

USB Radio Clock

Rev. 1.0



Instruction Manual

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Homepage:

<http://re.reworld.eu/en/products/usbdcf77/>

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1. Introduction

The *USB Radio Clock* is a compact gadget to adjust the real time clock of any personal computer with the operating system “Windows”. The *USB Radio Clock* is only designed for this purpose, so there is renounced for a display. Only a two colour LED shows the signal receiving state. The features of this USB radio clock are:

- connection to PC and powered by USB interface
- precisely time based on DCF77 (Mainflingen near Frankfurt/Main, Germany)
- precisely time at power on and when no DCF77 signal available through battery buffered internal real time clock (always synchronized on available signal, when powered)
- ability to measure backup battery voltage
- a comfortable software for Microsoft “Windows” for automatic synchronization of the system time

“Real time clock” and “battery voltage measure” are available in the full equipped gadget. In options, this equipment can be omitted.

This manual describes, how to install the software and use Your “USB Radio Clock”. Please install the software package, before You connect the gadget.

2. Installation and Configuration

Important hint: You should install the software, before You connect the USB Radio Clock.

2.1 Software Installation

Please download the most actual version of the *USB Radio Clock Software Package* at

<http://re.reworld.eu/en/products/usbdcf77/>

Download the installation file ([USBDCF77_Setup_Win7_10.exe](#) for Windows Vista and higher or [USBDCF77_Setup.exe](#) for Windows 2000/XP) and execute it. Follow the steps of the installation program. Hint: If You are updating an existing installation and the TNA application (USBRadioClock.exe) is still running, You will be requested at the end, to restart the system. You can prevent this step, when You terminate the TNA application, before updating.



The installation procedure will install the following files into the designated installation path (usually *C:\Program Files\USBDCF77*):

- driver files for the radio clock gadget
- TNA application (task bar notification area) (USBRadioClock.exe)
- serialization tool (USBRadioClock_Ser.exe)

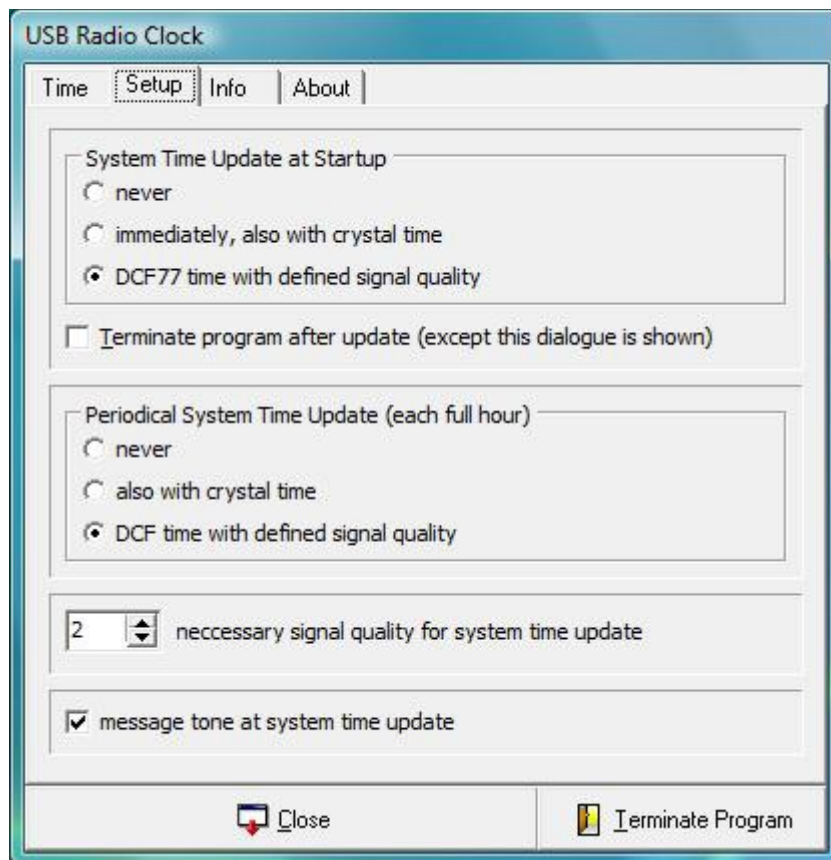
Windows Vista and higher: The TNA application will be set as a task (“USB-DCF77”) in the task scheduler. It will be started at user logon. Hint: By default the task entry contains the setting, that it won't be started, if the PC is not AC powered. That means, the radio clock will not be used, if your notebook or tablet is battery powered! The task entry has to be modified, to change this behaviour.

