Manual for InduSoft Web Studio Solution

(version 1.0)

Produced by ICPDAS LTD., Co.

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ICPDAS solution for InduSoft Web Studio

InduSoft Web Studio is a powerful, integrated collection of automation tools that includes all the building blocks needed to develop human machine interfaces (HMIs), supervisory control and data acquisition (SCADA) systems, and embedded instrumentation and control applications. InduSoft Web Studio can run in native Windows NT, 2000, XP and CE 3.x/4.x (x86) environments and conforms to industry standards such as Microsoft DNA, OPC, DDE, ODBC, XML, SOAP and ActiveX. For more information please visit: http://www.InduSoft.com/.



The Above figure illustrates the integration application for ICP DAS products and InduSoft Web Studio. InduSoft provides the stability and reliability software system for HMI, SCADA and Web solution. And ICP DAS supplies the good performance hardware with suitable firmware or controller. From the demonstration, ICP DAS proposes remote I/O, I-7000, I-8000, I-87K series modules and embedded controller, such as ISaGRAF based products and I-7188 series. Furthermore, ICPDAS also provides several of the standard Industry communication tool kits and software kits, such as OPC, DDE, Modbus, bundled driver, NAP7000D, NAPOPC, 7000Utility, ..., through Rs-232/Rs-485/Ethernet media to help user to easily communicate and control the remote or embedded modules in various application system. On the other hand, InduSoft provides a software platform such that users can easily build a small to large SCADA system within a short time. Eventually, the cooperation of ICPDAS and InduSoft can provide an easy application solution for system integrator even for simple to complex system.

Note that this manual will focus on communication setting demonstration for Software and hardware. Based on the application structure, we will show five solutions for InduSoft Web Studio, which are Bundled driver, OPC server, DDE server, Modbus TCP, ISaGRAF Soft PLC solution. Firstly, the Bundled driver solution for InduSoft will be presented in section 1. Section 2 and 3 will introduce the OPC and DDE server solution. Modbus TCP is the international communication protocol for field bus control system. Therefore, this Modbus TCP solution for InduSoft will be discussed in section 4. Finally, ISaGRAF Soft PLC solution for InduSoft, which is based on Modbus RTU and TCP, will also be established in section 5. In addition, every solution only gives a simple example for InduSoft Web Studio how to connect to hardware system. If users need to know more knowledge for how to use InduSoft Web Studio SCADA design skill, please refer to the technique reference manual of InduSoft Web Studio software.

Section 1: Bundled Driver for InduSoft Web Studio

1-1 Introduction

ICPDAS develops the bundled "DCON" driver to enable **InduSoft Web Studio** to communicate with some series of remote control modules, such as, I-7000 series, I-8XX1 I-8XX0 series, and I-87K series. Due to this driver was developed base on the DLL driver of ICPDAS, therefore, it provides two communication methods for his products:(1) the first one is RS232 to RS485 series communication by the I-7520 (RS-232 to RS485 converter), (2) the second one is the Ethernet communication scheme by the VxComm driver of ICPDAS (For more information, please refer to website <u>http://www.icpdas.com/</u>). By using these two schemes, allows InduSoft Web Studio to use the series communication method to connect to RS-485 and Ethernet remote control modules. The more detail application of modules and communication scheme are shown in the following figure and tables.



Туре	Support Modules
Analog Input Modulo	I-7011/7012/7013/7014/7016/7017/7018/7033/8017/8017H/87013
Analog input wodule	/87016 /87017/87018
Analog Output Module	I-7016/I-7021/I-7022/I-7024/87022/87024/87026/8024
Digital Input Madula	I-7011/12/14/16, I-7041/44/50/52/53/55, I-7060/63/65,
Digital Input Module	I-8051/52/53/54/55/63 and I-87051/52/53/54/55/63
	I-7011/12/14/16, I-7042/43/44/50, I-7060/63/65/66/67/80,
Digital Output Module	I-8054/55/56/57, -8060/63/64/65/66/68, I-87054/55/56/57 and
	1-87060/63/64/65/66/68
Time/Counter Module	I-7080, I-8080/81/83, and I-87082

Besides, the documentation for DCON driver will be organized as following 8 parts:

- Introduction: Provides an overview of the driver documentation.
- General characteristics: Provides information necessary to identify all the required components (hardware and software) necessary to implement the communication and global characteristics about the communication.
- Installation: Explains the procedures that must be followed to install the software and hardware required for the communication.
- Driver configuration: Provides the required information to configuration the communication driver such as the different permutations for configuration and its default values.
- Execution: Explain the steps to test whether the driver was correctly installed and configuration.
- Troubleshooting: Supplies a list of the most common error codes for this protocol and the procedures to fix them.
- Application Sample: Provides a sample application for testing the configuration the driver.
- History of versions: Provides a log of all the modifications done in driver.

Note: This document presumes that the user has read the chapter of Driver Configuration in the InduSoft Web Studio's Technical reference manual.

1-2 General Characteristics

1-2-1 Device Characteristics

The following table shows that this driver is designed for ICPDAS products and what series modules are supported.

Compatible Equipment

I-7000 series remote control modules I-7011, I-7012, I-7013, I-7033, I-7014D, I-7016, I-7017, I-7018, I-7021, I-7022, I-7024, I-7041, I-7042, I-7043, I-7044, I-7050, I-7052, I-7053, I-7060, I-7063, I-7065, I-7066, I-7067, I-7080 I-8000 series remote control modules I-8017H, I-8024, I-8040, I-8041, I-8042, I-8050, I-8051, I-8052, I-8053, I-8055, I-8056, I-8057, I-8058, I-8060, I-8063, I-8064, I-8065, I-8066, I-8068, I-8069, I-8080, I-8081, I-8083 I-87k series remote control modules I-87013, I-87016, I-87017, I-87018, I-87022, I-87024, I-87026, I-87051, I-87052, I-87053, I-87054, I-87055, I-87057, I-87058, I-87063, I-87064, I-87065, I-87066, I-87068, I-87082

- Note: Please refer to section 1-2-4 to see the Equipment used in the standard conformance tests for this driver.
- Note: All analog modules must be configured to engineering units.
- Note: This Driver version does not implement the CRC. The equipment must be configuration to does not use CRC check.

1-2-2 Link Characteristics

Device communication part	RS-232 port	Ethernet port
Physical protocol	RS-232/RS-485	Ethernet/RS-485
Logic protocol:	ASCII	ASCII
Device Runtime software	DCON driver,	DCON and VxComm driver
Specific PC Board	None	None

1-2-3 Driver Characteristics

The driver operation System is available for:

- - Windows XP
- - Windows 2000
- - Windows 9x
- - Windows NT
- - Windows CE 3.x/4.x (x86)

The driver is composed of the following files:

- DCON.INI: Internal files of the driver, it should not be modified by the user.
- DCON.MSG: This file contains the error messages for each error code. It is an internal file of the driver the users should not modify it.
- DCON.PDF: This document provides detailed documentation about the driver.
- DCON.DLL: This is the compiled library for the driver

☞ Note: All the files above must to be in the subdirectory /DRV of the Studio's installation direction.

1-2-4 Information about conformance testing

Equipment	(1) Family 7000: 7012, 7021, 7060, 7017, 7018 (2) Family 8000: I-8410 (Main unit), 8064, 8053, 8024	
Configuration	Baud Rate: 9600	
-	Protocol: ASCII (Proprietary)	
	Data Bits: 8, Stop Bits: 1, Parity: None	
	Communication port: Com 1, Ethernet	
Cable	Twin wire	
Development System	Development: Windows 2000, Windows XP	
Operation System	NT4.0, Windows 2000, Windows XP, WinCE	
	3.x/4.x (x86)	
Studio Version	Ver. 4.4 and Ver. 5.1	
Driver version	DCON Ver. 1.01 and VxComm driver	

1-3 Installation the driver

When you install the Studio v4.4 or higher version into your system, the communication drivers should be already installed. Users only need to know how to select the driver and add it to the application where it will be used. Following is the procedure step for how to add the driver DCON into an application:

1-3-1 Install DCON Driver into InduSoft Web Studio

Step 1: Execute the InduSoft Web Studio and select the proper application, as below figure.

۹ew			×
File F	Project		
Applicati APPL	ion name:		
Location	r.		
D:\Prog	gram Files\InduSoft Web Studio\	Projects\	Browse
Configur D:\Prog	ation file: gram Files\InduSoft Web Studio\	Projects\APPL\APPL.APP	
, Target p	latform:		
CEView Local Ir Operato Control) hterface or Workstation Room		
Advand	ed Server		
		ОК	Cancel
(Project Wizard		×
	Template: Sample Application	Resolution	
	Toolbar and menus Empty Application	C 320 x 240 C 640 x 240	
		C 640 x 480	
		● 800 × 600 ● 1024 × 768	
		O 1280 x 1024	
	PC Based Control		
	Name: SteepleChase	Configure	
		OK Cancel	

Step 2: Click on the "Add/Remove drivers" menu item to pop up the available communication driver window, as shown in below figure.

Workspace	×
🖃 🔥 Project: app1.APP	
OPC <u>A</u> dd/Remove drivers	
DDE	
📓 Data 👫 Grap 🌌 Tasks 😰 Co	mm

Step 3: In the column Available Drivers list, select the DCON Driver and click the button "Select>>" to add DCON driver into the selected drivers list. (Note: If DCON driver is not found in "Available drivers" list, please refer to appendix A to setting DCON driver into InduSoft Web Studio.)

		1200 (NT 2000 CE 2.00 / CL27		1.12.12.12.1
		300 (N 1,2000,CE7x00751137	CUTLER-HAMMER - D50	CUTL
	J .	-2000-9x) [v1.03]	DAVIS - Weather Wizard	DAVI
	>	8000 compatibles (NT/9x/20	ICP DAS- Series 7000/87	DCON
		-2000-9x) [v1.07]	DEGUSSA AG, Degussa	DDS
		evicence Slave (N172000/9x	Hilscher/Synergetic board	DEVN
)00-9x) [v1.04]	SCHENCK, Disomat C (N	DISOM
1	The second second	DL50 Display (NT-2000-9x) [ALLEN-BRADLEY - Data	DL50
>>	Select >>)-9x-CE/x86/Sh3/Sh4/ARM/ 🤇	DSC - Reader DSC (NT-2	DSC
			rivers:	elected dr
ove	>> Remov		Description	DLL
ALC: NOT THE REAL PROPERTY OF				
	Select	DL50 Display (NT-2000-9x) [D-9x-CE/x86/Sh3/Sh4/ARM/	ALLEN-BRADLEY - Datal DSC - Reader DSC (NT-2 rivers: Description	DL50 DSC elected dr DLL

Step 4: When driver DCON appear in the column Selected Drivers, then click "OK" bottom to add driver to InduSoft Web studio.

DLL	Description		<u>H</u> elp
CUTL DA100	CUTLER-HAMMER - D50 / D300 (NT,2000,CE/x86/Sh3/ YOKOGAWA - DA100 (NT-2000-9x) [1.08]		
DAVI DDS DEVN DISOM	DAVIS - Weather Wizard (NT-2000-9x) [v1.03] DEGUSSA AG, Degussa (NT-2000-9x) [v1.07] Hilscher/Synergetic board - DeviceNet Slave (NT/2000/9x SCHENCK, Disomat C (NT-2000-9x) [v1.04]		
2L50	ALLEN-BRADLEY - Dataliner DL50 Display (NT-2000-9x) [DSC - Beader DSC (NT-2000-9x-CE/x86/Sh3/Sh4/ABM/		
ESB	ESB - Vip D3-485 / HV / Energy (NT-2000) [v1.04]	-	Select >>
elected dr	ivers:		
DLL	Description		>> Remov
DCON	ICP DAS- Series 7000/8700/8000 compatibles (NT/9x/20	$\mathbf{>}$	

1-3-2 Other software requirements

If users try to use the Ethernet communication solution for InduSoft Web Studio, the VxComm driver from ICPDAS need to be installed into the system where the application is developed for. Besides, users should also need to define the Ethernet Protocol and assign it to mapping to a Com port. And then users can use the Ethernet communication just like the series communication, which you have assigned it.

🥳 VxComm Utility ∨2.04	×
7188E/8000E Internet/Ethernet IP Address 192.168.0.200	Check Duplicat 🔽 Check Server
⊡. ∀xComm Devices i7188E2 (192.168.0.200)	Port COM Status Port I/O UnMap Available Port 1 HoMap Available Port 2 COM4 Available
Server Options X Remove Se	rver

1-4 Driver Configuration

After the driver is installed into Studio (see section 1.3), user should proceed to the driver configuration procedure to enable the correct communication protocol with remote control modules. The driver configuration is operated as two parts: (1) The first is the setting or Communication parameters of the driver, which is the driver protocol definition. (2) The second one is the setting of Driver Worksheets, which define the method for how to communicate with variable tags. The more detail procedure for configuration of these two parts will be described in following sub-section.

1-4-1 Driver configuration

These parameters are valid for all driver worksheets configured in the system. To open the window for configuration of **Communication parameters**, Please follow these steps:

Step 1: In the Workspace of the Studio environment selects the "Comm" table.

Step 2: Expand the folder Driver and select the subfolder DCON.

Step 3: Right click on the DCON subfolder and select the option <u>Settings</u>.



Step 4: When selecting the Settings, there is a communication parameters window to be popped up for configuring the protocol. Please select the correct parameters to conform to the remote control modules. The station parameter is not used in DCON driver. The more detail parameter setting and description is presented in the below table.

:OM:	COM2	οκ
laud Rate:	9600 💌	
) ata Bits:	8 💌	Cancel
itop Bits:	1	Advanced
arity:	None 💌	
itation:		
Long 1:		String 1:
U		1
.ong 2:		String 2:

Parameter	Default Value	Valid values	Description
СОМ	COM2	COM1 to COM8	Serial port of the PC used to communication with the device.
Baud Rate	9600	110 to 57600bps	Communication rate of data.
Data Bits	8	5 to 8	Number of data bits used in the protocol. ICPDAS Data Bits is 8 .
Stop Bits	1	1 or 2	Number of stop bits used in the protocol. ICPDAS Stop bits is 1.
Parity	None	Even, odd, none, space or mark	Parity of the protocol. ICPDAS parity is None.

Note: These Parameter must be the same as the remote control modules of ICPDAS products. Besides, DCON Driver does not use CRC. Therefore, users should disable checksum function of the modules.

Step 5: By clicking on the button "Advanced..."in the window of Communication Parameters, the "advanced settings" window for additional communication parameter will be opened as follow. Users can further define the communication property of the driver in InduSoft Web Studio. Please define the parameters as the figure description.

