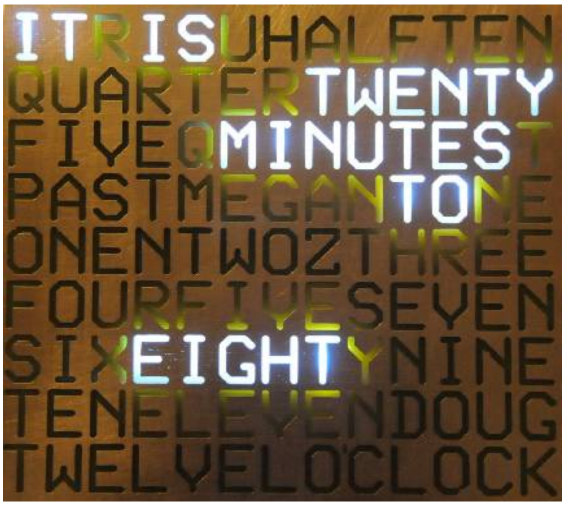
Word Clock

Display PCB Construction Notes

A fun clock to build



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Licence

Welcome

Thanks for deciding to make this great little clock project. You will find that this clock will be a centre piece for many discussions into the future, as well as providing a great way to tell the time.

Because there are so many ways to construct the clock, I have broken assembly down into various documents – this document details the construction of the LED Display board.

You will find that construction of this clock is very simple. If you are methodical with your construction practices , and careful with you soldering, you will find that the clock almost assembles itself.

Parts List

The first thing you need to do is to verify that you have all of the necessary components required to assemble your clock. Here is the complete parts list. Feel free to check off each component as you verify it is present.

Resistors

680R	25	360R	19

Semiconductors

Blue LED	120		

There are always spare LEDs included in each kit!

