



xSlave

Data Processing Applications

User Manual

NOTE:

Jason Hua has made every reasonable attempt to ensure the completeness and accuracy of this document. However, the information contained in this manual is subject to change without notice.

ALL RISKS OF USING THIS SOFTWARE WILL REMAIN WITH THE USER.

NEITHER THIS SOFTWARE PROGRAM NOR PROGRAMMER HAS ANY LIABILITIES FOR ANY RISKS AND DAMAGES THAT THIS SOFTWARE MIGHT CAUSE. AND NEITHER THIS SOFTWARE PROGRAM NOR OUTCOMES OF ITS RUNTIME DOES PROVE ANYTHING AT ALL THAT YOU MAY WANT TO.

ANY COMMENTS WELCOME!

Revision Notes

This Manual is for the version of 2.2013.5.15 or higher.

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1 Overview

The xSlave is a set of software of Protocol Slave Application that helps you to:

1. **Easily and efficiently and quickly set up the Simulation of Protocol Slave devices talking to the Protocol Master End over Serial Link, MB Plus Network and Ethernet (TCP/IP).**
2. **Simulate data of Digital Input, Analogue Input and Counter.**
3. **Monitor control-commands (i.e. Digital Output, Analogue Output, Freezing, etc.) sent by the Protocol Master End.**
4. **Record/Log protocol messages.**
5. **Simulate the PLC program Runtime.**
6. **Share the point database with Protocol Master Applications to make a PC (Embedded) to be a RTU.**

1.1 The Directory of Files

The directory of files of this set of software (so called as xSlave below) is located at 'C:\xMaster'.

1.2 The List of Files

The list of files of xSlave is as follows.

NO.	File Name	Comment
1	DNP_Slave.exe	The xSlave for DNP3 executable file.
2	MB_Slave.exe	The xSlave for Modbus executable file.
3	MB_Plus_Slave.exe	The xSlave for Modbus Plus executable file.
4	Readme.txt	Readme file.
5	xSlave_Manual.pdf	This manual.
6	*.SDB, *.LDB, *.DAS, *.LGC	Configuration files.
7	*.Log	Logs File.
8	PLC_CMD.txt	PLC Program Run-time simulator script file.

1.3 Installation of the software

1.3.1 Preparation for installation

Minimum system requirements

- Windows XP

You might have to get the Administrator/Boost privileges in order to install and register the xSlave software.

1.3.2 Installation

You run the installation program: Install_xMasterSlave.exe to install xMasterSlave.

2 Start up

2.1 Making the registration file

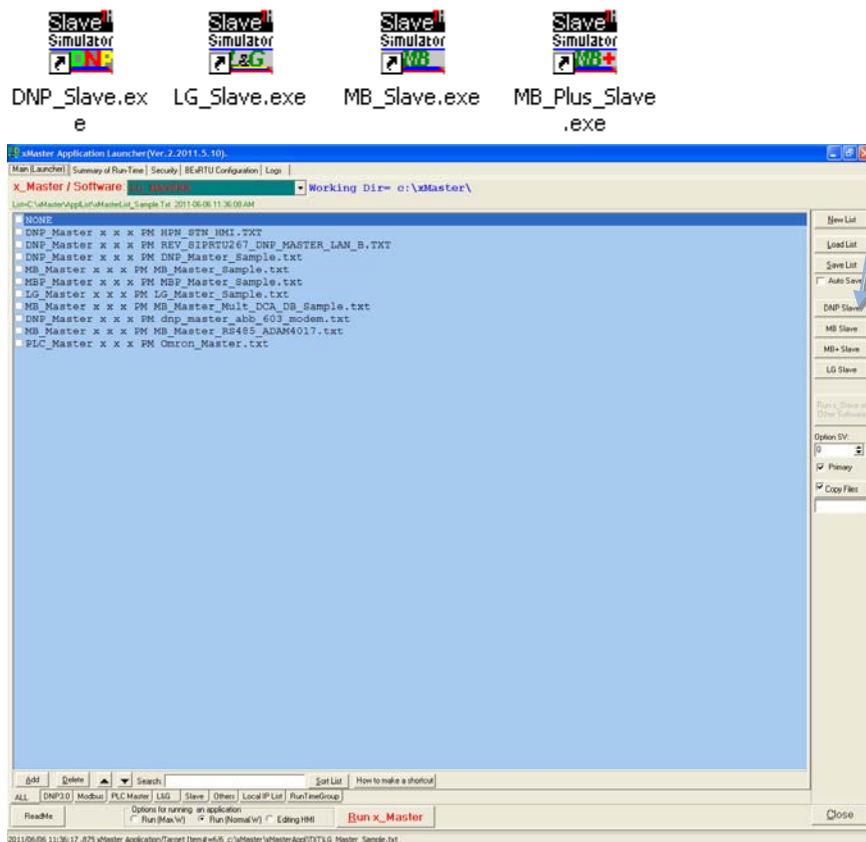
If it is the first time to run the xSlave program on the current PC, you will be asked to register the xSlave software and send the registration file: "software.aut" to the xSlave developer. And the xSlave developer will send you back two files: "software.aut" and "software.key". You should copy them into the directory "c:\xMaster". The register window is shown in the screenshot Figure 2-1.

The image shows two overlapping Windows-style dialog boxes. The top dialog box is titled "Software Registration" and contains four text input fields: "User/Company Name :", "User/Company Address : Or eMail address", "User/Company Tel. :", and "Contact Person". To the right of these fields are three buttons: "Cancel", "Read Liability Statement", and "Register". Two callout boxes with arrows point to the first two input fields, indicating "Max. Length =50" for the first and "Max. Length=60" for the second. The bottom dialog box is titled "Liability Statement Alert" and features a yellow warning triangle icon. It contains the following text: "This software program is written by JH. Neither this software program nor programmer has any liabilities for any risks and damages might caused by this software program. And neither this software program nor outcomes of its runtime does prove anything at all that you might want to. DO YOU AGREE AND ACCEPT ?". Below this text, it says "YES to continue. NO to exit" and provides "Yes" and "No" buttons.

Figure 2-1

If the xSlave fails in checking the register file, it alerts you that the current installation of xMasterSlave software has not been registered.

2.2 Running a xSlave



Running xSlave

Press the button of [xxx Slave] to run xSlave software, which can simulate Slave protocol/device (i.e. RTU, Sub-RTU, PLC, IED, etc.). You can add xSlave application line into the list by press the button of [Add]. Note: you have to save the xSlave configuration in xSlave application by press the button of [Save Config].

Note:

Multi-instances of xSlave cannot share the same serial port.

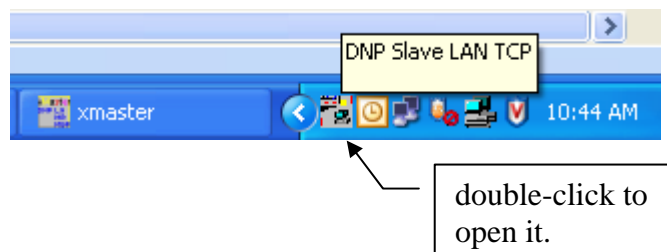
xSlave can handle all polling from via the same comm port (incl: multi-drop -- RS422/RS485 link) within ONE session.

xSlave can handle all polling from the LAN with sessions (up to 200 DNP server TCP/IP sessions-connections using same IP port i.e. 20000 -- only in the embedded pc version) respectively.

xSlave can be running multi-instances as many as the PC can handle (if over the LAN TCP/IP, cannot use the same IP Port, i.e. 20000 for DNP, 502 for Modbus. It means that only one can use them.).

Each xSlave instance can be respectively tied/bonded IP address assigned in the same PC. You can assign 200 IPs in a PC to simulate up 200 DNP Slave IEDs.

If you minimize the xSlave window, the window will disappear and you can find it on the task bar and will appear again after a double-click on it. Refer to the following screenshot.

