

Total solder points: 290

Difficulty level:

beginner 1  2  3  4  5  advanced



# K8005

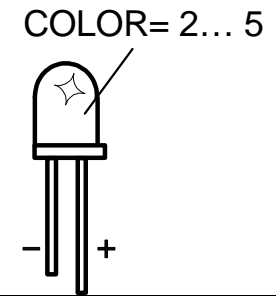
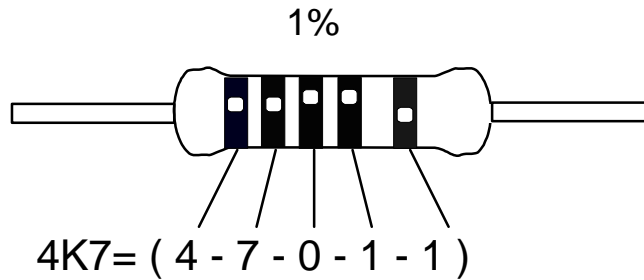
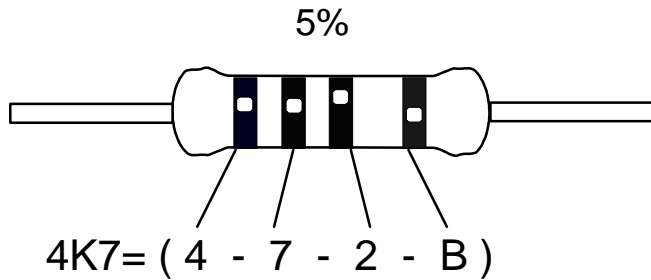
## INTERFACE CARD FOR STEPPER MOTOR

- For unipolar and bipolar motors (maximum 1A).
- Uses K8000 interface for connection with PC.
- High precision stepping possible (Up to 0.9°, or even more when using a motor with reduction).
- A high precision stepping motor is included.
- While the motor turns you can simultaneously check the status of switches using K8000, or drive another motor.
- You can give an emergency stop signal by software at any time.
- Test program included.
- Manual test buttons to test the card without interface.
- Can be used in every application where positioning is needed (For example a plotter, printer, a valve, robot projects, lightshow..).

### Specifications

- I<sup>2</sup>C controlled via K8000
- Communication address of the card selectable via DIP-switches on the PCB
- Adjustable drive speed
- Programmable in Turbo Pascal for Dos, Quick Basic and Visual Basic
- Emergency stop can be send to one or all cards
- Supply: 7..25 Volt DC or AC - 1,5 A (Maximum current depends on motor type)
- Dimensions: 100mm x 90mm

modifications reserved

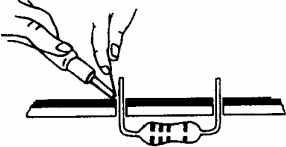
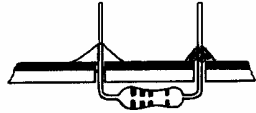
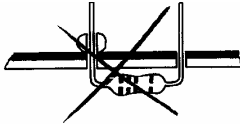
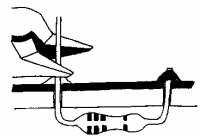


C O D E	I	P	E	SF	S	DK	N	D	GB	F	NL	C O D E
	<i>CODICE COLORE</i>	<i>CODIGO DE CORES</i>	<i>CODIGO DE COLORES</i>	<i>VÄRI KOODI</i>	<i>FÄRG SCHEMA</i>	<i>FARVE KODE</i>	<i>FARGE KODE</i>	<i>FARB KODE</i>	<i>COLOUR CODE</i>	<i>CODIFI- CATION DES COU- LEURS</i>	<i>KLEUR KODE</i>	
0	Nero	Preto	Negro	Musta	Svart	Sort	Sort	Schwarz	Black	Noir	Zwart	0
1	Marrone	Castanho	Marrón	Ruskea	Brun	Brun	Brun	Braun	Brown	Brun	Bruin	1
2	Rosso	Encarnado	Rojo	Punainen	Röd	Rød	Rød	Rot	Red	Rouge	Rood	2
3	Aranciato	Laranja	Naranjado	Oranssi	Orange	Orange	Orange	Orange	Orange	Orange	Oranje	3
4	Giallo	Amarelo	Amarillo	Keltainen	Gul	Gul	Gul	Gelb	Yellow	Jaune	Geel	4
5	Verde	Verde	Verde	Vihreä	Grön	Grøn	Grønn	Grün	Green	Vert	Groen	5
6	Blu	Azul	Azul	Sininen	Blå	Blå	Blå	Blau	Blue	Blue	Blauw	6
7	Viola	Violeta	Morado	Purppura	Lila	Violet	Violet	Violet	Purple	Violet	Paars	7
8	Grigio	Cinzento	Gris	Harmaa	Grå	Grå	Grå	Grau	Grey	Gris	Grijs	8
9	Bianco	Branco	Blanco	Valkoinen	Vit	Hvid	Hvidt	Weiss	White	Blanc	Wit	9
A	Argento	Prateado	Plata	Hopea	Silver	Sølv	Sølv	Silber	Silver	Argent	Zilver	A
B	Oro	Dourado	Oro	Kulta	Guld	Guld	Guldl	Gold	Gold	Or	Goud	B

## ASSEMBLY STEPS

### Required tools to assemble the kit:

- Use a small soldering iron of max. 40W.
- Use thin (1mm) solder, do not use any flux.
- Use a small cutter to trim the excess wires.

