

AAPRE

Rework 2001



printed circuit board rework and repair equipment from the rework company

Welcome...

...to our third edition. Since introducing our new catalog format, many exciting additions have been included to suit major shifts in our industry. We can now offer products that stretch throughout the spectrum of electronic manufacture, including Communication and Contract manufacturing.

These industries in particular use a broad spread of board sizes and component types. A.P.E. systems can ergonomically handle the smallest of communication PCBs to the largest circuit boards found in infrastructure or computer frame environments. We are confident that we can provide a solution for your application and look forward to providing a personal service in caring for your needs.

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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 Rework

Overview

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



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 Hot Air technology for reworking SMT components without damage.

Low Temperature Operation

Low Temperature Operation Accurate closed-loop temperature monitoring of a patented High Power heater, reduces rework temperature below 450°F (232°C).

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 at any time for any nozzle featured in the standard nozzle list available, as detailed on page 22.

Automatic Lift Off

An automatic vacuum pick-up assembly lifts the part from the board once eutectic 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 Souce	Internal Blower
Shipping	24"x12" x 16" , Weight 28 lb (12.73 kg)

Chipper SMD-500 Power Rework

Automatic Vacuum Pick-up

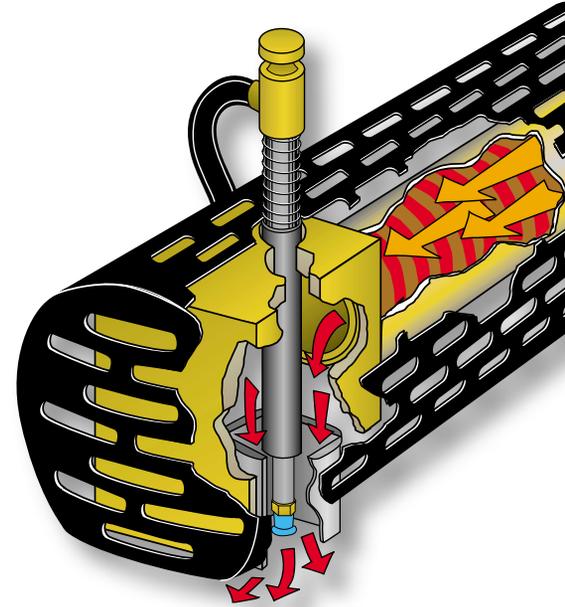
The vacuum switch is turned on and the vacuum pick-up assembly is attached to the top of the component body. The foot pedal is activated and when the component passes the eutectic temperature of 361°F (183°C), the component automatically lifts from the circuit board.

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 solder ball, 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.

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 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

Overview

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

Intelligent Rework for SMT & BGA Components— Now Available with Electric Z-Axis Control (see pg. 8)

Wide Ranging

From plastic sockets to BGA components, the Chipmaster SMD-1000 Rework Engine, provides a controlled rework environment, which cares for your repair process. Features 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 "POWER." Its 1200-Watt heater reworks sensitive components at original Convection Oven temperatures, typically less than 450°F (232°C), thereby reducing the temperature to the component and surrounding area.

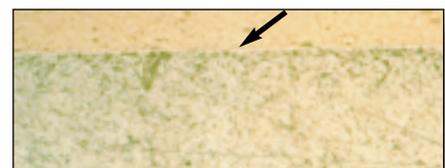
Low Temperature Advantage

The advantages of this patented design have only recently become recognized, particularly with the research into BGA sphere behavior under differing temperatures. For example, the lower the temperature, the greater the viscosity of the sphere; therefore, it follows that the greater the viscosity, the more definite the alignment characteristics of the sphere during reflow.

Solder Integrity

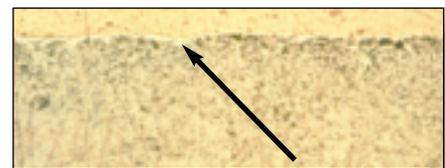
The following micro sections indicate the superior quality of a solder junction when operating at Low Temperature using the Chipmaster.

Chipmaster Rework Temperature



At 400 to 450°F (204 to 232°C) Convection temperature integrity of solder remains intact.

Common Low Power Rework Temperatures



At >475°F (246°C) integrity of solder begins to break down; this is a problem with other rework systems.



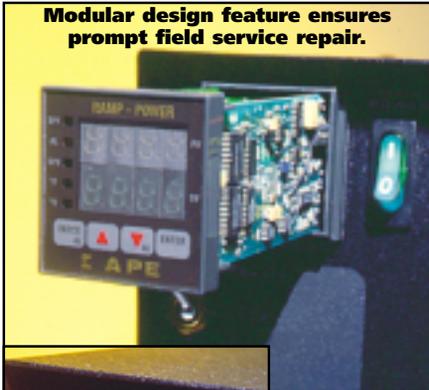
Specifications:

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)

Chipmaster SMD-1000

Safer, faster rework

Modular design feature ensures prompt field service repair.



Time



Temperature

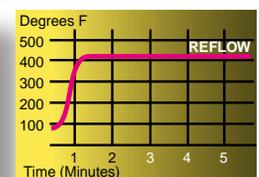
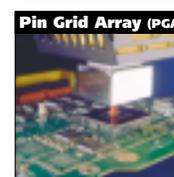
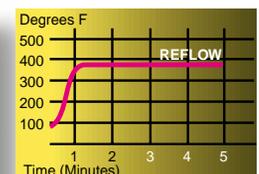
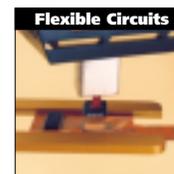
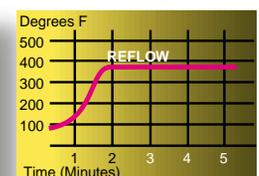
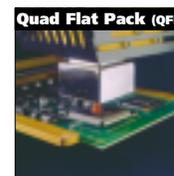
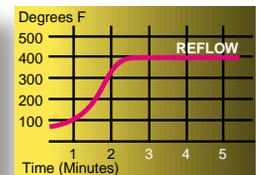
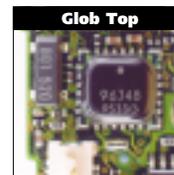
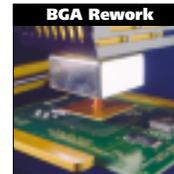
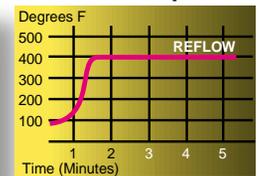
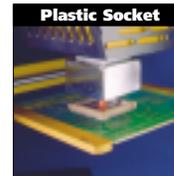
Features:

- 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

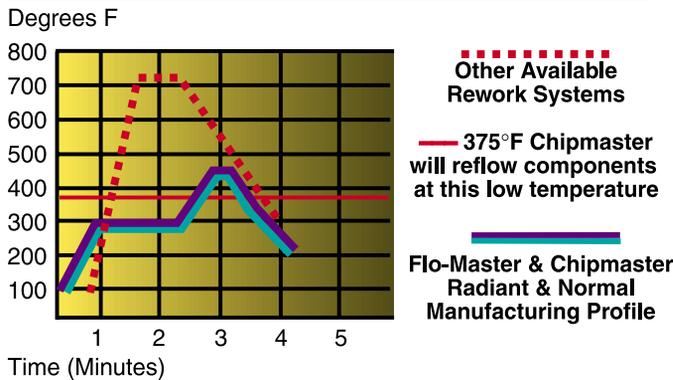
Profile Storage Controller

- Automatic component pick-up
- Existing solder can be used, due to low temperature—no need to add solder in many cases
- Uniform heat distribution
- PID Profile Storage Control for workshop repair conditions, optimizing performance, providing soak and ramp without an unnecessary computer add on

Profile Examples

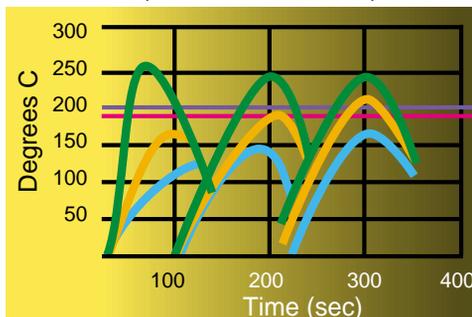


"Truth Graph" Original Build vs Rework



260°C 500°F Top Heat Only
 Brand X 380°C Top 200°C Bottom
 Brand Y 350°C Top 300°C Bottom

COMPONENT BEING REFLOWED
 ADJACENT COMPONENT #1
 ADJACENT COMPONENT #2



Safe Zone for Un-Baked Plastic Packages

The Critical Difference

Heating of neighboring devices minimized by using Control Ramp-Up Top Heat only.

For order information see page 7.

Chipmaster and Chipmaster-Z Accessories

Overview

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

Chipmaster Accessory Options

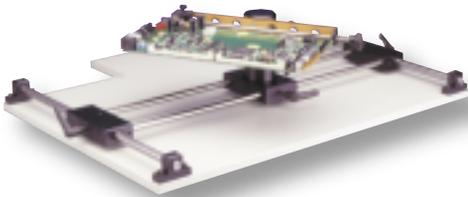
Chipmaster BGA/SMT rework engines are available in configurations that include accessories, which provide optimum process control for most applications. All 110V powered accessories connect to 110V outlets on the rear of the Chipmaster.

Precision X-Y Positioning

Tables:

Large X-Y Table 8100-2000

The large X-Y Table is for applications requiring a larger rework area, usually greater than 16" x 14" (406 x 356 mm).



