SeeMeCNC®
3D Printers & More

Service Bulletin

Instructional Guide

Firmware Upgrade
v3.2.2

Support provided for firmware downloaded from SeeMeCNC only.
version 2.02RTOS and version 3.2.2

This service bulletin is for all SeeMeCNC Delta 3D Printers
using genuine Duet2 control boards installed into SeeMeCNC
Delta Printers purchased after the Fall of 2016

Table of Contents

Safety, Read Me First!

Before using the 3D printer, thoroughly read and understand all instructional material for safe and effective operation of the machine as provided by SeeMeCNC.

Warning	
Personal property damage, serious injury, or death can result from not following instructions or warnings in the manual or misuse of the machine.	
⚠	Automatic machines can start unexpectedly. Pay close attention and keep clear while power is connected to the machine.
⚠	Adult supervision required. Children under 18 years of age require supervision.
⚠ DANGER Shock Hazard. Disconnect power before servicing. Improper use will result in serious injury or death.	The machine power supply is connected to AC voltage and can be hazardous. Disconnect power before servicing this machine. High voltage can cause injury or death.
⚠ CAUTION: Hot Surface. Do NOT touch. Allow to cool before servicing.	The hot end of the machine can reach very high temperatures of 700F and cause serious burns. The heated print surface (heated bed) can also reach temperatures high enough to cause severe burns. Allow both to cool for 20 minutes after turning off power.
⚠ CAUTION: Pinch Point. Keep hands and fingers clear.	Use caution near moving parts of the machine. Keep body and loose articles clear.
⚠ DANGER Fire risk	Risk of Fire. Do not leave the machine unattended.
⚠	Use genuine parts manufactured or designated by SeeMeCNC.
⚠	This machine is capable of using some thermoplastic materials which may emit poisonous gas, smoke, or fumes. In such a case, you should install ventilation.
⚠	Choking Hazard. This machine contains small parts and can produce small parts which can be a choking hazard to children.
Keep a copy of this manual near the machine, easily accessible to all operators.	
Use of this machine is at your own risk.	
Visit www.seemecnc.com to contact us if you have any questions.	

What Is Needed to Upgrade

- Couple of hours
- Micro SD card adapter for use with a computer
- All firmware control files ONLY downloaded from SeeMeCNC as instructed by this document.
- Confirm the micro SD card is 32Gb or smaller and of a quality genuine name brand

Objective

The objective of this update is to improve the performance and features of the machine and control. There is no reason to update your machine if you are happy with how it currently operates.

It is highly recommended to print a copy of these instructions and then check off each item as completed.

Quick Overview

The installation of new firmware requires a great number of proper settings. The control board microcontroller is literally erased and reprogrammed several times during this service upgrade bulletin. It is extremely important to follow these instructions in this Service Bulletin.

1. It is recommended to backup the files on the control micro SD card.
2. Download files as directed by this document
3. If current firmware version is greater than or equal to 1.19 AND less than version 3.0, then proceed to install the FIRST firmware preparatory programming, otherwise STOP
4. If v3.0 or higher, install the SECOND firmware preparatory programming.
5. Finally, update to version 3.2.2 RepRapFirmware, twice.

The upgraded firmware has been tested on stock SeeMeCNC factory printers. We can only support printers and accessories made by SeeMeCNC.

INSTALLING FIRMWARE

STEP 1 - Prior to Upgrading Firmware

This service bulletin is to be used for upgrading SeeMeCNC Delta Printers running a version of RepRapFirmware on a Duet2 controller board. Allow time to complete each instruction one at a time. We recommend checking off each item as you complete it and allowing time to ensure the update fully completes before turning off power to the printer.

- On the touchscreen CONSOLE screen, enter diagnostic command **M115** to show the firmware version (open the keyboard by pressing the icon in the upper right corner.

