

Subaru SH7058 ECU Unbrick Guide

*** Following this guide may cause damage to hardware, vehicle, property or self. By proceeding, you understand the risks and will not hold the author liable for damages. Use at your own risk. ***

Required Hardware

- FTDI Friend - <https://www.adafruit.com/product/284>
- Pico H or Arduino - <https://www.adafruit.com/product/5525>
- Breadboard - <https://www.adafruit.com/product/64>
- F/F 20x3 Jumpers - <https://www.adafruit.com/product/1951>
- F/M 10x12 Jumpers - <https://www.adafruit.com/product/5018>
- M/M 20x6 Jumpers - <https://www.adafruit.com/product/1957>
- 12v/2A Power Supply
- Basic Multimeter
- USB to USB-Micro cable

Optional Hardware

- Adjustable Power Supply - <https://www.adafruit.com/product/4880>
- Wire Strippers - <https://www.adafruit.com/product/147>
- High Temp Hot Glue Gun + Glue
- Solder Station + Solder + Wick
- Fingernail Primer
- Rubbing Alcohol + Cotton Swabs
- Flathead Screwdriver
- Socket Set

Required Software

- Arduino IDE - <https://www.arduino.cc/en/software>
- Arduino for Pico - <https://github.com/earlephilhower/arduino-pico>
- EcuFlash - <https://www.tactrix.com/index.php?Itemid=58>

*** Stock ECU is not recommended for use with Motor Swaps or external Blow-Off Valves ***
<https://linkecu.com/>

References

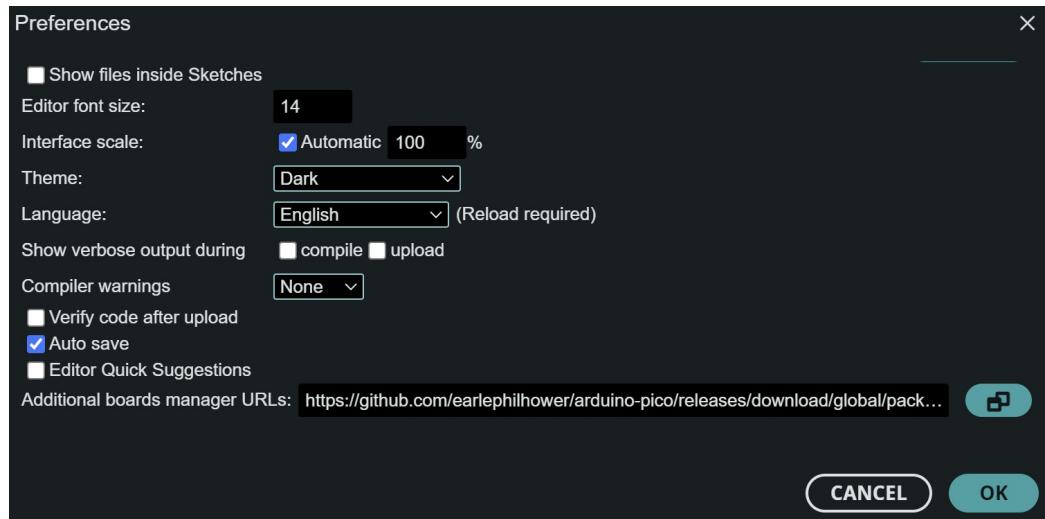
- <https://www.alldatasheet.com/datasheet-pdf/pdf/249824/RENESAS/SY7058.html>
- <http://www.openecu.org/downloads/shbootmode.pdf>
- <https://ecu.design/ecu-pinout/pinout-denso-sh7058-gw-subaru-petrol/>

Pico Setup

- Install Arduino IDE to your computer

- Add Pico Support in Arduino:

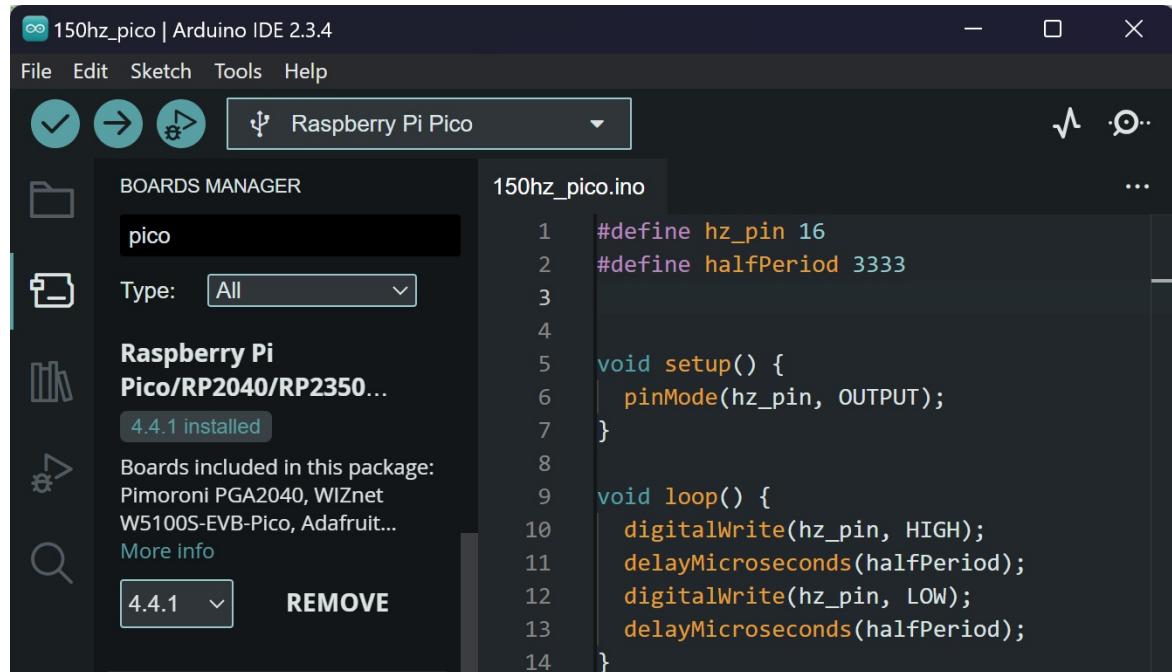
Click the File menu and select Preferences, then in the default Settings tab, scroll down to "Additional boards manager URLs" and click the two-squares button. Click "Click for a list of unofficial board support URLs", scroll down to "Raspberry Pi RP2040 Boards" and copy the link "https://github.com/earlephilhower/arduino-pico/releases/download/global/package_rp2040_index.json". Paste this URL into the "Additional Boards Manager URLs" list. Click Ok, Ok.



- Verify Pico support is complete:

Select the Board Manager icon on the left and make sure "Raspberry Pi Pico RP2040..." is installed.

- Copy the following code block into your Arduino IDE sketch



- Connect the Pico via USB and click the Right Arrow button (→) to upload

Note: If you have issues uploading, try selecting different UF2 or COM# options from the dropdown.

EcuFlash Setup

- Install EcuFlash onto your computer:

This can be found in the downloads section of the Tactrix website.

- Open EcuFlash

- Select the ECU menu and then "Select Vehicle Type"

- Select your ECU type from the list, click Select

| | | | | | | |
|--------|----------|-----------------------|-----------|---------------|----------|-------|
| Subaru | ALL | DBW STi/FXT/LGT/Baja | 2004 | sti04 | SH7055 | 512k |
| Subaru | ALL | DBW WRX/STi | 2005-2007 | sti05 | SH7058 | 1024k |
| Subaru | ALL | DBW FXT/OBXT/LGT/Baja | 2005-2006 | | | |
| Subaru | ALL | hitachi | 2013+ | subaruhitachi | SH7059 | 1536k |
| Subaru | ALL | hitachi | 2013+ | subaruhitachi | SH72543R | 2048k |
| Subaru | ALL | CAN Vehicles | 2007+ | subarucan | SH7058 | 1024k |
| Subaru | ALL | CAN Diesel Vehicles | EURO4 | subarucand | SH7058 | 1024k |
| Subaru | ALL | CAN Diesel Vehicles | EURO5 | subarucand | SH7059 | 1536k |
| Subaru | ALL | BRZ | 2013+ | subarubrz | SH72531 | 1280k |
| Subaru | USDM | Impreza WRX | 2002-2003 | wrx02 | 68HC16Y5 | 160k |
| Subaru | non-USDM | Impreza WRX/STI | 2001-2005 | | | |
| Subaru | USDM | Impreza WRX | 2004-2005 | wrx04 | 68HC16Y5 | 160k |

