

R5 Square Pixel Matrix Cube Design

All textures shown in the present document are copyright protected under the [Creative Commons License](http://creativecommons.org/licenses/by-sa/4.0/) terms.

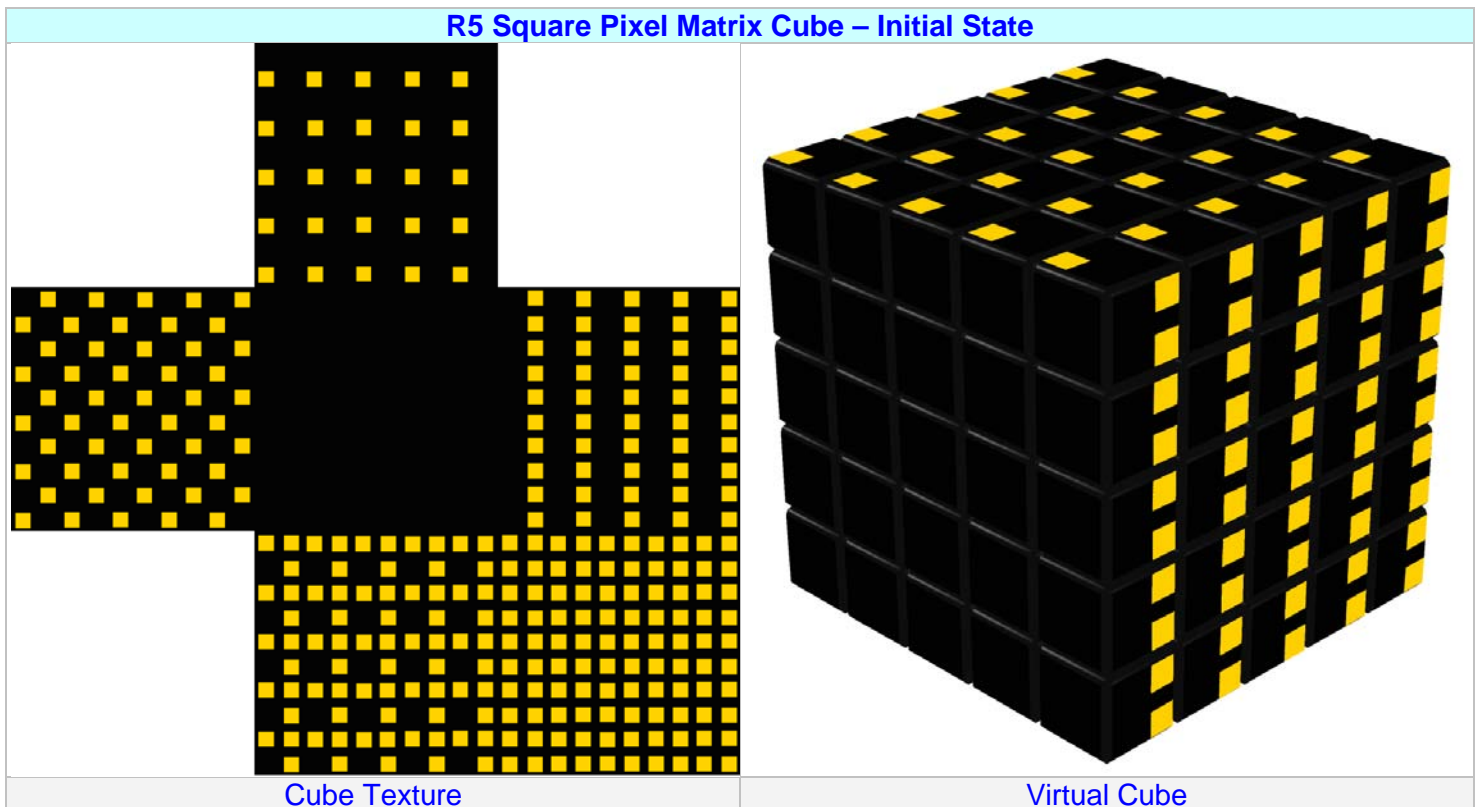
Designers	André Boulouard	Walter and Werner Randelshofer
WebSites	http://www.mementoslangues.fr/	http://www.randelshofer.ch/

Introduction

An **R5 Square Pixel Matrix Cube** is a 5x5x5 **Professor Cube** used to display pixellized characters, symbols, images, smileys and graphs on a 2-dimensional array of square pixels.

