

ACHI-HR15000 Rework Station

NO.: ACHI HR-15000

Instruction Manual



深圳市玉海源科技有限公司
Shenzhen Scotle Technology Co.,Ltd



www.achibgarework.com

ACHI- [BGA rework station](#)



深圳市玉海源科技有限公司

Shenzhen Scotle Technology Co.,Ltd

Office Address: 038-068 2F Handmade Culture Street, Phase III

Shuiku Road, Bantian, Longgang, Shenzhen, China

Tel: 86-755-83692414

Email: easybga@gmail.com

Factory Address: 801#A, The Zhonghengsheng hi-tech Park,

Xinyu Road No.3, Shajing, Baoan, Shenzhen, China

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1. Instruction Features

1. Adopt liner slide which make X、 Y、 Z axis all can do micro adjust or rapid positioning with high precisely.
2. Heating system controlled by touch screen, and optical alignment are easy operation to ensure positioning precision.
3. Have connected computer device, achievable computer control, convenience for setting, display, save, and printing curve.
4. The excellent temperature control system ensures the effectiveness of welding.
 - 1) There are independent heating areas from top to bottom. The first and second temperature areas can control many groups & sections of temperature parameters at the same time. The third area preheats the PCB thoroughly to achieve the best welding effect. Temperature, time, slope, cooling and alarming all display on the touch screen.
 - 2) Use a V-groove equipped with a flexible fixture for PCB positioning to protect the PCB.
 - 3) Use a powerful cross-flow fan to cool PCB rapidly to prevent it from deformation and ensure the welding effect.
 - 4) When the temperature goes out of control, the electric circuit can cut off automatically, with over-heating protection.

2. Installation

1. Be away from flammable, explosive, corrosive gas or liquid.
2. Avoid damp places, the air humidity is less than 90%.
3. Temperature $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$, avoid direct sunlight, prolonged sun exposure.
4. No dust, fibers and metal particles floating in the operational environment.
5. The place of installation needs to be flat, solid, no vibration.
6. Place heavy objects on the body are strictly prohibited.
7. Avoid the affection of direct airflow, such as air-conditioners, heaters or fans.
8. The back of rework station should be reserved 30CM for heat dissipation.
9. The placing table (900x900mm) be flat, the relative level of a height 750~850mm.
10. Distribute wiring must be handled by a qualified professional technician,

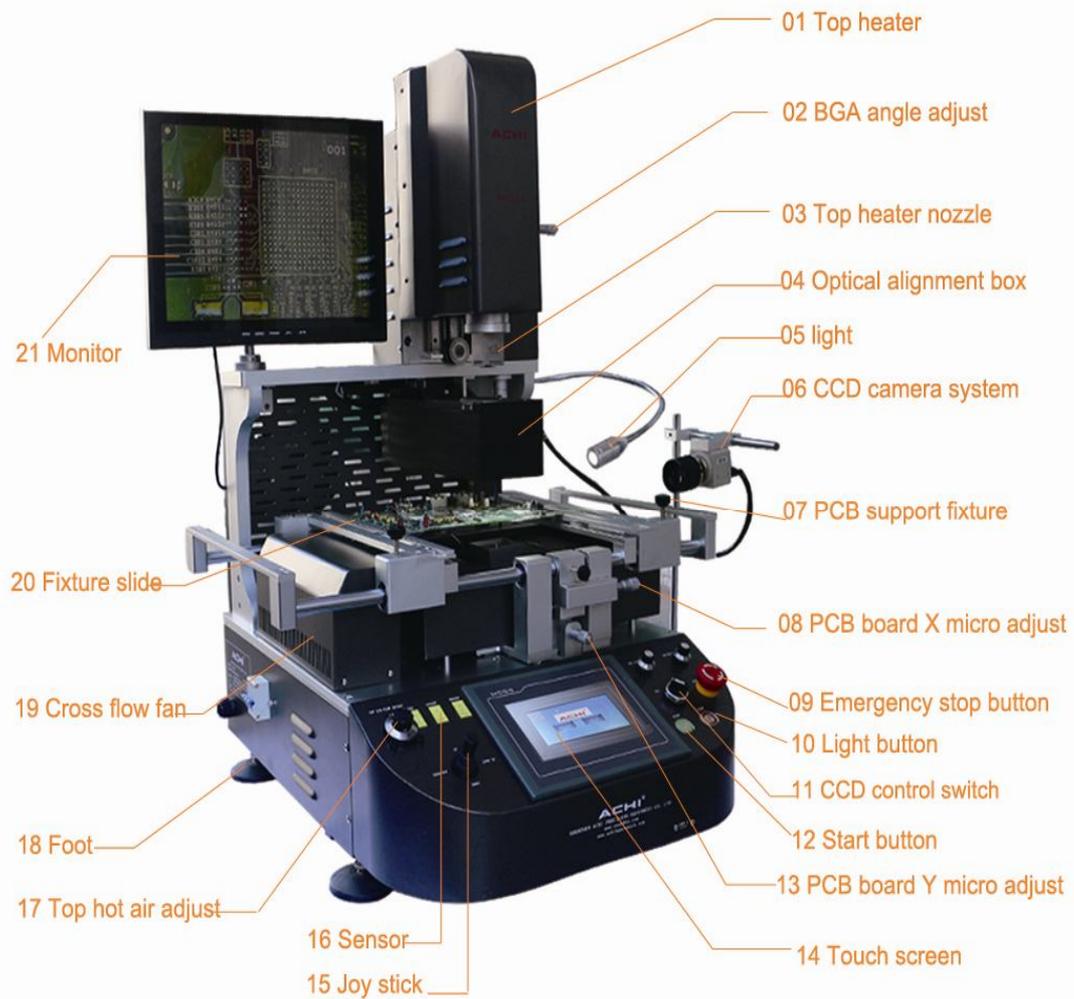
the main line is 1.5 square feet. Equipment must be well grounded.

