IPC-7711 - Includes Change 1

Rework of Electronic Assemblies

Developed by the Electronic Assembly Rework Task Group (7-34b) of IPC

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Users of this standard are encouraged to participate in the development of future revisions.

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Acknowledgment

Any Standard involving a complex technology draws material from a vast number of sources. While the principal members of the IPC Electronic Assembly Rework Task Group (7-34b) of the Product Assurance Committee are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of the IPC extend their gratitude.

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Foreword

IPC's documentation strategy is to provide distinct documents that focus on specific aspects of electronic packaging issues. In this regard document sets are used to provide the total information related to a particular electronic packaging topic. A document set is identified by a four digit number that ends in zero (0) (i.e., IPC-7710).

This standard is intended to provide information on the rework, repair and modification of printed boards and electronic assemblies. This information must also be supplemented by a performance specification that contains the requirements for the chosen technology. When used together, these documents should lead both manufacturer and customer to consistent terms of acceptability.

These documents supersede the following:

IPC-7711 supersedes IPC-R-700C
IPC-7721 supersedes IPC-R-700C

As technology changes, a performance specification will be updated, or new focus specifications will be added to the document set. The IPC invites input on the effectiveness of the documentation and encourages user response through completion of ''Suggestions for Improvement'' forms at the end of each document.

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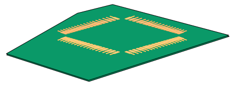
Procedure	Description 	Product Class	Skill Level	Level of Conformance
4.1.1	Surface Mount Land Preparation - Individual Method	R,F,W,C	Intermediate	High
4.1.2	Surface Mount Land Preparation - Continuous Method	R,F,W,C	Intermediate	High
4.1.3	Surface Solder Removal - Braid Method	R,F,W,C	Intermediate	
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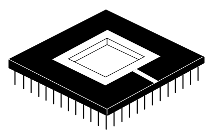
Procedure	Description 	Product Class	Skill Level	Level of Conformance
5.2.1	Solder Fountain Method with PTH Prefilled	R,F,W,C	Expert	Medium

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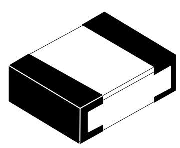
Procedure	Description 	Product Class	Skill Level	Level of Conformance
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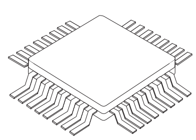
Procedure	Description 	Product Class	Skill Level	Level of Conformance
5.5.1A	Multi-Lead Method - Top of Lead	R,F,W,C	Advanced	High
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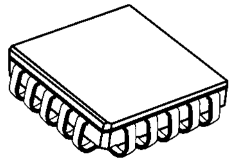
Procedure	Description 	Product Class	Skill Level	Level of Conformance
5.6.1	Wire Solder Method	R,F,W,C	Advanced	High
5.6.2	Point-to-Point Method	R,F,W,C	Intermediate	High
5.6.3	Solder Paste Method/Hot Air Pencil	R,F,W,C	Advanced	High
5.6.4	Multi-Lead Method	R,F,W,C	Intermediate	High

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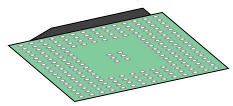
Procedure	Description 	Product Class	Skill Level	Level of Conformance
5.7.1	Using Wire Solder to Prefill Lands	R,F,W,C	Advanced	High
5.7.2	Using Solder Paste to Prefill Lands	R,F,W,C	Advanced	High
5.7.3	BGA Reballing Procedure	R,C	Advanced	High

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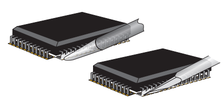
Procedure	Description 	Product Class	Skill Level	Level of Conformance
6.1.1	J-Leads - Draw Off Method	R,F,W,C	Intermediate	High
6.1.2	J-Leads - Respread Method	R,F,W,C	Intermediate	High
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6.1.4	Gull-Wing - Respread Method	R,F,W,C	Intermediate	High

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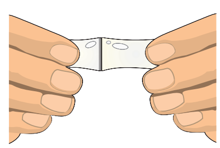
Procedure	Description 	Product Class	Skill Level	Level of Conformance
7.1.1	Epoxy Mixing and Handling	R,F,W,C	Intermediate	High
7.2.1	Replacement, Solder Resist	R,F,W,C	Intermediate	High
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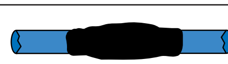
Procedure	Description 	Product Class	Skill Level	Level of Conformance
8.1.1	Mesh Splice	N/A	Intermediate	Low
8.1.2	Wrap Splice	N/A	Intermediate	Low
8.1.3	Hook Splice	N/A	Intermediate	Low
8.1.4	Lap Splice	N/A	Intermediate	Low

Rework of Electronic Assemblies

1.0 General

1.1 Scope This document covers procedures for repairing and reworking printed board assemblies. It is an aggregate of information collected, integrated and assembled by the Repairability Subcommittee (7-34) of the Product Assurance Committee of the IPC.

1.2 Purpose This document prescribes the procedural requirements, tools and materials and methods to be used in the modification, rework, repair, overhaul or restoration of electronic products. Although this document is based in large part on the Product Class Definitions of ANSI/J-STD-001, this document should be considered applicable to any type of electronic equipment. When invoked by contract as the controlling document for the modification, rework, repair, overhaul or restoration of products, the requirements flowdown apply.

