## Fujitsu Launches World's First 1394 Automotive IC for HD Video
### *- Contributes to reduced costs, lighter wiring harness, and higher fuel efficiency -*

**Tokyo, April, 22, 2009** - Fujitsu Microelectronics Limited announced today the launch of the world's first "1394 Automotive"(IDB-1394)[1] controller IC that realizes high-definition (HD) (1,280 dots x 720 lines) video transmission over the IDB-1394 in-vehicle multimedia network protocol. The new IC, the MB88395, can simultaneously transmit multiple streams within the vehicle, such as HD video from Blu-ray DVDs, digital TV, audio and car navigation images. The new IC realizes this by utilizing a high-speed 800Mbps physical layer[2] as well as Fujitsu's proprietary SmartCODEC that provides high compression and which can transmit HD video without perceptible lag. This not only brings the rich HD experience to rear-seat entertainment, but reduces the system cost of in-vehicle multimedia networks by a maximum of 30%, while reducing the number of wire harnesses (cables) by a maximum of 70% to reduce vehicle weight and improve fuel efficiency. Sample shipment of the new MB88395 will begin from April 22, 2009.

Fujitsu Microelectronics will present and demonstrate the new controller IC at the 1394 Automotive Tech seminar to be held in Detroit, US on April 30, 2009.
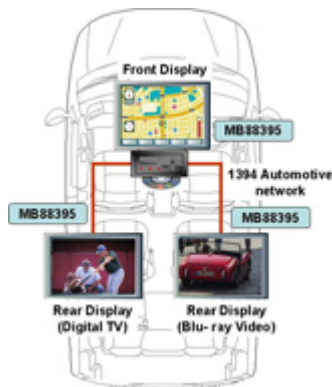


**Figure 1: The 1394 Automotive controller usage in-vehicle**
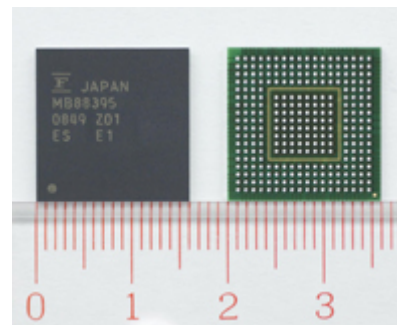


**Figure 2: 1394 Automotive Controller (unit: cm)**

There is increasing attention being paid to 1394 Automotive for in-vehicle multimedia networking, and it is expected to become common in the automotive market. The reason for this includes the gradual shift to digital TV in each country, the increased availability of HD content, as well as the analog output from Blu-ray players to be stopped from 2013, making 1394 Automotive necessary for the upcoming flood of digital transmissions through in-car networks. Anticipating the future needs for rear-seat entertainment systems, Fujitsu Microelectronics lead other vendors in introducing 1394 Automotive controllers in 2005, and with this new 1394 controller co-developed with Fujitsu VLSI Limited, allows more HD video content to be easily and flexibility viewed throughout the vehicle.

This was emphasized by Yuji Kawaguchi, Operating Officer of Honda R&D Co., Ltd. in saying, "Honda R&D welcomes the MB88395, the first IC to provide the 800Mbps speeds of the 1394 Automotive spec. The importance of high-speed digital transmissions will increase further in the future to handle in-vehicle multimedia as well as to reduce weight. 1394 Automotive is an in-vehicle network that can enrich entertainment and comfort. We plan to promptly evaluate the MB88395."

The key to the capabilities of the new controller are the physical layer compliant with the

800Mbps specification of 1394 Automotive - double the 400Mbps of the previous product - as well the a version of the SmartCODEC compression codec for video that has an even higher compression ratio, compressing video to one-fourth (1/4) its original size, compared to one-third (1/3) that of the previous product. The SmartCODEC, which was developed by Fujitsu Laboratories and is used in the BT.601 Transport Over IEEE-1394[3] standard, can compress and decompress high resolution video in 2 to 3 milliseconds (2-3ms) without any perceptible annoying time lag or out of sync contents, which can be a problem when watching the same contents on the front and rear monitors.

This results in the ability to transmit HD video from Blu-ray DVDs and digital TV, as well as high-resolution navigation images, within the vehicle without any perceptible time lag, making this the first IC in the world to allow multiple streams of HD video and navigation images over 1394 Automotive. For example, a HD video stream (1,280 dots x 720 lines) from a Blu-ray DVD that has been decompressed has a rate of 885Mbps. With subsequent compression to one-fourth (1/4) with SmartCODEC, the rate becomes 249Mbps, so two (2) channels can be transmitted in the 800Mbps bandwidth that was not possible over 400Mbps products.

Going forward, Fujitsu Microelectronics plans to expand its lineup of 1394 Automotive ICs to handle the increasing information streams in automobiles, such as video content and peripheral cameras on the vehicle, as well as to drive further reductions in system costs. These in-vehicle networking chips complement Fujitsu Microelectronics' strong presence in automotive ICs for processing graphics and video.

