



Startup of Remote I/O Modules

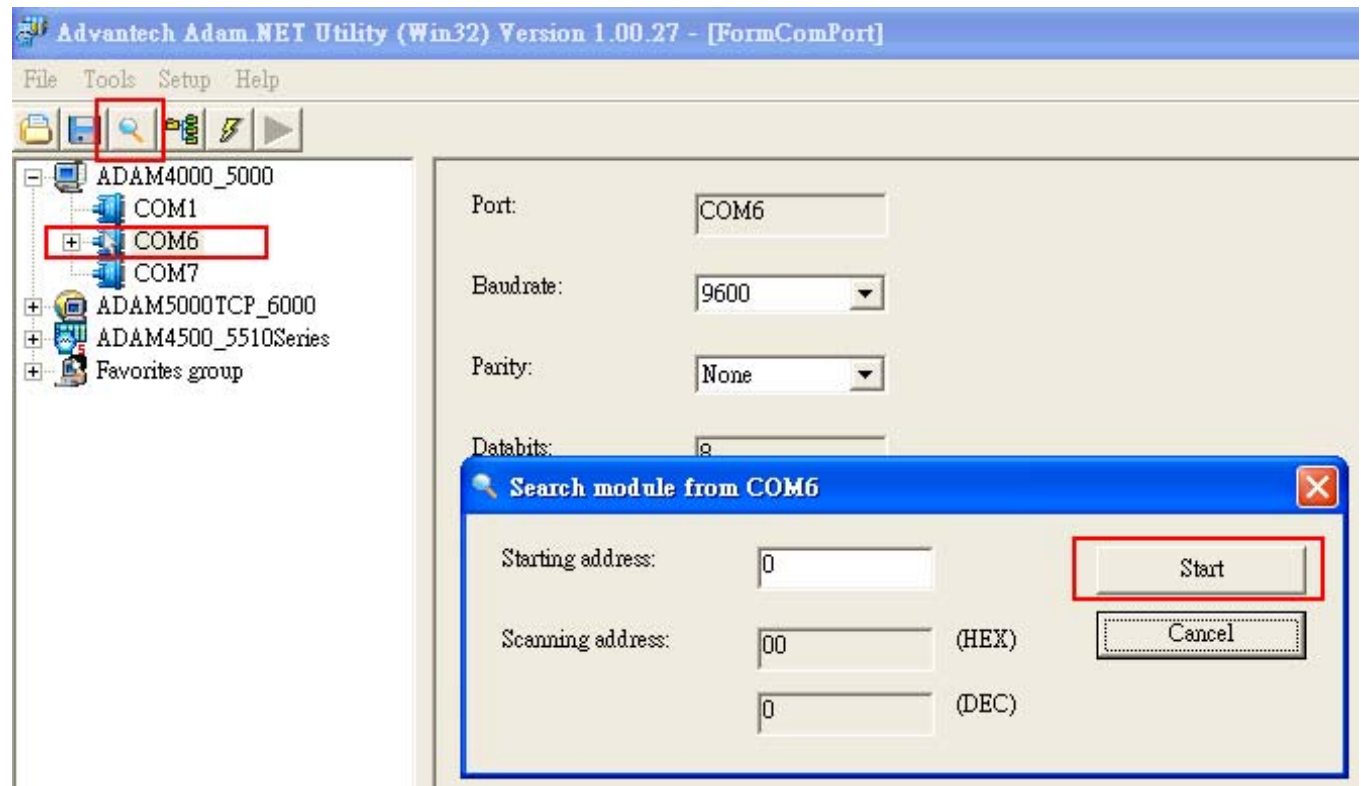
Agenda

- **ADAM-4000/5000 Configuration and Utility**
- **ADAM-6000/5000TCP Configuration and Utility**
- **Communication Protocols**
- **Basic Trouble Shooting**

- **ADAM-4000/5000 Configuration and Utility**
 - Initial Mode
 - Utility Operation
- **ADAM-6000/5000TCP Configuration and Utility**
- **ASCII Command / Modbus RTU / Modbus TCP**
- **Basic Trouble Shooting**
- **Hands-on for Installation & Wiring**

Utility Configuration

- Adam.Net Utilitiy
- In RS-485, the address of every module must be unique



Initial Mode

- Why Using Initial Mode
- How to Set Initial
- Some Modes can only be configured under Initial mode

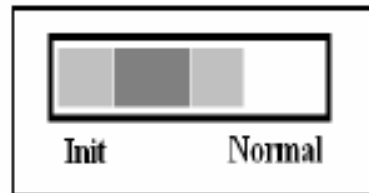
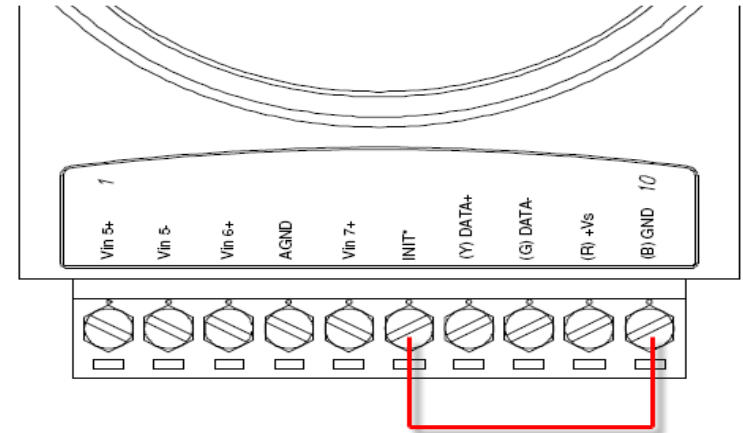
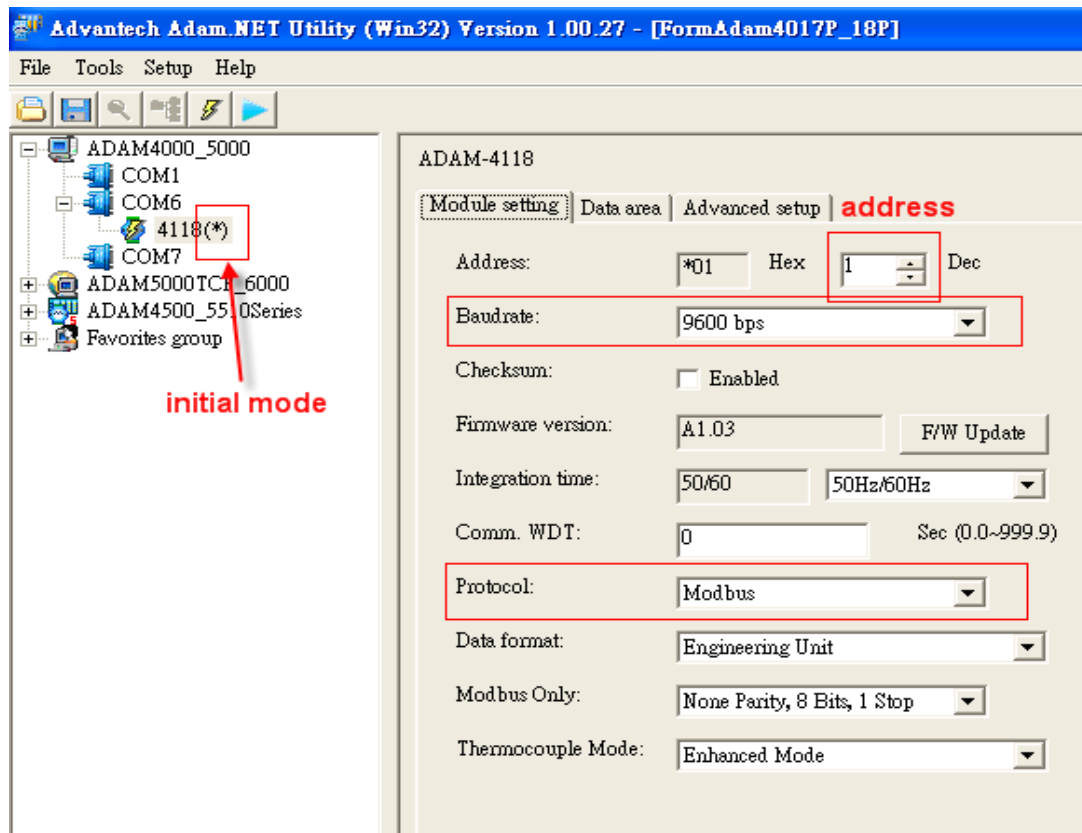


Figure 2-4 Set INIT switch to "Init"

Utility with Initial Mode

- Just only one module can be set to initial mode
- Start sign means ID= 0



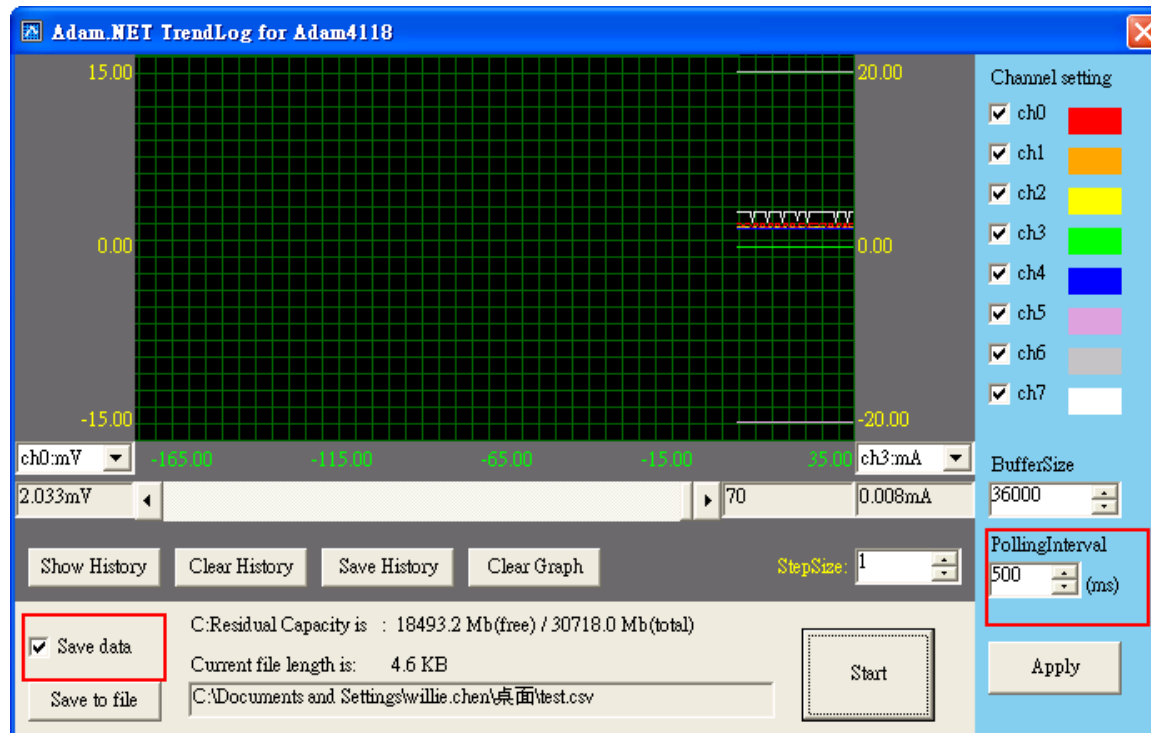
Hand-On Practice

- **Objective : Utility Operation**
 - Step1 : Set Module in Initial Module
 - Step2 : Use Utility to Search Module
 - Step3 : Change Baud rate, Address, and Protocol Setting
 - Step4 : Get I/O data

