TTL MSI

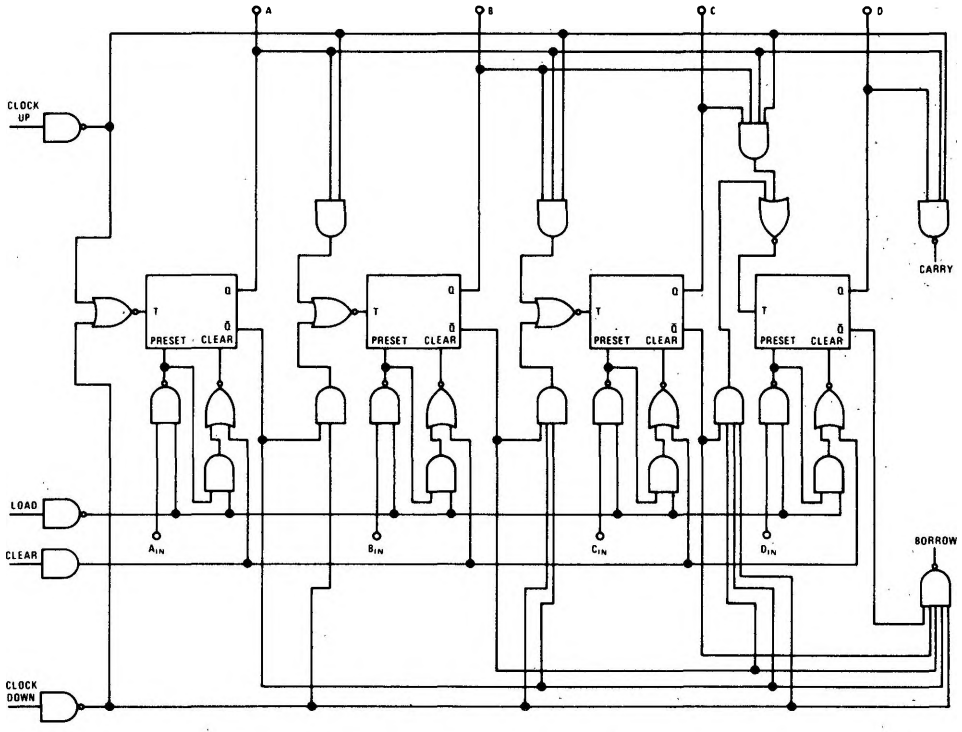
DM7563/DM8563 up/down binary counter

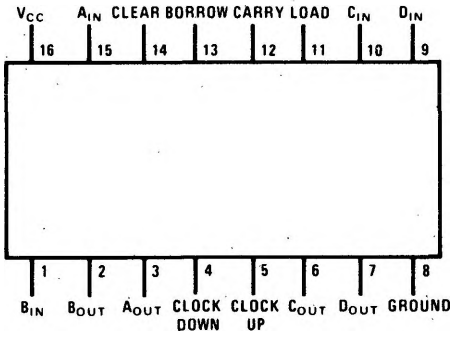
general description

The DM7563/DM8563 is a TTL, Series 54/74 compatible, up-down binary counter which is capable of being preset to any number from 0 through 15. A load input controls the asynchronous entry of these numbers, and sets all outputs to appropriate state.

Counting is performed through two clock lines—one controlling the count in the up direction, and the other in the down direction. Two outputs, Borrow and Carry, are connected to the clock inputs of subsequent counters to provide for counting to numbers greater than 15. The counter is synchronous by itself, and "semi-synchronous" (two gate delays between stages) when cascaded.

logic and connection diagrams





absolute maximum ratings

V_{CC}		7.0V
Input Voltage		5.5V
Operating Temperature Range	DM7563	−55°C to +125°C
	DM8563	0°C to +70°C
Storage Temperature Range		−65°C to +150°C
Fanout		10
Lead Temperature (Soldering, 10 sec)		300°C

electrical characteristics (Note 1)

