

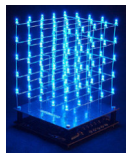
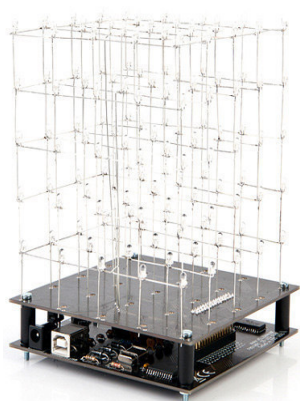
K8018

ILLUSTRATED ASSEMBLY MANUAL H8018IP1

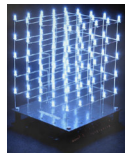
K8018W K8018B

3D LED CUBE
5x5x5

 **velleman**
projects



K8018B (Blue LED)



K8018W (White LED)

Connect to your computer and create
your own 3D LED effect.

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News

NEW PK193 LED CUBE

CubeAnimator software available for download here!!

Posted on 04-06-12

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developments: Kits, Modules,
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It is currently Fri Sep 14, 2012 1:50 pm.

All times are UTC.

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2	Forum administration Velleman Le Forum Forum Discussions Moderation: Velleman Support	1	4	Thu May 03, 2012 1:23 pm VELBUS MD
Velbus				
2	Velbus Home Automation Special section for our new Velbus Home Automation System (domotic) Moderation: Velleman Support	454	3079	Tue Sep 11, 2012 1:11 pm VELBUS MD
Kits (Building projects) - Projects à réaliser				
2	General For other topics, general tips and tricks, new ideas Moderation: Velleman Support	131	428	Wed Sep 05, 2012 9:37 pm VELBUS MD
2	Audio HiFi Projects All audio related projects, amplifiers, valve amplifiers Moderation: Velleman Support	557	1450	Fri Sep 14, 2012 6:03 am VELBUS MD
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Forum



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**Expert soldering
skills required!**



It is advised to start with the mini 3D LED cube MK193. View the assembly movie of MK193 as guideline for assembly of the LEDs.

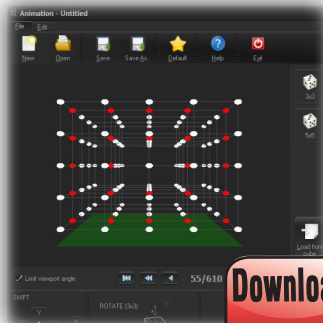
**View
Assembly**



Build your 3D led cube and created unlimited 3D effects. The unit comes standard loaded with effects. Connect to your computer (USB) and create your own!

Features

- LEDs: $5 \times 5 \times 5 = 125$ LEDs
- user programmable via USB (creation of animation/scenes)
- large amount of user programmable frames
- frames are separately dimmable
- 4 transition speeds
- available frames: 3200
- 5 levels LED dimming available
- no coding skills required
- regulated power supply: 9VDC

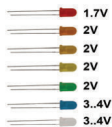


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Software**

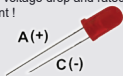


For software, visit www.vellemanprojects.eu

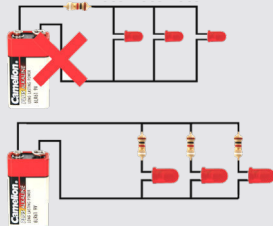
Leds and how to use them



Leds feature a specific voltage drop, depending on type and colour. Check the datasheet for exact voltage drop and rated current !



Never connect leds in parallel



How to Calculate the series resistor:

Example: operate a red led (1.7V) on a 9Vdc source.

Required led current for full brightness: 5mA (this can be found in the datasheet of the led)

$$\frac{\text{Supply voltage (V) - led voltage (V)}}{\text{required current (A)}} = \text{series resistance (ohms)}$$

$$\rightarrow \frac{9V - 1.7V}{0.005A} = 1460 \text{ ohm}$$

closest value :
use a 1k5 resistor

Required resistor power handling=
voltage over resistor x current passed trough resistor

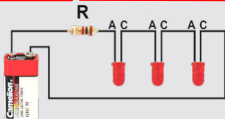
$$\rightarrow (9V - 1.7V) \times 0.005A = 0.036W$$

a standard 1/4W resistor
will do the job

LEDs in series:

Example: 3 x red led (1.7V) on 9V battery

Required led current for full brightness: 5mA
(this can be found in the datasheet of the led)



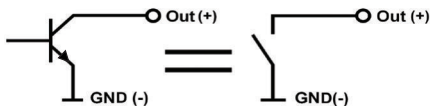
$$\frac{\text{Supply voltage (V) - (number of leds x led voltage (V))}}{\text{required current (A)}} = \text{series resistance (ohms)}$$

$$\rightarrow \frac{9V - (3 \times 1.7V)}{0.005A} = 780 \text{ ohm}$$

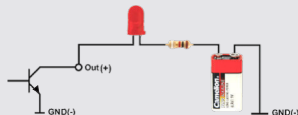
use an
820 ohm resistor

open collector outputs

An open collector output can be compared to a switch which switches to ground when operated



Example: How to switch an LED by means of an open collector output



assembly hints

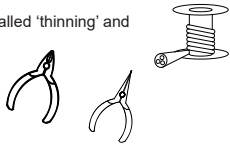
1. Assembly (Skipping this can lead to troubles !)

Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.



1.1 Make sure you have the right tools:

- A good quality soldering iron (25-40W) with a small tip.
- Wipe it often on a wet sponge or cloth, to keep it clean; then apply solder to the tip, to give it a wet look. This is called 'thinning' and will protect the tip, and enables you to make good connections. When solder rolls off the tip, it needs cleaning.
- Thin raisin-core solder. Do not use any flux or grease.
- A diagonal cutter to trim excess wires. To avoid injury when cutting excess leads, hold the lead so they cannot fly towards the eyes.
- Needle nose pliers, for bending leads, or to hold components in place.
- Small blade and Phillips screwdrivers. A basic range is fine.



For some projects, a basic multi-meter is required, or might be handy



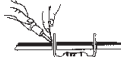
1.2 Assembly Hints :

- Make sure the skill level matches your experience, to avoid disappointments.
- Follow the instructions carefully. Read and understand the entire step before you perform each operation.
- Perform the assembly in the correct order as stated in this manual
- Position all parts on the PCB (Printed Circuit Board) as shown on the drawings.
- Values on the circuit diagram are subject to changes, the values in this assembly guide are correct*
- Use the check-boxes to mark your progress.
- Please read the included information on safety and customer service

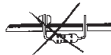
* Typographical inaccuracies excluded. Always look for possible last minute manual updates, indicated as 'NOTE' on a separate leaflet.

1.3 Soldering Hints :

1. Mount the component against the PCB surface and carefully solder the leads

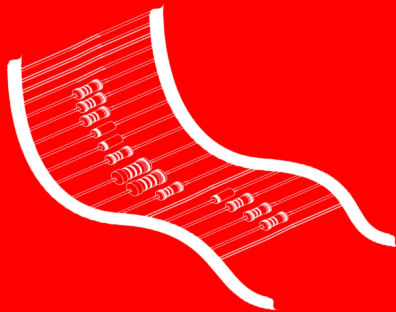


2. Make sure the solder joints are cone-shaped and shiny



3. Trim excess leads as close as possible to the solder joint





REMOVE THEM FROM THE TAPE ONE AT A TIME !

Included in this kit

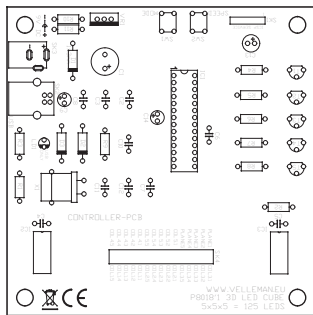
RESISTOR

R1 : 120 (1 - 2 - 1 - B)

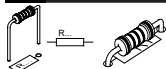
COLOUR	COLOUR NAME	1ST DIGIT/ STRIPE	2ND DIGIT/ STRIPE	3RD DIGIT/ STRIPE	MULTIPLIER STRIPE	TOLE 4TH
Black	BLACK	0	0	0	x1	1%
Brown	BROWN	1	1	1	x10	
Red	RED	2	2	2	x100	
Orange	ORANGE	3	3	3	x1.000	
Yellow	YELLOW	4	4	4	x10.000	
Green	GREEN	5	5	5	x100.000	
Blue	BLUE	6	6	6	x1.000.000	

DO NOT BLINDLY FOLLOW THE ORDER OF THE COMPONENTS ONTO THE TAPE. ALWAYS CHECK THEIR VALUE ON THE PARTS LIST!

