

K8018

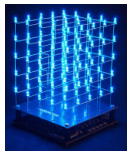
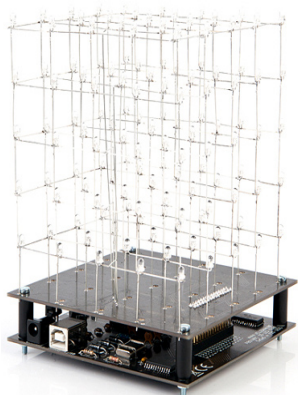
ILLUSTRATED ASSEMBLY MANUAL H8018IP'1

☒ K8018W ☒ K8018B

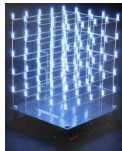
3D LED CUBE 5x5x5



velleman®
projects



K8018B (Blue LED)



K8018W (White LED)

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

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- Products
- Sales outlets
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- Publications
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News

NEW MK193 LED CUBE

CubeAnimator software available for download here!!!

Posted on 04/06/12

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United Kingdom -
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	Topics	Topics	Posts	Last post
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⑧	Forum rules / Règlements du forum Read first / À lire en premier fois Moderation: Velleman Support	3	2	Wed Sep 05, 2008 10:04 pm velleman Ⓜ
⑧	Forum Administration Velleman Software Forum Discussion Moderation: Velleman Support	1	4	Thu May 03, 2012 1:32 pm VELLAD Ⓜ
Velbus				
④	Velbus Home Automation Special section for our new Velbus Home Automation System (Domotica) Moderation: Velleman Support	404	2072	Tue Sep 11, 2012 1:11 pm Dereck Ⓜ
Kits (Soldering projects - Projects & solder)				
④	General For other topics, general tips and tricks, new ideas Moderation: Velleman Support	131	428	Wed Sep 05, 2012 2:07 pm VELA47 Ⓜ
④	Audio Hi-Fi Projects All audio related projects, amplifiers, valve amplifiers Moderation: Velleman Support	337	2400	Fri Sep 14, 2012 8:32 am VELA47 Ⓜ
④	PC Related Projects For projects that are connected to the PC like interface cards Moderation: Velleman Support	1430	6940	Fri Sep 13, 2012 9:04 pm Hark Ⓜ
④	Microcontroller Programmer - Superimposing Projects Here you can discuss PIC programming, example soft. Moderation: Velleman Support	457	1749	Tue Sep 11, 2012 4:12 am Dereck Ⓜ
④	Timers and Clocks All about our time related projects from regular clocks to programmable timers Moderation: Velleman Support	231	896	Fri Sep 07, 2012 8:40 am VELA47 Ⓜ
④	Home Projects Household related projects, from light drivers to remote control Moderation: Velleman Support	636	2283	Fri Sep 14, 2012 10:00 pm VELLAD Ⓜ

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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.

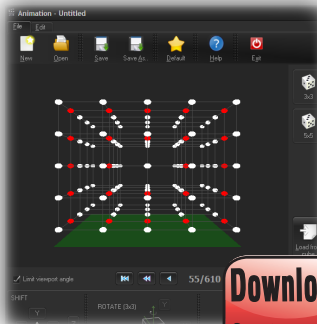
**View
Assembly**



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

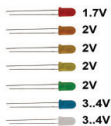


**Download
Software**

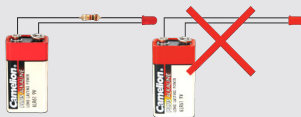
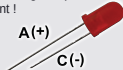


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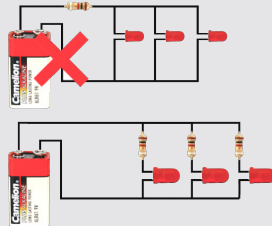
Leds and how to use them



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)

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

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

closest value :
use a 1k5 resistor

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

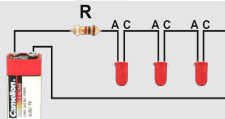
$$\rightarrow (9V - 1.7V) \times 0.005A = 0.036W$$

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)



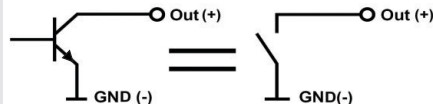
$$\frac{\text{Supply voltage (V)} - (\text{number of leds} \times \text{led voltage (V)})}{\text{required current (A)}} = \text{series resistance (ohms)}$$

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

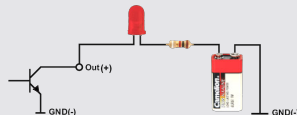
use an
820 ohm resistor

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 !)

