

Automated Locker

User Manual

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Overview of system

System Description

We have designed a modified locker insert to replace a traditional lock and automatically unlock and open a locker door for a locker in Alden High School. The system allows a user to unlock the door by pushing the red button and then scanning a registered RFID (Radio-Frequency Identification) tag. The system will automatically lock itself and the locker can be closed regularly. If the button is pushed, the system will power off after 15 seconds if no registered RFID card is scanned.

In case of system failure (e.g. a dead battery), a mechanical key override is included. A key will be provided which can be used to open the locker.

System Components



Provided Parts:

Power Supply

- 2x Dewalt DCB205CK 20V Battery
- 1x Dewalt Battery Charger Kit
- 1x Dewalt Battery Docking Station (Retrofitted Charger Kit)

Circuit

- 1x Arduino Uno R3
- 1x Parallax Read/Write RFID Module
- 2 x 12V DC Relay
- 1x Micro Linear Actuator
- 1x Adafruit Push-button Power Switch Breakout
- 1x 30mm Arcade Button with LED

Operational Parts

- Keychain RFID Tags
- Card RFID Tags
- Mechanical Lock Keys
- Mechanical Parts
- Tumbler Lock
- Push Latch

Using The Locker

Turning on the Locker

The system is powered by DeWalt 20 V max rechargeable battery inside the locker. Pressing the round red button on the front of the locker door turns on the system. Then the button will turn red, indicating the system has been turned on, but the door is still locked.



Unlocking the Locker

The user has to place the RFID Tag in front of the reader. After a successful scan attempt, the button light will blink twice and the locker door will unlock and be pushed open a little. The door can then be pulled open further by pulling the handle.



Locking the Locker

After the locker is opened, it will automatically lock itself again. To close the locker, just push it close like any normal locker.

Mechanical Key Override

In case of power failure or any other reason that a RFID Tag may not or can not be used to open the locker, the user can use an external override key to unlock the locker. The key needs to be inserted into the locker and turned to the right to unlock, and then the door should be pulled open. To lock the system again, the key must be turned back to its original position and then removed from the locker.



Charging the Battery

A separate DeWalt Battery Charger kit is provided to recharge the battery. Simply disconnect the battery from the retrofitted docking station and connect it onto the charger kit. The charger kit will blink red, indicating that it is charging the battery. If the kit stays a solid red, the battery is fully charged. Remember to replace the disconnected battery with a charged battery onto the docking station to continue using the locker.



User Required Maintenance

The system requires the user to charge the battery every so often and to keep their RFID Tag and Override Key in a secure place. If you determine there to be any damage to any of the components, please see the design documents for more detailed parts information.

Troubleshooting

If the power button does not light up after being pressed, try pressing it again a couple more times more forcefully. If this doesn't light up, the battery is likely dead and the manual override will be needed to remove the battery and charge it. If the system still does not power on after this, there is likely something damaged and you should refer to the Design Document.

Ordering Additional RFID Tags

Additional RFID Tags can be ordered from Amazon.com:

https://www.amazon.com/dp/B01M1L7NHI?ref=ppx_pop_mob_ap_share. Any additional tags you order need to be programmed before they can unlock the locker properly. Please enlist the help of an expert to do so. Anyone programming the tags should look into the design documentation to correctly program the RFID tags.