How to Dump the Kodak Reels/Reelz Film Scanner Firmware with a UART Serial Adapter

Guide Version 1.0 - February 14, 2024

THESE INSTRUCTIONS ARE PROVIDED AS-IS. YOU CAN PERMANENTLY DAMAGE YOUR DEVICE IF YOU ARE NOT CAREFUL! YOU DO THIS AT YOUR OWN RISK !!

WARNING: Dumping the Kodak Reels firmware requires you to disassemble your device. You should have advanced soldering skills, experience handling and removing delicate ribbon cables, and a steady hands. **You are obviously performing these steps AT YOUR OWN RISK! You may void your warranty, break it or shoot your eye out, etc… but just take your time and you should be just fine.** 😃

Parts you'll need:

- A phillips screwdriver
- Tweezers or a plastic electronics pry tool to remove delicate ribbon cables
- A UART serial to USB adapter or Arduino board (**Not a RS232 adapter!**)
- A Mac or PC compatible with your UART adapter / Arduino software
- Soldering stuff: Good quality flux and solder, thin enameled wire (**34 AWG**) etc.

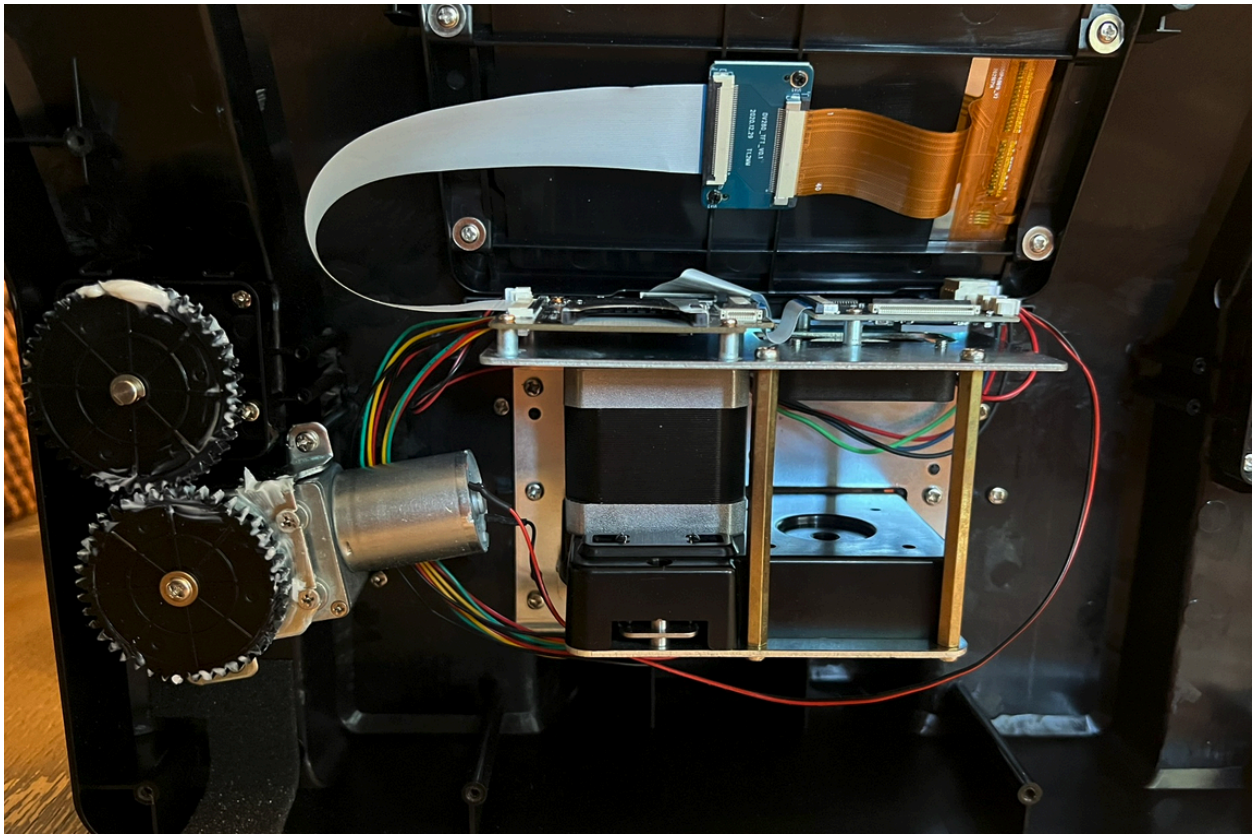
1. Remove the 8 phillips case screws from the back of the Kodak scanner.

2. The top button panel is connected with a fragile, short cable. Use some clear tape to adhere it to one side of the top panel, so when the case is removed it does not fall.

3. Carefully pry apart the two halves of the case - **DO NOT FULLY separate the case yet.** You should not need to use a lot of force, but some of the plastic edges can get stuck. If you run into trouble, ensure all 8 screws are removed.

4. Some models (mostly 2.0 labeled units) have a short ribbon cable going from the main board to the power board where the power and USB ports are. You'll need to carefully disconnect this short flat ribbon cable before you fully separate the case halves.

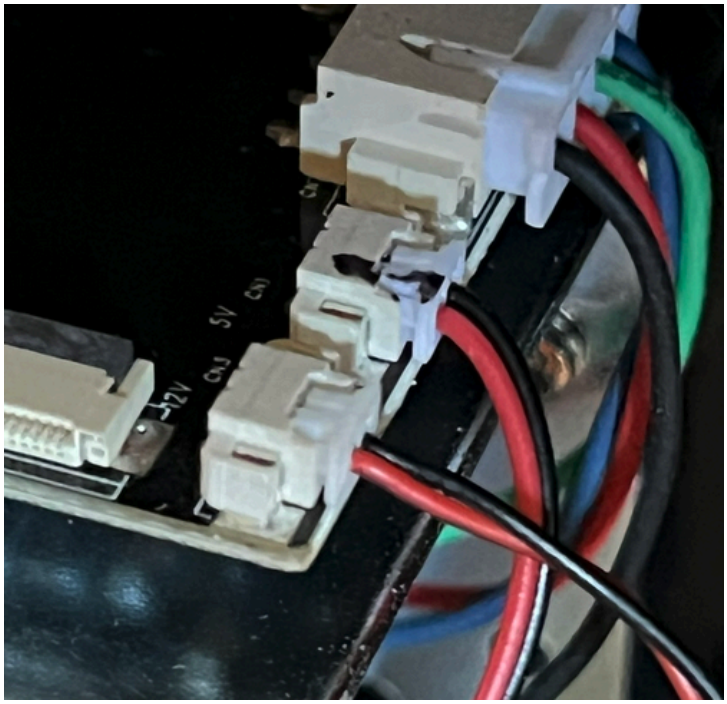
5. With the scanner opened, the insides are revealed.



