

# ***SMD-2000M***

**PROVIDING THE SKILLS AND  
KNOWLEDGE FOR TOMORROWS  
TECHNOLOGY**

**3661 Horseblock Road, Building N**

**Medford, New York 11763**

**Tel: (631) 654-1197 Fax: (631) 289-4735**

# SMD-2000M Self Contained SMT/PHT Repair & Desolder System (Deluxe)

**Part Number**            **6200-0009**    **(110V)**  
                                   **6200-2009**    **(220V)**

**Standard Package Consists of:**

SMD Hot Air Jet Reflow Tool	1700-0060
Ex 1700 Sensor; Anti Static	1700-6700
Desolder Handpiece (24v, 5WIRE)	
Resistive Tweezers with Tips	2200-0130
Thermal Parting Unit	2900-0132
Dual Holder Assembly	3550-0602
SMD Thermal Holder	3550-6000
Power Cord (110V)	4000-8402
Power Cord (220V)	8000-0100
Electric Foot Pedal w/plug	5000-8404
SMD Vacuum Pick and Place Tool	6000-2500
Cushion Grip Thermal Quad Tweezers	6000-0286
SMD Thermal Quad Pack Tweezers	6000-2400A
Operations/Maintenance Manuals	6200-6200
Cushion Grip Desolder Extractor	6700-0286
MTD Cleaning Unit Assembly	6730-3803
SMT/PHT Solder Iron w/Tip (24V, 5 Wire)	6910-1700♦
SMT/PHT Solder Iron w/Tip (24V, 5 Wire)	6910-2700•

**Optional Accessories:**

Conductive Tweezers with Tips	2300-0132
Thermal Strippers with Tips	2400-0133
Therm-Tool Kit	2700-0001
SMD Thermovac Tool	6000-2600
Tip Holder	6000-5001
Solder Paste Holder	6000-5002
Quick Plate Kit	0690-0002
Reflow Soldering Kit	2800-0130
Deluxe Holder-Tri	3550-6003
Solder Paste Kit	6000-5000
Drill Kit Assortment (Cirk Grind)	6000-6780
Cirk Grind System, Complete w Accessories	7300-0060
Assortment Kit	6000-5200
Dispenser Kit	6910-4229

♦ -Denotes Prior to April 1, 2005 • -Denotes After April 1, 2005 A - Denotes After September 9, 2000

**SMD 2000M SPECIFICATIONS:**

**110 (volts)**

110/120vac, 50/60Hz  
 15" L x 12 ½" W x 6" H  
 Weight 29 lbs.  
 P/N 6200-0009

**220 (volts)**

220/240vac, 50/60 Hz  
 15" L x 12 ½" W x 6" H  
 Weight 29 lbs.  
 P/N 6200-2009

**SAFETY STANDARDS**

In compliance with  
 DOD-STD-2000A  
 MIL-S-45743E  
 WS-6536E

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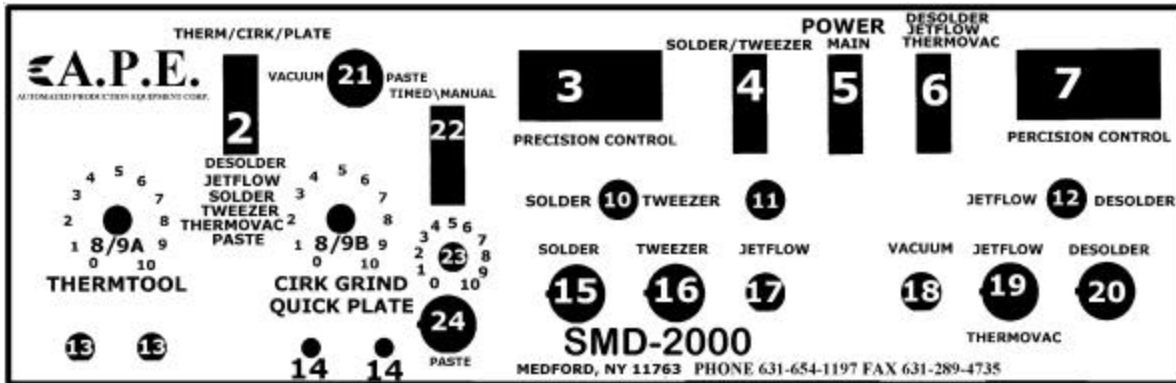
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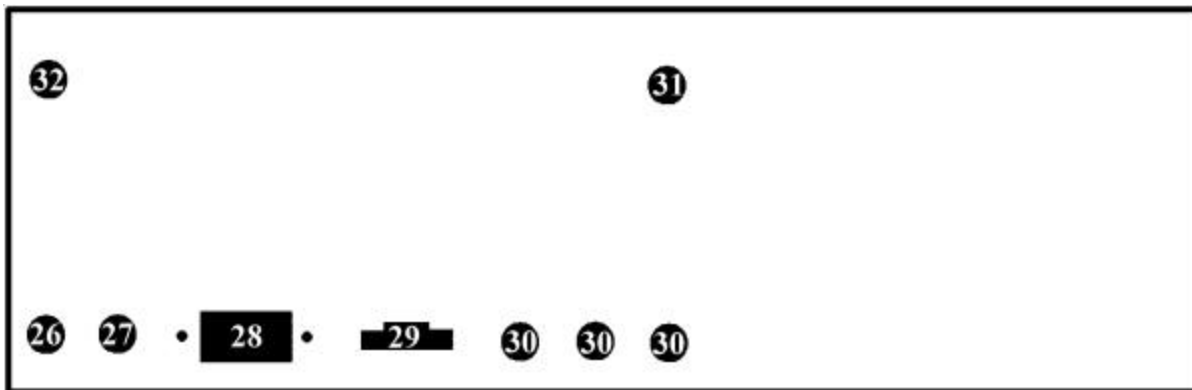
# NOMENCALTURE

## SMD-2000M

### FRONT PANEL



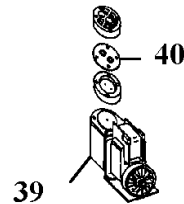
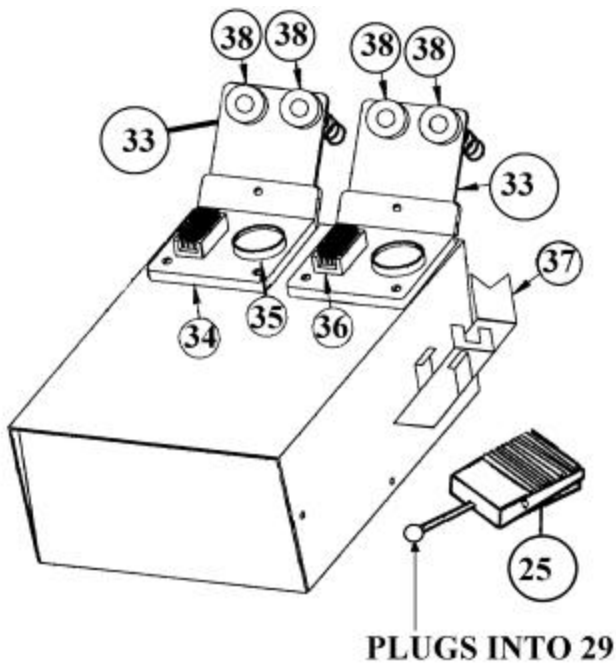
### REAR PANEL



Top of Machine

Internal Rise Vacuum Pump

Note found inside machine



## NOMENCLATURE

NO.	DESCRIPTION	NO.	DESCRIPTION
2.	Therm/Cirk/Plate/Desolder/ Jetflow /Thermovac/Vacuum Switch Non-Lighted	19.	Receptacle (Jetflow/Thermovac)
3.	Digital Controller (Solder/Tweezers Tools)	20.	Receptacle Desolder
4.	Power Switch (Solder/Tweezers Digital Controller)	21.	Paste/ Desolder Selector Switch
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18.	Vacuum Valve (Desolder/Thermovac)	36.	Brush
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		38.	Tool Holder Assembly
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		40.	Pump over Haul Kit

# SECTION I

## POWER SOURCE

The power Source of a SMD (Surface Mount Device) system provides all the necessary power requirements for the operation of the tools and accessories needed to perform the repair function covered within the scope of this manual.

Before operating a repair system, familiarize yourself with the panel layout, switches, etc. The operating parameters for A.P.E. rework systems are as follows:

<b>Specifications:</b>	<b>SMD-2000M (110v)</b>	<b>SMD-2000M (220v)</b>
Power Required:	110 Volts; AC; 60 Hz; 5 Amps	220 Volts; AC; 60 Hz. 3.5 Amps
Four Digital AC Outputs:	35 Watts; 24 Volts	35 Watts; 24 Volts
Low voltage AC Output:	15 Amps; 5.0 Volts	15 Amps; 5.0 Volts
Variable DC Output:	5 - 20 Volts	5 - 20 Volts
Vacuum Supply:	Internal Rise Vacuum Pump 4" to 20" Hg.	Internal Rise Vacuum Pump 4" to 20" Hg.

## Mechanical Parameters:

<u>Model:</u>	<u>Length:</u>	<u>Width:</u>	<u>Height:</u>	<u>Weight:</u>
SMD-2000M 110v 6200-0009	15"	12 ½"	6"	29 Lbs.
SMD-2000M 220v 6200-2009	15"	12 ½"	6"	29 Lbs.

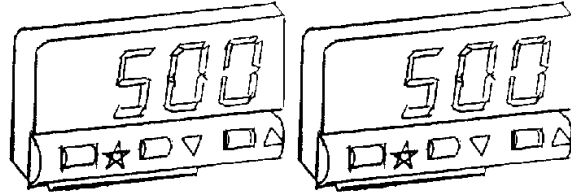


## INITIAL SETUP

1. Arrange suitable space on the work surface for power supply and cleaning unit assembly.
2. Turn main power on/off switch to OFF.
3. Plug power supply into an outlet receptacle providing the appropriate voltage input (**110V OR 220V**).
4. Position foot pedal (Nomenclature #25) in comfortable position, routing wire behind work bench, if possible.
5. Assemble desoldering handpiece by attaching hose from end cap assembly to stop clog and quick disconnect. Install desoldering tip in heater and leaving about 1/2" of smaller end protruding and tighten set screw only enough to secure.
6. Set up cleaning unit on work surface. Insert desoldering tool and soldering iron in holders. (Nomenclature # 38)
7. Plug desoldering handpiece and soldering iron power cords the AC receptacle on power supply (Nomenclature #15 and #20).
8. Attach free end of hose from desoldering handpiece to vacuum hose fitting on power supply with quick disconnect. Dress hose and power cord together with tie wraps if desired.
9. Position vacuum valve in maximum position.
10. Position pressure valve in maximum position.
11. Press the solder power switch (Nomenclature #6) and the desolder power switch (Nomenclature #4) to the off position.
12. Turn Therm Tool control off.(Nomenclature #8, and 9A)
13. Turn Cirk Grind tool control off. (Nomenclature #8, and 9B)

# DIGITAL CONTROLLERS

## OPERATING INSTRUCTIONS



1. Plug in the tool containing the "K" sensor.
2. Turn the power ON. The indicator will show four number eights, darken, and then show a LOW TEMPERATURE which will quickly start rising to the set point temperature. When the set point is reached, the display will remain constant.
3. To check for an unknown set point temperature, press the star (\*) button continuously. The indicator will show "F°" (Fahrenheit degree) then blink to the number that the temperature is set.
4. To increase the set point temperature, press the star (\*) button continuously and press the "UP" (▲) button until the new number is displayed. Release the buttons. The temperature is set.
5. To decrease the set point temperature, press the star (\*) button continuously and press the "DOWN" (▼) button until the new number is displayed. Release the buttons. The temperature is set.
6. The set point temperature remains in the digital controller's memory. Turning the machine off does not change the set point temperature.
7. The controllers have been "LOCKED" electronically at the AUTOMATED PRODUCTION EQUIPMENT CORPORATION manufacturing plant. This precaution is taken to assure continuance of extremely accurate calibration of the machine.

8. **Recommended** set point temperatures for using the tools are:

TOOL	TEMPERATURE (F°)	RANGES (C°)
Solder Iron	100 to 900	38 to 482
Desolder	100 to 900	38 to 482

9. The machine can be operated using Fahrenheit or Centigrade.

## USE OF THE DIGITAL TEMPERATURE CONTROLLERS

The **SMD-2000M** has two, independent temperature controllers. The digital controller on the left side of the system has been designed for the solder iron and tweezer while the controller on the right side of the system governs the desolder handpiece; jet flow and thermovac handpiece.

### CONTROLLER ACTIVATION

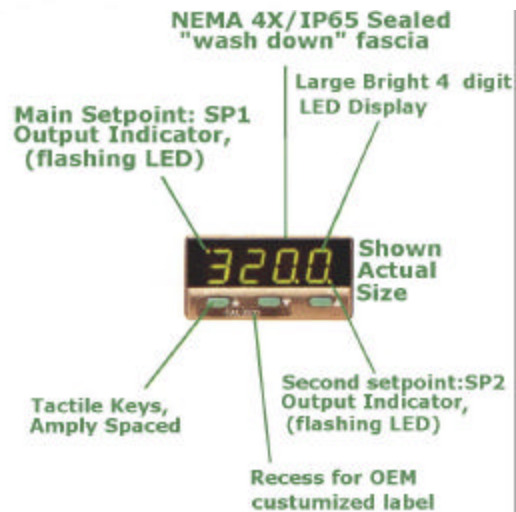
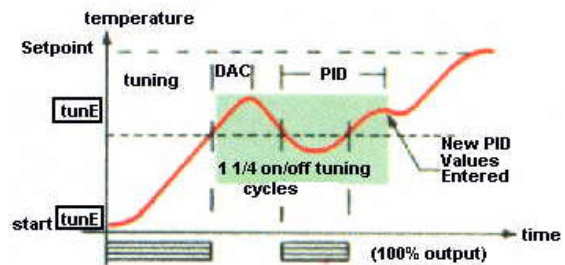
Attach the tools to the proper AC output as described in the "Initial Set-up" portion of this manual. Place the heat tools in the holder assembly atop the chassis.

Turn the Main Power Switch, located in the center of the system, to the "On" position. The switch will light, indicating power to the system. (NOMENCLATURE #5).

### TEMPERATURE SELECTION/STABILITY

The controllers on the **SMD-2000M** allows the system technician to select and program a desired working temperature, which the controller will automatically maintain ( $\pm 2^{\circ}\text{F}$ ). The temperature programmed into the controller's memory is referred to as the "Set point" temperature.

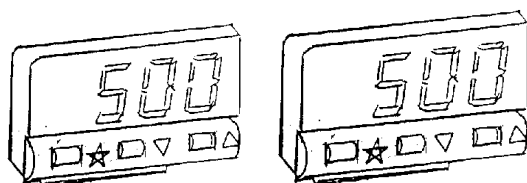
Once programmed, the controller monitors the temperature at the heat tool's tip, continually comparing and adjusting the actual temperature to match the "Set point." This is accomplished by a metallic sensor which connects the heat tool's tip directly to the controller.



## **POWER SOURCE CHECKOUT**

Follow the instructions in the "Initial Set-up" portion of this manual prior to checking the power source. The power source of your **SMD-2000M** Desoldering System is to be checked in the following manner:

- 1. Main Power:** Turn on the power switch (Nomenclature #5). The switch will light, indicating power to the system.
- 2. Circuit Selection:** Push selector switch (Nomenclature #2) to Therm to energize the Therm- tool, Cirk Grind, and Quick Plate circuits. Push the switch to Desolder to energize the Desolder, Solder, Tweezers, and Thermovac.
- 3. Vacuum:** With the desoldering handpiece attached as outlined in steps 5 & 8 of the "Initial Set-up" instructions, remove the internal glass tube of the handpiece, leaving the air hose still connected and the glass tube seated on the rear rubber seal. Step on the foot pedal to activate vacuum. Place a finger over the exposed end of the tube to evaluate suction.
- 4. Pressure:** To evaluate pressure, with the foot pedal (Nomenclature #25) depressed, place a finger over the Pressure Control (Nomenclature #17). The air pressure should be felt.
- 5. AC Outputs:** AC outputs (Nomenclature #15, #16, #19, #20) can be checked by plugging in the soldering iron and desoldering handpiece. After allowing the tools to heat up at a setting of 9, apply tips of both tools to the moistened sponge in the holder assembly.
- 6. Temperature Controllers:** The **SMD-2000M** provides two, separate temperature controllers for independent operation and monitoring of the solder extractor, and the solder iron.



Because of the difference in output voltage and connector style, it is important to use the proper part numbers when ordering replacement parts for your system. The following listing will aid in proper part selection:

<u>STYLE</u>	<u>VOLTAGE</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
(DIN)	24 Volt AC	Handpiece Complete	1700-6700
		Replacement Heater	6700-1724
		Power Cord 110V	4000-8417
		Solder Iron	6910-1700

## **POWER SOURCE CHECKOUT (Cont'd)**

- 7. To Test Accessories:** Flip "THERM TOOL/CIRK GRIND/QUICK PLATE" (Nomenclature #2) switch to the "accessory" position. This will disengage pump and power the drill and therm tool outputs.
- 8. Therm Tool:** Plug reflow tool into therm tool output (Nomenclature #13). Depress foot pedal. At a setting of 6, the tip of the reflow tool will turn red. The SMD-2000M will also indicate power to the tool.
- 9. Cirk Grind:** Plug drill handpiece into DC receptacle (Nomenclature #14). Depress foot pedal. Vary speed of drill with the speed control (Nomenclature #8/ 9B).

## **THE 90 MINUTE TIMED SET BACK CONTROLLERS**

THE MACHINE IS PRESENTLY SET FOR A MANUAL TIME OPERATION. THE ILLUMINATED POWER SWITCHES (NOMENCLATURE NUMBER 4 AND 6) ENERGIZE AND ILLUMINATE THE DIGITAL CONTROLLERS (NOMENCLATURE NUMBER 3 AND 7) FOR POWER CONTROL AND HEAT CONTROL OF THE TOOLS.

THE TIMER CIRCUITS ARE ENERGIZED BY TURNING ON TWO SELECTOR SWITCHES LOCATED ON THE REAR OF THE CHASSIS.

A MOMENTARY CONTACT SWITCH ENERGIZES THE TIMER FOR 90 MINUTES WHEN THE TOOL IS LIFTED OUT OF THE CLEANING UNIT ASSEMBLY HEAT SHIELD. AFTER USE, WHEN THE TOOL IS RETURNED TO THE HEAT SHIELD, THE 90 MINUTE INTERIM CONTINUES; REMOVING THE TOOL FROM THE HEAT SHIELD RESETS THE TIMER FOR AN EXTENDED 90 MINUTES.

WHEN THE TIMER SWITCH IS TURNED TO THE "OFF" POSITION, THE TIMER CIRCUIT IS BYPASSED. THE DIGITAL CONTROLLER FOR THE TOOL WILL OPERATE MANUALLY WITHOUT THE TIMED MODE. POWER CONTROL FOR EACH CIRCUIT IS THROUGH THE INDICATOR LIGHT SWITCH LOCATED NEAR EACH DIGITAL CONTROLLER; THIS SWITCH DE-ENERGIZES POWER TO THE DIGITAL CONTROLLER, TIMER AND THE TOOL.

THE MACHINE MAY BE OPERATED IN THE TIMED OR THE MANUAL MODE EFFICIENTLY. THE POWER SWITCH AND THE TEMPERATURE ILLUMINATED IN THE WINDOW OF THE DIGITAL CONTROLLER ADVISES THE OPERATOR OF THE SET POINT AND TIP'S TEMPERATURE. A CONTINUOUS DROP IN TEMPERATURE ALERTS THE OPERATOR THAT 90 MINUTES HAVE EXPIRED IN THE TIME MODE. TO RETURN TO THE SET POINT, THE TOOL IS LIFTED FROM THE HEAT SHIELD AND PLACED BACK IN THE HEAT SHIELD TO EXTEND THE TIMED CYCLE AN ADDITIONAL 90 MINUTES.

## Operating Instructions for Timed or Manual cycle

1. THIS MACHINE OPERATES IN MANUAL OR TMED OPERATIONS.
2. FOR MANUAL (TIMER OFF) OPERATION SET THE SELECTOR SWITCHES ON THE REAR PANEL TO THE “OFF” POSITION. THE MACHINE WILL OPERATE WITH THE TOOLS IN OR OUT OF THE TOOLS HOLDERS.
3. FOR TIMED OPERATION, SET THE SELECTOR SWITCH ON THE REAR PANEL TO THE “ON” POSITION. THE TOOLS MUST BE IN THE TOOL HOLDERS TO INITIATE A NINETY-MINUTE TIME CYCLE WHEN THE TOOL IS LIFTED FROM ITS HOLDER.
4. IT IS RECOMMENDEND THAT THE TIMERS BE LEFT IN THE “OFF” POSITION. SUFFFIEICIENT ILLUMINATIONS EXIST IN THE POWER SWITICHES AND PRECISION CONTROLLERS TO ADVISE THE OPERATOR OF TEMPERATURES AND POWER CONTROL, THE TOLL WILL NOT INITIATE A TIMED CYCLE WHEN LIFTED; THE TIMED CYCLE IS BYPASSED.

## UNLOCKING THE DIGITAL CONTROLLER

THE DIGITAL CONTROLLERS ARE LOCKED ELECTRONICALLY TO RETAIN PRECISION TEMPERATURES.

- (1) TO UNLOCK THE CONTROLLER, PRESS ▲▼ TOGETHER THREE SECONDS UNTIL “TUNE” AND “OFF” BLINKS ALTERNATELY. RELEASE BUTTONS
- (2) PRESS ▼ UNTIL “LEVL” “1” BLINKS ALTERNATELY.
- (3) PRESS ▲\* TOGETHER UNTIL “LEVL””3” BLINKS ALTERNATELY.
- (4) PRESS ▲ ALONE TO “VER.”
- (5) PRESS ▲▼ TOGETHER TEN SECONDS UNTIL “LOCK” “ALL” BLINKS ALTERNATELY.
- (6) PRESS ▼\* TOGETHER UNTIL “LOCK” ”NONE” BLINKS ALTERNATELY.
- (7) PRESS ▲▼ TOGETHER UNTIL A NUMBER APPEARS. THE CONTROLLER IS NOW UNLOCKED.

## SELECTING CENTIGRADE OR FAHRENHEIT TEMPERATURES

- 1) PLUG THE TOOL IN THE RECEPTACLE.
- 2) PRESS ▲▼ TO “TUNE”
- 3) PRESS ▼ TO “LEVL” “1” BLINKING ALTERNATELY.
- 4) PRESS ▲\* TO “2”
- 5) PRESS ▲ TO “UNIT”
- 6) PRESS ▲\* TO SELECT “F”, OR ▼\* TO SELECT “C”
- 7) PRESS ▲▼ UNTIL A NUMBER APPEARS. THE SELECTION IS PROGRAMMED. THE INDICATOR WILL BLINK THE SELECTED “C” OR “F” WHEN \* IS PRESSED FOR VIEWING THE SET TEMPERATURE.



