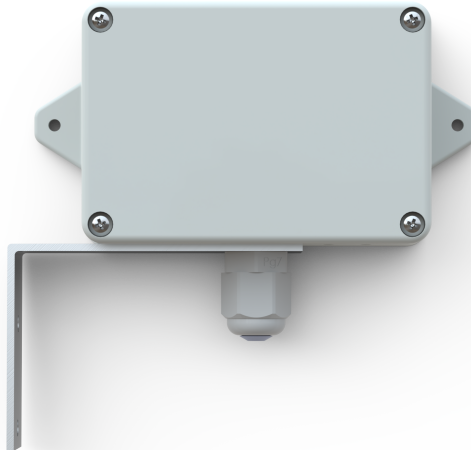




User Manual

AD 650

Radiosignal Receiver



Scan the QR code or enter following URL to get the latest version:
<https://docs.mobatime.cloud/AD-650>

Regulations and Certification

The device fulfils the requirements of the following standards:

Electrical safety :	EN 62368-1 ED.2
EMC :	EN 55032 ED.2; EN 55035; EN 50121-4 ED.4

This product was developed and produced with the following EU directives:

EMC :	Electromagnetic compatibility directive 2014/30/EU
LVD :	Low voltage directive 2014/35/EU
RED :	Radio equipment directive 2014/53/EU
RoHS II :	Restriction of the use of certain hazardous substances directive 2011/65/EU
WEEE :	Waste electrical and electronic equipment directive 2012/19/EU
REACH :	Chemical substance directive ES 1907/2006

See Conformity for the declaration of conformity of this specific product. This product may offer a CB test certificate on request.



Important Notes

1. Please read and follow the safety information in this document before operating the product. We cannot guarantee that no accidents or damage will occur to improper use of this product. Please use this product with care and operate at your own risk.
2. We are not liable for any direct or indirect damage caused by the use of this document or the said product.
3. This product must be connected and installed by qualified electrician who is familiar with the relevant regulations (e.g. VDE).
4. The information in this document is subject to change without notice. The latest version of this document is available for download at <https://docs.mobatime.cloud/AD-650/user-manual/pdf>.
5. This User Manual has been composed with the utmost care to explain all the details to ensure a safe and stable operation of this product. Nevertheless, if question arise or error appear, feel free to contact support.
6. Images shown are for illustrative purposes and may differ from the final product.
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1 Safety



Read the safety instructions carefully and follow all the instructions. This ensures safe and reliable operation of this device.

1.1. Instructions and Symbols

Symbols used throughout this document and their meaning are as follows:



A note or important information.



Answer to a possible question. Contact information.



Keep away from children and people with limited physical, sensory, or mental capacities.



Action needs to be taken.



Connect device to earth ground.



More information included in the manual.



Disconnect mains power before doing anything.



An example or a hint.



Additional references or information.



Attention of electrical shocks.



Surface may be hot.



Item is flammable.



A warning, be cautious.



Recyclable materials.



Do not put in trash.

1.2. General



For safety and licensing reasons, unauthorized modifications and/or changes to the product is prohibited. Maintenance, adjustments or repairs may only be carried out by the factory (copyright holder).



This product is not a toy; it does not belong in the hands of children. Mount or place the product so that it cannot be reached by children. Children may try to insert objects into the product. The product will not only be damaged, but there is also a risk of injury, as well as danger to life through electric shock.



Never open the housing of this product, for it poses mortal danger from electric shock or may even cause a fire.

Keep packaging such as plastic films away from children. There is the risk of suffocation of misused.



Use caution with the product, knocks, blows, or even falls from a low height can damage it.



In industrial facilities, the accident prevention regulations of the trade associations for electrical systems and equipment must be observed.

Do not use the product if it is damaged. It can be assumed that safe operation is no longer possible, if:

- The product has visible damage.
- The product is not working properly (thick smoke or a burning smell, audible crackling noise, discoloration of the product or surrounding areas).
- The product was stored under adverse conditions.
- Tough conditions during transport.



Improper handling of this product operated on the mains voltage can cause mortal danger from electric shock!



Interconnection or combining equipment bearing a CE label does not inevitably result in a system that conforms with the safety regulations. Integrators will have to reassess the new product's compliance according to the locally valid directives. See section Conformity for more information on certifications of this product.

1.3. Installation

This product must be connected and installed by a qualified electrician who is familiar with the relevant regulations (e.g. VDE).



Never plug the product into voltage / power supply immediately after it has been moved from cold into warm environment (e.g. during / after transport / unboxing). The resultant condensed water may damage the product or may cause electric shock.



Allow the product reach the ambient temperature. Wait until the condensation has evaporated, this can take a few hours. Only then can the product be connected to the voltage / current supply and put into operation.



This product may have screw terminals with open electrical contacts. It is essential to ensure that the connection is made only when no voltage / current is applied. Secure the power supply to prevent accidental reconnection. Verify the absence of voltage using an appropriate meter.



Always connect earth ground to the device at the indicated protective earth terminal (PE or earth symbol indication).

