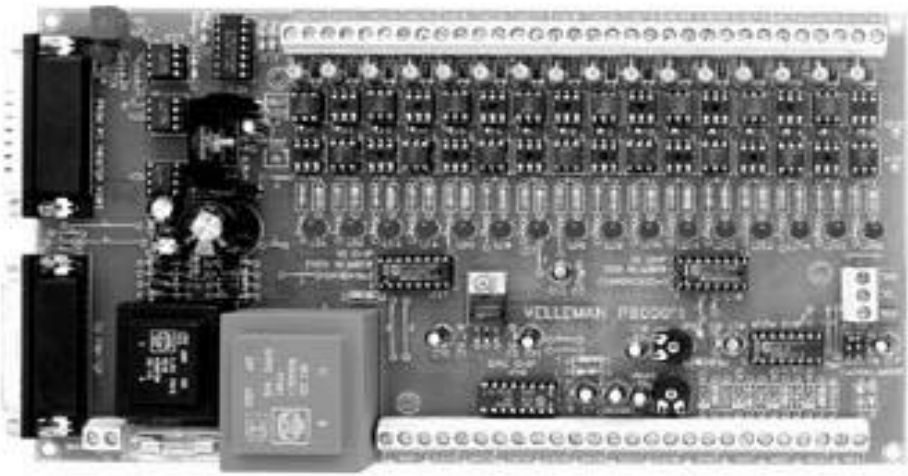
HIGH-Q velleman-kit

K8000

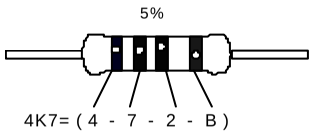
COMPUTER INTERFACE BOARD

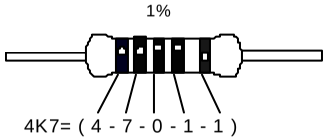
- SIXTEEN INPUT / OUTPUTS WITH OPTO COUPLER
- EIGHT - 6bit (64 steps) ANALOG OUTPUTS
- ONE - 8bit (256 steps) ANALOG OUTPUT
- FOUR - 8bit (256 steps) ANALOG INPUTS
- SIMPLE CONNECTION WITH PRINTER PORT
- PRINTER BY-PASS CONNECTOR ON BOARD
- FULL OPTO-ISOLATION WITH COMPUTER

modifications reserved



VELLEMAN Components NV
Legen Heirweg 33
9890 Gavere
Belgium
http://www.velleman.be





CODE	I	P	E	SF	S	DK	N	D	GB	F	NL	CODE
	CODICE COLORE	*CODIGO DE CORES*	*CODIGO DE COLORES*	*VÄRI KOODI*	*FÄRG SCHEMA*	*FARVE-KODE*	*FARGE-KODE*	*FARB KODE*	*COLOUR CODE*	*CODIFICATION DES COULEURS*	*KLEUR KODE*	
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	Arancio	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	Bleu	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

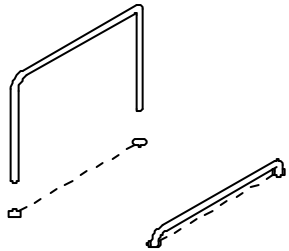
CONSTRUCTION

Mount the components in the order indicated in the separate part list. The parts marked with (**!**) require special attention in the assembly instructions.

IMPORTANT : Read the disk file READ.ME before commencing assembly. This file will report any updated changes.

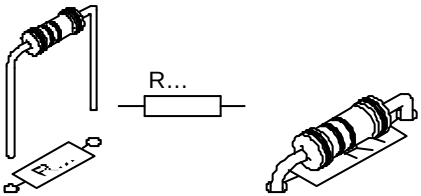
ATTENTION : If the card is to built as an expansion card (Slave) to one already connected tot the computer (Master), the components marked with **S** should not be mounted.

