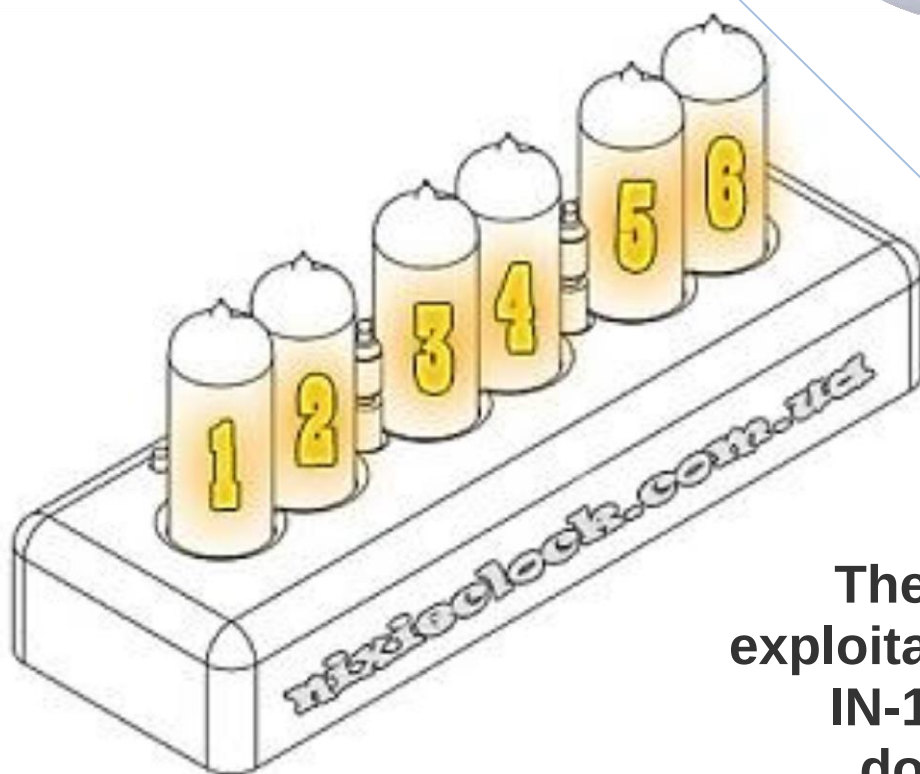
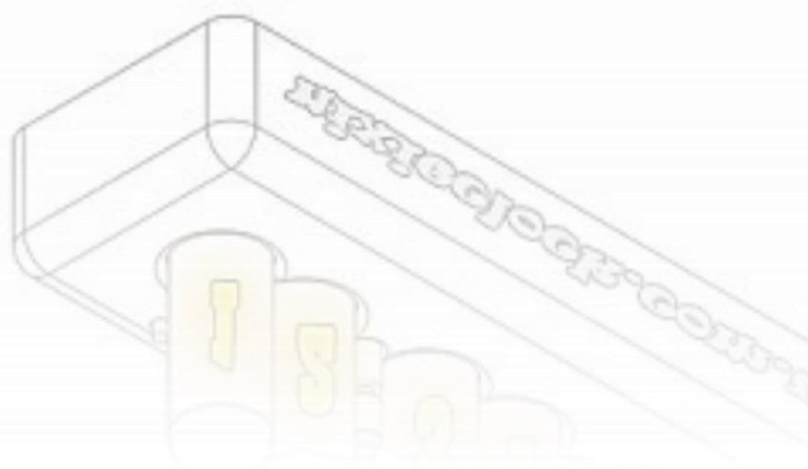




**The assembly and
exploitation of Nixie clock
IN-14 4 - tube sets
documentation.**



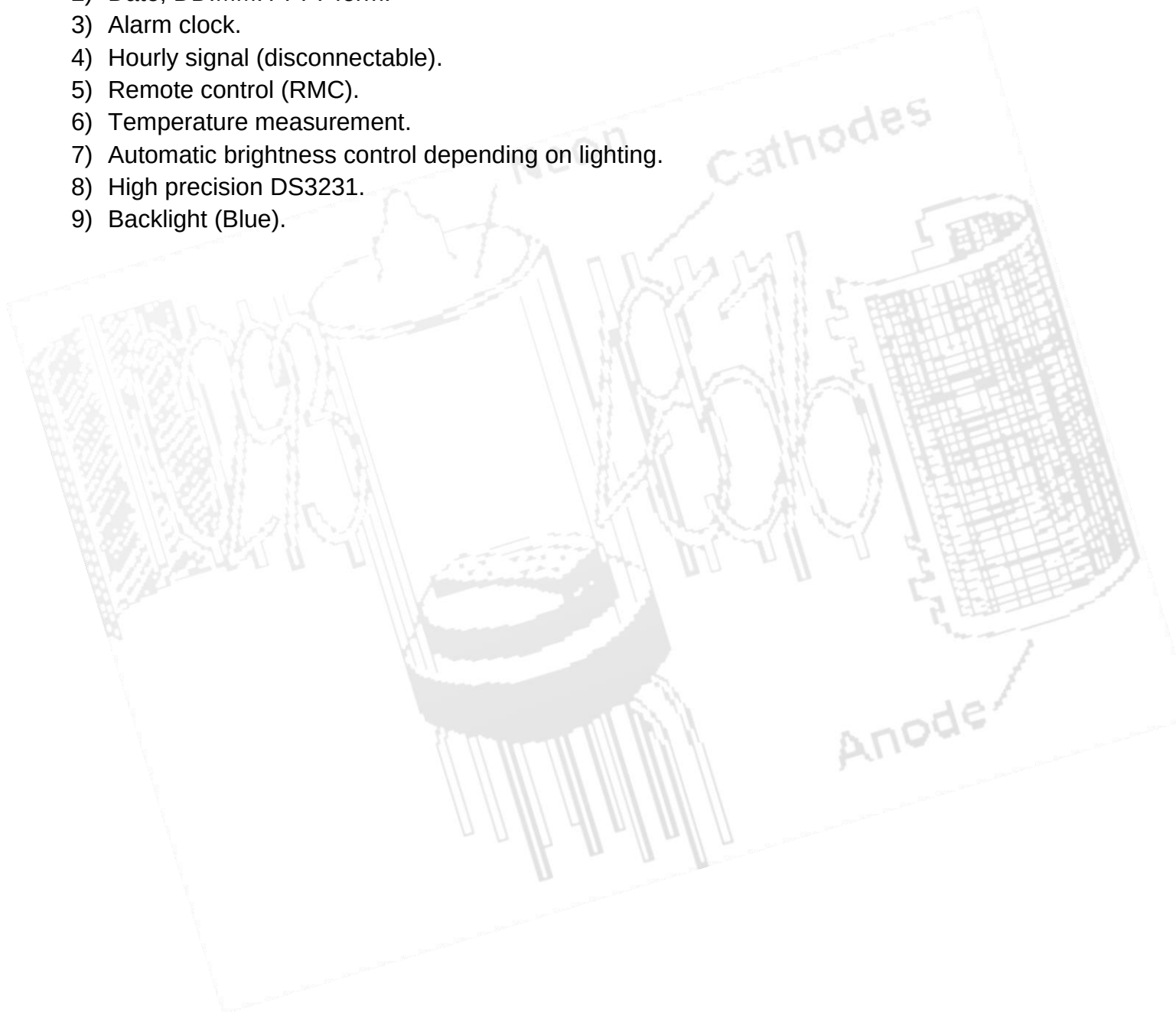
1. Contents:

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2. Description and technical characteristics.

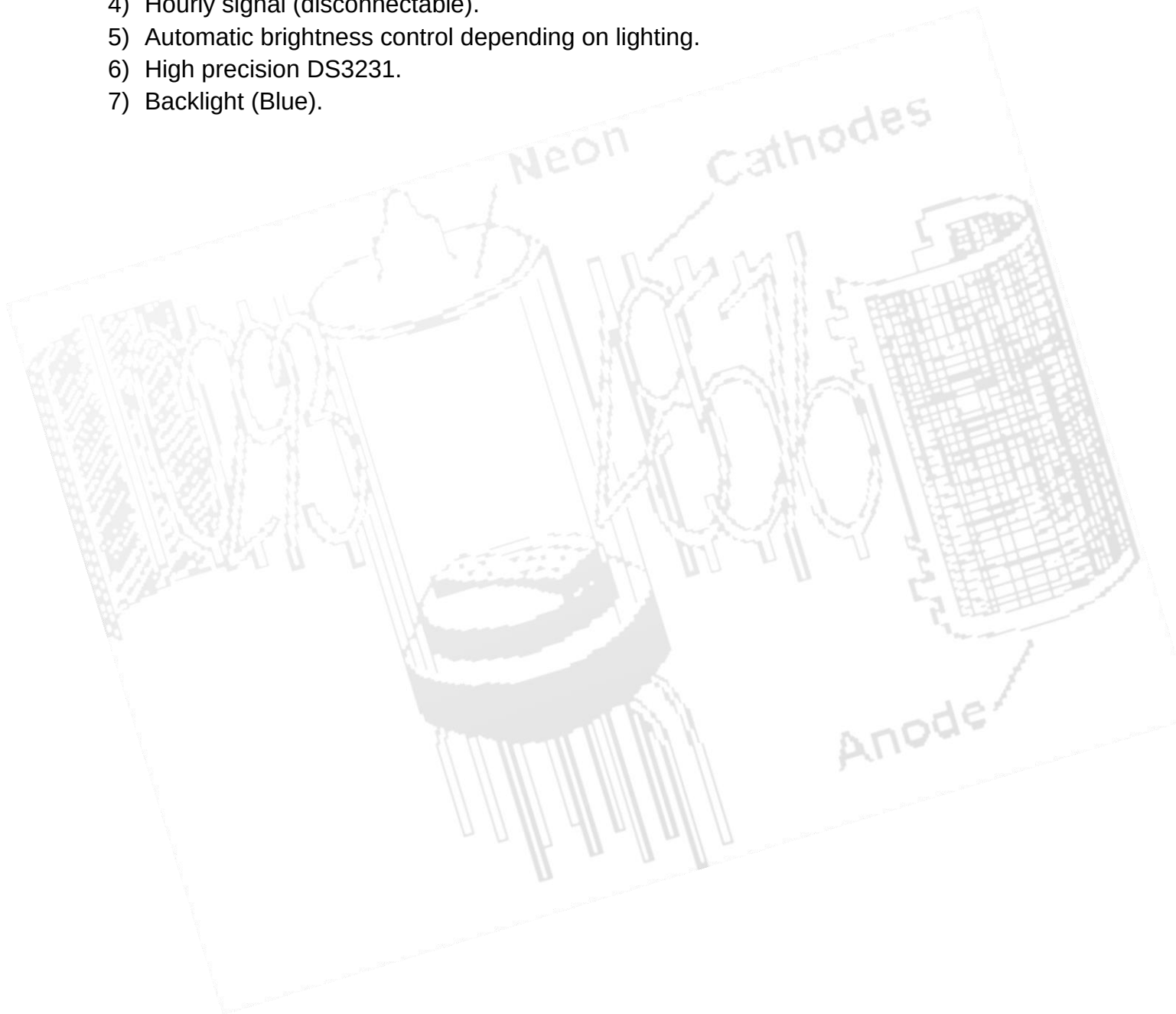
Nixie clock Kit IN-14 4 - tube Full.

