Touchpad Joystick
DESIGN RATIONALE

Makers Making Change
A Neil Squire Program

Introduction

This device is a capacitive touchscreen joystick that allows users to connect to the XAC and operate a joystick with little to zero force. This device is well suited for users with limited dexterity and finger strength.

Research

Commercial Products

Title	Picture	Price	Notes
Steam Controller		N/A	This commercial gaming controller made by Steam uses a trackpad joystick instead of the standard analog joystick. Considered a commercial flop and is no longer available.
Vive Controller		$179.99	A controller used for VR gaming that uses a track pad joystick
Dell Wireless Touchpad		$109.99	A wireless trackpad that can connect to a computer through a USB dongle.

DIY Products

Title	Picture	Price	Notes
Joy-Con Touchpad Mod			"The initial inspiration for this project was to create a permanent solution to joystick fatigue and drifting issues" Replaces the stock joystick with the Cirque GlidePoint capacitive joystick.

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Requirements

Goals

G01	Offer users an alternative to analog joysticks.
G02	Allow users to control their joystick with little to no activation force.
G03	Use capacitive touch to control joystick movements.

Functional Requirements

F01	Must be compatible with the XAC.
F02	Must use common connection types to connect the device to the XAC.

Non-functional Requirement

NF01	3D printed parts must be printable on common maker printers.
NF02	3D printed parts should be printable with no supports.

Constraints

C01	Must use readily available off the shelf parts.
C02	Must be buildable using common maker tools.

Version 1.0

GlidePoint Joystick MKII

Designer: Ron Nelson

Cost: ~$32

Print Time: ~1h

GitHub Repository: nelsonii (Ron Nelson) (github.com)

- Contains firmware and housing designs for various devices made by Ron Nelson, including the glide point joystick.

YouTube: GlidePoint as Joystick for XBOX Adaptive Controller - YouTube

- Brief explanation of the prototyping process.

Other Resources:

ATMakers - Makers & Users | Facebook – Some discussion of device.

Cirque Glidepoint Light Touch Switch - YouTube – Review of product.

SevenMileMountain - Etsy Canada – Etsy shop where Ron Nelson currently sells mounts for this device.

Cirque GlidePoint Sensor

The GlidePoint is a capacitive trackpad that is used as a joystick in this project. There are three sizes available: 23 mm, 35 mm, and 40 mm in diameter.

There are also 4 different top surfaces available:

1. Curved Overlay
2. Flat Overlay
3. Adhesive Overlay
4. No Overlay

Device Configurations

Configuration	GlidePoint Variants	Microcontroller Options	Enclosure
1 (MKII)	• 35 mm - Curved Overlay	• QT PY SAMD21 • QT PY RP2040	• Top • Base
2	• 23 mm - Flat Overlay • 23mm - No Overlay	• QT PY SAMD21 • QT PY RP2040	• Top • Base
3	• 35 mm - Flat Overlay • 35 mm - Adhesive Overlay • 35 mm - No Overlay	• QT PY SAMD21 • QT PY RP2040	• Top • Base
4	• 40 mm - Flat Overlay • 40 mm - Adhesive Overlay • 40 mm - No Overlay	• QT PY SAMD21 • QT PY RP2040	• Top NA or uses other top. • Base
5	• 35 mm - Flat Overlay • 35 mm - Adhesive Overlay • 35 mm - No Overlay	• KB2040 – RP2040	• Top • Base
6	• 40 mm - Flat Overlay • 40 mm - Adhesive Overlay • 40 mm - No Overlay	• KB2040 – RP2040	• Top • Base

License

Testing

3D Printing

Device printing successfully without the need of support. The top and bottom of the enclosure fit together nicely.

Assembly

Wires could be shorter to fit better or note the gauge of wire to be smaller.

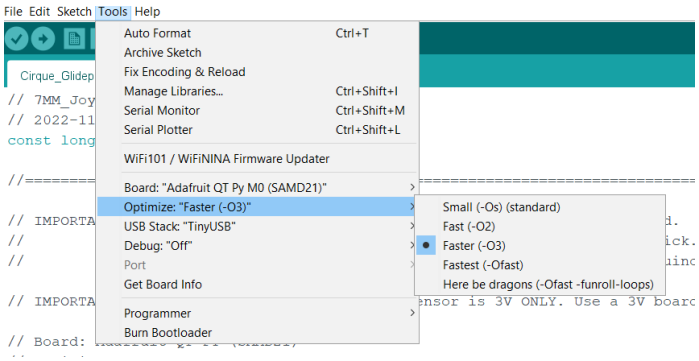
Functional Test

Connecting to XAC

Plugging in the joystick to the left or right USB input on the XAC and testing on Gamepad-Tester is successful.

Current testing

- Soldered components
  - Soldered easily.
  - Should have used less stiff wire as this made it more difficult to install components into the enclosure.
- Uploaded code
  - Had to download Adafruit board backage
  - Downloaded Neopixel and TinyUSB libraries
  - Forgot to change “Optimize:” to “Faster” as defined in the code.



Opportunities for Improvement

- Create a 3D printed handheld mount.
- Have markers to establish joystick orientation.
- Have the enclosure halves click-lock together.