A.P.E.

Lead-Free Rework

APE.COM

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

Bill Scheu…….President and CEO

International Service and Support:

USA

A.P.E. USA Headquarters
2 North Blackwater Lane
Key Largo, FL 33037
Tel: 305-451-4722
Fax: 305-451-3374
E-mail: Sales@ape.com

Canada

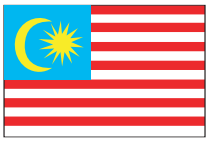
A.P.E. USA Headquarters
2 North Blackwater Lane
Key Largo, FL 33037
Tel: 305-451-4722
Fax: 305-451-3374
E-mail: Sales@ape.com

UK

Kaisertech
Unit 12, M3 Trade Park
Manor Way, Eastleigh,
Hampshire England, SO50 9YA
Tel: 44-(0)23 8065 0065
Fax: 44-(0)23 8065 0060
E-mail: sales@kaisertech.co.uk

Radio Products Service Division

Motorola
Radio Products Service Division
1313 E. Algonquin Road
Shaumburg, IL 60196-1081
Tel: 800-442-4210
Fax: 800-622-6210



Maylasia

Yip In Tsoi & Jacks, Ltd.
523 Mahaprutharam Road
Bangrak, Bangkok
Thailand 10500
Tel: 662-353-8667
Fax: 665-353-8686
www.yipjacks.com

China

American Tec Co Ltd
Flat A 1st Floor, Block 1
Cyber-Tech Zone, Gaoxin Ave 7 South
Nansham District, Shenzhen 518057
Tel: 86-7556-135-0555
Fax: 86-7556-135-0531
E-mail: hongkong@americantec.com

Singapore

Primetec Pte Ltd
4012 Ang Mo Kio Avenue 10
#07-01 Techplace I
Singapore 569628
Tel: 65-6485-4811
Fax: 65-6481-4522
E-mail: primetec.kelvin@gmail.com

Turkey

3S Electronics & Automation
Technologies Ltd.
Davutpasa Caddesi, Sercekale Sokak
10/1 Topkapi-Instanbul 34010 / Turkey
Tel: 90-212-482 8446 / 8456
Fax: 90-212-482 8456
E-Mail: info@3s-technologies.com.tr

Brazil

KTI
Rua da Uniao, 25
Villa Mariana
Sao Paulo, Brazil, 04107-010
Tel: 551-157-59494
Fax: 551-157-50594
E-Mail: kti@globalvip.com.br

Australia

Mektronics Co. PTY Ltd.
84B Industrial Drive
Braeside, Victoria
Australia, 3195
Tel: 613-958-73888
Fax: 613-958-73836

India

American Tec Co. Ltd.
1010, 10th Floor, Mercantile House
15 K.G Marg, New Delhi
India 110001
Tel: 91 11 23706055
Fax: 91 11 237 06054
E-mail: india@americantec.com

Germany

Microtronic GMBH
Klein Grotzing
D-84494 Newmarkt - St. Vrit
Germany
Tel: 49-722-962-030
Fax: 49-722-962-00
eeggelaar@microtronic.de

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

CAGE CODES: 1QWZ2 and 57216 GSA Contract # GS-07F-0483U

Table of Contents

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.

Chipper SMD-500 Power Rework

Overview
The Chipper is used for general low-volume standard SMT rework, prototyping, removing, and replacing components.

SMT Rework

An affordable, totally integrated system for SMT rework and repair, the Chipper SMD-500 is an excellent choice in replacing older "Contact" rework tools with the latest Low Temperature technology for reworking SMT components without damage.

Lead-Free Rework

For Lead-Free rework the Chipper can be used with an APE Bottom Heater featured on page 9.

Board Holder

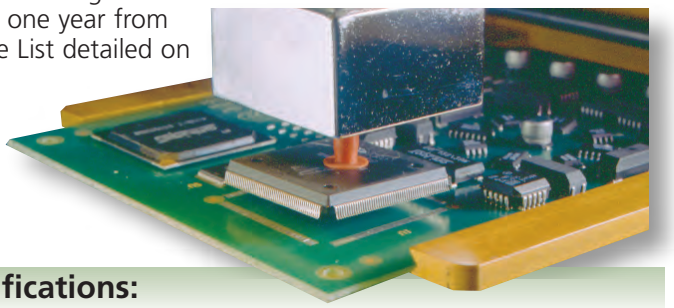
A standard 8" x 8" (203 x 203 mm) Board Holder is included for most board sizes, adjustable on every axis. A board release mechanism allows each board to snap into place and be quickly released when required. In addition, an on-demand, Z-Axis clearance piston avoids profile obstructions, when locating to, or moving from the nozzle.

Nozzle Exchange Program

The SMD-500 also includes three (3) nozzles which can be included in a unique A.P.E. exchange program, allowing the User to exchange any nozzle for up to one year from purchase. See Nozzle List detailed on page 11.

Automatic Lift Off

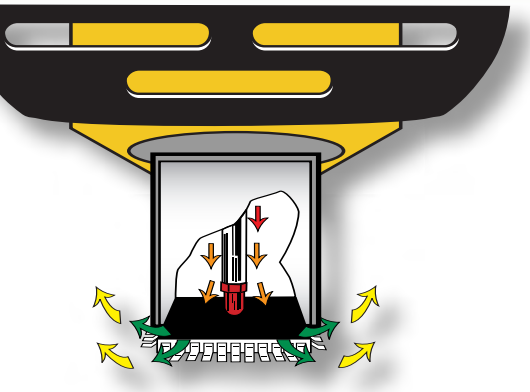
An automatic vacuum pick-up assembly lifts the part from the board once reflow temperature has been reached and continues to hold the part during the systems cooling cycle.



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)
Board 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"x12" x 16", Weight 28 lb (12.73 kg)

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com



Preparation

Preparation of the part for removal and cleaning of the PCB component footprint for replacement is critical in successful rework. A.P.E. has therefore designed a carefully constructed SMT Tool Kit, which has all the necessary tools and ingredients for a professional job; see page 20-21 for details.

Automatic Vacuum Pick-up

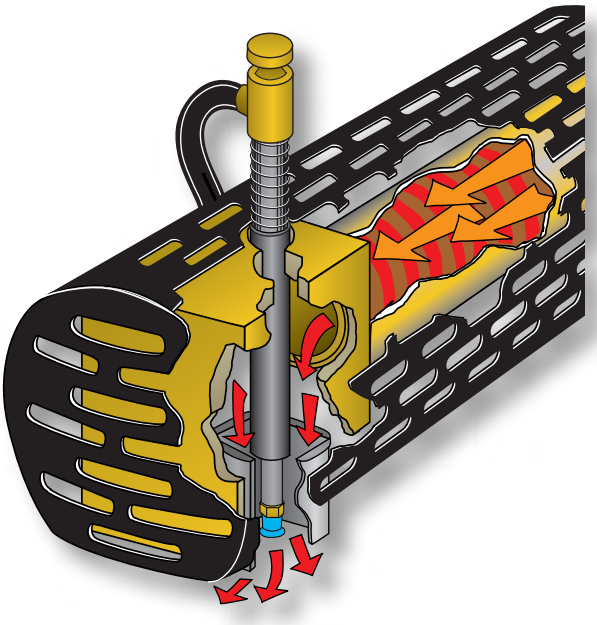
The vacuum switch is turned on and the vacuum pick-up assembly with vacuum cup, is brought to the top of the component body. The foot pedal is then activated and the component automatically lifts from the circuit board when the component passes reflow temperature.

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 rework area.

Autotune Controller

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



Nozzle Selection

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

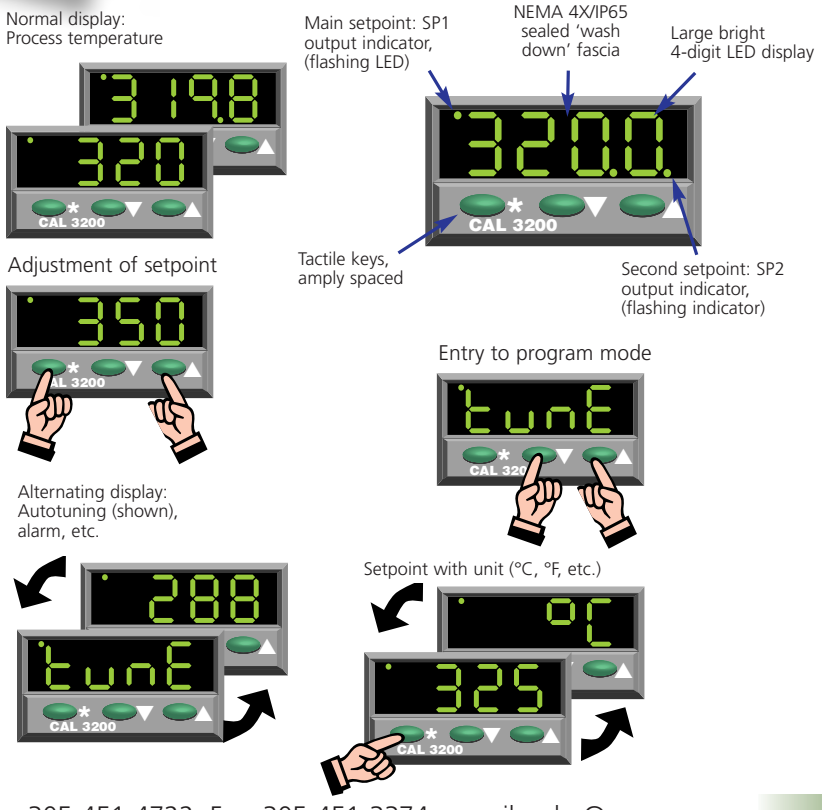
Optional Accessories:

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



Chipmaster SMD-1000

Overview
Chipmaster systems are reliable SMT Component Rework machines, suitable for small to medium size boards and devices, requiring Profile Temperature Control.

Note - Lead-Free placement for BGA's requires a Vision/Reflow system for accurate alignment
(see pg. 14 - 18)

Wide Ranging

Covering a wide range of components, the Chipmaster SMD-1000 Rework Engine, provides a controlled rework environment, which cares for your repair process. The system features a simple operation with automatic "Timed" process control and selected thermal profiling.

Energy Reflow

What makes the Chipmaster different from other Hot Air 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 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 components. Replicating the manufacturing method using a convection air reflow technology is the safest method.

