

# BGA Rework Station G-750

## User's Manual V1.0

### Introduction

Respected customers, thank you very much for using LY-G750 BGA Rework Station.

#### The main features of LY-G750 Touch Screen BGA Rework Station :

- 1) Adopt linear slide which makes X,Y,Z axis all can do micro adjust or rapid positioning, with high precision, easy operation
- 2) Mounting, welding , removing process are intelligent controlled and work automatically
- 3) High definition CCD color optical vision system, three independent heaters, temperature control technical up to the level of the domestic leading
- 4) Panasonic control system: stable, reliable, safety, efficient
- 5) Multifunctional and humanized operation interface, can display 6pcs temperature curves and save more than 50 groups profiles
- 6) The nozzle can 360degree rotation, IR heating can make the PCB board heating balance;
- 7) PCB board position by V-groove, moveable and flexible universal fixture can protect the PCB board
- 8) Powerful cross-flow fan cool the PCB board automatically after desoldering and soldering, It can prevent the deformation of PCB board to ensure the welding effect
- 9) CE certificate , with emergency stop and automatic power-off protection device when abnormal accident happens, with a double over-heating protection control

## **Company Introduction**

Shenzhen LYBGA Technology Co., Ltd is an electronic technique company which precedes multi-aspect managements including innovating, production, and selling and trade services.

Thanks to its location in the western district of Bao'an, we can take the advantage of the international airport, shore line and container terminal to face modern business opportunities.

BGA repair solution system is the heart of our activities. We professionally provide our costumers both at home and abroad with SMT handicraft Solution, as well the advanced production equipment, testing equipment, and rework station and other excellent services. The main products of our company are AI, 3D temperature Curve Test, 3D Thickness Measurement System for Tin Paste, BGA Rework Station, AOI, Spare Parts Counter and PCB Curve. Developing new solutions to help customers tackle more diverse and complex issues keeps LYBGA engineering teams always at the forefront of the high-technology, prestigious awards and wide recognition in China.

LYBGA regards well-educated workers as a main drive to our development. A strong R&D team supports a dynamic workforce of over thirty people. A well established sales network and after-sale services have been built which reward us a strong reputation among high profile customers both at home and abroad. We promise to provide perfect product and service for the customer. We have applied the appearance patent for our products and got through the CE. We have good market in Korea, Japan, North Africa, Vietnam, and Southeast Asia, Mid-East and European countries.

We are devoted to the practice of the motto "Specialized, Innovative and Dedicated" and the company focuses on its customer's satisfaction and has set up a network of local offices to tailor its offer to an expanding market. To expand our management scope, we look forward to your co-operation.

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## —、 Installation requirements

- 1、 Far from inflammable, explosive, corrosive gas or liquid environment。
- 2、 To avoid wet places, air humidity is less than 90%。
- 3、 Environmental temperature-10 °C ~ 40 °C , avoid direct sunlight,。
- 4、 No dust, floating fibrous and metal particles work environment。
- 5、 Installation plane require that flat , firm and no vibration。
- 6、 No heavily object on the machine。
- 7、 Avoid any air conditioner, heater or fan directly airflow influence。
- 8、 it is required to reserve >300mm space at the back of the rework station to heat elimination。
- 9、 Workbench of placing bga rework station Suggest surface area (1200 x 1200 mm) relative level, level 750 ~ 850 mm。
- 10、 Equipment of wiring must be made by qualified professional and technical personnel for operation, the main line 2.5 square, the equipment must be grounding is good。
- 11、 Turn off the power when discontinued the switch, long-term out of service must be pulled out power plug。

## 二、 Technical parameter

1	total power	5200W
2	Upper heating power	800W
3	Lower heating power	Second temperature zone 1200W, Third temperature zone3000W
4	Power supply	(Single Phase)AC 220V±10 50Hz±3 5.2KVA
5	Overall dimension	L610×W660×H820mm ( not include the display holder)
6	Locating way	V-shaped groove ,PCB holder can adjust any direction of X、 Y
7	Temperature controlling	(high precision K-sensor) (Closed Loop) , Up and down can test the temperature independently
8	Large PCB size	560×420mm
9	Small PCB size	10×10mm
10	Chip zoom multiple	10-100 multiple
11	Weight of machine	85kg

