

General information about DCF77

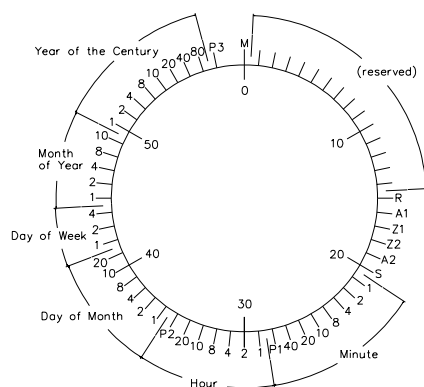
The Meinberg receiver module RU226 receives the signal of the long wave transmitter DCF77. This long wave transmitter installed in Mainflingen near Frankfurt/Germany transmits the reference time of the Federal Republic of Germany. This time reference is either the Central European Time (MEZ) or the Central European Summer Time (MESZ).

The transmitter is controlled by the atomic clock plant at the Federal Physical Technical Institute (PTB) in Braunschweig/Germany and transmits the current time of day, date of month and day of week in coded second pulses. The complete time information is available once every minute.

At the beginning of every second the amplitude of the high precision 77.5kHz carrier frequency is shifted to 25% for a period of 0.1 or 0.2 sec. The length of these time marks represents a binary coding scheme using the long time mark for logical ones and the short one for logical zeroes. The information about the current date and time as well as some parity and status bits can be decoded from the time marks of the 15th to the 58th second every minute. The absence of any time mark at the 59th second of a minute indicates the beginning of a new minute with the next time mark.

Switching to MESZ or MEZ can be done automatically. The reception of the time information is free of charge and does not need to be registered.

Figure : decoding scheme



M	Start of minute (0.1 sec)
R	RF transmission via secondary antenna
A1	Announcement of a change in daylight saving
Z1, Z2	Time zone identification
A2	Announcement of a leap second
S	Start of time code information
P1, P2, P3	Parity bits

General information RU226

The module RU226 is mounted in a plastic case and contains the ferrite antenna and the complete straight receiver. Two LEDs are included for visualization of the demodulated time marks and the field intensity of the DCF-signal. The case is delivered with a stick pad for easy mounting (e.g. on windows/furniture). As an output-signal, the demodulated time marks are available at a four-wire cable.

Antenna

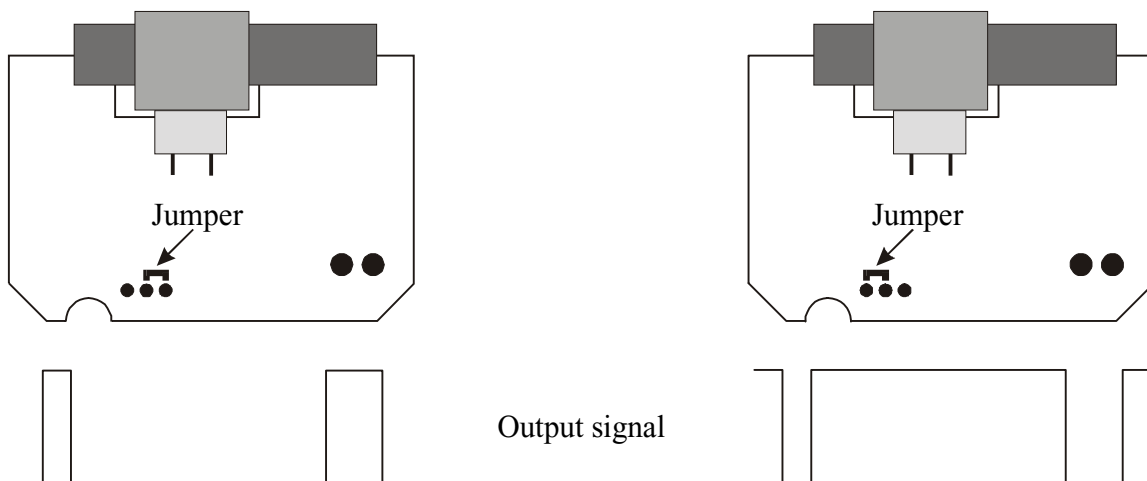
Generally, the exact mounting of the antenna is important. It has to be placed in longitudinal direction to the transmitter (Frankfurt). The antenna should be installed with a minimum distance of 30cm to all metal objects. A distance of several meters to TV- or computer monitors should be kept. The vicinity of computers or microprocessors must be avoided. Adjustment of the antenna can be done by watching the LEDs. But: a large field strength on its own is no guarantee for good conditions of reception, because interfering signals within the bandwidth of the receiver also have an effect on the brightness of the 'field'-LED. Therefore, only undisturbed pulses per second together with a high field intensity is a criterion for good reception of the DCF-signal.