Compact X-Y Table

8100-0002

The "Compact" Chipmaster X-Y Table is the most popular unit for general rework on board sizes under 16" x 14" (406 x 356 mm). Precision linear bearings ensure a smooth and positive action.



Board Holder Options:

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

8100-1517
15" x 17" (381 x 432 mm)

8100-1620
16" x 20" (406 x 508 mm)

These new Board 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

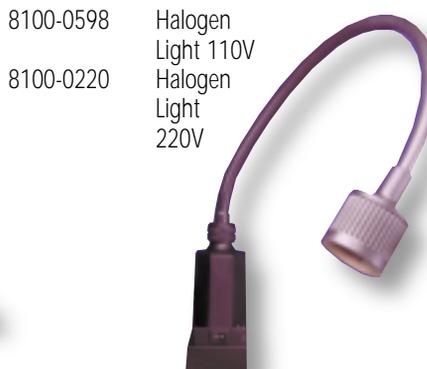
Bottom board adjustable point height support. Not for use with Chipmaster-Z

Optional Lighting and Magnification:

Halogen Lighting

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. See page 11 for further details.

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 Features and Ordering Information

Overview

The Chipmaster can be purchased in a number of configurations that include accessories. The standard Chipmaster Engine is used in all packages. See pages 4 and 5 for the Chipmaster specification.

SYSTEM 1 SMD-1000

Standard Chipmaster

The Standard Chipmaster is a fully operational system configured for reworking BGA/SMT components. See pages 4 and 5 for full description.

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



SYSTEM 3 SMD-0001

BGA "Basics" Chipmaster Package

The "Basics" Package includes the Profile Chipmaster as featured in SYSTEM 2, with the addition of a Halogen Light and the invaluable SMD Rework Tool Kit. See page 20.

- All items as SYSTEM 2, plus
- Halogen Light
- SMD Tool Kit
- Extra Nozzle Kit (total 6)

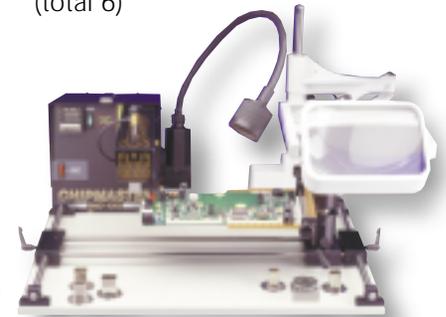


SYSTEM 5 SMD-0005 "Cheetah"

Chipmaster Package

The "Cheetah" package includes the larger X-Y Table option for improved positioning and maneuvering of larger and perhaps more complicated PCB types, together with the MasterLens for enhanced stereo optic inspection.

- All Items as SYSTEM 2, plus
- Halogen Light
- MasterLens
- Extra Nozzle Kit (total 6)
- SMD Tool Kit
- Large X-Y Table



SYSTEM 2 SMD-1003

Storage Profile Chipmaster

The SMD-1003 upgrades the Digital Timer Controller in SYSTEM 1 to a Profile Storage Controller, with preprogrammed thermal profiles for a wide range of BGA applications. The SMD-1003 is included in all package configurations detailed on this page.

- All items as SYSTEM 1
- Plus Profile Storage Upgrade



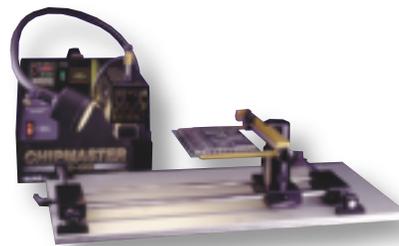
For information on Chipmaster-Z Optimum Kits see page 8.

SYSTEM 4 SMD-0003

"Quick Fix" Chipmaster Package

The "Quick Fix" introduces easier handling of PCBs, improving process control, placement and alignment of component under the reflow nozzle using the Compact X-Y Table detailed on page 6.

- All Items as SYSTEM 2, plus
- Halogen Light
- SMD Tool Kit
- Compact X-Y Table
- Extra Nozzle Kit (total 6)



Ordering Information

Part #	Description
System 1: SMD-1000	
8100-1000	Standard Chipmaster 110V 60 Hz CSA
8100-1002	Standard Chipmaster 220V 50 Hz CE
System 2: SMD-1003	
8100-1003*	Profile Chipmaster 110V 60 Hz CSA
8100-1023*	Profile Chipmaster 220V 50 Hz CE
System 3: SMD-0001	
8000-0001*	Basics Chipmaster 110V 60 Hz CSA
8000-0002*	Basics Chipmaster 220V 50 Hz CE
System 4: SMD-0003	
8000-0003*	Quick Fix Chipmaster 110V 60 Hz CSA
8000-0004*	Quick Fix Chipmaster 220V 50 Hz CE
System 5: SMD-0005	
8000-0005*	Cheetah Chipmaster 110V 60 Hz CSA
8000-0006*	Cheetah Chipmaster 220V 50 Hz CE
System 4 & 5: SMD-0003 & SMD-0005	
8100-1517U	15" x 17" BH Upgrade Trade In

* For a Z-Axis system add -Z to the part number, e.g., 8000-0001-Z. See page 8.

"SMT Tool Kit" See page 20

"Nozzle" See page 22

Phone: 49 (8722) 9620-0 Fax: 49 (8722) 9620-30 e-mail: info@microtronic.de

Chipmaster-Z SMD-1000-Z

Overview

The Chipmaster-Z is identical in specification to the standard Chipmaster but with the addition of an electric Z axis, providing easy clearance of the nozzle thus avoiding obstructions. Particularly convenient for awkward height components.

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.

Underboard Heating

The SMD-1000-Z is a necessary rework station when used with a Radiant Hotplate or other fixed underboard heating system. It also serves as an economical alternative when used with the APE Dragon bottom Heater, (see page 11)

8100-1003-Z Optimum Kit:

The Chipmaster-Z SMD-1003-Z, package with optional features, (see below) has been discounted to introduce this unique system. These features ensure that the Chipmaster-Z functions as intended.

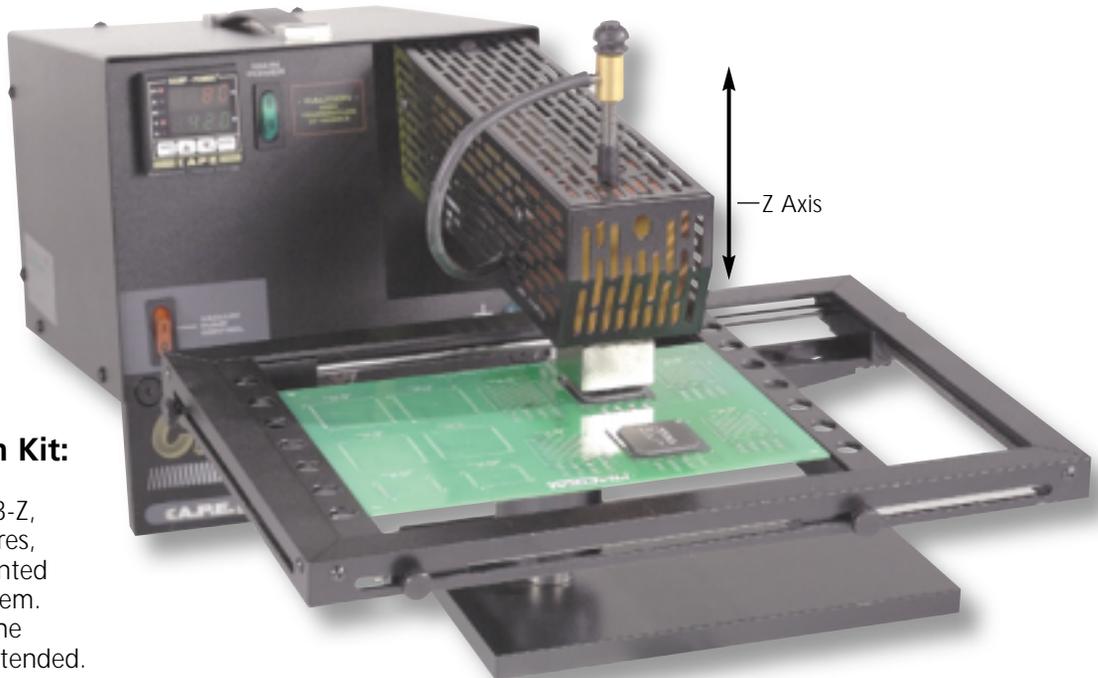
New Chipmaster-Z (110V or 220V)
New Profile Storage Controller Upgrade
New 4 side Board Holder 8" x 12" (8100-0812)
Six (6) Reflow Nozzles (Users Choice)

New Board Holders



New 4 Sided Board Holder

A new range of 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).



Specifications:

Chipmaster	(see page 4)
Z Axis Movement	2 inches (50 mm)

Chipmaster-Z Axis Order Information

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

For a full description of the following Chipmaster-Z package kits, refer to page 7.

8000-0001-Z Optimum Kit + Basic	110V 60 Hz
8000-0002-Z Optimum Kit + Basic	220V 50 Hz
8000-0003-Z Optimum Kit + Quick Fix	110V 60 Hz
8000-0004-Z Optimum Kit + Quick Fix	220V 50 Hz
8000-0005-Z Optimum Kit + Cheetah	110V 60 Hz
8000-0006-Z Optimum Kit + Cheetah	220V 50 Hz
8100-1517U 15" x 17" (381 x 432 mm)	Board Holder Upgrade

New Board Holders:

8100-0812	8" x 12" (203 x 304 mm)
8100-1517	15" x 17" (381 x 432 mm)
8100-1620	16" x 20" (406 x 508 mm)
8100-2024	20" x 24" (508 x 610 mm)

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 preheat 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 circuit boards.

