

Document No.	853-1496
ECN No.	00731
Date of Issue	October 17, 1990
Status	Product Specification
ACL Products	

# 74AC/ACT11286

## 9-bit odd/even parity generator/ checker with bus drive I/O port

### FEATURES

- Generates either odd or even parity for nine data lines
- Word length easily expanded by cascading
- Direct bus connection for parity generation or for checking by using the parity I/O port
- Glitch-free bus during power up/down
- Output capability:  $\pm 24\text{mA}$
- CMOS (AC) and TTL (ACT) voltage level inputs
- $50\Omega$  incident wave switching
- Center-pin  $V_{CC}$  and ground configuration to minimize high-speed switching noise
- $I_{CC}$  category: MSI

### DESCRIPTION

The 74AC/ACT11286 high-performance CMOS devices combine very high speed and high output drive comparable to the most advanced TTL families.

The 74AC/ACT11286 9-bit parity generator or checker is commonly used to detect errors in high-speed data transmission or data retrieval systems. It features *(continued)*

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS		TYPICAL		UNIT
		$T_{amb} = 25^\circ\text{C}; \text{GND} = 0\text{V}; V_{CC} = 5.0\text{V}$		AC	ACT	
$t_{PLH}/t_{PHL}$	Propagation delay $I_n$ to PARITY ERROR	$C_L = 50\text{pF}$		5.9	7.3	ns
$C_{PD}$	Power dissipation capacitance <sup>1</sup>	$f = 1\text{MHz};$	Enabled	53	56	pF
		$C_L = 50\text{pF}$	Disabled	46	50	
$C_{IN}$	Input capacitance	$V_I = 0\text{V or } V_{CC}$		3.5	3.5	pF
$C_{I/O}$	I/O capacitance	$V_{I/O} = 0\text{V or } V_{CC}; \text{Disabled}$		8.5	8.5	pF
$I_{LATCH}$	Latch-up current	Per Jeduc JC40.2 Standard 17		500	500	mA

#### Note:

1.  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ):

$$P_D = C_{PD} \times V_{CC}^2 \times f_I + \sum (C_L \times V_{CC}^2 \times f_O) \text{ where:}$$

$f_I$  = input frequency in MHz,  $C_L$  = output load capacitance in pF,

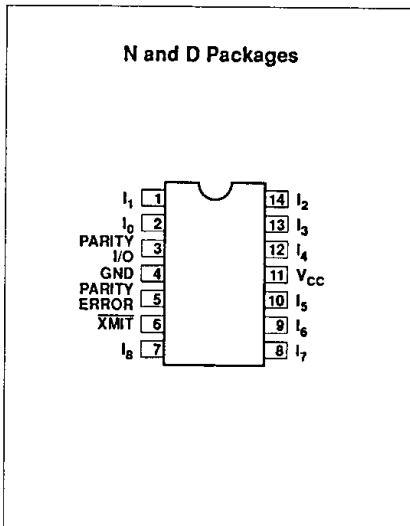
$f_O$  = output frequency in MHz,  $V_{CC}$  = supply voltage in V,

$\sum (C_L \times V_{CC}^2 \times f_O)$  = sum of outputs

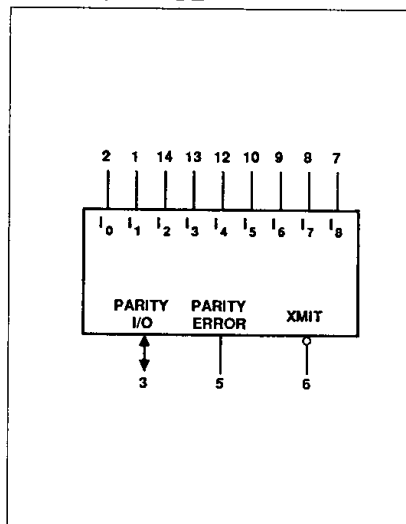
### ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE
14-pin plastic DIP (300mil-wide)	-40°C to +85°C	74AC11286N 74ACT11286N
14-pin plastic SO (150mil-wide)	-40°C to +85°C	74AC11286D 74ACT11286D

