

- 4-Bit Counters/Registers
- Multiplexed Outputs for Counter or Latched Data
- High-Current 3-State Outputs Drive Bus Lines Directly or up to 15 LSTTL Loads
- 'HC696 . . . Decade Counter, Direct Clear
'HC697 . . . Binary Counter, Direct Clear
'HC698 . . . Decade Counter, Synchronous Clear
'HC699 . . . Binary Counter, Synchronous Clear
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

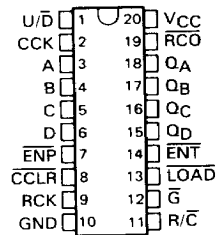
description

These high-speed CMOS devices incorporate synchronous up/down counters, four-bit D-type registers, and quadruple two-line to one-line multiplexers with three-state outputs in a single 20-pin package. The up/down counters are programmable from the data inputs and feature enable \bar{P} (ENP) and enable \bar{T} (\bar{ENT}) and ripple-carry output (RCO) for easy expansion. The register/counter select input (R/\bar{C}) selects the counter when low and the register when high for the three-state outputs Q_A , Q_B , Q_C , and Q_D .

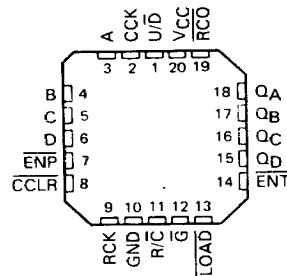
Both the counter clock (CCK) and register clock (RCK) are positive-edge triggered. The counter clear (\bar{CCLR}) is active low and asynchronous on the 'HC696 and 'HC697, synchronous on the 'HC698 and 'HC699.

The SN54HC696 through SN54HC699 are characterized for operation over the full military range of -55°C to 125°C . The SN74HC696 through SN74HC699 are characterized for operation from -40°C to 85°C .

SN54HC696 THRU SN54HC699 . . . J PACKAGE
SN74HC696 THRU SN74HC699 . . . J OR N PACKAGE
(TOP VIEW)



SN54HC696 THRU SN54HC699 . . . FH OR FK PACKAGE
SN74HC696 THRU SN74HC699 . . . FH OR FN PACKAGE
(TOP VIEW)



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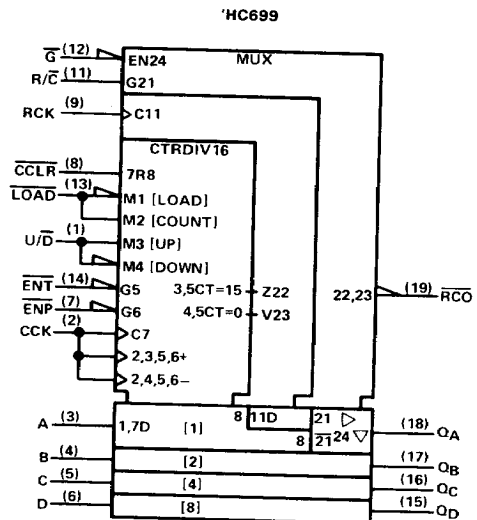
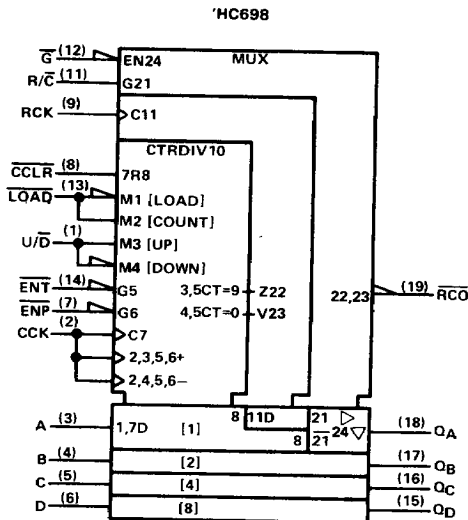
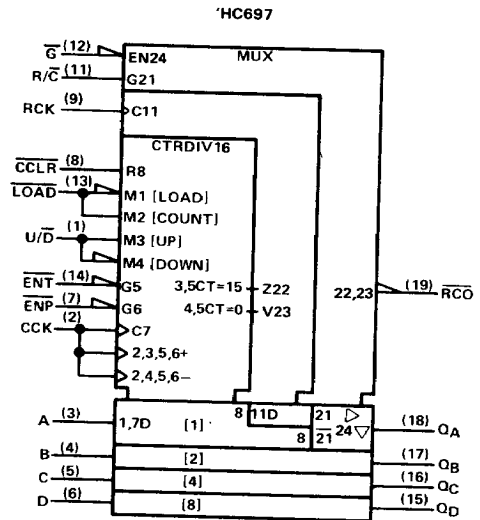
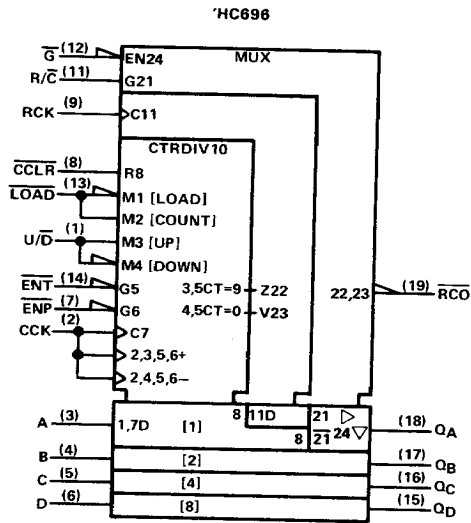
This document contains information on a new product. Specifications are subject to change without notice.



