

- Count Divider Chain
- Digitally Programmable from 2² to 2³¹ for 'HC292 or 2¹⁵ for 'HC294
- Usable Frequency Range from DC to 30 MHz
- Easily Expandable
- Applications
 - Frequency Division
 - Digital Timing
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

These are programmable frequency dividers/digital timers whose count modulo is under digital control of the inputs provided.

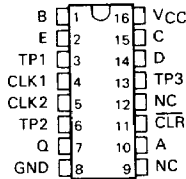
Both types feature an active-low clear input to initialize the state of all flip-flops. To facilitate incoming inspection, test points are provided (TP1, TP2, and TP3 on the 'HC292 and TP on the 'HC294). These test points are not intended to drive system loads. Both types feature two clock inputs; either one may be used for clock gating. (See the function table.)

A brief look at the digital timing capabilities of the 'HC292 will show that with a 1-MHz input frequency, programming for 2¹⁰ will give a period of 1.024 ms, and 2²⁰ will give a period of 1.05 sec, 2²⁶ will give a period of 1.12 min, and 2³¹ will give a period of 35.79 min.

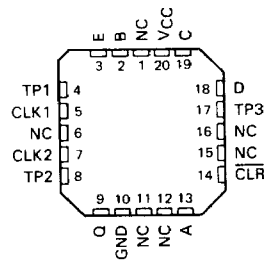
These devices are easily cascadable giving limitless possibilities to timing delays that can be achieved.

The SN54HC292 and SN54HC294 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74HC292 and SN74HC294 are characterized for operation from -40°C to 85°C.

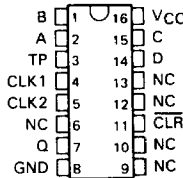
**SN54HC292 . . . J PACKAGE
SN74HC292 . . . J OR N PACKAGE
(TOP VIEW)**



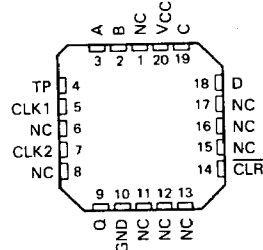
**SN54HC292 . . . FH OR FK PACKAGE
SN74HC292 . . . FH OR FN PACKAGE
(TOP VIEW)**



**SN54HC294 . . . J PACKAGE
SN74HC294 . . . J OR N PACKAGE
(TOP VIEW)**



**SN54HC294 . . . FH OR FK PACKAGE
SN74HC294 . . . FH OR FN PACKAGE
(TOP VIEW)**



NC—No internal connection



TYPES SN54HC292, SN54HC294, SN74HC292, SN74HC294 PROGRAMMABLE FREQUENCY DIVIDERS/DIGITAL TIMERS

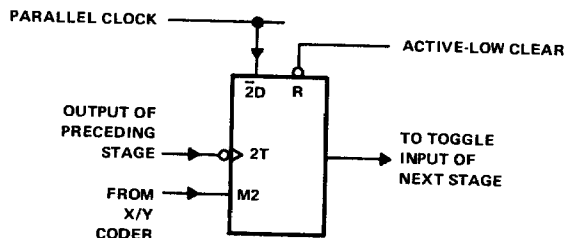
'HC292, 'HC294 FUNCTION TABLE

CLEAR	CLK 1	CLK 2	Q OUTPUT MODE
L	X	X	Cleared to L
H	↑	L	Count
H	L	↑	Count
H	H	X	Inhibit
H	X	H	Inhibit

operation

The logic diagram shows that the count modulo is controlled by an X/Y decoder connected to the mode-control inputs of several flip-flops. These flip-flops with mode controls each have a "D" input connected to the parallel clock line and a "T" input driven by the preceding stage. The parallel clock frequency is always the input frequency divided by four.

