

DNP3
Device Profile Document
For
Reliatronics Inc.
Model: RTU3200

Revision Date: 09/12/2008

DEVICE PROFILE REVISION HISTORY

Date	Version ¹	Reason for change	Edited by
09/12/2008	0	Initial release	HR

¹ Version of the Device Profile Document is indicated by a whole number incremented with each new release. The most recent version number should match the "Device Profile Document Version Number" (item 1.1.6) in the Current Device Settings Table.

Contents

1	DEVICE PROPERTIES	7
1.1	Device Identification	8
1.1.1	Device Function:	8
1.1.2	Vendor Name:	8
1.1.3	Device Name:	8
1.1.4	Device manufacturer's hardware version string:	8
1.1.5	Device manufacturer's software version string:	8
1.1.6	Device Profile Document Version Number:	8
1.1.7	DNP Levels Supported for:	9
1.1.8	Supported Function Blocks:	9
1.1.9	Notable Additions:	9
1.1.10	Methods to set Configurable Parameters:	10
1.1.11	DNP3 XML files available On-Line:	10
1.1.12	External DNP3 XML files available Off-line:	11
1.1.13	Connections Supported:	11
1.2	Serial Connections	12
1.2.1	Port Name	12
1.2.2	Serial Connection Parameters:	12
1.2.3	Baud Rate:	12
1.2.4	Hardware Flow Control (Handshaking):	13
1.2.5	Interval to Request Link Status:	14
1.2.6	Supports DNP3 Collision Avoidance:	14
1.2.7	Receiver Inter-character Timeout:	14
1.2.8	Inter-character gaps in transmission:	15
1.3	IP Networking	16
1.3.1	Port Name	16
1.3.2	Type of End Point:	16
1.3.3	IP Address of this Device:	16
1.3.4	Subnet Mask:	16
1.3.5	Gateway IP Address:	16
1.3.6	Accepts TCP Connections or UDP Datagrams from:	16
1.3.7	IP Address(es) from which TCP Connections or UDP Datagrams are accepted:	16
1.3.8	TCP Listen Port Number:	16
1.3.9	TCP Listen Port Number of remote device:	17
1.3.10	TCP Keep-alive timer:	17
1.3.11	Local UDP port:	17
1.3.12	Destination UDP port for DNP3 Requests (Master Only):	17
1.3.13	Destination UDP port for initial unsolicited null responses (UDP only Outstations):	17
1.3.14	Destination UDP port for responses:	17
1.3.15	Multiple outstation connections (Masters only):	18
1.3.16	Multiple master connections (Outstations Only):	18
1.3.17	Time synchronization support:	18
1.4	Link Layer	19
1.4.1	Data Link Address:	19
1.4.2	DNP3 Source Address Validation:	19
1.4.3	DNP3 Source Address(es) expected when Validation is Enabled:	19
1.4.4	Self Address Support using address 0xFFFC:	19
1.4.5	Sends Confirmed User Data Frames:	19
1.4.6	Data Link Layer Confirmation Timeout:	20

1.4.7	Maximum Data Link Retries:.....	20
1.4.8	Maximum number of octets Transmitted in a Data Link Frame:.....	20
1.4.9	Maximum number of octets that can be Received in a Data Link Frame:.....	20
1.5	Application Layer.....	21
1.5.1	Maximum number of octets Transmitted in an Application Layer Fragment other than File Transfer: 21	
1.5.2	Maximum number of octets Transmitted in an Application Layer Fragment containing File Transfer: 21	
1.5.3	Maximum number of octets that can be Received in an Application Layer Fragment:.....	21
1.5.4	Timeout waiting for Complete Application Layer Fragment:.....	21
1.5.5	Maximum number of objects allowed in a single control request for CROB (group 12):.....	22
1.5.6	Maximum number of objects allowed in a single control request for Analog Outputs (group 41): 22	
1.5.7	Maximum number of objects allowed in a single control request for Data Sets (groups 85,86,87): 22	
1.5.8	Supports mixing object groups (AOBs, CROBs and Data Sets) in the same control request:22	
1.6	Fill Out The Following Items For Masters Only.....	23
1.6.1	Timeout waiting for Complete Application Layer Response(ms):.....	23
1.6.2	Maximum Application Layer Retries for Request Messages:.....	23
1.6.3	Incremental Timeout waiting for First or Next Fragment of an Application Layer Response:23	
1.7	Fill Out The Following Items For Outstations Only.....	24
1.7.1	Timeout waiting for Application Confirm of solicited response message:.....	24
1.7.2	How often is time synchronization required from the master?.....	24
1.7.3	Device Trouble Bit IIN1.6:.....	24
1.7.4	File Handle Timeout:.....	24
1.7.5	Event Buffer Overflow Behaviour:.....	24
1.7.6	Event Buffer Organization:.....	24
1.7.7	Sends Multi-Fragment Responses:.....	25
1.7.8	DNP Command Settings preserved through a device reset:.....	25
1.8	Outstation Unsolicited Response Support.....	26
1.8.1	Supports Unsolicited Reporting:.....	26
1.8.2	Master Data Link Address:.....	26
1.8.3	Unsolicited Response Confirmation Timeout:.....	26
1.8.4	Number of Unsolicited Retries:.....	27
1.9	Outstation Unsolicited Response Trigger Conditions.....	28
1.9.1	Number of class 1 events:.....	28
1.9.2	Number of class 2 events:.....	28
1.9.3	Number of class 3 events:.....	28
1.9.4	Total number events from any class:.....	28
1.9.5	Hold time after class 1 event:.....	28
1.9.6	Hold time after class 2 event:.....	28
1.9.7	Hold time after class 3 event:.....	29
1.9.8	Hold time after event assigned to any class:.....	29
1.9.9	Retrigger Hold Timer:.....	29
1.9.10	Other Unsolicited Response Trigger Conditions:.....	29
1.10	Outstation Performance.....	30
1.10.1	Maximum Time Base Drift (milliseconds per minute):.....	30
1.10.2	When does outstation set IIN1.4?.....	30
1.10.3	Maximum Internal Time Reference Error when set via DNP (ms):.....	30
1.10.4	Maximum Delay Measurement error (ms):.....	30
1.10.5	Maximum Response time (ms):.....	31

