

DOBOT Dobot Magician User Manual

Dobot Magician User Manual

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Revised History

Version	Date	Reason	
V1.0.0	2016/09/27	Create a document	
V1.0.1	2016/11/10	Add iOS APP and Bluetooth module tutorial	
V1.1.0	2016/12/12	Add system adaptation description in the home page	
V1.1.0	2016/12/12	Add shade laser engraving tutorial	
V1.2.0	2017/2/28	Revised several function instructions	
V1.2.4	2017/7/12	Add function and operation description of Linear Rail, Add angle calibration instruction, Add Beitong joystick instruction	



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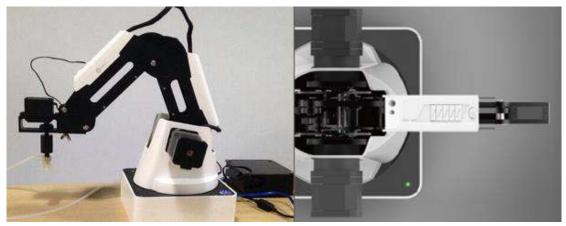


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Dobot Magician User Manual Instruction and Precautions

- 1. Please refer to the Dobot Magician User Manual along with the box before using.
- 2. Precautions:
- Power On: Please align the Dobot into the "neutral position" by making a 45° angle between the forearm and rear arm (shown below), press the power button, and the stepper motors will lock. After about 5 seconds, there will be a short sound. If the status light switches from orgnge to green, the Dobot is ready to use. Note that if the light turns red, it indicates that the Dobot is at a limited position, so please make sure the forearm and rear arm are kept in the normal range of motion.



- 2) Power Off: If the status light at the bottom right of the Dobot is green, press on the power button to turn off Dobot. In this process, Dobot will move slowly to the "resting" position. Be safe and watch your hands!
- If the Dobot becomes unaligned with the computer, press the **Reset** button behind the controller to recalibrate. The Dobot will automatically disconnect with the computer and reset. Then you can reconnect it.
- 4) Please turn off the Dobot completely first before plugging or unplugging external modules, such as Bluetooth, WIFI, Stick controller, Infrared sensor, Color sensor etc...Not powering down the Dobot before doing so may damage or break your Dobot! Note that only once the status light completely turns off, the Dobot has powered down.
- 5) When packing and transporting the Dobot, please unplug the left and right motors wires located near the sides to avoid damage to your Dobot.
- 3. Important Safety Notice:
 - Small spare parts are included, so please keep them away from children, as they are a choking hazard.
 - DO NOT let children play with the Dobot alone. All processes need to be monitored while running. After processes have finished, please turn off the equipment promptly.
 - While using the laser module, please wear protective glasses. Avoid eye or skin exposure to direct radiation. Keep a safe distance from the laser to avoid accidental injury.
 - ➤ When using the 3D printing module, the heating rod will produce temperatures up to 250°C, please be careful!
 - DO NOT put hands into the operating zone while the Dobot is running. Not doing so runs the risk of bruising and/or pinching.



4. More Materials

Follow us to get first-hand material about Dobot Magician: Tutorial: <u>http://dobot.cc/tutorial/</u> Download Center: <u>http://dobot.cc/download-center/</u>

- 5. DobotStudio platforms: Windows XP (DobotStudio does not support using Blockly function and Leapmotion function in Windows XP), win7 SP1 x32/x64, win8/win10, mac osx10.10 and mac osx10.11, mac osx10.12.
- 6. Should you have any further questions, feel free to email us at support@dobot.cc



1. Dobot Magician Driver Installation Instruction

When first connecting the Dobot, connect the Dobot to PC through the USB port. Then, power on the Dobot, then the system will recognize the corresponding hardware automatically and will search for the correct driver and install it. However, if it fails to install, you can install it again manually. The installation flow chart as follows:



1.1 Download CH340 driver package and install it

There are two versions of the driver based on Windows/Linux, so please choose the corressponding version to your OS to download. The driver can be located at the download address:

http://www.dobot.cc/downloadcenter.html?sub_cat=70#sub-download

After downloading, unzip and install the driver. The driver file is in the file **attachment** of root directory:

Dobolstu	dioV1.2.5 🕨 attachment 🕨		- 49 St	earch atta
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🔆 Favorites	Name	Date modified	Туре	Size
📃 Desktop	📕 CH341SER_LINUX	2016/10/9 16:58	File folder	
📕 Downloads	📕 CH341SER_WIN	2016/10/9 16:58	File folder	
Recent Places	Dobot 2.0 Vase	2016/8/24 14:45	Configuration sett	4 k
	Dobot 2.0	2016/8/24 14:36	Configuration sett	4 1
🗃 Libraries 🛛 🗏	Repetier1.0.6	2016/10/9 14:56	Registration Entries	13
Documents	🚰 vc2010_x64	Type: Registration Entries Size: 12.0 KB	Application	5,585 k
J Music	₩vc2010_x86	Date modified: 2016/10/9 14:56	Application	4,955 k
Pictures	j∰ vc2013_x64	2016/9/9 12:45	Application	7,027
Subversion	j₩ vc2013_x86	2016/7/28 11:55	Application	6,353 k
Videos	j₩ vc2015.x64	2016/9/9 12:22	Application	14,231 1
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Computer				
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Figure 1.1 Driver file

For example, on Windows, enter into the subfolder

CH341SER_WIN->CH341SERCH341SER. Double click SETUP.exe and install it, as follows:



Dobots	tudioV1.2.5 + attachment + CH341SER_	WIN CH5413EK	✓ 4 Searce	h CH
organize 💌 Include	in library 🔹 Share with 👻 New f	older		
🗶 Favorites	Name	Date modified	Type Si	ze
E Desktop	DRVSETUP64	2016/10/9 16:58	File folder	
👃 Downloads	CH341PT.DLL	2005/7/30 0:00	Application extens	71
📃 Recent Places	🚳 CH341S64.SYS	2015/1/26 0:00	System file	59
	CH341S98.SYS	2007/6/12 0:00	System file	20
🗃 Libraries 🛛 🗏	eh341SER	2015/2/6 6:43	Security Catalog	11
Documents	CH341SER	2014/8/8 0:00	Setup Information	7
J Music	CH341SER.SYS	2015/1/26 0:00	System file	41
E Pictures	CH341SER.VXD	2008/12/18 0:00	Virtual device driver	20 1
Subversion	SETUP	2015/11/14 18:36	Application	98
Videos				
₩ 暴风影视库				
🔒 迅雷下载				
🖳 Computer				
🏭 Windows7_OS (C 🗸	· .	m		

Figure 1.2 Install driver

Click Install:

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 ★ Favorites ■ Desktop ♦ Downloads ⊛ Recent Places ➢ Libraries ☑ Documents ④ Music Pictures Subversion Videos 暴风影视库 迅雷下载 	Install	H341SER.INF CH.CN USB-SERIAL CH340 08/08/2014, 3.4.2 tall	folder plication extens tem file tem file urity Catalog	e 7 KB 59 KB 20 KB 11 KB 7 KB 41 KB 20 KB 98 KB
Computer Mindows7_OS (C + SETUP Dat Application	 e modified: 2015/11/14 18:36 Size: 97.9 KB 	m Date created: 2016/10/9 19:4:	1	•

Figure 1.3 Click Install



A B CH341SER	× (+)	-	122 800		
C v bobot	StudioV1.2.5 🕨 attachment 🛛	CH341SER_WIN + CI	H341SER 🕨	👻 🍫 Search	СН 🔎
Organize 👻 🖻 Op	een Share with 🔻 New	w folder			10
Y Favorites	🛃 驱动安装(X64)			Jie Size	es d
 Desktop Downloads Recent Places Libraries Documents Music Pictures Subversion Videos 裏风影视库 迅雷下载 	驱动安装/卸载 选择INF文件: 安装 卸载	riverSetup Successfull 函动安装成功 OK	3.4.2014	folder plication extens tem file tem file urity Catalog up Information tem file ual device driver plication	7 KB 59 KB 20 KB 11 KB 7 KB 41 KB 20 KB 98 KB
P Computer	+ < [Date modified: 2015/11/14 18: Size: 97.9 KB	36 Date created:	m : 2016/10/9 19:41		•

Figure 1.4 the driver was installed successfully

1.2 Check if the equipment can work properly in the device manager

1.2.1 Open the device manager and if you can find the corresponding COM port of "**USB-SERIAL CH340**", then it shows the driver is installed successfully. The correct installation is shown below:

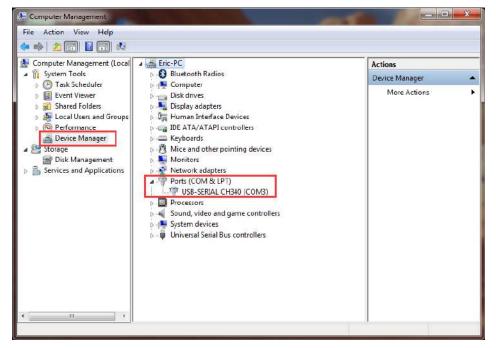


Figure 1.5 The COM port in the device management



2. DobotStudio Operating Instructions

The software used by Dobot Magician is **DobotStudio**, and you can download the latest version from our official website:

http://www.dobot.cc/downloadcenter.html?sub_cat=70#sub-download

After the file successfully downloads, unzip and double click DobotStudio.exe. Then, open the software. The result should be as follows:

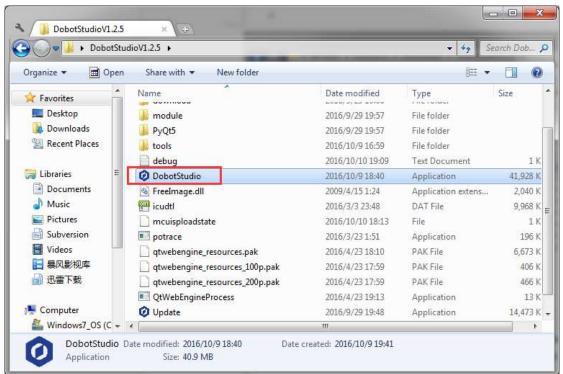


Figure 2.1 DobotStudio file



Figure 2.2 DobotStudio

Note: There may be small errors when opening DobotStudio, as shown below:



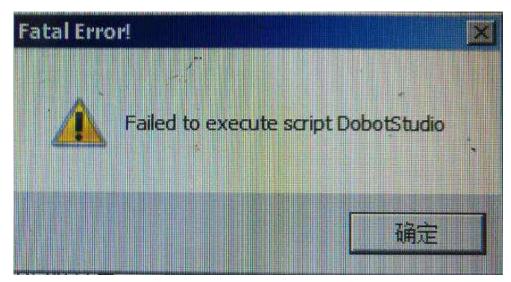


Figure 2.3 An error screen when open DobotStudio

Please right-click the DobotStudio icon and choose to run the software as administrator.

 Select the corresponding Dobot serial port, by the top left corner of DobotStudio, and click "Connect". After a successful connection, "Disconnect" will be shown. When the Dobot is connected, the coordinate parameters will be updated on the right side of the interface as shown below:



Figure 2.4 Connected successfully

There are eight modules on the main software interface:

(1) **Teaching & Playback:** A system to teach the Dobot how to move. It enables the Dobot to accomplish recorded movements by manual control.

(2) Write & Draw: Controls the Dobot to write, draw or laser engrave.

(3) **DobotBlockly:** Teaches basic programming through a puzzle interface. Intuitive and easy to understand.

(4) Script: Edit scripting language to control the Dobot.

(5) **LeapMotion:** Control the Dobot by gesture.



- (6) Mouse: Control the Dobot by mouse.
- (7) LaserEngraving: Engraves images, shapes, and words through bitmap with the Dobot.
- (8) Add More: Add even more functions for the Dobot!

Here we will introduce Teaching & Playback at first.

Click Teaching & Playback, the brief introduction of each area as follows:



Figure 2.5 The main interface of teaching & playbac

Area 2:

5

Here comes with Dobot movement area, linear mode and jog mode.

Linear mode: Based on the body axes coordinate system X, Y, Z with the origin at the center of three motors. X, Y, Z is the coordinate of the center of the end platform, and the direction of X is perpendicular to the base forward, Y is perpendicular to the base



towards the left, and Z is vertical upward. R indicates the rotation of the servo joint relative to the coordinate frame (counter-clockwise is the positive direction).

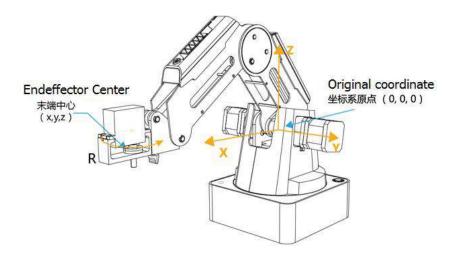


Figure 2.6 Coordinate system

- (1) Click X+,X- and Dobot will move along X in the negative or positive direction;
- (2) Click Y+,Y- and Dobot will move along Y in the negative or positive direction;
- (3) Click Z+,Z- and Dobot will move along Z in the negative or positive direction;
- (4) Click R+,R- and Dobot will move along R in the negative or positive direction.

Note:

The R-axis will move together with Y-axis during the movements, so make sure the terminal posture relative to the origin of coordinates stays constant.

Jog mode: This movement is aimed for a single axis. Hold down the button, and the corresponding axis will move independently. Once the axis is maxed out, the joint will stop moving. Each axis has counterclockwise as the positive direction. Joint $1 \\ 2 \\ 3 \\ 4$ refer to base, rear arm, forearm and servo respectively.



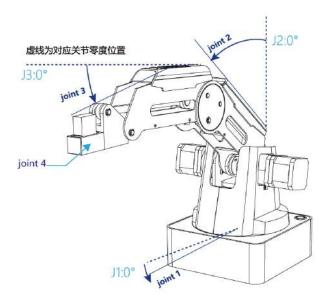


Figure 2.7 Single axis coordinate system

(1) Click Joint1+, Joint1- and control the Dobot base motor to rotate in the negative or positive direction;

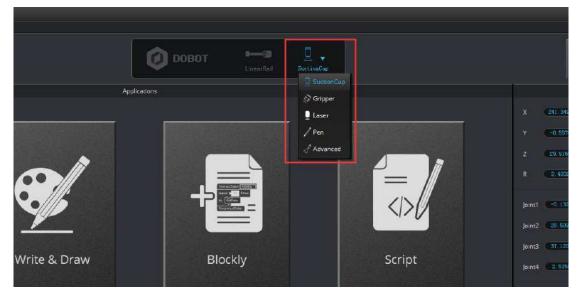
(2) Click Joint2+, Joint2- and control rear arm motor to rotate in the negative or positive direction;

(3) Click Joint3+, Joint3- and control forearm motor to rotate in the negative or positive direction;

(4) Click Joint4+, Joint4- and control servor to rotate in the negative or positive direction; Among this, the rotation range of Joint4 is $\pm 150^{\circ}$.

Pen/Gripper/SuctionCup/Laser:

Through choosing the corresponding buttons, open gripper/suction cup/laser.





	DOBOT LinearRail	dvanced
	Applications	
	 ✓ EndEffector Configure ✓ EndType: SuctionCup xBias 59.70 → yBias 0.00 → zBias Add Delete OK 	× 0.00 Cancel
Draw	Blockly	Script

Figure 2.8 Select End Effector

You can also customize the **End Effector Configuration** according to the relative coordinate of the terminal center. The central terminal is shown as follows:

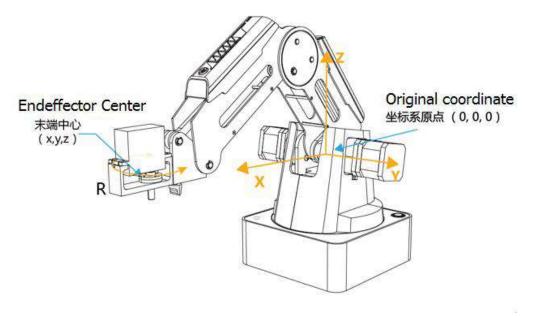


Figure 2.9 The central terminal

Speed: Adjust the ratio bar to change the velocity ratio of the movement of the jog control. The movement velocity is calculated by multiplying the corresponding percentage. Click **Settings** in Area 3 to get a fast adjustment of parameters.

Area 1:



Home: The Dobot will automatically reset to it original neutral position. When this button is pressed, the Dobot will rotate back to its preset home position. In this process, the **Home point** can be self-defined, which will be explained in area 5.

Emergency Stop: Automatically stops all processes.

Area 3:

New/ Open/Save: Create / Open / Save point list.

Start/stop: Start / Stop playback motions.

Click **Start** to start from the beginning. (The button will now change into **Pause**.) Click **Pause** when the dobot moves, and the button will change into **Resume**. Click **Resume** and it will continue to move.

Loop: Set how many times the playback will loop.

Easy/Pro: Mode switch, including offline mode and I/O settings, and refer to the detailed tutorial: The tutorial of advanced functions.

Speed/Acc: Detailed parameter configuration of playback speed and acceleration.

Settings: Set movement parameters.

You can also set the velocity and acceleration of single joint.

	Teaching & Playback				
					Setting Ext
v Ø Playback Setting	, v	-	y ×	R	+Point
1					PTP Point
General	JointParam CoordinateParam	JumpParam Hand	hold Teaching		Move Mode
Jog	joint1Velocity	200.00			(MOV)
Playback	joint1Acceleration	200.00	4.1		MOVL MOVL MINP
·	joint2Velocity	200.00	•		PauseTime
Write Draw	joint2Acceleration	200.00	0		U. 00 . S
LeapMotion	joint3Velocity	200.00	(
Mouse	joint3Acceleration	200.00	4		
LaserEngraving	joint4Velocity	200.00	0		
caser cigraving	joint4Acceleration	200.00			
	Welocity	200.00			
	Acceleration	200.00	×.		
	Default	ок	Cancel		

Figure 2.10 Parameters of single joint movement



Playback Setting				1	×
General	JointParam	CoordinateParam	JumpParam	Handhold Teaching	
Jog	xyzVelocity		200.00	*	
Playback	xyzAccelerati	on	200.00		
Write Draw	rVelocity		100.00		÷.
LeapMotion	rAcceleration		100.00	×	10 25
Mouse					
LaserEngraving					
	Default		ок	Cancel	

Set velocity and acceleration of coordinates:



The height and Z limit of Jump mode:

Playback Setting					×
General Jog Playback Write Draw LeapMotion	JointParam JumpSetting	CoordinateParam	JumpParam JumpHeig Z Limit	Handhold Teaching ht 20.00 100.00	
Mouse LaserEngraving	Default		ОК	Cancel	

Handhold teaching: Tick the function says, "Enable Handhold Teaching". Then, press and hold down Unlock on the forearm and drag the Dobot to any position. You can save a point after letting

图 2.12 Jump mode settings



go of the Unlock button. Of course, you can save points continuously. After all the points are recorded, Dobot will be able to play back the programmed trajectories.

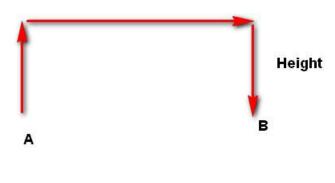
Playback Setting		×
General Jog Playback Write Draw LeapMotion Mouse LaserEngraving	JointParam CoordinateParam ✓ Enable Handhold Teaching Automatically save a point when	JumpParam Handhold Teaching
	Default	OK Cancel

图 2.13 Playback settings

Area 4: Select save mode.

- 1. Click **+Point**, you can save the current point information in area 5.
- 2. **PTP Point:** Point mode, and three modes between saved points, **JUMP**, **MOVJ**, **MOVL** respectively.

JUMP: From point A to point B, the trajectory is shown below, the end effector will lift upwards by amount of Height (in mm) and move horizontally to a point that is above B by Height and then move down to Point B.



