Fundamental Soldering Technologies Volume 1: Iron Soldering

The process of iron soldering has repeatedly proven over many years that is it the most reliable type of soldering

Iron soldering, the most basic of basics, provides the highest bond strength and reliability. It also provides many advantages and can solve today's most difficult solder challenges.

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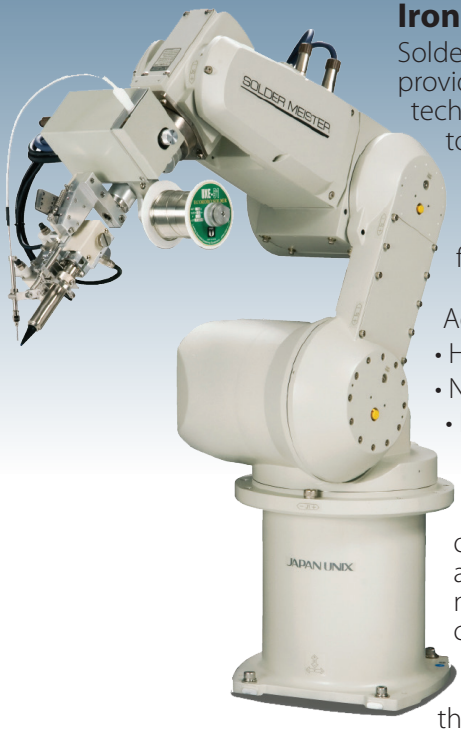
Mature, reliable and traditional, soldering is a 6,000-year-old technique, and iron soldering is known to have been used in the 19th century. In the 1920s, electronic appliances became smaller, and that triggered the wide-spread use of electric soldering irons.

Although various soldering techniques have been invented and applied in manufacturing fields today, iron soldering is the most technically established and mature basic technology that provides high bond strength and reliability.



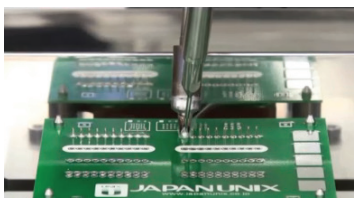
Iron Tip Advantages

Soldering quality is determined by material reliability and bond strength. Iron tip soldering provides the highest stability, strength and reliability compared to any other soldering techniques. In iron tip soldering, one point is soldered at a time by applying solder wire to a heated tip, which means the technique uses new and pure solder all the time. Unlike reflow soldering that heats an entire area, iron tip soldering will not damage electronic parts due to the limited contact area. Additionally, iron soldering can reduce the amount of solder waste because it does not need a solder bath used in flow soldering.

Advantages of iron soldering:

- High-quality soldering: uses 100% new solder every time
- No heat damage to electronic parts: applicable to heat-sensitive parts
- High maintainability: easy solder replacement and machine cleaning

One of the advantages of iron soldering over reflow is that it does not cause heat damage to electronic parts and PCBs. In reflow soldering, solder paste is printed onto a pattern on a circuit board showing points to be soldered, and then the board and electronic parts are put into a reflow oven to get soldered. Reflow soldering is not applicable to electronic parts too sensitive to the heat inside the oven since it can cause considerable damage to each part. Another significant advantage of an iron tip soldering robot over flow or reflow soldering is decreased, simplified maintenance for cost and time. On the other hand, iron soldering does not decrease the performance of each electronic part by causing heat damage. Therefore, in reflow soldering, any heat sensitive parts need to be soldered later by iron tip soldering.



There is a large difference in quality of solder used between iron tips and flow soldering. In flow soldering, solder is repeatedly heated and used for weeks, and its composition changes as gold and copper on circuit boards melt into it as impurities. Compared to new solder, solder with impurities does not provide enough strength and durability. One of the common causes of malfunction of electronic appliances is a "contact failure" caused by deterioration over time, which means soldering quality decides the durability of a product. Notably, the use of lead-free solder containing tin (Sn) has become popular and that has made it easier for impurities to melt into solder than before. The quality deterioration from melted impurities has been a serious problem in various fields today.

The recent evolution of electronic appliances has been phenomenal and iron soldering alone cannot cover all uses.

For high heat capacity materials, a soldering iron with high heat storage can provide stable bond strength. There are a variety of types of iron tips and wire for different purposes, and the flexibility of choice is one of the major advantages of iron soldering. On the other hand, the productivity of flow and reflow soldering is indispensable in this mass production age.

In these ever complicating manufacturing fields, it is necessary to choose the most suitable soldering process for each purpose. Since 1974, JAPAN UNIX has been conducting research on the basics of soldering with state-of-the-art analytical instruments, as well as developing soldering equipment using the latest technologies such as laser and ultrasonic soldering.

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