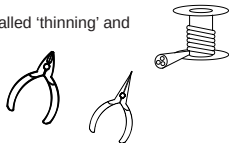
Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.



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



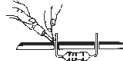
1.2 Assembly Hints :

- 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

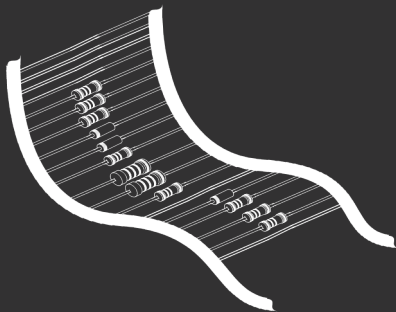


2. Make sure the solder joints are cone-shaped and shiny



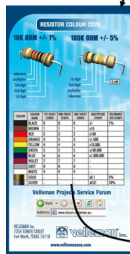
3. Trim excess leads as close as possible to the solder joint



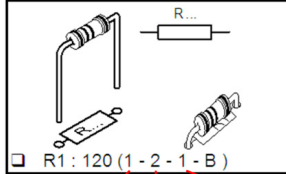


REMOVE THEM FROM THE TAPE ONE AT A TIME !

Included in
this kit



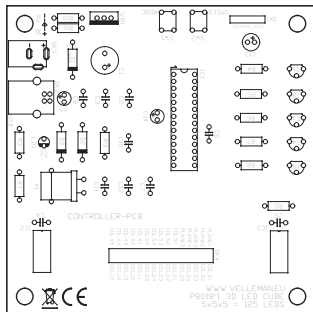
2. RESISTOR



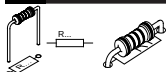
COLOUR	COLOUR NAME	1ST DIGIT/ STRIPE	2ND DIGIT/ STRIPE	3RD DIGIT/ STRIPE	MULTIPLIER STRIPE	TOL- 4TH!
	BLACK	0	0	0	x1	1%
	BROWN	1	1	1	x10	
	RED	2	2	2	x100	
	ORANGE	3	3	3	x1.000	
	YELLOW	4	4	4	x10.000	
	GREEN	5	5	5	x100.000	
	BLUE	6	6	6	x1.000.000	

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

P8018 - TOP



1 Resistors

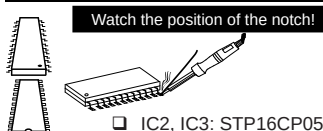


- ☐ R1, R2 : 2K2 (2 - 2 - 2 - B)
- ☐ R3 : 10 (1 - 0 - 0 - B)
- ☐ R4 ... R8 : 390 (3 - 9 - 1 - B)
- ☐ R9 : 4K7 (4 - 7 - 2 - B)
- ☐ R10 : 470 (4 - 7 - 0 - 0 - 1)
- ☐ R11 : 1K1 (1 - 1 - 0 - 1 - 1)

2 Ceramic Capacitors



3 SMD IC



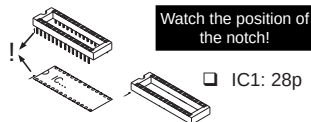
4 Diodes (Check polarity!)



5 Quartz crystal



6 IC socket



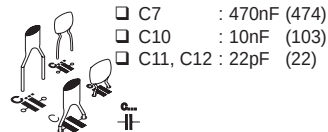
7 LED



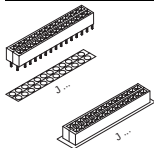
8 Push buttons



9 Ceramic Capacitors

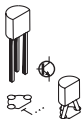


10 Female Header



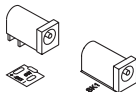
SK4 : 30pins

11 Transistors



T1 ... T5: BC640

12 DC-Jack



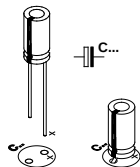
SK3 : 9VDC

13 USB connector



SK2

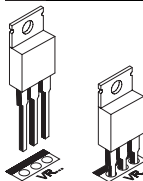
14 Electrolytic capacitors



Watch the polarity!

