

# **RABBIT**<sup>®</sup>

EASY EMBEDDED SOLUTIONS SINCE 1983











**RABBIT**<sup>™</sup>



**Product Catalog • Vol. 1**

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## CORPORATE OVERVIEW

# The Rabbit Solution

Rabbit, a worldwide manufacturer of low-cost embedded solutions, was founded in 1983 and acquired by Digi International® in 2005. Our mission is to develop silicon, boards and software to bring intelligent real-time control to existing applications, and enable completely new applications.

## Designing Software with Confidence

Developing real-time software can challenge engineering teams and put project schedules at risk. Rabbit was founded on the principle of delivering a software environment for fast development. That is why Rabbit pioneered the Dynamic C integrated development environment, which implements extensions to the C programming language to make real-time software design faster, more intuitive and easier to debug. We are dedicated to constant additions to Dynamic C tools, such as improved memory handling, increased web security, enhanced web serving capability, solid networking infrastructure, and a greater diversity of sample programs. These new functions and tools help our customers manage the development process to meet their schedule and cost goals.



## Integrating Software with Known Good Hardware

When design teams complete the initial phase of software development, the work begins to debug the software and integrate sub-systems. Rabbit offers a complete set of development kits that include the target hardware you need for your design. You get known good hardware to debug software in real time and test it with other systems before committing to the final product. Once the design is completed and tested, our customers go into production using the same hardware upon which they tested their design. Design risk is minimized, as is the development time.

## Path To Success



We offer different levels of integration, from chips to rack-mounted modular systems, giving our customers a choice of how best to adopt the technology. This complete spectrum of reliable, cost-effective, proven hardware reduces development time and system redesign, keeping our customers' projects on schedule.





## Getting Acquainted with the Technology

Rabbit customers include companies experienced with our products as well as newcomers looking for a faster, lower-risk path to get through new product development. For the latter set of customers, we offer an array of application kits to introduce new types of technologies, such as ZigBee® and Wi-Fi®, or different types of applications, such as a security or I/O expansion.

Each kit comes with hardware, development software and accessories, plus sample programs to teach the new technology for faster application development. We also offer extensive technical support via telephone or email, as well as datasheets, manuals, white papers, technical notes and software downloads on our website.

Wireless 802.15.4  
Application Kit



## Take the Next Step



### We Are Here to Help

If you would like Rabbit to support your real-time control and communications projects, or if you just want to know more about how our products can be used, please contact the Rabbit sales team.

Rabbit sales representatives will talk with you to understand your design needs, and if we think we have a potential solution, we will offer you guidance to find the lowest-cost product to fit your requirements. If you need additional insight from our technical support group, a discussion can be arranged so that you feel confident you are on the right path.

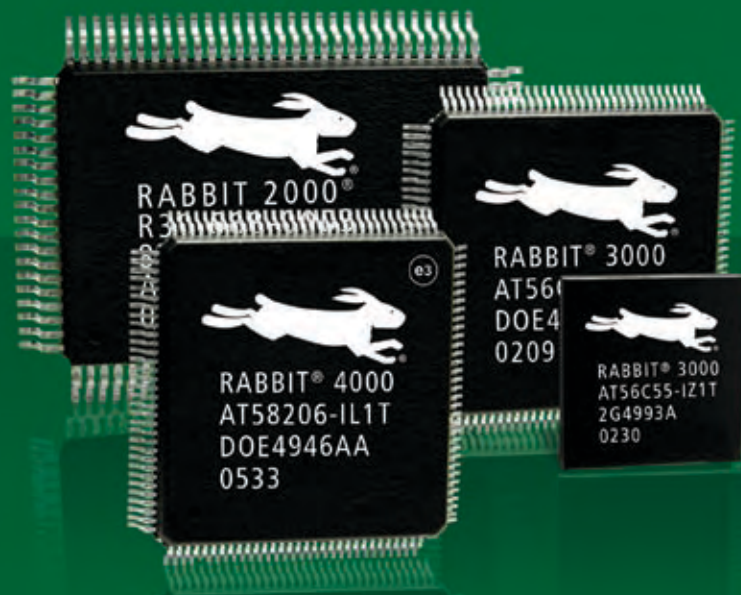
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RABBIT USERS TELL OUR STORY

# Tales of Innovation

In 1983, Rabbit recognized that embedded systems design could be made faster, easier and far more accessible to people who were not trained as computer architects. Rabbit focused on the challenge of writing software for real-time applications and providing the tools to make it work reliably. Out of this challenge was born the Dynamic C integrated development environment, which offered extensions to the C language to reduce the time to develop code and the effort to debug it.

Rabbit introduced the popular line of single-board computers and RabbitCore modules, which unified processor, memory and connectivity into a solder-free form factor. Customers found that they could easily design board-level products and then add the RabbitCore modules. This allowed companies to focus on their expertise and leverage Rabbit's capabilities to reduce engineering costs and maintain schedules. The ease of integration, low cost and connectivity options gave customers the ability to expand the opportunities of monitoring and control.



Palladium Technologies chose Dynamic C and the Rabbit 2000 based SR9000 Smart Star expansion system for their marine product, SiMON. This monitoring and control product consolidates complex information systems on marine vessels into a concise, usable format.

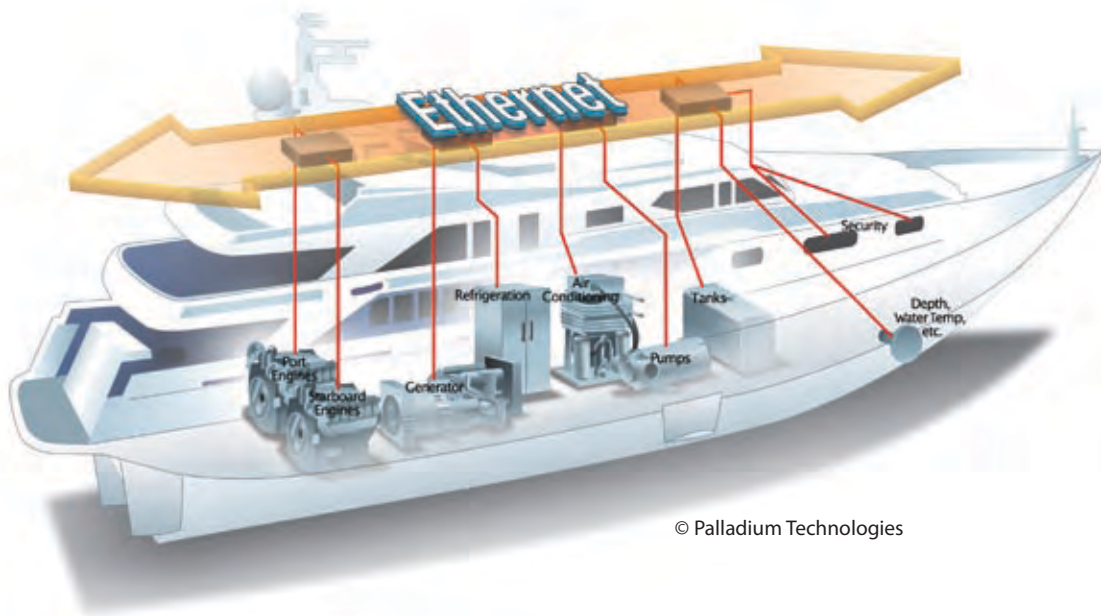
Mike Blake, president of Palladium Technologies compared SiMON to an “artificial intelligence” computer that assists in the maintenance and control of the ship’s around-the-clock functions. The “non-stop” engineer helps provide a safe environment by monitoring the ship’s most critical systems.

Thousands of sensors are spread throughout the ship, leaving no system unmonitored. These sensors keep track of engine operation, electrical generators, water levels, air, sewage, and other critical components. The sensors are connected to Smart Star controller units that are located throughout the vessel. Ten to twenty controllers connected via an Ethernet backbone are installed in a typical mega yacht application.

“We are happy to have made the radical but correct decision both then and now in choosing Rabbit products,” said Blake.

**“We are happy to have made the radical but correct decision both then and now in choosing Rabbit products.”**

- Mike Blake, president of Palladium Technologies



© Palladium Technologies



Sunset Dynamics, an embedded design consulting firm, saw the potential of Rabbit products when the company embarked on a project that required hoisting performers into the air timed along with music. The theatrical acrobatic show required reliable and easy-to-integrate equipment – and the equipment needed to be much smaller than the PC previously used.

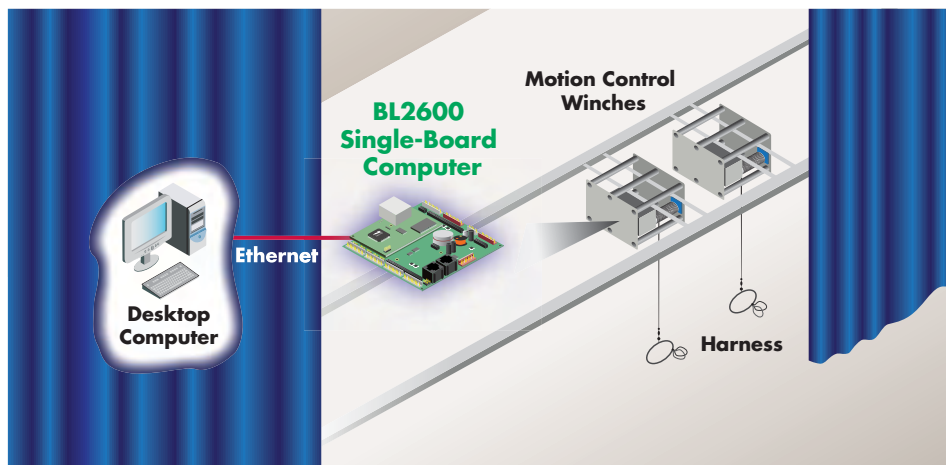
**“The established code base included with Dynamic C allowed very rapid software development.”**

