

## Smart Dumpster

Team 24

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Power Source:

Power Supply:

A 6W solar panel, a 3.7V 6600mAh lithium ion battery pack, a solar lithium ion charging circuit, and a 5V boost converter.

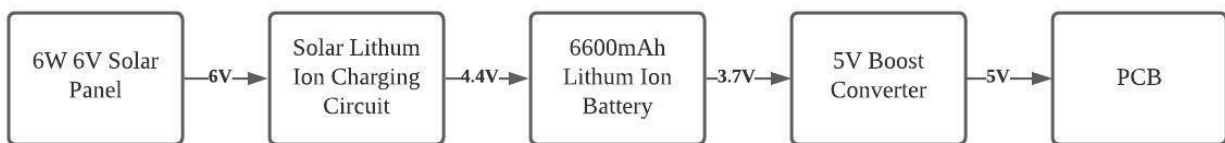


Table 1(15 points)

Requirements	Verification
- Provides 5V +/- 5% from a 3.7V source	<ul style="list-style-type: none"><li>- Connect the output of the battery to the regulators</li><li>- Measure the output voltage using a voltmeter or using an oscilloscope, ensuring that the output voltage stays within 5% of 5V</li><li>- Verification of solar panel charging function can be done by observing the LEDs located on the charging circuit</li></ul>

On PCB:

A 5V to 3.3V voltage regulator for RFID reader, a 5V to 12V boost converter for linear actuator and solenoid lock

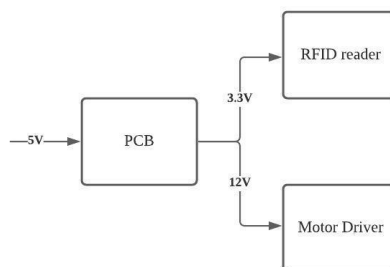


Table 2(5 points)

Requirements	Verification
<ul style="list-style-type: none"> <li>- Provides 3.3V +/- 5% from a 5V source</li> <li>- Provides 12V +/- 5% from a 5V source</li> </ul>	<ul style="list-style-type: none"> <li>- Provides a 5V to the PCB board</li> <li>- Measure the output voltage of the 3V3 regulator using a voltmeter or an oscilloscope, ensuring that the output voltage stays within 5% of 3.3V</li> <li>- Measure the output voltage of the 12V boost converter using a voltmeter or an oscilloscope, ensuring that the output voltage stays within 5% of 12V</li> <li>- Can also be verified with RFID reader and both linear actuator and solenoid lock working properly</li> </ul>

Automatically open/close, lock/unlock functions:

RFID functions:

Table 3(20 points)

Requirements	Verification
<ul style="list-style-type: none"> <li>- Unlocks and opens the lid of the dumpster when a valid RFID card is presented and the green LED lights up. The lid will close automatically after a 5 seconds delay.</li> <li>- Dumpster remains locked and closed when an invalid RFID card is presented. Red LED lights up.</li> <li>- A master keycard can register and deregister other users.</li> </ul>	<ul style="list-style-type: none"> <li>- Provides a 5V to the PCB board.</li> <li>- Place the master keycard close to the RFID reader, both LEDs will light up, indicating it is in register mode.</li> <li>- Place any unregistered RFID card close to the RFID reader, both LEDs will briefly flash for a second, indicating that it is being successfully registered.</li> <li>- Place the master keycard close to the RFID reader again, only the red LED will be ON, indicating it is in deregister mode.</li> <li>- Place any registered RFID card close to the RFID reader, the red LEDs will briefly flash for a second, indicating that it is being successfully deregistered.</li> </ul>

	<ul style="list-style-type: none"> <li>- Place the master keycard close to the RFID reader a third time, both LEDs will turn off, putting the dumpster back to its normal functioning state.</li> <li>- Place any registered RFID card close to the RFID reader, the green LED will light up, indicating that a valid card is presented, the dumpster will then automatically unlock and open itself. The dumpster will also close and lock itself after a 5 second delay.</li> <li>- Place any unregistered RFID card close to the RFID reader, the red LED will light up, indicating that the card is invalid, and the dumpster will remain locked.</li> </ul>
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Overfill protection functions:

Table 4(10 points)

Requirements	Verification
<ul style="list-style-type: none"> <li>- When the dumpster has less than 5cm of space left in all x, y, and z directions, it is considered to be full and a valid user keycard won't be able to open the dumpster.</li> <li>- An admin keycard, which is administered to the dumpster disposal company opens the dumpster regardless of its level of fullness.</li> </ul>	<ul style="list-style-type: none"> <li>- Provides a 5V to the PCB board.</li> <li>- Fill the inside of the dumpster with trash, ensuring that less than 5cm of space is left between all three directions.</li> <li>- Place any registered RFID card close to the RFID reader, the green LED will light up, indicating that a valid card is presented, but the dumpster will remain locked and closed.</li> <li>- Place any pre-registered admin RFID card close to the RFID reader, both LEDs will light up and the dumpster will unlock and open itself.</li> <li>- The lid will remain opened until the admin card is used again.</li> </ul>