Select

Cancel

- Download your stock ROM from the RomRaider forum

<https://www.romraider.com/forum/viewtopic.php?f=35&t=7591>

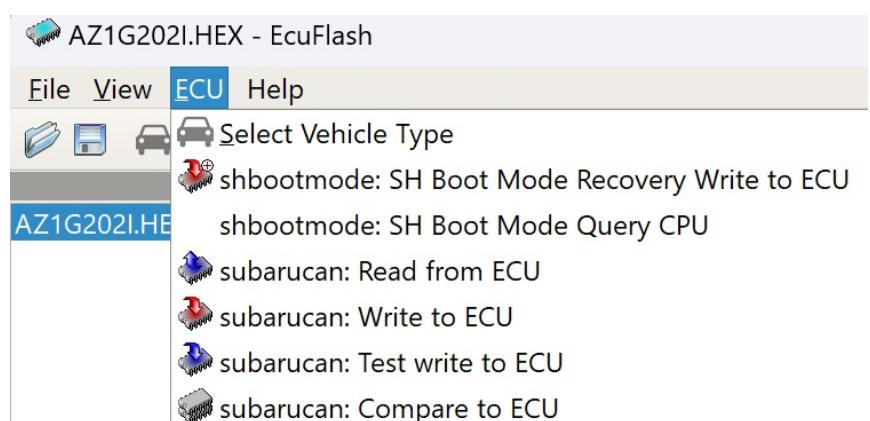
- Locate and unzip your ROM .HEX file

- In EcuFlash, select the File menu and then Open ROM

- Select your stock .HEX file

- Connect your FTDI Friend to USB

- Verify that SH Boot Mode is now active by selecting the ECU menu



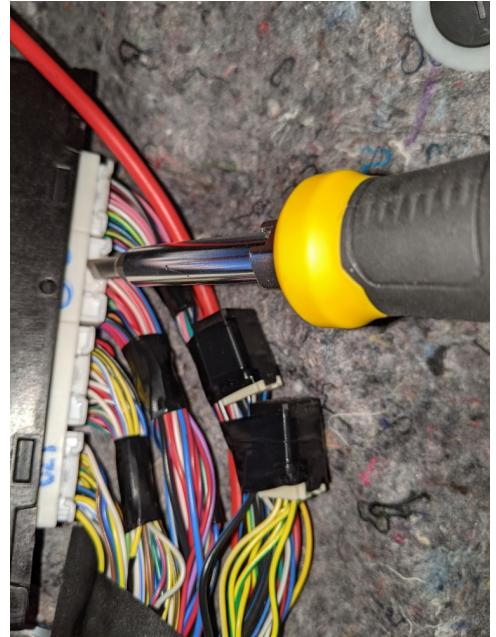
- Disconnect the Pico and FTDI Friend from USB

Note: DO NOT connect the Pico to USB in ANY future steps. Power will be sent from the FTDI Friend.

