

Total solder points: 176

Skill level :

Beginner 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐ Advanced

velleman-kit

HIGH-Q



SLOW ON / SLOW OFF DIMMER

K2657

Features:

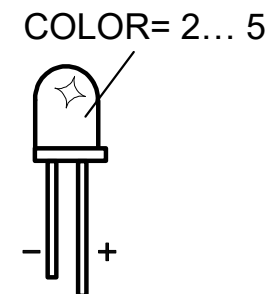
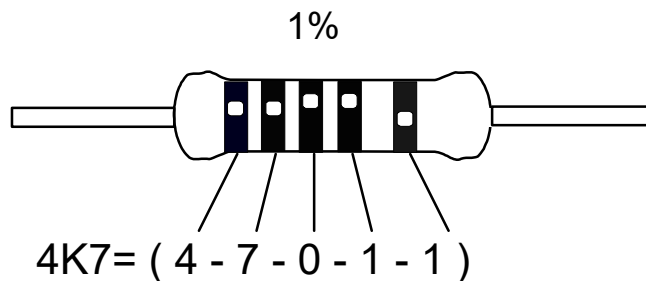
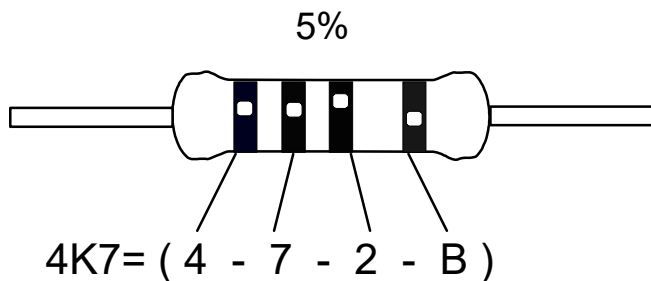
- ☒ Two operation modes :
- ☒ Up/down dimmer with independent speed adjust (2 seconds till 1 hour)
- ☒ Timer/dimmer with adjustable on-time and dimming speed (1second till 30 minutes)
- ☒ Simulate day-night rhythm, or use as staircase light timer

Specifications :

- ☒ 24, 110-125 or 220-240VAC 50/60 Hz operation
- ☒ Max. load : 2A (50W/24V, 200W/110V or 400W/220V)
- ☒ Dimensions : 70 x 95mm / 2.8" x 3.8"

modifications reserved



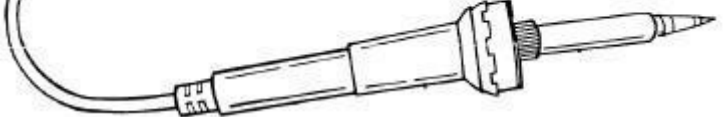
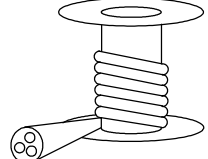
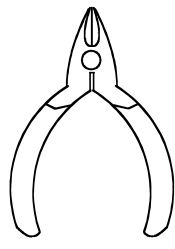
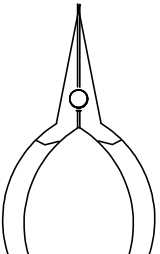



C O D E	I	P	E	SF	S	DK	N	D	GB	F	NL	C O D E
	<i>CODICE COLORE</i>	<i>CODIGO DE CORES</i>	<i>CODIGO DE COL- ORES</i>	<i>VÄRI KOODI</i>	<i>FÄRG SCHEMA</i>	<i>FARVE KODE</i>	<i>FARGE KODE</i>	<i>FARB KODE</i>	<i>COLOUR CODE</i>	<i>CODIFI- CATION DES COU- LEURS</i>	<i>KLEUR KODE</i>	
0	Nero	Preto	Negro	Musta	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

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

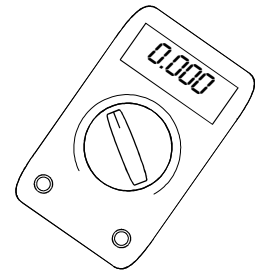
Ok, so we have your attention. These hints will help you to make this project successful. Read them carefully.

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

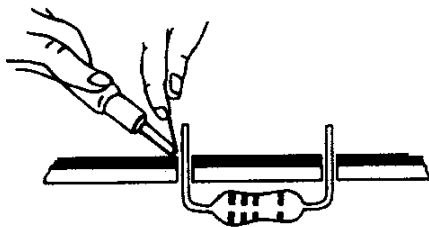


1.2 Assembly Hints :

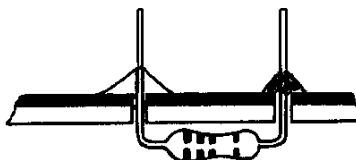
- ⇒ Make sure the skill level matches your experience, to avoid disappointments.
- ⇒ Follow the instructions carefully. Read and understand the entire step before you perform each operation.
- ⇒ Perform the assembly in the correct order as stated in this manual
- ⇒ Position all parts on the PCB (Printed Circuit Board) as shown on the drawings.
- ⇒ Values on the circuit diagram are subject to changes.
- ⇒ 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.

