

User Manual IN16-4-V1 Nixie Clock

Power for your Nixie Clock

The clock does not include a wall adapter. You should get a universal adapter yourself, these are not very expensive. The preferred voltage is 12VDC, but often 9VDC – 15VDC will do nicely too. The middle pin of the plug is the positive. Universal adapters often come with a set of various plugs, choose one that fits. If none of them fits, you can use the dc-plug is included with the clock. If the clock does not work, you may have gotten the polarity wrong. Change the polarity and try again.

Setting the Nixie Clock

Turn on the clock by plugging in the wall adapter. The time will start at 12:00 and blinks. Press and hold the set button, for about 5-6 seconds until the first tube will turn on its decimal point. Release the button.

Now, with each short press of the button, you can advance the first digit. The format is 24 hours, so the first tube only changes from 0-1-2 etcetera. After the digit is set correct, press the button again for 2 seconds, and see that the second tube will turn on its decimal point. Set all the other tubes in the same way.

Once you have set all digits, press and hold the button for 5-6 seconds, and the clock will resume normal operation. Note that the internal timekeeping of seconds will be reset to zero. To set your clock as accurately as possible, press and hold the button exactly when your reference clock changes to the next minute. The 5-6 seconds you need to hold don't affect this, the software compensates for that.

At first, this may seem a bit of a hassle, but after a while you will notice that it is remarkably easy to set the clock.

Calibrating the Nixie Clock

The clock comes calibrated. There's a label on the bottom with the correct calibration value for use at normal room temperature. If you use the clock in extreme cold or warm places, you may want to recalibrate it. Press and hold the set button, for about 7-8 seconds. While you hold it, you will first see that the first tube turns on its decimal point, and then the second tube will turn on its decimal point. Now release the button. There should be 4 digits displayed now. Here you can set a new calibration value for the timing of the clock. First set this value at 5000. After setting this value, press and hold the button for 5-6 seconds, to return to normal mode. This value will be stored inside the microcontroller. Turn off the clock, and turn it on again.

Now set the clock, using a reliable time reference. Set the clock as described earlier, and wait until your time reference matches the time you have set. Now press and hold the set button for 5-6 seconds, and notice that the clock now runs synchronous with your reference, both displaying the same time.

Using the standard calibration value of 5000, the clock should run with a better accuracy than +/- 10 seconds per day. Let the clock run for a couple of days, and note the time difference

between the nixieclock and the reference clock you have used. Calculate the number of milliseconds per hour the clock runs too fast or too slow.

Example: after 2 days, the nixieclock seems 7 seconds too fast. Divide by 48 hours, And multiply by 1000. That's 145 millisecond per hour. The clock needs to run 145 milliseconds per hour slower, so the new calibration value will be $5000 - 145 = 4855$.

Enter the new calibration value, turn off the clock, and turn it on again. Now you can set the clock, and it will be more accurate now. Repeat the procedure if need be.

Setting Display Off Time

Nixietubes last very long, but possibly not forever. You may want to use this option, to turn the tubes off during the night. Press and hold the set button, for about 9 seconds. You will first see that the first tube turns on its decimal point, and then the second tube will turn on its decimal point, and then the third tube turns on its decimal point. Now release the button. There should be 2 values displayed now. These values tell you at what hour the display goes off, and at what hour it turns on again. Adjust the values to your preferences. To save the values, hold the button for 5-6 seconds, to return to normal mode. The value will be stored automatically inside the clock. If you don't want to use this option, put both hours at 00. (or set them at equal values). For your information, rumours tell the tubes last for 50.000 hours. I have reasons to believe it will be actually longer than that, as the current at which the tubes are driven is very low and well regulated in this design. 50.000 hours equals to more than 5 years. Lifetime is defined as the time it takes for the nixies to fade to 50% of their initial brightness.

Setting General Options

In this option setup you can select 'fading' display of the tubes, and also you can turn off the flashing neons. Press and hold the set button, for about 11 seconds. Notice that the first tube starts flashing, and then the second tube, the third, and the fourth tube. Now release the button. There should be 4 numbers displayed now, the first '1' and the others '1' or '0'. The first number tells what category of options we are about to change. The other three tell us if an option is on or off. When set to '1' the option is turned on, when set to '0' the option is turned off. First select the category you want to edit. This is done by changing the first digit. Then you can alter the settings for that category.

Adjust the values to your preferences, according to this list:

Option Categories:

- 1 - Fading On=1, Flashing Neon=1, Neon On=1 (Default 1-1-1)
- 2 - DCF77 On=1, Timezone=-1 for UK, Not used. (Default (0-0-0))
- 3 - RTC On=1, Not used, Not used. (Default 0-0-0)
- 4 - 12 Hour format On =1, No Leading Zero=1, Not used. (Default (0-0-0))

The first category deals with the behaviour of the tubes and the little neon indicator. You can choose 'fading' tubes, or turn off the neon flashing, or even turn off the neon entirely.

The second category deals with the DCF77 atomic time receiver. This option is only for Europe. You can turn it on, and adjust the timezone for UK residents.

The third category is for the RTC option. You can turn it on or off.

The fourth category is for the 24Hr/12Hr mode. If you prefer the US style, turn on the 12 hour mode. Here you can also suppress leading zeroes, which will work in both 24Hr/12Hr mode.

All the changes you make to these settings will be stored automatically inside the clock.

If you have any further questions, please contact me at

support@franktechniek.nl

or look for additional information at

www.franktechniek.nl

Have fun with your new nixieclock!

Thanks,

Frank Bemelman.