PROGRAMMING TOOL – STANDARD USER GUIDE

Thank you for purchasing and using Marlin Technologies' electronic control units. This programming tool was created to easily program and configure Marlin Technologies modules. The emphasis of the design was ease-of-use and speed of operations.

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A. Supported USB-CAN dongles

- Kvaser Leaf Light v2 (https://www.kvaser.com/product/kvaser-leaf-light-hs-v2/) (Fig. 1)
- PCAN-USB (https://www.gridconnect.com/products/can-usb-adapter-pcan-usb) (Fig. 2)

1. Figure 1: Kvaser Leaf Light v2

Figure 2: PCAN-USB

1. How to install the Programming Tool application

Unzip 'MTI ProgTool Installer.zip' file provided by Marlin Technologies, Inc. Locate and run "MTI Programming Tool Installer.exe" to initiate the Marlin CAN USB Programmer application installation. Follow the prompts during the process until it's finished.

During installation, you have the option to install drivers for your desired CAN dongle (Fig. 3). If you don't already have these drivers, they will need to be installed for the program to run.
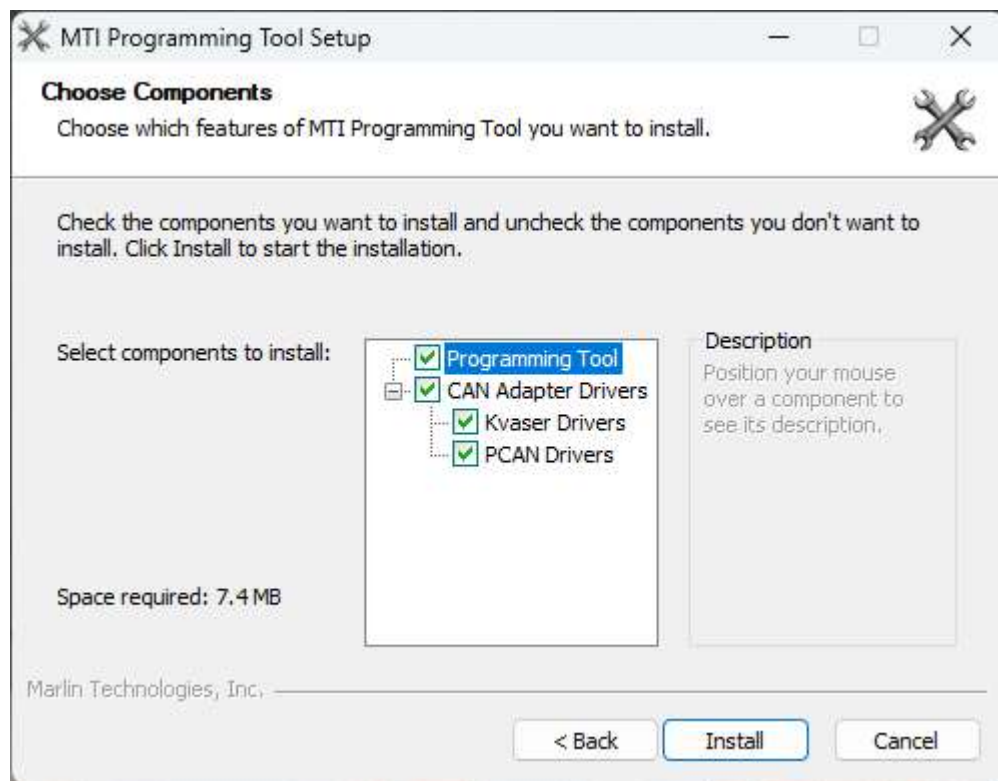

Figure 3: Menu for selecting which CAN Drivers to install

1.1 How to uninstall the application

To uninstall the application, right click on the windows icon in the taskbar and navigate to "Installed apps" (Fig. 4).
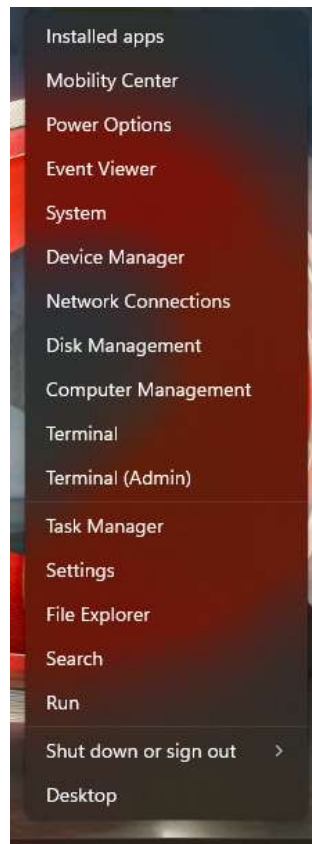
Figure 4: Menu showing "Installed apps"

Locate "MTI Programming Tool", click on the 3 dots to the side, and click on "Uninstall" to start the uninstall process (Fig. 5).

Figure 5: Uninstalling the Programming Tool

Follow the prompts and wait for the process to complete (Fig. 6). The shortcut should disappear from your workstation's Desktop.
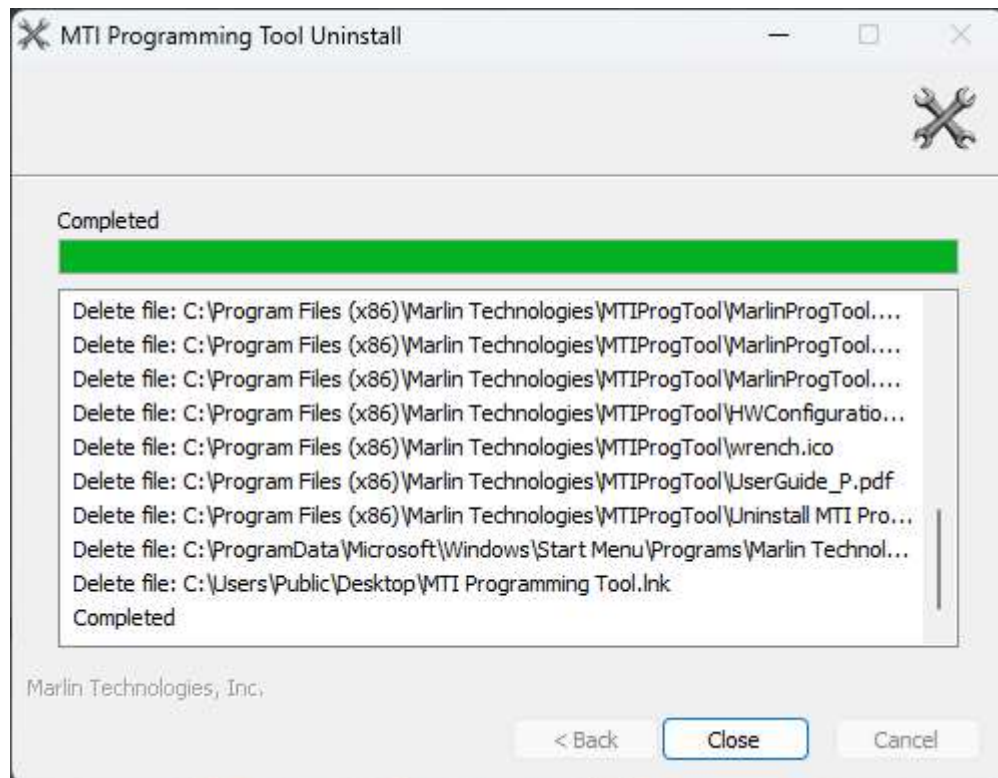

Figure 6: Uninstallation completion

2. Launch the installed application

After successful installation, a shortcut called "MTI Programming Tool" will appear on the user's desktop (Fig. 7). To launch the application, double click it.
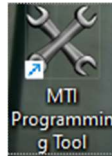

Figure 7: Shortcut icon for Programming Tool

Once the program is launched, the application's main page will appear (Fig. 8) and an automatic search for compatible dongle(s) attached to the computer's USB port(s) will be performed.

