# **Tech Tips**



# Using DNP3 with Janus Products (2500P-Jxxx, 2500C-Jxxx, 2500P-JACP)

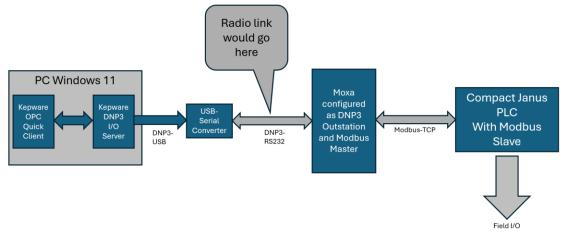
# 1.1 Overview

Janus products offer extensive communications capabilities, including:

- CAMP Client and Server
- Modbus Client (Master) and Modbus Server (Slave)
- Ethernet/IP I/O Scanner, I/O Adapter, Tag Client, Tag Server, Flex I/O
- Network Data Exchange
- DataCache to 2500-Cxxx Processors
- MQTT
- OPC-UA Server

In this Tech Tip, we will show how to communicate using DNP3 to Janus devices. This use case is commonly found in electric utilities and water/wastewater applications, where a small PLC operating a remote station needs to communicate with an Enterprise SCADA, often over leased Ethernet or serial lines using radio or cellular.

For this connection, we will employ a Moxa Mgate 5109, which functions as a gateway between the serial DNP3 and Modbus Ethernet.





# 1.2 Summary of Operation

- 1. To simulate the SCADA system, we use a PC running Kepware with the DNP3 I/O Server. This is an available I/O server from Kepware which does serial or Ethernet DNP3. Using the OPC Quick Client builtin to Kepware, we can read and write variables through DNP3 to the Compact Janus PLC. In this example, we are reading sixteen words of data from the Janus PLC.
- 2. Since this is a Windows PC with no serial port, we use a standard USB-Serial converter which maps to a COM port in Windows.
- 3. A serial RS232 cable links the USB-Serial converter to the Moxa Mgate 5109, which is configured as a DNP3-Modbus gateway. In remote applications, this cable is logically replaced by a serial radio link.
- 4. On the serial side, the Moxa device is set up as a DNP3 Outstation. One the Modbus side, the Moxa is a Modbus TCP Master (Client). In a remote application, the Moxa device would be co-located with the Compact Janus PLC at the remote site.
- 5. The Moxa is connected to the Compact Janus PLC using standard Ethernet. They could be connected directly by a cable, or they could be part of the local network at the remote site.
- 6. On the Compact Janus, a Modbus Slave (Server) configuration completes the communication between Moxa and Janus.

## 1.3 Demo Project Files

A zip file containing all the required configuration files is available on the CTI web site:

- Kepware server and quick client project files
- Moxa setup file
- Janus Workbench (JSoft) project file

# 1.4 Kepware Server Setup

DNP\_SCADA Property Editor:

DNP_SCADA
DNP Client Serial
Enable
16



Property Groups	Connection Type	
General	Physical Medium	COM Port
Serial Communications	Serial Port Settings	
Write Optimizations	COMID	5
Advanced	Baud Rate	19200
Communication Serialization	Data Bits	8
Timing	Parity	Even
	Stop Bits	1
	Flow Control	None
	Operational Behavior	
	Report Communication Errors	Enable
	Close Idle Connection	Disable
	Idle Time to Close (s)	15

Property Editor - DNP_SCADA			
Property Groups	Write Optimizations		
General	Optimization Method	Write Only Latest Value for All Tags	
Serial Communications	Duty Cycle	10	
Write Optimizations			
Advanced			
Communication Serialization			
Timing			

Property Editor - DNP_SCADA		
Property Groups	Non-Normalized Float Handling	
General	Floating-Point Values	Unmodified
Serial Communications		
Write Optimizations		
Advanced		
Communication Serialization		
Timing		

🍘 Property Editor - DNF	SCADA	
Property Groups	Channel-Level Settings	
General	Virtual Network	None
Serial Communications	Transactions per Cycle	1
Write Optimizations	Global Settings	
Advanced	Network Mode	Load Balanced
Communication Seriali		
Timing	1	

Property Groups	Timing	
General	Response Timeout (ms)	10000
Serial Communications		
Write Optimizations		
Advanced		
Communication Serialization		
Timing		
1		
Property Editor - DNP_S	CADA	
Property Groups	Identification	
General	Name	DNP_SCADA

Name	DNP_SCADA
Description	
Driver	DNP Client Serial
Diagnostics	
Diagnostics Capture	Enable
Tag Counts	
Static Tags	16
	Name Description Driver Diagnostics Diagnostics Capture Tag Counts



Property Groups	E Connection Type	
General	Physical Medium	COM Port
Serial Communications	Serial Port Settings	
Write Optimizations	COMID	5
Advanced	Baud Rate	19200
Communication Serialization	Data Bits	8
Timing	Parity	Even
	Stop Bits	1
	Flow Control	None
	Operational Behavior	
	Report Communication Errors	Enable
	Close Idle Connection	Disable
	Idle Time to Close (s)	15

Property Groups	Write Optimizations	
General	Optimization Method	Write Only Latest Value for All Tag
Serial Communications	Duty Cycle	10
Write Optimizations		
Advanced		
Communication Serialization		
Timing		

Property Groups	Non-Normalized Float Handling	
General	Floating-Point Values	Unmodified
Serial Communications		
Write Optimizations		
Advanced		
Communication Serialization		
Timing		

