



Embedded Software Solutions

SEGGER Microcontroller GmbH & Co. KG

Efficient and easy to use
middleware and development tools
for embedded and real-time systems

- Middleware -



June 15,
2009



Middleware

emWin

embOS

embOS/IP

emFile

emUSB

Licensing

SEGGER Microcontroller GmbH & Co. KG

Developer and producer of middleware, development and production tools for embedded systems



- Founded: 1992
- Headquarter: Hilden, Germany
- US Office: Westminster, MA
- Employees: 20
- Managing Director: Ivo Geilenbrügge
- CTO: Rolf Segger (founder)



Middleware

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Licensing

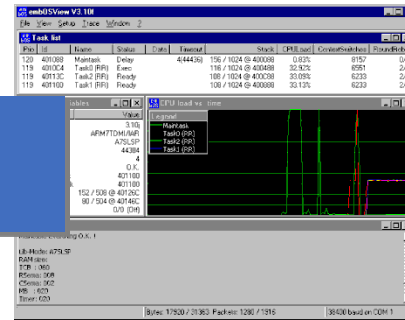


**GUI
(emWin)**

**USB (emUSB)
Host + Device**



**RTOS
(embOS)**



**TCP/IP Stack
(embOS/IP)**



**File System
(emFile)**



Middleware

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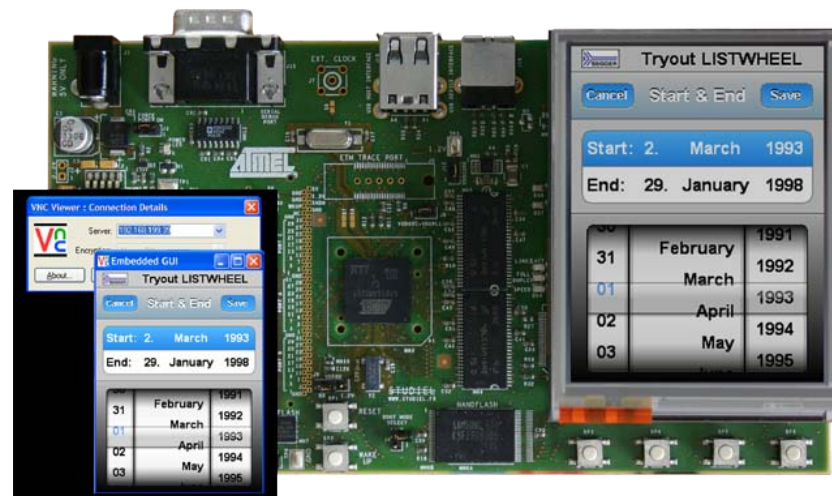
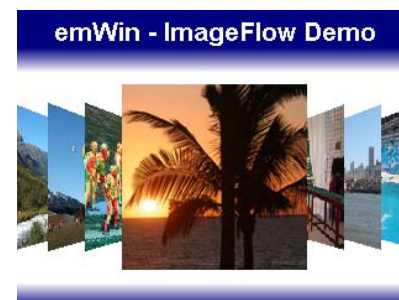
emFile

emUSB

Licensing

- Any CPU, any LCD, any LCD controller
- Very fast drawing routines
- Small footprint
- Unicode font support
- Font converter available
- Touch screen support
- Simulation included
- Virtual display support
- Multiple layer / multi display support
- Child windows
- Customizable Widgets

- Alpha blending
- Support for transparent windows
- PNG, JPEG support
- VNC Server available





Middleware

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Licensing

- Preemptive scheduling, Round-robin for tasks at same priority
- Unlimited number of tasks
- Zero interrupt latency time
- Small footprint: ROM <3 kB, RAM <1kB (Kernel only, ARM7)
- Very easy to use, No configuration needed
- Start application and projects (BSPs) for an easy start.
- Fully dynamic task creation / termination
- Fast context switch (independent of number of tasks)
- High resolution time measurement
- High precision per task profiling
- Real time kernel viewer (embOSView) included