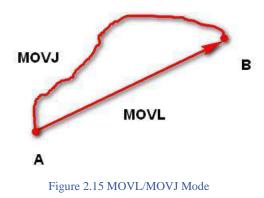


MOVJ: Joint movements. From point A to point B, each joint will run from initial angle to its target angle, regardless of the trajectory. The motion time for all joints are the same which



means all joints will start and finish at the same time.

MOVL: The joints will perform a straight line trajectory from point A to point B.



- 3. **Pause Time:** The pause unit of time is 1 second.
- 4. **CP Point:** Track points, saved points between velocity and acc transmit smoothly.

Area 5: Playback list that can be edited.

To show the current endeffector coordinates, Move Mode, pause time and any other parameters, double click to edit every single saved point coordinate. You can also edit from the sidebar on the left side or press right –hand button:

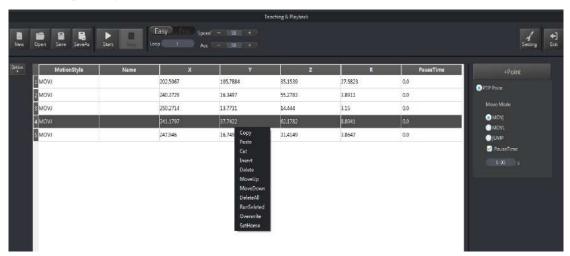


Figure 2.16 Right click options of the saved point list

- 1. MotionStyle: JUMP, MOVJ, MOVL.
- 2. **X**, **Y**, **Z** is the coordinate of the center of the end platform.
- 3. **RHead** indicates the rotation of the servo joint relative to the coordinate frame (counterclockwise is the positive direction).
- 4. PauseTime.
- 5. Insert: Insert a line of saved points.
- 6. MoveUp/MoveDown: Move up/Move down the line of saved point.
- 7. Delete: Delete selected saved points.
- 8. **DeleteAll**: Delete all saved points.



- 9. RunSeleted: Execute selected points.
- 10. **Overwrite:** Overwrite current saved points.
- 11. **SetHome**:Set as Home point location.



3. Teaching & Playback

Here we will learn how to suck up or grab simple objects using the function of Teaching & Playback. Because we need to use the air pump kit for the suction cup and the gripper kit, we will introduce these two kits together.

3.1 Air pump kit

The default installation of the Dobot Magician is the suction cup. The pump box and suction cup kit is shown below:



Figure 3.1 Air pump kit

Installation Steps:

1. Connect power line SW1 on the pump box with interface SW1 on the controller box, connect signal line with interface GP1;

- 2. Tighten air pump kit into the end of the socket with butterfly nut;
- 3. Connect windpipe on the controller box with pipe connector on the pump box;
- 4. Connect GP3 of Joint4 servo line with forearm connector①GP3.

The installation effect as follows:



Figure 3.2 The installation effect of air pump kit



3.2 Pneumatic Gripper Kit

1. Pneumatic accessories are shown in following picture:



Figure 3.3 Pneumatic Gripper Kit

2. The gripper kit shares the air pump kit of suction cup. You can remove the suction cup from Joint4. Unscrew the fixed on the suction cup with the hex wrench, shown in Figure 3.4:



Figure 3.4 Remove suction cup



3. Install the gripper kit on Joint4 with the coupler, as shown in Figure 2.5:



Figure 3.5 Gripper Installation

- 4. The connection method of gripper is the same with air pump kit. You can refer to air pump kit method above.
- 5. The installation effect of gripper kit as follows:



Figure 3.6 Gripper Installation

3.3 Demo of Teaching & Playback

After learning about the software, now we can try to make Dobot Magician move. Through the function of Teaching & Playback, we can make it move a small object.

- 1. Select the terminal tool as **SuctionCup** on the software interface and select **JUMP** mode.
- 2. Place a small object nearby and move the Dobot above the small object. Click **Area 2**, tick **SuctionCup** and open the pump. The small object will be sucked up.
- 3. Click +**Point** and save a point.



- 4. Click **Z**+ to raise the Dobot and move the arm to another position. Place the small object on the table, uncheck **SuctionCup**, and close the pump.
- 5. Click **+Point** and save one more point.
- 6. Put back the small object and click **Start**. Our task for moving the object from the current location to another location has been completed successfully.



4. Advanced function of Teaching&Playback

You can switch Easily into Pro when pressing the button "Easy/Pro", as shown below:

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3 MOV1	21.6		16.3497	25.2765	3.15	0 <i>0</i>	Mare Mare				
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							■ R,4 ■ Vel.et				
							0 KD_5 Value 0 KD_5 0 Value				
							TID.7 Velie				

Figure 4.1 Advanced function of teaching&playback

4.1 StepRun

1. **StepRun:** StepRun allows you to execute one command at a time. Pressing it once executes the first motion, and subsequent presses will execute commands down the list one at a time.

			÷٦	eaching & Playback				
Open Save SaveAs Start StepRun Download Loop J Acc - 50 +								
tionStyle	Name	×	Y	z	R	PauseTime		
		202.5067	105.7884	35.1539	27.5823	0.0		
		240.3729	16.3497	55.2783	3.8911	0.0		
		250.2714	13.7731	14.444	3.15	0.0		
		241.1797	37.7422	62.1782	8.8941	0.0		
		247.946	16.7497	31.4149	3.8647	0.0		
			tionStyle Name X 202.5067 240.3729 250.2714 241.1797	tionStyle Name X Y 202-5067 105.7384 240.3729 16.3497 250.2714 13.7731 241.1797 37.7422	Name X Y Z 202.5067 105.7884 35.1539 240.3729 16.3497 55.2783 250.2714 13.7731 14.444 241.1797 37.7422 62.1782	Name X Y Z R 202.5067 105.7884 35.1539 27.5823 240.3729 16.3497 55.2783 3.8911 250.2714 13.7731 14.444 3.15 241.1797 37.7422 52.1782 6.8941		



2. Click Stop and then you can exit the mode of StepRun.

4.2 Offline mode

1. Click **Download** to download the current saved points list into the Dobot. A USB cable will not be needed for use.



Teaching & Payback.							
MotionStyle	Name	× 1	z	I R	PauseTime	+Point	
MOVI	202.5067	105.7884	35.1539	27.5823	0.0	PTP Paint	
2 MOV/	240.3729	16.3497	55.2783	3.8911	0.0	Move Mode	
E MOVI	250.2714	13.7731	14.444	3.15	0.0	MOV	
C MOVI	241.1797	37.7422	62.1782	8.8941	0.0	MCVL	
MOVI	247.946	16,7497	31.4149	3.8647	0.0	CIUMP	
						Tribatin Etiti Jarossi Condicion E Value 0 NB Convol	
						Ourput 0.0_1 Value 0.0_2 Value	

Figure 4.3 Download saved point list

2. After downloading, pull out the USB cable, press **Key** behind the controller box, and execute the downloaded program. The program will stop executing when it is pressed again.

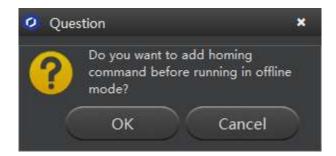


Figure 4.4 Offline mode button

Note: Before offline mode can be used, the Dobot needs to be reset by pressing Home. Switch on the Dobot, wait 20 seconds after the green light is on, and click **Home** when the sensor is stable.

- 1) The blue light will flash during homing. It is completely normal for that to happen. Do not operate the Dobot until the green light is on.
- 2) After homing, you can save points and then download. Click **OK** in the dialog box.





Playback steps:

Switch on the Dobot, wait 20 seconds after the green light is on, and then click **Key** to move offline when the sensor is stable.

4.3 EIO multiplex

The EIO (Extended I/O) in Dobot has multiple functions and uses. This chapter aims to address all the functions for DobotV2.0 EIO.

MotionStyl=					_		
19	Name	×	v	Z	R	PauseTime 0.0	
MOVJ		202.5067	105.7884	35.1539	27.5823		Trigger KIOL-Japut
2 MOVJ		240.3729	16.3497	55.2783	3.8911	0.0	Condtion
a MOVJ		250.2714	13.7731	14,444	3.15	0.0	-
4 MOVJ		241.1797	37,7422	62.1782	8.8941	0.0	1 con
5 MOVJ		247.946	15.7497	31,4149	3.8647	0.0	Value
							■ 10_3 ■ Va ■ 10_4 ■ Va ■ 10_5 ■ Va
							🖸 10_5 🛛 Va
							🖸 10_7 👘 Va
							💭 10,8 💦 Va
							🖸 (Q.9 🛛 🖓
							 □ 10_9 □ 10_10 □ 10_10 □ 10_10
							0.9 0.9 0.9 0 00 00 00 00 00 00 00 00 00 00 00 00
							00,9 0 Va 00,10 0 Va 00,11 Va 00,11 Va
							0.9 0.9 0.9 0 00 00 00 00 00 00 00 00 00 00 00 00

The EIO interface of advanced functions is shown below:

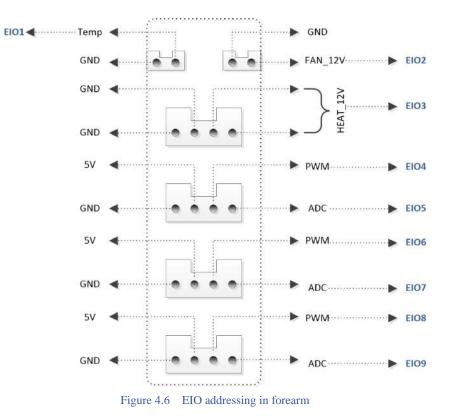
Figure 4.5 EIO Interface

4.3.1 EIO locations

EIO are located near the base and forearm separately in DobotV2.0.

1) EIO located in the forearm are shown below:





2) EIO located in the base 18PIN interface board are shown below:

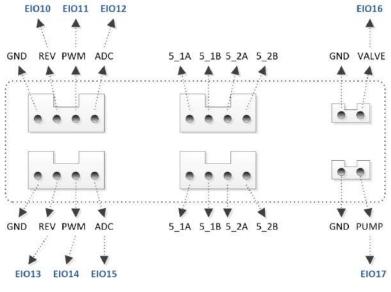


Figure 4.7 EIO addressing in base 18PIN

3) EIO located in the base 10PIN interface board are shown below:



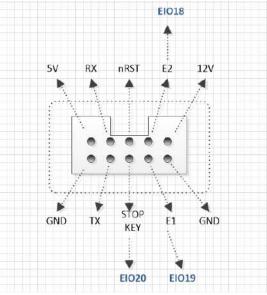


Figure 4.8 EIO addressing in base 10PIN

4.3.2 EIO multiplex function

Now let's describe the EIO multiplex function. (Depending on hardware)

EIO	Level Range	Level	PWM	Level Input	ADC
addressing		Output			
O1	3.3V	\checkmark		\checkmark	\checkmark
O2	12V	\checkmark			
O3	12V	\checkmark			
O4	3.3V	\checkmark	\checkmark	\checkmark	
O5	3.3V	\checkmark		\checkmark	\checkmark
O6	3.3V	\checkmark	\checkmark	\checkmark	
07	3.3V	\checkmark		\checkmark	\checkmark
08	3.3V		\checkmark	\checkmark	
09	3.3V			\checkmark	\checkmark

Figure 4.1 EIO multiplex instruction of forearm interface board

2) EIO multiplex instruction of 18PIN interface board on the base, as shown below:

Figure 4.2 EIO multiplex instruction of 18PIN interface board on the base

EIO Addressing	Level Range	Level Output	PWM	Level Input	ADC
10	5V	\checkmark			
11	3.3V	\checkmark	\checkmark	\checkmark	
12	3.3V	\checkmark		\checkmark	
13	5V	\checkmark			
14	3.3V	\checkmark	\checkmark	\checkmark	
15	3.3V	\checkmark		\checkmark	\checkmark
16	12V				
17	12V	\checkmark			



3) EIO multiplex instruction of 10PIN interface board on the base, as shown below:

	EIO Addressing	Level Range	Level Output	PWM	Level Input	ADC
	18	3.3V	\checkmark		\checkmark	
Γ	19	3.3V			\checkmark	
	20	3.3V				

Figure 4.3 EIO multiplex instruction of 18PIN interface board on the base

4.3.3 EIO multiplex Demo

Selected corresponding EIO, set input/output condition, and then you can multiplex each unique EIO. Here we have detailed explanation of level output, level input, ADC input and PWM output.

1) Level Output

Take EIO01 on the forearm connector for an example, it can configure level output into 3.3V. Shown as follows:

EIO	Level Range	Level	PWM	Level Input	ADC
Addressing		Output			
O1	3.3V	\checkmark		\checkmark	\checkmark

Tick **IO_1**(in the output option) -> **tick Value**, -> +**Point**, and then it can be configured into high-level output of 3.3V(If you don't tick it, please choose low-level output).

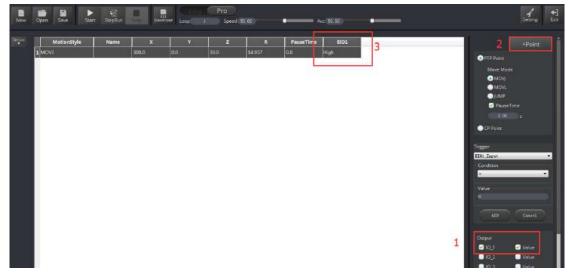


Figure 4.9 High level output of EIO1 demo

2) Level input

Also, take EIO01 on the forearm connector for an example, if you get an external photoelectric sensor, it will trigger Dobot move and can be configured into low/high level input trigger mode when access to an inductive object. Select trigger point->**EIO1_Input** (Trigger area on the bottom right)-> **Condition=1->add ADD key.** Cancel key can delete trigger settings of the current point. Trigger Value=0 denotes a low level and Value=1 denotes a high level.



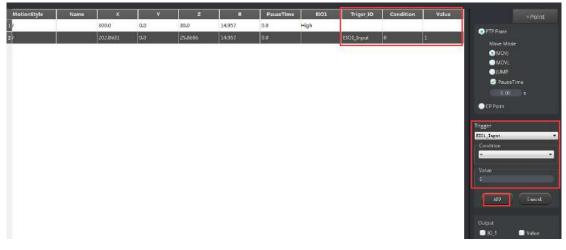


Figure 4.10 High level output of EIO1 demo

3) ADC input

ADC input operational method is the same with level input. Select configured saved point and pins of the ADC (such as EIO1), set ADC value less than 200, and click ADD key to finish. The trigger value settings range is from 0 to 4095.

otionStyle	Name	×	Y	z	R	PauseTime	EIO1	Triger_10	Condition	Value	+Poin
		300.0	0.0	30.0	14.957	0.0	High				PTP Paint
		202.8631	0.0	25.8686	14.957	0.0		EIO1_ADC	0	200	Move Mode
											MOM
											MOVL
											JUMP
											🧭 PauseTime
											CP Point
											Trigger
											BIOL_ADC
											Condition
											8
											Value
											200
											🕘 10_t 🔄 Value
											10.7 Value

Figure 4.11 EIO1 ADC input demo

4) PWM Output

PWM:	Take	EIO4	for	a	demo
------	------	------	-----	---	------

EIO Addressing	Level Range	Level Output	PWM	Level Input	ADC
O4	3.3V	\checkmark	\checkmark	\checkmark	

Tick **IO_4** pin in the Output area, click **+Point** to save new points, double click **EIO4** table cell, select "…" in the drop-down box, and set **Frequency, unit of KHZ**, **10HZ-1MHZ** and **DutyRatio** (0-100%) in the pop-up dialog, as shown below:



Y	z	R	PauseTime	EIO4		2 +Point
0.0	25.9403	21.0199	0.0	Low V Low High	3	PTP Point Move Mode MOVJ MOVL JUMP PauseTime D.00 s CP Point
						Trigger EIDI_Irput Condition = Value 0 AID Cancel
					1	Output 10_1 Value 10_2 Value 10_3 Value 210_4 Value

Y	z	R	PauseTime	EIO4
0.0	25.9403	21.0199	0.0	Low

EIO Setting	3	2
Frequenc	y 100.00	-
	OK Cancel	

۷	z	R	PauseTime	EIO4
0.0	25.9403	21.0199	0.0	100.0kHZ/30.0%

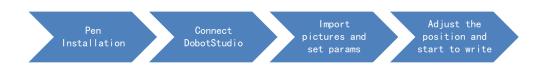


Above is the four multiplex demo.



5. Write & Draw Manual

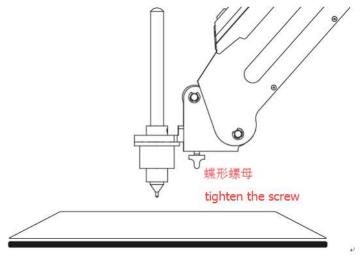
The whole flow chart as follows:



5.1 Installation of writing accessories

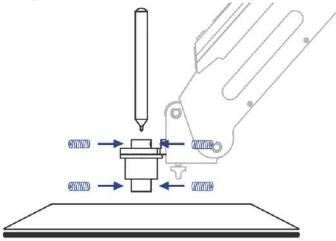
A pen and pen holder included in the Write & Draw kit. The steps to install are as follows:

- 1. Install the pen into the fixture;
- 2. Lock the fixture into the end-effector with butterfly nut.





If you want to change the pen, just loosen the four screws on the pen holder.







5.2 Connect DobotStudio

1. The software used by Write & Draw is DobotStudio, and the hardware itself is applicable for DobotStudio, so you can connect it directly. Open the software and click the Write & Draw module. The interface of Write & Draw is shown below:

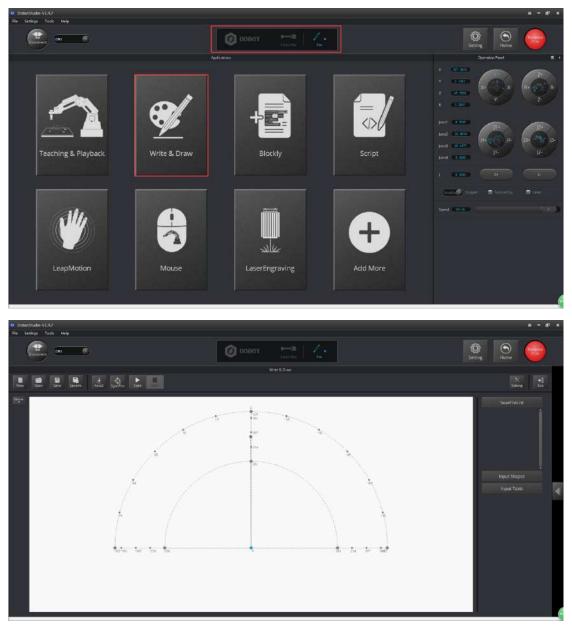


Figure 5.3 Writing & drawing interface

2. If the current hardware is not the hardware of Write & Draw itself, there will be a pop up to change the firmware. For example, if the current firmware is for 3D printing, there will be a pop up for a selected window. Here, we can choose DobotStudio in the drop-down box:



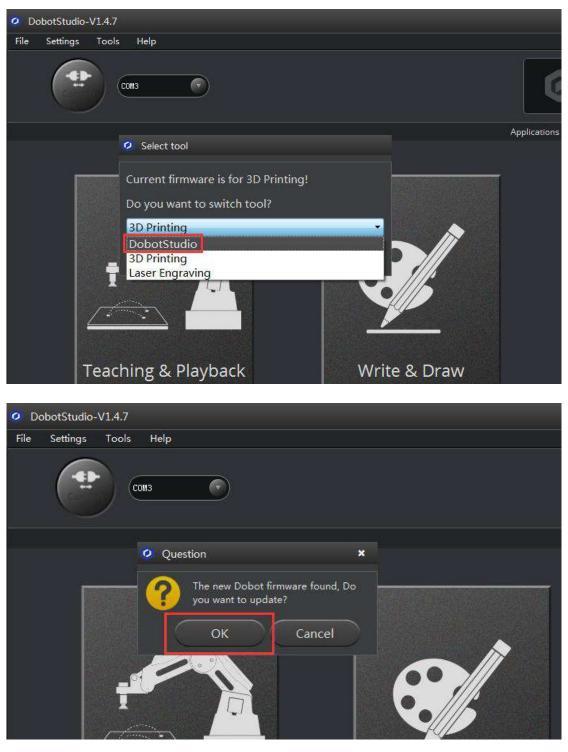


Figure 5.4 Select DobotStudio

Then click **OK**. A pop up window will ask to burn hex. Click **Confirm** to do so:



0	Dobot FM	×	0	Dobot FM	×
	Confirm Cancel			Stop Cancel	
Curre	nt Firmware:RepetierHost-V4.4.0)		Current Firmware:Unknow	
Burnii	ng Firmware:Dobot-V3.0.2			Burning Firmware:Dobot-V3.0.2	
	ng connection ction is well.		37 W 37 W 37 W 37	RITE_MEMORY:阶段3-开始写数据操作… , RITE_MEMORY:阶段3-开始写数据操作… , RITE_MEMORY:阶段3-开始写数据操作… , RITE_MEMORY:阶段3-开始写数据操作…	l

After burning, **DobotStudio** will be opened automatically. Also, after about ten seconds, you will hear a short sound from the built-in buzzer, which shows a successful burning. At the same time, the light on the bottom right will also turn green. Finally, we can connect Dobot according to the above operation.

