

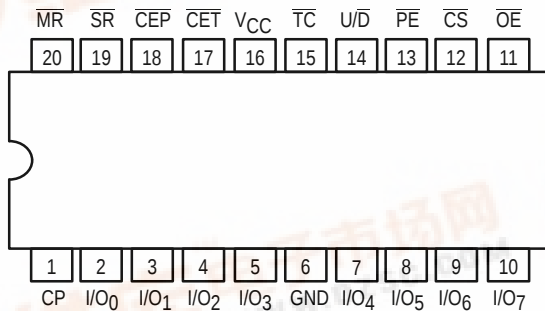

MOTOROLA

8-BIT BIDIRECTIONAL BINARY COUNTER (3-STATE)

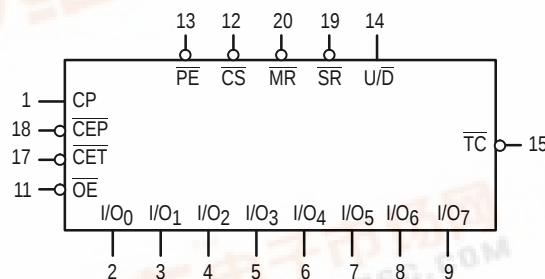
The MC74F579 is a fully synchronous 8-stage up/down counter with multiplexed 3-state I/O ports for bus-oriented applications. It features a preset capability for programmable operation, carry look-ahead for easy cascading and a $U/\bar{D}$ input to control the direction of counting. All state changes, except for the case of asynchronous reset, are initiated by the rising edge of the clock. $\bar{T}C$ output is not recommended for use as a clock or asynchronous reset due to the possibility of decoding spikes.

- Multiplexed 3-State I/O Ports For Bus-oriented Applications
- Built-In Cascading Carry Capability
- Count Frequency 115 MHz Typ
- Supply Current 100 mA Typ
- Fully Synchronous Operation
- U/D Pin to Control Direction of Counting
- Separate Pins for Master Reset and Synchronous Reset
- Center Power Pins to Reduce Effects of Package Inductance
- See F269 for 24-Pin Separate I/O Port Version
- See F779 for 16-Pin Version
- ESD Protection > 4000 Volts

PIN ASSIGNMENT

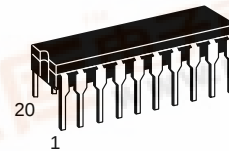


LOGIC SYMBOL

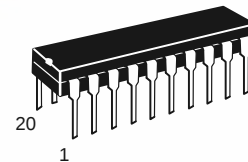


MC74F579

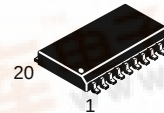
8-BIT BIDIRECTIONAL BINARY COUNTER (3-STATE)

FAST™ SCHOTTKY TTL


J SUFFIX
CERAMIC
CASE 732-03



N SUFFIX
PLASTIC
CASE 738-03



DW SUFFIX
SOIC
CASE 751D-03

ORDERING INFORMATION

MC74FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXDW	SOIC

GUARANTEED OPERATING RANGES

Symbol	Parameter	Min	Typ	Max	Unit
V _{CC}	Supply Voltage	4.5	5.0	5.5	V
T _A	Operating Ambient Temperature Range	0	25	70	°C
I _{OH}	Output Current — High	$\bar{T}C$		−1.0	mA
		I/O _n		−3.0	
	Output Current — Low	$\bar{T}C$		20	mA
		I/O _n		24	



MC74F579

FUNCTION TABLE

$\overline{MR}$	$\overline{SR}$	$\overline{CS}$	$\overline{PE}$	$\overline{CEP}$	$\overline{CET}$	$\overline{U/D}$	$\overline{OE}$	CP	Function
X	X	H	X	X	X	X	X	X	I/O ₀ to I/O ₇ in Hi-Z ($\overline{PE}$ disabled)
X	X	L	H	X	X	X	H	X	I/O ₀ to I/O ₇ in Hi-Z
X	X	L	H	X	X	X	L	X	Flip-Flop outputs appear on I/O lines
L	X	X	X	X	X	X	X	X	Asynchronous reset for all flip-flops
H	L	X	X	X	X	X	X	↑	Synchronous reset for all flip-flops
H	H	L	L	X	X	X	X	↑	Parallel load all flip-flops
H	H	(not LL)		H	X	X	X	↑	Hold
H	H	(not LL)		X	H	X	X	↑	Hold ($\overline{TC}$ held high)
H	H	(not LL)		L	L	H	X	↑	Count up
H	H	(not LL)		L	L	L	X	↑	Count down

