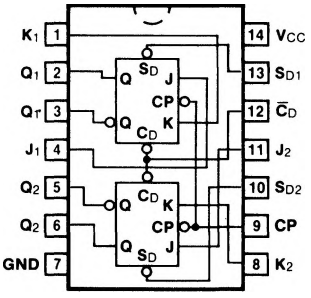
54H/74H108

DUAL JK EDGE-TRIGGERED FLIP-FLOP

(With Separate Sets, A Common Clear and Clock)

DESCRIPTION — The '108 is a high speed JK negative edge-triggered flip-flop. It features individual J, K, and asynchronous Set inputs to each flip-flop as well as common clock and asynchronous Clear inputs. When the clock goes HIGH, the inputs are enabled and data will be accepted. The logic state of J and K inputs may be allowed to change when the clock pulse is in a HIGH state and the bistable will perform according to the Truth Table as long as minimum setup times are observed. Input data is transferred to the outputs on the falling edge of the clock pulse.

CONNECTION DIAGRAM
PINOUT A



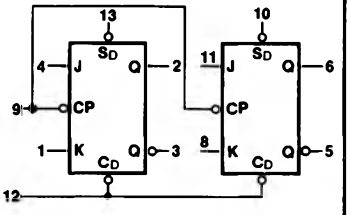
TRUTH TABLE

INPUTS		OUTPUT
@ t_n		@ t_{n+1}
J	K	Q
L	L	Q_n
L	H	L
H	L	H
H	H	$\overline{Q}_n$

Asynchronous Inputs:
LOW input to $\overline{S}_D$ sets Q to HIGH level
LOW input to $\overline{C}_D$ sets Q to LOW level
Clear and Set are independent of clock
Simultaneous LOW on $\overline{C}_D$ and $\overline{S}_D$ makes both Q and $\overline{Q}$ HIGH

t_n = Bit time before clock pulse.
t_{n+1} = Bit time after clock pulse.
H = HIGH Voltage Level
L = LOW Voltage Level

LOGIC SYMBOL



V_{CC} = Pin 14
GND = Pin 7

ORDERING CODE: See Section 9

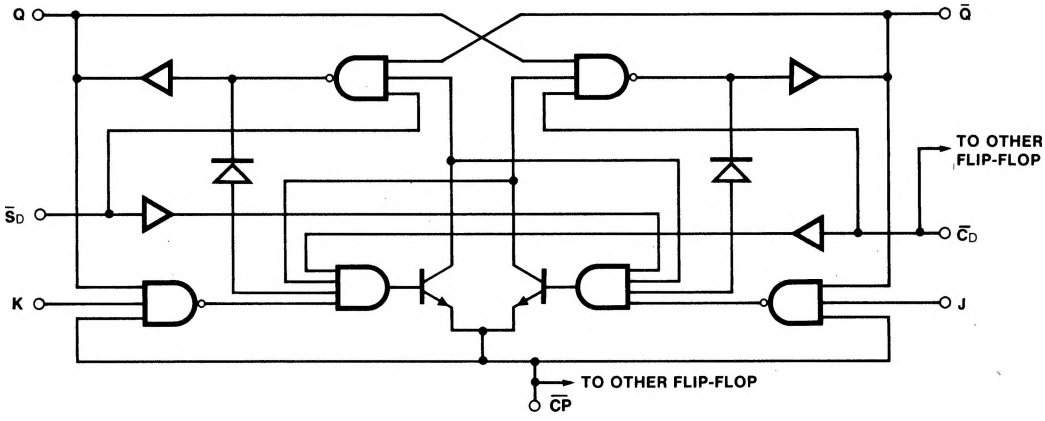
PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		V_{CC} = +5.0 V ±5%, T_A = 0°C to +70°C	V_{CC} = +5.0 V ±10%, T_A = -55°C to +125°C	
Plastic DIP (P)	A	74H108PC		9A
Ceramic DIP (D)	A	74H108DC	54H108DM	6A
Flatpak (F)	A	74H108FC	54H108FM	3I

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

PIN NAMES	DESCRIPTION	54/74H (U.L.) HIGH/LOW
J_1, J_2, K_1,K_2	Data Inputs	1.25/1.25
$\overline{CP}$	Clock Pulse Input (Active Falling Edge)	0*/6.0
$\overline{C}_D$	Direct Clear Input (Active LOW)	5.0/2.5
$\overline{S}_{D1}$, $\overline{S}_{D2}$	Direct Set Inputs (Active LOW)	2.5/1.25
Q_1, Q_2, $\overline{Q}_1$, $\overline{Q}_2$	Outputs	12.5/12.5

*$\overline{CP}$ Sourcing Current, see DC Characteristics Table

LOGIC DIAGRAM (one half shown)



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER	54/74H		UNITS	CONDITIONS
		Min	Max		
I_{IH}	Input HIGH Current at $\overline{CP}$	0	-1.0	mA	V_{CC} = Max, V_{CP} = 2.4 V
I_{CC}	Power Supply Current		76	mA	V_{CC} = Max, V_{CP} = 0 V

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

SYMBOL	PARAMETER	54/74H C_L = 25 pF, R_L = 280 Ω		UNITS	CONDITIONS
		Min	Max		
f_{max}	Maximum Clock Frequency	40		MHz	Figs. 3-1, 3-9
t_{PLH} t_{PHL}	Propagation Delay $\overline{CP}$ to Q_n or $\bar{Q}_n$		15 20	ns	Figs. 3-1, 3-9
t_{PLH} t_{PHL}	Propagation Delay $\bar{C}_D$ or $\bar{S}_{Dn}$ to Q_n or $\bar{Q}_n$		12 20	ns	$V_{CP} = \geq$ 2.0 V Figs. 3-1, 3-10
t_{PLH} t_{PHL}	Propagation Delay $\bar{C}_D$ or $\bar{S}_{Dn}$ to Q_n or $\bar{Q}_n$		12 35	ns	$V_{CP} = \leq$ 0.8 V Figs. 3-1, 3-10

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

SYMBOL	PARAMETER	54/74H		UNITS	CONDITIONS
		Min	Max		
t_s (H) t_s (L)	Setup Time J_n or K_n to $\overline{CP}$	10 13		ns	Fig. 3-7
t_h (H) t_h (L)	Hold Time J_n or K_n to $\overline{CP}$	0 0		ns	
t_w (H) t_w (L)	$\overline{CP}$ Pulse Width	10 15		ns	Fig. 3-9
t_w (L)	$\bar{C}_D$ or $\bar{S}_{Dn}$ Pulse Width LOW	16		ns	Fig. 3-10