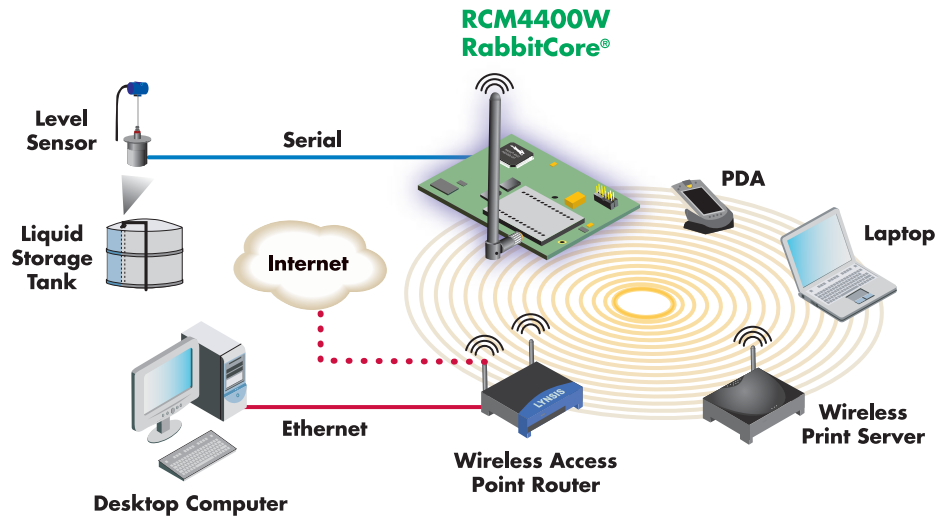
- Ryan Neimi,  
Sunset Dynamics

Initial designs of this system consisted of PCs next to each winching system suspended in the ceiling. The cost, size and functionality of the PCs became a prohibitive factor. Ryan Neimi of Sunset Dynamics decided to move to a PLC design. While the PLC met the custom control, cost and size requirements, it lacked the accuracy and real-time control that the application demanded. The company chose Rabbit’s BL2600, a cost-effective single-board computer in a small, complete package that met the application’s accuracy and real-time control requirements.

“We selected the Rabbit 3000 based BL2600 single-board and Dynamic C,” said Neimi. “Compared with brewing up our own motion control board and producing the firmware from scratch, the established code base included with Dynamic C allowed very rapid software development.”

### Theatrical Performance Stage





With Digi International's acquisition of Rabbit in 2005, Rabbit embarked on an exciting path to integrate features on-chip as well as new technologies including Wi-Fi and ZigBee. In 2006, Rabbit released the next generation Rabbit 4000 microprocessor chip with integrated Ethernet. The Rabbit 4000 opened the door to an offering of products that takes embedded development to the next level.

The Rabbit 4000 family gives customers the flexibility to integrate more features into their embedded design. Pin-compatibility in the RabbitCore series enables quick migration for your design by just plugging in another core. The Rabbit 4000 family has proven to be ideal for designs requiring robust Ethernet, larger memory support or new wireless technologies such as Wi-Fi or ZigBee.

Companies such as Palladium Technologies and Sunset Dynamics envisioned the opportunities and the extreme value that Rabbit offers. Rabbit is committed to being at the forefront of new technologies, while maintaining the ease of integration. As we continue to improve, we hope that you may someday be part of the Rabbit family and help tell our story.

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**More Customer Success Stories at [www.rabbit.com/story](http://www.rabbit.com/story)**

## INTEGRATED DEVELOPMENT ENVIRONMENT

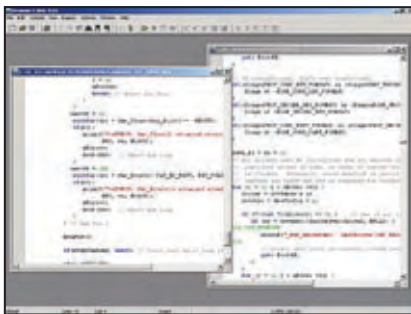
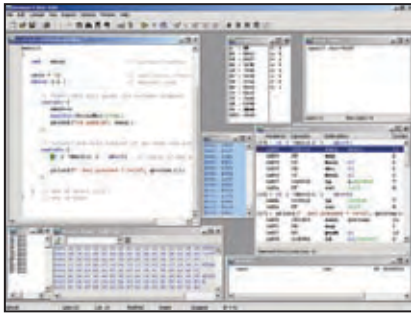
# Dynamic C® Software

Rabbit's Dynamic C integrated development environment makes it easy to write real-time software for embedded systems that use a Rabbit microprocessor. It has all the traditional elements of C, plus enhancements that make developing easy and reliable.

### Development Couldn't Be Easier

The Dynamic C software plus Rabbit hardware support fast development of low-cost intelligent devices that perform a wide range of functions. These functions include switching motors on and off, actuating valves, controlling displays, keyboard controls and making telephone calls.





## Dynamic C®

You can design real-time embedded systems with enormous flexibility to connect to other systems via a local area network or the Internet. This provides the ability to send emails, serve web pages, accept commands, report exceptions or raise alarms, just to name a few examples.



It's easy to get started. Simply connect one of Rabbit's development kits to your computer using serial or USB connection. Dynamic C supports device connection to systems via wired or wireless Ethernet, RS-232 and ZigBee. Over 700 sample programs, a variety of supplied routines and hardware drivers will get you up and running, allowing real-time system development in a matter of minutes. Debugging is easy with Dynamic C's built-in editor. No in-circuit emulator or analyzer is needed.

## Customizing the Dynamic C Development Environment

The software modules bundled with Dynamic C make it possible to customize your programming needs quickly and easily. Use only what you need to configure your development environment.

### FAT File System

Popular, network-accessible file system for flash memories.

### Library Encryption Executable

Program to encrypt Dynamic C library source files.

### µC/OS-II Real-Time Kernel

Real-time preemptive, prioritized operating system.

### Modbus TCP

Ethernet variant of the standard communication protocol in industrial automation systems.

### Point-to-Point Protocol (PPP)

TCP/IP functionality for serial and PPPoE connections.

### RabbitWeb™

System of HTML tags used to easily create web interfaces to monitor and control embedded applications.

### Simple Network Management Protocol (SNMP)

Management software for networked devices.

**Rabbit's Dynamic C is royalty-free. You can develop your product and go into production with no further licensing or paperwork.**

## Dynamic C Add-on Module

If you need encryption for your application, you can also add a low-cost module to develop with SSL/TLS and AES.



### Advanced Encryption Standard (AES)

128-bit encryption for transfer of sensitive data.



### Secure Sockets Layer (SSL)/Transport Layer Security (TLS)

Industry standard web security for embedded applications.



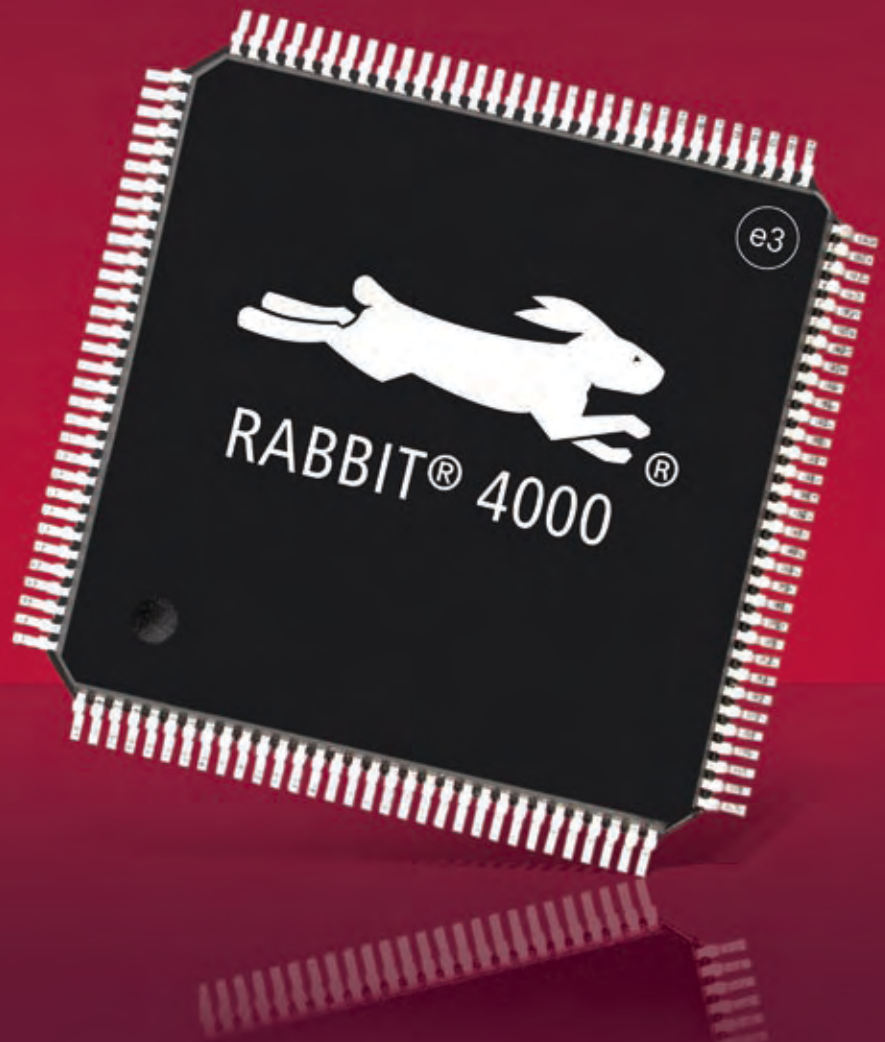
PERFORMANCE • ON-BOARD ETHERNET • PIN COMPATIBILITY

# Rabbit® 4000 Product Family

The Rabbit 4000 family of scalable products delivers reliable, easy-to-integrate embedded solutions with both wired and wireless connectivity.

## Flexible Connectivity

Rabbit 4000 products deliver a wide range of functionality and connectivity options to reduce engineering effort and speed your development with less risk. Use technologies such as Ethernet, ZigBee and Wi-Fi to network subsystems and expand application.



### ICON LEGEND



NEMA 4



RoHS



Analog



Ethernet



Wireless



miniSD

**Rabbit 4000 RabbitCore® Line** | Rabbit delivers reliable core modules that make it easy to integrate new features and new industry-standard functions. Rabbit 4000 microprocessor based core modules give you a low-risk path for integrating Ethernet, Wi-Fi and ZigBee into your embedded designs while keeping development on schedule.