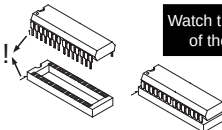
- C9 : 4,7 μ F
- C13 : 100 μ F
- C14 : 10 μ F
- C1 : 470 μ F

15 Voltage regulator



VR1 : LM317

13 IC

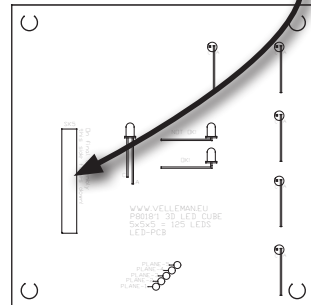
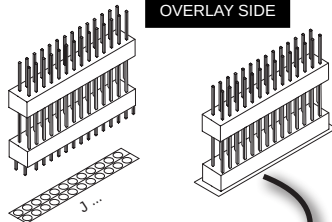


Watch the position of the notch!

IC1: VK8018 (programmed PIC18F27J53ISP)

P8018 - BOTTOM

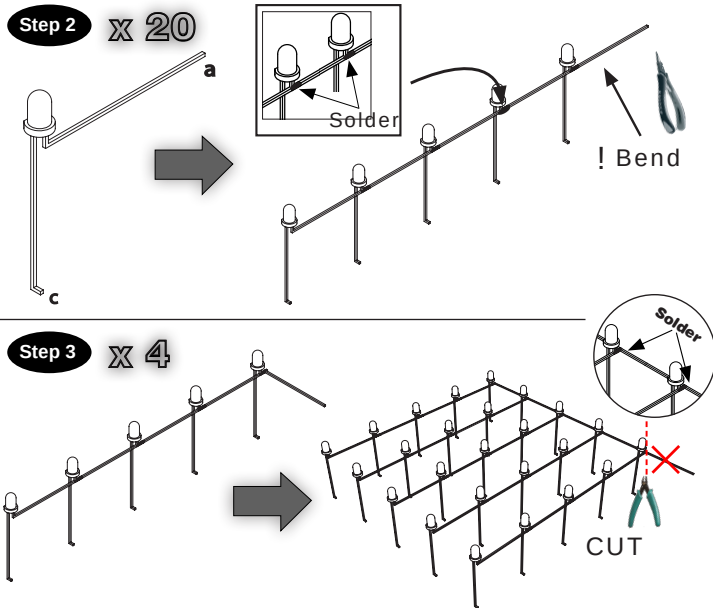
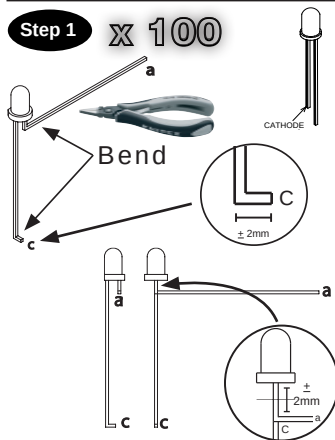
MOUNT ON TOP-OVERLAY SIDE



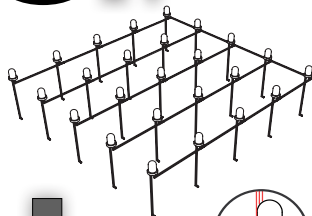
ASSEMBLY OF THE LEDS



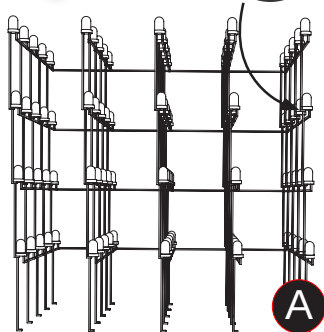
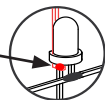
View the assembly movie of MK193 as guideline for assembly of the LEDs.



