MOTOROLA

DESCRIPTION — The SN54LS/74LS283 is a high-speed 4-Bit Binary Full Adder with internal carry lookahead. It accepts two 4-bit binary words $(A_1 - A_4, B_1 - B_4)$ and a Carry Input (C_0). It generates the binary Sum outputs $(\Sigma_1 - \Sigma_4)$ and the Carry Output (C_4) from the most significant bit. The LS283 operates with either active HIGH or active LOW operands (positive or negative logic).

SN54LS283
SN74LS283

4-BIT BINARY FULL ADDER WITH FAST CARRY

LOW POWER SCHOTTKY

PIN NAMES

		LOADING (Note a)	
		HIGH	LOW
$A_1 - A_4$	Operand A Inputs	1.0 U.L.	0.5 U.L.
$B_1 - B_4$	Operand B Inputs	1.0 U.L.	0.5 U.L.
C_0	Carry Input	0.5 U.L.	0.25 U.L.
$\Sigma_1 - \Sigma_4$	Sum Outputs (Note b)	10 U.L.	5(2.5) U.L.
C_4	Carry Output (Note b)	10 U.L.	5(2.5) U.L.

NOTES:
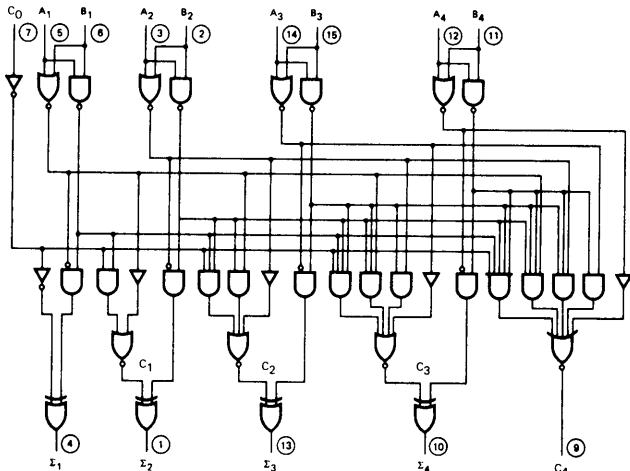a. 1 TTL Unit Load (U.L.) = 40 µA HIGH/1.6 mA LOW.
b. The Output LOW drive factor is 2.5 U.L. for Military (54) and 5 U.L. for Commercial (74) Temperature Ranges.
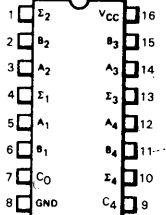
LOGIC SYMBOL
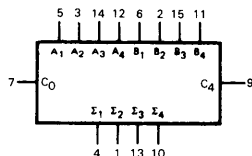
V_{CC} = Pin 16
GND = Pin 8

LOGIC DIAGRAM

V_{CC} = Pin 16
GND = Pin 8
◯ = Pin Numbers

CONNECTION DIAGRAM
DIP (TOP VIEW)

1	Σ_2	V_{CC}	16
2	B_2	B_3	15
3	A_2	A_3	14
4	Σ_1	Σ_3	13
5	A_1	A_4	12
6	B_1	B_4	11
7	C_0	Σ_4	10
8	GND	C_4	9

J Suffix — Case 620-08 (Ceramic)
N Suffix — Case 648-05 (Plastic)

NOTES:
The Flatpak version has the same pinouts (Connection Diagram) as the Dual In-Line Package.

FUNCTIONAL DESCRIPTION — The LS283 adds two 4-bit binary words (A plus B) plus the incoming carry. The binary sum appears on the sum outputs ($\Sigma_1 - \Sigma_4$) and outgoing carry (C_4) outputs.

$$C_0 + (A_1+B_1)+2(A_2+B_2)+4(A_3+B_3)+8(A_4+B_4) = \Sigma_1+2\,\Sigma_2+4\,\Sigma_3+8\,\Sigma_4+16C_4$$
Where: $(+)$ = plus

Due to the symmetry of the binary add function the LS283 can be used with either all inputs and outputs active HIGH (positive logic) or with all inputs and outputs active LOW (negative logic). Note that with active HIGH inputs, Carry Input can not be left open, but must be held LOW when no carry in is intended.

Example:

	C_0	A_1	A_2	A_3	A_4	B_1	B_2	B_3	B_4	Σ_1	Σ_2	Σ_3	Σ_4	C_4	
logic levels	L	L	H	L	H	H	L	L	H	H	H	L	L	H	
Active HIGH	0	0	1	0	1	1	0	0	1	1	1	0	0	1	(10+9=19)
Active LOW	1	1	0	1	0	0	1	1	0	0	0	1	1	0	(carry+5+6=12)

Interchanging inputs of equal weight does not affect the operation, thus C_0, A_1, B_1, can be arbitrarily assigned to pins 7, 5 or 3.

FUNCTIONAL TRUTH TABLE

$C_{(n-1)}$	A_n	B_n	Σ_n	C_n
L	L	L	L	L
L	L	H	H	L
L	H	L	H	L
L	H	H	L	H
H	L	L	H	L
H	L	H	L	H
H	H	L	L	H
H	H	H	H	H

$C_1 - C_3$ are generated internally
C_0 is an external input
C_4 is an output generated internally