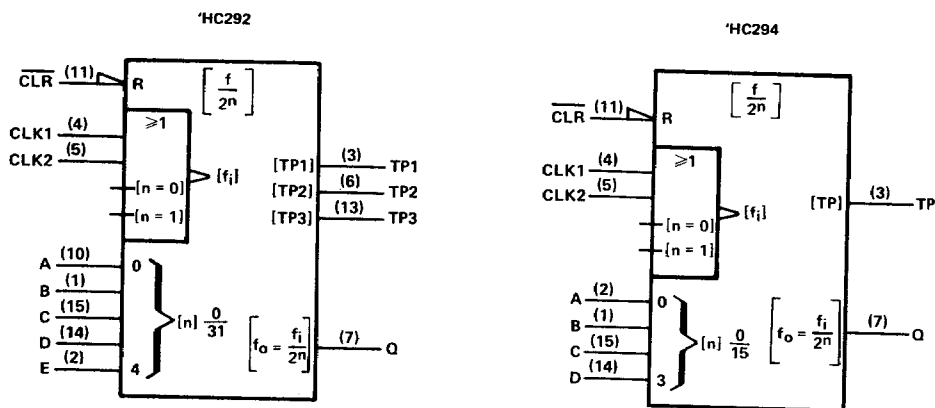
The X/Y decoder output selected by the programming inputs goes low. While a mode control is low, the "D" input of that flip-flop is enabled, and the signal from the parallel clock line ($f_{in} / 4$) is passed to the "T" input of the following stage. All the other mode controls are high enabling the "T" inputs and causing each flip-flop in turn to divide by two.



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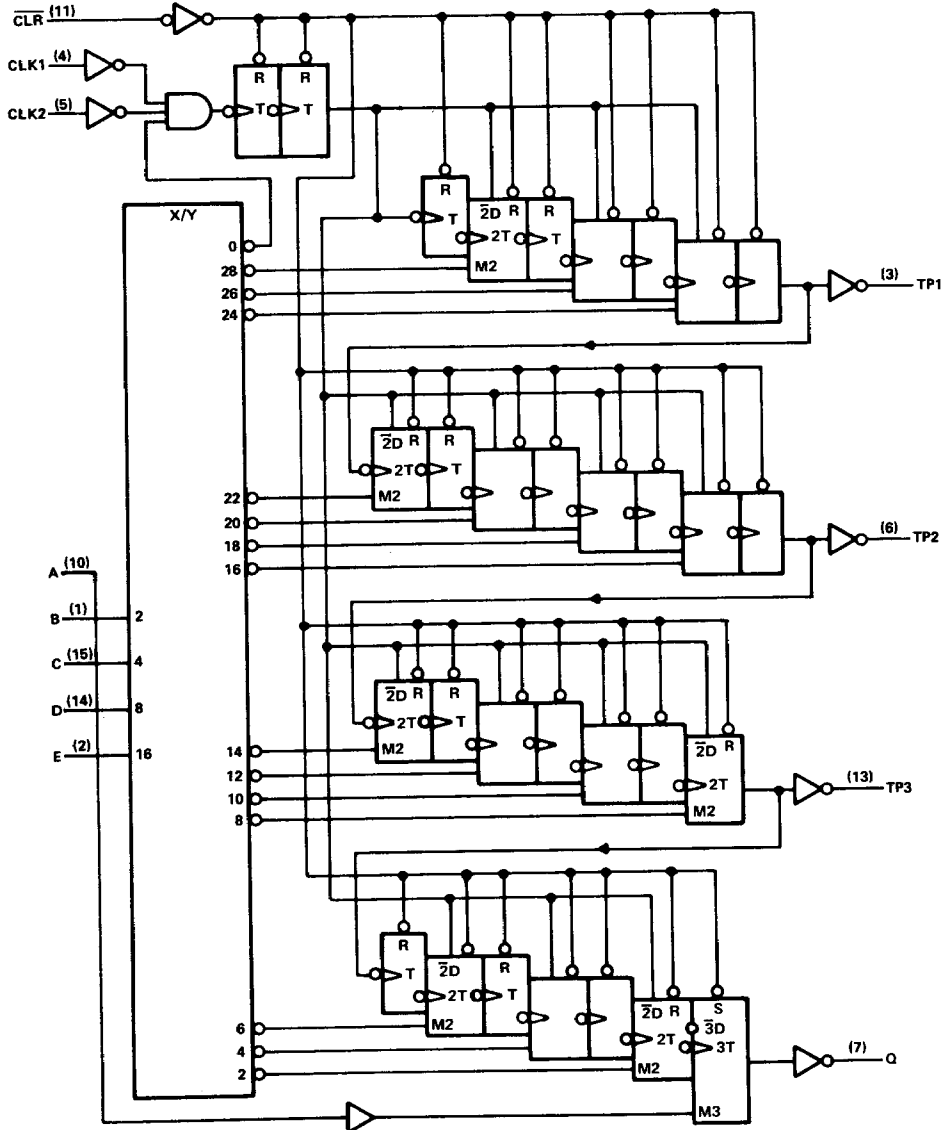
logic symbols



Pin numbers shown are for J and N packages.

