

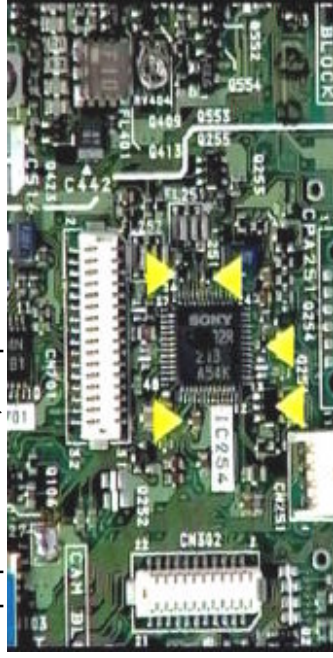
Modern Soldering Techniques

This section is an excerpt from the Sony videotape (p/n T-MODSOL-9) by the same name. This document only shows how to remove and install multi-pin ICs used on many Sony® products. The removal of these fine lead large-scale integrated circuits (LSI) requires modern methods. After replacing the IC, checking each pin for solder bridges is essential to prevent IC damage.

IC Removal - Which method?

Choose one of three methods for removing the ICs based upon the density of parts about the defective IC.

Cutting the IC's leads in a high-density board is the best method for IC removal. If there are many small parts about the defective IC the hot air and Chip Quick removal methods may desolder local components. If you choose the chip quick method, keep solder to a minimum on the IC pins.



Use the CUT OUT IC removal method when there are many parts surrounding the IC

IC Removal - Cut Out method

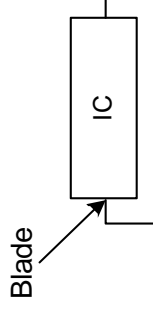
This method requires a minimum of tools to cut the legs off the IC and clean the board:

- Knife
- cutters
- dental pick
- soldering iron
- solder wick

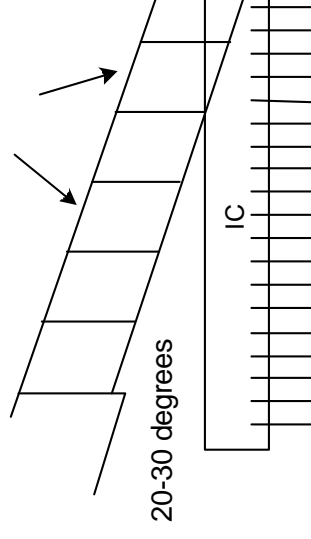
Use a sharp knife blade each time you remove an IC because the knife was not originally intended to cut metal. Break off the old blade segments of knife before cutting to expose a new sharp blade.

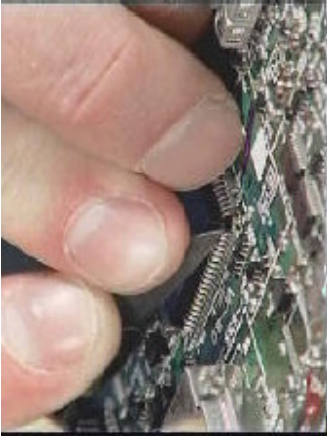


1. You must place the new blade at the legs where they meet the IC body. Angle the blade into the body slightly to avoid slipping off the IC legs.

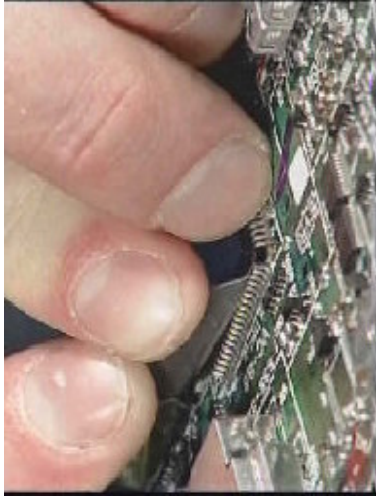


2. Along the IC legs, hold the knife at a shallow 20 - 30 degree angle.
3. Place your finger above the blade for control as you press down and rock the blade down.