1.10.6	Maximum time from start-up to IIN 1.4 assertion (ms):	31
1.10.7	Maximum Event Time-tag error for local Binary and Double-bit I/O (ms):.....	31
1.10.8	Maximum Event Time-tag error for local I/O other than Binary and Double-bit data types (ms):	31
1.11	Individual Field Outstation Parameters:	32
1.11.1	User-assigned location name or code string (same as g0v245):.....	32
1.11.2	User-assigned ID Code/number string (same as g0v246):.....	32
1.11.3	User-assigned name string for the outstation (same as g0v247):	32
1.11.4	Device Serial Number string (same as g0v248):.....	32
2	MAPPING TO IEC 61850 OBJECT MODELS.....	33
3	CAPABILITIES AND CURRENT SETTINGS FOR DEVICE DATABASE (OUTSTATION ONLY)	34
3.1	Single-Bit Binary Inputs.....	35
3.1.1	Static Variation reported when variation 0 requested:	35
3.1.2	Event Variation reported when variation 0 requested:	35
3.1.3	Event reporting mode:	35
3.1.4	Binary Inputs included in Class 0 response:	35
3.1.5	Definition of Binary Input Point List:	35
3.2	Double-bit Input Points.....	36
3.2.1	Static Variation reported when variation 0 requested:	36
3.2.2	Event Variation reported when variation 0 requested:	36
3.2.3	Event reporting mode:	36
3.2.4	Double-bit Inputs included in Class 0 response:	36
3.2.5	Definition of Double-bit Input Point List:.....	36
3.3	Binary Output Status and Control Relay Output Block.....	37
3.3.1	Minimum pulse time allowed with Trip, Close, and Pulse On commands:	37
3.3.2	Maximum pulse time allowed with Trip, Close, and Pulse On commands:	37
3.3.3	Binary Output Status included in Class 0 response:.....	37
3.3.4	Reports Output Command Event Objects:	37
3.3.5	Event Variation reported when variation 0 requested:	37
3.3.6	Command Event Variation reported when variation 0 requested:	37
3.3.7	Event reporting mode:	37
3.3.8	Command Event reporting mode:	38
3.3.9	Maximum Time between Select and Operate:	38
3.3.10	Definition of Binary Output Status/Control relay output block (CROB) Point List:	38
3.4	Counters/Frozen Counters	40
3.4.1	Static Counter Variation reported when variation 0 requested:	40
3.4.2	Counter Event Variation reported when variation 0 requested:	40
3.4.3	Counters included in Class 0 response:	40
3.4.4	Counter Event reporting mode:	40
3.4.5	Static Frozen Counter Variation reported when variation 0 requested:	40
3.4.6	Frozen Counter Event Variation reported when variation 0 requested:	41
3.4.7	Frozen Counters included in Class 0 response:	41
3.4.8	Frozen Counter Event reporting mode:	41
3.4.9	Counters Roll Over at:.....	41
3.4.10	Counters frozen by means of:.....	41
3.4.11	Definition of Counter/Frozen Counter Point List:.....	42
3.5	Analog Input Points	43
3.5.1	Static Variation reported when variation 0 requested:	43
3.5.2	Event Variation reported when variation 0 requested:	43
3.5.3	Event reporting mode:	43