1. Jump wire



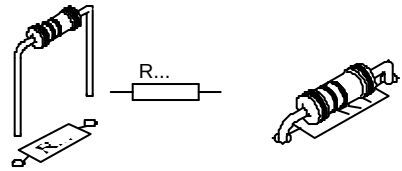
- ❑ J

2. 1/4W Resistors



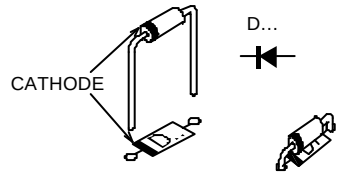
- ❑ R1... R16 : 100 (1-0-1-B)
- ❑ R17, R18 : 100 (1-0-1-B) (S)
- ❑ R19 : 47 (4-7-0-B) (S)
- ❑ R20 : 150 (1-5-1-B)
- ❑ R21… R36 : 220 (2-2-1-B)
- ❑ R37, R38 : 1K (1-0-2-B)
- ❑ R39 … R45 : 4K7 (4-7-2-B) (S)
- ❑ R46, R47 : 4K7 (4-7-2-B)
- ❑ R48 : 1k8 (1-8-2-B)
- ❑ R66 : 220 (2-2-1-B)

3. 1/2W Resistors



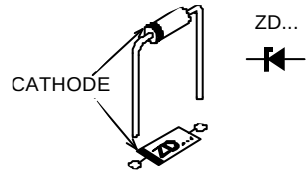
- ❑ R49 : 10 (1-0-0-B-9) (S)

4. Diodes (check the polarity)



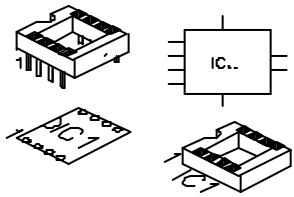
- ❑ D1 ….. D16 : 1N4148!
- ❑ D17 … D20 : 1N4000.. 4007 (S)

5. Zener diode (check the polarity)

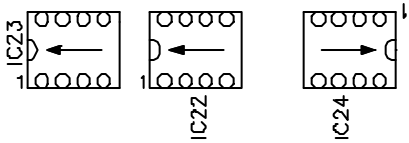


- ❑ ZD1: 4,7V (4V7) (S)

6. IC sockets

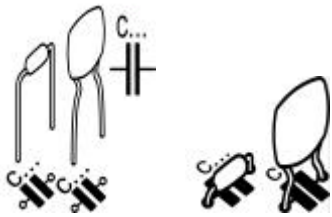


- ❑ IC1 ... IC16 : 6P
- ❑ IC17 ... IC20 : 16P
- ❑ IC21 : 14P (S)
- ❑ IC22 ... IC24 : 8P (S)



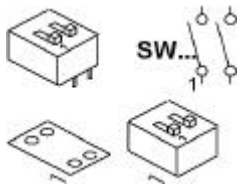
☝ **Attention :** Look carefully on the direction of the notch of IC24

7. Capacitors



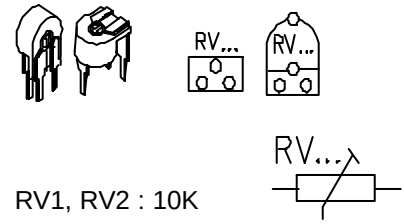
- ❑ C1 ... C9 : 100nF (104, µ1)

8. Dip Switch



- ❑ SW1 : 2P DIP

9. Resistor Trimmer

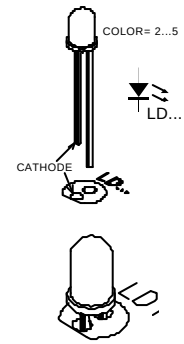


- ❑ RV1, RV2 : 10K

Rv1 = Vmax, max DAC output voltage : 0 ...10V

RV2 = Vref. max IN/OUT voltage : 0 ...5V

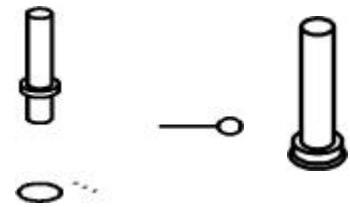
10. LEDs



LD1 ... LD16 : 5mm LED

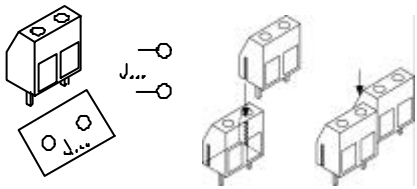
- ❑ LD17 ... LD19 : 5mmm LED (S)