H = High voltage level

L = Low voltage level

X = Don't care

↑ = Low-to-High clock transition

(not LL) = CS and PE should never both be low voltage at the same time

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter		74F			Unit	Test Conditions (Note 1)	
			Min	Typ (2)	Max			
V _{OH}	Output HIGH Voltage	TC	2.5			V	I _{OH} = −1.0 mA V _{IL} = MAX V _{IH} = MIN	V _{CC} = 4.5 V
			2.7	3.4				V _{CC} = 4.75 V
		I/O _n	2.4	3.3		V	I _{OH} = −3.0 mA V _{IL} = MAX V _{IH} = MIN	V _{CC} = 4.5 V
			2.7	3.3				V _{CC} = 4.75 V
V _{OL}	Output LOW Voltage	$\overline{\text{TC}}$		0.35	0.5	V	I _{OL} = 20 mA	V _{CC} = 4.5 V V _{IL} = MAX V _{IH} = MIN
		I/O _n					I _{OL} = 24 mA	
V _{IK}	Input Clamp Diode Voltage			−0.73	−1.2	V	V _{CC} = 4.5 V, I _{IN} = −18 mA	
I _{IH}	Input HIGH Current	I/O _n			1.0	mA	V _{CC} = 5.5 V	V _{IN} = 5.5 V
		others			100			V _{IN} = 7.0 V
		I/O _n			70	μA	V _{CC} = 5.5 V, V _{IN} = 2.7 V	
		others			20			
I _{IL}	Input LOW Current	Except I/O _n			−0.6	mA	V _{CC} = 5.5 V, V _{IN} = 0.5 V	
I _{OZH}	OFF-State Current High-Level Voltage Applied	I/O _n			70	μA	V _{CC} = 5.5 V	V _{OUT} = 2.7 V
I _{OZL}	OFF-State Current Low-Level Voltage Applied				−600			V _{OUT} = 0.5 V
I _{OS}	Output Short Circuit Current (Note 3)		−60	−80	−150	mA	V _{CC} = MAX, V _{OUT} = 0 V	
I _{CC}	Total Supply Current (total)	I _{CCH}		95	135	mA	V _{CC} = MAX	
		I _{CCL}		105	145			
		I _{CCZ}		105	150			

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating conditions for the applicable device type.
- All typical values are at V_{CC} = 5.0 V, T_A = 25°C.
- Not more than one output should be shorted at a time. For I_{OS} testing, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a HIGH output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

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AC ELECTRICAL CHARACTERISTICS