IPC has identified the most common equipment and process in order to affect a specific repair or rework. It is possible that alternate equipment and processes can be used to make the same repair. If alternate equipment is used, it is up to the user to determine that the resultant assembly is good and undamaged.

1.2.1 Definition of Requirements The words *must* and *shall* have no special meaning beyond that commonly used in other IPC standards.

1.2.2 Requirements Flowdown The applicable requirements of this document must be imposed by each manufacturer or supplier on all applicable subcontracts and purchase orders. The manufacturer or supplier must not impose or allow any variation from these requirements on subcontracts or purchase orders other than those that have been approved by the user. Unless otherwise specified, the requirements of this document are not imposed on the procurement of off the shelf assemblies or subassemblies. However, the manufacturer of these items may comply as deemed appropriate.

1.3 Background Today's PC boards are more complex and microminiaturized than ever before. Despite this, they can be successfully modified, reworked or repaired if the proper techniques are followed. This manual is designed to help you repair, rework and modify PC boards reliably. The procedures in this document have been obtained from end product assemblers, printed board manufacturers and end product users who recognized the need for documenting commonly used rework, repair and modification techniques. These techniques have, in general, been proven to be acceptable for the class of product indicated through testing and extended field functionality. Procedures contained herein were submitted for inclusion by commercial and military organizations too numerous to list individually. The Repairability Subcommittee has, where appropriate, revised procedures to reflect improvements.

Rework completed satisfactorily will meet the original specification and requirements of IPC-A-600 and IPC-A-610. But, by definition, modifications and repairs do not comply with the initial design or fabrication criteria. For modification and repair, the user must recognize that the criteria in IPC-A-600 Acceptability of Printed Boards and IPC-A-610 Acceptability of Printed Board Assemblies are not necessarily applicable to the procedures herein. Modifications and repairs should not compensate for the lack of proper processes and quality controls. Ultimate cost effectiveness is achieved using appropriate design, fabrication and assembly techniques that minimize the need for modification and repair.

1.4 Controls Although modification, rework and repair procedures may be very similar, the control of such procedures may not be the same, due to the conditions and objectives involved.

1. *Modification*

   The revision of the functional capability of a product in order to satisfy new acceptance criteria.

   Modifications are usually required to incorporate design changes which can be controlled by drawings, change orders, etc. Modifications should only be performed when specifically authorized and described in detail on controlled documentation.

2. *Rework*

   The act of reprocessing non-complying articles, through the use of original or equivalent processing, in a manner that assures full compliance of the article with applicable drawings or specifications.

3. *Repair*

   The act of restoring the functional capability of a defective article in a manner that precludes compliance of the article with applicable drawings or specifications.

   Repairs are generally changes to an unacceptable end product to make it acceptable in accordance with original functional requirements. The control of repaired products should be by means of Material Review Board (MRB), or its equivalent, which may consist of

1.9.9 The rework of circuit boards assembled using lead free solders are similar to common alloys except as noted below. Proper training needs to be in place to ensure quality and reliability of the assembly. Generally all that is needed is to understand those differences.

Those differences are:

- In most cases the newer alloys will require more time and temperature and one must understand why
- The melting point of the solder alloys are likely to be higher and thus may require a modified flux chemistry
- Wetting times are generally extended
- Solderability indicators such as wetting angles, joint appearance etc., will generally be different
- Higher temperatures and longer dwell times may increase oxidation
- Component lead frames as well as circuit board finishes must be compatible with the solder alloy
- Using alternative means of attachment for rework/repair (such as conductive epoxies) may be advantages due to temperature and other considerations
- For both conductive and convective assembly rework/repair, the use of inert atmosphere (such as nitrogen) should be considered to facilitate the process

IPC 7711 Rework of Electronic Assemblies	Revision: **A** Date: **5/02** **Handling Electronic Assemblies**	Number: **2.1** Product Class: R, F, C, W Skill Level: Intermediate Level of Conformance: High

OUTLINE

Electrostatic Discharge (ESD) is the rapid discharge of electrical energy that was created from static sources. When the electrical energy is allowed to come in contact with or even close to a sensitive component it can cause damage to the component. Electrostatic-Discharge Sensitive (ESDS) components are those components that are affected by these high energy surges. The relative sensitivity of a component to ESD is dependent upon its construction and materials. As components become smaller and operate faster, the sensitivity increases.

Electrical Overstress (EOS) is the internal result of a unwanted application of electrical energy that results in damaged components This damage can be from many different sources, such as electrically powered process equipment or ESD occurring during handling or processing.

ESDS components can fail to operate or change in value as a result of improper handling or processing. These failures can be immediate or latent. The result of immediate failure can be additional testing and rework or scrap. However the consequences of latent failure are the most serious. Even though the product may have passed inspection and functional test, it may fail after it has been delivered to the customer.

It’s important to build protection for ESDS components into circuit designs and packaging. However, in the manufacturing and assembly areas, we often work with unprotected electronic assemblies that are attached to the ESDS components. This section will be dedicated to safe handling of these unprotected electronic assemblies.