- **Time : 5 Mins**

Utility with Trend and Data Logging

- Trend View
- Data Logg



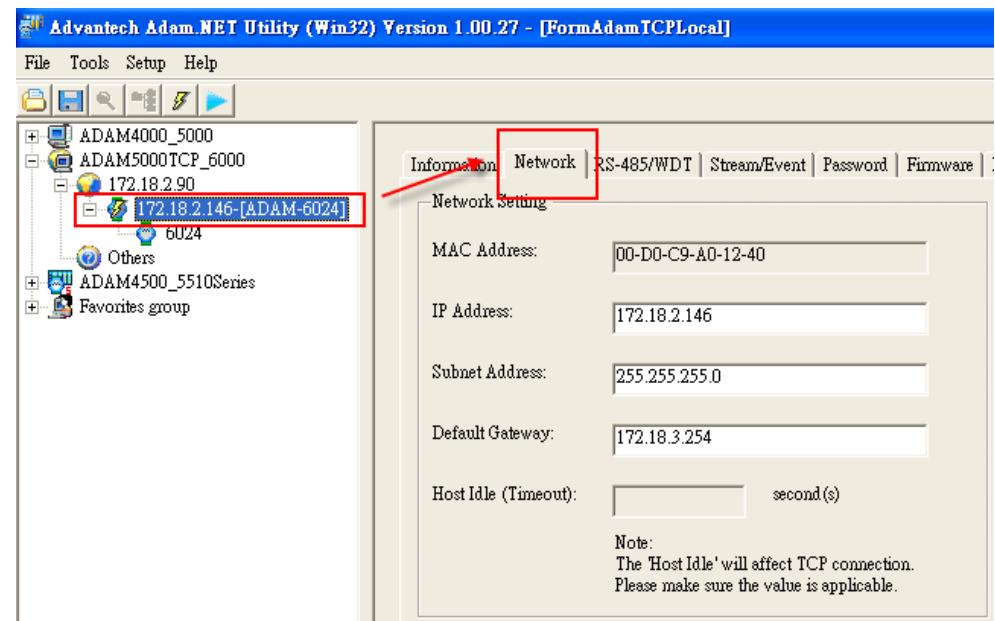
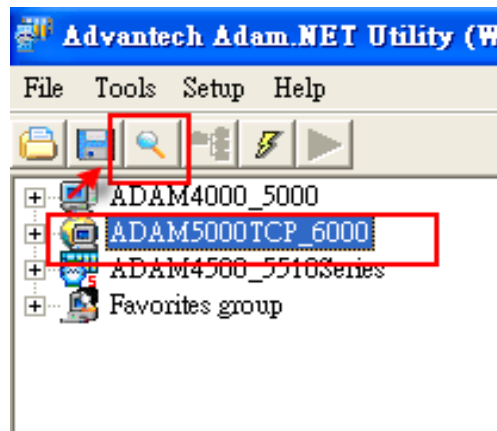
Hands-On Practice

- **Objective : DI/O data & show AI/O data**
 - Step1 : Show trend
 - Step2 : Change the setting
 - Step3 : Data Log Operation
- **Time : 5 Mins**

- **ADAM-4000/5000 Configuration and Utility**
- **ADAM-6000/5000TCP Configuration and Utility**
 - Search module
 - Network Setting
 - Add Remote Devices
 - Firmware Update
 - Access Control
 - Adam-6K series New Functions
- **Communication Protocols**
- **Basic Trouble Shooting - Modscan**
- **Hands-on for Installation & Wiring**

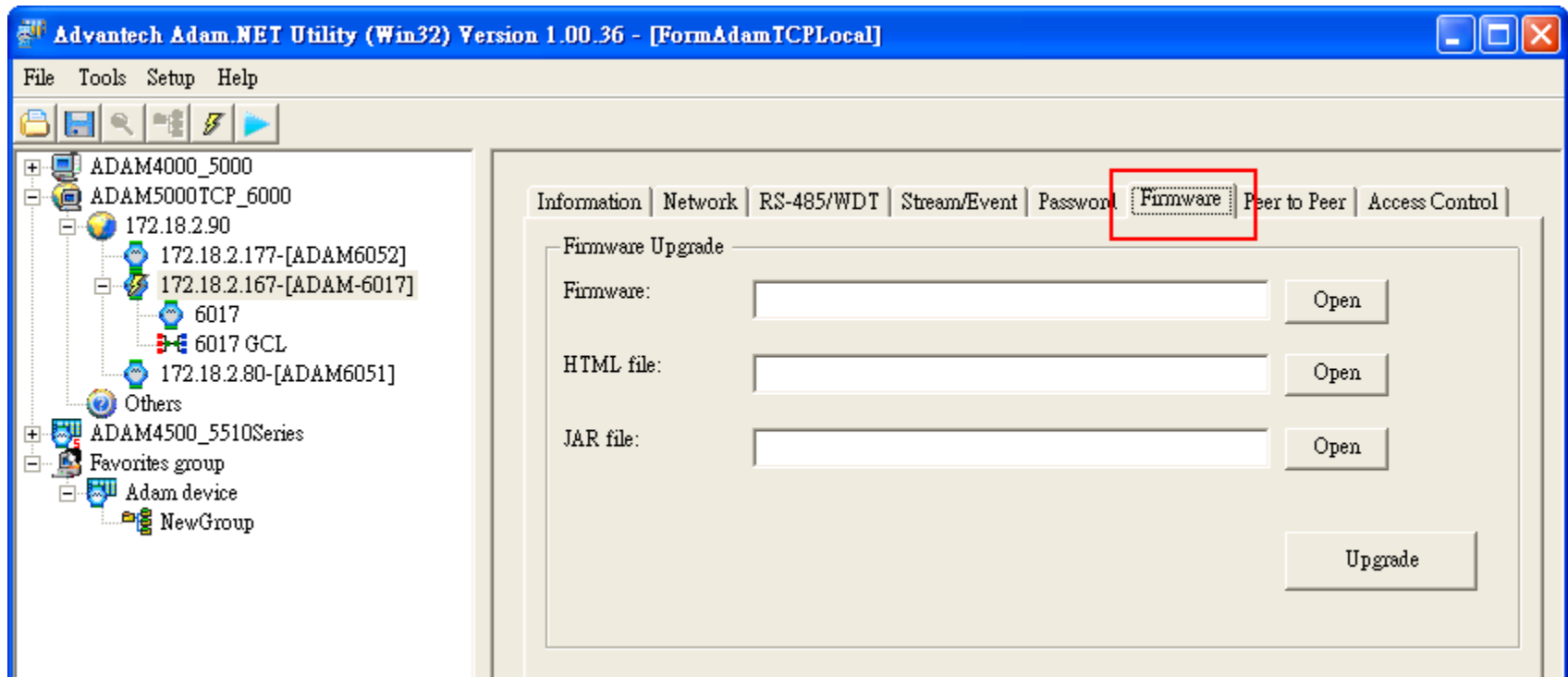
Utility Operation

- UDP Broadcast to search modules
- Works in the same sub-net
- Default IP: 10.0.0.1
- Network setting
- Default Password



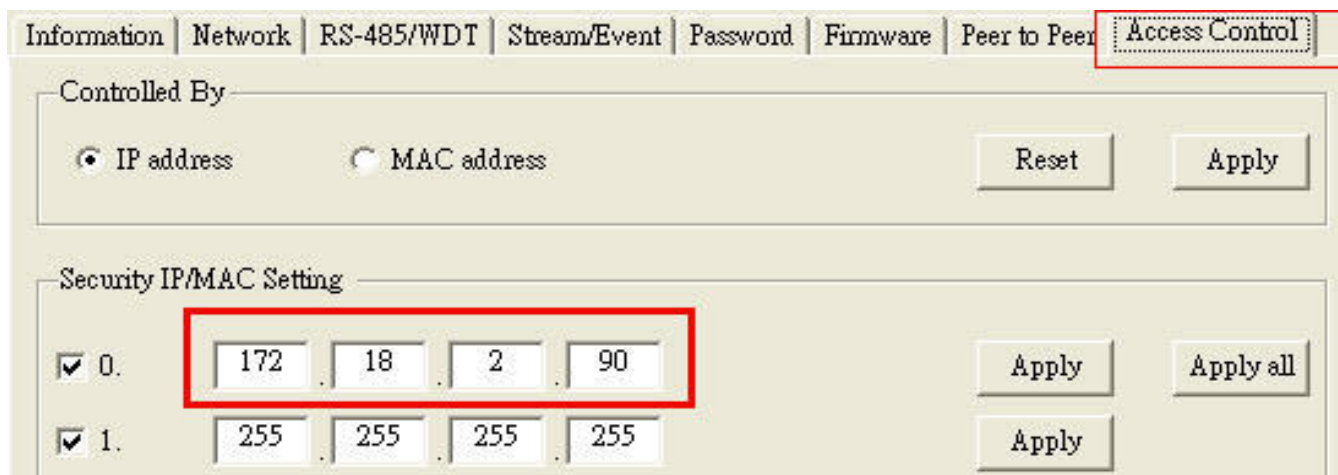
Firmware Update

- Firmware Update



Access Control

- Use IP or MAC address to control connected devices
 - Permit one device with IP:172.18.2.90 to access



Information | Network | RS-485/WDT | Stream/Event | Password | Firmware | Peer to Peer | **Access Control**