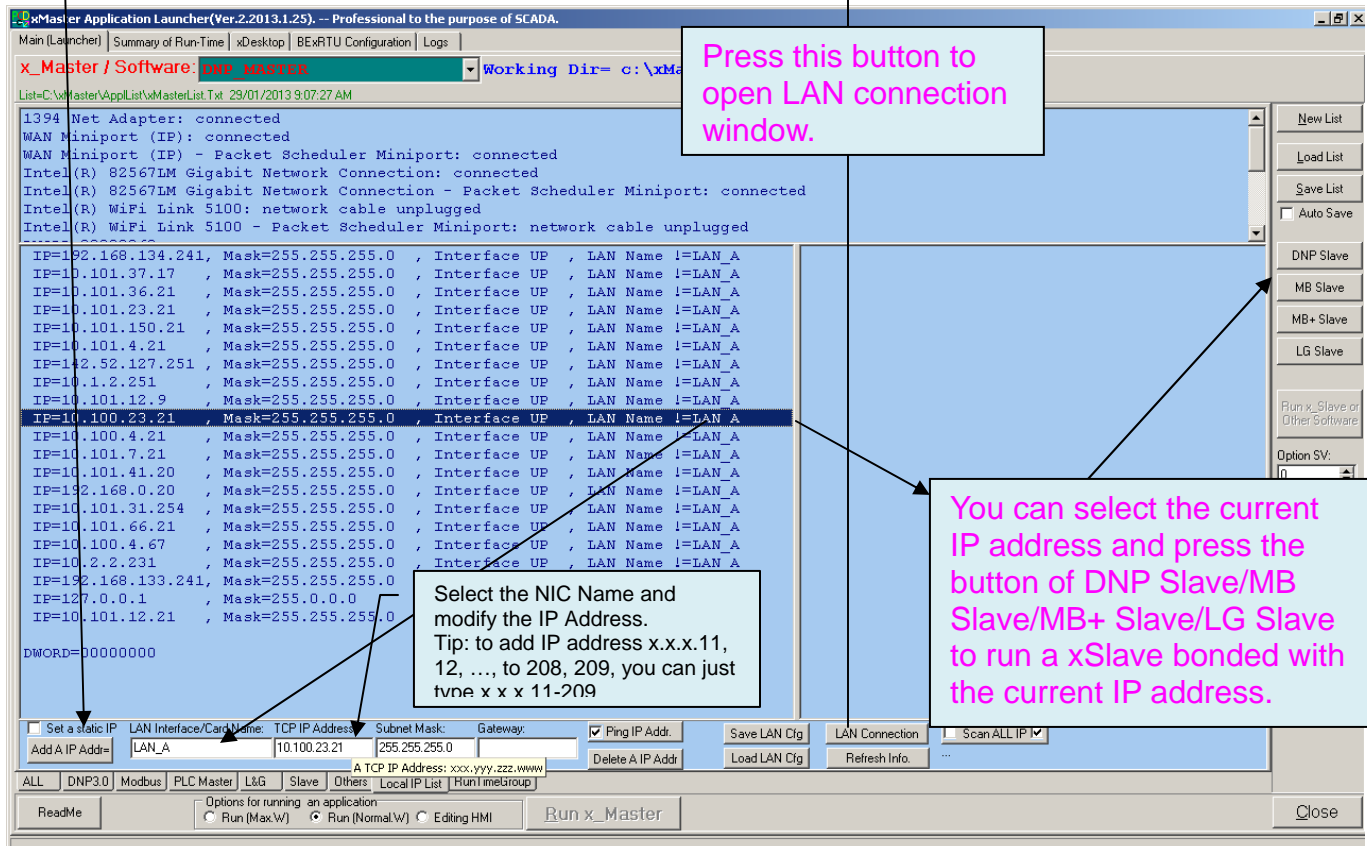
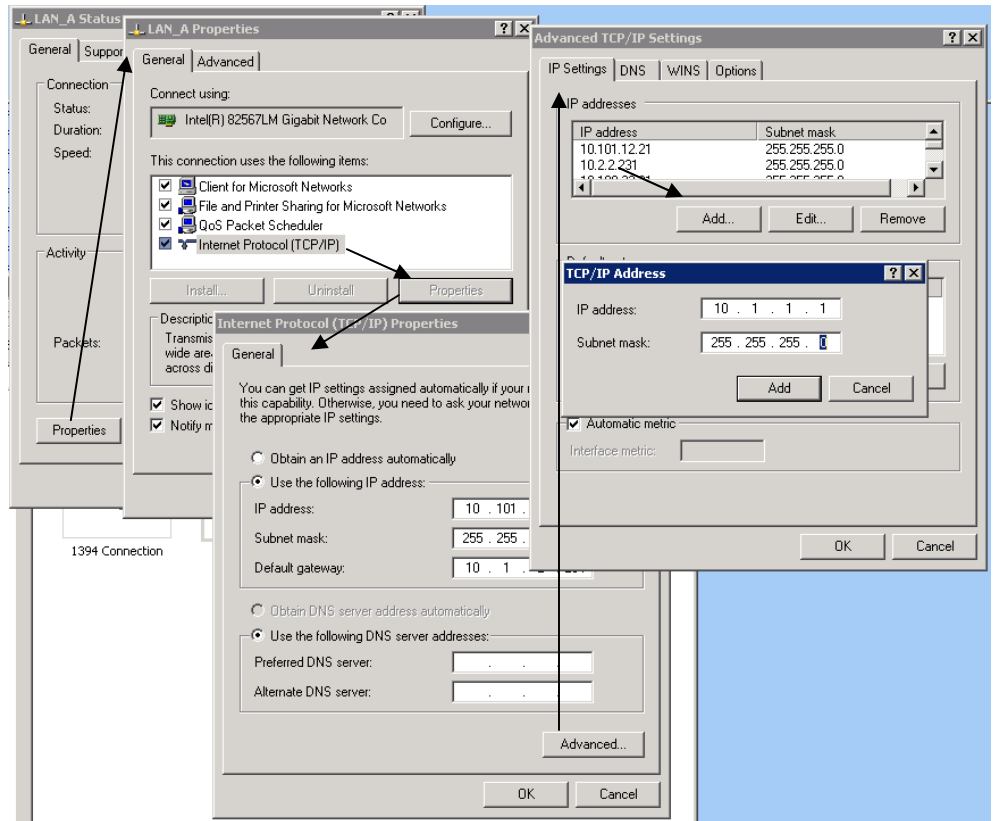


For LAN (TCP/IP) connection:

Assign Multi-IP address to the current computer NIC to simulate Multi-Slaves over the LAN/TCP-IP Connection.

In the Tab of [Local IP List] in xMaster window:

Add all slave IP address here directly (if OS is Window XP) or press the button of [LAN Connection] (if OS is Win7/8) to get into the window of Network Interface Card (NIC) Properties→ TCP/IP →Advanced→ IP Settings [Add].



3 Administrator & Setup

3.1 Setup for MB_Slave

The screenshot Figure 3-1 is the window of Administrator & Setup of MB_Slave.

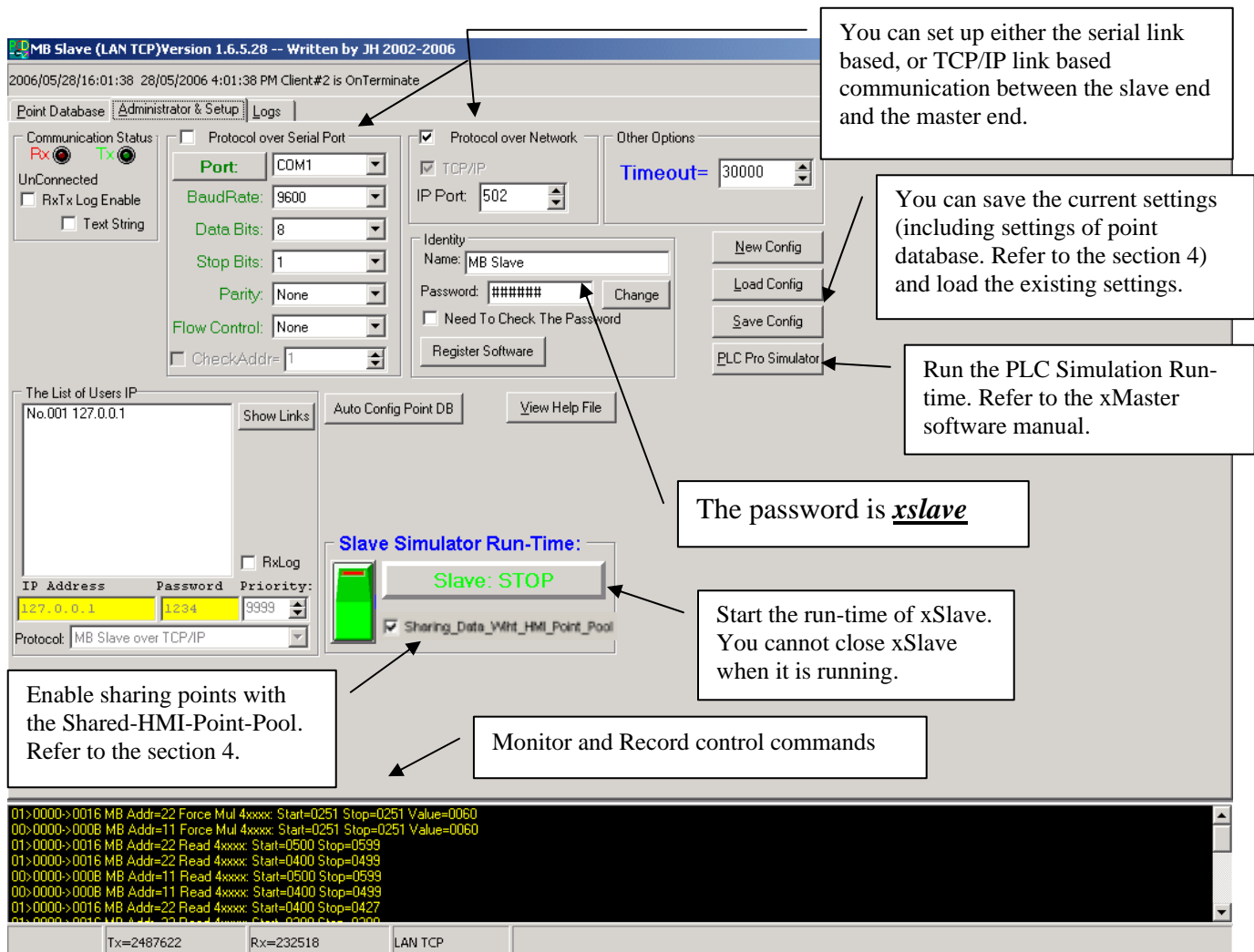


Figure 3-1

Note:

If the IP Port is 502 and 300-3099, the MB_Slave runs the protocol of Modbus TCP/IP, otherwise runs Modbus RTU protocol over TCP/IP.

In MB/MBP Slave you have an option to configure how to form 32bit data. [X]Modbus 32Bit Data If checked, the 2nd Word(16bit) is the Bit31-24 of 32bit data, otherwise is Bit15-00 of 32bit data. The data of 1x001 - 1x0ddd is assigned to the data of 3x001 - 3x0(ddd/16). e.g. if 1x001-1x0160 is assigned, 3x001-3x010 stores the data of 1x001-1x0160 by default.

3.2 Setup for MB_Plus_Slave

The screenshot Figure 3-3 is the window of Administrator & Setup of MB_Plus_Slave.