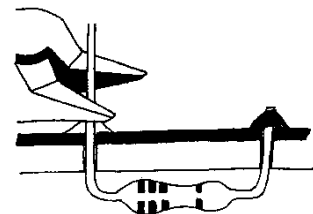
1.3 Soldering Hints :



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

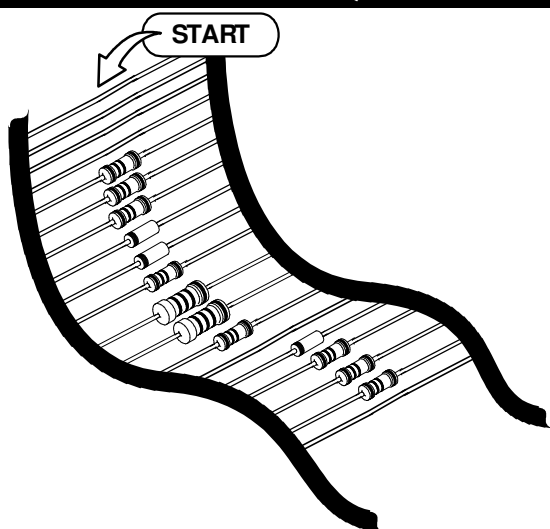


Make sure the solder joints are cone-shaped and shiny



Trim excess leads as close as possible to the solder joint

AXIAL COMPONENTS ARE TAPED IN THE CORRECT MOUNTING SEQUENCE !



REMOVE THEM FROM THE TAPE ONE AT A TIME !

1. CHOOSE OPERATING MODE :

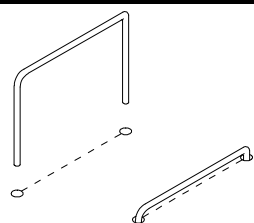
SLOW ON / SLOW OFF DIMMER :

- ☐ J1 : wire jumper
- ☐ R23 : 100K 1%(1 – 0 – 0 – 3 – 1)
- ☐ R30 : 51K 1%(5 – 1 – 0 – 2 – 1)

TIMER / DIMMER :

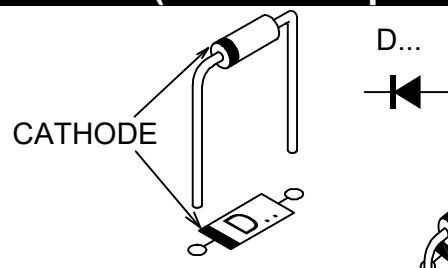
- ☐ J2 : wire jumper
- ☐ R30 : wire jumper
- ☐ R23 : 1N4148 diode (watch the polarity)

2. JUMPER WIRES

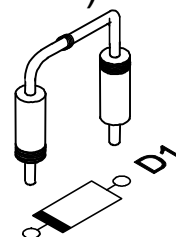


- ☐ J
- ☐ J

3. DIODES (Watch the polarity!)

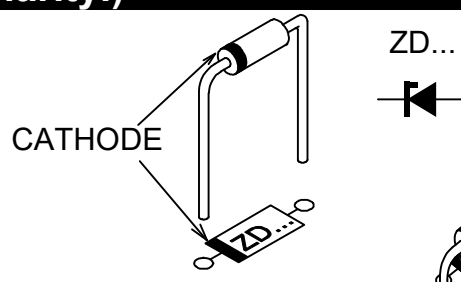


- ☐ D1 : 1N4148
- (For 24VAC : connect 2 diodes as shown below)



- ☐ D2 : 1N4148
- ☐ D3 : 1N4148

4. ZENER DIODES (Watch the polarity!)



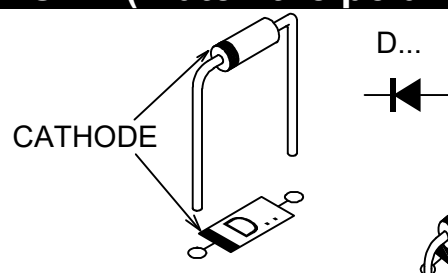
For 100-240VAC operation :

- ☐ ZD1 : 5V6

For 24VAC operation :

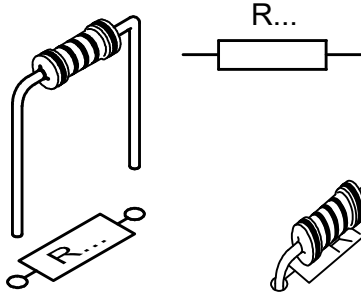
- ☐ ZD1 : 4V7

5. DIODE (Watch the polarity!)



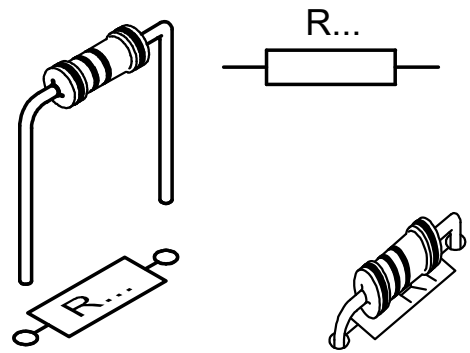
- ☐ D4: 1N4007

6. 1% RESISTORS



- ☐ R15 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R16 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R17 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R18 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R19 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R20 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R21 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R22 : 100K (1 – 0 – 0 – 3 – 1)
- ☐ R24 : 51K (5 – 1 – 0 – 2 – 1)
- ☐ R25 : 51K (5 – 1 – 0 – 2 – 1)
- ☐ R26 : 51K (5 – 1 – 0 – 2 – 1)
- ☐ R27 : 51K (5 – 1 – 0 – 2 – 1)
- ☐ R28 : 51K (5 – 1 – 0 – 2 – 1)
- ☐ R29 : 51K (5 – 1 – 0 – 2 – 1)

