The PVR Market with CXD1922Q

Personal Video Recorder (PVR) project

The personal video recorder (PVR) market has launched and is mainly dominated by two major players: TiVo and Replay. This consumer electronics device dramatically changes and enhances the way we watch TV. PVRs allow consumers to record programs digitally on a hard disk drive and play them back the way they would like. Features such as "pausing live program," or "time shift" which plays back a live program with a small time delay, are among the features in these PVR devices.

Some of the challenges in designing a consumer device include the need for a small footprint and low power consumption (no cooling fan). At the same time, it is necessary to have a feature-rich product, which stands out from those offered by the competition.

One of the major functions inside a PVR is the MPEG-2 video encoder. Sony's CXD1922Q chip is the MPEG-2 Video Encoder that meets all these design challenges and has been designed into these PVR products. In addition to meeting the MPEG-2 specification, the device has special power saving circuitry. It also features wide search range motion estimation, resulting in high picture quality. The CXD1922Q achieves all these features in a single chip. Normally, the solution from competitors requires several chips. Other products like video servers, recordable DVD and future set-top-boxes which require MPEG-2 encoder, will also find the CXD1922Q a viable solution.

Why was the CXD1922Q chosen

Sony has developed extensive MPEG-2 capabilities aimed at advancing this core technology for consumer applications. The CXD1922Q is an MPEG-2 video encoder, which integrates motion estimation and encoding control on a single chip. Customers choose the CXD1922Q because of its low power consumption, highly integrated features, and system-friendly host interface. In addition, the CXD1922Q has a number of superior technical features such as motion estimation, which reduces external memory. Figure 1 shows the block diagram of the CXD1922Q requiring only simple external interfaces.

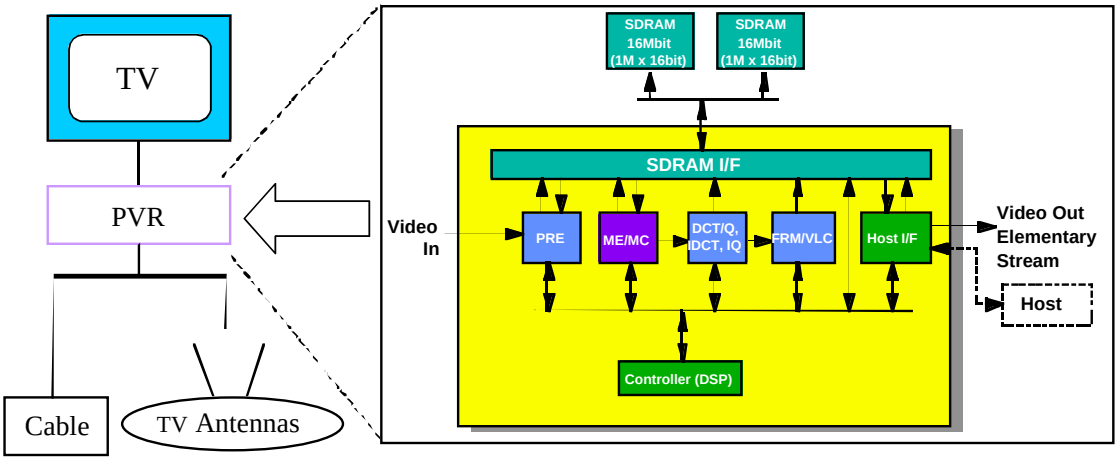

Figure 1. Block Diagram of CXD1922Q

By using an advanced adaptive motion estimation algorithm developed by Sony for efficient video compression processing, the chip expands existing search ranges to –288 to +297.5 horizontal pixels and –96 to +95.5 vertical pixels. This doubles the vertical range and triples the horizontal range of any previous Sony product. This is also the widest range of any product currently available on the market.

By using the adaptive motion algorithm optimized by Sony for the MPEG-2 standard, the CXD1922Q allows for the high quality recording and transmission of fast moving images with minimal image degradation. It significantly reduces the vast amount of arithmetic operations required for applications of this type. This is especially useful in video applications where the video camera is moved rapidly to capture the fast-motion of sporting events or other volatile activity.

Time-to-market factor

In today's highly competitive consumer electronics market, time-to-market is a critical factor in a product's success. Sony has long realized this critical factor in marketing semiconductor products for the consumer electronics market. Sony offers a complete evaluation board and documentation kit to facilitate evaluation of the CXD1922Q's features. Photo 1 shows the picture of the CXD1922Q evaluation board.