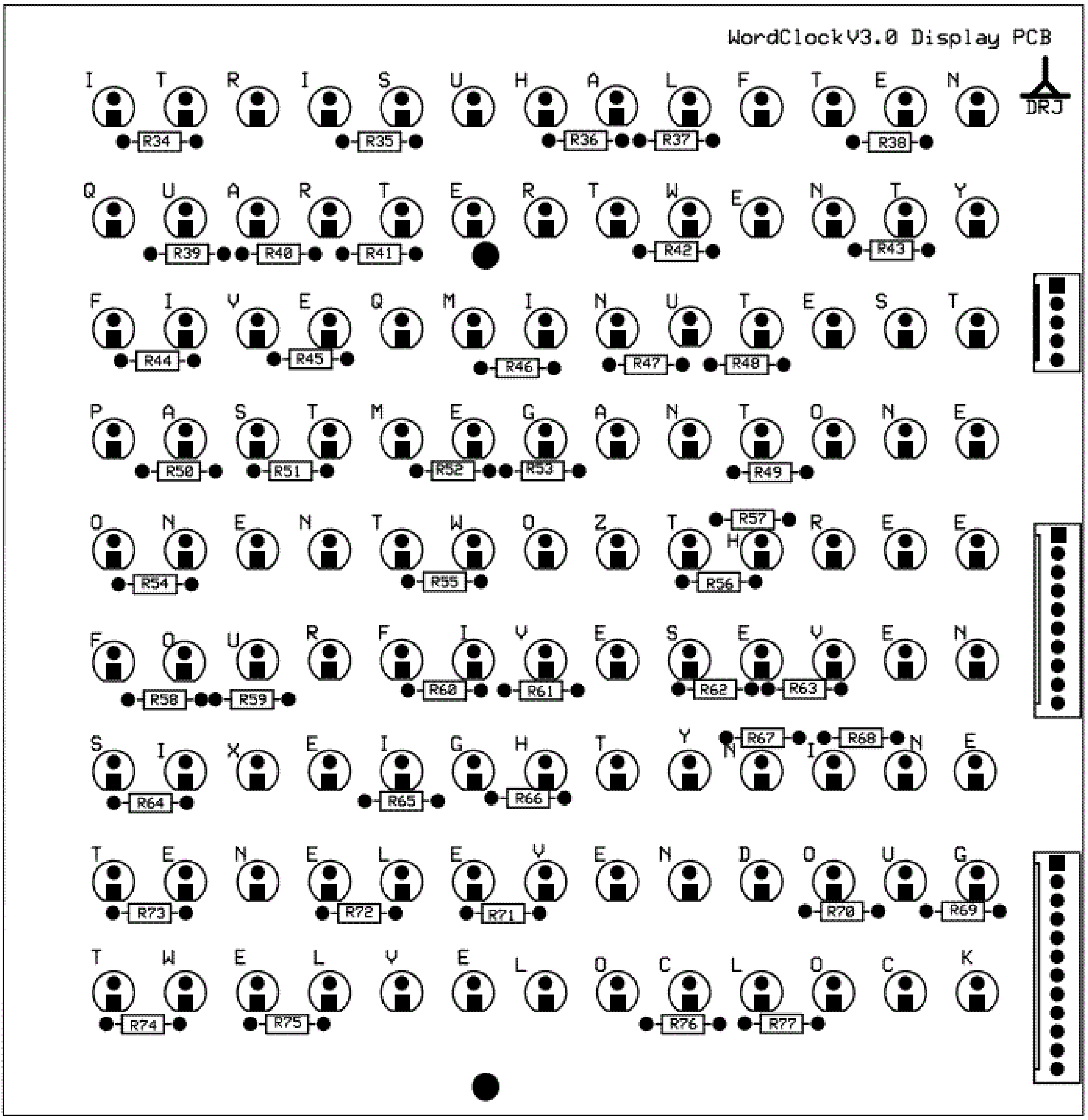
Hardware

Display PCB	3	Connector Pins *	3

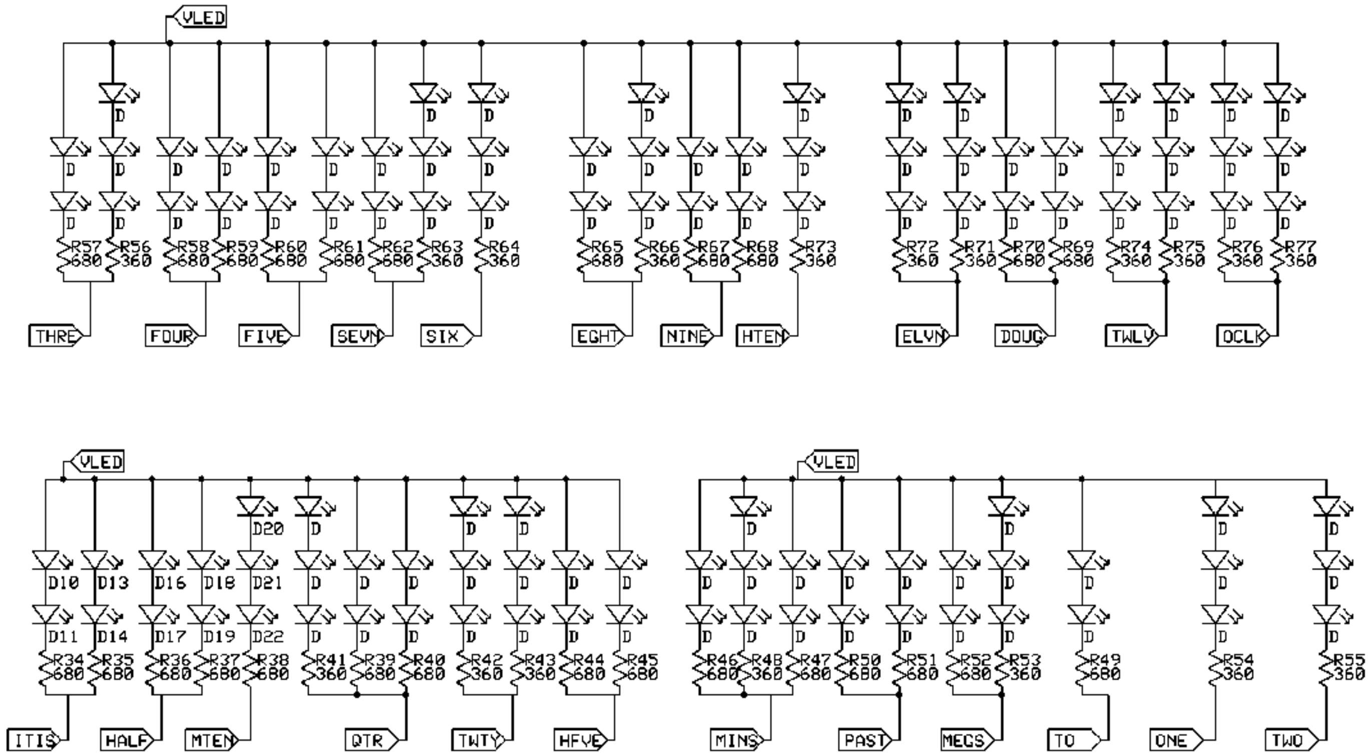
* (Note that the connector pins are only supplied with the Microchip PIC version of the project.)