## Sample Pricing and Shipment

| Product | Sample price | Sample shipment |
|---------|-------------|-----------------|
| MB88395 | JPY 1,700 | From April 22, 2009 |

## Sales Target

MB88395: 500,000 units/month by fiscal year 2012 (April 2012 - March 2013)

## Key Features of the New Series

1. **I Reduces system costs for rear-seat entertainment**
   The MB88395 IC includes the 1394 Automotive physical layer and link layer[4] as well as DTCP digital rights management[5] on one chip, while encoding occurs only within SmartCODEC's internal line memory, making an external frame buffer unnecessary, and thus reducing the necessary system components and total multimedia network system costs by a maximum of 30%. Also, by being able to simultaneously transmit at high speed several video and audio streams as well as control signals on one network line - not peer-to-peer - it reduces the number of the wire-harnesses (cables) by a maximum of 70%. This contributes to reducing vehicle weight, leading to higher fuel efficiency. Concretely, this can produce a reduction in the environmental impact by approximately 10kg of $CO_2$ per year for a car traveling 10,000km (that translates into roughly the amount of $CO_2$ a beech tree absorbs in 1 year).

2. **HD video compression, decompression and transmission without perceptible time lag**
   Includes Fujitsu's proprietary SmartCODEC which can compress video data to one-fourth in size, an improvement compared to the one-third of the previous product, and compress and decompress video within 2-3 milliseconds. Such low latency, combined with the

doubling of the speed of the physical layer to 800Mbps, allows transmission of HD video from Blu-ray DVDs and digital TV, within the vehicle without any perceptible time lag, which can be a problem when watching the same contents on the front and rear monitors. With an MPEG CODEC, there would be a perceptible time lag in transmission.

## Glossary and Notes

1. **1394 Automotive (IDB-1394):**
   Stands for "ITS Data Bus-1394."An automotive network protocol for high-speed multimedia applications promulgated by the 1394 Trade Association's Automotive Working Group. With the IDB Forum absorbed into the 1394 Trade Association, "IDB-1394" has been re-branded as "1394 Automotive" or "1394 Auto".
2. **Physical layer:**
   The first of seven layers when transmission functions are divided into seven layers, as defined by the OSI Reference Model. A key part of network hardware through which bit arrays are transmitted.
3. **BT.601 Transport Over IEEE-1394:**
   A transport protocol for sending BT.601 video streams (YUV, RGB, etc.) over 1394 Automotive, promulgated by the 1394 Trade Association.
4. **layer:**
   The second layer in the OSI Reference Model, in which packets are formed and transport is managed.
5. **DTCP:**
   Digital Transmission Content Protection. An encryption protocol that prevents unauthorized duplication, download or alteration of audio or visual media.

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## Press Contact:
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Inquiries
https://www-s.fujitsu.com/global/news/contacts/inquiries/index.html

Fujitsu Microelectronics - 1394 Automotive(IDB-1394)
Fujitsu Microelectronics - SmartCODEC press release
Fujitsu Microelectronics - Automotive Graphics Controllers

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## About Fujitsu Microelectronics (FML)
Fujitsu Microelectronics Limited designs and manufactures semiconductors, providing highly reliable, optimal solutions and support to meet the varying needs of its customers. Products and services include ASICs/COT, ASSPs, power management ICs, and flash microcontrollers, with wide-ranging expertise focusing on imaging, wireless, automotive and security applications. Fujitsu Microelectronics also drives power efficiency and environmental initiatives. Headquartered in Tokyo, Fujitsu Microelectronics Limited was established as a subsidiary of Fujitsu Limited on March 21, 2008. Through its global sales and development network, with sites in Japan and throughout Asia, Europe, and the Americas, Fujitsu Microelectronics offers semiconductor solutions to the global marketplace. For more information: http://jp.fujitsu.com/group/fml/en/

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**Attachment**

**Key Specifications of the MB88395 1394 Automotive IC**

| Product | MB88395 |
|---|---|
| Physical layer | Complies with IEEE-1394-2008 (*1)<br>Max speed 800 Mbps, 2 beta port |
| Link layer | Complies with IEEE1394-2008 |
| DTCP functionality | Simultaneous encryption and decryption of two streams |
| Transport protocol support | IEC61883-Part 8 (BT.601) (*2)<br>IEC61883-Part 6(Audio) (*3) |
| Video interface | BT.656 or Digital RGB I/O (switchable) |
| Audio interface | $I^2S$ (*4) 8-channel or IEC60958 (*5) I/O (switchable) |
| SmartCODEC | Included |
| Operating voltage | 3.3V±0.3V (I/O), 1.2V±0.1V (Internal) |
| Operating temperature | -40°C ~ 95°C |
| Packaging | FBGA (*6)<br>224 pins, 0.8 mm pitch, 16 mm x 16 mm |

**\*1. IEEE-1394-2008:**
An extension to the older IEEE1394a-2000 high-speed serial-bus standard used for PCs and audio-visual equipment. Enables faster transmission speeds and transmission across longer distances. This standard has also been has been adopted for 1394 Automotive.

**\*2. IEC61883-Part 8 (BT.601):**
IEC611883 is a transmission protocol established by the International Electrotechnical Commission, for digital interfaces of audio and visual equipments.
BT.601 Transport Over IEEE-1394 is in the process of being ratified as Part 8.

**\*3. IEC61883-Part 6 (Audio):**
A protocol for streaming audio over1394 Automotive.

**\*4. $I^2S$:**
Stands for "Inter-IC Sound Bus." An interface standard for connecting digital audio equipment.

**\*5. IEC60958:**
A standard established by the International Electrotechnical Commission for digitally transmitting audio signals.

**\*6. FBGA**(Fine pitch Ball Grid Array)
A type of surface-mounted packaging.