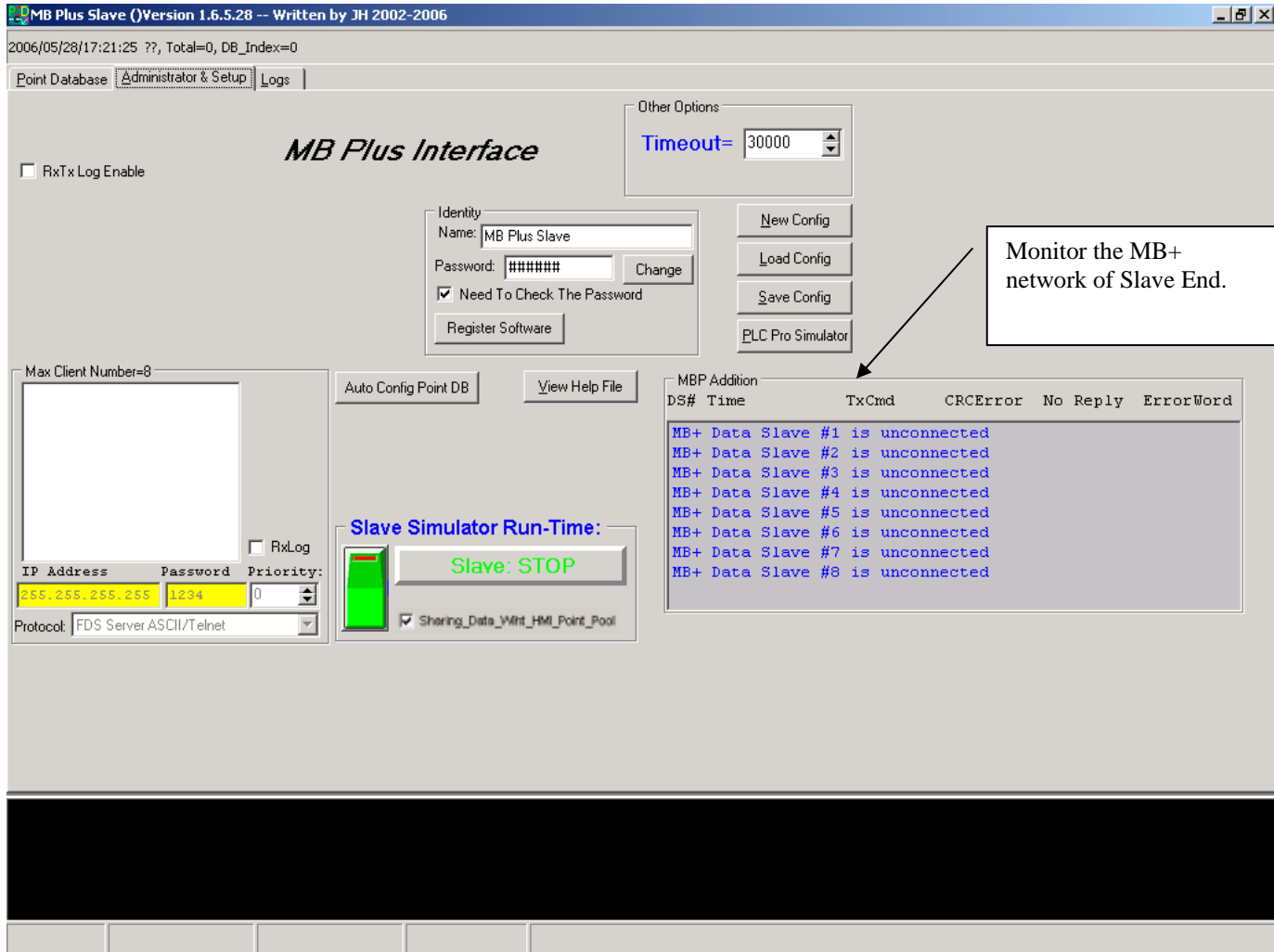


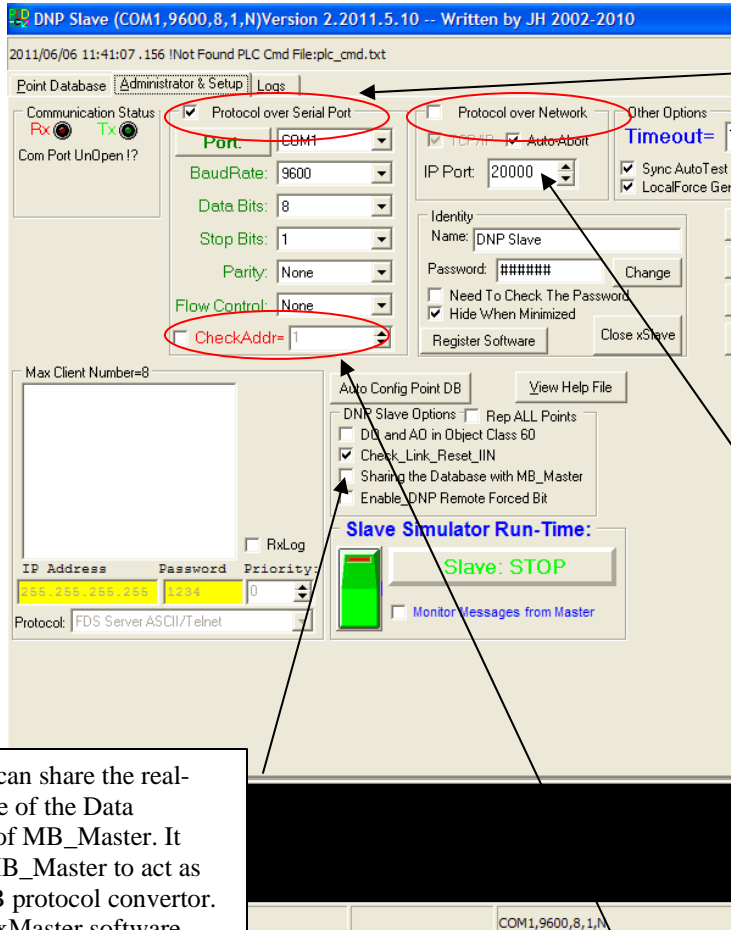
Figure 3-2

Note:

You have to ensure that MB+ Card driver works and is set up accordingly for MB+ network. You can use CONCEPT, the MB PLC programming tool, to connect to MB+ network and verify the existence of MB+ Master End or MB+ Network.

3.3 Setup for DNP_Slave

The screenshot Figure 3-4 is the window of Administrator & Setup of DNP_Slave.



DNP_Slave can share the real-time database of the Data Acquisition of MB_Master. It allows the MB_Master to act as the DNP-MB protocol convertor. Refer to the xMaster software manual. The DNP Slave End can forward controls sent by the DNP_Master to the slave end of the MB_Master, which is Modbus Slave End. It means DNP Master can control Modbus device(s) indirectly.

Figure 3-3

Setup the communication

For link over RS232:

Step1: check [X] Protocol over Serial Port.

Step2: select the comm port.

Step3: setup comm port parameters to match with the existing communication link between the DNP Master and the Slave.

Double-Click on the settings of Serial com port (Protocol over Serial Port) to popup Windows Device Manager.

For link over LAN:

Step1: check [X] Protocol over Network (TCP/IP).

Step2: Setup the IP port. For DNP3, the port number usually is 20000.

Step3: Setup your PC local LAN IP Address that can be recognized (reachable) by the DNP Master. If the DNP Master IP is 10.100.7.1, for example, your PC LAN IP address can be 10.100.7. 102 – the existing DNP Slave device IP address and must disconnect the existing LAN connection before the setting.

There is an option []Auto-Abort to enable/disable terminate the LAN TCP/IP socket connection if the Master End is silent for a while (TO=Timeout setting X 100).

If want to response only for a specific slave address check it and define the current slave device address/node. It's for multi-drop link over serial (incl. Modem) connections.

3.4 The List of TCP/IP Connection

The screenshot Figure 3-5 is the List of Client Connection over TCP/IP Link.

xSlave can support up to 32 connections. A special version for DNP Slave (dnpslave_200.exe) can support up to 200 connections simultaneously.

If the xSlave is connected over the LAN, you can check the all TCP/IP LAN connections by pressing the button of [Show Links]. All connections share the same point database. Double-click on it to expand/restore the table.

No.	Address	IP Address	IP Port	Messages
1	Master#=1, Slave#=1201	10.100.31.247	3796	RxTotal(Bytes)=27067779, TxTotal(Bytes)=25338401, EP=1859, I
2	Master#=1, Slave#=1202	10.100.31.247	3797	RxTotal(Bytes)=27067106, TxTotal(Bytes)=25336726, EP=1750, I
3	Master#=1, Slave#=1203	10.100.31.247	3798	RxTotal(Bytes)=27066482, TxTotal(Bytes)=25335085, EP=1625, I
4	Master#=1, Slave#=1204	10.100.31.247	1144	RxTotal(Bytes)=5517858, TxTotal(Bytes)=5160414, EP=1454, IP=10.100.31.24
5	Master#=1, Slave#=102	10.100.7.1	4694	RxTotal(Bytes)=49717192, TxTotal(Bytes)=1889248531, EP=610, I 10.100.7.102
6	Master#=1, Slave#=1022	10.100.7.1	4689	RxTotal(Bytes)=22113591, TxTotal(Bytes)=21732269, EP=1110, I 10.100.7.22
7				
8	Master#=1, Slave#=103	10.100.7.1	4691	RxTotal(Bytes)=49873768, TxTotal(Bytes)=1895198427, EP=625, I 10.100.7.103

Database: DI=512, DO=128, AI=160, AO=32, CNT=64

Figure 3-4

Note:

TCP Connection Silent Timeout is 10 times the setting of Timeout. It means that the TCP/IP connection between the slave and the master will be terminated after xx minutes the master still does not talk to the slave.

Right-Click on the current session/connection to determinate how to connect the Slave Point Database. The default is all Slave sessions/connection share the same point database. You can have the current session/connection link not to reply any data changes ([Disconnect from Database (Reply with Data-Zero)]) and the rest sessions still share the point database. You also can have the current session is the only one connected to the point database ([Connect Database exclusively]) and the rest sessions reply polling with Data-Zero only.

Note: If the current session/TCP IP connection is disconnected you have select another alive session to be connected or [Restore Database connection for ALL].

EP: Event Poll Interval/ How often the Master End Poll Class 1/2/3.

IP: Integrity Poll Interval/ How often the Master End Poll Class 0.

To expand/restore the window of LAN(TCP/IP) Link-Clients, you can double-click on the "Clients".

4 Point Database

You can set up a default point database after setting the total points of DI/DO/AI/AO/COUNTER. Refer to the section 3, you can click on the button of “AutoConfig DB”, which sets the default actions for DO/AO.

Note: All sessions of xSlave share the same point database. You may save the settings of total points of DI/DO/AI/AO/COUNTER. Refer to the section 3.1: buttons of “Load/Save Config”. And you should enable settings by clicking on the button of “Set DB Point”.

You can check whether the current point is sharing the data with others. Refer to the screenshot Figure 4-1.

Set the size of the point database.
Refer to the RTU point assignment or DNP Device Point List.
Step1: Setup Total DI Point(s).
Step2: Setup Total DO Point(s).
Step3: Setup Total AI Point(s).
Step4: Setup Total AO Point(s).
Step5: Setup Total Counter Point(s).
Step6: Presses the button of Set DB Points. Click on [NO] to define a default database.

Note: Support Points up to 8192 per instance of Slave Application.

No	Value/State	Online	DateTime/Others
0	OFF	ONLINE	ShortName=DI0001 LongName=
1	OFF	ONLINE	ShortName=DI0002 LongName=
2	OFF	ONLINE	ShortName=DI0003 LongName=
3	OFF	ONLINE	ShortName=DI0004 LongName=
4	OFF	ONLINE	ShortName=DI0005 LongName=
5	OFF	ONLINE	ShortName=DI0006 LongName=
6	OFF	ONLINE	ShortName=DI0007 LongName=
7	OFF	ONLINE	ShortName=DI0008 LongName=
8	OFF	ONLINE	ShortName=DI0009 LongName=
9	OFF	ONLINE	ShortName=DI0010 LongName=
10	OFF	ONLINE	ShortName=DI0011 LongName=
11	OFF	ONLINE	ShortName=DI0012 LongName=
12	OFF	ONLINE	ShortName=DI0013 LongName=
13	OFF	ONLINE	ShortName=DI0014 LongName=

Figure 4-1

4.1 Point Database of DNP

The screenshot Figure 4-2 to 4-6 is the Point Database of DNP.

The page of DI - Digital Input is shown as follows:

The screenshot shows the 'DNP Slave (LAN TCP) Version 1.6.5.28' software interface. The 'Point Database' tab is active, showing the 'DI' (Digital Input) section. The 'Total DI Point(s)' is set to 800. The 'Preset' is 0, and the 'State' is OFF. The interface displays a grid of 64 DI points (1-64) and a table of their states.

Annotations:

- Set up the number of DI point in the Point Database. You should enable settings by clicking on the button of "Set DB Point".
- Set the state of DI by clicking on it.
- Double-Click on the DI points to toggle the state directly.
- Set the state of DI by clicking on the column of Value/State.
- Set DI Object ONLINE/OFFLINE by clicking on the column of Online.