    ○ Note the version listed after "WiFi/Ethernet FIRMWARE_VERSION: **1.21**"
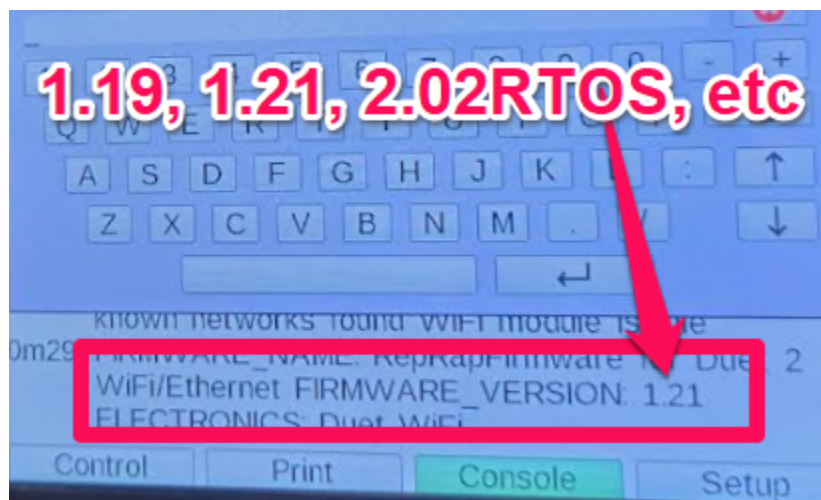
STEP 2 - Download Transition Firmware

The transition firmware is necessary if the control board has any version from 1.19 to less than v3.0 installed.

Click on the following links and download the transition firmware from SeeMeCNC.

1. If the firmware version already have v3.0 or higher, proceed to the next step
2. Download both "**RRF-FIRST-PREP**" and "**RRF-SECOND-PREP**"

STEP 3 - Download The New Firmware

Download the new v3.2.2 firmware for your printer model below. Click on your printer model below to open the folder location for the new firmware. Only use these files to update your SeeMeCNC printer.

- The v3.2.2 firmware combines both Ethernet and WiFi control boards. There is no need to change any settings related to communications in the configuration file.

- If you have a WiFi model controller, the WiFi module stores the user and password. What this means is that the controller will log on to the network even after reprogramming the microcontroller of the Duet2 control board. This is especially useful if you have an early machine without a touchscreen controller.

Click on the printer model here

https://drive.google.com/drive/u/0/mobile/folders/1Y1vkhvTCYaErVKq43pdaAR5gJ 80Wqvzl?usp=sharing
BOSSdelta 500
Artemis
RostockMAX v4
RostockMAX v3.2

STEP 4 - Extract Compressed Zip Downloads

Navigate to the downloaded files and extract (unzip) any compressed files. Note the location of the files.

STEP 5 - Update to version 2.02RTOS

If you have version 3.0 or higher of reprap firmware, then proceed to the next step, skipping over this step.

If you have any version 1.19 to 2.xx, perform this update step Even if you have 2.02RTOS

NOTE:
Versions lower than 1.19 require other procedures. SeeMeCNC did not sell or ship any 3D printers with any version lower than 1.19, therefore we will not have a guide for updating.

1. Power off the printer and remove the Duet2 micro SD card
2. Insert the card in a computer and backup any gcode files needing saved
3. Delete all files and folders on the micro SD card
4. From the downloaded folder **RRF-FIRST-PREP** copy all folders to the micro SD card
5. Eject the micro SD after all files are copied and re-insert into the printer
6. Power on the printer
7. Update the firmware by one of the following
   ○ At the touchscreen navigate to the "Control" screen and press "Macro" then "More Macros" then select "Program Firmware"
   ○ Optionally send command M997 S0:1 from a terminal
8. Wait for the update to fully complete. This will take a minute or two.
9. Power off the printer and wait about 10 seconds
10. Power on the printer
11. Verify the version by entering the following command at the "CONSOLE" screen.
    ○ The **M115** command should report RepRapFirmware **version 2.02RTOS**
    ○ The top of the touchscreen will have the printer name "DO NOT USE"
12. Turn off the printer

==**Do not proceed if the control does not report firmware 2.02RTOS after entering the M115 command !**==

If M115 reports 2.02RTOS, then this transitional step is complete. The printer is not usable in this condition. Proceed to the next transitional step, which will prepare the printer for the final firmware version.