P8018 - TOP



1 Resistors



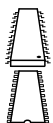
- R1, R2 : 2K2 (2-2-2-B)
- R3 : 10 (1-0-0-B)
- R4 ... R8 : 390 (3-9-1-B)
- R9 : 4K7 (4-7-2-B)
- R10 : 470 (4-7-0-0-1)
- R11 : 1K1 (1-1-0-1-1)

2 Ceramic Capacitors

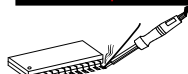


- C2..C6, C8 : 100nF (104)

3 SMD IC

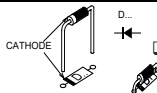


Watch the position of the notch!



- IC2, IC3: STP16CP05

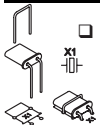
4 Diodes (Check polarity!)



D...

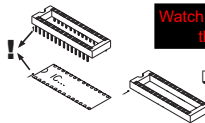
- D1...D3: 1N4007

5 Quartz crystal



- X1 : 12MHz

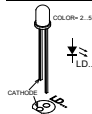
6 IC socket



Watch the position of the notch!

- IC1: 28p

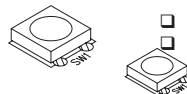
7 LED



Watch the polarity!

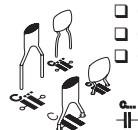
- LD1 : 3mm RED

8 Push buttons



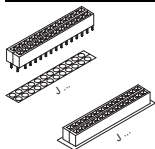
- SW1 : Mode
- SW2 : SPEED

9 Ceramic Capacitors



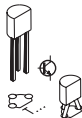
- C7 : 470nF (474)
- C10 : 10nF (103)
- C11, C12 : 22pF (22)

10 Female Header



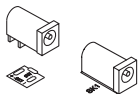
□ SK4 : 30pins

11 Transistors



□ T1 ... T5: BC640

12 DC-Jack



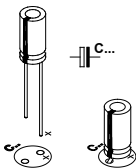
□ SK3 : 9VDC

13 USB connector



□ SK2

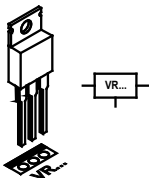
14 Electrolytic capacitors



Watch the polarity!

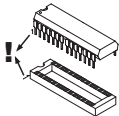
- C9 : 4,7 μ F
- C13 : 100 μ F
- C14 : 10 μ F
- C1 : 470 μ F

15 Voltage regulator



□ VR1 : LM317

13 IC

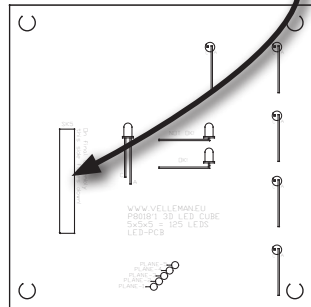
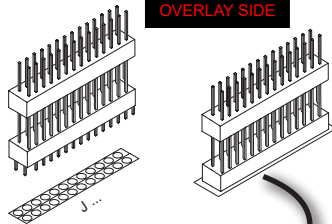


Watch the position of the notch!

□ IC1: VK8018 (programmed PIC18F27J53ISP)

P8018 - BOTTOM

MOUNT ON TOP-OVERLAY SIDE

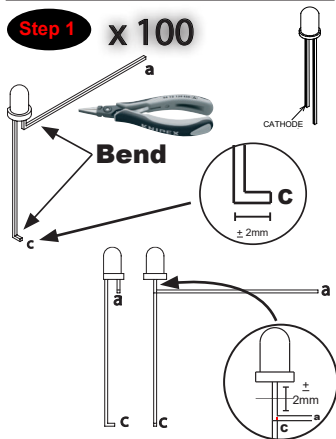


ASSEMBLY OF THE LEDs

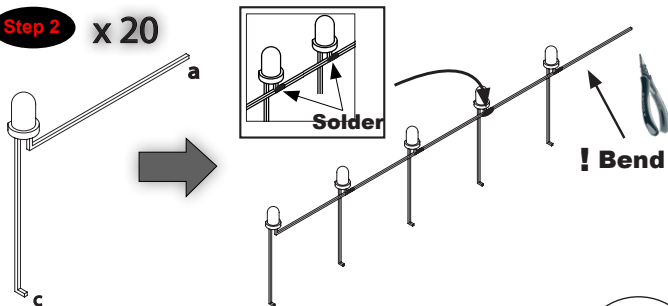


View the assembly movie of MK193 as guideline for assembly of the LEDs.