Windows 2000/XP: A link to the TNA application will be created in the autostart folder. This application will be started automatically after installation.

The serialization tool usually isn't needed. Use this tool only for device configuration, if You got your USB Radio Clock gadget as construction kit.

2.2 Program Configuration

The TNA application (USBRadioClock.exe) will be started automatically on every user log on. Click the icon in the task bar notification area, to open a dialogue windows. Choose the “setup” tab, to configure the program.



System Time Update at Startup

Choose, what the program has to do after start up.

- Never: it won't do anything at start up
- immediately: it will update the system time, also when only crystal time of the gadget is available
- DCF77 time: it will update the system time, when radio clock time with the defined quality is available

Terminate program after update

If this option is activated, the program will be terminated after system clock synchronization. If this option is activated, a periodical synchronization is disabled.

Periodical System Time Update

The TNA application also can synchronize the system clock each full hour (if it won't be terminated after start up synchronization). Choose one of the following options:

- never: no periodical synchronization
- also with crystal: synchronization also will be executed, when only crystal time is available
- DCF time: synchronization only, if radio clock time with the defined signal quality is available

necessary signal quality for system time update

A synchronization with DCF time (at start up or periodically) will only be executed, when the signal quality, set in this option, is obtained.

Message tone at system time update

If this option is activated, a short beep tone will be generated in the moment of time synchronization.

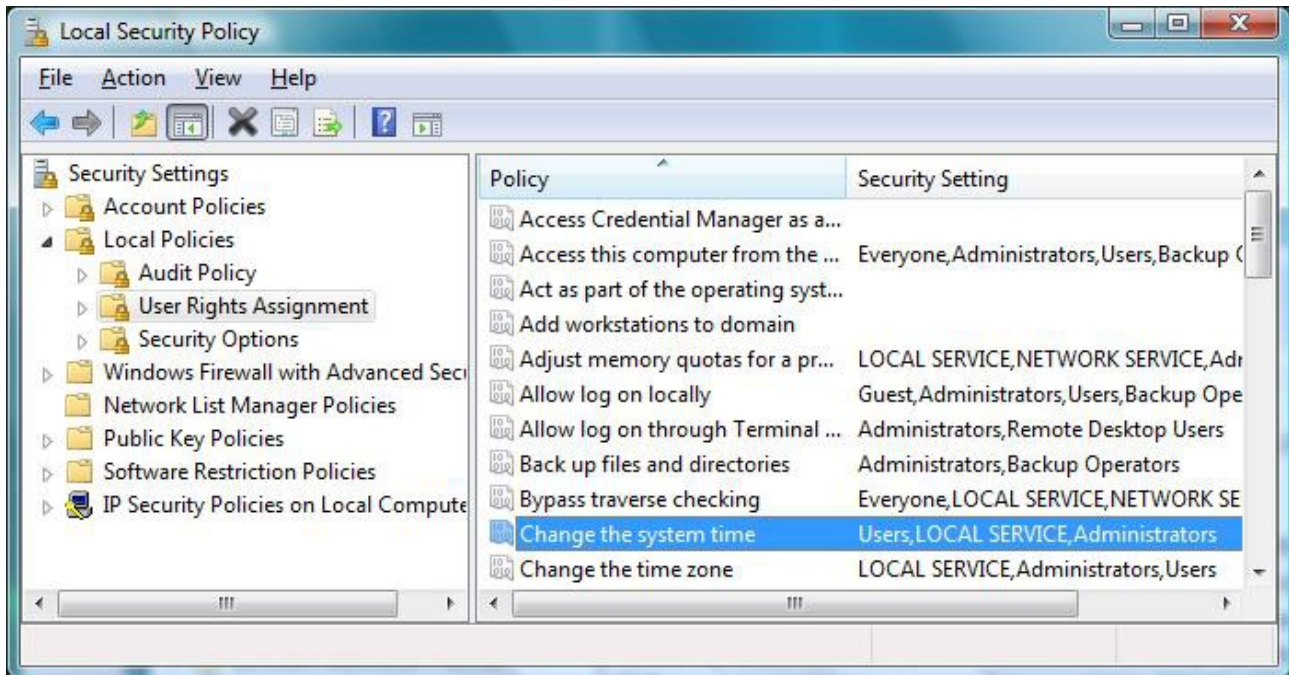
2.3 System Configuration

The TNA application *USBRadioClock.exe* has to change the system time of the personal computer to synchronize it with the radio clock. Usually only user accounts with administrator privileges has the authority, to do this. If You are working under an user account with restricted privileges usually, the following described configuration step is necessary (**only Windows 2000/XP**):

- open the "Control Panel"
- open then "Administration Tools"
- choose "Local Security Policy", a new dialogue window appears
- select "Local Policies", "User Rights Assignment" in the left tree view
- double click the entry "Change the system time" in the right list
- add Your account user name or the user group, were your account is a member (e.g. "Users")

After these steps, the TNA application is able to synchronize the system clock under restricted user account. The TNA application will prompt a message, if it won't be able to do this.