STEP 6 - Update 2.xx to 3.0

This step must be performed to properly update the SeeMeCNC printer to v3.2.2 firmware

1. Power off the printer and remove the Duet2 micro SD card
2. Insert the card in a computer and backup any gcode files needing saved
3. Delete all files and folders on the micro SD card
4. From the downloaded folder **RRF-SECOND-PREP** copy all files and folders to the micro SD card
5. Eject the micro SD after all files are copied and re-insert into the printer
6. Power on the printer
7. Update the firmware by one of the following
   a. At the touchscreen navigate to the "Control" screen and press "Macro" then "More Macros" then select "Program Firmware"
   b. Optionally send command M997 S0:1 from a terminal
8. Wait for update to fully complete, this takes a minute or two
9. Power off the printer and wait about 10 seconds
10. Power on the printer
11. Verify the version by entering the following command at the "CONSOLE" screen.
    a. The **M115** command should report RepRapFirmware **version 3.0**
    b. At the top of the touchscreen, the printer name will display "DO NOT USE"
12. Turn off the printer

Proceed only if the M115 command reports firmware version 3.0.

This transitional step is complete. The printer is not usable in this condition. The next step will help you install the final firmware version properly.

STEP 7 - Upgrade to the RepRapFirmware 3.2.2

Perform this step **only after** you have completed updating to firmware version v3.0

Please follow these steps exactly as shown. We have invested a considerable amount of time testing and installing on printers as old as 2016 at the factory. We have found multiple printers require the double "Program Firmware" (M997 S0:1) command. So please do not think this was a double entry error on our part, it is not.

1. Power off the printer and push to remove the micro SD card from the Duet controller
2. Insert the micro SD card into a computer and delete all files and folders
3. From the downloaded folder (such as **SD Card RRF322 eSlide Artemis** copy the **five folders** and files to the control micro SD card
4. Eject the micro SD card from your computer after all files are copied. For Windows computers, we recommend right clicking the sd card drive icon and selecting "eject" to ensure copying is complete.
5. Re-insert the micro SD card into the printer.
6. Power on the printer
7. Update the firmware by one of the following
    - At the touchscreen navigate to the "Control" screen and press "Macro" then "More Macros" then select "Program Firmware"
    - Optionally send command M997 S0:1 from a terminal
8. Wait until the touchscreen says
9. Power off the printer
10. Wait for update to fully complete, this takes a minute or two
11. Power on the printer
12. Update the firmware (again) by one of the following
    - At the touchscreen navigate to the "Control" screen and press "Macro" then "More Macros" then select "Program Firmware"
    - Optionally send command M997 S0:1 from a terminal
13. Again, wait for the update to fully complete.
14. Power off the printer
15. Wait 10 seconds
16. Power on the printer
17. Verify the firmware version by entering the following command at the "CONSOLE" screen.
    - Enter the M115 command and the control should report RepRapFirmware version 3.2.2
    - The top of the touchscreen should have the name of your printer model

The Upgrade is complete. BEFORE operating, proceed to the next step to determine if the control file needs to be edited for machine options.

STEP 8 - Configure

Determine if **config.g** needs to be adjusted.

