YAMAR Electronics Ltd
Operation Manual

DCB1M Test Program

General

The DCB1M Test Program provides an easy way to evaluate the performance of Powerline communication based on Yamar's DCB1M devices using a PC operating as a host with a UART port. DCB1M Evaluation boards (EVB) are used for the testing purpose.

The program modes of operations are:

1. Transmit and receive data in Hex or ASCII formats.
2. Transmit and receive Test pattern and perform BER measurements.
3. Transmit and receive a File.
4. Logging of BER statistics and data.
5. Set the DCB1M operating parameters.

1. Installation

The DCB1M Tester program is a single executable file operating under Microsoft .NET Framework 4. The .NET Framework 4 can be downloaded directly from Microsoft at:
http://www.microsoft.com/downloads/en/details.aspx?FamilyID=9cfb2d51-5ff4-4491-b0e5-b386f32c0992&displaylang=en

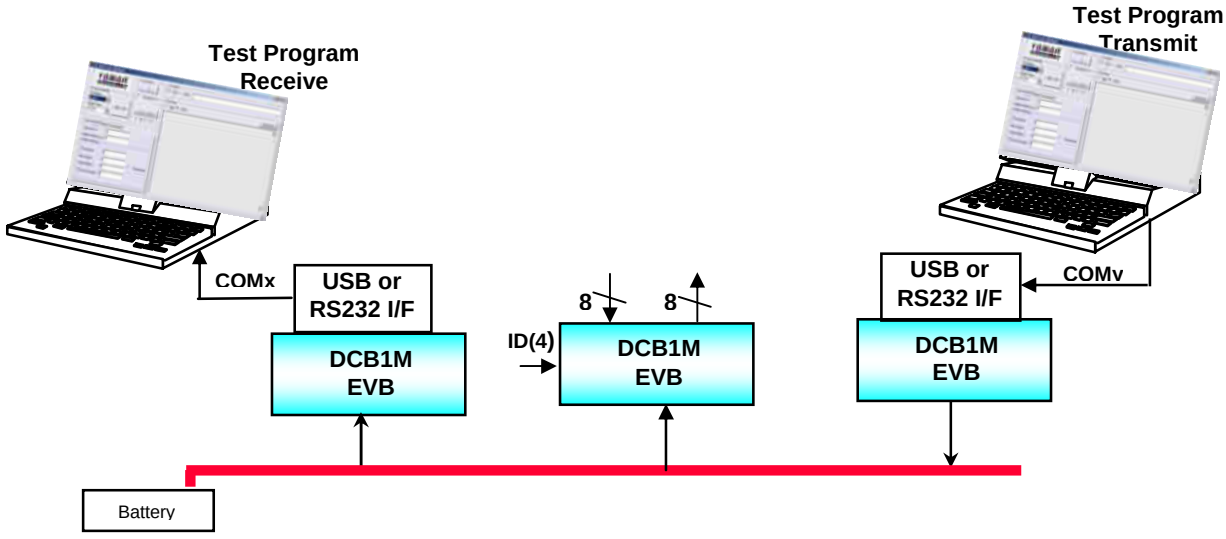

Figure 1 - Test system setup example

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The test environment has one DCB1M EVB operating as a transmitter and one or more DCB1M EVBs operating as receivers on the DC-BUS network.

The interface between the DCB1M EVB to its PC is performed either by a USB-DCB1M interface or by RS232 interface. Either can be supply by Yamar.

Installation process:

1. Connect the USB- DCB1M interface on top of the DCB1M EVB JP1 connector. Make sure that the USB- DCB1M drivers are installed. (See annex 1)

2. Connect the DCB1M EVBs to the same power supply.

3. Connect each DCB1M EVB to a PC either by using a USB- DCB1M Interface or a RS232 interface.

4. Run the provided “DCB1M_Tester.exe” program in all the PCs used for the testing. (Both at the transmitting DCB1M side and receiving side).

5. At the software GUI select the appropriate COM port and press the "Open Port" button.

6. At the RX side select the "BER" Mode button.

7. At the TX side select the "BER" Mode and the "Continuous Tx" buttons as shown in Figure 2, select the Tx PLC baud rate and press the "TX" button.

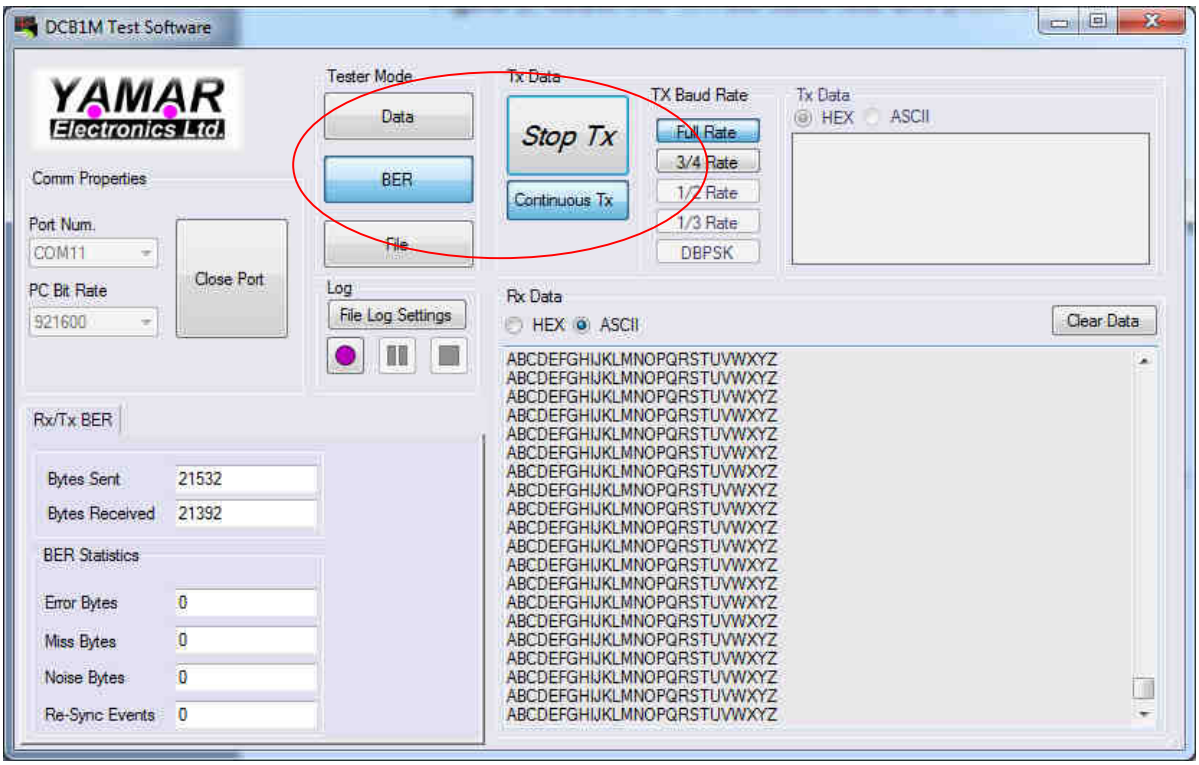

Figure 2 - Quick TX BER Mode

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The Software will start to send "ABCDEFGHIJKLMNOPQRSTUVWXYZ" data to the TX DCB1M device and at the RX side the software will receive the data and analyze it do detect errors.

2. Operation

2.1 Set the Comm. Properties

The program automatically detects the available COM port in the computer and displays it in the Port Num list.

