

Automotive Information System Network 1394 Automotive Controller LSI

MB88395

A controller LSI supporting “1394 Automotive,” an automotive information system network standard for transmitting multimedia data such as vehicle navigation images, HD video images for Blu-ray Discs, and digital TV within a car at high speed. This product enables the multiple and high-speed transmission of several high-quality video images and audio streams through one network and contributes to parts cost and vehicle weight reduction.

Overview

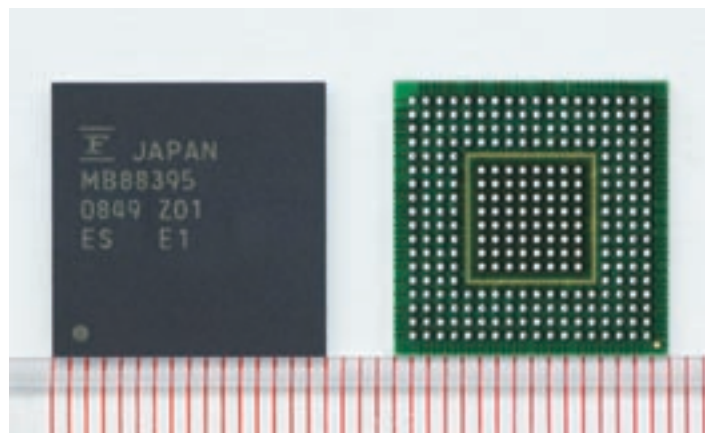
As terrestrial analog TV broadcasting will end in 2011 and analog output for Blu-ray Discs will end in 2013, in-vehicle digital video transmission has become a necessity, resulting in the rapid advance of the digitalization of automotive data. “1394 Automotive,” an international standard for automotive information system networks, is under the spotlight as a technology that not only addresses rear seat entertainment at a low cost but also contributes to vehicle weight reduction and improved fuel efficiency by reducing the number of wire harnesses (which has been increasing for the last several years).

In 2005, FUJITSU introduced 1394 Automotive controller LSIs into the market, ahead of other manufacturers. We have now developed “MB88395” for transmitting HD video and vehicle navigation images.

This product has built-in “SmartCODEC,” a video codec adopted by the international standard BT.601 Transport Over IEEE-1394. It enables broadband transmission at 800Mbps, which is nearly twice that of conventional products, and improves the compression rate for SmartCODEC from the conventional

1/3 to 1/4 to transmit HD video images for Blu-ray Discs and digital TV as well as high-definition vehicle navigation images without delay. This will enable the multiple transmission of HD video and vehicle navigation images through the 1394 Automotive network for the first time in the world.

Photo 1 External View



This product can be used as the common platform for automotive information networks ranging from simple audio transmission systems to multiple transmission systems for navigation and HD video images.

Figure 1 presents the application image for 1394 Automotive in a car.

This product also integrates the physical and link layers, in compliance with 1394 Automotive, SmartCODEC, AV protocol, and DTCP, a copyright protection function essential for digital contents transmission in 1 chip, thereby enabling surface area reduction and low power consumption.

Product Features

Physical and link layers supporting 1394 Automotive

This product has built-in physical layer and link layer functions, in compliance with 1394 Automotive.

The physical layer has 2 built-in cable ports, supporting data transmission speeds of 800Mbps, 400Mbps, 200Mbps, and 100Mbps.

Built-in SmartCODEC, a high-quality and low-delay video compression/decompression engine

The built-in SmartCODEC, which has newly reinforced functions, can compress/decompress the video data to 1/4 size (compared to 1/3 in conventional products). In addition, it enables the transmission of HD video images for Blu-ray Discs and digital TV as well as vehicle navigation images that could not be transmitted using the MPEG codec due to large delays at a small delay of 2 to 3 milliseconds by combining with the physical layer, realizing a transmission speed of 800Mbps, which is twice the conventional speed.

Codec processing is handled only by the internal line memory and it thus requires no external frame buffer memory, leading to a reduction in the number of system parts.

AV protocol function

Built-in functions supporting BT.601 (IEC61883-8) and Audio (IEC61883-6) enable the real-time transmission of digital video and audio streaming.

Built-in DTCP, copyright protection function

This product has a built-in DTCP function to encode/decode 2 streams simultaneously. It also complies with the localization standard to restrict the streams within the in-car network.

