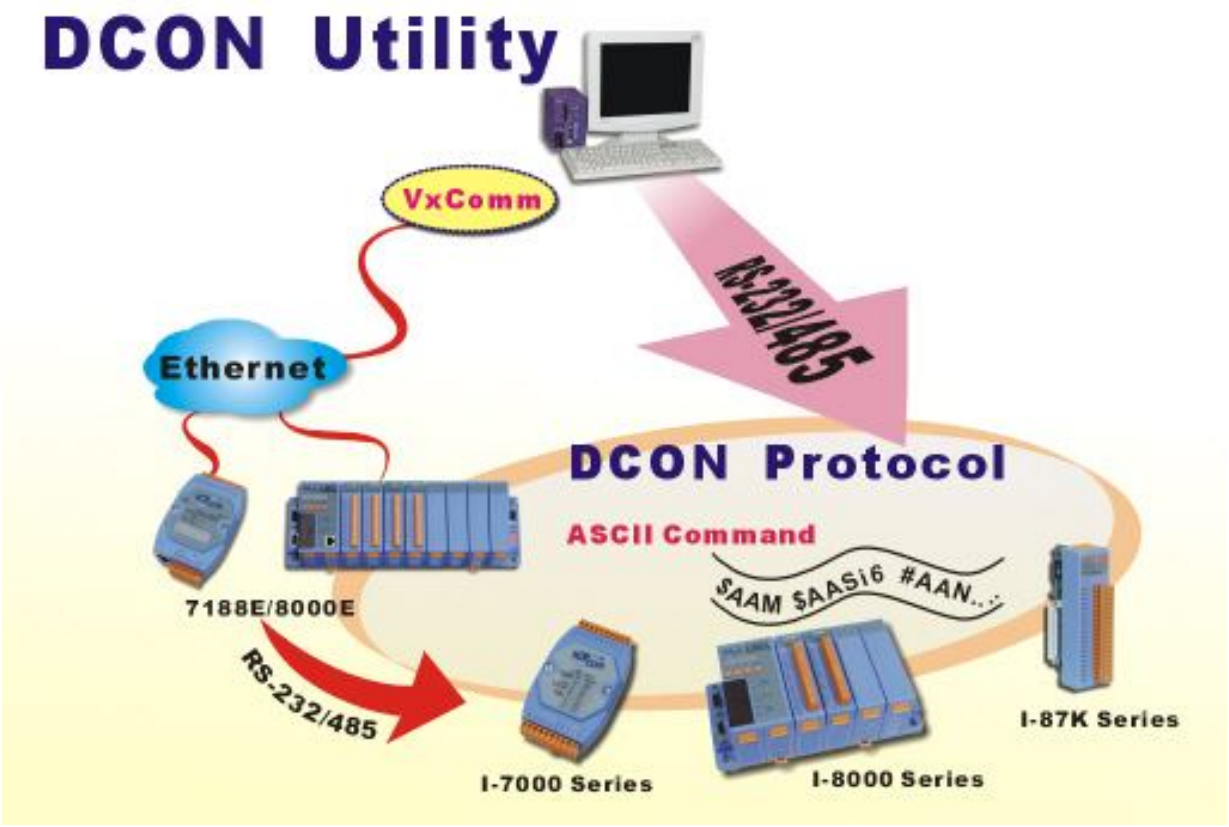
DCON Utility

User's Manual

Version 1.2, Feb 2009



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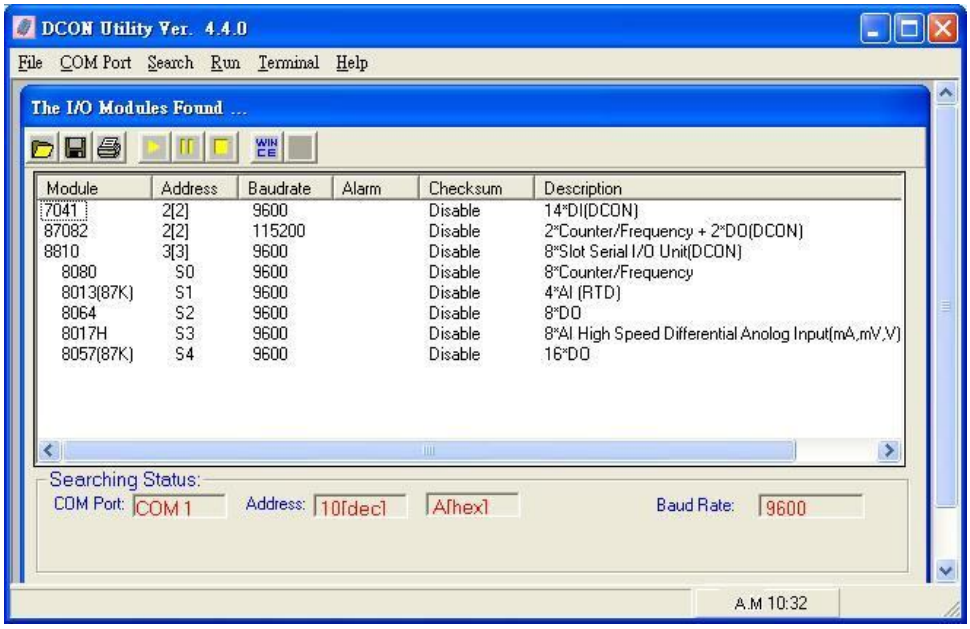
Chapter1. Introduction

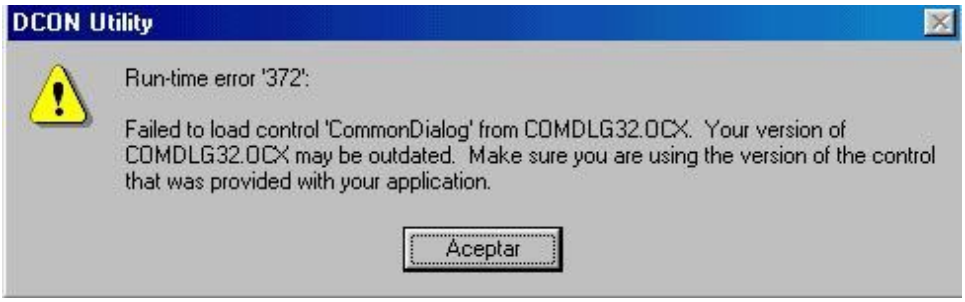
The DCON Utility is a toolkit that help user to search the network, easily to configure and test the I/O modules via the serial port (RS-232/485) or Ethernet port (using virtual com port). It also helps to configure the i-87K I/O modules on WinCon 8000 system. It support not only the DCON Protocol I/O modules but also the M Series I/O Modules (Modbus RTU M-7K,M-87K and will support Modbus ASCII M-87K in the future).



For DCON Utility version information and supported module list, please refer to
ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/
CD:\ Napdos\Driver\DCON_Utility

To update the DCON Utility, please refer to
ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/setup/

Note: When installed the DCON Utility, sometimes there will be a problem to cause an Run Time Error Message as below.



The error cause by the different version of ocx, there is another copy at the system32.
1. Please find the ocx file in system32 and backup the ocx to another folder.
2. Copy the ocx that in the DCON Utility installed path to system32.
3. Run the DCON Utility again.

Chapter2. Search the I/O modules with DCON Utility.

Before searching the I/O, make sure the I/O modules are correctly wired, the basic wiring includes power supplier and communicate interface.

2.1 Power Supplier:

ACE-540A

DIN-540A

Please refer to: http://www.icpdas.com/products/Accessories/power_supply/power_list.htm

1. The power supply must be DC power between +10V to +30V.

2. Wiring: +Vs connects to +Vs; GND connects to GND.

3. Carefully calculate the total watts or current consumption of the system.
   If the total watts were not enough, the system will become unstable and abnormal.

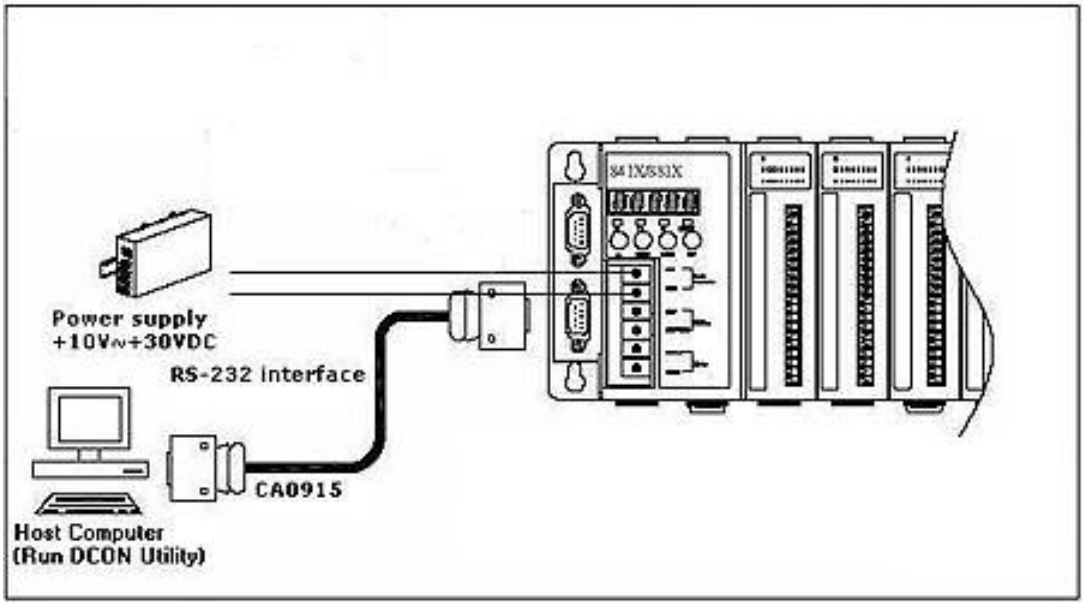
Total watts = Σ(supplied Voltage)*(Ampere consumed)

2.2 Communicate Interface:

2.2.1 RS-232 Interface:

This application only applies to DCON Utility with DCON Firmware running on i-8000 MCU unit. The both DCON firmware DCON_nnn.exe and E10M_nnn.exe can use RS-232 interface.

The RS-232 interface is seldom used in real application for the short transmitting distance of RS-232, it usually used in development stage to configure and test the I/O.



The 9-pin Male-Female D-sub cable CA-0915 please refer to:
http://www.icpdas.com/products/Accessories/cable/cable_selection.htm

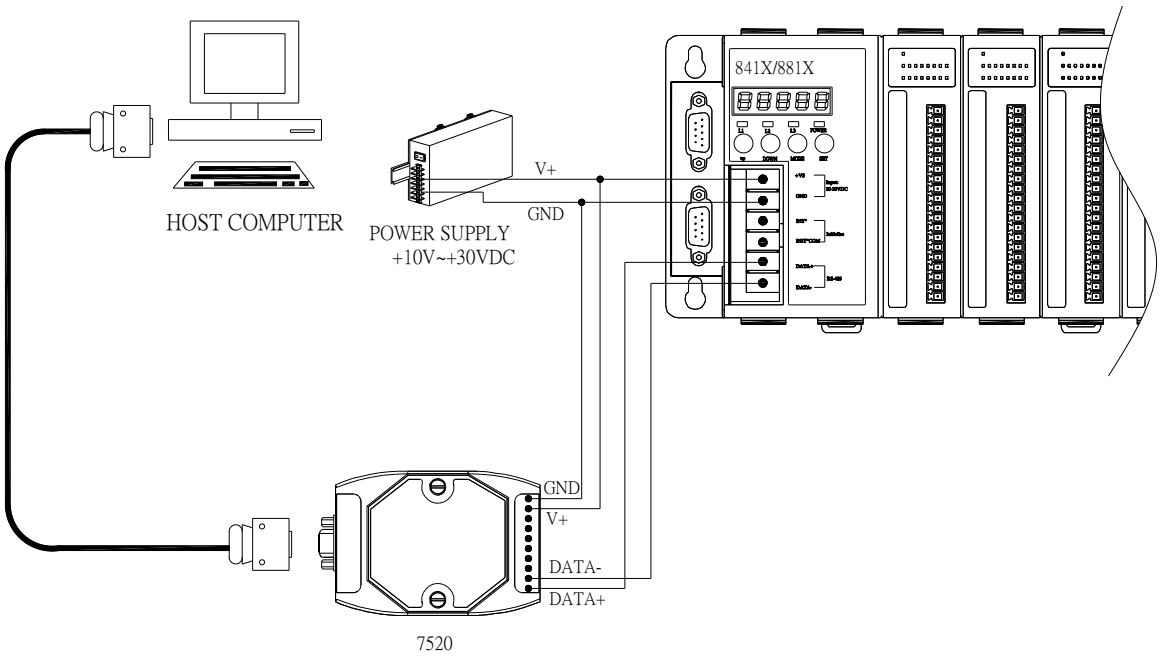
2.2.2 RS-485 Interface:

This is the most popular and basic communication interface in industry.

Generally, the host PC needs a RS-232 to RS-485 converter (i-7520) to convert the RS-232 electrical signal to RS-485.

Some industrial computers have RS-485 interface, they do not need i-7520 converter.

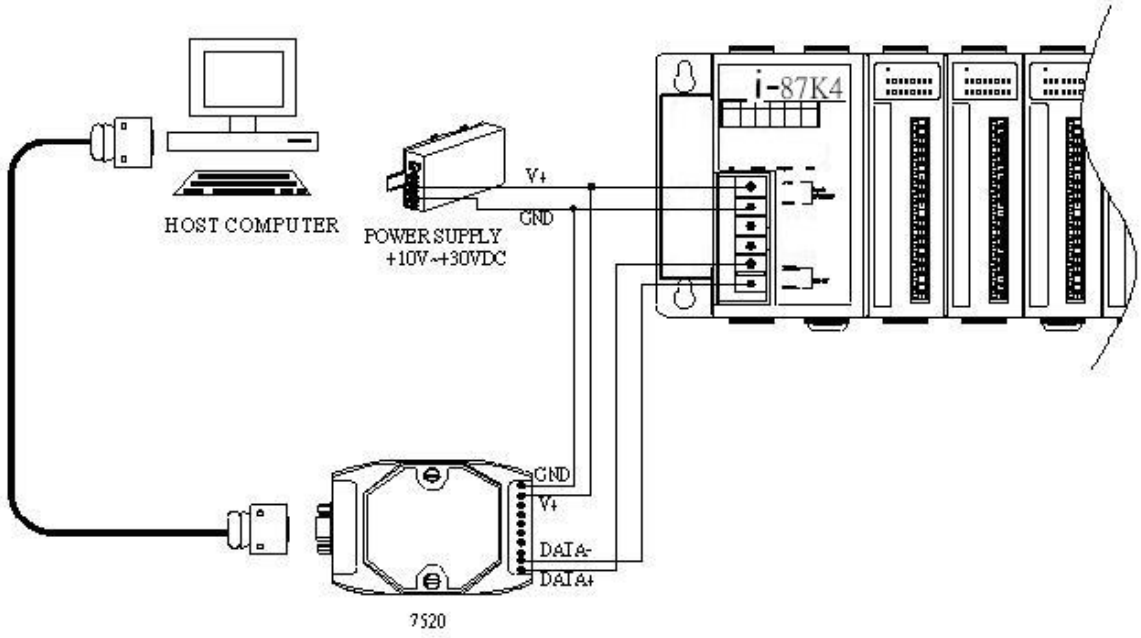
- i-8000 system: This application applies to DCON Utility with DCON Firmware DCON_nnn.exe running on i-8410, i-8411, i-8810, i-8811 serial I/O unit and DCON Utility communicates with the COM2 of serial I/O unit (RS-485 interface), DCON_nnn.exe supports both RS-232 and RS-485 interface. The i-8000 systems support both i-8K and i-87K I/O modules.



