CORNET Microsystem ED88TPlus5G (ED88TP5G) Data Logging/recording function description and user guide:

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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 (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 realtime 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 ED88TP5G and PC computer

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

   The CH340 chip driver is compatible with all Windows versions, as well as Linux, Apple Mac OS, and Android devices.

2) Go to http://ttssh2.osdn.jp/ and download and install the free Teraterm serial terminal software. You can connect your PC computer to the ED88TP5G 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 ED88TP5G to the PC computer using a microUSB to USB Data cable. The PC will power the ED88TP5G via USB cable (turn off the power switch on the ED88TP5G to save the battery inside the ED88TP5G.The power switch is only used to control the 9V battery inside the ED88TP5G).

Run the Teraterm program and connect it to the ED88TP5G's internal USB to serial UART bridge 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, you can check the COM port# assigned by Windows using the device manager in "control panel/system and security/".

When the meter is turned on, the ED88TP5G is set to automatically send the measured data to the USB serial port. The data is also continuously recorded in the ED88TP5G'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 ED88TP5G in the PC Teraterm data window.

4) Using the File/Log command in the Teraterm, log and store the received data from the ED88TP5G 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. You can rename the saved Logged/saved file (teraterm.log by default) to xxx.csv and access it in Excel for analysis, charting, and documentation.

5) The HOLD button can be used to stop the ED88TP5G Data Logging/Recording. When you exit the HOLD mode, the data recording will continue automatically.

6) 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.

7) The data from the Gauss and Low Frequency Electric Field modes is not stored in the data Buffer memory; it only works in the Realtime mode.
8) By default, the Logg time interval is set to 0.5 seconds. (it is programmable by user)

Data Logging/Recording modes in ED88TP5G:

1) The ED88TP5G Data Logging/Recording function has 3 data output modes. (a) Real-time output (b) Buffer output (c) Flashmem output.

2) There are 7 configurable recording time intervals for logging/recording. (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.

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 Flashmem 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.

ED88TP5G Data Logger/Recording setup command:

1) **To enter the ED88TP5G 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, (0.5 sec, 1 sec, 10 sec, 30 sec, 1 min, 2min. 3min. and OFF)
   4) **Clear Logger** – clear data Buffer to all zero, a "wait" sign will show up on screen, if it takes too long to get the clearing "done", just power off the meter, the Buffer memory will be cleared when power on, then use (7)Save to Flashmem to clear the data in 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 ED88TP5G 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 ED88TP5G 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 ED88TP5G 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 ED88TP5G 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), 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 MicroUSB 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 ED88TP5G. (In RF mode, the typical current consumption of the ED88TP5G is 55mA.)

Note4: After **changing the new Logg time** in the Logger Setup menu. To activate the new configuration changes, select "EXIT" from the Logger Setup menu, then return to the Logger Setup menu. (Press and hold the "**>**" key while clicking the

"MODE" key, then release the "**>**" key) and then use the "Save config" button to save the configuration data to memory.

Note5: In Realtime 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 will 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 Realtime 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.

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

-Download and install Android app " USB Serial Console" from google play website,
-Connect USB OTG serial cable or USB OTG adaptor to Android smart phone and ED88TP5G USB connector. Set Android phone to "flymode".
-Run " USB Serial Console", setup serial port data rate to (9600, 8bit, no parity, 1 stop)
-Save the logged data to file by using "SAVE" in " USB Serial Console"

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 ED88TP5G 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 ED88TP5G to Mac computer
3) you can also use the free "CoolTerm" serial terminal program for Mac-OS to save the logged data from ED88TP5G, 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 ED88TP5G) just google search "**CoolTerm for Mac**" to get the CoolTerm program.

<u>Working with Serialplot for plotting data from serial port</u>

Go to https://github.com/hyOzd/serialplot   to download the **<u>Serialplot</u>** <u>program</u>,
The **Serialplot** is Small and simple software for plotting data from serial port in realtime.

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 from PC to the meter
4) Set **Data Format** to ASCII, Number of Channels to 2, Column Delimiter to "comma"
5) Set **Plot** in Channel1, tick <u>Visible</u>, tick <u>Gain 1</u>   to plot data in plot window.
6) Set **Text View** tick <u>Enable</u>   to see the text data sent by the ED88TP5G
7) Use cursor in Serialplot to view data, zoom, scale and take **snapshot** of the plotted data, also **Record** the data into PC file.