

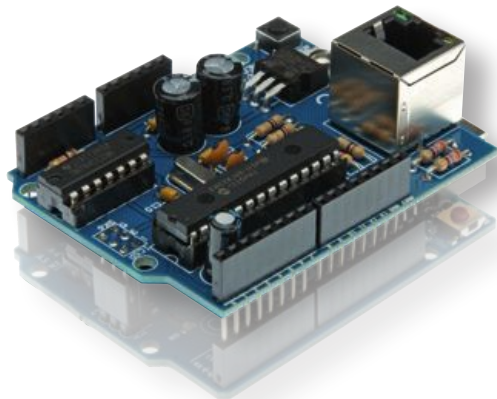
KA04

ILLUSTRATED ASSEMBLY MANUAL HKA04IP'1

Ethernet shield for Arduino®



velleman®
projects



Configure your Arduino™ as a simple web server or let it get data from the worldwide web.

Features

- For use with Arduino Uno™, Arduino Mega™
- Based on Microchip ENC28J60
- IEEE 802.3 compatible Ethernet controller
- Integrated MAC & 10BASE-T PHY
- SPI interface
- With RJ45 connector

Specifications

- Max. clock speed: 20MHz
- Transmit/receive buffer: 8kB
- Dimensions: 68 x 53mm / 2.67 x 2.08"





Velleman N.V.
Legen Heirweg 33
9890 Gavere
(België)

assembly hints

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

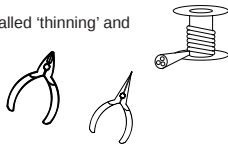
Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.



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

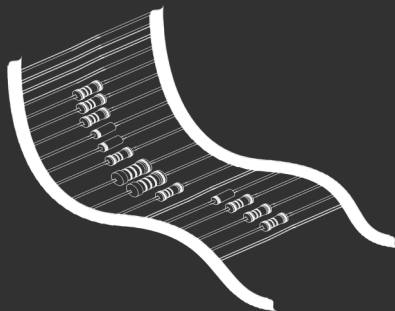


2. Make sure the solder joints are cone-shaped and shiny



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



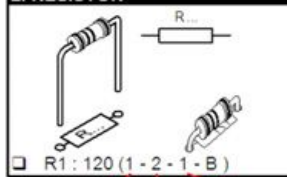


REMOVE THEM FROM THE TAPE ONE AT A TIME !

Included in
this kit



2. RESISTOR



COLOUR	COLOUR NAME	1ST DIGIT/ STRIPE	2ND DIGIT/ STRIPE	3RD DIGIT/ STRIPE	MULTIPLIER STRIPE	TOL 4TH
Black	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	
White	WHITE	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!

I CONSTRUCTION

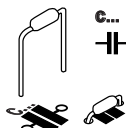
1 Resistors



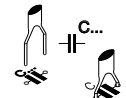
- ☐ R1: 47 (4 - 7 - 0 - B)
- ☐ R2: 47 (4 - 7 - 0 - B)
- ☐ R3: 18 (1 - 8 - 0 - B)
- ☐ R4: 47 (4 - 7 - 0 - B)
- ☐ R5: 47 (4 - 7 - 0 - B)
- ☐ R6: 270 (2 - 7 - 1 - B)
- ☐ R7: 270 (2 - 7 - 1 - B)
- ☐ R8: 2K7 (2 - 7 - 2 - B)
- ☐ R9: 10K (1 - 0 - 3 - B)
- ☐ R10: 10K (1 - 0 - 3 - B)
- ☐ R11: 10K (1 - 0 - 3 - B)



2 Ceramic capacitors

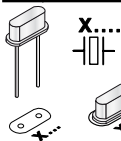


- ☐ C1: 100nF (104)
- ☐ C2: 100nF (104)
- ☐ C3: 100nF (104)
- ☐ C4: 100nF (104)
- ☐ C10: 100nF (104)



- ☐ C7: 15pF (15)
- ☐ C8: 15pF (15)

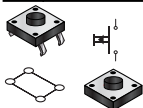
3 Crystal



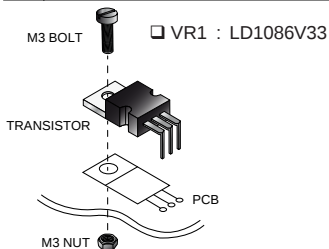
X....