BOSSdelta 300

- Nothing will need to be changed for this printer. You may proceed to the next STEP.
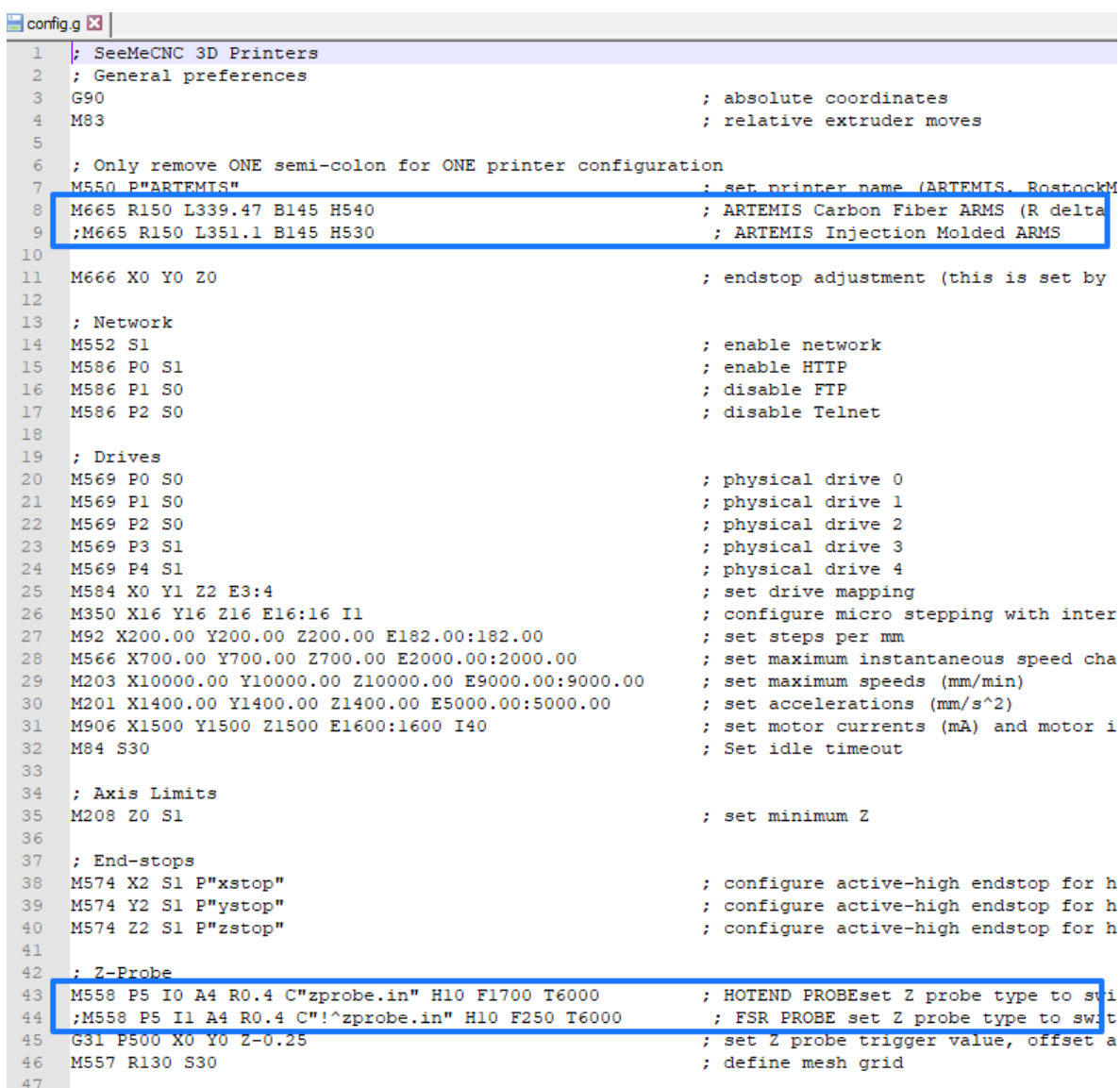
BOSSdelta 500

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We are currently working on this part of the manual.

Artemis 300

- If you have the following features, proceed to the next STEP
  - Carbon fiber arms
  - SE300 Hotend Probe

- If you have an older machine, edit the \sys\ folder **config.g** by adding or removing the semi-color at the beginning of the line. Open the file in the control web browser or open the file in a text editor on your computer. The following photo shows the *only* places you should edit. Ignore ANY differences in other code you may have. The picture is for reference only.

