DIVIDE-BY-TWELVE COUNTER (DIVIDE-BY-TWO AND DIVIDE-BY-SIX)

S5492 N7492

S5492–A,F,W • N7492–A,F

DIGITAL 54/74 TTL SERIES

DESCRIPTION

The S5492/N7492 is a high-speed monolithic 4-bit binary counter consisting of four master-slave flip-flops which are internally interconnected to provide a divide-by-two counter and a divide-by-six counter. A gated direct reset line is provided which inhibits the count inputs and simultaneously returns the four flip-flops outputs to a logical 0. As the output from flip-flop A is not internally connected to the succeeding flip-flops the counter may be operated in two independent modes:

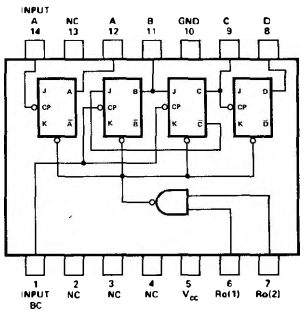
1. When used as a divide-by-twelve counter, output A must be externally connected to input BC. The input count pulses are applied to input A. Simultaneous division of 2, 6, and 12 are performed at the A, C, and D outputs as shown in the truth table.

2. When used as a divide-by-six counter, the input count pulses are applied to input BC. Simultaneously, frequency division of 3 and 6 are available at the C and D outputs. Independent use of flip-flop A is available if the reset function coincides with reset of the divide-by-six counter.

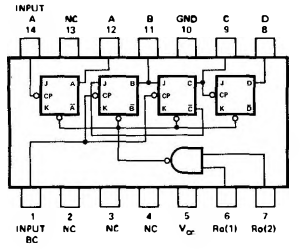
The S5492/N7492 is completely compatible with Series 54 and Series 74 logic families. Average power dissipation is 155mW.

PIN CONFIGURATIONS

W PACKAGE



A,F PACKAGE



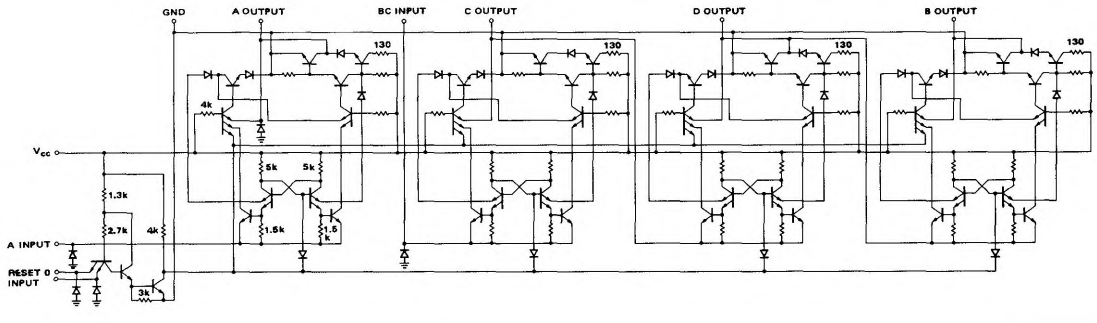
TRUTH TABLE (See Notes 1 and 2)

COUNT	OUTPUT			
	D	C	B	A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1

COUNT	OUTPUT			
	D	C	B	A
6	1	0	0	0
7	1	0	0	1
8	1	0	1	0
9	1	0	1	1
10	1	1	0	0
11	1	1	0	1

NOTES:
1. Output A connected to input B.
2. To reset all outputs to logical 0, both $R_{0(1)}$ and $R_{0(2)}$ inputs must be at logical 1.

SCHEMATIC DIAGRAM



RECOMMENDED OPERATING CONDITIONS

		MIN	NOM	MAX	UNIT
Supply Voltage V_{CC}: S5492 Circuits		4.5	5	5.5	V
N7492 Circuits		4.75	5	5.25	V
Operating Free-Air Temperature Range, T_A:	S5492 Circuits	-55	25	125	°C
	N7492 Circuits	0	25	70	°C
Normalized Fan-Out from each Output, N				10	
Width of Input Count Pulse, $t_{p(in)}$		50			ns
Width of Reset Pulse, $t_{p(reset)}$		50			ns

ELECTRICAL CHARACTERISTICS (over recommended operating free-air temperature range unless otherwise noted)

	PARAMETER	TEST CONDITIONS *			MIN	TYP**	MAX	UNIT
$V_{in(1)}$	Input voltage required to ensure logical 1 at any input terminal	V_{CC} = MIN			2			V
$V_{in(0)}$	Input voltage required to ensure logical 0 at any input terminal	V_{CC} = MIN					0.8	V
$V_{out(1)}$	Logical 1 output voltage	V_{CC} = MIN,	I_{load} = −400μA		2.4			V
$V_{out(0)}$	Logical 0 output voltage	V_{CC} = MIN,	I_{sink} = 16mA				0.4	V
$I_{in(1)}$	Logical 1 level input current at $R_{0(1)}$ or $R_{0(2)}$ inputs	V_{CC} = MAX,	V_{in} = 2.4V				40	μA
		V_{CC} = MAX,	V_{in} = 5.5V				1	mA
$I_{in(1)}$	Logical 1 level input current at input A	V_{CC} = MAX,	V_{in} = 2.4V				80	μA
		V_{CC} = MAX,	V_{in} = 5.5V				1	mA
$I_{in(1)}$	Logical 1 level input current at input BC	V_{CC} = MAX,	V_{in} = 2.4V				160	μA
		V_{CC} = MAX,	V_{in} = 5.5V				1	mA
$I_{in(0)}$	Logical 0 level input current at $R_{0(1)}$ or $R_{0(2)}$ inputs	V_{CC} = MAX,	V_{in} = 0.4V				-1.6	mA
$I_{in(0)}$	Logical 0 level input current input A	V_{CC} = MAX,	V_{in} = 0.4V				−3.2	mA
$I_{in(0)}$	Logical 0 level input current at input BC	V_{CC} = MAX,	V_{in} = 0.4V				−6.4	mA
I_{OS}	Short circuit output current †	V_{CC} = MAX,	V_{out} = 0	S5492	−20		−57	mA
				N7492	−18		−57	mA
I_{CC}	Supply current	V_{CC} = MAX,	V_{in} = 4.5V	S5492		31	44	mA
				N7492		31	51	mA

SWITCHING CHARACTERISTICS, V_{CC} = 5V, T_A = 25°C, N = 10

	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
f_{max}	Maximum frequency of input count pulses	C_L = 15pF,	R_L = 400Ω	10	18		MHz
t_{pd1}	Propagation delay time to logical 1 level from input count pulse to output D	C_L = 15pF,	R_L = 400Ω		60	100	ns
t_{pd0}	Propagation delay time to logical 0 level from input count pulse to output D	C_L = 15pF,	R_L = 400Ω		60	100	ns

* For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.

** All typical values are at V_{CC} = 5V, T_A = 25°C.

† Not more than one output should be shorted at a time.