



CYPRESS

CY54/74FCT480T

Dual 8-Bit Parity Generator/Checker

Features

- Function, pinout and drive compatible with FCT and F logic
- FCT-A speed at 7.5 ns max. (Com'l)
FCT-B speed at 5.6 ns max. (Com'l)
- Reduced V_{OH} (typically $\approx 3.3V$) versions of equivalent FCT functions
- Edge-rate control circuitry for significantly improved noise characteristics
- Power-off disable feature
- Matched rise and fall times
- ESD > 2000V

- Fully compatible with TTL input and output logic levels
- Sink Current 64 mA (Com'l), 32 mA (Mil)
- Source Current 32 mA (Com'l), 12 mA (Mil)
- Two 8 bit parity generator/checkers
- Open drain Active LOW parity error output
- Expandable for larger word widths

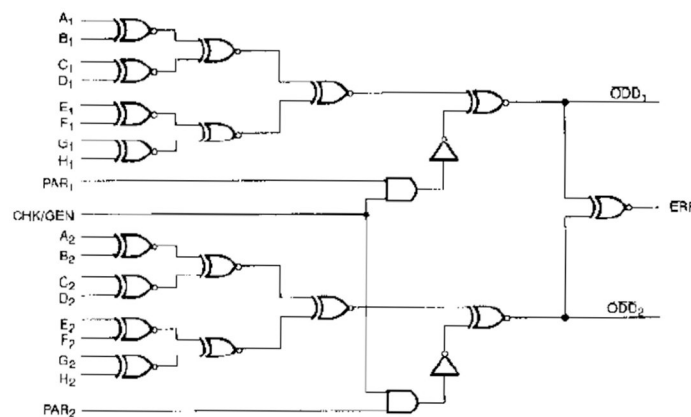
Functional Description

The FCT480T is a high-speed dual 8-bit parity generator/checker. Each parity generator/checker accepts eight data bits

and one parity bit as inputs, and generates a sum and parity error output. The FCT480T can be used in ODD parity systems. The parity error output is open-drain, designed for easy expansion of the word width by a wired-OR connection of several FCT480T type devices. Since additional logic is not needed, the parity generation or checking times remain the same as for an individual FCT480T device.

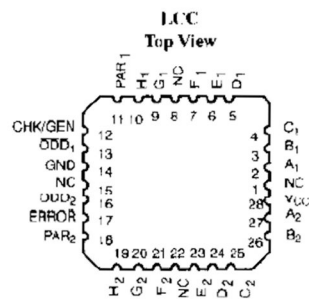
The outputs are designed with a power-off disable feature to allow for live insertion of boards.

Logic Block Diagram

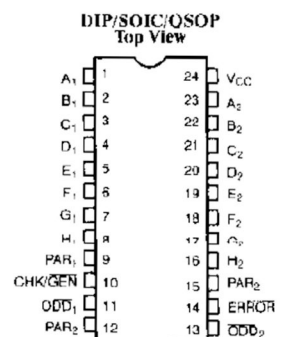


FCT480T-1

Pin Configurations



FCT480T-2



FCT480T-3

Function Table

Inputs					Outputs		
A ₁ to H ₁	A ₂ to H ₂	CHK/GEN	PAR ₁	PAR ₂	ODD ₁	ODD ₂	ERROR
Number of A ₁ to H ₁ Inputs HIGH is EVEN	Number of A ₂ to H ₂ Inputs HIGH is EVEN	H	H	H	L	L	H
			L	H	H	L	L
			H	L	L	H	L
			L	L	H	H	L
		L	X	X	H	H	L
	Number of Inputs HIGH A ₂ to H ₂ is ODD	H	H	H	L	H	L
			L	H	H	H	L
			H	L	L	L	H
			L	L	H	L	L
		L	X	X	H	L	L
Number of A ₁ to H ₁ Inputs HIGH is ODD	Number of A ₂ to H ₂ Inputs HIGH is EVEN	H	H	H	H	L	L
			L	H	L	L	H
			H	L	H	H	L
			L	L	L	H	L
		L	X	X	L	H	L
	Number of A ₂ to H ₂ Inputs HIGH is ODD	H	H	H	H	H	L
			L	H	L	H	L
			H	L	H	L	L
			L	L	L	L	H
		L	X	X	L	L	H

Maximum Ratings^[1, 2]