- 1) Clock, 12/24 forms.
- 2) Date, DD.MM.YYYY form.
- 3) Alarm clock.
- 4) Hourly signal (disconnectable).
- 5) Remote control (RMC).
- 6) Temperature measurement.
- 7) Automatic brightness control depending on lighting.
- 8) High precision DS3231.
- 9) Backlight (Blue).



Nixie clock Kit IN-14 4 - tube Lite.

- 1) Clock, 12/24 forms.
- 2) Date, DD.MM.YYYY form.
- 3) Alarm clock.
- 4) Hourly signal (disconnectable).
- 5) Automatic brightness control depending on lighting.
- 6) High precision DS3231.
- 7) Backlight (Blue).



3. Instruction.

Two buttons Mode and Set are used for control navigation.

Short pressing Set – switch the backlight.

Short pressing Mode – manual selection of brightness

0 – automatic adjustment.

1-6 – 5 steps of brightness adjustment.

Prolonged holding Mode – enter the main menu.

***** – the lamp is off or dimmed.

Mode – transition on menu

Set – value changing.

The main menu.

On the screen:

12 34 – menu items.

1 – time and date setting.

2 – alarm clock and hourly signal setting.

3 – delimiters and date control.

4 – binding the IR temperature transmitter.

1 – time and date setting.

On the screen 1:

XX XX – time HH.MM.

On the screen 2:

**** XX** – time SS.

On the screen 3:

XX XX – date DD.MM

On the screen 4:

XX XX – YYYY

On the screen 5:

**** *X** – time 12/24 forms.

0 – 24.

1 – 12.

2 – alarm clock and hourly signal setting.

On the screen 1:

XX XX – adjustment of alarm clock time HH.MI.

**** *0** – alarm clock is off.

**** *1** – alarm clock is on.

On the screen 2:

XX XX – Time period setting of hourly signal mode.

**** *0** – hourly signal is off.

**** *1** – hourly signal is on.

3 – delimiters and date control.

On the screen 1: _____

(XX) XX – time in seconds of date display.

0 – date display is off.

1-6 – time of date display continues for 1-6 seconds.

XX (XX) – number of times of date display in a minute.

On the screen 2:

(XX) *X – number of times of temperature display in a minute.

XX *(X) – delimiter modes.

0 – Off.

1 – Flickering.

2 – Constantly lightning.

On the screen 3:

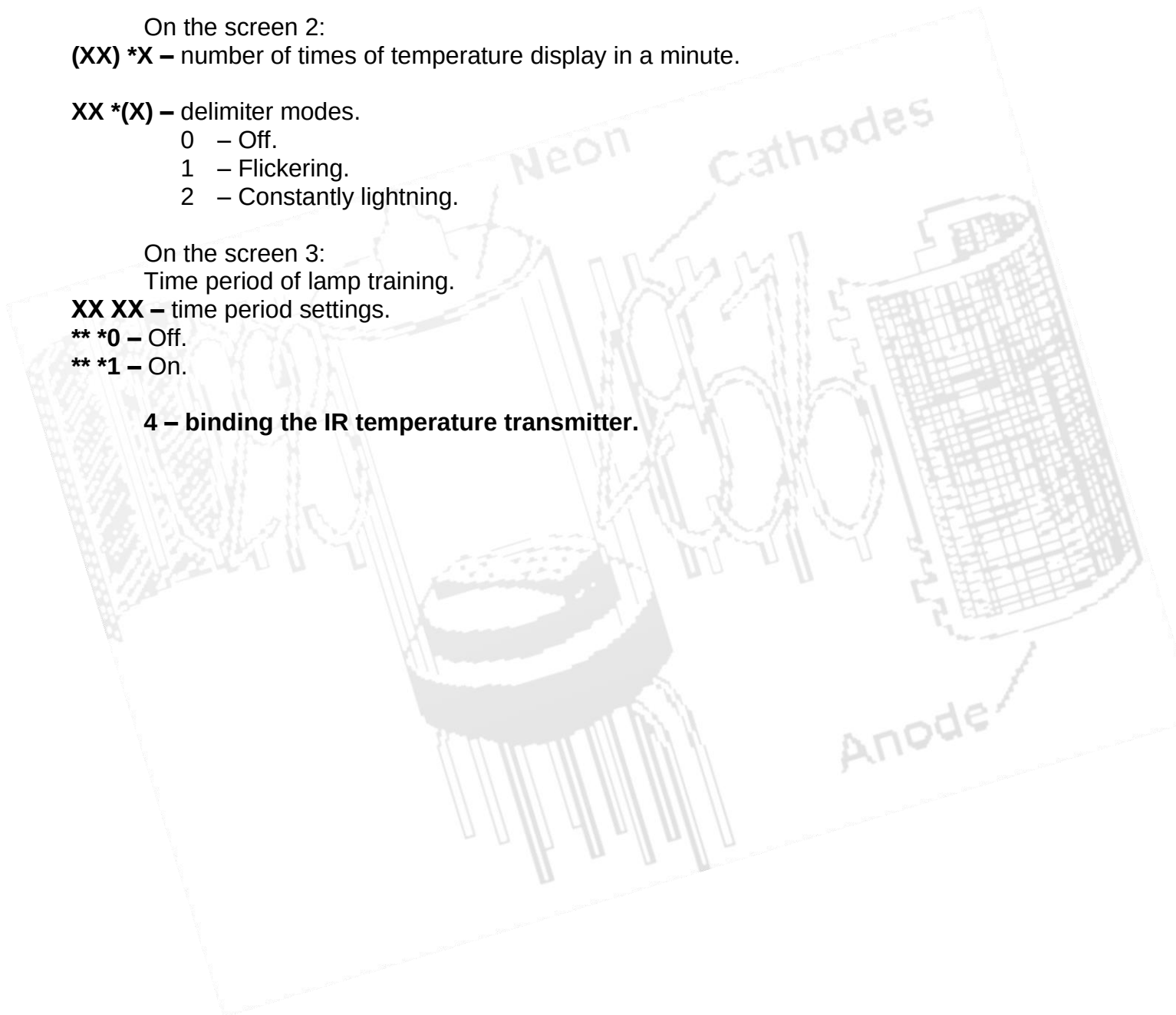
Time period of lamp training.

XX XX – time period settings.

**** *0** – Off.

**** *1** – On.

4 – binding the IR temperature transmitter.



The RMC (remote control) from IR remote.

1. Return. Кнопка Return.

The button return is to return to menu navigation.

2. The main menu. Button MENU.

Prolonged holding the button MENU is required to enter the main menu.

* - lamp is off or dimmed.

X - The editable value.

Left-Right – transition on menu.

“+”“-” –value changing.

On the screen:

12 34 – menu items

1 – time and date setting.

2 – alarm clock and hourly signal setting.

3 – delimiters and date control.

4 – binding the IR temperature transmitter.

1 – time and date setting.

On the screen 1:

XX XX – time HH.MM.

On the screen 2:

**** XX – time SS.**

On the screen 3:

XX XX – date DD.MM

On the screen 4:

XX XX – YYYY

On the screen 5:

**** *X – time 12/24 forms.**

0 – 24.

1 – 12.

2 – alarm clock and hourly signal setting.

On the screen 1:

XX XX – adjustment of alarm clock time.

**** *0 – alarm clock is off.**

**** *1 – alarm clock is on.**

On the screen 2:

XX XX – Time period setting of hourly signal mode.

**** *0 – hourly signal is off.**

**** *1 – hourly signal is on.**

3 – delimiters and date control.

On the screen 1:

(XX) XX – time in seconds of date display.

0 – date display is off.

1-6 – time of date display continues for 1-6 seconds.



XX (XX) – number of times of date display in a minute.

On the screen 2:

(XX) *X – number of times of temperature display in a minute.

XX *(X) – delimiter modes.

- 1 – Off.
- 2 – Flickering.
- 3 – Constantly lightning.

On the screen 3:

Time period of lamp training.

XX XX – time period settings.

**** *0** – Off.

**** *1** – On.

4 – binding the IR temperature transmitter.

3. Brightness settings. Button ON/OFF.

Short pressing **“ON/OFF”** – manual selection of brightness.

0 – automatic adjustment.

1-6 – 5 steps of brightness adjustment.

4. Control of delimiter. Button UP.

The selection of delimiter modes is by button **“UP”**.

5. Pendulum. Button DOWN.

Short pressing **“DOWN”** – pendulum is on/off.

6. Date display. Button Left.

Date display is by short pressing of button.

7. Temperature display. Button Right.

Temperature display is by short pressing of button.

8. Alarm clock. Button TEST.

Turn off the alarm clock is by button ON / OFF.

Short pressing button TEST displays the mode time of alarm clock.

Entering the alarm clock menu is by prolonged pressing button TEST.

9. Backlight.

Short pressing button **“7”** – backlight is on/off.

4. The list of elements.

Nixie clock Kit IN-14 4 - tube Full.

Resistors:

0.33 - 2 pcs.
20 Ом - 4 pcs.
330 Ом - 2 pcs.
680 Ом - 4 pcs.
3,3 kОм - 12 pcs.
2 kОм (adjustable) - 1 pc.
4.7 kОм - 2 pcs.
10 kОм - 11 pc.
20 kОм - 1 pc.
100 kОм - 1 pc.
240 kОм - 1 pc.
560 kОм - 1 pc.
1 MОм - 4 pcs.

Capacitors:

0.1 - 16 pcs.
470 pF - 1 pc.
100 pF - 1 pc.
100/16V - 3 pcs.
100/16V(tantalum) - 1 pc.
10/400V - 1 pc.

Diodes:

BYV26C - 1 pc.
42V - 2 pcs.

LEDs:

Blue - 4 pcs.

Microchips:

MC34063 - 1 pc.
STM32F030F4P - 1 pc.
DS3231 - 1 pc.
DS18B20 - 1 pc.
K155ИД1 - 1 pc.
REG1117-3.3 - 1 pc.
74HC595D - 2 pcs.
ULN2003D - 2 pcs.

Throttles:

220uH - 1 pc.

Others:

Battery container CP2030 - 1pcs.
Connector Power - 1 pc.
Connector DS18B20 - 1 pc.
Photoresistor - 1 pc.
TSOP - 1 pc.
Buttons - 2 pcs.
Buzzer - 1 pc.
Neon lamp - 1 pc.
Remote controller - 1 pc.

Transistors:

MMBTA42 - 5 pcs.
MMBTA92 - 4 pcs.
BC846 - 3 pcs.
BC856 - 1 pc.
IRFR320 - 1 pc.

Nixie clock Kit IN-14 4 - tube Lite.

Resistors:

0.33 - 2 pcs.
20 Ом - 4 pcs.
330 Ом - 2 pcs.
680 Ом - 4 pcs.
3,3 kОм - 12 pcs.
2 kОм (adjustable) - 1 pc.
4.7 kОм - 2 pcs.
10 kОм - 11 pc.
20 kОм - 1 pc.
100 kОм - 1 pc.
240 kОм - 1 pc.
560 kОм - 1 pc.
1 MОм - 4 pcs.

Capacitors:

0.1 - 16 pcs.
470 pF - 1 pc.
100 pF - 1 pc.
100/16V - 3 pcs.
100/16V(tantalum) - 1 pc.
10/400V - 1 pc.

Diodes:

BYV26C - 1 pc.
42V - 2 pcs.

LEDs:

Blue - 4 pcs.

Microchips:

MC34063 - 1 pc.
STM32F030F4P - 1 pc.
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74HC595D - 2 pcs.
ULN2003D - 2 pcs.

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220uH - 1 pc.

Others:

Battery container CP2030 - 1pcs.
Connector Power - 1 pc.
Photoresistor - 1 pc.
Buttons - 2 pcs.
Buzzer - 1 pc.
Neon lamp - 1 pc.

Transistors:

MMBTA42 - 5 pcs.
MMBTA92 - 4 pcs.
BC846 - 3 pcs.
BC856 - 1 pc.
IRFR320 - 1 pc.

5. The specification.

Nixie clock Kit IN-14

– Matchmark-Value

1-C1-100 pF	40-L1-220 uH	79-R38-3.3k
2-C2-100/16v	41-Q1-IRFR320	80-R39-240k
3-C3-10x400V	42-R1-0,22	81-R40-4k7
4-C4-100/16v	43-R2-0,22	82-R41-20
5-C5-100/16v	44-R3-680	83-R42-20k
6-C6-0.1	45-R4-20	84-R43-3,3k
7-C7-0.1	46-R5-560k	85-R44-4k7
8-C8-470 pF	47-R6-10k	86-R45-10k
9-C9-0.1	48-R7-20	87-R46-3,3k
10-C10-100/16v	49-R8-680	88-RT1-Neon
11-C11-0.1	50-R9-3.3k	89-Tube1-ИH14
12-C12-0.1	51-R10-680	90-Tube2-ИH14
13-C13-0.1	52-R11-3.3k	91-Tube3-ИH14
14-C14-0.1	53-R12-680	92-Tube4-ИH14
15-C15-0.1	54-R13-20	93-U1-Buzzer
16-C16-0.1	55-R14-330	94-U2-Power
17-C17-0.1	56-R15-3,3k	95-U3-BAT
18-C18-0.1	57-R16-330	96-U4-FR
19-C19-0.1	58-R17-2k	97-U5-PBS-4
20-C20-10uF/63V	59-R18-100k	98-U6-DS18B20
21-C21-0.1	60-R19-10k	99-U7-
22-C22-0.1	61-R20-10k	100-U8-
23-C23-0.1	62-R21-3,3k	101-U9-TSOP
24-C24-0.1	63-R22-3,3k	102-VT1-BC846
25-D1-LED	64-R23-3,3k	103-VT2-BC846
26-D2-BYV26C	65-R24-10k	104-VT3-BC846
27-D3-LED	66-R25-10k	105-VT4-BC856
28-D4-LED	67-R26-10k	106-VT5-MMBTA92
29-D5-LED	68-R27-1M	107-VT6-MMBTA92
30-D6-43v	69-R28-1M	108-VT7-MMBTA92
31-D7-43v	70-R29-1M	109-VT8-MMBTA92
32-IC1-MC34063	71-R30-1M	110-VT9-MMBTA42
33-IC2-1117-3.3	72-R31-10k	111-VT10-MMBTA42
34-IC3-DS3231	73-R32-10k	112-VT11-MMBTA42
35-IC4-STM32F030F4P	74-R33-10k	113-VT12-MMBTA42
36-IC5-74HC595D	75-R34-10k	114-VT13-MMBTA42
37-IC6-74HC595D	76-R35-3.3k	
38-IC7-U1N2003D	77-R36-3.3k	
39-IC8-U1N2003D	78-R37-3.3k	

