



LC89512W

CD-ROM Error Correction LSI with Built-In SCSI Interface

Preliminary

Overview

The LC89512W integrates a real-time error correction circuit and a SCSI interface in a single chip.

Functions

- CD-ROM error correction function, subcode readout function, SCSI interface

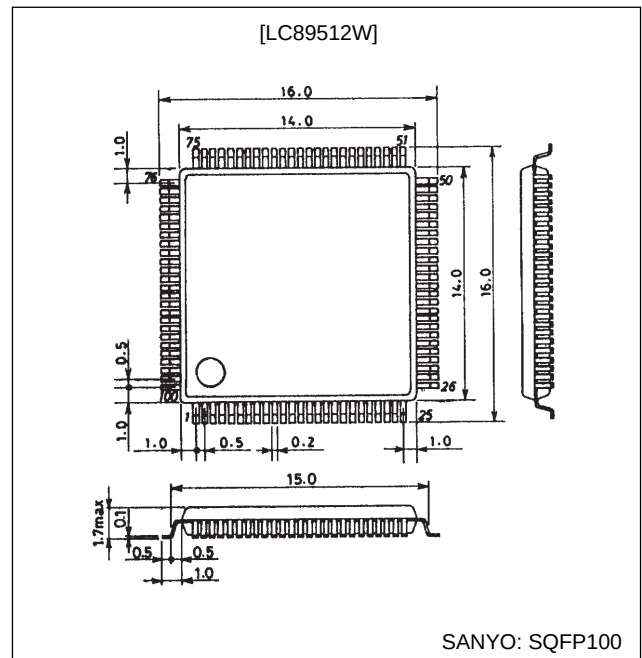
Features

- Support for double-speed drives at an operating frequency of 16.9344 MHz
Either SRAM (120 ns), DRAM (80 ns) or pseudo SRAM (85 ns) can be used.
- Support for quad-speed drives at an operating frequency of 33.8688 MHz
SRAM (70 ns) must be used.
- Built-in SCSI interface with built-in 48 mA sink buffer (Only the TARGET function is supported.)
- Built-in 12-byte output FIFO for sub-CPU to host computer data transmission
- Built-in 12-byte input FIFO for host computer to sub-CPU data transmission
- Subcode data can be written to buffer RAM and the sub-CPU can read the subcode values by connecting the LC89512 to the CD-DSP subcode pin.
- Sub-CPU access of buffer RAM through the LC89512
- Built-in function for buffer RAM internal data transfer
- Pseudo-SRAM (128-kword $\times$ 8-bit and smaller) can be used.
- DRAM (two 256-kword $\times$ 4-bit chips or two 1-Mword $\times$ 4-bit chips) can be used.
- Transfer speeds:
2.8 MB/second (asynchronous mode) (for CD-ROM decode only operation)
4.2 MB/second (synchronous mode) (CD-ROM decode operation is not supported in synchronous mode)
Both of these transfer modes use a 16.9344 MHz clock. (The transfer speed depends on the frequency used.)
- Operating frequencies: 16.9344 MHz (up to double speed), 33.8688 (quad speed)