  The comments to the right of the semicolon (right side of screen) indicate the features installed. When a semicolon is added to the beginning of the line, the entire line is ignored by the control when you turn on the power to the printer.

```
config.g
 1   ; SeeMeCNC 3D Printers
 2   ; General preferences
 3   G90                                              ; absolute coordinates
 4   M83                                              ; relative extruder moves
 5
 6   ; Only remove ONE semi-colon for ONE printer configuration
 7   M550 P"ARTEMIS"                                  ; set printer name (ARTEMIS, RostockM
 8   M665 R150 L339.47 B145 H540                      ; ARTEMIS Carbon Fiber ARMS (R delta
 9   ;M665 R150 L351.1 B145 H530                      ; ARTEMIS Injection Molded ARMS
10
11   M666 X0 Y0 Z0                                    ; endstop adjustment (this is set by
12
13   ; Network
14   M552 S1                                          ; enable network
15   M586 P0 S1                                       ; enable HTTP
16   M586 P1 S0                                       ; disable FTP
17   M586 P2 S0                                       ; disable Telnet
18
19   ; Drives
20   M569 P0 S0                                       ; physical drive 0
21   M569 P1 S0                                       ; physical drive 1
22   M569 P2 S0                                       ; physical drive 2
23   M569 P3 S1                                       ; physical drive 3
24   M569 P4 S1                                       ; physical drive 4
25   M584 X0 Y1 Z2 E3:4                               ; set drive mapping
26   M350 X16 Y16 Z16 E16:16 I1                       ; configure micro stepping with inter
27   M92 X200.00 Y200.00 Z200.00 E182.00:182.00       ; set steps per mm
28   M566 X700.00 Y700.00 Z700.00 E2000.00:2000.00    ; set maximum instantaneous speed cha
29   M203 X10000.00 Y10000.00 Z10000.00 E9000.00:9000.00  ; set maximum speeds (mm/min)
30   M201 X1400.00 Y1400.00 Z1400.00 E5000.00:5000.00  ; set accelerations (mm/s^2)
31   M906 X1500 Y1500 Z1500 E1600:1600 I40            ; set motor currents (mA) and motor i
32   M84 S30                                          ; Set idle timeout
33
34   ; Axis Limits
35   M208 Z0 S1                                       ; set minimum Z
36
37   ; End-stops
38   M574 X2 S1 P"xstop"                              ; configure active-high endstop for h
39   M574 Y2 S1 P"ystop"                              ; configure active-high endstop for h
40   M574 Z2 S1 P"zstop"                              ; configure active-high endstop for h
41
42   ; Z-Probe
43   M558 P5 I0 A4 R0.4 C"zprobe.in" H10 F1700 T6000  ; HOTEND PROBEset Z probe type to sti
44   ;M558 P5 I1 A4 R0.4 C"!^zprobe.in" H10 F250 T6000  ; FSR PROBE set Z probe type to swit
45   G31 P500 X0 Y0 Z-0.25                            ; set Z probe trigger value, offset a
46   M557 R130 S30                                    ; define mesh grid
47
```

RostockMAX v3.2

- Edit the **config.g** file items below, save and power cycle your printer
  - M665 Arms length and type
  - M92 Stepper motor AND pulley number of teeth
    - Early machines had 20T timing pulleys, adjust the steps/mm accordingly
    - Late model machines have 16T timing pulleys
    - You also need to consider 1.8deg early model or late model 0.9 degree steppers
  - M558 Probe Settings (we did not ship FSR printers)

We are currently working on this part of the manual
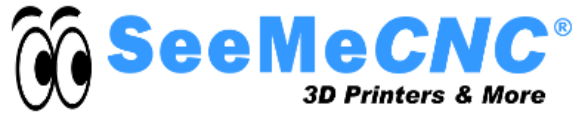
STEP 9 - Prepare for First Use

Notes:

☐ There are no longer macros "probe autolevel" or "first probe". The "Delta Calibration" now automatically deletes config-override.g and runs Delta Calibration routine twice.