## ADJUSTING FOR TEMPERATURE DIFFERENCE

- 1) ASSUME THAT A TEMPERATURE DIFFERENCE OF -100° EXISTS; FOR EXAMPLE, THE DIGITAL INDICATOR DISPLAYS 500° AND AN EXTERNAL CALIBRATED PYROMETER DISPLAYS 400° WHEN MEASURING AN EXTRACTOR TIP TEMPERATURE.
- 2) ASSURE THAT THE SECURITY LOCK SYSTEM IS UNLOCKED IN THE DIGITAL CONTROLLER.
- 3) PRESS ▲▼ FOR 3 SECONDS & “TUNE” “OFF” WILL APPEAR BLINKING ALTERNATELY.
- 4) PRESS AND HOLD\*, PRESS ▲ UNTIL “TUNE” “ON” APPEARS ALTERNATELY.
- 5) PRESS ▼ AND “LEVL” “1” WILL APPEAR.
- 6) PRESS AND HOLD \* AND PRESS ▲ UNTIL “LEVL” “3” APPEARS.
- 7) PRESS ▲ UNTIL “ZERO” APPEARS BLINKING ALTERNATELY WITH -50° (PREVIOUSLY PROGRAMMED).
- 8) PRESS AND HOLD \* AND PRESS ▼ UNTIL -150° APPEARS TO ADJUST FOR THE -100° DIFFERENCE.
- 9) PRESS ▲▼ TOGETHER, HOLD FOR 3 SECONDS UNTIL 400° APPEARS MATCHING THE PYROMETER’S 400°.
- 10) RELEASE BUTTONS TO ALLOW THE INDICATOR TO PROGRAM THE ADJUSTMENT.

“TUNE” AND DECREASING TEMPERATURE NUMBERS WILL BLINK ALTERNATELY WHILE THE CONTROLLER RESETS ITS PARAMETERS. “TUNE” WILL STOP BLINKING AND THE TEMPERATURES WILL INCREASE TO THE 400° SET POINT THUS MATCHING THE PYROMETER’S 400°. THE CONTROLLER IS NOW ADJUSTED.

## LOCKING THE DIGITAL CONTROLLER

- 1) TO LOCK THE DIGITAL CONTROLLER, PRESS ▲▼ TOGETHER FOR 3 SECONDS UNTIL “TUNE” AND “OFF” BLINKS ALTERNATELY. RELEASE THE BUTTONS.
- 2) PRESS ▲ ALONE UNTIL “LEVL” “1”BLINKS ALTERNATELY.
- 3) PRESS ▲\* TOGETHER UNTIL “LEVL” “3” BLINKS ALTERNATELY
- 4) PRESS ▲ ALONE TO “VER.”
- 5) PRESS ▲▼ SEVERAL SECONDS UNTIL“LOCK” “NONE” BLINKS ALTERNATELY
- 6) PRESS ▲\* UNTIL “LOCK” “ALL” BLINKS ALTERNATELY
- 7) PRESS ▲▼ 3 SECONDS UNTIL A TEMPERATURE APPEARS. RELEASE THE BUTTONS, THE CONTROLLER WILL AUTOMATICALLY LOCK ITS PARAMETERS BY BLINKING.“TUNE” ALTERNATELY WITH LOWERING TEMPERATURES. WHEN “TUNE “ STOPS BLINKING AND THE TEMPERATURE STARTS RISING TO THE SET POINT, THE CONTROLLER IS LOCKED ELECTRONICALLY.

## SECTION II

### OPERATION OF CONTROLS/OUTPUTS

All the SMD systems have AC and DC outputs that are variable to regulate the operation of the tools and attachments provided with each system.

- 1. Digital AC Temperature Control for Desoldering Handpiece (Nomenclature #7)** this control adjusts the temperature entering the handpiece through the AC output (Nomenclature #20). By changing the set point, the tip temperature of the handpiece is varied. A normal operating set point is 600 ° Fahrenheit.
- 2. Digital AC Temperature Control for Soldering Iron (Nomenclature #3)** Solder iron temperature is carried in the same manner described above. The controller will regulate temperature. When not in use, reduce setting to extend solder iron tip life.
- 3. Vacuum flow Control (Nomenclature #18)**

The vacuum produced at the desoldering tip is controlled by a twist valve on the vacuum hose fitting. Adjustment of vacuum is accomplished by twisting the vacuum fitting. Extreme left provides maximum vacuum, extreme right produces minimum vacuum.

A majority of desoldering jobs require or can use maximum vacuum. On printed circuit boards with large thermal planes and heat sinks or multi-layer boards, a lower vacuum setting is desirable. The vacuum should be reduced to a setting low enough to keep the solder molten as it is being withdrawn from the solder joint. If the vacuum level is too high, the melted solder will "chill down" before it is completely removed from the plated-through hole.

- 4. Pressure Flow Control (Nomenclature #17)**

Air flow rate is varied by the twist valve on the pressure hose fitting.

Adjustments are made in the same manner as the vacuum flow outlined in part 3 of this section.

The pressure mode is used to convert the EX-1700 desoldering handpiece into a hot air jet. A small diameter tip in the desoldering handpiece, with the temperature at maximum, will produce a pinpoint flow of heated air.

***CAUTION: Before using the pressure mode, be sure the handpiece is cleaned with the two brushes supplied with each system. This will ensure that the heater and glass tube are free of flux and solder particles. When the pressure is used, first point the handpiece away from the work piece and other personnel to be sure no remnant solder particles are blown out.***

## OPERATION OF CONTROLS/OUTPUTS (Cont'd)

### **5. Vacuum Pump**

All of the SMD systems have self-contained vacuum, generated from an internal pump. The pumps can be activated by the foot pedal assembly only when the Therm Tool/Cirk Grind/Pump selector switch (Nomenclature #2) is in the "pump" position. It should be remembered that the heating of the desoldering handpiece and solder iron are independent of the foot pedal and run at a constant temperature set by the AC controllers (Nomenclature #3, and #7).

*The functions and applications of the desoldering handpiece re outlined in section #3 of this manual.*

### **6. Drill Output (Nomenclature #14)**

The SMD-2000M has a DC output (Nomenclature #8 & #9B) to operate a variable speed drill system. By attaching the color coded jacks of the drill handpiece to the proper tip jacks, the speed of the drill may be varied by regulating the DC voltage (via the control knob; Nomenclature #8 & #9B). The DC output can also be used to operate an optional gold plating kit (part # 0690-0002).

*The functions and applications of the drill system are outlined in section #4 of this manual.*

### **7. Thermal Output (Nomenclature #13)**

The thermal output (Nomenclature #13) is designed to operate a wide range of thermal tools. The control knob (Nomenclature #8 & #9A) of the therm output varies the AC voltage from 0 to 5.0 volts.

Tools powered by the thermal output include:

- a. Thermal Parting Tool
- b. Reflow Tool
- c. Conductive Tweezers
- d. Resistive Tweezers
- e. Wire Stripping Tweezers

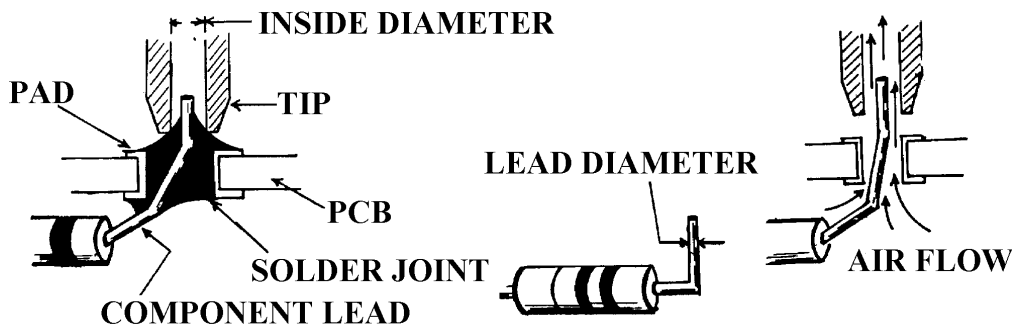
## SECTION III

This section will outline the proper use of the EX-1700 desoldering handpiece in the vacuum and pressure modes for the varying applications.

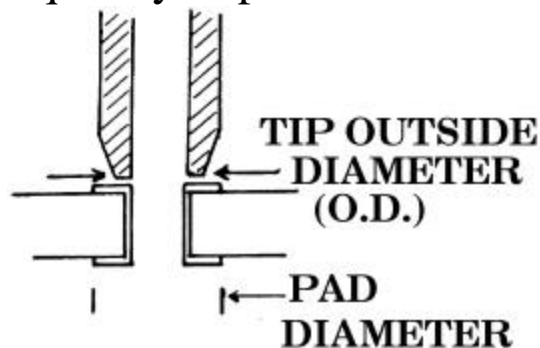
### DESOLDER TIP SELECTION

Proper selection of the tip is the key to successful desoldering.

- 1. Inside Diameter:** The tip should be large enough to fit over the lead to be desoldered. A slight clearance is necessary to allow the solder to flow through the tip. Although several tip diameters will work, ideally a tip inside diameter of  $1\frac{1}{2}$  to 2 times that of the lead diameter is best.



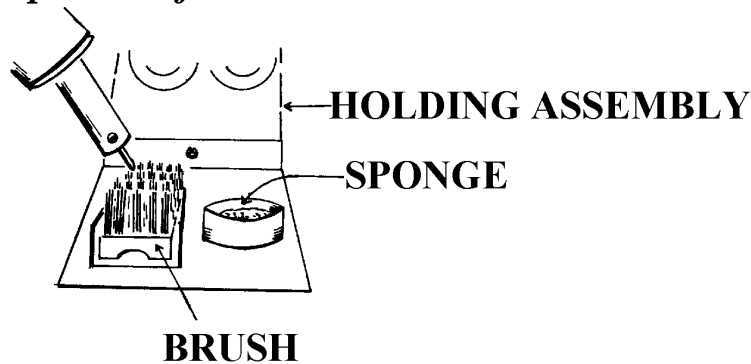
- 2. Outside Diameter:** The O.D. of the tip should be less than the diameter of the circuit board pad. This is to avoid burning or marking the board material. The tip wall thickness provides the path of heat into the solder joint. Thicker walls are preferable for large solder joints and bigger heat sinks to conduct the heat to the solder joint as quickly as possible.



## DESOLDER TIP SELECTION (CONT'D)

3. **Tip Care:** After each period of use, the tip should be cleaned off with the stand brush and inspected for signs of wear. The tip end may get frayed or spread out causing rough edges that can scratch a board. Tips should be removed from heater several times a day to clean heater and remove oxidation from outside of tip.

*Note: Failure to remove tip for a long period of time may result in tip seizing in heater due to expansion from oxidation.*

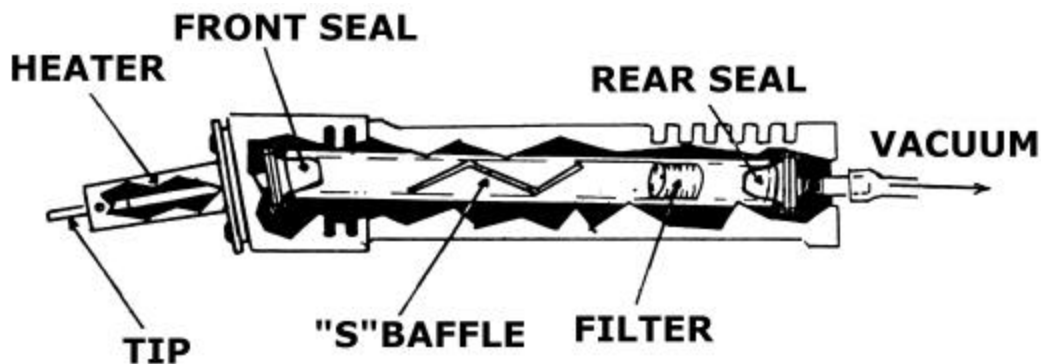


4. **Tip Wear:** Desoldering tips tend to wear out faster than soldering iron tips for many reasons such as:
  - a. Increased surface area exposed to oxidation.
  - b. Cycling of temperature from hot to cold.
  - c. Wearing out of inner surface from molten solder and flux passing through.
  - d. Mechanical wears from bending leads and stirring action.
  - e. High temperature causes oxidation.
5. **Set Screw:** An anti-seizing lubricating compound is impregnated into the set screw to prolong useful life. The set screw should be loosened every few hours to extend life. When holding tip in place, the set screw should be tightened to just make contact with tip and then turned only  $\frac{1}{4}$  turn additional to avoid crushing tip wall and making tip removal difficult.
6. **Tips:** Tips should be positioned so they protrude about  $\frac{1}{2}$ " from heater. Personal preference for variations will affect the temperature and thermal recovery time of tip. The adjustment of the temperature control in conjunction with position of tip as well as type of tip used can give infinite variations.

## **SOLDER JOINT REMOVAL**

The desoldering handpiece is a simple but critical tool. Understanding its functions will make its use and maintenance easier.

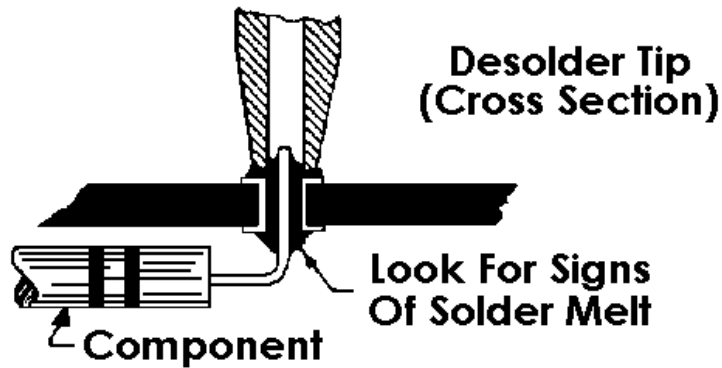
1. Through the tip, the solder joint is heated to make the solder molten. The vacuum is energized to extract the molten solder up through the tip and heater assembly and in to the glass collection tube. A metal baffle is positioned in the glass tube to provide a surface for the molten solder to adhere. The felt filter at the rear end of the glass tube will trap fine particles and vapors that are drawn in preventing these particles from reaching the vacuum pump.
2. A seal on both ends of the glass tube preserves the vacuum from the power supply through the hose to the heater and tip. The seals permit quick disconnection of the glass collection tube for removal of the solder and changing of the filter.
3. The tip is heated by the heater which also carries the vacuum. A tight seal at the tip is essential to both transfer the heat and the vacuum to the solder joint. The tip must not be blocked or have "blow holes" in its sides.



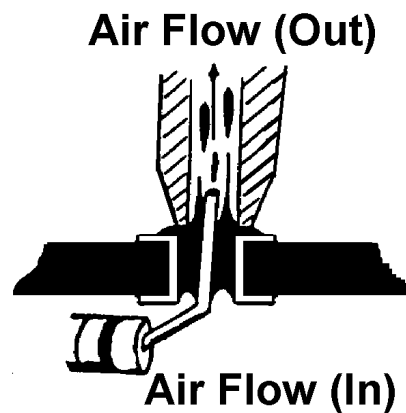
**Plated Through and Reinforced Hole Joint Removal:** These joints have solder in holes that are plated through. Complete evacuation of solder must be achieved before the component can be removed. Using four basic steps, the joint can be removed. The first step is to make the solder molten. This can be verified by glancing at the component side of the joint and watching for the first sign of bubbling or movement of the solder at the joint. Continuation of the basic steps will assure good joint removal. These steps are as follows:

- a. **Heating the solder joint:** Lay the tip over the lead against the pad-lead junction. This will ensure there is adequate melting of the solder. The time needed should be only a few seconds. It is helpful to watch component side of PCB for full melt of solder.

## SOLDER JOINT REMOVAL (Cont'd)



**Start vacuum:** Once solder is observed, step on the foot pedal to suck solder from joint. Hold tip in a perpendicular position to board and let tip gently lay on pad. This will seal the pad and tip and give maximum vacuum. Do this for several seconds.

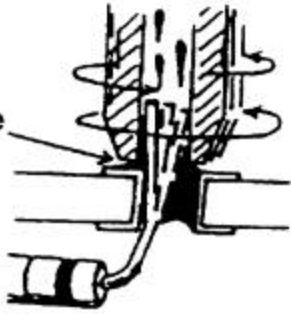


- b. **Oscillation:** After stepping on foot pedal to begin evacuating solder, almost instantaneously begin vigorously (but gently) oscillating the component lead. Usually the lead bends more easily in one direction than the other, such as IC's. This vigorous oscillating should be done only to the lead and the weight of the tip on the board *should be removed*. Care should be taken *not* to scratch the pad with the tip. Keep the vacuum on at all times. The purpose of oscillating the lead is to keep the joint from re-sweating until the temperature is lowered below the melting point of the solder. The temperature is lowered by the continuous flow of cool air through the joint by the vacuum at the tip.



## SOLDER JOINT REMOVAL (Cont'd)

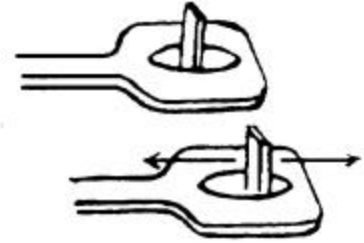
Raise Tip Slightly To Prevent Pad Damage



Keep Lead In Motion



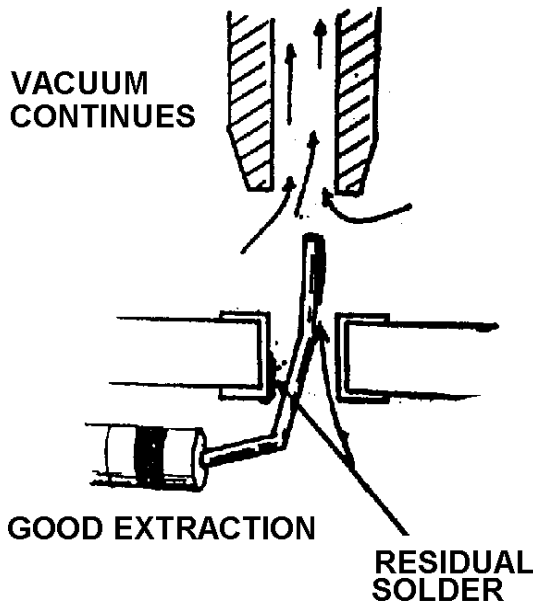
Use Circular Motion For Round Leads



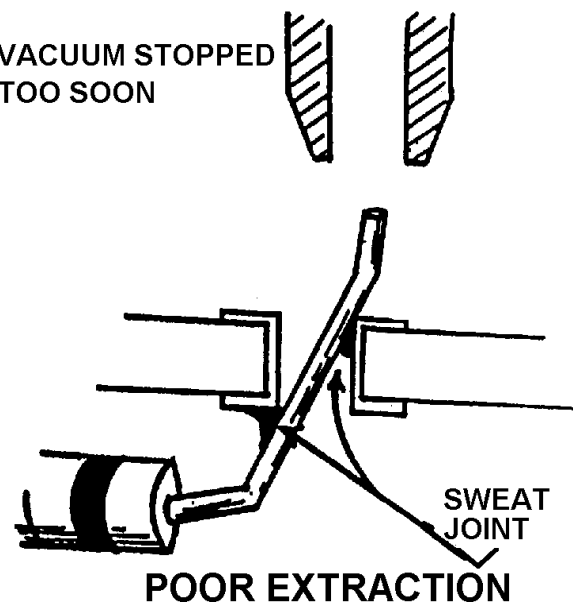
Use "Back And Forth" Motion For Flat Leads

- d. **Remove tip from lead:** While still holding the foot pedal and sucking air into tip, lift the tip off the component lead and away from circuit board. Maintain the vacuum for a count of three to ensure solder has had time to run into glass tube and will not stop and solidify in heater riser tube. Be sure that vacuum is continued after tip is raised from component lead. When vacuum flow is stopped, heat is instantly driven into the tip and can cause a sweat joint of residue solder particles if not removed from joint.

VACUUM CONTINUES



VACUUM STOPPED TOO SOON

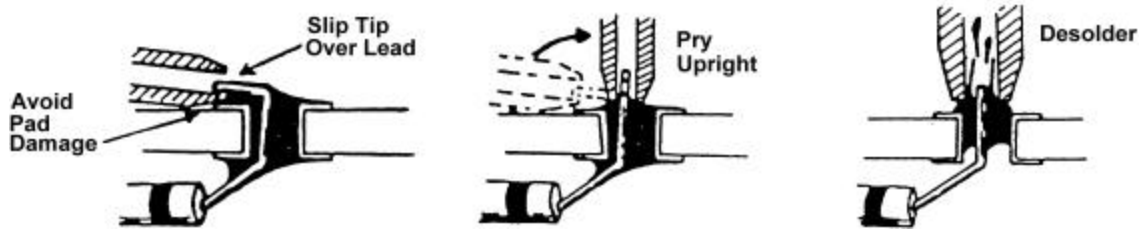


## SOLDER JOINT REMOVAL (Cont'd)

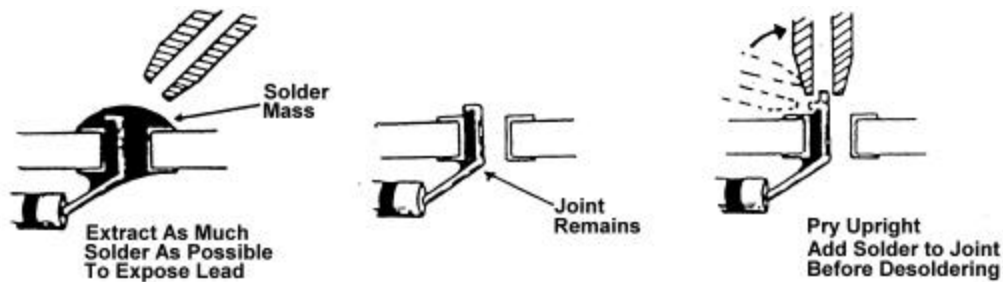
**Single Sided Board Joint Removal:** When removing the joint, the four previous steps must be observed. These solder joints are easiest to remove but care must be taken to prevent lifting of pads which are weakest when heat is applied. The bonding strength of the circuit pad recovers when the vacuum air cools down the joint.

**Double Sided Board and Multi-Layer Board Joint Removal:** Since there is really two single sided solder joints at each location, these joints will be treated like the above joints except that additional heat and time may be required as thermal properties increase. On leads that go through pads with no circuitry attached, be careful to oscillate the lead very gently to prevent the pad from being lifted.

