VijeoCitect and W@DE RTU DNP3 Solution



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1.1 Introduction

The purpose of this document is to give you a basic understanding of how to configure VijeoCitect and W@DE RTU(s) to communicate with one another via DNP3 over ethernet. There are many parameters (hundreds) available on both the VijeoCitect and the W@DE RTU side which allow you to adjust how the system functions. We will go over a few of them but it is best to consult the documentation for VijeoCitect DNP driver and the W@DE RTU configuration manuals for more details.

A bit about DNP and VijeoCitect read/writing polling:

DNP is a multi-layered protocol, with transactions occurring on multiple layers. This description is only concerned with protocol transactions handled directly by the VijeoCitect driver.

DNP allows the master (Vijeo Citect) to poll a unit for the current value of a group of pre-configured I/O points, via a single request. This is a Class0 poll (Class 0 has all of the master's relevant I/O points predefined), also termed as STATIC poll. Data reported as a current value is termed *static* data. DNP also allows the master to poll a unit for value changes in a group of pre-configured I/O points, via a single request. This is a Class1, Class2, or Class3 poll (these are all functionally equivalent, but the separate groups afford more flexibility in configuration). Data reported as a change in value (also known as an event), is termed *dynamic* data. An event may also include a timestamp field. DNP allows these different polls to be combined into one request. A poll for Class1, Class2 and Class3 is termed an event poll, as it will acquire all events that have been queued in the device and are awaiting transmission. A poll for Class0, Class1, Class2 and Class3 is termed an integrity poll, as it will acquire all events that have been queued in the device and are awaiting and then it will acquire a snapshot of all the current values.

The VijeoCitect driver allows each unit to have its polling period, and the ratio of integrity polls to event polls, defined. The driver also supports additional functionality such that an operator can generate on demand integrity and event polls.

DNP allows a unit to have the master's address be stored internally, so that the unit(W@DE RTU) is capable of transmitting unsolicited responses of event data to the master(VijeoCitect). An event may also include a timestamp field.

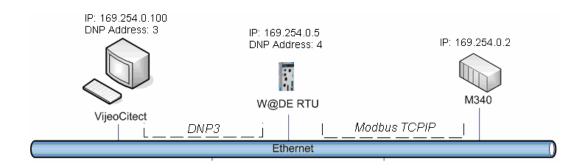
The VijeoCitect driver is capable of receiving and processing responses regardless of whether the response contains static or dynamic data, and regardless of whether the response is initiated by a master's request or initiated as an unsolicited response. All responses are used to update the driver's cache, and relevant time-stamped events are used to update configured time-stamped alarms and trends, via the DriverRuntimeInterface.dll.

Write requests from VijeoCitect may result in a physical write to the device, or they may only write to cache (in the case of internal values, eg OnTime), or they may actually trigger the driver to perform a function (eg Reset Poll Counters).

Read requests from Citect are serviced through the driver's cache. Note: at the time of this document VijeoCitect DNP3 driver 4.02.12.00001 BETA was used.

1.2 Solution Architecture Diagram

The architecture will have VijeoCitect talking DNP3 over Ethernet to a Schneider Electric W@DE RTU which in turn is talking Modbus over TCP/IP to an M340 (as the diagram below shows).



2 W@DE Configuration

2.1 Web browser

It is assumed you have configured your W@DE to utilize DNP3 and that it is on the network with the appropriate IP Address (our case: 169.254.0.5). You should be able to go to your web browser and bring up the login page for the W@DE configurator. You should login with admin privileges (default: username:adm pwd:adm).

Please consult the W@DE User Manual if you can not get to the W@DE Configurator web page.

2.2 Settings|Operation Mode Menu

Configuration should be as follows:

	Schneie Geleo	der	Home		WA	DE		
	Monitoring	Control	Administrator Diagi	nostic	Mainte	nance	Setti	ngs
	Com	municati	on general p	arameters	S			
cation p	arameters on physical ports							Communi
	DNP3							Protocol:
Node:	No report by exception 💌	Link:	Normal	▼ Me	edia:		•	Port 1
	DNP3							Protocol :
Node:	No report by exception 🔽	Link:	Off	▼ Me	edia:		-	Port 2
cation p	arameters on TCP/IP ports							Communi
	DNP3 over TCP/IP	Link:	Normal 💌					Protocol :
		Save						