TYPES SN54HC292, SN74HC292
PROGRAMMABLE FREQUENCY DIVIDERS/DIGITAL TIMERS

'HC292 logic diagram (positive logic)



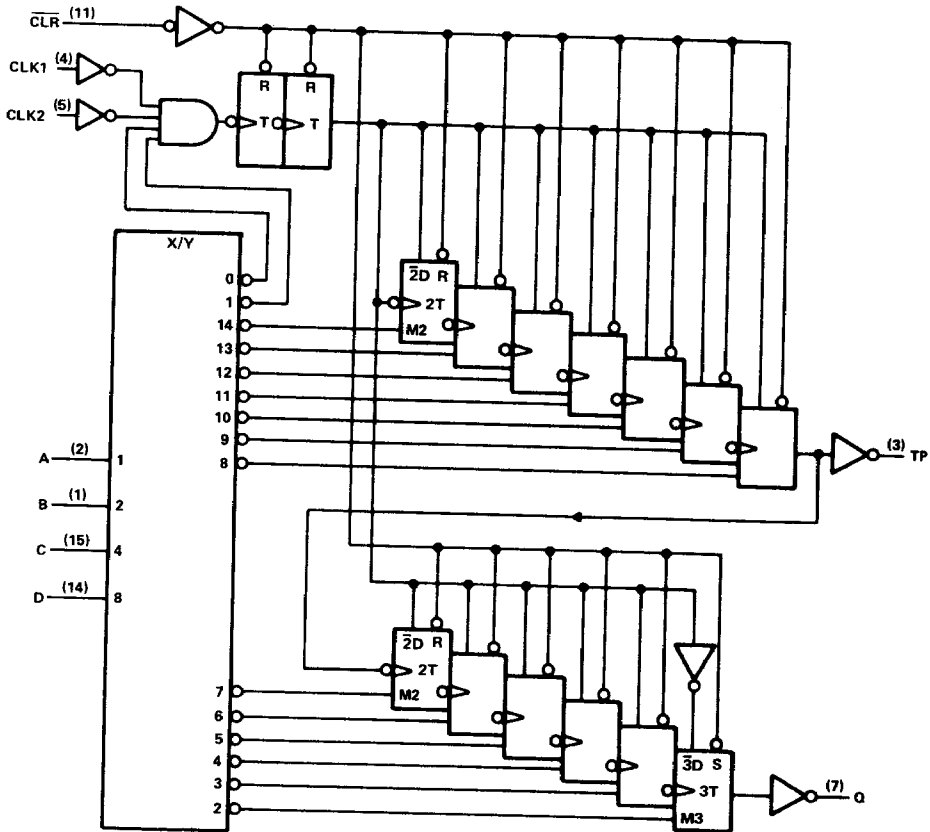
Pin numbers shown are for J and N packages.

PRODUCT PREVIEWS



TYPES SN54HC294, SN74HC294
PROGRAMMABLE FREQUENCY DIVIDERS/DIGITAL TIMERS

'HC294 logic diagram (positive logic)



Pin numbers shown are for J and N packages.

PRODUCT PREVIEWS

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**TYPES SN54HC292, SN74HC292
PROGRAMMABLE FREQUENCY DIVIDERS/DIGITAL TIMERS**

