

# **CELLCATRAZ** Developer Guide

Eliminate Distractions Improve Productivity



Sam Leonard OSU Winter 2021 Junior Design II

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#### I. System Overview

Students and workers alike understand both the powerful capabilities of mobile devices as well as the complications they introduce. Though cell phones provide immediate access to an abundance of information and an instant connection to others, they can also be a source of distraction that can have disastrous effects on productivity. In fact, just being in the same room as one's cell phone is enough to make it hard to focus on a task [1]. **CELLCATRAZ** (Figure 1) is the tool to overcome cell phones' power over the human psyche. More generally, Cellcatraz can improves work and study habits through the use of the Pomodoro Technique [2].

Cellcatraz allows the user to select a 25-minute or 5-minute timer. If the 25-minute setting is selected, the user must place their phone in the box to start the timer. If the phone is removed early, an alarm will sound; the user has 5 seconds to return their phone before the system resets. If the 5-minute setting is selected, the user may remove their phone without penalty. In this way, Cellcatraz will allow the user to develop an effective 25-minutes-on/5-minutes-off study routine.



#### Figure 1: Cellcatraz

### II. Electrical Specifications

Cellcatraz uses an LM7805T voltage regulator to step down input dc power and supply an ATmega328P microcontroller with 5V. The electrical characteristics of the two devices are summarized in Table 1 [3], [4].

#### Table 1: Absolute Maximum Ratings

Parameter	Min.	Тур.	Max	Unit		
ATmega328P						
Operating temperature	-55		+125	°C		
Storage temperature	-65		+150	°C		
Voltage on any pin except RESET with respect to ground	-0.5		VCC + 0.5	V		
Voltage on RESET with respect to ground	-0.5		+13.0	V		
Maximum Operating Voltage		6.0		V		
DC current per I/O pin		40.0		mA		
DC current VCC and GND pins		200.0		mA		
Injection current at VCC = 0V		±5.0		mA		
Injection Current at VCC = 5V		±1.0		mA		
LM7805						
DC Input Voltage			+35	V		
Junction Temperature			+150	°C		
Storage Temperature	-65		+150	°C		
Lead Temperature (Soldering, 10sec)			+230	°C		
ESD Susceptibility		2		kV		
Cellcatraz System						
Supply Voltage	-0.5		+35	V		
Supply Current	0		+1.5	А		
Operating Temperature	-55		+125	°C		

#### III. User Guide

The Cellcatraz user interface includes an input DC\_POWER jack, ON/OFF switch, 7-segment display, Time\_Select switch, Brightness\_Select pushbutton, and Reset pushbutton. The switch and pushbutton functions are summarized in Table 2.

#### Table 2: User Interface Functions

Switches/Pushbuttons	Positions		Function	
ON/OFF Switch	ON	OFF	Turn on or off the device.	
Time_Select Switch	25-Minute	5-Minute	Select between 25-minute mode	
			or 5-minute mode.	
Brightness_Select	OPEN	SHUT	Cycle through the 7-segment	
Pushbutton			display's three brightness settings.	
RESET Pushbutton	OPEN	SHUT	System reset.	

#### A. System Startup

- 1. Ensure DC\_POWER is available by plugging the Wall Transformer (Part No. 24) into a typical 120VAC wall socket and then into the Ø2.1mm barrel jack labeled POWER.
- 2. Turn on the system by placing the ON/OFF switch to the ON position.

#### B. Timer Mode Selection

- 1. To select 25-Minute Mode, place the Time\_Select switch to the 25-Minute position.
- 2. To select 5-Minute Mode, place the Time\_Select switch to the 5-Minute position.

#### C. 25-Minute Mode

When in 25-Minute Mode, the 7-segment display will blink 25:00 every second. The 25-Minute timer begins countdown once a cell phone or other device is placed in the phone bay, thus blocking light from entering through the pomodoro-shaped cutout.

If the cell phone is removed before the timer has reached 00:00, the countdown will pause and a 440Hz alarm will sound. If the cell phone is returned within 5 seconds, the alarm will silence, and normal countdown will continue. If the cell phone is not returned within 5 seconds, the system will reset.

Once 00:00 is reached, the speaker will play three beeps and Cellcatraz will display 88:88 for 1 second and then reset the 25-Minute timer. If the cell phone is still present, the 25-Minute timer will begin countdown.

#### D. 5-Minute Mode

When in 5-Minute Mode, Cellcatraz will count down regardless of whether a cell phone is or is not present in the phone bay.

Once 00:00 is reached, the speaker will play three beeps and Cellcatraz will display 88:88 for 1 second and then reset the 5-Minute timer.

#### E. Selecting Display Brightness

The 7-segment display has three brightness levels. The 7-segment display will cycle through brightness levels as follows:

→ DIM → BRIGHT → BRIGHTEST →

1. To select the brightness level, depress the Brightness\_Select pushbutton.

#### F. System Reset

System reset will stop the timer, silence the speaker, and return the Brightness setting to DIM.

1. To perform system reset, depress the **RESET** pushbutton.

#### G. System Shutdown

ON/OFF

Switch

- 1. Turn off the system by placing the ON/OFF switch to the OFF position.
- 2. (Optional) Remove DC\_POWER by unplugging the Wall Transformer (Part No. 24) from the Ø2.1mm barrel jack labeled POWER and then unplugging the Wall Transformer from the wall socket.

# Igure Za: User Interface Functions (Front)

#### Figure 2a: User Interface Functions (Front)

Time\_Select Switch 7-segment Display Figure 2b: User Interface Functions (Side)