5.3 Import pictures and set parameters

- The imported picture should be put into the sector area of the main interface, as Dobot will be at a limited position if beyond the standard range of motion because of unnatural writing. There will be a warning of a red highlighting if beyond range.
- 1) Click **Open**, and import the ready PLT or SVG file:

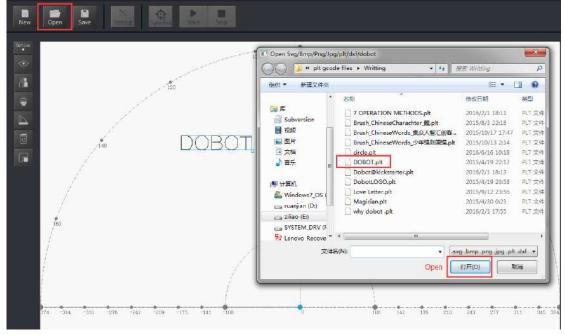


Figure 5.5 Open the file

2) Insert the included pictures of DobotStudio;



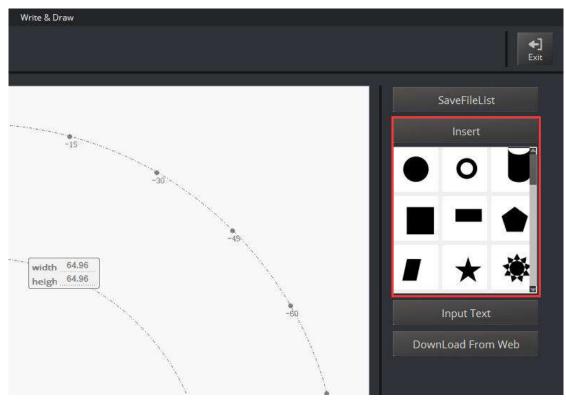


Figure 5.6 Insert the included file

3) Input text manually;



Figure 5.7 Input text manually

4) You can also import pictures. You need convert these formats (BMP/JPEG/JPG/PNG and so on) into SVG (the format recognized by Dobot).





Figure 5.8 Import pictures

After opening the picture, adjust the image to desired size and click **Convert Bitmap**. The SVG path file will come out automatically. Then, click **Plot to Main Scene**, and the file will be loaded in writing main interface, as shown below:

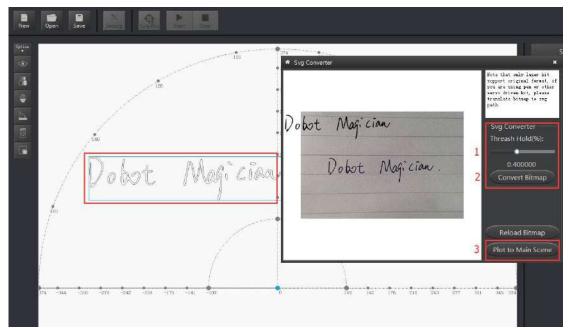


Figure 5.9 Import pictures into SVG files

2. Set writing parameters: set velocity and acceleration(0~500mm/s) and PenUpOffset;



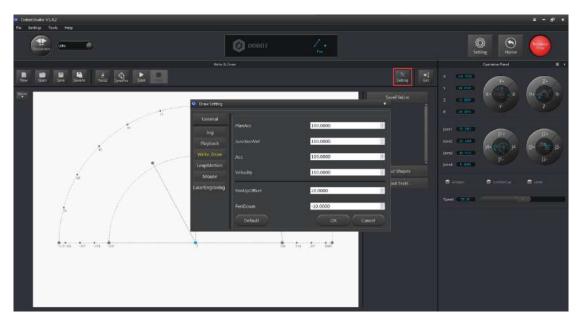


Figure 5.10 Set velocity and acceleration

5.4 Adjust the position and start writing

1. Set endeffector as Pen. Here, you can choose from **Settings**->EndEffector, as shown below:

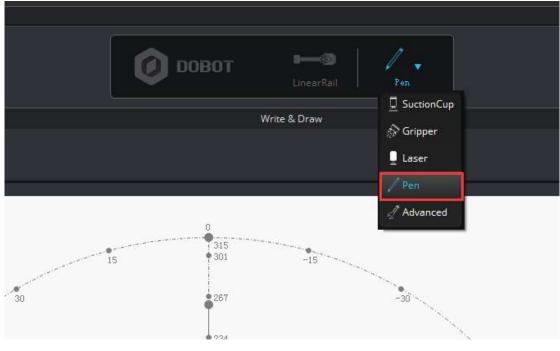


Figure 5.11 Set EndEffector

2. Adjust the nib position: press and hold down **Unlock key on the forearm** and drag the forearm to make the nib contact to paper. Also, you can control Z axis moving down to paper gradually, shown as follows:



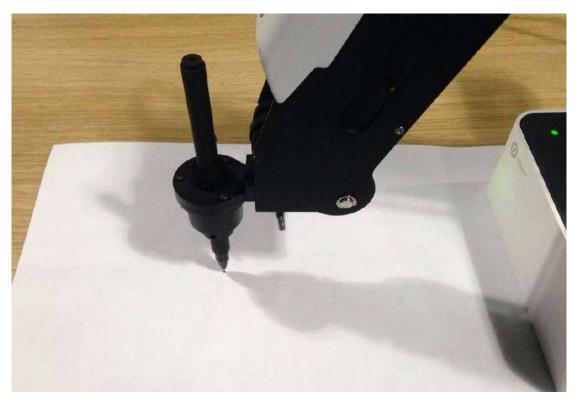


Figure 5.12 Adjust the nib position

3. Click **AutoZ** and get the current Z value. This is so you don't need to adjust the nib position when you write next time. Then, follow these steps: **import pictures-> SyncPos->Start** to start.

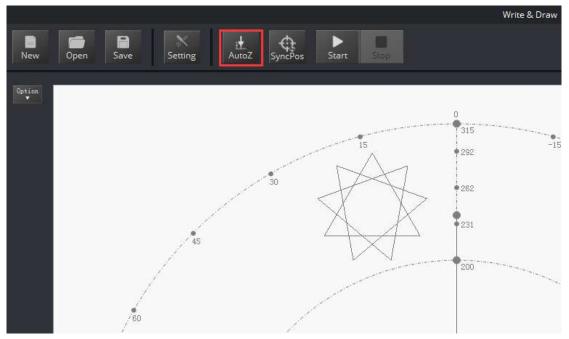


Figure 5.13 Lock writing height

You can check the **PenDown parameter** from here:



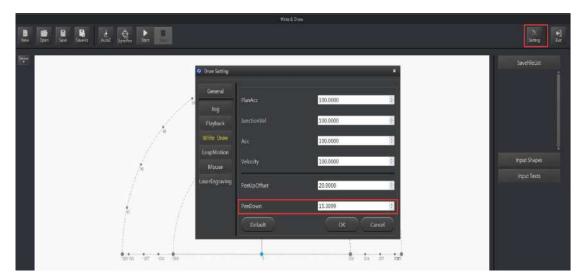


Figure 5.14 Pendown parameters

If the writing is not very clear, the nib height may need to be adjusted slightly. Revising the value of Pendown may also help.

- 4. Click **SyncPos** and the Dobot will move into the top position of writing starting point automatically.
- 5. Click **Start, Pause and Stop** to control Dobot.
- 6. The result is shown below:

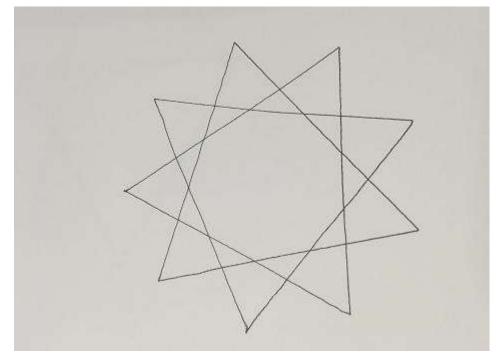


Figure 5.15 The effect of writing



6. Laser Engraving

The entire process of laser engraving is as follows:



Notice:

Laser engraving and shade laser engraving are different functions. The firmware and upper computer used by laser engraving are the same as the ones used in Write & Draw, which can only engrave pictures that are composed of a single line. However, shade laser engraving can achieve the function of bitmap engraving .(For example, it can engrave figures and head portraits.) If you want to use the function of shade laser engraving, please refer to Dobot2.0 Shade Laser Engraving.

6.1 Laser Installation

- 1. Fasten the laser by butterfly nut;
- Connect 12V power line with interface (5)SW4 and connect TTL control line with interface (3)GP5.

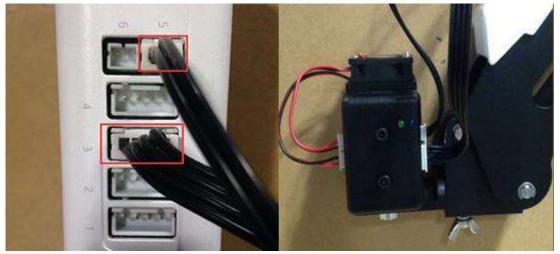


Figure 6.1 Install Laser

6.2 Connect DobotStudio

 The software used by laser engraving is **DobotStudio**, so please open the software, click **Write** & **Draw**, and enter into laser engraving interface, as shown below:





Figure 6.2 Laser engraving interface

2. If the current firmware is not for laser engraving, for example, if it is for firmware 3D printing, then a pop up dialog will give the option to choose **DobotStudio** in the drop-down box:



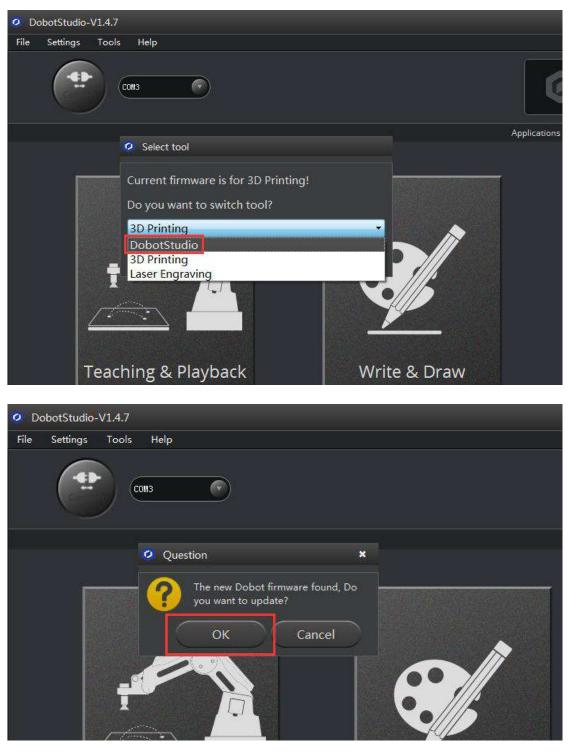


Figure 6.3 Connect DobotStudio

Click **OK** aand a window will pop up asking to burn hex. Click **Confirm** to burn hex:

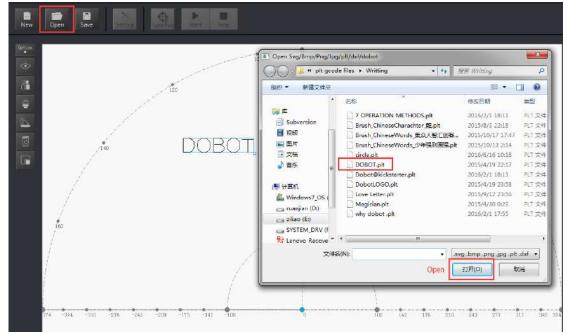


0	Dobot FM	×	0	Dobot FM	×
	Confirm Cancel			Stop Cancel	
Currer	nt Firmware:RepetierHost-V4.4	1.0		Current Firmware:Unknow	
Burnin	g Firmware:Dobot-V3.0.2			Burning Firmware:Dobot-V3.0.2	
	g connection tion is well.		37 Wi 37 Wi 37 Wi 37	RITE_MEMORY:阶段3-开始写数据操作 RITE_MEMORY:阶段3-开始写数据操作 RITE_MEMORY:阶段3-开始写数据操作 RITE_MEMORY:阶段3-开始写数据操作 RITE_MEMORY:阶段3-开始写数据操作	乍… 乍… 乍…

After burning, **DobotStudio** will be opened automatically. Also, after about ten seconds, you can hear a short sound from built-in buzzer, which shows a successful burning. At the same time, the light on the bottom right will turn into green. We can then connect Dobot according to the above operation.

6.3 Import pictures and set parameters

1) The imported laser engraving file should be put near where the Dobot arm is, as the Dobot will be at a limited position if beyond the standard range of motion. There will be a flashing red light to warn you if the arm is beyond its natural range.



2) Click **Open**, and import the ready PLT or SVG file:

Figure 6.4 Open PLT File



3) Insert the included pictures of DobotStudio;

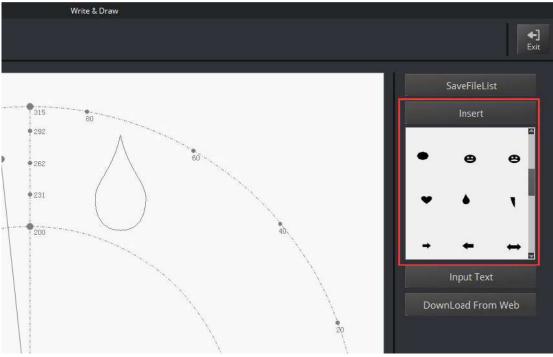


Figure 6.5 Insert included pictures

4) Input text manually;



Figure 6.6 Input text manually

5) You can also import pictures. You need convert these formats (BMP/JPEG/JPG/PNG and so on) into SVG (the format recognized by Dobot).





Figure 6.7 Import pictures

After opening the picture, set proper switching threshold, click **Convert Bitmap**. The SVG path file will come out automatically. Then, click **Plot to Main Scene** and the file can be loaded in writing main interface, as shown below:

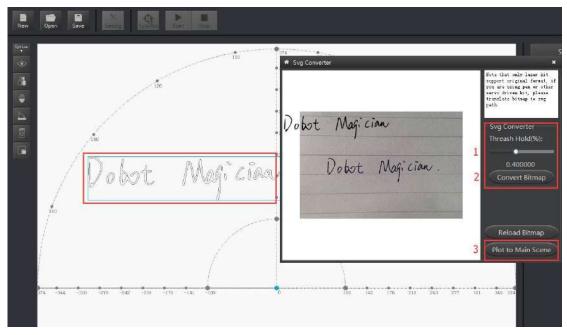


Figure 6.8 Import pictures and SVG path file will come out automatically

1. Set laser engraving parameters: set velocity and acceleration(suggested value is 3) and PenUpOffset. On here, just keep the default 20;



												≡ - e ⁰ ×
		🗿 ровот								() Interest of the second seco	Home	(and a second se
	Write & Draw									Operatio	n Panel	= *
	Draw Setting General	PlanAcc	100.0	000		Sening	÷.		(10) 2024) (20) 6201 (10) (10) 0000 (10)	X+ (**	R+ 2+ Z
Width 04.51 heigh 24.01	Jog Playback htte_Draw Notion Mouse	JunctionVel Acc Velocity	100.0 100.0	000				jaini2 Jaini3	10.000 (c) 14.000 (c) 50.600 (c) 40.2284 (c) 244.2500 (c)	H+(л. Д.	р+ В+ В- β-
Lave	erEngraving	PenUpOffset PenDown	20.00		12	t Shapes ut Texts				9 50		🖉 Liser
		Default		OK	Cancel Briston ETC	т <mark>и</mark>		Speed				

Figure 6.9 Set parameters of laser engraving

6.4 Adjust the focus and start writing

1. Select the EndEffector as **Laser**, shown as follows:

Write & Draw	DOBOT E	Laser	Setting	←] Exit
		Pen		
		of Advanced	SaveFileList	
1920 1920 1906 -15	and the second			Î
• 272	-30'			
• 236	-45.			
\$204				
·····	1	•	Input Shapes	
	Figure 6.10 S	et EndEffector		

2. Tick ON on the Operation Panel to open the laser;





Figure 6.11 Open the laser

Focus Adjustment: Hold down the **Unlock Key** to adjust the distance between laser and the surface of the material, and then adjust the knob to focus it properly. It will be at the right height when the laser dot burns the brightest. Burn marks on the paper will be another indicator that you have done so correctly. You can turn off the laser by unticking the box after adjusting.

If it still cannot focus, then the focus of the laser is wrong. We can rotate the metal knob of the laser to adjust (as shown on the bottom right) and refocus again.

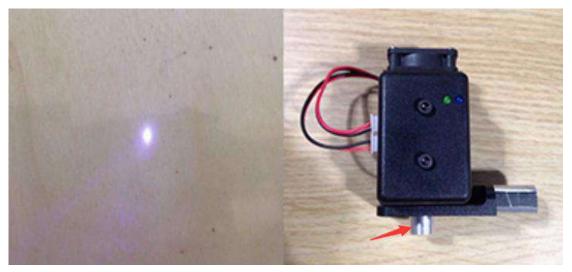


Figure 6.12 Focus Adjustment

▲ Notice:

The laser can heat objects when it is in a focused state, so objects like paper or wood can



be engraved or burned.

- ! DO NOT focus the laser on people or animals
- ! DO NOT let children play with it alone.
- ! The process needs to be monitored when it is running.
- ! After the process, please turn off the laser promptly.
- Click AutoZ and get the current Z value. This way, you do not need to adjust the focus manually when you engrave next time. To do so, here are the steps: import pictures-> SyncPos->Start.

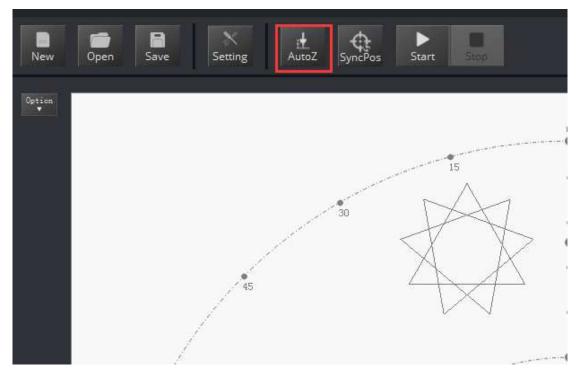


Figure 6.13 Lock writing height

You can check the Pendown parameter from here:

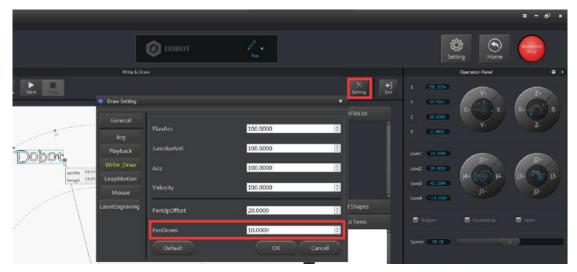


Figure 6.14 Pendown parameters



If the engraving isn't clear, the laser height needs to be adjusted slightly. Revising the value of **Pendown** also helps.

