

<http://www.t-engine.org/>

# T-Engine Forum

Admission Guide



**T-Engine**

# What is T-Engine?

## Key Points

- T-Engine is an open, standardized real-time operating system development environment for constructing a ubiquitous computing environment.
- T-Engine incorporates the eTRON security architecture which enables the development of application systems with strong network security.
- The T-Engine Project standardizes the hardware, a real-time operating system, and the object format specifications to enable the smooth distribution of middleware.
- By using the abundant middleware available for T-Engine, the development time and cost can be greatly reduced.



## Summary

The TRON Project has established the T-Engine Project in order to promote an open, real-time standardized development environment with the aim of achieving a ubiquitous computing environment where everything has a computer incorporated in it and is connected to a network. T-Engine offers an efficient development environment for the development of portable information devices, home electronic appliances and other network devices in a short period of time. The TRON Project's network security architecture, eTRON, has also been incorporated in T-Engine. This eTRON subarchitecture is intended to prevent tapping, falsification, and disguise of malicious users so that electronic information can be safely delivered to the other party through insecure network channels such as the Internet.

For efficient development, the hardware (T-Engine board) and real-time operating system (T-Kernel) are standardized and distribution of middleware are encouraged. Moreover, T-Engine is able to smooth cooperation among chip makers, hardware makers, software makers and system manufacturers, encourage mutual business dealings, reduce development time and cost, thus enabling high value added product offerings in a short period of time.

The combination of advanced semiconductors, packaging and software technologies in T-Engine makes it suitable and unrivaled for the development of advanced application products. Participation has also been declared by various hardware, software, and/or system development makers. The actual T-Engine products are scheduled to put on the market in the second quarter of 2002.

# Middleware Scheduled to Run on T-Engine

## ●File System

BTRON  
FAT12  
FAT16  
FAT32  
ISO9660  
UDF Ver.1.5 CDR  
DVD-ROM  
NOR  
NAND  
NetWork  
UNIX FS  
CDROM XA

## ●Device

IDE  
ATAPI  
SCSI  
PCMCIA-ATA  
CompactFlash (I/F)  
USB  
IrDA  
SIR  
FIR  
LAN

## ●Device Driver

HDD(IDE connected)  
FDD  
CD-ROM  
CD-R  
MO  
Touch panel  
Electronic Stylus  
PS/S Mouse  
Serial Mouse  
IR Remote Controller  
Keyboard  
Printer

## ●Memory Card

FlashROM driver  
Multimedia Card driver  
SD Memory driver  
SD Audio Manager  
SD Sound Manager  
SD Video Manager  
SD Image Manager  
Memory Stick driver

## ●USB

USB Host  
USB Host Function  
MIDI driver  
Audio driver

## ●Communication

TCP/IP (ITRON API)  
TCP/IP (BSD)  
Telnet  
FTP  
TFTP  
SMTP  
SNMP  
POP3

BOOTP  
HTTP  
DNS  
PPP  
V.42BIS  
IEEE1394  
TCP/IP Protocol Stack  
Socket I/F  
Bluetooth  
RF  
IEEE802.11b

## ●Bluetooth

Serial port profile  
MIDI profile

## ●GUI Library

Display Primitive  
Event Management  
Window/Panel Management  
Parts Management  
Databox Management

## ●Font

Outline Font manager  
Grayscale Outline Font Manager

## ●Chinese Character(Kanji) Search Engine

Kanji Element Search  
Kanji-variant Search  
Symbol Character Search

## ●Digital Signature

Elliptic Curve Cryptography  
Digital Watermark/Invisibility

## ●JPEG

JPEG(Exif Ver2.0 compliant)  
Motion JPEG

## ●Still Image - Compression/Extension

JBIG(ITUT-TT.85 compliant)  
MH/MR/MMR  
PNG

## ●Motion Picture

MPEG-4(Extension)  
H.323 Protocol

## ●Graphics

Compact 3D-Graphics  
Draw Library

## ●Voice CODEC

G.711  
G.726  
G.729A  
G.723.1

## ●Speech Recognition

Word/Sequential Number  
Word Spot  
Single Sound Recognition  
Japanese Speech Recognition

## ●Speech Synthesis

Emotion Expression

## ●Sound

MP3 Decoder  
MP3 Encoder  
AAC Decoder  
AAC Encode  
TwinVQ  
Dolby-Digital  
ATRAC

## ●Sound/Tone Generator

Sound Driver of Mobile Phone  
Sound Driver of GM  
Sound Driver of XG  
FM Voice Parameter Set

