Embedded System Design Techniques™

Building Your Own Internet Connected PLC

Class 5: PLC Application Design

April 27th, 2018

Jacob Beningo

Presented by: CEC CONTINUING EDUCATION CENTER Digi-Key ELECTRONICS

Course Overview

Topics:

- PLC Fundamentals
- Designing a PLC
- PLC Software Design Part 1
- PLC Software Design Part 2
- **PLC Application Design**

Session Overview

- Our First Application Review
- Building a Latch
- Experimenting with Counters

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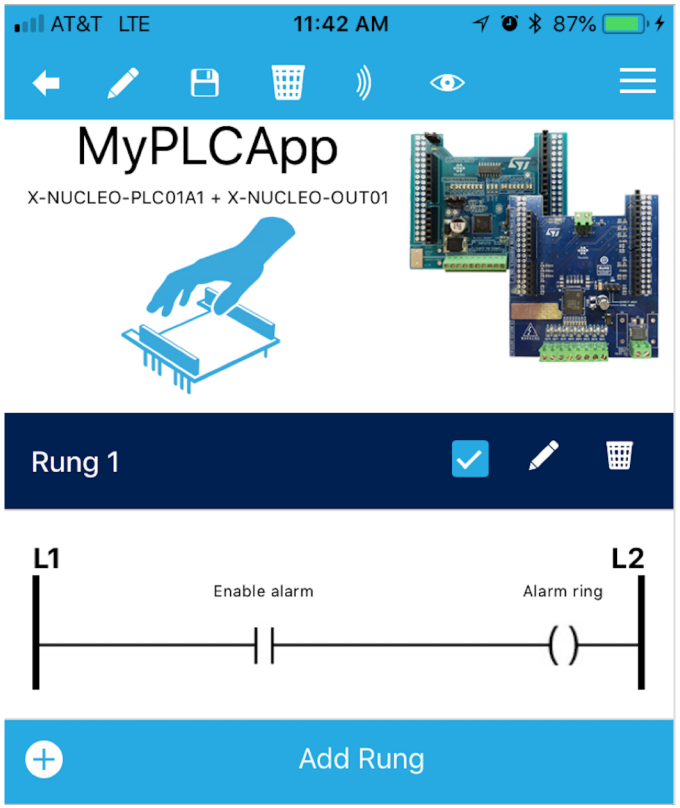
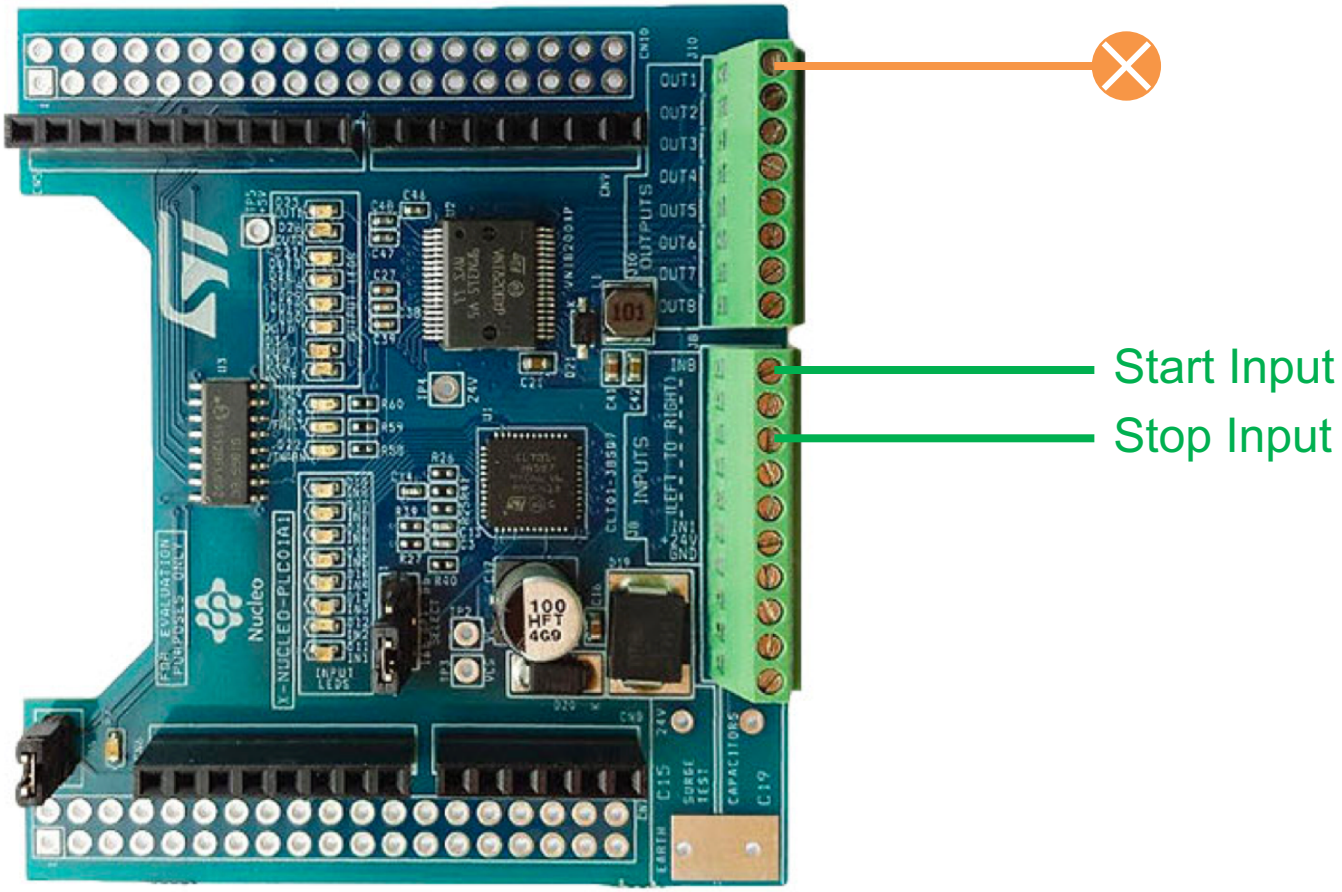
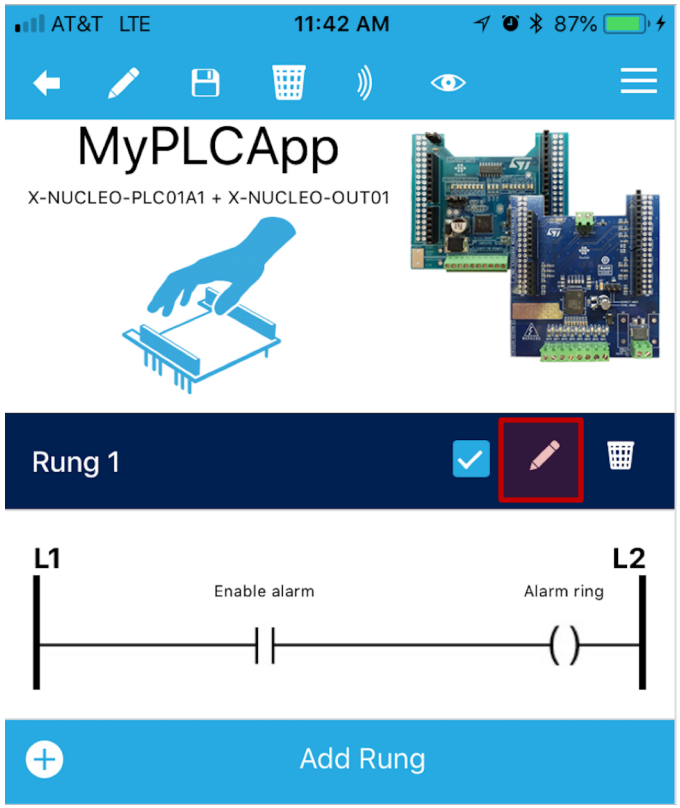
Our First Application