For **Windows Vista and higher** all necessary configuration steps will be done by the installation program!



Important hint: You should turn off the “day light saving” in the clock configuration, because the radio clock always returns the official “Central Europe Time” (CET) respectively “Central Europe Summer Time” (CEST)!

2.4 Device Installation

All required driver files for the radio clock gadget are stored in the installation path (usually *C:\Program Files\USBDCF77*). When You connect the radio clock gadget the first time, the driver installation dialogue of the operating system will be prompted (only Windows 2000 and XP). For Windows Vista and higher the device will be recognized automatically.

First time installation (only Windows 2000/XP or when driver installation failed)

Use the (recommended) “automatic” installation procedure for the first device to install. It may proper work and is the most simple way, to get running the gadget.

A “manual” driver installation is also possible. Use the “have disk” option and choose the path with the driver files manually. Enter the installation path of the radio clock software package as source for the files (especially the “inf” file).

Further installations

Theoretically more than one radio clock can be installed and used at the same time (but it doesn't make any sense at all). For further installations, always the automatic installation procedure can be used. The required driver files are already copied into the Windows directories and will be found there.

The applications will work properly after drivers are installed successfully.

2.5 Uninstall Software

The USB Radio Clock Software Package can be uninstalled in three ways (with the same result):

- Open the folder *USBDCF77* in the start menu. There You will find the entry “Uninstall USBDCF”. Click this entry to execute uninstallation.
- You can execute the file *unins000.exe*, found in the installation path of the software package.
- Open the control panel and choose “Programs and Features”. The entry “USB Radio Clock Software” will be found in the list of installed software. Double click this entry to execute uninstallation.

The uninstallation procedure will leave the driver files, which are copied into the Windows directory through the driver installation procedure. Use the *Device Manager* to remove the files (device must be connected, that it is viewed in the device list).

All applications creates and uses a configuration file with the name *USBDCF77.ini*. This file will be found in the *AppData* folder (usually *C:\Users\username\AppData* under *Vista* and higher). This short file will also be leaved by the uninstallation procedure. If You don't have the intention, to install the *Radio Clock Software Package* again and and You don't want preserve the configuration, You can delete this file.

3. Usage

Make sure that the TNA application (*USBRadioClock.exe*) is running after start up and is configured. Plug in the Radio Clock on any free USB connector. Find a place for the gadget with a good signal reception, as far as possible away from any interference (e.g. a valve monitor). Direct the gadget to Frankfurt/Main (see arrows on casing). The LED in the gadget should light red in the first moment. The colour should change while it's working. The meaning of the colours is:

Red, continuous lightning

Powered, but no DCF77 radio signal receiving.

Red flashing

DCF77 radio signal is incoming. Waiting for the start of a new minute. At power on it takes about 10 up to 30 seconds, to come into this state.

Yellow flashing

Start of the new minute detected. Incoming data will be evaluated.

Green flashing

DCF77 radio time is available. System time will be updated, after signal quality is obtained.

Please note: The flashing should be regularly in one second distances, except the 59. second of a minute, where there is no pulse (marker for a new minute in the DCF77 protocol).

The incoming data will be checked continuous. If invalid data is detected, the state will change into “no radio time” (red or yellow flashing LED).

The TNA application will use the time of the real time clock, while no DCF77 radio time is available (only models with real time clock). The internal real time clock will be synchronized with the DCF77 radio time at start up and periodical at each full hour.

At the first usage or after a battery replacement, a time from the real time clock won't be available, until an internal synchronization were executed.

3.1 Maintenance Mode

The printed circuit board of the radio clock has a jumper J1. If this jumper is closed before power on, the gadget will work in maintenance mode. That means, the device will respond with the USB serial number "00000000". The lightning time of the flashing LED is shorter.

The maintenance mode is intended to use for serialization with the serialization tool *USBRadioClock_Ser.exe*.

