University at Buffalo
The State University of New York

Automated Locker Technical Documentation

Contents

1. Safety Information

PRODUCT SAFETY NOTICE: The use of a substitute replacement component which does not meet the same characteristics as the recommended replacement one, shown in the parts list in this Technical Documentation, may create shock, fire, or other hazards.

2. Parts List

Section	Part	Symbol/Description
Circuit	12V 15.6Wh Battery	V1, DeWalt DCB120
	1N4004 Diode	D2
	Lock-style Solenoid	
	TIP102 BJT	Q1
	2.2kΩ 1/4W Resistor	R1
	SPST Toggle Switch	S1, 6A 125VAC Maximum
	10uF 50V Capacitor **x 2**	C1, C3
	4.7uF 50V Capacitor	C2
	10uH Inductor	L1
	Buck Converter	A1, Recom Power R-78E5.0-0.5
	Resettable Fuse	U1, 300mA Hold Current
	5.1V Zener Diode	D1
	Perf Board	3” x 4.5”
	Enclosure	From DeWalt DCB107 Battery Charger
Wiring	22AWG VW-1 Wire	Green, Yellow, Black, White, Red, Blue
	14-22AWG Wire Nut **x 3**	Gray (Color Code Standardized)
	Male Jumper Wire x **3**	22AWG or lower
	Cable Sleeving	0.5” diameter
Touchscreen	3.2” Touchscreen	4D Systems ULCD-32PTU-AR
	Micro SD Card	2GB suggested
Mechanical	U-bolt + nuts	
	Cam lock	
	Spacer	
	Grounding bolt+ nut	
	2 bolts + 2 nuts for enclosure	

Figure 1: Parts list

3. Schematic Diagram

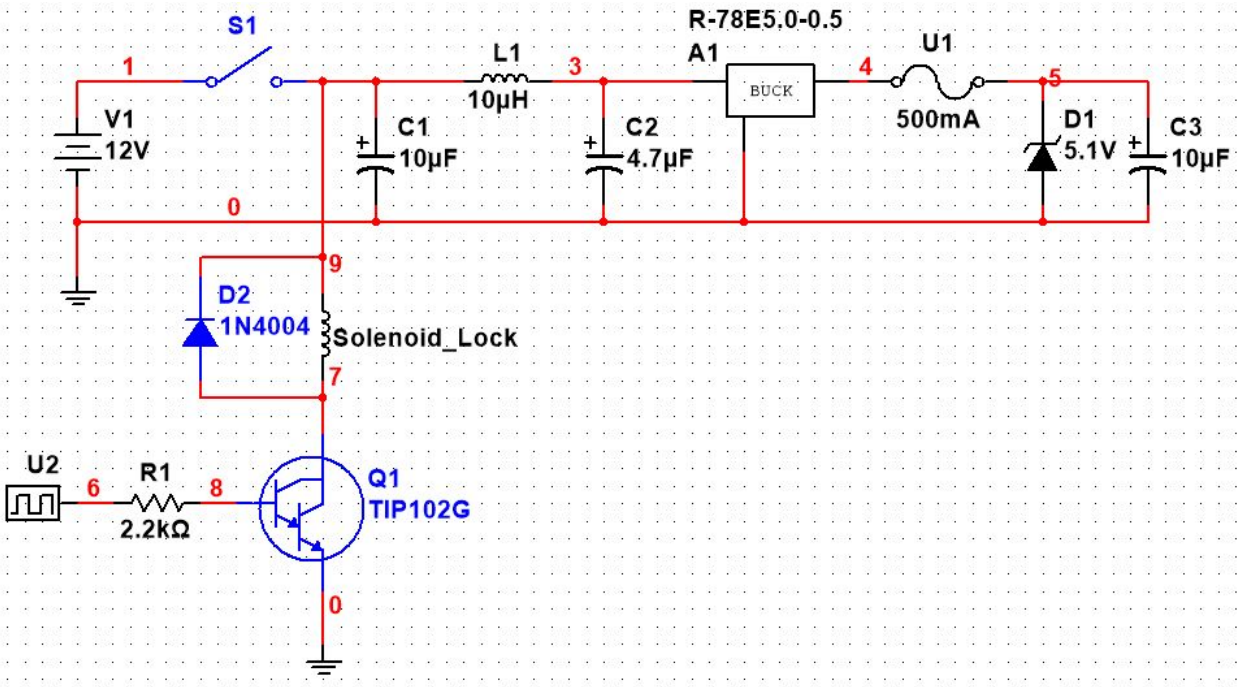


Figure 2: Circuit Schematic

Figure 2 above shows the circuit schematic. The 5VDC and GND supply rails for the touchscreen are taken from nodes 5 and 0, respectively. Component U2 represents the digital signal from I/O Pin 1 of the touchscreen.

