Enable, Gate, and Strobe Inputs Wilfrid Laurier University

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Often they are called gate, strobe, or enable.

There may be more than one of them.

ENABLE	SELECT	A	В	OUTPUT Y
1	х	х	х	0
0 .	0	0	х	0
0	0	1	х	1
0	í	х	0	0
0	1	Χ,	1	1

ENABLE	SELECT	A	В	OUTPUT Y
1	х	х	х	0
0 .	0	0	х	0
0	0	11	х	1
0	í	х	0	0
0	1	Χ,	1	1

Note the row that has 'X' in all of the input columns except 1.

ENABLE	SELECT	A	В	OUTPUT Y
1	×	х	х	0
0 .	0	0	×	0
. 0	0	11	х	11
0	1	х	0	0
0	1	Χ,	1	1

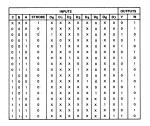
This column doesn't have an equal number of ones and zeros.

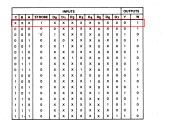
ENABLE	SELECT	A B		OUTPUT Y
1	х	х	х	0
0	0	0	х	0
0	0	11	х	1
0	1	х	0	0
0	1	Χ,	1	1

When the **ENABLE** input is '1', none of the other inputs matter.

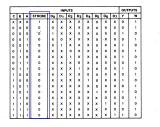
ENABLE	SELECT	A	В	OUTPUT Y
1	х	х	х	0
0 .	0	0	х	0
0	0	11	х	1
0	1	х	0	0
0	1	Χ,	1	1

Normal operation of the chip is when the **ENABLE** input is '0'.

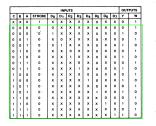




Note the row where STROBE is one.

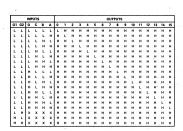


STROBE is zero for all of the other rows.

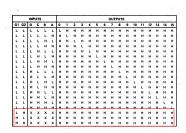


For normal operation, set **STROBE** to zero.

This has two inputs, G1 and G2:

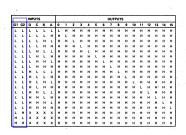


This has two inputs, **G1** and **G2**:



When either of G1 or G2 is high, the other inputs don't matter.

This has two inputs, **G1** and **G2**:



Normal operation is when both G1 and G2 are low.

CE	DIG	IT ADDI	RESS	WE	OPERATION	
CE	КЗ	K2	K1	WE		
0	0	0	0	0	Write Digit 1	
0	0	0	0	- 16	Latch Digit 1	
0	0	0	1	0	Write Digit 2	
0	0	0	1	1	- Latch Digit 2	
0	0	1	0 -	0	Write Digit 3	
0	. 0	- 1	0	1 1	Latch Digit 3	
0	0	. 1	1	0	Write Digit 4	
0	0	- 1	- 1	. 1	Latch Digit 4	
0	1	0	0	0	Write Digit 5	
0	1.1	0	0	. 1	Latch Digit 5	
0	1	0	1 1	0	Write Digit 6	
0	1	.0	1	. 1	Latch Digit 6	
0	1	1.	0	0	Write Null Digit	
0	1	1	0	1	Latch Null Digi	
0	1 -	1 1	1	. 0	Write Null Digi	
0 .	1	1 1	1	1	Latch Null Digi	
1	X .	X	x	x	Disable Writing	

Œ	DIG	T ADDI	RESS	-	0.1112.1	
K3 K2	K2	K1	WE	OPERATION		
0	0	0	0	0	Write Digit 1	
0	0	0	0	- 16	Latch Digit 1	
0	0	0	1 1	0	Write Digit 2	
0	0	0	1	- 1	- Latch Digit 2	
0	0	1	0	0	Write Digit 3	
0	0	- 1	0	1 1	Latch Digit 3	
0	0	. 1	. 1	0	Write Digit 4	
0	0	- 1	. 1	. 1	Latch Digit 4	
0	1	0	0	0	Write Digit 5	
0	1 1	0	0	. 1	Latch Digit 5	
0	1	0	1 1	0	Write Digit 6	
0	111	.0	1 1	. 1	Latch Digit 6	
0	- 1	1.	0	0	Write Null Digit	
0	1	1	0	1	Latch Null Digit	
	0 1 1 1 1	0 1 1 1 1 0	0 1 1 1 0 V	Write Null Digi		
0 .	1	1 1	1	1.	Latch Null Digit	
1	X	, X	X	X	Disable Writing	

When $\overline{\textbf{CE}}$ is 1, the other inputs don't matter.

