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## Master Clock GPS Module Software Update

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### Reason for the Software Update

Some Sapling Master Clocks utilize a GPS receiver module for receiving accurate time data. This document is only meant for customers using a Sapling Master Clock with the GPS receiver.

Trimble, the GPS receiver manufacturer, advised us that the GPS receiver used in the Sapling Master Clock needs to have a software update **no later than April 2019** in order to avoid time discrepancies.

To rectify the time discrepancy, Trimble has released new software. In order to perform this software update, Sapling is providing its customers the below instructions, a link to the new software and a GPS receiver programming kit.

If you have any questions regarding this process, please do not hesitate to contact us; our Support Team will be happy to help!

### Required Tools and Components

To complete this update, please have the following items available:

- Your master clock
- A Phillips-head screwdriver
- A computer running Windows 7 or 10 that has access to the Internet and at least one USB-A port
- A .zip file containing installation files and applications. Please extract all of these to your desktop before proceeding:
  - A copy of the program Trimble GPS Studio. Use the current version, do not update the program after launching it.
  - A copy of the firmware to be used by Trimble GPS Studio for the update - file ending in ".bin"
  - Copies of the driver for the USB-Serial Adapter, for use on Windows 7 and Windows 10.

The zip file is available at this link

<https://sapling-inc.com/gps-module-firmware-update/>

- The USB to Serial Adapter Cable (pictured below)



### Safety Measures

Before reprogramming the GPS Module, power down the master clock by removing the power cable. **Do not attempt this procedure while the clock is powered!**

**NOTE:** Follow the instructions as explained **in the text** on each page. The images are presented to inform the installer of where particular objects and fields are, not what to enter into each field. Unless specified otherwise, entering values in directly as shown will result in the module malfunctioning.

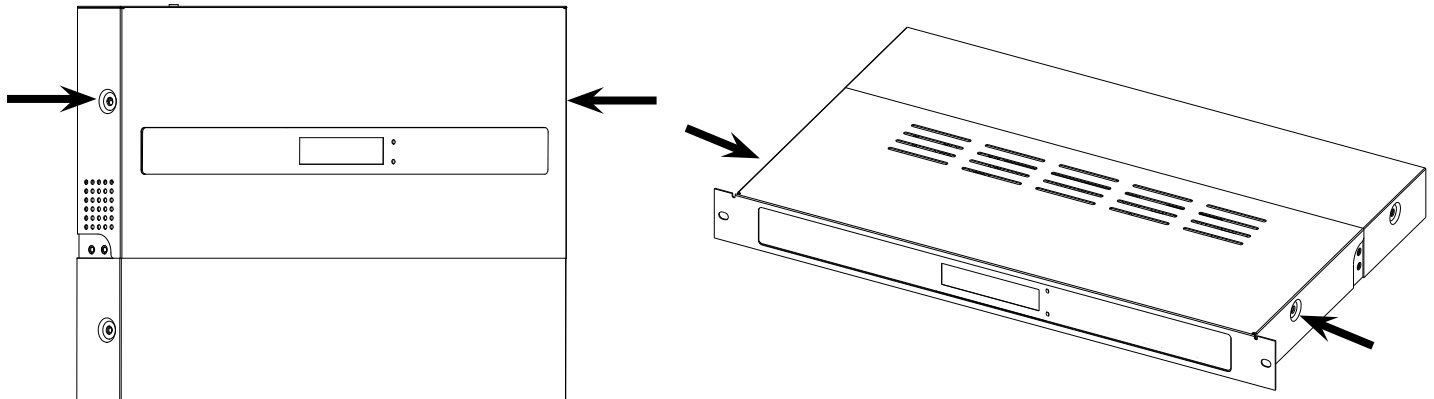
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## Master Clock GPS Module Software Update