4. Wiring

Wire Color	Description
Green	12V
Yellow	5V
Black	GND
White	I/O
Red	Solenoid +

Blue	Solenoid -

Figure 3: Wire Color Code Table

WIRING DIAGRAM HERE (SEE ENGINEERING NOTEBOOK FOR ROUGH DRAFT)

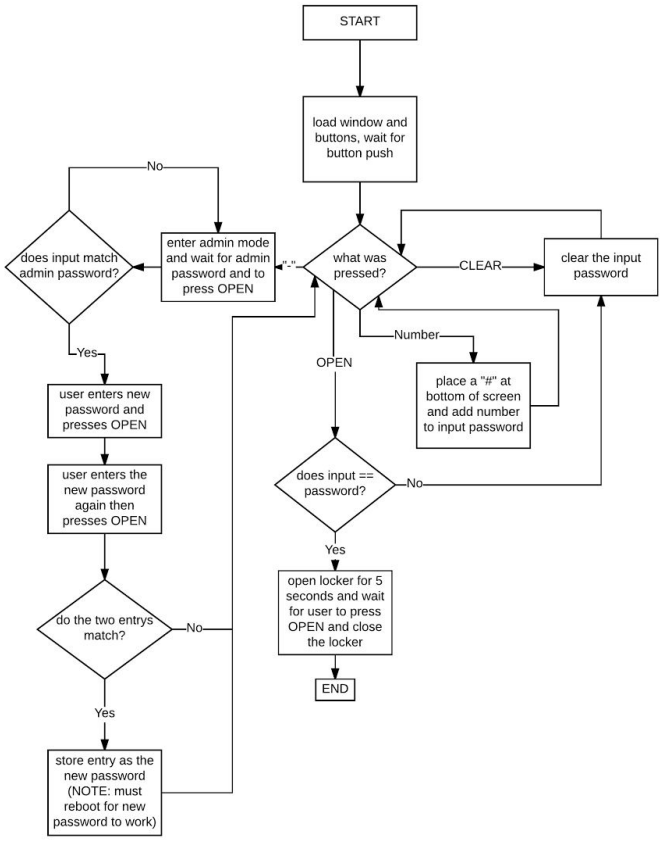
Figure 4: Wiring Diagram

5. Software

1. 4D systems workshop 4 IDE. Used to write the code and flash the touch screen with the pin and password for the locker.

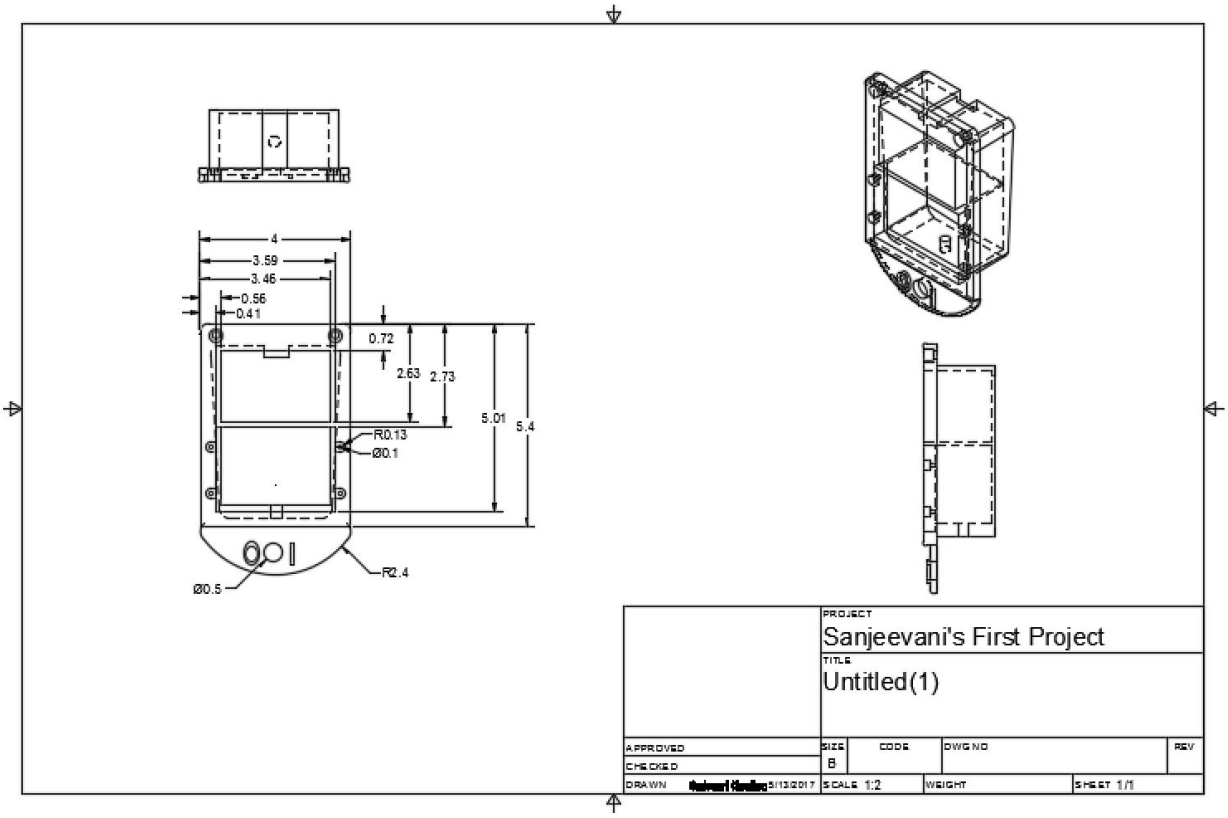
2. How to flash the board:
    a. Plug the board into your computer with the USB-to-Serial Bridge adapter connected to the screen
    b. Open up the 4D systems workshop software
    c. If the software does not detect the board you may need to install the drivers from http://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers
    d. Open the code named "FinalTouchScreen.4dg" provided at: https://github.com/cooljjkid/AutomatedLocker
    e. Copy the code into the IDE and use the tools provided to flash the code to the screen

3. Basic program flow:



6. 3D Printed Locker Plate

1. Image
2. The dimension thingy from CAD (work in progress)



7. Modifications to the Locker