No	Value/State	Online	DateTime
0	OFF	ONLINE	13:53:30 Mar 30
1	OFF	ONLINE	13:53:30 Mar 30
2	OFF	ONLINE	11:55:00 Mar 29
3	OFF	ONLINE	
4	OFF	ONLINE	
5	OFF	ONLINE	
6	OFF	ONLINE	
7	OFF	ONLINE	15:41:49 Mar 07
8	OFF	ONLINE	15:41:49 Mar 07
9	OFF	ONLINE	15:41:49 Mar 07
10	OFF	ONLINE	15:41:49 Mar 07
11	OFF	ONLINE	15:41:49 Mar 07
12	OFF	ONLINE	15:41:49 Mar 07
13	OFF	ONLINE	15:41:49 Mar 07

Figure 4-2

Note: the number of points in DNP and LG is starting from 0. But the number of points in DI/DO modules (LED lights panel) and Modbus is starting from 1.

The page of DO - Digital Output is shown as follows:

Set up the number of DO point in the Point Database.

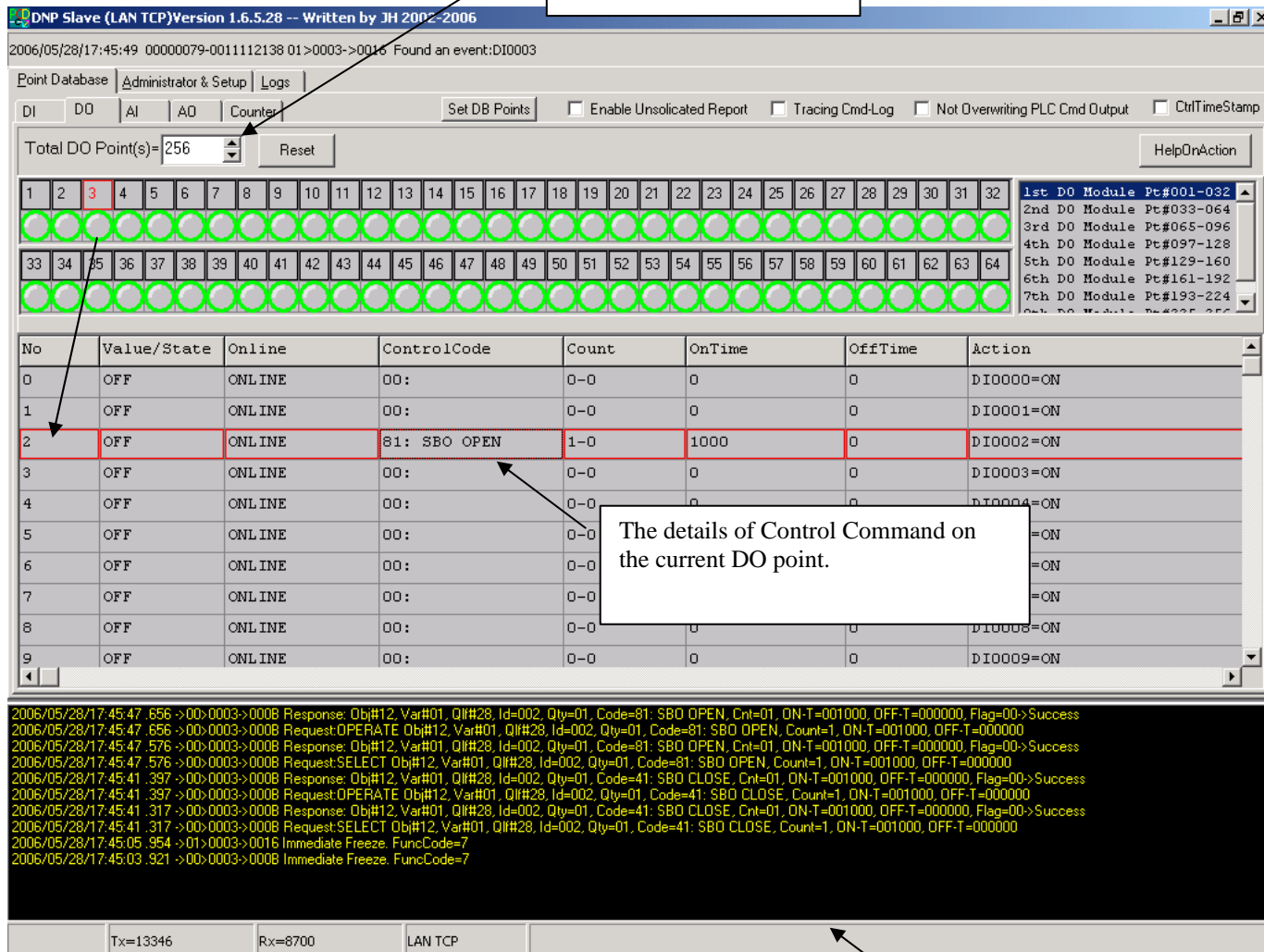


Figure 4-3

Monitor and Log Control Commands.

Note:

You can setup actions after controls by the configuration of the column of Action. Click on the button of HelpOnAction to get help how the Action works. The default action of DO Control is that the state of DI OFF/ON is set by the DO control commands of ON/OFF or OPEN/CLOSE.

The 24-Bit Binary Output is sharing with SBO/DO/Pulse Output. It means that Binary-Output Point/Block #1 uses DO Point #1 to #24, Binary-Output Point/Block #2 uses DO Point #25 to #48, and so on. The current DO-Script/Control-action will be blocked when its flag of OFFLINE is ON.

The page of AI - Analogue Input is shown as follows:

Set up the number of AI point in the Point Database.

You can set up a watchdog timer by setting the point number and the timer in seconds. If the point number is 0, there is no watchdog timer.

First please select the current point. You can edit/input the value for the current point. The data format can be in the formats of Integer, Hex (i.e. **0xAA55**) and 32Bit Integer (i.e. **1234567L**) and floating (i.e. **23.45F**). You can edit the value by clicking on it. If you want to change 32-bit integer back to 16-bit integer, you input a data within -32768 to 32767 and followed by 'S' (i.e. **1234S**). Press the key of Enter to confirm the value you input. It also applies when you edit/input the value for other data.

No	Value/State	Online	DateTime
0	0/0000/0000,0000,0000,0000	ONLINE	11:54:32 Mar 29
1	32769/8001/1000,0000,0000,0001	ONLINE	17:48:30
2	0/0000/0000,0000,0000,0000	ONLINE	12:50:51
3	0/0000/0000,0000,0000,0000	ONLINE	12:50:51
4	0/0000/0000,0000,0000,0000	ONLINE	12:50:51
5	0/0000/0000,0000,0000,0000	ONLINE	12:50:51 Mar 07
6	0/0000/0000,0000,0000,0000	ONLINE	12:50:51 Mar 07
7	0/0000/0000,0000,0000,0000	ONLINE	12:50:51 Mar 07
8	0/0000/0000,0000,0000,0000	ONLINE	12:50:51 Mar 07
9	0/0000/0000,0000,0000,0000	ONLINE	
10	0/0000/0000,0000,0000,0000	ONLINE	
11	0/0000/0000,0000,0000,0000	ONLINE	
12	0/0000/0000,0000,0000,0000	ONLINE	
13	0/0000/0000,0000,0000,0000	ONLINE	
14	0/0000/0000,0000,0000,0000	ONLINE	
15	0/0000/0000,0000,0000,0000	ONLINE	

2006/05/28/17:45:28.894 -> 01>0003>0016 Immediate Freeze. FuncCode=7
 2006/05/28/17:45:19.592 -> 00>0003>0008 Immediate Freeze. FuncCode=7
 2006/05/28/17:45:47.656 -> 00>0003>0008 Response: Obj#12, Var#01, QI#28, Id=002.
 2006/05/28/17:45:47.656 -> 00>0003>0008 Request: OPERATE Obj#12, Var#01, QI#28
 2006/05/28/17:45:47.576 -> 00>0003>0008 Response: Obj#12, Var#01, QI#28, Id=002.
 2006/05/28/17:45:47.576 -> 00>0003>0008 Request: SELECT Obj#12, Var#01, QI#28, Id=002.
 2006/05/28/17:45:41.397 -> 00>0003>0008 Response: Obj#12, Var#01, QI#28, Id=002.
 2006/05/28/17:45:41.397 -> 00>0003>0008 Request: OPERATE Obj#12, Var#01, QI#28
 2006/05/28/17:45:41.317 -> 00>0003>0008 Response: Obj#12, Var#01, QI#28, Id=002.
 2006/05/28/17:45:41.317 -> 00>0003>0008 Request: SELECT Obj#12, Var#01, QI#28, Id=002.
 2006/05/28/17:45:05.954 -> 01>0003>0016 Immediate Freeze. FuncCode=7
 2006/05/28/17:45:03.921 -> 00>0003>0008 Immediate Freeze. FuncCode=7

Tx=37968 Rx=30896 LAN TCP

Figure 4-4

The page of AO - Analogue Output is shown as follows:

Set up the number of AO point in the Point Database.

DNP Slave (LAN TCP) Version 1.6.5.28 -- Written by JH 2002-2006

2006/05/28/17:50:56 000003BC-0011418719 01>0003->0016 Found an event:AI0004

Point Database Administrator & Setup Logs

DI DO AI AO Counter Set DB Points ☐ Enable Unsolicited Report ☐ Tracing Cmd-Log ☐ Not Overwriting PLC Cmd Output ☐ CtrlTimeStamp

Total AO Point(s)= 256 Reset 1234 HelpOnAction

No	Value/State	Online	Action	DateTime
0	0	ONLINE	AI0000=*	12:50:51 Mar 07
1	0	ONLINE	AI0001=*	12:50:51 Mar 07
2	0	ONLINE	AI0002=*	12:50:51 Mar 07
3	1234	ONLINE	AI0003=*	17:50:55 May 28
4	0	ONLINE	AI0004=*	12:50:51 Mar 07
5	0	ONLINE	AI0005=*	12:50:51 Mar 07
6	0	ONLINE	AI0006=*	12:50:51 Mar 07
7	0	ONLINE	AI0007=*	12:50:51 Mar 07
8	0	ONLINE	AI0008=*	12:50:51 Mar 07
9	0	ONLINE	AI0009=*	12:50:51 Mar 07
10	0	ONLINE	AI0010=*	12:50:51 Mar 07
11	0	ONLINE	AI0011=*	12:50:51 Mar 07
12	0	ONLINE	AI0012=*	12:50:51 Mar 07
13	0	ONLINE	AI0013=*	12:50:51 Mar 07
14	0	ONLINE	AI0014=*	12:50:51 Mar 07
15	0	ONLINE	AI0015=*	12:50:51 Mar 07

```

2006/05/28/17:50:55 508->00>0003>000B Request:DIRECT OPERATE w/O ACK Obj#41, Var#02, QI#28, Id=003, Qty=01, AO Value= Byte#1=D2 Byte#2=04 Ctrl Status=00
2006/05/28/17:46:28 894->01>0003>0016 Immediate Freeze. FuncCode=7
2006/05/28/17:46:19 592->00>0003>000B Immediate Freeze. FuncCode=7
2006/05/28/17:45:47 656->00>0003>000B Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
2006/05/28/17:45:47 656->00>0003>000B Request:OPERATE Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Count=1, ON-T=001000, OFF-T=000000
2006/05/28/17:45:47 576->00>0003>000B Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
2006/05/28/17:45:47 576->00>0003>000B Request:SELECT Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Count=1, ON-T=001000, OFF-T=000000
2006/05/28/17:45:41 397->00>0003>000B Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
2006/05/28/17:45:41 397->00>0003>000B Request:OPERATE Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Count=1, ON-T=001000, OFF-T=000000
2006/05/28/17:45:41 317->00>0003>000B Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
2006/05/28/17:45:41 317->00>0003>000B Request:SELECT Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Count=1, ON-T=001000, OFF-T=000000
2006/05/28/17:45:05 954->01>0003>0016 Immediate Freeze. FuncCode=7
2006/05/28/17:45:03 921->00>0003>000B Immediate Freeze. FuncCode=7

```

Tx=50041 Rx=47913 LAN TCP

Figure 4-5

Note:

You can setup actions after controls by the configuration of the column of Action. Click on the button of HelpOnAction to get help how the Action works. The default action of AO Control is that the Value of AI is set by the Setpoint of AO.

