# Startup of Remote I/O Modules

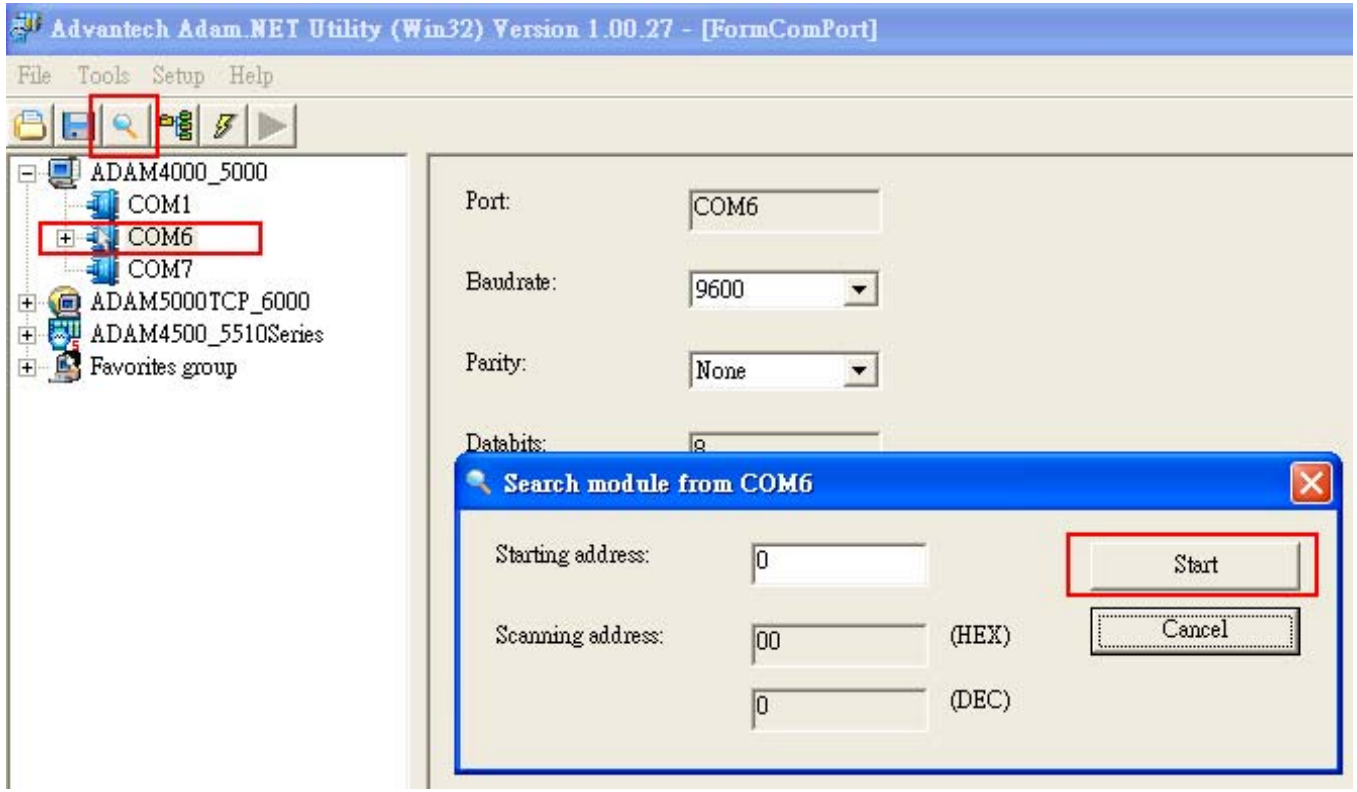
# Agenda

- 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**

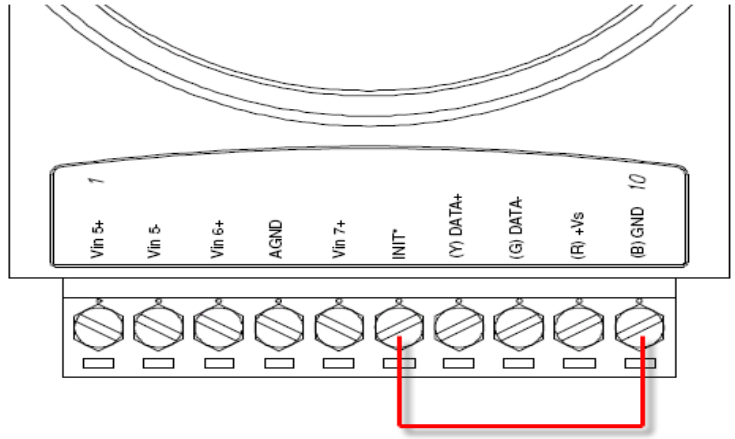
# Utility Configuration

- Adam.Net Utiltiy
- 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



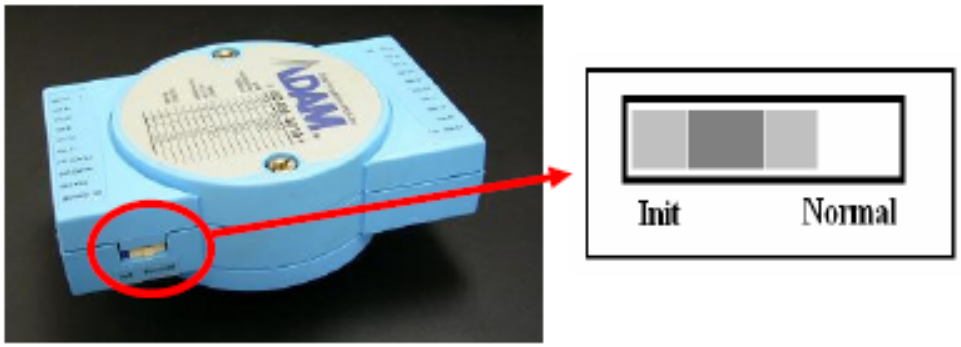
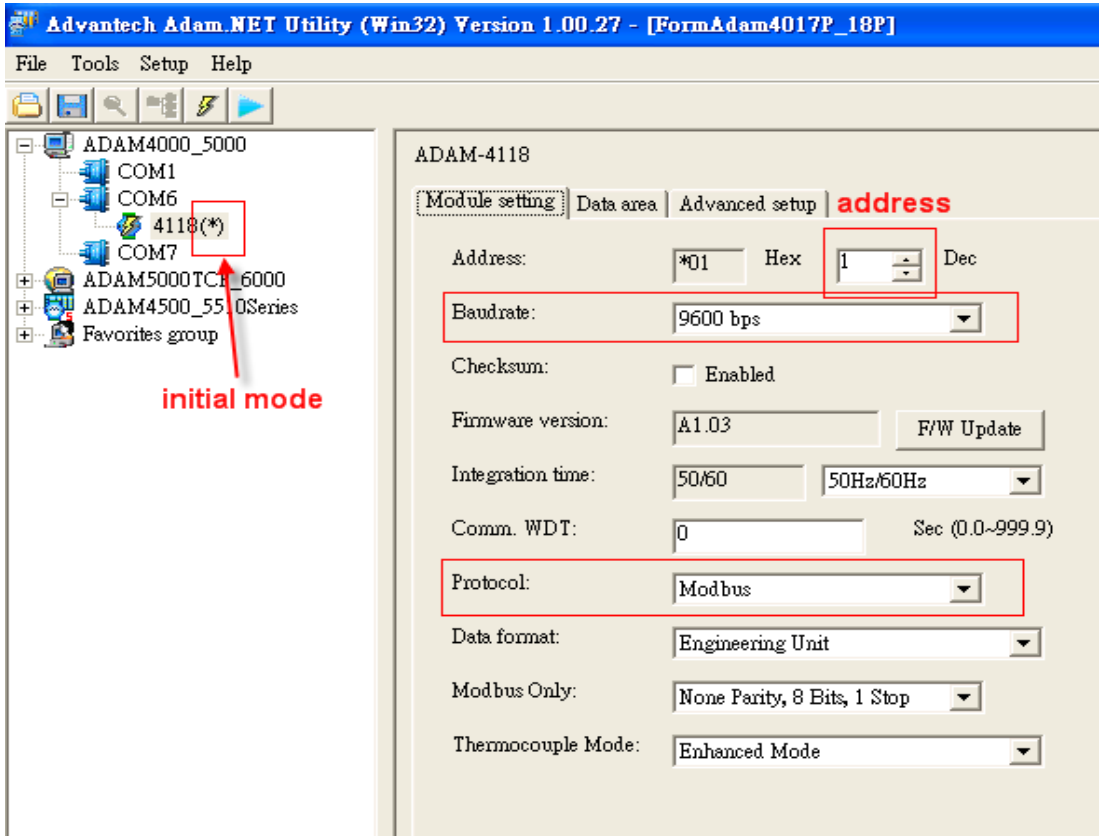




Figure 2-4 *Set INIT switch to "Init"*

# Utility with Initial Mode

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



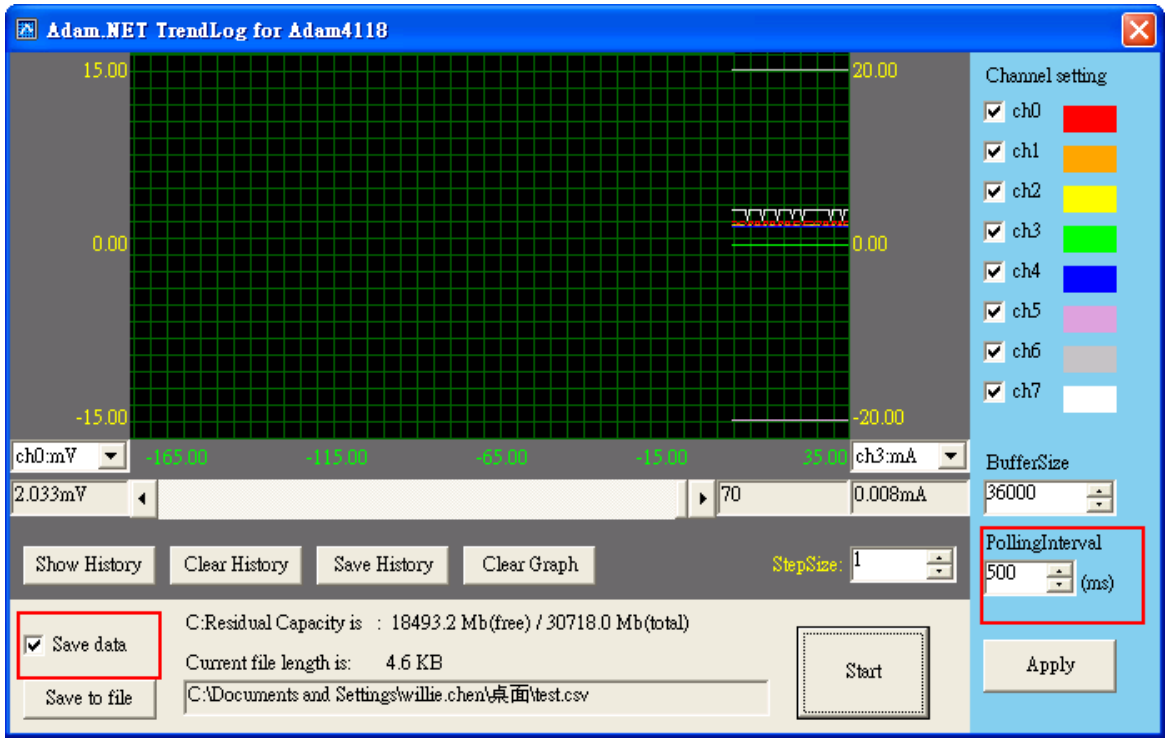
# Hand-On Practice

- **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

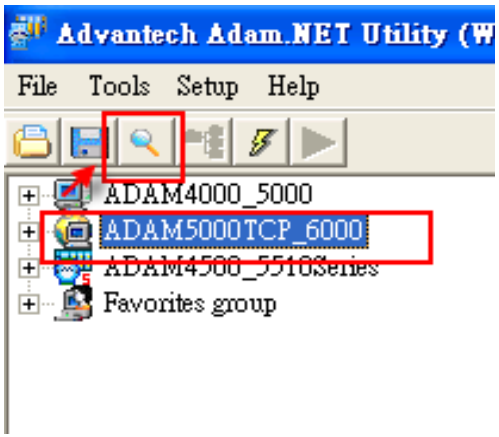
- **Objective : DI/O data & show AI/O data**
  - **Step1 : Show trend**
  - **Step2 : Change the setting**
  - **Step3 : Data Log Operation**

