CIRCUIT TYPE SN7441A
BCD-TO-DECIMAL DECODER/DRIVER

A SERIES 74 BCD-TO-DECIMAL DECODER
For Driving
Gas-Filled Cold-Cathode Indicator Tubes

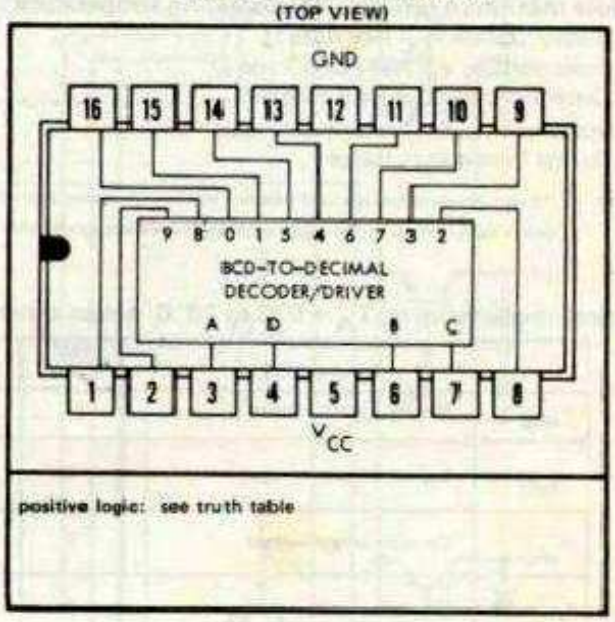
logic

TRUTH TABLE

INPUT				OUTPUT ON†
D	C	B	A	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9

† All other outputs are off.

J OR N DUAL-IN-LINE PACKAGE
(TOP VIEW)



positive logic: see truth table

description

The SN7441A is a monolithic, BCD-to-decimal decoder incorporating high performance output transistors designed for driving gas-filled, cold-cathode indicator tubes. The BCD-to-decimal decoder consists of familiar transistor-transistor-logic (TTL) gate circuits which select one of the ten decimal output drivers. The BCD inputs are fully compatible with Series 74 logic outputs; and, in addition, physical placement of these inputs is coincidental with the BCD output of the SN7490 decade counter. The ten high-breakdown, n-p-n transistors have a maximum reverse current of 50 μA at 5.5 V over the operating temperature range.

A typical application shows the SN7441A used as a gas-filled, display-indicator driver.

recommended operating conditions

Supply Voltage V_{CC} (See Note 1) . . . . . 4.75 V to 5.25 V
Maximum Voltage on any Output . . . . . 70 V

absolute maximum ratings (over operating temperature range unless otherwise noted)

Supply Voltage V_{CC} (See Note 1) . . . . . 7 V
Input Voltage, V_{in} (See Notes 1 and 2) . . . . . 5.5 V
Current into any Output (Off-State) . . . . . 2 mA
Operating Free-Air Temperature Range: . . . . . 0°C to 70°C
Storage Temperature Range . . . . . −65°C to 150°C

NOTES: 1. These voltage values are with respect to network ground terminal.
2. Input signals must be zero or positive with respect to network ground terminal.