6. The scanner has a lot of similarly colored wires. You may want to mark these with a marker by putting a smidge of color onto the connector where it meets the cable. This way you can determine which plug goes where.

   I suggest doing this once on the right side with the black/red wires, and once on the left side with the black/red/yellow/green wires.

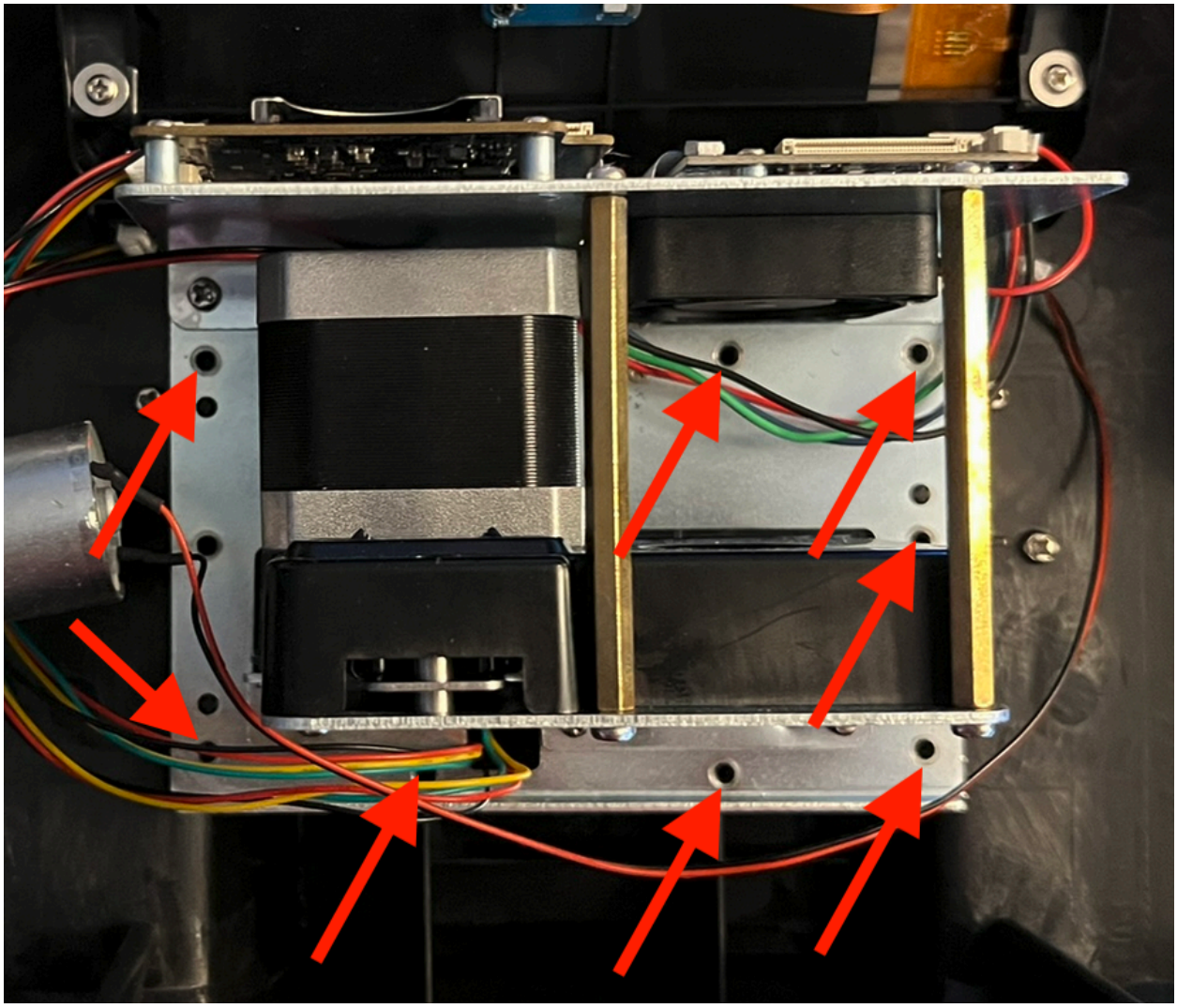
   It’s also a GREAT idea to take photos of these wires so you remember where they go.



7. Carefully remove all of the non-ribbon cables plugged into the left side of the board. Most of the cables on the right can stay in place except for one black and red pair.