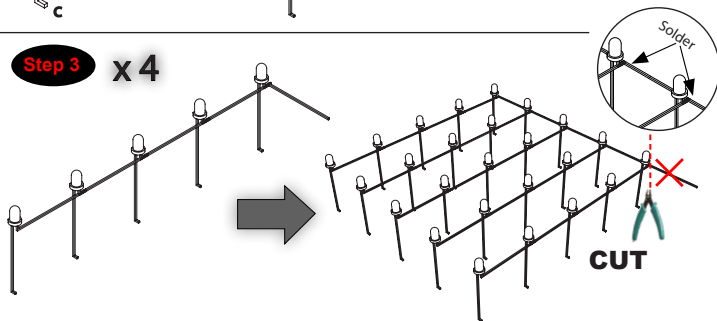
Step 1 x 100



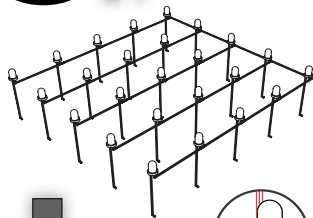
Step 2 x 20



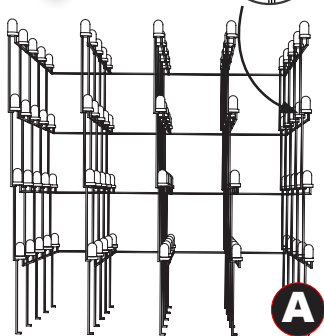
Step 3 x 4



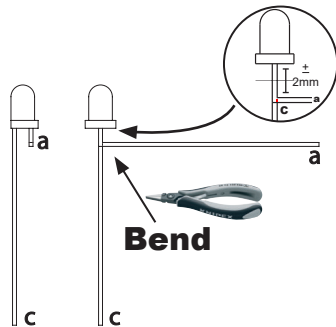
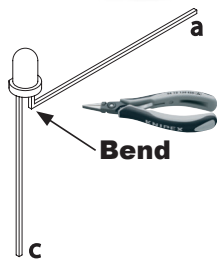
Step 4 x 1



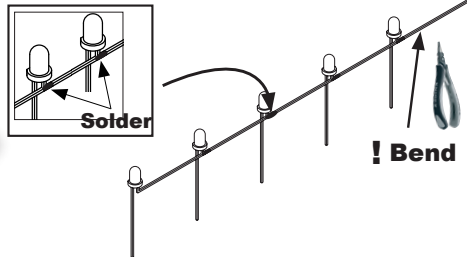
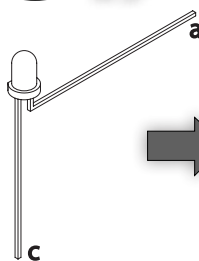
Solder



