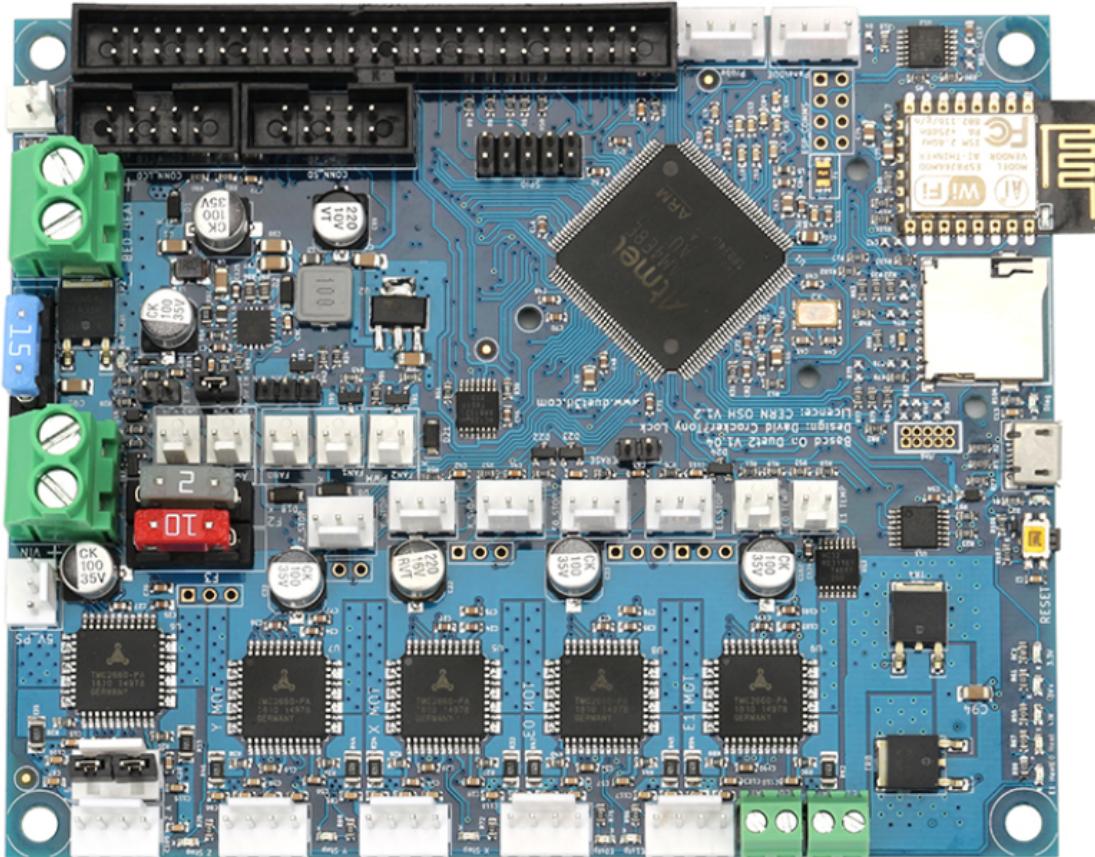


Duet2 Wifi manual



1. Features and advantages.

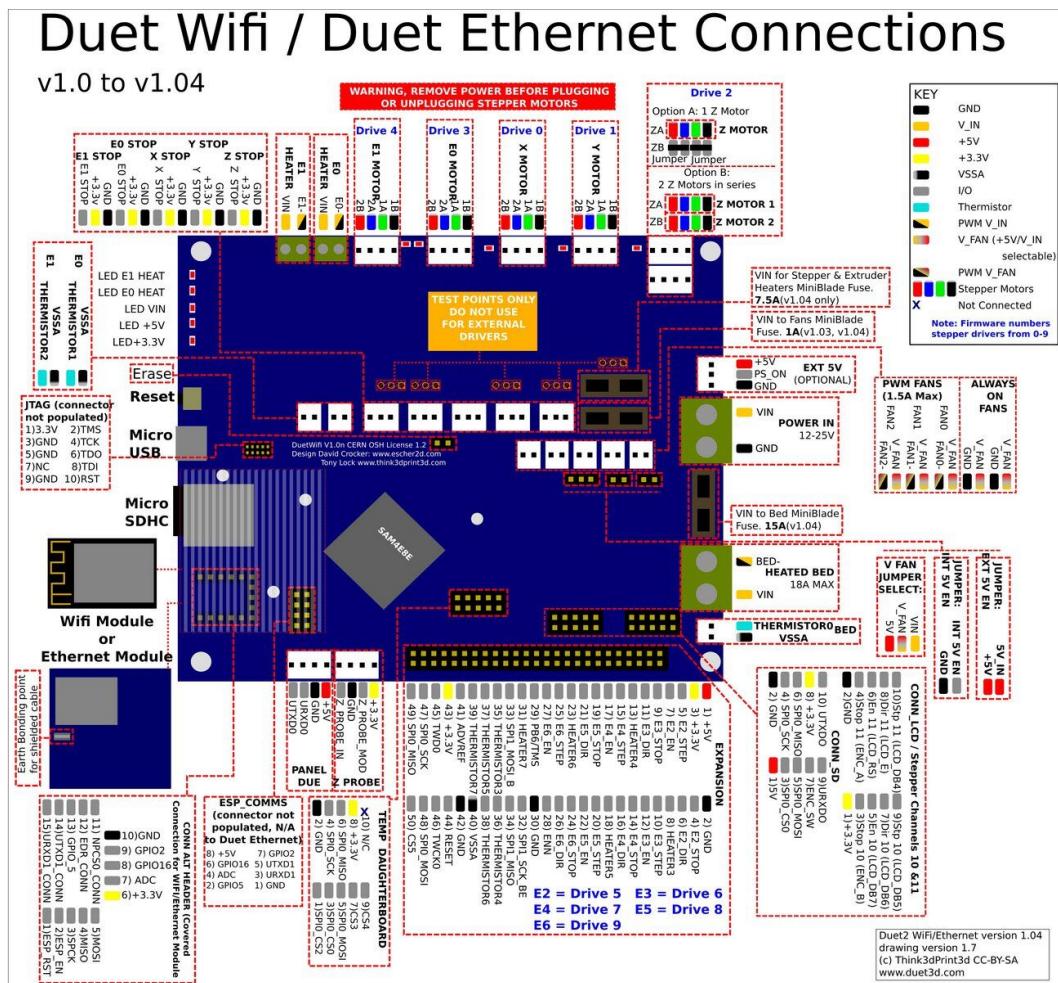
Duet 2 Wifi is an advanced 32 bit electronic controller for 3D printers and other CNC machines.

- Powerful 32 Bit Processor: [Atmel SAM4E8E](#): 120MHz ARM Cortex-M4 microcontroller with floating point unit, 512Mb flash memory, 128Mb RAM and many peripherals.
- Dedicated Wifi module: Low level networking is handled by a separate module, this leaves the main processor free to do precise stepper pulse timing and implement other advanced features.
- Super quiet [TMC2660](#) stepper drivers: SPI controlled and capable of up to 256 microstepping with optional 16x interpolation when using 16x microstepping. Hardware support for variable microstepping and variable stepper current for optimum speed and power efficiency.
- On board High speed SD card and support for a second SD external card if required.
- High Power rating: Each stepper driver is capable of 2.8A motor current, currently limited in software to 2.4A. The bed heater channel is specifically designed for high current (18A) .
- Fuses fitted for bed heater, steppers & other heaters, and fans .
- Connect via PC, tablet or smartphone on the same network to the on board web interface.