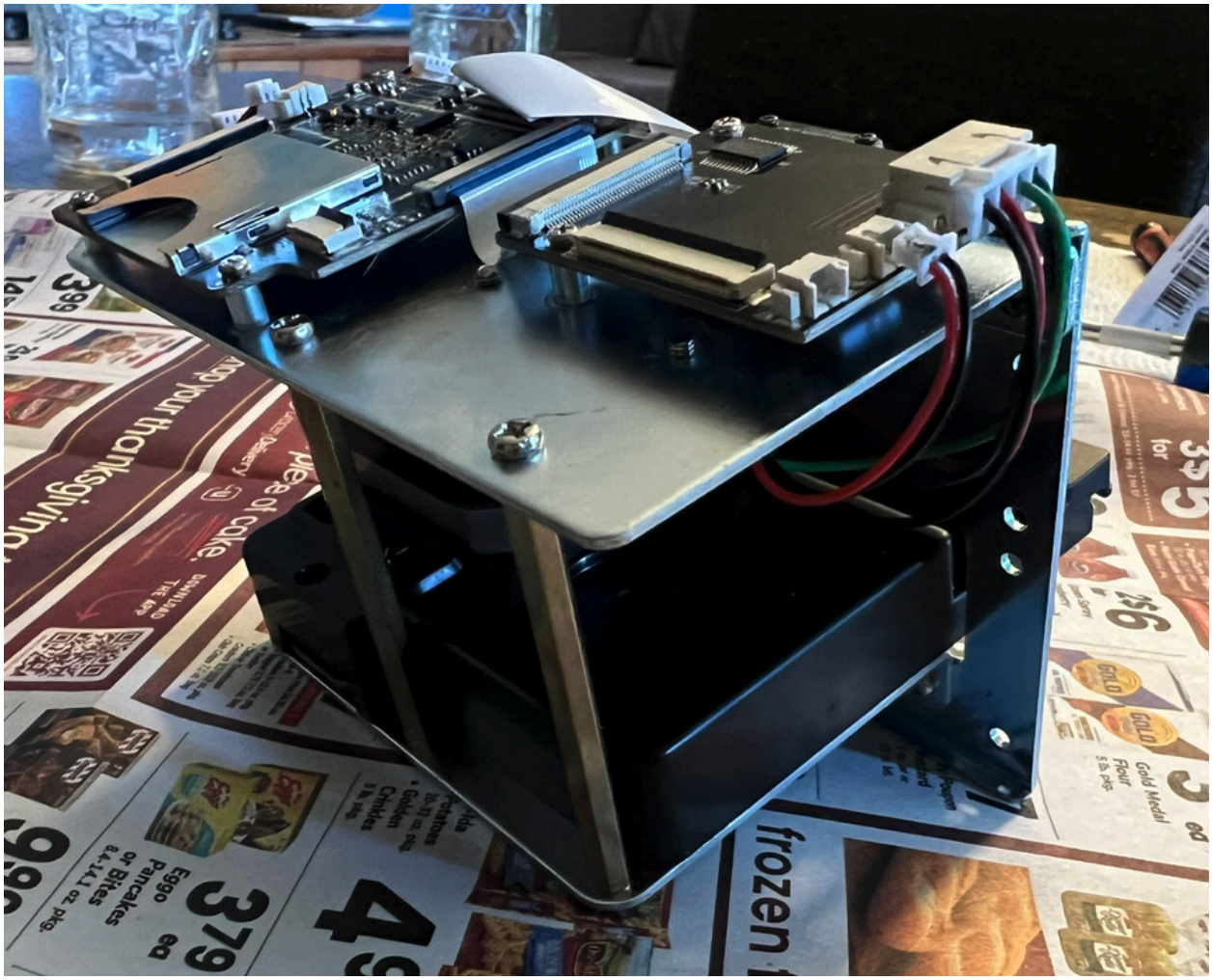
8. The v1 and v2 have a slightly different metal bracket / screw set up. You don't need to remove all the screws. Removing the ones highlighted below should do it, but use your best judgment. You just want to remove the metal frame from the plastic case.

   <u>Careful:</u> DO NOT remove this unit once it is unscrewed! You'll need to disconnect ribbon cables for the LCD display and the button panel before doing so.



9. Carefully disconnect the small cable for the button panel and the ribbon cable for the LCD before proceeding.

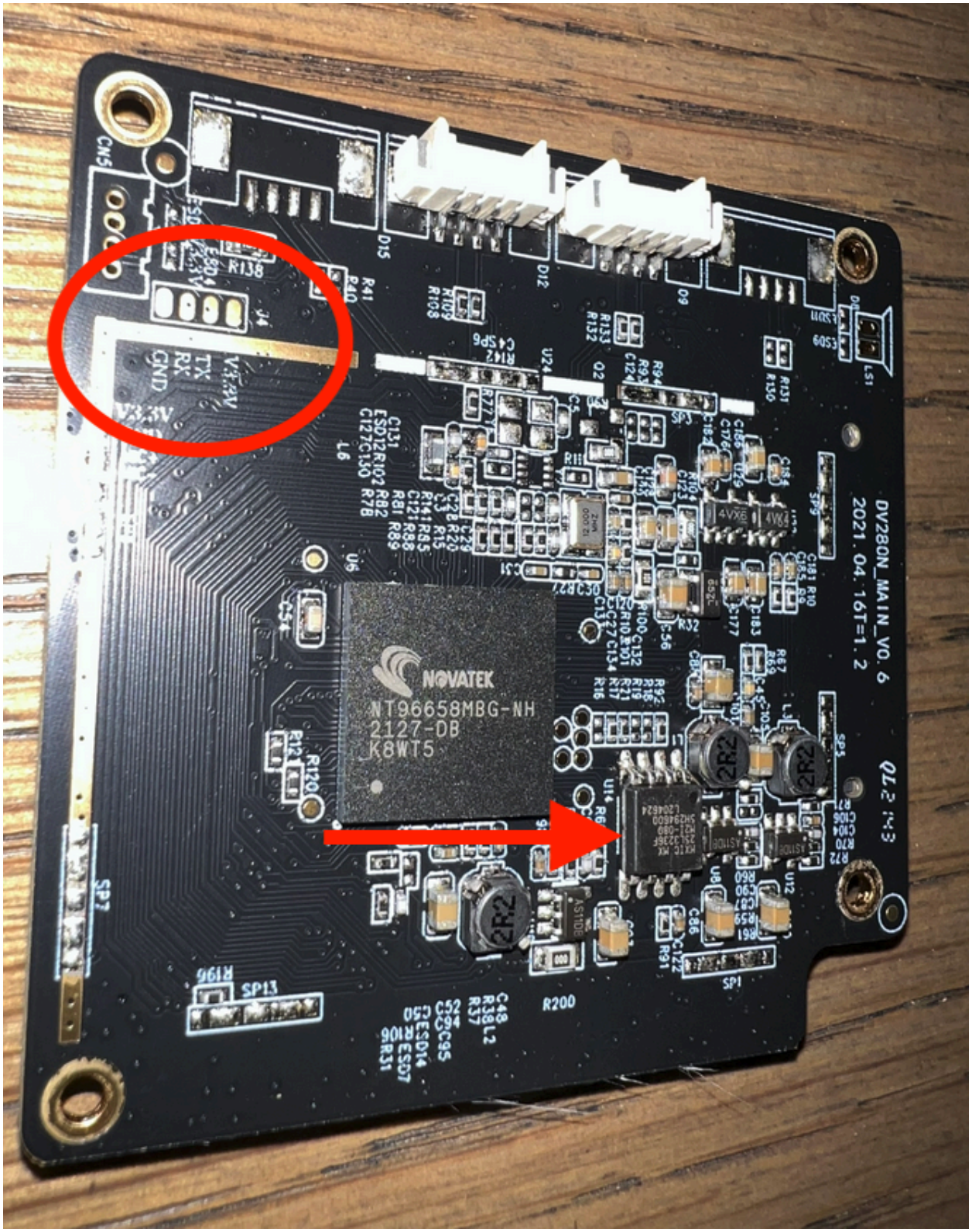
10. Once those cables are disconnected the unit you unscrewed can be removed from the case.