2.3 Settings | Protocolor. + TCP/IPor.1)) Menu

2.3.1 DNP3 IP Parameters Configuration section SCADA IP Address= IP address of the SCADA server

	Protocol Parameters DNP3								
DNP3 IP P	DNP3 IP Parameters Configuration								
	SCADA IP address	169.254.0.100	TCP Port	20000					
	Connection Mode	Server 💌	Outgoing TCP Port	20000					
Port 3:	Dest UDP Port	20000	Init UDP Port	20000					
	Local UDP Port	20000	UDP Mode	Configured value					
	Timeout	60 s							
	SCADA IP address	0.0.0.0	TCP Port	20000					
	Connection Mode	Server	Outgoing TCP Port	20000					
Port 4:	Dest UDP Port	20000	Init UDP Port	20000					
	Local UDP Port	20000	UDP Mode	Configured value					
	Timeout	60 s							

2.3.2 DNP3 Parmeters Configuration

Port 3: SCADA Address is the DNP Address of VijeoCitect (3 in our case)

Device Address is the DNP Address of the W@DE (4 in our case)

DNP3 Para	DNP3 Parameters Configuration							
Port 3:	SCADA address	3	Device address	4				
Port 4:	SCADA address	0	Device address	0				

We are only utilizing Port 3:

2.3.3 Application Layer

This is where we actually can configure the W@DE to send unsolicited responses via a specific DNP Class. Here we are telling W@DE to only send unsolicited responses for DNP Class1 objects.

Applicatio	on layer				
	Sends unsolicited responses	Yes 💌	Class1 🗹 Class2 🗆	Class3)
Port 3:	Unsolicited wait delay	1000 ms	Objects Index		16 💌 bits
	Maximum application re-tries	3	Application time-out		60000 ms
	Requires application confirm	No	Handle requested object	t unknown bit	Yes 💌
	Select Timeout	5 s	Clock validity		3600 s
	Use of double-bit binary input	Yes 💌	TM read mode		Standard 💌
er e M	F <mark>rank</mark> ia (manakining manakini Man Manakini Manakini Man	a Real Distance	man <mark>alles da</mark>	<u></u>	a constant and constants
and a state of the	<u>م</u> اجا	5 <u></u> jous			
littatiitin tiim	_	000 ms	Maximum applicatio	in ine-triieis-1. 3	Арр
	Handle requested object unknow	vn bit Ves 💌		equires application co	nfirm No 💌
	Clock validity	3600	s Se	elect Timeout	5 s
	. JM read mode	Stenderd	Us	e of double bit biner	ipput Yes y

We are only utilizing Port 3.

2.4 Settings|Operation Mode Menu

Here is where we are telling the W@DE that we will communicate DNP3 over TCP/IP on the TCP/IP ports. Your configuration should be as follows:

Communication general parameters									
Communication parameters on physical ports									
Protocol :	DNP3								
Port 1 Mode:	No report by exception	Link:	Normal	-	Media:		▼		
Protocol :	DNP3								
Port 2 Mode:	No report by exception 💌	Link:	Off	T	Media:		-		
Communication	arameters on TCP/IP ports								
Protocol :	DNP3 over TCP/IP	Link:	Normal 💌						
		Save							

2.5 Settings Modbus Master Communication Menu

2.5.1 Modbus TCP Client Parameters

Here we will configure the W@DE to use port 502 to communicate to the PLC. We can also setup different scan groups (Topics) on how often we want the W@DE to scan the PLC for data. In our example we will only configure Topic 1 at a 1sec scan rate. The Modbus Slave Address of the PLC is 2. When we create the variable object in the W@DE, we will assign the object to a Topic.

Your configuration should be as follows:

	Modbus master Communication Configuration									
Gene	General Parameters									
Seria	I Line Interface:	RS485 -	Reply Timeout:	1000 ms						
		Polarization:								
Tran	smission speed:	19200 V bauds	Parity: Even	Number of stop bits	1					
maxi	mum frame length:	255	Event Polling period: 1000) ms						
Address Gap Span: 0			No complementary filtered	time:	1000 ms					
Even	ts on validity change:									
Mod	bus TCP Client Parame	eters								
Serv	er Port 🛛 🤇	502	Connection Timeout	60 s						
Торі	C									
1	Slave Address:	2	Watch period:	1000 ms	Topic On: 🔽					
2	Slave Address:	1	Watch period:	2000 ms	Topic On: 🔽					
3	Slave Address:	1	Watch period:	3000 ms	Topic On: 🔽					
4	Slave Address:	1	Watch period:	4000 ms	Topic On:					
5	Slave Address:	1	Watch period:	5000 ms	Topic On: 🔽					

2.6 Settings|Slaves Configuration Menu

Define the IP Address of the M340 (Slave Device) and make sure it is 'Active'.

