



DNP3 Configurator

Instruction Manual

DNP3 CONFIGURATOR (SECOND EDITION REV 1)

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CHAPTER 1: START HERE...

About this Manual

It is important that this manual is referred to for correct operation.

This manual has been written for people who need to use a DNP3 configuration (.xml file) to load onto an Ultimate controller.

In producing this manual, it has been assumed that the reader has some experience of communication protocols and is familiar with the Pulsar range of instruments.

Disclaimer: *Pulsar accepts no responsibility for any loss or damage caused by the misapplication of the information contained in this document.*

Tips



TIP: Look for this icon throughout your Pulsar Measurement manual to find helpful information and answers to frequently asked questions.

Additional Information

Additional Information

At various parts of the manual, you will find sections like this that explain specific things in more detail.


CHAPTER 2 ULTIMATE IMPORT/EXPORT XML FILES


Overview


The configuration of the RTU is stored as a file called rtuconfig.xml. This file can be read from the Pulsar PC configuration DNP3 configurator. Changes can be made in the software and saved back into an xml file, which is a proprietary format, ready to be programmed into the Ultimate.

Creating an XML file using the Ultimate

To make changes to the RTU via the Ultimate controller, you must first have a profile (program) setup in Ultimate. Or to create a new xml file to export, you will first need to create a profile on Ultimate.

Enter program mode by pressing the  button and keying in the passcode **1997**.

Now select the Advanced Config menu option  where you will see a new screen appear for the menu options now available.

From the menu options available please select the communication option , and once selected you will now see the Comms Setting screen as shown below:




Port	Connecting Mode	DialUp Number	Network Protocol	EndPoint Type	Network IP Address	Server Port
1. None	NotUsed		None	Listen		20000
2. None	NotUsed		None	Listen		20000
3. None	NotUsed		None	Listen		20000
4. None	NotUsed		None	Listen		20000
5. None	NotUsed		None	Listen		20000
6. None	NotUsed		None	Listen		20000
7. None	NotUsed		None	Listen		20000
8. None	NotUsed		None	Listen		20000
9. None	NotUsed		None	Listen		20000
10. None	NotUsed		None	Listen		20000

Creating and exporting an xml file

To create and export an xml file you would first need to setup your profile and return to run mode, so that the changes made are conveyed to the Ultimate's RTU correctly.

Ensure that the external SD card is placed into its slot correctly. Return to program mode and back to the Advanced Configuration menu and choose the Communications menu option. Select the DNP3/WITS Setup tab in the Comms Setting screen and you should now see the screen below (example shown below does not have any customer settings programmed in):

The screenshot shows the 'Comms Setting' screen with the 'DNP3/WITS Setup' tab selected. The screen displays various configuration fields for a DNP3/WITS connection. At the top, there's a status bar with the Pulsar logo, 'Level' indicator, and a red alarm icon. Below the title bar, there are tabs for 'DNP3/WITS Connections', 'DNP3/WITS Setup', 'Comms Setup', 'Serial RS232/485', 'Master Setup', 'Internal Modem', and 'Modem Info'. The 'DNP3/WITS Setup' tab is active, showing fields for Station Name, Station Id, Station Location, Authentication (checkbox), Dest Addr (3), Source Addr (4), Key Change Int (20 min), Log Size (8192 kB), Log Thresh (80 %), Repeat Int (1440 min), and Scheduled Time (Fri, 25 Jan 2019 @ 11:07). At the bottom, there are buttons for 'Generate Template BCF', 'Generate Device BCF', 'Authentication Hash Key', 'Export Device XML', 'Import Device XML', and 'Generate Device XML'.

To export the xml file to the SD card, press the  button to begin the export process to the SD card. The file will be saved on the SD card as an rtu.xml file on to the SD card, which can be used to set up another Ultimate or read and changed using the Pulsar DNP3 software.


Important Information


Prior to exporting the xml file, the Ultimate will need to be returned to run mode to convey all new changes to the Ultimate RTU. Once completed return to program mode and export the xml file.

Importing an xml file using Ultimate


This is done in the same way as exporting an xml file. To import an xml file, you must have the file created by the Pulsar DNP3 software configuration software or from another Ultimate Controller.

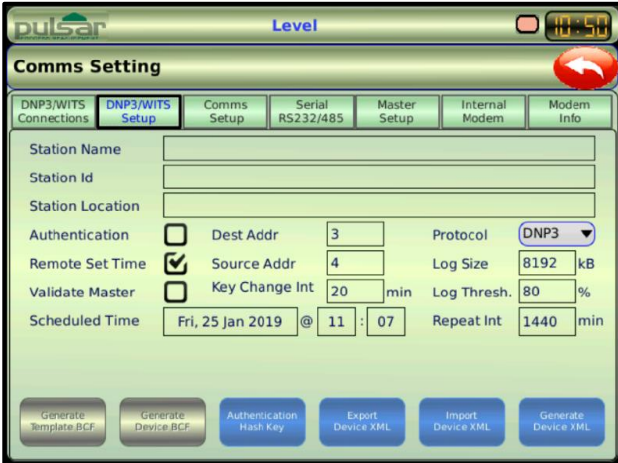
Insert the SD card into the Ultimate and Enter program mode by pressing

the  button and keying in the passcode **1997**.

Navigate to the Advanced Config menu option  where you will see a new screen appear for the menu options now available.


From the menu options available please select the communication option

, and once selected you will now see the Comms Setting screen. Select the DNP3/WITS Setup tab in the comms setting screen.



Comms Setting

DNP3/WITS Connections	DNP3/WITS Setup	Comms Setup	Serial RS232/485	Master Setup	Internal Modem	Modem Info
Station Name: <input type="text"/> Station Id: <input type="text"/> Station Location: <input type="text"/> Authentication: <input type="checkbox"/> Dest Addr: <input type="text" value="3"/> Protocol: <input type="text" value="DNP3"/> Remote Set Time: <input checked="" type="checkbox"/> Source Addr: <input type="text" value="4"/> Log Size: <input type="text" value="8192"/> kB Validate Master: <input type="checkbox"/> Key Change Int: <input type="text" value="20"/> min Log Thresh: <input type="text" value="80"/> % Scheduled Time: <input type="text" value="Fri, 25 Jan 2019"/> @ <input type="text" value="11"/> : <input type="text" value="07"/> Repeat Int: <input type="text" value="1440"/> min						

Pressing the  button will allow you to import a DNP3 configuration file from the SD Card. When prompted to do so select the file you wish to import and press '**Import**'. When the import has finished, return to run mode for the changes to take place.

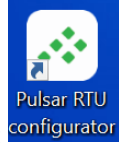
CHAPTER 3 USING PULSAR DNP3 PC SOFTWARE

Installing the DNP3 Configurator software

The DNP3 Configurator software can be downloaded directly from the Pulsar Measurement website:

<https://pulsarmeasurement.com/downloads/software/>

When the software has downloaded a shortcut icon will be placed on to



your PC's desktop: . Double click on this icon to open the software, and when prompted to enter the passcode **1997**.

The software will open, and you will be met with the following screen:



Software menu options

Configuration

This menu option allows you to select what protocol you are communicating in and the ability to open and save files.

WITS/DNP3

Selecting this option will allow you to open and edit files for either DNP3 or WITS (**only DNP3 is available**)

Open

Selecting this menu will allow options to open, upload or import different file types to view and edit on the software.