The Chipmaster requires an APE Bottom Heater featured on pages 8-9 for Lead-Free reworking.

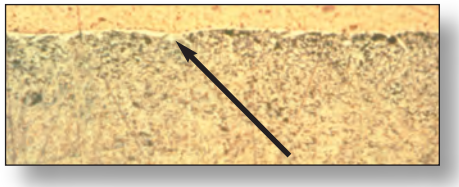
Solder Integrity

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

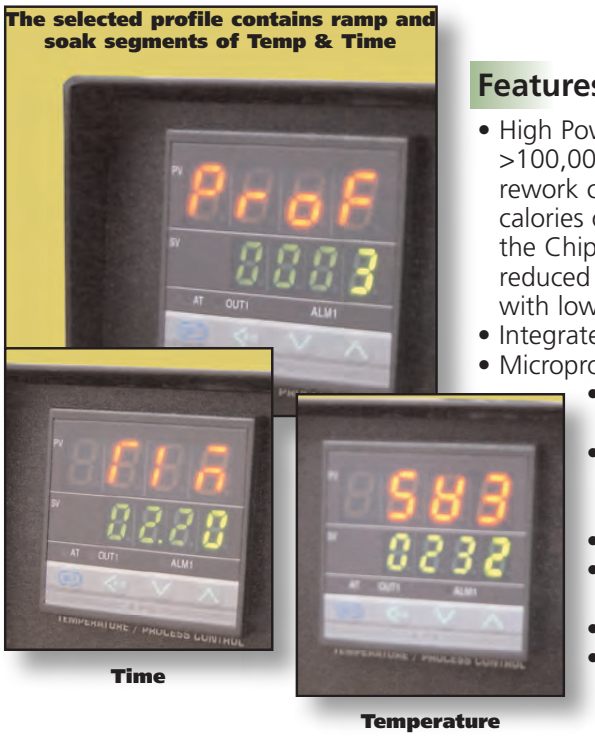


With air temperatures greater than the original Convection Oven Temperature the integrity of solder begins to break down.

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)
Board 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)

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com



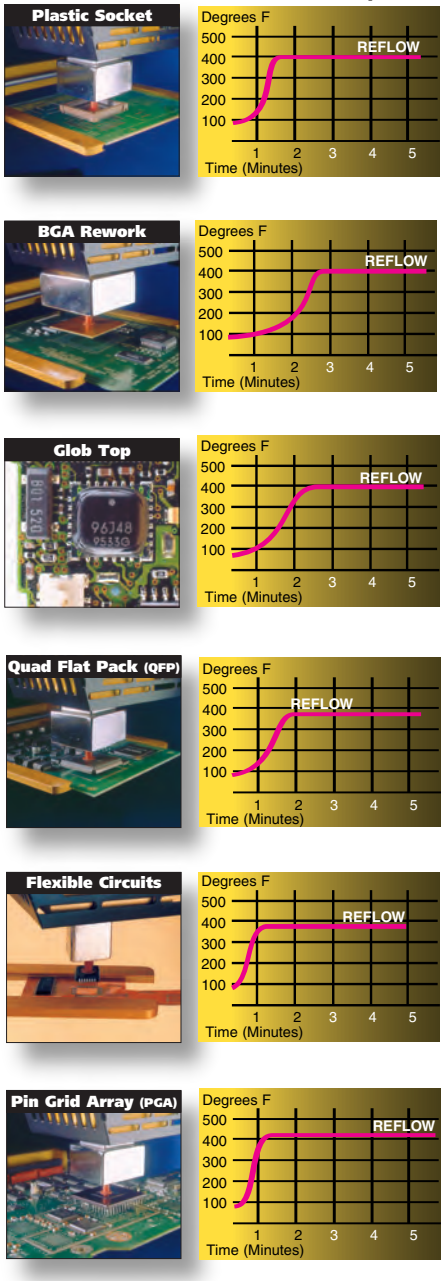
Features:

- High Power: 1200 Watts providing >100,000 Joules during a typical rework cycle, delivering >28,000 calories of energy, which enables the Chipmaster to work at reduced temperatures and with low 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

Profile Storage Controller

- Automatic component pick-up
- Uniform heat distribution
- PID Profile Storage Control for workshop 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

Ordering information

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

SMD-1000 System includes:

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

Part #	Description
SMD-1000	
8100-1003-114	Standard Chipmaster 110V 60 Hz CSA
8100-1023-114	Standard Chipmaster 220V 50 Hz CE

The Standard SMD-1000 Chipmaster includes components as shown

Information on SMT Tool Kit See page 20 "Nozzles" See page 11

Chipmaster and Chipmaster-Z Accessories

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

Automated Z Axis

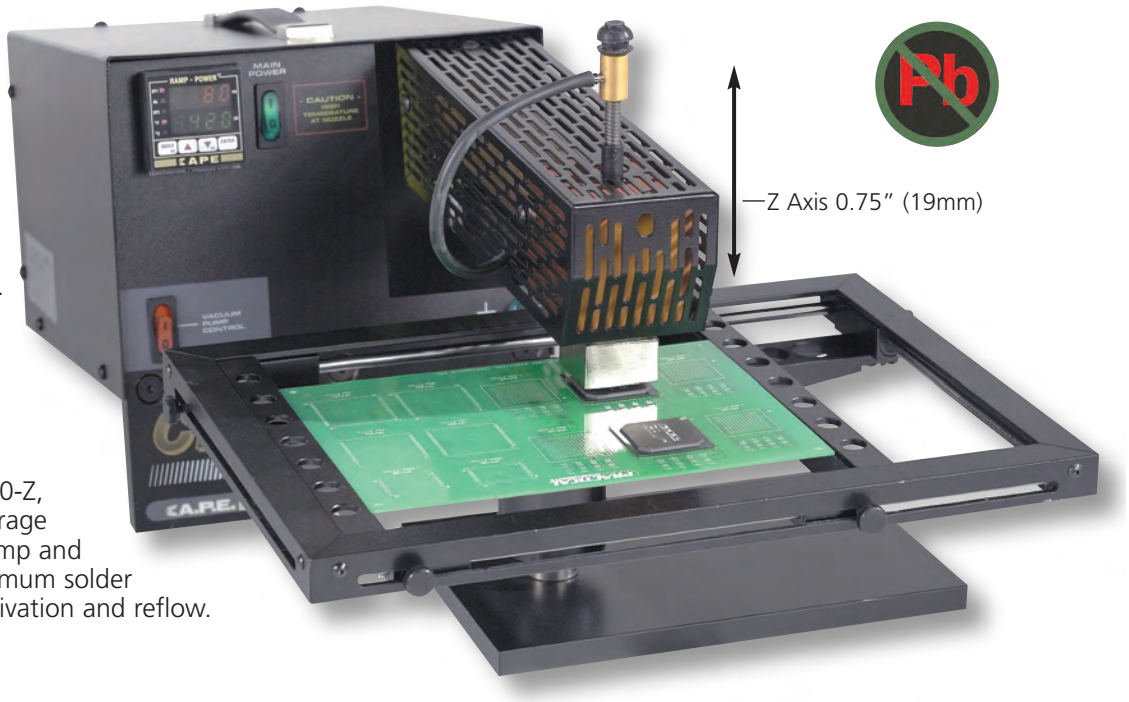
The Chipmaster-Z automates the Z axis adjustment and assists the user in clearing the area after rework. It also helps access the component without concern of surrounding obstructions.

New 4 Sided Frame Board Holder

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

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.

High Temperature Vacuum Cups

Available in three different sizes High Temperature Vacuum Cups specifically desgined for use with APE Hot Air products. Order online at www.ape.com

Part #	Description
8100-0003	Vacuum Cups 0.312
8100-0003S	Vacuum Cups 0.200
8100-0003L	Vacuum Cups 0.520
8100-0003A	Vacuum Cups Assorted

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)

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 Board Holder 8" x 12" (208 x 304mm)
Three (3) Reflow Nozzles (Users Choice)

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

Chipmaster-Z Axis Radiant RAD-6000-Z

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

Rework Larger PCBs Safely

A common problem in reworking larger 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 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

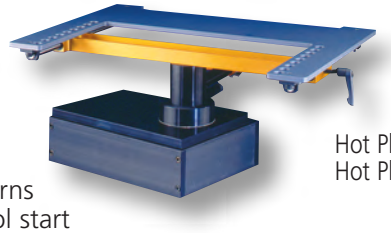
The Chipmaster-Z Axis Radiant delivers 144 sq. inches of digitally controlled radiant energy accurate to ±2°F, once calibrated. Its cast aluminum surface may be machined for unique profiling for one or more circuit boards.

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 Board 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	Board 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)

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 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.

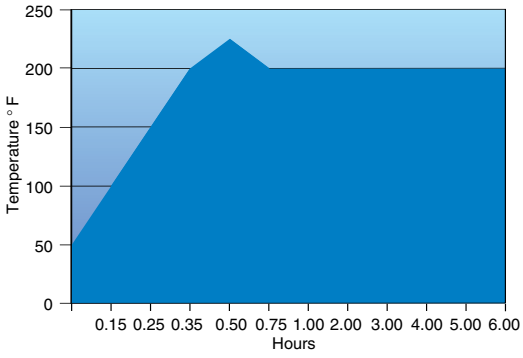
Digital Control

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 ±2°F.

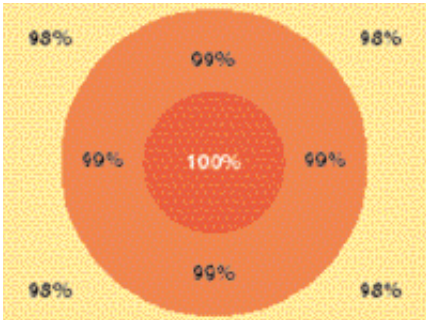
Safety First

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) ±2°F
Special Factory Regulated	700°F (371°C) ±2°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

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

Chipmaster Bottom Heaters SMD-2000 Series

Overview
Bottom Heaters are necessary in Lead-Free rework to assist in keeping top reflow conditions to the original manufacturing oven temperatures. The Dragon and Komodo Dragon can be used in conjunction with Chipper/Chipmaster systems.

