Introduction

The K44 has a great CW reader but one thing that slows most folks down is connecting audio from their receiver to the K44's audio input. K1EL recommends using audio from the receiver's audio line output jack which, in most cases, is located on the back of the radio. Usually it's in a multi-pin DIN accessory connector, which is certainly not very convenient. The reason the line out works so well is that it is a high impedance output, which matches the K44 audio input, and it is unaffected by the radio's AF gain control. You can turn the AF gain control up and down and K44 copy is unaffected.

The next best option is to plug into the radio's external speaker jack. There are two problems with this, the first is that it is a low impedance output, usually 8 ohms. The second is as soon as you plug something into the external speaker jack, the radio's internal speaker is muted. Our recommendation, up to now, has been to make up a Y cable but that doesn't solve the impedance mismatch. To solve this once and for all, we designed an audio splitter board which takes the place of a Y cable and also solves the impedance mismatch problem. Unfortunately, it doesn't solve the AF gain adjustment issue but it's a good compromise.

The K44 Splitter board has three 1/8 inch jacks, one jack goes to your radio's external speaker jack, a second one goes to you exernal speaker, and a third goes to the K44's audio input jack. Use two of our 1/8 inch to 1/8 inch audio cables as shown below and you are all set.

Features

- 1/8 inch (3.5mm) audio input jack. Connect this to your radio's external speaker jack.
- 1/8 inch (3.5mm) speaker audio output jack. Connect this to your external speaker.
- 1/8 inch (3.5mm) Hi-Z audio output jack. Connect this to the K44's audio input jack.
- K44 audio is coupled through a low level impedance transformer
- 4 - 16 ohm audio input, 4 - 16 ohm speaker output and 4.7K ohm output impedance to K44.
- Audio attenuator to prevent K44 audio overload.
- Negligible effect on external speaker volume or tone.
- All connectors are on board with no flying leads or components.
- External power is not required.
- Easy assembly with large through hole components.

Figure 1 – K44 Audio Splitter board

Construction

Building a K44-SPLT kit is quite easy. All components are through hole and ¼ watt resistors are used to make it easier to identify color codes. It will take about one half hour to build the kit, previous soldering experience is suggested. Even if you are an experienced kit builder, please review Appendices A, B, and C before starting.

Bill of materials

R1 – 4.7 K ¼ watt resistor (violet,yellow,red)   C1 - .1 uF Ceramic capacitor
R2 – 2.7 K ¼ watt resistor (red,rellow,red)   J1,J2,J3 – 1/8" phone jack
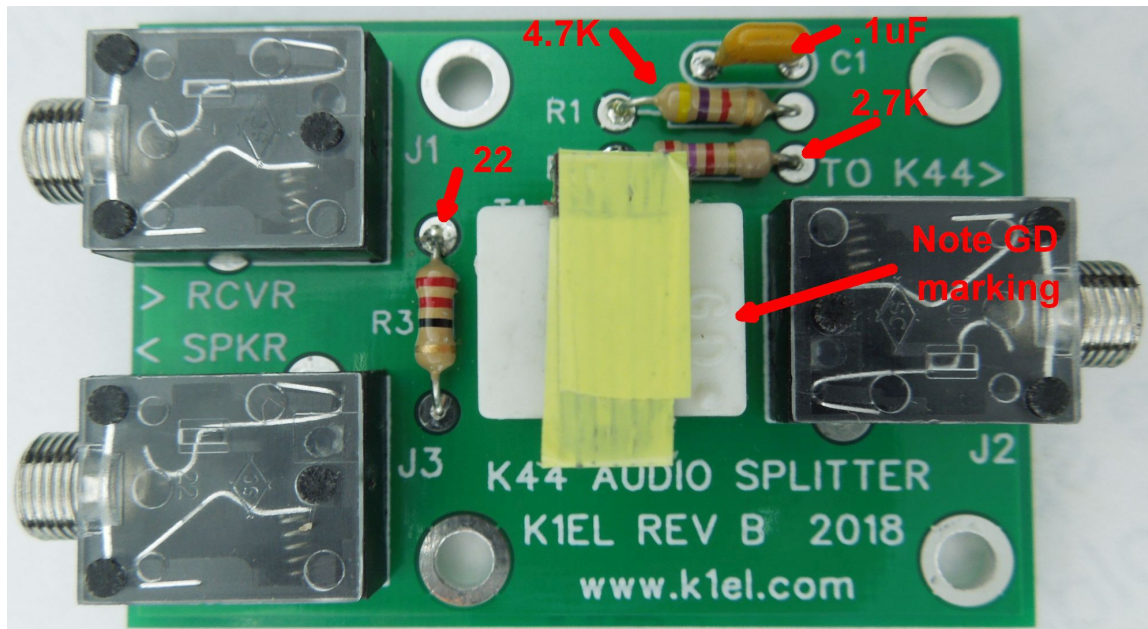R3 – 22 ohm ¼ watt resistor (red,red,black)   T1 – Audio transformer

