

DM7520/DM8520 modulo-n divider general description

The DM7520/DM8520 combines TTL technology and MSI (Medium Scale Integration) design to provide a circuit equal in complexity to more than 50 gates.

Although extremely versatile in a number of digital applications, its primary usage will be realized in two areas:

1. MODULO-N DIVIDER

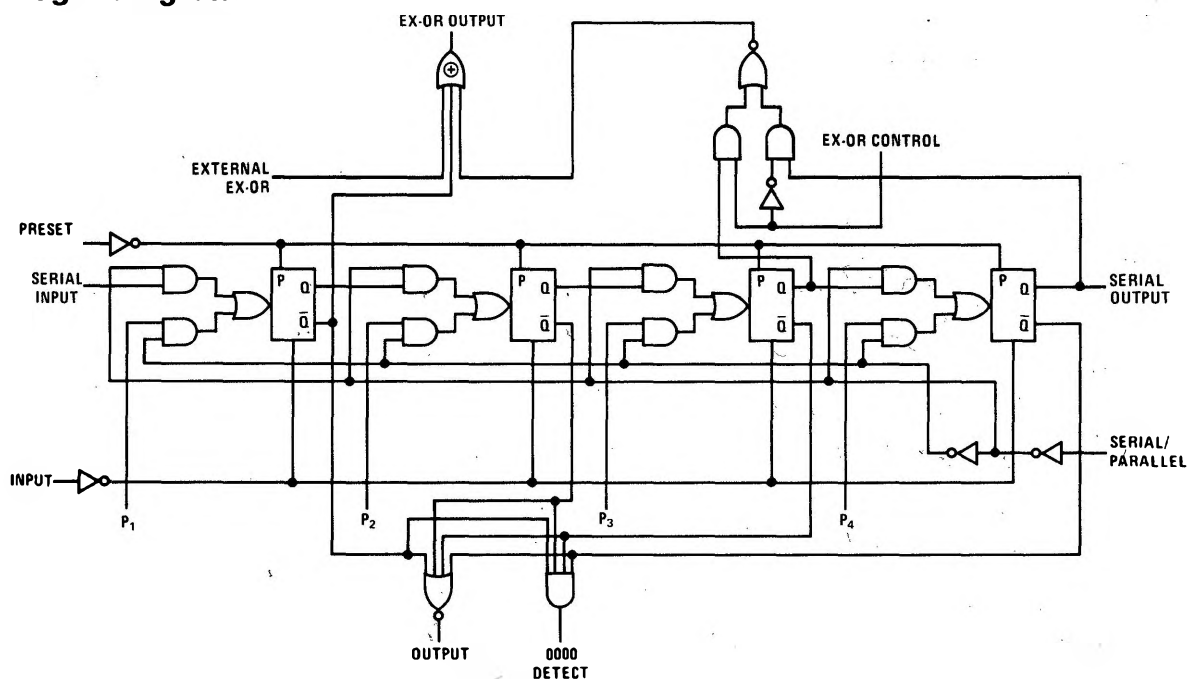
A single DM7520/DM8520 can be programmed

without external components to divide by any number from 2 to 15. Cascading of these dividers will provide division by any number from 2 to very large numbers.

2. SHIFT REGISTER

Since the basic organization of the logic is that of a serial shift register, the device may be used where four-bit parallel-in-serial out shifting is required.

logic diagram



connection diagram

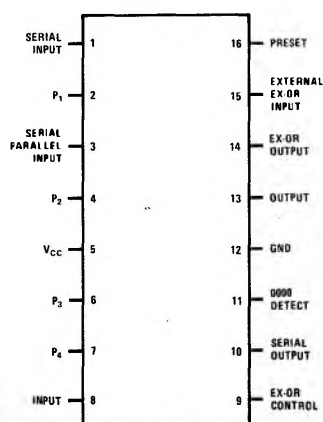


table for division by n

SETTING				÷ BY
P ₁	P ₂	P ₃	P ₄	
1	1	1	0	2
1	1	0	0	3
1	0	0	0	4
0	0	0	1	5
0	0	1	0	6
0	1	0	0	7
1	0	0	1	8
0	0	1	1	9
0	1	1	0	10
1	1	0	1	11
1	0	1	0	12
0	1	0	1	13
1	0	1	1	14
0	1	1	1	15

absolute maximum ratings

Supply Voltage	7V
Input Voltage	5.5V
Operating Temperature Range	DM7520 -55°C to +125°C
	DM8520 0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10 sec.)	300°C