6. The recommendations of assembly

Preparation of materials.

Choosing the flux for brazing is the most important and responsible moment. There is a high probability that the device does not even start using the various fluxes, acids with conducting particles. It occurs because there is high voltage on the board (160–200 V) and low-voltage lines nearby.

Cleaning the board is the important moment after assembly. Choosing the cleaning agent is the important moment too. The best variant for it is alcohol, petrol "Kalosha". It is not strongly recommended to clean the board using the sanitary ware cleaners and whiskey (there were precedents).



The rosin is the safest solution!

7. The converters.

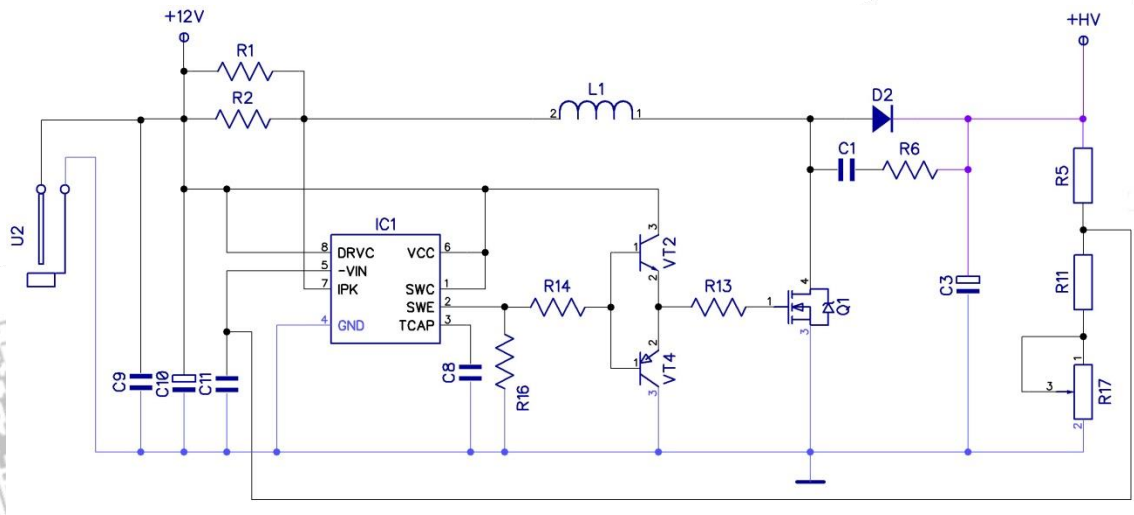
The upconverter 12–200 V.

The upconverter 12–200 V.

The supply of lamps is carried out by 180–200 V.

Attention!!! High voltage can be dangerous to your life.

The converter is constructed on common scheme MC 34063.

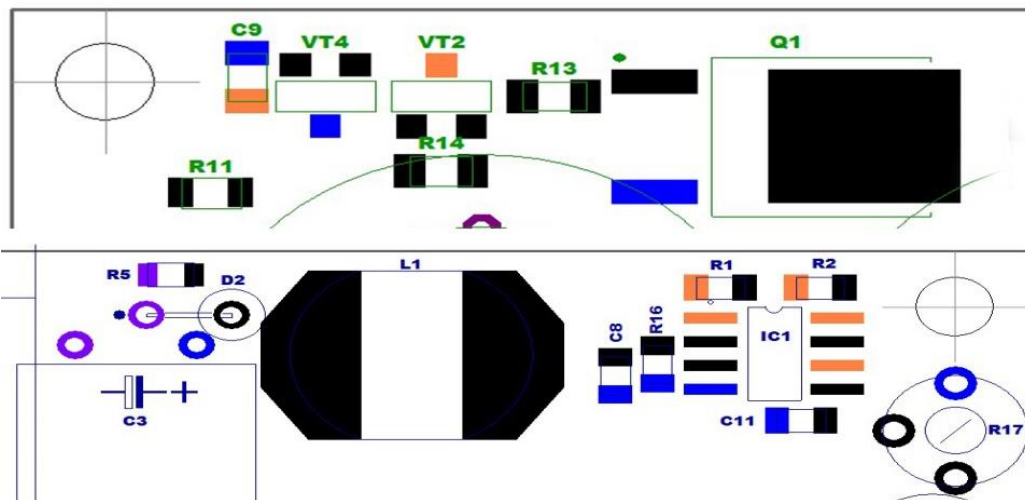


Components:

U2 - Power
D2 - BYV26C
R1 - 0,22
R2 - 0,22
R14 - 330
R16 - 330
R13 - 20
R167 - 10k

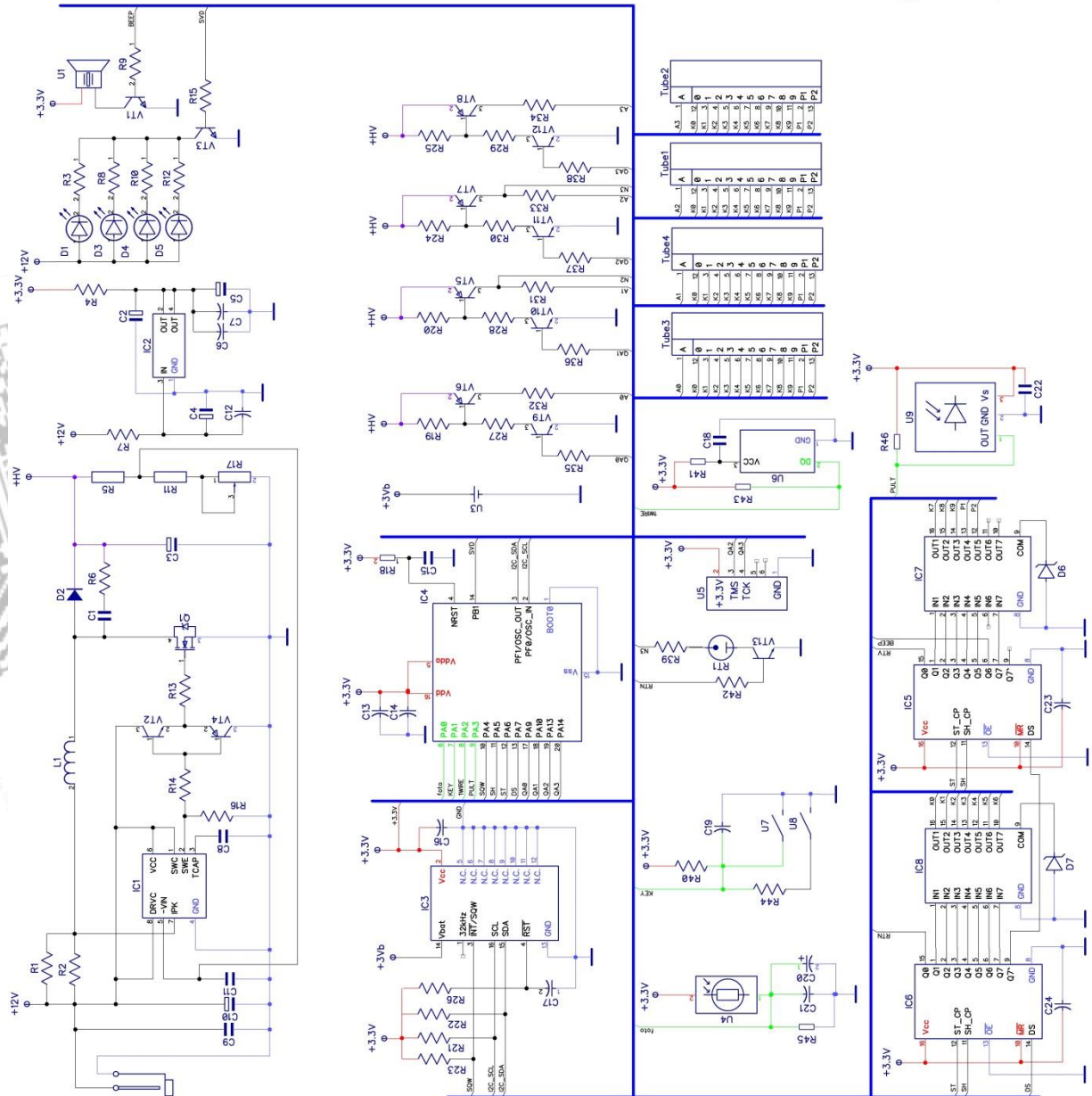
R17 - 2k
R5 - 560k
R11 - 3,3k
L1 - 220 uH
IC1 - MC34063
C9 - 0.1
C10 - 100/16v
C11 - 0.1

