KÄRCHER

MEMORANDUM

DATE: draft

TO: Thomas McKegney
Paul Vaughn
Justin Lamar

FROM: Jeffrey Bernath

RE: Deluxe CV60/1 Field Service Programming Instructions Rev 2

This memo details the process for updating the firmware on the Deluxe CV60/1. This does not cover process for updating the KIRA CV60/1 (see *KIRA_CV60/1_Field_Service_Programming_Instructions.pdf*)

This document is part of a package that includes all of the software, drivers and files needed to update the machine. This package is *CV60_1_Field_Service_Programming.zip.*

Software to be Installed

The folder below includes all of the software and drivers that will need to be installed. The install will need to be performed by the Karcher IT Help Desk. Install instructions can be found in *readme_for_install_instructions.txt.*

KIRA_CV60_1_Field_Service_Programming\Software_to_be_installed

Updating to Bootloader Firmware

This section covers instructions for updating the firmware to include the bootloader. After the machine has been updated with the bootloader, the firmware can be updated using the *T-Rex Diagnostics* tool.

If the machine has already been updated with the bootloader, please skip this section and move on to Updating Firmware.

1. Turn off the main breaker (see Figure 1). The main breaker can be accessed from the right door.

[Figure 1: Main Breaker Off]

2. Remove the control panel (see figure 2).

[Figure 2: Control Panel Removed]

3. From the start menu open *Microchip>MPLAB IPE v6.05*.

4. The first time the program is opened it will need to be setup. *Select Settings>Advanced Mode* and using the password "microchip" to login.

5. Select *File>Import>Environment* and open the following file.

   KIRA_CV60_1_Field_Service_Programming\Bootloader_Hex\VCM_3_2_2.Bootloader/VCM_3_2_2.Bootloader.pen

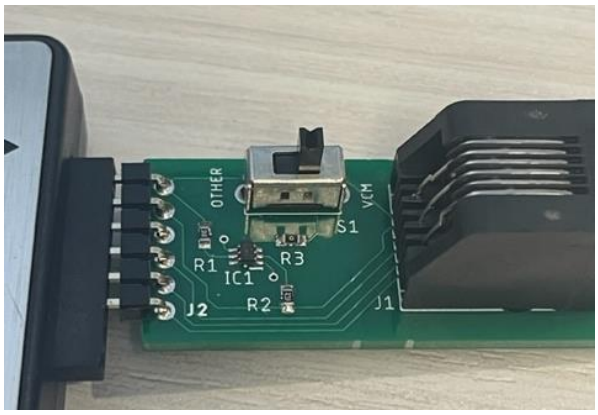
6. Select *File>Import>Hex* and open the following file.

   KIRA_CV60_1_Field_Service_Programming\Bootloader_Hex\VCM_3_2_2.Bootloader/VCM_3_2_2.Bootloader.hex

7. Assemble the PICkit 4 programmer, included USB cable, PICkit 4 adapter and Tag Connect (see figure 3).

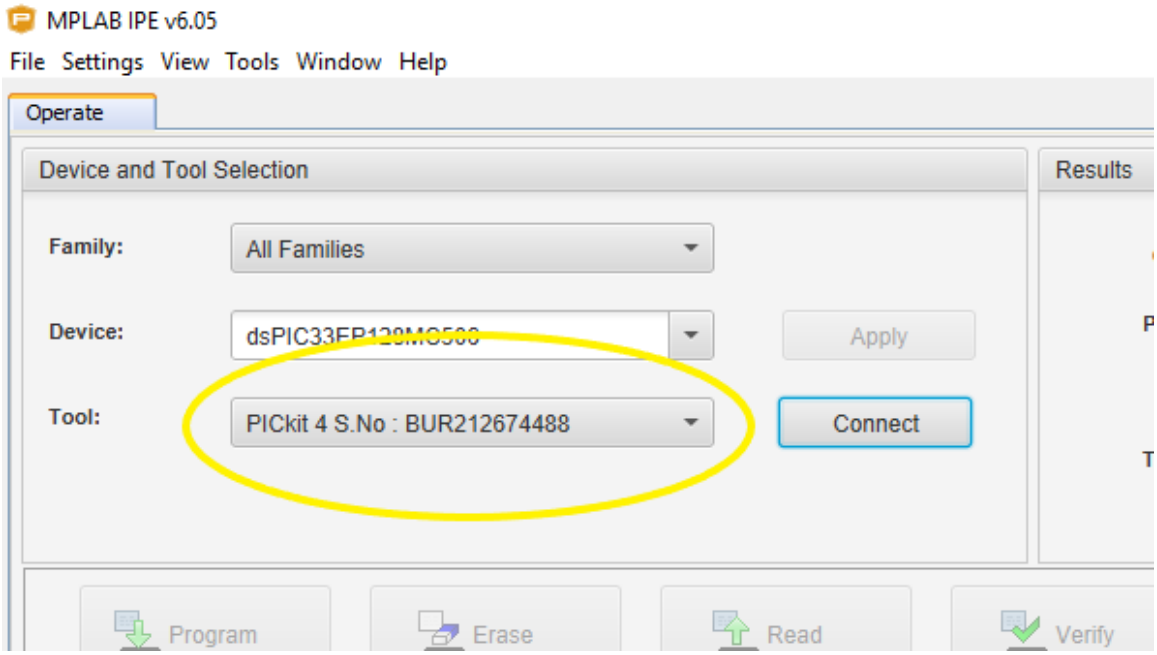
[Figure 3: Assembled PICkit 4]

8. On the PICkit4 adapter select "VCM" using the selector switch (see figure 4) .



[Figure 4: PICkit 4 Adapter set to "VMC"]

9. Plug the PICkit 4 into the computer. After a few seconds the PICkit 4 should show up in the *Tool:* drop down menu in the *Device and Tools Selection* pane (see figure 5). Do not press the *Connect* button at this point.