Dot Matrix – Useful Links		
http://en.wikipedia.org/wiki/Dot-matrix	http://en.wikipedia.org/wiki/Dot_matrix_display	

There are **virtual cubes** that can be *virtually* rotated and twisted on a computer screen and **real cubes** that can only be *physically* rotated and twisted by hand. A **texture** is laid down on a virtual cube whereas real **stickers** are stuck down on a real cube. A Square Pixel Matrix Cube is designed by placing square pixels on a texture which is then laid down on a virtual cube (see <http://www.randelshofer.ch/> for more details). Characters, symbols and images can be displayed on a *selected* cube face by rotating and twisting some parts of the cube. When this has been achieved, we say that the cube has been *solved*. The following example shows the *initial* state of the cube where there are no square pixels displayed on the front face.



R5 Square Pixel Matrix Cube Features

The cube can be used in 3 modes:

- 1- Mode A (Alpha-numerical square pixel matrix display)
- 2- Mode B (Graph square pixel matrix display)
- 3- Mode C (Picture square pixel matrix display)

There are 6 basic 2x2 pixel patterns that can be displayed on any cubie, from which other patterns can be obtained by a 90°, 180° or 270° rotation.

Letters, numerals and symbols can be best displayed on a matrix of 5x7 or 7x7 pixels.

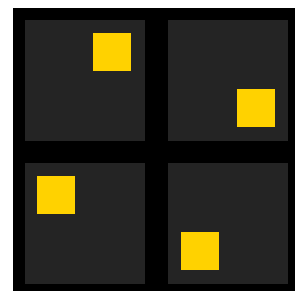
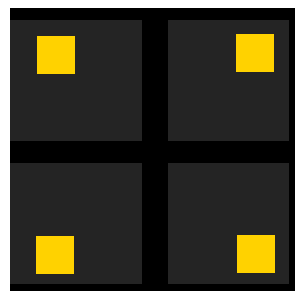
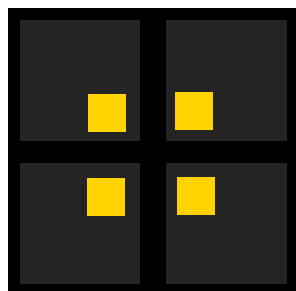
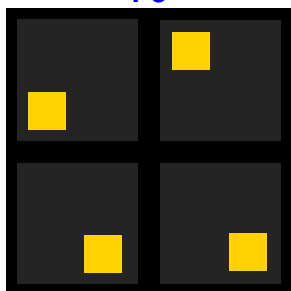
R5 Square Pixel Matrix Cube Patterns

R5 Square Pixel Matrix Cube Patterns

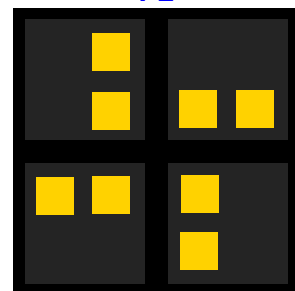
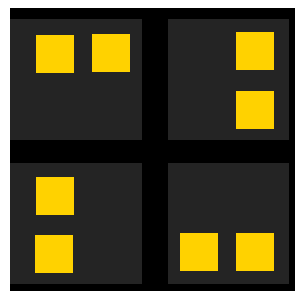
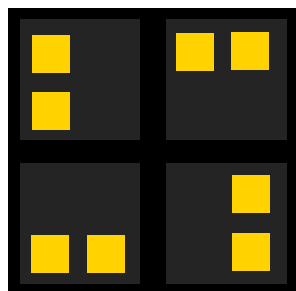
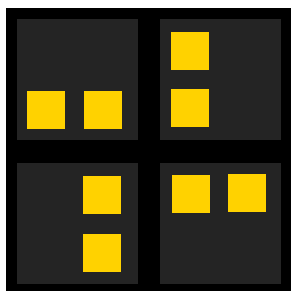
Basic patterns are located Top Left – The 3 other patterns are obtained by a 90°, 180° or 270° rotation