11. Switch off the power after use, power must be disabled if a long-term no need.

3. Product specifications and technical parameters

1. Power voltage: 220V±10% VAC 50/60Hz
2. Total power: 5300W Max
3. Heaters: Top hot-air heater 1200W Bottom hot-air heater 1200W Bottom IR heater 2700W
4. Electrical materials: Intelligent programmable temperature control system, have connected computer device.
5. Temperature control: K-type thermocouple (Closed Loop): Independent control top and bottom temperature, temperature accuracy within ±3°C
6. Positioning: V-type groove, with universal fixture
7. PCB size: 410x370mm Max 65x65mm Min
8. Machine size: 640x630x900mm
9. Weight: 68kg
10. Color: Black

4. Introduction of the main structure



	Name	Function	Method
1	Top heater	Soldering or de-soldering BGA	Up and down to the desired position
2	BGA angle adjust	BGA and PCB board position	Adjust forth and back
3	Top heater nozzle	Ensure hot air concentration on BGA surface	Blow to desired position from BGA
4	Optical alignment box	BGA and PCB board position	90 degree rotate, pull out when positioning, push back after finished position
5	Light	Lighting	Adjust light position
6	CCD camera system	Pick up the image of aligning, de-soldering and soldering	Switch the control button and place it properly.
7	PCB support fixture	Fixed PCB position from left to right position	Clockwise, anticlockwise rotation
8	PCB board micro adjust X-axis	BGA and PCB board when the X-axis direction of the bit of fine adjustment	PCB to the left rotating clockwise, counter clockwise
9	Emergency stop button	Abnormal or special equipment when emergency stop	Press to stop, Clockwise rotation
10	Light button	Lighting control	Press
11	CCD control switch	Screen image change	Switch over AV1 shows optical alignment image AV2 shows camera image
12	Start button	Starting control	Press
13	PCB board micro adjust Y-axis	BGA and PCB board when the Y-axis direction of the bit of fine adjustment	PCB backward spin clockwise, counter clockwise
14	Touch screen	Equipment operation control	Hand touch-screen control
15	Joy stick	Rise and fall on the heater up and down the left and right to zoom	Shaking the handle up and down
16	Sensors	Measure the actual	Connect an external

		temperature	galvanic
17	Top hot air adjust	Control of the upper part of a heating nozzle size of the wind	Clockwise to increase air flow, counter-clockwise
18	Foot	Support and adjust height	Elevated body clockwise, counterclockwise
19	Cross-flow cooling fan	After cooling the PCB heating	Choose manual or automatic
20	Fixture slide	PCB board supporting bar fixed	The PCB into V-groove, moving pallets for clamping
21	Monitor	BGA and PCB alignment display images	Good video, connector plug, power cord

5. Program settings and operation

(I) Power to prepare power on:

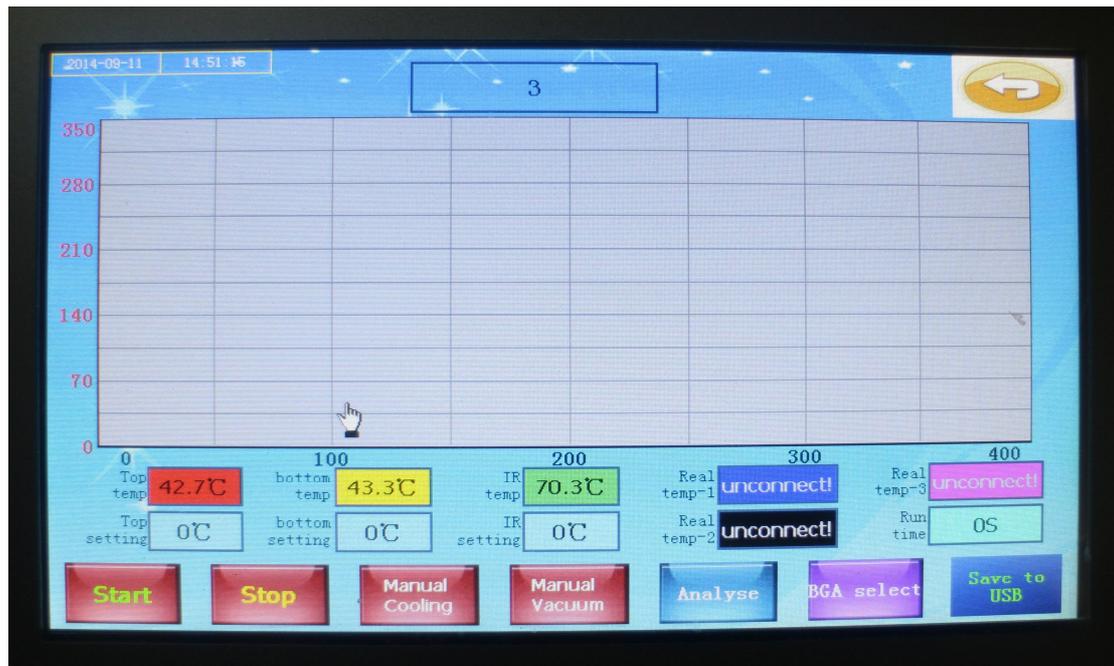
1. Careful check examination after installed, the switch power on.
2. Check the emergency stop button is pressed or not (Note: If emergency stop button is pressed, the device will cut off the control power.)

(II) "Operation" Operate

1. After power on, the touch screen will be display (as Figure1) interface, click "Operation" button, appears operation curve interface. (Figure2).



(Figure1)



(Figure 2)

Operation curve interface introduction:

Top heating temperature: top heating temp. Correspond to the red curve.

Bottom heating temperature: Bottom heating temp. Correspond to the yellow curve.

Top heater setting: top heater temperature setting.

Bottom heater setting: bottom heater temperature setting.

IR temperature: 3rd IR bottom heater temperature setting. Correspond to green curve.

IR setting: IR bottom heaters setting.

Real temperature (-1-2-3): shown current sensor temperature.

Run time: recording the time from start to end.

Start: Click start, starting heating.

Stop: when machine is heating, click "Stop" to stop heating.

Manual Cooling: Cooling system, switch control of the cooling system between manual and automatic.

(Note: During the heating process, don't allow to open the cooling system.)

Manual Vacuum: vacuum button to control the vacuum.

Analysis: Screen change button, control switch "curve analysis".

BGA select: Select the data stored in the database.

Save to USB: there is USB connector, can insert USB and saving current screen (BMP format).