More than one dongle can be connected to the user's PC workstation at the same time (Fig. 8), however, only one of them can be active at a given time (Fig. 9).
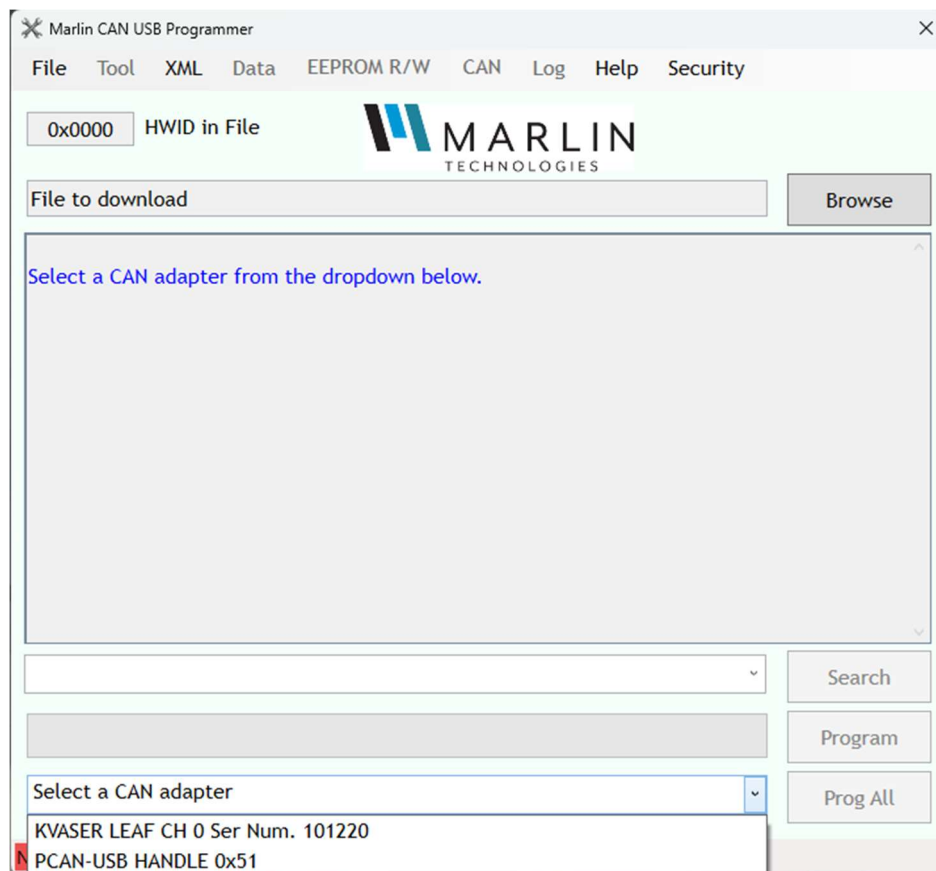

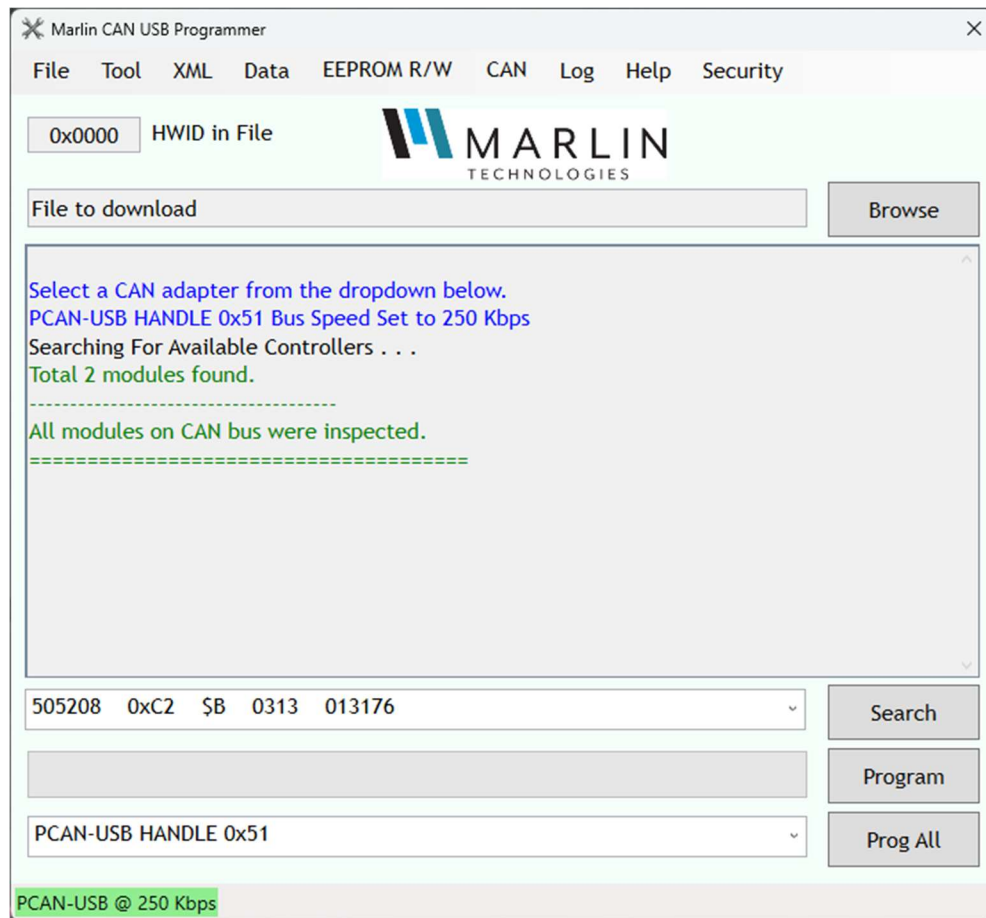
Figure 8: Multiple dongles connected

Figure 9: Selecting the 'PCAN-USB' dongle

Once a dongle is chosen, its name and the current baud rate will appear on the status strip at the bottom of the main window highlighted in green. A search for available on CAN bus controllers will start automatically. The user can then repeat the search by clicking on the "Search" button.