☐ Since 2016, we no longer recommend operating any SeeMeCNC printers over USB cable. Operation by web browser through WiFi or Ethernet on your network. Or by a quality SD card 32Gb or smaller using the touchscreen controller on the printer.

☐ Wait for the hotend to reach room temperature before running calibration.

Running Autolevel Calibration

The auto leveling calibration of the machine is as follows. Note we no longer recommend bed mesh calibration and have not found it necessary.
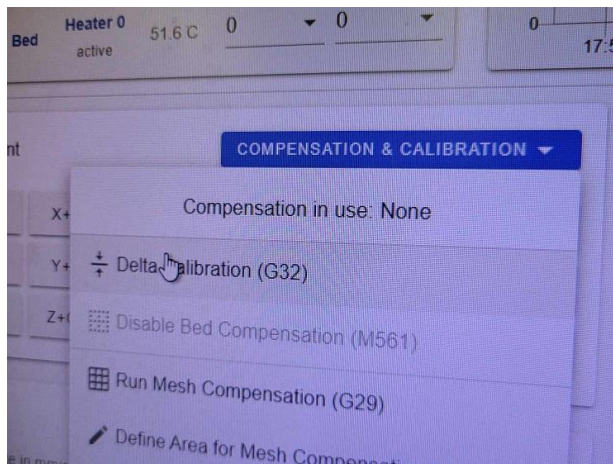
1. **Home First** using ONE of the following
   a. Touch the home icon on the touchscreen
   b. Click "Home All" button in the web browser control
   c. Send G28 command

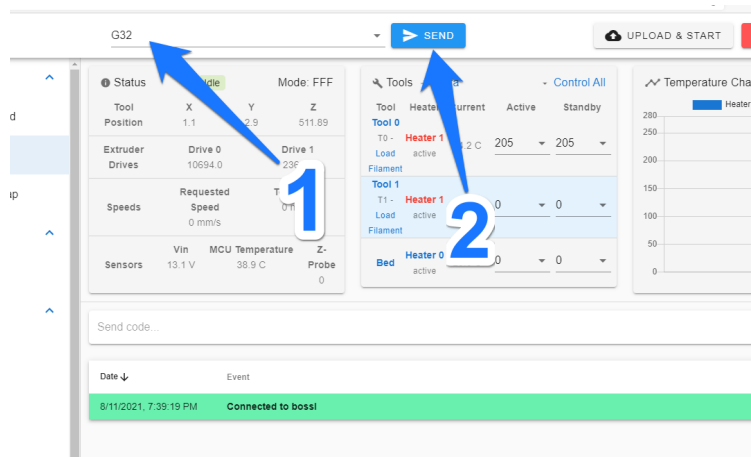2. **Run Delta Calibration** using ONE of the following
    a. Run by pressing the touchscreens' icon for delta calibration
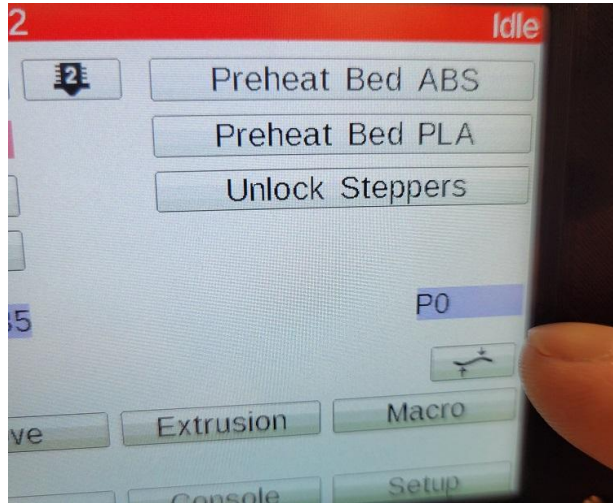
   b. Run by selecting "Delta Calibration" from the drop menu of the printers' web browser control screen

   c. Send G32 command

Calibration Notes - THIS INFORMATION IS FOR REFERENCE ONLY

Optional "Mesh Compensation" - **we no longer recommend bed mesh.**
- This may generate errors, however the printer should still print normally
- Run by pressing the macro named "Bed Mapping" found in the printers More Macros folder
- Run by selecting the "Run Mesh Calibration" from the drop menu of the printers' web browser control screen
- Send G29 command

