Makerbase

广州谦辉信息科技有限公司

Guangzhou Qianhui Information Technology Co.,Ltd.

MKS Sbase Motherboard Manual

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Directory

Firmware version update

Firmware version	Modified Time	Modify Content	Note
V1.3	2016.10.11	initial version	

Ⅰ　Overview

MKS-SBase is a very powerful 3D printer ARM motherboard launched by Maker Base. It adopts 32-bit 100M Cortex-M3 LPC 1768. The computing processing capability is very stable. It adopts Smoothieware firmware and is suitable for manufacturers with large machine functions and DIY. use.
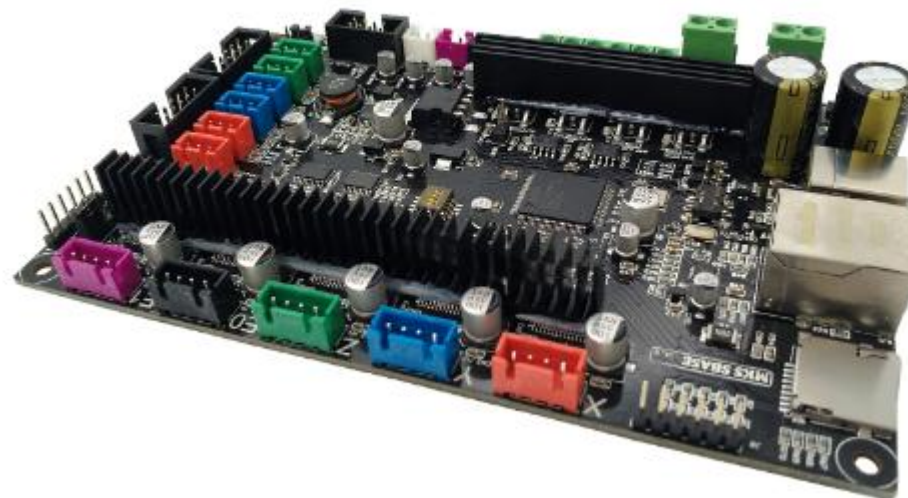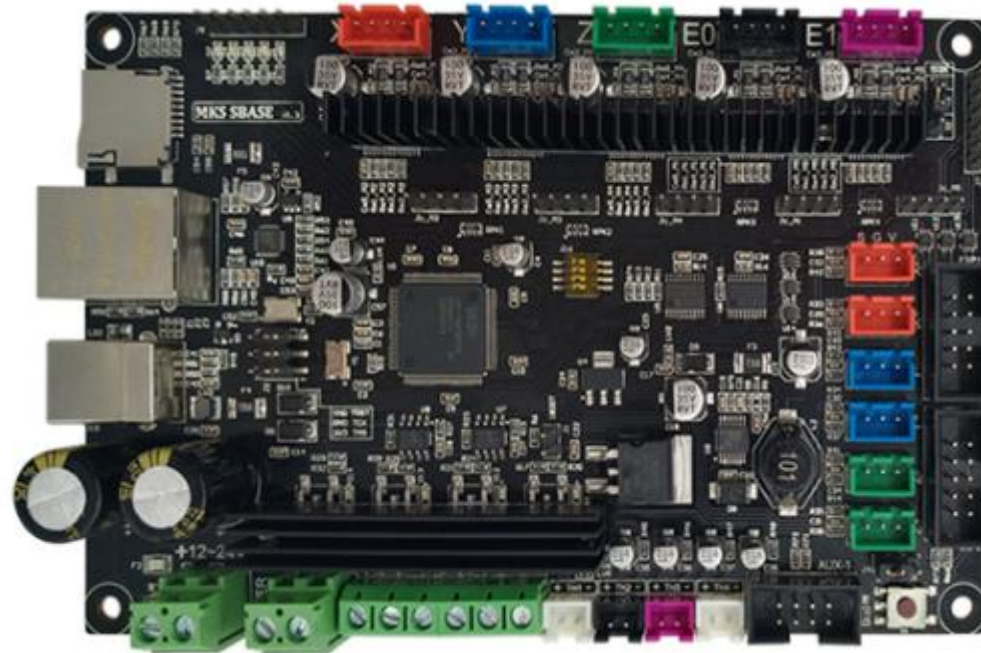
Ⅱ   Features

1   The 32-bit 100M Cortex-M3 LPC 1768 master chip has greatly improved performance.

2   Support for highly modular open source firmware Smoothieware.

3   Support network function, you can directly access the network through the network cable, and remote control can be realized by using IE browser.

4   Using 8825 as the motor drive, supporting 32 subdivisions, the performance is far more than 4988, using SOP package, the heat dissipation effect is better.

5   The stepper motor current is set directly, so there is no need to worry about damaging the drive or potentiometer when adjusting the current.

