

MAVOMASTER & MAVOPROBE SDK

1.0/11.22



Table of Contents

| | | |
|--------|---|----|
| 1 | Introduction..... | 3 |
| 2 | Quick Start..... | 4 |
| 2.1 | ZIP-Archive contents..... | 4 |
| 2.2 | Usage of the Excel Sheets..... | 4 |
| 3 | Serial Connection | 5 |
| 3.1 | CDC Protocol..... | 5 |
| 3.2 | Connecting the MAVOPROBE to a PC..... | 6 |
| 4 | Command Descriptions | 7 |
| 4.1 | Command Overview | 7 |
| 4.2 | MASTER & PROBE | 8 |
| 4.2.1 | Get Device Information..... | 8 |
| 4.2.2 | Get Firmware Revision | 8 |
| 4.2.3 | Get Hardware Revision | 8 |
| 4.2.4 | Get Probe Temperature..... | 8 |
| 4.2.5 | Get Measurement..... | 9 |
| 4.3 | MASTER | 10 |
| 4.3.1 | Get the Time and Date | 10 |
| 4.3.2 | Set the Time and Date..... | 10 |
| 4.3.3 | Get the Backlight level..... | 10 |
| 4.3.4 | Set the Backlight level | 10 |
| 4.3.5 | Get all Device Settings | 11 |
| 4.3.6 | Set a Device Setting | 12 |
| 4.3.7 | Reset the Settings to Factory default..... | 12 |
| 4.3.8 | Save the changed Settings..... | 12 |
| 4.3.9 | Make a Sound | 13 |
| 4.3.10 | Lock the Keys on the Device | 13 |
| 4.3.11 | Simulate pressing a Key..... | 13 |
| 4.3.12 | Get the Voltage Level of the Battery..... | 14 |
| 4.4 | PROBE | 15 |
| 4.4.1 | Set the Measuring Range to a fixed Range..... | 15 |
| 4.4.2 | Activate Auto-Ranging..... | 15 |
| 4.4.3 | Start the Device in Bootloader-Mode..... | 15 |
| | Document Revision History..... | 16 |

1 Introduction

The USB-Interface of the GOSSEN MAVOMASTER is a so called “USB composite device”. Meaning, that the device provides more than one interface functions with one connection.

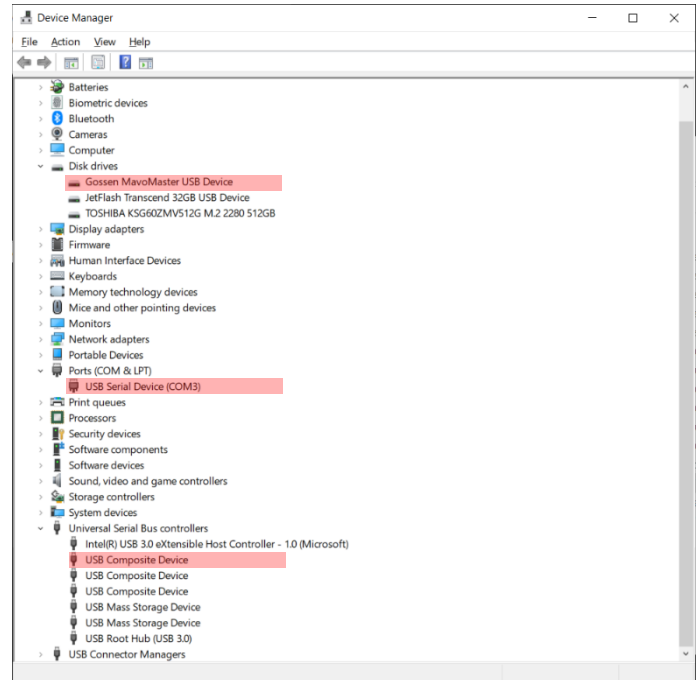
If the device is connected to your computer it will register as a disc drive as well as a CDC (Communications Device Class aka Serial Connection). The disc drive is for loading the saved measurements and the CDC for remote controlling the device and getting measured data.

The USB-Interface of the GOSSEN MAVOPROBE is only CDC, so you will not see a USB Device or a Composite Device.

For Windows 10 no special drivers are needed as all necessary drivers are included in your operating system and are installed automatically when the device is connected to the PC for the first time.

