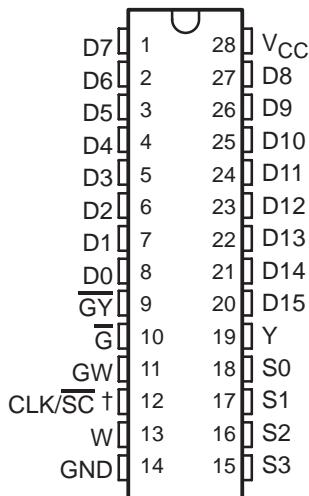


**SN74AS850A, SN74AS851B**  
**1 OF 16 DATA SELECTORS/MUXES**  
**WITH 3-STATE OUTPUTS**

SDAS154A – D2822, DECEMBER 1983 – REVISED JANUARY 1990

- 4-Line to 1-Line Data Selectors/Multiplexers That Can Select 1 of 16 Data Inputs Typical Applications:
  - Boolean Function Generators
  - Parallel-to-Serial Converters
  - Data Source Selectors
- Cascadable to n-Bits
- 3-State Bus Driver Outputs
- 'AS850A Offers Clocked Selects; 'AS851B Offers Enable-Controlled Selects
- Has a Master Output Control ( $\bar{G}$ ) for Cascading and individual Output Controls ( $\bar{G}_Y$ ,  $\bar{G}_W$ ) for Each Output
- Package Option Includes 600-mil Standard Plastic DIPs
- Dependable Texas Instruments Quality and Reliability

**SN74AS850A, SN74AS851B . . . N PACKAGE**  
**(TOP VIEW)**



† CLK for 'AS850A or  $\bar{S}C$  for 'AS851B

### description

These four-line to one-line data selectors/multiplexers provide full binary decoding to select one-of-sixteen data sources with complementary Y and W outputs. The 'AS850A has a clock-controlled select register allowing for a symmetrical presentation of the select inputs to the decoder while the 'AS851B has an enable-controlled select register allowing the user to select and hold one particular data line.

A buffered group of output controls ( $\bar{G}$ ,  $\bar{G}_Y$ ,  $\bar{G}_W$ ) can be used to place the two outputs in either a normal logic (high or low logic level) or a high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance third state and increased drive provide the capability to drive the bus lines in a bus-organized system without the need for interface or pullup components.

The output controls do not affect the internal operations of the data selector/multiplexer. New data can be setup while the outputs are in the high-impedance state.

The SN74AS850A and SN74AS851B are characterized for operation from 0°C to 70°C.

**SN74AS850A, SN74AS851B**  
**1 OF 16 DATA SELECTORS/MULTIPLEXERS**  
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**FUNCTION TABLE**

**INPUT SELECTION TABLE**

SELECT INPUTS				'AS850A	'AS851B	INPUT SELECTED
S3	S2	S1	S0	CLK	SC	
L	L	L	L	↑	L	D0
L	L	L	H	↑	L	D1
L	L	H	L	↑	L	D2
L	L	H	H	↑	L	D3
L	H	L	L	↑	L	D4
L	H	L	H	↑	L	D5
L	H	H	L	↑	L	D6
L	H	H	H	↑	L	D7
H	L	L	L	↑	L	D8
H	L	L	H	↑	L	D9
H	L	H	L	↑	L	D10
H	L	H	H	↑	L	D11
H	H	L	L	↑	L	D12
H	H	L	H	↑	L	D13
H	H	H	L	↑	L	D14
H	H	H	H	↑	L	D15
X	X	X	X	H or L	H	Dn

D = the input selected before the most-recent low-to-high transition of CLK or SC.

