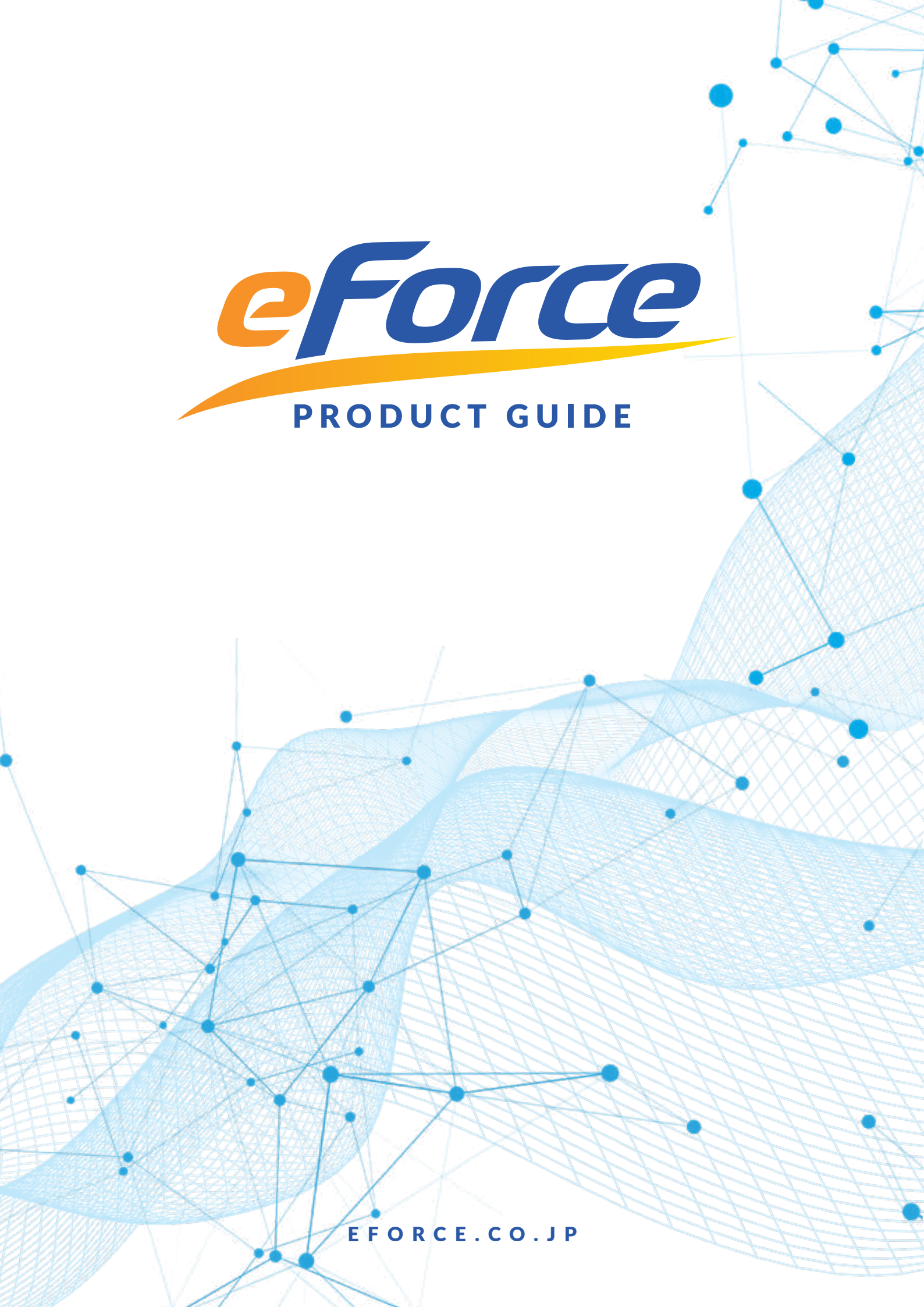

eForce
PRODUCT GUIDE
EFORCE.CO.JP

CONTENTS

THE EMBEDDED SYSTEMS INDUSTRY AND eForce

REQUIREMENTS FOR EMBEDDED SYSTEMS ARE DIVERSIFYING AND BECOMING MORE SOPHISTICATED.

