

## RFID Inlay Production

July 22, 2008

### Issues / Problems / Challenges

- 1) Requires Fast Movement to increase production
- 2) Requires No Overshoot to improve yield
- 3) Must handle wide range of product sizes
- 5) Competition is PANASONIC, LUST, BECKHOFF, and ETEL for linear motors.

### Solution

**Controller:** Special "B" Controller  
**Controller Software:** Proprietary  
**Interface:** +/- 10V Analog spd ref  
**Servo:** Sigma-5 SGDV (5 axis)  
**Power Level:** 100 W up to 750 W  
**Voltage Level:** 230 VAC 1 Ph.

### Performance Achieved

**Throughput:** up to 20,000 cycles/hr  
**Accuracy:** < 5 micron  
**Auxiliary Functions:** Absolute encoder

### Customer Information

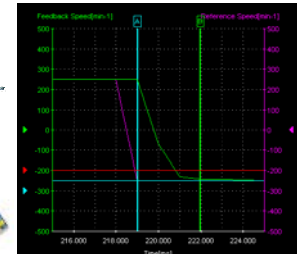
**Industry:** Electronic/Semiconductor  
**Application:** RFID inlay production line

### Customer Controller

+/- 10V Analog  
Velocity Reference  
(5 Axes)



### RFID technology



### Inlay:

An **RFID** microchip attached to an **antenna** and mounted on a **substrate**. Inlays are essentially unfinished RFID labels. They are usually sold to label converters who turn them into smart labels. They are also sometimes called inlets. <http://www.rfidjournal.com>

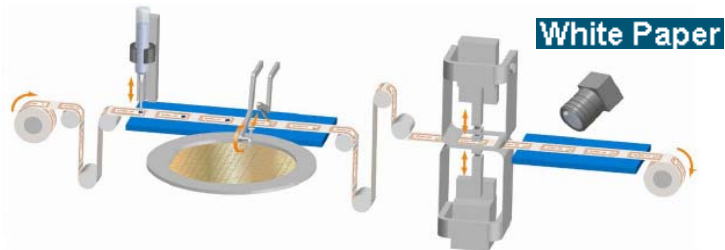


Illustration 1

Exemplary illustration of a typical production process for RFID inlays: In the first step, the adhesive is applied. Then, the chip is placed. Afterwards, contacting is ensured in the subsequent thermode station.

Address [http://www.idspackaging.com/Common/Paper/Paper\\_296/Productionprocess\\_RFID\\_adhesives.pdf](http://www.idspackaging.com/Common/Paper/Paper_296/Productionprocess_RFID_adhesives.pdf)

### Application Description

This production machine inserts all types of antenna technologies into various products such as labels, tickets, baggage tags, contactless cards, etc. The robotic head picks up an RFID chip or flexible inlay with a precise vacuum nozzle. The chip is then carried to a transfer station, where it is flipped over so its two electrical contact points are facing down (process known as "Flip-Chip"). Another vacuum nozzle sets the chip down, matching contact points only a few microns wide to the equally tiny pads of the antenna. At that point, the chip is pushed down, and heat and pressure cure the electrically conductive epoxy to bond the connection between chip and antenna. With this automation solution, the customer is able to expand its product portfolio into the high end RFID insertion market. The new machine provides a quantum leap in flip chip assembly technology for RFID inlays: Doubling assembly & test speed to 20,000 inlays per hour! Qualified for all die sizes, ranging from 0.3 x 0.3 mm to 5.0 x 5.0 mm. Web width of up to 610 mm (std format for card industry). HF and UHF.

### Differentiating Solution Features

- 5 times faster speed bandwidth with Sigma-5
- Settling time 3 ms!
- Simple setup and tuning
- +/- 10V analog velocity reference

### Resulting Solution Benefits

- Throughput for RFID flip-chip production doubled
- The world's fastest RFID inlay production line!
- Less than 30 min to setup/tune all 5 axes (typical for competitor to take 4-5 hr / axis in order to achieve the same performance)
- Allows customer to maintain and continue good relationship with existing control manufacturer