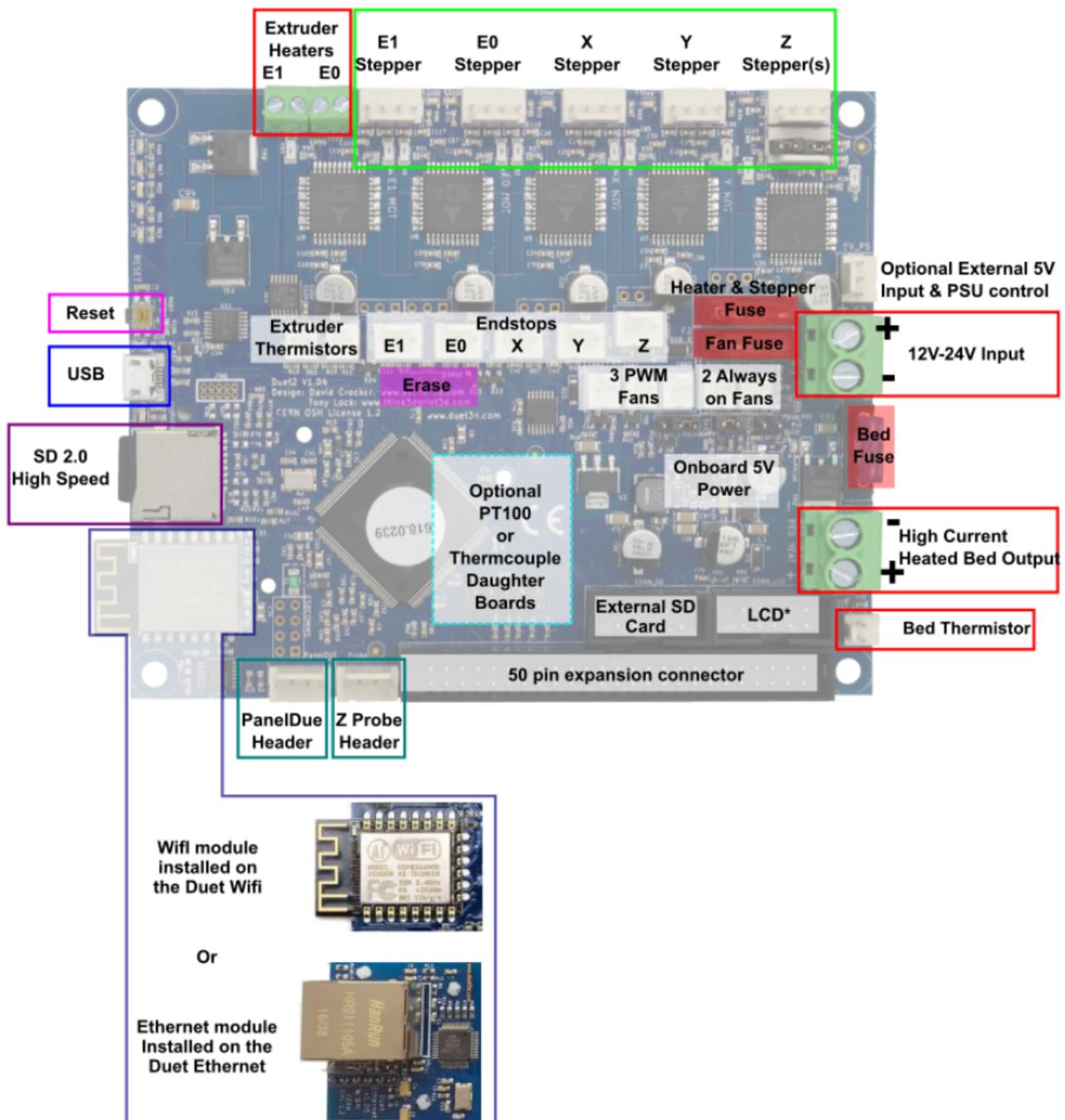
- Setup your printer and update the firmware through the web interface. No need to compile your own firmware.
- Also connect via USB or serial if desired.
- The Duet 2 Wifi uses WPA-2 encryption for network security. The Duet 2 Wifi does not need to be connected to the internet - keep it on a local network for added security.
- Most printers supported: All common 3D printer geometries are supported, with easily modified configuration templates for popular designs. Along with 3D printers a wide variety of CNC machines and lasercutters can be controlled.
- Expandable up to 7 extruders: Support for a further 5 stepper drivers and heaters on the expansion header. The Duex 2 and Duex 5 expansion boards are available.
- Firmware support for mixing nozzles and remapping axes to use high power external drivers.
- Touch Screen support for the PanelDue controller provides a full colour graphic touch screen controller with virtual keyboard. Also talks G-code for maximum flexibility.
- Automatic ADC gain calibration for thermistors allows for accurate and repeatable temperature setting. In addition PT100 and Thermocouples are supported through new SPI daughter boards.
- Power monitoring to allow for state save on power fail.