For that purpose, the following subjects are addressed:

2.1.1 Electrical Overstress (EOS) Damage Prevention
2.1.2 Electrostatic Discharge (ESD) Damage Prevention
2.1.3 Physical Handling

Information in this specification is intended to be general in nature. Additional detailed information can be found in EIA-625, Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices

2.1.1 Electrical Overstress (EOS) Damage Prevention

Electrical components can be damaged by unwanted electrical energy from many different sources. This unwanted electrical energy can be the result of ESD potentials or the result of electrical spikes caused by the tools we work with, such as soldering irons, soldering extractors, testing instruments or other electrically operated process equipment. Some devices are more sensitive than others. The degree of sensitivity is a function of the design of the device. Generally speaking higher speed and smaller devices are more susceptible than their slower, larger predecessors. The purpose or family of the device also plays an important part in component sensitivity. This is because the design of the component can allow it to react to smaller electrical sources or wider frequency ranges. With todays products in mind, we can see that EOS is a more serious problem than it was even a few years ago. It will be even more critical in the future.

When considering the susceptibility of the product we must keep in mind the susceptibility of the most sensitive component in the assembly. Applied unwanted electrical energy can be processed or conducted just as an applied signal would be during circuit performance.

Before handling or processing sensitive components, tools and equipment need to be carefully tested to ensure that they do not generate damaging energy, including spike voltages. Current research indicates that voltages and spikes less than 0.5 volt are acceptable. However, an increasing number of extremely sensitive components require that soldering irons, solder extractors, test instruments and other equipment must never generate spikes greater than 0.3 volt.

As required by most ESD specifications including EIA-625, periodic testing may be warranted to preclude damage as equipment performance may degrade with use over time. Maintenance programs are also necessary for process equipment to ensure the continued ability to not cause EOS damage.

EOS damage is certainly similar in nature to ESD damage, since damage is the result of undesirable electrical energy.

2.1.2 Electrostatic Discharge (ESD) Damage Prevention

The best ESD damage prevention is a combination of preventing static charges and eliminating static charges if they do occur. All ESD protection techniques and products address one or both of the two issues.

ESD damage is the result of electrical energy that was generated from static sources either being applied or in close proximity to ESDS devices. Static sources are all around us. The degree of static generated is relative to the characteristics of the source. To generate energy relative motion is required. This could be contacting, separation, or rubbing of the material.

Most of the serious offenders are insulators since they concentrate energy where it was generated or applied rather than allowing it to spread across the surface of the material. Common materials such as plastic bags or Styrofoam containers are serious static generators and as such are not to be allowed in processing areas especially static safe areas. Peeling adhesive tape from a roll can generate 20,000 volts. Even compressed air nozzles which move air over insulating surfaces generate charges.

Table 1 Typical Static Charge Sources

Work surfaces	Waxed, painted or varnished surfaces Untreated vinyl and plastics Glass
Floors	Sealed concrete Waxed or finished wood Floor tile and carpeting
Clothes and personnel	Non-ESD smocks Synthetic materials Non-ESD Shoes Hair
Chairs	Finished wood Vinyl Fiberglass Non-conductive wheels
Packaging and handling materials	Plastic bags, wraps, envelopes Bubble wrap, foam Styrofoam Non-ESD totes, trays, boxes, parts bins
Assembly tools and materials	Pressure sprays Compressed air Synthetic brushes Heat guns, blowers Copiers, printers

Destructive static charges are often induced on nearby conductors, such as human skin, and discharged into conductors. This can happen when a printed board assembly is touched by a person having a static charge potential. The electronic assembly can be damaged as the discharge passes through the conductive pattern to a static sensitive component. Static discharges may be too low to be felt by humans (less than 3500 volts), and still damage ESDS components. Typical static voltage generation is included in Table 2.

Table 2 Typical Static Voltage Generation

Source	10-20% humidity	65-90% humidity
Walking on carpet	35,000 volts	1,500 volts
Walking on vinyl flooring	12,000 volts	250 volts
Worker at a bench	6,000 volts	100 volts
Vinyl envelopes (Work Instructions)	7,000 volts	600 volts
Plastic bag picked up from the bench	20,000 volts	1,200 volts
Work chair with foam pad	18,000 volts	1,500 volts

2.1.3 Physical Handling

Care must be taken during acceptability inspections to ensure product integrity at all times. Table 3 provides general guidance.

Physical Damage

Improper handling can readily damage components and assemblies (e.g., cracked, chipped or broken components and connectors, bent or broken terminals, badly scratched board surfaces and conductor lands). Physical damage of this type can ruin the entire assembly or attached components.

Contamination

Contamination by handling with bare hands or fingers without some form of protection causes soldering and coating problems; body salts and oils, and unauthorized hand creams are typical contaminants. Body oils and acids reduce solderability, promote corrosion and dendritic growth. They can also cause poor adhesion of subsequent coatings or encapsulates. Lotion formulated specifically for use in solder assembly areas is available. Normal cleaning procedures will not always remove such contaminants. The best solution is to prevent contamination.