Advanced settings	×
Timeout (ms) Start message: 1000 End message: 0	Disable OK DTR Cancel
Interval between char: 500 Wait CTS: 100	Protocol Retries: 0
Handshake	Buffers length (bytes)
Control RTS: no	Tx Buffer: 512
Verify CTS: no	Rx Buffer: 512

Note: The Advanced setting parameters are explained at the Studio Technical Reference Manual. And you should keep the default values to all field described at the next tables should be configured.

1-4-2 Driver Worksheet

After the communication parameter settings in above description, then users need to add driver worksheet into Studio's application to enable communication between the input/output values with variable tags of user application. Each of the worksheet composes of a Header and Body. In order to optimize communication and ensure better performance of the system, it is important to add the tags in different driver sheets according to the events that must be triggered in the communication of each group of tags and the periodicity for which each group of tags must be written or read. That means that tags are separated in the different worksheets based on AI, AO, DI, DO..., which is defined in Header, Besides, it is also recommended to configure the addresses of communication in sequential blocks in the worksheet. Followings are the procedure for how to create a new driver worksheet:

Step 1: In the Workspace of the Studio environment, select the table Comm.

Step 2: Expand the folder Drivers and select the subfolder DCON.

Step 3: Right click on the DCON subfolder and select the option Insert.



Step 4: When a communication table has been created, following window will be presented. All entries of the Driver Worksheet (exception by the Station, Header and Address) are standards for all communication drivers of InduSoft Web Studio. Users should refer to Studio Communication Driver documentation to know how to configure these standard fields. Here, this manual will only describes how to define the Station, Header and Address fields of DCON driver. These fields usually have specific way for each communication driver.

De	escription:					
In	tput		🗌 🗌 Incre	ase priority		
Re	ad Trigger: Er	nable Read when Idle: Read Completed: Read Statu		atus:		
R	۲I Tb	RdEn				
W	rite Trigger: En	able Write on Tag Change: Wr	ite Completed:	Write St	atus:	
Г						
Sta	ation:	leader:				80 80
				1,110,00		
		4		MUN:	<u> </u>	
	ļ	4J		Max	 	
	Tag Name	Al Address		Div	Add]
1	Tag Name Al[0]	Al Address 01:7012:0		Div	Add	
1	Tag Name AI[0] AI[1]	Al Address 01:7012:0 01:7012:1		Div	Add	
1 2 3	Tag Name Al(0) Al(1)	Al Address 01:7012:0 01:7012:1		Div	Add	
1 2 3 4	Tag Name Al(0) Al(1)	Al Address 01:7012:0 01:7012:1		Div	Add	

Step 5: Define Head, Tag Name, and Address of remote control modules. For how to correctly input parameter, please refer to the following description.

1-4-3 Station and Header configuration

Parameter	Default Value	Valid value	Description
Station			Not used
Header	AI	See next table	Define the type of variable to be read or written from or to the device.

The Header field defines the type of variables that will be read or written from or to the device. It complies with the syntax: <Module's Type>. After keying in the field Header, the system will check if it is valid or not. If the syntax was incorrect, the default value (AI) will be automatically placed in the field. Note that header define the property of worksheet. And it is recommended to add all of the same property of the tags into the worksheets.

Information regardin	g the parameter "H	leader"	
Туре	Sample of syntax	Valid range of initial Address	Comment
Read Digital Input/Output	DI	Any	
Read Digital Output	DO	Any	
Read Analog input/output	AI	Any	The ICP DAS device channel must be configured to engineering units
Write Analog Output	AO	Any	The ICP DAS device channel must be configured to engineering units
Read/Set Counter	Counter	Any	
Read/Set DI Counter value	DICounter	Any	
Write Command	SendCmd	Any	Send command to the device

✓ Note: Always create two different driver worksheets to read Input and Output.

1-4-4 Address Configuration

In the body fields of the driver worksheet, it allows users to associate each tag to corresponding channel of device by independence address. In the column **Tag Name**, you must type the tag from your application database. This tag will get or send values from or to the corresponding device of the defined address. The address cells for remote control module of ICPDAS products will be complied with the following syntax (1) I-7000 and I-87k remote control modules:

<Module's Address>: <Module ID>: <Channel Number>

(2) I-8000 remote control modules:

<Module's Address>: <Module ID>: <Slot Number >: <Channel Number>

Where the parameter is described as follows:

- **Module's Address:** Module's Address in the network (Range from 00 to FF)
- **Module ID:** Module's ID of the device. Please refer to ICPDAS product manual.
- Slot Number: Module's Slot hanging on the rack.
- **Channel Number:** Channel's Number to be read or written for the module.
- •

Note: For AI and DI, if the channel number is bigger than the number of the modules, you can read all the value of the module in a communication.

The following table is the example for how to define the parameters.

(1) I-7000 and I-87K series modules

Sample of Addressing Configuration		
Address on the Device	Header Field	Address Field
Read channel 0 of module 87053 of Address 1 (input)	DI	01:87053:0
Write channel 1 of module 7064 of Address 6 (output)	DO	06:7064:1
Read channel 0 of module 7017 of Address 4 (input)	AI	04:7017:0
Write channel 1 of module7021 of Address A (output)	AO	0A:7021:1
Read/Set channel 0 of module 7080 of Address 3 (counter	Counter	03:7080:0
Read/Set channel 0 of module 7060 of Address 5 (DI counter)	DICounter	05:7060:0
Write command to devices with tag value	SendCmd	Not used

(2) I-8000 series modules

Sample of Addressing Configuration					
Address on the Device	Header Field	Address Field			
Read from channel 0 of module 8053 in slot 1 of address 1	DI	01:8053:1:0			
Write to channel 1 of module 8064 in slot 4 of address 6	DO	06:8064:4:1			
Read from channel 5 of module 8017 in slot 6 of address 3	AI	03:8017:6:5			
Write to channel 4 of module 8024 in slot 1 of address A	AO	0A:8024:1:4			

(3) The following table presents the current support modules of ICPDAS products by this

driver DCON. For more new products supported by this driver, please refer to the ICPDAS website <u>http://www.icpdas.com</u>.

Head Type	Support Modules
DI	I-7011/12/14/16, I-7041/44/50/52/53/55, I-7060/63/65, I-8051/52/53/54/55/63 and I-87051/52/53/54/55/63
DO	I-7011/12/14/16, I-7042/43/44/50, I-7060/63/65/66/67/80, I-8054/55/56/57, -8060/63/64/65/66/68, I-87054/55/56/57 and I-87060/63/64/65/66/68
AI	I-7011, I-7012, I-7013, I-7014, I-7016, I-7017, I-7018, I-7033, I-8017, I-8017H, I-87013, I-87016, I-87017, I-87018
AO	I-7016, I-7021, I-7022, I-7024, I-87022, I-87024, I-87026, I-8024
Counter	I-7080, I-8080, I-87080
DI Counter	I-7011,I-7012,I-7014,I-7016,I-7041/44/50/52/53/55,I-7060/63/65, and I-87051/52/53/54/55/63

Note: The device parameter (baud rate, stop bits, etc) must match the settings of configuration of the Communication Parameters in the DCON driver. Otherwise, users can change the setting of DCON driver or modify the communication protocol of every remote control module in the control network.

1-5 Driver Execution Setting

After finishing the setting of driver, users need to setup DCON driver in the Runtime mode, which allow InduSoft Web Studio to start up the driver automatically. Please go to "Execution Tasks" tab of project status window by click **Project/Status** menu option. The result window is as below figure. Please go to double click the driver runtime mode in automatic mode.

Background Task	2020/2020/06/06/2020	
	Automatic	<u>S</u> tart
🔁 Database Spy	Manual	
DDE Client Runtime	Manual	Stop
- DDE Server	Manuel	
Driver Runtime	Automatic	
🛃 LogWin	Manual	Startup
ODBC Runtime	Manual	
COPC Client Runtime	Manual 📃	
🎀 Studio Scada OPC Server	Manual	
ТСРЛР Client Runtime	Manual 🚽	
©OPC Client Runtime Studio Scada OPC Server	Manual Manual Manual	

1-6 DCON Driver Troubleshooting

After each attempt of InduSoft Web studio to communicate the remote control modules by using DCON driver, the tag configuration in the field **Read Status or Write Status** will receive the error code regarding the kind of failure that occurred. The error messages are:

Error Code	Description	Possible causes	Procedure to solve
0	NoError	Communication without problems	
1	Invalid Header	An invalid Header has been typed or the tag that is inside this field has an invalid configuration.	Type a valid Header either on the header field or on the tag value. A lot of different valid headers are shown on the section 1-2
2	Invalid Address	An invalid Address has been typed or the tag that is inside this field has an invalid configuration.	Type a valid Address either on the addre field or on the tag value. The address' va values are show on the section 1-4.
10	SendCmdError	Send command error!!	Check the serial communication configuration. Verify if the settings on the Communication Parameters and on the device are the same
12	ResultStrCheckError	Result string check error!!	 Check the cable wiring Check the PLC state. It must be RUN Check the station number. Check the right configuration.
15	TimeOut	TimeOut error!!	 Check the cable wiring Check the PLC state. It must be RUN Check the station number. Check the right configuration. See on the section 2.2 the different

			RTS/CTS valid configurations.
17	ModuleIdError	Module ID error!!	Check support of the Module. See on the section 1-4.
18	AdChannelError	Channel number error!!	Check the AI channel number.
19	UnderInputRange	Under input range error!!	Check the input range. See if the value is valid.
20	ExceedInputRange	Exceed input range error!!	Check if the input value is valid.
21	InvalidateCounterNo	Invalid counter number!!	Check if the counter number value is valid.
22	InvalidateCounterValue	Invalid counter value!!	Check if the counter number value is valid.

Note: The results of the communication may be verified in the **output** Window of the Studio's environment. To set a log of events for Field Read Commands, Field Write Commands and Serial Communication, click the right button of the mouse on the output window and chose the option setting to select these log events. When testing under a Windows CE target, you can enable the log at the unit (Tools/Logwin) and verify the file celog.txt created at the target unit.

When testing the communication with the Studio, you should first use the application sample described at section 1-7, instead of the new application that you are creating. If it is required to contact technical support, please have the following information available:

- Operating System (type and version): To find this information use the Tools/System Information option
- Project information: It is displayed using the option Project/Status from the Studio menu
- Driver version and communication log: Available from Studio Output when running the driver
- Device model and boards: please refer to hardware manufacture's documentation

1-7 Application Sample

The Studio contains a configured project to test the driver. It is strongly recommended to do some tests with this application before beginning the configuration of the customized project for the follow reasons:

- To understand better the information covered in section 4 of this document.
- To verify that your configuration is working.
- To certify that the hardware used in the test (device + adapter + cable + PC) is

in working conditions before beginning the configuration of the applications.

Sote: The Application Sample is not available for all drivers.

You can download the driver test application from http://www.icpdas.com. To perform the test, you need to follow these steps:

- Configure the device communication parameters using manufacture programmer software. Please unzip the application sample file.
- Open the application
- Execute the application

P Note: Before you use the DCON bundled driver test application, you must have install the modules.

Step1: Start up the InduSoft Web Studio (Version 4.1 or newer). Currently, the newest version is 5.1. The first popped up window is shown as following figure.



Step2: When starting up procedure has finished, InduSoft Web studio would be presented. Then users can open the DriverTest project, just like the following figure. After users select "DriverTest" and click "OK" bottom, DriverTest application project will be opened in InduSoft Web Studio.

Open					? ×
Look in:	CPDriverTes	t	•	🗢 🗈 💣 🎟•	
History Desktop My Documents My Computer	Alarm Config Database Hst Screen Symbol Web				
My Network P	File name:	DriverTest		•	Open
	Files of type:	[Application (*.app]		•	



Step 3: Open DCON folder in Comm tab. There are 7 attribute tables in DCON (AI, DO, DI, AO, SendCmd, Counter, DICounter tables). Right-click the AI, and then click "Open" as shown in the follow figure. And then AI attributes window will be popped up, just like following figure.



Setp 4: Users can modify the Address field to fit the installed modules in his system as shown in the follow figure.

Description:					
AI		Incr	ease priority		
Read Trigger:	Enable Read whe	n Idle: Read Completed:	Read Stat	us:	
RdTr[1]	RdEn[1]	RdCpl[1]	RdSt[1]		
Write	Enable Write on 3	Iag Change: Write Completed:	Write Stat	tus:	
WrTr[1]	WrEn[1]	WrCpl[1]	WrSt[1]	60.66	
Station:	Header:				
[AI		Min:		
		\frown	Max:		
	Tag Name	Address	Div	Add	
1	AI[0]	40:7017:8			
2	AI[1]	07:7017:3			
3	AI[2]	06:7018:2			
4	AI[3]	06:7018:3			
5	AI[4]	06:7018:4			
6	AI[5]	05:7033:0			
7	AI[6]	05:7033:1			
8	AI[7]	05:7033:2			
9	AI1[0]	01:7012:0			
40	05.02				11

Step 5: After finishing the setting of the driver, users need to setup DCON driver in the Runtime mode, which allow InduSoft Web Studio to start up the driver automatically. Users can setup the Driver Runtime automatically in Project/Status menu option "Execution Tasks" tab of project status window. The result window is as following figure.

Task	Status	Startup 🔺	
🕂 Background Task		Automatic	<u>S</u> tart
Database Spy		Manual	
DDE Client Runtime		Manual	Stop
DDE Server		Manual	
Driver Runtime		Automatic	
🛃 LogWin ——		Manual	Startup
ODBC Runtime		Manual	
OPC Client Runtime		Manual 🔜	
💏 Studio Scada OPC Server		Manual	
TCP/IP Client Runtime		Manual 🔤	
A TONTO O			

Step 6: After finishing above steps, run DriverTest application. Users can trigger bundled driver to input/output from/to IO modules by setting the RdEn/WrEn field as 1. The following is the figure in runtime mode. If users setup the parameters correctly in driver windows, they can get/write the correct values from/to modules.