3. Setting up desired baud rate for a dongle

The first time you open the application, a default value of 250 kbit/s will be set. To change the speed, click on "Tool" -> "Baud Rate:" and pick any of four available rates: 125 kbit/s 250 kbit/s, 500 kbit/s or 1 Mbit/s. This selection will be remembered after the application is closed.
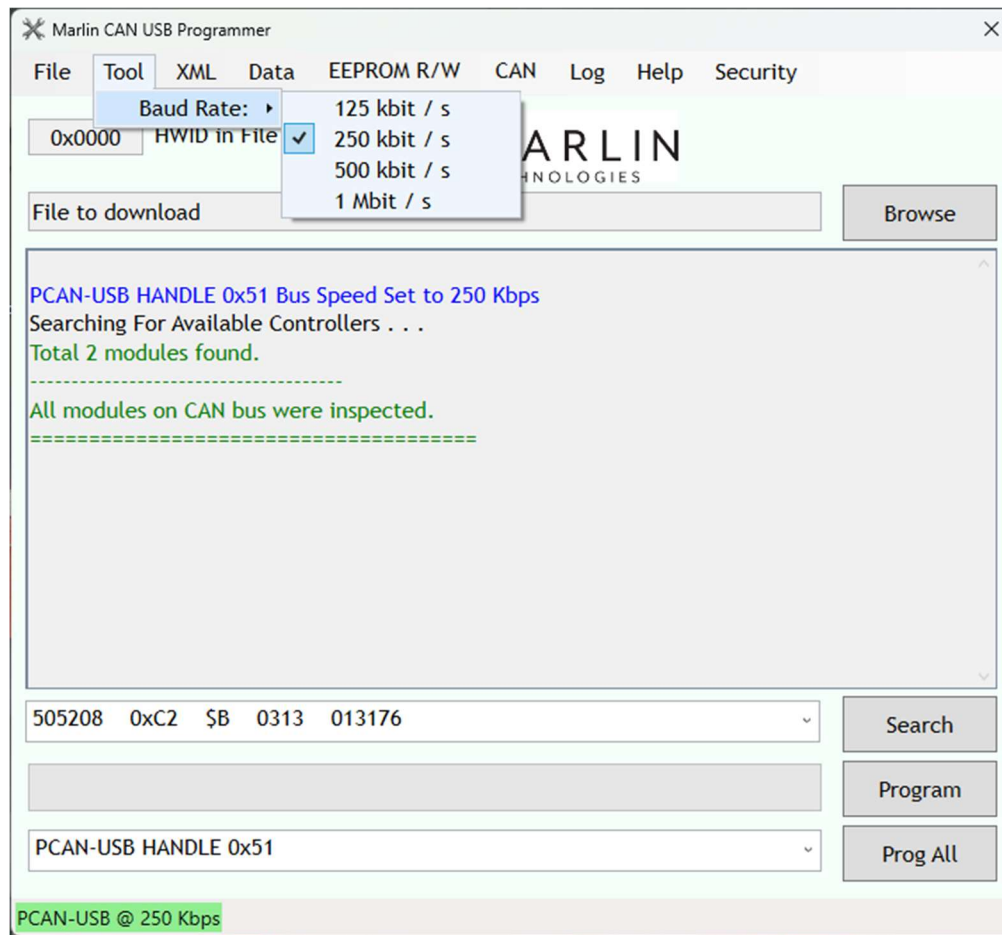

Figure 10: Selecting a baud rate

4. Setting up 'Security' folder

If you have a policy requiring the use of a fixed folder containing .s19 files, click on "Security" -> "File Directory" -> "Lock" to lock the programming tool to a specific folder (Fig.11, Fig. 12):

To remove the folder lock, uninstall and reinstall the programming tool as outlined in the relevant section of this guide.
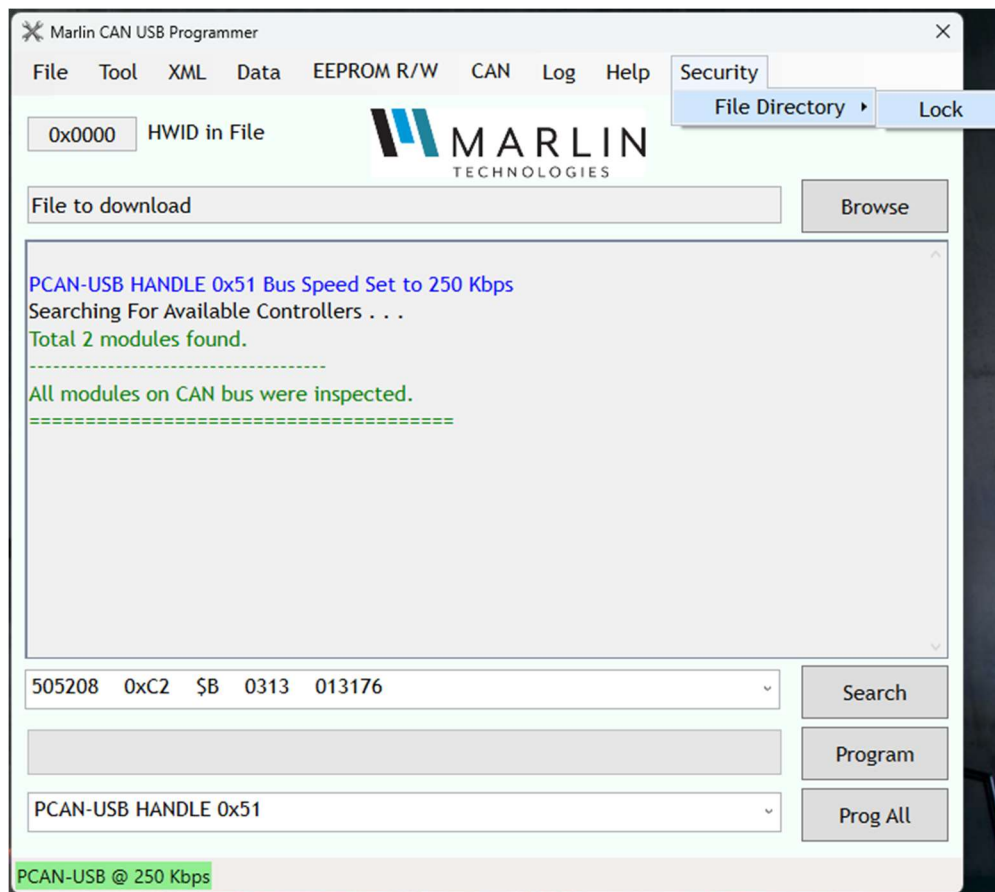

Figure 11: Locking the file directory

Figure 12: Confirmation of directory lock

Note the 'Security' tab has disappeared from the menu.

5. Program an .s19 file into a selected controller

Click on the "Browse' button or go to 'File' -> 'Open .s19 File' to choose an .s19 file saved on your PC's hard drive (Fig. 13, Fig. 14).

Note: do not place your .s19 files into 'C:\Program Files (x86)\Marlin Technologies\'. The access to this location might be denied by the operating system.
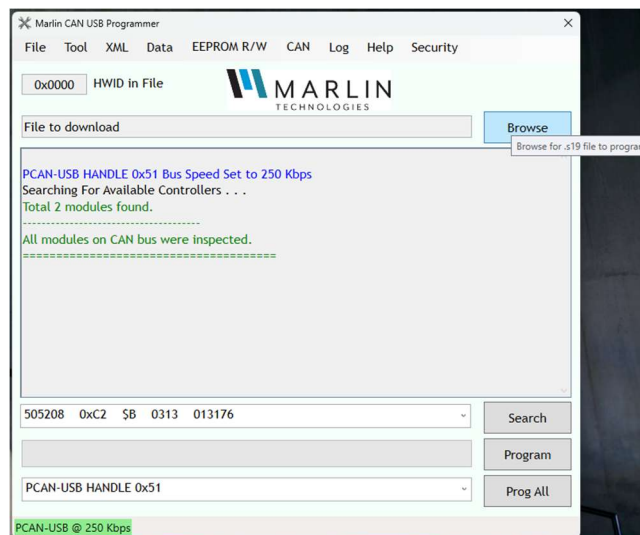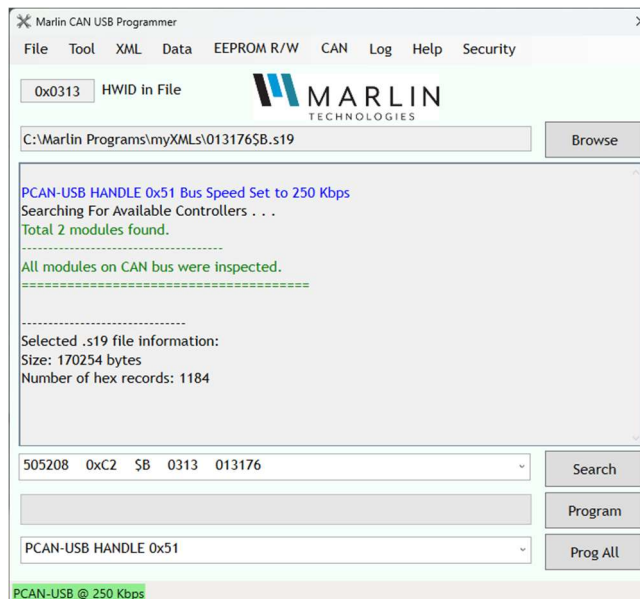