Table 3 General Rules for Handling Electronic Assemblies

1. Keep work stations clean and neat. There must not be any eating, drinking, or use of tobacco products in the work area.
2. Minimize the handling of electronic assemblies and components to prevent damage.
3 When gloves are used, they need to be changed as frequently as necessary to prevent contamination from dirty gloves.
4. Solderable surfaces are not to be handled with bare hands or fingers. Body oils and salts reduce solderability, promote corrosion and dendritic growth. They can also cause poor adhesion of subsequent coatings or encapsulates.
5. Do not use hand creams or lotions containing silicone since they can cause solderability and conformal coating adhesion problems..
6. Never stack electronic assemblies or physical damage may occur. Special racks need to be provided in assembly areas for temporary storage.
7. Always assume the items are ESDS even if they are not marked.
8. Personnel must be trained and follow appropriate ESD practices and procedures.
9. Never transport ESDS devices unless proper packaging is applied.

Handling Electronic Assemblies

If no ESDS markings are on an assembly, it still needs to be handled as if it were an ESDS assembly. However, ESDS components and electronic assemblies need to be identified by suitable EOS/ESD labels. Many sensitive assemblies will also be marked on the assembly itself, usually on an edge connector. To prevent ESD and EOS damage to sensitive components, all handling, unpacking, assembly and testing must be performed at a static controlled work station.

Avoid contaminating solderable surfaces prior to soldering. Whatever comes in contact with these surfaces must be clean. When boards are removed from their protective wrappings, handle them with great care. Touch only the edges away from any edge connector tabs. Where a firm grip on the board is required due to any mechanical assembly procedure, gloves meeting EOS/ESD requirements need to be worn. These principles are especially critical when no-clean processes are employed.

Handling After Solder

After soldering and cleaning operations, the handling of electronic assemblies still requires great care. Finger prints are extremely hard to remove and will often show up in conformally coated boards after humidity or environmental testing. Gloves or other protective handling devices need to be used to prevent such contamination. Use mechanical racking or baskets with full ESD protection when handling during cleaning operations.

Common Tools and Equipment

Work environments require tools and equipment to conduct electronic assembly operations. The following information is provided as guidance regarding the use of common equipment. EIA-625 provides more specific information.

NOTES

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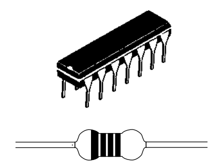
Electronic Assemblies

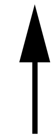
Revision: **A**
Date: 5/02

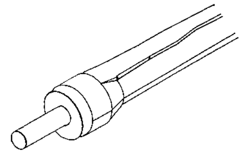
Number: **3.1.1**

Through-Hole Desoldering

Continuous Vacuum Method







Product Class: R, F, W
Skill Level: Intermediate
Level of Conformance: High

EQUIPMENT REQUIRED

Continuous vacuum desoldering system
Desoldering tip
Damp sponge

OPTIONAL EQUIPMENT

N/A

MATERIALS

Flux-cored solder
Flux
Cleaner
Tissue/wipes

PROCEDURE

1. Remove conformal coating (if any) and clean work area of any contamination, oxides, residues or fluxes.
2. Install thermal drive desoldering tip handpiece.
3. Start with tip temperature of approximately 315°C and change as necessary.
4. Apply flux to all solder connections (optional).
5. Thermal shock tip with damp sponge.
6. Tin tip with solder.
7. Lower tip contacting solder connection. (See Figure 1.)
8. Confirm complete solder melt of contacted lead. (See Figure 2.)

   NOTE

   Auxiliary heating may be required on solder joints with a large thermal mass. This is most common on multilayer PC boards.
9. For a flat lead, move lead back and forth; for a round lead, use a circular motion and apply vacuum while continuing lead movement. (See Figures 3 & 4.)
10. Lift tip from lead, hold vacuum for sufficient time to clear all molten solder from heater chamber. (See Figure 5.)
11. Repeat for all solder connections.
12. Re-tin tip end with solder and return handpiece to its stand.
13. Clean lands as required for component replacement.

