



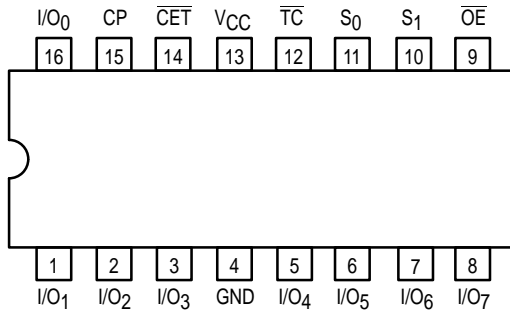
# 8-BIT BIDIRECTIONAL BINARY COUNTER (3-STATE)

The MC74F779 is a fully synchronous 8-stage up/down counter with multiplexed 3-state I/O ports for bus-oriented applications. All control functions (hold, count up, count down, synchronous load) are controlled by two mode pins ( $S_0$ ,  $S_1$ ). The device also features carry look-ahead for easy cascading. All state changes are initiated by the rising edge of the clock.

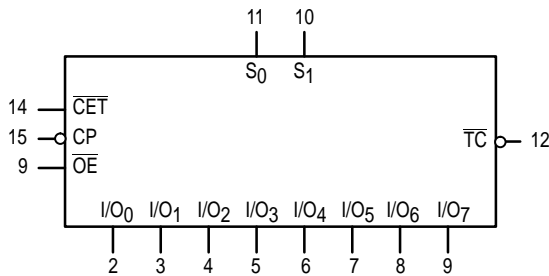
When  $\overline{CET}$  is High the data outputs are held in their current state and  $\overline{TC}$  is held high. The  $\overline{TC}$  output is not recommended for use as a clock or asynchronous reset due to the possibility of decoding spikes.

- Multiplexed 3-State I/O Ports For Bus-oriented Applications
- Built-In Look-Ahead Carry Capability
- Count Frequency 145 MHz Typ
- Supply Current 90 mA Typ
- Fully Synchronous Operation
- 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 F579 for 20-Pin Version
- ESD Protection > 4000 Volts

### PIN ASSIGNMENT



### LOGIC SYMBOL

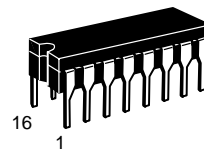


### GUARANTEED OPERATING RANGES

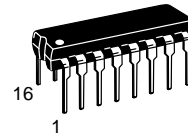
Symbol	Parameter		Min	Typ	Max	Unit
$V_{CC}$	Supply Voltage	74	4.5	5.0	5.5	V
$T_A$	Operating Ambient Temperature Range	74	0	25	70	°C
$I_{OH}$	Output Current — High	$I/O_0-I/O_7$			-3.0	mA
		$\overline{TC}$			-1.0	
$I_{OL}$	Output Current — Low	$I/O_0-I/O_7$			24	mA
		$\overline{TC}$			20	

**MC74F779**

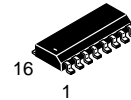
**8-BIT BIDIRECTIONAL BINARY COUNTER (3-STATE)**



**J SUFFIX**  
CERAMIC  
CASE 620-09



**N SUFFIX**  
PLASTIC  
CASE 648-08



**D SUFFIX**  
SOIC  
CASE 751B-03

### ORDERING INFORMATION

MC74FXXXJ Ceramic  
MC74FXXXN Plastic  
MC74FXXXD SOIC

# MC74F779

## FUNCTION TABLE

S1	S0	$\overline{CET}$	$\overline{OE}$	CP	Operating Mode
X	X	X	H	X	I/Oa to I/Oh in Hi-Z
X	X	X	L	X	Flip-flop outputs appear on I/O lines
L	L	X	H	↑	Parallel load all flip-flops
(not LL)		H	X	↑	Hold (TC held High)
H	L	L	X	↑	Count up
L	H	L	X	↑	Count Down

H = High voltage level

L = Low voltage level

X = Don't care

↑ = Low-to-High clock transition

(not LL) = S<sub>1</sub> and S<sub>2</sub> should never be Low voltage level at the same time in the hold mode only.