## ●Sound/Sequencer

SMAF Sequencer  
SMF Sequencer  
XF Sequencer

## ●Sound/Application Engine

Auto Arranger  
Style Converter  
Automatic Music Composition  
Musical Score Presentation Engine  
3D acoustics  
Speech-speed Conversion

## ●Internet Application

Mailer software  
Browser software  
Http Server

## ●Utility

Image Format Converter  
Character Code Conversion  
handwriting recognition  
Software Keyboard

## ●Electronic Dictionary and Dataware

Chokanji Kojien (Kojien: Famous Japanese Dictionary)  
Chokanji Kokijiten (Kokijiten: Old Chinese Kanji Dictionary)  
Chokanji Tompa Font (Tompa: Minority Language in China)

## ●Misc.

Kana-to-Kanji Conversion Engine  
Visual Programming Language Microscript

# Outline of T-Engine Forum

## Objectives

- T-Engine Forum plays active part in achieving following its goals.
1. Carrying out the research and development, standardization, and promotion of T-Engine architecture, proposed by Prof. Ken Sakamura, the University of Tokyo, as the standard development platform for real-time embedded systems, and coordinating related organs.
  2. Building a ubiquitous computing environment using T-Engine.
  3. To conduct activities for the Ubiquitous ID Center.

## Chairman

Ken Sakamura  
TRON Project Leader  
Professor of the University of Tokyo  
Director of YRP Ubiquitous Networking Laboratory

## Activities

The followings are main activities of the Forum, including a quarterly meeting with all forum members, and a working group meeting held at any time related to some specific topics.

1. To research and develop the T-Engine architecture and carry out survey studies for its standardization<sup>(\*)</sup>  
(\*1) Research, development and drafting of T-Engine open specification are included.
2. To spread and promote T-Engine architecture
3. To collect, exchange, and provide information concerning the construction of a ubiquitous computing environment
4. To coordinate related organs concerned with the ubiquitous computing environment
5. To send information about T-Engine architecture using Web pages, etc.
6. To achieve a distribution platform for T-Engine middleware using E-commerce
7. And other operations necessary to achieve the objectives of the Forum

The Forum currently has the following working groups.

### A level members only working groups

#### Hardware WG

The Hardware WG carries out activities concerning the hardware specifications of the T-Engine family, namely T-Engine (Standard T-Engine),  $\mu$ T-Engine (micro T-Engine), nT-Engine (nano T-Engine) and pT-Engine (pico T-Engine).

#### Kernel and Development Environment WG

The Kernel and Development Environment WG carries out activities concerning the software specification of T-monitor, which is the basic monitor running on the T-Engine family, and T-kernel, the basic kernel, as well as the development environment of application software and middleware that run on T-Kernel.

#### Middleware WG

The Middleware WG carries out activities concerning the middleware that runs on T-Kernel.

#### Java WG

The Java WG carries out activities concerning the Java language environment, picked from middlewares specially.

#### Ubiquitous Communicator WG

The Ubiquitous Communicator WG carries out activities concerning the human machine interface of devices such as PDAs, which run on the T-Engine/T-Kernel, and are equipped with communication features that can communicate with a ubiquitous environment.

#### T-Linux WG

The T-Linux WG carries out activities concerning T-Linux, which runs Real-Time Linux on T-Kernel for T-Engine platforms.

#### Cellular Phone WG

The Cellular Phone WG carries out activities concerning the application of T-Engine architecture to cellular phones.

#### Ubiquitous Technology WG

The Ubiquitous Technology WG carries out activities concerning the infrastructure and device technology development for Ubiquitous IDs.

### e level members only working groups

#### Ubiquitous ID Application WG

Ubiquitous ID Application WG carries out activities concerning the use of ubiquitous IDs and eTRON.

## Membership

Membership consists of corporate members who undertake to respect and support the aforesaid objectives of the T-Engine Forum, and who have submitted the membership application form. Memberships are divided into three categories: A level, B level and e level.

#### A level members :

They are able to participate in the decision-making of the T-Kernel specification for T-Engine. They are also able to develop the technologies and determine the specifications necessary for implementing Ubiquitous IDs.

#### B level members :

They are the user members who use T-Kernel and/or T-Engine for product development. can be purchased before public release.

#### e level members:

They carry out activities concerning the use of Ubiquitous IDs and eTRON.

## Membership Fees

#### A level member :

1,000,000 yen/year for one share  
(Please pay one or more than one share.)

#### B level member :

100,000 yen/year for one share  
(Please pay one or more than one share.)

#### e level member :

100,000 yen/year each (for one or more units)

\*A level members can automatically become e level members without additional payment. All A level members who hold three or more A level memberships shall be eligible to become Executive Committee Members of the T-Engine Forum.

# T-Engine Forum Secretariat

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