Bomb Defusal Game

Custom Project Final Report

Spring 2019

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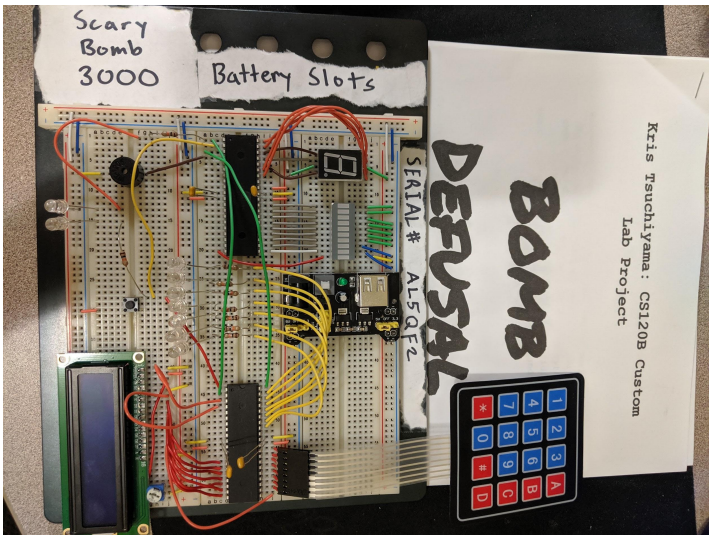
Table of Contents

Introduction

My project is be based off the cooperative video game “Keep Talking and Nobody Explodes.” The premise is that one player will have a bomb consisting of multiple module puzzles while the other has a bomb defusal manual. Players are not allowed to look at what the other person is seeing and must test their communication skills in order to complete the puzzles and defuse the bomb. The bomb defusal manual can be found here: https://drive.google.com/open?id=1YlSdTGKsDfWQA4LBQ2CRv_O5j1SxWQK5gCBClEZ1c-s