7. RESISTORS



For 24 VAC operation :

- ☐ R1 : 15K (1 – 5 – 3 – B)
- ☐ R2 : 39K (3 – 9 – 3 – B)
- ☐ R3 : wire jumper

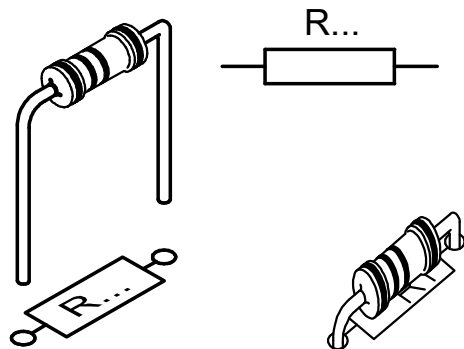
For 100-125VAC operation :

- ☐ R1 : 100K : (1 – 0 – 4 – B)
- ☐ R2 : 220K : (2 – 2 – 4 – B)
- ☐ R3 : 470K : (4 – 7 – 4 – B)

For 220-245VAC operation :

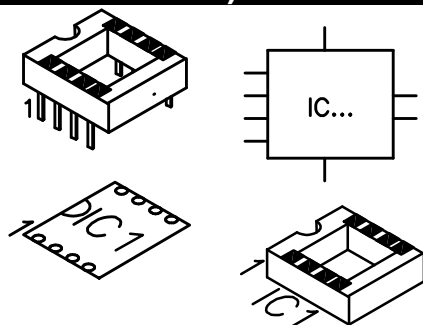
- ☐ R1 : 220K : (2 – 2 – 4 – B)
- ☐ R2 : 470K : (4 – 7 – 4 – B)
- ☐ R3 : 470K : (4 – 7 – 4 – B)

8. RESISTORS continued



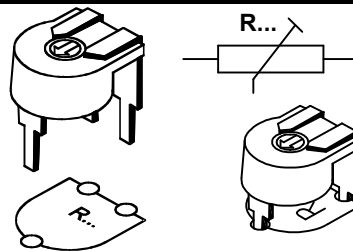
- ☐ R4 : 4K7 (4 – 7 – 2 – B)
- ☐ R5 : 22K (2 – 2 – 3 – B)
- ☐ R6 : 22K (2 – 2 – 3 – B)
- ☐ R7 : 68K (6 – 8 – 3 – B)
- ☐ R8 : 10K (1 – 0 – 3 – B)
- ☐ R9 : 10K (1 – 0 – 3 – B)
- ☐ R10 : 10K (1 – 0 – 3 – B)
- ☐ R11 : 10K (1 – 0 – 3 – B)
- ☐ R12 : 10K (1 – 0 – 3 – B)
- ☐ R13 : 10K (1 – 0 – 3 – B)
- ☐ R14 : 10K (1 – 0 – 3 – B)

9. IC SOCKETS (Watch the position of the notch!)



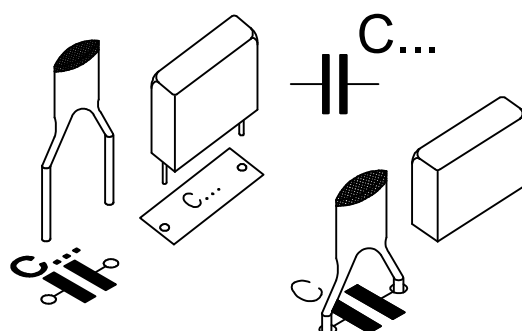
- ☐ IC1 : 8P
- ☐ IC2 : 14P
- ☐ IC3 : 16P
- ☐ IC4 : 16P

10. RESISTOR TRIMMERS



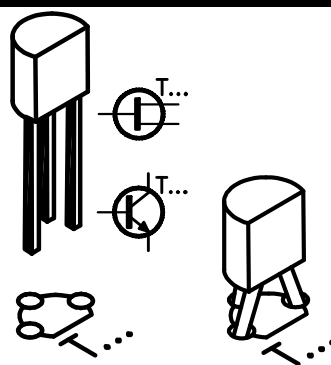
- ☐ RV1 : 1M
- ☐ RV2 : 470K (500K)
- ☐ RV3 : 470K (500K)

11. CAPACITORS



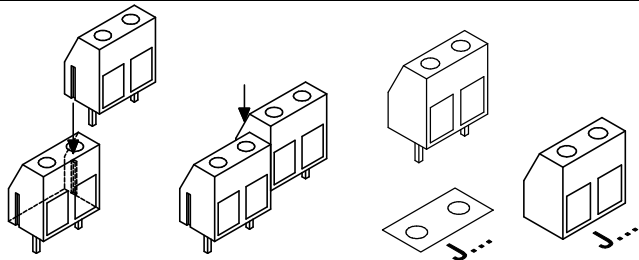
- ☐ C1 : 4n7 (472, 4700)
- ☐ C2 : 100n (104)
- ☐ C3 : 100n (104)
- ☐ C4 : 100n (104)

12. TRANSISTORS



- ☐ T1 : BC557 or eq.
- ☐ T2 : BC557 or eq.

