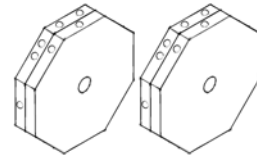




Braillebook



Refreshable Braille Display

April 19, 2016



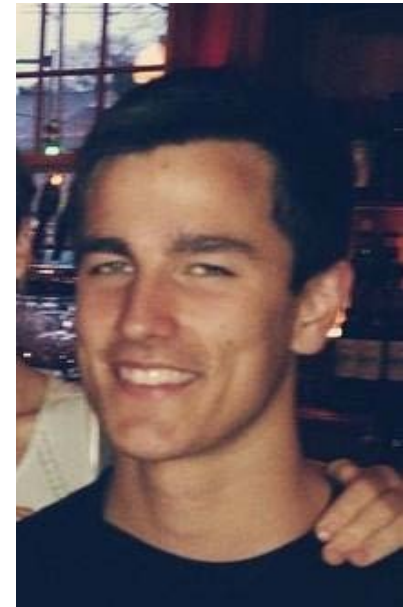
Team **braillebook**



Richard Lam
EE, '16
Team Manager



Raveena Kothare
EE, '16



Steven Golonka
EE, '16

Faculty Advisor: Professor Dennis Goeckel

Introduction

braillebook

The Braille Tutor

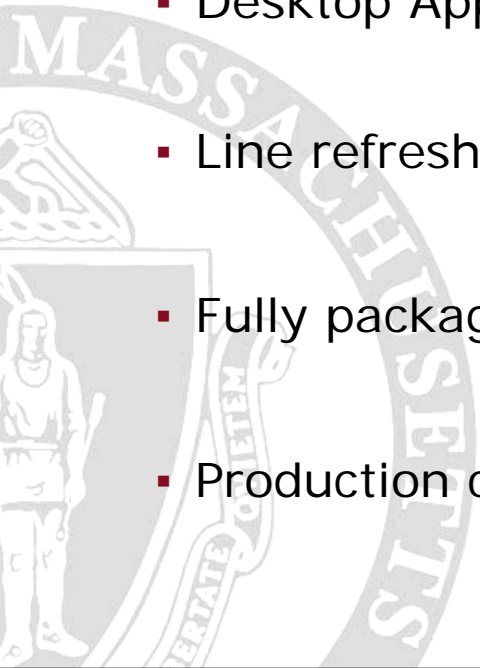
- *“Only a quarter of blind Americans of working age actually have jobs, and it is surely no coincidence that almost all of them can read Braille.”*¹
- Today, 10% of blind children are taught Braille²
 - Compare to 50% in the 1950s
- Braille texts are expensive
 - Costs several times more than ordinary books
 - Electronic refreshable Braille displays cost \$2000-\$8000³

braillebook: A Learning Tool

- User will be able to read the displayed line of Braille and compare it to the output of the text-to-speech output
- Market competition:
 - BraillePen 12 Touch: 12 cell display, bluetooth keyboard, compatible with text to speech software, \$1150
 - Smart Beetle 14-Cell Braille Display: compatible with popular screen reader software, audio prompt for menu, \$1200
 - Brailliant BI 40: 40 cell display, compatible with screen reader software, \$2995

Proposed CDR Deliverables

- Fully functional electromechanical display
 - 20 characters
 - Buttons for: Previous Line, Next Line, Read Line
 - Switch for: Power ON/OFF
- Desktop Application
 - Line refreshes in 5 seconds
 - Fully packaged device
 - Production cost: <\$400



Proposed FPR Deliverables

- Fully functional electromechanical display
 - 20 characters
 - Buttons for: Previous Line, Next Line, Read Line
 - Switch for: Power ON/OFF
- Desktop application is compatible with screen reading software
- Line refreshes in 10 seconds on average
- Fully packaged device
- Production cost: <\$400

As per
evaluators'
suggestions
from CDR



Proposed FPR Deliverables

- ✓ Fully functional electromechanical display
 - 20 characters
 - Buttons for: Previous Line, Next Line, Read Line
 - Switch for: Power ON/OFF