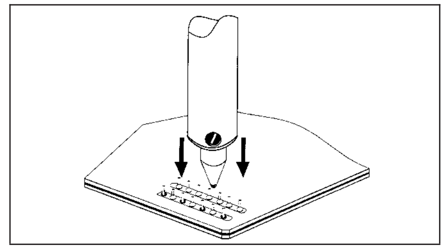


Figure 1 Position Tip

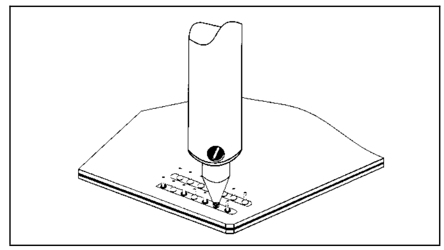


Figure 2 Melt Solder

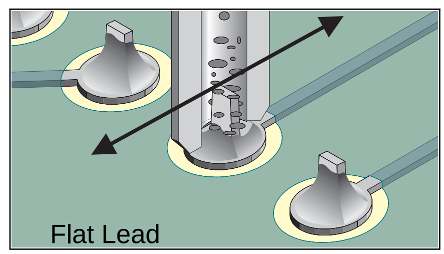


Figure 3 Move Lead & Apply Vacuum

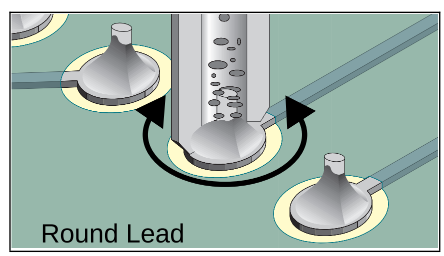


Figure 4 Move Lead & Apply Vacuum

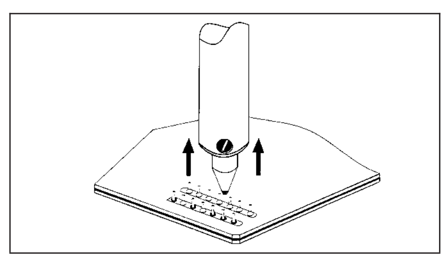


Figure 5 Lift Handpiece

NOTES

IPC

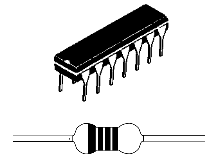
7711
Rework of
Electronic Assemblies

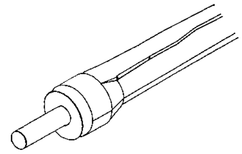
Revision:
Date: 5/02

Number: **3.1.2**

Through-Hole Desoldering

Continuous Vacuum Method – Partial Clinch





Product Class: R, F, W
Skill Level: Intermediate
Level of Conformance: High

EQUIPMENT REQUIRED

Continuous vacuum desoldering system
Desoldering tip
Damp sponge

OPTIONAL EQUIPMENT

N/A

MATERIALS

Flux-cored solder
Flux
Cleaner
Tissue/wipes

NOTE

On multileaded devices a skipping/alternating pattern may be needed to reduce heat buildup.

PROCEDURE

1. Remove conformal coating (if any) and clean work area of any contamination, oxides, residues or fluxes.
2. Install desoldering tip handpiece.
3. Start with tip temperature of approximately 315°C and change as necessary.
4. Apply flux to all solder connections (optional).
5. Thermal shock tip with damp sponge.
6. Tin tip with solder.
7. Lower tip contacting solder connection.
8. Confirm complete solder melt of contacted lead and gently straighten the lead to a vertical position. (See Figure 1.)
9. For a flat lead, move lead back and forth; for a round lead, use a circular motion and apply vacuum while continuing lead movement. (See Figures 2 & 3.)
10. Lift tip from lead, hold vacuum for sufficient time to clear all molten solder from heater chamber. (See Figure 4.)
11. Repeat for all solder connections.
12. Re-tin tip end with solder and return handpiece to its stand.
13. Clean lands as required for component replacement.

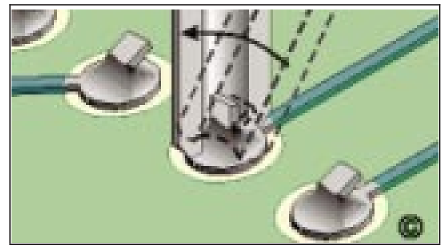


Figure 1

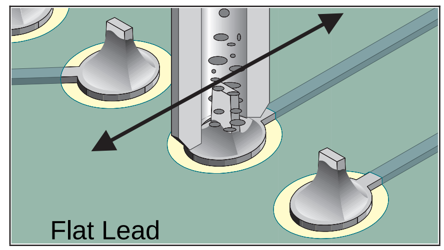


Figure 2

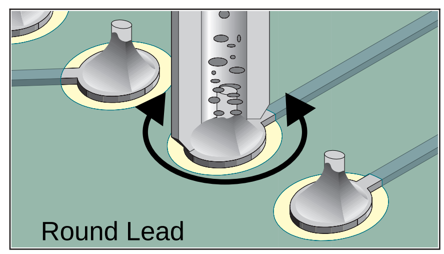


Figure 3

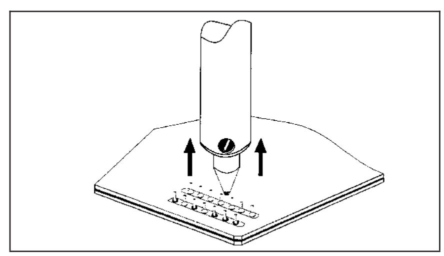
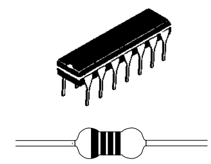
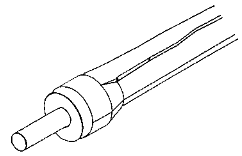


Figure 4

NOTES

7711 Rework of Electronic Assemblies	Revision: Date: 5/02 Number: **3.1.3** **Through-Hole Desoldering** **Continuous Vacuum Method – Full Clinch**		
		Product Class: R, F, W Skill Level: Intermediate Level of Conformance: High	