1-dot Patterns: 4 Patterns

P3



2-dot Patterns: 6 Patterns

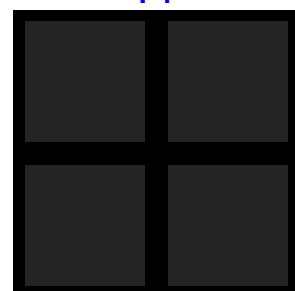
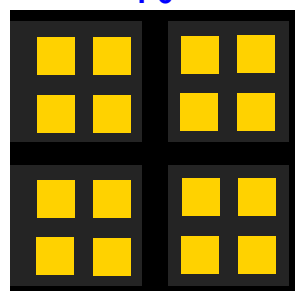
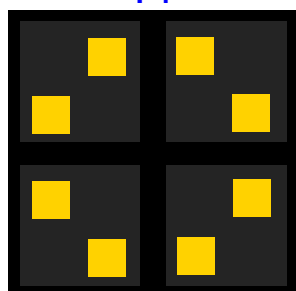
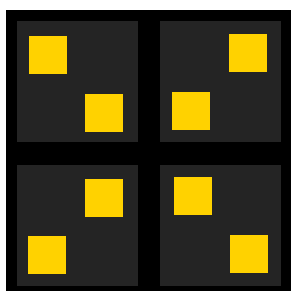


P2

2-dot Patterns (cont'd)

4-dot Pattern

0-dot Pattern



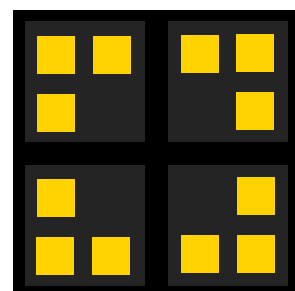
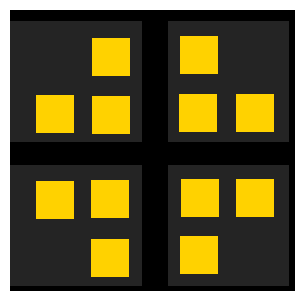
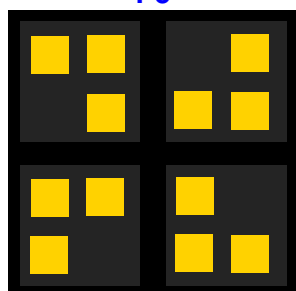
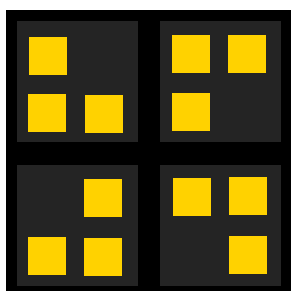
P4

P6

P1

3-dot Patterns: 4 Patterns

P5



Selecting Square Pixel Matrix Cube Patterns

There is a total of 16 different patterns and we have to make a choice on the most suitable patterns.

Patterns P1 – P6 have been selected as explained below:

- 1- There is no unique choice: other patterns could have been selected as well.
- 2- As there are 6 center cubies, only 6 patterns have to be considered.
- 3- One 1-dot, two 2-dot, one 3-dot, one 4-dot and one 0-dot patterns have been selected.
- 4- The same 6 patterns are repeated on all 6 cubies of each face.

