

A.P.E.



Lead-Free Rework



A.P.R.E.



Lead-Free Rework



printed circuit board rework and repair equipment from the rework company

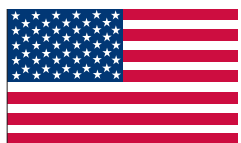
Welcome...

...to the APE Rework Equipment Catalog. Many changes are taking place in our industry with the influence of RoHs regulations and the acceptance of Lead-Free materials in equipment manufacture. There are few exceptions and generally this requirement regulates the international electronics community. Lead-Free materials require more stringent controls during production. A higher degree of manufacturing complications will result in a greater demand for quality rework. To address these demands we have introduced several models of Vision/Reflow machines to meet every budget while maintaining the rigorous requirements for Lead-Free manufacture. We are confident that we can provide a solution for your application and look forward to providing a personal service in caring for your rework needs.



Bill Scheu.....President and CEO

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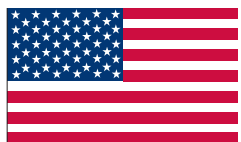
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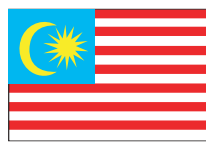
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A.P.E. is proud to be a supplier to:



For your convenience we have written a Quick Description called “Overview” to introduce each of our Hot Air Rework machines at the beginning of each page.

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Chipper SMD-500 Power PCB Rework and Repair System for SMT Components

Overview

The Chipper SMD-500 is used for low-volume SMT component PCB rework, PCB repair and prototyping



SMT Repair & Rework

The Chipper SMD-500 is an affordable, integrated system for SMT component PCB rework and repair. Replace older "Contact" rework tools with the latest Low Temperature PCB rework technology for reworking SMT components without damage.



Lead Free Rework

For Lead Free rework and repair the Chipper can be used with an APE Bottom Heater featured on page 10.

PCB Rework Holder

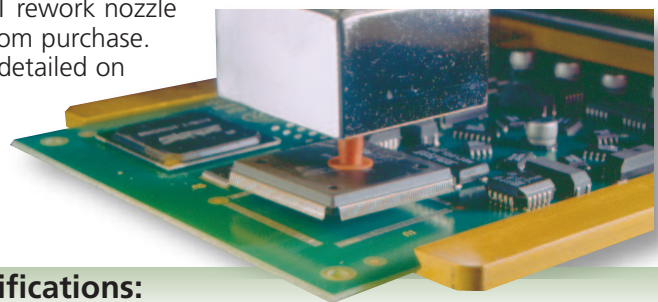
A standard 8" x 8" (203 x 203 mm) PCB repair Holder is included for most PCB sizes, adjustable in every axis. A board release mechanism allows each PCB to snap into place and quickly released when required. In addition, a Z-Axis nozzle clearance piston avoids profile obstructions, when locating and clearing SMT components.

SMD-500 Nozzle Exchange Program

The SMD-500 also includes three (3) SMT component repair nozzles which can be included in a unique A.P.E. exchange program, allowing the User to exchange any SMT rework nozzle for up to one year from purchase. See SMT Nozzle List detailed on page 22.

Automatic Lift Off

An automatic SMT component vacuum pick-up lifts the SMT component from the PCB once reflowed and continues to hold the part during the systems cooling cycle.



Specifications:

Power	1200 Watts
Current	10.90 Amp @ 110V, 5.45 Amp @220V
Dimension	14" x 8" x 12" (203 x 180 x 305 mm)
PCB Holder	Standard 8" x 8" (203 x 203 mm)
Nozzles included:	(User may select alternatives)
8100-0000-44	0.80" x 0.80" (20.3 x 20.3 mm)
8100-1424	0.71" x 0.40" (18.0 x 10.2 mm)
8100-1075	1.00" x 0.75" (25.4 x 19.0 mm)
Temperature	Selectable Fahrenheit or Celsius
Air Velocity	<12.7 CFM
Vacuum	Internal Pump
Air Source	Internal Blower
Shipping	24" x 12" x 16", Weight 28 lb (12.73 kg)

Chipper SMD-500 Power PCB Rework and Repair System for SMT Components

SMT Component Removal

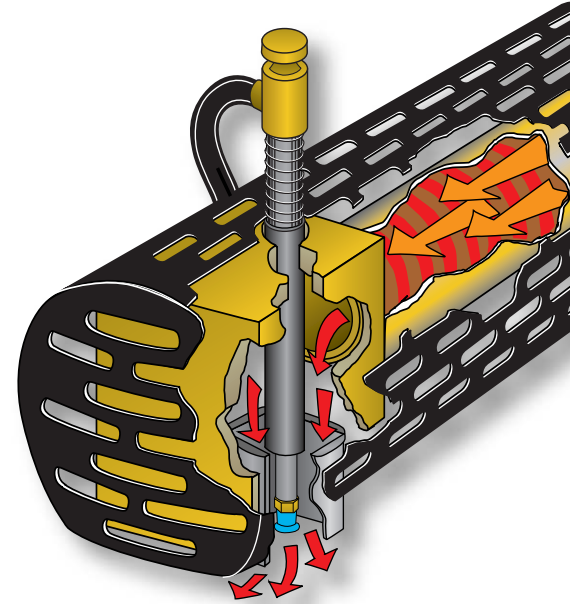
By activating a vacuum switch the SMT component pick-up assembly vacuum cup, is brought into contact with the top of the SMT component body. A foot pedal is then operated to start the rework cycle. Once reflow temperature is reached the SMT component automatically lifts from the PCB.

Cool Operation

Once the system is switched on, the Controller carries out a "Self Test" and the internal Blower Motor engages to provide a constant stream of high volume, low velocity cool air, which will not disturb or solderball, within the PCB rework area.

Autotune Controller

Temperature Display registers SMT component "Set Point" temperature in either Celsius or Fahrenheit.



SMT Nozzle Selection

An appropriate size SMT component-nozzle is easily installed and the correct temperature is selected. The PCB is mounted in the PCB holder and the nozzle placed over the SMT component allowing a gap of 1/8" (3 mm) above the body of the SMT component.

PCB Rework Preparation

Preparation of the SMT component for desoldering and cleaning of the PCB rework footprint is critical in successful rework. APE has therefore designed a PCB repair SMT Tool Kit, which has all the necessary tools and ingredients for a professional job; see page 20 for details.



Optional Accessories:

Part #	Description
8100-0598	Halogen Light 110V
8100-1097	SMT Tool Kit

Order Information:

Model	Part #	Description
SMD-500	4000-1000	110V 60 Hz CSA
SMD-502	4000-1002	220V 50 Hz CE

Autotune Digital Controllers

Normal display:
Process temperature



Adjustment of setpoint



Alternating display:
Autotuning (shown),
alarm, etc.



Main setpoint: SP1
output indicator,
(flashing LED)

NEMA 4X/IP65
sealed 'wash
down' fascia

Large bright
4-digit LED display



Tactile keys,
amply spaced

Second setpoint: SP2
output indicator,
(flashing indicator)

Entry to program mode



Setpoint with unit (°C, °F, etc.)



Chipmaster SMD-1000 Profile Controlled PCB Rework and Repair System

Overview

The Chipmaster SMD-1000 system is a reliable SMT Component PCB rework and repair system, suitable for small to medium PCB assemblies, BGA and SMT components, requiring Profile Temperature Control.

Note - Lead Free placement for BGA components requires a Vision/Reflow system for accurate alignment

(see pg. 13 - 19)

Wide Ranging

The Chipmaster SMD-1000 PCB repair system covers a wide range of SMT components providing a controlled PCB rework environment, which cares for your repair process. The system features a simple operation with automatic "Timed" process control and selected thermal BGA profiling.

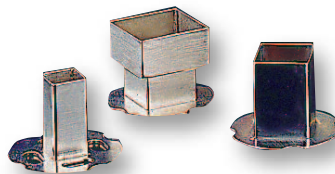
Energy Rework Reflow

What makes the Chipmaster different from other Hot Air SMT rework machines is "CONVECTION POWER." Its high-power heater reworks sensitive components at original Convection Oven temperatures.

Lead Free Rework

Oven Temperature Convection Rework is critical when reworking Lead Free components. The SMT component reflow temperature is higher for Lead-Free materials but the heat source should be kept to an optimum convection temperature to avoid damaging surrounding SMT components. Replicating the manufacturing method using a convection hot air reflow technology is the safest method.

The Chipmaster requires an APE Bottom Heater featured on page 10 for Lead Free rework and repair.

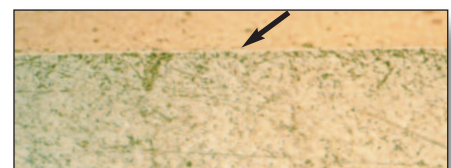


Solder Integrity

The following micro sections indicate the superior quality of a solder junction when operating at Low Temperature using the Chipmaster.

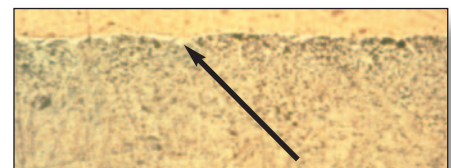


Chipmaster Rework Temperature



At the original Convection Oven Temperature integrity of solder remains intact.

Common Low Power Rework Temperatures



With air temperatures greater than the original Convection Oven Temperature the integrity of solder begins to break down.

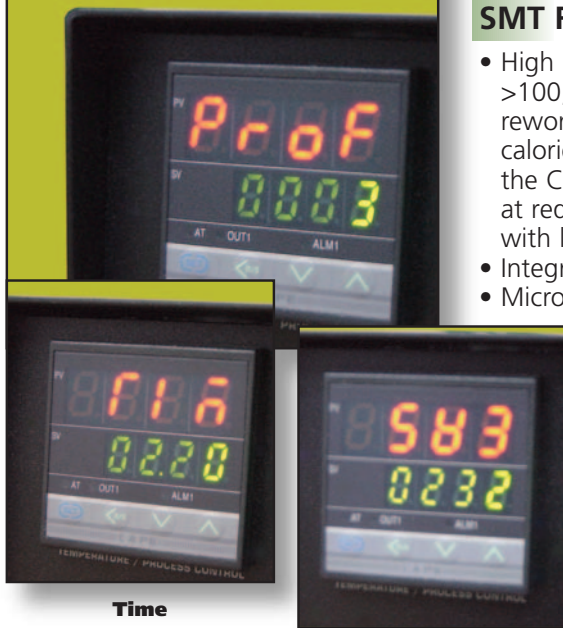
Specifications:

Power	1200 Watts
Current	10.90 Amp @ 110V, 5.45 Amp @ 220V
Dimension	22.25" x 9.25" x 8.62" (362 x 235 x 219 mm)
PCB Holder	Standard 8" x 8" (203 x 203 mm)
Nozzles included:	(User may select alternatives)
8100-0000-44	0.80" x 0.80" (20.3 x 20.3 mm)
8100-1424	0.71" x 0.40" (18.0 x 10.2 mm)
8100-1075	1.00" x 0.75" (25.4 x 19.0 mm)
Temperature	Selectable Fahrenheit or Celsius
Air Velocity	<12.7 CFM
Vacuum	Internal Pump
Air Source	Internal Blower
Controller	Fuzzy Logic PID
Shipping	Standard 8100-1003 24" x 12" x 16" Weight 35 lb (15.9 kg)

Chipmaster SMD-1000 Profile Controlled PCB Rework and Repair System

Safer, faster rework

The selected profile contains ramp and soak segments of Temp & Time



Time

Temperature

SMT Rework Features:

- High Power: 1200 Watts providing >100,000 Joules during a typical rework cycle, delivering >28,000 calories of energy, which enables the Chipmaster SMD-1000 to work at reduced temperatures and with lower air velocity
- Integrated Digital Timer
- Microprocessor PID Control
 - Digital closed-loop sensing
 - Optimum process repeatability <2% of Set Point temperature
 - °F and °C selectable
 - Low air velocity of 12.7 CFM
 - Internal vacuum pump
 - Quick change nozzle design



Ordering information

The standard SMD-1000 Chipmaster is a fully operational SMT repair system configured for reworking BGA/SMT components.

SMD-1000 System includes:

- Power Supply
- Blower Unit
- Digital Timer Controller
- SMD Pick-Up Assembly
- Heater: 1200 Watt
- Board Holder: 8" x 8" (203 x 203 mm)
- SMT Nozzle Kit three (3) piece
- SMT Rework Tool Kit 8100-1097
- Halogen Light



The Standard SMD-1000 Chipmaster includes components as shown

Part # Description

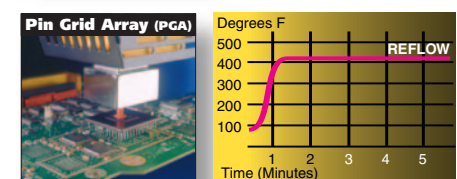
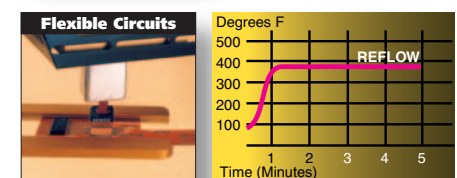
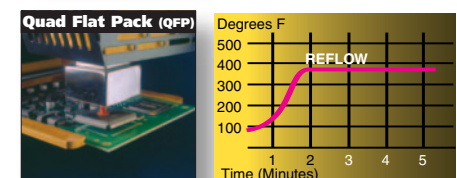
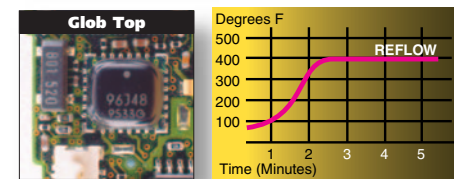
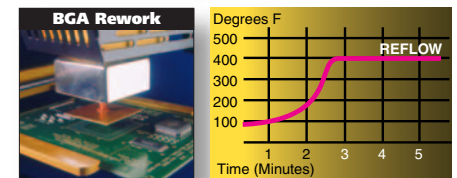
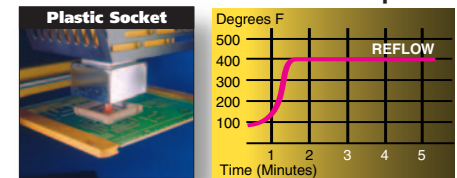
SMD-1000

- 8100-1003-114 Standard Chipmaster 110V 60 Hz CSA
- 8100-1023-114 Standard Chipmaster 220V 50 Hz CE

Profile Storage Controller

- Automatic SMT component pick-up
- Uniform heat distribution
- PID Profile Storage Control for workshop SMT repair conditions, optimizing performance, providing soak and ramp without a computer add on

Eutectic Profile Examples



Lead-Free reflow requires Bottom Heat to achieve safe temperature conditions

Information on SMT Tool Kit See page 20

"Nozzles" See page 22

Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

Chipmaster-Z SMD-1000-Z PCB Rework System for SMT Components

Overview

The Chipmaster-Z is similar in specification to the standard Chipmaster SMT Rework Machine but includes an electric Z axis, which provides precise control in accessing and extracting the nozzle from the SMT component being reworked.

