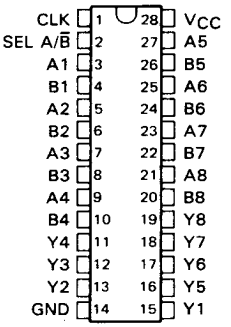
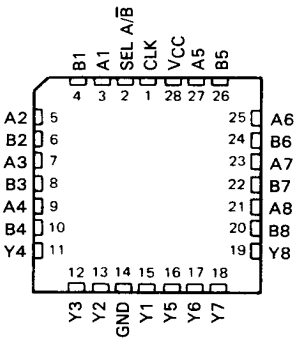
D2804, MARCH 1984—REVISED SEPTEMBER 1987

- **High-Current 3-State Outputs Can Drive Up to 15 LSTTL Loads**
- **16 D-Type Registers, One for Each Data Input**
- **Multiplexer Selects Stored Data from Either A Bus or B Bus**
- **Application-Oriented for Maximum Speed**
- **Package Options Include Ceramic Chip Carriers, and Standard Plastic and Ceramic DIPs**
- **Dependable Texas Instruments Quality and Reliability**

SN54HC604 . . . J PACKAGE
SN74HC604 . . . N PACKAGE
(TOP VIEW)



SN54HC604 . . . FK PACKAGE
(TOP VIEW)



description

The 'HC604 multiplexed latch is ideal for storing data from two input buses, A and B, and for providing the output bus with stored data from either the A or B register.

The clock loads data on the positive-going (low-level to high-level) transition. The clock pin also controls the active and high-impedance states of the outputs. When the clock pin is low, the outputs are in the high-impedance or off state. When the clock pin is high, the outputs are enabled.

The device is optimized for high-speed operation.

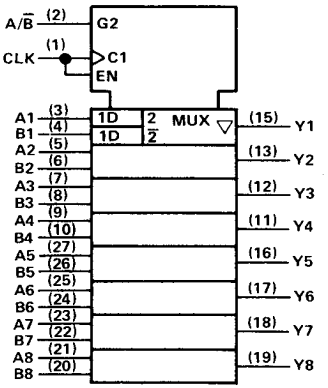
These functions are ideal for interfacing from a 16-bit microprocessor to a 64K RAM board. The row and column addresses can be loaded as one word from the microprocessor and then multiplexed sequentially to the RAM during the time that RAS and CAS are active.

The SN54HC604 is characterized for operation over the full military range of −55°C to 125°C. The SN74HC604 is characterized for operation from −40°C to 85°C.

FUNCTION TABLE

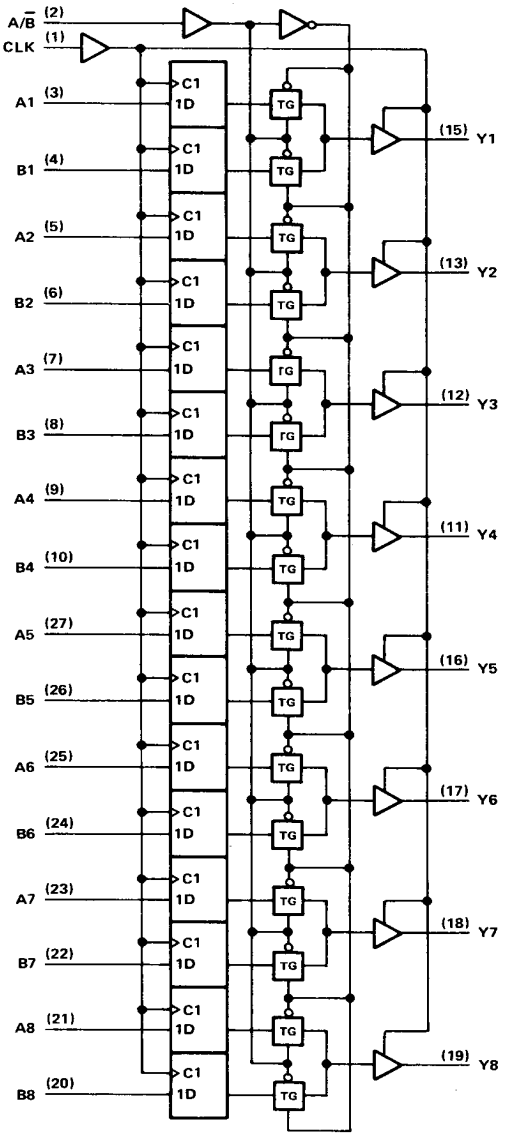
INPUTS				OUTPUTS
A1−A8	B1−B8	A/$\overline{B}$	CLOCK	Y1−Y8
A data	B data	L	↑	B data
A data	B data	H	↑	A data
X	X	X	L	Z
X	X	L	H	B register stored data
X	X	H	H	A register stored data

