

BlackJack SolderWerks BK6000 Repairing System

INSTRUCTION MANUAL

Thank you for purchasing the BlackJack BK6000 Repairing System.
Please read this manual before operating the equipment.
Keep manual in accessible place for future reference.

NOTE: Please remove the screw located at the center of the bottom part of the main unit. This screw holds the pumps in place during shipping. Failing to remove this screw prior to use can cause damage to the unit

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PRODUCT DESCRIPTION

The BlackJack SolderWerks BK6000 Repairing System is a digital multipurpose reworking equipment that incorporates a Hot-Air Gun, Soldering Iron, Smoke Absorber, and Desoldering Gun.

The Hot air gun is equipped with our BlackJack SolderWerks Hot-air triple protection system, which provides (1) **System cool-down**, (2) **Auto System Sleep**, and (3) **Overheat Protect**. The **System cool-down** feature removes the residual heat from nozzle when the Hot-air function is switched off, this will let the nozzle cool down more rapidly and pro-long the life of the heating element. The **Auto System Sleep** feature puts hot-air gun in sleep mode when the hot-air gun has been left unattended. The **Overheat Protect** feature effectively shuts off power to the heater when an overheat in the handle has been detected.

The Soldering iron is a lead free solder compatible system. Its fast heat up and thermal recovery, ensures quick and easy soldering at any temperature setting. The **Digital offset** feature allows easy calibration of tips with a few pushes of the buttons. Its **Auto Sleep** feature turns off the soldering iron if no user input has been detected.

The Desoldering gun features fast heat up speeds and a powerful diaphragm pump that allows easy and efficient desoldering. Its Integrated smoke absorber efficiently filters harmful fumes.

SPECIFICATIONS

Main Station	
Power input:	110V/ 50hz—60hz
Station Dimensions:	188(w)x126(h)x250(d)mm
Hot air gun:	
Power consumption:	500W peak
Temperature range:	100°C - 480°C
Heating element:	Metal Heating Core
Pump Type/ Capacity:	Diaphragm Pump, 23L/min. (max)

SPECIFICATIONS

	Soldering Iron	Desoldering Gun
Power consumption	60W peak	70W peak
Temperature range:	200°C - 480°C	
Heating Element	Ceramic Heater	
Voltage	24V	

Specifications are subject to change without prior notice

SAFETY PRECAUTIONS

CAUTION: Improper usage can cause serious injury to personnel and/or damage to equipment. For personnel safety, please follow these precautions:

- Check each component after opening the package to make sure everything is in good condition. Do not use item if visible damage is seen, report the issue to your vendor.
- Power off unit and unplug the device when moving the device from one location to another.
- Do not subject the main unit to physical shock
 - Never drop or sharply jolt the unit.
 - Contains delicate parts that may break if the unit is dropped.
- Always connect power to a grounded receptacle.
- Tip temperature may reach as high as 480°C when switched ON.
 - Do not use the device near flammable materials.
 - Do not touch heated parts which may include tips, nozzles, barrels.
- Disconnect from power source if the unit will not be used for a long periods. Switch off power during short breaks.
- Use only genuine replacement parts.
- Soldering process produces smoke — use on well ventilated place.
- Do not try to alter or repair unit, bring to qualified service center for repairs.

Initial Setup

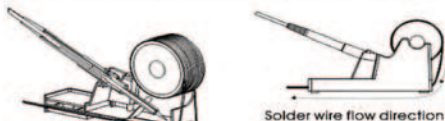
1. Main Unit

REMOVE THE SCREW located at the center of the bottom of the main unit. This screw holds the pump in place during transportation.

WARNING: Failure to remove the screw before using the equipment can cause damage to the unit.

2. Soldering Iron

1. Install the solder wire to the soldering iron holder as seen.



2. Connect the soldering iron cord assembly to the 6-pin output terminal found at the lower middle portion of the main unit.
3. Place the soldering iron to the soldering iron stand as shown above.