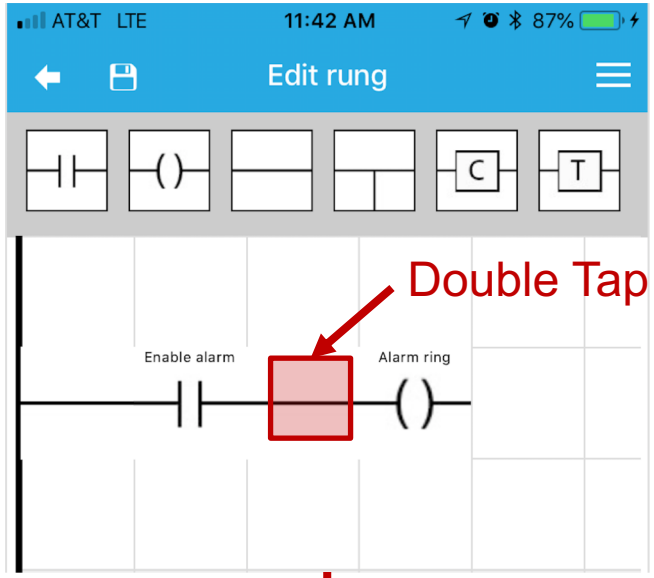


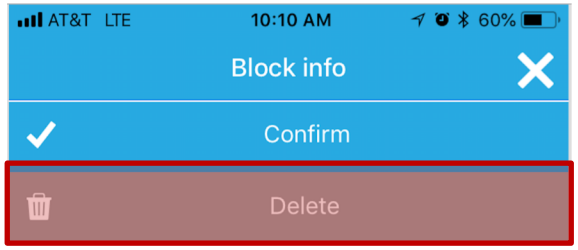
Building a Latch



Building a Latch







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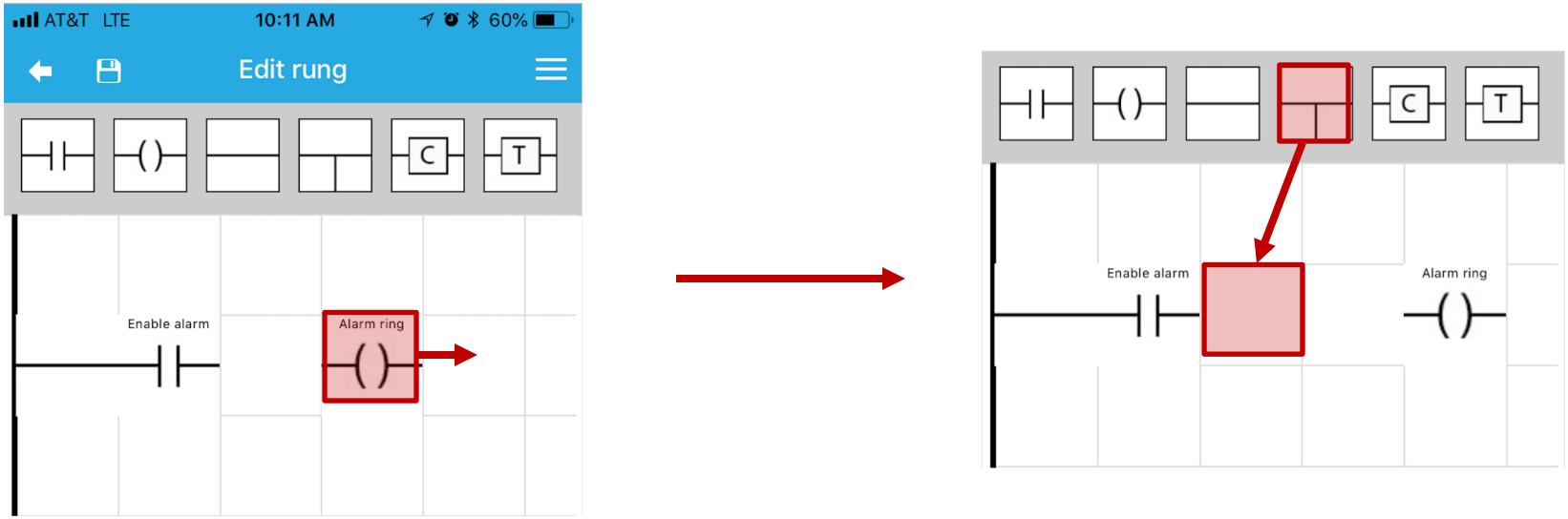

