- **Dependable Texas Instruments Quality and Reliability**
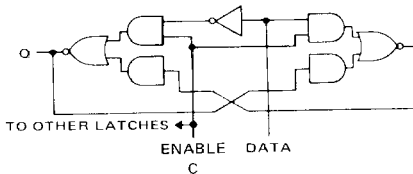
description

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 setup at the data input at the time the transition occurred) is retained at the Q output until the enable is permitted to go high.
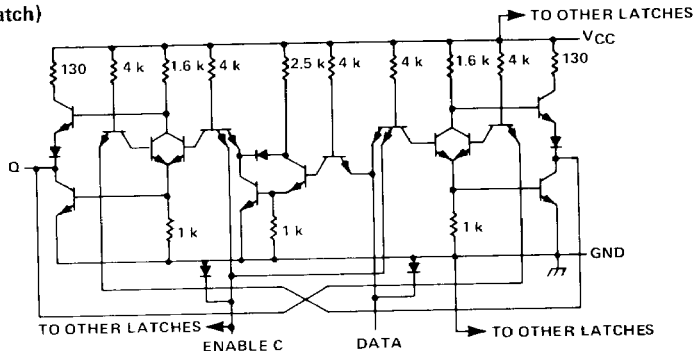
These circuits are completely compatible with all popular TTL families. All inputs are diode-clamped to minimize transmission-line effects and simplify system design. Typical power dissipation is 40 milliwatts per latch.

The SN54100 is characterized for operation over the full military temperature range of –55° to 125°C; the SN74100 is characterized for operation from 0°C to 70°C.

SN54100 . . . J OR W PACKAGE
SN74100 . . . J OR N PACKAGE
(TOP VIEW)

```
      NC [ 1    24 ] VCC
     1D1 [ 2    23 ] 1C
     1D2 [ 3    22 ] 1D3
     1Q2 [ 4    21 ] 1D4
     1Q1 [ 5    20 ] 1Q4
      NC [ 6    19 ] 1Q3
     GND [ 7    18 ] 2Q3
     2Q1 [ 8    17 ] 2Q4
     2Q2 [ 9    16 ] 2D4
     2D2 [ 10   15 ] 2D3
     2D1 [ 11   14 ] NC
      2C [ 12   13 ] NC
```
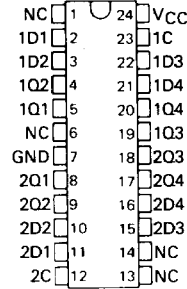
NC – No internal connection

FUNCTION TABLE
(Each Latch)

INPUTS		OUTPUTS	
D	G	Q	Q̄
L	H	L	H
H	H	H	L
X	L	Q_0	$\bar{Q}_0$

H = high level, X = irrelevant
Q_0 = the level of Q before the high-to-low transition of G

logic diagram (each latch)

TO OTHER LATCHES
ENABLE DATA
C

schematic (each latch)

TO OTHER LATCHES
VCC

| 130 | 4 k | 1.6 k | 4 k | 2.5 k | 4 k | 4 k | 1.6 k | 4 k | 130 |

Q

1 k   1 k   1 k   GND

TO OTHER LATCHES
ENABLE C   DATA   TO OTHER LATCHES

Resistor values shown are nominal and in ohms.

3

TTL DEVICES

TYPES SN54100, SN74100
8-BIT BISTABLE LATCHES

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . 7 V
Input voltage . . . . 5.5 V
Interemitter voltage (see Note 2) . . . . 5.5 V
Operating free-air temperature range: SN54100 . . . . -55°C to 125°C
                                  SN74100 . . . . 0°C to 70°C
Storage temperature range . . . . -65°C to 150°C

NOTES: 1. Voltage values, except interemitter voltage, are with respect to network ground terminal.
2. This is the voltage between two emitters of a multiple-emitter input transistor. For this circuit, this rating applies between the enable and D inputs of any latch.

recommended operating conditions

	SN54100			SN74100			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			-400			-400	μA
Low-level output current, I_{OL}			16			16	mA
Width of enabling pulse, t_w	20			20			ns
Setup time, t_{su}	20			20			ns
Hold time, t_h	5			5			ns
Operating free-air temperature, T_A	-55		125	0		70	$^\circ$C

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

PARAMETER		TEST CONDITIONS†		MIN	TYP‡	MAX	UNIT
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN,	$I_I = -12$ mA			-1.5	V
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IL} = 0.8 V,	V_{IH} = 2 V, $I_{OH} = -400\ \mu$A	2.4	3.4		V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IL} = 0.8 V,	V_{IH} = 2 V, I_{OL} = 16 mA		0.2	0.4	V
I_I	Input current at maximum input voltage	V_{CC} = MAX,	V_I = 5.5 V			1	mA
I_{IH}	High-level input current	D input	V_{CC} = MAX,	V_I = 2.4 V			80	μA
		C input					320	
I_{IL}	Low-level input current	D input	V_{CC} = MAX,	V_I = 0.4 V			-3.2	mA
		C input					-12.8	
I_{OS}	Short-circuit output current§	V_{CC} = MAX	SN54100	-20		-57	mA
			SN74100	-18		-57	
I_{CC}	Supply current	V_{CC} = MAX, See Note 3	SN54100		64	92	mA
			SN74100		64	106	

†For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡All typical values are at V_{CC} = 5 V, T_A = 25°C.
§Not more than one output should be shorted at a time.
NOTE 3: I_{CC} is tested with all inputs grounded and all outputs open.

3

TTL DEVICES

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switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER¶	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	D	Q	C_L = 15 pF, R_L = 400 Ω, See Note 4		16	30	ns
t_{PHL}					14	25	
t_{PLH}	C	Q			16	30	ns
t_{PHL}					7	15	

¶ t_{PLH} = propagation delay time, low-to-hgih-level output
t_{PHL} = propagation delay time, high-to-low-level output
NOTE 4: Load circuits and voltage waveforms are the same as those shown for the '75, '77, 'L75, and 'L77.

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