CAN BUS QT GUI Tool

This tool is a proof of concept of the CAN BUS GUI Tool.

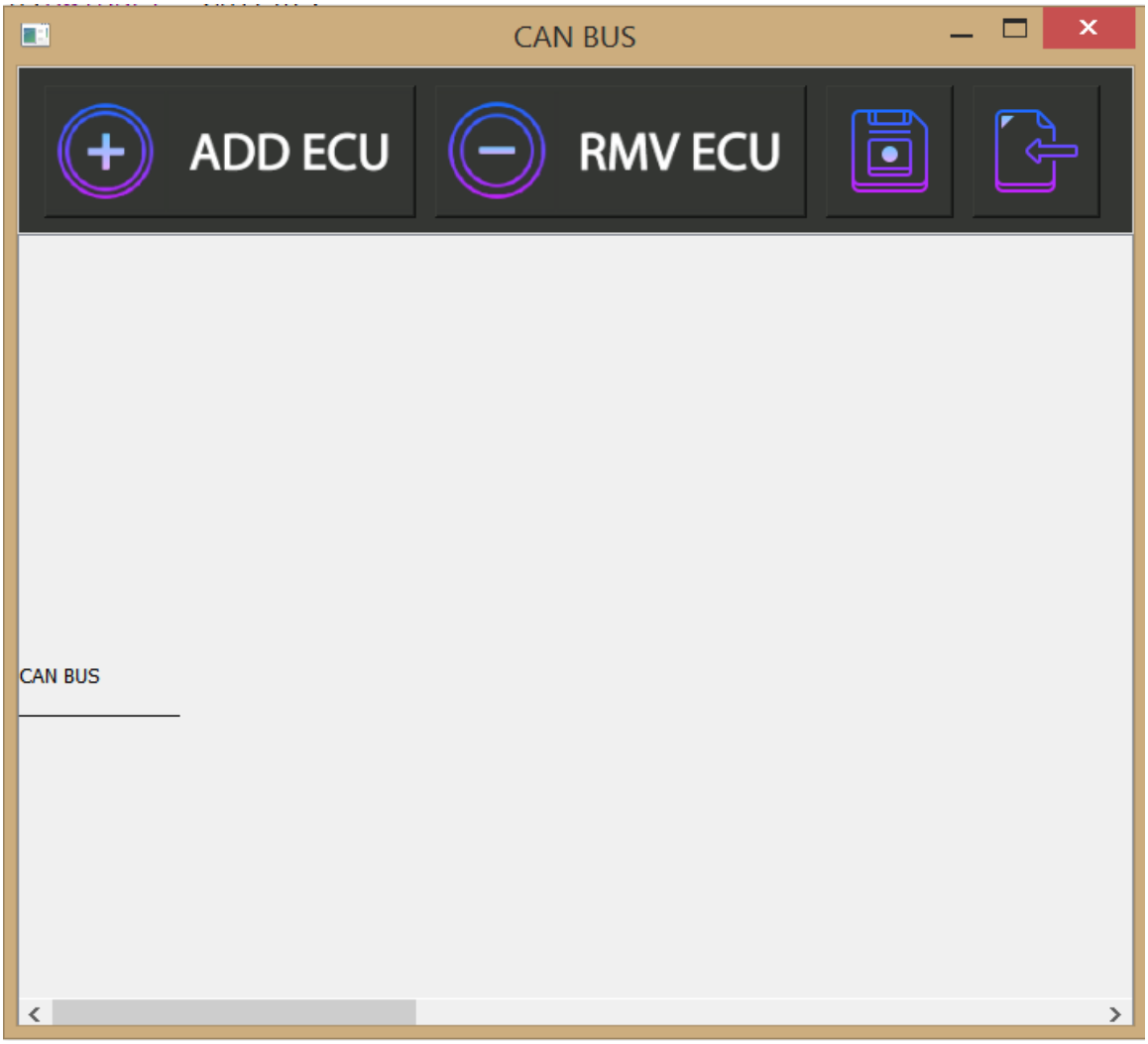
Main GUI Look:

Main Technologies used:

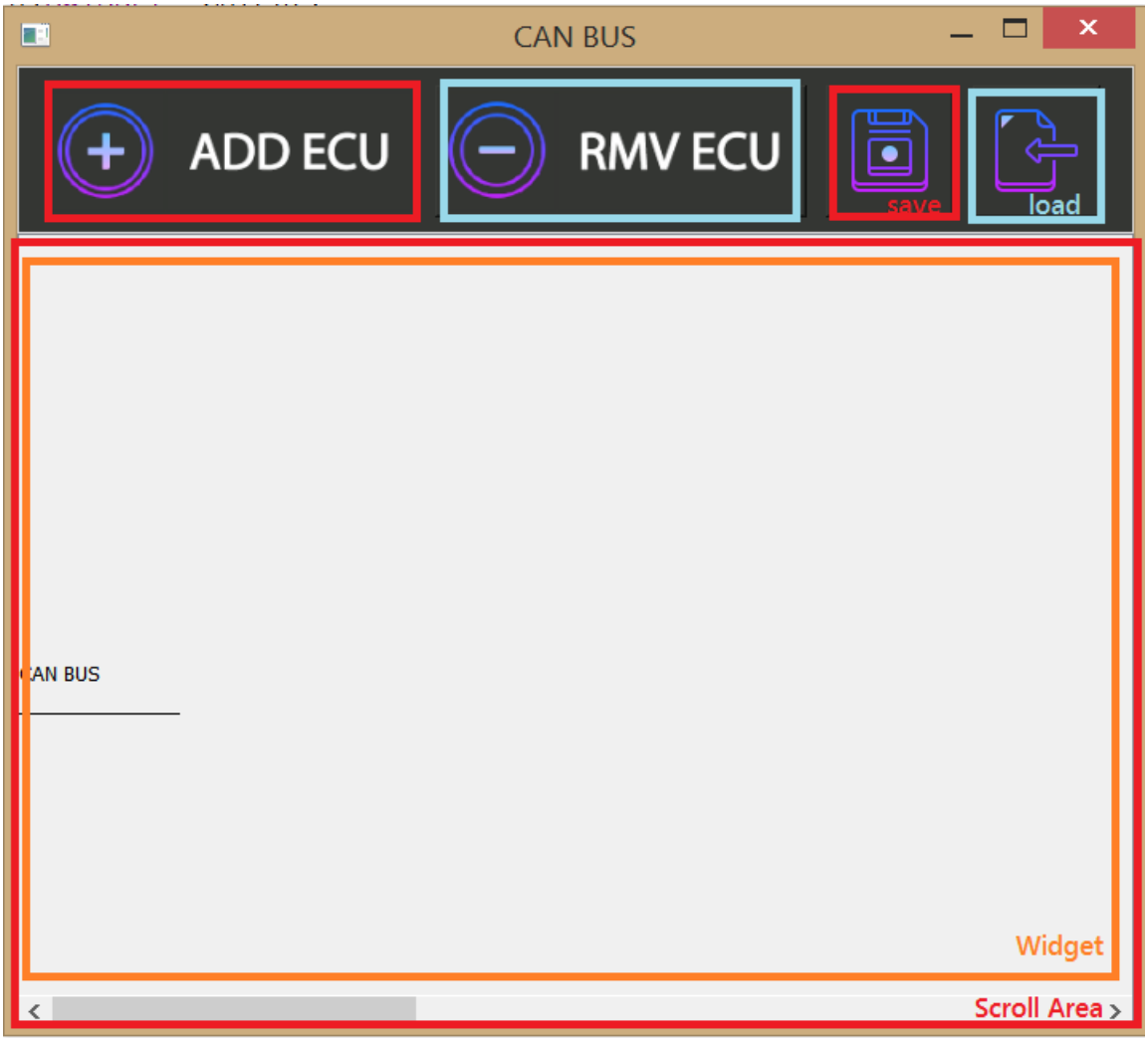
- C++ Qt
- Python BackEnd
- XML

Main Features:

- Creating New Design
- Loading Existing Design
- Adding new ECU to the Existing Design
- Removing ECU from the Existing Design

