

HD74HC646, HD74HC648 ● Octal Bus Transceivers/Registers with Multiplexed 3-state outputs

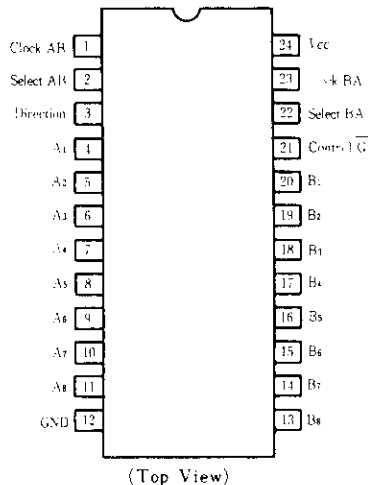
Six control inputs enable this device to be used as a latched transceiver, unlatched transceiver, or a combination of both. As a latched transceiver, data from one bus is stored for later retrieval by the other bus. Alternately real time bus data (unlatched) may be directly transferred from one bus to another.

Circuit operation is determined by the Control \bar{G} , Direction, Clock AB, Clock BA, Select AB, Select BA control inputs. The enable input, Control \bar{G} , controls whether any bus outputs are enabled. The direction control Direction (DIR), determines which bus is enabled, and hence the direction data flows: The Select AB, Select BA inputs control whether the latched data (stored in D type flop-flops), or the bus data (from other bus input pins) is transferred. Each set of flip-flops has its own clock Clock AB, and Clock BA, for storing data. Data is latched on the rising edge of the clock.

FEATURES

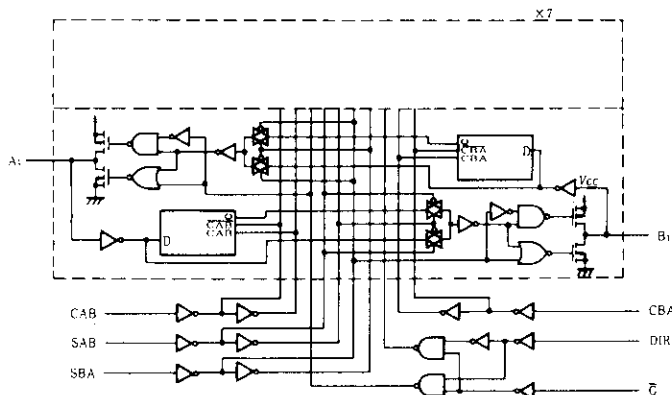
- High Speed Operation: t_{pd} (Bus to Bus)=14ns typ. ($C_L=50pF$)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: $V_{CC}=2\sim 6V$
- Low Input Current: $1\mu A$ max.
- Low Quiescent Supply Current: I_{CC} (static)= $4\mu A$ max. ($T_a=25^\circ C$)

PIN ARRANGEMENT

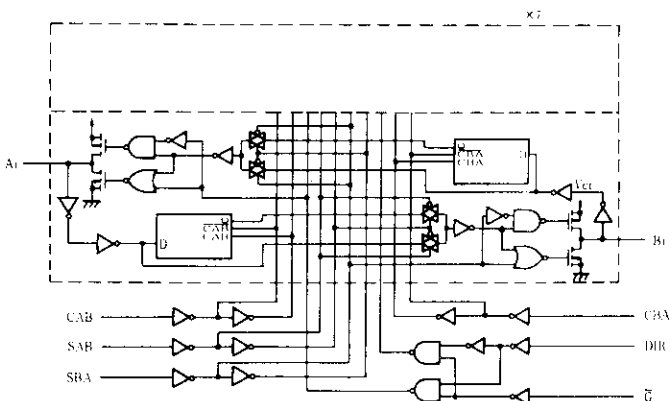


LOGIC DIAGRAM

● HD74HC646



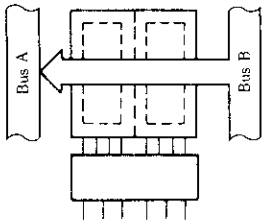
● HD74HC648



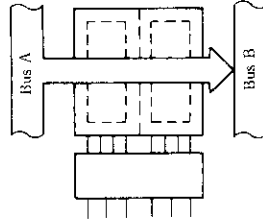
HD74HC646, HD74HC648

FUNCTION TABLE

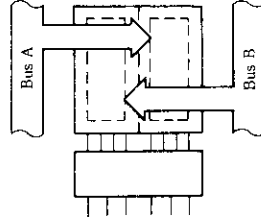
Control \bar{G}	Inputs					Data I/O	Data I/O	Operation or Function	
	Direction	Clock		Select				HD74HC646	HD74HC648
H	X	X	X	X	X	Z(Input)	Z(Input)	Isolation	Isolation
H	X			H	H	Z(Input)	Z(Input)	Store A & B data	Store \bar{A} & \bar{B} data
L	L	X	X	X	L	Output	Z(Input)	B real-time data to A bus	\bar{B} real-time data to A bus
L	L	H	H	X	H	Output	Z(Input)	B stored data to A bus	\bar{B} stored data to A bus
L	L	L	L	X	H	Output	Z(Input)	B stored data to A bus	\bar{B} stored data to A bus
L	H	X	X	L	X	Z(Input)	Output	A real-time data to B bus	\bar{A} real-time data to B bus
L	H	H	H	H	X	Z(Input)	Output	A stored data to B bus	\bar{A} stored data to B bus
L	H	L	L	H	X	Z(Input)	Output	A stored data to B bus	\bar{A} stored data to B bus