13. TERMINAL BLOCKS



□ J3 : 2P + 2P

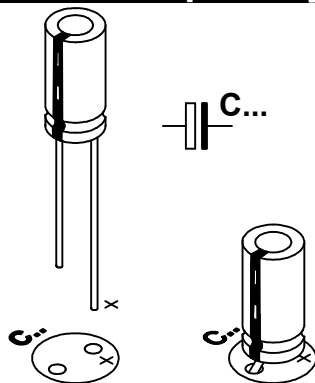
For slow on / slow off dimmer :

□ J4 : 2P (SW & N)

For timer / dimmer :

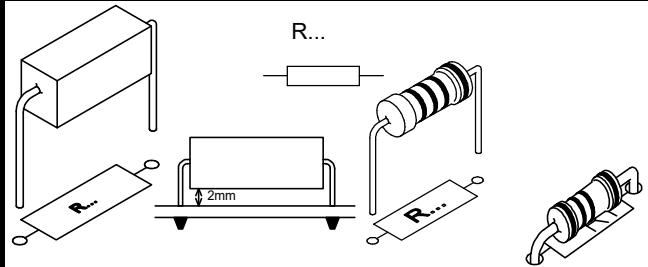
□ J4 : 2P (N & PB)

14. ELECTROLYTIC CAPACITORS (Watch the polarity!)



- C5 : 10µF
- C6 : 100µF
- C7 : 1µF
- C8 : 1µF
- C9 : 1µF
- C10 : 4.7µF

15. POWER RESISTOR



For 24VAC operation :

□ R31 : 470 (4 – 7 – 1 – B)

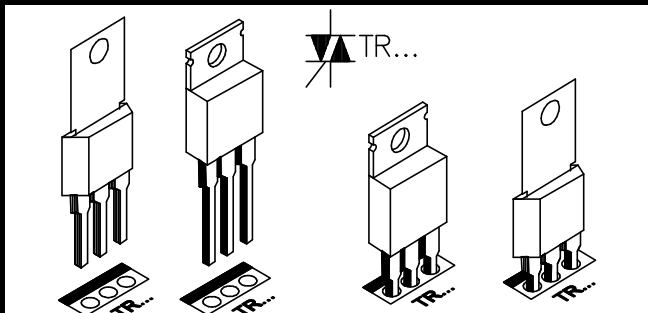
For 100-125VAC operation :

□ R31 : 8K2 / 5W

For 220-245VAC operation :

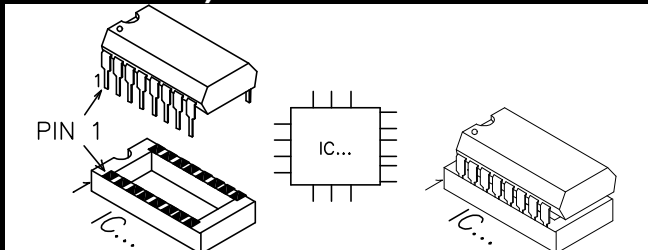
□ R31 : 15K / 5W

16. TRIAC



□ TR1 : T410-600T, TIC226 or eq.

17. IC's (Watch the position of the notch!)



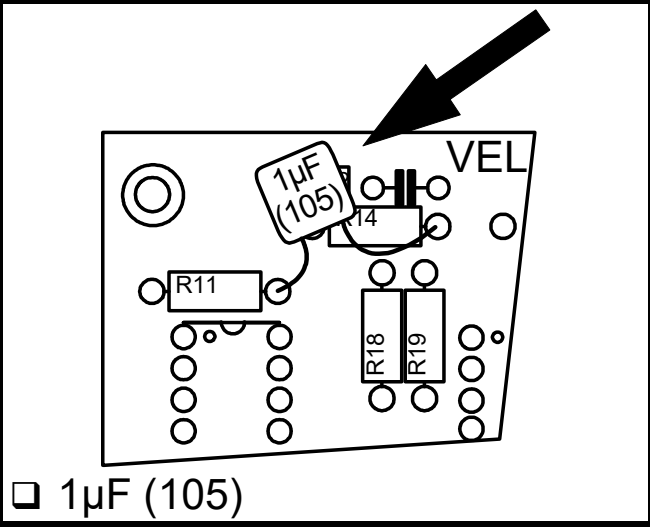
IC1 : TEA1007 or eq.

