
Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

- Performs Look-Ahead Carry Across n-Bit Counters
- Accommodates Active-High or Active-Low Carry
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Improves Cascaded Counters System Performance
- Dependable Texas Instruments Quality and Reliability

description

This look-ahead generator was designed specifically to perform a carry-anticipate across any number of n-bit counters, thus increasing system clock frequency. A carry enable CE, and carry outputs RCOA and RCOB are provided for n-bit cascading.

The counter can be used with either active-high-carry or active-low-carry counters. For active-high-carry counters, CE is active high, the A set of inputs and output RCOA are used, and the B set of inputs are connected to a low logic level. For active-low-carry counters, CE is active low, the B set of inputs and output RCOB are used, and the A set of inputs are connected to a high logic level. See Figures 1 and 2 for typical applications.

The SN54AS264 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74AS264 is characterized for operation in the temperature range of 0°C to 70°C .

positive logic equations

ACTIVE-HIGH-CARRY COUNTERS

(CE is high, all B inputs are low)

$$\begin{aligned} \text{CO} &= \text{A0} \\ \text{C1} &= \text{A0} \cdot \text{A1} \\ \text{C2} &= \text{A0} \cdot \text{A1} \cdot \text{A2} \\ \text{RCOA} &= \text{A0} \cdot \text{A1} \cdot \text{A2} \cdot \text{A3} \\ \text{RCOB} &\text{ is high} \end{aligned}$$

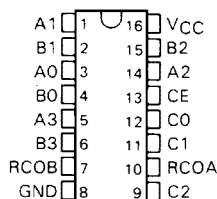
ACTIVE-LOW-CARRY COUNTERS

(CE is low, all A inputs are high)

$$\begin{aligned} \text{CO} &= \overline{\text{B0}} \\ \text{C1} &= \overline{\text{B0}} \cdot \overline{\text{B1}} \\ \text{C2} &= \overline{\text{B0}} \cdot \overline{\text{B1}} \cdot \overline{\text{B2}} \\ \text{RCOA} &= \overline{\text{B1}} \cdot \overline{\text{B2}} \cdot \overline{\text{B3}} \\ \text{RCOB} &= \overline{\text{B0}} \cdot \overline{\text{B1}} \cdot \overline{\text{B2}} \cdot \overline{\text{B3}} \end{aligned}$$

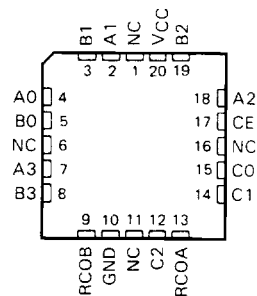
SN54AS264 . . . J PACKAGE
SN74AS264 . . . D OR N PACKAGE

(TOP VIEW)



SN54AS264 . . . FK PACKAGE

(TOP VIEW)



NC No internal connection

SN54AS264, SN74AS264

LOOK-AHEAD CARRY GENERATORS FOR COUNTERS

FUNCTION TABLE FOR C0 OUTPUT

INPUTS			OUTPUT
A0	B0	CE	C0
H	H	X	H
H	X	H	H
L	X	X	L
X	L	L	L

FUNCTION TABLE FOR C1 OUTPUT

INPUTS					OUTPUT
A1	A0	B1	B0	CE	C1
H	X	H	X	X	H
H	H	X	H	X	H
H	H	X	X	H	H
L	X	X	X	X	L
X	L	L	X	X	L
X	X	L	L	L	L

FUNCTION TABLE FOR C2 OUTPUT

INPUTS							OUTPUT
A2	A1	A0	B2	B1	B0	CE	C2
H	X	X	H	X	X	X	H
H	H	X	X	H	X	X	H
H	H	H	X	X	H	X	H
H	H	H	X	X	X	H	H
L	X	X	X	X	X	X	L
X	L	X	L	X	X	X	L
X	X	L	L	L	X	X	L
X	X	X	L	L	L	L	L