Power supply

The receive module needs a 3,5 V to 5,5V power supply. This voltage should be sourced by a linear regulated power supply. If the use of a switched mode power supply becomes necessary the GND access of the RU226 has to be grounded directly or via a capacitance of min. 0.1 μ F. This connection avoids the signal-to-noise ratio reducing influence of the harmonics of the switched mode power supply.

Polarity of the pulses

If the cover of the case is removed, a jumper becomes accessible. The position of this jumper decides on the polarity of the output signal. The selection of high-active (default) or low-active pulses is possible.



Output signal

For evaluating of the DCF-time-telegramm, the module delivers the demodulated time marks. The following values for the output signal are possible:

Positive pulses:

High-level : typ.: power supply - 1 V

Low-level : typ.: 0,1 V

Negative pulses:

High-level : typ.: power supply

Low-level : typ.: 0,1 V

With a +5V power supply, the output pulses are delivered with TTL-Level.

Pulse duration

The pulse duration of the output signal of RU226 depends on the conditions of reception. The resulting tolerances of the demodulated time marks have to be taken into consideration when evaluating the DCF-telegramm. The following durations are possible:

DCF binary '0': 60ms < t < 130ms

DCF binary '1': 150ms < t < 220ms

Power saving mode

By connecting an appropriate signal to the control pin "POFF", the module can be switched on or off. The current consumption is reduced to about 1mA (with 5V power supply) in the power saving mode. If this function is not used, the pin "POFF" may stay unconnected. The following signals will cause the described mode:

POFF = GND or unconnected : module aktive

POFF = VDD : module inactive (power down mode)

Connections

The module is delivered with a four-wire cable of 1m length (others on request). The following colours are corresponding to the described signals:

black : GND (reference potential)

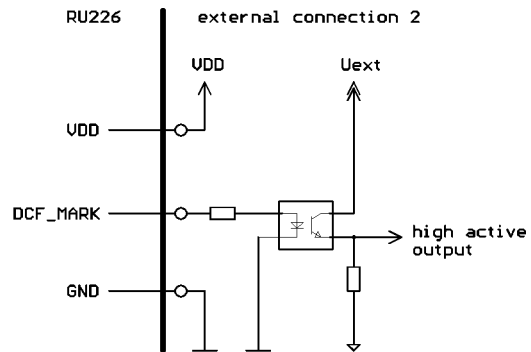
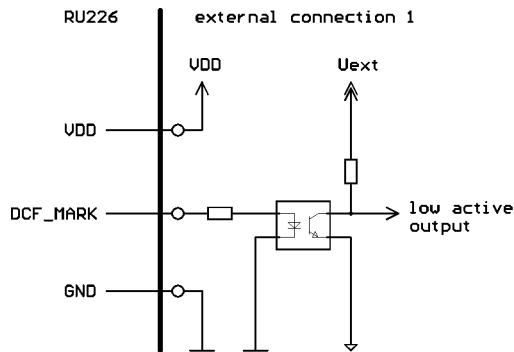
red : VDD (power supply)

orange : DCF-MARK (demodulated time marks)

brown : POFF (power down input)

Connection of an optocoupler

The signal level of the DCF_MARK-output isn't sufficient for some applications. In that case an optocoupler may be connected externally to achieve the required output level. The jumper of the RU226 has to be in the default position (high-active DCF_MARK pulses) for the connections shown below.



Dimensions

