

# Executive Summary

The team's goal was to create a controller which would interface with a computer as a keyboard and mouse while still being usable by someone who doesn't have a hand. This way, the team would implement inclusive design principles in order to implement the device. The controller would be able to act as a keyboard and mouse, with the joysticks used to both type and move the mouse cursor. It must also be easy for the intended user to control as well as three discrete levels of sensitivity for the user to choose from. The system must be properly enclosed, so that it is travel safe and partially dust proof. Finally, the system must be able to display its functional status to the user, which is done through an OLED display and several LEDs.

The team first worked on the design problem by doing research, then created a high-level design of the system itself with a block diagram. This way, the team was able to identify all of the components which would need to be designed, built, and implemented into the system, as well as all of the interfaces connecting them. The team was able to divide the system into eight different blocks, and each team member took on responsibility for two blocks in the systems. For the first phase of block design and checkoffs, the team worked on the Joystick, OLED implementation, Mouse firmware, and Keyboard firmware. All of these components were properly implemented and tested before working on the second phase of blocks, which include the Enclosure, Input Modification, PCB, and OLED interface code. Once all of these components were completed, the team then worked on integrating the system together, in order to make sure that it fulfilled all of the requirements the team had set out to meet.

Through the design, the team was able to learn about how to implement the firmware for a keyboard and mouse as well as how to ensure that the system communicates with all of its peripherals seamlessly. This way, the team was able to come up with a design and properly manage themselves in order to implement a controller which can be utilized by a wide user group. Something else that we learned through working on this project is that 3D printing has an inherent tolerance adjustment that needs to be taken into consideration when implementing precise and dimension-dependent components, which can be alleviated with more lead time to prototype the designs. In theory, our enclosure satisfied everything we needed but there were several issues including misalignment with the USB port, difficulty closing and securing the system, and other challenges that could have been resolved if we had more time to create prototype prints for our enclosure.

Refer below for a timeline of the team's project process updates and task completion.

# Timeline

Legend:

Phase
  Task
  Critical Path Tasks
  Milestone

Week	1	2	3	4	5	6	7	8	9	10	11
Date	Sep 26 - Oct 2	Oct 3 - Oct 9	Oct 10 - Oct 16	Oct 17 - Oct 23	Oct 25 - Oct 30	Oct 31 - Nov 6	Nov 7 - Nov 13	Nov 14 - Nov 20	Nov 21 - Nov 27	Nov 28 - Dec 4	Dec 5 - Dec 11
Phase 1		Research									
Task 1.1			Modular Assistive Technology								
Task 1.2			Firmware								
Task 1.3			Software								
Task 1.4			Hardware								
Milestone 1.1											
Task 1.5					Design Impact						
Phase 2					Design						
Task 2.1					Project Requirements						
Task 2.2							Implemented Design				
Task 2.3									Block Diagram		
Milestone 2.1											
Phase 3						Tech Demo / Prototyping Practice					
Task 3.1						Visualization Cohort					
Task 3.2							Embedded Cohort				

## Term 1 Task Description

### Task

1.1 Modular Assistive Technology  
1.2 Firmware

### Assigned to:

Alyssa and Anthony  
Alyssa

### Status:

Complete  
Complete

1.3 Software	Jordyn	Complete
1.4 Hardware	Don	Complete
1.5 Design Impact	Alyssa, Anthony, Don, Jordyn	Complete
2.1 Project Requirements	Alyssa, Jordyn	Complete
2.2 Implementation Design	Alyssa, Anthony, Don, Jordyn	Complete
2.3 Block Diagram	Alyssa, Anthony, Don, Jordyn	Complete
3.1 Visualization Cohort	Alyssa, Anthony	Complete
3.2 Embedded Cohort	Don, Jordyn	Complete

Week	12	13	14	15	16	17	18	19	20	21	22
Date	Jan 3 - Jan 8	Jan 9 - Jan 15	Jan 16 - Jan 22	Jan 23 - Jan 29	Jan 30 - Feb 5	Feb 6 - Feb 12	Feb 13 - Feb 19	Feb 20 - Feb 26	Feb 27 - Mar 5	Mar 6 - Mar 12	Mar 13 - Mar 19
<b>Phase 4</b>	<b>Block I</b>										
Task 4.1		OLED									
Task 4.2	Keyboard										
Task 4.3		Mouse									
Task 4.4		Joystick & Buttons									
<b>Phase 5</b>					<b>Block II</b>						
Task 5.1						Input Modifications					
Task 5.2					Enclosure						
Task 5.3					PCB						
Task 5.4					Input Display Code						
<b>Phase 6</b>								<b>System I</b>			
Task 6.1								Keyboard Functionality			
Task 6.2								Mouse Functionality			

## Term 2 Task Description

Task	Assigned to:	Status:
4.1 OLED	Don	Complete
4.2 Keyboard	Anthony	Complete
4.3 Mouse	Jordyn	Complete
4.4 Joysticks & Buttons	Alyssa	Complete
5.1 Input Display Code	Don	Complete
5.2 PCB	Anthony	Complete

5.3 Enclosure	Jordyn	Complete
5.4 Input Modification	Alyssa	Complete
6.1 Keyboard Functionality	Anthony, Don, Jordyn, Alyssa	Complete
6.2 Mouse Functionality	Anthony, Don, Jordyn, Alyssa	Complete

Week	23	24	25	26	27	28	29	30	31	32	33
Date	Mar 28 - Apr 2	Apr 3 - Apr 9	Apr 10 - Apr 16	Apr 17 - Apr 23	Apr 24 - Apr 30	May 1 - May 7	May 8 - May 14	May 15 - May 21	May 22 - May 28	May 29 - Jun 4	Jun 5 - Jun 11
Phase 7	System II										
Task 7.1	Ease of Use										
Task 7.2	Dust Protection										
Task 7.3		Travel Safe									
Task 7.4			Accuracy								
Task 7.5			Functional Status								
Task 7.6				Sensitivity Level							
Phase 8	Expo/Presentation Preparation										
Task 8.1	Elevator Pitch										
Task 8.2		Project Poster									
Task 8.3	Project Showcase										
Task 8.4	Final Project Document										

### Term 3 Task Description

Task	Assigned to:	Status:
7.1 Ease of Use	Anthony, Don, Jordyn, Alyssa	Complete
7.2 Dust Protection	Anthony, Don, Jordyn, Alyssa	Complete
7.3 Travel Safe	Anthony, Don, Jordyn, Alyssa	Complete
7.4 Accuracy	Anthony, Don, Jordyn, Alyssa	Complete
7.5 Functional Status	Anthony, Don, Jordyn, Alyssa	Complete
7.6 Sensitivity Level	Anthony, Don, Jordyn, Alyssa	Complete
8.1 Elevator Pitch	Anthony, Don, Jordyn, Alyssa	Complete
8.2 Project Poster	Anthony, Don, Jordyn, Alyssa	Complete
8.3 Project Showcase	Anthony, Don, Jordyn, Alyssa	Complete
8.4 Final Project Document	Anthony, Don, Jordyn, Alyssa	Complete