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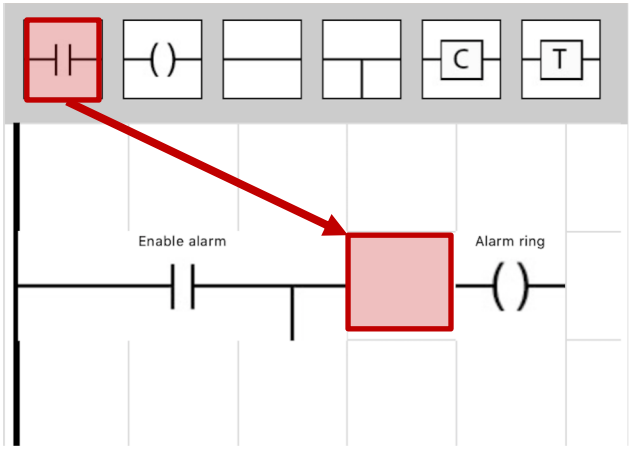

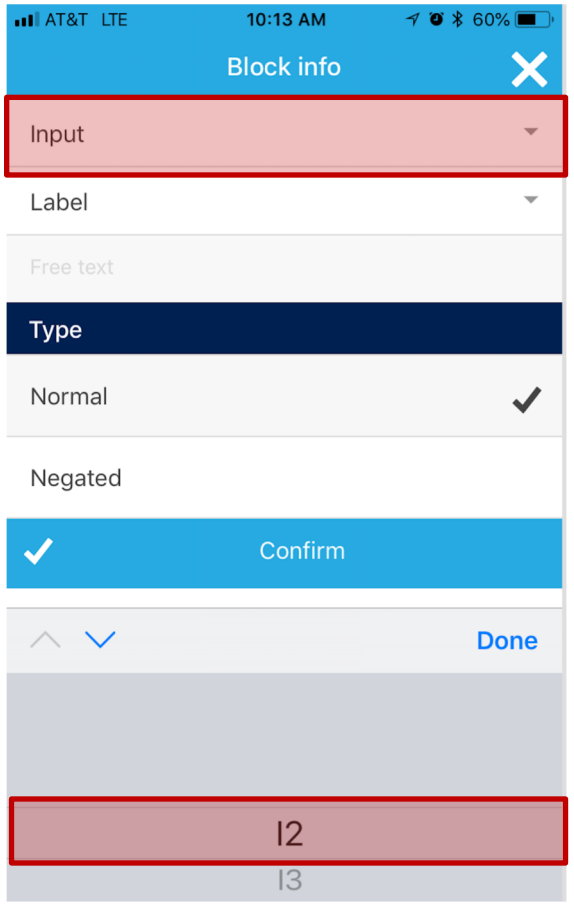

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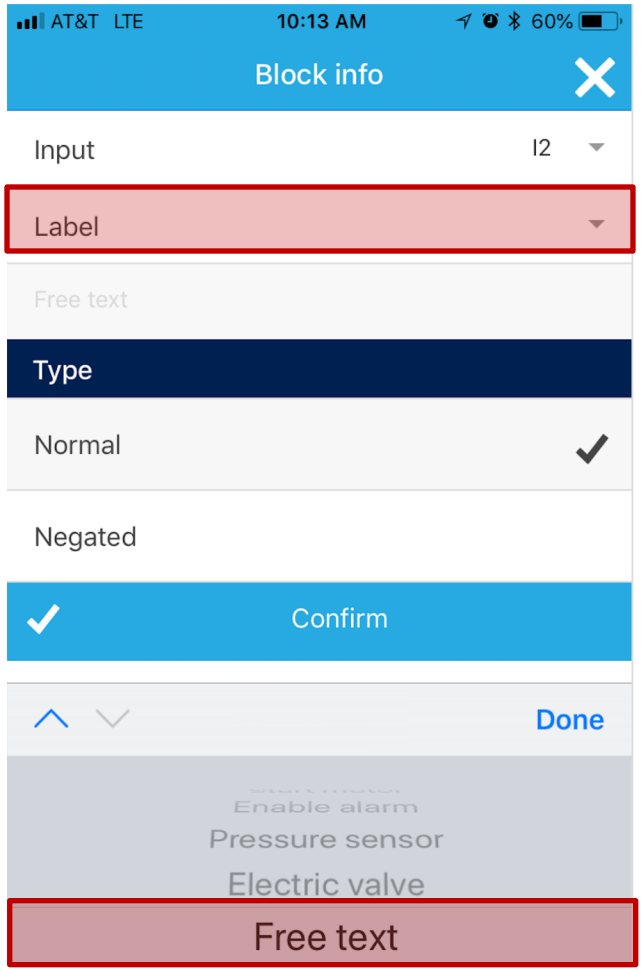