3. **Smoke Absorber**—Attach the smoke absorbing tube to the suction vacuum cap. Make sure the cord connections are free from tangles.

4. Hot Air Gun

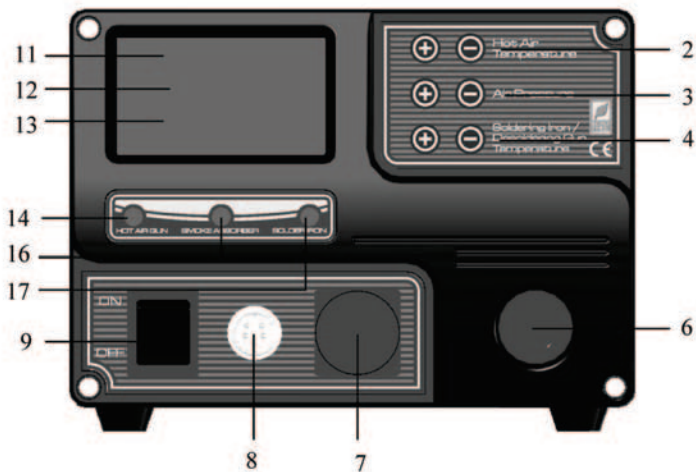
The Hot Air Gun holder was installed on the station upside down for packaging purpose. To set up the Hot Air Gun holder:

1. Loosen the two screws that secure the holder to the station.
2. Turn the holder right side up.
3. Re-fasten the two screws.
4. Place the hot air gun onto the holder in preparation for usage.
5. Make sure the mesh cap is place at the smoke absorber terminal.

5. Desoldering Gun

1. Connect the cord assembly of the desoldering gun to the 6-pin terminal .
2. Connect the vacuum tube to the suction vacuum cap.
3. Place the desoldering gun onto the holder in preparation for usage.

CONTROL PANEL GUIDE



LEGEND:

- 2 — Hot Air Gun Temperature Adjustment Buttons
- 3 — Hot Air Gun Airflow Adjustment Buttons
- 4 — Soldering Iron / Desoldering Gun Temp Control Buttons
- 6 — Hot Air Gun Output Terminal
- 7 — Smoke Absorber Terminal, Vacuum Cap or Desolder Gun Vacuum.
- 8 — Soldering Iron / Desoldering Gun 6-Pin Receptacle
- 9 — Main Power Switch
- 11 — Hot Air Gun Temperature Display
- 12 — Hot Air Gun Air Pressure Display
- 13 — Soldering Iron / Desoldering Gun Temperature Display
- 14 — Hot Air Gun Activation Switch
- 16 — Smoke Absorber Switch
- 17 — Soldering Iron / Desoldering Gun Activation Switch

OPERATING GUIDELINES

Please refer to the **CONTROL PANEL GUIDE** page for buttons and display panel directory.

1. INITIAL PROCEDURES

1. Plug the device to the main power source.
2. Make sure all function switches are deactivated and all terminal connections properly secured, switch ON the main power switch (see 9 from the control panel).
3. Display panels, 11 and 12 will display "OFF". The system will remain at this state until the user activates a function.

2. HOT AIR GUN

1. Follow "INITIAL PROCEDURES".
2. Utilize the Hot air filter cap at the Smoke Absorber Terminal or Vacuum Cap ("7" from the control panel).
3. Activate "Hot Air Gun" switch ("14" from the control panel).
4. The system will rapidly and safely increase the air temperature to 100°C and airflow at 50% level (default system operating parameters). These values will be reflected from the Hot Air Gun Air Temperature and Air Pressure display panels, "11" and "12" from the control panel, respectively.
5. Adjust the air flow level and hot air gun temperature using the AIR PRESSURE ADJUSTMENT BUTTONS ("3" from the control panel), and the HOT AIR GUN TEMPERATURE ADJUSTMENT BUTTONS ("2" from the control panel) .
6. When the desired hot air temperature and airflow level are shown from display panels "11" and "12", allow 1-2 minutes for the temperature to stabilize before reworking.
7. When reworking is complete, return the Hot Air Gun to its holder. **DO NOT** immediately turn off the main power switch.