## MOXA 1 Property Editor:

Property Groups	Identification	
General	Name	Moxa1
Scan Mode	Description	
Auto-Demotion	Driver	DNP Client Serial
Tag Generation	Model	DNP Client Serial
Communications	Channel Assignment	DNP_SCADA
Polling	Operating Mode	
Unsolicited	Data Collection	Enable
Event Playback	Simulated	No
Tag Import	Tag Counts	
Authentication	Static Tags	16
Update Key Authentication		
File Control		
Advanced		



E				
Property Editor - DNP_SCADA.Moxa1				
Property Groups	🖃 Scan Mode			
General	Scan Mode	Do Not Scan, Demand Poll Only		
Scan Mode	Initial Updates from Cache	Enable		
Auto-Demotion	1			
Tag Generation				
Communications				
Polling				
Unsolicited				
Event Playback				
Tag Import				
Authentication				
Update Key Authentication				
File Control				
Advanced				

#### 🍘 Property Editor - DNP\_SCADA.Moxa1

Property Groups	Communication Settings	
General	DNP Client Address	3
Scan Mode	DNP Server Address	4
Auto-Demotion	Request Timeout (msec)	30000
Tag Generation	Max Timeouts	1
Communications	Time Base Options	
Polling	DNP Server Uses UTC	No
Unsolicited	DNP Server Time Zone	(UTC-05:00) Eastern Time (US & Canada)
Event Playback	DNP Server Respects DST	Yes
Tag Import	Time Synchronization	
Authentication	Honor Time Sync Requests	Yes
Update Key Authentication	Time Sync Style	Serial
File Control	Delay Measure in Time Sync	No
Advanced		

Property Groups	E Class 1	
General	Class 1 Poll Interval	5
Scan Mode	Class 1 Poll Interval Resolution	Seconds
Auto-Demotion	🖃 Class 2	
Tag Generation	Class 2 Poll Interval	5
Communications	Class 2 Poll Interval Resolution	Seconds
Polling	🖃 Class 3	
Unsolicited	Class 3 Poll Interval	5
Event Playback	Class 3 Poll Interval Resolution	Seconds
Tag Import	Integrity	
Authentication	Integrity Poll Interval (s)	3600
Update Key Authentication	Issue Integrity Poll On Restart	Enable
File Control	Issue Integrity Poll On DNP Server Online	Disable
Advanced	Issue Integrity Poll On Buffer Overflow	Disable

#### Property Editor - DNP\_SCADA.Moxa1 Property Groups Unsolicited Unsolicited Mode Class 1 General Automatic Unsolicited Mode Class 2 Automatic Scan Mode Unsolicited Mode Class 3 Automatic Auto-Demotion Use Unsolicited Messaging During Startup Enable Tag Generation Communications Polling Unsolicited Event Playback Tag Import Authentication Update Key Authentication File Control Advanced



#### Tagname database:

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Project	Tag Name	/ Address	Data Type	Scan Rate	Scalir
(D) Connectivity	G Analog_Input_0	30.2.0.Value	Short	100	None
DNP_SCADA	Analog_Input_1	30.2.1.Value	Short	100	None
Aliases	Analog_Input_2	30.2.2.Value	Short	100	None
pro Allases	California Analog_Input_3	30.2.3.Value	Short	100	None
	G Analog_Input_4	30.2.4.Value	Short	100	None
	Analog_Input_5	30.2.5.Value	Short	100	None
	Analog_Input_6	30.2.6.Value	Short	100	Non
	Analog_Input_7	30.2.7.Value	Short	100	Non
	Analog_Input_8	30.2.8.Value	Short	100	Non
	Canalog_Input_9	30.2.9.Value	Short	100	None
	Analog_Input_10	30.2.10.Value	Short	100	None
	Analog_Input_11	30.2.11.Value	Short	100	None
	Analog_Input_12	30.2.12.Value	Short	100	None
	Analog_Input_13	30.2.13.Value	Short	100	None
	Canalog_Input_14	30.2.14.Value	Short	100	None
	G Analog_Input_15	30.2.15.Value	Short	100	None

#### Property Editor - DNP\_SCADA.Moxa1.Analog\_Input\_0 Property Groups Identification Name Analog\_Input\_0 General Description Scaling Data Properties Address 30.2.0.Value Data Type Client Access Short Read Only Scan Rate (ms) 100

Property Groups	Identification	
General	Name	Analog_Input_1
Scaling	Description	
	Data Properties	
	Address	30.2.1.Value
	Data Type	Short
	Client Access	Read Only
	Scan Rate (ms)	100

Property Groups	Identification	
General	Name	Analog_Input_2
Scaling	Description	
3	Data Properties	
	Address	30.2.2.Value
	Data Type	Short
	Client Access	Read Only
	Scan Rate (ms)	100