Rabbit helps reduce engineering effort by offering development kits with all the tools you need to design embedded solutions. These kits include a core module, prototyping board, accessories and our Dynamic C® integrated development environment.



#### **RCM4510W RabbitCore® Module**

Easily implement a wireless mesh network as part of your control solution.

- On-board ZigBee/802.15.4 wireless connectivity
- Rabbit 4000 running up to 29.49 MHz
- 512K flash memory/512K data SRAM
- Up to 40 configurable GPIO
- 1.84" × 2.85" × 0.54" (47 mm × 72 mm × 14 mm)



#### **RCM4400W RabbitCore® Module**

Use industry-standard wireless networking to create a low-cost, low-power, Wi-Fi based control and communications solution.

- Integrated Wi-Fi/802.11b wireless connectivity
- Serial-to-Wi-Fi bridge capability
- Rabbit 4000 running up to 58.98 MHz
- 512K flash memory, 512K data SRAM, 512K fast program-execution SRAM
- Up to 35 configurable GPIO
- Low-power modes down to 2 kHz
- 1.84" × 2.85" × 0.50" (47 mm × 72 mm × 13 mm)



### RCM4300 RabbitCore® Series

Mass storage support with the hot-swappable, industry-standard miniSD™ memory cards, plus memory to support algorithmic-intensive applications such as graphics and encryption.

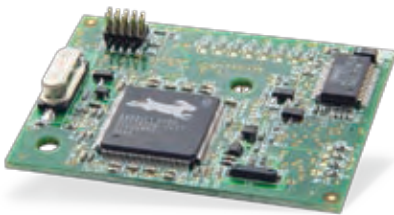
- Capability to add up to 1 GB miniSD memory card
- Rabbit 4000 running up to 59.98 MHz
- 8-channel 12-bit ADC
- 512K battery-backed SRAM, 1 MB fast program execution SRAM
- 1 MB to 2 MB flash memory
- 1.84" × 2.85" × 0.84" (47 mm × 72 mm × 21 mm)



### RCM4200 RabbitCore® Series

Ideal for embedded applications needing 10/100Base-T Ethernet connectivity. There is also an option for on-board 12-bit analog channels.

- Rabbit 4000 running up to 58.98 MHz
- 10/100Base-T Ethernet, RJ-45 jack
- 4 MB or 8 MB serial flash for mass data storage
- 512K flash memory/512K SRAM
- Up to 35 GPIO with multi-layer alternate pin functions
- Synchronized PWM channels with 16-bit counter
- 1.84" × 2.42" × 0.84" (47 mm × 61 mm × 21 mm)



### RCM4100 RabbitCore® Series

Delivers serial ports without the cost of Ethernet for embedded control applications needing a small module.

- Rabbit 4000 running up to 58.98 MHz
- Up to 40 GPIO
- 6 CMOS-compatible serial ports
- 512K flash memory/256K or 512K data SRAM
- Low-power modes
- 8-channel, 12-bit A/D converter (RCM4100)
- 1.41" × 1.88" × 0.49" (36 mm × 48 mm × 12 mm)



### RCM4000 RabbitCore® Series

Targeted for embedded control applications needing 10Base-T Ethernet connectivity for remote monitoring.

- Rabbit 4000 running @ 58.98 MHz
- 32 MB NAND flash for data
- 512K flash/512K SRAM
- 8 channel 12-bit A/D converter
- Up to 25 GPIO with multi-layer alternate pin functions

## APPLICATION SPOTLIGHT

### Rabbit Keeps Things Flowing

#### FMC Technologies Uses the RCM4000 RabbitCore in Petroleum Metering Simulation

FMC Technologies manufactures load controllers and flow computers for the liquid petroleum industry, providing customers an efficient way to collect data for controlling valves, pumps and other instruments. In order to perform demonstrations or tests, however, a meter or pulse generator is required. This equipment is very heavy and difficult to set up and use, so FMC wanted to find a way to eliminate it.

FMC's Simumate solution is a portable meter simulator that allows customers to easily test and demonstrate the functionality of load controllers and flow computers. At the heart of the Simumate is the

RCM4000 RabbitCore. The Simumate connects to a PC via an Ethernet connection, mimicking an actual meter. Users may customize the meter's function via a web page and access information about volume, flow rate, temperature and pressure.

"The RCM4000 expedited the design process by providing a powerful canned hardware solution and complete, well-illustrated software examples. Its small form factor provided us the ability to easily create a handheld device," said Patrick Walsh a Electronic Engineer for FMC Technologies. "We are excited about the possibility of swapping the tethered Ethernet



Simumate Display

for a wireless solution such as the RCM4400W."

With the RCM4000 and Dynamic C, Rabbit helped FMC successfully develop a solution that not only saved time and money, but also helped provide a reliable and cost-effective product to their customers.

**More Customer Success Stories at**  
[www.rabbit.com/story](http://www.rabbit.com/story)



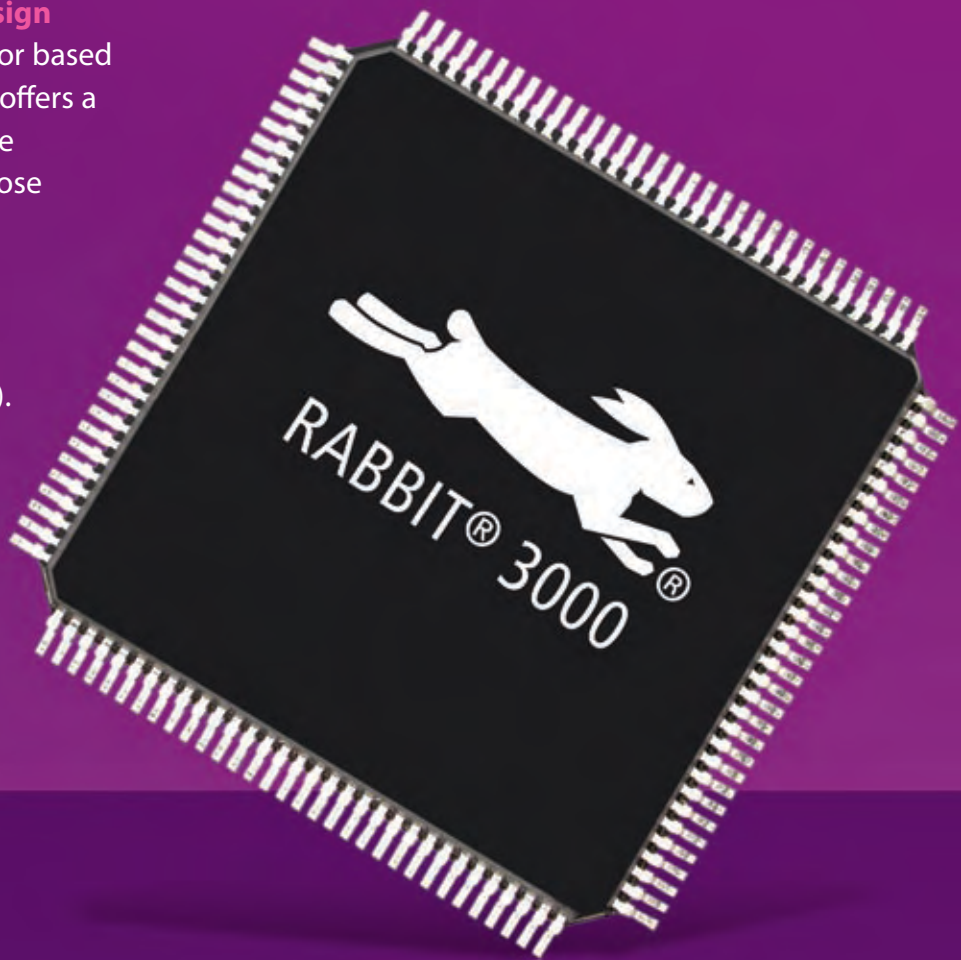
CONNECTIVITY • ETHERNET • EMBEDDED CONTROL

# Rabbit® 3000 Product Family

The Rabbit 3000 microprocessor is designed specifically to deliver the performance of a 16-bit processor in a low-cost 8-bit architecture for embedded applications.

## Liberate Your Embedded Design

The Rabbit 3000 microprocessor based family of embedded products offers a wide range of proven hardware for real-time applications. Choose from either core modules, designed to provide an easy way to add functionality to your own board designs, or single-board computers (SBCs). Both offer a choice of features such as Ethernet, expandable memory, and analog to let you tailor the solution to your application.



### ICON LEGEND



NEMA 4



RoHS



Analog



Ethernet



miniSD



RabbitNet Compliant

**Rabbit® 3000 RabbitCore® Line** | Accelerate your development process by adding Rabbit 3000 RabbitCore modules to your board. Not only can you add functionality, but you can also change the module to adapt to a new application or new requirement. By using proven Rabbit 3000 microprocessor based hardware, you can focus on overall system design, while keeping the project schedule on track.



### RCM3900 RabbitCore® Series

The most feature-rich Rabbit 3000 microprocessor based module.

- Rabbit 3000 @ 44.2 MHz
- 512K flash memory, 512K program execution SRAM, 512K data SRAM
- 1 GB flash mass storage option (can be hot-swapped)
- 10/100Base-T Ethernet port
- 52 GPIO
- Up to 5 serial ports
- 2-channel Quadrature decoder
- 1.85" x 2.73" x 0.86" (47 mm x 69 mm x 22 mm)



### RCM3750 RabbitCore® Module

Designed for small, cost-sensitive applications requiring 10/100Base-T Ethernet connectivity.

- Rabbit 3000 @ 22.1 MHz
- 10/100Base-T Ethernet
- Up to 512K flash memory/512K SRAM
- 33 digital I/O, alternate I/O bus
- 4 serial ports
- 2.95" x 1.20" x 0.89" (75 mm x 30 mm x 23 mm)



### RCM3700 RabbitCore® Series

The lowest priced Rabbit 3000 microprocessor based core module designed for Ethernet/Internet applications.

- Rabbit 3000 up to 22.1 MHz
- 10Base-T Ethernet connectivity
- Up to 512K flash memory/512K SRAM
- 4 serial ports
- 2.95" x 1.20" x 0.88" (75 mm x 30 mm x 22 mm)



### RCM3600 RabbitCore® Series

The lowest priced Rabbit 3000 family core module, designed for embedded applications that do not require Ethernet connectivity.

