

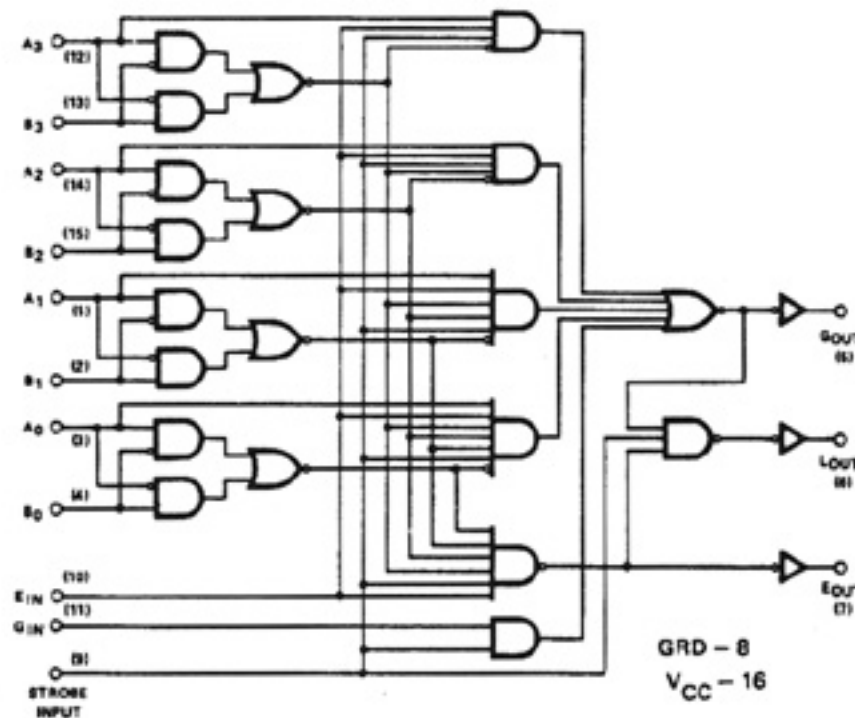
**Features**

- IDEAL FOR DIGITAL CONTROLS REQUIRING COMPARATORS
- CASCADES TO COMPARE LARGE BINARY OR BCD NUMBERS
- ACTIVE-HIGH OUTPUTS
- STROBE INPUT

**General Description**

The 343 compares two 4-bit binary numbers,  $A_3, A_2, A_1, A_0$  and  $B_3, B_2, B_1, B_0$ . The comparison generates an active high output indicating whether A is greater than, equal to, or less than B. Longer binary numbers can be compared by operating a number of comparators in cascade. A strobe is provided to hold all outputs low.

**Logic Diagram**

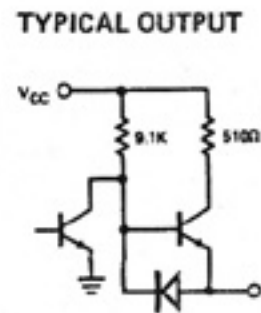
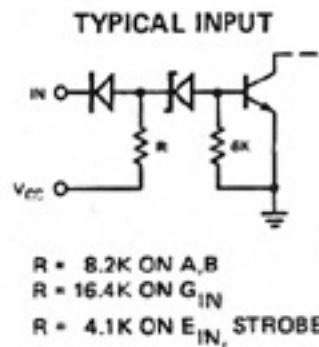


**Truth Table**

	INPUTS			OUTPUTS		
	E <sub>IN</sub>	G <sub>IN</sub>	STROBE	E <sub>OUT</sub>	G <sub>OUT</sub>	L <sub>OUT</sub>
A > B	1	0	1	0	1	0
A = B	1	0	1	1	0	0
A < B	1	0	1	0	0	1
A > B	1	1	1	0	1	0
A = B	1	1	1	1	1	0
A < B	1	1	1	0	1	0
A > B	0	1	1	0	1	0
A = B	0	1	1	0	1	0
A < B	0	1	1	0	1	0
A > B	0	0	1	0	0	1
A = B	0	0	1	0	0	1
A < B	0	0	1	0	0	1

NOTE: If the device is being used correctly E<sub>IN</sub> and G<sub>IN</sub> will never be high at the same time. Whenever the strobe is low (logical "0"), all outputs will be low regardless of the input states.