Component Layout

Use the following diagram to assist you in locating components on the Display PCB:

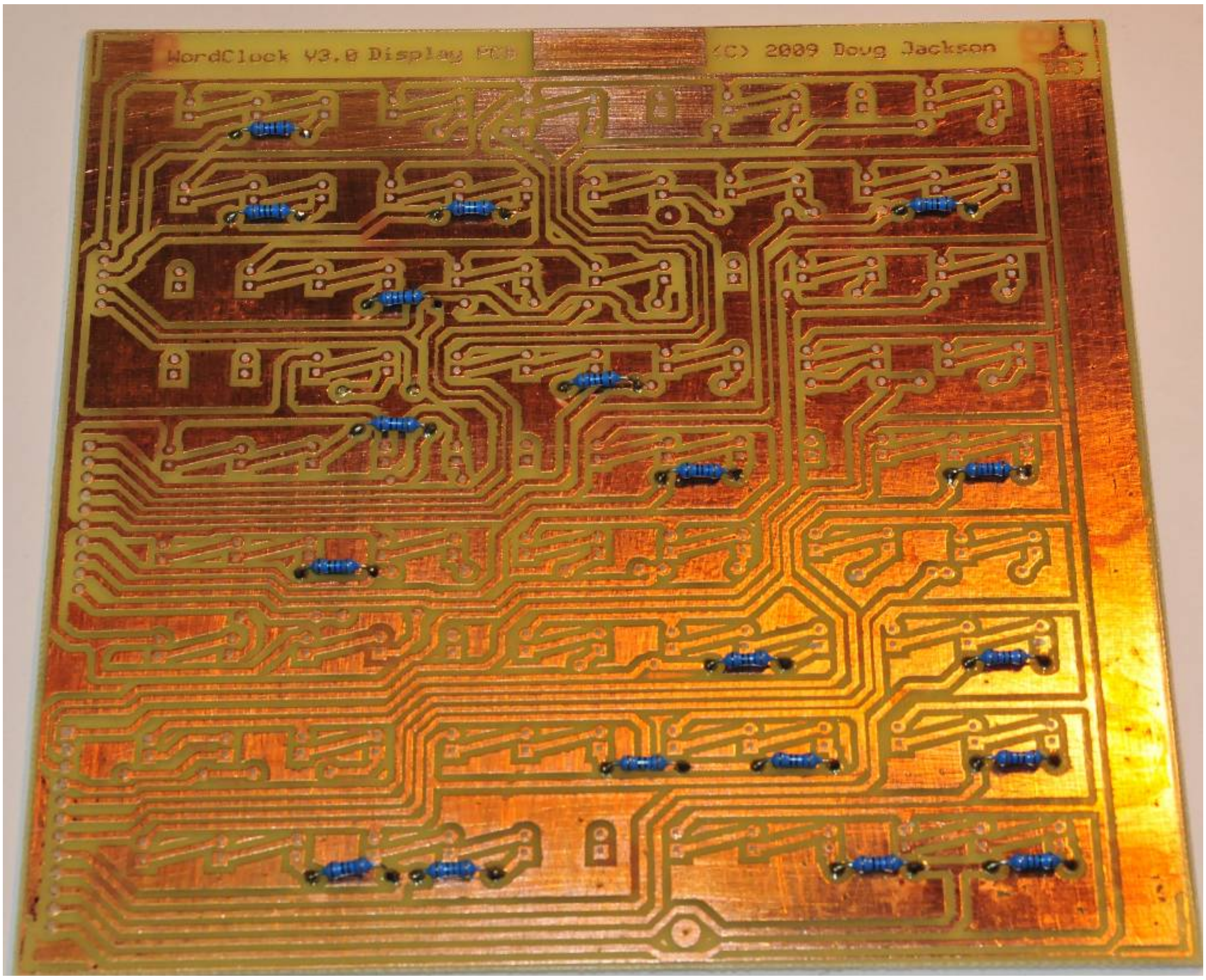


Schematic Diagram



Construction

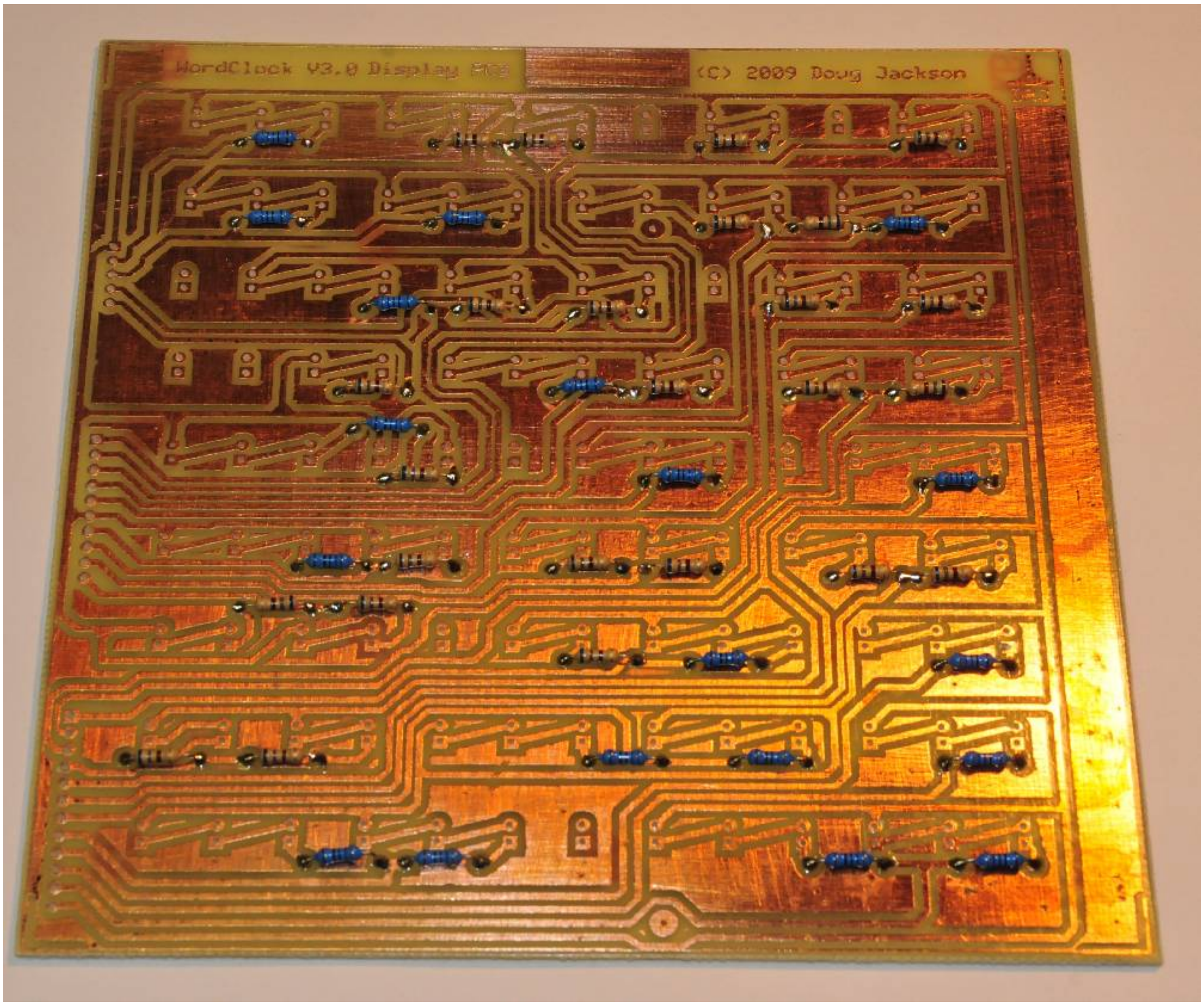
Assembly is straight forward, Start by mounting all of the 360 Ohm resistors – In order to ensure that the light baffles have a flat surfact to mount to – mount these resistors against the copper side of the PCB – Don't solder them to the traditional component side.



