Assembly instructions GPS-RTC to DCF77 Module

The kit is also for other clocks with DCF input

Cabel version for IV-11 DCF melody clock kit incl. Cable Jack 3.5mm plug

The PCB, double-sided, lead-free solder mask and lettering on top.

For a better overview, the photos are in high resolution.
If you increased the PDF, you can for example see the colors of the resistors.

You need:

Grounded soldering irons 16-50 Watt (360 °C soldering station) and wire cutter.
Some electronics knowledge and patience.

AT89LP and the modules are tested before shipping.
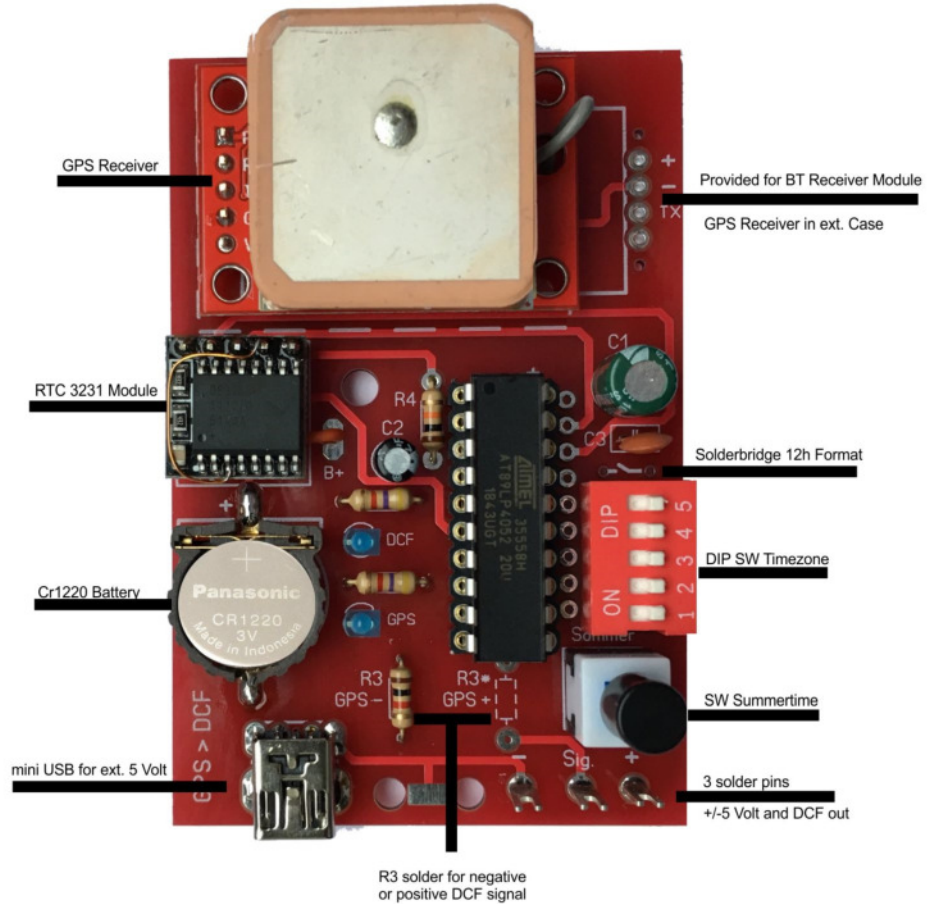
Any questions or suggestions please mail@grother.de

Now have fun and success!

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10.01.2019

Assembly instructions GPS-RTC to DCF77 Module

Cable version

GPS Receiver

Provided for BT Receiver Module

GPS Receiver in ext. Case

RTC 3231 Module

Solderbridge 12h Format

DIP SW Timezone

Cr1220 Battery

SW Summertime

mini USB for ext. 5 Volt

3 solder pins
+/-5 Volt and DCF out

R3 solder for negative
or positive DCF signal

1. Solder the resistors.

- The resistors have color code, look on the PCB pictures, and
   in the component list.
   so you can correctly identify their value.