ECU Removal

- Remove the floor mat and clear the Passenger footwell
- Pull back the carpet by grabbing it from the top right using force
- Remove the metal plate by unscrewing the hex bolts and nut
- Unplug the ECU by pressing and twisting against the plug clips
- Remove the ECU by unscrewing the hex bolt and nut

Note: Do not touch the newly exposed pins in the ECU connector



PCB Removal

- Carefully pry each side clip up only enough to pass the catch
- Press the front clips in to make sure they are free moving
- Pry the front lip to clear the catches
- Remove the PCB by grabbing the plastic connector by the ends
- Place the PCB on a section of cardboard or wood

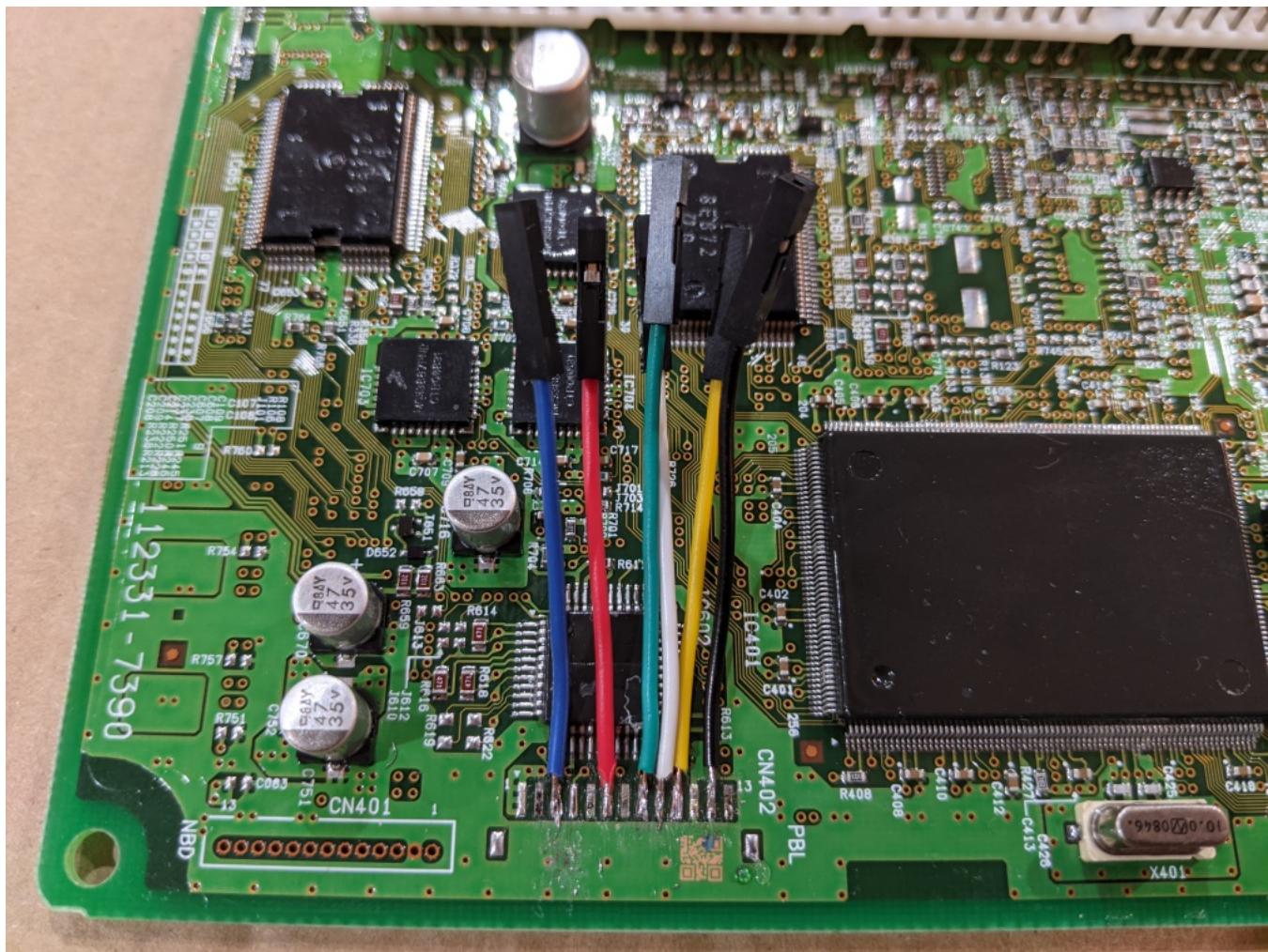
Note: Do not touch the PCB or exposed metal pins.



