

General

The DC-BUS Test Program provides an easy way to evaluate the performance of Powerline communication based on Yamar's SIG60 and SIG61 devices using a PC operating as a host with a UART port. SIG60 and SIG61 Evaluation boards (EVB) are used for the testing purpose.

The test program controls its SIG60 device via the PC, either by a RS232 interface or by a USB interface provided by Yamar.

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. Set the SIG60 operating parameters
4. Command remote SIG61 slave devices (only with the USB-SIG60 interface)

1. Installation

The DC-BUS 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>

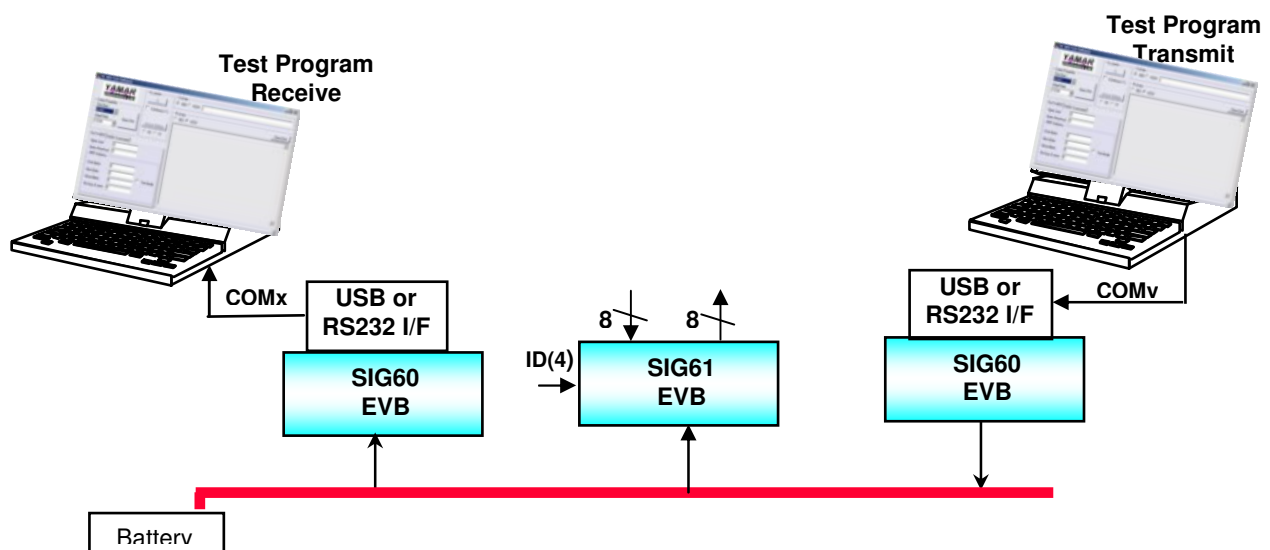


Figure 1 - Test system setup example

Preliminary

The test environment has one SIG60 EVB operating as a transmitter and one or more SIG60 EVBs or SIG61 EVBs operating as receivers on the DC-BUS network.

The interface between the SIG60 EVB to its PC is performed either by a USB-SIG60 interface or by RS232 interface. Either can be supply by Yamar.

Installation process:

1. Connect the USB-SIG60 interface on top of the SIG60 EVB J1 connector. Be sure that the USB-SIG60 drivers are installed. (See annex 1)
2. Connect the SIG60 EVBs and SIG61 EVBs to the same power supply.
3. Connect each SIG60 EVB to a PC either by using a USB-SIG60 Interface or a RS232 interface.
4. Run the provided "DC-BUS_Tester.exe" program in all the PCs used for the testing. (Both at the transmitting SIG60 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 "Rx/Tx BER" tab and check the "Test mode" check box.
7. At the TX side select the "Rx/Tx BER" tab, check the "Test mode" and the "Continuous Tx" check boxes as shown in Figure 2 and press the "TX" button.

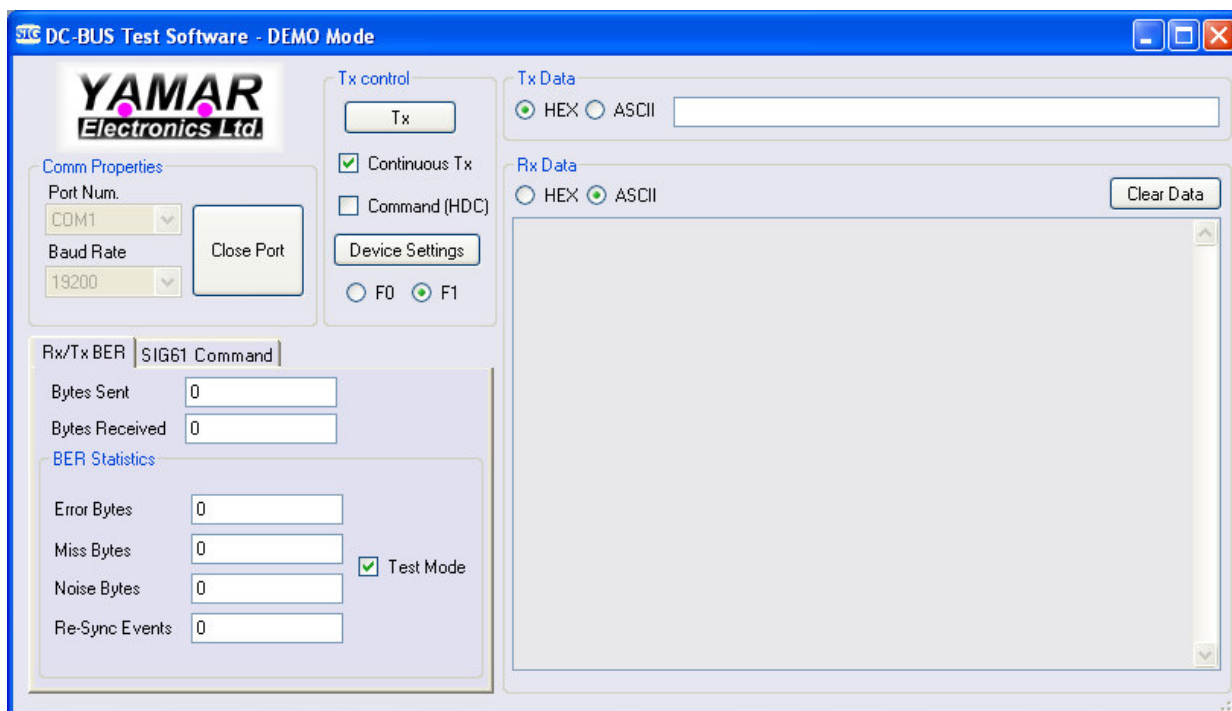


Figure 2 - Quick TX mode

The Software will start to send "ABCDEFGHJKLMNOPQRSTUVWXYZ" data to the TX SIG60 device and at the RX side the software will receive the data and analyze it to 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.

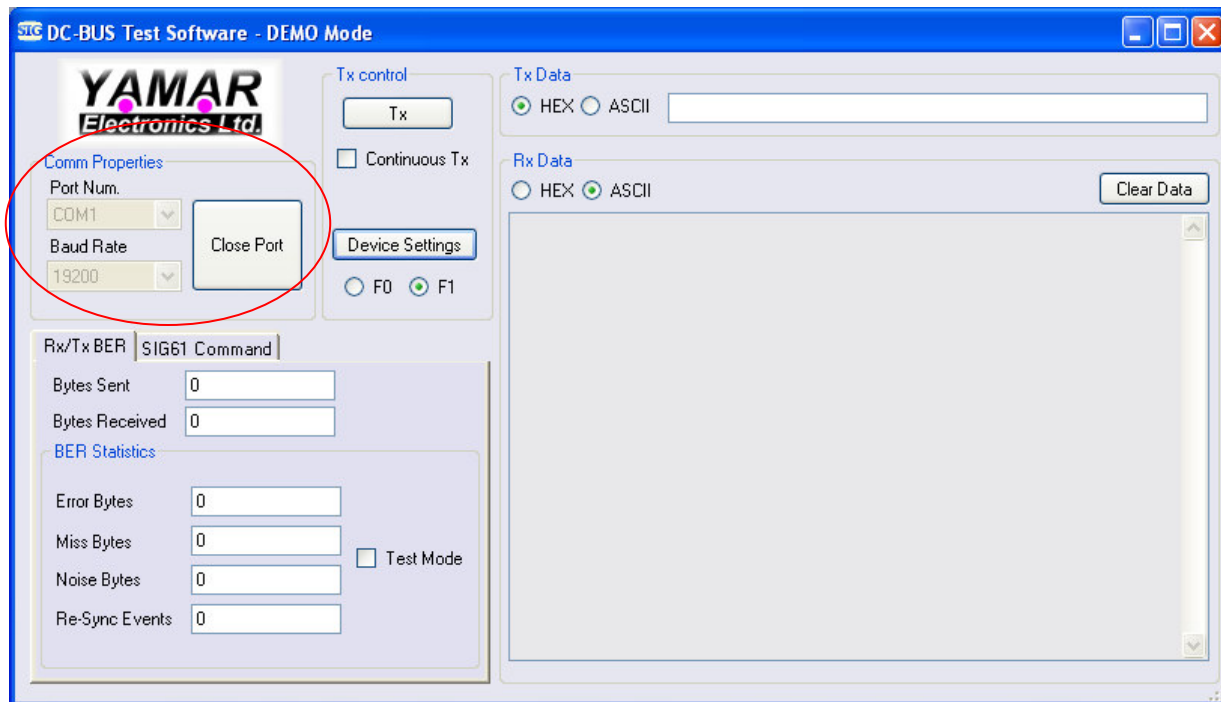


Figure 3 - Comm. port setting

Port Num. - Select the COM port that the SIG60 is connected to, either a virtual COM port (via the USB dongle) or a physical one.

Baud Rate - Choose the Baud Rate for the SIG60 operation. The software will configure the SIG60 to work at selected Baud Rate however; it is the user responsibility to make sure that the Baud Rate/Frequency settings are valid.

Please refer to the SIG60 data sheet for further information regarding the operating modes of the SIG60.

Open/Close Port button - Open or close the selected COM port. If there is no SIG60 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.

2.2 SIG60 Device Setting

Note: The SIG60 has its default configuration values: Bit rate = 19.2Kbps F0=5.5MHz, F1=6.5MHz. If the SIG60 device intends to operate at these parameters, there is no need to set further more the EVBs.

The SIG60 contains internal registers that configure the SIG60 operation mode.

Pressing on the **Device Settings** button will bring up a new window with option to modify the SIG60 configuration.

Preliminary

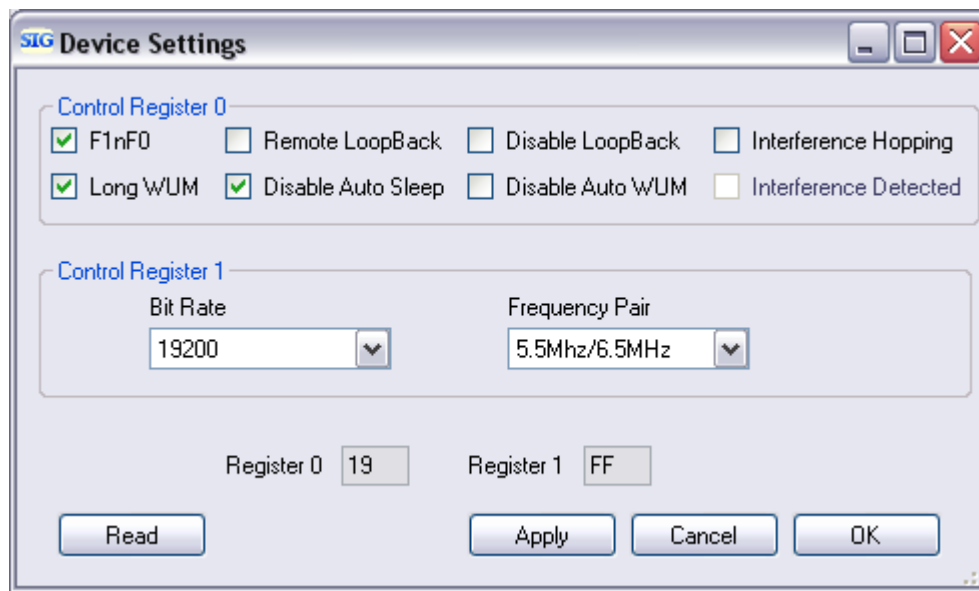


Figure 4 - Device setting window

Control Register 0 - Set Control register 0 in the SIG60.

Control Register 1 - Set Control register 1 in the SIG60. This control register configure the working bit rate and frequencies pair. Please note that not all combinations are valid. Inserting none valid combination will result in bad or even no communication at all. Refer to the SIG60 data sheet for more information.

Register 0 - Display the current status of Control register 0 of the SIG60.

Register 1 - Display the current status of Control register 1 of the SIG60.

Apply button - Writes the new settings to the SIG60. If the writing passed successfully then the new values will be displayed in the Register 0 and Register 1 boxes.

Read button - Reads the current status of the SIG60's control registers.

OK button - Writes the new settings to the SIG60 and close the Device Settings window resuming normal operation.

Cancel button - Closes the Device Settings window resuming normal operation.

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 SIG60 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. For configuring the SIG60 please use the **Device Settings** window.

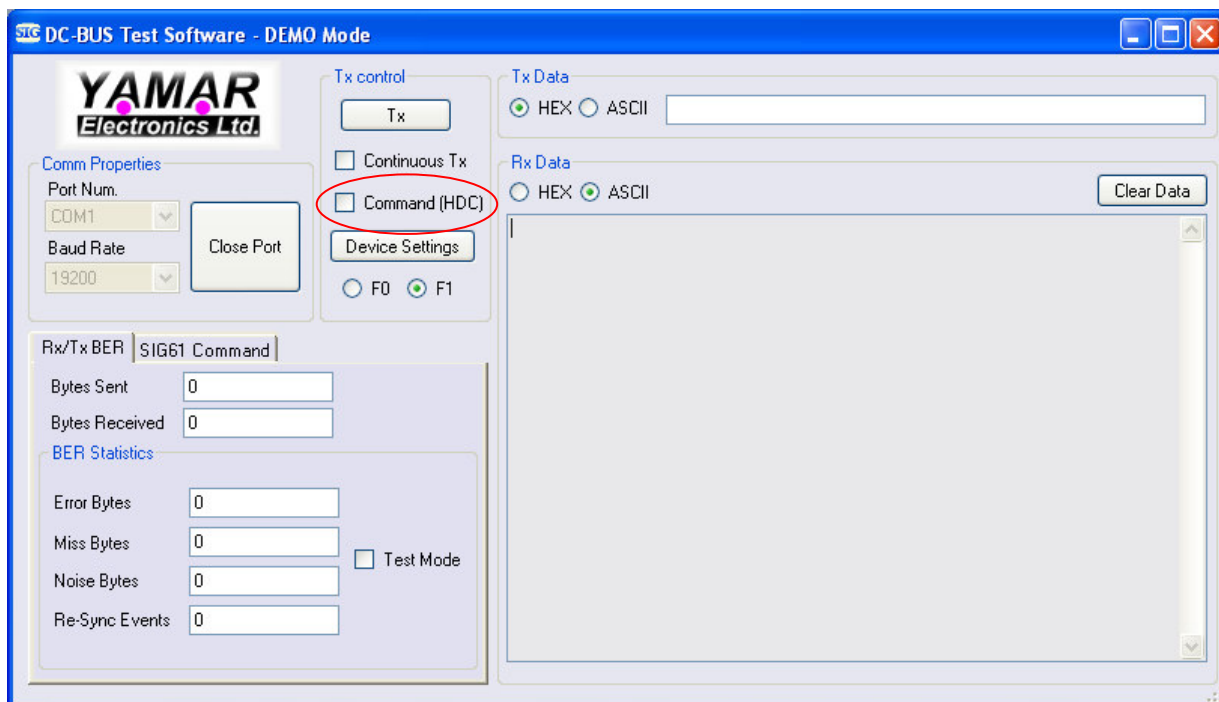


Figure 5 - Advanced setting Command (HDC)

2.3 TX and Rx 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 check the “**Continuous Tx**”.

At the receiving (Rx) side the program will receive the data messages form its SIG60 EVB and display it in the Rx Data section. The data can be viewed either in ASCII or Hex format.

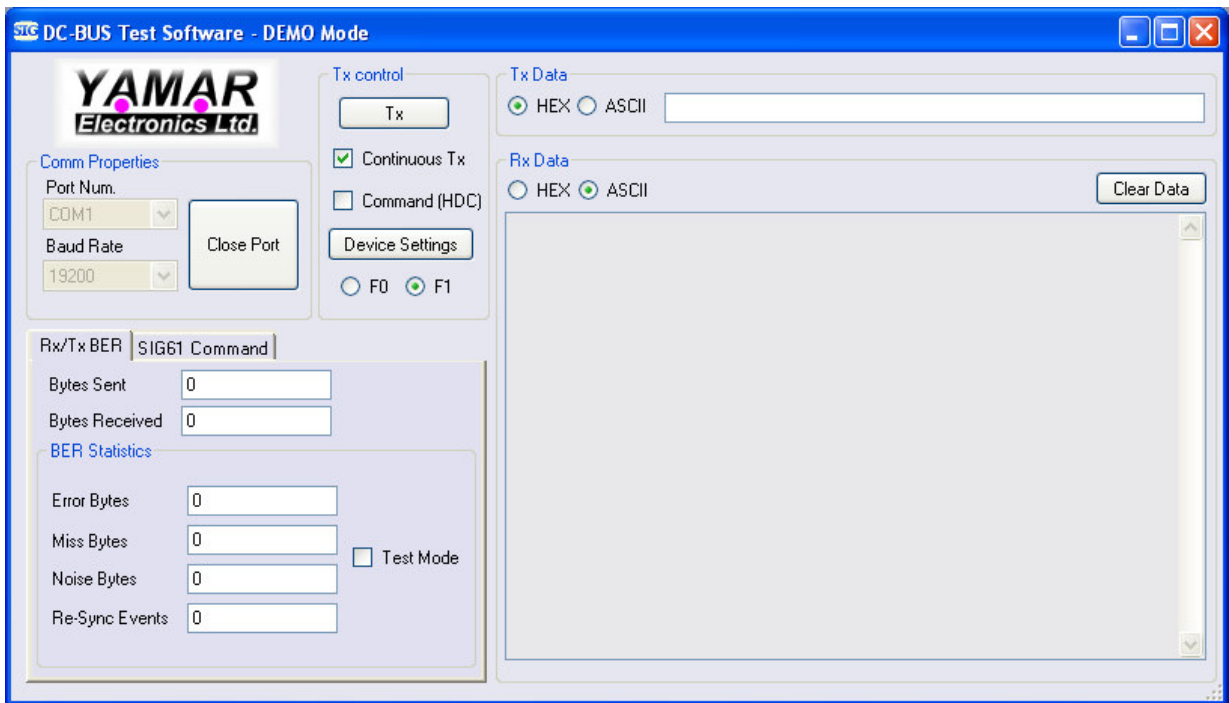


Figure 6 - TX and Rx Data mode

Tx/Stop Tx button - Start or stop the data transfer to the SIG60. The data to be sent depends on the current operation mode of the software and will be explained in the next sections.

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

Device Settings Button - This button opens a new window that gives the user a simple access to the SIG60 configuration register. See section 2.2 for a detailed explanation on the SIG60 configuration.

F0/F1 - These buttons provide a quick access to select between the two working frequencies of the SIG60 device.

2.4 BER Test

During BER test, a predefined message ("ABCDEFGHIJKLMNOPQRSTUVWXYZ") is transmitted over the powerline. The receiving SIG60 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 "Rx/Tx BER" tab, check the "Test mode", the "Continuous Tx" check boxes and press the "TX" button. The program will send "ABCDEFGHIJKLMNOPQRSTUVWXYZ" test data messages to the TX SIG60 EVB.

At the RX side select the "Rx/Tx BER" tab. When the "Test mode" check box is checked, 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 SIG60.

Bytes Received - Amount of bytes received from the SIG60.

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.

2.5 SIG61 Commands (Valid with Yamar's USB-SIG60 Interface only)

The SIG61 mode assists to construct SIG61 commands as set in the SIG61 data sheet. Each SIG61 command contains a Break, Sync, SIG61 ID address, Command type, Data and Check-sum. For further information regarding the structure of the SIG61 command, see the [SIG61](#) data sheet.

(<http://www.yamar.com/datasheet/DS-SIG61.pdf>).

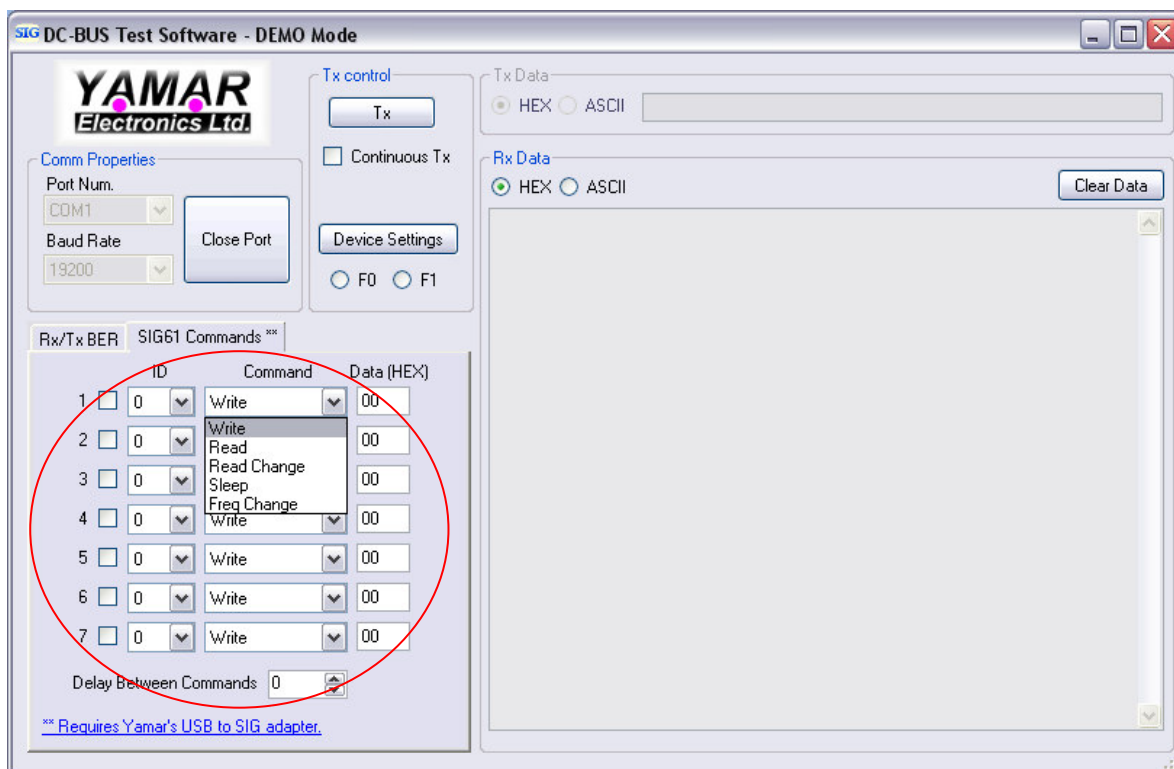


Figure 7 - SIG61 commands

The program automatically calculates the SIG61 message check-sum and parity bits allowing the user to select only the command type and ID. The full command is displayed in the Rx Data window once it was sent.

Preliminary

There are five fields of commands, each field contain the following items:

ID - Select the ID to send the command to.

Command - Select the command type to be sent. Refer for the [SIG61](#) for additional information regarding the available commands.

Data -The command data window. On Write command, the data byte entered to this window will be written to the output port of SIG61 having same ID. On Read and Read Change commands the window will display the received data from the input port of SIG61 having same ID.

Each command can be selected to add it to the commands loop. When the **Tx** button is pressed the program starts to send all the selected commands. If the **Continuous Tx** is also checked the program repeats sending the commands in a loop.

Delay Between Commands - This field adds additional delay between each command sent. It allows monitoring the commands activity. The actual delay is the DELAY VALUE * 10mSec.

Application example; is writing commands with different data to turn on /off LEDs controlled by a SIG61 EVB.

3. Software updates

The Program can check if a new version is available (require an internet access). By clicking on the right mouse button and selecting the "Check for update" the program will look for updates in Yamar's web site and inform the user when new update found.

Annex 1 - USB-SIG60 Driver installation

When the USB-SIG60 serial Interface is plugged to the PC's USB connector, a *new device founded* message will appear.



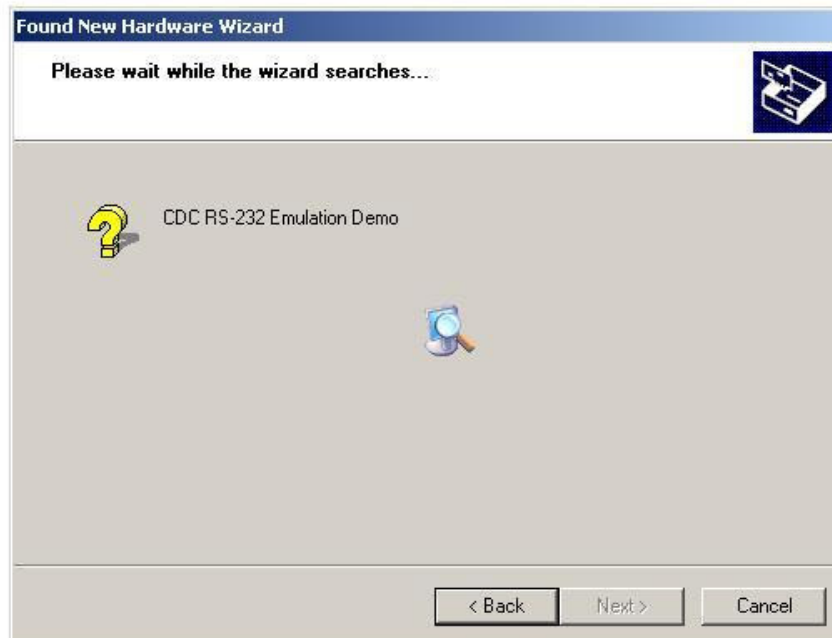
Select '*No, not this time*' and click on *Next*

After a new window will appear, click con "*Install from a list or specific location (Advanced)*" and then click on *Next*

Preliminary



Search for the location of the Driver directory with the .inf file provided by Yamar and then click on Next



The driver will be installed.

Preliminary



At the end, click on finish and the device is ready for use.

Note: if the USB to Serial module is plugged in another USB connector of the PC, the driver must be installed again.