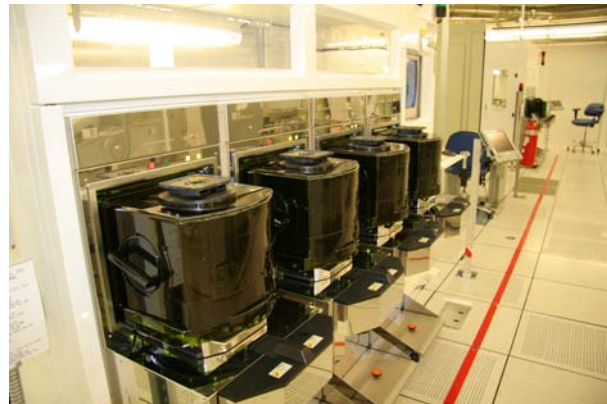


## Case Study

# TI Leverages its Low Frequency RFID Technology to Improve Wafer Tracking in Manufacturing

### Operations Data

- Texas Instruments Incorporated provides innovative DSP and analog technologies to help our customers create the world's most advanced electronics. Our real-time signal processing technology permeates daily life in many different ways, from digital communications and entertainment to medical services, automotive systems and a wide range of applications in between.
- Texas Instruments is the world's largest integrated manufacturer of radio frequency identification (RFID) transponders and reader systems. There are more than 600 million TI RFID tags on the market today.
- Capitalizing on its competencies in high-volume semiconductor manufacturing and microelectronics packaging, TI is a visionary leader at the forefront of establishing new markets and international standards for RFID applications. TI has been utilizing low frequency RFID tags in its manufacturing process for more than 10 years.
- TI has received Fortune's "Most Admired Companies" – ranked No. 1 in the semiconductor industry – 2007 for the 4th consecutive year; selected as Fortune's "100 Best Companies to Work For in America" – 2008 for the 9th year; chosen as Working Mother's "100 Best Companies for Working Mothers" – 2007 for the 12th consecutive year; Member of Dow Jones Sustainability World Indexes, chosen for industry leadership in corporate sustainability – 2007 for the 2nd consecutive year; won the Corporate Responsibility Officer's "100 Best Corporate Citizens" – 2007 for the 4<sup>th</sup> consecutive year.



### Problem

More than 10 years ago, Texas Instruments realized an opportunity to improve its inventory control, product tracking and make further enhancements to its automated manufacturing process. Specifically, TI wanted to understand – at any given point of a product development cycle – where a product was located and be able to generate a report that could provide customers a status on product manufacturing. Additionally, implementing a tracking system would improve the transport of materials, enhance security measures already in place, create a mechanism to quickly detect possible errors or failures and perhaps most importantly, protect TI's product investment. In today's 300mm manufacturing process, the wafers are moved through the automated manufacturing system in containers called FOUPs (front opening unified pods). Because each wafer at the 300mm manufacturing node can contain as many as 20,000 dies or chips, and a FOUP carries 25 wafers, the lot at stake can represent hundreds of thousands of dollars in technology revenue.

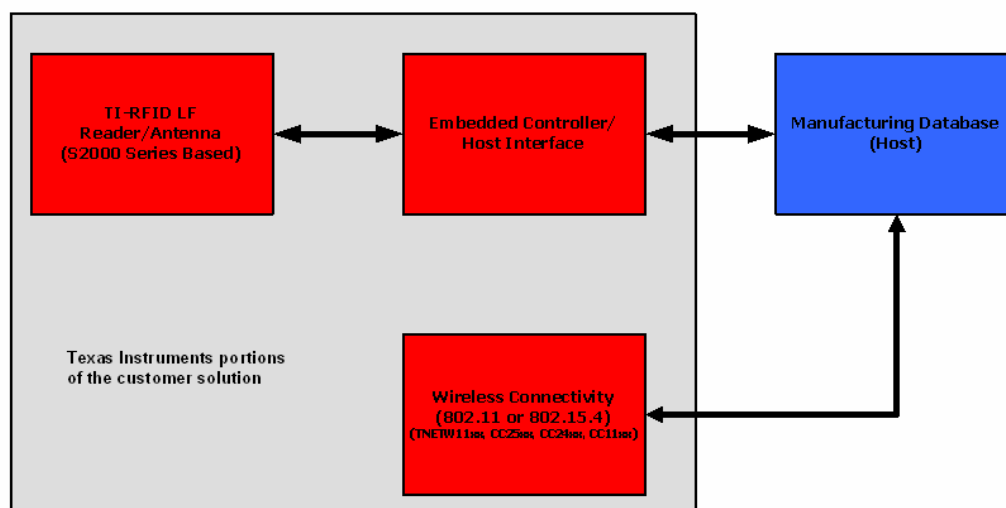
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Therefore, managing the automated process and the safe, visible movement of these materials is a mission critical priority. TI wanted to track every FOUP as a way to increase its automation, become more efficient, and understand - at any point of the process - where a given FOUP was located in the manufacturing process to prevent materials from being misplaced or inaccurately processed. If not monitored or effectively tracked, failures in the process can result in a significant loss of revenue, resources and productivity to Texas Instruments. Even more significant, any amount of loss in TI's manufacturing processes can affect the company's customers. As such, classic domino effect is at risk of happening because customers expect on-time delivery in order to meet their production schedules. With sophisticated process implementations already in place, TI saw an opportunity to leverage its own expertise in RFID to become an even more efficient and effective semiconductor manufacturer.

### Solution

It should be noted that TI had a clear and built in advantage since the distance between the problem and solution was not far away – literally. Within the company's very own walls resides its industry leading RFID Systems Group. Within that group, there are revolutionary asset tracking tools being deployed in markets such as livestock tracking, library asset management and access control, to name a few. TI looked to its RFID counterpart to implement low frequency RFID tags into its industry-leading manufacturing process.

Working with the FOUP and equipment manufacturers, TI adhered a tag (the RI-TRP-DR2B Multi-page LF Transponder) to the back of the FOUP and then rolled out the RFID integrated reader system across all of its manufacturing tools and systems. The FOUPs and RFID system interact in a very symbiotic relationship. For example, if a FOUP arrives at an incorrect tool, the loadport will recognize the carrier and prevent the FOUP from being opened or processed. This is important because once a wafer is loaded onto the tool, the process has begun, for better or worse. Since each FOUP has a unique identifying tag, TI can prevent wafer misplacements and ensure a greater level of manufacturing integrity for each product developed.



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“Using the RFID system has made a definitive difference on our processes and we see it working everyday with our ability to provide real-time reporting on product development,” said Bill Vigrass, Sr. Member Technical Staff, Texas Instruments. “When technology is working so well that it makes the development of technology that much better, that is putting innovation to work.”

Texas Instruments low frequency RFID tags are compliant with the SEMI compliant standard, E144-00-0306, which has been developed for wafer tracking. Today there are 80-100 semiconductor manufacturers that operate at 300mm and they use RFID as a way to track and manage their technology.



### About Texas Instruments RFID Systems

Texas Instruments is the world's largest integrated manufacturer of radio frequency identification (RFID) transponders and reader systems. Capitalizing on its competencies in high-volume semiconductor manufacturing and microelectronics packaging, TI is a visionary leader and at the forefront of establishing new markets and international standards for RFID applications. For more information, contact RFID Systems at 1-800-962-7343 (North America) or +1 214-567-7343 (International), or visit the Web site at [www.ti-rfid.com](http://www.ti-rfid.com).

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