Figure 13: Button to browse for an .s19 file

Figure 14: .s19 file selected

Once an .s19 file is selected, the file path will be shown in the text box by the "Browse" button. You can now download a program to the selected controller by clicking on the "Program" button. During programming, the progress bar will advance and completion percentage will be shown, and all buttons are disabled to prevent programming disruption (Fig. 15, Fig. 16).
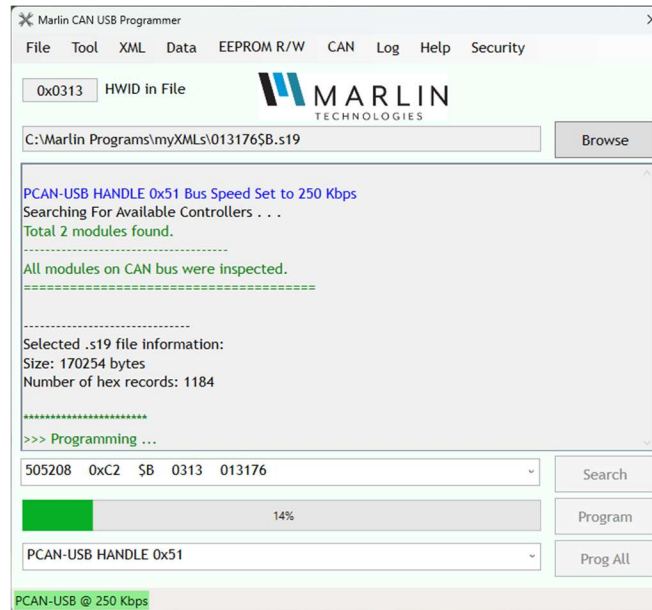

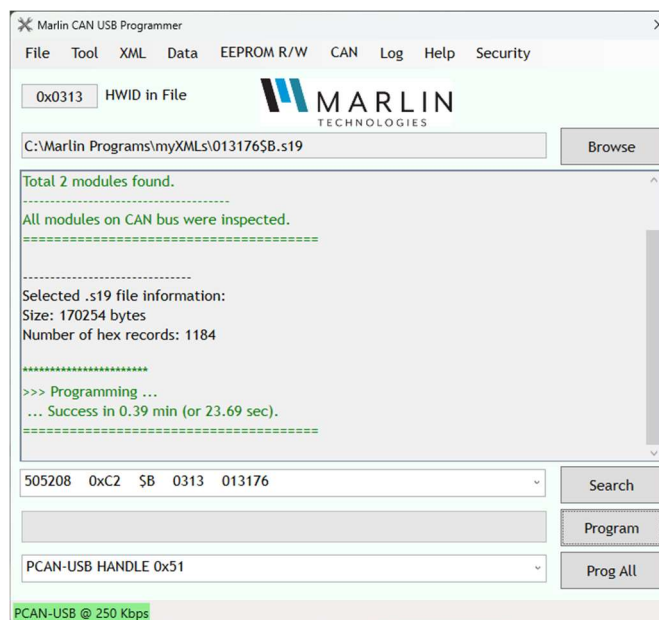Figure 15: Device programming in progress

Figure 16: Device programming success

6. Program ALL

It is possible to program all Marlin controllers on a CAN bus by clicking on "*Prog All*" button. The user will be prompted to choose a CSV file that contains a list of connected modules and links to their .s19 programming files (Fig. 17).
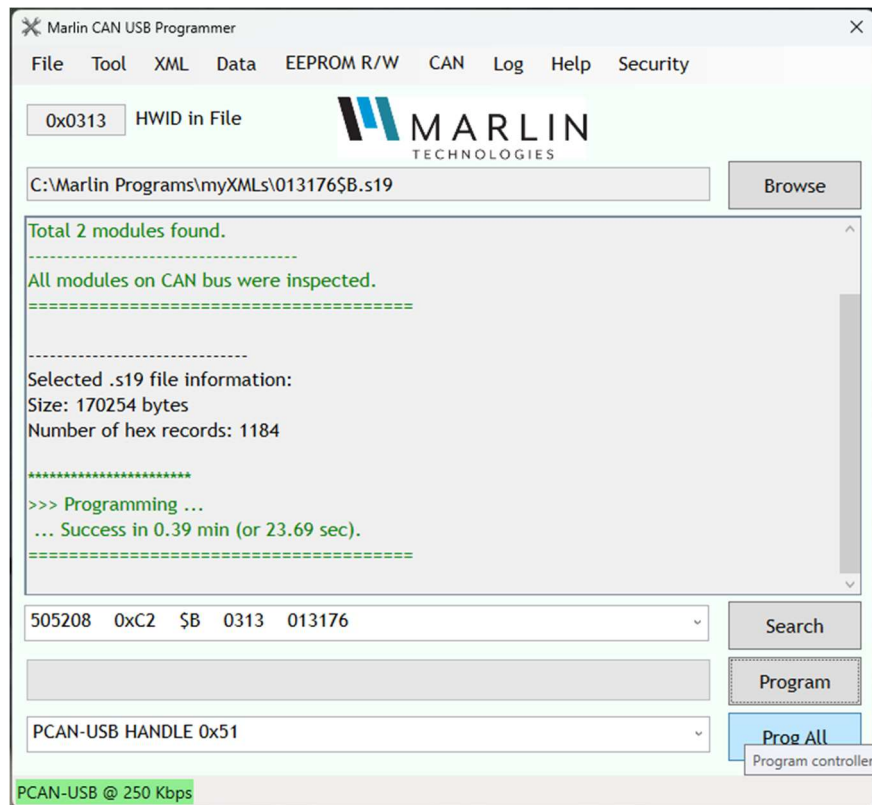

Figure 17: Button for programming all devices

6.1 Creating a Vehicle Config file

To create a Vehicle Config file for use with the "Prog All" function, navigate to "File" -> "Vehicle Config" (Fig. 18, Fig. 19).
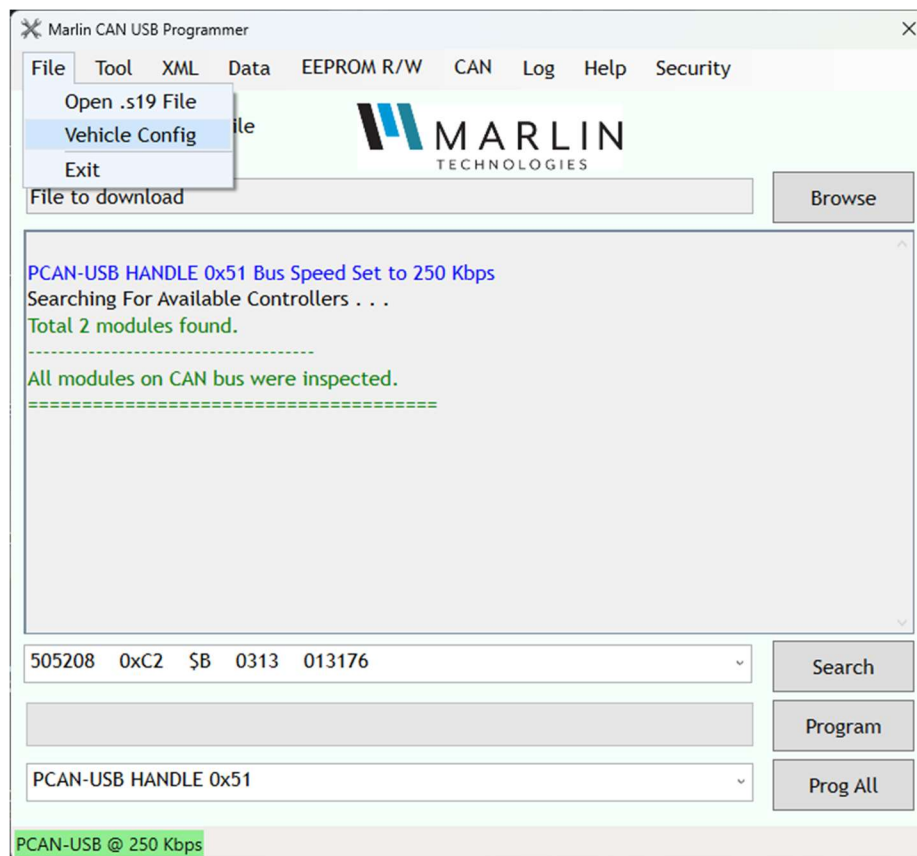