1.4. Operation

Use the product in the specified environment. Use outside of the specifications can damage the product and/or stop any operation.

The product may not be exposed to extreme temperatures, direct sunlight or strong vibrations. Protect the product from moisture, dust and dirt.



Operation in environments with excessive dust, flammable gases, vapours or solvents is not permitted. It may cause explosion or fire.

- Do not overload the product. Note the input / output voltage and currents as well as output powers indicated on the product.
- Depending on the input currents and input voltages, suitable connecting cables with appropriate cable diameter must be used. Only use the plugs and connectors supplied in the original packaging with the product.

1.5. Maintenance and Cleaning

- If the product and/or the connecting cable is damaged, do not touch it: there is mortal danger from electric shock! First, turn off the power supply to all poles of the product. Verify the absence of voltage using an appropriate meter.
- For the end consumer, the product is maintenance-free. Leavy any maintenance to an expert. Repairs may only be done by the factory itself (copyright holder).
- For external cleaning one can use a clean, soft, dry cloth. Dust can be easily removed with a clean, soft brush and a vacuum cleaner.

1.6. Disposing



At the end of its lifecycle, do not dispose of this device in the regular household rubbish. Return it to the supplier who will dispose of it correctly.



The user is lawfully obligated to return unusable batteries. **Disposal of used batteries through household waste is prohibited!** Batteries which contain dangerous substances are labelled with a picture of crossed out trash bin. The symbol means that this product may not be disposed through household waste.

Unusable batteries can be returned free of charge at appropriate collection points of your waste disposal company or at shops that sell batteries. By doing so, you fulfil your legal responsibilities and help protect the environment.



This product was packed and stuffed with proper materials to protect it during transportation. Packaging materials can be recycled and should be disposed environmentally friendly.

1.7. Warranty

The device is intended for a normal operational environment according to the corresponding norm.

The following circumstances are excluded from the warranty:

- Inappropriate handling or interventions.
- Chemical influences.
- Mechanical defects.
- External environmental influences (natural catastrophes, etc.)



Repairs during and after warranty period are assured by the manufacturer.

2 Introduction

The DCF 77 radiosignal, received by the AD 650 radiosignal receiver, enables nearly absolute precision in clock operation and ensures a fully automatic transition to daylight saving time.

The receiver can be connected to all types of MOBATIME master clocks using a two-wire unshielded cable.

3 Technical Data

3.1. Basic Data

Parameter		Value
Immunity to interference	radio (selectivity)	normal
	coming from network	normal
Connecting Cable	standard length	10 m
	max. length	200 m
Protection Degree		IP 65
Dimensions [mm]	W x H x D	84 x 59 x 34

3.2. Placement of the AD 650

Align the radio signal receiver with the front cover (using screws) or the rear surface pointing towards the DCF Mainflingen transmitter (approximately to the west). If the DCF reception is of good quality, the time base on the connected clocks will synchronize automatically within a few minutes. In the case of poor reception (especially during the day), the initial setup must be performed manually so that the LED blinks regularly.

Like any radio receiver, the DCF radio signal receiver is subject to disruptive and attenuating influences. Their impact increases with the distance from the DCF transmitter in Mainflingen and the presence of the following factors:


- metal cladding of buildings and rooms, metal structural elements (beams, reinforcement, roofs)
- strong walls and insulation, basement and cellar spaces
- inappropriate local geographical conditions (difficult to predict in advance)
- atmospheric disturbances, storms
- unshielded electrical appliances
- televisions and computers located near the DCF radio receiver

4 Connection

The AD 650 DCF receiver is delivered with a 10 m cable. The maximum length of the cable depends on its cross-section (at least 0.25 mm²) and can be up to 200 m. We recommend using shielded cable only in critical conditions.

The functionality of the receiver is independent of the connection polarity. Cut the cable to the required length.

With good reception, the LED on the receiver flashes once per second with a skip of 1 pulse at the 59th second.

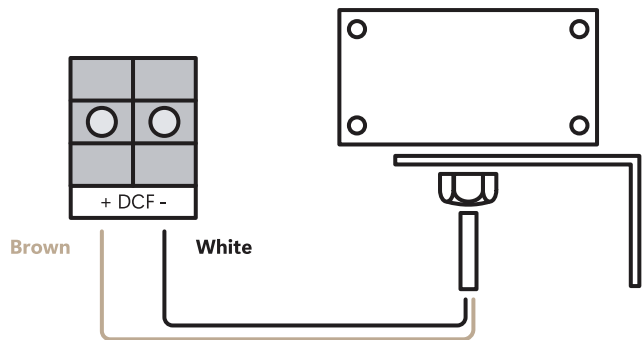


Do not install the receiver close to buildings consisting of metallic steel structures, near to PCs, TV and radio receivers or in places surrounded with thick walls or into underground or cellar areas.


4.1. Connection to Master Clock

Connect the AD 650 DCF receiver to the master clock terminal board (**+DCF-** terminal).