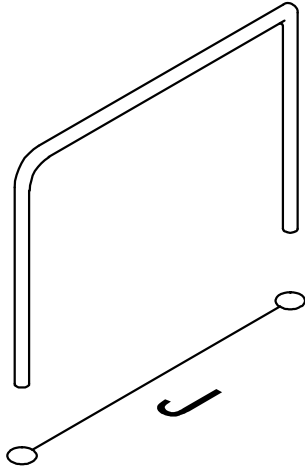
- |  |  |  |  |
|--|--|--|--|
| <p>1. </p> <p>Mount the components against the PCB surface and carefully solder the leads in place.</p> | <p>2. </p> <p>Obtain cone-shaped, shiny soldered joints by heating up the component leads sufficiently.</p> | <p>3. </p> <p>This solder joint results in a bad connection.</p> | <p>4. </p> <p>Trim the excess wires up to the level of the solder</p> |
|--|--|--|--|

- Careless assembly will certainly lead to problems.
  - Insert the part, oriented correctly, into its correct holes in the PCB.
  - Mount the components in the correct order as stated in this manual.
  - Do NOT remove the components from the tape, as they are in the correct mounting order.
  - The component values in the circuit diagram are for reference only. The values in this parts list are correct and must be followed.
  - Use the boxes  to check off your progress.
- ☞ Before starting to build, read also the general guidelines

### How the stepper motor card is built:

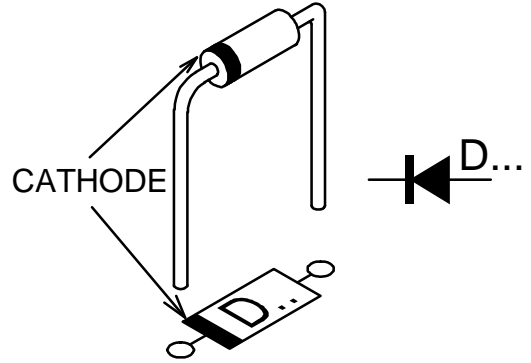
1. Mount the components (sections 1 to 17).
2. Select the MotorCard number (Select 0 if you have only one card connected to the K8000, see section 18).
3. Connect the card (section 19)
4. Test the card (see section 20).
5. Install the diskette by running the INSTALL.EXE program on the disk.
6. Read the manual on-screen, or make a hard copy of the files.

## 1. JUMPERS



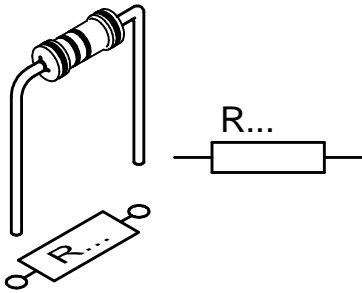
- J1
- J2
- J3
- J4
- J5
- J6
- J7
- J8
- J9
- J10
- J11

## 2. DIODES (Check the polarity!)



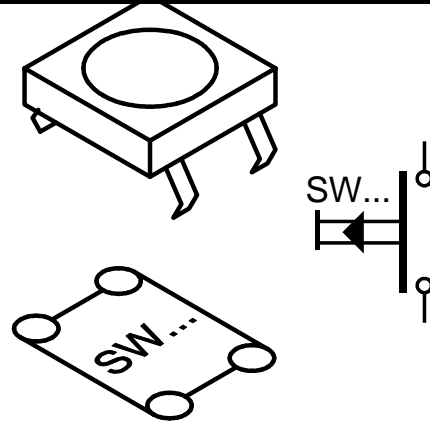
- D1: 1N4148
- D2: 1N4148
- D3: 1N4148
- D4: 1N4148
- D5: 1N4148
- D6: 1N4148
- D7: 1N4148
- D8: 1N4148
- D9: 1N4007
- D10: 1N4007
- D11: 1N4007
- D12: 1N4007
- D13: 1N4007
- D14: 1N4007
- D15: 1N4007
- D16: 1N4007
- D17: 1N4007
- D18: 1N4007
- D19: 1N4007
- D20: 1N4007
- D21: 1N4148