CEView emulation Ele Security Window Iools	
ICP DAS Driver Test	SendCmd Test1[0]
RdTr 1 TagName Value Al[0] 0.0020 WrTr 0 Al[1] 0.0020 RdEn 1 Al[2] 0.0020 RdEn 1 Al[3] 0.0020 WrEn 0 Al[4] 0.0020 WrEn 0 Al[5] 0.0020 RdSt 0 Al[6] 0.0020 WrSt 0 Al[7] 0.0020 RdCpl 1 WrCpl 0	RdTr 0 AO[0] 2.220 WrTr 0 AO[1] 4.000 WrTr 0 AO[2] 3.500 RdEn 0 AO[3] 0.00 WrEn 1 AO[4] 0.00 RdSt 0 AO[5] 0.000 WrSt 0 AO[6] 0.000 RdCpl 0 WrCpl 0
TagName Value RdTr 0 DI1[0] 1 WrTr 0 DI[0] 1 WrTr 0 DI[0] 1 RdEn 1 DI[2] 1 WrEn 0 DI[3] 1 WrEn 0 RdCpl 1 WrSt 0 WrCpl 0	RdTr 0 DO[0] 0 WrTr 0 D0[1] 0 WrTr 0 D0[2] 0 RdEn 0 D0[3] 0 WrEn 0 D0[5] 0 RdSt 0 D0[6] 0 WrSt 0 D0[7] 0

When users setup the wrong parameters in Driver windows, the IO values would not be read/write correctly. And the IO text with Input modules attributes would show "????". Besides, users can find the error codes in RdSt/WrSt fields. Users can check the where is wrong from the errors.

CEView emulation File Security Window Iools	X _ 8 x
ICP DAS Driver Test	SendCmd Test1[0]
RdTr 1 TagName Value Al[0] ?????? WrTr 0 Al[1] ?????? Al[2] ?????? Al[2] ?????? RdEn 1 Al[3] ??????? WrEn 0 Al[4] ????? WrEn 0 Al[5] ?????? RdSt 15 Al[6] ?????? Wrst 0 Al1[0] ?????? RdCpl 1 WrCpl 0	RdTr 0 AO[0] 3.000 WrTr 0 AO[1] 4.000 WrTr 0 AO[2] 3.500 RdEn 0 AO[3] 0.00 WrEn 1 AO[4] 0.00 RdSt 0 AO[5] 0.000 WrSt 15 AO[7] 0.000 RdCpi 0 WrCpi 1
TagName Value RdTr 0 Dl1[0] 1 WrTr 0 Dl[0] 1 WrTr 0 Dl[1] 1 RdEn 1 Dl[2] 1 WrEn 0 Dl[3] 1 DI[4] 1 Dl[4] 1	RdTr 0 DO[0] 0 WrTr 0 D0[1] 0 WrTr 0 D0[2] 0 RdEn 0 D0[3] 0 WrEn 0 D0[5] 0 RdSt 0 D0[6] 0 WrSt 0 D0[7] 0

☞ Note: The Application for testing may be used like a maintenance screen for the custom application.

Section 2: NAPOPC DA for InduSoft

In the following section of ICPDAS product software manual for InduSoft Web Studio, the method for how to link to NAPOPC DA server (ICPDAS OPC server) will be explored to user in steps by steps. The NAPOPC DA Server uses an Explorer-style user interface to display a hierarchical tree of modules and groups with their associated tags. A group can be defined as a subdirectory containing one or more tags. A module may have many subgroups of tags. All tags belong to their module when they are scanned to perform I/O. (The "OPC" stands for "OLE for Process Control" and the "DA" stands for "Data Access".)



2.1 NAPOPC DA Server

Before using the InduSoft OPC Client module, you need to install and configure the NAPOPC DA server from ICPDAS product CD-Rom in the machines you will run it. After executing the OPC server, the configuration interface of OPC will be popped up as below figure. And the users need to employ the searching mode to connect to all of the remote controller modules (I-7000, 87K, I-8000) from the RS-485 or Ethernet network and then generates tags automatically as shown in following figure. Note that users need to install VxComm software into the system if they try to use Ethernet communication. The more detail information for Ethernet network, please refer to section1 or ICPDAS VxComm software manual. The Following procedure is only for demo for how to use the NAPOPC DA. If users need more information for OPC, please refer to NAPOPC DA user manual from ICPDAS CD-ROM.

Step 1: Click on the "Add/ Search Modules..." menu item or the 🔎 icon to search for modules.

<u>A</u> dd	Edit	$\underline{V} iew$	Options	<u>H</u> elp
No	w <u>D</u> ov	icc	CtrlID	1
Ne	w <u>G</u> ro	up	Ctrl+G	- H
Ne	w <u>T</u> ag		Ctrl+T	
Se	arch M	odules.		
Ge	enerate	Tags		

Step 2: The "Search Modules" window pops up. Users need to configure the parameters of the searching mode. After setting the "search" bottom should be clicked to start to search function. The window will be closed automatically when completed or the exit bottom is clicked.

1800 m 1800 m	230400	☐ 115200
1800 F	230400	□ 115200
100 004	10200	
	15200	▼ 9600
0	1200	
	Clear	All
- Check		
	T	imeout (mSe
Dise	abled	500
✔ Ena	.ble:	
	Check: Diss Ens	Clear Checksum Checksum Disabled Enable

Step 3: After the search, the discovered modules will be listed on the Device-Window (left side). Users can also see the tags on the Tag-Window (right side) generated by the "Search Modules..." function automatically.



Step 4: Monitoring Devices. Use the "Monitor" function to see values of tags by checking the "View/ Monitor" menu item. Uncheck the item to stop monitoring.

Step 5: Save the search the results and exit the NAPOPC DA OPC server.

2-2 InduSoft Web Studio

In the following section, the procedure for how the InduSoft Web Studio connect to the I-7000, I-87K and I-8000 series modules of ICPDAS products will be demonstrated by steps.

Step 1: Start up the InduSoft Web Studio (Version 4.1 or newer). Currently, the newest version is 5.1. The first popped up window is shown as following figure.



Step 2: When starting up procedure is finished, InduSoft Web studio will be presented. And then users can create a new project, just like the following figure. After user define the new property and click "OK" bottom. And then the new project will be presented as following figure.

New								×
File	Project							
Applic APPL	ation <u>n</u> ame:							
Locati	on:						_	
C:\Pro	ogram Files\I	nduSoft	Web Stu	dio\Proje	cts\		Brows	»
Config C:\Pro	guration ogram Files\I	nduSoft	Web Stu	dio\Proje	cts\APPL\API	L.APP		-
, <u>T</u> arget								
CEVi Lite I:	ew nterface							
Local Opera	Interface (tor Workstat	tion						
Contr Adva:	ol Room nced Server							
					ħ	窟	取消	Ì



Step 3: In the Studio Workspace window, click the OPC tab.

💑 InduSoft Web Studio - Display1					_ 8 ×
Eile Edit View Insert Project Tools Window He	lp				
) 🏠 🥩 🖬 🖉 🕹 🖻 🖀 🗙 그 🚭	🔁 🎇 ጆ 🌃 🛛 Rd Tr	🍇 🕌 📘 🕨	🛛 🖳 🧀 💼		
$ \leftrightarrow \Rightarrow \otimes \mathbb{P} \bigtriangleup \square$	0 I I I I I I I	[@ 눼 쿄 ☆ [10 聖聖 開盟		
Workspace - ×	🔛 Display1				
Project: MyOPCTest APP					2
📓 Database 👫 Graphics 📑 Tasks 🖉 Comm					
Name Value Quality Continuous		×	[] 4 [
			CAP	X: 1, Y: 233	

Step 4: Right-click the OPC folder, and then click "Insert", as shown in the above figure. And then OPC Attributes window will be popped up, just like following figure.

ore OPCC	LOO1.OPC			
Descrip	tion: Serve	r Identifier:	Disable:	
Update	Rate (ms): Perce	nt Deadband:	Status:	
Remote	e Server Name:	8		
	Tag Name			Item
1				
2				
3				
4				
5				
•	1			Þ

Step 5: In the OPC attribute window, please click on the selection bottom of the Server Identifier. And users should select the "NAPOPC.Svr" OPC server in the drop-down menu. The "NAPOPC.Svr" OPC server is produced by ICPDAS and users can down it from the website http://www.icpdas.com.

Description:	Server Identifier:	Disable:
ICP DAS	NAPOPC.Svr	•
Read Update Rate (ms):	NAPOPC.Svr Studio.Scada.OPC	Status:
Remote Server Name:		

The other configuration table for OPC attribute window has the following functions. Description: This field is used for documentation only and the OPC Client module does use it. <u>Server Identifier</u>: This field should contain the name of the server you want to connect. If the server is installed in the computer, its name can be selected through the list box. IF the OPC server is installed in the remote site, please refer to Remote Server Name field. Disable: This field should contain a tag or a constant. If its value is different from zero, the communication between OPC server and client is disabled. Update Rate: This field indicates how often the server will update this group in milliseconds. If it is zero indicates the server should use the fastest practical rate. Percent Dead band: This field indicates the percent change in an item value that will cause a notification by the server. It's only valid for analog items. In the below section of OPC attribute window is the Tag Name and item fields. Tag Name: These fields should contain the tags linked to the server items. <u>Item</u>: These fields should contain the name of the server's items. The more detail setting procedure is described as following steps.

Step 6: In the first cell of the Tag Name column, users can type the tag name, which is already created in database window. For how to define the tags in the database window, please refer to the InduSoft manual.

Step 7: In the first cell of the item, user can right-click it and an attribute menu will be popped up, as shown in the below figure. Please click the OPC Browser to introduce the OPC Browser window.

CP ead Update Rate (ms):	Percent Deadband:	Statue
Read Update Rate (ms):	Percent Deadband:	Status
		orarao,
Tag Nama	Itom	Scon
Tagrianie	10511	abuses a
1 do1		
1 do1	OPC	I Browser
1 do1	OPC	Browser
1 do1 2 3		Ctrl+X
1 do1 2 3 4		Ctrl+X y Ctrl+C

Step 8: When the OPC Browser window is presented, users can select an item (tag) in the tree-view, as shown in the following figure. When users select the item (linking tag) OK, please click the "OK" button to add and link this tag to item field. When users finish the procedure for define the tag name and linkage OPC server tag item, the results will be like the following figure.
escript	ion: Server	Identifier:	Disable:		
P.	NAPC	PC.Svr	•		
ead Up	odate Rate (ms): Percei	nt Deadband:	Status:	_	
emote	Server Name: Browse	<u></u>			
	Tag Name	OPC Brow	vser: 'NAPOPC.Svr' [LOCAL]		×
1	do1	OPC IS	t of Items		OK 1
2		6.6	7012D_2		
3		÷.	🦳 Als		Cancel
×		E 1337	18 5786		22.22.22.22.2
4			🛅 Dis		<u></u>
4 5			Dis S DOs		
4 5 6			Dis Dos V Choo Choo		
4 5 6 7			DIS DDS V Ch00 V Ch01 Counter		
4 5 6 7 8			☐ Dis ☐ Dos ↓ Ch00 ↓ Ch01 ☐ Counter ↓ Di		lter:
4 5 6 7 8			☐ DIs ☐ DOs ↓ Ch00 ↓ Ch01 ☐ Counter ↓ DI ↓ DO	Fi	lter:
4 5 6 7 8			☐ DIs ☐ DOs ↓ Ch00 ↓ Ch01 ☐ Counter ↓ DI ↓ DO 7021_3	Fi	lter: ⊡ <u>B</u> ead ⊡ <u>W</u> rite
4 5 6 7 8			DIs DDs V Ch00 V Ch01 Counter V DI V DO 7021_3 7060D_4	- Fi	lter: □ <u>B</u> ead □ <u>W</u> rite ● <u>B</u> oth

ICP		NAPOPC.Svr 🗾	1
Read Update Rate (ms):		Percent Deadband:	Status:
Remote	Server Name;	Browse	
	Tag Name	Item	
1	do1	7012D_2.DOs.Ch00	Always
2			
3			
4			
5			
6			
7			
8			

Step 9: Repeat the steps from step 6 to 8 for adding more tags to the SCADA system.

Step 10: Please switch to the graphic window by selecting Graphics tab from the left corner.



When switching to the graphic window, users can add arbitrary graphic item of man-machine interface from the Object editing toolbar.



In the following, we will show how to link the IO value and graphic interface. First, create 2 texts object from right toolbar. And type "do1" and "###" individually.



Step 11: Please select the text "###" and then click the Text Input/Output property icon on the Object Editing toolbar. *Text I/O* appears in the drop-down menu of the Object Properties window. In the Tag/Expression field type the tag name you want to be linked. Or users can click . which is in the right side of Tag/Expression field, to open the tag database of Studio. And then user can choose a tag to link to.



🖬 Display2	_	
		:: 🔺
Object Properties		<u>×</u>
Replace Hint:	Text I/O	-
] Tag/Expression: do1		
Minimum Value:	Input Enabled Fmt: Deci	mal 💌
Maximum Value: Di	Password Confirm Secu sable:	urity:

Step 12: After finishing the graphic interface setting of this Project, users need to setup the "OPC client Runtime" in the automatic mode from "Execution Tasks" tab of project status window. This property will allow InduSoft Web Studio to automatically start up OPC client function and link the OPC server.

Task	Status	Startup	
🚪 Background Task		Automatic	<u>S</u> tart
👷 Database Spy		Manual	
🙀 DDE Client Runtime		Manual	Stop
- DDE Server		Manual	
Driver Runtime		Manual	
🛛 LogWin		Manual	Startun
ODBC Runtime		Manual	
OPC Client Runtime		Automatic	
🕅 TCP/IP Client Runtime		Manual	
🕅 TCP/IP Server		Manual	
Viewer		Automatic	

Step 13: Run the application program and InduSoft OPC Client Runtime will be automatically started up. After running this program, a small icon will appear in your system tray. To close the InduSoft OPC Client module, Users can right-click this icon in the system tray, and select "Exit".



Step 14: Database Spy allows users to monitor and forces application tags, reading and writing to the database. Users can find it in Tools menu.

🔲 Application Name - File Security Window Tools	<u>- 0 ×</u>
Image:	
Display2	NUM //.

Section 3: NAPDDE Server for InduSoft Web Studio

In this section we will show the method for how NAPDDE of ICPDAS DDE server cooperate with InduSoft Web Studio. The NAPDDE server supports I-7000, I-87K and I-8XX0, and I-8XX1 series products of ICPDAS. Here, we will show the co-work skill of InduSoft and ICPDAS by steps in DDE server projects.



3-1 NA7000D DDE Server

Before using the InduSoft DDE Client module, you need to install and configure the NAP7000D DDE server from ICPDAS product CD-Rom in the machines you will run it. After executing the DDE server, the configuration interface of DDE will be popped up as below figure. And the users need to employ the searching mode to connect to all of the remote controller modules (I-7000, 87K, I-8000) in the RS-485 or Ethernet network. Users can follow the below steps to setup the property of DDE server Tags. For the application of Ethernet network, users need to install the software of VxComm, which can be download from website <u>http://www.icpdas.com</u> or ICPDAS product CD-ROM. The more detail information for how to VxComm, please refer to section1 or ICPDAS VxComm software manual. After that, we can use InduSoft DDE client module to connect to the server. The following will demonstrate the procedure for how to set DDE server and the results will be user in later project of InduSoft Web Studio.