The above diagram shows the location of the 360R resistors.

Please remember when soldering that the hand made PCBs have a protective coating applied to prevent the tracks from suffering from oxidation – this coating may require a small amount of additional time when soldering to allow the solder to bond to the copper track.

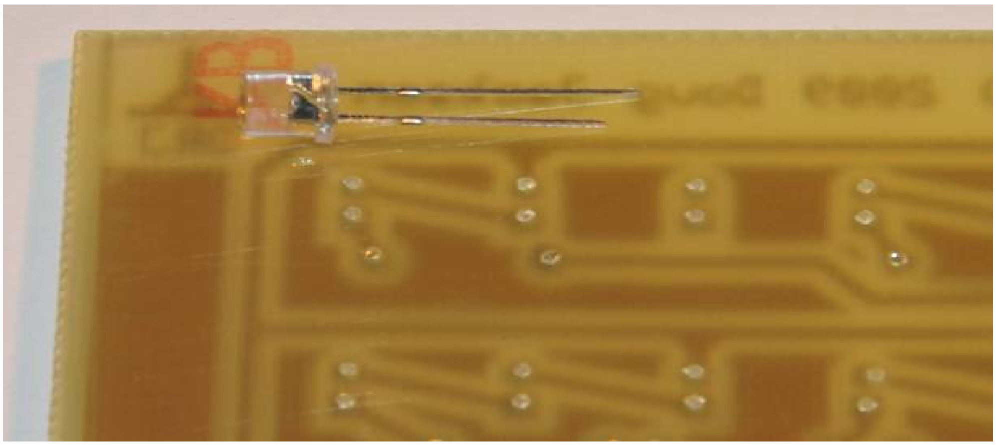
Continue assembly by soldering the 680 Ohm resistors – again, these are inserted on the copper side of the PCB.



