

# AC398 • ACT398 • AC399 • ACT399

## 54AC/74AC398 • 54ACT/74ACT398 54AC/74AC399 • 54ACT/74ACT399

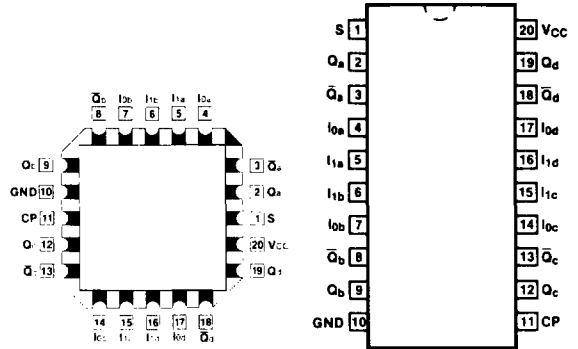
### Quad 2-Port Register

#### Description

The 'AC/'ACT398 and 'AC/'ACT399 are the logical equivalents of a quad 2-input multiplexer feeding into four edge-triggered flip-flops. A common Select input determines which of the two 4-bit words is accepted. The selected data enters the flip-flop on the rising edge of the clock. The 'AC/'ACT399 is the 16-pin version of the 'AC/'ACT398, with only the Q outputs of the flip-flops available.

- Select Inputs from Two Data Sources
- Fully Positive Edge-Triggered Operation
- Both True and Complement
- Outputs—'AC/'ACT398
- Outputs Source/Sink 24 mA
- 'ACT398 and 'ACT399 have TTL-Compatible Inputs

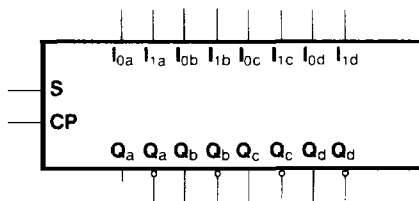
#### Connection Diagrams



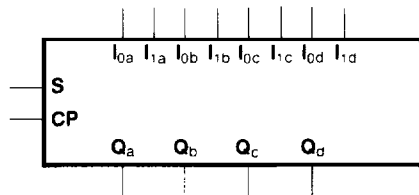
'AC/'ACT398

Ordering Code: See Section 6

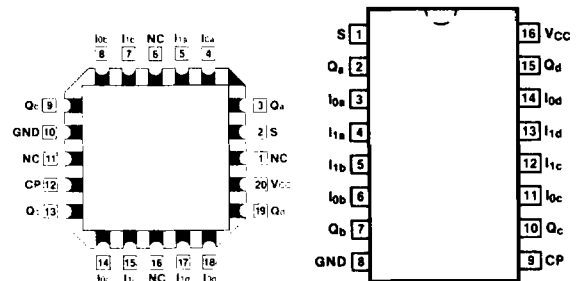
#### Logic Symbols



'AC/'ACT398



'AC/'ACT399



'AC/'ACT399

Pin Assignment  
for LCC

Pin Assignment  
for DIP, Flatpak and SOIC

#### Pin Names

- |                 |  |
|-----------------|--|
| S               | Common Select Input                          |
| CP              | Clock Pulse                                  |
| I0a - I0d       | Data Inputs from Source 0                    |
| I1a - I1d       | Data Inputs from Source 1                    |
| Qa - Qd         | Register True Outputs                        |
| Qa-bar - Qd-bar | Register Complementary Outputs ('AC/'ACT398) |

## Functional Description

The 'AC/ACT398 and 'AC/'ACT399 are high-speed quad 2-port registers. They select four bits of data from either of two sources (Ports) under control of a common Select input (S). The selected data is transferred to a 4-bit output register synchronous with the LOW-to-HIGH transition of the Clock input (CP). The 4-bit D-type output register is fully edge-triggered. The Data inputs (I<sub>0x</sub>, I<sub>1x</sub>) and Select input (S) must be stable only a setup time prior to and hold time after the LOW-to-HIGH transition of the Clock input for predictable operation. The 'AC/'ACT398 has both Q and  $\bar{Q}$  outputs.

## Function Table

Inputs				Outputs	
S	I <sub>0</sub>	I <sub>1</sub>	CP	Q	$\bar{Q}^*$
L	L	X	┐	L	H
L	H	X	┐	H	L
H	X	L	┐	L	H
H	X	H	┐	H	L

H = HIGH Voltage Level

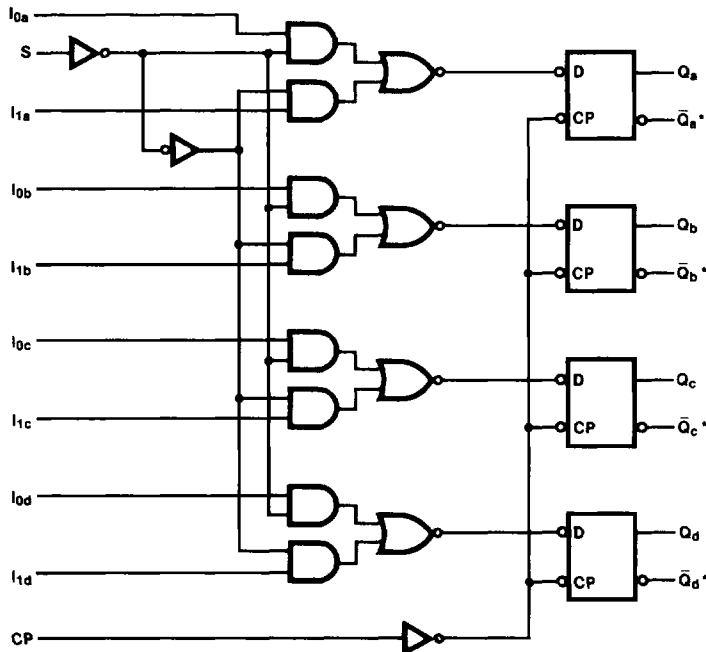
L = LOW Voltage Level

X = Immaterial

┐ = LOW-to-HIGH Clock Transition

\* = 'AC/'ACT398 only

## Logic Diagram



\*\*AC/'ACT398 only

Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

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## DC Characteristics (unless otherwise specified)