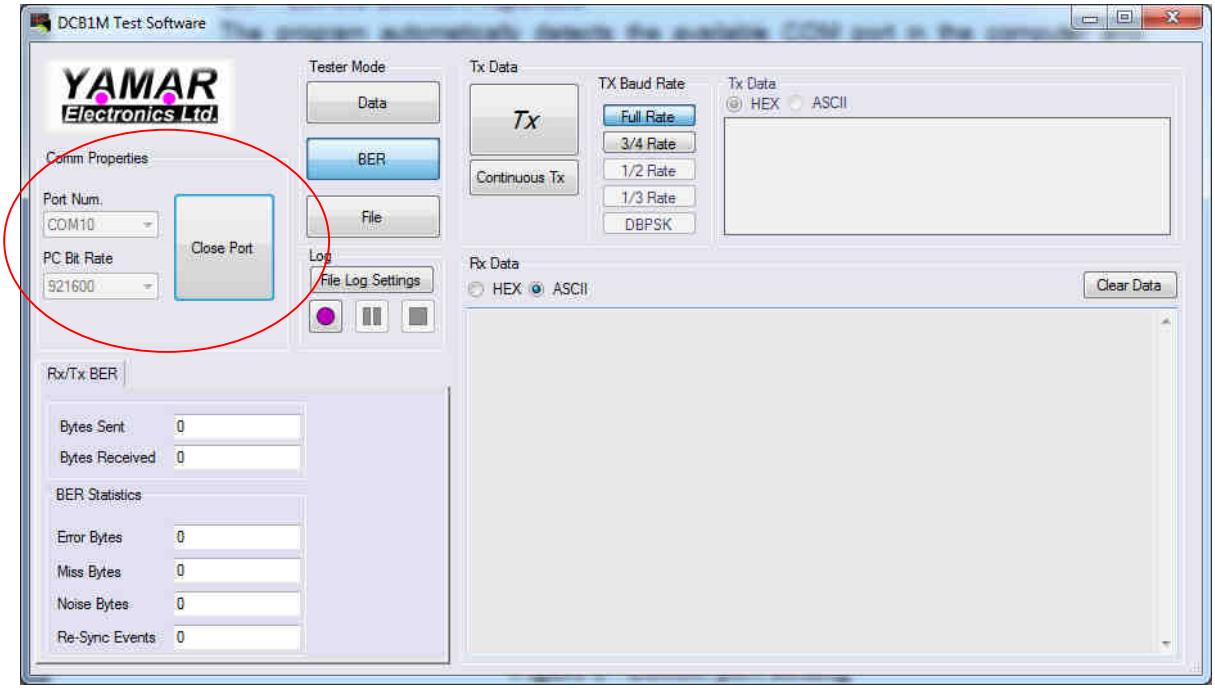

Figure 3 - Comm. port setting

Port Num. - Select the COM port that the DCB1M is connected to, either a virtual COM port (via the USB dongle) or a physical one.

UART PC Bit Rate - Choose the Bit Rate for the DCB1M operation. The software will configure the DCB1M to work at selected Bit Rate however; it is the user responsibility to make sure that the PC Bit Rate settings are valid.

- Setting baud rates higher than 115200bps, requires use of USB to UART interface.
- Maximum allowed PC bit rate is 921.6Kbps when using the PC Tester in TX mode.
- Set PC Bit Rate to 3.68Mbps when using Yamar's 'Auto Generator Board' as a transmitter.

Open/Close Port button - Open or close the selected COM port. If there is no DCB1M device connected to the selected COM port, the software will switch to DEMO mode and will remain in DEMO mode until the COM port is closed.

Advanced Settings

Clicking on the Right mouse button and selecting the “Advanced View” option brings a new check box to the GUI the **Command (HDC)** check box. This option allows the user to manually lower the HDC signal of the DCB1M hence bringing the device to Command mode. In this mode the user can write his preferred settings to the control registers. Please note that writing improper values can lead to bad or even no communication. This mode is for advance use only.

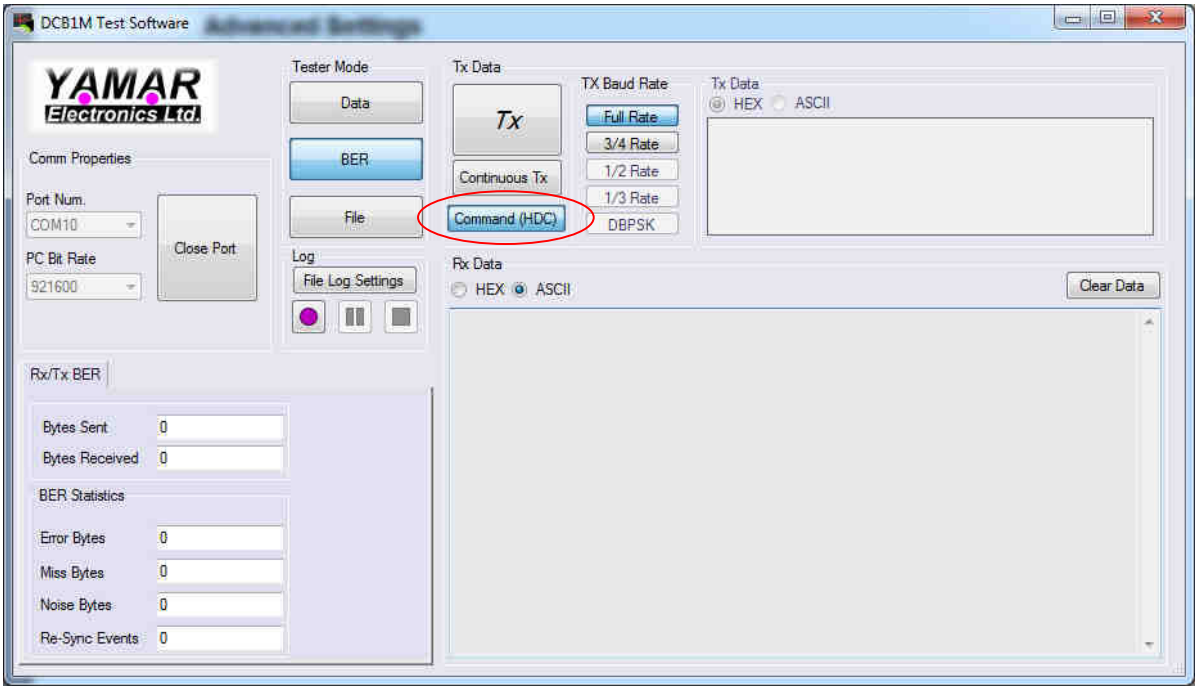

Figure 5 - Advanced setting Command (HDC)

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File Data Logging

Clicking on the 'File Log Setting' button will open the log setting window.