**Clinched Lead Solder Joint Removal:** The first step is to straighten out the clinched lead. If the end of the lead is visible and it is laying on some circuitry, carefully slide the desoldering tip under the lead while melting the solder. After the tip is on the lead, slowly and carefully begin to straighten out the lead with the tip. When in a vertical position, proceed as in four basic steps.



When the end of the lead is not visible, it may be necessary to first lay the desoldering tip on top of the clinched lead to melt the solder. Then suck excess solder from joint thereby exposing end of component lead.



Now the lead can either be clipped off next to the hole to be desoldered, or it can be straightened as shown. Re-soldering and extracting of the lead yields the best results.

If the lead is laying on the board without any circuitry under it, clipping the lead is safer to avoid scratching board.

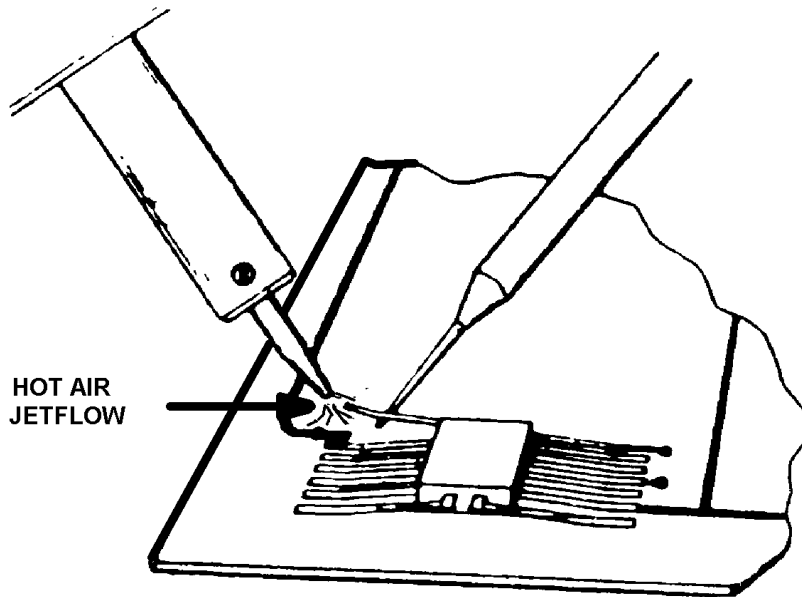


## **SOLDER JOINT REMOVAL (Cont'd)**

**Blind Side Solder Joint Removal:** This is where the component is flat against the board so there is no air path possible through the board along the protruding component leads. This may be due to conformal coating or the component body designed to lie flat against the board.

In these cases, first - as much of the solder is removed by the vacuum mode. Then - the hose is changed to the pressure mode and the protruding lead is heated enough to conduct the heat to the blind sided solder joint. After sufficient time is allowed to melt the solder, the blast of hot air is blown into the hole. Stir the lead vigorously, to keep the joint free from forming a re-sweated solder joint until the joint is cooled down below the melting point of solder.

**Removal of Flat Packs:** Where the component leads are mounted on a flat surfaced and do not protrude through holes in the boards. These "lap joints" are heated by the hot air from the desoldering tip direction on them 1/4" away. When the solder is molten the flat lead is tilted up with a tweezer or other tool. Each lead is removed in this manner without harm to component or board.



**Heat Gun:** A fine stream of temperature controlled air can be used to direct hot air on a component under suspicion of failure or to heat shrink tubing in hard to reach locations. The hot air can be used to soften conformal coating and facilitate removal from around components. For removal methods and specialized equipment for removal of all types of conformal coating, contact your distributor or the factory.

## SECTION IV: MAINTENANCE

### MAINTENANCE /REPAIR OF THE EXTRACTOR

Although the handpiece is a low maintenance device, proper cleaning during use will ensure optimum performance and is critical in reducing system malfunctions.

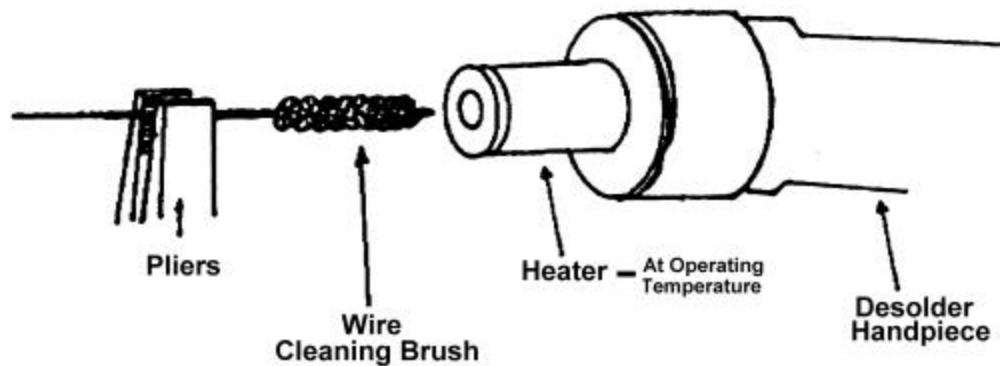
Poor or no vacuum at the desolder tip is the most common system failure on an extractor system. In most cases, this failure is the direct result of inadequate cleaning of the handpiece and heater element.

When excessive amounts of solder collect in the handpiece, the vacuum flow becomes obstructed or blocked. Continued use under poor vacuum conditions increases the likelihood of a solder clog in the heater element.

Use the following steps to clean your desolder handpiece.

#### REGULAR HEATING CLEANING

1. Use Caution! The heater element must remain hot during the cleaning process. Never raise the heating element above eye-level to examine interior of element.
2. Loosen the set screw which secures the desolder tip in the heater element.
3. Using pliers, remove the tip from heater. Caution - The tip will remain hot for a short period after removal from the heater.



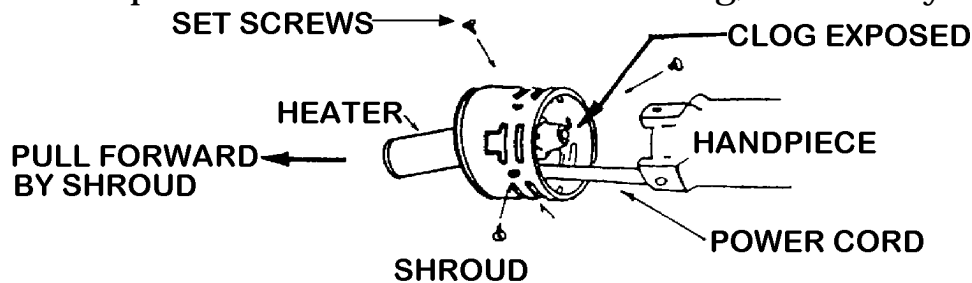
4. Using pliers, insert the small wire brush into the front of the heater element. Caution - The brush will begin to absorb heat. **DO NOT TOUCH WITH HANDS!!**
5. Run the brush up and down the heater, pushing the solder particles into the glass tube secured in the handpiece.
6. When the heater is clean of all obstructions, **SLOWLY** remove the brush from the front of the heater. This will avoid solder particles on the brush bristles from spattering.
7. Replace desolder tip in heater and secure with set screw.

## MAINTENANCE /REPAIR OF THE EXTRACTOR (CONT'D)

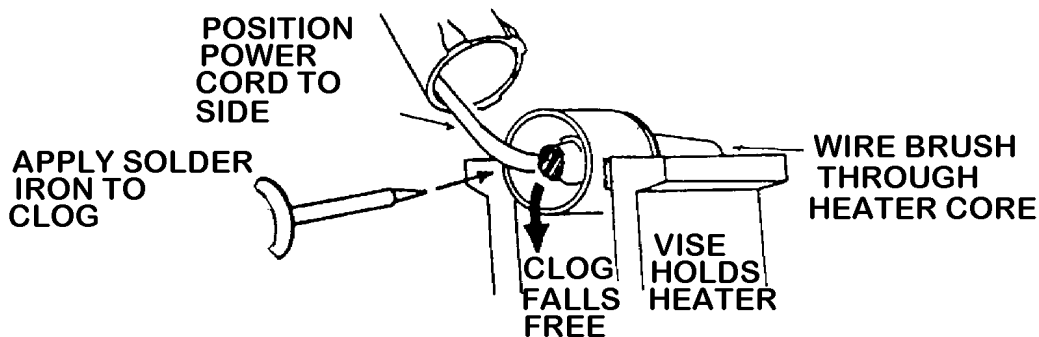
### CLEANING A SEVERELY CLOGGED HEATER

When excessive amounts of solder are allowed to accumulate in the handpiece's glass tube, the possibility of a solder clog is greatly increased. Typically, the solder particles will mass around the front seal that connects the heater to the glass tube. If the clog is too massive, the wire brush may not be able to clear the vacuum path.

1. Let the handpiece remain hot, do not turn the power off. Removal of a solder clog is easier from a hot heating element.
2. Remove the three screws which secure the handpiece shroud to the handpiece body,
3. Separate the shroud from the body. Make certain the power cord moves forward with the shroud. For best results and safety, place the shroud and heater in a vise. Have the power cord on either side of the clog, not directly below the clog.



4. With the handpiece apart, direct access to the solder clog is permitted. Insert the wire cleaning brush in the front of the heater element. Use pliers to avoid getting burned.



5. Apply the tip of a hot solder iron directly to the mass of the solder clog at the front seal.
6. When the solder melts, push the wire brush completely through the heater. Caution - The solder will fall freely. Do not allow the solder to land on the power cord.
7. With the clog removed, reassemble the handpiece.
8. The Heater operates on a gentle air flow (pressure) and will not clog.

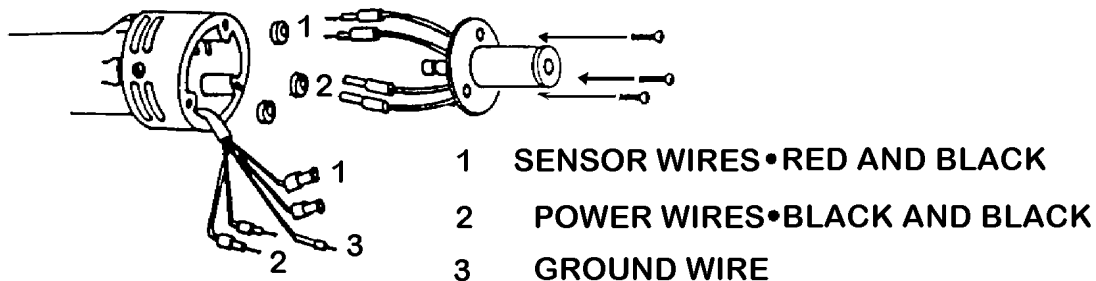
*\*Note: This is available with the **SMD-2000M** unit.*

## MAINTENANCE /REPAIR OF THE EXTRACTOR (cont'd)

### HEATER REPLACEMENT

To replace the heater element on the handpiece, unplug the handpiece from the power source. Replace the heater in the following manner:

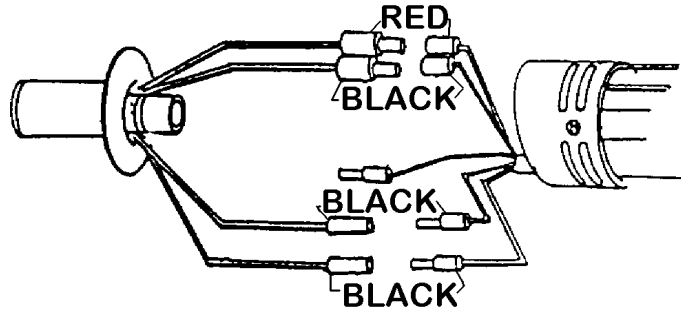
1. Make certain the heater to be removed from the handpiece is cool to the touch.
2. Remove the three heater retaining screws which secure the heater to the shroud of the handpiece.
3. When the screws are removed, the insulating spacer can also be removed. On standard handpieces, one screw will also secure the heater ground wire.
4. Separate the heater element form the handpiece. Carefully pull the power cord forward with the heater element.
5. A desoldering handpiece equipped with a thermal sensor utilizes five wires to connect the heater to the power source. All five wires have push fittings that require separation for heater replacement. The two black wires carry power to the heater element. The red wire and black wire control the temperature sensor. The brown wire is the ground wire for the heater element. The wires are color-coded to ensure proper attachment. Alternating the female and male push fittings prevents the improper connection of the three black wires.



6. The extractor heater element is 35 watts. The Heater Element is 60 Watts.

## HEATER REPLACEMENT ELEMENT (cont'd)

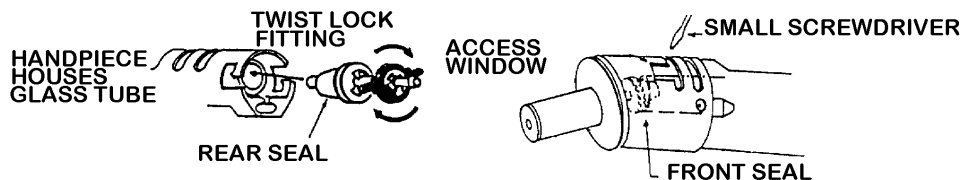
7. Install the new heater following the color-coding.



8. Return the heater to the shroud of the handpiece. Pull power cord from the rear of the handpiece to remove any slack in the cord.
9. Secure the heater in place with the retaining screws. Make certain the insulating spacers are secured by screws between the heater and the shroud.
10. On handpiece, the ground lug is secured by one of the retaining screws. The ground lug is positioned between the heater and the insulating spacer.

## GLASS TUBE

1. Remove the glass tube from the desolder handpiece via the twist - lock fitting at the rear of the handpiece. If the glass tube remains seated on the front seal and does not exit the handpiece, insert a small bladed screwdriver through the access window on the handpiece shroud. The glass tube can be separated from the front seal with a light push.



2. With the glass tube out of the handpiece, remove the tube from the rear seal on the end-cap assembly (Twist lock fitting).
3. Use the large bristle brush to push the aluminum "S" Baffle and felt filter out of the glass tube.



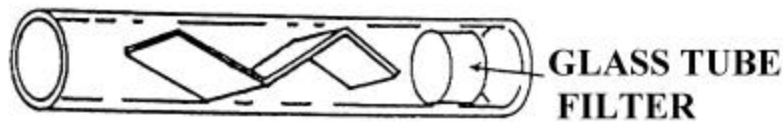
## GLASS TUBE (cont'd)

4. Brush the interior of the glass tube to remove solder particles.
5. With the bristle brush, remove the solder particles from the "S" baffle. The poor bond strength between solder and aluminum will allow easy cleaning of the "S" baffle.
6. Return the "S" baffle to the glass tube. Center the baffle with the brush.
7. Inspect the felt filter. Determine if a new filter is required. Place the filter in the glass tube. The filter must rest between the "S" baffle and the REAR seal.
8. Place the glass tube on the rear seal (End-cap Assembly) and return tube to handpiece.
9. Make certain the glass tube seats properly on the front seal. Secure in place with the twist - lock fitting.

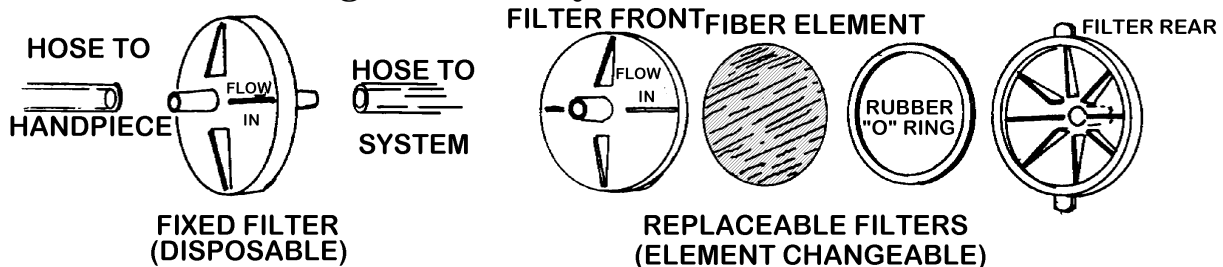
## FILTERS

The Desolder handpiece has two filter elements to prevent flux and solder particles from entering the Power source and damaging the vacuum pump.

1. The glass tube filter should be replaced on a regular basis. The need to change the filter is determined by visual inspection. A suggested rate of a new filter every two days of normal use is recommended.



2. The stop clog filter, in the air line of desolder handpiece, adds some additional protection to the vacuum pump by trapping any particles that may have passed the glass tube filter. A visual inspection indicates the need for a new filter (or new filter element). A change rate of every two weeks of normal use is recommended.



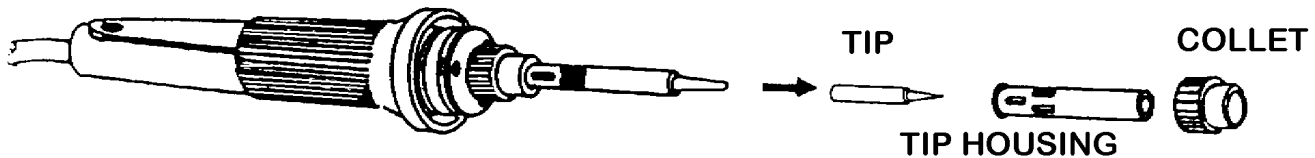


## MAINTENANCE /REPAIR OF THE SOLDER IRON

### TIP REPLACEMENT

When changing the tip or heater on the solder iron, make certain that the iron is unplugged from the power source and is cool to the touch.

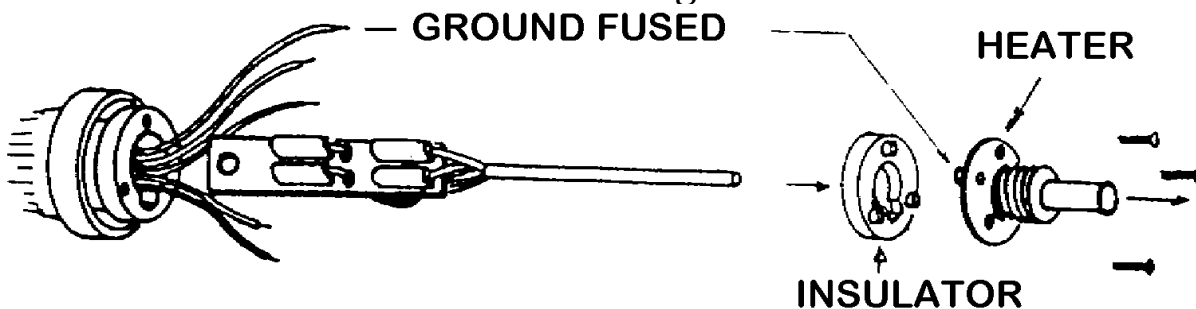
1. Unscrew the collet that secures the tip housing to the heater flange.
2. Slide the tip housing forward, exposing the tip.



3. The tip rests on the heater/sensor core rod. When the tip housing is removed the tip will slide off the rod.
4. Install new tip by sliding heater/sensor rod into hollow center of tip.
5. Replace tip housing and secure with the collet.

### HEATER / SENSOR REPLACEMENT

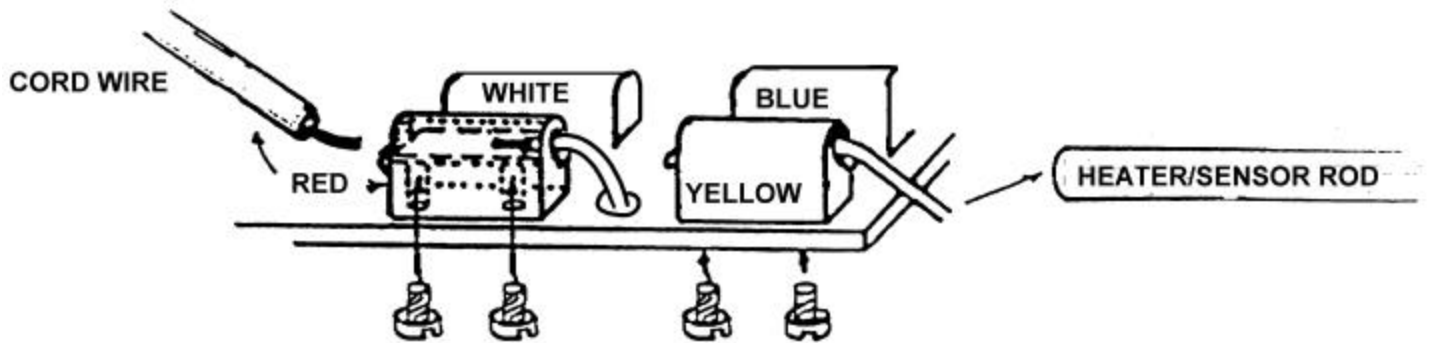
1. Remove the tip from the heater assembly as outlined above.
2. Remove the three heater retaining screws located on the heater flange.



3. With the screws removed, the heater flange and insulator can be separated from the handpiece.
4. The ground wire for the heater element is fused to the heater flange. It is not necessary to disconnect the ground wire from the flange for heater replacement.
5. Loosen the screw at the rear of the solder iron handpiece. This will free the power cord. Push the cord forward from the rear of the handpiece. As the cord moves forward, the heater/sensor rod and control board will emerge from the front of the handpiece.

## HEATER/SENSOR REPLACEMENT (cont'd)

- On the control board are four (4) metal housings. These housings provide the electrical connections for the power cord to the control board. Each housing, has two screws on the underside of the control board. The front screw (nearest the heater/sensor rod) of each housing connects the control board to the power cord.
- Loosen the REAR SCREW of each housing. Pull the color-coded wire out of each housing.



- Position the control board and heater rod with the metal housings face up, and the screws down. Attach the control board to the color-coded wires in the following fashion:

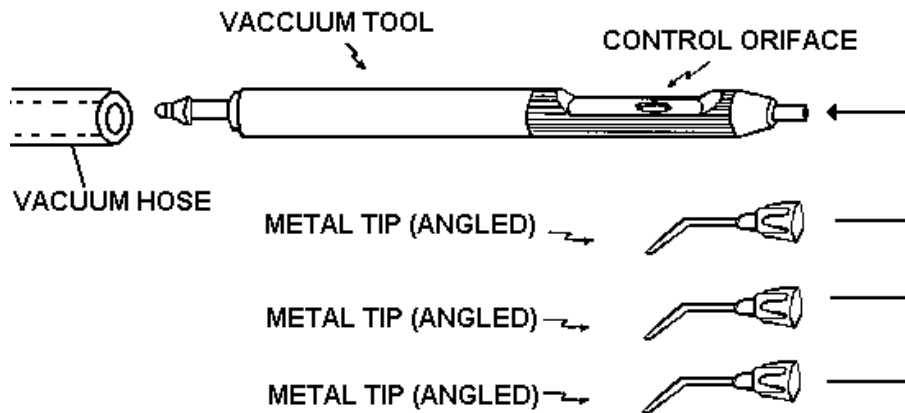
<b>FRONT</b>	<b>(Housings nearest rod)</b>		
LEFT	Yellow	RIGHT	Blue
<b>REAR</b>	<b>(Housings away from rod)</b>		
<b>LEFT</b>	<b>Yellow</b>	<b>RIGHT</b>	<b>Blue</b>

- Tighten all screws on the control board.
- Pull power cord back into handpiece from the rear. Guide the control board into the handpiece. Tighten the screw at back of handpiece to secure power cord.
- Slip heater insulator and heater flange over rod. Secure in place with heater retaining screws.
- Place tip on exposed end of heater/ sensor rod.
- Replace tip housing and secure with collet.

