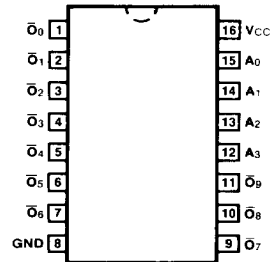


OK ✓ 7442 010097
 ✓ 54/7442A • 54LS/74LS42 016/100
 010062 ✓ 54/7443A • 54/7444A 010095
 1-of-10 DECODER

CONNECTION DIAGRAM
 PINOUT A



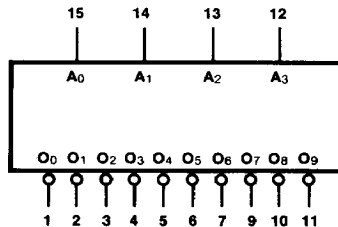
DESCRIPTION - The '42, '43 and '44 are multipurpose decoders. For any valid input combination, one and only one output is LOW. For all invalid input combinations all outputs are HIGH. The '42 accepts four BCD inputs and provides ten mutually exclusive outputs; the '43 accepts four lines of EXCESS-3 encoded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

ORDERING CODE: See Section 9

| PKGS | PIN OUT | COMMERCIAL GRADE | MILITARY GRADE | PKG TYPE |
|-----------------|---------|--|--|----------|
| | | $V_{CC} = +5.0 V \pm 5\%$, $T_A = 0^\circ C \text{ to } +70^\circ C$ | $V_{CC} = +5.0 V \pm 10\%$, $T_A = -55^\circ C \text{ to } +125^\circ C$ | |
| 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



$V_{CC} = \text{Pin } 16$
 $GND = \text{Pin } 8$

4

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 | |
| \bar{O}_0 — \bar{O}_9 | Decimal Outputs (Active LOW) | 20/10 | |

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.

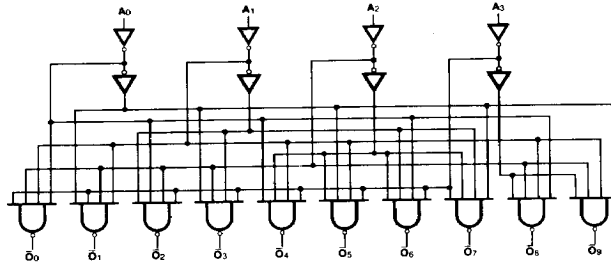
The '42 can be used as a conventional 1-of-8 decoder by treating the most significant input A₃ as an active LOW Enable. Similarly, it can be used as an 8-output demultiplexer by using A₃ as the data input.

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 | \bar{O}_0 | \bar{O}_1 | \bar{O}_2 | \bar{O}_3 | \bar{O}_4 | \bar{O}_5 | \bar{O}_6 | \bar{O}_7 | \bar{O}_8 | \bar{O}_9 | |
| L | L | L | L | L | L | H | H | L | L | H | L | L | H | 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 | H |
| L | L | H | L | L | H | L | H | L | H | H | H | H | H | L | H | H | H | H | H | H | H | H |
| L | L | H | H | L | H | H | L | L | L | H | L | H | H | H | L | H | 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 | H |
| L | H | L | H | L | H | L | L | L | H | H | L | L | H | H | H | L | H | H | H | H | H | H |
| L | H | H | L | L | H | L | L | H | H | H | L | H | H | H | H | H | L | H | H | H | H | H |
| L | H | H | H | L | H | L | H | L | H | H | H | H | H | H | H | H | H | L | H | H | 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 |
| H | L | L | H | H | H | L | L | L | H | L | L | H | H | H | H | H | H | H | H | H | L | H |
| H | L | H | L | H | H | L | H | L | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| H | L | H | H | L | H | H | L | L | L | H | H | 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 | H | L | H | L | L | L | L | L | L | L | L | H | 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 | H | L | L | H | L | L | L | H | H | H | H | H | H | H | H | H | H | H | H | H |

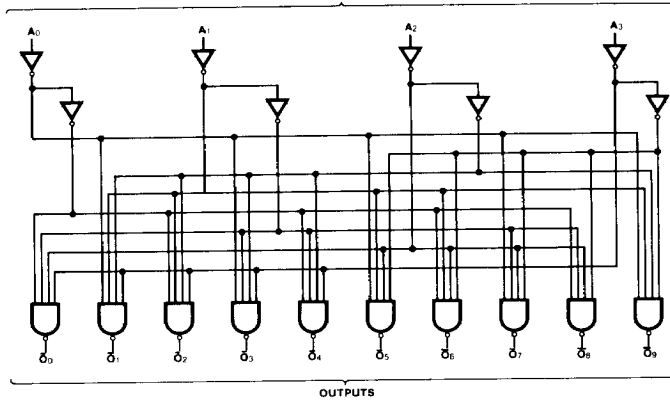
H = HIGH Voltage Level
L = LOW Voltage Level

LOGIC DIAGRAMS
'42A • 'LS42



'43A

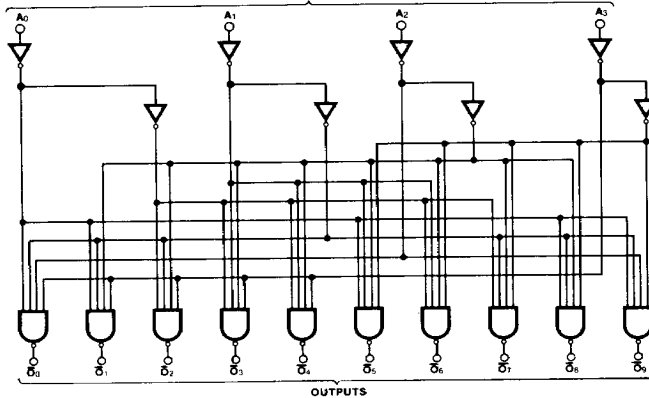
INPUTS



OUTPUTS

'44A

INPUTS



OUTPUTS

4

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 | XM | -20 | -55 | -20 | -100 | mA | V _{CC} = Max |
| | Circuit Current | 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 | | 54/74LS | | UNITS | CONDITIONS |
|--------------------------------------|---|--|--|-----|------------------------|-----|-------|-----------------|
| | | | C _L = 15 pF R _L = 400 Ω | | C _L = 15 pF | | | |
| | | | Min | Max | Min | Max | | |
| t _{PLH} t _{PHL} | Propagation Delay A _n to \bar{O}_n , 2 Levels | | 25 25 | | 18 25 | | ns | Figs. 3-1, 3-20 |
| t _{PLH} t _{PHL} | Propagation Delay A _n to \bar{O}_n , 3 Levels | | 30 30 | | 20 27 | | | |