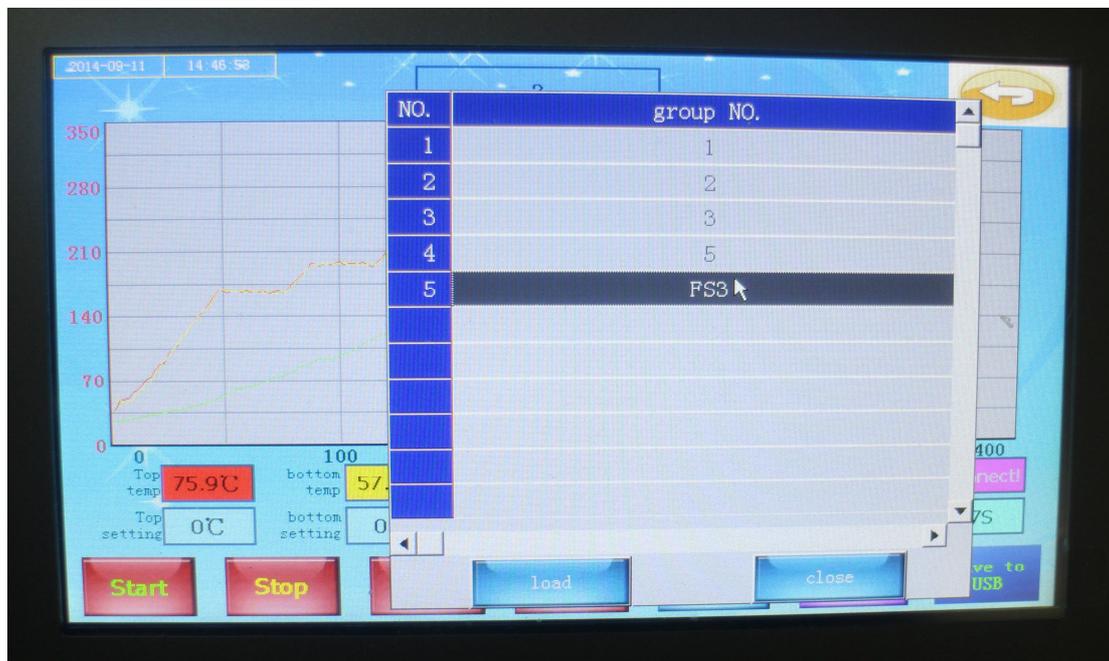
Exit: screen “” button to return to the boot screen.

(Note: the heating curve will show from start to end, and save the curve until the next time start, and re-display the current time temperature curve next time)

Date: “” shown current date and timer.

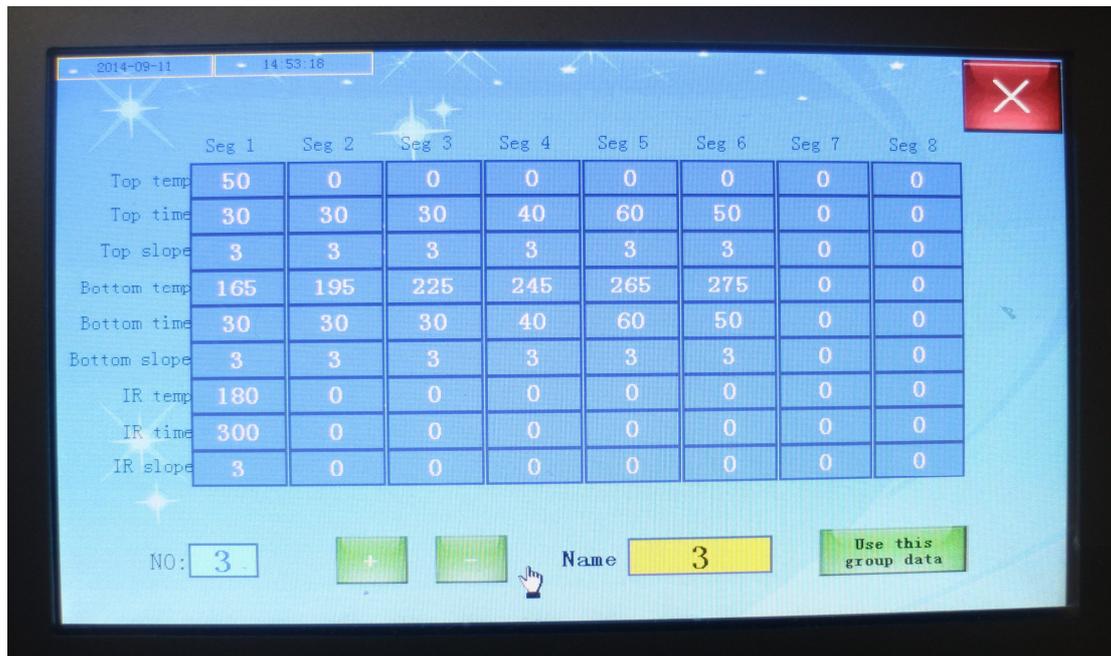
BGA name: “” shown current running group name.

2. Click (Figure 2) “BGA select” button, then enter “group No.” sub-window as (Figure 3) shown. It show all stored data in database.



(Figure 3)

- Choose a data and click the “load” button. (Figure 3) appearing the detail information of chosen data as (Figure4).