# 1.5 Kepware OPC Quick Client Setup

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SWToolbox.TOPServer.V6	Item ID	<ul> <li>Data Type</li> </ul>	Value	Timestamp	Quality	Update Cou
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- DNP_SCADA_System	System_Date_DayOfWeek	DWord	4	06:36:36.372	Good	1
DNP_SCADA.Moxa1_System	System_Date_Month	DWord	5	06:36:36.372	Good	1
- DNP_SCADA.Woxa1_System	System_Date_Year2	DWord	24	06:36:36.372	Good	1
	System_Date_Year4	DWord	2024	06:36:36.372	Good	1
	System_DateTime	Date	2024-05-23T12:07:44.412	08:07:44.412	Good	5421
	System_DateTimeLocal	Date	2024-05-23T08:07:44.412	08:07:44.412	Good	5421
	System_ExpiredFeatures	String Array	[]	08:07:44.412	Good	5420
	System_FullProjectName	String	C:\ProgramData\Software Toolbox\TOP Server\V6\default.opf	06:36:36.372	Good	1
	System_LicensedFeatures	String Array	[]	08:07:44.412	Good	5420
	_System_OpcClientNames	String Array	[ Quick Client ]	06:36:36.372	Good	1
	_System_ProductName	String	TOP Server	06:36:36.372	Good	1
	_System_ProductVersion	String	6.16	06:36:36.372	Good	1
	_System_ProjectName	String	default.opf	06:36:36.372	Good	1
	System_ProjectTitle	String	Untitled 8:07:44 AM	06:36:36.372	Good	1
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	<ul> <li>_System_Time_Hour</li> <li>_System_Time_Hour24</li> </ul>	DWord	8	08:00:00.433	Good	3
	System_Time_Minute	DWord	7	08:07:00.002	Good	92
	System_Time_PM	Boolean	9	06:36:36.372	Good	1
	System_Time_Second	DWord	44	08:07:44.412	Good	5418
	System_TimeLimitedFeatures	String Array	[ DNP Client Serial:1709 ]	08:07:44.412	Good	5325
	System_TotalTagCount	DWord	112	06:36:36.372	Good	1
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— DNP_SCADAStatistics	DNP_SCADA_CommunicationSerialization_RegisteredTo	String	N/A	06:36:36.374	Good	1
DNP_SCADASystem	DNP_SCADA_CommunicationSerialization_StatisticAveNetworkOwnershipTimeSec	Float	0	06:36:36.374	Good	1
- DNP_SCADA.Moxa1	DNP_SCADA_CommunicationSerialization_StatisticNetworkOwnershipCount	DWord	0	06:36:36.374	Good	1
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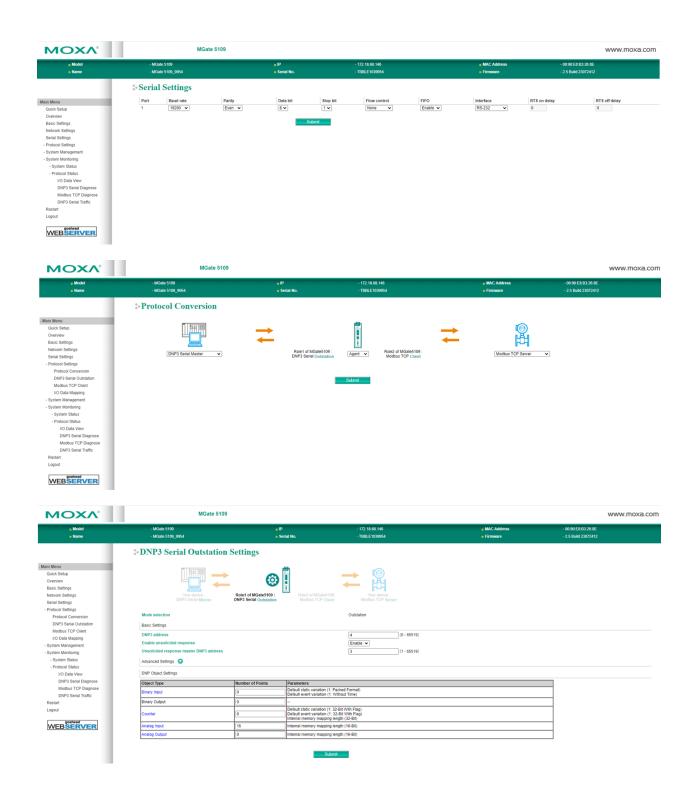
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System	DNP SCADA.Moxa1. AuthCurrentUserNumber	Word	1	06:36:36.468	Good	1
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DNP_SCADA_communicationsenalization	DNP_SCADA.Moxa1channelikesponseTimeout	DWord	0	06:36:36.468	Good	
DNP_SCADA_Statistics	DNP_SCADA.Moxa1DeviceRequestQueueDeptn DNP_SCADA.Moxa1DeviceRequestTimeout	DWord	30000	06:36:36.468	Good	1
		DWord	30000	06:36:36.468	Good	
DNP_SCADA.Moxa1	DNP_SCADA.Moxa1_DNPClientAddress	DWord	3	06:36:36.468	Good	1
DNP_SCADA.Moxa1System	DNP_SCADA.Moxa1DNPServerAddress	DWord	4	06:36:36.468	Good	
	ONP_SCADA.Moxa1EventClass1PolIInterval		5		Good	1
	DNP_SCADA.Moxa1EventClass2PollInterval DNP_SCADA.Moxa1EventClass3PollInterval	DWord DWord	5	06:36:36.468 06:36:36.468	Good	1
		DWord	3600		Good	1
	DNP_SCADA.Moxa1. IntegrityPollInterval DNP_SCADA.Moxa1. MasterAddress	DWord	3600	06:36:36.468 06:36:36.468	Good	1
			3		Good	1
	DNP_SCADA.Moxa1SlaveAddress	DWord	4	06:36:36.468		1
	DNP_SCADA.Moxa1TimeSyncStyle	Byte		06:36:36.468	Good	
	DNP_SCADA.Moxa1.Analog_Input_0	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_Input_1	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_Input_2	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_Input_3	Short	41	08:08:19.205	Good	1102
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	DNP_SCADA.Moxa1.Analog_Input_10	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_Input_11	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_Input_12	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_input_13	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_Input_14	Short	41	08:08:19.205	Good	1102
	DNP_SCADA.Moxa1.Analog_Input_15	Short	41	08:08:19:205	Good	1102
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	DNP_SCADA.Moxa1_System_ActiveTagCount			Ub:3b:3b.3/4		1
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DNP_SCADA_CommunicationSerialization	DNP_SCADA.Moxa1SystemAutoCreateTagDatabase	Boolean	0	06:36:36.374	Good	
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# 1.6 Moxa Setup

The following series of screenshots show the setup and operation of the Moxa gateway.