Equivalent Circuits



Specifications

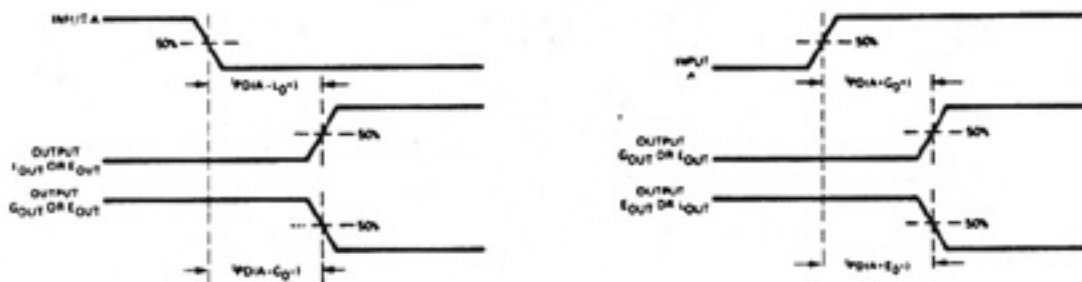
343

I <sub>CC</sub> (WORST-CASE)	42 mA @ 13V, 56 mA @ 16V
t <sub>PD</sub>	1 microsecond
I/O FUNCTION FOR t <sub>PD</sub>	A+ or A- to G, E, or L+ or -

NOTE:

I<sub>CC</sub> is tested at V<sub>CC</sub> +1 Volt (+13V for C type and 16V for A type) and is guaranteed across the applicable temp range.  
 t<sub>PD</sub> is guaranteed at V<sub>CC</sub> ±1V and across the applicable temp range with the output loaded with 5 unit loads.

Switching Time Waveforms

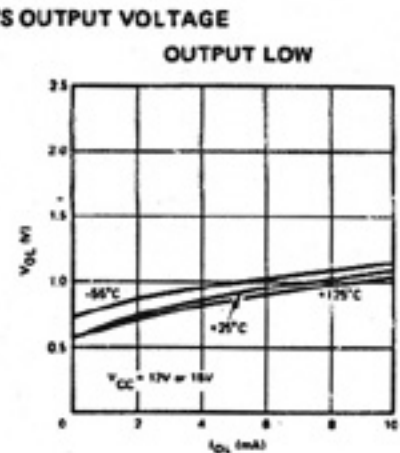
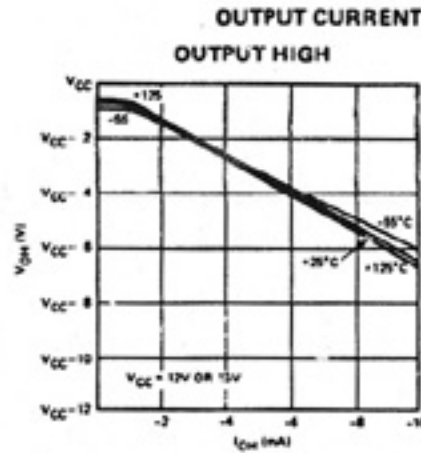
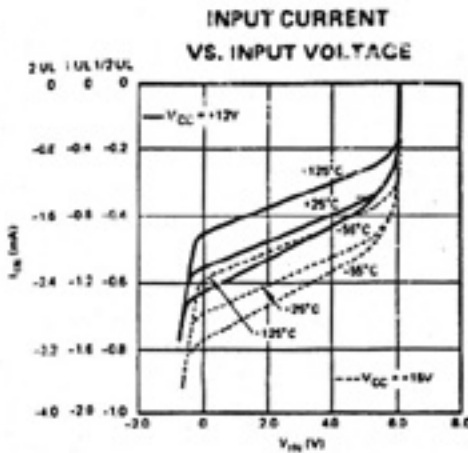


