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| **A screenshot of a cell phone  Description automatically generatedStep 1 – Get a copy of the Teensy program file**  Download **4Rose.hex** to your computer. |
| **Step** A screenshot of a cell phone  Description automatically generated**2 – Get a copy of the Nextion configuration file**  Download **RoseEngine\_14.tft**, and put it in the root folder of a microSD card.  **Notes:**   1. You can only have one file on this card which is a .TFT file. The upgrade will not work if there is a 2d one. 2. You need to check for hidden files on the microSD card. I found that hard to do on macOS (which created a hidden TFT file) and had to do this on a Raspberry Pi. |
| A screenshot of a cell phone  Description automatically generated**Step 3 – Get a copy of the 4Axes.ini settings file**  Download **4Axes.ini**, and put it in the root of a second microSD card |
| A circuit board  Description automatically generated**Step 4 - Upgrade the Teensy**  **Step 4a**  Connect the computer to the Teensy.   * The cable end connected to the Teensy uses a MicroUSB connector. * The Teensy’s jack is noted in the picture to the right.   **Notes:**   1. Be sure you have a good MicroUSB cable. Some are only used for charging a device (and they are usually longer). These will often not work. |
| A circuit board  Description automatically generated**Step 4b**  On the Computer, start the **Teensy Loader**. The icon looks like the one to the right.  **Note:**   1. If you don’t have the **Teensy Loader**, you can get it from <https://www.pjrc.com/teensy/loader.html>. |
| **A picture containing game  Description automatically generatedStep 4c**  Be sure the system shows that the Teensy is connected. This is evident when the Auto button is illuminated green. As noted in step 4a above, if your USB cable is bad, this won’t light.  The default for the CPU selected won’t handle the whole 4Rose.hex file, so if you try to open it, you will get the message as shown here. |
| A circuit board  Description automatically generated**Step 4d**  Press the button on the Teensy to load the get the Teensy loader to recognize which CPU you are using. |
| **A picture containing game  Description automatically generatedStep 4e**  Back on the Computer, using the **Teensy Loader**, open **4Rose.hex**.  Once this is loaded, the bottom message will change to reflect the file size. (this picture was not updated). |
| A circuit board  Description automatically generated**Step 4f**  Press the button on the Teensy to load the program file.  Disconnect the computer from the Teensy, and then reboot the Teensy. |
| A circuit board  Description automatically generated**Step 5 – Upgrade the Nextion**  Secure the microSD card which has the Nextion configuration file (from step 2).  Put this microSD card into the Nextion’s microSD card slot.  Reboot the Teensy again.  If this works as expected, it will read  Check Data … 100%  Updated Successed!  (guess that is a bad translation from Chinese).  After that message appear, remove the microSD card from the Nextion, and reboot the Teensy again. |
| A circuit board  Description automatically generated**Step 6 - Load the .ini file**  Secure the microSD card which has the 4Axes.ini settings file (from step 3).  Put this microSD card into the Teensy’s microSD card slot.  A close up of a device  Description automatically generatedStart the system and click the **Load ini** button.  The Load ini button will turn green, and then it will take off.  Once completed, a message will appear saying  Done – Restart may be needed.  Reboot the system one last time. |
| **Step 7 – Verify the Settings**  It's a good practice to verify all of the settings once you've completed the steps.     1. Touch the Config button on each page and verify the Teensy column is populated with the same numbers as the Nextion column.  Repeat for each axis on each page. 2. Next verify the Preferences are correct for the Spindle, Axes, Limits, and Returns. 3. Select the Main page, then the '...' (Preferences) page.  Select the More page. Touch EEPROM.  Repeat for each page and axis on the page.  This will show all of the settings for the selected page.   A copy of the settings file (4Axes.ini) is on the following sheets. |

**Config file settings**

;====================================

[Setup]

;====================================

BoardType=4

Microsteps\_Spindle=32

StepsPer360\_Spindle=200

GearRatio\_Spindle=9

Polarity\_Spindle=1

;Z Axis

Microsteps\_Z=32

StepsPer360\_Z=200

DistancePer360\_Z=.02

Polarity\_Z=1

;X Axis

Microsteps\_X=32

StepsPer360\_X=200

DistancePer360\_X=.02

Polarity\_X=1

;B Axis

Microsteps\_B=32

StepsPer360\_B=200

GearRatio\_B=150

Polarity\_B=1

DistancePer360\_B=1.02

RadialOrLineal=0

BRadius=5

;====================================

[Limits]

;====================================

;Limit Switches

Min\_Z=34

Max\_Z=35

Min\_X=36

Max\_X=37

Min\_B=38

Max\_B=39

;====================================

[Returns]

;====================================

;Return

MaxSpeed\_Spindle=15011

Accel\_Spindle=15012

MaxSpeed\_Axis\_Z=15013

Accel\_Axis\_Z=15014

MaxSpeed\_Axis\_X=15015

Accel\_Axis\_X=15016

MaxSpeed\_Axis\_B=15017

Accel\_Axis\_B=15018

;====================================

[Main]

;====================================

;Axis Ids:

;-----------------

;Z=0

;X=1

;B=2

;Spindle=3

;-----------------

AxisId=0

;Spindle

MaxSpeed\_Spindle=15000

Accel\_Spindle=15001

SpeedPercentage\_Spindle=30

;Z Axis

MaxSpeed\_Z=4001

Accel\_Z=5002

SpeedPercentage\_Z=53

;X Axis

MaxSpeed\_X=4000

Accel\_X=5005

SpeedPercentage\_X=10

;B Axis

MaxSpeed\_B=5007

Accel\_B=5008

SpeedPercentage\_B=59

;====================================

[One]