### 3. 1/4W RESISTORS



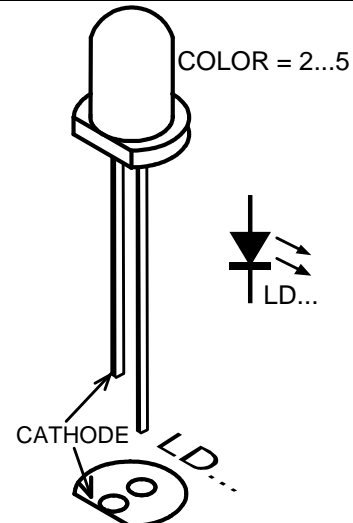
- R1: 680 (6-8-1)
- R2: 270 (2-7-1)
- R3: 1K8 (1-8-2)
- R4: 5K6 (5-6-2)
- R5: 5K6 (5-6-2)
- R6: 270 (2-7-1)
- R7: 1K8 (1-8-2)
- R8: 680 (6-8-1)
- R9: 680 (6-8-1)
- R10: 5K6 (5-6-2)
- R11: 270 (2-7-1)
- R12: 1K8 (1-8-2)
- R13: 5K6 (5-6-2)
- R14: 270 (2-7-1)
- R15: 1K8 (1-8-2)
- R16: 5K6 (5-6-2)
- R17: 680 (6-8-1)
- R18: 5K6 (5-6-2)
- R19: 5K6 (5-6-2)
- R20: 5K6 (5-6-2)
- R21: 5K6 (5-6-2)
- R22: 10K (1-0-3)
- R23: 100K (1-0-4)
- R24: 100K (1-0-4)
- R25: 5K6 (5-6-2)
- R26: 5K6 (5-6-2)
- R27: 330 (3-3-1)
- R28: 1K (1-0-2)
- R29: 1K (1-0-2)

### 4. PUSH BUTTONS



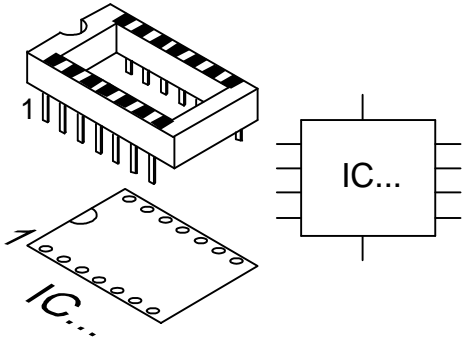
- SW2 :KRS-0611
- SW3 :KRS-0611

### 5. LED's (Check the polarity!)



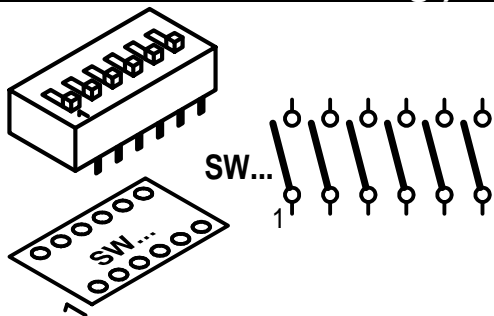
- LD1: 5MM(2)

### 6. IC SOCKETS (Check the position of the notch!)



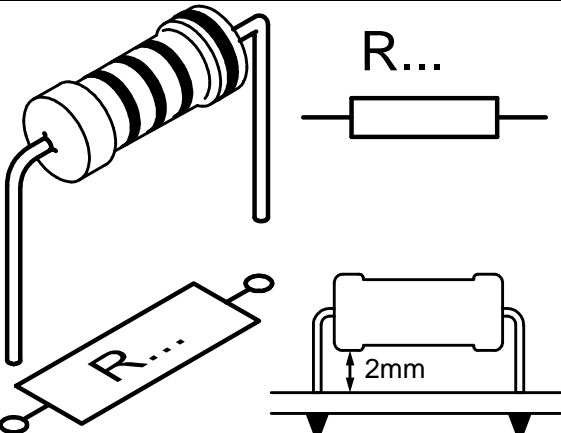
- IC1: 14P
- IC2: 14P
- IC3: 14P
- IC4: 18P

### 7. DIP SWITCHES (Check the position of the numbering!)



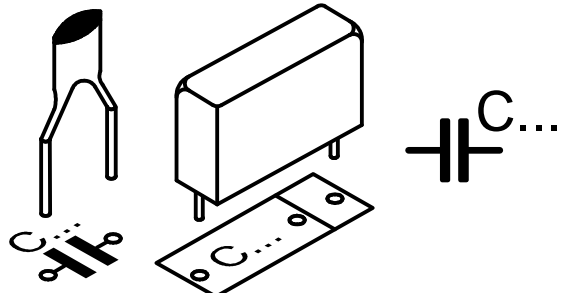
- SW1: DS-4

### 8. 1W RESISTORS



- R31: 3.3 (3-3-A)
- R30: 3.3 (3-3-A)