Komodo Panel Bottom Heat Unit for Chipmaster

Panel PreHeat

A heavy duty 6" Round Bottom Panel Heater with a surface area of 64" (1,615mm). A Digital Closed-Loop Temperature Controller maintains the programmed temperature via high capacity 1200 Watt heater. Can be used with both Frame and Fork board holders. Also great for hand soldering.

Part #	Description
4000-1033	Komodo Dragon Bottom Heat System 110V 60 Hz
4000-1034	Komodo Dragon Bottom Heat System 220V 50 Hz

Dragon Focal Bottom Heat Unit

Focused PreHeat

A Digital Closed-Loop Ttemperature Controlled Bottom Heater for use with the Chipmaster. Includes a self-contained blower unit for constant low-velocity, high-volume air flow. Temperature may be directly focused using standard nozzles, which are interchangeable. The system is fully guarded throughout the length of the heater of the heater arm.

Order Information

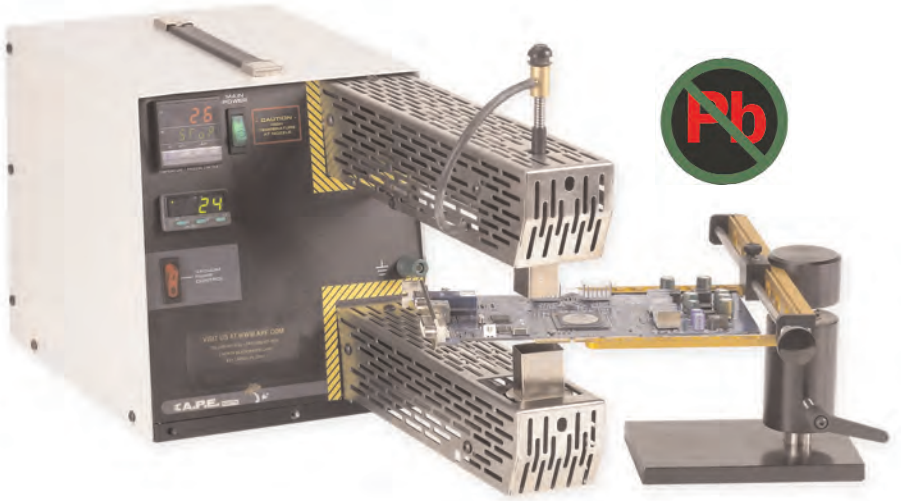
Part #	Description
2000-1000	Dragon Bottom Heat System 110V 60 Hz
2000-1002	Dragon Bottom Heat System 220V 50 Hz

The Dragon can be used with a Chipmaster-Z Axis (P-6) and a 14" x 16" Board Holder Upgrade.

Chip-Max RoHS Rdy Chipmaster 8300-33-RoHS-RdyChipmaster

Overview
An affordable, totally integrated system for SMT rework and repair, the Chip-Max RoHS Rdy. Chipmaster is an excellent choice in replacing older "Contact" rework tools wit h the latest Low Temperature Hot Air technology for reworking Lead Free SMT components without damage, at an affordable price.

Portable Benchtop Lead Free Rework



Low Temperature Operation

Accurate closed-loop temperature monitoring of a APE patented High Power heater, reduces rework temperature below 482°F (250°C). A bottom integrated heat source ensures stability of board temperature, reducing the necessary top reflow temperature, thereby following a more precise profile structure for the component undergoing rework.

SMT & Through-Hole Rework

A.P.E. Chip-Max Rework and manufacturing system performs surface mount and conventional component repairs. Nozzle 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.

Component Automatic Lift Off

The vacuum switch is turned on and the vacuum pick-up assembly is contacted to the top of component body. When the component passes the eutectic temperature the component automatically lifts from the circuit.

Order Information

Part #	Description
8300-33-RoHS-Rdy	RoHS Rdy. Chip-Max 110V 60 Hz
8300-34-RoHS-Rdy	RoHS Rdy. Chip-Max 220V 50 Hz
8100-0485	Board Holder 8" x 8" (203 x 203 mm) (included)
8100-0812	Frame Board Holder 8" x 12" (203 x 304 mm)
8100-2024	Frame Board Holder 14" x 16" (355 x 406 mm)

Chipmaster RoHS Rdy. Chip-Max

Total Power	110V/220V 50/60 Hz 2400 Watts
Current	16.36 Amps @ 110V, 10.91 Amp @ 220V
Dimension	22.25"x 9.25" x 8.62" (362 x 235 x 219 mm)
Board Holder	8" x 8" (203 x 203 mm)
Reflow Nozzles included	3 User Selected Nozzles (Optional nozzles available)
Bottom Heater	1200 Watts Forced Air Convection Heater
Temperature	Celsius or Fahrenheit Selectable
Reflow Air Velocity	12.7 CFM
Component Vacuum Pick-Up	Internal
Reflow Control	On-Board Fuzzy Digital Logic
Bottom Controller	PID Fuzzy Logic
Range	450 to 900°F (232 to 482°C)
Weight	40 lbs (18.14 Kilos)
Shipping	Standard
Includes	Board holder 8" x 8", SMT Tool kit, Nozzles, Footpedal

Toll Free: 1-800-VAC-TOGO (822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

The Nozzle Page

Overview

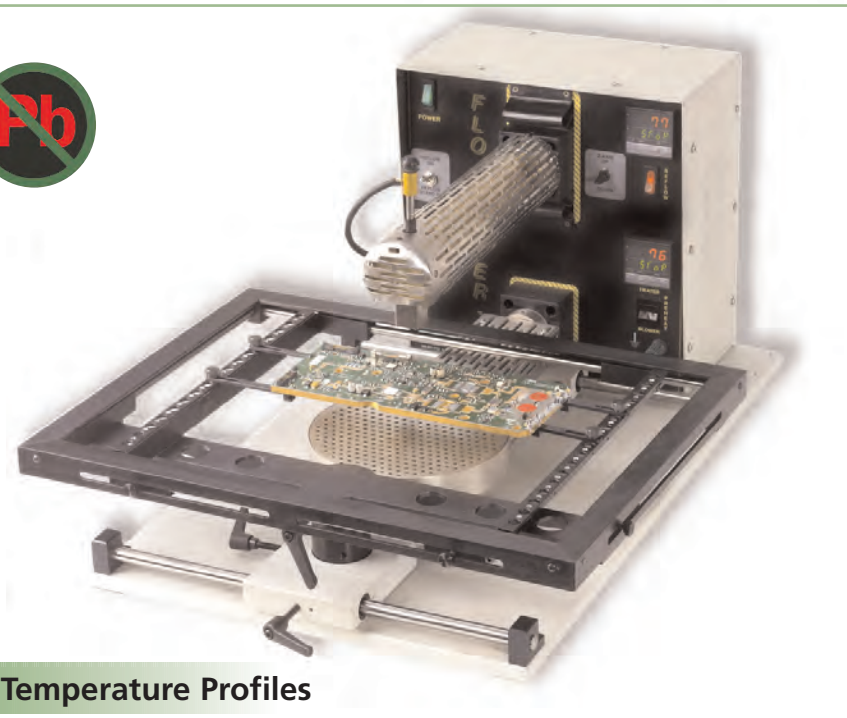
Large selection of Hot Air nozzles available for a variety of applications ranging from BGA's, RF shields, edge connectors, and Preheat nozzles. Please go to our online website www.APE.com for a more detailed and complete list of nozzles.

Inches	Millimeters	Part Number	Inches	Millimeters	Part Number
0.25 x 0.25	6.3 x 6.3	8100-0008	0.75 x 1.9	19.1 x 48.3	8100-1978
0.30 x 0.40	7.6 x 10.2	8100-0016J	0.75 x 2.0	19.1 x 50.8	8100-0028J
0.30 x 0.53	7.6 x 13.5	8100-7613	0.75 x 2.0	19.1 x 50.8	8100-0028
0.30 x 1.6	7.6 x 40.6	8100-1603	0.80 x 0.80	20.3 x 20.3	8100-0000-44
0.35 x 0.5	8.9 x 12.7	8100-0020J	0.83 x 0.83	21.1 x 21.1	8100-0080Q
0.37 x 2.20	8.9 x 55.9	8100-2204	0.897 x 1.77	22.8 x 45.0	8100-0817
0.40 x 0.45	10.2 x 11.4	8100-0018J	0.90 x 0.90	22.9 x 22.9	8100-0000-52
0.40 x 0.50	10.2 x 12.7	8100-0504	0.95 x 0.95	24.1 x 24.1	8100-0100Q
0.40 x 0.71	10.2 x 18.0	8100-1424	1.00 x 1.00	25.4 x 25.4	8100-0110
0.40 x 0.8	10.2 x 20.3	8100-0804	1.1 x 1.1	27.9 x 27.9	8100-0000-68
0.40 x 1.7	10.2 x 43.2	8100-1704	1.2 x 1.2	30.5 x 30.5	8100-0132
0.40 x 2.4	10.2 x 61.0	8100-2404	1.25 x 1.25	31.8 x 31.8	8100-1250
0.40 x 2.6	10.2 x 66.0	8100-2604	1.25 x 3.0	31.8 x 76.2	8100-3125
0.45 x 0.67	11.5 x 17.0	8100-1117	1.272 x 1.99	32.3 x 50.6	8100-0199
0.45 x 0.96	11.4 x 24.4	8100-4596	1.3 x 1.3	33.0 x 33.0	8100-1313
0.45 x 2.4	11.4 x 61.0	8100-0240	1.4 x 1.4	35.6 x 35.6	8100-1414-F
0.45 x 4.0	11.4 x 101.6	8100-4045	1.4 x 1.4	35.6 x 35.6	8100-1414-C
0.47 x 0.55	12.0 x 14.0	8100-1214	1.4 x 2.6	66.0 x 35.6	8100-2614
0.47 x 0.79	12.0 x 20.0	8100-2012	1.4 x 3.0	35.6 x 76.2	8100-3014
0.47 x 0.77	12.0 x 19.5	8100-1912	1.479 x 2.87	37.6 x 72.9	8100-1479
0.5 x 4.2	12.7 x 106.7	8100-4255	1.5 x 1.5	38.1 x 38.1	8100-1515
0.5 x 0.5	12.7 x 12.7	8100-0000-20	1.5 x 1.5	38.1 x 38.1	8100-0196Q
0.5 x 0.95	12.7 x 24.1	8100-0595	1.5 x 1.75	38.1 x 44.5	8100-5175
0.5 x 0.95	12.7 x 24.1	8100-0024J	1.5 x 3.35	38.1 x 85.1	8100-1305
0.5 x 1	12.7 x 25.4	8100-0510	1.57 x 2.146	39.9 x 54.5	8100-2115
0.5 x 1.35	12.7 x 34.3	8100-2460	1.6 x 1.6	40.6 x 40.6	8100-0161
0.5 x 4.5	12.7 x 114.3	8100-4505	1.625 x 1.625	41.3 x 41.3	8100-0340
0.51 x 1.06	13.0 x 27.0	8100-2713	1.69 x 1.69	43 x 43	8100-4343
0.53 x 0.53	13.5 x 13.5	8100-1313C	1.75 x 1.75	44.5 x 44.5	8100-1750
0.53 x 0.63	13.5 x 16.0	8100-1316	1.80 x 1.80	45.7 x 45.7	8100-1818
0.55 x 0.79	14.0 x 20.0	8100-1420	1.82 x 1.82	46.2 x 46.2	8100-1821
0.6 x 0.6	15.2 x 15.2	8100-0000-28	1.85 x 1.85	47 x 47	8100-4747
0.6 x 0.9	15.2 x 22.9	8100-0609	2.0 x 2.0	50.8 x 5.8	8100-2222
0.6 x 0.7	15.2 x 17.8	8100-0000-32	2.25 x 2.25	57.1 x 57.1	8100-2225
0.65 x 1	16.5 x 25.4	8100-0640	2.5 x 2.5	63.5 x 63.5	8100-2525
0.7 x 1.4	17.8 x 35.6	8100-1407	2.5 x 4.5	63.5 x 114.3	8100-2545
0.7 x 1.525	17.8 x 38.7	8100-0157	2.75 x 2.75	69.9 x 69.9	8100-2775
0.7 x 2.0 x .25	17.8 x 50.8 x 6.4	8100-0101PA	3.00 x 3.00	76.2 x 76.2	8100-3030
0.7 x 2.3	17.8 x 58.4	8100-2307	3.25 x 3.25	82.3 x 82.3	8100-3225
0.7 x 2.6	17.8 x 66.0	8100-0267	3.50 x 3.50	88.9 x 88.9	8100-3535
0.715 x 0.715	18.2 x 18.2	8100-7171	3.75 x 3.75	95.3 x 95.3	8100-3725
0.72 x 1.5	18.3 x 38.1	8100-1572	1.3 x 1.3	33 x 33	8100-1313P
0.75 x 0.75	19.1 x 19.1	8100-7575	1.5 x 1.5	38.1 x 38.1	8100-0196P

