T-Engine Hardware Specification

Ver. 1.01.02

May 2008

T-Engine Forum

http://www.t-engine.org/
Table of Contents

1. Overview of T-Engine ........................................................................................................................................... 4
   1.1 What is T-Engine? ........................................................................................................................................... 4
   1.2 Entire Configuration of T-Engine System ....................................................................................................... 4
   1.3 Scope of Application of Specification ............................................................................................................. 5
2. Basic Configuration of CPU Board ....................................................................................................................... 6
3. Implementation Specifications of CPU Board ...................................................................................................... 8
   3.1 Implementation Specifications of CPU Board A side ..................................................................................... 8
   3.2 Implementation Specifications of CPU Board B side ...................................................................................... 9
4. Interface Specifications of CPU Board ............................................................................................................. 10
   4.1 Expansion Bus Interface Specification .......................................................................................................... 10
   4.2 Serial Interface Specification ....................................................................................................................... 11
   4.3 PC Card Interface Specification .................................................................................................................... 12
   4.4 LCD/Touch Panel Interface Specification ................................................................................................... 12
   4.5 eTRON SIM Card Interface Specification .................................................................................................. 13
   4.6 Interface Specifications of USB Host ........................................................................................................... 15
   4.7 Audio Input/output Interface Specification ................................................................................................ 15
   4.8 Power supply Interface Specification ........................................................................................................ 16
5. Specifications for Power Control Function of T-Engine Hardware ........................................................................ 17
   5.1 System States and their Names .................................................................................................................... 17
   5.2 Specifications for External Power Supply Control Function ....................................................................... 17
   5.3 Functions to handle power blackout .......................................................................................................... 18
6. Regulation and Operation of T-Engine Hardware ................................................................................................... 19
   6.1 About T-Engine Logo Marking .................................................................................................................. 19
   6.2 Documentation .......................................................................................................................................... 19
   6.3 Accreditation Standard of T-Engine Hardware ............................................................................................. 20
7. Expansion Board Standard .................................................................................................................................. 21
   7.1 Size of Expansion Board Plate .................................................................................................................... 21
   7.2 Restricted Area for Expansion Board Implementation .................................................................................. 22
   7.3 Stacking Specification for the Expansion Board .......................................................................................... 22
<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Content of update</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.01.01</td>
<td>2005.7</td>
<td>First Edited</td>
</tr>
</tbody>
</table>
| 01.01.02| 2008.5 | - Change the model name of recommended parts for expansion bus connector, PC card connector, USB connector, and eTRON connector to RoHS-compliant parts.  
   - Change the model name of recommended parts for serial connector and audio input/output connector.  
   - Added comments to the recommended interface for LCD/touch panel.  
   - Add 16-pin connector to serial connector specification. |
1. Overview of T-Engine

1.1 What is T-Engine?

(1) Features

- Open platform for real-time system of next generation and ubiquitous system
- CPU agnostic
- Common physical form factor, and common interface
- T-Kernel real-time OS support

(2) Applied Target for T-Engine

- As a reference development platform for portable information equipments (such as PDA, e-book, and next-generation cellular phone), Internet information terminal, SetTopBox, controller for information appliances, and in-vehicle information terminal, etc.
- As a training board for hardware and real-time programming
- As a general-purpose control board

(3) Merits of T-Engine Application

- Allows dramatic shortening of development period due to accumulation and distribution of middleware, and distribution of peripheral Expansion board.

1.2 Entire Configuration of T-Engine System

T-Engine consists of LCD board, Expansion board, etc. around CPU board depending on purposes, and enables constructing evaluation systems for various uses by combinations. Entire configuration layout of T-Engine system is shown in the figure below.
(1) CPU Board
   The CPU board is the standard board that allows stand-alone operation. It consists of 32bit CPU, memory, RTC, power supply control function, etc. It also has various interfaces such as serial port, PC Card, Audio CODEC, USB Host, eTRON card, LCD, expansion bus connector, etc. on the board.

