

# **DCF77PlusPackage**

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<b>REVISION HISTORY</b>
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## Chapter 1

# DCF77PlusPackage

### 1.1 The DCF77 Plus package

The DCF77 Plus package V1.10

The "cheap" radio controlled watch  
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What's new?

~ Introduction ~

~~ ~Installation~ ~~~

Using the software~

Error messages

~ Description of DCF signal

Construction of the~hardware~

~System requirements

History

Copyright & liability

### 1.2 What's new?

What's new?

In contrast to earlier you do not need anymore to install the program in the startup-sequence; now just copy the program DCF77Plus to the WBStartup drawer.

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The configuration results no more over command line but comfortably over Tooltypes.

The hardware now is addressed over Device and Unit, thus the organization at additional I/O-cards is possible.

Now a sound can played back when setting the time.

## 1.3 Introduction

### Introduction

DCF77 Plus is a package which allows every Amiga user to receive an exact system time on a very simple and advantageous way.

This is achieved by using a hardware extension and the pertinent software. The linking can be done at the start of the computer in your S:User-Startup file, for instance.

The advantage of this package is that you do not depend on commercial products and that self-construction often is more favourable.

This project is based on the circuit from "Atomuhr V1.2" by Stefan Glükler, Chur/Switzerland. However, the circuit has been altered so that it covers the power supply directly from the serial port, and support for actual DCF modules has been added.

## 1.4 Installation

### Installation

The assembled hardware of DCF77Plus is connected simply to the serial port of the Amiga (be sure to switch it off before doing so!!!).

Then you have to copy the DCF77Plus program file into an arbitrary drawer; the best location would be the WBStartup drawer.

Ensure that your C: drawer contains the following files:

- Date
- Setclock

These files are necessary to guarantee a flawless setting of the system time.

As soon as the computer is turned on, the function of the receiver should be tested: The LED should begin to flash about once per second, indicating the received data bits in the normal case.

If this is not the case, several causes are possible:

- You have not assembled the hardware correctly.
-

- The receiver PCB with the ferrite antenna lies too densely in the range of the computer or monitor, which has a disturbing influence. However, a distance of 2.5 meters should be sufficient.
- Change the direction of the ferrite antenna to ascertain the correct receiving direction.

The function of the software can be tested using the diagnostics utility DCF77Plus\_Check. In its window all data bits are displayed. Additionally, you can find a short description of the individual bits at the top of the window.

If errors occur while transferring or decoding the data, this will be indicated via a system requester.

## 1.5 Using the software

Using the software

DCF77Plus is called up completely simply through a double-click on the Icon. Just copy the program in the WBStartup drawer; so it is called up automatically after a reset.

The programs DCF77Plus and DCF77Plus\_Check can be configured over entries in the Tooltypes of their Icons.

The following Tooltypes are at the disposal:

DEVICE= For the statement of the device-name, without statement the serial.device is used.

UNIT= For the statement of the unit-number, preset is 0.

At the program DCF77Plus there is in addition following:

PRIORITY= Sets the priority of the program. The default is 0. To prevent a system overload, only negative values should be stated.

DEBUG= Switch on the debug-modus.  
0 off  
1 The screen flashes when system time has been updated.  
2 Like 1, but flashes the screen also when synchronization impulse is received, indicating the beginning of the time-signal.  
3 Like 2. You are informed about each signal of the time-signal being received, too.

DELTA= Defines a time correction. To the determined time x hours are added (x can also be negative). This is useful if the software has to be adjusted for a certain time zone.

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SOUND= Here can stated a IFF-Soundfile, which is played after setting the system-time.

DONOTWAIT This keyword should used to prevent the system waiting of the end of the program at a system-start.

#### Examples

```
DEVICE=serial.device
UNIT=0
PRIORITY=-1
DEBUG=1
DELTA=-1
SOUND=SYS:Prefs/Sounds/ping.iff
```

The Hardware is used with the serial.device at unit number 0. The program is started as a background task with a priority of -1. After updating the system time, the screen flashes once at the very end of the program and the IFF-Soundfile is played. The system time is set to the received time minus one hour (e. g. for the United Kingdom).

## 1.6 Error messages

### Error messages during the completion

During the execution of the DCF77Plus programme, the following error messages can appear:

No DCF77 signal. This indicates that 5 minutes have been serviced in vain for the beginning of the time-signal. The programme may be interrupted now.

Error receiving signal. This means that over a longer period faulty data has been received and that it is not to be reckoned with a flawless reception. Also here the programme may be interrupted.

Error opening device. The device or the unit was misstated. The program is interrupted.

Soundfile not found. The Soundfile was misstated. The program is finished without playing the sound.

**Solution:** In the first case you should examine whether the hardware functions correctly - see Installation for details. Besides you can try to change the orientation of the ferrite antenna in a manner that a signal can be received (LED flashes).

In the second case you can try to remove the reception module from electrically disturbing devices (e.g. computers, monitors

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etc.) to increase the receiving quality.

In the third and fourth case you should examine the entry in the tooltypes and correct them if necessary.

## 1.7 Description of the DCF signal

The construction of the DCF signal

The DCF signal is produced by the "Physikalisch Technische Bundesanstalt" in Braunschweig, Germany. This signal is radiated by a transmitter in Mainflingen/Frankfurt. This is done at a frequency of 77.5 kHz, and hence it is also called DCF77.