6   The circuit board uses a high-quality 4-layer board and is specially designed for heat dissipation.

7   Support for external large drive modules to use large motors.

8   The special power chip is used to support 12V-24V power input.

9   It can connect MKS 12864LCD control board developed by customer base.

10   It can connect the MKS TFT24, 28, 32, 35 and 70 touchscreens developed by the customer base.

Ⅲ The connection description and size chart

1 MKS Sbase motherboard front
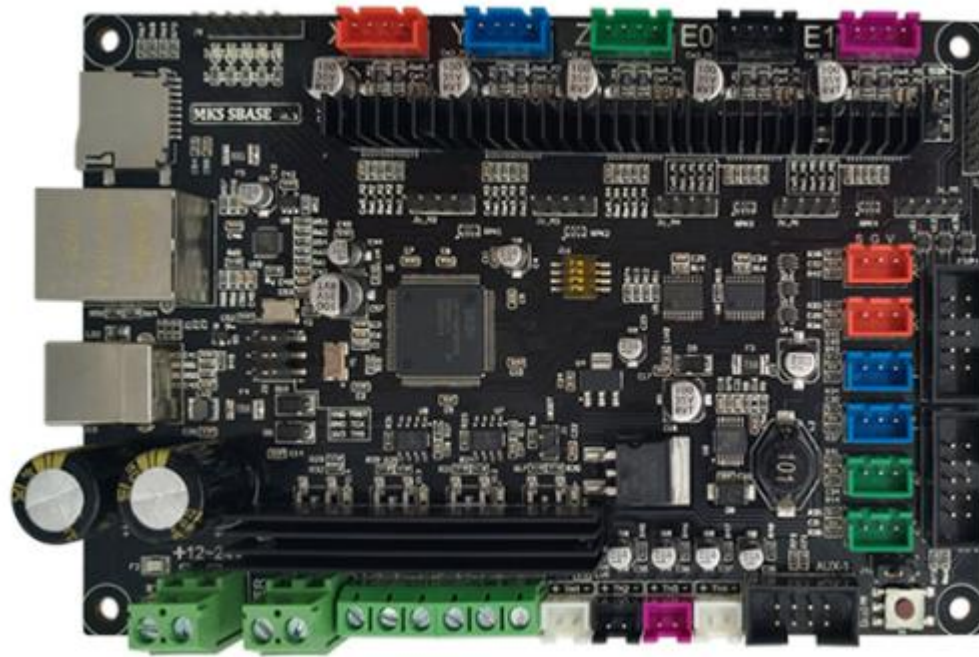
2 System connection diagram
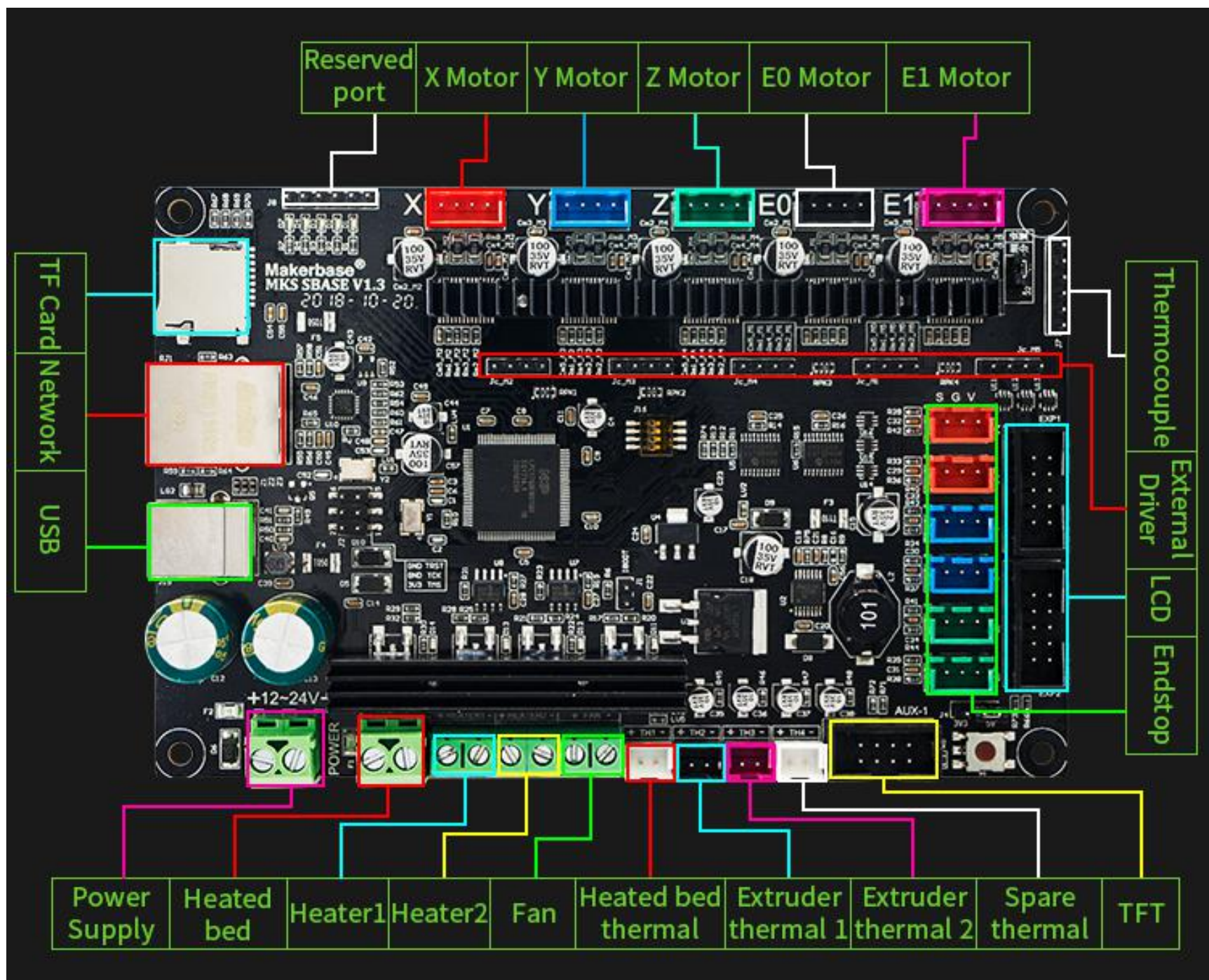
3　MKS Sbase　Installation Dimensional Drawing
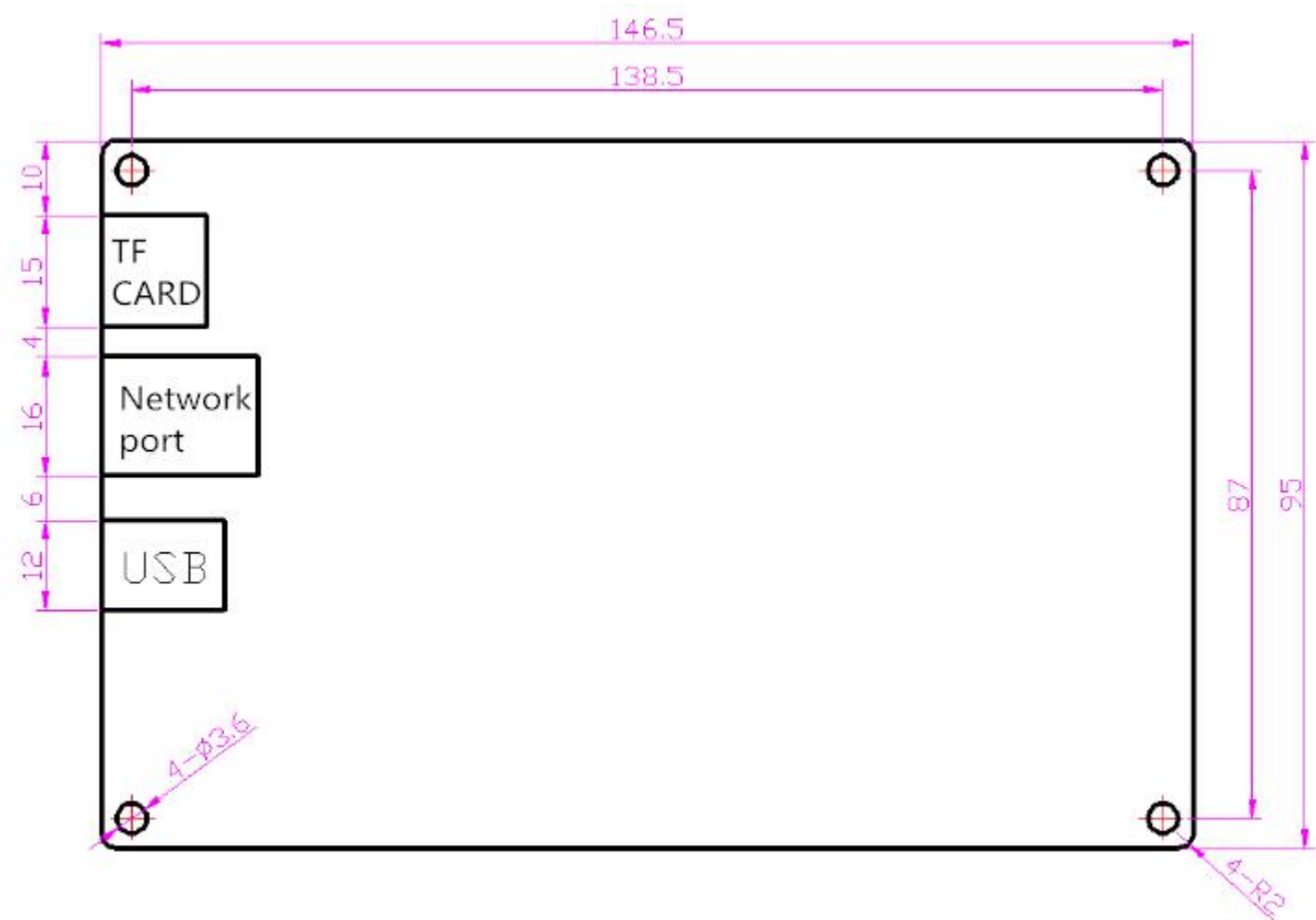
4　MKS Sbase　PIN Port
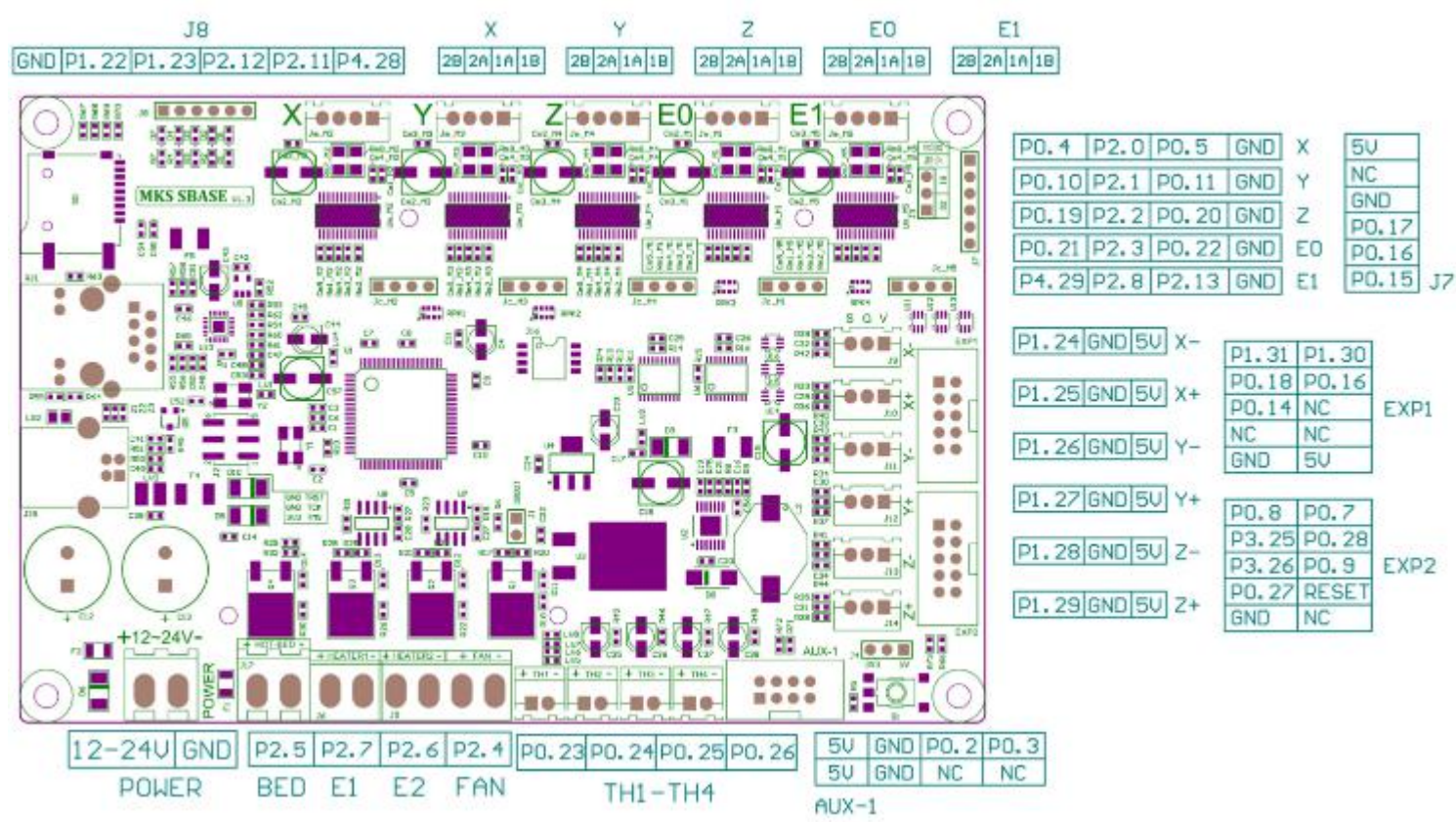
Ⅳ   Instructions