Open xml

This option allows you to open an xml file that is saved on to your local PC or from an SD card inserted into your PC from an Ultimate.

Save

This function allows the user the ability to save an xml to file to the local PC or to an SD card. Or directly to the RTU of the Ultimate.

Save xml

Select this to save the current configuration as an xml file to the local PC or SD card, ready to be imported on to an Ultimate Controller.

Access Level

Selecting this option allows you to view the current access level you are in. Any change to the access level should only be carried out when consulting a Pulsar engineer.

Help

Selecting this option opens a window, displaying the current version of the DNP3 Configurator software and Pulsar's Copyright statement.

Default configuration

This allows the user to pick a general defaulted configuration xml file (nothing setup). Or a 2-pump configuration xml file.

Exit

Selecting this option will close the PC Software down.

Importing an xml file from the Ultimate

Open the rtuconfig.xml file that was exported from the Ultimate controller.

Select **Configuration > Open > Open xml**.

For further details on how to export an xml file from an Ultimate please refer to [Chapter 2 Ultimate Import/Export xml files](#).

You will then be prompted to open the xml file that was exported from Ultimate. When the software opens the xml, a configuration tree will appear on the left-hand side of the software to (as shown in the following screenshot.):



Binary Input Points

Selecting this menu from the tree will allow you to see part of the table of configurable binary input points, the columns shown can be changed by clicking on the tree view Binary input headers.

DNP3 CONFIGURATOR INSTRUCTION MANUAL

Index	Name	Description	Virtual parent	Pump phase	WTS point initial level	Pump initial start	Pump initial interval	WTS initial interval	Change Event Class	Included in Class0 Response	Default Status Variable	Default Event Variable
0	H level alarm is active	H level alarm is active	0	1	3	0	0	0	one	always	2	2
1	Main1 Fail active	Main1 Fail active	0	1	3	0	0	0	one	always	2	2
2	DC Fault active	DC Fault active	0	1	3	0	0	0	one	always	2	2
3	DC Fault low active	DC Fault low active	0	1	3	0	0	0	one	always	2	2
4	Storm disable pump is operating	Storm disable pump is operating	0	1	3	0	0	0	one	always	2	2
5	Overwell is operating	Overwell is operating	0	1	3	0	0	0	one	always	2	2
6	Ultrasonic transducer 01 Not OK is active	Ultrasonic transducer 01 Not OK is active	0	1	3	0	0	0	one	always	2	2
7	Ultrasonic transducer 01 loss of echo is active	Ultrasonic transducer 01 loss of echo is active	0	1	3	0	0	0	one	always	2	2
8	Ultrasonic transducer 01 failed no transducer is active	Ultrasonic transducer 01 failed no transducer is active	0	1	3	0	0	0	one	always	2	2
9	Ultrasonic transducer 02 transducer fault is Failed Safe	Ultrasonic transducer 02 transducer is Failed Safe	0	1	3	0	0	0	one	always	2	2
10	Pump Main burst is active	Pump burst is active	0	1	3	0	0	0	one	always	2	2
11	Analog input 01 over range is active	Analog input 01 over range is active	0	1	3	0	0	0	two	always	2	2
12	Analog input 01 under range is active	Analog input 01 under range is active	0	1	3	0	0	0	two	always	2	2
13	Analog input 01 open circuit is active	Analog input 01 open circuit is active	0	1	3	0	0	0	two	always	2	2
14	Analog input 01 short circuit is active	Analog input 01 short circuit is active	0	1	3	0	0	0	two	always	2	2
15	Analog input 02 over range is active	Analog input 02 over range is active	0	1	3	0	0	0	two	always	2	2
16	Analog input 02 under range is active	Analog input 02 under range is active	0	1	3	0	0	0	two	always	2	2
17	Analog input 02 open circuit is active	Analog input 02 open circuit is active	0	1	3	0	0	0	two	always	2	2
18	Analog input 02 short circuit is active	Analog input 02 short circuit is active	0	1	3	0	0	0	two	always	2	2
19	Pump 01 running is active	Pump 01 running is active	0	1	3	0	0	0	two	always	2	2
20	Pump 01 tripped is active	Pump 01 tripped is active	0	1	3	0	0	0	one	always	2	2
21	Pump 01 available	Pump 01 available	0	1	3	0	0	0	two	always	2	2
22	Pump 01 denvered is active	Pump 01 denvered is active	0	1	3	0	0	0	two	always	2	2
23	Pump 01 under current fault condition is active	Pump 01 under current fault condition is active	0	1	3	0	0	0	one	always	2	2
24	Pump 01 over current fault condition is active	Pump 01 over current fault condition is active	0	1	3	0	0	0	one	always	2	2
25	Pump 01 blocked condition is active	Pump 01 blocked condition is active	0	1	3	0	0	0	one	always	2	2
26	Pump 01 out of service is active	Pump 01 out of service is active	0	1	3	0	0	0	one	always	2	2
27	Pump 02 running is active	Pump 02 running is active	0	1	3	0	0	0	two	always	2	2
28	Pump 02 tripped is active	Pump 02 tripped is active	0	1	3	0	0	0	one	always	2	2
29	Pump 02 available	Pump 02 available	0	1	3	0	0	0	two	always	2	2
30	Pump 02 denvered is active	Pump 02 denvered is active	0	1	3	0	0	0	one	always	2	2
31	Pump 02 under current fault condition is active	Pump 02 under current fault condition is active	0	1	3	0	0	0	one	always	2	2
32	Pump 02 over current fault condition is active	Pump 02 over current fault condition is active	0	1	3	0	0	0	one	always	2	2
33	Pump 02 blocked condition is active	Pump 02 blocked condition is active	0	1	3	0	0	0	one	always	2	2
34	Pump 02 out of service is active	Pump 02 out of service is active	0	1	3	0	0	0	one	always	2	2
35	Maintenance mode is active	Maintenance mode is active	0	1	3	0	0	0	two	always	2	2

You can edit the individual or multiple columns by carrying out the following:

Highlight which columns that are to be selected, then click right on the column which will now bring up a menu:

- **Open point data** – This will open a form for that specific point.
- **Add Point** - This will add a point at the end of the list with an index of one more than the last index.
- **Copy** - Copy an existing point.
- **Cut** - Cut a row from the table.
- **Paste** - Paste a row into the table.
- **Delete** - Delete a row from the table.

Important Information

Greyed out sections of the points functionality means that it is not used with DNP3 configurations.

Open Point Data

Double clicking on a specific point will open a form for that point and allow the user to make changes to it.

Binary Input Main Tab

The screenshot shows a web application window titled "Binary Input Point". It has a tabbed interface with the following tabs: "Main", "DNP3 Parameters", "State Runtime", "State Counter", "WITS Actions", and "Function Code". The "Main" tab is currently selected. The form contains the following fields:

- Index:** A text input field containing the value "1".
- Name:** A text input field containing the value "Mains Fail active".
- Description:** A text input field containing the value "Mains Fail active".
- On Scan:** A dropdown menu with a downward arrow, currently showing the value "1".
- Virtual parent:** An empty text input field.

Index

This is a unique number from 0 to 65535 for binary inputs.

Name

This sets the name of the individual point on the table. This is not used in DNP3.

Description

This sets the description for the individual point on the table. This is not used in DNP3.

