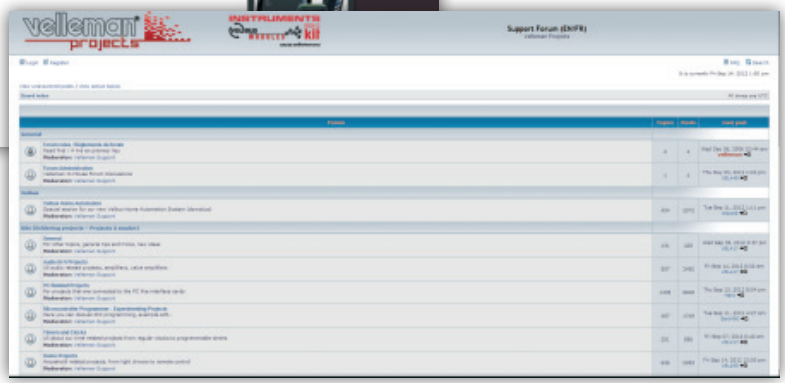
K8025

ILLUSTRATED ASSEMBLY MANUAL H8025IP'1

VIDEO PATTERN GENERATOR

Check the picture quality of your monitor or TV, ideal for adjustment or troubleshooting.



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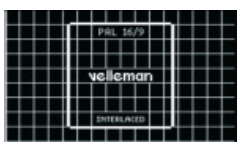
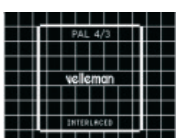
Features

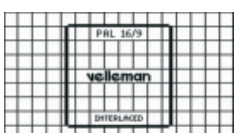
- pocket video generator and fixed audio sine wave
- black and white + gray scale video patterns
- check the picture quality of your monitor or TV
- use for picture adjustment or troubleshooting
- video selections:
  - A PAL or NTSC
  - A interlaced or progressive (non-interlaced)
  - A 12 different patterns included: purity patterns (black, white, gray), grayscale (staircase), square grids, 100% contrast half screens
  - A 4/3 and 16/9 patterns

Specifications

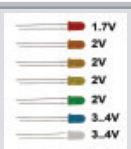
- supply: 3V, CR2032 battery (not included)
- consumption: 12mA (grid signal@75ohm)
- audio output: 1kHz sine wave / 0.7Vrms (10k load)
- video output: 0.8Vpp @ 75 ohm load (staircase signal)
- auto power off: 10 minutes



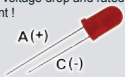




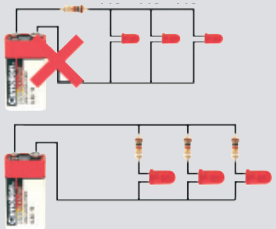
Leds and how to use them



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)

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

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

closest value : use a 1k5 resistor

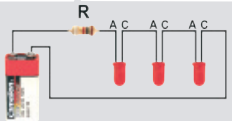
Required resistor power handling=
voltage over resistor x current passed trough resistor

(9V - 1.7V) x 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)



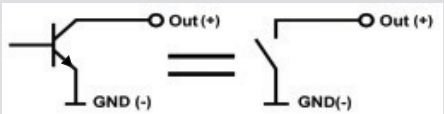
$$\frac{\text{Supply voltage (V) - (number of leds x led voltage (V))}}{\text{required current (A)}} = \text{series resistance (ohms)}$$

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

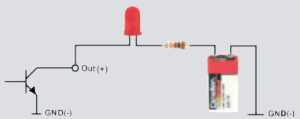
use an 820 ohm resistor

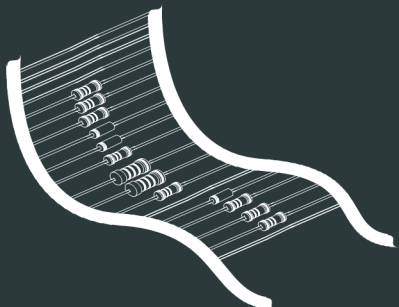
open collector outputs

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

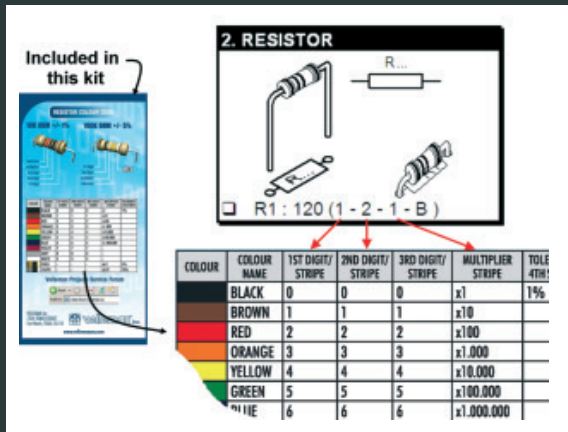


Example: How to switch an LED by means of an open collector output





REMOVE THEM FROM THE TAPE ONE AT A TIME !



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

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.

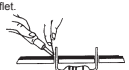
For some projects, a basic multi-meter is required, or might be handy

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 :

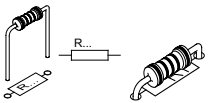


1. Mount the component against the PCB surface and carefully solder the leads

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

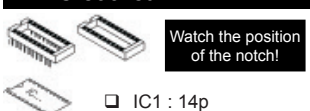
3. Trim excess leads as close as possible to the solder joint

1 Resistors



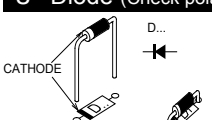
- ❑ R1 ... R3 : 68K (6 - 8 - 3 - B)
- ❑ R4 ... R7 : 680 (6 - 8 - 1 - B)
- ❑ R8 : 330 (3 - 3 - 1 - B)
- ❑ R9, R10 : 180 (1 - 8 - 1 - B)
- ❑ R11 : 560 (5 - 6 - 1 - B)
- ❑ R12 : 1K (1 - 0 - 2 - B)
- ❑ R13 : 120 (1 - 2 - 1 - B)

2 IC-socket



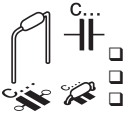
- ❑ IC1 : 14p

3 Diode (Check polarity!)



- ❑ D1: 1N4007

4 Ceramic Capacitor

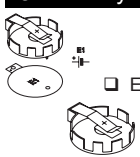


- ❑ C1, C2 : 27pF (27)
- ❑ C3 : 1nF (102)
- ❑ C4,C5 : 220nF (224)

5 Switch

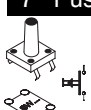
- ❑ SW1 : power on/off

6 Battery holder



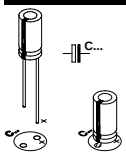
- ❑ E1 : 3V (# part. CR2032)

7 Push button



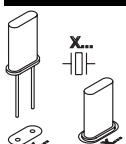
- ❑ SW2 : Pattern

8 Electrolytic capacitor



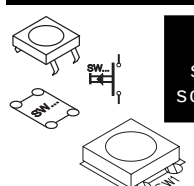
- ❑ C6, C7 : 10µF

9 Quartz crystal



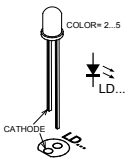
- ❑ X1 : 4MHz

10 Push button



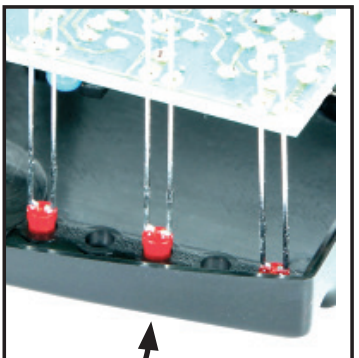
- ❑ SW3 : int / prog

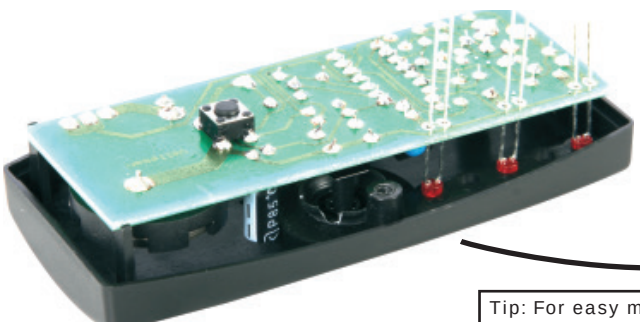
11 LEDs



Watch the polarity!

