

SHARP**NEW PRODUCT
INFORMATION****PRELIMINARY****LH1511/LH1512****100-Output Common Driver/
80-Output Segment Driver****■ Description**

The LH1511 is a 100-output LCD common driver, and its bidirectional data I/O pins provide four kinds of data shifting with pin selectable.

The LH1512 is an 80-output LCD segment driver which provides a 4-bit parallel input mode with a chip select function.

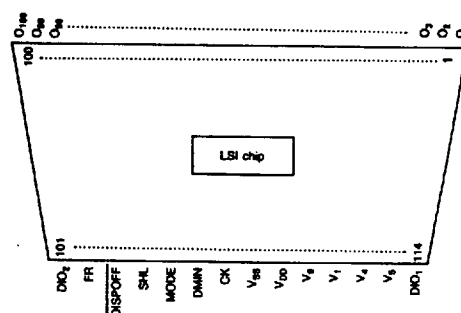
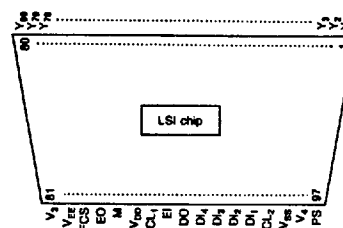
Both devices are operated on 3V power supply for use in battery back-up system of a high resolution dot-matrix LCD unit with low power consumption.

■ Features

1. CMOS process
2. LCD drive voltage: -20 to -10V
3. LCD drive outputs:
100 for LH1511
80 for LH1512
4. Low power consumption
5. Shift clock frequency:
100KHz (MAX.) for LH1511
2.5MHz (MAX.) for LH1512
6. Logic power supply: -5.5 to -3.0V
7. Package:
114-pin TAB (TCP) for LH1511
97-pin TAB (TCP) for LH1512
*TCP: Tape Carrier Package

LH1511

1. 100 bidirectional shift register (available for 50×2)
2. Usable under single mode (100×1) or dual mode (50×2) shift register
 - 1) $O_1 \rightarrow O_{100}$ Single mode
 - 2) $O_{100} \rightarrow O_1$
 - 3) $O_1 \rightarrow O_{50}$, $O_{51} \rightarrow O_{100}$ Dual mode
 - 4) $O_{100} \rightarrow O_{51}$, $O_{50} \rightarrow O_1$
3. 4 kinds of data shifting with pin selectable
4. A couple of input pins (DIO₁, DIO₂)
4. Low output impedance

■ Pin Connections**114-pin TAB (TCP)****97-pin TAB (TCP)**

* Package drawing is not specified in shape.
A variety of outline dimensions are available
on customers' request.

Top View**LH1512**

1. 4-bit parallel input mode
2. Automatic count for 80 input data to stop internal clock, in chip select