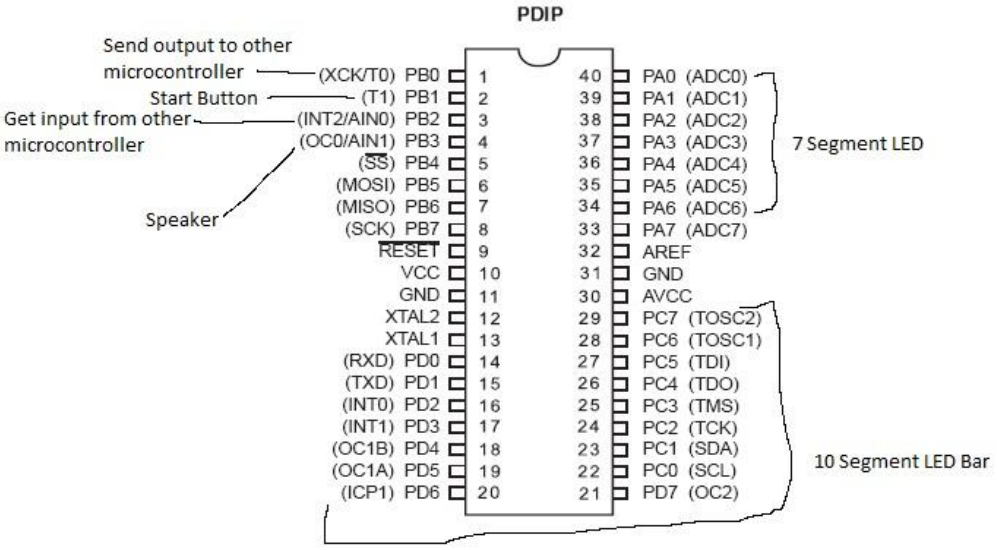


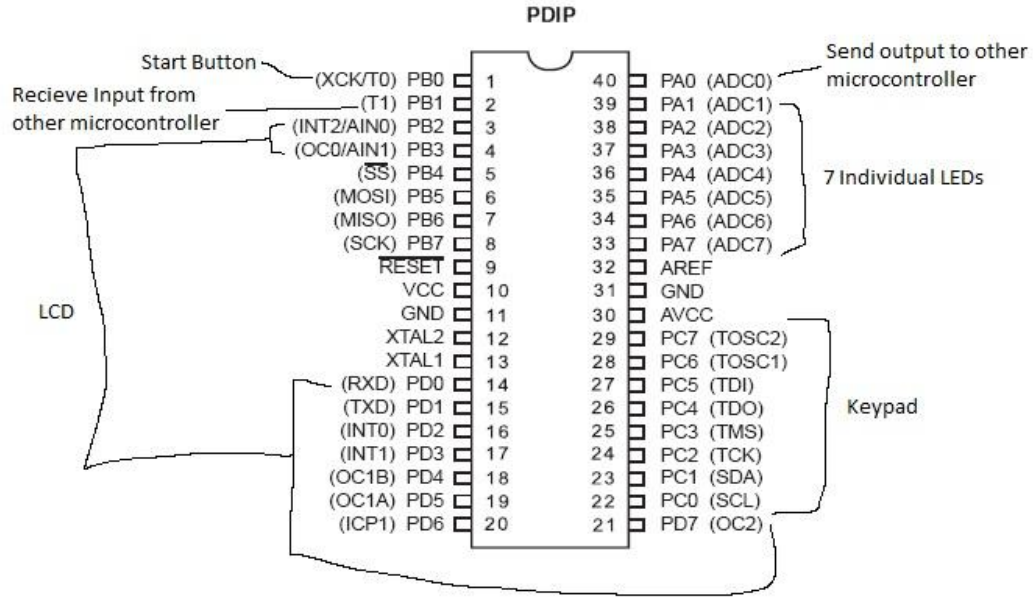
Hardware

Parts List:

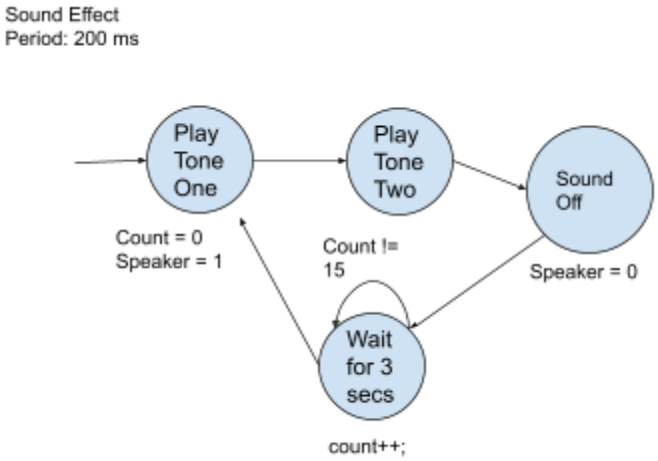
- 2 ATMega1284 microcontrollers
- 7 Segment LED
- 10 Segment LED Bar
- Keypad
- LCD Screen
- Speaker
- Button
- 9 Individual LEDs