2.Connection and dimension drawing

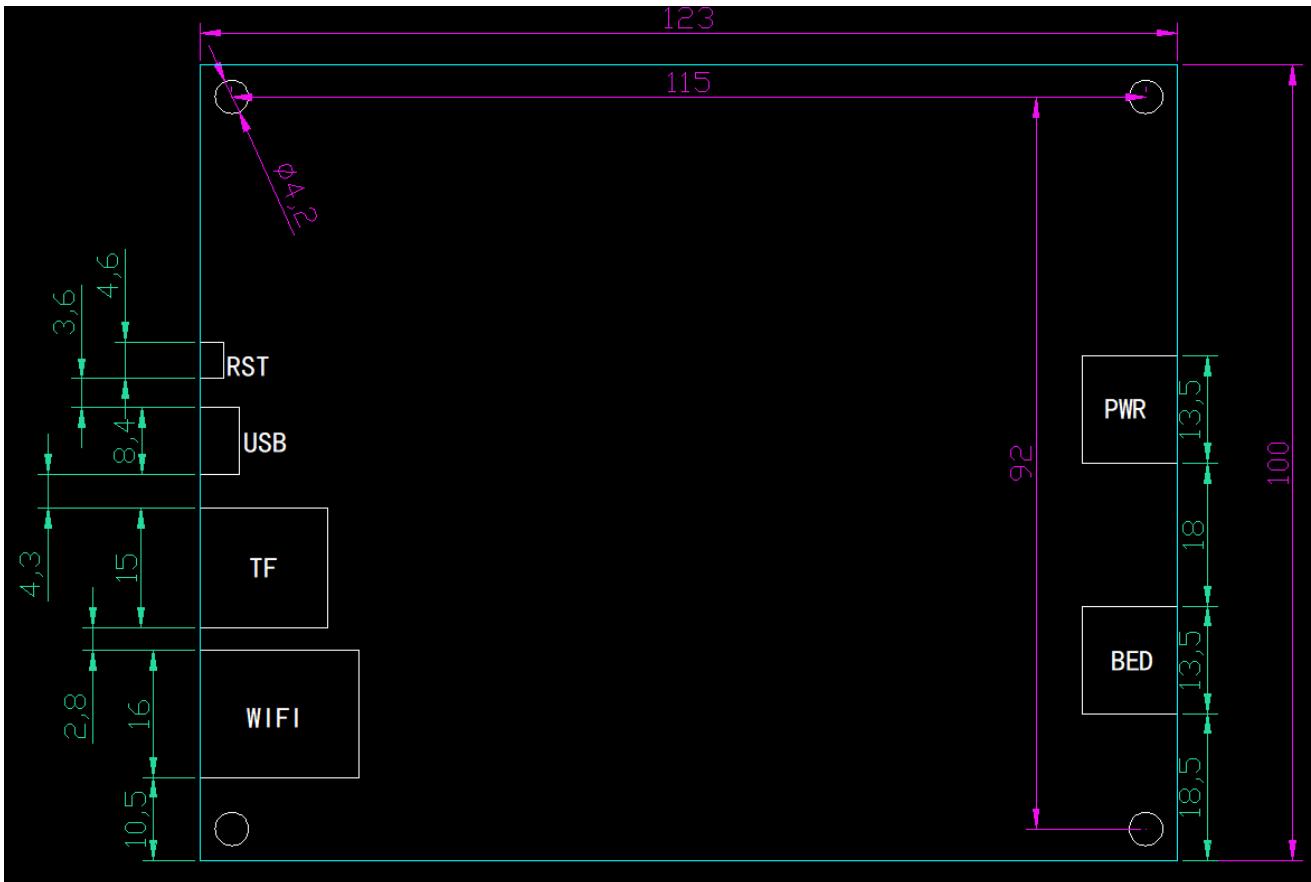
2.1.Pin diagram



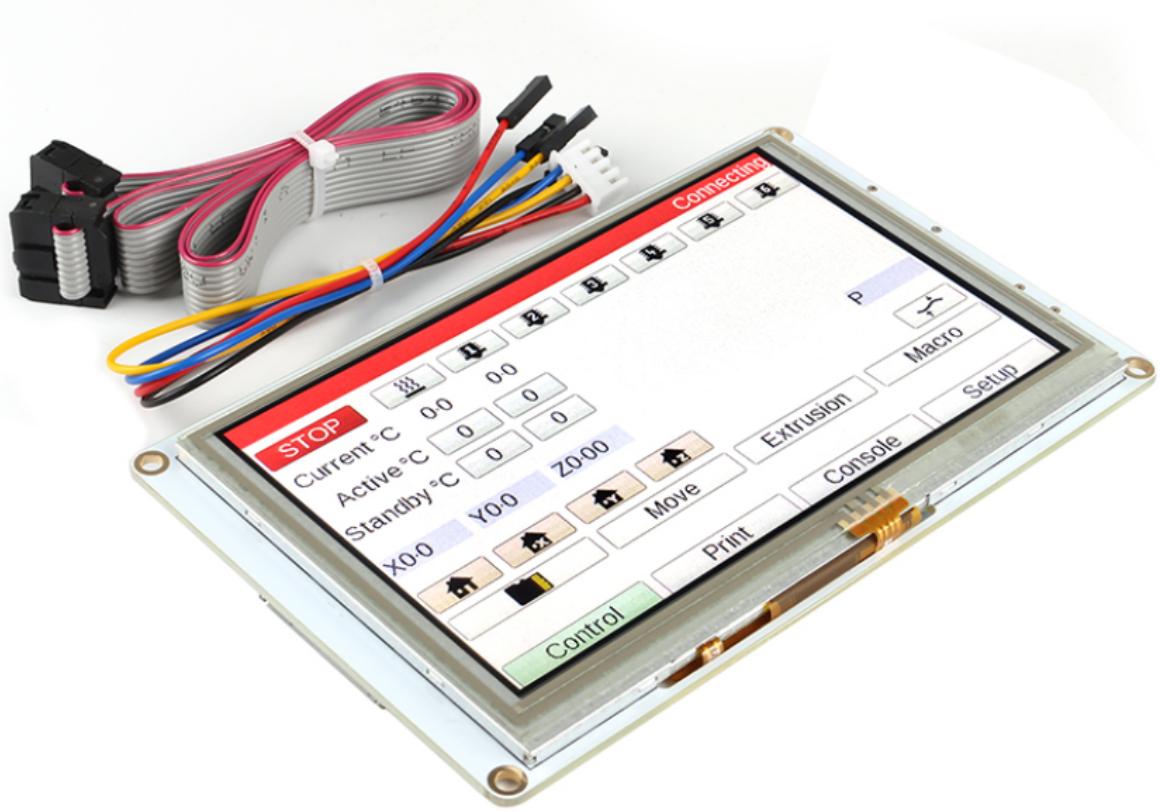
2.2.Connection



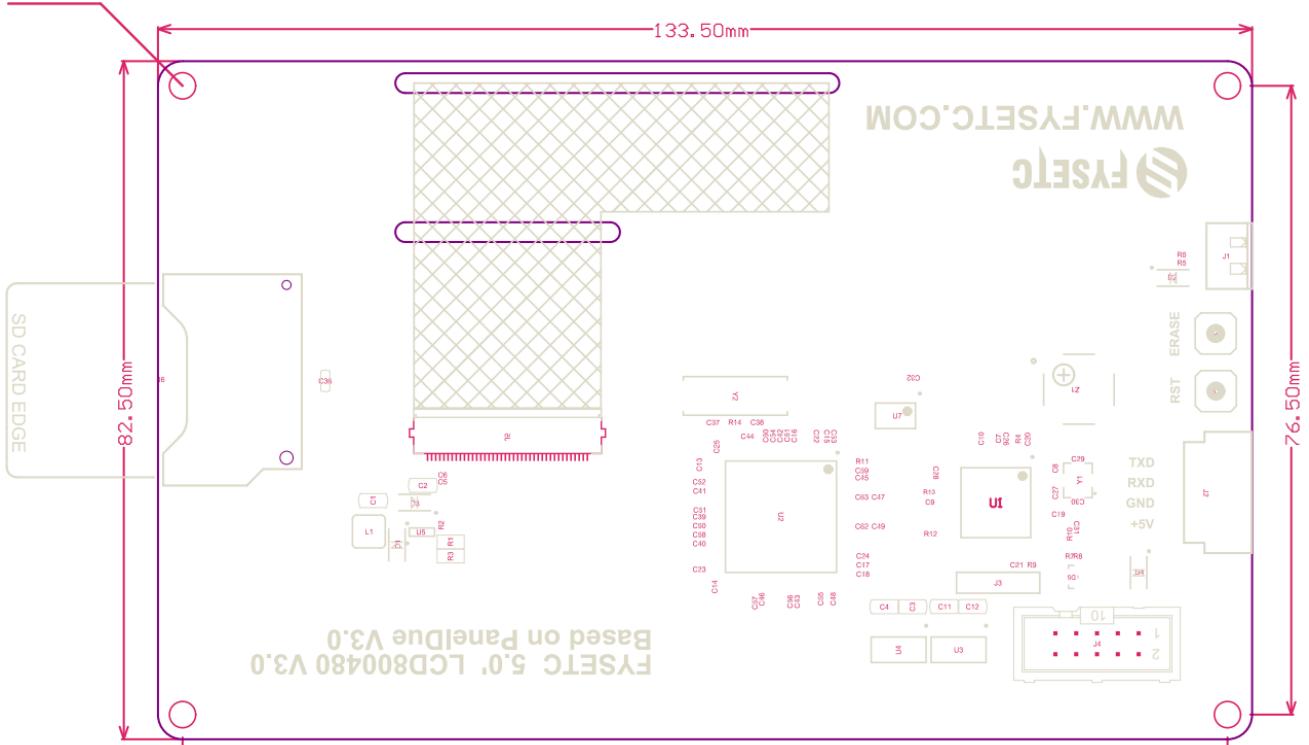
2.3.dimension drawing



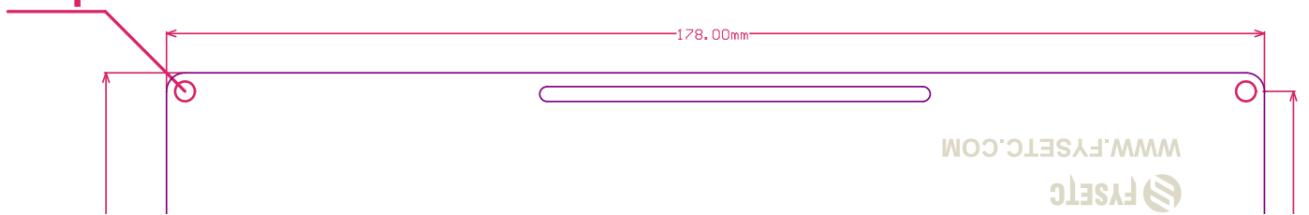
2.4. PanelDue 5i&7i