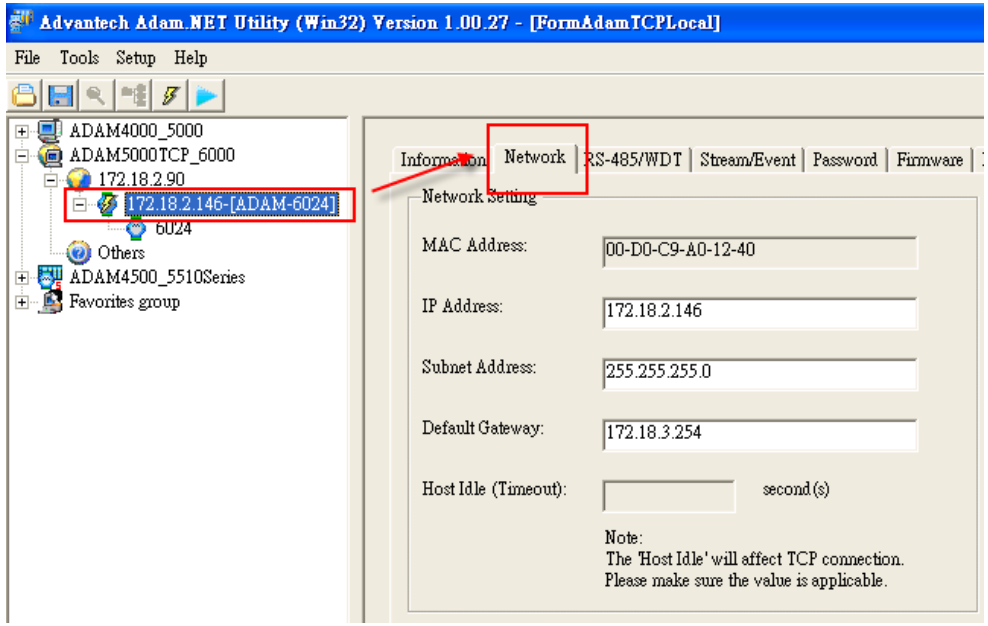
- **Time : 5 Mins**

- **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

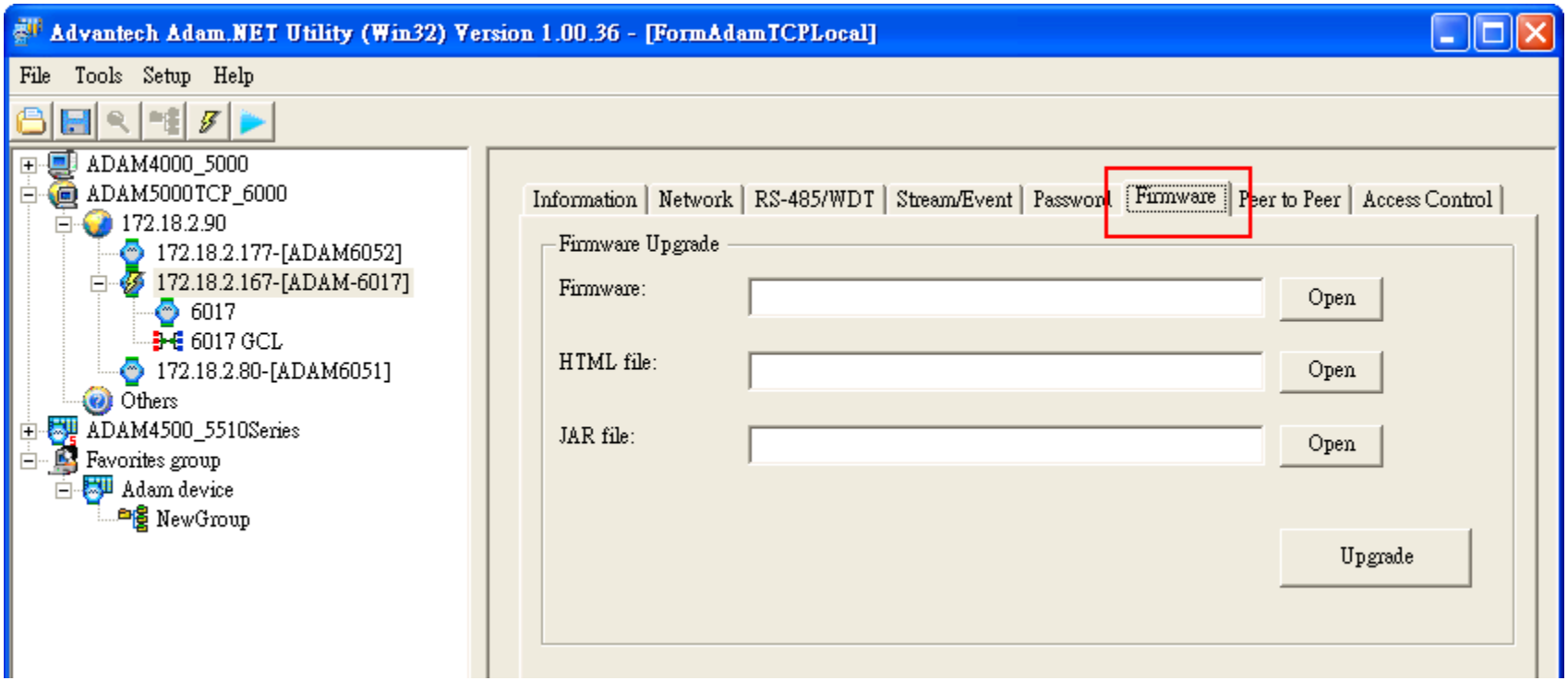
- UDP Broadcast to search modules
- Works in the same sub-net
- Default IP: 10.0.0.1
- Network setting
- Default Password