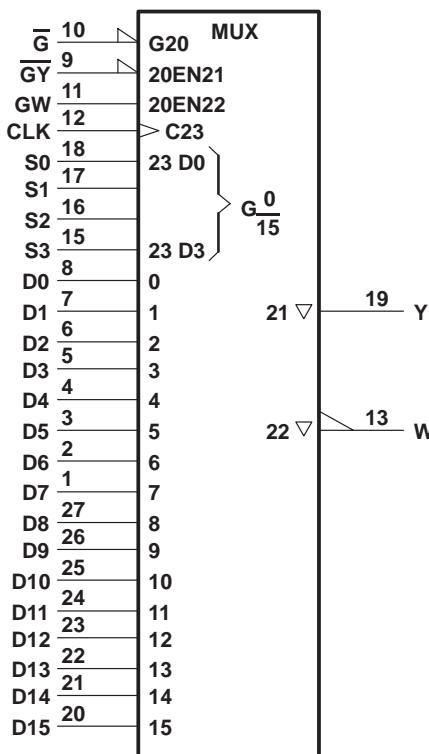
**OUTPUT FUNCTION TABLE**

$\bar{G}$	$\bar{G}_Y$	$\bar{G}_W$	OUTPUTS	
			Y	W
H	X	X	Z	Z
L	H	L	Z	Z
L	L	L	D	Z
L	H	H	Z	D
L	L	H	D	D

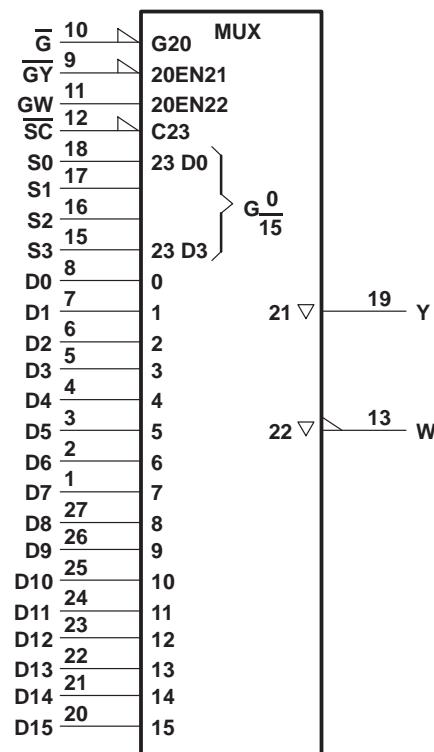
D = level of selected input D0 - D15

**logic symbols†**

'AS850A



'AS851B

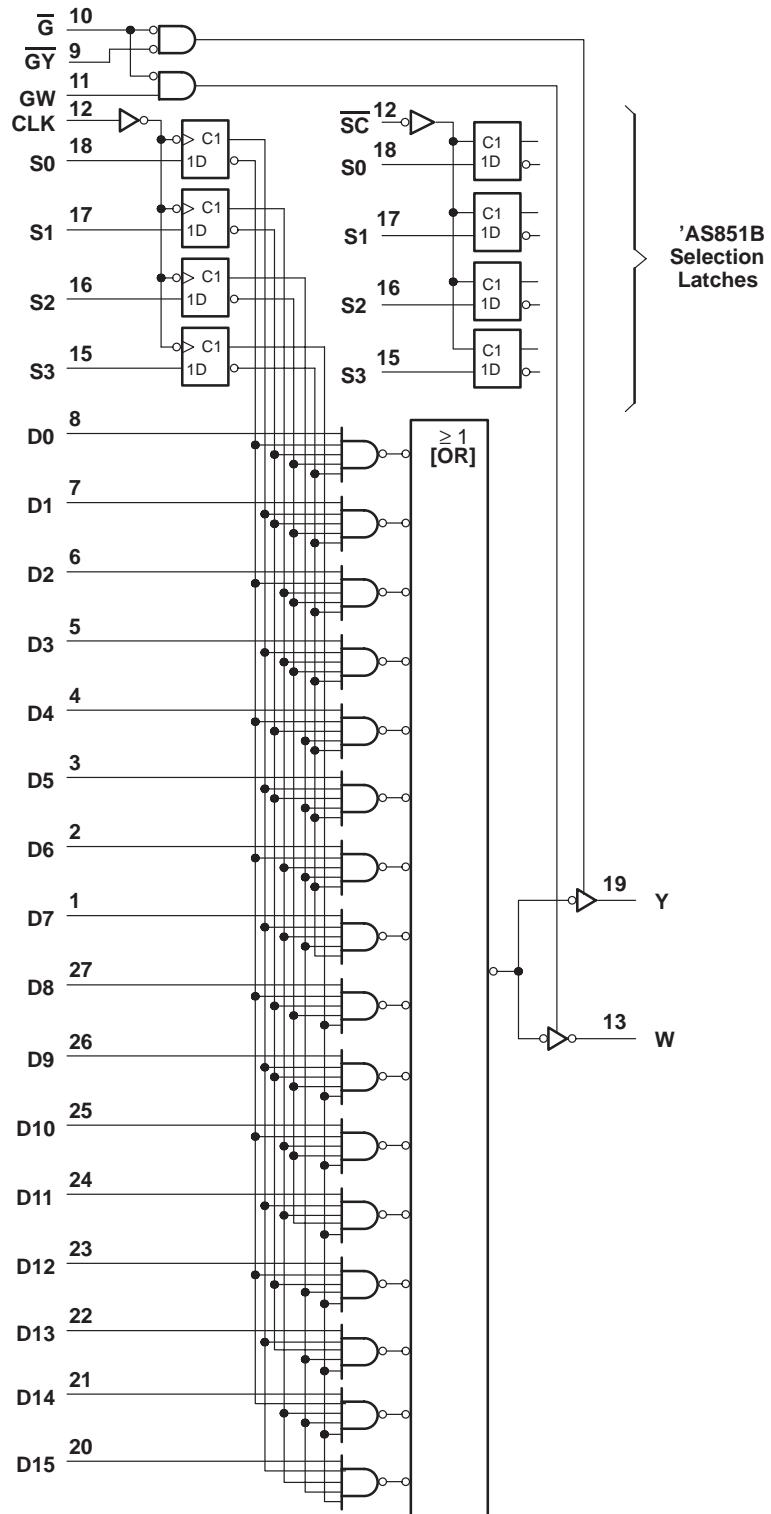


† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

SN74AS850A, SN74AS851B  
**1 OF 16 DATA SELECTORS/MULTIPLEXERS  
 WITH 3-STATE OUTPUTS**

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**'AS850A logic diagram (positive logic) (see inset for 'AS851B)**



**TEXAS  
 INSTRUMENTS**

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# SN74AS850A

## 1 OF 16 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, $V_{CC}$ .....	7 V
Input voltage .....	7 V
Operating free-air temperature range: .....	0°C to 70°C
Storage temperature range .....	-65°C to 150°C

### SN74AS850A recommended operating conditions

		MIN	NOM	MAX	UNIT
$V_{CC}$	Supply voltage	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			V
$V_{IL}$	Low-level input voltage			0.8	V
$I_{OH}$	High-level output current			-15	mA
$I_{OL}$	Low-level output current			48	mA
$f_{clock}$	Clock frequency	0	60		MHz
$t_w$	Pulse duration	8			ns
		8			
$t_{SU}$	Setup time, select inputs before $CLK\uparrow$	10			ns
$t_h$	Hold time, select inputs after $CLK\uparrow$	0			ns
$T_A$	Operating free-air temperature	0	70		°C

