BINARY-TO-OCTAL DECODER
BCD-TO-DECIMAL DECODER

8250
8251
8252

DIGITAL 8000 SERIES TTL/MSI

DESCRIPTION

The 8250, 8251 and 8252 are gate arrays for decoding and logic conversion applications.

The 8250 converts 3 lines of input to a one-of-eight output. The fourth input line (D) is utilized as an inhibit to allow use in larger decoding networks.

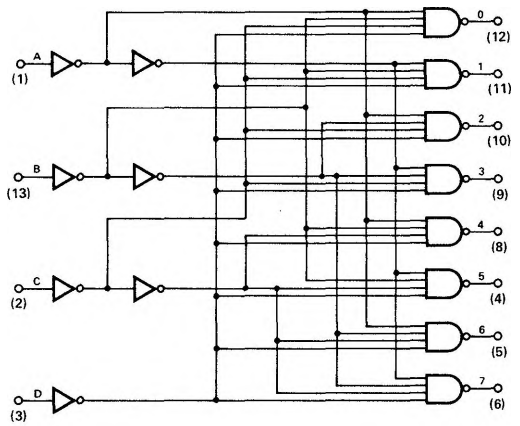
The 8251 and 8252 convert a 4 line input code (with 1-2-4-8 weighting) to a one-of-ten output as shown in the Truth Table.

The 8252 is a direct replacement for the 9301 with all outputs being forced high when a binary code greater than nine is applied to the inputs.

The selected output is a logic "0".

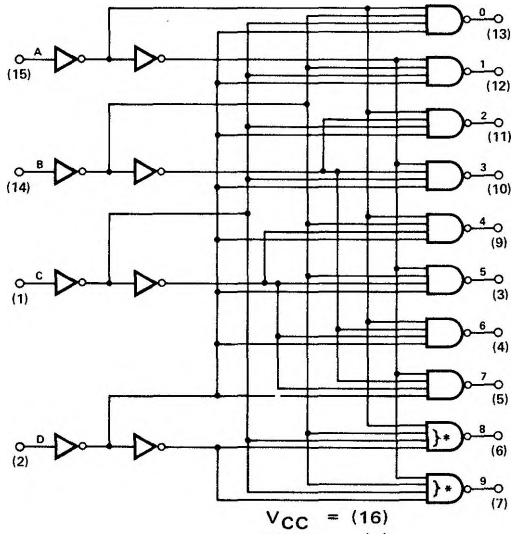
LOGIC DIAGRAMS

8250



V_{CC} = (14)
GND = (7)
( ) = Denotes Pin Numbers

8251/8252



V_{CC} = (16)
GND = (8)
*Connections made on 8252 only ( ) = Denotes Pin Numbers

TRUTH TABLE

INPUT STATE				OUTPUT STATES											
				8250								8251		8252	
A	B	C	D	0	1	2	3	4	5	6	7	8	9	8	9
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
1	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1
0	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1
0	0	1	0	1	1	1	1	0	1	1	1	1	1	1	1
1	0	1	0	1	1	1	1	1	0	1	1	1	1	1	1
0	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1
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0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	1
1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	0
0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1
0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1
0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1

ELECTRICAL CHARACTERISTICS (Over Recommended Operating Temperature And Voltage)

CHARACTERISTICS	LIMITS				A	B	C	D	OUTPUTS	NOTES
	MIN.	TYP.	MAX.	UNITS						
"1" Output Voltage	2.6	3.5		V					-800	6, 10
"0" Output Voltage			0.4	V					16mA	7, 10
"1" Input Current										
A, B, C, D			40	μA	4.5V	4.5V	4.5V	4.5V		
"0" Input Current										
A, B, C (8250, 8251)	-0.1		-1.2	mA	0.4V	0.4V	0.4V			
A, B, C, D (8252)	-0.1		-1.6	mA	0.4V	0.4V	0.4V	0.4V		
D (8251 Only)	-0.1		-1.2	mA				0.4V		
D (8250 Only)	-0.1		-1.0	mA				0.4V		

