Ordering number : EN3215B

CMOS LSI

SANYO No.3215B

LC8955

CD-I Format ADPCM Data Replay LSI

Overview

The Sanyo LC8955 is a stereo/mono replay LSI for CD-I format ADPCM data. In addition to an ADPCM decoding circuit, the LC8955 also incorporates a DMA interface, buffer RAM interface and a D/A converter serial interface.

The LC8955 interfaces directly with the Sanyo LC8951 Real-time Error-correction and Host Interface Processor, allowing a CD-I replay system to be configured easily.

The LC8955 is designed to operate with a host microprocessor which sets the operating mode. It operates from a single 5V supply, and is available in 80-pin plastic QIPs.

Features

- Real-time ADPCM decoder LSI
- Direct interface to Sanyo's LC8951 error-correction LSI for high-speed data transfer
- Data transfer under program or DMA control
- Independent data and control busses in auto-request transfer
- 8K byte external static RAM interface
- Buffers up to 64 ADPCM sound groups in external RAM
- DAC interface circuit
- 80-pin plastic QIP

Functional Description

The LC8955 is divided into three major functional blocks.

ADPCM Input Block

The ADPCM input block has three data input modes, selected by setting internal registers.

① Auto-request transfer

Data is transferred automatically into the LC8955's data port without CPU intervention. A number of handshaking signals control data transfer. The input device can be an LC8951 Real-time Error-correction and Host Interface Processor or another CD-ROM output device.

② Program transfer

The CPU writes each byte of data directly into the LC8955 under program control. Data is transferred using the CPU data bus.

③ DMA transfer

Data is written into the LC8955 by an external DMA controller using the CPU data bus. Up to 64 ADPCM sound groups can be written to an external 8K byte buffer RAM. One sound group consists of 128 bytes of CD-I data.

The LC8955 then decodes data in the buffer without intervention from the CPU or DMA controller, leaving these devices free for other tasks.

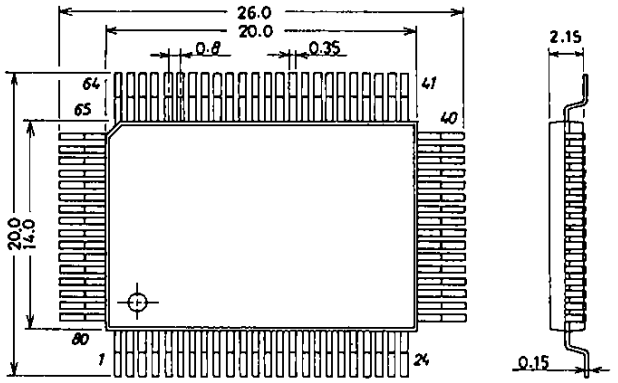
Decoder Block

The decoder block converts the ADPCM data into 16-bit linear PCM data. Decoding parameters can either be set by the CPU, or read from subheader information in the ADPCM data stream.

DAC Interface Block

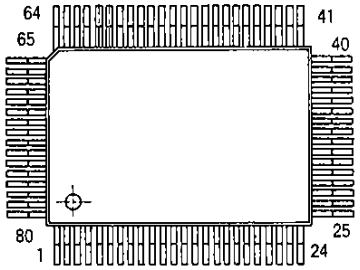
Two output formats are available. The first is suitable for input to Sanyo's LC7883, 7883M DA converters, and the second is the standard CD-I format. The output circuit will also accept CD-DA format input data and, by setting an LC8955 internal register, switch it through to the output pins without processing.

Package Dimensions (unit: mm) 3044B-Q80AIC



SANYO: QIP80A

Pin Assignment



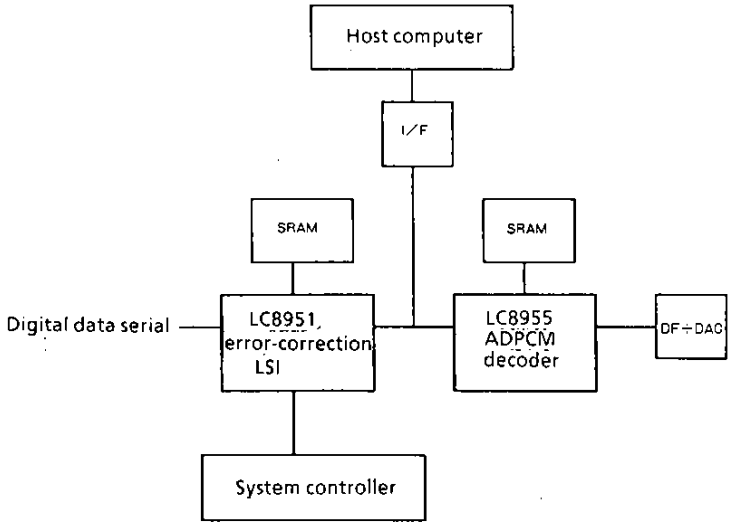
Type
- I : Input pin
- O : Output pin
- B : Bidirectional pin
- P : Power supply pin
- NC : No connection

Note) All V_{DD} and V_{SS} pins should be connected to the positive supply or ground.

