

54LS/74LS256

DUAL 4-BIT ADDRESSABLE LATCH

DESCRIPTION — The '256 is a dual 4-bit addressable latch with common control inputs; these include two Address inputs (A₀, A₁), an active LOW Enable input (\bar{E}) and an active LOW Clear input (\bar{CL}). Each latch has a Data input (D) and four outputs (Q₀ — Q₃).

When the Enable (\bar{E}) is HIGH and the Clear input (\bar{CL}) is LOW, all outputs (Q₀ — Q₃) are LOW. Dual 4-channel demultiplexing occurs when the \bar{CL} and \bar{E} are both LOW. When \bar{CL} is HIGH and \bar{E} is LOW, the selected output (Q₀ — Q₃), determined by the Address inputs, follows D. When the \bar{E} goes HIGH, the contents of the latch are stored. When operating in the addressable latch mode (\bar{E} = LOW, \bar{CL} = HIGH), changing more than one bit of the Address (A₀, A₁) could impose a transient wrong address. Therefore, this should be done only while in the memory mode (\bar{E} = \bar{CL} = HIGH).

- SERIAL-TO-PARALLEL CAPABILITY
- OUTPUT FROM EACH STORAGE BIT AVAILABLE
- RANDOM (ADDRESSABLE) DATA ENTRY
- EASILY EXPANDABLE
- ACTIVE LOW COMMON CLEAR

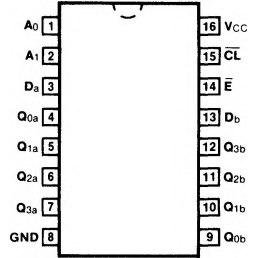
ORDERING CODE: See Section 9

| PKGS | PIN OUT | COMMERCIAL GRADE | MILITARY GRADE | PKG TYPE |
|-----------------|---------|--|--|----------|
| | | V _{CC} = +5.0 V ±5%, T _A = 0° C to +70° C | V _{CC} = +5.0 V ±10%, T _A = -55° C to +125° C | |
| Plastic DIP (P) | A | 74LS256PC | | 9B |
| Ceramic DIP (D) | A | 74LS256DC | 54LS256DM | 6B |
| Flatpak (F) | A | 74LS256FC | 54LS256FM | 4L |

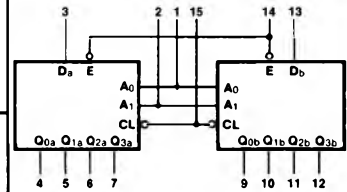
INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

| PIN NAMES | DESCRIPTION | 54/74LS (U.L.) HIGH/LOW |
|-----------------------------------|--------------------------------------|-------------------------|
| A ₀ , A ₁ | Common Address Inputs | 0.5/0.25 |
| D _a , D _b | Data Inputs | 0.5/0.25 |
| \bar{E} | Common Enable Input (Active LOW) | 1.0/0.5 |
| \bar{CL} | Conditional Clear Input (Active LOW) | 0.5/0.25 |
| Q _{0a} — Q _{3a} | Side A Latch Outputs | 10/5.0 (2.5) |
| Q _{0b} — Q _{3b} | Side B Latch Outputs | 10/5.0 (2.5) |