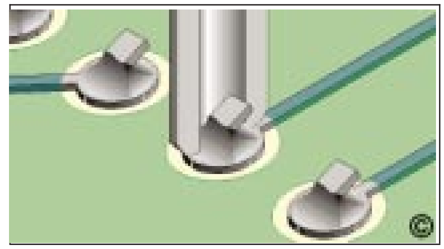


Figure 1

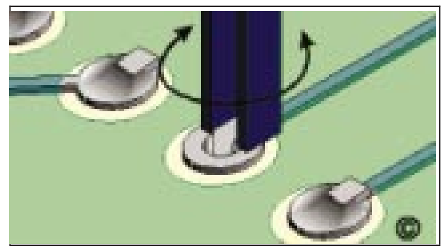


Figure 2

Figure 3

EQUIPMENT REQUIRED

Continuous vacuum desoldering system
Desoldering tip
Damp sponge
Non-metallic tool (wood stick or spudger)
Flat nose pliers

OPTIONAL EQUIPMENT

N/A

MATERIALS

Flux-cored solder
Flux
Cleaner
Tissue/wipes

NOTES

On multileaded devices a skipping/alternating pattern may be needed to reduce heat buildup.

PROCEDURE

1. Remove conformal coating (if any) and clean work area of any contamination, oxides, residues or fluxes.
2. Install desoldering tip handpiece.
3. Start with tip temperature of approximately 315°C and change as necessary.
4. Apply flux to all solder connections (optional).
5. Thermal shock tip with damp sponge.
6. Tin tip with solder.
7. Lower tip contacting solder connection.
8. Confirm complete solder melt of contacted lead and apply vacuum. (See Figure 1.)
9. Lift tip from lead, hold vacuum for sufficient time to clear all molten solder from heater chamber.
10. Inspect connection to ensure only a small amount of solder remains between lead and land area.

    NOTE: If excess solder exists use wicking braid and iron to remove solder. (See 3.1.5.)
11. Using a Flat Nose pliers gently rotate the lead laterally until the joint separates. (See Figure 2.)

12. Lift lead with wood stick to vertical position. (See Figure 3.)
13. Repeat for all solder connections.
14. Re-tin tip end with solder and return handpiece to its stand.
15. Clean lands as required for component replacement.

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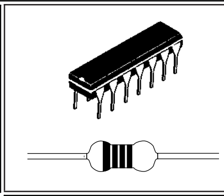
Electronic Assemblies

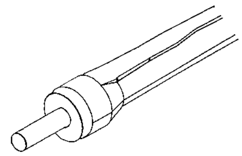
Revision:
Date: 5/02

Number: **3.1.4**

Through-Hole Desoldering

Full Clinch Straightening Method





Product Class: R, F, W
Skill Level: Intermediate
Level of Conformance: High

EQUIPMENT REQUIRED

Soldering Iron
Continuous vacuum desoldering system
Desoldering tip
Chisel tip
Damp sponge
Non-metallic tool (wood stick or spudger)
Flat nose pliers

OPTIONAL EQUIPMENT

N/A

MATERIALS

Flux-cored solder
Flux
Cleaner
Tissue/wipes

NOTE: On multileaded devices a skipping/alternating pattern may be needed to reduce heat buildup.

PROCEDURE

1. Remove conformal coating (if any) and clean work area of any contamination, oxides, residues or fluxes.
2. Install soldering iron tip and desoldering tip into handpieces.
3. Start with tip temperature of approximately 315°C and change as necessary.
4. Apply flux to all solder connections (optional).
5. Thermal shock tip with damp sponge.
6. Lower soldering iron tip contacting solder connection. (See Figure 1.)
7. Confirm complete solder melt of contacted lead
8. Lift lead with a non-metallic tool to the vertical position. (See Figure 2.)
9. Lower desoldering tip contacting solder connection.
10. Confirm complete solder melt of contacted lead.
11. For a flat lead, move lead back and forth; for a round lead, use a circular motion and apply vacuum while continuing lead movement. (See Figures 3 & 4.)
12. Lift tip from lead, hold vacuum for sufficient time to clear all molten solder from heater chamber.
13. Repeat for all solder connections.
14. Re-tin tip end with solder and return handpiece to its stand.
15. Clean lands as required for component replacement.

Figure 1

Figure 2

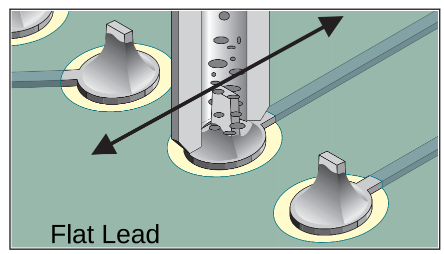


Figure 3

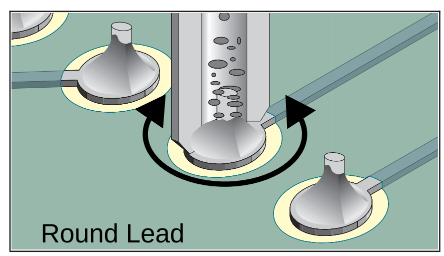


Figure 4

NOTES

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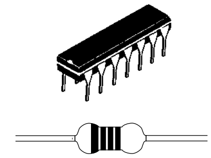
Rework of
Electronic Assemblies

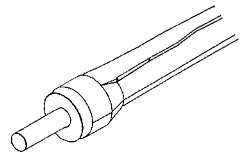
Revision:
Date: 5/02

Number: **3.1.5**

Through-Hole Desoldering

Full Clinch Wicking Method





Product Class: R, F, W
Skill Level: Advanced
Level of Conformance: High

Figure 1

Figure 2

EQUIPMENT REQUIRED

Soldering iron
Chisel tip
Damp sponge
Non-metallic tool (wood stick or spudger)
Wicking braid

OPTIONAL EQUIPMENT

N/A

MATERIALS

Flux-cored solder
Flux
Cleaner
Tissue/wipes

NOTE

On multileaded devices a skipping/alternating pattern may be needed to reduce heat buildup.