# SECTION V

## SMD VACUUM PICK AND PLACE TOOL

The **SMD** Vacuum Handling Tool is ideal for the precision handling and placement of surface mounts. Included with the handling tool are three different tips sizes that can lift a wide range of components.

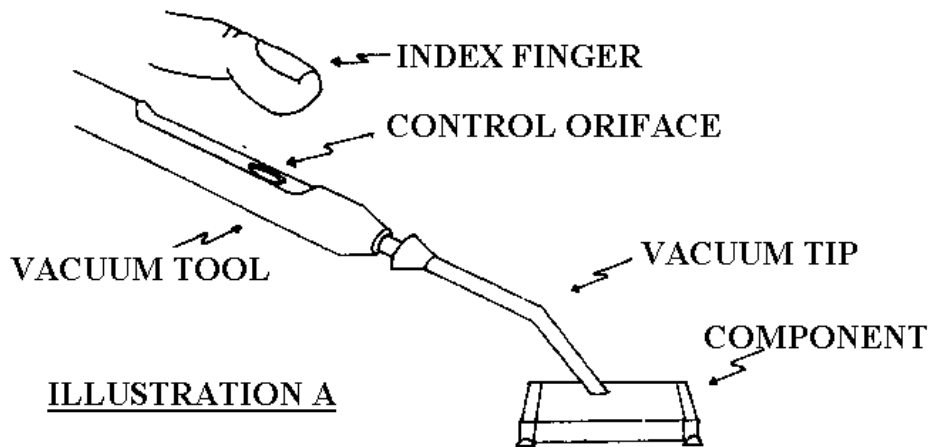


### SET-UP

The three tips included in the Vacuum Tool Kit are rapidly interchangeable and slip easily over the head of the Vacuum Tool. To use the Vacuum Tool, select a tip size appropriate for the component to be removed. Place the tip on the Handpiece; connect the Air Hose to the Vacuum Valve. As with all the equipment on the SMD Machines, the Vacuum Tool is activated by the foot pedal.

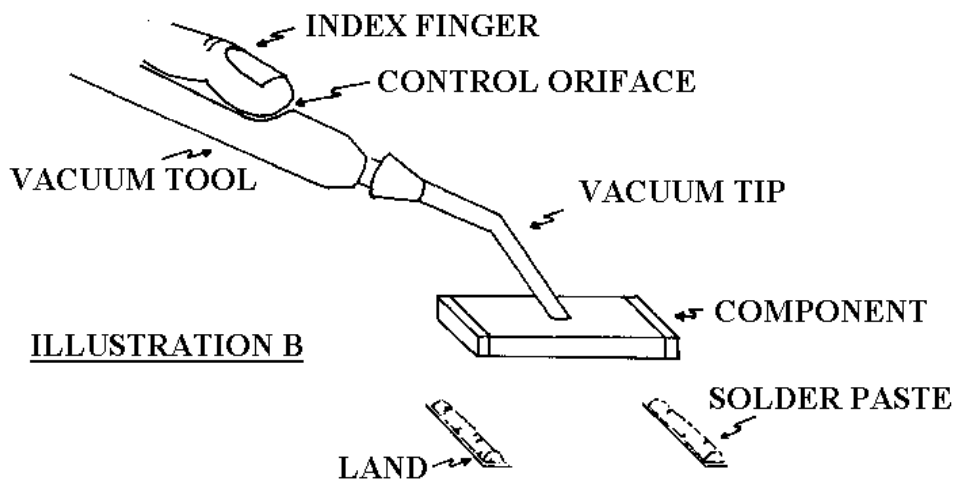
## SMD VACUUM PICK AND PLACE TOOL (cont'd) USING THE HANDLING TOOL

To use the tool, select the desired tip. While the vacuum is in operation, the suction force is drawn through the control orifice on top of the handpiece.



Only when the control orifice is covered by the operator's finger is the suction force diverted to the tip.

Use the handling tool for either removal of components or the precision placement of a component by placing the tip directly atop of the desired component. The operator will then step on the foot pedal while simultaneously covering the control orifice with a finger. The suction force will secure the component for easy maneuverability.



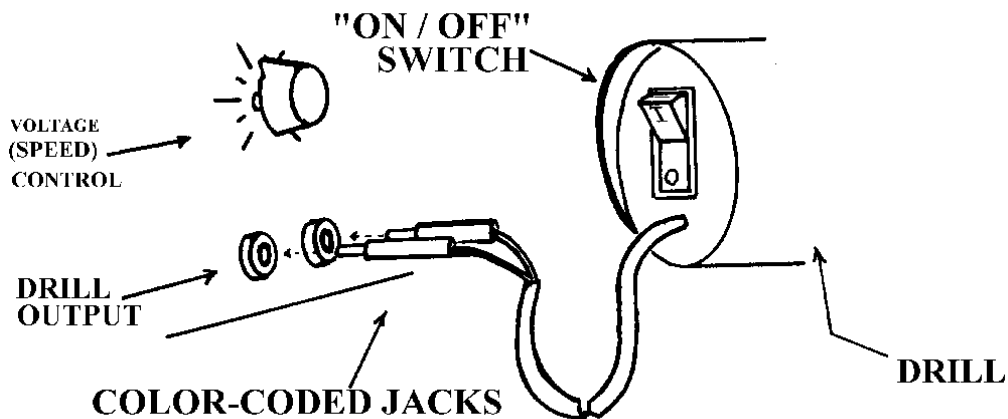
\* *Note: The Vacuum Tool should never be used to remove molten solder from a board. Solder particles may become lodged in the tool, hindering the vacuum flow.*

# SECTION VI

## CIRK GRIND (DRILL) (OPTIONAL)

**Set Up:** After following set up in Section II, 6, set the controls on the Power Source as follows:

- A. Cirk Grind speed control to number 4 (Nomenclature #8 AND #9B).
- B. Insert color coded jacks into their proper location.
- C. Flip the Therm Tool/Cirk Grind/Pump switch to cirk grind (Nomenclature #2).
- D. Engage foot pedal (Nomenclature #25).
- E. To insure operator safety, an "ON/OFF" switch is located at the rear of the drill handpiece.
- F. Increase or decrease the speed by turning the speed control to a higher number for a faster speed or a lower number for a slower speed.
- G. Disengaging the foot pedal (Nomenclature #25) stops the drill.



**General:** The Cirk Grind is a variable speed tool and can be used to perform any of the following functions:

- A. Drilling
- B. Ball mill routing and removing plating in PCB holes for eyelet installation
- C. Removing coatings
- D. Cutting circuitry
- E. Cutting inaccessible leads
- F. Plating preparation
- G. Abrasion, sawing, grinding, brushing, and milling

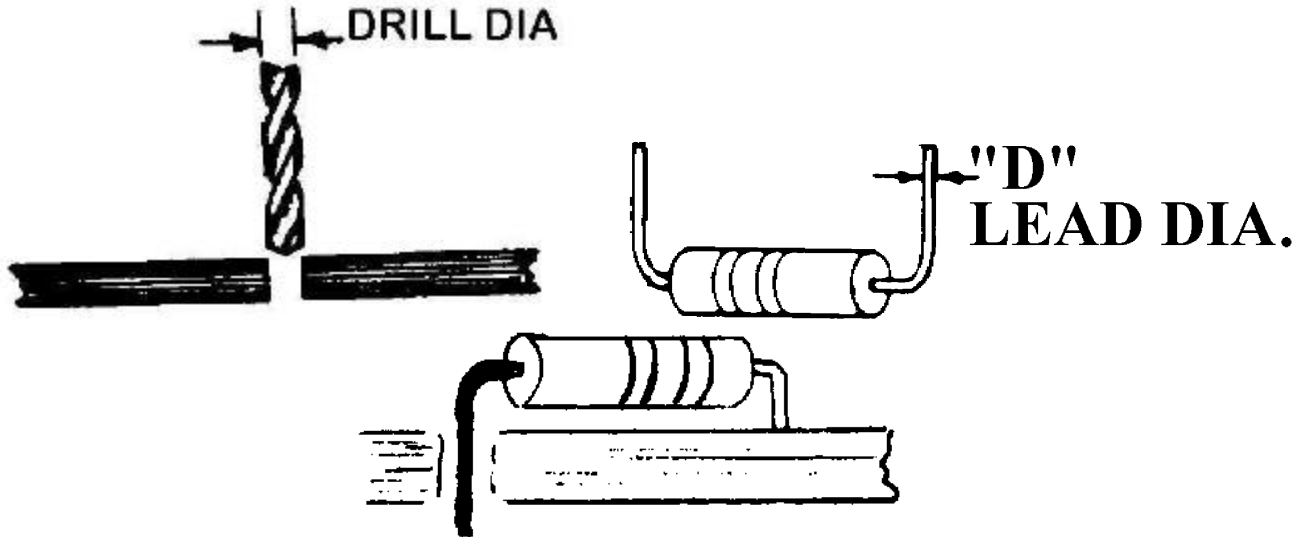
### A. Drilling

Variable speed drilling can be used for a variety of PCB applications. Start at a middle speed setting and adjust to a comfortable setting for the job.

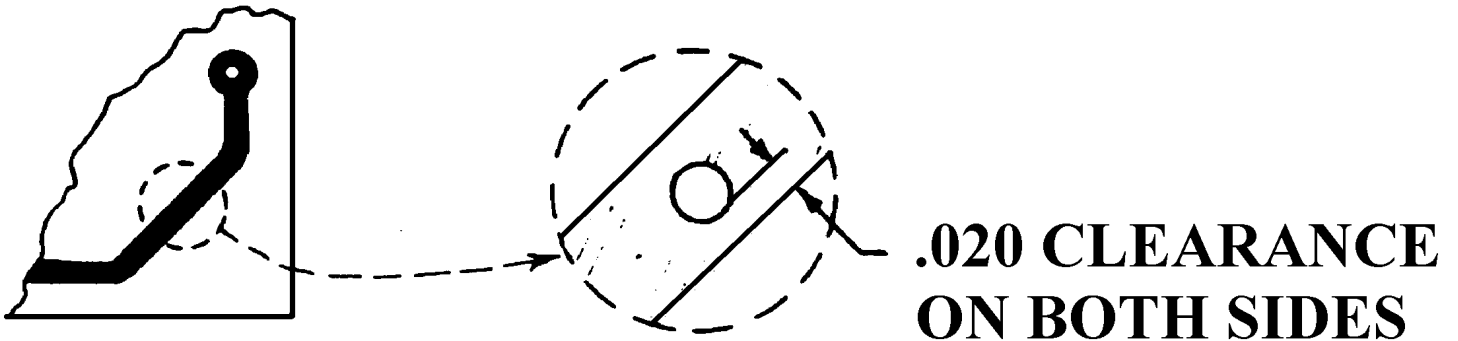
Select appropriate size ball mill from drill kit. Sizes provided are 3/64", 1/16", and 3/32". Contact the factory for additional sizes available.

Drill hole large enough to accommodate lead or wire device to be used.

## CIRK GRIND (Cont'd)

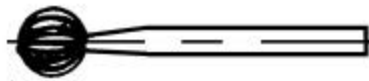


When drilling through circuitry be sure the drill diameter is not wider than the circuit run to be drilled. Allow approximately .020" clearance on both sides of drilled hole in runs.



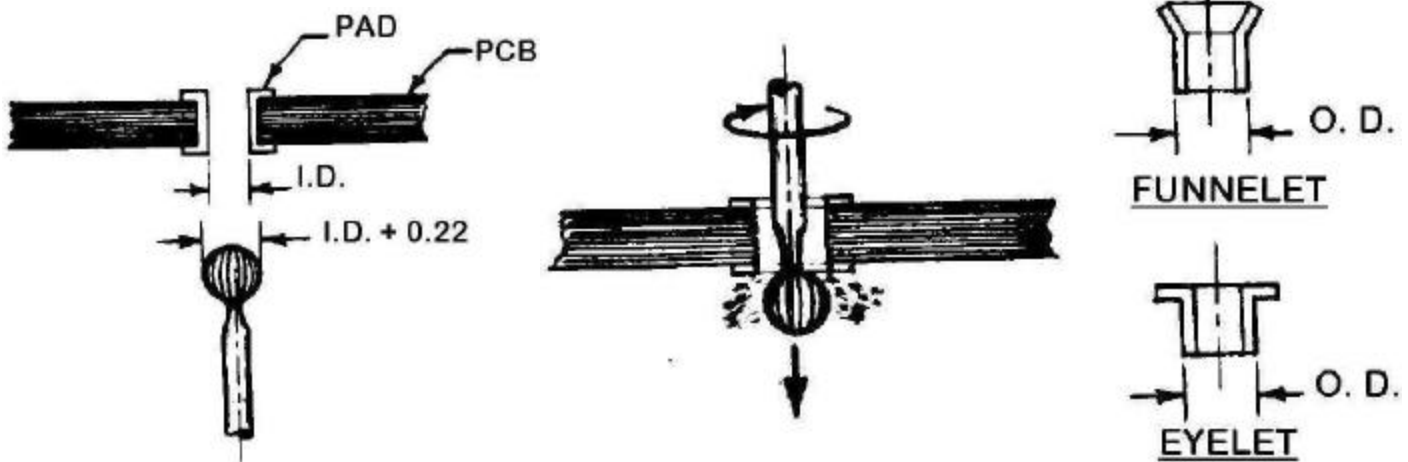
## **B. Eyelet Preparation**

Drills or ball mills are used for removal of plating in PCB holes for eyelet insertion. Ball mills are available in the following sizes: 1/64", 1/32", 3/64", 1/16", 3/32", 1/8", 5/32", 3/16" and 1/4". Ball mills are also used for heavy conformal coating removal covered under Section IV, C.



## CIRK GRIND (Cont'd)

**Plating Removal of Through-Holes:** Select a drill approximately .022" larger in diameter than the I.D. of the hole to be routed.



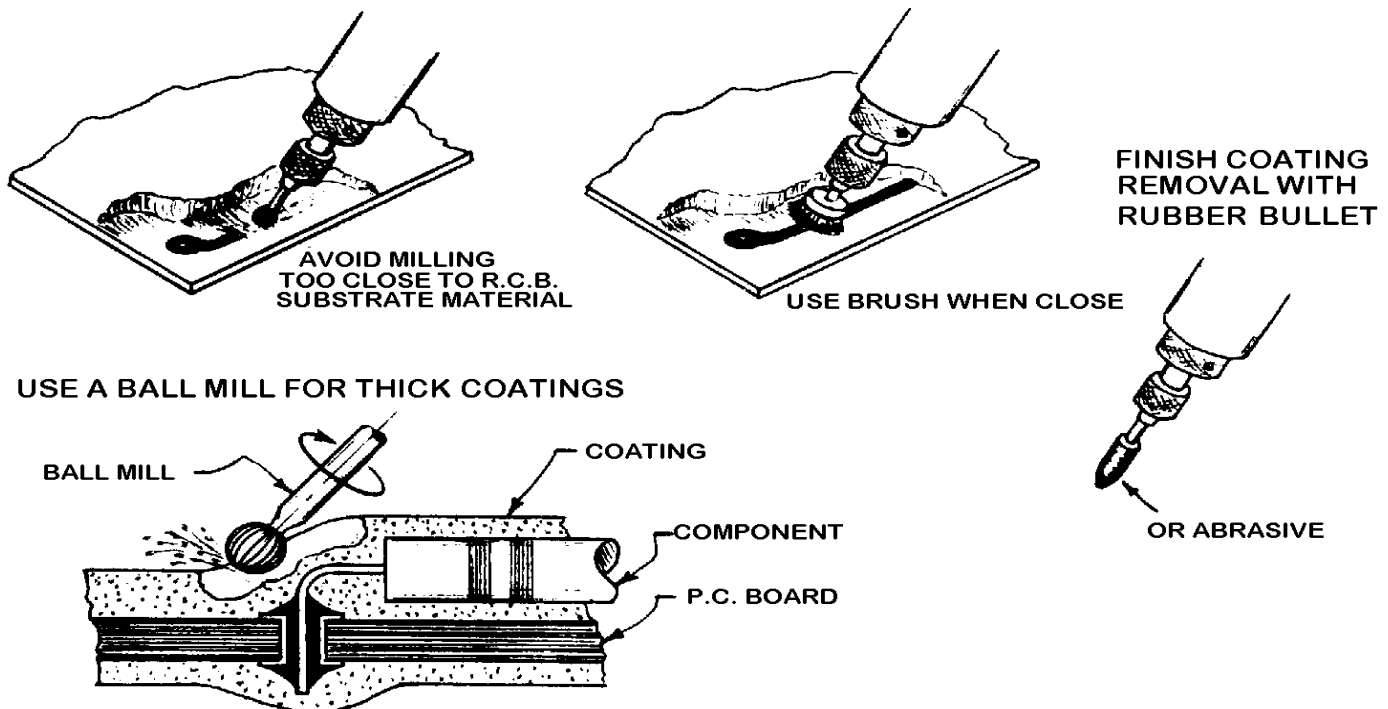
Route the old plating out of the hole while opening the hole to the O.D. of the replacement eyelet or funnelet. The fit should be snug.

### **C. Coating Removal**

Select the ball mill of appropriate size.

Start with a slow speed to get the feel of how tough the coating is.

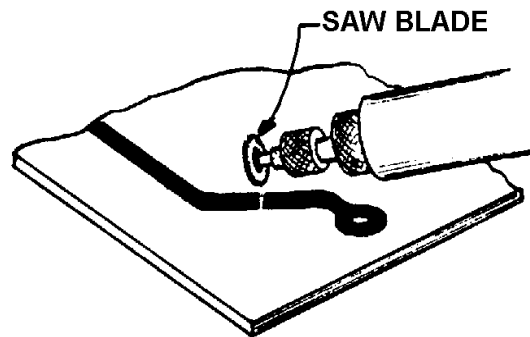
Avoid milling too close to the PCB substrate material. When close, switch to a brush or an abrasive to finish the removal of coating down to the board.



## **CIRK GRIND (Cont'd)**

### **D. Cutting Circuitry and Leads**

Select the appropriate size saw. The saws come 3/32" and 3/4" Dia. Set the speed control in the maximum position. The object is to gain a clean, fast cut without slitting sub-straight materials. With Cirk Grind in the maximum speed, slowly lower saw to circuitry. Apply gentle pressure - allow saw to cut, not the pressure of the saw blade. Occasionally check the depth of the cut. When cut approaches sub-straight, start a gentle oscillation perpendicular to the circuit run until the cut is complete. The same procedure can be used to cut inaccessible leads and wires on chassis assemblies.



### **E. Plating Preparation (Optional)**

When a solder spill or excessive build-up has to be removed before re-plating, use the following procedure. The desoldering tool should be used first to remove as much solder as possible.

Place the tip of the desoldering tool perpendicular to the area to be cleaned. Allow an over-heating of the solder to be removed. Depress foot pedal and remove solder. Even when all the solder appears to have been removed, continue a vacuum action and apply a gentle perpendicular pressure to the area with the tip and continue vacuuming until the area is clean.



The remaining build-up of solder can be removed with either the brown bullets or wheels.



# SECTION VII

## THERM TOOLS

Select a Therm Tool and plug into Power Source. A Therm Tool is activated by depression of foot pedal and the temperature is controlled by varying voltage (Nomenclature #8 AND #9A). This tool can be used to provide heat either continuously or in pulses.

**Set Up:** After initial set up as in Section II, 7, do the following:

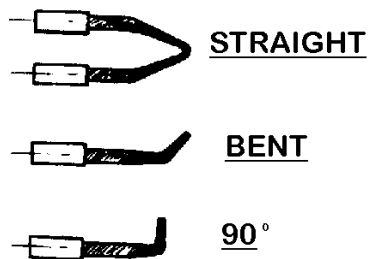
Plug the Therm Tool into the Therm Tool posts (NOMENCLATURE #13)

Turn control to Zero

Caution is the guideline to epoxy removal and removal of circuitry.

Depress foot pedal and slowly increase power with Therm Tool control. Note the glow of the tool tip.

### TIPS CAN BE MADE INTO THE FOLLOWING CONFIGURATIONS



The Therm Tool can perform any of the following functions:

Epoxy removal

Unclenching joints

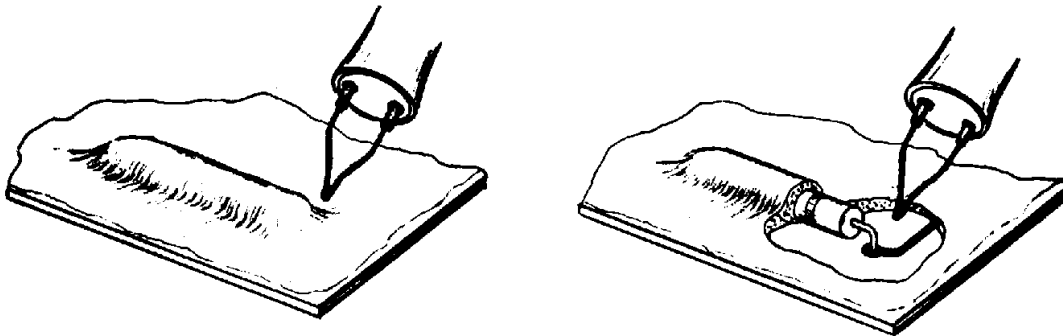
Removing circuitry

Connecting wires to terminals

## **THERM TOOLS (Cont'd)**

### **1. Epoxy Removal**

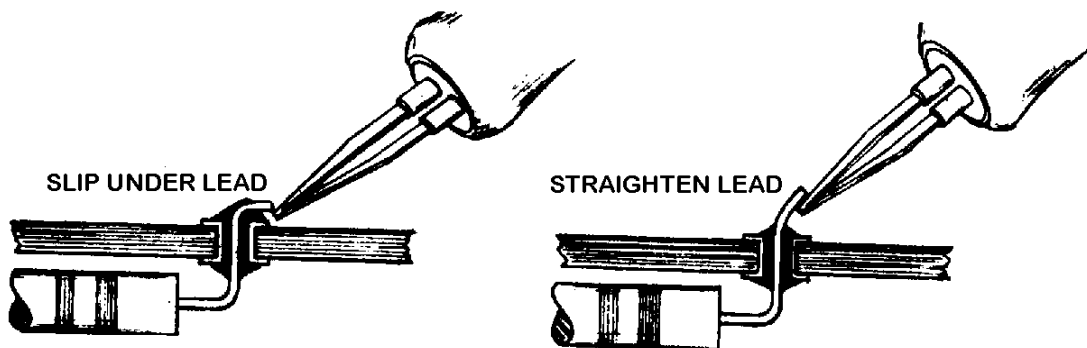
- a. Select the operating temperature by testing on coating to be removed. Slowly increase the temperature while holding the foot pedal fully depressed.
- b. Simultaneously try to scratch the coating on the board. When the epoxy scratches, increase the temperature until the epoxy can be scrapped off. This is the cure temperature of the epoxy. Too much heat will burn epoxy.
- c. Maintain the proper temperature so epoxy can be continuously scrapped off PCB. As heat is absorbed by epoxy, the temperature may have to be slightly increased. The epoxy coating will rupture when it is penetrated. Polyurethane coating will soften when heated.