3.5.4	Analog Inputs Included in Class 0 response:	43
3.5.5	How Deadbands are set:	44
3.5.6	Analog Deadband Algorithm:	44
3.5.7	Definition of Analog Input Point List:	44
3.6	Analog Output Status and Analog Output Control Block	45
3.6.1	Static Analog Output Status Variation reported when variation 0 requested:	45
3.6.2	Analog Output Status Included in Class 0 response:	45
3.6.3	Reports Output Command Event Objects:	45
3.6.4	Event Variation reported when variation 0 requested:	45
3.6.5	Command Event Variation reported when variation 0 requested:	46
3.6.6	Event reporting mode:	46
3.6.7	Command Event reporting mode:	46
3.6.8	Maximum Time between Select and Operate:	46
3.6.9	Definition of Analog Output Status/Analog Output Control Block Point List:	47
3.7	Sequential File Transfer	48
3.7.1	File Transfer Supported:	48
3.7.2	File Authentication:	48
3.7.3	File Append Mode:	48
3.7.4	Permissions Support:	48
3.7.5	Multiple Blocks in a Fragment:	48
3.7.6	Max number of Files Open at one time:	48
3.7.7	Definition of File Names that may be read or written:	48
3.8	Octet String Points	50
3.8.1	Event reporting mode:	50
3.8.2	Octet Strings Included in Class 0 response:	50
3.8.3	Definition of Octet String Point List:	50
3.9	Virtual Terminal Port Numbers (Points)	51
3.9.1	Definition of Virtual Terminal Port Numbers:	51

1 DEVICE PROPERTIES

Unless otherwise noted, multiple boxes in the second column below should be selected for each parameter to indicate all capabilities supported or required. Parameters without checkboxes in the second column do not have capabilities and are included so the current value may be shown in the third column.

The items listed in the capabilities column below may be configurable to any of the options selected, or set to a fixed value when the device was designed. Item 1.1.10 contains a list of abbreviations for the possible ways in which the configurable parameters may be set. Since some parameters may not be accessible by each of these methods supported, an abbreviation for the configuration methods supported by each parameter is shown in the fourth column of the tables below.

This document may be used to show the device capabilities, the current value of each parameter, or both. If it is used to show the current values, the third column should be filled in even if a fixed parameter is selected in the capabilities section (“NA” may be entered for parameters that are Not Applicable).

If this document is used to show the current value of each parameter, the “Current Value” column applies to a single connection between a master and outstation. If the device has multiple or backup connections to other DNP devices that you wish to show in the Device Profile Document, see section 8.3.2 “ReferenceDevice and AuxillaryInfo” of Volume 8 Interoperability or duplicate the entire Device Profile Document for each communication link to a logical or physical DNP3 Device.

1.1 DEVICE IDENTIFICATION	Capabilities	Current Value	If configurable, list methods
<p>1.1.1 Device Function:</p> <p><i>Masters send DNP requests, while Outstations send DNP responses. If a single physical device can perform both functions, a separate Device Profile Document must be provided for each function.</i></p>	<ul style="list-style-type: none"> <input type="radio"/> Master <input checked="" type="radio"/> Outstation 	<ul style="list-style-type: none"> <input type="radio"/> Master <input checked="" type="radio"/> Outstation 	
<p>1.1.2 Vendor Name:</p> <p><i>The name of the organization producing the device.</i></p>		Reliatronics Inc.	
<p>1.1.3 Device Name:</p> <p><i>The model and name of the device, sufficient to distinguish it from any other device from the same organization.</i></p>		Model: RTU3200	
<p>1.1.4 Device manufacturer's hardware version string:</p>		All versions	
<p>1.1.5 Device manufacturer's software version string:</p>		F3200_p002_10.bin	
<p>1.1.6 Device Profile Document Version Number:</p> <p><i>Version of the Device Profile Document is indicated by a whole number incremented with each new release. This should match the latest version shown in the Revision History at the beginning of this document.</i></p>		0	

1.1 DEVICE IDENTIFICATION	Capabilities	Current Value	If configurable, list methods
<p>1.1.7 DNP Levels Supported for:</p> <p><i>Indicate each DNP3 Level to which the device conforms fully. For Masters, requests and responses can be indicated independently.</i></p>	<p>Masters Only</p> <p>Requests Responses</p> <p><input type="checkbox"/> <input type="checkbox"/> None</p> <p><input type="checkbox"/> <input type="checkbox"/> Level 1</p> <p><input type="checkbox"/> <input type="checkbox"/> Level 2</p> <p><input type="checkbox"/> <input type="checkbox"/> Level 3</p> <p>Outstations Only</p> <p>Requests and Responses</p> <p><input type="checkbox"/> None</p> <p><input type="checkbox"/> Level 1</p> <p><input checked="" type="checkbox"/> Level 2</p> <p><input type="checkbox"/> Level 3</p>		
<p>1.1.8 Supported Function Blocks:</p> <p>.</p>	<p><input checked="" type="checkbox"/> Self-Address Reservation</p> <p><input checked="" type="checkbox"/> Object 0 – attribute objects</p> <p><input type="checkbox"/> Data Sets</p> <p><input checked="" type="checkbox"/> File Transfer</p> <p><input checked="" type="checkbox"/> Virtual Terminal</p> <p><input type="checkbox"/> Mapping to IEC 61850 Object Models defined in a DNP3 XML file</p> <p><input type="checkbox"/> Function code 31, activate configuration</p>		
<p>1.1.9 Notable Additions:</p> <p><i>A brief description intended to quickly identify for the reader the most obvious features the device supports in addition to the Highest DNP Level Supported. The complete list of features is described in the Implementation Table.</i></p>			

