



First-Aid Kits for Circuit Boards®





Circuit board repair is a challenge. So when the inevitable first-aid is needed, you should provide your operators with time-tested tools and materials designed and built for the job. The tools and materials in CircuitMedic kits have been used for decades by the most demanding commercial, medical and military electronics manufacturers.

CircuitMedic delivers quality and reliability proven through decades of in-the-field use.

CircuitMedic kits have been specifically designed to meet the requirements outlined in repair and rework guidelines published by IPC, the leading electronics manufacturing industry association.

#### World's #1 First-aid Kits for Circuit Boards.

- Meet electronics industry's highest requirements.
- Include in-depth instructions that follow recommended industry methods.
- Used by hundreds of major electronics manufacturers world-wide.
- Field-tested and used for over 25 years.
- Include 100% performance guarantee.

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### **Professional Repair Kit**

#### **APPLICATIONS**

- Surface Mount Pad Repair
- Land Repair
- Gold Edge Contact Repair
- Circuit Track Repair
- Plated Hole Repair
- Base Board Repair

#### **FEATURES**

- Has everything you need to repair most any type of circuit board damage.
- Includes dry film, epoxy-backed replacement circuits that do not use messy liquid epoxy.
- Includes eyelets and setting tools for plated through hole repair.
- Includes Circuit Tracks to repair damaged circuits.
- Includes epoxy and color agents for solder mask or base board repair.
- All the tools and materials are neatly arranged in a conductive, ESD safe carrying case.
- Tools and materials conform to IPC guidelines.
- Every item is prime quality, time-tested, to meet high standards.





Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

#### 201-2102

Professional Repair Kit, 230 VAC

www.circuitmedic.com/201-2100

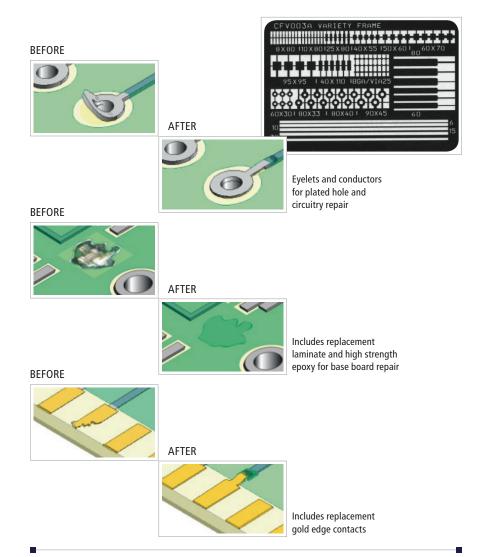
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#### **DESCRIPTION**

The Professional Repair Kit is the most complete and most versatile circuit board repair kit you'll find anywhere. It's the total package.

The kit includes dry film, epoxy-backed circuit frames, and unique replacement circuits that do not use messy liquid epoxy. Includes eyelets and setting tools for plated through hole repair, Circuit Tracks to repair damaged circuits, epoxy and color agents for solder mask or base board repair all packaged in a convenient carrying case.

If you need to repair damaged circuit boards, the all-in-one Professional Kit is what you need.



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### **Master Repair Kit**

#### **APPLICATIONS**

- Surface Mount Pad Repair
- Land Repair
- Circuit Track Repair
- Base Board Repair

#### **FEATURES**

- Includes dry film, epoxy-backed replacement circuits that do not use messy liquid epoxy.
- Includes Circuit Tracks to repair damaged circuits.
- Includes epoxy and color agents for solder mask or base board repair.
- All the tools and materials are neatly arranged in a conductive, ESD safe carrying case.
- Tools and materials conform to IPC guidelines.
- Every item is prime quality, time-tested, to meet high standards.
- Does not include eyelets and setting tools for plated through hole repair.



Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

#### **DESCRIPTION**

The Master Repair Kit includes dry film, epoxy-backed circuit frames for repair of lands and surface mount pads. The kit also Circuit Tracks for repair damaged conductors, epoxy and color agents for solder mask or base board repair all packaged in a convenient carrying case.

#### 201-2402

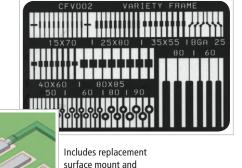
Master Repair Kit, 230 VAC

www.circuitmedic.com/201-2400

#### **BEFORE**

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**BGA** pads

### Land/Pad Repair Kit

#### **APPLICATIONS**

- Surface Mount Pad Repair
- Land Repair

#### **FEATURES**

- Includes dry film, epoxy-backed replacement circuits that do not use messy liquid epoxy.
- Includes epoxy for solder mask or base board repair.
- All the tools and materials are neatly arranged in a conductive,
   ESD safe carrying case.
- Tools and materials conform to IPC quidelines.
- Every item is prime quality, time-tested, to meet high standards.

