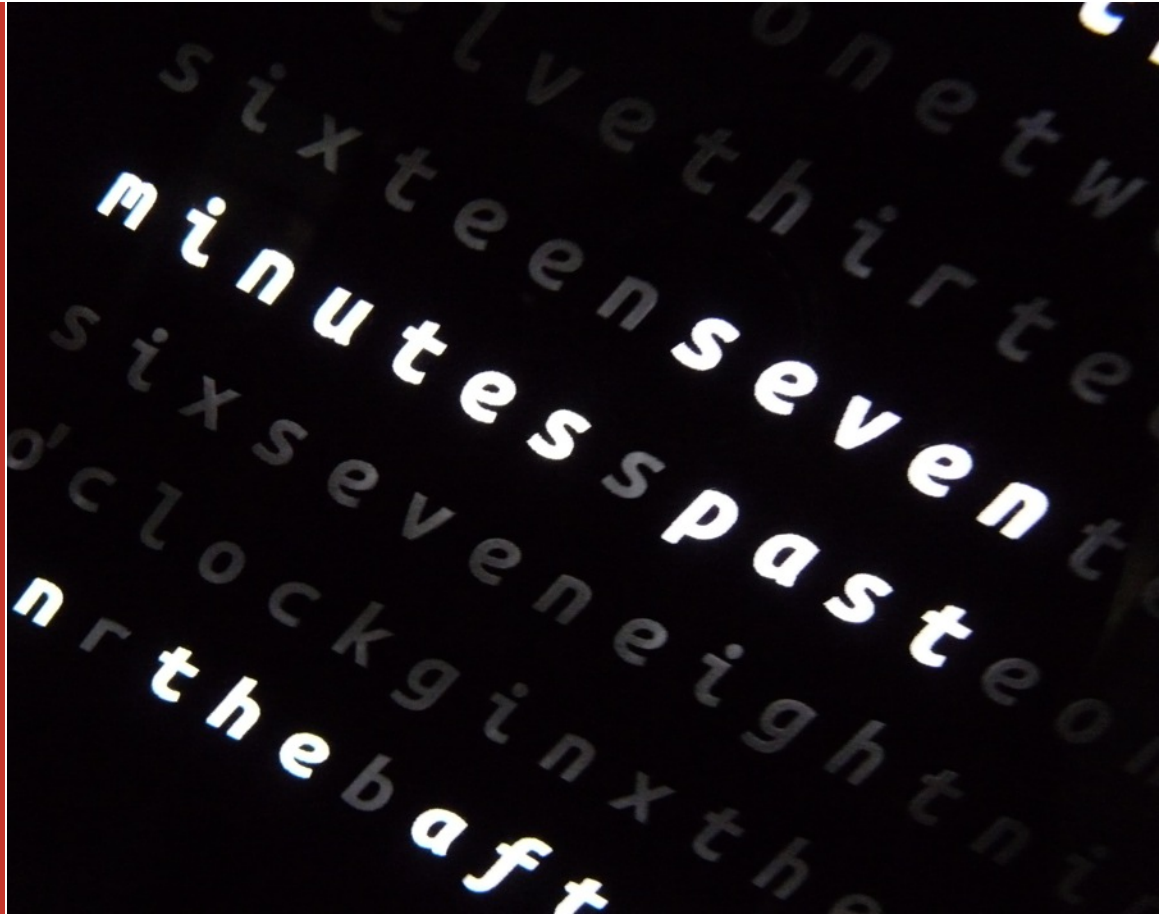


CHRONOGRAM2

What's better than a ClockThree Jr? Two ClockThree Jr's that's what! Even better is when you combine them to create the Chronogram2 - A functional piece of art that tells the time to the minute in glorious fashion. Interested in building one yourself? Well read on.....



Chronogram2 - Functional Art.

Nick Stock - WyoLum

If you're reading this, then you're probably familiar with the ClockThree Jr and perhaps word clocks in general. If not then you're in for a treat. Word clocks tell time in a unique fashion, by spelling it out in plain English for all to see. Simple eh? The ClockThree Jr is an addressable LED matrix that is extensible, so multiple boards can be combined and, hence, more complex word clocks (and other things!) created. As part of WyoLum's original KickStarter, multiple board clocks were offered and back then I took the plunge and bought a Chronogram2 kit to assemble my very own piece of functional art. I've since built three of these and within these pages I hope to help others build their own too.....