C8 - 470 pF
C2 - 100pF
C3 - 10x400V
VT2 - BC846
VT4 - BC856
Q1 - IRFR320

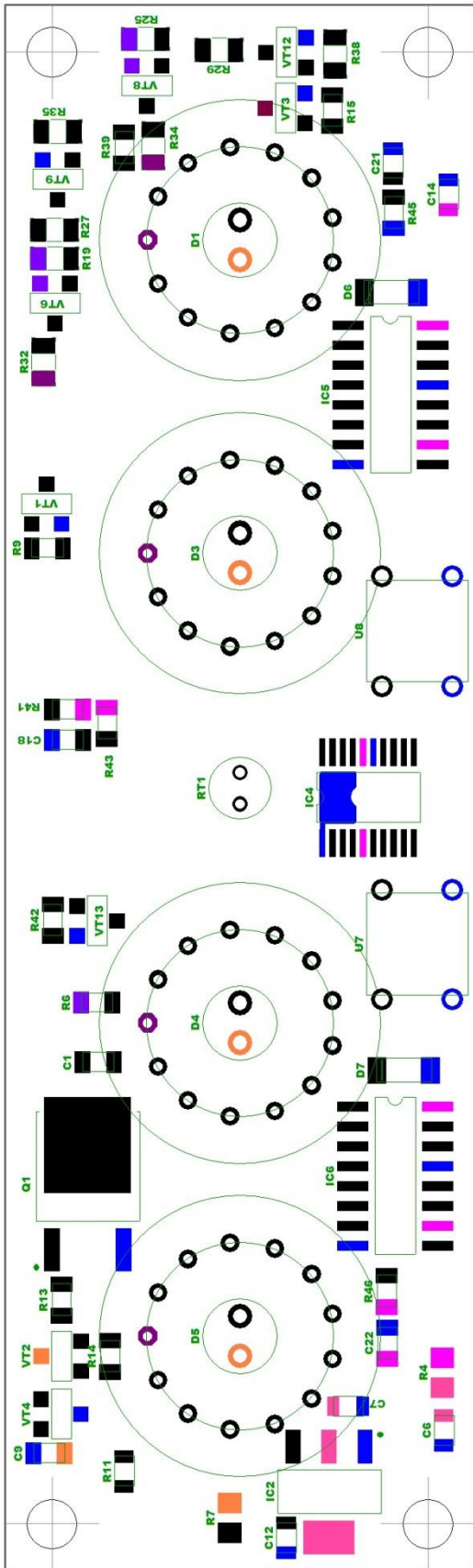


8. The wiring and elementary diagrams.

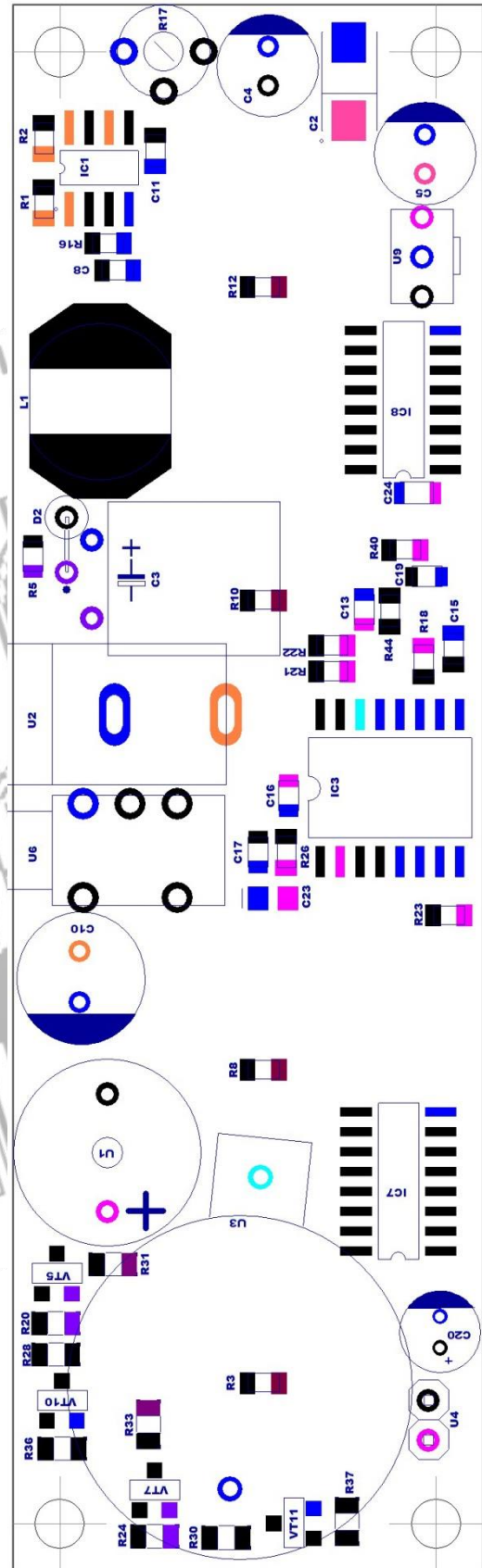
The elementary diagram - matchmarks







Matchmarks. Nixie clock kit IN-



Values. Nixie clock Kit IN-14 (Full)