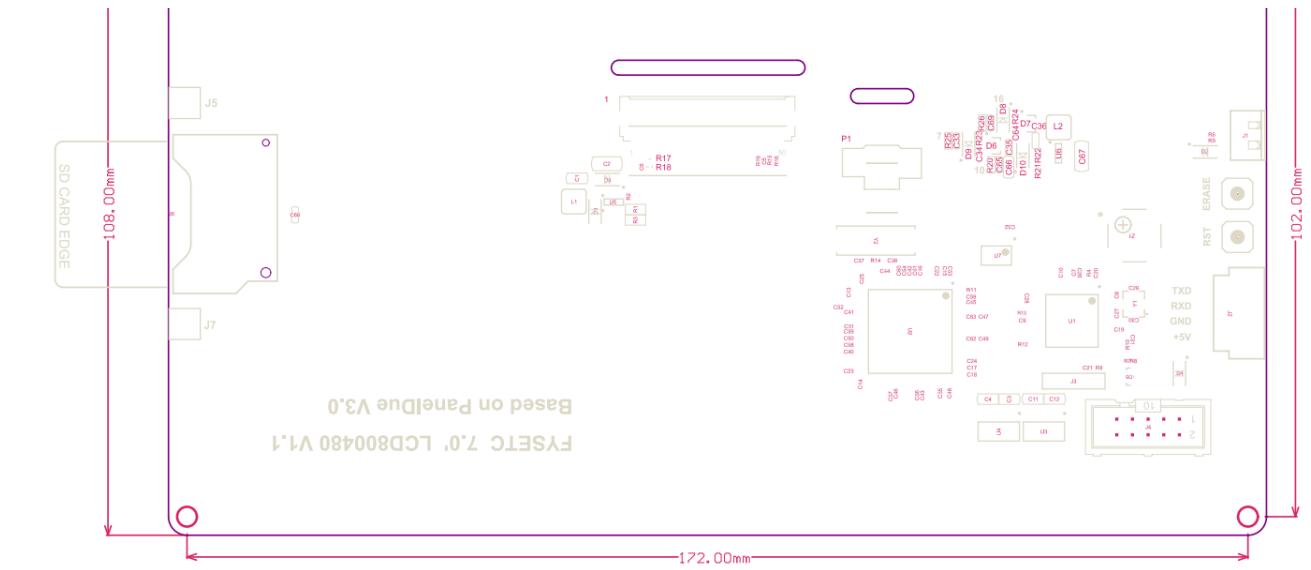


4 x φ 3.2mm



4X φ 3.2mm





2.3.PanelDue V3.0



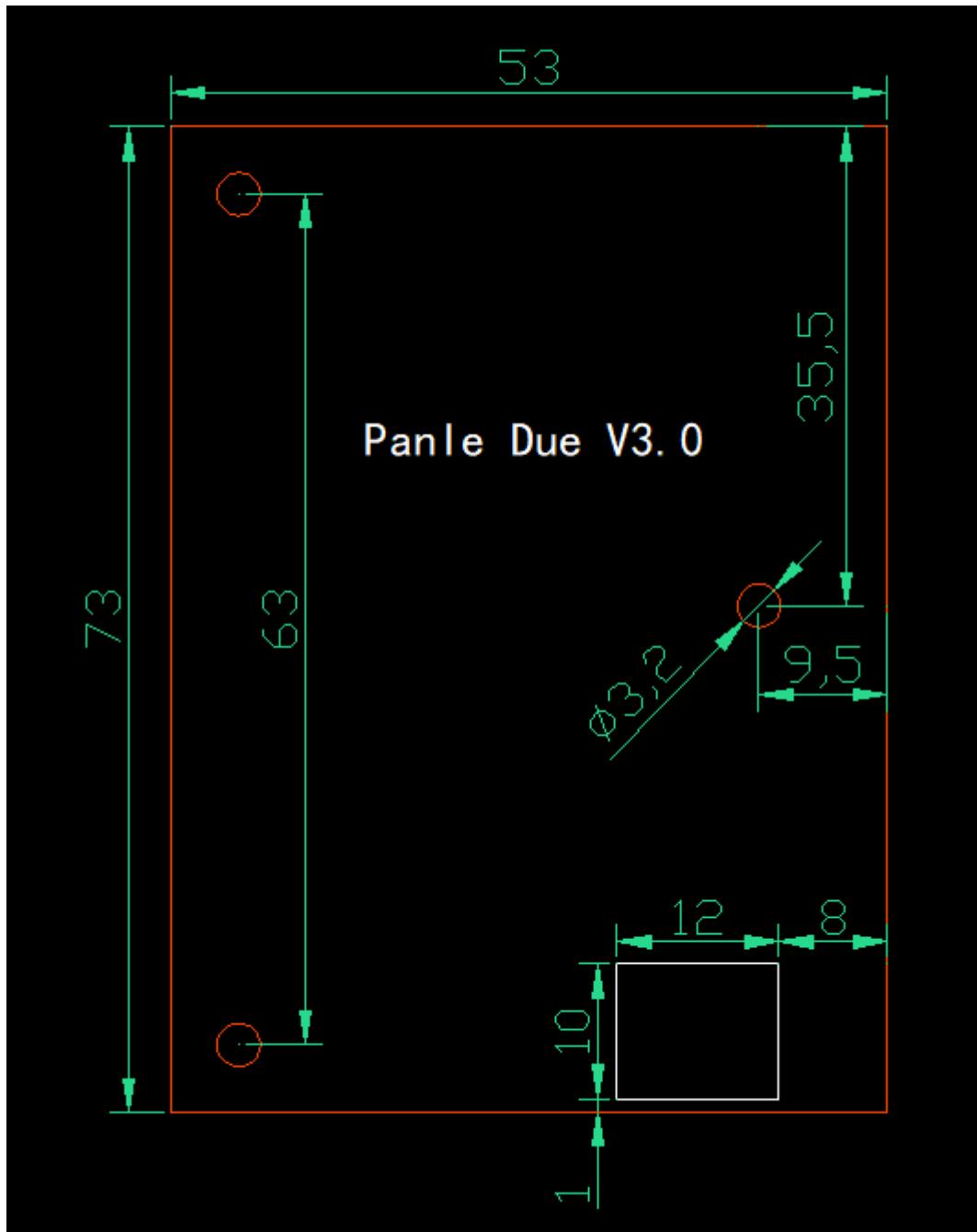
4.3 inch



5.0inch



7.0 inch



3. Instructions for using

3.1 where to get Duet firmware ,software and drivers

- **Firmware:** <https://github.com/dc42/RepRapFirmware/releases>.