*HC292 FUNCTION TABLE

PROGRAMMING INPUTS					FREQUENCY DIVISION							
					Q		TP1		TP2		TP3	
E	D	C	B	A	BINARY	DECIMAL	BINARY	DECIMAL	BINARY	DECIMAL	BINARY	DECIMAL
L	L	L	L	L	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit
L	L	L	L	H	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit	Inhibit
L	L	L	H	L	2 ²	4	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216
L	L	L	H	H	2 ³	8	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216
L	L	H	L	L	2 ⁴	16	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216
L	L	H	L	H	2 ⁵	32	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216
L	L	H	H	L	2 ⁶	64	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216
L	L	H	H	H	2 ⁷	128	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216
L	H	L	L	L	2 ⁸	256	2 ⁹	512	2 ¹⁷	131,072	2 ²²	4
L	H	L	L	H	2 ⁹	512	2 ⁹	512	2 ¹⁷	131,072	2 ²²	4
L	H	L	H	L	2 ¹⁰	1,024	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16
L	H	L	H	H	2 ¹¹	2,048	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16
L	H	H	L	L	2 ¹²	4,096	2 ⁹	512	2 ¹⁷	131,072	2 ²⁶	64
L	H	H	L	H	2 ¹³	8,192	2 ⁹	512	2 ¹⁷	131,072	2 ²⁶	64
L	H	H	H	L	2 ¹⁴	16,384	2 ⁹	512	Disabled Low		2 ²⁸	256
L	H	H	H	H	2 ¹⁵	32,768	2 ⁹	512	Disabled Low		2 ²⁸	256
H	L	L	L	L	2 ¹⁶	65,536	2 ⁹	512	2 ³	8	2 ¹⁰	1,024
H	L	L	L	H	2 ¹⁷	131,072	2 ⁹	512	2 ³	8	2 ¹⁰	1,024
H	L	L	H	L	2 ¹⁸	262,144	2 ⁹	512	2 ⁵	32	2 ¹²	4,096
H	L	L	H	H	2 ¹⁹	524,288	2 ⁹	512	2 ⁵	32	2 ¹²	4,096
H	L	H	L	L	2 ²⁰	1,048,576	2 ⁹	512	2 ⁷	128	2 ¹⁴	16,384
H	L	H	L	H	2 ²¹	2,097,152	2 ⁹	512	2 ⁷	128	2 ¹⁴	16,384
H	L	H	H	L	2 ²²	4,194,304	Disabled Low		2 ⁹	512	2 ¹⁶	65,536
H	L	H	H	H	2 ²³	8,388,608	Disabled Low		2 ⁹	512	2 ¹⁶	65,536
H	H	L	L	L	2 ²⁴	16,777,216	2 ³	8	2 ¹¹	2,048	2 ¹⁸	262,144
H	H	L	L	H	2 ²⁵	33,554,432	2 ³	8	2 ¹¹	2,048	2 ¹⁸	262,144
H	H	L	H	L	2 ²⁶	67,108,864	2 ⁵	32	2 ¹³	8,192	2 ²⁰	1,048,576
H	H	L	H	H	2 ²⁷	134,217,728	2 ⁵	32	2 ¹³	8,192	2 ²⁰	1,048,576
H	H	H	L	L	2 ²⁸	268,435,456	2 ⁷	128	2 ¹⁵	32,768	2 ²²	4,194,304
H	H	H	L	H	2 ²⁹	536,870,912	2 ⁷	128	2 ¹⁵	32,768	2 ²²	4,194,304
H	H	H	H	L	2 ³⁰	1,073,741,824	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216
H	H	H	H	H	2 ³¹	2,147,483,648	2 ⁹	512	2 ¹⁷	131,072	2 ²⁴	16,777,216

PRODUCT PREVIEWS



maximum ratings, recommended operating conditions, and electrical characteristics

See Table IV, page 2-10.

**TYPES SN54HC294, SN74HC294
PROGRAMMABLE FREQUENCY DIVIDERS/DIGITAL TIMERS**

***HC294 FUNCTION TABLE**

PROGRAMMING INPUTS				FREQUENCY DIVISION			
				Q		TP	
D	C	B	A	BINARY	DECIMAL	BINARY	DECIMAL
L	L	L	L	Inhibit	Inhibit	Inhibit	Inhibit
L	L	L	H	Inhibit	Inhibit	Inhibit	Inhibit
L	L	H	L	2 ²	4	2 ⁹	512
L	L	H	H	2 ³	8	2 ⁹	512
L	H	L	L	2 ⁴	16	2 ⁹	512
L	H	L	H	2 ⁵	32	2 ⁹	512
L	H	H	L	2 ⁶	64	2 ⁹	512
L	H	H	H	2 ⁷	128	Disabled Low	
H	L	L	L	2 ⁸	256	2 ²	4
H	L	L	H	2 ⁹	512	2 ³	8
H	L	H	L	2 ¹⁰	1,024	2 ⁴	16
H	L	H	H	2 ¹¹	2,048	2 ⁵	32
H	H	L	L	2 ¹²	4,096	2 ⁶	64
H	H	L	H	2 ¹³	8,192	2 ⁷	128
H	H	H	L	2 ¹⁴	16,384	2 ⁸	256
H	H	H	H	2 ¹⁵	32,768	2 ⁹	512

maximum ratings, recommended operating conditions, and electrical characteristics

See Table IV, page 2-10.

PRODUCT PREVIEWS

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