# Firmware Update

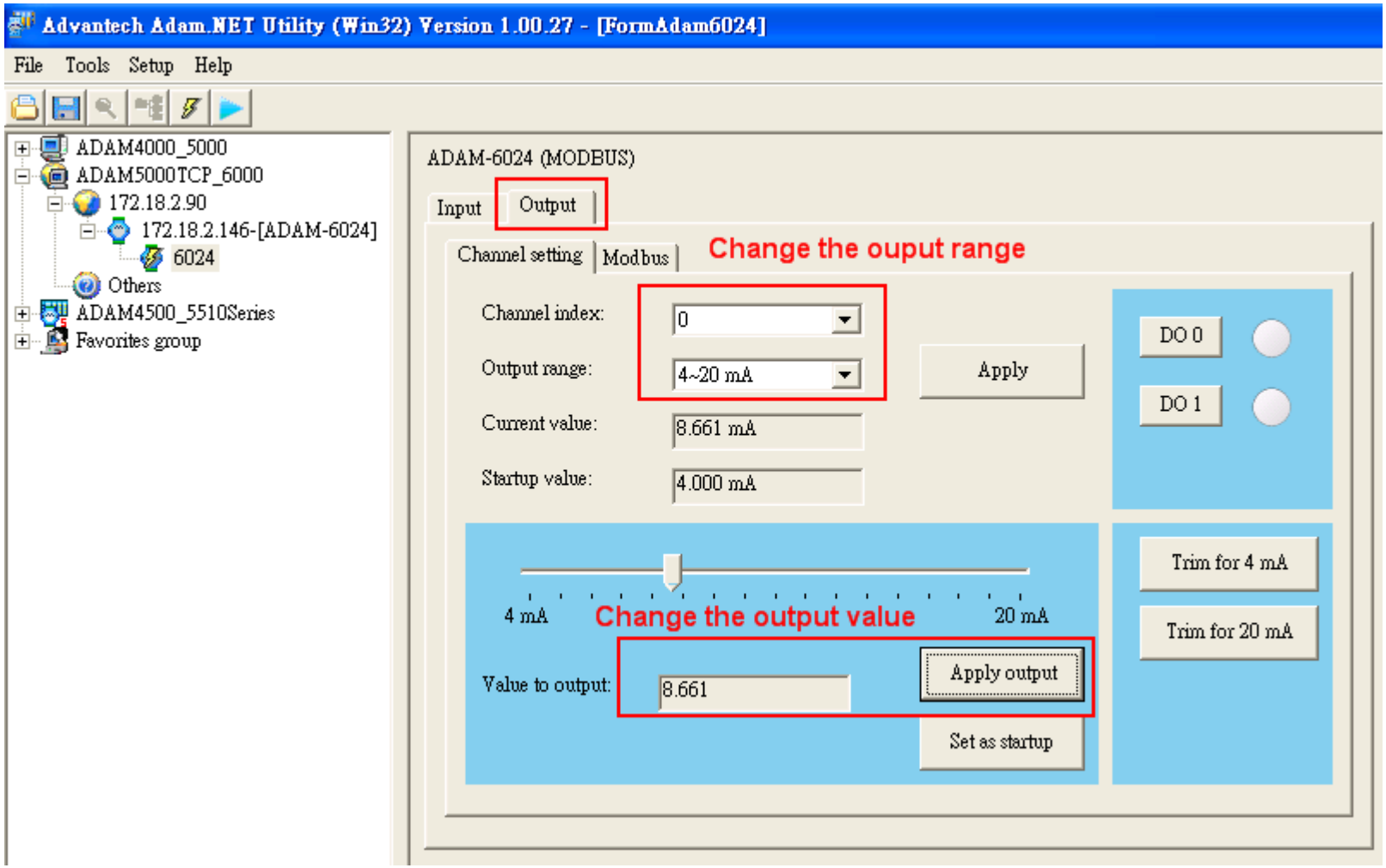
- **Firmware Update**



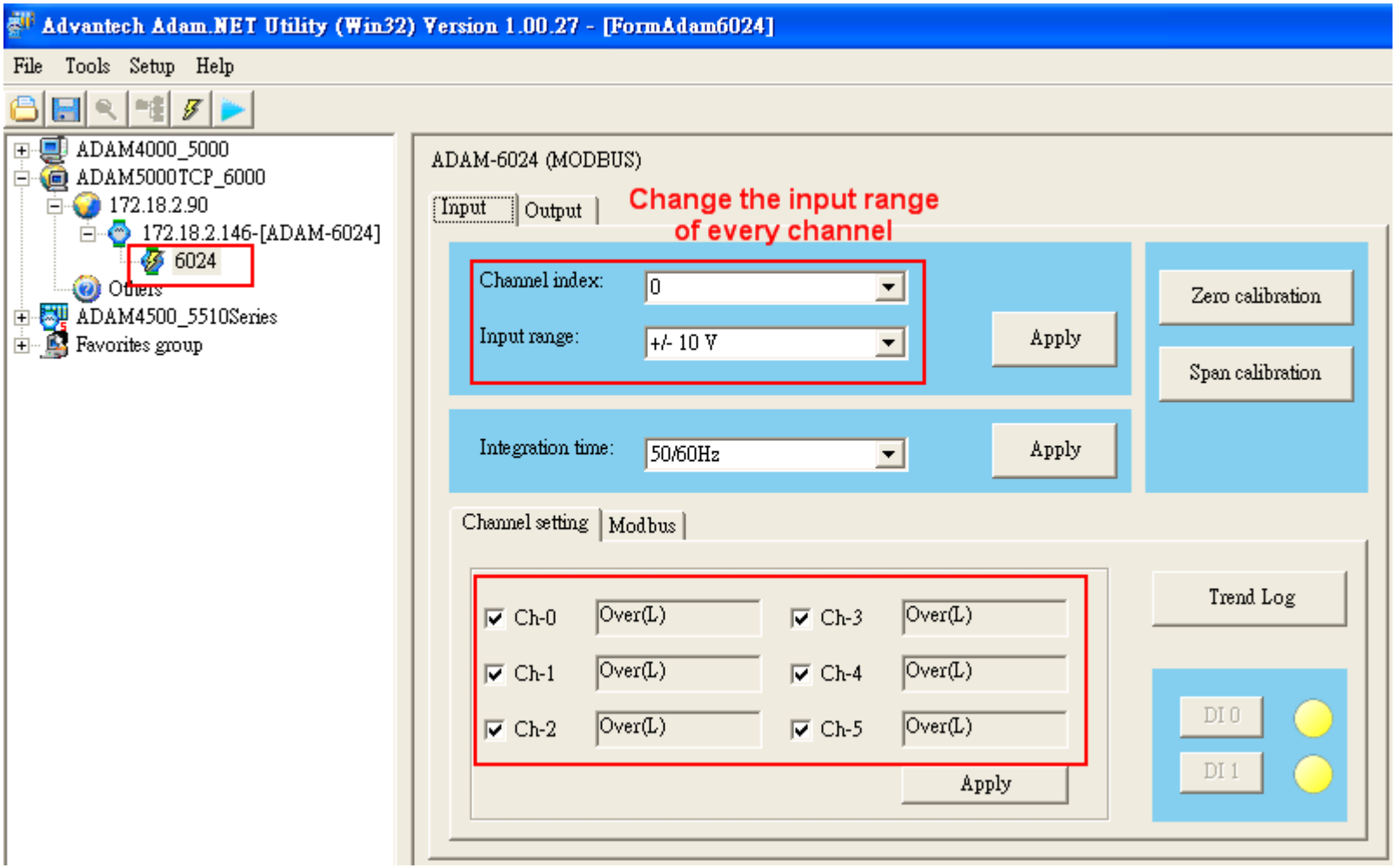
# Access Control

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

# Utility Operation-Set AO Value

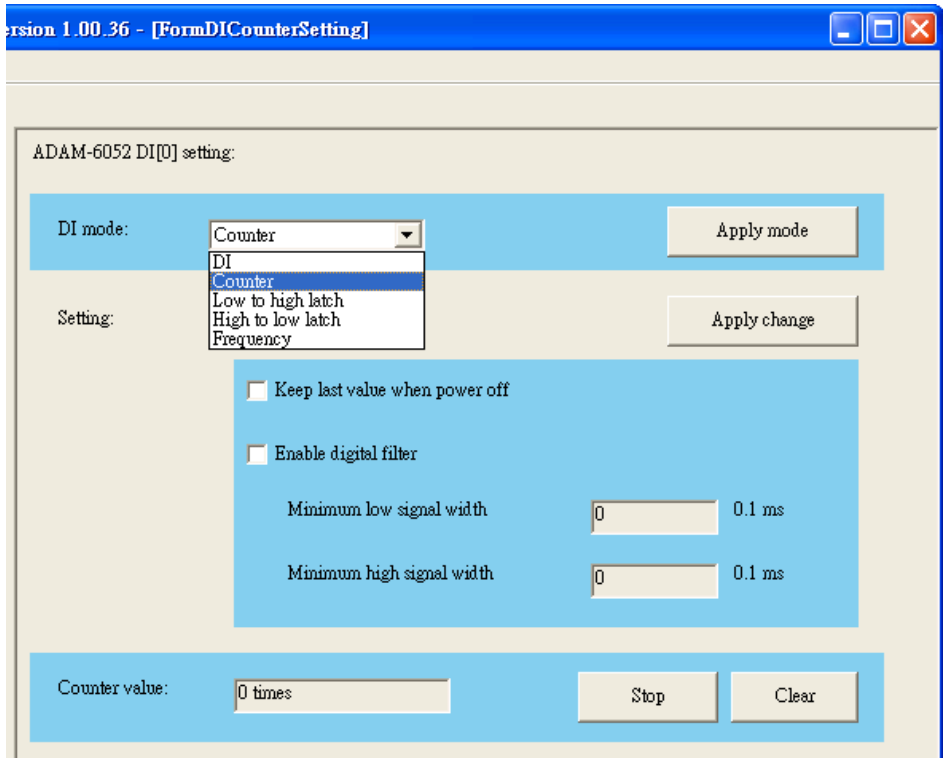


# Utility Operation-Read AI Value



# Advance I/O functions

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



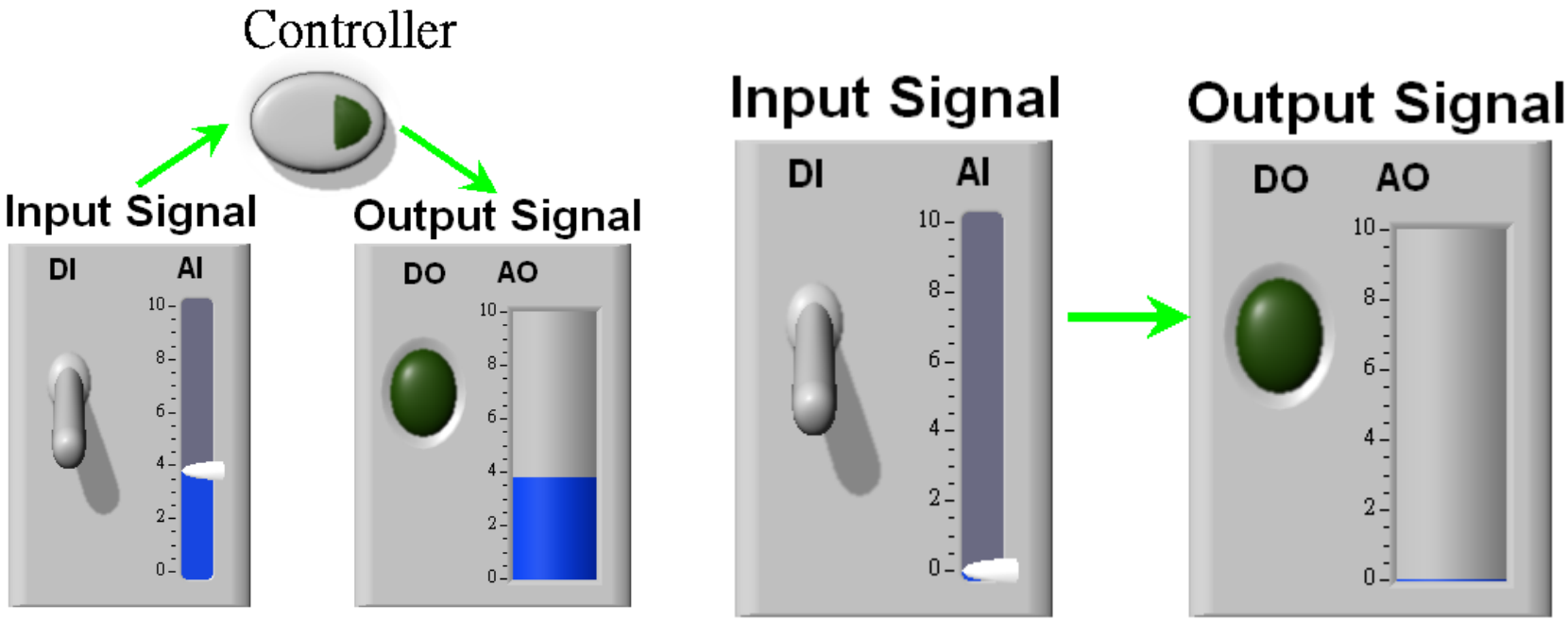
# Adam-6K series New Functions

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

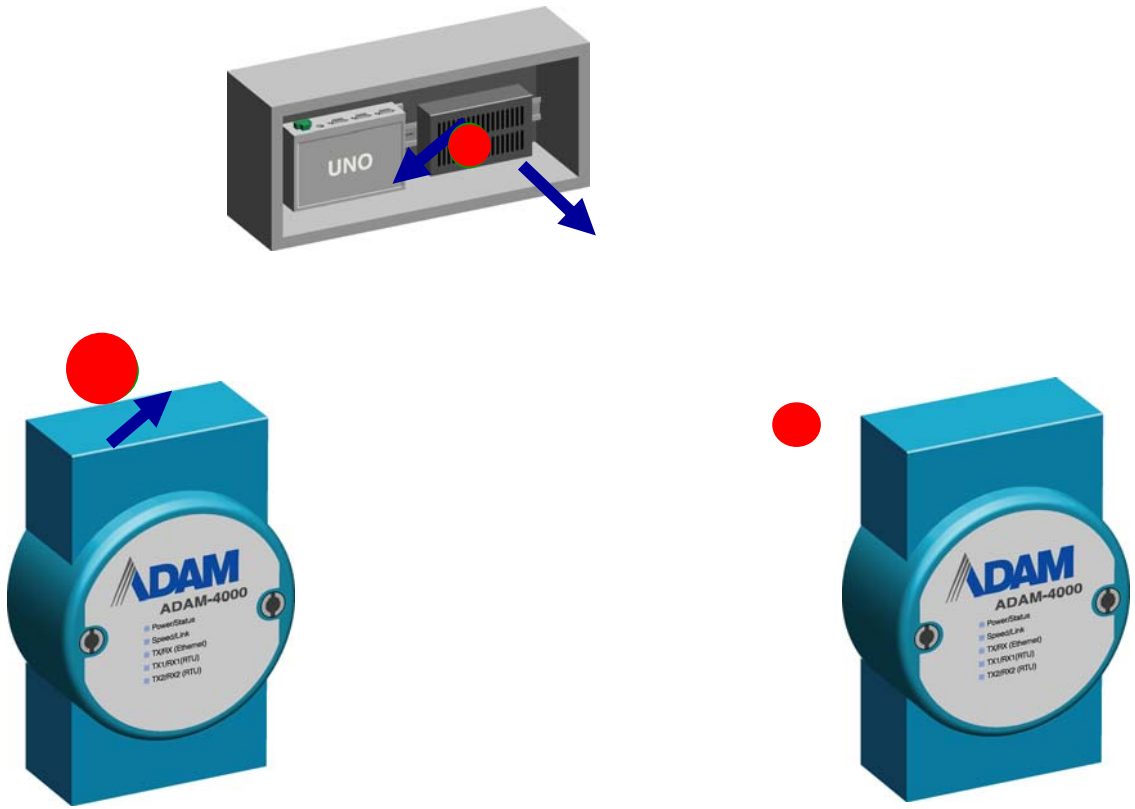
## Advantech Providing
## P2P function and GCL Control

# What is Adam Peer to Peer

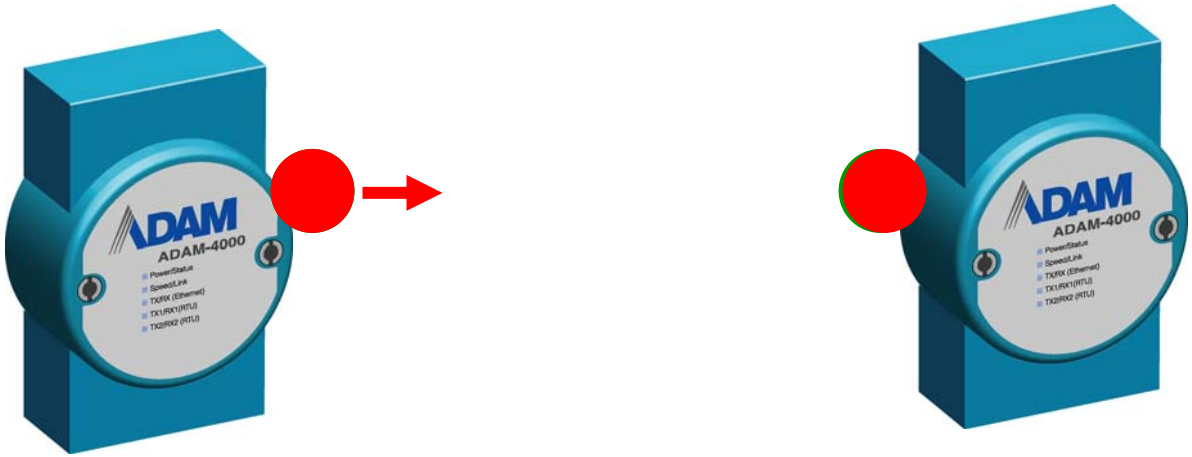
- Instead of Master (Client)
- Actively update Input status to Output status
- DI channel to DO channel; AI channel to AO
- Only for Digital modules