Automated Z Axis

The Chipmaster-Z automates the Z axis adjustment and assists the user in clearing the SMD area after rework. It also helps access the SMT component without concern of surrounding obstructions.

Underboard Heating

The SMD-1000-Z is a good choice for reworking Lead-Free devices and can be used with a Radiant Hotplate or a Dragon series Bottom Board Heater. (P-10).

8100-1003-114-Z:

The Chipmaster-Z, SMD-1000-Z, system includes a Profile Storage Controller, which enables ramp and soak profiling to ensure optimum solder temperatures during flux activation and reflow.

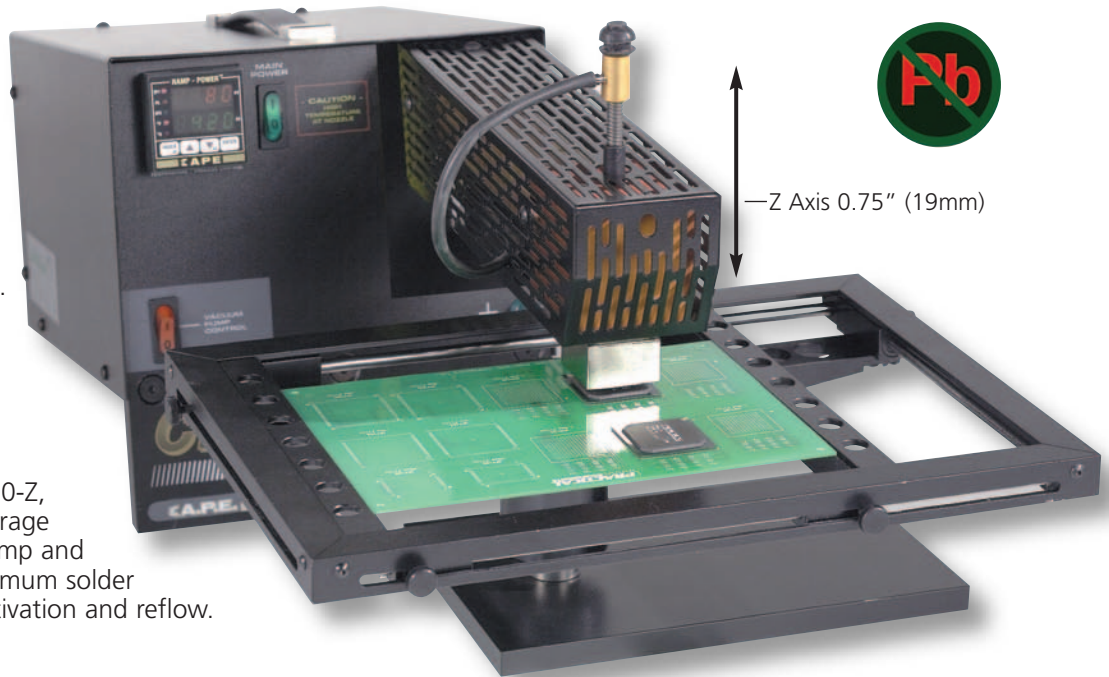
Frame Board Holders

- 8100-0812 8" x 12" (203 x 304 mm) as photo
- 8100-1416 14" x 16" (355 x 406 mm)
- 8100-2024 20" x 24" (508 x 610 mm)



New 4 Sided Frame Board Holder

A range of Frame Board Holders has been designed for use with the Chipmaster-Z and other APE rework products. They include smooth action bearings and ledge pressure PCB support (see illustration below).



Specifications:

Chipmaster (see page 4)
Z Axis Movement 0.75 inches (19 mm)

Chipmaster-Z Axis Order Information

8100-1003-114-Z Optimum Kit 110V 60 Hz
8100-1023-114-Z Optimum Kit 220V 50 Hz

Includes:

Chipmaster-Z (110V or 220V)
Profile Storage Controller
Frame PCB Holder 8" x 12" (208 x 304mm)
Three (3) Reflow Nozzles (Users Choice)

Chipmaster and Chipmaster-Z Accessories for PCB Rework

Overview

SMT Rework Accessories can be added to a Chipmaster to assist the operator, providing visual and ergonomic aids.

Chipmaster Accessory Options

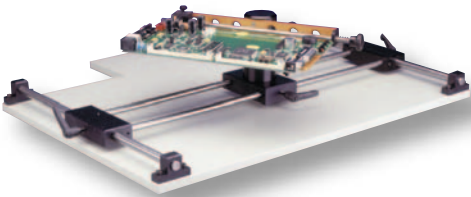
Chipmaster SMT rework engines are available in configurations that include accessories, which provide optimum process control for most SMT applications. All 110V powered accessories connect to 110V outlets on the rear of the Chipmaster.

Precision X-Y Positioning

Tables:

Large X-Y Table 8100-2000

The large X-Y Table is for applications requiring a larger SMT rework area, usually greater than 14" x 16" (355 x 406 mm).



Compact X-Y Table 8100-0002

The "Compact" Chipmaster SMT Rework X-Y Table is the most popular unit for general rework on PCB sizes under 14" x 16" (355 x 406 mm). Precision linear bearings ensure a smooth and positive action.



Frame PCB Holder Options:

8100-0812 8" x 12" (203 x 305 mm)

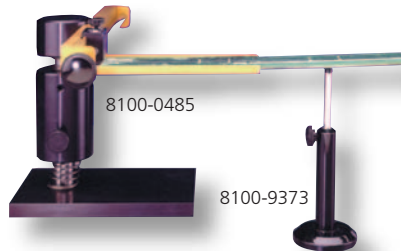
8100-1416 14" x 16" (355 x 406 mm)

8100-2024 20" x 24" (508 x 609mm)

These new PCB Holders provide maximum support and adjustment.

Model 8100-0485

8" x 8" (203 x 203 mm) board holder supplied as standard with all Chipmaster systems, adjustable edge holding forks and Z-axis piston.



Board Point 8100-9373

Bottom board adjustable point height support. Not for use with the Chipmaster-Z

Lighting and Magnification

Halogen Light

Important illumination for component removal and placement, gooseneck flexible extension for exact focusing.

Part #	Description
8100-0598	Halogen Light 110V
8100-0220	Halogen Light 220V



MasterLens Stereo Optics

A precision cast stereo optic for bright glare-free, three-dimensional viewing. Mounts to X-Y Table or workbench. Also available with inspection base.

Part #	Description
8100-0899	MasterLens 110V
8100-0898	MasterLens 220V



Stereo Microscope 8100-0134

A high quality performance bi-optic 12x microscope for general inspection of fine pitch SMT devices—complete with base and stand. Free ranging multi-position articulating arm for optimum focal alignment.



Chipmaster-Z Axis Radiant RAD-6000-Z for Large PCB's and SMT Components

Overview

The Chipmaster-Z Axis Radiant System will rework larger SMT boards and larger chips, or high metal content PCBs requiring additional heat distribution

Rework Larger PCBs Safely

A common problem in reworking larger SMT circuit boards, typically greater than 10" x 12" (254 x 305 mm), is warp during the local heating process. This problem can also be experienced on smaller SMT boards depending upon layer structure and connection distribution.

Stabilized Rework Operation

The Chipmaster-Z Axis Radiant provides a wide area preheat solution, which gradually and uniformly maintains a temperature, sufficient to stabilize the PCB prior to and during the rework operation. This constant total area heat stabilization is not possible with bottom focal heat systems.

High Mass Radiant Energy

The Chipmaster-Z Axis Radiant delivers 144 sq. inches of digitally controlled radiant energy accurate to $\pm 2^\circ\text{F}$, once calibrated. Its cast aluminum surface may be machined for unique profiling for one or more SMT circuit boards.

High Energy, Low Temperature Operation

When integrated with the High Energy, Low Temperature technology of the Chipmaster-Z, the system can rework soft plastic components at less than 410°F (210°C), which would otherwise distort or melt down with conventional machines.

Articulating PCB Holder

8100-2424

The 8100-2424 Frame Board Holder is an important dual-axis mechanism, which positions the PCB over the radiant surface for rework to the circuit board and returns the PCB to its original cool start location for preparation.



Stop Board Warp Dead in its Tracks...



Part #	Description
8000-0009-Z	Radiant Chipmaster Z-Axis System 110V 60 Hz CSA
8000-0010-Z	Radiant Chipmaster Z-Axis System 220V 50 Hz CE

RAD-6000-Z System includes:

8100-1003-Z	Chipmaster-Z (see page 6)
8100-6000	Radiant Preheater 12" x 12" (305 x 305 mm)
8100-2424	Board Holder for Hot Plate
8100-1102	Chipmaster Riser Platform
8100-1103	PCB Holder Riser Platform
8100-0598	Halogen Light 110V
8100-1097	SMD Tool Kit
8100-1649	Nozzle Kit three (3) piece



Specifications:

Chipmaster 8100-1003-Z	110V, 60 Hz CSA
Chipmaster 8100-1023-Z	220V, 50 Hz CE
Power	1200 Watts
Current	10.90 Amp @ 110V, 5.45 Amps @ 220V
Dimension	22.25" x 9.25" x 8.62" (362 x 235 x 219 mm)
Board Holder 8100-2424	24" x 24" (610 x 610 mm)
Nozzles included:	(User may select alternatives)
8100-0000-44	0.80" x 0.80" (20.3 x 20.3 mm)
8100-1424	0.71" x 0.40" (18.0 x 10.2 mm)
8100-1075	1.00" x 0.75" (25.4 x 19.0 mm)
Temperature	Selectable Fahrenheit or Celsius
Air Velocity	<12.7 CFM
Vacuum	Internal Pump
Air Source	Internal Blower
Controller	Fuzzy Logic PID
Hot Plate 8100-6000	110V 60 Hz CSA
Hot Plate 8100-6002	220V 50 Hz CE
Controller	Fuzzy Logic PID
Surface Area	Cast Aluminum 12" x 12" (305 x 305 mm)

Radiant Hot Plate SMD-6000 for PCB Repair

Overview

A Hot Plate system designed especially for the Electronics Industry - Soak, Preheat, Burn In, Reflow, Pull Test & other uses

Radiant Energy

The Radiant Hot Plate has been engineered to provide an efficient High Mass Digitally Controlled Direct Radiant Energy source for "in-process" or "off-line" preheat and bake requirements of SMT components and circuit boards.

Large Area Stability

The Radiant Hot Plate is non-static generating and includes 144 sq. inches of cast aluminum, selected to ensure stability of performance and close tolerance over the surface of the Hot Plate.

Digital Control

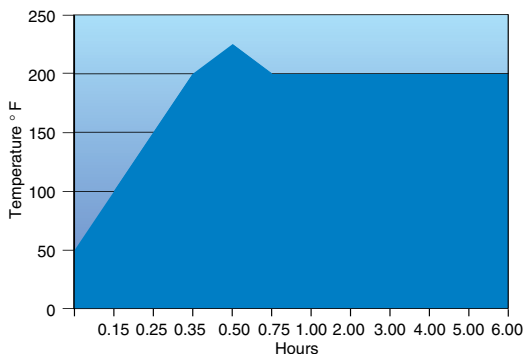
A PID Digital Closed-Loop Programmable Controller measures the temperature feedback via a "K" type thermocouple. A temperature setting may be calibrated and stored within the Controller and once set, will be maintained to $\pm 2^{\circ}\text{F}$.

Safety First

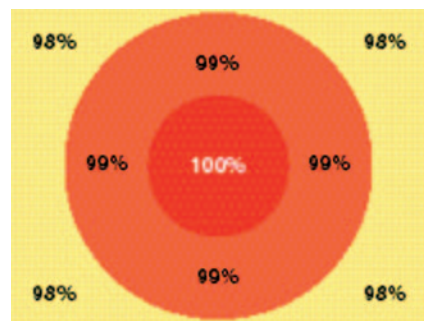
Four (4) Heat Shield Guards are installed to protect the user. The Digital Controller is preset to a maximum of 350°F (176°C), but can be increased upon request. It is recommended that the Hot Plate be placed in a zoned area and a "Caution" notice posted that a hot surface is present.



Temperature Profile Chart



Thermal Imaging of Surface



Specifications:

Dimension:	12" x 6-1/8" x 13" (305 x 156 x 330 mm)
Weight:	17.5 lb (7.9 kg)
Power:	110V-1500 Watts, 220V-1600 Watts, 50/60 Hz
Maximum Temperature:	
Standard Factory Regulated	350°F (177°C) $\pm 2^{\circ}\text{F}$
Special Factory Regulated	700°F (371°C) $\pm 2^{\circ}\text{F}$
Maximum Permitted Weight on top of Hot Plate	40 lb (17.1 kg)
Cord	Three Wire
Heating Element	Ceramic
Controller	PID Fuzzy Logic Digital
Radiant Plate	Cast Aluminum 12" x 12" (305 x 305 mm)
Stabilizing Period	45 Minutes
Timer	Push to start, push to stop
ESD Rating	<0.004V
Safety Shielding	Four (4) Side Guards
Fuse	15 Amps
Switching	Solid-State 430 m/s

Order Information

Part #	Description
8100-6000	Hot Plate 110V 60 Hz
8100-6002	Hot Plate 220V 50 Hz

High Temperature Reflow Hot Plate

Part #	Description
8100-6100	Reflow Hot Plate 110V 60 Hz
8100-6102	Reflow Hot Plate 220V 50 Hz

Chipmaster Bottom Heaters SMD-2000 Series for PCB Rework

Overview

Bottom Heaters are necessary in Lead-Free SMT rework to assist in keeping top reflow conditions to the original manufacturing oven temperatures. The Dragon and Super-Dragon can be used with Chipmaster PCB rework systems.

Dragon Portable Bottom Heat Unit for Chipmaster

A Digital Closed-Loop Temperature Controlled Bottom Heater for use with the Chipmaster SMT rework system. Includes a self-contained blower unit for constant low-velocity high-volume air flow.