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter	74F			Unit	Test Conditions (Note 1)		
		Min	Typ (Note 2)	Max				
V <sub>OH</sub>	Output HIGH Voltage	TC	2.5			V	I <sub>OH</sub> = -1.0 mA V <sub>IL</sub> = MAX V <sub>IH</sub> = MIN	V <sub>CC</sub> = 4.5 V
			2.7	3.4			V <sub>CC</sub> = 4.75 V	
		I/O <sub>n</sub>	2.4	3.3		V	I <sub>OH</sub> = -3.0 mA V <sub>IL</sub> = MAX V <sub>IH</sub> = MIN	V <sub>CC</sub> = 4.5 V
			2.7	3.3				V <sub>CC</sub> = 4.75 V
V <sub>OL</sub>	Output LOW Voltage	$\overline{TC}$		0.35	0.5	V	I <sub>OL</sub> = 20 mA	V <sub>CC</sub> = 4.5 V
		I/O <sub>n</sub>					I <sub>OL</sub> = 24 mA	V <sub>IL</sub> = MAX V <sub>IH</sub> = MIN
V <sub>IK</sub>	Input Clamp Diode Voltage		-0.73	-1.2		V	V <sub>CC</sub> = 4.5 V, I <sub>IN</sub> = -18 mA	
I <sub>IH</sub>	Input HIGH Current	I/O <sub>n</sub>			1.0	mA	V <sub>CC</sub> = 5.5 V	V <sub>IN</sub> = 5.5 V
		others			100			μA
		I/O <sub>n</sub>			70	μA	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 2.7 V	
		others			20			
I <sub>IL</sub>	Input LOW Current	Except I/O <sub>n</sub>			-0.6	mA	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0.5 V	
I <sub>OZH</sub>	OFF-State Current High-Level Voltage Applied	I/O <sub>n</sub>			70	μA	V <sub>CC</sub> = 5.5 V	V <sub>OUT</sub> = 2.7 V
I <sub>OZL</sub>	OFF-State Current Low-Level Voltage Applied				-600			V <sub>OUT</sub> = 0.5 V
I <sub>OS</sub>	Output Short Circuit Current (Note 3)		-60	-80	-150	mA	V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0 V	
I <sub>CC</sub>	Total Supply Current (total)	I <sub>CC</sub> H		82	116	mA	V <sub>CC</sub> = MAX	
		I <sub>CC</sub> L		91	128			
		I <sub>CC</sub> Z		97	136			

### 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<sub>CC</sub> = 5.0 V, T<sub>A</sub> = 25°C.
- Not more than one output should be shorted at a time.