ΜΟΧΛ	MGate 5109				www.moxa.com
= Model = Name	- MGate 5109 - MGate 5109_9954	≡ IP ≡ Serial No.	- 172.18.68.146 - TBBLE1039954	<ul> <li>MAC Address</li> <li>Firmware</li> </ul>	- 00:90 E8 B3 26 8E - 2.5 Build 23072412
- Main Menu Quick Setup Overview Basic Settings Network Settings Serial Settings	System setting Select p	rotocol DNP3 Serial Mo	dbus TCP Finish		
- Protocol Settings     - System Management     - System Monitoring     Restart	Server name Network Settings IP configuration	MGate 5109_9954			
	IP address Netmask Gateway	172.18.68.146 255.255.240.0 172.18.64.1			
		Next Exit	1		



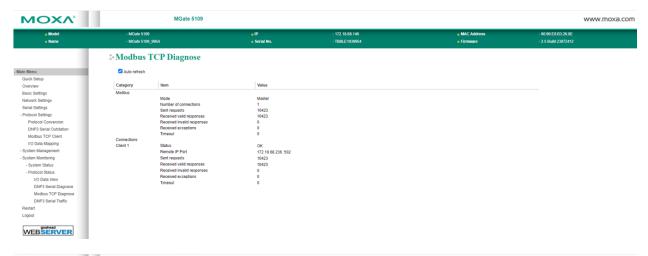




Name	- MGate 5109_9954		Serial No.		- TBBLE1039954		💣 Firmware	- 2.5 B	uild 23072412
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OXV.		MGate 5109							www.moxa
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k Setting : wething : denting :	Client Settings Initial delay Massimiliar Setting Modius Commands Modius Commands Modius Commands Modius Commands Modius Commands Read Holding Rey Modius 5109 - Modius Commands - Modius Status - Modius Commands - Modius Status - Modius Status	pother_1	Slave IP Address 172.16.66.236 : 502	C Stave ID Function 1 3 Gudami	Role 2 of MCAteG109 : Modbus TCP Client           Client           0         0	- 30000 ms) - 5) 0 - 120000 ms)	Trigger Poil Interval Cyclic 500	Endian Swap None - 00 90	E8.83.26.8E
<pre>k Settings i dentings i dentings i dentings i dentings i dentings i dentings i dentification i dentificat</pre>	Client Settings Initial delay Mas, retry Response timeout Modbus Commands Modbus Commands Modbus Commands T Read Holding Reg - Modae S100 - Modae S100_9904	pother_1	Slave IP Address 172.16.66.236 : 502	C Stave ID Function 1 3 Gudami	Role 2 of MCAteG109 : Modbus TCP Client           Client           0         0 <td>- 30000 ms) - 5) 0 - 120000 ms)</td> <td>Trigger Poil Interval Cyclic 500</td> <td>Endian Swap None - 00 90</td> <td>E8.83.26.8E</td>	- 30000 ms) - 5) 0 - 120000 ms)	Trigger Poil Interval Cyclic 500	Endian Swap None - 00 90	E8.83.26.8E
k Sating : kenng: d Sating : d Sating :	Client Settings Initial delay Massimiliar Setting Modius Commands Modius Commands Modius Commands Modius Commands Modius Commands Read Holding Rey Modius 5109 - Modius Commands - Modius Status - Modius Commands - Modius Status - Modius Status	Ditlers_1 MGate 5109	Slave IP Address 172.16.66.236 : 502	C Stave ID Function 1 3 Gudami	Role 2 of MCAteG109 : Modbus TCP Client           Client           0         0 <td>- 30000 ms) - 5) 0 - 120000 ms)</td> <td>Trigger Poli Intervat Cycic 509 # MAC Address # Firmware</td> <td>Endian Swap None - 00 90</td> <td>E8 83 26 8E Ind 23072412</td>	- 30000 ms) - 5) 0 - 120000 ms)	Trigger Poli Intervat Cycic 509 # MAC Address # Firmware	Endian Swap None - 00 90	E8 83 26 8E Ind 23072412
k Settings k Settings if Settings 20 Setting // Containen but TCP Cinet Data Masping Managament	Client Settings Initial delay Mass, retry Response timeout Modius Commands <u>Index Name</u> <u>1 Read Holding Red</u> -Malae S100 -Malae S10 -Malae S100 -Malae S100 -Mala	psters_1 MGate 5109 ≈I Master ← Mostous TCP t	Stave IP Address 172 16 56 236 : 502 - IP - Senal No. Stever V	Stare D Function	Role 2 of MCAte6109 : Modbus TCP Client           Client           0         0           0         0           0         0           1000         01           1000         01           1000         01           1000         01           1000         01           1000         01           1000         100           - 172.18.06.546         - 108LE 1500954           Start address/P         Start address/P	- 3000 ms) - 5) 2- 12000 ms) 2uently 18 Hex) (0	Trigger Poli Intervat Cycic 500 MMC Address # Firmware Lang	E findan Sang Nore -00 59 -25 Ba n [128 ▼]	E8 83 26 8E ad 23072412 Format [Hex
k Settings k Settings d Sett	Client Settings Initial delay Mas, retry Response timeout Moditus Commands Moditus Commands Moditus Commands 1 Read Holding Reg -Malake 5100 -Malake	Ditket_1 MGate 5109	Slave IP Address 172.16.66.236 : 502	C Stave ID Function 1 3 Gudami	Role 2 of MCAteG109 : Modbus TCP Client           Client           0         0 <td>- 3000 ms) - 5) 2- 12000 ms) 2uently 18</td> <td>Trigger Poli Intervat Cycic 509 # MAC Address # Firmware</td> <td>Endan Swap None -00 99 -25 Bi</td> <td>E8.83.26.8E e8.23072412 Format [<del>Hec</del>. 00 0E 0F</td>	- 3000 ms) - 5) 2- 12000 ms) 2uently 18	Trigger Poli Intervat Cycic 509 # MAC Address # Firmware	Endan Swap None -00 99 -25 Bi	E8.83.26.8E e8.23072412 Format [ <del>Hec</del> . 00 0E 0F
Settings Settings Settings Setting Sector Setting Contactions but TOP Clavel Management Managem	Client Settings Initial delay Massima Commands Moduss Commands Moduss Commands Initial Massima Initial Read Holding Rey Massima S100 Marke	2016/rs_1 MGate 5109 101 Master Modius TCP 1 00 91	Stave IP Address           172.16.06.230 : 502           172.16.06.230 : 502           Server ♥           01         02           4E         01	03 04 46 01	Role 2 of MCLate3109 : Modbus TCP Client           Dient           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0000         01           0000         100           000         100           00         100           1000         100           00         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100           1000         100	- 3000 ms) - 5) - 12000 ms) - 1	Trigger         Poll Interval           Cycic         500   MAC Address           Firmmare           Upper Data           09         0A           4E         01	Ender Swap           None           -00.50           -2.5 for           n           08           0C           4E           01	Format (Hes 00 0E 0F 4E 01 4E 4E 01 4E
settings (settings (settings) card Coversion 23 Serial Outstation but TOP Cinet Data Mapping Management Manage	Client Settings Initial delay Mas, retry Response Inneout Modius Commands Modius Commands Modius Commands 1 Read Holding Reg - Michae Stop - M	pstkrs_1 MGate 5109 wil Master < Modeus TCP 1 0 01 01 01 01	Slave IP Address           172.18.86.236 : 502           • UP           • Server •           01         02           4E         01           00         00	Stave ID         Function           1         3           Guinni         Guinni           40         01           40         01           40         01           40         01           40         01           40         01	Role 2 of MCAteS109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           00         0           00         0           00         0           00         0	- 30000 ms) - 5) 10000 ms) 10000 ms) 20000 ms) 	Trigger Poli litervat Cyck 500 #MCC Address # Firmmere 00 0A 4E 01 4E 01 4E 01	Ender Swap           None	ERB3266E ad 23072412 Format [Hex 00 0E 0F 4E 01 4E 4E 01 4E 00 00 00
settings ettings (settings (settings) cost Covversion 35 serial Cutatation but TCP Clavel and Mangonet Management Montorings am Status cost Status Cos	Client Settings Initial delay Response timeout Motous Commands <u>Initial Commands Initial Addes</u> <u>Audo Read Holding Reg Commands </u>	2014rr_1 MGate 5109 all Master ← Modbus TCP 1 00 01 01 00 00 00	Save IP Address           172.16.66.236 : 502           string International Model           01         02           4E         01           00         00           00         00           00         00	03 04 44 01 45 00 00 00 00 00	Role 2 of MCAteS109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           05         06           4E         01           4E         01           00         00           00         00	- 30000 ms) - 5) - 120000 ms) - 120000 ms) - 12000 ms) - 12000 ms) - 20000 m	Trigger         Poll litterval           Cycitic         500           a         MAC. Address           a         Firmmaria           Leng         00           00         00           00         00           00         00           00         00	Ender Swap           Nore	E833309E #023072412 Format [Hec 00 00 0E 00 00 00 00 00 00 00 00 00