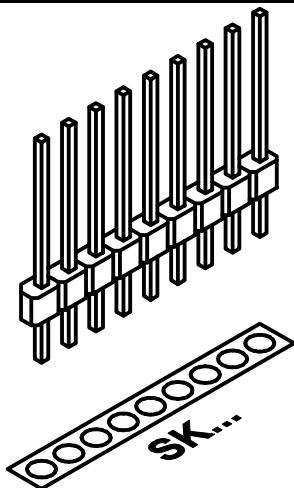
### 9. CAPACITORS



- C1: 100nF (0.1µF - 104)
- C2: 100nF(0.1µF - 104)
- C3: 18 pF
- C4: 18 pF

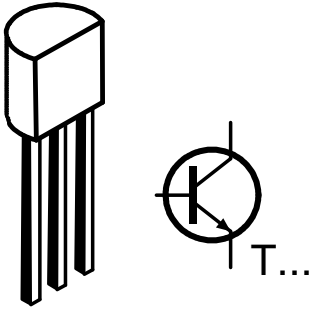
### 10. PIN HEADER

Cut to the desired number of pins



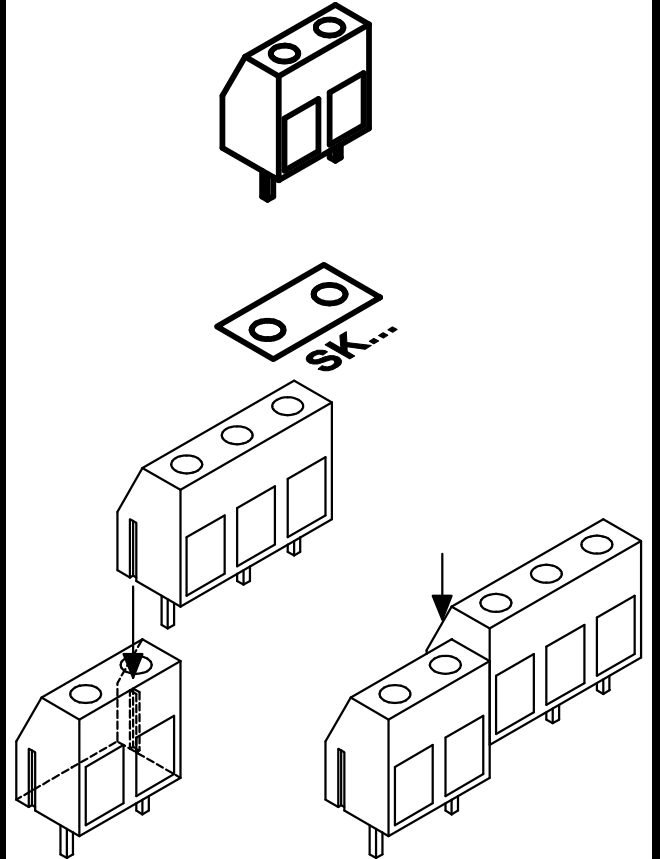
- SK1: Do not mount for now. Use only for optional driver card.
- SK2: 5 Pins

## 11. TRANSISTORS



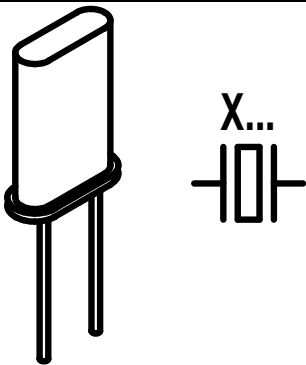
- T1: BC640
- T2: BC639
- T3: BC549
- T4: BC549
- T5: BC640
- T6: BC639
- T7: BC640
- T8: BC639
- T9: BC549
- T10: BC549
- T11: BC640
- T12: BC639

## 13. PCB TERMINAL BLOCK (First slide them into each other)



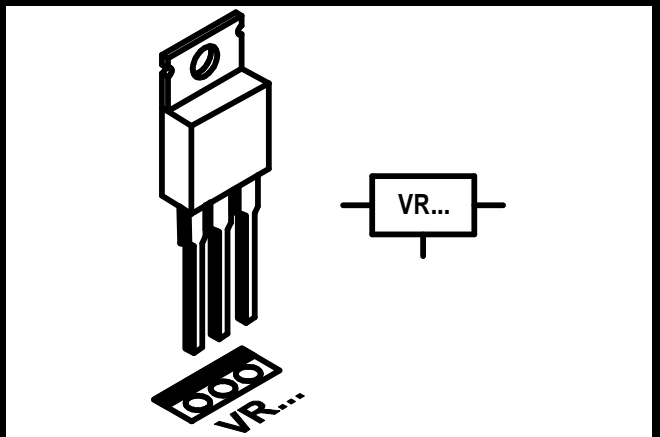
- SK3 + SK4: 2P + 3P
- SK5 + SK6: 2P + 3P

## 12. CRYSTALS



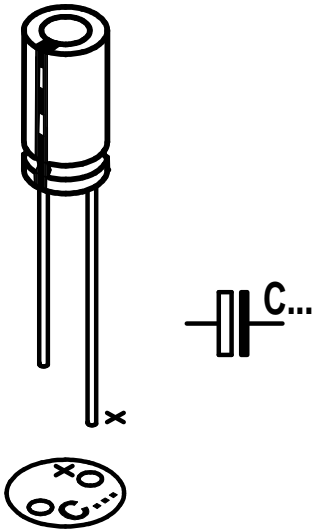
- X1: 20 Mhz

## 14. VOLTAGE REGULATORS



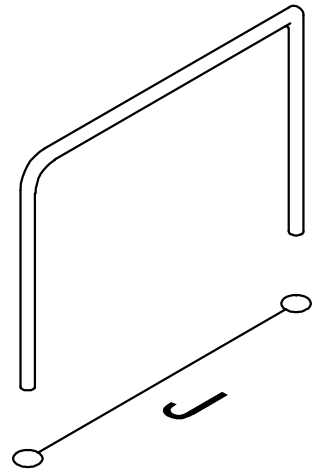
- VR1: 7805

### 15. ELECTROLYTIC CAPACITOR (Check the polarity!)



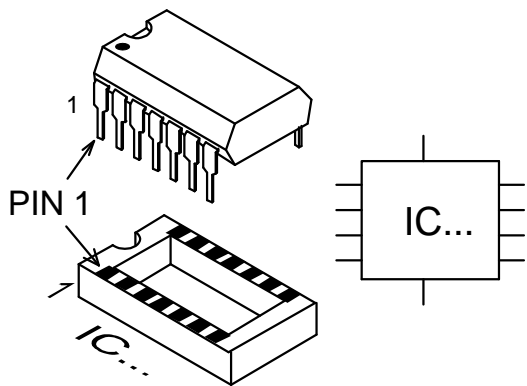
- C5: 10  $\mu$ F
- C6: 10  $\mu$ F
- C7: 2200  $\mu$ F