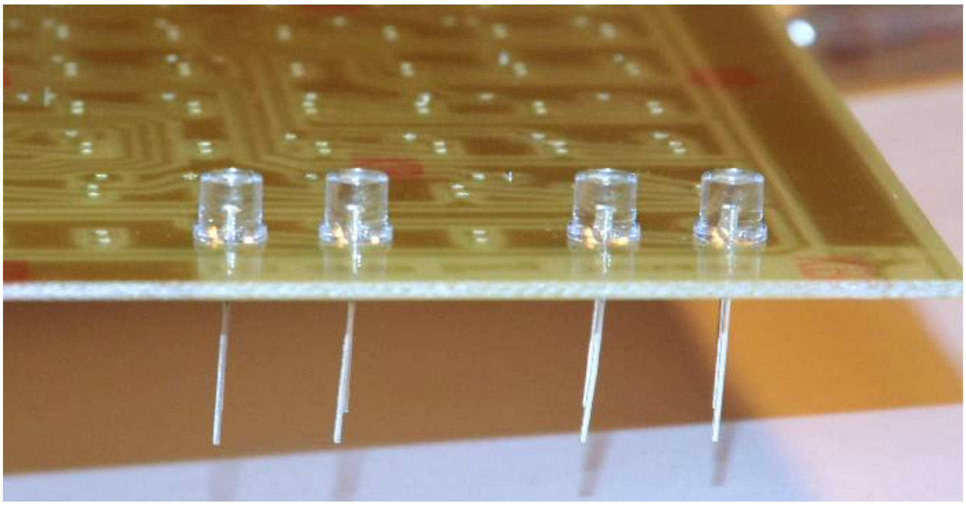
The above diagram shows the board with all of the resstors mounted.

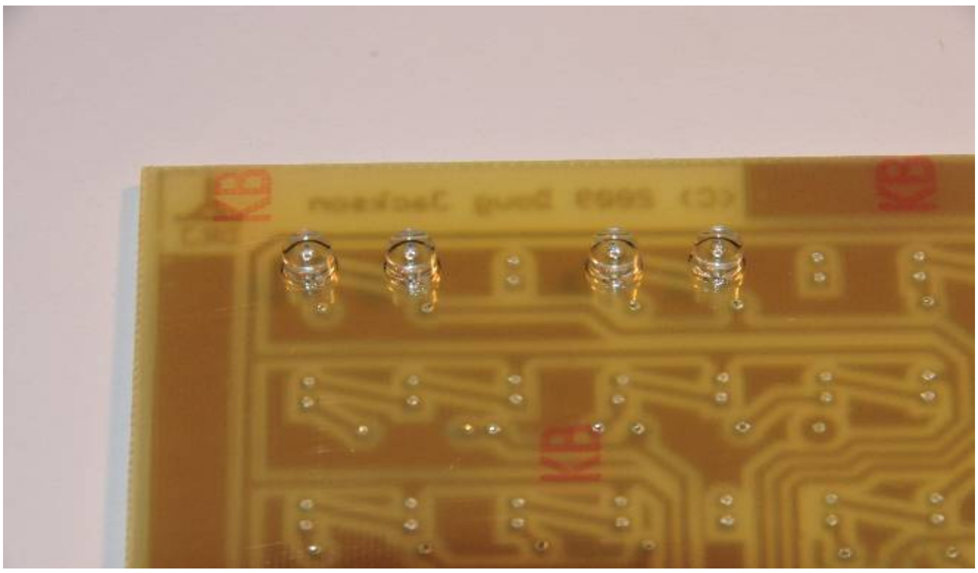
Remember to clip the leads flush with the front of the PCB.

Next – Insert the LEDs – Be careful with the orientation: All LEDs are inserted with the SHORT LEAD inserted into the SQUARE hole (The hole closest to the bottom of the PCB



Start by inserting a group of LEDs, solder one lead, turn the board over and verify that the LED is flush against the base of the board. Move the LED closer to the board while applying heat from your soldering iron if it needs to be closer. Complete soldering by soldering in the other lead.



