54AC/74AC398 • 54ACT/74ACT398
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Quad 2-Port Register

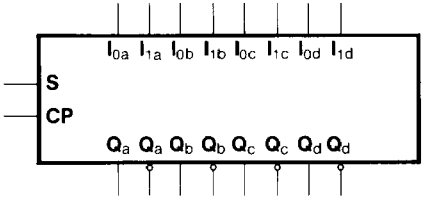
Description

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.

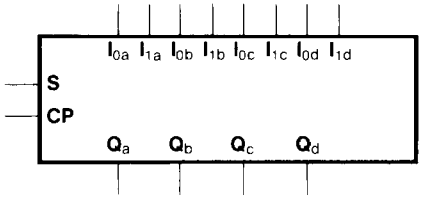
- **Select Inputs from Two Data Sources**
- **Fully Positive Edge-Triggered Operation**
- **Both True and Complement Outputs—'AC/'ACT398**
- **Outputs Source/Sink 24 mA**
- **'ACT398 and 'ACT399 have TTL-Compatible Inputs**

Ordering Code: See Section 6

Logic Symbols

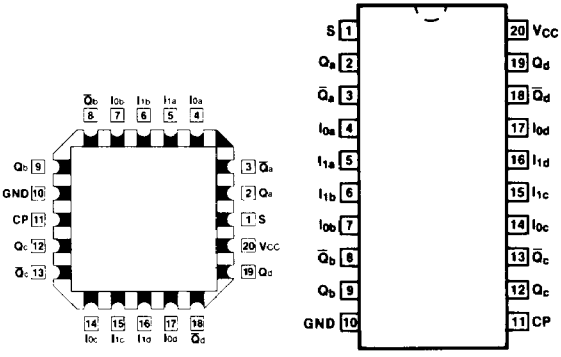


'AC/'ACT398

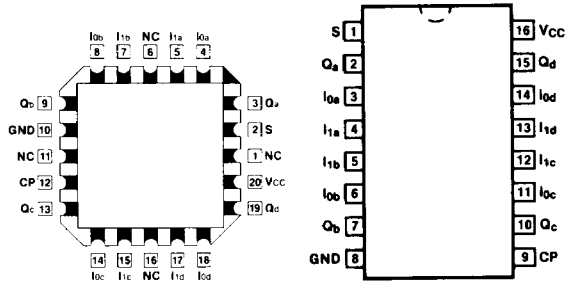


'AC/'ACT399

Connection Diagrams



'AC/'ACT398



'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
$\overline{Q}_a$ - $\overline{Q}_d$	Register Complementary Outputs ('AC/'ACT398)

Functional Description

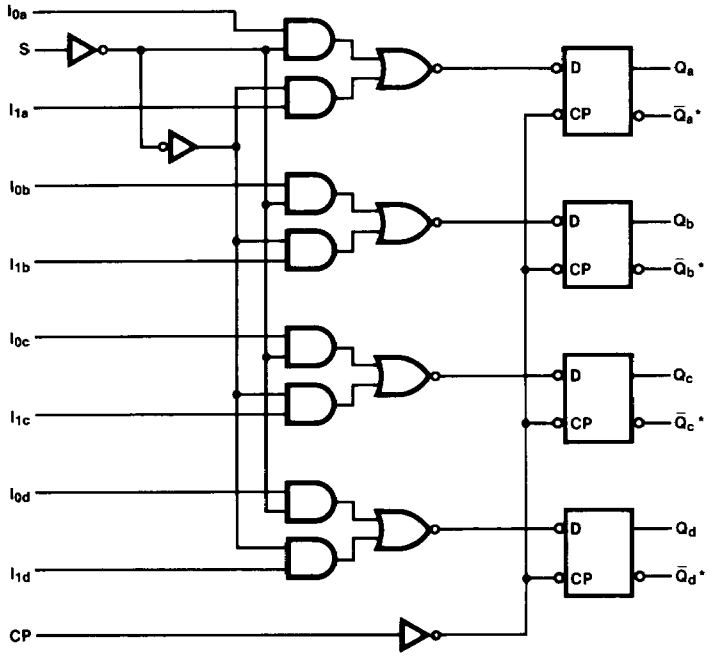
The 'AC/ACT398 and 'AC/'ACT399 are high-speed quad 2-port registers. They select four bits of data from either of two sources (Ports) under control of a common Select input (S). The selected data is transferred to a 4-bit output register synchronous with the LOW-to-HIGH transition of the Clock input (CP). The 4-bit D-type output register is fully edge-triggered. The Data inputs (I_{0x}, I_{1x}) 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 $\overline{Q}$ outputs.

