Supertex inc.

HCT/SC242
HCT/SC243

Quadruple Bus Tranceivers

Product Summary

Device Parameter	High Speed (74HCT)	Standard (74SC)	Military (54HCT)
Inverted outputs	74HCT242	74SC242	54HCT242
Non-inverted outputs	74HCT243	74SC243	54HCT243
Operating temperature range (°C)	−40 to +85	−40 to +85	−55 to +125
Recommended operating voltage (V)	4.75 to 5.25	4.75 to 5.25	4.50 to 5.50
Maximum gate propagation delay (ns)	18	36	36

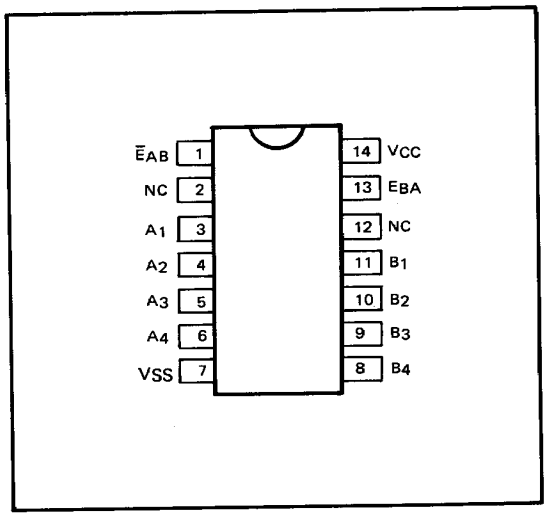
Features

- ☐ Pin and function compatible to 54/74LS242, 54/74LS243
- ☐ Typical DC operating supply current: 10μA
- ☐ Typical propagation delay (port-to-port):
  14ns (74HCT series)
  24ns (SC series)
- ☐ Typical enable/disable time: 20ns
- ☐ Fan out of 30 LSTTL loads.
- ☐ Input hysteresis to improve noise margins
- ☐ Full TTL and CMOS compatibility
- ☐ 3-State outputs drive bus directly
- ☐ −40°C to +85°C operating temperature range
- ☐ High speed silicon-gate CMOS technology
- ☐ Capable of operating over 3-volt to 6-volt range
- ☐ Ideal for interfacing with microprocessors
- ☐ MIL STD 883B Screening/Leadless chip carrier available.

General Description

These Quadruple Bus Transceivers are designed for asynchronous two-way communication between data buses. Data direction between buses is controlled by two separate control lines. The 242 provides inverted outputs, while the 243 provides non-inverted outputs.

Pin Configuration



Absolute Maximum Ratings

Rating	Value
Supply voltage, VCC	−0.5V to +7.0V
Input voltage, VI	−0.3V to VCC +0.3V
Short circuit output current, ISC (not more than 1 output for 1 second)	±100mA
Operating temperature range, TA: 74HCT, 74SC (commercial) 54HCT (military)	−40° C to +85° C −55°C to +125°C
Storage temperature, TS	−65°C to +150°C
Power dissipation, PD	500mW

Recommended Operating Conditions

Symbol	Parameter	54HCT			74HCT/74SC			Unit	Conditions
		min	typ	max	min	typ	max		
VCC	Supply voltage	4.50	5.00	5.50	4.75	5.00	5.25	V	
VI	Input voltage	0		VCC	0		VCC	V	
TA	Operating free-air temperature	−55		125	−40		85	°C	
VCCF	Functional Operating VCC Range	3.00		6.00	3.00		6.00	V	

Electrical Characteristics (over recommended operating conditions)

Symbol	Parameter	54HCT			74HCT/74SC			Unit	Conditions
		min	typ	max	min	typ	max		
VIH	High-level input voltage	2.0			2.0			V	
VIL	Low-level input voltage			0.8			0.8		
	Hysteresis, A or B input (VT+ − VT−)		0.3			0.3		V	VCC = min
VOH	High-level output voltage	2.4			2.4				VCC = min, IOH = −10mA VIL = 0.8V, VIH = 2V
VOL	Low-level output voltage			0.4			0.4		VCC = min, IOL = 12mA VIL = 0.8V, VIH = 2V
IOZH	OFF-State output current, high-level voltage applied			20			20	μA	VCC = max, VO = 2.7V VIL = 0.8V, VIH = 2V
IOZL	OFF-State output current, low-level voltage applied			−20			−20		VCC = max, VO = 0.4V VIL = 0.8V, VIH = 2V
II	Input current			5			1		VCC = max, VI = VCC
ICC	Supply current		.01	0.5		.01	0.1	mA	VCC = max, VI = VCC or GND, all outputs open