#### DESCRIPTION

This kit includes the tools and materials needed to reliably replace damaged lands, surface mount and BGA pads. The unique Circuit Frames used to replace these conductor patterns are made from rolled, annealed copper electroplated with tin. Each Circuit Frame has a dry film adhesive backing. You simply select the appropriate size pad or land, trim it from the Circuit Frame and bond it to the circuit board surface. Included with the kit are a bonding ironand tips to match the various sizes of the lands and pads.



Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

#### 201-1402

Land/Pad Repair Kit, 230 VAC www.circuitmedic.com/201-1400

A multifunctional epoxy is included for over coating the lap solder joint formed between the replacement pad and connecting circuitry.

This kit that is specifically designed to make the repair process as simple and reliable as possible. All the tools and materials are packaged in a rugged ESD safe carrying case.

### **Gold Contact Repair Kit**

#### **APPLICATIONS**

■ Gold Edge Contact Repair

#### **FEATURES**

- Conforms to IPC guidelines.
- Dry film epoxy backing on Circuit Frames eliminates messy epoxies.
- Replacement contacts are supplied with nickel and gold plating.
- Kit contains everything needed for gold edge contact repairs.
- All the tools and materials are neatly arranged in a conductive, ESD safe carrying case.



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Repairing gold edge contacts on circuit boards is delicate work, but this kit helps make the process easier and more reliable. Simply select the correct size and shape of gold plated contact from the Circuit Frames included in the kit and bond it in place. These unique replacement circuits have a dry film, adhesive backing that is activated and cured with heat and pressure. This IPC recommended repair method restores your boards to their original level of performance and reliability.

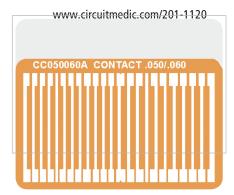
**Note:** When gold edge contacts become contaminated with solder, consider using the Gold Contact Plating Kit described on page 18.





Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

### 201–1122 Gold Contact Repair Kit, 230 VAC



### **Circuit Bonding System**

#### **APPLICATIONS**

- Surface Mount Pad Repair
- Land Repair
- Gold Edge Contact Repair

#### **FEATURES**

- Precision design for bonding of extremely small pads.
- Heavy duty construction provides a stable platform.
- Calibration gauge maintains regulated bonding force.
- Temperature controller maintains uniform temperature.
- Includes voltage converter for 120 VAC and 220 VAC.



The Circuit Bonding System is ideal for replacing small surface mount and BGA pads.

#### DESCRIPTION

Repair technicians appreciate the accuracy of this calibrated Bonding Press, especially when repairing surface mount and BGA pads. The press 115-3118 Bonding System

www.circuitmedic.com/115-3118

not only gives the operator better control over the bonding process, but also ensures optimal adhesion and repeatability. The Rework Stand has a built-in calibration slide to maintain a regulated bonding force depending upon the circuit pattern size and shape. A digital temperature controller maintains a uniform temperature throughout the 30-second bonding cycle.

#### **SPECIFICATIONS**

Frame Construction: 11 gauge steel
Throat Depth: 12.0" (30.0 cm)
Throat Height: 7.0" (17.0 cm)k
Vertical Travel: 7.0" (17.0 cm)
Weight: 10 lb. (4.5 kg.)
Power Input: 120/220 VACV

Temperature

Controller Range: Ambient to 990 °F (871 °C)

Resolution: 1 °F (1 °C)
Cycle Time: 2 to 80 seconds
Power Consumption: 5 VA maximum
Heat Output: 20 Watts
Heat Up Time: 10 minutes

### **Circuit Frames**

#### DESCRIPTION

Imagine replacing damaged circuits without the mess of liquid epoxy, with a bond strength equal to the original, on bare or loaded circuit boards -- all in about 30 seconds. Our replacement Circuit Frames with dry-film adhesive backing make this delicate, precise procedure quick and neat. Trim out the circuit you need and bond it to the circuit board surface with a bonding iron or bonding press.

Choose from hundreds of different shapes or let us custom design and fabricate that special shape for you.

Replacing pads, lands and conductors is done in 4 steps.

