



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

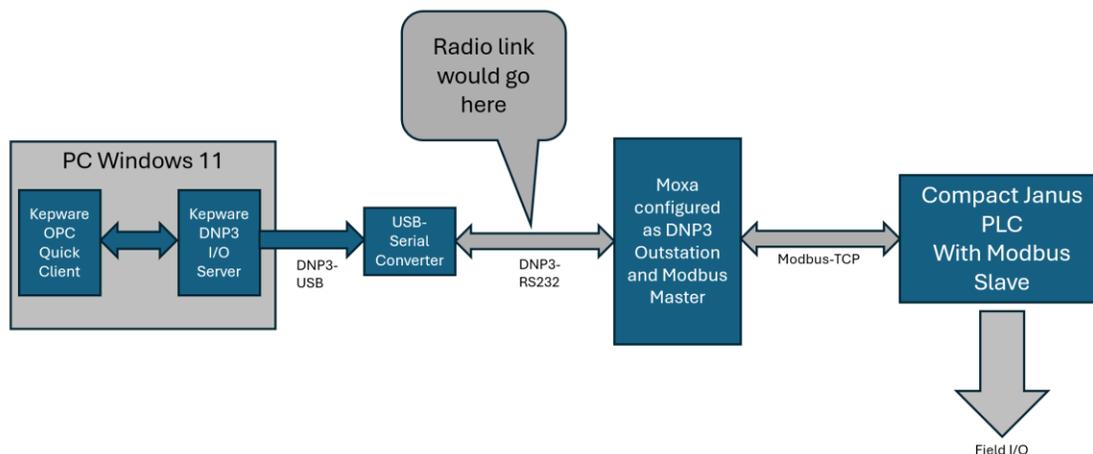
1.1 Overview

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 built-in 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. On 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.

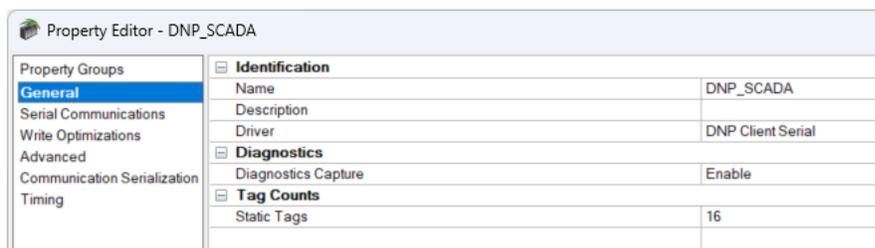
1.3 Demo Project Files

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:



Property Editor - DNP_SCADA	
Property Groups	
General	
Serial Communications	
Write Optimizations	
Advanced	
Communication Serialization	
Timing	
Identification	
Name	DNP_SCADA
Description	
Driver	DNP Client Serial
Diagnostics	
Diagnostics Capture	Enable
Tag Counts	
Static Tags	16

Property Editor - DNP_SCADA

Property Groups	<ul style="list-style-type: none"> [-] Connection Type 	
General	Physical Medium	COM Port
Serial Communications	<ul style="list-style-type: none"> [-] Serial Port Settings 	
Write Optimizations	COM ID	5
Advanced	Baud Rate	19200
Communication Serialization	Data Bits	8
Timing	Parity	Even
	Stop Bits	1
	Flow Control	None
	<ul style="list-style-type: none"> [-] Operational Behavior 	
	Report Communication Errors	Enable
	Close Idle Connection	Disable
	Idle Time to Close (s)	15

Property Editor - DNP_SCADA

Property Groups	<ul style="list-style-type: none"> [-] 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	<ul style="list-style-type: none"> [-] Non-Normalized Float Handling 	
General	Floating-Point Values	Unmodified
Serial Communications		
Write Optimizations		
Advanced		
Communication Serialization		
Timing		

Property Editor - DNP_SCADA

Property Groups	<ul style="list-style-type: none"> [-] Channel-Level Settings 	
General	Virtual Network	None
Serial Communications	Transactions per Cycle	1
Write Optimizations	<ul style="list-style-type: none"> [-] Global Settings 	
Advanced	Network Mode	Load Balanced
Communication Seriali...		
Timing		

Property Editor - DNP_SCADA

Property Groups	<ul style="list-style-type: none"> [-] Timing 	
General	Response Timeout (ms)	10000
Serial Communications		
Write Optimizations		
Advanced		
Communication Serialization		
Timing		

