Ordering number : EN ———

CMOS IC

LC897193

ATAPI/IDE-Interface CD-ROM decoder IC

Preliminary

Functions

Fully CAV compatible CD-DSP function, CD-ROM function, built-in ATAPI (IDE) I/F, built-in DVD-RAM IF

Features

CD-ROM decoder, ATAPI (IDE) I/F block

- 24× speed fully CAV compatible
- Built-in ATAPI (IDE) I/F
- 16-bit DRAM (FPM, EDO) connectable (8-bit DRAM connectable)
- Up to 32 Mbits of buffer RAM connectable (when using DVD I/F) (CD-ROM connectable up to 4 Mbits)
- CD main channel and C2 flag areas in buffer RAM can be freely set by user
- Built-in batch transfer function (function for sending CD main channel, C2 flag, etc. at one time)
- Built-in multi block transfer function (function for sending several blocks at one time)
- Built-in DVD-ECC I/F
- Built-in intelligent functions
- Inter-memory transfer function
- Fixed data embedding function

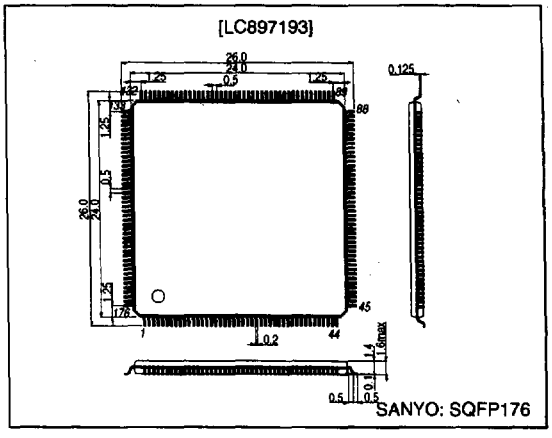
CD-DSP Block

- Slices the interface input signal at precision levels, converts the result to the EFM signal, and compares the phase with the built-in Vage-controlled oscillator.
- Generates the standard clock and other internal timing signals necessary from an external 16.9344-MHz crystal oscillator
- Detects, protects, and inserts frame synchronization signals to ensure stable data readout
- Demodulates the EFM signal to derive 8-bit symbol data
- Checks the CRC of the subcode Q signal and communicates with the microcontroller using parallel I/O
- Descrambles and de-interleaves by rearranging the demodulated EFM signal in the specified order
- Detects and corrects error signals and processes flags (C1 : dual error correction, C2 : quadruple error correction)
- Derives the C2 flag from the C1 flag and C2 check and uses it to interpolate the signal for muting. The interpolation circuit uses binary interpolation so that the C2 flag converges to the muting level at least two points.
- Uses 8-bit parallel input to receive commands from the microcontroller for jumping tracks, starting/stopping the disc motor, enabling/disabling muting, determining the track count, etc
- Supports arbitrary track count
- Built-in CAV-AUDIO support
- Uses zero cross muting
- Built-in eightfold oversampling and digital filter
- Built-in digital-to-analog converter (PWM output)
- Separate built-in digital attenuators (with 8-bit precision) for left and right channels
- Built-in digital de-emphasis
- Bilingual support

Package Dimensions

unit: mm

3230-SQFP176



Specifications

Absolute Maximum Ratings at V_{SS} = 0 V

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{DD} max	Ta = 25°C	–0.3 to +7.0	V
Input/output voltage	$V_I V_O$	Ta = 25°C	–0.3 to V_{DD} +0.3	V
Allowable power dissipation	Pd max	Ta ≤ 70°C	500 *2	mW
Operating temperature	Topr		–30 to +70	°C
Storage temperature	Tstg		–55 to +125	°C
Soldering temperature (pin part only)		10s	235	°C
Input/output current	I_I, I_O		±20 *1	mA

Note: *1 Per 1 input/output reference cell
*2 Implement heat dissipation measures, for example by inserting a radiating sheet.
For details, contact a SANYO sales representative.