logic symbol†



†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



TEXAS INSTRUMENTS
POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

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: 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

			SN54HC604			SN74HC604			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

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			SN54HC604		SN74HC604		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_I = V_{IH} or V_{IL}, I_{OH} = −6 mA	4.5 V	3.98	4.30		3.7		3.84		
	V_I = V_{IH} or V_{IL}, I_{OH} = −7.8 mA	6 V	5.48	5.80		5.2		5.34		
V_{OL}	V_I = V_{IH} or V_{IL}, I_{OL} = 20 μA	2 V		0.002	0.1		0.1		0.1	V
		4.5 V		0.001	0.1		0.1		0.1	
		6 V		0.001	0.1		0.1		0.1	
	V_I = V_{IH} or V_{IL}, I_{OL} = 6 mA	4.5 V		0.17	0.26		0.4		0.33	
	V_I = V_{IH} or V_{IL}, I_{OL} = 7.8 mA	6 V		0.15	0.26		0.4		0.33	
I_I	V_I = V_{CC} or GND	6 V		±0.1	±100		±1000		±1000	nA
I_{OZ}	V_O = V_{CC} or GND	6 V		±0.01	±0.5		±10		±5	μA
I_{CC}	V_I = V_{CC} or 0, I_O = 0	6 V			8		160		80	μA
C_i		2 to 6 V		3	10		10		10	pF

timing requirements over recommended operating free-air temperature range (unless otherwise noted)

		V_{CC}	T_A = 25°C		SN54HC604		SN74HC604		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
f_{clock}	Clock frequency	2 V	0	5	0	3.3	0	4	MHz
		4.5 V	0	25	0	17	0	20	
		6 V	0	29	0	20	0	24	
t_w	Pulse duration, CLK high or low	2 V	100		150		125		ns
		4.5 V	20		30		25		
		6 V	17		25		21		
t_{su}	Setup time, data before CLK↑	2 V	75		115		95		ns
		4.5 V	15		23		19		
		6 V	13		20		16		
t_h	Hold time, data after CLK↑	2 V	5		5		5		ns
		4.5 V	5		5		5		
		6 V	5		5		5		

TEXAS INSTRUMENTS
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switching characteristics over recommended operating free-air temperature range (unless otherwise noted), C_L = 50 pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	T_A = 25°C			SN54HC604		SN74HC604		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
f_{max}			2 V	5			3.3		4		MHz
			4.5 V	25			17		20		
			6 V	29			20		24		
t_{pd}	A/$\overline{B}$	Y	2 V		92	170		255		215	ns
			4.5 V		23	34		51		43	
			6 V		17	29		43		37	
t_{en}	CLK	Y	2 V		96	195		295		245	ns
			4.5 V		25	39		59		49	
			6 V		19	33		50		42	
t_{dis}	CLK	Y	2 V		84	200		300		250	ns
			4.5 V		30	40		60		50	
			6 V		26	34		51		43	
t_t		Any	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 latch	No load, T_A = 25°C	100 pF typ

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), C_L = 150 pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	T_A = 25°C			SN54HC604		SN74HC604		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A/$\overline{B}$	Y	2 V		110	225		385		320	ns
			4.5 V		28	51		77		64	
			6 V		21	44		65		56	
t_{en}	CLK	Y	2 V		120	280		425		350	ns
			4.5 V		30	56		85		70	
			6 V		23	48		72		61	
t_t		Any	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.