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**TYPES SN54HC696 THRU SN54HC699, SN74HC696 THRU SN74HC699
SYNCHRONOUS UP/DOWN COUNTERS WITH OUTPUT REGISTERS
AND MULTIPLEXED 3-STATE OUTPUTS**

logic symbols

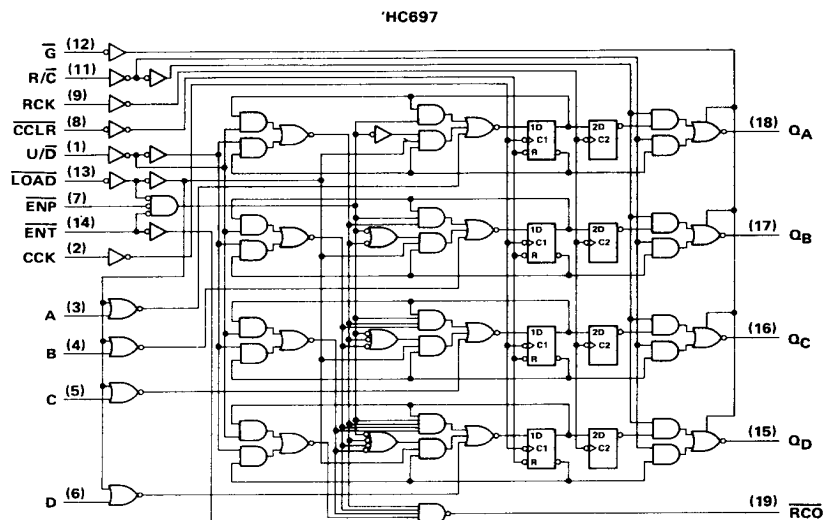
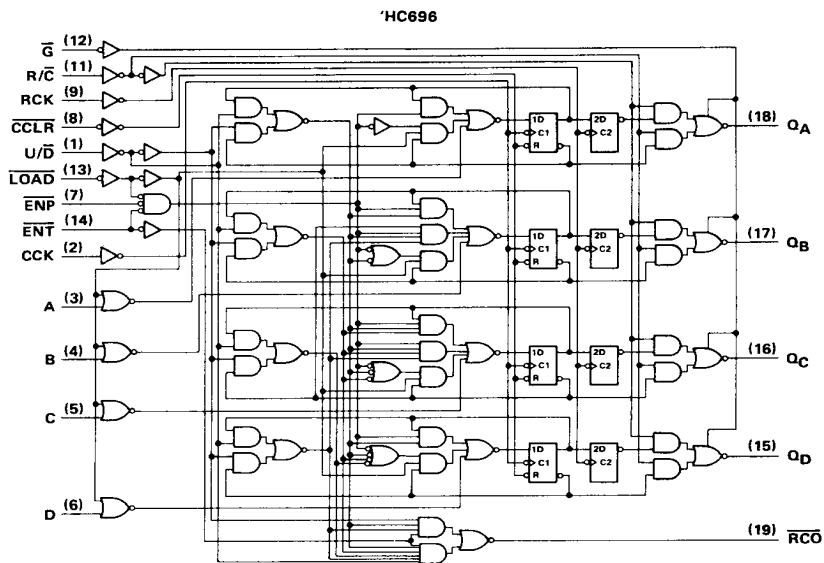