- ✓ Desktop application is compatible with screen reading software

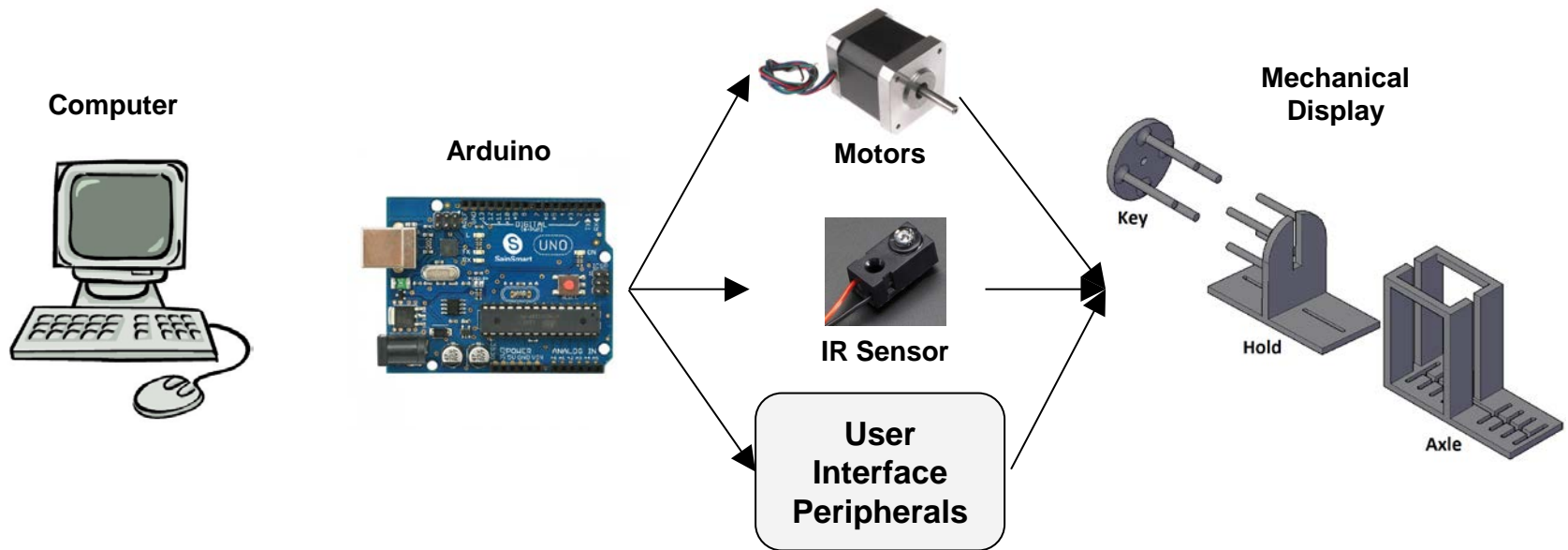
- ✓ Line refreshes in 10 seconds on average