File COM Port Search Run DDE Display Help	<u>_</u> _×
Establish Conversation	<u>× </u>
DDE Server Conversations	
🗖 Conv 0 🗖 Conv 8 🗖 Conv 16 🗖 Conv 24	
🗖 Conv 1 🔲 Conv 9 🔲 Conv 17 🔲 Conv 25	
Conv 2 Conv 10 Conv 18 Conv 26	
Conv 3 🗖 Conv 11 🗖 Conv 19 🗖 Conv 27	
Conv 4 🔲 Conv 12 🗌 Conv 20 🔲 Conv 28	
Conv 5 Conv 13 Conv 21 Conv 29	
Conv 6 Conv 14 Conv 22 Conv 30	
Conv 7 🗖 Conv 15 🗖 Conv23 🗖 Conv 31	
50 mSec Timer Interval: 1000 mSec 10 Sec	sit

Step1: Run NAP7000DDE Server, as shown in below figure.



Step2: Please click drop-down Menu of COM Port and a communication configuration window will be presented. Please define and select the correct communication parameter based on the series communicating protocol setting of remote control modules. After setting the COM port parameter, please press "OK" bottom.

COM COM1	he COM o searc	Port and h:	Baud Rate	X
Baud F	Bate to 600 00	search: 460800 38400 2400	□ 230400 □ 19200 □ 1200 □ 1200	☐ 115200 ☑ 9600
			-	
- To Sea	arch Ch ⓒ No	ecksum	Enabled M O Yes	odule ? —

Step3: Please click "**searching** mode" of the drop-down menu to start searching the modules on the network. If the modules were found from the RS-485 or Ethernet network, the searching results will be shown in sub-window. If all of the modules in the network was found, please press "**stop**" bottom to stop the searching mode.

	For I-7000/	8000 Mo	dule			×
Module Type:	Address: Dec[Hex]	Baud Rate	Alarm	Checksur	Remark	
7012D 7021 7060D 7080 7033D 7018 7017 8800 8053	1[1] 2[2] 3[3] 4[4] 5[5] 6[6] 7[7] 10[Å] S0	9600 9600 9600 9600 9600 9600 9600 9600	Disable	Disable Disable Disable Disable Disable Disable Disable Disable	+/- 10V 0 to 10V 4*DI+4*D0 Frequency Mode PT/.00385 +/-: T/C K-type +/- 10V 8800 Module 16 Isolation I	∋ 100 (DI
-Search COM Pr	ing Status: - ort: COM 1	Ba	ud Rate: 961	00 Address	s: 48[dec] 30[hex]	

Step4: Choose "conv0" and a setting window will be popped up as following.

DDE Server Conversations Conv 0 Conv 8 Conv 16 Conv 24 Conv 1 Conv 9 Conv 17 Conv 25	
Conv D Conv 8 Conv 16 Conv 24	
Conv 1 Conv 9 Conv 17 Conv 25	
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	
Conv 3 Conv 11 Conv 19 Conv 27	
Conv 4 Conv 12 Conv 20 Conv 28	
🔽 Conv 5 🗖 Conv 13 🗖 Conv 21 🗖 Conv 29	
Conv 6 Conv 14 Conv 22 Conv 30	
50 mSec Timer Interval: 1000 mSec 10 Sec	1
Exit	
Setting 7000 Module Configuration	
Configuration Setting	
Module Type: 7060	
Address[Hex]: 3	
Baud Hate: 9600 V OK	
Baud Hate: 9600 ▼ CheckSum: Disable ▼	
Baud Hate: 9600 ▼ <u>O</u> K CheckSum: Disable ▼ Slot Number: 0 <u>Cancel</u>	
Baud Hate: 9600 V CheckSum: Disable V Slot Number: 0 Cancel	
Baud Hate: 9600 ▼ CheckSum: Disable ▼ Slot Number: 0 Cancel The Found Out Module: Module Address Baud	
Baud Hate: 9600 Image: Constraint of the second secon	
Baud Hate: 9600 ▼ CheckSum: Disable ▼ Slot Number: 0 Cancel The Found Out Module: Module Address Type: Dec[Hex Pec[Hex Rate Rate Remark 7012D 1[1] 9600 +/- 10V 7011 2[2]	
Baud Hate: 9600 Image: CheckSum: Disable Image: CheckSum: Disable Image: CheckSum: Disable Image: CheckSum: Image: Check	
Baud Hate: 9600 Image: CheckSum: OK CheckSum: Disable Image: Cancel Slot Number: 0 Image: Cancel The Found Out Module: Image: Cancel Image: Cancel Module Address Baud Type: Dec[Hex Rate Remark 7012D 1[1] 9600 +/- 10V 7021 2[2] 9600 0 to 10V 7080 4[4] 9600 Frequency Mode 7030 5[5] 9600 Frequency Mode 7030 5[5] 9600 Frequency Mode	▲
Baud Hate: 9600 Image: CheckSum: Disable Image: CheckSum: Disable Image: CheckSum: Disable Image: CheckSum: Image: CheckSum: <thimage: checksum:<="" th=""> Image: CheckS</thimage:>	

Step5: Based on the above setting window, please set "conv0" as 7060D. Besides, users can also double click on I-7060 to open a detail-setting window. Then Press the "Digital Input" button.

Setting Configurat	ion for 70) 🚫 🔇		00			\bigcirc	\bigcirc	•	•		LSB Value:
15 14 13	12 11	10	9 8	3 7	6	5	4	3	2	1	0
- Digital Output:- MSB - To output valu Service: Topci: Item:) 🔊 🔇 Je via DD	E link Cha	annel Sele	C C	() ()	• •	Out via l	tput DDE nk		OE	Use Value:

Step 6: Set the 7060 Output into NAP7000D DDE Server. For how to setup these parameters, please input the parameters of "TO output value via DDE link" as the demonstration of following figure. The service and topic name should be typed as "UNIDDE" and "DB", which are provided by InduSoft Web Studio. And then item name should be the tag name defined in Tags Database of InduSoft Web Studio. After setting the parameters, please press the "Output via DDE link" button. Eventually, the DO data of InduSoft Web Studio can be output to NAP7000 DDE Server.



Step 7: After setting the Conv0, then Conv0 set in Establish Conversation window will be presented as follow figure.

🚮 Establish Conversation	×
DDE Server Conversations	
🔽 Conv 0 🗖 Conv 8 🗖 Conv 16 🦵 Conv 24	
Conv 1 Conv 9 Conv 17 Conv 25	
Conv 2 🔽 Conv 10 🗂 Conv 18 🗖 Conv 26	
Conv 3 🗖 Conv 11 🗂 Conv 19 🔲 Conv 27	
Conv 4 🗖 Conv 12 🗂 Conv 20 🗖 Conv 28	
Conv 5 🔽 Conv 13 🗂 Conv 21 🔲 Conv 29	
🗖 Conv 6 🗖 Conv 14 🗖 Conv 22 🗖 Conv 30	
Conv 7 Conv 15 Conv23 Conv 31	
50 mSec Timer Interval: 1000 mSec 10 Sec	
	E <u>x</u> it

Step 8:Follow the step 4 to Step 6 to add more communication tags variable with DDE server.



3-2 NAP7000D DDE server for InduSoft Web Studio

In the following section, the procedure for how the InduSoft Web Studio connect to the I-7000, I-87K and I-8000 series modules of ICPDAS products by the DDE client and server will be demonstrated.

Step 1: Run the InduSoft (Version 4.4 or newer)



Step 2: Create the new project, which is the same with above section, bundled driver OPC driver. And add the application Tags from the Tags Database of InduSoft Web

Hamilton Applicat	ion Tags						_ 🗆	×
	Name	Array Size	Туре		Description	Webl	Data	
1	do1	0	Boolean	•		Local	•	
2	do2	0	Boolean	•		Local	-	
3	di1	0	Boolean	•		Local	-	
4	ai1	0	Integer	•		Local	-	
5	ao1	0	Real	•		Local	-	
6	di2	0	Boolean	•		Local	-	
7	ao2	0	Real	•		Local	•	
8	di3	0	Boolean	•		Local	•	
9	ao3	0	Real	•		Local	•	
10	ack	0	Boolean	•		Local	-	
11				•			-	
12				•			-	
13				•			-	Ţ
•	1	1					Þ	

Studio. The following figure is only an example.

Step 3: In the Studio **Workspace** window and click the DDE tab. Then, right-click the DDE folder and select "Insert" option, shown as following figure.



Step 4: A DDE Configuration window will be popped up as below figure. Due to InduSoft Web Studio try to read the data from NAPDDE server, therefore the "Application Name", "Topic" and "Item" is defined in NAPDDE server. Users must input the Application Name: "NAP7000D", Topic:"Form5" and Item:"TEXT1" to be the same with NAPDDE server. Besides, Users also need to use the "Connect" and "Enable Read when Idle" as below setting to connect the DDE server and trigger the InduSoft Web Studio to read data from server.



Step 5: For the output data to NAPDDE server from InduSoft Web Studio DDE client, users must define DDE configuration form as the following figure. The parameters of the DDE communication window will be as following setting, Application Name: "UNIDDE", Topic: "DB" and Item: "DO", which are already defined in NAPDDE server, as shown in s step 6 of section 3-1. Generally, this setting method can be used by digital output and analog output. Besides, users also need to use the "Connect" and "Enable Read when Idle" as following setting to connect the DDE server and trigger the InduSoft to write output value to DDE server.



Step 6: After finishing the setting of DDE client driver, users need to setup DDE server and client driver in the Runtime mode, which allow InduSoft Web Studio to start up the driver automatically and communicate data with DDE server. Please go to "Execution Tasks" tab of project status window by clicking Project/Status menu option. From the project Status, user can select the "DDE Server" and "DDE Client Runtime" to be in automatic mode by clicking the "startup..." bottom respectively in "Execution Tasks" tab.

Task	Status	Startup	
🦉 Background Task		Automatic	<u>S</u> tart
📑 Database Spy		Manual	
DDE Client Runtime	Automatic	Stop	
DDE Server		Automatic	
Driver Runtime		Manual	
🔜 LogWin		Manual	Startun
👸 ODBC Runtime		Manual	
OPC Client Runtime		Manual	
💓 TCP/IP Client Runtime		Manual	
TCP/IP Server		Manual	
Viewer		Automatic	

Step 6: Run InduSoft application. The following figure is only a sample of application project. Users can input the connect field as 1 to connect the DDE Server. And then users can change the DO value to DO module and also read the digital input from digital modules.

	Philostion Name -	
	The Second Annow Tools	
DDE (Input connect (Set to 1 to connect)	
1st:	Digital Input value F	
2nd:		
3rd :		
4th:	Output connect (Set to 1 to connect)	
5th:		
6th:	Digital Output value 7	
7th:		
8th:		
9th:		
10th:		
11th:		
12th:		
13th:	dde	1 //
14th:	30th:	
15th:	31th:	
16th:	32th:	
	Quit	

Section 4: ModBus/TCP for InduSoft Web Studio

In this section, we will explore the connection method of the Modbus/TCP protocol developed by ICPDAS with InduSoft Web Studio. In the first, the operation of modus Utility ver1.0.0 will be demonstrated. And then the general Modbus /TCP Driver of InduSoft Web Studio for how to communicate with Modbus/TCP remote control modules will be figured out steps by steps. Following figure is the communication scheme between InduSoft Web Studio and ICPDAS products.



4-1 Modbus Utility

In this section, we will introduce how to use the Modbus utility software of ICPDAS product. If you did not have this development tool, please go to website http://www.icpdas.com to download. And then install this software into the system where your application will be used. After that, please follow the below steps to define the Modbus address of every remote control module.

Step1: Before using the InduSoft Modbus/TCP communication protocol, you can use Modbus Utility to register modules or check which modules have been installed in the control network. After you start up the Modbus utility, the following initial window will be popped up. And then users need to input the Ethernet IP and click "Connect" bottom to connect to the module. After Modbus utility connected to module, the utility will present the online mode and show all of the modules information with Modbus address in the low half window of Modbus utility window. Besides, User can also change the configuration of module of I-80xx by click the figure. Then, the range code of every channel of the module will be shown in below figure.

Modbus Utility Ver 1.0.3 File Help				_ 🗆 ×
Load Save Help			Modbus Firmware Vers	ion
I-8831_NetID: 1 192.168.0.50 Online Mode (Ethernet) I-8053 I-8053	connect	nge Code		
Digital Module Mapping	Analog Mod	ule Mapping	Summary	
Slot Module DI (1xxxx) address 0 I-8053 00 [00] 1 I-8064 - 2 I-8024 - 3 I-8017H -	Points DD (0xxxx) address 16 . 00 (00) . 00 (00) 	Points Al (3xxxx) address - - 8 - - 00 [00]	Points A0 (4xxxx) address	Points

When Modbus Utility have connected to remote control modules, it will automatically figure out how many modules on the network and assign the Modbus address for every channel of every module as shown as the above figures. Actually, the results will be presented in three sub-windows, which are (1) Digital modules mapping, (2) Analog Module Mapping, (3) Summary, as shown in below figures. In the digital Modules Mapping window, setting results will be also separate in Digital input and output modules. Also, in the analog modules mapping window, the setting results will be separate into analog input and output module. From the below figures, Users will find out the Modbus address for every channel of the module with same type will be grouped together and defined orderly in the Modbus address.