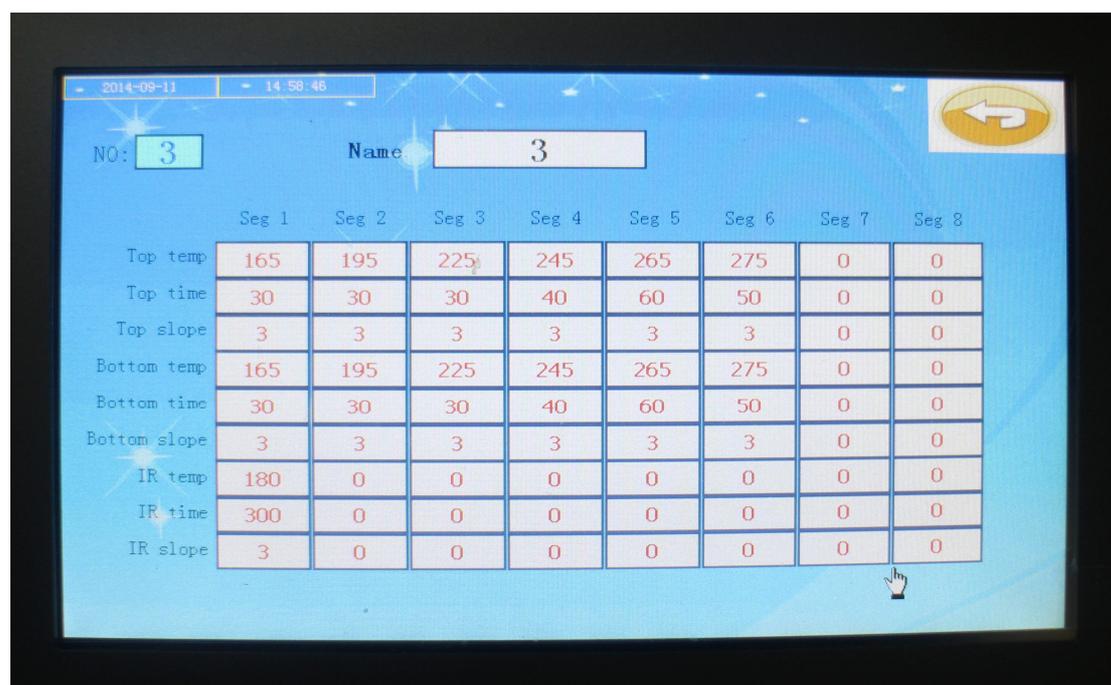


(Figure 4)

“+”: reverse the store data.

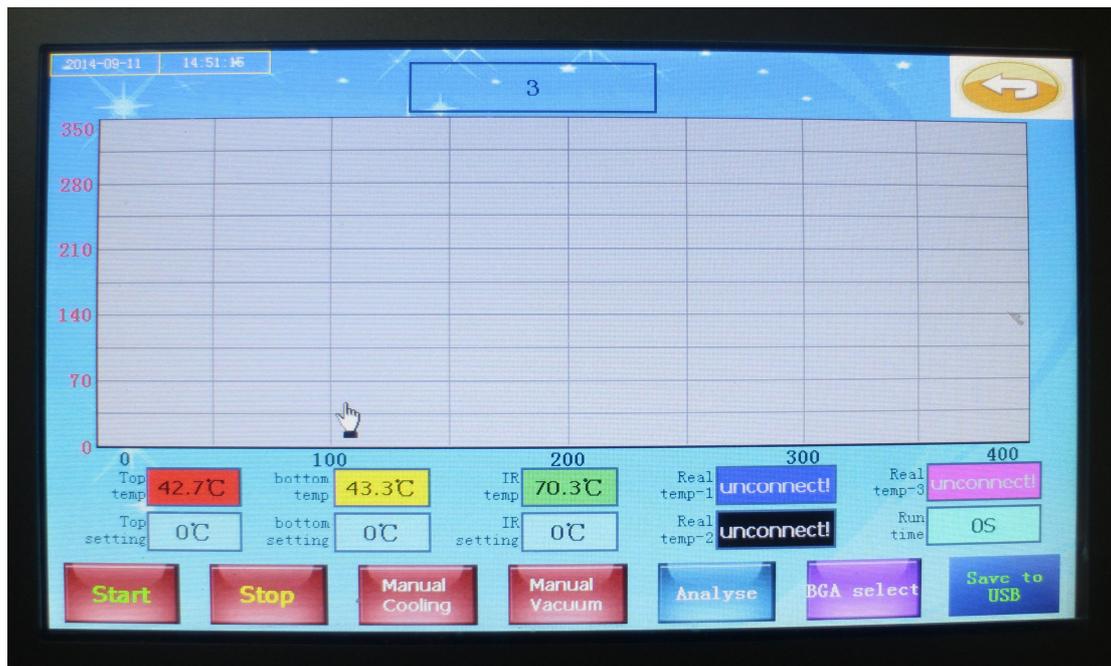
“-”: forward the store data.

- Click “use this group data” button. Appearing interface as (Figure5).



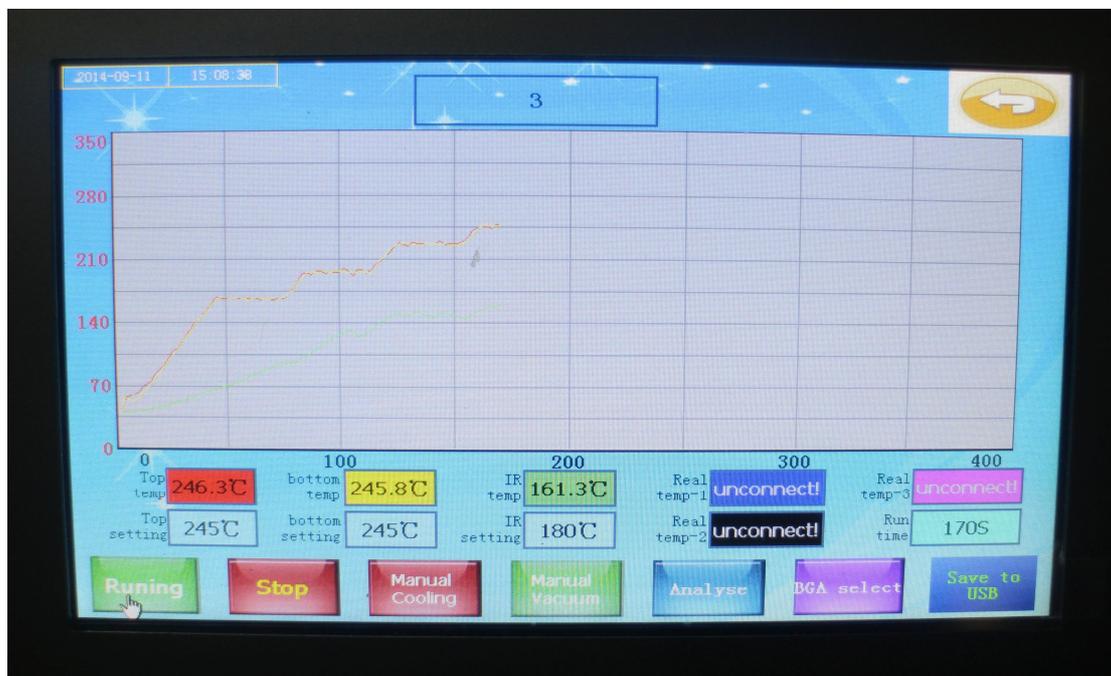
(Figure 5)

5. Click “” button, return to the operation curve interface. (Figure6)



(Figure 6)

6. Click “Start” button, HR-15000 start to heat according the chosen temp data.(Figure7)



(Figure 7)

Stated: “Operation” mode and “Set up” mode are basically same, the

difference is below:

“Set up” mode: the user have rights (need input password 8888) to set or modified each parameter.