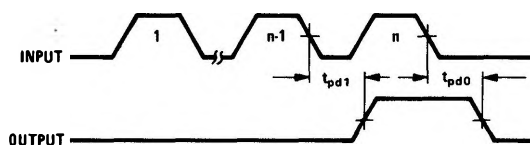
electrical characteristics (Note 1)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Logical "1" Input Voltage	DM7520 $V_{CC} = 4.5V$ DM8520 $V_{CC} = 4.75V$	2.0			V
Logical "0" Input Voltage	DM7520 $V_{CC} = 4.5V$ DM8520 $V_{CC} = 4.75V$			0.8	V
Logical "1" Output Voltage	DM7520 $V_{CC} = 4.5V$ DM8520 $V_{CC} = 4.75V$ $I_{OUT} = -400 \mu A$	2.4			V
Logical "0" Output Voltage	DM7520 $V_{CC} = 4.5V$ DM8520 $V_{CC} = 4.75V$ $I_{OUT} = 16 \text{ mA}$			0.4	V
Logical "0" Input Current (All inputs except pin 9)	DM7520 $V_{CC} = 5.5V$ DM8520 $V_{CC} = 5.25V$ $V_{IN} = 0.4V$			1.6	mA
Logical "0" Input Current (Pin 9)	DM7520 $V_{CC} = 5.5V$ DM8520 $V_{CC} = 5.25V$ $V_{IN} = 0.4V$			3.2	μA
Logical "1" Input Current	DM7520 $V_{CC} = 5.5V$ DM8520 $V_{CC} = 5.25V$ $V_{IN} = 2.4V$			40	μA
Logical "1" Input Current (Pin 9)	DM7520 $V_{CC} = 5.5V$ DM8520 $V_{CC} = 5.25V$ $V_{IN} = 2.4V$			80	μA
Logical "1" Input Current (All inputs except pin 9)	DM7520 $V_{CC} = 5.5V$ DM8520 $V_{CC} = 5.25V$ $V_{IN} = 5.5V$			1	mA
Output Short Circuit Current (Note 3)	DM7520 $V_{CC} = 5.5V$ DM8520 $V_{CC} = 5.25V$ $V_{OUT} = 0V$ (Note 2)	-20 -18		55	mA
Power Supply Current	$V_{CC} = 5.0V$ $T_A = 25^\circ C$		50		mA
Counting Frequency	$V_{CC} = 5.0V$ $T_A = 25^\circ C$		20		MHz

Note 1: Unless otherwise specified, limits shown apply across the -55°C to +125°C temperature range for the DM7520 and the 0°C to +70°C temperature range for the DM8520. Typical values apply to supply voltages of 5.0V.

Note 2: Only one output should be shorted at a time.

Note 3: Serial and exclusive OR outputs.