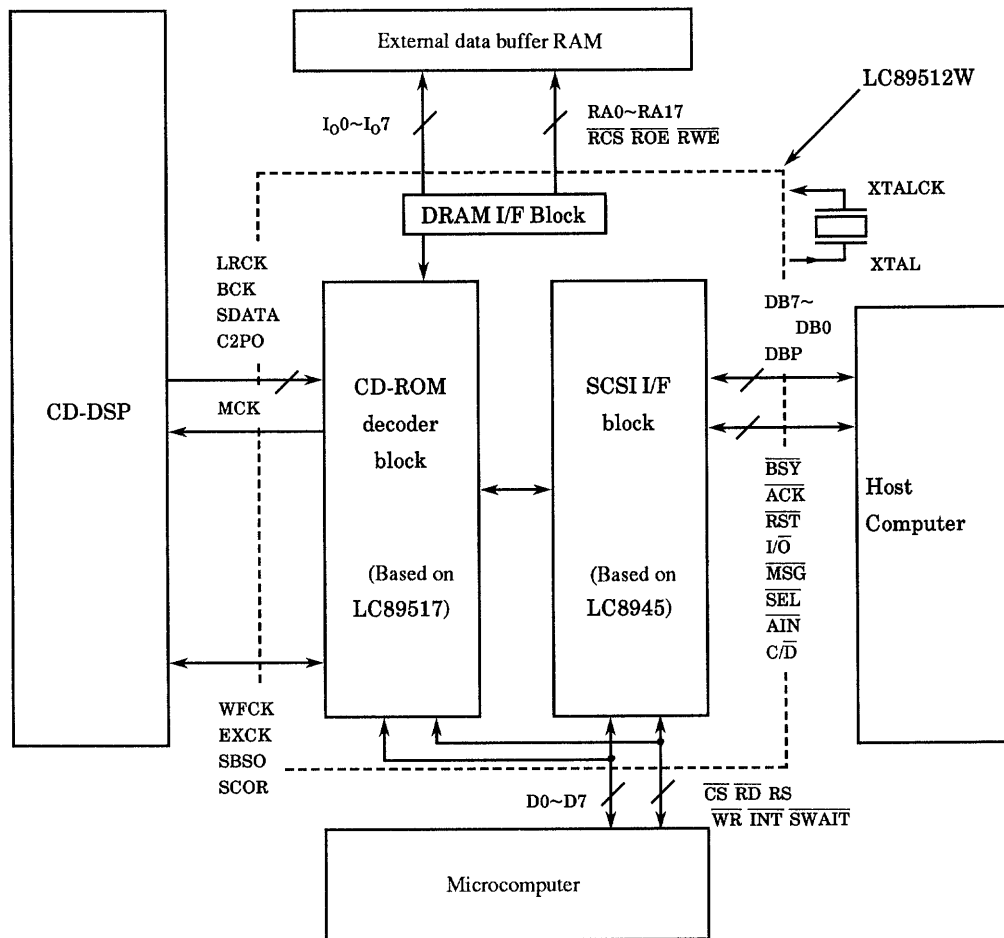
Package Dimensions

unit: mm

3181A-SQFP100



Block Diagram



LC89512W

Pin Functions

Type: I: Input pin, O: Output pin, B: Bidirectional pin, P: Power supply pin, NC: No connection pin

Pin No.	Pin	Type	Function
1	$\overline{\text{DB7}}$	B	SCSI connection
2	V_{SS1}	P	
3	$\overline{\text{DBP}}$	B	SCSI connection
4	$\overline{\text{ATN}}$	B	SCSI connection
5	V_{SS1}	P	
6	$\overline{\text{BSY}}$	B	SCSI connection
7	$\overline{\text{ACK}}$	B	SCSI connection
8	V_{SS1}	P	
9	$\overline{\text{RST}}$	B	SCSI connection
10	$\overline{\text{MSG}}$	B	SCSI connection
11	V_{SS1}	P	
12	$\overline{\text{SEL}}$	B	SCSI connection
13	C/D	B	SCSI connection
14	V_{SS1}	P	
15	$\overline{\text{REQ}}$	B	SCSI connection
16	I/O	B	SCSI connection
17	V_{SS0}	P	
18	I_{O0}	B	Data buffer RAM data signals These pins have built-in pull-up resistors.
19	I_{O1}	B	
20	I_{O2}	B	
21	I_{O3}	B	
22	I_{O4}	B	
23	I_{O5}	B	
24	I_{O6}	B	
25	I_{O7}	B	
26	$\overline{\text{INT1}}$	O	SCSI block interrupt request signal output (set using a register)
27	V_{SS0}	P	
28	V_{SS0}	P	
29	D0	B	Microprocessor data signals These pins have built-in pull-up resistors.
30	D1	B	
31	D2	B	
32	D3	B	
33	D4	B	
34	D5	B	
35	D6	B	
36	D7	B	
37	$\overline{\text{INT0}}$	O	Microprocessor interrupt request signal output
38	XTALCK	I	Crystal oscillator circuit input
39	XTAL	O	Crystal oscillator circuit output
40	V_{SS0}	P	
41	V_{DD}	P	
42	RA0	O	Data buffer RAM address signal outputs
43	RA1	O	
44	RA2	O	
45	RA3	O	
46	RA4	O	
47	RA5	O	
48	RA6	O	
49	RA7	O	
50	RA8	O	
51	RA9	O	
52	RA10	O	
53	RA11	O	