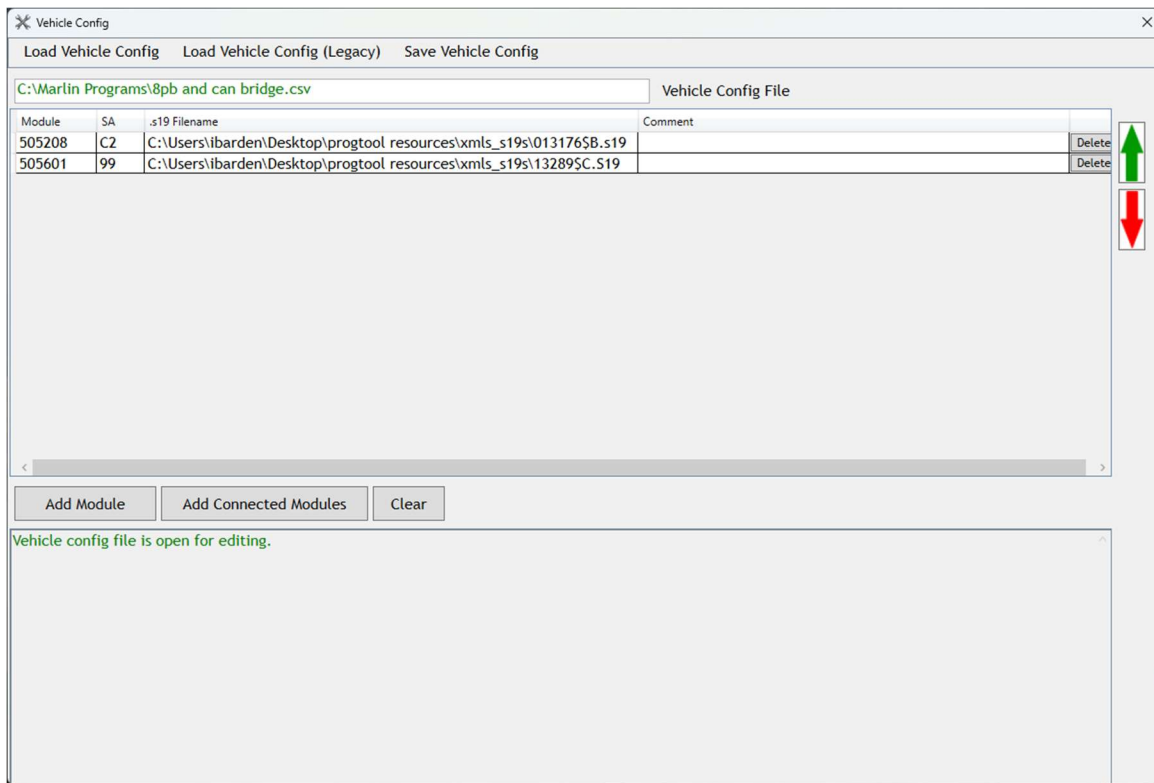Figure 18: Location of Vehicle Config menu

Figure 19: Vehicle Config menu

Pressing "Add Modules" will add an empty item to the table, which can be manually filled in.

Pressing "Add Connected Modules" will populate the table with the module number and source address of all currently connected modules.

Pressing Clear will empty the table.

Within the table, clicking on an item in the .s19 Filename column will open a file browser, to select the desired .s19 file. Clicking on the delete button will delete that row. Use the up and down buttons on the right to move the currently highlighted row.

To load an existing CSV Vehicle Config file, click "Load Vehicle Config" in the toolbar and select the desired file.

To load a deprecated XML Vehicle Config file, click "Load Vehicle Config (Legacy)" in the toolbar and select the desired file.

To save your configured Vehicle Config file, click "Save Vehicle Config"

7. Log CAN Bus traffic

Check the "Log" -> "J1939" box to log messages sent over the CAN Bus (Fig. 20, Fig. 21):
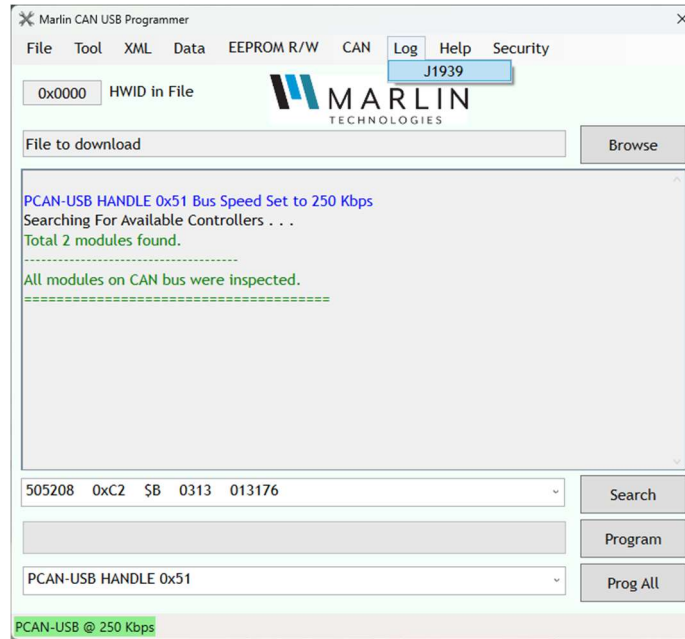
Figure 20: Location of start logging button

Figure 21: CAN logging in progress

To stop logging, click on the "Recording" button or click on "<u>L</u>og" -> "J1939" again (Fig. 22). A new log file (file extension .asc) will be created and saved to C:\Marlin Data\myLogs\.
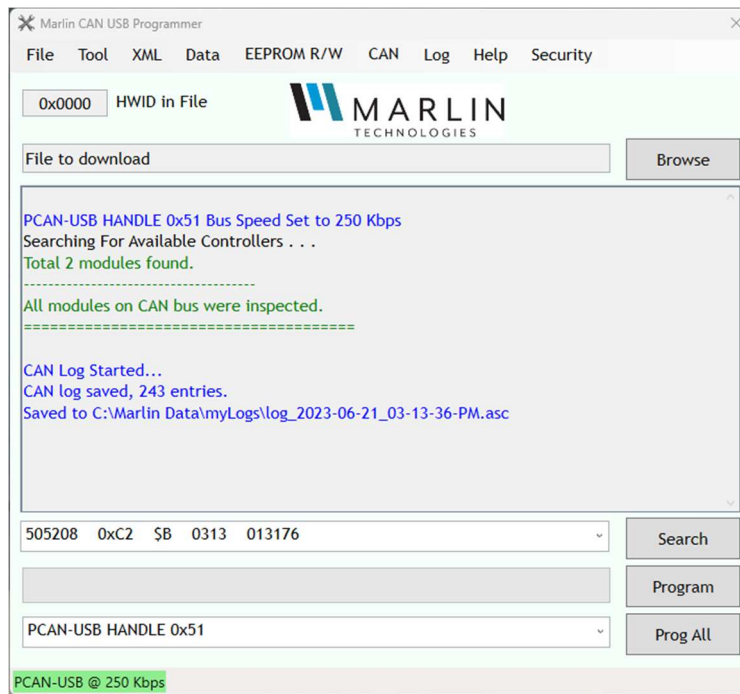

Figure 22: CAN logging is complete

The format of the log file (Fig. 23) is such that it can be used with Vector Informatik CANAlyzer:

Figure 23: Format of CAN log

8. Loading EEPROM Data from a controller into an XML File

The user can read and write data to a compatible controller by selecting the "XML" tab (Fig. 24):
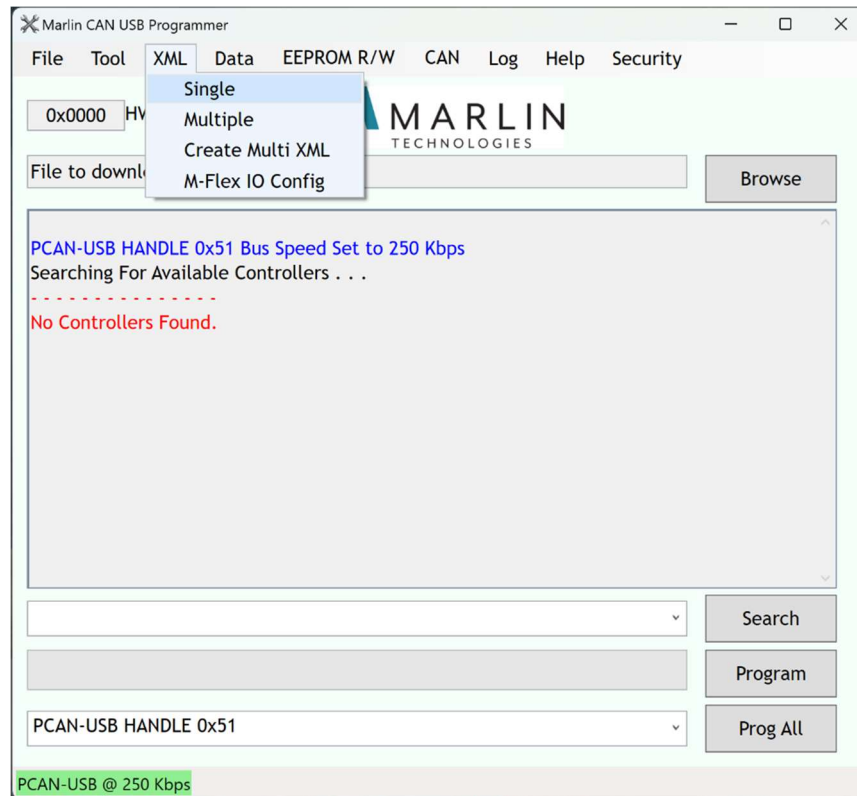

Figure 24: Entering the XML Menu

Single:

The application will prompt you to choose an .xml template file. After choosing the file, a new table will appear (Fig. 26). The user can also save the .xml file by clicking 'Save As' button.

To read attributes from a controller, select the desired controller on the main window (fig. 25) and then click on '*Read from EEPROM*' (Fig. 27):

Figure 25: Selecting the desired device on the main menu

Figure 26: An XML file is opened
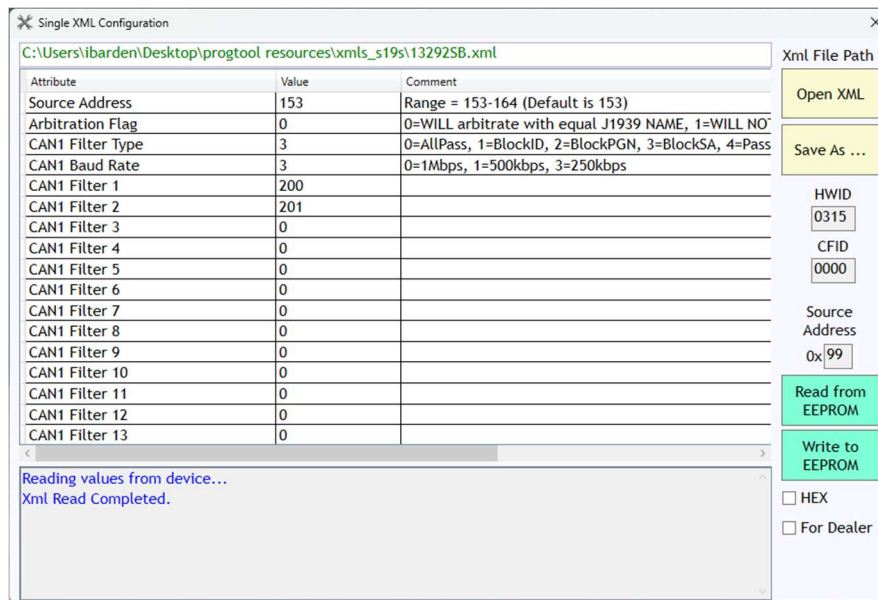
Figure 27: EEPROM attributes read from device

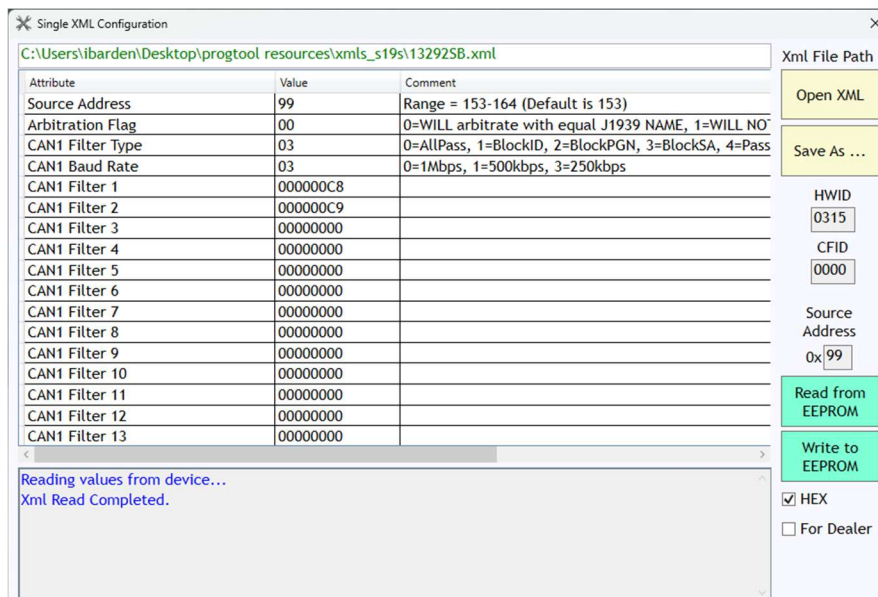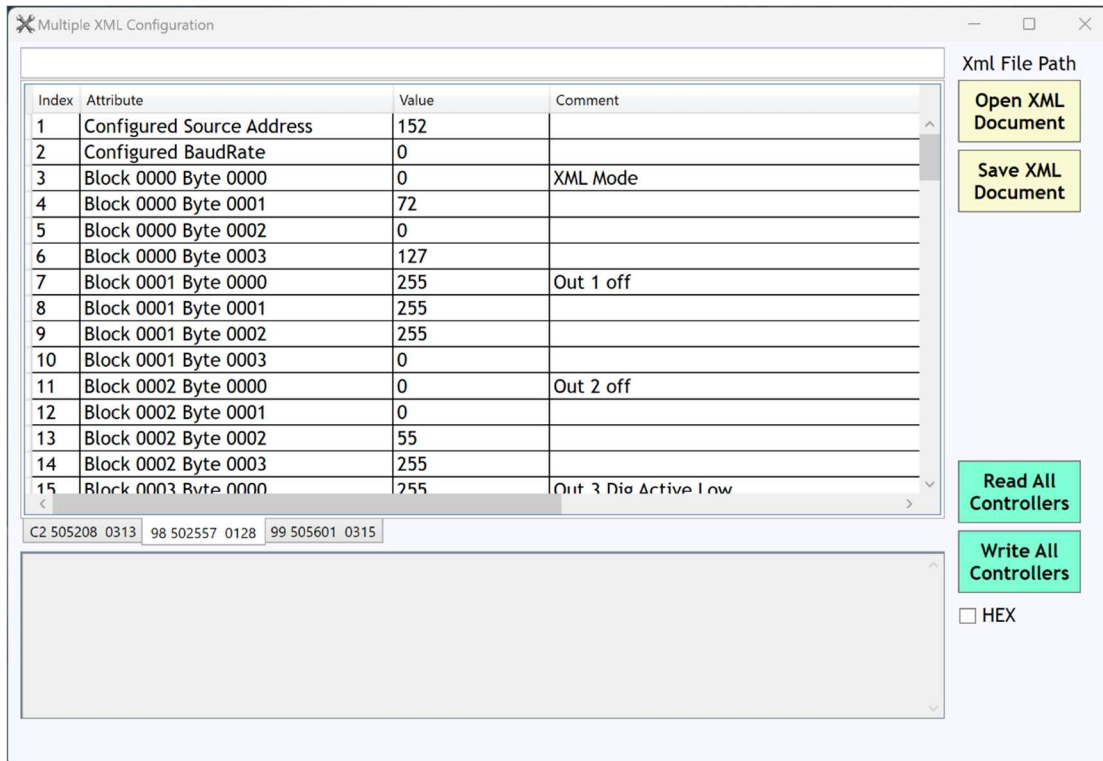To see the values of parameters in hexadecimal, check the 'HEX' box (fig. 28):