1.1 DEVICE IDENTIFICATION	Capabilities	Current Value	If configurable, list methods																				
<p>1.1.10 Methods to set Configurable Parameters:</p>	<input type="checkbox"/> XML – Loaded via DNP3 File Transfer <input type="checkbox"/> XML – Loaded via other transport mechanism <input type="checkbox"/> Terminal – ASCII Terminal Command Line <input checked="" type="checkbox"/> Software – Vendor software named _____ <input type="checkbox"/> Proprietary file loaded via DNP3 file transfer <input type="checkbox"/> Proprietary file loaded via other transport mechanism <input type="checkbox"/> Direct – Keypad on device front panel <input type="checkbox"/> Factory – Specified when device is ordered <input type="checkbox"/> Protocol – Set via DNP3 (e.g. assign class) <input type="checkbox"/> Other – explain _____	Download from: http://reliatronics.com /files /rtu3200_configuration.zip																					
<p>1.1.11 DNP3 XML files available On-Line:</p> <p><i>XML configuration file names that can be read or written through DNP3 File Transfer to a device</i></p> <p><i>A device's currently running configuration is returned by DNP3 on-line XML file read from the device.</i></p> <p><i>DNP3 on-line XML file write to a device will update the device's configuration when the Activate Configuration (function code 31) is received.</i></p> <p>.</p>	<table border="1"> <thead> <tr> <th>Rd</th> <th>Wr</th> <th>Filename</th> <th>Description of Contents</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td></td> <td>dnpDP.xml</td> <td>Complete Device Profile</td> </tr> <tr> <td><input type="checkbox"/></td> <td></td> <td>dnpDPcap.xml</td> <td>Device Profile Capabilities</td> </tr> <tr> <td><input type="checkbox"/></td> <td></td> <td>dnpDPcfg.xml</td> <td>Device Profile config. values</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>_____.xml</td> <td>_____</td> </tr> </tbody> </table> <p>* The Complete Device Profile Document contains the capabilities, Current Value, and configurable methods columns.</p> <p>* The Device Profile Capabilities contains only the capabilities and configurable methods columns.</p> <p>* The Device Profile Config. Values contains only the Current Value column.</p>	Rd	Wr	Filename	Description of Contents	<input type="checkbox"/>		dnpDP.xml	Complete Device Profile	<input type="checkbox"/>		dnpDPcap.xml	Device Profile Capabilities	<input type="checkbox"/>		dnpDPcfg.xml	Device Profile config. values	<input type="checkbox"/>	<input type="checkbox"/>	_____.xml	_____		
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<input type="checkbox"/>	<input type="checkbox"/>	_____.xml	_____																				

1.1 DEVICE IDENTIFICATION	Capabilities	Current Value	If configurable, list methods																				
<p>1.1.12 External DNP3 XML files available Off-line:</p> <p><i>XML configuration file names that can be read or written from an external system, typically from a system that maintains the outstation configuration.</i></p> <p><i>External off-line XML file read permits an XML definition of a new configuration to be supplied from off-line configuration tools.</i></p> <p><i>External off-line XML file write permits an XML definition of a new configuration to be supplied to off-line configuration tools.</i></p>	<table border="1"> <thead> <tr> <th>Rd</th> <th>Wr</th> <th>Filename</th> <th>Description of Contents</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dnpDP.xml</td> <td>Complete Device Profile</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dnpDPcap.xml</td> <td>Device Profile Capabilities</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>dnpDPcfg.xml</td> <td>Device Profile config. values</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>_____*.xml</td> <td>_____</td> </tr> </tbody> </table> <p>* The Complete Device Profile Document contains the capabilities, Current Value, and configurable methods columns.</p> <p>* The Device Profile Capabilities contains only the capabilities and configurable methods columns.</p> <p>* The Device Profile Config. Values contains only the Current Value column.</p>	Rd	Wr	Filename	Description of Contents	<input type="checkbox"/>	<input type="checkbox"/>	dnpDP.xml	Complete Device Profile	<input type="checkbox"/>	<input type="checkbox"/>	dnpDPcap.xml	Device Profile Capabilities	<input type="checkbox"/>	<input type="checkbox"/>	dnpDPcfg.xml	Device Profile config. values	<input type="checkbox"/>	<input type="checkbox"/>	_____*.xml	_____		
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<input type="checkbox"/>	<input type="checkbox"/>	_____*.xml	_____																				
<p>1.1.13 Connections Supported:</p>	<p><input checked="" type="checkbox"/> Serial (complete section 1.2)</p> <p><input checked="" type="checkbox"/> IP Networking (complete section 1.3)</p> <p><input type="checkbox"/> Other, explain _____</p>																						

