PRODUCT INFORMATION

Vol. 66

CD Player Chip Set with Integrated Microcontroller Developed

Intelligent DSP with standard software and servo IC with automatic adjustment functions

LA9251M, LC78601E, LC78602NE

Overview

The main functions provided by CD player system ICs consist of an RF amplifier, a servo block, a digital signal-processing block, memory, digital filters, D/A converters, and a microcontroller. Due to desires for rationalization of the manufacturing process, all of these functions except the microcontroller are usually integrated on a single special-purpose IC. Furthermore, the automatic adjustment technology used in the servo block has matured. However, there are still strong demands for further rationalization of CD player design, including the standardization of the CD player microcontroller software, which is currently a significant part of the new product development process.

Sanyo has now developed an new CD player chip set consisting of an ASP (the LA9251M) and a DSP (the LC78601E or LC78602NE). By integrating the microcontroller on chip and incorporating the standard CD player sequencing, this system chip set reduces the number of chips from the earlier servo plus DSP plus microcontroller three-chip structure to a two-chip structure that excludes the microcontroller chip, and thus can contribute to system rationalization and reduced development times. Furthermore, this chip set is optimally matched to the Sanyo popularly-priced CD94V5 CD mechanism, and can be applied in a wide range of products, from radio/cassette players that include a CD player, to music center products, to independent CD players.

The LA9251M is a servo signal-processing IC that includes an RF amplifier and adjustment functions. Since the tracking balance (EF balance) function executes in a self-completing manner internally to the IC, adjustment during manufacturing is not required. This IC also provides a follower operation that automatically sets the tracking gain and track detection level to be optimal for each disc played. This means that discs with low reflectivity can be played back under optimal conditions.

In addition to basic functions such as CD player signal processing, servo control, 8× oversampling digital filters, and a 1-bit D/A converter, the LC78601E and LC78602NE also provide display drivers, remote control input processing, and key acquisition and control processing. As a result, a system microcontroller is no longer required. The LC78601E supports 2-digit LCD display, and the LC78602NE supports 2-digit LED display.

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LA9251M

Features

- Automatic follower operation for optimized servo characteristics
- Increased performance and reliability, as well as reduced parts counts and manufacturing steps, provided by automatic adjustment functions.
- Improved track detection stability

Functions

- RF amplifier (I/V amplifier included)
- Servo amplifier
- Track detection
- Defect detection
- Shock detection
- Automatic adjustment function (EF balance)
- Automatic follower operation (tracking gain and track detection level)

Specifications

- Package: 64-pin QIP
- BIP structure
- 5 V single-voltage power supply

LC78601E and LC78602NE

Features

- Includes CD player microcontroller, two-digit display driver, and remote control input functions.
- Inclusion of standard CD player sequence control means that another microcontroller control is no longer required.
- Adjustment-free EFM PLL
- D/A converter using a delta-sigma technique based on a third-order noise shaper
- Overall system rationalization and improved reliability are possible since a microcontroller is not required.

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Functions

- Built-in 2-digit LCD display driver (LC78601E)
  Three-common and 6-segment outputs, 1/3 duty 1/2 bias drive
- Built-in 2-digit LED display driver (LC78602NE)
  Supports both dynamic display using digit scanning and static display.
- Remote control input function (Sanyo format, 3-bit custom code)
- Key matrix input for 8 keys
  - Play/Pause key
  - Stop/Clear key
  - FF/F-scan key
  - FB/B-scan key
  - Repeat (All/One) key
  - Random key
  - Program (16 tracks) key
  - Test key
- Built-in EFM PLL circuit
- Servo control
- 16K RAM on chip
- EFM data demodulation
- Digital outputs
- Interpolation, error detection and correction
- 8fs digital filters
- 1-bit D/A converter
- Analog low-pass filter

Specifications

- Package: 64-pin QIP
- Silicon gate CMOS structure
- 5 V single-voltage power supply

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Sample Availability

Samples of the LA9251M, LC78601E, and LC78602NE are available in August 1998; production quantities will be anticipated in October 1998

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