Controlled By

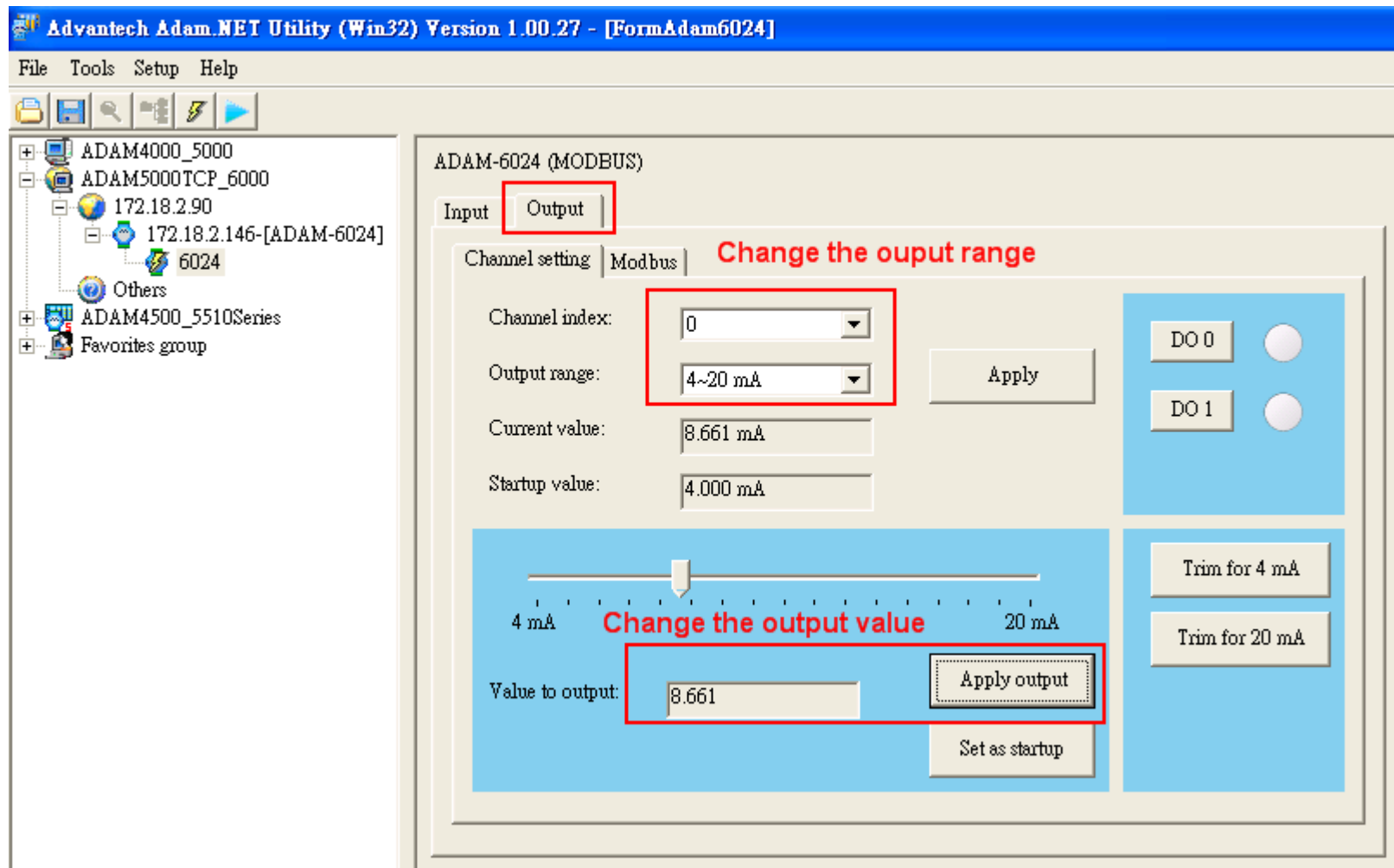
☒ IP address ☐ MAC address

Reset Apply

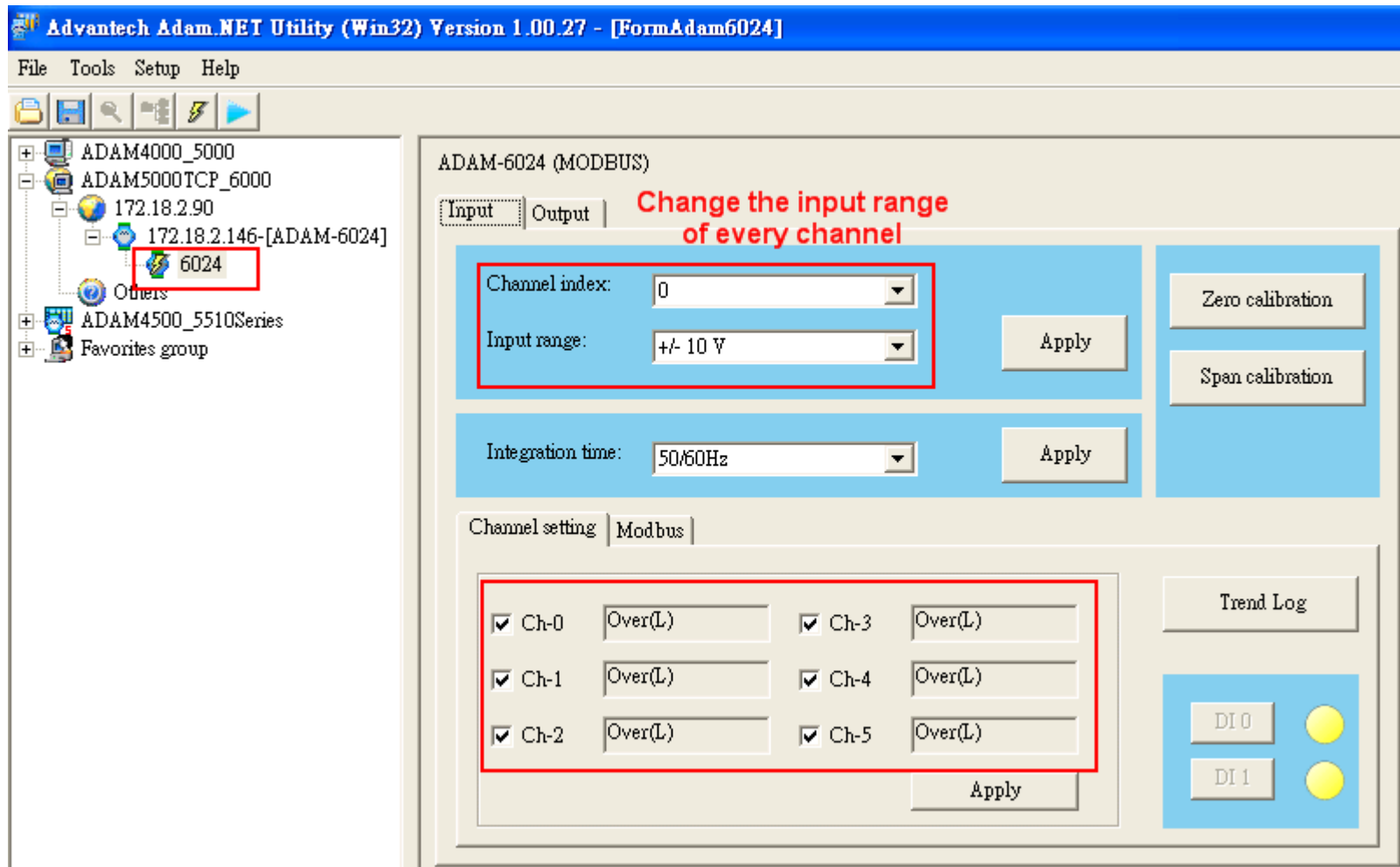
Security IP/MAC Setting

<input checked="" type="checkbox"/> 0.	172	18	2	90	Apply	Apply all
<input checked="" type="checkbox"/> 1.	255	255	255	255	Apply	

Utility Operation-Set AO Value



Utility Operation-Read AI Value



Advance I/O functions

- Using Utility to change the modes
- DI : Latch, Frequency, Counter
- DO : Delay, Pulse Output
- AI : Max/Min/Ave

The screenshot shows a software window titled "version 1.00.36 - [FormDICounterSetting]". The main content area is titled "ADAM-6052 DI[0] setting:". It contains several controls: a "DI mode:" label next to a dropdown menu currently showing "Counter" (with "DI" and "Counter" visible in the list), an "Apply mode" button, a "Setting:" label next to a dropdown menu showing "Low to high latch" (with "Counter", "Low to high latch", "High to low latch", and "Frequency" visible in the list), an "Apply change" button, two checkboxes labeled "Keep last value when power off" and "Enable digital filter", two input fields for "Minimum low signal width" and "Minimum high signal width" (both set to "0" with "0.1 ms" units), and a "Counter value:" label next to a text box showing "0 times", with "Stop" and "Clear" buttons.