Step 1. Buy the kit from WyoLum!

This is the easy part. Send us an email and you can customize the font and color of the faceplate to your choosing. (These clocks are currently built to order, but we're working on having two standard versions pre-made for customers soon.)

Step 2. Get your soldering iron out!

Assembly starts with constructing both boards just as you would for a standard C3Jr clock (See instructions at ([http://wyolum.com/docs/ClockTHREEjr_v2/C3jr_Manual%20\(1\).pdf](http://wyolum.com/docs/ClockTHREEjr_v2/C3jr_Manual%20(1).pdf)). Hopefully, everything goes smoothly and you have two complete C3Jr boards and you're not completely exhausted from soldering *all those LED's*.



All the pieces for one of the two Chronogram2 boards

As usual, if you have any problems then shoot us an email or post a question on the WyoLum Helpdesk (search for us on Google+).



Success! First board working nicely.

Putting it together.

Step 3. Connect the two boards.

Once you've completed *the second board*, things begin to take shape. For the matrices to talk to each other you'll need to



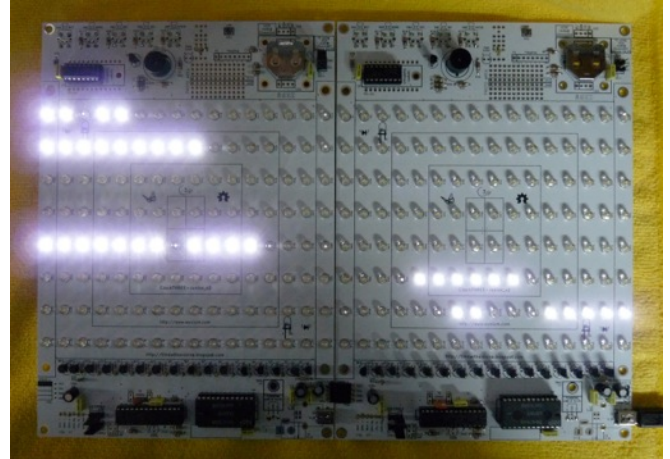
Joining the two boards together - can you spot the 'drunk' transistors?

populate the STACK_R on the left hand board and STACK_L on the right hand board with a header and pins (The pins go on the left hand board and socket on the right, as pictured above). On the right hand board remove the two header pins at K4 and K5 (You only need the one Chronodot active for the Master CPU on the left hand PCB).

Step 4. Reprogramming the chips - Master and Slave

Out of the box, the ATmega's come with the C3Jr program and don't 'realize' there's a partner involved, so we have to re-program one as the 'Master' and the other as the 'Slave'. To do this, you'll need to use the Arduino programming environment (<http://arduino.cc>) and your Arduino Uno or similar (You do have one right?). The code is available here (<https://code.google.com/p/clockthree>); you'll need the latest clockTHREE libraries. Once you've downloaded them, point your Arduino sketchbook at your newly found code (under preferences), *restart Arduino* (yes, really) and select

libraries/ClockTHREE/CHRONOGRAM2. Make sure the board type is set to Arduino Duemilanove w/ ATmega328, put the chip in your programmer and upload the code to one of the ATmega's. Put this 'master' in the left hand board CPU socket. Repeat the process, but this time select ClockTHREEJr_slave as the program to upload. For a more detailed description of re-programming the chips for C3Jr see (http://wyolum.com/programming-clockthreejr_v2). Put the 'slave' chip in the right hand board.

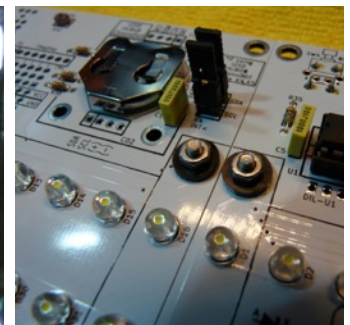
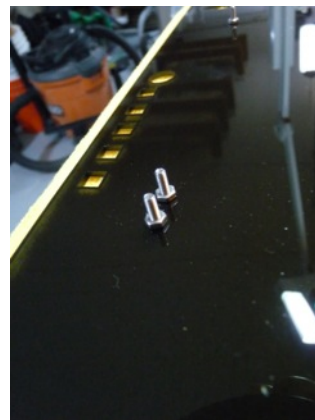


Together at last...those LED's sure are bright!! Can you tell the time?