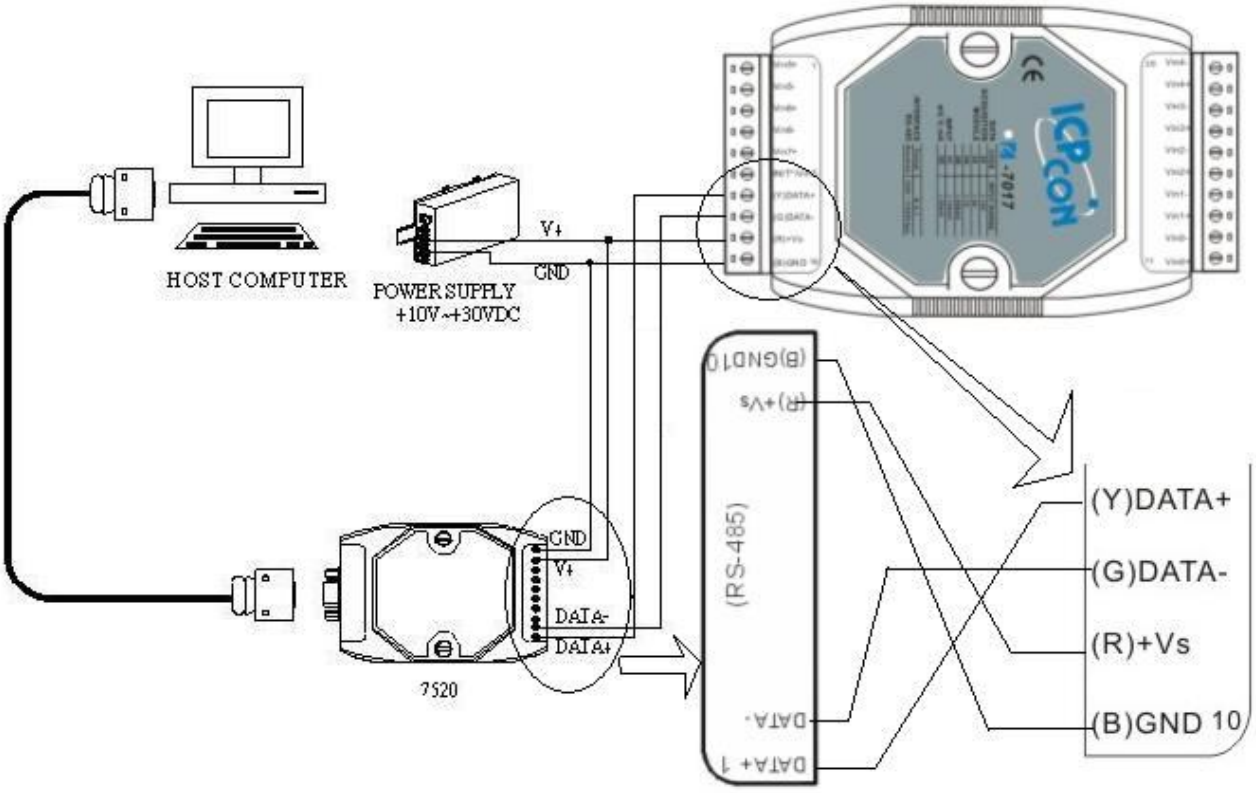
For more detail about the converter selection guide, please refer to:
http://www.icpdas.com/products/Industrial/communication_module/communication_list.htm

For using the i-7520, please refer to:
http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/7000/manual/7520.pdf

- i-87K I/O Expansion: The i-87K I/O Expansion supports only i-87K and M-87K I/O modules, it does not support the i-8K series I/O module. The only communication interface of i-87K I/O Expansion is its RS-485 port.



- i-7000 I/O modules and M-7000 I/O modules: The i-7000 series are typical distributed remote I/O modules and support only RS-485 interface.



➢ RS-485 network:

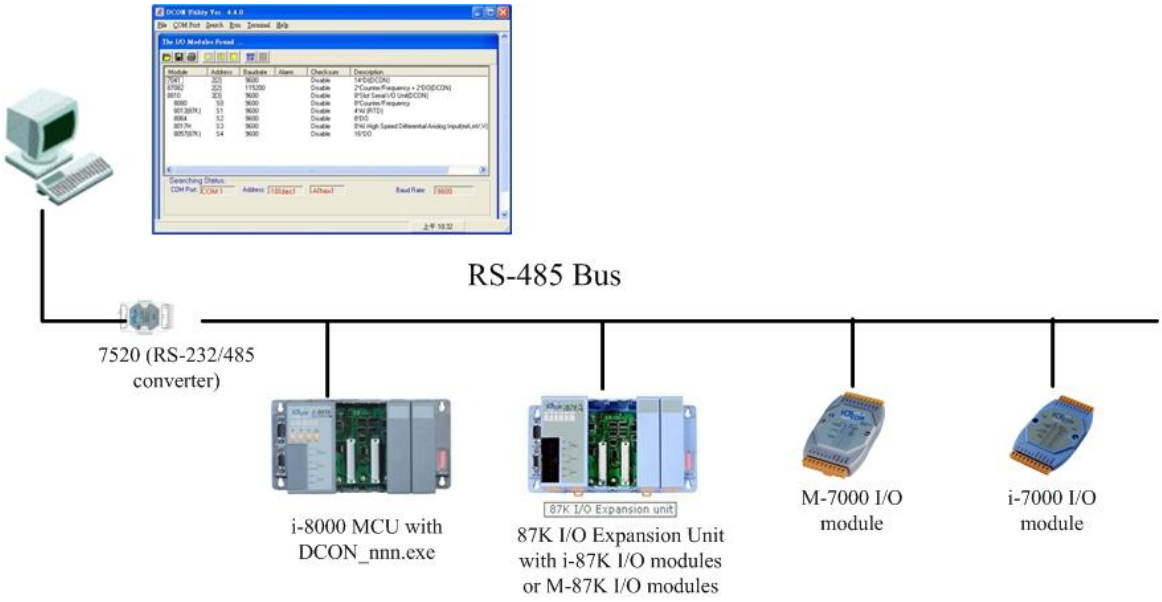


Diagram 1 :DCON Utility can search the DCON protocol I/O modules and Modbus I/O modules via serial interface (RS-485 bus)

For RS-485 network wiring and configuration please refer to
ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/dcon/8410_8810/documents/ or
CD:\Napdos\DCON\8410_8810\Documents\
8410_8810_manual.pdf (Appendix C)

2.2.3 Ethernet Interface:

DCON Utility is a program using the COM port interface to communicate with I/O modules. The host PC has to install VxComm utility and assigned a COM port to map the port I/O of i-8000 Ethernet I/O unit. And the remote Ethernet I/O must support XServer to have the virtual COM port's function.

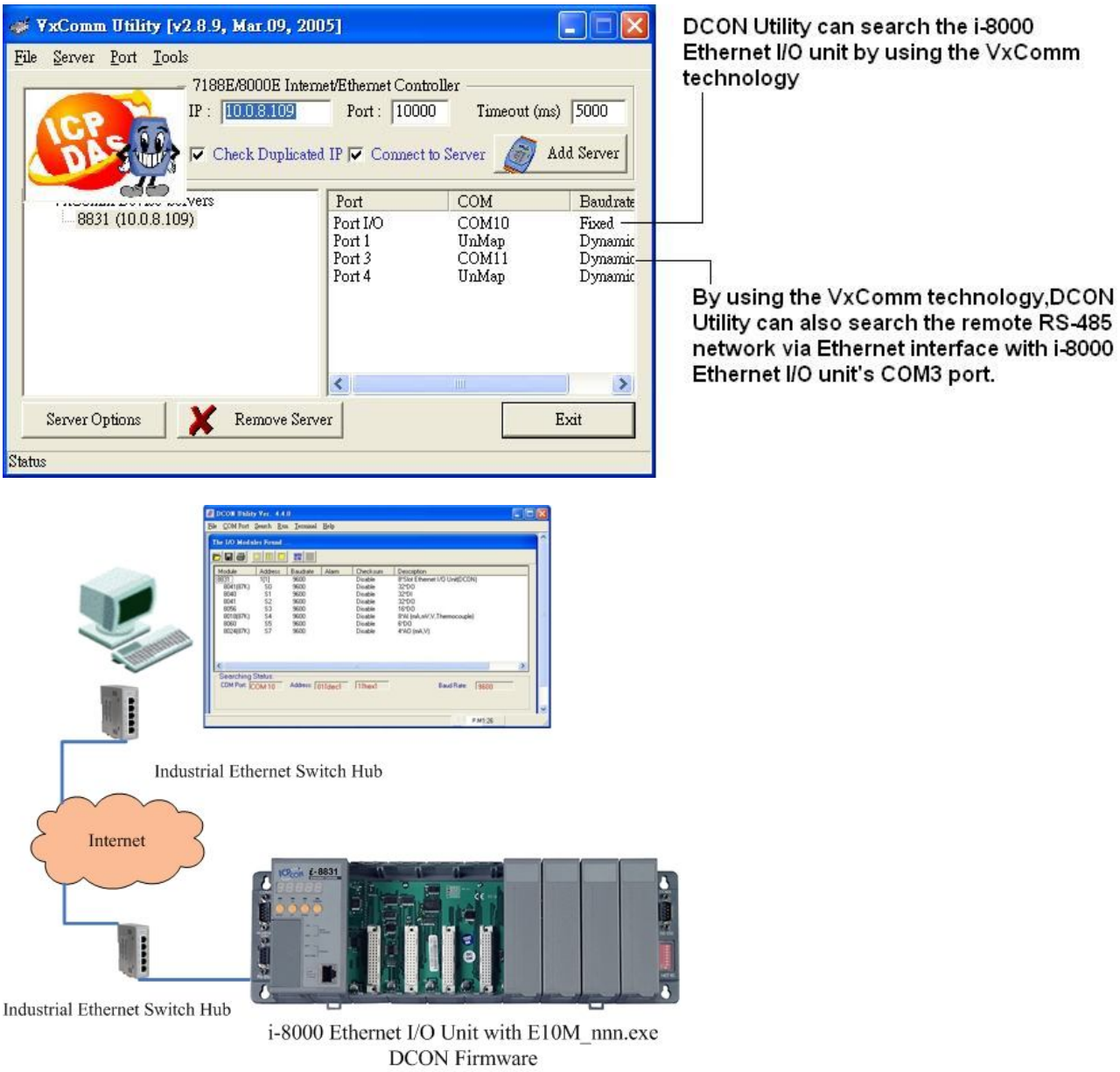
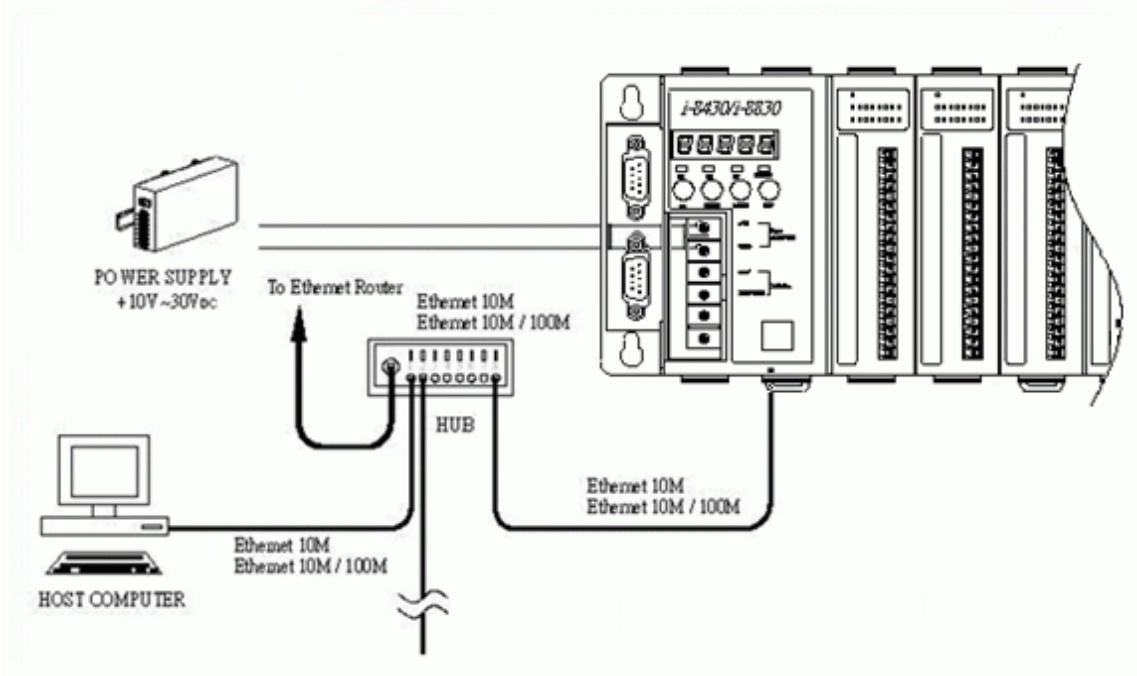


Diagram 2 :By using the VxComm technology, DCON Utility can search the DCON protocol I/O modules via Ethernet interface.

For VxComm technique, please refer to
ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/dcon/8430_8830/documents/ or
CD:\ Napdos\DCON\8430_8830\Documents
8430_8830_8KE4_8KE8_Manual.pdf (Chapter 2 and Chapter 3)

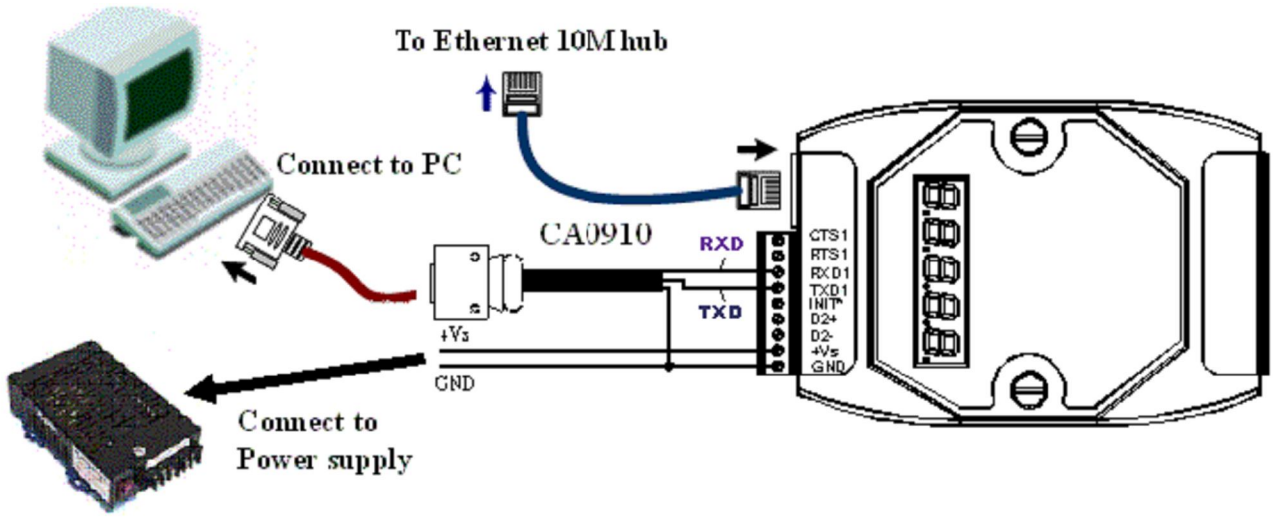
- i-8000 system:

This application only applies to DCON Utility with DCON Firmware E10M_nnn.exe running on i-8000 Ethernet I/O unit.



- i-7188EF-016 FR_Net:

This application only applies to DCON Utility with DCON Firmware EF016nnn.exe running on i-7188EF-016 Ethernet I/O unit.

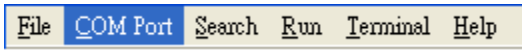


2.3 Search I/O with DCON Utility:

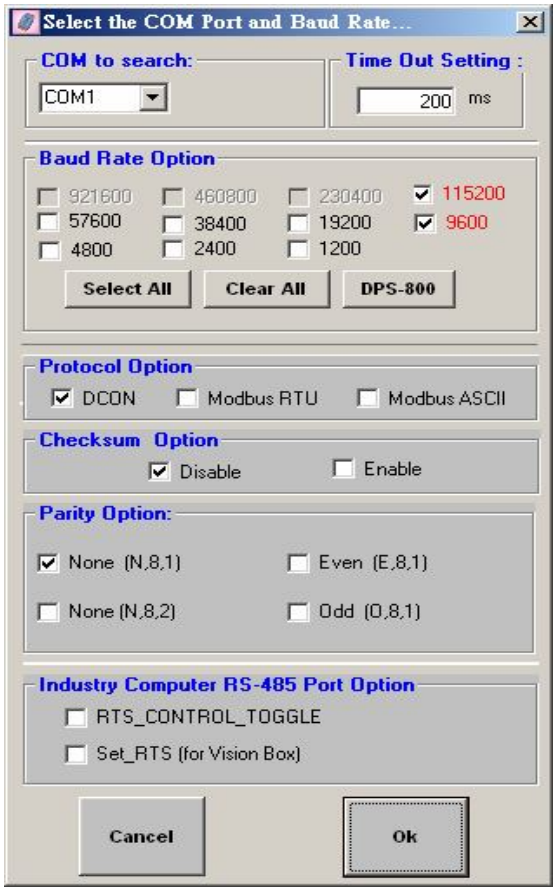
DCON Utility is a program based on Serial interface I/O, it can search DCON Protocol and Modbus RTU modules and support checksum disable and enable.

2.3.1 COM Port and Searching Conditions:

Step 1: Choose the COM port and select the searching parameters.