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Pin No.	Pin	Type	Function
54	RA12	O	Data buffer RAM address signal outputs
55	RA13	O	
56	RA14	O	
57	RA15	O	
58	RA16	O	
59	RA17	O	
60	V _{DD}	P	
61	V _{SS0}	P	
62	RESET	I	Reset
63	TEST1	I	Test inputs. These pins should be tied low in normal operation.
64	TEST2	I	
65	TEST3	I	
66	WFCK	I	Subcode I/O
67	SBSO	I	
68	SCOR	I	
69	SDATA	I	Serial data input
70	BCK	I	Serial data input clock
71	LRCK	I	44.1 kHz strobe signal input
72	C2PO	I	C2 pointer input
73	RD	I	Microprocessor data read signal input
74	WR	I	Microprocessor data write signal input
75	CS	I	Chip select signal input (from the microprocessor)
76	RS	I	Register selection signal input
77	V _{SS0}	P	
78	SWAIT	O	Sub-CPU wait signal
79	EXCK	O	Sub code I/O
80	MCK	O	Crystal oscillator frequency output
81	TEST0	I	Test inputs. These pins should be tied low in normal operation
82	RCS	O	RAM chip select
83	RWE	O	RAM data write signal output
84	ROE	O	RAM data read signal output
85		NC	
86		NC	
87		NC	
88		NC	
89	V _{DD}	P	
90	V _{SS1}	P	
91	DB0	B	SCSI connection
92	DB1	B	SCSI connection
93	V _{SS1}	P	
94	DB2	B	SCSI connection
95	DB3	B	SCSI connection
96	V _{SS1}	P	
97	DB4	B	SCSI connection
98	DB5	B	SCSI connection
99	V _{SS1}	P	
100	DB6	B	SCSI connection

Type: I: Input pin, O: Output pin, B: Bidirectional pin, P: Power supply pin, NC: No connection pin

Note: 1. NC must be left open. Do not connect any signals to these pins.

2. V_{SS0} is the logic system ground and V_{SS1} is the SCSI interface ground. (from the standard cell version)

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Specifications

Absolute Maximum Ratings at $V_{SS} = 0\text{ V}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{DD} max	$T_a = 25^\circ\text{C}$	-0.3 to +7.0	V
I/O voltages	V_I V_O	$T_a = 25^\circ\text{C}$	-0.3 to $V_{DD} + 0.3$	V
Allowable power dissipation	P_d max	$T_a \leq 70^\circ\text{C}$	350	mW
Operating temperature	T_{opr}		-30 to +70	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +125	$^\circ\text{C}$
Soldering thermal stress limit (pins only)		10 seconds	260	$^\circ\text{C}$

Allowable Operating Ranges at $T_a = -30$ to $+70^\circ\text{C}$, $V_{SS} = 0\text{ V}$

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply voltage	V_{DD}		4.5	5.0	5.5	V
Input voltage range	V_{IN}		0		V_{DD}	V

DC Characteristics at $T_a = -30$ to $+70^\circ\text{C}$, $V_{SS} = 0\text{ V}$, $V_{DD} = 4.5$ to 5.5 V

Parameter	Symbol	Conditions	min	typ	max	Unit
Input high level voltage	V_{IH1}	All input pins other than (1), (3), and XTALCK	2.2			V
Input low level voltage	V_{IL1}				0.8	V
Input high level voltage	V_{IH2}	$\overline{\text{RESET}}$, I_{O0} to I_{O7} , $D0$ to $D7$, $\overline{\text{RD}}$, $\overline{\text{CS}}$, $\overline{\text{WR}}$, $\overline{\text{WFCK}}$,	2.5			V
Input low level voltage	V_{IL2}	SBSO and $\text{SCOR}(1)$			0.6	V
Input high level voltage	V_{IH3}	$\overline{\text{ACK}}$, $\overline{\text{ATN}}$ and the input pins (3)	2.0			V
Input low level voltage	V_{IL3}				0.8	V
Output high level voltage	V_{OH1}	$I_{OH1} = -3\text{ mA}$: I_{O0} to I_{O7} , $D0$ to $D7$ and all output pins other than (2), (3) and XTALCK	2.4			V
Output low level voltage	V_{OL1}	$I_{OL1} = 3\text{ mA}$: I_{O0} to I_{O7} , $D0$ to $D7$ and all output pins other than (2), (3) and XTALCK			0.4	V
Output low level voltage	V_{OL2}	$I_{OL2} = 3\text{ mA}$: $\overline{\text{INT1}}$ and $\overline{\text{INT0}}$ (pull-up resistor open drain) (2)			0.4	V
Output low level voltage	V_{OL3}	$I_{OL3} = 48\text{ mA}$: $\overline{\text{DB0}}$ to $\overline{\text{DB7}}$, $\overline{\text{DBP}}$, BSY , I/O , $\overline{\text{MSG}}$, $\overline{\text{SEL}}$, $\overline{\text{RST}}$, $\overline{\text{REQ}}$, C/D (2)			0.4	V
Input leakage current	I_L	$V_I = V_{SS}$, V_{DD} : All input pins	-25		+25	μA
Pull-up resistance	R_{UP}	I_{O0} to I_{O7} , $D0$ to $D7$, $\overline{\text{INT1}}$ and $\overline{\text{INT0}}$	40	80	160	$\text{k}\Omega$

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