switching time waveforms

SETTING								÷ BY	SETTING								÷ BY	SETTING								÷ BY	
DIVIDER 1				DIVIDER 2					DIVIDER 1				DIVIDER 2					DIVIDER 1				DIVIDER 2					
P ₁	P ₂	P ₃	P ₄	P ₁	P ₂	P ₃	P ₄		P ₁	P ₂	P ₃	P ₄	P ₁	P ₂	P ₃	P ₄		P ₁	P ₂	P ₃	P ₄	P ₁	P ₂	P ₃	P ₄		
0	1	1	1	1	1	1	1	255	1	0	1	1	0	1	1	0	165	1	1	1	0	0	1	1	1	75	
1	0	1	1	1	1	1	1	254	0	1	0	1	1	0	1	1	164	1	1	1	0	0	0	1	1	74	
0	1	0	1	1	1	1	1	253	0	0	1	0	1	1	0	1	163	1	1	1	1	0	0	1	1	73	
0	0	1	0	1	1	1	1	252	1	0	0	1	0	1	1	0	162	0	1	1	1	1	1	0	0	72	
1	0	0	1	0	1	1	1	251	1	1	0	0	1	0	1	1	161	0	0	1	1	1	1	1	0	71	
0	1	0	0	1	0	1	1	250	1	1	1	0	0	1	0	1	160	0	0	0	1	1	1	1	1	70	
0	0	1	0	0	0	1	0	249	1	1	1	1	0	0	1	0	159	0	0	0	0	1	1	1	1	69	
0	0	0	1	0	0	1	0	248	0	1	1	1	1	0	0	1	158	0	0	0	0	0	0	1	1	68	
0	0	0	0	1	0	0	1	247	1	0	1	1	1	1	0	0	157	1	0	0	0	0	0	1	1	67	
0	0	0	0	0	1	0	0	246	1	1	0	1	1	1	1	0	156	0	1	0	0	0	0	0	1	66	
0	0	0	0	0	0	1	0	245	0	1	1	0	1	1	1	1	155	1	0	1	0	0	0	0	0	65	
0	0	0	0	0	0	0	1	244	1	0	1	1	0	1	1	1	154	0	1	0	1	0	0	0	0	64	
1	0	0	0	0	0	0	0	243	1	1	0	1	1	0	1	1	153	0	0	1	0	1	0	0	0	63	
1	1	0	0	0	0	0	0	242	1	1	1	0	1	1	0	1	152	0	0	0	1	0	1	0	0	62	
1	1	1	0	0	0	0	0	241	0	1	1	1	0	1	1	0	151	0	0	0	1	1	0	1	0	61	
0	1	1	1	0	0	0	0	240	1	0	1	1	1	0	1	1	150	1	0	0	0	0	1	0	1	60	
1	0	1	1	1	0	0	0	239	0	1	0	1	1	1	0	1	149	0	1	0	0	0	1	0	1	59	
1	1	0	1	1	1	0	0	238	0	0	1	0	1	1	1	0	148	0	0	1	0	0	0	0	1	58	
0	1	1	0	1	1	1	0	237	0	0	0	1	0	1	1	1	147	0	0	0	1	0	0	0	0	57	
0	0	1	1	0	1	1	1	236	1	0	0	0	1	0	1	1	146	0	0	0	0	1	0	0	0	56	
0	0	0	1	1	0	1	1	235	1	1	0	0	0	1	0	1	145	1	0	0	0	0	1	0	0	55	
0	0	0	0	1	1	0	1	234	1	0	1	0	0	0	0	1	144	1	1	0	0	0	0	0	1	54	
0	0	0	0	0	1	1	0	233	1	0	1	1	0	0	0	1	143	1	1	1	0	0	0	0	1	53	
0	0	0	0	0	0	1	1	232	1	1	0	1	1	0	0	0	142	1	1	1	1	0	0	0	0	52	
1	0	0	0	0	0	0	1	231	0	1	1	0	1	1	0	0	141	0	1	1	1	1	0	0	0	51	
0	1	0	0	0	0	0	0	230	0	0	1	1	0	1	1	0	140	0	0	1	1	1	1	0	0	50	
0	0	1	0	0	0	0	0	229	1	0	0	1	1	0	1	1	139	0	0	0	1	1	1	1	0	49	
1	0	0	1	0	0	0	0	228	1	1	0	0	1	1	0	1	138	1	0	0	0	1	1	1	1	48	
1	1	0	0	1	0	0	0	227	1	1	1	0	0	1	1	0	137	1	1	0	0	0	1	1	1	47	
0	1	1	0	0	1	0	0	226	0	1	1	1	0	0	1	1	136	0	1	1	0	0	0	1	1	46	