Property Editor - DNP_SCADA

Property Groups	<ul style="list-style-type: none"> [-] Identification 	
General	Name	DNP_SCADA
Serial Communications	Description	
Write Optimizations	Driver	DNP Client Serial
Advanced	<ul style="list-style-type: none"> [-] Diagnostics 	
Communication Serialization	Diagnostics Capture	Enable
Timing	<ul style="list-style-type: none"> [-] Tag Counts 	
	Static Tags	16



Property Editor - DNP_SCADA

Property Groups	[-] Connection Type	
General	Physical Medium	COM Port
Serial Communications	[-] Serial Port Settings	
Write Optimizations	COM ID	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		

MOXA 1 Property Editor:

Property Editor - DNP_SCADA.Moxa1

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	
Unsolicted	Data Collection	Enable
Event Playback	Simulated	No
Tag Import	[-] Tag Counts	
Authentication	Static Tags	16
Update Key Authentication		
File Control		
Advanced		



Property Editor - DNP_SCADA.Moxa1

Property Groups	<ul style="list-style-type: none"> General Scan Mode Auto-Demotion Tag Generation Communications Polling Unsolicited Event Playback Tag Import Authentication Update Key Authentication File Control Advanced 	
	Scan Mode	
	Scan Mode	Do Not Scan, Demand Poll Only
	Initial Updates from Cache	Enable

Property Editor - DNP_SCADA.Moxa1

Property Groups	<ul style="list-style-type: none"> General Scan Mode Auto-Demotion Tag Generation Communications Polling Unsolicited Event Playback Tag Import Authentication Update Key Authentication File Control Advanced 	
	Communication Settings	
	DNP Client Address	3
	DNP Server Address	4
	Request Timeout (msec)	30000
	Max Timeouts	1
	Time Base Options	
	DNP Server Uses UTC	No
	DNP Server Time Zone	(UTC-05:00) Eastern Time (US & Canada)
	DNP Server Respects DST	Yes
	Time Synchronization	
	Honor Time Sync Requests	Yes
	Time Sync Style	Serial
	Delay Measure in Time Sync	No

Property Editor - DNP_SCADA.Moxa1

Property Groups	<ul style="list-style-type: none"> General Scan Mode Auto-Demotion Tag Generation Communications Polling Unsolicited Event Playback Tag Import Authentication Update Key Authentication File Control Advanced 	
	Class 1	
	Class 1 Poll Interval	5
	Class 1 Poll Interval Resolution	Seconds
	Class 2	
	Class 2 Poll Interval	5
	Class 2 Poll Interval Resolution	Seconds
	Class 3	
	Class 3 Poll Interval	5
	Class 3 Poll Interval Resolution	Seconds
	Integrity	
	Integrity Poll Interval (s)	3600
	Issue Integrity Poll On Restart	Enable
	Issue Integrity Poll On DNP Server Online	Disable
	Issue Integrity Poll On Buffer Overflow	Disable

Property Editor - DNP_SCADA.Moxa1

Property Groups	<ul style="list-style-type: none"> General Scan Mode Auto-Demotion Tag Generation Communications Polling Unsolicited Event Playback Tag Import Authentication Update Key Authentication File Control Advanced 	
	Unsolicited	
	Unsolicited Mode Class 1	Automatic
	Unsolicited Mode Class 2	Automatic
	Unsolicited Mode Class 3	Automatic
	Use Unsolicited Messaging During Startup	Enable



Tagname database:

[Connected to Runtime] - TOP Server 6 Configuration - C:\Users\tmccormick\Documents\Projects\DNF3\Kepware_Top_Server\DNF3_Scada_05212024.opf

Tag Name	Address	Data Type	Scan Rate	Scaling
Analogue_Input_0	30.2.0.Value	Short	100	None
Analogue_Input_1	30.2.1.Value	Short	100	None
Analogue_Input_2	30.2.2.Value	Short	100	None
Analogue_Input_3	30.2.3.Value	Short	100	None
Analogue_Input_4	30.2.4.Value	Short	100	None
Analogue_Input_5	30.2.5.Value	Short	100	None
Analogue_Input_6	30.2.6.Value	Short	100	None
Analogue_Input_7	30.2.7.Value	Short	100	None
Analogue_Input_8	30.2.8.Value	Short	100	None
Analogue_Input_9	30.2.9.Value	Short	100	None
Analogue_Input_10	30.2.10.Value	Short	100	None
Analogue_Input_11	30.2.11.Value	Short	100	None
Analogue_Input_12	30.2.12.Value	Short	100	None
Analogue_Input_13	30.2.13.Value	Short	100	None
Analogue_Input_14	30.2.14.Value	Short	100	None
Analogue_Input_15	30.2.15.Value	Short	100	None