1   The ways to get the MKS Sbase i Latest Firmware.

● Get firmware from customer service or technician

● Download the firmware from the makerbase discussion group.

● Download on Web:
  https://github.com/makerbase-mks?tab=repositories

2, the method of updating the firmware

2.1 Copy the update program to the TF card root directory, including:

  1, firmware firmware.bin

2, configuration file config.txt   (Do not modify the file name)

 2.2 Insert the TF card into the card slot and power it on again. The system will automatically upgrade the

new firmware. After the upgrade is successful, the file in the SD card is renamed to firmware.cur.

 2.3 After the motherboard is updated with firmware, the indicator in the upper left corner of the

motherboard is normally D1 D4 D7 is always on and D2 D3 is blinking;

3   Driver Installation

3.1 Drive the file in the folder: smoothieware-windows-signeddriver-v1.0 and extract it. Plug the USB into

the USB port and enter the device manager
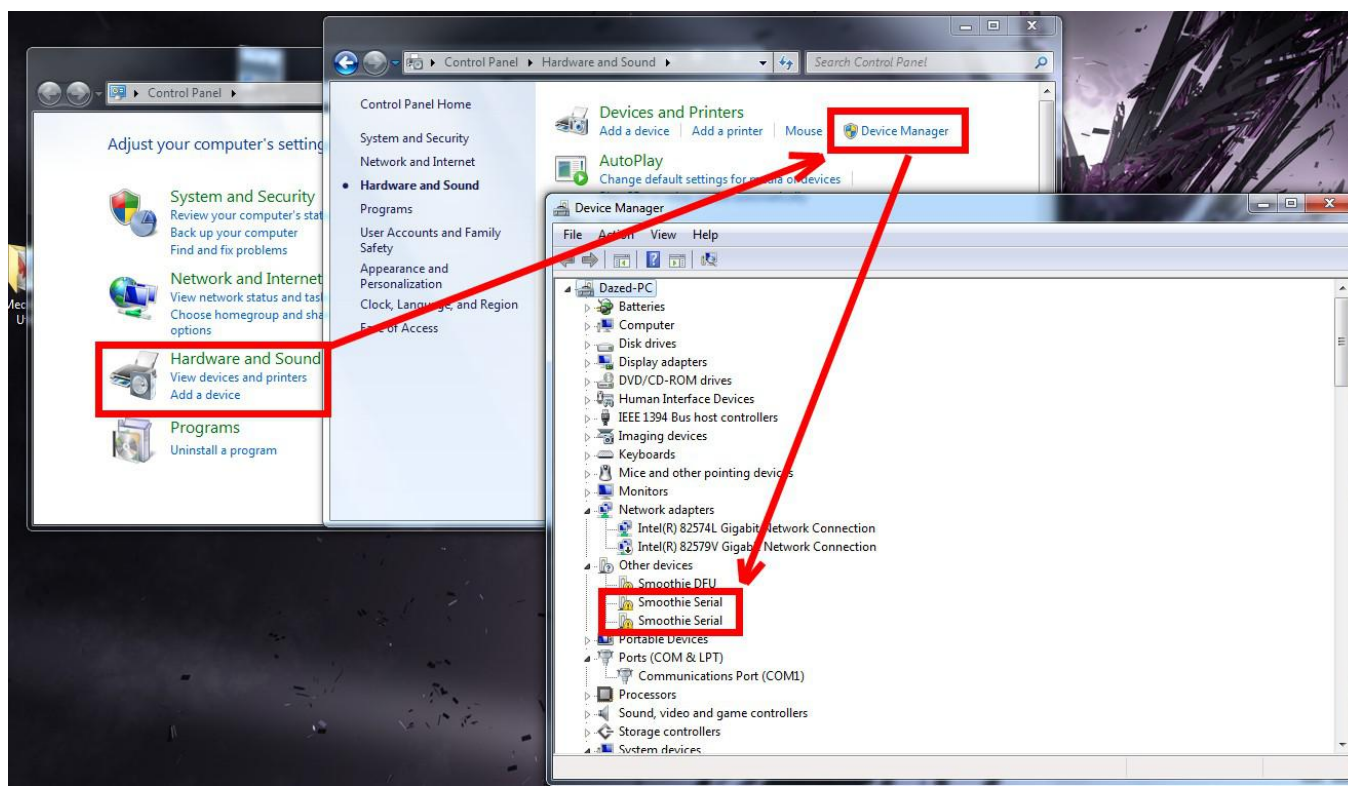
3.2 update the installation driver

3.3 Information after successful installation

Ⅴ parameter configuration instructions

1. Basic parameter configuration

(1) The following are parameters that need to be modified according to the machine.