- Rabbit 3000 up to 22.1 MHz
- Up to 512K flash memory/512K SRAM
- 33 digital I/O, alternate I/O bus
- 4 serial ports (IrDA, HDLC, asynch, SPI)
- 2.11" x 1.23" x 0.62" (54 mm x 31 mm x 16 mm)



### RCM3400 RabbitCore® Series

The smallest Rabbit 3000 family core module, intended for applications needing analog inputs.

- Rabbit 3000 @ 29.4 MHz
- 8-channel 12-bit A/D with programmable gain
- Up to 512K flash memory/512K SRAM
- 47 GPIO
- 5 serial ports
- 1.37" x 1.16" x 0.31" (35 mm x 29 mm x 7.9 mm)



### RCM3365 RabbitCore® Series

Supports removable xD Picture memory cards up to 128 MB that can be hot-swapped when the power is on. Designed for data-intensive applications.

- Rabbit 3000 @ 44.2 MHz
- 10/100 Base-T, RJ-45 port
- 32 MB NAND flash (RCM3365 only)
- xD Card slot (can be hot-swapped)
- 512K flash memory/512K SRAM
- 52 GPIO
- 6 serial ports
- 1.850" x 2.725" x 0.86" (47 mm x 69 mm x 22 mm)



### RCM3305 RabbitCore® Series

Designed for applications needing serial flash and 10/100Base-T Ethernet.

- Rabbit 3000 @ 44.2 MHz
- 10/100Base-T Ethernet
- 4 MB to 8 MB serial flash
- 512K SRAM plus 512K SRAM for data
- 49 GPIO
- 6 serial ports
- 1.850" × 2.725" × 0.86"  
(47 mm × 69 mm × 22 mm)



### RCM3200 RabbitCore® Series

Designed for applications needing 10/100Base-T Ethernet connectivity but not serial flash memory.

- Rabbit 3000 up to 44.2 MHz
- 10/100Base-T Ethernet
- Up to 512K fast flash and up to 512K SRAM for program
- 256K SRAM for data
- 52 GPIO
- 6 serial ports
- 2.73" × 1.85" × 0.86"  
(69 mm × 47 mm × 22 mm)



### RCM3100 RabbitCore® Series

Rabbit 3000 microprocessor based core module without Ethernet.

- Rabbit 3000 @ 29.4 MHz
- Up to 512K flash memory/512K SRAM
- 54 GPIO
- 6 serial ports
- Low power "sleepy" modes (<2mA)
- 1.85" × 1.65" × 0.55"  
(47 mm × 42 mm × 14 mm)



### RCM3000 RabbitCore® Series

Intended for embedded systems needing 10Base-T Ethernet connectivity.

- Rabbit 3000 @ 29.4 MHz
- 10Base-T Ethernet
- Up to 512K flash memory/512K SRAM
- 52 GPIO
- 6 serial ports
- 2.73" × 1.85" × 0.86"  
(69 mm × 47 mm × 22 mm)



**Rabbit® 3000 Single-Board Computer Line** | Rabbit 3000 based single-board computers (SBCs) are easy to use, come in a variety of form factors, and interface easily with other devices via Ethernet or serial communications.



### BL2600 Series

The BL2600 series offers our largest feature set, along with the capability to add functions to fit the requirements of your application.

- Rabbit 3000 @ 44.2 MHz
- 10/100Base-T Ethernet or 10Base-T and non-Ethernet options available
- 512K flash memory and 512K SRAM
- Molex type connectors for industry standard wire harness connectivity
- 36 GPIO
- 5 serial ports
- 12 analog channels: eight 11-bit A/D inputs and four 12-bit D/A outputs
- Available RabbitNet™ expansion and miniSD or xD removable card options
- 4.85" × 4.96" × 1.00" (123 mm × 126 mm × 25 mm)



### BL2500 Series

SBCs available with or without the 10Base-T or 10/100Base-T option.

- Rabbit 3000 @ 29.4 MHz
- Molex type connectors for industry standard wire harness connectivity
- 6 serial ports (2 RS-232, RS-485, RS-422, 2 CMOS)
- 16 digital inputs and 8 digital high-current sinking outputs
- Two 9-bit PWM analog output channels
- One 8-bit analog input channel
- 6 serial ports
- 3.94" × 3.94" × 1.16" (100 mm × 100 mm × 29 mm) with Ethernet
- 3.94" × 3.94" × 0.80" (100 mm × 100 mm × 20 mm) without Ethernet





### LP3500 Series

Compact, low-power series designed to operate in remote locations that do not need Ethernet connectivity. On-board analog option.

- Rabbit 3000 @ 7.4 MHz
- Low operating consumption: <20 mA at 7.4 MHz
- Power-save mode draws <100  $\mu$ A
- 26 industrialized I/O + 1 relay

## APPLICATION SPOTLIGHT

### Rabbit Captures the Moment

#### Marvell Consultants and Picsolve Develop Theme Park Camera Solution with RCM3200

There are moments during an amusement park ride when it would be fun to take a picture, but physically impossible to do so. Picsolve specializes in digital photographic solutions for theme parks and tourist locations. The company wanted to use digital cameras to obtain close-up pictures of 190 guests in a theater. Pre-determined points, such as exciting scenes, trigger the cameras to take a photograph.

Steve Marchant of Marvell Consultants chose the RCM3200 RabbitCore to help Picsolve provide customers with a picture perfect experience. The RCM3200 waits for a user datagram protocol (UDP) from the host PC, then toggles input to a complex programmable logic device, which starts the timed exposure of the cameras. Once the

picture is taken, the raw image data is transferred to external SRAM. The RCM3200 then transfers the raw data to the PC using the TFTP protocol.

“In this tough environment, we needed an industrial grade solution working over long cable runs. We settled on the idea of using Power over Ethernet to supply power and communications to each camera over a single UTP cable,” said Marchant.

In addition to reducing the cabling nightmare that other solutions might have incurred, the cost-effective RCM3200 offers plenty of memory, I/O and processing power. Plus, Dynamic C provides straight forward development, reducing development time.



Sample photograph courtesy of Picsolve.

Rabbit provided Picsolve with a means to rapidly develop a reliable solution, at an affordable price.

**More Customer Success Stories at**  
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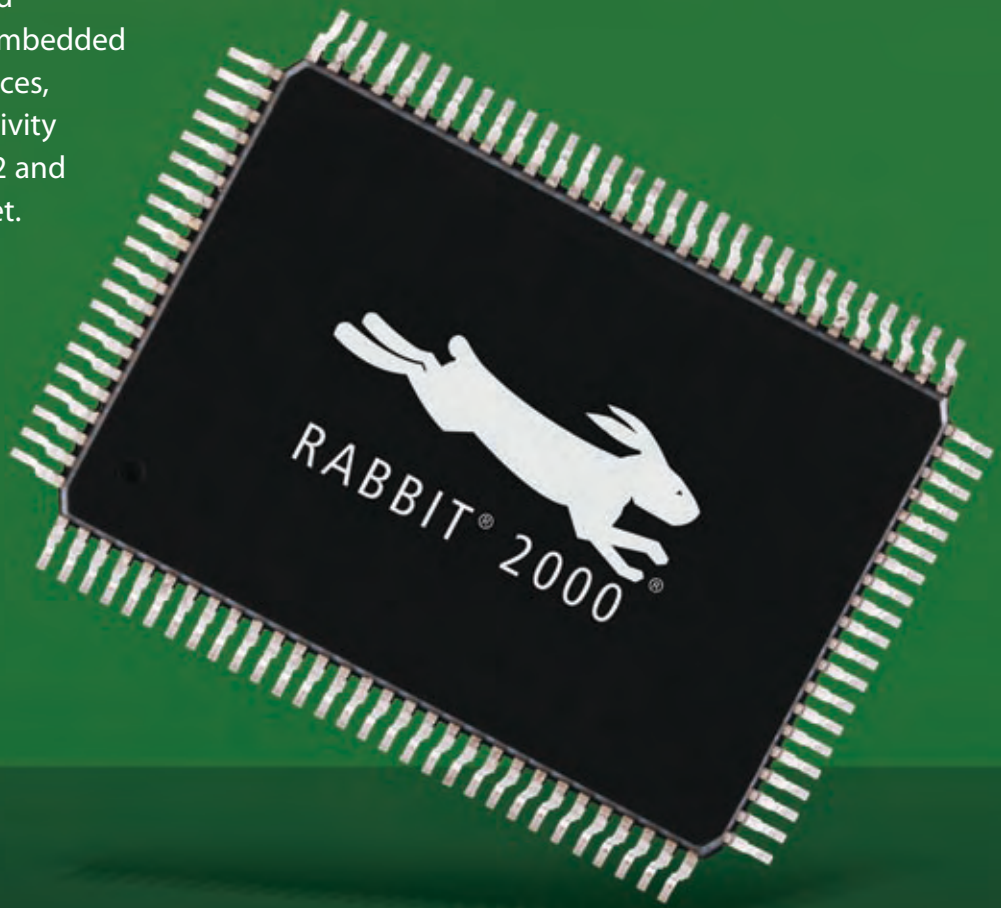
BASIC EMBEDDED CONNECTIVITY AND CONTROL

# Rabbit® 2000 Product Family

The Rabbit 2000 microprocessor based product family features clock speeds up to 30 MHz and wired connectivity for embedded control.

## Low-Cost Embedded Control

Rabbit 2000 microprocessor based products include single-board computers (SBCs), modular embedded systems, and operator interfaces, which provide wired connectivity such as serial ports for RS-232 and RS422/485, as well as Ethernet.



### ICON LEGEND



NEMA 4



RoHS

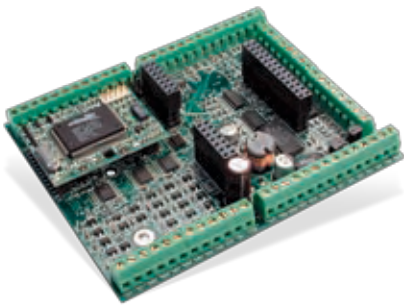


Analog



Ethernet

**Rabbit® 2000 Single-Board Computer Line** | These compact, easy-to-use SBCs are used worldwide for a broad array of applications. The Rabbit 2000 based SBCs are available in a variety of form factors and offer different options for wired connectivity.