#### Step 1 (See Figure 1.)

Evaluate the damaged circuits. If the base material is severely damaged it may have to first be repaired using epoxy.

#### See Base Board Repair Kit.

Remove the defective pad/land/conductor and scrape off any soldermask from the connecting circuit. Apply liquid flux to the connecting circuit on the board surface and tin with solder.

#### Step 2 (See Figure 2.)

Select a replacement pad that matches the missing pad. Scrape off the adhesive bonding film from the solder joint area on the back of new pad/land/conductor. Trim out the new pad/land/conductor from the Circuit Frame. Cut from the plated side.

#### Step 3 (See Figure 3.)

Place the new pad/land/conductor in position by using a disc of high temperature tape. Then apply heat using a heated bonding tip by placing the heated bonding tip directly on top of the tape over the new padd. Apply light pressure for 30 seconds to permanently cure the adhesive bonding film on the underside of the new pad/land/conductor. The bonding time is only 30 seconds.

#### Step 4 (See Figure 4.)

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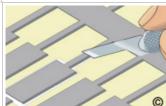
If the new conductor has a connecting circuit, apply liquid flux to the lap solder joint connection area and solder the circuit of the new pad/land/conductor to the circuit on the printed circuit board surface. If desired, apply epoxy to the lap solder joint connection.

Visit our website for a selection of Circuit Frames www.circuitmedic.com/frames

1. Remove the damaged pads and prepare the area.



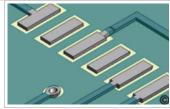
2. Select a replacement pad and trim it out from the Circuit Frame.



3. Place the pad in position using tape and bond in place.



4. Complete the connection to the existing circuit.



#### **SPECIFICATIONS**

Overall Size: 2.25" x 1.50" (57 x 38 mm)

Base Material: Rolled annealed copper foil .0014" (.036 mm) thick.

Adhesive Backing: Phenolic film adhesive .002" (.051 mm) thick.

Bonding Temperature: 475°F +/- 25°F (246°C +/- 14°C)

Bonding Time: 30 seconds

Peel Strength: Minimum 8 lbs/inch (1.43 kg/cm) after cure to FR-4 material.

**Shelf Life:** 6 months minimum. Each Circuit Frame is stamped with the expiration date.

#### PLATING OPTIONS

Bright Tin: .0001" (.0025 mm) Bright Tin (Lead Free)

Nickel/Gold: .000050" (.00127 mm) Gold over .000100" (.00254 mm) Nickel

Tin/Lead: .0001" (.0025 mm) 60/40 Tin/Lead

REACH: ... CircuitMedic Circuit Frames contain less than 0.1% by weight any

substance listed as a very high concern in Article 59 of REACH.

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### **Circuit Track Kit**

#### **APPLICATIONS**

Circuit Track Repair

#### **FEATURES**

- Everything you need to repair damaged circuits and conductors.
- Circuit Tracks can form to any conductor pattern.
- Designed to meet IPC recommended guidelines.
- 19 separate items, more than 50 pieces.
- Packaged in a rugged, ESD safe conductive case.



It's now easier than ever to repair damaged circuits. Circuit Tracks are rectangular shaped conductors made of 99.9% pure CDA 11000 copper.

These rectangular ribbons closely conform to the original conductor dimensions. The replacement Circuit Track is bonded in place using prepackaged epoxy included in the kit. This kit is a great time and labor-saver and an easy solution to repairing missing or damaged circuits.

1. Remove damaged conductor.



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2. Solder one end.







Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

201-3130 Circuit Track Kit

201-3132

Circuit Track Refill Kit

www.circuitmedic.com/201-3130

3. Form the shape.



4. Overcoat with epoxy.



### **Gold Contact Plating Kit**

#### **FEATURES**

- Specifically designed and packaged for gold edge contact plating.
- Plating probes use pre-wrapped plating anodes.
- Industry approved and conforms to IPC quidelines.
- Variable power supply provides accurate voltage and current.

#### DESCRIPTION

Here's the perfect kit for replating solder-contaminated or damaged gold edge contacts or contacts that don't meet the minimum thickness specification. The kit includes a DC power supply and all the tools and materials needed for gold edge contact plating.

Plating probes use pre-wrapped, screw-on plating anodes to end the common problems associated with loosely wrapped cotton anodes.