Figure 28: Read attributes in hexadecimal

To create a read only XML file for a dealer to program on their end, check the "Dealer" checkbox before saving the file. The resulting file will only be readable by the Dealer version of the Programming Tool.

Multiple:

Similar to the single XML menu, the application will prompt you to choose an .xml template file. After choosing the file, a new table will appear (Fig. 29). The user can also save the .xml file by clicking 'Save As' button.

Figure 29: Attributes from template XML files populated into a multi tab XML form.

Now, the user can:
- read attributes from all active controllers by pressing 'Read All Controllers'
- modify the attributes' values and write to the modules by clicking 'Write All Controllers'
- save attributes as a truck XML file by clicking 'Save XML Document'
- open previously saved truck XML files by clicking 'Open XML Document'

Note: some tabs may contain no information.

Create Multi XML:

From this menu, you can create a multiple XML file for use with the 'Multiple XML Configuration' tool.

Note: All information (other than 'File Path') needs to be filled in before a file can be saved. Thre user will be notified of an attempt to save an incomplete file.

Figure 30: The 'Create Multi XML' Menu

Pressing "Add File" will add an empty item to the table, which can be manually filled in.

Pressing "Add Connected Modules" will clear and populate the table with the module number and source address of all currently connected modules.

Pressing Clear will empty the table.

Within the table, clicking on an item in the File Path column will open a file browser, to select the desired .xml file. Clicking on the delete button will delete that row. Use the up and down buttons on the right to move the currently highlighted row.

To load an existing Multi XML file, click "Load Multi XML" in the toolbar and select the desired file.

To save your configured Multi XML file, click "Save Multi XML"

8.1 Reading EEPROM Data from an ECU into a .txt File. (Only applies to MTI PN 500812, 500815, and 500841)

If your module contains ECU specific data in its EEPROM, you can read its content into a single .txt file which will save to C:\Marlin Data\ (Fig. 31):

Figure 31: Reading EEPROM content into a .txt file

8.2 Accessing controller's EEPROM single cell content.

The user can read from or write to a single EEPROM memory cell if the controller's firmware allows it (Fig. 32).

Figure 32: Location of EEPROM cell access in main menu

Click on the '*EEPROM R/W*' tab on the main window to open the '*EEPROM R/W*' window (fig. 33). Before reading from or writing to a single memory cell, the user should select the desired module on the main window. The user can then type in the desired EEPROM address and read or write a byte by pressing the corresponding button.
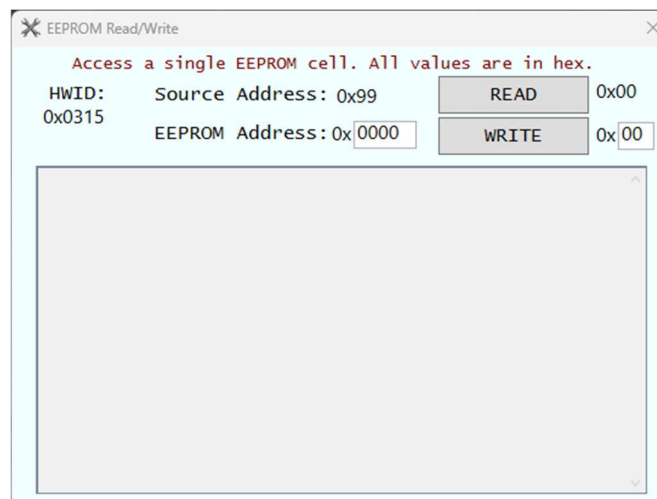

Figure 33: Single EEPROM Read/Write window

8. Sending CAN messages to a controller/monitoring CAN traffic

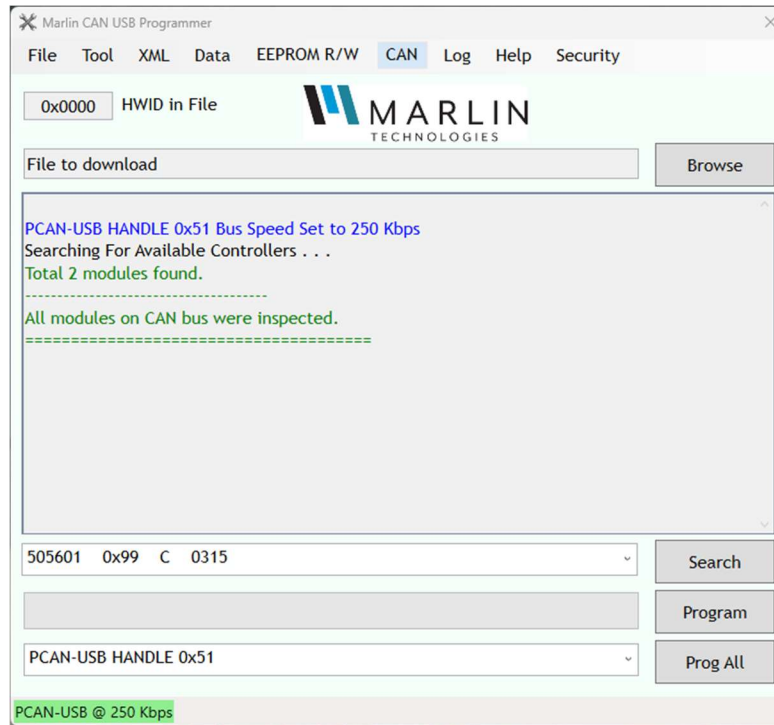Open the CAN Bus Viewer by clicking on the "CAN" tab (Fig. 34)

Figure 34: Location of CAN tab on main menu

The "Received CAN Messages" table shows all CAN messages sent by modules on the bus after opening the page.