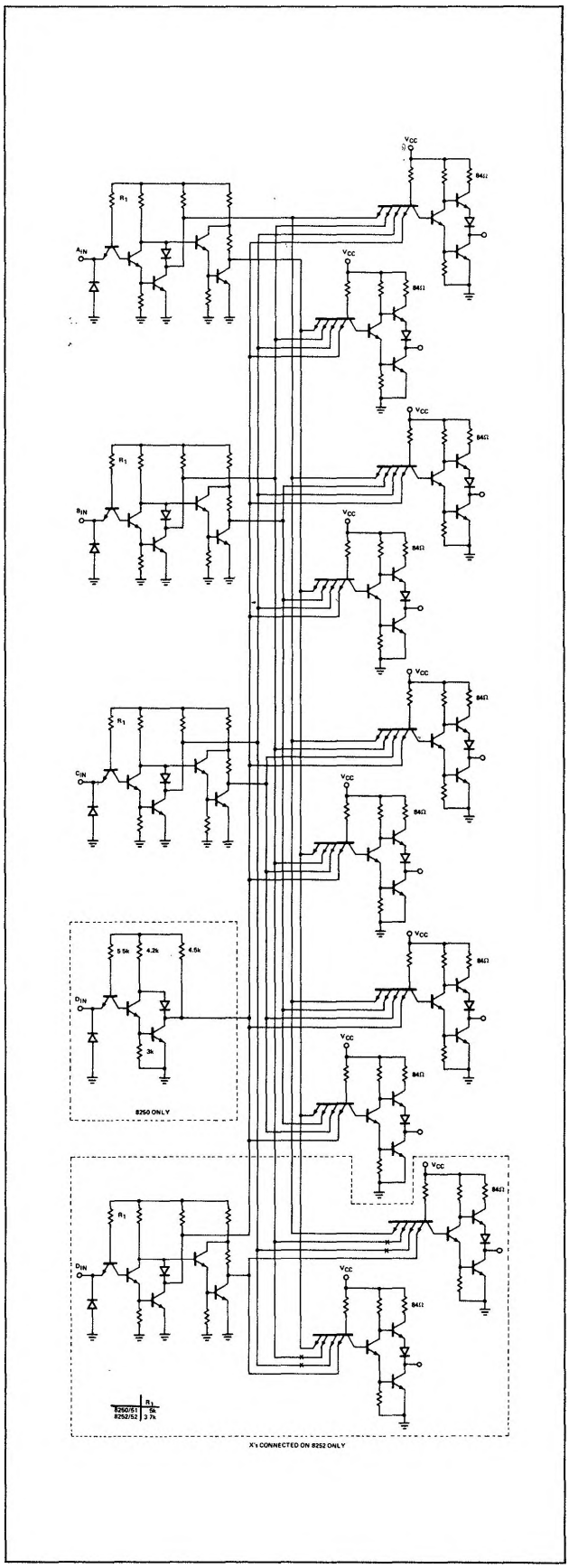
$T_A = 25°C$ and $V_{CC} = 5.0V$

CHARACTERISTICS	LIMITS				A	B	C	D	OUTPUTS	NOTES
	MIN.	TYP.	MAX.	UNITS						
Turn-on Delay t_{on}		20	35	ns						8
Turn-off Delay t_{off}		20	35	ns						8
Power/Current Consumption										
(8251 Only)			135/25.7	mW/mA	5.25V	5.25V	5.25V	0V		12
(8250 Only)			125/23.8	mW/mA	5.25V	5.25V	5.25V	0V		12
Input Latch Voltage	5.5			V	10mA	10mA	10mA	10mA		11
Output Short Circuit Current										
Outputs 1 thru 9	-10		-55	mA	0V	0V	0V	0V	0V	
Output 0	-10		-55	mA	5.0V	0V	0V	0V	0V	

NOTES:

1. All voltage measurements are referenced to the ground terminal. Terminals not specifically referenced are left electrically open.
2. All measurements are taken with ground pin tied to zero volts.
3. Positive current flow is defined as into the terminal referenced.
4. Positive logic definition:
   "UP" Level = "1". "DOWN" Level = "0".
5. Precautionary measures should be taken to ensure current limiting in accordance with Absolute Maximum Ratings should the isolation diodes become forward biased.
6. Output source current is supplied through a resistor to ground.
7. Output sink current is supplied through a resistor to V_{CC}.
8. Refer to AC Test Figures.
9. Manufacturer reserves the right to make design and process changes and improvements.
10. Inputs for "1" and "0" output voltage test is per TRUTH table with threshold levels of 0.8V for logical "0" and 2.0V for logical "1".
11. This test guarantees operation free of input latch-up over the specified operating power supply voltage range.
12. V_{CC} = 5.25 volts.