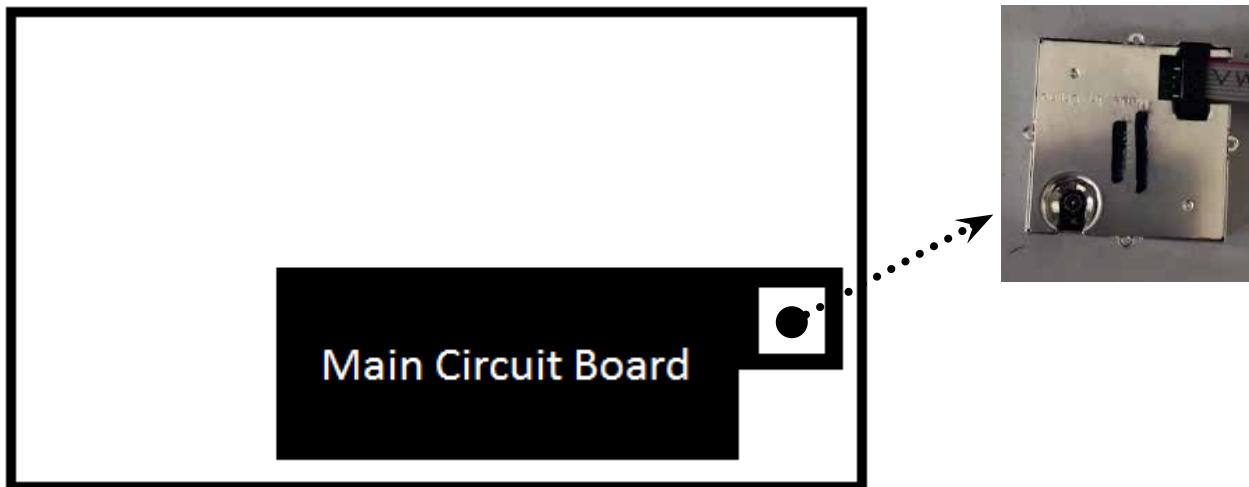
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### POWER DOWN THE CLOCK FIRST

1) Use the Phillips head screwdriver to open up the master clock and expose the circuit boards. The screws to open up the panel can be found along the shorter sides of the clock. On the wall-mount model of the clock, you may need to unscrew the display from the case as well. Do not disconnect any wires.



2) Identify the GPS module on the circuit board using the diagram below.



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## Master Clock GPS Module Software Update

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3) Disconnect the existing 8-pin cable from the module by pulling up gently on the connector. Connect the 8-pin Connector side of the USB to Serial Adapter to the socket that was just opened on the GPS module. If the connector is installed correctly, the red wire should be closest to the corner of the module, as shown below.



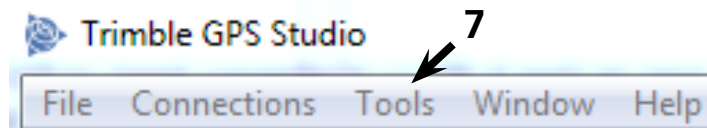
4) Connect the USB side of the USB to Serial adapter to a USB-A port on your computer. Your computer may take a few minutes to install additional drivers for the new device. If the computer does not automatically install the driver, a copy of the driver for Windows 7 and 10 are provided in the original .zip file.

5) Identify the COM port (example: COM3) being used by the Adapter. To locate the COM port, go to Start, type "Device Manager" into the search bar, click on the Device Manager application to open it, and expand the Ports group. Look for a device named Silicon Labs CP210x USB to UART Bridge Controller.

If the device does not appear, the driver may not have installed successfully. Drivers for Windows 7 and 10 were provided along with the .zip file. Install the appropriate driver for your operating system.

6) Run the Trimble GPS Studio application if you have not done so already. **Do not update the program if prompted.**

7) In the Trimble GPS Studio application, locate the "Tools" button at the top of the window. Click on it, and select Flash-loader from the drop-down menu.