To modify the parameters is very simple, directly modify the config.txt file on the SD card, save and then power on again, the parameter configuration will take effect.

```
# Arm solution configuration : Cartesian robot. Translates mm positions into stepper positions
alpha_steps_per_mm              78.7402          # Steps per mm for alpha stepper
beta_steps_per_mm               78.7402          # Steps per mm for beta stepper
gamma_steps_per_mm              400              # Steps per mm for gamma stepper

# Cartesian axis speed limits
x_axis_max_speed                10000        # mm/min
y_axis_max_speed                10000        # mm/min
z_axis_max_speed                200          # mm/min

# Stepper module pins ( ports, and pin numbers, appending "!" to the number will invert a pin )
alpha_step_pin                  2.0          # Pin for alpha stepper step signal
alpha_dir_pin                   0.5!         # Pin for alpha stepper direction
alpha_en_pin                    0.4          # Pin for alpha enable pin
alpha_current                   0.8          # X stepper motor current
alpha_max_rate                  10000.0      # mm/min

beta_step_pin                   2.1          # Pin for beta stepper step signal
beta_dir_pin                    0.11         # Pin for beta stepper direction
beta_en_pin                     0.10         # Pin for beta enable
beta_current                    1.2          # Y stepper motor current
beta_max_rate                   10000.0      # mm/min

gamma_step_pin                  2.2          # Pin for gamma stepper step signal
gamma_dir_pin                   0.20!        # Pin for gamma stepper direction
gamma_en_pin                    0.19         # Pin for gamma enable
gamma_current                   1.5          # Z stepper motor current
gamma_max_rate                  100.0        # mm/min

# Serial communications configuration ( baud rate default to 9600 if undefined )
uart0.baud_rate                 115200       # Baud rate for the default hardware serial port
```
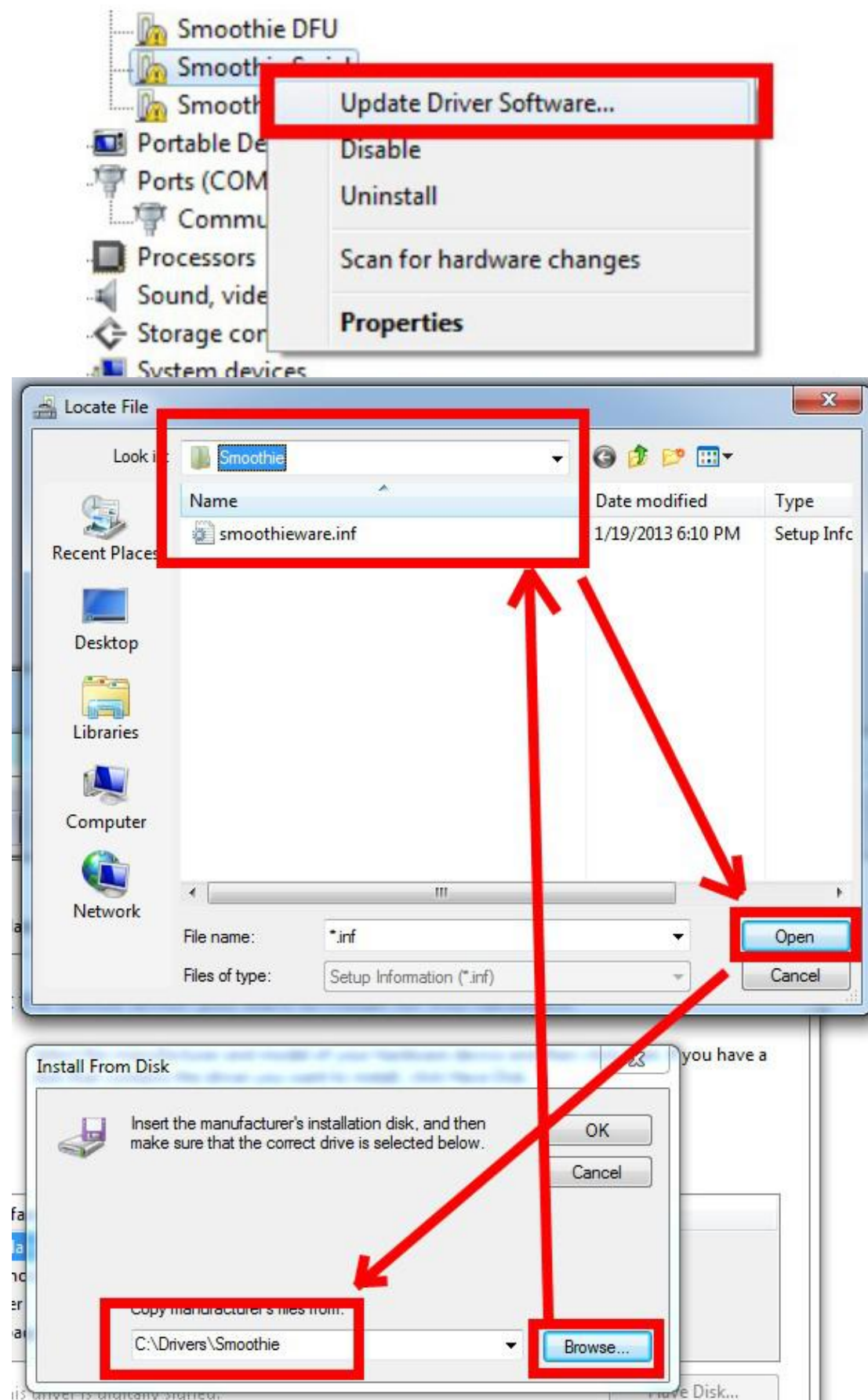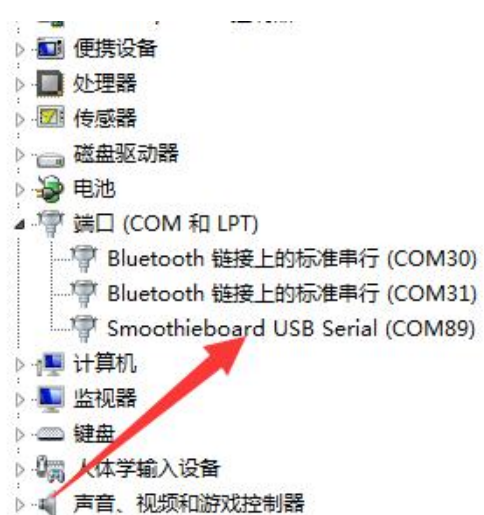
(2) The following are the parameters that are selected according to the needs.

```
default_feed_rate              4000        # Default rate ( mm/minute ) for G1/G2/G3 moves
default_seek_rate              4000        # Default rate ( mm/minute ) for G0 moves
acceleration                   600         # Acceleration in mm/second/second.
z_acceleration                 60          # Acceleration for Z only moves in mm/s^2, 0 uses acceleration which is the default. DO NOT SET ON A DELTA
acceleration_ticks_per_second        1000         # Number of times per second the speed is updated
junction_deviation             0.02        # Similar to the old "max_jerk", in millimeters,
                                           # see https://github.com/grbl/grbl/blob/master/planner.c
                                           # and https://github.com/grbl/grbl/wiki/Configuring-Grbl-v0.8
                                           # Lower values mean being more careful, higher values means being
                                           # faster and have more jerk
#z_junction_deviation          0.0         # for Z only moves, -1 uses junction_deviation, zero disables junction_deviation on z moves DO NOT SET ON A DELTA
#minimum_planner_speed         0.0         # sets the minimum planner speed in mm/sec
# Cartesian axis speed limits
x_axis_max_speed               10000       # mm/min
y_axis_max_speed               10000       # mm/min
z_axis_max_speed               200         # mm/min
```

```
# Endstops
endstops_enable                true        # the endstop module is enabled by default and can be disabled here
#corexy_homing                 false       # set to true if homing on a hbit or corexy
alpha_min_endstop              1.24^!      # add a ! to invert if endstop is NO connected to ground
alpha_max_endstop              1.25^       # NOTE set to nc if this is not installed
alpha_homing_direction         home_to_min    # or set to home_to_max and set alpha_max
alpha_min              0             # this gets loaded after homing when home_to_min is set
alpha_max              250           # this gets loaded after homing when home_to_max is set
beta_min_endstop               1.26^!      #
beta_max_endstop               1.27^       #
beta_homing_direction          home_to_min    #
beta_min               0             #
beta_max               250           #
gamma_min_endstop              1.28^!      #
gamma_max_endstop              1.29^       #
gamma_homing_direction         home_to_min    #
gamma_min              0             #
gamma_max              120           #
```