#### **BL2100 Series**

SBC with enhanced feature set, Ethernet connectivity and keypad/display.

- Rabbit 2000 @ 22.1 MHz
- 40 digital I/O
- 10Base-T Ethernet, RJ-45 connector
- 11 A/D inputs and 4 analog outputs
- 4 serial ports
- Optional backlit 122 x 32 display, 7 user-relegendable keys, 7 LEDs
- Provision for 0.1" IDC or friction-lock connectors



#### **BL2000 Series**

SBC with basic options for Ethernet and analog inputs.

- Rabbit 2000 @ 22.1 MHz
- 10Base-T Ethernet, RJ-45 connector
- Up to 28 digital I/O
- Up to 11 A/D inputs and 2 analog outputs
- On-board relay
- Provision for 0.1" IDC or friction-lock connectors



#### **BL1800 Series**

Our most compact and lowest cost SBC for small cost-sensitive applications.

- Rabbit 2000 up to 29.5 MHz
- Up to 15 configurable I/O
- 1 low-grade A/D Input and 2 analog outputs
- 4 serial ports
- 64 mm x 89 mm



**SR9000 Smart Star™ System** | SR9000 is a Rabbit 2000 microprocessor based scalable embedded control system that you can customize for real-time control and data acquisition applications. The modular Smart Star system offers multiple options such as Ethernet connectivity, digital and analog I/O, and a keypad and display unit.

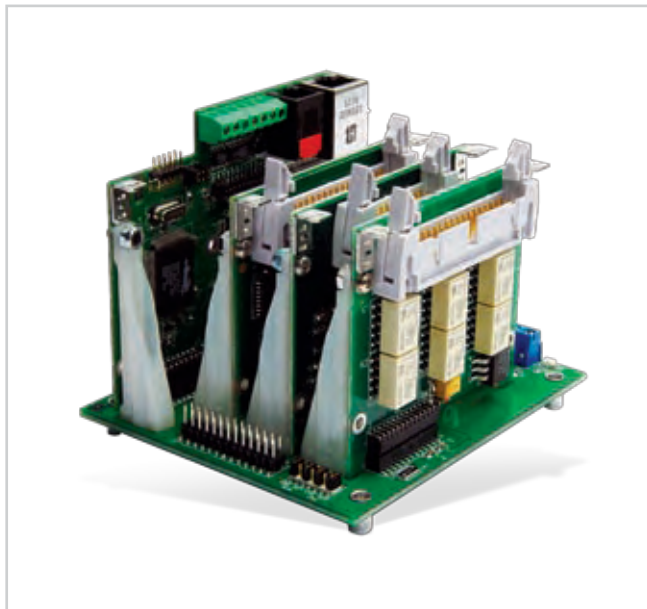


Top: SR9050  
 Left: SR9010  
 Right: Keypad display attached to SR9010



**SR9010**

- 8-slotted backplane with 1 slot for CPU card and 7 slots for I/O cards
- Optional keypad/display interface



**SR9050**

- 4-slotted backplane with 1 slot for CPU card and 3 slots for I/O cards
- Optional keypad/display interface

The following are CPU cards, I/O and relay cards, and the keypad/display available for the Smart Star control system.

#### Smart Star™ CPU Cards

- **Model SR9150** – Rabbit 2000 microprocessor based CPU card with 10Base-T RJ-45 Ethernet port
- **Model SR9160** – Rabbit 2000 microprocessor based CPU card without Ethernet

#### Smart Star™ Digital I/O Cards

- **Model SR9200** – 16 inputs and 8 sinking outputs
- **Model SR9205** – 16 inputs and 8 sourcing outputs
- **Model SR9210** – 8 inputs and 16 digital sinking outputs
- **Model SR9215** – 8 digital inputs, 16 sourcing outputs
- **Model SR9220** – 8 inputs and 8 sinking outputs

#### Smart Star™ A/D Converter Cards

- **Model SR9300** – Eleven 12-bit analog inputs (0–10 V)
- **Model SR9310** – Eleven 12-bit analog inputs ( $\pm 10$  V)
- **Model SR9320** – Eleven 12-bit analog inputs (4–20 mA)

#### Smart Star™ D/A Converter Cards

- **Model SR9400** – Eight 12-bit analog outputs (0–10 V)
- **Model SR9410** – Eight 12-bit analog outputs ( $\pm 10$  V)
- **Model SR9420** – Eight 12-bit analog outputs (4–20 mA)



#### Keypad/Display Module

The Keypad/Display plugs directly into the backplane, and offers an operator interface for the SR9000 expandable system.

- 122 x 32 graphic LCD with programmable backlight
- 7 relegendable keypad
- 7 user programmable LEDs
- Meets NEMA 4 water resistance

#### Smart Star™ Relay Cards

- **Model SR9500** – 6 relays: 1 SPDT, 5 SPST, including snubbers
- **Model SR9510** – 8 SPDT relays, no on-board snubbers

INTELLIGENT TERMINALS WITH I/O

# Operator Interfaces

Rabbit offers a range of keypads and displays that complement our boards and systems. These interfaces allow for easy integration of interactivity to your embedded control application.

## Embedded Control Interfaces

The Rabbit line of operator interfaces provides the data acquisition and display functionality to support most real-time systems. Options include connectivity with Ethernet and RabbitNet, touchscreen capability, and NEMA 4 water resistance. All operator interfaces include both RS-232 and RS-485 capability.



### ICON LEGEND



NEMA 4



RoHS



Analog



Ethernet



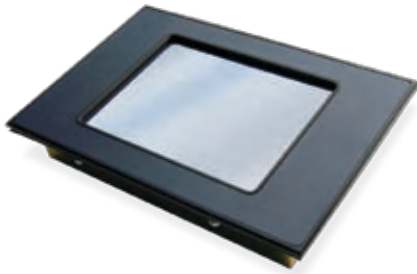
RabbitNet Compliant



### OP7200 eDisplay

Intelligent operator interface that offers a complete range of features.

- 1/4 VGA display (320 × 240 pixels)
- 10Base-T Ethernet, RJ-45 connector
- RabbitNet Expansion
- Up to 27 industrialized digital I/O protected to ±36V
- Meets NEMA 4 water resistance
- Optional 8 A/D inputs
- Optional 4096 × 4096 analog touchscreen
- 5.67" × 4.41" × 1.70" (144 mm × 112 mm × 43 mm)



### OP7100 Smart Screen

Easy-to-integrate graphic display that connects via RS-485/RS-232; ideal for remote terminals, automated machinery and control systems.

- 1/4 VGA display (320 × 240 pixels)
- Vertical or horizontal orientation
- Wide viewing angle
- 16 digital I/O
- Meets NEMA 4 water resistance
- Touchscreen matrix (optional)
- 8.0" × 5.4" × 0.25" (203 mm × 137 mm × 6 mm)



### OP6800 Minicom

Small, low-cost intelligent terminal interface.

- 122 × 32 graphic display/keypad
- 24 industrialized digital I/O
- Meets NEMA 4 water resistance
- 4 serial ports
- Optional 10Base-T Ethernet
- Compact 4.50" × 3.60" × 0.30" (114 mm × 91 mm × 7.6 mm)





## COMPLETE EMBEDDED SOLUTIONS

# Application Kits

Rabbit offers a wide range of application kits with all the necessary hardware and software to get your project up and running quickly.

### Apply Our Solution

Rabbit application kits provide sample programs and reference designs to give you a head start in your development, even with new technology. You can test and debug your design in real time with the kit hardware, allowing you to finish faster than ever expected. Reduce your design risk with Rabbit application kits!





### Rabbit RIO® Programmable I/O Kit

The Rabbit RIO programmable I/O kit demonstrates how to expand the I/O and features of any microprocessor design. See how to add additional digital I/O, PWM, TRIAC signals, input capture, and quadrature channels. The kit provides a complete development platform to get you started.

- Rabbit RIO programmable I/O chip
- RCM4110 RabbitCore module
- Rabbit RIO prototyping board
- AC adapter and programming cable
- Complete Dynamic C software and sample programs



### Wireless 802.15.4 Application Kit

Implement a practical, low-cost, low-power network of remote devices communicating via IEEE 802.15.4.

- RCM3720 RabbitCore module
- 10Base-T Ethernet
- Uses Digi's XBee® RF modules for simple wireless connections
- Sample programs and libraries to develop Ethernet-to-wireless gateway functionality and networking communications
- Simple HTML programming with refresh
- User-friendly web interface for IEEE 802.15.4 network setup, RF modem configuration and firmware update functions



### Bluetooth® Application Kit

Generate a Bluetooth design using the hardware and software provided. The 2.4 GHz FHSS (Frequency Hopping Spread Spectrum) technology ensures high reliability and minimal impact from interference.

- RCM3100 RabbitCore module and prototyping board
- Bluetooth radio modules to plug directly into supported RabbitCore modules and SBCs
- Dynamic C integrated development environment
- Bluetooth drivers, libraries, sample programs and manuals





### Wireless Control Application Kit

Program a Rabbit single-board computer (SBC) using standard software environments commonly used for Programmable Logic Controllers (PLCs).

The kit includes two Digi RF modems operating at frequencies of either 900 MHz or 2.4 GHz, and is a template for a robust wireless implementation where a serial connection is required. The modems are coupled with a DIP-switchable RS-232/422/485 interface board and they regularly outperform more expensive RF modems.

- LP3500 SBC
- 2 FCC approved, license-free Digi RF modules: a 900 MHz XCite™ and a 2.4 GHz 24XStream®
- Complete software libraries and samples
- ModBus control and PPP support for serving web pages
- Simple web programming with real-time refresh
- User-friendly interface for simple wireless set-up and configuration



### Camera Interface Application Kit

Enable your customers to monitor and control from their desktop via LAN communication with machinery, sensors and other serial devices. You can also add SSL and AES encryption software to secure data transmission.

The kit contains a VGA camera module, two servos that allow for pan-and-tilt motion, an infrared motion sensor for event triggering, and a RabbitCore module that can support up to 128 MB for storing pictures. Store and manage photos, send event notifications or send the logged files to an FTP server.

- RCM3365 RabbitCore module
- 10/100Base-T Ethernet
- Socket for removable memory
- Sample programs demonstrate motion detection, I/O input and timed event capture
- FAT file system included for storing and managing photos and data
- User-friendly web interface for simple event management





### Embedded PLC Application Kit

Program a Rabbit single-board computer (SBC) using a standard software environment that is commonly used with Programmable Logic Controllers (PLCs). Design engineers in automation and control applications can now make use of more cost-effective hardware solutions from Rabbit, while maintaining their software.

- BL2500 SBC
- Embedded PLC kernel for the BL2500 SBC
- Prototyping wires, connectors and terminals
- An ISaGRAF V3.50 workbench



### Multi-Port Serial-to-Ethernet Application Kit

This kit provides the hardware and software necessary for sensors and other serial devices to communicate via a LAN or other network to enable your customers to monitor sensors from their desktop. You can also use other optional software modules to secure data through SSL and encryption.

- RCM3700 RabbitCore module with 10Base-T Ethernet connectivity
- RS-232 serial ports
- Dynamic C integrated development environment
- Royalty-free TCP/IP stack in source code
- Sample programs and libraries



### Color Touchscreen Application Kit

Add advanced user interface functionality to embedded systems with the Reach Technology color touchscreen and a RabbitCore module. Color touchscreens provide more on-screen information, allowing for better control in industrial automation applications.

- RCM3720 RabbitCore module
- Audible beeper for audible touch feedback and alarms
- 5.7" TFT Hitachi display
- Backlight enable and brightness control
- Rugged, waterproof NEMA 4 compliant industrial steel enclosure
- Supports user-created bitmaps with RLE compression
- Extensive API to make programming easier





### Secure Embedded Web Application Kit 2.0

Secure data transmission is becoming increasingly important. The Secure Embedded Web Application Kit 2.0 provides software tools and sample security programs to build secure web interfaces for new and existing applications.

- RCM4300 RabbitCore module
- Dynamic C integrated development environment
- Advanced Encryption Standard (AES) software module
- Secure Socket Layer (SSL) and Transport Layer Security (TLS) software modules
- RabbitWeb system for rapid web development using embedded devices
- File Allocation Table (FAT) filing system
- *Practical Embedded Security* book, a reference to secure data transmission
- Sample programs



### GPRS/GSM Application Kit

Combine control with wireless GPRS/GSM communication. Enable your customers to change settings and receive alerts from anywhere in the world. They can upload data via wireless communications, send commands from one machine to another, or receive vehicle location and conditions via email. Libraries and sample programs show you how to get started on the project.

- RCM3100 RabbitCore module
- Enfora™ Spider SA-GL Quad Band wireless modem and antenna
- GUI and keypad configuration menu system
- Dynamic C integrated development environment



## Dedicated to Your Success

### Fostering Creativity and Boosting Productivity

Rabbit's Applications and Technical Support staff is dedicated in helping new and existing Rabbit users to accelerate their development schedules. We generate applications kits – such as our Bluetooth or Wireless Control Kits – to help our customers learn new technologies, get ideas about how to integrate into embedded systems, and arrive at solutions. Rabbit sets the standard for application kits and we are proud of our exceptional products that boost design engineers' productivity and creativity.

Our experienced technical staff continuously share their vast knowledge through resources such as technical notes, white papers and other available resources. The technical staff also supports the Rabbit Forum where the large community of Rabbit designers can interact to learn more about how to use Rabbit products to solve their design challenges.

In addition, Rabbit Technical Support staff responds to questions from individual design engineers whenever they encounter obstacles in their product development efforts. When designers have very broad questions, such as how to use the Rabbit API to configure a network, or questions about protected access in Wi-Fi networks, they can Ask Larry at [www.rabbit.com/support/ask\\_larry/](http://www.rabbit.com/support/ask_larry/).

Our goal is to help you be successful in your product development. When you consider Rabbit, consider all that Rabbit does to support you.

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[www.rabbit.com/support/ask\\_larry](http://www.rabbit.com/support/ask_larry)

# Selection Guide

## RabbitCore Selection Guide

	Model	Ethernet/ Wireless	Clock (MHz)	Input (V DC / mA)	Prog. Flash	Data SRAM
Rabbit 4000	RCM4510W	ZigBee 802.15.4	29.49	150 mA @ 3.3 V while transmitting/receiving, 80 mA @ 3.3 V while not transmitting/receiving, < 20 uA @ 3.3 V while asleep (with ZigBee modem and pins unloaded)	512K	512K
	RCM4400W	Wi-Fi 802.11b	58.98	3.3 V DC +/- 5%, 450 mA @ 3.3 V while transmitting/receiving, 80 mA @ 3.3 V while not transmitting/receiving	512K	512K
	RCM4310	10/100Base-T	58.98	3.0-3.6 V DC, 350 mA (typ.) @ 3.3 V, 385 mA @ 3.6 V and 85° C (max.)	512K	512K
	RCM4300	10/100Base-T	58.98	3.0-3.6 V DC, 350 mA (typ.) @ 3.3 V, 385 mA @ 3.6 V and 85° C (max.)	1 MB	512K
	RCM4210	10/100Base-T	29.49	3.0-3.6 V DC, 200 mA @ 3.3 V (typ.), (pins unloaded)	512K	512K
	RCM4200	10/100Base-T	58.98	3.0-3.6 V DC, 240 mA @ 3.3 V (typ.), (pins unloaded)	512K	512K
	RCM4120	No	59.98	3.0-3.6 V DC, 125 mA @ 3.3 V (pins unloaded)	512K	512K
	RCM4110	No	29.49	3.0-3.6 V DC, 65 mA @ 3.3 V (pins unloaded)	512K	256K
	RCM4100	No	58.98	3.0-3.6 V DC, 125 mA @ 3.3 V (pins unloaded)	512K	512K
	RCM4010	10Base-T	58.98	3.0-3.6 V DC, 90 mA @ 3.3 V (preliminary, pins unloaded)	512K 16-bit	512K 16-bit
	RCM4000	10Base-T	58.98	3.0-3.6 V DC, 90 mA @ 3.3 V (preliminary, pins unloaded)	512K 16-bit	512K 16-bit
	Rabbit 3000	RCM3910	10/100Base-T	44.2	3.15-3.45 V DC/325 mA @ 44.2 MHz, 3.3 V	512K
RCM3900		10/100Base-T	44.2	3.15-3.45 V DC/325 mA @ 44.2 MHz, 3.3 V	512K	512K
RCM3750		10/100Base-T	22.1	4.75-5.25 V DC/175 mA @ 22.1 MHz	512K	512K
RCM3720		10Base-T	22.1	4.75-5.25 V DC/100 mA @ 22.1 MHz	512K	256K
RCM3710		10Base-T	22.1	4.75-5.25 V DC/100 mA @ 22.1 MHz	256K	128K
RCM3700		10Base-T	22.1	4.75-5.25 V DC/100 mA @ 22.1 MHz	512K	512K
RCM3610		No	22.1	4.75-12.6 V DC/60 mA @ 22.1 MHz	256K	128K
RCM3600		No	22.1	4.75-12.6 V DC/60 mA @ 22.1 MHz	512K	512K
RCM3410		No	29.4	3.00-3.45 V DC/97 mA @ 29.4 MHz	256K	256K
RCM3400		No	29.4	3.00-3.45 V DC/97 mA @ 29.4 MHz	512K	512K
RCM3375		10/100Base-T	44.2	3.15-3.45 V DC/250 mA	512K	512K
RCM3365		10/100Base-T	44.2	3.15-3.45 V DC/250 mA	512K	512K
RCM3315		10/100Base-T	44.2	3.15-3.45 V DC/250 mA	512K	512K
RCM3305		10/100Base-T	44.2	3.15-3.45 V DC/250 mA	512K	512K
RCM3220		No	44.2	3.15-3.45 V DC/255 mA	512K	256K
RCM3200		10/100Base-T	44.2	3.15-3.45 V DC/255 mA	512K	256K
RCM3110		No	29.4	3.15-3.45 V DC/75 mA	256K	128K
RCM3100		No	29.4	3.15-3.45 V DC/75 mA	512K	512K
RCM3010		10Base-T	29.4	3.15-3.45 V DC/150 mA	256K	128K
RCM3000		10Base-T	29.4	3.15-3.45 V DC/150 mA	512K	512K

Development and Starter Kits are available for our line of SBCs, RabbitCores, Operator Interfaces and Smart Star solutions. Everything you need to get started.