Figure 2 – K44 Parts Locator

There are only four leaded components, install those first, solder, and then trim leads. We recommend using an ohmmeter to identify the resistors. Color codes are listed in the Bill of Materials.

Now install the three 1/8" phone jacks. The best way to do this is to first tack solder one pin to hold the connector in place and then solder the remaining pins.

Finally install the audio transformer. This must be oriented correctly for it to work properly. Note the GD marking on the top of the transformer. Rotate T1 so that the position of the GD marker matches the picture above.

That completes the assembly, recheck your component placement and organize the cabling arrangement. We ship a 1/8" to 1/* inch cable with the kit. This would be used to connect the splitter to your radio's external speaker output. If your radio does not use an 1/8" inch connector you will need to find an adapter. Contact us if you are having difficulty locating one. Your external speaker will connect to J3. In most cases your speaker will have an 1/8" connector so just plug it in. If not an adapter is required. You probably have an 1/8" to 1/8" cable that was supplied with the K44. Attach this between J2 and the K44's Audio Input jack. A typical cabling example is shown on the next page.
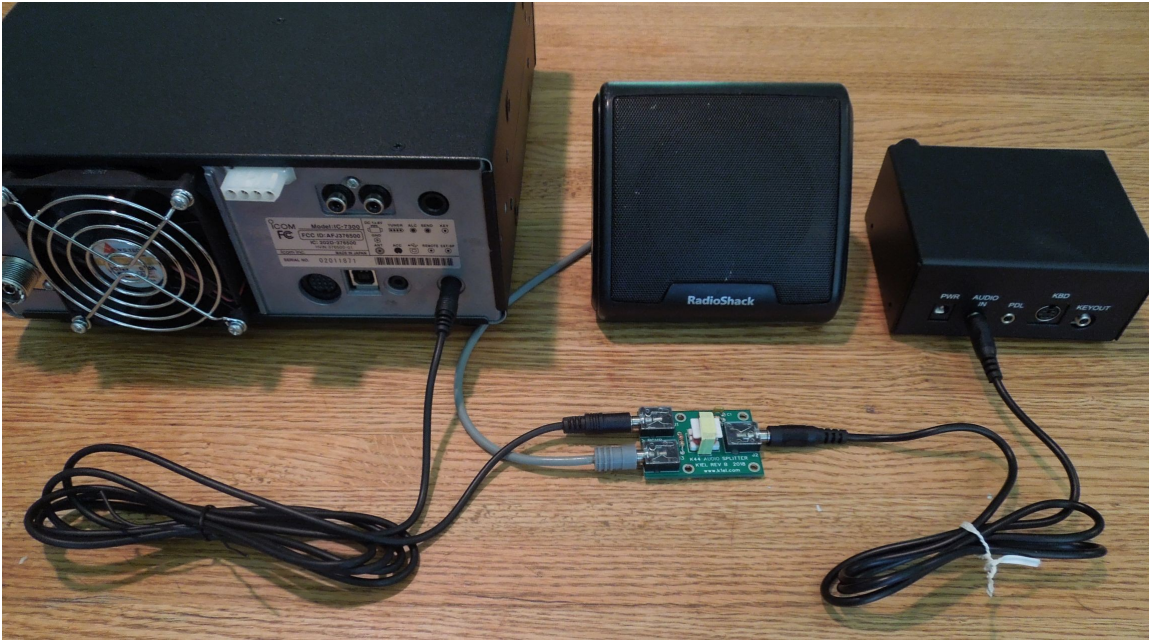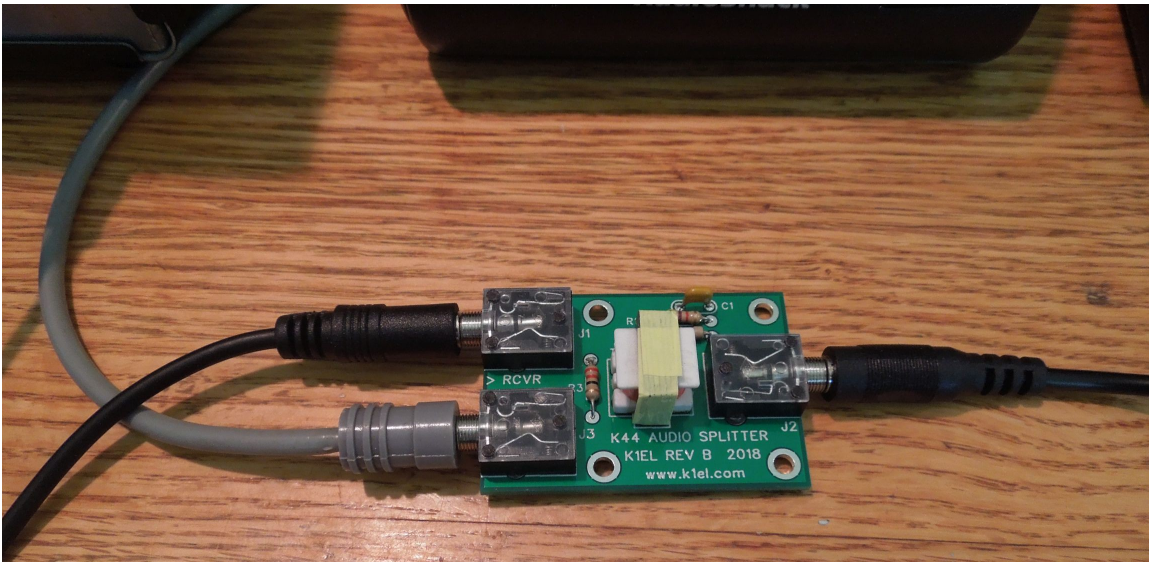
Figure 3 – K44 Audio Splitter cabing example