(3) Extruder E0 parameter setting

```
# Extruder module configuration
extruder.hotend.enable             true        # Whether to activate the extruder module at all. All configuration is ignored if false
extruder.hotend.steps_per_mm       90          # Steps per mm for extruder stepper
extruder.hotend.default_feed_rate  600         # Default rate ( mm/minute ) for moves where only the extruder moves
extruder.hotend.acceleration       500         # Acceleration for the stepper motor, as of 0.6, arbitrary ratio
extruder.hotend.max_speed          50          # mm/s

extruder.hotend.step_pin           2.3         # Pin for extruder step signal
extruder.hotend.dir_pin            0.22!       # Pin for extruder dir signal
extruder.hotend.en_pin             0.21        # Pin for extruder enable signal

# extruder offset
#extruder.hotend.x_offset          0           # x offset from origin in mm
#extruder.hotend.y_offset          0           # y offset from origin in mm
#extruder.hotend.z_offset          0           # z offset from origin in mm

# firmware retract settings when using G10/G11, these are the defaults if not defined, must be defined for each extruder if not using the defaults
#extruder.hotend.retract_length            3          # retract length in mm
#extruder.hotend.retract_feedrate          45         # retract feedrate in mm/sec
#extruder.hotend.retract_recover_length       0           # additional length for recover
#extruder.hotend.retract_recover_feedrate     8           # recover feedrate in mm/sec (should be less than retract feedrate)
#extruder.hotend.retract_zlift_length         0          # zlift on retract in mm, 0 disables
#extruder.hotend.retract_zlift_feedrate       6000        # zlift feedrate in mm/min (Note mm/min NOT mm/sec)
```

```
# Hotend temperature control configuration
temperature_control.hotend.enable          true         # Whether to activate this ( "hotend" ) module at all.
                                           # All configuration is ignored if false.
temperature_control.hotend.thermistor_pin   0.24        # Pin for the thermistor to read
temperature_control.hotend.heater_pin       2.7         # Pin that controls the heater, set to nc if a readonly thermistor is being defined   2.7
temperature_control.hotend.thermistor       RRRF100K    # see http://smoothieware.org/temperaturecontrol#toc5
#temperature_control.hotend.beta            3960        # or set the beta value
temperature_control.hotend.set_m_code       104         #
temperature_control.hotend.set_and_wait_m_code 109      #
temperature_control.hotend.designator       T           #
```

（4） Double extrusion head parameter setting

```
# Second extruder module configuration
#extruder.hotend2.enable                 true        # Whether to activate the extruder module at all. All configuration is ignored if false
#extruder.hotend2.steps_per_mm             140        # Steps per mm for extruder stepper
#extruder.hotend2.default_feed_rate        600        # Default rate ( mm/minute ) for moves where only the extruder moves
#extruder.hotend2.acceleration            500        # Acceleration for the stepper motor, as of 0.6, arbitrary ratio
#extruder.hotend2.max_speed                50         # mm/s

#extruder.hotend2.step_pin                 2.8        # Pin for extruder step signal
#extruder.hotend2.dir_pin                  2.13       # Pin for extruder dir signal
#extruder.hotend2.en_pin                   4.29       # Pin for extruder enable signal

#extruder.hotend2.x_offset                 0          # x offset from origin in mm
#extruder.hotend2.y_offset                 25.0       # y offset from origin in mm
#extruder.hotend2.z_offset                 0          # z offset from origin in mm
#epsilon_current            1.5            # Second extruder stepper motor current
```

```
# Hotend2 temperature control configuration
#temperature_control.hotend2.enable          true        # Whether to activate this ( "hotend" ) module at all.
                                             # All configuration is ignored if false.

#temperature_control.hotend2.thermistor_pin   0.25        # Pin for the thermistor to read
#temperature_control.hotend2.heater_pin       1.23        # Pin that controls the heater
#temperature_control.hotend2.thermistor       RRRF100K    # see http://smoothieware.org/temperaturecontrol#toc5
##temperature_control.hotend2.beta            4066        # or set the beta value
#temperature_control.hotend2.set_m_code       884         #
#temperature_control.hotend2.set_and_wait_m_code 889      #
#temperature_control.hotend2.designator       T1          #
```

（5） Hot bed setting

```
temperature_control.bed.enable          true        #
temperature_control.bed.thermistor_pin    0.23        #
temperature_control.bed.heater_pin        2.5       # 2.5
temperature_control.bed.thermistor       RRRF100K   # see http://smoothieware.org/temperaturecontrol#toc5
#temperature_control.bed.beta           3960        # or set the beta value

temperature_control.bed.set_m_code        140        #
temperature_control.bed.set_and_wait_m_code 190        #
temperature_control.bed.designator        B         #

#temperature_control.bed.bang_bang        false      # set to true to use bang bang control rather than PID
#temperature_control.bed.hysteresis       2.0        # set to the temperature in degrees C to use as hysteresis
                                          # when using bang bang
```

A. Thermistor

Ordinary 100K NTC thermistor temperature_control.module_name.thermistor RRRF100K

Refer to the list below for reference to the list below

Smoothie does not know the name of all the thermistors in existence. At the mo

Name	Beta for 0-80°C	Beta for 185-230°C	
EPCOS100K	4066	4193	
Honeywell100K	3974	4385	
Semitec	4267	4375	
Honeywell-QAD			
RRRF100K	3960		
RRRF10K	3964		
HT100K	3990		

In case you have a thermistor that is not known to Smoothie you can sin
algorythm (perfect).

