~Questions + Answers

* How are the Controllers Tracked?
  + There are 3 methods: Gyroscope, IR Camera, and Lighthouse, each increasing in accuracy.
    - Gyroscope
    - IR Camera
    - Lighthouse
      * HTC Vive uses this
  + What is 6 Degrees of Freedom?
  + ***Positions found using SolvePNP***
* How to Link it to VR?
  + How it communicates?
    - Bluetooth
* How is power supplied?
  + Batteries? Wired?
* Has anyone done this before?
  + Tutorials online?
* What are the necessary Electronics?
  + Do we have to make any ourselves? Like soldering?
* How are things designed?
  + Through KiCad

~Helpful Links

* [A Guy made a DIY VR setup.](https://www.youtube.com/watch?v=GwUCgW9XAUg)
* [Someone made a custom rifle controller on reddit](https://www.reddit.com/r/Vive/comments/4vdw8m/custom_rifle_controller_for_htc_vive/)
  + It’s just 3d printed parts, this could work though.
* [Custom VR Controller, just gyro though…](https://www.youtube.com/watch?v=VJ7w97qtVn0)
* [Different Platform, but this guy made a custom controller for Quest.](https://www.youtube.com/watch?v=o9phocbsioA)
  + But he just inserted the quest controller IN the box. Argh.
* [OpenVR Github! By Valve!](https://github.com/ValveSoftware/openvr)
* [Unity VR Input](https://youtu.be/U-L0COB3lys)
* [How lighthouse technology works](https://gizmodo.com/this-is-how-valve-s-amazing-lighthouse-tracking-technol-1705356768)
* [Valve Releases its trackers to Custom Hardware](https://www.theverge.com/circuitbreaker/2016/8/4/12374508/valve-htc-vive-steamvr-tracking-license-custom-hardware-program)
  + [Valve Steamworks VR License](https://partner.steamgames.com/vrlicensing)
* [VR Performance Guide](https://www.youtube.com/watch?v=b33kIxN63IY)
* [Real time projection mapping](https://www.youtube.com/watch?v=2gkidC6hTlY) (Something I found to be just so cool)
* [CUSTOM TRACKING FOR HTC VIVE LETS GOOOOOO](https://www.youtube.com/watch?v=bz14Qv--I6A)
  + [Hackaday Project](https://hackaday.io/project/19570-htc-vive-lighthouse-custom-tracking)
  + [SOURCE CODE YIPPEE](https://www.youtube.com/redirect?event=video_description&redir_token=QUFFLUhqazlfNzJXNUxWcDU0OUFSc09jekUxLXhTalRtQXxBQ3Jtc0trSkVmeHhLV0tULXJDSkkybU1nSFozQWdYZFhxang0bEtqcEwtdTZCMDV4UnlkRlhQbG1EUHBXQlRtdnJiYjlFMDhCMDdQdkhLNE4yRGpLc0ZzSy05aVNyWGMzWi1JWGpkc05nNlVQcGlFQ19sWVhYaw&q=https%3A%2F%2Fgithub.com%2FRoboy%2Froboy_darkroom&v=bz14Qv--I6A)
* [How tracking works](https://uploadvr.com/how-vr-tracking-works/)
* **Lighthouse tracking tutorial** - Scott Rumschlag
  + <https://trmm.net/Lighthouse/>
  + <https://github.com/nairol/LighthouseRedox>
* [DIY SteamVR Tracking Github](https://github.com/AttilaTheBum/VRKitz---Board-Library)
  + [VRKitz](https://vrkitz.com/)
  + [DIY Tracking Youtube](https://www.youtube.com/watch?v=T5NnRqFSBI4) and [Part 2](https://www.youtube.com/watch?v=NOJQ9MAs3YU)
* [Steam VR Hardware Presentation](https://www.youtube.com/watch?v=BhzUn0gmkEU)
* [Homebrew Lighthouse](https://trmm.net/Lighthouse/)
  + [Lighthouse Redox](https://github.com/nairol/LighthouseRedox/tree/master/docs)
* [HM-10 AT Commands](https://github-wiki-see.page/m/zubial/arduino-serial/wiki/Bluetooth-HM-10-AT-Commands)
* [Regular Serial with Unity](https://www.youtube.com/watch?v=5ElKFY3N1zs)
* [BLE Windows Docs](https://learn.microsoft.com/en-us/windows/uwp/devices-sensors/bluetooth-low-energy-overview)
* [BlueUnity -> Using Bluetooth in Unity](https://github.com/bentalebahmed/BlueUnity)
* [C# App w/ BLE](https://www.youtube.com/watch?v=CozmqN_iwNs)
* [BLE w/ Unity](https://stackoverflow.com/questions/60686302/ble-device-with-unity)
  + <https://github.com/adabru/BleWinrtDll>

~Items + Cost

* [TS4231 Light to DC](https://triadsemi.com/product/ts4231/) - $2.24
  + Converts infrared light (Has Photoresistor) into position-indicating digital envelope signals
  + [TS4112 Light to DC](https://triadsemi.com/product/ts4112/) - $1.45 (Not out yet)
  + [Arduino Library for TS4231](https://github.com/TriadSemi/TS4231)
    - ONLY handles configuration.
* [TL448K6D-VR](https://tundra-labs.com/products/tl448k6d-vr-system-in-package-for-steamvr-tracking?variant=39421399859409) - $51.78
  + SiD by tundra, easily handles VR, but is unavailable
* [MPU6050](https://www.amazon.com/HiLetgo-MPU-6050-Accelerometer-Gyroscope-Converter/dp/B00LP25V1A) IMU - $9.99
  + Has internal 6-DoF,

Photodiodes instead of photo transistors

24 Photodiodes inside of the VIVE controller

Due vs Mega - <https://www.educba.com/arduino-due-vs-mega/>

(there is a table in the website)

Due - **ARMSAM3X8E 16 MHz processor (3.3v)**

* 7-12 V voltage supply
* **Size of flash is 512 kb**
* **Size of SRAM is 96 kb**
* 54 digital input/output pins
* **12 pwm pins**
* 4 total hardware serial ports
* **12 analog inputs**

Mega - **ATmega 16MHz processor (5v)**

* 7-12 V voltage supply
* **Size of flash is 256 kb**
* **Size of SRAM is 8 kb**
* 54 digital input/output pins
* **14 pwm pins**
* 4 total hardware serial ports
* **16 analog inputs**

[**https://all3dp.com/2/arduino-mega-vs-uno-vs-due-differences/**](https://all3dp.com/2/arduino-mega-vs-uno-vs-due-differences/)

[**https://forum.kicad.info/t/bom-cpl-files/31140**](https://forum.kicad.info/t/bom-cpl-files/31140)