The Color column can be used to color code received CAN messages. Clicking on the cell will open a color picker, which you can use to select a color (Fig. 35, Fig. 36)
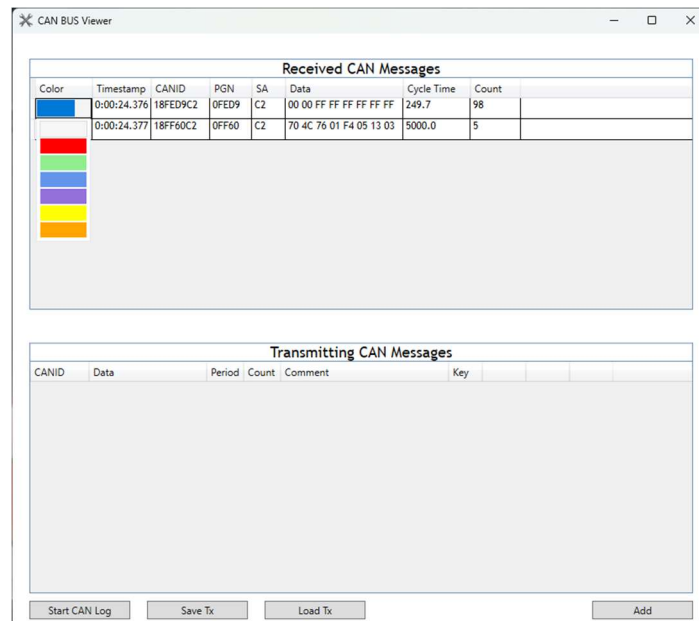

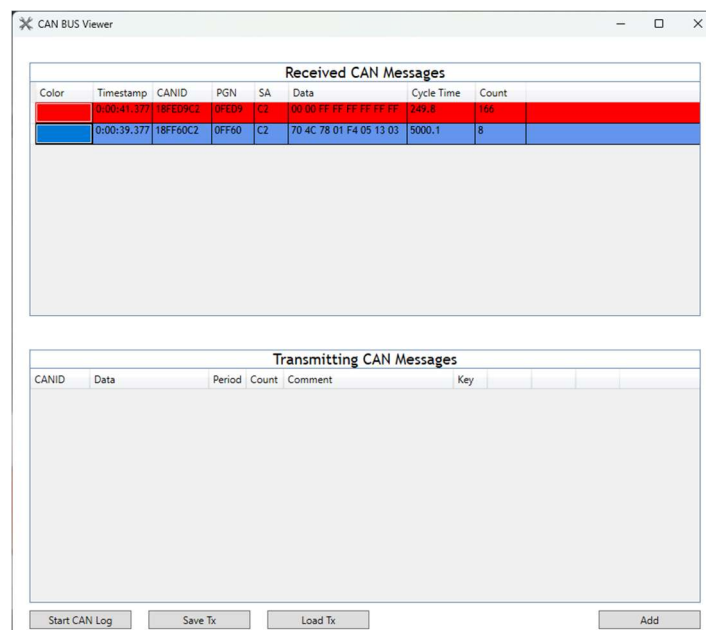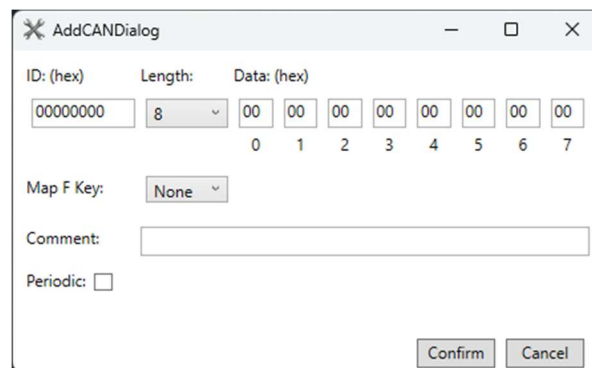
Figure 35: Dropdown to select a color

Figure 36: Color selected

The other columns show relevant information on the received CAN messages, including Cycle Time (approximate time elapsed between times this PGN was received), CANID, PGN, Source Address, CAN Data, and Count (the number of times this PGN was received)

The "Transmitting CAN Messages" Table can be used to send messages over the CAN bus.

To add a new message to the "Transmitting CAN Messages" table, click the "Add" button in the bottom right of the window. This will open a window for adding a new CAN message (Fig. 37)

Figure 37: Dialog box to add a new CAN message to transmit

In the window to add a new CAN message, you can set the CAN ID, the length of the data, the data bytes to be sent. An F key or the space key can be set as a hotkey to send this message. A comment can be added to easily identify a particular message. If "Periodic" is checked, you can set a period in milliseconds. This will send this message every time this amount of time has elapsed.

Figure 38: Transmitting CAN Messages section with example messages

Once a new row has been created, it will fill with the information you just entered. To send this message, or to start sending a periodic message, press the "Send" or "Start" button, or press the mapped key. To stop a periodic message, press the "Stop" button, or press the mapped key. This row can be changed or removed using the "Edit" or "Delete" buttons, respectively.

A CAN log can be started or stopped from this menu by pressing the "Start/Stop CAN Log" button in the bottom left corner.

A particular configuration of the "Transmitting CAN Messages" table (file extension .txcfg) can be saved by clicking the "Save Tx" button. These files can then be loaded again by clicking the "Load Tx" button.

9. Get information about the Programming Tool

The "Help" tab on the main window contains two options (Fig. 39):

"About…" will open a small window that gives some information about the Programming Tool (Fig. 40)

"User Guide…" will open this document.

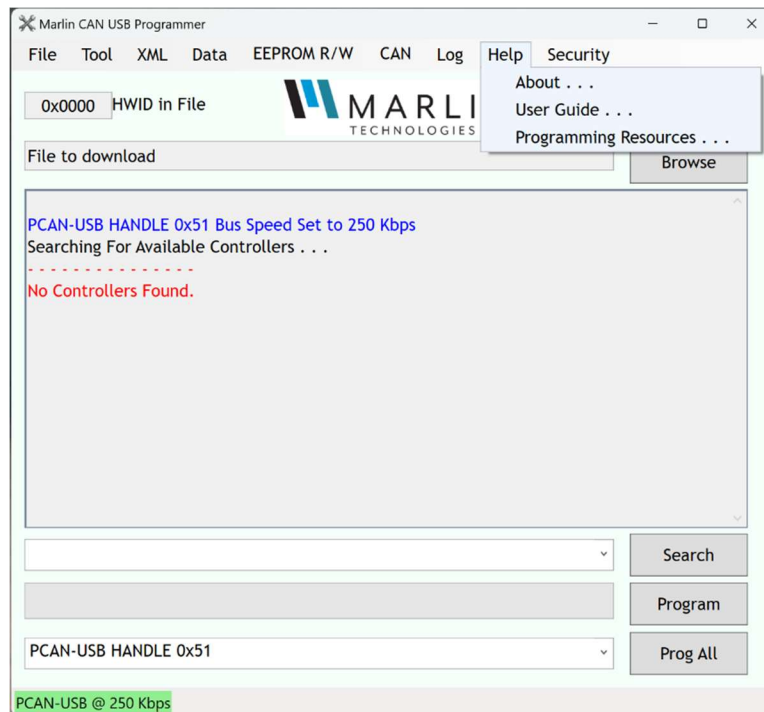"Programming Resources…" will open a webpage containing information and programming files for M-Flex devices (Fig. 41)
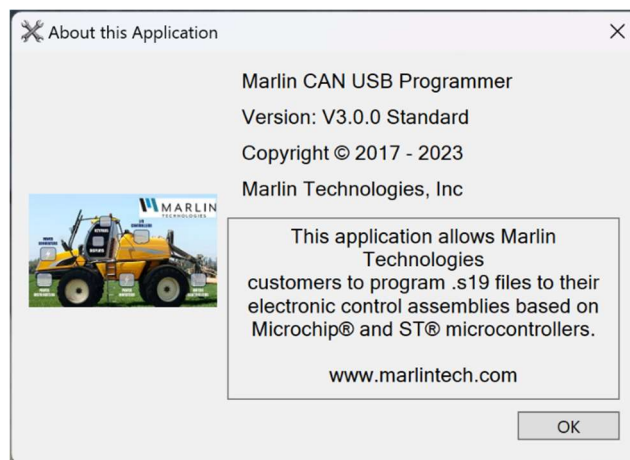

Figure 39: Location of help tab in main menu

Figure 40: About tab

Figure 41: Design Resources page on the Marlin Teechnologies website.

If you have any additional comments, questions, or concerns, please contact Marlin Technologies Inc customer service by calling 920-485-4463.