

SN54HC620, SN54HC623, SN74HC620, SN74HC623 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

D2684, DECEMBER 1982—REVISED SEPTEMBER 1987

- Lock Bus-Latch Capability
- Choice of True or Inverting Logic
- High-Current 3-State Outputs Can Drive Up to 15 LSTTL Loads
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

DEVICE	LOGIC
'HC620	Inverting
'HC623	True

description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control function implementation allows for maximum flexibility in timing.

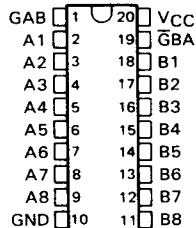
These devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the enable inputs ($\overline{\text{GBA}}$ and GAB .)

The enable inputs can be used to disable the device so that the buses are effectively isolated.

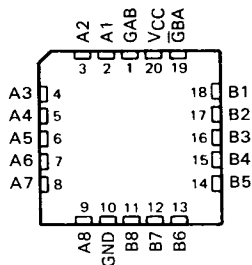
The dual-enable configuration gives these devices the capability to store data by simultaneous enabling of $\overline{\text{GBA}}$ and GAB . Each output reinforces its input in this transceiver configuration. Thus when both control inputs are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (16 in all) will remain at their last states. The 8-bit codes appearing on the two sets of buses will be identical for the 'HC623 or complementary for the 'HC620.

The SN54HC620 and SN54HC623 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC620 and SN74HC623 are characterized for operation from -40°C to 85°C .

SN54HC' . . . J PACKAGE
SN74HC' . . . DW or N PACKAGE
(TOP VIEW)



SN54HC' . . . FK PACKAGE
(TOP VIEW)



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PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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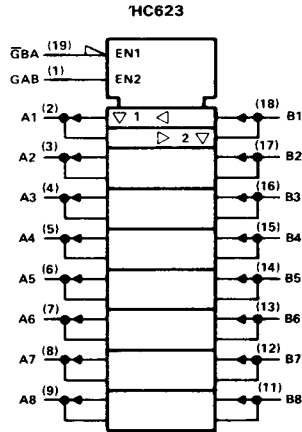
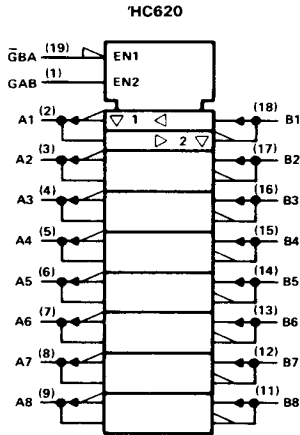
FUNCTION TABLE

ENABLE INPUTS		OPERATION	
$\bar{G}BA$	GAB	'HC620	'HC623
L	L	\bar{B} data to A bus	B data to A bus
H	H	\bar{A} data to B bus	A data to B bus
H	L	Isolation	Isolation
L	H	\bar{B} data to A bus, \bar{A} data to B bus	B data to A bus, A data to B bus

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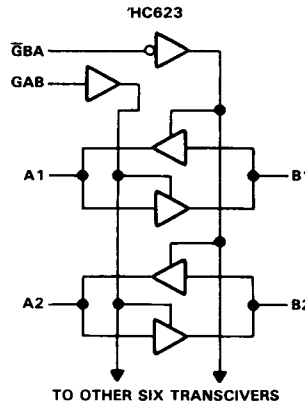
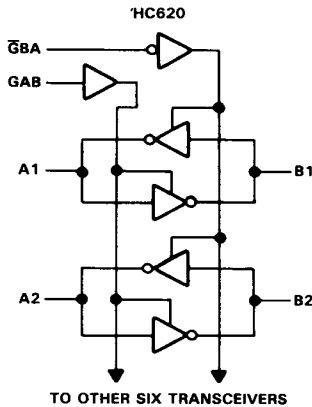
logic symbols†

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

logic diagrams (positive logic)



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absolute maximum ratings over operating free-air temperature range†

Supply voltage, V_{CC}	-0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	± 20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 35 mA
Continuous current through V_{CC} or GND pins	± 70 mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s; FK or J package	300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s; DW or N package	260°C
Storage temperature range	-65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" 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.

