



When the $\overline{E}$ input is LOW, new data is entered into the register on the LOW-to-HIGH transition of the CP input. When the $\overline{E}$ input is HIGH the register will retain the present data independent of the CP input. This circuit is designed to prevent false clocking by transitions on the $\overline{E}$ input..

- 6-Bit High-Speed Parallel Register
- Positive Edge-Triggered D-Type Inputs
- Fully Buffered Common Clock and Enable Inputs
- Input Clamp Diodes Limit High-Speed Termination Effects

Pin diagram of the 74VHC04 hex inverters. The chip has 14 pins. The top pins are labeled VCC, Q5, D5, D4, Q4, D3, Q3, and CP. The bottom pins are labeled 1, 2, 3, 4, 5, 6, 7, and 8. The chip is shown with a notch on the left side.

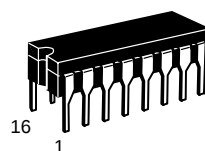
Inputs			Output
$\bar{E}$	CP	D_n	Q_n
H		X	No Change
L		H	H
L		L	L

H = HIGH Voltage Level
L = LOW Voltage Level
X = Don't Care
Z = High Impedance

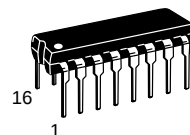
MC54/74F378

PARALLEL D REGISTER WITH ENABLE

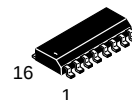
FAST™ SCHOTTKY TTL



J SUFFIX
CERAMIC
CASE 620-09



N SUFFIX
PLASTIC
CASE 648-08



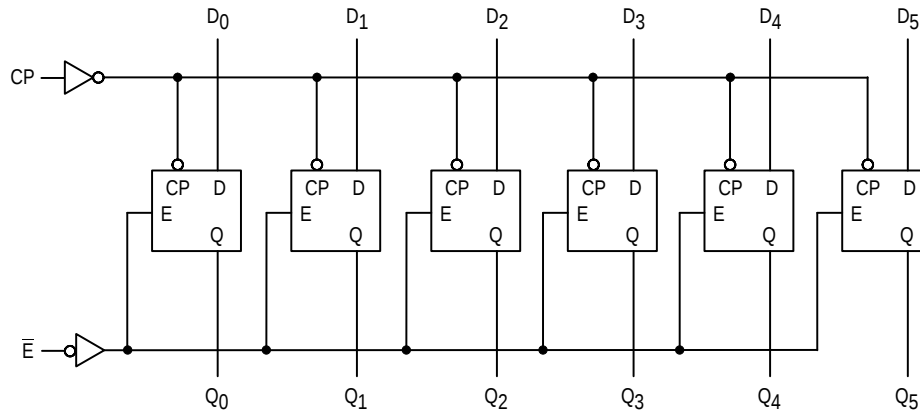
D SUFFIX
SOIC
CASE 751B-03

MC54FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXD	SOIC

Pin diagram of the 74LS161 4-bit binary counter. The chip has 16 pins. Pin 14 is D5, 13 is D4, 11 is D3, 6 is D2, 4 is D1, 3 is D0, and 1 is E (clock input). Pin 9 is CP (clock input). Pin 15 is Q5, 12 is Q4, 10 is Q3, 7 is Q2, 5 is Q1, and 2 is Q0. VCC is pin 16 and GND is pin 8.

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LOGIC DIAGRAM



GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Typ	Max	Unit
V _{CC}	Supply Voltage	54, 74	4.5	5.0	5.5	V
T _A	Operating Ambient Temperature Range	54	−55	25	125	°C
		74	0	25	70	
I _{OH}	Output Current — HIGH	54, 74			−1.0	mA
I _{OL}	Output Current — LOW	54, 74			20	mA

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
V _{IH}	Input HIGH Voltage	2.0			V	Guaranteed Input HIGH Voltage
V _{IL}	Input LOW Voltage			0.8	V	Guaranteed Input LOW Voltage
V _{IK}	Input Clamp Diode Voltage			−1.2	V	V _{CC} = MIN, I _{IN} = −18 mA
V _{OH}	Output HIGH Voltage	54, 74	2.5		V	I _{OL} = −1.0 mA, V _{CC} = 4.50 V
		74	2.7		V	I _{OL} = −1.0 mA, V _{CC} = 4.75 V
V _{OL}	Output LOW Voltage			0.5	V	I _{OL} = 20 mA, V _{CC} = MIN
I _{IH}	Input HIGH Current			20	μA	V _{CC} = MAX, V _{IN} = 2.7 V
				0.1	mA	V _{CC} = MAX, V _{IN} = 7.0 V
I _{IL}	Input LOW Current			−0.6	mA	V _{CC} = MAX, V _{IN} = 0.5 V
I _{OS}	Output Short Circuit Current (Note 2)	−60		−150	mA	V _{CC} = MAX, V _{OUT} = 0 V
I _{CC}	Power Supply Current		30	45	mA	V _{CC} = MAX, V _{CP} = 0 V

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.
- Not more than one output should be shorted at a time, nor for more than 1 second.

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AC CHARACTERISTICS

Symbol	Parameter	54/74F			54F		74F		Unit
		T _A = +25°C V _{CC} = 5.0 V C _L = 50 pF			T _A = -55°C to +125°C V _{CC} = 5.0 V ± 10% 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	Min	Max	
f _{max}	Maximum Input Frequency	80	140		80		80		MHz
t _{PLH}	Propagation Delay	3.0	5.5	7.5	3.0	9.5	3.0	8.5	ns
t _{PHL}	CP to Q _n	3.5	6.0	8.5	3.5	10.5	3.5	9.5	

AC OPERATING REQUIREMENTS

Symbol	Parameter	54/74F			54F		74F		Unit
		T _A = +25°C V _{CC} = 5.0 V			T _A = -55°C to +125°C V _{CC} = 5.0 V ± 10%		T _A = 0°C to +70°C V _{CC} = 5.0 V ± 10%		
		Min	Typ	Max	Min	max	Min	Max	
t _S (H)	Setup Time, HIGH or LOW	4.0			4.0		4.0		ns
t _S (L)	D _N to CP	4.0			4.0		4.0		
t _H (H)	Hold Time, HIGH or LOW	0			0		0		
t _H (L)	D _N to CP	0			0		0		ns
t _S (H)	Setup Time, HIGH or LOW	6.0			6.0		6.0		
t _S (L)	E to CP	6.0			6.0		6.0		
t _H (H)	Hold Time, HIGH or LOW	2.0			2.0		2.0		
t _H (L)	E to CP	2.0			2.0		2.0		ns
t _W (H)	CP Pulse Width,	4.0			4.0		4.0		
t _W (L)	HIGH or LOW	6.0			6.0		6.0		