If you are running Windows 8.1 / 8 or 7 you might need a driver to use the CDC-Interface (Serial Port). You can download this driver (*.inf – File) from our Homepage.

If you are still running Microsoft XP (you poor lad), the disc drive should work. The CDC might(?) work if you find drivers for it (we will not provide them, sorry).



Picture 1: Device Manager with a connected MAVOMASTER

2 Quick Start

2.1 ZIP-Archive contents

In this ZIP-Archive you find the following files:

- MavoMASTER & MavoPROBE SDK Manual.pdf this file
- MavoMASTER CDC demo.xlsm usage example in MS Excel for MAVOMASTER
- MavoPROBE CDC demo.xlsm usage example in MS Excel for MAVOPROBE
- MavoMASTER CDC Driver.inf the INF-File for Windows 7 / 8 / 8.1 (CDC-Driver)
- mavoSOFT virtualMASTER demo.exe A demo Program for the Communication
- mavoSOFT virtualMASTER demo.zip The Visual Studio (2019) Project with the Source Code for the demo Program

If you are missing a file, please download the archive again from <https://gossen-photo.de/mavomaster/> and if the problem persists please contact us via email to info@gossen-photo.de.

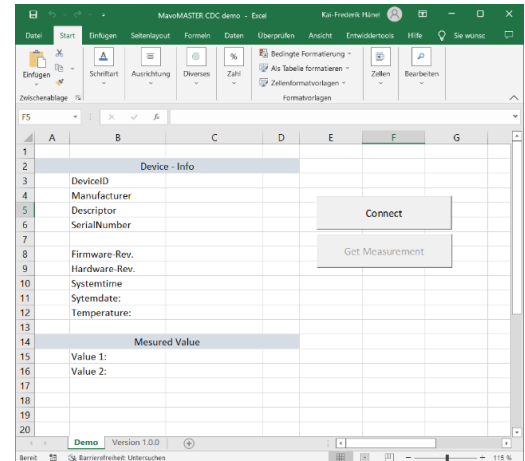
2.2 Usage of the Excel Sheets

Some of the used functions are not available in Excel for MAC so it will not work on a MAC.

In this Sheet are Buttons for connecting to the MAVOMASTER / MAVOPROBE ("Connect") and for taking measurements ("Get Measurement").

After connecting to a device, you can take a measurement. The measured values will be displayed on the first Sheet.

All VBA Macros and Functions are available for reading and editing and are commented.



Picture 2: Excel Sheet for taking measurements

3 Serial Connection

3.1 CDC Protocol

The UART Settings for the Device are: 9600 Bit per Second, 8 Data bits, 1 Stop bits (no parity, no Flow control)

To check that the serial communication works correctly you can try sending a command to the device with a Terminal-Program. We recommend [HTerm](#) from [der-Hammer.info](#). You can also use a different Terminal-Program that supports sending of several ASCII-Characters in one package.

Make all necessary settings in the Terminal-Program (red Circle). The commands are sent as ASCII and are terminated with either "line feed", "carriage return" or "carriage return - line feed" (yellow circle). The device will reply with the termination characters it received.

Additional information: CDC commands are not case sensitive, white spaces have to be placed where necessary.

If you send „*idn?“ to the device, the device (MAVOMASTER) should answer as shown in the screenshot (green circle).

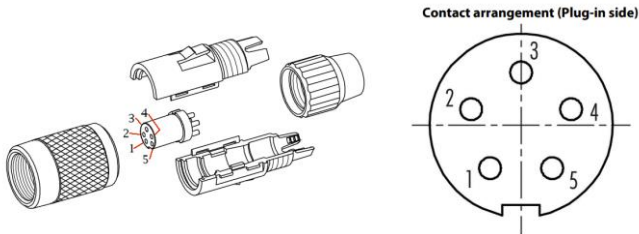


3.2 Connecting the MAVOPROBE to a PC

To connect the MAVOPROBE to a PC you need a special adapter cable. You can purchase a cable from us directly with your MAVOPROBE or order one as an accessory. The adapter cable has the Number V074A.

Alternatively, you can build the cable yourself.