LH1511/LH1512

100-Output Common Driver/80-Output Segment Driver

■ Pin Description

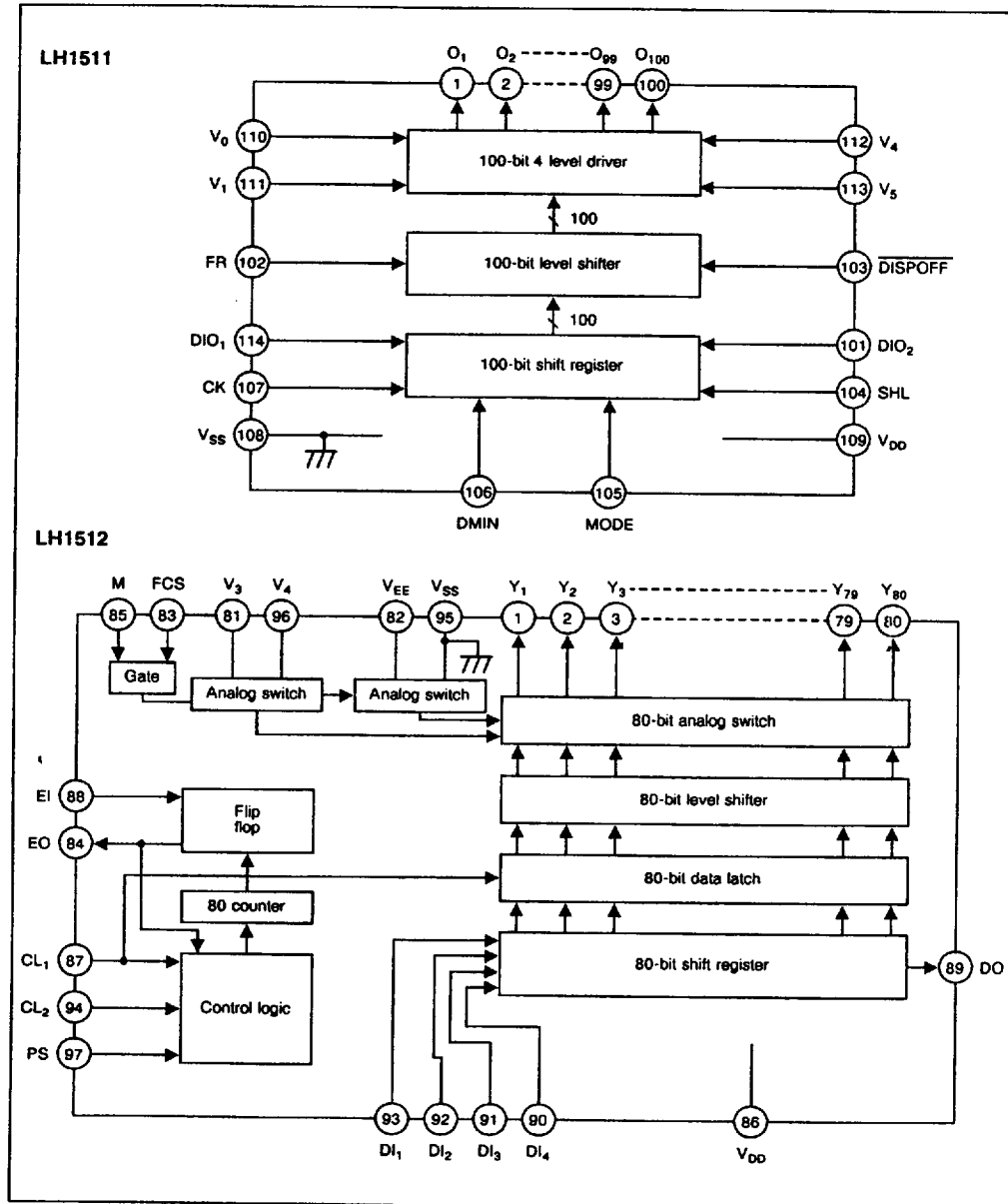
○ LH1511

Symbol	Circuit type	Pin name
V _{DD}	—	Power supply for logic system (– 5.5 to – 3.0V)
V _{SS}	—	Ground (0V)
V ₀ , V ₁ , V ₄ , V ₅	—	Bias power supply for LCD drive
DIO ₁ , DIO ₂	I/O	Data input/output for bidirectional shift register
CK	I	Clock pulse input for bidirectional shift register
SHL	I	Shift direction selector for bidirectional shift register
DISPOFF	I	Control input for nonselect output level
FR	I	AC-converting signal input for LCD drive waveform
MODE	I	Single mode/dual mode selection
DMIN	I	Dual mode data input
O ₁ -O ₁₀₀	O	LCD drive output

○ LH1512

Symbol	Circuit type	Pin name
V ₃	—	Power supply for LCD drive
V _{EE}	—	Power supply for LCD drive
FCS	I	Mode select input
EO	O	Output for chip select
M	I	AC-converting signal input for LCD drive waveform
V _{DD}	—	Power supply for logic system (– 5.5 to – 3.0V)
CL ₁	I	Display data latchpulse input
EI	I	Input for chip select
DO	O	Series data output
DI ₁ -DI ₄	I	Display data input
CL ₂	I	Display data read clock input
V _{SS}	—	Ground (0V)
V ₄	—	Power supply for LCD drive
PS	I	Mode select input
Y ₁ -Y ₈₀	O	LCD drive output

■ Block Diagram



■ Absolute Maximum Ratings

(Ta = +25°C)

Parameter	Symbol	Condition	Rating	Unit	Note
Supply voltage (1)	V _{DD}		- 7.0 to 0.3	V	1
Supply voltage (2)	V _S	LH1511	- 30.0 to 0.3	V	1
	V _{EE}	LH1512	- 29.0 to 0.3	V	
	V ₀ , V ₁ , V ₄	LH1511	V _S - 0.3 to 0.3	V	
	V ₃ , V ₄	LH1512	V _{EE} - 0.3 to 0.3	V	
Input voltage	V _I		V _{DD} - 0.3 to 0.3	V	1
Operating temperature	T _{opr}		- 5.0 to + 50	°C	
Storage temperature	T _{stg}		- 45 to + 125	°C	

Note 1: The maximum applicable voltage on any pin with respect to V_{SS}.