(2) LCD Board
   LCD board consists of display devices for PDA, electronic book, cellular-phone and others, and any user input device such as touch panel, key input and others.

(3) Expansion Board
   Consists of network functions such as Ethernet, Bluetooth, and IEEE1394 plus various extended functions such as extended memory and mass-storage devices.

(4) Debug Board
   Consists of debugging function for debug board such as JTAG interface and writing function to flash memory of a CPU board.

1.3 Scope of Application of Specification

   These specifications shall apply to regulations of the following specifications.

   (1) CPU board specifications
       Physical form factor specification and electronic specification regarding CPU board

   (2) Expansion Board
       Physical form factor specification and electronic specification regarding Expansion board

   (3) Documentation
       Regulations for documents on T-Engine hardware
2. Basic Configuration of CPU Board

(1) CPU
   Basic structure: Built-in MMU (Memory Management Unit), 32bit or more CPU

(2) RAM
   Appropriate volume of storage

(3) Flash memory
   Appropriate volume of storage

(4) eTRON SIM card interface
   SIM card connector interface (3.3V) that complies with ISO7816 mounted
   1 Slot: (UICC SIM Card connector mounted)
   Complies with ETSI TS102221 V4.1.0

(5) LCD/Touch Panel Interface
   1ch mounted (any touch panel is acceptable)

(6) Real-time clock (RTC)
   Must be equipped with 1ch calendar (Backup with battery or high-volume capacitor is recommended.)

(7) PC Card Interface
   Complies with PCMCIA Standard Release 2.1/JEIDA 4.2
   TYPE II/I Slot x 1 mounted
   Compliance with CardBus is optional

   (Refer to: http://www.pcmcia.org/pccardstandard.htm#1)

(8) USB Host Interface
   Complies with USB Specification Rev1.1
   Series "A" receptacle x 1 mounted

(9) Serial Port Interface
   Asynchronous serial communication port (by dedicated cable connection) 1ch: 115.2kbps or faster
(10) Switch
   The following functions are equipped with minimum rate of 3bits
   • Turn on/off power
   • NMI
   • Reset

(11) Audio Input/output Interface
   Stereo headphone output: 1ch
   Headset input/output: earphone: 1ch, microphone: 1ch

(12) Expansion Bus Interface
   Dedicated connector for T-Engine standard extended bus 1 slot (140-pin)
   Must comply with "Expansion bus connector Common Specifications"

(13) Power connector (DC jack)
   Connector complies with EIAJ RC-5320A
3. Implementation Specifications of CPU Board

External dimensions of CPU board, implementing positions of various switches and various connectors are as follows.

- Board size: 120mm x 75mm
- Board thickness: 1.6mm
- Tolerance of connector position shall be ±2mm.
- Tolerance of hole position shall be ±0.3mm.

3.1 Implementation Specifications of CPU Board A side
3.2 Implementation Specifications of CPU Board B side

Unit: mm
4. Interface Specifications of CPU Board

4.1 Expansion Bus Interface Specification

CPU board and Expansion board are connected with 140-pin expansion bus connector. The signal in expansion bus is connected by the signals of CPU bus (data bus, address bus, and various control signals) via bus buffer.

133-136 pins shall be VBAT (voltage: 5.0V±5% input), and 137-140 pins shall be GND as the common specification of T-Engine. Other bus signal pins shall be voluntarily allocated to each CPU.

* The above XXXX is 4-digit number called a “keying no.” and represents a classification code of error insertion prevention key to T-Engine extension bus connector.

Keying allocation of the extension bus connector shall be in accordance with the following operational procedure.

Allocated keying will be released on the members-only page of the T-Engine forum website (http://www.t-engine.org/).

Manufacturers, which develop new board, shall refer to this information, and shall use the existing keying if it is available.

Approval by the T-Engine Forum is required for the new keying allocation. At this point, the new keying allocation may be disapproved if bus specification is determined to be compatible with existing keying.
4.2 Serial Interface Specification

Used for the general-purpose serial I/O or console port for debugging.