- 4. Click **SyncPos**, Dobot will move into the top position of the starting point automatically.
- 5. Click **Start, Pause and Stop** to control Dobot.
- 6. The effect shown as follows:

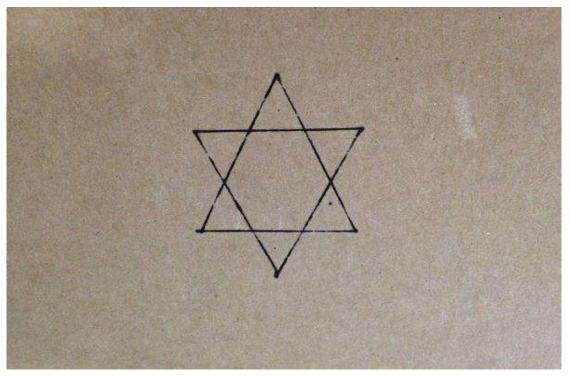


Figure 6.15 The product of laser engraving



7. The Tutorial of Shade Laser Engraving

The whole flow chart of shade laser engraving is shown below:



Note: Shade laser engraving is also a kind of laser engraving!

7.1 Installation of Laser Accessories

Shade laser engraving and laser engraving share the same kit. Please refer to the chapter pertaining to laser engraving installation.

7.2 Connect DobotStudio

1. Open DobotStudio and select the EndEffector as Laser.



Figure 7.1 Open laser engraving interface



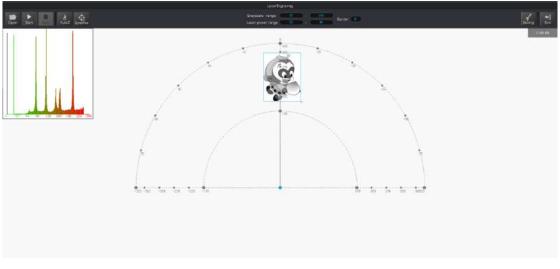


Figure 7.2 Enter the shade laser engraving interface

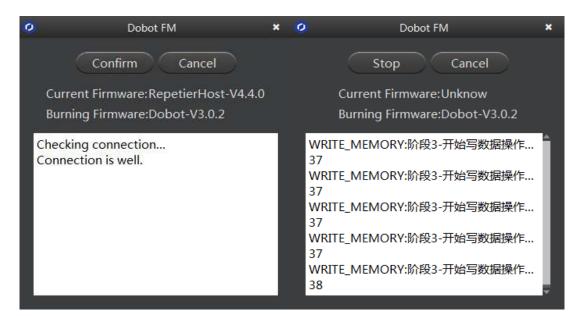
2. If the current firmware is not for **DobotStudio**, (for example, 3D printing) a pop up window will ask for you to switch. Then, we can select **DobotStudio** in the drop-down box:



Figure 7.3 Select DobotStudio

Then click **OK**, and a window will pop up asking to burn hex. Click **Confirm** to burn hex:





After burning, **DobotStudio** will open automatically. Also, after about ten seconds, you can hear a short sound from built-in buzzer, which shows a successful burning. At the same time, the light on the bottom right will turn into green. We can then connect Dobot according to the above operation.

7.3 Import Pattern and Set Parameters

1. The imported picture should be put into an area near the Dobot's arm, as it will be at a limited position if beyond the standard writing range. If the Dobot is out of reach, then a red light will flash.

You can also import pictures. Convert these formats (BMP/JPEG/JPG/PNG and so on) into SVG, which is recognized by Dobot.

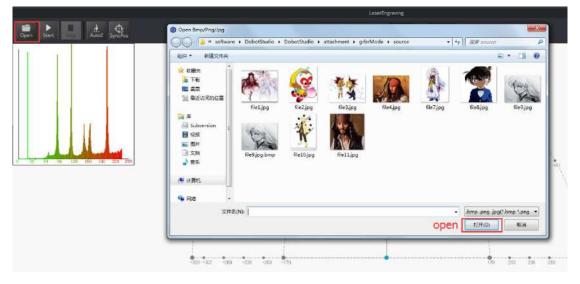


Figure 7.4 Import engraving pictures

Open the picture, adjust the gray scale(0-255), laser power(0-100%) and the border for the customized engraving effect.



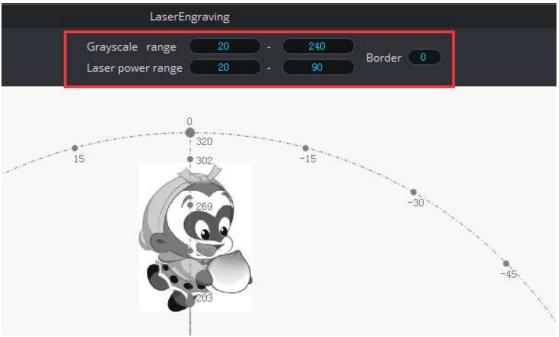


Figure 7.5 Import the pictures into SVG file

2. Set shade laser engraving velocity and acceleration, here we suggest 5, as shown below:

LaserEngraving			
Grayscale range 20 - (Laser power range 20 - (240 Border 0		Setting Exit
			8 00:00
Laser Setting		×	
General			
Jog	PlanAcc	5.0000	
Playback	JunctionVel	5,0000	
Write Draw			
LeapMotion	Acc	5.0000	
Mouse			
LaserEngraving	PenUpOffset	-10.0000	
	DPI	93.8362	
	Default	OK Cancel	

Figure 7.6 Set the parameter

7.4 Adjust Focus and Start to Engrave

1. Set the endeffector as Laser, as shown below:



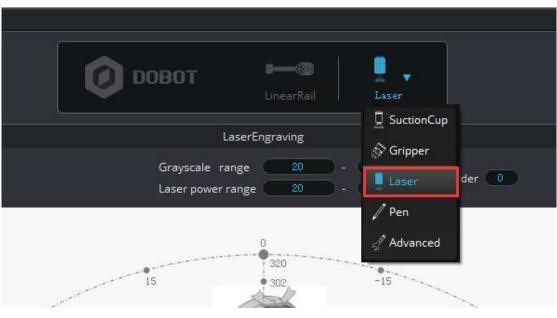


Figure 7.7 Set EndEffector

2. Focus adjustment. Adjust the distance between the laser and engraving material and check **ON** to open the laser.



Figure 7.8 Check the laser

Focus Adjustment. Hold down the **Unlock Key** to adjust the distance between laser and the surface of the material, and then adjust the knob to focus it properly. It will be at the right height when the laser dot burns the brightest. Burn marks on the paper will be another indicator that you have done so correctly. One can cancel ticking to close laser after adjusting.





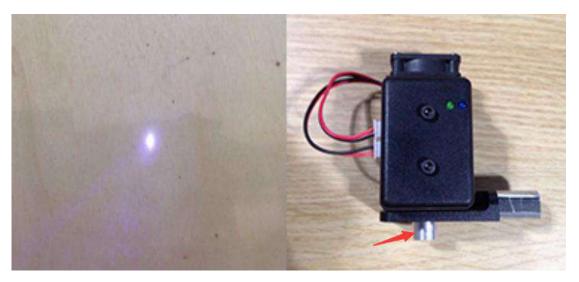


Figure 7.9 Focus adjustment



The laser can heat object when it is in focused state, objects like paper board or wood can be engraved or burned.

- ! DO NOT focus the laser on people or animals
- ! DO NOT let children play with it alone.
- ! The process needs to be monitored when it is running
- ! After the process, please turn off the laser promptly
- 3. Click AutoZ to set the current Z value, and then follow these steps: **import pictures->Synchronous->Start**)

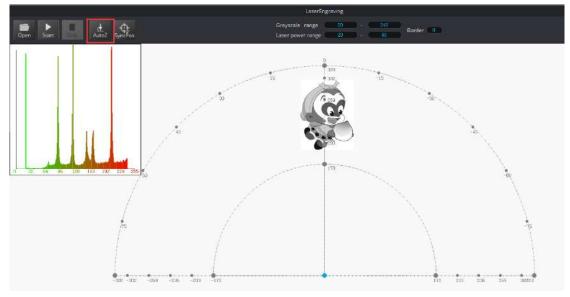


Figure 7.10 Lock the height

Saved value of Z, check from here:

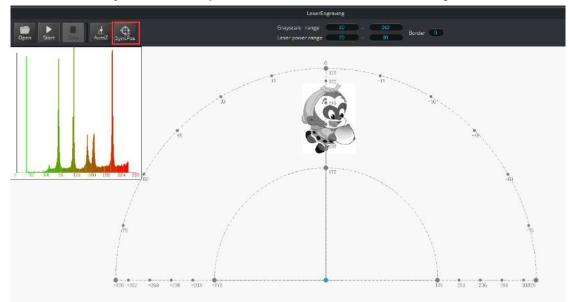


Laser Setting			×
General Jog	PlanAcc	5.0000	
Playback Write Draw	JuncitionVel	5.0000	
LeapMotion Mouse	Acc	5.0000	×
LaserEngraving	PenUpOffset	-10.0000	×
	DPI	250.0000	A V
	Default	OK Cancel	

Figure 7.11 Check the height

If the engraving isn't clear, the laser height needs to be adjusted slightly. Revising the value of **Pendown** also helps.

4. After focus adjustment, click **SyncPos**. The Dobot will move to the start position.



- 5. Click **Start**, **Pause** and **Stop** to control the Dobot.
- 6. The result is shown below:





Figure 7.12 The Engraving Effect



8. The Tutorial of 3D Printing

The whole flow chart of 3D printing as shown below:



3D printing can use Repetier Host and Cura:

- Cura: Slicing is fast and stable, has strong inclusiveness to 3D model structure, less parameter settings, more users.
- Repetier-Host: It can slice, check and modify G-Code, and control 3D printing manually. While it doesn't offer built in slicing, it can use 3rd party slicing software, such as CuraEngine, Slic3r and so on. Finally, it has more parameter settings, making it very flexible.

Here will introduce the details separately from the second step.

Note: On Mac OS, Dobot can only use Cura, please refer to the tutorial of Cura.

8.1 Installation of Accessories of 3D Printing

3D printing accessories: extruder, hotend, motor cable and filament, as shown below:



Figure 8.1 Accessories of 3D Printing

The steps as follows:

1. Press down the lever on the extruder by hand, and push down the filament to the bottom of the hole via the pulley.





Figure 8.2 Insert filament

2. Insert the filament to PTFE Tube and push it down the bottom of the hotend, then tighten the Push-in fitting on the extruder. Notice: Make sure the PTFE Tube itself is pushed down to the hotend bottom. Otherwise, it will cause abnormal discharge.

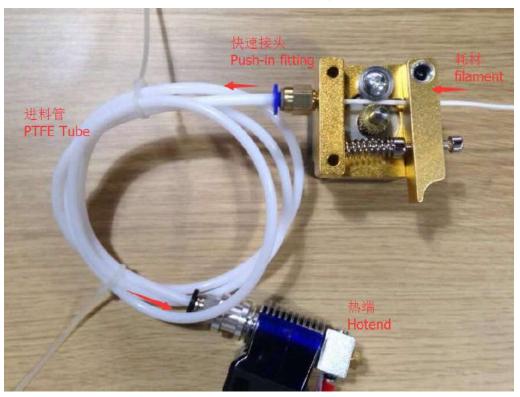


Figure 8.3 Connect extruder and hotend



- 3. Fasten hot end with butterfly nut;
- 4. Connect power line of heating cable with interface 4 on the forearm, link power line of fan with interface 5, and connect thermistor line with interface 6.



Figure 8.4 Connection of forearm

5. Connect extruder motor line with Stepper1 on the controller.



Figure 8.5 Connection of extruder

6. The whole kit should look like this:

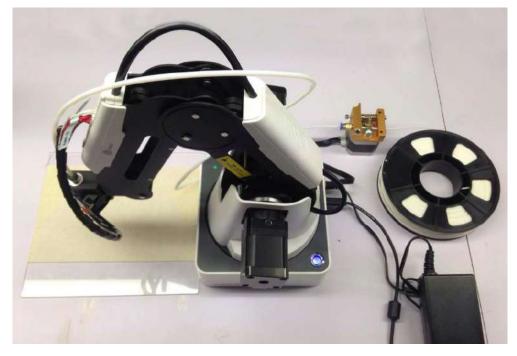


Figure 8.6 3D printing installation



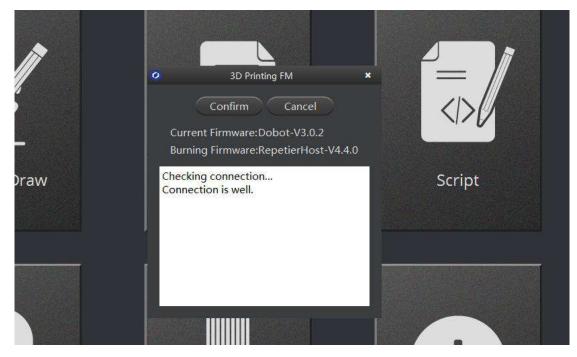
8.2 Repetier Host

8.2.1 Switch into 3D printing

Repetier host has been built into DobotStudio. Open DobotStudio, click **Tools-> Open 3D Printing:**

File Settings	io-V1.4.7 ; Tools Help	
	Base Calibration Sensor Calibration	
Disco	DobotStudio Firmware	
	Open 3D Printing	
	Open Laser Engraving	
	Set Initial Pose	
	Set Angle Sensor Error	
	Device	
	Wi-Fi Alarm Log	

A pop up a dialog of 3D printing burning firmware will appear. Click **Confirm**, and then Repetier Host will pop up automatically, as shown below:



The interface of Repetier Host:



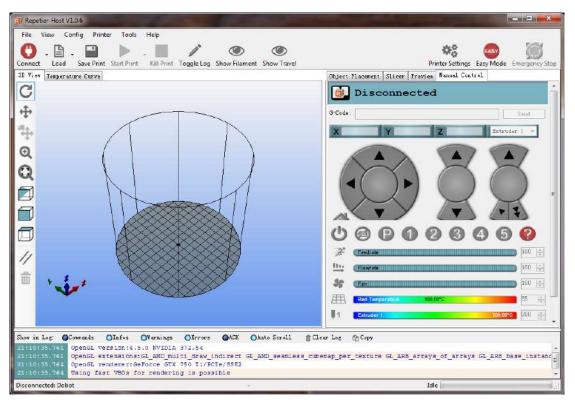


Figure 8.7 Repetier host

Note: If the current software is set for 3D printing, you can open DobotStudio directly when you want to use next time. Click **Connect**, select **Ok**, and then you can switch to Repetier Host, as follows:

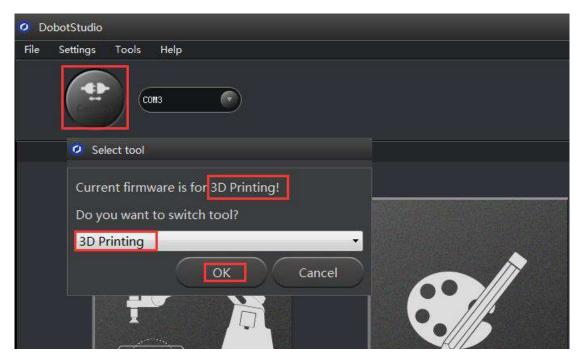


Figure 8.8 Switch into 3D printing automatically



8.2.2 Parameter Settings of 3D printing for the first time

Set this up when you use it for the first time ONLY. (You don't need to do this twice!) Click '**Printer settings**' in the top right corner of the interface, and set related parameters in the pop up diaglogue box:

(1) Connection lable settings

Printer Name: Dobot (can be named by oneself)

Select Dobot Serial Port: Dobot serial port

Baud Rate: 115200

Reset on connect:DTR low->high->low

Reset on Emergency: Send emergency command+DTR high->low(If failed to connect, please try other options)

Receive cache size: 63

The rest keep the default settings, click **Apply** after setting.

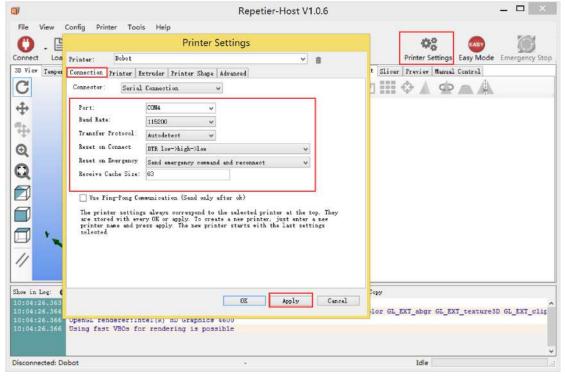


Figure 8.9 Connection Settings

(2) Connection Lable Settings



Printer Setting	gs							
Printer:	Dobot						•	m
Connection	Printer	Extruder	Print	er Shape	Advanced			
Travel Fee	ed Rate:			4800		[mm/min]		
Z-Axis Fe	ed Rate:			100		[mm/min]		
Manual Ex	trusion Sp	peed:		2		20		[mm/s]
Manual Re	traction 3	Speed:		30		[mm/s]		
Default E	xtruder T	emperature	:	200		°C		
Default H	eated Bed	Temperatu	re:	55		°C		
☐ Remove Check eve Park Posi ☑ Send EJ ☑ Disable ☐ Disable Add to com	temperat ry 3 seco: tion: X: CA to prir E Extruder Motors a pp. Printi	0 nter displa after Job/M	ts fro U Y y /Kill	m Log	Dis Dis	to Park Pos able Heated nter has SD	Bed aft card	ter Job/Kill er Job/Kill]Z-Axis
					OK		Apply	Cancel

uncheck the following three settings and keep the rest default:

Figure 8.10 Printer settings



Number of Extruder: Max. Extruder Temperature: Max. Bed Temperature: Max. Volume per second Printer has a Mixing Extruder (one nozzle for all colors) Extruder 1 Name: Diameter: 0.4 Color: Max. 0.4 Color: Color: Max. Extruder 1 Color:	onnection	Printer	Extruder	Frinter Shape Advanced		•
Max. Extruder Temperature: 250 Max. Bed Temperature: 120 Max. Volume per second 12 [mm ³ /s] Printer has a Mixing Extruder (one nozzle for all colors) Extruder 1 Name: Diameter: 0.4 [mm] Temperature Offset: 0 [° C] Color:	Number o	f Extrude	er:	1		
Max. Volume per second 12 [mm ³ /s] Printer has a Mixing Extruder (one nozzle for all colors) Extruder 1 Name: Diameter: 0.4 [mm] Temperature Offset: 0 [° C] Color:	Max. Ext	ruder Tem	perature:	a strange to the second se		
Printer has a Mixing Extruder (one nozzle for all colors) Extruder 1 Name: Diameter: 0.4 [mm] Temperature Offset: 0 [° C] Color:	Max. Bed	l Temperat	ure:	120		
Extruder 1 Name: Diameter: 0.4 [mm] Temperature Offset: 0 [° C] Color:	Max. Vol	ume per s	econd	12 [mm ³ /s]		
Color:					-	
	1996 (1997) A.	U. 4		[mm] lemperature Offset:	U	[- 1]
Offset X: 0 Offset Y: 0 [mm]		0		Offset Y:	0	[mm]

Figure 8.11 Extruder Settings

(4) Printer Shape Settings

Select circle printer and the detailed parameters as follows:

Home X: Min

Home Y: Min

Home Z: 0

Print area radius: 80mm

Print area height: 150mm

Click Apply after setting.



rinter: Dobot			▼ 前	
onnection Printer	Extruder Printer Sha	ape Advanced		
rinter Type:	ostock Printer (circul	ar print sha 🔻		
fome X: Min	➡ Home Y: Min	➡ Home Z:	0 🔹	
rintable Radius:	80	mm		
rintable Height:	150	mm		

Figure 8.12 Printer Shape Settings

After setting parameters, return to the main interface. Open the Dobot main power supply, insert USB, and click **Connect** at the top left corner of main interface. Then, we can connect Dobot. The LED will turn green and the temperature will be shown below the interface:



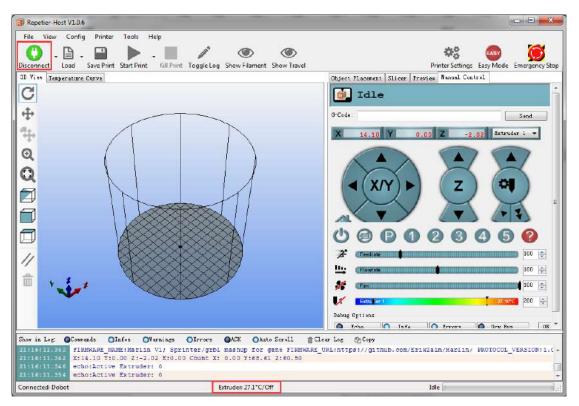


Figure 8.13 Connect Dobot

8.2.3 Preparation before Printing

We need to melt the plastic to be able to have it flow properly, so we first heat the extrusion head.

