button 1
- Button 2 [PRESSED]
- Button 3
- Button 4
- Button 5
- Button 6
- Button 7
- Button 8
- Button 9
- Button 10
- Button 11
- Button 12
- Button 13
- Button 14
- Button 15
- Button 16

The PC will await a server to connect to, checking both a primary and secondary port. When connected, a brief exchange of info takes place and the device name shows in the GUI, indicating readiness to take commands from the PC.

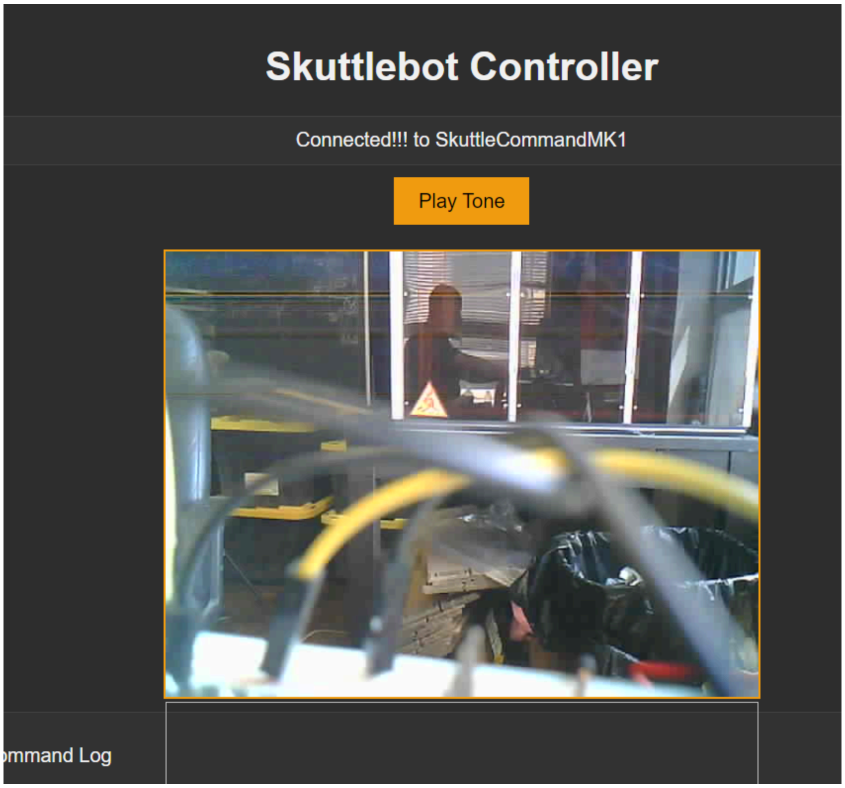


Skuttlebot Controller

Connected!!! to SkuttleCommandMK1

While most commands are taken from the controller, sound can be sent to the Command Unit when hitting the ‘Play Tone’ button on the GUI, which will send a 1 second tone to the device.

Hitting the Start Button, will toggle the camera.

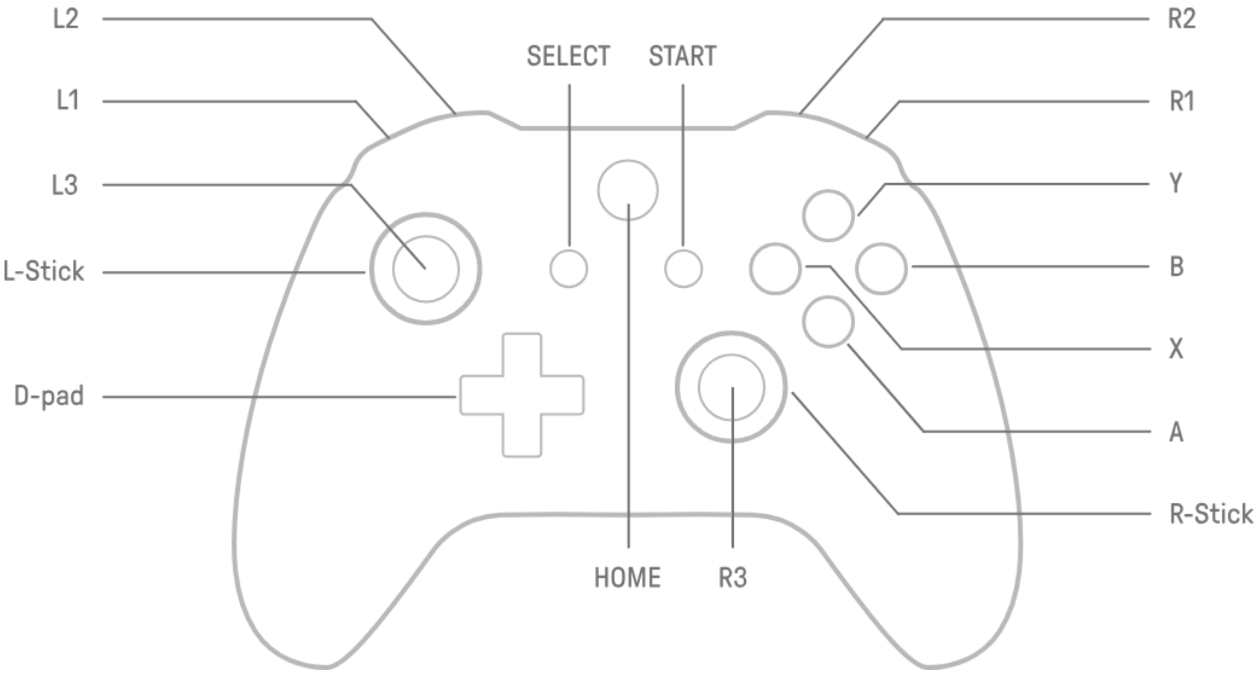


Skuttlebot Controller

Connected!!! to SkuttleCommandMK1

Controller Map

The controller works as follows:



	Turret	Tank	Car
Select	Change Mode		
Start	Toggle Camera		
D-pad Up	Cam Tilt Up		
D-pad Down	Cam Tilt Down		
D-pad Right	Rotate CL		
D-pad Left	Rotate CCW		
L-Stick		Left Wheel	
R-Stick		Right Wheel	Left and Right Wheel

Revisions

1.0	Initial Release	6/11/2024