		Schne	ider	Home	10/05		
-		Ű	ider Electric	Administrator		Æ 8 :	
	Monit	oring	Control	Diagnostic	Maii	ntenance	Settings
			Slaves C	Configuration			Add
	Sla	ive:	Events:	Time Format:	Time Syn	chronisation:	IP Address:
	Active	Туре	Address		Address	Period	
+	1 OFF 💌	other 💌	1	Type CEI (4 words)	0	0 x10s	192.168.3.71
)+	2 ON 💌	other 💌	2	Type CEI (4 words)	0	0 x10s	169.254.0.2
				Save			

2.7 Settings|Classes Configuration Menu

The Class here is <u>not</u> the DNP Class. This is just a means to organize your data for viewing within the W@DE web environment (Monitoring Menu).

Classes configuration							
18 🙈	Class name	Confirm					
	My Class Name Here	Save					
	Digital Inputs	Save					
	Internal Information	Save					
	M340	Save					
	Quantum	Save					
	CH2M Hill Test	Save					
	Austin	Save					
	Delete						

Cal		Home				
Sch	Schneider Electric			WA	DE	
Monitoring	Control	Administrator Diagno:	stic	Mainten	ance	Settings
		E	quipm	ent status		
Classes	Label			Status		
- <u>CH2M Hill Test</u>	CH2M Hill Test					
	Pump in Auto_100002			Manual		
	Pump Fail Status_1000	004		Normal		
	Pump Run Status_000	Pump Run Status_000040		Running		
	Pump Start Cmd_0000	050		Start		
	Pump Stop Cmd_0000	152		Off		
	Valve in Auto_400035.	2		Manual		
	Valve Open Status_40	0035.4		InActive		
	Valve Close Status_4	00035.7		Inactive		
	Valve Open Cmd_4000	037.3		Inactive		
	Valve Close Cmd_400	037.6		Inactive		
	Pump Start Setpoint_	400020		6.00		
	Pump Stop Setpoint_4	400022		2.00		
	Valve Open Setpoint_	400030		6.00		
	Valve Close Setpoint	400032		3.00		
	Flow_400005			2519		
I						

2.8 Settings|Variable Configuration Menu

Define a variable object. Depending on the variable type (DI/DO/AI/AO) you will have different configuration screens. In this document, we will define AI, AO, DI, and DO as these will be used in the VijeoCitect demonstration.

2.8.1 Adding a variable of type Al

Measur	ement c	onfigura	tion					
General Par	ameters							
Variable na	ne	Flow_400005	5			Correction factor	Direct	-
Logical Add	ress:	Al12 🔻	Class:	CH2M Hill Te	est 💌	Access:	DISPLA	Y
Internal Add	iress:	0,0				External Address	: 108,2	
Unit:				Scale:	Max va	lue: 0	Min value: 0	
Modbue Ma	tar.Commu	sication name	natasan penenn	14400 B20				
	Topic		1 💌		Туре:	16 bits word	•	
0 💌	Slave Addre	ess:	2	Word:	4	Bit:	0 💌	Length:
	Read function	on:	03: Read Holdi	ng Registers 💌				
	Periodic tre	atment	🗹 Log				Event 🗖 Dia	I-Up
			Period 10 se	c 💌	Type Samp	le 💌 Peri	od 10 sec 💌	
	Threshold t	reatment	🗖 Log				Event	Dial-Up
	High thresh	old	Value	16000				
	Low thresh	old	Value	2500				
	Dead band		🗖 Log				Event	Dial-Up
	Method		Fixed		Value	100	0	
	Minimum va	ariation	0					
	Alarms con	figuration						
	Alarm level	:	1					
	Min and Ma	x log		Maximum	Active		Minimum Active	e
	Period value	е	1 Day 💌					
				Sa	ve Cance	el Delete		