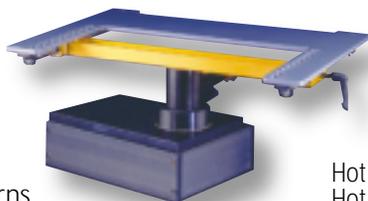
High Energy, Low Temperature Operation

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 Articulating 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 and cleaning.



Stop Board Warp Dead in its Tracks...



Part

Description

8000-0009-Z	Chipmaster Z-Axis 110V 60 Hz CSA
8000-0010-Z	Chipmaster Z-Axis 220V 50 Hz CE

RAD-6000-Z System includes:

8100-1003-Z	Chipmaster-Z Optimum Kit
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 [six (6) total]



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)
8100-1414	1.40" x 1.40" (35.6 x 35.6 mm)
8100-0000-20	0.50" x 0.50" (12.7 x 12.7 mm)
8100-0000-68	1.10" x 1.10" (28.0 x 28.0 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 Aluminium 12" x 12" (305 x 305 mm)

For full specification see page 10 for Hot Plate details.

Radiant Hot Plate SMD-6000

Finally, a Hot Plate System Designed Especially for the Electronics Industry—
Preheat, Burn In, Reflow, Pull Test, and many 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

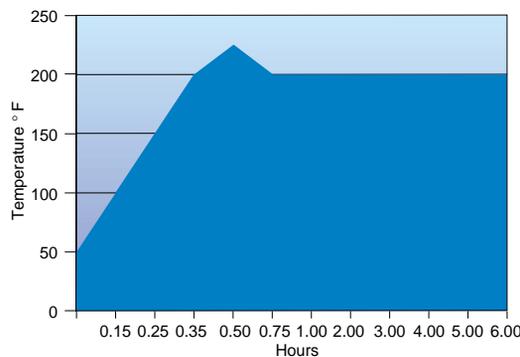
A PID Digital Closed-Loop Programmable Controller measures the temperature feedback via a “K” type thermocouple. A temperature setting may be calibrated and stored within the Controller and once set, will be maintained to $\pm 2^\circ\text{F}$.

Safety First

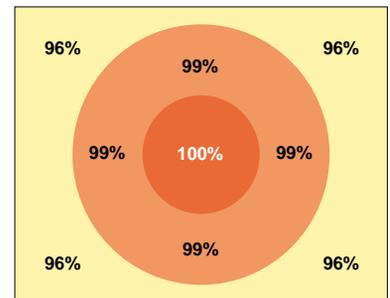
Four (4) Heat Shield Guards are provided to protect the user. The Digital Controller is preset to a maximum of 350°F (176°C), but can be increased upon request. It is recommended that the Hot Plate be placed in a zoned area and a “Caution” notice posted that a hot surface is present.



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

Overview

An excellent upgrade to existing Chipmaster users, requiring Bottom Heat for BGA and larger QFP components.

“Dragon” Portable Preheat Unit for Chipmaster

A Digital Closed-Loop Temperature Controlled Bottom Preheater for use with the Chipmaster. The SMD-2000 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

MasterLens™

Less Stress and Greater Accuracy

You can actually work with tools and instruments without groping; there is no loss of depth perception—everything stays in focus. This simply means that operators can work faster with more accuracy and greater eye safety and comfort than ever before.

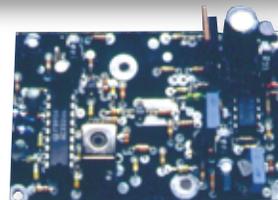
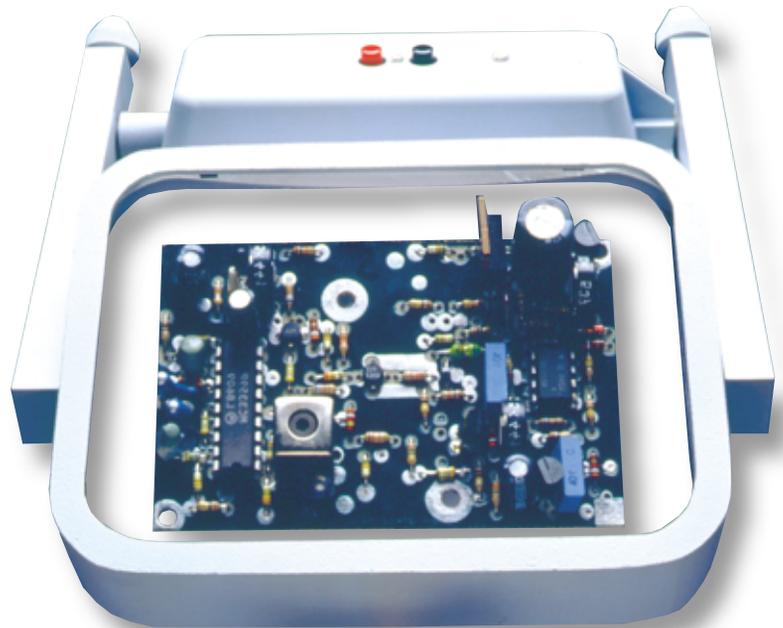
Features

- Precision Cast and Ground Glass Optical Lens
- No Distortion Diopter 3.0
- Magnification 1.75X
- Cast Aluminum Base and Suspension Arm
- Dual 4-Watt Shadow-Free Integrated Light
- Sturdy Lifetime Construction

Benefits

- Low Operator Fatigue
- Cast Construction Eliminates Vibration
- X-Y-Z Pivoting
- Lens Size 5.5" x 7.48" (140 x 190 mm)

Part #	Description
8100-0899	MasterLens 110V
8100-0898	MasterLens 220V
8400-0004	Antistatic Base
8400-0001	Replacement Bulb



Flo-Master-Z™ SMD-5000-Z Series

Overview

The Flo-Master-Z family of products provide solutions to reworking large boards and larger BGA components. They include handling capabilities that make it easier to work with cumbersome PCBs. The SMD-5000-Z is the first system in this family, having a smaller footprint and focal preheat.

For Gentle but Powerful Low Temperature Rework

Improved Alignment

Research has verified that increasing the available energy during reflow has two significant effects:

- Increased Energy availability reduces the necessary air temperature needed to Reflow.
- A reduction in Reflow Temperature results in higher solder viscosity, producing improved alignment characteristics for BGA and SMT components.

These two important effects produce the following important advantages:

- Reduced component and board stress
- Prevent the possibility of scorching
- Assist in the prevention of bridging between contacts
- Help align BGA components more comfortably



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 ceramic BGAs, Military-type boards, and commercial applications requiring an efficient level of energy versus temperature.

Preheat

A bottom preheat and in-process 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.

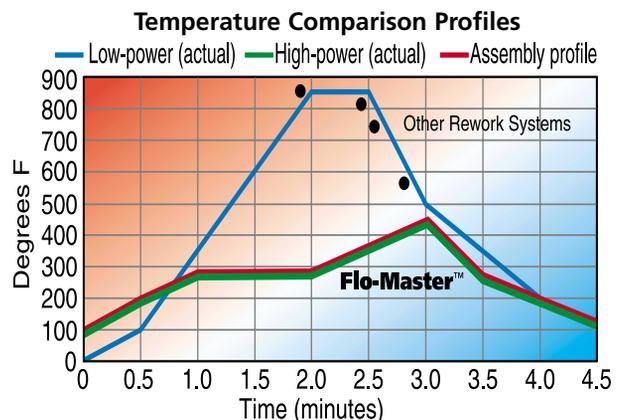
Independent Preheat Control

The preheater is an independently controlled integral system, 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 installed for bottom and top controllers and each thermal profile may be custom programmed, enabling different combinations of preheat and removal temperatures to be selected.



Cool Power Rework

Mechanical Control

The Flo-Master-Z has been engineered to operate on a standard workbench and includes a built-in X-Y Table for precise alignment. Each of the axes can be locked for optimum control.

Linear Air Delivery

The Heat Acceleration Chamber and delivery Nozzle Block are designed to provide maximum air spin of the air flow to the nozzle, ensuring minimal temperature differences across wide area packages—important for linear reflow of CCBGA and larger devices.

