 SPD Software Package for IP TV Phones

This is a package that incorporates a variety of application software to implement the basic functions of IP TV phones such as VoIP control, audio/video processing, and communication protocols. The new product will offer a platform solution for the development of IP TV phones when used with a reference board and Linux OS.

* SPD: Solution Package for Development

**Background**

As broadband networking is becoming widely diffused, the utilization of IP phones is increasing in both homes and offices. In response to this trend, IP TV phones that feature video functions added to IP phones have started to be introduced on the market. In the development of IP TV phones, this trend has created a need for increased development efficiency for systems configured with complicated technologies for the compression, decompression, and transfer of video and audio as well as for development time that is reduced even further. To meet this demand, FUJITSU is developing the SPD Software Package as a second round of the “FR-V Solution Package for IP TV Phones” that can be used for the system development of IP TV phones. The new product will be introduced in March 2005.

**Product Description**

This product can be used as a platform for the development of IP TV phones when utilized with the optionally available reference board configured with an FR-V processor MB93461 and the Linux OS. This development platform allows evaluation and GUI customization by changing the video codec and/or communication protocols. Utilization of this platform enables customers to efficiently develop IP TV phone systems.

The development and introduction of this product is based on a combination of FUJITSU’s FR-V processor technology and FR-V middleware, a wealth of experimentation in the development of IP phones by Beijing UD Technology Co., Ltd.*1 in China, and the powerful system integration technology of FUJITSU MICROELECTRONICS (SHANGHAI) Co., Ltd. Fig.1 presents an outline of the SPD system for IP TV phones.

**Product Features**

Packaged basic functions necessary to IP TV phones

In addition to VoIP control, audio and video processing, and other basic functions, on-hook and off-hook control, dial tone and ring-back tone, and other telephone-specific basic control

* Photo 1 Reference Board of the SPD for IP TV phones
functions are also incorporated. These serve to increase the system development efficiency and reduce the development time.

■ Easy-to-change software modules available
Evaluation can be performed by changing the video codec (H.263 and MPEG-4 SP) and/or communication protocols (SIP and H.323).

■ Quick response to any added functions or changed protocols
The software configuration is based on FUJITSU’s proprietary API specifications common to all SPDs; these allow software export/import and interactive distribution between SPDs and/or reference boards.

■ Crisp video images due to the FR-V technology
High-quality video images are realized due to the combination of the FR-V processor and middleware.

Outline of Specifications

■ Basic functions
  * Processor: MB93461

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Table 1 Product Configuration

<table>
<thead>
<tr>
<th>Type</th>
<th>Item</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middleware</td>
<td>• JPEG codec</td>
<td>Evaluation version (provided in object code)</td>
</tr>
<tr>
<td></td>
<td>• MPEG-4 Visual SP codec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• H.263 codec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2D graphics library</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• RTP/RTCP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SIP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• H.323 codec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• BMP</td>
<td></td>
</tr>
<tr>
<td>Reference applications</td>
<td>GUI, key operation, menu</td>
<td>Sample applications without a warrant (provided in source code)</td>
</tr>
<tr>
<td>Documents</td>
<td>Users guide</td>
<td>—</td>
</tr>
<tr>
<td>Customer support</td>
<td>Basic support package (technical support for 180 days)</td>
<td>Technical support for 180 days (answering questions, etc. for SPD software package for IP TV phones)</td>
</tr>
<tr>
<td>Device driver</td>
<td>Driver of device incorporated in a reference board</td>
<td>Provided in source code</td>
</tr>
</tbody>
</table>

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For the operation of this product, it is necessary to purchase a reference board incorporating an FR-V processor, which will soon be released separately.

For the operation of this product, μC/OS for FR-V provided by Red Hat, Inc. is required as the OS. μC/OS for FR-V and its development environment (GNUPro tool) are distributed to the customers contracting the support service by Red Hat, Inc. Also, evaluation versions of the products are available. Please refer to Red Hat's web site for details.

http://www.jp.redhat.com/embedded/
E-mail: embedded-ja@redhat.com
• Audio codec: G.711a/μ-law, G.723, G.726, G.729
• Video codec: MPEG-4 SP/H.263
  Image size: QCIF (128×96 pixels) to CIF (352×288 pixels)
  Number of display frames: 1 to 30fps
  Transmission speed: 8Kbps to 64Kbps (H.263)
  8Kbps to 1Mbps (MPEG-4 SP)
• Display: Picture-in-picture
• Communication protocols: SIP, H.323, RTP/RTCP
• Video output: LCD/Analog video output
  (720×480, 704×576 pixels)
• Video input: CCD/Analog video input
  (720×480, 704×576 pixels)
• Ethernet port: 100/10Base-T
• PSTN: RJ11
• Console: RS232C
• Key: Matrix-type key
• GUI: Widget Manager