1.2 SERIAL CONNECTIONS	Capabilities	Current Value	If configurable, list methods
1.2.1 Port Name <i>Name used to reference the communication port defined in this section.</i>		RS232 Port 1 RS232 Port 2 RS485	
1.2.2 Serial Connection Parameters:	<input checked="" type="checkbox"/> Asynchronous - 8 Data Bits, 1 Start Bit, 1 Stop Bit, No Parity <input type="checkbox"/> Other, explain _____		
1.2.3 Baud Rate:	<input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Configurable, range _____ to _____ <input checked="" type="checkbox"/> Configurable, selectable from 300 – 38,400 <input type="checkbox"/> Configurable, other, describe _____		300, 600, 1200, 2400, 4800, 9600, 19200, 38400

1.2 SERIAL CONNECTIONS	Capabilities	Current Value	If configurable, list methods
<p>1.2.5 Interval to Request Link Status:</p> <p><i>Indicates how often to send Data Link Layer status requests on a serial connection. This parameter is separate from the TCP Keep-alive timer.</i></p>	<p><input checked="" type="checkbox"/> Not Supported</p> <p><input type="checkbox"/> Fixed at _____ seconds</p> <p><input type="checkbox"/> Configurable, range _____ to _____ seconds</p> <p><input type="checkbox"/> Configurable, selectable from ____, ____, ____ seconds</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>		
<p>1.2.6 Supports DNP3 Collision Avoidance:</p> <p><i>Indicates whether a device uses a collision avoidance algorithm. Documentation by the vendor will provide information on collision avoidance schemes.</i></p>	<p><input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Yes, explain _____</p>		
<p>1.2.7 Receiver Inter-character Timeout:</p> <p><i>When serial interfaces with asynchronous character framing are used, this parameter indicates if the receiver makes a check for gaps between characters (i.e. extension of the stop bit time of one character prior to the start bit of the following character within a message). If the receiver performs this check and the timeout is exceeded then the receiver discards the current data link frame. A receiver that does not discard data link frames on the basis of inter-character gaps is considered to not perform this check.</i></p> <p><i>Where no asynchronous serial interface is fitted, this parameter is not applicable. In this case none of the options shall be selected.</i></p>	<p><input type="checkbox"/> Not checked</p> <p><input type="checkbox"/> No gap permitted</p> <p><input type="checkbox"/> Fixed at _____ bit times</p> <p><input type="checkbox"/> Fixed at _____ ms</p> <p><input type="checkbox"/> Configurable, range _____ to _____ bit times</p> <p><input checked="" type="checkbox"/> Configurable, range 0 to 10,000 ms</p> <p><input type="checkbox"/> Configurable, Selectable from ____, ____, ____ bit times</p> <p><input type="checkbox"/> Configurable, Selectable from ____, ____, ____ ms</p> <p><input type="checkbox"/> Configurable, other, describe _____</p> <p><input type="checkbox"/> Variable, explain _____</p>		

1.2 SERIAL CONNECTIONS	Capabilities	Current Value	If configurable, list methods
<p>1.2.8 Inter-character gaps in transmission:</p> <p><i>When serial interfaces with asynchronous character framing are used, this parameter indicates whether extra delay is ever introduced between characters in the message, and if so, the maximum width of the gap.</i></p> <p><i>Where no asynchronous serial interface is fitted, this parameter is not applicable. In this case none of the options shall be selected.</i></p>	<p><input checked="" type="checkbox"/> None (always transmits with no inter-character gap)</p> <p><input type="checkbox"/> Maximum _____ bit times</p> <p><input type="checkbox"/> Maximum _____ ms</p>		