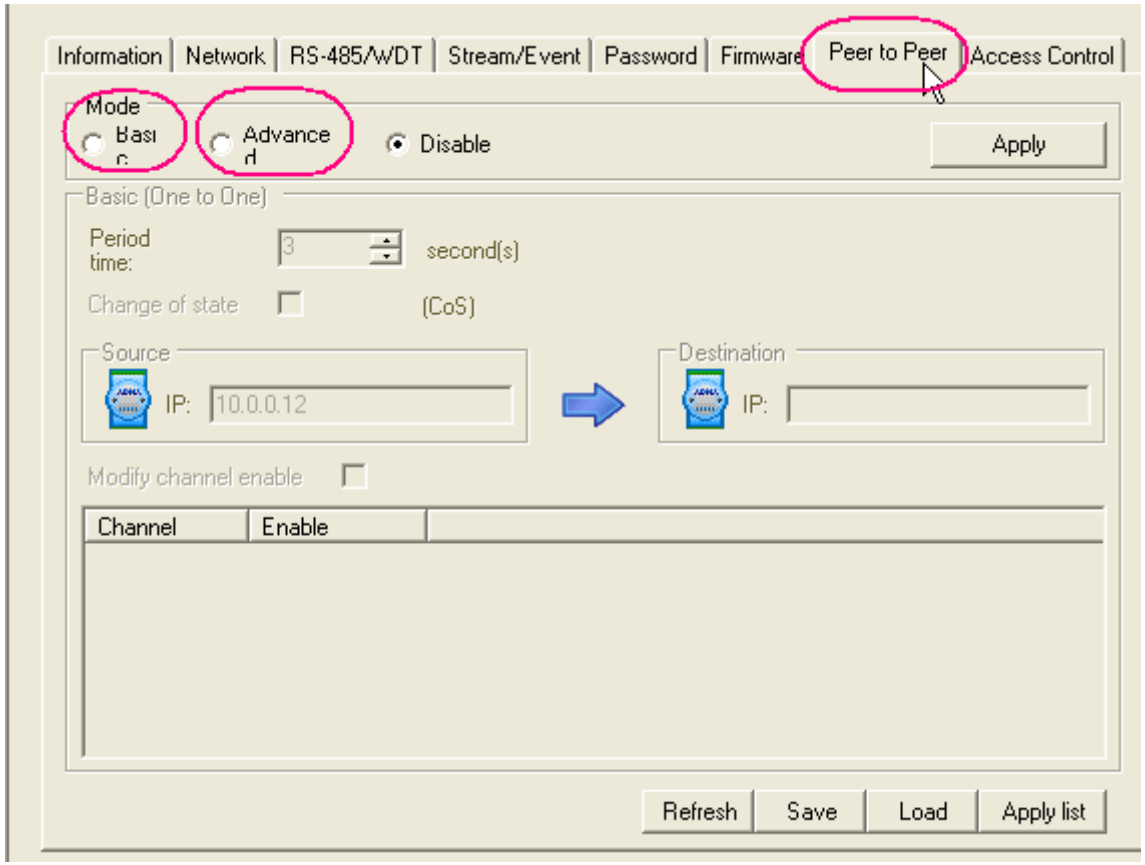
# Passive Way – Continuously Polling



# Actively update Input status to Output status

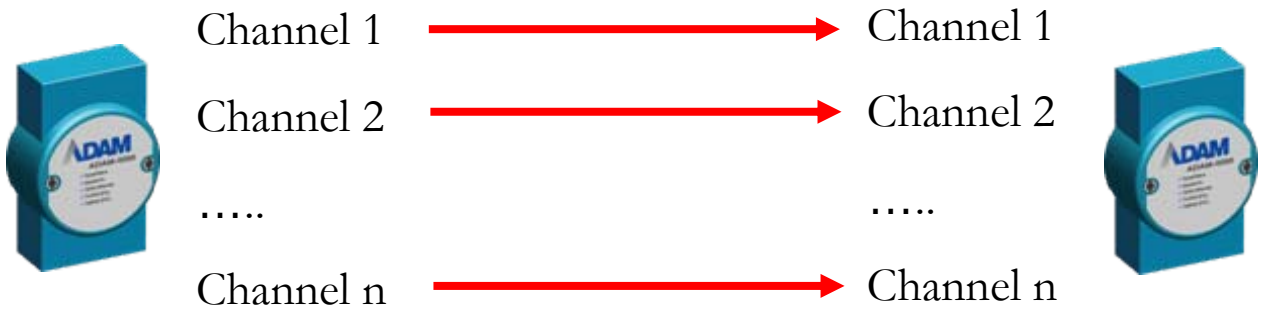


# Adam-6K P2P in Adam.NET Utility

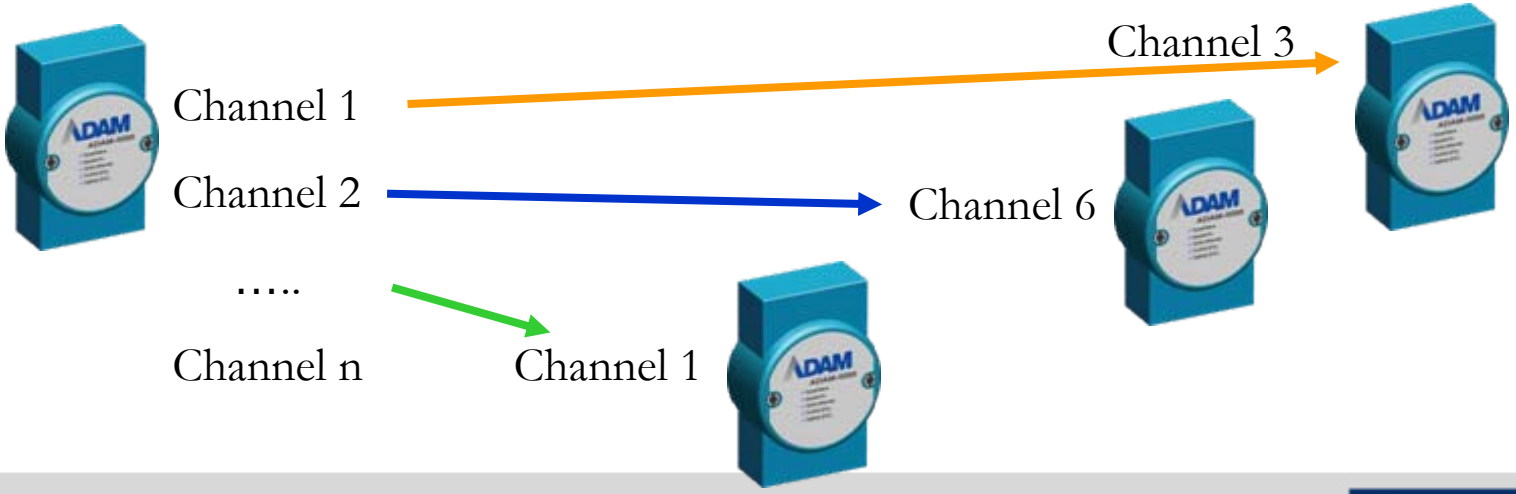


# ADAM-6K P2P Modes

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



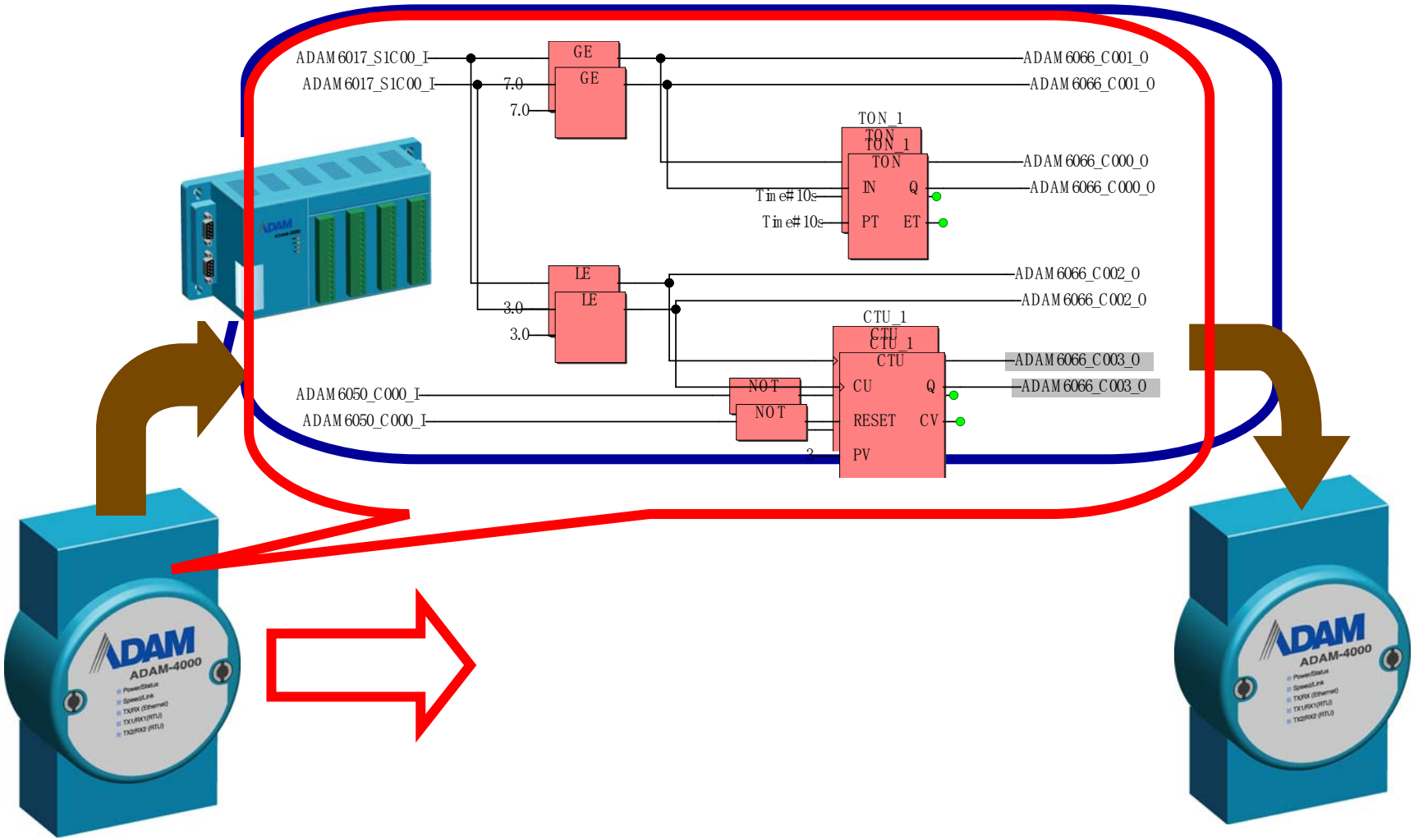

- **Advanced mode: DI/O mapping to multi module DO**



# What is GCL

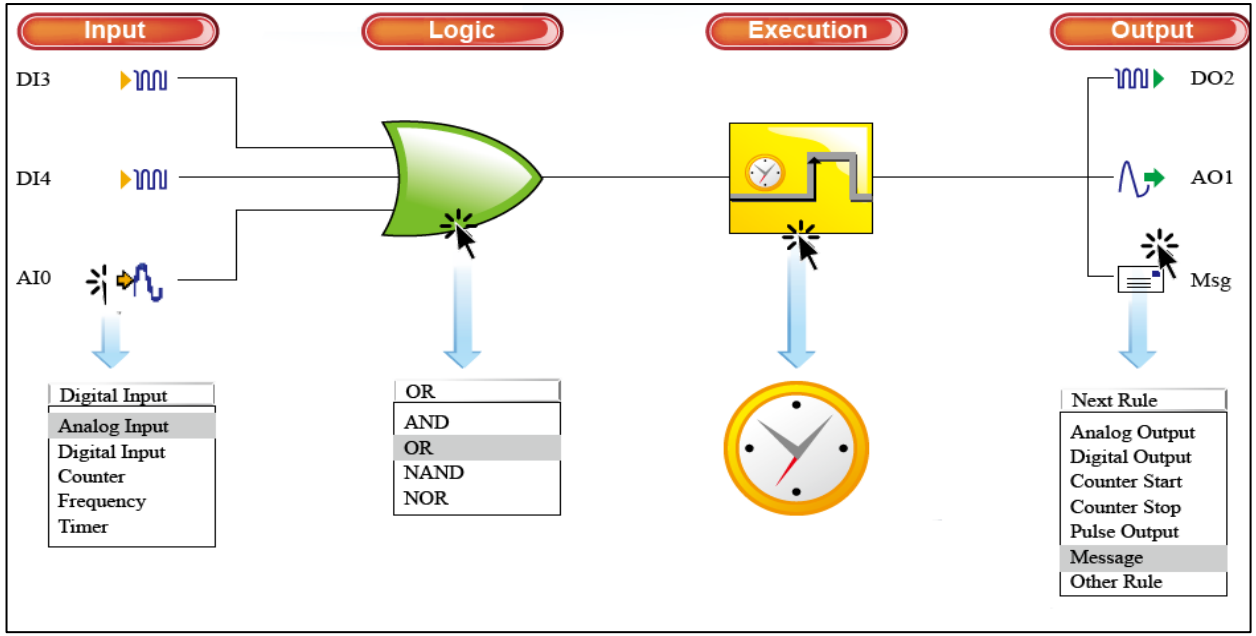
- **Graphic Condition Logic**
- **UDP protocol control**
- **Graphically Pre-set Logic Rule**
- **Logic Rule directly installs in IO modules**

