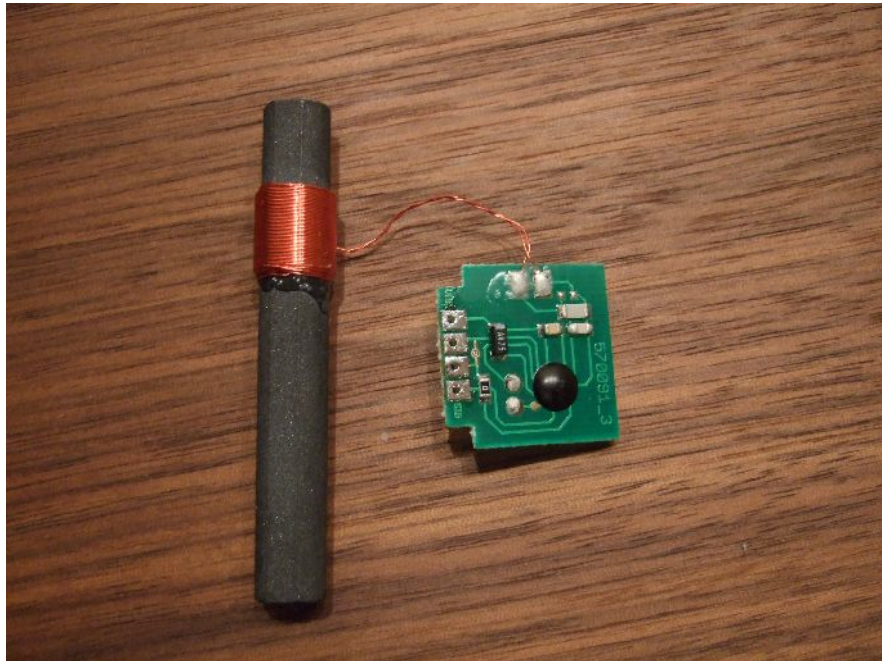


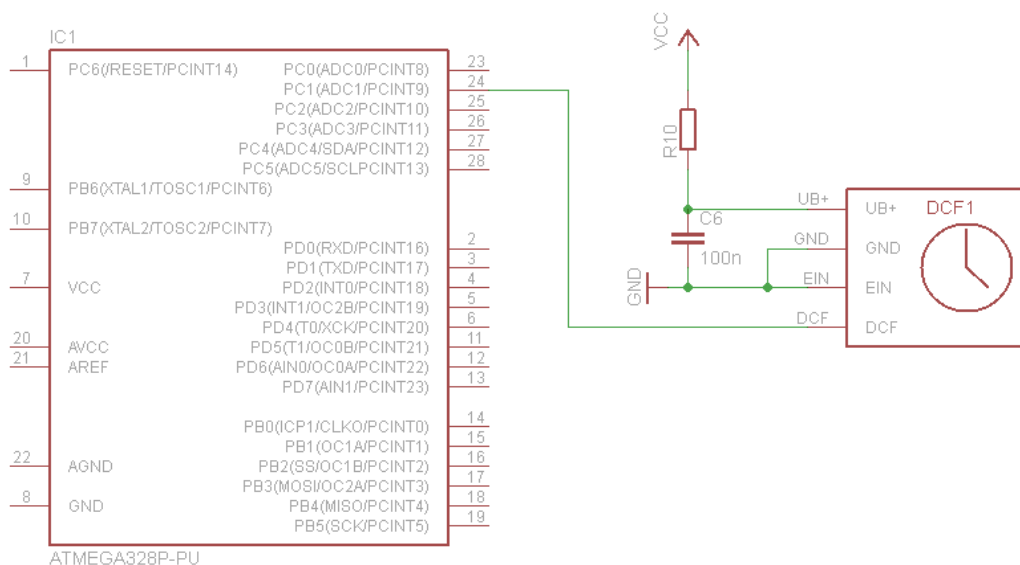
# The Monochron DCF77 HOWTO

## Modify at your own risk!

This document describes how to connect a DCF77 receiver to your monochron clock. I am using a DCF module like this:

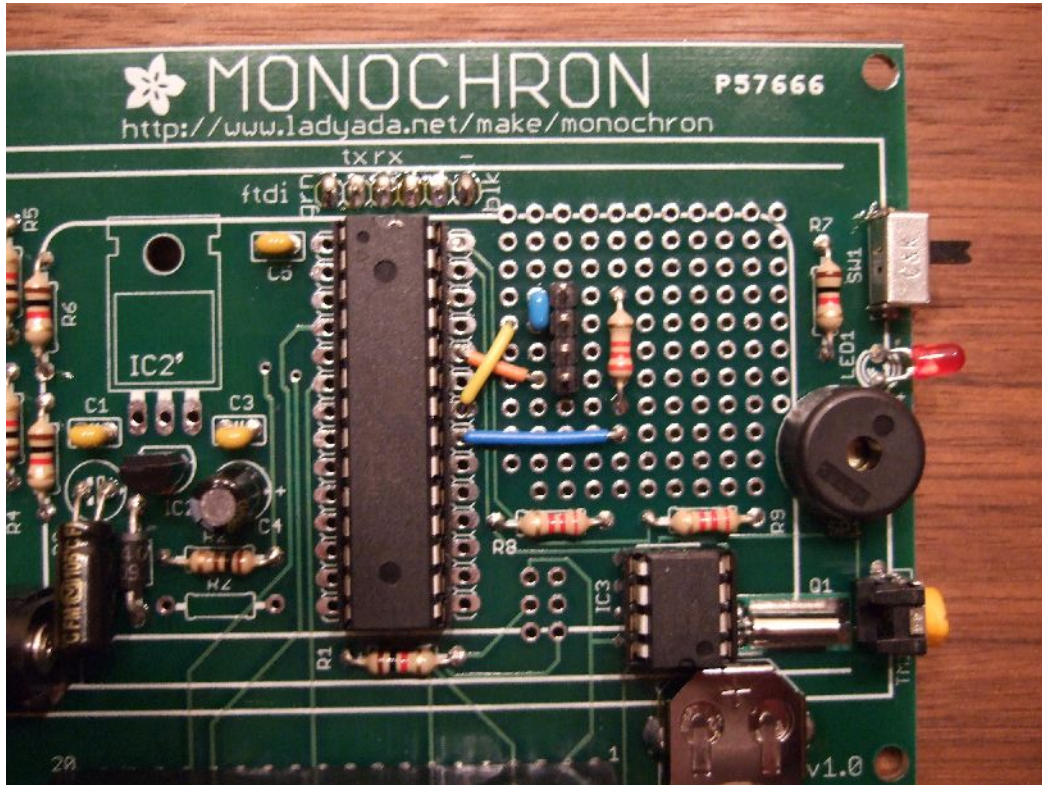


This module is small enough to fit in the original monochron case, so you can't see any modifications from the outside. If you want to use a larger module, you will have to put it in an external case and find a way to lay the wires out of the clock case. All DCF modules have at least three ports: GND and VCC for power supply and one that delivers the DCF signal. Most modules have an additional port for enabling/disabling the module. The following schematic shows how the module should be connected:

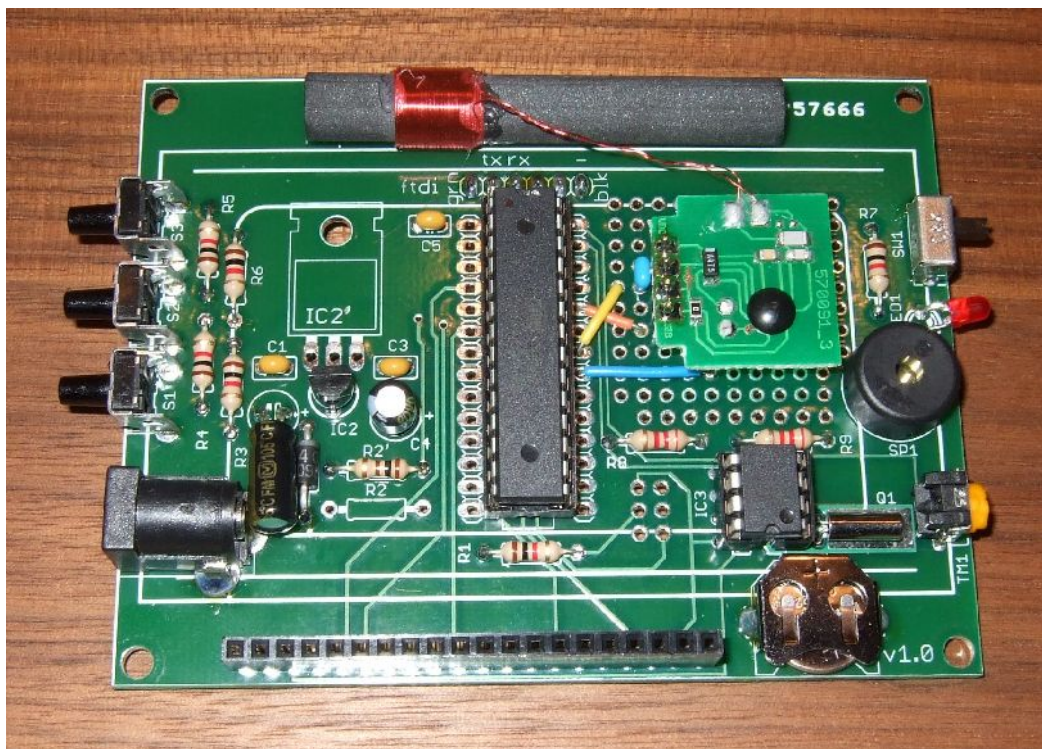


The ceramic capacitor ensures a stable power supply for the module and should be placed as near as possible to it. The value of the resistor depends on the concrete type of module. The modules you can buy from [reichelt.de](http://reichelt.de) work fine with a 2.2k $\Omega$  resistor. The modules from [conrad.de](http://conrad.de) or [elv.de](http://elv.de) do not need a resistor to work. If you want to use another microcontroller pin than PC1, remember to change the software. The pin definitions are located in the file *dcf77.h*.

First solder the resistor, the capacitor and a four pin male header:



Then place the DCF module on top of the header and solder it:





Place the antenna on top of the board. Use hot-glue or tape to keep it in place.

Next install the firmware. The firmware consisting of the files *MultiChronDCF.hex* and *MultiChronDCF.epp* is delivered with the sources and contains the clocks “ratt”, “intruderchron” and “sevenchron”. You can use this firmware or compile your own. Just edit *ratt.h* and choose your favourite clocks.

Now you can plug in the power supply. To check if the module works correctly, the firmware contains an infoscreen, which you can activate from the clocks configuration menu. The infoscreen looks like this:



The “Now” labelled line shows the actual time. The next line shows one of three states:

- wait – the clock is waiting for a DCF signal to start
- read – the clock evaluates a DCF signal
- fail – an error occurred during the last attempt of reading a signal

The “Last” labelled line displays the time that has passed since the last successful read of a DCF signal. The second last line displays the duration of the last zero-pulse (“Z”), one-pulse (“O”) and start-pulse (“S”) in milliseconds. These values are an indication for the quality of the signal. 100ms for a logical zero and 200ms for a logical one is optimal. If a pulse of an implausible duration has been read, the “S” changes into an “F” and the length of that pulse is shown. The last line shows the actual read raw-signal. The following characters can appear in that line:

- 1 – represents a logical one
- 0 – represents a logical zero
- S – represents a start-pulse
- F – represents a pulse of implausible duration

Don't worry if you see a lot of “F” for the first minutes. Some modules need up to 10 minutes to deliver the first valid DCF-signal. If you see ones and zeroes passing by without any “F”:

CONGRATULATIONS you have build a working DCF Monochron!