PCB Soldering

- (optional) Remove solder from each of the 13 PCB pads shown using solder wick
 - (optional) Add new solder to each of the 13 pads
 - Cut the F/F 20x3 Jumper Wires in half and separate each color shown
 - Strip 4-5mm of shielding from the wire ends using strippers
 - Pre-solder the 5mm wire ends
 - Cut 1mm of soldered wire off the end to prep for connection
 - Press each pre-soldered end against the pads shown using a soldering iron
- Note: Follow the color pattern as shown as it will be needed later
- Verify a good connection by pulling on the wire to move the PCB
 - Check for bridging between adjacent pads using a multimeter
 - (optional) Cover all the pads with a layer of Clear Fingernail Primer, let dry for 10m
 - Cover all pads and base 8mm of wire with hot glue

Note: Waiting for the hot glue to turn clear from white makes for a better hold

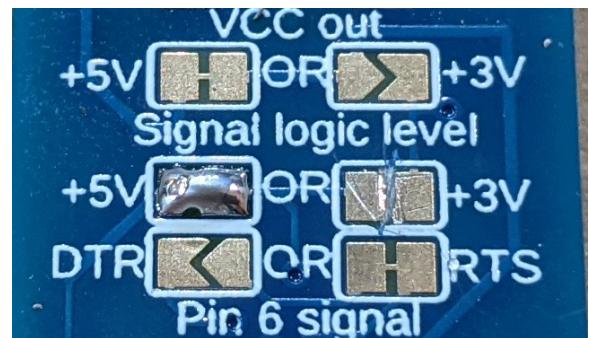


Blue 3 | Red 6 | Green 8 | White 9 | Yellow 10 | Black 12

Note: If your PCB looks different, it likely has a different pinout.
Try finding your board on <https://ecu.design/> or the forums.

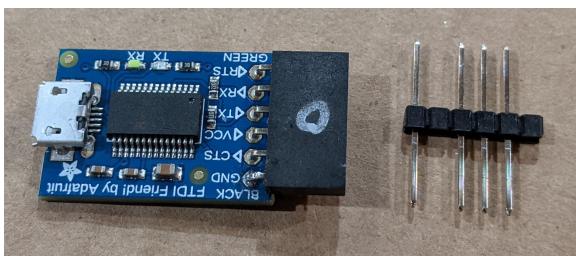
Solder / Prepare FTDI Friend

- Forcefully break the trace on the 2nd row +3V pad
- Note: this can be done with a razor blade or screwdriver
- (Required!) Check for bridging using a multimeter
- Solder-bridge the 2nd row +5V pad
- Note: All soldering is now complete!