- General Parameters:
 - š Variable Name DNP Object Name
 - š Class: W@DE class as defined in section 2.7
 - š External Address: <DNP Address>, <DNP Class> DNP Address is a unique number between 0-65565. DNP supervisor (VijeoCitect) will utilize this reference to access the object. DNP Class is optional. On our variable set it to be of DNP Class2. If you omit the DNP Class, it defaults to Class1.
- Modbus Master Communication Parameters
 - š Topic: Topic to which variable is attached as defined in secton 2.5.1
 - š *Type*: Configurable on analogs.
 - š Slave Address: To overwrite the Slave Address defined in Topic
 - š Word: Word address in the PLC of the analog information (example here is %MW4, the modbus address of the Variable (Flow_6 T005) is 6 T005 and the address entered here is based upon IEC 0: %MW4)
 - š *Read Function:* Modbus function to be used by the W@DE to read the data from PLC.

- Peroidic Treatment
 - š Log : Period defines how often to log into Measures Log (Diagnostics|Measures Log menu) within W@DE RTU.
 - š *Event*: Activate saving of event to the DNP protocol event stack according to the Type and Period criteria (create event of sample type every 10 sec).
- Threshold Treatment
 - Log and Event same as Periodic Treatment only based on thresholds.
- Dead band
 - Log and Event same as Periodic Treatment only based on deadband
- Alarms Configuration
 - Alarm Level is the W@DE Alarm Level configured under the Settings|Alarms menu (not used in this demo)
- Min and Max Log
 - Period of the logs defined.

Adding a variable of type AO

a valiable	or type AO			
Measurement c	onfiguration			
General Parameters				
Variable name	Valve Open Setpoint_400030		Precision	0,01 💌
Logical Address:	A04 Class:	CH2M Hill Test	Access:	DISPLAY
Internal Address:	0		External Address:	106
Unit:		Scale: Max v	alue: 100 Min	value: 0
Modbus Master Commu	nication parameters			
Торіс	1	Type: Real	(L/H) 💌	Read only:
Slave Address:	2 Word:	29 Bit:	0 🔽	Length:
Read function:	03: Read Holding Registers 💌	Write	function:	16: Write Registers 💌
Periodic treatment	🗖 Log		🗾 🗹 Event 🗖 Dial-Up	
	Period 15 min 💌	Type Average	Period 10 sec 💌	
Threshold treatment	🗖 Log		Event	🗖 Dial-Up
High threshold	Value 0			
Low threshold	Value 0			
Dead band	🗖 Log		Event	🗖 Dial-Up
Method	Fixed 💌	Value	10	
Minimum variation	In			
configuration				Alarms
level: 1 🔽				Alarm
d Max log	Maximum Active		Minimum Active	Min an
value 1 Day	•			Period
	Save	Cancel Delete		
	Jave	Delete		

The same as AI with a few fields to explain:

- š *External Address:* When we just enter the DNP address with no DNP Class the object defaults to Class1
- š *Write Function*: Since this is an AO we can write to the object so we have to setup the write function.

2.8.2 Adding a variable of type DI

Digital input cor	nfiguration		
General parameters			
Variable name:	Valve Open Status_400035.4	Туре:	C Double C Single
Logical address	DI13 Class CH2M Hill Test	Access	DISPLAY
Internal address:	0,0	External address:	104,1
Active/Inactive status definition:	Active (1): Open O	Inactive (0): InActive	
Modbus Master Commu	nication parameters		
Торіс	Type: single b	it 💌	
Slave Address:	2 Word: 34 Bit:	4 💌	
Read function:	03: Read Holding Registers 💌		
Log configuration			Activate
On status change	On active 🔽	On inactive	
Alarms configuration			Activate
On status change	On active 🔽	On inactive	
Alarm level :	1		
Delayed alarm	0 Hours O Minutes O Seconds		
	Save Cancel Dele	te	

The same as AI with a few fields to explain:

- š Active/Inactive Status: This is how you want it displayed on the screen in the Monitor menu. In the example here we will display words (Open or Inactive) based on the bit being on or off. It will also have a background color of red for Open and Green for Inactive.
- š Note that for digital data any change of state on a variable <u>automatically</u> generates recording in the protocol event stack. For the other types of variables (AI, AO,etc) it is configurable.