☐ X1 : 25MHz

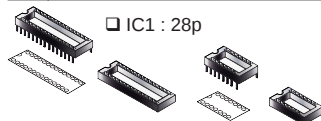
4 Push button

☐ SW1 : Reset

5 Voltage regulator

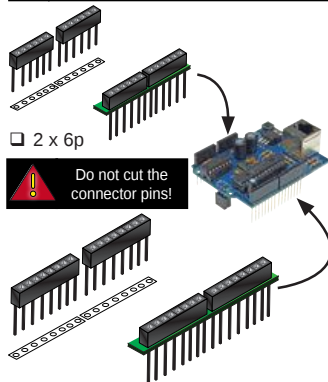


6 IC socket

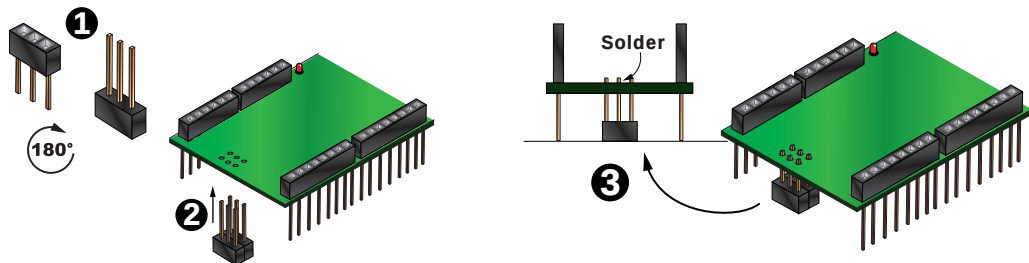
☐ IC1 : 28p☐ IC1 : 14p

Watch the position of the notch!

7 Female header

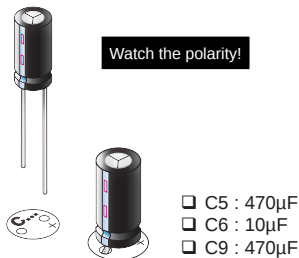
☐ 2 x 6p

Do not cut the connector pins!



