

# Setting Up a Computer-Aided Recording System with METRAHit multimeters and METRAWin 10 software

## I. Communications Features of Multimeters and Adapters

Today's 20 series METRAHit digital multimeters (22S/M, 23S, 24S, 25S, 26S/M, 27M/I, 28S, 28C and 29S) demonstrate the following significant differences in comparison with the older 10 series instruments (12S, 13S, 14S, 15S, 16S and 18S) with regard to communication via the infrared interface:

Parameter	METRAHit 22-29S/M/C/I	METRAHit 12S-18S / ONEplus
Transmission direction	Bidirectional, half-duplex	Unidirectional, DMM → PC
Interface functions	a) Transmit measured values b) Query measured values c) Remote device configuration	Transmit measured values
Baud rate	For b) and c): 9600 baud Dependent upon settings for a): <b>SEt &gt; Addr &gt; AdAPtEr</b> <b>bd 232 :</b> 9600 baud <b>S1 232 onLI nE:</b> 9600 baud <b>S1 232 StOrE:</b> 8192 baud <b>rS 232 :</b> 8192 baud	8192 baud
Measured value transmission interval	Dependent upon settings for a): <b>rAtE</b> 0.05 s to 1 min Software controlled for b)	0.05 s regardless of the actual sampling rate

Various adapters are available for connecting multimeters to an RS 232 interface at the PC (COM port), which differ as follows:

Parameter	SI 232-II memory adapter	SI 232 memory adapter (old)	BD 232 interface adapter	RS 232 interface adapter (old)
Transmission direction between multimeter and adapter	Bidirectional DMM ↔ adapter	Unidirectional DMM → adapter	Bidirectional DMM ↔ adapter	Unidirectional DMM → adapter
Transmission direction between adapter und PC	Bidirectional adapter ↔ PC	Bidirectional adapter ↔ PC	Bidirectional adapter ↔ PC	Unidirectional adapter → PC
Operating modes	<ul style="list-style-type: none"> <li>•<b>Store mode:</b> receive and save measurement data from the DMM</li> <li>•<b>Online mode:</b> receive measured data from the DMM, store to buffer memory if necessary and transmit to the PC with/without baud rate conversion</li> <li>•<b>PC mode:</b> <ul style="list-style-type: none"> <li>– Receive memory setting from the PC</li> <li>– Receive DMM parameters from the PC and forward to the DMM</li> <li>– Transfer own memory data to the PC</li> <li>– Query measurement or memory data from the DMM, save to buffer memory and transfer to the PC</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>•<b>Store mode:</b> receive and save measurement data from the DMM</li> <li>•<b>Online mode:</b> receive measured data from the DMM, store to buffer memory if necessary and transmit to the PC with/without baud rate conversion</li> <li>•<b>PC mode:</b> <ul style="list-style-type: none"> <li>– Receive memory setting from the PC</li> <li>– Transfer own memory data to the PC</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>•Forward measured data from the DMM to the PC</li> <li>•Forward settings from the PC to the DMM</li> </ul>	<ul style="list-style-type: none"> <li>•Forward measured data from the DMM to the PC</li> </ul>
Baud rate DMM → adapter Adapter → PC	<b>bd i n:</b> 8192, 9600 <b>bd out:</b> 9600, 19,200, 38,400	8192 baud <b>Baud:</b> 9600, 19,200, 38,400	Dictated by the DMM or the PC	Dictated by the DMM

## **II. Possible Device Combinations and Required Settings**

Despite the above mentioned differences between older and newer generation instruments, compatibility amongst the various components is assured to a great extent. However, depending upon the utilized combination of devices and adapters, several restrictions must be taken into consideration, and certain settings are required for error-free interaction. These are described below.

### **Note:**

METRAwin 10 software includes a "Setup help" window (can be accessed by clicking "Channels" and "Setup help" in the "Extras" menu), which displays the required settings and makes reference to any restrictions after entering the utilized multimeter.