2.8.3 Adding a variable of type DO

Control order configura	ation			
General parameters				
Variable name:	Valve Open Cmd_400037.3	Туре:	C Double C Si	ngle
Access	DISPLAY	Order	Normal 💌	
Class	CH2M Hill Test			
Logical address	D08 🔽	Internal address:	0,-1	-
Logical address of associated input	DI15 🔽	External address:	102	-
Active/Inactive status 1): Journ	C Inactive (0):	.	definition:	Active
parameters			Modbus Master Commu	unication
Туре:	single bit 💌	Read only:	Торіс	1
Word: 36	Bit: 3 💌		Slave Address:	2
id Holding Registers 💌	Write function:	06: Write Register 💌	Read function:	03: Re
		Activate	Log configuration	
/e 🔽	On inactive		On status change	On acti
			Alarme configuration	
		فليب اعلمه الم		

Same as DI configuration.

3 VijeoCitect Configuration

3.1 Introduction

This manual assumes that you understand the basic concept of communication configuration within VijeoCitect including cluster configuration requirements.

3.2 Communication Configuration

Step 1: In your project, launch the Communications Setup Wizard and configure a device for DNP filling out the appropriate info as required.

Step 2: Manally define:

Cluster: < Give it a name>

Network : Use loopback (127.0.0.1) for standalone system

Assign the Cluster and Network to the IOServer, Alarm, and Trend Servers configuration as shown.

Citect Project Editor [Wade_Demo] - COMPILED			
e Edit Tags Alarms System Communication Servers Tools Window He	lp		
<u> </u>	1 📓 🥏		
	🛄 I/O Server [Wa	ade_Demo]	
	Cluster Name	Cluster1	•
	Server Name	IOServer1	
	Network Addresses	Local	Port
Cluster [Wade_Demo]			Peer Port
Cluster Name Cluster1	Comment		
Comment	Add	<u>Renlace</u> <u>Delete</u>	Help
Add Replace Delete Helo	🔁 Alarm Servers	[Wade_Demo]	
Record: 1	Cluster Name	Custen	
	Server Name	AlarmServer1	Mode Primary
Network Addresses [Wade_Demo]	Network Addresses	(bal	Port
Name Name	Comment		
Address 727.000	Add	Replace Delete	
Comment			
Add Replace Delete Help	Trend Servers		
	Cluster Name	Cluster1	<u> </u>
Record : 1	ServerMame	TrendServer1	Mode Primary
	Network Addresses	(Local	Fot
	Comment		
	Add	<u>R</u> eplace <u>D</u> elete	Help

×					
Citect Project Editor [Wade_Demo] - CO					
File Edit Tags Alarms System Communicati	· · · · · · · · · · · · · · · · · · ·				
<u> </u>	16 <u> 99 R</u>	2			
🛄 Boards [Wade_Demo]					
Server Name IOServer1	<u> </u>				
Board Name BOARD1					
Address 0 I/OPort	Interrupt			_	
Special Opt	🛄 Ports [Wade_Demo]		_ 🗆 🗡	J	
Comment	Server Name IOServer1	-	<u> </u>		
	Port Name PORT1_BOARD1	Port Number	1	-	
Add Replace Delei	Board Name BOARD1 -				
Record : 1	Baud Rate	Data Bits			
		-			
	Stop Bits	Parity			
	Special Opt -I169.254.0.5 -P2000	00 -T			
	Comment				
		🛄 I/O Device	s [Wade_Demo]		
	Add Replace	Server Name	IOServer1	<	
	Record : 1	Name	Wade_DNP	Number	1
		Address	4		
		Protocol	DNPR 💌	Port Name	PORT1_BOARD1
				(
		Memory			_
		Comment	1		
		Add	Replace	Delete	Help
					0.10
		Record: 1			

You should have the following configuration for Boards, Ports, and IODevices:

Note the following:

- S Port configuration is where the wizard places the IP address of the W@DE (-i<no space>IP Add) and also the TCP Port as configured in the W@DE's DNP3 IP Parameters Configuration (-P20000).
- š IODevice is the place where the Wizard places the DNP address of the W@DE (4).