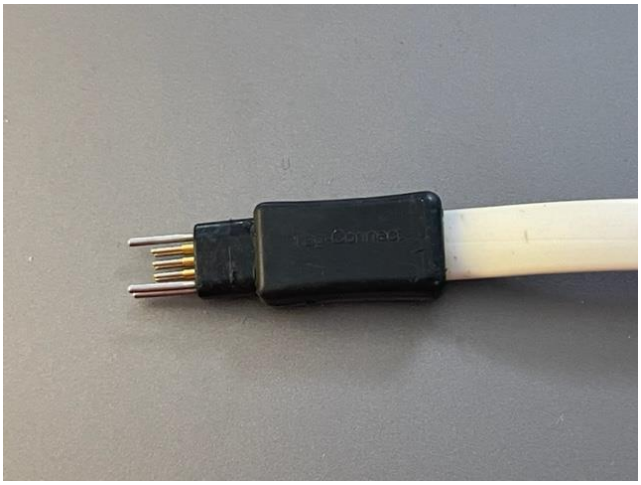


[Figure 5: PICKit4 Connected]

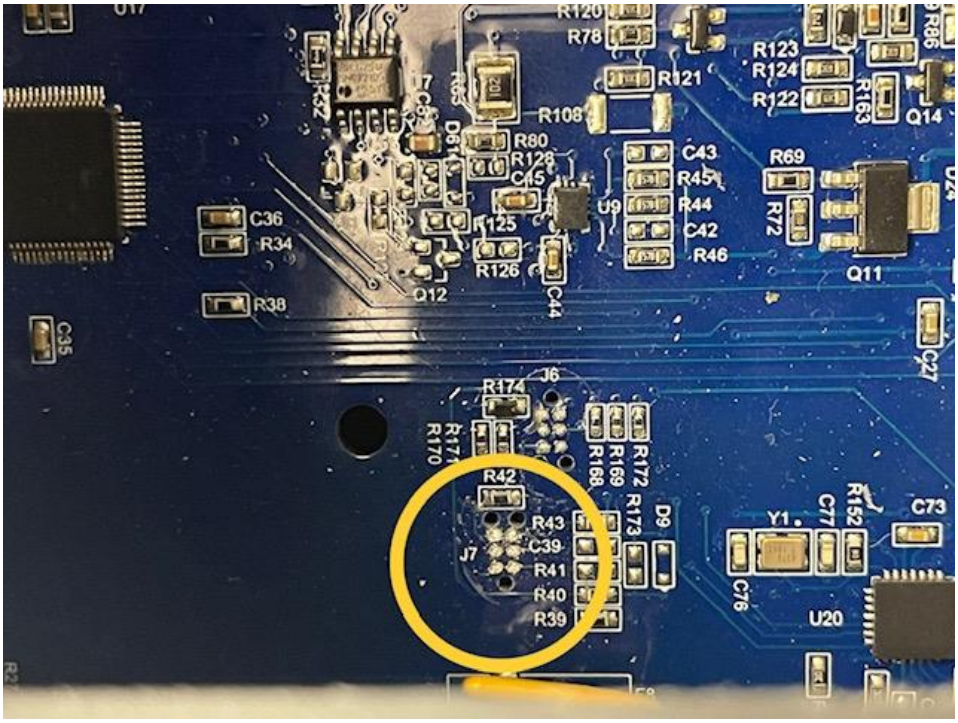
10. Plug the tag connect end of the PICkit4 (see figure 6) into the J7(see figure 7 and 8) of the VCM (vehicle control module). J7 can be found on the VCM toward the back of the machine. This connection will need to be held in place until programming is complete.

Warning: Accidentally plugging the programmer into J6 will permanently damage the VCM.

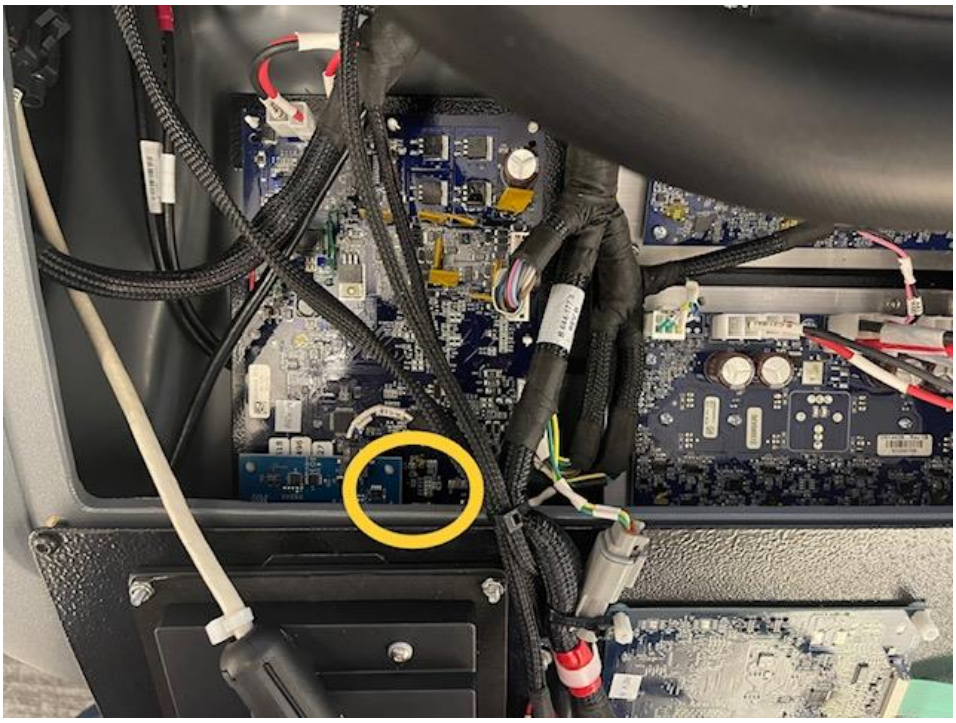
Note: The first time the PICkit4 is connected to the IPE it will download and install updates. This may take a couple of minutes.