Digital I	Module M	lapp	oing 🗌	Analog Moc	lule Mappii	ng	Sur	nmary
Digital Input (1xxxx)				Digital Output (0xxxx)				
Address	Module	Slot	Channel	▲	Address	Module SI	ot Channel	
00 [00]	1-8053	0	0		00 [00]	I-8064 1	0	
01 [01]	1-8053	0	1		01 [01]	I-8064 1	1	
02 [02]	1-8053	0	2		02 [02]	I-8064 1	2	
03 [03]	1-8053	0	3		03 [03]	I-8064 1	3	
04 [04]	1-8053	0	4		04 [04]	I-8064 1	4	
05 [05]	1-8053	0	5		05 [05]	I-8064 1	5	
06 [06]	1-8053	0	6		06 [06]	I-8064 1	6	
07 [07]	1-8053	0	7		07 [07]	I-8064 1	7	
08 [08]	1-8053	0	8	_				

Digita	al Modu	apping	Analog Mo	dı	ule Map	ping			Summary		
Analog I			Analog (Dutput	(4)000	x)					
Address	Module	Slot	Channel	Comment		Address	Module	Slot	Channel	Comment	
00 [00]	I-8017H	3	0	[08] +/- 10.0 V		00 [00]	1-8024	2	0	[33] -10.0 To +10.0 V	
01 [01]	I-8017H	3	1	[08] +/- 10.0 V		01 [01]	1-8024	2	1	[33] -10.0 To +10.0 V	
02 (02)	I-8017H	3	2	[08] +/- 10.0 V		02 (02)	1-8024	2	2	[33] -10.0 To +10.0 V	
03 [03]	I-8017H	3	3	[08] +/- 10.0 V		03 [03]	1-8024	2	3	[33] -10.0 To +10.0 V	
04 [04]	I-8017H	3	4	[08] +/- 10.0 V							
05 [05]	I-8017H	3	5	[08] +/- 10.0 V							
06 [06]	I-8017H	3	6	[08] +/- 10.0 V							
07 [07]	I-8017H	3	7	[08] +/- 10.0 V							
•				•	1	•					Þ

ſ	Ľ	Digital Mo	odule Mapping	Ť	Analog Mod	ule Ma	upping		Summary	
	Slot	Module	DI (1xxxx) address	Points	DO (0xxxx) address	Points	AI (3xxxx) address	Points	AO (4xxxx) address	Points
	0	1-8053	00 [00]	16				-		
	1	1-8064			[00] 00	8				· · ·
	2	1-8024							[00] 00	4
	3	I-8017H		-		-	00 [00]	8		· ·
L	·									

Besides, **Modbus Station** can be called as NetID of I-8000 controllers. If users want to set to different ModBus Station, users can find a dipswitch (at right Conner of controllers) to set the station number. And after changing the station number, user must reboot the I-8000 controller and use ModBus Utility to connect to the modules again. Furthermore, in Summary window of Modbus Utility, summary information and how many ModBus address have been used will be exposed in the sub-window. User can find the first address is 0.

Ľ)igital Mo	odule Mapping	Ŷ	Analog Module Mapping				Summary			
Slot	Module	DI (1xxxx) address	Points	DO (0xxxx) address	Points	AI (3xxxx) address	Points	AO (4xxxx) address	Points		
0	1-8053	00 [00]	16	-	2	and the second s	<u></u>	8 .	20 20		
1	I-8017H	1.000	-		*	00 [00]	8	14 A	-		
2	1-8024						100	00 [00]	4		
3	1-8041			[00] 00	32				25		

Step 2: After setting the ModBus address, user can click file/output to save the current results into a file. And this ModBus information file can be used in the later SCADA project application.

	100 M	odbus Utility Ver 1.0.3			
	File	Help			
		Save Help	Exit		
		192.168.255.1	Conn		
		Communication Mode	Discon		
		Q 10000 14431	3		
Save As					? X
Course in:		la		avis een _	
Save jri.		15			
3					
History	mbtcp				
	👼 ModBus				
Desktop					
<u> (4</u>)					
My Documents					
My Computer	File name:	ModBus		.	Save
	Causes been				Cancel
My Network P	pave as type;	J".ini			Cancer
					1

4-2 InduSoft Web Studio

In the following sub-section, the procedure for how the InduSoft Web Studio connect to the I-8XX1 ModTCP and I-8xx0 ModTCP series modules of ICPDAS products will be demonstrated by steps.

Step 1: Run the InduSoft (Version 4.4 or newer)



Step 2: Create the new project, which is the same with above section, bundled driver OPC driver.



Step 3: In the Studio Workspace window, click the Driver tab and right-click the driver folder, and then click Add/Remove drivers, as following figure.



Step 4: A Driver window will be popped up. Please select MOTCP driver and click the "Select>>" Bottom to add the ModBus /TCP Driver into selected drivers list window, as shown in the below window. And then click "OK" Bottom to finish the adding driver procedure.

Available drivers: UL Description MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol RTU/ASCI (NT-2000-9x-CE/x86/Sh./ MODBU MODBUS Protocol RTU/ASCI (NT-2000-9x-CE/x86/Sh./ MODPL MODBUS Protocol RTU/ASCI (NT-2000-9x-CE/x86/Sh./ MDTCP MODBUS Protocol RTU/ASCI (NT-2000-9x-CE/x86/Sh./ MPL SIEMENS, MPI Protocol - S7 (NT-93) (V1-28) MTRAC SEW - Movitac31(NT-2000-9x) (Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 Selected dri Communication Drivers DLL Description MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, S7 (NT-9x) (V1-2000-9x-CE/x86/Sh MODPL MODBUS Protocol RTU/ASCI (NT-2000-9x-CE/x86/Sh MODPL MODBUS Protocol RTU/ASCI (NT-2000-9x-CE/x86/Sh MDDPL MODBUS PluS Protocol (NT-9x) (V1-2) MTRAC SEW - Movitrac31(NT-2000-9x) (Ef/x86/Sh./ MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPL SIEMENS, MPI Protocol - S7 (NT-9x) (V1-2) MTRAC SEW - Movitrac31(NT-2000-9x) (Beta] NOVUS NOVUS, MODBUS RTU Protocol - S1 (NT-9x) (V1-2) MTRAC SEW - Movitrac31(NT-2000-9x) (Beta] NOVUS NOVUS, MODBUS RTU Protocol - S1 (NT-9x) (V1-2) MTRAC SEW - Movitrac31(NT-2000-9x) (Beta] NOVUS NOVUS, MODBUS RTU Protocol - S1 (NT-9x) (V1-2) METH OMRON, OMPLC Protocol - FINS communication / CS1 (N) Select>> Selected drivers: DLL Description METCP MDDBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-CE) NETHORN, OMPLC Protocol RTU/ASCII via TCP/IP (NT-2000-9x-CE) NETHORN, MDRUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-CE)		Co	ommunicatio	n Drive	ers				×	1			
DLL Description Help MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh Help MITSU MITSUBISHI Protocol, RTU/ASCII (NT-2000-9x-CE/x86/Sh, MODBU MODBL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh, MODPL MODSL Protocol ModBus Slave(ASCII and RTU/) (NT-2000-9x-CE/ MOTCP MODBUS Protocol RTU/ASCII (via TCP/IP (NT-2000-9x-CE/ MITSU SIEMENS, MPI Protocol - S7 (NT-9x) [v1-26] MTRAC SElect> 4.2 Selected dii Communication Drivers Imitsu MITSU MITSUBISHI Protocol, R10/28/ [v1-26] 4.2 DLL Description Imitsu MITSU MITSUBISHI Protocol, N1100 / N1550 / N20 Imitsu Help MUSL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh Help Help MUSL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh Help MUSL MITSU MITSUBISHI Protocol, PX Series (NT-2000-9x-CE/x86/Sh Help MUSU MITSU MITSUBISHI Protocol, RY Series (NT-2000-9x-CE/x86/Sh Help MUSU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh Help MUSU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh Help MODB			Available dri	vers:									
4.1 MITSU BISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSU MITSUBISHI Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODBU MODBL Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODCP MODBLS Protocol RTU/ASCII (NT-2000-9x-CE/x MOTCP MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x MOTCP MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1-26] MTRAC SEW · Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 Selected di Communication Drivers DLL Description MITSA MITSUBISHI Protocol, RTU-2000-9x-CE/x86/Sh MITSU MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MUTSA MITSUBISHI Protocol, RTU-2000-9x-CE/x86/Sh MITSU MUTSA MITSUBISHI Protocol, RTU-2000-9x-CE/x86/Sh MITSU MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/x86/Sh MODPL MOBBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODPL MODBUS Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/x86/Sh MODPL Select >>> MDEU MODBUS Protocol NTU/ASCII (NT-2000-9x-CE/x86/Sh MITAC			DLL	Desc	cription				Help				
4.1 MIT SU MIT SUBJESHI Protocol (NT-3x) [v1.3] MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/X86/Sh3/ MODEL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MDTCP MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/ MDTCP MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 Selected dri Communication Drivers DLL Description MITSU MITSUBISHI Protocol, RTU/ASCII (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, RTU/ASCII (NT-2000-9x-CE/x86/Sh MDDBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MDDBU MODBUS PluS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MDDSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/x86/Sh MDSL Pro			MITSA										
4.1 MODPL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE7 MDTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-CE7 MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - S7 (NT-9x) [v1.26] MTRAC Image: Steeler steel		MITSU MITSUBISHI Protocol, FX Series (NT-2000-9x-CE7x8b/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE7x8b/Sh MODPL MODBUS Protocol (NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE7											
4.1 MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MOT CP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-CE MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 Selected dri Communication Drivers DLL Description MITSA MITSUBISHI Protocol, RX Series (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MDDBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MDDBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MDDL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - FINS communication / CS1 (N Selected drivers: DLL Description DLL Description >> Remove <th>\sim</th> <td></td> <td></td>	\sim												
IMDICE MODBUS Protocol RTU/ASCII via TCP/IP [NT-2000-9x-C MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitacs 31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 Selected dri Communication Drivers DLL Description MITSA MITSUBISHI Protocol, Melsec-A. (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, PX Series (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MDDL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol -S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol -N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol -FINS communication / CS1 (N Selected drivers: DLL DLL Description NOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C METH OMBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C Selected drivers: DLL Descri	(4.1												
MPT SIEMENS, MPI Protocol - S7 (N1-38) (V1.26) MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 Selected dri communication Drivers DLL Description MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODPL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [seta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers: DLL Description DLL Description >> Remove	\sim	/	MOTCP	MOD	BUS Prot	col RTU/ASCII via TCP/II	P (NT-2000-9x-C						
MOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 Select Selected dri Communication Drivers Image: Communication Drivers DLL Description Image: Communication Drivers MITSA MITSUBISHI Protocol, Melsec A. (NT-2000-9x-CE/x86/Sh) MITSU MITSUBISHI Protocol, Melsec A. (NT-2000-9x-CE/x86/Sh) MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh) MODDL MODBUS Protocol NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/) MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - FINS communication / CS1 [N] Selected drivers: DLL DLL Description MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C)				SIEM SEW	4ENS, MF / - Movitra	Pfotocol - 57 (NT-38) [VT., 21(NT-2000-90) [Bata]	26]			42			
Selected dri Communication Drivers DLL Description MITSA MITSUBISHI Protocol, Melsec-A. (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series. (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODPL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODSL Protocol ModBus Slave(ASCI and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW · Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol · N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol · FINS communication / CS1 (N Selected drivers: DLL Description MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C			NOVUS	NOV	US. MOD	US RTU Protocol - N1100) / N1550 / N20		elect >>				
Selected dri Communication Drivers DLL Description MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODPL MODBUS Plus Protocol (NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers: DLL DLL Description MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C)													
DLL Available drivers: DLL Description MITSA MITSUBISHI Protocol, Melsec-A. (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series. (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODPL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers: DLL DLL Description MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C			Selected dri	Comm	Communication Drivers								
DLL Description MITSA MITSUBISHI Protocol, Melsec:A. (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series. (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODPL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers: DLL DLL Description MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C			DLL	Ava	ilable drive	·•·							
DELL Description MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODPL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODPL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers:						o. Na anti-tinu				titete 1			
MITSA MITSUBISHI Protocol, Mesec-A (NT-2000-9x-CE7x86/Sh MITSU MITSUBISHI Protocol, FX Series (NT-2000-9x-CE7x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE7x86/Sh3/ MODPL MODBUS PLUS Protocol (NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE7 MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers: DLL DLL Description MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C						Jescription Alter Die U. Diskassi Mai	A (NIT 2000 0)		╵╹╾╴	Telb			
MITOSO MITOSOUSTITUCCOLSTITU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODPL MODBUS PLUS Protocol (NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers:				MI	TSH	ALLSUBISHI FIOLOCOL, ME ALTSUBISHI Protocol FX	ISEC:A (INT-2000-3X-0 Series (INT-2000-9X-0	JE7X00731 FF7v867Sh					
MODPL MODBUS PLUS Protocol (NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE7 MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers:				MC	DDBU	MODBUS Protocol RTU/A	SCII (NT-2000-9x-CE	/x86/Sh3/					
MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE7 MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers: DLL Description MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C				MC	DDPL	MODBUS PLUS Protocol (NT-9x) [v1.3]						
MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers:				MC	DDSL	Protocol ModBus Slave(AS	CII and RTU) (NT-20)00-9x-CE7					
MTRAL SEW - Movitrac31[N1-2000-9x] [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 [N Selected drivers:				MF	의 5040	SIEMENS, MPI Protocol - 3	57 (NT-9x) [v1.26]						
NOVOS NOVOS, MODBOS HTO Holdcol - NT100 / NT350 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N Selected drivers:				MI	NULIS	SEW - MOVILIACST(NT-200 JOVILE MODELLE DITLE	U-9x) [Beta] votocol - N1100 / N1	550 / N20					
Selected drivers: DLL Description >> Remove MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C >> Remove					METH	MRON, OMPLC Protocol	- FINS communicatio	on / CS1 (N	. . .	Select >>			
Selected drivers: DLL Description >> Remove MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C) >> Remove				1									
DLL Description >> Remove MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C) >> Remove				Sele	ected drive	S:							
MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C				DL	L	Description				>> Remove			
				M	DTCP	40DBUS Protocol RTU/A	SCII via TCP/IP (NT	-2000-9x-C					
							\frown						
4.3 OK Cancel	<u> </u>						(4.3)	OK		Cancel			

Step 5: In the Studio Workspace window, click the MODTCP tab and right-click the MODTCP folder. And then click Insert Tag to insert a new MOTCP driver dialog.



Step 6: When creating a communication table, you have the following window for setting the ModBus TCP communication protocol.

All entries at the Driver Worksheet (exception of the **Station**, **Header** and **Address**) are standard to all communication drivers. Users should refer to Studio Communication Driver documentation about the configuration of the standard fields. Here, We will write down the document description and how to setting those parameters of the Station, Header and Address fields for ICPDAS ModBus communication Products.