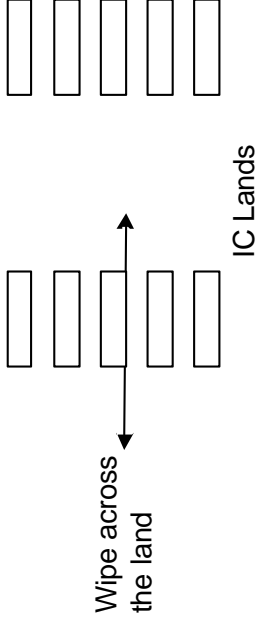
4. You should apply enough pressure to shear off 4-5 legs as you rock the blade while pressing down. **DO NOT** let the blade point touch the board.



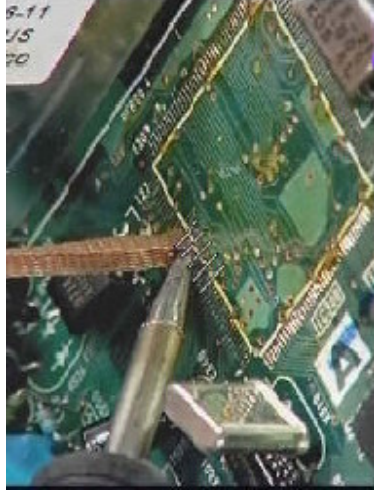
5. Reposition the blade back along the legs and repeat. Do not cut the last leg off or you will lose control and the blade point will hit the board. Use cutters to nip these last IC legs or unsolder and lift the leg with a dental pick. Remove the IC body.



6. Use a standard soldering iron to heat and push the legs off the lands. Push only in the direction of the lands so they are not damaged.



7. Remove the solder on the lands using a solder wick looped about the soldering iron for better control.



IC Removal - Hot Air method

This method requires the following:

- Hot Air Controller
- Desoldering Tips
- Flux Pen
- Tweezers

In the following steps you will use the Hot Air Controller to heat up all the pins while you lift the IC off the board with tweezers.



1. Apply flux from a pen to remove the oxide layer from the IC pins during heating. Removing the oxide establishes a uniform temperature on all the IC pins for removal and prevents an IC leg from still being attached to the land when lifting the IC. These low residue pens are made by Kester and distributed by companies such as www.mcmelectronics.com and www.newark.com.



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2. If you cannot find a hot air tip that will cover the IC, attach a single 1/8" (0.125") diameter tip that will heat all the pins if you move the tip around the IC pins.
3. Start at 0 air flow and maximum heat so the tip will warm up fast.
4. After warm up increase the air flow slightly (to #1 of 10) and position the hot air tip over the pins of the IC. Do not touch the IC with the tip. Count the nearby components and make sure they do not move away by controlling the airflow. Insert tweezers at the corner of the IC.



5. Gently lift the IC with the tweezers.
6. Remove the solder on the lands using a solder wick looped about the soldering iron for better control.

IC Removal - Hot Air method using butane torch

The hot air controller is effective, but expensive. The butane torch is similar in performance and inexpensive (about \$100). In Weller's PyroPen, hot air comes from a controlled flame.



Put safety goggles on before using the butane torch. Circle the IC leads with the torch flame and flip the IC over when the IC is loose.



1. Apply the Chip Quick flux to all the leads of the IC. (Medium size IC shown for removal).



IC Removal - Chip Quick® Method
Chip Quick is a low temperature solder that remains molten longer than ordinary solder, giving you time to unsolder the IC. Chip Quick is best for removing medium to large scale ICs when there are few parts about the IC. This method takes about the same time as the hot air method and requires about the same level of skill.