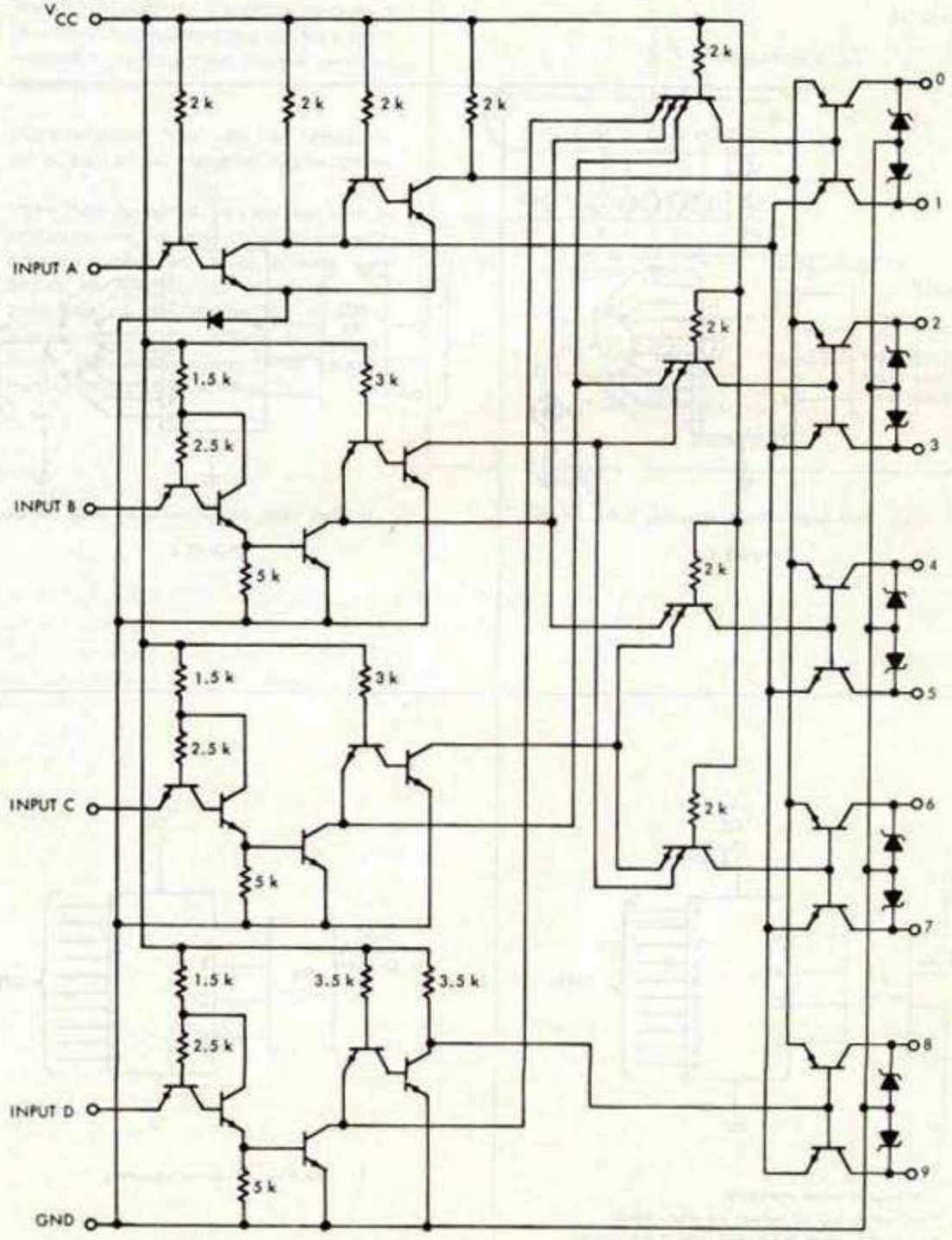
electrical characteristics, T_A = 0°C to 70°C, unless otherwise noted.

PARAMETER		TEST FIGURE	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$V_{in(1)}$	Logical 1 input voltage	1	V_{CC} = 4.75 V	2			V
$V_{in(0)}$	Logical 0 input voltage	1	V_{CC} = 4.75 V			0.8	V
V_{on}	On-state output voltage	1	V_{CC} = 4.75 V, I_{on} = 7 mA			2.5	V
I_{off}	Off-state reverse current	2	V_{CC} = 5.25 V, V_{out} = 55 V			50	μA
			V_{CC} = 5.25 V, V_{out} = 70 V			2	mA
$I_{in(1)}$	Logical 1 level input current at B, C, or D	3	V_{CC} = 5.25 V, V_{in} = 2.4 V			40	μA
			V_{CC} = 5.25 V, V_{in} = 5.5 V			1	mA
$I_{in(1)}$	Logical 1 level input current at A	3	V_{CC} = 5.25 V, V_{in} = 2.4 V			80	μA
			V_{CC} = 5.25 V, V_{in} = 5.5 V			1	mA
$I_{in(0)}$	Logical 0 level input current at B, C, or D	4	V_{CC} = 5.25 V, V_{in} = 0.4 V			-1.6	mA
$I_{in(0)}$	Logical 0 level input current at A	4	V_{CC} = 5.25 V, V_{in} = 0.4 V			-3.2	mA
I_{CC}	Supply current	3	V_{CC} = 5.25 V		21	42	mA

† This typical value is at V_{CC} = 5 V, T_A = 25°C

–SEE ORDERING INSTRUCTIONS PAGE 1-1–

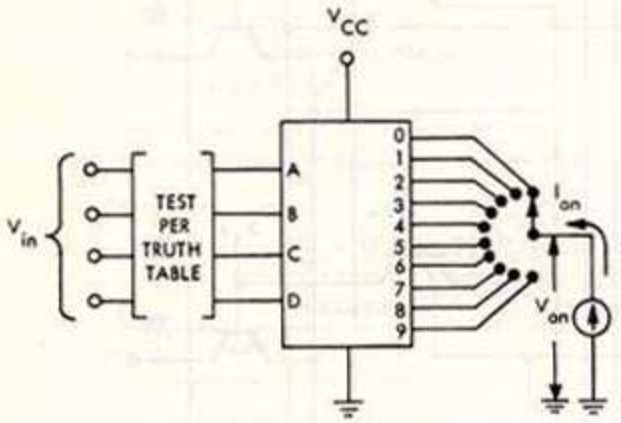
schematic



Component values shown are nominal.
All resistor values are in ohms.