# 三、 Program setting and operation

## 1、 Machine outside introduce

### 1、 Power (picture 1)

Machine power (over-current protection)



Picture 1

### 2、 K-type sensor (picture 2)

test the temperature of the machine (picture 2)



Picture 2



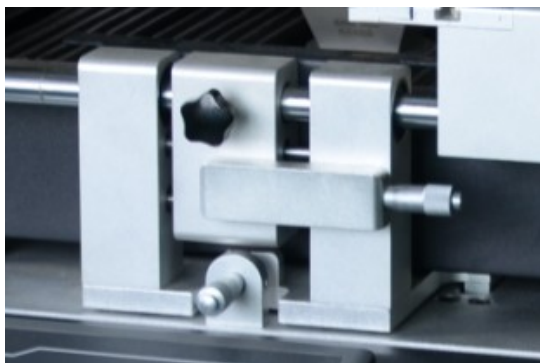
Picture 3

adjust the optical light



Picture 4

emergency bottom



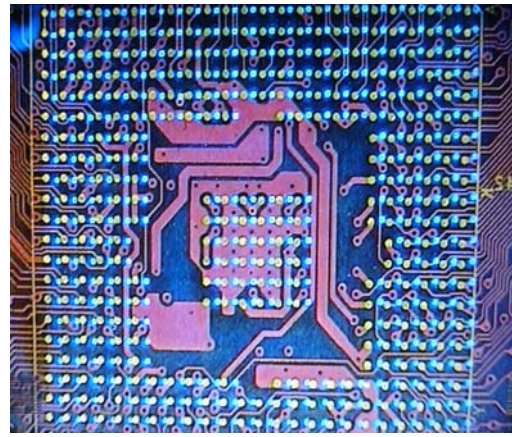
Picture 5

PCB support X,Y axis adjust bottom, during the PCB heating ,u can adjust the place of the PCB board



BGA chips position camera lens

USE: for BGA chip mounting and position ;

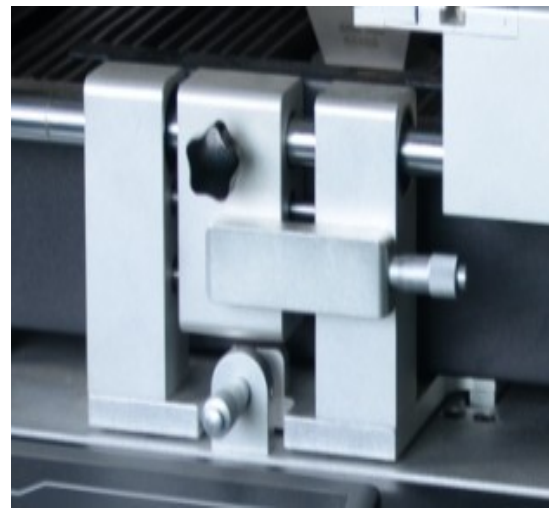


15' CCD

USE: for BGA chip position using



BGA chip angle adjust




adjust front and back

## 2. Main interface introduce

1、 open the power,Touch screen will appear picture 6

Picture 6 main menu



2、 click  enter the main control of the machine

3 ,the main control introduce : Picture 7



(picture 7)

### Main menu control bottom and function:

Run : press “RUN” and work

Zero : the machine will stop heating and back to the original place automatic during the heating when you press “zero” bottom

**Note:** if u press “run”bottom,the machine not working,pls press “Zero bottom”; It will not run if the machine not on the Zero condition;

Stop : press “stop” bottom, the machine will stop heating automatical during the heating,but the machine will not back to “Zero” condition

Back : Picture toggle button; Returns the boot screen. Returns the upper directory

Keeping : the temperature will keep on the current temperature and stop heating, if u need to go on heating, press this bottom again, the temperature will heating as the curve.

