

DATA SHEET

For a complete data sheet, please also download:

- The IC04 LOCMOS HE4000B Logic Family Specifications HEF, HEC
- The IC04 LOCMOS HE4000B Logic Package Outlines/Information HEF, HEC

HEF4532B

MSI

8-input priority encoder

Product specification
File under Integrated Circuits, IC04

January 1995

8-input priority encoder

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DESCRIPTION

The HEF4532B is an 8-input priority encoder with eight active HIGH priority inputs (I_0 to I_7), three active HIGH outputs (O_0 to O_2), an active HIGH enable input (E_{in}), an active HIGH enable output (E_{out}) and an active HIGH group select output (GS). Data is accepted on inputs I_0 to I_7 . The binary code

corresponding to the highest priority input (I_0 to I_7) which is HIGH, is generated on O_0 to O_2 if E_{in} is HIGH. Input I_7 is assigned the highest priority. GS is HIGH when one or more priority inputs and E_{in} are HIGH. E_{out} is HIGH when I_0 to I_7 are LOW and E_{in} is HIGH. E_{in} , when LOW, forces all outputs (O_0 to O_2 , GS, E_{out}) LOW.

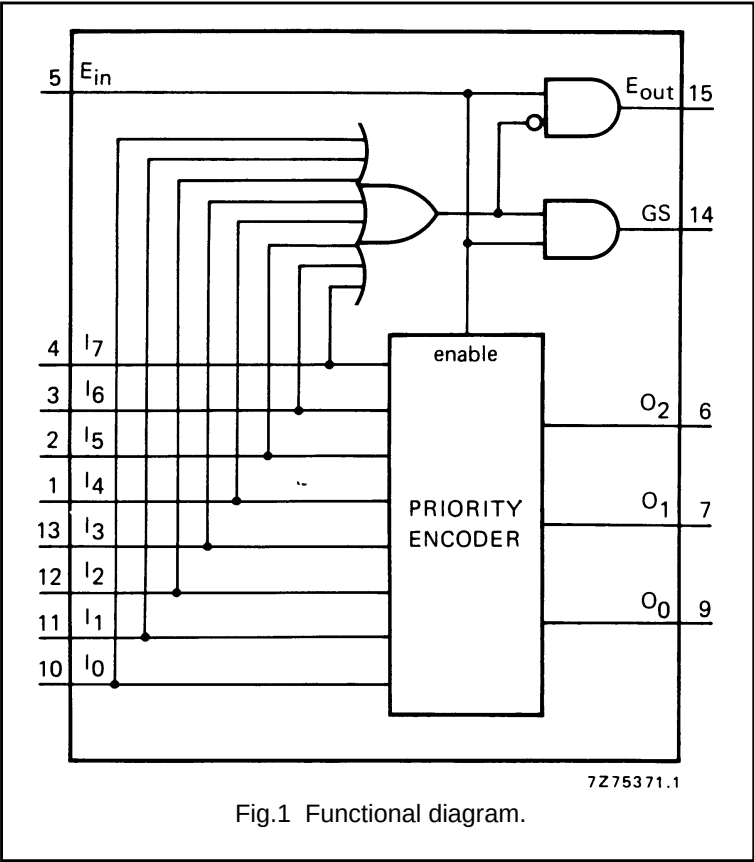


Fig.1 Functional diagram.

- HEF4532BP(N): 16-lead DIL; plastic (SOT38-1)
- HEF4532BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)
- HEF4532BT(D): 16-lead SO; plastic (SOT109-1)
- (): Package Designator North America

PINNING

- | | |
|----------------|---------------------|
| I_0 to I_7 | priority inputs |
| E_{in} | enable input |
| E_{out} | enable output |
| GS | group select output |
| O_0 to O_2 | outputs |

FAMILY DATA, I_{DD} LIMITS category MSI

See Family Specifications

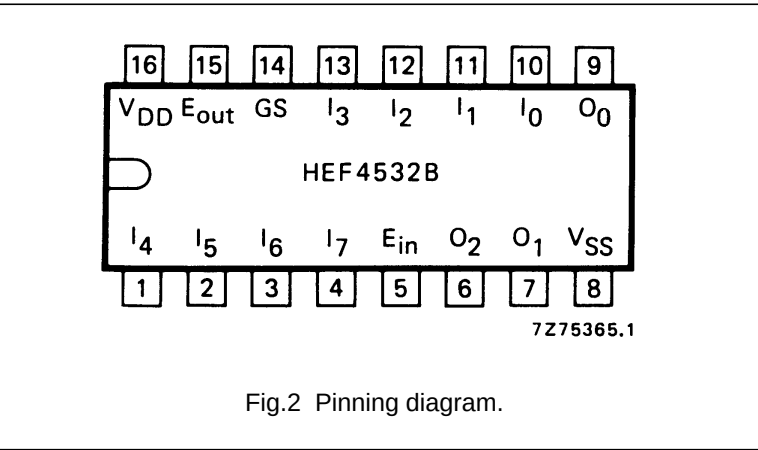


Fig.2 Pinning diagram.