(1) Connector specification

15-pin connector or 16-pin connector

Recommended connector:

- RMC-EA15MY-OM15-MC1 (by Honda Communications)
- LX60-16S (by Hirose Electric) or other

(2) Pin Assignment

<table>
<thead>
<tr>
<th>15-pin</th>
<th>16-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin No.</td>
<td>Signal name</td>
</tr>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>TxD</td>
</tr>
<tr>
<td>3</td>
<td>RxD</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>RTS</td>
</tr>
<tr>
<td>6</td>
<td>CTS</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>Reserved</td>
</tr>
<tr>
<td>9</td>
<td>Reserved</td>
</tr>
<tr>
<td>10</td>
<td>Reserved</td>
</tr>
<tr>
<td>11</td>
<td>Reserved</td>
</tr>
<tr>
<td>12</td>
<td>Reserved</td>
</tr>
<tr>
<td>13</td>
<td>Reserved</td>
</tr>
<tr>
<td>14</td>
<td>Reserved</td>
</tr>
<tr>
<td>15</td>
<td>Reserved</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3 PC Card Interface Specification

PC card controller and connector shall be Type II, 1 slot 68-pin connector complied with the PCMCIA standard. Also available for the 5V/3.3V card.

(1) Connector specification

68-pin connector

Recommended connector:

- 31-5027-068-130-833+ (by KYOCERA ELCO) or other
4.4 LCD/Touch Panel Interface Specification

1ch is supplied for LCD/touch panel input interface (any touch panel is acceptable if it uses 1ch input). The following LCD and touch panel interface are recommended.

(1) Connector specification

![CN1: LCD interface connector]  
Model name: FH12-40S-0.5SH  
Maker: Hirose Electric Co., LTD.  

![CN2: LCD interface connector]  
Model name: FH12-24S-0.5SH  
Maker: Hirose Electric Co., LTD.

(2) Pin Assignment

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>I/O</th>
<th>Remarks</th>
<th>Pin No.</th>
<th>Signal name</th>
<th>I/O</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VBAT</td>
<td>-</td>
<td>Power supply</td>
<td>21</td>
<td>LCD13</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>2</td>
<td>VBAT</td>
<td>-</td>
<td>Power supply</td>
<td>22</td>
<td>LCD14</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>3</td>
<td>VBAT</td>
<td>-</td>
<td>Power supply</td>
<td>23</td>
<td>LCD15</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>4</td>
<td>VBAT</td>
<td>-</td>
<td>Power supply</td>
<td>24</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
<td>-</td>
<td>unused</td>
<td>25</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>6</td>
<td>LCD0</td>
<td>OUT</td>
<td>LCDC</td>
<td>26</td>
<td>CL1</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>7</td>
<td>LCD1</td>
<td>OUT</td>
<td>LCDC</td>
<td>27</td>
<td>CL2</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>8</td>
<td>LCD2</td>
<td>OUT</td>
<td>LCDC</td>
<td>28</td>
<td>DON</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>9</td>
<td>LCD3</td>
<td>OUT</td>
<td>LCDC</td>
<td>29</td>
<td>M_DISP</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>10</td>
<td>LCD4</td>
<td>OUT</td>
<td>LCDC</td>
<td>30</td>
<td>FLM</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>11</td>
<td>LCD5</td>
<td>OUT</td>
<td>LCDC</td>
<td>31</td>
<td>VEPWC</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>12</td>
<td>LCD6</td>
<td>OUT</td>
<td>LCDC</td>
<td>32</td>
<td>VCPWC</td>
<td>OUT</td>
<td>LCDC</td>
</tr>
<tr>
<td>13</td>
<td>LCD7</td>
<td>OUT</td>
<td>LCDC</td>
<td>33</td>
<td>NC</td>
<td>-</td>
<td>unused</td>
</tr>
<tr>
<td>14</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
<td>34</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>15</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
<td>35</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>16</td>
<td>LCD8</td>
<td>OUT</td>
<td>LCDC</td>
<td>36</td>
<td>IR_IN</td>
<td>IN</td>
<td>Remote controller</td>
</tr>
<tr>
<td>17</td>
<td>LCD9</td>
<td>OUT</td>
<td>LCDC</td>
<td>37</td>
<td>3.3V</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>18</td>
<td>LCD10</td>
<td>OUT</td>
<td>LCDC</td>
<td>38</td>
<td>3.3V</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>19</td>
<td>LCD11</td>
<td>OUT</td>
<td>LCDC</td>
<td>39</td>
<td>3.3V</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>20</td>
<td>LCD12</td>
<td>OUT</td>
<td>LCDC</td>
<td>40</td>
<td>3.3V</td>
<td>-</td>
<td>Power supply</td>
</tr>
</tbody>
</table>