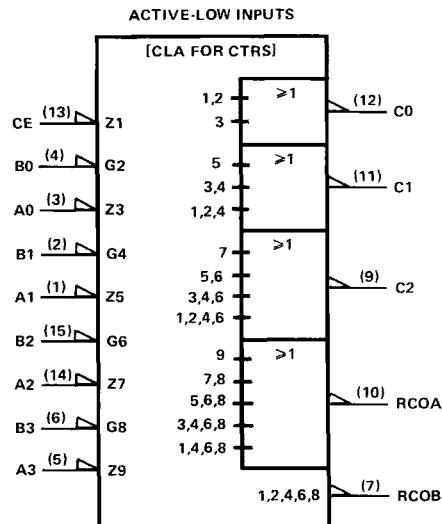
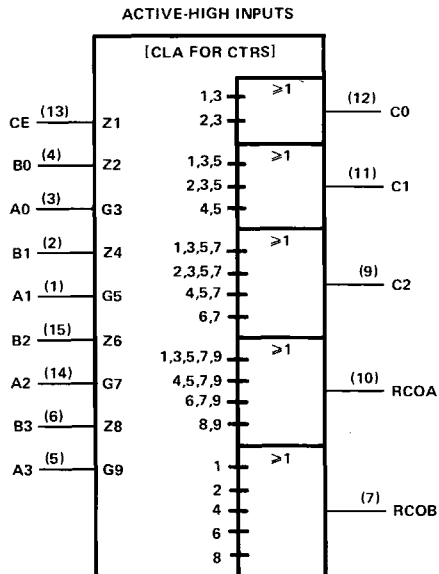
FUNCTION TABLE FOR RCOA OUTPUT

INPUTS								OUTPUT
A3	A2	A1	A0	B3	B2	B1	CE	RCOA
H	X	X	X	H	X	X	X	H
H	H	X	X	X	H	X	X	H
H	H	H	X	X	X	H	X	H
H	H	H	H	X	X	X	H	H
L	X	X	X	X	X	X	X	L
X	L	X	X	L	X	X	X	L
X	X	L	X	L	L	X	X	L
X	X	X	L	L	L	L	X	L
X	X	X	X	L	L	L	L	L

FUNCTION TABLE FOR RCOB OUTPUT

INPUTS					OUTPUT
B3	B2	B1	B0	CE	RCOB
H	X	X	X	X	H
X	H	X	X	X	H
X	X	H	X	X	H
X	X	X	H	X	H
X	X	X	X	H	H
L	L	L	L	L	L

logic symbols[†]

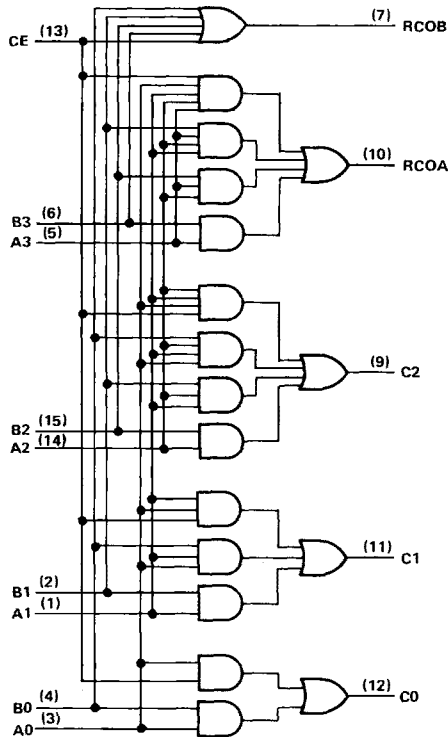


[†] These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, and N packages.

SN54AS264, SN74AS264 LOOK-AHEAD CARRY GENERATORS FOR COUNTERS

logic diagram (positive logic)



Pin numbers shown are for D, J, and N packages.

absolute maximum ratings over free-air temperature (unless otherwise noted)

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Operating free-air temperature range: SN54AS264	-55°C to 125°C
SN74AS264	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

	SN54AS264			SN74AS264			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH} High-level input voltage	2			2			V
V_{IL} Low-level input voltage			0.8			0.8	V
I_{OH} High-level output current			-2			-2	mA
I_{OL} Low-level output current			20			20	mA
T_A Operating free-air temperature	-55		125	0		70	°C

SN54AS264, SN74AS264

LOOK-AHEAD CARRY GENERATORS FOR COUNTERS

electrical characteristics over recommended operating free-air temperature range
(unless otherwise noted)