### **A. For online operation:**

#### **1. 1 to 6 METRAHit 22-29S/M/C/I instruments via BD232 and/or SI232-II adapter (without/with modem)**

This combination is the least complicated. The only prerequisites are:

##### **a) For the multimeters and the SI232-II memory adapter:**

- .. Each device must be manually set to its own address ranging from 1 to 10 (adapter address = address of the connected multimeter).
- .. In the case of communication via modem, the multimeters and the adapter must be set to **ModEM YES** in the **SEt** menu (after acknowledging the address), or otherwise to **ModEM no**.
- .. The transmission mode is not activated, because the measured values are queried block by block from the individual multimeters, one after the other, via the bidirectional IR interface by the PC. The devices can even be switched off at first, because they start up automatically as soon as signals are received at the RS 232 port or the IR interface (exception: METRAHit 22S). Selection can be made from amongst the measuring functions available for each of the selector switch positions with the help of the software.
- .. The **rAtE** and **AdAPtEr** settings in the multimeter **SEt** menu are irrelevant: They are specified by the software.

##### **b) For the software:**

- .. Required "Device type" setting in the "Device" menu: **METRAHit 12-29S/M/C/I**
- .. Required "Communication" setting in the "Device" dialog box: **Block Mode**
- .. The desired recording mode and sampling interval must be selected under "Sampling interval" in the "Extras" menu. The following restrictions apply to this setting depending upon the number of interconnected multimeters:

<b>Number of Devices</b>	<b>Minimum Sampling Rate</b>
1	0.05 s
2	0.1 s
3 or 4	0.2 s
5 or 6	0.5 s

### **Note:**

Sampling intervals of less than 0.5 seconds are only advisable for the VDC, Vdiode and ADC measuring functions, because the multimeter performs a maximum of only 2 measurements per second in all other measuring functions.

## 2. 1 to 6 METRAHit 22-29S/M and/or METRAHit 12S-18S/ONE instruments via SI232-II and/or SI232 adapter (without modem)

The following settings are required:

### a) For METRAHit 22-29S/M multimeters:

- .. Although the multimeter address setting is irrelevant in this case, it is advisable to use the same address as assigned to the adapter for reasons of clarity.
- .. One of the following **AdAPtEr** settings must be selected in the **SEt** menu after acknowledging the selected address:
  - > For connection to an SI232-II: **bd 232** (device transmits at 9600 baud)
  - > For connection to an SI232 : **S1 232 onl i ne** (device transmits at 8192 baud).**ModEM no** must then be selected.
- .. The **rAtE** setting specifies the transmission interval, and should generally be set here to 0.05 or 0.1 s.
- .. The transmission mode must be activated either via the **Send on** menu, or after switching the device off and then back on again while executing the DATA+ON key combination. The blinking ON triangle at the LCD indicates transmission mode operation, during which no more changes can be made to the above mentioned parameters.

### b) For METRAHit 12-18S/ONE multimeters:

- .. The transmission mode must be activated by switching the device on while executing the DATA+ON key combination. The blinking ON triangle at the LCD indicates transmission mode operation.

### c) For SI232-II adapters:

- .. Each device must be manually set to its own address ranging from 1 to 10 (adapter address = address of the connected multimeter).
- .. Baud rate setting for receiving data from the multimeter:
  - > METRAHit 22-29S/M: **bd-i n 9600** baud
  - > METRAHit 12-18S/ONE: **bd-i n 8192** baud
- .. Baud rate setting for transmitting data to the PC:
  - > For 1 to 4 channels: **bd-ou 9600** baud
  - > For 5 to 6 channels: **bd-ou 19200** baud
- .. The transmission mode is activated with the ⇐ + ⇓ key combination.  
**on [address]** appears at the LCD and DATA blinks in order to indicate that data transmission is in progress.

### d) For SI232 adapters:

- .. Each adapter must be manually set to its own address ranging from 1 to 10 (adapter address = address of the connected multimeter).
- .. Baud rate setting for transmitting data to the PC:
  - > For 1 to 4 channels: **baud 9600** baud
  - > For 5 to 6 channels: **baud 19200** baud
- .. The transmission mode is activated with the ⇐ + ⇓ key combination.  
**on [address]** appears at the LCD and DATA blinks in order to indicate that data transmission is in progress.

### e) For the software:

- .. Required "Device type" setting in the "Device" menu: **METRAHit 12-29S/M/C/I**
- .. Required "Communication" setting in the "Device" dialog box: **Adapter**  
The desired recording mode and sampling interval can be selected in the dialog box which appears after activating "Sampling interval" in the "Extras" menu without the restrictions listed in section A. 1. b. However, the note included in that section applies here as well.