The page of Counter is shown as follows:

DNP Slave (LAN TCP) Version 1.6.5.28 -- Written by JH 2002-2006

2006/05/28/17:52:29 000004C8-0011511582 01>0003->0016 Found an event:CNT0004

Point Database | Administrator & Setup | Logs

DI | DO | AI | AO | Counter | Set DB Points | ☐ Enable Unsolicited Report | ☐ Tracing Cmd-Log | ☐ Not Overwriting PLC Cmd Output | ☐ CtrlTimeStamp

Total CNT Point(s)= 64 Preset= 0 12345 ☐ It is Running Counter

No	Value/State	Online	DateTime
0	0	ONLINE	15:22:04 Mar 13
1	0	ONLINE	15:22:04 Mar 13
2	0	ONLINE	15:22:04 Mar 13
3	12345	ONLINE	17:52:28 May 28
4	0	ONLINE	15:22:04 Mar 13
5	0	ONLINE	15:22:04 Mar 13
6	0	ONLINE	15:22:04 Mar 13
7	0	ONLINE	15:22:04 Mar 13
8	0	ONLINE	15:22:04 Mar 13
9	0	ONLINE	15:22:04 Mar 13
10	0	ONLINE	15:22:04 Mar 13
11	0	ONLINE	15:22:04 Mar 13
12	0	ONLINE	15:22:04 Mar 13
13	0	ONLINE	15:22:04 Mar 13
14	0	ONLINE	15:22:04 Mar 13
15	0	ONLINE	15:22:04 Mar 13

2006/05/28/17:51:28 895->01>0003->0016 Immediate Freeze. FuncCode=7
 2006/05/28/17:51:26 323->00>0003->0008 Immediate Freeze. FuncCode=7
 2006/05/28/17:50:55 508->00>0003->0008 Request:DIRECT OPERATE w/O ACK Obj#41, Var#02, QI#28, Id=003, Qty=01, AO Value= Byte#1=D2 Byte#2=04 Ctrl_Status=00
 2006/05/28/17:46:28 894->01>0003->0016 Immediate Freeze. FuncCode=7
 2006/05/28/17:46:19 592->00>0003->0008 Immediate Freeze. FuncCode=7
 2006/05/28/17:45:47 656->00>0003->0008 Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
 2006/05/28/17:45:47 656->00>0003->0008 Request:OPERATE Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Count=1, ON-T=001000, OFF-T=000000
 2006/05/28/17:45:47 576->00>0003->0008 Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
 2006/05/28/17:45:47 576->00>0003->0008 Request:SELECT Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=81: SBO OPEN, Count=1, ON-T=001000, OFF-T=000000
 2006/05/28/17:45:41 397->00>0003->0008 Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
 2006/05/28/17:45:41 397->00>0003->0008 Request:OPERATE Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Count=1, ON-T=001000, OFF-T=000000
 2006/05/28/17:45:41 317->00>0003->0008 Response: Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Cnt=01, ON-T=001000, OFF-T=000000, Flag=00->Success
 2006/05/28/17:45:41 317->00>0003->0008 Request:SELECT Obj#12, Var#01, QI#28, Id=002, Qty=01, Code=41: SBO CLOSE, Count=1, ON-T=001000, OFF-T=000000

Tx=63809 Rx=60747 LAN TCP

Figure 4-6

For DNP Slave, the following is the supported Object/Variation:

Objects	Variations	Qualifier (8/16-Bit Start/Stop)	Note
1	0,1,2	0x00,0x01,0x06	DI
2	0,1,2	0x00,0x01,0x06	DI Events, with T-Stamp
10	0,2	0x00,0x01,0x06	DO Status
12	1,2,3	0x00,0x01,0x06,0x17,0x27,0x28	DO Control
20	0,1,2,3,4,5,6	0x00,0x01,0x06	Counter 16/32-Bit
21	0,1,2,3,4,5,6	0x00,0x01,0x06	Counter Events, with T-Stamp
22	0,1,2,3,4,5,6	0x00,0x01,0x06	Frozen Counter
23	0,1,2,3,4,5,6	0x00,0x01,0x06	Frozen Counter Events
30	0,1,2,3,4,5	0x00,0x01,0x06	AI 16/32-Bit(floating)
32	0,1,2,3,4,5	0x00,0x01,0x06	AI Events, with T-Stamp
40	0,1,2,3,4	0x00,0x01,0x06	AO Status
41	1,2,3	0x00,0x01,0x06,0x17,0x27,0x28	AO Controls
50	0,1	0x00,0x01,0x06	D&T
60	1,2,3,4	0x06	Class data (Event-Poll)

The current Counter object var#2 (16-bit) can be changed to var#1(32-bit) when you input the data string with a suffix:"L".

☐ Obj_2_1_For_IntegrityPoll

Default is Unchecked. If Checked, the DNP Slave replies the integrity-poll with Obj1-Var2 instead of Obj1-Var1.

☐ Enable_DNP Remote Forced Bit

Default is Unchecked. If Checked, the DNP Slave sets the bit of Remote Force when you change the value of the current point manually.

☒ Enable Frozing Command in DNP Slave so that the DNP Object #20 and #21 can be read respectively.

☐ Sync AutoTest with Event-Poll

☐ LocalForce Generates Events

DNP Multi-SBO points command (multi-points in the same DNP protocol frame - Select & Operation) is allowed.

4.2 Point Database of Modbus

The screenshots Figure 4-7 to 4-9 is the Point Database of Modbus.

The page of DI - Digital Input -- 1xxx is shown as follows:

MB Slave (LAN TCP) Version 1.6.5.28 -- Written by JH 2002-2006

2006/05/28/17:13:56 Start the Data Server thread:127.0.0.1

Point Database | Administrator & Setup | Logs

DI 1xxx | DO 0xxxx | Reg 4xxxx | Set DB Points | ☐ Enable Unsolicited Report | ☐ Tracing Cmd-Log | ☐ Not Overwriting PLC Cmd Output | ☐ CtrlTimeStamp

Total DI Point(s) = 512 | Preset = 0 | OFF | MB DI Point Offset = 0

No	Value/State	Online	DateTime
1	OFF	ONLINE	15:55:00 Dec 05
2	OFF	ONLINE	15:55:00 Dec 05
3	OFF	ONLINE	15:55:00 Dec 05
4	OFF	ONLINE	15:55:00 Dec 05
5	OFF	ONLINE	15:55:00 Dec 05
6	OFF	ONLINE	15:55:00 Dec 05
7	OFF	ONLINE	15:55:00 Dec 05
8	OFF	ONLINE	15:55:00 Dec 05
9	OFF	ONLINE	15:55:00 Dec 05
10	OFF	ONLINE	15:55:00 Dec 05
11	OFF	ONLINE	15:55:00 Dec 05
12	OFF	ONLINE	15:55:00 Dec 05
13	OFF	ONLINE	15:55:00 Dec 05
14	OFF	ONLINE	15:55:00 Dec 05

1st DI Module Pt#001-064
2nd DI Module Pt#065-128
3rd DI Module Pt#129-192
4th DI Module Pt#193-256
5th DI Module Pt#257-320
6th DI Module Pt#321-384
7th DI Module Pt#385-448

You can define the first point number. The default is 1x001

01>0000->0016 MB Addr=22 Force Mul 4xxxx: Start=0251 Stop=0251 Value=01BC
00>0000->0008 MB Addr=11 Force Mul 4xxxx: Start=0251 Stop=0251 Value=01BC
01>0000->0016 MB Addr=22 Read 4xxxx: Start=0500 Stop=0599
01>0000->0016 MB Addr=22 Read 4xxxx: Start=0400 Stop=0499
00>0000->0008 MB Addr=11 Read 4xxxx: Start=0500 Stop=0599
00>0000->0008 MB Addr=11 Read 4xxxx: Start=0400 Stop=0499
01>0000->0016 MB Addr=22 Read 4xxxx: Start=0400 Stop=0427
01>0000->0016 MB Addr=22 Read 4xxxx: Start=0400 Stop=0427

Tx=7553078 Rx=707472 LAN TCP

Figure 4-7

The page of DO - Modbus Coil -- 0xxx is shown as follows:

MB Slave (LAN TCP) Version 1.6.5.28 -- Written by JH 2002-2006

2006/05/28/17:13:56 Start the Data Server thread:127.0.0.1

Point Database | Administrator & Setup | Logs

DI 1xxx DO 0xxxx Reg 4xxxx

Set DB Points ☐ Enable Unsolicited Report ☐ Tracing Cmd-Log ☐ Not Overwriting PLC Cmd Output ☐ CtrlTimeStamp

Total DO Point(s)=128 Reset MB Coil Point Offset=0 HelpOnAction

No	Value/State	Online	ControlCode	Count	OnTime	OffTime	Action	Date
1	OFF	ONLINE	00:	0-0	0	0	DI0000=ON	15:
2	OFF	ONLINE	00:	0-0	0	0	DI0001=ON	15:
3	OFF	ONLINE	00:	0-0	0	0	DI0002=ON	15:
4	OFF	ONLINE	00:	0-0	0	0	DI0003=ON	15:
5	OFF	ONLINE	00:	0-0	0	0	DI0004=ON	15:
6	OFF	ONLINE	00:	0-0	0	0	DI0005=ON	15:
7	OFF	ONLINE	00:	0-0	0	0	DI0006=ON	15:
8	OFF	ONLINE	00:	0-0	0	0	DI0007=ON	15:
9	OFF	ONLINE	00:	0-0	0	0	DI0008=ON	15:
10	OFF	ONLINE	00:	0-0	0	0	DI0009=ON	15:
11	OFF	ONLINE	00:	0-0	0	0	DI0010=ON	15:
12	OFF	ONLINE	00:	0-0	0	0	DI0011=ON	15:
13	OFF	ONLINE	00:	0-0	0	0	DI0012=ON	15:

01>0000->0016 MB Addr=22 Force Mul 4xxxx: Start=0251 Stop=0251 Value=01D9
 00>0000->0008 MB Addr=11 Force Mul 4xxxx: Start=0251 Stop=0251 Value=01D9
 01>0000->0016 MB Addr=22 Read 4xxxx: Start=0500 Stop=0599
 00>0000->0008 MB Addr=11 Read 4xxxx: Start=0500 Stop=0599
 00>0000->0008 MB Addr=11 Read 4xxxx: Start=0400 Stop=0499
 01>0000->0016 MB Addr=22 Read 4xxxx: Start=0400 Stop=0427
 01>0000->0016 MB Addr=22 Read 4xxxx: Start=0400 Stop=0427

Tx=8124246 Rx=761046 LAN TCP

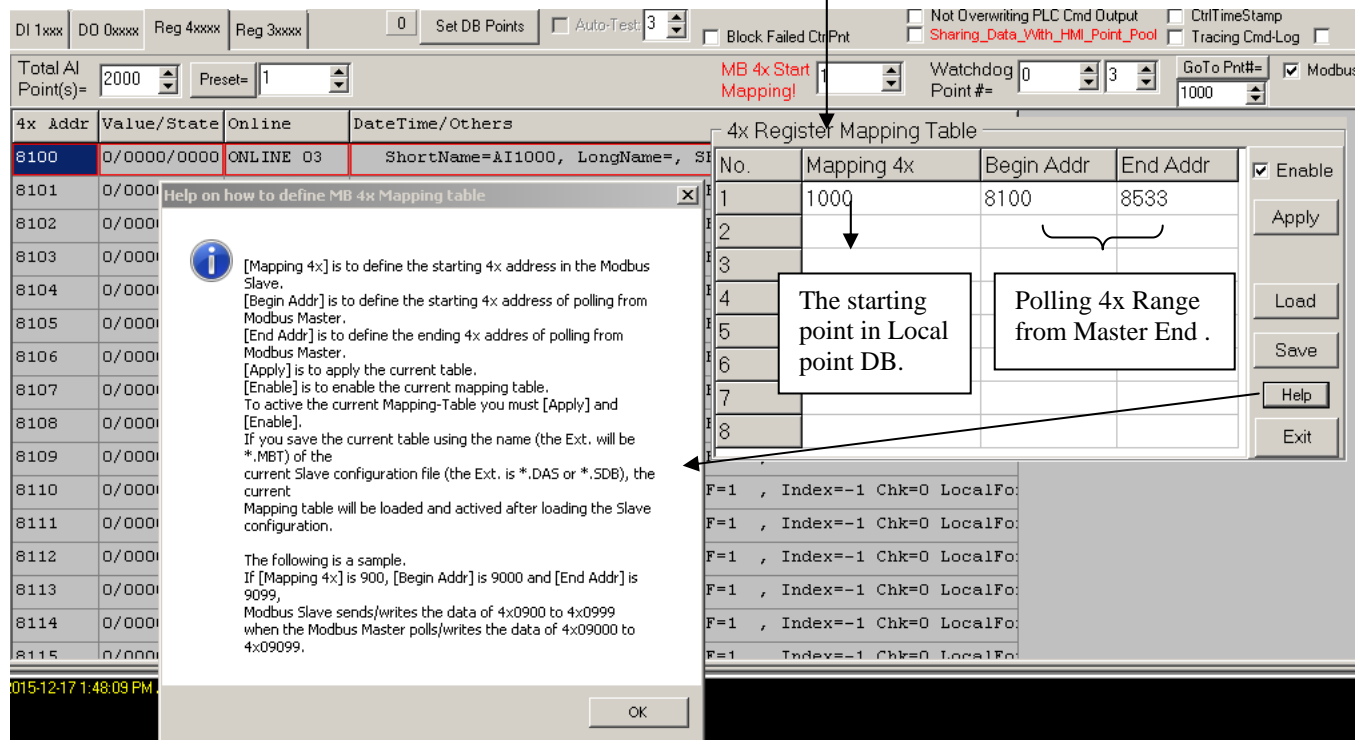
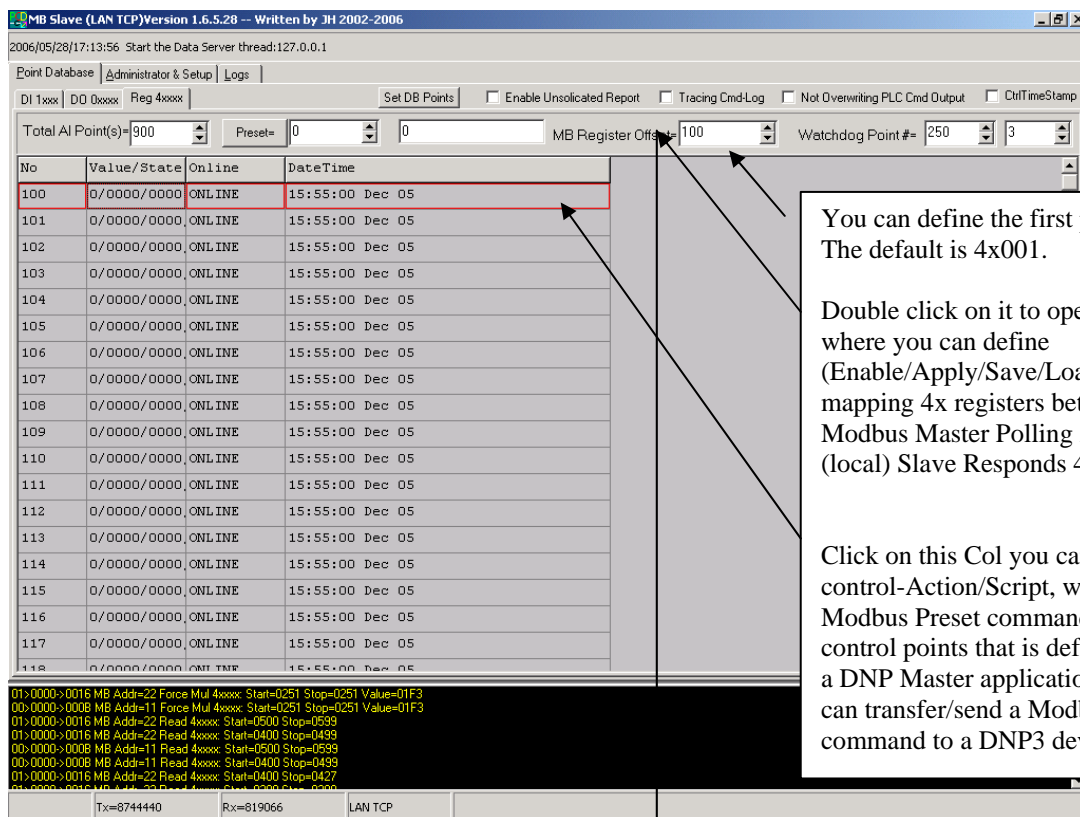
Figure 4-8

The page of AI/AO/COUNTER - Modbus Hold Registers -- 4xxx is shown as follows:

Note: By double-clicking on the label of [MB4x Start Address], the mapping table window will appear.

Figure 4-9

4.3



Processing the Tren-Points

The xSlave has the capability to process tren point and feed them into slave point database.

The file of Settings is xxxxx_tren_settings.txt. The contents of the file are described as follows:

A String: TheTrenPointFileName
A String: TheTrenPointFileSmpName
A String: TheTrenPointReadingProgram
A String: TheTrenPointReadingAckProgram
A DWord: TheTrenPointInterval (disable when 0)
A DWord: TrenPointOfflineTimeout (disable when 0)
A bool: NeedToDeleteTheTrenPointFile (enable when DELETETRENFILE)

If both files TheTrenPointFileName and TheTrenPointFileSmpName exist the TheTrenPointFileSmpName (and TheTrenPointFileName, if enabled) will be deleted after processing TheTrenPointFileName.

The following is a sample:

```
C:\xMaster\xSlaveAppl\dnpslave_tren_point.txt
C:\xMaster\xSlaveAppl\dnpslave_tren_smp.txt
*
*
1000
0
N
```

The file of Tren Point Setup is xxxxxx_setup.txt.

The format of the file of Tren Point Setup:

```
DI:dddd[TAB]vvvvvv[TAB][*][TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
AI:dddd[TAB]vvvvvv[TAB][*][TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
CNT:ddd[TAB]vvvvvv[TAB][*][TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
REG:ddd[TAB]vvvvvv[TAB][*][TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
```

The format of the file of Tren Point Data:

```
DI:dddd[TAB]vvvvvv[TAB]DateTimeString(or [*])[TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
AI:dddd[TAB]vvvvvv[TAB]DateTimeString(or [*])[TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
CNT:ddd[TAB]vvvvvv[TAB]DateTimeString(or [*])[TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
REG:ddd[TAB]vvvvvv[TAB]DateTimeString(or [*])[TAB]LongName[TAB]Scaling-A[TAB]Scaling-B[TAB]
```

Where [TAB] is the key of TAB and [*] is the Key *. DateTimeString is the time stamp referring the sample 11/9/2007 8:46:37 PM

Note: above prefix of the file name is defined by the current xSlave configuration file name that is created when you press the button of [Save Config]. For example, if you save the current configuration into (c:\xMaster\xSlaveAppl\)\ABCD.DAS, the xxxxx_tren_settings.txt will be ABCD_tren_settings.txt and the xxxxxx_setup.txt will be ABD_setup.txt. The files of Tren-Points are text-based file. User has to create/edit it manually (i.e. by using NotePad.exe, etc.). It will be loaded/detected/processed by xSlave automatically after *.DAS/*.SDB is loaded. User program now can run and generates the TheTrenPointFileSmpName (C:\xMaster\xSlaveAppl\dnpslave_tren_smp.txt) after the TheTrenPointFileName (C:\xMaster\xSlaveAppl\dnpslave_tren_point.txt) is created. The xSlave will read the data of Tren Point from dnpslave_tren_point.txt when dnpslave_tren_smp.txt is found and delete dnpslave_tren_smp.txt. User program start preparing/updating the Tren Point data file when finds dnpslave_tren_smp.txt is deleted. Again user program creates a new dnpslave_tren_smp.txt when finishes a new data file for all Tren Points.