Here, set heating temperature to 200° C and then click the **heating button** on the control panel to heat it. s

M Notice:

The heating rod will produce high temperature up to 250°C, so please be careful !

DO NOT let children play with it alone.

The process needs to be monitored when it is running.

After the process, please turn off the equipment promptly.



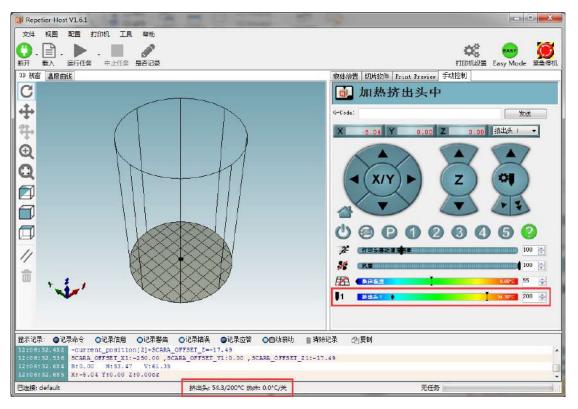


Figure 8.14 Heat the Extrusion Head

When the heating temperature is up to 200° C, click the extruder feeder and feed up to 10-30mm, as shown below:

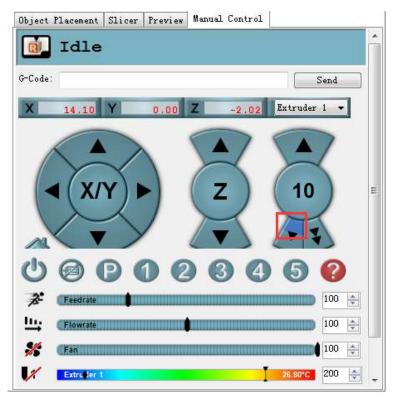


Figure 8.15 Extrude filaments



If melted materials flows from nozzle of the extruder, then it means the extruder is working properly:

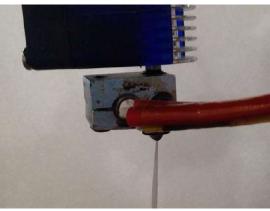


Figure 8.16 Filament Extrusion

Note: If the filament extrusion is in the opposite direction, simply remove the filament, turn the extruder around, and replace the filament.

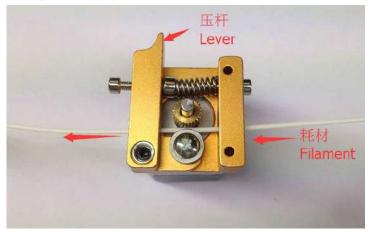


Figure 8.17 Reverse installation diagram of the extruder

8.2.4 Adjust the printing space and get printing coordinates

During printing, if the distance between the nozzle and print is too large to paste the print bed of the first layer or if the distance is too small, which will cause a blockage, we need to adjust the proper distance for smooth printing. Generally, the thickness of a sheet of paper is OK so paste a layer of masking tape on the glass print bed in order to have the first layer printed adhere better.



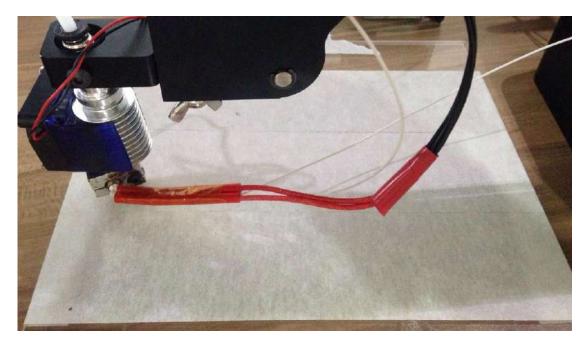


Figure 8.18 Masking tape

Adjustment process: Press the **Unlock** key on the forearm and drag the printing head to contact the surface of the masking tape. Then, press "key" at the base of the Dobot to save the current Z value (or insert **M415** in the command line, enter and get the current Z value).

Notice:

After sending M415 or press "KEY", Dobot will get current coordinates, if it is successful, you will hear a beep. Also, you don't have to insert the command next time when printing. The window of command is shown below:

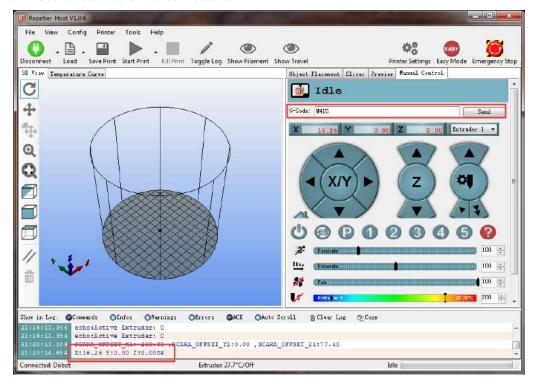
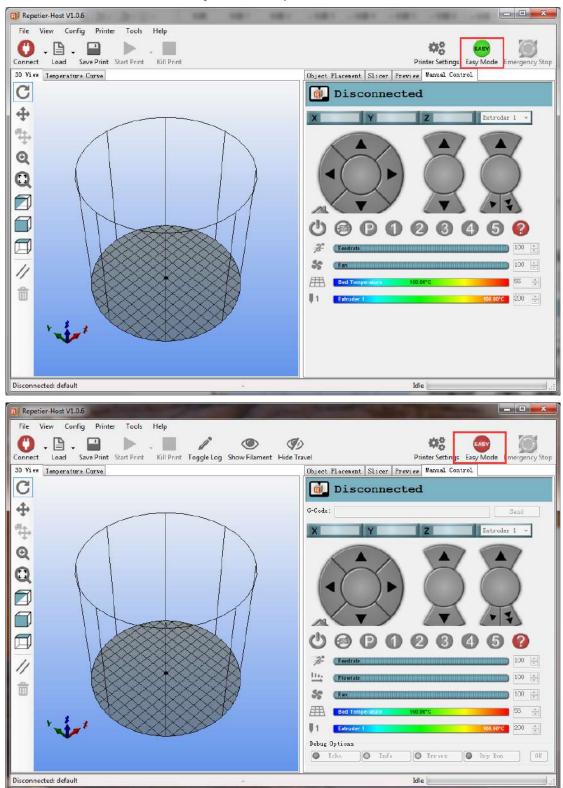


Figure 8.19 Sending out M415 command





If you cannot find the command line window, please close Easy mode, as shown below:

8.2.5 Import Model

The file format of 3D printing is STL, which is employed universally. Users can build one's own 3D model and transfer it into a STL file, or search for free models to import them directly. Click open, import 3D model file (in STL format), as shown below:



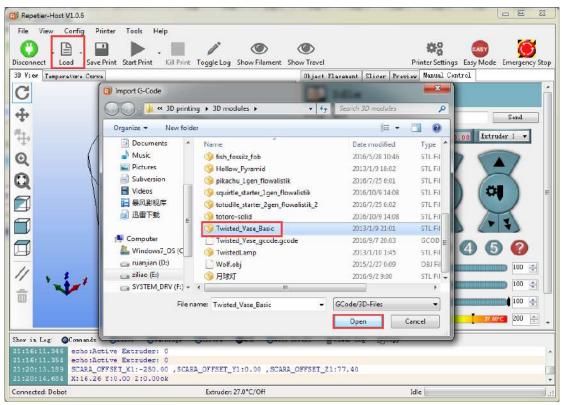


Figure 8. 20 Import Models

Model Center/Scale: Users can operate the model to place in the middle, zoom or rotate and any other functions.

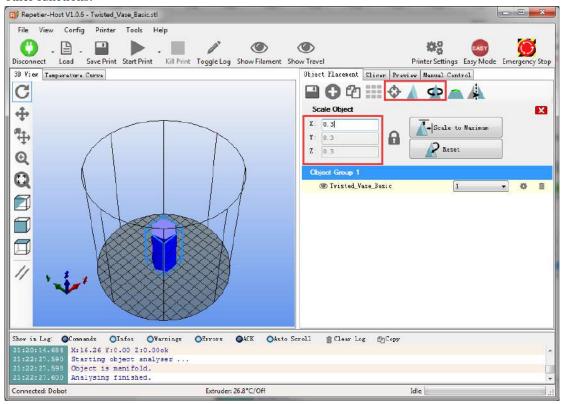


Figure 8.21 Model Center/Scale

8.2.6 Set slice parameters and slice up

Select slice engine Slic3r and click Configuration to set slice parameters.



Repetier-Host V1.0.6 - Twisted_Vase_Basic.	sti			
File View Config Printer Tools	Help			
Disconnect Load Save Print Start Print	+ 🚺 🖋 🔘 t Kill Print Toggle Log Show Filament S	Chow Travel	Printer Settings Ease	Mode Emergency Stop
3D View Temperature Curve	. Martine rogge cog storriteriete .		licer Preview Manual Control	mode emergency stop
C		Slice	with Slic3r	Kill Shong
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			1 Co	mfiguration _
		Print Setting	Dobot 2.0 Vase	-
		Printer Settings Filament settings:	Dobot 2.0 Vase	<u> </u>
	\perp $ A $		Dobot 2.0 Vase	
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			Settings to Override	
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		Layer Height: 0.2	m	
		Infill Density	0	
	Warnings Offrors OACK OAuto	Scroll 🖀 Clear Log	Copy	
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21:22:27.598 Object is manifold. 21:22:27.600 Analysing finished.				*
Connected: Dobot	Extruder: 27.5°C/Off		ldle	J
💋 Slic3r			of 6	
File Window Help				
Print Settings Filament Settings P	rinter Settings			
- default - 👻 🗒 🤤	Layer height			
Layers and perimeters	Layer height:	0.3	mm	
Infill Skirt and brim	First layer height:	0.35	mm or %	
L Support material				
Speed Wultiple Extruders	Vertical shells	~		
Je Advanced	Perimeters:	3	(minimum)	
Output options	Spiral vase:			
	Horizontal shells	a		
	Solid layers:	Top: 3	Bottom: 3	
	Ourlie (dama disian)			
	Quality (slower slicing) Extra perimeters if needed:			T I
	Avoid crossing perimeters:			
	Detect thin walls: Detect bridging perimeters:			
		(here al)		
	Advanced			
	Seam position:	Aligned 👻		
	External perimeters first:			
	External perimeters first:			

Figure 8.23 Main interface of parameter settings



Its important to set slice parameters, so users should get the best slice parameters according to printed models and tested performance of the equipment. Here we suggest a configuration file that can be impoted from **attachement** of DobotStudio:

ile Home Share					
	obotStudioV1.2.3 → attachment	ٽ ~	Search attachment		,
^	Name	Date modified	Туре	Size	
📌 Quick access	CH341SER LINUX	2016-10-04 11:33	File folder		
🕂 Downloads 🖈	CH341SER WIN	2016-10-04 11:33	File folder		
📃 Desktop 🛛 🖈	Dobot 2.0 Vase	2016-10-05 9:10 PM	Configuration sett	5 KB	
🔮 Documents 🖈	Dobot 2.0	2016-10-05 9:10 PM	Configuration sett	5 KB	
📰 Pictures 🛛 🖈	Dobot-2.0 Vase-Cura	2016-10-05 4:35 PM	Configuration sett	11 KB	
3D Printing	Dobot-2.0-Cura	2016-10-05 4:35 PM	Configuration sett	11 KB	
Laser Engraving	闄 vc_redist.x64	2016-09-09 12:22	Application	14,231 KB	
Messages	闄 vc_redist.x86	2016-09-13 2:22 PM	Application	13,446 KB	
Workflow	闄 vcredist_x64	2016-09-09 12:45	Application	7,027 KB	
WORKNOW	🛃 vcredist_x86	2016-07-28 11:55	Application	6,353 KB	
🕋 OneDrive					
💻 This PC					
E Desktop					
Documents					
Downloads					
h Music Y					

图 8.24 Config files

Dobot-2.0-Vase.ini is used for printing a thin-valled vase, while Dobot-2.0.ini is used for filling, (the filling rate is 15%).

Import the file after downloading: Click File->Load configto load.ini file.



Slic3r	11.00		1		
Window Help					
Load Config	Ctrl+L				
Export Config	Ctrl+E				
Load Config Bundle			0.3		
Export Config Bundle		iht:	0.35	mm mm or %	
Quick Slice	Ctrl+U	Inc	0.55	mm or 76	
Quick Slice and Save As	Ctrl+Alt+U				
Repeat Last Quick Slice	Ctrl+Shift+U				
Slice to SVG	Ctrl+G		3	🚔 (minimum)	
	curro				
Repair STL file					
Preferences	Ctrl+,	ills			
Quit			Top: 3	Bottom:	3
-	1	<u></u>			
	Quality (slo	wer slicing)			
	1000 ST 100	eters if needed:			
		ing perimeters:			
	Detect thin		V		
	Detect brid	ging perim <mark>et</mark> ers:			
	Advanced				
	Seam positi		Aligned 🔻		
	External per	imeters first:			
Slic3r : Window Help					5-1-41
t Settings Filament Setting	s Printer Settings				
efault - 💋 Select configu	ration to load:	-	-		×
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1.2.2	1 A	Dobot 2.0		2016/8/24 14:36	Configura
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	File name: 🚦	onfig	✓ INI f	iles *.ini	-
				Open 🔽 Can	
C	1				
on 1.1.7 - Remember to che	ck for updates at http	o://slic3r.org/			

Figure 8.25 Import configuration file



After importing the file, users need to save the three labels: Print settings, Filament settings and Printer settings. Users can rename them, but the default names are recommended for clarity:

Slic3r		1.0		
le Window Help				
int Settings Filament Settings	Printer Settings			
lobot 2.0 Vase.ini 🔹 📄	Layer height			
Layers and perimeters	Layer height:	0.2	mm	
Infill Save preset	×	0.35	mm or %	
Speed				
Skirt and brin Support mati	ings as:			
Notes Dobot 2.0 Vas	se 🔻 "ım):	1		
Output optio	Cancel	V		
Multiple Extr		(Areas)		
³ Advanced	Horizontal shells			
	Solid layers:	Top: 0	Bottom: 2	
		· · ·		
	Quality (slower slicing)			
	Extra perimeters if needed:	V		
	Avoid crossing perimeters (slow):			
	Detect thin walls: Detect bridging perimeters:	V		
	Detect bridging permeters.	V		
	Advanced			
	Seam position:	Aligned		
	External perimeters first:	Alighed		
	External permeters first.	<u>B</u>		
sion 1.1.7 - Remember to check f	and the states //sla2.and/			

Figure 8.26 Save configuration file

Slice: After finishing above settings, save the settings of each label, and return to main interface. Select **slic3r**, import slice settings and **click Slice with Slic3r.io**



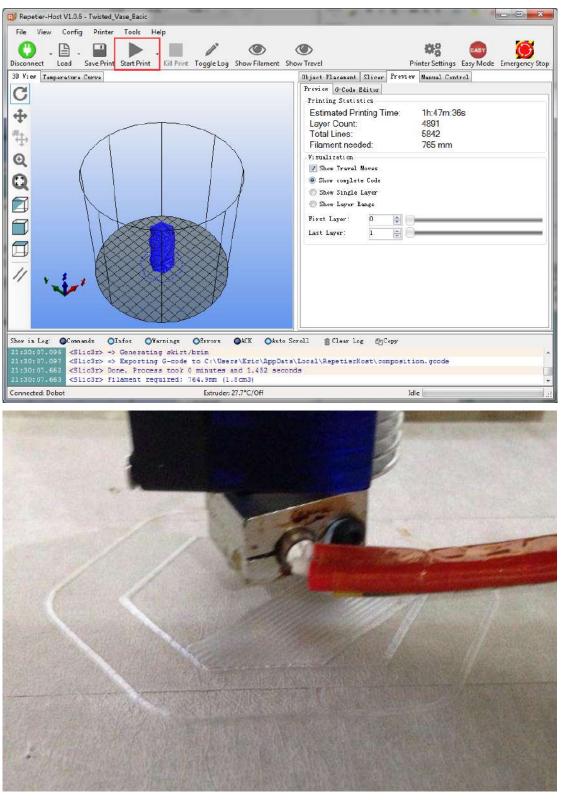
Repetier-Host V1.0.6 - Twisted_Vase_Basic.stl	
File View Config Printer Tools Help	
Disconnect Lead Save Print Start Print Kill Print Toggle Log Show Filament Si	www.Travel Printer Settings Easy Mode Emergency Stop
3D View Temperature Curve	Object Flacement Slicer Proview Manual Control
C	Slice with Slic3r
	Slicer: Slic3r + @@Manager
	Configuration
	Print Setting: Dobot 2.0 Vass
	Printer Settings Dabat 2.0 Vasa
	Filament settings
	Extruder 1. Dobot 2.0 Vase
	Deuride Sließr Settings Copy Frint Settings to Override
	Inable Support
	Thable Cooling Layer Height: 0.2 mm
	Infill Density Density D
Show in Log: @Commands OInfos OWarnings OFrrors OACK OAuto S	Scroll 💼 Clear Log 🖉 Copy
21:26:07.553 <slic3r> Unknown option infill_overlap 21:26:07.553 <slic3r> Unknown option external_perimeter_extrusion</slic3r></slic3r>	width
21:26:07.553 <slic3r> Unknown option support_material_contact_dis 21:26:07.553 <slic3r> Unknown option octoprint_host</slic3r></slic3r>	
Connected: Dobot Extruder: 27.1°C/Off	Idie
Repetier-Host V1.0.6 - Twisted_Vase_Basic	
Repetier-Host V1.0.5 - Twisted_Vase_Basic File View Config Printer Tools Help	
File View Config Printer Tools Help	<u>ه</u> به ا
	<u>ه</u> به ا
File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filament St	Dijact Flacement Slicer Freview Manual Centrel
File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filement Si 30 View Temperature Curve C	Tow Travel Printer Settings Easy Mode Emergency Stop
File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filement Si 30 View Temperature Curve C	Image: Second
File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filement Si 30 View Temperature Curve C	Image: State of the s
File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filament St	Printer Settings Easy Mode Emergency Stop Dijact Flacement Slicer Preview Manual Control Preview G-Code Editor Frinting Stetistics Estimated Printing Time: 1h:47m:36s Layor Count: 4891 Total Lines: 5842 Filament needed: 765 mm Visualization
File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filement S 30 View Temperature Curve	Printer Settings Easy Mode Emergency Stop Diject Flacement Slicer Preview Meanual Control Preview Grode Editor Frinting Stetistics Estimated Printing Time: 1h:47m:36s Layer Count: 4891 Total Lines: 5842 Filament needed: 765 mm
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File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filement S 30 View Temperature Curve	Printer Settings Easy Mode Emergency Stop Dijact Flacement Slicer Preview Manual Central Preview G-Code Editor Frinting Statistics Estimated Printing Time: 1h:47m.36s Layor Count: 4891 Total Lines: 5842 Filament needed: 765 mm Visualization Show Traval Movae Show complete Code
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File View Config Printer Tools Help	Average Printer Settings Easy Mode Emergency Stop Dijact Flacement Slicer Freview Manual Central Preview G-Code Editor Frinting Stetistics Estimated Printing Time: 1h:47m 36s Layor Count: 4891 Total Lines: 5842 Filament needed: 765 mm Visualization Show Taval Movae Show Single Layer Show Layer Range First Layer: 0 D
File View Config Printer Tools Help	Average Printer Settings Easy Mode Emergency Stop Dijact Flacement Slicer Freview Manual Central Preview G-Code Editor Frinting Stetistics Estimated Printing Time: 1h:47m 36s Layor Count: 4891 Total Lines: 5842 Filament needed: 765 mm Visualization Show Taval Movae Show Single Layer Show Layer Range First Layer: 0 D
File View Config Printer Tools Help	Average Printer Settings Easy Mode Emergency Stop Dijact Flacement Slicer Freview Manual Central Preview G-Code Editor Frinting Stetistics Estimated Printing Time: 1h:47m 36s Layor Count: 4891 Total Lines: 5842 Filament needed: 765 mm Visualization Show Taval Movae Show Single Layer Show Layer Range First Layer: 0 D
File View Config Printer Tools Help	Average Printer Settings Easy Mode Emergency Stop Dijact Flacement Slicer Freview Manual Central Preview G-Code Editor Frinting Stetistics Estimated Printing Time: 1h:47m 36s Layor Count: 4891 Total Lines: 5842 Filament needed: 765 mm Visualization Show Taval Movae Show Single Layer Show Layer Range First Layer: 0 D
File View Config Printer Tools Help	Average Printer Settings Easy Mode Emergency Stop Dijact Flacement Slicer Freview Manual Central Preview G-Code Editor Frinting Stetistics Estimated Printing Time: 1h:47m 36s Layor Count: 4891 Total Lines: 5842 Filament needed: 765 mm Visualization Show Taval Movae Show Single Layer Show Layer Range First Layer: 0 D
File View Config Printer Tools Help Disconnect Load Save Print Start Print Toggle Log Show Filement S 30 View Temperature Curve	Average Provide a constraint of the second sec
File View Config Printer Tools Help Disconnect Load Save Print Start Print Kill Print Toggle Log Show Filement S 30 Vier Temperature Curve C C C C C C Show in Lag: Commands Olafos Overnings Otross OACK OAuto 3 211:301:07.005 <slic3z> -> Generating skirt/brin</slic3z>	An and the second seco
File View Config Printer Tools Help Disconnect Load Save Print ScattPrint Kill Print Toggle Log Show Filement S 30 View Temperature Curve	Average Average Average Average Average Average Average Average Average Average Average
File View Config Printer Tools Help Disconnect Load Save Print StartPrint Kill Print Toggle Log Show Filement S 30 Vier Temperature Curve	Average A