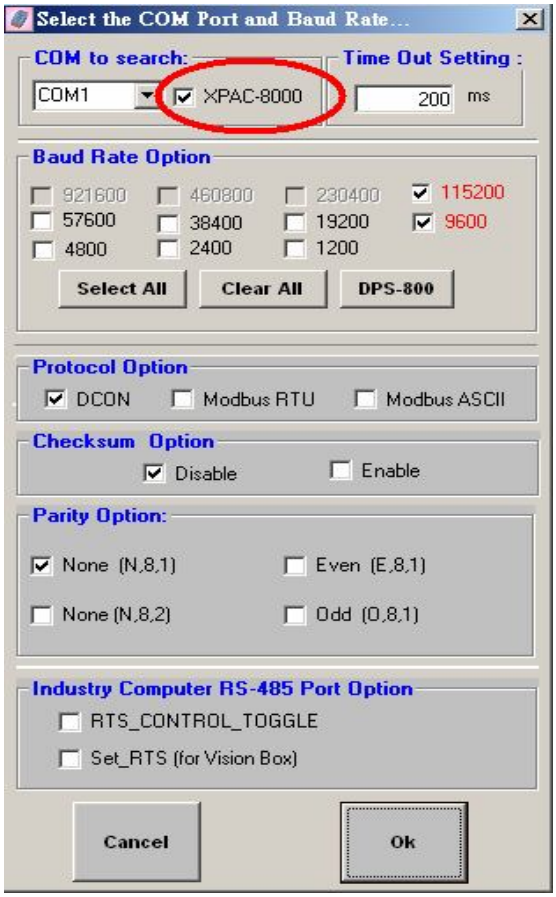


If user does not know the modules' communication baud rate or the network consists of I/O modules with different baud rates, it can choose multi baud rates, both checksum disable and enable condition for searching condition.



If the response may have many characters or the module use low speed baud rate, it is better to increase the timeout setting.

If running DCON Utility on the XPAC-8000 Serial PAC，it must click the XPAC-8000 checkbox as below picture



2.3.2 Searching Principles:

Search and configure the I/O one by one. If there are several I/O modules with unknown Net Address, Baud rate, Checksum and Protocol, they have to be searched and configured one by one.

If failed to find the I/O module, it is better to Power on the I/O module with INIT* pin connects to the GND to get the I/O module's initial communication settings.

Initial communication settings of 7000 series and 87K series are list at the table below.

	7000 series (i-7000 and M-7000)	87K series
Address	0	0
Baud rate	9600	115200
Checksum	Disabled	Disabled
Protocol	DCON Protocol	DCON Protocol

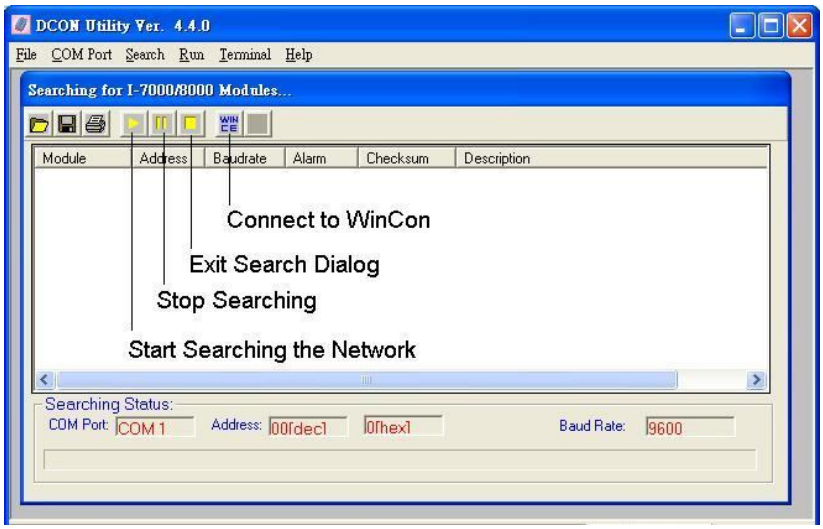
Note: The default settings and initial settings are different.

Default communication settings of i-7K, M-7K and 87K series are list at the table below.

	i-7000	M-7000	87K series
Address	1	1	1
Baud rate	9600	9600	115200
Checksum	Disabled	Not defined	Disabled
Protocol	DCON Protocol	Modbus Protocol	DCON Protocol

Note: The i-8000 system can not power on with INIT* connect to INIT*COM to get the default communication setting, because when INIT* connect to INIT*COM, the firmware can not be auto executed by the MiniOS7.

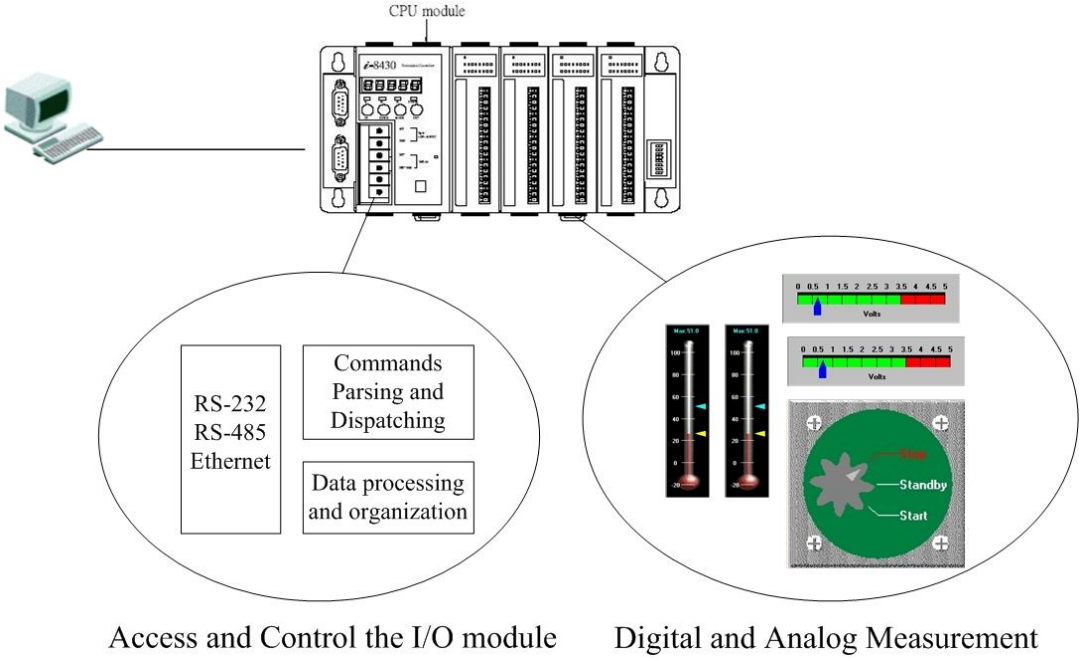
If the wirings are correctly connected and communication parameters are correct too. Then clicks to start searching.



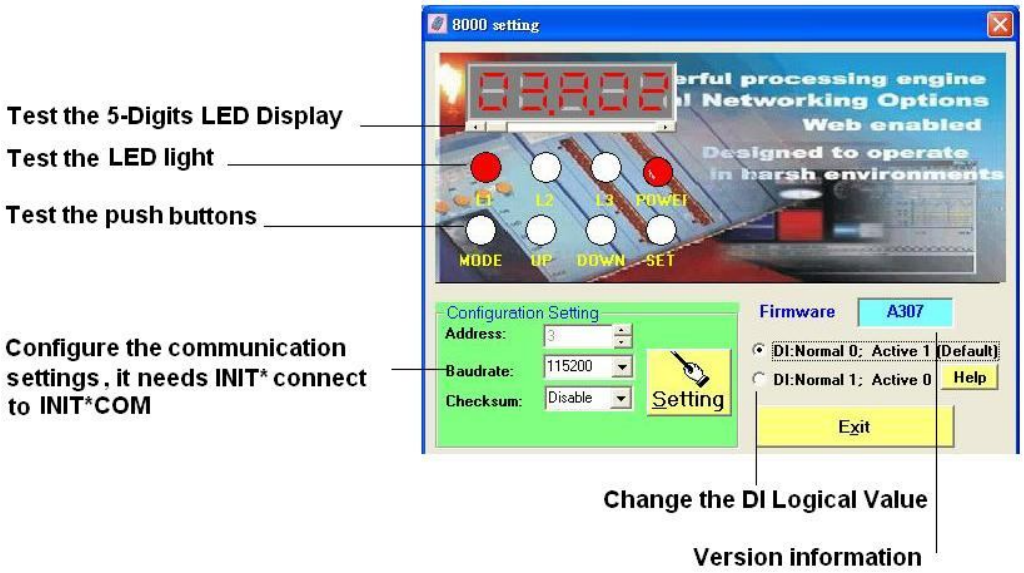
Chapter3. Configure the I/O modules with DCON Utility.

3.1 i-8000 system:

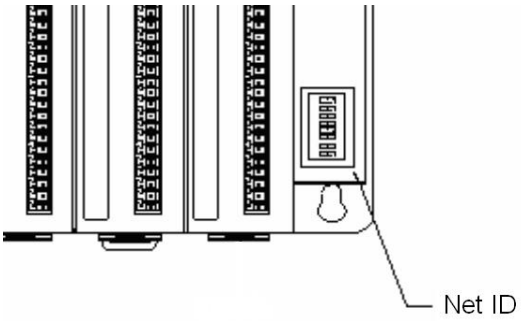
i-8000 system include CPU board and the I/O modules on its slots.
All I/O modules include i-8K and i-87K are controlled by this CPU module.



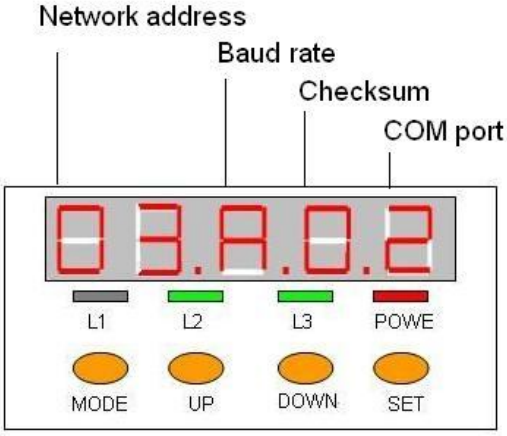
To configure the CPU module, the most import is to configure the communication parameters and DI active state reverse function.



The i-8000 system's address is determined by the dip switch at the right edge of plastic housing.



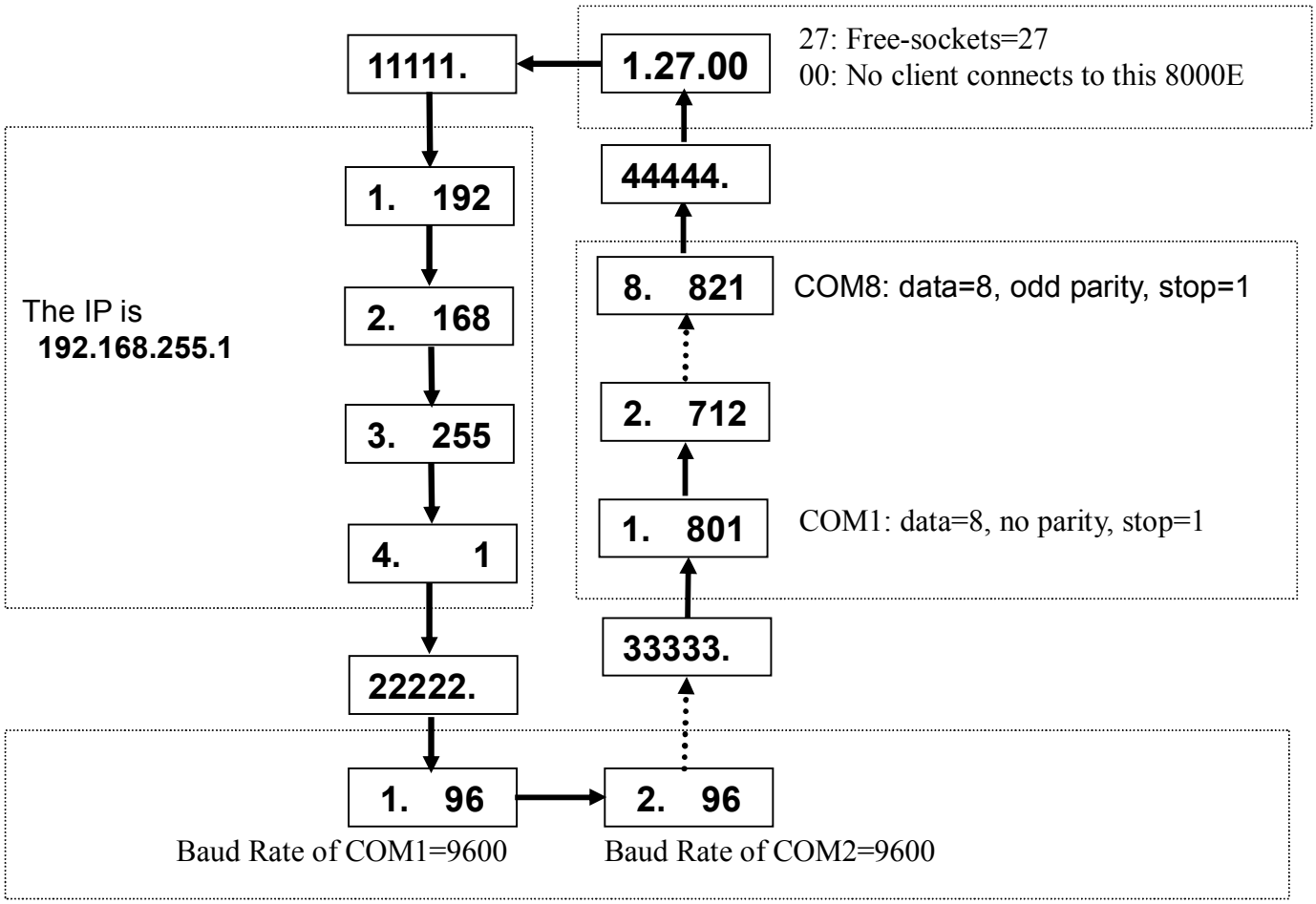
The DCON_nnn.exe will show the communication setting on the 5-digital LED menu.



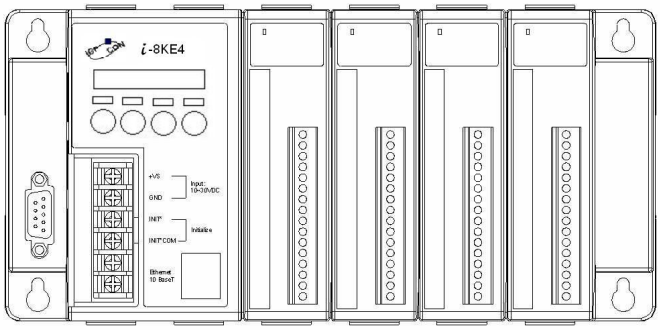
Baudrate Table:

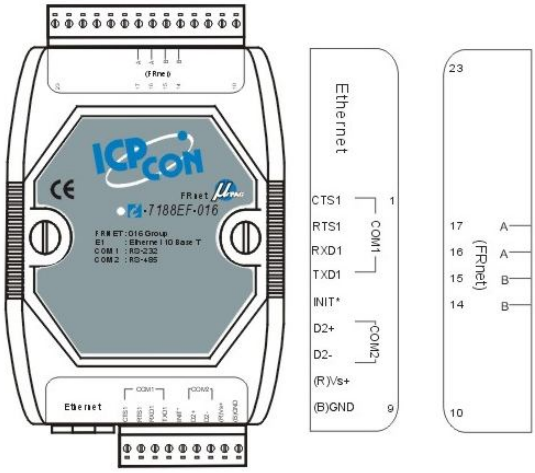
0x3	0x4	0x5	0x6	0x7	0x8	0x9	0xA
1200	2400	4800	9600	19200	38400	57600	115200

For E10M_nnn.exe, the LED constantly shows IP address, Baud Rate, Data Bit Format ..etc as following sequences.



The i-8KE4, i-8KE8, i-7188-EF016 Ethernet I/O units do not have Net ID dip switch at the right edge of plastic housing, the only address is 1.

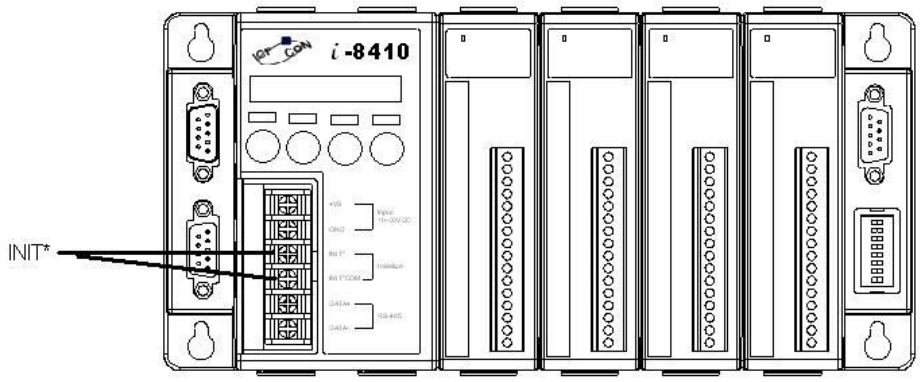




3.1.1 Change Baud rate and Checksum:

If attempted to change the Baud Rate, Checksum, the INIT* pin needs to connect to INIT*COM.