IMPORTANT: It is strongly advised to increase the airflow level when higher temperature is needed. This is to protect the heating element inside the handle from excessive heat .

OPERATING GUIDELINES

7. Deactivate the Hot Air Gun Activation button. This will activate our SolderWerks **System cool-down** process. The system will start to blow air at a fast rate to reduce heat from the hot air gun. Once the temperature drops to approximately **90°C** the system will turn off the pump while displaying "OFF" on the panel. It is now safe to switch off the main power switch.
8. Unplug the device from the main power source.

IMPORTANT:

1. Make sure the equipment is placed on a flat stable surface and all the heat-generating components placed on their respective holders or stands.
2. Ensure all terminal connections are properly secured.

3. SOLDERING IRON / SMOKE ABSORBER

1. Connect the Soldering Iron to the 6-pin receptacle located at the front of the control panel ("**8**").
2. Follow the initial procedures.
3. Connect the vacuum tube to the Smoke Absorber Terminal or Vacuum Cap ("**7**"). **Utilize the larger Smoke absorber cap.**
4. Switch on the smoke absorbing function. Then activate the "SOLDER IRON" switch ("**17**"). The temperature of the soldering iron will increase to 350°C (default).
5. Adjust the soldering iron temperature using the SOLDER/DESOLDER TEMPERATURE ADJUSTMENT buttons ("**4**").
6. Start Soldering iron when the desired temperature is reached.

4. DESOLDERING GUN

1. Connect the Desoldering to the 6-pin receptacle at the front of the control panel ("**8**").

OPERATING GUIDELINES

2. Follow the initial procedures.
3. Connect the vacuum tube to the Vacuum Cap ("7"). **Utilize the smaller Vacuum Cap.**
4. Activate the "SOLDER IRON" Activation switch ("17"). Desoldering gun temperature will increase to 350°C.
5. Adjust the desoldering gun temp. using the DESOLDER TEMPERATURE ADJUSTMENT buttons ("4").
6. You may start using the desoldering gun when the desired temperature is reached. Use the trigger of the desoldering gun to vacuum solder.

USAGE TIPS AND NOTES

- **Make sure the SMOKE ABSORBER switch is de-activated while using the desoldering gun. Otherwise, the desoldering gun will keep on sucking air indefinitely.**
- Clean the Desoldering gun frequently, Clogged desoldering gun filter springs and filter pads can lower the efficiency of the desoldering gun.
- Because of the difference in the heating element and size of the soldering iron tip and desoldering gun, the soldering iron will heat up faster than the desoldering gun. This is normal and does not have any impact on the system's performance.
- There will be a slight drop in temperature display once the trigger of the desoldering gun is used. This is due to rapid intake of air in which temperature is significantly cooler than the desoldering gun tip. When the system detects this, it will automatically adjust the temperature to compensate for the temperature difference.
- If the Solder iron tip is not plugged in correctly or if the solder iron / desoldering gun is not plugged into the 6 pin port. The Solder Iron/ Desolder gun temperature display would show "PLUG" . This indicates that there is a connection problem.

SPECIAL FUNCTIONS AND FEATURES

SolderWerks® Hot Air Triple Protection System

1. **System cool-down** — This feature draws the heat out of the nozzle before turning off the pump. By decreasing the residual heat of the nozzle we prolong the life of the heating element and eliminate potential heat damage to other equipments .