Binary Input DNP3 Parameters Tab

The screenshot shows the 'Binary Input Point' configuration window with the 'DNP3 Parameters' tab selected. The window has a title bar with a green icon and the text 'Binary Input Point'. Below the title bar is a tabbed interface with five tabs: 'Main', 'DNP3 Parameters' (selected), 'State Runtime', 'State Counter', 'WITS Actions', and 'Function Code'. The 'DNP3 Parameters' tab contains two main sections. The first section, 'Static/Event/Class 0', has four dropdown menus: 'Included in Class 0 Response' (set to 'always'), 'Default Change Event Class' (set to '1'), 'Default Static Variation' (set to '2 8 Bit including Flag'), and 'Default Event Variation' (set to '2 8 Bit + time'). The second section, 'DNP3 Flag actions', has seven dropdown menus: 'Online/offline', 'Restart', 'Comms Lost', 'Remote forced', 'Local Forced', 'Overrange', and 'Ref error', all set to 'None'. To the right of these is a 'State names' section with two text input fields: 'Name state 0' (set to 'off') and 'Name state 1' (set to 'on').

There is a command event class and command event variation. Where there is no value then they default to binary output static and event variations.

Included in Class 0 Response

This is normally set to always, so when the DNP3 master carries out an object 0 poll, all static data is returned. Other conditions can be selected; never or when assigned to class 1, 2, 3.

Default Change Event Class

The default to this is 1, but can be set to 1, 2, 3.

Default Static Variation

This is for the DNP3 master where the binary input value is either set to none, packed format 2 bytes, or 1-byte format.

Default Event Variation

This is the event reporting for the binary input, and can be set to 8-bit, 8-bit+time or 8-bit+relative time. The default is set to 8-bit+time.

State Names

This is not transferred to DNP3 but is used as a reference.

State Run Time, State Counter and WITS actions are not used with DNP3 configurations.

Function Code Tab

❖ Binary Input Point

Main

DNP3 Parameters

State Runtime

State Counter

WITS Actions

Function Code

Memory Index

80

Function Code

0

☐ Set point as virtual

Function Index

0

Point in use

1

! Setting the point in use to zero, leaves the configuration in the xml file

Memory Index

This is a Pulsar feature, where the memory index is the shared memory between the Ultimate Controller and the RTU. In the example above it is set to 49, which is triggered by the high-level alarm. This memory is updated every 5 seconds. The list of memory indexes can be found in the Ultimate controller manual and also relate to registers used for Modbus communication.

Special Functions – Binary Input

Function code & Function Index

If a point is mapped out to the shared memory, then this is set to 0. To make a point a virtual point this must be set to 64.

Function Code	Function index	Operation
0 (Default)	NA	Takes value of register
3	2	This tests for mA input open circuit, and tests this memory location, for 1 being open circuit. Typically this memory location would be the status of mA input (151, 161, 171.)
4	2	This tests for mA input short circuit, and tests this memory location, for 1 being open circuit. Typically this memory location would be 150 to 229
9	NA	This tests for dB Transducer status at the shared memory location, where Transducers start at IDX_TRANSDUCER_START 110
10	NA	This tests for Transducer for loss of echo at the shared memory location, where Transducers start at IDX_TRANSDUCER_START 110, this will set a flag if LOE
11	NA	This tests for Transducer for not connected at the shared memory location, where Transducers start at IDX_TRANSDUCER_START 110, this will set a flag if not connected.
12	NA	This tests for Transducer for FAIL at the shared memory location, where Transducers start at IDX_TRANSDUCER_START 110, this will set a flag if FAIL
14	NA	1= pump(s) running 0= no pumps running. Index not required
15	NA	1=pumps tripped, 0=pump(s) healthy Index not required. Index not required
16	NA	1=Pump(s) demoted 0=No Pumps Demoted. Index not required

Function Code	Function index	Operation
17	NA	1=Alarm relay(s) active 0=No alarm relay(s) active. No index required
18	NA	1=Control relay(s) active 0=No Control relay(s) active No index required
19	NA	1=dB Transducer(s) in fault condition 0=dB Transducer(s) healthy
20	NA	1=mA input(s) in fault condition 0=mA input(s) healthy

Point In Use

This is used where the user would want a point configured, but at the time the RTU parses the xmlconfig.xml file and this point would be ignored.

Binary Input Headers

Index	Description	Enable
0	index	on
1	Name	on
2	Description	on
3	Virtual parent	off
4	Point inuse	off
5	WITS point inhibit level	off
6	Point inhibit start	off
7	Point inhibit timeout	off
8	WITS inhibit	off
9	Change Event Class	on
10	Included In Class0 Response	on
11	Default Static Variation	on
12	Default Event Variation	on
13	mem index	on
14	Func code	on
15	Func index	on
16	Persist_time	on
17	Name state 0	on
18	Name state 1	on

Buttons: All Off, All On, Virtual Points on, Close

Selecting this option will allow the user to adjust which variables are shown in the points in the Binary Input table.

All Off

This will disable all the variables shown in the points.

All On

This will enable all variables to be shown in the points.

Virtual Points

This will enable any virtual point variable to be shown in the points.

Binary Output Points

Index	Name	Description	Parent point	Point name	WITS point initial level	Point initial start	Point initial interval	WITS initial	Change Event Class	Included in Class0 Response	Default Status Variation	Default Event Variation	Item index	Func. code	Func. name
0	Activate Wet Weather Profile	Activate Wet Weather Profile	-1	1	3	0	0	0	two	always	2	2	0	10	2418
1	Station Reset	Activate new profile	-1	1	3	0	0	0	two	always	2	2	0	10	2420
2	General Reset	General Reset	-1	1	3	0	0	0	two	always	2	2	0	10	2422
3	Pump Down	Pump Down	-1	1	3	0	0	0	two	always	2	2	0	10	628
4	Outflow Reduction	Outflow Reduction	-1	1	3	0	0	0	two	always	2	2	0	10	883
5	Pump Max Run Time	Pump Max Run Time	-1	1	3	0	0	0	two	always	2	2	0	10	2585

Double clicking on a specific point will open a form for that point and allow the user to make changes to it.

Open a single point from the binary output headers, in the below example point index 3 has been selected:

Binary Output Main Tab

Binary Output Point

Main

DNP3 Parameters

State Runtime

State Counter

WITS Actions

Function Code

Index

3

Name

Pump Down

Description

Pump Down

On Scan

1

Virtual parent

No

Save xml

Close

Index

This is the DNP3 index.

Name

This sets the name of the individual point on the table. This is not used in DNP3.

Description

This sets the description for the individual point on the table. This is not used in DNP3.

Binary Output DNP3 Parameters Tab

Binary Output Point

MainDNP3 ParametersState RuntimeState CounterWITS ActionsFunction Code

Static/Event/Class 0

Included in Class 0 Responsealways

Default Change Event Class2

Default Static Variation2 16 Bit + Flag

Default Event Variation2 16 Bit

Default Command Event Classtwo

Command Event Variation

DNP3 Rag actions

Online/offlineNone

RestartNone

Comms LostNone

Remote forcedNone

Local ForcedNone

OverrangeNone

Ref errorNone

State names

Name state 0off

Name state 1on

Pulse_width

Minimum Pulse Width mS0

Maximum Pulse Width mS9999

Minimum Pulse Time mS0

Maximum Pulse Time mS9999

Control0

Status

Supported Control Operations

Support Select Operate

Support Direct Operate

Support Direct Operate No Ack

Support Trip

Support Close

Support Pulse On

Support Pulse Off

Support Latch On

Support Latch Off

Count Greater Than One

Cancel Current Operation

Save.xml

Close

Included in Class 0 Response

This is normally set to always, so when the DNP3 master carries out an object 0 poll, all static data is returned. Other conditions can be selected; never or when assigned to class 1, 2, 3.

