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Assembly Notes

This document is intended to assist when attaching the HAT and experiment to a raspberry pi 3B+ computer. The mechanical configuration of the experiment has been designed to be as simple as possible, and hopefully will not present a challenge to assemble.

Initial Setup:

* To assemble the experiment, you need:
  + HAT/experiment
  + M2.5 screws
    - Length determined by UAH, supplied screws are 12mm.
    - x4
  + M2.5 standoffs
    - 6mm
    - X4
  + Pi 3B+

To Assemble:

* Remove all corner screws and standoffs from the pi HAT.
* Extra Pins
  + On the 3B+, there is an extra 4 pins not attached to the 40-pin standard used by our design.
  + We designed a cutout for this, but it is not properly aligned.
  + You can remediate this by either:
    - Shortening the height of the four pins with a Dremel.
    - Widening the hole in the HAT PCB to allow room for pins
      * So long as no other components are hit (SPS30 and Header are closest) AR2B team can widen the slot with a Dremel or other tool.
      * There are no imbedded wires anywhere near that side of the PCB board.
    - Bending the pins out of the way.
      * In testing, we bent the pins out of the way away from each other.
      * Not an ideal configuration, but it was the best we could do.
      * This was definitely the sloppiest part of this entire project.
* Slide the HAT down onto the pi’s GPIO Header.
  + This is the most difficult part of the entire assembly.
  + Try to keep the HAT level with the pi and push down on the two corners adjacent to the GPIO header.
    - The idea is to provide uniform pressure to push the GPIO pins through the receiver on the HAT.
    - If the HAT is pushed onto the GPIO header at an angle, you may damage the experiment or the pi.
  + Push until no GPIO header is exposed below the surface of the HAT.
    - The black receiver should be pressed against the black GPIO base and no metal GPIO header should be visible.
  + Slide 6mm standoffs in between the pi and HAT.
    - May take some working, this is a very tight fit.
    - Repeat this step for all four corners.
  + Screw through standoffs.
    - Insert screws of desired length and screw through the standoffs into baseplate.
  + Insert SD card into SD card slot.

Congratulations, you have successfully assembled this experiment. When supplied with power, it should function properly.

* Testing proper functionality
  + First, simply leave the experiment plugged in for thirty minutes and watch for a restart.
    - If there are any program errors, the pi will restart itself to alleviate the issuu.
  + If the experiment passed this step, manually test for program functionality using the ps -aux with the grep command.
    - “ps -aux | grep startup”
    - “ps -aux | grep monitor”
    - “ps -aux | grep sps30”
    - “ps -aux | grep UAH”
    - “ps -aux | grep transfer”
      * All of these commands should return two results, or running processes.
        + One of the results is the search, the other is the program.

Congratulations, you have successfully assembled and tested this experiment. Thank you for setting it up!