;====================================

AxisId=3

;Spindle

MaxSpeed\_Spindle=25060

Accel\_Spindle=20061

SpeedPercentage\_Spindle=61

;Z Axis

MaxSpeed\_Z=5062

Accel\_Z=5063

SpeedPercentage\_Z=64

;X Axis

MaxSpeed\_X=5065

Accel\_X=5066

SpeedPercentage\_X=67

;B Axis

MaxSpeed\_B=5068

Accel\_B=5069

SpeedPercentage\_B=70

;====================================

[Ind]

;====================================

IndexId=1

MaxSpeed\_Spindle=5070

Accel\_Spindle=5071

SpeedPercentage\_Spindle=72

;-----------------

;Division:0 Degrees:2

;Fixed:0 File:1

;-----------------

;Index 1

DivisionsOrDegrees\_1=2

FixedOrFile\_1=0

Size\_1=1.875

;Index 2

DivisionsOrDegrees\_2=2

FixedOrFile\_2=0

Size\_2=24.375

;Index 3

DivisionsOrDegrees\_3=2

FixedOrFile\_3=0

Size\_3=90

;====================================

[Mov]

;====================================

AxisId=0

;Z Axis

MaxSpeed\_Z=5080

Accel\_Z=5081

SpeedPercentage\_Z=82

Distance\_Z=3

;X Axis

MaxSpeed\_X=5083

Accel\_X=5084

SpeedPercentage\_X=85

Distance\_X=5.75

;B Axis

MaxSpeed\_B=5086

Accel\_B=5087

SpeedPercentage\_B=88

Distance\_B=5.78

;====================================

[BE]

;====================================

AxisId=0

;Spindle

MaxSpeed\_Spindle=5090

Accel\_Spindle=5091

SpeedPercentage\_Spindle=92

;Z Axis

MaxSpeed\_Z=5093

Accel\_Z=5094

SpeedPercentage\_Z=95

;X Axis

MaxSpeed\_X=5096

Accel\_X=5097

SpeedPercentage\_X=98

;B Axis

MaxSpeed\_B=5099

Accel\_B=5100

SpeedPercentage\_B=50

;====================================

[Sync]

;====================================

AxisId=0

HelixType=0

Revolutions=.3

Distance=10

;Spindle

MaxSpeed\_Spindle=5040

Accel\_Spindle=5041

SpeedPercentage\_Spindle=42

;Z Axis

MaxSpeed\_Z=5043

Accel\_Z=5044

SpeedPercentage\_Z=45

;X Axis

MaxSpeed\_X=5046

Accel\_X=5047

SpeedPercentage\_X=48

;B Axis

MaxSpeed\_B=5048

Accel\_B=5049

SpeedPercentage\_B=49

;====================================

[Rec]

;====================================

AxisId=0

RadialOrAxial=0

;Spindle

MaxSpeed\_Spindle=5030

Accel\_Spindle=5031

SpeedPercentage\_Spindle=32

;Z Axis

MaxSpeed\_Z=5033

Accel\_Z=5034

SpeedPercentage\_Z=35

;X Axis

MaxSpeed\_X=5036

Accel\_X=5037

SpeedPercentage\_X=38

;B Axis

MaxSpeed\_B=5039

Accel\_B=5040

SpeedPercentage\_B=39

;Radial

Radial\_Waves=5

Radial\_Spindle\_Amplitude=20

Radial\_Axis\_Distance=5

;Axial

Axial\_Waves=4

Axial\_Spindle\_Degrees=25

Axial\_Axis\_Amplitude=7

;====================================

[Grk]

;====================================

AxisId=0

FileOrPattern=0

;Spindle

MaxSpeed\_Spindle=5020

Accel\_Spindle=5021

SpeedPercentage\_Spindle=22

;Z Axis

MaxSpeed\_Z=5023

Accel\_Z=5024

SpeedPercentage\_Z=25

;X Axis

MaxSpeed\_X=5026

Accel\_X=5027

SpeedPercentage\_X=28

;B Axis

MaxSpeed\_B=5028

Accel\_B=5029

SpeedPercentage\_B=29

;Pattern page

RadialOrAxial\_Pattern=0

;4a: 2 4b: 3 3a: 6 3b: 7 2a: 4 2b: 5

PatternType=4

Pattern\_PatternsPer360=8

Pattern\_PatternCount=1

Pattern\_SegmentLength=1

;File page

RadialOrAxial\_File=0

File\_PatternsPer360=7

File\_PatternCount=1

File\_SegmentLength=1

;Segments: 2 Actual: 3

File\_SegmentsOrActual=2

;====================================

[Geo]

;====================================

AxisId=0

RadialOrAxial=0

Rose\_n=7

Rose\_d=5

;Spindle

MaxSpeed\_Spindle=5010

Accel\_Spindle=5011

SpeedPercentage\_Spindle=12

;Z Axis

MaxSpeed\_Z=5013

Accel\_Z=5014

SpeedPercentage\_Z=15

RadialAmplitude\_Z=2

AxialAmplitude\_Z=2.5

;X Axis

MaxSpeed\_X=5016

Accel\_X=5017

SpeedPercentage\_X=18

RadialAmplitude\_X=2

AxialAmplitude\_X=2.5

;B Axis

MaxSpeed\_B=5018

Accel\_B=5019

SpeedPercentage\_B=19

RadialAmplitude\_B=3

AxialAmplitude\_B=3.5