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature -65°C to +150°C
 Ambient Temperature with
 Power Applied -65°C to +135°C
 Supply Voltage to Ground Potential -0.5V to +7.0V
 DC Input Voltage -0.5V to +7.0V
 DC Output Voltage -0.5V to +7.0V
 DC Output Current (Maximum Sink Current/Pin) 120 mA
 Power Dissipation 0.5W

Static Discharge Voltage >2001V
 (per MIL-STD-883, Method 3015)

Operating Range

Range	Range	Ambient Temperature	V _{CC}
Commercial	BT	0°C to +70°C	5V ± 5%
Commercial	T, AT	-40°C to +85°C	5V ± 5%
Military ^[3]	All	-55°C to +125°C	5V ± 10%

Notes:

- Unless otherwise noted, these limits are over the operating free-air temperature range.
- Unused inputs must always be connected to an appropriate logic voltage level, preferably either V_{CC} or ground.
- T_A is the "instant on" case temperature.

Electrical Characteristics Over the Operating Range

Parameter	Description	Test Conditions		Min.	Typ. ^[4]	Max.	Unit
V _{OH}	Output HIGH Voltage	V _{CC} =Min., I _{OH} =-32 mA	Com'l	2.0			V
		V _{CC} =Min., I _{OH} =-15 mA	Com'l	2.4	3.3		V
		V _{CC} =Min., I _{OH} =-12 mA	Mil	2.4	3.3		V
V _{OL}	Output LOW Voltage	V _{CC} =Min., I _{OL} =64 mA	Com'l		0.3	0.55	V
		V _{CC} =Min., I _{OL} =32 mA	Mil		0.3	0.55	V
V _{IH}	Input HIGH Voltage			2.0			V
V _{IL}	Input LOW Voltage					0.8	V
V _{HI}	Hysteresis ^[5]	All inputs			0.2		V
V _{IK}	Input Clamp Diode Voltage	V _{CC} =Min., I _{IN} =-18 mA			-0.7	-1.2	V
I _I	Input HIGH Current	V _{CC} =Max., V _{IN} =V _{CC}				5	μA
I _{IH}	Input HIGH Current	V _{CC} =Max., V _{IN} =2.7V				±1	μA
I _{IL}	Input LOW Current	V _{CC} =Max., V _{IN} =0.5V				±1	μA
I _{OZH}	Off State HIGH-Level Output Current	V _{CC} =Max., V _{OUT} =2.7V				10	μA
I _{OZL}	Off State LOW-Level Output Current	V _{CC} =Max., V _{OUT} =0.5V				-10	μA
I _{OS}	Output Short Circuit Current ^[6]	V _{CC} =Max., V _{OUT} =0.0V		-60	-120	-225	mA
I _{OFF}	Power-Off Disable	V _{CC} =0V, V _{OUT} =4.5V				±1	μA

Capacitance^[5]

Parameter	Description	Typ. ^[4]	Max.	Unit
C _{IN}	Input Capacitance	5	10	pF
C _{OUT}	Output Capacitance	9	12	pF

Notes:

4. Typical values are at V_{CC}=5.0V, T_A=+25°C ambient.
5. This parameter is guaranteed but not tested.
6. Not more than one output should be shorted at a time. Duration of short should not exceed one second. The use of high-speed test apparatus and/or sample and hold techniques are preferable in order

to minimize internal chip 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 parametric tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

Power Supply Characteristics

Parameter	Description	Test Conditions	Typ. ^[4]	Max.	Unit
I_{CC}	Quiescent Power Supply Current	$V_{CC} = \text{Max.}, V_{IN} \leq 0.2V,$ $V_{IN} \geq V_{CC} - 0.2V$	0.1	0.2	mA
ΔI_{CC}	Quiescent Power Supply Current (TTL inputs HIGH)	$V_{CC} = \text{Max.}, V_{IN} = 3.4V$, ^[7] $f_1 = 0$, Outputs Open	0.5	2.0	mA
I_{CCD}	Dynamic Power Supply Current ^[8]	$V_{CC} = \text{Max.}$, One Bit Toggling, 50% Duty Cycle, Outputs Open, $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$	0.06	0.12	mA/ MHz
I_C	Total Power Supply Current ^[9]	$V_{CC} = \text{Max.}$, 50% Duty Cycle, Outputs Open, One Bit Toggling at $f_1 = 2.5$ MHz, $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$	0.7	1.4	mA
		$V_{CC} = \text{Max.}$, 50% Duty Cycle, Outputs Open, One Bit Toggling at $f_1 = 2.5$ MHz, $V_{IN} = 3.4V$ or $V_{IN} = \text{GND}$	1.0	2.4	mA
		$V_{CC} = \text{Max.}$, 50% Duty Cycle, Outputs Open, Sixteen Bits Toggling at $f_1 = 2.5$ MHz, $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$	2.5	5.0 ^[10]	mA
		$V_{CC} = \text{Max.}$, 50% Duty Cycle, Outputs Open, Sixteen Bits Toggling at $f_1 = 2.5$ MHz, $V_{IN} = 3.4V$ or $V_{IN} = \text{GND}$	6.5	21.0 ^[10]	mA