Default Change Event Class

The default to this is 1, but can be set to 1, 2, 3.

Default Static Variation

This is for the DNP3 master where the binary input value is either set to none, packed format 2 bytes, or 1-byte format.

Default Event Variation

This is the event reporting for the binary input, and can be set to 16-bit, 16-bit+time or 16-bit+relative time. The default is set to 16-bit+time.

Default Command event class

This is

Command Event Variation

This is

State Names

This is not transferred to DNP3 but is used as a reference.

Pulse Width

This is a legacy feature for the electricity industry for controlling moving actuators and control valves.

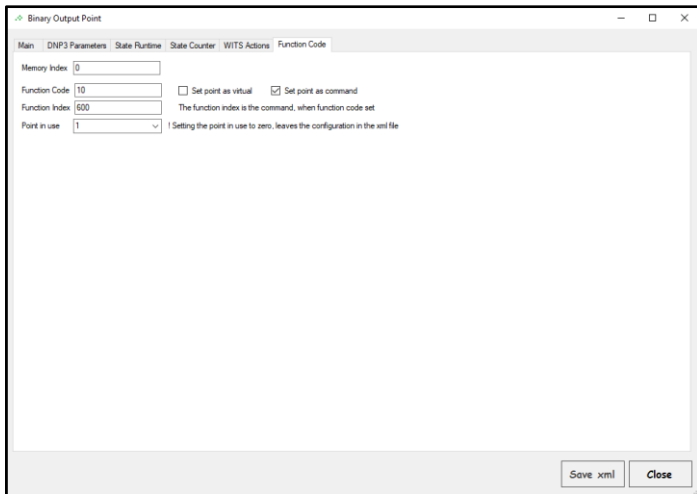
Supported Control Operations

This is also a legacy feature, the Ultimate Controller will use the 'Direct Operate No Ack' and 'Direct Operate'. Pulsar supports all modes as part of the TMW stack.

Important Information

State Run Time, State Counter and WITS actions are not used with DNP3 configurations.

Binary Output Function Code Tab



The screenshot shows a software window titled "Binary Output Point" with a standard Windows interface (minimize, maximize, close buttons). The window contains several tabs: "Main", "DNP3 Parameters", "State Runtime", "State Counter", "WITS Actions", and "Function Code". The "Function Code" tab is currently selected. Inside this tab, there are four input fields: "Memory Index" with the value "0", "Function Code" with the value "10", "Function Index" with the value "600", and "Point in use" with a dropdown menu showing "1". To the right of the "Function Code" and "Function Index" fields are two checkboxes: "Set point as virtual" (unchecked) and "Set point as command" (checked). Below these checkboxes is a small text note: "The function index is the command, when function code set". At the bottom right of the window are two buttons: "Save xml" and "Close".

The functionality of this tab is similar to the binary input. However, the difference is that the function code is set to 10, and the function index is 600, which comes from the excel spreadsheet of Ultimate Controller remote commands (this is Run on enabled).

If any of the points functionality has been changed, selecting Save xml will save the changes made and create an xml file with the changes made in it. Or selecting close will shut the point configuration box down and allow you to make further changes before saving all changes to an xml file.

Important Information

State Run Time, State Counter and WITS actions are not used with DNP3 configurations.

Special Functions – Binary Output

Important Information

For forcing relay outputs in Ultimate controller please use Analogue output functions.

Function code & Function Index

Function Code	Function Index	Description
1	10	Remotely Set a Pump Relay on/off (3=on, 4= off) Name of point relates to order of pump (01, 02, 03.... Required in point name)
2	8	Remotely Set a Pump Relay on/off (3=on, 4= off) Name of point relates to order of pump (01, 02, 03.... Required in point name)
3	9	Remotely Set an Alarm Relay on/off (3=on, 4= off) Name of point relates to order of pump (01, 02, 03.... Required in point name)
4		Remotely Set a Control Relay on/off (3=on, 4= off) Name of point relates to order of pump (01, 02, 03.... Required in point name)

Binary Output Headers

Bo_header_information

Index	Description	Enable
0	index	on
1	Name	on
2	Description	on
3	Parent point	off
4	Point inuse	off
5	WITS point inhibit level	off
6	Point inhibit start	off
7	Point inhibit timeout	off
8	WITS inhibit	off
9	Change Event Class	on
10	Command Event Class	on
11	Included In Class0 Response	on
12	Default Static Variation	on
13	Default Event Variation	on
14	mem index	on
15	Func code	on
16	Func index	on
17	Pulsar units	on
18	Persist_time	on

All Off

All On

Virtual Points on

Close

Selecting this option will allow the user to adjust which variables are shown in the points in the Binary Output table.

All Off

This will disable all the variables shown in the points.

All On

This will enable all variables to be shown in the points.

Virtual Points

This will enable any virtual point variable to be shown in the points.

Counter Points Tab

Counter Points								
index	Name	Description	parent point	Point reuse	WITS point inhibit level	Point inhibit start	Point inhibit timeout	WITS inhibit
0	Total RMA blockages detected	Total RMA blockages detected	-1	1	3	0	0	0
1	Total number of pump reversals in station	Total number of pump reversals in station	-1	1	3	0	0	0
2	Total overflow duration of the station	Total overflow duration of the station	-1	1	3	0	0	0
3	Total number of overspill counts	Total number of overspill counts	-1	1	3	0	0	0
4	Pump 01 no of starts	Pump 01 no of starts	-1	1	3	0	0	0
5	Pump 01 no of starts this week	Pump 01 no of starts this week	-1	1	3	0	0	0
6	Pump 01 no of starts per interval	Pump 01 no of starts per interval	-1	1	3	0	0	0
7	Pump 01 total run time	Pump 01 total run time	-1	1	3	0	0	0
8	Pump 01 total kWh used	Pump 01 total kWh used	-1	1	3	0	0	0
9	Pump 01 Reversal counter	Pump 01 Reversal counter	-1	1	3	0	0	0
10	Pump 01 Num of retroflo clearance	Pump 01 Num of retroflo clearance	-1	1	3	0	0	0
11	Pump 02 no of starts	Pump 02 no of starts	-1	1	3	0	0	0
12	Pump 02 no of starts this week	Pump 02 no of starts this week	-1	1	3	0	0	0
13	Pump 02 no of starts per interval	Pump 02 no of starts per interval	-1	1	3	0	0	0
14	Pump 02 total run time	Pump 02 total run time	-1	1	3	0	0	0
15	Pump 02 total kWh used	Pump 02 total kWh used	-1	1	3	0	0	0
16	Pump 02 Reversal counter	Pump 02 Reversal counter	-1	1	3	0	0	0
17	Pump 02 Num of retroflo clearance	Pump 02 Num of retroflo clearance	-1	1	3	0	0	0
18	Network provider	Network provider	-1	1	3	0	0	0
30	Virtual counter 01	Virtual 01	-1	1	3	0	0	0
31	Virtual counter 02	Virtual 02	-1	1	3	0	0	0
32	Virtual counter 03	Virtual 03	-1	1	3	0	0	0
33	Virtual counter 04	Virtual 04	-1	1	3	0	0	0
34	Virtual counter 05	Virtual 05	-1	1	3	0	0	0

The Counters tab displays the number of times that a point has been activated. Double clicking on the individual points will open a form to allow changes to be made. Some of the information that is seen and is changeable in the form is repeated from the Binary Input information. For further information on each of the tab's functionality please refer to the [Binary Inputs Open data points](#) section of this manual.