11. We'll be focusing on the board with the SD card slot. First remove the two ribbon cables connected to this board, there is a cable going to the camera and a cable going to the side board.

12. Remove the four screws securing the SD card board to the plate, remove it from the bracket.

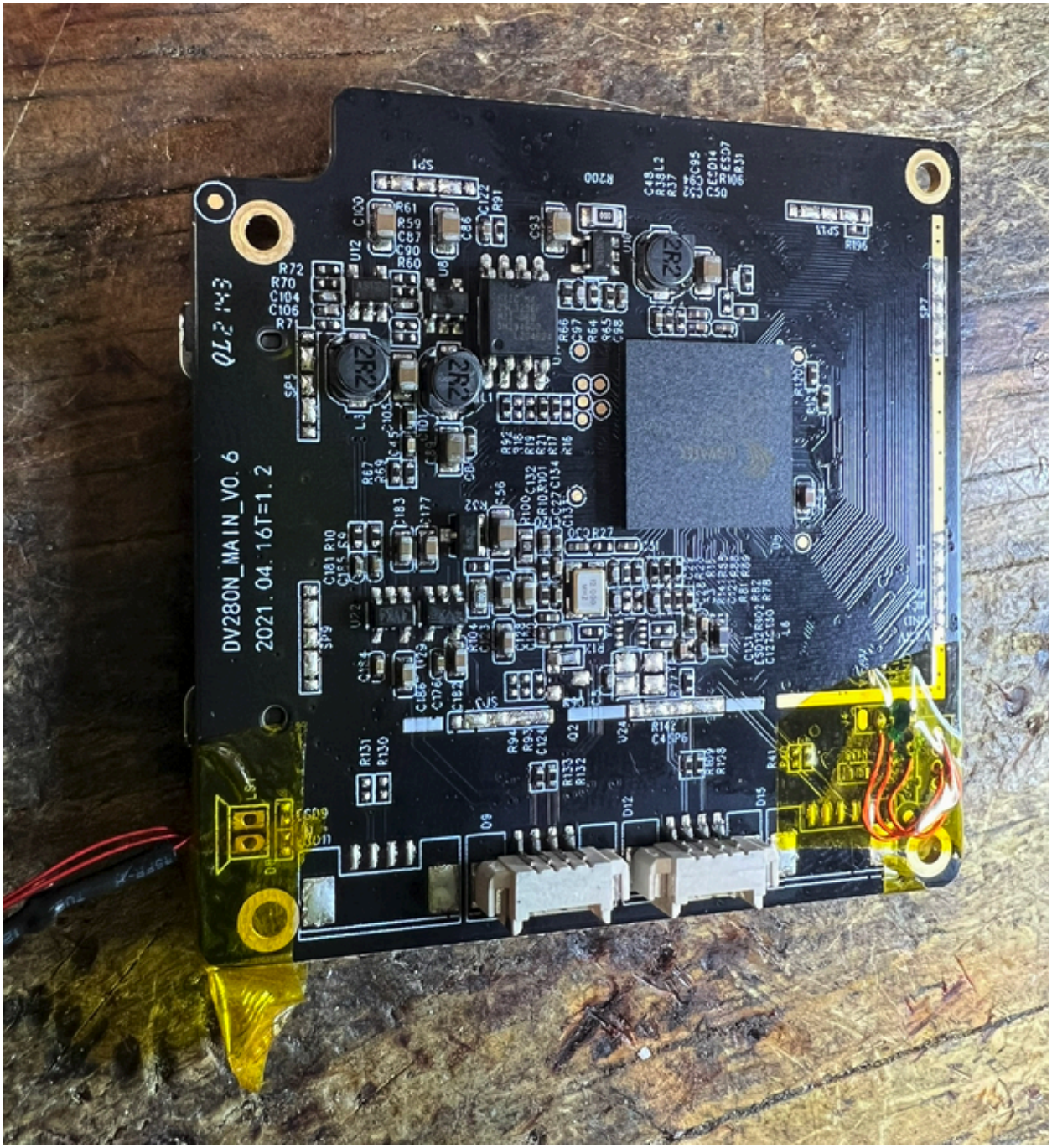
13. Turn the SD card board upside down to reveal the area we'll be working on. The circled area is where the serial port connections can be soldered onto. The arrow points to the memory chip where the ROM file is stored.



14. You'll only need to solder three wires to GND, RX, and TX. You **do not** need to solder a wire to **V3.3**. I used 34 AWG sized enameled wire for this task, but any thin wire will do.

Note: **BEFORE** you solder the wires, you may want to run them through the vents in the back case of the unit. This'll make it more seamless and allow you to fully close the case while having the unit plugged into your serial adapter. However, 34 AWG wire is quite thin and I do have mine simply sticking out between the case halves.