	Protocol Parameters DNP3						
DNP3 IP P	arameters Configuration						
	SCADA IP address	169.254.0.100	TCP Port	20000			
	Connection Mode	Server	Outgoing TCP Port	20000			
Port 3:	Dest UDP Port	20000	Init UDP Port	20000			
	Local UDP Port	20000	UDP Mode	Configured value			
	Timeout	60 s					
	SCADA IP address	0.0.0.0	TCP Port	20000			
	Connection Mode	Server	Outgoing TCP Port	20000			
Port 4:	Dest UDP Port	20000	Init UDP Port	20000			
	Local UDP Port	20000	UDP Mode	Configured value			
	Timeout	60 s					
DNP3 Par	ameters Configuration						
Port 3:	SCADA address	3	Device address	4			
Port 4:	SCADA address	0	Device address	0			

š -T option on the Ports form tells the driver to us TCP and not UDP (-U option).

Step 3: VijeoCitect INI File Settings

You will want to set the following DNPR parameters in the Citect.ini file (thru the Computer Setup Editor). For more details on the available parameters and their descriptions please see the DNPR documentation for VijeoCitect (there are many parameters).

[DNPR]

SCADAAddress=3 ! The DNP Address Matches W@DE configuration for the SCADA in DNP3 Parameters

EventPollPeriodDefault=30 !Event Polls occur every 30 sec

EventPollRatioDefault=2 !After every 2 Event Polls on the next poll do Integrity Poll – ePoll, ePoll, iPoll, ePoll...

ProcessTrendEvents=1 !Turn on if you want event trends process by the driver otherwise only alarm events on

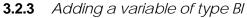
3.2.1 Adding a variable of type Al

Configure a variable tag called *Flow* with an Address of Al0108.Val (108 is the DNP address defined in the W@DE configuration. Set the Eng and Raw scales as shown below (since this is the LONG and we will want to trend it – remember if no scaling defined it defaults 1-32000 so need to specify limits.)

	Measurement configuration								
	General Parameters								
,	Variable name	Flow_400005				Correction factor	Direct	v	
1	Logical Address:	Al12 🔽	Class:	CH2M Hill Test	-	Access:	DISPLAY	•	
	Internal Address:	0,0				External Address:	108,2		
	Unit:			Scale:	Max valu	ie: 0	Min value: 0		
-					-				
Variable Ta	ags [Wade_Demo]				- 0				
Variable Tag Na						_			
Cluster Name	Cluster1		I/O Device Na	me Wade_DNP	_				
Address	Ai0108.Val		Data Type	LONG					
Raw Zero Scale			Raw Full Scale						
Eng Zero Scale		_	Eng Full Scale						
Eng Units	GPM	-	Format		-				
Deadband			ronnac	1	<u> </u>				
Comment									
Commeric	1								
Add	<u>R</u> eplace	Delete	Help						
Record : 1			Linked: No			•			

Because we want to display the timestamps on the screen, we want to create VijeoCitect tags that will hold the timestamps. The timestamp is coming from the W@DE and is embedded in the DNP message to VijeoCitect on each object read/event. To get to it, we will define 2 tags (a .TS – time seconds and a .TMS – time millisecond). The VijeoCitect driver will automatically grab the time stamps from the DNP protocol message and place them within the defined variable tags. You will see how we utilize these tags later when we display them on the screen.

🋄 Variable Tags [V	¥ade_Demo]								
Variable Tag Name	Flow_TS								
Cluster Name	Cluster1	▼ I/C) Device Name	Wade_DNP	▼ .				
Address	Ai0108.Val.TS	Da	ta Type	LONG	•				
Raw Zero Scale		Ra	w Full Scale						
Eng Zero Scale		En	g Full Scale						
Eng Units	•	Foi	rmat		-				
Deadband			🛄 V a	ariable Tags [\	₩ade_Demo]			
Comment	Analog Input Time Stamp Se	conds since 197	0 Varia	ble Tag Name	Flow_TMS				
		1	1	er Name	Cluster1		I/O Device Name		
Add	<u>R</u> eplace <u>D</u> elete		· · · · · · · · · · · · · · · · · · ·	<u> </u>	T I-U COSSER -		- D-1- T	LSN1	-
				R	aw Zero Scale			Raw Full Scale	
				E	ng Zero Scale			Eng Full Scale	
				▼ E	ng Units		•	Format	
				D	eadband				
				C	iomment	Analog Inpu	t Time Stamp MiliSeconds :	since Midnig	
					Add	<u>R</u> eplace	Delete	Help	
				_ ,	Record: 3			Linked: No	
3.2.2 Ad	lding a variable	of type A	40					200001110	
🛄 Variable Tag	s [Wade_Demo]					-			
Variable Tag Nam	e Pump_Start_Setpoint					▲			
Cluster Name	Cluster1	•	I/O Device Name	Wade_DNP	-				
Address	Ao0115.Val.FLOAT		Data Type	REAL	-				
Raw Zero Scale			Raw Full Scale						
Eng Zero Scale		🛄 ¥ariable Ta	ags [Wade_De	mo]					
Eng Units	FT 💌	Variable Tag Na	ame Pump_St	art_Setpoint_wr	ite				
Deadband		Cluster Name	Cluster1		-	I/O Device Name	Wade_DNP 💌		
Comment		Address	Ao0115.	SELECT.FLOAT		Data Type	REAL		
Add	Replace Del	Raw Zero Scale	•			Raw Full Scale			
		Eng Zero Scale				Eng Full Scale			
Record : 19		Eng Units		•		Format	•		
			Deadband			i			
			Comment						
					1				
			Add	Replace	De	lete Hel			
		_	Record : 20				Linked: No		



