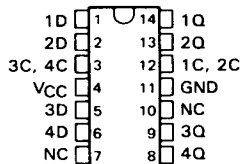


SN54HC77, SN74HC77 4-BIT BISTABLE LATCHES

D2684, DECEMBER 1982 — REVISED SEPTEMBER 1987

- Package Options Include Plastic "Small Outline" Packages, Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54HC77 . . . J PACKAGE
SN74HC77 . . . D OR N PACKAGE
(TOP VIEW)



NC—No internal connection

Not available in chip carrier package with JEDEC-Standard pinout. For chip carrier information, contact the factory.

description

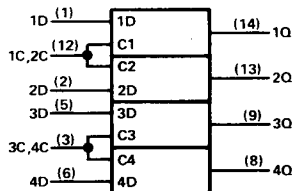
These latches are ideally suited for use as temporary storage for binary information between processing units and input/output or indicator units. Information present at a data (D) input is transferred to the Q output when the enable (C) is high, and the Q output will follow the data input as long as the enable remains high. When the enable goes low, the information, which was present at the data input at the time the transition occurred, is retained at the Q output until the enable is permitted to go high.

The SN54HC77 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC77 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE
(Each Latch)

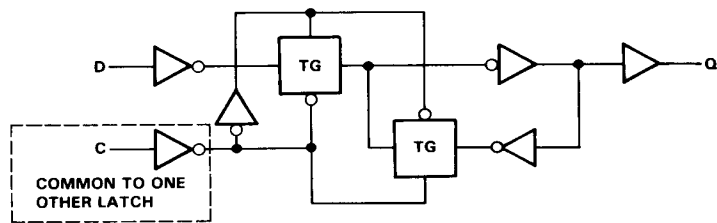
INPUTS		OUTPUT
D	C	Q
L	H	L
H	H	H
X	L	Q_0

logic symbol†



†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram, each latch (positive logic)



PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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HCMOS Devices

SN54HC77, SN74HC77

4-BIT BISTABLE LATCHES

absolute maximum ratings over operating free-air temperature range†

Supply voltage, V_{CC}	-0.5 V to 7 V
Input clamp current, $I_{IK}(V_I < 0 \text{ or } V_I > V_{CC})$	± 20 mA
Output clamp current, $I_{OK}(V_O < 0 \text{ or } V_O > V_{CC})$	± 20 mA
Continuous output current, $I_O (V_O = 0 \text{ to } V_{CC})$	± 25 mA
Continuous current through V_{CC} or GND pins	± 50 mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s: J package	300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s: D or N package	260°C
Storage temperature range	-65°C to 150°C

†Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

			SN54HC77			SN74HC77			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage		2	5	6	2	5	6	V
V_{IH}	High-level input voltage	$V_{CC} = 2$ V	1.5			1.5			V
		$V_{CC} = 4.5$ V	3.15			3.15			
		$V_{CC} = 6$ V	4.2			4.2			
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V	0	0.3	0	0.3	V		
		$V_{CC} = 4.5$ V	0	0.9	0	0.9			
		$V_{CC} = 6$ V	0	1.2	0	1.2			
V_I	Input voltage		0	V_{CC}	0	V_{CC}	V		
V_O	Output voltage		0	V_{CC}	0	V_{CC}	V		
t_t	Input transition (rise and fall) times	$V_{CC} = 2$ V	0	1000	0	1000	ns		
		$V_{CC} = 4.5$ V	0	500	0	500			
		$V_{CC} = 6$ V	0	400	0	400			
T_A	Operating free-air temperature		-55	125	-40	85	°C		

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V_{CC}	$T_A = 25^\circ\text{C}$		SN54HC77		SN74HC77		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	
V_{OH}	$V_I = V_{IH} \text{ or } V_{IL}, I_{OH} = -20 \mu\text{A}$	2 V	1.9	1.998	1.9	1.9	V		
		4.5 V	4.4	4.499	4.4	4.4			
		6 V	5.9	5.999	5.9	5.9			
	4.5 V	3.98	4.30	3.7	3.84				
	$V_I = V_{IH} \text{ or } V_{IL}, I_{OH} = -5.2 \text{ mA}$	6 V	5.48	5.80	5.2	5.34			
V_{OL}	$V_I = V_{IH} \text{ or } V_{IL}, I_{OL} = 20 \mu\text{A}$	2 V	0.002	0.1	0.1	0.1	V		
		4.5 V	0.001	0.1	0.1	0.1			
		6 V	0.001	0.1	0.1	0.1			
	4.5 V	0.17	0.26	0.4	0.33				
	$V_I = V_{IH} \text{ or } V_{IL}, I_{OL} = 5.2 \text{ mA}$	6 V	0.15	0.26	0.4	0.33			
I_I	$V_I = V_{CC} \text{ or } 0$	6 V	± 0.1	± 100	± 1000	± 1000	nA		
I_{CC}	$V_I = V_{CC} \text{ or } 0, I_O = 0$	6 V	4		80	40	μA		
C_i		2 to 6 V	3	10	10	10	pF		

SN54HC77, SN74HC77
4-BIT BISTABLE LATCHES

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HCMOS Devices

timing requirements over recommended operating free-air temperature range (unless otherwise noted)

	V _{CC}	T _A = 25°C		SN54HC77		SN74HC77		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t _w Pulse duration, C high	2 V	80		120		100		ns
	4.5 V	16		24		20		
	6 V	14		20		17		
t _{su} Setup time, data before Cl	2 V	100		150		125		ns
	4.5 V	20		30		25		
	6 V	17		26		21		
t _h Hold time, data after Cl	2 V	5		5		5		ns
	4.5 V	5		5		5		
	6 V	5		5		5		

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), C_L = 50 pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC77		SN74HC77		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	D	Q	2 V		40	120		180		150	ns
			4.5 V		12	24		36		30	
			6 V		10	20		31		26	
t _{pd}	C	Q	2 V		45	130		195		165	ns
			4.5 V		14	26		39		33	
			6 V		11	22		33		28	
t _t		Any	2 V		28	75		110		95	ns
			4.5 V		8	15		22		19	
			6 V		6	13		19		16	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

C _{pd}	Power dissipation capacitance per latch	No load, T _A = 25°C	16 pF typ
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