Figure 4 – K44 Audio Splitter cabing closeup

Here we have connected the K44-SPLT to an IC-7300's external speaker jack and are using a Radio Shack external speaker. Note that the connection to the K44 is very simple, just one cable from K44-SPLT J2 to K44 Audio Input.

Revision History

Manual Rev A.1 - Initial Release

K44 CW Reader Settings, or how to get the best copy out of your CWR

1) *The K44 CWR does not like noise*. If you set the signal level properly, noise will be less of an issue. Before trying to copy any stations, find a frequency where there is no activity. If there is a lot of band noise, you may see the LEDs respond to the noise and climb up two or three LEDs. This is a bad setup. Use the K44's gain adjustment (SHIFT+ENCODER CCW) to reduce the gain until either the first LED never or just barely lights. A gain setting of 3 is a typical high noise setting but it is highly dependent on the signal level you feed into the K44. Once the gain is set correctly, you will find that the LEDs will respond accurately to CW signals and provide much better copy.

2) *Find the optimal gain setting in quiet band conditions*. Again find a quiet band spot and adjust the CWR gain until the first LED just barely lights. If you encounter very strong stations, you may have to reduce gain as described in the next paragraph.

3) *Avoid overloading the K44's CW decoder.* Too much gain can be just as bad as not enough. In general, you should set maximum signal level to the point where the 5th LED on the right just barely lights when a station is tuned in. This is the point where signal clipping first occurs. While the K44 CWR handles overload pretty well, reducing the gain gives you the narrowest filtering. If the signal increases beyond clipping, the 5th and 1st or 2nd LEDs will light at the same time. This is an extreme overload condition and can happen with very strong signals. You should back the CWR gain off to get the signal level under control. In extreme cases you may need to reduce the receiver's RF gain setting.

4) *The CWR's noise filtering setting does matter*. This filter, adjusted by ALT-ENCODER, essentially controls the width of signal dropout correction. These dropouts are caused mostly by fast burst noise such as static crashes. These dropouts are very short in comparision to the width of a CW dit or dah and can be filtered out automatically. The higher the filter setting, the more aggressively dropout reduction is employed. Not surprisingly, very high settings will distort the CW integrity and will result in copy errors, especially at higher CW speeds (25 WPM and above). Our recommendation is to leave the filter at a low setting and use it only when there is a lot of atmospheric noise.

