

SN54HC4514, SN74HC4514
4-LINE TO 16-LINE DECODERS/DEMULTIPLEXERS
WITH ADDRESS LATCHES

D2684, DECEMBER 1982—REVISED JUNE 1989

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

description

These devices present two output options of a 4-line to 16-line decoder with latched inputs. The 'HC4514 presents a high level at the selected output.

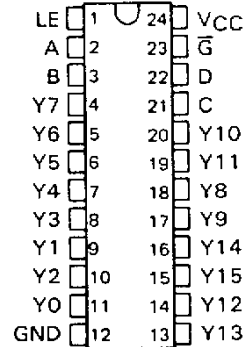
These devices consist of four storage latches with common latch enable (LE) and inhibit (\bar{G}) inputs. When a low signal is applied to the LE input, the input data is stored, decoded, and presented to the output. When \bar{G} is high, all sixteen 'HC4514 outputs are at a low logic level.

The SN54HC4514 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC4514 is characterized for operation from -40°C to 85°C .

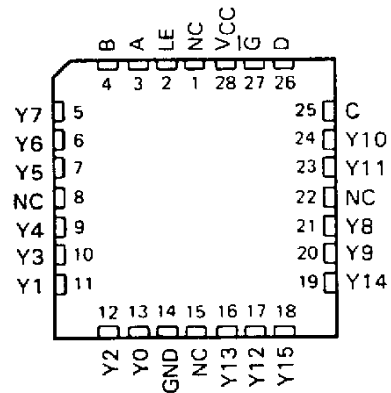
FUNCTION TABLE

INPUTS						OUTPUT SELECTED	OUTPUTS
LE	\bar{G}	D	C	B	A		
H	L	L	L	L	L	0	
H	L	L	L	L	H	1	
H	L	L	L	H	L	2	
H	L	L	L	H	H	3	
H	L	L	H	L	L	4	
H	L	L	H	H	L	5	Selected
H	L	L	H	H	H	6	Output = H
H	L	L	H	H	H	7	All others = L
H	L	H	L	L	L	8	
H	L	H	L	L	H	9	
H	L	H	L	H	L	10	
H	L	H	L	H	H	11	
H	L	H	H	L	L	12	
H	L	H	H	L	H	13	
H	L	H	H	H	L	14	
H	L	H	H	H	H	15	
X	H	X	X	X	X		All = L
L	L	X	X	X	X		All outputs remain in state existing before LE!

SN54HC4514 . . . JT PACKAGE
 SN74HC4514 . . . DW OR NT PACKAGE
 (TOP VIEW)



SN54HC4514 . . . FK PACKAGE
 (TOP VIEW)



NC—No internal connection

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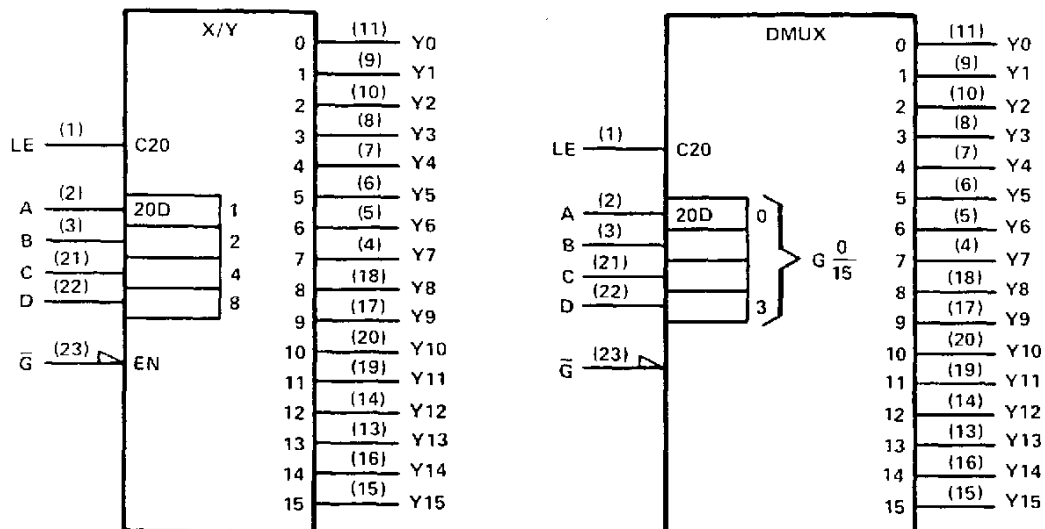