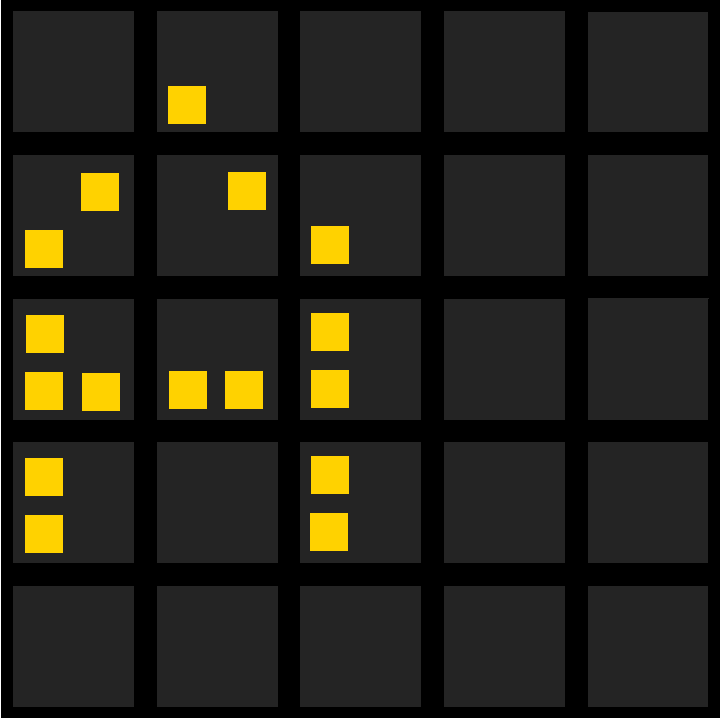
R5 Square Pixel Matrix Cube Display Modes