Standard Board Holders:



Board Holder 8100-0812



Board Holder 8100-1517

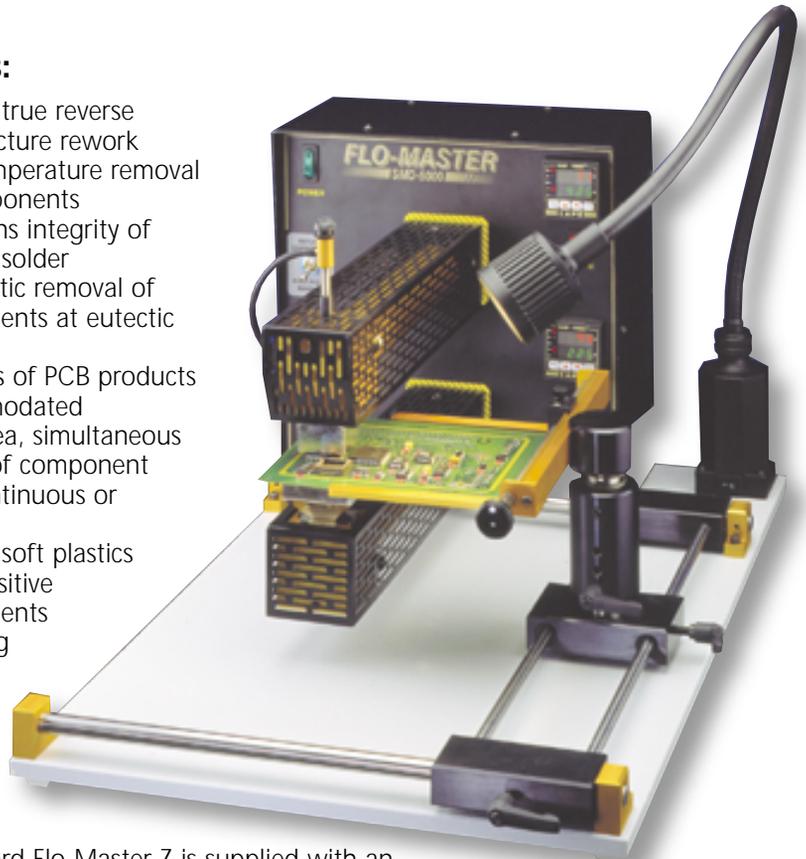


Board Holder 8100-1620

Part #	Description
5000-2000-Z	Flo-Master-Z 110V 60 Hz
5000-2002-Z	Flo-Master-Z 220V 50 Hz
8100-0812	Board Holder 8" x 12" (203 x 305 mm) (included)
8100-1517U	Board Holder Upgrade 15" x 17" (381 x 432 mm) (optional)
8100-1620U	Board Holder Upgrade 16" x 20" (406 x 508 mm) (optional)

Benefits:

- Enables true reverse manufacture rework
- Low temperature removal of components
- Maintains integrity of existing solder
- Automatic removal of components at eutectic stage
- All types of PCB products accommodated
- Total area, simultaneous reflow of component
- Run continuous or pulsed
- Rework soft plastics and sensitive components requiring short heat cycles



The standard Flo-Master-Z is supplied with an 8" x 12" (203 x 305 mm) Board Holder.

Optional sizes include:

- 8100-1517 Board Holder 15" x 17" (381 x 432 mm)
- 8100-1620 Board Holder 16" x 20" (406 x 508 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)
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

Overview

The Flo-Master II is the second system in the Flo-Master family, with integrated features required for computer profiling of larger PCBs. The Flo-Master II should be considered for PCBs greater than 12" x 14" (305 x 356 mm).

Multiple Profile Storage

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

Simple Operation

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



Windows-Based Profile Creation Software

The optional Graphical Display Program communicates via an RS232 port. Its simple graphical display enables the user to create, edit, and save any number of rework profiles and "Data Log" their events, as Adobe Portable Document Format (PDF) files for future recall. The software also contains "Start" and "Stop" commands to run the "Profile Pattern Recipe" (see page 18) directly from the computer.

Automated Z-Axis

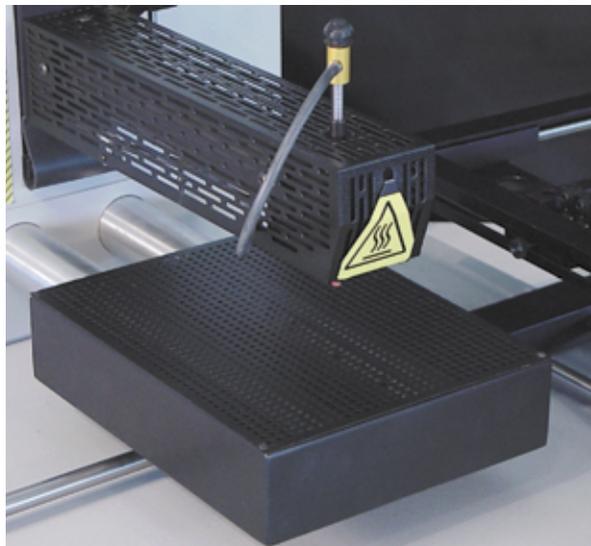
The Flo-Master II includes a pneumatic Z-axis adjustment to clear the area after rework. It also helps access the component without concern of surrounding obstructions.



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 Panel Heat



Flo-Master II Options

1. **Focal Heat:** 1200 Watts maximum nozzle 4" x 4" (102 x 102 mm). Focal Heat is suitable for bottom and top reflow and selective underboard heating.
2. **Panel Heat:** 2400 Watts Hot Air Assisted 8" x 10" (203 x 254 mm) The Panel Heat option is recommended to prevent warping during the rework operation.

Overview

The third system in the Flo-Master family is the Flo-Master III. This machine is designed for the largest PCB types, which require extreme high energy bottom heat to assist in low temperature reflow.

Flo-Master III

The Flo-Master III includes a 12" x 12" (305 x 305 mm) 3600 Watt Forced Air Convection Bottom Heater providing sufficient energy for very large boards.



Machine and Computer Stored Profiles



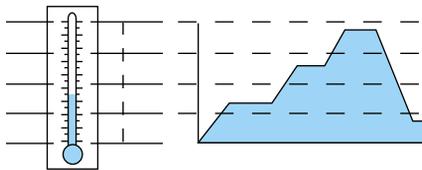
New Ledge

Support Board Holders for Flo-Master II & Flo-Master III

A new range of Board Holders is available for use with the Flo-Master family. They include smooth action bearings and edge PCB support. The Model 8100-1517 15" x 17" is provided with the Flo-Master II system and the 8100-1620 16" x 17" is supplied with the Flo-Master III. Other sizes are available (see order information).



Multiple Ramp and Soak Segments



Ordering Information

Flo-Master II

Part #	Description
5000-1002	Flo-Master II Focal Bottom Heat Heat 220V 50/60 Hz
5000-6002	Flo-Master II Panel Heat 220V 50/60Hz
8100-1620U	PCB Holder Upgrade 16" x 20" (406 x 508 mm)

Flo-Master III

5003-6002	Flo-Master III Panel Heat 220V 50/60 Hz
7000-1250	Optional Windows Graphical Software
8100-2024U	PCB Holder Upgrade 20" x 24" (508 x 610 mm)

Board Holders:

8100-0812	8" x 12" (203 x 304 mm)
8100-1517	15" x 17" (381 x 432 mm) Included with Flo-Master II
8100-1620	16" x 20" (406 x 508 mm) Included with Flo-Master III
8100-2024	20" x 24" (508 x 610 mm)

Flo-Master II & Flo-Master III Specifications:

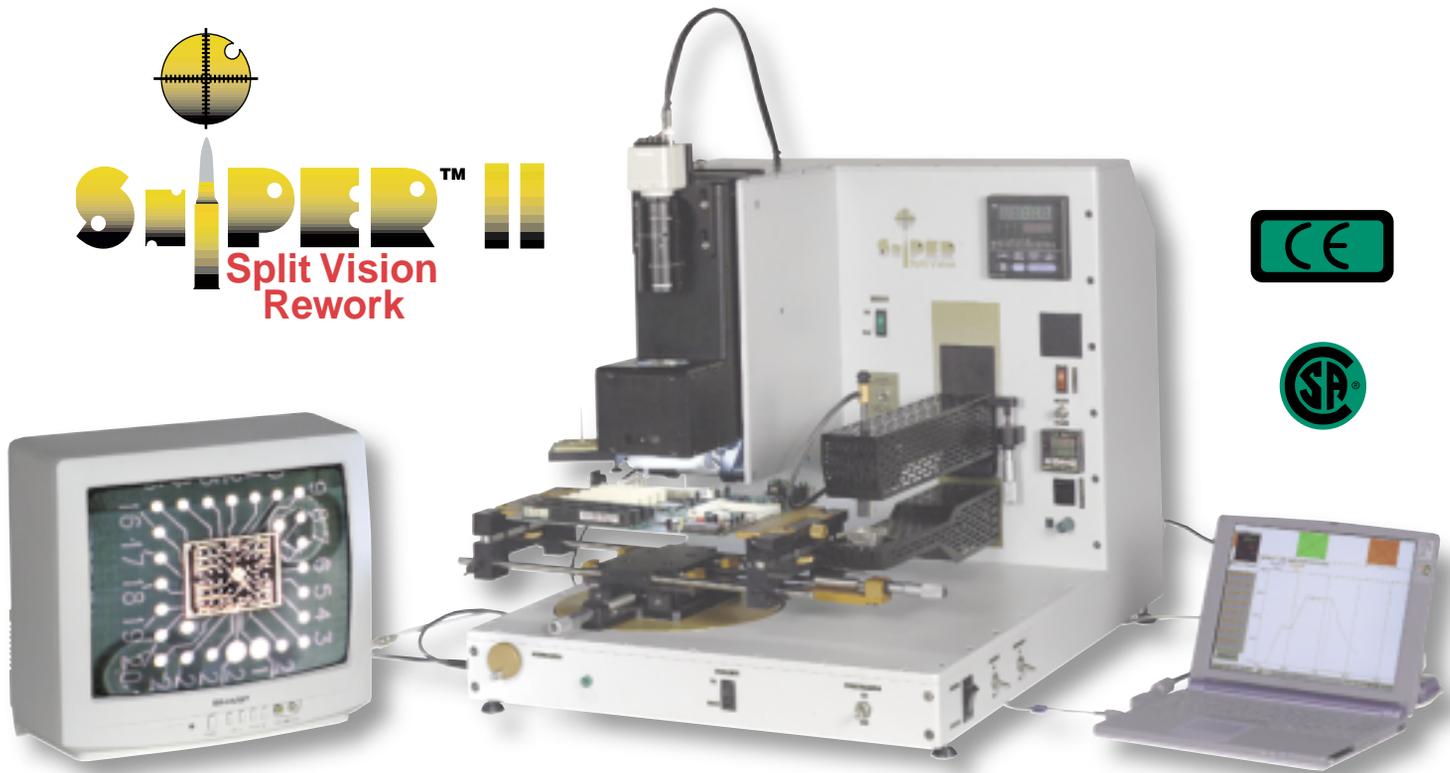
Flo-Master II Focal Heat Power	2400 Watts 220V 50/60 Hz 15 Amps
Flo-Master II Panel Heat Power	3600 Watts 220V 50/60 Hz 20 Amps
Flo-Master III Panel Heat Power	4800 Watts 220V 50/60 Hz 30 Amps
Flo-Master II Panel Heat Dimension	8" x 10" (203 x 254 mm)
Flo-Master III Panel Heat Dimension	12" x 12" (305 x 305 mm)
Flo-Master II Board Holder (included)	8100-1517, PCB size 15" x 17" (381 x 432 mm)
Flo-Master III Board Holder (included)	8100-1620, PCB size 16" x 20" (406 x 508 mm)
Flo-Master II Dimension	20.5" x 22" x 29" (521 x 559 x 737 mm) H x W x D
Flo-Master III Dimension	20.5" x 28.5" x 32.5" (521 x 724 x 825 mm) H x W x D
Reflow Nozzles included	See page 13 and page 22 for complete Nozzle Options
Preheat Nozzles included (Focal Heat only)	See page 13
Temperature	Celsius, Fahrenheit Selectable
Reflow Air Velocity	12.7 CFM
Component Vacuum Pickup	Internal Venturi
Factory Air for Z-axis	80 psi
Controller reflow	Sixteen (16) Profile, (16) Segment PID
Computer Interface	RS422/RS232
Controller Bottom Heat	Four (4) Bottom Heat Temperatures Stored
Air Flow	Up to 1 SCFM
Weight	70lbs (154 Kilos)
Z-Axis	Travel 2" (50 mm)
X-Y Table mounted	Sleeve Bearing
Computer Software	Windows 95/98
Data Logging	Adobe Acrobat 4.0 (not supplied)