■ DC Characteristics

(Unless otherwise specified, V_{SS} = 0V, V_{DD} = - 5.5 to - 3.0V, Ta = - 5 to + 50°C)

Parameter	Symbol	Condition	MIN.	MAX.	Unit	Note
Supply voltage	V _{DD}		- 5.5	- 3.0	V	1
Operating voltage	V _S	LH1511	- 20.0	- 10.0	V	2
	V _{EE}	LH1512	- 20.0	- 10.0	V	3
Input HIGH voltage	V _{IH}		0.2 V _{DD}		V	4
Input LOW voltage	V _{IL}			0.8 V _{DD}	V	4
Output HIGH voltage	V _{OH}	I _{OH} = - 0.4mA	- 0.4		V	5
Output LOW voltage	V _{OL}	I _{OL} = 0.4mA		V _{DD} + 0.4	V	5
Input leakage current	I _{LI}	V _{DD} ≤ V _I ≤ V _{SS} LH1511		10.0	μA	6
		V _{DD} ≤ V _I ≤ V _{SS} LH1512		1.0	μA	7
I/O leakage current	I _{LI/O}	V _{DD} ≤ V _I ≤ V _{SS}		10.0	μA	8
Output leakage current	I _{LO}	V _{EE} ≤ V _O ≤ V _{SS}		10.0	μA	9

Note 1: Applied to V_{DD} pin.Note 2: Applied to V_S pin. (LH1511)Note 3: Applied to V_{EE} pin. (LH1512)Note 4: Applied to pins DIO₁, DIO₂, CK, DMIN, SHL, FR, DISPOFF and MODE. (LH1511)
Applied to pins DI₁-DI₄, CL₁, CL₂, FCS, M and EI. (LH1512)Note 5: Applied to pins DIO₁ and DIO₂. (LH1511)

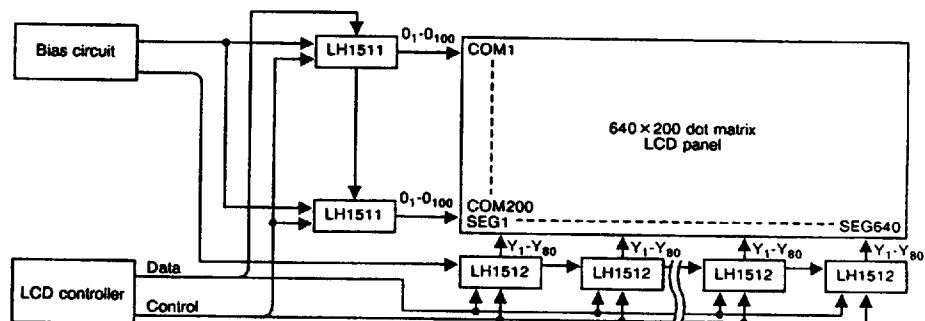
Applied to pins EO and DO. (LH1512)

Note 6: Applied to pins CK, SHL, FR, DISPOFF, DMIN and MODE. (LH1511)

Note 7: Applied to all input pins. (LH1512)

Note 8: Applied to pins DIO₁ and DIO₂. (LH1511)Note 9: Applied to pins Y₁-Y₈₀. (LH1512)

■ System Configuration Example



■ Sharp's Product Lineup for Large Screen LCD Driver Combination

Drive function				Segment driver								
Display voltage				20V	28V				35V	28V	40V	
Clock frequency				2.5MHz	3.3MHz	6MHz			8MHz	10MHz	20MHz	
Package				TAB		100QFP COB	TAB					
Model No.				LH1512	LH1520	LH1522	LH1523	LH5028	LH1526	LH1504	LH1510	
Common driver	20V	100KHz	TAB	LH1511	S							
	28V			LH5027A	S	S	S	S				
	35V	2MHz	128QFP COB	LH5029	A	A	A	A	S			
			TAB	LH1529					S			
	LH1503				A	A	A	A		S		
	LH1509										S	

S: Suitable
A: Acceptable