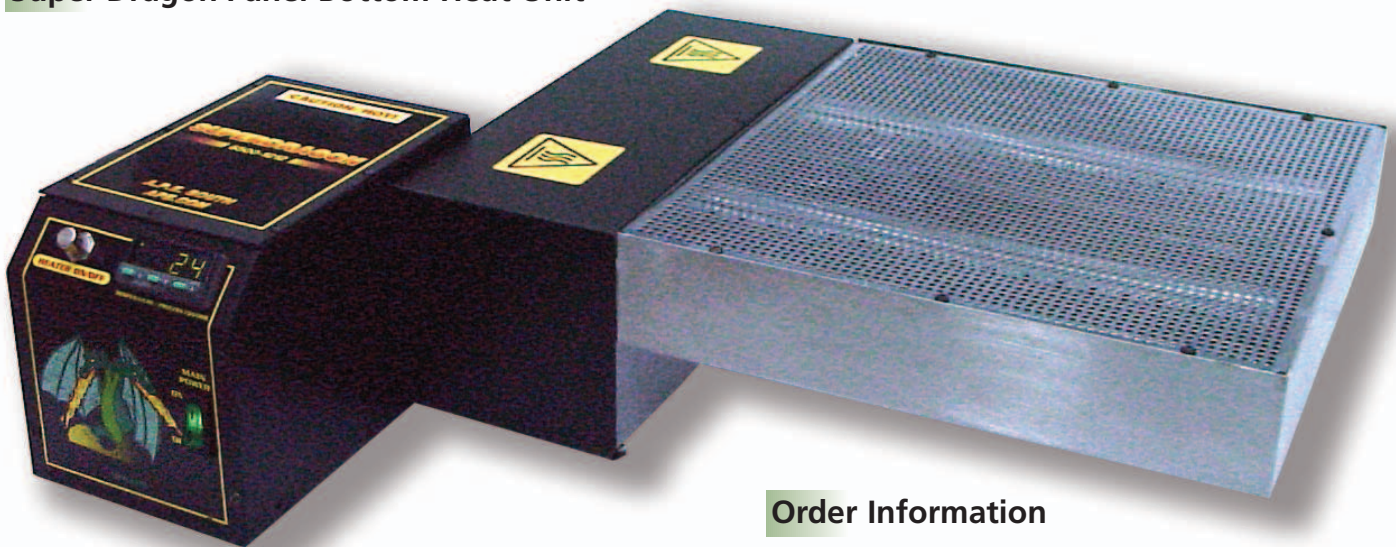
Focused Heat

Temperature may be directly focused using standard nozzles, which are interchangeable. The system is fully guarded throughout the length of the heater arm.

Part #	Description
2000-1000	Dragon Preheat System 110V 60 Hz
2000-1002	Dragon Preheat System 220V 50 Hz



Super-Dragon Panel Bottom Heat Unit



A heavy duty Bottom Panel Heater with a surface area of 12" x 12" (304 x 304mm). A Digital Closed-Loop Temperature Controller maintains the programmed temperature via two high capacity 1200 Watt heaters, making a total of 2400 Watts. This high energy feature enables a lower overall PCB rework temperature to be applied to the work.

Order Information

Part #	Description
6500-1212	Super-Dragon Bottom Heat System available as 220V 60 Hz only
The Super-Dragon can be used with a Chipmaster-Z Axis (P-6) and a 14" x 16" PCB Holder Upgrade. The following Risers are used in the kit:	
8100-1002	Riser for Chipmaster
8100-1003	Riser for 14" x 16" PCB Holder

Flo-Master-Z™ SMD-5000-Z Series for SMT Lead-Free Components

Overview

Flo-Master SMT rework machines provide solutions to reworking large PCB's and larger SMT components. They include handling capabilities that make it easier to work with difficult SMT PCBs.

For Gentle but Powerful Rework

Energy Reflow with Z-Axis

The Flo-Master-Z BGA/SMT rework and repair engine is a fully integrated dual, top and bottom heat system, including an electrically actuated Z-Axis, designed to handle Lead-Free SMT devices, Military-type PCB's and commercial applications that require an efficient level of energy versus temperature.

Bottom Heat

A bottom heat source ensures stability of PCB temperature, reducing the necessary top reflow temperature, thereby following a more precise profile structure for the SMT component undergoing rework.

Latched Top and Bottom Control

The top reflow controller triggers the bottom heater thereby controlling the overall PCB rework process. Each controller is set up independently with its own "profile" and "process time" controls. An important feature is the power available, optimizing the energy performance flowing below and into the PCB, preventing unnecessary overheating.

Order Information

Part #	Description
5000-2000-Z	Flo-Master-Z 110V 60 Hz Focal Bottom Heater
5000-2002-Z	Flo-Master-Z 220V 50 Hz Focal Bottom Heater
8100-0812	PCB Holder 8" x 12" (203 x 305 mm) (included)
8100-1416U	PCB Holder Upgrade 14" x 16" (355 x 406 mm)
8100-2024U	PCB Holder Upgrade 20" x 24" (508 x 609 mm)



Temperature Profiles

A range of SMT temperature profiles are pre-installed for top and bottom controllers. Each thermal profile may be custom programmed, for different SMT combinations of ramp & soak temperature profiling.

Lead-Free BGA Rework

Lead-Free device placement for BGA's requires a Vision/Reflow system for accurate alignment



Specifications:

Power	110V-1800 Watts, 220V-2400 Watts
Current	16.36 Amp @ 110V, 10.91 Amp @ 220V
Dimension	26" x 12.75" x 16" (660 x 324 x 406 mm)
Board Holder Standard	8" x 12" (203 x 305 mm) included
Reflow Nozzles included:	(User may select alternatives)
8100-0000-44	0.80" x 0.80" (20.3 x 20.3 mm)
8100-1424	0.71" x 0.40" (18.0 x 10.2 mm)
8100-0132	1.20" x 1.20" (30.5 x 30.5 mm)
8100-1414	1.40" x 1.40" (35.6 x 35.6 mm)
8100-0000-20	0.50" x 0.50" (12.0 x 12.7 mm)
8100-0000-68	1.10" x 1.10" (28.0 x 28.0 mm)
Preheat Nozzles:	(Fixed Selection)
8100-2222P	2.00" x 2.00" (50.8 x 50.8 mm)
8100-0340P	1.62" x 1.62" (41.1 x 41.1 mm)
8100-0196P	1.50" x 1.50" (38.1 x 38.1 mm)
8100-1313P	1.30" x 1.30" (33.0 x 33.0 mm)
Temperature	Selectable Fahrenheit or Celsius
Air Velocity (Both Heaters)	<12.7 CFM
Vacuum	Internal (Optional Factory Air)
Air Source	Internal
Controller (Both Heaters)	Fuzzy Logic PID Profile Storage
4-Axis X-Y Table Built In	19.0" x 15.50" (482.6 x 393.7 mm)
Operation	Pulsed or Continuous
Maximum Board Size	14" x 20"
Illumination	Halogen Light 8100-0598

Flo-Master II SMD-5002 with extra Power for Large PCB's and SMT Components

Overview

The Flo-Master II includes integrated features for computer profiling of SMT components. The Flo-Master II rework machine should be considered for PCB's greater than 12" x 14" (305 x 356 mm). The standard Flo-Master II model includes a 14" x 16" (355 x 406 mm) PCB Holder. A 20" x 24" (508 x 609 mm) PCB Holder is available as a standard upgrade option.

Multiple Profile Storage

The Flo-Master II Reflow Controller uses a state of the art On-Board-Computer, which rapidly calculates a temperature environment. The Computer Controller stores sixteen (16) profiles each with sixteen (16) segments for temperature ramp and soak instructions. Profiles may be programmed directly using the keypad. Alternatively, unlimited profiles can be generated with an external computer and "uploaded" by the optional Windows-compatible Graphical Display Program.

Simple Operation

An SMT profile pattern can be run by simply selecting the "Run" key on the Controller. The entire process is controlled so that the operator need not be in attendance during the reflow process.



Ordering Information

Flo-Master II

Part #	Description
5000-1500	Flo-Master II Focal Bottom Heat Heat 110V 60 Hz
5000-1502	Flo-Master II Focal Bottom Heat Heat 220V 50 Hz
5000-6002	Flo-Master II Panel Bottom Heat 220V 50/60Hz
8100-2024U	PCB Holder Upgrade 20" x 24" (508 x 609 mm)
7000-1250	Optional Windows Graphical Software

Board Holders:

8100-0812	8" x 12" (203 x 304 mm)
8100-1416	14" x 16" (355 x 406 mm) Included with Flo-Master II
8100-2024	20" x 24" (508 x 610 mm) (upgrade)

Underboard Heating

The Flo-Master II underboard heater is automatically controlled by the top Reflow Controller. An output signal starts the bottom heat cycle and automatically switches it off after the reflow cycle.

Flo-Master II specifications:

Flo-Master II Focal Heat Power	2400 Watts 220V 50/60 Hz 15 Amps
Flo-Master II Panel Heat Power	3600 Watts 220V 50/60 Hz 20 Amps
Flo-Master II Panel Heat Dimension	8" x 10" (203 x 254 mm)
Flo-Master II Board Holder (included)	8100-1416, PCB size 14" x 16" (355 x 406 mm)
Flo-Master II Board Holder Upgrade Option	8100-2024, PCB size 20" x 24" (508 x 609 mm)
Flo-Master II Dimension	20.5" x 22" x 29" (521 x 559 x 737 mm) H x W x D
Reflow Nozzles included	See page 11 and page 22 for complete Nozzle Options
Preheat Nozzles included (Focal Heat only)	See page 11
Temperature	Celsius, Fahrenheit Selectable
Reflow Air Velocity	12.7 CFM
Component Vacuum Pickup	Internal Venturi Pump
Factory Air for Z-axis	80 psi
Controller Bottom Heat	Four (4) Bottom Heat Temperatures Stored
Air Flow	Up to 1 CFM
Weight	70lbs (154 Kilos)
Automated Z-Axis	Travel 3" (75 mm)
X-Y Table mounted	Sleeve Bearing
On-Board-Computer reflow	Sixteen (16) Profiles, (16) Segment PID
Computer Interface	RS422/RS232
Optional Computer Graphic Programming	Specview GDW control
Computer Operating System	Windows 2000/XP
Data Logging	Adobe Acrobat 6.0 (not supplied)



Liberty Split Vision Rework Systems for SMT/BGA Rework

The Liberty series Bandit (110V) and Sharpshooter (220V) are, simple to operate, Vision Placement rework machines that include a Temperature Profile Controller. Machines may be configured as a single Top Heater reflow system or with an integrated Bottom Heater. The Liberty series is designed for flexibility and for a budget conscious user. The system is also available as a Vision system only. Systems configured with a Bottom Heater are suitable for Lead-free BGA & SMT rework

Liberty Series

The Bandit 110V and Sharpshooter 220V are identical machines that include a manual component placement arm with a final precision touch-down stage. The Liberty series is designed for SMT PCB sizes up to 14" x 16."

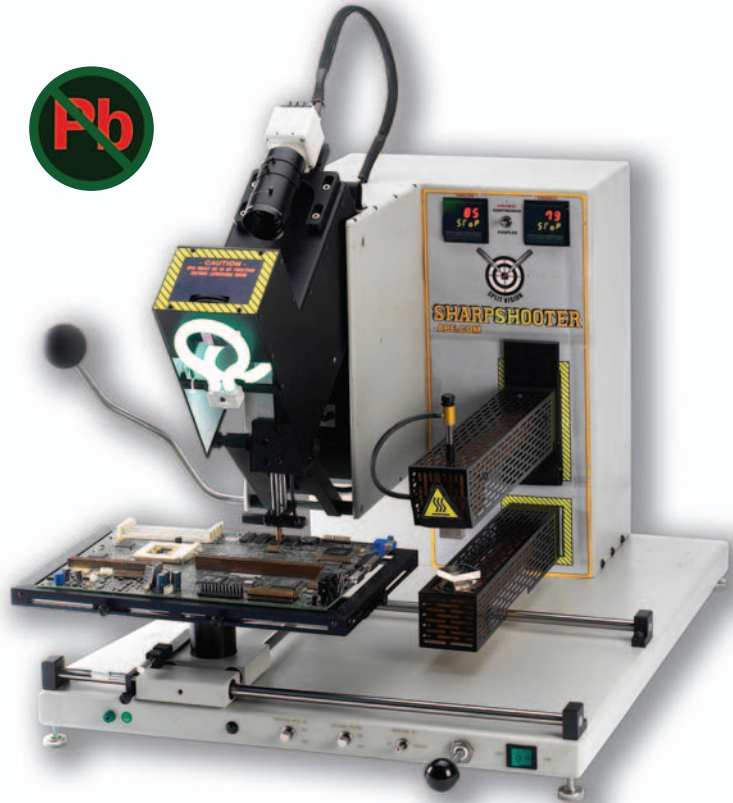
XY Table

The basic model 7500-1000 is equipped with a free standing 8" x 12" Frame PCB Holder with a Teflon coated base for easy positioning (see below). The model 7500-1500 includes the same Frame PCB Holder but mounted on linear rails, (see Sharpshooter photo adjacent).

Profile Storage Controller

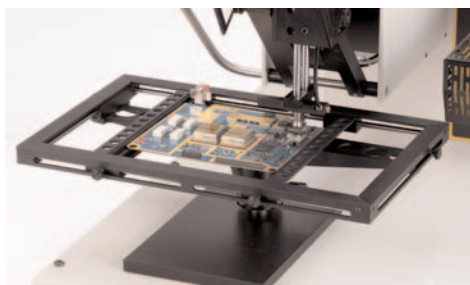
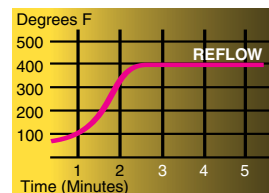
A dual system of Microprocessor Profile Storage Controllers provide high throughput SMT rework conditions, optimizing performance and generating soak/ramp SMT/BGA profiles without a computer accessory.

These Top Reflow and Bottom Pre-Heat Controllers are electrically coupled and include Integrated Digital Timers, Digital Closed-Loop sensing and an optimum process with repeatability <2% of set point temperature °F and °C selectable



Order Information

Liberty series Part #	(Pb = Lead-Free compliant) Description
7500-1500 Pb	Complete Vision Bandit Top/Bottom Heater 110V 60Hz
7500-1502 Pb	Complete Vision Sharpshooter Top/Bottom Heater 220V 50Hz
7500-1000	Bandit Top Heater installed only 110V 60Hz
7500-1002	Sharpshooter Top Heater installed only 220V 50Hz
7500-0250	Bandit Vision system only (no Heaters) 110V 60Hz
7500-0252	Sharpshooter Vision system only (no Heaters) 220V 50Hz
8100-1416	Optional Frame PCB Holder 14" x 16"



Basic Free Standing PCB Holder supplied with 7500-1000 and 7500-1002 machines

Liberty Series Specification:

Power Top Heater	110–220V 1200 Watts
Power bottom Heater	600 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
Standard PCB Holder	Frame 8" x 12" (203 x 304 mm)
Reflow Nozzles included	Three Nozzles of Choice
Preheat Nozzles included	Two included
Temperature	Select Celsius or Fahrenheit
Reflow Air Velocity	Internal Motor <12.7 CFM
Component Pick Up Controller	Internal Pump -Shop Air option
Monitor for Lightning	On Board PID Computers
Board Alignment	13" Color Display
Reflow Operation	Micrometer Controls
Weight	Close Loop 125 lb (56.81kg)

Intruder Lightning Split Vision SMT/BGA Rework

There are two variations in the Intruder series, both are suitable for Lead-Free SMT & BGA rework: The Intruder-Lightning model 7500-5000 (as shown) has a Focal Bottom Heater whereas the Intruder-Marksman 7500-7500 has a Panel Heater. Each SMT/BGA rework machine includes a manual component placement arm with a final precision SMT component touch-down stage. Programming and reflow functions are identical to the Sniper series of SMT/BGA rework systems.