IC2 : 4093

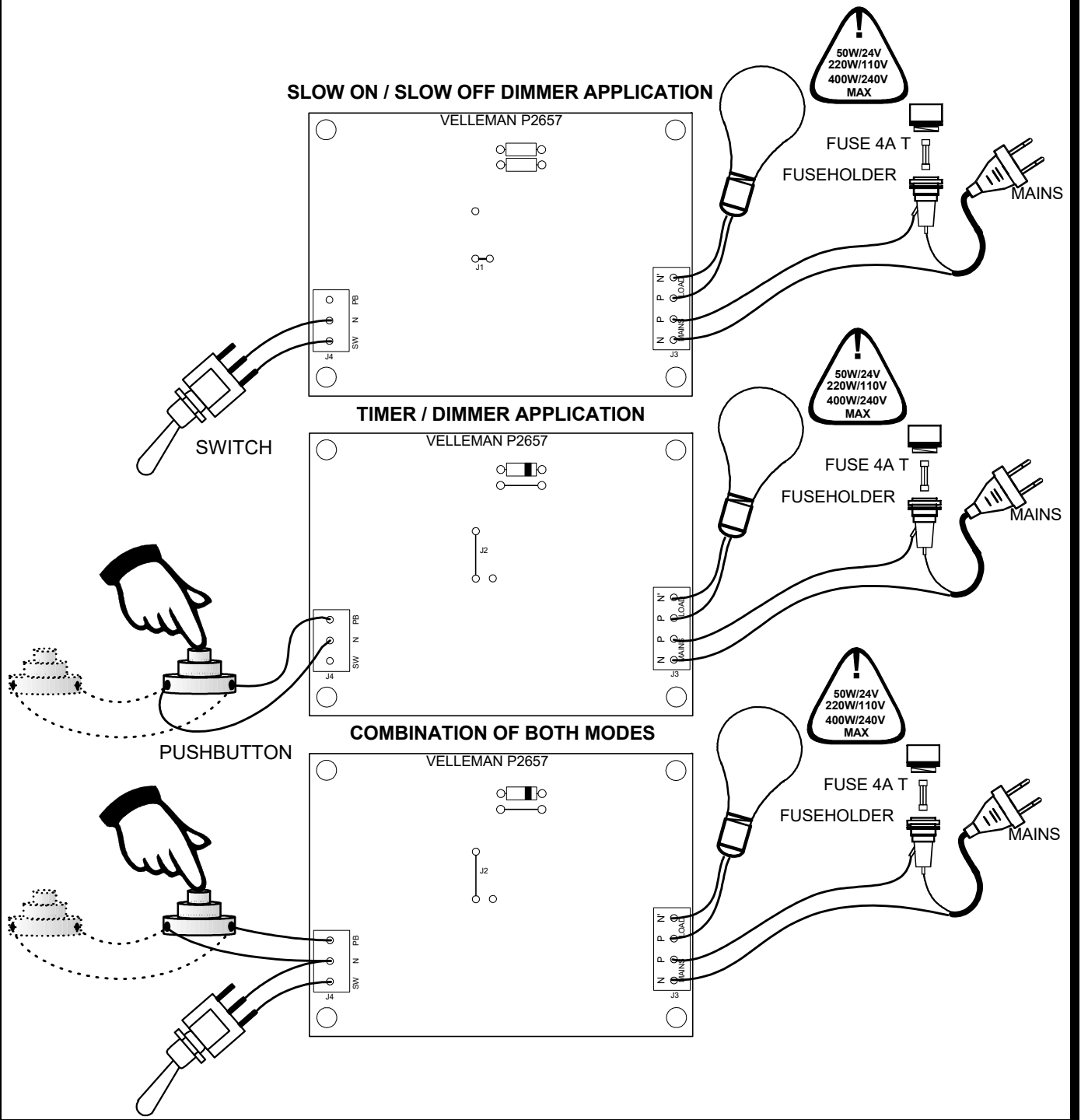
IC3 : 4516

IC4 : 4516

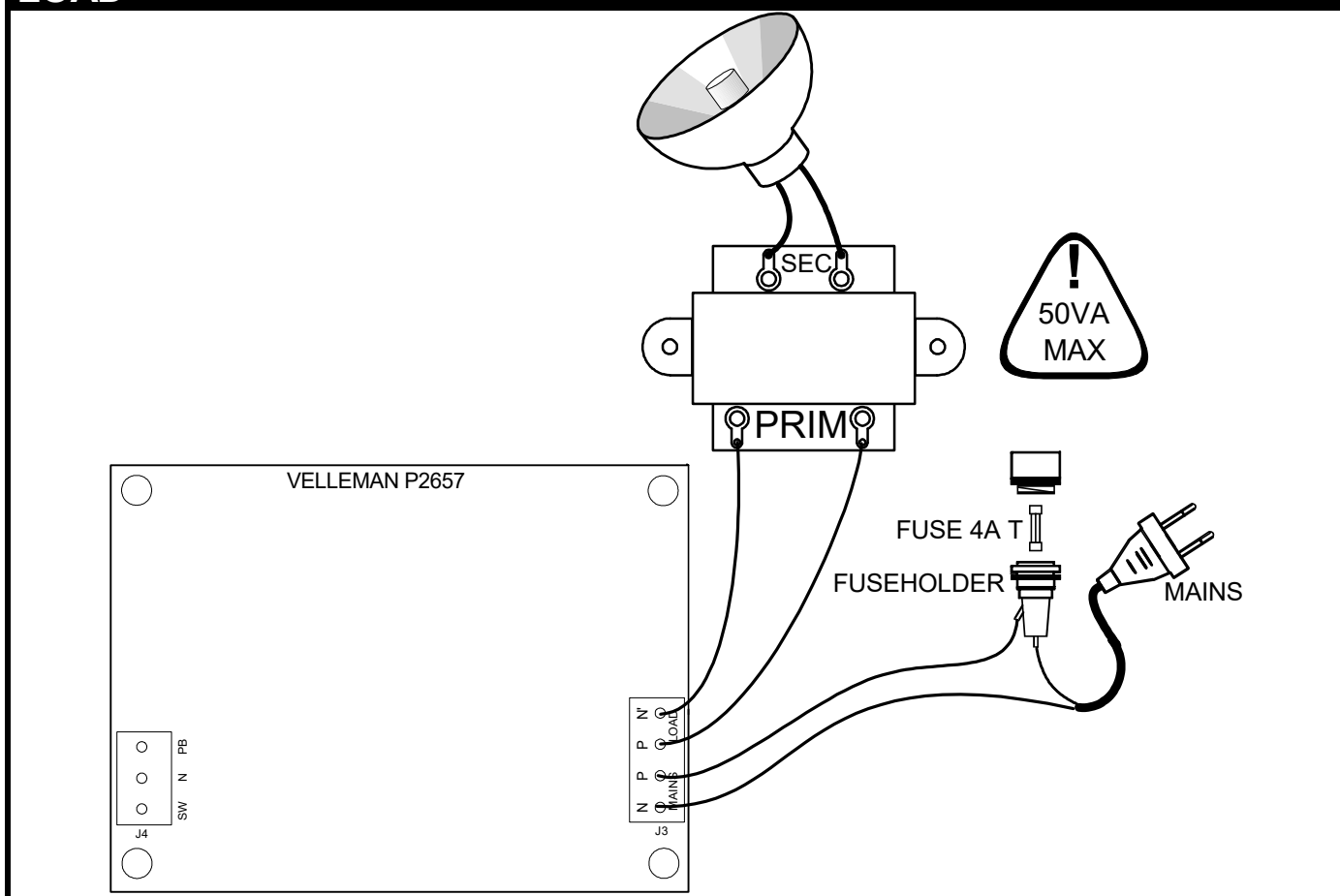
18. LAST MINUTE IMPROVEMENT



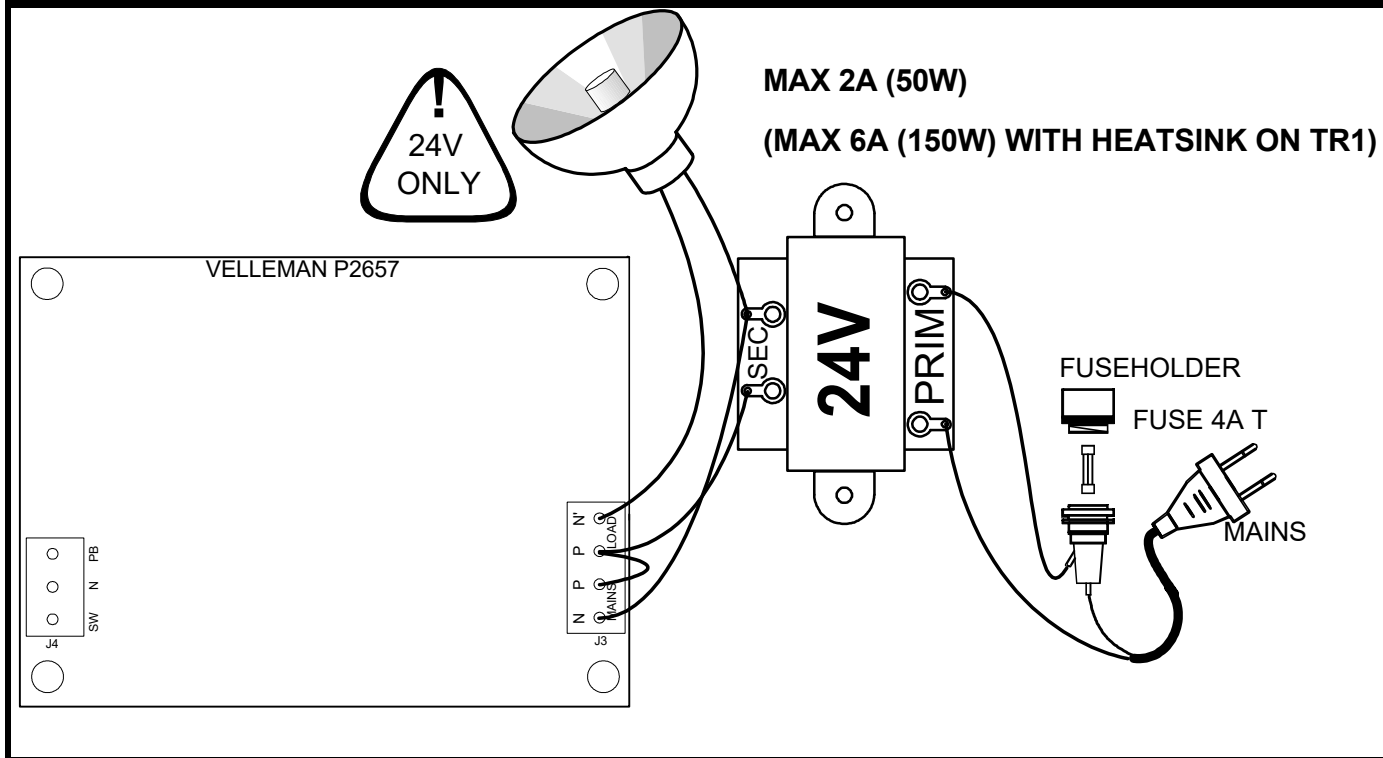
19. CONNECTION EXAMPLES



20. CONNECTION EXAMPLE WITH PRIMARY REGULATED INDUCTIVE LOAD



21. CONNECTION EXAMPLE WITH SECONDARY REGULATED LOAD



21. HOOK-UP AND USE

Warning :

This kit is not separated from the mains by means of a transformer. All part can carry lethal voltages during operation. Use either a non-conductive or an earthed metal enclosure. Make sure all optional parts such as switches, pushbuttons or relays are suitable for mains operation.