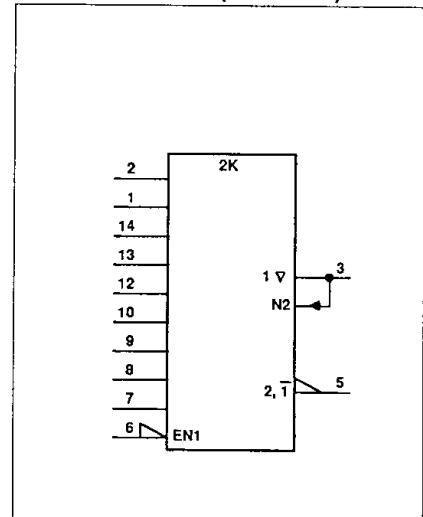
### PIN CONFIGURATION



### LOGIC SYMBOL



### LOGIC SYMBOL (IEEE/IEC)



# 9-bit odd/even parity generator/checker with bus drive I/O port

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tures a local output for parity checking and a bus-driving parity I/O port for parity generation/checking.

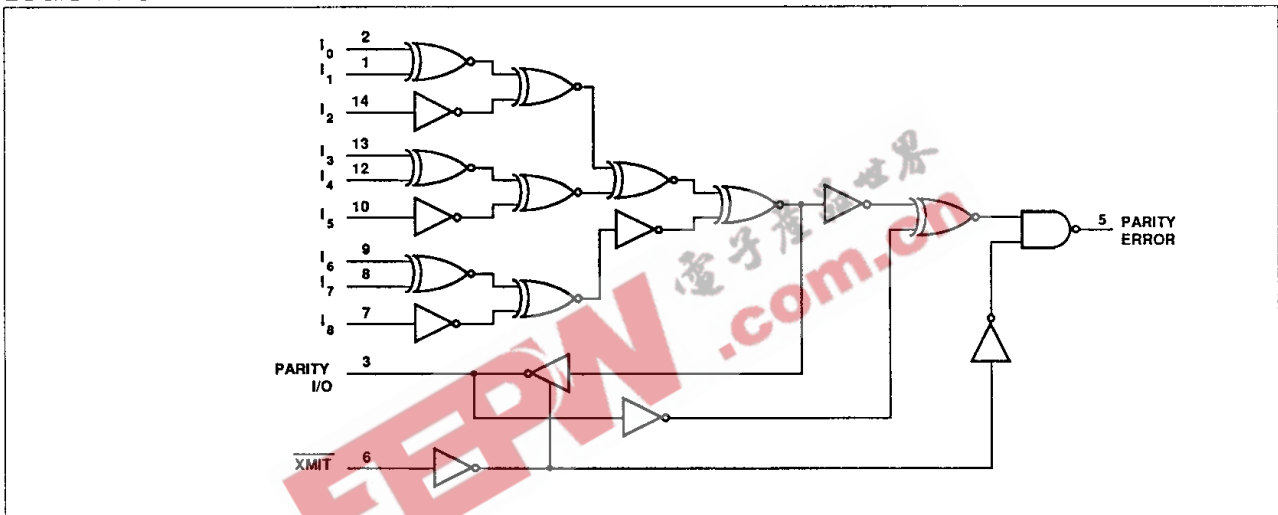
The  $\overline{\text{XMIT}}$  control input is implemented specifically for cascading for expanding word length. When  $\overline{\text{XMIT}}$  is held Low

the parity tree is disabled and the Parity Error output remains at a High logic level regardless of the other inputs ( $I_0 - I_8$ ). When  $\overline{\text{XMIT}}$  is High the parity tree is enabled. Parity Error indicates a parity error when either an even number of inputs are High and Parity I/O is forced

to Low, or when an odd number of inputs are High and Parity I/O is forced High.

The I/O control circuitry is designed so that the I/O port will remain in the high-impedance state during power-up or power-down to prevent bus glitches.