Duet2wifi main firmware file is **DuetWiFiFirmware.bin** up to version 1.20 and **Duet2CombinedFirmware** for version 1.21 and later. The WiFi module firmware is **DuetWiFiServer.bin**. The firmware update loader file stored in /sys on the internal SD card is called **iap4e.bin**.

- **paneldue** firmware : <https://github.com/Duet3D/PanelDueFirmware/releases>

PanelDue version	Screen size	Firmware file
PanelDue 5i	5"	PanelDue-5.0i-7.0i.bin
PanelDue 7i	7"	PanelDue-5.0i-7.0i.bin
PanelDue v3.0	4.3"	PanelDue-v3-4.3.bin
PanelDue v3.0	5"	PanelDue-v3-5.0.bin
PanelDue v3.0	7"	PanelDue-v3-7.0.bin

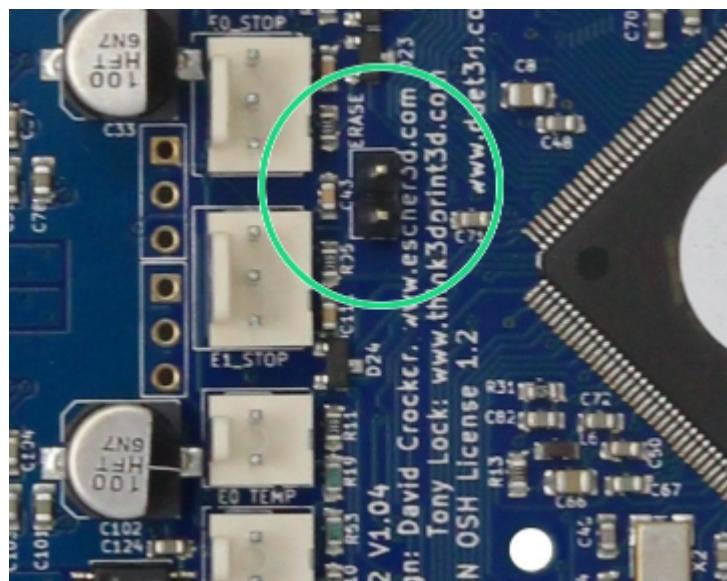
- The two Windows device driver files which may be required if you want to communicate with the Duet over **USB** from your PC are here:
<https://github.com/dc42/RepRapFirmware/tree/dev/Driver>
 - If you need to re-install the main firmware via USB, you will need Atmel's **SAM-BA** version 2.18 from:
<http://www.microchip.com/DevelopmentTool...>
 - Alternatively you can install main firmware via USB using **Bossa** 1.8 from:
<http://www.microchip.com/DevelopmentTool...>

3.2 update firmware

All Duet series boards you get come with firmware. If you want to update the firmware, or when you accidentally erase the firmware, you can upload/update the firmware as follows.

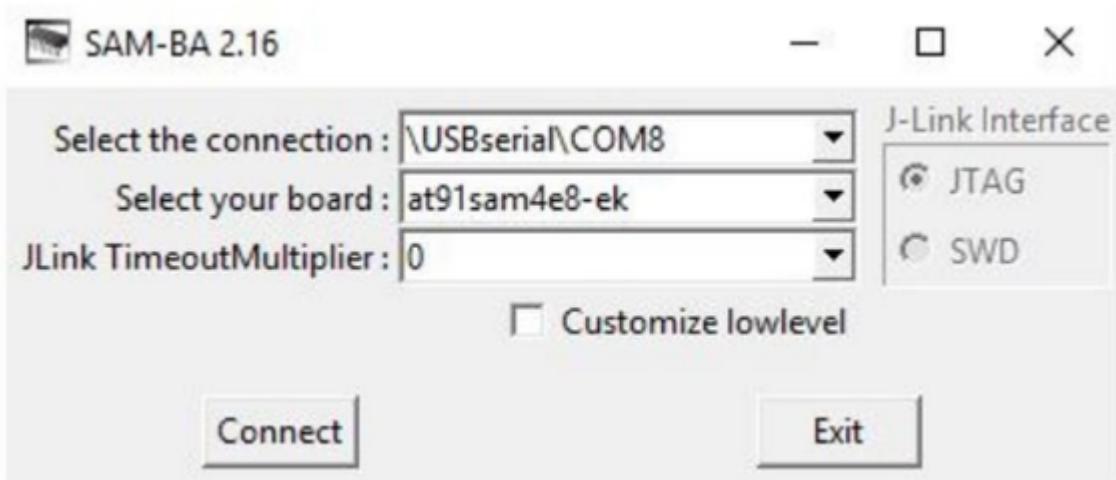
3.2.1 update mainboard firmware

- Install SAM-BA on your PC.
 - Insert a jumper cap on the "Earse" jumper.



- Connect the Duet 2 to your PC via USB.
 - Verify that the 5V and 3.3V LED are on before continuing.

- Remove the erase jumper as soon as the Diag LED lights up. This means you are successfully in programming mode.
- Load SAM-BA. For Duet WiFi/Ethernet, select **at91sam4e8-ek**. For Maestro, select **at91sam4s8-ek**. Press **Connect**. A connection error will be reported if the wrong board is selected.



- In the Send File Name box enter or browse to the **Duet2CombinedFirmware.bin** or **DuetMaestroFirmware.bin** file to be installed, then press **Send File** (leave the **Address** at the default of 0x400000). On completion it will invite you to lock the region; press **Yes**.
 - If desired, press **Compare sent file with memory**.
 - Press the **Execute** button next to the **Boot from Flash** option in the Scripts box. Then exit SAM-BA.



- Restore 5V power and now you should now be able to connect via USB/Pronterface or YAT.

If you are unable to connect to your Duet from a browser, but you can connect to the Duet via USB using Pronterface or YAT etc:

1. Take the on-board SD card out and put it in a computer
2. Delete any existing firmware files in /sys (Duet2CombinedFirmware.bin, DuetMaestroFirmware.bin, DuetWiFiFirmware.bin or DuetEthernetFirmware.bin)
3. Copy the new firmware binary file to the **/sys** folder. For a Duet WiFi or Duet Ethernet, it must be called exactly **Duet2CombinedFirmware.bin** on the SD card. For a Duet Maestro it must be called **DuetMaestroFirmware.bin**.
4. Also copy file **iap4e.bin** (for Duet WiFi/Ethernet) or **iap4s.bin** (for Duet Maestro) into **/sys**
5. If your board is a Duet WiFi, also copy the new DuetWiFiServer.bin file into **/sys**
6. Eject/safely remove the SD card from the PC
7. Replace the on-board SD card in the Duet 2 WiFi
8. Restart the Duet 2 WiFi and connect with Pronterface or YAT
9. Send command **M997 S0** to install the firmware.

