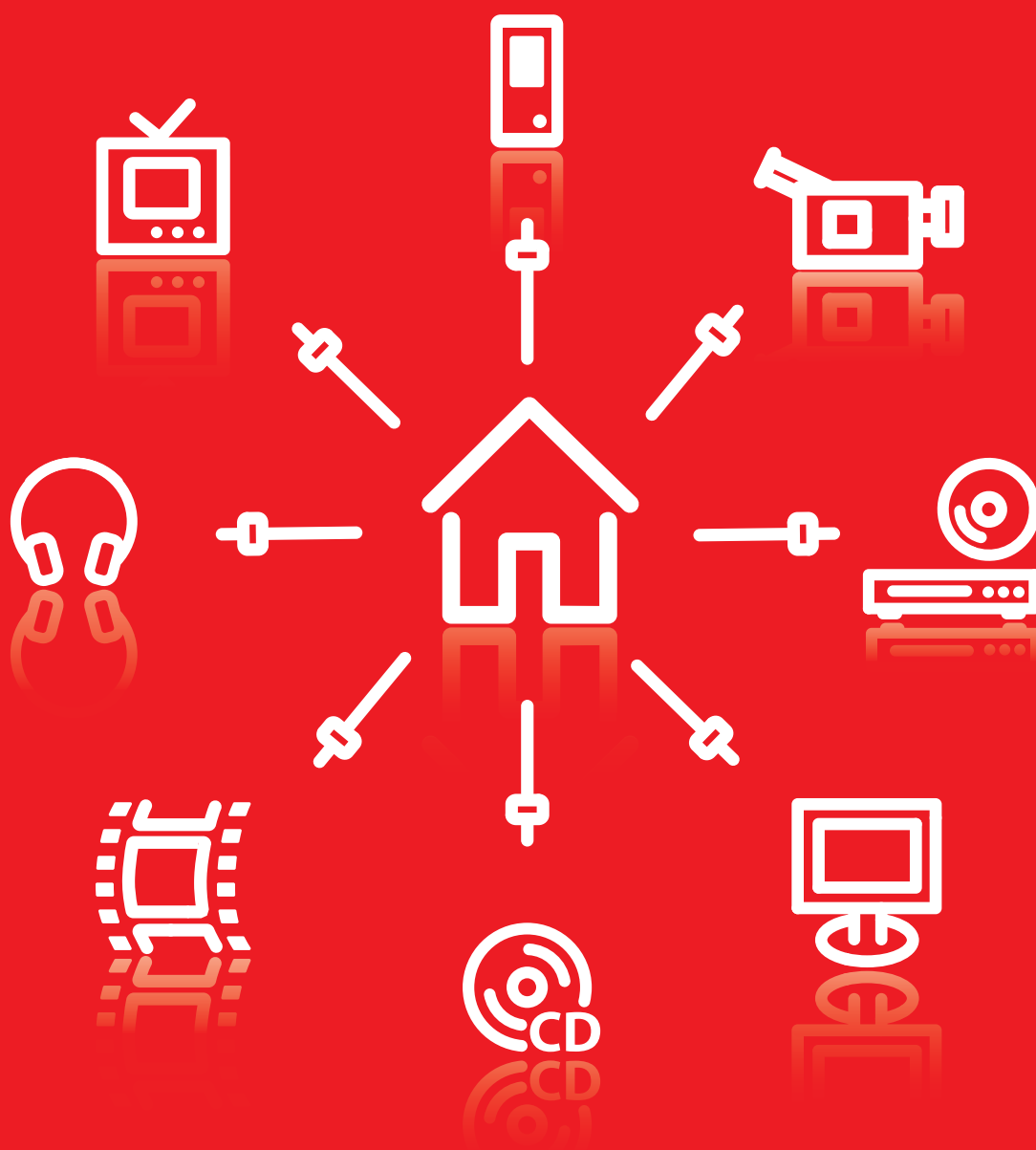


1394 solutions for consumer electronics



The 1394 source for consumer electronics

Integrated features

Built-in hardware support for isochronous data

- Dedicated generic high-speed data interfaces (HSDIs) for video and audio data
- CIP headers
- Time stamping
- Program ID (PID) filtering
- Packet insertion

Hardware packet formatting

- IEC61883-1 (general)
- IEC61883-2 (SD-DVCR)
- IEC61883-4 (MPEG2-TS)
- IEC61883-6 (audio and music)
- IEC61883-7 (ITU-R BO.1294 System B) – DSS
- Asynchronous packets
- Asynchronous streams
- PHY packets (including self-IDs)

Support for different types of CPU interfaces

- Motorola 68K-style 16-bit asynchronous interface
- SRAM-like 16-bit asynchronous interface
- 33-MHz PCI 3.0-compliant interface with support for PCI slave and master

Secure transport of content

- Built-in hardware ciphers and encryption engines for DTCP (digital transport copy protection), approved by MPAA, DVDCCA (DVD copy control association), DVD Forum, CableLabs
- Hardware AKE acceleration (authentication key exchange)
- Upcoming TSB43EC4x will take security to a new level with added AES-128 encryption on the HSDI ports, protecting content throughout the system
- Secure method for loading DTLA/AES information
- TSB43Ex4x supports DTLA's localization requirement for DTCP

As high-definition (HD) video and audio bring greater amounts of digital data into the home, communications among entertainment systems are becoming ever faster and more complex. Manufacturers of consumer electronics systems are increasingly turning to the IEEE 1394 (FireWire) serial bus for higher bit rates, longer transfer distances, flexible topologies, the ability to handle isochronous or asynchronous data, and the simplicity and richness it offers the end consumer experience.