Thermocouples placed for SMT/BGA profile development



Profile Pattern Generation

The Intruder-Lightning SMT/BGA rework system includes an On-Board-Computer, which is programmed and operated using an integral keypad. The machine can also be controlled via an RS232 connection from an external computer.

Graphical Display Window (GDW) 7000-1250

External Computer profile and operation software is optional on the Intruder-Lightning. The software operates in a Windows-based environment. SMT/BGA Profile Pattern Recipes are easily created, stored, recalled, and edited using a Graphical Display Window (GDW). Programs are automatically uploaded to the Intruder controller. Any number of SMT/BGA rework profiles may be stored for future recall.

Thermocouple (TC) Bank

The integrated TC Bank provides 4 Thermocouple outputs, which can be used to develop a profile pattern, when used with the external computer software 7000-1250, (optional with the Intruder-Lightning). Note that the TC Bank is used for profile development and need not be used in production.

Order Information

Part #	Description
7500-5000	Intruder Lightning 110V 60Hz
7500-5002	Intruder Lightning 220V 50Hz
7000-1250	Optional Computer Software

Intruder-Lightning Specification:

Power	110-220V 1800 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
PCB Holder Lightning	Frame 8" x 12" (203 x 304 mm)
PCB Holder Upgrade	Frame 14" x 16" (355 x 406 mm)
Reflow Nozzles included	Three Nozzles of Choice
Bottom Nozzles	Two included
Temperature	Select Celsius or Fahrenheit
Reflow Air Velocity	Internal Motor <12.7 CFM
Component Pick Up	Internal Pump -Shop Air option
Profile Controller	On-Board-Computer 16 profiles
External Profile Generation	Pentium IV with 17" Monitor (option)
Monitor	13" Color Display
Program Development	Thermocouple Bank (4 x TC)
Board Alignment	Micrometer Controls
Reflow Operation	Close Loop
Maximum Board Size	14" x 16" (355 x 406 mm)
Weight	125 lb (56.81kg)
Communication	RS232 Sniper II Only
Operational Software	Option 7000-1250



Intruder Marksman Split Vision PCB Rework System

The Intruder-Marksman 7500-7500 has a Panel Bottom Heater and is recommended for larger PCB's, particularly when assemblies are manufactured using Lead-Free materials. The machine includes a manual component placement arm with a final precision SMT/BGA component touch-down stage. Programming and reflow functions are identical to the Sniper series of SMT/BGA rework systems, generating SMT "Ramp-Soak" Profile Patterns using graphical software supplied.



On-Board-Computer

Profile Pattern Generation

The Intruder-Marksman includes an On-Board-Computer, which is programmed and operated using an integral keypad. The system can also be controlled via an RS232 connection from an external computer.

Graphical Display Window (GDW) 7000-1250

External Computer software is included with Intruder-Marksman. The software operates in a Windows-based environment. Profile Pattern Recipes are easily created, stored, recalled, and edited using a Graphical Display Window (GDW). Programs are automatically uploaded to the Intruder controller. Any number of profiles may be stored for future recall.

Thermocouple (TC) Bank

The integrated TC Bank provides 4 Thermocouple outputs, which can be used to develop a profile pattern, when used with the external computer software 7000-1250.

Note that the TC Bank is used for profile development and need not be used in production.

Order Information

Part #	Description
7500-7500	Intruder Marksman 110V 60Hz
7500-7500	Intruder Marksman 220V 50Hz

Intruder-Marksman Specification:

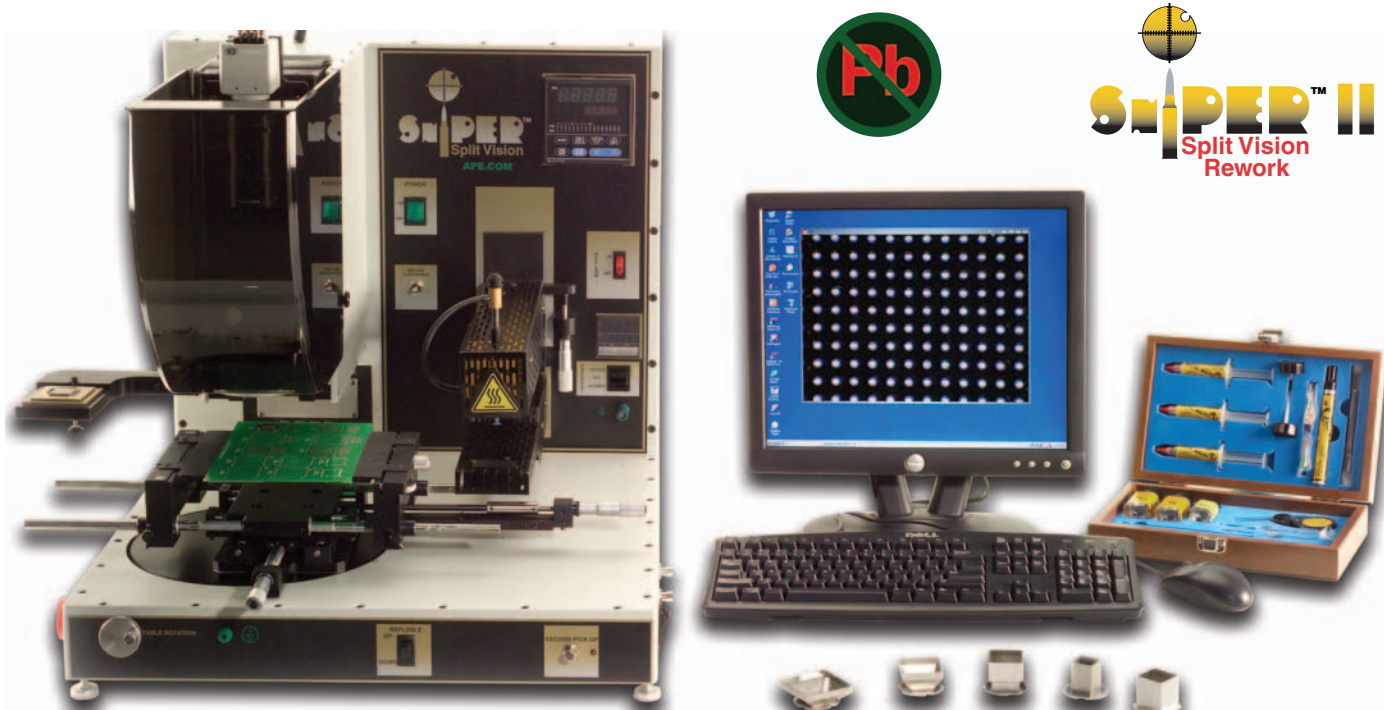
Total Power	110-220V 2100 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
PCB Holder Lightning	Frame 8" x 12" (203 x 304 mm)
PCB Holder Marksman	Frame 14" x 16" (355 x 406 mm)
Reflow Nozzles included	Three Nozzles of Choice
Bottom Heater	Panel Heater 900 Watts
Temperature	Select Celsius or Fahrenheit
Reflow Air Velocity	Internal Motor <12.7 CFM
Component Pick Up	Internal Pump -Shop Air option
Profile Controller	On-Board-Computer 16 profiles
External Profile Generation	Pentium IV with 17" Monitor
Program Development	Thermocouple Bank (4 x TC)
Board Alignment	Micrometer Controls
Reflow Operation	Close Loop
Maximum Board Size	14" x 16" (355 x 406 mm)
Weight	125 lb (56.81kg)
Communication	RS232
Operational Software	7000-1250 included



Sniper II Split Vision Rework System SMD-7007 for SMT/BGA PCB Rework

Overview

The Sniper II is a rigidly constructed automatic SMT/BGA placement system designed for high production SMT Lead-Free rework environments. One station of the Sniper II removes the SMT device, the other station places a new component. A monitor reflects the image of the bottom of the SMT chip and the footprint on the PCB. These are then adjusted to exactly overlay each other and the SMT/BGA component placed automatically. The SMT component is then reflowed.



Energy Reflow

The Sniper II SMT Rework system combines the unique Energy Reflow operation of the Flo-Master with the latest technology in optic engineering and alignment design. These features provide control in positioning SM, BGA, ultrafine pitch, Micro BGA, QFP, and CSP's (Chip Scale Packages), together with large ceramic or plastic BGA devices.

Vacuum Pick-Up

A Venturi Vacuum Pick-Up system supports the SMT/BGA component during alignment and automatically snap releases the component during placement.

Order Information

Part #	Description
7007-5001	Sniper II 110V 60Hz
7007-5002	Sniper II 220V 50Hz
7000-2500	Macro Imager

Precision

Once aligned, the component is automatically positioned by pneumatic control, lifting the camera system clear of the placement vector. A Vertical Placement Drive (VPD) accurately orients the SMT component to the contact land pattern.

Programming and Operation

The Sniper II includes an On-Board Computer and an external Pentium IV computer with color monitor. Programs are generated using Graphical Display Window Software (GDW). Programs are uploaded to the On-Board-Computer.

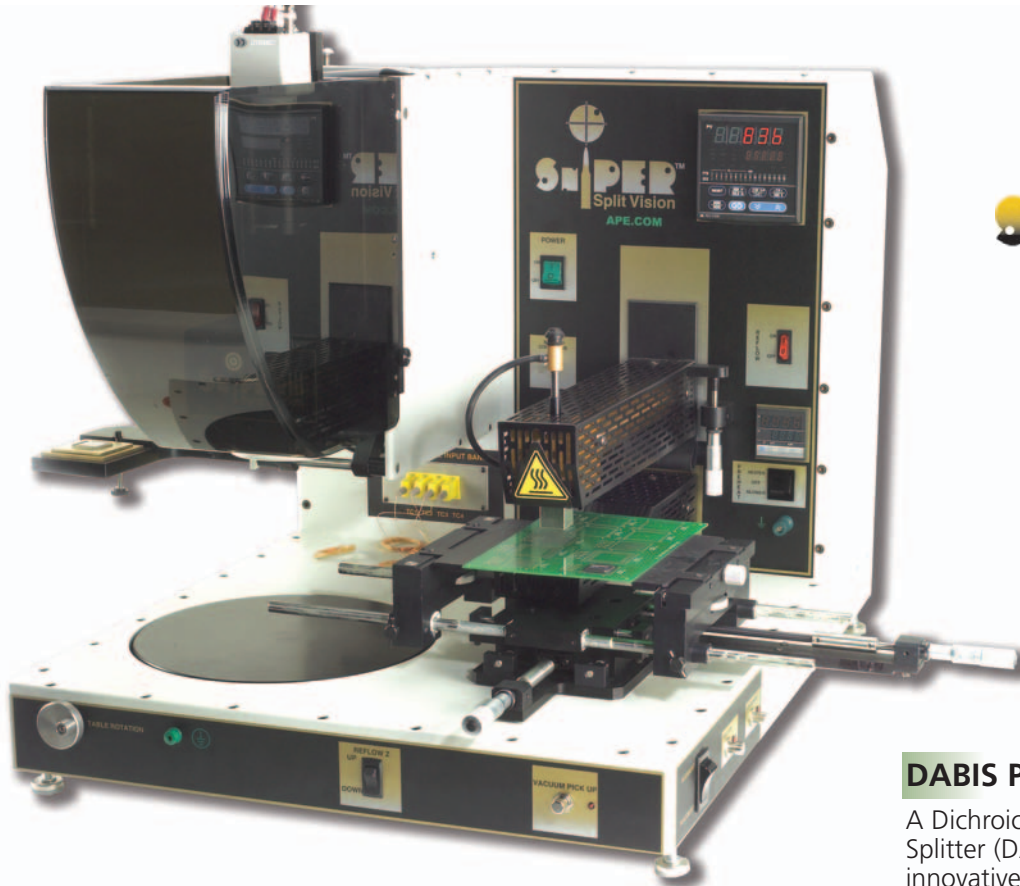
Sniper II Specification:

Power	110-220V 1800 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
PCB Holder Standard	12" x 16" (305 x 406 mm)
Reflow Nozzles included	See Flo-Master, page 11
Preheat Nozzles included	See Flo-Master, page 11
Temperature	Select Celsius or Fahrenheit
Reflow Air Velocity	Internal Motor <12.7 CFM
Component Pick Up	Venturi Generator Reflow & Imaging
Factory Air	60-80 psi for Placement System
Board Alignment	Micrometer Controls
Reflow Operation	Pulsed or Continuous
Maximum Board Size	16" x 20" (406 x 508 mm)
Maximum component size	2" x 2" (50.8 x 50.8mm)
Air Flow	Up to 1 CFM
Weight	165 lb (75 kg)
Communication	RS232
Controller	On-Board-Computer
Profile Generation	Pentium IV with 17" Monitor
Operational Software	On-Board-Computer & Specview GDW



Sniper III Split Vision Rework System for SMT/BGA PCB Rework

The Sniper III is the latest in BGA and Micro BGA, Lead-Free SMT rework system design. With On-Board-Computer control and profile generation. The system also includes a Thermocouple-Bank to develop the SMT rework profile and monitor the component and environment. A monitor reflects the image of the bottom of the chip and the footprint on the PCB, these images are then adjusted to exactly overlay each other and the SMT/BGA component placed automatically.



Programming and Operation

The Sniper III includes an On-Board Computer and an external Pentium IV computer with 17" color monitor. Programs are generated using Graphical Display Window Software (GDW) and are uploaded to the Sniper On-Board-Computer. A Thermocouple Bank provides four thermocouples to develop SMT/BGA profile pattern programs.

The On-Board-Computer can run programs independent of an external computer.

Order Information

Part #	Description
7750-0033	Sniper III 110V 60Hz
7750-0034	Sniper III 220V 50Hz
7000-2500	Macro Imager

DABIS Prism

A Dichroic Alignment Beam Image Splitter (DABIS) is a contemporary innovative refinement in imaging dual fields using a split prism to enhance and clarify the image.