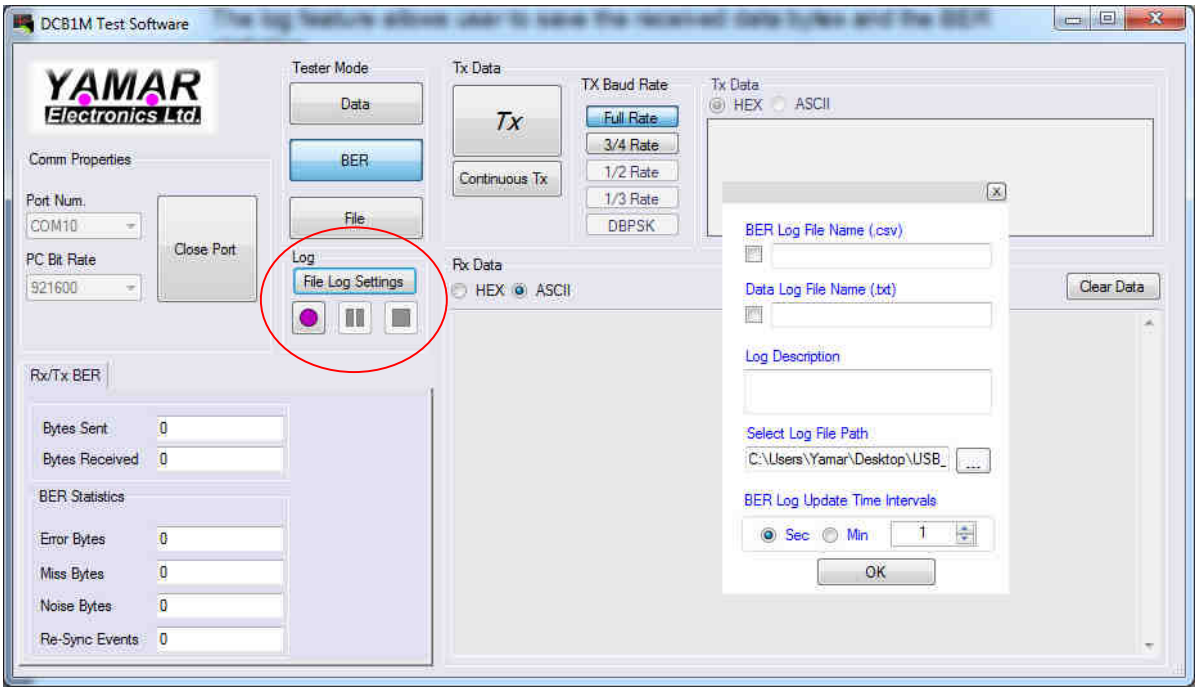


Figure 6 - Log Setting

The log feature allows user to save the received data bytes and the BER statistics.
The received data bytes are continuously saved into a .txt file.
The BER statistics is sampled periodically according to user interval time setting. For each BER sample, the difference between current sample's and previous sample's statistics is saved into a .CSV file. (BER statistics is valid only when the Software is in BER mode at the RX side and the Transmitter sending the ABCD…Z pattern).

BER Log File Name - Enter the name of the BER log file**.**
Data Log File Name - Enter the name of the Data log file**.**
Log Description - Enter a Log description. The description is saved to the first line of each log file.
Select Log File Path - Select the save log file path for both log files.
BER Log Update Time Interval - Select the interval time in Sec / Minutes for the BER log file to sample current BER statistics.

To start data logging, click on 'Start Record' Button.
The log files are automatically created and saving data according to the log setting.
In case logs files are already created, user will be notified and can select to override or append file(s).
To pause file data logging click on 'Pause Record' Button. Logging data is paused. By clicking 'Start Record' Button, the data logging is resumed appending the logs files automatically.
To stop file data logging, click on 'Stop Record' Button. Data Logging is stopped and files are saved.

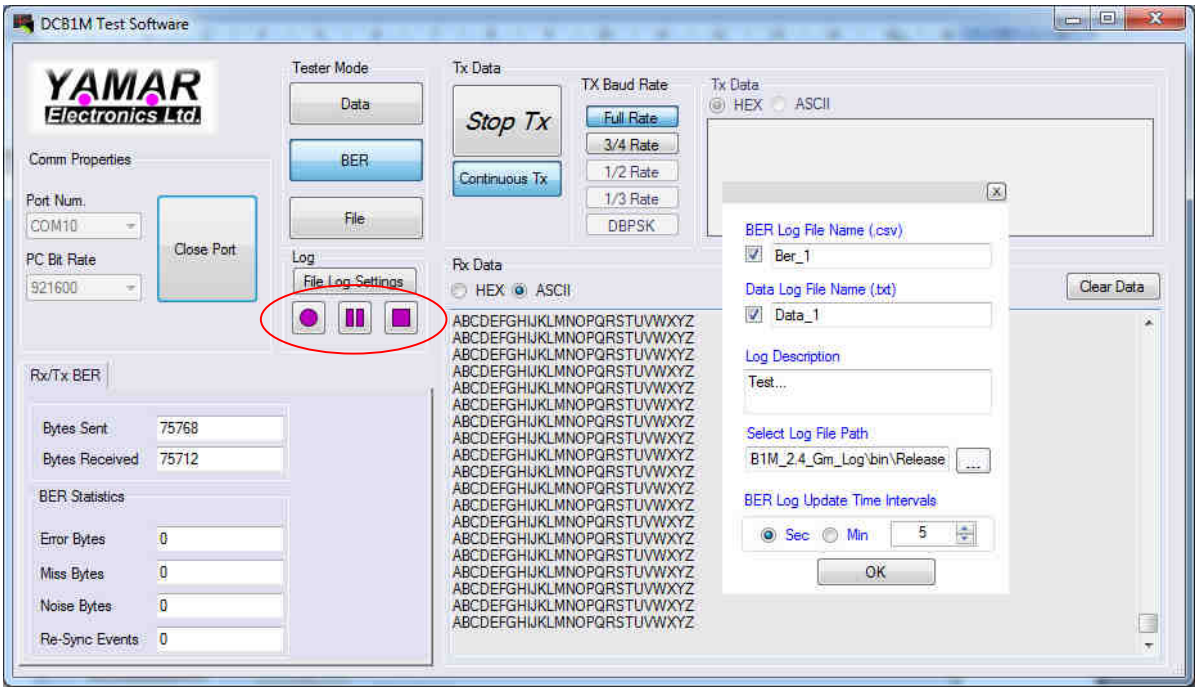
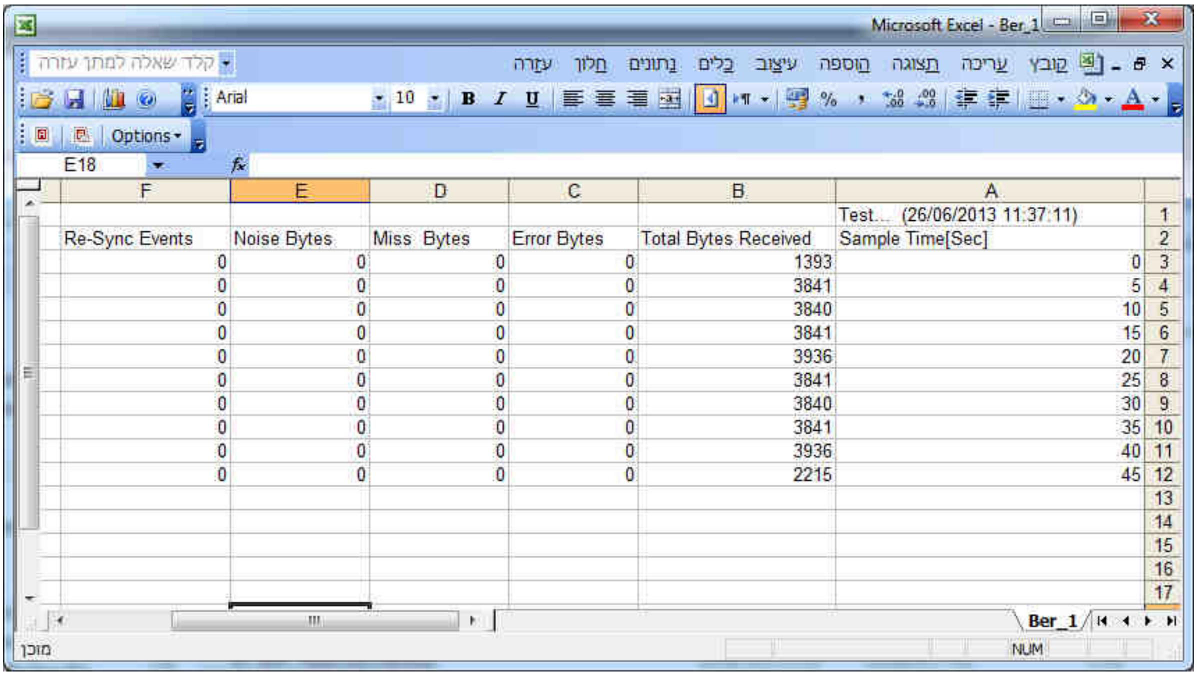
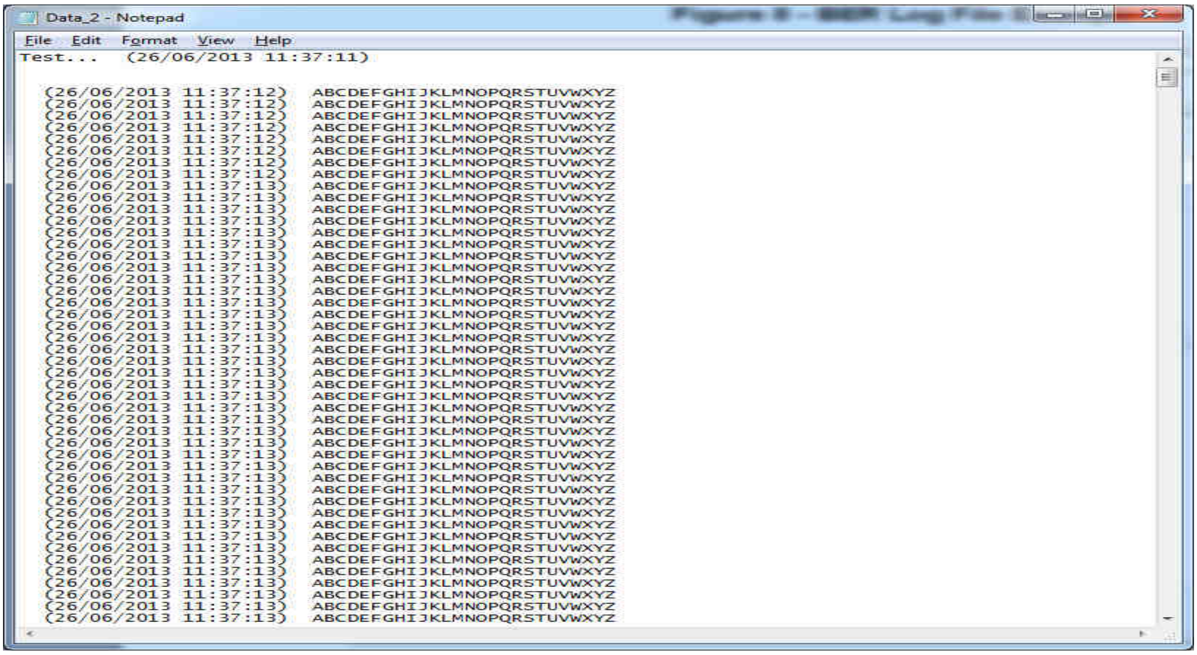