Alpha-numerical Display Mode: Letters

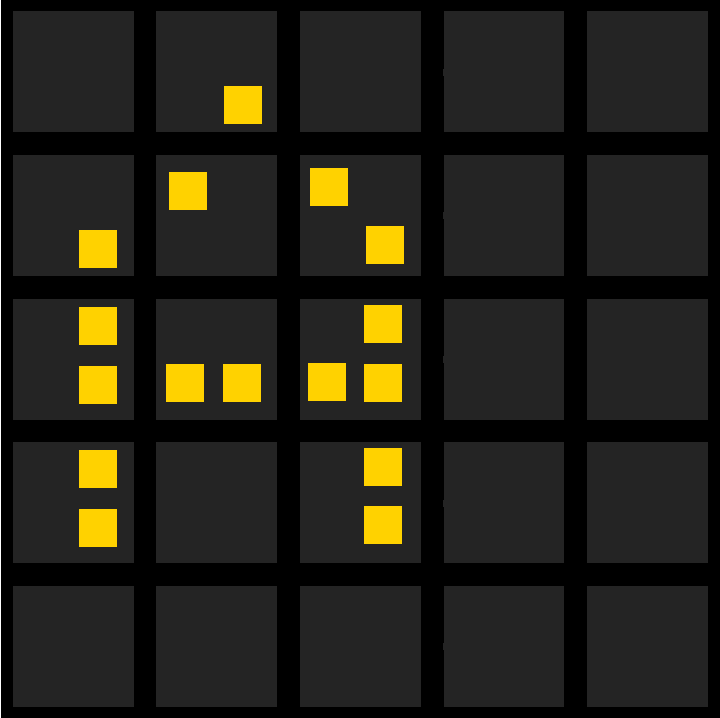
Letter Display Mode

Letters are displayed on a 5x7 pixel matrix

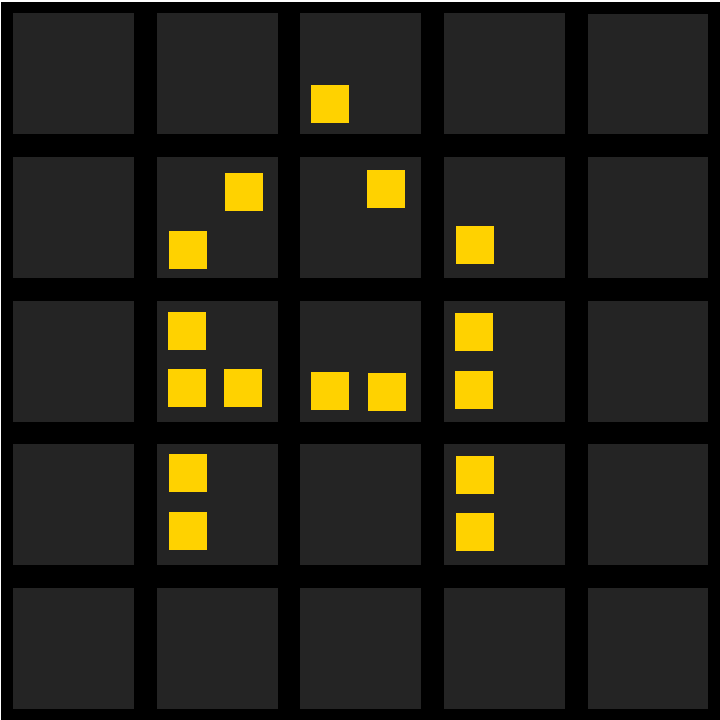
Letter 'A' – Left



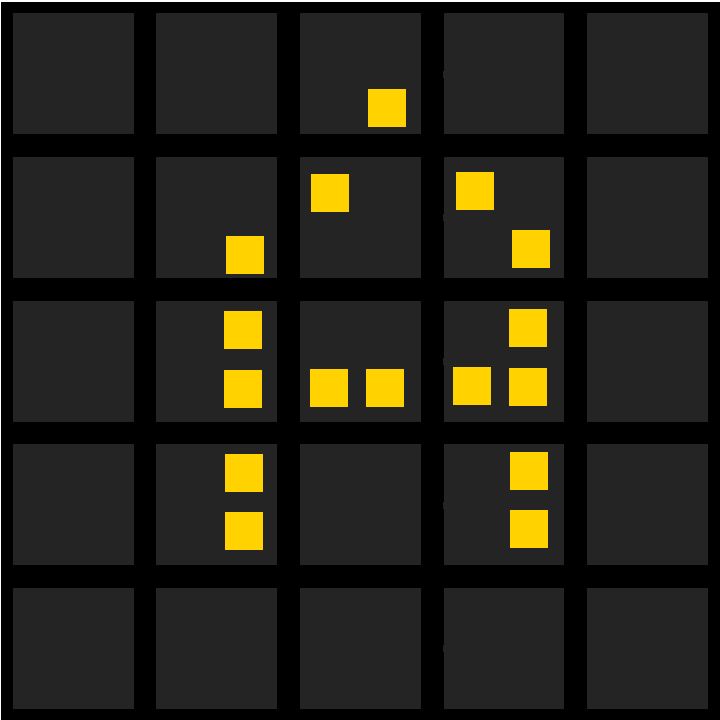
Letter 'A' – Left +1



Letter 'A' – Left+2