“Operation” mode: the user haven’t right (don’t need input password) to set or modified each parameter. User can operate according stored parameter only.

(III) Description of parameter settings

1. **Preheating section:** when you start the program, the top heater will enter the process, the slope of it is 3 degrees per second, when it reaches to 165 °C (the temperature setting of preheating section), keep this temperature for 30 sections (the time setting of preheating section, till now, the preheating is finished, then the top heater will enter the next work process—insulation section.

The bottom heater start to heat from room temperature, the heating slope is 3 degrees per second, when it reaches to 165 °C (the temperature setting of preheating section), keep this temperature for 30 seconds (the time setting of preheating section, till now, the preheating section is finished, then the top heater will enter the next work process—insulation section.

IR preheating: Set 180 °C, it means that the IR heating plate will be heated to 180 °C, and then keep it.

2. **Insulation section:** the slope of the top heater is 3degrees per second, start from 165 °C to 195 °C, then keep it for 30seconds.
3. **Heating section:** the slope of the top heater is 3 degrees per second, start from 195 °C to 225 °C, then keep it for 30 seconds.

The slope of the bottom heater is 3 degrees per second, start from 190 °C to 225 °C, then keep it for 30 seconds.

4. **Welding 1、welding2 and cooling section** are same as above.

The process of actual temperature control of this system can be less than maximum control section (6 sections). During the heating process, if you do not use the control section, then you can set 0 to close it.

6. Operation Basic Introduction

(I) De-soldering process

1. Work flow:

Power on→ Place PCB on PCB supporter→adjust position by laser→front forward Joystick→Fixed the splint→Switch the CCD control bottom to AV2 (for watching the de-soldering process)→ Start

2. Detailed description:

- 1) Put the BGA pad align bottom heater, fixing the PCB on the PCB supporter;
- 2) Fixed PCB board by locked screw of X aisle;
- 3) Choose the proper nozzle according BGA chip, let laser shine the chip to position, adjust the joystick to make the top heater fall down to the distance 3~5mm from PCB board.
- 4) Switch the CCD control bottom to AV2 for watching the de-soldering process.
- 5) Press “start” to run, machine will be automatic heating.
- 6) After finished heated, press “vacuum”, make the sucker point sucked up BGA, rising the sucker point to proper position, take out BGA after cooling.

(II) Soldering process

1. work flow:

Power on→Place PCB on PCB supporter→adjust position by laser→Front forward Joystick→ Fixed the splint→Switch the CCD control bottom to AV2 (for watching the de-soldering process)→Start

2. Detailed description:

- 1) Place the PCB on the PCB splint, coating proper flux paste on the BGA PAD, choose the proper nozzle according BGA size;
- 2) Let laser shine the soldering place to position, front forward Joystick, stop when nozzle approaching BGA, then adjust alignment, make the center of BGA pad aligns nozzle, adjust X axle fixing screw of PCB splint, to fixed PCB board;
- 3) Put the balled BGA chips on the PCB pad;
- 4) Choose the proper nozzle according BGA chip, adjust the joystick to make the top heater fall down to the distance 3~5mm from PCB board;
- 5) Switch the CCD control bottom to AV2 for watching the de-soldering process.

- 6) Press “start” to run, machine will be automatic heating;
- 7) After finished heated, top heater will automatic rising up to original position and stop there;
- 8) cooling fan start cooling;
- 9) Welding is finished.

(III) Mounting process

1. Work flow:

Power on→Place PCB on PCB supporter→Place BGA→Adjust position→Fixed the splint→Front forward Joystick→Sucking BGA→Go Back Joystick→Optical Alignment adjust image

2. Detail description

- 1) Fixed X axis screw, locked PCB splint.
- 2) Put the balled BGA chips on the PCB pad.
- 3) Operate joystick to front forward, make the sucking point touched BGA, press “Vacuum” to sucking BGA;
- 4) Go back the joystick, let the sucker point with BGA to rising up proper position;
- 5) Drag out optical alignment to proper position (BGA center);
- 6) Adjust image, operating joystick from left to right as zoom in and zoom out, micro control X, Y axis and R angle to got clearer image.
- 7) Push back optical alignment to original position, and there is magnetic positioning.
- 8) Front joystick, top heater fall down to put BGA on correspond welding pad, then start heating;
- 9) After finished heated, top heater will automatic rising up to original position; BGA has welded on PCB;
- 10) So far, the mounting process is finished.

7. The use of external thermocouple wires

(I) Function

1. More accurate to measure the actual temperature of the part to be heated during the welding process.
2. It is easy to move, so that it can be convenient to measure the temperature of the different parts of the welded components during the

process.

3. After installing thermocouple wires correctly, it will display the galvanic current measurement temperature in the touch-screen outside the measured temperature curve screen “measured” column.

(II) Installation

1. Check the thermocouple wires, whether there are disconnected phenomenon or not.
2. Insert the galvanic Plug into the “outer galvanic Socket” on the control according to the positive and negative mark.
3. After GALVANIC installed correctly, the real temperature of the outer temperature curve screen of the touch screen will show the temperature of the GALVANIC.