Switching Characteristics Over the Operating Range

	Description	FCT480T		FCT480AT		FCT480BT		Unit
		Military	Com'l	Military	Com'l	Military	Com'l	
t_{PLH} t_{PHL}	Propagation Delay A to EVEN/ODD	17.0 16.0	13.0 13.0	9.5 9.0	7.5 7.0	7.0 6.6	5.6 5.6	ns
$t_{PLH}^{[11]}$ $t_{PHL}^{[11]}$	Propagation Delay A to ERROR	17.0 20.0	13.0 16.0	9.0 10.5	7.0 8.5	7.0 8.1	5.6 6.5	ns
t_{PLH} t_{PHL}	Propagation Delay CHK/GEN to EVEN/ODD	15.0 18.0	12.0 15.0	8.5 10.0	6.5 7.5	6.3 7.4	5.9 5.9	ns
$t_{PLH}^{[11]}$ $t_{PHL}^{[11]}$	Propagation Delay CHK/GEN to ERROR	17.0 16.0	14.0 13.0	9.5 9.0	7.5 7.0	7.1 6.9	5.7 5.5	ns

Notes:

7. Per TTL driven input ($V_{IN} = 3.4V$); all other inputs at V_{CC} or GND.

8. This parameter is not directly testable, but is derived for use in Total Power Supply calculations.

9. $I_C = I_{\text{QUIESCENT}} + I_{\text{INPUTS}} + I_{\text{DYNAMIC}}$
 $I_C = I_{CC} + \Delta I_{CC} D_H N_I + I_{CCD} (f_0/2 + f_1 N_I)$
 I_{CC} = Quiescent Current with CMOS input levels
 ΔI_{CC} = Power Supply Current for a TTL HIGH input ($V_{IN} = 3.4V$)
 D_H = Duty Cycle for TTL inputs HIGH
 N_I = Number of TTL inputs at D_H

I_{CCD} = Dynamic Current caused by an input transition pair (HLH or LHL)

f_0 = Clock frequency for registered devices, otherwise zero

f_1 = Input signal frequency

N_I = Number of inputs changing at f_1

All currents are in milliamps and all frequencies are in megahertz.

10. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.

11. t_{PLH} is measured up to $V_{OUT} = V_{OL} + 0.3V$



Ordering Information

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
5.6	CY74FCT480BTPC	P13/13A	24-Lead (300-Mil) Molded DIP	Commercial
	CY74FCT480BTQC	Q13	24-Lead (150-Mil) QSOP	
	CY74FCT480BTSOC	S13	24-Lead (300-Mil) Molded SOIC	
7.0	CY54FCT480BTDMB	D14	24-Lead (300-Mil) CerDIP	Military
	CY54FCT480BTLMB	L64	28-Square Leadless Chip Carrier	
7.5	CY74FCT480ATPC	P13/13A	24-Lead (300-Mil) Molded DIP	Commercial
	CY74FCT480ATQC	Q13	24-Lead (150-Mil) QSOP	
	CY74FCT480ATSOC	S13	24-Lead (300-Mil) Molded SOIC	
9.5	CY54FCT480ATDMB	D14	24-Lead (300-Mil) CerDIP	Military
	CY54FCT480ATLMB	L64	28-Square Leadless Chip Carrier	
13.0	CY74FCT480TPC	P13/13A	24-Lead (300-Mil) Molded DIP	Commercial
	CY74FCT480TQC	Q13	24-Lead (150-Mil) QSOP	
	CY74FCT480TSOC	S13	24-Lead (300-Mil) Molded SOIC	
17.0	CY54FCT480TDMB	D14	24-Lead (300-Mil) CerDIP	Military
	CY54FCT480TLMB	L64	28-Square Leadless Chip Carrier	