System manufacturers are also turning to Texas Instruments for the largest selection of integrated circuits designed to support the 1394 high-speed bus in consumer electronics. TI products are the most widely used in the industry, enabling a wide range of consumer electronic systems to enjoy the benefits of the 1394 high-speed bus. Based on advanced technology that delivers outstanding performance, TI's fully integrated products provide both 1394 physical (PHY) and link-layer control. In-depth expertise in 1394 connectivity assures that TI solutions can interoperate reliably among entertainment systems and home computer networks, with comprehensive support and a strong third-party partner program makes it easier for customers to develop systems and get them into production fast.

Designed for audio-video entertainment

TI's 1394 products for consumer electronics are created specifically for applications with moving audio and HD video, including HDTVs, STBs, DVRs, HD DVD and Blu-Ray Disc recorders, surround sound, and other familiar forms of home entertainment. Two families of 1394 products are now available; TI will soon offer a third generation, the TSB43Ex4x, with enhanced security for content. In the TSB43Ex4x family will be an option for AES-128 encryption, which will enable all content in the PCB to remain protected. Integrated features make TI's 1394 products well suited for consumer electronics.

For more information

To find out more about TI's line of high-performance 1394 solutions for consumer electronics, see www.ti.com/1394 or call 1-972-644-5580. Learn how our 1394 technology can help launch your next design.

TI's integrated 1394 products

Feature	TSB43CA4x	TSB43DA42A	TSB43Ex4x
Integrated 1394a PHY ports	2	2	2 or 3
Package	176 BGA, 176 QFP	196 BGA	144 BGA
DTCP (5C) encryption with hardware AKE	Yes	Yes	Yes
AES-128 encryption	No	No	Yes
Integrated ARM processor	Yes	No	No
Number of high-speed data interfaces for isochronous transport streams	2	3	2
Built-in audio support	Yes	Yes	No
GPIOs	11	11	11

Why choose IEEE 1394 for consumer electronics?

With the emergence of HD video and residential networking, consumer electronics systems are undergoing a high-speed digital revolution that will enable entertainment and informational content to be shared throughout the home. Among competing interfaces, Ethernet/IP is attempting to extend its data networking success into the realm of home entertainment, while HDMI is widely used for point-to-point AV connections. The IEEE 1394 serial bus combines these strengths with a proven networking interface designed for the high bit rates of HD video.

The 1394 interface is self-configuring and easy to install, can transport multiple HD streams with robust quality of service (QoS), and offers a proven security method for data transfer and storage. As many as eight simultaneous HD streams can be transported using 1394a at 400 Mbps, with 1394b speeds doubling to 800 Mbps. To ensure QoS, 1394 allocates up to 80 percent of transport to time-sensitive data such as AV programming. Peer-to-peer operation allows a device to be plugged into any other device, with up to 63 nodes in a network today (and more in the future). New media options for 1394b include CAT5/6 unshielded twisted pair, coax POF, GOF and power line. With these new cable options 1394 can be networked throughout the home without running any new wires.

Ethernet/IP networks, not designed for AV, use best-effort delivery, as packets are reordered, discarded, duplicated or delayed. This causes significant problems for the video decode makes it virtually impossible to synchronize content to multiple displays and introduces lipsync. Ethernet's inherent architecture means that regardless of bandwidth, networks may need additional display buffering to improve QoS. This is especially true as the number of video streams increases. Recent developments around IP help free time-sensitive data from regular traffic, yet congestion will continue to be an issue when multiple video streams compete for priority. Ethernet also requires a router that must communicate directly with every node, adding to costs and forcing consumers into specific topologies.

HDMI is the speediest of the interfaces. However, even with its CEC extensions, it is still a unidirectional point-to-point interface and cannot be networked for full home distribution. Additionally, HDMI can only be used for a single uncompressed AV stream in one direction. Its HDCP encryption offers good copy protection, but the full volume of uncompressed HD video can make it expensive to implement encoders for storage on home recording devices.

Piracy is thwarted in 1394 through the use of DTCP (also known as 5C) content protection, approved by the Motion Picture Association of America (MPAA) and required by the Open Cable specification for HD cable STBs. DTCP does not manage digital rights, but protects the content during transfer with a unique key for each device. Among competing interfaces for networked consumer electronics, 1394 is unsurpassed in its content protection, speed, QoS, flexibility and ease of use.

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Americas

Phone	972-644-5580
Fax	972-927-6377
Internet/e-mail	support.ti.com/sc/pic/americas.htm

Europe, Middle East and Africa

Phone	
European free call	00800-ASK-TEXAS (00800 275 83927)
International	+49 (0) 8161 80 2121
Russian support	+7 (4) 95 98 10 701

Note: The European free call (toll free) number is not active in all countries. If you have technical difficulty calling the free call number, please use the international number above.

Fax	+(49) (0) 8161 80 2045
Internet	support.ti.com/sc/pic/euro.htm

Japan

Fax	International	+81-3-3344-5317
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Asia

Phone	
International	+91-80-41381665
Domestic	<u>toll-free number</u>
Australia	1-800-999-084
China	800-820-8682
Hong Kong	800-96-5941
India	1-800-425-7888
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Singapore	800-886-1028
Taiwan	0800-006800
Thailand	001-800-886-0010
Fax	+886-2-2378-6808
E-mail	tiasia@ti.com or ti-china@ti.com
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