




DecaWave Intros Ultra-wideband Active RFID Module


The company says its DWM1000 module can be used to make low-cost tags, supporting real-time location systems that can pinpoint a tag's location within 10 centimeters at a distance of 100 meters or more.

By Claire Swedberg

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Jun 30, 2014—Companies worldwide are beginning to use a new [ultra-wideband \(UWB\)](#) module known as the DWM1000, designed to be easily built into an [active RFID tag, transceiver](#), machine or electronic shelf for unique, low-cost real-time location system (RTLS) applications. The module, provided by Irish prefabricated [chip](#) manufacturer DecaWave, is based on the DW1000 [chip](#) that the company released last year after spending nearly a decade developing it. DecaWave was founded in 2004, and the DW1000 [chip](#) and the new module that includes it are the company's first products. The DWM1000 module—which, like the DW1000 [chip](#), complies with the IEEE 802.15.4-2011 ([UWB PHY](#)) standard—was commercially released today.

The DWM1000 module consists of the DW1000 [chip](#), as well as an [antenna](#), a balun (a signal converter) and [passive](#) components (such as resistors and capacitors), in a relatively small [form factor](#): 23 millimeters by 13 millimeters by 2.9 millimeters (0.9 inch by 0.5 inch by 0.1 inch). Users—typically, indoor tracking systems integrators, as well as original equipment manufacturers (OEMs)—can build the module into other devices, such as tags used in industrial environments, machinery utilized in manufacturing, or electronic shelf labels within a retail environment. In addition, several automotive manufacturers are exploring the possibility of deploying the modules in new vehicles, for use by customers as a security alternative to other keyless entry systems that thieves have managed to hack.

Although there are [UWB RTLS](#) solutions already in use, there were several shortcomings with the technology prior to the DW1000 [chip](#)'s release, says Mickael Viot, DecaWave's marketing manager, which inspired the company's founder to develop a better solution. [Ultra-wideband](#) transponders are typically large, requiring multiple components to operate, including their own printed circuit boards. This makes the tags cumbersome for many applications, he explains, as well as high-priced.

DecaWave was interested in developing a technology that would be lower in cost—just a few dollars for a very small [chip](#), or \$15 to \$30 for a module—and easier to implement, in addition to offering very precise location data in indoor environments. The resultant technology supports time difference of arrival (TDOA) and time of flight (TOF) schemes, enabling a [tag](#)'s location to be pinpointed in three dimensions within 10 centimeters (3.9 inches). It has a maximum [read range](#) of 35 meters to 290 meters (115 feet to 951 feet) with a clear line of sight. Users could employ their own software, which could be provided via a third-party vendor, or they could license software from DecaWave.



*Mickael Viot,
DecaWave's
marketing
manager*

The DW1000 [chip](#) measures 6 millimeters by 6 millimeters (0.2 inch by 0.2 inch). The [chip](#) requires very little energy to send transmissions of short range and duration.

"We've integrated all the algorithms into a single [chip](#)," Viot says, making it possible for systems integrators or OEMs with an RF engineer on staff to create their own [UWB transceiver](#) more easily than would be feasible using other [UWB](#) chips that still require a motherboard and multiple components. The DW1000 is already in use by [LG Innotek](#) a South Korean firm that builds the [chip](#) into lighting-control and building-automation systems (to identify, for instance, when a badged individual enters a room to adjust lighting accordingly) and [South Korea Telecommunication](#) (SK Telecom), for tracking patron locations and traffic within museums.

According to DecaWave, other customers have incorporated the DW1000 [chip](#) into [active RFID](#) tags of their own design. These companies are currently using the resulting tags at manufacturing sites, for tracking assets in health care, as well as for retail applications—such as smart shelves.

DecaWave is marketing its DMW1000 module to midsize and small companies in the industrial and manufacturing sectors, for use in a variety of applications. "The industrial market is very fragmented," Viot states. Although companies tend to have unique potential applications for the DW1000 [chip](#), the majority of firms in the industry lack their own in-house RF engineers (a necessity for enabling a company to design its own solutions based on the [chip](#)). Therefore, DecaWave developed the DMW1000 module—which is already in the hands of a few companies around the world, since the early versions were shipped out two weeks ago.

The module includes not only the [chip](#), but also the [antenna](#), balun and other components necessary to make it ready for soldering onto an item, such as a [microcontroller](#) (which is not built into the module) with a power supply. "We focus only on the RF," Viot says, which means solution designers need not worry about such details as [antenna](#) attachment, but would be responsible for connecting the module to the necessary [microcontroller](#) and battery, or some other power source.

At present, DecaWave's module is being produced by LG Innotek. In the future, Viot says, his company envisions the [chip](#)—with or without the module—being used in retail environments and other applications for which a mobile phone would be equipped with the DecaWave [chip](#). For retailers, it could transmit information to in-store receivers, thereby enabling a store to provide customers with location-based details, such as where a specific product is located within the store relative to a user's own position.

The module is initially selling in quantities of up to 1,000 in a single order. However, Viot says, he expects that number will increase as production ramps up.