[Figure 6: PICKit4 Tag Connect]



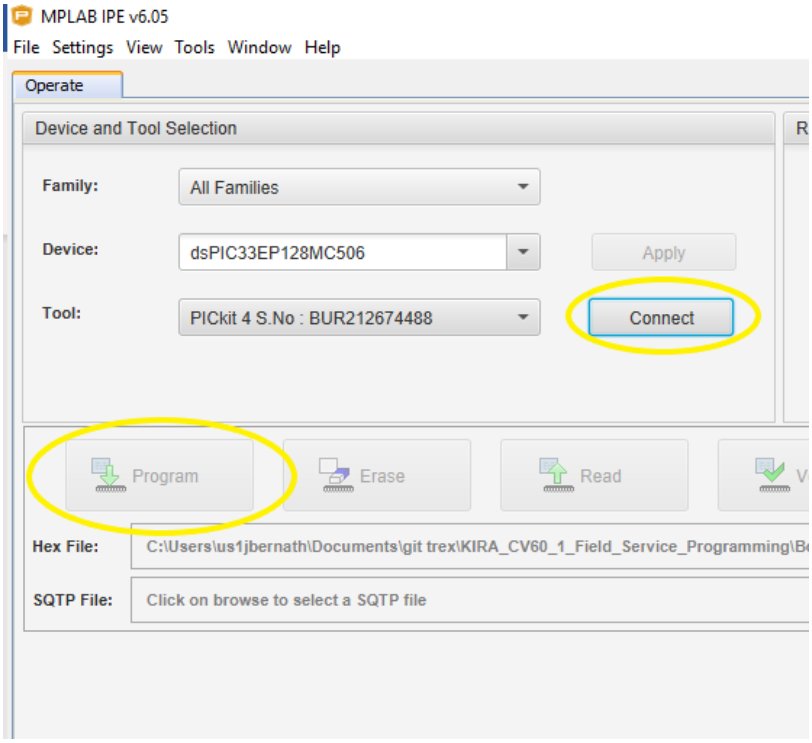
[Figure 7: J7 – VCM Programming Connection]



[Figure 8: J7 – VCM Programming Connection]

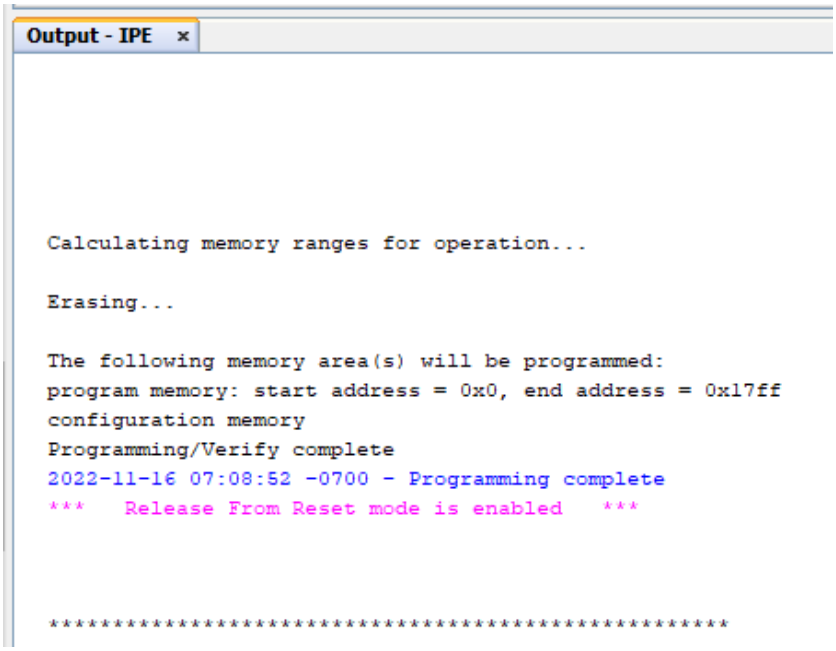
11. Select the ***Connect*** button (see figure 9).

12. Select the ***Program*** button (see figure 9).



[Figure 9: Connect and Program Buttons]

13. If programming was completed successfully "Programming/Verify complete" will be displayed in the *Output – IPE* tab on the lower pane (see figure 10).



[Figure 10: Successful Programming Message]

14. Remove the tag connect from J7 of the VCM.

15. Turn on the main breaker (see figure 11).

[Figure 11: Main Breaker On]

16. Turn off the key switch and press the e-stop (see figure 12).

Warning: Leaving the key switch on and not pressing the e-stop will damage the machine.

[Figure 12: Press E-Stop, Key Switch Off]

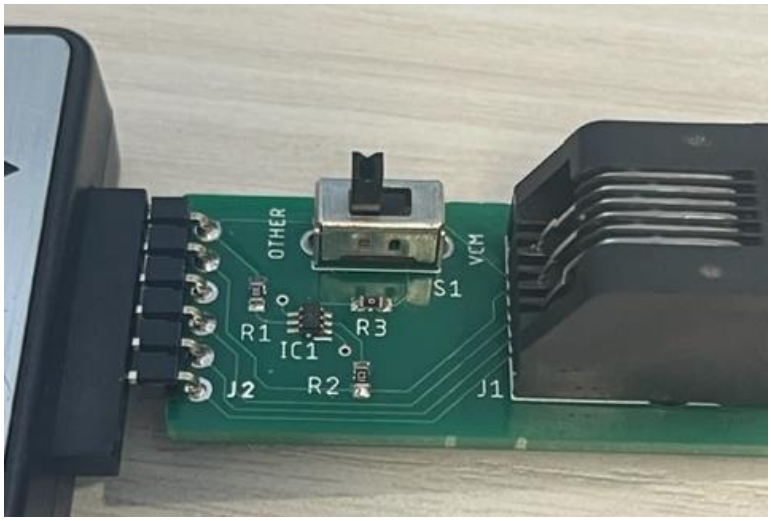
17. Select *File>Import>Environment* and open the following file.

