Micro joining Techniques To Enable Product Miniaturization

Kunio YOSHIDA President AJI Co,.Ltd.

Abstract –

We designed and developed small-sized micro assembly machines that have relatively large working space yet excellent positioning accuracy.

The target of this assembly machine is small and fragile parts such as optical or MEMS/Nano and components for HDD/DVD heads.

Such small parts are picked by pneumatic way, and placed on the substrate by pushing by some amount of force. This time we focused on joining electric components using small solder balls, and this paper deals with handling and heating problems of them.

Since the size of the solder ball is 100 micrometer or 80 micrometer, and in order to improve the efficiency of handling solder balls, we have prepared a special sticky sheet where solder balls are placed in order, so that the assembly machine can pick up multiple solder balls simultaneously.

The first half of this paper deals with this handling technique.

Next, the heating problem of solder balls is described. We have succeeded in controlling the quality of soldering by using blue violet laser heating technique. The soldering results are proves the validity of our approach.

Index Terms –micro assembly, positioning, handling, image processing, solder, Laser beam Micro soldering