Sniper III Specification:

Power	110-220V 1800 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
PCB Holder Standard	12" x 16" (305 x 406 mm)
Reflow Nozzles included	See Flo-Master Page 11
Preheat Nozzles included	See Flo-Master Page 11
Temperature	Select Celsius or Fahrenheit
Reflow Air Velocity	Internal Motor <12.7 CFM
Component Pick Up	Venturi Generator Reflow & Imaging
Factory Air	60-80 psi for Placement System
Reflow Operation	Close Loop
Maximum Board Size	16" x 20" (406 x 508 mm)
Maximum component size	2" x 2" (50.8 x 50.8mm)
Air Flow	Up to 1 CFM
Weight	165 lb (75 kg)
Communication	RS232 Sniper II Only
Controller	On-Board-Computer
Profile Generation	Pentium IV with 17" Monitor included
Operational Software	On-Board-Computer and Specview Graphic Display
Profile Pattern Development	Thermocouple Bank with 4 Thermocouples



Sniper-WB "Wide Body" Split Vision Rework System for SMT/BGA Rework

Overview

The Sniper-WB is a higher-powered machine designed to handle large PCBs with SMT/BGA components requiring special attention. Large PCBs and larger SMT components require careful underboard heating, covering a wide area to avoid warping. The Sniper-WB includes a 3600 watt convection Hot Air Panel Heater for a total of 4800 watts including reflow.

Sniper-WB

The Sniper-WB Wide Body will rework PCBs as small as 2" x 2" and as large as 20" x 24" (508 x 610 mm) {larger on special request}. Its powerful under board heater stabilizes the entire PCB and gently neutralizes the warping of large PCB surface areas. This is achieved by a 3600 Watt high energy convection Panel Heater and a 1200 Watt Reflow Heater, total energy is 4800 Watts.

Low Temperature Benefits

The high energy capacity of the Sniper-WB reduces the temperature required to reflow. This feature is important in reworking TBGA components. The surface of these components are often metal and can warp if exposed to high temperatures for extended periods. Once the chip is warped it cannot recover.

Many other SMT components can benefit from this feature, CCBGA, PBGA and large QFP packages all demand simultaneous collapse and moderate reflow temperatures.

Thermocouple (TC) Bank

The integrated TC Bank provides 4 Thermocouple outputs, which can be used to develop an SMT profile pattern, when used with the external computer software (7000-1250) provided. Note that the TC Bank is used for profile development and need not be used in production.

Programming and Operation

The Sniper-WB includes an On-Board Computer and an external Pentium IV computer with 17" color monitor. Programs are generated using the Graphical Display Window Software (GDW) included. Programs are uploaded to the On-Board-Computer.

Rework patterns can either be run from the external computer or from the On-Board-Computer.



Axis Adjustment

Micrometer XYZ adjustment is provided on the Board Holder with a motorized Theta axis switch control. Theta in this manner is always "true" and referenced to the SMT/BGA component not the PCB.

Order Information

Part #	Description
7007-7007	Sniper-WB 220V 50/60Hz (220V Model only)

Sniper-WB Specifications:

Total Power	220V 50/60 Hz 4800 Watts
Current	22 Amps, Operational 30 Amps
Dimension	32.63" x 22.75" x 33" (828.80 x 577.85 x 838.20 mm)
PCB Holder	20" x 24" (508 x 610 mm)
Reflow Nozzles included	See Flo-Master Page 11
Bottom Heater	12" x 12" (305 x 305mm) 3600 Watts Forced Convection
Temperature	Celsius or Fahrenheit Selectable
Reflow Air Velocity	12.7 CFM
Component Vacuum Pick-Up	Venturi
Factory Air	80 psi Dry Regulated
Reflow Control	On-Board-Computer 16 Profiles
Bottom Controller	PID Fuzzy Logic 4 Profiles
Alignment	XY Table with Z-Axis
Component Theta	Motorized
Air Flow	1 CFM per operation
Weight	120 lbs (54.55 Kilos)



Sniper II, Sniper III & Sniper Wide-Body Split Vision Rework System features

Look Up Look Down

The DABIS Prism permits the contact array of the SMT/BGA component to be viewed from the underside and superimposed over an image of the contact land pattern on the PCB.

Component Alignment

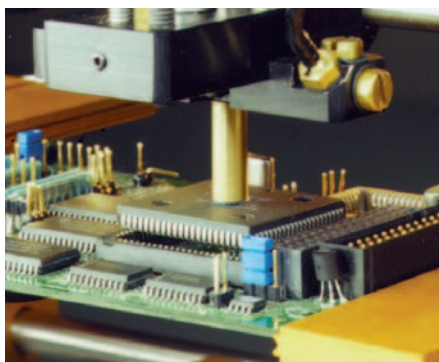
Precision Micrometers align the two lead patterns; the camera's zoom and focus are adjusted to comfortably align and view the PCB and SMT component on the monitor.

Focus and Split

Using a prism simplifies the alignment procedure and ensures repeatability during continuous operation. It is also possible to view many different types of SMT components without additional setup. To view the diagonal corners of very large SMT components, an optional Macro Imager 7000-2500 can be inserted when required.

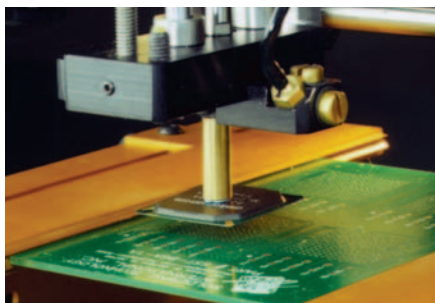
Vertical Placement Drive (VPD)

When placing delicate components to fine tolerances, emphasis on stability of engineering is a priority, the reinforced VPD provides a stable final positioning operation, and is adjustable in the Z-axis for pressure sensing.



Thermal Tracer (Sniper II option)

- 8300-9660 Thermal Tracer Software and PCMCIA Card. Includes five (5) Sensors
- 8300-9661 PCMCIA ISA Card Reader



Rotary/Staged Vacuum Board Holder

Sniper II and Sniper III machines include a standard 12" x 16" (305 x 406 mm) vacuum actuated Board Holder, which quickly glides to position. Precision micrometers adjust in X- and Y-axis and the Rotary/Staged feature of the table provides "Theta." Optional PCB Holder Kits are available for smaller and larger Circuit board types.



Thermocouple (TC) Bank Sniper III & Sniper Wide-Body only

Thermocouples are used to develop a SMT Rework Thermal Profile. Placing thermocouples strategically in and around the component environment during the creation of a profile will assure an optimum profile pattern for the rework process. Note that the TC Bank is used for development and need not be used in production.

Thermal Tracer for Sniper II

An optional Thermal Tracer tracks up to six (6) sensors. The sensors are used to develop a "Profile Pattern Recipe," indicating actual PCB temperatures during the SMT rework process. The 8300-9660 is supplied as a PCMCIA Card for insertion in a laptop or within the Card Reader option. For more details see page 33.

On-Board Computer

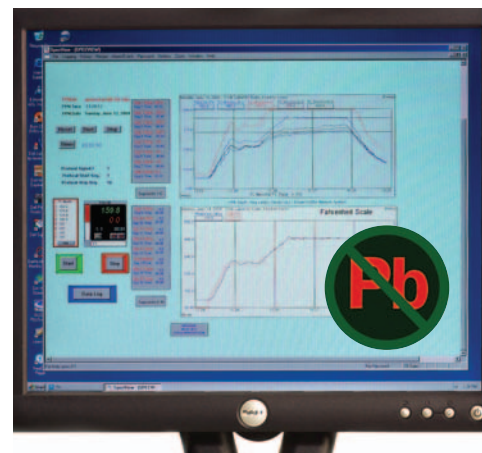
All systems can be operated without an external computer directly from the On-Board-Computer. This controller can run pre-programmed Profile Patterns. The Bottom Heater is automatically controlled by the on-board computer ensuring complete process control.

Profile Control

The On-Board-Computer stores up to sixteen (16) multi-segment (Ramp & Soak) profiles. Any number of profiles may be stored on the PC. Programs can be created and entered directly on the Top Reflow Controller keypad or created using the PC and Graphical Display software (included). Data Logging of events is provided in PDF format. The SMT rework cycle is automatically controlled and shut off after completion.

Graphical Display Window (GDW)

The computer software operates in a Windows-based environment. Profile Pattern Recipes are easily created, stored, recalled, and edited using a Graphical Display Window (GDW).



Essential Supplies for SMT Rework and Repair

Aids for Rework and Repair

A key ingredient to successful SMT/BGA PCB repair is to use a system of high quality cleansing and preparation materials to remove and replace an SMT component. APE SMT rework products have been specifically formulated for SMT rework and their use will assist in a professional reconstruction.

Rework SMT Tool Kit 8100-1097

The 8100-1097 SMT Tool Kit has been especially formulated for Motorola, and includes a special blend of tools and materials, providing the highest quality SMT rework possible.



SMT Kit includes:

- Dental quality probes
- SMD pad prep cleaner pen
- Tweezers for efficient SMT component handling
- Assorted SMT flux and fluid dispensing needles
- Solder wick gun
- No-clean BGA Liquid Flux solution
- No-clean rework formulated flux
- Double sided flux and PCB prep brush

Part #	Description
8100-1097	SMT Tool Kit

Consumable Rework Materials:

No-clean SMT Flux Paste Kit

APE No-Clean SMT Flux is a high-quality especially formulated material and is the choice of many professionals to ensure a successful rework procedure. Ideal for Lead-Free SMT rework processes.



Part #	Description
8200-1310	Flux Paste Kit with 8 x 5cc syringes
8200-1325	Flux Paste Kit with 25 x 5cc syringes
8200-1327	Flux Paste Kit with 100 x 5cc syringes



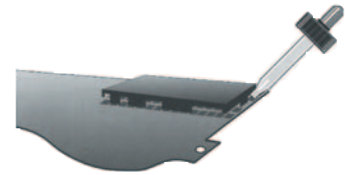
Essential Supplies for SMT Rework and Repair

No-Clean SMT Rework Liquid Flux Wetting Solution Kit



Liquid Flux Solution Kit

- BGA Preparation
- BGA Installation
- Oxidation Removal
- Hot Air Reflow



Part #	Description
8200-1330	BGA Liquid Flux Solution with 6 – 1 oz. bottles
8200-1331	BGA Liquid Flux Solution with 8 pen kit
8200-1335	BGA Liquid Flux Solution with 48 – 1 oz. bottles

PCB SMT Rework Pad-Prep Pen Kit



SMT Rework Pad Prep Kit

- Pad Cleaning
- Conformal Coating Removal
- General Cleaning

Part #	Description
8200-1350	SMT Pad Prep Pen Kit (organic) with 8 pens
8200-1361	SMT Cleaning Solution (organic) with 8 – 1/2 oz. bottles

No-Clean SMT Solder Paste kit



No-clean SMT Solder Paste Kit

- QFP, PLCC, LCC Pad Prep
- Tin BGA Pads
- PA Pad Prep



Part #	Description
8200-1320	No-clean SMT Solder Paste Kit with 8 – 5cc syringes
8200-1322	No-clean SMT Solder Paste Kit with 25 – 5cc syringes
8200-1323	No-clean SMT Solder Paste Kit with 100 – 5cc syringes



Wick Gun Kit

- BGA, C-5 Pad Prep
- General Light Desoldering

Part #	Description
8200-1305	Wick Gun Kit with 5 cartridges
8200-1306	Wick Gun Only



SMT Consumables Kit

- General SMT Assortment of Kit Supplies

Part #	Description
8100-2300	General Consumable Kit

The SMT Nozzle Page

Inches	Millimeters	Part Number	Component Suggestion
0.25 x 0.25	6.3 x 6.3	8100-0008	SOD 80, SOIC 8, SMI Rectifier Chip Caps, Chip & MELF Resistors
0.30 x 0.40	7.6 x 10.2	8100-0016J	D-Pak, SO 14, Tant Caps, SOL 16J, SOIC 16, SOIC 14
035 x 0.50	8.9 x 12.7	8100-0020J	SOLIC 16, PLCC 20, SILIC 20, PLCC 18
0.40 x 0.45	10.2 x 11.4	8100-0018J	SOL 18J, SOM 16, D-Pak, SOL 16J, Tant Caps
0.50 x 0.50	12.7 x 12.7	8100-0000-20	PLCC 20, TQFP 44,52,64,80, UTQFP 32,48, JEDI 20 PIN
0.50 x 0.40	12.7 x 10.2	8100-0504	TSSOP 8, SOL 18J,SOIC 16, SOM 16, SOL 4, Tant Caps
0.50 x 0.95	12.7 x 24.1	8100-0024J	TSOP 32, SOL 24J
0.60 x 0.60	15.2 x 15.2	8100-0000-28	MGBA 88, Flat Pack 16, PLCC 28, TQFP 64
0.60 x 0.70	15.2 x 17.8	8100-0000-32	TQFP 80. CHERPACK 24
0.65 x 1.00	16.5 x 25.4	8100-0640	SOP 64
0.70 x 2.00 x 0.25	17.8 x 51.0 x 6.3	8100-0101PA	Two-Way Radio Power Amplifier
0.71 x 0.40	18.0 x 10.2	8100-1424	IC PIN 14, 16, 18, 20, 24, TSOP 32
0.80 x 0.40	20.3 x 10.2	8100-0804	QFP 80, 128, CF 220T
0.80 x 0.80	20.3 x 20.3	8100-0000-44	CBGA 121, TQFP 50, 100, PLCC 44, JEDI 44, UTQFP 52
0.80 x 0.80	20.3 x 20.3	8100-8118	RF Screen Nozzle with Baffle
0.83 x 0.83	21.1 x 21.1	8100-0080Q	QFP 80, CBGA 196, TQFP 100, UTQFP 64, PLCC 44
0.90 x 0.90	22.9 x 22.9	8100-0000-52	BGA 117, 121, QFP 64, 80, 52, PLCC 52
0.95 x 0.95	24.1 x 24.1	8100-0100Q	CBGA 256, TQFP 144, 176, 184, QFP 100
1.00 x 0.75	25.4 x 19.0	8100-1075	
1.10 x 1.10	28.0 x 28.0	8100-0000-68	CBGA 361, TBGA 432, TBGA 240, PLCC 68
1.20 x 1.20	30.5 x 30.5	8100-0132	BGA 169, QFP 132, TQFP 160, 176, BQFP 132
1.30 x 1.30	33.0 x 33.0	8100-1313	BGA 225, 240, 256, PGA 121, PLCC 84
1.35 x 0.50	34.3 x 12.7	8100-2460	
1.40 x 1.40	35.6 x 35.6	8100-1414	BQFP 114, 160, 184, 256, QFP 208
1.50 x 0.72	38.1 x 18.3	8100-1572	
1.50 x 1.50	38.1 x 38.1	8100-0196Q	BGA 313, 396/400, CBGA 240, QFP 196, 120, 136, 160, BQFP 208
1.50 x 1.75	38.1 x 44.4	8100-5175	RF Screen Nozzle with Baffle
1.60 x 1.60	40.6 x 40.6	8100-0161	BGA 364/400
1.62 x 1.62	41.3 x 41.3	8100-0340	TBGQ 736, BGA 340, QFP 184
1.665 x 0.70 x 0.70	42.3 x 17.8 x 17.8	8100-EDGE-0160	32 Lead Double-Sided Connector Nozzle
1.665 x 0.90 x 0.70	42.0 x 22.9 x 17.8	8100-EDGE-016B	32 Lead Double-Sided Nozzle, with one end closed
1.90 x 0.75	48.3 x 19.0	8100-1978	
2.00 x 0.75	51.0 x 19.0	8100-0028	SOD 80, SOL 28J, Diode SOIC 8
2.00 x 2.00	51.0 x 51.0	8100-2222	BGA 540, BGA 1013, Pentium Socket
2.60 x 0.70	66.0 x 17.8	8100-0267	
2.76 x 0.70 x 0.65	70.1 x 17.8 x 16.5	8100-EDGE-027	54 Lead Double-Sided Nozzle, with both sides open
2.76 x 0.90 x 0.65	70.1 x 22.9 x 16.5	8100-EDGE-027B	54 Lead Double-Sided Nozzle, with one end closed
4.00 x 0.45	101.6 x 11.4	8100-4045	
4.16 x 0.68 x 0.68	105.8 x 17.4 x 17.4	8100-EDGE-0410	82 Lead Double-Sided Nozzle, with both sides open
4.16 x 0.88 x 0.70	105.8 x 22.4 x 17.8	8100-EDGE-041B	82 Lead Double-Sided Nozzle, with one end closed
Nozzle Kit		8100-1649	3 Piece Kit—User selects from any of the above
Nozzle Kit		8100-1650	6 Piece Kit—User selects from any of the above
4.00 x 4.00	100 x 100	8100-0404P	Panel Nozzle

SMT Solder and Tweezer System EX-755

Dual Operation

An advanced compact digital controlled production soldering and SMD component rework system, suitable for high-capacity soldering and temperature-regulated installation and removal of PLCC/SOIC types, together with chip resistors and capacitors.