	0	51		
🛄 Variable Tags	[Wade_Demo]			
Variable Tag Name	Pump_in_Auto			
Cluster Name	Cluster1	I/O Device Name	Wade_DNP	
Address	Bi0110.Val	Data Type	DIGITAL	
Raw Zero Scale	🛄 Variable Tags [Wade_Demo]		I
Eng Zero Scale	Variable Tag Name	Pump_in_Auto_TS	_	1
Eng Units	Cluster Name	Cluster1	▼ I/O Device Name Wade_DNP ▼	
Deadband	Address	Bi0110.Val.TS	Data Type LONG 💌	
Comment	Raw Zero Scale	🛄 Variable Tags [Wade_Demo]	
Add	Eng Zero Scale	Variable Tag Name	Pump_in_Auto_TMS	L
Record : 11	Eng Units	Cluster Name	Cluster1 I/O Device Nam	ne Wade_DNP 💌
Record, II	Deadband	Address	Bi0110.Val.TMS Data Type	LONG
	Comment	Raw Zero Scale	Raw Full Scale	
)	Add	Eng Zero Scale Replace	Eng Full Scale	
	Record : 13	Eng Units	Format	•
	Record: 13	Deadhard		

3.2.4	Adding a varia	able of type BO
-------	----------------	-----------------

🋄 ¥ariable Tags [\	Wade_Demo]						
Variable Tag Name	Pump_Stop_Cmd						
Cluster Name	Cluster1	▼ I/C	Device Name Wade_DNP	•			
Address	Bo0114.Val	Dal	ta Type DIGITAL	•			
Raw Zero Scale		🛄 Variable Tags [\	Wade_Demo]				
ile.		Variable Tag Name	Pump_Stop_Cmd_Latch				<u> </u>
	▼	Cluster Name	Cluster1	•	I/O Device Name	Wade_DNP	-
		Address	Bo0114.SELECT.LATCH		Data Type	DIGITAL	-
		Raw Zero Scale			Raw Full Scale		
Replace	Delete	Eng Zero Scale			Eng Full Scale		
.1		Eng Units	•		Format		•
		Deadband					
		Comment					
		Add	<u>R</u> eplace <u>D</u> elete		Help		
		Record : 22			Linked: No		•

3.2.5 Add Alarm Configuration

Step 1: Create the Category so that we can see the millisecond information (timestamp from RTU) on the alarm page in runtime.

🛄 Alarm Ca	itegories [Wade_Demo]	
Category Nu	mber 1 Priority 1	
alay on Alarm P	age TRUE TRUE Display on Summary Page TRUE	D isp
	Unacknowledged Acknowledged	
m Off Font		Ala
m On Font		Ala
bled Font		Disa
Action		ON
Action		OFF
Action	_	AC
m Format .	{DATE, 10}^t {TIME,14}^t {Millisec,3}^t {TAG,8}^t {NAME,8}^t {DESC,8]	Ala
mary Format	{TAG,10}^t {NAME,12}^t {SUMDESC,10}^t {ONTIME,12}^t (OnMill,3}^t 📻	Sun
mary Device	tog Alarm Transitions	Sur
Device		Log
nment		Con
Add	Replace Delete .Help	
cord :1.		Re

Step 2: Create a Time Stamped Digital Alarm and Time Stamped Analog Alarm (as shown). Assigamped 3c

3.2.6 *Trend Configuration*

Configure an Event Trend (only event trends are supported for pushing data and timestamps in from the RTU).

