

ThingMagic M6e-Micro FAQs



The ThingMagic® Mercury®6e-Micro (M6e-Micro) UHF RFID module is designed to meet the demands of high performance RFID handheld, mobile, and stationary readers. This module offers two antenna ports and supports the ability to transmit up to +30 dBm for demanding applications. Edge connections for signals, power, and RF allow the module to be soldered directly to a motherboard as a standard component. The on-board connectors allow the module to be mated to a motherboard as an add-on option.

Q. What applications are the M6e-Micro best suited for?

A. Examples of applications that the M6e-Micro was designed for include:

- Hand held devices and scanners
- RFID label printers – desktop and portable
- Point of sales devices
- Smartphone accessories
- Small USB dongles

Q: What are the primary differences between the M6e-Micro and other ThingMagic modules?

The M6e-Micro is an addition to ThingMagic’s embedded UHF RFID module family and designed for applications requiring a very small form factor, multiple antenna ports, and high performance. See the chart below for the primary differences related to module form factor and performance:

	M6e	M6e-Micro	M5e	M5e-Compact
Size (L x W x H mm)	69 x 43 x 7.5	46 x 26 x 4	82 x 54 x 5	56 x 36 x 5
Antenna Ports	4	2	2	1
Interface	UART USB	UART USB	UART	UART
Power (dBm)	31.5	30	30	23
Read Rate (tags/sec)	750*	750*	200	200
Protocol Support	Multiprotocol	Multiprotocol	Gen2	Gen2

* Using high-performance settings

Q. What are the most important and competitive features of the M6e-Micro?

A. A combination of the key features listed below and their corresponding benefits make the M6e-Micro the value leader for embedded RFID modules in this size class:

- Small form factor: High performance RFID can now be designed into the latest smaller form factor mobile and handheld products and stationary readers where size is important.
- RF Power output adjustable up to 30 dBm: Results in tag read distance over 30 feet which is valuable for many hand held scanner applications.
- Read rate (up to 750 tags per second using high performance settings): Speed is important in many hand held applications as well as in high performance fixed reader designs. Faster read speeds also permit shorter transmit times, resulting in power savings for battery-powered devices.
- Two external antenna ports: Provides more flexibility than modules of comparable size resulting in increased read area and increased percentage of successful reads.
- Flexible mounting options: The M6e-Micro is designed for both solder-down and mating to a mother board, providing superior design flexibility for developers integrating UHF RFID into their products.

Q. What regions is the M6e-Micro certified for?

A. The M6e-Micro is pre-configured for FCC (North America & South America) in the 902-928 MHz band and ETSI (EU and India) in the 865.6-867.6 MHz band. Subsets of these bands support operation in other regions, including Korea, Australia, and P.R. China.

Q. Am I required to buy an M6e-Micro Development Kit?

A. First time M6e-Micro module purchases must include a Development Kit (DevKit). The DevKit includes one module, a test fixture, AC power adapter, plug adapter kit (US, UK, EU, AUS plugs), sample antenna, sample tags, and instructions for obtaining the SDK/API. Your DevKit purchase also initiates access to one year of ThingMagic Support.

Q. I've written code for the M6e and other ThingMagic modules. What software engineering is required to use that code on the M6e-Micro?

A. The ThingMagic API supports all ThingMagic products. In this case, you will simply need to recompile your code using the latest version of the ThingMagic API.

Q. Does the M6e-Micro support bi-static operation?

A. No, the M6e-Micro is monostatic only.

Q: What is the lowest temperature that the M6e-Micro can operate in?

A. The M6e-Micro meets all its specifications to temperatures as low as -20 C. If necessary, ThingMagic will assist customers with determining what specifications change at temperatures below -20 C.

Q: Is the M6e-Micro Lead Free?

A. Yes, the M6e-Micro is ROHS compliant.

Q. For a battery-powered device, does the M6e-Micro consume less power than the M6e?

A. Yes, the M6e-Micro consumes around 0.5 W less than the M6e when both are set to +30 dBm. As the RF output power is reduced, the difference becomes more significant. Below +20 dBm, the M6e-Micro consumes around 2 W of DC power whereas the M6e consumes just over 4 W. When not transmitting, both modules consume a similar level of DC power.

Q. The M6e-Micro has a higher tag/second read rate than other ThingMagic modules. Why is this?

The M6e and M6e-Micro represent ThingMagic's newest additions to our embedded RFID module family. As such, these modules offer the most recent advancements relative to form factor, efficiency and performance. Several performance optimizations available with the M6e and M6e-Micro deliver an improved base read rate, and when coupled with application specific capabilities such as ThingMagic's *Fast Search* algorithm, result in market leading performance. We feel the differing characteristics of our module family – including tag read rate - provides customers with the greatest number of options when considering embedded RFID for their products and services.