Descri	iption:					
Driver	· Tests			🗌 Increa:	se read priority	
Read	Read Trigger: Enable Read whe		en Idle:	Read Completed:	Read Status:	
rdtrg	rdtrg rden			rdom	rdst	
Write [*]	Write Trigger: Enable Write on T		lag Chan	ge: Write Completed:	Write Status:	
wrtrg	wrtrg wren			wrem	wrst	
Station	Station: Header:					
192.1	68.1.55:502:11	4X:0			Min:	_
					Max	
	Tagi	Name		Address	Div	Add
1						
	tag[1]		1			
2	tag[1] tag[2]		1 2			
2	tag[1] tag[2] tag[3]		1 2 3			
2 3 4	tag[1] tag[2] tag[3] tag[4]		1 2 3 4			
2 3 4 5	tag(1) tag(2) tag(3) tag(4) tag(5)		1 2 3 4 5			
2 3 4 5 6	tag[1] tag[2] tag[3] tag[4] tag[5] tag[6]		1 2 3 4 5 6			
2 3 4 5 6 7	tag[1] tag[2] tag[3] tag[4] tag[5] tag[6] tag[7]		1 2 3 4 5 6 7			
2 3 4 5 6 7 8	tag[1] tag[2] tag[3] tag[4] tag[5] tag[6] tag[7] tag[8]		1 2 3 4 5 6 7 8			
2 3 4 5 6 7 8 9	tag[1] tag[2] tag[3] tag[4] tag[5] tag[6] tag[7] tag[8] tag[9]		1 2 3 4 5 6 7 8 9			
2 3 4 5 6 7 8 9 9	tag[1] tag[2] tag[3] tag[4] tag[5] tag[6] tag[7] tag[7] tag[9] tag[10]		1 2 3 4 5 6 7 8 9 10			

Step 7: Setting up the configuration of Station and Header for remote control modules. Please refer to following information.

The station parameter defines the station of Ethernet network that will be read or written from or to the device. It complies with the syntax: <IP address>: <port No>: <Station no>. The station No is referred to the NetID of I-8000 controllers.

Parameter	Default Value	Valid value	Description
Station	-	-	 This field complies with the following syntax: <ip address="">: <port number="">: <station no.=""></station></port></ip> IP Address:I-8000 controller IP Address in the TCP/IP network Port Number: Every Ethernet TCP/IP device has a Port number to communicate with other ones. ICPDAS port number is 502. Station No.: It is NetID of I-8000 controllers from 0~255
Header	0X:0	Refer to next table	Defines the type of variable to be read or written from or to the device and the reference of the initial address.

The **Header** parameter defines the type of variables that will be read or written from or to the device. It complies with the syntax: <type>: <initial address reference>. After editing the field **Header**, the system will check if it is valid or not. If the syntax were incorrect, the default value (0X:0) will be automatically placed in this field. Users can type Tag between

curly brackets into this field, but be sure that the Tag's value is correct, with the correct syntax, or you will get the Invalid Header error. The correct syntax for the field type and Tag value is described as bellow:

Informatio	n regarding the para	ameter "Header"	
Туре	Sample of syntax	Valid of initial Address	Comment
0x	0x:0	Depend on the equipment	Coil status: Read and write events using the
			Modbus instructions 01, 05 and 15
1x	1x:0	Depend on the equipment	Input status: Read events using the Modbus
			instruction 02
3x	3x:0	Depend on the equipment	Input register: Read events using the Modbus
			instruction 04
4x	4x:0	Depend on the equipment	Holding Register: Read and write events
			using the Modbus instructions 03, 06 and 16

Step 8 : The body of the driver worksheet allows you to associate each tag to its respective address in the device. In the column Tag Name, you must type the tag from your application database. This tag will receive or send values from or to an address on the device. The address cells complies to the following syntax: <offset>.<bit>

Station: Header: 192.168.0.50:502:1 1X:0										
	Tag Name	Address	Div	Add						
1	di1	1								
2	di2	2								
3										
4										
5										
6										
7										

Step 9: After finishing the setting of driver, users need to setup ModBus TCP driver in the Runtime mode, which allow InduSoft Web Studio to start up the driver automatically. Please go to "Execution Tasks" tab of project status window. By click Project/Status menu option. The result window is as following figure. Please go to double click the driver runtime mode in automatic mode.

Task	Status	Startup	
Background Task		Automatic	<u>S</u> tart
Database Spy		Manual	
DDE Client Runtime		Manual	Ston
BDE Server		Manual	-146
📰 Driver Runtime		Automatic	,
🖳 LogWin		Manual	
📴 ODBC Runtime		Manual	Start <u>up</u>
GFC OPC Client Runtime		Manual	
W TCP/IP Client Runtime		Automatic	
Server		Automatic	
🖳 Viewer		Automatic	

4-3 Analog input and Analog output value converter formula:

Analog input Converter formula:

- Analog input value = tag value / 32767 * Span
- Span = analog input maximum value 0

```
In this case, the Span is 10.0. Analog input value = 6554 / 32767 * 10.0 = 2.000 (V)
```

	Digita	al Modul	Analog	Nalog Module Mapping				Summary					
	Analog I	nput (3x				Analog Output (4xxxxx)		
	Address	Module	Slot	Channel	Comment		Address	Module	Slot	Channel	Comment		
\subseteq	00 [00]	I-8017H	1	0	[08] +/- 10.0 V		00 [00]	1-8024	2	0	[33] -10.0 To +10.0 V		
	01 [01]	L-8017H	1	1	[09] +/ 10.0 V		01 [01]	1-8024	2	1	[33] -10.0 To +10.0 V		
	02 [02]	I-8017H	1	2	[08] +/- 10.0 V		02 [02]	1-8024	2	2	[30] +0.0 To +20.0 mA		
	03 [03]	I-8017H	1	3	[08] +/- 10.0 V		03 [03]	1-8024	2	3	[30] +0.0 To +20.0 mA		
	04 [04]	I-8017H	1	4	[06] +/- 20.0 mA								
	05 [05]	I-8017H	1	5	[06] +/- 20.0 mA								
	06 [06]	I-8017H	1	6	[06] +/- 20.0 mA								
	07 [07]	I-8017H	1	7	[06] +/- 20.0 mA								
	•					►	•						



Analog Output Converter formula:

- Tag value = analog output value / Span * 32767
- Span = analog out maximum value 0

Analog value for InduSoft Web Studio = 5.0 / 10.0 * 32767 = 16383 (16#3FFF)

Digital Module Mapping Analog Mod						dı	ule Mapping S				Summary			
	Analog I	Input (3:	xxxx)					Analog	Output	(4)000	4xxxxx)			
	Address	Module	Slot	Channel	Com	ment		Address	Module	Slot	Channel	Comment		
	00 [00]	I-8017H	1	0	[08]	+/-10.0 V		00 [00]	1-8024	2	0	[33] -10.0 To +10.0 V		
	01 (01)	I-8017H	1	1	[08]	+/-10.0 V		01 [01]	1-8024	2	1	[33] -10.0 To +10.0 V		
	02 [02]	I-8017H	1	2	[08]	+/-10.0 V		02 [02]	1-8024	2	2	[30] +0.0 To +20.0 mA		
	03 [03]	I-8017H	1	3	[08]	+/- 10.0 V		03 [03]	1-8024	2	3	[30] +0.0 To +20.0 mA		
	04 [04]	I-8017H	1	4	[06]	+/- 20.0 mA								
	05 [05]	I-8017H	1	5	[06]	+/- 20.0 mA								
	06 [06]	I-8017H	1	6	[06]	+/- 20.0 mA								
	07 [07]	I-8017H	1	7	[06]	+/- 20.0 mA								
	•					•		•				•		



Section 5: ISaGRAF (I-8xx7, I-7188XG, I-7188EG) for InduSoft Web Studio

ICPDAS products supporting ISaGRAF (Soft PLC) solution are I-8xx7, I-7188XG, I-7188EG. In this section, we will demonstrate this solution how to cooperate with InduSoft Web Studio. Firstly, we will describe the ModBus Address setting in the ISaGRAF software. And then in the second part, the method for how InduSoft Web Studio communicating with ISaGRAF Soft PLC will be presented. However, we only show the communicating scheme between this software. If users need to know more information, please also go to see the technical reference manual of the software. The communication protocols supported by ISaGRAF and InduSoft Web studio are Modbus RTU and Modbus TCP, which will be described in the following sub-section.





5-1 The definition of ISaGRAF Soft PLC

In the following section, the procedure for how the definition of ModRTU address of ISaGRAF Soft PLC for the I-8X17 and I-7188XG, and the definition of Modbus TCP address Page 64 of ISaGRAF Soft PLC for I-8x37 and I-7188EG will be demonstrated by steps, respectively.

Step 1:To start a new ISaGRAF project, click on the "Create New Project" icon and then enter the name of the new project. You can then enter additional information for your project by clicking on the "Edit" and then "Set Comment Text" menu as illustrated below.

	🞇 ISaGRAF - Project Management
\frown	File Edit Project Tools Options Help
(1.1	🕒 💷 📴 🛅 🏛 🔐 🚝 🕆 🖡 😤 DemoPgm 🛛 💡
	demo 1 Liner control: TP, TON, TOF (QLD) demo Create new project and reset timer: TSTART, TSTOP (ST + QLD) demo 03 RWV system date & time: SYSDAT_R, SYSDAT_W, SYSTIM_R, SYSTIM demo 04 calculate empty cycle time: TP, +, 1 (QLD) demo 05 create new project X demo 1.2 demo 07 Name: SimpleLD OK V
	Author : ICP L to configuration. Cancel
	Version Numbe
	🞇 ISaGRAF - Project Management
	Eile Edit Project Tools Options Help
(1.3	Set comment text 🚬 🚘 🚹 🤑 🚝 🎦 DemoPgm 🛛 💡
	Toggle separator K control: TP, TON, TOF (QLD)
	Sort
	Move up in list stop and reset timer: TSTART, TSTOP (ST + QLD)
	Move down in list vstem date & time: SYSDAT_R, SYSDAT_W, SYSTIM_R, SYSTIM
	III 0emo_U4 Comment text
	m demo_U5 1.4
	Project: simpleId
	Author Comment: A Simple LD Program
	Date of creation : 12
	Version number : 1
	Description :

You will now see the name of the new project in the "Project Management" window. Double click on the name of the new project to open the project.



Step 2:Before you start to develop an ISaGRAF program; you must first declare the variables that will be used in the ISaGRAF program. To begin this process, firstly click on the "Dictionary" icon and then click on the "Boolean" tab to declare the Boolean variables that will be used in our example program.

• ISaGRAF - SIMPLELD - Programs	
2.1 File Make Project Tools Debug Options Help	
🚬 🕺 🕺 🗰 🖓 🛄 🗋 🗍 🕅 🖓 🙀 🗐	
Dictionary	
ISaGRAF - SIMPLELD - Global booleans	
2.2 File Edit Tools Options Help	
🗡 📄 🙆 🖉 🖉 🖆 🕹 🗮	5
Booleans Integers/Reals Timers Messages FB instances Defined	words
Name Attrib. Addr. Comment	
	-

To declare the program variables of the ISaGRAF project, double click on the colored area below the "Boolean" tab, and a "Boolean Variable" window will be opened. Enter the name of the variable to be used in the project. For the purpose of this example program the variable "Boolean Variable Name" is "DI", the variable "Network Address " is "0001", and "From InduSoft Web Studio control value" is added to the "Comment Section". The next item that must be declared is what type of "Attribute" the variable will possess. In this

example program, DI's attribute will be an "Internal". Then press the "Store" button to save the Boolean variable that has been created.

SIGRAF - SIMPLELD - Global booleans	
	a 🖄 🖷 🛛
Booleans Integers/Reals Timers Messages FB instance Name Attrib. Addr. Commer	es Defined words nt
Boolean Variable	×
Name: DI Netv	vork Address: 0001
Comment: From Indusoft Web Studio control value	
Attributes Values	Store
© Input	<u>Cancel</u>
O Dutput	Next
	Previous
	E <u>x</u> tended

Note: You MUST make sure that the variable declared has the desired Attribute assigned. If you decide that you want to change a project variable's attribute, just double click on the variable name and you can reassign the attribute for the variable.

Step 3:Using the same method described above, declare the additional Boolean variables for this example program, "DO1". When you have completed the Boolean variable assignments, the Global Boolean window should look like the example below.

🂊 ISaGRAF - SIMI	PLELD - Global boo	leans							
<u>File E</u> dit <u>T</u> ools	Options <u>H</u> elp								
	200	6 🖷	🛏 🖬 🤞 📉 📇						
Booleans Integers	s/Reals Timers Me	ssages Ft	3 instances Defined words						
Name	Attrib.	Addr.	Comment						
DI	[internal]	0001	From Indusoft Web Studio control value						
D01	[output]	0002	ISaGRAF Program control Digital Output						
				~					
DO1 (* ISaGRAF P	rogram control Digit	al Output *)							
@0002 [output] (false,true)								

Step 4: Referring to Step2, user can declare the additional Integer variables for this example program, "AI" and "AO". When you have completed the Integer/Real variable assignments, the Global Integer/Real window should look like the example below.

🂊 ISaGRAF - SIMPLELD -	- Global intege	rs/reals						
<u>File Edit T</u> ools Option	ns <u>H</u> elp							
<u></u>	i 🔾 🖸 🥝) 🖷 🕯	< 🗈 💰 📉 🚝					
Booleans Integers/Reals	Timers Mes	sages FB	instances Defined words					
Name At	trib.	Addr.	Comment					
Al [in	iput,integer]	0003	Analog Input from ISaGRAF Address to Indusoft 🛛 🛛 🖂					
AO [ou	utput,integer]	0004	From Indusoft change Analog Output					
1								
			-					
·								
		anut X)						
@0004 [output,integer]	ige Analog Ou	.put ")						

Step 5:Once all of the variables have been properly declared, you are now ready to create the example LD program. To start this process, click on the "Create New Program" icon and the "New Program" window will appear.

Enter the "Name" as "LD1" (the name of our example program). Next, click on the "Language" scroll button and select "SFC: Sequential Function Chart", and make sure the "Style" is set to "Sequential: Main Program". You can add any desired text to the "Comment" section for the LD program, but it is only for reference and not for program.

9.1	File	<u>M</u> ake	<u>P</u> roject	<u>T</u> ools	De <u>b</u> uş	g <u>O</u> ptio	ns <u>H</u>	<u>l</u> elp				
			8 🔟 🗍		1 🛍	苓 🏅	 ¢		₿	× (📱 🏂	
		Create new program										
		52	New Pr	ogram							×	
		0.2	Name		LD1							
			Comn	nent:								
			— Langi	uage:	SFC: S	Sequenti	al Fun	ction	Chart			
			Style:		Seque	ntial : Ma	in pro	gram				
					<u>0</u> K			<u>C</u> ar	ncel			

When the "LD1" program has now been created, users can double click on the "LD1" name to open the "LD1" program.



Step 6:When you double click on the "LD1" name, the "SFC Program" window will be appeared. Then, users can follow the SFC programming skill of ISaGRAF to develop a SFC program, which users can refer to the manual of ISaGRAF solution of ICPDAS products. However, the following description is only a demo program for this example, which will be presented in the ISaGRAF workbench when users install the demo programs of development tool kit for ISaGRAF from ICPDAS product CD-ROM.



