

# $\mu$ T-Engine/VR4131 Development Kit

An Open Development Platform for Embedded Systems



The CPU Board of the  $\mu$ T-Engine/VR4131 Development kit (in full-scale)

If you have any questions, please feel free to contact us.  
E-mail: [te-sales@personal-media.co.jp](mailto:te-sales@personal-media.co.jp)

|                  |  |
|------------------|--|
| CPU *            | NEC Electronics Vr4131 (MIPS II, 200MHz, 240MIPS)  |
| Flash Memory *   | 16 MB  |
| SDRAM *          | 32 MB  |
| Input/Output I/F | Compact Flash (CF) card, Serial, eTRON chip I/F, MultiMedia card (MMC), Expansion bus (PCI compatible), JTAG-ICE I/F |
| Others           | RTC  |
| Power Supply     | AC adapter   |
| Dimensions       | 60 x 85 mm (2.362 x 3.346 inch, excluding protrusions)   |

\* For implementations on the Vr4131BGA module.

## PRODUCT SPECIFICATION

### Supplied Software

#### For T-Engine target board

- PMC T-Monitor
- PMC T-Kernel  
T-Kernel/OS, T-Kernel/SM, T-Kernel/DS
- PMC T-Kernel Extension  
File management functions, CLI (Command Line Interpreter), PC card manager (bus driver), USB manager (bus driver)
- Device drivers: source code included  
Clock (RTC), Console (serial), System disk (CF, MMC Card)
- Sample applications: Source code included  
Simple Hard Disk Partitioner (hdpart), Disk Format (format), Compare Files (cmp), Disk Dump (dd), Simple Editor (ed)

#### Note:

- Customers are allowed to execute the above software on T-Engine/Vr4131 Development Kit only. If the above software are executed on another hardware (or embedded in a final product), a separate license is required. Please contact us for further information.
  - Among software shown above, the copyright to T-Kernel, the standard real-time OS for T-Engine, is held by the T-Engine Forum (<http://www.t-engine.org/>).
- The T-Kernel program, including source code, has been made open to the public by the T-Engine Forum. Anyone who agrees to the conditions set forth in the T-License is free to use it, including incorporation in end products. Note, however, that the T-Kernel offered by the T-Engine Forum lacks MMU support. The addition of MMU support is necessary in order to run the PMC T-Kernel Extension, for realizing file management and virtual memory, or in order to run other middleware such as the PMC T-Shell with its GUI functionality. Personal Media offers the PMC T-Kernel with these and other enhancements.

#### For development machine

- GNU development environment with source code GNU based development environment running on PC-based Linux and Windows (Cygwin), including GDB source debugger.
- GUI integrated development environment:  
Eclipse for PMC T-Kernel  
(Free download for the registered user)

### Main Package Details

- Hardware
- $\mu$ T-Engine specification CPU board with Vr4131 (LCD board not included)
- Power Supply Connector Board
- AC adapter
- RS232C (serial) cable
- CD-ROM  
T-Kernel and other software and various documentation
- Others  
Packing list, Software License Agreement, etc.

### Optionals

- **T-Engine Development Bench (acrylic board)**
- **Dedicated Connectors for Extension Bus of T-Engine/ $\mu$ T-Engine**
- **LAN Extension Board**  
Drivers and TCP/IP software are not included.

### System Requirements for GNU Development Environment

- PC/AT compatible Linux
  - Confirmed package: RedHat Linux 7.1 / 7.3 / 8.0 / 9.0, Red Hat Professional Workstation.
- Windows (Cygwin)
  - Confirmed package: Cygwin on Windows XP Professional

### Documentation

The following documentation are being supplied in electronic files:

- Development Kit User's Manual
- Library Manual
- Device Driver Manual
- T-Kernel Extension Manual
- GNU Development Environment Manual
- GNU Development Environment Manual (for Windows)
- T-Monitor Specification
- T-Kernel Specification
- T-Monitor/T-Kernel Implementation Specification
- Hardware User's Manual (circuit diagrams provided)

### Reference Books and Related Information

- T-Kernel Kumikomi Programing Kyokasho (A Practical Guide to T-Kernel Embedded Programing), Ken Sakamura (Ed.), 4200yen.
- T-Kernel Standard Handbook, Ken Sakamura (Ed.), 3800yen.  
\* English documents are included as PDF files on CD-ROM.
- T-Engine, T-Engine2, T-Engine3 (TRONWARE extra edition), 1600yen (each).
- TRONWARE Vol.1-109 (TRON bimonthly magazine, scheduled to be continued), 1200yen (ordinary issue).
- $\mu$ ITRON 4.0 Standard Guidebook, Ken Sakamura (Ed.), 3200yen.  
\* The above books are published by Personal Media Corporation in Japanese. Tax is not included.
- T-Engine Forum <http://www.t-engine.org/>
- TRON Project <http://www.tron.org/>
- Personal Media Corporation (T-Engine Solution Website)  
<http://www.t-engine4u.com/en/index.html>

## Personal Media Corporation

Koizumi Bldg. 1-29-1 Nishi-Gotanda, Shinagawa-ku, Tokyo 141-0031 Japan

E-mail: [te-sales@personal-media.co.jp](mailto:te-sales@personal-media.co.jp)

<http://www.personal-media.co.jp/>

Tel: +81-3-5759-8305

Fax: +81-3-5759-8306

- For details and price, please contact us.

- TRON is an abbreviation of "The Real-time Operating System Nucleus".

- eTRON is an abbreviation of "entity and economy TRON".

- TRON, eTRON, T-Engine,  $\mu$ T-Engine, T-Monitor, and T-Kernel are specified terms for computers, and are not product names.

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- Due to continued product upgrade or enhancement, the information in this document is subject to change without notice.

- T-Engine is an open, royalty-free specification, and not a commercial product.