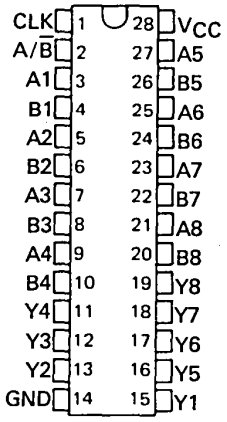
TYPES SN54LS604 THRU SN54LS607, SN74LS604 THRU SN74LS607
OCTAL 2-INPUT MULTIPLEXED LATCHES

D2545, JULY 1979 – REVISED DECEMBER 1983

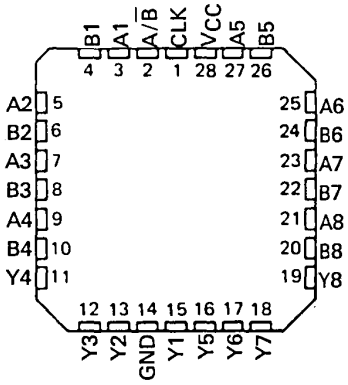
(TIM99604 THRU TIM99607)

- Choice of Outputs:
  - Three-State ('LS604, 'LS606)
  - Open-Collector ('LS605, 'LS607)
- 16 D-Type Registers, One for each Data Input
- Multiplexer Selects Stored Data from Either A Bus or B Bus
- Application Oriented:
  - Maximum Speed ('LS604, 'LS605)
  - Glitch-Free Operation ('LS606, 'LS607)

SN54LS604 thru SN54LS607 . . . JD PACKAGE
SN74LS604 thru SN74LS607 . . . JD OR N PACKAGE
(TOP VIEW)



SN54LS604 thru SN54LS607 . . . FK PACKAGE
SN74LS604 thru SN74LS607 . . . FN PACKAGE
(TOP VIEW)



description

The 'LS604 through 'LS607 multiplexed latches are ideal for storing data from two input buses, A and B, and 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 'LS604 and 'LS605 are optimized for high-speed operation. The 'LS606 and 'LS607 are especially designed to eliminate decoding voltage spikes.

These functions are ideal for interface 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.

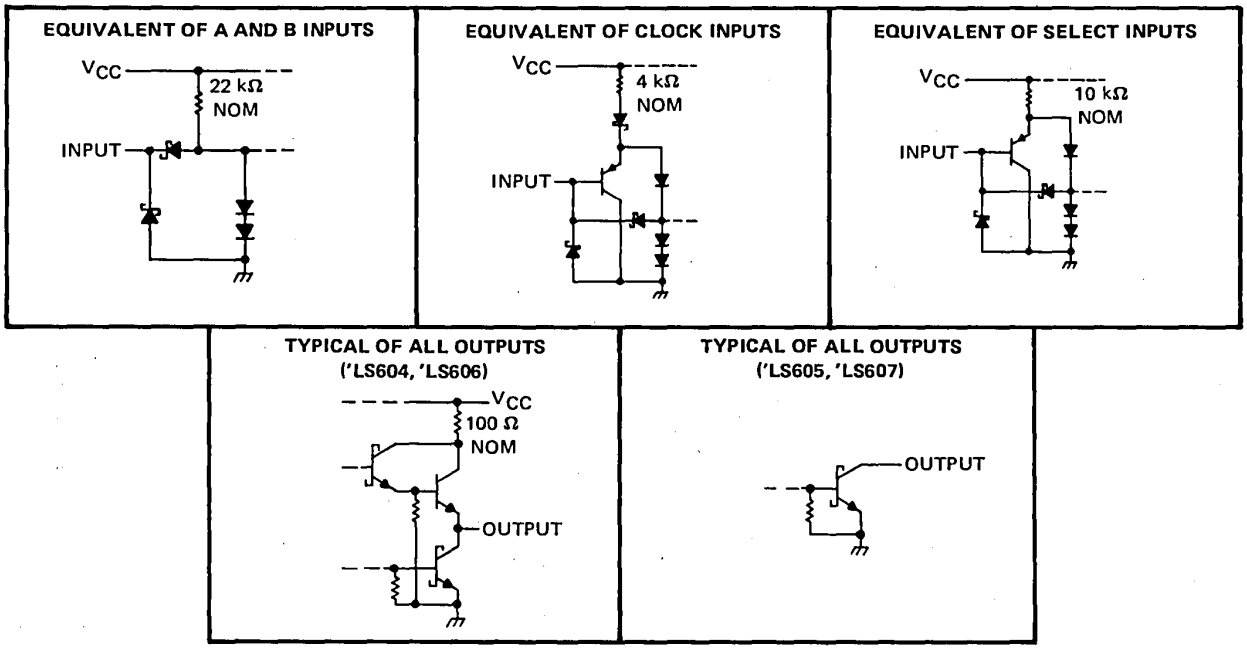
The SN54LS604 through SN54LS607 are characterized for operation over the full military temperature range of −55°C to 125°C; the SN74LS604 through SN74LS607 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE

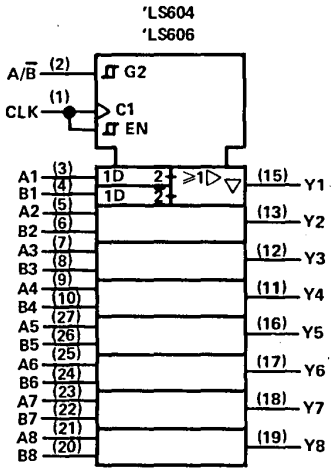
INPUTS				OUTPUTS
A1-A8	B1-B8	SELECT A/B̄	CLOCK	Y1-Y8
A data	B data	L	↑	B data
A data	B data	H	↑	A data
X	X	X	L	Z or Off
X	X	L	H	B register stored data
X	X	H	H	A register stored data

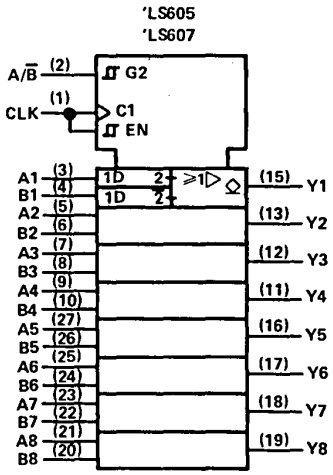
H = high level (steady state)
L = low level (steady state)
X = irrelevant
Z = high-impedance state
Off = H if pull-up resistor is connected to open-collector output
↑ = transition from low to high level

schematics of inputs and outputs



logic symbols





Pin numbers shown on logic notation are for JD or N packages.