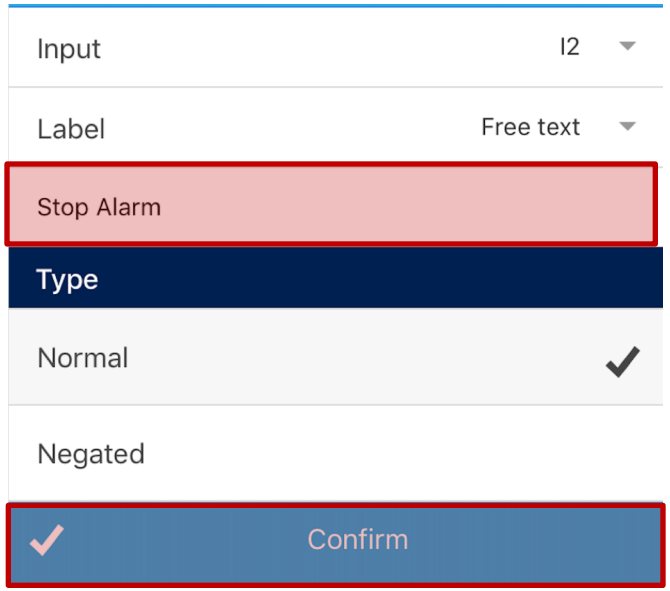

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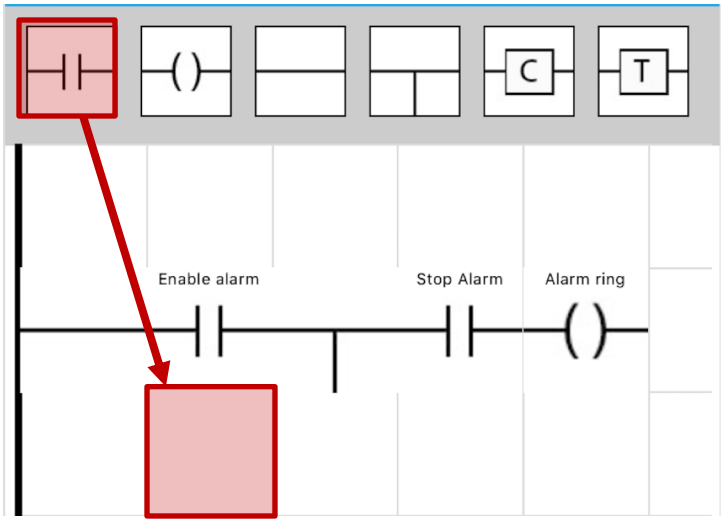

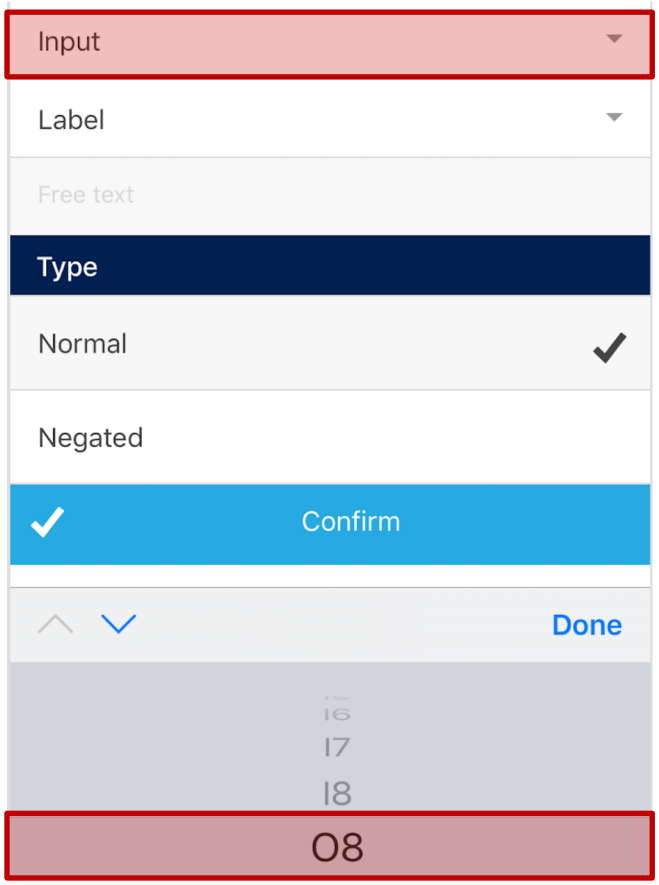

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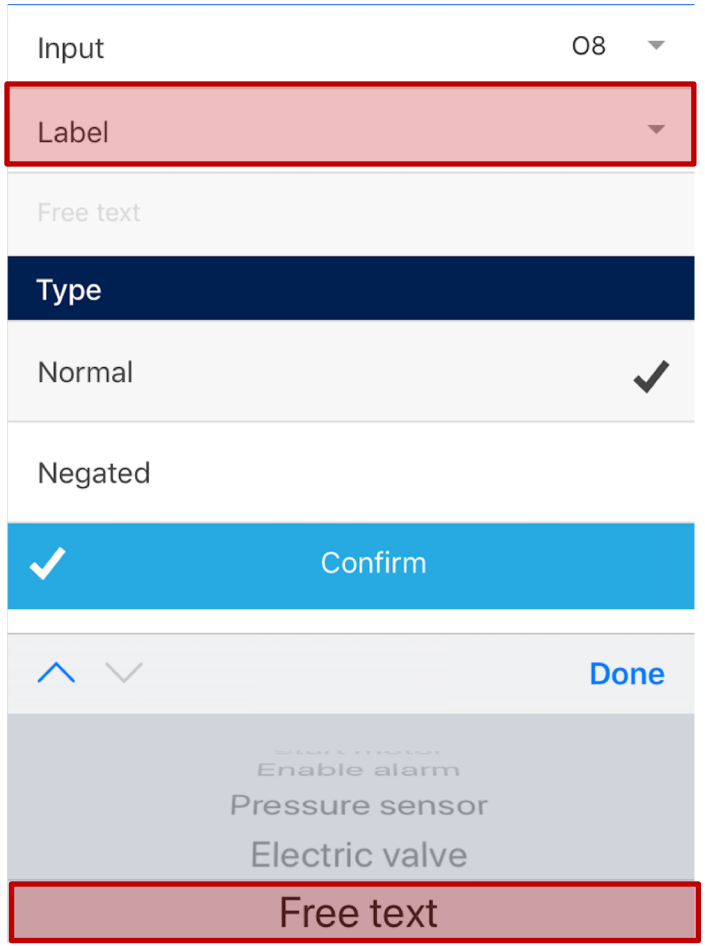