* Leave NC terminals open on the circuit board.
## Pin Assignment of CN2

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>I/O</th>
<th>Remarks</th>
<th>Pin No.</th>
<th>Signal name</th>
<th>I/O</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
<td>13</td>
<td>~PAD_CS</td>
<td>OUT</td>
<td>PAD I/F</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
<td>14</td>
<td>~PAD_IRQ</td>
<td>IN</td>
<td>PAD I/F</td>
</tr>
<tr>
<td>3</td>
<td>KEY_IN0</td>
<td>IN</td>
<td>KEY I/F</td>
<td>15</td>
<td>PAD_DIN</td>
<td>OUT</td>
<td>PAD I/F</td>
</tr>
<tr>
<td>4</td>
<td>KEY_IN1</td>
<td>IN</td>
<td>KEY I/F</td>
<td>16</td>
<td>PAD_DOUT</td>
<td>IN</td>
<td>PAD I/F</td>
</tr>
<tr>
<td>5</td>
<td>KEY_IN2</td>
<td>IN</td>
<td>KEY I/F</td>
<td>17</td>
<td>PAD_DCLK</td>
<td>OUT</td>
<td>PAD I/F</td>
</tr>
<tr>
<td>6</td>
<td>KEY_IN3</td>
<td>IN</td>
<td>KEY I/F</td>
<td>18</td>
<td>~RESET</td>
<td>OUT</td>
<td>Reset</td>
</tr>
<tr>
<td>7</td>
<td>KEY_IN4</td>
<td>IN</td>
<td>KEY I/F</td>
<td>19</td>
<td>~LCD_Fلون</td>
<td>OUT</td>
<td>LCD power supply</td>
</tr>
<tr>
<td>8</td>
<td>KEY_OUT0</td>
<td>OUT</td>
<td>KEY I/F</td>
<td>20</td>
<td>~LCD_PWRDY</td>
<td>IN</td>
<td>LCD power supply</td>
</tr>
<tr>
<td>9</td>
<td>KEY_OUT1</td>
<td>OUT</td>
<td>KEY I/F</td>
<td>21</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>10</td>
<td>KEY_OUT2</td>
<td>OUT</td>
<td>KEY I/F</td>
<td>22</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
<td>23</td>
<td>3.3VSB</td>
<td>-</td>
<td>Power supply</td>
</tr>
<tr>
<td>12</td>
<td>GND</td>
<td>-</td>
<td>Power supply</td>
<td>24</td>
<td>3.3VSB</td>
<td>-</td>
<td>Power supply</td>
</tr>
</tbody>
</table>

### 4.5 eTRON SIM Card Interface Specification

For specifications and electrical characteristics of connector, must comply with ISO7816-1-3. It is mandatory that the protocol supports T=0 and desirable that it support T=1.

eTRON card is equipped with SIM card connector complied with "VICC-Terminal Interface" of ETSI TS 102221 V4.1.0.

