Hints for Flash Drive Repair

CSAW Forensics Challenge Organizers

The USB flash drive around which the CSAW 2008 Forensics Challenge is centered has been mechanically damaged. It was found by investigators near the scene of the murder Cori Plumb. It appears that somebody deliberately crushed the USB flash drive to make it unreadable. The USB connector is probably damaged beyond repair. The rest of the USB flash drive seems fine. Before the contents of the flash drive can be examined, a new connector is needed. The damaged connector can be removed and replaced with an undamaged connector. To do this, soldering is probably necessary. It is important to avoid causing damage to the actual flash drive, since that will make your forensic job much harder, and the murder case might never be solved. Here are some hints for successful soldering:

1. Do not kill the flash drive with electrostatic discharge. Work on a grounded surface and wear a grounding strap on your wrist.

2. Be gentle with the flash drive, particularly after you open it. There are small surface mount components on the PC board. If you knock them off, the flash drive might not work.

3. Be careful not to rip off any pads or traces from the PC board.

4. Do not overheat any part of the USB flash drive. Overheating could kill the electronics or could cause the PC board to delaminate. Use the minimum amount of heat that will do what you need to do.

5. Be patient. Do not expect the damaged connector to just drop off as soon as you touch it with the soldering iron. You have to gently work it away from the PC board.

6. After removing the damaged connector, you have the option of replacing it with a similar but undamaged connector, or you can cut a USB
cable and solder the four wires to the PC board of the USB flash drive. In either case, tin the pads on the PC board and the new connector or wire ends. Use a very small amount of solder. The pads on the USB flash drive’s PC board are not very close together, but still a big blob of solder can cause a short circuit.

7. Keep in mind that the original connector was mechanically supported by two lugs that passed through holes to the other side of PC board. If your replacement connector is not attached this way, it will probably be fragile. Be careful not to pull on connections that are made to the pads on the PC board. Take time to consider mechanical stability.

8. When making solder connections, both surfaces should be tinned with solder and pressed together. Touching the soldering iron to the joint for one or two seconds should be enough to melt the solder on the both surfaces so it flows together.
Figure 1: A very small amount of solder is used to tin the pads and the wires. The wire ends are bent so they align properly with the pads on the PC board. Then the solder joints can be made quickly and cleanly, without overheating the PC board or the chips.
Figure 2: A USB cable was sacrificed. It was cut, revealing the four inner wires. Insulation was stripped from each wire to expose 1mm of conductor. We felt that this was easier and safer than soldering the USB connector directly to the PC board, but you can decide for yourself.