The Chip Quick package (P/N = T99856421) contains:

- Low Temperature Solder
- Flux
- Wick



2. Melt the Chip Quick solder along the IC leads. Keep the solder molten by running your iron along the IC leads.



3. Insert tweezers and lift the IC up.

IC Installation

Once the solder and bridges are cleaned off with a solder wick, the new IC can be installed. You must prevent static charges from damaging the new IC by using a grounded wrist strap. The amount of static electric you generate depends upon the humidity level and the clothing worn that day. Some days you will not generate enough static electricity to damage the new IC.



4. Remove the blobs of Chip Quick by heating and removing with a solder sucker.



5. The remaining Chip Quick is removed with a solder wick. Move the wick in the same direction as the lands of foil.



To solder all the IC leads without creating bridges, you need a constant tip temperature soldering iron.

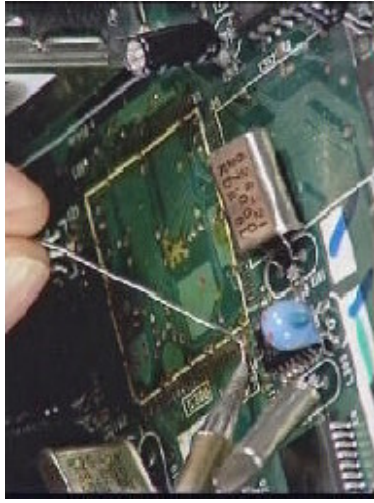
The constant tip temperature makes soldering uniform and increases the speed of the soldering so you don't have to resolder missed leads. Since these constant tip temperature irons have a 5-10 second warm-up time there is no reason to leave these irons on when in use.



1. Whichever iron you use, clean the tip by dipping it into a cleaner or tinner. Kester and Multicore manufacture these. A dirty tip will cause you to mis-solder some IC leads as you drag the solder across the IC pins.



2. Tin one land on the board, then position the IC over the lands.
3. With the IC in place solder the lead to the tinned land.



4. Check the IC position and solder another lead to hold the IC in place.



5. Apply flux from a pen to all the IC leads to stop solder bridges.



6. Using the magnifying glass, place the iron's tip furthest away from you on the IC pins and apply enough solder for 10 lands. Using the flat part of the iron, drag the solder blob down the pins in a side by side motion (zigzag pattern) allowing the solder blob to touch (heat) each IC lead and land. Only a small amount of solder resides at each land. At first it looks as though the lead was not soldered.



7. After soldering all the pins, run a dental pick across the pins to see if movement reveals an unsoldered one.



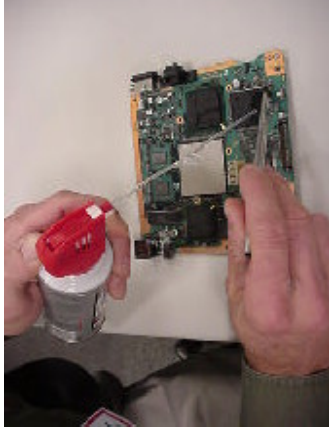
8. Most technicians forget to inspect for bridges after installing the IC. When power is turned ON, a bridge will take out the new IC or damage another related parts. Therefore it is important to inspect the pins for bridges before approving your own work.



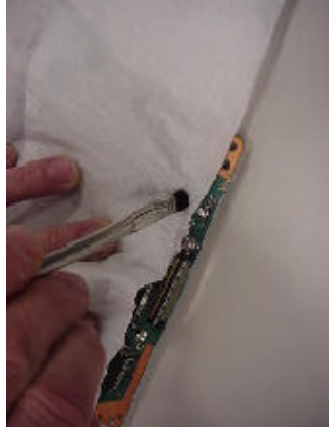
9. Using a low flux solder means you do not have to clean the board of flux with a flux remover...



10. Remove the excess flux by spraying the area lightly with flux remover.



11. Place a towel over the work and dab the flux off with the stiff bristles of the brush. This leaves the work clean without the cotton fibers leftover had you used a cotton swab.



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