1. **Connector specification**
   - 8-pin connector
   - Recommended connector: 00-5036-008-110-862+ (KYOCERA ELCO) or other

2. **Pin Assignment**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Input/output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vcc</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Reset</td>
<td>I</td>
</tr>
<tr>
<td>3</td>
<td>Clock</td>
<td>I</td>
</tr>
<tr>
<td>4</td>
<td>Reserved</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Vpp</td>
<td>NC</td>
</tr>
<tr>
<td>7</td>
<td>I/O</td>
<td>I/O</td>
</tr>
<tr>
<td>8</td>
<td>Reserved</td>
<td>-</td>
</tr>
</tbody>
</table>

3. **Supplied clock**
   - 3.5712MHz
   - Duty: 50±10%
(4) Connection Guidelines

- About Power Pin Control
  Since presence of power supply of Vcc determines whether the interface is contact or noncontact, it must have the Vcc power supply shut down function.

- 4 and 8 Pins handling
  When eTRON card is set to the noncontact interface, the terminal is of antenna connection, therefore, connect these pins to independent through-holes around the SIM card connector.

- About Power Supply Sequence
  Refer to the following figure

![Waveform Diagram](image-url)
4.6 Interface Specifications of USB Host

Interface complied with USB Host Ver1.1 (12M/1.5Mbps) mounted. Arrange so that the power can be supplied to USB device if the power supply has sufficient capacity such when connecting to the external power supply.

(1) Connector specification
4-pin connector
Recommended connector: 
20-5041-004-100-834+ (by KYOCERA ELCO) or other

(2) Pin Assignment

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Input/output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vcc</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>-Data</td>
<td>I/O</td>
</tr>
<tr>
<td>3</td>
<td>+Data</td>
<td>I/O</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>-</td>
</tr>
</tbody>
</table>

4.7 Audio Input/output Interface Specification

Equipped with sub mini jack for Audio I/O. Standard shall be applicable to the headset plug that can be connected to cellular telephone or other device. (φ2.5mm mini jack)

(1) Connector specification
3-pin connector
Recommended connector:
HSJ1602-010011 (by Hoshiden)
STX-2550-5N-TR (by KYCON) or other companies
4.8 Power supply Interface Specification

Power shall be supplied to the basic CPU board through the power supply connector or VBAT pin of the expansion bus connector.

(1) Connector specification
EIAJ RC5320A
Connector for voltage class 2 (3.15V<vin<6.3V)
Outer: Minus          Inner: Plus

(2) Direction of Power Supply
VBAT pin of the expansion bus connector shall supply the power from the Expansion board to the CPU board. Other power pins shall supply the power from the CPU board to the Expansion board. The following diode is recommended to be inserted into the power line.
5. Specifications for Power Control Function of T-Engine Hardware

5.1 System States and their Names

Follow the naming convention shown below when implementing the power management function to T-Engine.

Name: P0
State: Main power OFF

Name: P1
State: Main power ON, CPU sleep (startup by interruption available), no memory retained, peripheral modules optional

Name: P2
State: Main power ON, CPU sleep (startup by interruption available), memory retained, peripheral modules optional

Name: P3
State: Main power ON, CPU activated, memory retained, peripheral modules optional

More detailed naming convention shall be specified when CPU of P3 is activated. The lowest clock frequency that the CPU can set shall be "1" and the highest frequency shall be the maximum value.

Ex)  Low speed: P3-1
     Middle speed: P3-2
     High speed: P3-3

5.2 Specifications for External Power Supply Control Function

(1) Power ON Control
Power ON control supports following 2 types.
  ● Power ON by power activation
  ● Power ON by power switch

  • Power ON by power activation and that by power switch can be mode switched by DIP switch or other methods.
  • In addition, it is recommended to support the power ON control by power ON control signal on the expansion bus.
  • The power ON by power ON control signal on the expansion bus shall be controlled by inputting the power ON control signal from the Expansion board with WakeOnLAN function.

(2) Power OFF Control
  ● Power OFF by power switch (controlled by software)
5.3 Functions to handle power blackout

It is recommended that T-Engine has the following to handle power blackout.

(1) Power failure detection by backup power supply (UPS, battery, etc.)
   Select one of following three solutions to realize the power failure detection by backup power supply.