(III) Measurement

1. PCB board will be installed on the rework station, with the galvanic fixed on the PCB board
2. Adjust the height of the probe with the probe galvanic head located in the top 1-2mm of the test site.
3. Adjust the related mechanical adjustment knob, so that the heating part just below the hot-air tube.
4. Adjust the up and down adjustment knob of the hot-air head to make the distance between the edge of PCB board side and hot-air head is 3-5mm.
5. Implementation of the welding / disordering process, that is to start the process of upper and lower heater.
6. Then it will show three curves of the green, red and yellow on the computer monitor screen.

(IV) Using the external thermocouple to adjust the temperature curve

Statement: In this operation, it may be due to improper operation to cause the temperature deviation of the device or even lose control, please caution!

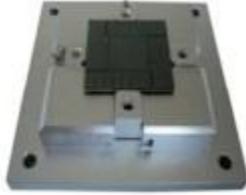
Take the upper hot-air tube as an example to make detailed description of adjustment method.

1. Set the temperature, the time, the slope and so on parameters of the upper heater;
2. Adjustment process proposed to do on a waste circuit board in order to prevent damage to the circuit board and on-board electronic components.
3. Implementation of the above process (3), installed the external thermocouple, in which the top of the PCB board just below the hot-air tube.
4. Close the lower part of the heating process, click on "Start" button to start the heating process, which will on the computer monitor screen will be displayed on the upper curve of the measured temperature (green) and external galvanic measuring temperature (red) the two curves;
5. Green curves represent the actual measurement of the galvanic temperature curve of the upper heating wire interior, the red curve represents the actual measurement of the galvanic temperature outside. the smaller the gap between the green curve and red curve, the closer between the actual temperature and set temperature of the heating parts, more standard of the upper heating process; On the contrary, the greater the gap between the two curves, the greater the actual temperature deviate from the set temperature, the more non-standard of the upper part during the heating process.
6. If the deviation between the two curves is too much, you should make the appropriate adjustments.
7. The specific adjustment method is as follows, because of the impact of the system processes and the environmental, deviations in the objective is inevitable. If the temperature deviation does not affect the normal welding and de-soldering, non-professionals should avoid the following corrective actions!
 - A. If the outer galvanic curve (red) lower than the upper one (green), adjust the internal hairdryer galvanic probe upward;
 - B. If the outer galvanic curve (red) higher than the upper one (green), adjust the internal hairdryer galvanic probe downward;
 - C. Adjustment must be small, try to control the amplitude of accommodation in 1mm or less;

- D. Repeated several adjustments;
 - E. During adjustment process, the heated of galvanic probe is strictly prohibited from contacting with any objects, so as not to affect the accuracy of measuring temperature;
 - F. After temperature adjustment, you should fix the probe, to avoid the probe vibration measurement of the temperature of the equipment
 - G. The method of the adjustment applies only to the two parallel curves in a smooth uniform deviation, and it is invalid to the temperature which is from top to bottom jitters free-laws regulating!
 - H. The upper part of the internal galvanic Duct location: Remove the upper heater nozzle, at a distance of 2-3cm at the edge wind-cone.
8. There is no booster thermocouple temperature curve on the bottom of the computer screen, so you have to adjust the process of the lower part of the heaters by visual.
 9. Fixed the galvanic line with foil stickers on the bottom of PCB board (as opposed to the upper heater set back on the PCB board), so that the probe of the booster thermocouple is located just 2mm above the mouth of the bottom hot-air nozzle, and adjust the mechanical parts, make the upper hot-air nozzle deviate from the heated parts to avoid cold air affect the temperature of the heated parts.
 10. The caution is same as the top heater.
 11. The methods of adjustment:
 - A If the outer temperature is lower than the bottom, you should adjust the lower internal galvanic probe downward.
 - B If the outer temperature is higher than the bottom; you should adjust the lower internal galvanic probe upward.

8. Reballing process

1. Fix the BGA chip on the base of universal [reballing station](#); adjust the four slipper blocks to fix the chip to make it on the center of the reballing kit.



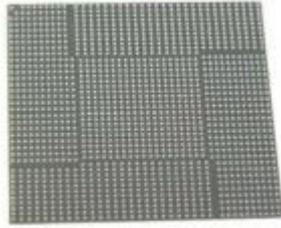
2. Select the appropriate steel mesh according to chip type. Fix the steel mesh to the ceiling cover and tighten it with 4 M3 screws, covered with lid. Adjust 4 Jimmy on the base to meet the suitable height required.
3. Observe the hole on steel mesh which should be completely coincide with the solder holes on BGA. If not coincide, we must remove the cap to reposition to ensure steel mesh holes aligned with the chip, and then lock the four screws.



4. Locking two no spring fixed slide, remove the BGA chip and coated with a thin layer of solder flux, card the chip into the base again, covered with lid (make sure the right direction).
5. Put into solder ball, clench hands and gently swaying reballing station to ensure the solder ball completely filled in the holes and pour out extra solder balls.



6. Place the reballing station on the flat location; remove the lid, carefully scored BGA chips. Observe the chip, if individual solder balls are not in the rightly, please correct it with forceps.
7. It is convenient to use our different types of repair stations or welding machine to fix solder ball. Heat solder balls on the BGA to soldering it on BGA, thus reballing finished.



9. Repair and Maintenance

(I) Upper heater:

1. Turn off the power supply, wait until the machine is cool down;
2. Replace the fan: take off the cover of top heater, then change the fan;
3. Then replace the cover, fan, fan splint, plastic connector, heating tube, take off the heater and replace heater.

Noted: It must be use high-temperature insulation paper to wrapped heating wire when replace it.

(II) Replacement of Bottom heating wire:

1. Dismantle the locking fan bolts, careful overturn body of machine, then the components are shown.
2. Remove fan and fan fixture, plastic connector, heating wire fixture, then take off the heating wire to replace.

Noted: It must be use high-temperature insulation tape to wrap heating wire when replace it.

(III) Bottom (3rd heating area) heater replacement:

1. Remove the heating box cover, demolition of locking screw, remove the heating plate and the assembly of the fixed plate, placed on the table which is covered with a sponge (with heating plate surface facing down).
2. Removed the fixed heating plate card, you can break down the fixed plate and heating plate assembly, remove the heating plate then it can be replaced

(IV) Machine maintain

1. Always keep slider clean;
2. Optical system do not remove at random, use the fabric with alcohol to clean;
3. Frequently cleaning heating plate, PCB split. Use cloth with alcohol wrap surface of machine after heaters gully cool.