10. Press the Disconnect button in Pronterface, then when the USB port disappears and reappears about 20 seconds later, press Connect.
11. Send M115 to confirm the new firmware version
12. If the board is a Duet WiFi, send **M997 S1** to install the WiFi module firmware

Note: when you run M997 S0, if your board is a Duet WiFi or Ethernet running old firmware, you may get an error message telling you that file DuetWiFiFirmware.bin or DuetEthernetFirmware.bin was not found. If that happens, copy or rename the Duet2CombinedFirmware.bin file to that filename and try again.

3.2.2 update WiFi firmware

- Upload the new **DuetWiFiServer.bin** file to the /sys folder on the on-board SD card, either via the Settings page of DuetWebControl (if WiFi is working), or by temporarily moving the on-board SD card to a PC. If you copy it directly to the SD card on a PC, you must remove the version number from the filename so that its name on the SD card is exactly DuetWiFiServer.bin. If you upload it through the Settings page of DuetWebControl, the renaming will be done automatically.
- Send command **M997 S1** to install the new firmware. Preferably, send this command from Pronterface or PanelDue, because then the update status will be reported.
- If you sent the M997 S1 command via the web interface, it will lose the connection and you should allow a minute or so for the firmware installation to complete before you press the Connect button.

3.2.3 update DuetWebControl files

- Upload the new **DuetWebControl.zip** file through the General tab on the Settings page of DuetWebControl.
- If the web interface is not working, then move the SD card to a PC, delete or rename any existing /www folder, create a new one, and extract the contents of DuetWebControl.zip into it. Do not unzip the individual .gz files, leave them as they are on the SD card.

For more detailed instructions, see:

https://duet3d.dozuki.com/Wiki/Installing_and Updating_Firmware

4. Generate configuration file

The configurator can be used to setup these files for your printer type:

<https://configurator.reprapfirmware.org>

- If your machine matches the model it provides, you can enter the preset template for configuration. The following is an example of a custom configuration.

Welcome to the RepRapFirmware Configuration Tool

Please follow this wizard to obtain an individual configuration bundle for your printer

If you are using a printer that was originally shipped with RepRapFirmware, you can select a predefined template here:

- T3P3 Mini Kossel
- RepRapPro Ormerod 1
- RepRapPro Ormerod 2
- RepRapPro Fisher
- Creality Ender 3 Pro

The following machine templates were contributed by users and have not been thoroughly tested:

- Anet A8
- Distech Prometheus System
- Reach3D Printer
- Wanhao Duplicator i3

Alternatively, you can create your own individual configuration by creating a new one from scratch or by loading an existing JSON template:

- Custom configuration
- Use existing configuration

Note: If you encounter problems, please report your problems on [GitHub](#).

Some configuration options may not be available yet. In this case please refer to the [Duet3D wiki](#).

This web app is fully open-source and licensed under the terms of the [GPLv3](#). Version 3.1.4

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- Set the printing range and homing preferences of the machine according to your machine.

General Preferences

Board:

Duet 2 WiFi

Firmware version:

3.0 or later (stable)

Printer Name:

FYSDuet

 Read config-overrides.g file at end of startup process Save print state on power failure

Printer Geometry

Cartesian

CoreXY

CoreXZ

Delta

X minimum:

0



mm

X maximum:

250



mm

Y minimum:

0



mm

Y maximum:

250



mm

Z minimum:

0



mm

Z maximum:

200



mm

This machine uses individual motors to drives each axis

Homing Preferences

Homing Speed (First Pass):

30



mm/s

Homing Speed (Second Pass):

6



mm/s

Travel Speed:

100



mm/s

Z Dive Height:

5



mm

 Set dive height to 30mm for initial calibration[« Back](#)[Next »](#)

- Configure I/O. Here X and Y axis use limit switches, and Z axis uses BLtouch. Duet2wifi supports two extruders. Adding Duex 5 can add 5 extruders.

Expansion Boards

+ Add Duex 2 + Add Duex 5

No Expansion Boards configured

Drives

Drive	Driver	Endstop Pin
X	X	xstop
Y	Y	ystop
Z	Z	zprobe.mod
E0	E0	

Fan Mapping

Fan	Output
Fan 0	fan0
Fan 1	fan1

Heaters

Index	Type	Output	Sensor
0	Bed	bedheat	bedtemp
1	Nozzle	e0heat	e0temp

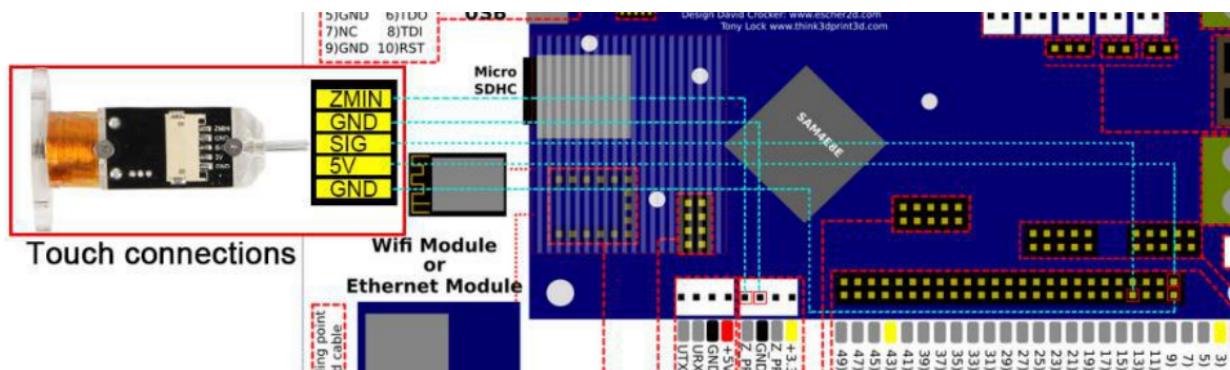
Z-Probe

Pin	Assignment
Input Pin	zprobe.in
Modulation Pin	zstop
PWM Control Channel (BLTouch only)	exp.heater3

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Example configuration BLtouch wiring diagram.



- The direction, current, speed and acceleration of the motor are set according to the actual situation.

steps per mm= $360^\circ \div 1.8^\circ \times \text{Microsteps} \div$ (belt pitch x pulley teeth)

or **steps per mm**= $360^\circ \div 1.8^\circ \times \text{Microsteps} \div$ (Pitch x number of threads)

Axes							
Drive	Direction	Microstepping (Interpolation)	Steps per mm	Max. Speed Change (mm/s)	Max. Speed (mm/s)	Acceleration (mm/s ²)	Motor Current (mA)
X	Forwards	x16 (on)	80 ✓ interpolated to x256	15 ✓	100 ✓	500 ✓	800 ✓
Y	Forwards	x16 (on)	80 ✓ interpolated to x256	15 ✓	100 ✓	500 ✓	800 ✓
Z	Forwards	x16 (on)	400 ✓ interpolated to x256	0.2 ✓	3 ✓	20 ✓	800 ✓

Extruders							
Drive	Direction	Microstepping (Interpolation)	Steps per mm	Max. Speed Change (mm/s)	Max. Speed (mm/s)	Acceleration (mm/s ²)	Motor Current (mA)
E0	Forwards	x16 (on)	436.5 ✓ interpolated to x256	2 ✓	20 ✓	250 ✓	800 ✓