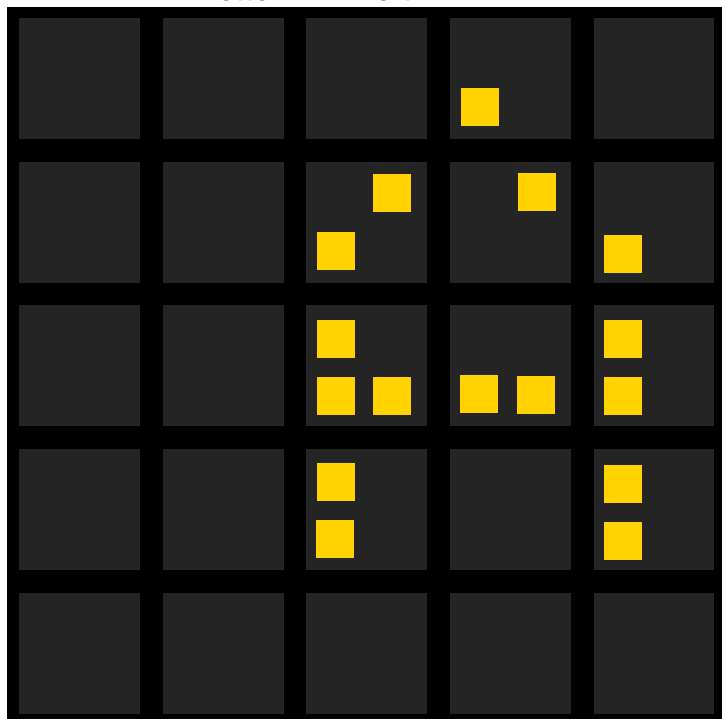


Letter 'A' – Left+3

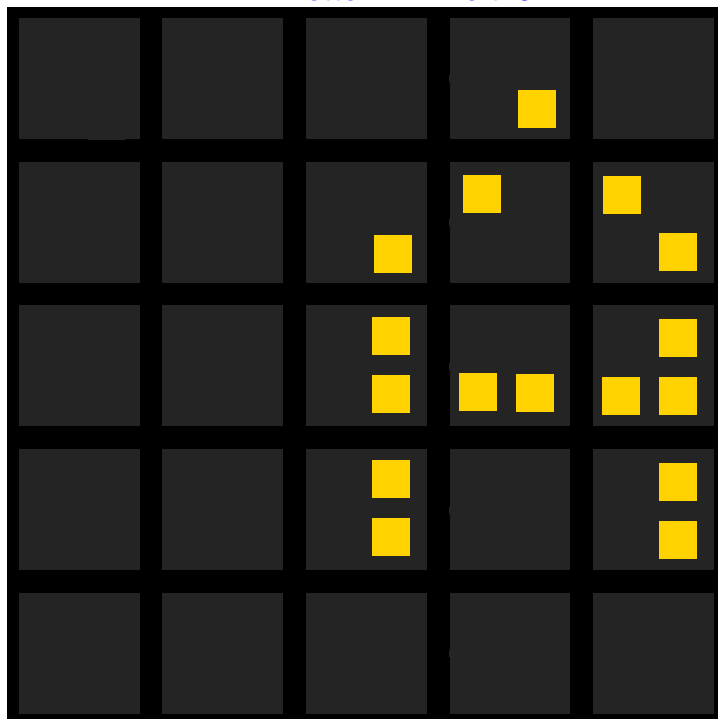


Letter Display Mode
Letters are displayed on a 5x7 pixel matrix

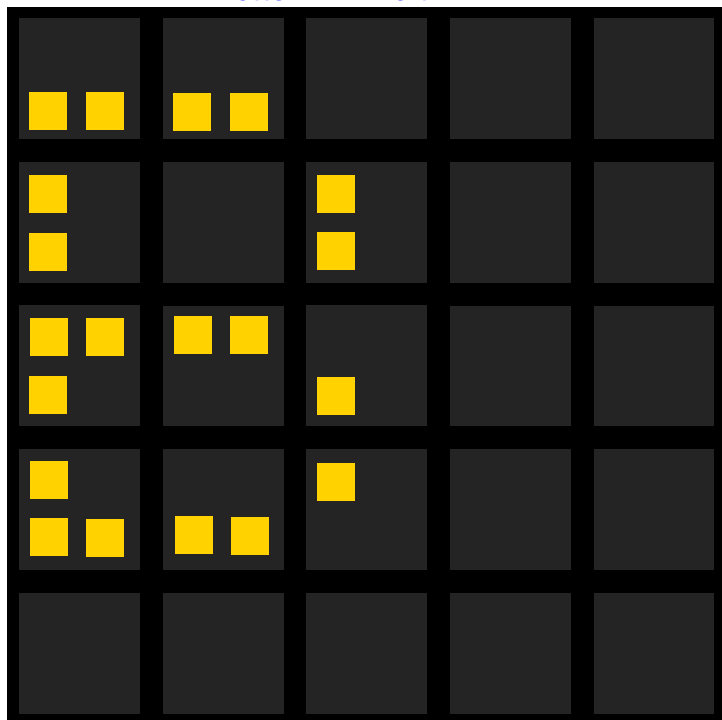
Letter 'A' – Left+4



Letter 'A' – Left+5



Letter 'B' – Left



Letter 'C' – Left

