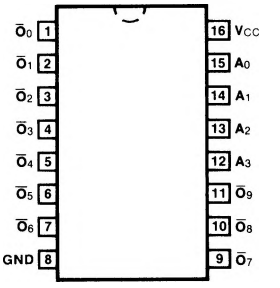
54/7442A • 54LS/74LS42
54/7443A • 54/7444A

1-of-10 DECODER

DESCRIPTION - The '42, '43 and '44 are multipurpose decoders. For any valid input combination, one and only one output is LOW. For all invalid input combinations all outputs are HIGH. The '42 accepts four BCD inputs and provides ten mutually exclusive outputs; the '43 accepts four lines of EXCESS-3 encoded data and provides ten mutually exclusive outputs; the '44 accepts four lines of EXCESS-3 Gray encoded data and provides ten mutually exclusive totem pole outputs.

- **MULTIFUNCTION CAPABILITY**
- **MUTUALLY EXCLUSIVE OUTPUTS**
- **DEMULTIPLEXING CAPABILITY**
- **FULLY TTL AND CMOS COMPATIBLE**

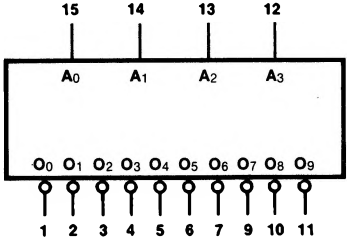
CONNECTION DIAGRAM
PINOUT A



ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE V_{CC} = +5.0 V ±5%, T_A = 0° C to +70° C	MILITARY GRADE V_{CC} = +5.0 V ±10%, T_A = -55° C to +125° C	PKG TYPE
Plastic DIP (P)	A	7442APC, 74LS42PC 7443APC, 7444APC		9B
Ceramic DIP (D)	A	7442ADC, 74LS42DC 7443ADC, 7444ADC	5442ADM, 54LS42DM 5443ADM, 5444ADM	6B
Flatpak (F)	A	7442AFC, 74LS42FC 7443AFC, 7444AFC	5442AFM, 54LS42FM 5443AFM, 5444AFM	4L

LOGIC SYMBOL



V_{CC} = Pin 16
GND = Pin 8

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

PIN NAMES	DESCRIPTION	54/74 (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
$A_0 - A_3$	BCD Inputs ('42)	1.0/1.0	0.5/0.25
$A_0 - A_3$	EXCESS-3 Inputs ('43)	1.0/1.0	
$A_0 - A_3$	EXCESS-3 GRAY Inputs ('44)	1.0/1.0	
$\overline{O}_0 - \overline{O}_0$	Decimal Outputs (Active LOW)	20/10	10/5.0 (2.5)

FUNCTIONAL DESCRIPTION — Logically, the '42, '43 and '44 differ only in their input codes. The '42 accepts the standard 8421 BCD code. The '43 accepts the EXCESS-3 decimal code while the '44 accepts the EXCESS-3 Gray code. For any input combination within the assigned ten states, only one output is LOW, as shown in the Truth Table. For all invalid input combinations, all ten outputs are HIGH.

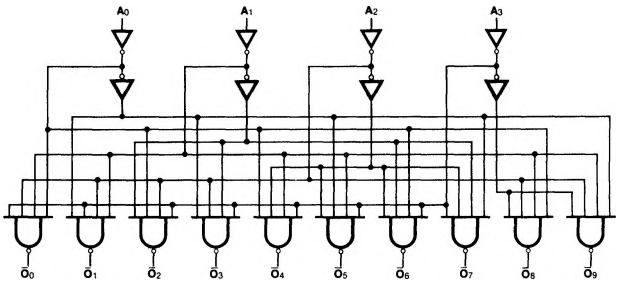
The '42 can be used as a conventional 1-of-8 decoder by treating the most significant input A_3 as an active LOW Enable. Similarly, it can be used as an 8-output demultiplexer by using A_3 as the data input.