11. PCB tab



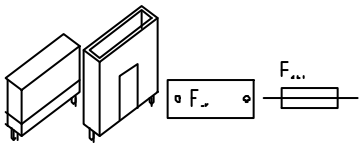
- ❑ I/O1 ... 16; GND; +5V

12. Terminal blocks



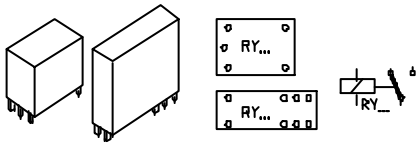
- ❑ J1 … J16 : 16 x 2P !
- ❑ J17 … J29 : 13 x 2P !
- ❑ J30 : 1 x 2P
- ❑ J31 : 1 X 3P

13. Fuse



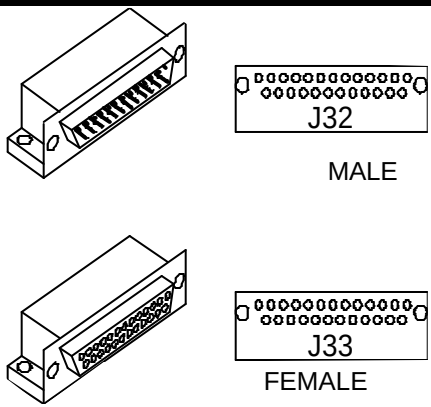
- ❑ F1 : 250mA

14. Relay



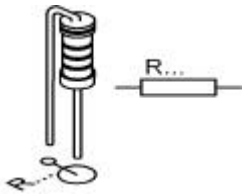
- ❑ RY1 : OUC-5 (S)

15. 25P sub D connector



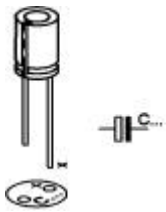
- ❑ J32, J33 : 25P SUB D (!)

16. 1W Resistors



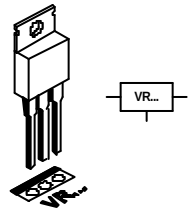
- ❑ R50 … R65 : 470 (4-7-1-B)

17. Electrolytic capacitors. Check the polarity !

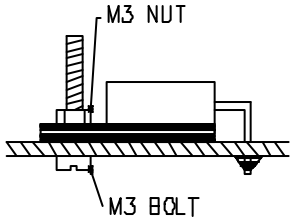


- ❑ C10 … C19 : 100µF!
- ❑ C20 … C21 : 470µF (S)
- ❑ C22 : 2200 µF!

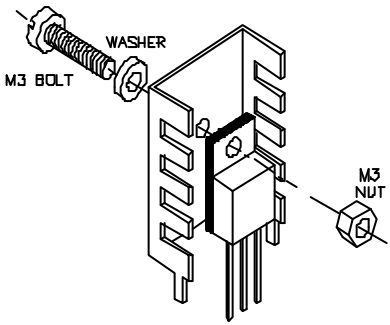
18. Voltage regulator.
The back side corresponds to the thick line.



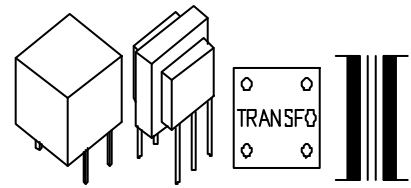
- ❑ VR1 : UA7812!



- ❑ VR2 : UA7805!