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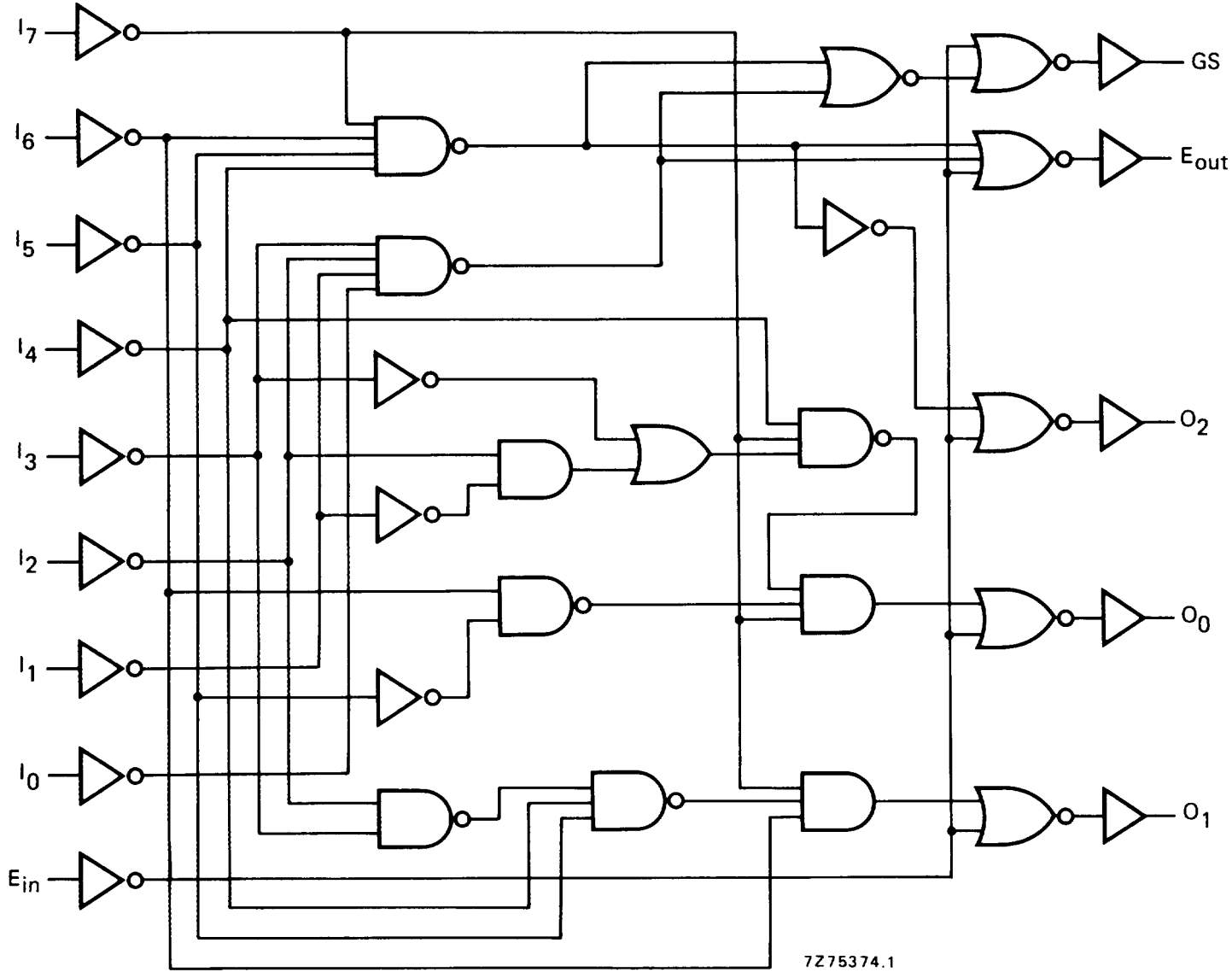


Fig.3 Logic diagram.

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TRUTH TABLE

INPUTS									OUTPUTS				
E _{in}	I ₇	I ₆	I ₅	I ₄	I ₃	I ₂	I ₁	I ₀	GS	O ₂	O ₁	O ₀	E _{out}
L	X	X	X	X	X	X	X	X	L	L	L	L	L
H	L	L	L	L	L	L	L	L	L	L	L	L	H
H	H	X	X	X	X	X	X	X	H	H	H	H	L
H	L	H	X	X	X	X	X	X	H	H	H	L	L
H	L	L	H	X	X	X	X	X	H	H	L	H	L
H	L	L	L	H	X	X	X	X	H	H	L	L	L
H	L	L	L	L	H	X	X	X	H	L	H	H	L
H	L	L	L	L	L	H	X	X	H	L	H	L	L
H	L	L	L	L	L	L	H	X	H	L	L	H	L
H	L	L	L	L	L	L	L	H	H	L	L	L	L

Notes

1. H = HIGH state (the more positive voltage)
2. L = LOW state (the less positive voltage)
3. X = state is immaterial

LOGIC EQUATIONS

$$\begin{aligned}
 O_2 &= E_{in} \cdot (I_4 + I_5 + I_6 + I_7) \\
 O_1 &= E_{in} \cdot (I_2 \cdot \bar{I}_4 \cdot \bar{I}_5 + I_3 \cdot \bar{I}_4 \cdot \bar{I}_5 + I_6 + I_7) \\
 O_0 &= E_{in} \cdot (I_1 \cdot \bar{I}_2 \cdot \bar{I}_4 \cdot \bar{I}_6 + I_3 \cdot \bar{I}_4 \cdot \bar{I}_6 + I_5 \cdot \bar{I}_6 + I_7) \\
 E_{out} &= E_{in} \cdot \bar{I}_0 \cdot \bar{I}_1 \cdot \bar{I}_2 \cdot \bar{I}_3 \cdot \bar{I}_4 \cdot \bar{I}_5 \cdot \bar{I}_6 \cdot \bar{I}_7 \\
 GS &= E_{in} \cdot (I_0 + I_1 + I_2 + I_3 + I_4 + I_5 + I_6 + I_7)
 \end{aligned}$$

AC CHARACTERISTICS

V_{SS} = 0 V; T_{amb} = 25 °C; input transition times ≤ 20 ns

	V _{DD} V	TYPICAL FORMULA FOR P (μW)	
Dynamic power dissipation per package (P)	5 10 15	1 620 f _i + Σ (f _o C _L) × V _{DD} ² 6 600 f _i + Σ (f _o C _L) × V _{DD} ² 15 970 f _i + Σ (f _o C _L) × V _{DD} ²	where f _i = input freq. (MHz) f _o = output freq. (MHz) C _L = load capacitance (pF) Σ (f _o C _L) = sum of outputs V _{DD} = supply voltage (V)

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AC CHARACTERISTICS

 $V_{SS} = 0$ V; $T_{amb} = 25$ °C; $C_L = 50$ pF; input transition times ≤ 20 ns; see also waveforms Fig.4

	V _{DD} V	SYMBOL	MIN.	TYP.	MAX.	TYPICAL EXTRAPOLATION FORMULA	
Propagation delays							
E _{in} → E _{out}	5			95	190	ns	68 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		45	90	ns	34 ns + (0,23 ns/pF) C _L
	15			35	70	ns	27 ns + (0,16 ns/pF) C _L
LOW to HIGH	5	t _{PLH}		80	160	ns	53 ns + (0,55 ns/pF) C _L
	10			35	70	ns	24 ns + (0,23 ns/pF) C _L
	15			30	60	ns	22 ns + (0,16 ns/pF) C _L
E _{in} → GS	5			85	170	ns	58 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		45	90	ns	34 ns + (0,23 ns/pF) C _L
	15			35	70	ns	27 ns + (0,16 ns/pF) C _L
LOW to HIGH	5	t _{PLH}		80	160	ns	53 ns + (0,55 ns/pF) C _L
	10			40	80	ns	29 ns + (0,23 ns/pF) C _L
	15			30	60	ns	22 ns + (0,16 ns/pF) C _L
E _{in} → O _n	5			80	160	ns	53 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		40	80	ns	29 ns + (0,23 ns/pF) C _L
	15			30	60	ns	22 ns + (0,16 ns/pF) C _L
LOW to HIGH	5	t _{PLH}		85	170	ns	58 ns + (0,55 ns/pF) C _L
	10			40	80	ns	29 ns + (0,23 ns/pF) C _L
	15			30	60	ns	22 ns + (0,16 ns/pF) C _L
I _n → O _n	5			115	230	ns	88 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		50	100	ns	39 ns + (0,23 ns/pF) C _L
	15			35	70	ns	27 ns + (0,16 ns/pF) C _L
LOW to HIGH	5	t _{PLH}		115	230	ns	88 ns + (0,55 ns/pF) C _L
	10			50	100	ns	39 ns + (0,23 ns/pF) C _L
	15			35	70	ns	27 ns + (0,16 ns/pF) C _L
I _n → GS	5			115	230	ns	88 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		50	100	ns	39 ns + (0,23 ns/pF) C _L
	15			40	80	ns	32 ns + (0,16 ns/pF) C _L
LOW to HIGH	5	t _{PLH}		115	230	ns	88 ns + (0,55 ns/pF) C _L
	10			50	100	ns	39 ns + (0,23 ns/pF) C _L
	15			40	80	ns	32 ns + (0,16 ns/pF) C _L
Output transition times	5			60	120	ns	10 ns + (1,0 ns/pF) C _L
HIGH to LOW	10	t _{THL}		30	60	ns	9 ns + (0,42 ns/pF) C _L
	15			20	40	ns	6 ns + (0,28 ns/pF) C _L
LOW to HIGH	5	t _{TLH}		60	120	ns	10 ns + (1,0 ns/pF) C _L
	10			30	60	ns	9 ns + (0,42 ns/pF) C _L
	15			20	40	ns	6 ns + (0,28 ns/pF) C _L

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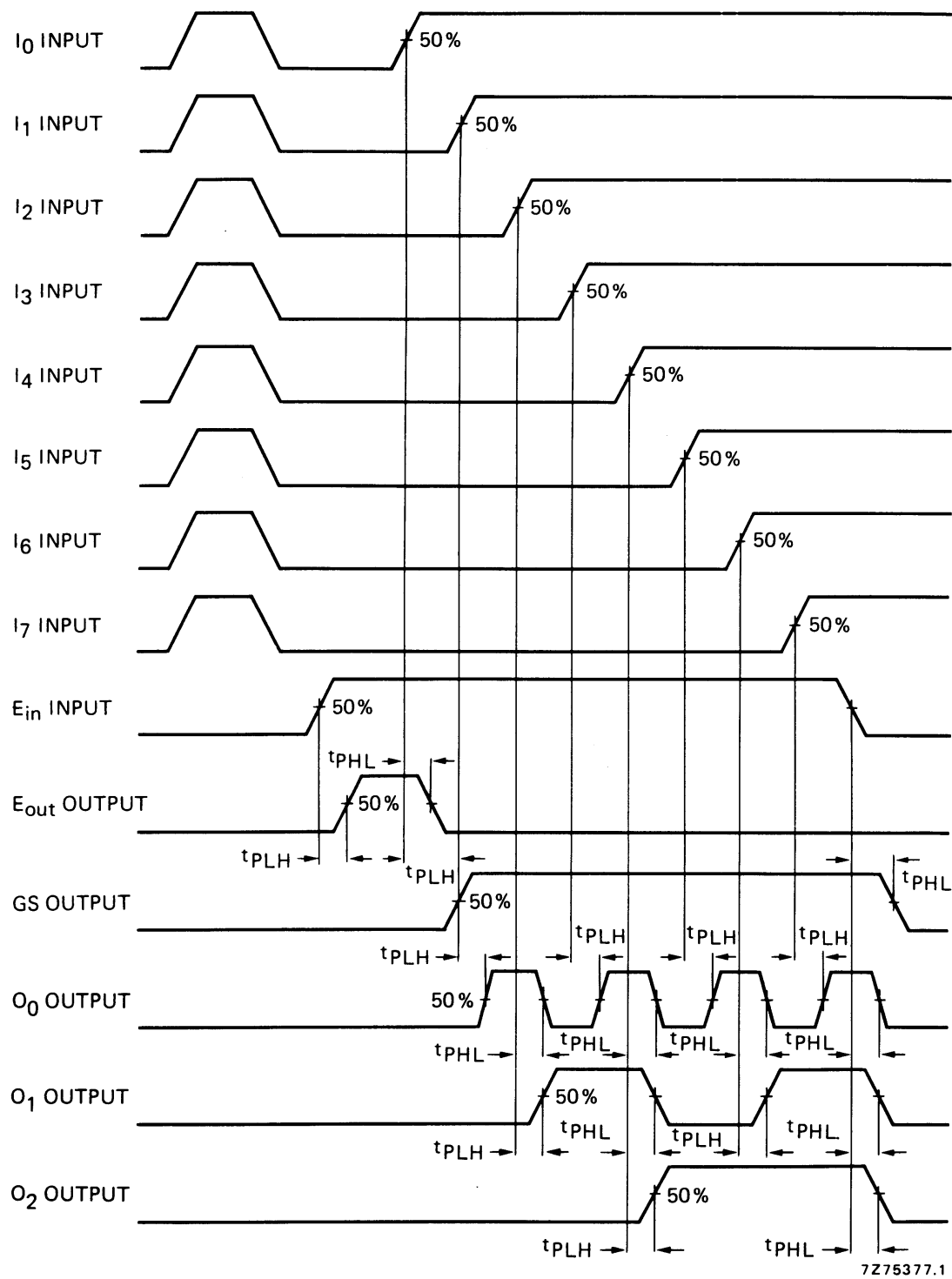