### **AVOID BURNING COATING AND PCB**

### **2. Unclenching Joints**

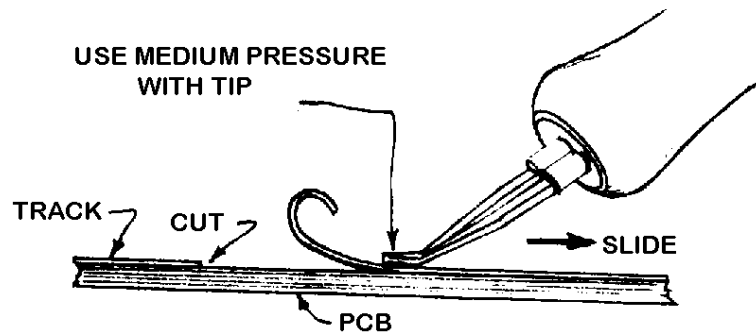
- A. Turn temperature control until the tip just begins to glow a soft red. Keep foot on pedal.
- B. Lay tip on joint to be unclenched to melt solder and begin sliding tip under joint and lift.



## THERM TOOLS (Cont'd)

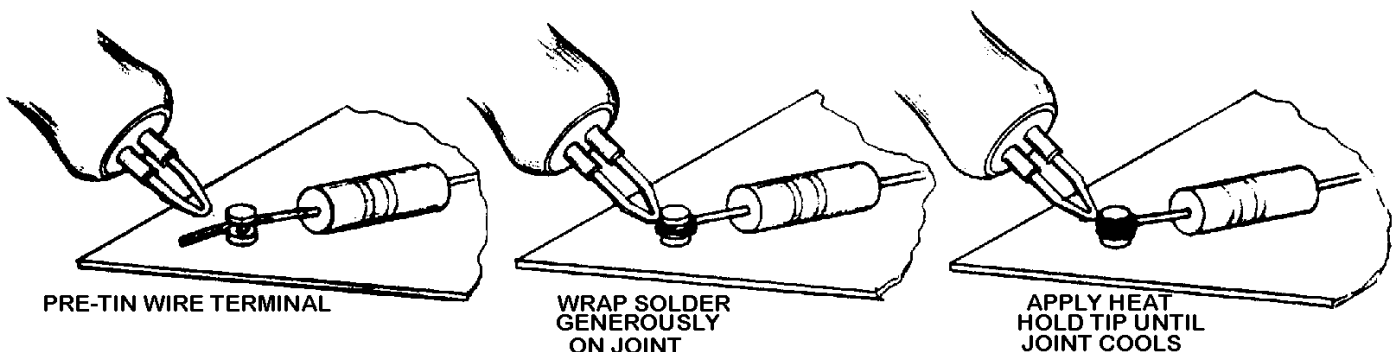
### 3. Removing Circuitry

- To remove circuitry from a PCB, set temperature to make a dull red.
- Cut track to be removed with saw.
- Lay tip on circuitry next to cut and slide tip away from cut while applying medium pressure or circuitry with tip.



### 4. Soldering Wires to Terminals

- Place tip on terminal to be soldered.
- Increase tip temperature until solder begins to flow. Pre-tin wire and terminal.
- Wrap wire around terminal.
- Wrap solder onto connection to make joint.
- Place hot tip on joint to melt solder and hold foot pedal until complete melt is made.
- Keep tip on joint to hold in place while removing.



## **THERM TOOLS (Cont'd)**

### **Reflow Soldering**

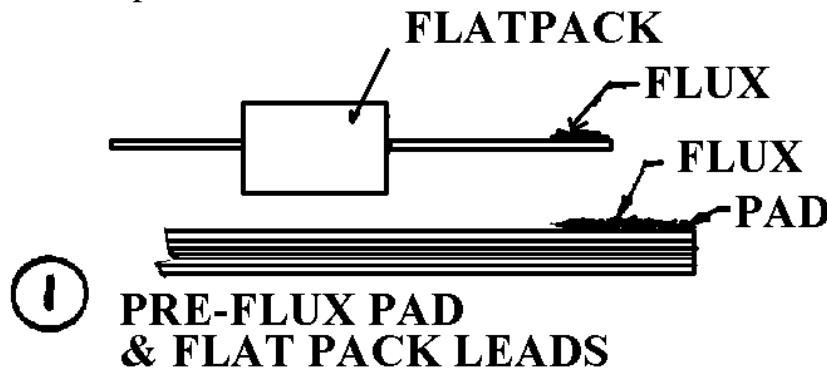
**General:** Reflow soldering is similar to sweat soldering. The advantage of Therm Tool soldering is the ability to pulse heat and hold a given work place in place while the solder joint is cooling. In using this method of reflow soldering, a technique must be learned (practice boards and flat packs are provided) to anticipate heat loss. When first using the tool, the tendency is to overheat the joint. The joint absorbs a great amount of heat. This heat must be controlled to ensure even and formal reflowing of the solder. Flat packs and circuit replacements require this same expertise.

**Set Up:** After initial set up as in Section II, 7, do the following:

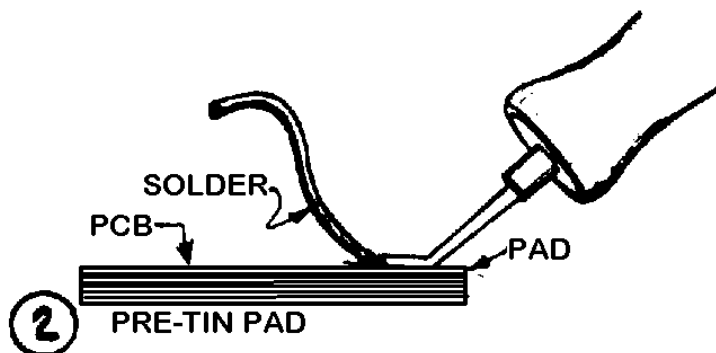
1. Plug Therm Tool in Therm Tool posts (Nomenclature #13).
2. Turn control to Zero.
3. Depress foot pedal and slowly increase power with Therm Tool control (Nomenclature #8, and 9A). Note the glow of the tool tip.

### **Flat Pack Replacement**

1. Prepare area to be soldered in clean area that was cleaned with solvent or with grinding tool if oxidation is present. See Cirk Grind Section.
2. Flux area and flat pack.

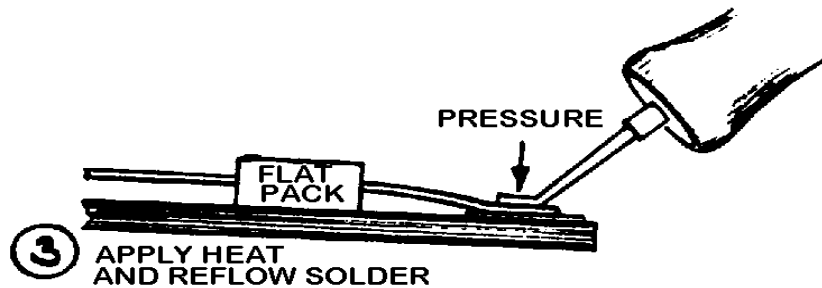


3. Pre-Tin Pad Area.

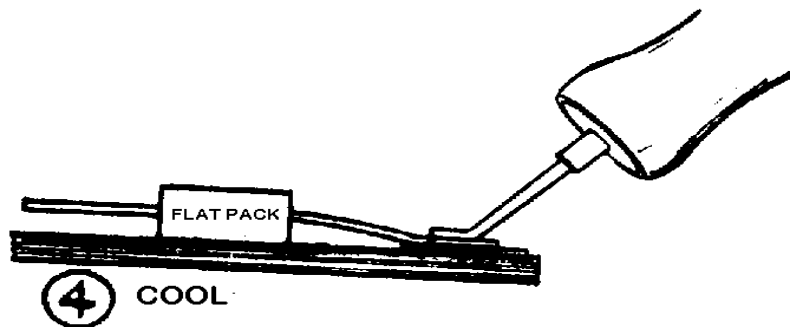


## **THERM TOOLS (Cont'd)**

4. Position flat pack and hold corner lead in place with tip.
5. Depress foot pedal and watch solder reflow between lead and pad.



6. After complete reflow occurs, release foot pedal while holding tip on lead until cooling is complete.

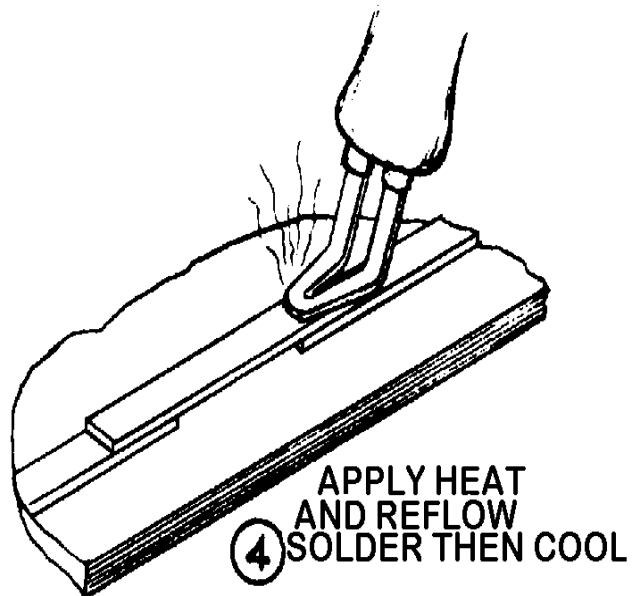
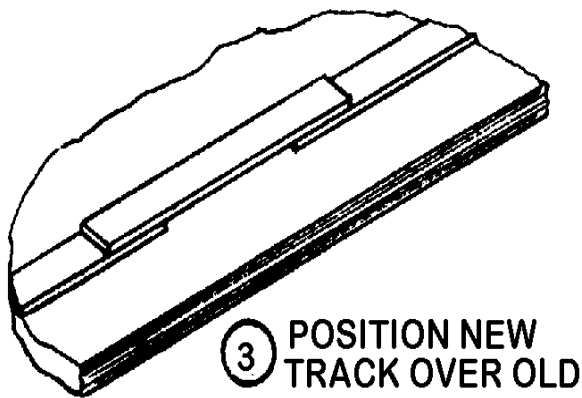
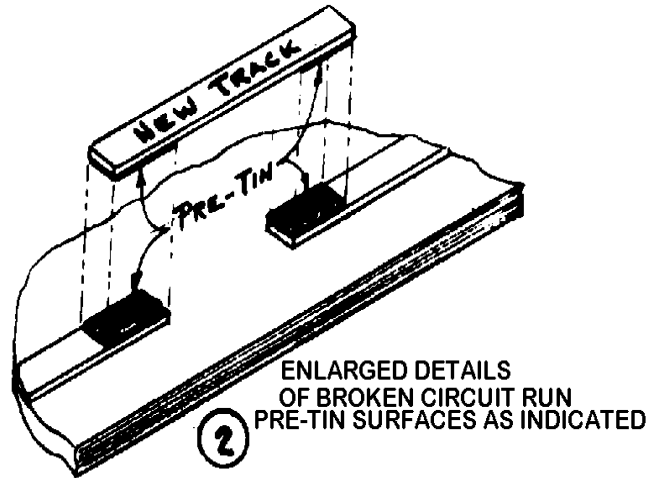
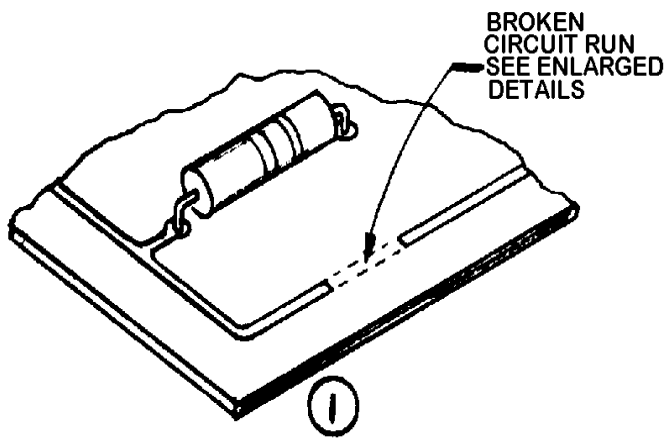


7. Repeat procedure on diagonal corner lead and then the remaining leads.

## **Circuit Replacement**

1. Clean surface of a PCB.
2. Cut new circuit track longer than break to overlap both ends.
3. Clean surface of new track.
4. Pre-tin the land on the PCB.
5. Pre-tin the new track.
6. Reflow the solder joint as in flat pack replacement.

**THERM TOOLS (Cont'd)**



**All track repair kits contain a manual providing detailed descriptions and illustrations of all repair capabilities.**

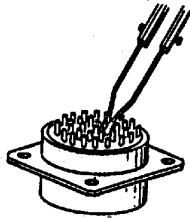
## **THERM TOOLS (Cont'd)**

### **Resistive Tweezer**

**General:** Resistive Tweezer provides localized control heat for soldering and desoldering applications. The advantage of this tool over a standard soldering iron is that the work piece becomes part of the current path of the tool. This allows high temperature, localized heating. The nature of this tool lends itself ideally for soldering and desoldering wires on terminals, as well as component devices mounted on terminals extraneous to circuit boards. In high density quick disconnect plugs that require removal and replacement of single wires from dense configurations, work can be accomplished without damage to adjacent areas.

**Set Up:** The Therm Tool section of the Power source powers this device.

1. Plug the Tweezer into the Therm Tool posts (Nomenclature #13).
2. Turn Therm Tool control to Zero (Nomenclature #8 AND #9A).
3. Grip part to be heated.



**RESISTIVE TWEEZER**

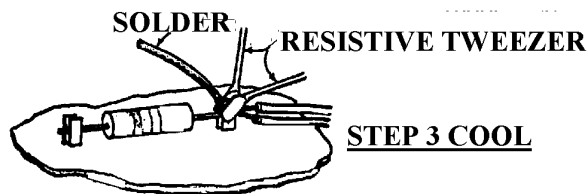
**FOR HIGH DENSITY CONFIGURATION  
SEE ENLARGED DETAILS**



**STEP 1 HEAT**



**STEP 2 ADD WIRE**



4. Depress foot pedal (NOMENCLATURE #25) and slowly increase power with Therm Tool control (Nomenclature #8, and 9A). Note the glow of the tool tip and part.

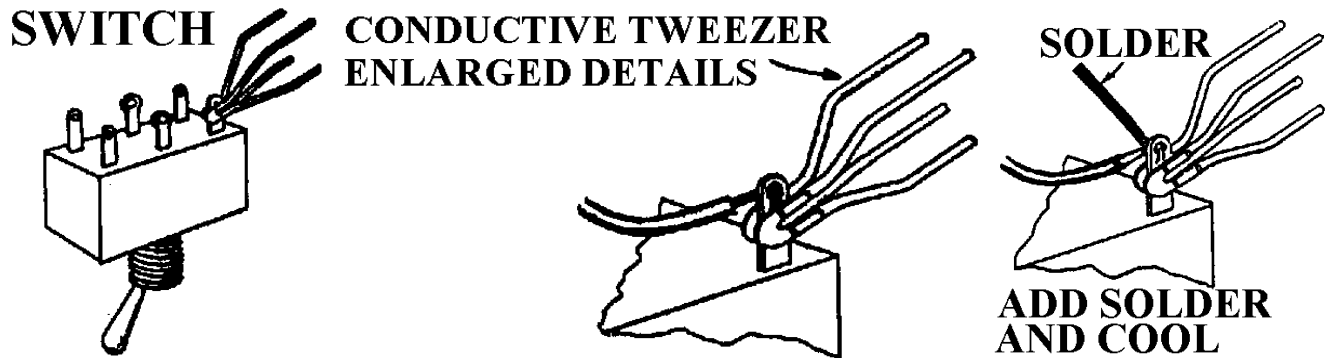
### **Conductive Tweezer**

**General:** Conductive Tweezer is similar in nature to the Resistive Tweezer covered on this page. The difference between these devices is the Resistive Tweezer utilizes the work piece as part of the current path and the Conductive Tweezer uses the internal resistance of the pair of blades to generate heat. In any application where a Resistive Tweezer could cause damage from arcing or flashing the Conductive Tweezer is ideally suited for the operation. It is possible to accurately control the temperature and heat output with this device which allows a repeatability of any given operation.

## **THERM TOOLS (Cont'd)**

**Set Up:** The Therm Tool section of the Power Source powers this device.

1. Plug the Tweezer into the Therm Tool posts (Nomenclature #13).
2. Depress foot pedal (NOMENCLATURE #25) and slowly increase power with Therm Tool control (Nomenclature #8 and #9A). Note the glow of the tool tip.



### **Wire Stripper**

**General:** The Wire Stripper is used to remove insulation from wires with a hot blade technique. It allows quick stripping of wires without damage to the conductor. The unit is temperature controlled which allows repeatability of the stripping process without damage to the wires or insulator.

**Set Up:** The Therm Tool section of the Power Source powers this device.

1. Plug the Tweezer into the Therm Tool posts (Nomenclature #13).
2. Turn control (Nomenclature #8 and #9A) to Zero.
3. Depress foot pedal (NOMENCLATURE #25) and slowly increase power with Therm Tool control (Nomenclature #8 and 9A). Note the glow of the wire stripping tip.





## **SECTION VIII:**

### **OPTIONAL ACCESSORIES**

#### **QUIK PLATING (OPTIONAL)**

The Quick Plate System (Nomenclature #14) allows you to clean and electro plate printed circuit boards and electronic assemblies. Standard supplies include gold solution, nickel solution and electro clean. Available optionally are tin, lead, copper and nickel plating solutions. See plating supplies replacement parts in this manual for part numbers and ordering information.

## **GOLD PLATING**

1. REMOVE ALL SOLDER FROM THE SURFACE TO BARE METAL.
2. FOLLOW VOLTAGE SETTING OR THE YELLOW STICKER ON COVER (OR BELOW).
3. USE ONE BRUSH FOR GOLD, A SECOND BRUSH FOR NICKEL, A THIRD BRUSH FOR ELECTROCLEAN. DO NOT MIX BRUSHES.
4. SURFACE MUST BE CLEAN, DRY AND POLISHED BEFORE ANYAPPLICATION.
5. REVERSE POLARITY FOR ELECTROCLEAN APPLICATION. (RED TO BLACK, BLACK TO RED)
6. THOROUGHLY DRY BEFORE APPLYING NICKEL, CHANGE POLARITY; RED TO RED, BLACK TO BLACK.
7. THOROUGHLY DRY BEFORE APPLYING GOLD SOLUTION.
8. BUFF ANY CLOUDED SURFACE TO A SHINE BEFORE ANY APPLICATION.
9. CLEAN AND DRY ALL BRUSHES AFTER WORK IS COMPLETED.

## GENERAL PLATING PROCEDURE

1. If there are solder splashes on the surface to be plated, they must be removed prior to the plating procedure.
2. In all cases, after thoroughly cleaning the work surface, the preliminary step is to Electro-clean the area with Electro-cleaning solution provided. This should be done for the number of seconds and voltage called for in the Plating Preparation description which follows.
3. Between each plating step, water wash bottle (distilled water is required). When going through two or three steps in a plating sequence, use the water wash between each step to clean off previous solution as well as to prevent dry off between steps which cause failure of deposit. When working with the brush and solutions, you can dip directly into the solution containers with the brush. **Be sure that the anode and brush are used for one solution only so as not to contaminate other solutions.** Remember to remove each brush not in use to avoid mix-ups. When brushing the work surface with plating solution, keep the brush saturated and work over a drip tray and not over solution containers, thus avoiding contamination and maintaining a clean work area. Drying off the workpiece after plating can be done with paper towels or tissue.

## **PLATING PREPARATION**

### **Copper, Beryllium Copper and Brass**

- a. Clean the surface per General Preparation.
- b. Electro-clean using Electro-cleaning solution at the settings indicated for 3 to 5 seconds. This should remove light tarnish and oils. Rinse thoroughly.
- c. Brush surface with the solution being plated (silver excepted) before the current is connected.
- d. Electro-plate the surface per the plating solution instructions. (An underplate of nickel is used in most cases.) Rinse dry.

### **Aluminum**

- a. Clean the surfaces per General Preparation.
- b. Electro-clean as previously outlined for 3 to 5 seconds. This should remove light tarnish and oils. Rinse thoroughly.
- c. Prior to plating any aluminum, preplate aluminum with a base of copper alkaline as outlined.
- d. Brush surface with the solution being plated (silver excepted) before the current is connected.
- e. Electro-plate the surface per the plating solution instructions. (An underplate of nickel is used in most cases.) Rinse and dry.

## PLATING SOLUTION USE

**Caution:** Plating solutions are water based solutions and with the exception of gold, contain no irritating chemicals. Good industrial practice requires care to be taken so that no solution is splashed in or near the eyes. Hands should be washed thoroughly and at frequent intervals to avoid carrying residual solution to the mouth and to prevent prolonged skin contact.

### **Electro Clean**

After preparing board for platings as outlined in preparation section of this manual under plating preparation, proceed as follows:

1. It is good general practice to electro-clean all areas to be plated to insure a good bond of metals and surfaces. Set controls as indicated.
2. Secure plating brush into probe and dip brush into electro-clean solution. With plating brush saturated with solution, gently rub area to be cleaned.
3. Take grounding probe (thin pointed metal probe) and touch to circuit to be cleaned.
4. Before subsequent plating operations, all areas must be thoroughly rinsed with **distilled** water.