Alignment OK : Alignment on the mode of mount, after alignment OK, press the bottom “Alignment OK”,the machine will mount the chip to the PCB board automatical,at this time , the machine will start to heating, the touch

Screen running light will work (like the picture ) ,this means the machine is heating now

**MODE:** mode switch button; Repeat click on the button, the progress will appear



**“weld” “remove” “ mount”**

**Weld** : heating on the mode of weld, the machine only heating the BGA chips, after machine heating finish, The machine doesn't have any action until stop to Zero (if the BGA chip empty welding,u can choose weld mode)。

**Remove**: heating on the mode of remove, after machine heating finish ,machine will remove the BGA chips automatical (if the BGA chip bad or short circuit ,u can choose remove mode)

**Mount**: when the BGA chips need to alignment and mount ,after press “run”bottom,the machine up heating head will suction the BGA chips automatical,then pull the alignment camera out,and alignment ,after alignment OK, press the bottom “Alignment OK” ,the machine will mount the BGA chips to the PCB board automatical,then heating and welding

Up hot air : SV show the up current testing temperature ; the temperature line is red temperature curve;  
PV show up current setting temperature。

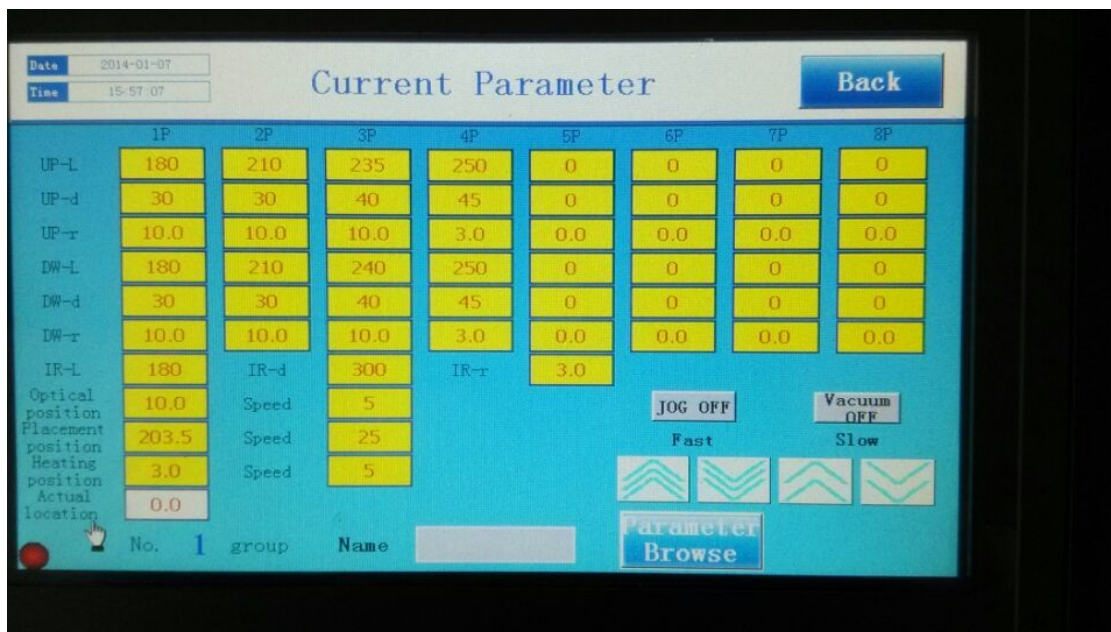
Down hor air: SV show the down current testing temperature ; the temperature line is yellow temperature curve  
PV show down current setting temperature。

IR temperature: SV show the current down IR heating panel testing temperature ,the temperature line is green temperature line;  
PV show IR current setting temperature。

Time : after the machine running, heating running light start to timing

Current curve (picture 8) : press the bottom “current curve”and enter in from the main menu

