

54/74198

8-BIT R/L SHIFT REGISTER

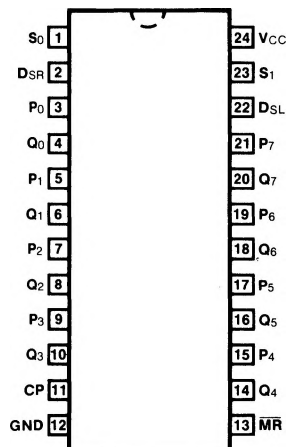
DESCRIPTION — The '198 features synchronous parallel load, hold, shift right and shift left modes, as determined by the Select (S_0 , S_1) inputs. State changes are initiated by the rising edge of the clock. An asynchronous Master Reset ($\overline{MR}$) input overrides all other inputs and clears the register. The '198 is useful for serial-serial, serial-parallel, parallel-serial and parallel-parallel register transfers.

- **PARALLEL IN/PARALLEL OUT**
- **SYNCHRONOUS PARALLEL LOAD**
- **SHIFT RIGHT AND SHIFT LEFT CAPABILITY**
- **ASYNCHRONOUS OVERRIDING CLEAR**

ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		$V_{CC} = +5.0\text{ V} \pm 5\%$, $T_A = 0^\circ\text{C to } +70^\circ\text{C}$	$V_{CC} = +5.0\text{ V} \pm 10\%$, $T_A = -55^\circ\text{C to } +125^\circ\text{C}$	
Plastic DIP (P)	A	74198PC		9N
Ceramic DIP (D)	A	74198DC	54198DM	6N
Flatpak (F)	A	74198FC	54198FM	4M

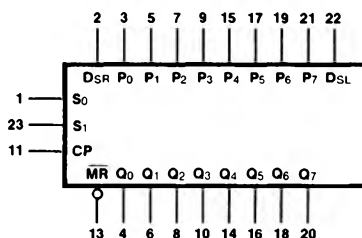
CONNECTION DIAGRAM PINOUT A



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

PIN NAMES	DESCRIPTION	54/74 (U.L.) HIGH/LOW
S_0 , S_1	Mode Select Inputs	1.0/1.0
P_0 — P_7	Parallel Data Inputs	1.0/1.0
DSR	Serial Data Input (Shift Right)	1.0/1.0
DSL	Serial Data Input (Shift Left)	1.0/1.0
CP	Clock Pulse Input (Active Rising Edge)	1.0/1.0
$\overline{MR}$	Asynchronous Master Reset Input (Active LOW)	1.0/1.0
Q_0 — Q_7	Flip-flop Outputs	20/10

LOGIC SYMBOL



V_{CC} = Pin 24
GND = Pin 12

FUNCTIONAL DESCRIPTION — The '198 contains eight edge-triggered D-type flip-flops and the interstage gating required to perform synchronous parallel load, shift right, and shift left operations. Serial data enters at D_{SR} for shift right and at D_{SL} for shift left operations. Parallel data is applied to the P₀ — P₇ inputs. State changes are initiated by the rising edge of the clock. The D_{SR}, D_{SL} and P₀ — P₇ inputs can change when the clock is in either state, provided only that the recommended setup and hold times are observed.

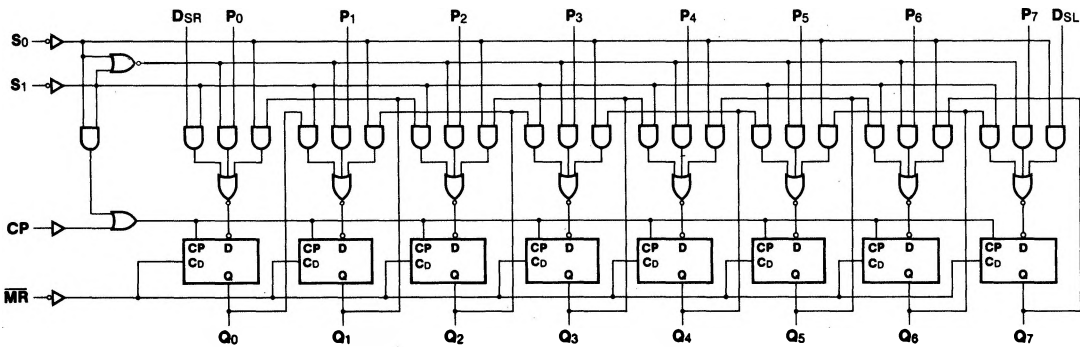
The operating mode is determined by S₀ and S₁, as shown in the Mode Select Table. Clocking of the flip-flops is inhibited when both S₀ and S₁ are LOW. To avoid inadvertently clocking the register, the Select inputs should only be changed while CP is HIGH. A LOW signal on $\overline{\text{MR}}$ overrides all other inputs and forces the outputs LOW.

MODE SELECT TABLE

INPUTS				RESPONSE
$\overline{\text{MR}}$	CP	S ₀ *	S ₁ *	
L	X	X	X	Asynchronous Reset; Outputs = LOW
H		H	H	Parallel Load; P _n → Q _n
H		L	H	Shift Right; D _{SR} → Q ₀ , Q ₀ → Q ₁ , etc.
H		H	L	Shift Left; D _{SL} → Q ₇ , Q ₇ → Q ₆ , etc.
H	X	L	L	Hold

*Select inputs should be changed only while CP is HIGH
H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

LOGIC DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER		54/74	UNITS	CONDITIONS
			Min Max		
I _{CC}	Power Supply Current	XC	116	mA	V _{CC} = Max; S ₀ , S ₁ = 4.5 V CP =  ; $\overline{\text{MR}}$, P _n = Gnd
		XM	104		

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

SYMBOL	PARAMETER	54/74	UNITS	CONDITIONS
		C _L = 15 pF R _L = 400 Ω		
		Min Max		
f _{max}	Maximum Shift Frequency	25	MHz	Figs. 3-1, 3-8
t _{PLH} t _{PHL}	Propagation Delay CP to Q _n	26 30	ns	Figs. 3-1, 3-8
t _{PHL}	Propagation Delay MR to Q _n	35	ns	Figs. 3-1, 3-16

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

SYMBOL	PARAMETER	54/74	UNITS	CONDITIONS
		Min Max		
t _s (H) t _s (L)	Setup Time HIGH or LOW P _n , D _{SL} , D _{SR} to CP	20 20	ns	Fig. 3-6
t _h (H) t _h (L)	Hold Time HIGH or LOW P _n , D _{SL} , D _{SR} to CP	0 0	ns	
t _s (H) t _s (L)	Setup Time HIGH or LOW S ₀ or S ₁ to CP	30 30	ns	
t _h (H) t _h (L)	Hold Time HIGH or LOW S ₀ or S ₁ to CP	0 0	ns	
t _w (H)	CP Pulse Width HIGH	20	ns	Fig. 3-8
t _w (L)	$\overline{\text{MR}}$ Pulse Width LOW	20	ns	Fig. 3-16