B. Thermocouple

Only the MAX31855 interface board is supported.

C.PID settings

First run the M303 command, for example:

M303 E0 S190

For the case where the print head E0 is often heated to 190 degrees, the PID operation is automatically run.

#System Run for about 8 cycles, showing the following information

```
T: 190.4/190.0 @0 0 7/8
T: 190.2/190.0 @0 0 7/8
Cycle 7:
Max: 190.8  Min: 184.3  high time: 48.2s  low time: 7.5s
Averages over last 3 cycles: Max:  81.8c  Min:  79.0c  high :
  ku: 17.7607
  tu: 23.7929
Trying:
  Kp:  10.7
  Ki: 0.045
  Kd:   32
PID Autotune Complete! The settings above have been loaded ir
```

You can write the obtained PID value directly to config.txt, or run M500 directly to save the value.

(6) Fan settings

```
# Switch module for fan control
switch.fan.enable                true        #
switch.fan.input_on_command           M106      #
switch.fan.input_off_command          M107      #
switch.fan.output_pin            2.4       #
switch.fan.output_type          pwm          # pwm output settable with S parameter in the input_on_comand
#switch.fan.max_pwm                255        # set max pwm for the pin default is 255
```

(7) Endstop switch setting

```
# Endstops
endstops_enable                true         # the endstop module is enabled by default and can be disabled here
#corexy_homing                 false        # set to true if homing on a hbit or corexy
alpha_min_endstop              1.24^!       # add a ! to invert if endstop is NO connected to ground
alpha_max_endstop              1.25^        # NOTE set to nc if this is not installed
alpha_homing_direction         home_to_min  # or set to home_to_max and set alpha_max
alpha_min            0                       # this gets loaded after homing when home_to_min is set
alpha_max            250                     # this gets loaded after homing when home_to_max is set
beta_min_endstop               1.26^!       #
beta_max_endstop               1.27^        #
beta_homing_direction          home_to_min  #
beta_min             0               #
beta_max             250             #
gamma_min_endstop              1.28^!       #
gamma_max_endstop              1.29^        #
gamma_homing_direction         home_to_min  #
gamma_min            0               #
gamma_max            120             #

# optional order in which axis will home, default is they all home at the same time,
# if this is set it will force each axis to home one at a time in the specified order
#homing_order                   XYZ          # x axis followed by y then z last
```

(8) Automatic leveling setting

```
# optional Z probe
zprobe.enable                  false        # set to true to enable a zprobe
zprobe.probe_pin               1.28!^       # pin probe is attached to if NC remove the !
zprobe.slow_feedrate           5            # mm/sec probe feed rate
#zprobe.debounce_count              100          # set if noisy
zprobe.fast_feedrate           100          # move feedrate mm/sec
zprobe.probe_height            5            # how much above bed to start probe
#gamma_min_endstop                  nc           # normally 1.28. Change to nc to prevent conflict,
```

To level the process, use the PC software to perform the following process:

1) G32

#Executing the leveling process

2) G28

#Homing

3) G0 Z5

#Z axis moves up 5mm

4) Manually adjust the Z-axis height until there is only one sheet of paper between the print head and the

hot bed.

5) M306 Z0

#Set the current height to 0

6) G28

#Homing

7) G0 Z1

#Set the current height to 1mm, and measure whether the print head is 1mm away from the hot bed.

8) M500

#Save the current data to the EEPROM;

#Note After executing M500, the system will not read the parameters from config.txt. After running M502 to clear the parameters, the parameters will be read from config.txt at the next startup.

2. Network configuration

Detailed network configuration can refer to: Network.htm

(1) DHCP network configuration (example)

Network.enable   true

Open network function

Network.webserver.enable   true

 # enable webserver

Network.telnet.enable   true

Enable telnet server

Network.ip_address   auto

 # Use dhcp to get the ip address

Network.hostname smoothie1

Set the host name for dhcp, optional parameters

(2) Static IP setting (example)

Network.enable   true

Open network function

Network.webserver.enable   true

 # enable webserver

Network.telnet.enable   true

Enable telnet server

Network.plan9.enable   true

#Enable plan9 network filesystem used on Linux, please study by yourself

Network.ip_address   192.168.3.221

IP address

Network.ip_mask   255.255.255.0

#Subnet mask

Network.ip_gateway   192.168.3.1
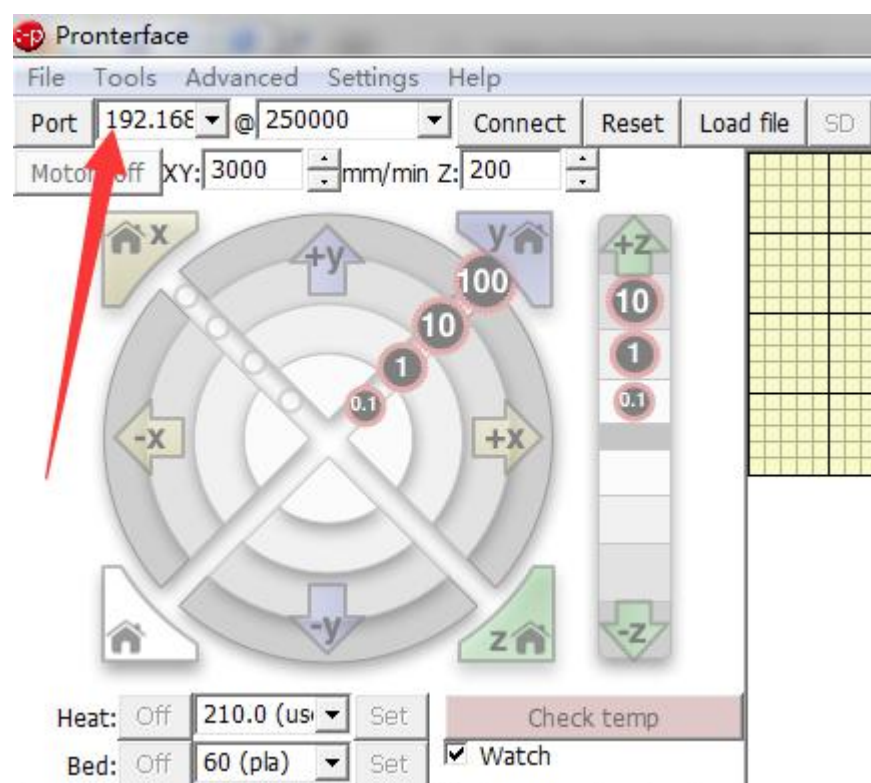
gateway

(3) Mobile or computer browser access

The printer can be controlled by directly entering the configured IP address or host name in the browser.