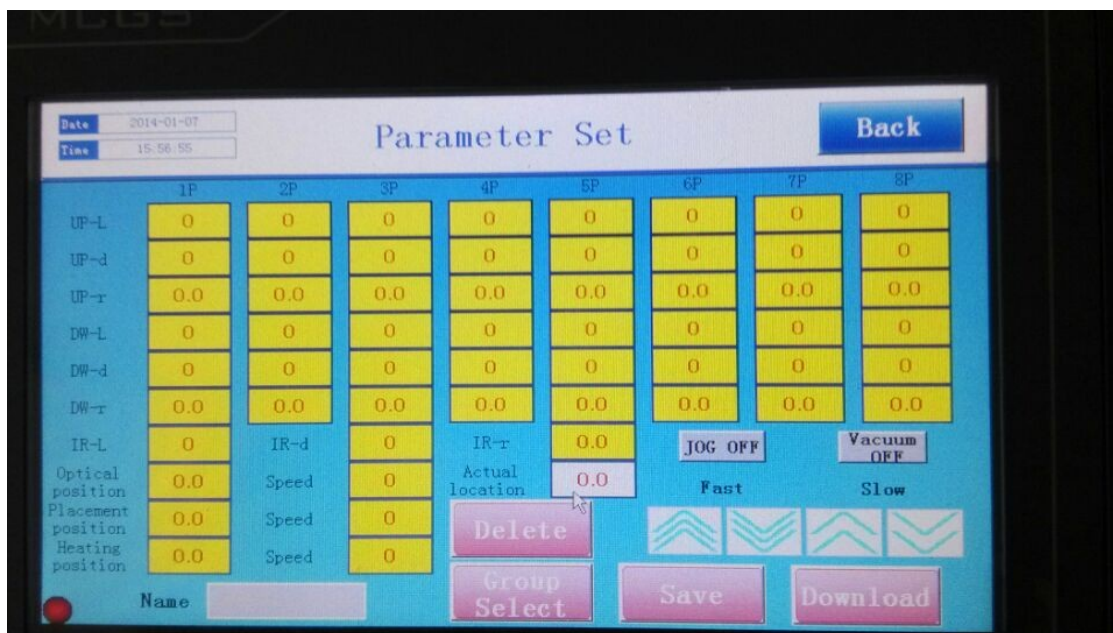
function: check the current temperature curve fast or choose the temperature curve ,only can check and choose ,cannot change the parameter (curve choose way, 一、click bottom “parameter browse”, 二、click the curve and choose the temperature curve u need,click download,then back and u can use it)。



( 图 8 )

5. **parameter setting** (picture9 from the main menu click the bottom “parameter setting “ enter in)

Function: different BGA chips need to setting different temperature setting, the first time setting the temperature u can reference the last page on this manual book to set the temperature



( picture9 )

**Up hot air temperature:** the heating temperature, like the first paragraph temperature ....., the second paragraph temperature... total can set 8 paragraphs (1-8 paragraph), but only need 5-6 paragraph temperature when heating the BGA chips, usually we only set 5-6 paragraph is ok, the rest paragraph we can set 0 (the top temperature of the lead free usually about 260 degree, the top temperature of the lead usually about 230 degree)

**Up hot air time:** the current temperature keeping time (eg. the first paragraph temperature set at 155 degree, time 30s, then the temperature heating to 155 degree will keep 30s), we usually set the time between 30-60s.

**UP hot air rate:** setting the heating up rate when heating (eg. We set 3.0, this means one second the temperature will heating up 3 degree), we usually set the rate at 3.0;

**Down hot air temperature:** u can set the same temperature as the up hot air temperature, or up to the up hot air temperature about 5 degree;

**Down hot air time:** the front paragraph time need to set the same time as the up hot air time, the last paragraph time need to set more than 10s than the up hot air time, the up hot air time is control the whole machine stop working, if the last paragraph time setting as the same as the up hot air time, this would make the machine the up head still heating, but the down heating already cooling, which would make the bad welding ;