### 17. MOTOR TYPE SELECTION.



- JU (Mount only if motor is an unipolar motor)
- ⇒ Mount JU if you are going to use the supplied motor.

### 16. IC's (Check the position of the notch!)



- IC1:7408
- IC2:7408
- IC3:7404
- IC4:VK8005



## 18.DIP SWITCH SETTINGS

You must set the communication address of each card connected to the K8000. The DIP switch settings are:

Number Card	J1	J2	J3	J4
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

**REMARK:**

**Motor card 0 must always be connected to the K8000. If you have only one card it must be configured as card 0.**

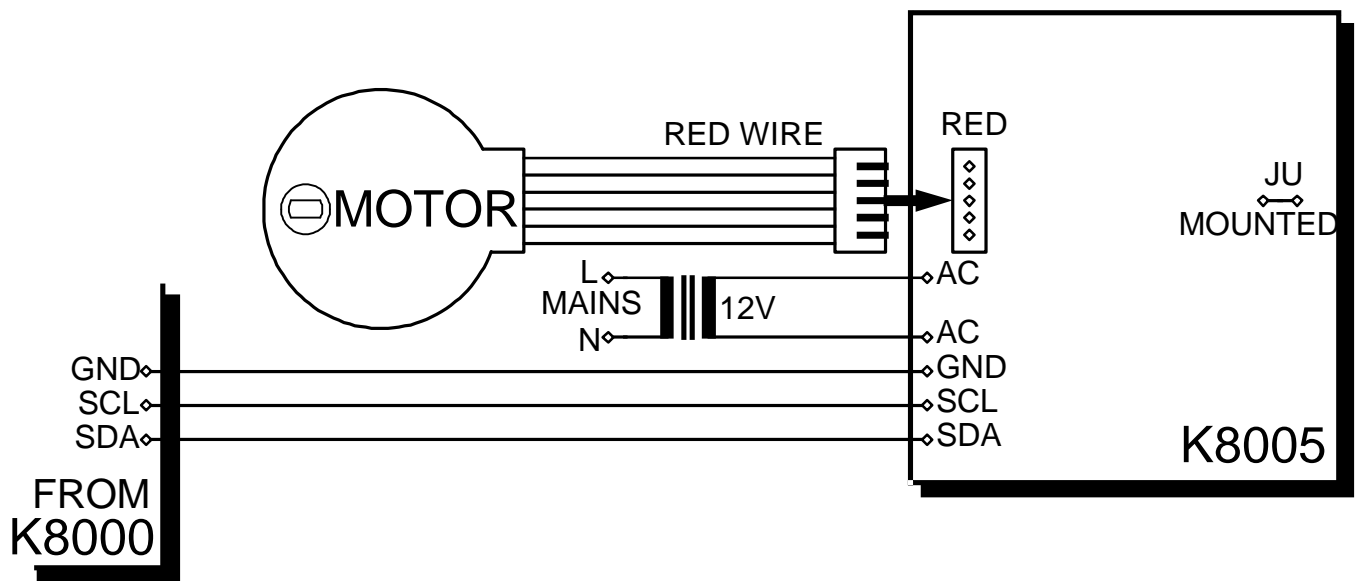