# With GCL Control Programming



# What is GCL

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

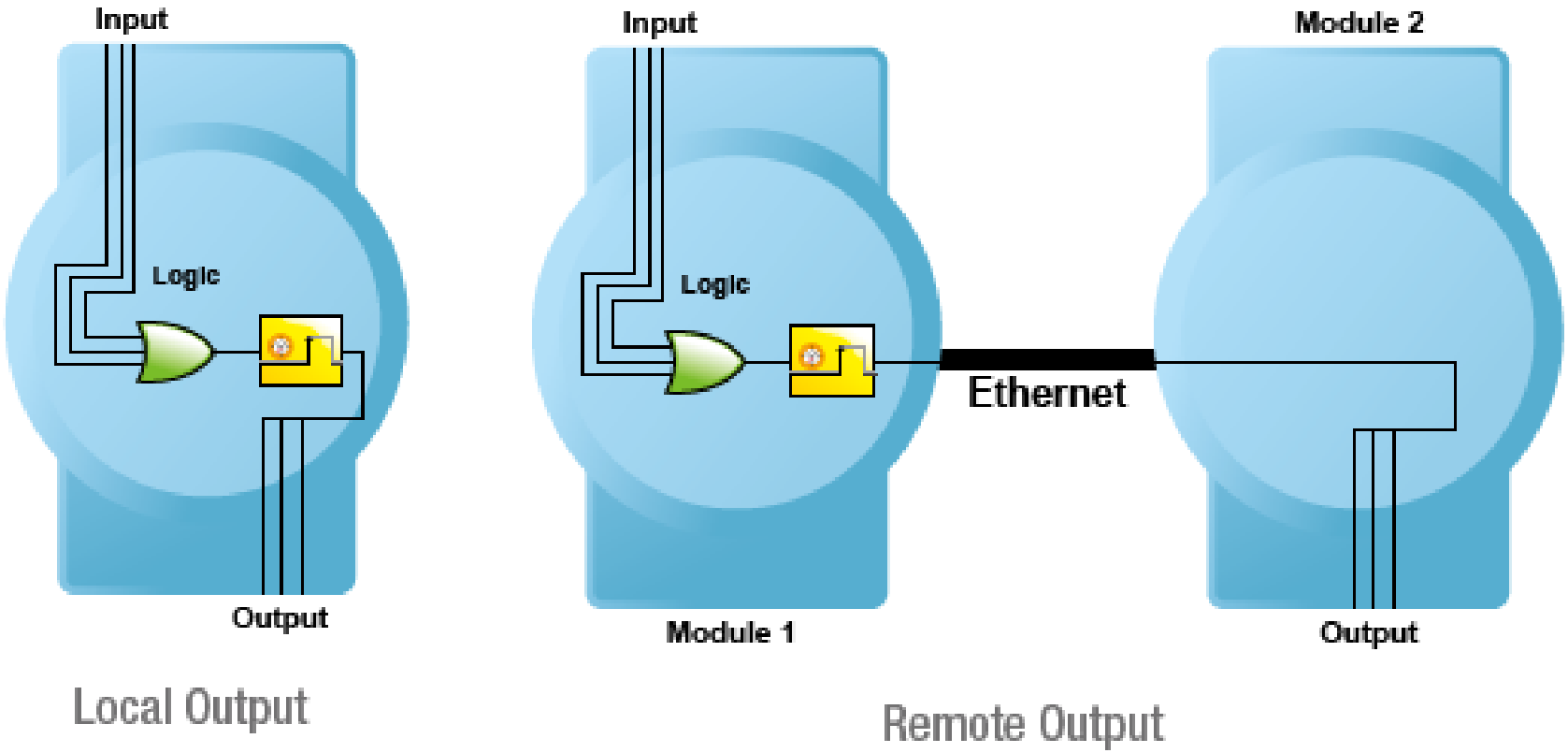


# GCL Features

- 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

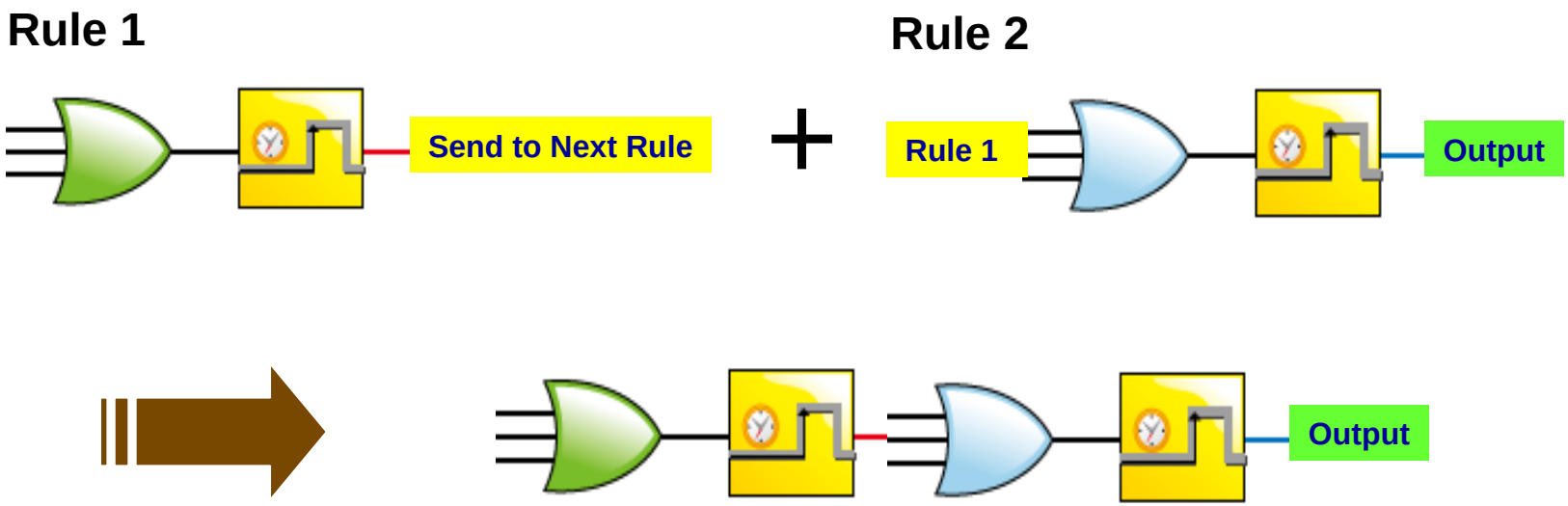
- Output can be Local or Remote module
- One module can have 16 logic rules