Flo-Master-Z™ SMD-5000-Z Series

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

For Gentle but Powerful Rework



Energy Reflow with Z-Axis

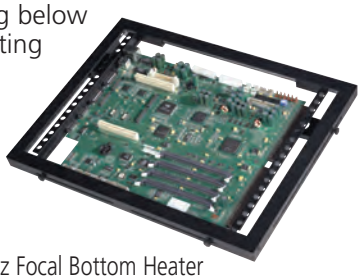
The Flo-Master-Z BGA/SMT rework and repair engine is a fully integrated dual, top and bottom heat system, including an electrically actuated Z-Axis, designed to handle Lead-Free conditions, Military-type boards, and commercial applications that require an efficient level of energy versus temperature.

Bottom Heat

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

Latched Top and Bottom Control

The top reflow controller triggers the bottom heater thereby controlling the overall 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 workpiece, preventing unnecessary overheating.



Temperature Profiles

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

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
5000-2000-ZP	Flo-Master-Z 110V 60 Hz Panel Preheater
5000-2002-ZP	Flo-Master-Z 220V 50 Hz Panel Preheater
8100-0812	Board Holder 8" x 12" (203 x 305 mm) (included)
8100-1416U	Board Holder Upgrade 14" x 16" (355 x 406 mm)
8100-2024U	Board Holder Upgrade 20" x 24" (508 x 609 mm)

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

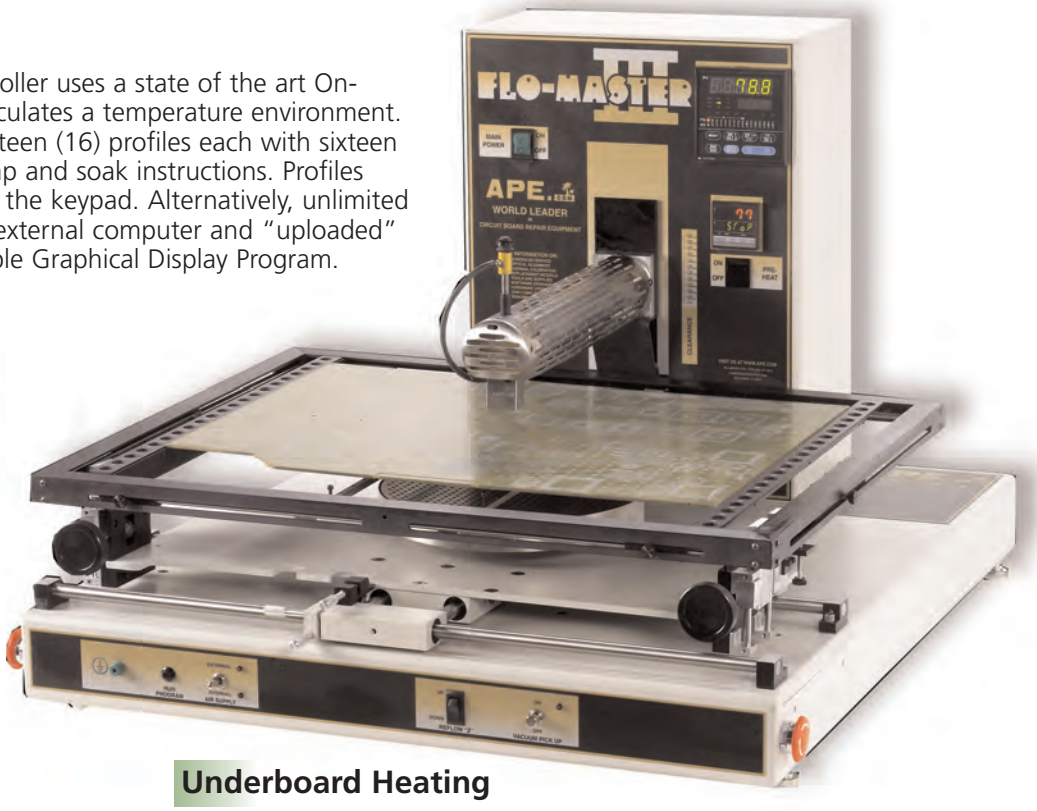
Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

Flo-Master II SMD-5002 & Flo-Master III SMD-5003

Overview
The Flo-Master series includes integrated features for computer profiling of components. The Flo-Master series should be considered for PCB's greater than 12" x 14" (305 x 356 mm). Preheats can be configured in either a Focal preheat or Panel preheat The standard model includes a 14" x 16" (355 x 406 mm) Board Holder, a 20" x 24" (508 x 609 mm) is available as a standard upgrade option.

Multiple Profile Storage

The Flo-Master series 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.



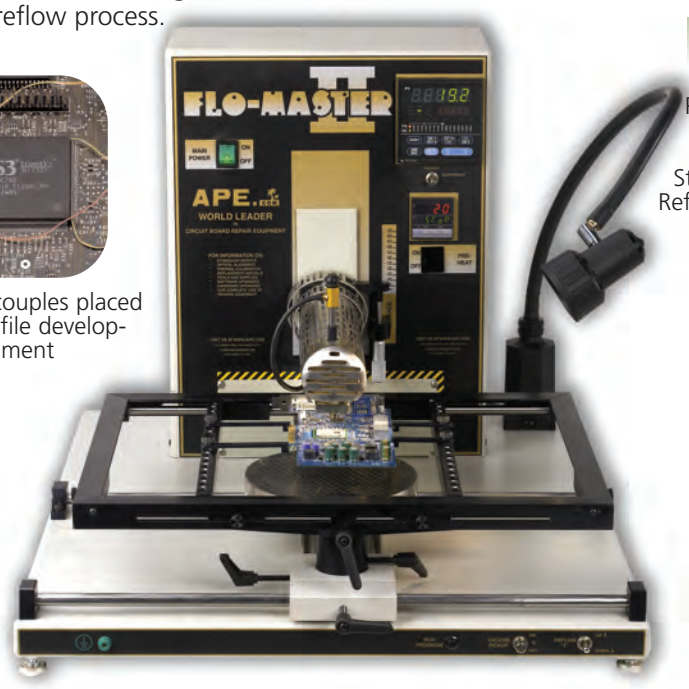
Simple Operation

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

Underboard Heating

The Flo-Master series 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. Available both in a focal or panel pre-heat version.

Thermocouples placed for profile development



Flo-Master II & III Series Specification:

Power Top Heater	110–220V 1200 Watts
Power bottom Heater	1200 Watts - 2400 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
Standard Board Holder	Frame 8" x 12" (203 x 304 mm)
Reflow Nozzles included	Three Nozzles of Choice
Temperature	Select Celsius or Fahrenheit
Reflow Air Velocity	Internal Motor <12.7 CFM
Component Pick Up	Internal Pump -Shop Air option
Controller	On Board PID Computers/ Optional Windows PC graphical Software
Weight	125 lb (56.81kg)

Part #	Description
5000-1500	Flo-Master II Focal Bottom Heat 110V 60 Hz
5000-1502	Flo-Master II Focal Bottom Heat 220V 50 Hz
5000-6002	Flo-Master II Panel Bottom Heat 220V 50 Hz
5003-1002	Flo-Master III Panel Bottom Heat 220V 50 Hz

Board Holders:

8100-2024	20"x 24" (508 x 610 mm) (upgrade) Included with Flo-Master III

APE NEW PRODUCTS Liberty Split Vision Rework Systems

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 Placement system only. Systems configured with a Bottom Heater are suitable for Lead-free 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 board sizes up to 14" x 16."