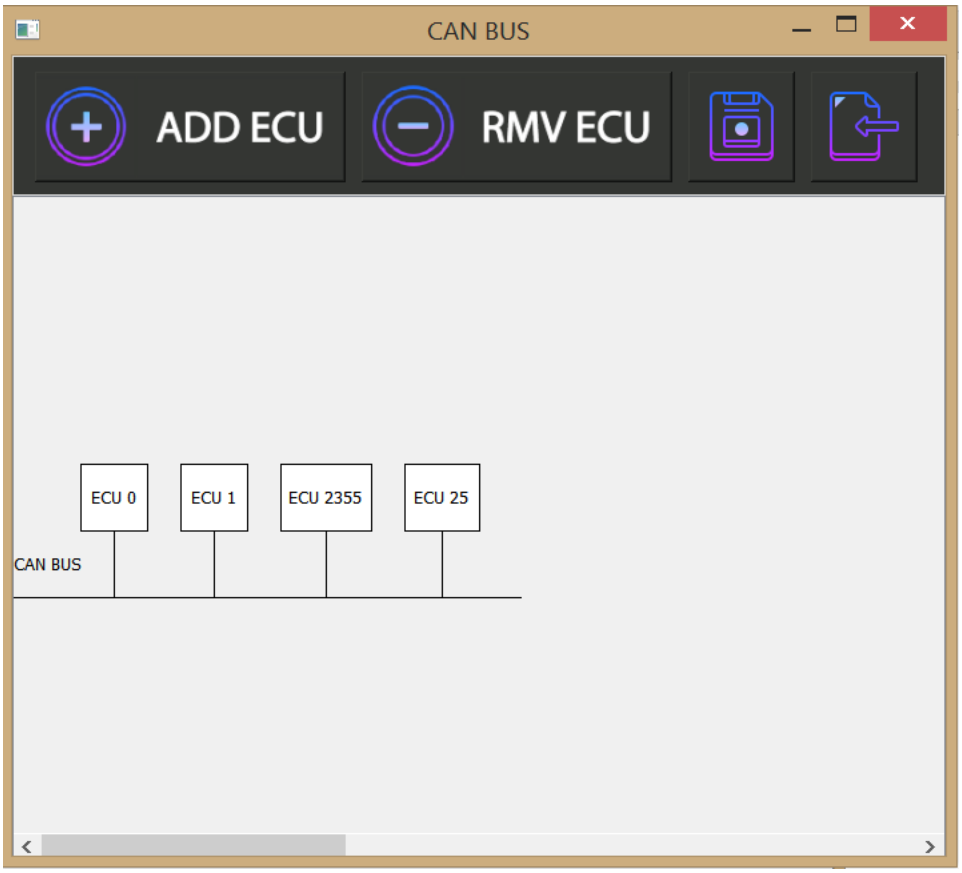


Main Components of the GUI:



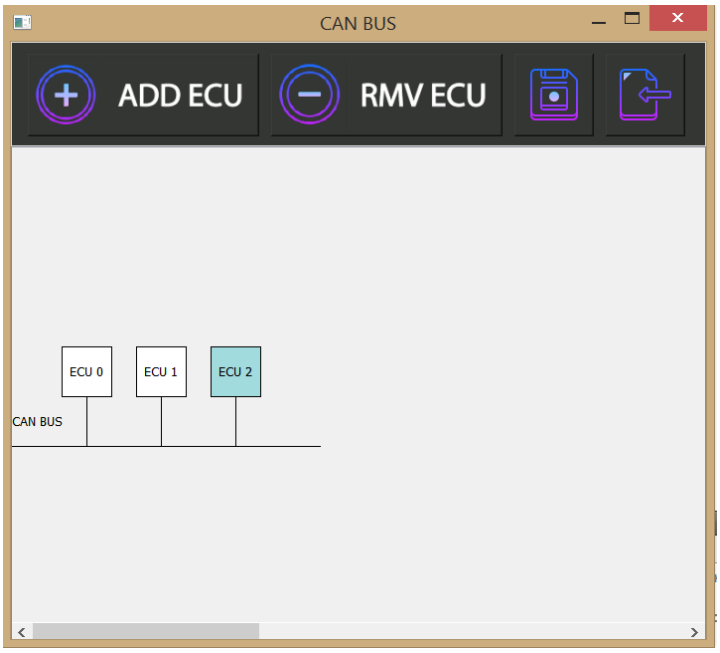
- Buttons GroupBox
  - Add new ECU Button
  - Remove Existing ECU
  - Save Current Design
  - Load Old Design
- Scroll Area
  - Contains QWidget that has an over ridden paint Event

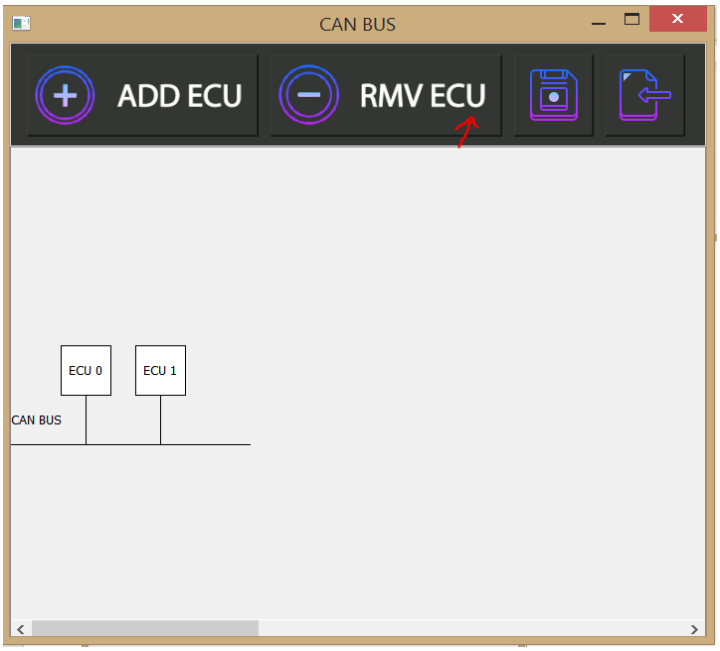
Adding New ECU:



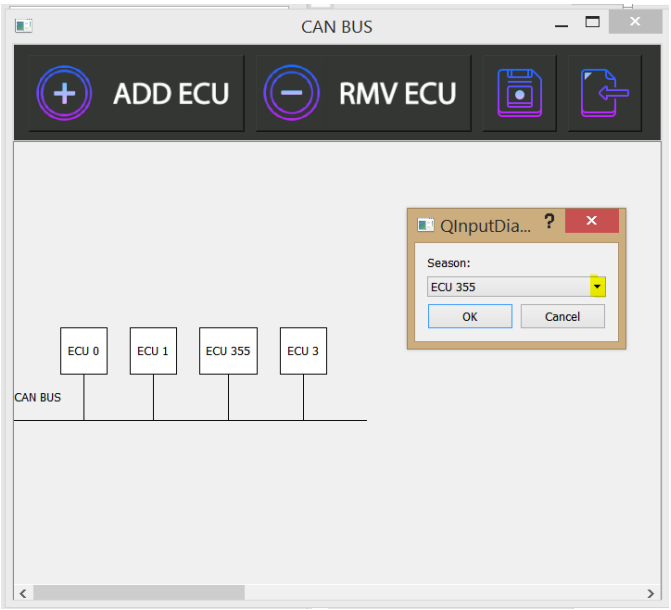
Can Bus Grows with the existing ECU Number

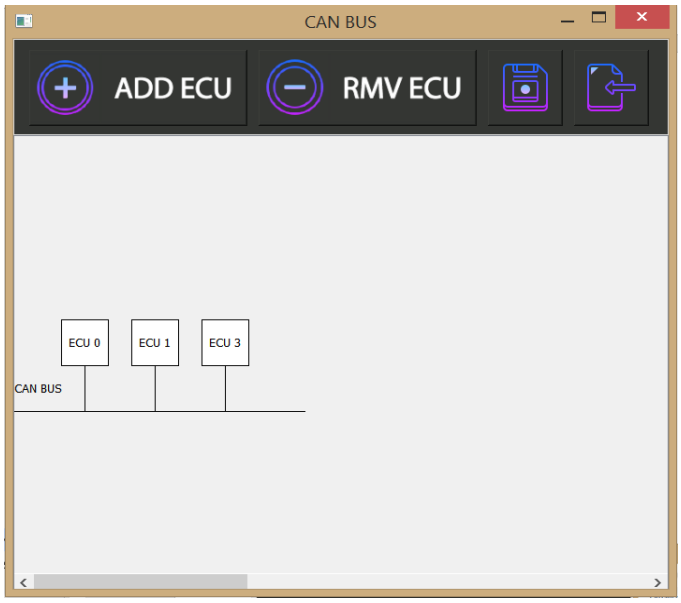
Removing Selected ECU:



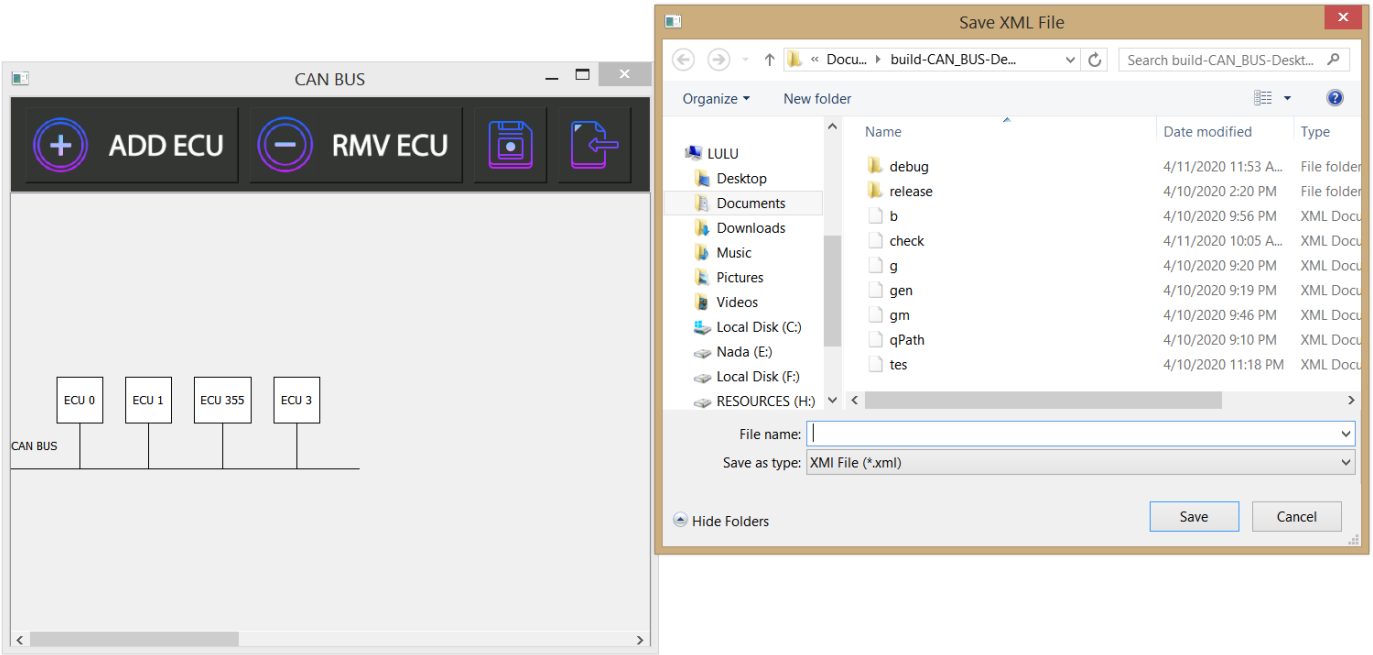


Removing ECU By Choosing its Name from the existing ECUs Name list:



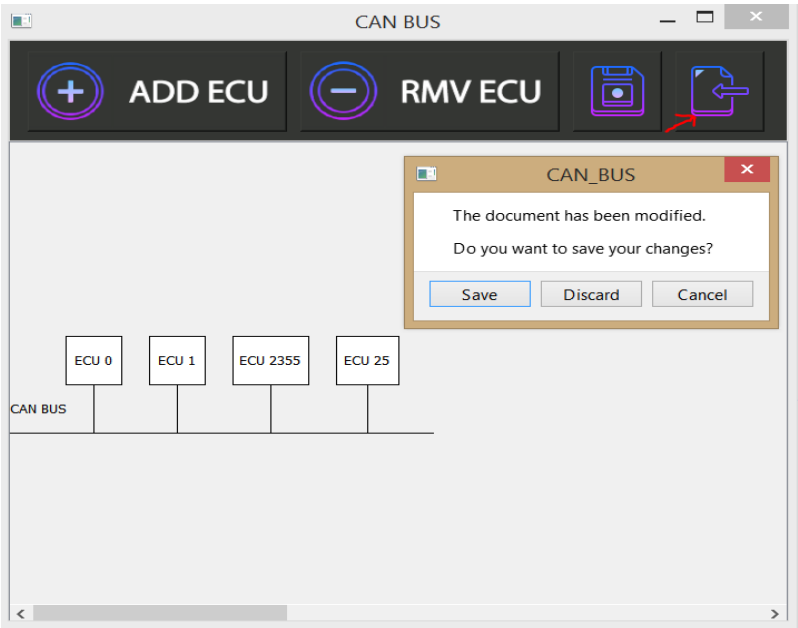


Saving Design in the desired Destination:

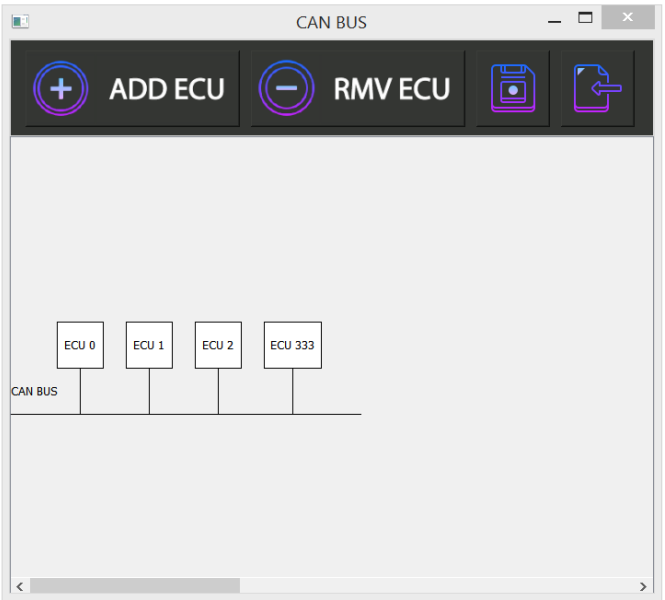


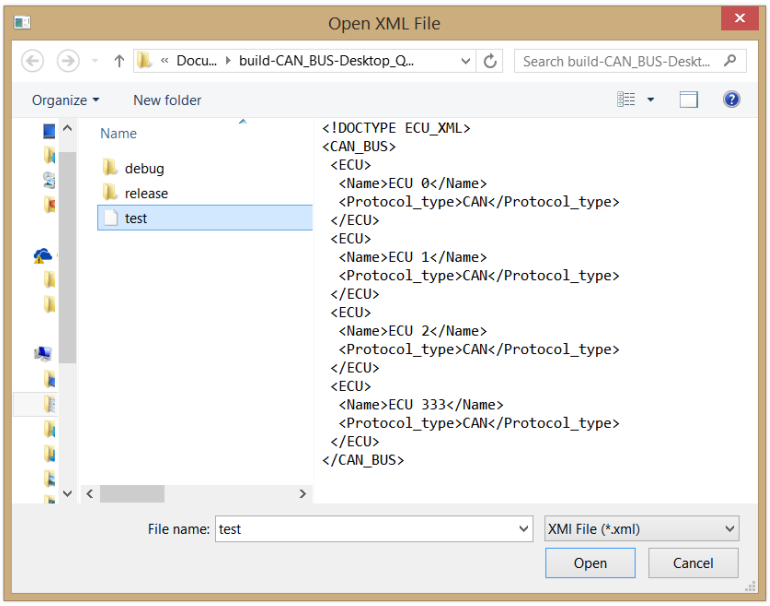
CTRL + S Shortcut is supported for saving the Existing Design

Loading Old Design checks first if there is an existing design that needs to be saved:



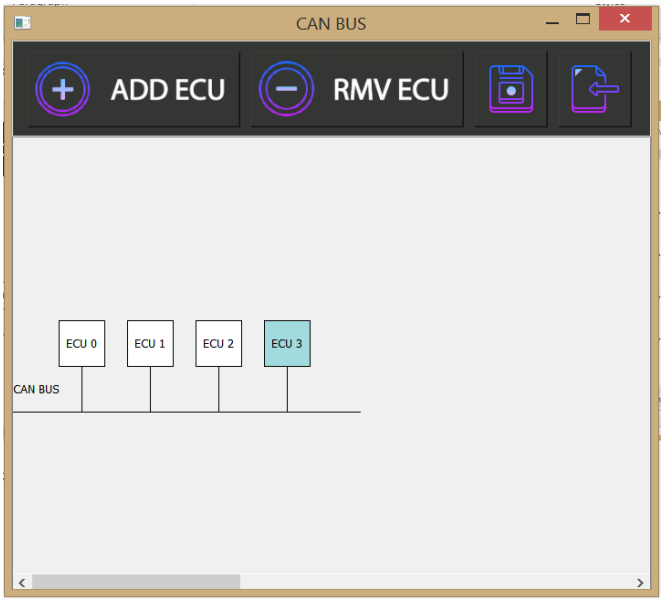
Loading Existing Design from a file named test.XML:

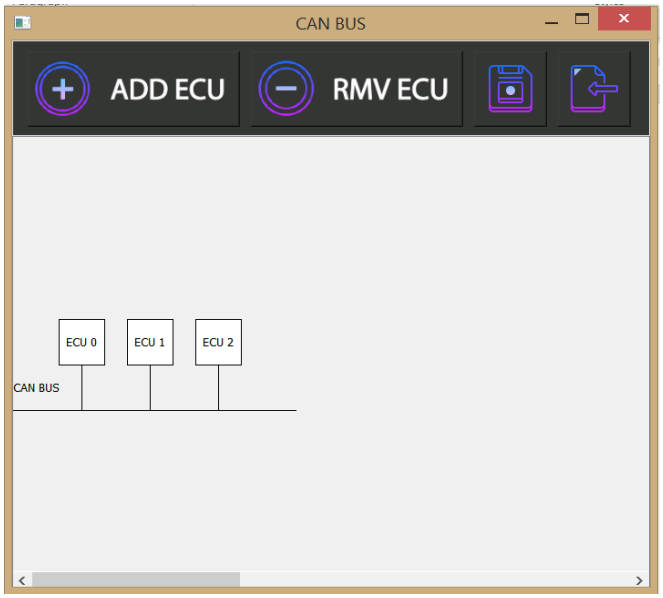


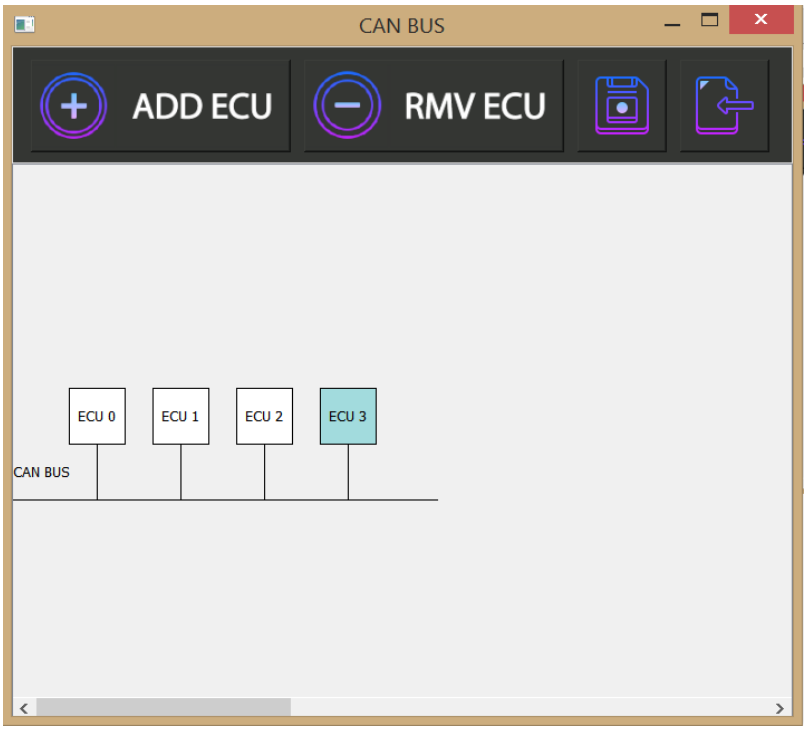


CTRL + O Shortcut is supported to load existing Design

Undo the last add or remove is also supported via the CTRL+Z shortcut:

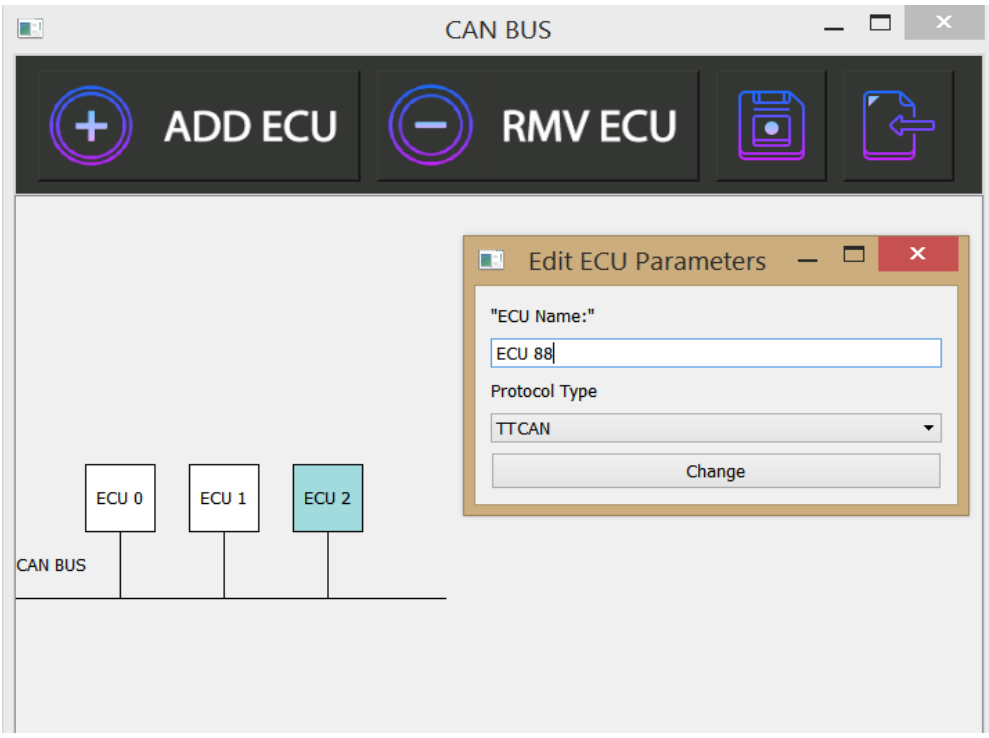




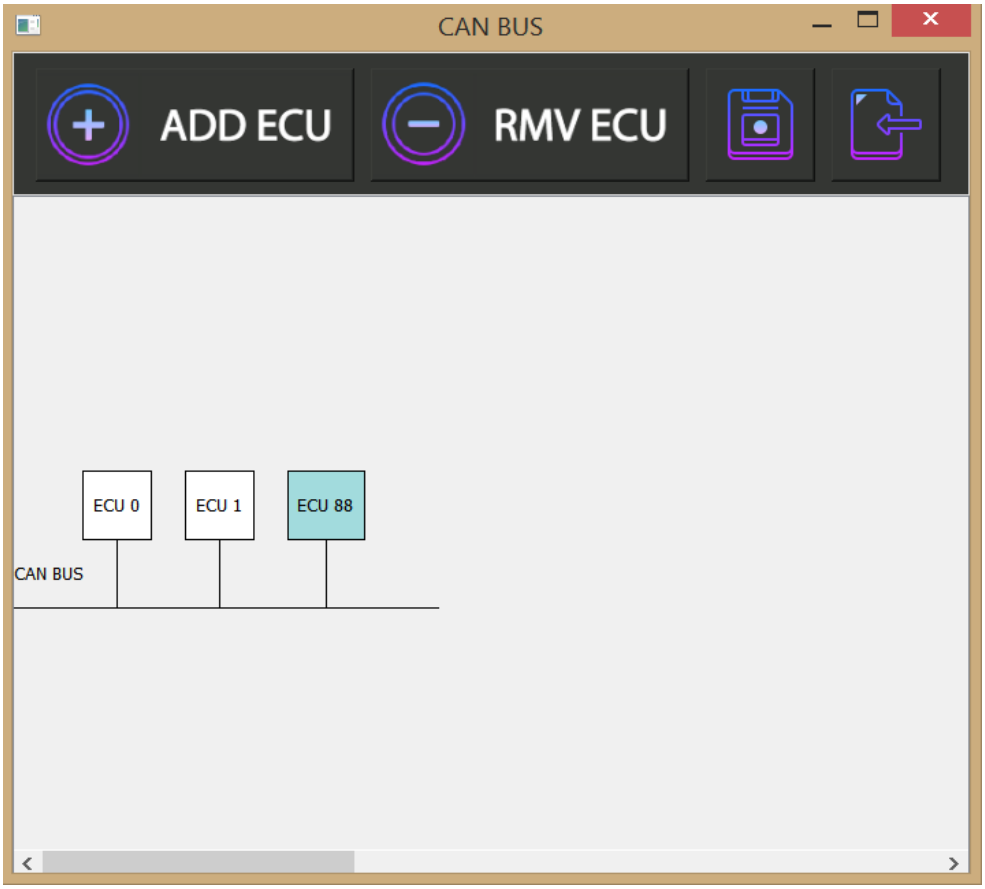


ECU 3 was deleted using the RMV ECU button then retrieved via the CTRL + Z Shortcut

Editing Current ECU by double clicking it:



After editing ECU2 to be ECU 88 with TTCAN Protocol:



Brief info about the implementation

- The ECUs are drawn inside a class called PaintArea created by subclassing the QWidget class
- Subclassing QWidget was mainly for overriding the PaintEvent to be able to use QPainter Class
- The Main Class used to draw the ECUs is the QPainter Class, The performance of QPainter is pretty high compared to QGraphicsScene and other similar solutions
- QPainter's main disadvantage is that it requires lots of math to calculate where each element should be
- For Each ECU QPainter draws Rectangle, connector line to the CAN Bus and the Text representing the Name of the ECU
- Then the inter ECU space is calculated and the next ECU in the ECUs Vector is Drawn
- Other Events that were over ridden in the PaintArea class are the mousePressEvent to select the ECU and the mouseDoubleClickEvent to view the edit pop menu
- Selecting the ECU is done by calculating the mouse position and checking among which ECU that position lies then updating the color of the current ECU
- The same goes for the double click event but instead a function that creates the Edit properties pop up window is called
- The next subclass is the PropertiesWindow, it is subclassed from the QMainWindow class
- PropertiesWindow is used to view the pop up window after double clicking the mouse to enable editing the ECU Properties

Python BackEnd Parsing

The used parser script is *"CAN_BUS_PARSER.py"*

Script Sequence:

1. The Script gets the right file path
    - Checks the availability of the given file path and the xml extension

- Using the xml.etree.ElementTree library it parses the XML File and returns the xml tree
- Iterates over the ECU Nodes
- Gathers the Parameters for each ECU in a dictionary
- Creates a text file for each ECU with the name existing in the Name tag, then appends the parameter pairs in the file comma separated lines.

Running the Script:

The scripts needs to be provided with the file name or path only to generate the ECU Files.