🍓 Citect P	Project Editor [Wad	e_Demo] - COMPILE	D	
File Edit	Tags Alarms System	m Communication Se	rvers Tools Window Help	
<u> </u>	Variable Tags Local Variables			
		🛄 Trend Tags [W	/ade_Demo]	×
	Trend Tags SPC Tags	Trend Tag Name	Flow	4
		Cluster Name	Cluster1	
		Expression	Flow	
		Trigger		
		Sample Period	00:00:10 Type TRN_EVENT	
		Comment	Water Flow Trend	
		Add Record : 1	Replace Delete Help	

3.3 Graphics Page Configuration

The easiest thing to do is utilize the WADE_Demo project created for distribution with this document.

If you don't have a copy of the project you can create a display with the following examples

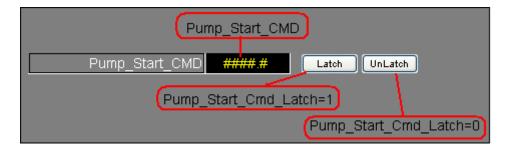
For an AI (and BI) tag type such as Flow (ReadOnly):

TimeToStr(Flow_TMS,6)	
Value	RTU Time Stamp
Flow #### EU ####.	# #####.#
Flow	TimeToStr(Flow_TS, 9)

For an AO tag type such as Pump_Start_Setpoint:

Appearance Tab: Display Value: Pump_Start_Setpoint Pump_Start_Setpoint
Input Tab: Key Sequence: ####Enter Command: Pump_Start_Setpoint_write=ArgValue1

For an BO tag type such as Pump_Start_CMD:



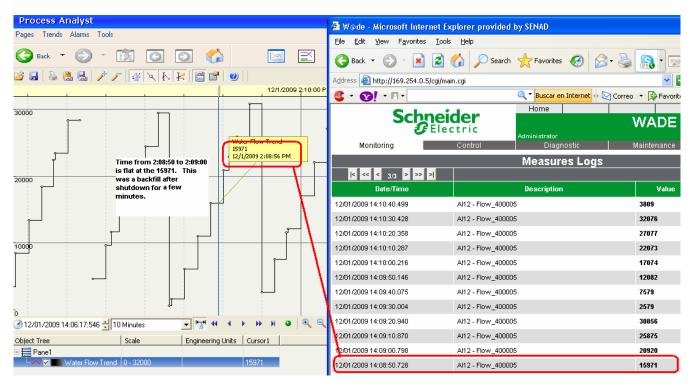
5 Trend Demonstration

Step 1: Go into runtime and confirm comms

Step 2: Go to Process Analyst and add a Trend Pen.

Step 3: Right mouse click and right mouse click. Go to Properties. On the Main Page tab under Process Analyst View|Pane1 select <your trend name>. On the Appearance Tab to the right select Interpolation: Stepped.

Step 4: Open the W@DE Diagnostic Measures Log side by side with Process Analyst. You should see the trend values match.



Step 5: Disconnect the Ethernet cable from the SCADA PC (to simulate a lost of communication) and wait a specified time period. Observe the display that was built in Section 3.3 and notice the data has gone to #COM indicating the lost of real time data. On the W@DE web interface go to the W@DE Measures log and observe samples being logged (remember in the W@DE config we said log every 10 sec). The W@DE will have put an event on the Protocol Event Stack every 10 sec as we have configured.

Step 6: Observe 4-5 samples enter the log and then reconnect the VijeoCitect network connection. Upon reconnection of comms between VijeoCitect and the W@DE, VijeoCitect will go and read from the Protocol Event Stack (which contains the events in the W@DE) bringing in the 'missed' trend data and inserting it into the SCADA trend system. Next go to the Process Analyst, and when VijeoCitect finishes obtaining all the event data you will see the trend data fill in appropriately (this may take a minute to process the events). Check the data with that which is logged in the Measures Log (as shown above). This proves that VijeoCitect has gone out to the W@DE, pulled the Events off the Protocol Event Stack, and insert the data into the SCADA trend system. All this is done automatically by the VijeoCitect driver.