5 Running and Log Information

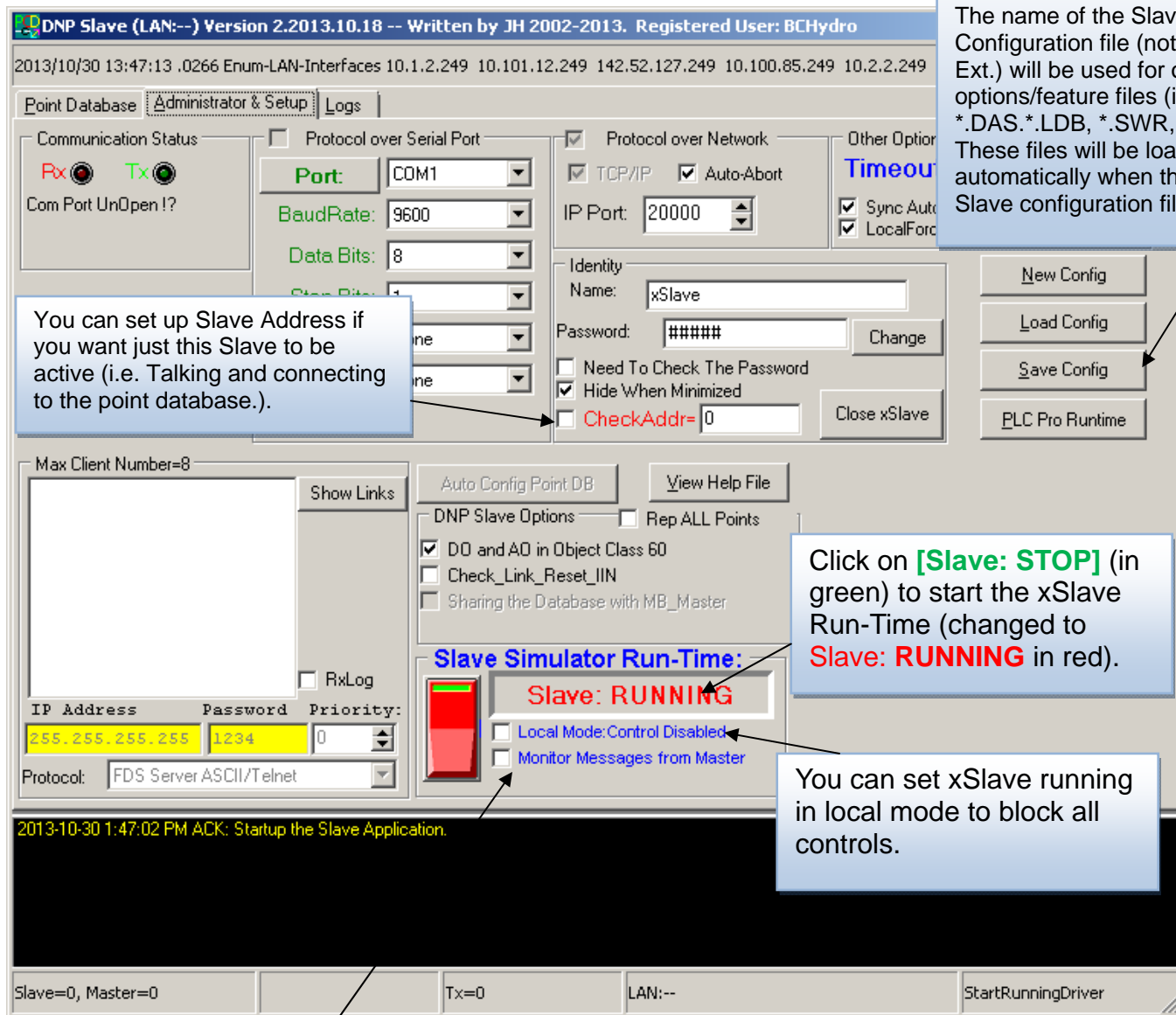


Figure 5-1

You can Load/Save the configuration/Settings. Using *.SDB (a Text based file) is Recommend. The name of the Slave Configuration file (not including Ext.) will be used for other options/feature files (i.e. *.DAS, *.LDB, *.SWR, Tren, etc.) These files will be loaded automatically when the current Slave configuration file is loaded.

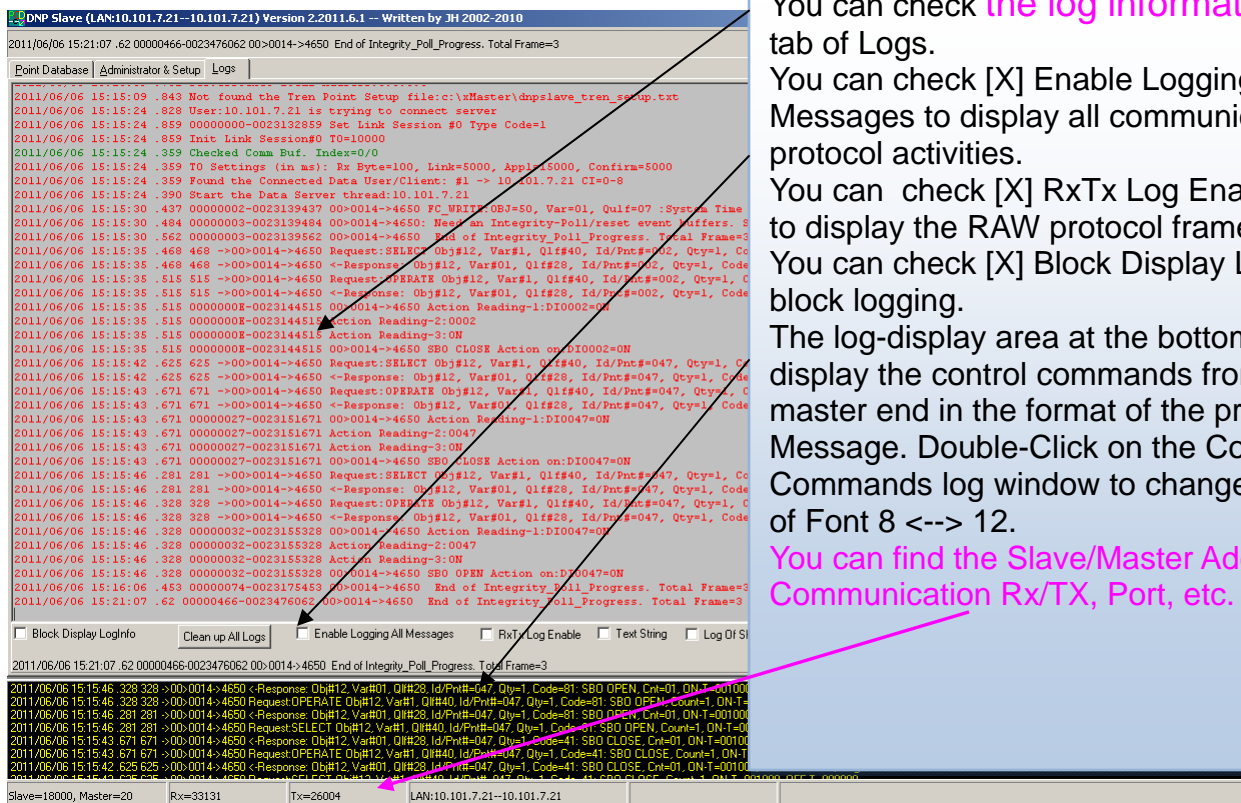
You can set up Slave Address if you want just this Slave to be active (i.e. Talking and connecting to the point database.).

Click on **[Slave: STOP]** (in green) to start the xSlave Run-Time (changed to **Slave: RUNNING** in red).

You can set xSlave running in local mode to block all controls.

To only monitor the polling and control commands from the xMaster (i.e DNP_Master or MB_Master) over a serial communication link by using 2-wire RS232 cable (Rx and GND), you can check [X] Monitor Messages from Master. In this case xSlave won't response and polling/control command.

There is an option to force replying all polling with ALL Points in the current point database. if Auto-Test is checked, all DI data will be toggled and all AI data will be increased by ONE.



You can check **the log information** in the tab of Logs.

You can check [X] Enable Logging All Messages to display all communication & protocol activities.

You can check [X] RxTx Log Enable only to display the RAW protocol frames/bytes.

You can check [X] Block Display Loginfo to block logging.

The log-display area at the bottom is to display the control commands from the master end in the format of the protocol Message. Double-Click on the Control-Commands log window to change the size of Font 8 <--> 12.

You can find the Slave/Master Address, Communication Rx/TX, Port, etc.

Figure 5-2

Double-Click on the Control-Commands log window to change the size of Font 8 <--> 12.