Sniper & Sniper II Split Vision Rework Systems SMD-7000

Overview

The Sniper & Sniper II are BGA and Micro BGA Rework systems. One side of the Sniper removes the device, the other side selects a replacement 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 & Sniper II SMD-7000 Rework systems combine the unique Energy Reflow operation of the Flo-Master with the very latest technology in optic engineering and alignment design. They provide absolute control in positioning all ultrafine pitch, Micro BGA, QFP, and CSPs (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.

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.

Free & Clear

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.

Sniper & Sniper II Specifications:

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 13
Preheat Nozzles included	See Flo-Master, page 13
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
Controller Both Heaters	Fuzzy Logic PID Profile Storage
Board Alignment	Micrometer Controls
Reflow Operation	Pulsed or Continuous
Maximum Board Size	16" x 18" (406 x 457 mm)
Air Flow	Up to 1 SCFM
Weight	165 lb (75 kg)
Communication	RS232 Sniper II Only
Operational Software	Specview GDW Sniper II Only

Sniper & Sniper II Split Vision Rework Systems SMD-7000

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

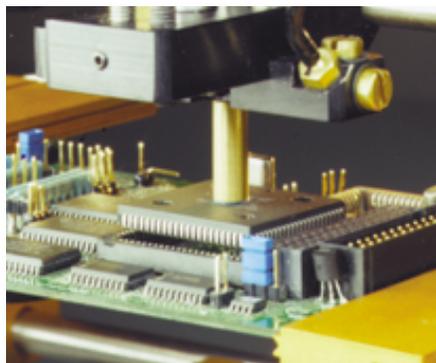
Precision Micrometers align the two lead patterns; the camera's zoom and focus are adjusted to comfortably align and view the PCB and component on the monitor.

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 Diagonal Image Scope can be dropped into place when needed.

Repeatable Alignment

The selected component is first supported in a Template Nest, which is seated within a Reflex Register. The Register is then moved to position under the Vacuum Pick-Up on the Vertical Placement Drive (VPD), thus providing repeatable selection from the same registration, every time.



Final Positioning

The Vacuum Pick-Up has been designed to ensure adequate clearance of adjacent components and obstacles around the positioning arena, consequently the length of the Vacuum Pick-Up Barb is 0.90" (22.86 mm), which should provide sufficient depth of penetration.



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.

Rotary/Staged Vacuum Board Holder

The SMD-7007 includes 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 Extender Kits are available for smaller and larger board types.

Features:

- Registration without mirror adjustment for components 0.040"–2.50" sq. (1.02–63.5 mm²)
- Automatic placement
- Component Templates for fast registration
- Vacuum pick-up of component
- Vacuum actuated Rotary Board Holder
- X, Y, Z and Theta Micrometer adjustments
- High Resolution Camera and 14" Monitor for 10-80X viewing
- Widest range of component types accommodated from Micro BGAs to high pin count Ceramic CBGA
- Board sizes up to 16" X 18" (406 x 457 mm)
- Proven integrated High Power, Low Temperature Flo-Master Technology
- Inspection option for ghosted images of board and component leads/balls

Sniper vs. Sniper II

The vision operation of both machines is identical, only the reflow programming and storage capabilities differ.

Sniper

The Sniper is an ideal choice where simple programming is required. Four (4) profiles are provided in the reflow controller. The Bottom Heater is independently controlled and the system is operated by a foot pedal (panel switch optional). The Sniper does not include Data Logging capabilities. See page 18 for order information.

Sniper II

The Sniper II stores up to sixteen (16) multi segment (Ramp & Soak) profiles on the machine or any number of profiles by using Windows-based software. Programs can be created and entered directly on the Reflow Controller keypad or created using Graphical Display software (included). Data Logging events is provided in PDF format. The rework cycle is automatically controlled and shut off after completion. See details and order information on page 18.

Stencil Attachment

An optional Screen Stencil Foot mounts to the Vacuum Pick-Up Barb of the vision system, so that the stencil pattern is overlaid to the PCB component pattern, when viewed on the monitor. The stencil can then be automatically lowered to position and solder paste applied by the squeegee, which is included in the Kit.



Sniper II Control Features and SMD-7000 Order Information

Overview

The Sniper II includes enhanced programming and operational features. Programs may be created, edited and stored on board the system or managed from a computer running Windows 95/98/2000 and NT. The system's rework process is automatically controlled by the machine and switched off after its cycle.

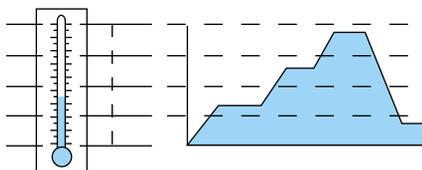
Sniper II

The Sniper II includes a sixteen (16) profile, sixteen (16) segment controller, which is easily programmed using an integral keypad. Alternatively the system can be controlled via an RS232 connection with an external computer.



Graphical Display Window (GDW)

The computer software provided operates in a Windows-based environment. Profile Pattern Recipes (PPR) are easily created, stored, recalled, and edited using a Graphical Display Window (GDW). Programs are automatically uploaded to the Sniper II controller. Any number of PPRs may be stored for future recall.



Computer Operation

Programs may be controlled and operated directly from the computer and a graphical chart of the temperature profile traced in "real-time."

Simple Operation

It is not necessary to use the computer for general operation. To run a PPR, the operator simply selects the PPR from the Controller panel and presses the "Run" key. The program is then run automatically. The operator need not be in attendance during the reflow process.

Bottom Heat Control

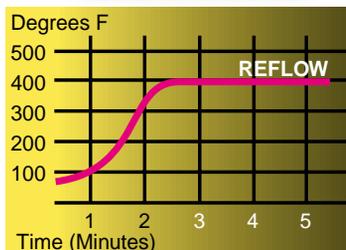
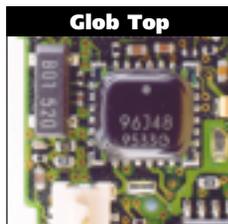
The bottom heater is controlled by the top reflow controller. The top and bottom heaters are automatically switched off after the rework program is complete.

Data Logging

Once the rework operation is completed, the event may be automatically "Data Logged" using Adobe PDF graphical images. These are easy to read and can be communicated via the internet.

Thermal Tracer

The Thermal Tracer tracks up to six (6) sensors, which can be strategically located at and around the component. The sensors are used to develop a "Profile Pattern Recipe," indicating actual board temperatures during the rework process. The system can also be used to calibrate the Sniper hot air delivery. 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 23.



Order Information

Sniper

Part #	Description
7007-1000	Sniper 110V 60Hz
7007-1002	Sniper 220V 50Hz
7000-1216	PCB Holder Extension Kit 12" x 16" (305 x 406 mm)
7000-2500	Macro Image Diagonal Splitter

Sniper II

7007-5001	Sniper II 110V 60Hz
7007-5002	Sniper II 220V 50Hz
7000-1216	PCB Holder Extension Kit 12" x 16" (305 x 406 mm)

Thermal Tracer

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

Example Stencil Foot

8300-2169	Stencil Foot BGA 169
8300-2225	Stencil Foot BGA 225
8300-2313	Stencil Foot BGA 313
8300-2100	Stencil Foot QFP 100
8300-2208	Stencil Foot QFP 208

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 retards 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.