### **Nickel Plating**

The nickel solution is primarily used for underplating in thickness of approximately .0003” - .0005” between a base copper surface and an overplate of gold. It may also be plated directly to mild steel.

## **Nickel Plating, cont'd.**

Nickel-acid	6911-1330
Deposition Rate	.0006" /minute
Avg. Time (in sec.) to Deposit .0001	10

In plating nickel acid on all basic metals except aluminum, the surface should be first wet with the solution before applying power to the brush

## **Copper**

High Speed - This solution will give a rapid build-up of thickness which is its intended purpose. It should never be used directly on base materials but should be put over an underplate of .0003" - .0005" copper-alkaline. This material can be put directly over a base copper metal by first wetting the copper with the solution before applying power. This material can be used to fill or bridge small voids and will make satisfactory deposits of .0005" thick and over.

Copper - High Speed	6911-1324
Deposition Rate	.0010" /minute
Avg. Time (in sec.) to Deposit .0001	6

Alkaline - Copper Alkaline is ideally suited to underplating application on base aluminum surfaces. It is also used for thin copper build-ups of under .0005 in thickness (over .0005, use high copper speed). It may be plated directly to mild steel.

## **Copper, cont'd.**

Copper - Alkaline	6911-1326
Deposition Rate	.0003" /minute
Avg. Time (in sec.) to Deposit .0001	20

## **Tin - Lead Plating**

Tin-lead alloy solder plating can be accomplished with the Power Source. Since the life of the tin-lead alloy solution is relatively short (approx. 4 hours) we have supplied the tin (alkaline) and lead as separate solution which can be mixed in small batches as required to create the tin-lead alloy solution.

To create a 60/40 solder alloy for plating requires mixing 30% by volume of the lead solution with 70% by volume of the tin (alkaline) solution. To create a 50/50 solder alloy requires mixing 40% by volume of the lead solution with 60% by volume of the tin solution. This will provide a solder alloy of approximately 55/45 which is suitable for solder plating circuit boards and which can be applied directly to base copper materials.

Solder plating thickness for circuit boards should be .0002" to .0003".

## **Solder Alloy**

Tin (Alkaline)	6911-1334
Lead	6911-1328
Deposition Rate	.0005" /minute
Ave. Time (in Seconds) to Deposit .0001	12

## **Tin plating**

This plating material offers excellent solderability characteristics and may be used as an underplate for tin-lead (solder) overplating or by itself to create solderable surface surfaces.

Tin (Alkaline) 6911-1334  
Deposition Rate .0005"/minute  
Avg. Time (in sec.)  
to Deposit .0001 12

## **Gold Plating**

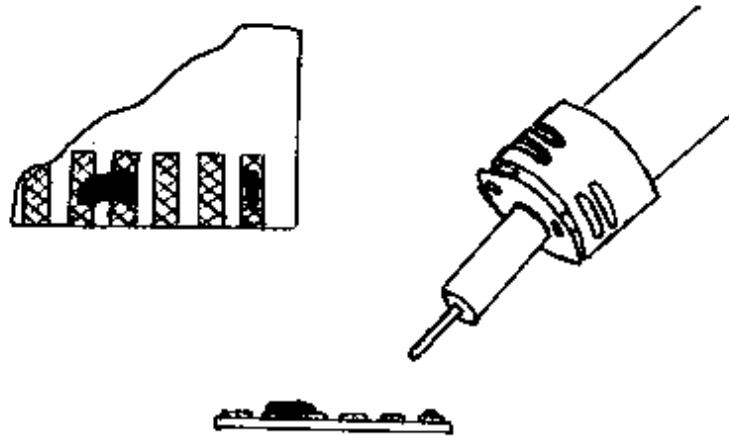
Gold plating solution is ideally suited to printed circuit contacts as well as other electrical devices. It will provide corrosive resistance and a lubricating property to edge connector fingers. It may also be used to great advantage on flexible circuitry and is useful in gold plating jewelry. For consistency of quality in plating copper and preventing copper migration through the gold, gold requires a nickel underplate. The gold plating thickness normally required for circuit board edge connectors is .0005" over a nickel underplate. (See nickel plating.)

Gold itself should not be used as an underplate flashing.

Gold 6911-1336  
Deposition Rate .0020"/minute  
Avg. Time (in sec.)  
to Deposit .0001 3

## **PREPARATION OF CIRCUITRY PRIOR TO GOLD PLATING CLEAN UP**

### **SOLDER SPLASH**



There are two procedures to remove solder splashes from circuit fingers.

1. Solder Removal

Using APE's desoldering handpiece EX-1700, the solder can be heated and removed with no damage to the fingers.

Cirk Grind

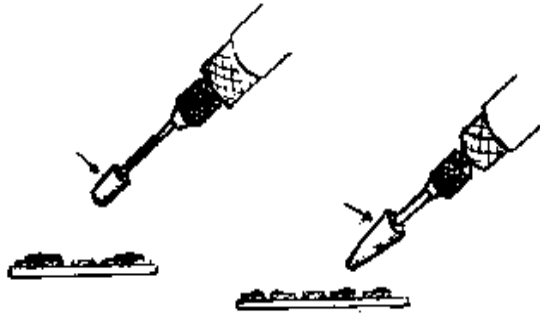
See following page



## PREPARATION OF CIRCUITRY PRIOR TO GOLD PLATING CONT'D

### CIRK GRIND

1. To remove solder splashes on fingers using the APE Cirk grind tool, start with the conical stone to remove thick layers of solder.
2. Before the circuitry is uncovered, switch to the polishing abrasive tools.



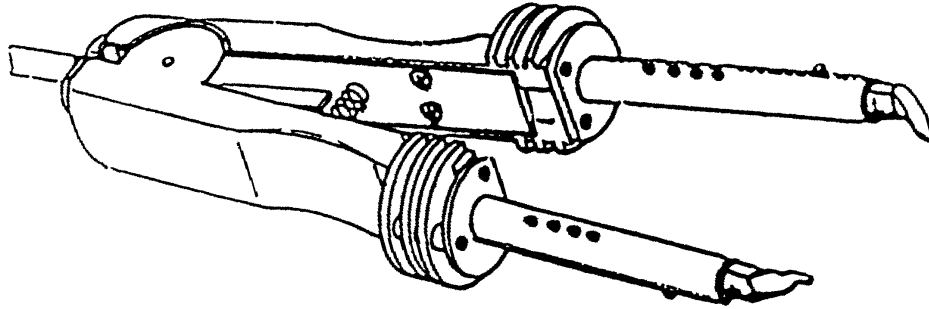
3. Abrasives can be used to polish splashes prior to plating.
  - a. They come in coarse (green) and fine (brown) bullets and wheels.



4. The final preparation before plating is the fine polishing with the brown bullet.

## **USING THE TWEEZERS**

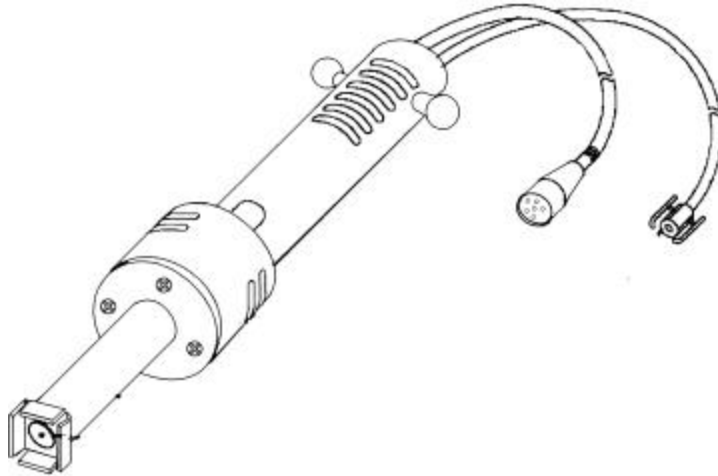
**(NOMENCLATURE #3, #4, #10 AND #16)**



Plug the tool into the power receptacle (NOMENCLATURE #16). Turn power switch (NOMENCLATURE #4) to on position. Then set the Solder/Tweezer switch (NOMENCLATURE #10) to Tweezer. The set point recommended for the tips in the illustration is 400°F. When the digital controller (NOMENCLATURE #3) indicates 400° F, position the tool at an angle of 45° with the tips on the chip's leads. Remove the chip when the solder melts.

1. Using larger tips require a higher set point. The larger the tip, the higher the set point to a maximum setting of 900°F. Use the tool when the set point is reached.
2. Use similar temperatures to replace the chip.

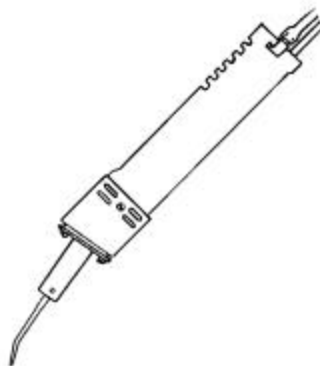
## **USING THE THERMOVAC (OPTIONAL)** (NOMENCLATURE #6, #7, #12, #18, #19, AND #25)



1. Set the Jetflow/Desolder selector switch (NOMENCLATURE # 12) to “Jetflow”
2. Connect the quick disconnect air fitting of the tool to the vacuum air valve (NOMENCLATURE # 18). Turn the air valve counter clock to the maximum position.
3. Insert plug of the tool into the receptacle (NOMENCLATURE #19)
4. Turn on the Power switch (NOMENCLATURE #6) to energize the digital controller (NOMENCLATURE # 7)
5. Set the temperature in the digital controller to 500° F.
6. When the heat rises to 500°F, place the tip of the tool around the chip to be removed. The suction cup of the tool will seat on top of the chip. Allowing the tool to melt the chip’s terminals (about 30 seconds). Step on the foot pedal (NOMENCLATURE #25) the vacuum will suck the chip into the tip’s chamber.
7. Remove the chip from the printed circuit board. Move the tool to a safe area to drop the chip. Step off the foot switch and the chip will drop. To install a replacement chip, apply solder paste to the cleaned printed circuit board terminals. Allow the heat to rise to set point 500°F; step on the foot switch for the vacuum to hold the chip in the tip; target the chip to its proper position on the surface mounted board. Allow an additional 30 seconds of heat for the chip contacts to solder. Step off the foot switch. Do not remove the tool until the solder has cooled and the chip will not move when the tool is lifted from the printed circuit board.

## USING THE JETFLOW

(NOMENCLATURE #2, #3, #4, #17, #21, #25, #29, and #15)

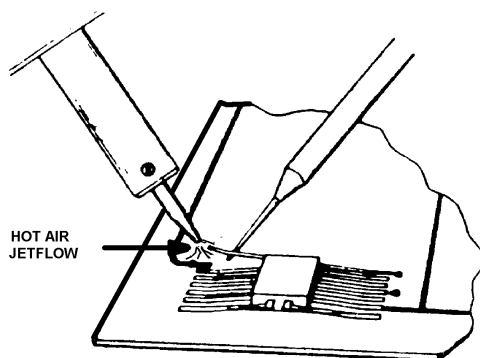


### Jetflow Control

Set the pressure air control valve (NOMENCLATURE #17) to the “min” position. Select the hand tool with “Jetflow” on the handle. Connect the air fitting of the tool to NOMENCLATURE #17. Place the pump/vacuum switch (NOMENCLATURE #2) to the pump / vacuum position. Place the air switch (NOMENCLATURE # 21) to the vacuum position. Connect the foot switch (NOMENCLATURE #25) to the foot switch receptacle (NOMENCLATURE #29) located on the rear panel of the machine. Insert a .025 extractor tip into the Jetflow handpiece. Start the pump by stepping on the foot switch. (NOMENCLATURE #25) Check the cold air stream blowing from the tip of the handpiece; the air stream should be a small zephyr. Release the foot switch. Insert the plug of the handpiece into the solder receptacle (NOMENCLATURE #15). Energize the solder digital controller (NOMENCLATURE #3) by turning on switch (NOMENCLATURE #4). Increase the setpoint of the controller to 800°F. When the controller reaches 800°F, aim tool on a piece of waste paper that has paste on it. Step on the foot switch so that the emitting hot air melts the paste. Never aim this tool at your finger. Practice on a trial board before trying SMD removal or installation work.

### Removal of Flat Packs - Use the Jetflow Hand Tool

Where the component leads are mounted on a flat surface and do not protrude through holes in the boards. These “lap joints” are heated by the hot air from the Jetflow tip directed on them from ¼” away. When the solder is molten, the flat lead is tilted up with a tweezers or other tool. Each lead is removed in this manner without harm to component or board.



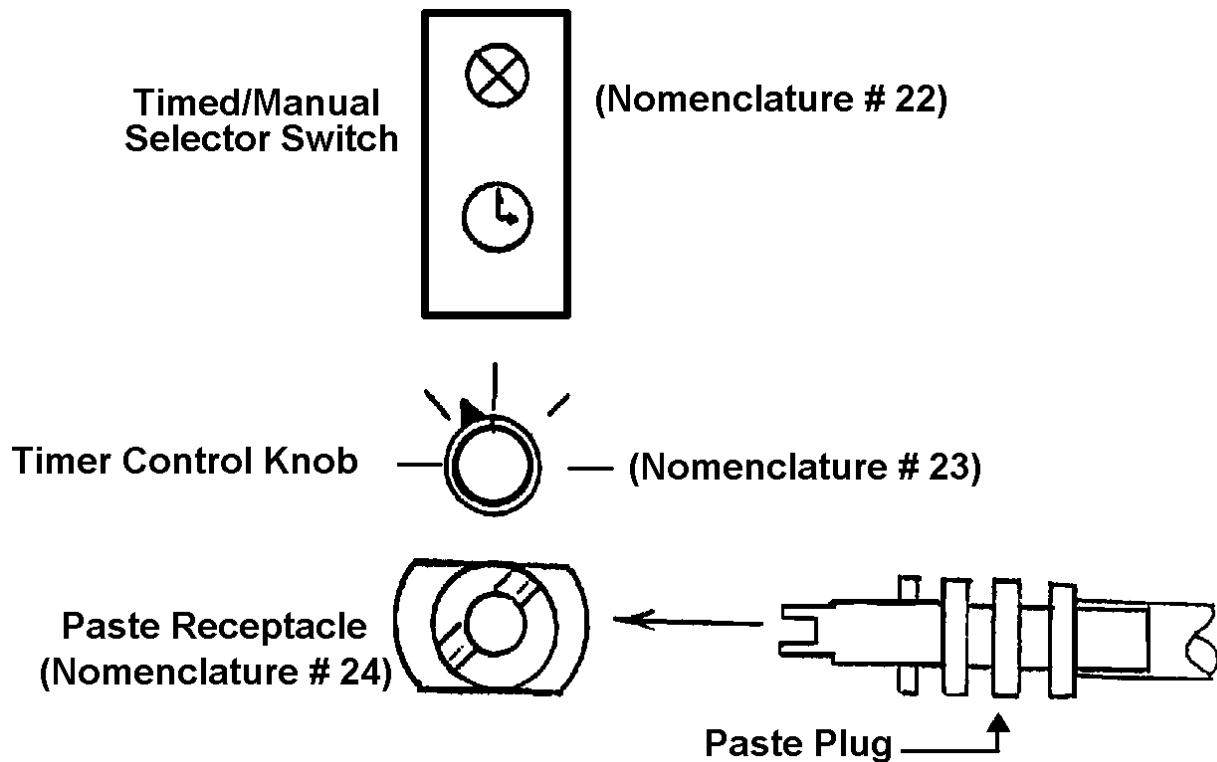
A fine stream of temperature controlled air can be used to direct hot air on a component under suspicion of failure or to heat shrink tubing in hard to reach locations. The hot air can be used to soften conformal coating and facilitate removal from around the components. For removal methods and specialized equipment for removal of all types of conformal coating, contact your distributor at the factory.

## USING THE DISPENSER

Plug the male clip into its receptacle (NOMENCLATURE #24) as shown. Located inside the receptacle is a safety lock that will prohibit air pressure from leaving the machine without having the dispenser barrel adaptor assembly attached. The main power switch (NOMENCLATURE #5) must be in the "ON" position. When the foot pedal is depressed (NOMENCLATURE #25), solder paste is dispensed.

Once the machine is activated in the dispenser mode, the operator has the option of manual or timed dispensing as stated earlier. The timer "ON/OFF" switch is (NOMENCLATURE #22).

If the operator desires the timer, simply push the timer to the timed position. The operator has only to set the length of dispensing time desired by using the electronically controlled timer (NOMENCLATURE #23). When the timer is set, the operator steps on the foot pedal and the dispenser will run for the selected time and shut down immediately at the set time (remember to keep the foot pedal depressed for the entire length of dispensing.)



**IMPORTANT:** Make sure that the Selector (Nomenclature #21) is pointing to "paste" when operating the paste equipment.

## USING THE DISPENSER

There are three methods of varying the amount of paste to be dispensed. The first method is to use different size tips with varying inside diameters at the point. A.P.E. offers five different tip sizes.

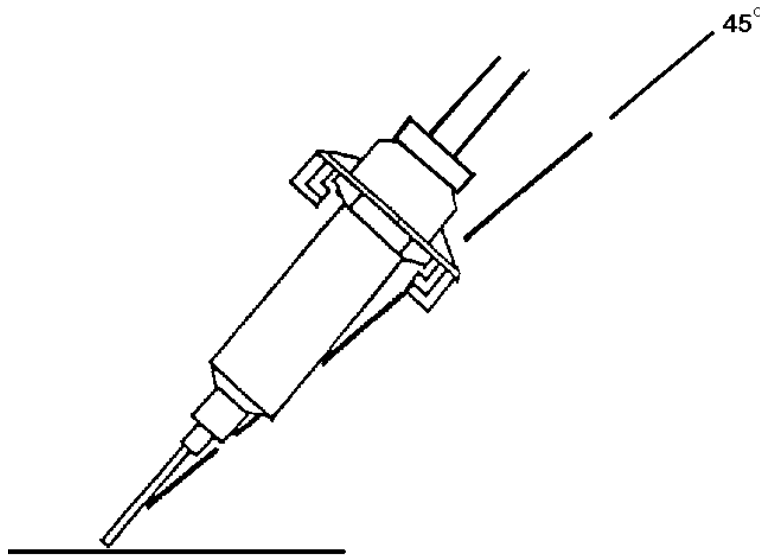
When trying to achieve a precise size solder dot, it is recommended that the operator first use the inert test material which is supplied in the solder paste kit. This test material has a similar viscosity to the solder paste and can be used to practice setting the proper adjustments to attain the desired dot size.

Select the desired tip for the amount of solder deposit required. This selection is left entirely to the operator. Recommended is the largest applicable tip size to be used in the shortest length of dispensing time possible. Slide the tip on the paste syringe. The five tips can be changed rapidly.

Prior to the solder paste application, be sure all solder has been removed from the lands where the component is to be placed. This will assure that the component will rest level when placed into the solder paste (use desolder handpiece in the vacuum mode to remove solder from the lands). Once the lands are clear of old solder, they are ready to receive the new solder paste.

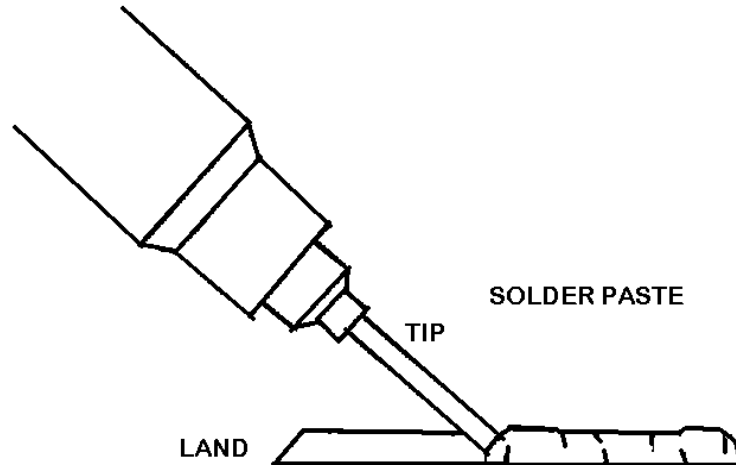
After tip size has been determined using the test material, attach the tube of solder paste to the barrel adaptor assembly and use the tip that was selected by the test procedure.

Hold the barrel as shown:

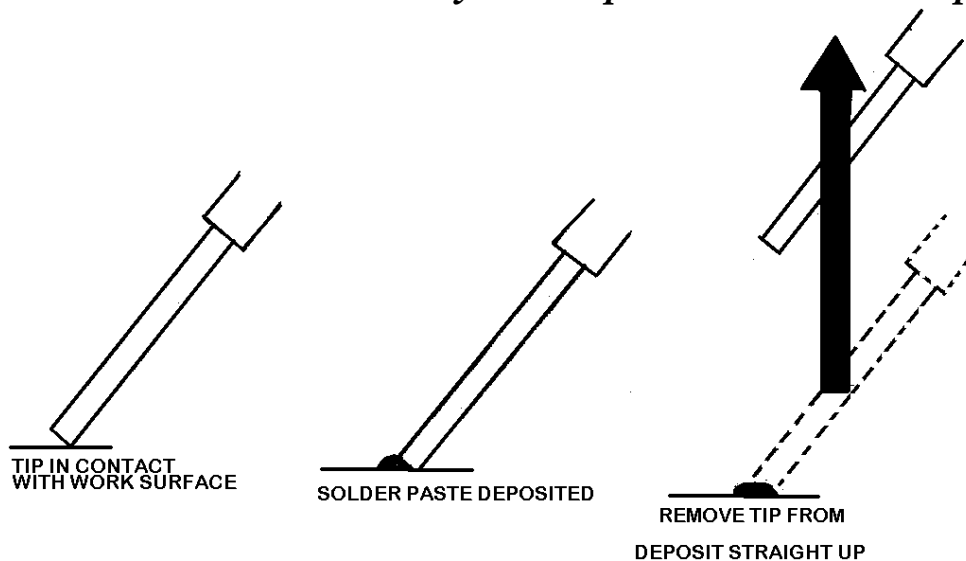


Holding the paste syringe at this angle will assure the quickest and most even solder dot dispensing. Rest the tip on the piece of scrap paper and depress the foot pedal until the tip is full of solder. This will assure repeatable dot sizes from the very first dot when in the timer mode.