### SN74AS850A electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP <sup>‡</sup>	MAX	UNIT
$V_{IK}$	$V_{CC} = 4.5$ V, $I_I = -18$ mA			-1.2	V
$V_{OH}$	$V_{CC} = 4.5$ V, $I_{OH} = -2$ mA	2.5			V
	$V_{CC} = 4.5$ V, $I_{OH} = -15$ mA	2	3.3		
$V_{OL}$	$V_{CC} = 4.5$ V, $I_{OL} = 48$ mA	0.35	0.5		V
$I_{OZH}$	$V_{CC} = 5.5$ V, $V_O = 2.7$ V			50	µA
$I_{OZL}$	$V_{CC} = 4.5$ V, $V_O = 0.4$ V			-50	µA
$I_I$	$V_{CC} = 5.5$ V, $V_I = 7$ V			0.1	mA
$I_{IH}$	$V_{CC} = 5.5$ V, $V_I = 2.7$ V			20	µA
$I_{IL}$	$V_{CC} = 5.5$ V, $V_I = 0.4$ V		-1		mA
			-0.5		
$I_O^{\ddagger}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V	-30	-112		mA
$I_{CC}$	$V_{CC} = 5.5$ V	Outputs active	50	81	mA
		Outputs disabled	52	85	

<sup>†</sup> All typical values are at  $V_{CC} = 5$  V,  $T_A = 25^\circ\text{C}$ .

<sup>‡</sup> The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit current,  $I_{OS}$ .

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $C_L = 50\text{ pF}$ , $R1 = 500\text{ }\Omega$ , $R2 = 500\text{ }\Omega$ , $T_A = 0^\circ\text{C to }70^\circ\text{C}$		UNIT
			MIN	MAX	
$f_{max}$			60		MHz
$t_{PLH}$	Any D	Y	3	10.5	ns
$t_{PHL}$			3	11	
$t_{PLH}$	Any D	W	3	8.5	ns
$t_{PHL}$			1	8.5	
$t_{PLH}$	CLK	Y	3	14.5	ns
$t_{PHL}$			3	17.5	
$t_{PLH}$	CLK	W	3	15	ns
$t_{PHL}$			3.5	13	
$t_{PZH}$	$\overline{G}$	Y	2	9.5	ns
$t_{PZL}$			3	11	
$t_{PHZ}$	$\overline{G}$	Y	1	6	ns
$t_{PLZ}$			2	8	
$t_{PZH}$	$\overline{G}$	W	2	9	ns
$t_{PZL}$			3	10	
$t_{PHZ}$	$\overline{G}$	W	1	6	ns
$t_{PLZ}$			2	9	
$t_{PZH}$	$\overline{GY}$	Y	2	9	ns
$t_{PZL}$			3	11.5	
$t_{PHZ}$	$\overline{GY}$	Y	1	6	ns
$t_{PLZ}$			2	9	
$t_{PZH}$	GW	W	2	10	ns
$t_{PZL}$			3	12	
$t_{PHZ}$	GW	W	1	6	ns
$t_{PLZ}$			2	11	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of *ALS/AS Logic Data Book*, 1986.

**SN74AS851B****1 OF 16 DATA SELECTORS/MUXES  
WITH 3-STATE OUTPUTS**

SDAS154A - D2822, DECEMBER 1983 - REVISED JANUARY 1990

**recommended operating conditions**

		MIN	NOM	MAX	UNIT
$V_{CC}$	Supply voltage	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			V
$V_{IL}$	Low-level input voltage		0.8		V
$I_{OH}$	High-level output current			-15	mA
$I_{OL}$	Low-level output current		48		mA
$t_w$	Pulse duration, SC low	10			ns
$t_{SU}$	Setup time, select inputs before SC↑	4.5			ns
$t_h$	Hold time, select inputs after SC↑	0			ns
$T_A$	Operating free-air temperature	0	70		°C