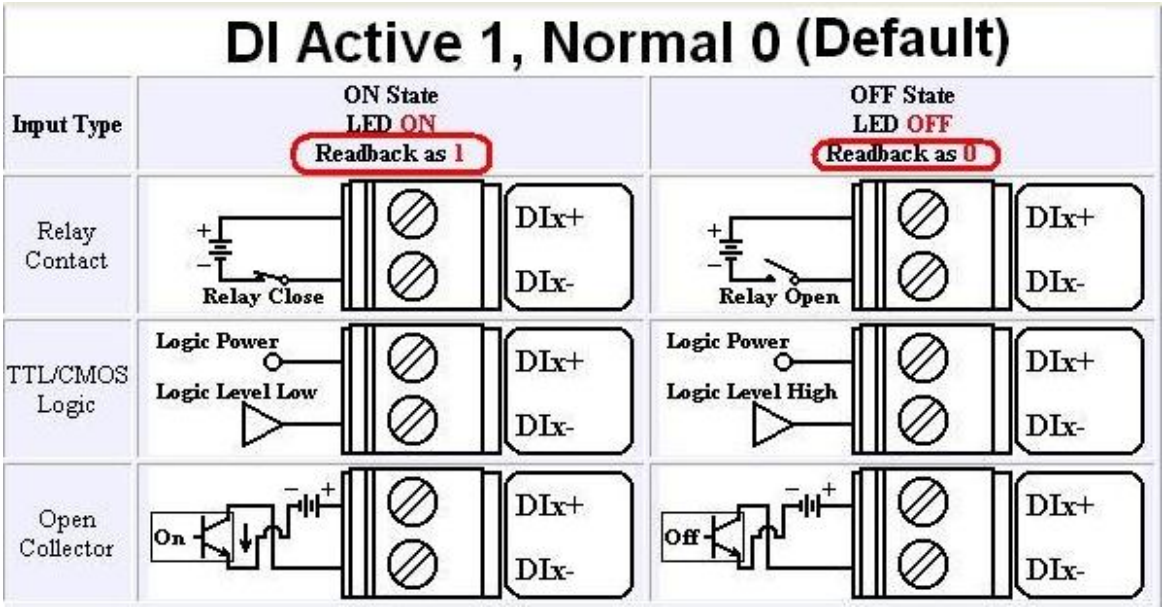
Note: There is no need to configure the Baud rate and checksum for I/O modules on slots.

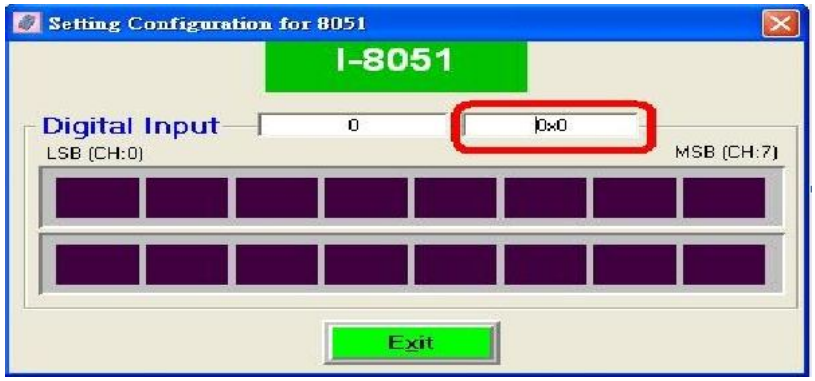


The INIT* pin position

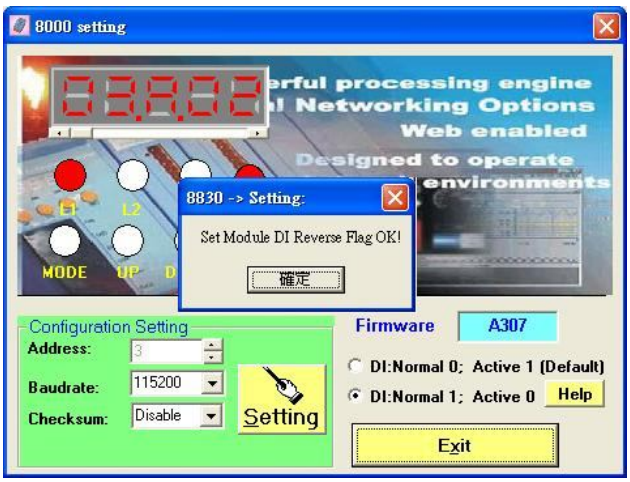
3.1.2 Change the DI Logical Value:

There are two applications about the DI signal. Default is “DI: Normal 0; Active 1”. When DI modules detect the input signal, the LED will be turned on (Green color) and will get logical value 1, otherwise the LED will be turned off (dark color) and get logical value 0.

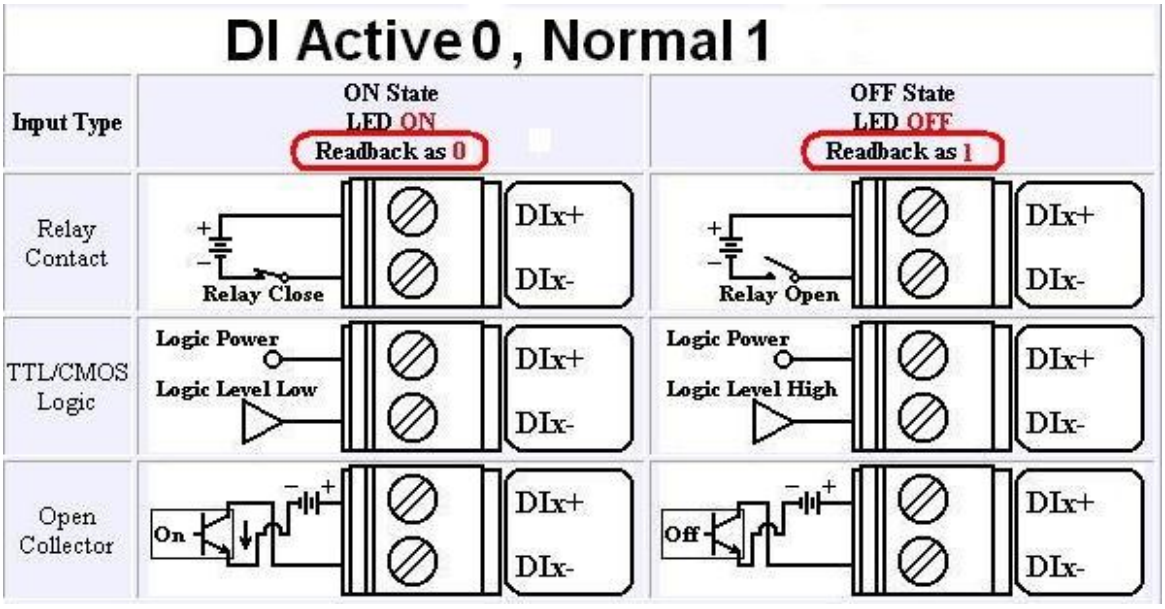


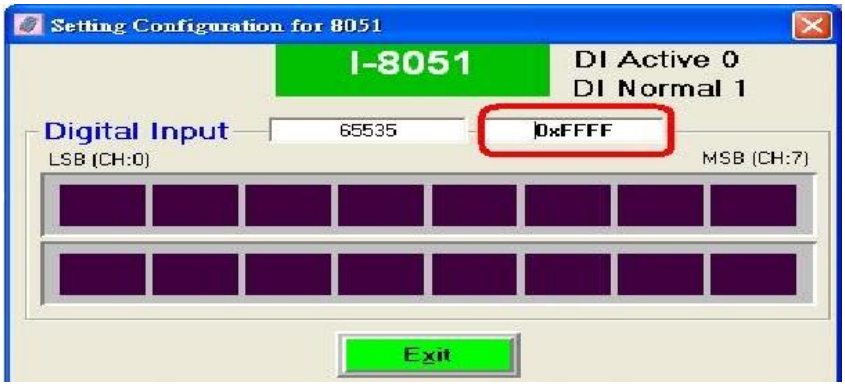


Choose the other “DI: Normal 1; Active 0” will reverse the Logical input value of DI modules.



In this case, when there is no DI input signal detected, the LED is off, but the logical value is 1; otherwise, the LED will be on and the logical value is 0.



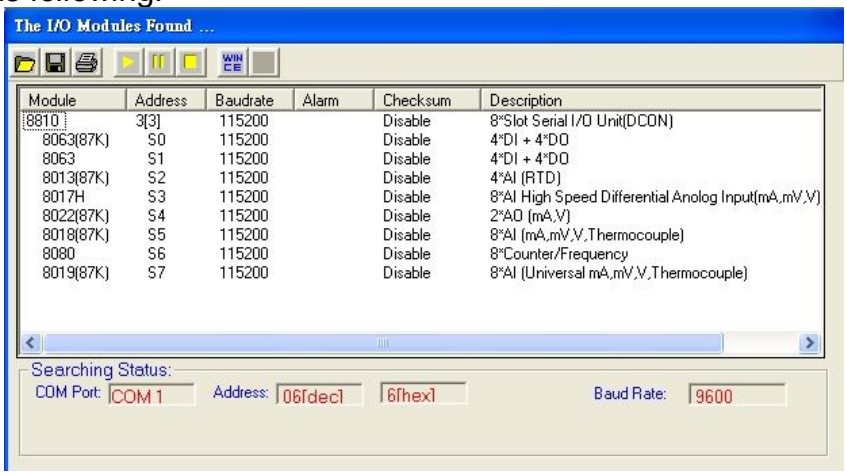


3.1.2 The differences between i-8K and i-87K I/O modules:

The DCON firmware (DCON_nnn.exe,E10M_nnn.exe) supports both 8K and 87K series I/O modules. The two series I/O modules can be plug in same I-8000 MCU. The modules for DI, DO, DIO, AI, AO and Counter/Frequency are supported. Other modules such as multi-serial port (8112, 8144, 8142, 8144), MMC(8073), motion (8090, 8091) are not supported. The file in the shipped CD lists details.

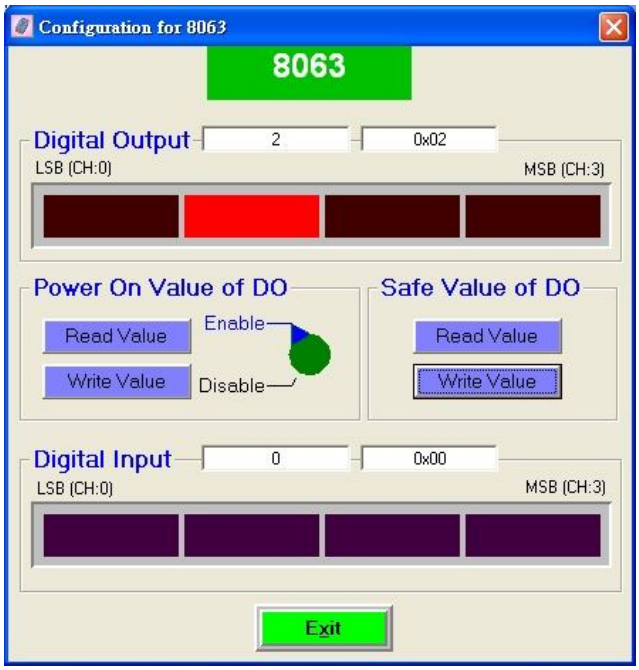
CD:\Napdos\Driver\DCON_Utility\DCON_Utility_Module_List.htm

The DCON firmware only accepts 4 digits numbers. Thus both 8K and 87K series are recognized as 4 digits numbers. When using the DCON Utility to search I/O modules, the screen shown as following:

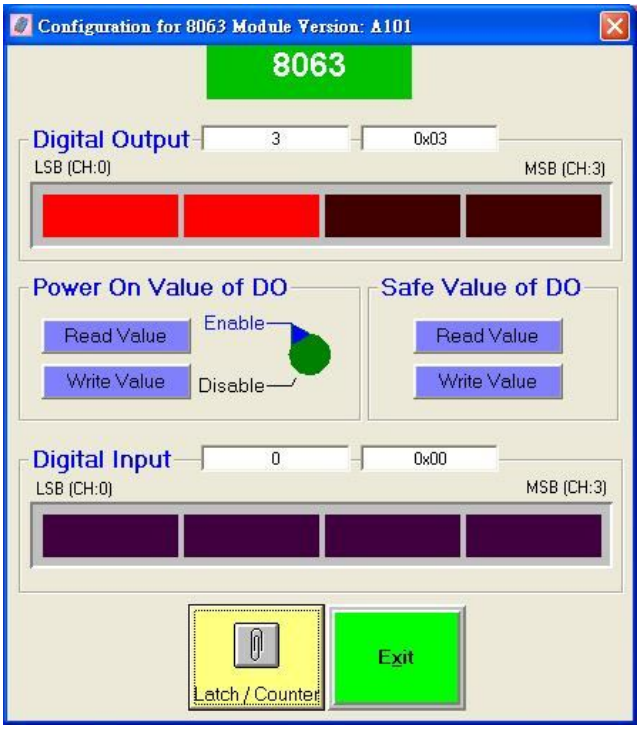


3.1.3 Digital I/O modules on i-8000 system:

Both i-8K DO modules and i-87K DO modules have DO Power On value and safe value and they are controlled by the CPU module of i-8000 system.



i-8063 on i-8000 system



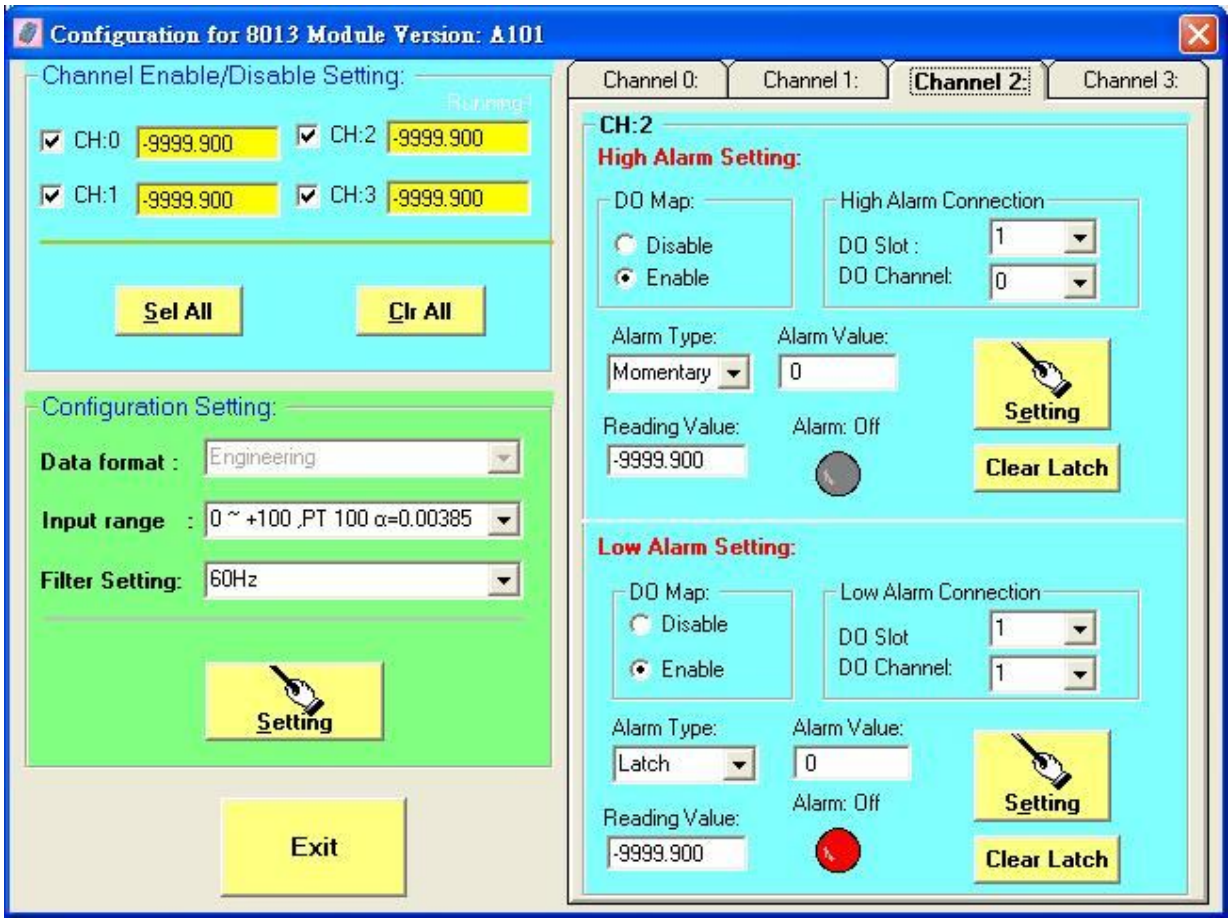
i-87063 on i-8000 system

But DI module of i-87K have DI counter and DI latch functions and i-8K DI modules do not.

The DI counter and latch functions of i-87063 on i-8000 system.