## SOLDER PASTE SYRINGE



*Remember, when making a solder dot; bring the tip into contact with the land at an angle. This allows an unrestricted paste flow. When the foot pedal is depressed, the solder paste will flow smoothly from the tip. The foot pedal in the timer mode must remain depressed until the cycle is complete. Releasing the foot pedal during the time mode immediately interrupts the timer and stops the cycle.*



# SECTION IX

## TROUBLE-SHOOTING

### A. Power Source

TROUBLE	PROBABLE CAUSE	SOLUTION
Motor pump doesn't run - silent	No power to unit	Check plug and line
	Fuse blown	Replace Fuse
Motor pump doesn't run-humming	Pump binding	Check pump. Adjust
Motor pump runs, but no vacuum at desoldering tip	Hose not attached	Attach hose
	Flow control valve at minimum vacuum	Set valve for maximum vacuum
	Tip hole too large in heater	Replace heater
	Seals on glass tube not seated or worn	Examine seals.
	Put finger on glass end and test for vacuum	
	Clog in tube of heater	Unclog heater
	Tip broken or clogged or has hole in side	Examine and replace tip
	Glass tube filter loaded	Change filter
Pump line or fittings clogged	Run wire through line to dislodge debris	

### B. Desoldering Handpiece

TROUBLE	PROBABLE CAUSE	SOLUTION
Not extracting solder but have vacuum at end of glass tube	Tip clogged	Run wire up tip
	Tip has blow hole	Replace tip
	Tip is loose in heater	Replace heater
	Front seal is shrunk, worn or not seated	Examine and replace front seal with new one
Not extracting solder and has <u>no</u> vacuum at end of glass tube	Hose clogged or has leak	Examine or replace hose
	Vacuum valve slide is set at minimum suction	Check valve - put in maximum vacuum



## ***TROUBLE-SHOOTING (Cont'd)***

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### **C. Cirk Grind**

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<b>TROUBLE</b>	<b>PROBABLE CAUSE</b>	<b>SOLUTION</b>
<b>Drill does not run</b>	Blown fuse	Replace fuse
	Defective control	Replace control
	Main fuse blown	Replace main fuse

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### **D. Therm Tools**

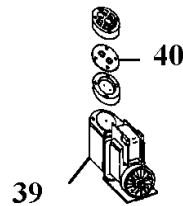
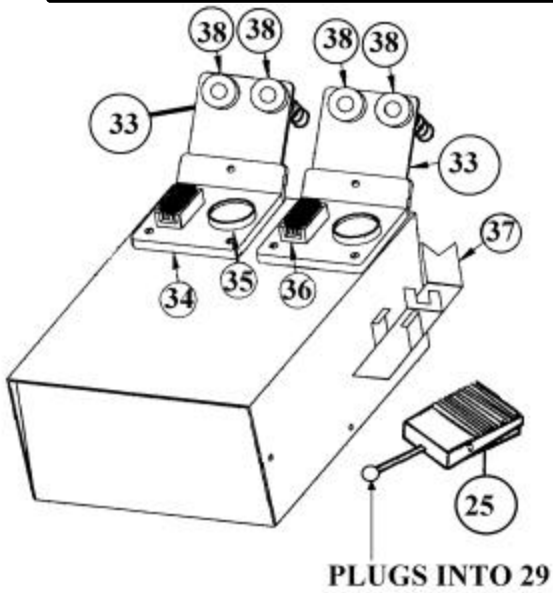
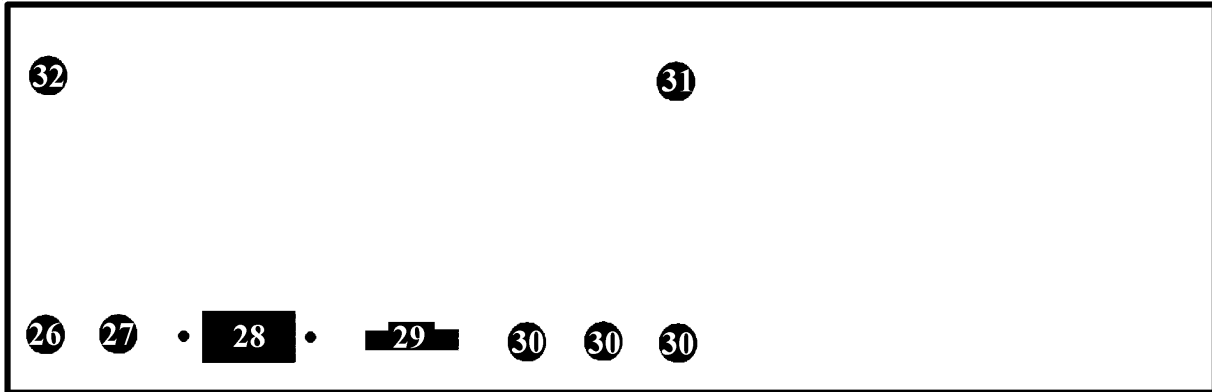
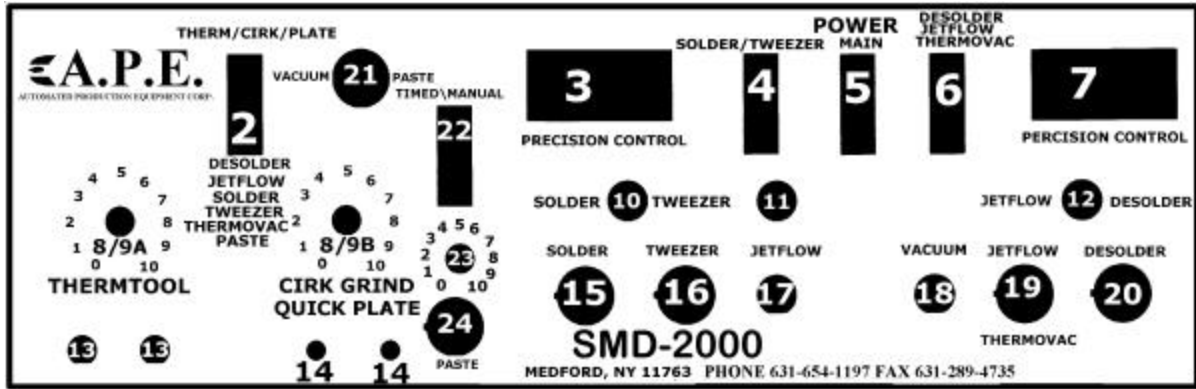
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<b>TROUBLE</b>	<b>PROBABLE CAUSE</b>	<b>SOLUTION</b>
<b>No response after foot pedal depressed</b>	Broken fuse	Replace fuse
	Blown transformer	Replace transformer
<b>Tool will not get hot</b>	Blown fuse	Replace fuse
	Crushed tip	Replace tip
	Poor connectors	Replace connectors
<b>Fuse blows when depressing foot pedal</b>	Bad transformer	Replace transformer
	Bad foot pedal	Replace foot pedal

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# SECTION X: REPLACEMENT PARTS

## Rework Systems Power Source General Supplies SMD-2000M



Description:	Nomenclature #:	Part #:
Flow Control (Vacuum)	18	7001-8799
Flow Control (Pressure)	17	7001-8799
Fuse Holder	27,30	8000-0020
Fuse (5 Amp Slo-Blo)	27,30	8000-0046
Knob	8	3000-8004
Solder/Tweezers Switch	10	5000-8020
Jetflow/Desolder Switch	12	5000-8020
24V Receptacle	15,16,19,20	4000-8407
Ground	26	3006-0133
Pump/Cirk/Therm/Plate/Jetflow/ Thermovac/Vacuum/Desolder Switch	2	8000-0015
Lighted Power Switch	5	8000-0010
AC Controller (0-5 Volts)	8,9A	4000-8444
DC Controller (24 Volts)	8,9B	4000-8444
Thermal Output (AC)	13	3505-0272
Drill Output (DC) 7300-0126	14	7300-0126
Foot Pedal	25	5000-8404
Desolder Timer Switch	31	5000-8020
Solder Timer Switch	32	5000-8020
Holder Assembly (Attached)	34	3550-0602
Sponge (Holder Assembly)	35	6730-0118
Brush (Holder Assembly)	36	6730-0116
Internal Rise Vacuum Pump 110Volt	39	5000-0531
Internal Rise Vacuum Pump 220Volt	39	5000-0631
Pump Overhaul Kit	40	1525-0010
<u>Items Not Shown:</u>		
ZVS, 24V control 220/110 Load		7000-0220
Power Cord (110V)		4000-8402
Power Cord (220)		8000-0100

# **REPLACEMENT PARTS (cont'd)**

## **VACUUM PUMP MAINTENANCE**

**Vacuum pumps are designed to yield maximum, trouble free performance under all conditions. To assure safe and proper operation and**

**maximize the life of the unit, the following guidelines should be observed.**

- 1). Be sure that the available electric power matches the specifications of the electric motor.
- 2). Care should be taken to ensure that the temperature of the compressor or vacuum pump environment remains between 40° and 100°F. This is particularly important when unit is installed in a confined space.
- 3). Unit should be started against atmospheric pressure only, not under load (pressure or vacuum). Care must be taken to eliminate load when pump is turned off for any reason.
- 4). Be sure that the pump is installed at the highest point within the system to prevent possible condensation from entering in the unit.
- 5). Use only to pump air or gas, not liquids. In the event that corrosive gasses are to be pumped, be certain that a corrosive resistant model is used.
- 6). Always install pump in such a location that it is protected from direct (or indirect) moisture contact.
- 7). Avoid operating the unit in very dusty conditions if this cannot be prevented then be sure to install an inlet filter and inspect and change it frequently.
- 8). If flow is throttled for any reason care must be taken to not exceed the maximum continuous operating design pressure of the unit.

### **Exchanging diaphragm and valveplate**

Diaphragm and valveplate, the only parts which may wear out, are easily and quickly replaced.

A). Mark with a pencil the position between the housing A, the intermediate plate B and the headplate C

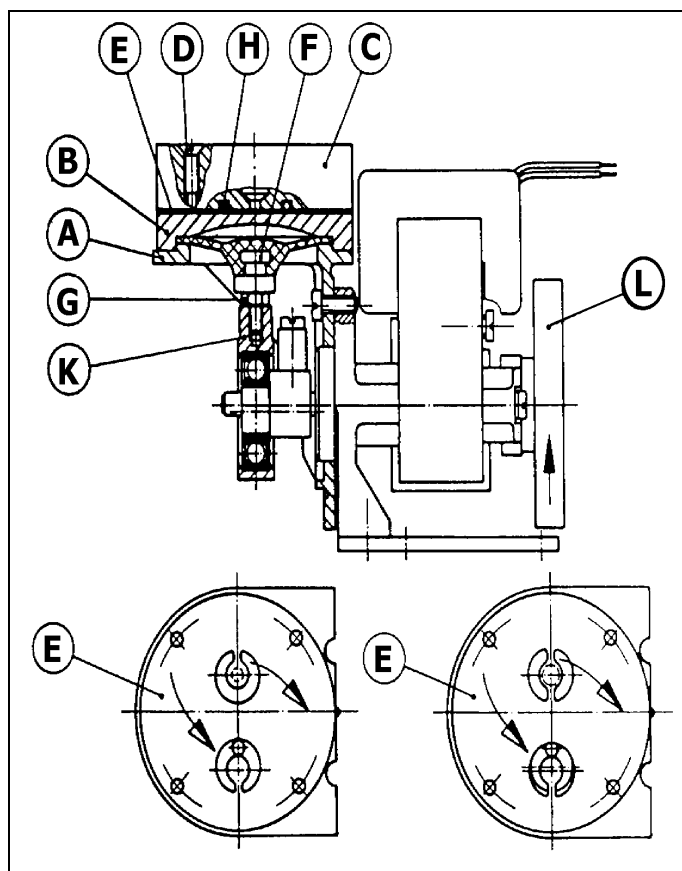
B). Loosen the 4 countersunk screws D and remove the headplate C, the valveplate E and the intermediate plate B. Remove O-ring H from the headplate C.

C). Loosen the diaphragm F by turning it counterclockwise! (Caution: If a spacer nut is present, it must be screwed back on top of plug bolt of the diaphragm when reassembling unit).

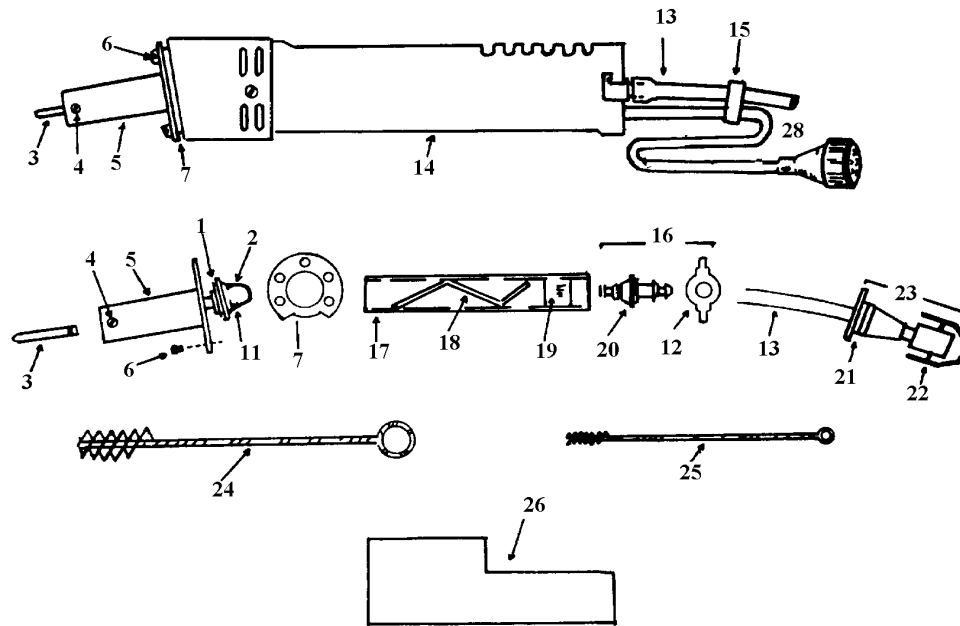
D). Screw on new diaphragm F and tighten by hand.

E). Turn the fan L until connecting rod K is in mid-position and replace intermediate plate B according to the pencil markings on the housing A.

F). Now place new valveplate E (as shown on the drawing) on top of the intermediate plate B and headplate C (with new O-ring H) on top of the valveplate. Tighten with countersunk screws D uniformly in a criss-cross fashion. Check easy rum by slightly turning the fan L.



# Solder Extractor Model EX – 1700



Item	Description	A.P.E. Part Number	Description	A.P.E. Part Number
1	Seal Support	6700-0028	Element,	3000-5001-P25
2	Seal, Forward Assy.	6700-3700	Replaceable (25 pk)	
3	Desolder Tips	See tip page	Replaceable Element, (50 pk)	3000-5001-P50
4	Set Screws	6700-7700-P10	22 Quick Disconnect	6700-8799
5	Heater & Seal Assy (24v Sensor)	6700-1724	23 Stop Clog Filter Assy.	6700-5000
6	Heater Retaining Screws	6700-7017-P3	24 Bristle Brush, Glass Tube	6700-0010
7	Heater Insulator	6700-3813-P2	25 Wire Brush, Heating Assy	6700-0112
11	Seal	6700-7201	26 Handpiece Insulator	6700-0286
12	End Cap Retaining Clip	6700-7302	28 Line Cord Assembly (24v Sensor)	4000-8417
13	Tubing (5 Feet)	7000-8790	<b>EX – 1700 Sensor Desolder Handpiece</b>	
	Tubing (12 Feet)	7000-8701	Handpiece Complete (24v Sensor)	1700-6700
14	Handpiece	6700-0287	Handpiece Alone (24v Sensor)	1700-6701
	Replacement Assy.		<b>Handpiece Consist of:</b>	
15	Hose Clamp, Round	6700-2002-05	Desolder Tool w/Heater	
16	End Cap Assembly	6700-7300	Stop-Clog Filter Assy.	6700-5000
17	Glass Tube	6700-3200-P1	Tube Assy.	7000-8790
	Glass Tube	6700-3200-P6	Desolder Tip Kit (1 ea. Standard)	6700-4223
18	“S” Baffle	6700-4100	Bristle Brush (1 ea.), Glass Tube	6700-0010
19	Glass Tube Filters (25 Pk)	6700-0100-P25	Wire Brush (1 ea.), Heater Assy.	6700-0112
	Glass Tube Filters (50 Pk)	6700-0100-P50	Quick Disconnect (1 ea)	6700-8799
20	Rear Seal	6700-7200	Hose Clamps, Round	6700-2002-05
21	Stop-Clog Filter Fixed (Disposable)	3000-5002	<b>Contents Handpiece Alone</b>	
	Stop-Clog Filter Replaceable (2 Parts)	3000-5003	Desolder Tool w/Heater	
	Element, Replaceable (10 pk)	3000-5001-P10	Stop-Clog Filter Assy.	6700-5000
			Tube Assy.	7000-8790

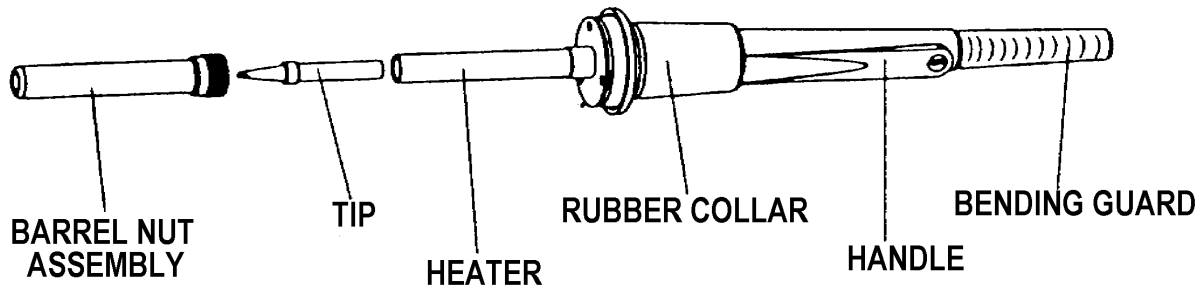
# REPLACEMENT PARTS

## Solder Iron (PRIOR TO APRIL 1, 2005)



Item	Description	Part No.	Optional Tips Available	Part No.
A	Complete 24v w/Sensor	6910-1700	Fork Small Chip	6910-2311
B	Control Board & Rod	6910-1724	Fork SOT 23/143	6910-2310
C	Tip		Funnel SOIC-14	6910-2314
	1/8" chisel	1212-1725	Fork Large Chip	6910-2312
	1/16" chisel	1212-1716	Funnel SOIC -8	6910-2308
	1/32" pointed	1212-1701	Flat Blade	6910-2395
	1/64" pointed	1212-1717	Funnel SOIC -16	6910-2316
	3/16" chisel	1212-1736	PQFP .389" x .389"	6910-2401
	3/64" chisel	1212-1764	PQFP .512" x .512"	6910-2402
			PQFP .545" x .545"	6910-2403
			PQFP .574" x .574"	6910-2404
			PQFP .697" x .697"	6910-2405
			PQFP .820" x .820"	6910-2406

## Solder Iron (SOLD AFTER APRIL 1, 2005)



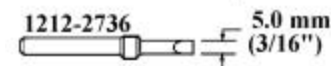
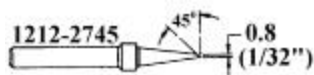
### Accessories:

**Solder Iron** 6910-2700

**Heater Assy.** 6910-2724

### Allen Key

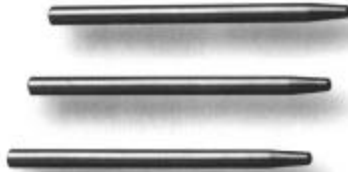
### Solder Irons Tips:



# SOLDERING AND DESOLDERING TIPS

## Tips Desoldering/Soldering

Description:	Part No.:	Description:	Part No.:
Tip 3/64"	1212-1764	Tip 1/64"	1212-1717
Tip 3/16"	1212-1736	Tip 1/16"	1212-1716
Tip 1/8"	1212-1725	Tip 1/32"	1212-1701



### Tips Desoldering

(I.D. to fit Pace & Plug Tips)

I.D.	Part No.
.018	1212-0018
.025	1212-0225
.040	1212-0440
.050	1212-0550
.060	1212-0660
.080	1212-0080
Assorted Tips	1212-1212

### Long Tips

(Fits Pace MP-also for wire wrap pins)

I.D.	Part No.
.060	1212-2060
.040	1212-2040
.025	1212-2025

### Curved Tips

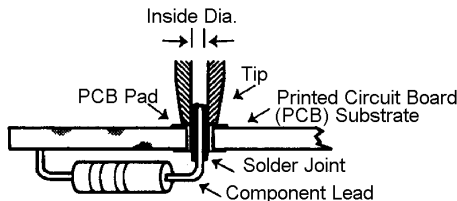
(30° bend)

I.D.	Part No.
.025	1212-2125
.040	1212-2140
.060	1212-2160

## DESIGNED FOR MAXIMUM HEAT CONDUCTIVITY AND OPTIMUM OPERATING LIFE. DESOLDER TIP SELECTION

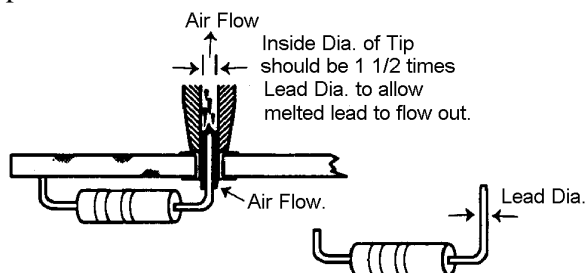
### INSIDE DIAMETER

The tip should be large enough to fit over the lead to be desoldered. A slight clearance is necessary to allow the solder to flow through the tip. Although several tip diameters will work ideally a tip diameter 1/3 the lead diameter is best.

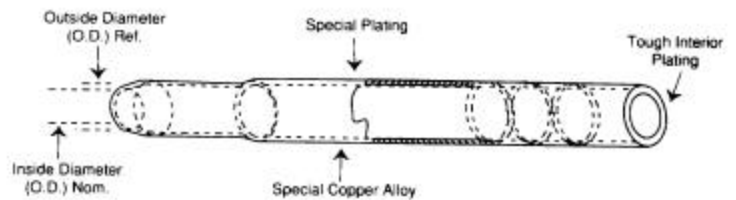


### OUTSIDE DIAMETER

The O.D of the tip should be less than the diameter of the circuit board pad. This is to avoid burning or marking the board material. The tip wall thickness provides the path of heat into solder joint. Thick walls are preferable for large solder joint and bigger heat sinks to conduct the heat into the solder joint as quickly as possible.