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

PARAMETER	TEST CONDITIONS		MIN	TYP <sup>†</sup>	MAX	UNIT
$V_{IK}$	$V_{CC} = 4.5$ V, $I_I = -18$ mA				-1.2	V
$V_{OH}$	$V_{CC} = 4.5$ V, $I_{OH} = -2$ mA		2.5			V
	$V_{CC} = 4.5$ V, $I_{OH} = -15$ mA		2	3.3		
$V_{OL}$	$V_{CC} = 4.5$ V, $I_{OL} = 48$ mA		0.35	0.5		V
$I_{OZH}$	$V_{CC} = 5.5$ V, $V_O = 2.7$ V			50		µA
$I_{OZL}$	$V_{CC} = 5.5$ V, $V_O = 0.4$ V			-50		µA
$I_I$	$V_{CC} = 5.5$ V, $V_I = 7$ V			0.1		mA
$I_{IH}$	$V_{CC} = 5.5$ V, $V_I = 2.7$ V			20		µA
$I_{IL}$	D, G All others	$V_{CC} = 5.5$ V, $V_I = 0.4$ V		-1		mA
				-0.5		
$I_O^{\ddagger}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V		-30	-112		mA
$I_{CC}$		Outputs active Outputs disabled		50	81	mA
				52	85	

<sup>†</sup> All typical values are at  $V_{CC} = 5$  V,  $T_A = 25^{\circ}\text{C}$ .<sup>‡</sup> The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit current,  $I_{OS}$ .

SN74AS851B  
1 OF 16 DATA SELECTORS/MUXES  
WITH 3-STATE OUTPUTS

SDAS154A – D2822, DECEMBER 1983 – REVISED JANUARY 1990

**switching characteristics (see Note 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $C_L = 50\text{ pF}$ , $R1 = 500\text{ }\Omega$ , $R2 = 500\text{ }\Omega$ , $T_A = \text{MIN to MAX}$		UNIT
			MIN	MAX	
$t_{PLH}$	Any D	Y	3	10.5	ns
$t_{PHL}$			3	11	
$t_{PLH}$	Any D	W	3	8	ns
$t_{PHL}$			1	8	
$t_{PLH}$	S0, S1, S2, S3	Y	3	18	ns
$t_{PHL}$			3	19	
$t_{PLH}$	S0, S1, S2, S3	W	3	16	ns
$t_{PHL}$			3	15	
$t_{PLH}$	$\overline{SC}$	Y	3	18	ns
$t_{PHL}$			3	20	
$t_{PLH}$	$\overline{SC}$	W	3	16	ns
$t_{PHL}$			3	15	
$t_{PZH}$	$\overline{\overline{G}}$	Y	2	8	ns
$t_{PZL}$			3	11	
$t_{PHZ}$	$\overline{\overline{G}}$	Y	1	6	ns
$t_{PLZ}$			2	8	
$t_{PZH}$	$\overline{\overline{G}}$	W	2	8	ns
$t_{PZL}$			3	10	
$t_{PHZ}$	$\overline{\overline{G}}$	W	1	6	ns
$t_{PLZ}$			2	8	
$t_{PZH}$	$\overline{\overline{GY}}$	Y	2	8	ns
$t_{PZL}$			3	11	
$t_{PHZ}$	$\overline{\overline{GY}}$	Y	1	6	ns
$t_{PLZ}$			2	8	
$t_{PZH}$	GW	W	2	10	ns
$t_{PZL}$			3	12	
$t_{PHZ}$	GW	W	1	6.5	ns
$t_{PLZ}$			2	11	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of *ALS/AS Logic Data Book*, 1986.



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**SN74AS850A, SN74AS851B**  
**1 OF 16 DATA SELECTORS/MUXPLEXERS**  
**WITH 3-STATE OUTPUTS**

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**TYPICAL APPLICATION DATA**

The 'AS850A or 'AS851B can be used as a 1-of-16 Boolean function generator. Figure 1 shows the 'AS850A in one example.