Operating mode :

Slow on / slow off dimmer : Closing SW-N by means of a pushbutton, switch or relay contact will result in a gradually increasing intensity of the lightsource until the maximum intensity is reached. Rise time is adjustable with RV3. It will remain at maximum intensity, as long as SW-N are closed. When SW-N are opened again, the unit will gradually decrease the intensity, until the minimum setting (adjustable with RV1) is reached. Decay time is adjustable with RV2.

Timer / dimmer : Closing PB-N by means of a pushbutton, switch or relay contact will switch-on the lightsource at it maximum intensity. When PB-N are opened again, the lightsource will remain at its maximum intensity for a preset time (adjustable with RV3) before it gradually decreases the intensity, until the minimum setting (adjustable with RV1) is reached. Decay time is adjustable with RV2.

Hook- up :







Hook-up the unit according to one of the examples.





If you would like to use the unit with loads drawing up to 6A, you must use an appropriate heatsink for TR1. Make sure the heatsink is electrically isolated from the enclosure or any other components, as it carries the mains voltage !

If you run a considerable length of wire between the unit and the control switch or if you experience malfunction caused by picked-up noise, you might want to use a twisted pair, or even a screened cable (connect screen to N) for improved noise immunity.

19. HOW TO OBTAIN DIFFERENT ON/OFF TIMES

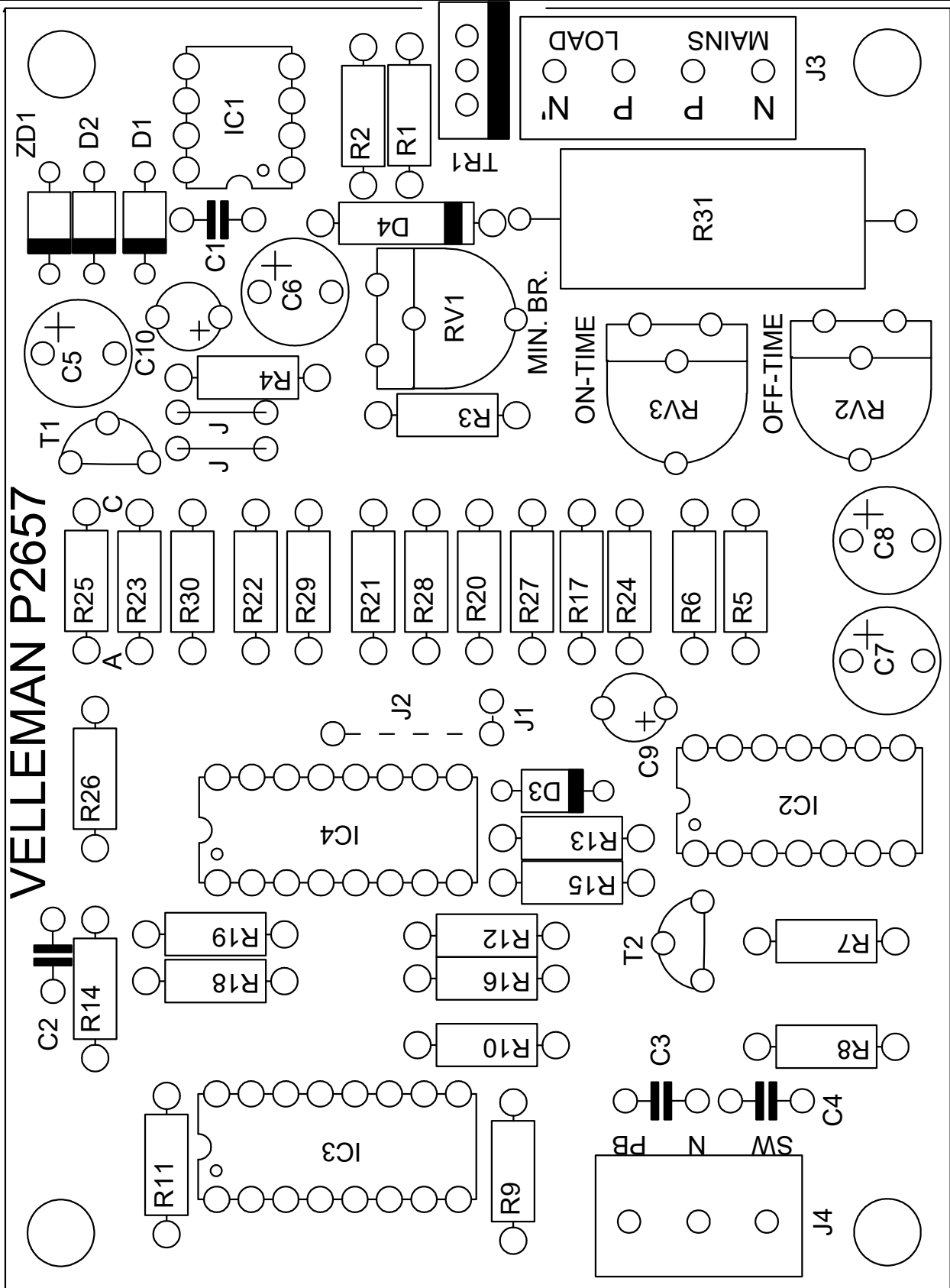
You can select different ON / OFF times by changing the value of capacitors C7 and C8 :