Figure 8.27 Finish slice

8.2.7 Start to Print

Now, click **Start print** at the top left corner of main interface to print:





Here we choose **vase mode**, and the product after printing as follows:





Figure 8.28 The Product of Printing



8.3 Cura Introduction for 3D printing

If you want to use Cura for 3D printing, the details seen as follows:

Notice: Installation of accessories and firmware burning shown as Repetier Host 3D printing.<u>8.2</u> Repetier Host

8.3.1 Cura parameter settings

Cura is a free software that can be downloaded on its official website. We recommend you to use Version **V14.07**. You can download the software here:

https://ultimaker.com/en/products/cura-software/list

The software interface is as follows:

Cura - 14.07 File Tools Machine Expe	rt Heln	-	
Basic Advanced Plugins			F 78
Quality			k
Layer height (mm)	0.2		
Shell thickness (mm)	0.8		
Enable retraction	\checkmark		
Fill			
Bottom/Top thickness (mm	0.6		
Fill Density (%)	15		
Speed and Temperature			
Print speed (mm/s)	5		
Printing temperature (C)	200		6
Support			
Support type	None	• •	
Platform adhesion type	None		
Filament	10.		
Diameter (mm)	1.75		
Flow (%)	100.0		

Figure 8.29 Cura interface

Machine->machine settings, set related parameters in the pop-up dialog:

- (1) Connection label settings
 - maximum width: 80mm maximum depth: 80mm maximum height: 150mm;Machine center 0,0: Need tickBuild Platform shape: Circular
 - COM port setting: The corressponding COM port in the device management

Baud rate: 115200

You can also choose to change the machine's name. Keep the rest of the default settings and click OK after finishing.



Cura - 14.07			-	
File Tools Machine Expert	Help			
Basic Adva Dobot Magic	ian			R
Quality Reprap				144
Layer heigh Machine sett	ings			
Shell thickn Install defaul	t firmware			
Enable retr Install custor	n firmware			
Fill Contraction (contraction)	0.6			
Bottom/Top thickness (mm) Fill Density (%)	15			
	15			
Speed and Temperature	5			
	200			
	200			
Support]			
	None 👻		~	
	None 👻			
Filament				
Diamacai (miny	1.75			
Flow (%)	100.0			
				7
Machine settings				×
Dobot Magician				
Machine settings			Printer head size	
E-Steps per 1mm filament	t 0		Head size towards X min (mm)	0.0
Maximum width (mm)	80		Head size towards Y min (mm)	0.0
Maximum depth (mm)	80		Head size towards X max (mm)	0.0
Maximum height (mm)	150		Head size towards Y max (mm)	0.0
Extruder count	1	•	Printer gantry height (mm)	0.0
Heated bed			Communication settings	
Machine center 0,0	Circular		Serial port	сомз 🗸
Build area shape	Circular	▼	-	
GCode Flavor	RepRap (Marlin/Sprin	iter) 🔻	Baudrate	115200 -
Ok Add new	machine Remove	machine	ange machine name	

Figure 8.30 Machine settings

(2) Import configuration file

It is vital to set slice parameters so users should get the best slice parameters according to printed models and tested performance of equipment. Here we suggest a configuration file that can be impoted from **attachment** of DobotStudio:

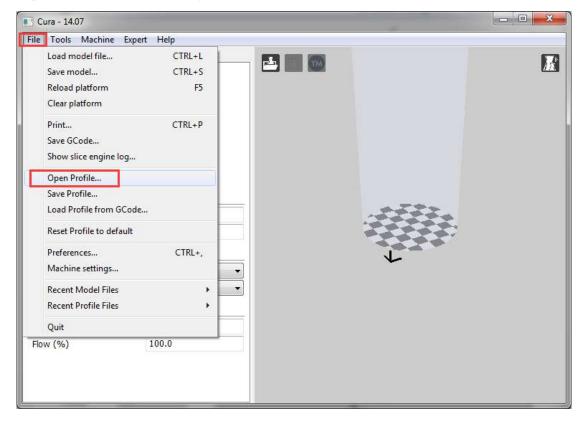


ile Home Shar	:\Administrator\Desktop\DobotStudioV1.2.3 re View			- 0	~
	DobotStudioV1.2.3 > attachment	ٽ ~	Search attachment)
A	Name	Date modified Ref	resh "attachment" (F5)	Size	
A Quick access	CH341SER_LINUX	2016-10-04 11:33	File folder		
🕂 Downloads 🖈	CH341SER_WIN	2016-10-04 11:33	File folder		
📃 Desktop 🛛 🖈	Dobot 2.0 Vase	2016-10-05 9:10 PM	Configuration sett	5 KB	
🚆 Documents 🖈	Dobot 2.0	2016-10-05 9:10 PM	Configuration sett	5 KB	
📰 Pictures 🛛 🖈	💩 Dobot-2.0 Vase-Cura	2016-10-05 4:35 PM	Configuration sett	11 KB	
3D Printing	📓 Dobot-2.0-Cura	2016-10-05 4:35 PM	Configuration sett	11 KB	
Laser Engraving	闄 vc_redist.x64	2016-09-09 12:22	Application	14,231 KB	
Messages	😸 vc_redist.x86	2016-09-13 2:22 PM	Application	13,446 KB	
Workflow	🗒 vcredist_x64	2016-09-09 12:45	Application	7,027 KB	
WORNDW	🚽 vcredist_x86	2016-07-28 11:55	Application	6,353 KB	
🗥 OneDrive					
💻 This PC					
📃 Desktop					
Documents					
Downloads					
h Music 🗸					
0 items					8==

Figure 8.31 Configure files

Dobot-2.0-Vase.ini is used for printing a thin-valled vase, while Dobot-2.0.ini is used for the filling. (The filling rate is 15%.)

Import the file after downloading: Click File->Load Profile.





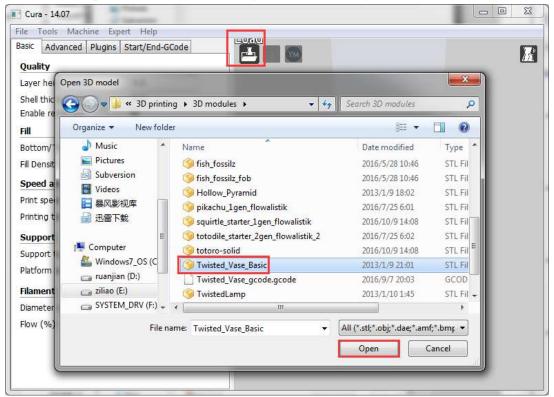
	ed Plugins Start/En	m-GC	ode.			x
iyer heig 🄇	🌏 🔵 🗢 📕 🕨 Dob	otStu	dioV1.2.5 🕨 attachment 🕨	▼ 4 ₂	Search attachment	Q
ell thick	Organize 🔻 New	folde	:r			
	🚖 Favorites	*	Name		Date modified	Туре
ttom/T	🧮 Desktop		CH341SER_LINUX		2016/10/9 16:58	File folder
Density	퉳 Downloads	-	CH341SER_WIN		2016/10/9 16:58	File folder
	🔛 Recent Places	-	Dobot 2.0 Cura		2016/10/5 16:35	Configura
eed ar			Dobot 2.0 Vase Cura		2016/10/5 16:35	Configura
nt spee	詞 Libraries		Dobot 2.0 Vase		2016/8/24 14:45	Configura
ting te	Documents		Dobot 2.0		2016/8/24 14:36	Configura
pport	J Music					
port t	Pictures					
form a	Subversion					
	Videos	-	< [m		*
ment					E TEL MET D	
neter		ile na	ime:	-	ini files (*.ini)	•
v (%)					Open 🔫 🤇	Cancel

Figure 8.32 Import configuration settings

For more detailed printing parameters, go to the Cura website!

(3) Open the model and connect Dobot

Click **Load**, import a 3D model, and Cura will slice up automatically. You can also select different modes in the drop-down list located on the right to check if its trajectory is correct or not::





Cura - 14.07			
File Tools Machine Exper	t Help		
Basic Advanced Plugins S	itart/End-GCode		
Quality		nour 50 minutes	Normal
Layer height (mm)	0.2	26 meter 4 gram	Overhang
Shell thickness (mm)	0.4		Transparent
Enable retraction	V		Layers
Fill			
Bottom/Top thickness (mm)	0.6		
Fill Density (%)	15		
Speed and Temperature			
Print speed (mm/s)	5		
Printing temperature (C)	200		
Support			
Support type	None 👻		
Platform adhesion type	None 👻		
Filament			
Diameter (mm)	1.75		
Flow (%)	100.0		

Figure 8.33 Import a model

Click the model to operate it. You can place it in the middle, zoom or rotate, as well as other functions.

Cura - 14.07				x
File Tools Machine Exp	ert Help			
Basic Advanced Plugins	Start/End-GCode			R
Quality			nour 50 minutes	17.
Layer height (mm)	0.2		26 meter 4 gram	
Shell thickness (mm)	0.4			
Enable retraction	V		W, D, H: 30.0, 30.0, 60.0 mm	
Fill				
Bottom/Top thickness (mm	1) 0.6			
Fill Density (%)	15			
Speed and Temperature				
Print speed (mm/s)	5		8	
Printing temperature (C)	200			
Support				
Support type	None	•	Scale X 0.3	
Platform adhesion type	None	•	Scale Y 0.3	
Filament			Scale Z 0.3	
Diameter (mm)	1.75		Size X (mm) 30.0	
Flow (%)	100.0		Size Y (mm) 29.99	
			Size Z (mm) 60.0	
			🖄 Uniform scale 🔒	
			$\Xi \overline{\Lambda} \pi$	



After importing a model, **Print with USB** on the main interface will be activated. Click it to connect to Dobot automatically. The screen will show the current printing temperature on the top corner of the window. At the same time, the Printing key will be activated, as shown below:

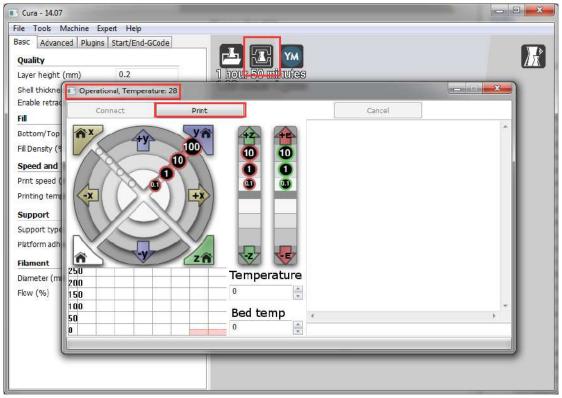


Figure 8.34 Connect Dobot

8.3.2 Preparation before Printing

Before printing, test the function of the extruder. Test to see if the filament flows in and out and if the direction of the filament is in reverse. Set the heating temperature to 200° C and then press enter to heat the nozzle.

M Notice:

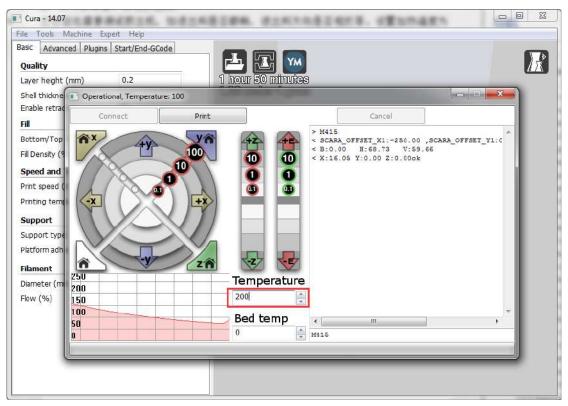
The heating rod will produce high temperatures up to 250°C, please be careful!

DO NOT let children play with it alone.

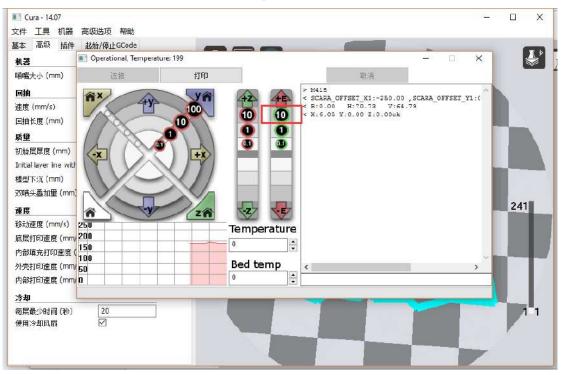
The process needs to be monitored when it is running.

After the process, please turn off the equipment promptly.





In the heating process, the fan will turn on automatically. When the heating temperature is up to 200° C, click the feedstock extruder and feed up to 10-30mm, as shown below:



If melted filament flows from the nozzle of the extruder, then it means the extruder is working properly:



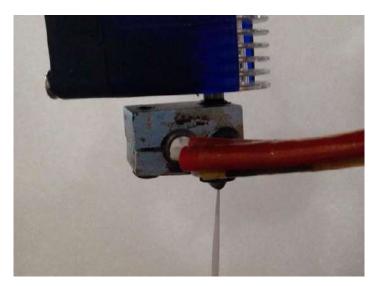


Figure 8.35 Filament Extrusion

Note: If the filament extrusion is in the opposite direction, simply remove the filament, turn the extruder around, and replace the filament.

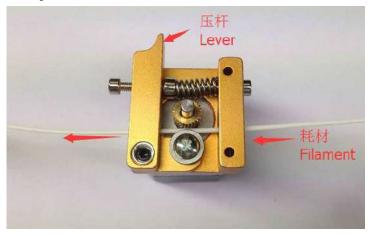


Figure 8.36 Reverse installation diagram of the extruder



8.3.3 Adjust the printing space and get printing coordinates

Note: For more detailed steps, please refer to the above chapter Repetier Host.

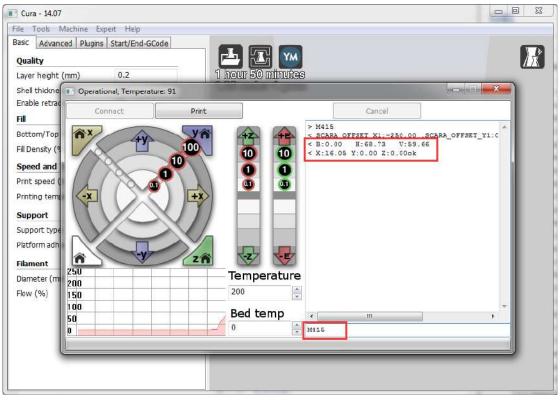
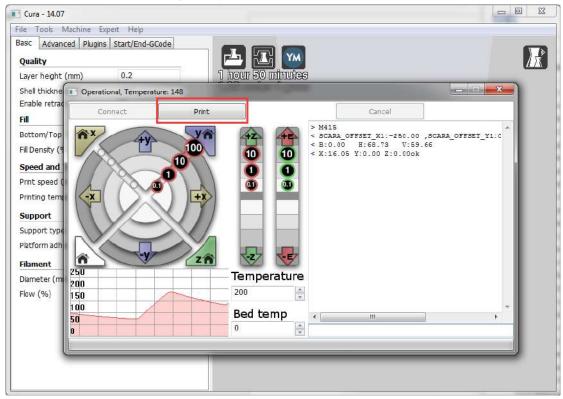


Figure 8.37 Distance adjustment

8.3.4 Start printing

Just click **Print**, and then start printing.





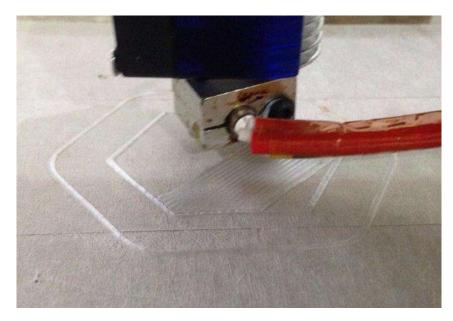


Figure 8.38 Start printing

Note: During the printing, if the distance between the nozzle and print is too large or too small to paste the print bed of the first layer, there may be a blockage. We need to adjust the proper distance for smooth printing. If it is not proper height when printing the first layer, we can change the parameters in the **initial-layer thickness**. (For example, -0.1mm or +0.1mm.) After fixing it, Cura will slice the model automatically. Then you can test the print again. After testing, the default heught of first layer is 0.87mm.