3.1.4 Analog Input modules on i-8000 system:

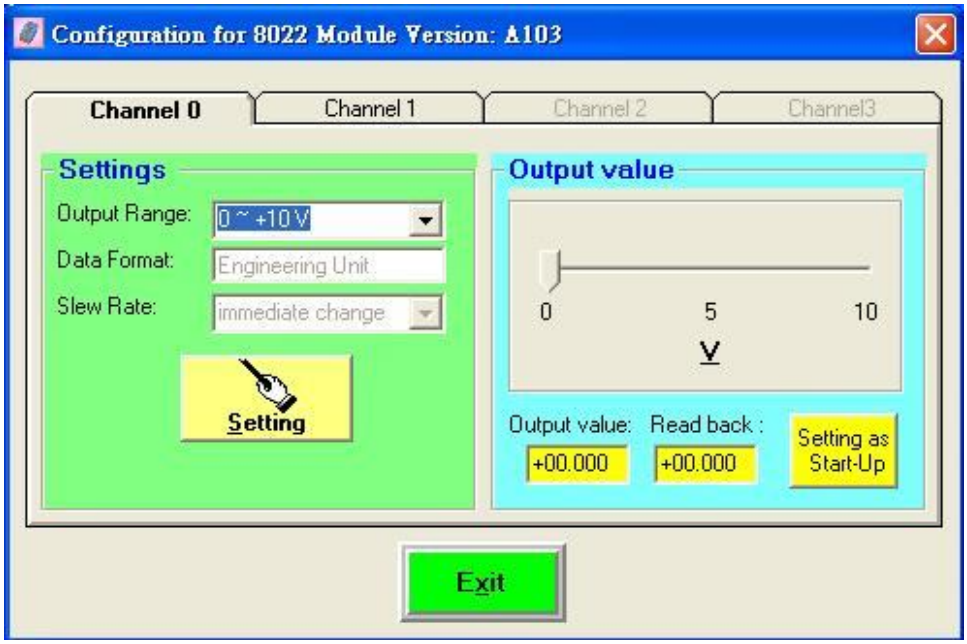
The analog input module on i-8000 system have an advantage in DO Alarm mapping, they can have there alarm output map to any slot of DO module (must less then or equal to16 bits DO) for each channel of Analog input, and the firmware will auto scan the Analog input modules and auto trigger the DO alarm output.
The data format of all the Analog input modules on i-8000 system support only engineering format, the i-8000 system does not support hex format and percent format.



i-87013 RTD input on i-8000 system

3.1.5 Analog Output modules on i-8000 system:

The analog output modules on i-8000 system can change their type code and setup their power on value, but not safe value.
The data format of analog output modules on i-8000 system support engineer format only.
The slew rate function also be disabled,



i-87022 on i-8000 system

3.2 i-7K, M-7K and i-87K I/O modules:

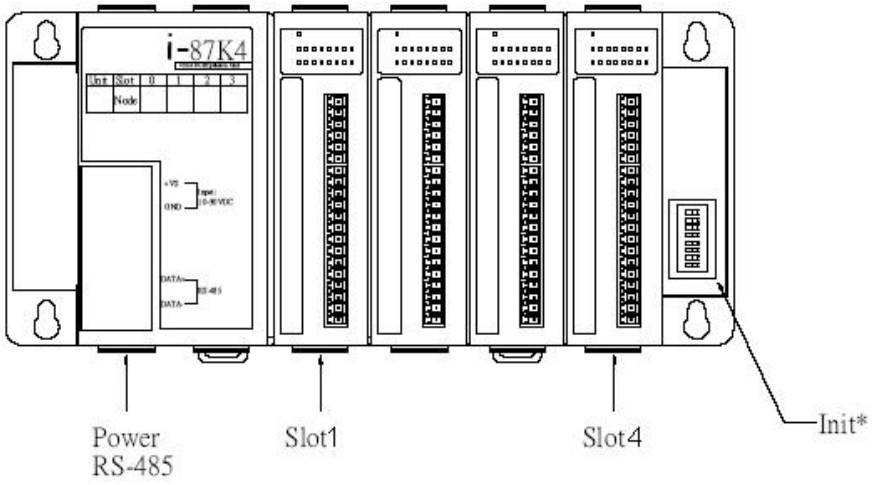
To configure i-7K, M-7Kand i-87K I/O modules
There are DCON Protocol and Modbus Protocol I/O module, for most general settings, they need to choose the wanted property and click setting to make it effect.

3.2.1 Change Baud rate, Checksum and Protocol:

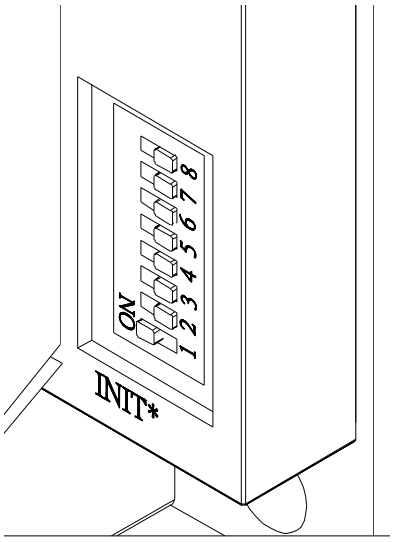
If attempted to change the Baud Rate, Checksum and Protocol, the INIT* pin needs to connect to GND. After successfully configuring these properties, the I/O modules must be reset the Power to bring the settings into effect.

There are some types of INIT* and they are at different position.

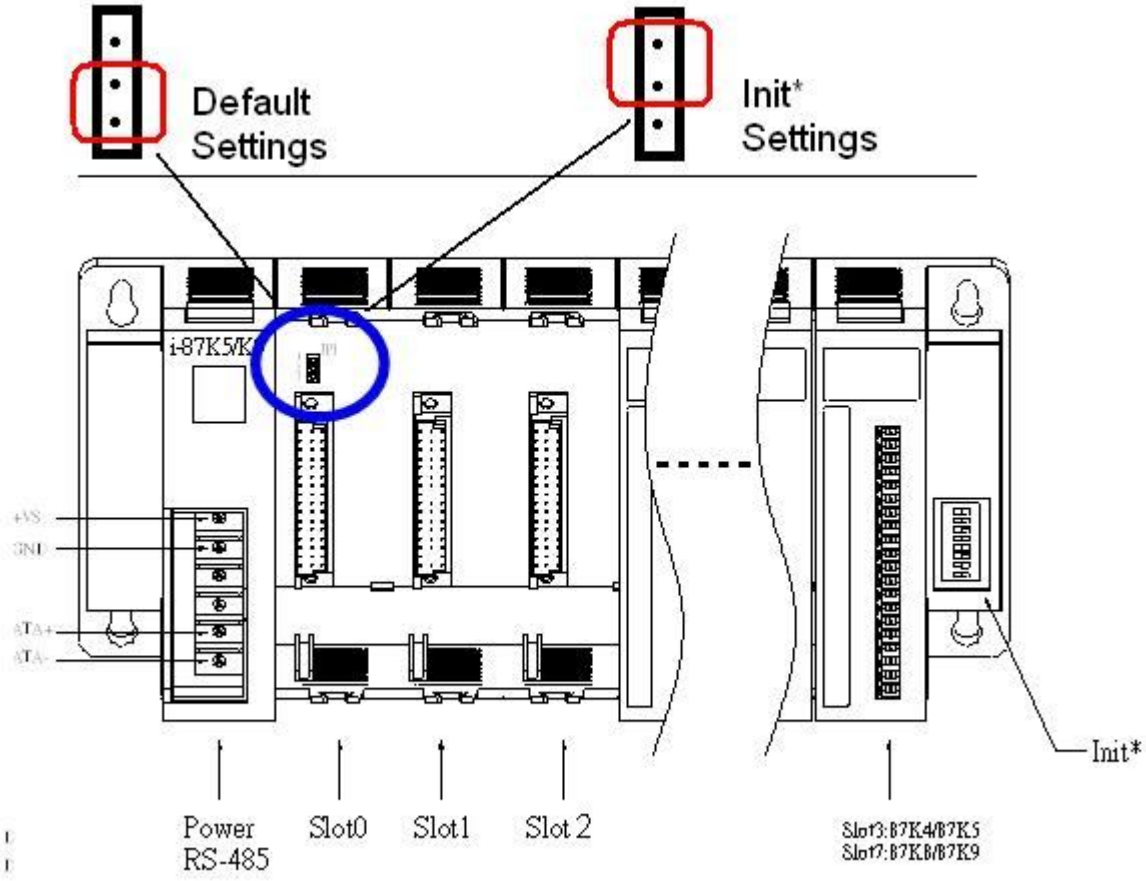
- i-87K1, i-87K4, i-87K8 I/O Expansion:



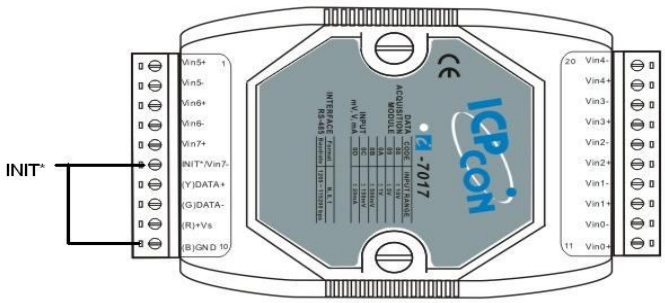
The INIT* pins of Slot1 to Slot8 are located at at the right edge of i-87K I/O Expansion.



NOTE: The INIT* pin of slot 0 on i-87K5 and i-87K9 is set by internal JP1 as follows:

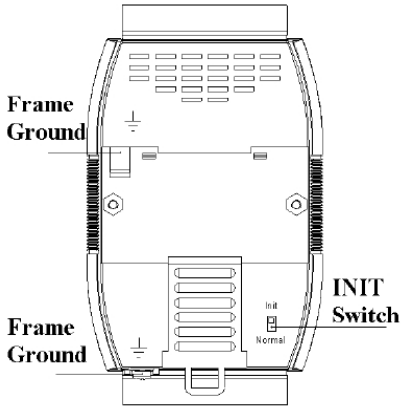


- Old style INIT* pin of 7000 series:



The old style of INIT* needs to use a wire to connect to the GND

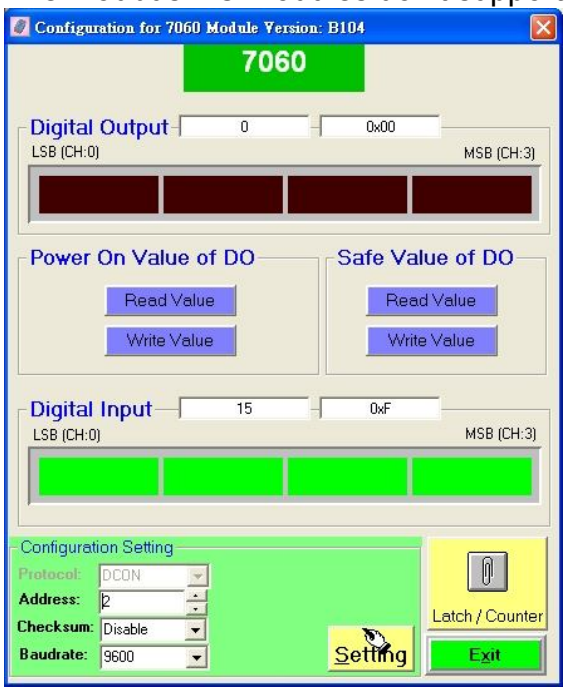
- New style INIT* pin of 7000 series:



The new style of INIT* pin is a dip switch and located at back side.

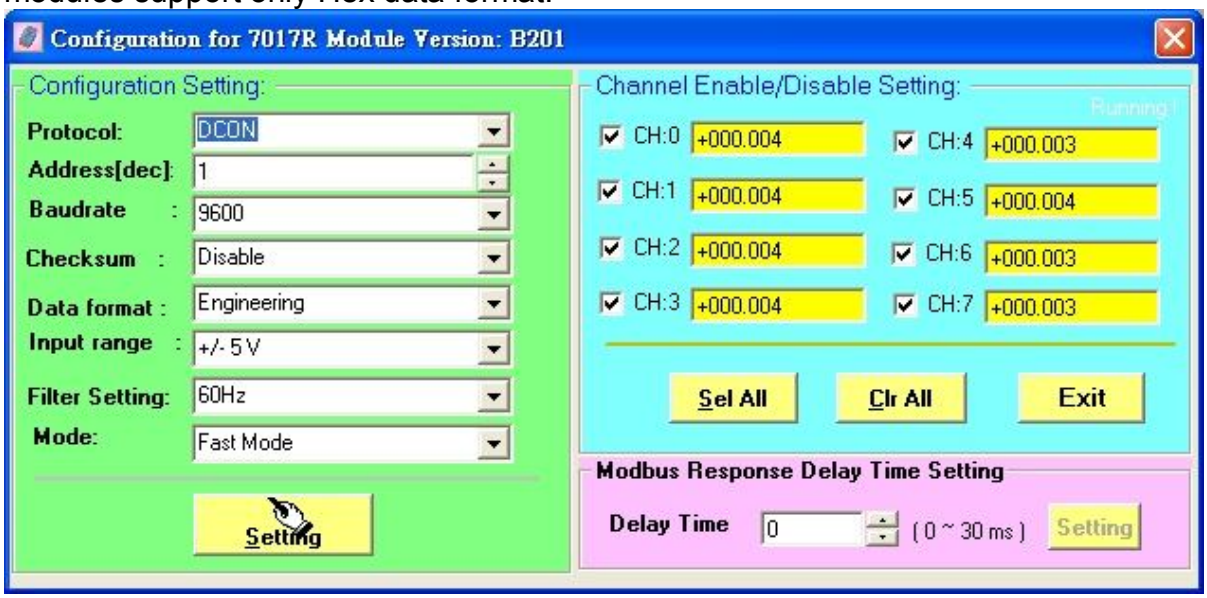
3.2.2 Digital I/O modules:

The Modbus DO modules don't support safe value function, but the DCON modules do.

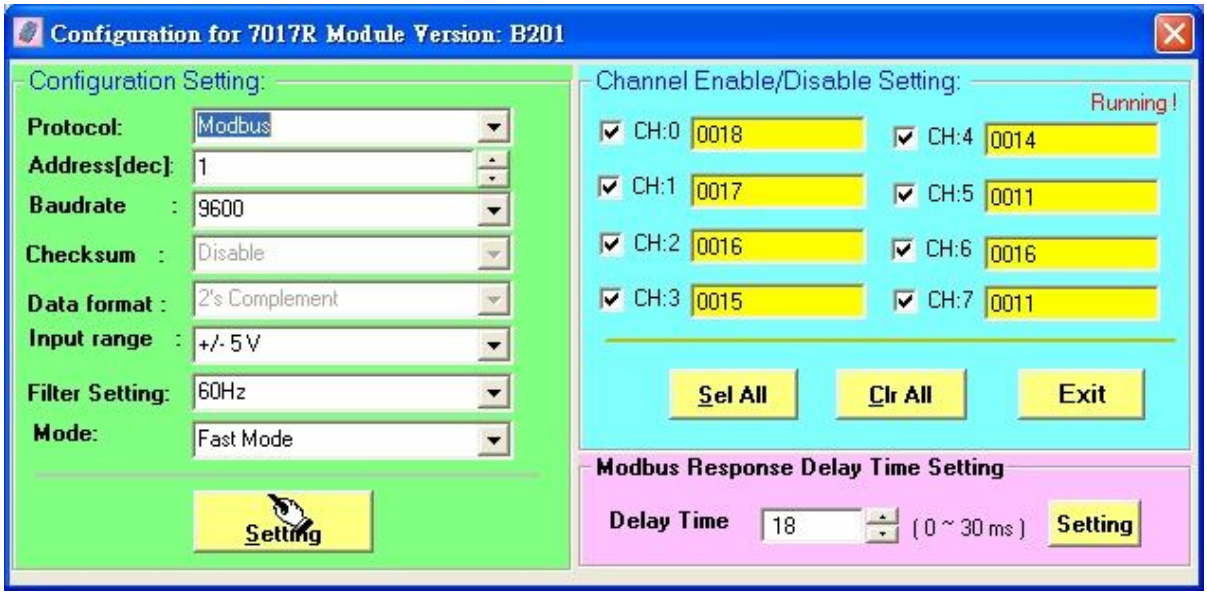


3.2.3 Analog Input modules:

The DCON modules support Engineering, Percent, Hex, Ohm data formats; the Modbus modules support only Hex data format.

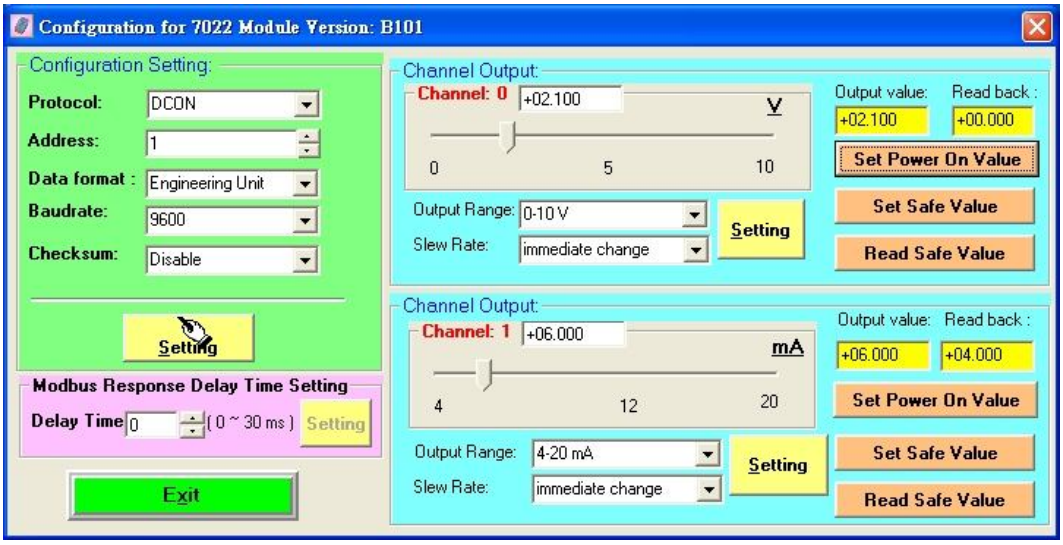


Sometimes the Modbus modules need to set the Modbus Response Delay time, For Modbus RTU mode, messages start with a silent interval of at least 3.5 character times, some PLC or SCADA software can not totally receive the response data from the Modbus modules for the quick response time.

