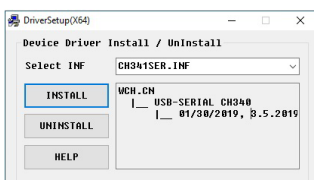
CORNET Microsystem ED85EXPlus5G (ED85EXP5G) Data Logging/recording function description and user guide: 06/22/2023 (ReV.1.0)

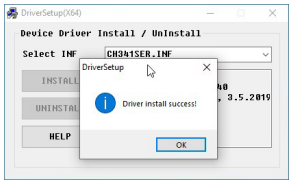
Features:

1) Transferring recorded data to a PC computer via a USB to serial
2) 1024 data storage Buffer memory and 1024 non-volatile Flash memory for logging/recording RF signal level measurements
3) Data recording time intervals (1msec, 0.5sec, 1sec, 10 sec, 30 sec, 1min, 2min, and 3min.) are programmable. When using a 3 minute time interval, you can record for up to 50 hours.
4) The maximum signal level/frequency of the RF signal can be recorded in real time for each time interval can be recorded in realtime.
5) Data is recorded in Excel csv format, which can be saved to a PC computer and used with an Excel spread sheet for data analysis, charts, and documentation.
6) Data Logging View mode allows you to review the logged data on the meter's LCD display without having to connect to a PC computer.
7) For extended data logging sessions, an external USB Mobile Battery Pack can be used.

Setup and enable the Data Logging/recording function in ED85EXP5G and PC computer

1) From the wch-ic.com website, download and install the WCH (CH340) USB to serial chip software driver for Windows (http://www.wch-ic.com/downloads/CH341SER_ZIP.html).





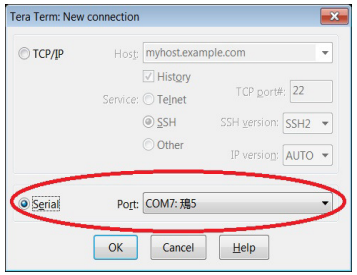
The CH340 chip driver is compatible with all Windows versions, you can also find the version for Linux, Apple Mac OS, and Android devices.

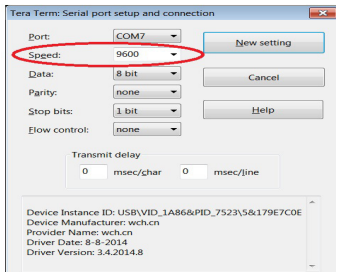
Power down your PC computer and power up the PC again to make sure the CH340 driver is installed correctly.

2) Go to http://ttssh2.osdn.jp/ download and install the free **Teraterm** serial terminal software. You can connect your PC computer to the ED85EXP5G using the Teraterm "serial" interface mode as a host program.

3) After successfully installing the CH340 chip driver and Teraterm terminal program on your PC computer, connect the ED85EXP5G to the PC computer using a microUSB to USB "Data link cable". (not the battery charging only cable) The PC will power the ED85EXP5G via USB cable (turn off the power switch on the ED85EXP5G to save the battery inside the ED85EXP5G.The power switch is only used to control the 9V battery inside the ED85EXP5G).

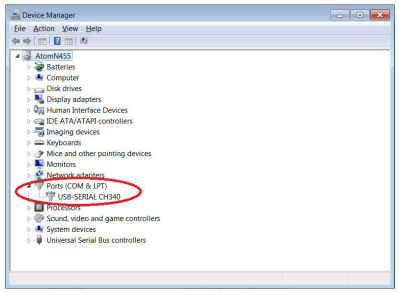
4) Run the Teraterm program (ttermpro.exe) and connect it to the ED85EXP5G's internal USB to serial UART bridge chip (CH340 chip) by selecting the correct serial port devices detected by Teraterm. Use the Teraterm setup/serial port command to set the Teraterm serial port data rate to 9600, 8bit, no parity, and one stop.





If you do not see the CH340 USB to UART Bridge device in Teraterm, exit from the Teraterm program and run it again.

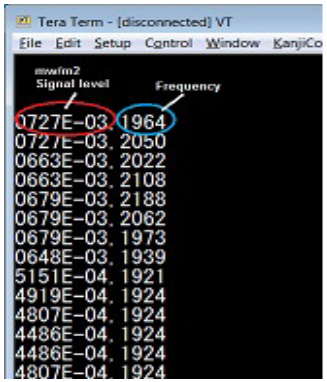
You can also check the COM port# assigned by Microsoft Windows in PC using the "device manager" in "control panel/system and security/". Plug and unplug the USB cable connected to the PC, the "Port(COM&LPT): USB-SERIAL CH340" should pop up when the USB cable is connected to the PC and the CH340 chip inside the meter has been detected.