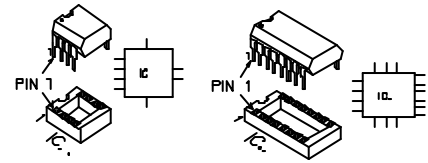


19. Transformers



- ❑ TRANSFO 1 : 1 X 15V (2X7,5V)
- ❑ TRANSFO 2 : 1 X 6V (S)

20. IC's
(watch the position of the notch)



- ❑ IC1 … IC16 : 4N33 !
- ❑ IC17, IC18 : PCF8574A !
- ❑ IC19 : TDA8444 !
- ❑ IC20 : PCF8591 !
- ❑ IC21 : 74LS125 (S)
- ❑ IC22 … IC24 : 6N136 (S)

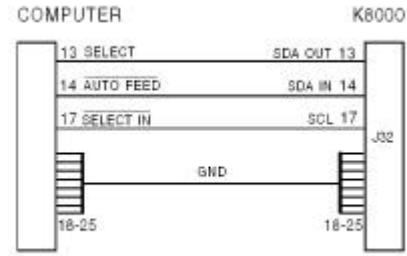
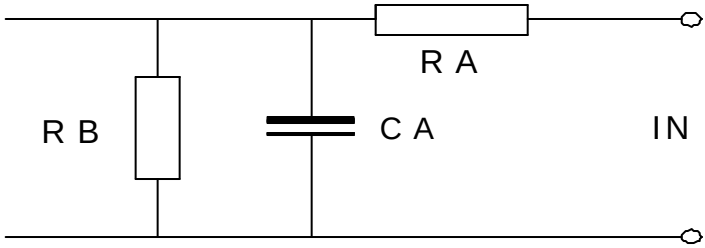


FIG 1.0

21. Information

If desired, a voltage divider or filter can be fitted tn each analogue input. The voltage divider can be useful if a higher input voltage than normal is to be monitored. Normally only a maximum of 5V can be accepted by the input. The filter can be useful for eliminating (mains) hum from the signal for example. Points A to D give examples.

K 8 0 0 0
A D 1 . . . A D 4



A No attenuation and no filtering (input impedance= 100K). In place of RA a jump wire needs to be fitted. RA is a resistor. Nothing should be fitted in place of CA.

Ri = 100K

RA : J
RB : 100K (1-04-B)
CA : /

B 50Hz mains filter (low-pass filter). By use of the formula, different values for RA and CA can be calculated as a function of the desired frequency. If a high value for CA is arrived at, then an electrolytic capacitor can be used, but check the polarity.

Freq. = 50Hz / -3dB

RA : 10K
RB : /
CA : 330nF

$$CA = \frac{1}{6{,}28 \times f \times RA}$$

C

An input attenuator of 10. This means that up to 50V may be connected to the input, which is then reduced by a factor of 10. With the first values the input impedance is 20kÙ. With the values in brackets the input impedance is 200kÙ. With higher input voltages it is advisable to choose high values for the resistors, otherwise resistors of a high power rating must be used for RA.

Att = 10

RA : 18K (180K)
RB : 2K (20K)
CA : /

$$att = \frac{RB}{RA + RB}$$

D

Conversion of current to voltage. In order to avoid interruptions, it is possible for a variable current to be measured as the reference input value which is used for current to voltage conversion. Here a variable current from 4 to 20 mA is converted to a voltage of 0.8 to 4V.

4—20mA > 0,8—4V

RA : J
RB = 200 ohm
CA = /

22. Connection numbering

Output numbering is important, especially if a number of cards are to be used together as these numbers will be used by the control programmes. Cut out the desired numbers from the sticky labels provided.

Input/Outputs (I/O):

I/O1 to I/O16, or if used as slave
I/O17 to I/O32
I/O33 to I/O48 or I/O49 to I/O64.

Analogue outputs (DAC):

DAC1 to DAC8, or if used as slave
DAC9 to DAC16
DAC17 to DAC24 or DAC25 to DAC32.

Precision analogue output (DA):

DA1, or if used as slave
DA2, DA3 or DA4.

Analogue inputs (AD):

AD1 to AD4, or if used as slave
AD5 to AD8; AD9 to AD12 or AD13 to AD16.

23. Test and Connection

TEST

Prior to testing the card by computer a number of "passive" tests can be done.
Connect the connectors, MAINS N and L to the supply voltage.
Normally no LEDs should light up.
Measure the voltage on testpin +5V to see if the 5V supply voltage is present.
Connect the test points 1 to 16, one by one, with the earth (GND) testpin.
Normally the LED from the respective channel should light up.