- ❑ LD1 : Interlace
- ❑ LD2 : NTSC
- ❑ LD3 : PAL



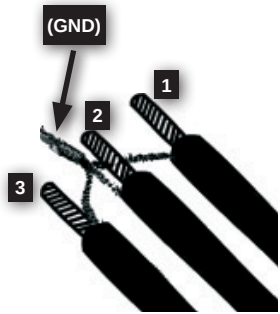


Tip: For easy mounting at the correct height

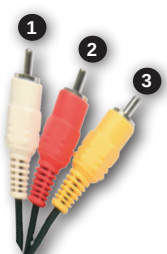
1. Mount the LEDs on the PCB
2. place the PCB with the leds on the front panel on flat surface.
3. Solder the connections.

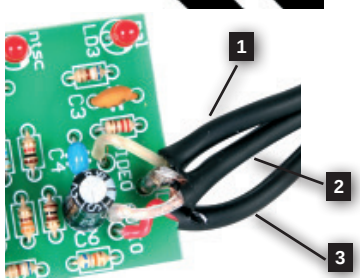
12 RCA plug male cable

- Solder the signal wires of the RCA cable (1,2 &3) to the pcb.
- Solder the shielding cable of the RCA cable together en solder to the GND on the PCB.

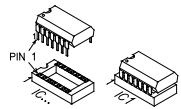


1	Video
2, 3	Audio





13 IC

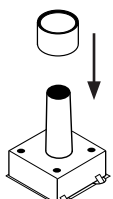


Watch the position of the notch!

❑ IC1: VK8025 (programmed PIC16F1825-I/P)

14 CAP

Mount the black cap on the push button



14 Assembly

fig. 1.0

fig. 2.0

fig. 3.0

1. First make an opening of +/- 4mm heigh in the upper part of the housing. The RCA will run trough. (fig.1.0)
2. Then remove a part of the lip in the lower part of the housing. (fig.2.0)
3. Drill a Ø 10mm hole in the housing according to figure 3.0 if you want to let push button SW2 come trough (fig.3.0)

Do not use the enclosed red button!

4. Insert 1x CR2032 battery into the battery holder. Mind the polarity!
5. Mount all parts and close the housing by means of the enclosed screws.

Beware: do not forget to feed the RCA cable trough the hole in the houding.

6. Now stick the enclosed stickers to the housing;

15 Use

Select pattern:
Select between 12 different patterns.

Setup:
Select between interlaced or progressive video.
Keep the button pressed to select between PAL and NTSC.

On/Off power switch

Interlaced video: This technique uses two fields to create a frame. One field contains all the odd lines in the image, the other contains all the even lines of the image. Only CRT displays and plasma displays are capable of displaying interlaced signals.

Progressive video: is a way of displaying, storing, or transmitting moving images in which all the lines of each frame are drawn in sequence.
Progressive scan is used for most computer monitors, all LCD computer monitors, and most HDTVs.

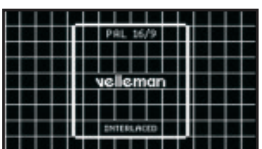
PAL: Phase Alternating Line is an analogue television colour encoding system. It refer to the 625-line/50 Hz (576i) television system in general.

NTSC: National Television System Committee, is the analog television. offers very slightly smoother motion than PAL. NTSC receivers have a tint control to perform colour correction manually. If this is not adjusted correctly, the colours may be faulty. The PAL standard automatically cancels hue errors by phase reversal, so a tint control is unnecessary.