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**TYPES SN54HC696, SN54HC697, SN74HC696, SN74HC697
SYNCHRONOUS UP/DOWN COUNTERS WITH OUTPUT REGISTERS
AND MULTIPLEXED 3-STATE OUTPUTS**

logic diagrams (positive logic)



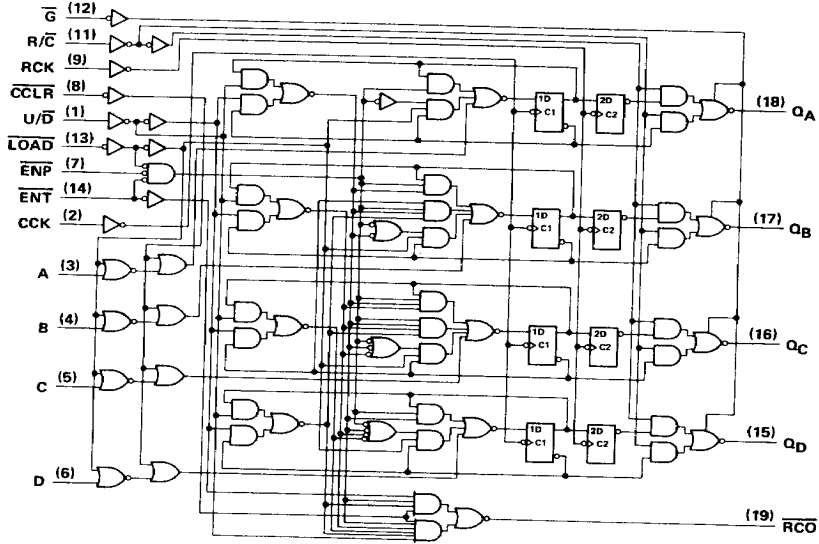
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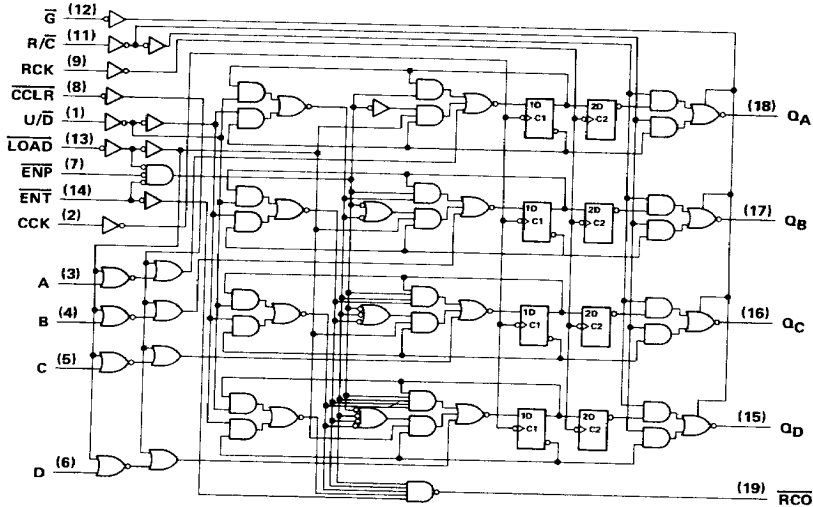
TYPES SN54HC698, SN54HC699, SN74HC698, SN74HC699
SYNCHRONOUS UP/DOWN COUNTERS WITH OUTPUT REGISTERS
AND MULTIPLEXED 3-STATE OUTPUTS

logic diagrams (positive logic)