recommended operating conditions

		SN54HC620 SN54HC623			SN74HC620 SN74HC623			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	2	5	6	2	5	6	V
V_{IH}	High-level input voltage	$V_{CC} = 2$ V	1.5		1.5			V
		$V_{CC} = 4.5$ V	3.15		3.15			
		$V_{CC} = 6$ V	4.2		4.2			
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V	0	0.3	0	0.3		V
		$V_{CC} = 4.5$ V	0	0.9	0	0.9		
		$V_{CC} = 6$ V	0	1.2	0	1.2		
V_I	Input voltage	0	V_{CC}	0	V_{CC}		V	
V_O	Output voltage	0	V_{CC}	0	V_{CC}		V	
t_t	Input transition (rise and fall) times	$V_{CC} = 2$ V	0	1000	0	1000		ns
		$V_{CC} = 4.5$ V	0	500	0	500		
		$V_{CC} = 6$ V	0	400	0	400		
T_A	Operating free-air temperature	-55	125	-40	85		°C	

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

PARAMETER	TEST CONDITIONS	V_{CC}	$T_A = 25^\circ\text{C}$			SN54HC620 SN54HC623		SN74HC620 SN74HC623		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	$V_I = V_{IH}$ or V_{IL} , $I_{OH} = -20$ μA	2 V	1.9	1.998		1.9	1.9		V	
		4.5 V	4.4	4.499		4.4	4.4			
		6 V	5.9	5.999		5.9	5.9			
V_{OL}	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 20$ μA	4.5 V	3.98	4.30		3.7	3.84		V	
		6 V	5.48	5.80		5.2	5.34			
		2 V		0.002	0.1		0.1	0.1		
V_{OL}	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 6$ mA	4.5 V		0.001	0.1		0.1	0.1	V	
		6 V		0.001	0.1		0.1	0.1		
		4.5 V		0.17	0.26		0.4	0.33		
I_I	GAB or $\bar{G}BA$	$V_I = V_{CC}$ or 0	6 V	± 0.1	± 100		± 1000	± 1000	nA	
		$V_O = V_{CC}$ or 0	6 V	± 0.01	± 0.5		± 10	± 5	μA	
I_{OZ}	A or B	$V_I = V_{CC}$ or 0, $I_O = 0$	6 V		8		160	80	μA	
C_I	GAB or $\bar{G}BA$		2 to 6 V	3	10		10	10	pF	



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OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 50 \text{ pF}$ (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC620 SN54HC623		SN74HC620 SN74HC623		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	B or A	2 V		29	105		160		130	ns
			4.5 V		10	21		32		26	
			6 V		8	18		27		22	
t _{en}	$\overline{\text{G}}\text{BA}$	A	2 V		112	210		315		265	ns
			4.5 V		27	42		63		53	
			6 V		20	36		54		45	
t _{dis}	$\overline{\text{G}}\text{BA}$	A	2 V		40	150		225		190	ns
			4.5 V		18	30		45		38	
			6 V		16	26		38		32	
t _{en}	GAB	B	2 V		112	210		315		265	ns
			4.5 V		27	42		63		53	
			6 V		20	36		54		45	
t _{dis}	GAB	B	2 V		40	150		225		190	ns
			4.5 V		18	30		45		38	
			6 V		16	26		38		32	
t _t		A or B	2 V		20	60		90		75	ns
			4.5 V		8	12		18		15	
			6 V		6	10		15		13	

C _{pd}	Power dissipation capacitance per transceiver	No load, T _A = 25°C	40 pF typ
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switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 150 \text{ pF}$ (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC620 SN54HC623		SN74HC620 SN74HC623		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	B or A	2 V		44	135		200		170	ns
			4.5 V		14	27		40		34	
			6 V		11	23		34		29	
t _{en}	$\overline{\text{G}}\text{BA}$	A	2 V		130	270		405		335	ns
			4.5 V		31	54		81		67	
			6 V		23	46		69		56	
t _{en}	GAB	B	2 V		130	270		405		335	ns
			4.5 V		31	54		81		67	
			6 V		23	46		69		56	
t _t		A or B	2 V		45	210		315		265	ns
			4.5 V		17	42		63		53	
			6 V		13	36		53		45	

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