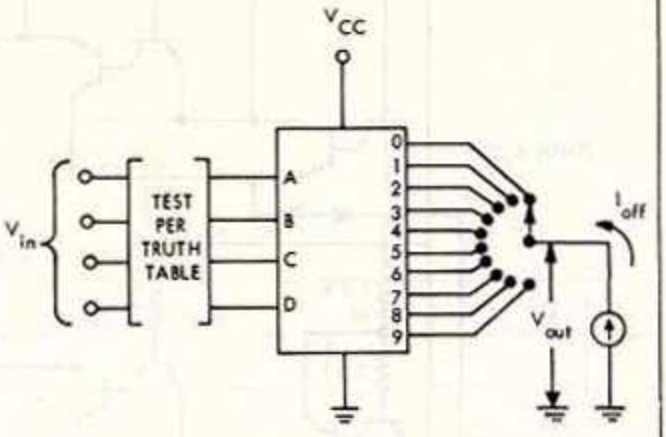
PARAMETER MEASUREMENT INFORMATION

d-c test circuits§



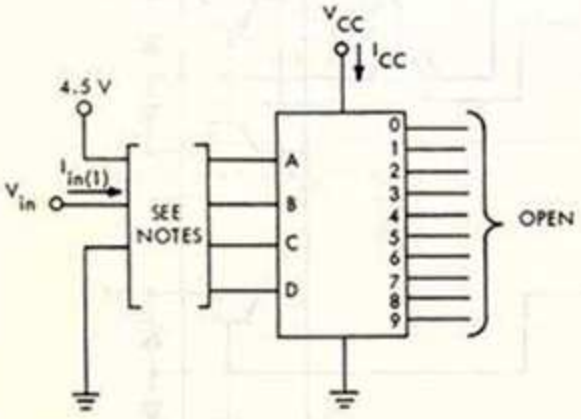
1. Each output is tested separately in the ON state.

FIGURE 1



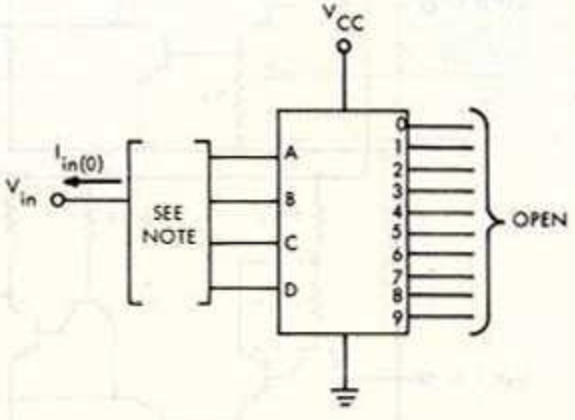
1. Each output is tested separately in the OFF state.

FIGURE 2



1. When testing $I_{in(1)}$, each input is tested separately.
2. When testing I_{CC} all outputs are open, inputs A, B, and C are at 4.5 V, and input D is grounded.

FIGURE 3



1. Each input is tested separately.

FIGURE 4

§ Arrows indicate actual direction of current flow.

typical application data

The SN7441A output transistors are capable of withstanding voltages and sinking current required to operate most types of gas-filled indicator tubes.

Clamping diodes have been incorporated in the outputs of this improved decoder/driver.

When these decoder/drivers are used in close proximity (on the same circuit board) with standard digital integrated circuits, care should be exercised to ensure that the impedance of the ground bus (including interconnections) is sufficiently low to absorb the normal energy levels resulting from switching the tube elements.

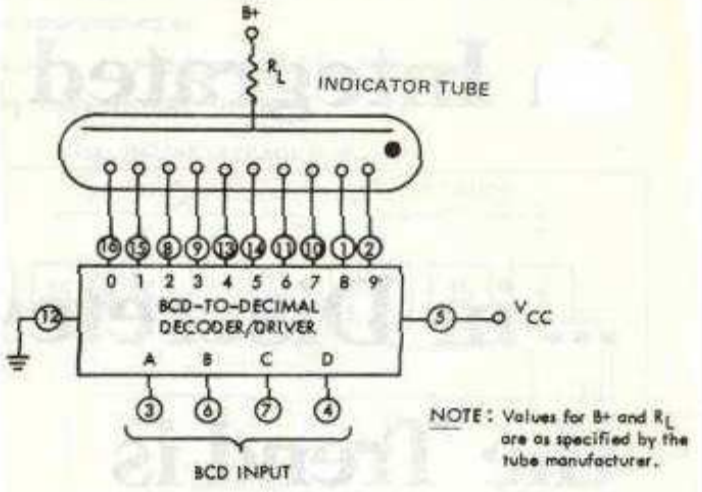


FIGURE 5

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