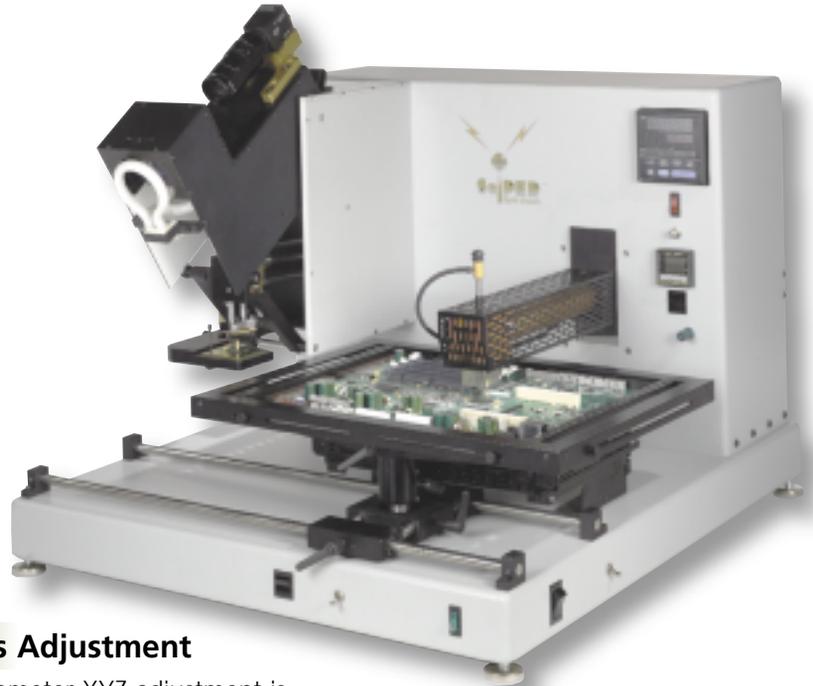
XY Table

In addition to the importance of high energy and greater bottom coverage, the Sniper-WB includes a sleeve bearing XY Table with ledge support rails for the PCB. Steel support rods are used to prevent board sag and warping. The standard Board Holder supplied is 20" x 24" (508 x 610mm).

Programming and Operation

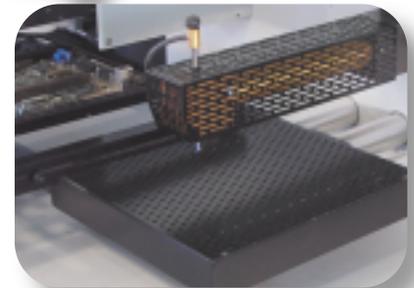
(For a more detailed description of temperature profiling and operation refer to page 18)

The Sniper-WB includes a sixteen (16) profile, sixteen (16) segment controller, which is easily programmed using an integral keypad. Alternatively the system can be controlled via an RS232 connection with an external 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

Sniper-WB

Part

7007-7007

Thermal Tracer

8300-9660

8300-9661

Description

Sniper-WB 220V 50/60Hz (220V Model only)

Thermal Tracer Software and PCMCIA Card

Includes five (5) Sensors

PCMCIA Card Reader

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 page 13
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 Controller	PID Fuzzy Logic 16 Profiles
Bottom Controller	PID Fuzzy Logic 4 Profiles
Alignment	XY Table with Z-Axis
Theta	Motorized
Air Flow	1 SCFM per operation
Template Provided	7000-0099 Universal
Weight	120 lbs (54.55 Kilos)



Rework SMT Tool Kit 8100-1097

Essential Tools for Rework and Repair

One of the key ingredients in successful rework is to use a system of high quality cleansing and preparation materials to remove and replace the component. The 8100-1097 SMT Tool Kit has been especially formulated for Motorola, and includes a special blend of products and materials, providing the highest quality rework possible.



Features:

- 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

- GA, C-5 Installation
- QFP, PLCC Installation



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

Fluid Kit

- BGA Prep
- 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



Part #	Description
8100-1097	SMT Tool Kit complete



General Consumables Kit

- General Assortment of Kit Supplies

Part #	Description
8100-2300	General Consumable 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



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



A.P.E. Reball Kits have been designed to provide a quick and simple solution to the problem of replacing solder spheres for attachment to the BGA chip package.

Why choose a Reball Kit?

Generally, only a few types of BGA packages are used for each board type in any production line, the reballing process requires a number of operations involving preparation material. It is recommended that the materials and tools for each BGA component type be maintained within a controlled kit.

The most important advantage of the A.P.E. process is that the BGA need not be taken from the Fixture for reflow. The Fixture may be reflowed using a convection oven or an APE rework system with Bottom Heat.

Features:

- Ideal for rework, prototype, and small production runs of components
- Simple quick and repeatable process
- Reflow within the Fixture
- Controlled Kit Management
- All materials, spheres, and tools included

Contents:

- Reball Fixture
- Solder Spheres 10,000
- Antistatic Wipes, pack of 75
- Dental Style Probe
- Flux Paste no-clean, 5cc Syringe
- Needle Luer Lock Tips, pack of 25
- Wick Gun and Solder Wick
- Double-end antistatic Brush
- Pad Prep Cleaning Pen
- M.S.D.S
- Instruction Manual



Reballing Process

(All process items included)

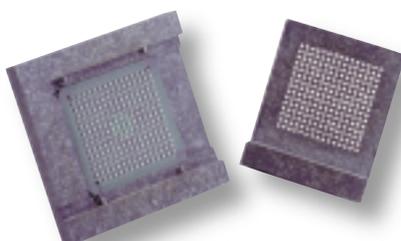
1. Remove residual solder with Wick Gun
2. Clean Part with Prep Pen
3. Clean with antistatic wipe
4. Place component in Alignment Base of Fixture
5. Flux part with no-clean flux
6. Insert Matrix Template
7. Hold assembled Reball Fixture and load spheres, use brush or probe to ensure filled matrix
8. Drain any excess spheres through "Ball Drain"
9. Take Fixture Template to reflow, reflow and remove component

The following are only a few examples of the types of BGA and CSP Kits that can be manufactured to order.

Kit Part #	Matrix	Description	Sphere Size
8300-0169	13 x 13	Full Grid BGA 169	0.030"
8300-0225	15 x 15	Full Grid BGA 225	0.030"
8300-0313	20 x 20	Staggered BGA 313	0.030"
8300-0352	26 x 26	Perimeter BGA 352	0.030"
8300-0400	20 x 20	Full Grid BGA 400	0.030"
8300-0540	32 x 32	Perimeter BGA 540	0.030"

Reball Spheres

8200-1400	63/37	Solder Sphere 10,000	0.030"
8200-1410	63/37	Solder Sphere 100,000	0.030"
8200-1415	63/37	Solder Sphere 1,000,000	0.030"
8200-1420	63/37	Solder Sphere 10,000	0.025"
8200-1425	63/37	Solder Sphere 100,000	0.025"
8200-1430	63/37	Solder Sphere 1,000,000	0.025"



A.P.E. manufactures BGA Reball Kits for Ceramic, Plastic, and Micro Components.

The 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

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

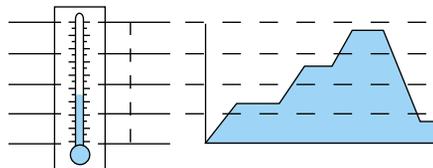
Six sensor connections are available on the PCMCIA card, five (5) thermocouple "K" type sensors are included with the 8300-9660 Thermal Tracer Kit. These sensors can be strategically located, at and around the component, providing necessary feedback for a Profile Pattern Recipe (PPR). connection to an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

Software

The software is designed for Windows 95/98/2000. Its operation is extremely 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 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

Rework Fume Extraction SMD-333 and SMD-4322

SMD-333

Bench Top Fume Extractor

- Low Noise, Brushless Mini Fan
- Easy Replaced Activated Carbon Filter
- Absorbs Noxious Flux and Lead Fumes
- Quickly Removes Smoke and Fumes
- Easily Portable



Specifications:

Dimension	6.38" x 7.78" x 4.72" (162 x 200 x 120 mm)
Weight	3.5 lb (1600g)
Filter Size	130 x 130 mm
Filter Weight	12 g
Power	20-22 Watts
Max Air Volume	93/115 CFM

Part #	Description
0333-0001	Portable Fume Extractor 110V 60 Hz
0334-0002	Portable Fume Extractor 220V 50 Hz
0334-0003	Replacement Filter

SMD-433

Econo Iron with Fume Extractor

- Electronic Temperature Controlled, Continuously Adjustable
- Highly Insulated Ceramic Heater
- Zero Voltage Switching (Spike Free)
- Fast Heat Up and Instant Heat Recovery



Specifications:

Soldering Iron (3 Wire Grounded)	110-120 Vac, 60 Hz
Insulation Power	Over 100 Mohms
Consumption	42W @ 650°F
Tip Leakage	Less than 2mV
Tip to Ground Resist.	Less than 0.1 ohm
Stability @ Idle Temperature	9°F (5°C)
Range	500 to 800°F (250 to 430°C)

Dimension	6.38" x 7.78" x 4.72" (162 x 200 x 120 mm)
Weight	3.5 lb (1600 g)
Filter Size	130 x 130 mm
Filter Weight	12g
Power	20-22 Watts
Max Air Volume	95/115 CFM

Part #	Description
0433-0001	Soldering Iron 110V 60 Hz
0433-0002	Soldering Iron Extractor 220V 50 Hz



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:

6910-1700	Sensor Soldering Iron
	60 Watt, 24V
6000-2400	Tweezer 80 Watt, 24V
3550-0600	Cleaning Station Holder
3550-6000	Tweezer Holder
6000-0286	Tweezer Handpiece Insulator
1212-2311	Tweezer Chip Component Tip
1212-1701	Solder 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
6000-2400	Thermal Tweezer Handpiece
6000-0286	Tweezer Handle Insulator
3550-6000	Tweezer Holder
1212-2311	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:

1212-2311	Tip Pair for Chip Component (Included)
1212-2310	Tip Pair SOT 23/143
1212-2308	Tip Pair SOIC 8
1212-2314	Tip Pair SOIC 14
1212-2316	Tip Pair SOIC 16
1212-2320	Tip Pair SOIC 20
1212-2324	Tip Pair SOIC 24
1212-2318	Tip Pair PLCC 18
1212-2328	Tip Pair PLCC 28
1212-2344	Tip Pair PLCC 44
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.