Activating the automated system cool down feature

- Place the Hot air gun on its holder.
 - Switch OFF the Hot air gun function switch ("14").
 - The unit will immediately blow maximum air at room temperature this will quickly cool down the nozzle.
 - It will then turn off the pump when the temperature at the nozzle has fallen below 100 degrees Celsius.
2. **Auto System Sleep** — This offers protection in case of operator neglect and as a power saving feature.
 - In case the operator forgets to turn off the unit, the Auto Sleep system kicks in (5 minutes default) by enabling the **system cool-down mode**, before putting the system into Sleep mode (pump and heater are inactive). This feature also acts as power save mode and heater protection. When the hot air has been idle for some time it shuts the system off, It easily reverts back to previous system setting once the operator picks up the hot air gun.
 - This feature is activated by default, with a preset 5 minute standby timer. The standby timer will begin countdown once the hot air gun is placed on its dock , when the timer expires the system will go to **system cool-down mode** before displaying four dashes on the Hot air temperature and Air flow display. The dashes "- - - -" indicate that the system is in sleep mode. Picking up the nozzle will automatically awaken the system.

Note: The device has a switch located at the cradle, which activates the countdown before the system goes to sleep.

SPECIAL FUNCTIONS AND FEATURES

Changing countdown time before Stand-by Mode

- While "**OFF**" is displayed on the panels "6" and "7", press and hold both **UP** and **DOWN** buttons of the HOT AIR GUN TEMPERATURE adjustment buttons.
- Wait until "**005t**" is displayed on the Hot Air Gun Temperature display panel, "6". Release the buttons when "**005t**" appears.
- Adjust the time using the same **UP** and **DOWN** buttons of the HOT AIR GUN TEMPERATURE adjustment buttons.
- Confirm the change by activating the HOT AIR GUN function switch.

Notes: This setting will be saved in memory and will be in effect unless changed. The timer is configurable between 1 to 30 minutes.

2. **Overheat Protect**— This offers automatic protection in case overheat in the handle is detected, There is a built in heat sensitive fuse that unlatches when overheat is detected. When it is activated the power to the heating element is cut off. It will wait for the handle and nozzle to cool down before it deactivates. It is recommended to activate the **System cool-down** feature and wait for the entire hand piece to cool to room temperature before using the equipment if Overheat Protect become active.

BlackJack SolderWerks® Solder Iron Special Features

1. **Soldering Iron Auto-Sleep Mode** –This feature puts the soldering iron into SLEEP mode (" - - - " displayed) if no user input has been detected for a certain period. This is deactivated, by default, and the user must do the following set of procedures in order to activate this feature.
 - While soldering iron is "**OFF**" or in stand-by mode, push both UP and DOWN buttons of the SOLDERING IRON TEMPERATURE adjustment buttons ("3" from the CONTROL PANEL GUIDE page).
 - Wait until "**OFFt**" appears from soldering iron temperature display panel. This corresponds to a **30**-minute countdown time before the soldering iron goes to sleep mode.

SPECIAL FUNCTIONS AND FEATURES

- Release the two buttons after the change in display.
- Use the same two buttons to adjust the countdown time.
- Confirm the change by activating the SOLDERING IRON switch. This will now be used as the countdown parameter before the soldering iron goes to sleep and will remain active until the soldering iron has been deactivated or when the system has been powered OFF.
- To **DEACTIVATE** this feature, simply follow the above procedures. This time, select "**OFF**".

Note: This setting will be in effect unless settings are changed.

2. **Solder iron digital temperature calibration** — In cases where the tip temperature needs to be recalibrated the SolderWerks system allows easy calibration by a few push of buttons.
 1. Turn on the soldering iron function switch.
 2. Set to appropriate temperature you want to calibrate. Place the tip of the soldering iron on an external temperature sensor.
 3. The readings on the external temperature sensor should be more or less equal to the displayed temperature.
 4. If there are large discrepancy in the temperature reading we can recalibrate temperature setting.
 5. While the solder iron is operating make sure the hot air gun is in off mode ("**OFF**" is displayed on the panels "6" and "7"), hold the air pressure **UP** button for a few seconds until four zeroes are displayed "0000".
 4. Adjust the temperature compensation using the **UP** and **DOWN** buttons of the Soldering iron adjustment buttons.
 5. A letter "A" on the last digit signifies addition to the current temperature and a letter "d" on the last digit will decrease the displayed value from the current settings.
 6. Confirm the change by pressing the air pressure down button.
 7. The system will immediately switch back to operation and the temperature would self adjust based on your input adjustment values.