**Up hot air rate:** same setting as the up hot air rate;

**IR temperature:** Big areas PCB board heating setting bottom, (main function is to

preheating the PCB around, protect the motherboard being out of shape, which make bad welding or empty welding or short circuit, IR temperature setting between 150-210)

**IR time:** the big areas PCB board heating time bottom(time setting is 500 ok)

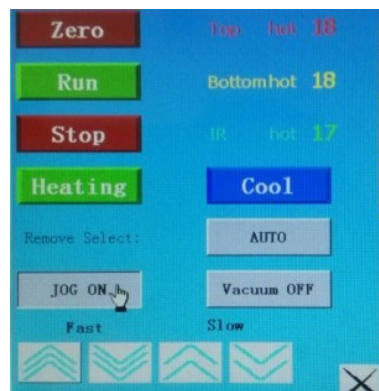
**IR RATE:** setting 3.0 is ok;

**Note:** the above information is only for reference, u can change the data as actual operation. which condition u can edit? According to the welding chips ,for example:welding 10pcs chips, the result is 100% successful, then u don' t need to edit . Welding 10pcs chips, there is 5 pcs chips are empty welding, then u need to turn a little up of the temperature and the time , if welding 10pcs chips, 5pcs is bad welding or short circuit , then u need to turn a little down of the temperature and the time;

**Optics place:** only use this on the mode of the mount, the up head will suction the chips from the motherboard automatical during the mount, then the up head will back to the original(zero), then from the original (zero) fall to the setting optics place, for example 10MM, then the up head will fall to 10MM.

The first time mount the chips ,we usually need to adjust the optics place so that we can meet the good optics effect, how to adjust ? There is a red circle on the left side of the touch screen, after click, the screen will appear menu (picture 10), click the JOG OFF, after click, the bottom is JOG ON, at this time , u can adjust the focal length of the para on slow up or down (definition), adjust to the most definition place, check the up right corner of the touch screen, the number appear is what u need, then u can write this number to the optics place , the first time setting the optics place is setting about 10MM;

**Speed:** setting 5 ;



(picture 10)

**Mount place:** the meaning is the distance between up heating head and motherboard, how to know the real place? 1、take one pcs motherboard and fix it on the machine support jigs, open the laser light, find the chip core and click the bottom “Zero”

2、enter into the parameter setting, click the bottom “JOG off” , the bottom will keep on JOG ON (like the picture 10), then click the arrows down or up, until the suction pen of the up heating head touch the BGA chips and cannot down, the number is the most right mount place, at the left side, there is one bottom “Actual location” , u put the number (you get just now) to here and save then is ok;

**Heating place:** when BGA rework station heating, the distance between nozzle and motherboard (height), For example : the mount place is 200MM, heating place is 2mm, when heating, the head actual height is 198mm. Usually the heating place setting number is between 2-3mm.

Function of the heating place, when BGA rework station heating, the suction pen of the up heating head cannot touch the BGA chips, if touch the BGA chips heating, after finish the welding, the chips will 100% short circuit.

**Actual location:** the distance between the up heating head and the original place (Zero),

Unit is mm;

### 3. Parameter setting;

Enter into from the main menu.

**Note:** the parameter in the system is setting by the factory before the machine ship out, if not emergency problem, pls don' t change or edit the parameter.

### 4. Prepare well before welding

# Preheat: preheat for BGA and PCB before rework (constant temperature BGA oven should be set 80~ 100 degree, time is 12 ~ 24 hours) to remove moisture of PCB and BGA, avoid PCB damage;

# Desolder: Place PCB on BGA Rework Station's PCB supporting frame, choose suitable hot air nozzle and perfect desoldering temperature curve, ( If need to set again, please back to "administrator screen" to set ), chose "**remove**", (Desoldering model) and click "Run", after heating finish, the vacuum suction nozzle suck up BGA automatically.