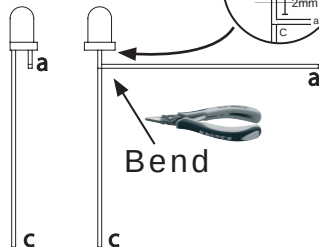
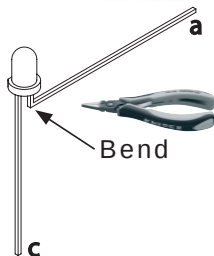
Step 4 X 1



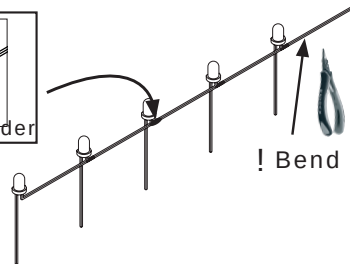
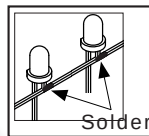
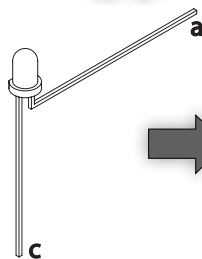
Solder



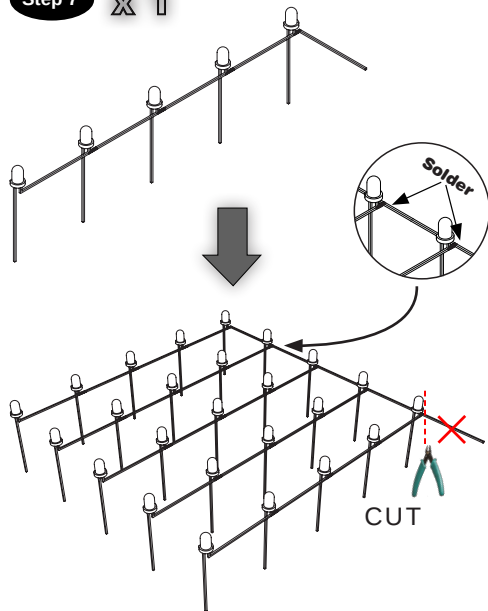
Step 5 X 25



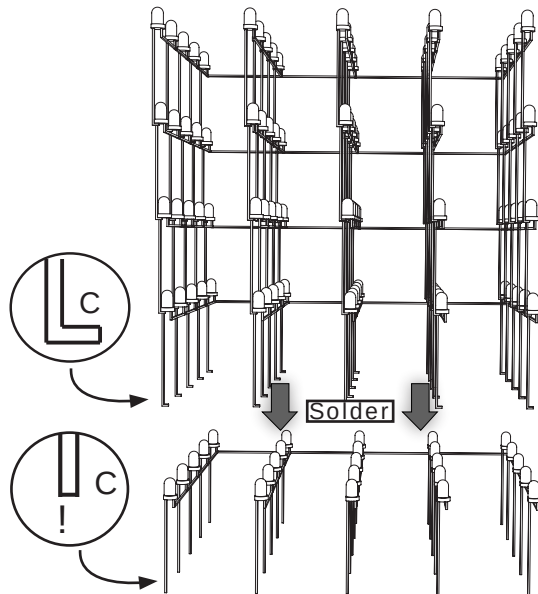
Step 6 X 5



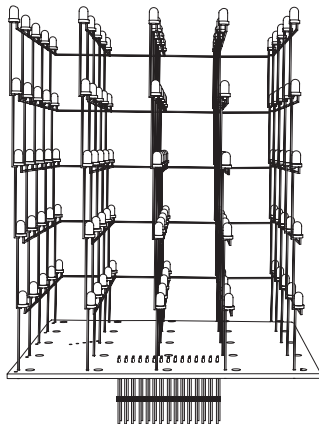
Step 7 X 1



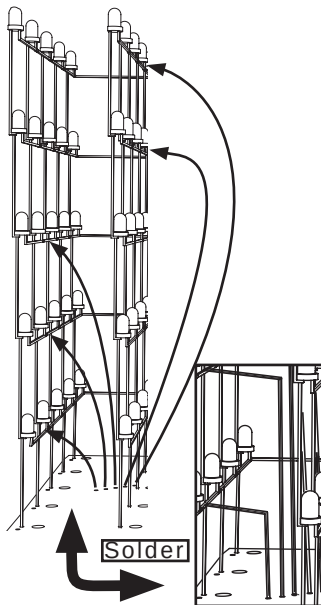
Step 8 X 1



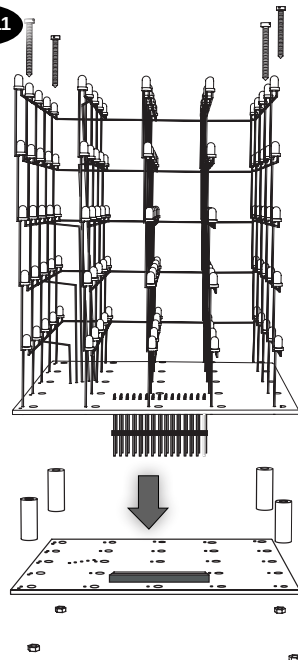
Step 9



Step 10



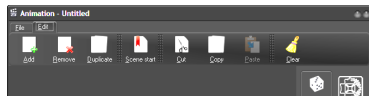
Step 11