2.Solder the LEDs.

- Observe the direction as shown in the PCB layout plan, the Negative (-)
   is the short wire .

3.Solder capacitors.

100nF   33pF   220uF   10uF
Polarity !

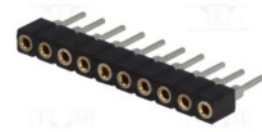- 2 x 33pF are below At89LP4052 also the quartz crystal

4. Solder quartz crystal.
- Little silver cylinder, polarity not important.
- solder in place and carefully (see layout plan)

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Assembly instructions GPS-RTC to DCF77 Module

5. Solder socket pin strip female 2 x 10 pin.
- for AT89LP4052

6.Solder socket mini USB

-

7.Solder CR1220 socket and 3 x solder Pins.

8.Solder DIP SW and SW for summertime.

9. Solder RTC3231 module.
- Solder the wire to B+.

10.Solder GPS module.

For mounting the PCB to the enclosure please drill a hole 3,5mm at the buttom plate.

Also drill a hole for the cable.

11. 3.5mm jack cabel for IV-11 DCF melody clock

There are two different typs, so check wires to 3.5mm jack with ohmmeter

+ red / violet
⊓ white
− sheeld

For longer distance you can use a 3.5mm jack extension cable.

12. USB-B cabel for IV-11 DCF melody clock (next version)

+ red
⊓ green
− black

For longer distance you can use a 4m - 12m USB-B cable.
This is almost use for printer.

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Assembly instructions GPS-RTC to DCF77 Module

Usage:

For bluetooth version connect 5 Volt power wall adapter.

The red Led from GPS receiver is on and the red Led bluetooth modul flashes.

- Install the AT89LP4052 (look for the right direction)
- Install the CR1220 battery (look for the right direction)

**It could be that the power supply of the clock is not sufficient.
In this case use a external 5 Volt USB power supply with mini USB plug.
The current consumption of the MCU module is <100mA.
In the version with negative DCF signal output (like IV-11 DCF melody clock)
the + (red wire) should not be soldered to the solder pins.**

Solder 3 wires for + / - 5Volt and DCF signal
(optional 5 Volt from USB power supply)

