

4727B

7-STAGE COUNTER

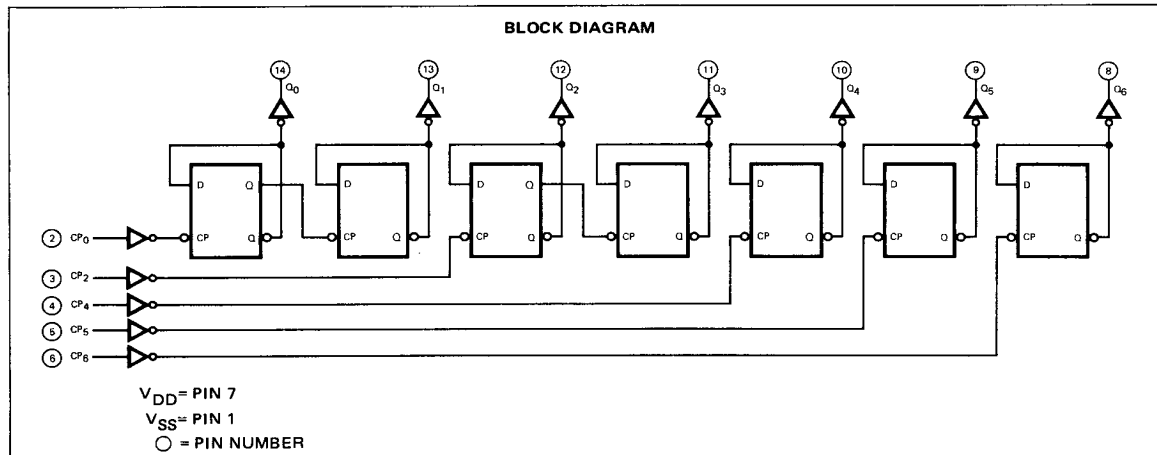
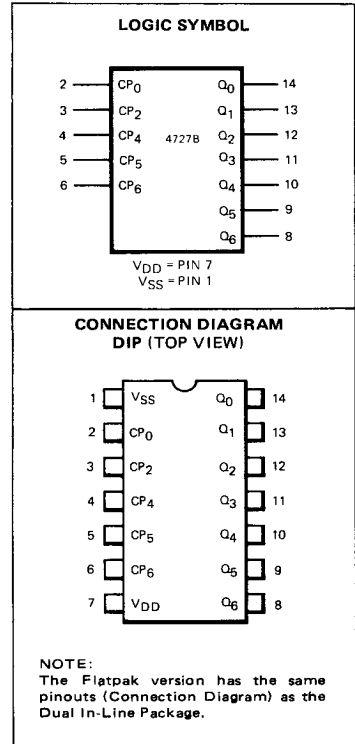
DESCRIPTION — The 4727B is a 7-Stage Frequency Counter especially useful for frequency synthesis in musical applications. The device is designed to generate, from a primary chromatic scale, each of the twelve flats, sharps, and naturals comprising each chromatic scale of the seven additional octaves in the musical spectrum. Twelve 4727B devices are required to generate the entire musical spectrum from a primary scale.

The 4727B consists of a pair of 2-Bit Counters, with Clock Inputs (CP₀ and CP₂) and Parallel Outputs (Q₀ and Q₁, Q₂ and Q₃), available, and three 1-bit counters, also with Clock Inputs (CP₄, CP₅, and CP₆) and Parallel Outputs (Q₄, Q₅, and Q₆) available. Each counter advances on a LOW-to-HIGH transition at the appropriate Clock Input.

- REPEATS A PRIMARY MUSICAL NOTE OR HALF NOTE IN SEVEN OCTAVES
- CLOCK INPUT EDGE — TRIGGERED ON THE LOW-TO-HIGH TRANSITION
- BUFFERED OUTPUTS AVAILABLE FROM ALL SEVEN STAGES

PIN NAMES

CP₀-CP₆ CLOCK INPUTS (L→H TRIGGERED)
 Q₀-Q₆ PARALLEL OUTPUTS



DC CHARACTERISTICS: V_{DD} as shown, $V_{SS} = 0$ V (See Note 1)

