User Manual Z570M-1-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 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.

How late is it?

The clock has only one tube and displays the time in a sequence of 4 numbers. For instance, 10:25 AM is displayed as 1-0-2-5. There is a small gap between each display cycle, so you can recognize the start of the cycle. The time is displayed once per 3 seconds.

When you turn the clock on, it will start at 12:00 hours. If you have the RTC option installed, it will display the actual time. The blue led can have different behaviours, depending on how you have programmed the display options for the LED. It can be on or off, blinking or work in a couple of other modes. In setup mode, the LED works as an aid to set the clock properly.

Setting the Nixie Clock

This is a weird clock, and setting it takes a bit of practice. If you already own one of my other clocks, this will be somewhat easier, but it still takes a bit of getting used to.

The blue led under the tube helps you to set the clock. If the LED isn't turned on already, tap the button once to turn it on.

Press and hold the button. The LED goes off. While keeping the button pressed, after 5 seconds it will flash briefly. Now release the button. You are now in the 'SET TIME' mode. Tapping the button advanced the first digit. Each time you tap it, it will advance the digit. Of course you need to pause and wait to see that it actually has. When the first digit has been set correctly, you can move to the next digit. This is done by pressing and holding the button, until the LED flashes again, which takes about a full second. Release the button. Now you can set the second digit, again by tapping the button and watching the result being displayed. Once you have set all the digits, press and hold the button for 5 seconds, disregarding the brief flash of the LED and wait until it turns on permanent. Release the button and the clock will resume normal operation.

At first, this may seem a bit of a hassle, but after a while you will hopefully notice that it is not extremely difficult 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 and release it after the second(!) brief flash of the LED. There should be 4 digits being displayed now,

showing the actual calibration value. 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 reaches the time you have set (always at a full minute). Now press and hold the set button for 5-6 seconds, release when the LED turns on permanently, and notice that the clock now runs synchronous with your reference, both displaying exactly 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 weeks, 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, in the same manner as you would set the time. Once you have entered the new calibration value, press and hold the button for 5-6 seconds, disregarding the brief flash of the LED and wait until it turns on permanent. Release the button and the clock will resume normal operation. Now you can set the time again, using a reliable reference, and the clock will run much more accurate now. Repeat the procedure if need be.

Setting General Options

In this option setup you can set the modes for the LED, choose 12hr or 24hr mode, and set the timezone if you are using the optional DCF77 or WWVB receiver that synchronizes the clock to atomic time.

Press and hold the set button, for about 9-10 seconds and release it after the third(!) brief flash of the LED. There should be 4 digits being displayed now,

The first digit defines the behaviour of the LED in normal running mode. It can have a value of 0-5. A '0' means the LED will be off. A '1' means the LED will be always on. A '2' means it will flash every second. A'3' means it will work as an indicator for the atomic time receiver. A '4' means it will be on if a succesful synchronisation has occurred in the last 24 hours. A '5' means that it will work as a AM/PM indicator, and the LED will be on when it is PM.

The second digit defines the 12hr or 24 hour mode. A '0' selects 24 hour mode, a '1' selects the 12 hour mode.

The third digit sets the number of hours to be added to the Atomic time that was received. The fourth digit sets the number of hours to be subtracted to the Atomic time that was received. Depending on your location and receiver used, you can thus add or subtract 9 hours. You can set both if you like, but that doesn't make much sense. Normally, you set one of them to 0 and

the other one to correct the number of hours. If you don't have a receiver attached, it will make no difference at all.

Once you have set all the options and values, press and hold the button for 5-6 seconds, disregarding the brief flash of the LED and wait until it turns on permanent. Release the button and the clock will resume normal operation.

Setting the brightness of the tube

This is done by the little potentiometer adjustment on the bottom. The normal position is in the middle. Turning it clockwise, the tube will be brighter. Turning it the other way will dim the tube and it actually goes off entirely if you turn it too far. Keeping it in the middle is often the best position.

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
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