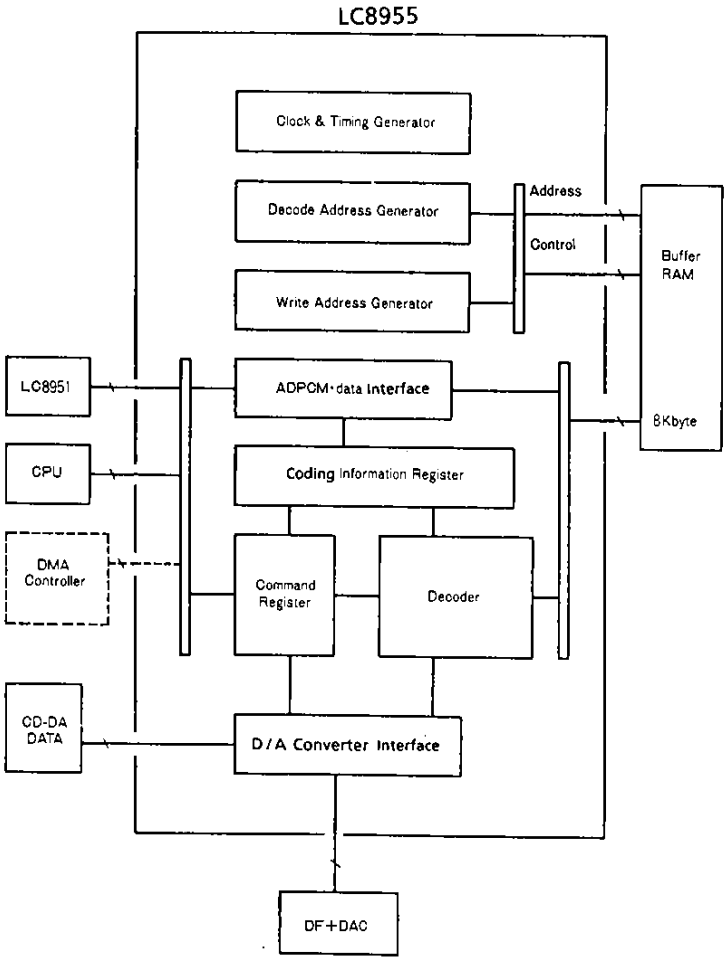
No.	Pin Name	Type
1	T2	I
2	T1	I
3	OUTSET	I
4	Vss	P
5	A12	O
6	A11	O
7	A10	O
8	A9	O
9	A8	O
10	A7	O
11	A6	O
12	A5	O
13	Vss	P
14	A4	O
15	A3	O
16	A2	O
17	A1	O
18	A0	O
19	MWEB	O
20	MCSB	O
21	Vss	P
22	IO7	B
23	IO6	B
24	IO5	B
25	IO4	B
26	IO3	B
27	IO2	B
28	IO1	B
29	IO0	B
30	DD7	I
31	VDD	P
32	DD6	I
33	DD5	I
34	DD4	I
35	DD3	I
36	DD2	I
37	DD1	I
38	DD0	I
39	EFLAG	I
40	READB	O

No.	Pin Name	Type
41	WAITB	I
42	MCK	I
43	DTENB	I
44	EOPB	I
45	SD7	B
46	SD6	B
47	SD5	B
48	SD4	B
49	SD3	B
50	SD2	B
51	SD1	B
52	Vss	P
53	SD0	B
54	SA1	I
55	SA0	I
56	CSB	I
57	RDB	I
58	WRB	I
59	BUSY	O
60	BUFFULL	O
61	UNDFLOW	O
62	DATAEMP	O
63	MEMPHAS	O
64	MBITSPL	O
65	MSPLFRQ	O
66	MSTEMON	O
67	RESETB	I
68	LRCLK	O
69	WCLK	O
70	DATA	O
71	BCLK	O
72	CLRCLK	I
73	VDD	P
74	CWCLK	I
75	CDATA	I
76	CBCLK	I
77	REQB	O
78	DACKB	I
79	READYB	O
80	DONEB	I

System Diagram



Block Diagram



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

Parameter	Symbol	Condition	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	350	mW
Operating Temperature	**Topr**		−30 to +70	°C
Storage Temperature	Tstg		−55 to +125	°C
Solder Temperature		10sec.,dipping of pins only	260	°C

Allowable Operating Conditions at Ta=−30 to +70°C,$V_{SS}=0V$

Parameter	Symbol	Ratings			Unit
		min	typ	max	
Supply Voltage	V_{DD}	4.5	5.0	5.5	V
Input Voltage Range	V_{IN}	0		V_{DD}	V

DC Characteristics at $V_{SS}=0V$,$V_{DD}=4.5$ to 5.5V,Ta=−30 to +70°C

Parameter	Symbol	Applicable Pins	Condition	Ratings			Unit
				min	typ	max	
Input 'H'-Level Voltage	V_{IH1}	All input pins except RESETB, EOPB, IO7 to 0, SD7 to 0		2.2			V
Input 'L'-Level Voltage	V_{IL1}					0.8	V
Input 'H'-Level Voltage	V_{IH2}	RESETB, EOPB, IO7 to 0, SD7 to 0		2.5			V
Input 'L'-Level Voltage	V_{IL2}					0.6	V
Output 'H'-Level Voltage	V_{OH}	All output pins	$I_{OH}=-3mA$	2.4			V
Output 'L'-Level Voltage	V_{OL}		$I_{OL}=3mA$			0.4	V
Input Leakage Current	I_L	All input pins	$V_I=V_{SS}$,V_{DD}	−25		25	μA
Pull-up Resistor	R_{UP}	IO0 to 7, SD0 to 7		10	20	40	kΩ