SLOW ON / SLOW OFF DIMMER			
C8	  	C7	  
1 μ F	2s...30s	1 μ F	2s...30s
10 μ F	30s...5min	10 μ F	30s...5min
100 μ F	5min...1h	100 μ F	5min...1h

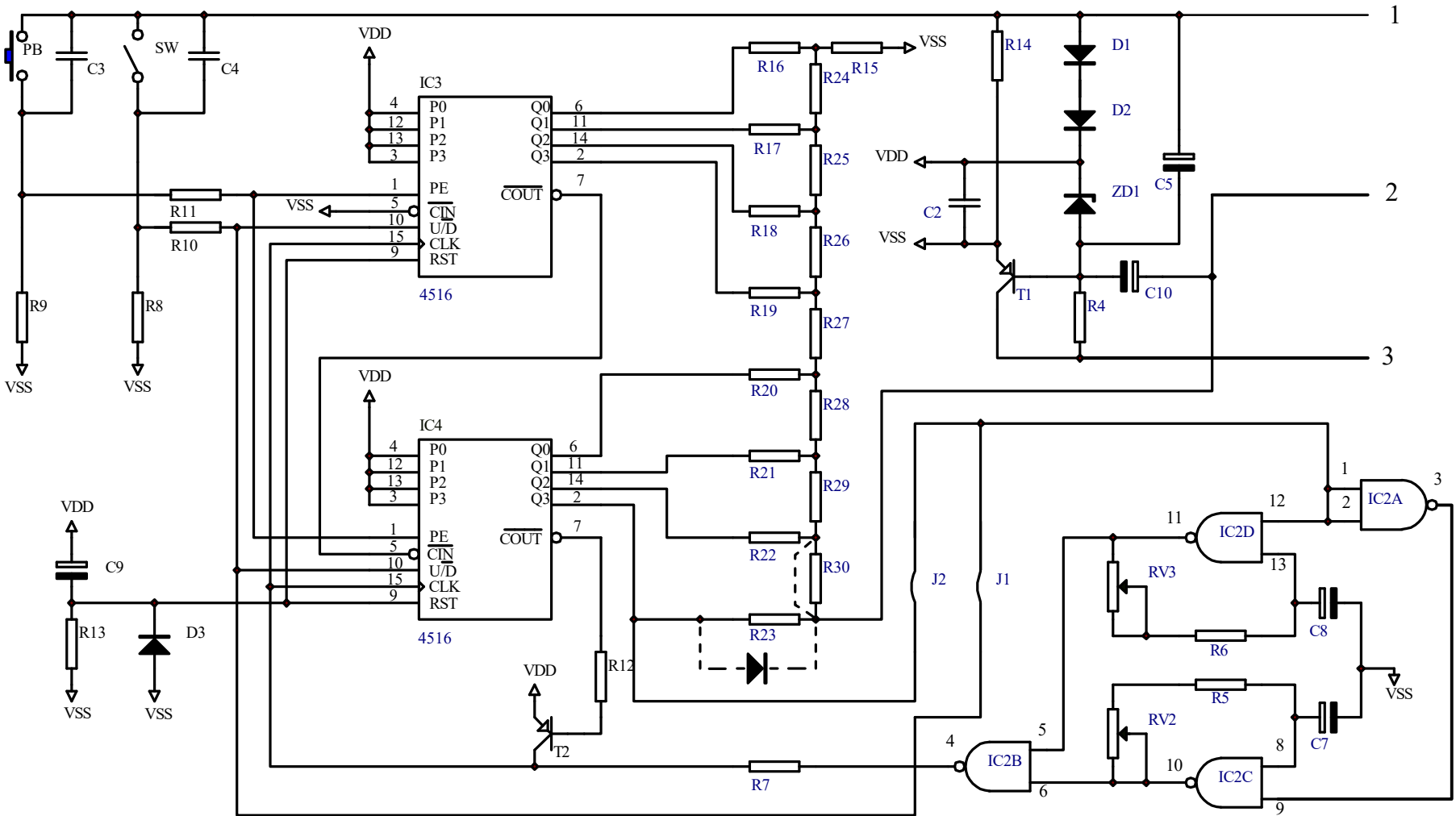
TIMER / DIMMER			
C8		C7	  
1 μ F	1s...15s	1 μ F	1s...15s
10 μ F	15s...2.5min	10 μ F	15s...2.5min
100 μ F	2.5min...30min	100 μ F	2.5min...30min

11. PCB LAYOUT

VELLEMAN P2657



11. DIAGRAM CONTROL PART



11. DIAGRAM POWER PART