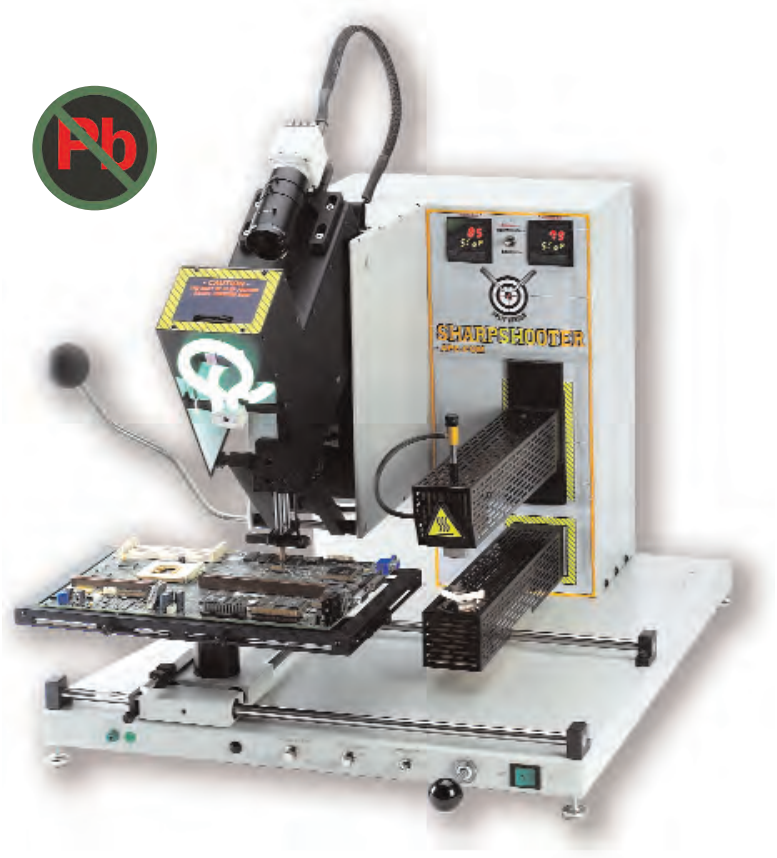
XY Table

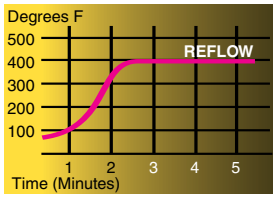
The basic model 7500-1000 is equipped with a free standing 8" x 12" Frame Board Holder with a Teflon coated base for easy positioning (see below). The model 7500-1500 includes the same Frame Board Holder but mounted on linear rails, (see Sharpshooter photo adjacent).

Profile Storage Controller

A dual system of Microprocessor Profile Storage Controllers is provided for high throughput repair conditions, optimizing performance and providing soak/ramp without a computer accessory.

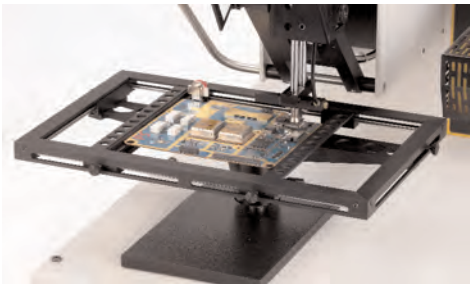
These Top Reflow and Bottom Pre-Heat Controllers are electrically coupled and include Integrated Digital Timers, Digital Closed-Loop sensing and an optimum process with repeatability <2% of set point temperature °F and °C selectable





Order Information

Liberty series Part #	(Pb = Lead-Free compliant) Description
7500-1500 **Pb**	Bandit Top/Bottom Heat 110V 60Hz
7500-1502 **Pb**	Sharpshooter Top/Bottom Heat 220V 50Hz
7500-1000	Bandit Top Heat only 110V 60Hz
7500-1002	Sharpshooter Top Heat only 220V 50Hz
7500-0250	Bandit vision system only 110V 60Hz
7500-0252	Sharpshooter vision system only 220V 50Hz
8100-1416	Optional Frame Board Holder 14" x 16"



Basic Free Standing Board 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 Board 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	Internal Pump -Shop Air option
Controller	On Board PID Computers
Monitor for Lightning	13" Color Display
Board Alignment	Micrometer Controls
Reflow Operation	Close Loop
Weight	125 lb (56.81kg)

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

APE NEW PRODUCTS Intruder Lightning Split Vision

There are two variations in the Intruder series, both are suitable for Lead-Free 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 machine includes a manual component placement arm with a final precision touch-down stage. Programming and reflow functions are identical to the Sniper series of systems.

Thermocouples placed for profile development

Profile Pattern Generation

The Intruder-Lightning includes an On-Board-Computer, which is programmed and operated using an integral keypad. Alternatively the system can be controlled via an RS232 connection with an external computer.

Graphical Display Window (GDW) 7000-1250

External Computer software is optional on the Intruder-Lightning. 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 (optional with the Intruder-Lightning). Note that the TC Bank is used for 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)
Board Holder Lightning	Frame 8" x 12" (203 x 304 mm)
Board 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

APE NEW PRODUCTS Intruder Marksman Split Vision

The Intruder-Marksman 7500-7500 has a Panel Bottom Heater and is recommended for larger boards, particularly when assemblies are manufactured using Lead-Free materials. The machine includes a manual component placement arm with a final precision touch-down stage. Programming and reflow functions are identical to the Sniper series of systems, generating "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 with 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 (optional with the Intruder-Lightning). Note that the TC Bank is used for development and need not be used in production.

Order Information

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

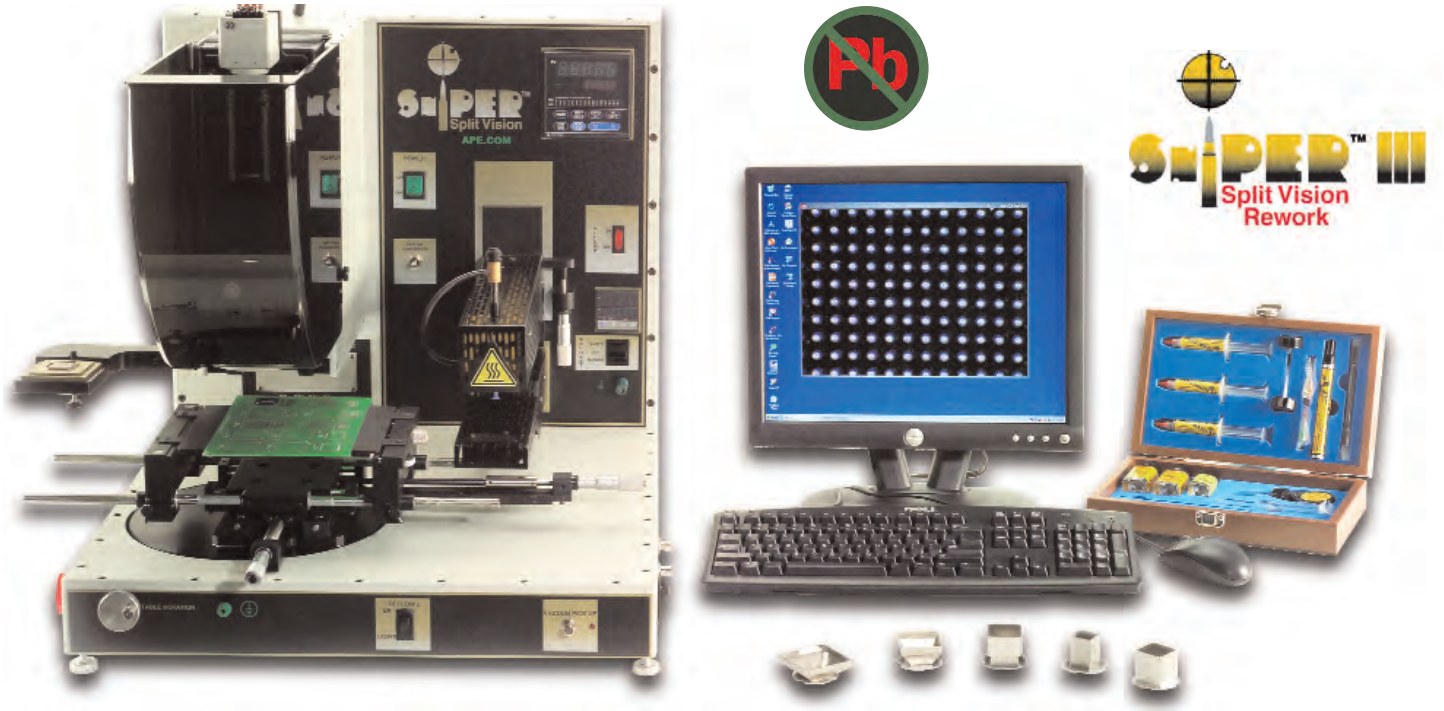
Intruder-Marksman Specification:

Total Power	110–220V 2100 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
Board Holder Lightning	Frame 8" x 12" (203 x 304 mm)
Board Holder Marksman	Frame 14" x 16" (355 x 406 mm)
Reflow Nozzles included	Three Nozzles of Choice
Bottom Heater	Panel Heater 1200 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

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

APE Sniper III Split Vision Rework System

Overview
The Sniper III is a rigidly constructed automatic placement system designed for high production rework environments. One station of the Sniper III removes the device, the other station places a new component. A monitor reflects the image of the bottom of the chip and the footprint on the board. These are then adjusted to exactly overlay each other and the component placed automatically. The part is then reflowed.



Energy Reflow

The Sniper III 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 absolute control in positioning 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 component during alignment and automatically snap releases the component during placement.

Order Information

Part #	Description
7750-0033	Sniper III 110V 60Hz
7500-0034	Sniper III 220V 50Hz

Stand alone Sniper unit available as Sniper II unit no PC and software.

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 component to the contact land pattern.

Programming and Operation

The Sniper III 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 III Specification:

Power	110–220V 1800 Watts
Current	25 Amps @ 110V, 15 Amps @ 220V
Dimension	21.75" x 29.12" (552 x 740 mm)
Board Holder Standard	12" x 16" (305 x 406 mm)
Reflow Nozzles included	See Flo-Master Page 12
Preheat Nozzles included	See Flo-Master Page 12
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 III Only
Controller	On-Board-Computer
Profile Generation	Pentium IV with 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 SMD-7007

Overview
The Sniper-WB is a higher-powered machine designed to handle large PCBs with 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 and 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 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 a profile pattern, when used with the external computer software (7000-1250) provided. Note that the TC Bank is used for 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 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 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)
Board Holder	20" x 24" (508 x 610 mm)
Reflow Nozzles included	See Flo-Master Page 12
Bottom Heater	2400 Watts Forced Air Convection Panel Heater
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)
Optional Features	Nitrogen Preheat and Pen Cam

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

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 component to be viewed from the underside and superimposed over an image of the contact land pattern on the PCB.