Autotune

Programmable digital Autotune controllers provide continuous regulated temperature control for the soldering and "Chip Tweez" modules, with operating temperatures easily visible in large clear LED displays.

System Includes:

- 6910-2700 Sensor Soldering Iron 60 Watt, 24V
- 6000-2400A Tweezer 80 Watt, 24V
- 3550-0600 Cleaning Station Holder
- 3550-6000 Tweezer Holder
- 6000-0286 Handpiece Insulator
- 1212-2311A Tweezer Chip Tip
- 1212-2701 Iron Tip 1/32" Conical
- 0700-0700 Manual



Specifications:

Dimension	10.20" x 8.50" x 4.75" (25.90 x 21.60 x 12.00 cm)
Weight	14.5 lb (6.58 Kg)
Range	450 to 900°F (232 to 482°C)
Idle	2°F
Switching	Zero Voltage Thyristor

Model Part # Description

EX-755	0755-0002	Dual System 60 Hz 110V
EX-755	0755-2000	Dual System 50 Hz 220V

Safety Rating:

USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE

Digital Tweezer System SMD-625

Thermal Control

The SMD-625 is a closed loop thermal control SMT "Chip Tweez" rework system providing digital controlled installation and removal of small PLCC/SOIC type components together with chip resistors and capacitors.



System Includes:

- SMD-625 Power Source
- 6000-2400A Thermal Tweezer Handpiece
- 6000-0286A Tweezer Handle Insulator
- 3550-6000 Tweezer Holder
- 1212-2311A Tip Pair for Chip Devices

Model Part # Description

SMD-625	0625-2400	Chip Tweez 60 Hz 110V
SMD-625	0625-2402	Chip Tweez 50 Hz 220V

Optional Tips:

1212-2311A	Tip Pair for Chip Component (Included)
1212-2310A	Tip Pair SOT 23/143
1212-2308A	Tip Pair SOIC 8
1212-2314A	Tip Pair SOIC 14
1212-2316A	Tip Pair SOIC 16
1212-2320A	Tip Pair SOIC 20
1212-2324A	Tip Pair SOIC 24

6000-7700 Tip Retaining Screw, Pack of 10

Specifications:

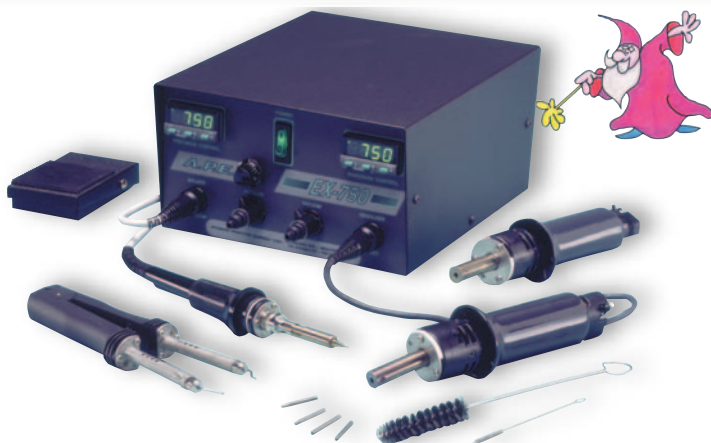
Dimension	6.00" x 5.00" x 2.75" (15.24 x 12.70 x 6.98 cm)
Weight	3.5 lb (1.58 Kg)
Range	450 to 900°F (232° to 482°C)
Idle	2°F

Safety Rating:

USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE



SMT & Through-Hole Rework System EX-750



The EX-750 Rework and manufacturing system performs surface mount and conventional component repairs. Tip temperature is electronically controlled from 450 to 900°F (232 to 482°C). Two programmable digital controllers feature responsive closed-loop temperature control with large LED readouts, indicating "Set" and "Operating" temperatures.

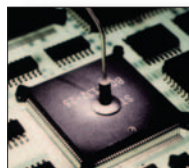
Conventional Through-Hole Operation

Conventional Desoldering is enabled through an instant-rise, high-volume internal vacuum pump connected to the Desolder Handpiece. A "Cool Sleeve" is supplied to ensure operator comfort. A new Stop Clog filter removes flux fumes and solids, preventing contamination of the vacuum pump.

BGA Site Preparation

The Desolder Handpiece may also be used to remove residue solder from reworked spheres on BGA patterns.

Model	Part #	Description
EX-750	0750-0002	Mix Tech System 60 Hz 110V
EX-750	0750-2002	Mix Tech System 50 Hz 220V



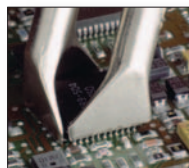
Vacuum Pick and Place Wand



Thermal Chip Tweezer



SMT Through-Hole Soldering Iron



Thermal Quad-Pack Tweezer



Desolder Tool

EX-750 Includes:

6910-2700	Sensor Soldering Iron 60 Watt, 24V
6000-2400A	Tweezer 80 Watt, 24V
3550-0600	Cleaning Station Holder
3550-6000	Tweezer Holder
3550-0602	Dual Tool Holder
1700-6700	Desolder Handpiece 24V, 60 Watt
1700-0060	Hot Air Handpiece 24V, 60 Watt
5000-0531	Internal Pump 110V
5000-0631	Internal Pump 220V system only
6000-0286	Tweezer Handpiece Insulator
1212-2311A	Tweezer Chip Component Tip
1212-2701	Solder Iron tip 1/32" Conical
6700-0112	Desolder Tube Cleaning Brush
6700-0010	Glass Tube Cleaning Brush
6700-4223	Desolder Tip Kit
3000-5002	Fixed Stop-Clog Filter Assembly
0700-0700	Manual
5000-8404	Foot Pedal

Optional:

6000-2500	Vacuum Pick and Place Wand
6700-8717	Spares Kit
2570-0025	Standard Track Repair Kit
6700-1394	Starter Consumable Kit
6700-8719	One Year Consumable Kit

Specifications:

Dimension	10.20" x 8.50" x 4.75", (25.90 x 21.60 x 12.00 cm)
Weight	14.5 lb (6.58 kg)
Range	450 to 900°F (232 to 482°C)
Idle	2°F
Switching	Zero Voltage Thyristor

Safety Rating:

USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE

For replacement Desolder Tips and Solder Tips, see page 27.

A combination system, which includes the EX-750 and the new Chipper Hot Air SMT Rework System featured on pages 2 and 3.

Mixed Technology

These two products provide an economic versatile solution to mixed technology applications, requiring Through-Hole, Contact and Hot Air SMT features.

Model	Part #	Description
CX-750	0750-0003	Plus System 60 Hz 110V
CX-750	0750-2003	Plus System 50 Hz 220V



Chipper Plus CX-750

Digital Solder & Desolder SMT Station EX-700

Closed-Loop Digital Control

A Digital Closed-Loop Sensor controlled Solder & Desolder Station with SMT upgrade features, represents an ideal manufacturing and rework system for sensitive components.

Desoldering

Desoldering is enabled through an instant-rise, high volume internal vacuum pump connected to the Desolder Handpiece. A "Cool Sleeve" is supplied to ensure operator comfort. A new Stop Clog filter removes flux fumes and solids, preventing contamination of the vacuum pump.

Upgrading

The standard Through-Hole Desolder Tool and Soldering Iron may be interchanged with optional SMD Tweezers, Hot Jet Flow, or Vacuum Pick and Place Wand.

EX-700 Includes:

- 6910-2700 Sensor Soldering Iron 60 Watt, 24V
- 1700-6700 Desolder Handpiece 60 Watt, 24V
- 5000-0531 Vacuum Pump 110V
- 5000-0631 Vacuum Pump 220V system only
- 3550-0602 Dual Iron Holder
- 1212-2701 Solder Iron Tip 1/32" Conical
- 6700-0112 Desolder Tube Cleaning Brush
- 6700-0010 Glass Tube Cleaning Brush
- 6700-4223 Desolder Tip Kit
- 3000-5002 Fixed Stop-Clog Filter Assembly
- 0700-0700 Manual
- 5000-8404 Foot Pedal

Optional:

- 6000-2500 Vacuum Pick and Place Wand
- 6000-2400A Tweezer 24V, 80 Watts
- 3550-6000 Tweezer Holder
- 6000-0286 Tweezer Insulator
- 1700-0060 Hot Air Jet Tool 24V, 60 Watts
- 6700-8717 Spares Kit
- 2570-0025 Standard Track Repair Kit
- 6700-1394 Starter Consumable Kit
- 6700-8719 One Year Consumable Kit

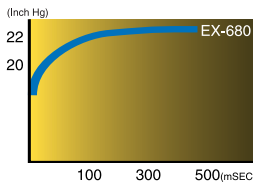
Model	Part #	Description
EX-700	0700-0002	Rework System 60 Hz 110V
EX-700	0700-2000	Rework System 50 Hz 220V

Specifications:

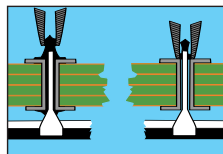
Dimension	11.50" x 8.50" x 6.75" (29.10 x 21.60 x 17.14 cm)
Weight	12.5 lb (5.6 kg)
Range	450 to 900°F (232 to 482°C)
Idle	2°F
Switching	Zero Voltage Thyristor

Safety Rating:

USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE



Time required to reach the maximum vacuum



Before After
Multilayer Desoldering

A.P.E. Systems offer quick vacuum response, which is the most critical factor

Digital Desolder Station (Factory Air) EX-680

Digital Temperature Control

A powerful and economic Desoldering system for leaded components, featuring a large LED display for temperature set, operation and operator lock out. Vacuum is achieved through an in-house air supply, filtered and regulated from 60 to 120 psi; a PNEU-VAC foot pedal activates a Venturi system for an instant vacuum force of 20 to 23" Hg.

EX-680 Includes:

- 1700-6700 Desolder Handpiece 24V, 60 Watts
- 8000-9053 PNEU-VAC Foot Pedal Venturi
- 3550-0600 Cleaning Station Holder
- 6700-4223 Tip Kit
- 6700-0112 Desolder Tube Wire Cleaning Brush
- 6700-0010 Glass Tube Cleaning Brush
- 3000-5002 Fixed Stop-Clog Filter Assembly
- 0680-0680 Manual

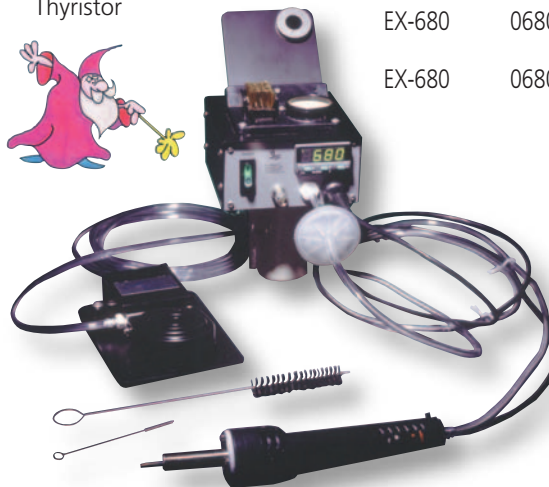
Specifications:

Dimension	6.00" x 5.00" x 2.75" (15.24 x 12.70 x 6.98 cm)
Weight	7.00 lb (3.18 kg)
Range	450 to 900°F (232 to 482°C)
Idle	2°F
Switching	Zero Voltage Thyristor

Safety Rating:

USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE

Model	Part #	Description
EX-680	0680-0000	Desolder System 60 Hz 110V
EX-680	0680-2000	Desolder System 50 Hz 220V



Digital Solder Station EX-685

Closed-Loop Digital Control

A Sensor controlled digital soldering system for heavy duty, fast response manufacturing and rework applications. A closed-loop sensor provides constant feedback with sensitivity of 2°F.

Designed for Comfort

The Soldering Iron handpiece has been ergonomically designed for constant use without operator fatigue. A quick release element cover allows easy tip change.

Performance

Zero voltage switching and MIL spec grounding ensure minimal leakage of less than 2mV.

Easy View

Large LED Displays register set point and operating temperature. The controller also features an operator Lock Out for process control.

EX-685 Includes:

6910-2700	Sensor Soldering Iron 24V, 60 Watt
1212-2701	Solder Iron Tip 1/32" Conical
6730-3803	Iron Holder & Cleaning Assembly
0685-0685	Manual
4000-8402	Power Cord 110V
8000-0100	Power Cord 220V system only

Model	Part #	Description
EX-685	0685-0000	Soldering System 60 Hz 110V
EX-685	0685-2000	Soldering System 50 Hz 220V

Specifications:

Dimension	6.00" x 5.00" x 2.75", 15.24 x 12.70 x 6.98 cm
Weight	6.00 lb (3.18 kg)
Range	450 to to 900°F (232 to 482°C)
Idle	2°F
Switching	Zero Voltage Thyristor

Safety Rating:

USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE



Economy Desoldering System

An economic Desoldering System for high volume production, touchup, and repair. Vacuum is achieved through an in-house air supply, filtered and regulated from 60 to 120 psi; a PNEU-VAC foot pedal activates a Venturi system for an instant vacuum force of 20 to 23" Hg.

