MOTOROLA

MC54/74HC93

Product Preview

HIGH-PERFORMANCE
CMOS
LOW-POWER COMPLEMENTARY MOS
SILICON-GATE

4-STAGE BINARY RIPPLE COUNTER WITH ÷2 AND ÷8 SECTIONS

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The MC54/74HC93 is identical in pinout to the LS93. The device inputs are compatible with standard CMOS outputs; with pullup resistors, they are compatible with LSTTL outputs.

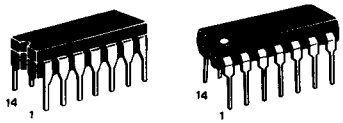
The HC93 is a 4-bit ripple type counter consisting of four master/slave flip-flops that are internally connected to provide separate divide-by-two and divide-by-eight sections. Each section has a separate Clock input which initiates state changes of the counter on the high-to-low clock transition. State changes of the Q outputs do not occur simultaneously because of internal ripple delays. Therefore, decoded output signals are subject to decoding spikes and should not be used as clocks or as strobes except when gated with the clock of the HC93. Q_A is the output of the divide-by-two section; Q_B, Q_C, and Q_D are the binary outputs of the divide-by-eight section.

A gated AND asynchronous Reset is provided which resets all the flip-flops.

Because the output from the divide-by-two section is not internally connected to the succeeding stages, the devices may be operated in various counting modes:

1. A 4-Bit Ripple Counter — The Q_A output must be externally connected to the Clock B input. The input count pulses are applied to the Clock A input. Simultaneous divisions of 2, 4, 8, and 16 are performed at the Q_A, Q_B, Q_C, and Q_D outputs.
2. A 3-Bit Ripple Counter — The input count pulses are applied to the Clock B input. Simultaneous frequency divisions of 2, 4, and 8 are available at the Q_B, Q_C, and Q_D outputs. Independent use of the first flip-flop is available if the reset function coincides with reset of the 3-bit ripple-through counter.

- Choice of Counting Modes: ÷2, ÷8, and ÷16
- Low Power Consumption Characteristic of CMOS Devices
- Output Drive Capability: 10 LSTTL Loads Minimum
- Operating Speeds Similar to LSTTL
- Wide Operating Voltage Range: 2 to 6 Volts
- Low Input Current: 1 μA Maximum
- Low Quiescent Current: 80 μA Maximum (74HC Series)
- High Noise Immunity Characteristic of CMOS Devices
- Diode Protection on All Inputs



J SUFFIX
CERAMIC PACKAGE
CASE 632

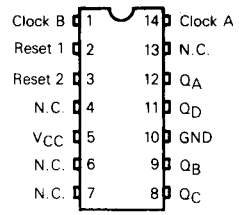
N SUFFIX
PLASTIC PACKAGE
CASE 646

ORDERING INFORMATION

54 Series: −55°C to +125°C
MC54HCXXJ (Ceramic Package Only)

74 Series: −40°C to +85°C
MC74HCXXN (Plastic Package)
MC74HCXXJ (Ceramic Package)

PIN ASSIGNMENT



N.C. = No Connection

MODE SELECTION TABLE

Inputs			Outputs			
Reset 1	Reset 2	Clock	Q_D	Q_C	Q_B	Q_A
H	H	X	L	L	L	L
L	H	↘	Count			Toggle
H	L	↘	Count			Toggle
L	L	↘	Count			Toggle

This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.

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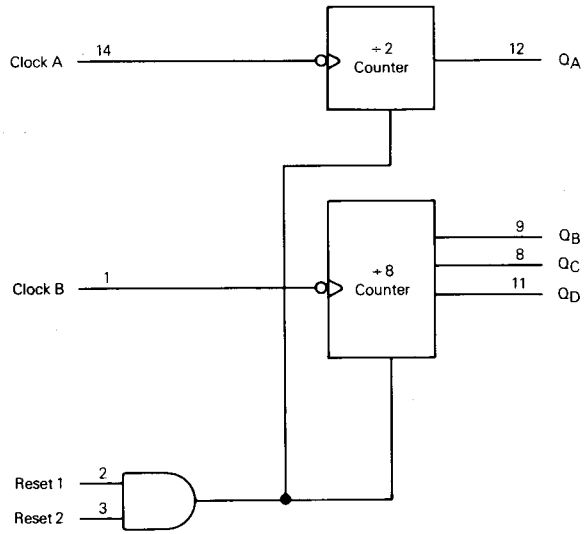
BLOCK DIAGRAM



V_{CC} = Pin 5
GND = Pin 10
No Connection = Pins 4, 6, 7, 13

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