Component Alignment

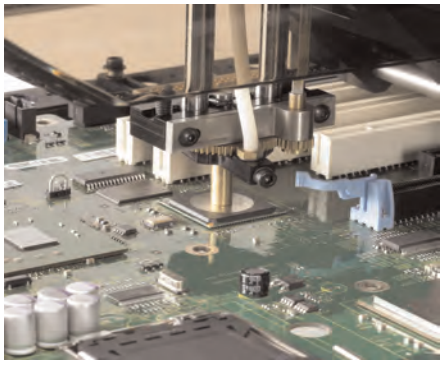
Precision Micrometers align the two lead patterns; the camera's zoom and focus are adjusted to comfortably align and view the PCB and component on the monitor.

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 components without additional setup. To view the diagonal corners of very large 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.

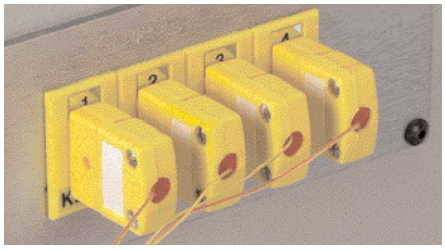


Nitrogen & Pencam (Sniper options)

7000-NITR	Nitrogen Preheat
7000-PCAM	Reflow Pen Cam

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 Board Holder Kits are available for smaller and larger board types.



Thermocouple (TC) Bank

Sniper III & Sniper WideBody only

Thermocouples are used to develop a 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.

Nitrogen Preheat & Pencam

An optional Nitrogen Preheat injection system is available. Nitrogen is preheated and injected into the selected reflow cycle for a nitrogen rich atmosphere. Optional Pencam can be installed to watch solder balls reflow and collapse. Can also be used for inspection during the job and after completion of the work for visual inspections.

On-Board Computer

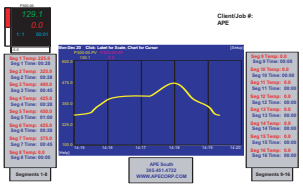
All systems can be operated without an external computer directly from the On-Board-Computer. This controller can run pre-programmed Profile Patterns. The Bottom Heater is automatically controlled by the on-board computer ensuring complete process control.

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 rework cycle is automatically controlled and shut off after completion.

Graphical Display Window (GDW)

The computer software provided 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 Rework and Repair

Aids for Rework and Repair
A key ingredient to successful repair is to use a system of high quality cleansing and preparation materials to remove and replace a component. APE SMT products have been specifically formulated for 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 rework possible.

Part #	Description
8100-1097	SMT Tool Kit

Kit includes:

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

Consumable Rework Materials:

No-clean Flux Paste Kit

APE No-Clean 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 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

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

No-Clean Liquid Flux Wetting Solution Kit

Wetting Solution Kit

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

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

PCB Pad-Prep Pen Kit

Pad Prep Kit

- Pad Cleaning
- Conformal Coating Removal
- General Cleaning

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

No-Clean Solder Paste kit

No-clean Solder Paste Kit

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

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

General Consumables Kit

- General Assortment of Kit Supplies

Part #	Description
8100-2300	General Consumable Kit

SMD-2000M SMT/PTH Self Contained Repair System

Overview
The APE SMD-2000M Self Contained SMT/PTH Repair & Desolder system is the ideal station for sensitive expensive electronic circuit repair. The SMD-2000 is a surface mount and conventional component repair and rework station. This all-in-one station is capable of electroplating, drilling/grinding, conventional soldering, desoldering, paste dispensing, hot wire stripping, conformal coating removal and many other uses. One station for all of your circuit board repair needs.

SMT & Through-Hole Rework

SMD-2000M Rework and manufacturing system performs surface mount and conventional repairs. Temperature is electronically controlled from 450 to 900F (232 to 482C). Two programmable digital controllers feature responsive closed-loop temperature control with large LED readouts, indicating "Set" and "Operating" temperatures.

Track and Trace Repair

Precision Drilling, Grinding, Cutting and sanding circuit boards capable with optioinal Cirk Grind System. It removes coating, cuts circuits, cuts leads, drills holes, cuts slots, shapes FR4 and performs many other procedures using various interchangeable bits.

Gold Contact Repair

Repair Gold finger contacts on circuit boards, but the optional Quick Plate Kit can be used to electroplate a variety of materials, e.g., lead, tin, copper to nickel, aluminum, and gold. Cleans and electroplates printed circuit board connector contacts and other electronic assemblies

Model	Part #	Description
SMD-2000EM	6200-0003	(EM) Domestic Version Complete (110V)
SMD-2000EM	6200-2005	(EM) Domestic Version Complete (220V)
SMD-2000DM	6200-0005	(DM) Domestic Version Complete (110V)
SMD-2000DM	6200-2004	(DM) Domestic Version Complete (220V)
SMD-2000EMP	6200-0008	(EMP) Domestic Version Complete (110V)
SMD-2000EMP	6200-2008	(EMP) Domestic Version Complete (220V)
SMD-2000M	6200-0009	(M) Domestic Version Complete (110V)
SMD-2000M	6200-2009	(M) Export Version Complete (220V)

Safety Rating:

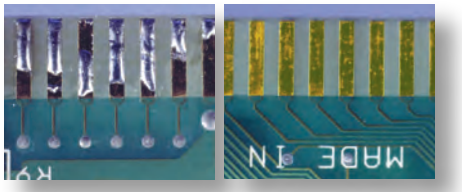
USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE

Standard System Includes:

1700-0060	SMD Hot Air Jet Reflow tool
1700-6700	EX-1700 Desolder Handpiece
2200-0130	Resistive Tweezer with Tips
2900-0132	Thermal Parting Unit
3550-0602	Dual Holder Assembly
3550-6000	SMD Thermal Holder
4000-8402	Power Cord (110V)
6000-2400A	Thermal Tweezer Handpiece 24V
6000-2500	Vacuum Pick and Place Wand
5000-8404	Electric Foot Pedal w/ plug
6000-0286	Cushion Grip Desolder Extractor
6730-3803	MTD Cleaning Unit Assembly
6910-2700	SMT/PTH Solder Iron w/ Tip (24v, 5wire)
8000-0100	Power Cord (220V)

Optional:

0690-0002	Quick Plate Kit
2300-0132	Conductive Tweezers with Tips
2400-0133	Thermal Strippers with Tips
2700-0001	Therm-Tool Kit
6000-2600	SMD ThermoVac Tool
6000-5000	Solder Paste Kit
6000-5001	Tip Holder
6000-5002	Solder Paste Holder
6000-5200	Assortment Kit
6000-6780	Drill Kit Assortment (Cirk Grind)
6700-1394	Starter Consumable Kit
6700-8717	Spare Kit
6700-8719	One Year Consumable Kit
6910-4229	Dispensor Kit
7300-0060	Cirk Grind System, Complete w/ Accesories



Before After

Specifictions:

Total Power	110V/220V 50/60 Hz 2400 Watts
Current	16.36 Amps @ 110V, 10.91 Amp @ 220V
Dimension	15"x 12.5" x 6" (381 x 304 x 152 mm)
Temperature	Celsius or Fahrenheit Selectable
Range	450 to 900°F (232 to 482°C)
Weight	29 lbs (13.15 Kilos)
Internal Vacuum Supply	4" to 20" Hg.

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

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	Thermal Tweezer Handpiece
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

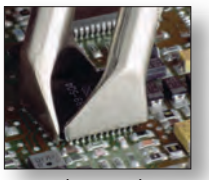
The Desolder Handpiece may also be used to remove residue solder from reworked spheres on BGA patterns.

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	Thermal Tweezer Handpiece
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 Heater 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 29.

Chipper Plus CX-750

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

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

Digital Solder & Desolder Station EX-700

Closed-Loop Digital Control

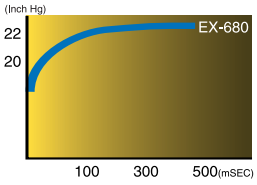
A Digital Closed-Loop Sensor controlled Solder & Desolder Station with SMT upgrade features, represents an ideal manufacturing and rework system for sensitive components.

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.



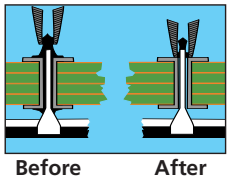
Time required to reach the maximum vacuum

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 Heater 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	Thermal Tweezer Handpiece
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



Before After

Multilayer Desoldering

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

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

Digital Desolder Station (Factory Air) EX-680

Digital Temperature Control

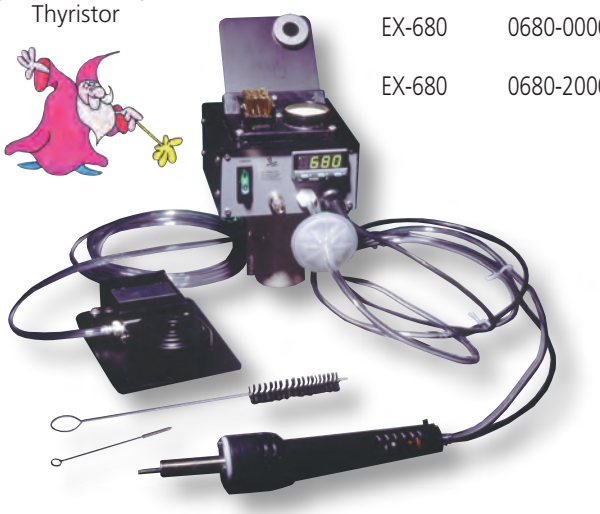
A powerful and economic Desoldering system for leaded components, featuring a large LED display for temperature set, operation and operator lock out. Vacuum is achieved through an in-house air supply, filtered and regulated from 60 to 120 psi; a PNEU-VAC foot pedal activates a Venturi system for an instant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

EX-680 Includes:

1700-6700	Desolder Handpiece 24V, 60 Watts
9000-0053	PNEU-VAC Foot Pedal Venturi
3550-0600	Cleaning Station Holder
6700-4223	Tip Kit
6700-0112	Desolder Heater 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 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