'HC698



'HC699



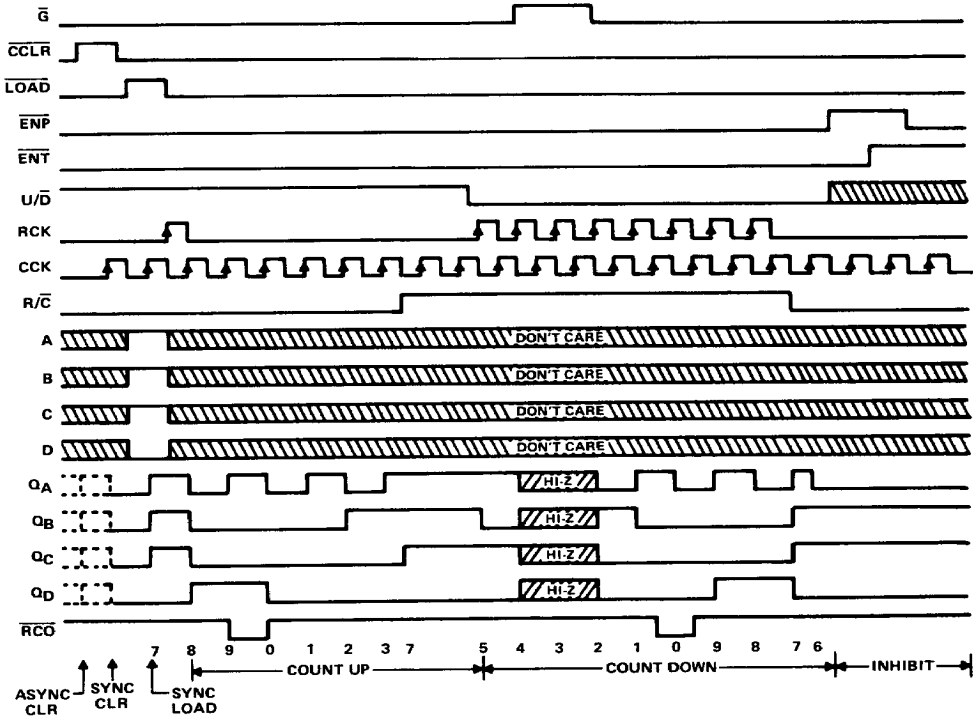
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**TYPES SN54HC696, SN54HC698, SN74HC696, SN74HC698
 SYNCHRONOUS UP/DOWN COUNTERS WITH OUTPUT REGISTERS
 AND MULTIPLEXED 3-STATE OUTPUTS**

typical operating sequences

'HC696 DECADE COUNTER, Asynchronous Clear
 'HC698 DECADE COUNTER, Synchronous Clear



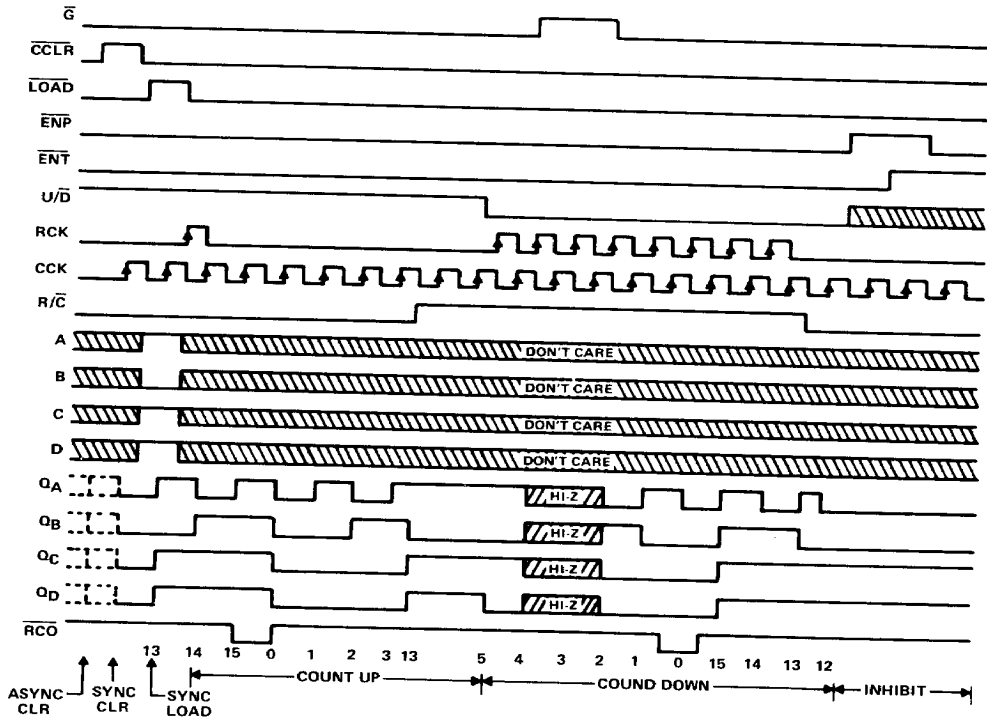
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TYPES SN54HC697, SN54HC699, SN74HC697, SN74HC699
SYNCHRONOUS UP/DOWN COUNTERS WITH OUTPUT REGISTERS
AND MULTIPLEXED 3-STATE OUTPUTS