(V)Transmission maintain

1. Drive screw rod must be regular clean (at least once one month) and add lubricant oil, use dry cloth to wrap;
2. Top slider rail and optical slider rail: always keep surface clean, without sundries. Regular (at least once one month) add lubricant oil;
3. Regular check each transmission part, if there are loose, injure and etc.

(VI)Electronic maintain

1. Always keep display and touch screen clean, use the detergent clean.
2. Regular check circuit, replace old one in time;
3. Always keep the optical system and top heater and Photoelectric switch always avoid dusty pile up to dysfunction.
4. Regular check the leakage switch sensitivity, ensure safety.

10. Safety precautions

1. BGA rework station ACHI HR-15000 use AC220V power, working temperature may up to 400°C, improper operation may cause damage to the equipment and even endanger the safety of the operator. Therefore must strictly abide the following:
2. The power supplier for this machine is ~220V, the total power is 4700W; so before you use it, you have to check your power supplier is suitable for this machine.
3. Prohibited flammable gases or liquid around the machine; After booting, forbidden combustibles touch high temperature district and peripheral metal parts, otherwise it will easily cause fire or explosion;
4. To avoid high temperature scald, forbidden touching high temperature fever zone during working. PCB board still warm when completed, operation process should take necessary protective measures;
5. PCB board should be placed on V type support shelves and used slider pairs to support PCB board in the center;
6. Metal or angular and sharp objects are avoided on touch screen surface;
7. Upper and lower heater inlet must not be blocked, otherwise heating wire will be damaged;
8. After work, please guarantee natural cooling for 5 minutes, then Switch

off;

9. If metal objects or liquid fall into rework station during working, you should power off immediately, unplug power plug, until it cooled, then eradicate litter and dirt; it will be influenced if grease on the heating panels and accompanied by odor when rebooting. Please keep the machine clean and timely maintenance;
10. When appears abnormal warming or smoke on the machine, immediately disconnect power and notify technical service personnel to repair it; Remove the connections data line between computer and devices, hold the plug to unplug the data line, to avoid damaging internal connection.

Normal BGA welding and de-soldering parameters (for reference)

1. The temperature curve of lead welding

41*41 the temperature setting of the BGA welding:

	preheating	insulation	heating	Welding1	Welding2	cooling
upper	160	185	210	235	240	225
time	30	30	35	40	20	15
bottom	160	185	210	235	240	225
time	30	30	35	40	20	15
slope	3.0	3.0	3.0	3.0	3.0	3.0
IR	180					

38*38 the temperature setting of the BGA welding:

	preheating	insulation	heating	welding1	welding2	welding3
Upper	160	185	210	225	235	215
Time	30	30	35	40	20	15
bottom	160	185	210	225	235	215
Time	30	30	35	40	20	15
Slope	3.0	3.0	3.0	3.0	3.0	3.0
IR	185					

31*31 the temperature setting of the BGA welding:

	preheating	insulation	heating	Welding1	Welding2	cooling
Upper	160	180	200	215	225	215
Time	30	30	35	40	20	15
Bottom	160	180	200	215	225	215
Time	30	30	35	40	20	15
Slope	3.0	3.0	3.0	3.0	3.0	3.0
IR	180					

Above is the reference temperature of the lead BGA

2. The temperature curve of Lead-free welding

41*41 the temperature setting of the GBA welding:

	preheating	insulation	heating	Welding1	Welding2	Cooling
Upper	165	190	225	245	255	240
Time	30	30	35	55	25	15
Bottom	165	190	225	245	255	240
Time	30	30	35	55	25	15
Slope	3.0	3.0	3.0	3.0	3.0	3.0
IR	210					

38*38 the temperature setting of the BGA welding:

	preheating	insulation	heating	Welding1	Welding2	Cooling
Upper	165	190	225	245	250	235
Time	30	30	35	45	25	15
Bottom	165	190	225	245	250	235
Time	30	30	35	45	25	15
Slope	3.0	3.0	3.0	3.0	3.0	3.0
IR	210					

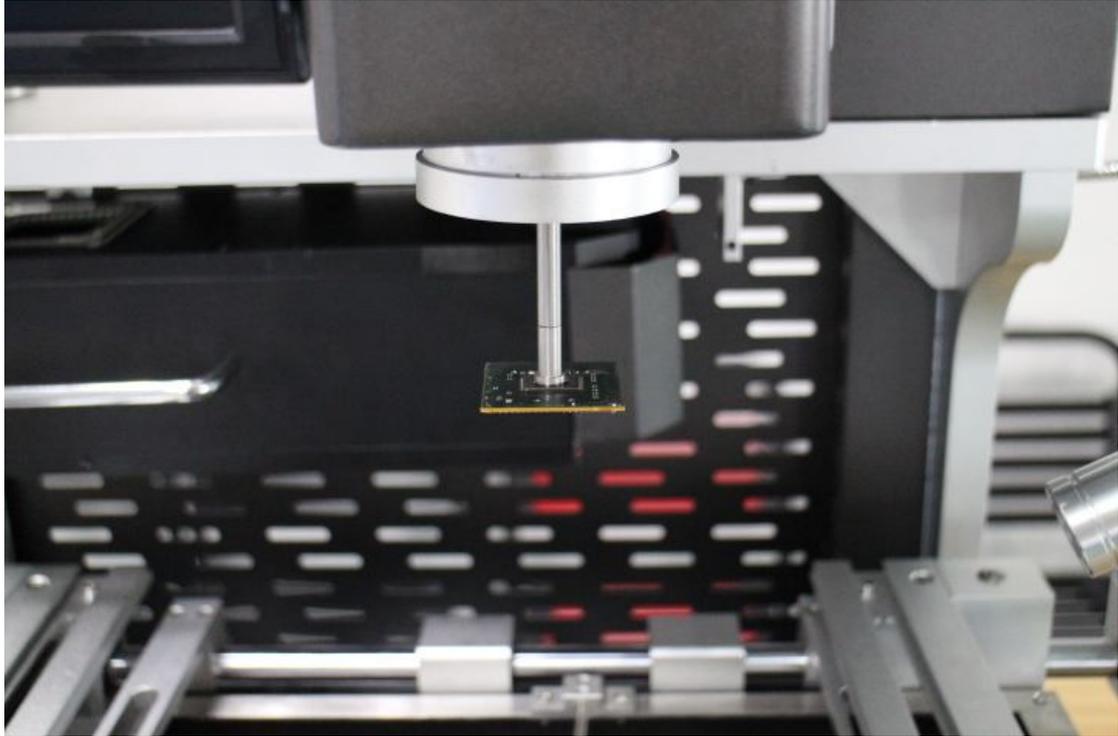
31*31 the temperature setting of the BGA welding:

	preheating	insulation	heating	Welding1	Welding2	Cooling
Upper	165	190	220	240	245	235
Time	30	30	35	40	20	15
Bottom	165	190	220	240	245	235
Time	30	30	35	40	20	15
Slope	3.0	3.0	3.0	3.0	3.0	3.0
IR	210					

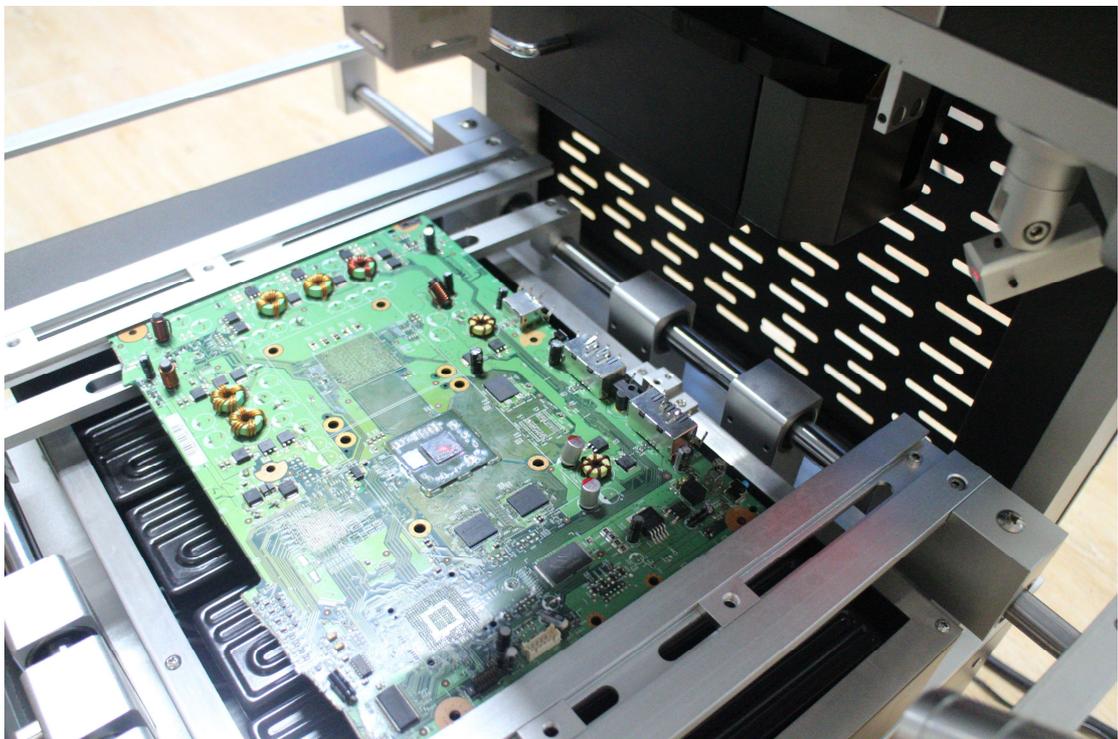
Above is the reference temperature of the lead-free BGA

Such as set 0 when the demolition of the cooling section of BGA.

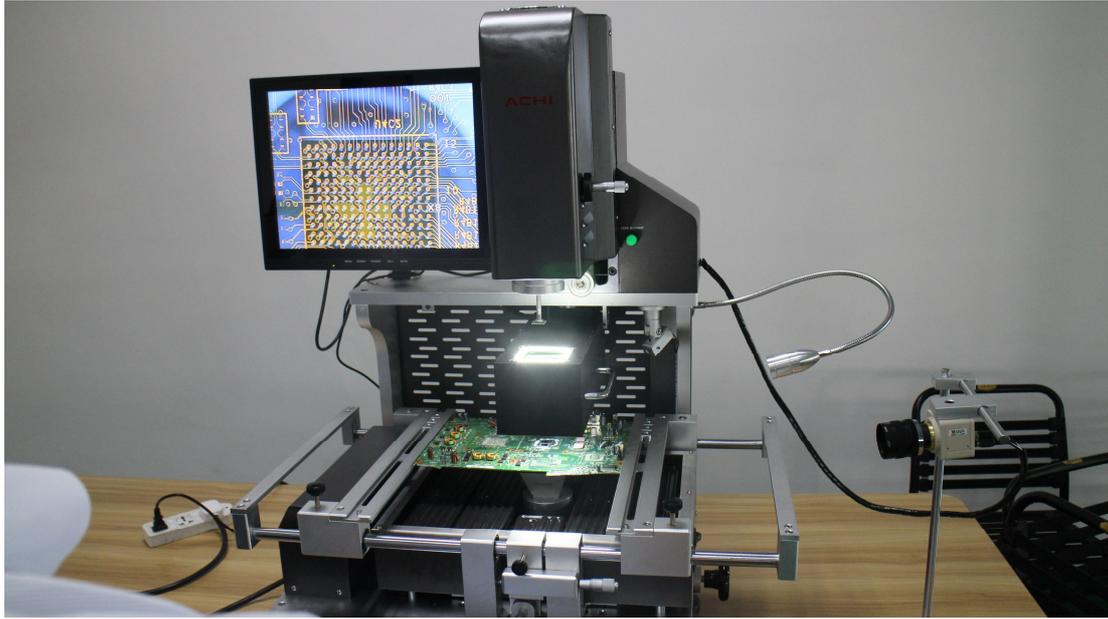
The vacuum pen is sucking the chip.



Laser position (the red light point in the center of chip)



Optical alignment



Machine testing for customers