Property Editor - DNP_SCADA.Moxa1.Analog_Input_0

Property Groups General Scaling	Identification	
	Name	Analog_Input_0
	Description	
	Data Properties	
	Address	30.2.0.Value
	Data Type	Short
	Client Access	Read Only
Scan Rate (ms)	100	

Property Editor - DNP_SCADA.Moxa1.Analog_Input_1

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

Property Editor - DNP_SCADA.Moxa1.Analog_Input_2

Property Groups General Scaling	Identification	
	Name	Analog_Input_2
	Description	
	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

OPC Quick Client - DNP_SCADA.etc

File Edit View Tools Help

SWToolbox.TOPServer.V6

Item ID	Data Type	Value	Timestamp	Quality	Update Count
System					
DNP_SCADA.CommunicationSerialization					
DNP_SCADA.Statistics					
DNP_SCADA.System					
DNP_SCADA.Moxa1					
DNP_SCADA.Moxa1.System					
_System_ActiveTagCount	DWord	112	06:36:372	Good	1
_System_ClientCount	DWord	1	06:36:372	Good	1
_System_Date	String	5/23/2024	06:36:372	Good	1
_System_Date_Day	DWord	23	06:36:372	Good	1
_System_Date_DayOfWeek	DWord	4	06:36:372	Good	1
_System_Date_Month	DWord	5	06:36:372	Good	1
_System_Date_Year2	DWord	24	06:36:372	Good	1
_System_Date_Year4	DWord	2024	06:36:372	Good	1
_System_DateTime	Date	2024-05-23T12:07:44.412	08:07:44.412	Good	5421
_System_DateTimeLocal	Date	2024-05-23T10:07:44.412	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	06:36:372	Good	1
_System_LicensedFeatures	String Array	[]	08:07:44.412	Good	5420
_System_OpcClientNames	String Array	[Quick Client]	06:36:372	Good	1
_System_ProductName	String	TOP Server	06:36:372	Good	1
_System_ProductVersion	String	6.16	06:36:372	Good	1
_System_ProjectName	String	default.opf	06:36:372	Good	1
_System_ProjectTitle	String	Untitled	06:36:372	Good	1
_System_Time	String	8:07:44 AM	08:07:44.412	Good	5420
_System_Time_Hour	DWord	8	08:00:00.433	Good	3
_System_Time_Minute	DWord	7	08:00:00.433	Good	3
_System_Time_Second	DWord	44	08:07:00.002	Good	92
_System_Time_LimitedFeatures	String Array	[DNP Client Serial:1709]	06:36:372	Good	1
_System_TotalTagCount	DWord	112	06:36:372	Good	1

OPC Quick Client - DNP_SCADA.etc

File Edit View Tools Help

SWToolbox.TOPServer.V6

Item ID	Data Type	Value	Timestamp	Quality	Update Count
System					
DNP_SCADA.CommunicationSerialization					
DNP_SCADA.Statistics					
DNP_SCADA.System					
DNP_SCADA.Moxa1					
DNP_SCADA.Moxa1.System					
DNP_SCADA.CommunicationSerialization_NetworkOwner	Boolean	0	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_Registered	Boolean	0	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_RegisteredTo	String	N/A	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_StatisticAveNetworkOwnershipTimeSec	Float	0	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_StatisticAveNetworkOwnershipCount	DWord	0	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_StatisticNetworkOwnershipTimeSec	Float	0	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_StatisticsReset	Boolean	0	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_TransactionsPerCycle	Long	1	06:36:374	Good	1
DNP_SCADA.CommunicationSerialization_VirtualNetwork	String	None	06:36:374	Good	1