Patterns:

PAL, NTSC : 4/3 square grid *

100% contrast half screens **

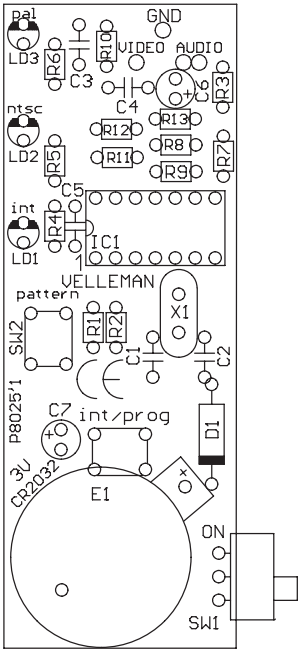


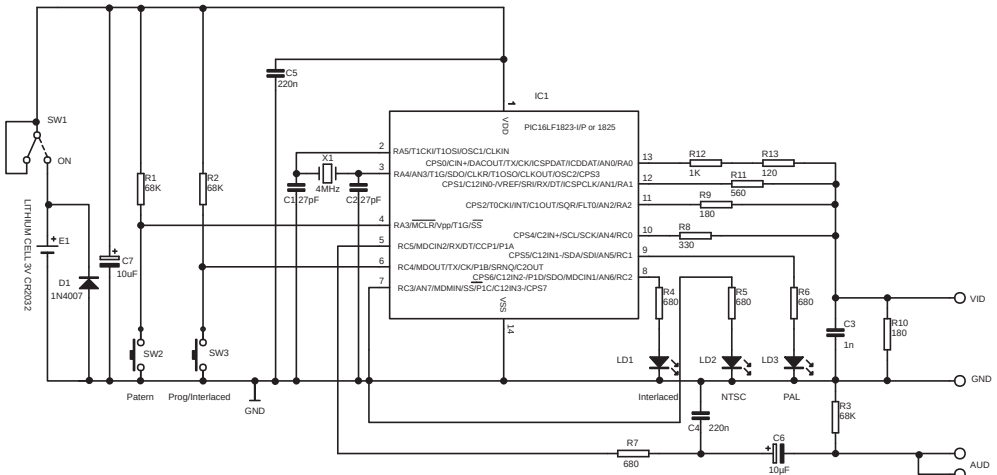
PAL, NTSC : 16/9 square grid *

Purity patterns (black, grey, white)

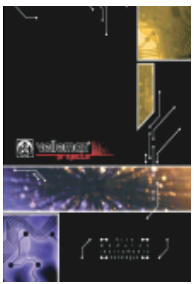
Grayscale (staircase) **

* available also in grey and white pattern
** reverse pattern selectable


pal
LD3
R6
C3
R10
GND
VIDEO
AUDIO
C6
R3
C4
ntsc
LD2
R5
R12
R13
R8
R11
R9
R7
C5
int
LD1
R4
IC1
VELLEMAN
pattern
SW2
R1
R2
X1
C1
C2
P80251
C7
int/prog
D1
3V
CR2032
E1
ON
SW1


IC1
PIC16LF1823-I/P or 1825
VDD
VSS
RA5/T1CKI/T1OSI/OSC1/CLKIN
CPS0/CIN+/DACOUT/TX/CK/ICSPDAT/ICDDAT/AN0/RA0
RA4/AN3/T1G/SDO/CLKR/T1OSO/CLKOUT/OSC2/CPS3
CPS1/C12IN0-/VREF/SRI/RX/DT/ICSPCLK/AN1/RA1
CPS2/T0CKI/INT/C1OUT/SQR/FLT0/AN2/RA2
RA3/MCLR/Vpp/T1G/SS
CPS4/C2IN+/SCL/SCK/AN4/RC0
RC5/MDCIN2/RX/DT/CCP1/P1A
CPS5/C12IN1-/SDA/SDI/AN5/RC1
RC4/MDOUT/TX/CK/P1B/SRNQ/C2OUT
CPS6/C12IN2-/P1D/SDO/MDCIN1/AN6/RC2
RC3/AN7/MDMIN/SS/P1C/C12IN3-/CPS7
SW1
ON
LITHIUM CELL 3V CR2032
E1
D1
1N4007
C7
10uF
R1
68K
R2
68K
X1
4MHz
C1 27pF
C2 27pF
C5
220n
SW2
SW3
Patern
Prog/Interlaced
GND
R12
1K
R13
120
R11
560
R9
180
R8
330
R4
680
R5
680
R6
680
LD1
LD2
LD3
Interlaced
NTSC
PAL
C3
1n
R10
180
VID
GND
C4
220n
R3
68K
R7
680
C6
10µF
AUD

Velleman NV
Legen Heirweg 33
9890 Gavere
(België)



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