## 19.CONNECTION AND USE

### Power supply:

### Hook-up when using the supplied motor:

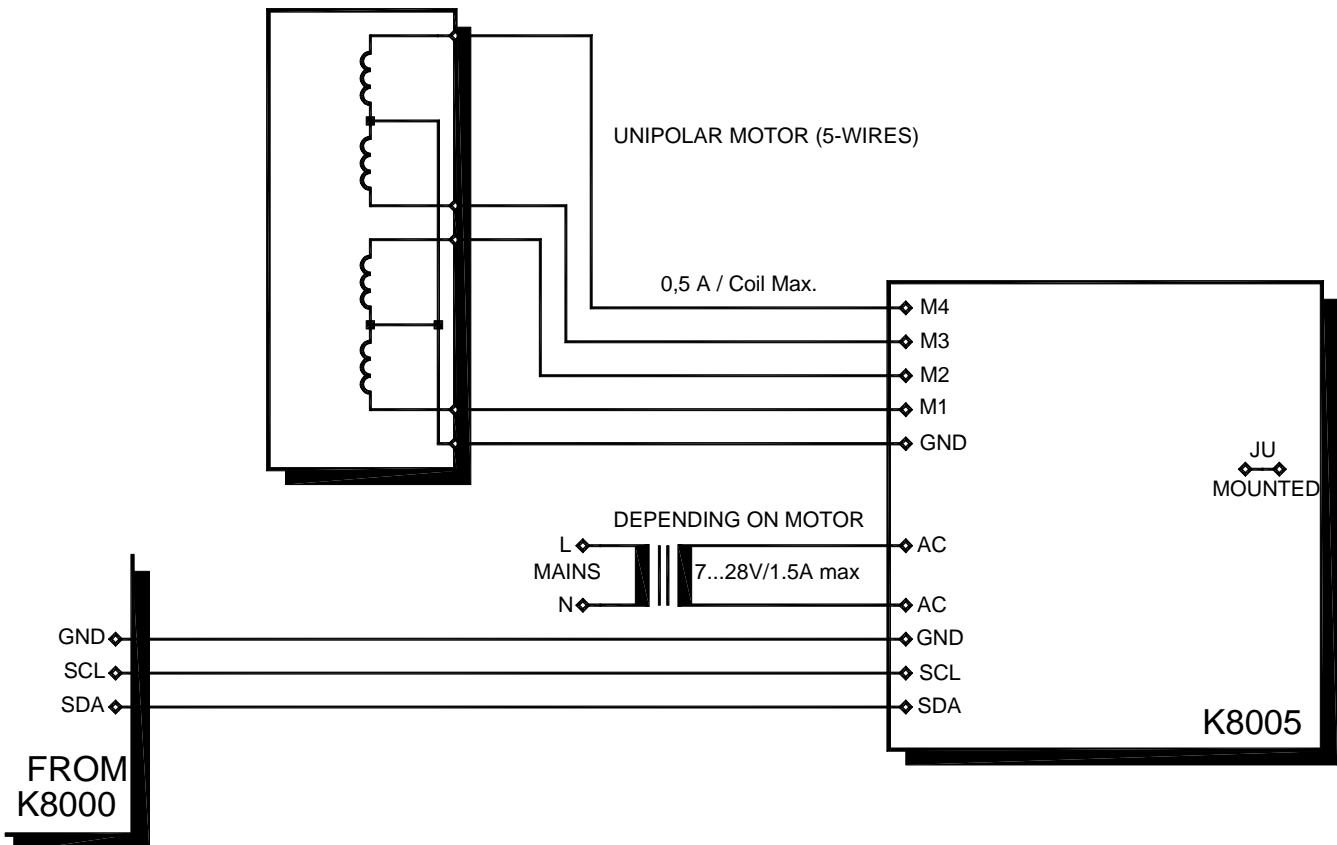
Connect the motor to the pin-header. Make sure the the red wire is hooked-up to the pin marked 'RED'.

Use a 12V/500mA AC or DC power supply (polarity of the DC power supply doesn't matter).



## Hook-up when using an unipolar motor with 5 wires:

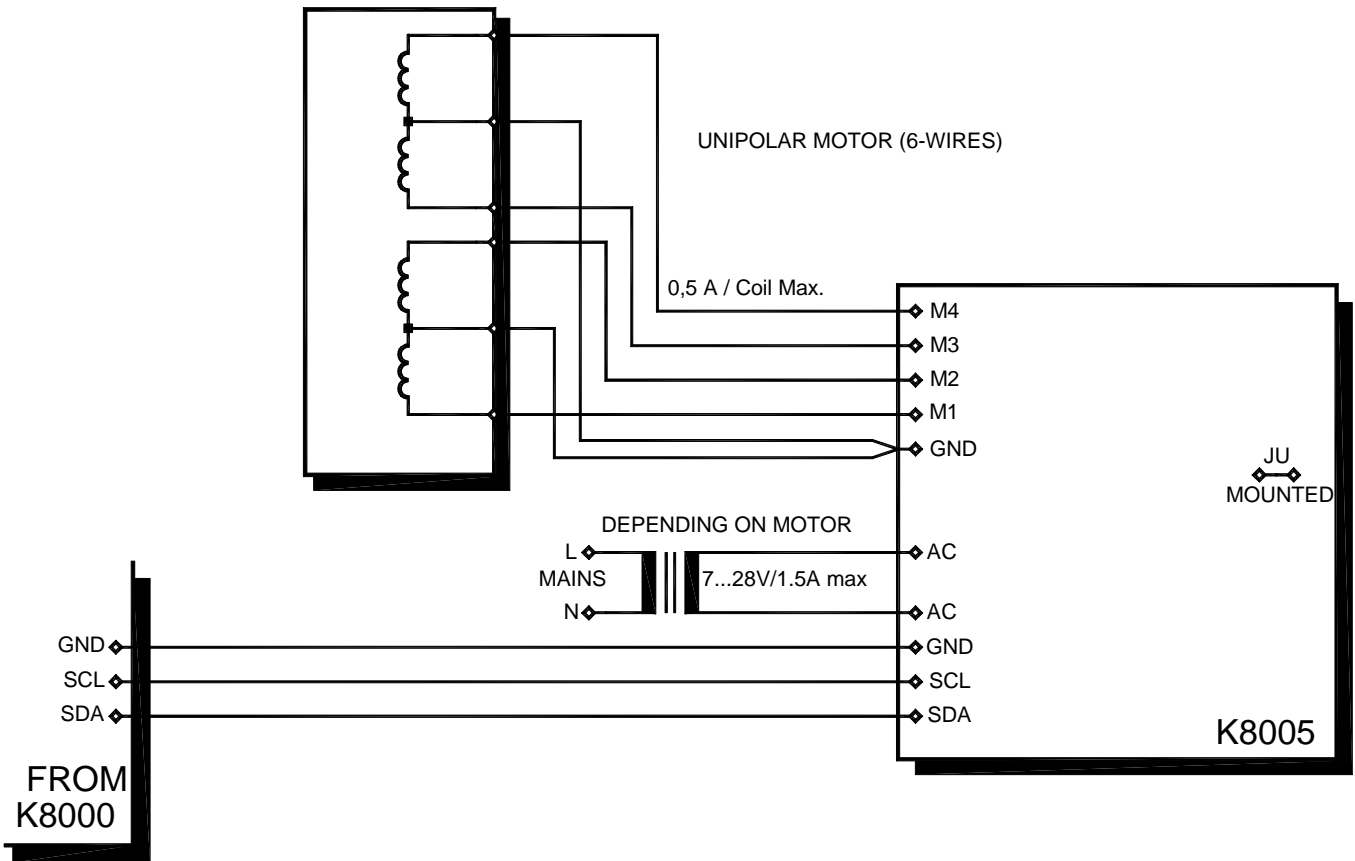
Connect the stepper motor card according to the diagram.  
 Connect a DC or AC voltage to the card, equal to the motor rating. (Minimum voltage: 7 Volts). The maximum current the power supply will have to deliver is the sum of the motor current + 200 mA (consumed by the card).