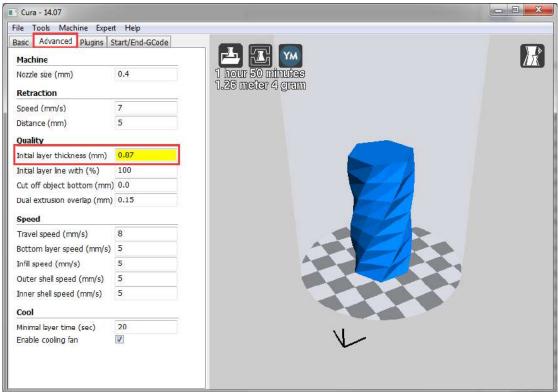


Figure 8.39 Amend the height of first layer



Here we choose vase mode, and the product after printing as follows:



Figure 8.40 The Product of Printing

8.3.5 Text note

Parameters Introduction of 3D printing Here we only introduce necessary parameter settings, and one can review the related links about the

rest parameters: <u>http://manual.slic3r.org/</u>

Printer settings
 Set the height of print layer: 0.2mm;
 The height of first layer: 0.35mm;



int Settings Filament Settin	gs Printer Settings		
lobot 2.0 🔹	🕒 Layer height		
Layers and perimeters	Layer height:	0.2	mm
Infill Skirt and brim	First layer height:	0.35	mm or %
Support material	Vertical shells		
Multiple Extruders Advanced	Perimeters:	2	(minimum)
Output options Notes	Spiral vase:		
	Horizontal shells		
	Solid layers:	Тор: 3	Bottom: 3
	Quality (slower slicing)		
	Extra perimeters if needed:		
	Avoid crossing perimeters: Detect thin walls:	V	
	Detect bridging perimeters:	V	
	Advanced		
	Seam position:	Aligned 💌	
	External perimeters first:		

Spiral vase: Check this one and click Yes. Then we can print unfilled vase.

le Window Help				
rint Settings Filament Settin	gs Printer Settings			
Dobot 2.0 (modified) 🔹 🚽	lo Layer height			
Layers and perimeters	Layer height:	0.2	mm	
Infill Skirt and brim	First layer height:	0.35	mm or %	
 Support material Speed Multiple Extruders 	Vertical shells			
Advanced	Perimeters:	2	(minimum)	
Output options	Spiral vase:	V		
Notes		There are a second		
	Spiral Vase			
	The Spiral Vase mode - one perimeter - no top solid layers - 0% fill density - no support material	requires: ttings in order to enable S	tom: 3	Y
	The Spiral Vase mode - one perimeter - no top solid layers - 0% fill density - no support material	ttings in order to enable S	ipiral Vase?	X



The fill rate settings:

le Window Help rint Settings Filament Settings	In the second			
-				
lobot 2.0 🔹 🚽 🔚 🤅	Infill			
Lavers and perimeters	Fill density:	20 👻 %		
Infill	Fill pattern:	Rectilinear	*	
Support material	Top/bottom fill pattern:	Rectilinear	*	
Speed		23 	and the second se	
Multiple Extruders Advanced	Reducing printing time			
Output options	Combine infill every:	1	ayers	
Notes	Only infill where needed:			
	Advanced Solid infill every: Fill angle: Solid infill threshold area: Only retract when crossing perimeters: Infill before perimeters:	0 45 70 🔽	layers → → mm ²	

If users need print support, please tick Generate support material:

rint Settings Filament Settings	Printer Settings		
Dobot 2.0 👻 🔚	Support material		
Layers and perimeters Infill Skirt and brim	Generate support material: Overhang threshold: Enforce support for the first:	0 0	× • × layers
Speed Multiple Extruders Advanced Output options Notes	Raft Raft layers:	0	▲ layers
	Options for support material and Contact Z distance:	0.2 (detachable) 👻	mm
	Pattern: Pattern spacing:	pillars v 2.5	mm
	Pattern angle: Interface layers:	0 3	a a a a a a a a a a a a a a a a a a a
	Interface pattern spacing: Don't support bridges:	0	mm
	our copport undges	121	

The speed settings:



ile Window Help				
rint Settings Filament Settings	Printer Settings			
Dobot 2.0 🔹 🚽	Speed for print moves		1.12.14	
 Layers and perimeters Infill Skirt and brim Support material Speed Multiple Extruders Advanced Output options Notes 	Perimeters: Small perimeters: External perimeters: Infill: Solid infill: Top solid infill: Support material: Support material interface: Bridges:	5 5 5 5 5 5 100% 10	mm/s mm/s or % mm/s or %	
	Gap fill: Speed for non-print moves Travel:	5	mm/s	
	Modifiers First layer speed:	5	mm/s or %	
	Acceleration control (advanced) Perimeters:	0	mm/s²	

(2) Filament settings

Consumable diameter: 1.75mm The temperature: 200° C

Slic3r			
File Window Help Print Settings Filament Settings	Printer Settings		
Dobot 2.0 V Hereit		1.75 m 1	m
	Temperature (°C) Extruder: Bed:	First layer: 200 First layer: 0	
	٠.		



Open the fan:

💋 Slic3r	Statistics of the local division of	
File Window Help		
Print Settings Filament Settings	Printer Settings	
Dobot 2.0 🔹 🚽	Enable	
Filament	Keep fan always on: Enable auto cooling:	
	Fan will always run at 100% except	for the first 3 layers.
	Fan settings	
	Fan speed:	Min: 100
	Bridges fan speed:	100 👷 %
	Disable fan for the first:	3 ayers
	Cooling thresholds	
	Enable fan if layer print time is belov	
	Slow down if layer print time is below	
	Min print speed:	10 mm/s
	٠.	m
Version 1.2.9 - Remember to check f	or updates at http://slic3r.org/	

(3) Printer settings

The number of Extruder: 1

The nozzle Z offset of extruder: 0mm

Notice: If the height of nozzle is so large that consumables cannot paste onto the print bed or so small that it cannot discharge when printing the first layer, users can amend the height from this interface, such as -0.01mm or +0.01mm, thus, one need not adjust the height again.



int Settings Filament Setti	ngs Printer Settings				
General	Bed size:	x: 200	y: 200	mm	
Custom G-code	Print center:	x: 0	y: 0	mm	
Extruder 1	Z offset:	0		mm	
	Firmware				
	G-code flavor:				
	Use relative E distances:				
	Capabilities				
	Extruders:	1	*		
	Advanced				
	Use firmware retraction:				
	Vibration limit:	0		Hz	

G-code Settings:

Start G-code: M106 End G-code: M104 S0 ; turn off extruder G91 ; relative positioning G1 E-1 F300 ; retract the filament a bit before lifting the nozzle to release some of the pressure G1 Z+3 E-5 F{travel_speed} ;move Z up a bit and retract filament even more G1 Y+50 G90 M107



💋 Slic3r			x
File Window Help			
Print Settings Filament Settings P	inter Settings		
Dobot 2.0 🔹 🔚 🤤	Start G-code		1
Custom G-code	M106	*	
		-	
	End G-code	_	
	M104 S0 ; turn off extruder G91 ; relative positioning G1 E-1 F300 ; retract the filament a bit before lifting the nozzle to release some of the pressure G1 Z+3 E-5 F{travel_speed} ;move Z up a bit and retract filament even more G1 Y+50 G90 M107	*	
		*	
	Before layer change G-code		
		*	
/ersion 1.2.9 - Remember to check for	updates at http://slic3r.org/		R.

The nozzle diameter settings: 0.4mm;

The pump back speed settings: length=6 mm, speed=60 mm/s.

ettings Filament Settings t 2.0 👻 🔚 🤤	Printer Settings		
	Size		
eneral ustom G-code	Nozzle diameter:	0.4	mm
truder 1	Position (for multi-extruder printer	5)	
	Extruder offset:	х: 0 у: 0	mm
	Retraction		
	Length:	6	mm (zero to disable)
	Lift Z:	0	mm
	Speed:	60	mm/s
	Extra length on restart:	0	mm
	Minimum travel after retraction:	2	mm
	Retract on layer change:		
	Wipe while retracting:		
	Retraction when tool is disabled (ad	dvanced settings for	multi-extruder setups)
	Length:	10	mm (zero to disable)
	Extra length on restart:	0	mm
	Extra length on restart:	0	mm



9. Base Calibration and Sensor Calibration

9.1 Base Calibration

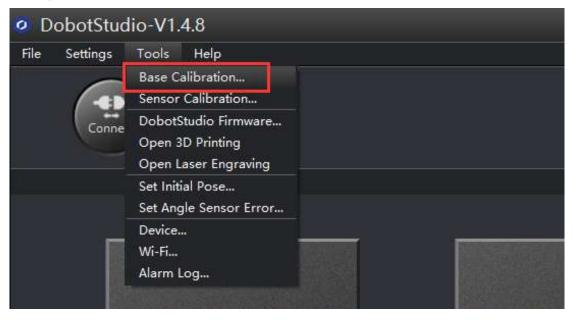
Dobot Magician has been carefully calibrated before being shipped out. If the home position isn't in the middle when you use the Dobot(errors between $1^{\circ} - 2^{\circ}$ is in the allowable range), it needs to be re-calibrated.



1. Put Dobot in the marked place, as shown below.

1. Figure 9.1 Put dobot in the marked place

2. Open Dobot Studio, click Tools, and choose Base Calibration, as shown below:





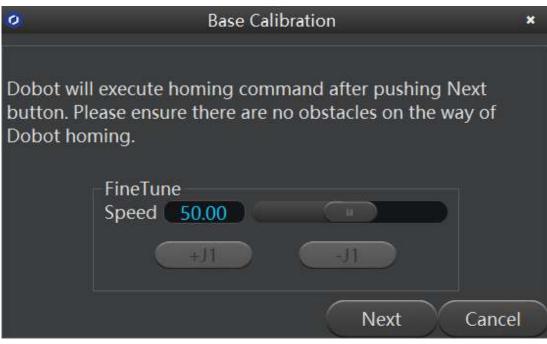
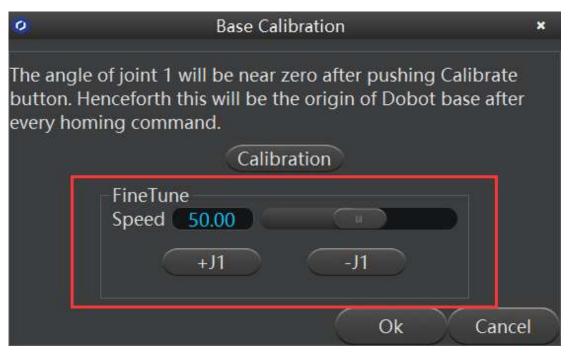


Figure 9.2 Base Calibration

- 3. Click **Next**, and Dobot will begin auto-homing. You can do the next step when the button changes from grey to white.
- 4. You need to fine tune the home position through +**J1** and **-J1** before clicking **Calibration**. put the nib in the line between A3 and B3, as shown below.







The angle of joint 1 will be near zero after pushing Calibrate button. Henceforth this will be the origin of Dobot base after every homing command.

1.Click Cal	bration Calibration
	eed 50.00
	+J1 -J1
	2.Click Ok Cancel



9.2 Sensor Calibration

If you find the pen faces upward paper during writing & drawing or 3D printing, the sensor needs to be calibrated. (The Dobot Magician has been carefully calibrated before shipping out. You don't need to re-calibrate it before using it.)

1. Put Dobot on the marked place, shown as below.



Figure 9.4 Put dobot in the marked place

2. Open Dobot Studio, click **Tools**, and choose **Sensor Calibration**, shown as below. Notice: Don't calibrate the sensor until all end effectors are removed!





0	Sensor Calibration	×
	Remove all End Effector from Dobot!	
	FineTune Speed 50.00	
	+X +Y +Z	
	Skip Next Can	cel

Figure 9.5 Sensor Calibration

3. Click **Next**, and the Dobot arm will carry out a preset action to compensate for the sensor coefficient of the front arm and rear arm.

0	Sensor Calibration	×
	Don't touch Dobot with your hand and wait a minute.	
	FineTune Speed 50.00	
	+X $+Y$ $+Z$	
	Skip Next Ca	ncel

Figure 9.6 Sensor Calibration

4. Click **Next** when the operation interface appears the instructions, shown as below.

0	Sensor Calibration	×
	Change RearArmAngleCoef From 0.9937 To 0.9923	
	Change FrontArmAngleCoef From <mark>0.9929</mark> To <mark>0.9941</mark>	
	FineTune Speed 50.00	
	+X +Y +Z	
	Skip Next Car	ncel





5. Continue to click **Next**.

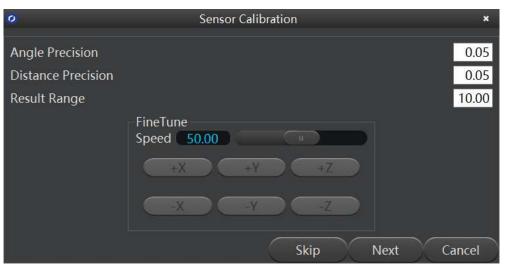


Figure 9.8 Sensor Calibration

6. Follow the instructions to calibrate sensor they appear and then click **Next**.

0	Sensor Calibration	×
	Step1. Install the Pen Effector On Dobot.	
	Step2. Hand hold Dobot to the place near 1st calibration position.	
	Step3. Use motion button to fine tune the position.	
	FineTune Speed 50.00	
	+X +Y +Z	
	Skip Next Ca	ncel

Figure 9.9 Sensor Calibration

After fine tuning, the nib should be in the center of A3, as shown below.

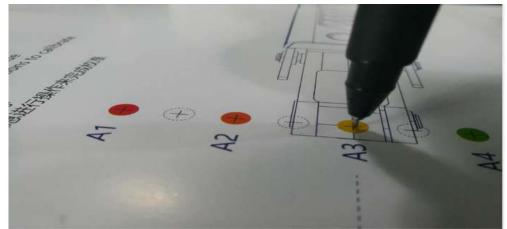


Figure 9.10 Sensor Calibration Board

7. Follow the instructions below, then click **Next**.





Figure 9.11 Sensor Calibration

Do not touch the Dobot. Use the motion button and move Dobot to 2^{nd} calibration position and fine tune it. Click **Next** when the nib is in the center of B3. Shown as below:

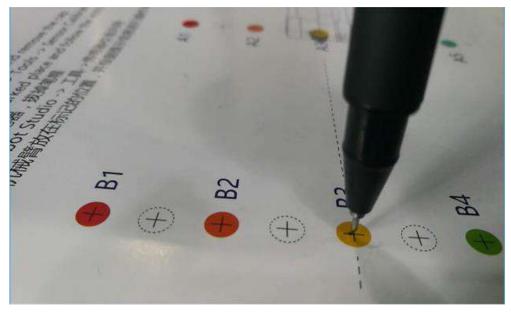
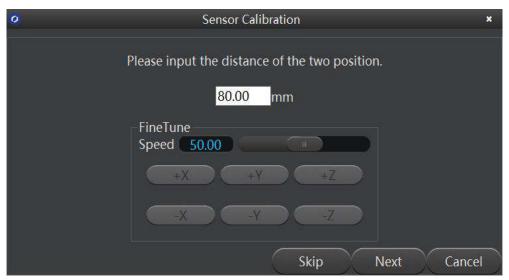


Figure 9.12 Sensor Calibration

8. The distance between A3 and B3 is 80mm, so you don't need to change the distance. Continue to click **Next**.





9. Click **Ok** to finish sensor calibration.

0	Sensor Calibration	×
	Sensor Calibration Succeeded.	
	Change RearArmAngleError From 0.4500 To 1.4500	
	Change FrontArmAngleError From -1.9500 To -1.0500	
	FineTune Speed 12.00	
	+X +Y +Z	
	Skip Ok Cance	el D



10.Bluetooth Kit

10.1 Bluetooth module is included in this kit, and the installation shown as follows:



Figure 10.1 Bluetooth module installation

10.2 Switch off the Dobot and plug the Bluetooth module into the communication interface. After installation, power on the Dobot and you will hear three short beep sounds. This means the Bluetooth module has been installed. At this time, a blue light is on and a green light is flashing. 10.3 Turn on bluetooth on your phone (IOS), and then open the Dobot App to connect the Dobot arm .

You can refer to the detailed tutorial on Youtube: https://www.youtube.com/watch?v=kyeXwuf17IY

Notice: Please make sure Dobot is completely powered down before connecting/disconnecting extenal modules such as Bluetooth module, WIFI module, USB-Host module, Infrared sensor, Color sensor, etc. Otherwise, you risk damaging the Dobot! Remember that only until the status indicator light is off is when the Dobot is powered down.



11.WIFI Kit

The WIFI kit contains a WiFi module. Connect it into Dobot extensible port and use the USB cable to connect the Dobot together with your PC, as shown below:



Figure 11.1 WiFi module

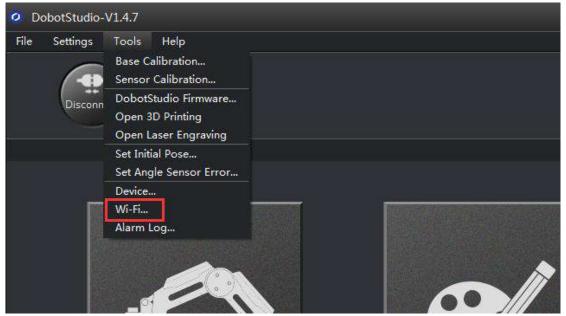
Notice: Please make sure the Dobot is completely powered down before connecting/disconnecting extenal modules such as Bluetooth module, WIFI module, USB-Host module, Infrared sensor, Color sensor, etc. Otherwise, you risk damaging the Dobot! Remember that only until the status indicator light is off is when the Dobot is powered down.

11.1 Set Dobot WiFi module

When first using the WiFi module, you need connect the USB to configure the WiFi module. This is to create a virtual serial port. After setting it up, you can use the WiFi module alone without the USB cable.

1. Open DobotStudio, Click **Connect->Tools->Wi-Fi**, and enter into the parameter setting interface.





2. Input related parameters of WLAN.

	Set Dobot Wi-Fi											
SSID		Dobot4_2.4G										
Password		******										
Support of the second s												
IPAddress	192	168	5	120								
Netmask	255	255	255	0								
Gateway	192	168	5	1								
DNS	192	168	5	.1								
	OK Cancel											

Figure 11.2 Wi-Fi interface

- Fill in Wifi name at "SSID" input box;
- Fill in Wifi password at "Password" input box;
- If you want to use function of DHCP, please tick checkbox;
- Otherwise, fill in "IPAddress", "Netmask", "Gateway", "DNS" and any other parameters.

Generally, use DHCP. Click **OK** to finish setting up. Wait several seconds, and the green indicator of the Dobot WiFi wireless module will be on, which means that the Dobot has been connected with WLAN.





Figure 11.3 Connected with WLAN

Then you will find out the IP address, located on the main interface of DobotStudio as shown below:



Figure 11.4 Dobot IP address

Select the address, click Connect, then you can control the Dobot through WiFi. On future uses, just insert the WiFi module and connect the Dobot through the address.



12.Stick controller kit

12.1 GameSir Joystick Instruction

1. The Stick controller kit includes a gamepad and USB Host module. Connect wireless module into the 10pin communication port behind the controller. There are two ways to connect, wired and wireless, shown as follows:



Figure 12.1 Installation of stick module

2. For wireless mode: (Before starting, make sure to install the module first!) When syncing the gamepad, the green LED will light up and you will hear 4 short beeps. This means that the gamepad has finished initializing. At the same time, press the button **Home** and **A** to start up the gamepad.

Notice: Please make sure the Dobot is completely powered down before connecting/disconnecting extenal modules such as Bluetooth module, WIFI module, USB-Host module, Infrared sensor, Color sensor, etc. Otherwise, you risk damaging the Dobot! Remember that only until the status indicator light is off is when the Dobot is powered down.