    KIRA_CV60_1_Field_Service_Programming\Bootloader_Hex\HMI_PIC16_3_2_2.Bootloader/HMI_PIC16_3_2_2.Bootloader.pen

18. Select *File>Import>Hex* and open the following file.

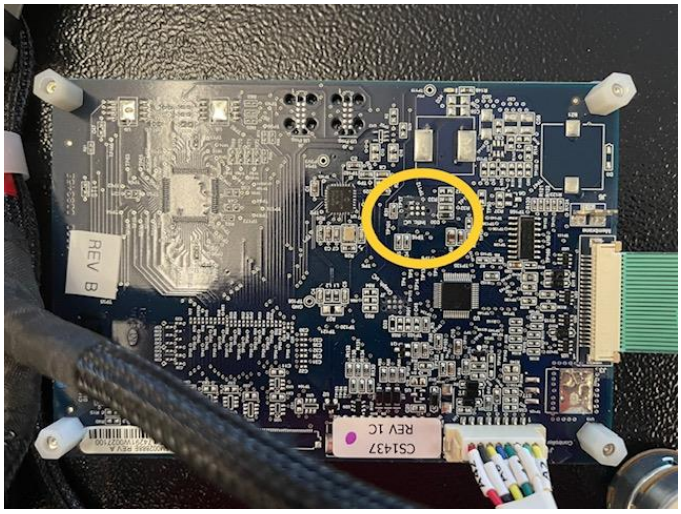
KIRA_CV60_1_Field_Service_Programming\Bootloader_Hex\HMI_PIC16_3_2_2.Bootloader/HMI_PIC16_3_2_2.Bootloader.hex

19. On the PICkit4 adapter select "OTHER" using the selector switch (see figure 13) .



[Figure 13: PICKit 4 Adapter set to "OTHER"]

20. Plug the tag connect end of the PICkit4 (see figure 6) into the J4 (see figure 14) of the HMI (human machine interface). This connection will need to be held in place until programming is complete.



[Figure 17: J4 – HMI PIC16 Programming Connection]

21. Select the *Connect* button (see figure 9).

22. Select the *Program* button (see figure 9).

23. If programming was completed successfully "Programming/Verify complete" will be displayed in the *Output – IPE* tab on the lower pane (see figure 10).

24. Remove the tag connect from J4 of the HMI.

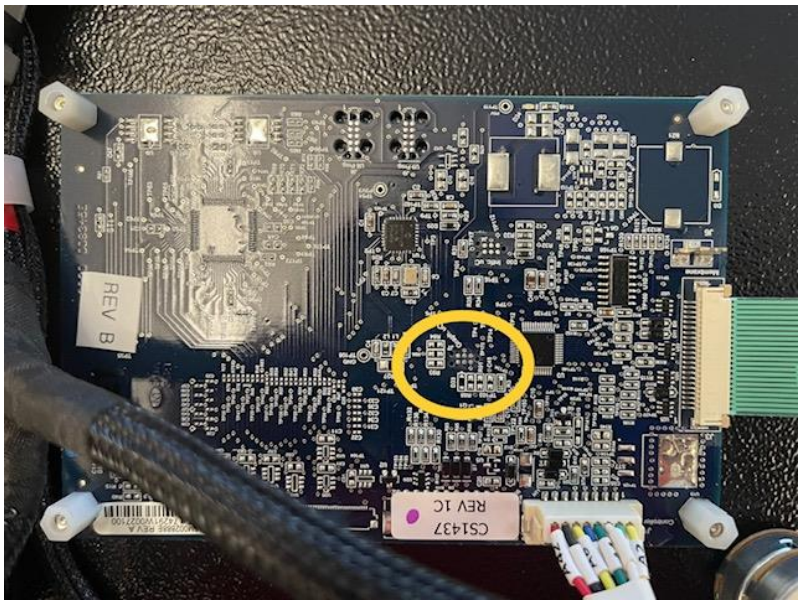
25. Select *File>Import>Environment* and open the following file.

    KIRA_CV60_1_Field_Service_Programming\Bootloader_Hex\HMI_PIC24_3_2_2.Bootloader/HMI_PIC24_3_2_2.Bootloader.pen

26. Select *File>Import>Hex* and open the following file.

    KIRA_CV60_1_Field_Service_Programming\Bootloader_Hex\HMI_PIC24_3_2_2.Bootloader/HMI_PIC24_3_2_2.Bootloader.hex

27. Plug the tag connect end of the PICkit4 (see figure 6) into the J7 of the HMI (see figure 15). This connection will need to be held in place until programming is complete.



[Figure 15: J7 – HMI PIC24 Programming Connection]

28. Select the *Connect* button (see figure 9).

29. Select the *Program* button (see figure 9).

30. If programming was completed successfully "Programming/Verify complete" will be displayed in the *Output – IPE* tab on the lower pane (see figure 10).

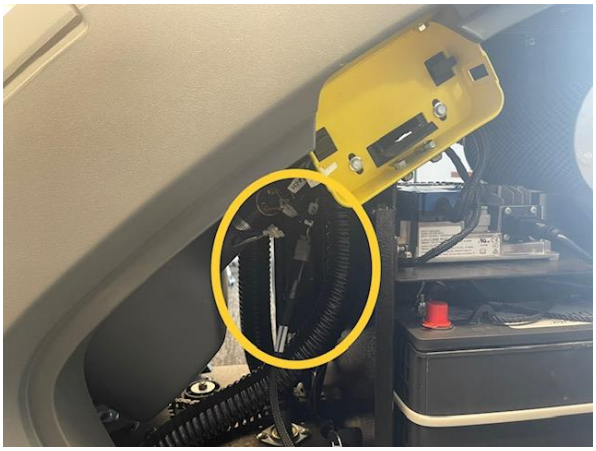
31. Remove the tag connect from J7 of the HMI.

