

## DM54LS77/DM74LS77 Quad Latches

### General 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 (G) 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 (that 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.

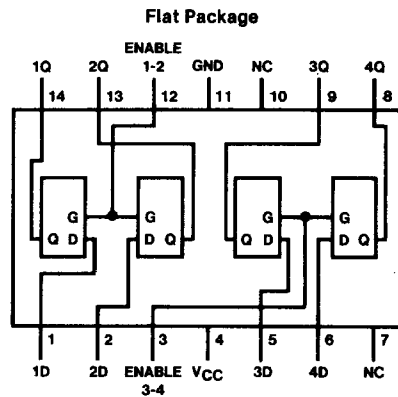
For higher component density applications, the DM54LS77/DM74LS77 4-bit latches are available in 14-pin flat packages (only).

### Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	7V
Storage Temperature Range	-65°C to 150°C

**Note 1:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

### Connection Diagram



54LS77 (W) 74LS77 (W)

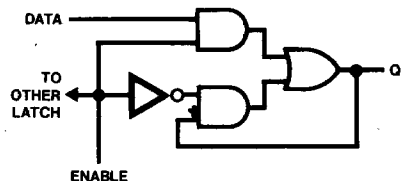
### Function Table

(Each Latch)

Inputs		Outputs
D	G	Q
L	H	L
H	H	H
X	L	Q <sub>0</sub>

H = High Level, L = Low Level, X = Don't Care  
Q<sub>0</sub> = The Level of Q Before the High-to-Low Transition of G

### Logic Diagram (Each Latch)



## Recommended Operating Conditions

Sym	Parameter	DM54LS77			DM74LS77			Units
		Min	Nom	Max	Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			2			V
V <sub>IL</sub>	Low Level Input Voltage			0.7			0.8	V
I <sub>OH</sub>	High Level Output Current			-0.4			-0.4	mA
I <sub>OL</sub>	Low Level Output Current			4			8	mA
t <sub>w</sub>	Enable Pulse Width	20			20			ns
t <sub>SU</sub>	Setup Time	20			20			ns
t <sub>H</sub>	Hold Time	0			0			ns
T <sub>A</sub>	Free Air Operating Temperature	-55		125	0		70	°C

## Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

Sym	Parameter	Conditions	Min	Typ (Note 1)	Max	Units	
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.5	V	
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = Min I <sub>OH</sub> = Max V <sub>IL</sub> = Max V <sub>IH</sub> = Min	DM54	2.5	3.4	V	
			DM74	2.7	3.4		
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min I <sub>OL</sub> = Max V <sub>IL</sub> = Max V <sub>IH</sub> = Min	DM54		0.25	0.4	V
			DM74		0.35	0.5	
		I <sub>OL</sub> = 4 mA V <sub>CC</sub> = Min	DM74		0.25	0.4	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max V <sub>I</sub> = 7V	D Input		0.1	mA	
			G Input		0.4		
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max V <sub>I</sub> = 2.7V	D Input		20	μA	
			G Input		80		
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max V <sub>I</sub> = 0.4V	D Input		-0.4	mA	
			G Input		-1.6		
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)	DM54	-20	-100	mA	
			DM74	-20	-100		
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max (Note 3)		6.9	13	mA	

**Note 1:** All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

**Note 2:** Not more than one output should be shorted at a time, and the duration should not exceed one second.

**Note 3:** I<sub>CC</sub> is measured with all outputs open and all inputs grounded.

**Switching Characteristics** at  $V_{CC}=5V$  and  $T_A=25^\circ C$  (See Section 1 for Test Waveforms and Output Load)

Parameter	From (Input) To (Output)	$R_L = 2\text{ k}\Omega$						Units
		$C_L = 15\text{ pF}$			$C_L = 50\text{ pF}$			
		Min	Typ	Max	Min	Typ	Max	
$t_{PLH}$ Propagation Delay Time Low to High Level Output	D to Q		15	27		19	30	ns
$t_{PHL}$ Propagation Delay Time High to Low Level Output	D to Q		9	17		14	25	ns
$t_{PLH}$ Propagation Delay Time Low to High Level Output	G to Q		15	27		19	30	ns
$t_{PHL}$ Propagation Delay Time High to Low Level Output	G to Q		17	25		20	30	ns