OPC Quick Client - DNP_SCADA.etc

File Edit View Tools Help

SWToolbox.TOPServer.V6

Item ID	Data Type	Value	Timestamp	Quality	Update Count
System					
DNP_SCADA.CommunicationSerialization					
DNP_SCADA.Statistics					
DNP_SCADA.System					
DNP_SCADA.Moxa1					
DNP_SCADA.Moxa1.System					
DNP_SCADA.Statistics_FailedReads	DWord	0	06:36:375	Good	1
DNP_SCADA.Statistics_FailedWrites	DWord	0	06:36:375	Good	1
DNP_SCADA.Statistics_MaxPendingReads	DWord	0	06:36:375	Good	1
DNP_SCADA.Statistics_MaxPendingWrites	DWord	0	06:36:375	Good	1
DNP_SCADA.Statistics_NextReadPriority	Long	-1	06:36:375	Good	1
DNP_SCADA.Statistics_PendingReads	DWord	0	06:36:375	Good	1
DNP_SCADA.Statistics_PendingWrites	DWord	0	06:36:375	Good	1
DNP_SCADA.Statistics_Reset	Boolean	0	06:36:375	Good	1
DNP_SCADA.Statistics_RxBytes	DWord	538756	08:07:58.925	Good	1406
DNP_SCADA.Statistics_SuccessfulReads	DWord	1457203	08:07:59.403	Good	5438
DNP_SCADA.Statistics_SuccessfulWrites	DWord	0	06:36:375	Good	1
DNP_SCADA.Statistics_TxBytes	DWord	43112	08:07:58.941	Good	1454

OPC Quick Client - DNP_SCADA.etc

File Edit View Tools Help

SWToolbox.TOPServer.V6

Item ID	Data Type	Value	Timestamp	Quality	Update Count
System					
DNP_SCADA.CommunicationSerialization					
DNP_SCADA.Statistics					
DNP_SCADA.System					
DNP_SCADA.Moxa1					
DNP_SCADA.Moxa1.System					
DNP_SCADA.System_AvailableNetworkAdapters	String	Default\Intel(R) Wi-Fi 6E AX211 160MHz Realtek USB GbE Family Controller	06:36:375	Good	1
DNP_SCADA.System_BaudRate	Long	19200	06:36:375	Good	1
DNP_SCADA.System_ComId	String	COM 5	06:36:375	Good	1
DNP_SCADA.System_DatBits	Long	8	06:36:376	Good	1
DNP_SCADA.System_Description	String		06:36:376	Good	1
DNP_SCADA.System_EnableDiagnostics	Boolean	1	06:36:376	Good	1
DNP_SCADA.System_EncapsulationConnectTimeout	Long	3	06:36:376	Good	1
DNP_SCADA.System_EncapsulationInp	String		06:36:376	Good	1
DNP_SCADA.System_EncapsulationPort	Word	2101	06:36:376	Good	1
DNP_SCADA.System_EncapsulationProtocol	String	TCP/IP	06:36:376	Good	1
DNP_SCADA.System_FloatHandlingType	String	Unmodified	06:36:376	Good	1
DNP_SCADA.System_FlowControl	String	None	06:36:376	Good	1
DNP_SCADA.System_NetworkAdapter	String		06:36:376	Good	1
DNP_SCADA.System_Parity	String	Even	06:36:376	Good	1
DNP_SCADA.System_ReportComErrors	Boolean	1	06:36:376	Good	1
DNP_SCADA.System_SharedConnection	Boolean	0	06:36:376	Good	1
DNP_SCADA.System_StopBits	Long	1	06:36:376	Good	1
DNP_SCADA.System_WriteOptimizationDutyCycle	Long	10	06:36:376	Good	1



OPC Quick Client - DNP_SCADA.ots

File Edit View Tools Help

SWToolboxTOPServer.V6

Item ID	Data Type	Value	Timestamp	Quality	Update Count
System					
DNP_SCADA.CommunicationSerialization					
DNP_SCADA.Statistics					
DNP_SCADA.System					
DNP_SCADA.Moxa1					
DNP_SCADA.Moxa1.System					
DNP_SCADA.Moxa1_AuthCurrentUserNumber	Word	1	06:36:36.468	Good	1
DNP_SCADA.Moxa1_ChannelResponseTimeout	DWord	10000	06:36:36.468	Good	1
DNP_SCADA.Moxa1_DeviceRequestQueueDepth	DWord	0	06:36:36.468	Good	1
DNP_SCADA.Moxa1_DeviceRequestTimeout	DWord	30000	06:36:36.468	Good	1
DNP_SCADA.Moxa1_DNPClientAddress	DWord	3	06:36:36.468	Good	1
DNP_SCADA.Moxa1_DNPServerAddress	DWord	4	06:36:36.468	Good	1
DNP_SCADA.Moxa1_EventClassPollInterval	DWord	5	06:36:36.468	Good	1
DNP_SCADA.Moxa1_EventClassPollInterval	DWord	5	06:36:36.468	Good	1
DNP_SCADA.Moxa1_EventClassPollInterval	DWord	5	06:36:36.468	Good	1
DNP_SCADA.Moxa1_IntegrityPollInterval	DWord	3600	06:36:36.468	Good	1
DNP_SCADA.Moxa1_MasterAddress	DWord	3	06:36:36.468	Good	1
DNP_SCADA.Moxa1_SlaveAddress	DWord	4	06:36:36.468	Good	1
DNP_SCADA.Moxa1_TimeoutStyle	Byte	0	06:36:36.468	Good	1
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
DNP_SCADA.Moxa1_Analog_Input_4	Short	41	08:08:19.205	Good	1102
DNP_SCADA.Moxa1_Analog_Input_5	Short	41	08:08:19.205	Good	1102
DNP_SCADA.Moxa1_Analog_Input_6	Short	41	08:08:19.205	Good	1102
DNP_SCADA.Moxa1_Analog_Input_7	Short	41	08:08:19.205	Good	1102
DNP_SCADA.Moxa1_Analog_Input_8	Short	41	08:08:19.205	Good	1102
DNP_SCADA.Moxa1_Analog_Input_9	Short	41	08:08:19.205	Good	1102
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