REFERENCE INFORMATION

Scale Calibration - Print On-Size

Not printing on size? For the new v3.x firmware SeeMeCNC chose to use the M579 command. This is the last line in the config.g file. The printer configuration file, config.g, defines the delta printer. Config.g is located on the Duet2 controller micro SD card, in the **sys** folder. Edit in a text editor or open in the printers web browser control window (preferred).
The **last** line in the config.g will look similar to this:
M579 X1.0040 Y1.0040 Z1.004

In the above example, each axis is multiplied by 1.004. All three axes should be identical. We have found the current configuration we specify requires scaling up all three axes a small amount. If your prints are undersize, increase the scale and vice versa.

Once you have modified the config.g scale factor, **power cycle** the printer, then run "Delta Calibration" (procedure in last STEP 9)

Factors affecting scale
- Belt tension
- Arm ball joints snapped onto balls
- Hotend secure to SE300 PCB
- Screws tightened properly on hotend
- Carriages properly tightened
- Probing Speed (in config.g)
- Ooze on nozzle
- Bed clean
- Using SeeMeCNC Factory provided parts

Roll Back Procedure - Downgrade Firmware v3.2.2 to v2.02RTOS

Note that version 3.0 RepRapFirmware is the "gateway" to leveling up or leveling down in revisions of firmware. We only support using the firmware files linked from this SeeMeCNC provided Service Bulletin.

1. Copy v3.0 to the control microSD card (download link in 'transition' step above)
2. Insert into printer and turn on
3. Run "Program Firmware" macro gcode
4. Turn off, remove micro SD card
5. Follow the original Duet Firmware Update guide here for version 2 firmware
   a. [DUET Firmware Update - SeeMeCNC Guides (dozuki.com)](dozuki.com)

Technical Support

First, post to our [Forum Topic for this Update](). Your question may help others too. If you do contact us by our technical support email, let us know if you also posted on the forum, as we'd like to respond or share the question there too. We will update this Service Bulletin based on the feedback should something needs to be improved.

And secondly, if you have trouble, please submit a technical support request through our website. Select tab "SUPPORT" > "Technical Support". Our website link is the official company support channel.

Notes

The following notes and reference materials are not part of our official instructions for updating firmware.

What an amazing control board and firmware shared by Duet3d. These reference notes helped our team prepare this guide to help you properly update your SeeMeCNC printer. They are included for reference and to give credit where credit is due.

- ➢ WiFi models only: The network and password should be stored. If the printer does not connect to your network, you may need to re-enter using the following commands. Remember to keep the double quotes
    - M552 S0
    - M587 S"NetWorkSSID" P"password"
    - M552 S1

- ➢ The M997 is twice because WiFi and WiFi just doesn't work on 3 of 4 printers until the second time. Steve believes the Wifi doesn't update until version 3.2.2 finishes. Then run the second time, things update and your existing WiFi SSID and PASS will still work. Because it is saved to the WiFi module itself.
- ➢ https://duet3d.dozuki.com/Wiki/Setting_up_to_resume_a_print_after_a_power_failure#Section_Overview
- ➢ https://duet3d.dozuki.com/Wiki/RepRapFirmware_3_overview#Section_Pin_names_for_Duet_2_WiFi_Ethernet
- ➢ https://duet3d.dozuki.com/Wiki/Installing_and_Updating_Firmware#Section_Updating_from_older_firmware_versions
- ➢ https://duet3d.dozuki.com/Wiki/Setting_up_automatic_probing_of_the_print_bed#Section_Setting_probe_parameters
- ➢ https://duet3d.dozuki.com/Wiki/Installing_and_Updating_Firmware_%28Legacy%29#Section_If_your_Duet_2_WiFi_is_running_main_firmware_1_19_or_later