Step 7:The ISaGRAF Workbench software program is an open programming system. This allows the user to create an ISaGRAF program that can operate a large number of different PLC controller systems. It is the responsibility of the PLC hardware manufacturer to embed the ISaGRAF "driver" in their respective controller for the ISaGRAF program to operate properly. The ICP DAS provides ISaGRAF embedded driver for main unit I-8xx7, I-7188EG and 7188XG and corresponding interface card for user to creating a powerful and flexible industrial controller system.

When you have created the ISaGRAF example program, now you must connect the I/O to the I-8xx7 I/O controller system. A useful feature of the I-8xx7 controller system is to use the SMMI interface when user only get the I-8xx7 controller system without having any I/O boards plugged into the system. The four pushbuttons on the I-8xx7 controller system can be used as four digital inputs, and the three left LED's above the control panel pushbuttons can be used as outputs.

In the following procedure, we will show the method how to add a hardware linkage into the system. The first, click on the "I/O Connection" icon as shown in the top picture

and the "I/O Connection" window will appear as shown in the next illustration. For the purpose of this example, you can either double click on the "0" slot, or just click on the "0" slot, then click on "Edit" and then "Set Board/Equipment" and then the "I/O Connection" window will appear. Corresponding to hardware plugged into the system users can select the correct board from the list window and then click OK to add the connecting interface into the controller.

7.1 ISaGRAF - SIMPLELD - Programs
<u>File Make Project Tools Debug Options Help</u>
🕒 🖬 😔 🕮 🕒 🛅 👘 🐥 💥 🔄 🖓 🛠 🛄 😤
Sequential: 📻 LD1 I/O connection
File Built Tools Options Help
1
2
3
4 7.3 Select board/equipment
i 8040: 32 CH. Isolated DI
7 i_8051: 16 CH. DI i_8051: 9 CH. bitward Differential DI
8 13052: 3 CH. Isolated Differential Dif
9 [_8056: 16 CH. Open Collector DO i 8057: 16 CH. Isolat Open Collector DO
10 i 8058: 8 CH. Isolated DI, AC/DC ~240V
Library
i_8066: 8 CH. SSR-AC DO
i_8068:8 CH. Relay DO i 8069:8 CH. Photo Mos Relay DO
i_8090: 3-axis encorder: long int form
Note: I/O Slots 0 through 7 are reserved for REAL I/O boards that will be used in the I-8xx

Repeat the step 7.1 to Step 7.3 to add interface setting into the system to confirm the

hardware setting. The result is shown in below.

interface.



Here, we will demo the procedure for how analog output variable connect to the hardware interface. The first, click on I_8024 and then double clink on the "channel 1" to open an I/O connecting window. From the connecting window, we can connect the AO variable to the connection and click "close" bottom confirm the setting. And the connecting result will be shown as below.

	📷 ISaGRAF - SIMPLELD - I/O connection	
	<u>File Edit T</u> ools Options <u>H</u> elp	
	🖴 📼 🗟 🎾 💼 🗘 🤑 🕒 👫 🖀	
	0 m i_8053 л ф 🔺 💷 ref = 8024	
	1 № i_8057 л + СН1_rang = 33	
\frown	2 m i_8017h ~ ← mm CH2_r ^a Connect I/O channel #1	×
7.5	3 m i_8024	Class
	5 7.6 1 2 Free: AD	
		Connect 7.7
		Free
	10 File Edit Tools Options Help	
	$\begin{array}{c} 11 \\ 11 \\ 11 \\ 11 \\ 11 \\ 11 \\ 11 \\ 11$	Next
		Previous
	3 1_0024 ~~ (mm CH4_rapg = 33	
	7 (7.8)	
	8 4 2	
	9	
	10	
	11	
Follow the same procedure; users can connect all of the I/O variables of digital and analog to the corresponding to hardware module and channel. Finally, users need to click on the "SAVE" icon to save the I/O connections that have been created for the example program. And then click on the "X" to exit the window.

Step 8:Before beginning the compilation process, users need to check on the "MAKE" option from the main menu bar, and then click on "Compiler Options" as shown below.

-6119	aGRAF - SIMPLELD - Program	ns 📃 🗆 🗙
File	Make Project Tools Debug	Options Help
Begir	Make application Verify Touch	☆ 1☆ 💷 ጰ 🛠 🖳 🖏 D Program
	Application run time Options Compiler options	
Begir	Resources	

Next, the "Compiler Options" window will be presented. Make sure to select the options as shown below. And then press the "OK" button to complete the compiler option selections.

Compiler options	x
Targets:	
> SIMULATE: Workbench Simulator	Select N
ISA68M: TIC code for Motorola	
> ISA86M: TIC code for Intel	Unselect
CC86M: C source code (V3.04)	
✓ Use embedded SFC engine → MAKE SURE	Upload
Optimizer: THESE BOXES ARE	
CHECKED!	
M Run two optimizer passes	
Evaluate constant expression-	Default
Suppress unused labels	
Coptimize variable copying	
Coptimize expressions	
Suppress unused code	
C Optimize arithmetic operations	ОК
Coptimize boolean operations	
Build binary decision diagrams (BDDs)	Cancel

After you have selected the proper compiler options. Click on the "Make Application Code" icon to compile the example LD project. If there are no compiler errors detected during the compilation process, CONGRATULATIONS, you have successfully created our example LD program.

Step 9:The last step requires executing the example LD program on the I-8xx7 controller system. That is, the compiled project needs to be downloaded to the I-8xx7 controller system (frequently referred to as the "Target" platform"). Before starting the download process, users must establish communications between PC development platform and the I-8xx7 controller system. The I-8xx7 have two different products, and each communication parameter setting are showed as following:

(a) The I-8X17 and I-7188XG parameter setting for using Modbus RTU protocol:

To begin this process, click on the "Link Setup" icon in the "ISaGRAF Programs" window. When you click on the "Link Setup" icon, the following window will be shown.

92	IS&GRAF - SIMPLELD - Programs	
<u>Ju</u> .	rie <u>M</u> ake <u>P</u> roject <u>T</u> ools De <u>b</u> ug <u>Options</u> <u>H</u> elp	
	- ■ 🖓 🗓 🕒 🖻 🗰 💥 🚧 📟 🎘 🛠 🛄 🐉	24
	Sequential: 😰 🛄	ink setup
	Sequential: LD1 (Sequential Function Chart)	
	Da.2 Target Slave Number: Communication port: Control Time out (seconds): Retries: Control Time out (seconds): Control Time out (seconds): Control	a.3
	9a.4 Parity: Format: Flow controt: Parity:	

The "Target Slave Number" is the Node-ID address for the I-8xx7 controller system as defined by the dipswitch settings, which is outlined in I-8000 User's Manual Chapter 1, Section 1.3.1. The Node-ID dipswitch is located in the bottom right corner portion of the I-8xx7 controller. If your I-8X17 controller is the first one, the Node-ID address should be set to "1". The "Communication Port" is the serial port connecting on your PC development platform, and this is normally either COM1 or COM2. The communication parameters of the target I-8X17 controller MUST be set to the same serial communication parameters for the PC development platform. For I-8417 and I-8817 controllers (serial Page 74

port communications), the default parameters for COM1 (RS232) and COM2 (RS485) ports are as following:

Baud rate	19200
Parity	None
Format	8 bits, 1 stop
Flow control	None

(b)The I-8X37 and I-7188EG parameter setting for using Modbus TCP protocol:

To begin this process, click on the "Link Setup" icon in the "ISaGRAF Programs" window. When you click on the "Link Setup" icon, the following window will be shown.

	ISaGRAF - SIMPLELD - Programs							
9b.1	e <u>M</u> ake <u>P</u> roject <u>T</u> ools De <u>b</u> ug <u>O</u> ptions <u>H</u> elp							
	🕒 🖬 😔 🏨 🗅 🖻 🍈 🐥 👗 🐖 🙀 🛠 😐	\$						
	Sequential: 📻 LD1	Link setup						
	Sequential: LD1 (Sequential Function Chart)							

The "Target Slave Number" is the Node-ID address for the I-8X37 controller system as defined by the dipswitch settings, which is outlined in I-8000 User's Manual Chapter 1, Section 1.3.1. The Node-ID dipswitch is located in the bottom right corner portion of the I-8xx7 controller. If your I-8X37 controller is the first one, the Node-ID address should be set to "1". And set the "Communication Port" as "ETHERENET".

9b.2	Target Slave Number:	1	ОК	
	Communication port: Control Time out (seconds): Retries:	ETHERNET	Cancel Setup	9b.3

Set the "Port Number" to "502" and Internet address (IP) of the I-8x37 controller in "Internet address".

HERNET link paramet	ers	×
Internet address:	192.168.1.1	ок 9b.4
Port number:	502	Cancel
The Workbench u library for TCP-IP o that this file is co ha	ses the WINSOCK.DLL communications. Ensure rrectly installed on the rd disk.	

Before you can download the project to the I-8xx7 controller system, you must first verify that your development PC and the I-8xx7 controller system are communicating with each other. To verify proper communication, click on the "Debug" icon in the "ISaGRAF Programs" window as shown below.

(9	5	aGRAI	F - SIMPL	ELD - Pi	rograms							
	<u>±</u> me	<u>M</u> ake	<u>P</u> roject	<u>T</u> ools	De <u>b</u> ug	<u>O</u> ptic	ons <u>H</u>	<u>I</u> elp				
			🕹 🔟 🚽	D 🗈) 🏛 🕺	5 X	¢		<mark>∛</mark> 4	3 😐	\$	
	Sequ	ential:	Ē	🖻 LD1							1	
										Debug		
	Sequ	ential:	LD1 (S	equential	I Function	Chart)					

From the "ISaGRAF Debugger" window, click on the "Download" icon, select on "ISA86M and then click on the "download" bottom to download from PC platform to target machine.

96	StagRAF - SIMPLELD - Debugger	
	No antication	
Down	load	×
9.7 ISA	86M: TIC code for Intel	
9.7	Download Cance	:

The example project will now be downloaded to the I-8xx7 controller system. A

progress bar will be appeared in the "ISaGRAF Debugger" window showing the project downloading progress.



When the example project has successfully completed the downloading process to the I-8xx7 controller system, the following two windows will be appeared. It means that the SoftPLC program of the example project has correctly run in the target machine.



5-2 The InduSoft Web Studio communicating with ISaGRAF Soft PLC

ICPDAS ISaGRAF Soft PLC solution provides two communication protocols, Modbus RTU and Modbus TCP. In the following section, we will demonstrate these two communication protocols for how to co-work with InduSoft Web Studio.

5-2-1 Use I-8X17 and I-7188XG Modbus RTU series modules of ICPDAS products

In the following section, the procedure for how the InduSoft Web Studio connect to the Modbus RTU series modules of ICPDAS ISaGRAF products will be presented by steps.

Step 1: Run the InduSoft (Version 4.4 or newer)



Step 2: Create the new project (Refer to section 1, section 2), as shown below.



Step 3: In the Studio Workspace window, click the Driver tab and right-click the driver folder. And then click Add/Remove drivers, as following figure.

💑 InduSoft Web Studio - Display1						
<u>File</u> dir	t <u>V</u> iew	Insert	Proj	ect	<u>T</u> ools	Wind
🖀 💕	80	1 %	Đ	6	\times	2
		100	101	‡0∏	时]⇔[
Workspace					*	×
🖃 🦂 Pr	oject: M	lodbu	sTcp	AP.	P	
±	OPC	A	dd/Re	mo\	/e driv	ers
	ТСР/ЛР					
·	DDE					

Step 4: A Driver window will be popped up. Please select MODBU driver and click the "Select>>" Bottom to add the ModBus /RTU Driver into selected drivers list window, as shown in the below window. And then click "OK" Bottom to finish the adding driver procedure.

	C	ommunicatio	n Drivers	×
		Available dri	vers:	
		DLL	Description <u>H</u> elp	1
4.1	>	MFC MISTC MITSA MITSU MODBU MODPL MODSL	MFC, Fascitec - Single-loop - MFC (NT-2000-9x) [v1.04] OPTO22, MISTIC Protocol - OPTO22 Controller (NT-2000 MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSUBISHI Protocol, FX Series (NT-2000-9x-CE/x86/Sh MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODBUS PLUS Protocol (NT-9x) [v1.3] Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/	
		MOICP	SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26]	(4.2)
		, Selected dri	Communication Drivers	
		DLL	Available drivers:	
			DLL Description	Help
			LAMIX LAMIX - Display Lamix (NT-2000-9x) [v1.06] LAUER LAUER GMBH, Lauer Standard Protocol - PCS Light (NT-2 MATSU MATSUSHITA - FP1-Cxx (NT-2000-9x) [v1.02] MBLAU MICROBLAU, TD 3000 (NT-2000) [1.23] MFC MFC, Fascitec - Single-loop - MFC (NT-2000-9x) [v1.04] MISTC OPT022, MISTIC Protocol - OPT022 Controller (NT-2000 MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, Series (NT-2000-9x-CE/x86/Sh	
			MODPL MODBUS PLUS Protocol (NT-9x) [v1.3]	Select >>
			Selected drivers:	
			DLL Description	>> Remove
			MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/	
			4.3 OK	Cancel

Step 5: In the Studio Workspace window, click the MODBU tab and right-click the MODBU folder. And then click Insert Tag to insert a new MODBU driver dialog.



Step 6: After creating a communication table, users have the following window for setting the ModBus RTU communication protocol. Note that the communication protocol needs to be set to be the same with target machine of ISaGRAF Soft PLC. The communication parameters for ICPDAS ISaGRAF products is defined as <u>Baud rate:</u> <u>19200, Parity: none, Format: 8 bits, 1 stop, Flow control: none, protocol: RTU.</u> The following figure is the example for setting the communication parameters.

🎬 MODBU: Co	mmunication Parame	eters	×
COM: Baud Rate: Data Bits: Stop Bits:	COM1	OK Cancel Advanced	
Parity:	None 💌	- Advanced	
Station:	lo		
Signed Value: 0		Protocol(ASCII or RTU): RTU	
FP swap (0=By	te/1=Word):	Custom Command (ERO-xxx):	

Besides, all entries at the Driver Worksheet (exception of the **Station**, **Header** and **Address**) are standard to all communication drivers. User should refer to Studio

Communication Driver documentation about the configuration of the standard fields. Here, We will write down the document description and how to setting those parameters of the Station, Header and Address fields for ICPDAS ModBus RTU ISaGRAF Products. Users can export the IO tags information to the text file or Windows clipboard from ISaGRAF. The following table comes from LD program of ISaGRAF.