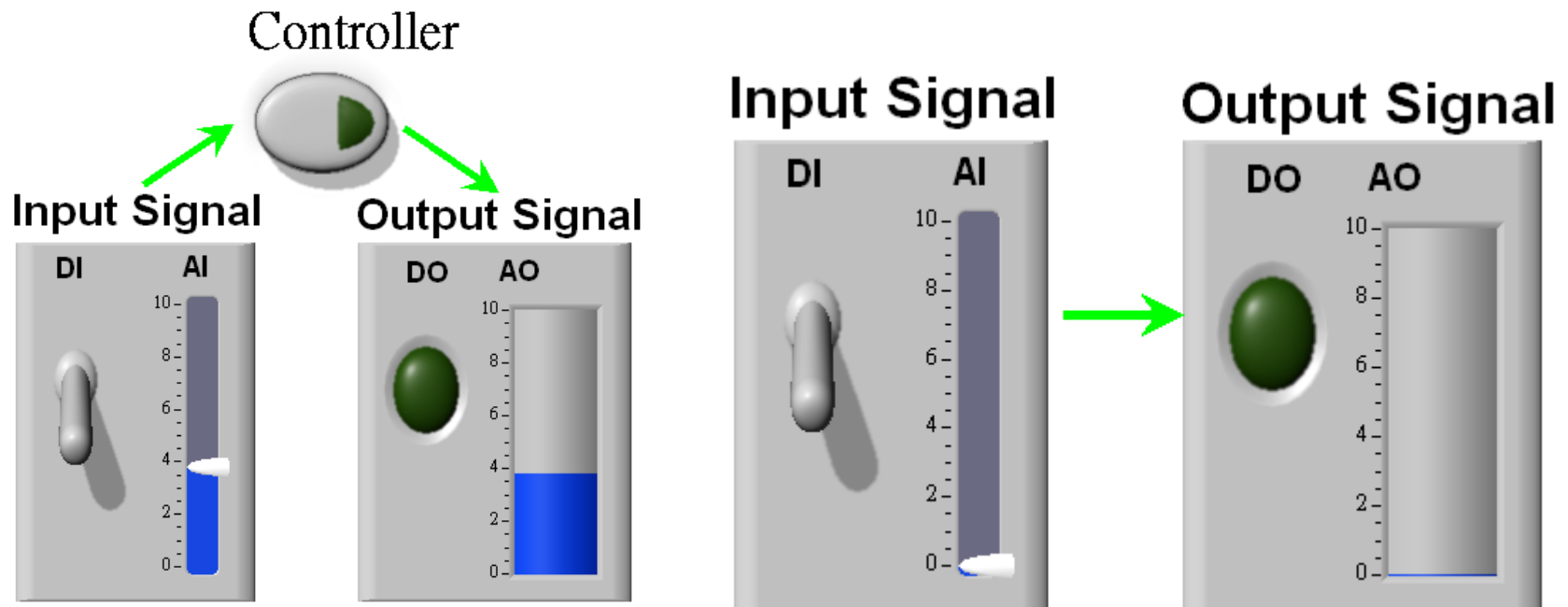
Adam-6K series New Functions

- Shorten Developing time
- Reduce software learning curve
- Cut down budget

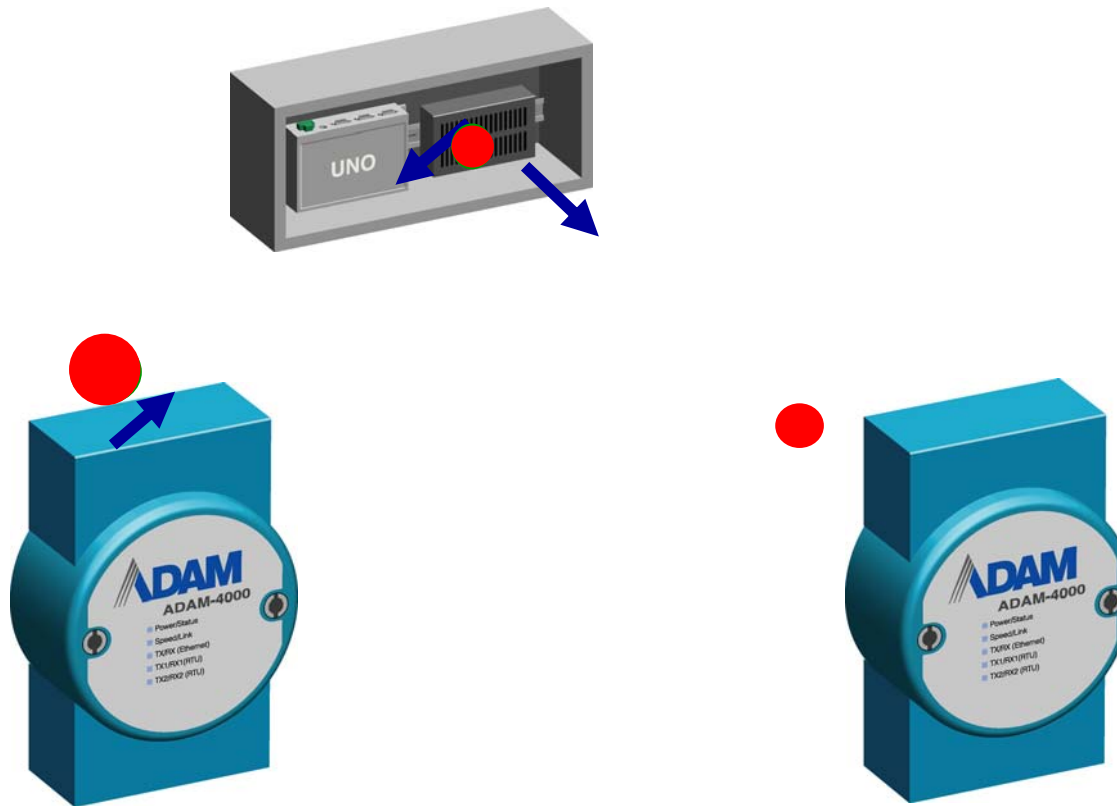
**Advantech Providing
P2P function and GCL Control**

What is Adam Peer to Peer

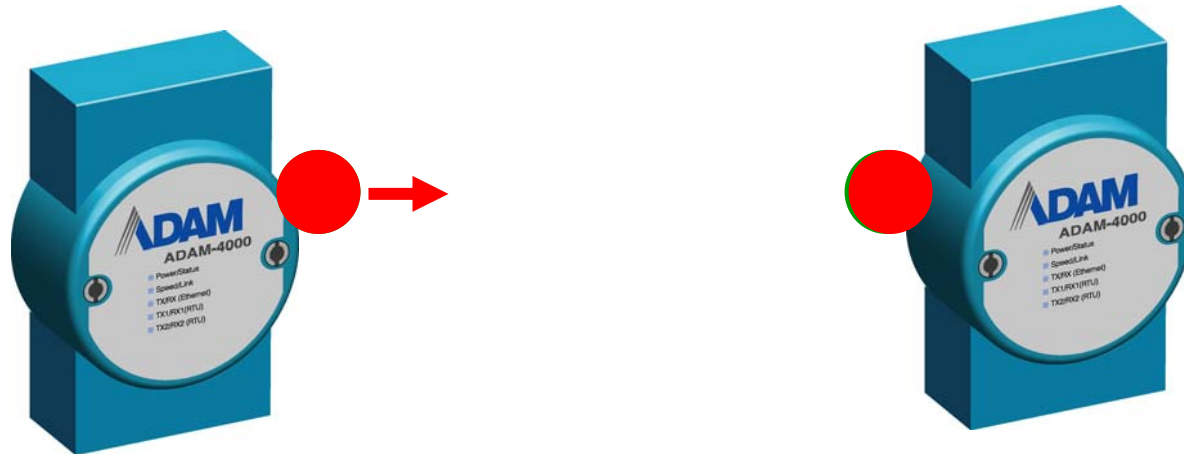
- Instead of Master (Client)
- Actively update Input status to Output status
- DI channel to DO channel; AI channel to AO
- Only for Digital modules



Passive Way – Continuously Polling



Actively update Input status to Output status



Adam-6K P2P in Adam.NET Utility



Information | Network | RS-485/WDT | Stream/Event | Password | Firmware | **Peer to Peer** | Access Control

Mode
☐ Basic ☐ Advanced ☒ Disable Apply

Basic (One to One)

Period time: second(s)

Change of state ☐ (CoS)

Source  IP: → Destination  IP:

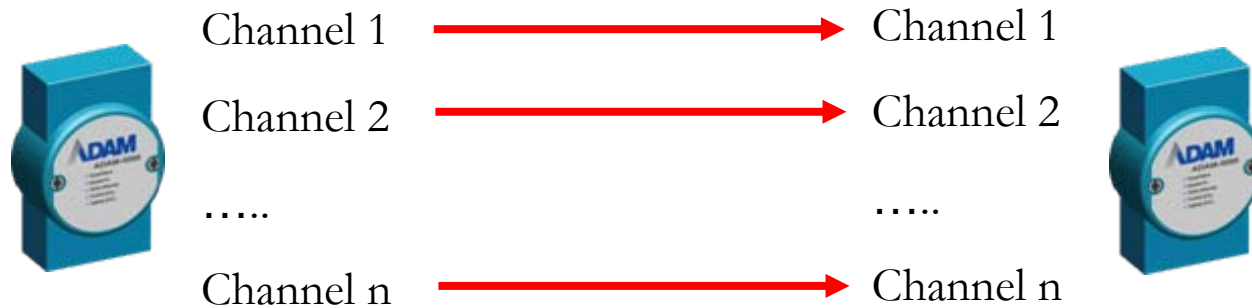
Modify channel enable ☐

Channel	Enable
---------	--------

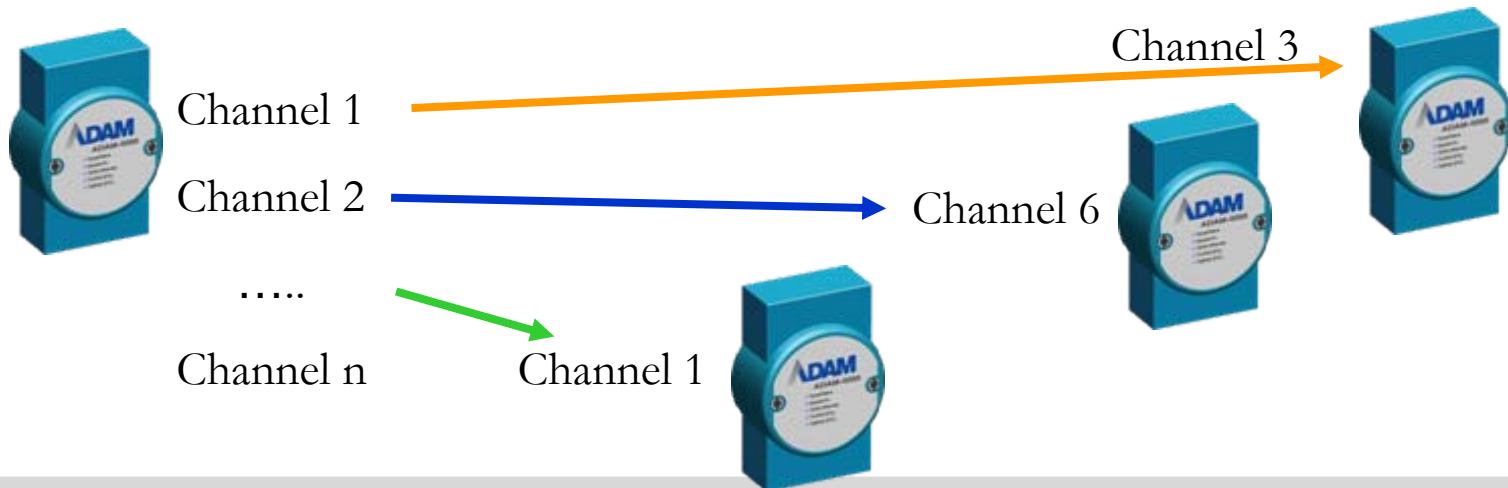
Refresh Save Load Apply list

ADAM-6K P2P Modes

- Basic mode: one module every DI mapping to another module DO



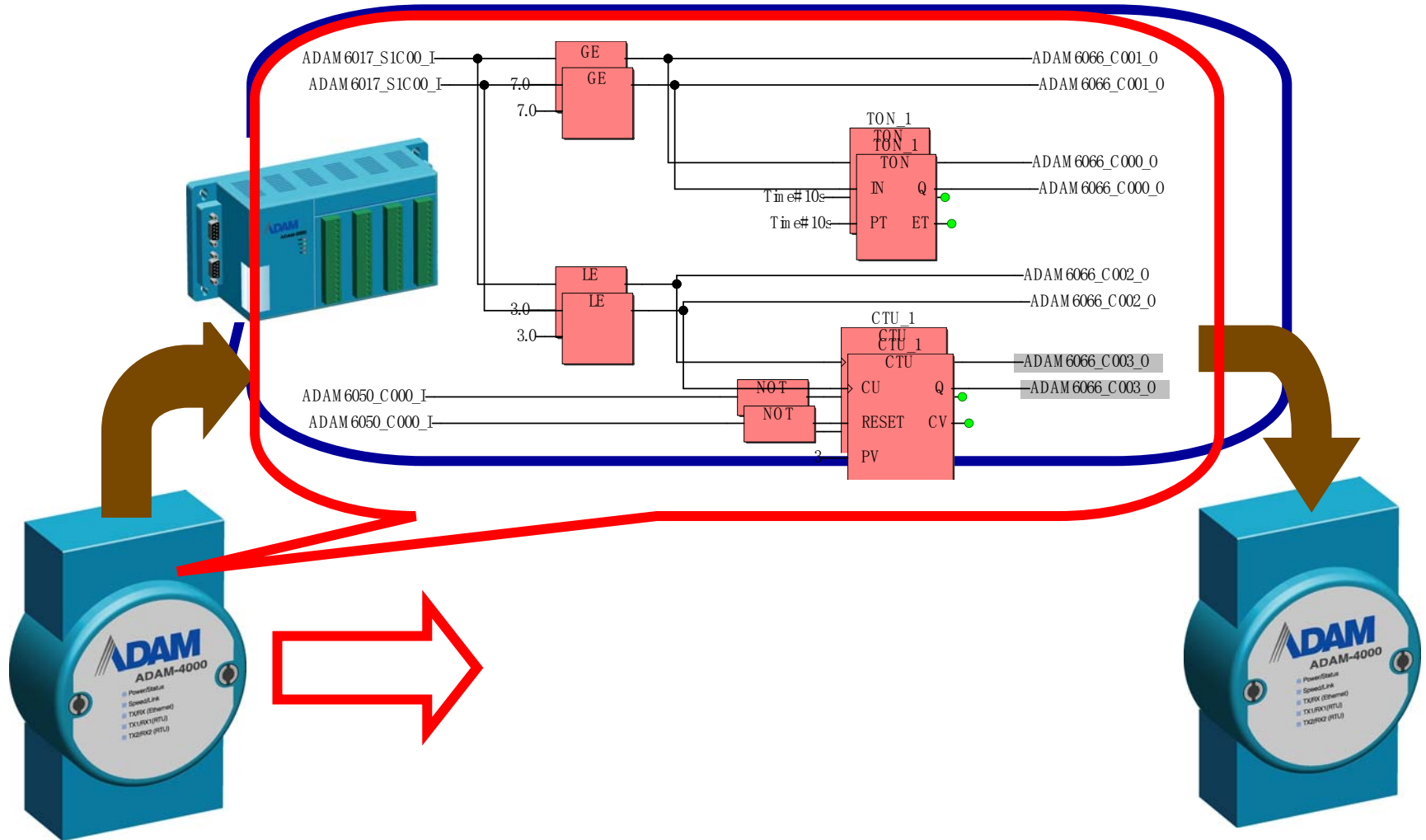
- Advanced mode: DI/O mapping to multi module DO



What is GCL

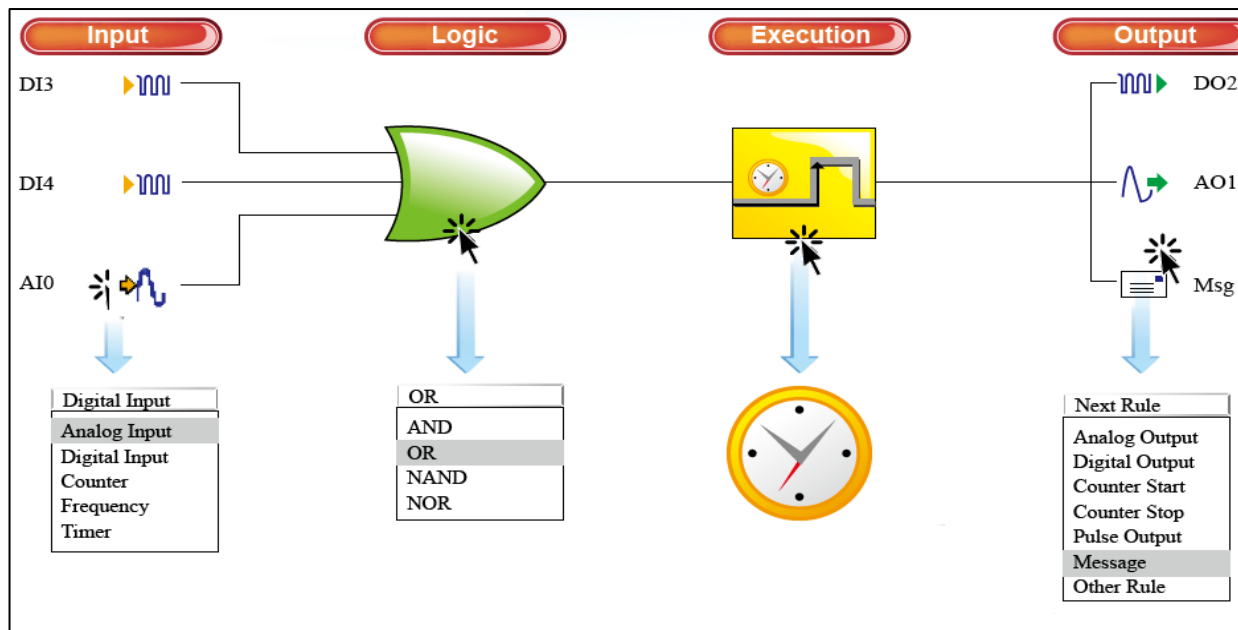
- Graphic Condition Logic
- UDP protocol control
- Graphically Pre-set Logic Rule
- Logic Rule directly installs in IO modules

With GOT Control Programming



What is GCL

- UDP protocol control
- Graphically Pre-set Logic Rule
- Logic Rule directly installs in IO modules
- Including 4 parts:

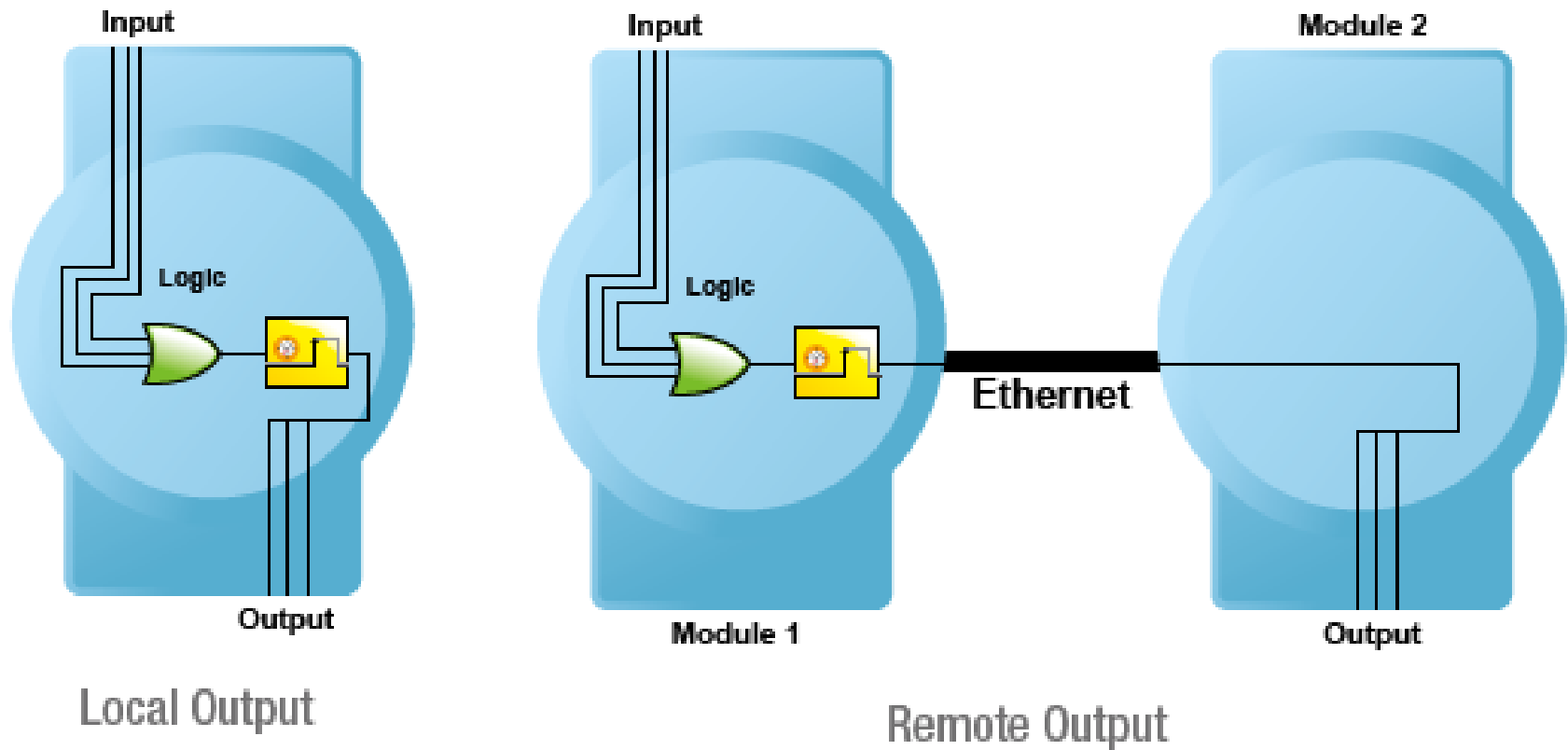


GCL Features

- **No Controller needed**
- **No Additional Software**
- **Simple Utility configuration**
- **Secured by IP or Mac address control**
- **Online Monitor**
- **One module includes 16 rules**
- **Rules in one module can be cascaded**
- **Rules can be expanded over modules**

Control the Output

- Output can be **Local** or **Remote** module
- One module can have 16 logic rules

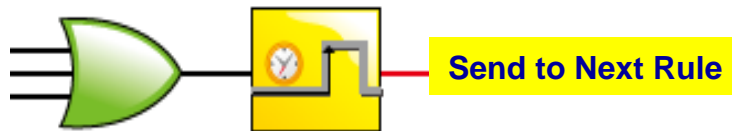


TCP/IP Port: 1025

Logic Rule Cascade

- At most 16 rules cascade in one modules

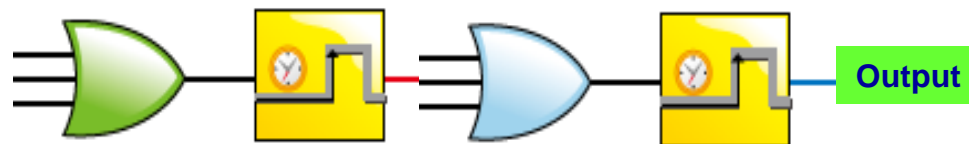
Rule 1

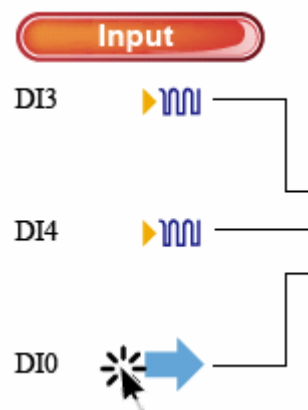


Rule 2



+





GCL Input Properties

Tag: Adam6050.Rule1.Input1

Mode: **DI**

Channel: **DI**

Operation Type: **DI**

☐ Scaling

Min (n1): Max (n1):

Input range:

Min (n2): Max (n2):

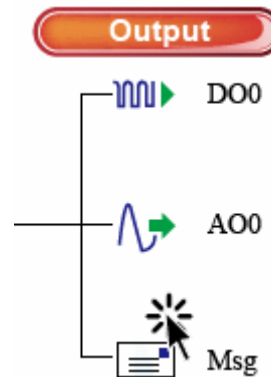
Scale to:

Result = $n2 + (input - n1) \times [(m2 - n2) / (m1 - n1)]$

Condition: **True**

Value:

Refresh OK Cancel



GCL Output Properties

Tag: Adam6050.Rule1.Output1

Destination: **Local** IP table

Operation Type: **AuxFlag**

Note: You can verify the

Operation

Target module: **<Not Assigned>**

True Action: **True**

False Action: **False**

Index: **0**

Value:

Message: **Hello**

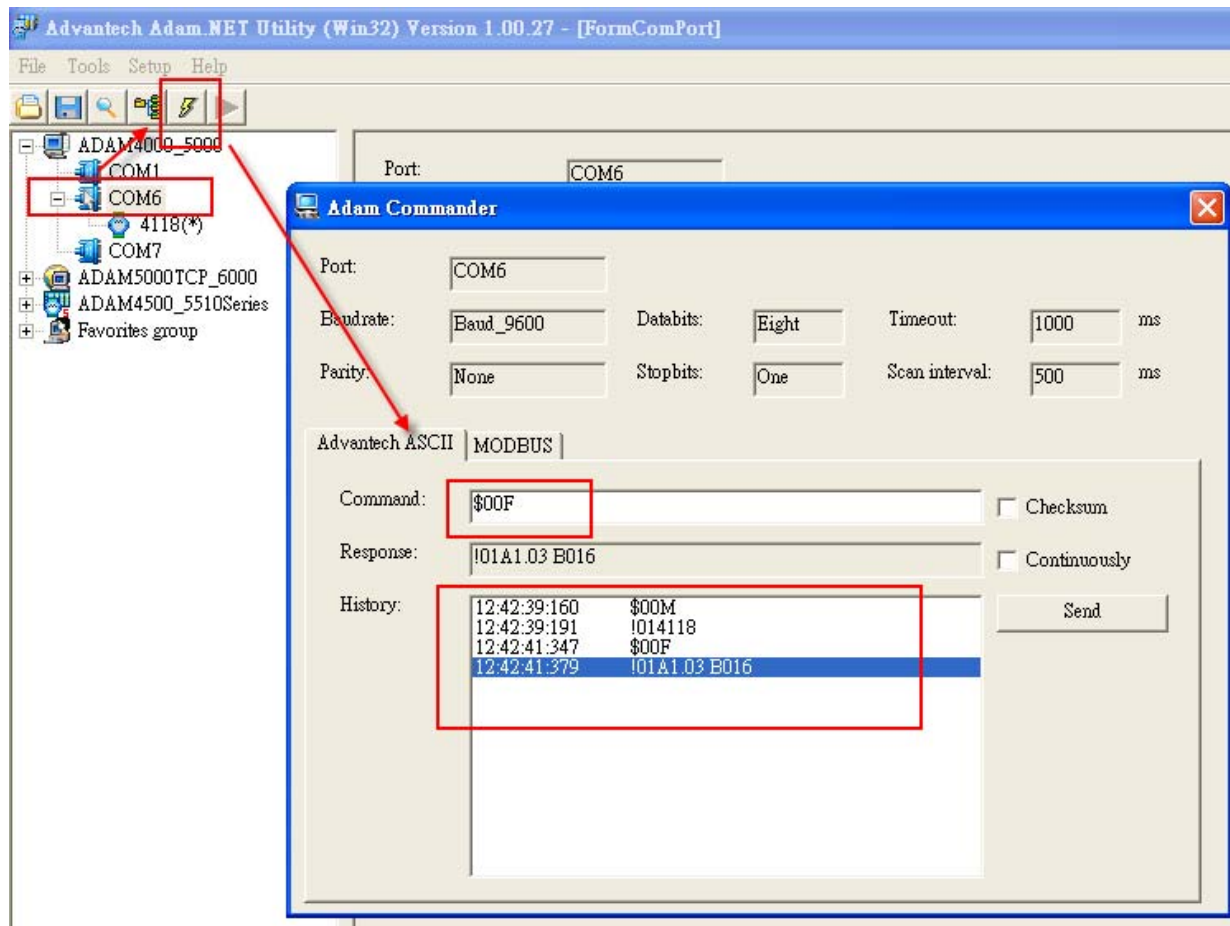
(Device Description)

Refresh OK Cancel

- **ADAM-4000/5000 Configuration and Utility**
- **ADAM-6000/5000/TCP Configuration and Utility**
- **Communication Protocols**
 - ASCII commands for Serial Modules
 - ASCII commands for Ethernet Modules
 - Introduction to Modbus Protocol
- **Basic Trouble Shooting - Modscan**

ASCII commands for Serial Modules

- Follow Advantech ASCII Commands



Hand-On Practice? (make sure if there is adam-5000)

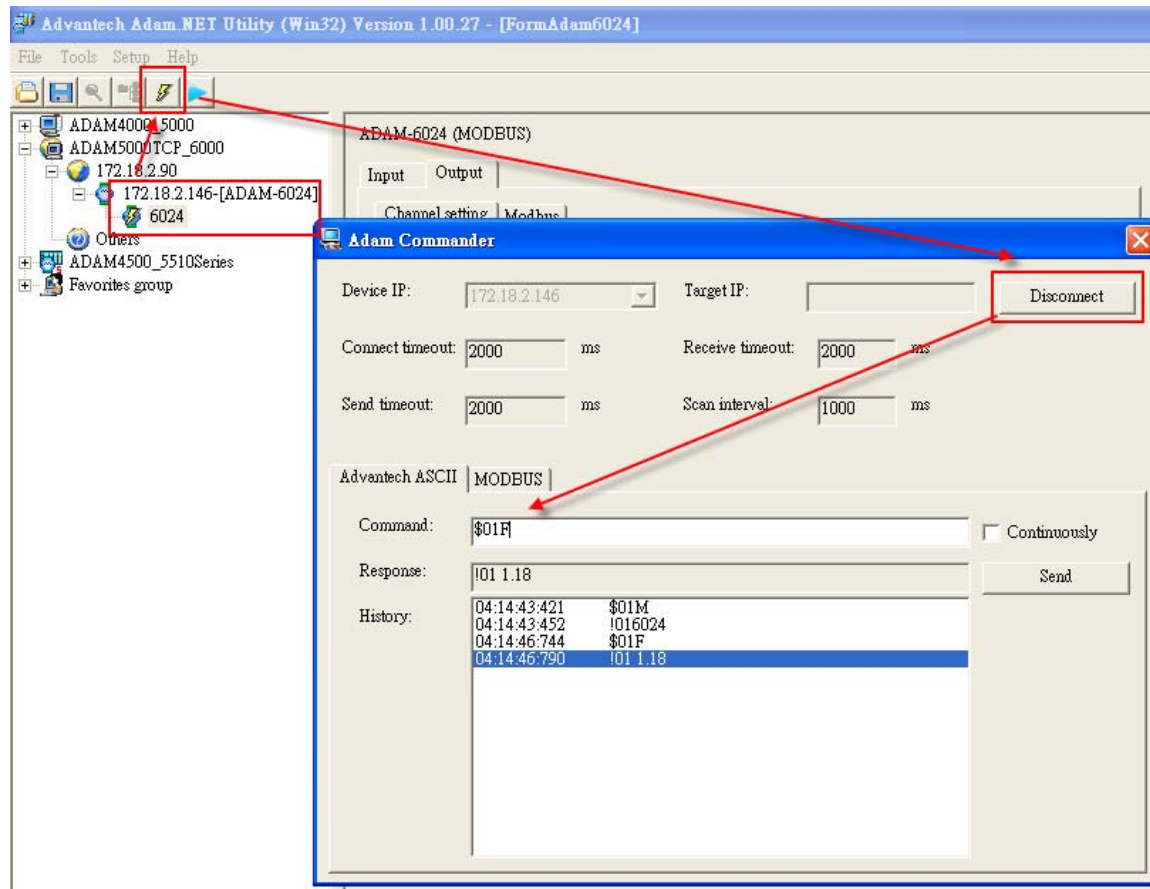
- **Objective : Send ASCII Commands**

- Step1 : Use utility to send
- Step2 : Get module name & firmware version
- Step3 : #**AAN** to read AI data from ADAM-4017
- Step4 : #**AASiCj**(data) AO in ADAM-5024 (#02S1C115.000)
- Step5 : \$**AASi6** read DI from ADAM-5051
- Step6 : #**AASi1N01** Set DO-N On In ADAM-5056

- **Time : 10 Mins**

ASCII commands for Ethernet Modules

- User could send the ASCII commands through TCP or UDP



Introduction to Modbus Protocol

- **Modbus RTU**

- For Advantech Serial Remote I/O modules
- Standard Modbus Protocol, not Advantech protocol

- **Modbus TCP**

- For Advantech Ethernet Remote I/O modules

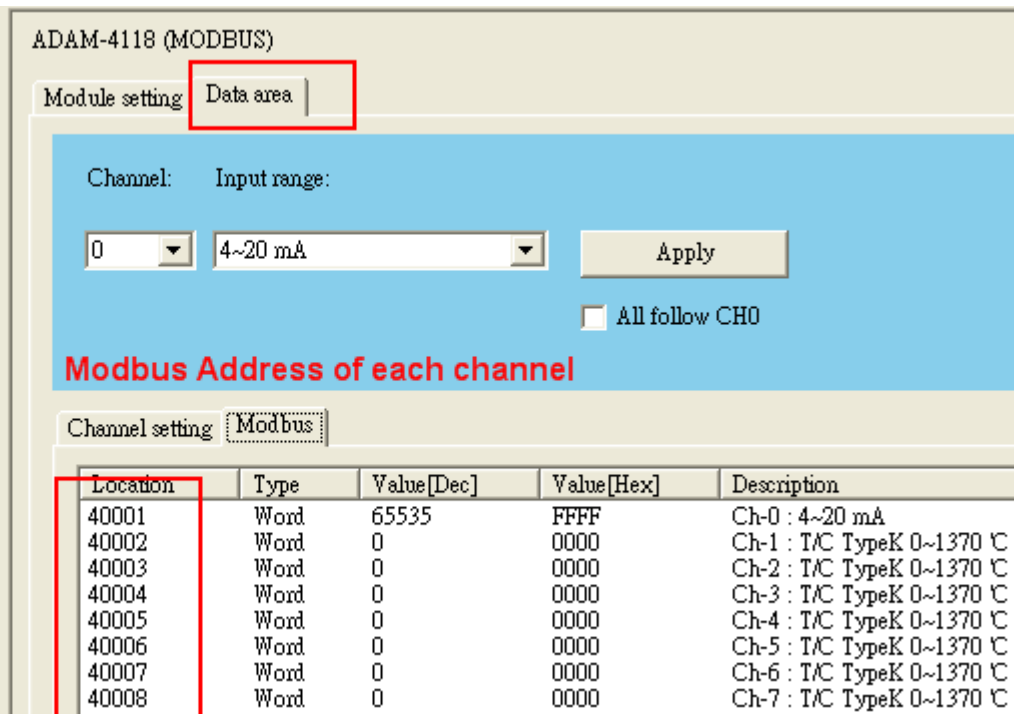
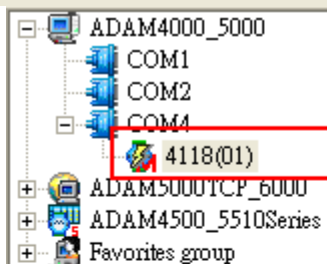
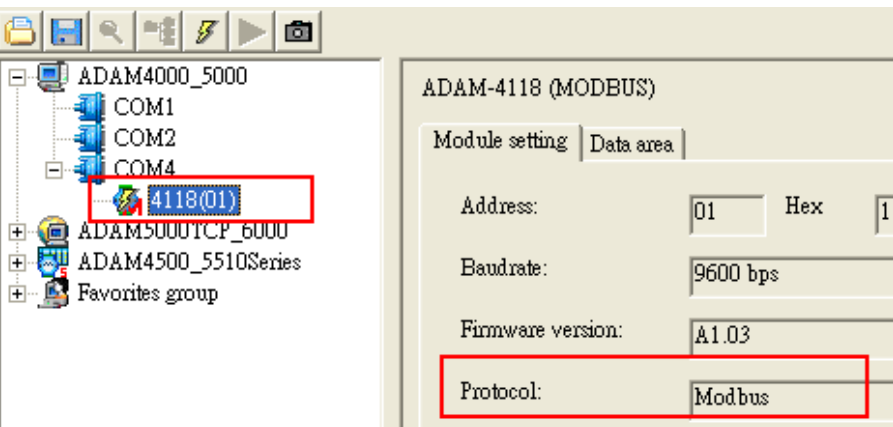
Introduction to Modbus Protocol