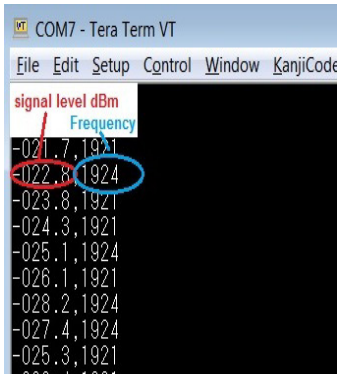


When the meter is turned on, the ED85EXP5G is set to automatically send the measured data to the USB serial port. The data is also continuously recorded in the ED85EXP5G's internal data Buffer memory.

After selecting the serial mode with the right serial data rate in Teraterm, you should be able to view the serial data sent by the ED85EXP5G in the PC Teraterm data window.

5) Using the File/Log command in the Teraterm, log and store the received data from the ED85EXP5G to the Log file in the PC using the Teraterm's Log function. Teraterm will save/log the data received in the file name you specify. The data sent by the meter is in Microsoft Excel .csv format, You can rename the saved Logged/saved file (teraterm.log by default) to xxx.csv and access it in Microsoft Excel for analysis, charting, and documentation.





6) The HOLD button can be used to stop the ED85EXP5G Data Logging/Recording. When you exit the HOLD mode, the data recording will continue automatically.

7) The measured RF data is continuously stored in the internal data buffer memory, which has a capacity of 1024 data. When the data buffer is filled, it wraps around and overwrites the previously stored information. At any given time, the data Buffer memory retains 1024 previous measured data. The user can also log and save the data in PC computer hard disk by connecting the USB cable to PC and using data communication program (such as Teraterm) for very long period of data logging session.

8) The data from the Gauss and Low Frequency Electric Field modes is not stored in the data Buffer memory; it only send out the data in the Real time mode.

9) By default, the "Logg time interval" is set to 0.5 seconds. (it is programmable by user).

Data Logging/Recording modes in ED85EXP5G:

1) The ED85EXP5G Data Logging/Recording function has 3 data output modes.
(a) Real-time output (b) Buffer output (c) Flashmem output.

2) There are 8 configurable recording time intervals for logging/recording. (1 msec, 0.5 seconds, 1 second, 10 seconds, 30 seconds, 1 minute, 2 minutes, and 3 minutes). The maximum signal level and frequency of the RF signal within each time interval are recorded and saved to the internal data Buffer memory. There are 1024 data storage locations in the data Buffer. (You can record up to 500 seconds of data if the Logg time interval is set to 0.5 seconds.) If the time interval is set to 3 minutes, 50 hours of data can be stored. (3000 minutes of data, with the maximum value stored at each data storage place every 3 minutes).

You can turn off the automatic data logging/recording by setting the time interval to "OFF". In Real time mode, the meter outputs real-time measured data to the serial port per time interval.

In **Real time mode**, the signal level/frequency of the RF mode signal and the signal level of the Gauss mode, Low Frequency Electric Field mode signal are output to the serial port in real time. ***(Real time mode is not available when the Logg time interval is set to 1 msec.)**

In **Buffer output mode**, The 1024 recorded data in the data Buffer is transferred to the serial port . The output data is transmitted in reverse order, starting with the most recent data and progressing through the previous 1023 data.
The data Buffer is a high-speed SRAM memory; when the meter is turned off, the data in the data Buffer is lost. If you want to save the recorded data in the Data Buffer memory, you can save it to non-volatile Flash memory before turning off the meter.

In **Flashmem output mode**, The 1024 saved data in the internal Flash memory will be sent out to the serial port. The output data is sent in reverse order, starting from the most recent data and ending with the last 1024 data. The data stored in Flash memory will not be lost if the meter is turned off.

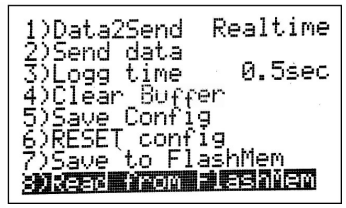
The Typical application sequence for Data Logging/recording

power-on meter-->measure the signal around area-->get into Data Logging view mode-->review logged data in LCD display window→get into Logger setup mode-->save the data in Buffer to Flashmem--> power off the meter--> Go back to office--> connect the MicroUSB cable from ED88TPlus to PC computer--> run Teraterm program in PC--> enable the file Log function in Teraterm--> get into meter's Logger setup mode--> select the Flashmem output mode--> start sending data to PC--> change the Logged file name from xxx.log in PC to xxx.csv --> open the renamed logged file in Excel spread sheet program using .csv format--> analyze and chart the data in Excel spread sheet.