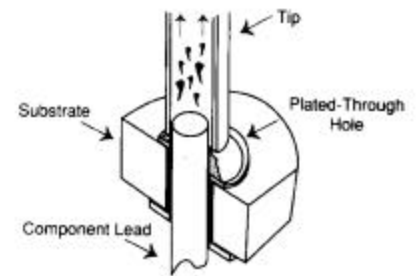
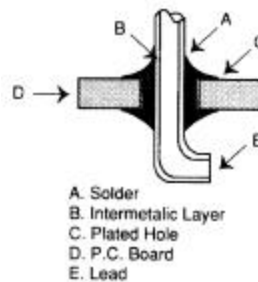


### DESOLDER CROSS SECTION



### MEASUREMENT OF REPLACEMENT

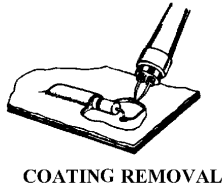
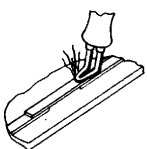
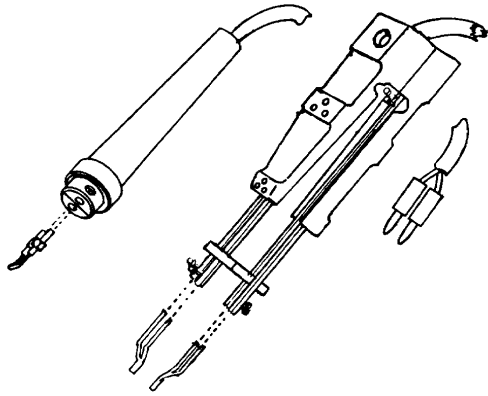
Typical Cross Section of Printed Circuit Board, with Plated Through Holes



A.P.E. Tips are manufactured to outlast any competitive tip on the market today. Three years of research and development and specialized tooling allow us to introduce this tip with plating high conductivity copper with corrosive-resistant inner-lining for longer life and instant heat recover.

# REPLACEMENT PARTS (Cont'd)

## Thermal Parting



### Standard Accessories:

Thermal Parting Handpiece (with Tips)	2900-0132
Resistive Tweezers (with Tips)	2200-0130

### Optional Accessories shown below:

A. Therm Tool Kit Complete	2700-0001
<u>Contains:</u>	
1. Heat Tweezers Assembly	2600-0320
2. Stripper Tips	2400-0310
3. Conductive Tips	2300-0200
4. Resistive Tips	2200-0100
5. Thermal Parting Handpiece	2900-0132
6. Reflow Tip	2800-0001

### Therm Tool Accessories:

1. Set Screws (Stripper, conductive, Resistive)	3003-0235
2. Tips - Flat "V" Blade	2900-0001
3. Tips - 60° Bend "V" Blade	2900-0660
4. Tips - 90° Bend "V" Blade	2900-0690

Reflow Soldering Kit: (Optional)	2800-0130
Tips - Reflow	2800-0001
Circuit Board	3028-0162
IC Kit	3028-0119
Solder	3028-0168
Flux Bottle (Empty)	6911-8899

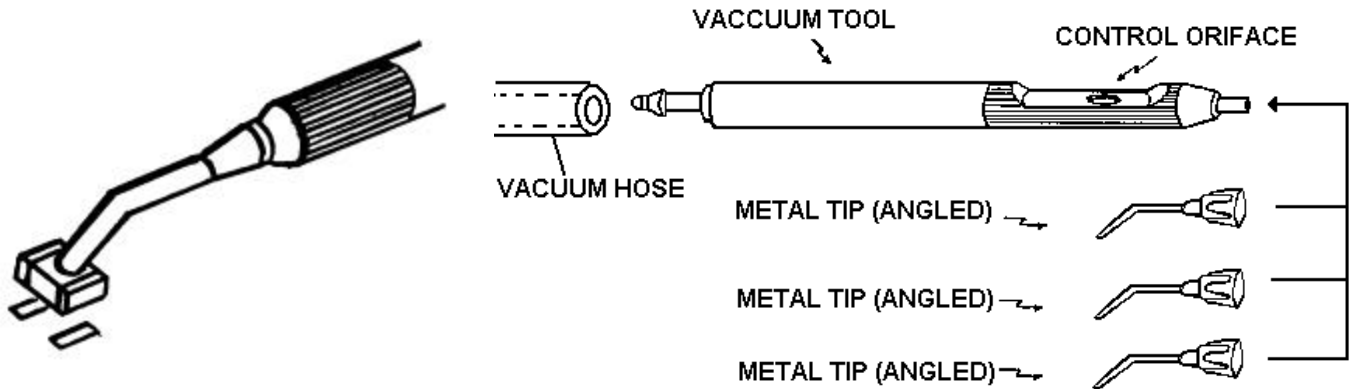
Conductive Tweezer (with Tips)	2300-0132
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Thermal Stripper Handpiece (with Tips)	2400-0133
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Reflow Soldering Spares Kits (without Handpiece)	2800-0400
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**REPLACEMENT PARTS  
SMD VACUUM HANDLING  
PART NUMBER: 6000-2500**



**SMD Vacuum Pick-up/Placement Handling Tool Kit**

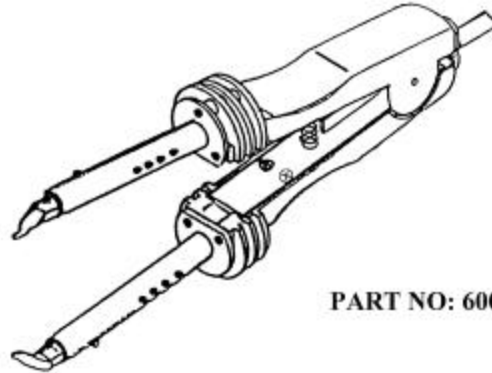
This kit is designed to handle all types of SMD components. A by-pass hole is covered with finger to allow vacuum flow through probe tip, causing a delicate suction force to remove and replace SMD's Components. Handpiece is contoured to minimize fatigue.

<b>A.P.E. Stock No.</b>	<b>6000-2500</b>
<b>Kit Contains:</b>	
<b>Probe (Vacuum By-pass)</b>	<b>not sold separately</b>
<b>SMD Vacuum Probe Tip (.063" ID x .083" OD)</b>	<b>6000-2501</b>
<b>SMD Vacuum Probe Tip (.033" ID x .050" OD)</b>	<b>6000-2502</b>
<b>SMD Vacuum Probe Tip (.020" ID x .032" OD)</b>	<b>6000-2503</b>
<b>Quick Disconnect Fitting</b>	<b>6700-8799</b>
<b>5 ft Flexible Tubing</b>	<b>7000-8790</b>
<b>Vacuum Replacement Cups</b>	
<b>SMD Vacuum Cups (.140" dia)</b>	<b>6000-2504</b>
<b>SMD Vacuum Cups (.200" dia)</b>	<b>6000-2505</b>
<b>SMD Vacuum Cups (.250" dia)</b>	<b>6000-2506</b>
<b>SMD Vacuum Cups (.320" dia)</b>	<b>6000-2507</b>
<b>SMD Vacuum Cups (.400" dia)</b>	<b>6000-2508</b>

# THERMAL QUAD-PACK TWEEZER

## THERMAL QUAD PACK TWEEZER

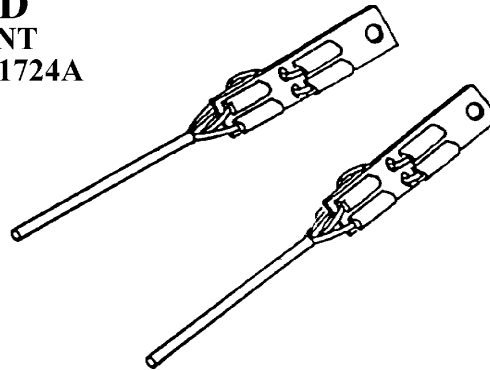
Part No. 6000-2400A



PART NO: 6000-2400A

### HEATER ELEMENT WITH BOARD

HEATER ELEMENT  
PART NO: 6000-1724A



### Quad-pack Tweezer Handpiece Tips

TIP	PART NO.
Chip Component ( <b>supplied with Tweezer</b> )	1212-2311A
SOT 23/143	1212-2310A
SOIC-8	1212-2308A
SOIC -14	1212-2314A
SOIC - 16	1212-2316A
SOIC -20	1212-2320A
SOIC -24	1212-2324A
PLCC/Quads - 18	1212-2318A
PLCC/Quads-20	1212-2326A
PLCC/Quads - 28	1212-2328A
PLCC/Quads - 44	1212-2344A
Handpiece Insulator	6000-0286

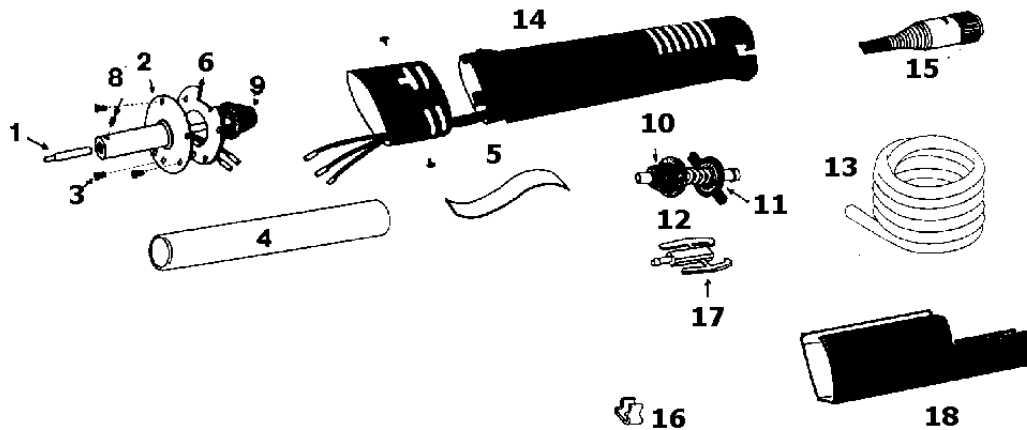
\*NOTE: THE TWEEZER ASSEMBLY REQUIRES QUAD-PACK TWEEZER HOLDER ASSEMBLY  
(Part No. 3550-6000)

# REPLACEMENT PARTS (continued)

## SMD HOT AIR REFLOW HANDPIECE REPLACEMENT PARTS

(JETFLOW HANDPIECE)

Part Number 1700-0060



Item	Description	Part No.
A	Handpiece Complete (24v w/ Sensor)	1700-6700
1	Tip	See tip section
2	Heater & Seal Assy. (24v- 60 WATTS)	6700-1760
4	Glass Tube	6700-3200
5	"S" Baffle	6700-4100
6	Heater Insulator	6700-3813
7	Heater Retaining Screws	6700-7017
8	Set Screws	6700-7700
9	Seal, Forward	6700-7201
10	Seal, Rear	6700-7200
11	End -cap Retaining Clip	6700-7302
12	End -cap Assembly (Standard)	6700-7300
13	Tubing: 5' Length	7000-8790
	Tubing: 12' Length	7000-8701
14	Handpiece Assembly (Standard)	6700-0287
15	Power Cord for handpiece w/ Sensor	4000-8417
16	Hose Clamps	6700-2002
17	Quick Disconnect	6700-8799
18	Handpiece Insulator	6700-0286

# **O P T I O N A L**

# REPLACEMENT PARTS (CONTINUED)

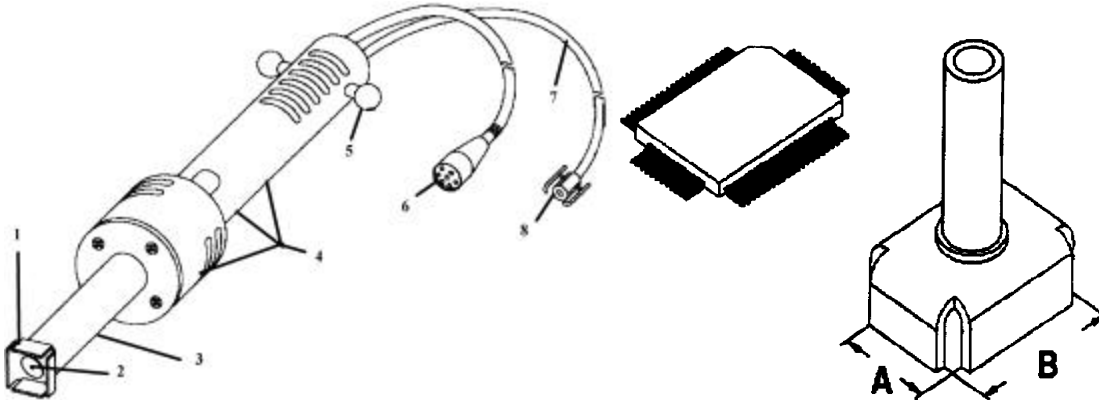
## THERMOVAC REPLACEMENT PARTS (OPTIONAL)

THERMOVAC  
PART NUMBER

6000-2600

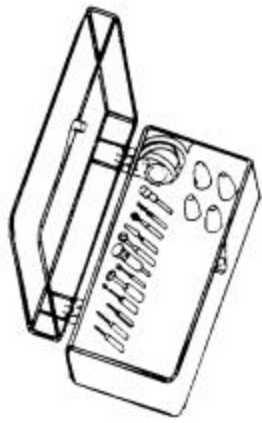











THERMOVAC  
TIP REPLACEABLE

see below



NUMBER	DESCRIPTION	PART NUMBER
1	TIPS SEE SIZES LISTED BELOW	SEE LISTING BELOW
2	VACUUM CUP	8100-0003
3	HEATER ASSY 24V-60W	6700-1765
4	REPLACEMENT HANDLE ASSY	6700-0288
5	END CAP ASSY	6700-7300
6	POWER CORD - SENSOR	4000-8417
7	TUBING 5 FEET LENGTH	7000-8790
8	QUICK DISCONNECT FITTING	6700-8799
INTERNAL	SPRING	6000-3204
INTERNAL	VACUUM TUBE	6000-3203
INTERNAL	BUSHING	6000-3201
INTERNAL	WASHER	6000-3202
INTERNAL	VACUUM PICK-UP TUBE	6000-3200
INTERNAL	SET SCREWS	6000-7706P2
DESCRIPTION	TIP SIZE A X B	PART NUMBER
FLATPACK TIP	.63" X .87"	1212-2423
FLATPACK TIP	.68" X .92"	1212-2425* supplied with unit
PQFP-68 TIP	.64" X .64"	1212-2426
PQFP-84 TIP	.74" X .74"	1212-2427
PQFP-100 TIP	.84" X .84"	1212-2428
PQFP-132 TIP	1.04" X 1.04"	1212-2429
PQFP-144 TIP	1.17" X 1.17"	1212-2430
PQFP-160 TIP	1.24" X 1.24"	1212-2431
PQFP-208 TIP	1.24" X 1.24"	1212-2431

**REPLACEMENT PARTS (Optional)**  
**SPECIALIZED REWORK SYSTEM**  
**CIRK GRIND<sup>®</sup> DRILL UNIT**

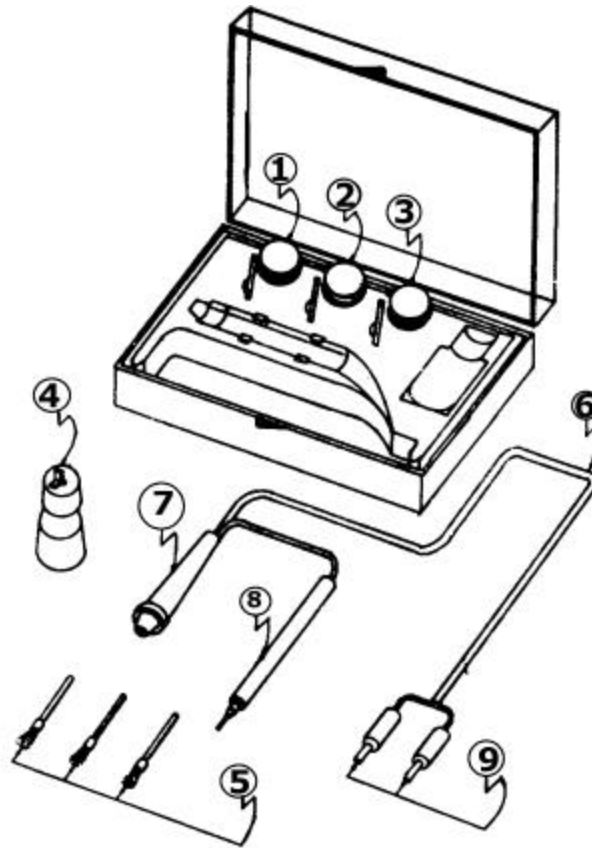
ITEM DESCRIPTION	A.P.E. PART NO.		
<b>Cirk Grind Variable Speed Drill</b>		<b>Cirk Grind Drill and Spares</b>	
Drill/Abrading System ■■■			
Drill Handpiece w/ Drill Assortment	7300-0060		
Standard Package Consists of:			
1. Variable Speed Drill Handpiece	7300-0050		
2. Deluxe Drill Tool Assortment Kit	6000-6780		
<b>Drill Replacement Parts:</b>			
			
Abrasive 5/8" Tapered Brown	1111-0061 ▲	Ball Mill 1/64"	1111-0006
Abrasive 5/8" Tapered Green	1111-0062 ▲	Ball Mill 1/32"	1111-0007
		Ball Mill 3/64"	1111-0008 ▲
Abrasive Wheel 7/8" Brown Fine	1111-0063 ▲	Ball Mill 1/16"	1111-0009 ▲
Abrasive Wheel 7/8" Green Coarse	1111-0064 ▲	Ball Mill 3/32"	1111-0010 ▲
		Ball Mill 1/8"	1111-0011
Abrasive Bullet, Brown Fine	1111-0072-	Ball Mill 5/32"	1111-0012
Abrasive Bullet, Green Coarse	1111-0073-	Ball Mill 3/16"	1111-0013
	1111-0065	Ball Mill 1/4"	1111-0014
Abrasive, White-Mtd.			
Abrasive, Pink-Mtd.	1111-0066	Drill 1/32"	1111-0001 ▲
		Drill 3/64"	1111-0002 ▲
Abrasive Wheel, White-Mtd.	1111-0067	Drill 1/16"	1111-0003 ▲
Abrasive Wheel, Pink-Mtd.	1111-0068	Drill 5/64"	1111-0004
		Drill 3/32"	1111-0005
Abrasive Wheel, White-Unmtd.	1111-0069	Saw 3/32"	1111-0074 ▲
Abrasive Wheel, Pink-Unmtd.	1111-0070	Saw 3/4"	1111-0075 ▲
			1111-0076 ▲
Brush, Bristle-Mtd.	1111-0017 ▲		1111-0390 ▲
			
Brush, 3/4" Wheel	1111-0016 ▲		

▲ - 1 ea. Included in the 6000-6780      • - 2 ea. Included in 6000-6780  
 The Rest of the Cirk Grind Drill Bits are optional accessories.

# REPLACEMENT PARTS (CONT'D)

## QUICK PLATE KIT REPLACEMENT PARTS (OPTIONAL)

Part Number 0690-0002



### NOMENCLATURE

<b>No:</b>	<b>DESCRIPTION</b>	<b>PART NUMBER</b>
1.	Gold Solution	6911-1336
2.	Nickel Solution	6911-1330
3.	Electroclean	6911-1321
4.	Bottle	6911-8899
5.	Plating Brushes	6911-0823
6.	Handle Assembly with Cord	4100-6100
7.	Brush Holder; Anode	Not Available Separately
8.	Probe; Cathode	Not Available Separately
9.	Plugs	Not Available Separately

# REPLACEMENT PARTS

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## PLATING SUPPLIES for QUIK PLATE KIT (OPTIONAL)

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Part Number 0690-0002

ITEM NO.	DESCRIPTION	PART NO.
1.	Brushes	6911-0823
2.	Brush Holding Screws	3028-3029
3.	Probe Cord Set	4000-6182
4.	Cleaning Bottle	6911-8899
5.	Probe Assy., w/Cord	4100-6100

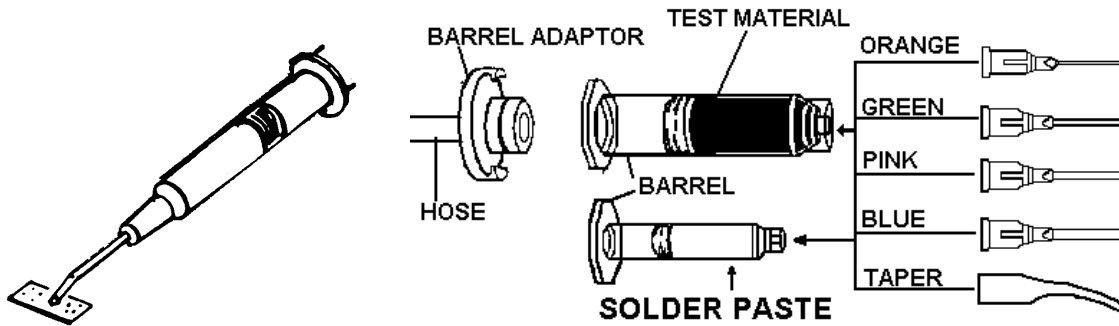
## SOLUTIONS

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1.	Electro-Clean	6911-1321
2.	Copper (High Speed)	6911-1324
3.	Copper (Alkaline)	6911-1326
4.	Lead	6911-1328
5.	Nickel	6911-1330
6.	Nickel (High Speed)	6911-1332
7.	Tin	6911-1334
8.	Gold 1 oz.	6911-1336
9.	Gold 3 oz.	6911-3336
10.	Silver	6911-1338



## SOLDER PASTE DISPENSING KIT ■ ■ ■ (OPTIONAL)



This kit contains a 5 cc. barrel of 63/37 solder paste used to apply solder dot on PCB's pads. Complete w/3 ft. (0.9 mm) flexible hose, clamps, & male quick connect.

A.P.E. Stock No.

6000-5000

### Kit Contains:

5 cc. Solder Paste (63/67)

6000-6565

5 cc. Barrel Adaptor

6000-5155

5 cc. Test Material

6000-6568

### Disposable Dispensing Tips:

.054" (1.37 mm) Orange; 15 Gage

6000-5115

.033" (0.84 mm) Green; 18 Gage

6000-5118

.023" (0.58 mm) Pink; 20 Gage

6000-5120

.016" (0.41 mm) Blue; 22 Gage

6000-5122

.025" (0.64 mm) Taper; 20 Gage

6000-5123

### Available Separately

Solder Paste (60/40)

6000-6567

Solder Paste (62/36/2)

6000-6566

Barrel Stand (Standard Accessory)

6000-5002

## **Notes:**

## **Notes:**

## **Notes:**

# **A.P.E. CORP.**

**Automated Production Equipment Corp.**

3661 HORSEBLOCK RD, BUILDING N

MEDFORD, NY 11763 U.S.A.

PHONE: (631) 654-1197    FAX: (631) 289-4735

EMAIL: [apecorp@aol.com](mailto:apecorp@aol.com)