Within one minute the so-called "time-signal" is radiated. It consists of a sequence of low and high bits. These bits are transferred through a short-term sinking of the amplitude to 25 %. If these sinkings are shorter than 120 ms so it indicates a low bit (0); with at least 180 ms it indicates a high bit (1).

The 59th bit serves for synchronization purposes only. It contains no mark; the following zeroeth bit is a low bit (0). Thus you know exactly that the seconds are at 00 and that you can begin to receive the required data bits now and to decode them after that.

The entire time-signal is composed as follows:

Bit	Meaning	Value
0	Begin of a minute (always low)	
1-14	(unused)	
15	if "Hi": the reserve-antenna is in use	
16	if "Hi": it is 1 hour before transposition of time	
17	if "Hi": daylight saving time (MEST)	
18	time-zone bit, always "Lo"	
19	if "Hi": it is 1 hour before intercalary second	
20	begin of time-signal, always "Hi"	
21	minute (unit)	1
22	"	2
23	"	4
24	"	8
25	minute (ten)	10
26	"	20
27	"	40
28	verify bit (completes on even parity)	
29	hour (unit)	1
30	"	2
31	"	4
32	"	8
33	hour (ten)	10
34	"	20
35	verify bit (completes on even parity)	
36	calendar day (unit)	1

37	"	2
38	"	4
39	"	8
40	calendar day (ten)	10
41	"	20
42	week-day	1
43	"	2
44	"	4
45	month (unit)	1
46	"	2
47	"	4
48	"	8
49	month (ten)	10
50	year (unit)	1
51	"	2
52	"	4
53	"	8
54	year (ten)	10
55	"	20
56	"	30
57	"	40
58	verify bit (completes on even parity)	
59	no mark	

## 1.8 Hardware

Construction of the hardware

In essential, the hardware relies on a ready-made DCF module and the adapter circuit. The adapter circuit can be built using the following list:

Layout

Required parts

Construction

## 1.9 Layout

How to print the layout

For the PCB you can select the file fitting to your printer from the "layout" drawer and send it to the printer using the "copy" command.

The following layout files are supplied:

- Star24PinPrinter for Star 24-pin printers
- 24PinPrinter for generic 24-pin printers
- 9PinPrinter for generic 9-pin printers

- Epson\_Ink                   for Epson ink printers
- HP\_Ink                     for Hewlett Packard ink printers
- laser                      for laser printers

These must be sent to the printer directly via the parallel port. This is performed simply by double-clicking the corresponding file's icon. Thereby the programme ParPrint is called, which is located in the same drawer. This programme actually performs the transfer and is used like Commodore's "PrintFiles" utility.

Alternatively you can enter something similar to the following in the CLI:

```
copy FileName par:
```

For instance,

```
copy Epson_ink par:
```

## 1.10 Required parts

The following parts are required:

- DCF module: No. 641138 from Conrad (approx. 20 DM)
- for the adapter circuit:
  - photo-covered PCB
  - IC1:       74 HC 14 N   (Schmitt trigger)
  - IC2:       78 L 05       (5V voltage regulator)
  - D1:        LED
  - R1:        100 kOhm
  - R2:        15 kOhm
  - R3         470 Ohm
  - C1, C2:   100 nF
  - C2:        1  $\mu\text{F}$
- besides a cable with 3 leads and a 25-pin Sub-D socket for the connection to the serial port.
- possibly a casing (e.g. Conrad No. 522244, 53x37x20mm with strap to hang up)

Altogether it comes to about 30 DM.

## 1.11 Construction

Construction of the circuit

The best way to reproduce this project is to orientate yourself on the chart which is presented in the file DCF77Plus.iff. As you can see, the con-

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struction is not problematic. If you want to use an electrolytic capacitor for C2, you should pay attention to the fact that the ground connector shows to the edge of the PCB.

Here you can also see how to join the PCB with the DCF module.

You can see the finished PCB (and how to install it in a casing completely with the DCF module) on the pictures in the Pictures drawer.

If you do not get the DCF module or you already own another one, you certainly can use this one. But you must pay attention, however, to the operating voltage (here 5V) and to the fact that the adapter-PCB is marked here with the positive impulse. (DCF modules often deliver both signals.)

## 1.12 System requirements

### System requirements

The DCF77 Plus package runs on all Amigas using Kickstart version 2.0 or above.

It has been developed on an Amiga 4000 with Kickstart 3.1 and tested successfully on an Amiga 500 with Kickstart 2.1.

To be able to read this documentation, 2.X users should replace the Default-Tool in its icon with Amigaguide.

The Default-Tool of the picture files should be replaced with Display.

## 1.13 History

### History

- Version 1.00 (20.10.1996)

First public release of the project.

- Version 1.10 (05.03.1997)

In contrast to earlier you do not need anymore to install the program in the startup-sequence; now just copy the program DCF77Plus to the WBStartup drawer.

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## 1.14 Copyright & liability

Copyright

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DCF77 plus is freeware. It may be used unrestricted as long as the supplied files are neither changed nor decompiled. All pertinent files may be transmitted in the complete package only.

I would be happy if users would send me a postcard or Email.

Inspirations, questions, or hints are accepted happily.

Exclusion from liability

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