1.3 IP NETWORKING	Capabilities	Current Value	If configurable, list methods
1.3.1 Port Name <i>Name used to reference the communication port defined in this section.</i>		Ethernet	
1.3.2 Type of End Point:	<input type="checkbox"/> TCP Initiating (Master Only) <input checked="" type="checkbox"/> TCP Listening (Outstation Only) <input type="checkbox"/> TCP Dual (required for Masters) <input checked="" type="checkbox"/> UDP Datagram (required)	Listens for TCP and UDP for DNP and one other alternative protocol	
1.3.3 IP Address of this Device:		192.168.0.100 (default)	Configuration Program
1.3.4 Subnet Mask:		255.255.255.0	Configuration Program
1.3.5 Gateway IP Address:		192.168.0.1	Configuration Program
1.3.6 Accepts TCP Connections or UDP Datagrams from:	<input checked="" type="checkbox"/> Allows all (show as *.*.* in 1.3.7) <input type="checkbox"/> Limits based on an IP address <input checked="" type="checkbox"/> Limits based on list of IP addresses <input type="checkbox"/> Limits based on a wildcard IP address <input type="checkbox"/> Limits based on list of wildcard IP addresses <input type="checkbox"/> Other validation, explain _____	Default value 'all'	Configurable for one or two IP addresses, or for all IP addresses.
1.3.7 IP Address(es) from which TCP Connections or UDP Datagrams are accepted:		Default value 'all'	See above
1.3.8 TCP Listen Port Number: <i>If Outstation or dual end point Master, port number on which to listen for incoming TCP connect requests. Required to be configurable for Masters and recommended to be configurable for Outstations.</i>	<input type="checkbox"/> Not Applicable (Master w/o dual end point) <input type="checkbox"/> Fixed at 20,000 <input checked="" type="checkbox"/> Configurable, range 0 to 65535 <input type="checkbox"/> Configurable, selectable from _____, _____, _____ <input type="checkbox"/> Configurable, other, describe _____	DNP 20,000	Configuration Program

1.3 IP NETWORKING	Capabilities	Current Value	If configurable, list methods
<p>1.3.9 TCP Listen Port Number of remote device:</p> <p><i>If Master or dual end point Outstation, port number on remote device with which to initiate connection. Required to be configurable for Masters and recommended to be configurable for Outstations.</i></p>	<p><input checked="" type="checkbox"/> Not Applicable (Outstation w/o dual end point)</p> <p><input type="checkbox"/> Fixed at 20,000</p> <p><input type="checkbox"/> Configurable, range _____ to _____</p> <p><input type="checkbox"/> Configurable, selectable from _____, _____, _____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>		
<p>1.3.10 TCP Keep-alive timer:</p> <p><i>The time period for the keep-alive timer on active TCP connections.</i></p>	<p><input type="checkbox"/> Fixed at _____ms</p> <p><input checked="" type="checkbox"/> Configurable, range 10 to 65,653 ms</p> <p><input type="checkbox"/> Configurable, selectable from _____, _____, _____ms</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>	120 seconds	Configuration Program
<p>1.3.11 Local UDP port:</p> <p><i>Local UDP port for sending and/or receiving UDP datagrams. Master may let system choose an available port. Outstation must use one that is known by the master.</i></p>	<p><input type="checkbox"/> Fixed at 20,000</p> <p><input checked="" type="checkbox"/> Configurable, range 0 to 65535</p> <p><input type="checkbox"/> Configurable, selectable from _____, _____, _____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p> <p><input type="checkbox"/> Let system choose (Master only)</p>	20,000	Configuration Program
<p>1.3.12 Destination UDP port for DNP3 Requests (Master Only):</p>			
<p>1.3.13 Destination UDP port for initial unsolicited null responses (UDP only Outstations):</p> <p><i>For a UDP only Outstation, the destination UDP port for sending initial unsolicited Null response</i></p>	<p><input type="checkbox"/> None</p> <p><input type="checkbox"/> Fixed at 20,000</p> <p><input checked="" type="checkbox"/> Configurable, range 0 to 65535</p> <p><input type="checkbox"/> Configurable, selectable from _____, _____, _____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>	20,000	Configuration Program
<p>1.3.14 Destination UDP port for responses:</p> <p><i>For a UDP only Outstation, the destination UDP port for sending all responses other than initial unsolicited Null Response.</i></p>	<p><input type="checkbox"/> None</p> <p><input type="checkbox"/> Fixed at 20,000</p> <p><input type="checkbox"/> Configurable, range _____ to _____</p> <p><input type="checkbox"/> Configurable, selectable from _____, _____, _____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p> <p><input checked="" type="checkbox"/> Use source port number</p>		

1.3 IP NETWORKING	Capabilities	Current Value	If configurable, list methods
1.3.15 Multiple outstation connections (Masters only): <i>Master only. Indicates whether multiple outstation connections are supported.</i>	<input type="checkbox"/> Supports multiple outstations (Masters only)		
1.3.16 Multiple master connections (Outstations Only): <i>Outstation only. Indicates whether multiple master connections are supported and the method that can be used to establish connections.</i>	<input checked="" type="checkbox"/> Supports multiple masters (Outstations only) If supported, the following methods may be used: <input checked="" type="checkbox"/> Method 1 (based on IP address) - required <input checked="" type="checkbox"/> Method 2 (based on IP port number) - recommended <input type="checkbox"/> Method 3 (browsing for static data) - optional		
1.3.17 Time synchronization support:	<input checked="" type="checkbox"/> DNP3 LAN procedure (function code 24) <input checked="" type="checkbox"/> DNP3 Write Time (not recommended over LAN) <input type="checkbox"/> Other, explain _____ <input type="checkbox"/> Not Supported		