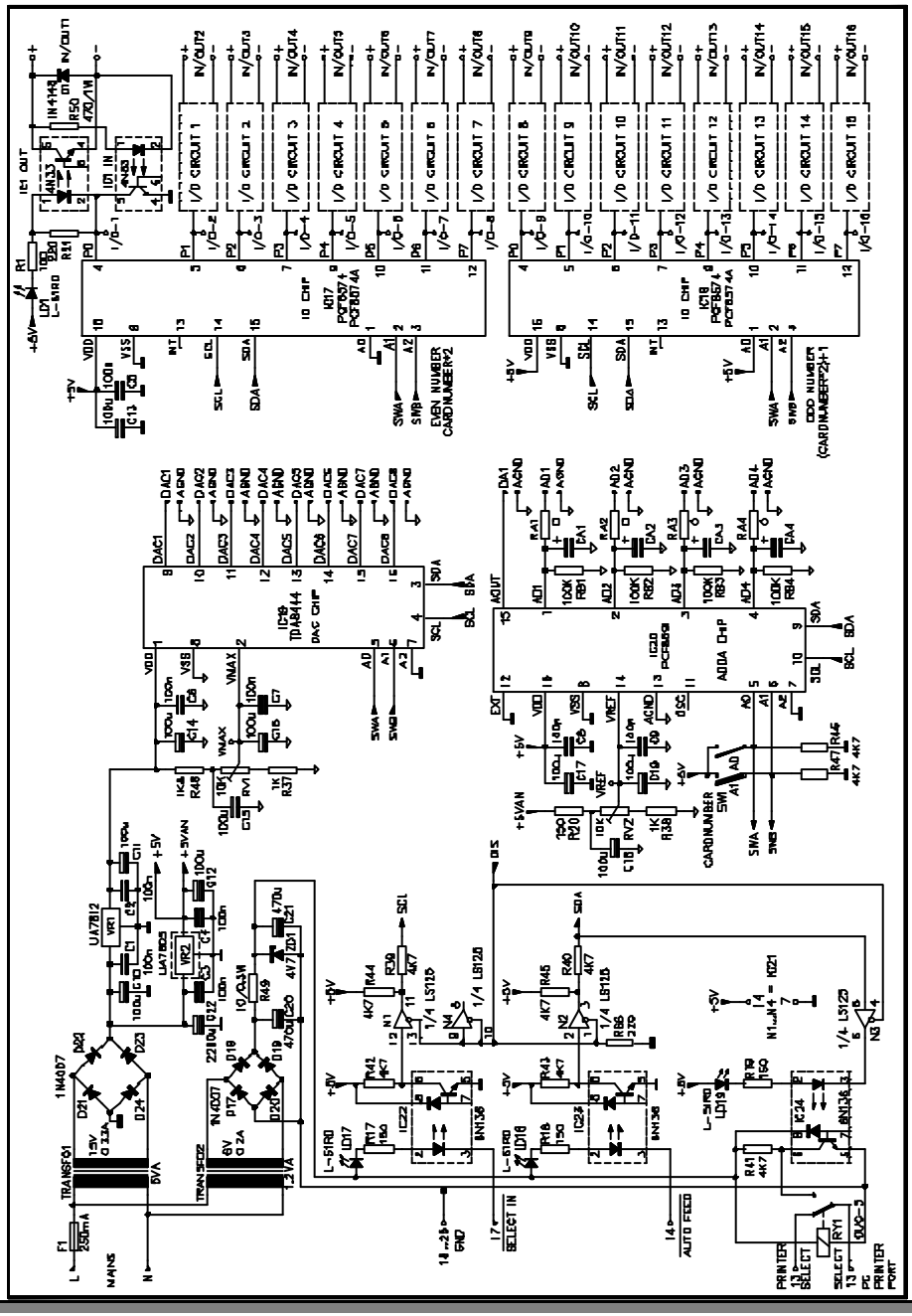
CONNECTION

The computer can be connected to the card via a standard cable.
If no printer is to be connected in, a cable can be made up, such as shown in figure 1.0 (the length of the cable has been tested to 10m).
NB: if the printer feed through connector is used and problems subsequently occur with printing, then shorter cables must be used.