In recent years, it has become commonplace for things around us to be connected to networks, and due to this it has become possible to provide an **unprecedented added value** in product development.
User needs are becoming more sophisticated and more diverse than ever before.
With the evolution of semiconductors, embedded systems continue to become more diverse and sophisticated, including not only real-time performance but also HMI and wireless communication functions.

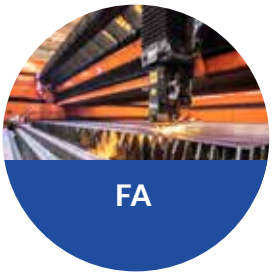
µC3 IS ALREADY IN USE IN A VARIETY OF LOCATIONS

µC3 has been installed in various products since 2006.It has been adopted in various industries including industrial equipment, medical equipment, IoT, communications, automobiles, and OA equipment, and the number continues to rise. We are the first OS vendor in Japan to support Arm's Cortex-M/A core, and our products can be used with **confidence** by our customers.


Infrastructure


Medical Equipment


Industrial Equipment


FA


Measuring Equipment


Consumer Products


IoT


Automotive

OUR PURSUAL OF HIGH EFFICIENCY AND OPTIMIZATION

Since its founding in 2006, eForce has been developing software such as operating systems and middleware for embedded systems with a focus on **highly efficient and optimized system design**.
In recent years, we have also been focusing on wireless communication technologies such as Wi-Fi and BLE, as well as multi-OS solutions. We will continue to provide products that match technological trends and **support our customers' development.**

µC3 micro c cube Compact

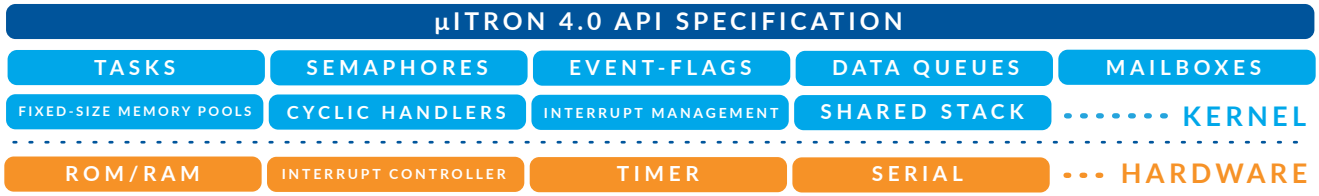
ULTRA-LIGHTWEIGHT RTOS KERNEL FOR MICRO-CONTROLLERS

The µC3 (Micro C Cube) / Compact is a compact RTOS(Real-Time Operating System) complying with the µITRON4.0 specification. It is optimized to fit memory devices with small capacity implemented in microcontrollers.

A GUI-based configurator is provided so that users can configure the RTOS kernel, TCP/IP and peripherals without modifying source code. This configurator generates configured source code automatically.

µC3/Compact is the first ITRON-based RTOS running on top of ARM Cortex®-M processors in Japan. Many companies have selected µC3/Compact for their embedded products.

Key Features of the µC3/Compact



µC3 micro c cube Standard

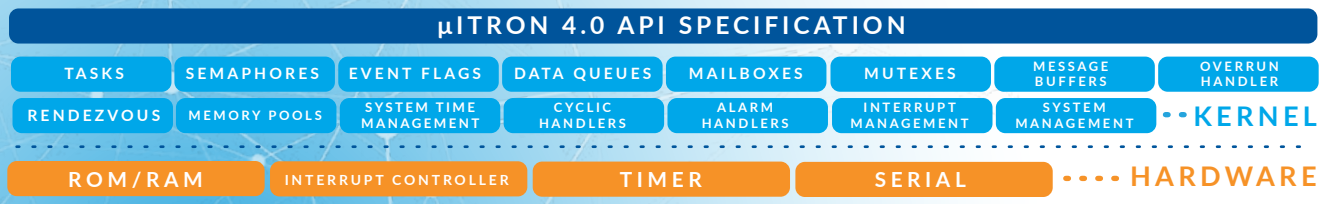
RTOS KERNEL WITH µITRON 4.0 BASED FUNCTIONALITY FOR MICROPROCESSORS

The µC3 (Micro C Cube) / Standard is an RTOS having rich functionality which complies with the µITRON specification (standard profile).