Settings Settin	Client Settings Initial delay Mas, retay Response timeout Modulus Commands <u>Index</u> Name <u>1</u> Read Holding Red -Malae S100 -Malae S100 -Mal	2014rrs_1 MGate 5109 101 Master Modbus TCP 1 00 01 01 00 00 00 00 00 00	Slave IP Address           172 16 66 236 : 502           Server v           01         02           4E         01           00         00           00         00           00         00	03 04 03 04 04 01 04 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Dient           0         0           0         0           0         0           1000         01           1000         01           1000         01           Interf         0	- 30000 m;) - 5) D - 120000 m;) 2uethy 16 	Trigger         Poll Interval           Cycic         509	Endan Swap           None           -00.50           -25.5 ks           00         0C           4E         01           4E         01           4E         01           00         00           00         00           00         00	EB33268E Format [Hec 00 0E 0F 4E 01 4E 4E 01 4E 00 00 00 00 00 00 00 00 00
settings ettings (settings (settings 2) serial Cutatalian but TCP Clavel but TCP	Client Settings Initial delay Response timeout Motous Commands <u>Initial Commands Initial Addes</u> <u>Audo Read Holding Reg Commands </u>	2014rr_1 MGate 5109 all Master ← Modbus TCP 1 00 01 01 00 00 00	Save IP Address           172.16.66.236 : 502           string International Model           01         02           4E         01           00         00           00         00           00         00	03 04 44 01 45 00 00 00 00 00	Role 2 of MCAteS109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           0000         (10           05         06           4E         01           4E         01           00         00           00         00	- 30000 ms) - 5) - 120000 ms) - 120000 ms) - 12000 ms) - 12000 ms) - 20000 m	Trigger         Poll litterval           Cycitic         500           a         MAC. Address           a         Firmmaria           Leng         00           00         00           00         00           00         00           00         00	Ender Swap           Nore	E833309E #023072412 Format [Hec 00 00 0E 00 00 00 00 00 00 00 00 00
settings ethings isotings isotings isotings isotings isotings transformer Management Manageme	Client Settings Initial delay Massima Setting Response timeout Modulus Commands <u>Initial Assem</u> <u>Initial Setting</u> - Maske Stop - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Firmeaite           Leng         00           00         0A           4E         01           4E         01           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 CO 0E 0F 4E 01 4E 00 00 00 00 00 000 00 00 00 00 00 00 00 00 00 00 00
k Settings k Settings k Settings c Setting	Client Settings Initial delay Massima Setting Response timeout Modulus Commands <u>Initial Assem</u> <u>Initial Setting</u> - Maske Stop - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Firmeaite           Leng         00           00         0A           4E         01           4E         01           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 CO 0E 0F 4E 01 4E 00 00 00 00 00 000 00 00 00 00 00 00 00 00 00 00 00
settings ettings isottings isottings isottings isottings isottings to TCP Clevel but TCP Clevel isottings to TCP Clevel isottings col Status to TCP Clevel isottings col Status to O total Yew isottings i	Client Settings Initial delay Massima Setting Response timeout Modulus Commands <u>Initial Assem</u> <u>Initial Setting</u> - Maske Stop - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Finneaita           Up         DA           4E         01           4E         01           00         00           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 CO 0E 0F 4E 01 4E 00 00 00 00 00 000 00 00 00 00 00 00 00 00 00 00 00
k Settings k Settings k Settings d Settings c Setting	Client Settings Initial delay Massima Setting Response timeout Modulus Commands <u>Initial Assem</u> <u>Initial Setting</u> - Maske Stop - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Finneaita           Up         DA           4E         01           4E         01           00         00           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 CO 0E 0F 4E 01 4E 00 00 00 00 00 000 00 00 00 00 00 00 00 00 00 00 00
settings ettings (settings (settings 2) Serial Octation but TOP Colert Jabi Mapping) Management Mantering (NT-5 Serial Diagnose (NT-5 Serial Diagnose (NT-5 Serial Diagnose (NT-5 Serial Diagnose (Settings) (Set	Client Settings Initial delay Massima Setting Response timeout Modulus Commands Modulus Commands <u>Initial Assem</u> - Maske S100 - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Finneaita           Up         DA           4E         01           4E         01           00         00           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 Format [Hec 4E 01 4E 4E 01 4E 4E 04 60 00 00 000 00 000 00 000 00000000
k Settings k Setting	Client Settings Initial delay Massima Setting Response timeout Modulus Commands Modulus Commands <u>Initial Assem</u> - Maske S100 - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Finneaita           Up         DA           4E         01           4E         01           00         00           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 Format [Hec 4E 01 4E 4E 01 4E 4E 04 60 00 00 000 00 000 00 000 00000000
settings (settings (settings) (settings) 25 setti Octastian but TCP Cales (settings) am Shabs soot Columnia am Shabs soot Shabs (settings) am Shabs soot Shabs (settings) am Shabs soot Shabs (settings) (setting	Client Settings Initial delay Massima Setting Response timeout Modulus Commands Modulus Commands <u>Initial Assem</u> - Maske S100 - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Finneaita           Up         DA           4E         01           4E         01           00         00           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 Format [Hec 4E 01 4E 4E 01 4E 4E 04 60 00 00 000 00 000 00 000 00000000
k Settings k Settings k Settings k Settings c C Setting c Setti	Client Settings Initial delay Massima Setting Response timeout Modulus Commands Modulus Commands <u>Initial Assem</u> - Maske S100 - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Finneaita           Up         DA           4E         01           4E         01           00         00           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 Format [Hec 4E 01 4E 4E 01 4E 4E 04 60 00 00 000 00 000 00 000 00000000
settings (settings (settings) (settings) 25 setti Octastian but TCP Cales (settings) am Shabs soot Columnia am Shabs soot Shabs (settings) am Shabs soot Shabs (settings) am Shabs soot Shabs (settings) (setting	Client Settings Initial delay Massima Setting Response timeout Modulus Commands Modulus Commands <u>Initial Assem</u> - Maske S100 - Maske	004ers_1 MGate 5109 (a) Master ← Modbus TCP 1 00 01 00 00 00 00 00	Save IP Address           172.16.66.236 : 502           ■ EP           ● EP	03 04 4E 01 00 00 00 00 00 00	Role 2 of MCLate3109 : Modbus TCP Client           Client           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0	- 30000 ms) - 5) - 10000 ms) - 1000000 ms) - 10000 ms) - 1000000000000000000000000000000000000	Trigger         Poll Interval           Cycitic         500           a         MAC. Address           a         Finneaita           Up         DA           4E         01           4E         01           00         00           00         00           00         00           00         00	Ender Swap           Nore	E883/26/8E #023072412 Format [Hec 4E 01 4E 4E 01 4E 4E 04 60 00 00 000 00 000 00 000 00000000