| SYMBOL | PARAMETER | LIMITS | | | | | | | | | UNITS | TEMP | TEST CONDITIONS | |
|----------|--------------------------------|----------------|-----|-----|-----------------|-----|-----|-----------------|-----|-----|---------|--------------------|--|---|
| | | $V_{DD} = 5$ V | | | $V_{DD} = 10$ V | | | $V_{DD} = 15$ V | | | | | | |
| | | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | | | | |
| I_{OH} | Output High Current | -0.3 | | | -0.84 | | | -1.8 | | | mA | MIN 25°C MAX | $V_{OUT} = 4.5$ V For $V_{DD} = 5$ V. $V_{OUT} = 9.5$ V For $V_{DD} = 10$ V. $V_{OUT} = 13.5$ V For $V_{DD} = 15$ V. | Inputs at V_{SS} or V_{DD} Per the Logic Function or Truth Table |
| | | -0.25 | | | -0.7 | | | -1.5 | | | | | | |
| I_{OL} | Output Low Current | 0.64 | | | 1.6 | | | 4.2 | | | mA | MIN 25°C MAX | $V_{OUT} = 0.4$ V for $V_{DD} = 5$ V $V_{OUT} = 0.5$ V for $V_{DD} = 10$ V $V_{OUT} = 1.5$ V for $V_{CC} = 15$ V | |
| | | 0.51 | | | 1.3 | | | 3.4 | | | | | | |
| I_{DD} | Quiescent Power Supply Current | XC | | 20 | | | 40 | | | 80 | μ A | MIN, 25°C MAX | All Inputs at V_{DD} or V_{SS} | |
| | | | | 150 | | | 300 | | 600 | | | | | |
| | | XM | | 5 | | | 10 | | | 20 | μ A | MIN, 25°C MAX | | |
| | | | | 150 | | | 300 | | 600 | | | | | |

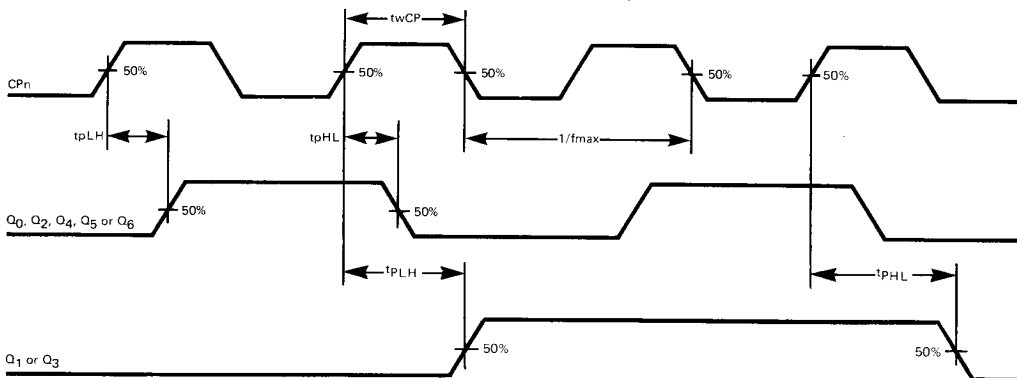
AC CHARACTERISTICS AND SET-UP REQUIREMENTS: V_{DD} as shown, $V_{SS} = 0$ V, $T_A = 25^\circ$ C (See Note 2)

| SYMBOL | PARAMETER | LIMITS | | | | | | | | | UNITS | TEST CONDITIONS |
|-----------|--|----------------|-----|------|-----------------|-----|-----|-----------------|-----|-----|-------|--|
| | | $V_{DD} = 5$ V | | | $V_{DD} = 10$ V | | | $V_{DD} = 15$ V | | | | |
| | | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | | |
| t_{PLH} | Propagation Delay, CP_n to Q_0, Q_2, Q_4, Q_5 or Q_6 | | 225 | 500 | | 90 | 250 | | 75 | 200 | ns | $C_L = 50$ pF $R_L = 200$ k Ω Input Transition Times ≤ 20 ns |
| t_{PHL} | Propagation Delay, CP_n to Q_1 or Q_3 | | 225 | 500 | | 90 | 250 | | 75 | 200 | | |
| t_{PLH} | Propagation Delay, CP_n to Q_1 or Q_3 | | 365 | 1000 | | 130 | 500 | | 100 | 400 | ns | |
| t_{PHL} | Propagation Delay, CP_n to Q_1 or Q_3 | | 365 | 1000 | | 130 | 500 | | 100 | 400 | | |
| t_{TLH} | Output Transition Times | | 70 | 500 | | 40 | 250 | | 30 | 200 | ns | |
| t_{THL} | Output Transition Times | | 70 | 500 | | 40 | 250 | | 30 | 200 | | |
| T_{wCP} | Min Clock Pulse Width | 250 | 125 | | 125 | 65 | | 100 | 50 | | ns | |
| f_{MAX} | Input Count Frequency (Note 3) | 2 | 4 | | 4 | 8 | | 5 | 10 | | MHz | |

NOTES:

- Additional DC characteristics are listed in this section under "4000B Series CMOS Family Characteristics."
- Propagation Delays and Output Transition Times are graphically described in this section under "4000B Series CMOS Family Characteristics."
- For f_{MAX} input rise and fall times are greater than or equal to 5 ns and less than or equal to 20 ns.

SWITCHING WAVEFORMS



PROPAGATION DELAY, CP to Q_n , MINIMUM CLOCK PULSE WIDTH AND MAXIMUM FREQUENCY