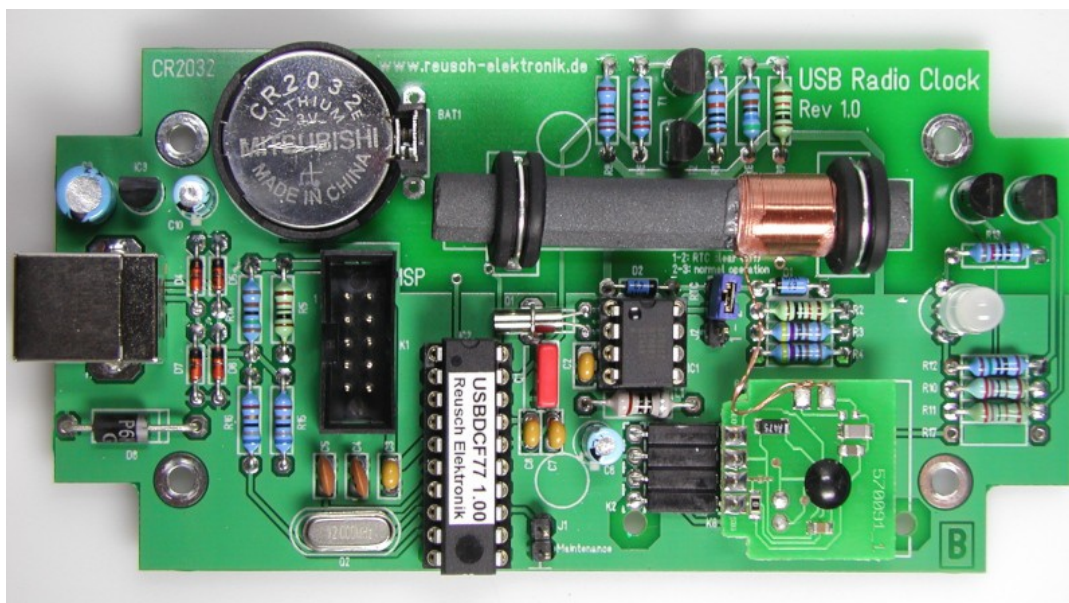
3.2 Battery replacement

The TNA application prompts a warning dialogue at start up, when a low battery voltage is detected. This is the time to replace the battery. You need a

lithium coin cell, 3 Volts, Type CR2032

Execute the following steps, to replace the battery:

- Unplug the USB cable.
- Open the casing (four screws on the back side).
- Remove the old battery.
- Insert the new (fresh) battery (plus pole at the upper side).
- Close the casing.
- Plug the gadget to USB (low battery warning should stay away).



At first power on, no time from the real time clock is available. This state will get rid of, when DCF77 time is available.

Hint: If You have a gadget model without real time clock, it doesn't contain a battery.

4. Technical Data

Revision 1.0

USB Supply Voltage	4.5 to 5.5 Volts (typ. 5.0V) DC	
USB Supply Current	Less than 40mA	
Battery Voltage	2.8 to 3.4 Volts (typ. 3.0V)	CR2032 (only with RTC)
USB Speed	Low Speed, 1.5MBit/s	USB 2.0 compliant
USB Cable Length	Max. 5 meters	Limited by USB specification
Radio Time Base	DCF77, 77.5kHz	Mainflingen, Germany
Operation temperature range	5 ... 40°C	
Storage temperature	-5 ... 55°C	
Humidity	Max. 80%	Non condensing
Dimensions	126 x 68 x 26 mm ³	Without cable
Weight	125 gr.	Without cable
Supported operating systems	Microsoft Windows ® 2000, XP, Vista, 7, 8, 10 (including Server versions)	Tested under Windows 2000, XP, 7 and 10

Technical data may change without notice.

The device is for in-house use only!

5. Links

Visit the following links for more information and download about this product, used software modules and tools.

Reusch Elektronik electronic product home:

<http://products.reworld.eu>

V-USB, Virtual USB Port for AVR microcontroller:

<http://www.obdev.at/products/vusb/index.html>

WinAVR, GCC development environment:

<http://winavr.sourceforge.net/>

LibUSB-Win32, USB drivers for Microsoft Windows ®:

<http://libusb-win32.sourceforge.net/>

6. Statement and Disclaimer

This electronic device is designed under best known engineering guidelines. It confirms the appropriate design rules. No warranty or liability is given for adherence, assured properties, or damages which might be caused by the usage of this hardware or the accessory software.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver

7. Support

If you have any trouble with the device, we will try to help you! Please contact us by e-mail:

support@reusch-elektronik.de

We can handle requests in german and english language.