1.4 LINK LAYER	Capabilities	Current Value	If configurable, list methods
<p>1.4.1 Data Link Address:</p> <p><i>Indicates if the link address is configurable over the entire valid range of 0 to 65,519. Data link addresses 0xFFFF0 through 0xFFFFF are reserved for broadcast or other special purposes.</i></p>	<p><input type="checkbox"/> Fixed at _____</p> <p><input checked="" type="checkbox"/> Configurable, range 0 to 65,519</p> <p><input type="checkbox"/> Configurable, selectable from _____, _____, _____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>		
<p>1.4.2 DNP3 Source Address Validation:</p> <p><i>Indicates whether the device will filter out messages not from a specific source address.</i></p>	<p><input checked="" type="checkbox"/> Never</p> <p><input type="checkbox"/> Always, one address allowed (shown in 1.4.3)</p> <p><input type="checkbox"/> Always, any one of multiple addresses allowed (each selectable as shown in 1.4.3)</p> <p><input type="checkbox"/> Sometimes, explain _____</p>		
<p>1.4.3 DNP3 Source Address(es) expected when Validation is Enabled:</p> <p><i>Selects the allowed source address(es).</i></p>	<p><input type="checkbox"/> Configurable to any 16 bit DNP Data Link Address value</p> <p><input type="checkbox"/> Configurable, range _____ to _____</p> <p><input type="checkbox"/> Configurable, selectable from _____, _____, _____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>	NA	
<p>1.4.4 Self Address Support using address 0xFFFC:</p> <p><i>If an Outstation receives a message with a destination address of 0xFFFC it shall respond normally with its own source address. It must be possible to disable the feature if supported.</i></p>	<p><input checked="" type="checkbox"/> Yes (only allowed if configurable)</p> <p><input type="checkbox"/> No</p>		
<p>1.4.5 Sends Confirmed User Data Frames:</p> <p><i>A list of conditions under which the device transmits confirmed link layer services (TEST_LINK_STATES, RESET_LINK_STATES, CONFIRMED_USER_DATA).</i></p>	<p><input type="checkbox"/> Always</p> <p><input type="checkbox"/> Sometimes, explain _____</p> <p><input checked="" type="checkbox"/> Never</p>		

1.4 LINK LAYER	Capabilities	Current Value	If configurable, list methods
<p>1.4.6 Data Link Layer Confirmation Timeout:</p> <p><i>This timeout applies to any secondary data link message that requires a confirm or response (link reset, link status, user data, etc)</i></p>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at _____ms <input checked="" type="checkbox"/> Configurable, range 0 to 1000 seconds <input type="checkbox"/> Configurable, selectable from ____, ____, ____ms <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	Default 2 seconds	Configuration Program
<p>1.4.7 Maximum Data Link Retries:</p> <p><i>The number of times the device will retransmit a frame that requests Link Layer confirmation.</i></p>	<input type="checkbox"/> Never Retries <input type="checkbox"/> Fixed at _____ <input checked="" type="checkbox"/> Configurable, range 0 to 100 <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____	Default 3	Configuration Program
<p>1.4.8 Maximum number of octets Transmitted in a Data Link Frame:</p> <p><i>This number includes the CRCs. With a length field of 255, the maximum size would be 292.</i></p>	<input checked="" type="checkbox"/> Fixed at 292 <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____		
<p>1.4.9 Maximum number of octets that can be Received in a Data Link Frame:</p> <p><i>This number includes the CRCs. With a length field of 255, the maximum size would be 292. The device must be able to receive 292 octets to be compliant.</i></p>	<input checked="" type="checkbox"/> Fixed at 292 <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____		