5) *A receiver's automatic noise blanker does not help.* Due to the way a noise blanker works, it really confuses the CWR and for that reason we suggest not using it. In addition, a fast AGC setting should also be avoided. Fast changes in signal level will also confuse the CWR and affect copy. We suggest always using a slow attack AGC.

6) *Narrow CW filters are not always worth using*. Narrow CW filters (200 and 400 Hz) do ring and distort the detection timing of the CWR. If the detected element widths aren't correct then the CWR will make incorrect decoding decisions and misdecode letters. The CWR has a built-in 6 pole narrow bandpass filter and in most cases this is all you really need. That said, a good 2.3 KHz SSB filter with steep skirts does a good job in filtering out adjacent signals and in most cases that's all you will need.

The K44-SPLT is fully warranted to the original purchaser against defects in materials and workmanship for one year after purchase. This warranty does not cover damage caused by accident, improper care, or lightning damage. Please contact us before returning your K44-SPLT for repair and we will issue an RMA.

Please submit support questions by e-mail to: k1el.kitsinfo@gmail.com

While every effort has been made to insure that the K44-SPLT design is safe and the documentation is clear and accurate, it is still possible to cause equipment damage or incur personal injury if
      a) K44-SPLT is not used as intended
      b) K44-SPLT is connected incorrectly
      c) K44-SPLT is modified in any way
K1EL Systems can not be held responsible in these or similar events.

K44-SPLT Schematics
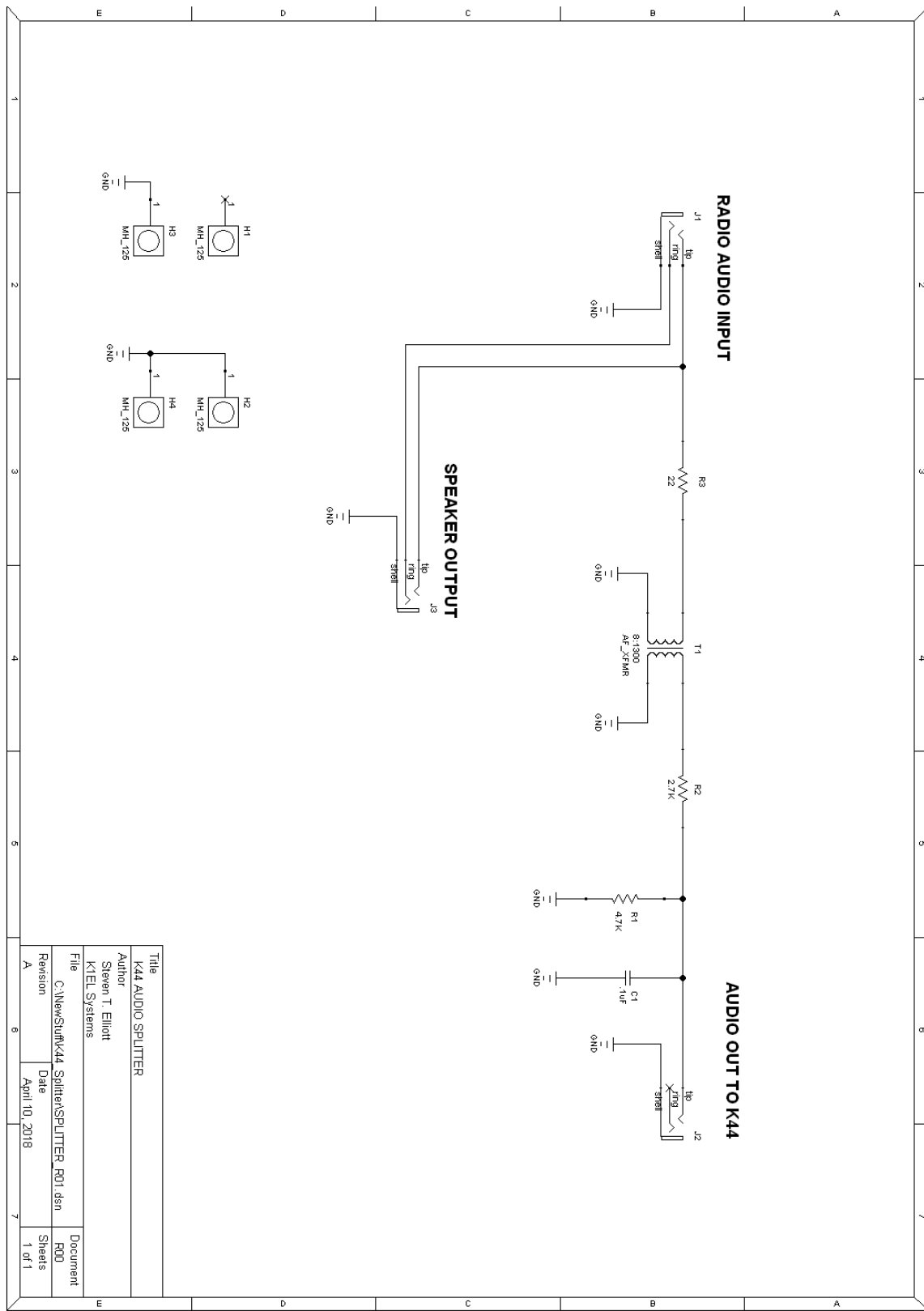
Appendix A - Kit Construction Hints