EX-675 Includes:

1500-6700	Desolder Handpiece 110V, 35 Watts
8000-9053	PNEU-VAC Foot Pedal Venturi
3550-0600	Cleaning Station Holder
6700-4223	Tip Kit
6700-0112	Desolder Tube Wire Cleaning Brush
6700-0010	Glass Tube Cleaning Brush
3000-5002	Fixed Stop-Clog Filter Assembly
0675-0675	Manual

Analog Desolder Station (Factory Air) EX-675

Model	Part #	Description
EX-675	0675-0000	Desoldering System 60 Hz 110V
EX-675	0675-2000	Desoldering System 50 Hz 220V

Specifications:

Dimension	2.75" x 4.875" x 2.75" (6.98 x 12.38 x 6.98 cm)
Weight	5.00 lb (2.27 kg)
Range	380 to 850°F (193 to 454°C)
Idle	2°F
Switching	Zero Voltage Thyristor

Safety Rating:

USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE

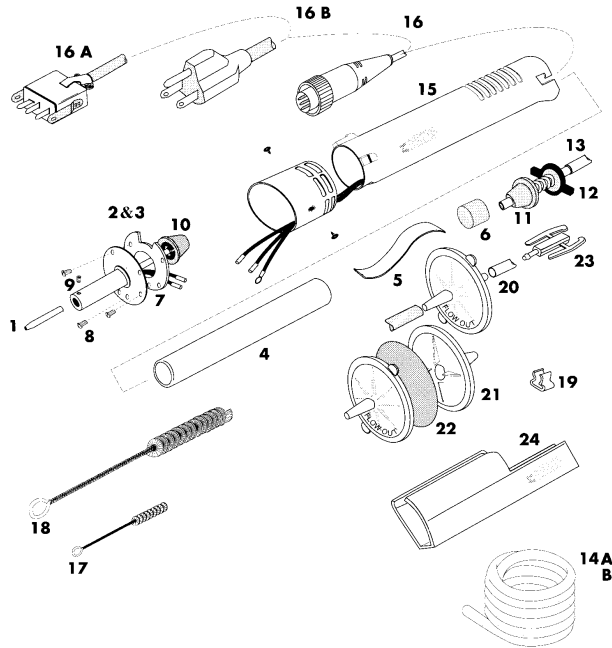


Parts for Desolder Handpiece

Parts for Desolder Handpiece

The Desolder Handpiece includes consumable parts which require replacement from time to time. This section lists the parts which are appropriate for the EX-1700 (24V) and EX-1500 (110V) Desolder Handpiece models featured in this catalog.

The following columns list the parts for each of the Desolder Handpiece assemblies, which may be referenced from the exploded detail.



Handpiece EX-1700 (1700-6700)

For EX-750, 700, 680 Sensor

1	Desolder Tips (see below)	
2	6700-1724	Heater & Seal Assy 24V, 37 Watt
3	6700-1760	Heater & Seal Assy 24V, 60 Watt (AirJet)
4	6700-3200	Glass Tube
5	6700-4100	"S" Baffle
6	6700-0100-P25	Glass Tube Filter Felts
7	6700-3813-P2	Heater Insulator
8	6700-7017-P3	Heater Retaining Screws
9	6700-7700-P10	Set Screws
10	6700-7201	Forward Seal
11	6700-7200	Rear Seal
12	6700-7302	End Cap Retaining Clip
13	6700-7300	End Cap Assembly
14A	7000-8790	Tubing 5 feet length
14B	7000-8701	Tubing 12 feet length (EX-680, EX-675)
15	6700-0287	Handpiece Replacement Assembly
16	4000-8417	24V Power Cord (Din)
17	6700-0112-P5	Desolder Tube Wire Brush
18	6700-0010-P5	Glass Tube Cleaning Brush
19	6700-2002-P5	Hose Clamps for Tubing
20	3000-5002	Filter Fixed Stop Clog
21	3000-5003	Filter Replaceable Stop Clog
22	3000-5001-P10	Replaceable Filter Element
23	6700-8799	Quick Disconnect
24	6700-0286	Handpiece Insulator

Handpiece EX-1500 (1500-6700)

For EX-675, Non-Sensor

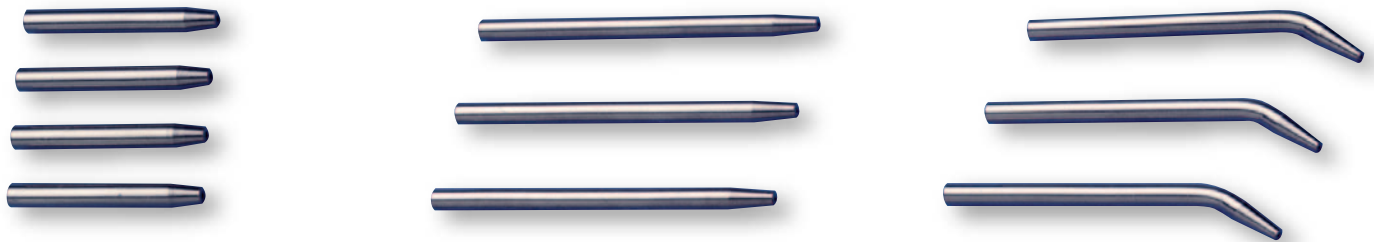
1	Desolder Tips (see below)	
2	6700-0045	Heater & Seal Assy 110V, 40 Watt
3	6700-0060	Heater & Seal Assy 110V, 60 Watt
4	6700-3200	Glass Tube
5	6700-4100	"S" Baffle
6	6700-0100-P25	Glass Tube Filter Felts
7	6700-3813-P2	Heater Insulator
8	6700-7017-P3	Heater Retaining Screws
9	6700-7700-P10	Set Screws
10	6700-7201	Forward Seal
11	6700-7200	Rear Seal
12	6700-7302	End Cap Retaining Clip
13	6700-7300	End Cap Assembly
14A	7000-8790	Tubing 5 feet length
14B	7000-8701	Tubing 12 ft length (EX-680, EX-675)
15	6700-0287	Handpiece Replacement Assembly
16	6700-4000	110V Power Cord
17	6700-0112-P5	Desolder Tube Wire Brush
18	6700-0010-P5	Glass Tube Cleaning Brush
19	6700-2002-P5	Hose Clamps for Tubing
20	3000-5002	Filter Fixed Stop Clog
21	3000-5003	Filter Replaceable Stop Clog
22	3000-5001-P10	Replaceable Filter Element
23	6700-8799	Quick Disconnect
24	6700-0286	Handpiece Insulator

Complete Handpiece Assembles:

1700-6700 Desolder Sensor Handpiece 24V, 60 Watt
1500-6700 Desolder Handpiece 110V, 40 Watt

Tips for Desolder Handpiece

Replacement Tips for APE Desolder Extractor Handpiece and other manufacturers of similar Desoldering equipment.



Standard Desoldering Tips

Part #	I.D. Nominal		O.D. Reference	
	mm	In.	in.	mm
1212-0225	0.630	0.025	0.060	1.520
1212-0440	0.910	0.036	0.072	1.830
1212-0550	1.270	0.050	0.085	2.160
1212-0660	1.520	0.060	0.085	2.160

2" Long Desoldering Tips

Part #	I.D. Nominal		O.D. Reference	
	in.	mm	in.	mm
1212-2025	0.025	0.630	0.060	1.520
1212-2040	0.036	0.910	0.072	1.830
1212-2060	0.060	1.520	0.085	2.160

Angle Desoldering Tips:

Part #	I.D. Nominal		O.D. Reference	
	in.	mm	in.	mm
1212-2125	0.025	0.630	0.060	1.520
1212-2136	0.036	0.910	0.072	1.830
1212-2160	0.600	1.520	0.085	2.160

PCB Track Repair Kits

Overview

Carefully designed and convenient kits for the repair of printed circuit board tracks. A.P.E. Kits were originally designed for "on the spot" circuit repairs by the National Guard and are regularly used in military repair operations and by manufacturers in rework applications.



Master Track Repair Kit 2570-4000

Part #	Qty	Description
7293-2850	1	Master Frame Kit
2000-0002	1	Master Funnelet/Eyelet Kit
5000-0117	1	Abrasive Stick
2570-0111	1	Setting Tool
5301-0118	1	Bonding Kit
2570-0040	1	Edge Connector Clamp
2570-2570	1	Manual

Standard Track Repair Kit 2570-0025

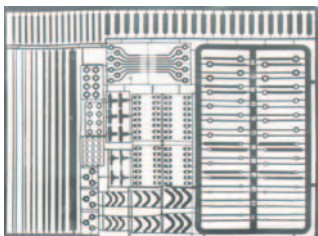
Part #	Qty	Description
7293-3522	3	Master Frames
2000-0000	6	Funnelet/Eyelet Kits
2590-1524	1	Track Tool Set
2570-0111	1	Setting Tool
2580-1394	1	Consumable Kit
2570-2570	1	Manual

Basic Track Repair Kit 2570-0010

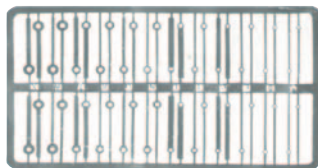
Part #	Qty	Description
7293-3522	2	Master Frames
2000-0000	6	Funnelet/Eyelet Kits
2570-0111	1	Setting Tool
2570-2570	1	Manual



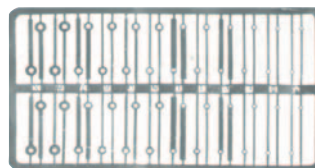
Track Frames



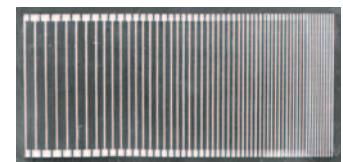
Master Frame
7293-3522



Frame A-Y
7103-2936



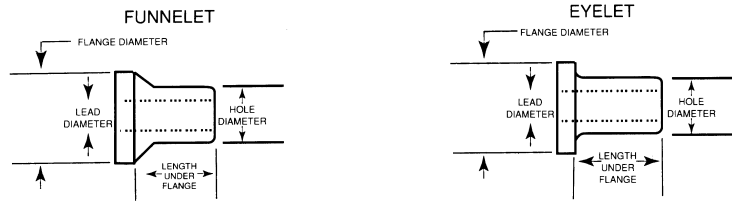
Frame A.B.C.
7114-0934(A)



Conductor Frame
7113-2634

Funnelets and Eyelets

Precision thru-hole layer connectors for repair of PCB route connections, available in Funnelet or Eyelet designs (see chart). Many other sizes available upon request.



A.P.E. Part Number	Outside Diameter of Barrel in. (mm)	Length Under Flange in. (mm)	Flange Diameter at Pierce in. (mm)	Minimum Inner Diameter in. (mm)	Range Style Type	Board Thickness in. (mm)
2000-0003*	.040 (1.016)	.093 (2.362)	.060 (1.524)	.026 (.6604)	Eyelet	.062 (1.575) 1/16
2000-0010	.068 (1.727)	.102 (2.590)	.114 (2.895)	.058 (1.473)	Eyelet	.062 (1.575) 1/16
2000-0014	.030 (.7620)	.073 (1.854)	.046 (1.168)	.021 (.5334)	Eyelet	.046 (1.168) 3/64
2000-0018	.046 (1.168)	.052 (1.320)	.082 (2.082)	.035 (.8890)	Funnelet	.062 (1.575) 1/16
2000-0023	.059 (1.498)	.093 (2.362)	.105 (2.667)	.046 (1.168)	Eyelet	.062 (1.575) 1/16
2000-0025	.038 (.9652)	.047 (1.193)	.065 (1.651)	.026 (.6604)	Funnelet	.031 (0.787) 1/32
2000-0038	.047 (1.193)	.093 (2.362)	.082 (2.0828)	.035 (.8890)	Funnelet	.062 (1.575) 1/16
2000-0043*	.121 (3.073)	.093 (2.362)	.200 (5.080)	.096 (2.438)	Eyelet	.062 (1.575) 1/16
2000-0046	.60 (1.524)	.088 (2.235)	.095 (2.413)	.046 (1.168)	Funnelet	.062 (1.575) 1/16
2000-0048	.047 (1.193)	.118 (2.997)	.080 (2.032)	.035 (.8890)	Funnelet	.093 (2.362) 3/32
2000-0053*	.152 (3.860)	.093 (2.362)	.245 (6.223)	.132 (3.352)	Eyelet	.062 (1.575) 1/16
2000-0055	.040 (1.016)	.075 (1.905)	.062 (1.574)	.026 (.6604)	Funnelet	.062 (1.575) 1/16
2000-0058	.047 (1.193)	.085 (2.159)	.072 (1.828)	.036 (.9144)	Funnelet	.046 (1.168) 3/64
2000-0098	.059 (1.498)	.127 (3.225)	.095 (2.413)	.046 (1.168)	Funnelet	.093 (2.362) 3/32
2000-0203	.030 (.7620)	.094 (2.387)	.046 (1.168)	.021 (.5334)	Eyelet	.062 (1.575) 1/16
2000-0205	.047 (1.193)	.125 (3.125)	.080 (2.032)	.036 (.9144)	Eyelet	.093 (2.362) 3/32
2000-0206	.046 (1.168)	.100 (2.540)	.076 (1.930)	.034 (.8636)	Eyelet	.062 (1.575) 1/16
2000-0207	.047 (1.193)	.062 (1.574)	.080 (2.032)	.036 (.9144)	Eyelet	.031 (0.787) 1/32
2000-0208	.030 (.7620)	.174 (4.419)	.046 (1.168)	.021 (.5334)	Eyelet	.125 (3.175) 1/8
2000-0210	.046 (1.168)	.075 (1.930)	.076 (1.930)	.034 (.8636)	Eyelet	.046 (1.168) 3/64
2000-0222*	.048 (1.219)	.155 (3.937)	.074 (1.879)	.034 (.8636)	Eyelet	.125 (3.175) 1/8
2000-0225	.059 (1.498)	.127 (3.225)	.095 (2.413)	.046 (1.168)	Funnelet	.093 (2.362) 3/32
2000-0230	.047 (1.193)	.062 (1.574)	.080 (2.032)	.036 (.9144)	Funnelet	.031 (0.787) 1/32
2000-0235	.030 (.7620)	.174 (4.419)	.046 (1.168)	.021 (.5334)	Eyelet	.125 (3.175) 1/8
2000-0240	.030 (.7620)	.120 (3.048)	.046 (1.168)	.022 (.5588)	Eyelet	.093 (2.362) 3/32
2000-0246	.046 (1.168)	.088 (2.235)	.080 (2.032)	.034 (.8636)	Funnelet	.046 (1.168) 3/64
2000-0258	.030 (.7620)	.028 (.7112)	.046 (1.168)	.021 (.5334)	Eyelet	.010 (0.254) 1/100
2000-0478*	.152 (3.860)	.120 (3.048)	.245 (6.223)	.137 (3.479)	Eyelet	.093 (2.362) 3/32
2000-0858	.030 (.7620)	.054 (1.371)	.046 (1.168)	.021 (.5334)	Eyelet	.015 (0.381) 1/64
2000-0865	.030 (.7620)	.088 (2.235)	.046 (1.168)	.021 (.5334)	Eyelet	.062 (1.575) 1/16
2000-1083	.078 (1.981)	.115 (2.920)	.110 (2.794)	.066 (1.676)	Funnelet	.093 (2.362) 3/32
2000-1084	.031 (.7874)	.088 (2.235)	.055 (1.397)	.021 (.5334)	Funnelet	.062 (1.575) 1/16
2000-1088	.039 (.9906)	.051 (1.295)	.062 (1.575)	.027 (.6858)	Funnelet	.0156 (.0397) 1/64
2000-1815	.059 (1.498)	.093 (2.362)	.090 (2.286)	.046 (1.168)	Eyelet	.062 (1.575) 1/16
2000-1925	.046 (1.168)	.092 (2.336)	.076 (1.930)	.034 (.8636)	Eyelet	.062 (1.575) 1/16

* Available in Brass Only. All Dimensions are in inches + 10%

Plate-Master Gold Contact Repair SRS-069

Overview

The Plate-Master System cleans and electroplates gold-plate and other metals on printed circuit board connector contacts and electronic assemblies.