ED85EXP5G Data Logger/Recording setup command:

1) **To enter the ED85EXP5G Logger setup mode**, press and hold the ">" key and click the "MODE" key, then release the ">" key. In the Logger setup menu, use the ">" key to move the cursor, and the "<" key to activate the selection.





2) **Logger Setup menu**:

(EXIT) Logger Setup --- exit the setup mode

1) **Data2Send** -- select data from Realtime, or data Buffer or Flashmem to serial port
2) **Send data** -- start sending the 1024 logged data from selected source to serial port, It might take a while, please wait until it is finished
3) **Logg time** -- change the time interval of recording, (1 msec, 0.5 sec, 1 sec, 10 sec, 30 sec, 1 min, 2min. 3min. and OFF)
4) **Clear Buffer** – clear data Buffer memory to all zero. or you can just power off the meter, the Buffer memory will be cleared when the meter is power on again,
   *To clear the Flashmem, clear the Buffer memory first, then use (7)Save to Flashmem to copy the cleared data in Buffer memory to Flashmem.
5) **Save config** -- save the new Logger setup/configuration
6) **RESET config** – RESET the Logger setup/configuration to default
7) **Save to Flashmem** --- save the recorded data in data Buffer to Flash memory, so data will not get lost after meter power off
8) **Read from Flash mem** – read the stored data in Flash memory to Buffer memory for displaying it on data logger view mode LCD display window.

***** If the Flash memory has never been written before, please use the (7) **Save to Flashmem** command first to initialize the Flashmem before using the Read from Flashmem command.

*When the cursor reaches the bottom of the Logger setup menu, the menu will scroll up to reveal the item (8) Read from Flash memory.

Data Logging View mode:

The Logged data stored in the ED85EXP5G internal Buffer memory and Flash memory can be displayed on the meter's LCD display without using the USB serial cable to connect to the PC computer, up to 50 hours of data can be stored in the ED85EXP5G based on the **Logg time** setup in the meter.
For long Data Logging sessions in the field with long period of recording time (such as overnight logging session) a high capacity rechargeable 9V Li-on battery with 650mAh capacity (such as "EBL 9V rechargeable Li-on battery") or a mobile battery bank is recommended,

Please visit www.cornetmicro.com and click on the datasheet/application tab to download the most recent "**CORNET ED85EXP5G2 user manual**" file for a detailed description of the "**Data Logging view mode**" operations.

Note1: You can have 1024 new data stored in data buffer memory and 1024 old data already stored in Flashmem (each with its own recording time interval) at the same time. You do not need to save the new data in the Data Buffer to Flashmem (overwrite the old data already in Flashmem) before sending the data in Data Buffer memory to PC computer. If you can connect the ED85EXP5G to a PC computer's USB port without losing power (using the internal 9v battery) and send both the data in Buffer and Flashmem to the PC computer for analysis. You can effectively have 2048 data storage for logging/recording this way.

Note2: **Make sure your MicroUSB cable is a "sync cable" or "data cable" for PC communication** (rather than a "battery charging only" cable which does not have two data line), as some of the MicroUSB cables included in the USB Mobile Battery Pack are only for battery charging and not for communication with a PC computer. To find the correct cable, perform a Google search for "USB sync cable." Amazon's own brand of “Basics USB 2.0 A-Male to Micro B Cable” is a good choice.

Note3: Make sure **your USB Mobile Battery Pack will not shut down automatically by itself** if the output current falls below a certain threshold. Avoid the older type of USB Mobile Battery Pack, which is designed to charge the internal battery of a mobile phone only and will automatically power down when the charging is complete or the output current falls below a certain threshold. For long data logging sessions, use a USB Mobile Battery Pack (e.g., PNY model AD5200) that will "not" auto power down the ED85EXP5G. (In RF mode, the typical current consumption of the ED85EXP5G is 55mA.)

Note4: After **changing the new Logg time** in the Logger Setup menu. To activate the new configuration changes, use the "Save config" button to save the configuration data to memory.