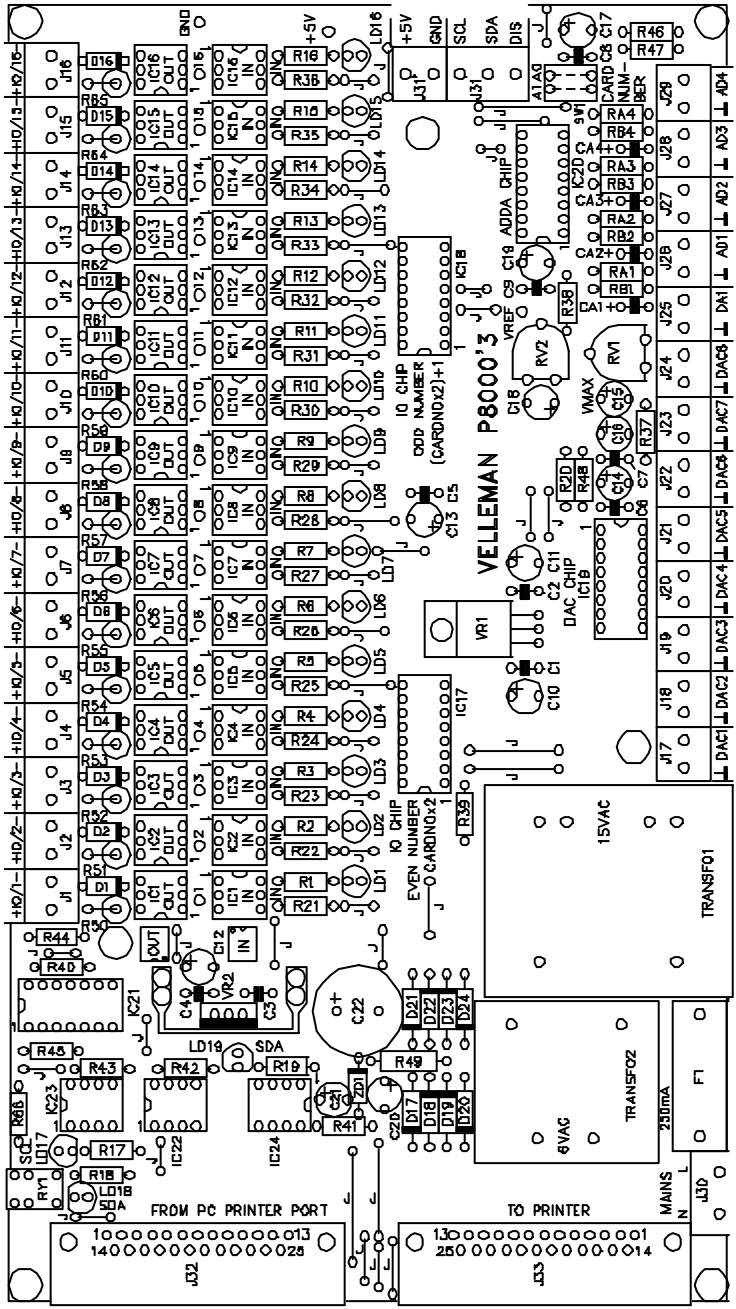
If the card has been built as a slave unit, then it must be connected via the three pole connector J31 and through to the GNR, SCL and SDA connections.