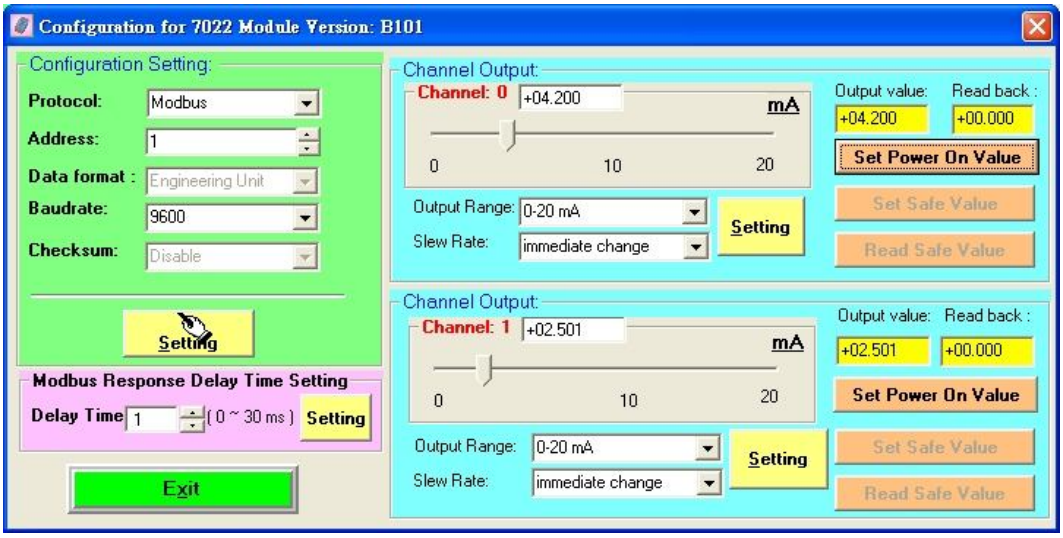


3.2.4 Analog Output modules:

The DCON modules support Engineering, Percent, Hex data formats; the Modbus modules support only Hex data format.



The modbus AO modules do not support the safe value function also.

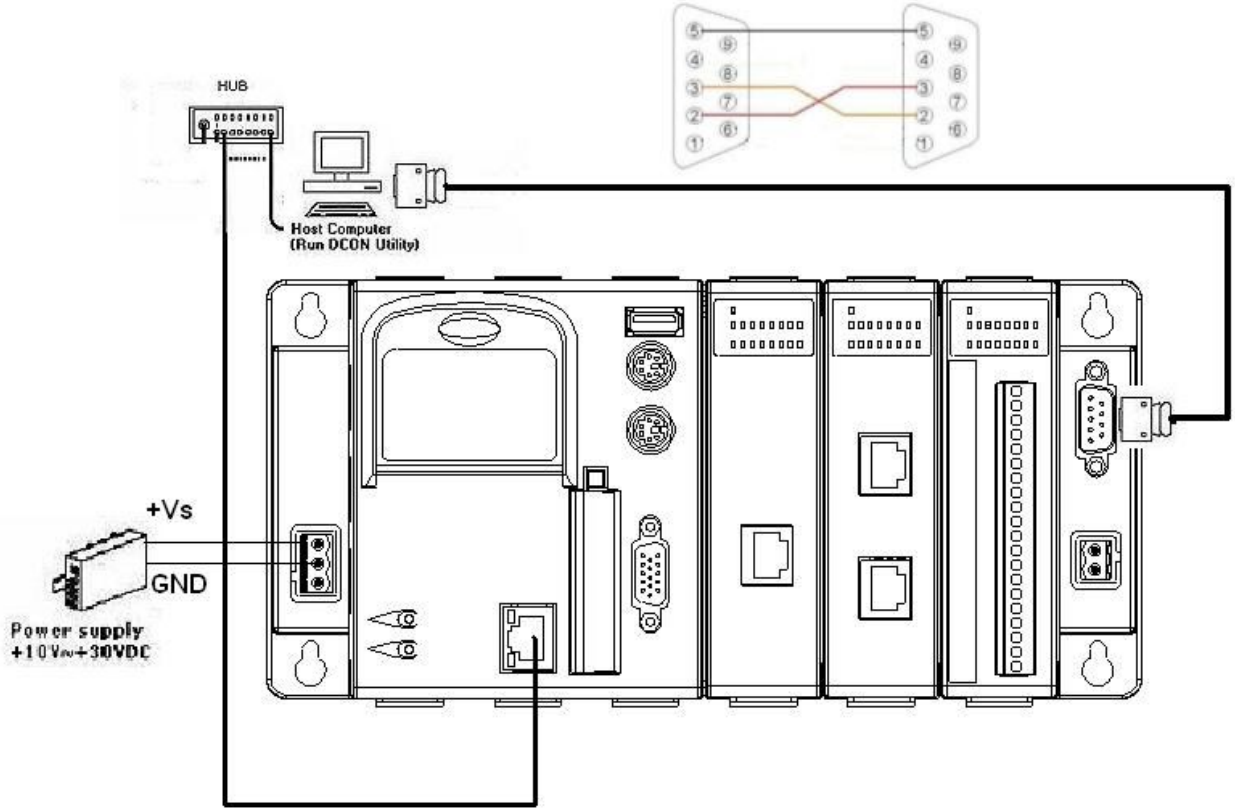


The differences between DCON modules and Modbus modules.

	DCON Protocol	Modbus
Checksum setting	Yes	No
Modbus response delay time	No	Yes
DO safe value	Yes	No
AO safe value	Yes	No
Data format(Engineering)	Yes (AI, AO)	No
Data format(Hex)	Yes (AI, AO)	Yes
Data format(Percent)	Yes (AI, AO)	No
Data format(Ohm)	Yes (RTD, Thermistor)	No

3.2 Configure i-87K I/O modules on WinCon with DCON Utility:

When i-87K I/O modules applies to the WinCon system, DCON Utility can also help user to configure the I/O especially for AI, AO and Counter/Frequency modules.

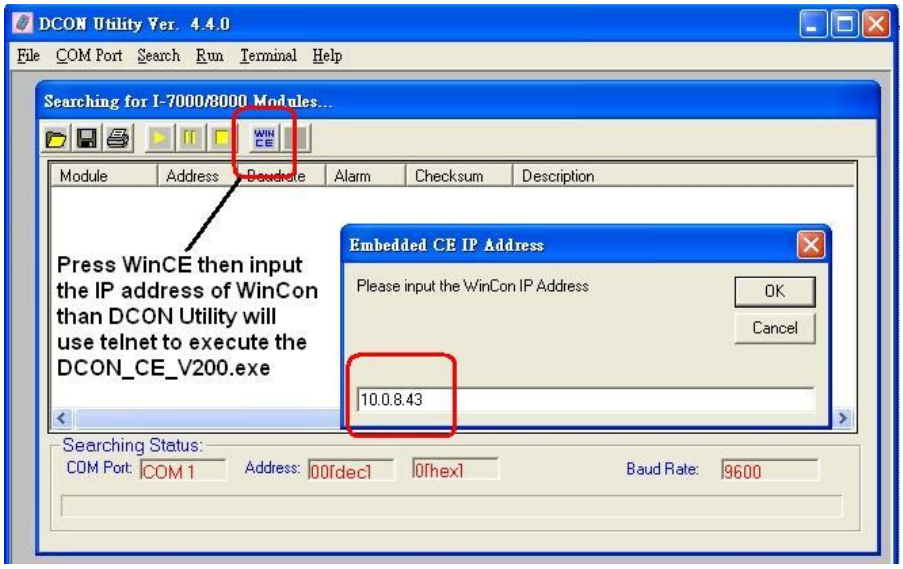


DCON Utility can not search the WinCon directly, it needs some steps to achieve the mission.

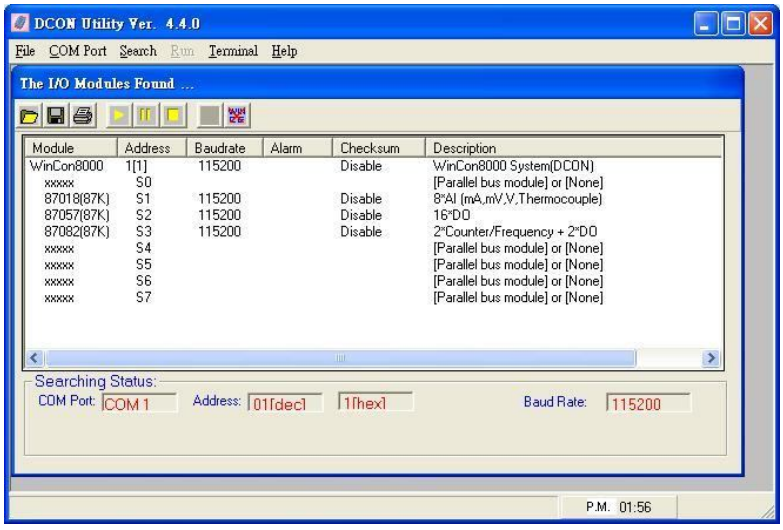
Step 1: Check the DCON_CE_V200.exe which the WinCon may be locate at the path CompactFlash\ICPDAS\Tools\ or Compact Flash\ICPDAS\Tools\.

http://www.icpdas.com/products/PAC/wincon-8000/Download/download_Compact%20Flash.htm

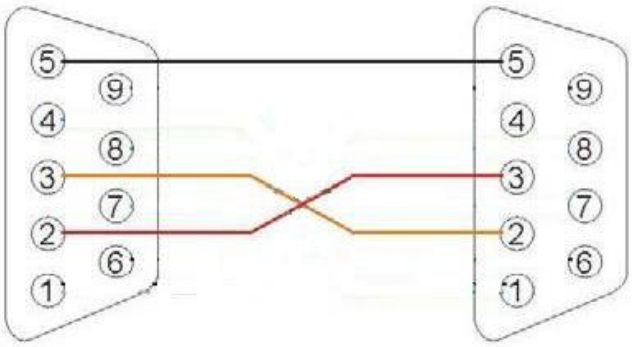
Step 2: It need to use telnet protocol to execute the DCON_CE_V200.exe and to configure the i-87K I/O module.



Step 3: When DCON_CE_V200.exe has been executed, DCON Utility need to use COM port cable to connect to the WinCon's COM2 (RS-232) to search and to configure the i-87K I/O modules.



Note : The wire connection between WinCon's COM2 and PC's COM port is the most asked question when using DCON Utility to configure the 87K I/O modules which are inserted into the WinCon.



Please note the crossover between
pin2 and pin3 of the COM port connecter

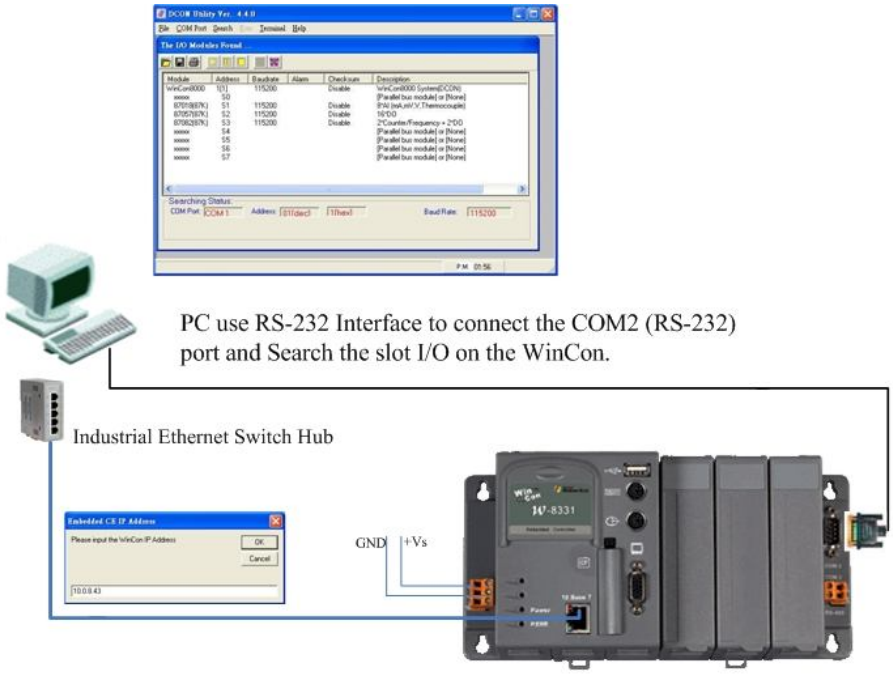


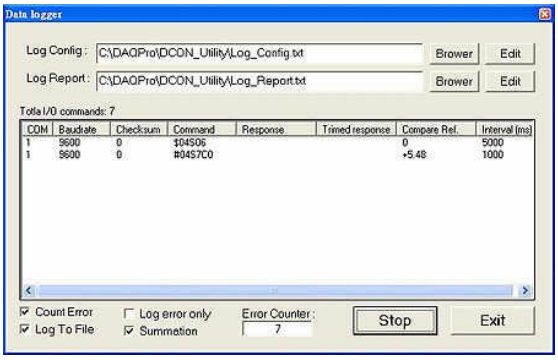
Diagram 4 : DCON Utility can search and configure the i-87K I/O modules on WinCon 8000 system via COM2(RS-232) interface.

For using DCON_CE_V200.exe and
wire connection of WinCon's COM2 with PC, please refer to
ftp://ftp.icpdas.com/pub/cd/winconcd/napdos/WinCE/User%20Manual/ or
WinCon CD:\Napdos\WinCE\User Manual
WinCON Getting Started 1.4.pdf (2.3 I-87K Module Settings)

Chapter4. Tools of DCON Utility.

4.1 Data Log function:

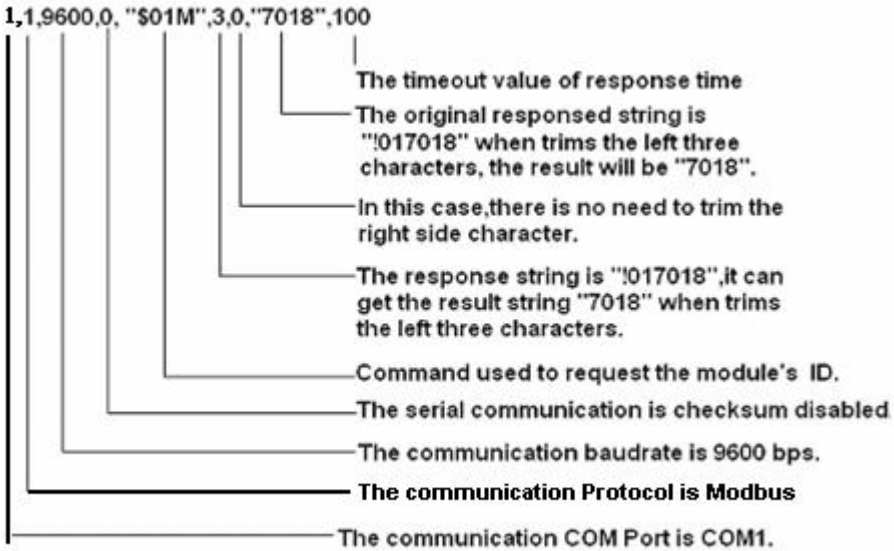
This function is a simple tool to have data log report.