## LOGIC DIAGRAM



## PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
2, 1, 14, 13, 12, 10, 9, 8, 7	$I_0 - I_8$	Data inputs
3	PARITY I/O	Parity I/O
6	$\overline{\text{XMIT}}$	Transmit input (active Low)
5	PARITY ERROR	Parity error output
4	GND	Ground (0V)
11	$V_{CC}$	Positive supply voltage

## FUNCTION TABLE

Number of High Data Inputs ( $I_0 - I_8$ )	$\overline{\text{XMIT}}$	PARITY I/O	PARITY ERROR
0, 2, 4, 6, 8	l	H	H
1, 3, 5, 7, 9	l	L	H
0, 2, 4, 6, 8	h	h	H
	h	l	L
1, 3, 5, 7, 9	h	h	L
	h	l	H

l = Low voltage level input  
 h = High voltage level input  
 H = High voltage level output  
 L = Low voltage level output

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### RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	74AC11286			74ACT11286			UNIT
		Min	Nom	Max	Min	Nom	Max	
$V_{CC}$	DC supply voltage	3.0 <sup>1</sup>	5.0	5.5	4.5	5.0	5.5	V
$V_I$	Input voltage	0		$V_{CC}$	0		$V_{CC}$	V
$V_O$	Output voltage	0		$V_{CC}$	0		$V_{CC}$	V
$\Delta V/\Delta t$	Input transition rise or fall rate	0		10	0		10	ns/V
$T_{amb}$	Operating free-air temperature range	-40		+85	-40		+85	°C

## NOTE:

- No electrical or switching characteristics are specified at  $V_{CC} < 3V$ . Operation between 2V and 3V is not recommended, but within that range, a device output will maintain a previously established logic state.

### ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

SYMBOL	PARAMETER	TEST CONDITIONS	RATING	UNIT
$V_{CC}$	DC supply voltage		-0.5 TO +7.0	V
$I_{IK}$ or $V_I$	DC input diode current <sup>2</sup>	$V_I < 0$	-20	mA
	DC input voltage	$V_I > V_{CC}$	20	
$I_{OK}$ or $V_O$	DC output diode current <sup>2</sup>	$V_O < 0$	-50	mA
		$V_O > V_{CC}$	50	
	DC output voltage		-0.5 to $V_{CC} + 0.5$	V
$I_O$	DC output source or sink current per output pin	$V_O = 0$ to $V_{CC}$	±50	mA
$I_{CC}$ or $I_{GND}$	DC $V_{CC}$ current		±100	mA
	DC ground current		±100	
$T_{STG}$	Storage temperature		-65 to 150	°C
$P_{TOT}$	Power dissipation per package	Above 70°C; derate linearly by 8mW/K	500	mW
	Power dissipation per package Plastic surface mount (SO)	Above 70°C; derate linearly by 8mW/K	400	mW

## NOTES:

- Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

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**DC ELECTRICAL CHARACTERISTICS**

SYMBOL	PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	74AC11286				74ACT11286				UNIT	
				T <sub>amb</sub> = +25°C		T <sub>amb</sub> = -40°C to +85°C		T <sub>amb</sub> = +25°C		T <sub>amb</sub> = -40°C to +85°C			
				Min	Max	Min	Max	Min	Max	Min	Max		
V <sub>IH</sub>	High-level input voltage		3.0	2.10		2.10						V	
			4.5	3.15		3.15		2.0		2.0			
			5.5	3.85		3.85		2.0		2.0			
V <sub>IL</sub>	Low-level input voltage		3.0		0.90		0.90					V	
			4.5		1.35		1.35		0.8		0.8		
			5.5		1.65		1.65		0.8		0.8		
V <sub>OH</sub>	High-level output voltage	V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	I <sub>OH</sub> = -50μA	3.0	2.9		2.9					V	
				4.5	4.4		4.4		4.4		4.4		
				5.5	5.4		5.4		5.4		5.4		
			I <sub>OH</sub> = -4mA	3.0	2.58		2.48						
				4.5	3.94		3.8		3.94		3.8		
				5.5	4.94		4.8		4.94		4.8		
I <sub>OH</sub> = -75mA <sup>1</sup>	5.5			3.85				3.85					
V <sub>OL</sub>	Low-level output voltage	V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	I <sub>OL</sub> = 50μA	3.0		0.1		0.1				V	
				4.5		0.1		0.1		0.1			0.1
				5.5		0.1		0.1		0.1			0.1
			I <sub>OL</sub> = 12mA	3.0		0.36		0.44					
				4.5		0.36		0.44		0.36			0.44
				5.5		0.36		0.44		0.36			0.44
I <sub>OL</sub> = 75mA <sup>1</sup>	5.5				1.65				1.65				
I <sub>I</sub>	Input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND	5.5		±0.1		±1.0		±0.1		±1.0	μA	
I <sub>oz</sub>	3-State output off-state current	V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub> , V <sub>O</sub> = V <sub>CC</sub> or GND	5.5		±0.5		5.0		±0.5		5.0	μA	
I <sub>CC</sub>	Quiescent supply current	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0mA	5.5		8.0		80		8.0		80	μA	
ΔI <sub>CC</sub>	Supply current, TTL inputs High <sup>2</sup>	One input at 3.4V, other inputs at V <sub>CC</sub> or GND	5.5						0.9		1.0	mA	