typical operating sequences

'HC697 BINARY COUNTER, Asynchronous Clear
 'HC699 BINARY COUNTER, Synchronous Clear



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ADVANCE INFORMATION

**TYPES SN54HC696, SN54HC697, SN74HC696, SN74HC697
SYNCHRONOUS UP/DOWN COUNTERS WITH OUTPUT REGISTERS
AND MULTIPLEXED 3-STATE OUTPUTS**

maximum ratings, recommended operating conditions, and electrical characteristics

See Table III, page 2-8.

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 50$ pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25 °C			SN54HC696 SN54HC697		SN74HC696 SN74HC697		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	CCK↑	RCO	2 V	115							ns
			4.5 V	23							
			6 V	20							
t _{pd}	ENT	RCO	2 V	55							ns
			4.5 V	11							
			6 V	9							
t _{pd}	CCLR↓	RCO	2 V	115							ns
			4.5 V	23							
			6 V	20							
t _{pd}	CCK↑	Any Q	2 V	85							ns
			4.5 V	17							
			6 V	14							
t _{pd}	RCK↑	Any Q	2 V	85							ns
			4.5 V	17							
			6 V	14							
t _{PHL}	CCLR↓	Any Q	2 V	90							ns
			4.5 V	18							
			6 V	15							
t _{pd}	R/C	Any Q	2 V	70							ns
			4.5 V	14							
			6 V	12							
t _{en}	G↑	Any Q	2 V	70							ns
			4.5 V	14							
			6 V	12							
t _{dis}	G↑	Any Q	2 V	95							ns
			4.5 V	19							
			6 V	16							
t _t		Any	2 V	38							ns
			4.5 V	8							
			6 V	6							

NOTE 1: For load circuits and voltage waveforms, see page 1-14.

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ADVANCE INFORMATION

**TYPES SN54HC698, SN54HC699, SN74HC698, SN74HC699
 SYNCHRONOUS UP/DOWN COUNTERS WITH OUTPUT REGISTERS
 AND MULTIPLEXED 3-STATE OUTPUTS**

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 50$ pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25 °C			SN54HC698 SN54HC699		SN74HC698 SN74HC699		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	CCK↑	\overline{RCO}	2 V		115						ns
			4.5 V		23						
			6 V		20						
t _{pd}	\overline{ENT}	\overline{RCO}	2 V		55						ns
			4.5 V		11						
			6 V		9						
t _{pd}	CCK↑	Any Q	2 V		95						ns
			4.5 V		19						
			6 V		16						
t _{pd}	RCK↑	Any Q	2 V		85						ns
			4.5 V		17						
			6 V		14						
t _{pd}	R/ \overline{C}	Any Q	2 V		70						ns
			4.5 V		14						
			6 V		12						
t _{en}	$\overline{G}\downarrow$	Any Q	2 V		70						ns
			4.5 V		14						
			6 V		12						
t _{dis}	$\overline{G}\uparrow$	Any Q	2 V		95						ns
			4.5 V		19						
			6 V		16						
t _t		Any	2 V		38						ns
			4.5 V		8						
			6 V		6						

NOTE 1: For load circuits and voltage waveforms, see page 1-14.

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