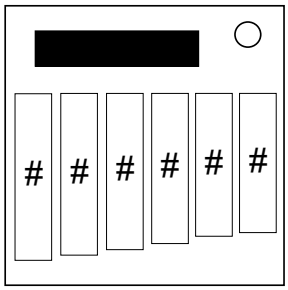
# On the Subject of Reordered Keys




*Seeing triple now, are we?*

This module consists of 6 coloured keys, each of which is labelled with a coloured number.

These keys turn black when highlighted, and remain black when pressed.

The possible colours for both the keys and the numbers labelling them are: (R)ed, (G)reen, (B)lue, (C)yan, (M)agenta, and (Y)ellow.

Any of the numbers 1 - 6 may appear on each of the keys.

The information given by each key is used to locate two cells, each within a 6×6 grid, which in turn will be used to locate a cell in a third 6×6 grid, which will have a unique value in the range 1 - 6.

One of the six keys is a pivot, which is used to determine the correct configuration of keys to be submitted, and acts as the submit button for the current sequence of keys.

Pressing any two of the other keys will swap them and their values.

The module will reset if-

- the pivot key is pressed.
- any key is pressed after six swaps.

In six swaps or fewer, rearrange the keys until the configuration of key values is correct, avoiding dangerous configurations, and submit it by pressing the pivot key to advance to the next of two stages.

Submitting an incorrect configuration or failing to avoid dangerous configurations will cause a strike to be issued.

## Step 1: Finding key values

The value of each key is found in Grid 3, the coordinates of which, are given by entries in the other two grids.

On Grid 1,

- the column on the left refers to the colour of the key.
- the row along the top refers to the label on the key.

On Grid 2,

- the column on the left refers to the colour of the label.
- the row along the top refers to the initial position of the key from left to right.

**Grid 1**

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **R** | C | A | F | D | B | E |
| **G** | E | D | B | C | F | A |
| **B** | F | B | C | A | E | D |
| **C** | B | C | D | E | A | F |
| **M** | A | F | E | B | D | C |
| **Y** | D | E | A | F | C | B |

**Grid 2**

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **R** | V | Y | U | Z | X | W |
| **G** | Z | X | V | W | U | Y |
| **B** | X | W | Z | U | Y | V |
| **C** | U | Z | Y | V | W | X |
| **M** | Y | V | W | X | Z | U |
| **Y** | W | U | X | Y | V | Z |

**Grid 3**

| | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|
| **A** | 5 | 3 | 6 | 1 | 2 | 4 |
| **B** | 4 | 1 | 5 | 3 | 6 | 2 |
| **C** | 1 | 6 | 2 | 4 | 5 | 3 |
| **D** | 3 | 5 | 1 | 2 | 4 | 6 |
| **E** | 2 | 4 | 3 | 6 | 1 | 5 |
| **F** | 6 | 2 | 4 | 5 | 3 | 1 |

## Step 2: Pivot key

If exactly one of the keys has a label that is the same colour as the key itself, then the pivot is the key whose value is equal to the label of that key.

Otherwise, the pivot is the key whose value is equal to the value in Grid 3 with-

- the row given by the sum of the primary coloured labels modulo 6, starting with A = 0.
- the column given by the sum of the secondary coloured labels modulo 6, starting with U = 0.

Note: the primary colours are red, green, and blue and the secondary colours are cyan, magenta, and yellow.

## Step 3: Key Configurations

The correct configuration of key values is a 6-cyclic permutation of the configuration '123456' with the value of the pivot key in the correct position.

A strike will be issued if the configuration of key values after swapping two keys belongs to the list below:

| | | | | | |
|---|---|---|---|---|---|
| 123465 | 213645 | 312546 | 412365 | 512634 | 612435 |
| 124635 | 214536 | 314652 | 413526 | 513462 | 613425 |
| 125346 | 215463 | 315246 | 415623 | 514362 | 614235 |
| 126453 | 216543 | 316254 | 416325 | 516423 | 615324 |
| 132564 | 231546 | 321654 | 421563 | 521634 | 621354 |
| 134265 | 234516 | 324615 | 423561 | 523146 | 623514 |
| 135624 | 235461 | 325164 | 425631 | 524316 | 624153 |
| 136542 | 236145 | 326451 | 426531 | 526314 | 625134 |
| 142356 | 241653 | 341256 | 431562 | 531426 | 631452 |
| 143625 | 243156 | 342651 | 432165 | 532416 | 632415 |
| 145236 | 245361 | 345261 | 435162 | 534612 | 634215 |
| 146523 | 246135 | 346251 | 436152 | 536412 | 635421 |
| 152436 | 251364 | 351264 | 451326 | 541263 | 641253 |
| 153642 | 253164 | 352641 | 452163 | 542361 | 642351 |
| 154632 | 254136 | 354126 | 453621 | 543216 | 643521 |
| 156243 | 256413 | 356241 | 456312 | 546123 | 645231 |
| 162345 | 261534 | 361245 | 461532 | 561342 | 651234 |
| 163524 | 263154 | 362541 | 462315 | 562431 | 652341 |
| 164352 | 264513 | 364125 | 463512 | 563124 | 653142 |
| 165432 | 265143 | 365214 | 465132 | 564213 | 654321 |