Analog Desolder Station (Factory Air) EX-675

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 to120 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
9000-0053	PNEU-VAC Foot Pedal Venturi
3550-0600	Cleaning Station Holder
6700-4223	Tip Kit
6700-0112	Desolder Heater Wire Cleaning Brush
6700-0010	Glass Tube Cleaning Brush
3000-5002	Fixed Stop-Clog Filter Assembly
0675-0675	Manual

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:

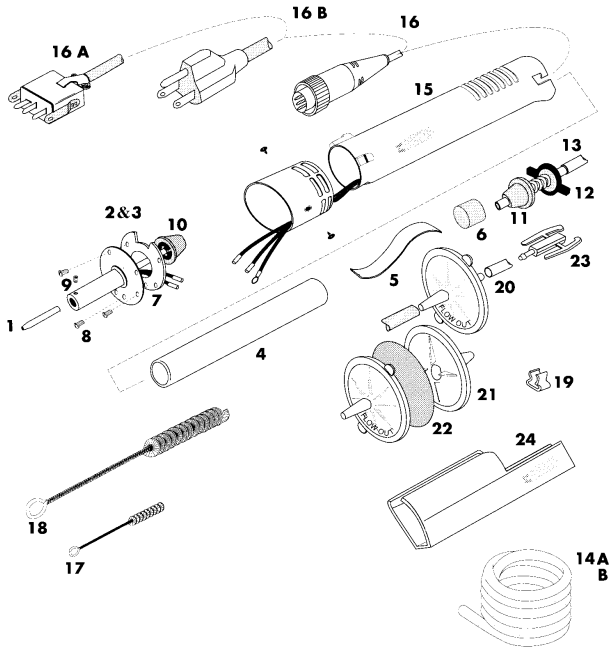
USA	MIL-STD-2000-A
USA	MIL-S-45743E
USA	WS-6536E
EUROPE	CE

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

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.



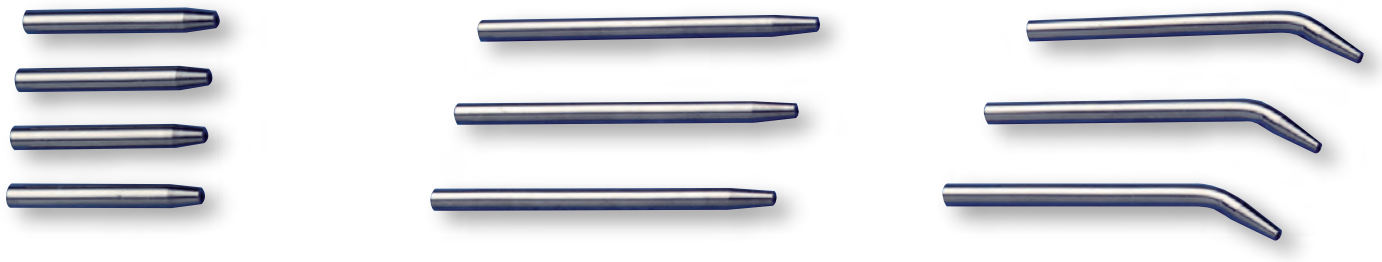
	Handpiece EX-1700 (1700-6700) For EX-750, 700, 680 Sensor		Handpiece EX-1500 (1500-6700) For EX-675, Non-Sensor	
1	Desolder Tips (see below)		Desolder Tips (see below)	
2	6700-1724	Heater & Seal Assy 24V, 37 Watt	6700-0045	Heater & Seal Assy 110V, 40 Watt
3	6700-1760	Heater & Seal Assy 24V, 60 Watt (AirJet)	6700-0060	Heater & Seal Assy 110V, 60 Watt
4	6700-3200	Glass Tube	6700-3200	Glass Tube
5	6700-4100	"S" Baffle	6700-4100	"S" Baffle
6	6700-0100-P25	Glass Tube Filter Felts	6700-0100-P25	Glass Tube Filter Felts
7	6700-3813-P2	Heater Insulator	6700-3813-P2	Heater Insulator
8	6700-7017-P3	Heater Retaining Screws	6700-7017-P3	Heater Retaining Screws
9	6700-7700-P10	Set Screws	6700-7700-P10	Set Screws
10	6700-7201	Forward Seal	6700-7201	Forward Seal
11	6700-7200	Rear Seal	6700-7200	Rear Seal
12	6700-7302	End Cap Retaining Clip	6700-7302	End Cap Retaining Clip
13	6700-7300	End Cap Assembly	6700-7300	End Cap Assembly
14A	7000-8790	Tubing 5 feet length	7000-8790	Tubing 5 feet length
14B	7000-8701	Tubing 12 feet length (EX-680, EX-675)	7000-8701	Tubing 12 ft length (EX-680, EX-675)
15	6700-0287	Handpiece Replacement Assembly	6700-0287	Handpiece Replacement Assembly
16	4000-8417	24V Power Cord (Din)	6700-4000	110V Power Cord
17	6700-0112-P5	Desolder Tube Wire Brush	6700-0112-P5	Desolder Heater Wire Brush
18	6700-0010-P5	Glass Tube Cleaning Brush	6700-0010-P5	Glass Tube Cleaning Brush
19	6700-2002-P5	Hose Clamps for Tubing	6700-2002-P5	Hose Clamps for Tubing
20	3000-5002	Filter Fixed Stop Clog	3000-5002	Filter Fixed Stop Clog
21	3000-5003	Filter Replaceable Stop Clog	3000-5003	Filter Replaceable Stop Clog
22	3000-5001-P10	Replaceable Filter Element	3000-5001-P10	Replaceable Filter Element
23	6700-8799	Quick Disconnect	6700-8799	Quick Disconnect
24	6700-0286	Handpiece Insulator	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	
	in.	mm	in.	mm
1212-0225	0.025	0.630	0.060	1.520
1212-0440	0.036	0.910	0.072	1.830
1212-0550	0.050	1.270	0.085	2.160
1212-0660	0.060	1.520	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	0.060	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
2570-2570	1	Manual

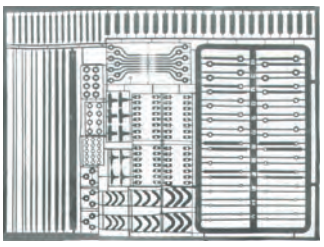
Standard Track Repair Kit 2570-0025

Part #	Qty	Description
7293-3522	2	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

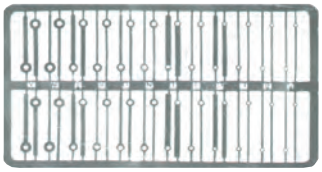
Basic Track Repair Kit 2570-0010

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

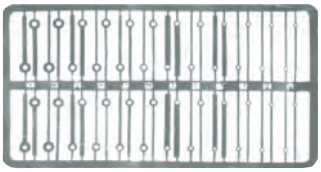
Track Frames



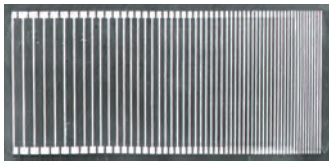
Master Frame
7293-3522



Frame A-Y
7103-2936



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

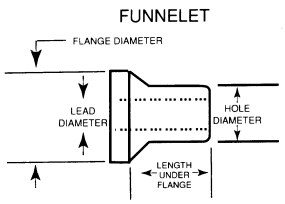


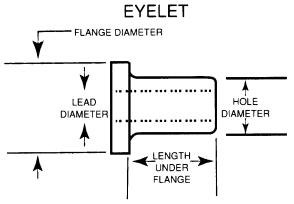
Conductor Frame
7113-2634

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

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 (1.588) 1/16
2000-0010	.068 (1.727)	.102 (2.590)	.114 (2.895)	.058 (1.473)	Eyelet	.062 (1.588) 1/16
2000-0014	.030 (.7620)	.073 (1.854)	.046 (1.168)	.021 (.5334)	Eyelet	.046 (1.910) 3/64
2000-0018	.046 (1.168)	.052 (1.320)	.082 (2.082)	.035 (.8890)	Funnelet	.062 (1.588) 1/16
2000-0023	.059 (1.498)	.093 (2.362)	.105 (2.667)	.046 (1.168)	Eyelet	.062 (1.588) 1/16
2000-0025	.038 (.9652)	.047 (1.193)	.065 (1.651)	.026 (.6604)	Funnelet	.031 (0.794) 1/32
2000-0038	.047 (1.193)	.093 (2.362)	.082 (2.0828)	.035 (.8890)	Funnelet	.062 (1.588) 1/16
2000-0043*	.121 (3.073)	.093 (2.362)	.200 (5.080)	.096 (2.438)	Eyelet	.062 (1.588) 1/16
2000-0046	.60 (1.524)	.088 (2.235)	.095 (2.413)	.046 (1.168)	Funnelet	.062 (1.588) 1/16
2000-0048	.047 (1.193)	.118 (2.997)	.080 (2.032)	.035 (.8890)	Funnelet	.093 (2.381) 3/32
2000-0053*	.152 (3.860)	.093 (2.362)	.245 (6.223)	.132 (3.352)	Eyelet	.062 (1.588) 1/16
2000-0055	.040 (1.016)	.075 (1.905)	.062 (1.574)	.026 (.6604)	Funnelet	.062 (1.588) 1/16
2000-0058	.047 (1.193)	.085 (2.159)	.072 (1.828)	.036 (.9144)	Funnelet	.046 (1.910) 3/64
2000-0098	.059 (1.498)	.127 (3.225)	.095 (2.413)	.046 (1.168)	Funnelet	.093 (2.381) 3/32
2000-0203	.030 (.7620)	.094 (2.387)	.046 (1.168)	.021 (.5334)	Eyelet	.062 (1.588) 1/16
2000-0205	.047 (1.193)	.125 (3.125)	.080 (2.032)	.036 (.9144)	Eyelet	.093 (2.381) 3/32
2000-0206	.046 (1.168)	.100 (2.540)	.076 (1.930)	.034 (.8636)	Eyelet	.062 (1.588) 1/16
2000-0207	.047 (1.193)	.062 (1.574)	.080 (2.032)	.036 (.9144)	Eyelet	.031 (0.794) 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 (1.910) 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 (2.381) 3/32
2000-0230	.047 (1.193)	.062 (1.574)	.080 (2.032)	.036 (.9144)	Funnelet	.031 (0.794) 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 (2.381) 3/32
2000-0246	.046 (1.168)	.088 (2.235)	.080 (2.032)	.034 (.8636)	Funnelet	.046 (1.910) 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 (2.381 3/32
2000-0858	.030 (.7620)	.054 (1.371)	.046 (1.168)	.021 (.5334)	Eyelet	.015 (0.397) 1/64
2000-0865	.030 (.7620)	.088 (2.235)	.046 (1.168)	.021 (.5334)	Eyelet	.062 (1.588) 1/16
2000-1083	.078 (1.981)	.115 (2.920)	.110 (2.794)	.066 (1.676)	Funnelet	.093 (2.381) 3/32
2000-1084	.031 (.7874)	.088 (2.235)	.055 (1.397)	.021 (.5334)	Funnelet	.062 (1.588) 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 (1.588) 1/16
2000-1925	.046 (1.168)	.092 (2.336)	.076 (1.930)	.034 (.8636)	Eyelet	.062 (1.588) 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 printed circuit board connector contacts and other 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 Finger Contacts on circuit boards, but the system may be used to electroplate a variety of materials, e.g., lead, tin, copper to nickel, aluminum, and gold.