The connector used in the adapter cable is a "Binder series 711 plug, 5-pin, female". The USB-Side is a standard USB-A Connector.



Connect the USB cable like this:

- 1 +5V (Red)
- 2 0V (Black)
- 3 0V (Black)
- 4 Data (White)
- 5 Data (Green)

Bridge Pins 2 and 3.

4 Command Descriptions

4.1 Command Overview

| CDC Command | Master or Probe | Short Command Description |
|-----------------|-----------------|--|
| *idn? | Master & Probe | Get Device Identification |
| fw? | Master & Probe | Get Firmware Revision |
| hw? | Master & Probe | Get Hardware Revision |
| temp? | Master & Probe | Get Probe Temperature (if connected to the Master) |
| ? | Master & Probe | Get last Measurement |
| mea? | Master & Probe | Get last Measurement |
| measure? | Master & Probe | Get last Measurement |
| | | |
| datetime? | Master | Get the Time and Date in the Device |
| datetime | Master | Set the Time and Date in the Device |
| backlight? | Master | Get the Backlight level |
| backlight | Master | Set the Backlight level |
| settings? | Master | Get all Device Settings |
| settings | Master | Set a Device Setting |
| factorysettings | Master | Reset the Settings to Factory default |
| savesettings | Master | Save the changed Settings |
| beep | Master | Make a Sound |
| keylock | Master | Lock the Keys on the Device |
| keycode | Master | Simulate pressing a Key |
| batvoltage? | Master | Get the Voltage Level of the Battery |
| | | |
| range | Probe | Set the Measuring Range to a fixed Range |
| autorange | Probe | Activate Auto-Ranging |
| bootloader | Probe | Start the Device in Bootloader-Mode |

4.2 MASTER & PROBE

4.2.1 Get Device Information

| | |
|-------------------|--|
| Command to Send: | *idn? |
| Received Command: | as Master: Identification of the Master and Identification of the connected Probe as Probe: Identification of the Probe |

4.2.2 Get Firmware Revision

| | |
|-------------------|-----------------------------------|
| Command to Send: | fw? |
| Received Command: | The Firmware Revision: x.y.z |

4.2.3 Get Hardware Revision

| | |
|-------------------|--------------------------------|
| Command to Send: | hw? |
| Received Command: | The Hardware Revision: xx |

4.2.4 Get Probe Temperature

| | |
|-------------------|--|
| Command to Send: | temp? |
| Received Command: | as Master: The Temperature in °C or °F as set in the Settings as Probe: The Temperature in °C |

4.2.5 Get Measurement

| | |
|-------------------|--|
| Command to Send: | ? mea? measure? |
| Received Command: | The measured Value(s) with Unit. "834.3 lx – 9860 W/m ² " for MAVOPROBE LUX/UVA "8084 cd/m ² " for MAVOPROBE MONITOR |

4.3 MASTER

4.3.1 Get the Time and Date

| | |
|-------------------|---|
| Command to Send: | datetime? |
| Received Command: | The Time and Date currently set in the Device "Time:05:20 Date:01.01.2022" |

4.3.2 Set the Time and Date

| | |
|-------------------|--|
| Command to Send: | datetime HH MM DD MM YYYY HH: Hour MM: Minutes DD: Day MM: Month YYYY: Year |
| Received Command: | The Time and Date that was set in the Device "Time:05:20 Date:01.01.2022" |

4.3.3 Get the Backlight level

| | |
|-------------------|---------------------------------|
| Command to Send: | backlight? |
| Received Command: | The Value of the Backlight in % |

4.3.4 Set the Backlight level

| | |
|-------------------|--|
| Command to Send: | backlight XXX XXX: the level in % (0-100) |
| Received Command: | "Backlight:XXX" |

4.3.5 Get all Device Settings

| | |
|-------------------|--|
| Command to Send: | settings? |
| Received Command: | All settable Device Settings (one Line per Setting) "Language": 0 = English 1 = German "LCD Illumination": 0 = off 1 = always on 2 = on Hold 3 = automatic "LCD Brighthness": Brightness in % (0-100) "Auto Shutdown": 0 = off Number in Seconds till Shutdown "Units Metric": 0 = Imperial 1 = Metric "Irradiance cm2": 0 = W/m ² 1 = W/cm ² "Function Key1": 0 = none 1 = relative 2 = integral 3 = grid 4 = A/B 5 = %A 6 = A-B 7 = Logger "Function Key2": see above "Log Interval": Number in Seconds (max. 24 hours) "Filename": 0 = Time 1 = ongoing Number "Decimal Sperator": 0 = Dot 1 = Comma "Time Format": 0 = 24h 1 = 12h "Date Format": 0 = dd.mm.yyy 1 = mm/dd/yyyy 2 = yyyy/mm/dd |