OPC Quick Client - DNP_SCADA.ots

File Edit View Tools Help

SWToolboxTOPServer.V6

Item ID	Data Type	Value	Timestamp	Quality	Update Count
System					
DNP_SCADA.CommunicationSerialization					
DNP_SCADA.Statistics					
DNP_SCADA.System					
DNP_SCADA.Moxa1					
DNP_SCADA.Moxa1.System					
DNP_SCADA.Moxa1_System_ActiveTagCount	String	29	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_AutoCreateTagDatabase	Boolean	0	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_AutoDemoted	Boolean	0	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_AutoDemotionDiscardWrites	Boolean	0	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_AutoDemotionEnabled	Boolean	0	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_AutoDemotionFailureCount	Long	3	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_AutoDemotionIntervalMS	Long	10000	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_ConnectTimeout	Long	3	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_DemandPoll	Boolean	0	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_Description	String		06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_DeviceId	String	-1	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_Enabled	Boolean	1	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_Error	Boolean	0	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_NoError	Boolean	1	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_ScanMode	String	DoNotScan	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_ScanRateMs	DWord	500	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_SecondsInError	DWord	0	06:36:36.374	Good	1
DNP_SCADA.Moxa1_System_Simulated	Boolean	0	06:36:36.374	Good	1

1.6 Moxa Setup

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



MOXA MGate 5109 www.moxa.com

Model: MGate 5109 IP: 172.18.68.146 MAC Address: 90:90:E8:B3:26:BE
 Name: MGate 5109_9954 Serial No.: TBBLE1039954 Firmware: -2.5 Build 23072412

Serial Settings

Port: 1 Baud rate: 19200 Parity: Even Data bit: 8 Stop bit: 1 Flow control: None FIFO: Enable Interface: RS-232 RTS on delay: 0 RTS off delay: 0

Submit

Main Menu: Quick Setup, Overview, Basic Settings, Network Settings, Serial Settings, Protocol Settings, System Management, System Monitoring, System Status, Protocol Status, I/O Data View, DNP3 Serial Diagnose, Modbus TCP Diagnose, DNP3 Serial Traffic, Restart, Logout

WEB SERVER

MOXA MGate 5109 www.moxa.com

Model: MGate 5109 IP: 172.18.68.146 MAC Address: 90:90:E8:B3:26:BE
 Name: MGate 5109_9954 Serial No.: TBBLE1039954 Firmware: -2.5 Build 23072412

Protocol Conversion

DNP3 Serial Master ↔ Role1 of MGate5109: DNP3 Serial Outstation (Agent) ↔ Role2 of MGate5109: Modbus TCP Client ↔ Modbus TCP Server

Submit

Main Menu: Quick Setup, Overview, Basic Settings, Network Settings, Serial Settings, Protocol Settings, Protocol Conversion, DNP3 Serial Outstation, Modbus TCP Client, I/O Data Mapping, System Management, System Monitoring, System Status, Protocol Status, I/O Data View, DNP3 Serial Diagnose, Modbus TCP Diagnose, DNP3 Serial Traffic, Restart, Logout

WEB SERVER

MOXA MGate 5109 www.moxa.com

Model: MGate 5109 IP: 172.18.68.146 MAC Address: 90:90:E8:B3:26:BE
 Name: MGate 5109_9954 Serial No.: TBBLE1039954 Firmware: -2.5 Build 23072412