Counter Point Main Tab

Counter Point

Main

DNP3 Parameters

State Runtime

State Counter

WITS Actions

Function Code

Index

3

Name

Total number of overspill counts

Description

Total number of overspill counts

On Scan

1

Virtual parent

The functionality of this tab has been covered in the Binary inputs section of this manual.

Counter DNP3 Parameters Tab

Counter Point

Main

DNP3 Parameters

State Runtime

State Counter

WITS Actions

Function Code

Running Counters Static/Event/Class 0

Included in Class 0 Response

always

Default Change Event Class

2

Default Static Variation

1 32 Bit + Flag

Default Event Variation

5 32 Bit + Flag + Time

Counter Roll Over

999999

Frozen Counters Static/Event/Class 0

Frozen Counter Exists

☐

Included in Class 0 Response

always

Default Change Event Class

2

Default Static Variation

5 32 Bit + Flag + Time

Default Event Variation

5 32 Bit + Flag + Time

DNP3 Flag actions

Online/offline

None

Restart

None

Comms Lost

None

Remote forced

None

Local Forced

None

The functionality of this tab has been covered in the Binary inputs section of this manual.

Important Information

State Run Time, State Counter and WITS actions are not used with DNP3 configurations.

Counter Point Function Code Tab

❖ Counter Point

MainDNP3 ParametersState RuntimeState CounterWITS ActionsFunction Code

Memory Index55

Function Code0☐ Set point as virtual

Function Index0

Point in use1

! Setting the point in use to zero, leaves the configuration in the xml file

The functionality of this tab has been covered in the Binary inputs section of this manual.

Counter Point Headers

❖ Counter header information

	Index	Description	Enable
▶	0	index	on
	1	Name	on
	2	Description	on
	3	parent point	off
	4	Point inuse	off
	5	WITS point Inhibit level	off
	6	Point inhibit start	off
	7	Point inhibit timeout	off
	8	WITS inhibit	off
	9	Default Static Variation	on
	10	Default Event Variation	on
	11	Included In Class0 Response	on
	12	Change Event Class	on
	13	Roll Over	on
	14	Default Frozen exist	on
	15	Default Frozen counter Static variation	on
	16	Default Frozen counter Event variation	on
	17	Frozen counter Include in Class 0	on
	18	Frozen counter event class	on
	19	mem index	on
	20	Func code	on

All Off

All On

Virtual Points on

Close

Selecting this option will allow the user to adjust which variables are shown in the points in the Counter Point table.

All Off

This will disable all the variables shown in the points.

All On

This will enable all variables to be shown in the points.

Virtual Points

This will enable any virtual point variable to be shown in the points.

Analogue Input Points

Analog input Points									
	index	Name	Description	Parent point	Point inuse	WITS point Inhibit level	Point inhibit start	Point inhibit timeout	Change Event Class
▶	0	inflow rate	inflow rate	-1	1	3	0	0	three
	1	Well current liquid level	Well current liquid level	-1	1	3	0	0	three
	2	Well current percentage liquid level	Well current percentage liquid level	-1	1	3	0	0	three
	3	Well current volume of liquid	Well current volume of liquid	-1	1	3	0	0	three
	4	mA input 01 value	mA input 01 value	-1	1	3	0	0	three
	5	mA input 02 value	mA input 02 value	-1	1	3	0	0	three
	6	Pump 01 rate	Pump 01 rate	-1	1	3	0	0	three
	7	Pump 01 phase A current	Pump 01 phase A current	-1	1	3	0	0	three
	8	Pump 01 phase B current	Pump 01 phase B current	-1	1	3	0	0	three
	9	Pump 01 phase C current	Pump 01 phase C current	-1	1	3	0	0	three
	10	Pump 01 IRT resistance	Pump 01 IRT resistance	-1	1	3	0	0	three
	11	Pump 01 efficiency	Pump 01 efficiency	-1	1	3	0	0	three
	12	Pump 01 kWh/m3	Pump 01 kWh/m3	-1	1	3	0	0	three
	13	Pump 02 rate	Pump 02 rate	-1	1	3	0	0	three
	14	Pump 02 phase A current	Pump 02 phase A current	-1	1	3	0	0	three
	15	Pump 02 phase B current	Pump 02 phase B current	-1	1	3	0	0	three
	16	Pump 02 phase C current	Pump 02 phase C current	-1	1	3	0	0	three
	17	Pump 02 IRT resistance	Pump 02 IRT resistance	-1	1	3	0	0	three
	18	Pump 02 efficiency	Pump 02 efficiency	-1	1	3	0	0	three
	19	Pump 02 kWh/m3	Pump 02 kWh/m3	-1	1	3	0	0	three
	20	xdr 01 confidence	xdr 01 confidence	-1	1	3	0	0	three
	21	Network strength	Network Signal strength	-1	1	3	0	0	three
	22	Average Fill Time	Average Fill Time This Week	-1	1	3	0	0	three
	23	Average Empty Time	Average Empty Time This Week	-1	1	3	0	0	three
	30	Virtual analog input 01	Virtual analog input 01	-1	1	3	0	0	two
	31	Virtual analog input 02	Virtual analog input 02	-1	1	3	0	0	two

Selecting this menu from the tree will allow you to see part of the table of configurable analogue input points, the columns shown can be changed by clicking on the tree view Analogue input headers.

The options available when clicking on a point in the table are identical to those for the binary input table. For further information on each the tabs functionality please refer to the [Binary Inputs Open data points](#) section of this manual.

Analogue Input Main Tab

The screenshot shows the 'Analog Input Point' configuration window. The 'Index' field is set to 2. The 'Name' and 'Description' fields both contain the text 'Well current percentage liquid level'. The 'On Scan' dropdown menu is set to 1. The 'Pulsar Min' field is set to 0, and the 'Pulsar Max' field is set to 100. The 'Units' field is set to m³/s. The 'Virtual parent' field is empty. The 'Save xml' and 'Close' buttons are located at the bottom right of the window.

The functionality for Index, Name, Description and On Scan have been explained previously in the manual. For further information on their functionality please refer to the [Binary Inputs Open data points](#) section of this manual.

Pulsar Min

This is the lower limit of the value from the Ultimate Controller.

Pulsar Max

This is the high limit of the value from the Ultimate Controller.

Units

This is a Pulsar units description and is used for information purposes only.

Analogue Input DNP3 Parameters Tab

The screenshot shows the 'Analogue Input Point' configuration window with the 'DNP3 Parameters' tab selected. The window has a menu bar with 'Main', 'DNP3 Parameters', 'Logging', 'Scaling', 'Rate of change/NC', 'State Runtime', 'State Counter', 'Min Mean Max', 'WITS Actions', and 'Function Code'. The 'DNP3 Parameters' tab contains several sections:

- Static/Event/Class 0**: Includes 'Included in Class 0 Response' (set to 'always'), 'Default Change Event Class' (set to '3'), 'Default Static Variation' (set to '5 Single Float + Flag'), and 'Default Event Variation' (set to '7 Single Float + Time').
- DNP3 Flag actions**: A group box containing 'Online/offline', 'Restart', 'Comms Lost', 'Remote forced', 'Local Forced', 'Overrange', and 'Ref error', each with a dropdown menu set to 'None'.
- Dead Bands**: Includes 'Deadband' (set to '5'), 'Dead band type' (set to 'Absolute'), and 'Pulse Persist time' (set to '0').
- Time Trigger**: Includes a checkbox for 'Interval (Mins)' (set to '2').
- Scale factor, resolution**: Includes 'Scale Offset' (set to '0'), 'Scale Factor' (set to '1'), and 'Resolution' (set to '0').