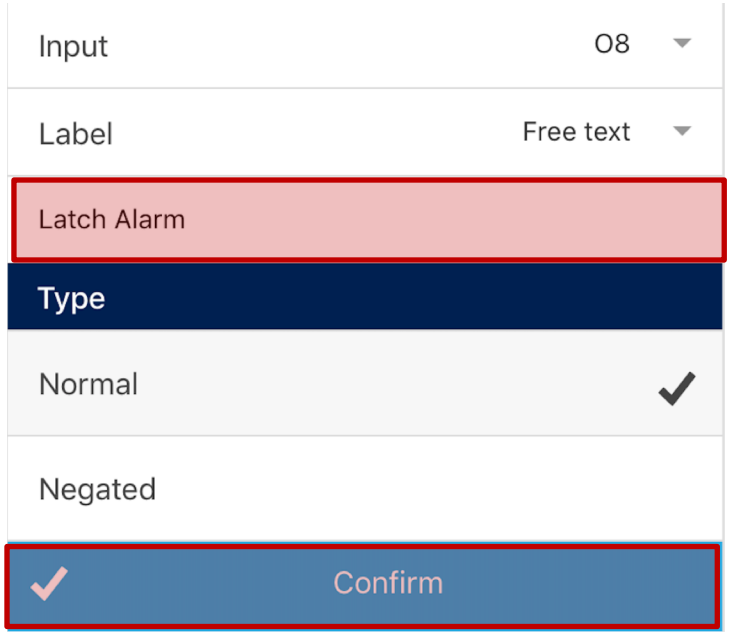

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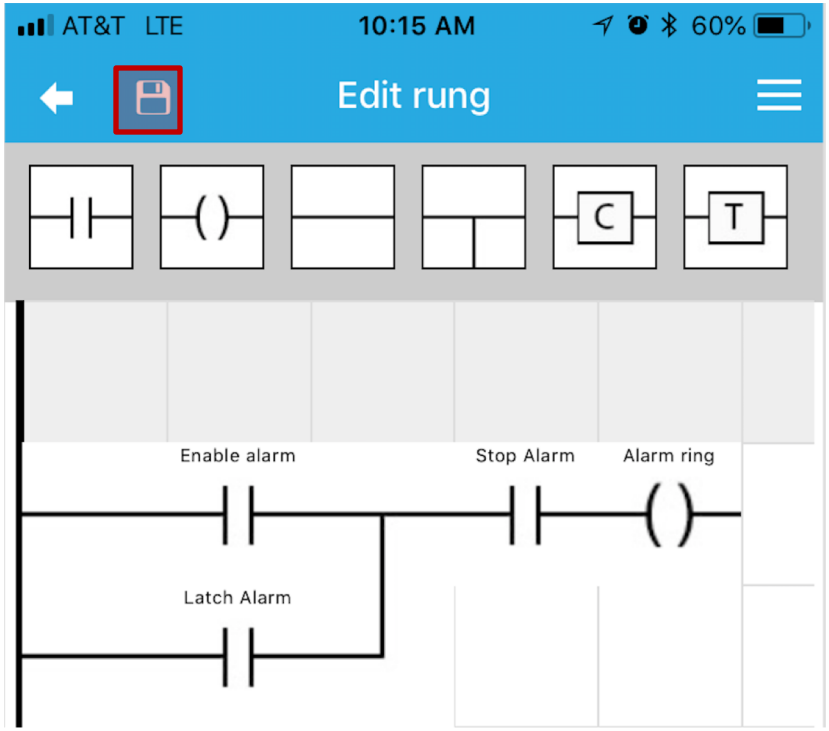
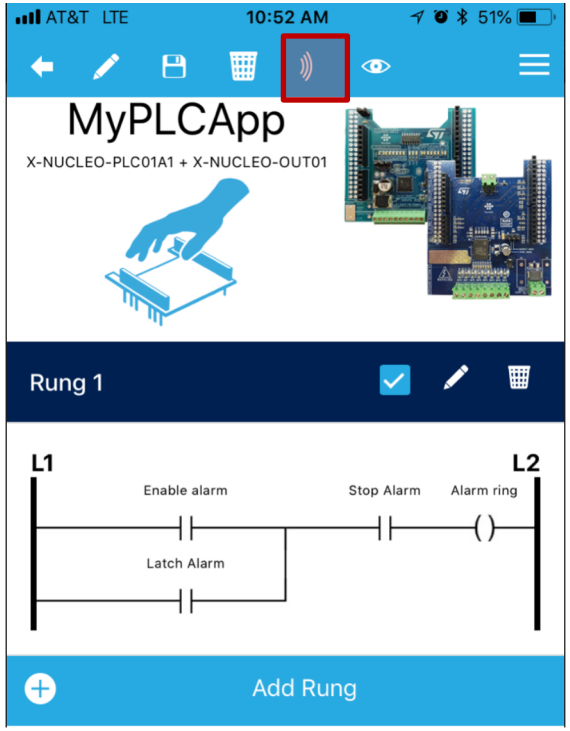