Note5: In Real time mode, when the meter sends serial data to the USB-to-serial chip at the end of each time interval, the meter's audio speaker might make **"chipping" noise**. By changing the **Data2Send setting** in Logger Setup to "**Buffer**," you can eliminate the "chipping" noise. (By default, the meter is set to Realtime mode.)

Note6: **The Guass mode or Low Frequency Electric Field mode data can only be sent to PC computer in Real time mode, the data will not be logged into the buffer memory or flash memory by the meter.** To save the data to the PC computer in realtime mode, connect the meter to the serial port via a microUSB cable.

Note7: Real time mode is not available when the Logg time interval is set to 1 msec. it will show “NoRealtime” on the display. Use the Buffer or Flashmem to send the Logged data when the Logg time interval is set to 1 msec.

Working with Android smart phone by using USB OTG serial cable :

-Download and install Android app **'Serial USB Terminal'** from google play website, **https://play.google.com/store/apps/details?id=de.kai_morich.serial_usb_terminal&hl=en_US&gl=US**

-Connect USB OTG serial cable or USB OTG adaptor to Android smart phone and

ED85EXP5G USB connector. Set Android phone to “flymode” to disable all wireless signal transmit from Android phone.

-Run **'Serial USB Terminal'** , make sure the Andriod phone detected the ED85EXP5G
device CH340 USB to serial chip. Go to setting to set the serial port data rate to (9600, 8bit, no parity, 1 stop)
-Click the **Connect** button on the 3rd button from top right to start the receiving data
-Click the 1st top right button then select the **Data,** then Tick the **Log** to enable the logging of the data to file or Save the data.
-The Save & log file location can be set in the **Settings** menu



Working with Apple Mac-OS computer :

-For meter with CH340 serial to USB chip: Download and install USB to serial chip (CH340) software driver for Mac-OS and install it in your Mac-OS computer. (make sure you got the correct version of driver if you are using older version of Mac-OS). the meter serial port name is /dev/tty.wchusbserialxxxx You can use the "screen" or "minicom" command to talk to it.

1) Connect the ED85EXP5G to Mac computer USB port using MicroUSB to USB communication cable or “Sync Cable” (not battery charging only cable),
2) In Mac "Terminal" window, type "screen /dev/tty.wchusbserialxxxx 9600" (for CH340 chip version) you will see the data sent from ED85EXP5G to Mac computer

3) you can also use the free "**CoolTerm**" serial terminal program for Mac-OS to save the logged data from ED85EXP5G, just scan and select the serial device as /dev/tty.usbmodem0001 or /dev/tty.wchusbserialxxxx” and the baud rate 9600 in the CoolTerm setup. then "connect" command in the CoolTerm to talk to serial device (the ED85EXP5G) just google search "**CoolTerm for Mac**" to get the CoolTerm program. Or https://freeware.the-meiers.org/

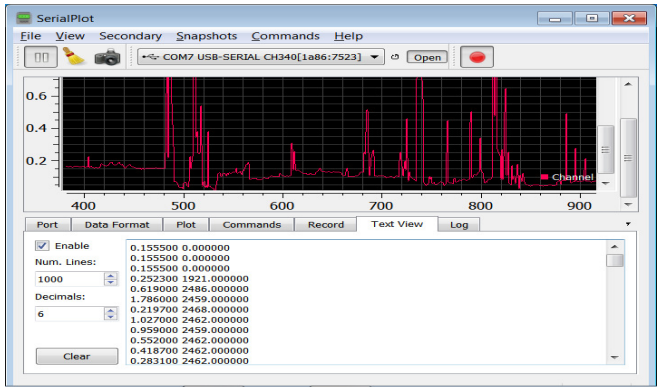
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Working with Serialplot for plotting data from serial port

Go to https://github.com/hyOzd/serialplot or https://hackaday.io/project/5334-serialplot-realtime-plotting-software to download the **Serialplot** program, choose the Windows or Linux version based on your PC operation system needs.

The **Serialplot** is Small and simple software for plotting data from serial port in real time. It can also record the received data in PC hard disk file and you can take snapshots of current view and store them in CSV files. You can also load them back from csv files, for convenient viewing.