Accurate Deposition

Cleaning and plating electrolysis is accomplished by the use of a plating point probe. The solutions are accurately deposited using easy-to-handle brush tipped applicators. Electroplating Control settings are simple to select by reference to a predetermined chart.

Plate-Master

The Plate-Master is used most commonly to repair Gold Plated Finger Contacts on PCB's, but the system may be used to electroplate a variety of materials, e.g., lead, tin, copper to nickel, aluminum, and gold.

Voltage Control

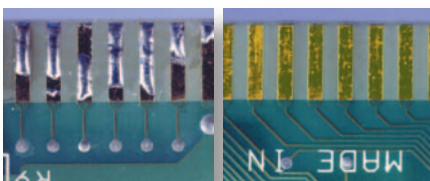
The SRS-069 is a low power system with a precision voltage source where the output voltage controls the activation of the plating solution. This voltage is controlled to within three percent by the internal regulator.

Current Control

The current control is a precision source that determines the rate and the amount of plating that is deposited, ensuring a uniform plating thickness when set, preventing the possibility of burning or arcing. The control setting changes the gain of an operational amplifier, and when proportional, prevents further current from being applied.

Before and After

These Before and After photographs indicate the finished result possible using the SRS-069 for Gold Plating, combined with the EX-680 Desolder System for preparation.



Before

After



Application Examples:

Gold Plating PC Board Edge
Connectors and other device contacts for excellent conductivity without corrosion

Nickel Plating Between base copper and overplate of gold to prevent copper migration; overplating on mild steel

Operational Plating Fast buildup over 0.0003 to 0.0005 in. thick copper

Copper High Speed alkaline

Copper Alkaline Thin buildup over aluminum or mild steel

Tin-Lead, Tin Plating Directly over base copper materials, alone for solderable surfaces or underplating for tin-lead

Consumable Solutions:

6911-1321 1 oz. Electroclean
6911-3321 3 oz. Electroclean
6911-1336 1 oz. Gold

6911-3336 3 oz. Gold
6911-1330 1 oz. Nickel
6911-3330 3 oz. Nickel
6911-1324 1 oz. Copper
6911-3324 3 oz. Copper
6911-1326 1 oz. Copper Alkaline
6911-3326 3 oz. Copper Alkaline
6911-0823 3 Brush Applicator
3028-3029 2 Brush Holding Screws

SRS-069 Includes:

0690-0001 Power supply 110V
0690-2001 Power Supply 220V system only
6911-0823 Brush Pk/3
4100-6100 Handle Assembly
6911-8799 Rinse Bottle 1 oz.
6911-1321-A Electroclean 1/2 oz.
6911-1330-A Nickel Solution 1/2 oz.
6911-1336-A Gold Solution 1/2 oz.
0690-0690 Manual
0000-0000 MSDS

Model	Part #	Description
SRS-069	0690-0000	Plate-Master System 60 Hz 110V
SRS-069	0690-2000	Plate-Master System 50 Hz 220V

Specifications:

Dimension 6.75" x 7.37" x 5.25"
(17.14 x 18.00 x 13.33 cm)
Weight 5.00 lb (2.27 kg)
Current High Gain Op Amp
Voltage DC Output

BondMaster LCD Production & Repair SMD-9000

Overview

A proven bonding repair and production system for Liquid Crystal Displays, which are bonded by Heat Seal Connector contacts (HSC) or Reflow Solder contacts, as used in Pagers, Portable Radios, PCMCIA, and PCS devices.

Automatic Control

A closed-loop system continually compensates for "Set Point" of temperature drop and overshoot, which is accomplished by a centrally located, low mass (fast response) thermocouple sensor, located directly within the Hot Bar.

The close tolerance temperature control eliminates thermal stress, delamination and heat degradation, providing a major advantage in the reliability of the bonded components.

Bonding Head

The BondMaster uses a self-aligning, free-floating Bond Head (Hot Bar Thermode), which is optimized by a Temperature Controller providing accurate and reliable temperature-time cycle control.

Bonding Thermal Stability

Uniform heat distribution throughout the Hot Bar is critical in ensuring a reliable bond.

Ingredients for a Successful Bond:

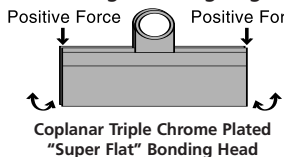
- Time
- Temperature
- Profile
- Pressure

Time, Temperature, and Profile are controlled by the PID Controller, which stores the correct program for the bond.

Pressure

Pressure is applied by a calibrated tension, maintained by a Bearing Carriage and determined by a Thumb Wheel Adjuster. A Locking Pin protects against intervention.

Free-Floating, Self-Aligning Head



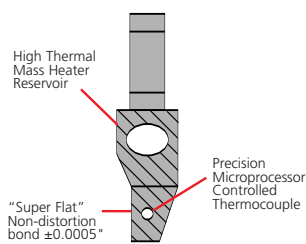
Bonding Lock

Once the subject is in place under the Bond Head and the pressure adjusted by the Thumb Wheel, the Bond Head is placed in position by a Locking Lever, which will remain until the bond time is completed.



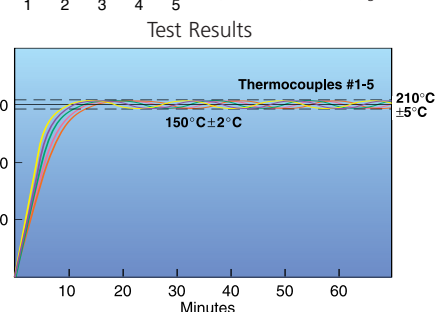
VISION AWARD

Winner for the best new product in the category of rework and repair.

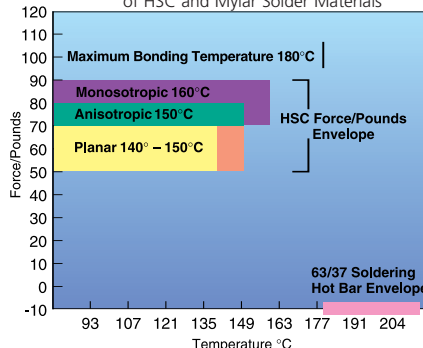


Bonding Surface Thermal Stability

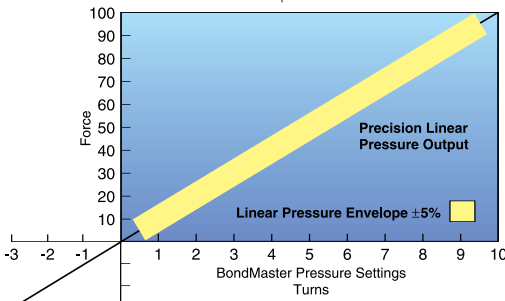
Embedded Thermocouple Test (bottom view) in Bonding Head



Precise and Repeatable Bonding of HSC and Mylar Solder Materials



Precise and Repeatable Bond Pressures



BondMaster LCD Production & Repair SMD-9000

Features:

- HSC, Mylar, PCMCIA, Flexible Circuit connections
- Microprocessor controlled
- Self-contained, no PC or factory air required
- Linear pressure control
- Precise temperature control and profiling
- Repeatable process control
- Continuous or pulse operation
- Pre-stored profile groups
- User programmable
- Floating and self-aligning Bond Head
- Thermal bonding reservoir
- "Super Flat" bonding surface
- Thermal stability throughout bonding cycle
- No silicone barrier required

Process Control Programmable

Features:

- Ramp rate degrees/sec
- Ramp rate time vs. temp
- Programmable set point Celsius or Fahrenheit
- Ramp time 15 (continuous) sec to 3 minutes

Motorola Pagers

- Bravo Classic
- Bravo Numeric
- Bravo Plus
- Bravo Alpha
- Bravo Express
- Bravo Ultra Express
- Pronto
- Renegade
- Bravo LX-0FLX
- Bravo Encore
- Pro Encore
- Lifestyle
- Lifestyle Plus
- Lifestyle (New)
- Free Spirit
- Memo Express
- MTX 838
- MTX 8000
- MTX 9000
- HT 1000
- MT 2000
- MTS 2000

Order Information

APE Part #	Motorola Part #	Description
9000-1000	R1346A	BondMaster 60Hz 110V
9000-1002	R1347A	BondMaster 50Hz 220V
9000-1010	0180304E22	Universal Bonding Fixture
9000-2000	0180304E24	X-Y Table and Microscope
9000-0899	0180302E51	MasterLens 110V
8200-1370	0180304E25	HSC Bond Tape, 3 pack
8200-1360	0180304E72	HSC Bond Tape, 6 Pack



BondMaster Fixturing

The BondMaster has been engineered to enable rapid interchange of differing product assemblies, not only for Pager products listed but also for production assembly of LCD and Flexible Circuits.

Fixturing:

We are pleased to offer advice in developing a Fixture. However in order to keep costs to a minimum we suggest that our customers use either in-house or local facilities to fabricate fixture requirements.

Specifications:

Electrical	110V/220V, 50/60Hz
Power	200 Watts
Mechanical	Aluminum Plate Construction
Dimension	15" x 12" x 12" (381 x 305 x 305 mm)
Weight	14 lbs. (6.36 Kg)
Temperature	Ambient up to 550°F (288°C)
Pressure	0-100 lbs. (45.45 Kg) Adjustable
Time	Programmable 1 sec to 3 minutes

Thermal Tracer Kit 8300-9660

Overview

This economical Thermal Tracer Kit is an important aid in developing thermal profiles for reworking components. Up to six (6) sensors can be strategically located at and around the component to be reworked. A graph trace is then plotted and stored for reference. The system is also used for calibration.

Hardware

The Thermal Tracer hardware is installed in a PCMCIA Card for convenient connection to an engineer's laptop system, alternatively the Card Reader option allows for installation to a desktop computer.

Sensors

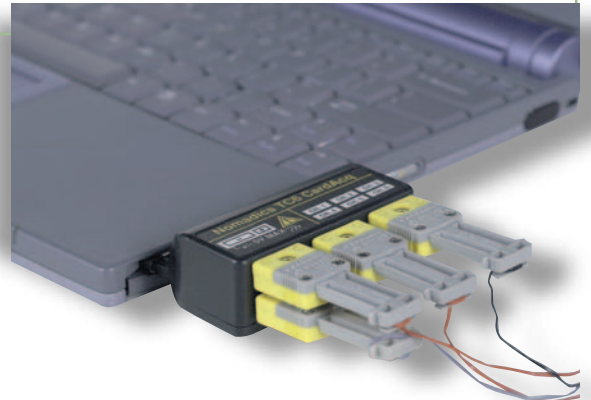
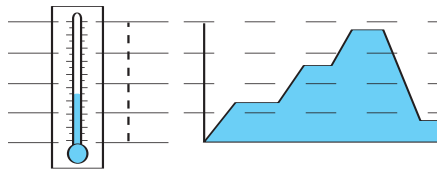
Six sensor connections are available on the PCMCIA card, five (5) thermocouple "K" type sensors are included with the 8300-9660 Thermal Tracer Kit. These sensors can be strategically located, at and around the component, providing necessary feedback for a Profile Pattern Recipe (PPR). connection to an engineer's Lap Top system, alternatively the Card Reader option allows for installation to a desktop computer.

Software

The software is designed for Windows 98/2000/XP. Its operation is User Friendly and takes just a few minutes to install and start tracing. "Time Above" indicators and zoning are a standard feature. The system can also be used for convection ovens with up to 12 zones.

Data Logging

The graph pen tracers (GPT) are real time and can be frozen for data logging in Adobe Acrobat PDF files.



Order Information

Part #	Description
8300-9660	Thermal Tracer Kit, Software and PCMCIA Card Includes five (5) Sensors and Manual
8300-9661	PCMCIA 2 Slot Card Reader

Reference Data

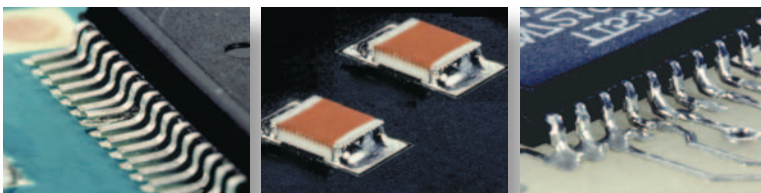
Solder Joint Comparison



Good

Good

Good



Inferior

Inferior

Inferior

Photographs, courtesy of Soldering Technology International Inc.

Fahrenheit to Celsius Conversion

Fahrenheit to Celsius: $(^{\circ}\text{F} - 32) / 1.8 = ^{\circ}\text{C}$
 Celsius to Fahrenheit: $(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$

Glossary of terms

Anisotropic	Flexible Circuit APC Conductive particles suspended in adhesive material
APC	Additive Polymer Conductive
BGA	Ball Grid Array
Bumped	Solder Sphere Contacts on BGA or Flip Chip
BQFP	Bumpered Quad Flat Pack (Corner Bumpers)
CBGA	Ceramic Ball Grid Array
CCBGA	Column Ceramic Ball Grid Array
Column	Non eutectic solder CBGA connections
Dummy	Component without active circuit
DIP	Dual Inline Package
Eutectic	Lowest possible temperature of solidification
Flip Chip	Die technology with bumped contacts
JLEAD	PLCC contact leads on edge of package in J shape
LCC	Leadless Chip Carrier
Micro BGA	Tessera package, high pin count, low physical size
Monosotropic	Flexible Circuit dense pitch APC
Perimeter BGA	Spheres constructed around circumference of BGA for Computer Board compatibility
Planar	Term used for Flexible Circuit Soldered Connections
PLCC	Plastic Leaded Chip Carrier
PCMCIA	Personal Computer Memory Card International Association
QFP	Quad Flat Pack
TSOP	Thin Small Outline Package
SMT	Surface Mount Technology
TBGA	Thin Ball Grid Array