

54/74122

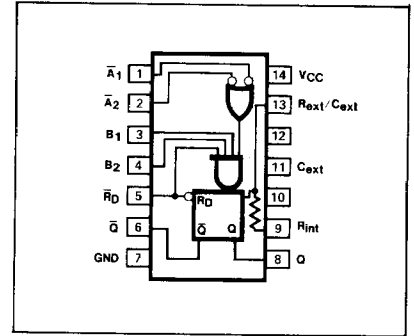
DESCRIPTION

These retriggerable monostable multi-vibrators feature dc triggering from gated active LOW inputs (\bar{A}) and active HIGH inputs (B) and also provide overriding direct reset inputs. Complementary outputs are provided. The retrigger capability simplifies the generation of output pulses of extremely long duration. By triggering the input before the output pulse is terminated, the output pulse may be extended. The overriding reset capability permits any output pulse to be terminated at a predetermined time independently of the timing components R and C.

FEATURES

- DC Triggered from active HIGH or active LOW inputs
- Retriggerable for very long pulses—up to 100% duty cycle
- Direct Reset terminates output pulse
- Compensated for V_{CC} and temperature variations

PIN CONFIGURATION



FUNCTION TABLE

| INPUTS | | | | | OUTPUTS | |
|-------------|-------------|-------------|----------------|----------------|---------------------|--------------------|
| \bar{R}_D | \bar{A}_1 | \bar{A}_2 | B ₁ | B ₂ | Q | \bar{Q} |
| L | X | X | X | X | L | H |
| X | H | H | X | X | L | H |
| X | X | X | L | X | L | H |
| X | X | X | X | L | L | H |
| H | L | X | ↑ | H | [Active HIGH pulse] | [Active LOW pulse] |
| H | L | X | H | ↑ | [Active HIGH pulse] | [Active LOW pulse] |
| H | X | L | ↑ | H | [Active HIGH pulse] | [Active LOW pulse] |
| H | X | L | H | ↑ | [Active HIGH pulse] | [Active LOW pulse] |
| H | H | ↓ | H | H | [Active HIGH pulse] | [Active LOW pulse] |
| H | ↓ | ↓ | H | H | [Active HIGH pulse] | [Active LOW pulse] |
| H | ↓ | H | H | H | [Active HIGH pulse] | [Active LOW pulse] |
| ↑ | L | X | H | H | [Active HIGH pulse] | [Active LOW pulse] |
| ↑ | X | L | H | H | [Active HIGH pulse] | [Active LOW pulse] |

H = HIGH voltage level
 L = LOW voltage level
 X = Don't care
 ↑ = LOW-to-HIGH input transition
 ↓ = HIGH-to-LOW input transition
 [Active HIGH pulse] = Active HIGH pulse
 [Active LOW pulse] = Active LOW pulse

ORDERING CODE (See Section 9 for further Package and Ordering Information)

| PACKAGES | COMMERCIAL RANGES | MILITARY RANGES |
|-------------|--|--|
| | $V_{CC}=5V \pm 5\%$; $T_A=0^\circ C$ to $+70^\circ C$ | $V_{CC}=5V \pm 10\%$; $T_A=-55^\circ C$ to $+125^\circ C$ |
| Plastic DIP | N74122N | |
| Ceramic DIP | B74122F | S54122F |
| Flatpak | | S54122W |

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE^(a)

| PINS | DESCRIPTION | | 54/74 | 54S/74S | 54LS/74LS |
|---------------------------------|---------------------------------|---------------------------------------|------------|---------|-----------|
| \bar{A}_1, \bar{A}_2 | Trigger (active LOW) inputs | I_{IH} (μA) I_{IL} (mA) | 40 -1.6 | | |
| B ₁ , B ₂ | Trigger (active HIGH) inputs | I_{IH} (μA) I_{IL} (mA) | 40 -1.6 | | |
| \bar{R}_D | Direct Reset (active LOW) input | I_{IH} (μA) I_{IL} (mA) | 80 -3.2 | | |
| Q | Pulse (active HIGH) output | I_{OH} (μA) I_{OL} (mA) | -800 16 | | |
| \bar{Q} | Pulse (active LOW) output | I_{OH} (μA) I_{OL} (mA) | -800 16 | | |

NOTE

a. The slashed numbers indicate different parametric values for Military/Commercial temperature ranges respectively.