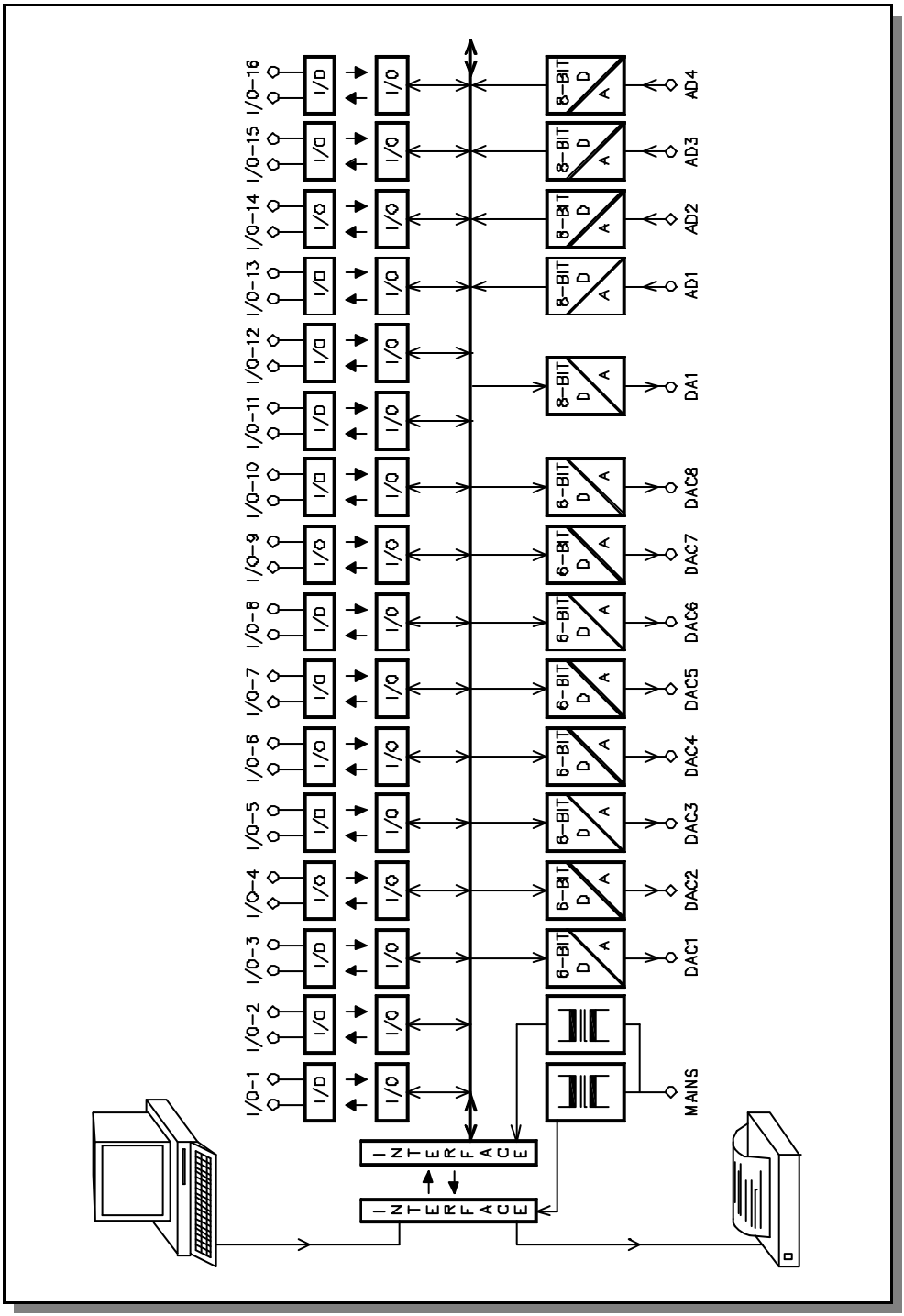
See the users manual for further connection configurations and tests.

24. Diagram



25. PCB Layout




I/O-1
I/O-2
I/O-3
I/O-4
I/O-5
I/O-6
I/O-7
I/O-8
I/O-9
I/O-10
I/O-11
I/O-12
I/O-13
I/O-14
I/O-15
I/O-16
I/O
INTERFACE
INTERFACE
6-BIT D A
8-BIT D A
DAC1
DAC2
DAC3
DAC4
DAC5
DAC6
DAC7
DAC8
DA1
AD1
AD2
AD3
AD4
MAINS

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