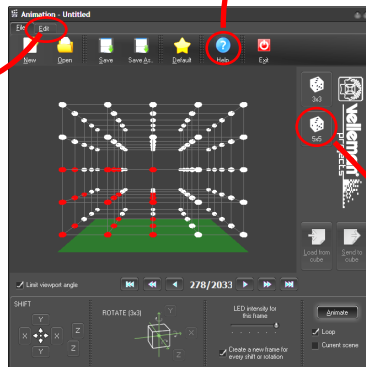


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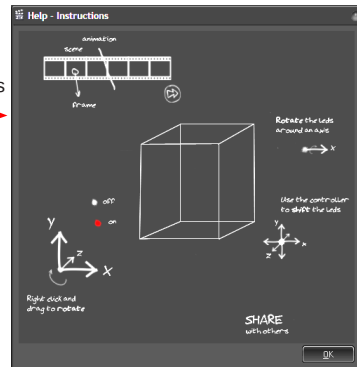
Download the LEDcube software on our website www.velleman.eu



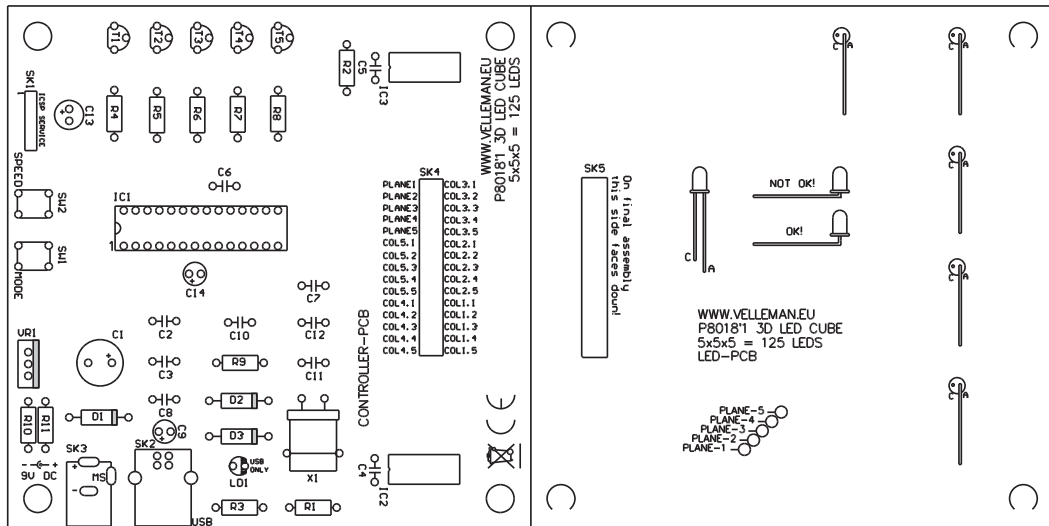
Create, edit or remove your own animation



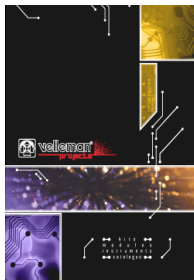
Help instructions



Choose 5x5 to send or read the animations of your 5x5x5 LED cube.







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www.vellemanprojects.eu



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