Middleware

emWin

embOS

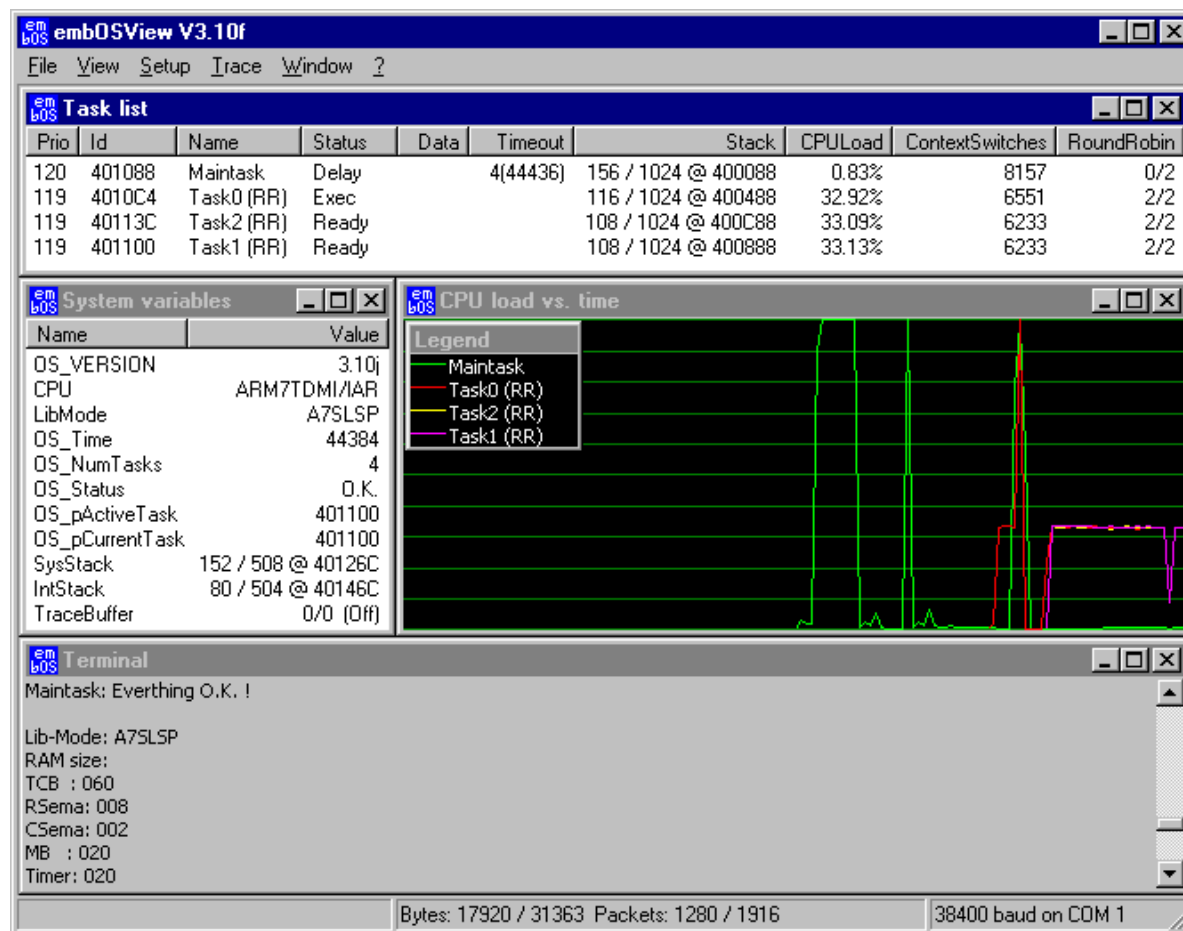
embOS/IP

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Licensing

- Included with embOS
- Real-time profiling
- via UART or JTAG (DCC)



embOSView V3.10f

File View Setup Trace Window ?

