CTS Electronics Manufacturing Solutions

January 2006

Bare Die Assembly Capability

Motivations for using bare die technology are many and varied and are often product or application specific. Common reasons for employing the technology have been cited as either improvement in device performance or reductions in product size, weight and cost. In response to existing customer requirements and future opportunities, primarily identified in the medical and military markets, in 2005 CTS EMS has invested $1M in establishing a bare die assembly capability in Moorpark, CA, which complements existing capabilities in the Singapore operation. (For an overview of Bare Die Assembly, See Page 2)

CTS Implements Bare Die Assembly in Moorpark, CA

CTS has invested a considerable amount of resource into introducing bare die capabilities to its flag-ship SMT facility in California. Investments include implementation of a Datacon 2200apm Multi Chip Die Bonder and a Delvotek 6200 Ball Bonder.

¥ **The Datacon 2200apm is technology agnostic and can be used for both flip chip and COB applications**

¥ **The Delvotek 6200 can bond 3 to 4 wires per second on substrates up to a maximum 200 x 150mm. Accuracy is better than ±1.5µm over a 200 x 250mm bond area.**

Delvotek 6200

The investment also includes the purchase of quality and reliability test equipment, rework station and most significantly, the construction of a purpose-built 1000 sq ft Class 10,000 Clean Room within the Moorpark facility.

Datacon 2200apm

Quality and Reliability

CTS has also installed interconnect test platforms. Specifically a **Keller BT 30 bond tester** and **Unitek Micropull IV wire puller**.

¥ **The Keller BT-30 is a combination die bond, ball bond and ball shear tester which can be used for both destructive and non-destructive testing.**

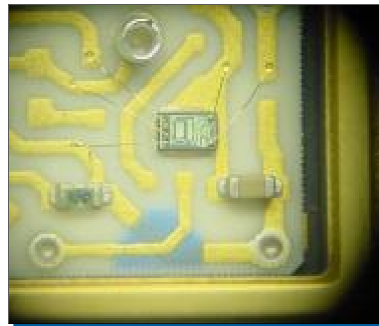
¥ **The Unitek has a 0.5 to 1000 gram-force range and is suitable for both destructive and non-destructive pull tests compliant with MIL-STD-883 Methods 2011 and 2024 respectively. The system also meets the requirements of MIL-PRF-38534E.**

For more information on Moorpark Assembly Capabilities, please contact: Michael McCallion, CTS EMS, 200 Science Drive, Moorpark, CA 93021-2003 (T) 805-532-2800

CTS Singapore — Wire Bonding

CTS Singapore have been using die attach and gold ball bonding technology since 1997 to manufacture Multi-Chip Modules (MCMs) for communications, military and medical applications. This capability has been built up around a **Panasonic HW22** platform capable of bonding 5 wires per second over a bonding area of 115 x 95mm, on substrates up to a maximum 100 x 300 x 1.6mm

MCM Bonding Technology at CTS Singapore

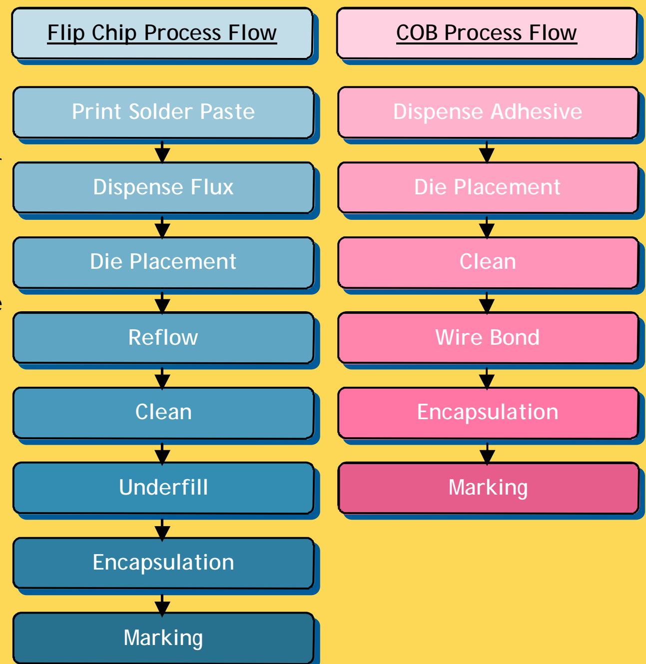


An Overview of Bare Die Assembly

Bare die assembly is generally accomplished one of two techniques, **Chip-on-Board (COB)** or **Flip Chip**. The two techniques differ fundamentally in the method used to establish interconnect between die and substrate, though some processing steps are common.

COB assembly leverages existing die attach, gold ball and aluminum wedge wire bonding technology. Consequently dies to be used in COB applications generally use a peripheral bond pad arrangement. Post wire-bond, the application of either liquid encapsulation or transfer molding provides protection for the die. The encapsulated device is then marked using inkjet techniques for maximum legibility and performance.

Flip Chip assembly relies on eutectic solder bumps to make the interconnection between die and substrate. Consequently dies to be used in flip chip applications generally use an array format, resulting in a smaller footprint and optimum electrical performance. Post placement dies are subjected to a reflow process and underfilled to enhance the thermal and mechanical properties of the interconnection. Devices are then encapsulated and marked just as in the COB process.



Want to Find Out More?

CTS has made a significant investment in bare die assembly technology and we believe that our installations in California and Singapore represent a truly world-class capability in these technically challenging applications. If you are currently looking to source a manufacturing partner for your existing bare die application, or if you are currently considering implementing bare die technology in your next design, please contact CTS where our process specialists can provide guidance on how to ensure optimum assembly yield and product reliability.

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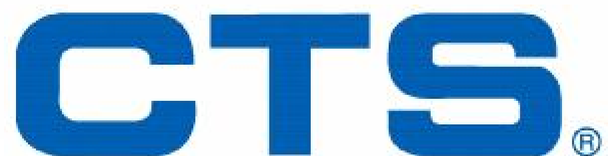

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