□ SK6: 2 x 3p

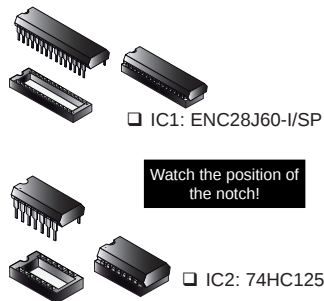
8 Electrolytic capacitors



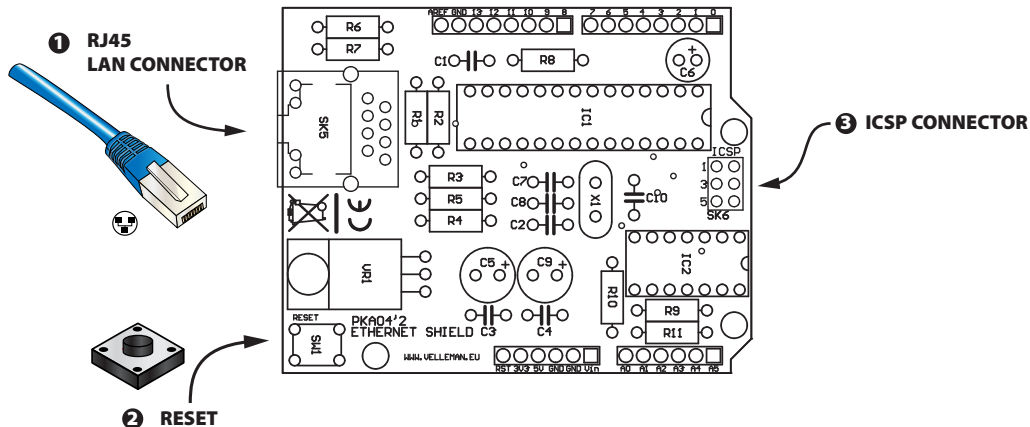
9 LAN connector



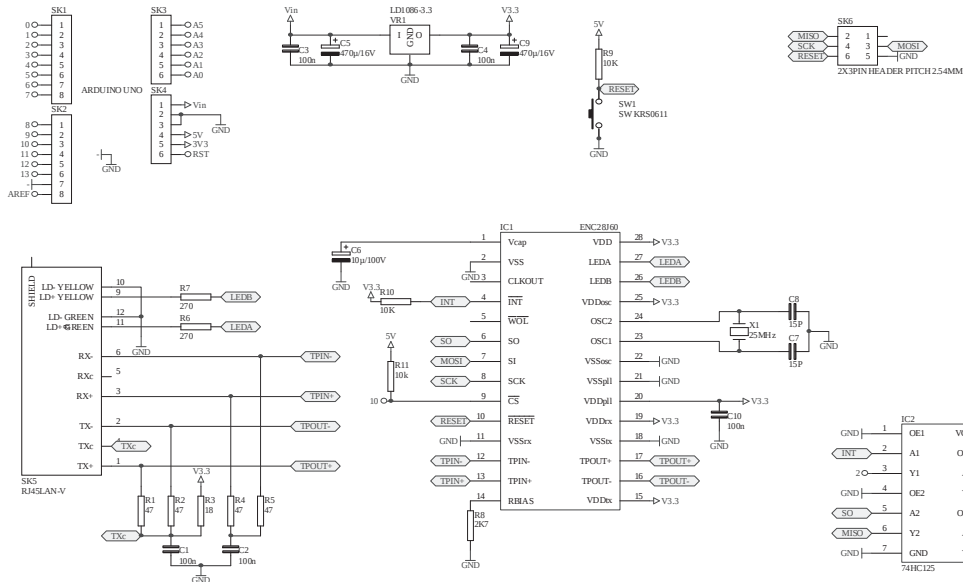
10 IC

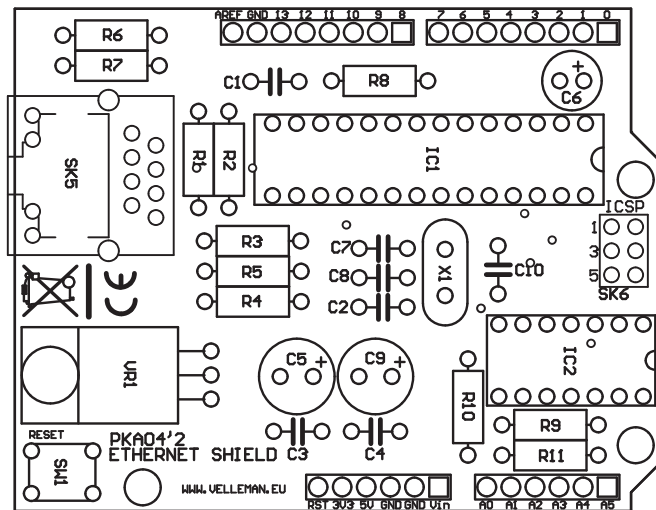


II CONNECTION DIAGRAM

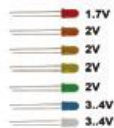


DOWNLOAD SAMPLE CODE FROM KA04 PAGE ON WWW.VELLEMANN.BE

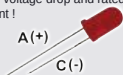




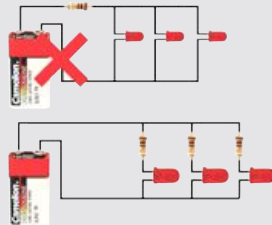
Leds and how to use them



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)

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



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

closest value :
use a 1k5 resistor

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

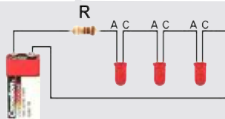


$$(9V - 1.7V) \times 0.005A = 0.036W$$

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)



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

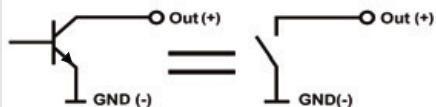


$$\frac{9V - (3 \times 1.7V)}{0.005A} = 780 \text{ ohm}$$

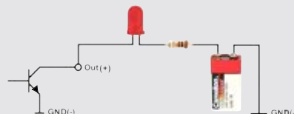
use an
820 ohm resistor

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





The new Velleman Projects catalogue is
now available. Download your copy here:
www.vellemanprojects.eu



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