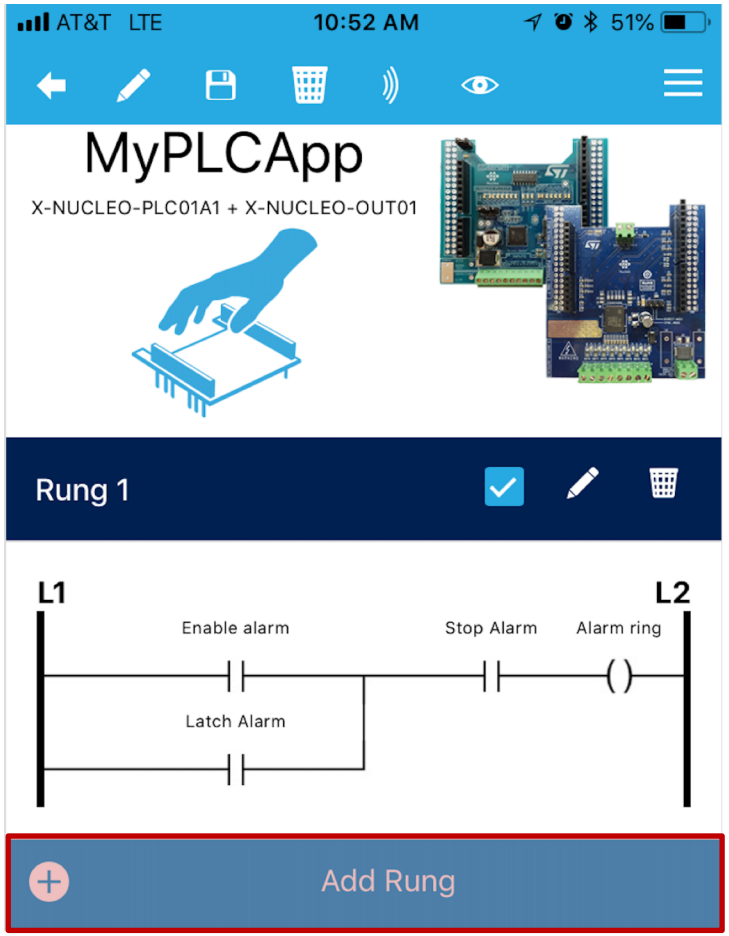


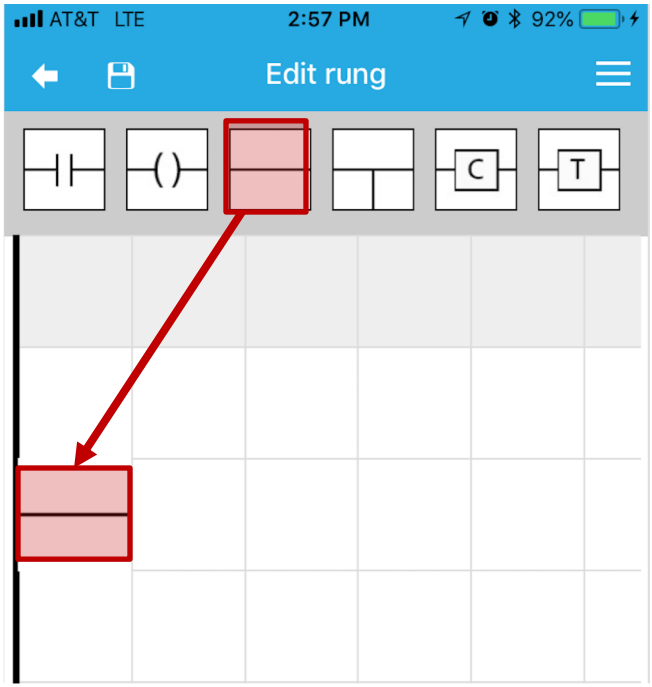
Experimenting with Counters

Counters are used to increment, decrement or index values.

- Requires an input
- Requires an output
- Output is true when the specified value is reached

Experimenting with Counters





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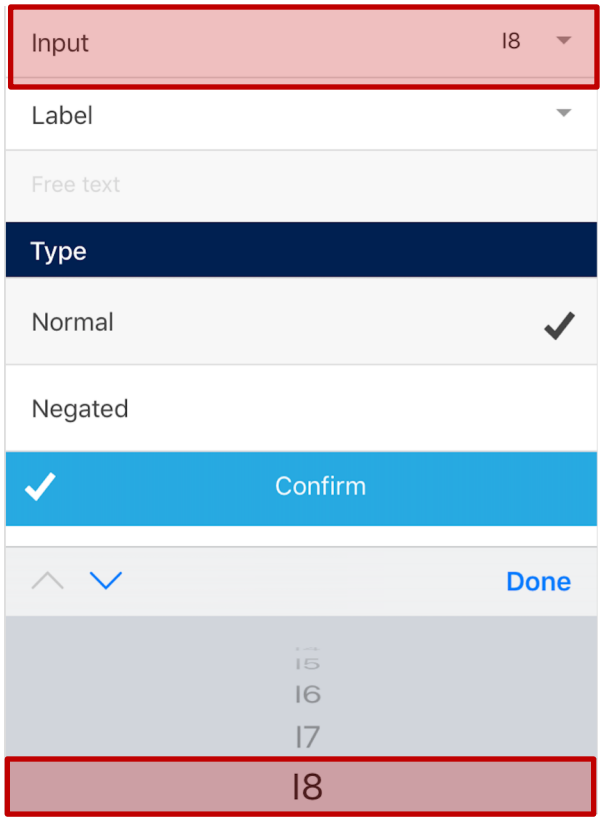