SPECIAL FUNCTIONS AND FEATURES

Solder iron digital temperature calibration example

- The external temperature sensor displays 248 to 252 degrees.
- The set temperature of the soldering Iron is 280 degrees.
- $280 - 248 = 32$. An additional adjustment of 32 degrees is required.
- Enter calibration mode
- We increase from "000A" to "032A".
- Exit calibration mode.
- The external temperature sensor would now display 279 to 281 degrees.

Notes:

- The calibrated data is saved into the memory and shall remain effective until it is recalibrated again or new data is entered.
- If the maximum of 40 degrees has already been added or subtracted pressing the air pressure down button would not exit from calibration mode. Instead turning off the soldering iron function switch would exit from the calibration mode.
- Calibration will only make the newly calibrated point the most accurate. Other temperature points may be a little off.

CARE and MAINTENANCE

Blower/Vacuum Air Terminal Filters

Filters should be cleaned and replaced regularly to avoid dirt which can clog the air passage. More importantly, this will also effectively clean the toxic fumes produced during soldering process.

Soldering Iron Tip

Always keep the solder-plated section of the tip/nozzle coated with a small amount of solder. Oxide coating on the tip of the nozzle reduces its heat conductivity. Coating the tip with a small amount of fresh solder ensures maximum heat conductivity is obtained.

CARE and MAINTENANCE

Replacing the Soldering Iron tip

1. Always turn OFF main power switch when removing or inserting a tip.
2. If the tip is hot, use the heat resistant pad to pull it out.
3. Insert the new tip fully into the handle. If the tip is not fully inserted (or if the tip is damaged), the device will display "PLUG"

Replacing the heating element of the Hot Air Gun

The heating element is found in the middle part of the hot air gun. The normal life of a heating element is 1 year under normal operating conditions.

Steps:

1. Ensure unit is off and is disconnected from main power source.
2. Loosen the 3 screws that secure the handle.
3. Slide off the nozzle.
4. Push out the heating element from the back of the hot air gun.
5. Disconnect the ground wire sleeve.
6. Peel of the protection tube covering the thermal sensor wires, unsolder the wires and detach from the base.
7. Loosen the clip securing the heating element to the base of the hand-piece and slide out the heating element.
8. Insert new heating element and reconnect the thermal sensor wires, use heat-shrink-tubes to avoid shorting of thermal sensor.
Be careful not to rub Heating Element wire.
9. Reconnect the ground wire after replacing the element.
10. Assemble the handle again.

BASIC TROUBLESHOOTING GUIDE

PROBLEM 1: THE UNIT HAS NO POWER

1. Check if the unit is switched ON.
2. Check the fuse. Replace with the same type if fuse is blown.
3. Check the power cord.
4. Verify that the unit is properly connected to the power source.

BASIC TROUBLESHOOTING GUIDE

PROBLEM 2: TEMPERATURE DISPLAY IS ALWAYS ABOVE 500°C

Description: Constant display of above 500°C temperature from the panel then displays a blinking "Err1" on the panel after a few minutes.

SOLUTION:

The thermal sensor may be broken and needs to be replaced.

PROBLEM 3: ACTUAL AIR TEMPERATURE IS NOT INCREASING

Description: Actual temperature reading is not increasing or decreasing based on desired level. The panel will then display "Err" on panel.

SOLUTION:

The heating element may be broken and needs to be replaced.

PROBLEM 5: THE UNIT IS VIBRATING TOO MUCH

SOLUTION: Check if the 4 rubber stub that hold the pump in place are properly and tightly connected. Unplug the system from the main power source before opening the case to check inside the station.