Allowable Operating Ranges at Ta = –30 to +70°C, V_{SS} = 0 V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply voltage	V_{DD}		4.75	5.0	5.25	V
Input voltage range	V_{IN}		0		V_{DD}	V
[Internal Cell Power Supply]						
Supply voltage	V_{DD}		3.9		4.1	V
Input voltage range	V_{IN}		0		V_{DD}	V

DC Characteristics at Ta = –30 to +70°C, V_{SS} = 0 V, V_{DD} = 4.75 to 5.25 V

Parameter	Symbol	Conditions	Ratings			Unit	Applicable pins*
			min	typ	max		
High-level input voltage	V_{IH}	TTL levels	2.2	—	—	V	10, 13
Low-level input voltage	V_{IL}		—	—	0.8	V	
High-level input voltage	V_{IH}	TTL levels	2.2	—	—	V	1
Low-level input voltage	V_{IL}	with pull-up resistor	—	—	0.8	V	
High-level input voltage	V_{IH}	TTL levels	2.2	—	—	V	15
Low-level input voltage	V_{IL}	With pull-down resistor	—	—	0.8	V	
High-level input voltage	V_{IH}	TTL levels	2.4	—	—	V	2, 3
Low-level input voltage	V_{IL}	Schmitt	—	—	0.8	V	
High-level input voltage	V_{IH}	CMOS levels	0.7 V_{DD}	—	—	V	14
Low-level input voltage	V_{IL}		—	—	0.3 V_{DD}	V	
High-level input voltage	V_{IH}	CMOS levels	0.8 V_{DD}	—	—	V	4
Low-level input voltage	V_{IL}	Schmitt	—	—	0.2 V_{DD}	V	
High-level output voltage	V_{OH}	I_{OH} = –2 mA	V_{DD} – 2.1	—	—	V	5, 1, 9,
Low-level output voltage	V_{OL}	I_{OL} = 2 mA	—	—	0.4	V	10, 15
High-level output voltage	V_{OH}	I_{OH} = –4 mA	V_{DD} – 2.1	—	—	V	3, 6
Low-level output voltage	V_{OL}	I_{OL} = 24 mA	—	—	0.4	V	
High-level output voltage	V_{OH}	I_{OH} = 2 mA	—	—	0.4	V	7, 11
Low-level output voltage	V_{OL}	I_{OL} = 24 mA	—	—	0.4	V	12
Input leak current	I_{IL}	V_I = V_{SS}, V_{DD}	–10	—	+10	µA	2, 3, 4, 10, 15
Output leak current	I_{OZ}	During high-impedance output	–10	—	+10	µA	3, 6, 7, 10, 12, 15
Pull-up resistance	R_{UP}		40	80	160	kΩ	1, 11
Pull-down resistance	R_{DN}		40	80	160	kΩ	10, 15

Note: * Applicable pin sets are as follows.