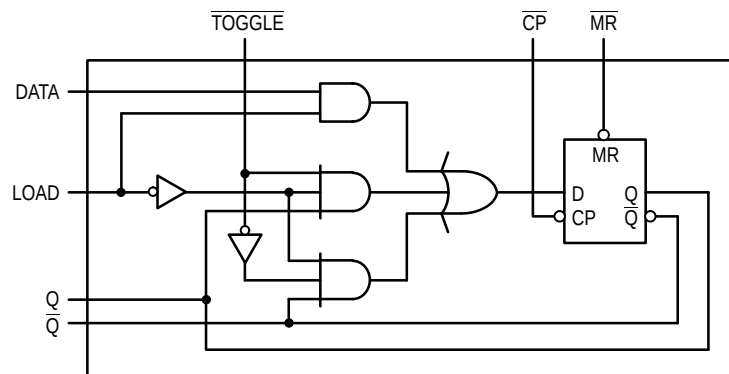
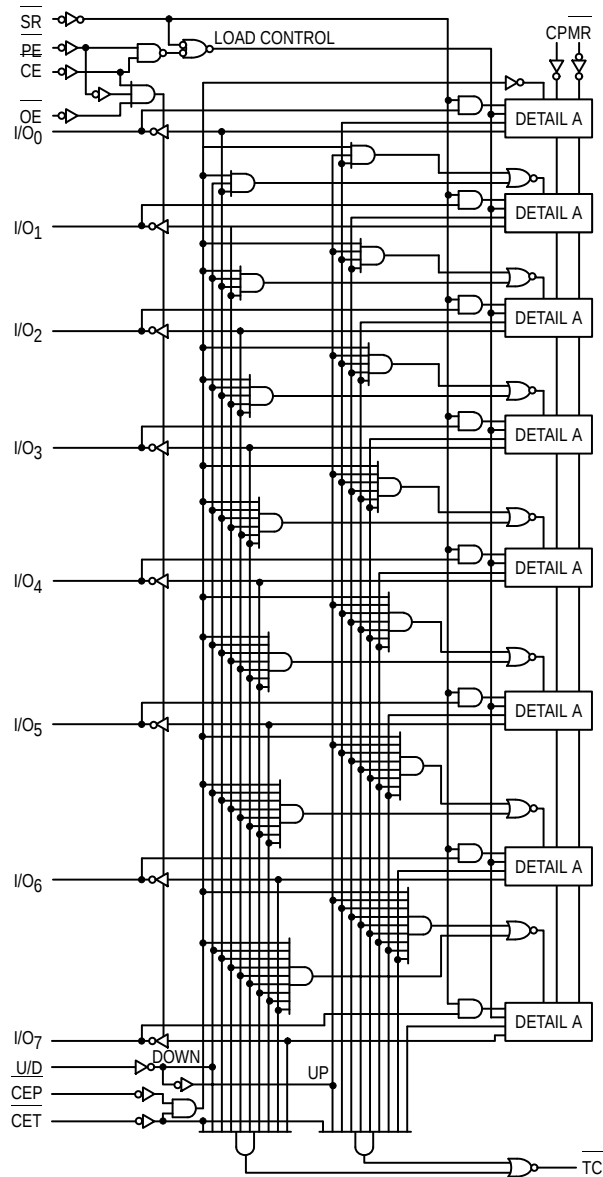
Symbol	Parameter	74F			74F		Unit
		T _A = +25°C V _{CC} = +5.0 V C _L = 50 pF			T _A = 0°C to +70°C V _{CC} = +5.0 V ±10% C _L = 50 pF		
		Min	Typ	Max	Min	Max	
f _{MAX}	Maximum Clock Frequency	100			80		MHz
t _{PLH} t _{PHL}	Propagation Delay CP to I/O _n	5.0 5.0		10.5 10.5	5.0 5.0	11.5 11.5	ns
t _{PLH} t _{PHL}	Propagation Delay CP to $\overline{TC}$	4.5 5.5		10 10	4.5 5.0	11 11	ns
t _{PLH} t _{PHL}	Propagation Delay U/ $\overline{D}$ to $\overline{TC}$	3.5 4.5		8.0 8.0	3.5 4.5	9.0 9.0	ns
t _{PLH} t _{PHL}	Propagation Delay $\overline{CET}$ to $\overline{TC}$	3.5 3.5		7.0 8.0	3.5 3.5	8.5 8.5	ns
t _{PHL}	Propagation Delay $\overline{MR}$ to I/O _n	5.0		10	5.0	11	ns
t _{PZH} t _{PZL}	Output Enable Time to HIGH or LOW Level $\overline{CS}$, $\overline{PE}$ to I/O _n	4.5 6.5		10.5 10.5	4.5 6.0	11.5 11.5	ns
t _{PHZ} t _{PLZ}	Output Disable Time to HIGH or LOW Level $\overline{CS}$, $\overline{PE}$ to I/O _n	3.0 4.0		7.5 9.5	3.0 4.0	9.0 11	ns
t _{PZH} t _{PZL}	Output Enable Time to HIGH or LOW Level $\overline{OE}$ to I/O _n	4.0 6.0		8.5 9.5	4.0 5.0	9.5 10.5	ns
t _{PHZ} t _{PLZ}	Output Disable Time to HIGH or LOW Level $\overline{OE}$ to I/O _n	1.0 2.5		6.0 7.0	1.0 2.5	6.5 8.0	ns

AC SETUP REQUIREMENTS

Symbol	Parameter	74F			74F			Unit
		$T_A = +25^{\circ}\text{C}$ $V_{CC} = +5.0\text{ V}$ $C_L = 50\text{ pF}$			$T_A = 0^{\circ}\text{C to } +70^{\circ}\text{C}$ $V_{CC} = +5.0\text{ V } \pm 10\%$ $C_L = 50\text{ pF}$			
		Min	Typ	Max	Min	Typ	Max	
$t_{s(H)}$ $t_{s(L)}$	Setup Time, HIGH or LOW I/O _n to CP	3.0 3.0			4.0 4.0			ns
$t_{h(H)}$ $t_{h(L)}$	Hold Time, HIGH or LOW I/O _n to CP	1.0 1.0			1.0 1.0			ns
$t_{s(H)}$ $t_{s(L)}$	Setup Time, HIGH or LOW PE, SR or CS to CP	9.5 9.5			10 10			ns
$t_{h(H)}$ $t_{h(L)}$	Hold Time, HIGH or LOW PE, SR or CS to CP	0 0			0 0			ns
$t_{s(H)}$ $t_{s(L)}$	Setup Time, HIGH or LOW CET, CEP to CP	5.0 9.0			5.5 10.5			ns
$t_{h(H)}$ $t_{h(L)}$	Hold Time, HIGH or LOW CET, CEP to CP	0 0			0 0			ns
t_w	CP Pulse Width	4.5			6.0			ns
$t_{w(L)}$	$\overline{\text{MR}}$ Pulse Width	3.5			4.5			ns
t_{rec}	$\overline{\text{MR}}$ Recovery Time	4.0			4.5			ns

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LOGIC DIAGRAM



Detail A