PROBLEM 6: THE UNIT IS VERY NOISY

SOLUTION:

Make sure the screw at the center of the base of the main unit has been removed. This holds the pump in place during transportation and needs to be removed before using the equipment.

PROBLEM 7: AIR PRESSURE LEVEL IS SIGNIFICANTLY LOW NO MATTER HOW HIGH THE AIRFLOW LEVEL IS CALIBRATED

Case 1: Check the mains voltage (AC power source). If the voltage level falls significantly low, about 15-20% lower than the standard, there will also be a noticeable drop in the air pressure level.

SOLUTION:

Please refer to your local power service provider.

Case 2: The microcontroller might have detected the operating frequency incorrectly. The user will notice that actual airflow is weaker compared with the displayed value.

BASIC TROUBLESHOOTING GUIDE

SOLUTION:

Turn off the unit wait a few seconds then turn on the unit again.

Case 3: The Suction Vacuum cap is connected to the Smoke Absorber Terminal or Vacuum cap instead of the mesh cap.

SOLUTION: Change the cap to the mesh cap. This allows more air to pass through the system. Make sure as well that the vacuum tube of the soldering iron or desoldering gun is not connected.

Case 4: The mesh cap is connected but airflow level is still low.

SOLUTION: Check the filter pad inside the mesh cap for dirt that can block the air passage. Clean or replace if necessary.

ADDITIONAL SOLUTION: Check for any tangles in the tube of the hot air gun that can cause the air blockage.

PROBLEM 8: SOLDERING / DESOLDERING TEMPERATURE DISPLAY PANEL SHOWS "PLUG" CHARACTERS

Case 1: The system display "PLUG" from the soldering / desoldering temperature display panel.

SOLUTION 1: Check if the soldering iron or the desoldering gun connection assembly is connected to the 6-pin receptacle of the control panel. Double check the pin connections if possible.

SOLUTION 2: Make sure the soldering iron tip is properly inserted and secured inside the handle. Lose contacts between the tip and handle can cause this error message.

PROBLEM 9: TEMPERATURE COMPENSATION WILL NOT CONFIRM

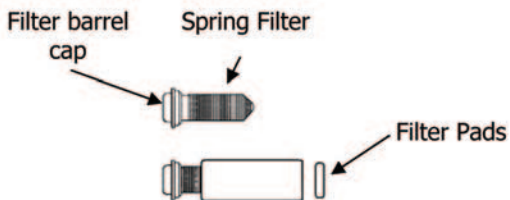
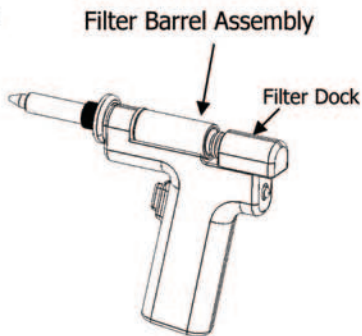
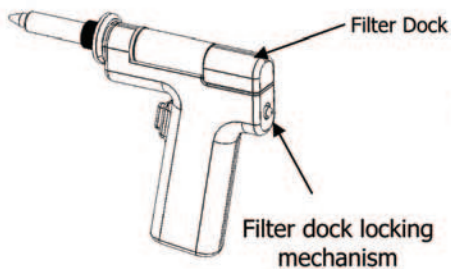
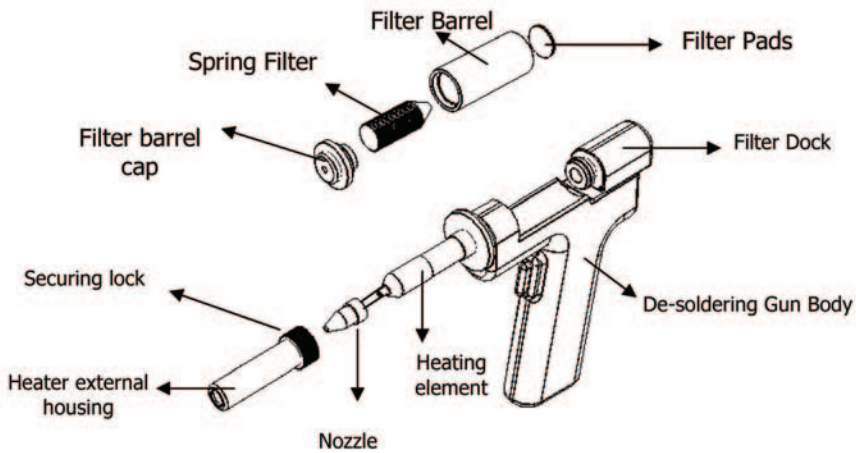
SOLUTION: To clear the temperature compensation, first power the unit off, hold down the air pressure UP button and turn the power back on.

