The Industry's First CD Digital Signal Processor with Built-in CD TEXT Decoder
CD Digital Signal Processing IC with Built-in Digital Servo Functions

CXD2587Q
CXD2588Q/R

CD TEXT is a format that allows additional text information (mainly album, artist, and song names) to be recorded on CDs.

Support for CD TEXT had appeared in both software and hardware by the end of 1995, and its use is expected to grow in the future.

The CXD2587Q and the CXD2588Q/R introduced here are the industry's first digital signal processing LSIs that incorporate CD TEXT decoder.

- ■ **On-chip CD TEXT decoder**
- ■ **Surf jump function** ∗1
- ■ **Fully adjustment free**
- ■ **Continuous playback at from 0.5 to 2× speed in CAV modes (CXD2588Q/R)**

∗1 Surf jump: A function that is effective when playing back discs with large eccentricities in systems that use optical pickups with low sensitivity in the low-frequency band. During track jumping on eccentric discs, there are cases where even if a large pulse-type drive voltage is generated, the pulses are hidden by large undulations in the drive waveform itself. To resolve this problem, these devices provide a mode in which the drive pulses that would have been hidden are added on top of the drive waveform.

◻ Built-in CD TEXT Decoder

CD TEXT is a new specification that adds a text function (information) to the earlier CD format. CD TEXT was announced by Philips and Sony in June 1996. Since earlier CD players only reproduce the music portions of the CD, it is fully compatible with earlier systems. This added information is recorded in the subcodes R through W in the lead-in area, which was previously unused. Individually, the subcodes R through W form 6-bit units, and sequences of these form an 18-byte unit called a pack. Error detection parity is included in that data. Decoding is required to acquire the text information, which may consist of up to a few hundred bytes. A special-purpose decoder circuit is required for decoding. Up to now, CD TEXT has been implemented by combining a special-purpose decoder circuit with the CD chip set. However, it is now possible to read out the CD TEXT data easily with circuits with a minimal printed circuit board area by using one of these recently developed Sony DSP products that includes a CD TEXT decoder on chip (See figure 1).

◻ Fully Adjustment Free

There are four points that require adjustment in CD systems: the focus balance, the focus gain, the tracking balance, and the tracking gain. (The laser brightness is handled as a separate item under the pickup system.) In a digital servo system (see figure 2), these four adjustment points can all be adjusted in the digital signal processing system. This means that the external variable resistors (trimmers) previously used for adjustment are no longer required. The focus balance is handled by a highly reliable technique in which the microcomputer reads out the result of a jitter measurement circuit that is part of the digital signal processing block. The tracking balance is handled by filtering the DC error component of the traverse signal and cancelling that component on the basis of the microcomputer judgment. To adjust the gain, the microcomputer issues and then terminates a single command for each of the gain items.

◻ Continuous Playback at from 0.5 to 2× Speed in CAV Modes (CXD2588Q/R)

The CLV (constant linear velocity) system is used for CD recording. The CXD2588Q/R can read out such discs using the CAV system, a technique in which the disc speed (angular velocity) is held constant. Discs can be read (played) at any speed in the range 0.5 to 2×.