FUNCTIONAL DESCRIPTION

The "122" is a retriggerable monostable multivibrator featuring output pulse width control by three methods. The basic pulse time is programmed by selection of external resistance and capacitance values (see typical application data in "123" data sheet). The "122" has an internal timing resistor that allows the circuit to be used with only an external capacitor, if so desired. Once triggered, the basic pulse width may be extended by retriggering the gated active LOW going edge inputs (\bar{A}_1, \bar{A}_2) or the active HIGH going edge inputs (B_1, B_2), or be reduced by use of the overriding active LOW Reset.

To use the internal timing resistor of the "122" connect R_{int} to V_{CC} . For improved pulse width accuracy and repeatability, connect an external resistor between R_{ext}/C_{ext} and V_{CC} with R_{int} left open. To obtain variable pulse widths, connect an external variable resistance between R_{int} or R_{ext}/C_{ext} and V_{CC} .

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE^(b)

| PARAMETER | TEST CONDITIONS | 54/74 | | 54S/74S | | 54LS/74LS | | UNIT |
|-----------|------------------------------|-----------------------|-----|---------|-----|-----------|-----|------|
| | | Min | Max | Min | Max | Min | Max | |
| I_{OS} | Output short circuit current | $V_{CC} = \text{Max}$ | | -10 | -40 | | | mA |
| I_{CC} | Supply current | $V_{CC} = \text{Max}$ | | | 28 | | | mA |

AC CHARACTERISTICS: $T_A = 25^\circ\text{C}$ (See Section 4 for Test Circuits and Conditions)

| PARAMETER | TEST CONDITIONS | 54/74 | | 54S/74S | | 54LS/74LS | | UNIT |
|-----------|---|---|-----|---------|------|-----------|-----|---------------|
| | | $C_L = 15\text{pF}$ $R_L = 400\Omega$ | | | | | | |
| | | Min | Max | Min | Max | Min | Max | |
| t_{PLH} | Propagation delay | Figure 1 | | | 33 | | | ns |
| t_{PHL} | \bar{A} input to Q & \bar{Q} output | $C_{ext} = 0\text{pF}, R_{ext} = 5\text{k}\Omega$ | | | 40 | | | ns |
| t_{PLH} | Propagation delay B | Figure 2 | | | 28 | | | ns |
| t_{PHL} | input to Q & \bar{Q} output | $C_{ext} = 0\text{pF}, R_{ext} = 5\text{k}\Omega$ | | | 36 | | | ns |
| t_{PLH} | Propagation delay \bar{R}_D | Figure 3 | | | 40 | | | ns |
| t_{PHL} | input to \bar{Q} & Q output | $C_{ext} = 0\text{pF}, R_{ext} = 5\text{k}\Omega$ | | | 27 | | | ns |
| t_{WQ} | Minimum Q pulse width | Figures 1 & 2 | | | 65 | | | ns |
| t_{WQ} | Output pulse width | Figures 1 & 2 | | 3.08 | 3.76 | | | μs |
| | | $C_{ext} = 1000\text{pF}, R_{ext} = 10\text{k}\Omega$ | | | | | | |

NOTES

b. For family dc characteristics, see inside front cover for 54/74 and 54H/74H, and see inside back cover for 54S/74S and 54LS/74LS specifications.

AC SETUP REQUIREMENTS: $T_A = 25^\circ\text{C}$ (See Section 4 for Test Circuits and Conditions)

| PARAMETER | TEST CONDITIONS | 54/74 | | 54S/74S | | 54LS/74LS | | UNIT |
|--|-----------------|-------|-----|----------------|-----|-----------|-----|-----------|
| | | Min | Max | Min | Max | Min | Max | |
| t_{W} Minimum input pulse width to trigger | Figures 1 & 2 | 40 | | | | | | ns |
| R_{ext} External timing resistor range | Mil | 5.0 | 25 | | | | | $k\Omega$ |
| | Com | 5.0 | 50 | | | | | $k\Omega$ |
| C_{ext} External timing capacitance range | | | | NO RESTRICTION | | | | pF |
| C_{R_x/C_x} Stray capacitance to GND at R_{ext}/C_{ext} terminal | | | 50 | | | | | pF |

AC WAVEFORMS