ΜΟΧΛ	MGate 510	9			www.moxa.com
Model	- MGate 5109	∎ IP	- 172.18.68.146	MAC Address	- 00.90 E8 B3 26.8E
<ul> <li>Name</li> </ul>	- MGate 5109_9954	<ul> <li>Serial No.</li> </ul>	- TBBLE 1039954	Firmware	- 2.5 Build 23072412
	<b>DNP3</b> Serial Outstation	n Diagnose			
- Main Menu	Auto refresh Refresh				
Quick Setup					
Overview	Outstation Statictics				
Basic Settings	Received Requests	971			
Network Settings	Sent Responses	971			
Serial Settings	Sent Unsolicited Message	0			
- Protocol Settings	Binary Input Event buffer	0			
Protocol Conversion	Counter Event buffer	0			
DNP3 Serial Outstation	Analog Input Event buffer Connected Master IP	80			
Modbus TCP Client	Connected Master IP				
I/O Data Mapping	Point Information				
- System Management					
- System Monitoring	Analog Input 👻				
	Point Index		Flags Time Updated		
- System Status	0	351	ONLINE 2024-05-23 02:56:		
- Protocol Status	1	351	ONLINE 2024-05-23 02:56:		
I/O Data View	2	351	ONLINE 2024-05-23 02:56:		
DNP3 Serial Diagnose	3	351 351	ONLINE 2024-05-23 02:56: ONLINE 2024-05-23 02:56:		
Modbus TCP Diagnose	4	351	ONLINE 2024-05-23 02:56: ONLINE 2024-05-23 02:56:		
DNP3 Serial Traffic	6	351	ONLINE 2024-05-23 02:56: ONLINE 2024-05-23 02:56:		
Restart	7	351	ONLINE 2024-05-23 02:50: ONLINE 2024-05-23 02:50:		
Logout	8	351	ONLINE 2024-05-23 02:50: ONLINE 2024-05-23 02:50:		
	9	351	ONLINE 2024-05-23 02:56:		
WEBSERVER	10	351	ONLINE 2024-05-23 02:56:		
VYLDOLKVER	11	351	ONLINE 2024-05-23 02:56:		
	12	351	ONLINE 2024-05-23 02:56:		
	13	351	ONLINE 2024-05-23 02:56:	48	
	14	351	ONLINE 2024-05-23 02:56:	48	
	15	351	ONLINE 2024-05-23 02:58:	48	