Step 5 x 25

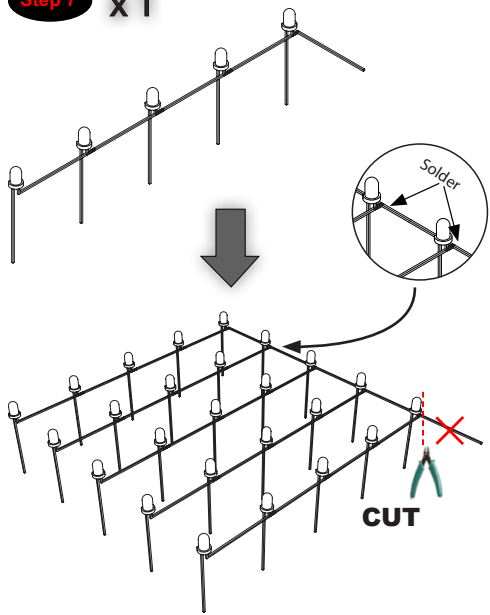


Step 6 x 5

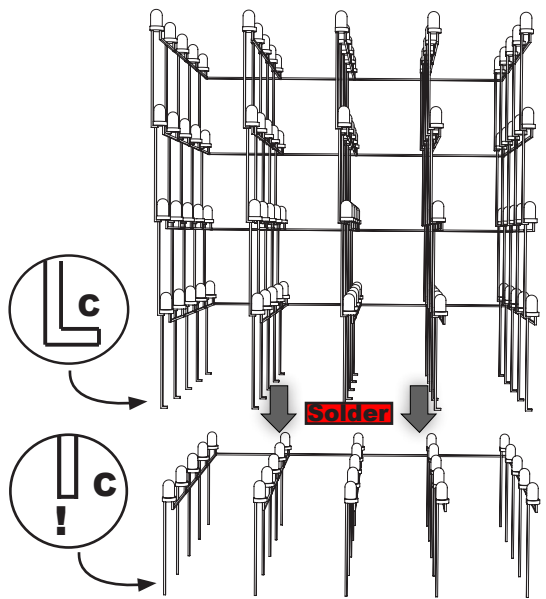


! Bend

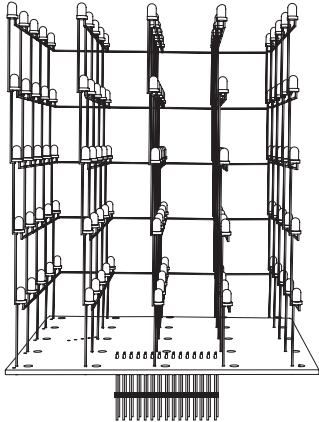
Step 7 x 1



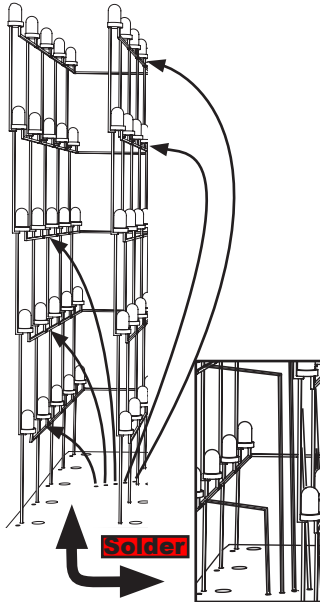
Step 8 x 1



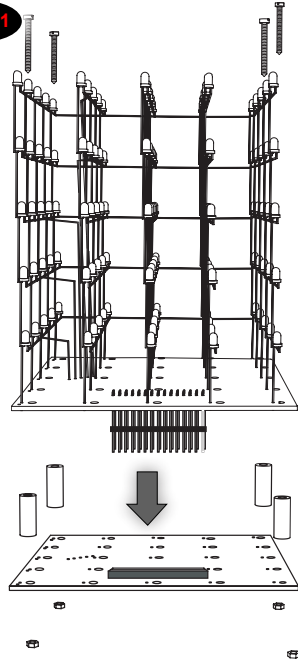
Step 9



Step 10



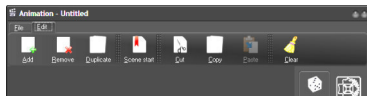
Step 11



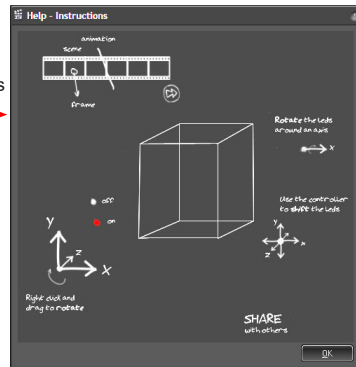



