NEWS RELEASE



February 13, 2003 Nippon Telegraph and Telephone Corp.

NTT Develops High-quality MPEG-2 CODEC LSI for Embedding in Consumer-oriented Interactive Video Communication Systems

-- High-quality CODEC processing (up to 720/30P) on a single chip enables superior picture quality in home AV and mobile systems --

Nippon Telegraph and Telephone Corp. (NTT; Head Office: Chiyoda-ku, Tokyo; President: Norio Wada) has developed an LSI implementation technology for consumer-oriented CODEC^{*1} LSIs (development code: ISIL) that offer high picture quality exceeding that of standard TVs^{*2}. Using this new technology, NTT is able to achieve simultaneous processing (full duplex^{*3}) for encoding and decoding (compression and decompression) of high-quality pictures at 480/60P (Progressive) in conformance with MPEG-2^{*4} standards. In the past, this level of processing required the use of several specialized chips; NTT's single-chip design is unprecedented anywhere in the world. In the case of half duplex^{*3} processing-that is, processing of only encoding or decoding-the new chip can accommodate high-quality pictures up to 720/30P.

The recently developed chip achieves both high performance and flexibility to accommodate video formats for a variety of applications, as well as video communication systems. The chip's design aims for low cost and low power consumption (less than 1.5 W), making it ideal for a wide range of consumer systems. It can be embedded in home digital video cameras, interactive video communication terminals, and mobile CODEC systems, contributing to the progress of a high quality video environment that offers picture quality surpassing that of standard TVs. This will in turn promote the development of diverse and interactive consumer-oriented contents, and enable a rapid acceleration in the establishment of a high-quality visual communication society.

OBackground to Development

For some time now, NTT Cyberspace Laboratories has been working on the development of a chip (named SuperENC) that enables encoding of standard TVs, as well as a very small MPEG-2 encoder PC card with this SuperENC, the size of a just business card. The goal of these development activities is to provide high-quality video communication and other services that make use of broadband networks. With the arrival of the "true era of broadband," there has been a growing need for MPEG-2 CODEC LSIs that offer high quality exceeding even that of standard TVs. These LSIs also had to be inexpensive, operate with low power consumption, and allow integration into a variety of consumer-oriented systems, so as to promote the creation and distribution of high-quality video contents.

OKeys to Related Technologies

1. Full duplex CODEC processing of 480/60P on a single chip (<u>Ref. Attachment 1</u>)

A huge volume of calculations is required in both the encoder and the decoder in order to execute full duplex CODEC processing of 480/60P. To achieve this on a single chip, NTT embedded in the chip an encoder core and a decoder core that operate independently, and developed a dual memory scheme for supplying data to each of these cores independently at high speeds. This facilitates simultaneous operation of the encoder^{*5} and decoder^{*5}, supporting a broader range of applications that include not only one-way communications but interactive communications as well. The 30 million transistors required for these types of applications have been integrated into the same single chip using commercial 0.13 μ m CMOS technology^{*6}.

2. Hardware and software co-design ensures lower power consumption and lower cost, and enables easy integrations in various CODEC systems (Ref. Attachment 2)

Establishing an optimum balance of roles between hardware and software components, this LSI executes CODEC processing for high quality exceeding that of standard TV with a power consumption of less than 1.5 W. In addition to standard TV format (480I), it responds flexibly to the high-quality video standards of 480/60P and 720/30P formats. Furthermore, because the chip features built-in audio encoder/decoder and multiplexer^{*7}/demultiplexer^{*7}, it can be easily incorporated into a variety of high quality mobile CODEC systems by adding simple AD/DA converters^{*8}, stream I/O circuits, or other simple external circuits, for use in a wide range of consumer applications.

OFuture Developments

In keeping with the rapidly advancing broadband era, as of spring 2003 NTT will incorporate this ISIL chip into a variety of ubiquitous mobile CODEC systems, including consumer-oriented video cameras and video communication terminals. It will promote commercialization of these devices, aiming to promote and popularize applications such as TV phones and teleconferencing using high-quality pictures surpassing that of standard TV, thus contributing to the expansion of optic fiber networks. This ISIL chip will be marketed by NTT Electronics Corp. (Head Office: Shibuya-ku, Tokyo; President: Tatsuo Izawa) under the name Super ENC-III. In order to develop diverse services in the future using optic networks, NTT will continue its efforts to achieve further miniaturization and increased quality in the ISIL chip, and to develop next-generation CODEC technologies to accommodate a wide range of new functions.

<Glossary>

*1: CODEC (COder and DECoder)

A CODEC system contains the functions of both an encoder (to compress video and audio data into a specified stream) and a decoder (to decompress that video and audio

data from the stream). Because digital video and audio uses huge volumes of data, it is important to use an appropriate CODEC when compressing data.

*2: High picture quality exceeding that of standard TV

Refers to video formats that improve the quality of video. Conventional formats for standard TV use an interlacing of 480 active scanning lines (480I) at a frame rate of 30 frames per second. In contrast, these methods utilize a progressive format (480P) that achieves smoother moving pictures by doubling the frame rate to 60 frames per second, or a progressive format (720/30P) that achieves high-resolution pictures by increasing the number of effective scanning lines by 50% at a frame rate of 30 frames per second.

*3: Full duplex / Half duplex

Simultaneous execution of encoding (compression) and decoding (decompression) processing to enable both one-way and interactive applications. Half duplex refers to one-way applications using only one of these processes.

*4: MPEG-2 (Moving Picture Experts Group-2)

MPEG is an international standard related to the compression of video signals. MPEG-2 is a standard encoding method for high-quality video, including HDTV and other TV images, and is also used for DVD and digital TV broadcasting.

*5: Encoder core / decoder core

These are the basic components used in MPEG-2 video encoding and decoding processing; they compress or decompress video signals on the LSI chip.

*6: 0.13-µm CMOS

CMOS is an abbreviation of Complementary Metal Oxide Semiconductor, which is a semiconductor production method characterized by high speeds and low power consumption. Nearly all current semiconductors, from CPUs to memory chips, are manufactured using CMOS. The dimension 0.13-µm represents the current minimum circuit width, and this is the most advanced commercially available process technology for mass production.

*7: Multiplexer/demultiplexer

The multiplexer is a device that combines compressed video and audio data into one output stream (transport stream or program stream) in conformance with the MPEG-2 standard. The demultiplexer executes the reverse process.

*8: AD/DA converter

A device that converts analog signals into digital, and vice versa.

- Attachment 1 Outline of the ISIL chip

- Attachment 2 Typical CODEC system configuration using the ISIL chip

For further information, please contact:

NTT Cyber Communications Laboratory Group Planning Division, PR Section;

Ochiai / Yamashita / Hagino TEL: 046-859-2032 e-mail:ckoho@lab.ntt.co.jp

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