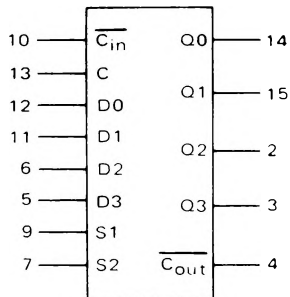### Universal Hexadecimal Counter

The MC10136 is a high speed synchronous counter that can count up, count down, preset, or stop count at frequencies exceeding 100 MHz. This binary counter is useful in high speed central processors and peripheral controllers, minicomputers, high speed digital communications equipment and instrumentation. The flexibility of this device allows the designer to use one basic counter for most applications, and the synchronous count feature makes the MC10136 suitable for either computers or instrumentation.

Three control lines (S1, S2, and $\overline{\text{Carry In}}$) determine the operation mode of the counter. Lines S1 and S2 determine one of four operations; preset (program), increment (count up), decrement (count down), or hold (stop count). Note that in the preset mode a clock pulse is necessary to load the counter, and the information present on the data inputs (D0, D1, D2, and D3) will be entered into the counter. $\overline{\text{Carry Out}}$ goes low on the terminal count, or when the counter is being preset.

This device is not designed for use with gated clocks. Control is via S1 and S2.

A prescaler can be constructed using the MC10136 in conjunction with the MC10231 which will operate at over 200 MHz input frequency. A 1000 MHz prescaler is possible using an MC1699 1GHz divide by 4, an MC12013 500 MHz divide by 10-11, and the MC10136.

SEQUENTIAL TRUTH TABLE*

INPUTS								OUTPUTS				
S1	S2	D0	D1	D2	D3	$\overline{\text{Carry}}$ $\overline{\text{In}}$	Clock **	Q0	Q1	Q2	Q3	$\overline{\text{Carry}}$ $\overline{\text{Out}}$
L	L	L	L	H	H	φ	H	L	L	H	H	L
L	H	φ	φ	φ	φ	L	H	L	H	H	H	H
L	H	φ	φ	φ	φ	L	H	L	H	H	H	H
L	H	φ	φ	φ	φ	L	H	H	H	H	H	L
L	H	φ	φ	φ	φ	H	L	H	H	H	H	H
L	H	φ	φ	φ	φ	H	H	H	H	H	H	H
H	H	φ	φ	φ	φ	φ	H	H	H	H	H	H
L	L	H	H	L	L	φ	H	H	H	L	L	L
H	L	φ	φ	φ	φ	L	H	L	H	L	L	H
H	L	φ	φ	φ	φ	L	H	H	L	L	L	H
H	L	φ	φ	φ	φ	L	H	L	L	L	L	H
H	L	φ	φ	φ	φ	L	H	H	H	H	H	H

φ = Don't care.

* Truth table shows logic states assuming inputs vary in sequence shown from top to bottom.

** A clock H is defined as a clock input transition from a low to a high logic level.

V_{CC1} = Pin 1
V_{CC2} = Pin 16
V_{EE} = Pin 8

P_D = 625 mW typ/pkg (No Load)
f_{count} = 150 MHz typ

FUNCTION SELECT TABLE

S1	S2	Operating Mode
L	L	Preset (Program)
L	H	Increment (Count Up)
H	L	Decrement (Count Down)
H	H	Hold (Stop Count)

MC10136   **COUNTERS**