

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.





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.



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Set-up

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

4 DeviceNet Master Simulato	r		
<u>File</u> <u>A</u> ddress <u>Communication</u>			<u>H</u> elp
	Bihl+Wiedema	ann GmbH	
DeviceNet Dongle <u>P</u> ort	LPT1 (0378)	DeviceNet Dongle Status	
Baud Rate of DeviceNet Dongle	250 kBaud 💌		
Current Slave Address	1		
<u>E</u> dit	7 🗖 8 🗖 5 🗖 4 🗖 3 🗖 2 🗖	1 🗖 0 🗖	
🔲 Freeze Outputs	🦳 Single <u>B</u> it Mode	Communication Active	
<u>O</u> utput Data 76543210	Input Data 76543210	- Identification	
		Vendor ID	
		Device Type	
		Product Code	
		Revision	
		Serial Number	
		Product Name	
	1		

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 readout 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*.



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.

DeviceNet Mast	er Simulator nunication					<u> </u>
		Bihl+	Wiedemann Gr	ъН		
DeviceNet Dongle <u>F</u>	Search Slaves				×	
Baud Rate of Devic Current Slave Addre Edit Freeze Outputs Output Data 765432	0 (16) 1 (17) (2) (18) (3) (19) (4) (20) (5) (21) (6) (22) (7) (23) (9) (24) (9) (25) (10) (26) (11) (27) (12) (28) (13) (29) (14) (30) (15) (31)	(32) (48) (33) (49) (34) (50) (35) (51) (36) (52) (37) (53) (37) (53) (38) (54) (39) (55) (40) (56) (41) (57) (42) (58) (43) (59) (44) (60) (45) (61) (46) (62) (47) (63)				
		I	<u>0</u> K			
				Serial Number Product Name		



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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.

DeviceNet Dongle <u>P</u> ort	LPT1 (0378)	•
Baud Rate of DeviceNet Dongle	250 kBaud	•
Curren <u>t</u> Slave Address	1	

Now go to <u>Communication and Start</u>.

DeviceNet Master Simulate	Dr	_	<u> </u>
	Bihl+Wieden	nann GmbH	
DeviceNet Dongle <u>P</u> ort <u>B</u> aud Rate of DeviceNet Dongle Current Slave Address	LPT1 (0378) 💌 250 kBaud 💌 1	DeviceNet Dongle Status	Bus normal
Edit 00 Freeze Outputs 00 Output Data 76543210 0: 00h 00000000 1: 00h 00000000 2: 00h 00000000 3: 00h 00000000 4: 00h 00000000 5: 00h 00000000 6: 00h 00000000 7: 00h 00000000	7 6 5 4 2 2 Single Bit Mode Input Data 76543210 0: 07h 00001111 . 1: 0Fh 00001111 . 2: EDh 11101101 . 3: 1Fh 00011111 . 4: 01h 0000000 . 5: 00h 0000000 . 6: F3h 1111101 . 7: 00h 0000000 .	Communication Act Identification Vendor ID 97 Device Type 2 Product Code 5 Revision 2.5 Serial Number 1 Product Name VL	ive

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 BUS WORD REF	150	STATUS OUTPUT WORD FREQ.
2	901 8 Byte	101	CONTROL BUS 915.1 915.2 WORD REF PROCESS PROCESS DATA 1 DATA 2	151	STATUS OUTPUT 916,1 916,2 WORD FREQ. PROCESS PROCESS DATA 1 DATA 2
3	902 4 Byte	20	See REF Instance 20 SPEED	70	See ACTUAL Instance 70 SPEED
4	903 8 Byte	102	915,1 915,2 915,3 915,4 PROCESS PROCESS PROCESS PROCESS DATA 1 DATA 2 DATA 3 DATA 4	152	916,1 916,2 916,3 916,4 PROCESS PROCESS PROCESS PROCESS DATA 1 DATA 2 DATA 3 DATA 4
1	1				



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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).

🖧 DeviceNet Master Simulate	10	_ 🗆 🗙
<u>File</u> <u>Address</u> <u>Communication</u>		<u>H</u> elp
	Bihl+Wiedemann GmbH	
DeviceNet Dongle <u>P</u> ort	LPT1 (0378) DeviceNet Dongle Status Bus normal	
Baud Rate of DeviceNet Dongle	250 kBaud	
Current Slave Address	1	
Edit 00 ☐ Freeze Outputs Output Data 76543210 0: 7Ch 01111100 I 1: 044 00000100 . 2: 00h 00000000 . 3: 20h 00100000 .	Z □ 6 □ 5 □ 4 □ 3 □ 2 □ 1 □ 0 □ Single Bit Mode Identification Input Data Identification 0: 07h 0000111 . . 1: 07h 0000111 . . 2: EDh 11101101 . . 3: 17h 0001011 . . 4: 01h 00000001 . .	
5: 00h 00000000 . 6: 00h 00000000 . 7: 00h 00000000 .	5: 00h 00000000 . Revision 2.9 6: F9h 11111001 . . Serial Number 1 7: 00h 000000000 . Product Name VLT5000	

Example 1: Ramp start the drive at 50% speed. The control word and bus reference will look as follows:

Control Word

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



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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 Poin	ter 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.

R	lead Attribute			×
	Class ID	1 hex		
	Instance ID	1 hex	🔽 hex	
	<u>A</u> ttribute ID	1 hex		

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.

Read Attribute	X				
Class ID	102 dec				
Instance ID	1 dec 🗖 hex				
<u>Attribute</u> ID	107 dec				
Data <u>T</u> ype					
⊢ hex	C raw hex bytes (e.g. a1 bc 73)				
	C SINT (120, 127)				
	C INT (-126127)				
	C INT (-3276832767)				
	C LINT (22512 514)				
·	C LISINT (0, 255)				
	C UINT (0. 65535)				
	C UDINT (02^32-1)				
	C ULINT (02^64-1)				
	C REAL				
	C LREAL				
	C STRING				
	🔿 SHORT_STRING (e.g. 3abc)				
Result Value	3000 dec				
Close	<u>B</u> ead				

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.



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Remove the hex selections to read the data in decimal.

Toggle the <u>Read</u> 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.

Write Attribute		X
Class ID	102 dec	
Instance ID	1 dec	☐ hex
<u>A</u> ttribute ID	107 dec	
Data <u>T</u> ype	_	
⊢ hex	C raw hex byte	es (e.g. a1 bc 73)
	C SINT (129	J 127)
	C INT (-32768	
	 DINT (-2^31 	2^31-11
	C LINT (-2^63	2^63-1)
	🔿 USINT (02	255)
	O UINT (065	5535)
	🔿 UDINT (0)	2^32-1)
	🔿 ULINT (02	2^64-1)
	C REAL	
	C LREAL	
	O SHURT_ST	RING (e.g. 3abc)
Send Value	500 dec	
<u>C</u> lose		<u>W</u> rite

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.