SCHEMATIC DIAGRAM



AC TEST FIGURE AND WAVEFORMS

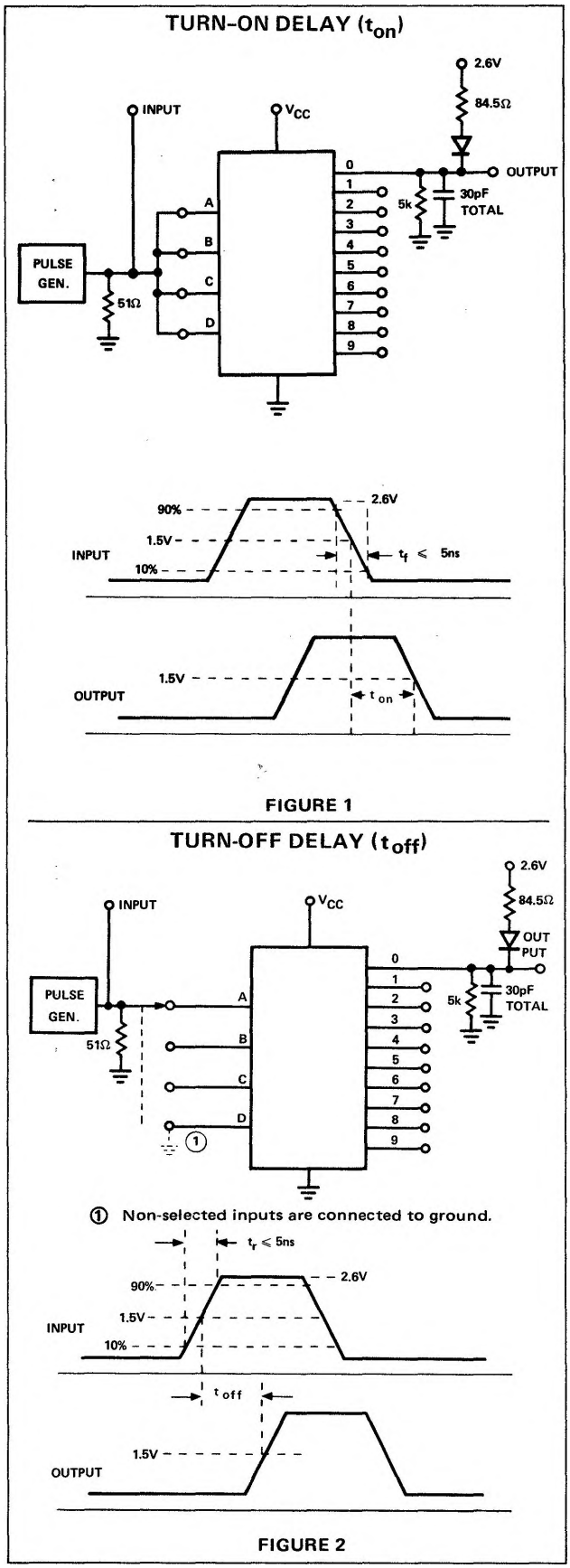
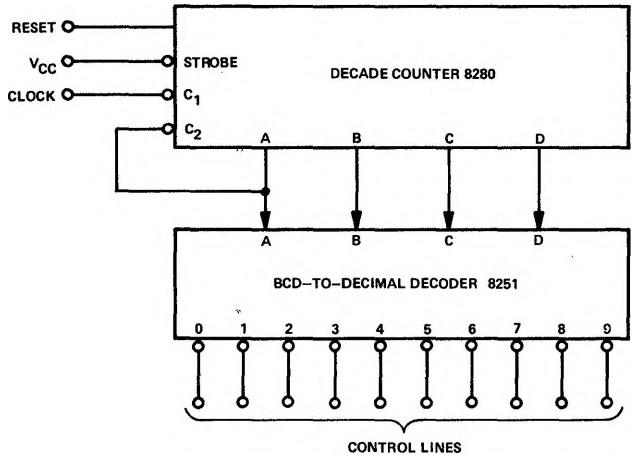


FIGURE 1

FIGURE 2

TYPICAL APPLICATIONS

ONE-OF-10 DECODER



ONE-OF-64 DECODER