TRUTH TABLE

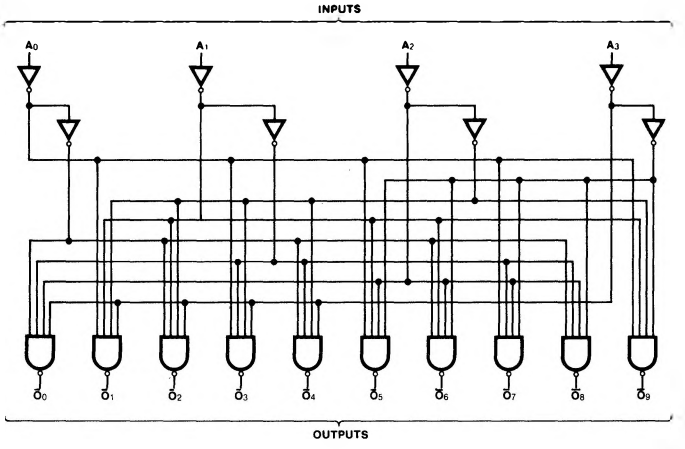
'42A • 'LS42 BCD INPUT				'43A EXCESS-3 INPUT				'44A EXCESS-3 GRAY INPUT				ALL TYPES DECIMAL OUTPUT									
A_3	A_2	A_1	A_0	A_3	A_2	A_1	A_0	A_3	A_2	A_1	A_0	$\overline{O}_0$	$\overline{O}_1$	$\overline{O}_2$	$\overline{O}_3$	$\overline{O}_4$	$\overline{O}_5$	$\overline{O}_6$	$\overline{O}_7$	$\overline{O}_8$	$\overline{O}_9$
L	L	L	L	L	L	H	H	L	L	H	L	L	H	H	H	H	H	H	H	H	H
L	L	L	H	L	H	L	L	L	H	H	L	H	L	H	H	H	H	H	H	H	H
L	L	H	L	L	H	L	H	L	H	H	H	H	H	L	H	H	H	H	H	H	H
L	L	H	H	L	H	H	L	L	H	L	H	H	H	H	L	H	H	H	H	H	H
L	H	L	L	L	H	H	H	L	H	L	L	H	H	H	H	L	H	H	H	H	H
L	H	L	H	H	L	L	L	H	H	L	L	H	H	H	H	H	L	H	H	H	H
L	H	H	L	H	L	L	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H
L	H	H	H	H	L	H	L	H	H	H	H	H	H	H	H	H	H	H	L	H	H
H	L	L	L	H	L	H	H	H	H	H	L	H	H	H	H	H	H	H	H	L	H
H	L	L	H	H	H	L	L	H	L	H	L	H	H	H	H	H	H	H	H	H	L
H	L	H	L	H	H	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
H	L	H	H	H	H	H	L	H	L	L	H	H	H	H	H	H	H	H	H	H	H
H	H	L	L	H	H	H	H	H	L	L	L	H	H	H	H	H	H	H	H	H	H
H	H	L	H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H
H	H	H	L	L	L	L	H	L	L	L	H	H	H	H	H	H	H	H	H	H	H
H	H	H	H	L	L	H	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H

H = HIGH Voltage Level
L = LOW Voltage Level

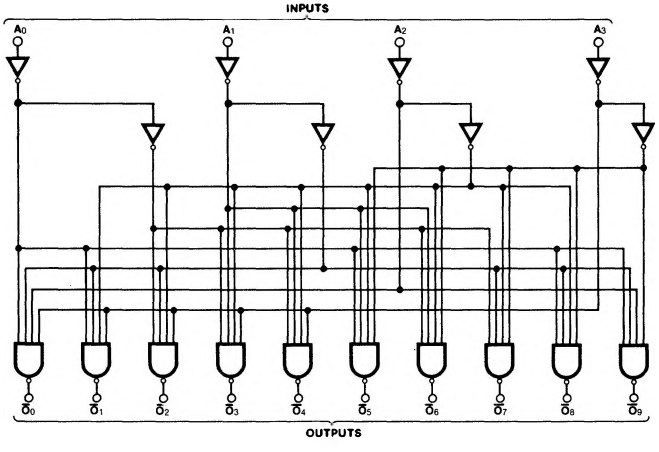
LOGIC DIAGRAMS
'42A • 'LS42



'43A



'44A



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER		54/74		54/74LS		UNITS	CONDITIONS
			Min	Max	Min	Max		
I_{OS}	Output Short Circuit Current	XM	-20	-55	-20	-100	mA	V_{CC} = Max
		XC	-18	-55	-20	-100		
I_{CC}	Power Supply Current	XM		41		12	mA	V_{CC} = Max
		XC		56		12		

AC CHARACTERISTICS: V_{CC} = +5.0 V, T_A = +25° C (See Section 3 for waveforms and load configurations)

SYMBOL	PARAMETER	54/74 C_L = 15 pF, R_L = 400 Ω		54/74LS C_L = 15 pF		UNITS	CONDITIONS
		Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay A_n to $\overline{O}_n$, 2 Levels		25 25		18 25	ns	Figs. 3-1, 3-20
t_{PLH} t_{PHL}	Propagation Delay A_n to $\overline{O}_n$, 3 Levels		30 30		20 27	ns	Figs. 3-1, 3-20