CAUTION

This procedure is not recommended for the removal of solder in plated-through holes due to the risk of conductor damage. This method should only be used when no other method exists. Wicking is most affective on surface solder only.

CAUTION

Trim the wicking braid to prevent damage to other land areas or components.

PROCEDURE

1. Remove conformal coating (if any) and clean work area of any contamination, oxides, residues or fluxes.
2. Install soldering iron tip in handpiece.
3. Start with tip temperature of approximately 315°C and change as necessary.
4. Apply flux to all solder connections (optional).
5. Thermal shock tip with damp sponge.
6. Apply braid material to lead land junction. (See Figure 1.)
7. Lower tip contacting braid material connection.
8. Observe solder wicking into the braid material.

NOTE: Once solder stops wicking into the braid material remove the iron and braid material immediately.

9. Remove tip and braid material.
10. Confirm complete solder removal from area.
11. Lift lead with a non-metallic tool to the vertical position. (See Figure 2.)
12. Repeat for all solder connections.
13. Re-tin tip end with solder and return handpiece to its stand.
14. Clean lands as required for component replacement.

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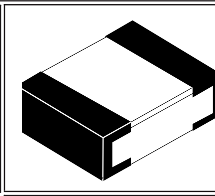
Rework of
Electronic Assemblies

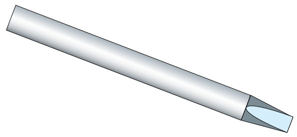
Revision:
Date: 5/02

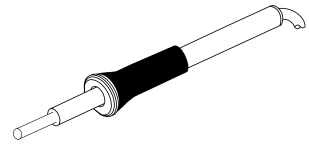
Number: **5.3.2**

Chip Installation

Point to Point Method







Product Class: R, F, W, C
Skill Level: Intermediate
Level of Conformance: High

EQUIPMENT REQUIRED

Soldering iron
Chisel or conical tip
Damp sponge
Wood stick or tweezers

MATERIALS

Flux-cored solder
Flux
Cleaner
Tissue/wipes

NOTE

Preheating is recommended for sensitive components (i.e., chip capacitors).

PROCEDURE

1. Remove conformal coating (if any) and clean work area of any contamination, oxides, residues or fluxes.
2. Install soldering iron tip in handpiece.
3. Start with tip temperature of approximately 315°C and change as necessary.
4. Apply flux to one land (optional).
5. Thermal shock tip with damp sponge.
6. Prefill one land with solder. (See Figure 1.)
7. Place the component in position and hold it with a wooden stick or tweezers.
8. Apply flux to both lands.
9. Place the tip at the junction between the prefilled land and termination area of component.
10. Observe complete solder melt. This is evident by component dropping down onto land. area. (See Figure 2.)
11. Pause briefly for solder to solidify
12. Solder remaining side by applying additional solder as needed. (See Figure 3.)
13. Re-tin tip end with solder and return handpiece to its stand.
14. Clean lands as required for component replacement.

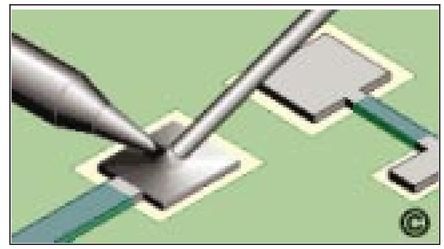


Figure 1

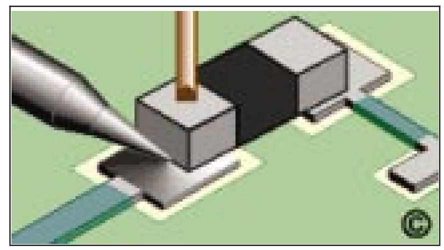


Figure 2

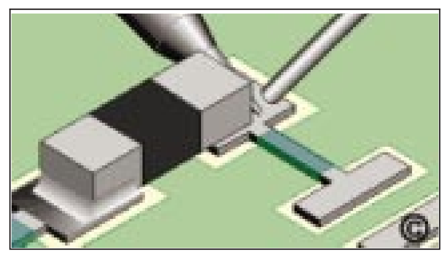


Figure 3

NOTES

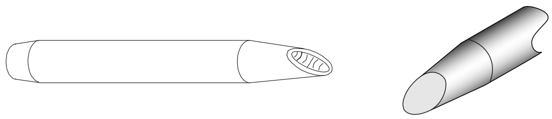
IPC 7711
Rework of
Electronic Assemblies

