

NIXIE BARGRAPH CLOCK USER GUIDE

Disclaimer:

You, the builder and user, bear the responsibility for your own safety in building, testing, and using this clock. By purchasing this clock, you acknowledge the risks involved in its operation and accept those risks as a result. I will in no way be held responsible for your actions, including your death by this device and you accept these terms by building and using this clock.

Introduction

I designed the Nixie Bargraph clock as I wanted a Nixie clock with a difference. By using two IN-9 Nixie bargraph tubes to display the time it allows almost anything to be used as a clock. Simply attached the tubes, mark some legends and mount the PCB. All you then need is 12v 1A power supply and you have yourself a Nixie clock. I have used this kit mounted to some Oak for a simple look or mounted onto an antique clock movement, the possibilities are, however, endless.

Due to the nature of Nixie tubes this board does produce high volt, and so all appropriate safety measures must be taken when handling this board.

Features:

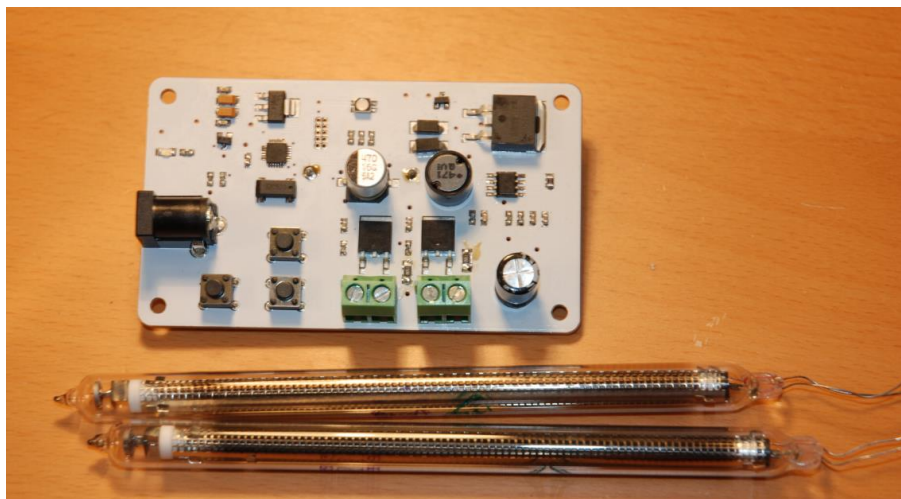
- Manual calibration of the tubes, allowing different scales to be used.
- Night time tube saving. The tubes are switch off between 1am and 6:59am. This is to prolong tube lifespan. The LED flashes blue every second in this mode.
- Back up battery to preserve time keeping if not powered from the wall.

Contents of the kit:

1x Assembled PCB

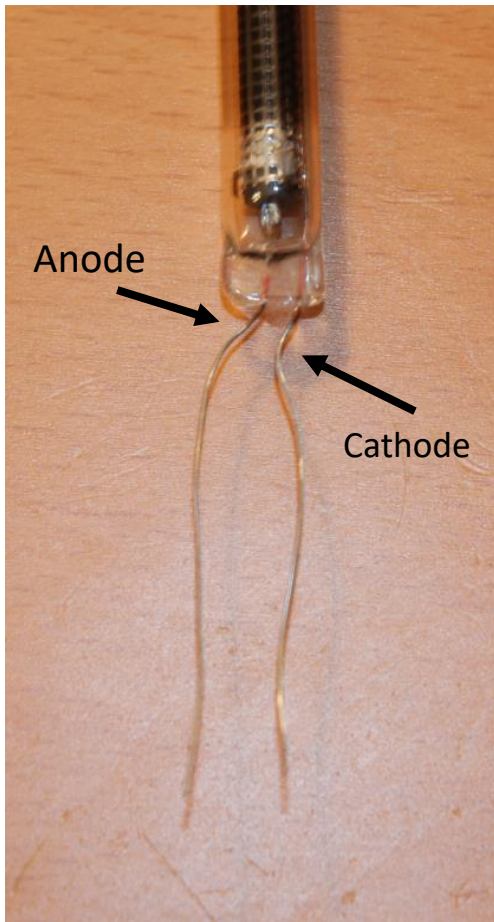
2x Nixie IN-9 bargraph tubes

1x CR2032 battery

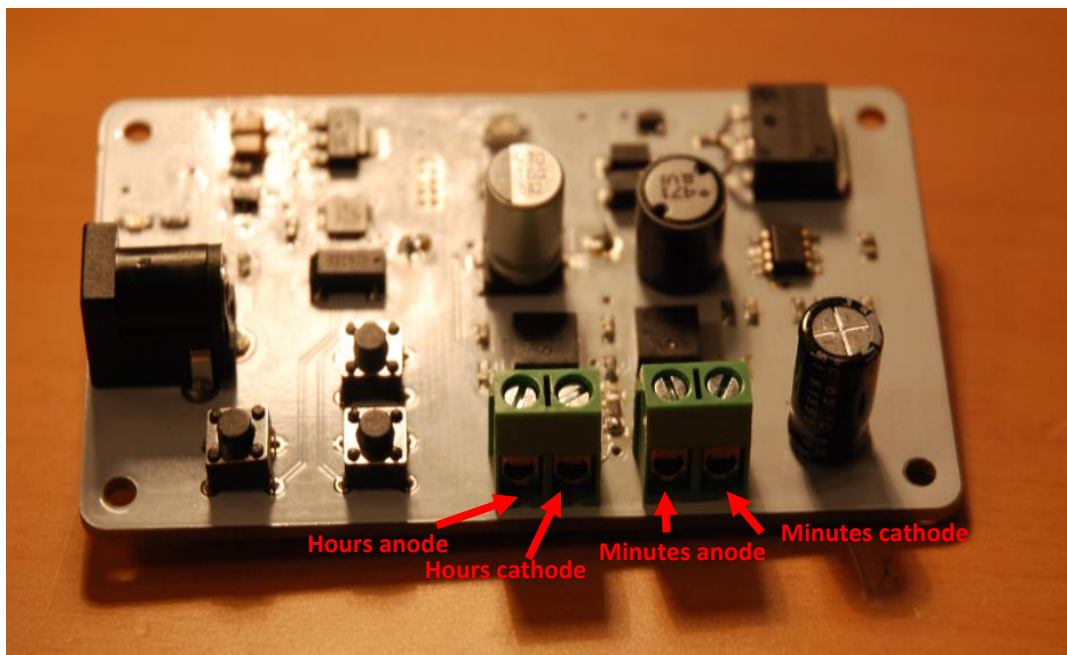


To power the PCB you will need a 12v 1A power supply with a 2.1mm DC jack connector.

The tubes are polarised and so it is important to connect the wires the correct way round.



The anode and cathode need to be connected to these pins on the board:



I would recommend using heat shrink to cover the wires. This offers protection against the high voltage and prevents the wires accidentally shorting to each other.

Lastly, insert the CR2032 battery into the back of the board. When you do this, or whenever the board is first powered on, the LED on board will flash red, green, blue. This is to let you know the board is now on and the clock is running.

Now that's it, you're ready to power up the board!

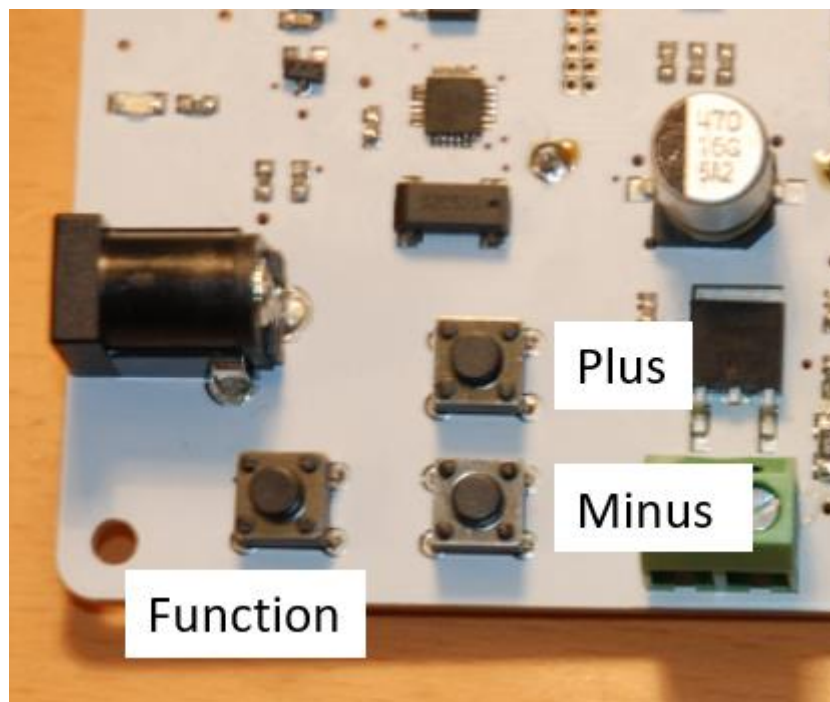
When you connect power to the board the tubes will raise up to the pre-set time of 6:30pm. This should position the glow at about half way up each tube. It is very unlikely this is the correct time so you will want to calibrate the tubes and set the time.

Setting the time and Calibration

Calibrating:

So that the tubes will tell the time on your own scale I have allowed the top and bottom positions of the tubes to be manually set. The clock will then divide up the space equally between these two points into 12 hours or 60 minutes.