Serial Flash	NAND Flash	Removable Memory	Config. I/O	Digital Inputs	Digital Outputs	Analog	Serial Ports	Product Size (mm)	Part Number	U.S. Development Kit	Int'l Development Kit	Page
No	No	No	49	—	—	Yes	6	47 x 72 x 14	20-101-1170	101-1118	—	13
No	No	No	35	—	—	No	6	47 x 72 x 13	20-101-1140	101-1173		13
1 MB	No	Yes	36	—	—	No	6	47 x 72 x 21	20-101-1139	101-1177 with RCM4300 RabbitCore		14
2 MB	No	Yes	28	—	—	Yes	5	47 x 72 x 21	20-101-1138	101-1177 with RCM4300 RabbitCore		14
4 MB	No	No	35	—	—	No	5	47 x 61 x 21	20-101-1132	101-1155 with RCM4200	101-1156 with RCM4200	14
8 MB	No	No	25	—	—	Yes	4	47 x 61 x 21	20-101-1131	101-1155	101-1156	14
No	No	No	40	—	—	No	6	36 x 48 x 12	20-101-1154	101-1157	101-1158	14
No	No	No	40	—	—	No	6	36 x 48 x 12	20-101-1093	101-1101	101-1102	14
No	No	No	29	—	—	Yes	6	36 x 48 x 12	20-101-1105	101-1157	101-1158	14
No	No	No	28	—	—	No	5	47 x 61 x 20	20-101-1112	101-1114	101-1115	15
No	32 MB	No	22	—	—	Yes	5	47 x 61 x 20	20-101-1094	101-1145	101-1146	15
No	No	Yes	44	4	4	No	5	30 x 75 x 23	20-101-1197	101-1226 with RCM3900		17
No	32 MB	Yes	44	—	—	No	5	30 x 75 x 23	20-101-1196	101-1226		17
1 MB	No	No	31	4	4	No	4	30 x 75 x 23	20-101-1028	101-1049	101-1050	17
1 MB	No	No	31	—	2	No	4	30 x 75 x 23	20-101-0961	101-0680 with RCM3700	101-0681 with RCM3700	17
1 MB	No	No	31	—	2	No	4	30 x 75 x 23	20-101-0675	101-0680 with RCM3700	101-0681 with RCM3700	17
1 MB	No	No	31	—	2	No	4	30 x 75 x 23	20-101-0674	101-0680	101-0681	17
No	No	No	31	—	2	No	4	31 x 54 x 16	20-101-0673	101-0678 with RCM3600	101-0679 with RCM3600	18
No	No	No	31	—	2	No	4	31 x 54 x 16	20-101-0672	101-0678	101-0679	18
No	No	No	41	3	3	Yes	5	29 x 35 x 7.9	20-101-0562	101-0587 with RCM3400	101-0588 with RCM3400	18
No	No	No	41	3	3	Yes	5	29 x 35 x 7.9	20-101-0561	101-0587	101-0588	18
No	No	Yes	44	4	4	No	6	47 x 69 x 22	20-101-1055	101-1053 with RCM3365	101-1054 with RCM3365	18
No	32 MB	Yes	44	4	4	No	6	47 x 69 x 22	20-101-1051	101-1053	101-1054	18
4 MB	No	No	43	3	3	No	5	47 x 69 x 22	20-101-1068	101-1069 with RCM3305	101-1070 with RCM3305	18
8 MB	No	No	43	3	3	No	5	47 x 69 x 22	20-101-1067	101-1069	101-1070	19
No	No	No	44	4	4	No	6	47 x 69 x 12	20-101-0522	101-0552 with RCM3200	101-0553 with RCM3200	19
No	No	No	44	4	4	No	6	47 x 69 x 22	20-101-0520	101-0552	101-0553	19
No	No	No	46	4	4	No	6	42 x 47 x 14	20-101-0518	101-0533 with RCM3100	101-0534 with RCM3100	19
No	No	No	46	4	4	No	6	42 x 47 x 14	20-101-0517	101-0533	101-0534	19
No	No	No	44	4	4	No	6	47 x 69 x 22	20-101-0508	101-0523	101-0524	19
No	No	No	44	4	4	No	6	47 x 69 x 22	20-101-0507	101-0533 with RCM3100	101-0534 with RCM3100	19



## Single-Board Computer Selection Guide

	Model	Ethernet	Clock (MHz)	Input (V DC / mA)	Prog. Flash	Data SRAM	Digital Inputs
Rabbit 3000	BL2610	No	29.4	9-36 V DC / 12 W	512K	512K	8
	BL2600	10/100Base-T	44.2	9-36 V DC / 12 W	512K	(512K Prog Exec.) 256K	8
	BL2510	No	29.4	8-40 V DC / 0.8 W (no load)	256K, 512K Option	128K, 512K Option	16
	BL2500	10/100Base-T	29.4	8-40 V DC / 0.8 W (no load)	256K, 512K Option	128K, 512K Option	16
	LP3510	No	29.4	3-30 V DC / 20 mA @ 7.4 MHz	256K	128K	16
	LP3500	No	7.4	3-30 V DC / 20 mA @ 7.4 MHz	512K	512K	16
Rabbit 2000	BL2130	No	22.1	9-36 V DC / 1.5 W (w/o display), 3 W (w/ display)	256K	128K	24
	BL2120	No	22.1	9-36 V DC / 1.5 W (w/o display), 3 W (w/ display)	256K	128K	24
	BL2110	10Base-T	22.1	9-36 V DC / 1.5 W (w/o display), 3 W (w/ display)	256K	128K	24
	BL2100	10Base-T	22.1	9-36 V DC / 1.5 W (w/o display), 3 W (w/ display)	256K	128K	24
	BL2030	No	22.1	9-40 V DC or 24 V AC / 1.5 W	256K	128K	11
	BL2020	No	22.1	9-40 V DC or 24 V AC / 1.5 W	256K	128K	11
	BL2010	10/100Base-T	22.1	9-40 V DC or 24 V AC / 1.5 W	256K	128K	11
	BL2000	10/100Base-T	22.1	9-40 V DC or 24 V AC / 1.5 W	256K	128K	11
	BL1820	No	14.7	7.5-25 V DC / 100 mA	128K	128K	7
	BL1810	No	14.7	7.5-25 V DC / 100 mA	128K	128K	6
	BL1800	No	29.5	8-40 V DC / 1.2 W	256K	128K	6

## Operator Interface Selection Guide

	Model	Ethernet	Clock (MHz)	Input (V DC / mA)	Keypad / Display
Rabbit 2000	OP6800	10Base-T	22.1	9-36 V DC / 1.5 W	132 x 32 Pixel graphic LCD (programmable backlight), user-reconfigurable keypad with 7-key / 7-LED interface
	OP6810	None	22.1	9-36 V DC / 1.5 W	132 x 32 Pixel graphic LCD (programmable backlight), user-reconfigurable keypad with 7-key / 7-LED interface
	OP7200	10Base-T	22.1	9-40 V DC or 22-26 V AC / 4 W	4096 x 4096 resistive touchscreen. 1/4 VGA (320 x 240 p) with programmable white LED backlight, 9-key keypad
	OP7210	10Base-T	22.1	9-40 V DC or 22-26 V AC / 4 W	1/4 VGA (320 x 240 pixels) with programmable white LED backlight, 9-key keypad
Z180	OP7100	None	18.432	12-30 V DC / 4.5 W (backlight on) / 1.5 W (backlight off)	8 x 8 touchscreen. STN, 320 x 240 pixels, blue-on-white background. Pixel matrix is 4.53" x 3.40" (115 x 86 mm) (0.36 mm pitch). Viewing area is 4.76" x 3.58" (121 x 91 mm). Adjustable contrast with automatic temperature compensation. CCFL backlight with software control.
	OP7110	None	18.432	12-30 V DC / 4.5 W (backlight on) / 1.5 W (backlight off)	STN, 320 x 240 pixels, blue-on-white background. Pixel matrix is 4.53" x 3.40" (115 x 86 mm) (0.36 mm pitch). Viewing area is 4.76" x 3.58" (121 x 91 mm). Adjustable contrast with automatic temperature compensation. CCFL backlight with software control.

## Accessories

Rabbit provides many accessories and peripherals to use with our core modules, single-board computers, application kits and development kits. We offer numerous cables, adapter boards, flash memories, headers, connectors and other products for your development process. For more information, please visit [www.rabbit.com/peripherals](http://www.rabbit.com/peripherals) and find what you need to get started.



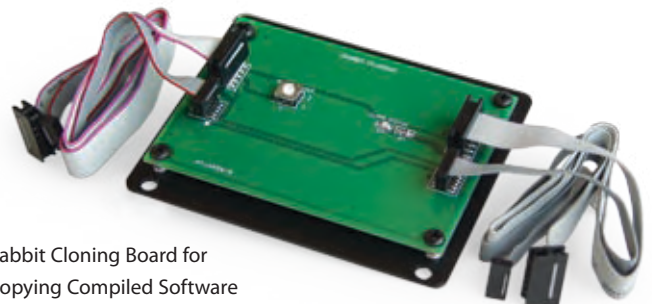
RS-232-to-USB Converter Cable for USB-Only PCs

Digital Outputs	Config. I/O	Analog	Serial Ports	Product Size (mm)	Part Number	U.S. Starter Kit	Int'l Starter Kit	Page
4	16	Yes	5	123 x 126 x 25	20-101-0891	20-101-0891, 101-0626	20-101-0891, 101-0627	20
4	16	Yes	5	123 x 126 x 25	20-101-0889	20-101-0889, 101-0626	20-101-0889, 101-0627	20
8	—	Yes	6	100 x 100 x 20	20-101-0576	—	—	20
8	—	Yes	6	100 x 100 x 29	20-101-0575	101-0577	101-0578	20
10	—	No	6	66 x 93 x 11	101-0526	20-101-0525, 101-0529	20-101-0525, 101-0530	21
10	—	Yes	6	66 x 93 x 11	20-101-0525	101-0526, 101-0529	101-0526, 101-0530	21
16	—	No	4	87 x 105 x 24	20-101-0464	20-101-0464, 101-0482	20-101-0464, 101-0483	23
16	—	Yes	4	87 x 105 x 24	20-101-0463	20-101-0463, 101-0482	20-101-0463, 101-0483	23
16	—	No	4	87 x 105 x 24	20-101-0462	20-101-0462, 101-0482	20-101-0462, 101-0483	23
16	—	Yes	4	87 x 105 x 24	20-101-0461	20-101-0461, 101-0482	20-101-0461, 101-0483	23
10	—	Yes	4	87 x 105 x 21	20-101-0457	101-0457, 101-0472	101-0457, 101-0476	23
10	—	Yes	4	87 x 105 x 21	20-101-0456	101-0456, 101-0472	101-0456, 101-0476	23
10	—	Yes	4	87 x 105 x 21	20-101-0455	20-101-0455, 101-0472	20-101-0455, 101-0476	23
10	—	Yes	4	87 x 105 x 21	20-101-0430	101-0430, 101-0472	101-0430, 101-0476	23
5	15	Yes	4	64 x 89 x 16	20-101-0358	101-0363	101-0364	23
4	14	Yes	4	64 x 89 x 24	20-101-0357	101-0363	101-0364	23
4	14	Yes	4	64 x 89 x 19	20-101-0356	101-0363	101-0364	23