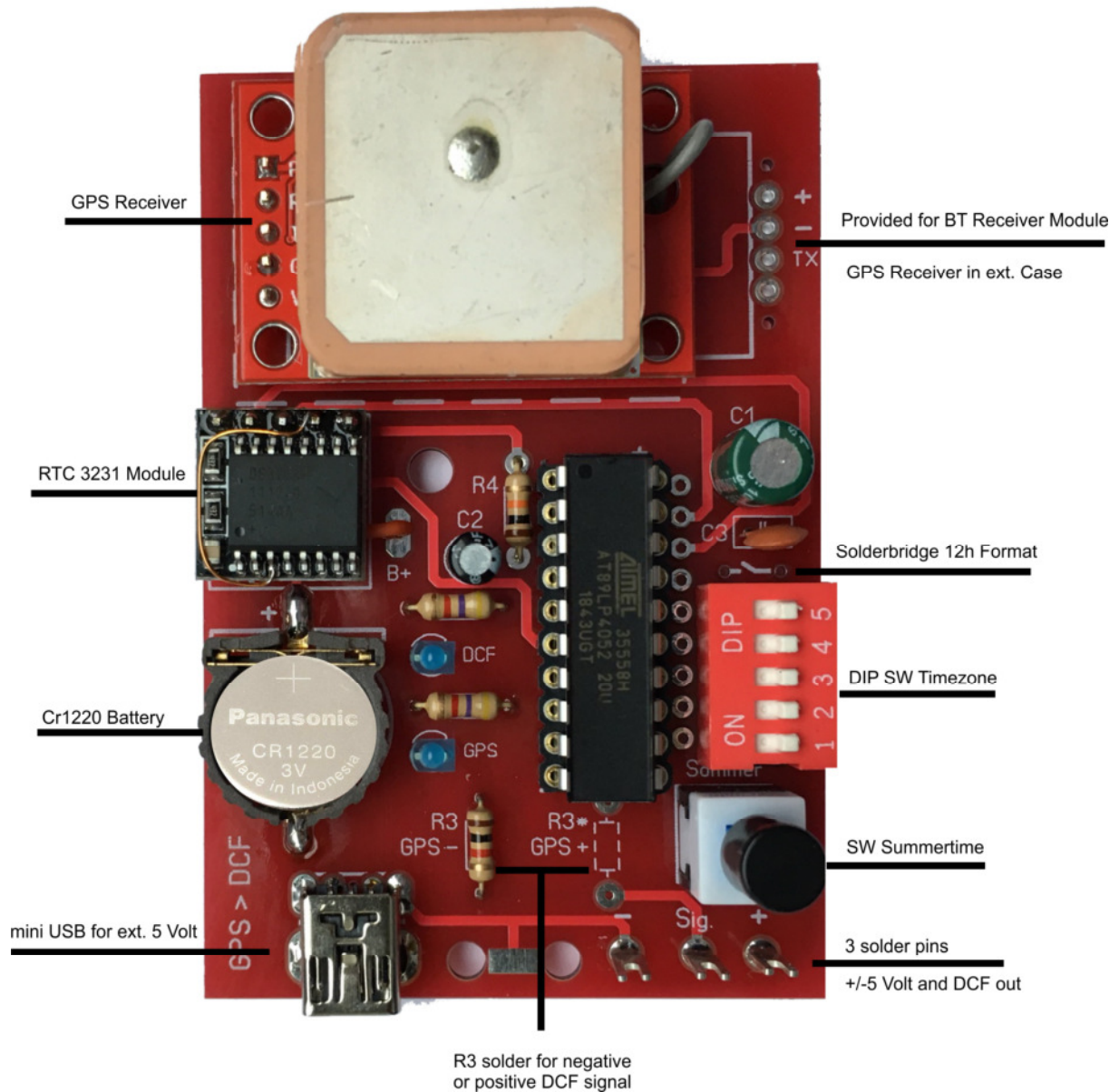- check 5 Volt at pin 10 and 20 on AT89LP4052

The blue LED DCF flashes each second.

The GPS module has a dedicated rechargeable battery.
Please allow 30 to 60 minutes for battery charging and time to acquire the
GPS signal

For all other instructions read the next pages below.

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GPS – RTC to DCF77 Module for Clock with DCF in.

Variant 1 with cable connection.

GPS Receiver

Provided for BT Receiver Module

GPS Receiver in ext. Case

RTC 3231 Module

Solderbridge 12h Format

DIP SW Timezone

Cr1220 Battery

SW Summertime

mini USB for ext. 5 Volt

3 solder pins
+/-5 Volt and DCF out

R3 solder for negative
or positive DCF signal

- GPC Module received UTC (Coordinated Universal Time) Time, Date and Weekday
- 5 Dip Switches adjusting local Time (SW 5 is for + or – time selection)
- Solder bridge for 12h format selection.
- Switch to select start and end of summertime.

The MCU unit get the UTC time and modified Time and Date for the local area.
Local time and date are programmed each minute by the RTC 3231 module, which
has a battery to support its internal memory.

The RTC output controls the MCU unit, which converts the signal to real DCF
Protocol. Positive or negative output is possible.

First Usage

- Set all DIP switches to OFF position including in the SW Summertime
- Install the CR1220 battery
- Connect the +/- 5 Volt supplies from your clock, external USB Power supply or Power Bank
 -Solder the Sig. point to your clock.
  Note: most clocks have – signal input, + signal is possible when R3 is soldered to * position.

The best location for the GPS receiver is on the window ledge.
In my office in the Ground floor it works too.
The GPS module has a dedicated rechargeable battery, allowing the time and date
Data to be stored in the internal RTC circuit when the GPS signal is out of range.
Please allow 30 to 60 minutes for battery charging and time to acquire the GPS signal.

The red LED from the GPS module is on and the blue DCF LED on the main board flashes.
When the GPS signal from 3 satellite is received the red LED flashes.
The blue GPS LED is on for 2 seconds each minute. (i.e.-on at second 00 to 02), which
means the time and date has been written to RTC 3231 module.

After 2 – 3 minutes your clock will display UTC time.

Adjusting Time for your local area.

Look at the world map and search for the United Kingdom. There is UTC time.
If you look to the west site, it is UTC+ time. Look for the east it is UPS – time
Check your local time to see what time is it and compare with the following table.

DIP SW settings:

Time	SW 1	SW 2	SW 3	SW 4	SW 5		Time	SW 1	SW 2	SW 3	SW 4	SW 5
UTC	off	off	off	off	**on**		UTC	off	off	off	off	**on**
UTC + 1h	**on**	off	off	off	**on**		UTC - 1h	**on**	off	off	off	off
UTC + 2h	off	**on**	off	off	**on**		UTC - 2h	off	off	off	off	off
UTC + 3h	**on**	**on**	off	off	**on**		UTC - 3h	**on**	**on**	off	off	off
UTC + 4h	off	off	**on**	off	**on**		UTC - 4h	off	off	**on**	off	off
UTC + 5h	**on**	off	off	off	**on**		UTC - 5h	**on**	off	off	off	off
UTC + 6h	off	off	**on**	off	**on**		UTC - 6h	off	off	**on**	off	off
UTC + 7h	**on**	**on**	**on**	off	**on**		UTC - 7h	**on**	**on**	**on**	off	off
UTC + 8h	off	off	off	**on**	**on**		UTC - 8h	off	off	off	**on**	off
UTC + 9h	**on**	off	off	**on**	**on**		UTC - 9h	**on**	off	off	**on**	off
UTC + 10h	off	off	off	**on**	**on**		UTC - 10h	off	off	off	**on**	off
UTC + 11h	**on**	**on**	off	**on**	**on**		UTC - 11h	**on**	**on**	off	**on**	off
UTC + 12h	off	off	**on**	**on**	**on**		UTC - 12h	off	off	**on**	**on**	**off**

Set the switches accordingly and after 2 – 3 minutes the time, date and weekday is displayed
on your clock.

Notes.

The RTC reception can be restricted by bad weather, cloudy or fog so is it not necessary to receive GPS continuously, because the internal RTC unit from the GPS module will keep good track of the time.

There is also a precise RTC 3231 module on main PCB that controls the clock.

Enclosure: 90mm x 57mm x 24mm, ABS, black

If you order the GPS DCF77 Kit with IV-11 DCF melody clock you get a 3.5mm audio cable for connection. The IV-11 Kit with wireless Temperature included a USB cable.
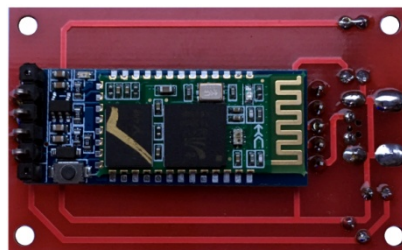
Variant 2 with wireless Bluetooth connection.

This version has a separate small case for GPS module and Bluetooth transmitter.

On the main PCB with MCU, RTC 3231 and DIP SW is a Bluetooth Receiver. The Bluetooth connection is always online.
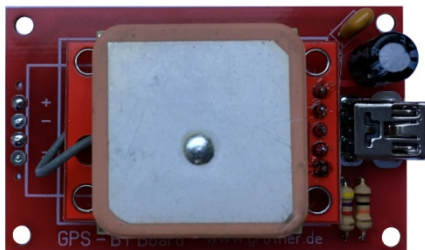
Top site with GPS module

Bottom site with BT Transmitter module

The 5 Volt USB Power adapter is included in this KIT.