At the bottom right, there are 'Save xml' and 'Close' buttons.

The functionality for the group boxes Static/Event/Class 0 and DNP3 Flags have been explained previously in the manual. For further information on their functionality please refer to the [Binary Inputs Open data points](#) section of this manual.

Dead band

The dead band is in mm, and now only Absolute is supported. With the dead band value shown if the current analogue level was 120mm and increased to 140mm this would create a DNP3 event. And the last value of 140mm would be stored internally, however if the level read was 149mm or 131mm then no event on this point would occur. However, if the level increased to 153mm, then a DNP3 event would be triggered and the last value of 153mm would be stored internally.

Important Information

Logging, Scaling, Rate of Change / NC, State Run Time, State Counter, Min, Mean, Max, and WITS actions are not used with DNP3 configurations.

Analogue Input Function Code Tab

Analogue Input Point

Main

DNP3 Parameters

Logging

Scaling

Rate of change/NC

State Runtime

State Counter

Min Mean Max

WITS Actions

Function Code

Memory Index

92

Function Code

0

Function Index

0

Point in use

1

Pulsar Units

6

☐ Set point as virtual

! Setting the point in use to zero, leaves the configuration in the xml file

Save xml

Close

The functionality of this tab has been covered in the Binary inputs section of this manual.

Special Functions – Analogue Inputs

Function code & Function Index

Function Code	Function Index	Description
8	(index of required variable) - (relay status index of pump) e.g. Pump1 phase A current = 384, Pump1 relay status=350. 384-350=34	Phase Voltage/current/power factor for running pump

If any of the points functionality has been changed, selecting Save xml will save the changes made and create an xml file with the changes made in it. Or selecting close will shut the point configuration box down and allow you to make further changes before saving all changes to an xml file.

Analogue Input Headers

❖ Ai_header_information

	Index	Description	Enable
▶	0	index	on
	1	Name	on
	2	Description	on
	3	Parent point	off
	4	Point inuse	off
	5	WITS point Inhibit level	off
	6	Point inhibit start	off
	7	Point inhibit timeout	off
	8	Change Event Class	on
	9	Included In Class0 Response	on
	10	Default Static Variation	on
	11	Default Event Variation	on
	12	Scale Offset	on
	13	Scale Factor	on
	14	Resolution	on
	15	Units	on
	16	Dead band	on
	17	Dead band type	on
	18	mem index	on
	19	Func code	on
	20	Func index	on
	21	Low limit	on

All Off

All On

Virtual Points on

Close

Selecting this option will allow the user to adjust which variables are shown in the points in the Analogue Input table.

All Off

This will disable all the variables shown in the points.

All On

This will enable all variables to be shown in the points.

Virtual Points

This will enable any virtual point variable to be shown in the points.

Analogue Output Points

Analogue Output Points																	
Index	Name	Description	Pump mode	Change Event Class	Included in Class0	Default Status Variation	min index	Func code	Func index	Percent_low	Resolution	Units	Dead band	Dead tolerance	Low limit	High limit	Pulsar min
1	Pump 01	Pump 01 Remote Force setting	1	low	always	3	0	10	26010	0	0	n/a	1	0	0	4	4
2	Pump 02	Pump 02 Remote Force setting	1	low	always	3	0	10	26020	0	0	n/a	1	0	0	4	4

Selecting this menu from the tree will allow you to see part of the table of configurable analogue output points, the columns shown can be changed by clicking on the tree view Analogue output headers.

The options available when clicking on a point in the table are identical to those for the binary input table. For further information on each the tabs functionality please refer to the [Binary Inputs Open data points](#) section of this manual.

Analogue Output Main Tab

Main | DNP3 Parameters | Logging | Scaling | Rate of change/NC | State Runtime | State Counter | Min Mean Max | WITS Actions | Function Code

Index

0

Name

Pump 01

Description

Pump 01 Remote Force setting

On Scan

1

Virtual parent

0

Pulsar Min

0

Pulsar Max

4

Units

n/a

Save xml

Close

The functionality of this tab has been covered in the Binary inputs section of this manual.

Analogue Output DNP3 Parameters Tab

MainDNP3 ParametersLoggingScalingRate of change/NCState RuntimeState CounterMin Mean MaxWITS ActionsFunction Code

Static/Event/Class 0

Included in Class 0 Responsealways

Default Change Event Class2

Default Static Variation3 Single Float + Flag

Default Event Variation7 Single Float + Time

DNP3 Flag actions

Online/offlineNone

RestartNone

Comms LostNone

Remote forcedNone

Local ForcedNone

OverrangeNone

Ref errorNone

Dead Bands

Deadband1

Dead band type0

Pulse Persist time0

Scale factor, resolution

Scale Offset0

Scale Factor1

Resolution0

Supported Operations

☒ Select operate

☒ Direct operate

☒ Direct operate no ACK

Save xml

Close

The functionality of this tab has been covered in the Binary inputs section of this manual. The only difference with the functionality of this form is that the default values for the Static and Event variation are different.

Important Information

Logging, Scaling, Rate of Change / NC, State Run Time, State Counter, Min, Mean, Max, and WITS actions are not used with DNP3 configurations.

Analogue Output Function Code Tab

MainDNP3 ParametersLoggingScalingRate of change/NCState RuntimeState CounterMin Mean MaxWITS ActionsFunction Code

Memory Index0

Function Code10☐ Set point as virtual☒ Set point as command

Function Index26010The function index is the command, when function code set

Point in use1

Pulsar Units0

Save xml

Close

The functionality of this tab has been covered in the Binary inputs section of this manual.

Special Functions – Analogue output*Function code & Function Index*

Function code	Function index	Description
1	0=Allocated measurement point 1=Setpoint1 2=Setpoint2 3=Setpoint3 4=Setpoint4 5=Closures 6=Failsafe 7=Max Rate 8=Standby 9=eventSMS 10=Remote forced setting	Allows writing of values to Pump relays. Memory index is not used. Relay selection relies on Point name containing 01, 02, 03... related to pump relay position in the relay setup table (not related to physical relay number).
2	0=Allocated measurement point 1=Setpoint1 2=Setpoint2 3=Setpoint3 4=Setpoint4 5=Closures 6=Failsafe 7=eventSMS 8=event sound 9=Remote forced setting	Allows writing of values to Alarm relays. Memory index is not used. Relay selection relies on Point name containing 01, 02, 03 related to alarm relay position in relay setup table (not related to physical relay number).
3	0=Allocated measurement point 1=Setpoint1 2=Setpoint2 3=Setpoint3 4=Setpoint4 5=Closures 6=Failsafe 7=eventSMS 8=Remote forced setting	Allows writing of values to Control relays. Memory index is not used. Relay selection relies on Point name containing 01, 02, 03 related to control relay position in relay setup table (not related to physical relay number).