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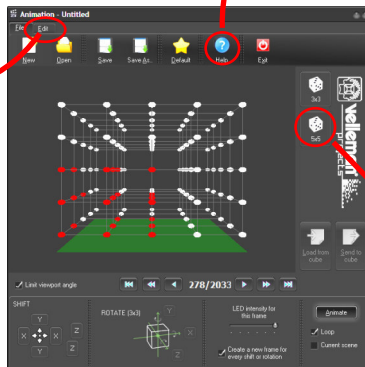
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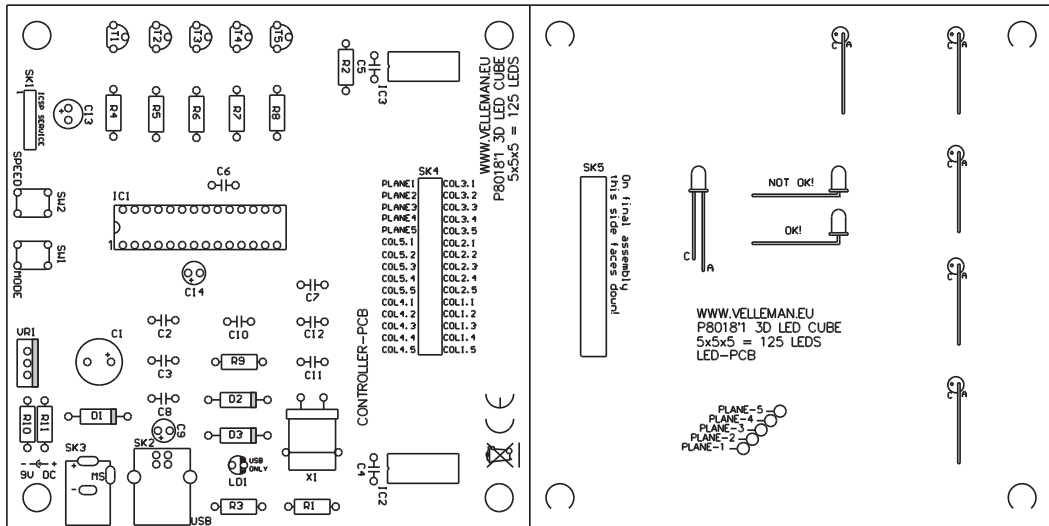
Help instructions

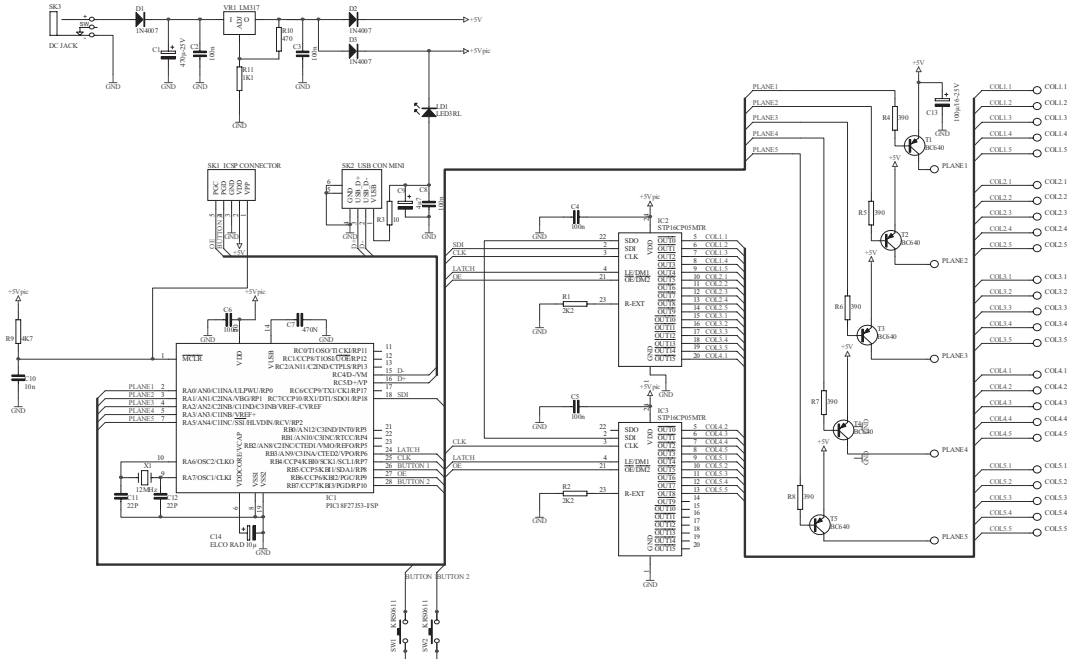


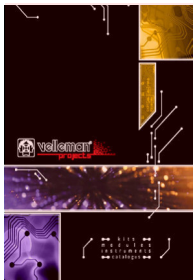
Create, edit or remove your own animation



Choose 5x5 to send or read the animations of your 5x5 LED cube.







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