Note that some browsers may not support it. It is recommended to use Google Chrome.



(4) Printrun remote control access

3. The main parameter configuration of the Cartesian (XYZ) machine

You can directly download config-mks-xyz.txt and modify it on the basis of it. Generally, you can use the main parameter configuration. Note that you need to change the file name to config.txt. If you encounter problems, you can refer to: Configuration_Options.

4. The main parameter configuration of the delta machine

Delta machine parameter configuration details can refer to: Delta.htm, you can directly download config-mks-delta.txt, and modify it on the basis, pay attention to the need to change the file name to config.txt. Automatic leveling configuration and use please refer to: Zprobe.htm

```
arm_length          250.0        # this is the length of an arm from hinge to hinge
arm_radius          124.0        # this is the horizontal distance from hinge to hinge
gamma_max           300          #this is  the  Printed maximum height
```
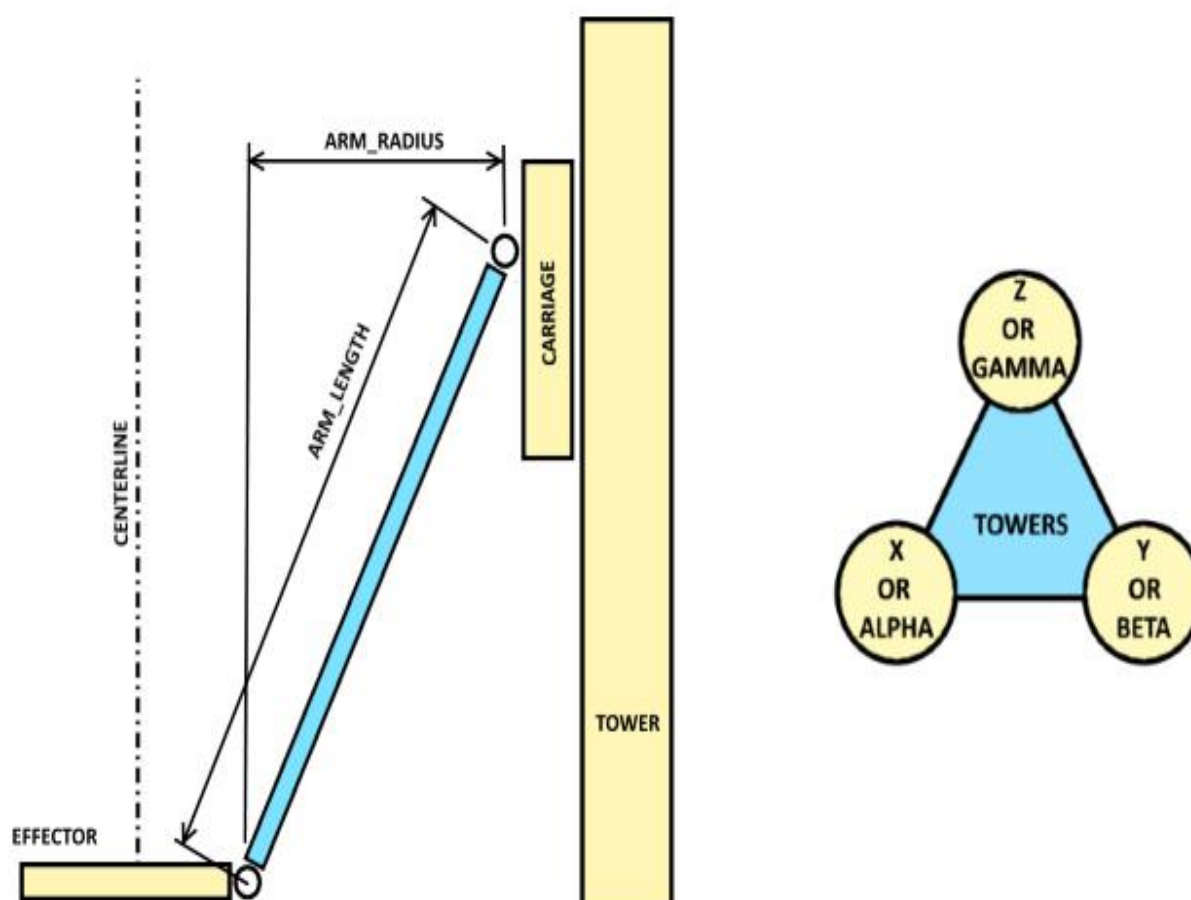
Ⅵ　Supported Gcode type

Please refer to <help>G-Codes.htm for supported G Codes.

Ⅶ　Supported host computer

Supported PCs include Printrun, Cura, Repetier-Host, etc.

Ⅷ　Drilling cycles module

Some CAM software often generates shorter G codes, reducing the number of instructions transmitted by the serial port. It can be implemented by the Drilling cycles module. For details, please refer to: Drillingcycles.htm.

Ⅸ　Does it support laser engraving machine

Laser engraving machine can be supported. For details, please refer to: Laser.htm. We have no relevant experience, please study on your own, thank you!

Ⅹ　Technical support and protection

1. Power test will be done prior to shipment to ensure normal use of the product

2. Welcome friends to join the discussion group:　232237692.

3. Welcome to Blog Exchange　：http://flyway97.blog.163.com.

4. 3D printer motherboard contact

Miss Zhong：15521638375　Mr. Huang：　13148932315　　Mr. Tan：13640262556.

Mr.Peng：13427595835

5. If you have any questions you can contact our customer service or find technical support staff in the group, we will be happy to serve you.

MKS official website

MKS Taobao website