Loading Table

343

PINS	FUNCTION	LOADING
A,B	Data inputs	1 UL
EIN	"Equal to" input	2 UL
GIN	"Greater than" input	1 UL
Strobe	Strobe input	2 UL
EOUT	"Equal to" output	5 UL
GOUT	"Greater than" output	5 UL
LOUT	"Less than" output	5 UL

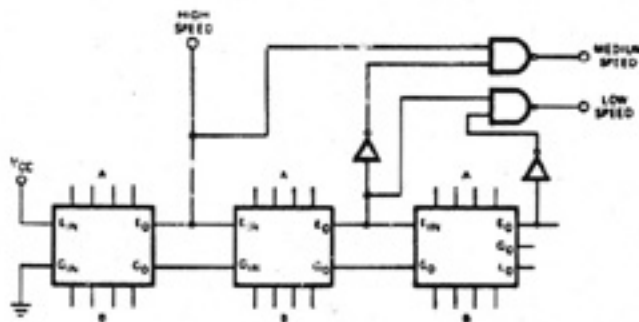
Typical Performance Characteristics



Typical Applications

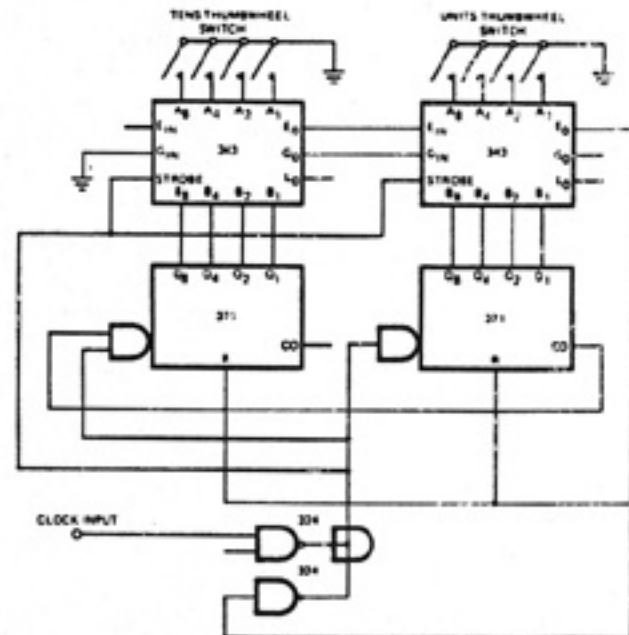
The "equal to" and "greater than" outputs can be connected to the corresponding inputs of another 343 to cascade the comparators. In this way, two binary or BCD numbers of any length can be compared. The final stage's outputs will indicate their relative magnitude. The unused "equal to" input should be left open, and the unused "greater than" input should be grounded.

SERVO OVERSHOOT CONTROL



Speed information is provided a servo positioning system by three comparators in cascade. The most significant digit of the control word is applied to the comparator at the left. If the device controlled is a long way from a new position, only the high speed output will be low. As the device approaches the new position, this output will go high, and the medium speed output will go low. When the device is very close, only the low speed output will be low. This allows regulation of motor speed to limit device overshoot. The circuit shown is a simplified version that is intended only to show the general application of the 343 to servo positioning controls. The actual circuit is more involved since the possibility exists that the controlled device may be on the other side of the desired position.

MOD N COUNTER



In this example, the counter modulus is any number up to 99 set with two thumbwheel switches. When the counters reach this number, the second comparator's  $E_{OUT}$  resets the counters. The 343 strobe inputs are tied to the system clock to prevent the possibility of false comparisons being made when the counters are changing state.