Task list

Prio	Id	Name	Status	Data	Timeout	Stack	CPUload	ContextSwitches	RoundRobin
120	401088	Maintask	Delay		4(44436)	156 / 1024 @ 400088	0.83%	8157	0/2
119	4010C4	Task0 (RR)	Exec			116 / 1024 @ 400488	32.92%	6551	2/2
119	40113C	Task2 (RR)	Ready			108 / 1024 @ 400C88	33.09%	6233	2/2
119	401100	Task1 (RR)	Ready			108 / 1024 @ 400888	33.13%	6233	2/2

System variables

Name	Value
OS_VERSION	3.10j
CPU	ARM7TDMI/AR
LibMode	A7SLSP
OS_Time	44384
OS_NumTasks	4
OS_Status	O.K.
OS_pActiveTask	401100
OS_pCurrentTask	401100
SysStack	152 / 508 @ 40126C
IntStack	80 / 504 @ 40146C
TraceBuffer	0/0 (Off)

CPU load vs. time

Legend:

- Maintask
- Task0 (RR)
- Task2 (RR)
- Task1 (RR)

Terminal

```
Maintask: Everthing O.K. !

Lib-Mode: A7SLSP
RAM size:
TCB : 060
RSema: 008
CSema: 002
MB : 020
Timer: 020
```

Bytes: 17920 / 31363 Packets: 1280 / 1916 38400 baud on COM 1



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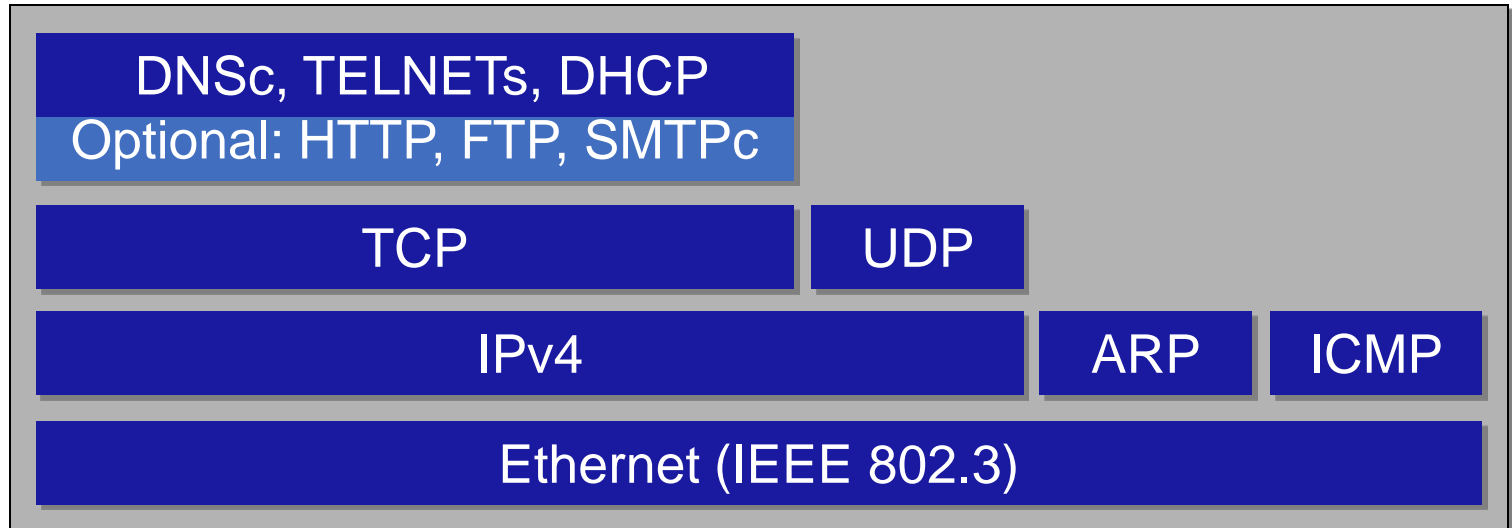
embOS/IP

emFile

emUSB

Licensing

- Standard sockets interface
- High performance
- Small footprint
- No configuration required
- Zero data copy for ultra fast performance
- Non-blocking versions of all functions
- Connections limited only by available memory
- Optional drivers for the most common devices are available
- Support for driver side (hardware) checksum computation