CONNECTION DIAGRAM PINOUT A



LOGIC SYMBOL



V_{CC} = Pin 16
GND = Pin 8

TRUTH TABLE

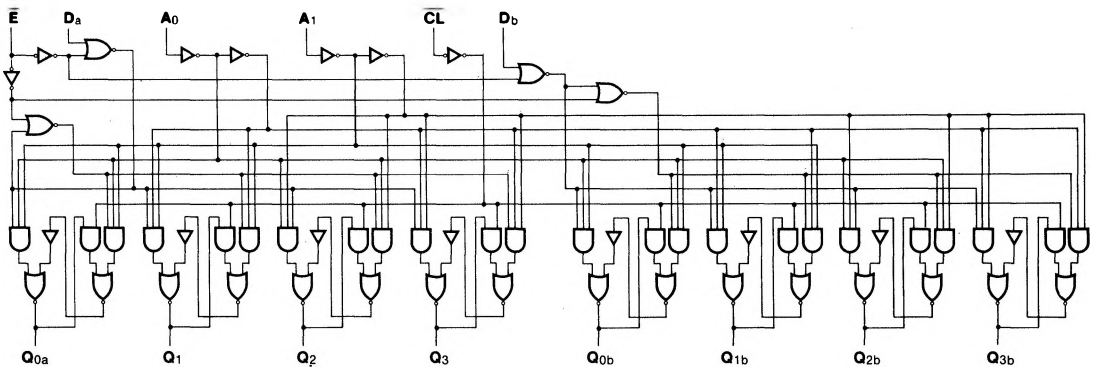
| INPUTS | | | | OUTPUTS | | | | MODE |
|-----------------|----------------|----------------|----------------|------------------|------------------|------------------|------------------|-------------------|
| \overline{CL} | \overline{E} | A ₀ | A ₁ | Q ₀ | Q ₁ | Q ₂ | Q ₃ | |
| L | H | X | X | L | L | L | L | Clear |
| L | L | L | L | D | L | L | L | Demultiplex |
| L | L | H | L | L | D | L | L | |
| L | L | L | H | L | L | D | L | |
| L | L | H | H | L | L | L | D | |
| H | H | X | X | Q _{t-1} | Q _{t-1} | Q _{t-1} | Q _{t-1} | Memory |
| H | L | L | L | D | Q _{t-1} | Q _{t-1} | Q _{t-1} | Addressable Latch |
| H | L | H | L | Q _{t-1} | D | Q _{t-1} | Q _{t-1} | |
| H | L | L | H | Q _{t-1} | Q _{t-1} | D | Q _{t-1} | |
| H | L | H | H | Q _{t-1} | Q _{t-1} | Q _{t-1} | D | |

t-1 = Bit time before address change or rising edge of E
 H = HIGH Voltage Level
 L = LOW Voltage Level
 X = Immaterial

MODE SELECTION

| E | \overline{CL} | MODE |
|---|-----------------|--------------------------------------|
| L | H | Addressable Latch |
| H | H | Memory |
| L | L | Active HIGH 4-Channel Demultiplexers |
| H | L | Clear |

LOGIC DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

| SYMBOL | PARAMETER | 54/74LS | | UNITS | CONDITIONS |
|-----------------|----------------------|---------|-----|-------|-----------------------|
| | | Min | Max | | |
| I _{CC} | Power Supply Current | | 25 | mA | V _{CC} = Max |

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

| SYMBOL | PARAMETER | 54/74LS | | UNITS | CONDITIONS |
|--------------------------------------|---|------------------------|----------|-------|-----------------|
| | | C _L = 15 pF | | | |
| | | Min | Max | | |
| t _{PLH} t _{PHL} | Propagation Delay \bar{E} to Q _n | | 27 24 | ns | Figs. 3-1, 3-9 |
| t _{PLH} t _{PHL} | Propagation Delay D _n to Q _n | | 30 20 | ns | Figs. 3-1, 3-5 |
| t _{PLH} t _{PHL} | Propagation Delay A _n to Q _n | | 30 20 | ns | Figs. 3-1, 3-20 |
| t _{PHL} | Propagation Delay \bar{C} L to Q _n | | 18 | ns | Figs. 3-1, 3-16 |

AC OPERATING REQUIREMENTS: V_{CC} = +5.0 V, T_A = +25° C

| SYMBOL | PARAMETER | 54/74LS | | UNITS | CONDITIONS |
|--|--|---------|-----|-------|------------|
| | | Min | Max | | |
| t _s (H) | Setup Time HIGH D _n to \bar{E} | | 20 | ns | Fig. 3-13 |
| t _h (H) | Hold Time HIGH D _n to \bar{E} | | 0 | ns | Fig. 3-13 |
| t _s (L) | Setup Time LOW D _n to \bar{E} | | 15 | ns | Fig. 3-13 |
| t _h (L) | Hold Time LOW D _n to \bar{E} | | 0 | ns | Fig. 3-13 |
| t _s (H) t _s (L) | Setup Time HIGH or LOW, A _n to \bar{E} | | 0 | ns | Fig. 3-21 |
| t _w (L) | \bar{E} Pulse Width LOW | | 17 | ns | Fig. 3-21 |