Figure 7 - Log Setting Example



	A	B	C	D	E	F
1	Test... (26/06/2013 11:37:11)					
2	Sample Time[Sec]	Total Bytes Received	Error Bytes	Miss Bytes	Noise Bytes	Re-Sync Events
3	0	1393	0	0	0	0
4	5	3841	0	0	0	0
5	10	3840	0	0	0	0
6	15	3841	0	0	0	0
7	20	3936	0	0	0	0
8	25	3841	0	0	0	0
9	30	3840	0	0	0	0
10	35	3841	0	0	0	0
11	40	3936	0	0	0	0
12	45	2215	0	0	0	0

Figure 8 - BER Log File Example



```
Test...   (26/06/2013 11:37:11)

  (26/06/2013 11:37:12)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
  (26/06/2013 11:37:12)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
  (26/06/2013 11:37:12)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
  (26/06/2013 11:37:12)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
  (26/06/2013 11:37:12)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
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  (26/06/2013 11:37:13)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
  (26/06/2013 11:37:13)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
  (26/06/2013 11:37:13)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
  (26/06/2013 11:37:13)   ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

Figure 9 - Data Log File Example

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2.2 File Mode

The file transfer feature allows user to upload a file and send it over the powerline to a remote device.

There is no restriction on the file size.

1. Select 'File Mode' button both at the RX and TX pc software sides.

2. At the TX Device Side, Click on the 'Send File' button. File Select windows will popup.

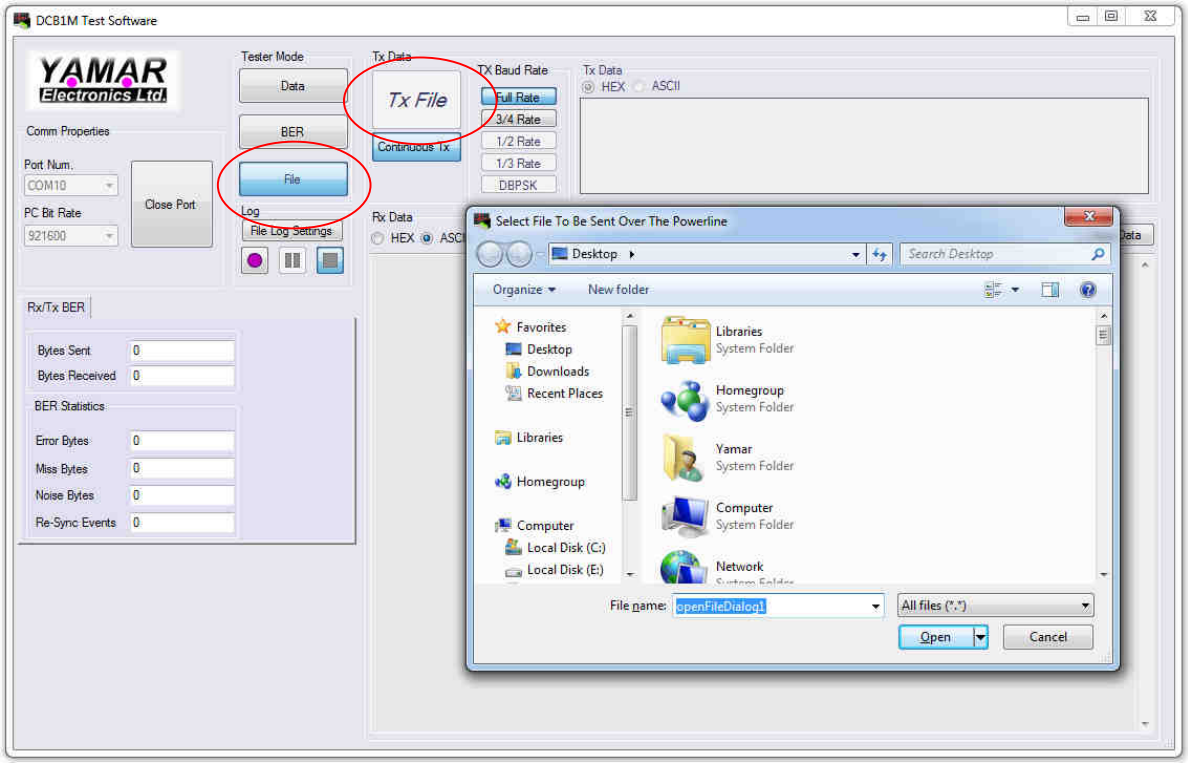


Figure 10 - Select File to Send

3. After selecting the file , a 'File Transfer Request' is sent over the powerline to the RX device. TX device will wait up to ~15 sec for 'File Request ACK' massage from RX device.

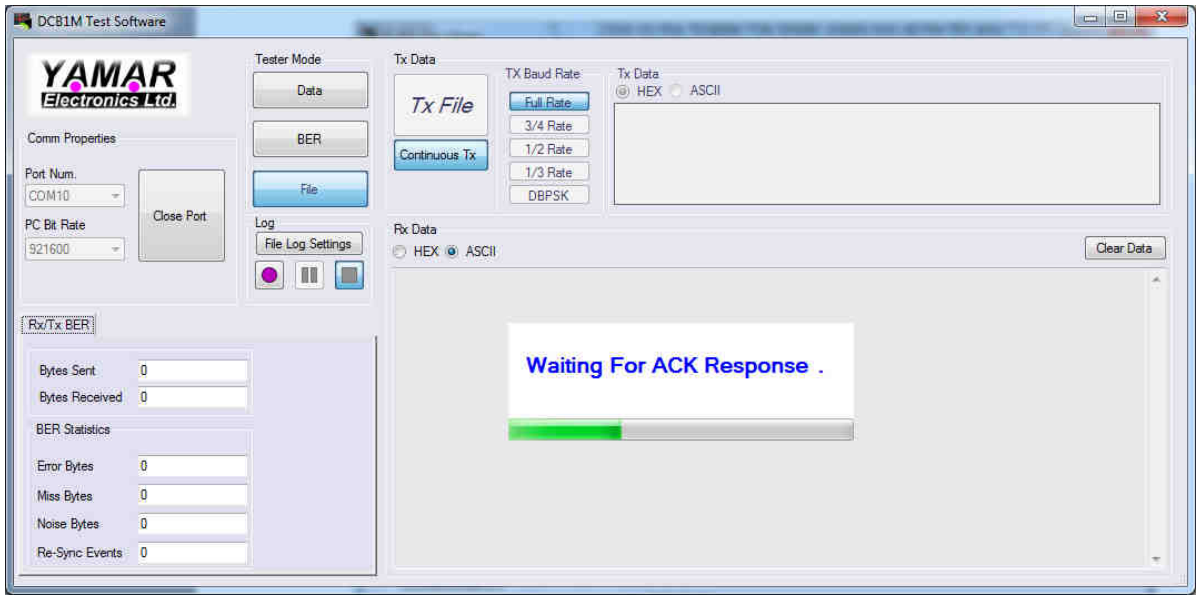


Figure 11 - TX Device Waits For ACK Response

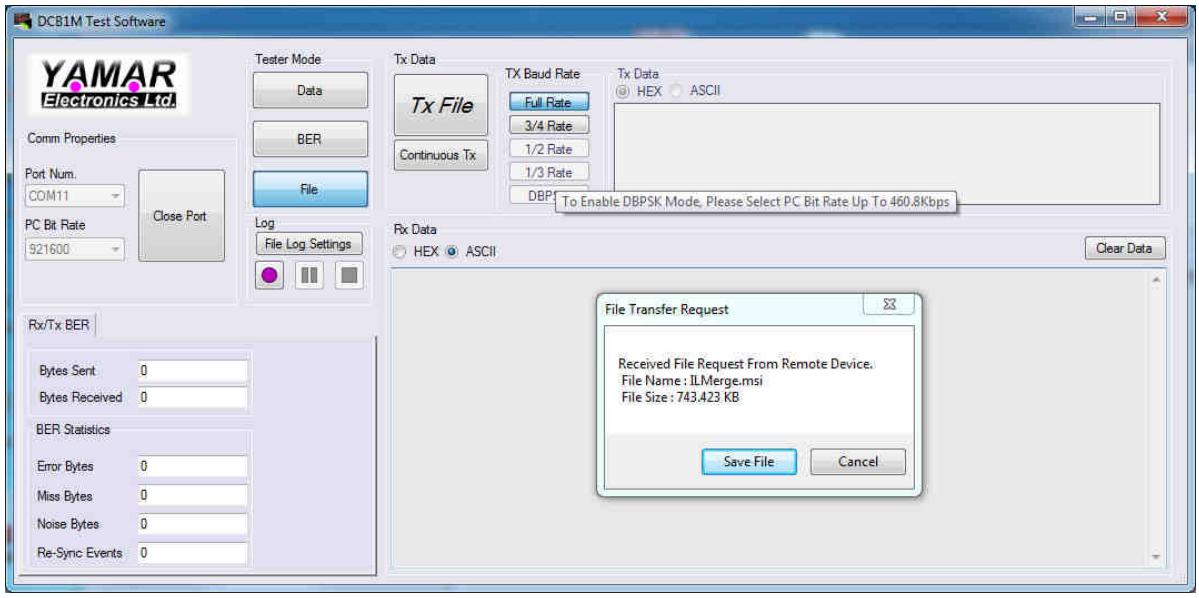


Figure 12 - RX Device File Transfer Request Window

4. To Acknowledge 'File Transfer Request', Click on 'Save File' button. A save file window will popup.

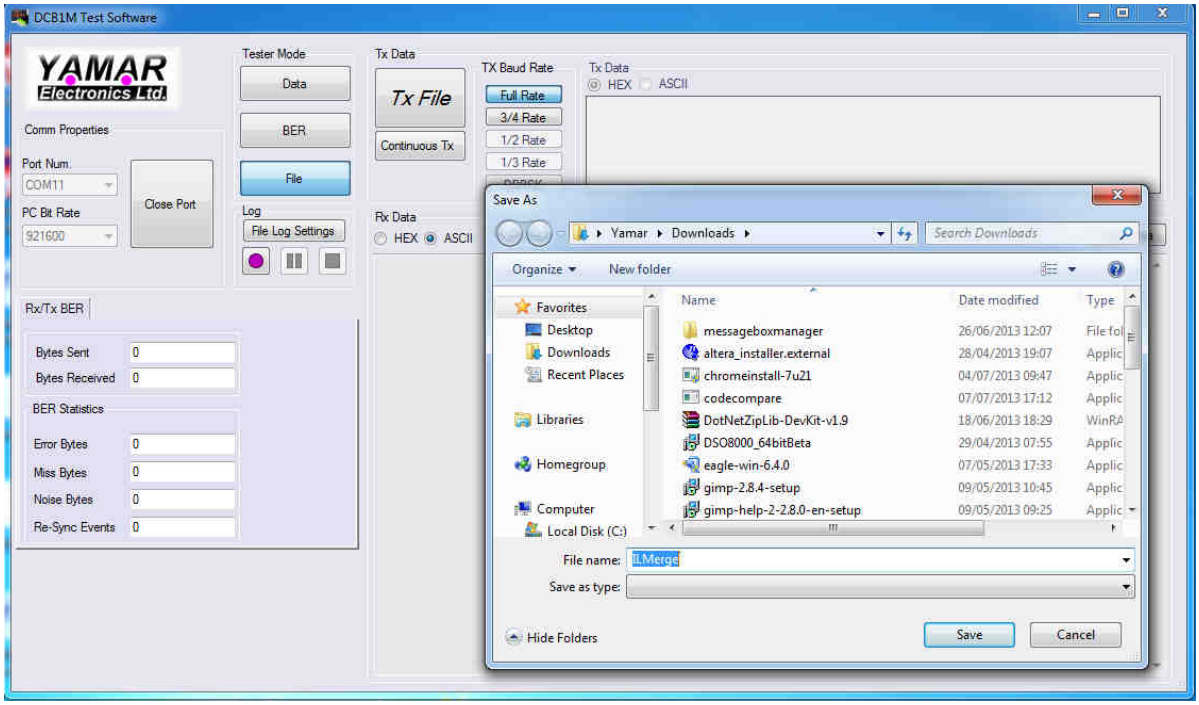


Figure 13 - RX Device Save File Window

5. After setting the 'Save File' location, the file transmission starts.

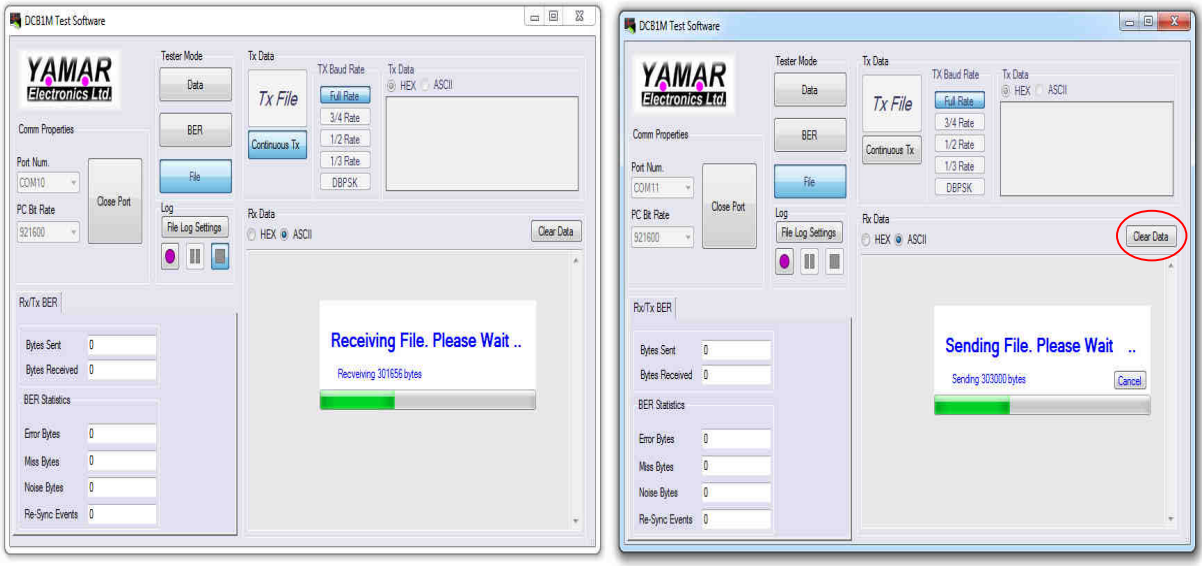


Figure 14 - File Transmission In Action.

File Transmission can be canceled by user at the TX Side by click the 'Cancel' button.

6. After File is fully received or time out event occurs* at the RX side, a notify message is displayed with info of the total bytes received and receiving elapsed time in seconds.

   * Time Out Event defined as not receiving bytes for more than ~1 sec.

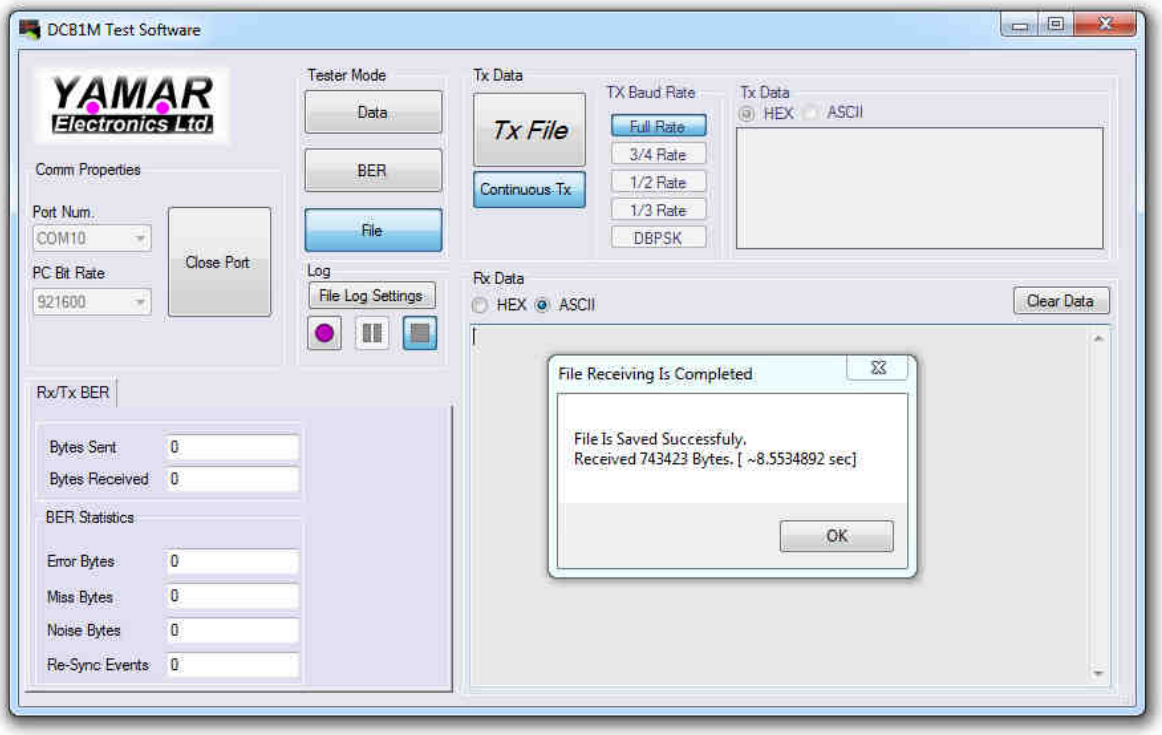


Figure 15 - File Transmission Is Completed

2.3 Data mode

To transmit custom data, at the transmitting (TX) side, enter in the "**Tx Data**" section a data message to be transmitted. The data message can be in either ASCII or Hex format.

Press the "**Tx"** button. The message will be transmitted once. For continues transmission of the same message click on "**Continuous Tx**".

At the receiving (Rx) side the program will receive the data messages form its DCB1M EVB and display it in the Rx Data section. The data can be viewed either in ASCII or Hex format.

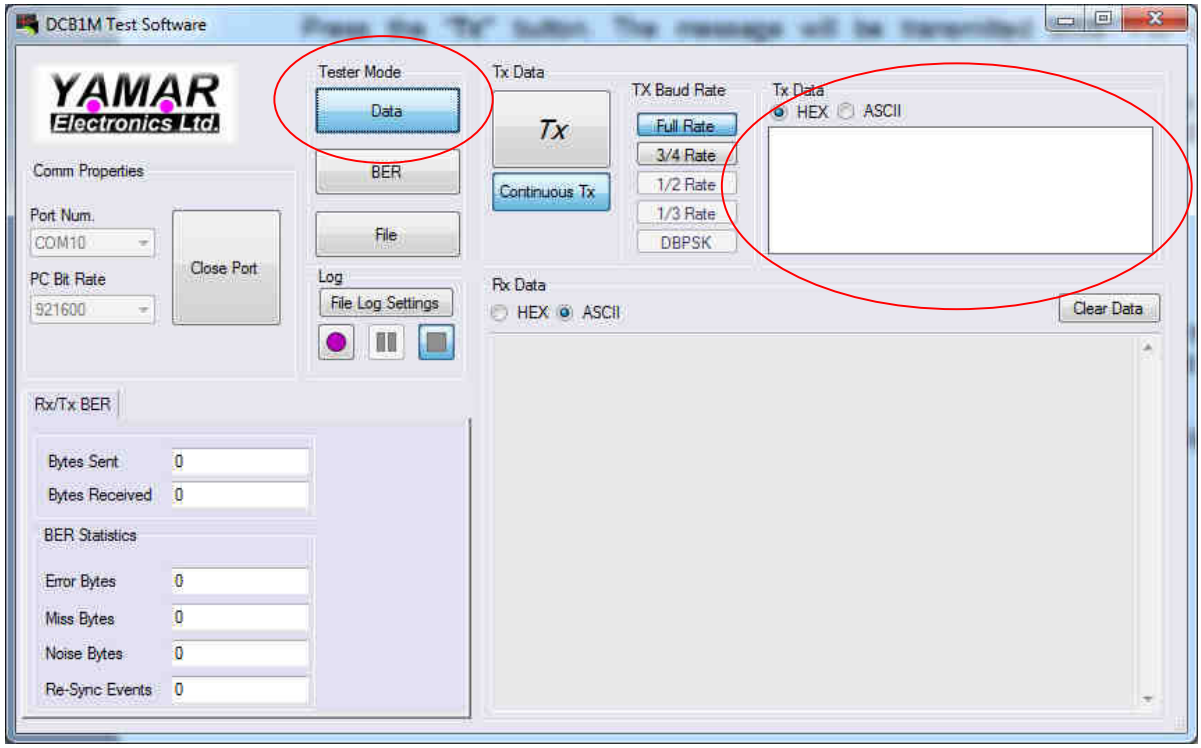


Figure 16 - TX and Rx Data mode

Tx/Stop Tx button - Start or stop the data transfer to the DCB1M.

Continuous Tx - When checked, the software will send the data continuously until the "**Stop Tx**" button is pressed or the **"**Continuous Tx**"** button is unchecked.

TX Baud Control Panel - Select the transmitting max baud rate over the DC-BUS.

Baud Rate	QPSK	DBPSK*
Full Rate	1.34 Mbps	0.669 Mbps
3/4 Rate	0.98Mbps	0.491Mbps
** 1/2 Rate	0.62 Mbps	0.312 Mbps
** 1/3 Rate	0.45 Mbps	0.223 Mbps (Default)

* Selecting between DBPSK / QPSK modes must be applied both in TX and RX sides.

** 1/2 Rate and 1/3 options are disabled automatically when setting the PC Bit rate above 460.8Kpbs.

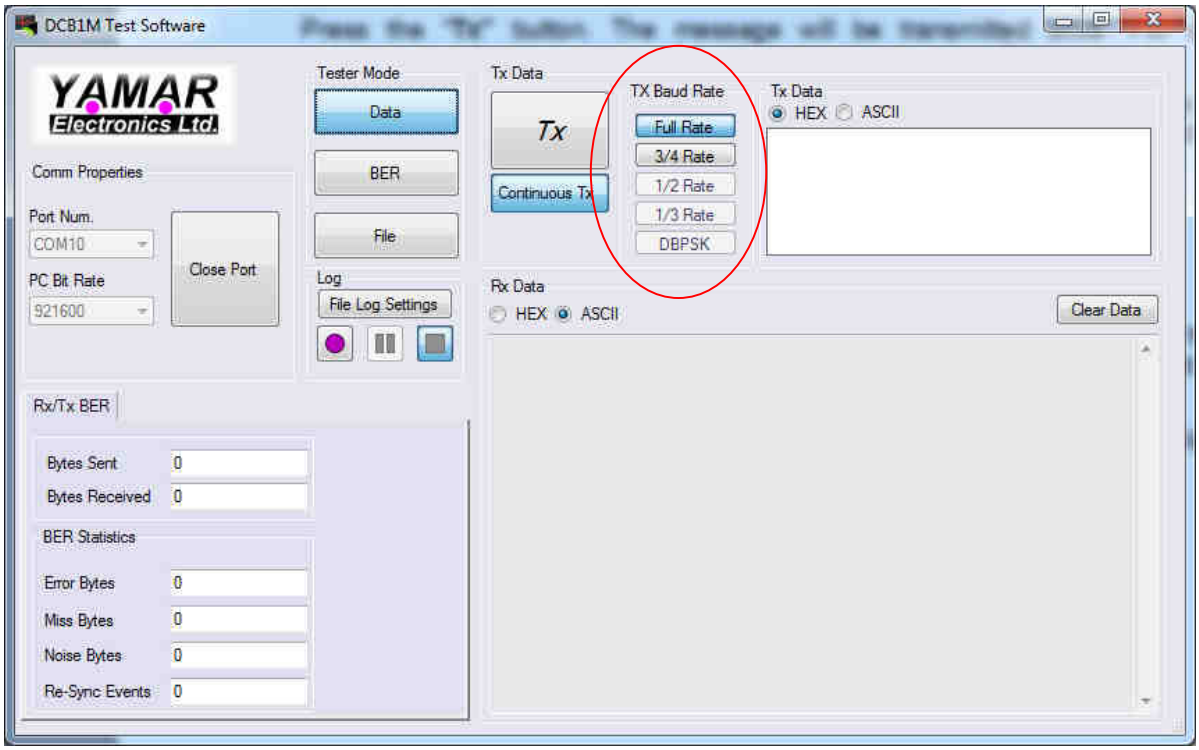


Figure 17 - TX Baud Rate

2.4 BER Mode

During BER test, a predefined message ("***ABCDEFGHIJKLMNOPQRSTUVWXYZ***") is transmitted over the powerline. The receiving DCB1M EVB(s) analyze the received messages and displays information regarding the quality of the message.

To operate the BER Test, at the TX side select the **"BER"** mode button, and "Continuous Tx" button and press the "**TX**" button. The program will send "***ABCDEFGHIJKLMNOPQRSTUVWXYZ***" test data messages to the TX DCB1M EVB.

At the RX side select the **"BER"** mode button. The program will start to analyze the received data messages and display the results in the Rx/Tx BER section.

Rx/Tx BER Test Results

Bytes Sent - Amount of bytes sent to the DCB1M.

Bytes Received - Amount of bytes received from the DCB1M.

Error Bytes - Number of error bytes received. Example: ***'ABC$EFG...'*** has one error byte

Miss Bytes - Number of missed bytes. Example: ***'ABCEFG...'*** has one miss byte

Noise Bytes - Number of noise bytes received. Example: ***'ABC%DEFG...***' has one noise byte

Re-Sync Events - Number of Re-Sync events. Three consecutive errors are causing a Re-Sync event. Example: ***'ABCXXX...LMNOP...'*** is a Re-Sync event.

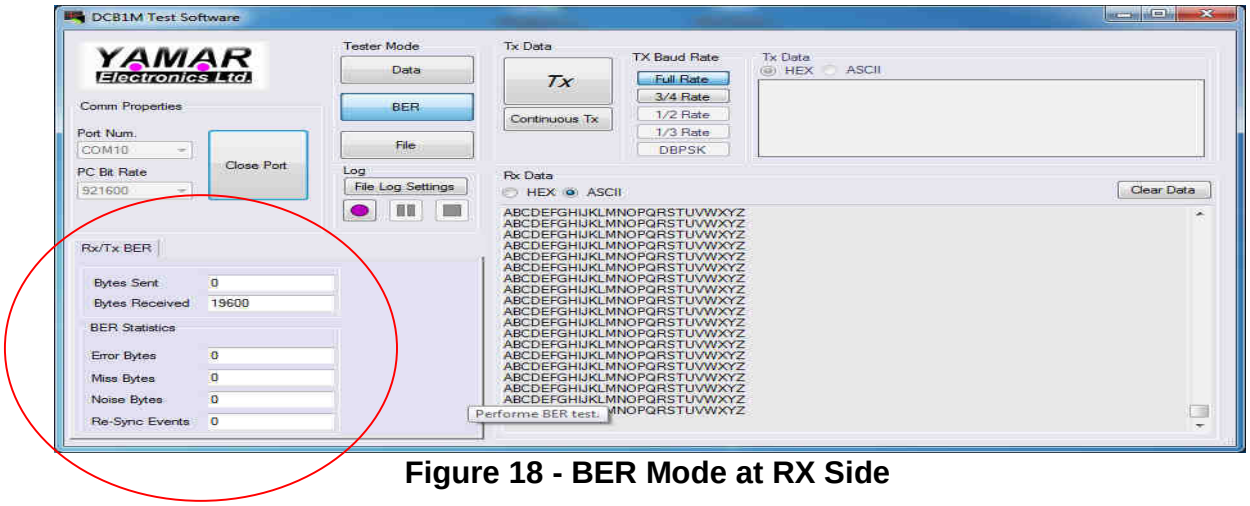


Figure 18 - BER Mode at RX Side

Real Time Graph Display

Click on the Graphs Tab, a real time graph view is opened.
The graph displays the 'PLC Baud Rate' (Purple) and the 'Errors' (Sum of error bytes, miss bytes and noise bytes) (blue) curves.
The graph sample interval is 1 second, calculating the change in 'Baud Rate' and 'Errors' for each sample interval.

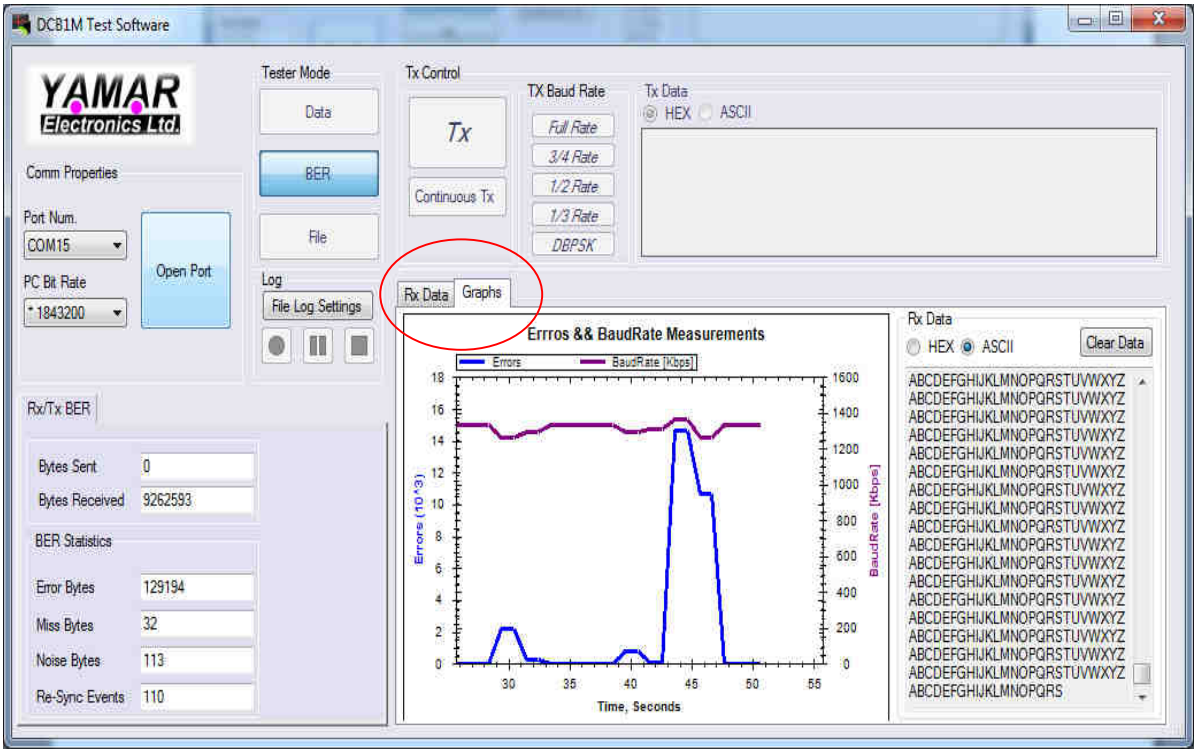
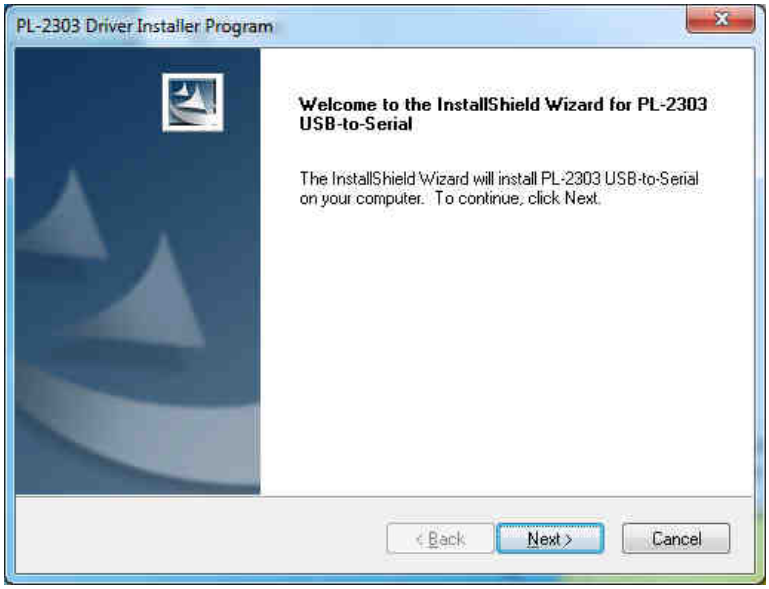


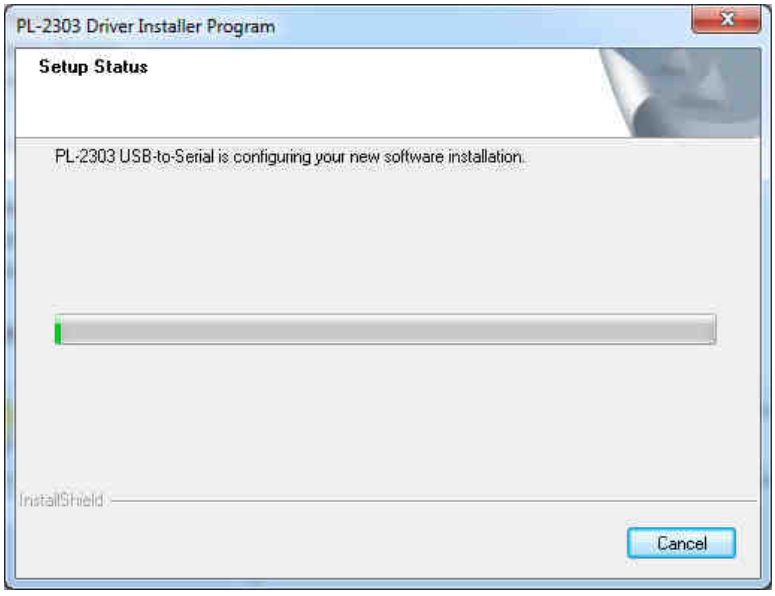
Figure 19 - Real Time Graph View

Annex 1 - USB- DCB1M Driver installation

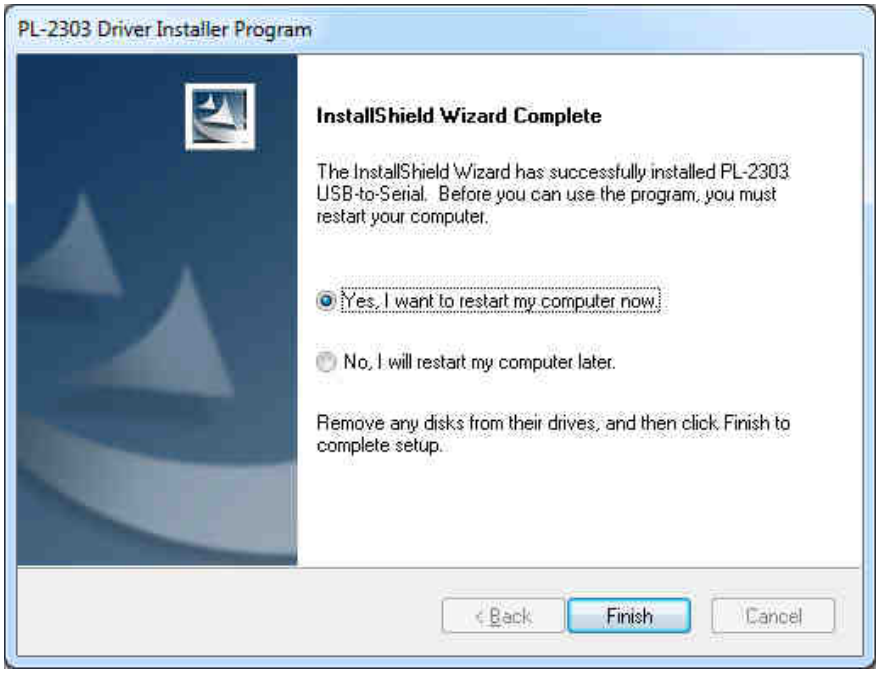
Open the "USB Driver" folder located at the Document CD and click on "PL2303_Prolific_DriverInstaller_v1.8.0.exe" file.



Click Next,



The driver is installed automatically.



Click Finish.