Voltage Control

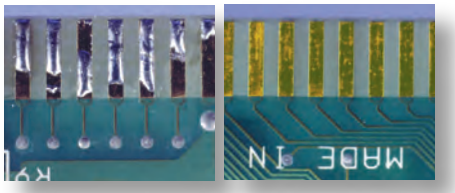
The SRS-069 is a low power system with a precision voltage source where the output voltage controls the activation of the plating solution. This voltage is controlled to within three percent by the internal regulator.

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, combined with the EX-680 Desolder System.



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

Cont'd

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

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

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.

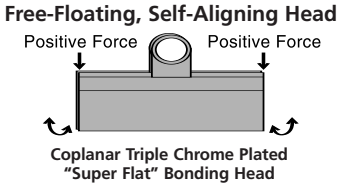
Ingredients for a Successful Bond:

- Time
- Temperature
- Profile
- Pressure

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

Pressure

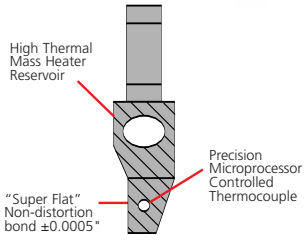
Pressure is applied by a calibrated tension, maintained by a Bearing Carriage and determined by a Thumb Wheel Adjuster. A Locking Pin protects against intervention.



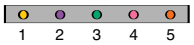
Bonding Lock

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.

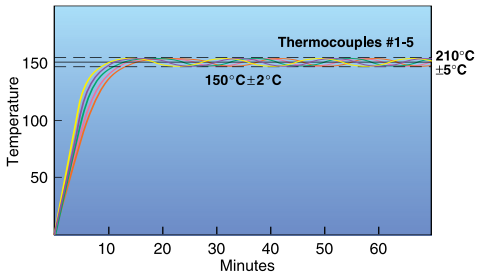


Bonding Surface Thermal Stability

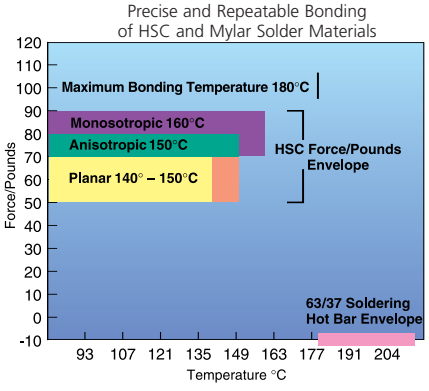


Embedded Thermocouple Test (bottom view) in Bonding Head

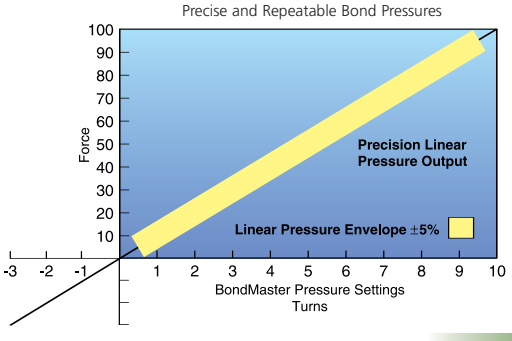
Test Results



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

Applications

- LCD Repair
- Pager Repair
- Hot Bar Bonding
- Flex Panels
- OLED displays
- Reflow Soldering
- Heat Staking
- Hot Bar Soldering
- ACF Bonding
- Flex Circuits
- Ribbon Cables
- Gold Wire Bonding
- Anistropic Conductive Adhesives
- TFT Modules
- Heat Sealing
- Radio Repair
- Solar Cell Production
- TAB Soldering
- Conductive Adhesives
- HSC Bonding
- Mobile Phones
- Thermocompression Bonding

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.

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

Specifications:

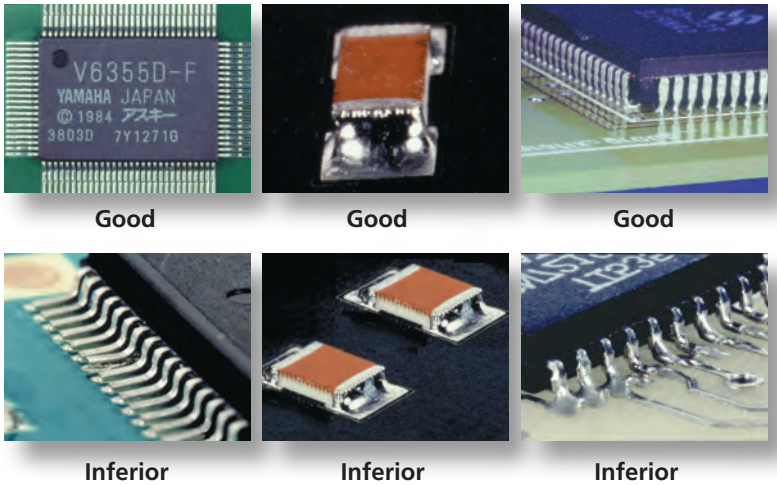
Electrical	110V/220V, 50/60Hz
Power	200 Watts
Mechanical	Aluminum Plate Construction
Dimension	15" x 12" x 12" (381 x 305 x 305 mm)
Weight	14 lbs. (6.36 Kg)
Temperature	Ambient up to 550°F (288°C)
Pressure	0–100 lbs. (45.45 Kg) Adjustable
Time	Programmable 1 sec to 3 minutes

Toll Free: 1-800-VAC-TOGO(822-8646) Phone: 305-451-4722 Fax: 305-451-3374 e-mail: sales@ape.com

Reference Data Page

Overview
This page is an important aid in developing thermal profiles for reworking components. Lead-free alloys require higher melting temperatures. A glossary of commonly used terms is also listed.

Solder Joint Comparison

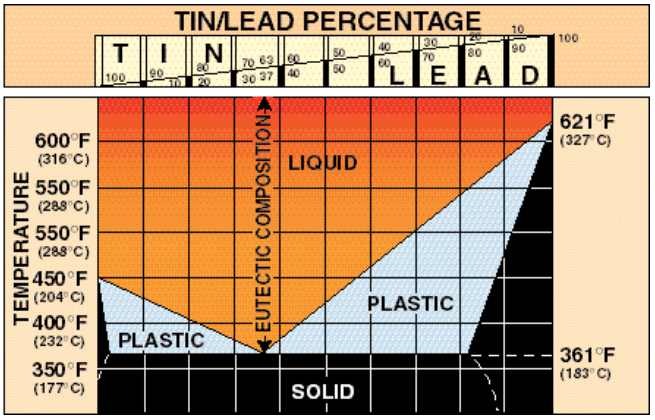


Good Good Good

Inferior Inferior Inferior

Photographs, courtesy of Soldering Technology International Inc.

Melting Range of Common Solder Alloys



Glossary of terms

Anosotropic	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
Perimiter BGA	Spheres constructed around circumference of BGA for Computer Board compatability
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

Alloy Composition	Melting Range Solidus		Melting Range Liquidus		Mushy Range	
	°C	°F	°C	°F	°C	°F
70Sn/30Pb	183	361	193	380	10	19
63Sn/37Pb	183	361	183	361	0	0
60Sn/40Pb	183	361	190	375	7	14
50Sn/50Pb	183	361	216	420	33	59
40Sn/60Pb	183	361	238	460	55	99
30Sn/70Pb	185	365	255	491	70	126
25Sn/75Pb	183	361	266	511	83	150
10Sn/90Pb	268	514	302	575	34	61
5Sn/95Pb	308	586	312	594	4	8
62Sn/36Pb/2Ag	179	355	179	355	0	0
10Sn88Pb/2Ag	268	514	290	554	22	40
5Sn/92.5Pb/2.5Ag	292	558	292	558	0	0
5Sn/90.5Pb/1.5Ag	287	549	296	564	9	15
5Sn/93.5Pb/1/5Ag	296	564	301	574	5	10
2Sn/95.5Pb/2.5Ag	299	570	304	579	5	9
1Sn/97.5Pb/1.5Ag	309	588	309	588	0	0
96.5Sn/3.5Ag	221	430	221	430	0	0
95Sn/5Sb	235	455	240	464	5	9
42Sn/58Bi	138	281	138	281	0	0
43Sn/43Pb/14Bi309	144	291	163	325	19	34
52Sn/38In	118	244	131	268	13	24
701n/30Pb	160	320	174	435	14	25
601n/40Pb	174	345	185	365	1	20
70Sn/18Pb/12In	162	324	162	324	0	0
90Pb/5n/5Ag	290	554	310	590	20	36
92.5Pb/5In/2.5Ag	300	572	310	590	10	18
97.5Pb/2.5Ag	303	578	303	578	0	0

Fahrenheit to Celsius Conversion

Fahrenheit to Celsius: (°F – 32) / 1.8 = °C

Celsius to Fahrenheit: (°C x 1.8) + 32 = °F

A.P.E.

Lead-Free Rework

APE.COM

2 North Blackwater Lane • Key Largo, FL 33037 • Tel. 305.451.4722 • Fax 305.451.3374 • Web Site: www.ape.com • E mail: sales@ape.com