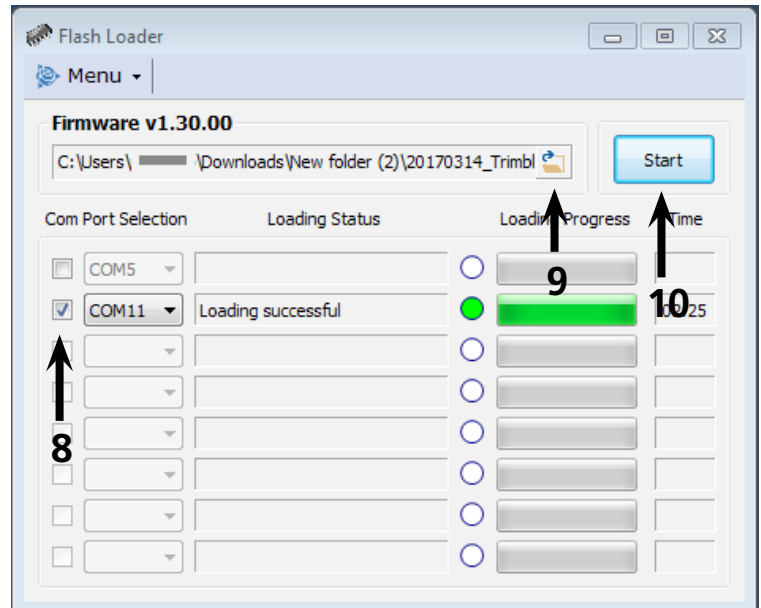
## Master Clock GPS Module Software Update

8) Check off the box next to whichever COM port your USB to Serial adapter is using.

9) In the Flash Loader window, click on the Browse button, and select the firmware file that you placed on your desktop. This should be a file type ending in extension **.bin**

**Press down lightly on the 8-pin connector with one finger to hold it in place. DO NOT DISCONNECT THE CABLE DURING THIS PROCESS. Any signal interruption can damage the GPS module.**

10) Press on the Start button. The Loading Progress bar should begin to fill after about two minutes. This process usually takes about three minutes to complete. If the bar does not start to fill, press the abort button and try again. When complete, the message "Loading Successful" will appear in the Loading Status field. You may now take your finger off of the connector. If this process produces an error message or runs for six minutes without starting, contact tech support.



11) In the Trimble GPS Studio application, locate the "Connections" button at the top of the window. Click on it, and select "New Connection" from the drop-down menu.

12) In the New Connection window, set the following parameters:

Device - **Any**

COM Port: **The COM port you identified earlier**

13) Click on the box next to "Auto-detect." The following values should be displayed below it.

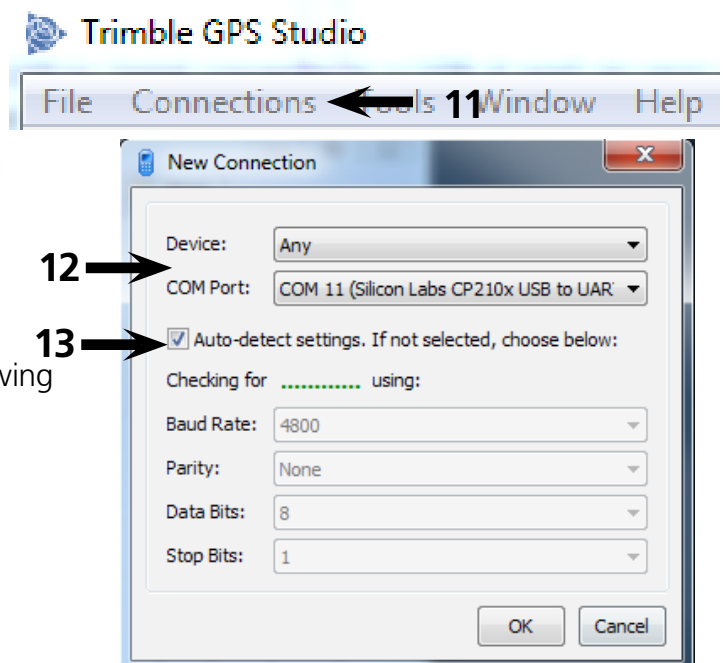
Baud Rate: **4800**

Parity: **None**

Data Bits: **8**

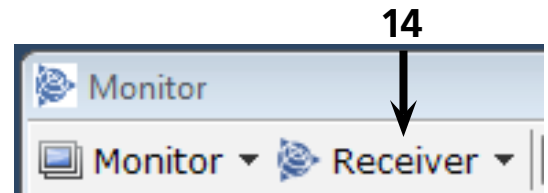
Stop Bits: **1**

Click OK when finished.