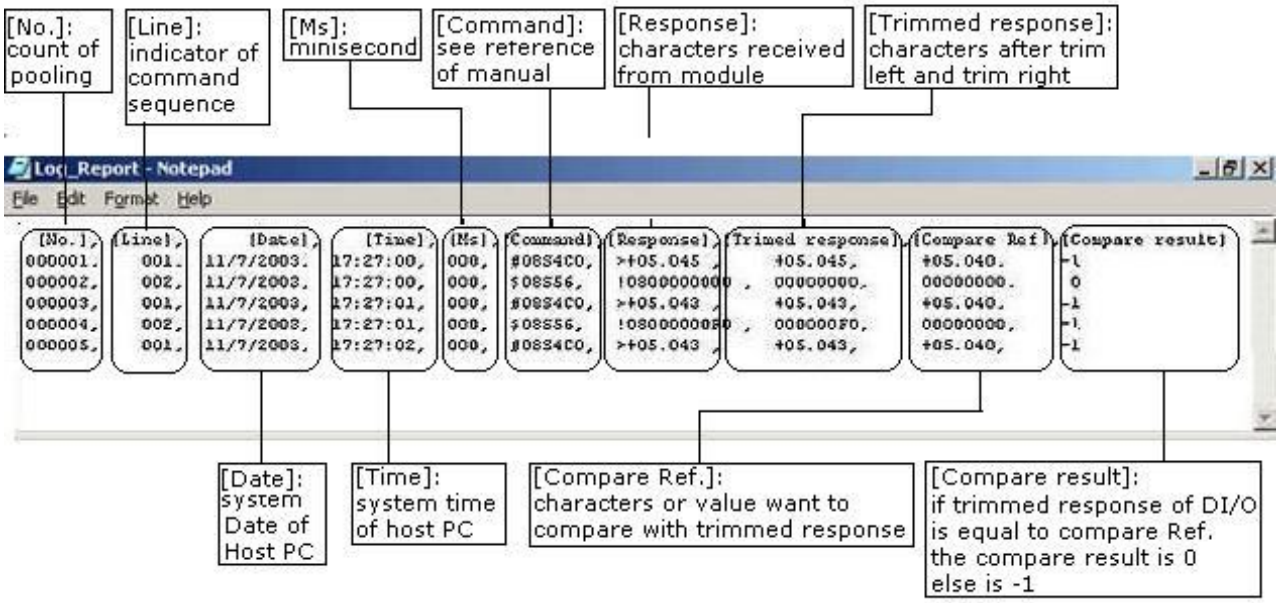


4.1.1 Edit the Log_Config.txt

```
/*
The documet is a configure file to let the Utility send specific
command string to the moudles and log the communication packages
to the report file.
The parameters are:
[COM],[Baudrate],[Checksum],[Command],[Left trim],[Right trim],[Compare Ref.],[Time interval]

[COM]:           1 ~ 255
[Baudrate]:      1200,2400,4800,9600,19200,38400,57600,115200
[Checksum]:      0 ==> disable
                 1 ==> enable
[Command]:       command string that will be sent to the I/O modules.
[Left trim]:     trims how many bytes of the left of the received string.
[Right trim]:    trims how many bytes of the right of the received string.
[Compare Ref.]:  referance string used to compare the trimmed response string.
[Time interval]: time interval to run the command.
                 unit: ms

Please change it to suit your hardware configuration.
[Oct,9,2003] by Kevin

Note 1: The config file is used from DCON Utility 4.2.7.
Note 2: The document is termniated by one '*' and one '/'.
*/
  1,9600,0, "$01M",0,0,"!017018",100
```

it needs to put right parameters to get right response records from modules,





example1.

If we have an i-8810 MCU at Address 08 and an i-8041 DI module at Slot 05 on MCU

We use $08S56 to read I/O Status and get response !0800000000

All we want from the response is the I / O Status 00000000

so we have to trim left 3(!08) from !0800000000 to get 00000000

example2.

If I/O status has been changed we can use Compared Ref. 00000000

If I/O status has been changed to 000000F0 then Compared result is -1

If no change then Compared result is 0

example3.

If we have an i-8810 MCU at Address 08 and an i-8017H AI module at Slot 04 on MCU

We use #08S4C0 to read Analog input at channel 0 and the response format is >+05.048

if we want to trim off the ">" character

then we set Left trim 1 and Right trim 0 to get +5.048 format

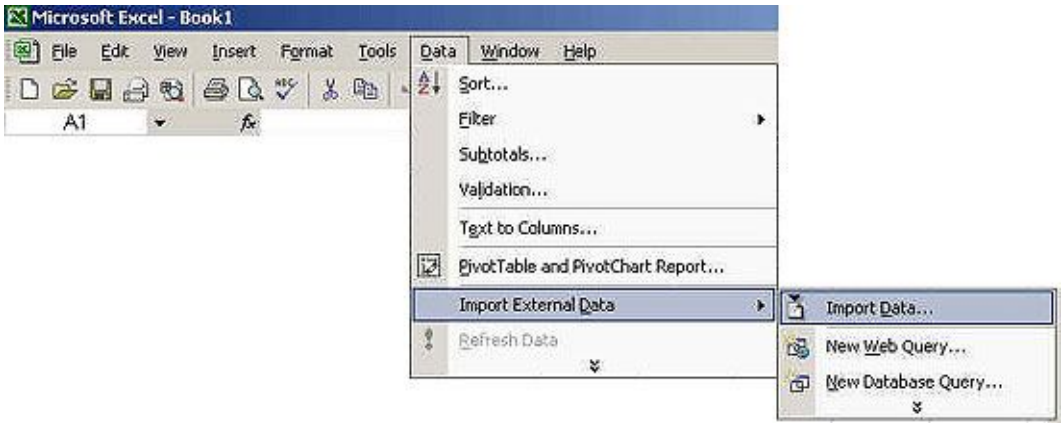
4.1.1 Use EXCEL to Import the data of Log_Report.txt

In some situation user would want to transfer Log_Report to excel file

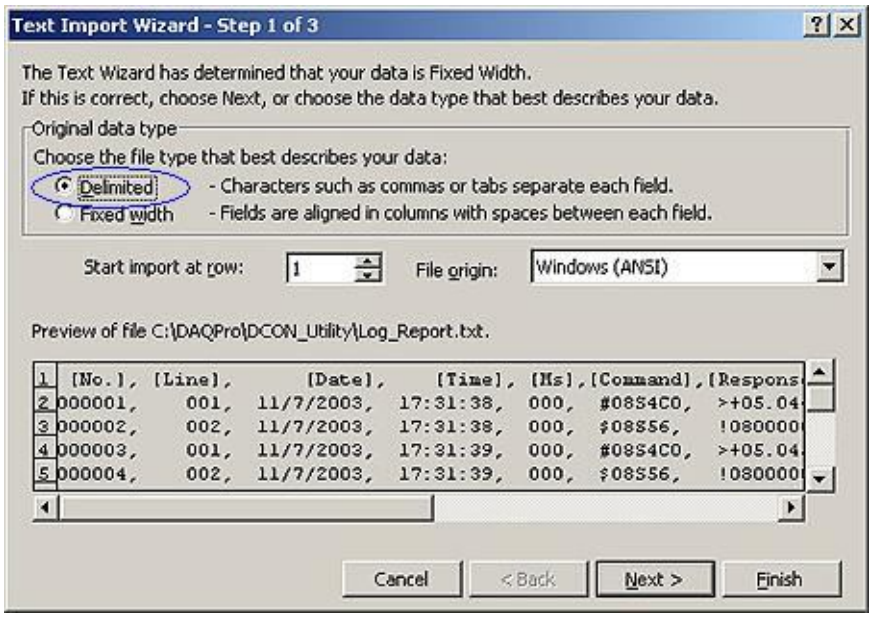
The procedure below will show how to do it

1. Execute Excel.exe

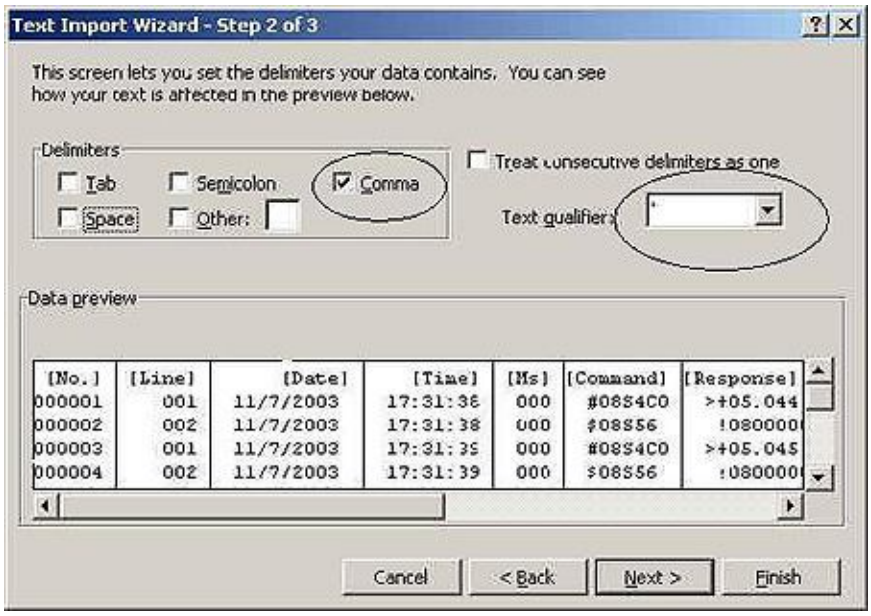
2.Data ->Import External Data ->Import Data



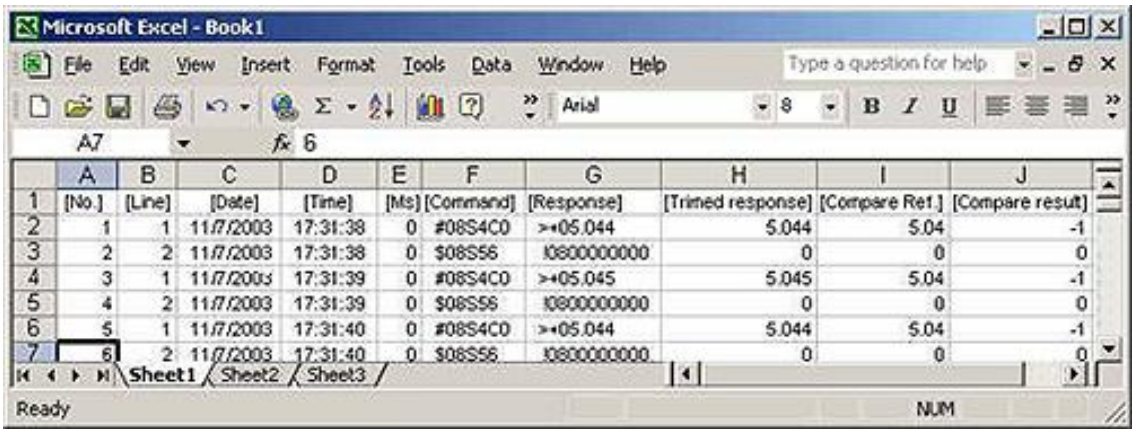
3.Select **"Delimit"**


Text Import Wizard - Step 1 of 3
The Text Wizard has determined that your data is Fixed Width.
If this is correct, choose Next, or choose the data type that best describes your data.
Original data type
Choose the file type that best describes your data:
Delimited - Characters such as commas or tabs separate each field.
Fixed width - Fields are aligned in columns with spaces between each field.
Start import at row: 1
File origin: Windows (ANSI)
Preview of file C:\DAQPro\DCON_Utility\Log_Report.txt.
1 [No.], [Line], [Date], [Time], [Ms],[Command],[Respons
2 000001, 001, 11/7/2003, 17:31:38, 000, #08S4C0, >+05.04
3 000002, 002, 11/7/2003, 17:31:38, 000, $08S56, !080000
4 000003, 001, 11/7/2003, 17:31:39, 000, #08S4C0, >+05.04
5 000004, 002, 11/7/2003, 17:31:39, 000, $08S56, !080000
Cancel
< Back
Next >
Finish

4.Select **"Comma"** as delimit

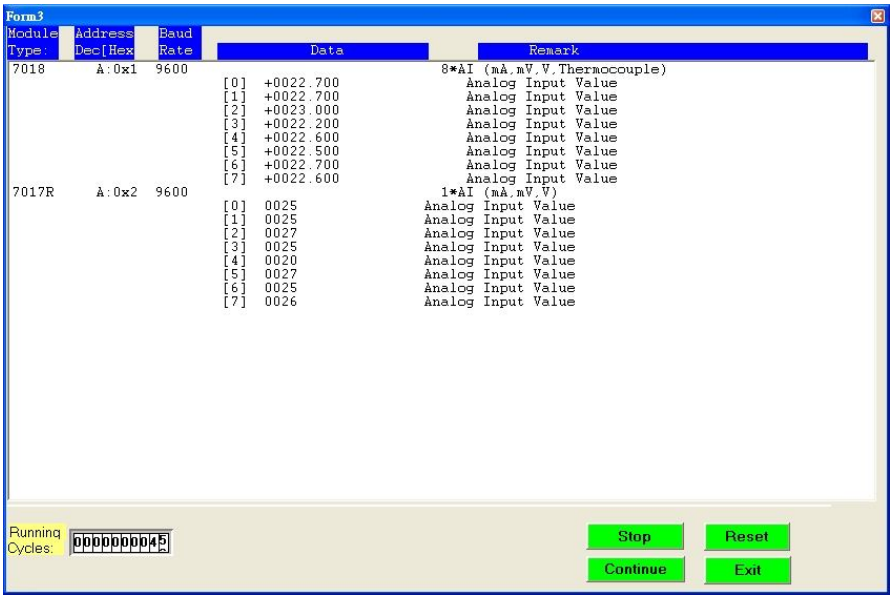


5.Click **"Finish"** and get the result

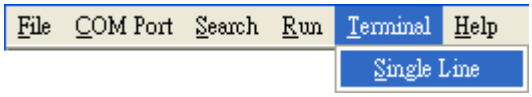


4.2 Monitoring function:

When finish searching and configuring the module, the monitor function can pooling every module one by one and show the results.

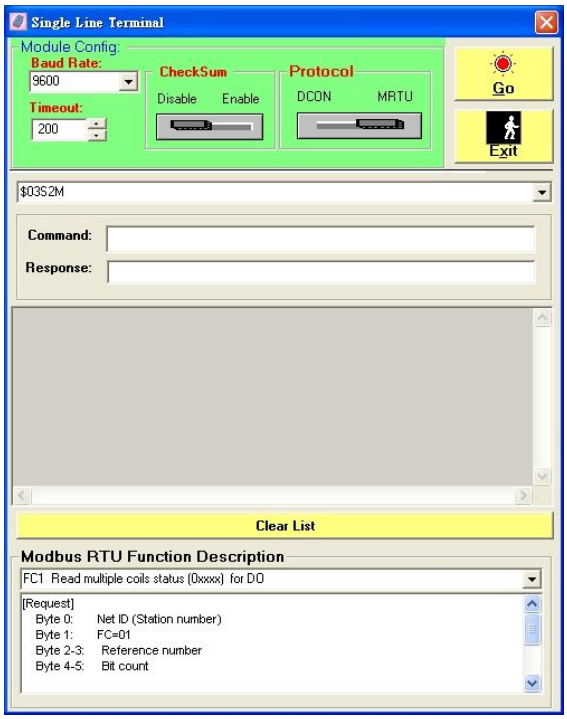


4.3 Terminal →Single Line function:



This is a basic tool for user to test and debug the command.

It supports both DCON Protocol and Modbus RTU Protocol.



The first step user must know the communication settings of target module.

The second step is to look for the commands on user manual.