4.3.6 Set a Device Setting

| | | |
|-------------------|-----------------------------|---|
| Command to Send: | settings XX YY... | |
| | Setting XX: | Value YY: |
| | 1 = "Language" | 0 = English 1 = German |
| | 2 = "LCD Illumination" | 0 = off 1 = always on 2 = on Hold 3 = automatic |
| | 3 = "LCD Brightness" | Brightness in % (0-100) |
| | 4 = "Auto Shutdown" | 0 = off Number in Seconds till Shutdown |
| | 5 = "Units Metric" | 0 = Imperial 1 = Metric |
| | 6 = "Irradiance cm2" | 0 = W/m ² 1 = W/cm ² |
| | 7 = "Function Key1" | 0 = none 1 = relative 2 = integral 3 = grid |
| | | 4 = A/B 5 = %A 6 = A-B 7 = Logger |
| | 8 = "Function Key2" | see above |
| | 9 = "Log Interval" | Number in Seconds (max. 24 hours) |
| | 10 = "Filename" | 0 = Time 1 = ongoing Number |
| | 11 = "Decimal Sperator" | 0 = Dot 1 = Comma |
| | 12 = "Time Format" | 0 = 24h 1 = 12h |
| | 13 = "Date Format" | 0 = dd.mm.yyy 1 = mm/dd/yyyy 2 = yyyy/mm/dd |
| Received Command: | "Settings: XX to Value: YY" | |

4.3.7 Reset the Settings to Factory default

| | |
|-------------------|---------------------------|
| Command to Send: | factorysettings |
| Received Command: | "Set Settings to Default" |

4.3.8 Save the changed Settings

| | |
|-------------------|----------------|
| Command to Send: | savesettings |
| Received Command: | "savesettings" |

4.3.9 Make a Sound

Command to Send: **beep X**
 0 = short beep
 1 = very short beep
 2 = long beep
 3 = error beep (3 short beeps)

Received Command: **“beep X”**

4.3.10 Lock the Keys on the Device

Command to Send: **keylock X**
 0 = disabled (false)
 1 = enabled (true)

Received Command: **“keylock true” or “keylock false”**

4.3.11 Simulate pressing a Key

Command to Send: **keycode XX**
 LL = Left Lower
 LU = Left Upper
 ML = Middle Lower
 MU = Middle Upper
 RL = Right Lower
 RU = Right Upper

Received Command: **“keycode XX”**

4.3.12 Get the Voltage Level of the Battery

Command to Send: batvoltage?

Received Command: "XXXX": The Voltage Level in mV

4.4 PROBE

4.4.1 Set the Measuring Range to a fixed Range

Command to Send: range X Y
 X = (1 to 5) Range for Channel 1 (Lux, cd/m²)
 Y = (1 to 5) Range for Channel 2 (W/m², W/cm²) only for UVA/Lux Probe

You **have** to send both ranges for all Probes, you can send a "1" for Channel 2 for Lux Probes. Fixed ranges only work with auto-ranging off, see command below.

Received Command: "Range set to X Y"

4.4.2 Activate Auto-Ranging

Command to Send: autorange X
 0 = false, no auto-ranging (use command above to set a fixed range)
 1 = true, auto-ranging enabled
 You have to send both ranges for all Probes, you can send a "1" for Channel 2 for Lux Probes

Received Command: "Autorange true" or "Autorange false"

4.4.3 Start the Device in Bootloader-Mode

Command to Send: bootloader
 The Device restarts in Bootloader-Mode without a comment.

Received Command: none

Document Revision History

| Version | Date | Creator | Short Description |
|---------|------------|---------|-------------------|
| V 1.0 | 16.02.2017 | HK | First Revision |
| | | | |
| | | | |
| | | | |