Wire Color	Connector
White	DCF -
Brown	DCF +



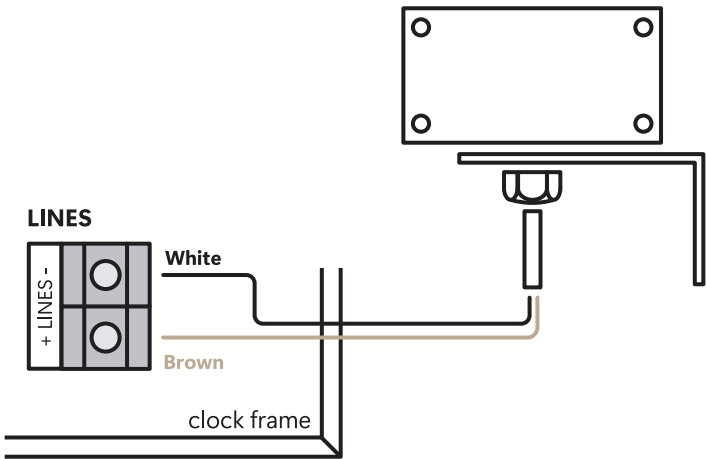
4.2. Connection to Digital Clock



For generation 4 digital clock:
It is important to configure DIP switch position to DCF.

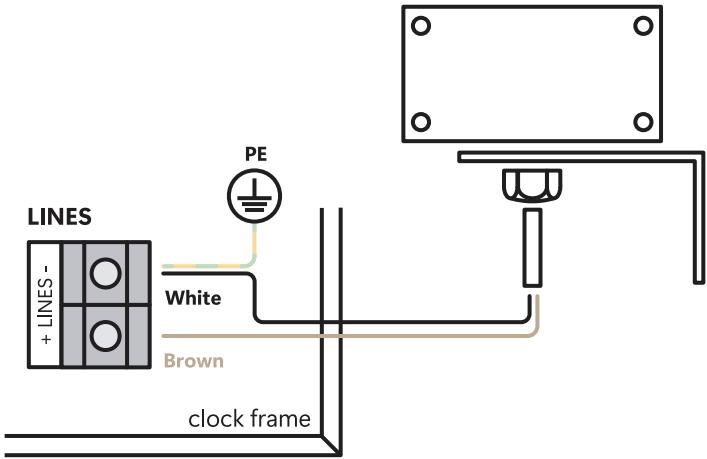
Connect the AD 650 DCF receiver to the clock terminal board placed on the anchoring plate (**LINE IN** terminal).

Wire Color	Connector
White	LINES -
Brown	LINES +



In case of issues with receiving the DCF signal when using the AD 650 / DCF 4500 receiver, it is necessary to ground (connect to PE) one of the signals/inputs (LINES+ or LINES-).
For the ECO-DC clock, **it is always necessary** to ground one (connect to PE) of the signals/inputs (LINES+ or LINES-).

Wire Color	Connector
White	LINES -
Brown	LINES +
Yellow / Green (PE conductor)	Either LINES + or LINES -



5 Digital Clock Settings

5.1. Generation 4 Digital Clock

1. Enter the digital clock menu, navigate to the **S Y N C** submenu and proceed to enter.
2. Navigate to item **o 1** and set it to value **A** (automatically set timezone).
3. Navigate then to item **o 2** and set it to value **A** (autodetection).
4. Return to digital clock menu, navigate to the **d I S P** submenu and proceed to enter.
5. Navigate to item **d 2** and set it to value **A** (automatically set timezone).

5.2. Generation 3 Digital Clock



Following procedure is for all generation 3 digital clocks except ECO-DC and ECO-M-DC series.

1. Enter the digital clock menu.
2. Navigate to item **P 3** and set it to value **A**.
3. Navigate to item **P 4** and set it to value **A**.
4. Navigate to item **P 7** and set it to value **A**.



Following procedure is only for generation 3 ECO-DC and ECO-M-DC series.

1. Enter the digital clock menu.
2. Navigate to item **P 4** and set it to value **A**.
3. Navigate to item **P 6** and set it to value **A**.



Headquarters/Production
Sales Worldwide
Sales Switzerland

Tel. +41 34 432 46 46 | Fax +41 34 432 46 99
moserbaer@mobatime.com | www.mobatime.com

MOBATIME AG | Stettbachstrasse 5 | CH-8600 Dübendorf
Tel. +41 44 802 75 75 | Fax +41 44 802 75 65
info-d@mobatime.ch | www.mobatime.ch

MOBATIME SA | En Budron H 20 | CH-1052 Le Mont-sur-Lausanne
Tél. +41 21 654 33 50 | Fax +41 21 654 33 69
info-f@mobatime.ch | www.mobatime.ch

Sales Germany/Austria

BÜRK MOBATIME GmbH
Postfach 3760 | D-78026 VS-Schwenningen
Steinkirchring 46 | D-78056 VS-Schwenningen
Tel. +49 7720 / 85 35 - 0 | Fax +49 7720 / 85 35 - 11
buerk@buerk-mobatime.de | www.buerk-mobatime.de