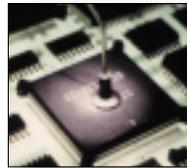
Conventional Through-Hole Operation

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.

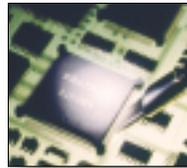
Model	Part #	Description
EX-750	0750-0002	Mix Tech System 60 Hz 110V
EX-750	0750-2002	Mix Tech System 50 Hz 220V



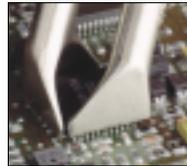
Vacuum Pick and Place Wand



Thermal Chip Tweezer



SMT Through-Hole Soldering Iron



Thermal Quad-Pack Tweezer



Desolder Tool

EX-750 Includes:

- 6910-1700 Sensor Soldering Iron
60 Watt, 24V
- 6000-2400 Tweezer 80 Watt, 24V
- 3550-0600 Cleaning Station Holder
- 3550-6000 Tweezer Holder
- 3550-0602 Dual Tool Holder
- 1700-6700 Desolder Handpiece 24V, 37 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
- 1212-2311 Tweezer Chip Component Tip
- 1212-1701 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.

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



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.

EX-700 Includes:

6910-1700	Sensor Soldering Iron 60 Watt, 24V
1700-6700	Desolder Handpiece 37 Watt, 24V
5000-0531	Vacuum Pump 110V
5000-0631	Vacuum Pump 220V system only
3550-0602	Dual Iron Holder
1212-1701	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
6000-2400	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

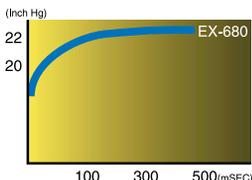
Model	Part #	Description
EX-700	0700-0002	Rework System 60 Hz 110V
EX-700	0700-2000	Rework System 50 Hz 220V

Specifications:

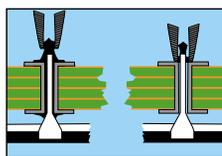
Dimension	11.50" x 8.50" x 6.75" (29.10 x 21.60 x 17.14 cm)
Weight	12.5 lb (5.6 kg)
Range	450 to 900°F (232 to 482°C)
Idle	2°F
Switching	Zero Voltage Thyristor

Safety Rating:

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

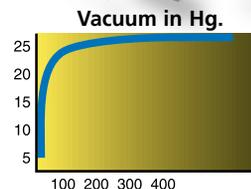


Time required to reach the maximum vacuum



Before After
Multilayer Desoldering

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



Vacuum Rise Time (Milliseconds)

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, 37 Watts
8000-0053	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:

6910-1700	Sensor Soldering Iron 24V, 60 Watt
1212-1701	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



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 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
8000-0053	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

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

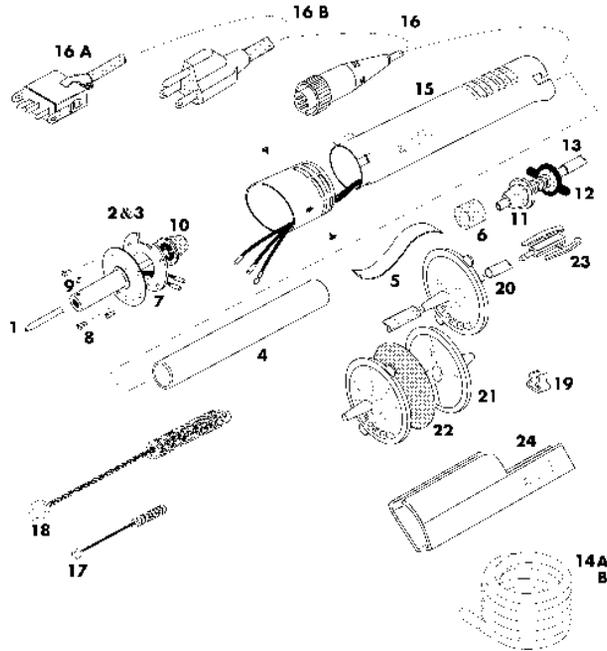


Parts for Desolder Handpiece

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, 35 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 6 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

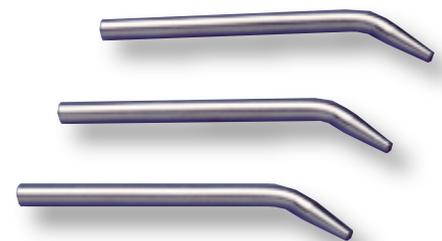
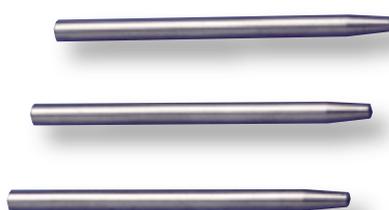
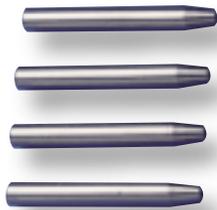
1	Desolder Tips (see below)
2	6700-0045 Heater & Seal Assy 110V, 40 Watt
3	6700-0060 Heater & Seal Assy 110V, 60 Watt
4	6700-3200 Glass Tube
5	6700-4100 "S" Baffle
6	6700-0100-P25 Glass Tube Filter Felts
7	6700-3813-P2 Heater Insulator
8	6700-7017-P3 Heater Retaining Screws
9	6700-7700-P10 Set Screws
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 6 feet length
14B	7000-8701 Tubing 12 feet 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 Assemblies:

1700-6700 Desolder Sensor Handpiece 24V, 35 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	0.060	0.025	1.520
1212-0440	0.910	0.072	0.036	1.830
1212-0550	1.270	0.085	0.050	2.160
1212-0660	1.550	0.104	0.060	2.640

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	0.600	1.550	0.104	2.640

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	1.550	0.104	2.640

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.



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

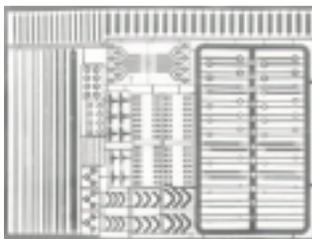
Basic Track Repair Kit 2570-0010

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

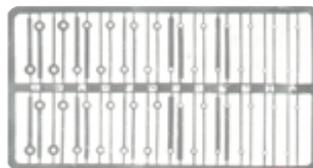
Master Track Repair Kit 2570-4000

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

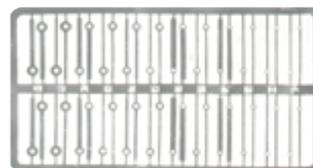
Track Frames



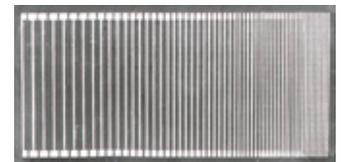
Master Frame
7293-3522



Frame A-Y
7103-2936



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

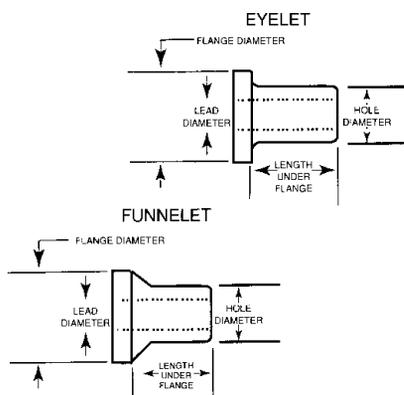


Conductor Frame
7113-2634

Other Frame designs available upon request.

Funnelets and Eyelets

Precision through-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)
2000-0858	0.030 (0.762)	0.054 (1.371)	0.046 (1.1680)	0.021 (0.5334)	Eyelet (Flat)	0.015 (0.381)
2000-0003	0.040 (1.016)	0.093 (2.362)	0.060 (1.5240)	0.026 (0.6604)	Eyelet (Flat)	0.062 (1.575)
2000-0206	0.046 (1.168)	0.100 (2.540)	0.076 (1.9300)	0.034 (0.8636)	Eyelet (Flat)	0.062 (1.575)
2000-1925	0.046 (1.168)	0.092 (2.336)	0.076 (1.9300)	0.034 (0.8636)	Eyelet (Flat)	0.062 (1.575)
2000-1815	0.059 (1.498)	0.093 (2.362)	0.090 (2.2860)	0.046 (1.1680)	Eyelet (Flat)	0.062 (1.575)
2000-0230	0.047 (1.193)	0.062 (1.574)	0.080 (2.0320)	0.036 (0.9144)	Funnelet	0.031 (0.787)
2000-0058	0.047 (1.193)	0.085 (2.159)	0.072 (1.8280)	0.036 (0.9144)	Funnelet	0.046 (1.168)
2000-0038	0.047 (1.193)	0.093 (2.362)	0.082 (2.0828)	0.035 (0.8890)	Funnelet	0.062 (1.575)
2000-0048	0.047 (1.193)	0.118 (2.997)	0.080 (2.0320)	0.035 (0.8890)	Funnelet	0.093 (2.362)
2000-0046	0.060 (1.524)	0.088 (2.235)	0.095 (2.4130)	0.046 (1.1680)	Funnelet	0.062 (1.575)

Other sizes available upon request

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

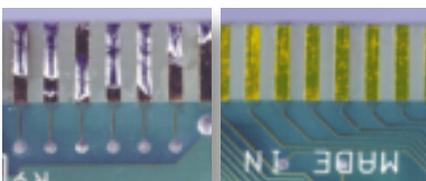
The SRS-069 is a low power system with a precision voltage source where the output voltage controls the activation of the plating solution. This voltage is controlled to within three percent by the internal regulator.