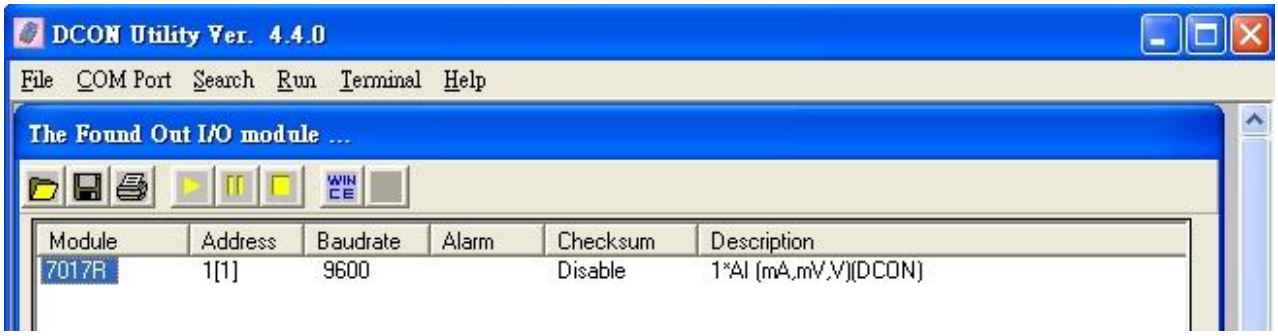
For I-8000 series modules the files are located at:
CD:\ Napdos\DCON\IO_Module\hw_dcon_on_8KUnit\8k
ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/dcon/io_module/hw_dcon_on_8kunit/8k/

For I-87K series modules the files are located at:
CD:\ Napdos\DCON\IO_Module\hw_dcon_on_8KUnit\87k
ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/dcon/io_module/hw_dcon_on_8kunit/87k/

For i-7K and M-7K series modules, please refer to
CD:\ Napdos\7000\Manual\
ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/7000/manual/

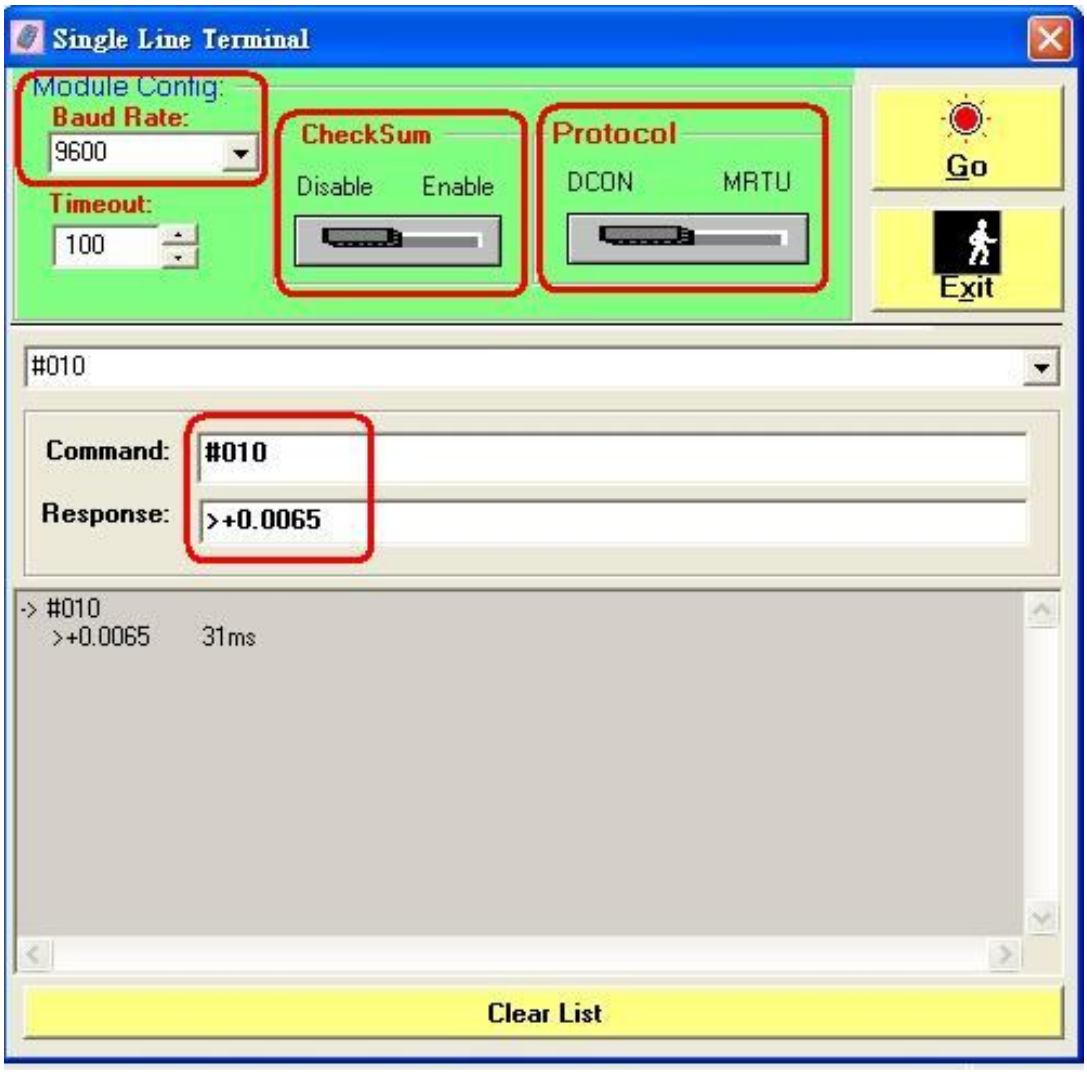
Example 1:

If there is a 7017R with the net address 01, baud rate 9600, checksum disable and DCON protocol.



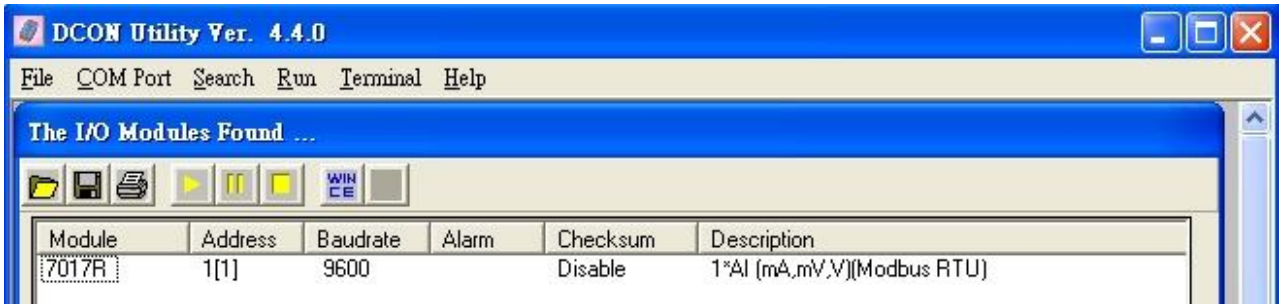
It can use #010 to read the AI values of channel 0.

The response of i-7017R is “>+0.0065”



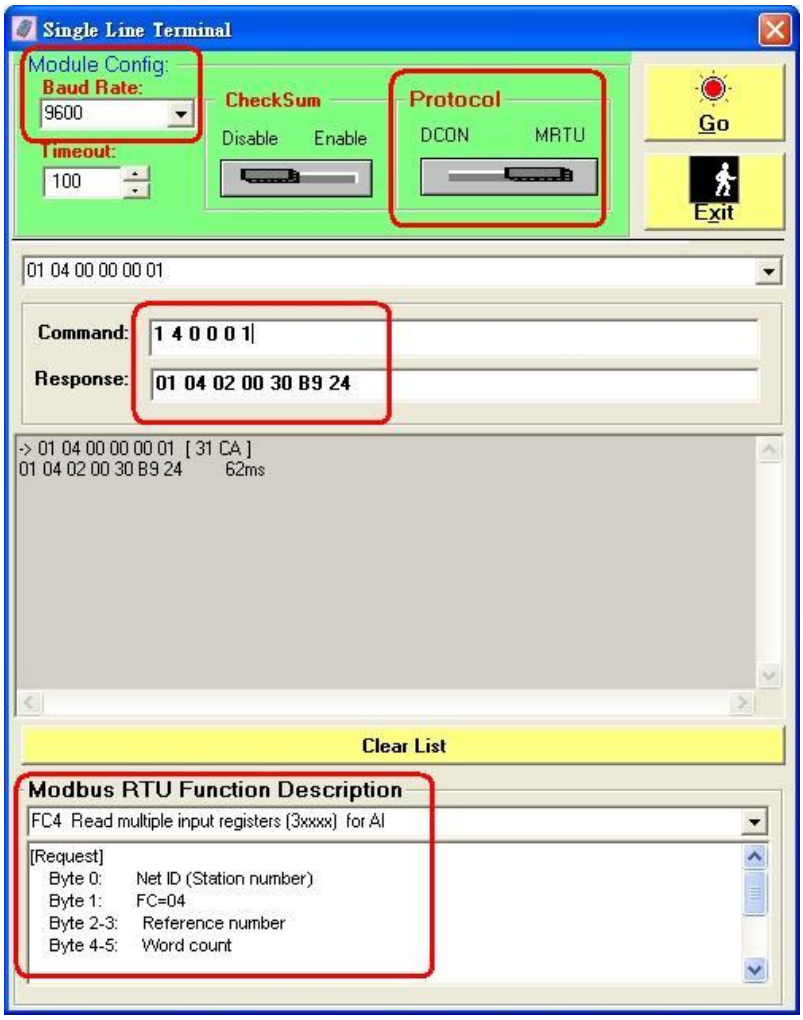
Example 2:

If there is a 7017R with the net address 01, baud rate 9600 and Modbus protocol.



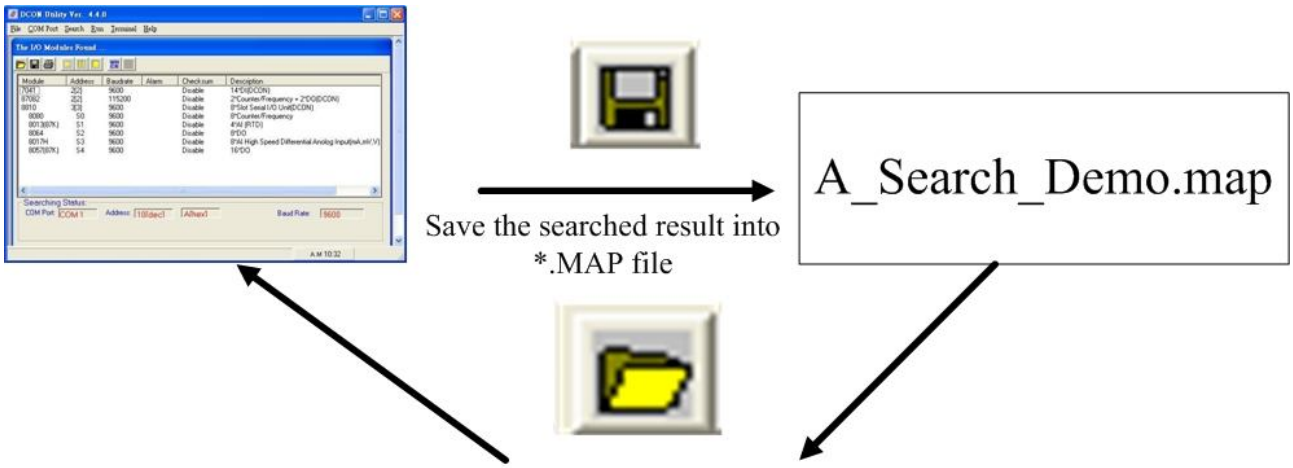
If wants to read AI value of channel 0, then it can look up to the description of Modbus command.

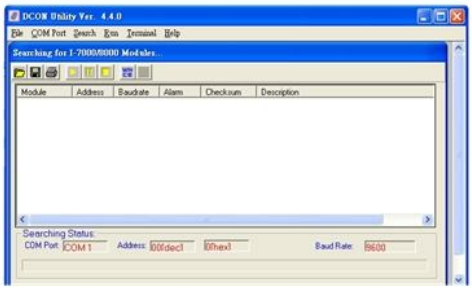
Then it can use 1 4 0 0 0 1 to read the AI value of channel 0 and
get the value 01 04 02 **00 30** B9 24



4.4 Save Map, Open Map and Print Map function:

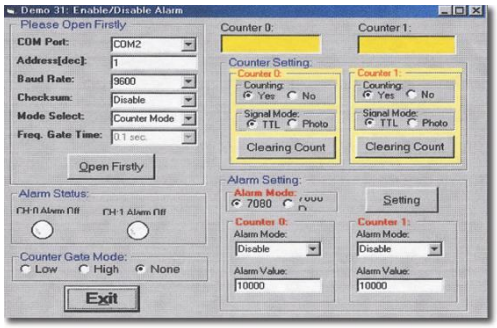
When the network contents many modules and need long time to search, it can save the search result into a map file, it will be very convenient to open map directly to load the previous result to searched form without searching time.





It also can print the searched result by using Print Map function.

Chapter5. DCON Protocol and Software Development ToolKit (free)



DCON DLL

DLL library

Supported modules:

i-7000/8000/87K series
(with DCON protocol)

Supported demos:

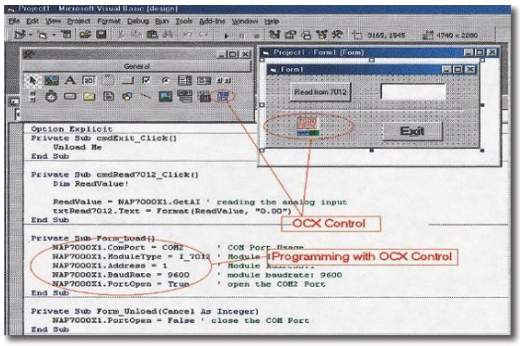
VB/VC/BCB/Delphi

Supported OS:

Windows 98/NT/2K/XP

File location:

CD:\Napdos\Driver\DCON_DLL



DCON ActiveX

ActiveX (ocx) component

Supported modules:

i-7000/8000/87K series
(with DCON protocol)

Supported demos:

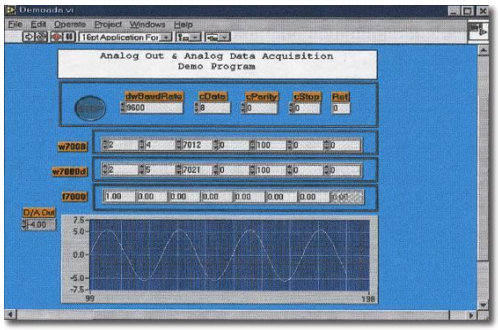
VB/VC/BCB/Delphi

Supported OS:

Windows 98/NT/2K/XP

File location:

CD:\Napdos\Driver\DCON_ActiveX



DCON LabVIEW

Bundled driver for LabVIEW

Supported modules:

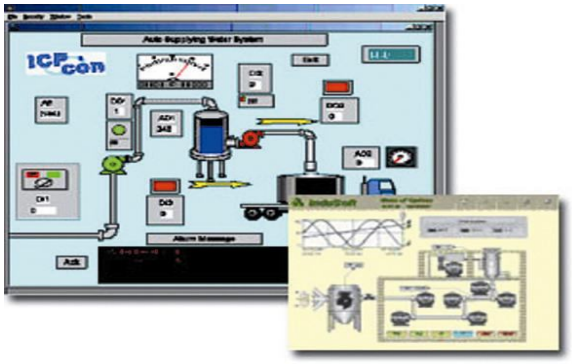
i-7000/8000/87K series
(with DCON protocol)

Supported OS:

Windows 98/NT/2K/XP

File location:

CD:\Napdos\Driver\DCON_Labview



DCON Indusoft

Supported Module:

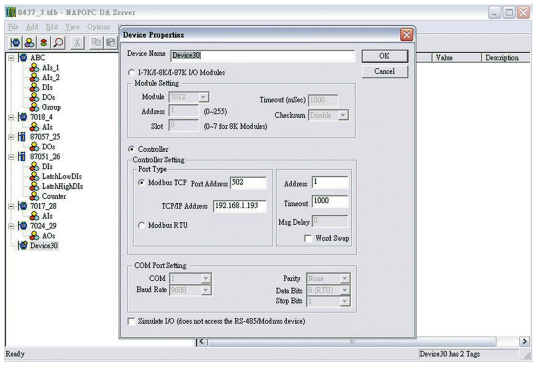
i-7000/8000/87K series
(with DCON protocol)

Supported OS:

Windows 98/NT/2K/XP/CE

File location:

CD:\Napdos\Driver\DCON_Indusoft



NAP OPC server

Supported module:

i-7000/8000/87K series
(with DCON protocol)
Modbus embedded controller
ISaGRAF embedded controller

Supported OS:

Windows 98/NT/2K/XP/CE

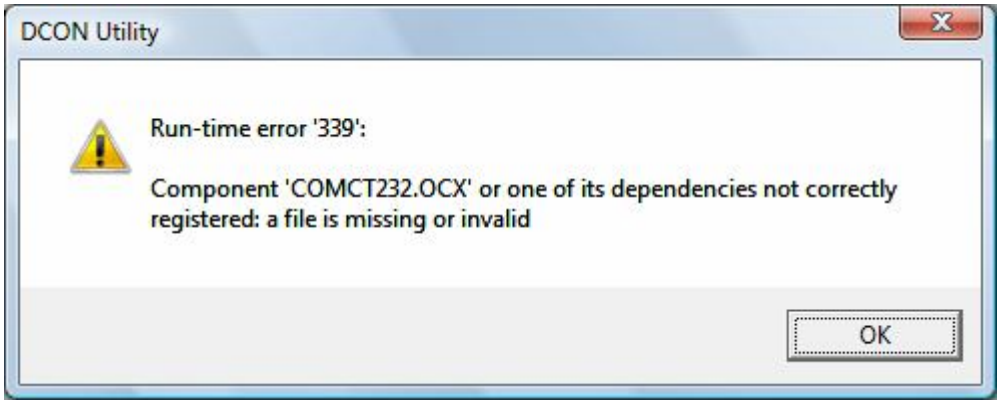
File location:

CD:\Napdos\NapOPCSvr

Appendix A. Trouble Shoot

Problem：

In the Win 7 or Vista OS, error message “Run-time error xx” .ocx file is not correctly registered as below picture:



Solution：

Step 1. Re-Install and run DCON Utility as administrator ：

Please uninstall DCON Utility and reboot OS .Then install it as administrator. When you want to use DCON Utility, please run it as administrator. And it will work correctly.

Step 2. Backup all *.ocx files and REGSVR32.EXE on the system32 catalog：

Please backup all .ocx files and REGSVR32.EXE that located at c:\windows\system32\ catalog on your PC

Step 3. Replace all file that located at DCON_Utility\ocx_file\ to system32 ：

Please copy all files (*.OCX ,REGSVR32.EXE and REGISTER.BAT) that located at DCON_Utility\ocx_file\ to your system32 catalog (they are located at : C:\WINDOWS\system32\) ,then run the REGISTER.BAT as administrator to register all ocx files . Run DCON Utility as administrator, it will work correctly.

Step 4. After replace files to your PC. If System has any problems , please use Step 2 files to return it.

If it still has any problems, please mail to us. Service@icpdas.com