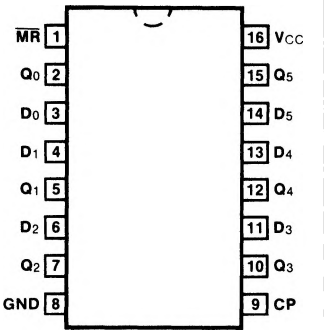
54/74174
54S/74S174
54LS/74LS174
HEX D FLIP-FLOP

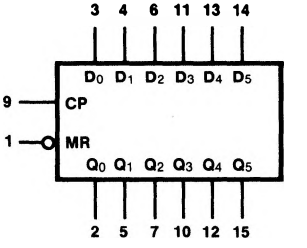
CONNECTION DIAGRAM
PINOUT A



DESCRIPTION — The '174 is a high speed hex D flip-flop. The device is used primarily as a 6-bit edge-triggered storage register. The information on the D inputs is transferred to storage during the LOW-to-HIGH clock transition. The device has a Master Reset to simultaneously clear all flip-flops.

- **EDGE-TRIGGERED D-TYPE INPUTS**
- **BUFFERED POSITIVE EDGE-TRIGGERED CLOCK**
- **ASYNCHRONOUS COMMON RESET**

LOGIC SYMBOL



VCC = Pin 16
GND = Pin 8

ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE VCC = +5.0 V ±5%, TA = 0°C to +70°C	MILITARY GRADE VCC = +5.0 V ±10%, TA = -55°C to +125°C	PKG TYPE
Plastic DIP (P)	A	74174PC, 74S174PC, 74LS174PC		9B
Ceramic DIP (D)	A	74174DC, 74S174DC, 74LS174DC	54174DM, 54S174DM, 54LS174DM	6B
Flatpak (F)	A	74174FC, 74S174FC, 74LS174FC	54174FM, 54S174FM, 54LS174FM	4L

INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74 (U.L.) HIGH/LOW	54/74S (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
$D_0 - D_5$	Data Inputs	1.0/1.0	1.25/1.25	0.5/0.25
CP	Clock Pulse Input (Active Rising Edge)	1.0/1.0	1.25/1.25	0.5/0.25
$\overline{MR}$	Master Reset Input (Active LOW)	1.0/1.0	1.25/1.25	0.5/0.25
$Q_0 - Q_5$	Flip-Flop Outputs	20/10	25/12.5	10/5.0 (2.5)

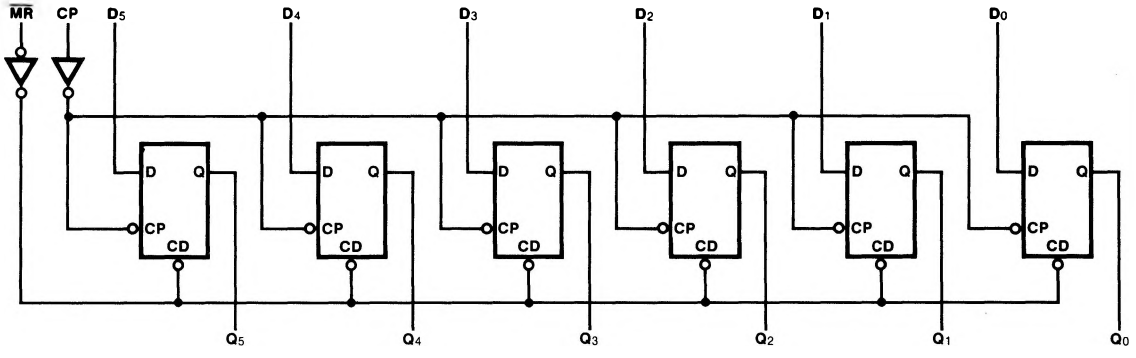
FUNCTIONAL DESCRIPTION — The '174 consists of six edge-triggered D flip-flops with individual D inputs and Q outputs. The Clock (CP) and Master Reset ($\overline{MR}$) are common to all flip-flops. Each D input's state is transferred to the corresponding flip-flop's output following the LOW-to-HIGH Clock (CP) transition. A LOW input to the Master Reset ($\overline{MR}$) will force all outputs LOW independent of Clock or Data inputs. The '174 is useful for applications where the true output only is required and the Clock and Master Reset are common to all storage elements.

TRUTH TABLE

INPUTS	OUTPUTS
@ t_n, $\overline{MR}$ = H	@ t_{n+1}
D_n	Q_n
H	H
L	L

t_n = Bit time before positive-going clock transition
t_{n+1} = Bit time after positive-going clock transition
H = HIGH Voltage Level
L = LOW Voltage Level

LOGIC DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER	54/74		54/74S		54/74LS		UNITS	CONDITIONS
		Min	Max	Min	Max	Min	Max		
I_{CC}	Power Supply Current		65		144		26	mA	V_{CC} = Max D_n = $\overline{MR}$ = 4.5 V CP = ⎍

AC CHARACTERISTICS: V_{CC} = +5.0 V, T_A = +25° C (See Section 3 for waveforms and load configurations)

SYMBOL	PARAMETER	54/74		54/74S		54/74LS		UNITS	CONDITIONS
		C_L = 15 pF R_L = 400 Ω		C_L = 15 pF R_L = 280 Ω		C_L = 15 pF			
		Min	Max	Min	Max	Min	Max		
f_{max}	Maximum Clock Frequency	25		75		30		MHz	Figs. 3-1, 3-8
t_{PLH} t_{PHL}	Propagation Delay CP to Q_n		30 35		12 17		25 22	ns	Figs. 3-1, 3-8
t_{PHL}	Propagation Delay $\overline{MR}$ to Q_n		35		22		35	ns	Figs. 3-1, 3-16

AC OPERATING REQUIREMENTS: V_{CC} = +5.0 V, T_A = +25° C

SYMBOL	PARAMETER	54/74		54/74S		54/74LS		UNITS	CONDITIONS
		Min	Max	Min	Max	Min	Max		
t_s (H) t_s (L)	Setup Time HIGH or LOW D_n to CP	20 20		5.0 5.0		10 10		ns	Fig. 3-6
t_h (H) t_h (L)	Hold Time HIGH or LOW D_n to CP	5.0 5.0		3.0 3.0		5.0 5.0		ns	
t_w (H)	CP Pulse Width HIGH	20		7.0		18		ns	Fig. 3-8
t_w (L)	$\overline{MR}$ Pulse Width LOW	20		7.0		18		ns	Fig. 3-16
t_{rec}	Recovery Time $\overline{MR}$ to CP	25		5.0		12		ns	