MOXV.			MGate	5109			www.moxa.co
= Model = Name		MGate 5109 MGate 5109_99	954	■ IP ■ Serial No.	- 172.18.68.146 - TBBLE1039954	MAC Address     Firmware	- 00.90 E8.83.26.8E - 2.5 Build 23072412
_			al Traffic				
Main Menu	🗹 Aut	o scroll					
Quick Setup Overview		Start	Stop	Export Capturing			
Basic Settings	No.	Time	Send/Receive	Data			
Network Settings	1	2.310	Receive	05 64 11 C4 04 00 03 00 4E EF FE C1 01 3C 02 05 3C 03 06	3C 04 06 88 34		
Serial Settings	2	2.312	Send	05 64 FF 44 03 00 04 00 48 60 7D E1 81 02 00 20 02 28 50 0			
- Protocol Settings				01 24 01 0B 00 39 47 01 24 01 0A 00 01 24 01 09 00 01 24 01 01 24 94 B8 01 04 00 01 24 01 03 00 01 24 01 02 00 01 24 01	D8 61 01 00 01 24 01 00 00 01 24 01 0F 00 01 25 01 0E A3		
Protocol Conversion				E9 00 01 25 01 0D 00 01 25 01 0C 00 01 25 01 0B 00 E0 65 0 07 00 01 25 01 06 00 01 25 01 05 00 01 25 2F 60 01 04 00 01			
DNP3 Serial Outstation				00 00 01 25 01 0F 00 01 26 01 0E 42 8A 00 01 26 01 0D 00 0	26 01 0C 00 01 26 01 0B 00 8B 02 01 26 01 0A 00 01 26 01		
Modbus TCP Client				09 00 01 26 01 08 00 01 F4 6C 26 01 07 00 01 26 01 06 00 01 02 00 01 26 01 4E 50 01 00 01 26 01 00 00 01 26 01 4C 2B	26 01 05 00 01 26 9B 44 01 04 00 01 26 01 03 00 01 26 01		
I/O Data Mapping - System Management	3	2.313	Send	05 64 A6 44 03 00 04 00 CF 99 BE 0F 00 01 27 01 0E 00 01 2	7 01 0D 00 01 27 01 7E C0 0C 00 01 27 01 0B 00 01 27 01		
- System Management - System Monitoring				0A 00 01 27 01 09 0E 35 00 01 27 01 08 00 01 27 01 07 00 01 03 00 01 B8 48 27 01 02 00 01 27 01 01 00 01 27 01 00 00 01			
- System Montoring				8A 8D 0C 00 01 28 01 0B 00 01 28 01 0A 00 01 28 01 09 FA D	5 00 01 28 01 08 00 01 28 01 07 00 01 28 01 06 00 48 6C 01		
- Protocol Status		2.646	Receive	28 01 05 00 01 28 01 04 00 01 28 01 03 00 01 3A 3F 28 01 02 05 64 08 C4 04 00 03 00 B4 B8 FF C1 00 E7 8A	00 01 28 01 01 00 01 28 01 00 00 01 28 02 73 01 A1 C9		
VO Data View	1	2.040	Neceive	05 04 06 C4 04 00 05 00 B4 B6 FF C1 00 E7 5K			
DNP3 Serial Diagnose							
Modbus TCP Diagnose							
DNP3 Serial Traffic							
Restart							
Logout							
WEBSERVER							
VLDOLIVER							