# Clean-up and solder: clean-up PCB pad and BGA pad, drag flat by wick or by soldering iron directly; the best way is that clean-up tin before BGA is not cooling completely, using BGA Flux Paste during cleaning-up tin to improve solder tin's activity and reduce the melting point of tin, better for cleaning-up tin. Please care that do not damage PCB pad; in order to make sure BGA soldering reliability by using some solvent (such as industrial alcohol) which have strong volatility.

#BGA Reballing: wipe BGA flux paste on the BGA pad, choose suitable BGA stencil, put BGA solder ball on BGA pad by BGA Reball Kit.

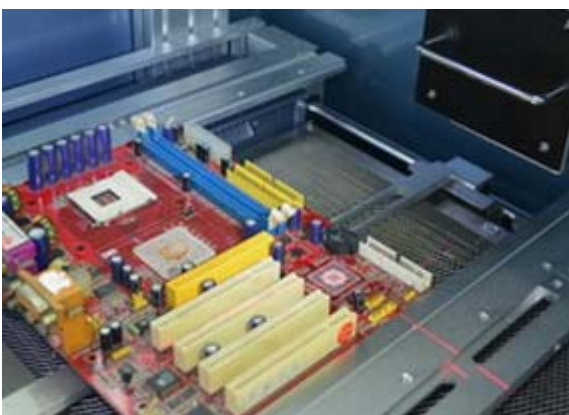
#BGA solder ball soldering: heat-up by constant temperature preheater or BGA rework station bottom heater to solder BGA ball on BGA pad.

# Wipe BGA flux paste:

Using brush to wipe a proper amount of BGA flux paste(proper amount of bga flux paste is good for clean-up dust on solder ball and improving soldering effect), wiping too much will cause connecting welding, otherwise, will cause insufficient soldering.

**BGA chips welding as below:**

1. Put PCB which has been dealed on PCB pallet, and place BGA on corresponding pad . (picture13-1);



( 13-1 ) PCBmotherboard fix



( 13-2 ) optics camera

2. Observe data of “Mounting position” and “Alignment position” whether it is suitable, if not suitable, please back to “administrator operation mode” to set as above.

Turn working model to “mounting” and click “Run”

Upper hot air head moves down

Reach “mounting position” then stop, start to suck and suck up BGA.

Upper hot air head will move up to the original position.

Upper hot air head move down to reach “optics alignment” position. Take out optical system by hand, meanwhile optical lens' LED light turn on automatically (picture 13-2) now two interlaced image of BGA' bottom pad and PCB's pad displays in LCD monitor

3. To make two pads coincide completely by adjusting PCB pallet XY axis' fine-adjustment knob (picture 13-3) and head BGA fine-adjustment rotating knob (picture 13-4 and 13-5), and lock XY axis magnetic plug and PCB pallet lock knob, then finish alignment;

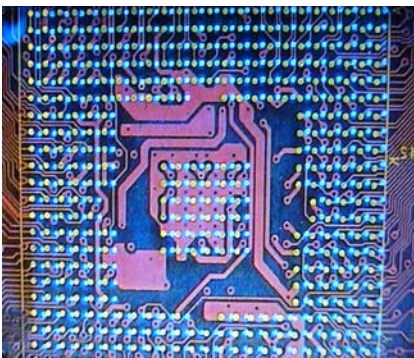
4. After alignment, optical lens back to original position;

Upper heater move down and reach a position corresponding to PCB, stop suck to blow;

# BGA is mounted on the pad precisely, and start to heat up;

# Heating finishes, upper hot air head go back to original position; BGA is soldered on the pad successfully;

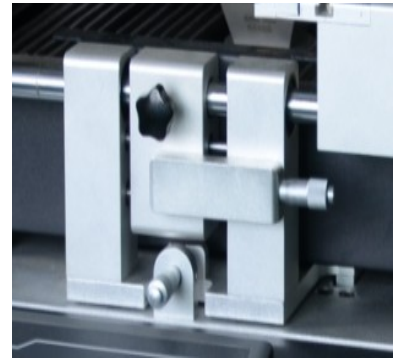
# Mounting finishes



( 13-3 ) LCD



(13-4) BGA chips adjust



( 13-5 ) X/Y adjust

#### 四. Common problems during operation and solutions

# No display of touch screen after turn on

1. To check power supply whether is normal ;
2. To check power main switch ( air switch ) whether is close;
3. To check the emergency stop switch whether pressed down;