Name	Address	Attribute	Format	Comment
DI	16# 0001	Internal	Boolean	From InduSoft Web Studio control value
DO1	16# 0002	Output	Boolean	ISaGRAF Program control Digital Output

Name	Address	Attribute	Format	Unit	Conversion	Comment		
AI	16# 0003	Input	Integer		(None)	Analog Input from ISaGRAI		
						Address to InduSoft		
AO	16# 0004	Output	Integer		(None)	From InduSoft change		
						Analog Output		

MODBU001.DRV		
Description:	Increas	se priority
Read Trigger:	Enable Read when Idle: Read Completed:	Read Status:
Write Trigger:	Enable Write on Tag Change: Write Completed:	Write Status:
Station:	Header:	Mins Mins
<u></u>	Tag Name	Ac
1	DI	1
2		
3		
4		
5		_1
۹ •	1	

Step 7 : Set up the configuration of Station and Header of remote control modules. Please refer to following information.

The station parameter defines the station that will be read or written from or to the device. It complies with the syntax: <Station no>. The station No is referred to the NetID of Page 81

I-8000 controllers.

Parameter	Default Value	Valid value	Description
Station	-	-	This field complies with the following syntax: <station no.=""> - Station No.: It is NetID of I-8000 controllers from 0~255</station>
Header	0X:0	Vide next table	Defines the type of variable to be read or written from or to the device and the reference of the initial address.

The **Header** parameter defines the type of variables that will be read or written from or to the device. It complies with the syntax:

<type>:<initial address reference>.

After editing the field **Header**, the system will check if it is valid or not. If the syntax were incorrect, the default value (0X:0) will be automatically placed in this field. Users can type Tag between curly brackets into this field, but be sure that the Tag's value is correct, with the correct syntax, or you will get the Invalid Header error. The correct syntax for the field type and Tag value is described as bellow:

Informa	nformation regarding the parameter "Header"						
Туре	Sample of syntax	Valid of initial Address	Comment				
0x	0x:0	Depend on the equipment	Coil status: Read and write events using the Modbus instructions 01, 05 and 15				
1x	1x:0	Depend on the equipment	Input status: Read events using the Modbus instruction 02				
3x	3x:0	Depend on the equipment	Input register: Read events using the Modbus instruction 04				
4x	4x:0	Depend on the equipment	Holding Register: Read and write events using the Modbus instructions 03, 06 and 16				

Step 8: The body of the driver worksheet allows users to associate each tag to its corresponding address in the device. In the column Tag Name, you must type the tag from your application database. This tag will receive or send values from or to an address on the device. The address cell complies to the following syntax: <offset>.<bit>.

modbu002.drv		
Description:		
Read Trigger:	Enable Read when Idle: Read Completed: Read Status:	
Write Frigger:	Enable Write on Lag Change: Write Completed: Write Status:	
Station:	Header:	
	Max	
	Tag Name	<u> </u>
1	DO 2	
2		
3		-

MODBU003.DRV		
Description:	Increase prior	ity
Read Trigger:	Enable Read when Idle: Read Completed: Read	d Status:
Write Trigger:	Enable Write on Tag Change: Write Completed: Write) Status:
Station:	Header:	fin:
	Tag Name	
1	Al	3
2		
3		_

MODBU004.DRV		
Description:	🗌 Increase priority	
Read Trigger:	Enable Read when Idle: Read Completed: Read Sta	itus:
Write Trigger:	Enable Write on Tag Change: Write Completed: Write Sta	tus:
Station:	Header: 4×:0 Min: Max:	
	Tag Name	
1	AO	4
2		
3		_

Step 9: After finishing the setting of driver, users need to setup ModBus RTU driver in the

Runtime mode, which allow InduSoft Web Studio to start up the driver automatically. Please go to "Execution Tasks" tab of project status window by click Project/Status menu option. The result window is as follow figure. Please go to double click the driver runtime mode in automatic mode.

atus Startup Automatic Manual Manual Automatic Manual Automatic Automatic Automatic Automatic
atus Startup Automatic Sta Manual Manual Automatic Manual Automatic Automatic Automatic Automatic
Automatic gra Manual Manual Automatic Hennal Manual Automatic Automatic Automatic
Manual Manual Automatic Manual Manual Automatic Automatic Automatic
Manual Automatic Manual Manual Manual Automatic Automatic Automatic
Manual Automatic Manual Manual Automatic Automatic Automatic
Automatic Manual Manual Automatic Automatic Automatic
Manual Manual Automatic Automatic Automatic
Manual Manual Automatic Automatic
Automatic Automatic Automatic
Automatic Automatic
Automatic
: 1
• 4 498
: 14742
. 44745
: 14/45
4.500

Note that please refer Section 4-3 to know more information about Analog input and Analog output value converter formula.

5-2-2 Use I-8X37 and I-7188EG Modbus TCP series modules of ICPDAS products

In the following section, the procedure show how the InduSoft Web Studio connect to

the I-8X37 Modbus TCP series modules of ICPDAS products will be demonstrated by steps.



Step 1: Run the InduSoft (Version 4.4 or newer)

Step 2: Create the new project, which is the same with above section, bundled driver OPC driver.



Step 3: In the Studio Workspace window, click the Driver tab and right-click the driver folder, and then click Add/Remove drivers, as following figure.

💑 InduSoft Web Studio - Display1								
<u>File</u> di	t <u>V</u> iew ;	<u>I</u> nsert	Proj	ect	<u>T</u> ools	<u>W</u> inc		
1 🖆 🧭	80	×	Đ	8	\times	\mathbb{D}		
			101	₩O[]	歸]⇔[
Workspace					-	×		
□ 🔥 Project: ModbusTcp.APP								
T	OPC	A	dd/Re	mov	e driv	ers		
-0	TCP/IP			0.00000				
i	DDE							

Step 4: A Driver window will be popped up. Please select MOTCP driver and click the "Select>>" Bottom to add the ModBus /TCP Driver into selected drivers list window, as shown in the below window. And then click "OK" Bottom to finish the adding driver procedure.

0	Communicatio:	n Drivers	×				
	Available driv	vers:					
	DLL	Description Help	1				
4.1	MITSA MITSU MODBU MODPL MODSL MOTCP MPI MTRAC NOVUS	4.2					
	Selected driv	lected drivers: Communication Drivers					
	DLL	De Available drivers:					
		DLL Description	▲ <u>H</u> elp				
		MITSA MITSUBISHI Protocol, Melsec-A (NT-2000-9x-CE/x86/Sh MITSU MITSUBISHI Protocol, FX Series (NT-2000-9x-CE/x86/Sh MODBU MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh.3/ MODPL MODBUS Protocol RTU/ASCII (NT-2000-9x-CE/x86/Sh3/ MODPL MODBUS PLUS Protocol (NT-9x) [v1.3] MODSL Protocol ModBus Slave(ASCII and RTU) (NT-2000-9x-CE/ MPI SIEMENS, MPI Protocol - S7 (NT-9x) [v1.26] MTRAC SEW - Movitrac31(NT-2000-9x) [Beta] NOVUS NOVUS, MODBUS RTU Protocol - N1100 / N1550 / N20 OMETH OMRON, OMPLC Protocol - FINS communication / CS1 (N	Select >>				
		Selected drivers:					
		DLL Description	>> Remove				
		MOTCP MODBUS Protocol RTU/ASCII via TCP/IP (NT-2000-9x-C					
		4.3 OK	Cancel				

Step 5: In the Studio Workspace window, click the MODTCP tab and right-click the MODTCP folder. And then click Insert Tag to insert a new MOTCP driver dialog.



Step 6: When creating a communication table, you have the following window for setting the ModBus TCP communication protocol.

All entries at the Driver Worksheet (exception of the **Station**, **Header** and **Address**) are standard to all communication drivers. Users should refer to Studio Communication Driver documentation about the configuration of the standard fields. Here, We will write down the document description and how to setting those parameters of the Station, Header and Address fields for ICPDAS ModBus communication Products.

Davai						
Descri	μαση. . Τ					
Driver	lests				e read priority	
Read	Trigger:	Enable Read whe	en I dle:	Read Completed:	Read Status:	
rdtrg		rden		rdom	rdst	
Write 1	Trigger:	Enable Write on 1	Fag Chan	ge: Write Completed:	Write Status:	
wrtrg		wren		wrem	wrst	
Station	Station: Header:				ber	
192.1	192.168.1.55:502:11 4×:0				Min:	
					Max	
	Tag I	Tag Name		Address	Div	Add
1	tag[1]		1			
2	tag[2]		2			
3	tag[3]		3			
4	tag[4]		4			
5	tag[5]		5			
6	tag[6]		6			
7	tad(7)		7			
8	tag(8)		8			
8 9	tag[8] tag[9]		8 9			
8 9 10	tag[8] tag[9] tag[10]		8 9 10			

Step 7: Setting up the configuration of Station and Header for remote control modules. Please refer to following information.

The station parameter defines the station of Ethernet network that will be read or written from or to the device. It complies with the syntax: <IP address>: <port No>: <Station no>. The station No is referred to the NetID of I-8000 controllers.

Parameter	Default Value	Valid value	Description
Station	-	-	 This field complies with the following syntax: <ip address="">:<port number="">:<station no.=""></station></port></ip> IP Address:I-8000 controller IP Address in the TCP/IP network Port Number: Every Ethernet TCP/IP device has a Port number to communicate with other ones. ICPDAS port number is 502. Station No.: It is NetID of I-8000 controllers from 0~255
Header	0X:0	Vide next table	Defines the type of variable to be read or written from or to the device and the reference of the initial address.

The **Header** parameter defines the type of variables that will be read or written from or to the device. It complies with the syntax: <type>: <initial address reference>. After editing the field **Header**, the system will check if it is valid or not. If the syntax were incorrect, the default value (0X:0) will be automatically placed in this field. Users can type Tag between

curly brackets into this field, but be sure that the Tag's value is correct, with the correct syntax, or you will get the Invalid Header error. The correct syntax for the field type and Tag value is described as bellow:

Information regarding the parameter "Header"					
Туре	Sample of syntax	Valid of initial Address	Comment		
0x	0x:0	Depend on the equipment	Coil status: Read and write events using the Modbus instructions 01, 05 and 15		
1x	1x:0	Depend on the equipment	Input status: Read events using the Modbus instruction 02		
3x	3x:0	Depend on the equipment	Input register: Read events using the Modbus instruction 04		
4x	4x:0	Depend on the equipment	Holding Register: Read and write events using the Modbus instructions 03, 06 and 16		

Step 8: The body of the driver worksheet allows you to associate each tag to its respective address in the device. In the column Tag Name, you must type the tag from your application database. This tag will receive or send values from or to an address on the device. The address cells complies to the following syntax: <offset>.<bit>

🛗 MOTCP001.DRV			
Description:	Increa	ase priority	
Read Trigger:	Enable Read when Idle: Read Completed:	Read Status:	_
Write Trigger:	Enable Write on Tag Change: Write Completed:	Write Status:	_
Station: 192.168.0.200:502:1	Header:	Min: Min: Max:	_
	Tag Name		<u> </u>
1	DI		1
2			
3			•

🎬 MOTCP002.DRV			
Description:		ease priority	
Read Trigger:	Enable Read when Idle: Read Completed:	Read Status:	
Write Trigger:	Enable Write on Tag Change: Write Completed:	Write Status:	
Station: 192.168.0.200:502:1	Header: 1X:0	Min:	
	Tag Name		
1	DO		2
2			
3			•

MOTCP003.DRV			
Description:	Increa	se priority	
Read Trigger:	Enable Read when Idle: Read Completed:	Read Status:	
Write Trigger:	Enable Write on Tag Change: Write Completed:	Write Status:	
Station: 192.168.0.200:502:1	Header: 3x:0	Min: Max	
	Tag Name		
1	Al		3
2			
3			_

motcp004.DRV			<u>_</u> _×
Description:	Increa	se priority	
Read Trigger:	Enable Read when Idle: Read Completed:	Read Status:	_
Write Trigger:	Enable Write on Tag Change: Write Completed:	Write Status:	
Station: 192.168.0.200:502:1	Header: 4%:0	Min:	_
	Tag Name		
1	AO		4
2			
3			•

Step 9: After finishing the setting of driver, users need to setup ModBus TCP driver in the Runtime mode, which allow InduSoft Web Studio to start up the driver automatically.
Please go to "Execution Tasks" tab of project status window. By click Project/Status menu option. The result window is as following figure. Please go to double click the driver runtime mode in automatic mode.

Task	Status	Startup	
Background Lask		Automatic	<u>S</u> tart
a DDE Client Puntime		Manual Masual	
		Manual	Stop
Driver Buntime		Automatic	
🔜 LogWin		Manual	
😰 ODBC Runtime		Manual	Start <u>up</u>
CPC Client Runtime		Manual	
🛞 TCP/IP Client Runtime		Automatic	
😥 TCP/IP Server		Automatic	
🛄 Viewer		Automatic	

Step 10: When users execute the application project, the result window will be shown as following figure.

DI: 0	
DO: 0	
Analog input Converter : 2.002	
connect Al value: 6559	
connect AO value : 6553	
Input AO: 2.000	

Appendix A

Setting DCON Driver into InduSoft

- Step 1: Insert the ICP DAS bundled driver (DCON) setup disk into floppy or CD-ORM disk drive.
- Step 2: Then click "Start bottom" in the task bar, and click Run.
- Step 3: Enter "A:\Setup" (the path dependence on where the Setup.exe located) as Fig 1-1 shown.

Run	? ×
	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.
<u>O</u> pen:	A:\Setup.exe
	OK Cancel <u>B</u> rowse

Fig 1-1. Enter the setup.exe path

Step 4: Click OK to start the install process.

Step 5: A "Welcome" window pops up to prompt user as Fig 1-2 shown.



Fig 1-2. The "Welcome" window

Step 6: Choose the InduSoft Web Studio path installed in the system. The default path is "C:\Program Files\InduSoft Web Studio", Refer to Fig 1-3. (If InduSoft Web Studio does not install in the default path, users must use "Browser" button to choose the correct path. Otherwise, DCON driver would not work normally in InduSoft Web Studio.)

Choose Destination Location		×
	Setup will install ICP DAS driver into the InduSoft Web Studio folder. If Indusoft Web Studio is not installed in the defaults folder. Please use browse to choose the desire folder, which has InduSoft Web Studio folder installed. Or, you can choose not to install ICP DAS driver by clicking to exit Steup.	
	Destination Folder D:\Program Files\InduSoft Web Studio <u>Browse</u> < <u>Back</u> <u>Next ></u> Cancel	

Fig 1-3. Select the folder that you want to install the software

Step 7: Please click button "Next" to install the software, Refer to Fig 1-4.



Fig 1-4. Click button "Next" to Strat Copying Files

Step 8: After successfully installing the software, please click button "Finish" to complete setup. Refer to Fig 1-5.



Fig 1-5. Click button "Finish" to complete Setup