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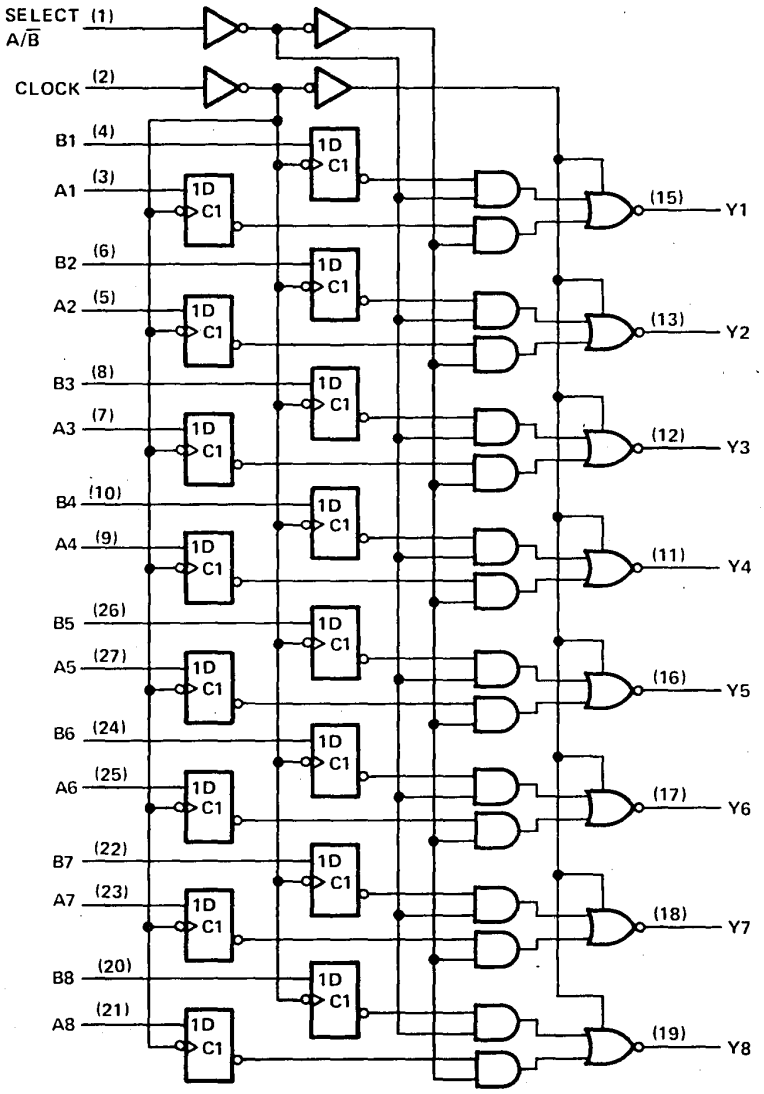
logic diagram (positive logic)



recommended operating conditions

	SN54LS604 SN54LS606			SN74LS604 SN74LS606			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC} (see Note 1)	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−1			−2.6	mA
Low-level output current, I_{OL}			12			24	mA
Width of clock pulse, t_w	20			20			ns
Setup time, t_{su}	20↑			20↑			ns
Hold time, t_h	0↑			0↑			ns
Operating free-air temperature, T_A	−55		125	0		70	°C

NOTE 1: Voltage values are with respect to network ground terminal.

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

PARAMETER		TEST CONDITIONS†			SN54LS604 SN54LS606			SN74LS604 SN74LS606			UNIT
					MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IH}	High-level input voltage				2			2			V
V_{IL}	Low-level input voltage						0.7			0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN,	I_I = −18 mA				−1.5			−1.5	V
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IL} = V_{IL} max,	V_{IH} = 2 V, I_{OH} = MAX		2.4	3.1		2.4	3.1		V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IL} = V_{IL} max,	V_{IH} = 2 V,	I_{OL} = 12 mA		0.25	0.4		0.25	0.4	V
				I_{OL} = 24 mA					0.35	0.5	
I_{OZH}	Off-state output current, high-level voltage applied	V_{CC} = MAX, V_{IL} = V_{IL} max,	V_{IH} = 2 V, V_O = 2.7 V				20			20	μA
I_{OZL}	Off-state output current, low-level voltage applied	V_{CC} = MAX, V_{IL} = V_{IL} max,	V_{IH} = 2 V, V_O = 0.4				−20			−20	μA
I_I	Input current at maximum input voltage	V_{CC} = MAX,	V_I = 7 V	A, B			0.1			0.1	mA
				CLK, SELECT			0.1			0.1	
I_{IH}	High-level input current	V_{CC} = MAX,	V_I = 2.7 V	A, B			20			20	μA
				CLK, SELECT			20			20	
I_{IL}	Low-level input current	V_{CC} = MAX,	V_I = 0.4 V	A, B			−0.4			−0.4	mA
				CLK, SELECT			−0.2			−0.2	
I_{OS}	Short-circuit output current§	V_{CC} = MAX			−30		−130	−30		−130	mA
I_{CC}	Supply current	V_{CC} = MAX,	See Note 2			55	70		55	70	mA