Function code	Function index	Description
4	0=Allocated measurement point 1=Setpoint1 2=Setpoint2 3=Setpoint3 4=Setpoint4 5=Closures 6=Failsafe 7=eventSMS 8=Remote forced setting	Allows writing of values to Miscellaneous relays. Memory index is not used. Relay selection relies on Point name containing 01, 02, 03 related to miscellaneous relay position in relay setup table (not related to physical relay number).
8	DNP3 index of Analogue input you want to set	This function allows a analogue input low limit scale to be set remotely, Memory index not used
9	DNP3 index of Analogue input you want to set	This function allows a analogue input low limit scale to be set remotely, Memory index not used
10	Memory location index	General command to write to a memory location. Memory index not used.

If any of the points functionality has been changed, selecting Save xml will save the changes made and create an xml file with the changes made in it. Or selecting close will shut the point configuration box down and allow you to make further changes before saving all changes to an xml file.

Analogue Output Headers

❖ Ai_header_information

	Index	Description	Enable
▶	0	index	on
	1	Name	on
	2	Description	on
	3	Parent point	off
	4	Point inuse	off
	5	WITS point Inhibit level	off
	6	Point inhibit start	off
	7	Point inhibit timeout	off
	8	Change Event Class	on
	9	Included In Class0 Response	on
	10	Default Static Variation	on
	11	Default Event Variation	on
	12	Scale Offset	on
	13	Scale Factor	on
	14	Resolution	on
	15	Units	on
	16	Dead band	on
	17	Dead band type	on
	18	mem index	on
	19	Func code	on
	20	Func index	on
	21	Low limit	on

All Off

All On

Virtual Points on

Close

Selecting this option will allow the user to adjust which variables are shown in the points in the Analogue Output table.

All Off

This will disable all the variables shown in the points.

All On

This will enable all variables to be shown in the points.

Virtual Points

This will enable any virtual point variable to be shown in the points.

Configuration

This allows you to configure the connection details to the Ultimate Controller. There are options in each of the forms to default, save xml or close the current configuration.

Default

Selecting this will default all options values to their normally configured values.

Save Xml

Selecting this will save the current configuration back to its original file name, or a new file name. Which can then be imported back into the RTU via the Ultimate UI.

Close

Selecting this will close the current configuration until saved or defaulted.

Connection Details

Connection Detail

Connection index	Comms Type	Connection Mode	Tel Number	Protocol	End point type	IP Address	TCP port	Changed
1	Listener	Permanent		IPv4 TCP	Listen	0.0.0.0	20000	<input type="checkbox"/>
2	None	None		None	Listen			<input type="checkbox"/>
3	None	None		None	Listen			<input type="checkbox"/>
4	None	None		None	Listen			<input type="checkbox"/>
5	None	None		None	Listen			<input type="checkbox"/>
6	None	None		None	Listen			<input type="checkbox"/>
7	None	None		None	Listen			<input type="checkbox"/>
8	None	None		None	Listen			<input type="checkbox"/>
9	None	None		None	Listen			<input type="checkbox"/>
10	None	None		None	Listen			<input type="checkbox"/>

Default

Save xml

Close

In the example shown above, in the first connection the RTU is configured as a "Listener". I.e. It is running in a server permanent mode listening on port 20000 for IPv4 TCP traffic, the address 0.0.0.0 denotes it is listening from any source.

The second connection, is an on-demand connection to a server on IP address 192.168.0.155 listening on port 20000 for IPV4 traffic. For example, any events created by the RTU will be sent to the DNP3 master.

Note: When configuring/Testing the RTU for comms, make sure any firewalls are set to allow port 20000 through, the DNP3 source and destination address are set correctly. The DNP3 have enabled unsolicited events, and check whether authentication is switch on or not.

Field Configuration

The screenshot shows the 'Field Configuration' window with the following sections and values:

- Ultimate**
 - Outstation Location: Pulsar 001
 - Outstation ID: Pulsar 002
 - Outstation Name: Pulsar 003
 - Serial Number: 100
- BCF version**
 - BCF version: 2 Pump Default Config
- DNP3 Address**
 - RTU address: 200
 - Master address: 1
 - ☐ Validate Master
- Time setting**
 - ☒ Allow remote set time
- Protocol DNP3/WITS**
 - Protocol: DNP3 (selected)
- Debug level**
 - Debug level: 45
- WITS logging**
 - Log Size: 8192 kb
 - Log Threshold: 80 %
- Authentication**
 - ☐ Authentication
 - Key Change interval: 29 Mins
- Connection settings**
 - Link status interval: 30 Mins
 - Disconnect Idle time: 60 Mins
 - Re-dial interval: 3 Mins
 - Listen timeout: 12 Hrs
 - Re-dial retry count: 3
 - Connect timeout: 3 Mins
- Last update time**
 - Last update time: 12 March 2020 02:00:12

At the bottom of the window are three buttons: **Default**, **Save xml**, and **Close**.

This is the most important form to configure so that communication between the Ultimate Controller and the master can take place correctly.

Ultimate

The options **Outstation Location**, **ID** and **Name** identify the Ultimate Controllers location. **Serial Number** helps to identify the Ultimate Controller itself, and if any queries arise regarding the Ultimate Pulsar engineers may require this information.

BCF

This is not used with the DNP3 configuration.

DNP3 Address

RTU Address

This is the source address from where the information is to be sent from (Ultimate Controller).

Master Address

This is the address for the Master DNP3 where the information is to be sent to.

Validate Master

When ticked, the RTU will only respond to a master with the same address as set in the Master address.

Time Setting

Allow Remote Set Time

We advise that this be set (ticked), as this allows the Ultimate time (UTC) to be kept in sync with the master.

Protocol DNP3/WITS

This drop-down box will be set to DNP3 by default.

Debug Level

This sets what is printed to the file DNP3_DMS.temp file which is stored in the ram disk. At 23:59 the file is renamed to DNP3_DMS.log, where at which point the program will move the logfile to the external SD card.

WITS Logging

This is not used with the DNP3 configuration.

Authentication

Authentication

The tick box is used to enable or disable this feature. We recommended to start off with authentication switched off at the RTU and the master, to prove communications is stable, see section on form Security Configuration for more details on authentication.

Key Change Interval

This is system dependent, it is recommended that the value entered here is less than the link status interval as DNP3 traffic consideration comes into this setting.

Connection Settings

Link Status Interval

The RTU sends out a DNP3 null link status poll which allows the RTU to "know" that it is still connected on a TCP connection. For example, the RTU will issue this DNP3 link poll every 30 mins, if there is no DNP3 traffic that is received in this 30-minute period, then the RTU will close the connection and revert to connection 1 setup. Therefore, setting key change interval to less than this interval.

Disconnect Idle Time

This timer will close any current connection if there is no DNP3 data received in this period (in minutes).

Re-Dial Interval

This is the time between successive connections to obtain a connection. For example, if the RTU is attempting to connect to a failed service you would want to limit the time intervals between re-tries.

Listen Timeout

This is a back-stop system, whereby if no DNP3 communications have been received for 'x' period of time (in hours) shown here, then the RTU will reboot. This is to cater for any internal modem/RTU lockups, it is not expected to happen, but used as a backup system.

Re-Dial Retry Count

This is the count given for a single or multiple outgoing connections. So, if an outgoing connection fails after the amount of tries set here then the next connection is used.

Connect Timeout

When attempting to establish a connection, modems such as PTSN modems can take a reasonable amount of time to establish a connection. If the connection is not established by the time (in minutes) set here, then a re-try is attempted after the re-dial interval.