4. To check touch screen indicator light whether is lighted, if it is lighted, then touch screen is black, please consider that there is something wrong with touch screen;

**# Click “Run” , there is no movements**

1. Working model whether is right;
2. Parameters of “Mounting position” in moving parameter whether is right;
3. Moving parts whether is in original position, if not in origin, please make it back to origin, please click “stop” knob on the touch screen.

**# Do not heating up**

1. Temperature parameter whether is right;
2. Please observe “**RUN**” indicator light; if “RUN” indicator light is lighted, but actual testing temperature does not rise, should consider Electric hardware problems .

**# Touch screen shows “overtemperature alarming”**

Equipped with overtemperature alarming function for machine safe;

1. “Upper overtemperature alarming” means upper heater’s temp. is over safe working temp.;
2. “Lower overtemperature alarming” means lower heater’s temp. is over safe working temp.;
3. “IR overtemperature alarming” means IR heater’s temp. is over safe working temp.;
4. “Whole machine overtemperature alarming” means upper and lower heaters’ temp. is over safe working temp.;

Because thermocouple resistance will magnify to infinite when under open circuit, appear 3 alarming models, meanwhile relative testing temp.window will show some words like“**276.7**”.

If “Whole machine overtemperature alarming” appears, please check upper and lower fan whether is smooth .

**# LCD monitor is not normal**

1. No displaying, to check LCD monitor and camera as well as webcam connecting cables whether are good;
2. Image has filamentous interference, to check equipment ground and its resistance whether are ok.

## **五、Reballing Process**

1. Put the BGA that need to reball onto the bottom of the adjustable BGA Reball Kit, adjust two sliders without spring to fix BGA.
2. Chose suitable stencil according to the BGA size .fix the stencil on the

header and lock 4 M3 screw, then cover the top. adjust the 4 screw on the bottom to suit the height of the BGA.

3. Observe the alignment situation between the stencil hole and the BGA soldering point, if misplace, please adjust again.
4. Lock two fixed slider without spring, take away the BGA and painted thin a layer of BGA solder paste, then put it to the kit and cover the top.
5. Put into suitable BGA Solder Ball ,then shake the reball kit lightly, to ensure every soldering point has the ball, then put out the needless part .
6. Place the reball kit on the flat table take away top cover, take away the BGA carefully.
7. To fix the solder ball can be through our bga rework station or soldering iron, to heat the BGA Solder Ball on the BGA ,soldering the ball to the BGA, last reballing is over !

## 六、 Maintenance

In order to guarantee the machine function and prolong service life of the machine, during usage, we have to do some maintenance on the system regularly as follows

<b>Parts Name</b>	<b>protection</b>	<b>Maintenance Period</b>
<b>Upper heater</b>	Open the cover, clean the fan with high-pressure air	1 month
<b>Drive mechanism of upper heater</b>	Apply some butter on the lead rail, rack and gear and shaft.	1 month



<b>Distribution box</b>	Open the back cover of the machine, use vacuum cleaner to suck the dust and dirt, and check whether the components fixed well	3 month
<b>Rotation Part of upper heater</b>	Apply some butter on the drive parts	1 month
<b>Bottom IR heating tube (protecting fence)</b>	Clean the heating plate with dry cloth(do not use wet one)	1day
<b>PCB clamps</b>	Apply some lubricant to the PCB supports and shaft of support guiding axle	1 month

## 七、 Safety caution



(一) **Power of the machine is AC220V, working temperature is up to 400℃, may damage the machine because of the incorrect operation, even endanger the safety of the operator. So must strictly comply with the following items:**

- 1、No fan or other equipment to blow up the machine when it is working , or cause the damage of the components;
- 2、No operation under that environment such as Inflammable and explosive liquids or gases; after power on , no combustibile to touch the high temperature area and metal components, or cause fire and blast easily ;