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

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:

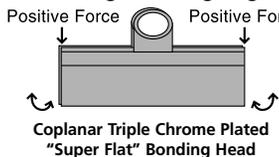
- Time
- Temperature
- Profile
- Pressure

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

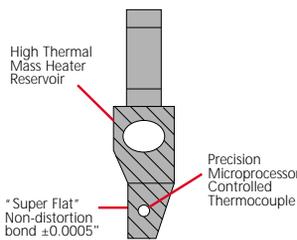


Bonding Lock

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.

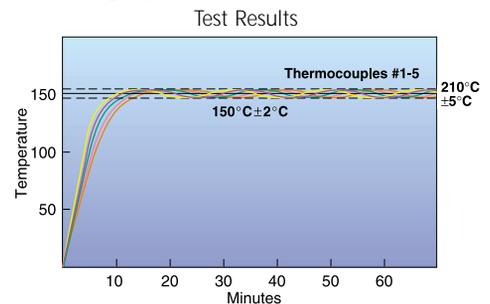


VISION AWARD
Winner for the best new product in the category of rework and repair.

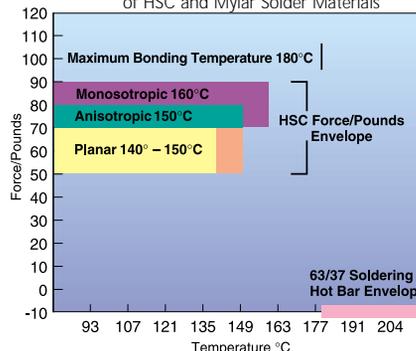


Bonding Surface Thermal Stability

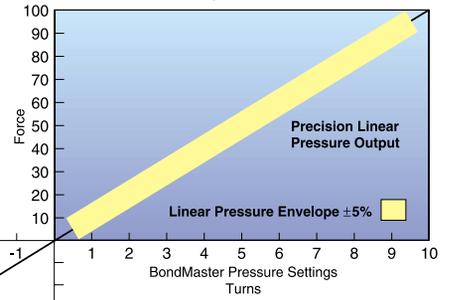
Embedded Thermocouple Test (bottom view) in Bonding Head



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:

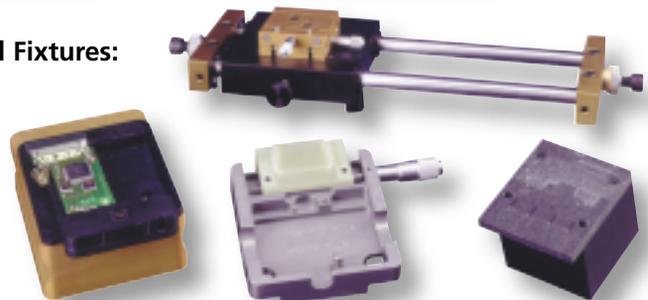
- Ramp rate degrees/sec
- Ramp rate time vs. temp
- Programmable set point Celsius or Fahrenheit
- Ramp time 15 (continuous) sec to 3 minutes



BondMaster Fixturing

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

Optional Fixtures:

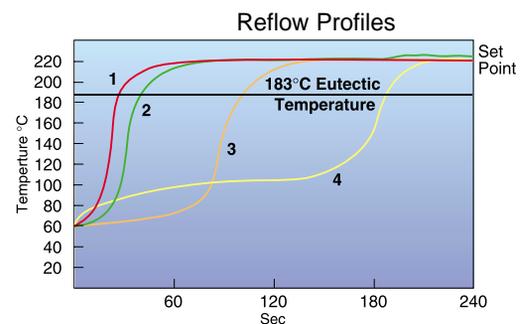


Motorola Fixturing

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

Reflow Profiles:

Anisotropic and Monosotropic HSC materials require careful handling while paying particular attention to temperature and pressure. The BondMaster's linear pressure and temperature profiles ensure repeatable results.

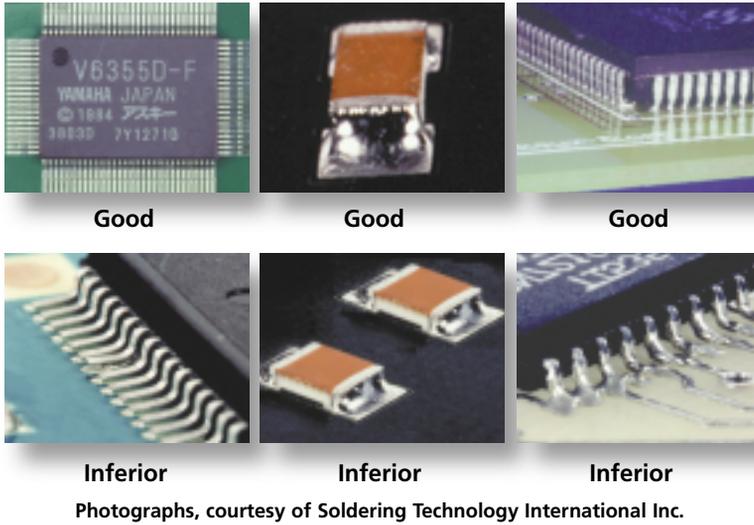


APE Part #	Motorola Part #	Description
9000-1000	R1346A	BondMaster 60Hz 110V
9000-1002	R1347A	BondMaster 50Hz 220V
9000-1010	0180304E22	Universal Bonding Fixture
9000-2000	0180304E24	X-Y Table and Microscope
9000-0899	0180302E51	MasterLens 110V
8200-1370	0180304E25	HSC Bond Tape, 3 pack
8200-1360	0180304E72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

Specifications:

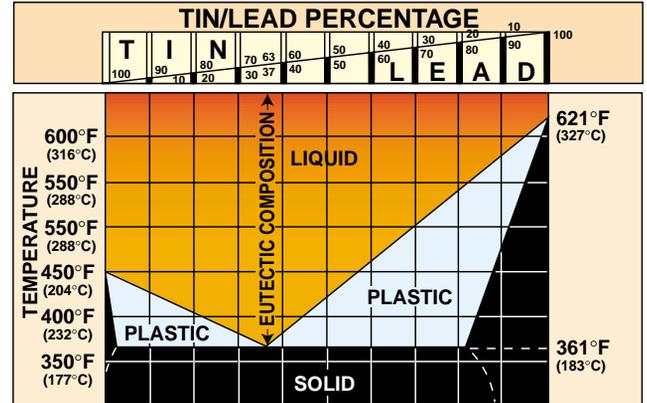
Electrical	110V/220V, 50/60Hz
Power	200 Watts
Mechanical	Aluminum Plate Construction
Dimension	15" x 12" x 12" (381 x 305 x 305 mm)
Weight	14 lbs. (6.36 Kg)
Temperature	Ambient up to 550°F (288°C)
Pressure	0-100 lbs. (45.45 Kg) Adjustable
Time	Programmable 1 sec to 3 minutes

Solder Joint Comparison



Good Good Good
Inferior Inferior Inferior
Photographs, courtesy of Soldering Technology International Inc.

Melting Range of Common Solder Alloys



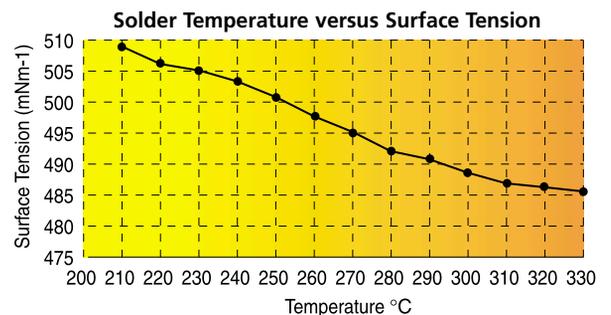
Alloy Composition	Melting Range Solidus		Melting Range Liquidus		Mushy Range	
	°C	°F	°C	°F	°C	°F
70Sn/30Pb	183	361	193	380	10	19
63Sn/37Pb	183	361	183	361	0	0
60Sn/40Pb	183	361	190	375	7	14
50Sn/50Pb	183	361	216	420	33	59
40Sn/60Pb	183	361	238	460	55	99
30Sn/70Pb	185	365	255	491	70	126
25Sn/75Pb	183	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
10Sn/88Pb/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/14Bi/309	144	291	163	325	19	34
52Sn/38In	118	244	131	268	13	24
70In/30Pb	160	320	174	435	14	25
60In/40Pb	174	345	185	365	1	20
70Sn/18Pb/12In	162	324	162	324	0	0
90Pb/5In/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

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 Bumped 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 Tessaera package, high pin count, low physical size
- Monosotropic Flexible Circuit dense pitch APC
- Perimeter 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

Fahrenheit to Celsius Conversion

Fahrenheit to Celsius: $(°F - 32) / 1.8 = °C$
 Celsius to Fahrenheit: $(°C \times 1.8) + 32 = °F$



A.P.R.E.

Repair 2001