32. The bootloader has been successfully loaded.

Updating Firmware

1. Turn on the main breaker and reset the e-stop. Turn the key switch off.

2. Connect the service harness (8.645-398.0) to the service port (B-C32) inside the left door (see figure 16).

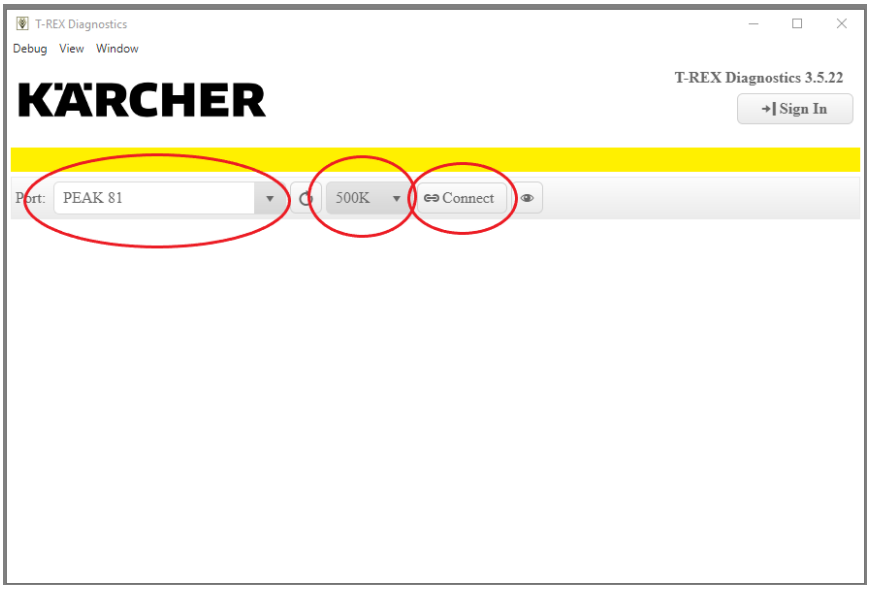


[Figure 16: B-C32 - Service Harness Connected to the Service Port]

3. Connect the PEAK USB CAN tool (8.645-399.0) to the service harness and computer.

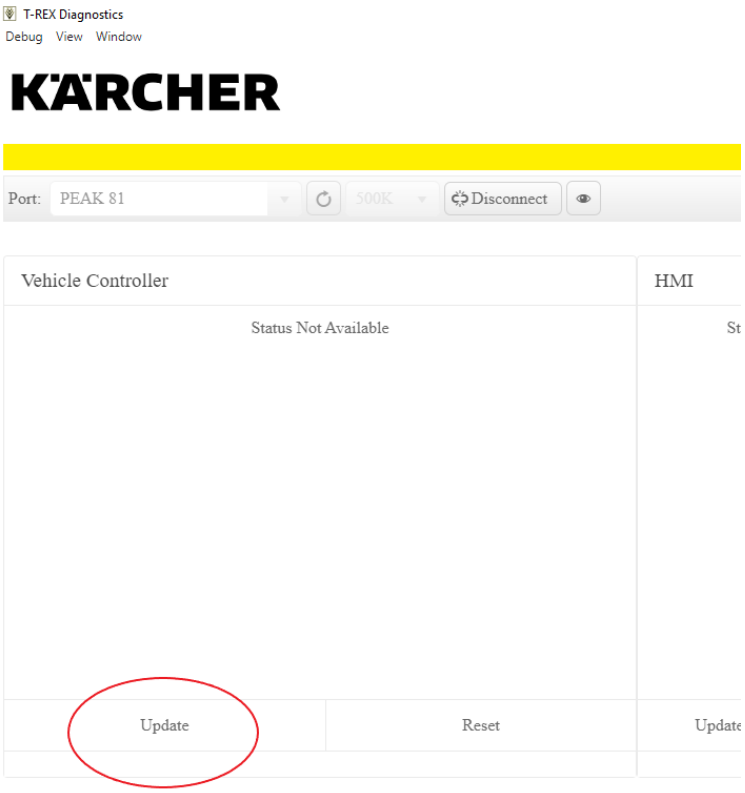
4. From the start menu open *T-Rex Diagnostics*.

5. Verify that the "PEAK 81" tool is recognized by the program in *Port:*, select *500K* in the second drop down menu, then press *Connect* (see figure 17).



[Figure 17: Connect the PEAK USB CAN Tool in Software]

6. In the *Vehicle Controller* Pane, select *Update* (see figure 18).



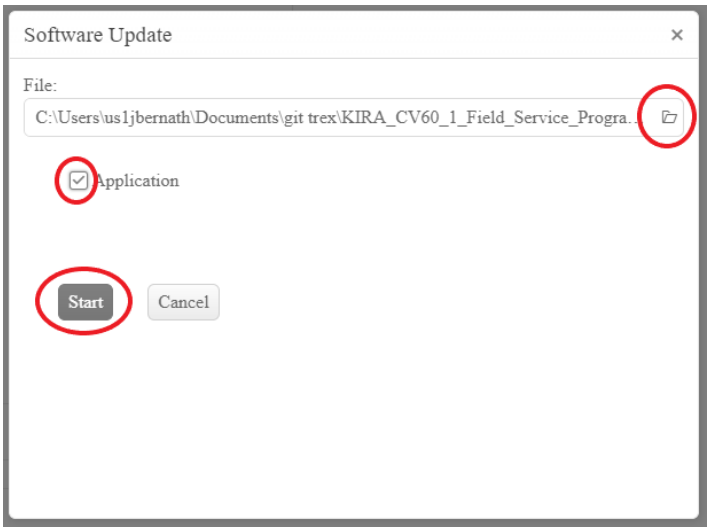
[Figure 18: Vehicle Controller Update]

