

MB86H23B

SmartMPEG

December 2004
Edition 1.1

MPEG-2 Decoder with Macrovision

FME/MM/PP/1204

INTRODUCTION:

This **SmartMPEG** is an integrated MPEG-2 set-top-box decoder which includes the hardware extensions required to support a low Bill of Material for Set-Top-Boxes and IDTVs. This device supports Macrovision.

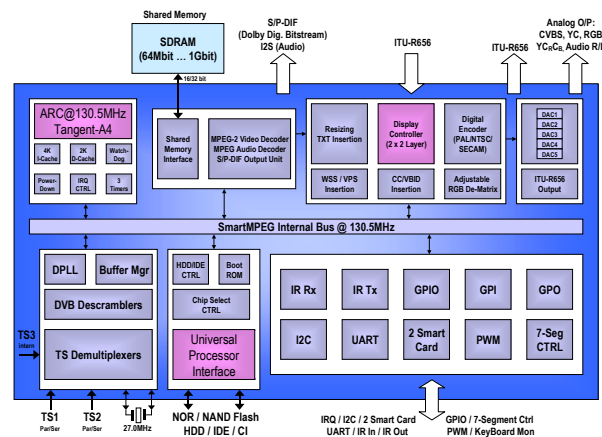
Highlights of the SmartMPEG include an ARC RISC CPU (@130.5MHz), two transport stream demultiplexers with integrated DVB descramblers, a PAL/NTSC/SECAM digital video encoder and a display controller, which overlays up to four layers of graphic data. A specially designed, shared SDRAM memory interface for the CPU and MPEG decoder connects to a single SDRAM device using either a 16 or 32-bit data bus depending on customer bandwidth requirements. The included universal processor interface allows simple connection to FLASH, hard disk drives (IDE), Common Interface and other asynchronous devices.

The **SmartMPEG** is part of Fujitsu's MPEG decoder family, and is the successor to the MB87L2250. The **SmartMPEG** offers several advantages over the MB87L2250, including support for 16/32-bit SDRAM devices up to 128Mbytes, an integrated S/P-DIF interface, DPLL, and internal audio DAC's. This helps to reduce product cost by eliminating the need for external components. The **SmartMPEG** adds also DPLL functionality, SECAM encoding, and two Smart-card interface to former MPEG devices.

To help our customers achieve the shortest possible time-to-market, the **SmartMPEG** comes with the **Fujitsu Driver Application Programming Interface (FAPI)**. FAPI is a complete driver set, allowing fast and efficient customer software design. In addition, FAPI is now the standard programming interface for Fujitsu DVB components, easing migration to future devices.

FEATURES

- MPEG2 video ISO/IEC 13818-2 (MP@ML...SP@ML)
- MPEG audio layer 1/2
- 32-bit RISC CPU (ARC Tangent A4 @130.5MHz)
- 4K I-cache, 2K D-cache
- Three timers / watchdog / power-down mode
- Shared memory interface (SDRAM, 16/32 bit data), 64Mbit...1Gbit
- Universal processor interface (IDE, NAND/NOR FLASH & Common Interface)
- Two transport stream decoders (decoding/recording) including two DVB descramblers
- Flexible MPEG video resizing (factor 1/16 to 2)
- Display controller with up to 4 true colour graphic or CLUT layers (total 6 layers)
- Flexible frame rate conversion (e.g. 50/60Hz)
- Flicker fixer for better on-screen text clarity
- Teletext / WSS / VPS / CC / VBI insertion
- PAL/NTSC/SECAM encoder with Macrovision 7.1.L1
- RGB De-matrix (RGB or YCrCb output)
- Control of brightness, contrast and colour saturation of RGB and YCrCb output
- 5 video DAC's @10bit for analogue video / audio O/P
- ITU-R 656 video input/output (shared with TS2 input)
- S/P DIF output for PCM/AC3/MPEG
- UART / 2 x Smart Card IF / I2C / GPIO / PWM Output
- 7-segment LED controller for 5 digits / KeyBoard mon.
- Infra Red receiver / transmitter
- On-chip DPPLL, requiring only 27.0MHz crystal
- Bootable from NOR Flash
- BGA 256 Package
- Ambient Temperature Range: 0°C to +70°C
- Advanced Technology: Fujitsu 0.18µm CMOS
- 1.8 volt device with 3.3 volt I/O
- Power consumption: typ. 700mW (Standby: 100mW)



Worldwide Headquarters

Japan

Tel: +81 3 5322 3353
Fax: +81 3 5322 3386

Fujitsu Limited
Marketing Division
Electronic Devices
Shinjuku Dai-Ichi Seimei Bldg.7-1
Nishishinjuku 2-chome, Shinjuku-ku
Tokyo 163-0721
Japan

<http://edevic.fujitsu.com/>

USA

Tel: +1 408 922 9000
Fax: +1 408 922 9179

**Fujitsu Microelectronics
America, Inc.**

3545 North First Street
San Jose, CA 95134-1804
USA

Tel: +1 800 866 8608
Fax: +1 408 922 9179

Customer Response Center
Mon-Fri: 7am-5pm (PST)

<http://www.fma.fujitsu.com/>

Asia

Tel: +65 6281 0770
Fax: +65 6281 0220

**Fujitsu Microelectronics Asia
PTE Limited**

#05-08, 151 Lorong Chuan
New Tech Park, Singapore 556741

Tel: +82 2 3484 7100
Fax: +82 2 3484 7111

Fujitsu Microelectronics Korea Ltd.
1702 Kosmo Tower, 1002 Daechi-Dong
Kangnam-Gu, Seoul 135-280, Korea

<http://www.fmal.fujitsu.com/>

<http://www.fmk.fujitsu.com/>

Europe

Tel: +49 6103 690-0
Fax: +49 6103
690122

**Fujitsu Microelectronics Europe
GmbH**

Am Siebenstein 6-10
D-63303 Dreieich-Buchschlag
Germany

e-mail

multimedia_info@fme.fujitsu.com

<http://www.fme.fujitsu.com/>

All Rights Reserved.

The contents of this document are subject to change without notice. Customers are advised to consult with FUJITSU sales representatives before ordering.

The information and circuit diagrams in this document are presented as examples of semiconductor device applications, and are not intended to be incorporated in devices for actual use. Also, FUJITSU is unable to assume responsibility for infringement of any patent rights or other rights of third parties arising from the use of this information or circuit diagrams.

The products described in this document are designed, developed and manufactured as contemplated for general use, including without limitation, ordinary industrial use, general office use, personal use, and household use, but are not designed, developed and manufactured as contemplated (1) for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could have a serious effect to the public, and could lead directly to death, personal injury, severe physical damage or other loss (i.e., nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system), or (2) for use requiring extremely high reliability (i.e., submersible repeater and artificial satellite).

Please note that Fujitsu will not be liable against you and/or any third party for any claims or damages arising in connection with above-mentioned uses of the products.

Any semiconductor devices have an inherent chance of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

If any products described in this document represent goods or technologies subject to certain restrictions on export under the Foreign Exchange and Foreign Trade Control Law of Japan, the prior authorization by Japanese government will be required for export of those products from Japan.

Use of this product in any manner that complies with the MPEG-2 Standard is only permitted with a license under applicable patents in the MPEG-2 patent portfolio, which is available from MPEG LA, LLC, 250 Stelle Street, Suite 300, Denver, Colorado 80206, URL: www.mpegla.com.

Macrovision is a registered trademark of Macrovision Corporation. All trademarks acknowledged.