242 Switching Characteristics (V_{CC} = 5.0V, T_A = 25°C)

Symbol	Parameter	54HCT/74HCT			74SC			Unit	Conditions
		min	typ	max	min	typ	max		
tPLH	Propagation delay time, low-to-high-level output		9	14			30	ns	C_L = 50pF, R_L = 1KΩ
tPHL	Propagation delay time, high-to-low-level output		12	18			36		
tPZL	Output enable time to low-level		20	30			36	ns	C_L = 50pF, R_L = 1KΩ
tPZH	Output enable time to high-level		15	23			30		
tPLZ	Output disable time from low-level		15	25			36	ns	C_L = 50pF, R_L = 1KΩ
tPHZ	Output disable time from high-level		10	18			30		

243 Switching Characteristics (V_{CC} = 5.0V, T_A = 25°C)

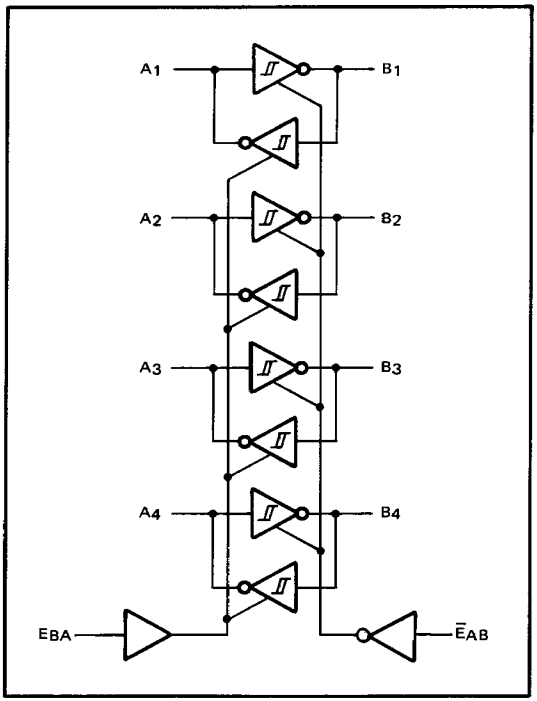
Symbol	Parameter	54HCT/74HCT			74SC			Unit	Conditions
		min	typ	max	min	typ	max		
tPLH	Propagation delay time, low-to-high-level output		12	18			36	ns	C_L = 50pF, R_L = 1KΩ
tPHL	Propagation delay time, high-to-low-level output		12	18			36		
tPZL	Output enable time to low-level		20	30			36	ns	C_L = 50pF, R_L = 1KΩ
tPZH	Output enable time to high-level		15	23			30		
tPLZ	Output disable time from low-level		15	25			36	ns	C_L = 50pF, R_L = 1KΩ
tPHZ	Output disable time from high-level		10	18			30		
C_I	Input Capacitance		8			8		pF	

Ordering Information

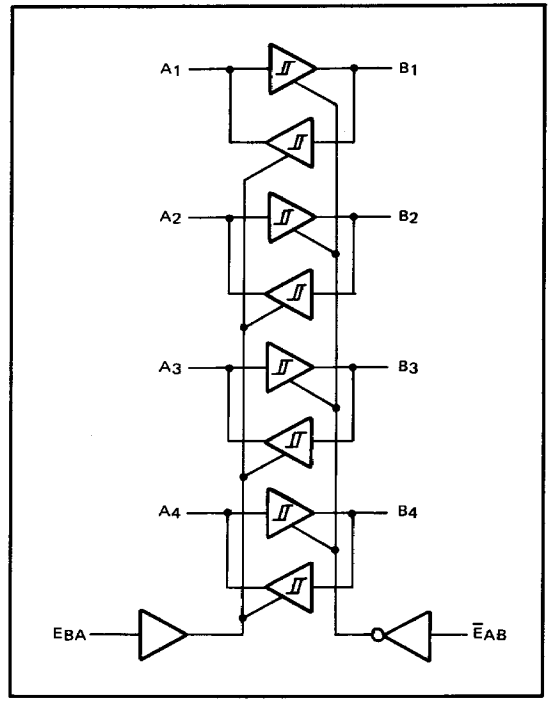
Package	Outputs	High Speed (74HCT)	Standard (74SC)	Military (54HCT)
14-pin plastic DIP	Inverted	74HCT242P	74SC242P	N/A
	Non-Inverted	74HCT243P	74SC243P	N/A
14-pin CERDIP	Inverted	74HCT242D	74SC242D	54HCT242D
	Non-Inverted	74HCT243D	74SC243D	54HCT243D
14-pin ceramic side-brazed DIP	Inverted	74HCT242C	74SC242C	54HCT242C
	Non-Inverted	74HCT243C	74SC243C	54HCT243C

NOTE: See Switching Wave Forms and Test Circuit at end of this section.

242 Functional Block Diagram



243 Functional Block Diagram



242 Function Table

Control Status		Data Port Status
$\overline{E}_{AB}$	E_{BA}	A B
H	H	B → $\overline{A}$
L	H	Invalid State
H	L	Hi-Z
L	L	A → $\overline{B}$

243 Function Table

Control Status		Data Port Status
$\overline{E}_{AB}$	E_{BA}	A B
H	H	B → A
L	H	Invalid State
H	L	Hi-Z
L	L	A → B