# MC74F779

## AC ELECTRICAL CHARACTERISTICS

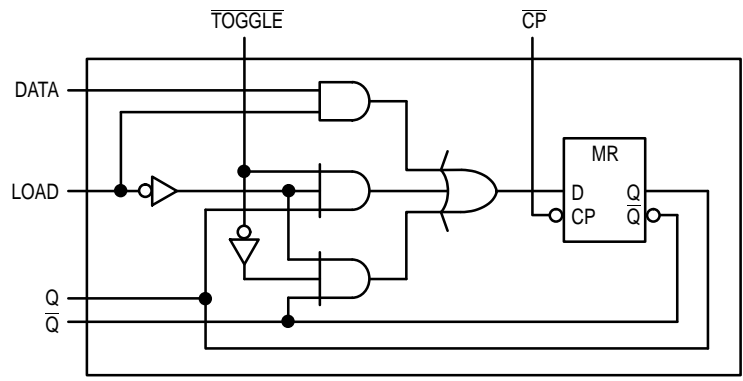
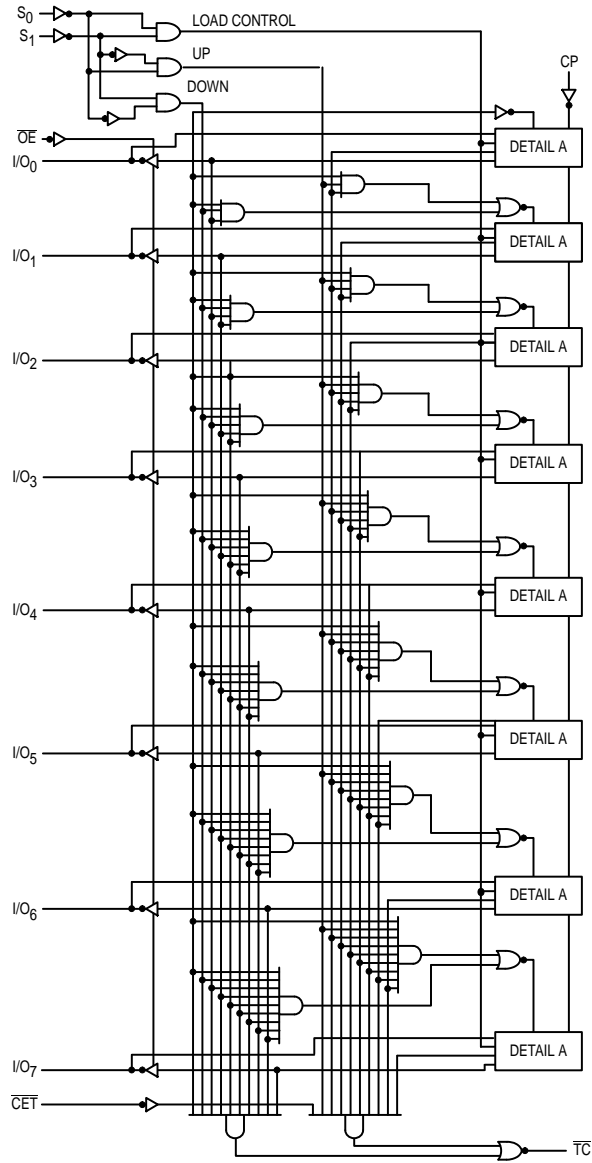
Symbol	Parameter	74F			74F		Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0 V C <sub>L</sub> = 50 pF			T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0 V ±10% C <sub>L</sub> = 50 pF		
		Min	Typ	Max	Min	Max	
f <sub>MAX</sub>	Maximum Clock Frequency	125			80		MHz
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay CP to I/O <sub>n</sub>	4.5 5.5		10.5 10.5	4.5 5.5	11 11	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay CP to $\overline{TC}$	4.5 4.5		9.0 9.0	4.5 4.5	10 10	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay CET to TC	3.0 3.0		6.5 7.5	2.5 2.5	7.5 8.0	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Enable Time from High or Low Level	2.5 4.5		7.0 9.0	2.5 4.5	8.0 9.5	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Disable Time from High or Low Level	1.0 1.0		6.5 7.0	1.0 1.0	8.0 8.0	ns

## AC SETUP REQUIREMENTS

Symbol	Parameter	74F			74F			Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0 V C <sub>L</sub> = 50 pF			T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0 V ±10% C <sub>L</sub> = 50 pF			
		Min	Typ	Max	Min	Typ	Max	
t <sub>s(H)</sub> t <sub>s(L)</sub>	Set-up time, HIGH or LOW I/O <sub>n</sub> to CP	5.0 5.0			5.0 5.0			ns
t <sub>h(H)</sub> t <sub>h(L)</sub>	Hold time, HIGH or LOW I/O <sub>n</sub> to CP	1.0 1.0			2.0 2.0			ns
t <sub>s(H)</sub> t <sub>s(L)</sub>	Set-up time, HIGH or LOW $\overline{CET}$ to CP	5.0 5.5			5.0 6.0			ns
t <sub>h(H)</sub> t <sub>h(L)</sub>	Hold time, HIGH or LOW $\overline{CET}$ to CP	0 0			0 0			ns
t <sub>s(H)</sub> t <sub>s(L)</sub>	Set-up time, HIGH or LOW S <sub>n</sub> to CP	8.0 8.0			8.5 8.5			ns
t <sub>h(H)</sub> t <sub>h(L)</sub>	Hold time, HIGH or LOW S <sub>n</sub> to CP	0 0			0 0			ns
t <sub>w(H)</sub> t <sub>w(L)</sub>	Clock Pulse Width	4.0 4.0			4.0 4.0			ns

# MC74F779

## LOGIC DIAGRAM



Detail A