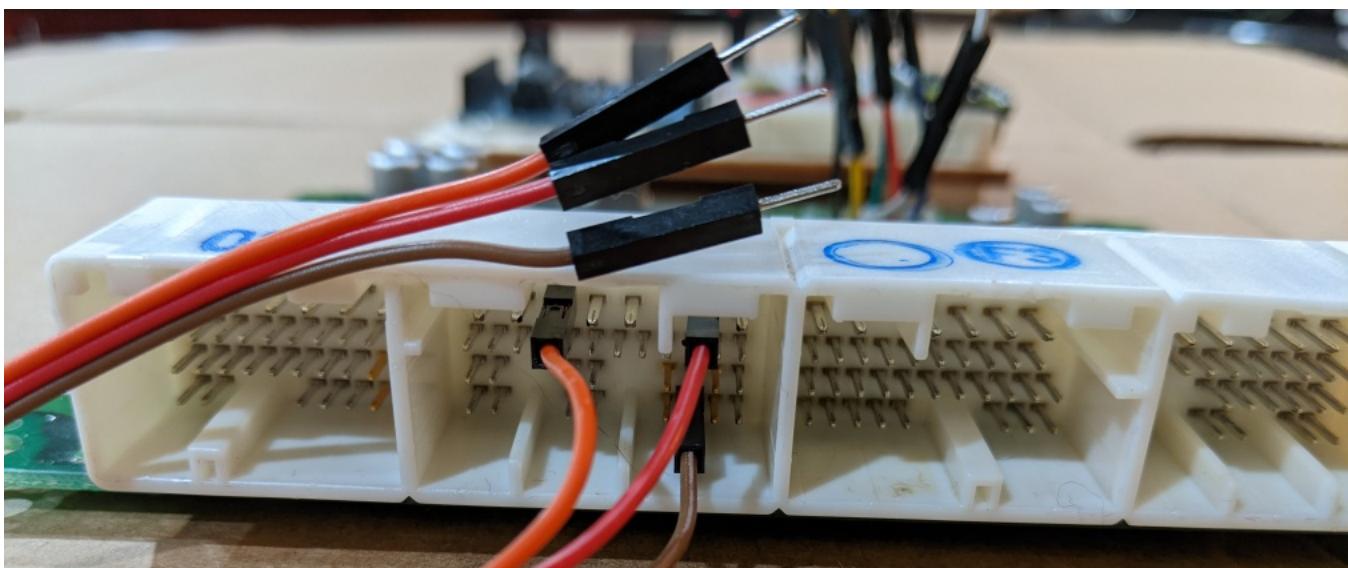


Wiring Prep

- Remove pins 2 and 6 from the pin header with pliers
- Insert header into FTDI Friend with GND being connected