Motor Current Reduction							
<input checked="" type="checkbox"/> Reduce motor currents when idle	Idle Current Percentage:			Idle Timeout:			
	30	✓	%	30	✓	s	

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- **M574 - RepRapFirmware 3**

Parameters

- **Xnnn** Position of X endstop: 0 = none, 1 = low end, 2 = high end.
- **Ynnn** Position of Y endstop: 0 = none, 1 = low end, 2 = high end.
- **Znnn** Position of Z endstop: 0 = none, 1 = low end, 2 = high end.
- **P"pin_name"** Defines the pin name(s) that the endstop(s) for the specified axis are connected to, see [Pin Names](#). Needed when S=1. May need ! before pin name to invert signal, or ^ to enable the pullup resistor, for example on the Duex expansion board.
- **Snnn** 1 = switch-type (eg microswitch) endstop input, 2 = Z probe (when used to home an axis other than Z), 3 = single motor load detection, 4 = multiple motor load detection (see Notes).

Endstop Configuration

Axis	Endstop Type	Endstop Location at				
X	None	Switch	Z-Probe	Sensorless	Low end	High end
Y	None	Switch	Z-Probe	Sensorless	Low end	High end
Z	None	Switch	Z-Probe	Sensorless	Low end	High end

Z-Probe

Probe X Offset: 0 mm Probe Y Offset: 0 mm Probing Speed: 2 mm/s Deploy/Retract Probe

Probe Type: Unmodulated or Smart IR Probe Simple Modulated IR Probe Smart Effector or Piezo BLTouch

Trigger Height: 2.5 mm

Use a BLTouch for Z-probing (also see [Duet3D wiki](#))
Make sure you change it to use +3.3V instead of +5V before you connect it or you risk damaging your board!

- Select the control method. Set the thermistor parameters.

General Heater Settings

Heated Bed Heated Chamber

Control Method: PID Bang-Bang

Heater Configuration

Heater	Type	Temp. Limit	PWM Limit	R25	β	C
0	Heated Bed	120 C	100 %	100000 Ω	4138 K	0
1	Nozzle	280 C	100 %	100000 Ω	4138 K	0

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- You can choose whether the fan is temperature controlled.

Cooling Fans						
Name	Speed (%)	Frequency (Hz)	Thermostatic Control	Monitored Heaters	Thermostatic Mode Trigger Temperature	
FAN0	✓	0	✓	500	✓	Yes No Bed E0 45 C
FAN1	✓	100	✓	500	✓	Yes No Bed E0 45 ✓ C

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- If you use dual extruders, you can increase the number of tools to control them.

Tool Preferences

- Wait for Temperatures to be Reached on Tool Change
 Select the First Tool on Start-Up

Tools

[+ Add Tool](#) [- Remove Tool](#)

Number	Name	Extruders	Heaters	Fans	XYZ Offsets
0	✓ optional	✓ E0	✓ E0	✓ FAN0	<input checked="" type="checkbox"/> Edit

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- Bed Probing for Mesh Bed Compensation

Note: 3/4/5 Point Bed Compensation is deprecated. It has been replaced with the new Mesh Bed Compensation.

Bed Probing for Mesh Bed Compensation

X Minimum:	X Maximum:	Y Minimum:	Y Maximum:	Grid Spacing:
15 ✓ mm	215 ✓ mm	15 ✓ mm	195 ✓ mm	20 ✓ mm

Orthogonal Axis Compensation

Enable Orthogonal Axis Compensation

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- Network Settings

Network Settings

Enable Network

Password for the web interface (HTTP), FTP, and Telnet:

reprap

WiFi Access Point Name:

configure manually

WiFi Password:

none

Acquire Dynamic IP Address via DHCP

Enable HTTP (required for the web interface)

Enable FTP

Enable Telnet

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- Download the configuration file and copy the sys folder to the TF card. If you use Duet web control, unzip Duet web control to the /www folder.

/O Mapping Motors Endstops Heaters Fans Tools Compensation Network Finish

Configuration Ready

Put the RepRapFirmware files in the /sys directory and extract Duet Web Control bundle to the /www directory of your SD card. If you are using Duet Web Control, upload those files on the Settings page.

- RepRapFirmware 2.05.1
- Duet Web Control 3.1.1

The following system files will be generated:

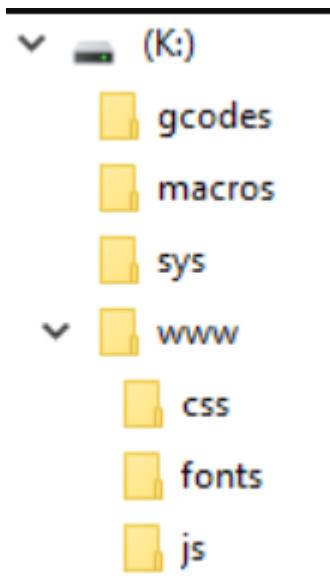
- bed.g
- config.g
- deployprobe.g
- retractprobe.g
- homeall.g
- homex.g
- homey.g
- homez.g
- pause.g
- resume.g
- sleep.g
- stop.g
- tfree0.g
- tpre0.g
- tpost0.g

If you are using Duet Web Control, you can upload the ZIP file(s) without extracting on the Settings page. Otherwise you can extract the contents of this configuration bundle directly to the root of your SD card.

See [this page](#) for further information about the purpose of these files.

 [Download JSON template](#) [Download configuration bundle as ZIP file](#)

5.SD card structure



Folder **/gcodes** is used to hold g-code files for printing. You can use subfolders of /gcodes to organize these files. G-code files can also be located on an external SD card if one is connected.

Folder **/macros** is used to hold user-defined macro files. The names of these files appear as menu entries in DuetWebControl and on PanelDue. You can use subfolders of /macros to organize these files.

The **/www** folder and its subfolders hold the files served by the web server. If you are setting up a new SD card, populate the **/www** folder by extracting the contents of the DuetWebControl.zip file to it.

Folder **/sys** is used to hold system files and to hold firmware update files ready for installation. It should contain at least the following files:

- **config.g** holds the firmware configuration script, which is executed at startup.
- **config-override.g** holds the configuration parameters that were saved when you last ran M500. Your config.g file should normally include command M501 near the end, to load these saved values at startup and override any similar commands earlier in config.g.
- **homex.g**, **homey.g**, **homez.g** and **homeall.g** are the homing scripts for a Cartesian or CoreXY printer. For a delta printer there is **homedelta.g** instead.
- **bed.g** holds the script for probing the bed and calculating bed compensation on a Cartesian or CoreXY printer, or doing delta calibration on a delta printer.
- **pause.g** is run when you pause a print.
- **resume.g** is run when you resume a print.
- **cancel.g** is optional, but if present is run when you cancel a paused print.
- **start.g** is optional, but if present is run whenever you start a job from the SD card
- **stop.g** is optional, but if present is run when a SD card print finishes normally with a M0 command at the end of the print job.
- **iap4e.bin** (Duet WiFi/Ethernet) or **iap4s.bin** (Duet Maestro) is a helper file used to install new main firmware. In RepRapFirmware 3.x, file **Duet2CombinedIAP.bin** or **DuetMaestrolIAP.bin** is used instead.
- **trigger2.g**, **trigger3.g**, ... are optional files that can be configured to run when particular endstop pins are triggered, for example by an emergency-stop button.
- If your Z probe needs to be deployed and retracted, the script files **deployprobe.g** and **retractprobe.g** are used. They are invoked automatically and by the [M401](#) and [M402](#) commands.