Middleware

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Licensing

- Journaling File system for FAT
 - Fail safe driver
 - Very small footprint, starting at 8KB ROM / 1,6 KB RAM for a system using RAM disk driver
 - Ready to use device drivers for: Media Cards (CF, SD, MMC), IDE and NOR/NAND flash
 - Ready to use sample projects
 - Highly configurable
 - Complete source code included
 - Any CPU can be used
 - Portable OS support
- Check Disk function
 - FAT 12, FAT 16 and FAT 32 support



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Licensing

- Control, bulk and interrupt transfers
- Currently supported classes: MSD, HID, printer
- USB-2.0-High-speed
- Runs out of the box
- Easy to use
- Small memory footprint
- Extended error recovery during device enumeration
- Hot plug and hot removal detection
- Dynamical attachment/removal of a USB Host Controller Driver





Middleware

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Licensing

Real-time Operating System

Application

API

API

API

Class Drivers

Direct Access

HID

MSD

Printer

USB Bus Driver API

USB Bus Driver Core

Hardware-independant

Hub Driver

USB Host Controller Driver

Hardware-specific

Hardware Abstraction Layer

emUSB Host Core

USB Host Controller

Middleware

emWin

embOS

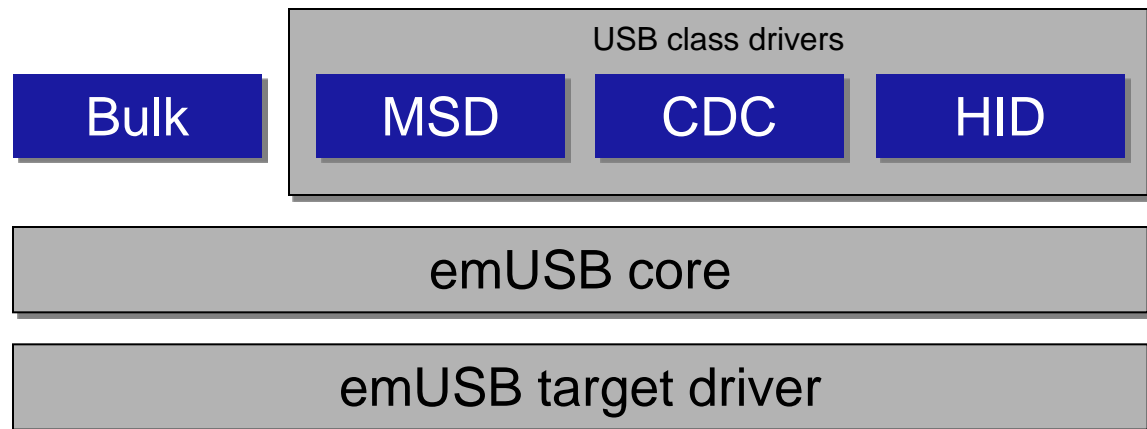
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Licensing

- Bulk communication component with Windows kernel mode driver available
- MSD Component available
- MSD-CDROM support
- MSD supports any type of storage incl. NAND
- CDC component available
- HID component available
- Supports USB 1.1/2.0 devices
- ISO/ANSI C source code
- Full/High speed support
- Target drivers for most popular USB devices
- Start/test applications supplied
- No royalties





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Licensing

- No royalties! Buyout possible
- embOS – developer license per seat
- emWin, emFile, emUSB, embOS/IP
 - product based licensing
 - Single product
 - Product family
 - Company buyout
- Support extension: 20% per year of 1st seat or product license

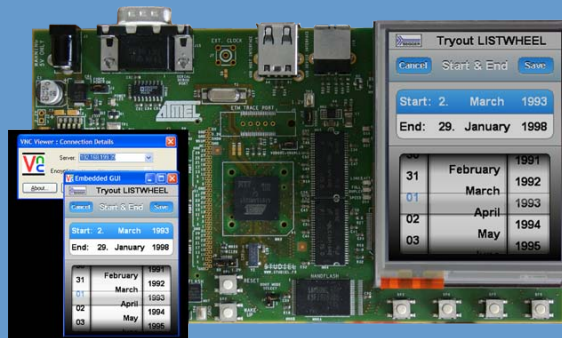
For more information, visit our web site at:

<http://www.microway.com.au>



Embedded Software Solutions

Thank you
for your attention



June 15,
2009