1. Find a good workspace.

It is essential that you have a good place to work on your kit,

You will need room to spread out your parts and have access to tools. Good lighting and ventilation is essential. A magnifying glass or visor is highly recommended.

2. Have the proper tools.

At a bare minimum you will need:

Small side cutters, flush cutters are a plus.

Small needle nosed pliers

Small flat blade & Philips head screw drivers

A good quality, 40-60Watt, temperature controlled Soldering Iron. The price has come down on these lately, you can buy a Weller WLC100 40W soldering station with adjustable temperature control for $40 on Amazon.

3. Read the Instructions First.

Read through the assembly instructions completely and have everything on hand <u>before</u> you start. Inventory the kit parts, make sure you have ALL of them.

4. Follow the assembly instructions in order.

Although not always obvious, the order in which parts are added to a board is important and should be followed. Sometimes sections are installed and tested in order or there could be a mechanical clearance consideration.

5. Keep your Workplace Clean and Orderly.

Nothing spoils a kit building experience more than lost parts. Second to that is stray bits of dirt and metal that get into a printed circuit board assembly. Our PC boards are nicely plated and accept solder easily. There is no need to clean the board with steel wool before starting. A good rosin core solder will work fine. Lead free solder is recommended for health reasons.

6. Take your time.

There is no need to rush, enjoy the process and the end result will be much better. Moving too quickly or working when you are tired often leads to big mistakes which could be difficult if not impossible to fix.

Appendix B - A Note About Safety

Burns to your skin can be very painful and can lead to serious injury.

Burns to your eyes can be catastrophic.

Toxic fumes can cause serious harm.

Flying objects such as wire ends etc. can cause painful and serious injuries.

When building your kit please remember that Soldering Irons and Solder are used at High Temperatures !

Soldering Irons can remain hot for many minutes after being turned off. Never touch the tip to see if it is hot. Touch the tip to a wet pad to test for temperature.

Wear safety glasses to protect your eyes from flying objects.

Appendix C - Soldering Basics

1. Insert component leads into PCB holes and bend them back slightly to hold the part in place. You can either trim the lead now or wait till after the joint is soldered. I usually install several parts at one time and then solder and trim multiple leads.

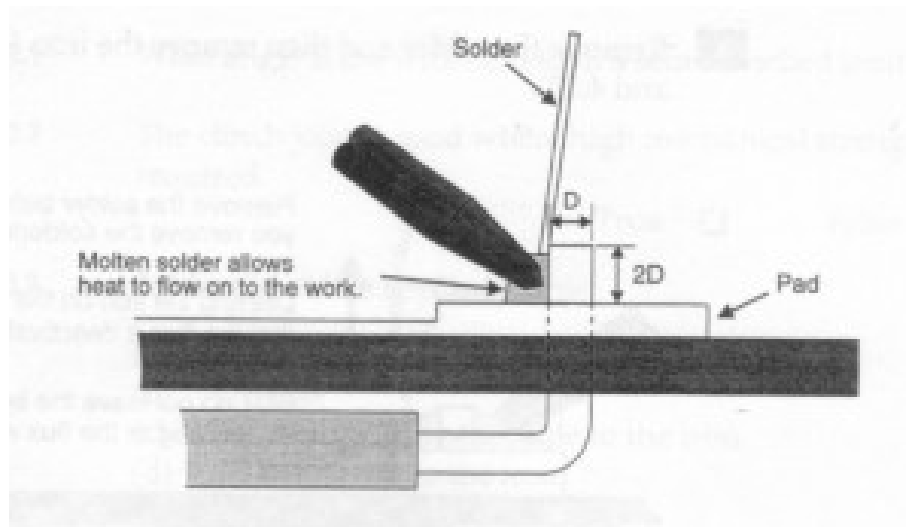2. Place a hot and clean iron tip against both the lead and pad as in Fig. A1.