- **Telephone basic control**
  - Detection of on-hook/off-hook signals
  - Start and stop of dial tone, ring-back tone, ring, and busy tone
  - Hands-free, redial, and volume control

- **Additional functions**
  - Telephone directory and call log
  - Dialing from telephone directory or call log

*The outline of specifications refers to the case, when the product is used in combination with the optionally available reference board configured with the FR-V processor.*

### Product Configuration

**Table 1** provides the product configuration.

The SPD for IP TV phones consists of the following three major components:
① SPD Software Package for IP TV phones: Software to implement the basic functions of IP TV phones
② Reference board for the SPD for IP TV phones: A board for the evaluation and development of hardware and software for the IP TV phone system
③ Technical support: Q&A and other technical support services for customers' product system development

Software Configuration

This product features a software configuration based on FUJITSU’s proprietary API specifications common to all SPDs. As such, it allows evaluation by changing the GUI or other individual system design blocks, or by changing the video codec (H.263 and MPEG-4 SP) or communication protocols (SIP and H.323). In addition, it allows the export/import and/or bidirectional distribution of software between SPDs and/or between reference boards.

Fig.2 presents the software configuration of this product.

Reference Board

The reference board is configured with the FR-V processor “MB93461” to allow the evaluation and development of hardware and software for IP TV phone systems.

Fig.3 presents a block diagram of the reference board. MB93461 incorporated on the board is a SoC that integrates the FR-V processor core “FR450” and video, audio, communications, and other peripheral functions in a single chip. It is best suited for IP TV phones, TV sets, advanced projectors, portable media players, and other digital AV equipment.

Table 2 provides the major specifications of MB93461.

Future Development

FUJITSU will continue to refine the “FR-V Solution Package” composed of the following three components and provide full and wide-ranging support for the reduced time to market and lower-cost development of embedded systems for digital AV equipment.

*Software package incorporating application-specific basic functions
• Reference board incorporating an FR-V processor
• Technical support
  As an advanced FR-V Solution Package, FUJITSU shall develop and offer portable media centers for portable/mobile equipment and media centers for TV sets and IP set top boxes.

### Table 2 Major Specifications of MB93461

<table>
<thead>
<tr>
<th>Product name</th>
<th>MB93461</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process technology</td>
<td>0.13μm process CMOS</td>
</tr>
<tr>
<td>Operating power supply</td>
<td>External: 3.3V±0.15V, Internal: 1.4V±0.07V</td>
</tr>
<tr>
<td>Cache</td>
<td>Instruction cache: 32KB (2-way), data cache: 32KB (2-way)</td>
</tr>
<tr>
<td>Maximum operating frequency</td>
<td>400MHz</td>
</tr>
<tr>
<td>Peak performance</td>
<td>800MIPS or 400MIPS+3200MOPS</td>
</tr>
</tbody>
</table>

| MMU (Memory Management Unit) | - Supports a flexible memory access control function enabled by a static address translator and a dynamic address translator.
|                              | - Attributes of address space: user mode protection, write protection, cacheable/non-cacheable
|                              | - Size of segment and page: address translation target area: 16KB to 512MB
|                              | - AMR (Address Map Register) entry count: Instruction: 8 entries
|                              | - Data: 12 entries
|                              | - TLB (Translation Look-aside Buffer) configuration: 64 entries×2 way (set associative type)
|                              | - Dynamic address Translator: Software table walk |

| Built-in peripheral circuit (core part) | - SDRAM interface (maximum 32-bit width, operation at 133MHz)
|                                         | - DMAC (8 channels)
|                                         | - Local bus interface (maximum 32-bit width, operation at 66MHz)
|                                         | - Interrupt controller (supports 8 external interrupts and 15 internal interrupts)
|                                         | - UART (2 channels)
|                                         | - Timer (3 channels, 16-bit timer/counter)
|                                         | - DSU (debug support unit) |

| Built-in peripheral circuit (proprietary peripheral) | Video I/O, scaler, audio I/O, USB host, USB function, I²C, card interface (supports Memory Stick and SD card) |

| Package | 420-pin plastic BGA (27mm×27mm)                        |
|         | 400-pin plastic FBGA (15mm×15mm)                       |

### NOTES

*1: Beijing UD Technology Co., Ltd.

A Beijing-based solution and development service provider dedicated to broadband network devices and related applications. Based on its long-term experience in the design and development of network communication products, it offers a series of services-consulting, design and development of hardware and/or software, license provision, and mass production—to network-communication-related companies in Japan including device manufacturers, service providers, and system integrators.

* Photo 1 shows a prototype of the SPD for IP TV phones. The released reference board may have a different external view.

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