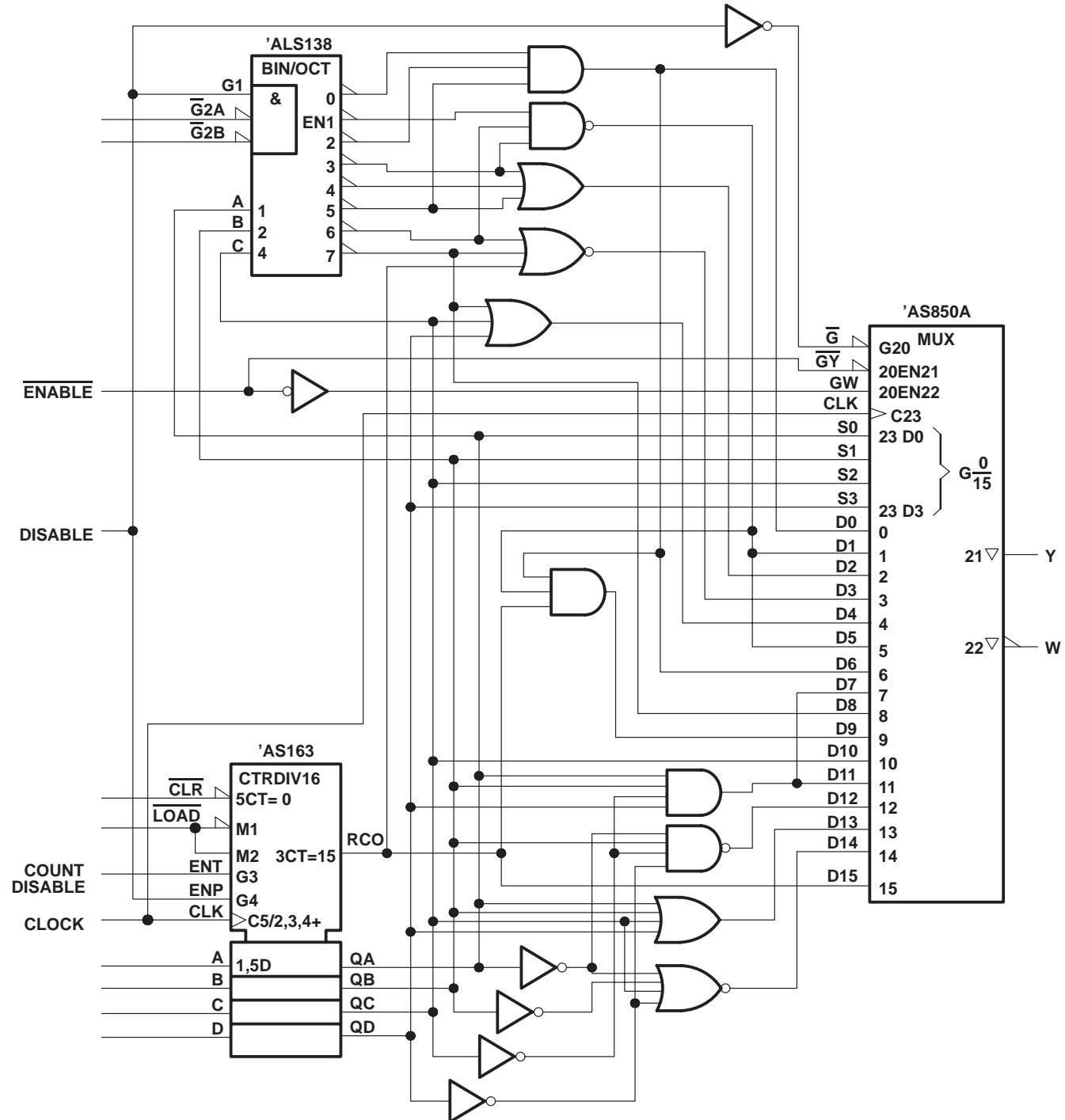


Figure 1. 1 - of - 16 Boolean Function Generator

TYPICAL APPLICATION DATA

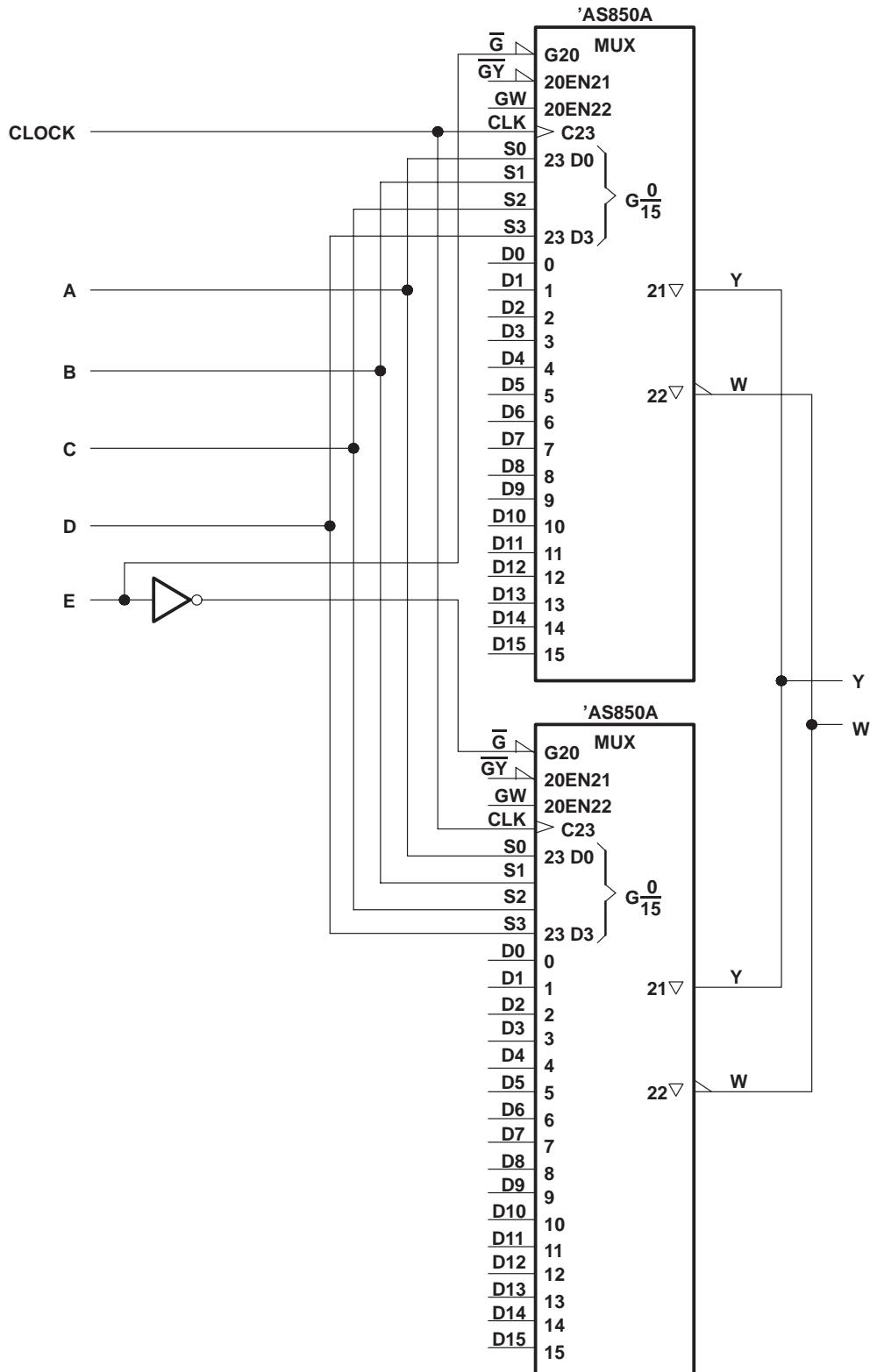