Last Update Time

This update time variable is written to the rtuconfig.xml file, at the time of writing, whether it is from the DNP3Configurator or from the Ultimate Controller.

Security Configuration

Security Configuration

Change Access Level

DNP Authentication String

Byte 1	0x49	Byte 9	0xEC
Byte 2	0xC8	Byte 10	0x80
Byte 3	0x7D	Byte 11	0x74
Byte 4	0x5D	Byte 12	0xEB
Byte 5	0x90	Byte 13	0x71
Byte 6	0x21	Byte 14	0x52
Byte 7	0x7A	Byte 15	0xFD
Byte 8	0xAF	Byte 16	0xB5

Default (Test)

Encrypt

Authentication

- Block size = 128
- Key size = 128
- Padding = none
- Mode = ECB

Help

Master Key

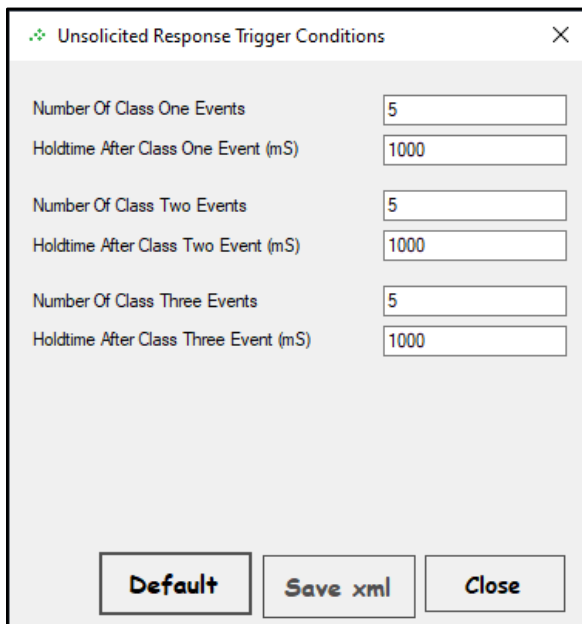
Encrypted String: A4CCD84B02CD1CDE3F1DCB62621B1A3F

Save xml Close

The authentication key for the master is set by populating the text boxes Byte 1 to Byte 16, for initial testing you can default the key, this will populate the Master Key box, to make it easier to copy and paste to a master.

Press the 'Encrypt' button, which will encrypt the key (AES) and can then be saved to the rtuconfig.xml file or make a note of the encrypted string so that it can be entered manually via the Ultimate UI.

The key is encrypted so it can be given to third parties to manually set up a configuration on the Ultimate or saved in the xml file without revealing the real key.

Unsolicited Response Trigger Conditions

The dialog box titled "Unsolicited Response Trigger Conditions" contains six input fields arranged in three pairs. Each pair consists of a label and a text box. The labels are "Number Of Class One Events", "Holdtime After Class One Event (mS)", "Number Of Class Two Events", "Holdtime After Class Two Event (mS)", "Number Of Class Three Events", and "Holdtime After Class Three Event (mS)". The text boxes contain the values "5", "1000", "5", "1000", "5", and "1000" respectively. At the bottom of the dialog are three buttons: "Default", "Save xml", and "Close".

Number Of Class One Events	5
Holdtime After Class One Event (mS)	1000
Number Of Class Two Events	5
Holdtime After Class Two Event (mS)	1000
Number Of Class Three Events	5
Holdtime After Class Three Event (mS)	1000

Default **Save xml** **Close**

For each class 1,2 or 3, conditions can be defined which cause the RTU to transmit unsolicited events. For example, Class one events will not be sent unless either we have 5 class one events or 1 second has elapsed from the triggering of the first event. This is used to reduce the amount of DNP3 traffic sent to the master.

Modem Configuration

Modem Configuration

Sim Card Settings

APN:

User Name:

Password:

Modem setup

Min signal dbm:

Re-scan interval hrs:

Ping IP address:

Serial Port Settings

Data Bits:

Stop Bits:

Parity:

Baud rate:

Network settings

Preferred network:

Preferred operator:

Default **Save xml** **Close**

Sim Card Settings

APN

This is used to set the SIM card APN, which is typically internet or mobiusnetworks.net.

Username

This is the SIM network login name, some providers although they don't require a login username it is expected that this field is populated.

Password

This is a password that is set to access the network. This must also be populated, and the password remembered.

Modem Setup

Min Signal dbm

This is the minimum threshold for the modem to consider the signal level to be acceptable, -113 is the bottom limit.

Re-scan Interval

This is the amount of time (in hours) that the modem will disconnect, and if the auto re-scan and re-connect to the network.

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This is the amount of time (in hours) that the modem will disconnect, and if auto re-scan and re-connect to the network.

Network Settings

Preferred Network

Use this to set the modem to use either 2G only, 2G preferred, 3G only or 3G preferred.

Preferred Operator

Use this to connect the modem to a preferred operator from the drop-down menu selection options, such as Vodafone.

Serial Port Settings

Preferred Network

When using an internal modem set to a default of the following: 8 data bit, 1 stop bit, no parity, and baud rate of 115200. Otherwise, if using serial comms then these can set as desired.

CHAPTER 4 SITE INSTALLATION AND TESTING

TCP Communications

if the RTU is going to be in listening mode then set the IP address as 0.0.0.0, and the connecting mode as permanent.

If the connection is an on-demand type, set the first connection as above, and add a second connection mode as on-demand. Then set the IP address to the master's address. Also set the TCP port number for both cases above, which would typically be 20000.

GPRS Modem Communications

Firstly, set the APN, network username and password. The username may not be required, however it is strongly advised to set a username and password.

Set the mode of communication, it is recommended to use the first connection as a listener, always. And if necessary, set the second connection as outgoing. However, since this is a TCP connection it should not be an on-demand connection.

Set a link status interval to 30 mins, this is a DNP3 null poll, and it tests the connection from the RTU to the master.

Set the disconnect idle time, to be a value greater than the link status interval, for example 120 mins.

Listen time out, is a fallback. So, if the RTU receives no DNP3 comms for 12hrs (user configurable) then the RTU will re-boot and will rely on the RTU to restart.

Testing

Establish comms with the DNP3 master, the output from the RTU can be monitored using a RS232 lead connected to the debug port.

You will see the DNP3 master and now disable unsolicited messages, and Poll all static points.

Remove events from the RTU event buffer and obtain all the log files from RTU, where the RTU will clear log entries on removal.

Now look to synchronize the RTU clock to UTC time and re-enable all unsolicited messages.

Test that all points create an event (Binary inputs, Counters, Analogue inputs), if the analogue control is enabled check these control points operate correctly.

And finally check that the Ultimate clock is set correct.

CHAPTER 5 DISPOSAL

Incorrect disposal can cause adverse effects to the environment.

Dispose of the device components and packaging material in accordance with regional environmental regulations including regulations for electrical \ electronic products.

Transducers

Remove power, disconnect the Transducer, cut off the electrical cable and dispose of cable and Transducer in accordance with regional environmental regulations for electrical \ electronic products.

Controllers

Remove power, disconnect the Controller, and remove battery (if fitted). Dispose of Controller in accordance with regional environmental regulations for electrical \ electronic products.

Dispose of batteries in accordance with regional environmental regulations for batteries.



■ EU WEEE Directive Logo

This symbol indicates the requirements of Directive 2012/19/EU regarding the treatment and disposal of waste from electric and electronic equipment.



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