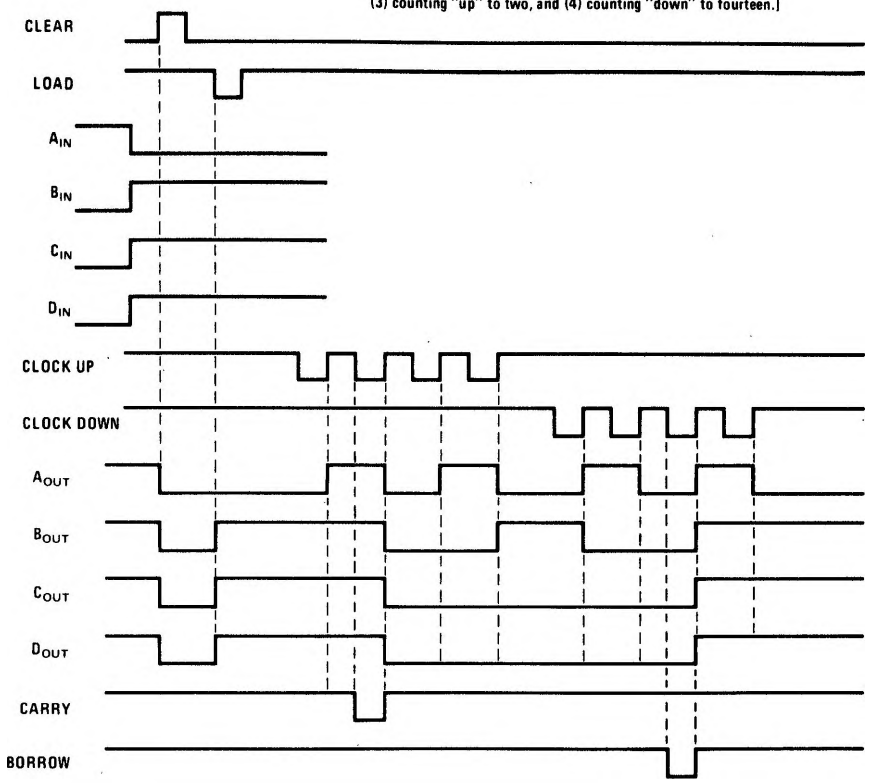
PARAMETER		CONDITIONS		MIN	TYP	MAX	UNITS
Logical "1" Input Voltage	DM7563	V_{CC} = 4.5V		2.0			V
	DM8563	V_{CC} = 4.75V					
Logical "0" Input Voltage	DM7563	V_{CC} = 4.5V				0.8	V
	DM8563	V_{CC} = 4.75V					
Logical "1" Output Voltage	DM7563	V_{CC} = 4.5V	I_{OUT} = −400 μA	2.4			V
	DM8563	V_{CC} = 4.75V					
Logical "0" Output Voltage	DM7563	V_{CC} = 4.5V	I_{OUT} = 16 mA			0.4	V
	DM8563	V_{CC} = 4.75V					
Logical "1" Input Current (All Inputs)	DM7563	V_{CC} = 5.5V	V_{IN} = 2.4V			40	μA
	DM8563	V_{CC} = 5.25V					
Logical "1" Input Current (All Inputs)	DM7563	V_{CC} = 5.5V	V_{IN} = 5.5V			1	mA
	DM8563	V_{CC} = 5.25V					
Logical "0" Input Current	DM7563	V_{CC} = 5.5V	V_{IN} = 0.4V			1.6	mA
	DM8563	V_{CC} = 5.25V					
Output Short Circuit Current (Note 2)	DM7563	V_{CC} = 5.5V	V_{OUT} = 0	20		55	mA
	DM8563	V_{CC} = 5.25V		18			
Supply Current	DM7563	V_{CC} = 5.5V			50		mA
	DM8563	V_{CC} = 5.25V					
Propagation Delay to a Logical "1", t_{pd1}		V_{CC} = 5.0V, T_A = 25°C	From Clock to Output		27		ns
			From Clock to Carry/Borrow		22		ns
Propagation Delay to a Logical "0", t_{pd0}		V_{CC} = 5.0V, T_A = 25°C	From Clock to Output		37		ns
			From Clock to Carry/Borrow		18		ns
Maximum Clock Frequency		V_{CC} = 5.0V, T_A = 25°C			30		MHz

Note 1: Specifications apply across −55°C to +125°C temperature range for the DM7563 and 0°C to 70°C for the DM8563 unless otherwise specified. Typicals are given for V_{CC} = 5V and T_A = 25°C only.

Note 2: Only 1 output may be shorted at a time.

logic waveforms

[Example shown for (1) clearing, (2) asynchronously setting to fourteen count, (3) counting "up" to two, and (4) counting "down" to fourteen.]



NOTES:
1. LOAD AND CLEAR INPUTS SHOULD NEVER BE ENABLED TOGETHER.
2. A, B, C, and D INPUTS ARE FREE TO CHANGE AFTER LOAD INPUT IS DISABLED.
3. WHEN COUNTING "UP", THE "DOWN" CLOCK MUST BE IN THE LOGICAL 1 STATE, AND CONVERSELY.

cascading counters