# 1.7 Janus PLC Setup

File Edit View Insert Project 1	ools Window Help	
Workspace	IO Drivers	
4 🖻 DNP3_v2	III MODBUS Slave	Name
Exception programs	🖓 🔺 🏯 Server - Slave number = 1	
🔺 🍃 Programs	*** *** Holding Registers [300315]	
Counter	+300: HR300	
1 Main	😑 +301: HR301	
NOVW 1	- 302: HR302	
<ul> <li>Watch (for debugging)</li> </ul>	- +303: HR303	
Soft Scope	🛥 +304: HR304	
IIII Initial values	🖶 🛥 +305: HR305	
🖬 Fieldbus Configurations	🕀 • 306: HR306	
No Binding Configuration	+307: HR307	
Profiles	- +308: HR308	
§g Globel defines	🔦 🛥 +309: HR309	
😭 Variables	+310: HR310	
Types	+311: HR311	
<ul> <li>(All Projects)</li> </ul>	+312: HR312	
	+313: HR313	
	+314: HR314	
	+315: HR315	

1 CTI Workbench - DNP3\_v2

	( ※     ク ♡   話   盂 幅 🙆 ജ 🇞 留 🎥 🕮		
Vorkspace	IO Drivers		
DNP3_v2	III A Me MODBUS Slave	Name	Value
Exception programs	율 🔺 🏦 Server - Slave number = 1	Slave number	1
Programs	Holding Registers [300315]	Server ID	Janus_PL0
Counter	🗀 🛥 +300: HR300		
Main	+301: HR301		
MOVW			
<ul> <li>Watch (for debugging)</li> </ul>	+303 HR303		
Soft Scope			
E Initial values	🖶 🛥 +305: HR305		
Fieldbus Configurations	(+) • +306 HR306		
5 Binding Configuration	• • 307: HR307		
Profiles	* +308: HR308		
§g Global defines	* = +309: HR309		
1 Variables	+310: HR310		
Types	+311: HR311		
(All Projects)	+312: HR312		
	+313: HR313		
	+314 HR314		
	+315: HR315		

🐲 CTI Workbench - DNP3\_v2

Vorkspace	IO Drivers		
DNP3_v2	Me MODBUS Sleve	Name	Value
Exception programs	율 🔺 🏜 Server - Slave number = 1	Request	Holding Register
🔺 🍃 Programs	Holding Registers [300315]	Address	300
陷 Counter	📥 📮 +300: HR300	Nb Item	16
🔁 Main	🖬 🗬 +301: HR301	Description	
1 MOVW	□ +302: HR302		
🔺 🍃 Watch (for debugging)	🛥 +303: HR303		
Soft Scope	🛸 📼 +304: HR304		
Initial values	🖶 🛥 +305: HR305		
Fieldbus Configurations	+ 306: HR306		
😘 Binding Configuration	+307: HR307		
D Profiles	▲ +308: HR308		
§g Global defines	* • +309: HR309		
😭 Variables	+310: HR310		
Types	+311: HR311		
<ul> <li>(All Projects)</li> </ul>	+312: HR312		
	+313: HR313		
	+314: HR314		
	+315: HR315		



	ew Insert Project Tools ♥   ➡   Q, X, G, B × X		
Vorkspace		sees [IO Drivers]	_
DNP3_v	2 [RUNNING]	E 4 Me MODBUS Slave	
Exception	tion programs	🖮 🎍 🚣 Server-Slave number = 1	
🖌 🍃 Progra	ams	Holding Registers [300315]	
E Co	unter	+300: HR300 = 52	
E Me	sin	HE +301: HR301 = 52	
E MO	ww	- +302: HR302 = 52	
🔺 🍃 Watch	(for debugging)	➡ +303: HR303 = 52	
A So	# Scope	- +304: HR304 = 52	
EIII Initial v	values	- +305: HR305 = 52	
Str Fieldb	us Configurations		
16 Bindin	g Configuration	• +307: HR307 = 52	
C Profile	rs	+308: HR308 = 52	
§g Globa	l defines	+309: HR309 = 52	
1 Variat	oles	+310: HR310 + 52	
E Type:		+311: HR311 = 52	
All Project	cts)	+312: HR312 = 52	
		+313: HR313 = 52	
		+314: HR314 = 52	
		+315: HR315 = 52	

IIIB B C X C C X		🖸 🖺 🖗 🖶 🚰 RU	NNING:	総設は	¥ 🗘					
orkspace	esse [Variables]									
DNP3_v2 [RUNNING]	Y Name	Value	Туре	Dim	Attrib.	S	Inity	Us.	Tag	Description
Exception programs	🔺 🙆 Global varia		Weters.							
<ul> <li>Programs</li> </ul>	HR300	65	INT							
D Counter	HR301	65	INT							
D Main	HR302	65	INT							
MOVW	HR303	65	INT							
<ul> <li>Watch (for debugging)</li> </ul>	HR304	65	INT							
Soft Scope	HR305	65	INT							
EIII Initial values	HR306	65	INT							
Fieldbus Configurations	HR307	65	INT							
😘 Binding Configuration	HR308	65	INT							
D Profiles	HR309	65	INT							
§g Globel defines	HR310	65	INT							
😭 Variables	HR311	65	INT							
E Types	HR312	65	INT							
<ul> <li>(All Projects)</li> </ul>	HR313	65	INT							
	HR314	65	INT							
	HR315	65	INT							
	FLASHER		blink							
	DONE_BIT	FALSE	BOOL							
	CTR1		CTUr							
	TCC1_INT	65	INT							
	TCC1	65	DINT							
	TCP1	500	DINT				500			
	BLINKING	TRUE	BOOL							
	ALWAYS_ON	TRUE	BOOL							
	CTI_RESER	'32353030432D4A	STRING			1	'3235			
	RETAIN var	iables								
	Counter									
	🗅 Main									
	D MOVW									
	*: pOnBadInd	вх								
	* pOnDivZero									
	D pShutDown									
	D pStartup									