Prog. Flash	Data SRAM	Digital Inputs	Digital Outputs	Analog	Serial Ports	Board Size (mm)	Enclosure Size (mm)	Part Number	U.S. Starter Kit	Int'l Starter Kit	Page
256K	128K	13	11	No	4	66 x 76 x 28	114 x 91 x 7.6	20-101-0654	20-101-0492, 101-0500	0-101-0492, 101-0501	27
256K	128K	13	11	No	4	66 x 76 x 28	114 x 91 x 7.6	20-101-0497	20-101-0497, 101-0500	20-101-0497, 101-0501	27
256K	128K	19	8	Yes	4	119 x 95.3	112 x 144 x 43	101-0535	20-101-0535, 101-0543	20-101-0535, 101-0544	27
256K	128K	16	8	No	4	119 x 95.3	112 x 144 x 43	101-0536	101-0536, 101-0543	101-0536, 101-0544	27
512K	128K	8	8	No	2	137 x 203 x 6	137 x 203 x 6	20-101-0303	20-101-0303, 101-0306	—	27
512K	128K	8	8	No	2	137 x 203 x 6	137 x 203 x 6	101-0304	101-0304, 101-0306	—	27



DB-9 to 10-Pin Flat Ribbon Connector Serial Cable



Rabbit Cloning Board for Copying Compiled Software

## Smart Star Selection Guide

	Model	Description	Voltage	Environmental	Board Size (mm)	Part Number	Starter Kit with Ethernet (U.S./Int'l)	Starter Kit without Ethernet (U.S./Int'l)	Page
Backplane	SR9010	8 slots: 1 for CPU 7 for I/O expansion cards	9-30 V DC/1 A	-40° C to +70° C	165 x 107 x 14	20-101-0512	101-0427, 101-0486, 101-0512	101-0427, 101-0506, 101-0512	24
	SR9050	4 slots: 1 for CPU 3 for I/O expansion cards	9-30 V DC/1 A	-40° C to +70° C	95 x 112 x 19	20-101-0487	101-0427, 101-0486, 20-101-0487	101-0427, 101-0506, 20-101-0487	24

	Model	Description	Voltage	Environmental	Board Size (mm)	Part Number	Page
Rabbit 2000 CPU Card	SR9150	10Base-T Ethernet port, 512K flash memory, 128K SRAM, 3V battery backup, 3 serial ports, real-time clock, five 8-bit timers and one 10-bit timer @ 22.1 MHz	5 V DC/190 mA	-40° C to +70° C	102 x 79 x 25	20-101-0486	25
	SR9160	Same as above without Ethernet port	5 V DC/190 mA	-40° C to +70° C	102 x 79 x 25	20-101-0506	25

	Model	Expansion Card Specifications	Part Number	Page
Digital I/O	SR9200	16 inputs and 8 outputs, sinking	20-101-0389	25
	SR9205	16 inputs and 8 outputs, sourcing	20-101-0437	25
	SR9210	8 inputs and 16 outputs, sinking	20-101-0390	25
	ST9220	8 inputs and 8 outputs, sinking	20-101-0391	25
Analog Input I/O	SR9300	Eleven 12-bit @ 100 kΩ, 0-10 V DC, up to 10,000 samples/sec.	20-101-0392	25
	SR9310	Eleven 12-bit @ 100 kΩ, +/-10 V DC, up to 10,000 samples/sec.	101-0423	25
	SR9320	Eleven 12-bit @ 249 Ω, 4-20 V DC, up to 10,000 samples/sec.	20-101-0444	25
Analog Output I/O	SR9400	Eight 12-bit, 0-10 V DC update rate 16 kHz	20-101-0393	25
	SR9410	Eight 12-bit, +/-10 V DC update rate 16 kHz	101-0394	25
	SR9420	Eight 12-bit, 4-20 mA, update rate 16 kHz	20-101-0445	25
Relay I/O	SR9500	6 total: 1 SPDT, 5 SPST (including snubbers)	20-101-0395	25
	SR9510	8 SPDT (no onboard snubbers)	20-101-0440	25

# Glossary

## **AES (Advanced Encryption Standard)**

An encryption standard that uses 128-, 192- and 256-bit keys to secure sensitive data.

## **Compiler**

Software that translates a program written in a high-level programming language (C/C++, COBOL, etc.) into machine language. A compiler usually generates assembly language first and then translates the assembly language into machine language. A utility known as a “linker” then combines all required machine language modules into an executable program that can run in the computer.

## **Debugger**

Software that helps a programmer debug a program by stopping at certain breakpoints and displaying various programming elements. The programmer can step through source code statements one at a time while the corresponding machine instructions are being executed.

## **Dynamic C®**

An integrated development environment that combines an integrated C compiler, editor, loader and debugger designed specifically for Rabbit® microprocessor based products.

## **Embedded System**

An electronic system that uses a CPU chip, but is not used in a general-purpose workstation, desktop or laptop computer. Found in transportation, such as automobiles, planes, trains and space vehicles, and industrial controls, such as machine tools, robots and access security. Embedded systems are also found in consumer electronic products like cameras, cell phones, handhelds and toys, as well as in office appliances like copiers, phone systems and temperature controls.

## **Ethernet**

The standard local area network (LAN) access method. A reference to “LAN,” “LAN connection” or “network card” automatically implies Ethernet. Defined by the IEEE as the 802.3 standard, Ethernet is used to connect computers in a company or home network as well as to connect a single computer to a cable modem or DSL modem for Internet access.

## **FAT (File Allocation Table)**

A file system developed by Microsoft® that is the primary file system for consumer versions of Microsoft Windows®.

## **IEEE 802.15.4**

A standard which specifies the physical layer (PHY) and medium access control (MAC) for low-rate wireless personal area networks (LR-WPANs). It is the basis for the ZigBee and MiWi specifications.

## **MCS™ (Megabyte Code Support)**

The capability in the Dynamic C version 10 development environment that enables designers to use over 1 MB of SRAM for shared code and data.

## **Operator Interface**

A graphical interface to a specialized computer (DCS, PLC or PAC) used in an embedded system, such as on the factory floor, or built into a ruggedized terminal. It provides a remote interface to the push buttons, switches and gauges found on the equipment itself. An operator interface may not offer the rich graphics and flexibility of a Windows-based interface.

## **RabbitCore® Module**

Compact, Rabbit microprocessor based board that mounts directly onto a user-designed motherboard and act as the controlling microprocessor for the system.



**RabbitNet™**

Point-to-point synchronous protocol developed by Rabbit to connect peripheral cards to a master. The signals themselves are differential RS-422, which are series-terminated at the source. Peripheral cards and masters connect using standard 8-conductor CAT 5/6 Ethernet cables into RJ-45 female connectors.

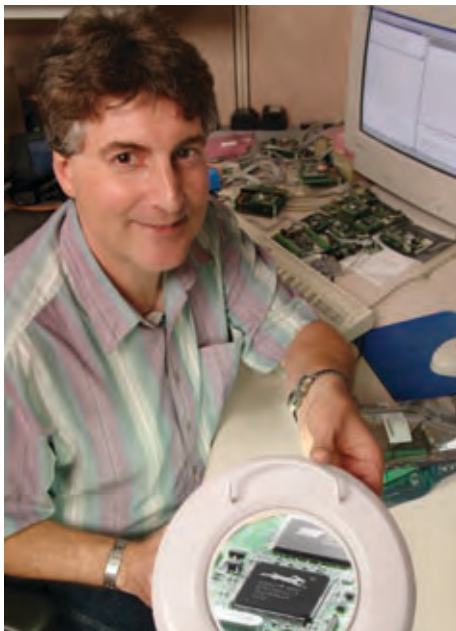


Photo: David Allen

**RabbitWeb™**

Consists of enhancements to our Dynamic C compiler, and extensions to our embedded HTTP server, to enable the development of HTML forms for web pages that interface with C variables in embedded networked applications.

**RF (Radio Frequency) Module**

A packaged semiconductor device, including an antenna, used as a wireless communication port for either a ZigBee connection or an IEEE 802.15.4 connection.

**RFU (Rabbit Field Utility)**

The utility allows binary image files generated by Dynamic C to be loaded to Rabbit targets without Dynamic C.

**Rabbit RIO®**

A device from Rabbit that interfaces to almost any microprocessor to add I/O connections and features, such as PWM functionality.

**RJ-45 (Registered Jack-45)**

A telephone connector that holds up to eight wires. RJ-45 plugs and sockets are used in Ethernet and Token Ring Type 3 devices.

**RS-232 (Recommended Standard-232)**

A TIA/EIA standard for serial transmission between computers and peripheral devices (modem, mouse, etc.). Using a 25-pin DB-25 or 9-pin DB-9 connector, its normal cable limitation of 50 feet can be extended to several hundred feet with high-quality cable.

**RS-422 (Recommended Standard-422)**

A TIA/EIA standard for serial interfaces that extends distances and speeds beyond RS-232. RS-422 is a balanced system requiring more wire pairs than its RS-423 counterpart and is intended for use in multipoint lines. Both use either a 37-pin connector defined by RS-449 or a 25-pin connector defined by RS-530.

**RTOS (Real-Time Operating System)**

A master control program that can provide immediate response to input signals and transactions.

**Smart Star™**

Rabbit's backplane based modular and expandable embedded control system designed for demanding real-time control and data acquisition applications.

**SMB™ (SAMBA)**

An application-level protocol used primarily to provide shared access to files, printers, serial ports, and miscellaneous communications between

nodes on a network. The name SAMBA comes from inserting one vowel, twice, into the name of the standard protocol used by the Microsoft Windows network file system, "SMB" (Server Message Block).

**SNMP (Simple Network Management Protocol)**

Consists of a set of standards for network management, including an Application Layer protocol, a database and a set of data objects.

**SSL (Secure Sockets Layer)**

A cryptographic protocol that provides secure communications on the Internet.

**10Base-T**

An Ethernet port that supports 10 Mbps.

**10/100Base-T**

A 10/100 Ethernet port that supports two speeds: 10 Mbps (10Base-T) and 100 Mbps (100Base-T).

**TLS (Transport Layer Security)**

A cryptographic protocol, similar to SSL, that provides secure communications on the Internet and came after the development of SSL.

**Wi-Fi® (Wireless-Fidelity)**

A logo from the Wi-Fi Alliance that certifies network devices comply with the IEEE 802.11 wireless Ethernet standards. In the early 2000s, Wi-Fi/802.11 became widely used (initially 802.11b, then 802.11g), and within a short time, all laptops and other handheld devices came with Wi-Fi built in.

**ZigBee®**

A wireless network used for home, building and industrial control. It conforms to the IEEE 802.15.4 wireless standard for low-cost, low-power networks.