- Connect three F/M 10x12 Jumper Wires to the pins shown using force



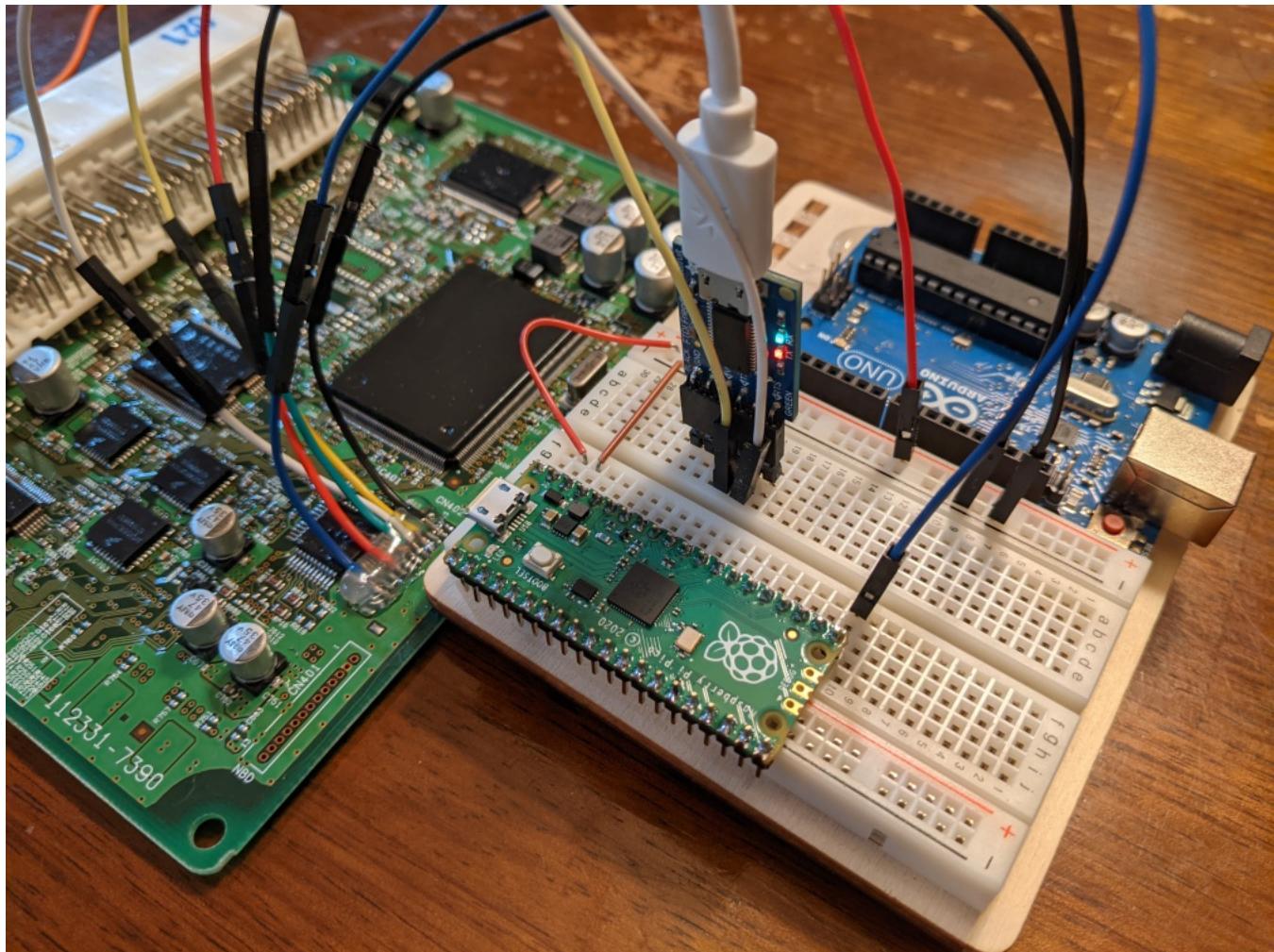
Orange
top row, 3rd from left

Red
top row, 2nd from right

Brown
bottom row, 3rd from right

Pico & PCB Wiring

- Press the right side of the Pico into the breadboard, letting the left side hang off
- Attach Pin 2 on the right side to the POWER rail
- Attach Pin 3 on the right side to the GROUND rail
- Attach the bottom pin on the right side to the BLUE PCB wire
- Attach the RED PCB wire to the POWER rail
- Attach the GREEN PCB wire to the GROUND rail
- Attach the BLACK PCB wire to the GROUND rail