†For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡All typical values are at V_{CC} = 5 V, T_A = 25°C.
§Note more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.
NOTE 2: I_{CC} is tested with all inputs grounded and all outputs open.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER	FROM (INPUT)	TEST CONDITIONS	'LS604			'LS606			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
t_{PLH}	Select A/$\overline{B}$ (Data: A = H, B = L)	C_L = 45 pF, R_L = 667 Ω, See Note 3		15	25		36	50	ns
t_{PHL}				23	35		16	30	
t_{PLH}	Select A/$\overline{B}$ (Data: A = L, B = H)			31	45		22	35	ns
t_{PHL}				19	30		22	35	
t_{PZH}	Clock			19	30		27	40	ns
t_{PZL}				28	40		35	50	
t_{PHZ}	Clock	C_L = 5 pF, R_L = 667 Ω, See Note 3		20	30		20	30	ns
t_{PLZ}				15	25		15	25	

t_{PLH} ≡ propagation delay time, low-to-high-level output
t_{PHL} ≡ propagation delay time, low-to-high-level output
t_{PZH} ≡ output enable time to high level
t_{PZL} ≡ output enable time to low level
t_{PHZ} ≡ output disable time from high level
t_{PLZ} ≡ output disable time from low level
NOTE 3: See General Information Section for load circuits and voltage waveforms.

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recommended operating conditions

	SN54LS605 SN54LS607			SN74LS605 SN74LS607			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC} (see Note 1)	4.5	5	5.5	4.75	5	5.25	V
High-level output voltage, V_{OH}			5.5			5.5	V
Low-level output current, I_{OL}			12			24	mA
Width of clock pulse, t_w	20			20			ns
Setup time, t_{su}	20†			20†			ns
Hold time, t_h	0†			0†			ns
Operating free-air temperature, T_A	−55		125	0		70	°C

NOTE 1: Voltage values are with respect to network ground terminal.

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

PARAMETER		TEST CONDITIONS†			SN54LS605 SN54LS607			SN74LS605 SN74LS607			UNIT
					MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IH}	High-level input voltage				2			2			V
V_{IL}	Low-level input voltage						0.7			0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN,	I_I = −18 mA				−1.5			−1.5	V
I_{OH}	High-level output current	V_{CC} = MIN, V_{IL} = V_{IL} max,	V_{IH} = 2 V, V_{OH} = 5.5 V				250			250	μA
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IL} = V_{IL} max	V_{IH} = 2 V,	I_{OL} = 12 mA		0.25	0.4		0.25	0.4	V
				I_{OL} = 24 mA					0.35	0.5	
I_I	Input current at maximum input voltage	V_{CC} = MAX,	V_I = 7 V	A, B			0.1			0.1	mA
				CLK, SELECT			0.1			0.1	
I_{IH}	High-level input current	V_{CC} = MAX,	V_I = 2.7 V	A, B			20			20	μA
				CLK, SELECT			20			20	
I_{IL}	Low-level input current	V_{CC} = MAX,	V_I = 0.4 V	A, B			−0.4			−0.4	mA
				CLK, SELECT			−0.2			−0.2	
I_{CC}	Supply current	V_{CC} = MAX,	See Note 2			40	60		40	60	mA

†For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡All typical values are at V_{CC} = 5 V, T_A = 25°C.
NOTE 2: I_{CC} is tested with all inputs grounded and all outputs open.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER	FROM (INPUT)	TEST CONDITIONS	'LS605			'LS607			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
t_{PLH}	Select A/$\overline{B}$ (Data: A = H, B = L)	C_L = 45 pF, R_L = 667 Ω, See Note 3		28	40		51	70	ns
t_{PHL}				28	40		21	30	
t_{PLH}	Select A/$\overline{B}$ (Data: A = L, B = H)			39	60		28	40	ns
t_{PHL}				25	40		28	40	
t_{PLH}	Clock			27	40		30	45	ns
t_{PHL}				25	40		32	45	

t_{PLH} ≡ propagation delay time, low-to-high-level output
t_{PHL} ≡ propagation delay time, low-to-high-level output
NOTE 3: See General Information Section for load circuits and voltage waveforms.