PARAMETER		TEST CONDITIONS	SN54AS264			SN74AS264			UNIT
			MIN	TYP [†]	MAX	MIN	TYP [†]	MAX	
V_{IK}		$V_{CC} = 4.5 \text{ V}$, $I_I = -18 \text{ mA}$			-1.2			-1.2	V
V_{OH}		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$, $I_{OH} = -2 \text{ mA}$	$V_{CC} - 2$			$V_{CC} - 2$			V
V_{OL}		$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 20 \text{ mA}$	0.3	0.5		0.3	0.5		V
I_I	CE	$V_{CC} = 5.5 \text{ V}$, $V_I = 7 \text{ V}$			500			500	μA
	A0, A2				700			700	
	A1				800			800	
	A3, B0, B1				400			400	
	B2				300			300	
	B3				200			200	
I_{IH}	CE	$V_{CC} = 5.5 \text{ V}$, $V_I = 2.7 \text{ V}$			100			100	μA
	A0, A2				140			140	
	A1				160			160	
	A3, B0, B1				80			80	
	B2				60			60	
	B3				40			40	
I_{IL}	CE	$V_{CC} = 5.5 \text{ V}$, $V_I = 0.4 \text{ V}$			-2.5			-2.5	mA
	A0				-3.5			-3.5	
	A1, A2				-4			-4	
	A3, B0, B1				-2			-2	
	B2				-1			-1	
	B3				-1.5			-1.5	
$I_O^{\ddagger}$		$V_{CC} = 5.5 \text{ V}$, $V_O = 2.25 \text{ V}$	-30		-112	-30		-112	mA
I_{CCH}		$V_{CC} = 5.5 \text{ V}$		26			26		mA
I_{CCL}				28			28		

[†]All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

[‡]The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit current, I_{OS} .

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 50 Ω, T _A = MIN to MAX						UNIT
			SN54AS264			SN74AS264			
			MIN	TYP [†]	MAX	MIN	TYP [†]	MAX	
t _{PLH}	CE	C0, C1, C2		6			6	ns	
t _{PHL}				5			5		
t _{PLH}	An or Bn	C0, C1, C2		5			5	ns	
t _{PHL}				5			5		
t _{PLH}	An, Bn, or CE	RCOA		5			5	ns	
t _{PHL}				5			5		
t _{PLH}	Bn or CE	RCOB		5			5	ns	
t _{PHL}				5			5		

[†]All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

SN54AS264, SN74AS264 LOOK-AHEAD CARRY GENERATORS FOR COUNTERS

TYPICAL APPLICATION INFORMATION

The circuit shown in Figure 1 illustrates how the 'AS264 can implement look-ahead carry for the active-high-carry 'AS163, while Figure 2 shows the look-ahead carry for the active-low-carry 'AS169.

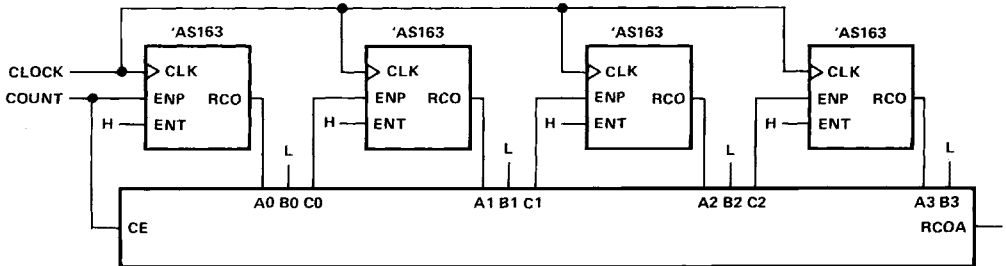


FIGURE 1—ACTIVE-HIGH-CARRY

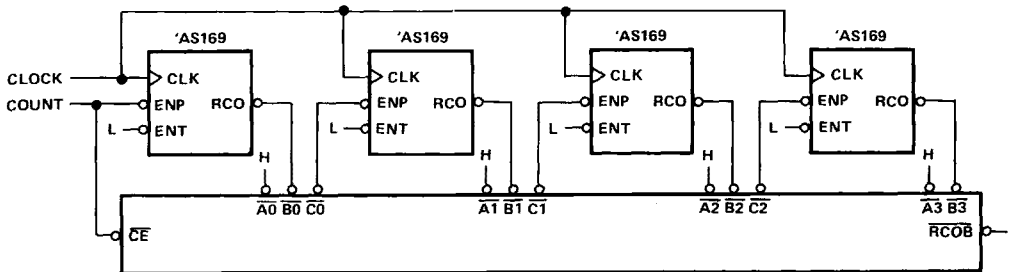


FIGURE 2—ACTIVE-LOW-CARRY

2

ALS and AS Circuits