**NOTES:**

1. Not more than one output should be tested at a time, and the duration of the test should not exceed 10ms.
2. This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0V or V<sub>CC</sub>.

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### AC ELECTRICAL CHARACTERISTICS AT 3.3V ±0.3V

SYMBOL	PARAMETER	WAVEFORM	74AC11286					UNIT
			T <sub>amb</sub> = +25°C			T <sub>amb</sub> = -40°C to +85°C		
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to PARITY I/O	1	2.6 3.8	10.0 11.6	11.7 14.5	2.6 3.8	13.1 16.1	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to PARITY ERROR	1	3.0 4.0	8.5 10.9	13.1 16.0	3.0 4.0	14.7 17.8	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay PARITY I/O to PARITY ERROR	1	2.2 3.4	5.9 7.9	7.6 10.2	2.2 3.4	8.4 11.1	ns
t <sub>PZH</sub> t <sub>PHZ</sub>	Propagation delay XMIT to PARITY I/O	2	1.8 3.2	4.9 5.4	6.4 6.6	1.8 3.2	7.0 7.0	ns
t <sub>PZL</sub> t <sub>PLZ</sub>	Propagation delay XMIT to PARITY I/O	2	3.5 3.2	9.7 5.4	12.8 6.7	3.5 3.2	13.6 7.2	ns

### AC ELECTRICAL CHARACTERISTICS AT 5.0V ±0.5V

SYMBOL	PARAMETER	WAVEFORM	74AC11286					UNIT
			T <sub>amb</sub> = +25°C			T <sub>amb</sub> = -40°C to +85°C		
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to PARITY I/O	1	2.0 3.1	5.5 6.9	8.0 9.1	2.0 3.1	9.0 10.7	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to PARITY ERROR	1	2.5 3.3	5.2 6.5	8.9 10.7	2.5 3.3	10.0 12.0	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay PARITY I/O to PARITY ERROR	1	1.9 2.9	3.9 5.0	5.6 7.2	1.9 2.9	6.2 7.9	ns
t <sub>PZH</sub> t <sub>PHZ</sub>	Propagation delay XMIT to PARITY I/O	2	1.4 3.1	3.3 4.8	4.9 6.1	1.4 3.1	5.3 6.5	ns
t <sub>PZL</sub> t <sub>PLZ</sub>	Propagation delay XMIT to PARITY I/O	2	3.0 3.0	5.4 4.6	8.3 6.0	3.0 3.0	8.9 6.3	ns

