# On the Subject of Basegate

Based and gatepilled.

- This module contains four colored switches and a 3×3 grid of hatches. Once a hatch is opened, the dial underneath it can be turned to one of four cardinal directions.
- There is one calculated number to be inputted 3 times:
- Once in binary via the switches, once in ternary via the hatches opened, and once in quaternary via the configurations of the dials under them.
- Pressing the round green button submits the current state of the module. A correct submission solves the module. A strike is gained if any correct hatch hasn't been opened, or the switch or dial configuration is incorrect. Attempting to open an incorrect hatch also strikes.
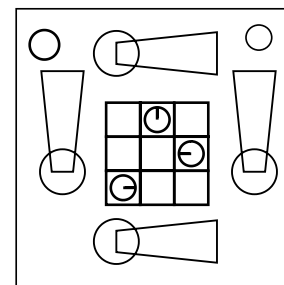
Calculating the Number:

Take the colors of the top and bottom switches and do the following:

- Find the row of the top switch's color on the left in the table below.
- Within this row, find the color of the bottom switch, and look at the instruction at the top of this color's column.
- Also take the color of one of the switch's sockets, and move forward in the grid K times, looping around if necessary. The socket to look at and K are defined below.
- Perform the obtained instruction on this new position to get a new color.

Do the same for the left and right switches respectively, then once more using the colors obtained from both of these pairs of switches. This final color is used to calculate the number to be submitted.

	←	→	↑	↓	↻	↺	¬
Red	R	Y	W	G	M	C	B
Green	Y	G	C	R	B	W	M
Blue	W	C	B	M	G	Y	R
Yellow	G	R	M	Y	W	B	C
Cyan	M	B	G	W	C	R	Y
Magenta	C	W	Y	B	R	M	G
White	B	M	R	C	Y	G	W

The sockets to look at and values of K are as follows:

- The first time the grid is used, look at the top socket. K is the number of batteries.
- The second time the grid is used, look at the right socket. K is the number of indicators.
- The last time the grid is used, look at the bottom socket of the number of solvable modules is even, the right one otherwise. K is the number of ports.

The symbols in the top row of the table are abbreviations for the following movements:

- ←: Move n spaces left in the row, wrapping around, where n is the last digit of the serial number.
- →: Move n spaces right in the row, wrapping around, where n is the last digit of the serial number.
- ↑: Move n spaces up in the column, wrapping around, where n is the first digit of the serial number.
- ↓: Move n spaces down in the column, wrapping around, where n is the first digit of the serial number.
- ↻: Rotate the position in the grid 90° clockwise.
- ↺: Rotate the position in the grid 90° counterclockwise.
- ¬: Rotate the position in the grid 180°.
- The gray square marks the center of the grid for convenience.

Concatenate the numbers in the serial number into one number, keeping any leading zeros. Then, modify the number using the final color calculated.

Red	Reverse the number.
Green	Cycle the number one space backwards.
Blue	Multiply the number by 3.
Yellow	Divide the number by 3. Ignore the remainder.
Cyan	Reverse the number.
Magenta	Cycle the number one space forwards.
White	Take the digital root of the number.

This is the final calculated number.

Base Conversion:

To convert a number from decimal to base-N, find the highest power of N that is less than or equal to the decimal number. Subtract this power of N from the decimal number as many times as possible without going negative: the number of times is the first digit in the base-N number. Go down one power and repeat the subtraction process with the modified decimal number, keeping in mind that 0 may be a possible answer. Once N0 is reached, the current decimal number is the last digit in the base-N number.

Example: 147 into base-4 (quaternary)

- 4^3 (64) fits into 147 2 times, resulting in 19 left over.
- 4^2 (16) fits into 19 1 time, resulting in 3 left over.
- 4^1 (4) fits into 3 0 times, resulting in 3 left over.
- 4^0 (1) fits into 3 3 times, resulting in 0 left over.
- 147 in quaternary is 2103.

Binary – Switches:

Modulo the calculated number by 16 and convert it to base-2. Use the calculated color to assign positions in a 4-digit binary number to each switch, with the abbreviations from most to least significant being M, m, l, L. Then, using the applicable diagram, determine the corners which represent 1s and 0s. A switch's value is the corner towards which it is flipped.

Red	Green	Blue	Yellow
M	L	m	L
m ⬛ l	l ⬛ <	M ⬛ l	M ⬛ l
L	m	L	m

Cyan	Magenta	White
L	m	M
l ⬛ m	l ⬛ M	L ⬛ l
M	L	m

# of SN vowels even:		# of SN vowels odd:	
1	0	0	1
0	1	1	0

Ternary – Hatches:

Modulo the number by 27 and convert it to base-3. Use the fourth character of the serial number along the top and the fifth character along the side to locate the values and placement of each dial position in a ternary number. Open one hatch in each column such that the corresponding digit in the calculated ternary number is in the row with the correct value. The abbreviations from most to least significant are M, –, L. The hatches my be pressed in any orders.

Side A–I:

A–I		M	L	–	J–R		L	–	M	S–Z		–	M	L
	0					2					1			
	1					0					2			
	2					1					0			

Side J–R:

A–I		L	–	M	J–R		–	M	L	S–Z		M	L	–
	2					1					0			
	0					2					1			
	1					0					2			

Side S–Z:

A–I		–	M	L	J–R		M	L	–	S–Z		L	–	M
	1					0					2			
	2					1					0			
	0					2					1			

Quaternary – Dials:

Modulo the number by 64 and convert it to base-4. If the values of K in the first step were all different, then the dials correspond to digits of this quaternary number in reading order. Otherwise, they go in reverse reading order.

To determine the values of each cardinal direction on the dials, multiply the number of modules on the bomb by the number of letters in the serial number, modulo 12, and add one. Turning the dial to the direction that is closest to this number on a clock face represents a 3, with the subsequent digits assigned clockwise in descending order.