Others

- Video port: BT656 or Digital-RGB

Figure 1 Application Image for 1394 Automotive in a Car



Table 1 Functions

Physical layer	Complies with IEEE1394-2008 *1 specifications (maximum speed 800 Mbps, 2 beta ports)
Link layer	Complies with IEEE1394-2008 specifications
DTCP functionality	Capable of encoding/decoding 2 streams simultaneously
Transport protocol support	· IEC61883-Part8 (BT.601) *2 · IEC61883-Part6 (Audio) *3
Video interface	1 system of BT656 or Digital-RGB input/output (switched)
Audio interface	2 systems of I ² S *4 8 channels or IEC60958 *5 input/output (switched with video interface for 1 system)
SmartCODEC	Supports 1/4 compression
Operating voltage	3.3V±0.3V (I/O), 1.2V±0.1V (internal)
Operating temperature	-40°C to 95°C
Packaging	FBGA *6 (224-pin, 0.8 mm pitch, 16 mm×16 mm)

*1: IEEE1394-2008: An extension to the older IEEE1394a-2000 high-speed serial-bus standard used for PCs and AV devices. Expansions to this standard have been made to enable faster transmission speeds and across longer distances. This standard has been adopted by 1394 Automotive.

*2: IEC61883-Part8 (BT.601): IEC61883 is the transmission protocol standard established by the International Electrotechnical Commission for digital interfaces of audio-visual devices. BT.601 Transport Over IEEE-1394 specifications have been developed as Part8.

*3: IEC61883-Part6 (Audio): A protocol for streaming audio over 1394 Automotive

*4: I²S: Inter-IC Sound Bus. Bus interface specifications for connecting digital audio devices.

*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-mount package.

- Audio port: I²S or IEC60958
- System interface: 16-bit MPU/DMA or SPI (Serial Peripheral Interface)
- Power supply voltage: 3.3V (I/O), 1.2V (internal)
- Package: FBGA-224

Table 1 presents a list of functions and Figure 2 the block diagram for this product.

Summary

To support the multiple transmission of growing information contents within the vehicle and camera images for vehicle proximity monitoring while addressing further system cost reduction, FUJITSU will continue to add to its lineup of 1394 Automotive products.

Figure 3 presents the roadmap of our 1394 Automotive controller LSI products. *

Figure 3 Roadmap for our 1394 Automotive Controller LSI

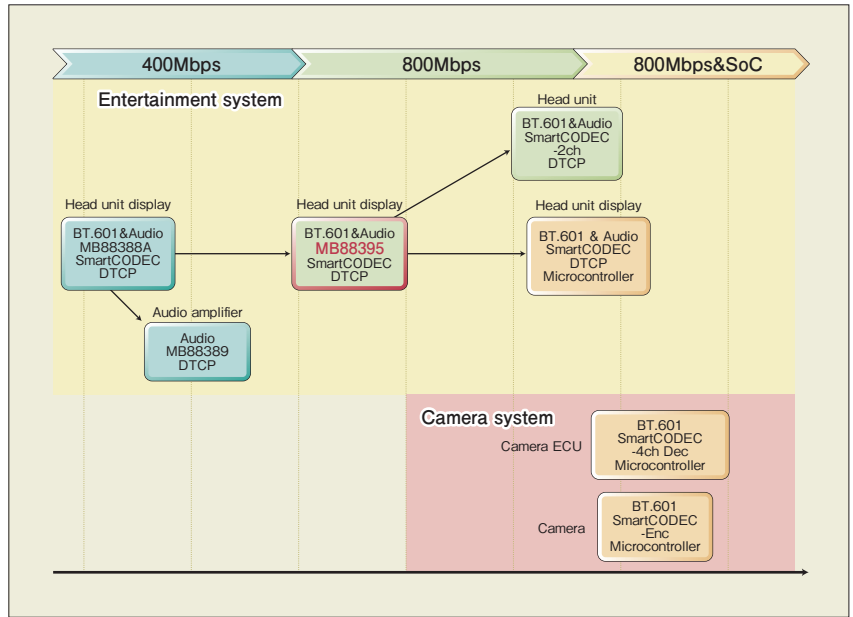


Figure 2 MB88395 Block Diagram