Fig. C1 - Form a heat bridge

3. Create a heat bridge between the lead, the PCB pad and the iron by placing a small amount of solder on the tip.

4. Apply solder around the outside edge of the pad as in Fig. A2. If the pad and lead are at the correct temperature, the solder will flow around the connection.
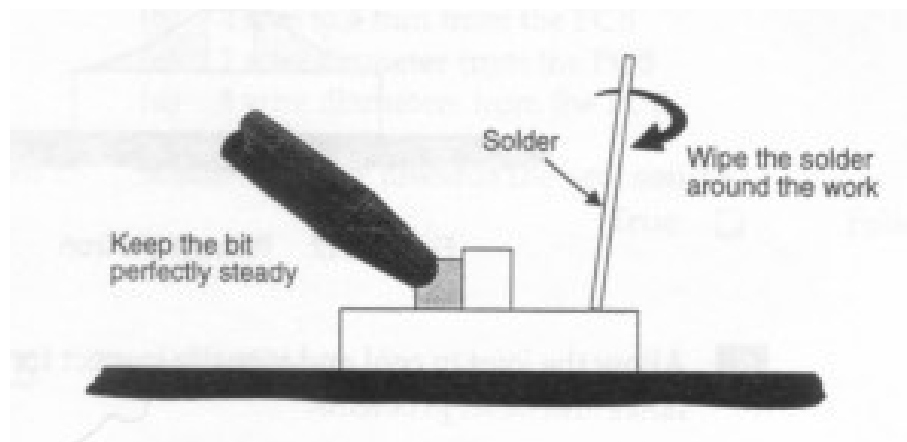
Fig. C2 - Spread solder around the work

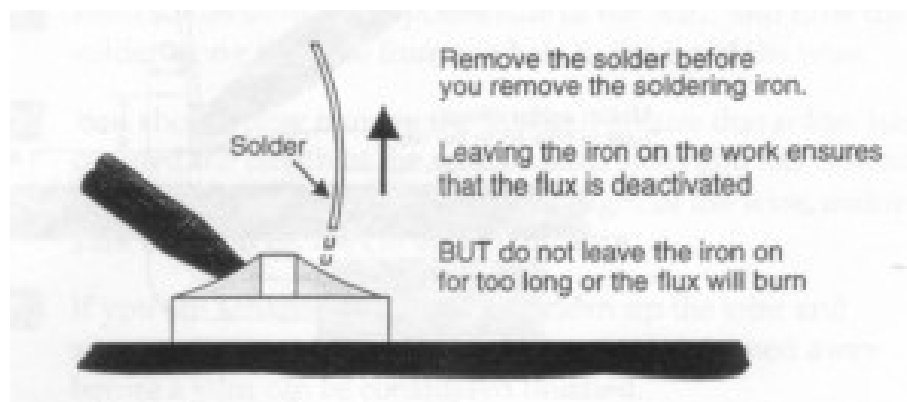5. Remove the solder and then remove the iron.

Fig C3 - Remove the solder

6. Allow the joint to cool and visually inspect for defects or other problems. You should have a solder joint with a bright shiny finish and a profile like that shown in the middle picture below.
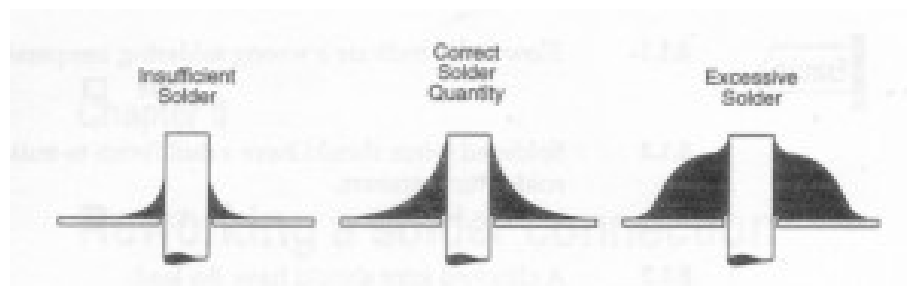

Fig. C4 - Solder quantity comparison

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