Circuit adds functions to a monostable multivibrator

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Gate generation is often an inevitable step in digital-signal processing. Invariably, the gate generation during event processing in a digital system uses the input trigger of a monostable multivibrator. The values of the RC (resistance-capacitance) components within the manufacturer-supplied parameters determine the gate width of the output pulse of the monostable multivibrator. The monostable multivibrator generates only one-shots for each input trigger during event processing.

However, you can enhance the functional capability of gate generation of a monostable multivibrator with modifications in its input-trigger circuitry to generate any number of output-gate pulses for each single-input triggering. You can exploit the resultant circuit to generate a fixed number of repetitive gate pulses with a single-input trigger by incorporating a counter with the circuit to keep track of the gate generation. The monostable multivibrator becomes inactive as soon as it generates the requisite number of gates.

Figure 1 shows modifications to a monostable multivibrator that allow it to repetitively generate 63 gate pulses with one trigger. The RC components determine a gate width of 5 to 75 μsec. However, this design has a preset gate width of 20 μsec to give a total time

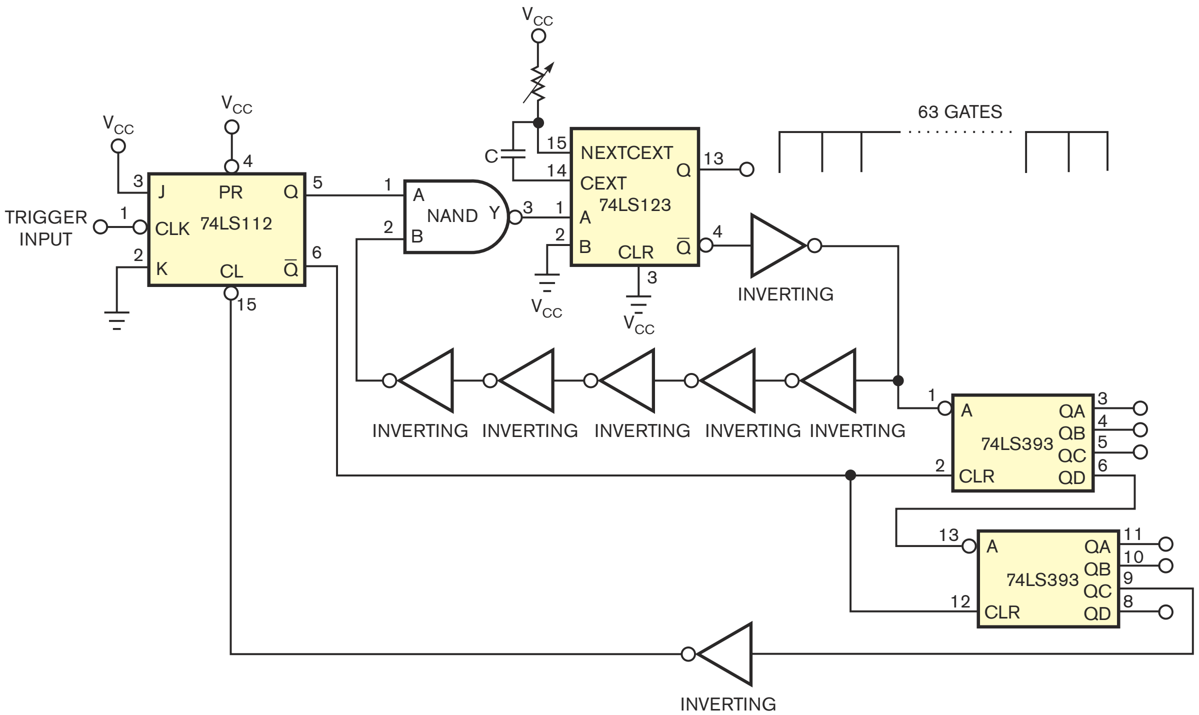

Figure 1 By adding counters and an oscillator to the output of a monostable multivibrator, you can generate any number of output-gate pulses.

interval of 1260 μsec. When the input-trigger pulse goes to the active low, Pin 1, of the JK 74LS112 flip-flop, the falling edge of the input-trigger pulse activates the flip-flop to set Q. Because the default condition of Pin 2 of the NAND gate is at a high level, the transition at the output pin, Pin 3, of the NAND gate passes on to the active-low input of the monostable multivibrator at Pin 1. The falling edge of the output pulse of the NAND gate triggers the monostable multivibrator to generate the first gate pulse of predefined gate width.

Subsequently, when the Q output pulse of the monostable multivibrator makes a transition from high to low, the rising edge of the complementary output pulse of the monostable multivibrator at $\overline{Q}$, Pin 4, connects back to the two-input NAND gate. Through a series of inverter retriggers, the monostable multivibrator again generates the next gate pulse. The gate generation can continue indefinitely. However, the $\overline{Q}$ output after inversion also feeds into two 74LS393 hex counters. The two hex counters cascade together to count the 63 gate pulses. As soon as the circuit counts the requisite number of gate pulses, Pin 9 of the hex counter goes high and, after inversion, clears the active state of the JK flip-flop.

The two-input NAND gate's Pin 1 also goes to a low level and disables the flip-flop, preventing the feedback rising-edge transition of the $\overline{Q}$ of the monostable multivibrator from again passing on to the trigger input—Pin 1 of the monostable multivibrator. So, the trigger to the monostable multivibrator and further gate generation stop (**references 1 and 2**).EDN

REFERENCES

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