DNP3 Serial Outstation Settings

Your device: DNP3 Serial Master ↔ Role1 of MGate5109: DNP3 Serial Outstation ↔ Role2 of MGate5109: Modbus TCP Client ↔ Your device: Modbus TCP Server

Mode selection: Basic Settings

DNP3 address: 4 (0 - 65519)
 Enable unsolicited response: Enable
 Unsolicited response master DNP3 address: 3 (1 - 65519)

Advanced Settings

DNP Object Settings

Object Type	Number of Points	Parameters
Binary Input	0	Default static variation (1: Packed Format) Default event variation (1: Without Time)
Binary Output	0	--
Counter	0	Default static variation (1: 32-Bit With Flag) Default event variation (1: 32-Bit With Flag) Internal memory mapping length (32-Bit)
Analog Input	16	Internal memory mapping length (16-Bit)
Analog Output	0	Internal memory mapping length (16-Bit)

Submit

Main Menu: Quick Setup, Overview, Basic Settings, Network Settings, Serial Settings, Protocol Settings, Protocol Conversion, DNP3 Serial Outstation, Modbus TCP Client, I/O Data Mapping, System Management, System Monitoring, System Status, Protocol Status, I/O Data View, DNP3 Serial Diagnose, Modbus TCP Diagnose, DNP3 Serial Traffic, Restart, Logout

WEB SERVER



Analog Input Settings

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 - DNP3 Serial Traffic
- Restart
- Logout

Analog Input

Number of points: 16

Internal memory mapping length: 16-Bit

Event Settings

Point Index	Default static variation	Default event variation	Class of Event	Event Trigger Method
0	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
1	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
2	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
3	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
4	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
5	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
6	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
7	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
8	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
9	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
10	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
11	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
12	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
13	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
14	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state
15	4-16-Bit Without Flag	2-16-Bit Without Time	0 1 2 3	Change of state

OK Cancel

Modbus TCP Settings

- Main Menu
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Role of MGate5109: DNP3 Serial Outstation

Role of MGate5109: Modbus TCP Client

Client

Initial delay: 0 (0 - 30000 ms)

Max. retry: 3 (0 - 5)

Response timeout: 1000 (10 - 120000 ms)

Modbus Commands

Index	Name	Slave IP Address	Slave ID	Function	Address / Quantity	Trigger	Poll Interval	Endian Swap	
1	Read Holding Registers_1	172.18.68.238	502	1	3	Read address 299, Quantity 16	Cyclic	500	None

Submit

I/O Data View

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 - DNP3 Serial Traffic
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- Logout

Auto refresh

Data flow direction: DNP3 Serial Master ← Modbus TCP Server

Start address(Hex): 0

Length: 128

Format: Hex

Internal Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0000h	01	4E														
0010h	01	4E														
0020h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0030h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0040h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0050h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0060h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0070h	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00



1.7 Janus PLC Setup

CTI Workbench - DNP3_v2

File Edit View Insert Project Tools Window Help

Workspace

- DNP3_v2
 - Exception programs
 - Programs
 - Counter
 - Main
 - MOVW
 - Watch (for debugging)
 - Soft Scope
 - Initial values
 - Fieldbus Configurations
 - Binding Configuration
 - Profiles
 - Global defines
 - Variables
 - Types
 - (All Projects)

IO Drivers

- MOBUS Slave
 - Server - Slave number = 1
 - Holding Registers [300..315]
 - +300: HR300
 - +301: HR301
 - +302: HR302
 - +303: HR303
 - +304: HR304
 - +305: HR305
 - +306: HR306
 - +307: HR307
 - +308: HR308
 - +309: HR309
 - +310: HR310
 - +311: HR311
 - +312: HR312
 - +313: HR313
 - +314: HR314
 - +315: HR315

Name

CTI Workbench - DNP3_v2

File Edit View Insert Project Tools Window Help

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 - +303: HR303
 - +304: HR304
 - +305: HR305
 - +306: HR306
 - +307: HR307
 - +308: HR308
 - +309: HR309
 - +310: HR310
 - +311: HR311
 - +312: HR312
 - +313: HR313
 - +314: HR314
 - +315: HR315