#### PLATING SOLUTION



Plating Solution, Gold, 1 oz (.03 liter)

115-3824

Plating Solution, Gold, 4 oz (.12 liter)

115-3834

Plating Solution, Nickel, 4 oz (.12 liter)

115-3844

Plating Solution, Electroclean, 4oz. (.12 liter)

115-3854

Plating Solution, Solder Strip, 4 oz (.12 liter)



Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

#### 201-6102

Gold Contact Plating Kit, 230 VAC www.circuitmedic.com/201-6100

#### **BEFORE**



gold contacts

contaminated

with solder

AFTER



gold contacts replated using the Gold Contact Plating Kit and Optional Plating Solutions.

www.circuitmedic.com www.circuitmedic.com <sub>13</sub>

### Plated Hole Repair Kit

#### **APPLICATIONS**

■ Plated Hole Repair

#### **FEATURES**

- Eyelets meet IPC Guidelines.
- Versatile has everything you need to repair plated holes in a wide variety of sizes.
- Standard eyelets are RoHS compliant.

#### **DESCRIPTION**

This kit includes all the tools and materials you need to repair damaged plated through holes in circuit boards.

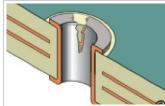
The kit includes a variety of eyelet, carbide ball mills for drilling, and setting tools to form the eyelets conforming to IPC guidelines.

Eyelets are made of pure copper or brass electroplated with tin.



Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

### BEFORE



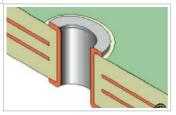
201–3140 Plated Hole Repair Kit

201-3142

Plated Hole Repair Kit

www.circuitmedic.com/201-3140

**AFTER** 



Eyelets and conductors for plated hole and circuitry repair.

Visit our website for a selection of Eyelets. www.circuitmedic.com/eyelets

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### **Eyelet Press**

#### **FEATURES**

- Heavy duty construction to properly form eyelets per IPC guidelines.
- Wide variety of setting tools available.
- Eyelet tooling made from hardened steel with .375" diameter shanks.

#### **DESCRIPTION**

This rugged, heavy duty press precisely forms eyelets in circuit boards for repair or assembly.

The unit has a 9" (16.50 cm) throat depth to accommodate 18" wide circuit boards.



This rugged, heavy duty press precisely forms eyelets in circuit boards for repair or assembly.

#### 110-5202

Evelet Press

www.circuitmedic.com/110-5202

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The CircuitMedic Eyelet Press will deliver years of maintenance-free reliable production.

#### **SPECIFICATIONS**

Throat Depth: 6.50" (16.50 cm)
Minimum Throat Opening: 1.00" (2.54 cm)

Tooling Shank Size: .375" (9.52 mm) Diameter

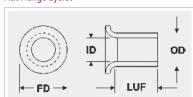
The heavy duty construction ensures eyelets are forming per

IPC guidelines. A wide variety of eyelets and tooling are available

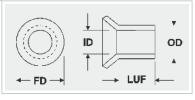
to meet most circuit board plated hole repair and rework needs.

Weight: 28 lbs. (13 kg.)

#### Flat Flange Eyelet



Funnel Flange Eyelet



Visit our web site for a selection of eyelets. www.circuitmedic.com/eyelets

### **Base Board Repair Kit**

#### **APPLICATIONS**

■ Base Board Repair

#### **FEATURES**

- Versatile, complete includes everything you need for base board repair.
- Meets IPC guidelines

DESCRIPTION

- High strength, high temperature epoxy withstands demanding physical environments.
- Color agents permit matching of solder mask and base board colors.

**EPOXY SPECIFICATIONS** 



Kit is shipped in a rugged, conductive plastic case safe for ESD sensitive areas.

Base Board Repair Kit

#### Packaging: 2 gram prepackaged containers

Most types of damage to base board material can be

repaired with this versatile repair kit. The kit includes

epoxies, color agents, and alcohol swabs.

Color: Clear, transparent Pot life: 30 minutes

24 hours at room temperature or 3 hours @ 165°F (75°C) Cure cycle:

Viscosity (after mixing): 1900 cps @ 77°F (25°C)

Operating

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-76°F to 284°F (-60°C to 140°C) temperature range:

Hardness: 88 Shore D Dielectric strength: 410 volts/mil



#### 201-3110

www.circuitmedic.com/201-3110

### **Epoxy Kit**

DESCRIPTION

#### **FEATURES**

- Two-compartment packaging eliminates mixing errors.
- High strength/high temperature epoxy withstands demanding physical environments.
- Epoxy is clear, can be tinted with coloring agents.
- Includes Foam Swabs and Alcohol Swabs for preparation and cleaning.
- Includes Micro Probes, ideal for dispensing a tiny volume of epoxy.



