

## FORD TRUCKS USE RFID TO TRACK TOOLS

### THE OPPORTUNITY

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Ford Motor, a global automotive industry leader based in Michigan, manufactures or distributes automobiles across six continents. With about 213,000 employees and 90 plants worldwide, the company's wholly owned brands include Ford, Lincoln, Mercury and Volvo.

Canvassing its truck owners in 2007, Ford asked what useful features might be added to its 2009 F-Series trucks and E-Series vans. One common request was to help contractors find and keep track of their tools, in order to be best equipped and more productive when traveling to and from job sites. Ford contacted Maryland-based DeWALT, a leading manufacturer of industrial power tools, to share insights into how contractors address this challenge of maintaining their tool inventories.

Ford began assessing technology to resolve this "unmet" need of its core truck customers. The company researched a number of auto-ID methods, including barcode systems, which they realized were too labor-intensive as they required users to manually scan each tool's barcode. Ford then turned its attention to RFID and found passive EPC Generation 2 UHF RFID tags attractive due to their ease-of-use and low cost. This led Ford to ThingMagic, a leading developer of RFID technology, including embedded RFID reader modules that offered high performance and tag reading accuracy.



# Ford RFID Tool Tracking

## THE SOLUTION

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RFID is the ideal technology for wirelessly tracking tools and construction crews arrive at and depart with the right tools and materials. Additionally, RFID can be used to prevent the loss of equipment and supplies through real-time inventory updates. If a contractor goes to a job site and forgets an important tool, valuable time and productivity is lost. It's harder to lose tools and other items once the trucks can help keep track of their own contents.

Ford, DeWALT and ThingMagic collaborated to design rugged and reliable RFID labels that would allow contractors to easily tag and identify specific tools, equipment, and other assets. The companies then integrated the DeWALT RFID tags, ThingMagic RFID readers and antennas, and the Ford Work Solutions™ on board computer system and dashboard LCD display to create the Tool Link RFID application.

Initial prototypes hit a road block, however, because metals, like truck bodies, tend to deflect UHF signals, making passive UHF RFID tags sometimes difficult to read.

Capitalizing on its RFID expertise, ThingMagic determined it could exploit the trucks' metal bodies to complement the RFID antennas. Since the vehicle frame becomes a metal container in which the signals bounce around, ThingMagic was able to read and parse the signals and increase the ability of its RFID antennas and readers to accurately read all tags onboard the truck.

Varying climates, including rain, snow, heat and the cold of winter, and on job site conditions, with mud, construction debris, loose stones and other materials that could potentially damage the solution, posed additional challenges. The team overcame climate and environmental obstacles by ruggedizing the RFID tags, readers, and antennas. By design, the ThingMagic RFID readers already supported an operating temperature range of -20°C to +60°C, thus removing the obstacle of extreme temperatures.

## FORD TOOL LINK BY DEWALT

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ThingMagic worked closely with Ford Motor Company and DeWALT to develop an innovative RFID-based solution to track tools on vehicles. Ford Work Solutions™ Tool Link™ from DeWALT™ uses UHF RFID technology to identify what is in a truck.

### ***How it works?***

ThingMagic's primary challenges in designing the system were to understand the performance of RFID tags on tools and develop innovative methods to increase read rates, creating a custom M5e-based module capable of being powered by a vehicle battery, and ruggedized to survive and perform in the everyday environments where Ford vehicles serve their customers.

Simply attach the included RFID tags to any tools or equipment you want to track. Place the tools in the truck or van and use the Tool Link system to scan them. The system identifies each tag, and you can type in the name of the item. Once the inventory is complete, the system can track the items tagged whenever they are in the truck, and provide an alert if they are missing. With a simple touch on the Tool Link screen, your truck will make sure you have the tools you need before you leave for the job.

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## ***What's the benefit?***

Check Tool Link before you leave for a job to make sure you have the tools you need. Check it again at the end of the workday to confirm that all the gear used at the job site is back on board. You can add new items to an existing inventory and even create job-specific inventories. Off the job, use Tool Link to track items used for camping, hunting or other hobbies. Whether it's tracking a compressor or a tackle box, Tool Link is a useful piece of technology.

Tool Link breaks new ground in UHF RFID with item-level tagging. See what Ford said about the technology:

[https://www.youtube.com/watch?time\\_continue=5&v=3Soz7bkzPe4](https://www.youtube.com/watch?time_continue=5&v=3Soz7bkzPe4)

## **CONCLUSION**

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Contractors who purchase RFID-enabled Ford trucks and vans place the DeWALT RFID tags on their tools or tool cases, and then enter a brief tool description for each tag into the Ford Work Solutions in-dash computer. Made with a protective tough plastic housing, the tags are attached through an adhesive backing or through an eyelet and zip tied if tagging a particular tool casing is problematic.

When the vehicle is started or when the user initiates, a pair of ThingMagic RFID antennas, mounted in corrosion- and impact resistant housings, automatically scan for RFID-tagged items. Tag data is transmitted via the RFID readers which associate the unique number on each tag with the tool to which it is attached. This information is instantly displayed and accessible on the touch screen dashboard computer, helping users complete an automated inventory of tools needed for a specific job. Tool Link can also be used to gather information about what is in the truck bed when leaving a job site, and compare that to what tools were on board when arriving at the site, making sure that no tools have been left behind. Furthermore, vehicle owners can create lists of tools for specific jobs, detailing what needs to be in the truck before heading to a particular job site.

The solution components included:

- ThingMagic M5e reader module & in-vehicle housing
- RFID antennas mounted in corrosion and impact resistant enclosures
- Durable UHF RFID DeWALT tool tags
- Ford Work Solutions™ on-board computer system and dashboard LCD display

The End-User Benefits:

- High value tool & material management
- Reduced costs related to lost equipment
- Improved worker productivity
- Improved worksite efficiencies and safety

# Ford RFID Tool Tracking

“Construction companies and professionals turn to Ford trucks for rugged, reliable and technically-advanced vehicles,” said Bill Frykman, Ford Work Solutions product and business development manager of Ford Motor Company. “Working with ThingMagic, the industry expert in embedded RFID technology, and DeWALT, the industry leader in professional power tools, we’ve developed an RFID system ‘Built Ford Tough’ that increases our customer’s productivity and saves them money.”

## A TRUSTED RFID PARTNER

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Many suppliers can offer a wide variety of RFID products to choose from but unlike most data collection manufacturers, JADAK has one of the broadest RFID product portfolios in the industry, backed by engineers with the resources and technical expertise to help customers implement solutions to meet their specific needs and requirements.

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### ABOUT JADAK:

JADAK, a business unit of Novanta, is a market leader in machine vision, RFID, barcode, printing, and color and light measurement products and services for original equipment manufacturers. The company designs and manufactures embedded detection and analysis solutions that help customers solve unique inspection, tracking, scanning and documenting challenges. The company is ISO 9001 and ISO 13485 registered.

Novanta is a trusted technology partner to OEMs in the medical and advanced industrial technology markets, with deep proprietary expertise in photonics, vision and precision motion technologies.

ThingMagic is JADAK’s RFID line of products and services.

[www.jadaktech.com](http://www.jadaktech.com)