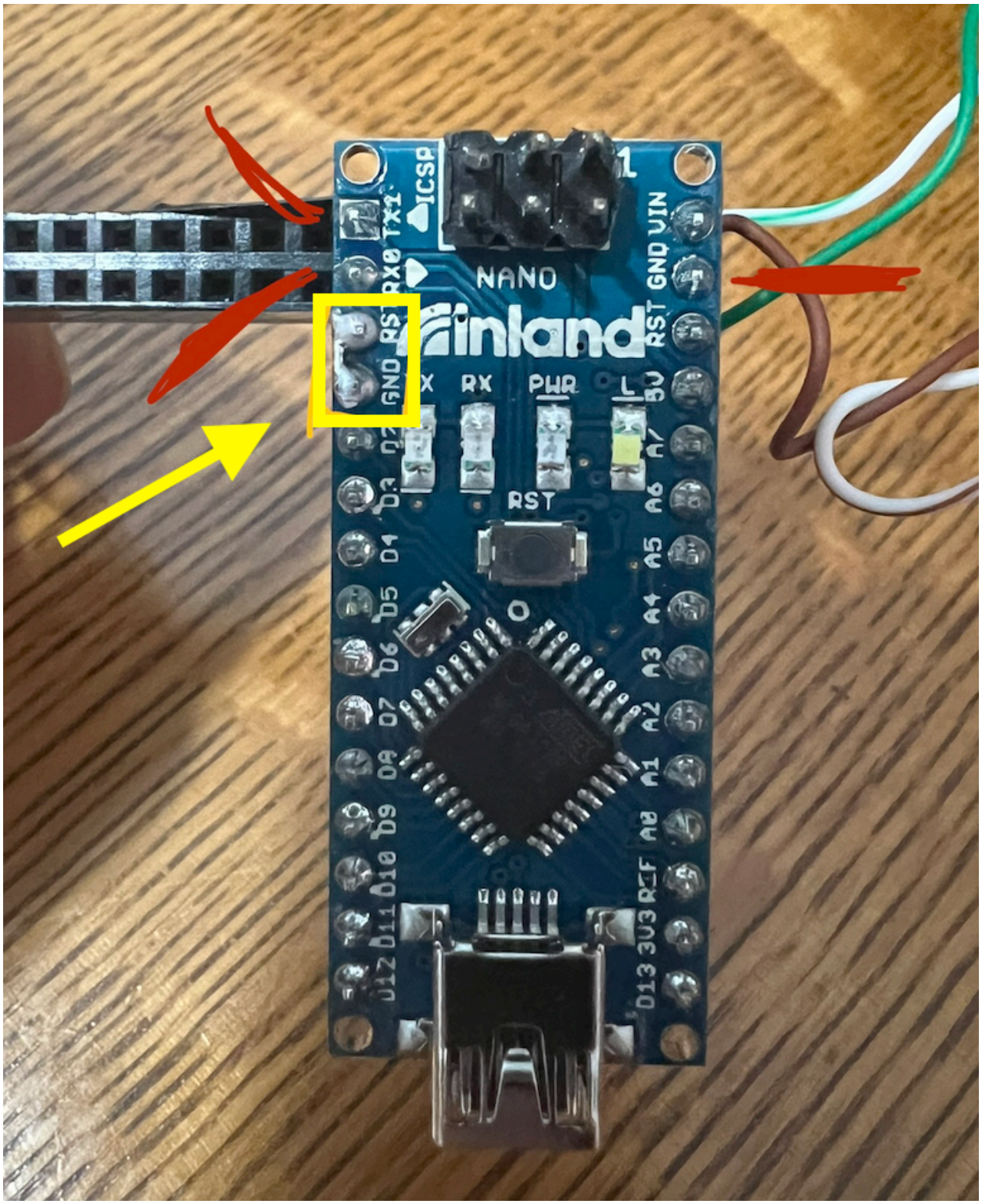
15. I snaked the wires into the unpopulated header on the left of the pads for a neater job, but that's not required. But I do recommend you put tape over your cables to ensure they don't touch anything else. Also use your multimeter in continuity mode to ensure none of the wires are bridging.



16. Connect the three wires to your UART to the USB serial adapter or an Arduino nano board. See the documentation that came with your adapter for specific details.

    Note: If using an Arduino nano or similar, you'll need to **bridge** the **GND** and **RS** lines (yellow arrow and box below) to make it act as a UART serial adapter!

    Connect the RX, TX and GND cables (the red lines shown in the photo) to the places on the Arduino board or UART serial adapter.


NANO
inland
ICSP
TX1
RX0
RST
GND
VIN
RX
PWR
L
RST
D13
3V3
REF
A0
A1
A2
A3
A4
A5
A6
A7
5V

17. For my case I used the Arduino serial monitor software, but you may prefer something else. The **KEY** thing is you **NEED** drivers for your USB UART / Arduino board depending on your OS.

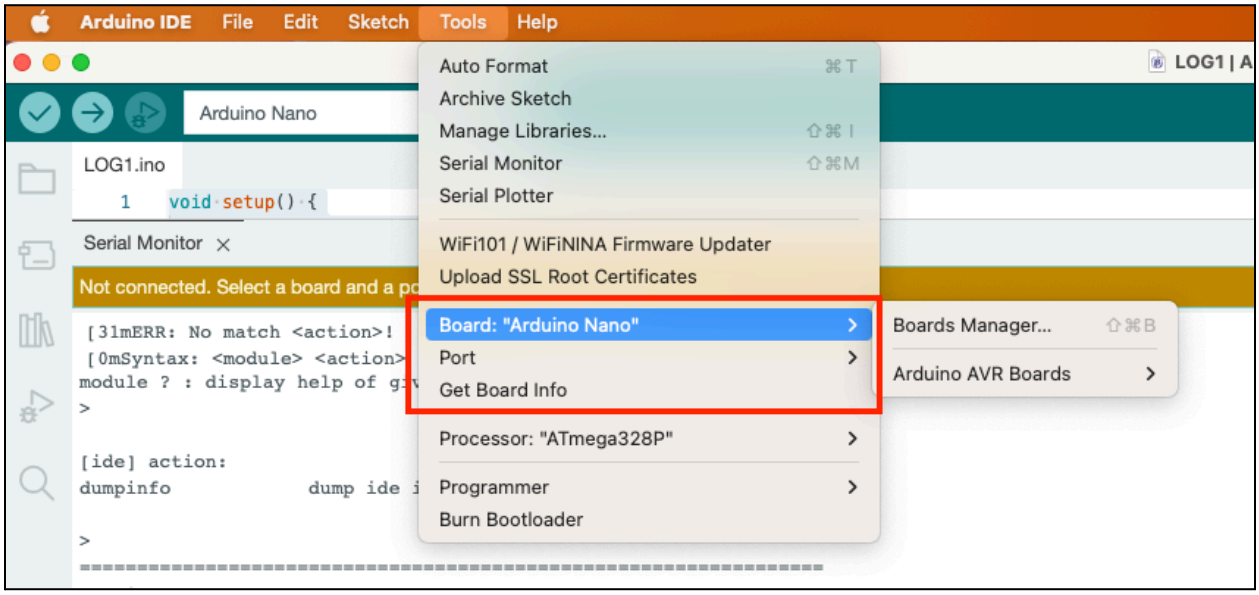
    Note: Some newer Windows / Mac OS versions may **NOT have this driver preinstalled**, so depending on your UART or Arduino board, you may need drivers, etc.

18. Download and install the Arduino or Arduino IDE software from the Arduino website. (Or whatever your serial monitor of choice is). The key thing is to ensure you select the right serial USB adapter and **baud speed of 115200**.