3、 To avoid high temperature burns, no touching on the high temperature area when working, there is hot after working, it is necessary to take some measures when operating;

## **Commonly used BGA soldering and desoldering process parameter table: (For reference)**

### **Leaded temperature curve soldering**

**41\*41 BGA soldering temperature setting:**

	<b>Preheating</b>	<b>Constant temperature</b>	<b>Warming period</b>	<b>Soldering 1</b>	<b>Soldering 2</b>	<b>Cooling</b>
<b>Upper heating</b>	160	185	210	235	240	225
<b>Constant temperature time</b>	30s	30s	35s	40s	20s	15s
<b>Lower heating</b>	160	185	210	235	240	225
<b>Constant temperature time</b>	30s	30s	35s	40s	20s	15s
<b>Slope</b>	3.0	3.0	3.0	3.0	3.0	3.0
<b>IR preheating</b>	180					

**38\*38 BGA soldering temperature setting:**

	<b>Preheating</b>	<b>Constant temperature</b>	<b>Warming period</b>	<b>Soldering 1</b>	<b>Soldering 2</b>	<b>Cooling</b>
<b>Upper heating</b>	160	185	210	225	235	215
<b>Constant temperature time</b>	30s	30s	35s	40s	20s	15s
<b>Lower heating</b>	160	185	210	225	235	215
<b>Constant temperature time</b>	30s	30s	35s	40s	20s	15s
<b>Slope</b>	3.0	3.0	3.0	3.0	3.0	3.0
<b>IR preheating</b>	185					

**31\*31 BGA soldering temperature setting:**

	<b>Preheating</b>	<b>Constant temperature</b>	<b>Warming period</b>	<b>Soldering 1</b>	<b>Soldering 2</b>	<b>Cooling</b>
<b>Upper heating</b>	160	180	200	215	225	215
<b>Constant temperature time</b>	30s	30s	35s	40s	20s	15s
<b>Lower heating</b>	160	180	200	215	225	215
<b>Constant temperature time</b>	30s	30s	35s	40s	20s	15s
<b>Slope</b>	3.0	3.0	3.0	3.0	3.0	3.0
<b>IR preheating</b>	180					

The above is apply to the leaded BGA

### **Lead-free temperature curve soldering**

**41\*41 BGA soldering temperature setting:**

	<b>Preheating</b>	<b>Constant temperature</b>	<b>Warming period</b>	<b>Soldering 1</b>	<b>Soldering 2</b>	<b>Cooling</b>
<b>Upper heating</b>	165	190	225	245	255	240
<b>Constant temperature time</b>	30s	30s	35s	55s	25s	15s
<b>Lower heating</b>	165	190	225	245	255	240
<b>Constant temperature time</b>	30s	30s	35s	55s	25s	15s
<b>Slope</b>	3.0	3.0	3.0	3.0	3.0	3.0
<b>IR preheating</b>	210					

**38\*38 BGA soldering temperature setting:**

	Preheating	Constant temperature	Warming period	Soldering 1	Soldering 2	Cooling
Upper heating	165	190	225	245	250	235
Constant temperature time	30s	30s	35s	45s	25s	15s
Lower heating	165	190	225	245	250	235
Constant temperature time	30s	30s	35s	45s	25s	15s
Slope	3.0	3.0	3.0	3.0	3.0	3.0
IR preheating	210					

**31\*31 BGA soldering temperature setting:**

	Preheating	Constant temperature	Warming period	Soldering 1	Soldering 2	Cooling
Upper heating	165	190	220	240	245	235
Constant temperature time	30s	30s	35s	40s	20s	15s
Lower heating	165	190	220	240	245	235
Constant temperature time	30s	30s	35s	40s	20s	15s
Slope	3.0	3.0	3.0	3.0	3.0	3.0
IR preheating	210					

The above is apply to the Lead-free BGA

Put the cooling temperature to 0 degree when desoldering .