Assembling the case.

Step 5. Build the Case and Baffles...

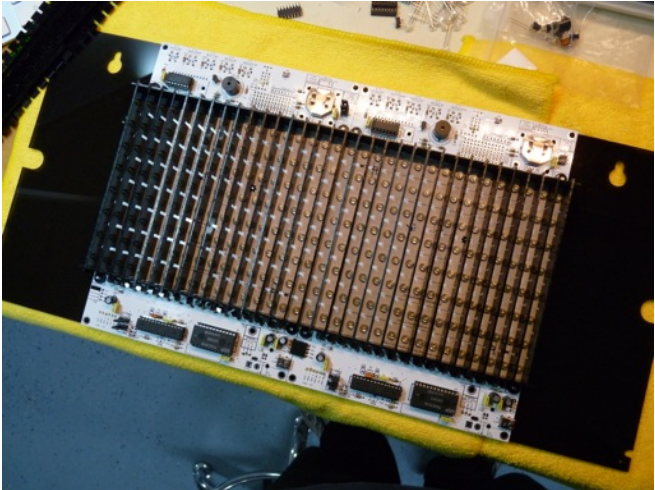
Now comes the fiddly part. The hardware package with the clock comes with screws, nuts and plastic washers. Remove the protective film on the case rear and insert 8 screws through the board mounting holes (the inner set of holes that match the holes in the PCB's) and secure them with 8 nuts. Gently put the joined PCB's over the holes so they lay flat against the nuts (Take care not to fold them like a book!). Place the plastic washers over the protruding threads and then secure the PCB's with another set of nuts.



Screws and nuts through the case rear (left); Washers and nuts secure the boards to the case (above).

Next comes the baffling part! The LED's are 'masked' from each other by a nifty set of laser-cut interlocking baffles that form a grid to go over the LED's. Start off by taking two of the long baffles and two of the short baffles and make a rectangle around the LED's (You'll want the flat edges of the baffles facing up). Now put all the short baffles in place from

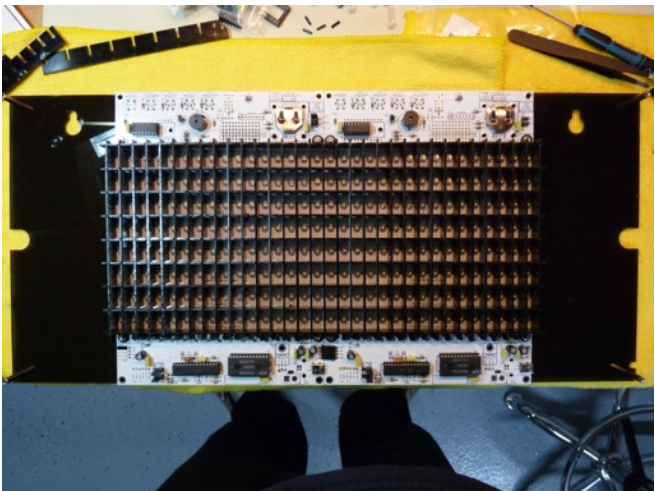
left to right and you should have something that looks like this...



Now, take the faceplate and place it on top of the baffles and turn *the whole thing over* (carefully, as you don't want the baffles to come apart). You should now have the following...



Next, insert the remaining long baffles to complete the grid. Place the LED matrix back on top making sure that it's in place correctly and *turn the whole thing back over again!* Et voila..



The completed baffles... Yes, those are my legs....

Attach the four corner standoffs by inserting the screws from the rear of the backplate and peel the protective film of the faceplate. Screw the faceplate on to the standoffs and you should be all set!



Sometimes I work late at night....

This is the where I keep my Chronogram2. I installed a USB wall outlet so I could power the clock directly without any wires to get in the way....

The Finishing Touch.



Enjoy your hard work and if you have any problems, then shoot us an email!

Nick.