Œ	DIG	T ADDI	RESS	WE		
CE	КЗ	K2	K1	WE	OPERATION	
0	0	0	0	0	Write Digit 1	
0	0	0	0	- 16	Latch Digit 1	
0	0	0	1	0	Write Digit 2	
0	0	0	1	1	- Latch Digit 2	
0	0	1	0	0	Write Digit 3	
0	. 0	- 1	0	1	Latch Digit 3	
0	0	. 1	1	0	Write Digit 4	
0	0	- 1	- 1	1 1	Latch Digit 4	
0	1	0	0	0	Write Digit 5	
0	1.1	8	0	1	Latch Digit 5	
0	1	0	1	0	Write Digit 6	
0	1	0	1	1 1	Latch Digit 6	
0	1	1.	0	0	Write Null Digit	
0	1	1	0	1	Latch Null Digit	
0	1	1	1	0	Write Null Digi	
0 .	1	1 1	1	1	Latch Null Digit	
1	X .	X	x	x	Disable Writing	

For normal operation, \overline{CE} should be 0.

DIGIT S	ELECT IN	SELECTED DIGIT	
DLE	D1	D0	SELECTED DIGIT
L	L.	L	Digit 0 (LSD)
L.	L	н	Digit 1
L	ŤH	L	Digit 2
L	Н	- н	Digit 3 (MSD)
н	×	×	Unchanged

DIGIT SI	ELECT IN	CELECTED DIGIT	
DLE	D1	D0	SELECTED DIGIT
L	L.	L	Digit 0 (LSD)
L	L	Н	Digit 1
L	H	L	Digit 2
L	H	н	Digit 3 (MSD)
Н	X	X	Unchanged

Here's the row to notice.

DIGIT	SELECT	INPUTS	CEL FOTED DIGIT
DLE	D1	D0	SELECTED DIGIT
L	L	L	Digit 0 (LSD)
L	L	Н	Digit 1
L	H	L	Digit 2
L	Н	н	Digit 3 (MSD)
Н	X	* X	Unchanged

DLE needs to be low for normal operation.

Here's one more example:

	INPUTS						1
SHIFT/	CLOCK	CLOCK	SERIAL	PARALLEL	OUTPUTS		OUTPUT
LOAD	INHIBIT	CLUCK SENIAL		A H	QA	QΒ	Q _H
L	×	Х	х	ah	a	ь	h
н	L	L	Х	×	Q _A O	Q_{B0}	Q _{H0}
н".	L	1	. н	×	н	QAn	Q_{Gn}
н	L	1 .	L	×	L	Q _{An}	Ω_{Gn}
н	н	1	X	×	Q _{AO}	Q _{B0}	Q _{H0}

Here's one more example:

			INPUTS				RNAL	ОПТРИТ
Γ	SHIFT/ LOAD	CLOCK INHIBIT	CLOCK	SERIAL	PARALLEL	OUTPUTS		
L					A H	QA	QΒ	O _H
Γ	L,	X	X	×	ah	a	ь	h
ľ	Hj	L	L	×	×	Q _{A0}	Q _{B0}	Q _{H0}
١	н".	L	1	. н	X	н	Q _{An}	Ω_{Gn}
ı	н	L	1 .	L	x	L	Q _{An}	Ω_{Gn}
L	Н	н	†	×	Х	Q _{A0}	Q _{BO}	Q _{H0}

This row stands out.

Here's one more example:

ſ		INPUTS					RNAL	
ſ	SHIFT/ LOAD	CLOCK	CLOCK	SERIAL	PARALLEL	OUTPUTS		OUTPUT
ı					A H	QA	QΒ	QH
ſ	L,	X	Х	х	ah	a	ь	h
٠	н ;	L	L	×	×	Q _A O	Q_{B0}	Q _{H0}
١	. н * .	L	1	. н	×	н	QAn	Q_{Gn}
١	н	L	1 .	L	×	L	Q _{An}	Q _{Gn}
	Н	н	†	×	×	Q_{A0}	Q _{BO}	Q _{H0}

SHIFT/LOAD should be high for normal operation.

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- ① Look for rows with lots of 'X' (i.e. "Don't care") inputs.
- Find the column which has a different value than normal in that row.

When using a device for the first time, there may be "extra" inputs,

i.e. pins which you aren't sure how to use.

- Look for rows with lots of 'X' (i.e. "Don't care") inputs.
- Find the column which has a different value than normal in that row.
- 3 Set the associated pin to the value it has for the rest of the truth table.

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Sometimes there may be more than one input like this, as in the example with **G1** and **G2**.