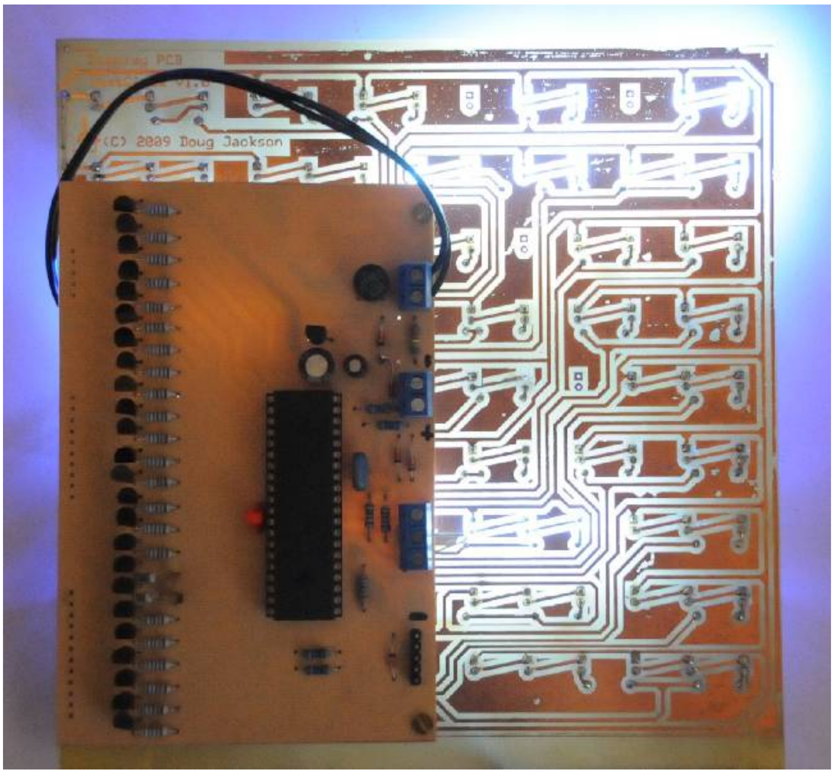


The first four LEDS installed.

Decision Point:

If the display board is being used with the Microchip PIC controller board, we need to insert the display connector pins. These are installed so that they stick out of the BACK of the PCB (so that the controller can piggy back on the display).

Here is a photo of the PIC controller mounted on the display (viewed from the rear)



The following picture shows a closeup of the pin layout on the display PCB when it is used with a Microchip PIC controller PCB.

Controller PCB

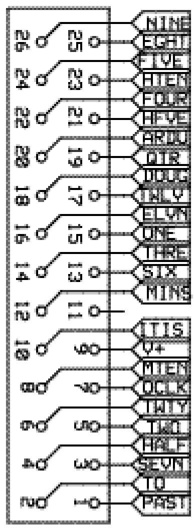
Controller Sockets

Display PCB

Header Pins

If you are constructing an Arduino based clock, you need to solder the 26 way ribon cable onto the appropriate pads on the display board. Simply strip and tin the cable into the 26 individual wires, and solder the relevant wire into the display pad, as per the following diagrams:

Arduino PCB pinout:



J2
Display Connector

Display 5 Pin connector:

Pin	Function
1	V+
2	TWTY
3	MTEN
4	HALF
5	TO

Display 10 Pin connector:

Pin	Function
1	THRE
2	MINS
3	ITIS
4	MEGS (ARDU)- Extra word
5	QTR
6	V+
7	SEVN
8	TWO
9	HFVE
10	NINE

Display 12 Pin connector:

Pin	Function
1	EGHT
2	PAST
3	FIVE
4	DOUG – Extra Word
5	ONE
6	FOUR
7	ELVN
8	OCLK
9	SIX
10	HTEN
11	TWLV
12	V+

And – Thats it – Your display is completed – If you like, you can test it using a 9V battery, simply connect the + wire of the battery to any V+ line, and connect the – wire of the battery to any of the display lines (TWLV, ONE, etc) and you will see that the corresponding set of LEDs lights up – If it doesnt, verify that all of the LEDs are connected correctly, and that there are no faulty soldering joints.

I hope you enjoy your clock, Doug Jackson