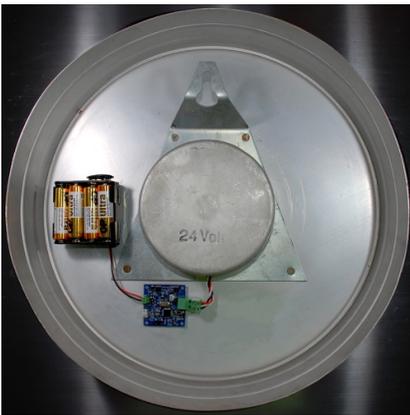


HASSEB MASTERCLOCK_{MINI}



hasseb MasterClock_{mini} is an easy to use battery operated master clock to drive slave clocks used for example in institutions like factories, offices, and schools. The device sends 24 volts voltage pulses every minute, every 30 seconds, or every second to drive the clock. The device utilizes simple Windows software to control the settings and fine tune the crystal.

INSTALLATION

The device has a two wire connector to attach the slave clock to the device. Depending on the settings, unipolar or bipolar pulses are sent out every minute or every 30 seconds to drive the clock.

Many slave clocks have three wires instead of two, to drive the solenoid of the hour, and can be joined with one or the other of the wires. In most cases *hasseb MasterClock_{mini}* is capable to drive also three wire slave clocks. However, it is your responsibility to check the connection of your particular device!

ADJUSTING TIME

The time can be adjusted by pressing the push button. The device will send a single pulse every time you press the button. If you keep the button pressed, the device sends successive pulses at the interval of two pulse length times.

CONTROL PROGRAM

By default the device will send a bipolar pulse every minute with a pulse length of 500 ms. If the default settings are not suitable for your slave clock, an easy to use Windows program MasterClock.exe can be used to configure the *MasterClock_{mini}* device. The *MasterClock_{mini}* is a stand-alone device, thus the USB cable needs to be connected only when configuring the device.

The *MasterClock_{mini}* is visible to the host computer as a human interface device, such like mouse or keyboard, and requires no drivers.

Due to the software, which is optimized for extremely low standby current consumption, it is important to connect the USB cable between the *MasterClock_{mini}* device and computer before powering the device. If the USB cable is connected after the *MasterClock_{mini}* has booted, Windows may not recognize the device.

After starting the MasterClock.exe software “Device found.” text should be visible on the bottom left corner of the software. If you see a text “Device not found. Please restart the program.” check the battery connection, recheck the device USB connection and restart the program.

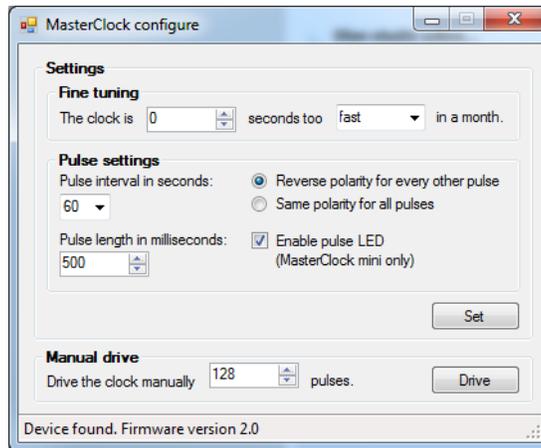


Figure 1. The *MasterClock_{mini}* device is configured using a simple Windows program.

Due to the manufacturing process and environmental conditions, such as temperature and relative humidity, the frequency of the crystal of the *MasterClock_{mini}* device may vary. The control software features a fine tuning function to calibrate the crystal. The calibration is carried out by setting the error in seconds within a month.

The manual drive function can be used to adjust the time of the clock. By using the manual drive function of the control software, a selectable amount of successive pulses can be sent to the device. This prevents the manual hold down of the push button switch when adjusting the time.

STATUS LED

There is an LED to indicate the status of the device. The LED will toggle when 24 V pulse is sent to the slave clock line. The toggling LED will also blink fast, when settings are sent through the USB port. To save energy and extend the battery lifetime, the LED can be disabled using the control software.

OPTIMIZING THE POWER CONSUMPTION

Your slave clock is the main part using the power of the battery. The quiescent current consumption of the *MasterClock_{mini}* device is in the range of micro amperes and thus negligible compared to the power consumption of the slave clock.

To reduce the power consumption of the device and thus extending the battery lifetime, it is important to adjust the pulse length as short as possible. It is recommended to use the shortest pulse length using which the slave clock is still operational.

The battery lifetime can be also slightly extended by disabling the LED, indicating the pulse status. This can be done using the Windows control software.

Specifications	
Input voltage	6-12 VDC
Output voltage	± 24 V
Maximum output current	50 mA
Operating temperature	0 – 50 °C
Dimensions	45 mm x 45 mm x 10 mm
Weight	30 g
Supported operating systems	Windows 7 / 8 / 10