Name	Value
Slave number	1
Server ID	Janus_PLC

CTI Workbench - DNP3_v2

File Edit View Insert Project Tools Window Help

Workspace

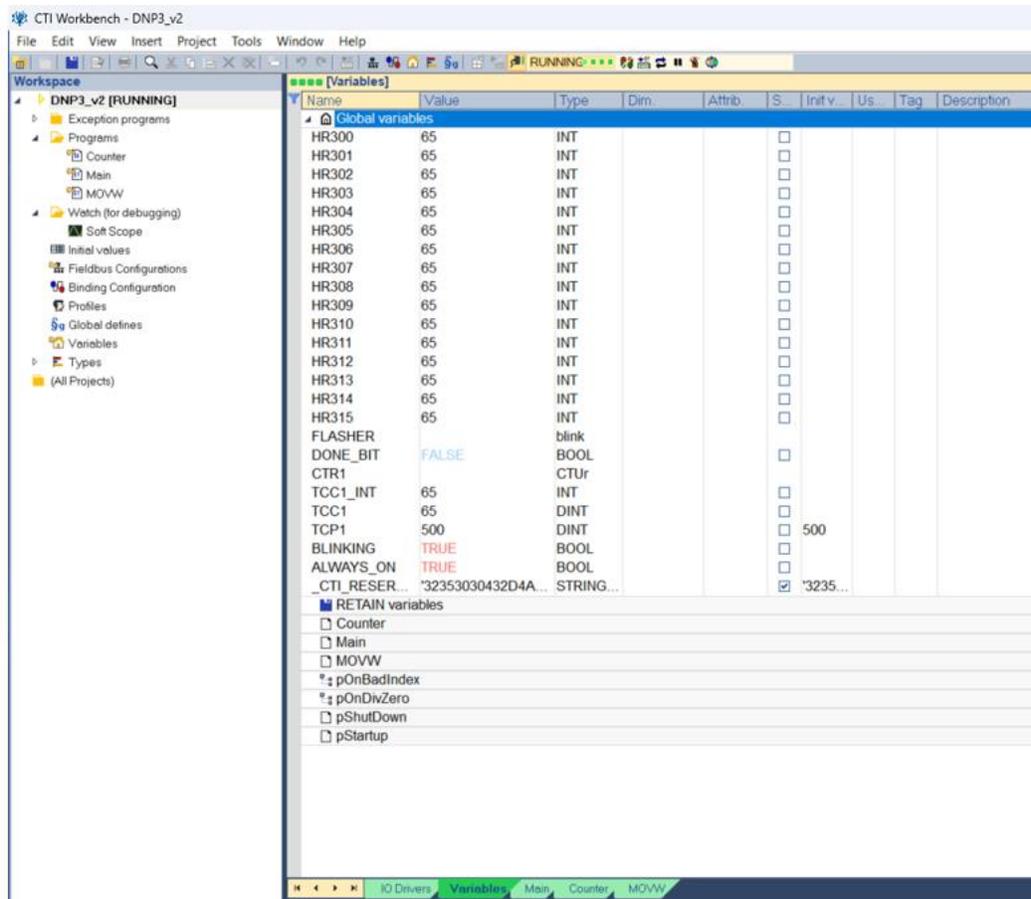
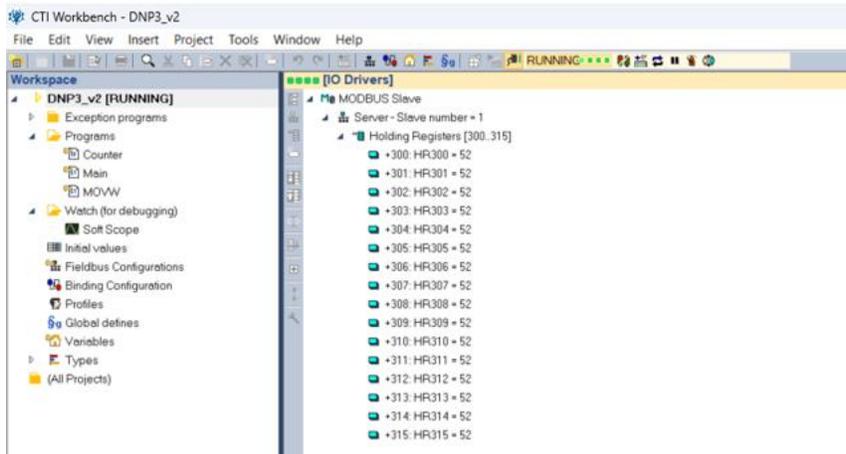
- DNP3_v2
 - Exception programs
 - Programs
 - Counter
 - Main
 - MOVW
 - Watch (for debugging)
 - Soft Scope
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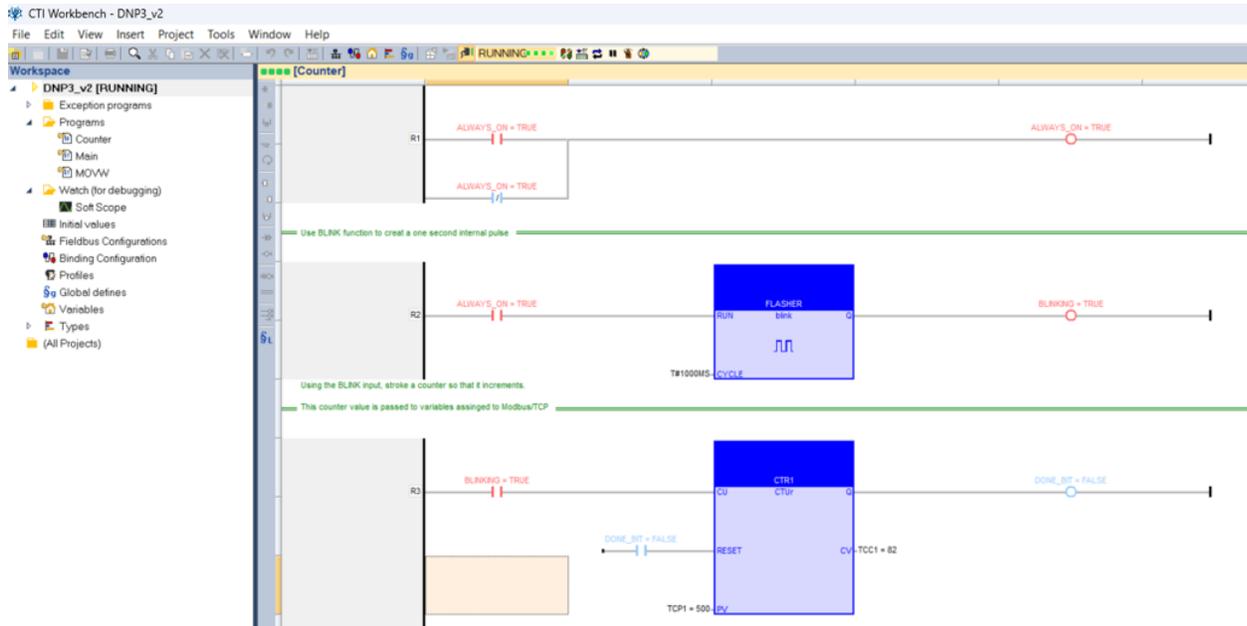
IO Drivers