Figure 2. 1 - of - 32 Data/Selector/Multiplexer

**SN74AS850A**  
**1 OF 16 DATA SELECTORS/MUXES**  
**WITH 3-STATE OUTPUTS**

SDAS154A - D2822, DECEMBER 1983 - REVISED JANUARY 1990

**TYPICAL APPLICATION DATA**

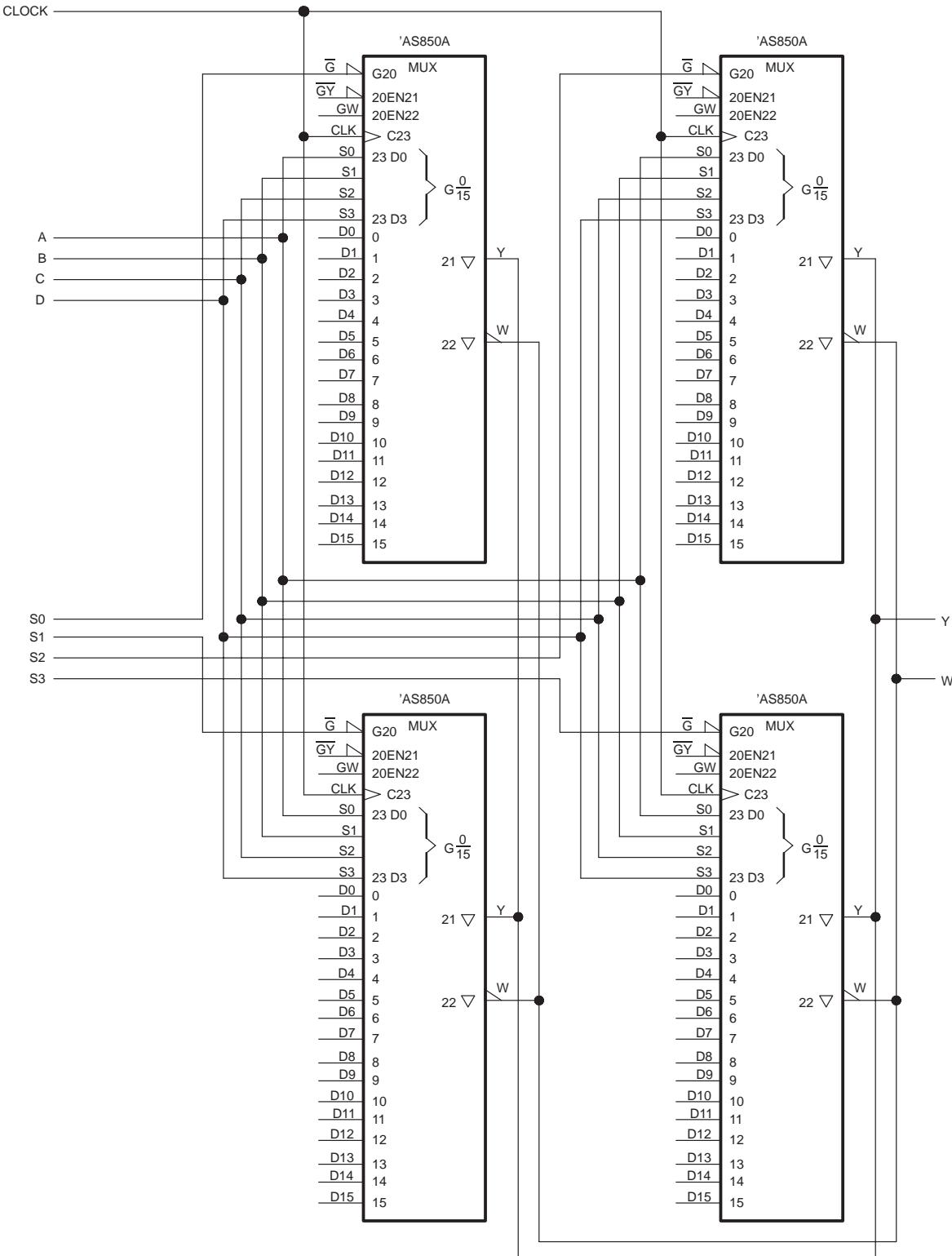


Figure 3.1 - of - 64 Data Selector/Multiplexer

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