**Hook-up when using an unipolar motor with 6 wires:**

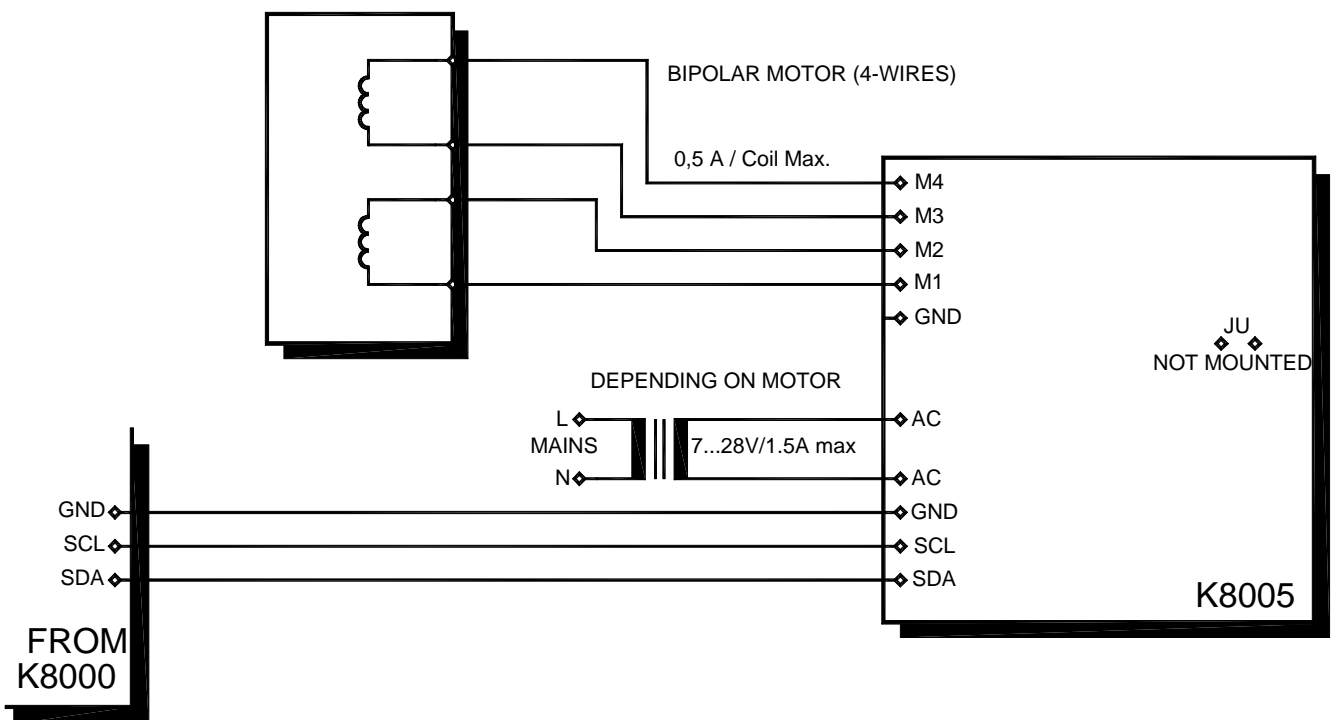
Connect the stepper motor card according to the diagram.

Connect a DC or AC voltage to the card, equal to the motor rating. (Minimum voltage: 7 Volts). The maximum current the power supply will have to deliver is the sum of the motor current + 200 mA (consumed by the card).