   - Installation of a signal input pin for power failure notification on the CPU board
   - Introduction of battery voltage drop detection function (in case that battery is equipped.)
   - Installation of a signal input pin for power failure notification on the Expansion board to notify the CPU board of power failure

(2) Power failure detection function using nonvolatile memory, RTC internal register, or other methods
   However, the data backup function (such as mounting nonvolatile memory) shall be optional.
6. Regulation and Operation of T-Engine Hardware

6.1 About T-Engine Logo Marking

- Operational Procedures
  The T-Engine logo marking shall be permitted for the board approved by the executive meeting of the forum. However, logo marking shall be at each vendor's option.

- Logo Marking Methods
  Either silk screening, etching, sticker, or other method is available

- Place to Mark
  anywhere

6.2 Documentation

The following contents shall be described in the specifications on each implementation of T-Engine hardware and user's manual.

(1) CPU
  Detailed specification: Availability of documents describing the CPU detailed specification or the CPU specification

(2) RAM
  Arbitrary

(3) Flash memory
  Arbitrary

(4) Specifications for Power Supply Control Function
  Detailed items

(5) Memory Map
  Detailed items

(6) Specifications for Register Function
  Detailed items
(7) Expansion Bus I/F Specifications
  Following specifications:
  • Timing specification
  • Pin allocation specification
  • Available current
  • Available voltage
  • Bus clock
  • Bus way
  • CPU allocation space
  • Interrupt
  • Others (DMA, etc.)

(8) I/F Specifications for Various Peripheral Devices
  Describe the specifications of I/F peripheral devices on board, or explain how to obtain the
  documentation in which the specifications are described, etc.

6.3 Accreditation Standard of T-Engine Hardware

  The procedure to develop the T-Engine and obtain the accreditation of the T-Engine Forum is as follows.

(1) Product Development Start
  Acquire the registration cord by submitting the registration application sheet accredited by T-Engine to
  the T-Engine Forum.

(2) Product Completion
  Apply the request for T-Engine accreditation to the office.

(3) Examination
  Development manufacturers shall submit the following target and seek the review.

  1. Main body of T-Engine (attachment such as power supply included)
  2. Specification
  3. Circuit diagram
  4. Sample program that allows checking each function
  5. Check list

(4) Approval
  Formal registration is completed once when the T-Engine Forum confirmed that no problem is found
  through the above evaluation and hardware is in accordance with T-Engine hardware specification. Then,
  Product name, etc., will be released in the members-only page of the T-Engine Forum website.
7. Expansion board Standard

7.1 Size of Expansion board Plate

Size of the Expansion board is shown in the figure below. The board shall be able to extend by 30mm pitch in the longitudinal direction. The 2.3mm fixing hole in diameter shall be established at a distance of 3mm from the edge of the board.

Size of the following Expansion board shall also be specified to extend it to the outer side of the T-Engine CPU board. In case of the external Expansion board, when extending the part of board that bites into the CPU board, the extended length shall be identical to the board size specification aforementioned.
7.2 Restricted Area for Expansion board Implementation

The φ6mm mounting hole for external Expansion board and the 6mm wide around its adjacent hole shall be the restricted area for implementation.

7.3 Stacking Specification for the Expansion board

Stacking Specification for the T-Engine Expansion board is shown below. The interval between boards shall be 10mm.
T-Engine Hardware Specification (Ver.1.01.02)

TEF010-S001-01.01.02/en

May 2008
Copyright © 2005-2008 by T-Engine Forum.

T-Engine Forum owns the copyright of this specification.
Permission of T-Engine Forum is necessary for copying, republishing, posting on servers, or redistribution to lists of the contents of this specification.
The contents written in this specification may be changed without a prior notice for improvement or other reasons in the future.

About this specification, please refer to follows;

T-Engine Forum
The 28th Kowa Building 2-20-1 Nishi-gotanda
Shinagawa-Ward Tokyo 141-0031 Japan
TEL : +81-3-5437-0572  FAX : +81-3-5437-2399
E-mail : office@t-engine.org