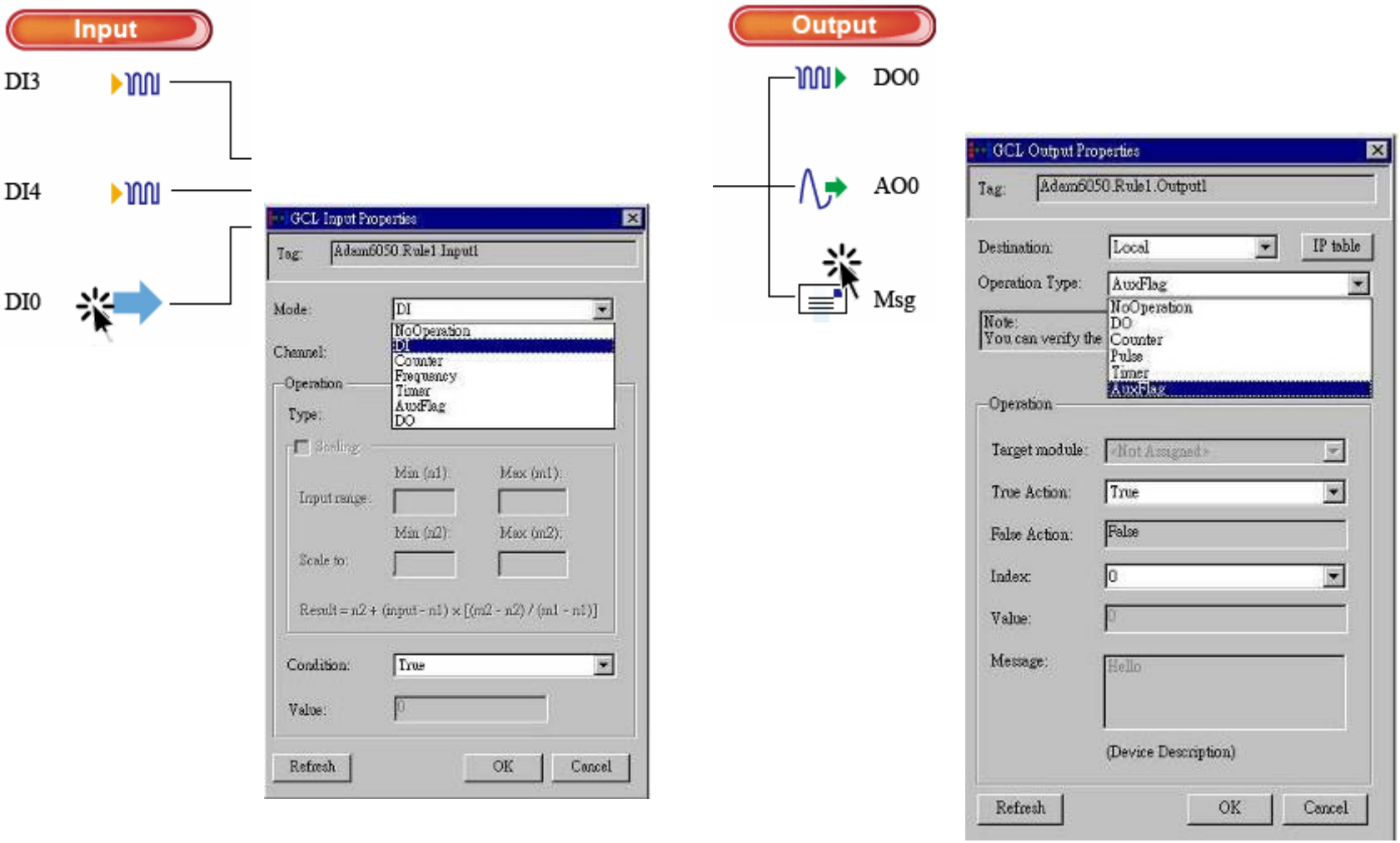



**TCP/IP Port: 1025**

# Logic Rule Cascade

- At most 16 rules cascade in one modules

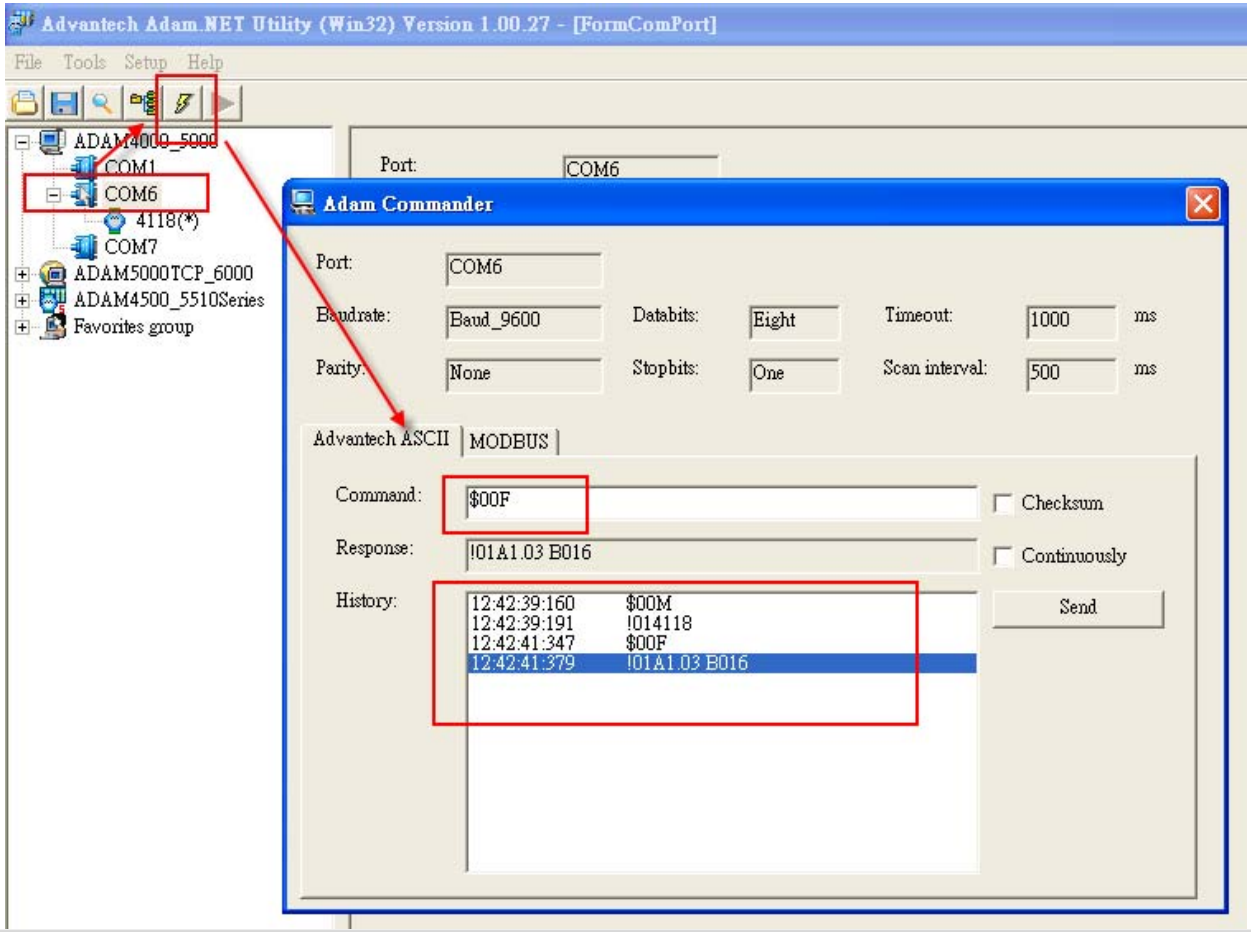



Input
DI3
DI4
DI0
GCL Input Properties
Tag:
Adam6050.Rule1.Input1
Mode:
DI
NoOperation
DI
Counter
Frequency
Timer
AuxFlag
DO
Channel:
Operation
Type:
Scaling
Min (n1):
Max (n1):
Input range:
Min (n2):
Max (n2):
Scale to:
Result = n2 + (input - n1) × [(n2 - n2) / (n1 - n1)]
Condition:
True
Value:
0
Refresh
OK
Cancel
Output
DO0
AO0
Msg
GCL Output Properties
Tag:
Adam6050.Rule1.Output1
Destination:
Local
IP table
Operation Type:
AuxFlag
NoOperation
DO
Counter
Pulse
Timer
AuxFlag
Note:
You can verify the
Operation
Target module:
<Not Assigned>
True Action:
True
False Action:
False
Index:
0
Value:
0
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**



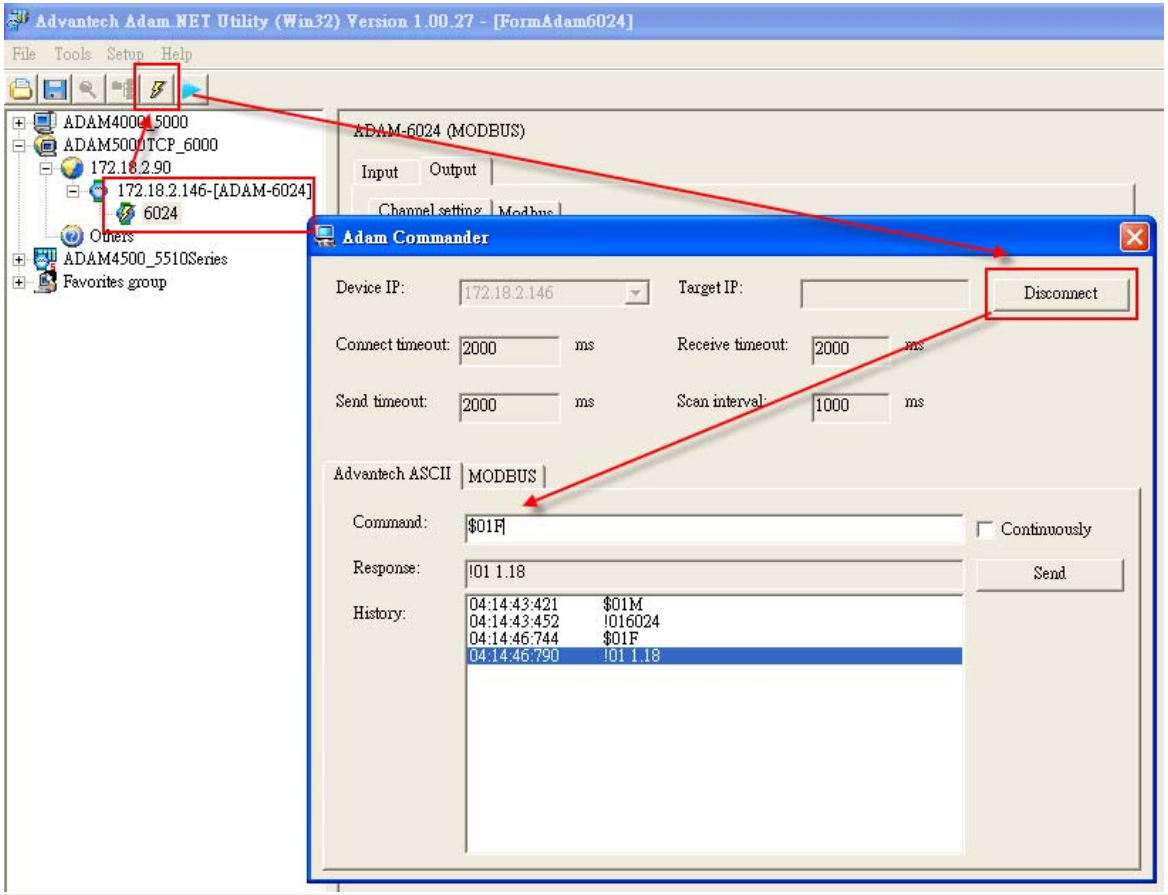
# Hand-On Practice? (make sure if there is adam-5000)

- **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

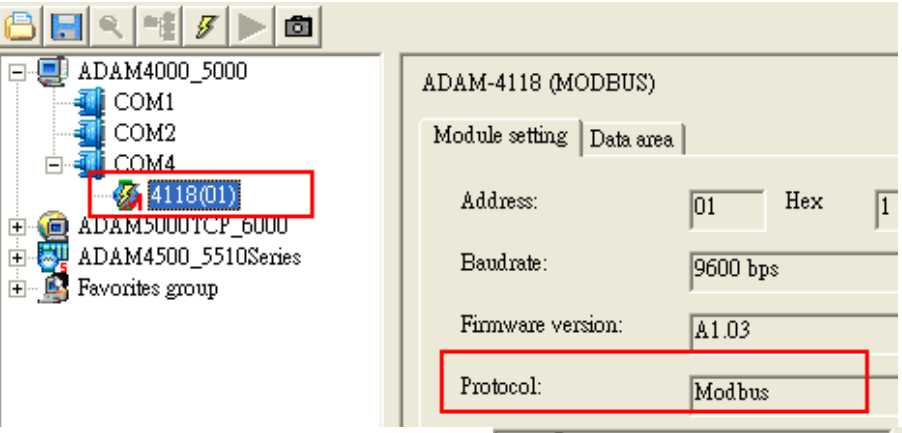
# Introduction to Modbus Protocol

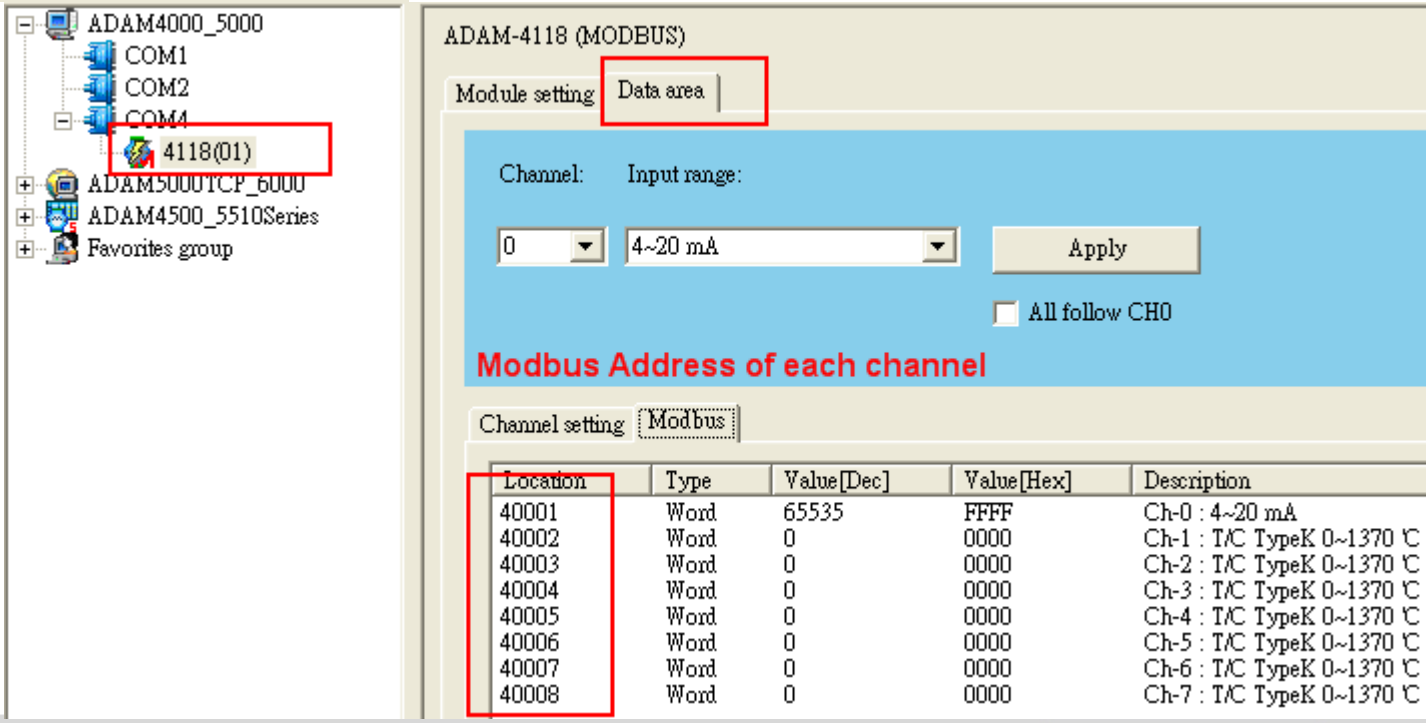
- **Data format**
  - **ID, Function call, Data, Check Sum**
- **Types of Data**
  - Coils; bit; Digital input output
  - Register; Word; 2 Bytes; 16 bits