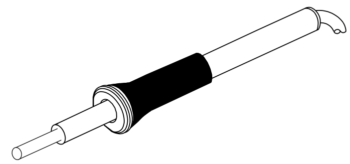
Revision: **A**
Date: 5/02

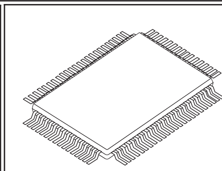
Number: **5.5.1**

Gull Wing Installation

Multi-Lead Method – Top of Lead







Product Class: R, F, W, C
Skill Level: Advanced
Level of Conformance: High

EQUIPMENT REQUIRED

Soldering system
Flat faced or cup-shaped tip
Damp sponge
Vacuum pick-up tool

OPTIONAL EQUIPMENT

Tweezers

MATERIALS

Flux-cored solder
Flux
Cleaner

PROCEDURE

1. Install selected tip into the soldering handpiece.
2. Start with tip temperature of approximately 315°C and change as necessary.
3. Position the component ensuring proper lead-to-land alignment. Hold the component in place using the vacuum pick-up tool or tweezers. (See Figure 1.)
4. Apply flux and tack solder opposing corner leads. (See Figure 2.)
5. Apply flux to remaining lead/land areas. (See Figure 3.)
6. Clean tip using a damp sponge.
7. Apply solder to tip to create a bead of molten solder. (See Figure 4.)
8. Position tip so the solder bead contacts the top portion of leads. Slowly move tip over the row of leads to form proper solder fillets at each joint. (See Figure 5.)
9. Repeat steps 7 through 8 on remaining sides of component.
10. Re-tin tip with solder.
11. Clean, if required, and inspect.

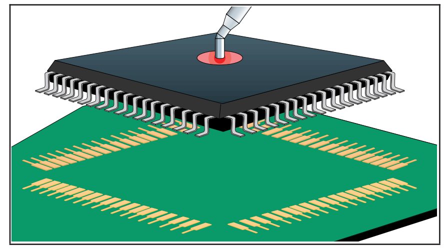


Figure 1 Position Component

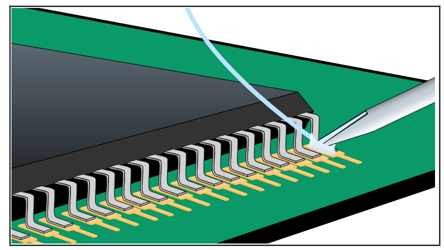


Figure 2 Tack Lead

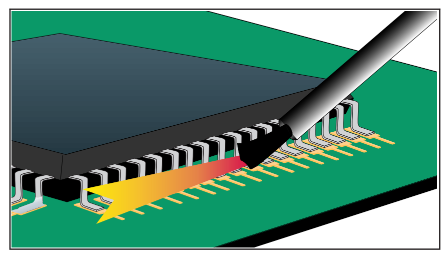


Figure 3 Flux Leads

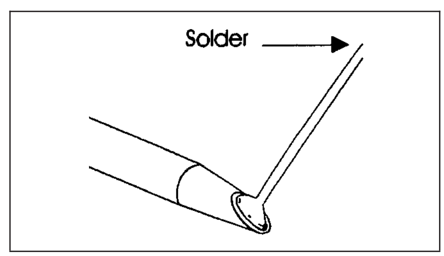


Figure 4 Fill Tip

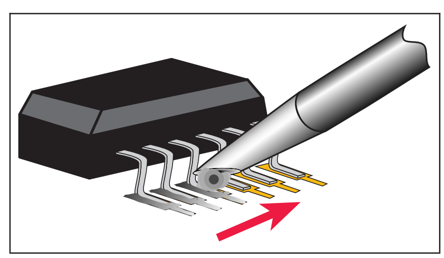


Figure 5 Solder Component

NOTES

IPC

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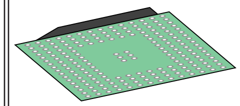
Rework of
Electronic Assemblies

Revision:
Date: 5/02

Number: **5.7.3**

BGA Reballing Procedure



Product Class: R, C
Skill Level: Advanced
Level of Conformance: High

EQUIPMENT REQUIRED

Solder removal system
Convective reflow station
Reballing fixture

OPTIONAL EQUIPMENT

Reflow oven
Bake-out (vacuum, convection) oven

MATERIALS

Flux
Cleaner
Tissue/wipes
Solder spheres

NOTE

Moisture sensitive components (as classified by IPC/JEDEC J-STD-020 or equivalent documented procedure) must be handled in a manner consistent with J-STD-033 or an equivalent documented procedure.

CAUTION

Verify component can withstand the multiple reflow cycles.

PROCEDURE

1. Remove excess solder in accordance with procedures 4.1.2, 4.1.3, or 4.2.1
2. Clean and inspect BGA for coplanarity.
3. Apply flux to land on BGA. (Figure 1.)
4. Insert the BGA into the applicable reballing fixture and secure. (Figure 2.)
5. Carefully pour solder sphere into fixture. (Figure 3.)
6. Drain off all excess spheres. Ensure all holes in fixture have a solder sphere.
7. Reflow solder spheres using the established profile. (Figure 4.)
8. Allow BGA to cool and remove from fixture.
9. Clean (if necessary) and inspect the BGA.

Figure 1

Figure 2

Figure 3

Figure 4

NOTES