To calibrate the minutes tube press the *function* button twice:



Pressing *function* should cause the LED to light up. Press twice so that the LED is **RED**.



You can see that the LED is red and the minutes tube has moved to the bottom of the tube, 0 minutes. Now by pressing the plus and minus buttons you can move the position of the illuminated tube. Move it to match the bottom of your minutes scale.

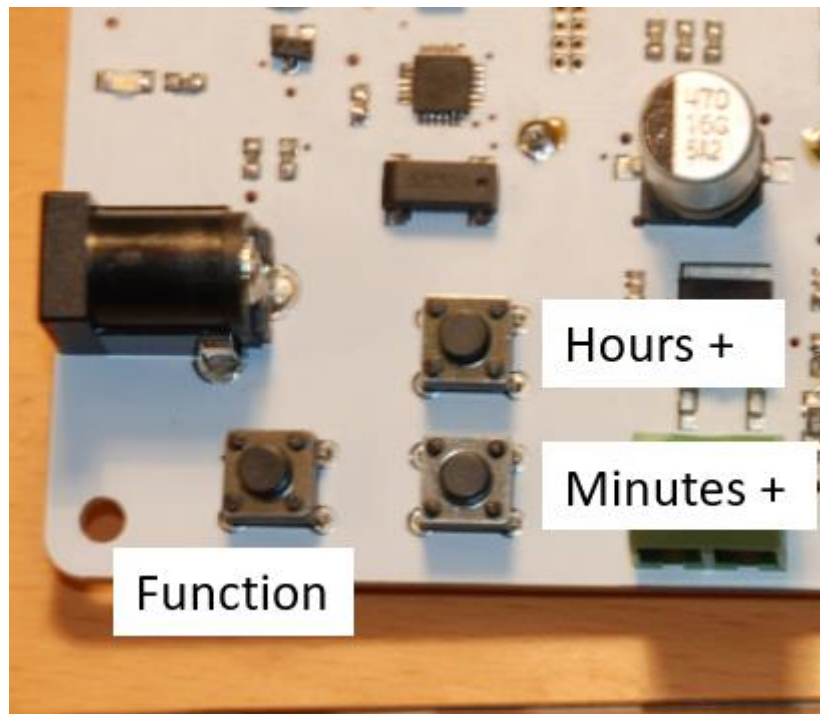
When you are happy with the position, press the *function* button again. The LED will now turn **light blue** and the minute tube will have moved to the top. This is the maximum position of the legend, 59 minutes. Again, using the *plus* and *minus* buttons move this position to match your legend.

You can now repeat the process with the hours tube. Pressing the *function* button will change the LED to **yellow**. This allows you to adjust the bottom of the hours scale, 1am and 1pm. Pressing the *function* button once again will change the LED to **pink**. This is the top of your hours legend, 12am and 12pm.

Once you are happy with the tube positions press *function* again and the LED will turn off and the tubes will return to telling the time.

Setting the time

Now the tubes are calibrated to your scale you can set the time. Pressing the *function* button once will turn the LED **green**. This time the tubes will remain the same. You can now adjust the time. The buttons have these functions:



Pressing the *hours+* button will add one hour to the time. Pressing *Minutes+* will add a minute to the time. When the minutes roll over it does not increment the hour. Once the time is set cycle through the calibration modes until the LED is off. The clock is now calibrated and the time is set. Sit back and enjoy!

Important note: When setting the hours remember the tubes only display 12 hours, but the clock runs up to 24. If you set the hours to between 1 am and 6:59 am the clock will enter night time mode. When you exit the function modes the tubes will switch off and the LED will flash blue at 1 second intervals. If this is not the correct time simply press *function* again and cycle the hours round to 12 hours later.

Replacing the tubes

Nixie tubes, like light bulbs, periodically need replacing. Fortunately, these tubes are fairly easy and cheap to pick up on line. They are also super easy to replace with the screw terminals. Should you replace the tubes you might be surprised to find the tubes only raises half way up and not all the way. This is a “burn in” effect, I ship tubes already burnt in, so when you receive them they will work all the way to the top, however new tubes show this effect. Simple leave the clock on and after a day or 2 the tubes should have burnt in and will display the time all the way to the top. This processes can be sped up by setting the hours then the minutes tubes to the top calibration.

Functions:

Number of pushes	LED colour	Function
1	GREEN	Adjust time, top right button = hours, bottom right = minutes
2	RED	Minutes bottom level calibration
3	LIGHT BLUE	Minutes top level calibration
4	YELLOW	Hours bottom level calibration
5	PINK	Hours top level calibration

Scale design

When you design your hours and minutes scale, you need to make sure that it fits within the upper and lower limits of the tube display. Then the time is simply equally divided along this length. This picture shows the limits of the time scale:

