How to set-up a Bihl+Wiedemann DeviceNet Master Simulator on a VLT® 5000

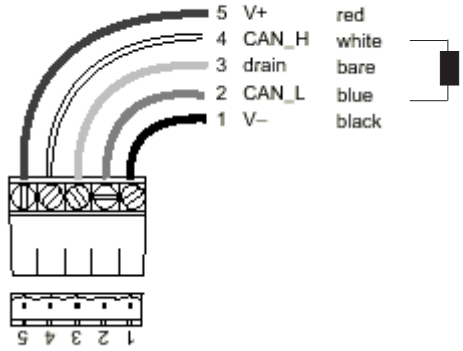
Introduction

The B+W DeviceNet Master Simulator is available in two versions. Model 1255 is using the Printer Port and Model 1420 is using the USB Port.
Instructions using the Model 1255 are shown below. Refer to the Help file and instructions, which is included with the software.

See www.bihl-wiedemann.com to find a local representative of Bihl and Wiedemanns products.

Configuration

After connecting the dongle to the appropriate port on your PC, you will need to check the wiring and bus termination.
The standard DeviceNet wiring is shown in the manual as thus:

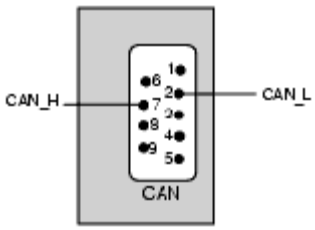


DeviceNet external network power supply requirements are:
11 - 25 VDC 70 mA draw per VLT 5000 DeviceNet node. Looping terminals 13 and 20 to pins 5 and 1 respectively can provide this.
Termination resistors should be installed at the first and last devices on each network. It is essential that the bus line is terminated properly. A mismatch of impedance may result in reflections on the line that will corrupt data transmission. A Termination Resistor of value 121Ω ,1/4 Watt should be placed between pins 2 and 4.

A 9 pin SUB-D connector is required to connect to the DeviceNet Master Simulator.

USB version

Parallel Port version

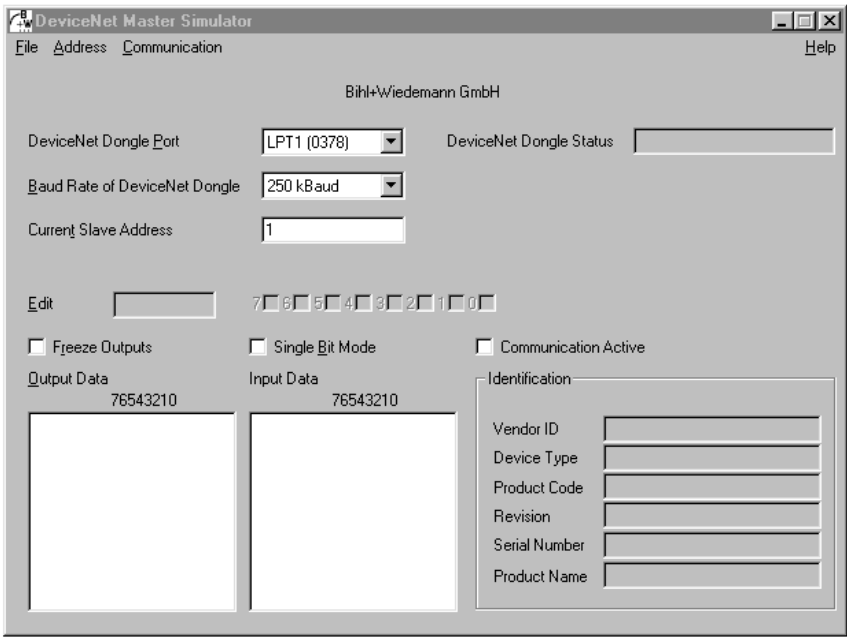


Connections at the Sub-D Plug

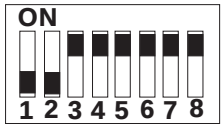
After this has been done, connect the simulator to your PC according to the instructions provided. Power supply for the simulator is 5V, which is provided from the mouse connector. If you have a PS2 connection, you will require two converter cables, which can be purchased from any computer store.

■ Set-up

Now, start the program and you will see the main window.



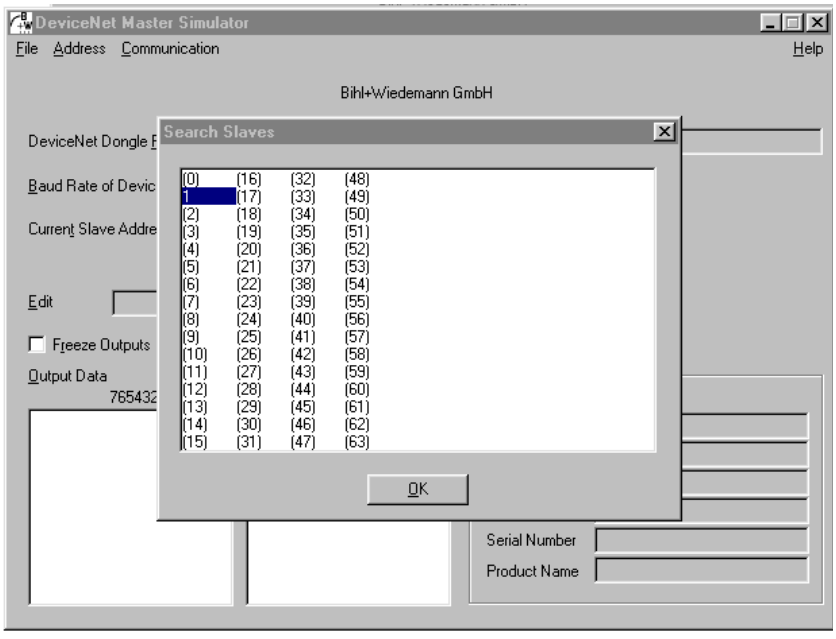
First, configure the address. Remember that the DeviceNet option card in the VLT must be set-up using the DIP switches. The address can be read-out in parameter 918 *Station address*.
The baud rate is also set-up via DIP switches and can be read-out in parameter 801 *Baud rate selection*.



ON = 0
OFF = 1

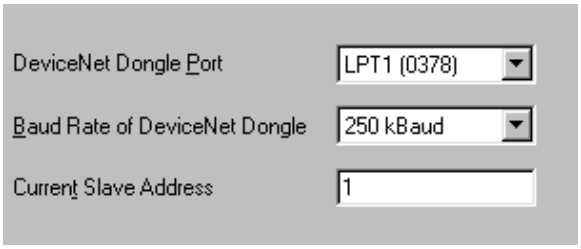
Dip switch 1-6 set the VLT frequency converters address and 7-8 the baud rate.

Check the DeviceNet Dongle Port and the Baud Rate. Make sure the same baud rate is set in the drive parameters. Go to Address, then Search Slaves.

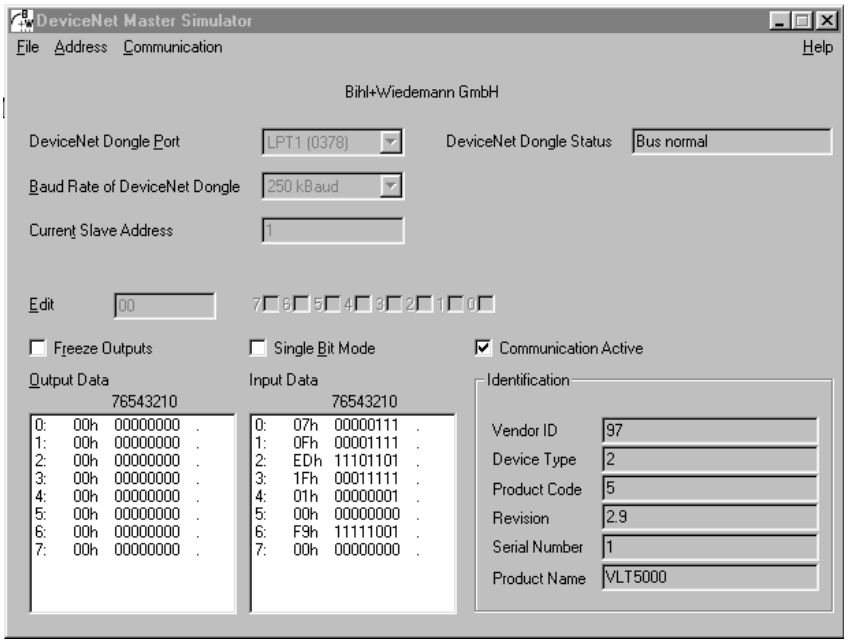


■ Set-up

The below picture shows that one slave has been found with address 1. Double click this address or highlight and OK. The current address is now shown in the window.



Now go to Communication and Start.



There are two byte tables shown. These are referring to the control word setup according to your PPO or Instance Type in Parameter 904 *PPO Selection*.

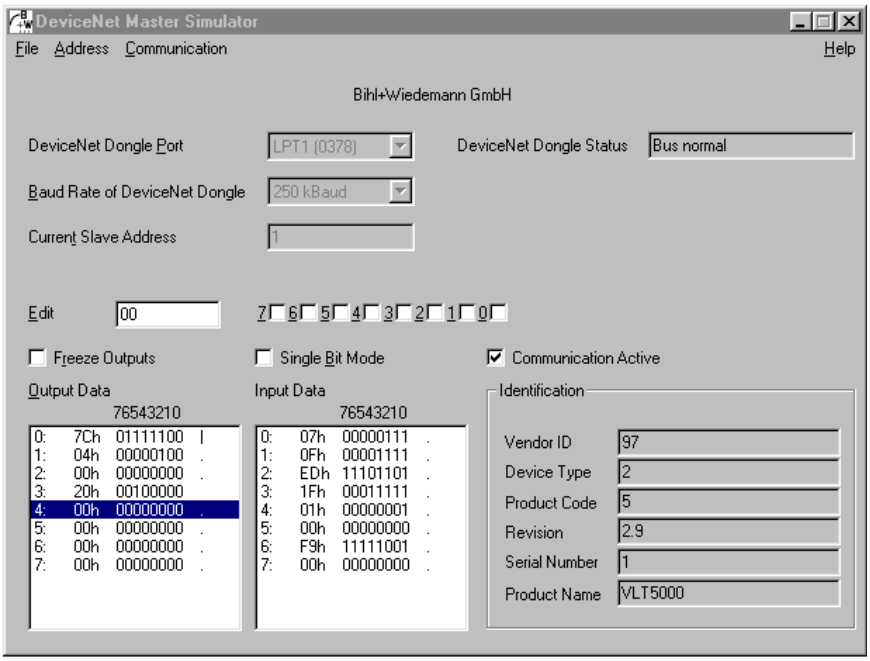
PPO Type	Value	Instance	WRITE	Instance	READ
1	900 4 Byte	100	CONTROL WORD; BUS REF	150	STATUS WORD; OUTPUT FREQ.
2	901 8 Byte	101	CONTROL WORD; BUS REF; 915,1 PROCESS DATA 1; 915,2 PROCESS DATA 2	151	STATUS WORD; OUTPUT FREQ.; 916,1 PROCESS DATA 1; 916,2 PROCESS DATA 2
3	902 4 Byte	20	See Instance 20; REF SPEED	70	See Instance 70; ACTUAL SPEED
4	903 8 Byte	102	915,1 PROCESS DATA 1; 915,2 PROCESS DATA 2; 915,3 PROCESS DATA 3; 915,4 PROCESS DATA 4	152	916,1 PROCESS DATA 1; 916,2 PROCESS DATA 2; 916,3 PROCESS DATA 3; 916,4 PROCESS DATA 4

■ Set-up

Lets assume that PPO2 (Instance 101/151) is selected. This means that the Poll I/O communication consists of 8 bytes. The first two output bytes (from the master to the slave) are the control word where a start/stop command can be given. The next two output bytes are the reference where a reference of 0-4000 hex corresponding to 0-100% can be given.

The first two input bytes (from the slave to the master) are the status word from the VLT and the next two bytes are the Main Actual Value, i.e. the actual frequency.

The simulator can also read and write to the PCD's. If the PCD has been assigned in parameters 915 or 916, the next four bytes can be written and read (bytes 4-5, 6-7).



Example 1: Ramp start the drive at 50% speed.

The control word and bus reference will look as follows:

Control Word

High Word								Low Word								Word
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit No.
0				4				7				C				Hex
0	0	0	0	0	1	0	0	0	1	1	1	1	1	0	0	Binary
Reverse	Setup msb	Setup lsb	Relay 04 control	Relay 01 control	Data Valid	Ramp No.	Jog	Reset	Ramp Stop/Start	Hold /Ramp enable	Quick-stop/Ramp	Coast/Enable	DC Brake/Enable	Preset Ref. msb	Preset Ref. lsb	0/1 format

The control word will be 047CHex.
The bus reference will be a percentage of 4000Hex. So 50% speed will be 2000Hex.

Showing the control and reference bytes for a ramp start to half speed in hexadecimal form (ascending address).

The Control Word, low word is 7C hex, so select byte 0 in Output Data and make it 7C hex. Then change byte 1 to 04 hex. Next, set the Bus Ref high word (byte 3) to 20 hex. Now the drive will start and ramp to 25 Hz.

■ Set-up

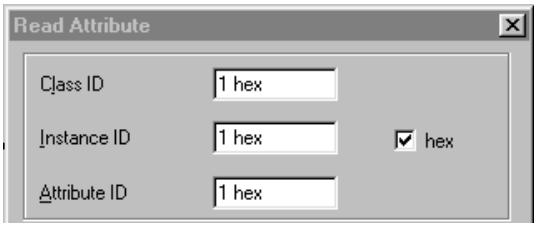
You can select the “Read” or “Write Attribute” from the Communication menu drop down box and then select the specific parameter you wish to read or write.

VLT parameters can be changed in several different ways over the DeviceNet network. For initial drive setup, DeviceNet Manager, RS Networks or some other package can be used to access the drive parameters when the Danfoss EDS file is used. There is a specific DeviceNet Class, Instance and Attribute associated with each VLT parameter.

VLT Parameter Danfoss Classes:
Parameter 001-099 Class 100
Parameter 101-099 Class 101
Parameter 200-299 Class 102
Parameter 300-399 Class 103
Parameter 400-499 Class 104
Parameter 500-599 Class 105
Parameter 600-699 Class 106
Parameter 700-799 Class 107
Parameter 800-899 Class 108
Parameter 900-999 Class 109
Index Pointer Class 120

Instance Description:
The Danfoss VLT parameters use Instance 1, so always leave this at the value of 1. Beyond the commissioning phase, VLT parameters can be accessed either within the polled data or through explicit messaging. Since the polled data approach can only provide read/ write access to a maximum of four parameters, explicit messaging is the only technique that allows complete VLT parameter access.

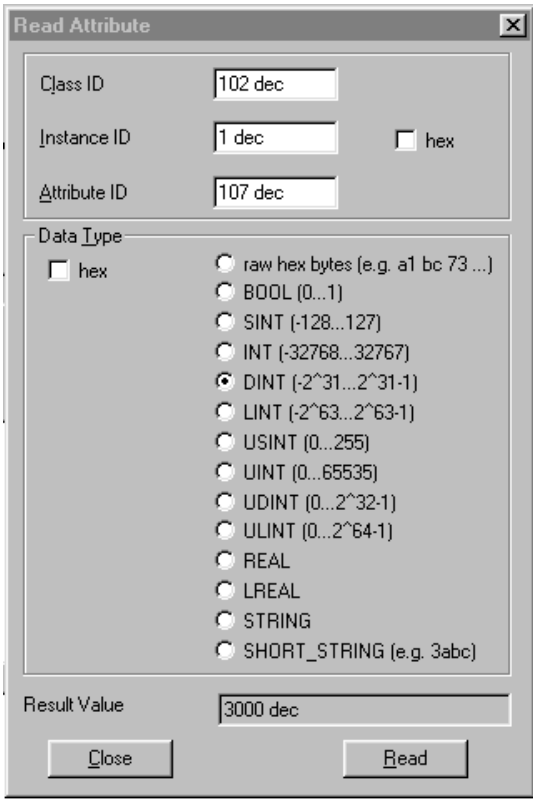
Attribute Description:
The attributes for the VLT parameter is the last two digits of the parameter + 100.



These three attributes must be selected to read and write the data.

Class ID = See VLT Parameter Danfoss Classes above.
Instance ID = Always leave at [1 dec]
Attribute ID = See Attribute Description above.

Firstly, we will read Parameter 207 and see the Ramp Up time.



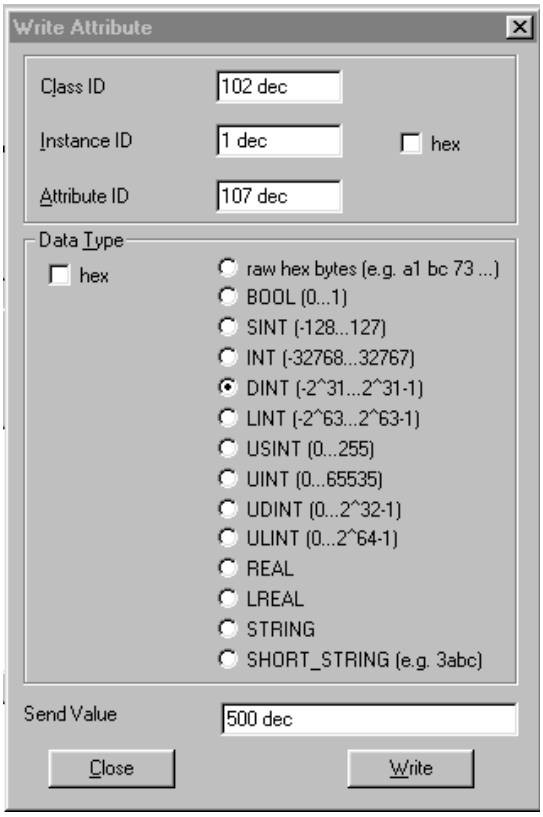
Enter the Class ID = 102 which equals parameters 200-299.
Then Attribute ID = 107 which selects Parameter 207 (007 + 100 = 107).
Select DINT (Double Integer) as parameter 207 have the datatype 7 which is a Unsigned 32. See factory settings in the Manual.

Set-up

Remove the hex selections to read the data in decimal.

Toggle the Read button and the result is 3000 dec which equals 30.00 seconds as parameter 207 have a conversion index of -2 (Conversion factor 0.01). See factory settings in the Manual.

Now we will write to Parameter 207. Select Write Attribute from the communication menu.



Enter the Class ID, Instance ID and Attribute ID as above. Now set a value of 500 dec in the Send Value area and toggle Write. Parameter 207 has now been changed to 5.00 seconds.

Reading and Writing can be done to any parameter listed.