SANYO

PRODUCT INFORMATION

Vol.102

Digital Servo DSP with On-Chip RF Amplifier Developed

CD player servo processing and decoding integrated on a single chip

LC78645E

Overview

The popularity of music has resulted in the widespread use of a wide range of audio media, such as cassette tape, CD, and MD. Recently, the consumer's options have expanded to include products that use semiconductor memory as the storage medium.
Still, the CD, with an annual worldwide market of 120 million units, remains the most popular format and is expected to retain its lead for the near future.

Since the CD player represents a mature market, particular aspects are desired in the components used in these products. The main desired properties are (1) the ability to provide stable performance for easy development of end products (In particular, this means reducing both the time and the number of employees required for end product development.) and (2) a small total parts count to improve reliability, to reduce manufacturing and parts costs and to increase production efficiency.
To respond to these needs, Sanyo has now developed the LC78645E super system-on-chip servo CD DSP that integrates an RF amplifier on the same chip.

Until now, even though a digital servo CD DSP has been used, CD players have required a separate bipolar IC to provide the required RF amplifier. Thus the main signal processing for CD playback has, until now, required a two-chip structure consisting of this bipolar IC and the CD DSP that handles the servo and digital later signal processing. The LC78645E is a super system-on-chip CD DSP that incorporates bipolar IC technology onto the MOS IC itself.

Use of the LC78645E allows both the parts count and the number of manufacturing steps to be reduced, and to increase end product reliability as a result. Furthermore, servo development support software can now be used to verify servo characteristics on a personal computer, an operation that had been extremely time consuming up to now.

Features

- Playback functions
  - — Audio CD playback (standard, 2×, and 4× speeds)

— Jitter-free playback (VCEC)
— CAV playback

• RF processing block
— RF system: AGC, support for CD-R and CD-RW playback, peak hold, bottom hold
— Error system: Tracking error signal generation (with balance adjustment), focus error signal generation, CD-RW playback support
— Track jump counter clock generation, jitter detection, defect (black, mirror) detection
— APC

• Servo control block
— All servo systems (tracking, focus, sled, and spindle) are implemented with digital processing.
— Automatic adjustment functions: focus gain, focus balance, focus offset, tracking gain, tracking offset, tracking balance
— Shock detection
— Interruption detection

• EFM processing block
— EFM signal synchronization detection, protection, and interpolation
— EFM signal demodulation
— Subcode P to W output
— Subcode Q output
— Jitter margin: ±13 frames
— Unscrambling and deinterleaving
— Error detection and correction (dual errors in both C1 and C2)
— Interpolation (quadruple interpolation)
— DOUT output

• Audio processing
— Digital attenuator
— Fadeout function
— Bilingual function
— 8× oversampling digital filters
— Digital deemphasis filter
— 1-bit D/A converter (third-order $\Delta\Sigma$ noise shaping)
— Second-order low-pass filter for audio output
— Supports external supply of DF and D/A converter clocks.

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Specifications

- Operating supply voltage: 3.3 V (The microcontroller interface also supports 5 V signal levels.)
- Package: QFP80 (14 × 14)

Sample Availability

The LC78645E will be available in sample quantities in mid-December 2000, and in production quantities in August 2001.

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PRODUCT INFORMATION

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