Q: Can the M6e-Micro be used for near-field and/or NFC applications?

A. NFC products operate in the 13.56 MHz frequency band which is a different technology than the products ThingMagic offers. As such, M6e-Micro does not work with NFC tags. However, near-field UHF tags are supported and the high power level of the M6e-Micro will help read smaller populations of UHF tags at a greater distance.

Q. Do I have to handle compliance requirements with the FCC? For example, if we use the M6e-Micro in a mobile unit, do the mobile unit and reader have to be recertified with the FCC?

A. One of the benefits of using the M6e-Micro and other ThingMagic embedded RFID modules is that we do most of this work for you. OEM customers don't have to be compliance experts and can leverage ThingMagic's expertise in this area. The M6e-Micro is FCC certified with high-gain antennas. As long as you certify your product with antennas of the same gain or lower, you can use ThingMagic's FCC Modular Approval license for your finished product, including the Transmitter Module FCC ID. If you use an antenna that does not fall under ThingMagic's certification, you will need to get a permissive change for your product. ThingMagic can assist with this process. For more information, see the M6e-Micro hardware manual found at <http://www.thingmagic.com/support-overview>

Q. Do I need to be an RFID expert to add RFID to my products?

A. No. As with FCC compliance, OEM customers can leverage ThingMagic's expertise in RFID to help develop your product quickly and cost effectively. Using a ThingMagic embedded module and software support tools will result in considerable time to market and cost savings compared to designing in RFID on your own. For more information, see our whitepaper *Getting a Read on Embedded UHF RFID: Why RFID Modules are the Smart Choice for Developing Next-Generation Solutions* at: <http://rfid.thingmagic.com/application-notes/>

Q. What are the interface ports available on the M6e-Micro?

A. The interface ports available on the M6e-Micro include USB, UART, and two (2) U.fl ports. The board-to-board connectors include power and interface connectivity.

Q: What types of RF connectors does the M6e-Micro have?

A. The M6e-Micro includes U.FL (also known as IPX) RF connectors.

Q. How does the antenna protection on the M6e-Micro compare to the M6e?

A. Both the M6e-Micro and M6e modules monitor the PA current and will cease transmission if the PA could be damaged by transmitting into a broken connection or an antenna which has been severely detuned by a metallic surface being brought near it.

Q: Does ThingMagic plan to introduce any custom small form-factor antennas to work with the M6e-Micro?

A. Not at this time. There are antennas on the market that are suitable for many applications. If you can't find what you are looking for, ThingMagic may be able assist by introducing you to an appropriate antenna manufacturer.

Q. My antenna is currently connected by a cable and a connector to the module. Do I have to use a solder-down or board-to-board connector for the antenna, or can I connect to the module directly?

A. You can connect to the module directly. Even if the data and signals use the solder-down connection, the RF can be connected by a cable. If you are using a board-to-board connector for the data and power, the RF connector will be facing the board, but there is enough clearance to attach a U.FL connector to the module underneath.

Q. Can I control the M6e-Micro with a PIC processor? What are the minimum processor resources needed to control the M6e-Micro?

A The Mercury C API is designed to be ported and run on a wide variety of runtime environments, ranging from full host operating systems to bare-metal embedded platforms. In order to best support embedded systems it avoids large memory buffers and dynamic memory allocation (where possible, interfaces are created so that if dynamic allocation is available, the user can take advantage of it without difficulty), and has several memory saving features including the ability to build only a subset of the API (strip out unused protocols, advanced features, etc.).

Q: Does the M6e-Micro support the battery assisted tag encoding and reading?

A. Yes. For the most part, the existence of a battery in the tag is transparent to the reader, but in some cases battery status information is available and the M6e-Micro is capable of retrieving it.

Q: Are there any characteristics of the M6e-Micro that would prevent a hand held device in which the module is installed from being certified intrinsically safe?

A. There is nothing specific to the M6e-Micro itself that prevents an OEM from designing a complete handheld unit that is intrinsically safe. If you are manufacturing a handheld unit, we suggest you incorporate the M6e-Micro module and get an intrinsically safe rating for the entire unit.

Q Do you offer volume discounts for the M6e-Micro?

A. Yes, volume discounts are available. Please contact ThingMagic for more information.

Q. Where can I buy the M6e-Micro?

A. The M6e-Micro and all other ThingMagic UHF RFID modules can be purchased directly from ThingMagic by contacting sales@thingmagic.com or calling Toll Free: 1-866-833-4069 (International Callers: +1-617-499-4090).

For more information, visit www.thingmagic.com

To purchase ThingMagic products, please email sales@thingmagic.com or call 1-866-833-4069 (International callers dial +1 617-499-4090)

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