7. In the *File:* dialog box file (see figure 19), open the following.

   KIRA_CV60_1_Field_Service_Programming\Application_Hex\Trex_VCM_Application_3_2_2/manifest.json

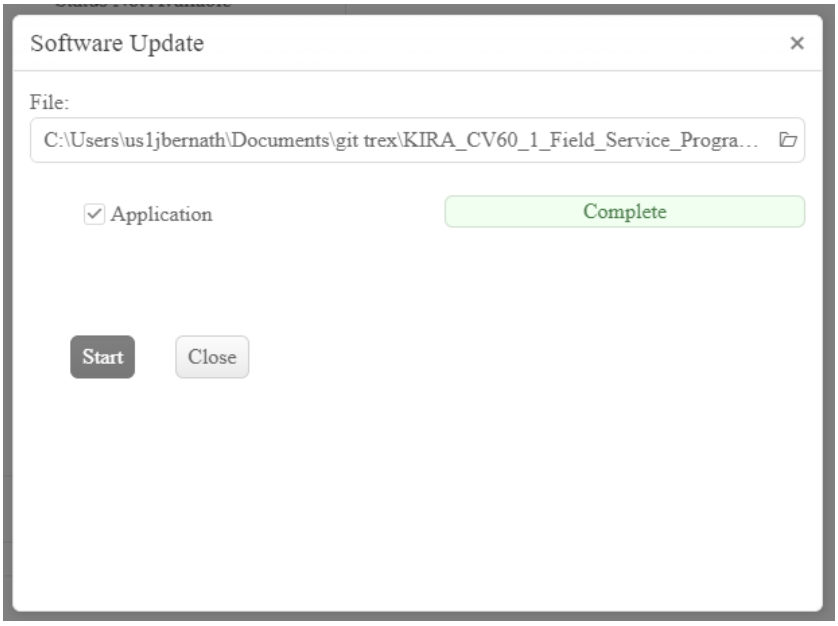
8. Check the *Application* box (see figure 19).

9. Press *Start* (see figure 19).



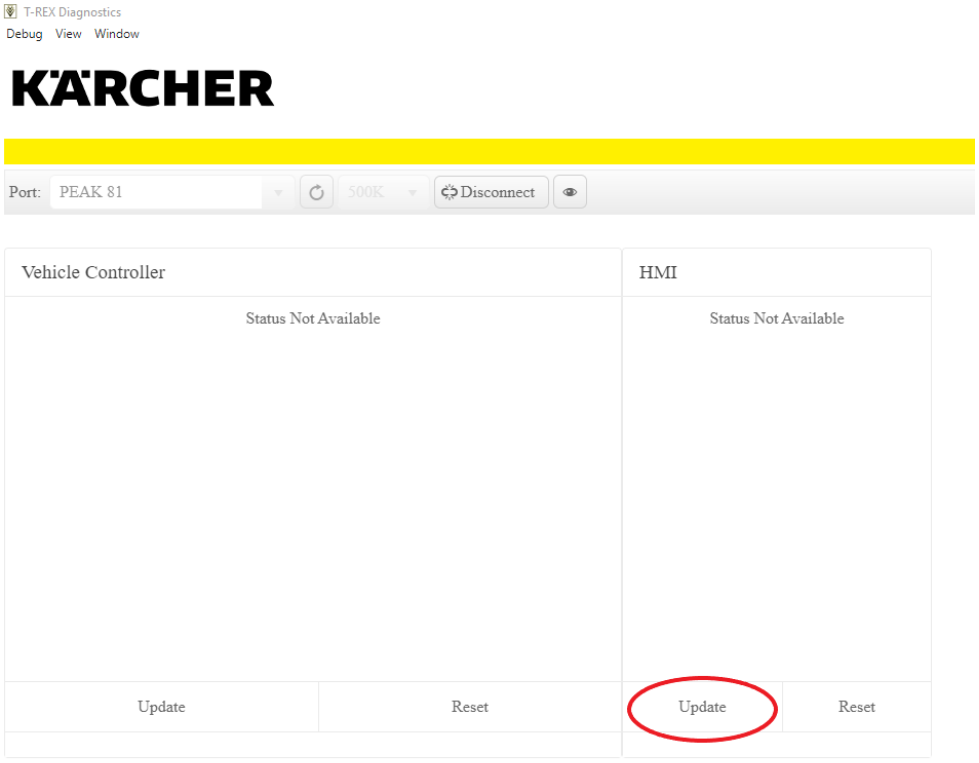
[Figure 19: Program VCM]

10. If programming was completed successfully, "Complete" will be displayed in the progress bar (see figure 20).



[Figure 20: Successful Programming Message]

11. In the ***HMI*** Pane, select ***Update*** (see figure 21).



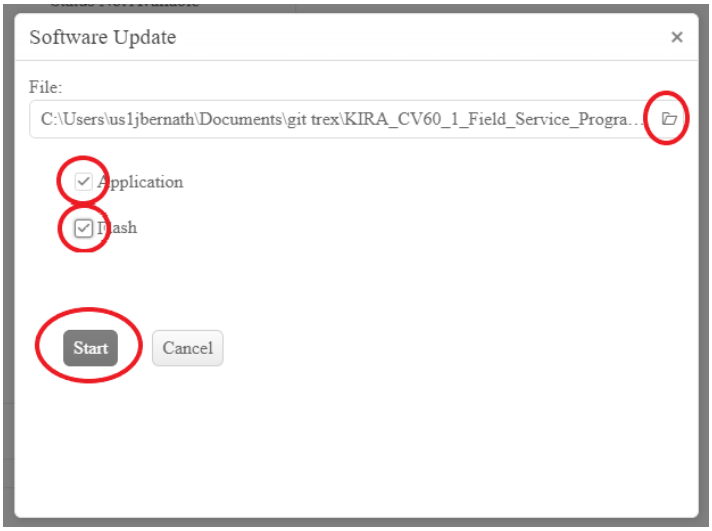
[Figure 21: HMI Update]