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

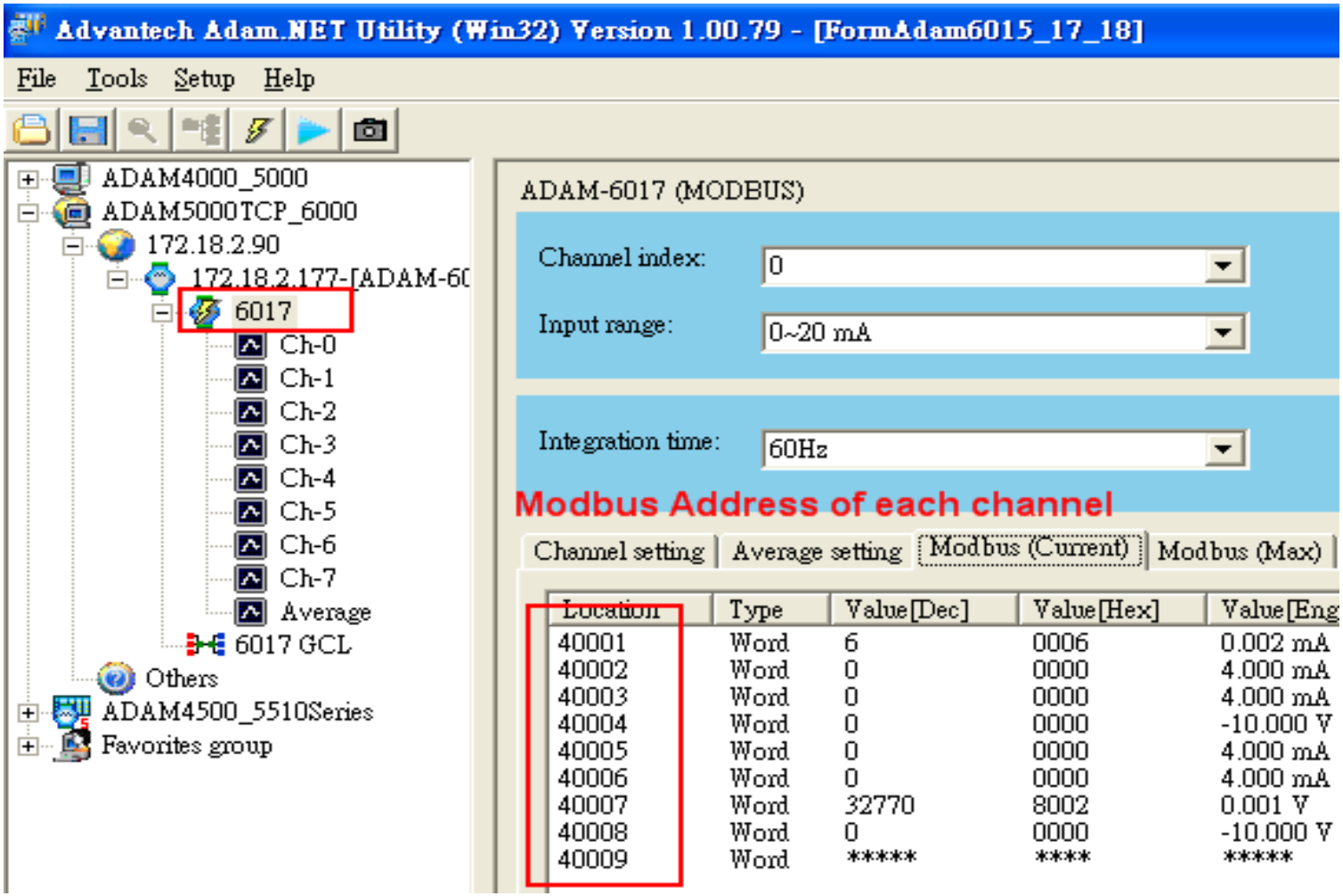
* Maximum value is device dependent

# Modbus Address of Adam serial modules



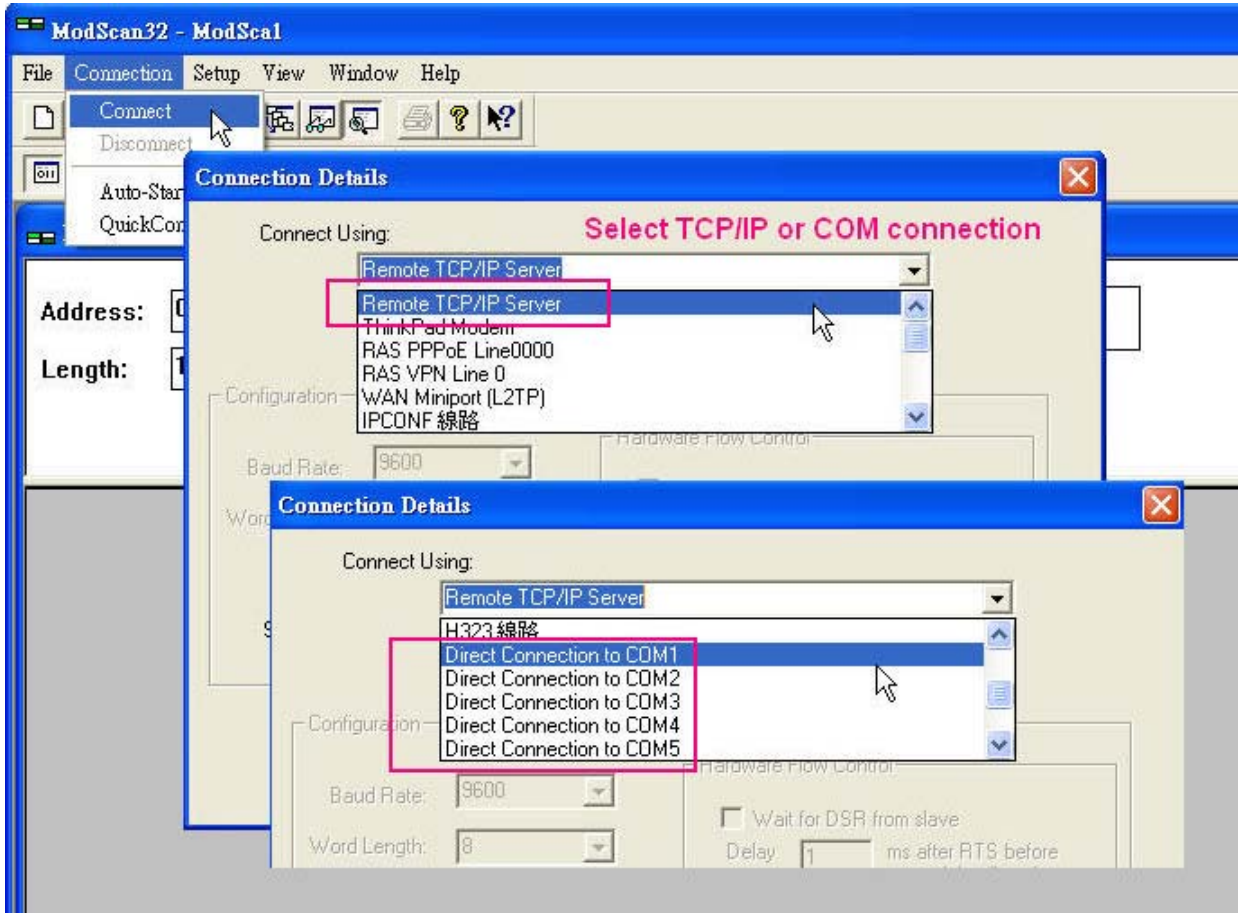
# Modbus Address of Adam Ethernet modules



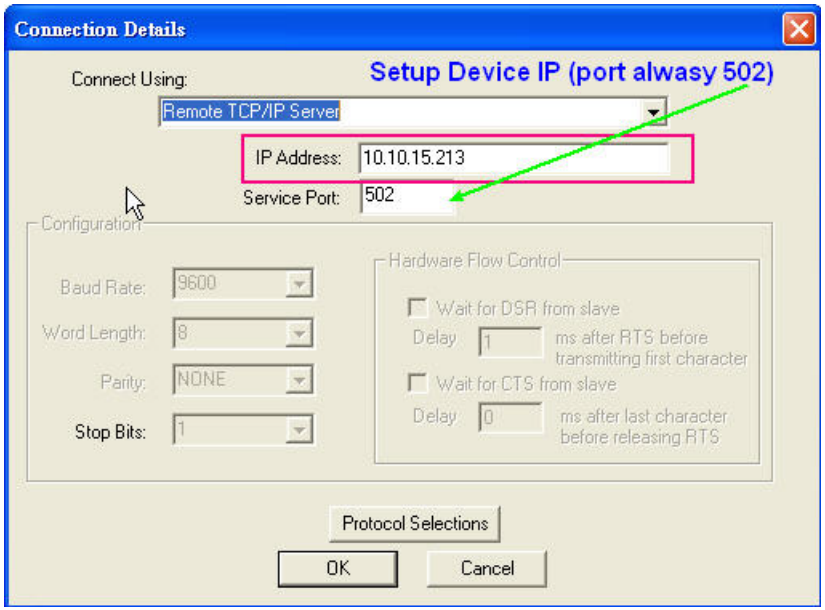
- **ADAM-4000/5000 Configuration and Utility**
- **ADAM-6000/5000TCP Configuration and Utility**
- **Communication Protocols**
- **Appendix – Intro of Modscan**
  - Get Data From ModScan tool