## Hook-up when using a bipolar motor (= 4 wire motor):

Connect the stepper motor card according to the diagram.  
 Connect a DC or AC voltage to the card, equal to the motor rating. (Minimum voltage: 7 Volts). The maximum current the power supply will have to deliver is the sum of the motor current + 200 mA (consumed by the card).



## 20.TEST

### **With Push Buttons:**

Connect the Card (see section 19).

Switch on the power supply. LD1 must light up.

Press the STEP button and the motor will turn in Counter Clock Wise direction and in half step mode.

### *Changing the step mode:*

Press the HALF/FULL button without pushing the STEP button, the step mode will now change, if you press the STEP button again, the motor will step into the other step mode.

### *Changing the Step direction:*

Press the HALF/FULL button while pushing the STEP button, the step direction will now change and if you keep the STEP button pressed, the motor will run in the opposite direction.

### **With the diagnostic software:**

Install the software by running INSTALL.EXE on the diskette.

A program group K8005 will be created and will contain the Windows Test program.

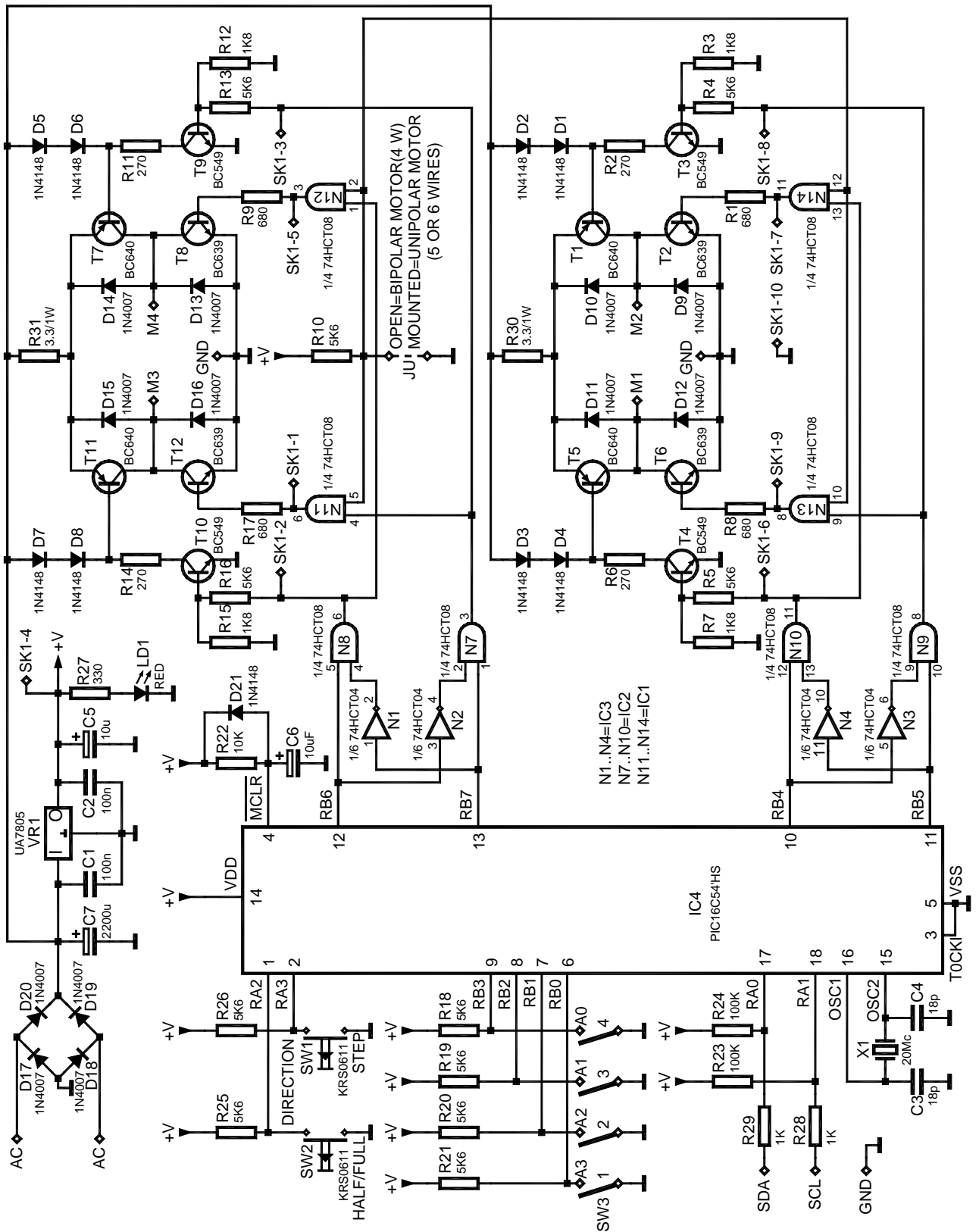
The test program for DOS (tst8005d.exe) can be found in the K8005 directory.

Both programs are very easy to use by following the on-screen instructions.

The latest software version is available on our WebSite:

<http://www.velleman.be>

# 20. SCHEMATIC DIAGRAM



!!! Values are for reference only !!!

# 21.PCB LAYOUT