12. In the *File:* dialog box file (see figure 22), open the following.

    KIRA_CV60_1_Field_Service_Programming\Application_Hex\Trex_HMI_Application_3_2_2/manifest.json

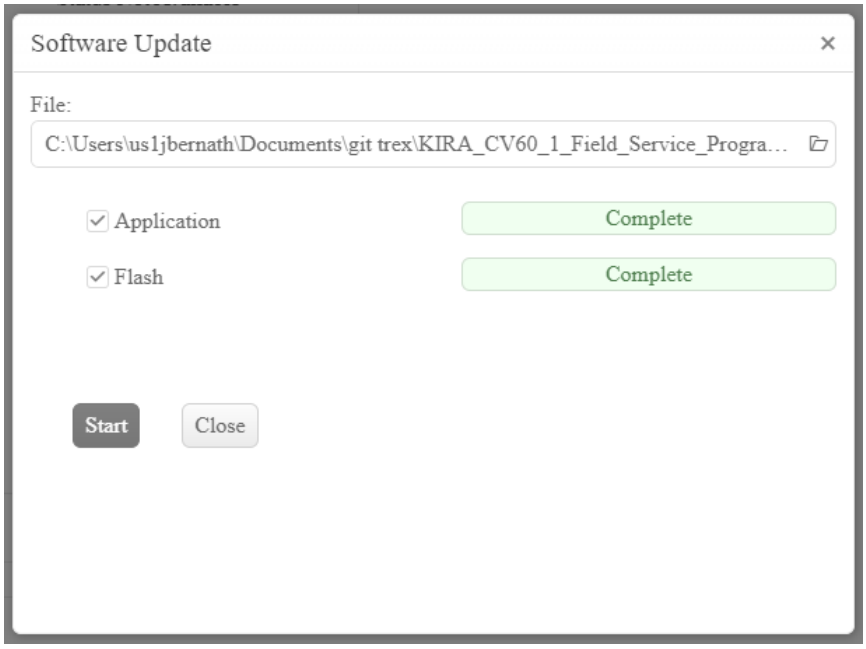
13. Check the *Application* and *Flash* box (see figure 22).

14. Press *Start* (see figure 22).



[Figure 22: Program VCM]

15. If programming was completed successfully, "Complete" will be displayed in both progress bar (see figure 23).



[Figure 23: Successful Programming Message]

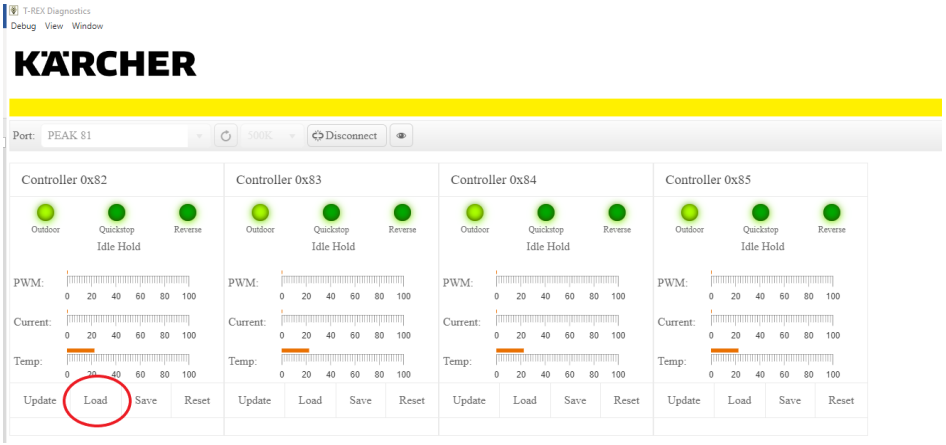
16. Turn the key switch on.

17. Select *Load* in the *Controller 0x82* Pane (see figure 24) and open the following.

    KIRA_CV60_1_Field_Service_Programming\Application_Hex\Trex_DMC_Settings_3_2_2/SWEE000340B_EE_59_tract_82.ee

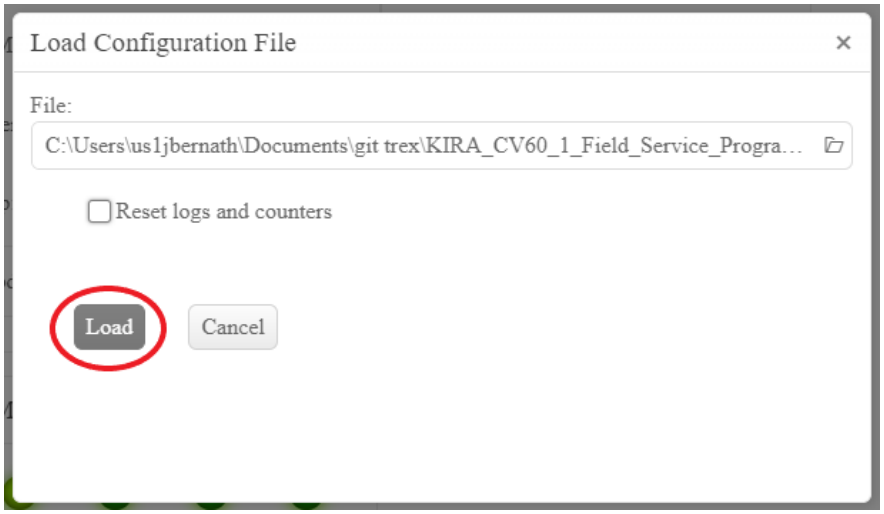
    Warning: The controllers are not always displayed in order from lowest to highest.