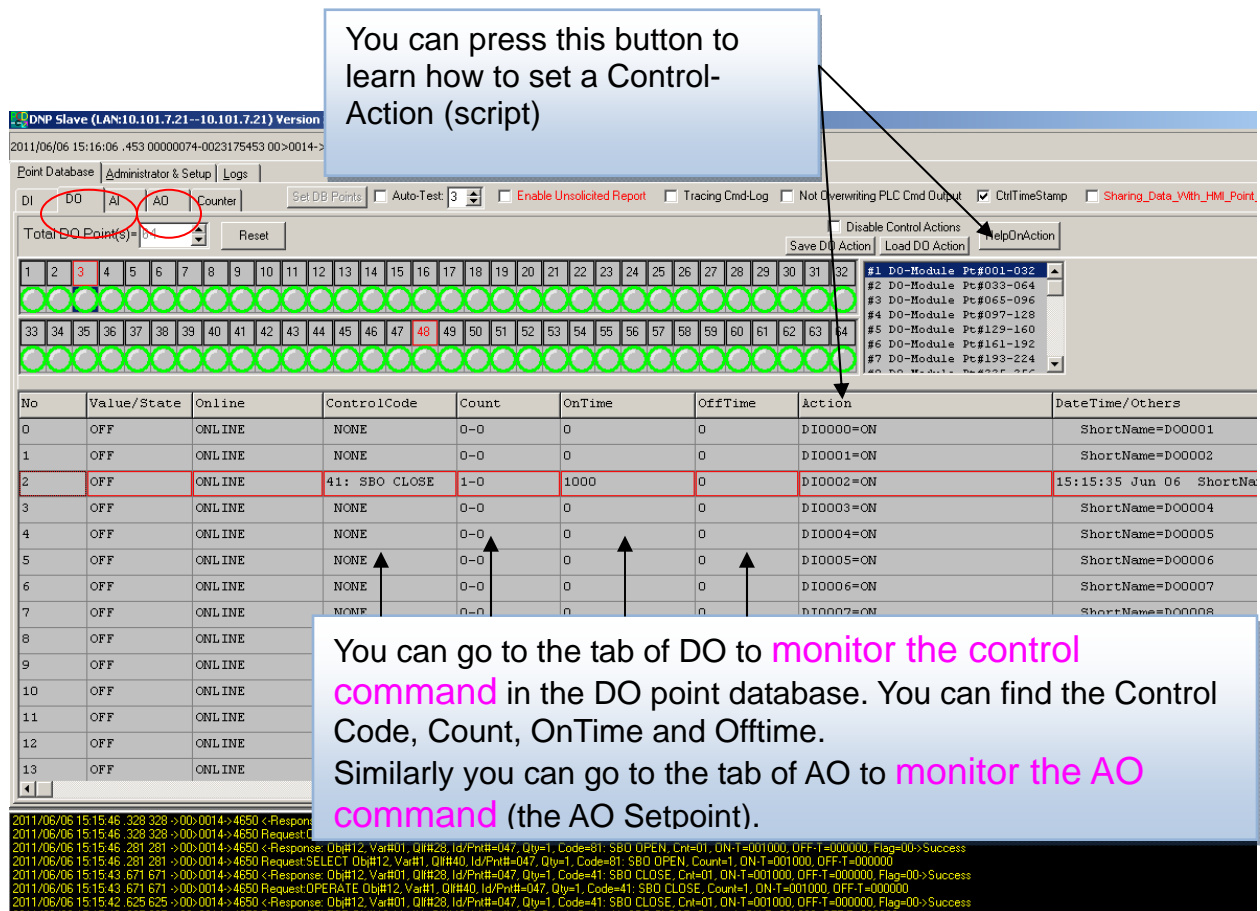
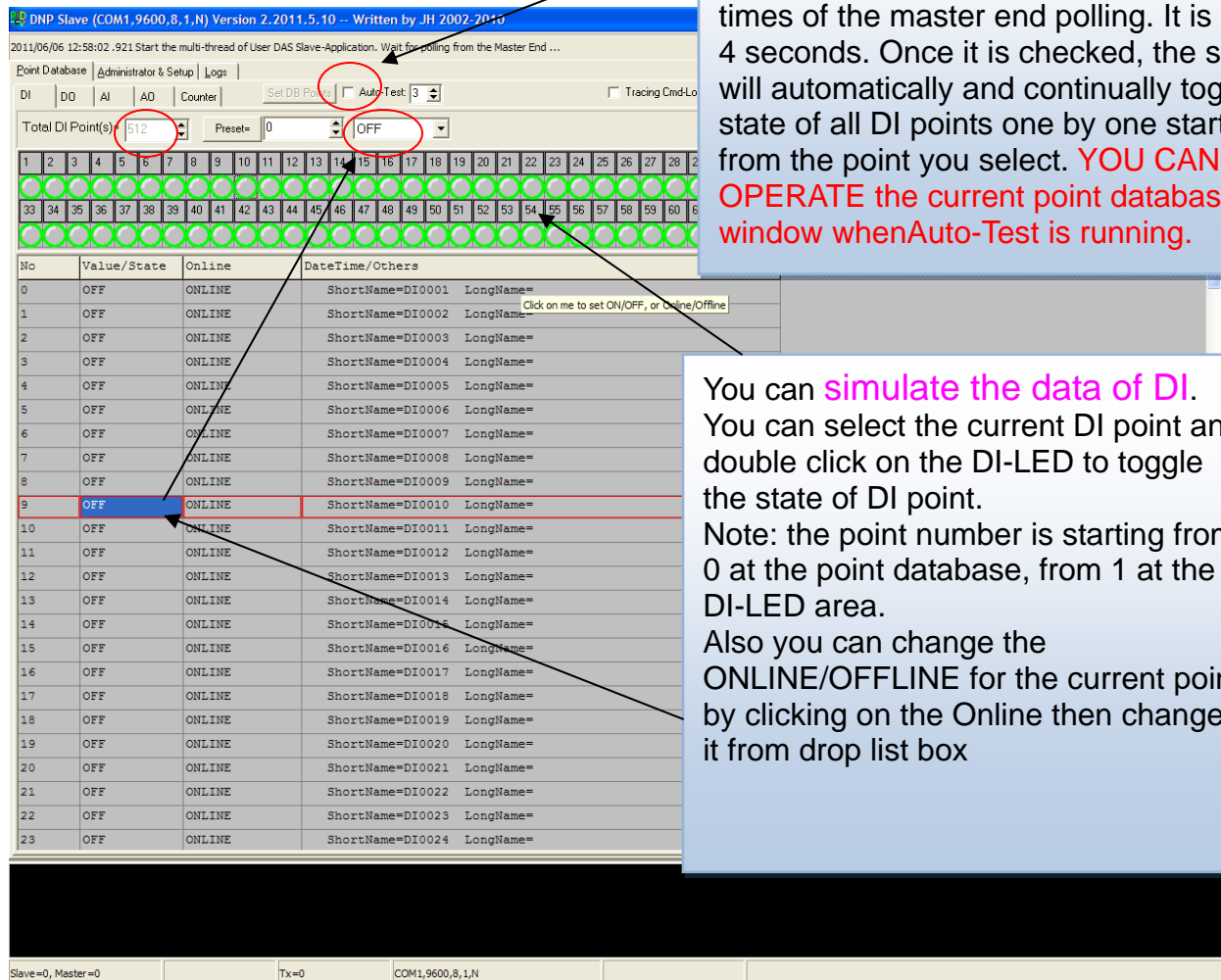


Figure 5-3



If want to be **hand-free testing**, you can check [X] Auto Test. The interval of changing the state of DI points must at least TWO times of the master end polling. It is usually 4 seconds. Once it is checked, the software will automatically and continually toggle the state of all DI points one by one starting from the point you select. **YOU CANNOT OPERATE** the current point database window when Auto-Test is running.

You can **simulate the data of DI**. You can select the current DI point and double click on the DI-LED to toggle the state of DI point. Note: the point number is starting from 0 at the point database, from 1 at the DI-LED area. Also you can change the **ONLINE/OFFLINE** for the current point by clicking on the Online then change it from drop list box

Figure 5-4

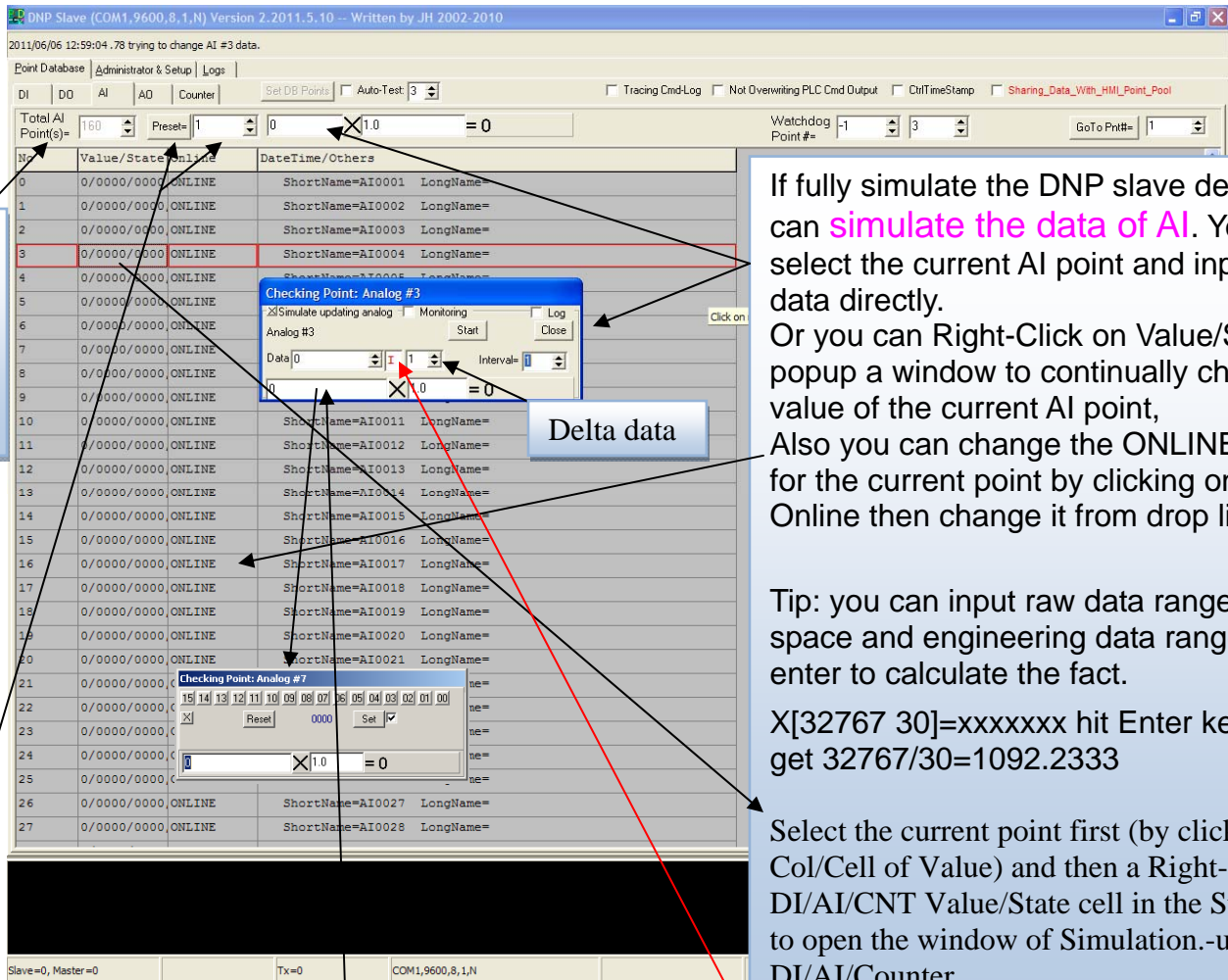


Figure 5-5

You can double-click on it to open a separate window.

If fully simulate the DNP slave device, you can **simulate the data of AI**. You can select the current AI point and input the data directly. Or you can Right-Click on Value/State to popup a window to continually change the value of the current AI point, Also you can change the ONLINE/OFFLINE for the current point by clicking on the Online then change it from drop list box.

Tip: you can input raw data range and space and engineering data range and enter to calculate the fact.

X[32767 30]=xxxxxxx hit Enter key you can get 32767/30=1092.2333

Select the current point first (by clicking on the Col/Cell of Value) and then a Right-Click on DI/AI/CNT Value/State cell in the String Grid to open the window of Simulation.-updating-DI/AI/Counter.

You can **preset the value for the AI points** with either ALL-SAME, Increased by 1, or RANDOM. You may have to set up the starting value. The default is 1 as shown. You can change to 1000, for example, you select [INC+1], then the AI#0 is 1000, AI#1 is 1001, AI#3 is 1002 and so on.

You can double-click on the editor of Data Value to open a Bit-Based Data Preset window where you can click on a bit-button to change the value of data by a bit. Click on the button of [Set] to preset the data.

Here is to define the data type as follows:
I: is to define an Integer (16Bit).
L: is to define a Long Integer (32Bit).
F: is to define a Floating (32Bit).

Note: if Delta (Inc/Dec) data is 0, the data of the current point will be changed by random +/- 5% of the value in the field of [Data=].

The Simulation Window can be registered/removed/saved (*.SWR). It can be loaded automatically when the current Slave Configuration file (*.DAS or *.SDB) is loaded.