It is designed so that it can achieve higher interrupt handling performance by reducing critical sections (interrupt-disabled sections) for fine-grained real-time control.

This RTOS supports many Arm core processors including the latest Cortex®-A and Cortex®-R series

Key Features of the µC3/Standard



µC3 micro c cube + Linux

BETTER REAL-TIME PERFORMANCE AND RICH FUNCTIONALITY THROUGH THE COMBINATION OF AN RTOS KERNEL AND LINUX

µC3+Linux enables Linux and µC3/Standard to run simultaneously on a multi-core CPU.

It provides memory-based communication paths between the two operating systems to develop applications which can achieve better real-time performance and have rich functionality.

µC3 micro c cube Standard+M

RTOS KERNEL TAKING ADVANTAGE OF MULTI-CORE CAPABILITY

The µC3/Standard+M is an advanced version of the µC3/Standard having AMP-type multi-core extensions to develop more powerful applications running on top of multi-core CPUs.

µNet3
micro net cube

COMPACT NETWORKING STACK CAPABLE OF OPERATING WITH SMALL SIZE MEMORY

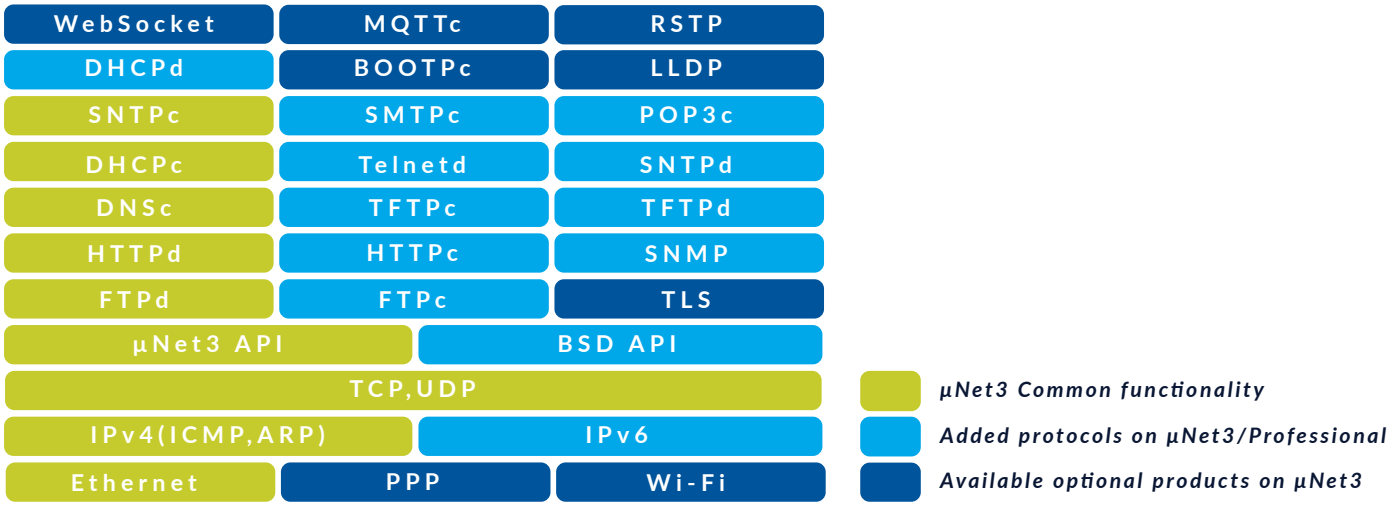
The µNet3 series provides a variety of networking stacks for embedded systems. It can be used in conjunction with the µC3/Compact or µC3/Standard.

This series supports the IPv4, ARP, ICMP, IGMPv2/v3, UDP, and TCP protocols.