- **Data format**
 - ID, Function call, Data, Check Sum
- **Types of Data**
 - Coils; bit; Digital input output
 - Register; Word; 2 Bytes; 16 bits

Data address	Modbus address	Description
0X; 1X	00001...10000*	Coils (outputs)
3X	10001...20000*	Inputs
4X	40001...50000*	Holding registers

* Maximum value is device dependent

Modbus Address of Adam serial modules



Modbus Address of Adam Ethernet modules

Advantech Adam.NET Utility (Win32) Version 1.00.79 - [FormAdam6015_17_18]

File Tools Setup Help

ADAM-6017 (MODBUS)

Channel index: 0

Input range: 0~20 mA

Integration time: 60Hz

Modbus Address of each channel

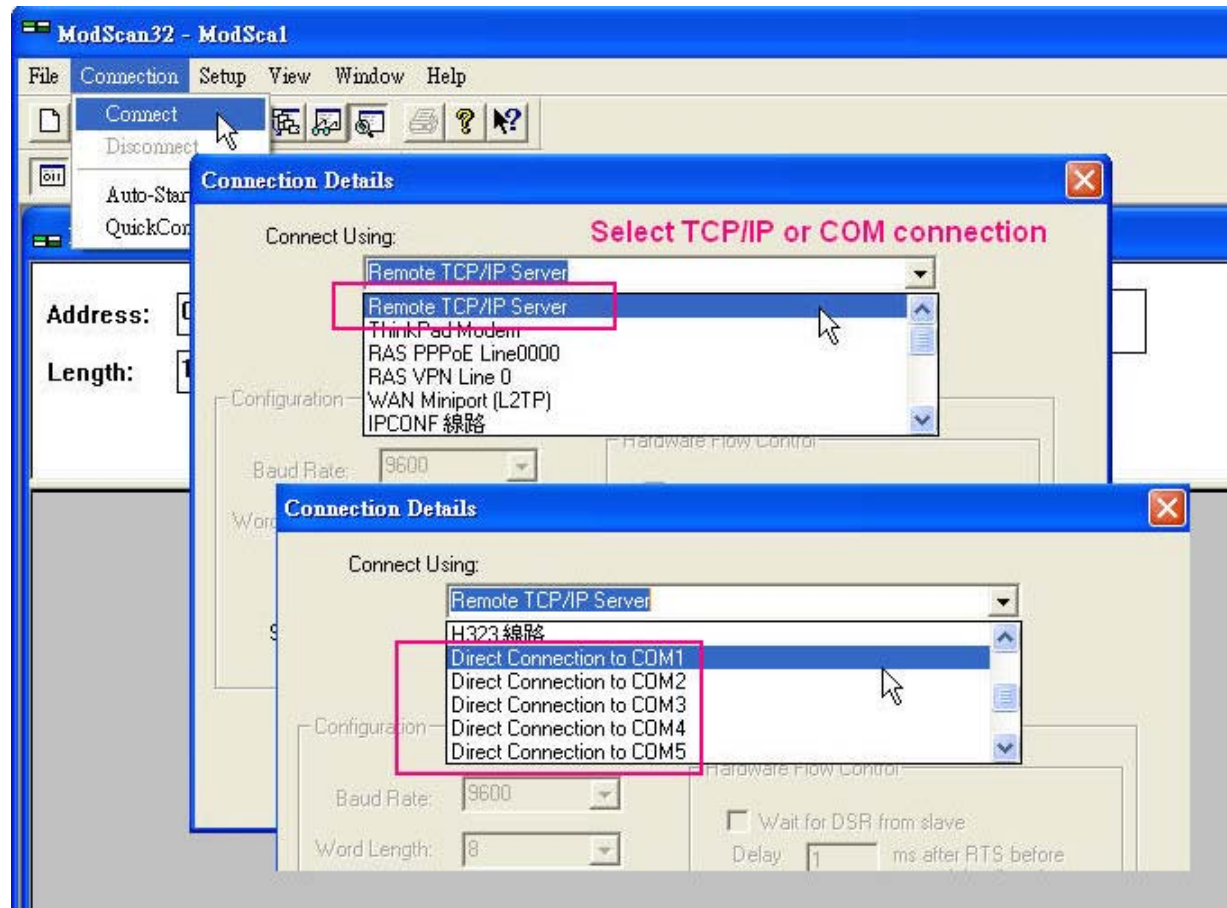
Channel setting | Average setting | **Modbus (Current)** | Modbus (Max)

Location	Type	Value[Dec]	Value[Hex]	Value[Eng]
40001	Word	6	0006	0.002 mA
40002	Word	0	0000	4.000 mA
40003	Word	0	0000	4.000 mA
40004	Word	0	0000	-10.000 V
40005	Word	0	0000	4.000 mA
40006	Word	0	0000	4.000 mA
40007	Word	32770	8002	0.001 V
40008	Word	0	0000	-10.000 V
40009	Word	*****	***	*****

- **ADAM-4000/5000 Configuration and Utility**
- **ADAM-6000/5000TCP Configuration and Utility**
- **Communication Protocols**
- **Appendix – Intro of Modscan**
 - Get Data From ModScan tool

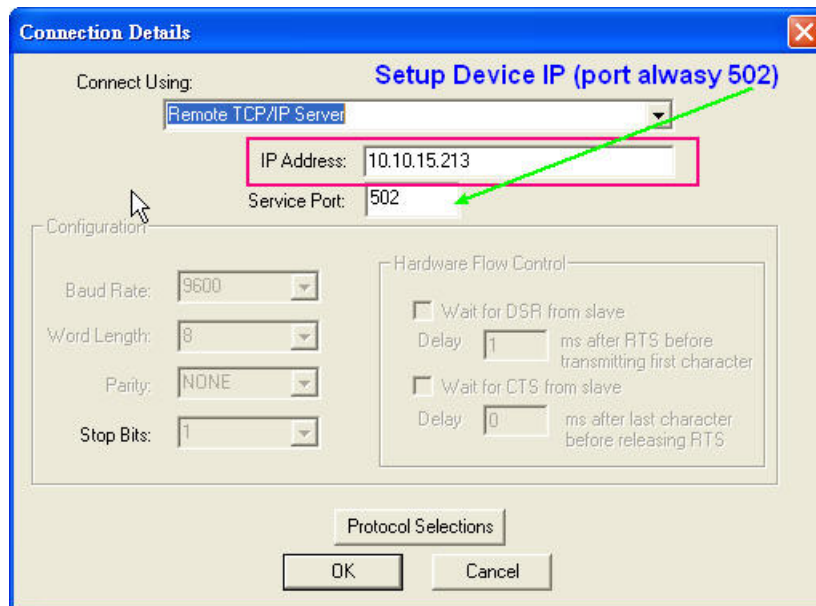
Quick Startup

- Deciding the Connection method



■ Connection Setting

- IP for Ethernet
- Port setting for Serial



The dialog box is titled "Connection Details". The "Connect Using:" dropdown is set to "Remote TCP/IP Server". The "IP Address:" field contains "10.10.15.213" and is highlighted with a pink rectangle. The "Service Port:" field contains "502" and is also highlighted with a pink rectangle. A green arrow points from the text "Setup Device IP (port always 502)" to the "Service Port:" field. The "Configuration" section includes "Baud Rate:" (9600), "Word Length:" (8), "Parity:" (NONE), and "Stop Bits:" (1). The "Hardware Flow Control" section has two options: "Wait for DSR from slave" (unchecked) and "Wait for CTS from slave" (unchecked). At the bottom, there is a "Protocol Selections" button and "OK" and "Cancel" buttons.

Connection Details

Connect Using: Remote TCP/IP Server

Setup Device IP (port always 502)

IP Address: 10.10.15.213

Service Port: 502

Configuration

Baud Rate: 9600

Word Length: 8

Parity: NONE

Stop Bits: 1

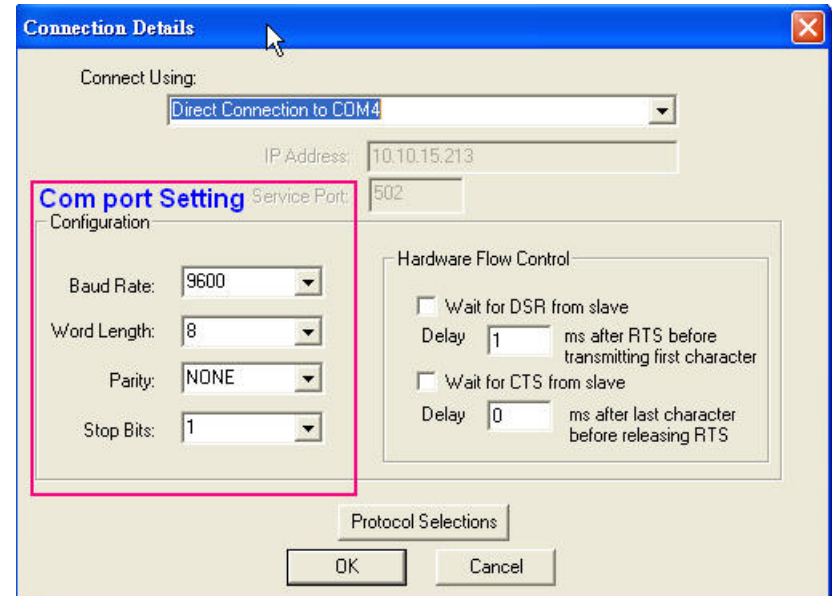
Hardware Flow Control

☐ Wait for DSR from slave
Delay 1 ms after RTS before transmitting first character

☐ Wait for CTS from slave
Delay 0 ms after last character before releasing RTS

Protocol Selections

OK Cancel



The dialog box is titled "Connection Details". The "Connect Using:" dropdown is set to "Direct Connection to COM4". The "IP Address:" field contains "10.10.15.213". The "Service Port:" field contains "502". The "Com port Setting" section is highlighted with a pink rectangle and contains the same configuration as the left dialog: "Baud Rate:" (9600), "Word Length:" (8), "Parity:" (NONE), "Stop Bits:" (1), and "Hardware Flow Control" options. At the bottom, there is a "Protocol Selections" button and "OK" and "Cancel" buttons.