19. Plug in your UART or Arduino device into your computer via an appropriate USB cable.

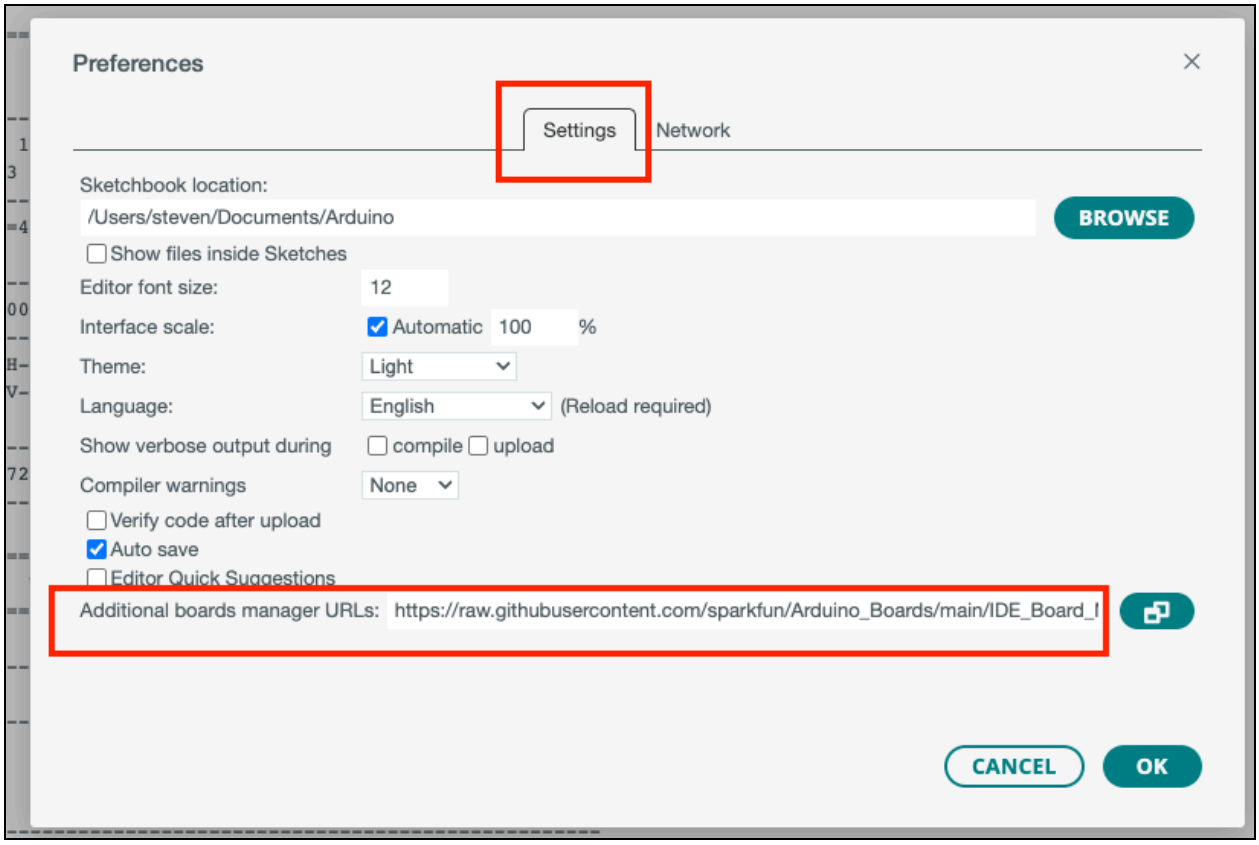
20. After you install your serial monitor software, I'm using Arduino IDE (v2.1.1) you'll need to configure the board and port in the software. The following steps only show examples for Arduino, but the steps should be similar elsewhere.

    Use the **TOOLS** menu to select the board and port info.

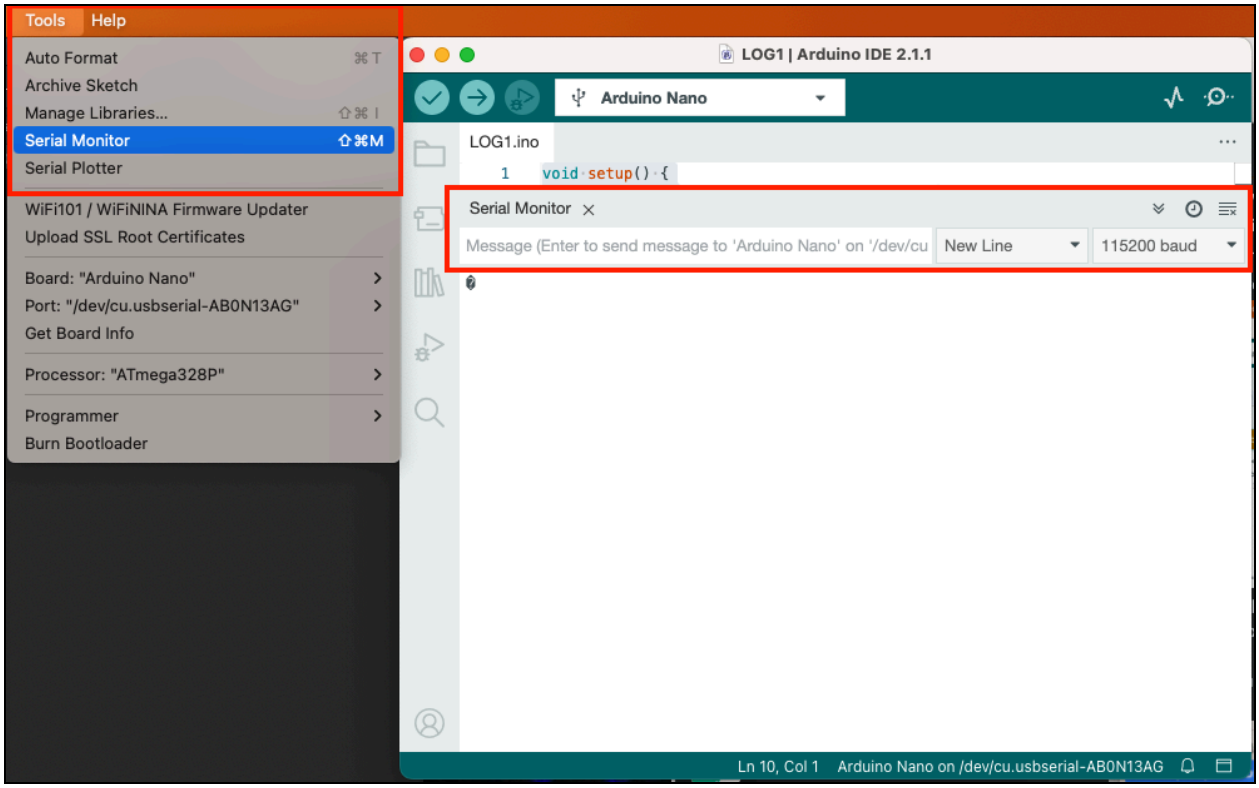


21. If you are using a clone (non-Arduino brand) board you may need to add additional boards by going to PREFERENCES, selecting SETTINGS, and pasting this URL into the highlighted area:

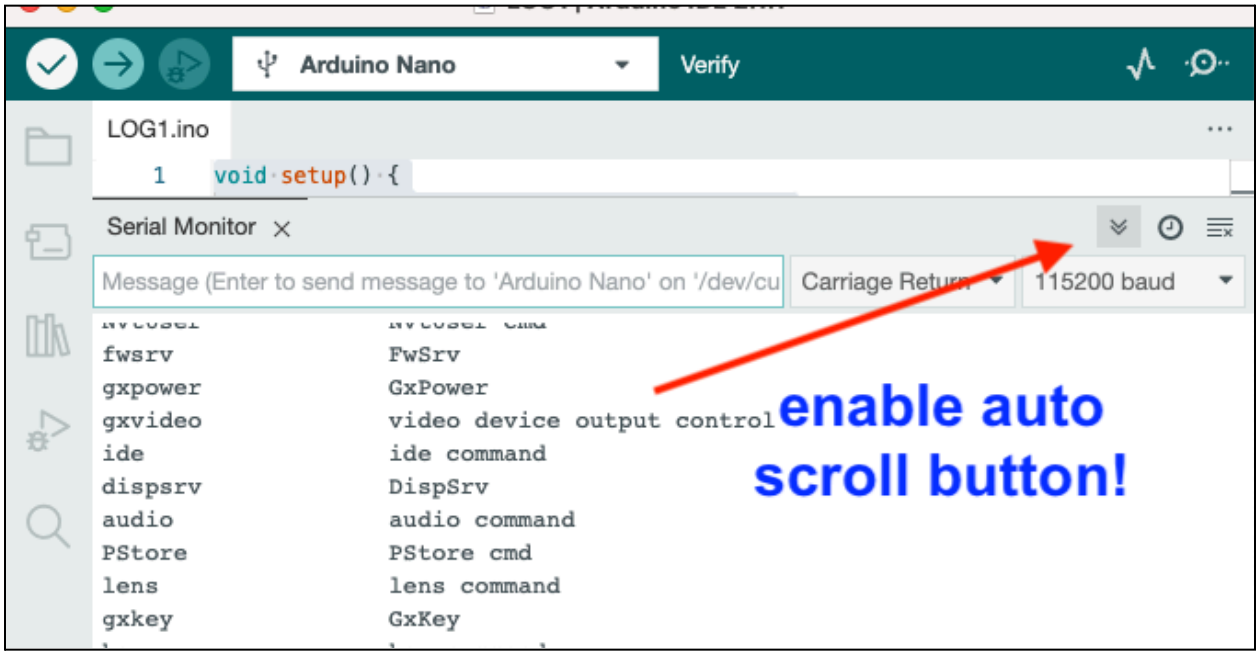
    https://raw.githubusercontent.com/sparkfun/Arduino_Boards/main/IDE_Board_Manager/package_sparkfun_index.json



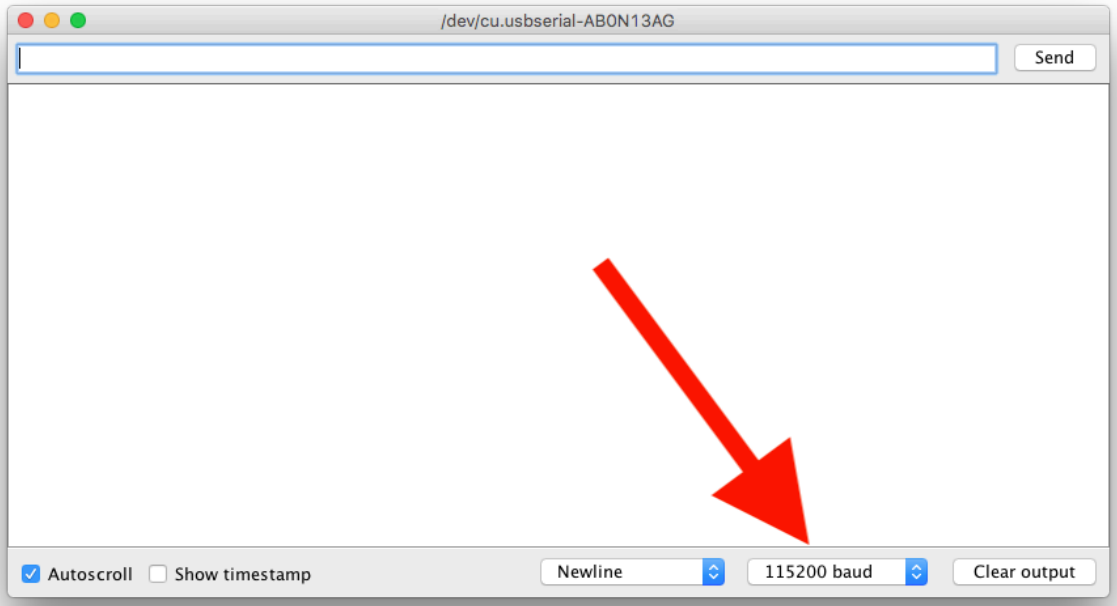
22. Once done, open the Serial Monitor from the Tools menu.