In addition, the functionality of a DHCP client, DNS client, FTP server and HTTP server is available. IPv6, PPP, MQTT, TLS and other protocols are also optionally provided.

Simple APIs dedicated to each protocol enable users to develop their network applications easily.

Protocols supported by the µNet3 Series



µC3 WLAN SDK — WIRELESS LAN SOFTWARE DEVELOPMENT KIT

The µC3 WLAN SDK is an all-in-one SDK package providing the required software to develop embedded systems using wireless LAN for devices such as the µC3/Compact, µNet3 and a Wi-Fi drivers.

This SDK is tested with a variety of Wi-Fi routers to guarantee high reliability of the provided software.

µC3 BLE Stack — PROTOCOL STACK ENABLING BLE COMMUNICATION ON EMBEDDED DEVICES

The µC3-BLE Stack is a host layer protocol stack supporting Bluetooth Low Energy(BLE) 4.2.

This stack can be utilized with µC3-WLAN SDK for Wi-Fi/BLE combo modules.

This stack is certified as a Bluetooth Host Subsystem product. Therefore, employing this stack enables reduction of the development cost for software communicating via BLE.

BLE+USB Entry Pack — NO RADIO LAW CERTIFICATION REQUIRED! EASILY MAKE EMBEDDED DEVICES WIRELESS

The BLE+USB Entry Pack is an SDK used for USB dongles for BLE. Both the µC3-BLE Stack above and the GR-USB host driver provided by GRAPE SYSTEMS INC. are required to use this SDK.

The development cost of embedded devices supporting BLE can be reduced easily through the use of this SDK and a USB dongle for BLE.

LINEUP AND DETAILED SPECIFICATIONS

	µC3/Compact	µC3/Standard
Supported CPUs	Cortex®-M0,Cortex®-M0+, Cortex®-M3,Cortex®-M4, Cortex®-M7, Cortex®-M33 RXv1, RXv2, Nios®II	Cortex®-M3,Cortex®-M4,Cortex®-M7, Cortex®-M33,Cortex®-M85,Cortex®-A5, Cortex®-A7, Cortex®-A8, Cortex®-A9, Cortex®-A15,Cortex®-A53,Cortex®-A72, Cortex®-R4,Cortex®-R5, Cortex®-R7, Cortex®-R52, RXv2, RXv3
Development Environment		
Supported Compilers	Arm : Keil MDK IAR : EWARM,EWRX TI : Code Composer Studio™ IDE Renesas : CS+, e² studio GCC:GNU Arm Embedded Toolchain	Arm : DS-5, Keil MDK, Development Studio IAR : EWARM TI : Code Composer Studio™ IDE Renesas : CS+, e² studio Xilinx : Vitis GCC:GNU Arm Embedded Toolchain
OS aware support debugger	Computex : CSIDE IAR : C-SPY Sohwa & Sophia Technologies : WATCHPOINT Arm : Keil MDK Renesas : CS+	Computex : CSIDE IAR : C-SPY Sohwa & Sophia Technologies : WATCHPOINT KMC : PARTNER-Jet Arm : DS-5, Development Studio DTS INSIGHT:adviceXross

	µC3/Compact	µC3/Standard
Dynamic creation	X	O
Task management functionality	O	O
Task dependent synchronization functionality	O	O
Task exception handling functionality	X	X
Synchronization and communication functionality - Semaphores	O	O
Synchronization and communication functionality - Event-flags	O	O
Synchronization and communication functionality - Data queues	O	O
Synchronization and communication functionality - Mailboxes	O	O
Extended synchronization and Communication functionality-Mutexes	X	O
Extended synchronization and Communication functionality -Message buffers	X	O
Extended synchronization and Communication functionality -Rendezvous	X	O
Fixed-size memory pool management functionality	O	O
Variable-size memory pool management functionality	X	O
Time management functionality - System time management	O	O
Time management functionality - Cyclic handlers	O	O
Time management functionality - Alarm handlers	X	O
Time management functionality - Overrun handlers	X	O
System state management functionality	O	O
Interrupt management functionality	O	O
Service call management functionality	X	X
System configuration management functionality	O	O
uC3 original / device driver functionality	X	O

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