Fig.4 Waveforms showing propagation delays from inputs to outputs.

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APPLICATION INFORMATION

Some examples of applications for the HEF4532B are:

- Priority encoder
- Keyboard encoder

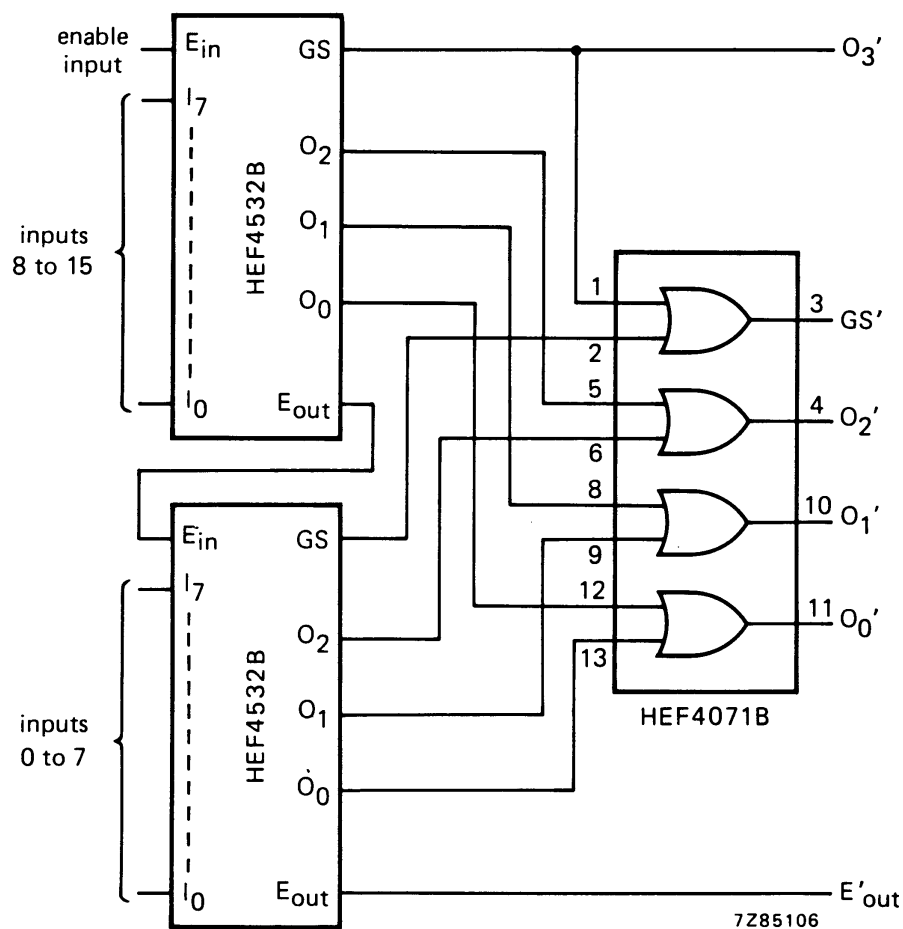
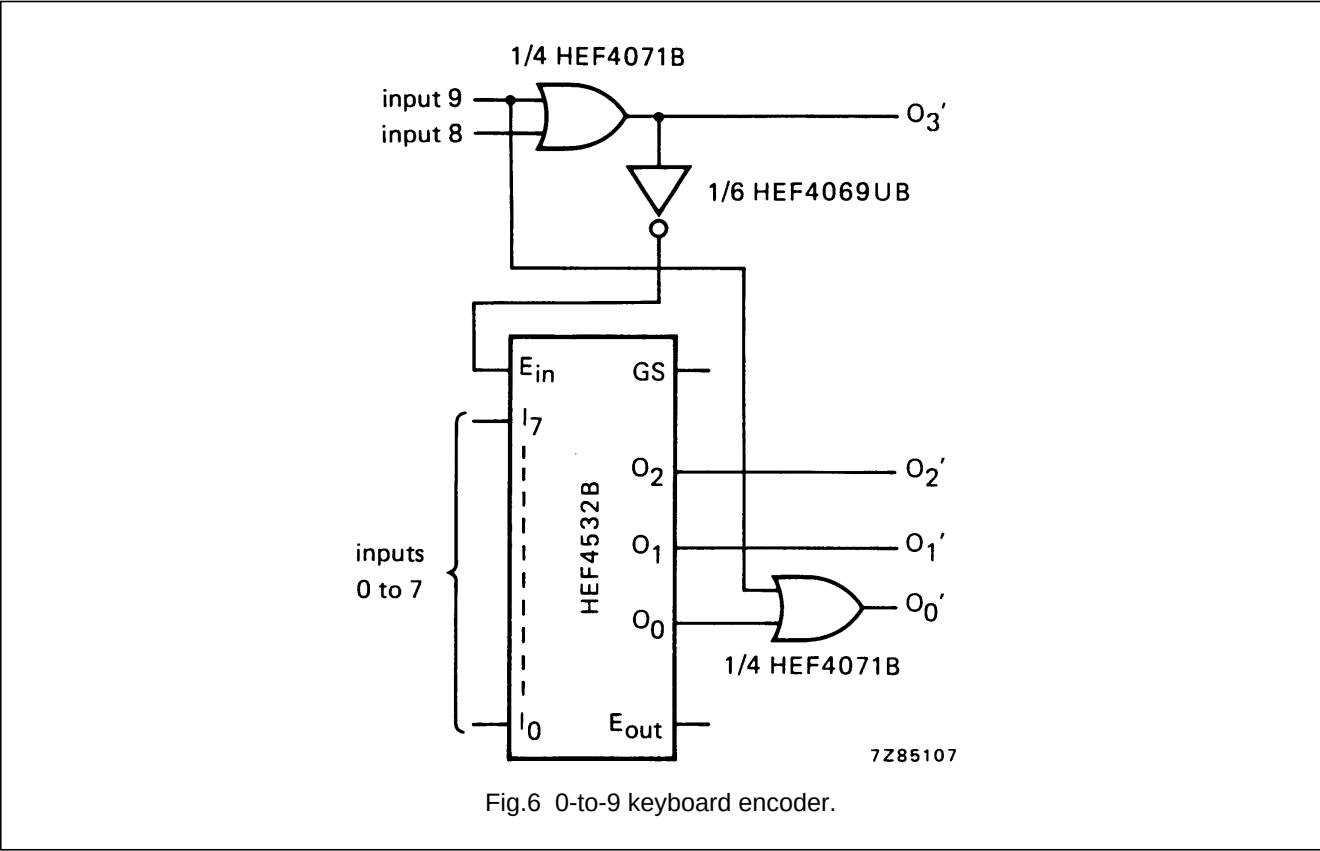


Fig.5 16-level priority encoder.

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TRUTH TABLE (for Fig.6)

INPUTS										OUTPUTS				
9	8	7	6	5	4	3	2	1	0	GS	O ₃ '	O ₂ '	O ₁ '	O ₀ '
H	X	X	X	X	X	X	X	X	X	L	H	L	L	H
L	H	X	X	X	X	X	X	X	X	L	H	L	L	L
L	L	H	X	X	X	X	X	X	X	H	L	H	H	H
L	L	L	H	X	X	X	X	X	X	H	L	H	H	L
L	L	L	L	H	X	X	X	X	X	H	L	H	L	H
L	L	L	L	L	H	X	X	X	X	H	L	H	L	L
L	L	L	L	L	L	H	X	X	X	H	L	L	H	H
L	L	L	L	L	L	L	H	X	X	H	L	L	H	L
L	L	L	L	L	L	L	L	H	X	H	L	L	L	H
L	L	L	L	L	L	L	L	L	H	H	L	L	L	L

Notes

- 1. H = HIGH state (the more positive voltage)
- 2. L = LOW state (the less positive voltage)
- 3. X = state is immaterial