Kit contains 10 packages of clear, low viscosity,

superior strength epoxy ideal for circuit board use.

The Epoxy Kit kit contains 10 packages of clear, low viscosity, 115-1322, Epoxy Kit superior strength epoxy, precisely measured out into twowww.circuitmedic.com/115-1322 compartment plastic packages. This epoxy is easy to use and there's no measuring.

Once cured, this epoxy makes an effective electrical insulator with good high temperature, mechanical and impact resistance properties. The epoxy can be used to bond replacement conductors, repair burns and circuit board surface defects, and many other high strength, high temperature applications.

You can tint the epoxy using Color Agents. Color agents are designed to mix with the epoxy to match solder mask colors commonly found on circuit boards.

#### **EPOXY SPECIFICATIONS**

Viscosity (after mixing): 2000 cps Packaging: 2 gram pre-measured packages Color: Clear (transparent) Pot Life: 30 minutes 88 Shore D 400 volts/mil Hardness: Dielectric strength:

Shelf Life: 6 months minimum Operating temperature

Cure Cycle: 24 hours at room temperature or range: -67°F to 275°F (-55°C to 135°C)

4 hours @ 149°F (65°C)

### **Color Agents**

#### DESCRIPTION

Matching epoxy to the color of the circuit board being repaired is a simple process when you use a color agent.





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### Micro-Drill System

#### **FEATURES**

- High quality construction for delicate work.
- Flexible telephone-style cord eliminates bothersome drive cables.
- Quick change chuck for easy bit replacement.
- Versatile forward, reverse, and variable speeds.
- Lightweight, ergonomically designed hand piece reduces fatique.



The Micro-Drill System is a repair technician's dream.

#### DESCRIPTION

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The Micro-Drill is a workhorse in a kit. This versatile powerhouse is ideal for milling, drilling, grinding, cutting and sanding circuit boards. It removes coating, cuts circuits, cuts leads, drills holes, cuts slots, shapes FR4 and performs many other procedures using various interchangeable bits.

110-4105

Micro-Drill System

www.circuitmedic.com/110-4105

Unlike most hand-held tools, the Micro-Drill has a tiny, high speed DC motor in the hand piece, eliminating bothersome drive cables and giving the technician better control. A separate power supply keeps the hand piece lightweight and reduces fatique. Power is supplied by a panel switch or foot switch for ease of use.

### Wire Dots

#### **FEATURES**

- Very good initial bond strength that increases over 72 hours to stabilize as a high strength reliable bond.
- High humidity has a minimal effect on adhesive performance.
- Will hold securely after exposure to numerous chemicals including cleaning solutions/sprays, saponifiers, mild acids and alkalies.
- Wires will hold securely through a typical PCB hot water wash.
- Low: -40F (-40C); High short term: 390F (200C);

loss of bond strength.

■ Temperature Range:

High long term: 275F (135C).

■ Can be repositioned during and immediately after

initial bonding without causing adhesive transfer or



Clean up your act when bonding wires. Wire Dots make the job of bonding jumper wires neat and fast.

## Wire Dots, .256" (6.5 mm) Round



310-0651

Retains its performance and properties for one year from date of purchase when stored at 310-0652 room temperature.

#### DESCRIPTION

Wire Dots are a wire tacking system consisting of pre-cut shapes of a thin, flexible polymer film membrane coated on one side with a high performance, electronics grade permanent pressure sensitive adhesive.

The result is a highly conformable, high strength bond. The adhesive release liner is an environmentally stable poly-coated kraft liner.

As with any wire tacking material, in order to achieve maximum bond strength and reliability, application surface must be clean, dry and free of flux, skin oils and other contaminants. Clean with isopropyl alcohol or equivalent if necessary.

Firm application pressure develops better adhesive contact and thus improves bond strength. Avoid placing Wire Dots or any other wire tacking material directly over exposed copper or plated surfaces.

Wire Dots will perform best when applied at temperatures between 60F (15C) and 100F (38C). Do not apply below 50F (10C).