- MOBUS Slave
 - Server - Slave number = 1
 - Holding Registers [300..315]
 - +300: HR300
 - +301: HR301
 - +302: HR302
 - +303: HR303
 - +304: HR304
 - +305: HR305
 - +306: HR306
 - +307: HR307
 - +308: HR308
 - +309: HR309
 - +310: HR310
 - +311: HR311
 - +312: HR312
 - +313: HR313
 - +314: HR314
 - +315: HR315

Name	Value
Request	Holding Registers
Address	300
Nb Item	16
Description	







CTI Workbench - DNP3_v2

File Edit View Insert Project Tools Window Help

Workspace

DNP3_v2 [RUNNING]

Exception programs

Programs

Counter

Main

MOVW

Watch (for debugging)

Soft Scope

Initial values

Fieldbus Configurations

Binding Configuration

Profiles

Global defines

Variables

Types

(All Projects)

[MOVW]

```

1 // Set up counter value to use for networking
2 //
3 // Convert DINT to INT
4 TCC1_INT 90 := ANY_TO_INT(TCC1 90);
5
6 // Send Counter value to variables mapped to Modbus/TCP
7 HR300 90 := TCC1_INT 90;
8 HR301 90 := TCC1_INT 90;
9 HR302 90 := TCC1_INT 90;
10 HR303 90 := TCC1_INT 90;
11 //
12 HR304 90 := TCC1_INT 90;
13 HR305 90 := TCC1_INT 90;
14 HR306 90 := TCC1_INT 90;
15 HR307 90 := TCC1_INT 90;
16 //
17 HR308 90 := TCC1_INT 90;
18 HR309 90 := TCC1_INT 90;
19 HR310 90 := TCC1_INT 90;
20 HR311 90 := TCC1_INT 90;
21 //
22 HR312 90 := TCC1_INT 90;
23 HR313 90 := TCC1_INT 90;
24 HR314 90 := TCC1_INT 90;
25 HR315 90 := TCC1_INT 90;
26 //

```