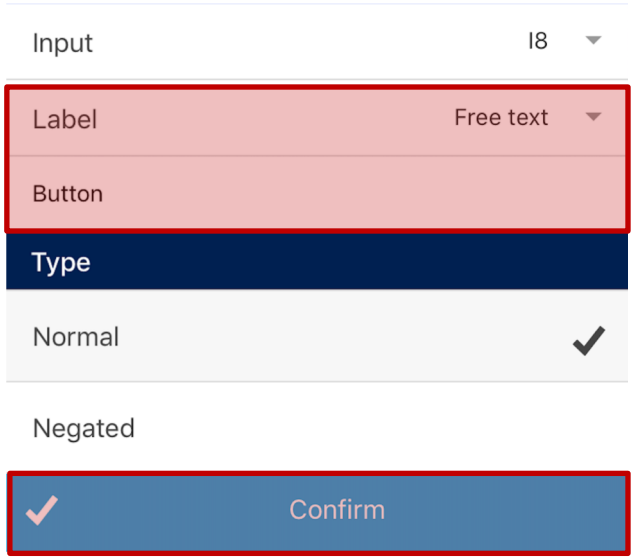

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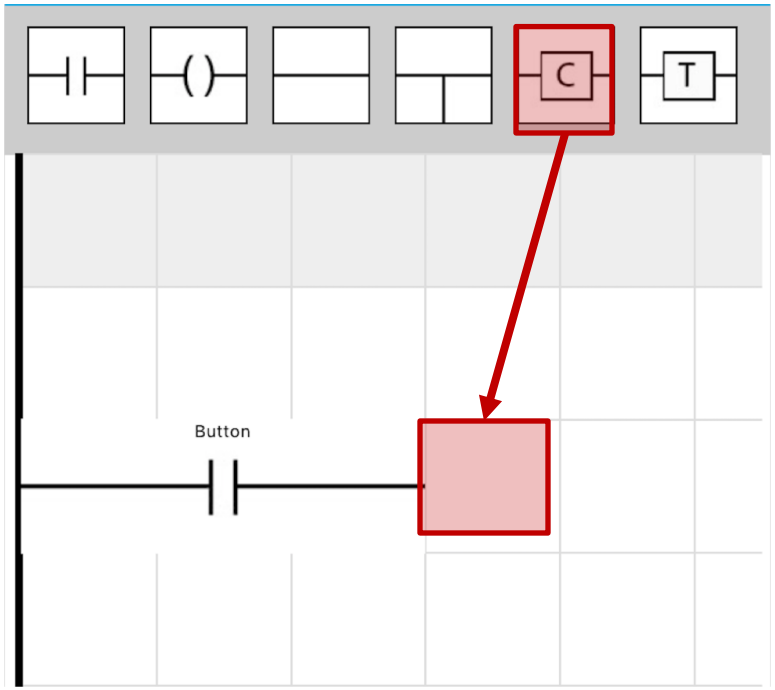

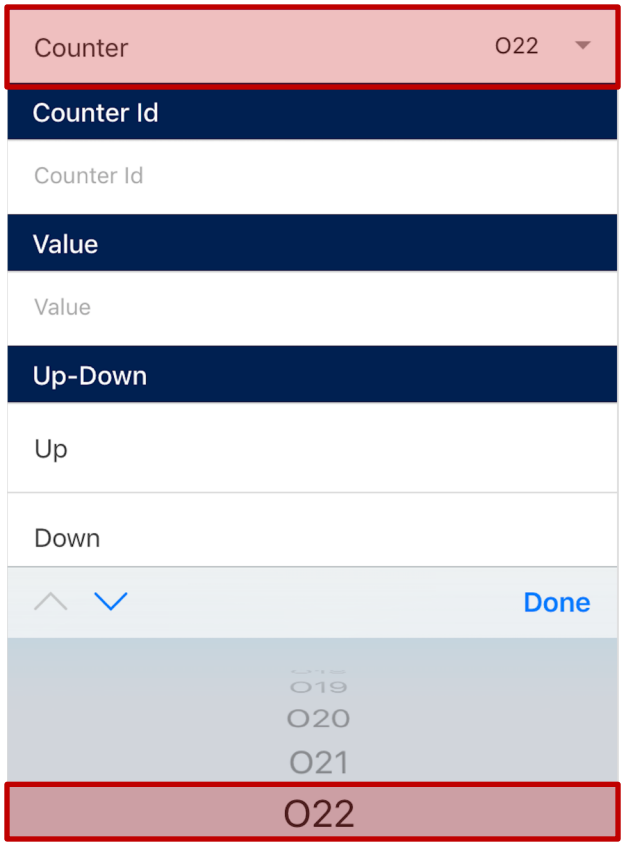

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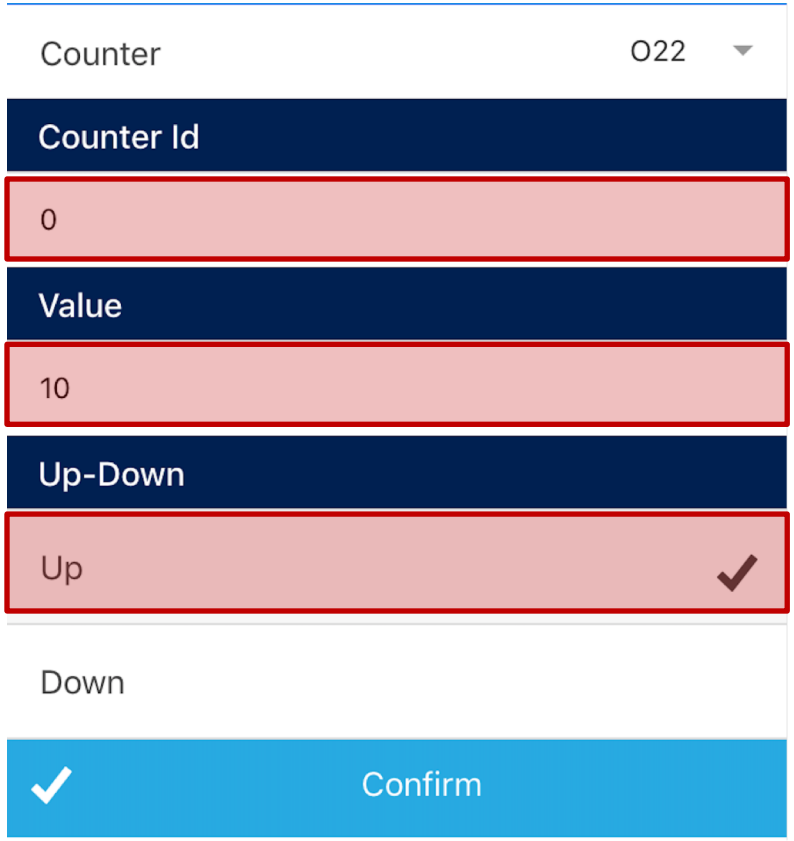

