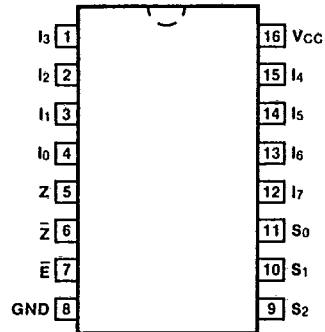


151

54/74151A
54S/74S151
54LS/74LS151
 8-INPUT MULTIPLEXER

T-66-21-53

CONNECTION DIAGRAM
 PINOUT A

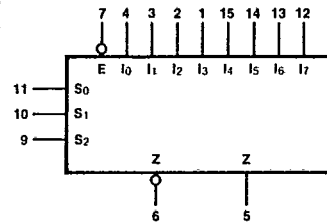


DESCRIPTION — The '151 is a high speed 8-input digital multiplexer. It provides in one package, the ability to select one line of data from up to eight sources. The '151 can be used as a universal function generator to generate any logic function of four variables. Both assertion and negation outputs are provided.

ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		V _{CC} = +5.0 V ±5%, T _A = 0°C to +70°C	V _{CC} = +5.0 V ±10%, T _A = -55°C to +125°C	
Plastic DIP (P)	A	74151APC, 74S151PC 74LS151PC		9B
Ceramic DIP (D)	A	74151ADC, 74S151DC 74LS151DC	54151ADM, 54S151DM 54LS151DM	6B
Flatpak (F)	A	74151AFC, 74S151FC 74LS151FC	54151AFM, 54S151FM 54LS151FM	4L

LOGIC SYMBOL



V_{CC} = Pin 16
 GND = Pin 8

INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74 (U.L.) HIGH/LOW	54/74S (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
I ₀ — I ₇	Data Inputs	1.0/1.0	1.25/1.25	0.5/0.25
S ₀ — S ₂	Select Inputs	1.0/1.0	1.25/1.25	0.5/0.25
E	Enable Input (Active LOW)	1.0/1.0	1.25/1.25	0.5/0.25
Z	Data Output	20/10	25/12.5	10/5.0 (2.5)
Z-bar	Inverted Data Output	20/10	25/12.5	10/5.0 (2.5)

FUNCTIONAL DESCRIPTION — The '151 is a logical implementation of a single pole, 8-position switch with the switch position controlled by the state of three Select inputs, S₀, S₁, S₂. Both assertion and negation outputs are provided. The Enable input (\bar{E}) is active LOW. When it is not activated, the negation output is HIGH and the assertion output is LOW regardless of all other inputs. The logic function provided at the output is:

$$Z = \bar{E} \cdot (I_0 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_1 \cdot S_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_2 \cdot \bar{S}_0 \cdot S_1 \cdot \bar{S}_2 + I_3 \cdot S_0 \cdot S_1 \cdot \bar{S}_2 + I_4 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot S_2 + I_5 \cdot S_0 \cdot \bar{S}_1 \cdot S_2 + I_6 \cdot \bar{S}_0 \cdot S_1 \cdot S_2 + I_7 \cdot S_0 \cdot S_1 \cdot S_2).$$

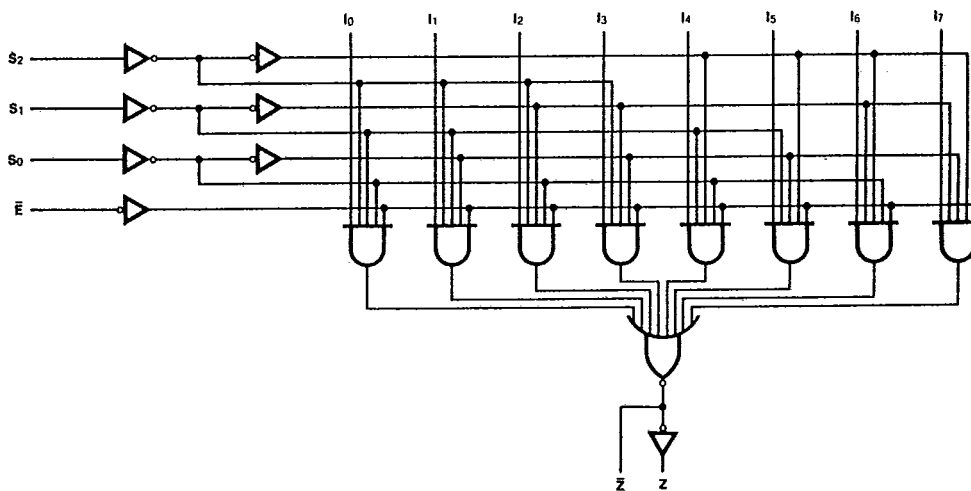
The '151 provides the ability, in one package, to select from eight sources of data or control information. By proper manipulation of the inputs, the '151 can provide any logic function of four variables and its negation.

TRUTH TABLE

INPUTS				OUTPUTS	
\bar{E}	S ₂	S ₁	S ₀	\bar{Z}	Z
H	X	X	X	H	L
L	L	L	L	\bar{I}_0	I ₀
L	L	L	H	\bar{I}_1	I ₁
L	L	H	L	\bar{I}_2	I ₂
L	L	H	H	\bar{I}_3	I ₃
L	H	L	L	\bar{I}_4	I ₄
L	H	L	H	\bar{I}_5	I ₅
L	H	H	L	\bar{I}_6	I ₆
L	H	H	H	\bar{I}_7	I ₇

H = HIGH Voltage Level
L = LOW Voltage Level

LOGIC DIAGRAM



4

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)										
SYMBOL	PARAMETER		54/74		54/74S		54/74LS		UNITS	CONDITIONS
			Min	Max	Min	Max	Min	Max		
I _{os}	Output Short Circuit Current	XM	-20	-55	-40	-100	-20	-100	mA	V _{cc} = Max
		XC	-18	-55	-40	-100	-20	-100		
I _{cc}	Power Supply Current		48		70		10		mA	V _{cc} = Max

AC CHARACTERISTICS: V _{cc} = +5.0 V, T _A = +25° C (See Section 3 for waveforms and load configurations)										
SYMBOL	PARAMETER		54/74		54/74S		54/74LS		UNITS	CONDITIONS
			C _L = 15 pF R _L = 400 Ω		C _L = 15 pF R _L = 280 Ω		C _L = 15 pF			
			Min	Max	Min	Max	Min	Max		
t _{PLH} t _{PHL}	Propagation Delay S _n to Z̄		26 30		15 13.5		23 34	ns	Figs. 3-1, 3-20	
t _{PLH} t _{PHL}	Propagation Delay S _n to Z		38 38		18 18		48 30	ns	Figs. 3-1, 3-20	
t _{PLH} t _{PHL}	Propagation Delay Ē to Z̄		21 23		13 12		24 30	ns	Figs. 3-1, 3-5	
t _{PLH} t _{PHL}	Propagation Delay Ē to Z		33 33		16.5 18		42 32	ns	Figs. 3-1, 3-4	
t _{PLH} t _{PHL}	Propagation Delay I _n to Z̄		14 14		7.0 7.0		21 20	ns	Figs. 3-1, 3-4	
t _{PLH} t _{PHL}	Propagation Delay I _n to Z		20 27		12 12		32 26	ns	Figs. 3-1, 3-5	