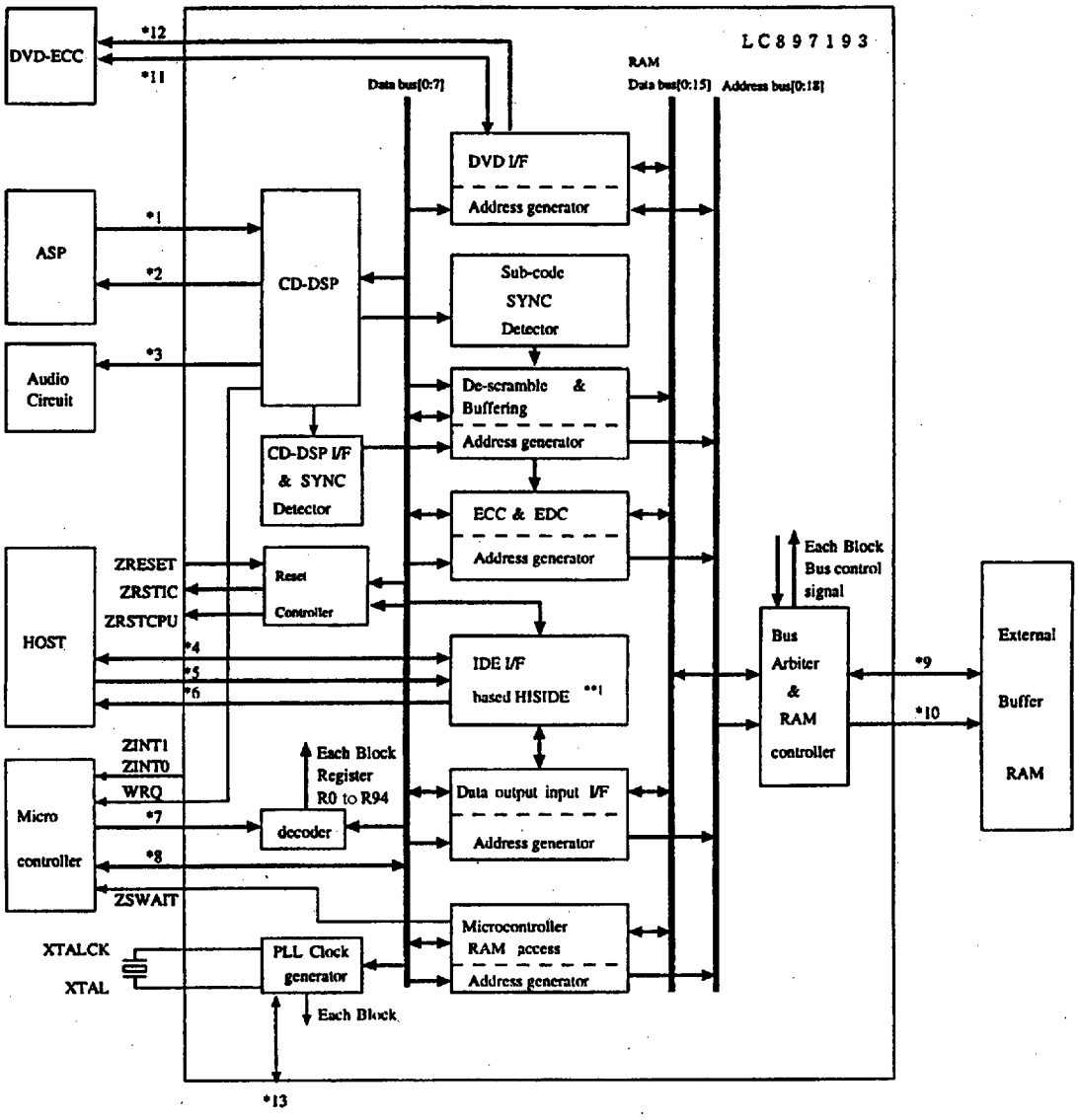
INPUT
2: ZRESET, ZDMACK, ZHRST, DA0 to DA2, ZCS1FX, ZCS3FX, ZDIOR, ZDIOW, FG
4: ZCSCTRL, ZCS, ZRD, ZWR, HFL, TES
14: DEFI
13: SUA0 to SUA6

OUTPUT
6: DMARQ, HINTRQ
5: RA0 to RA8, ZRAS0, ZCAS0, ZOE, ZUWE, ZLWE, C2F, ROMXA, FSX, EFLG, PCK, FSEQ, TOFF, TGL, 4.2M, WRQ, RWC, COIN, ZCQCK, RCHP, RCHN, LCHP, LCHN
7: ZRSTCPU, ZRSTIC
9: JP+, JP–, SPO
11: ZINT0, ZINT1, ZSWAIT
12: IORDY, ZIOCS16

INPUT/OUTPUT
1: D0 to D7, IO0 to IO15
3: DD0 to DD15, ZDASP, ZPDIAG
10: IOP0 to IOP7
15: DRESP, DREQ

Note: Pins XTAL, XTALCK, R0, VCNT0, PD00, R1, VCNT1, P011, P021, BSN1, R2, VCNT2, P012, P022, and BSN2 are not included in DC characteristics. For 1-bit DAC, measurement was made using only a logic tester, and analog measurement was not performed.

Block Diagram



*1 DEFI, EFMI, HFL, TES
*2 4.2M, EFMO, PCK, FSEQ, TOFF, TGL, JP+, JP−, RWC, COIN, ZCQCK
*3 RCHP, RCHN, LCHP, LCHN
*4 DD0 to DD15, ZDASP, ZPDIAG
*5 ZCS1FX, ZCS3FX, DA0 to DA2, ZDIOR, ZDIOW, ZDMACK, ZHRST
*6 DMARQ, HINTRQ, ZIOCS16, IORDY
*7 ZRD, ZWR, ZCS, ZCSCTRL, SUA0 to 6
*8 D0 to D7
*9 IO0 to IO15
*10 RA0 to RA8 (RA9), ZRAS0 (ZRAS1), ZCAS0, ZOE, ZUWE, ZLWE
*11 IOP0 to IOP7 (HDB0 to HDB7), DREQ, DRESP
*12 (HDBDIR)
*13 R0, VCNT0, PDO0
**1 HISIDE (WD25C32) is made by WESTERN DIGITAL.