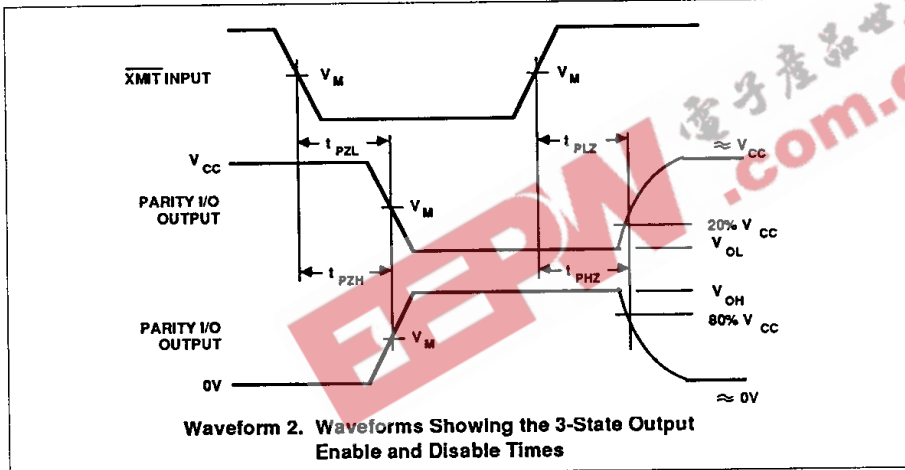
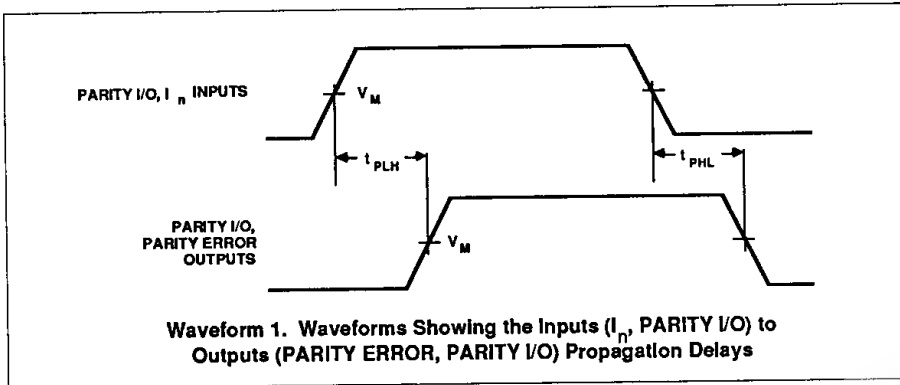
### AC ELECTRICAL CHARACTERISTICS AT 5.0V ±0.5V

SYMBOL	PARAMETER	WAVEFORM	74ACT11286					UNIT
			T <sub>amb</sub> = +25°C			T <sub>amb</sub> = -40°C to +85°C		
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to PARITY I/O	1	2.7 3.6	6.1 7.3	8.0 10.8	2.7 3.6	10.4 12.0	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to PARITY ERROR	1	3.0 3.9	6.9 7.7	9.7 11.4	3.0 3.9	11.3 12.9	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay PARITY I/O to PARITY ERROR	1	2.2 3.1	4.6 5.6	6.8 8.3	2.2 3.1	7.7 9.1	ns
t <sub>PZH</sub> t <sub>PHZ</sub>	Propagation delay XMIT to PARITY I/O	2	1.8 4.7	4.2 6.5	6.3 7.9	1.8 4.7	7.3 8.5	ns
t <sub>PZL</sub> t <sub>PLZ</sub>	Propagation delay XMIT to PARITY I/O	2	3.0 4.1	6.3 6.0	9.4 7.3	3.0 4.1	11.4 7.8	ns

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## AC WAVEFORMS



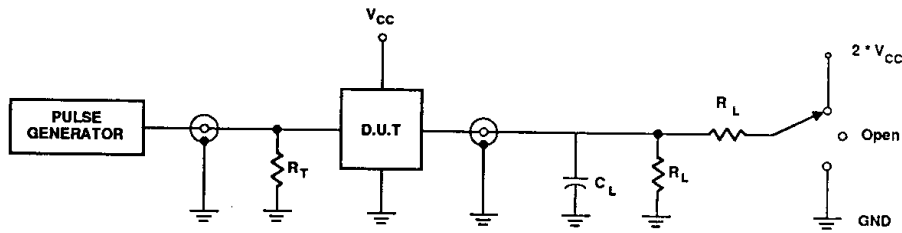
## WAVEFORM CONDITIONS

	INPUTS	OUTPUTS
AC	$V_{IN} = \text{GND to } V_{CC}$ , $V_M = 50\% V_{CC}$	$V_{OUT} = V_{OL} \text{ to } V_{OH}$
ACT	$V_{IN} = \text{GND to } 3.0V$ , $V_M = 1.5V$	$V_M = 50\% V_{CC}$

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**TEST CIRCUIT**



Test Circuit

TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$2 \cdot V_{CC}$
$t_{PHZ}/t_{PZH}$	GND

SWITCH POSITION

**DEFINITIONS**

$C_L$  = Load capacitance, 50pF; includes jig and probe capacitance

$R_L$  = Load resistor, 500 $\Omega$

$R_T$  = Termination resistance should be equal to  $Z_{OUT}$  of pulse generators

Input pulses: PRR  $\leq$  10MHz

$t_r = t_f = 3ns$