A copy of the SD card folders, as shipped with the latest Duets is available here:

<https://github.com/T3P3/Duet/tree/master...>

6.Wifi setting

6.1 update Wifi firmware

The WiFi module firmware is **DuetWiFiServer.bin**. When updating the wifi module firmware, put the new firmware into the /sys file, and then send M997 S1.

> Duet > TFcard > sys

名称	修改日期	类型	大小
config.g	2018/6/12 17:22	Repetier-Host	4 KB
DuetWiFiServer.bin	2018/6/12 9:22	BIN 文件	290 KB
homeall.g	2017/9/1 6:52	Repetier-Host	1 KB
homex.g	2017/9/1 6:52	Repetier-Host	1 KB
homey.g	2017/9/1 6:52	Repetier-Host	1 KB
homez.g	2017/9/1 6:52	Repetier-Host	1 KB
iap.bin	2018/6/12 9:22	BIN 文件	58 KB
iap4e.bin	2018/6/12 9:22	BIN 文件	58 KB

6.2 Connect Wifi

M552 S0 ;Disable networking.

M588 S*" ;Forget all remembered networks.

M587 S"WIFI-NAME" P"PASSWORD" ;Add WiFi host network to remembered list.

M552 S1 ;enable networking.

Tips:Do not use M587 and M588 within config.g ! Before sending M587 or M588 commands, you need to send M552 S0 to put it in idle mode first.

7.Bltouch usage example

7.1 Configure your config.g:

M574 Z1 S2 M307 H3 A-1 C-1 D-1 ;disable heater on PWM channel for BLTouch M558 P9 H5 F120 T6000 ;set Z probe type to bltouch and the dive height + speeds G31 P500 X0 Y0 Z2.5 ;set Z probe trigger value, offset and trigger height M557 X15:215 Y15:195 S20 ; define mesh grid

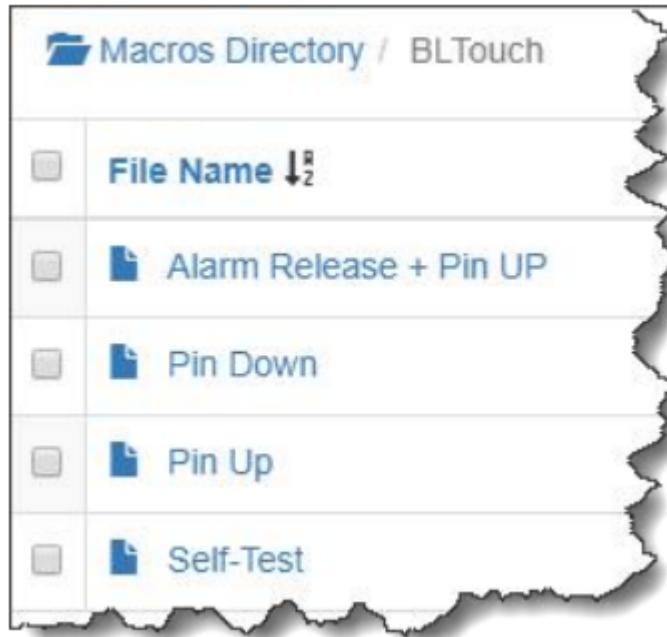
7.2 New Configuration Files

Regardless of how your setup looks we also created a **deployprobe.g** and a **retractprobe.g** file.

- Deployprobe.g : M280 P3 S10 I1
- Retractprobe.g : M280 P3 S90 I1

These files are used to execute our probe as needed.

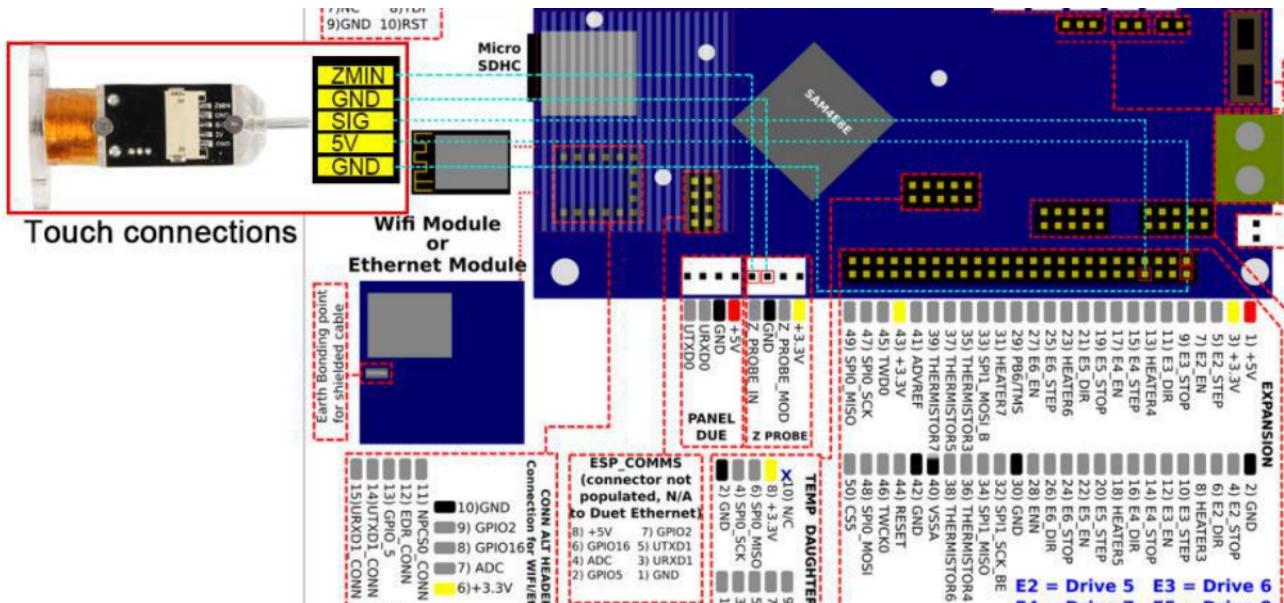
7.3 Create a Levelplate Macro Group in “macros”:



While not strictly necessary it comes in very handy to have created these:

- Alarm Release + Pin UP: M280 P3 S160 I1 ; Alarm Release and Push-Pin UP
- Pin Down: M280 P3 S10 I1 ; Send PWM channel 3 the s10 (angle) command
- Pin Up: M280 P3 S90 I1 ; Send PWM channel 3 the S90 (angle) command
- Self-Test: M280 P3 S120 I1; Send PWM channel 3 the S10 (angle) command

7.4 Wiring of Duet 2 Wifi V1.04 and BL-Touch



8. Support

For more detailed information about Duet2wifi, please refer to:

https://duet3d.dozuki.com/Wiki/Step_by_step_guide

Gcode instructions in detail: <https://duet3d.dozuki.com/Wiki/Gcode>

FYSETC wiki: <https://wiki.fysetc.com/> FYSETC Forum: <https://forum.fysetc.com/> FYSETC

Facebook: <https://www.facebook.com/groups/197476557529090/>