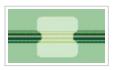
Wire Dots, 256" (6.5 mm) Square



310-1001 Wire Dots, .394" (10.0 mm) Round



310-1002 Wire Dots, .394" (10.0 mm) Square



www.circuitmedic.com/wire-dots

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### **BGA Rework Stencils**

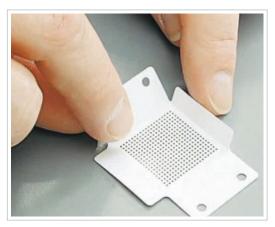
#### **APPLICATIONS**

Applying solder paste for BGA rework.

#### **FEATURES**

- Residue-free adhesive backing seals around BGA pads to prevent solder paste bleed.
- Laser cut ensures precise aperture size.
- Disposable eliminates tedious stencil cleaning.
- Flexible conforms to board surface.
- Fold-up sides for easy placement and solder paste containment.
- Low cost.

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BGA rework solder paste stencils with adhesive backing. No tape or fixturing is needed.

#### **DESCRIPTION**

If you've been using metal stencils for BGA rework, we have some great news for you. Flextac BGA Rework Stencils... a creative new product that is a major improvement over what you may be using now.

These flexible solder paste stencils are laser cut from high quality, anti-static polymer film with a residue-free adhesive backing. Because they are self-sticking, no tape or fixturing is needed.

The adhesive seals around each BGA pad to prevent solder paste from bleeding under the stencil when the paste is applied. Flextac Stencils are easy to use and leave no residue on the board surface.

Typical BGA rework stencils are made from metal and require fixturing or taping to position them and hold them in place. Metal stencils warp easily, and if the circuit board has undulations in the board surface, the metal stencil will not sit flat. Since there is no gasket-like seal, solder paste can easily bleed under metal stencils when paste is applied with a squeegee.

Also solder paste can spill out over the sides of flat metal stencils contaminating the circuit board surface. Metal stencils require tedious stencil cleaning. To use metal stencils effectively, a high level of operator skill is required.

Visit our website for a selection of BGA Rework Stencils. www.circuitmedic.com/stencils

### **BGA Rework Stencil**

Step 1. Select the proper size and fold up the side tabs.



Step 2. Peel off the cover film exposing the adhesive backing.



Step 3. Place in position using the handy side tabs.



Step 4. Apply paste using a standard metal squeegee.



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Step 5. Remove the stencil and save for another reuse or dispose



Visit our website for a selection of BGA Rework Stencils. www.circuitmedic.com/stencils

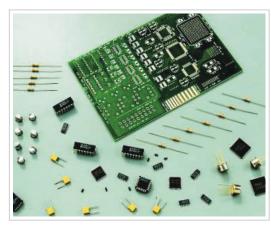
### **Soldering Skills Practice Kit**

#### **APPLICATIONS**

Applying solder paste for BGA rework.

#### **FEATURES**

- Includes 15 different component types.
- Includes a mulit-layer PCB for realistic soldering conditions.
- Includes all the component types required for IPC soldering skills certification.
- The perfect kit for practice prior to obtaining certification.
- The prefect kit to use when obtaining IPC soldering skills certification.



201–4150 Soldering Skills Practice Kit

www.circuitmedic.com/201-4150

#### **DESCRIPTION**

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Are your new soldering and rework operators skilled enough to work on your valuable products? Have they practiced enough to go for certification? The best way to find out is to order our Soldering Skills Practice Kit that lets them work on actual projects until they develop the expertise they need. We provide the tools and practice board and you decide when they're ready.

### Repair Skills Practice Kit

#### **FEATURES**

- The Repair Skills Practice Kit will help operators brush up on their circuit board repair skills.
- Includes dry film, epoxy-backed replacement circuits that do not use messy liquid epoxy.
- Includes Circuit Tracks to repair damaged circuits.
- Includes epoxy and color agents for solder mask or base board repair.
- Includes eyelets for plated through hole repair.
- Every item is prime quality, timetested, to meet high standards.
- Tools and materials conform to IPC guidelines.



The Repair Skills Practice Kit will help operators brush up on their circuit board repair skills.

201–4350 Repair Skills Practice Kit www.circuitmedic.com/201-4350

#### **DESCRIPTION**

The Repair Skills Practice Kit will help operators brush up on their circuit board repair skills, and give them a advantage toward becoming IPC certified. Using our Repair Skills Practice Kit and the tools and materials it contains, you can sharpen your skills until you're ready for certification.

Includes a circuit board with a variety of plated holes, surface mount pads, replacement circuit tracks, eyelets, epoxies and more.

These kits do not include soldering irons and bonding irons for bonding the replacement pads and lands.



# smart technology products and solutions

www.smarttec.dk



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