1	0	1	1	0	0	1	0	225	0	0	1	1	1	0	0	1	135	0	0	1	1	0	0	0	1	45	
0	1	0	1	1	0	0	1	224	1	0	0	1	1	1	0	0	134	0	0	0	1	1	0	0	0	44	
0	0	1	0	1	1	0	0	223	0	1	0	0	1	1	1	0	133	1	0	0	0	1	1	0	0	43	
0	0	0	1	0	1	1	0	222	1	0	1	0	0	1	1	1	132	0	1	0	0	0	1	1	0	42	
0	0	0	0	1	0	1	1	221	1	1	0	1	0	0	1	1	131	0	0	1	0	0	0	1	1	41	
0	0	0	0	0	1	0	1	220	0	1	1	0	1	0	0	1	130	0	0	0	1	0	0	0	1	40	
1	0	0	0	0	0	1	0	219	1	0	1	1	0	1	0	0	129	1	0	0	0	1	0	0	0	39	
1	1	0	0	0	0	0	1	218	0	1	0	1	1	0	1	0	128	0	1	0	0	0	1	0	0	38	
0	1	1	0	0	0	0	0	217	1	0	1	0	1	1	0	1	127	0	0	1	0	0	0	1	0	37	
1	0	1	1	0	0	0	0	216	0	1	0	1	0	1	1	0	126	1	0	0	1	0	0	0	1	36	
0	1	0	1	1	0	0	0	215	0	0	1	0	1	0	1	1	125	0	1	0	0	1	0	0	0	35	
1	0	1	0	1	1	0	0	214	1	0	0	1	0	1	0	1	124	1	0	1	0	0	1	0	0	34	
1	1	1	0	1	0	1	0	213	0	1	0	0	1	0	1	0	123	0	1	0	1	0	0	1	0	33	
1	1	1	0	1	0	1	1	212	1	0	1	0	0	1	0	1	122	0	0	1	0	1	0	0	1	32	
0	1	1	1	0	1	0	1	211	1	1	0	1	0	0	1	0	121	1	0	0	1	0	1	0	0	31	
0	0	1	1	1	0	1	0	210	1	1	1	0	1	0	0	1	120	1	1	0	0	1	0	1	0	30	
0	0	0	1	1	1	0	1	209	0	1	1	1	0	1	0	0	119	0	1	1	0	0	1	0	1	29	
0	0	0	0	1	1	1	0	208	1	0	1	1	1	0	1	0	118	0	0	1	1	0	0	1	0	28	
1	0	0	0	0	1	1	1	207	1	1	0	0	1	1	0	1	117	1	0	0	1	1	0	0	1	27	
0	1	0	0	0	0	1	1	206	1	1	1	0	1	1	1	0	116	1	1	0	0	1	1	0	0	26	
1	0	1	0	0	0	0	1	205	1	1	1	1	0	1	1	1	115	0	1	1	0	0	1	1	0	25	
1	1	0	1	0	0	0	0	204	1	1	1	1	1	0	1	1	114	1	0	1	1	0	0	1	1	24	
1	1	1	0	1	0	0	0	203	0	1	1	1	1	1	0	1	113	1	1	0	1	1	0	0	1	23	
1	1	1	1	0	1	0	0	202	1	0	1	1	1	1	1	0	112	1	1	1	0	1	1	0	0	22	
0	1	1	1	1	0	1	0	201	1	1	0	1	1	1	1	1	111	1	1	1	1	0	1	1	0	21	
1	0	0	1	1	1	1	0	200	0	1	1	0	1	1	1	1	110	0	1	1	1	1	0	1	1	20	
1	0	0	1	1	1	1	1	199	0	1	1	1	0	1	1	1	109	1	0	1	1	1	1	0	1	19	
0	1	0	0	1	1	1	1	198	0	0	1	1	1	0	1	1	108	0	1	0	1	1	1	1	0	18	
0	0	1	0	0	1	1	1	197	1	0	0	1	1	1	0	1	107	1	0	1	0	1	1	1	1	17	
0	0	0	1	0	0	1	1	196	1	1	0	0	1	1	1	0	106	0	1	0	1	0	1	1	1	16	
1	0	0	0	1	0	0	1	195	0	0	1	1	0	0	1	1	1	105	1	0	1	0	1	0	1	1	15
1	1	0	0	0	1	0	0	194	0	0	1	1	0	0	1	1	104	0	1	0	1	0	1	0	1	14	
1	1	1	0	0	0	1	0	193	0	0	0	1	1	0	0	1	103	1	0	1	0	1	0	1	0	13	
0	1	1	1	0	0	0	1	192	0	0	0	0															