Function Table

Inputs				Outputs	
S	I_0	I_1	CP	Q	$\overline{Q}$*
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.

DC Characteristics (unless otherwise specified)

Symbol	Parameter	54AC/ACT	74AC/ACT	Units	Conditions
I_{CC}	Maximum Quiescent Supply Current	160	80	μA	$V_{IN} = V_{CC}$ or Ground, $V_{CC} = 5.5$ V, T_A = Worst Case
I_{CC}	Maximum Quiescent Supply Current	8.0	8.0	μA	$V_{IN} = V_{CC}$ or Ground, $V_{CC} = 5.5$ V, $T_A = 25°C$
I_{CCT}	Maximum Additional Icc/Input ('ACT398/399)	1.6	1.5	mA	$V_{IN} = V_{CC} - 2.1$ V, $V_{CC} = 5.5$ V, T_A = Worst Case

AC Characteristics

Symbol	Parameter	Vcc* (V)	74AC $T_A = +25°C$, $C_L = 50$ pF			54AC $T_A = -55°C$ to $+125°C$, $C_L = 50$ pF		74AC $T_A = -40°C$ to $+85°C$, $C_L = 50$ pF		Units	Fig. No.
			Min	Typ	Max	Min	Max	Min	Max		
f_{max}	Input Clock Frequency	3.3 5.0		180 160						MHz	3-3
t_{PLH}	Propagation Delay CP to Q_0 or $\overline{Q}$	3.3 5.0		9.5 7.0						ns	3-6
t_{PHL}	Propagation Delay CP to Q_0 or $\overline{Q}$	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 $T_A = +25°C$, $C_L = 50$ pF		54AC $T_A = -55°C$ to $+125°C$, $C_L = 50$ pF	74AC $T_A = -40°C$ to $+85°C$, $C_L = 50$ pF	Units	Fig. No.
			Typ	Guaranteed Minimum				
t_s	Setup Time, HIGH or LOW I_n to CP	3.3 5.0	4.5 3.0				ns	3-9
t_h	Hold Time, HIGH or LOW I_n to CP	3.3 5.0	0 0				ns	3-9
t_s	Setup Time, HIGH or LOW S to CP ('398)	3.3 5.0	4.5 3.0				ns	3-9
t_s	Setup Time, HIGH or LOW S to CP ('399)	3.3 5.0	4.5 3.0				ns	3-9
t_h	Hold Time, HIGH or LOW S to CP	3.3 5.0	−1.5 −1.0				ns	3-9
t_w	CP Pulse Width HIGH or LOW	3.3 5.0	5.5 4.0				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

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AC Characteristics

Symbol	Parameter	Vcc* (V)	74ACT $T_A = +25°C$, $C_L = 50$ pF			54ACT $T_A = -55°C$ to $+125°C$, $C_L = 50$ pF		74ACT $T_A = -40°C$ to $+85°C$, $C_L = 50$ pF		Units	Fig. No.
			Min	Typ	Max	Min	Max	Min	Max		
f_{max}	Input Clock Frequency	5.0		160						MHz	3-3
t_{PLH}	Propagation Delay CP to Q or $\overline{Q}$	5.0		7.0						ns	3-6
t_{PHL}	Propagation Delay CP to Q or $\overline{Q}$	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 $T_A = +25°C$, $C_L = 50$ pF		54ACT $T_A = -55°C$ to $+125°C$, $C_L = 50$ pF	74ACT $T_A = -40°C$ to $+85°C$, $C_L = 50$ pF	Units	Fig. No.
			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 Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	$V_{CC} = 5.5$ V
C_{PD}	Power Dissipation Capacitance		pF	$V_{CC} = 5.5$ V