XeroHID

# Introduction

I am a mentor for the team Error Code Xero (1425) out of Wilsonville Oregon. Every year we build an “OI” that is used by the gunner. This OI is based on the TI Launchpad board this is really the only choice for building this OI devices. The TI Launchpad can be used in one of three configurations. But none of these three configurations were a great fit for what we wanted. The biggest issue was we were not interested in the analog inputs and were more interested in the largest number of digital inputs and output. Specifically, we wanted at least 20 digital inputs and at least 8 digital outputs. None of the TI Launchpad configurations met this need.

This lead to the creation of XeroHID. XeroHID is a USB based HID device with an on-board bootloader to provide the required HID functionality for an FRC OI. XeroHID provides …

* 6 analog inputs
* 24 digital inputs
* 16 digital outputs
* A bootloader and Windows based bootload utility to update the firmware

XeroHID is based on the Infineon CY8CPROTO-062-4343W development kit. This development kit was chosen because I work for Infineon and not only have easy access to the development kit, but I also understand the device and the development tools very well. In addition, this development kit was designed so that the peripherals that are usually available on microcontroller development kits can be removed providing almost unfettered access to a large number of device I/Os.

This kit was also chosen because it is inexpensive. These can be found from multiple vendors for about $30 per kit.

# Using XeroHID

Step 1: Get the XeroHID Firmware and Software

Run the clone command below to retrieve the XeroHID firmware and software. This retrieves whatis required to run the XeroHID firmware as well as everything needed to customize XeroHID for your own purposes. If the command below does not make sense, talk to someone on your software subteam. I generally do all of this on a Windows machine and use Cygwin for running git, but any git solution should work.

git clone https://github.com/sjcbulldog/frchid2.git

Step 2: Download and Install the Cypress Programmer

Navigate to the Infineon developer center (https://softwaretools.infineon.com/welcome) and select tools in the top bar. In the “Filter results” text box, type “Cypress Programmer”, click the download link, and select Windows (x64). Download and install the “Cypress Programmer” tool. Note, you will be required to have an account on the Infineon site to download the Cypress Programmer.

Step 3: Connect the Development Kit

Attach the CY8CPROTO-062-4343W development kit to your computer using the provided cable. Note, the development kit has two USB connectors. You want to use the port shown in the picture below.



Step 4: Program the Bootloader

Start the Cypress Programmer and follow these steps:

* In the Probe/Kit field select the entry that starts with CY8CPROTO‑062‑4343W
* In the “File” line under Program Settings, push the “…” button on the right and navigate to where you cloned the files

Step 5: Program the FRCHID program’

Programmer

Download the programmer

1. Program the bootloader
2. Program the HID program

|  |  |  |  |
| --- | --- | --- | --- |
| Device Pin | Connector | FRC Type | FRC Index |
| P10\_0 | J1-38 | Joystick | 1 |
| P10\_1 | J1-34 | Joystick | 2 |
| P10\_2 | J1-35 | Joystick | 3 |
| P10\_3 | J1-37 | Joystick | 4 |
| P10\_4 | J1-36 | Joystick | 5 |
| P10\_5 | J1-33 | Joystick | 6 |
| P0\_5 | J1-32 | Button | 1 |
| P1\_0 | J2-24 | Button | 2 |
| P11\_2 | J1-28 | Button | 3 |
| P11\_3 | J1-29 | Button | 4 |
| P11\_4 | J1-30 | Button | 5 |
| P11\_5 | J1-26 | Button | 6 |
| P11\_6 | J1-25 | Button | 7 |
| P11\_7 | J1-27 | Button | 8 |
| P12\_0 | J1-23 | Button | 9 |
| P12\_1 | J1-22 | Button | 10 |
| P12\_3 | J1-31 | Button | 11 |
| P12\_4 | J1-21 | Button | 12 |
| P12\_5 | J1-24 | Button | 13 |
| P13\_0 | J1-16 | Button | 14 |
| P13\_1 | J1-19 | Button | 15 |
| P13\_2 | J1-18 | Button | 16 |
| P13\_3 | J1-17 | Button | 17 |
| P13\_4 | J1-15 | Button | 18 |
| P13\_5 | J1-14 | Button | 19 |
| P13\_6 | J1-11 | Button | 20 |
| P5\_4 | J2-5 | Button | 21 |
| P5\_5 | J2-6 | Button | 22 |
| P5\_6 | J2-7 | Button | 23 |
| P5\_7 | J2-8 | Button | 24 |
| P6\_2 | J2-14 | Output | 1 |
| P6\_3 | J2-25 | Output | 2 |
| P8\_1 | J2-26 | Output | 3 |
| P8\_2 | J2-23 | Output | 4 |
| P8\_3 | J2-29 | Output | 5 |
| P8\_4 | J2-28 | Output | 6 |
| P8\_5 | J2-22 | Output | 7 |
| P8\_6 | J2-27 | Output | 8 |
| P8\_7 | J2-30 | Output | 9 |
| P9\_0 | J2-19 | Output | 10 |
| P9\_1 | J2-34 | Output | 11 |
| P9\_2 | J2-33 | Output | 12 |
| P9\_3 | J2-21 | Output | 13 |
| P9\_4 | J2-35 | Output | 14 |
| P9\_5 | J2-20 | Output | 15 |
| P9\_6 | J2-37 | Output | 16 |

# Building XeroHID

# XeroHID Design