Symbol	Parameter	54AC/ACT	74AC/ACT	Units	Conditions
I <sub>CC</sub>	Maximum Quiescent Supply Current	160	80	μA	V <sub>IN</sub> = V <sub>CC</sub> or Ground, V <sub>CC</sub> = 5.5 V, T <sub>A</sub> = Worst Case
I <sub>CC</sub>	Maximum Quiescent Supply Current	8.0	8.0	μA	V <sub>IN</sub> = V <sub>CC</sub> or Ground, V <sub>CC</sub> = 5.5 V, T <sub>A</sub> = 25°C
I <sub>CC(T)</sub>	Maximum Additional I <sub>CC</sub> /Input (ACT398/399)	1.6	1.5	mA	V <sub>IN</sub> = V <sub>CC</sub> - 2.1 V V <sub>CC</sub> = 5.5 V, T <sub>A</sub> = Worst Case

## AC Characteristics

Symbol	Parameter	V <sub>CC</sub> * (V)	74AC			54AC		74AC		Units	Fig. No.
			T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -55°C to +125°C C <sub>L</sub> = 50 pF		T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> = 50 pF			
			Min	Typ	Max	Min	Max	Min	Max		
f <sub>max</sub>	Input Clock Frequency	3.3, 5.0		180 160					MHz	3-3	
t <sub>PLH</sub>	Propagation Delay CP to Q <sub>0</sub> or $\bar{Q}$	3.3 5.0		9.5 7.0					ns	3-6	
t <sub>PHL</sub>	Propagation Delay CP to Q <sub>0</sub> or $\bar{Q}$	3.3 5.0		8.5 6.0					ns	3-6	

\*Voltage Range 3.3 is 3.3 V ± 0.3 V

Voltage Range 5.0 is 5.0 V ± 0.5 V

Military parameters given herein are for general references only. For current military specifications and subgroup testing information please request Fairchild's Table I data sheet from your Fairchild sales engineer or account representative.

AC Operating Requirements

Symbol	Parameter	Vcc* (V)	74AC		54AC		74AC		Units	Fig. No.
			TA = +25°C CL = 50 pF		TA = -55°C to +125°C CL = 50 pF		TA = -40°C to +85°C CL = 50 pF			
			Typ	Guaranteed Minimum						
ts	Setup Time, HIGH or LOW In to CP	3.3	4.5						ns	3-9
		5.0	3.0							
th	Hold Time, HIGH or LOW In to CP	3.3	0						ns	3-9
		5.0	0							
ts	Setup Time, HIGH or LOW S to CP ('398)	3.3	4.5						ns	3-9
		5.0	3.0							
ts	Setup Time, HIGH or LOW S to CP ('399)	3.3	4.5						ns	3-9
		5.0	3.0							
th	Hold Time, HIGH or LOW S to CP	3.3	-1.5						ns	3-9
		5.0	-1.0							
tw	CP Pulse Width HIGH or LOW	3.3	5.5						ns	3-6
		5.0	4.0							

\*Voltage Range 3.3 is 3.3 V ± 0.3 V  
Voltage Range 5.0 is 5.0 V ± 0.5 V

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AC Characteristics

Symbol	Parameter	Vcc* (V)	74ACT			54ACT		74ACT		Units	Fig. No.
			TA = +25°C CL = 50 pF			TA = -55°C to +125°C CL = 50 pF		TA = -40°C to +85°C CL = 50 pF			
			Min	Typ	Max	Min	Max	Min	Max		
fmax	Input Clock Frequency	5.0	160						MHz	3-3	
tPLH	Propagation Delay CP to Q or Q̄	5.0	7.0						ns	3-6	
tPHL	Propagation Delay CP to Q or Q̄	5.0	6.0						ns	3-6	

\*Voltage Range 5.0 is 5.0 V ± 0.5 V

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## AC Operating Requirements

Symbol	Parameter	Vcc* (V)	74ACT	54ACT	74ACT	Units	Fig. No.
			TA = +25°C CL = 50 pF	TA = -55°C to +125°C CL = 50 pF	TA = -40°C to +85°C CL = 50 pF		
			Typ	Guaranteed Minimum			
ts	Setup Time, HIGH or LOW In to CP	5.0	3.0			ns	3-9
th	Hold Time, HIGH or LOW In to CP	5.0	0			ns	3-9
ts	Setup Time, HIGH or LOW S to CP (*398)	5.0	3.0			ns	3-9
ts	Setup Time, HIGH or LOW S to CP (*399)	5.0	3.0			ns	3-9
th	Hold Time, HIGH or LOW S to CP	5.0	-1.0			ns	3-9
tw	CP Pulse Width HIGH or LOW	5.0	5.5			ns	3-6

\*Voltage Range 5.0 is 5.0 V ± 0.5 V

Military parameters given herein are for general references only. For current military specifications and subgroup testing information please request Fairchild's Table I data sheet from your Fairchild sales engineer or account representative.

## Capacitance

Symbol	Parameter	54/74AC/ACT	Units	Conditions
		Typ		
CIN	Input Capacitance	4.5	pF	Vcc = 5.5 V
CPD	Power Dissipation Capacitance		pF	Vcc = 5.5 V