- ✓ Fully packaged device

- ✓ Production cost: <\$400

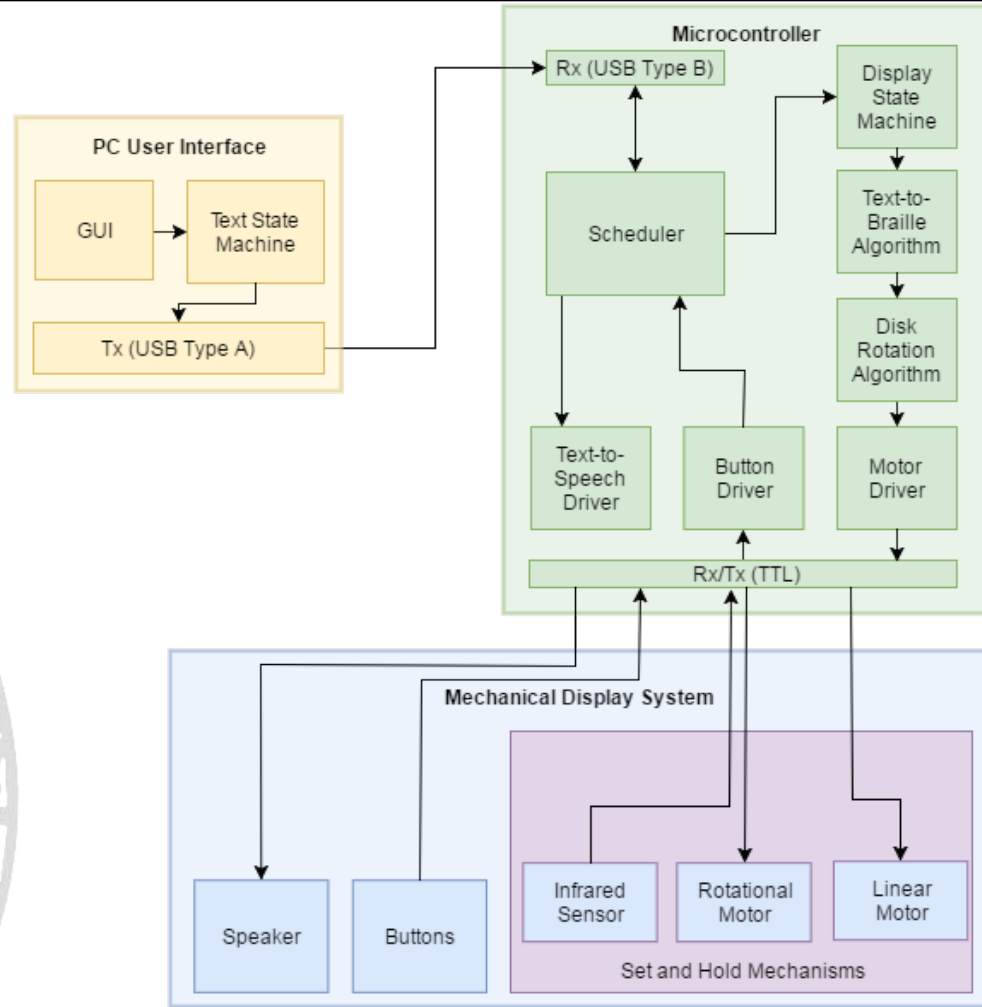
As per
evaluators'
suggestions
from CDR

System Overview





System Block Diagram



Cost of Materials

ITEM	QTY	Per Piece	Per 1000
stepper motor	2	\$14	\$5.00
<u>arduino uno</u>	1	\$5.65	\$2.65
motor driver	1	\$19.95	\$13.96
IR sensor	1	\$1.95	\$1.36
arcade buttons	3	\$2.00	\$0.27
speaker	1	\$1.95	\$1.36
power button	1	\$5.93	\$4.60
metal rod	2	\$2.00	\$1
wood case	1	\$20.00	\$10
emic2 chip	1	\$60.00	\$20.00
hinges	2	\$2.50	\$0.19
plastic pieces	1	\$20.00	\$10.00
slider	1	\$7.37	\$5.37
power supply	1	\$9.99	\$6.86
Total		\$195.79	\$89.35



A	B	C	D	E	F	G	H	I	J
● ○	● ○	● ●	● ●	● ○	● ●	● ●	● ○	○ ●	○ ●
○ ○	○ ○	○ ○	○ ●	○ ●	○ ○	○ ○	○ ○	○ ○	○ ●
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
K	L	M	N	O	P	Q	R	S	T
● ○	● ○	● ●	● ●	● ○	● ●	● ●	● ○	○ ●	○ ●
○ ○	○ ○	○ ○	○ ●	○ ●	○ ○	○ ○	○ ○	○ ●	○ ●
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
U	V	W	X	Y	Z				
● ○	● ○	○ ●	○ ●	○ ●	○ ○				
○ ○	○ ○	○ ●	○ ○	○ ○	○ ○				
○ ○	○ ○	○ ○	○ ○	○ ○	○ ○				



Demo

Questions & Discussion



Thank You