    Each controller must be programmed with the correct setting.



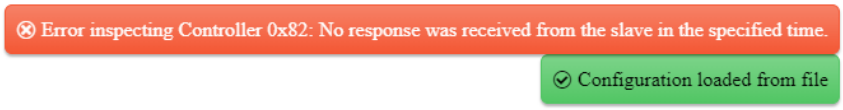
[Figure 24: Motor Controller Load]

18. Press *Load* (see figure 25).



[Figure 25: Load Motor Controller Settings]

19. If programming was completed successfully "Configuration loaded from file" will be displayed in the lower right corner (see figure 26). Ignore the error message.



[Figure 26: Successful Programming Message]

20. Repeat step 11-14 for *Controller 0x83*, *Controller 0x84* and *Controller 0x85*. Use the following files for each.

    Controller 0x83

    KIRA_CV60_1_Field_Service_Programming\Application_Hex\Trex_DMC_Settings_3_2_2/SWEE000341B_EE_59_brush_83.ee

    Controller 0x84

    KIRA_CV60_1_Field_Service_Programming\Application_Hex\Trex_DMC_Settings_3_2_2/SWEE000342B_EE_59_vac_84.ee

    Controller 0x85

    KIRA_CV60_1_Field_Service_Programming\Application_Hex\Trex_DMC_Settings_3_2_2/SWEE000343B_EE_59_side_br_85.ee

21. The Firmware has been successfully updated.

Updating Charger Configuration

22. Turn off the main breaker and turn the key switch off.

23. Plug the charger into AC power.

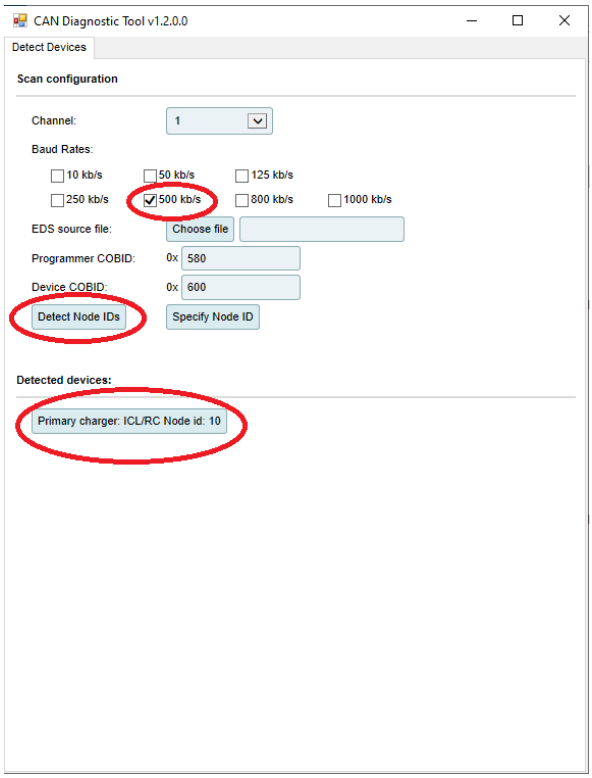
24. Connect the service harness (8.645-398.0) to the service port (B-C32) inside the left door (see figure 16).

25. Form the *CV60_1_Field_Service_Programming* package open the following.

    KIRA_CV60_1_Field_Service_Programming\Software_to_be_installed\Charger CAN_Diagnostics_tool_v1.2.0\RC1\CAN Diagnostic Tool.exe

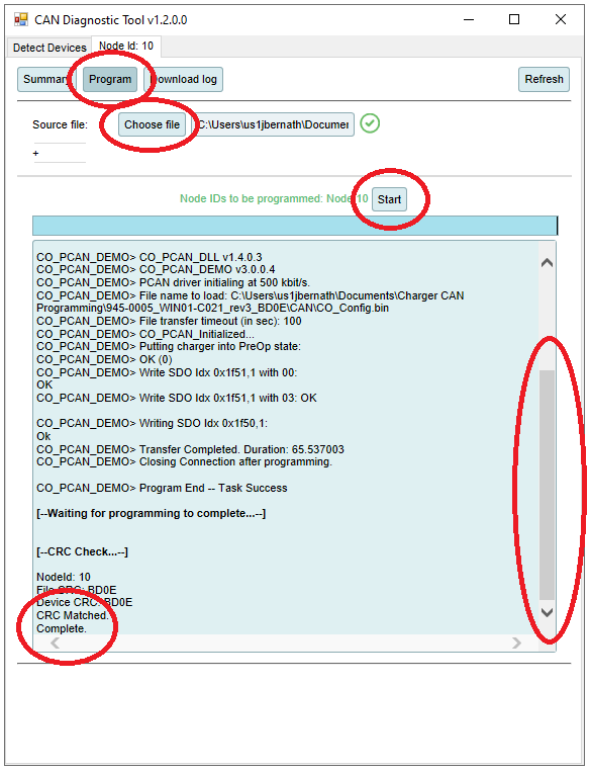
26. Set the *Baud Rate:* to 500Kb and press *Detect Node IDs* (see figure 27).

27. After the charger has been detected, it will show up in the *Detected devices:* window (see figure 27). Select it.



[Figure 27: Charger CAN Diagnostic Tool – Connect to Charger]

28. Press *Program* to use the programming Window (see figure 27).



[Figure 28: Charger CAN Diagnostic Tool – Charger Programming]

29. Select *Chose file*, open the following and press start (see figure 28).

    KIRA_CV60_1_Field_Service_Programming\Application_Hex\Trex_Charger_Configuration\CAN\CO_Config.bin

30. If programming was completed successfully "Complete" will be displayed at the bottom of the status window (see figure 28). Scroll down to view the bottom of the window.