V O I C E

In designing the pin configuration and functions of the CXD2587Q and CXD2588Q/R, we adopted as many of our customers' desires as possible. Although developed under a tight schedule, we are sure that these products will satisfy our customers. I would like to cooperate even more deeply with our customers in the future to design even better ICs.
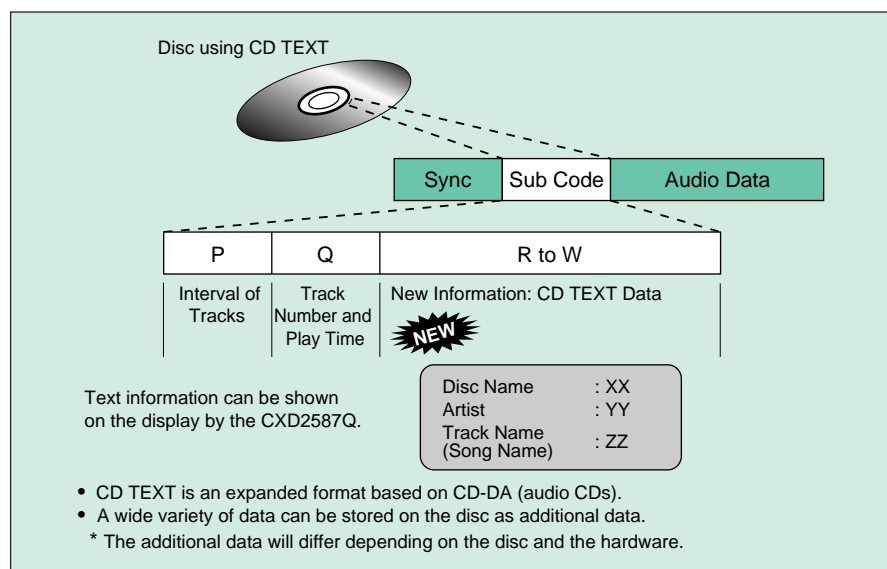
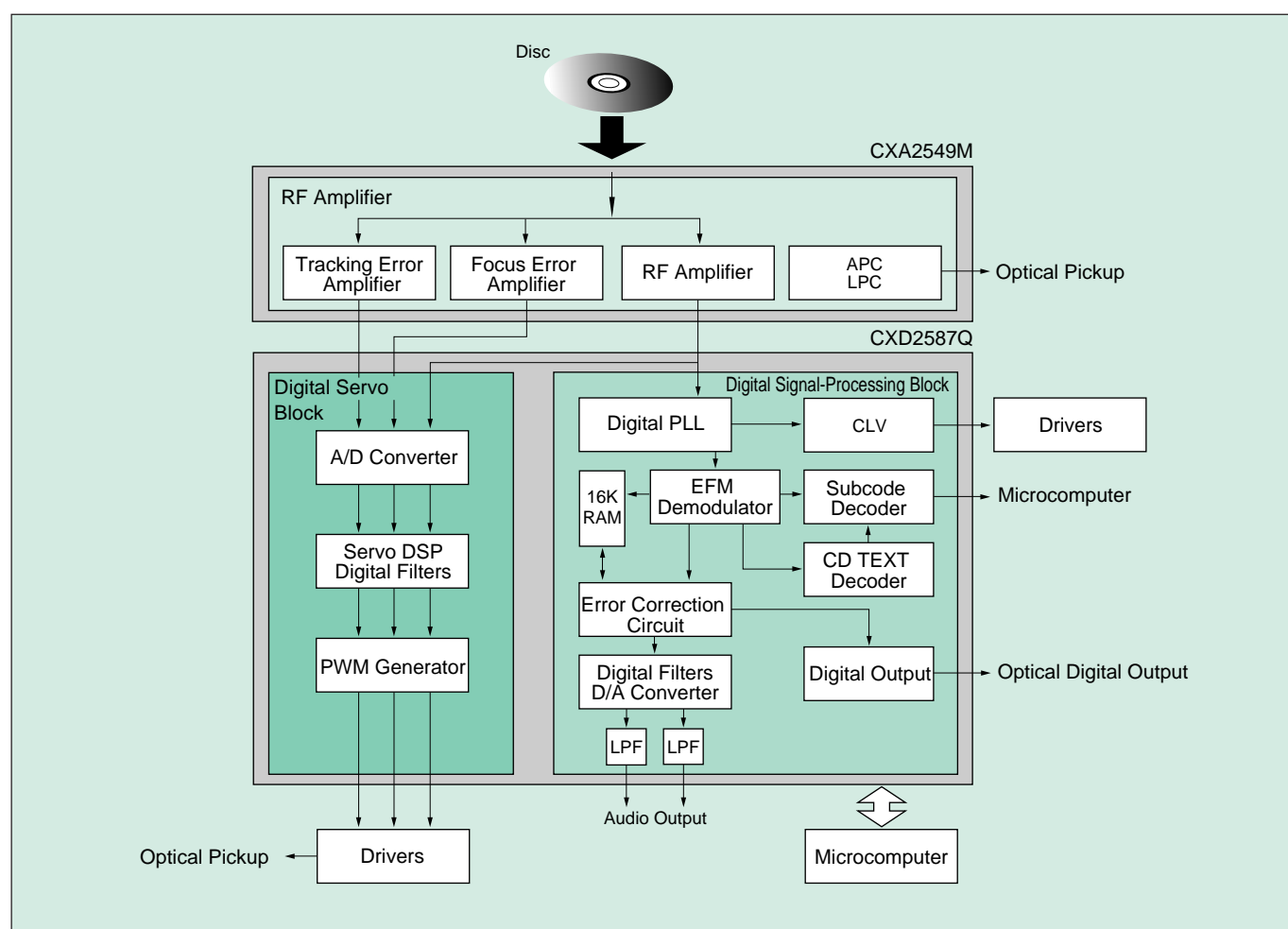■ **Figure 1   CD TEXT Conceptual Diagram**

Disc using CD TEXT

Sync	Sub Code	Audio Data

P	Q	R to W
Interval of Tracks	Track Number and Play Time	New Information: CD TEXT Data

NEW

Text information can be shown on the display by the CXD2587Q.

Disc Name	: XX
Artist	: YY
Track Name (Song Name)	: ZZ

- CD TEXT is an expanded format based on CD-DA (audio CDs).
- A wide variety of data can be stored on the disc as additional data.
  * The additional data will differ depending on the disc and the hardware.

■ **Figure 2   Digital Servo System that Supports CD TEXT**

Disc

CXA2549M

RF Amplifier

Tracking Error Amplifier	Focus Error Amplifier	RF Amplifier	APC LPC

→ Optical Pickup

CXD2587Q

Digital Servo Block

A/D Converter

Servo DSP Digital Filters

PWM Generator

Optical Pickup ← Drivers

Digital Signal-Processing Block

Digital PLL

CLV → Drivers

16K RAM

EFM Demodulator

Subcode Decoder → Microcomputer

CD TEXT Decoder

Error Correction Circuit

Digital Filters D/A Converter

Digital Output → Optical Digital Output

LPF LPF

Audio Output

Microcomputer