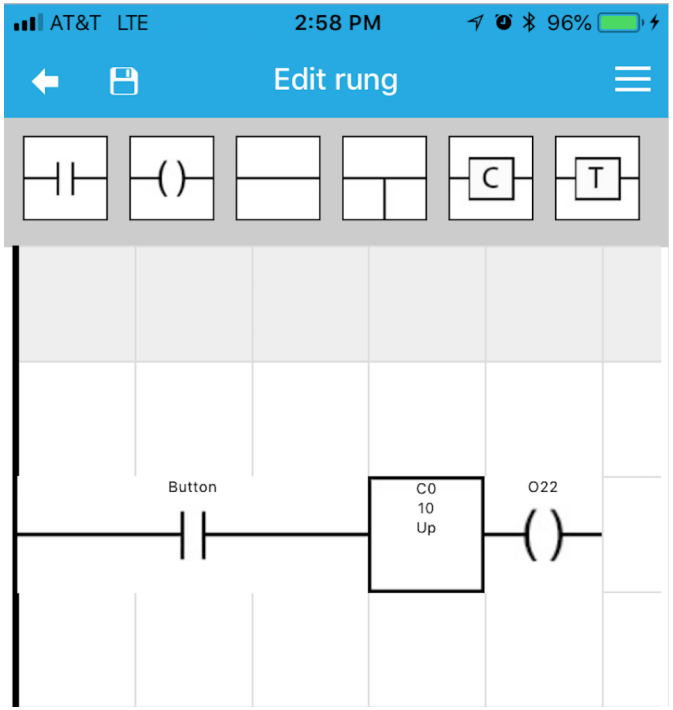

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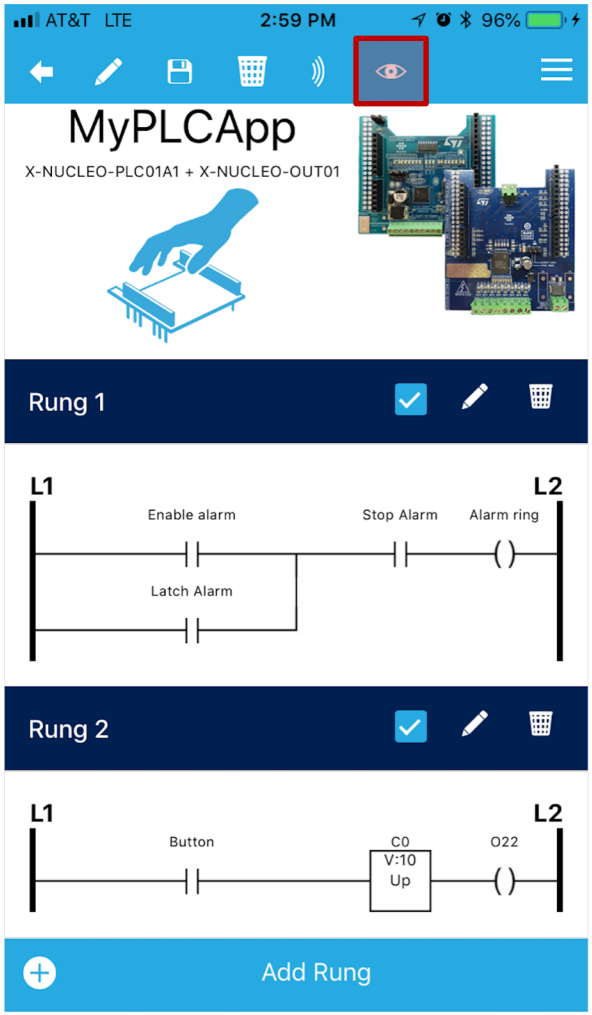

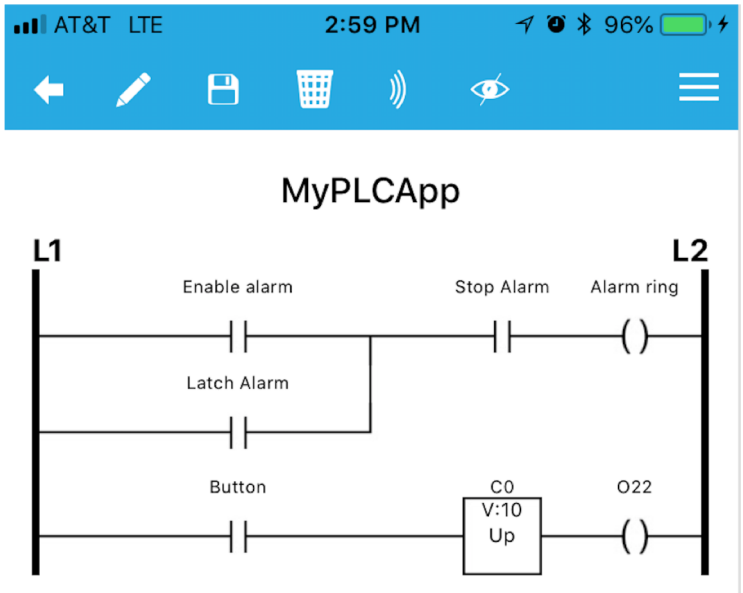

Issues with the PLC

- Security
  - Anyone can connect to the PLC wirelessly
  - No encryption
  - Open Network
- Symbol Support
  - Limited symbols and capabilities
- Limited timer and counter functionality compared to a traditional PLC

Going Further

- Update controller to toggle Wi-Fi state from AP to STA mode.
- Add additional industrial communications
  - RS485
  - MODBUS
- Find an interesting problem and try to solve it using ladder logic
- Experiment with the timer function

Additional Resources

- Download Course Material for
  - C/C++ Doxygen Templates
  - Example source code
  - Blog
  - YouTube Videos
- Embedded Bytes Newsletter
  - http://bit.ly/1BAHYXm

From www.beningo.com under

- Blog > CEC – Building Your own Internet Connected PLC