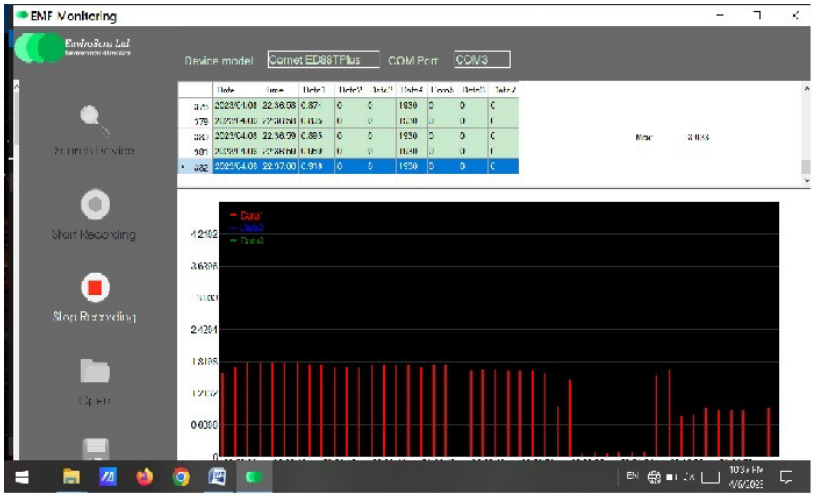
1) Download and install the Serialplot program in PC computer
2) Connect the meter to PC USB port through microUSB cable
3) Select the **Port** (COM# USB-SERIAL CH340) and Set the Baud Rate to 9600 in Serialplot Port setup menu, then **Open** the connection between PC and the meter in Serialplot program.
4) Set **Data Format** to ASCII, Number of Channels to 2, Column Delimiter to “comma”
5) Set **Plot** in Channel1, tick Visible, tick Gain 1 to plot data in plot window.
6) Set **Text View** tick Enable to see the text data sent by the ED85EXP5G
7) Use cursor in Serialplot to view data, zoom, scale and take **snapshot** of the plotted data, also **Record** the data into PC file.
8) Toggle the **Auto-Scale-Y-Axis** selection box in **Plot** if you mess up the plot window while doing the zoom or cursor move.



For Envirosens monitor program :

Here is the sequence :

1)install the Ch340 USB to series port chip software driver to PC (see Datalogging manual)
2)connect the meter's USB port to PC computer USB port through MicroUSB data link cable, (not battery charging only cable)
3)the meter will power-on through the PC USB port when USB cable is connected
4) set the meter in RF mode, the unit to mw/m2 or v/m, and "Data2Send" to Realtime in Logger Setup menu.
5) run the Envirosens software on PC
6) click the "search device" in the Envirosens software button
7) the software will search and detect the Cornet meter and show the Device model as "Cornet ED88TPLUS", and also the COM port number of the Cornet device
8) click the Start recording button in software
9)the Logged data will show up on the top of the display and it will also show the graphic chart in the graphics window below.
10)you can save the logged data to file or save the snap shot of the graphics display window to jpg graphics file. the "Save to jpeg" button is in the lower right bottom of the graphics display window



Typical usage sequence:
Power-on meter->measure the signal in area ->do not power off the meter, get into Datalogging view mode->review logged data in LCD display window ->get into Logger setup mode menu ->save the data in SRAM Buffer memory to FlashMem->power off the meter -> connect the meter to PC computer by using micro USB cable, ->**go into Logger setup mode menu, make sure the menu item#1 "Data to Send "is in Realtime mode** -> go to top of menu "Exit" from Logger setup mode-> the meter will be in normal operating mode and start sending the realtime data to PC->

run the Envirosens monitor program in PC-> click the **"search device"** button in Environsens program, make sure the Envirosens monitor program can detect the meter-> click the "start recording" button in the program, the program should start showing the new realtime data from the meter (not the data you have saved in Flash memory Flashmem)· make sure it is working, but ignore the realtime data on the screen -> get into meter's Logger setup mode menu -> change from "Realtime" to "Flashmem" in the menu item#1 "Data2Send" so the meter will send the logged data in the Flashmem to PC instead of the new realtime data -> then move cursor to menu item#2 "Send Data" and click the LIGHT key to start sending the data from Flash memory to PC computer and you will see the data in the Envirosens monitor display windows, it will take a while to send all the 1000 data out, after it is "done", save the data to PC file using Envirosens monitor program menu. the name of saved datalogging file is xxx.env you can rename it to xxx.csv so the Microsoft EXCEL program can open it.

Finally, **make sure you change the Data2Send from Buffer or Flashmem to Realtime after you send and save the logged data to PC computer,** or just power off the meter so next time when you powered on the meter it will be in Realtime mode and send the new realtime data out to the USB port of PC computer. the Envirosens monitor program might not able to detect the meter if nothing is sent from the meter to the USB port of the PC computer when you click the “search devices” button .