Connection Details

Connect Using: Direct Connection to COM4

IP Address: 10.10.15.213

Service Port: 502

Com port Setting

Configuration

Baud Rate: 9600

Word Length: 8

Parity: NONE

Stop Bits: 1

Hardware Flow Control

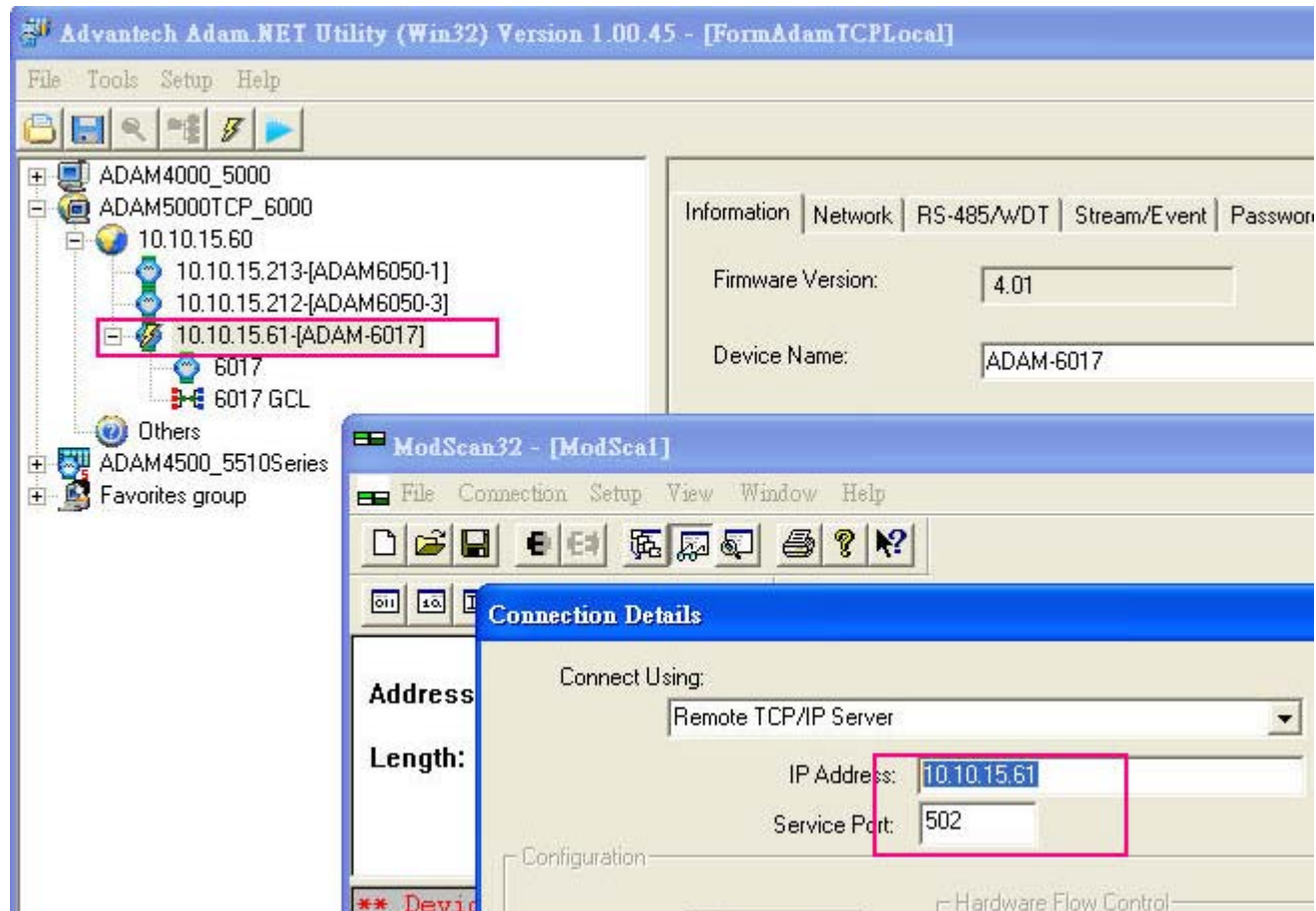
☐ Wait for DSR from slave
Delay 1 ms after RTS before transmitting first character

☐ Wait for CTS from slave
Delay 0 ms after last character before releasing RTS

Protocol Selections

OK Cancel

- **Example of Adam Analog Input - Adam-6017**



■ Depending on device modbus address

- Device ID is 1 for Adam-6K series
- Setup function code- 03 holding register
- Setup Address and Length

Integration time: 60Hz

Channel setting | Average setting | Modbus (Current) | M

1. Location	Type	Value[Dec]	Value[Hex]
40001	Word	32786	8012
40002	Word	32776	8008
40003	Word	32770	8002
40004	Word	32767	7FFF
40005	Word	32770	8002
40006	Word	32767	7FFF
40007	Word	32767	7FFF
40008	Word	32770	8002
40009	Word	xxxx	xxxx

2. Address: 0001

Length: 8
start from 001 and counts 8 channels

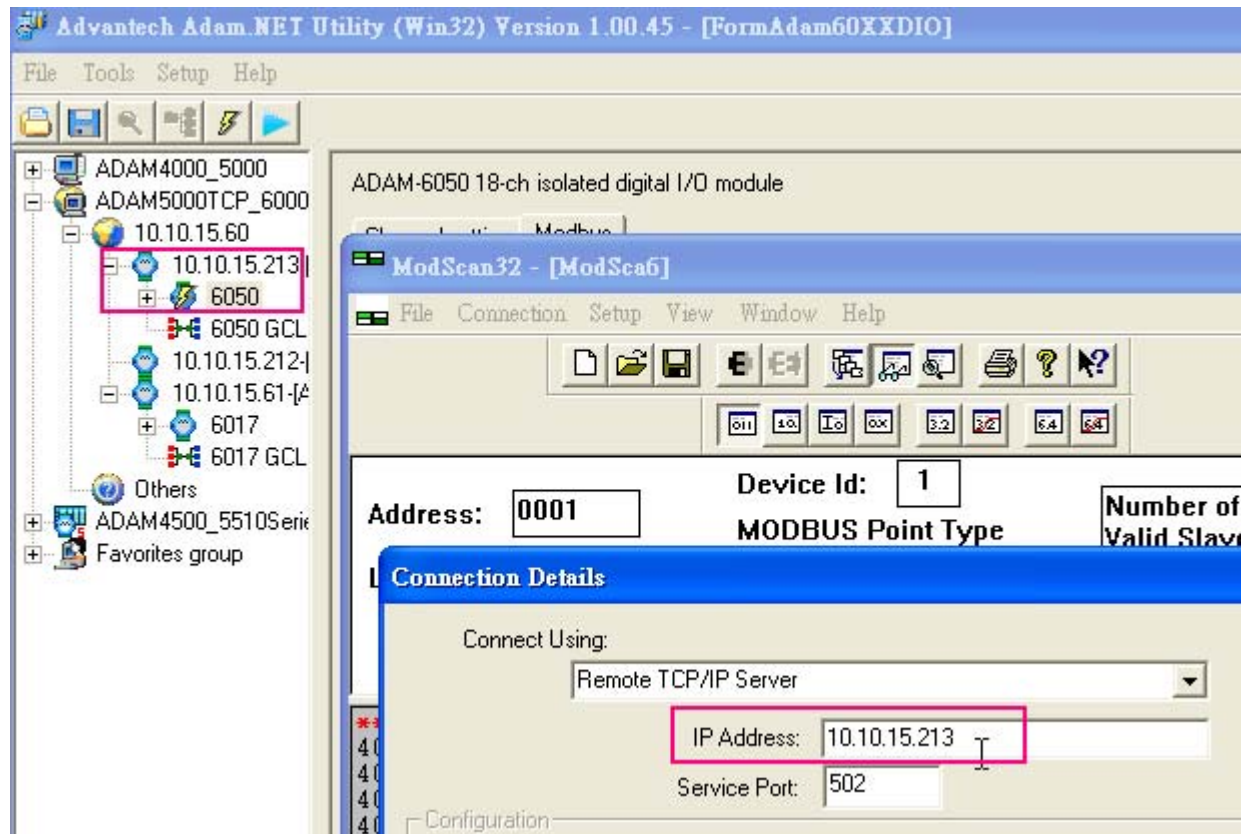
Device Id: 1

1. MODBUS Point Type
03: HOLDING REGISTER
Function code: map to 4x

40001: <32786>
40002: <32776>
40003: <32770>
40004: <32767>
40005: <32770>
40006: <32767>
40007: <32767>
40008: <32770>

g (Interval=1000ms): 1133 times...

■ Example of Adam Digital – Adam-6050



- **Function code: 01**
- **Address (for Adam-6k series)**
 - DI starts from 01
 - DO starts from 17

Channel setting Modbus

Lo...	Type	Value	Description	Mode
00001	Bit	1	DI 0	DI
00002	Bit	1	DI 1	DI
00003	Bit	1	DI 2	DI
00004	Bit	1	DI 3	DI
00005	Bit	1	DI 4	DI
00006	Bit	1	DI 5	DI
00007	Bit	1	DI 6	DI
00008	Bit	1	DI 7	DI
00009	Bit	1	DI 8	DI
00010	Bit	1	DI 9	DI
00011	Bit	1	DI 10	DI
00012	Bit	1	DI 11	DI
00017	Bit	1	DO 0	DO
00018	Bit	0	DO 1	DO
00019	Bit	0	DO 2	DO
00020	Bit	0	DO 3	DO
00021	Bit	1	DO 4	DO
00022	Bit	0	DO 5	DO

ModScan32 - [ModSca6]

File Connection Setup View Window Help

Address: 0017 Device Id: 1

Length: 6 MODBUS Point Type

01: COIL STATUS

00017: <1>
00018: <0>
00019: <0>
00020: <0>
00021: <1>
00022: <0>

For digital, device address is at 0X
Function code is 01

Usually DI starts from address 1
DO starts from 17

Thanks~~~~