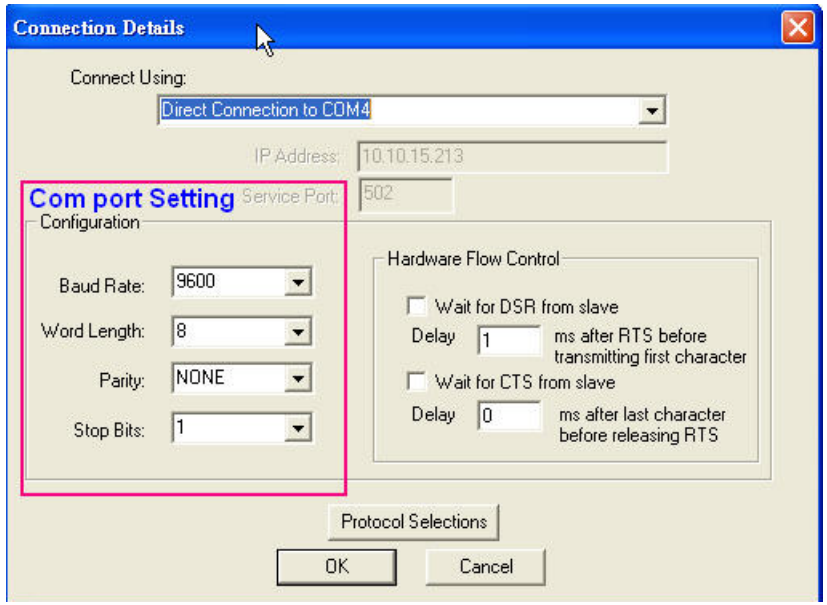
# Quick Startup

- **Deciding the Connection method**

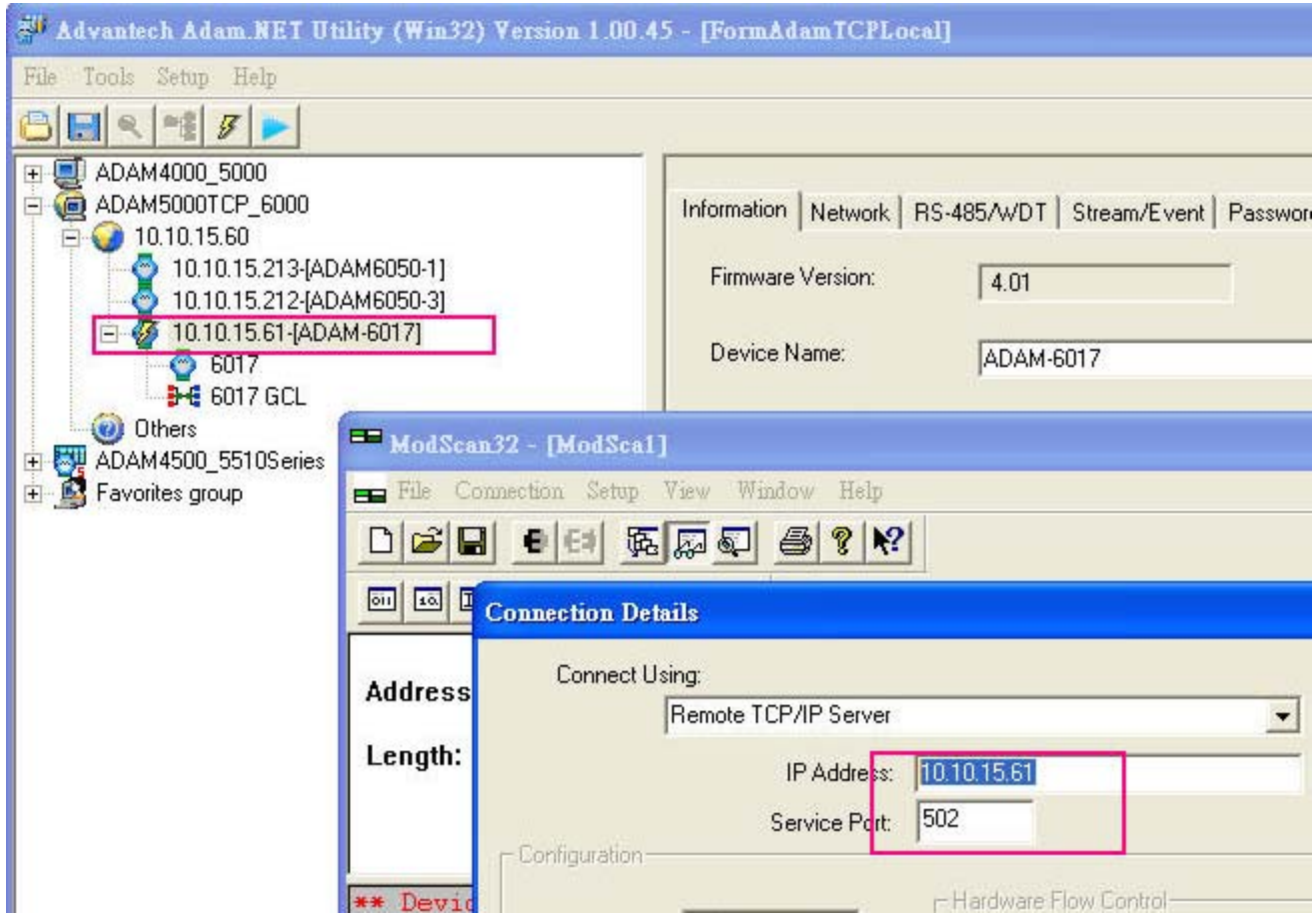


- **Connection Setting**
  - IP for Ethernet
  - Port setting for Serial

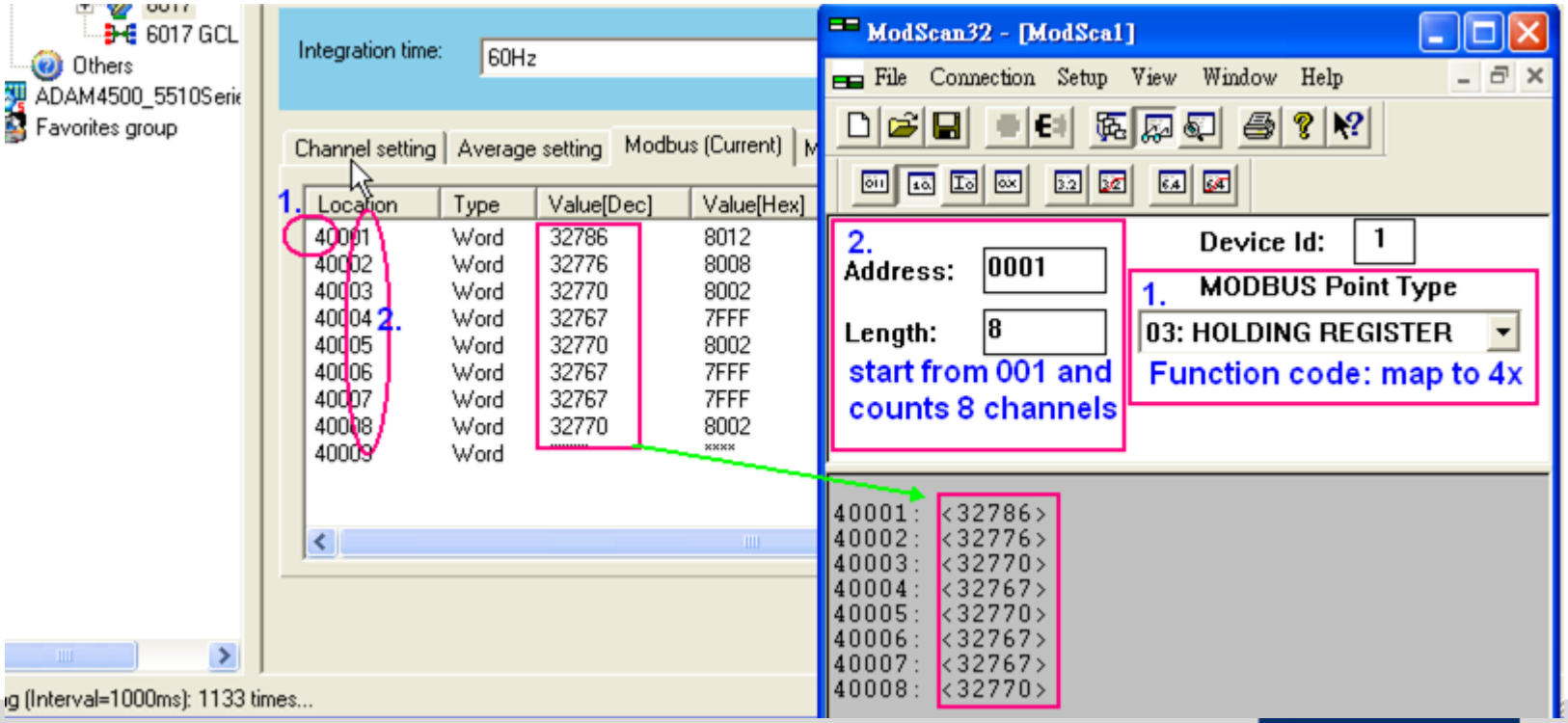


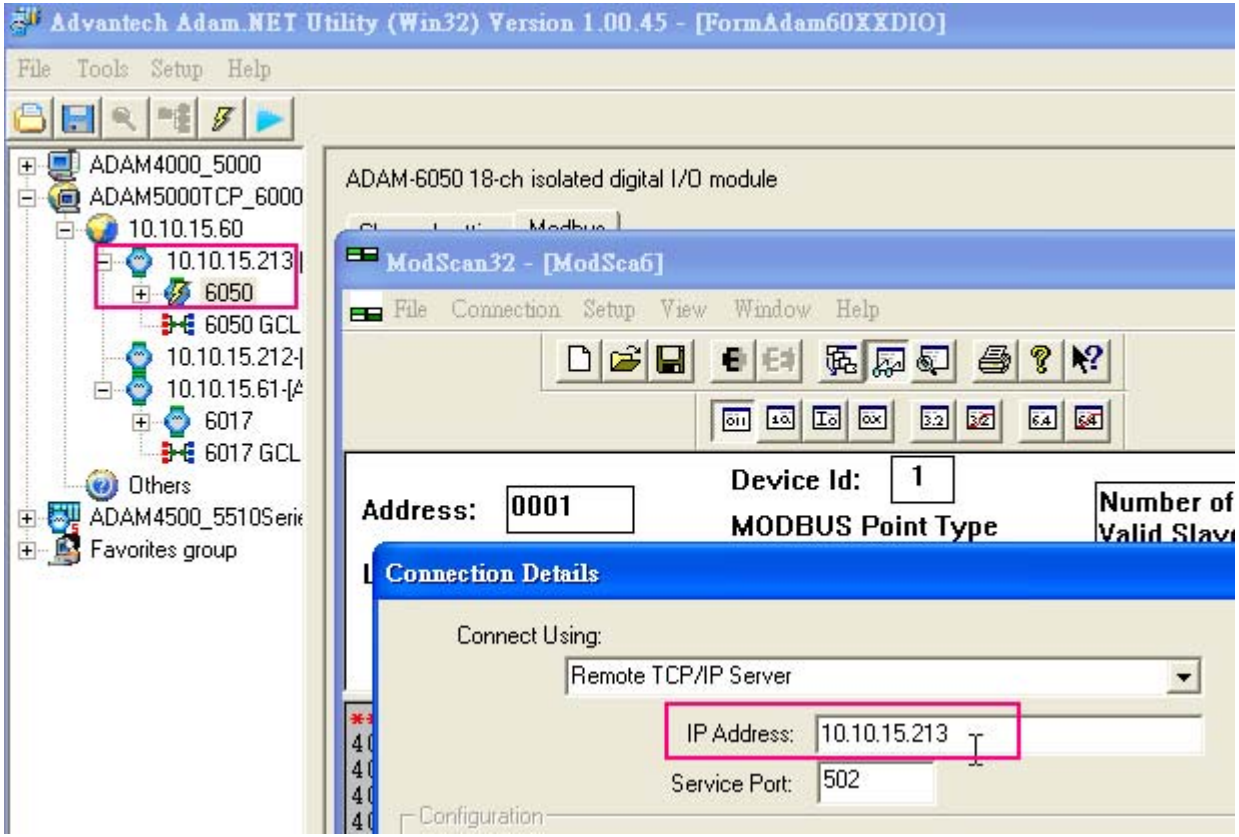
- **Example of Adam Analog Input - Adam-6017**



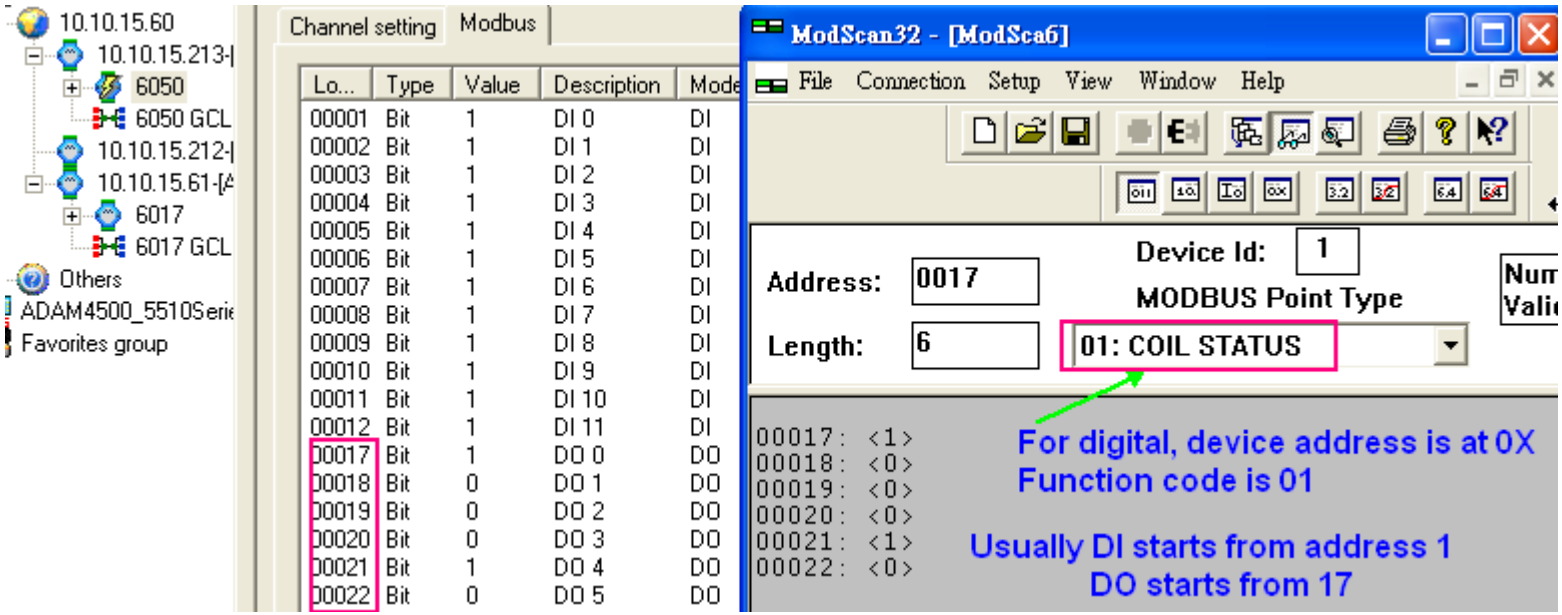
- **Depending on device modbus address**
  - Device ID is 1 for Adam-6K series
  - Setup function code- 03 holding register
  - Setup Address and Length



- **Example of Adam Digital – Adam-6050**



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



# Thanks~~~~