OTHER PROBLEMS NOT MENTIONED:

Contact the vendor.

ASSEMBLY GUIDE

Gun Assembly:



CARE and MAINTENANCE

General Maintenance Guidelines:

- Before usage dampen the filter pads with a little bit of water to allow efficient air passage and filter action, re-dampen pads frequently for maximum efficiency.
- Routinely clean Spring Filter, and replace filter pads when they are dirty or clogged .
- The solder pathway can be cleaned using the provided Nozzle cleaning pin, use the cleaning pin when pathway seems clogged

Replacing the filters:

1. Unlock the filter barrel assembly by toggling the release knob(see illustrations on page 6) . The filter dock would push out to allow easy extraction of the filter barrel assembly which houses the filter pad, Spring filter, Filter barrel body and Filter barrel cap
2. Take out the filter spring or the filter pads for cleaning or replacement.
3. Re-assemble Filter pipe assembly and place back to the desoldering gun body (see illustrations on page 6) .
4. Push the Filter dock back in place until a "click" sound is heard signifying that the filter dock is properly secured.

Using Cleaning pin:

Caution: Desoldering gun will be hot during maintenance please use proper materials and equipments to avoid injuries.

1. When suction efficiency has deteriorated the desoldering gun might be clogged follow these directions to properly clean the desoldering gun.
2. Turn on the desoldering gun and wait for the nozzle to heat up.
3. Slowly insert the cleaning pin while turning the cleaning pin clockwise.
4. Pull out the cleaning pin in a straight motion.

Guideline for Reworking SMT Devices

Removal of SMT devices requires temperature/time profiles similar to those used to install the devices.

Steps:

1. Ensure that the temperature of the SMT device package never exceeds 220 degrees C (235 degrees C for small packages). This can be done by attaching a thermocouple probe to the device and monitor the temperature during the rework process.
2. Place additional thermocouples on the PCB near the leads (balls for BGAs) of the device. Monitor both device package (as in step 1 above) and the PCB at the same time and ensure that the temperature difference between the two is never over 15 degrees.
3. Apply hot air at a sufficient temperature and air flow level to melt the solder in a reasonable period of time while not exceeding the maximum temperature as described in step 1 above.
4. Once the solder is melted use a vacuum pen to lift the device straight up off the PCB. **Avoid twisting or rotating the device while removing it.**
5. Remove and excess flux or residue from the PCB before installing the new device.
6. To install an SMT device you must ensure that the device temperature never exceeds 225 degrees C and that the rate of temperature increase is kept between 1 to 3 degrees C per second. Use thermocouples attached to the device and the PCB to assure this.

7. Some types of devices may be prone to moisture absorption that could cause catastrophic failure of the device when subjected to the temperatures required for rework. These devices must be baked in an oven prior to rework.
8. If a device has been removed from its protective packaging and may have become subjected to humidity levels that exceed the manufacturer's recommendations, the device should be baked for 12 hours at 125 degrees C to assure moisture removal. Once a device has been reflowed it can safely operate in any humidity level.