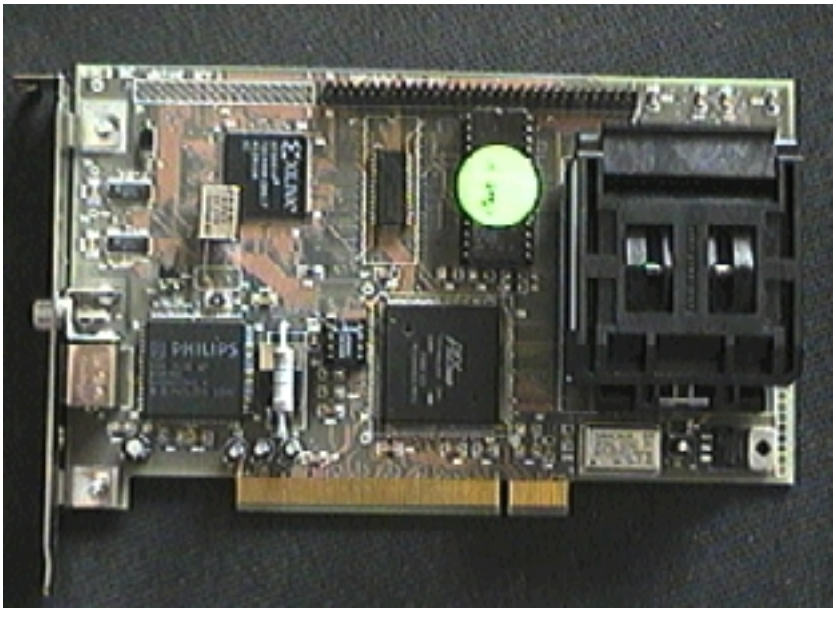

Photo 1. Block Diagram of CXD1922Q

Minimum Requirements:

- 166MHz PC, 32Mbit memory, 2-3GByte Hard Disk Space
- Windows 95 (rev B) operating system
- 1 free PCI slot
- MPEG2 hardware or software decoder

The evaluation board allows real-time MPEG2 encoding of video sources. The evaluation software contains features to test the common MPEG2 encoding parameters.

This board has a standard PCI-interface that can be plugged into a PC. The following table is the specification for the board.

Description	Half-size, PCI Card
MPEG Video Encoding	Real-time MPEG2 MP@ML, SP@ML
Encoding Format	4:2:0 Chroma format, Frame structure
Image Resolutions	NTSC 720x480 @ 30fps
Maximum Bit Rates	15Mbps (IPB frames), 25Mbps (I frame)
Video Input Formats	Composite video, S-video, CCIR-656 D1 (optional board required)
Computer Platform	Windows '95; (Power Macintosh support also available)
Software	Drivers, API, Application software: encoding parameter control, encoding preview

Table 1. CXD1922 PCI Board Specifications

On the software side, the evaluation kit comes with Window-based, stand-alone demo software. A very intuitive GUI interface menu is employed for all the operations. This allows the user to evaluate the features of the CXD1922Q with a minimum amount of effort. Please refer to the Evaluation Board User Manual for detailed operations. The following figures show samples of the demo software menus.

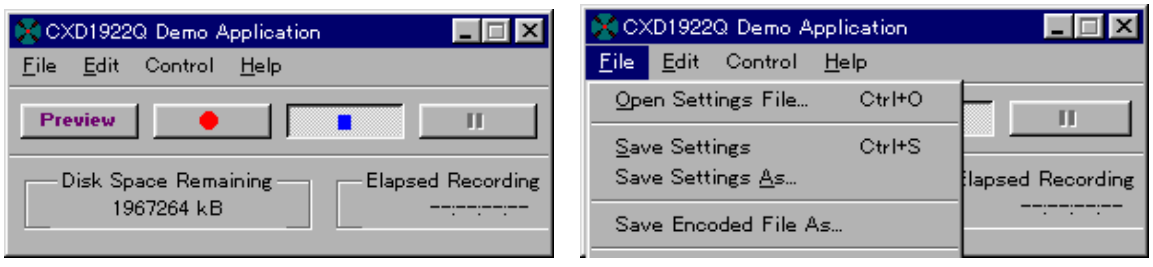

Figure 2. Encoding Control Window

Figure 3. MPEG Video Settings

Figure 4. Picture Settings Window

The CXD1922Q is an excellent choice for the consumer-oriented PVR market. It offers highly integrated, low power, feature-rich MPEG2 solution. The complete evaluation board and software for the product further reduces the time-to-market factor, resulting in early revenue realization.