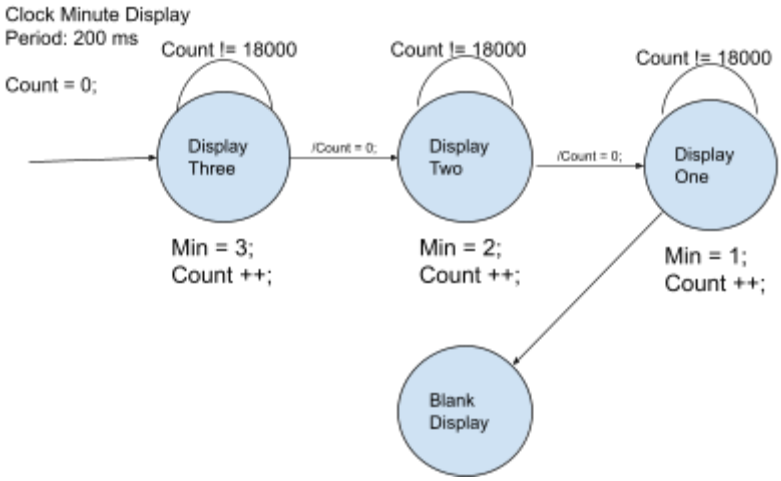
Pinout

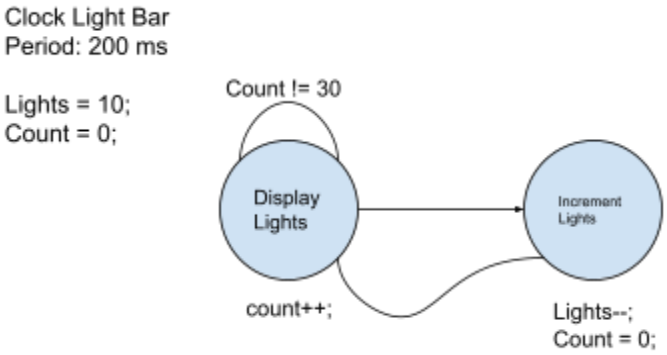

PDIP
Send output to other microcontroller
Start Button
Get input from other microcontroller
Speaker
(XCK/T0) PB0 1
(T1) PB1 2
(INT2/AIN0) PB2 3
(OC0/AIN1) PB3 4
(SS) PB4 5
(MOSI) PB5 6
(MISO) PB6 7
(SCK) PB7 8
RESET 9
VCC 10
GND 11
XTAL2 12
XTAL1 13
(RXD) PD0 14
(TXD) PD1 15
(INT0) PD2 16
(INT1) PD3 17
(OC1B) PD4 18
(OC1A) PD5 19
(ICP1) PD6 20
40 PA0 (ADC0)
39 PA1 (ADC1)
38 PA2 (ADC2)
37 PA3 (ADC3)
36 PA4 (ADC4)
35 PA5 (ADC5)
34 PA6 (ADC6)
33 PA7 (ADC7)
32 AREF
31 GND
30 AVCC
29 PC7 (TOSC2)
28 PC6 (TOSC1)
27 PC5 (TDI)
26 PC4 (TDO)
25 PC3 (TMS)
24 PC2 (TCK)
23 PC1 (SDA)
22 PC0 (SCL)
21 PD7 (OC2)
7 Segment LED
10 Segment LED Bar


PDIP
Start Button
Recieve Input from other microcontroller
LCD
(XCK/T0) PB0 1
(T1) PB1 2
(INT2/AIN0) PB2 3
(OC0/AIN1) PB3 4
(SS) PB4 5
(MOSI) PB5 6
(MISO) PB6 7
(SCK) PB7 8
RESET 9
VCC 10
GND 11
XTAL2 12
XTAL1 13
(RXD) PD0 14
(TXD) PD1 15
(INT0) PD2 16
(INT1) PD3 17
(OC1B) PD4 18
(OC1A) PD5 19
(ICP1) PD6 20
40 PA0 (ADC0)
39 PA1 (ADC1)
38 PA2 (ADC2)
37 PA3 (ADC3)
36 PA4 (ADC4)
35 PA5 (ADC5)
34 PA6 (ADC6)
33 PA7 (ADC7)
32 AREF
31 GND
30 AVCC
29 PC7 (TOSC2)
28 PC6 (TOSC1)
27 PC5 (TDI)
26 PC4 (TDO)
25 PC3 (TMS)
24 PC2 (TCK)
23 PC1 (SDA)
22 PC0 (SCL)
21 PD7 (OC2)
Send output to other microcontroller
7 Individual LEDs
Keypad

Software







Timer Code:
https://drive.google.com/open?id=14LX5l-DrXKgWZjtHMiml6585USm2kJzp
Puzzles Code:
https://drive.google.com/open?id=1aeCy3RpmB1Ly23e5psZwb1HCqR15DFQE

Complexities

- 2 ATMega1284 Microprocessors communicating with each other
- Using EEPROM to save the total number of bombs defused
- Several custom LCD characters
- Game logic

Youtube Link

https://www.youtube.com/watch?v=d-BQtmofsFo&feature=youtu.be

Known Bugs and Shortcomings

- The timer is not perfectly accurate. Due to the way i designed the tick function for the beeping sound effect and task manager, there player has a little over a second more than three minutes. This can probably be fixed by splitting the beeping function into a couple extra functions, as there are waiting times in the function itself.
- The puzzles are all on the LCD screen, should be split into different areas or atleast different screens. This could be solved by simply buying more LCD screens and more microcontrollers.
- Number of Bombs defused resets every time code is altered, I believe this is can be changed within the ATMega1284 but unsure.
- The EEPROM bombs defused score only holds up to 20 currently. This is solely due to time constraint and can easily be fixed to hold up to 99 while still fitting in the current format on the LCD screen.

Future Work

Future features I would like to add to this project include the following. I think that adding a different versions of the bomb, each with different puzzles, which could be toggled between using switches would be great for diversity. This could probably be relatively easy to code. I would also like to split the modules up into different areas of the bomb, this would allow the user to do whatever puzzle they want in whatever order which is more accurate to the original game. This would require simply the implementation of more LCD screens and ATMega1284s as well as probably a larger board. Finally, I think adding more puzzles inspired from the original game would be great.