

# 74141

## 1-OF-10 DECODER/DRIVER (NIXIE) (With Open-Collector Outputs)

**DESCRIPTION** — The '141 is a BCD-to-decimal decoder driver that is designed to accept a 4-bit BCD code input and drive cold-cathode indicator tubes. This decoder utilizes design improvements that minimize switching transients in order to maintain a stable display. The segments and numeric designations chosen to represent the decimal numbers are shown in the Truth Table. For binary inputs 10 through 15, the outputs are OFF. These invalid codes can be used in blanking leading or trailing-edge zeroes in a display. The ten high performance, npn output transistors have a maximum reverse current of 50  $\mu$ A at 55 V. Typical power dissipation is 55 mW.

**ORDERING CODE:** See Section 9

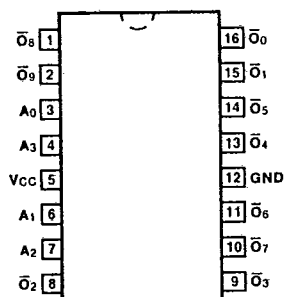
PKGS	PIN OUT	COMMERCIAL GRADE	PKG TYPE
		$V_{CC} = +5.0 \text{ V} \pm 5\%$ $T_A = 0^\circ\text{C to } +70^\circ\text{C}$	
Plastic DIP (P)	A	74141PC	9B
Ceramic DIP (D)	A	74141DC	6B

**INPUT LOADING/FAN-OUT:** See Section 3 for U.L. definitions

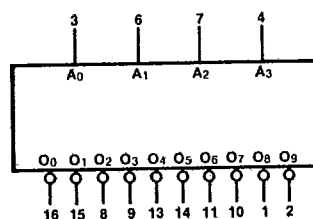
PIN NAMES	DESCRIPTION	74XX (U.L.) HIGH/LOW
$A_0$	BCD Input	1.0/1.0
$A_1 - A_3$	BCD Inputs	2.0/2.0
$\bar{O}_0 - \bar{O}_9$	Outputs (Active LOW)	OC*/7.0 mA

\*OC — Open Collector

### CONNECTION DIAGRAM PINOUT A



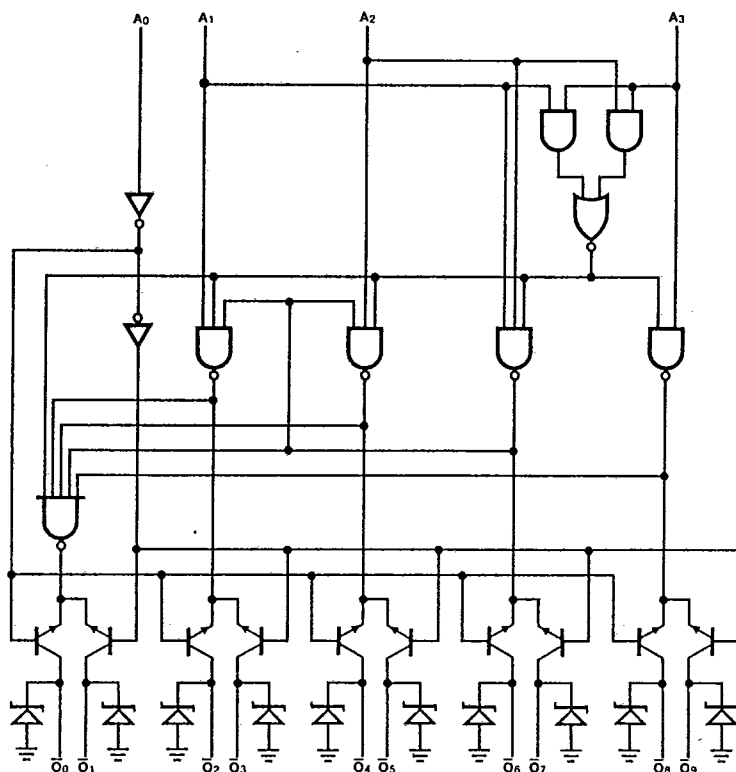
### LOGIC SYMBOL



$V_{CC} = \text{Pin } 5$   
 $GND = \text{Pin } 12$

**FUNCTIONAL DESCRIPTION** — The 1-of-10 decoder/driver accepts BCD inputs from all TTL circuits and produces the correct output selection to directly drive gas filled cold cathode indicator tubes. The outputs are selected as shown in the Truth Table. It is capable of driving all known available cold cathode indicator tubes having 7.0 mA or less cathode current.

LOGIC DIAGRAM



TRUTH TABLE

INPUTS				OUTPUT
A3	A2	A1	A0	ON†
L	L	L	L	0
L	L	L	H	1
L	L	H	L	2
L	L	H	H	3
L	H	L	L	4
L	H	L	H	5
L	H	H	L	6
L	H	H	H	7
H	L	L	L	8
H	L	L	H	9
H	X	H	X	NONE
H	H	X	X	NONE

†All other outputs are off  
H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial

**DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE** (unless otherwise specified)

SYMBOL	PARAMETER	74XX		UNITS	CONDITIONS
		Min	Max		
$V_{OL}$	Output LOW Voltage		2.5	V	$V_{CC} = \text{Min}$ $I_O = 7.0 \text{ mA}$
$V_{OH}$	Output HIGH Voltage (for Input Counts 0 thru 9)	60		V	$V_{CC} = \text{Max}$ $I_O = 0.5 \text{ mA}$
$I_{OH}$	Output HIGH Current		50	$\mu\text{A}$	$V_{CC} = \text{Max}$ $V_O = 55 \text{ V}$
$I_{OH}$	Output HIGH Current (for Input Counts 10 thru 15)		5.0 15	$\mu\text{A}$	$T_A = 55^\circ\text{C}$ $T_A = 70^\circ\text{C}$ $V_{CC} = \text{Max}$ $V_O = 30 \text{ V}$
$I_{CC}$	Power Supply Current		25	mA	$V_{CC} = \text{Max}$ All Inputs = Gnd