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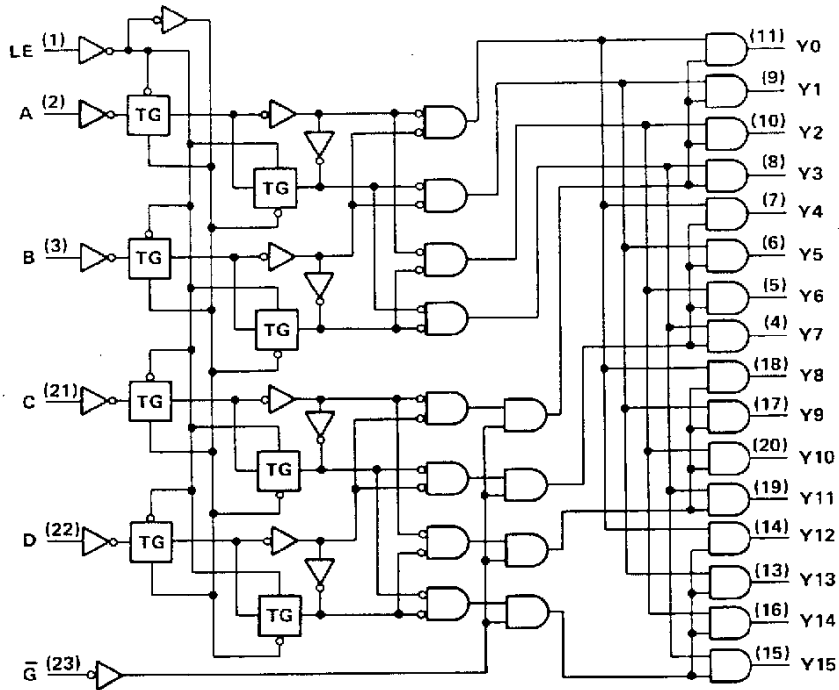
logic symbols (alternatives)†



†These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for DW, JT, and NT packages.

SN54HC4514, SN74HC4514
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logic diagram (positive logic)



Pin numbers shown are for DW, JT, and NT packages.

TEXAS
INSTRUMENTS

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4-LINE TO 16-LINE DECODERS/DEMULTIPLEXERS
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absolute maximum ratings over operating free-air temperature range†

Supply voltage, V_{CC}	-0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	± 20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 25 mA
Continuous current through V_{CC} or GND pins	± 50 mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s: FK or JT package	300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s: DW or NT package	260°C
Storage temperature range	-65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

		SN54HC4514			SN74HC4514			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	2	5	6	2	5	6	V
V_{IH}	High-level input voltage	$V_{CC} = 2$ V $V_{CC} = 4.5$ V $V_{CC} = 6$ V			1.5 3.15 4.2			V
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V $V_{CC} = 4.5$ V $V_{CC} = 6$ V			0 0 0			V
V_I	Input voltage	0			V_{CC}			V
V_O	Output voltage	0			V_{CC}			V
t_t	Input transition (rise and fall) times	$V_{CC} = 2$ V $V_{CC} = 4.5$ V $V_{CC} = 6$ V			0 0 0			ns
T_A	Operating free-air temperature	-55			125			°C

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

PARAMETER	TEST CONDITIONS	V_{CC}	$T_A = 25^\circ\text{C}$		SN54HC4514		SN74HC4514		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	
V_{OH}	$V_I = V_{IH}$ or V_{IL} , $I_{OH} = -20 \mu\text{A}$	2 V	1.9	1.998		1.9		1.9	V
		4.5 V	4.4	4.499		4.4		4.4	
		6 V	5.9	5.999		5.9		5.9	
	4.5 V	3.98	4.30		3.7		3.84		
	$V_I = V_{IH}$ or V_{IL} , $I_{OH} = -5.2 \text{ mA}$	6 V	5.48	5.80		5.2		5.34	
V_{OL}	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 20 \mu\text{A}$	2 V		0.002	0.1		0.1		V
		4.5 V		0.001	0.1		0.1		
		6 V		0.001	0.1		0.1		
	4.5 V		0.17	0.26		0.4		0.33	
	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 5.2 \text{ mA}$	6 V		0.15	0.26		0.4		0.33
I_I	$V_I = V_{CC}$ or 0	6 V		± 0.1	± 100		± 1000		nA
I_{CC}	$V_I = V_{CC}$ or 0, $I_O = 0$	6 V			8		160		μA
C_i		2 to 6 V		3	10		10		pF

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timing requirements over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	V _{CC}	T _A = 25°C		SN54HC4514		SN74HC4514		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t _w Pulse duration, LE high	2 V	80		119		100		ns
	4.5 V	16		24		20		
	6 V	14		20		17		
t _{su} Setup time, A thru D before LEI	2 V	100		149		125		ns
	4.5 V	20		30		25		
	6 V	17		20		21		
t _h Hold time, A thru D before LEI	2 V	5		5		5		ns
	4.5 V	5		5		5		
	6 V	5		5		5		

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), C_L = 50 pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC4514		SN74HC4514		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A thru D	Any	2 V	115	230		343		290	ns	
			4.5 V	23	46		69		58		
			6 V	20	39		58		49		
t _{pd}	LE	Any	2 V	115	230		343		290	ns	
			4.5 V	23	46		69		58		
			6 V	20	39		58		49		
t _{pd}	\bar{G}	Any	2 V	88	175		261		221	ns	
			4.5 V	18	35		52		44		
			6 V	15	30		44		37		
t _t		Any	2 V	38	75		110		95	ns	
			4.5 V	8	15		22		19		
			6 V	6	13		19		16		

C _{pd}	Power dissipation capacitance	No load, T _A = 25°C	60 pF typ
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Note 1: Load circuits and voltage waveforms are shown in Section 1.



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PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN74HC4514DW	OBSOLETE	SOIC	DW	24		TBD	Call TI	Call TI
SN74HC4514NT	OBSOLETE	PDIP	NT	24		TBD	Call TI	Call TI

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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