Figure 12.2 Start up the stick



Now, the front button LED will turn on, and the LED beneath will flash:



Figure 12.3 Stick at work

3. There are two way to use the gamepad, **Linear mode and Jog mode**, which can be switched by button **L1/R1(L1 refers to jog mode and R1 refers to linear mode**). The control mode details are shown below:

(1) Linear mod

Function	Corressponding buttons
Start up stick	Hold down Home and A for 2 seconds
Close the stick	Hold down Home for 2 seconds
Dobot X+/X-	Pad.LeftStick. front/back
Dobot Y+/Y-	Pad.LeftStick. left/right
Dobot Z+/Z-	Pad.LeftStick. front/back
Joint4 servo rotation R+/R-	Pad.LeftStick. left/right
Suction cup ON	Y key
Gripper ON	X key
Release suction cup/gripper	B key

Chart 12.1 Linear mode

(2) Jog Mode

Function	Corressponding buttons
Start up stick	Hold down Home and A for 3 seconds
Close the stick	Hold down Home for 3 seconds
Dobot Joint1+/ Joint1-	Pad.LeftStick. front/back
Dobot Joint2+/ Joint2-	Pad.LeftStick. left/right
Dobot Joint3+/ Joint3-	Pad.LeftStick. front/back
Joint4 servo rotation R+/R-	Pad.LeftStick. left/right
Suction cup ON	Y key
Gripper ON	X key
Release suction cup/gripper	B key

Chart 12.2 Jog mode



12.2 Beitong Joystick Instruction

The Beitong joystick kit includes a joystick, USB Host, charger, and a wireless receptor.



Figure 12.4 Joystick Module



1. Before plugging in the charger into the Dobot Magician, Connect the USB Host with the Dobot Magician via the 10pin communication interface on the back of the unit.

Figure 12.5 Installation of Beitong Joystick

2. Plug the charger and turn on the Dobot Magician. When the installation is finished, the green light on the USB Host will turn on and four short sounds will be heard, which means the initialization is completed. Press the Logo button on the joystick and it will start.



Notice: Please make sure the Dobot is completely powered down before connecting/disconnecting extenal modules such as Bluetooth module, WIFI module, USB-Host module, Infrared sensor, Color sensor, etc. Otherwise, you risk damaging the Dobot! Remember that only until the status indicator light is off is when the Dobot is powered down.



Figure 12.6 Start Joystick



The red light between the left bar and the right bar will flicker.

Figure 12.7 The operating Joystick



3. You can control the Dobot arm through the joystick. There are two control modes: **Linear Mode** and **Jog Mode** (**LB refers to jog mode and RB refers to linear mode**). They can be easily switched through the corresponding keys on the Joystick.

The instructions are shown below:

(1)Linear Mode

Corresponding buttons
Press the Logo Key for 3 Seconds
Auto Turnoff
Move Left Bar Forward/Backward
Move Left Bar Right/ Left
Move Right Bar Forward/Backward
Move Right Bar Right/Left
Y key
X key
B key

Chart 12.3 Linear Mode

(2)Joy Mode

Function	Corresponding buttons
Start Joystick	Press the Logo Key for 3 Seconds
Turnoff Joystick	Auto Turnoff
Robotic Arm Joint1+/Joint-	Move Left Bar Forward/Backward
Robotic Arm Joint2+/ Joint2-	Move Left Bar Right/ Left
Robotic Arm Joint3+/ Joint3-	Move Right Bar Forward/Backward
Joint4 Steering Gear Spinning R+/R-	Move Right Bar Right/Left
Suction Cup ON	Y key
Gripper ON	X key
Release Suction Cup/Gripper	B key

Chart 12.4 Jog Mode

Note: If the Joystick cannot control the Dobot Magician after pressing the Logo key, hold the Logo key to reset connection.



13.Leap Motion Kit

13.1 Connect the Leap Motion module to the PC through USB cable.



Figure 13.1 Leap motion module

13.2 Download the Leap motion driver and install it. (Here is the link: <u>https://www.leapmotion.com/setup)</u>

Leap Motion Controller 1	
	欢迎使用 Leap Motion
	你将要安装 Leap Motion 软件,其中包含了 App Home ,通过它你可以发现和下载新的动作控制类应用。
	下一步 0X) > 取消 (C)



-	正在安装 "Leap Motion Software"正在安装,请等候
输出目录: C:\Prog	ram Files (x86)\Leap Motion\App Home\node_modules\nw-gyp\
显示细节(0)	

Follow the directions below and keep installing until it's done.

- Windows	安全		<u> </u>
您想安装试	这个设备软件吗?		
	B Device		
反佈有:	.eap Motion Inc		
	来自 "Leap Motion Ir	nc"的软件(A)。	 不安装(N)





Figure 13.2 Successful installation

13.3 After installing, start up the equipment and open DobotStudio. Click Leap Motion to enter the interface:

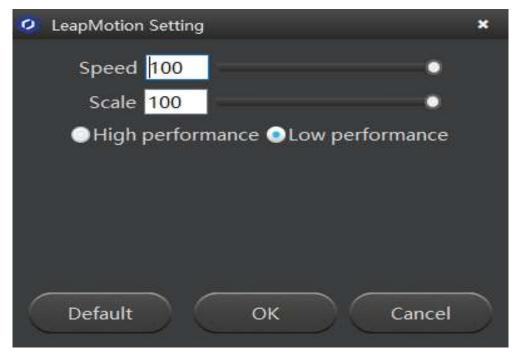






Figure 13.3 Leap motion interface

- 13.4 **Start**: To keep the Dobot stable, turn your palm up to move into controlled area of Leap Motion. The Dobot will move accordingly. (Hold hands to trigger the suction cup or gripper.)
- 13.5 Turn palm up: remove hand from surveyed area of Leap Motion.
- 13.6 Stop: Exit Leap Motion mode.
- 13.7 Settings: Set up speed and scale ratio;



Speed: Speed adjustment;

Scale: Coordinates ratio between leap motion and Dobot;

Low resource/high resource: Set as low-resource mode for low-performance computers.



14.Mouse control

14.1 The software used for mouse control is **DobotStudio**. Please open the software and enter into mouse module interface, as shown below:

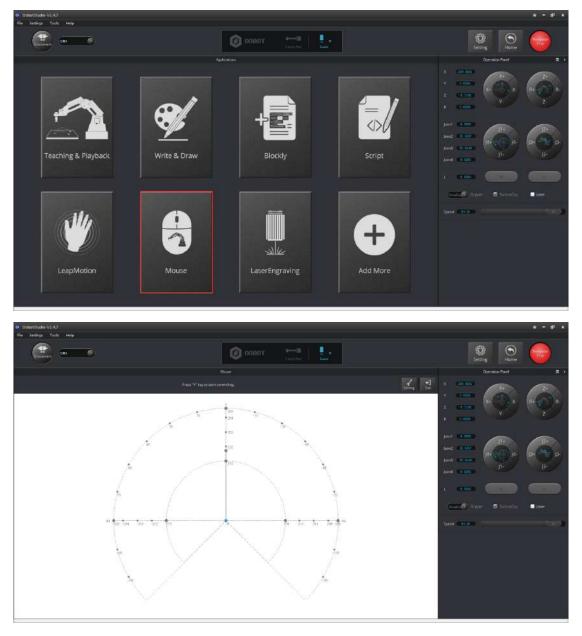


Figure 14.1 Enter into mouse controlling interface

14.2 V key: Start and Stop;

14.3 **Settings:** Set up related velocity and acc;



🤨 Mouse Setting		×
General Jog Playback Write _Draw LeapMotion Mouse LaserEngraving	Speed 40 Scale 100 • High performance Cow performance	
	Default OK Cancel	D

Figure 14.2 Parameter settings

Speed (percentage): 0-100, we suggest 50;

Scale (percentage): 0-100, we suggest 100;

We suggest users with a lower performance computer to opt for the low performance option.

Mouse t control				Setting Exit
10.81	Ø Mouse Setting		×	
315	CP Params LeapMoti	ion Param		
315 -15 282	ScaleX	1.0000		
241	ScaleY	1.0000		
Ī	ScaleZ	1.0000		
200	Sample	60.0000		
	DobotCenter X: 220	₽Y: 0 ₽Z: 0	-	
	Default	OK Cance	el	

Figure 14.3 Parameter settings

Scale X/Y/Z: Scale ratio between mouse coordinates and Dobot coordinates;Sample: 20-60, depending on PC performance;DobotCenter: Keep default settings;



15.Blockly

Dobot Blockly is a programming platform based on Google Blockly. In this process, users can program through the puzzle format, which is straightforward and easy to understand. Also, users can use the integrated API of Dobot anytime.

15.1 Blockly Interface

1. Open **DobotStudio** and click **DobotBlockly**:



Figure 15.1 Enter into DobotBlockly

2. 5 areas are included in this window:

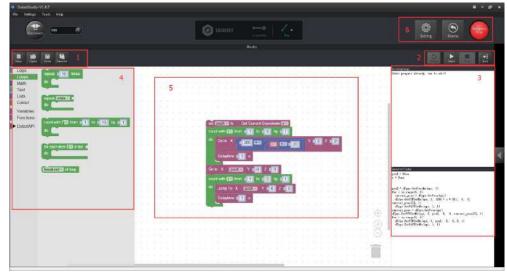


Figure 15.2 DobotBlockly Interface

Area 1: New/Open/Save: New/Open/Save the current files Area 2: Start/Stop Area 3:



This part includes the current point location info of Dobot. Log information is in the middle, while programming code is on the left:

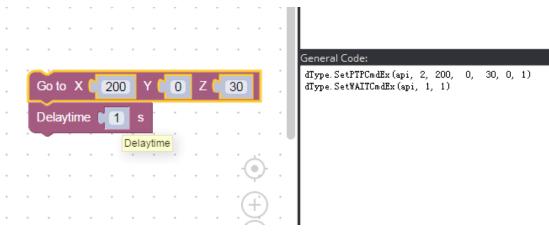


Figure 15.3 Code information

Area 4:

This part has the selection area of blockly module, including logistic, loop, math, Dobot API and so on. Just drag them to the window that is OK.

Dobot API has many functions, such as velocity/acc, end effector settings, move mode, linear or jog mode and each interface of I/O configuration. It is very convenient for secondary development.

Area 5: Main window of blockly programing Area6: Home and emergency stop.

15.2 Blockly Demo

Here is one basic demo, shown as follows:

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Explanation of Demo: Set endeffector as gripper, set the loop number as 3, and make the Z axis move back and forth 3 times. After this, click **Start**, and the Dobot will move accordingly.



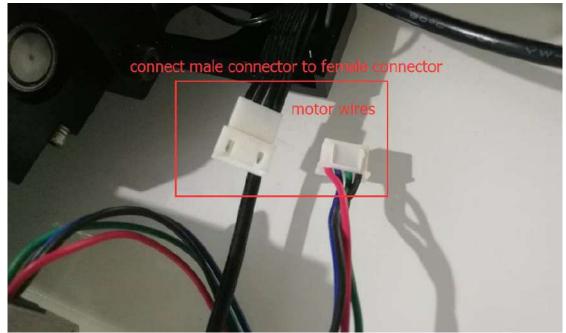
16.Function Description of LinearRail

About connecting the rail with Dobot, you can refer to the installation instructions of LinearRail. Plug the wires into the base of Dobot after connecting LinearRail with the Dobot. As shown below:



Figure 16.1 LinearRail connect to Dobot arm

Notice: Please make sure the Dobot is completely powered down before connecting/disconnecting extenal modules such as Bluetooth module, WIFI module, USB-Host module, Infrared sensor, Color sensor, etc. Otherwise, you risk damaging the Dobot! Remember that only until the status indicator light is off is when the Dobot is powered down.



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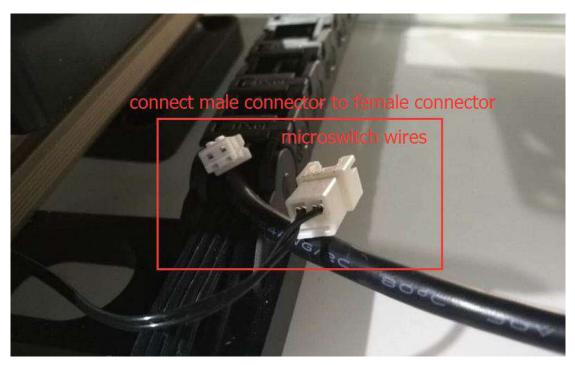


Figure 16.2 LinearRail wiring diagram

How to write & draw through the LinearRail: You can use CorelDRAW X7 to transform content into PLT format. The software can be downloaded from internet. For more details about software operation, refer to the PLT format instructions document.

1. Open DobotStudio, click **LinearRail** and the button at the right corner of Operation Panel, and choose **Linear Rail control**, as shown below:



Figure 16.3 Click LinearRail

 After clicking LinearRail, you need to test whether the LinearRail can move properly. Click L+ or L-. The Dobot would move left or right.





Click Setting and choose Jog to change the velocity and acceleration of the LinearRail. Available distance of LinearRail: 0-1000 mm;

Maximum load: 5kg.

ns					Operation Panel	
🤨 Jog Setting			*	X (255,2288)		
General	Joint Coordinate			Y (-12,5968)	Y+	1+
Jog	joint1Velocity joint1Acceleration	15.00	4	z (*********	X+ , X	R+ 7-
Playback	joint2Velocity	15.00		R. (2, 942)		
Write Draw	joint2Acceleration	50.00				
LeapMotion	joint3Velocity	15.00	1	Joint1 (+2.7784)	J1+	12+
Mouse	joint3Acceleration	50.00	Control of	Joint2 47-6270	14+000 14-	B+
LaserEngraving	joint4Velocity joint4Acceleration	30.00 50.00	4	joint3 (52.6080)	11-	J2-
	IVelocity	30.00		joint4 (19.1627.)		
	IAcceleration	50.00	÷	L (0.0000)		
	Default	ок	Cancel	(Disable) Grapp	er 🦪 SussionCup	Laser

Figure 16.4 LinearRail motion test



 The Dobot needs to reset. Press the Home button before you do anything else. Notice: Before you press the Home button, please take the pen off and/or raise the dobot arm up.



Figure 16.5 Home test

4. Click Write&Draw after finish homing.

	hudio-V1.4.7					= - n ⁰ *
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(🖹 🖛 💿				Setting .	S fore
			Write & Drawn			
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Figure 16.6 LinearRail operation panel

5. Click **Open** to import the PLT files.



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Figure 16.7 Import file

6. Click options in the left side of Write&Draw to adjust position and size of characters.

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	*	Sarvefillet.itr
	机器人世界标赛RoboC	RUP Kout thapes
	• 1 5 8 5 5 5 5 5 5 5	

Figure 16.8 Operation Panel

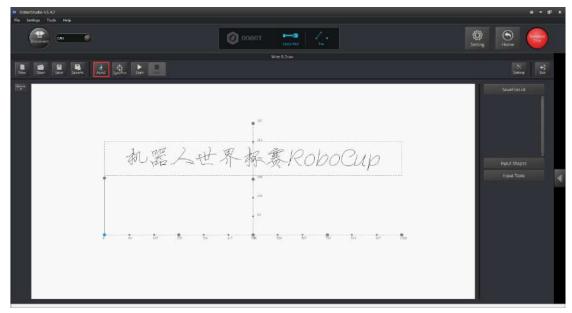
7. Adjust the height of pen, as shown below:

- - -





Figure 16.9 the height of pen



8. Click AutoZ to save the height of the pen (i.e. keep the position coordinate of Z-axis).

Figure 16.10 AutoZ

9. Click **SyncPosition** and the Dobot will move to the initial position.



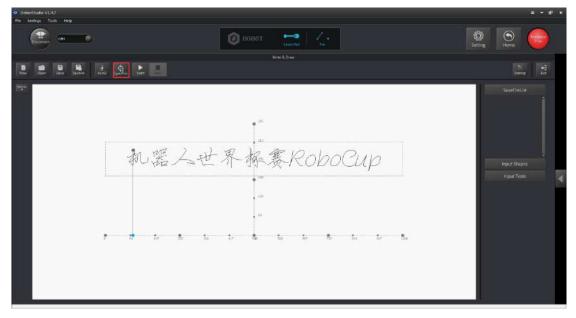


Figure 16.11 SyncPosition

10. Click **Start** and the Dobot will write automatically.

Note: If users want to set an action to dip the pen into the ink, please refer to the steps below. It uses the Teaching & Playback module. (Everytime you press Unlock Key and then release, the Dobot records a point's position.)

(1) Set ink dipping position, as shown below, right click blank spaces, and add playback triggers.

A playback trigger causes one ink dipping motion.

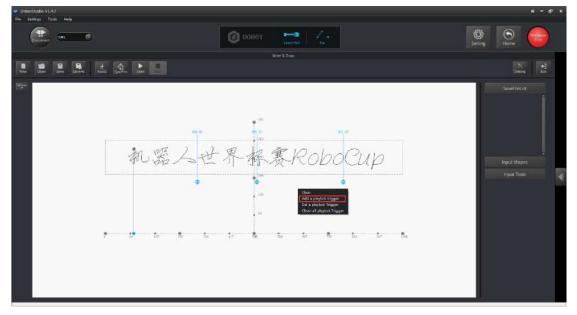


Figure 16.12 Set dip ink position

(2) Return to Teaching & Playback module to set ink dipping actions.



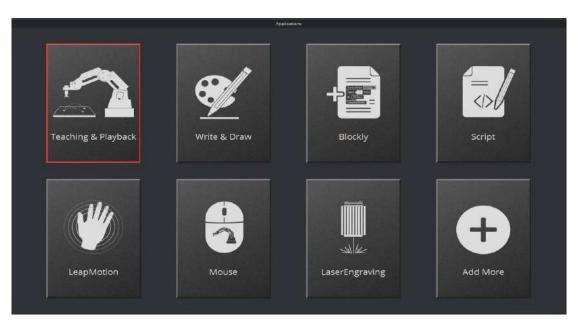


Figure 16.13 Return to Teaching&Playback

(3) Press the Unlock Key in forearm, move the forearm to the right place, and release the Unlock Key to record the first point position. This point position need to be a little high, but do not over the limit position. It will prevent the writing brush from touching the inkstone.



Follow the following steps for save points. Move the forearm to the related position, and use Teaching & Playback to record these points, as shown below:



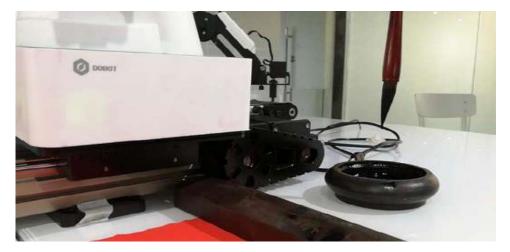
Figure 16.14 Simulate the actions of ink dipping These are the actions to shake off loose ink between the right and left sides.





Figure 16.15 Simulate the actions of ink dipping

Raise the writing brush up to prevent it from touching the inkstone.



Finish recording the ink dipping actions and return to the Write & Draw module to start writing in LinearRail.

Notice: The inkstone has its own height, so you need to set a suitable rising height to prevent the writing brush from touching the inkstone. (We recommend doing PenUpOffset between 50 to 75.)

🥝 Draw Setting			×
General	PlanAcc	100.0000	•
Playback	JunctionVel	100.0000	*
Write Draw LeapMotion	Acc	100.0000	
Mouse	Velocity	100.0000	×
LaserEngraving	PenUpOffset	70.0000	
	PenDown Default	15.3099 ОК Са	ncel



17.More support

- ➢ For more information, visit <u>http://cn.dobot.cc/</u>
- For more detailed material about software, second development and any others, visit <u>http://cn.dobot.cc/download-center/dobot-magician.html</u>
- Share your idea on Dobot forum <u>http://forum.dobot.cc/</u>
- Further question, welcome to send email at support@dobot.cc





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