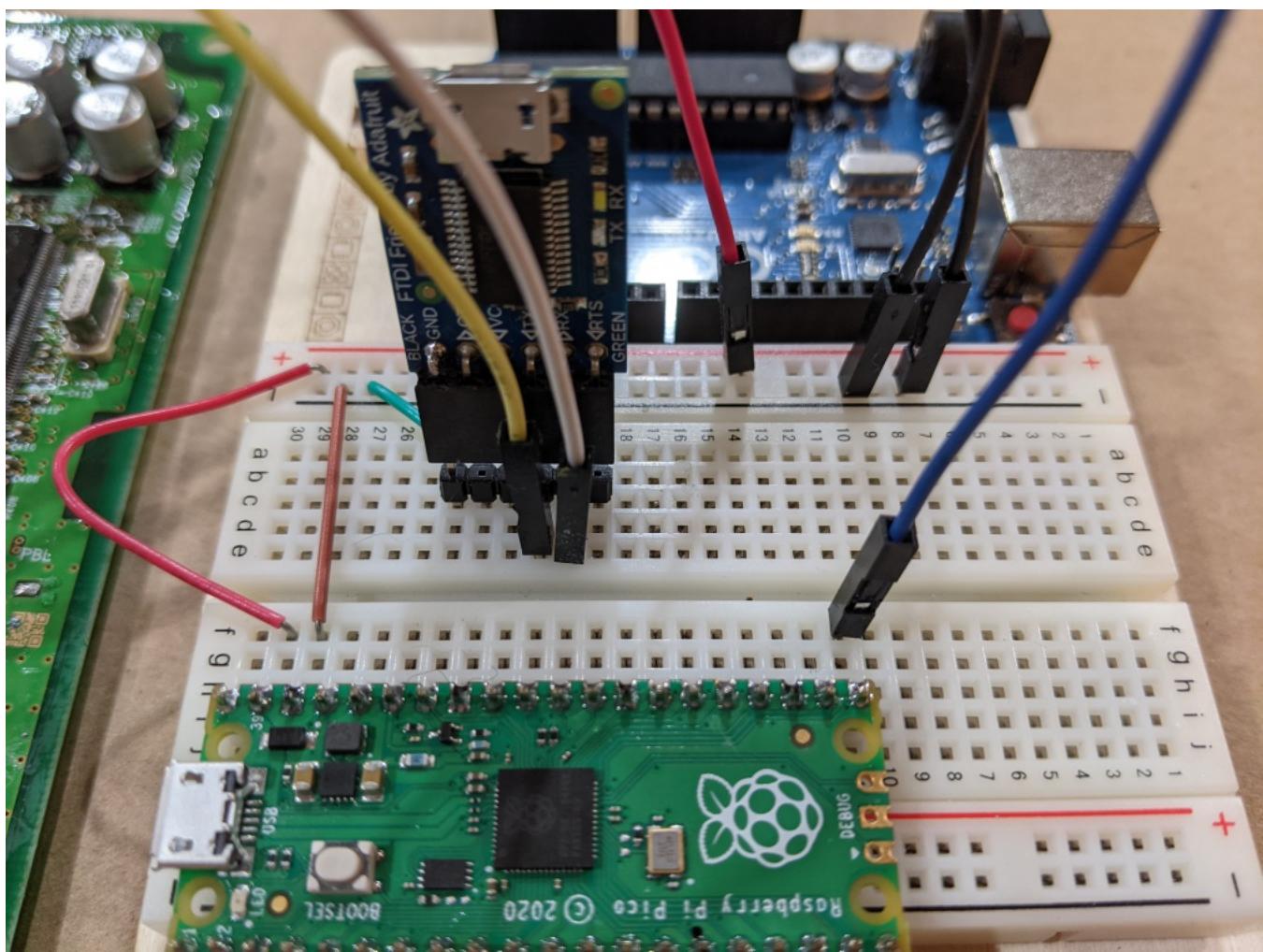


FTDI Friend Wiring

- Attach the FTDI GND pin to the GROUND rail
- Attach the FTDI VCC pin to the POWER rail



- Attach the FTDI TX pin to the YELLOW PCB wire
- Attach the FTDI RX pin to the WHITE PCB wire



Power the ECU

- Attach the BROWN Header wire to the Negative/GROUND of your 12V power supply
- Attach the ORANGE Header wire to the Positive/POWER of your 12V power supply
- Attach the RED Header wire to the Positive/POWER of your 12V power supply

Query the CPU

- Plug a USB-mini cable into the FTDI Friend and into your computer

Note: DO NOT plug a USB cable into the Pico.

- Open EcuFlash:

- Open your stock ROM .HEX file

- Click the ECU menu and select "SH Boot Mode Query CPU"

Note: Do not click any of the "subarucan:" menu items. If you have any trouble here, visit the forums.

The Big Moment

- Make sure your computer has FULL battery

- Click the ECU menu and select "SH Boot Mode Recovery Write to ECU"

Note: This operation can take 20-30 minutes.



Cleaning Up

- Disconnect the power and unplug everything
- Wrap the PCB Jumper wires with painters tape to keep them from vibrating
- Put your PCB back in the case
- Install the ECU back into the footwell
- Install the metal plate over the ECU
- Place the carpet back over the metal plate
- Start the Car!

What Next?

- COBB Accessport - <https://www.cobbtuning.com/>
- EcuTek - <https://www.ecutek.com/>
- HPtuners - <https://www.hptuners.com>
- (Open Source) Tactrix Cable - <https://www.tactrix.com/>
- (Open Source) RomRaider - <https://www.romraider.com/>
- (Open Source Advanced) MerpMod, DimeMod, Speed Density

Note: Advanced modding requires a Fast Temp Sensor and a Wideband O2

*** If all of this sounds like too much to handle, get a Standalone ECU ***

<https://linkecu.com/>