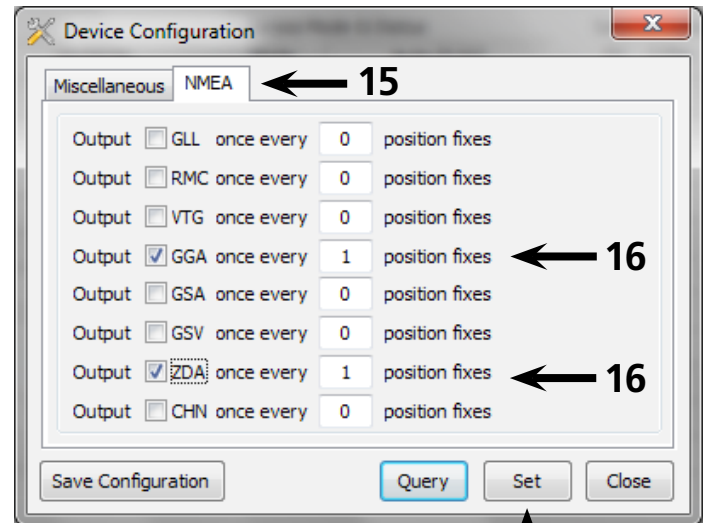


## Master Clock GPS Module Software Update

14) A new window labeled Monitor [COM #] should appear. Click on the "Receiver" tab and select "Configure" from the drop-down menu.



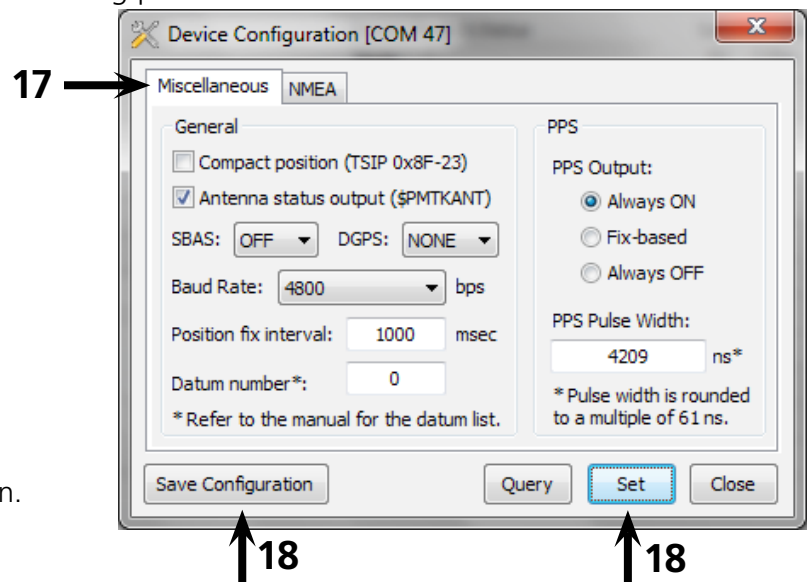
15) A new window labeled "Device Configuration" should appear. Click on the NMEA tab



16) Select the boxes next to **GGA** and **ZDA**. Set both to a value of 1. All other items should be left at 0 and remain unchecked. Click the Set button when finished.

17) Click on the Miscellaneous tab and set the following parameters:

- Compact Position **unchecked**
- Antenna status output **checked**
- SBAS: **OFF**
- DGPS: **NONE**
- Baud Rate **4800bps**
- Position fix interval **1000msec**
- Datum number: **0**
- PPS Output: **Always ON**
- PPS Pulse Width **4209ns**



18) When finished:

- First, click on the "Set" button,
- Next, click on the "Save Configuration" button.

19) Wait for the messages "Saving in progress" and "Configuration saved successfully" to appear.

20) Disconnect the cable from the USB port and the port on the module, reconnect the original cable, and reattach the clock cover. This completes the update, and your master clock will continue functioning properly.

If you need technical assistance please contact [support@sapling-inc.com](mailto:support@sapling-inc.com)