23. To make your life easier, enable the AUTO SCROLL function:



24. You **MUST** set the **baud rate** to **115200** or NOTHING will happen correctly!! 🙂

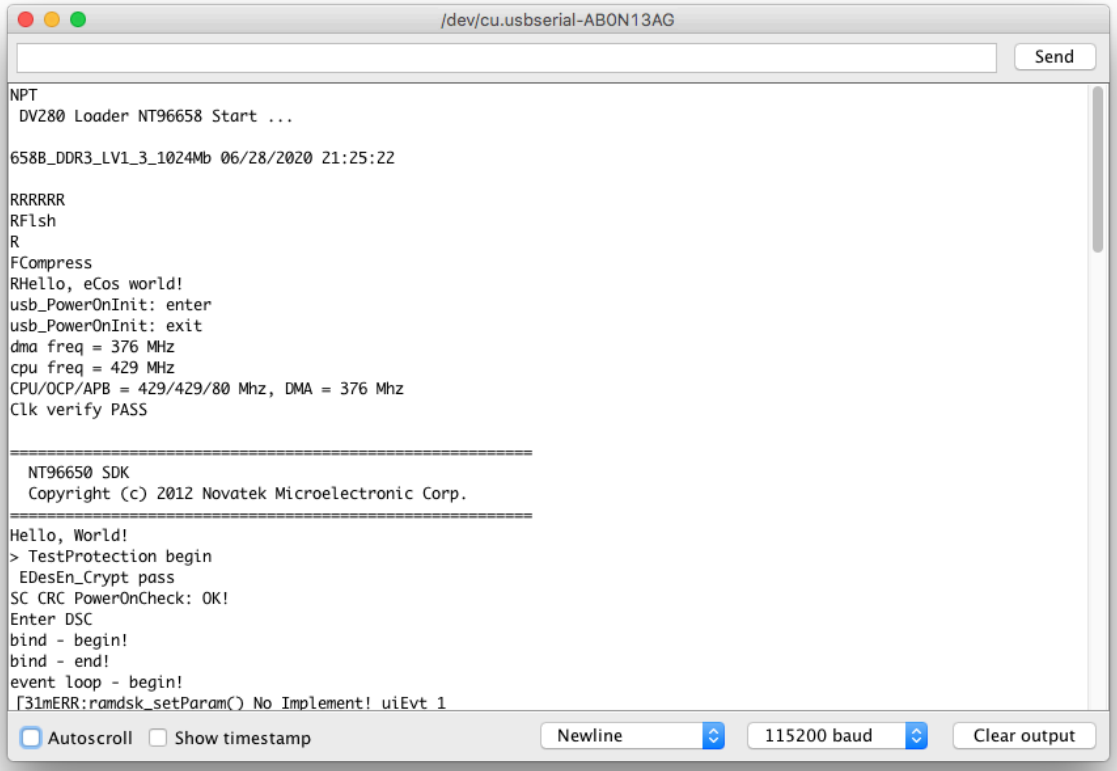


24. Once the baud rate is set, you're ready to try things out.

25. Insert a FAT32 formatted SD card into the Kodak scanner while it's off.

26. Turn **ON** your Kodak scanner.

27. You should see data starting to flow onto the serial monitor. Wait 10-15 seconds for the startup process to finish and the text to stop scrolling.



28. Type the command **?** into the top text field of your serial monitor and hit send or return on your keyboard.

    You should get a response from the unit listing all the modules on the device.

    If so then SUCCESS, things are communicating correctly!! 🎉

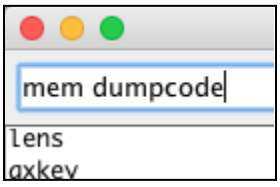
```
Syntax: <module> <action>
  ?                  Display Help of all module.
  module ?           Display Help of given module.
  module action ?    Display Help of given action.

module list:
dma                Engine DMA status
drvdump            Dump driver information
ker                OS
mem                Memory access
hwclk              check RTC clock function
ver                Library version
cwp                CPU write protection
mwp                DMA write protection
usage              CPU/DMA Usage
```

29. Now it's time to dump the firmware to the SD card. We'll need to type **TWO** commands separately to get the files dumped in two formats.

    One will dump an uncompressed firmware file, the other will dump a compressed firmware file. These will be helpful for tinkering with them later on.

30. Type the following into the text field and press enter/return to dump the uncompressed firmware file:

    ## mem dumpcode



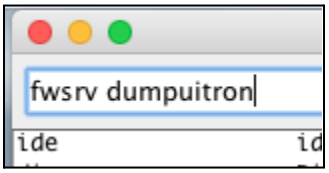
31. If successful, the serial monitor will show the following. When the dump is complete, it will say "System - not busy".

    This will save a file titled "**DUMPCODE.BIN**" to your SD card, it should be about 24 MB.

```
>
dump addr=80000000 length=01600000 to file A:\dumpcode.bin:
Card_DetBusy(): System - busy


> Card_DetBusy(): System - not busy
```

32. Next, type the following to dump the compressed firmware file, and press enter.

fwsrv dumpuitron



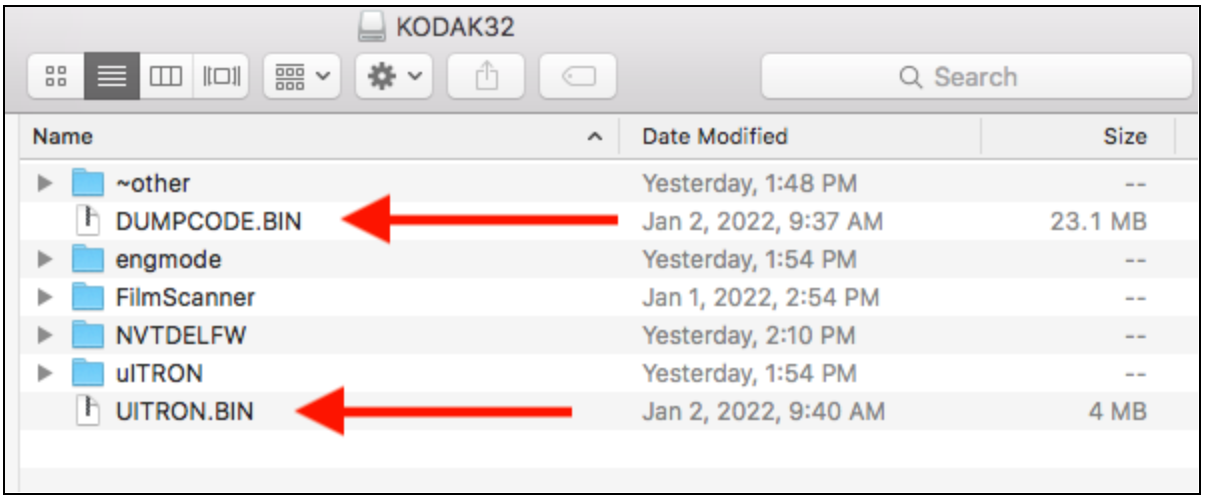
33. If successful, the serial monitor will show the following. When the dump is complete, it will say “System - not busy.”

    This will save a file titled “**UITRON.BIN**” to your SD card, it should be about 4 MB.

```
>
Card_DetBusy(): System - busy
> Card_DetBusy(): System - not busy
```

34. Your SD card should have these files on them.

    While the Kodak scanner is on, you can use the Settings > USB Upload feature of your scanner to transfer these files over it’s USB 2.0 cable to your computer. Or, simply eject the SD card and use the SD card on your computer to copy over the files.



That’s it, you’re done!