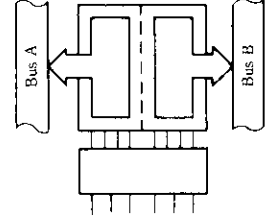
Real-Time Transfer
Bus B to Bus A



Real-Time Transfer
Bus A to Bus B



Storage from
A, B, or A and B



Transfer Stored Data
to A or B

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Supply Voltage Range	V_{CC}	-0.5 ~ +7.0	V
Input Voltage	V_{IN}	-0.5 ~ $V_{CC}+0.5$	V
Output Voltage	V_{OUT}	-0.5 ~ $V_{CC}+0.5$	V
Output Current	I_{OUT}	±35	mA
DC Current Drain per V_{CC}, GND	I_{CC}, I_{GND}	±75	mA
DC Input Diode Current	I_{IK}	±20	mA
DC Output Diode Current	I_{OK}	±20	mA
Power Dissipation per Package	P_T	500	mW
Storage Temperature	T_{STG}	-65 ~ +150	°C

DC CHARACTERISTICS

Item	Symbol	$V_{CC}(V)$	Test Conditions	$T_a = 25^\circ C$			$T_a = -40 \sim +85^\circ C$		Unit		
				min	typ	max	min	max			
Input Voltage	V_{IH}	2.0	$V_{IN} = V_{IH} \text{ or } V_{IL}$	1.5	-	-	1.5	-	V		
		4.5		3.15	-	-	3.15	-			
		6.0		4.2	-	-	4.2	-			
	V_{IL}	2.0		-	-	0.5	-	0.5	V		
		4.5		-	-	1.35	-	1.35			
		6.0		-	-	1.8	-	1.8			
Output Voltage	V_{OH}	2.0	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -20 \mu A$	1.9	2.0	-	1.9	-	V	
		4.5			4.4	4.5	-	4.4	-		
		6.0			5.9	6.0	-	5.9	-		
		4.5		$I_{OH} = -6 \text{ mA}$	4.18	-	-	4.13	-		
		6.0			$I_{OH} = -7.8 \text{ mA}$	5.68	-	-	5.63		-
		6.0				-	-	-	-		-
	V_{OL}	2.0	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20 \mu A$	-	0.0	0.1	-	0.1	V	
		4.5			-	0.0	0.1	-	0.1		
		6.0			-	0.0	0.1	-	0.1		
		4.5		$I_{OL} = 6 \text{ mA}$	-	-	0.26	-	0.33		
		6.0			$I_{OL} = 7.8 \text{ mA}$	-	-	0.26	-		0.33
		6.0				-	-	-	-		-
Off-state Output Current	I_{OZ}	6.0	$V_{IN} = V_{IH} \text{ or } V_{IL}, V_{OUT} = V_{CC} \text{ or } GND$	-	-	±0.5	-	±5.0	μA		
Input Current	I_{IN}	6.0	$V_{IN} = V_{CC} \text{ or } GND$	-	-	±0.1	-	±1.0	μA		
Quiescent Supply Current	I_{CC}	6.0	$V_{IN} = V_{CC} \text{ or } GND, I_{OUT} = 0 \mu A$	-	-	4.0	-	40	μA		

■ AC CHARACTERISTICS ($C_L=50\text{pF}$, Input $t_r=t_f=6\text{ns}$)

Item	Symbol	$V_{CC}(V)$	Test Conditions	$T_a=25^\circ\text{C}$			$T_a=-40\sim+85^\circ\text{C}$		Unit
				min	typ	max	min	max	
Maximum Clock Frequency	f_{max}	2.0	Clock AB to B or Clock BA to A	—	—	5	—	4	MHz
		4.5		—	—	27	—	21	
		6.0		—	—	32	—	25	
Propagation Delay Time	t_{PLH} t_{PHL}	2.0	A or B Input to B or A Output (HD74HC646 only)	—	—	170	—	215	ns
		4.5		—	14	34	—	43	
		6.0		—	—	29	—	37	
	t_{PLH} t_{PHL}	2.0	A or B Input to B or A Output (HD74HC648 only)	—	—	150	—	190	ns
		4.5		—	14	30	—	38	
		6.0		—	—	26	—	33	
	t_{PLH} t_{PHL}	2.0	Clock BA or Clock AB Input to A or B Output	—	—	220	—	275	ns
		4.5		—	18	44	—	55	
		6.0		—	—	37	—	47	
	t_{PLH} t_{PHL}	2.0	Select BA or Select AB Input to A or B Output, with A or B high	—	—	170	—	215	ns
		4.5		—	15	34	—	43	
		6.0		—	—	29	—	37	
t_{PLH} t_{PHL}	2.0	Select BA or Select AB Input to A or B Output, with A or B low	—	—	170	—	215	ns	
	4.5		—	16	34	—	43		
	6.0		—	—	29	—	37		
Output Enable Time	t_{ZH} t_{ZL}	2.0	Control \bar{G} Input or Direction to A or B Output	—	—	150	—	190	ns
		4.5		—	17	30	—	38	
		6.0		—	—	26	—	33	
Output Disable Time	t_{LZ} t_{HZ}	2.0	Control \bar{G} Input to A or B Output	—	—	150	—	190	ns
		4.5		—	20	30	—	38	
		6.0		—	—	26	—	33	
Setup Time	t_{sv}	2.0		100	—	—	125	—	ns
		4.5		20	3	—	25	—	
		6.0		17	—	—	21	—	
Hold Time	t_h	2.0		5	—	—	5	—	ns
		4.5		5	0	—	5	—	
		6.0		5	—	—	5	—	
Pulse Width	t_w	2.0		80	—	—	100	—	ns
		4.5		16	5	—	20	—	
		6.0		14	—	—	17	—	
Output Rise/Fall Time	t_{TLH} t_{THL}	2.0		—	—	60	—	75	ns
		4.5		—	4	12	—	15	
		6.0		—	—	10	—	13	
Input Capacitance	C_{in}	—		—	5	10	—	10	pF