1.5 APPLICATION LAYER	Capabilities	Current Value	If configurable, list methods
<p>1.5.1 Maximum number of octets Transmitted in an Application Layer Fragment other than File Transfer:</p> <p><i>This size does not include any transport or frame octets.</i></p> <ul style="list-style-type: none"> • Masters must provide a setting less than or equal to 249. • Outstations must provide a setting less than or equal to 2048. 	<p><input checked="" type="checkbox"/> Fixed at 2048</p> <p><input type="checkbox"/> Configurable, range _____ to _____</p> <p><input type="checkbox"/> Configurable, selectable from ____, ____, ____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>		
<p>1.5.2 Maximum number of octets Transmitted in an Application Layer Fragment containing File Transfer:</p>	<p><input checked="" type="checkbox"/> Fixed at 2048</p> <p><input type="checkbox"/> Configurable, range _____ to _____</p> <p><input type="checkbox"/> Configurable, selectable from ____, ____, ____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>		
<p>1.5.3 Maximum number of octets that can be Received in an Application Layer Fragment:</p> <p><i>This size does not include any transport or frame octets.</i></p> <ul style="list-style-type: none"> • Masters must provide a setting greater than or equal to 2048. • Outstations must provide a setting greater than or equal to 249. 	<p><input checked="" type="checkbox"/> Fixed at 2048</p> <p><input type="checkbox"/> Configurable, range _____ to _____</p> <p><input type="checkbox"/> Configurable, selectable from ____, ____, ____</p> <p><input type="checkbox"/> Configurable, other, describe _____</p>		
<p>1.5.4 Timeout waiting for Complete Application Layer Fragment:</p> <p><i>Timeout if all frames of a message fragment are not received in the specified time. Measured from time first frame of a fragment is received until the last frame is received.</i></p>	<p><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> Fixed at _____ms</p> <p><input type="checkbox"/> Configurable, range _____ to _____ms</p> <p><input type="checkbox"/> Configurable, selectable from ____, ____, ____ms</p> <p><input type="checkbox"/> Configurable, other, describe _____</p> <p><input type="checkbox"/> Variable, explain _____</p>	NA	

1.5 APPLICATION LAYER	Capabilities	Current Value	If configurable, list methods
1.5.5 Maximum number of objects allowed in a single control request for CROB (group 12):	<input checked="" type="checkbox"/> Fixed at all(enter 0 if controls are not supported) <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from _____,_____,_____ <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	No limit	
1.5.6 Maximum number of objects allowed in a single control request for Analog Outputs (group 41):	<input checked="" type="checkbox"/> Fixed at _____ (enter 0 if controls are not supported) <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from _____,_____,_____ <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	No limit	
1.5.7 Maximum number of objects allowed in a single control request for Data Sets (groups 85,86,87):	<input type="checkbox"/> Fixed at _____ (enter 0 if controls are not supported) <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from _____,_____,_____ <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	NA	
1.5.8 Supports mixing object groups (AOBs, CROBs and Data Sets) in the same control request:	<input checked="" type="checkbox"/> Not applicable – controls are not supported <input type="checkbox"/> Yes <input type="checkbox"/> No	NA	

1.6 FILL OUT THE FOLLOWING ITEMS FOR MASTERS ONLY	Capabilities	Current Value	If configurable, list methods
<p>1.6.1 Timeout waiting for Complete Application Layer Response(ms):</p> <p><i>Timeout on Master if all fragments of a response message are not received in the specified time.</i></p>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at _____ms <input type="checkbox"/> Configurable, range _____ to _____ms <input type="checkbox"/> Configurable, selectable from ____, ____, ____ms <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	NA	
<p>1.6.2 Maximum Application Layer Retries for Request Messages:</p> <p><i>The number of times a Master will retransmit an application layer request message if a response is not received. This parameter must never cause a Master to retransmit control or time sync messages. Outstations should never transmit retries.</i></p>	<input type="checkbox"/> None (required) <input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Configurable, range ____ to _____ <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	NA	
<p>1.6.3 Incremental Timeout waiting for First or Next Fragment of an Application Layer Response:</p>	<input type="checkbox"/> None <input type="checkbox"/> Fixed at _____ms <input type="checkbox"/> Configurable, range _____ to _____ms <input type="checkbox"/> Configurable, selectable from ____, ____, ____ms <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	NA	

1.7 FILL OUT THE FOLLOWING ITEMS FOR OUTSTATIONS ONLY	Capabilities	Current Value	If configurable, list methods
1.7.1 Timeout waiting for Application Confirm of solicited response message:	<input type="checkbox"/> None <input type="checkbox"/> Fixed at _____ms <input checked="" type="checkbox"/> Configurable, range 0 to 1000 seconds <input type="checkbox"/> Configurable, selectable from ____, ____, ____ms <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____		
1.7.2 How often is time synchronization required from the master?	<input type="checkbox"/> Never needs time <input type="checkbox"/> Within _____ seconds after IIN1.4 is set <input checked="" type="checkbox"/> Periodically every 24 hours (configurable).	See 1.10.2	
1.7.3 Device Trouble Bit IIN1.6: <i>If IIN1.6 device trouble bit is set under certain conditions, explain the possible causes.</i>	<input checked="" type="checkbox"/> Never used <input type="checkbox"/> Reason for setting _____		
1.7.4 File Handle Timeout: <i>If there is no activity referencing a file handle for a configurable length of time, the outstation must do an automatic close on the file. The timeout value must be configurable up to 1 hour. When this condition occurs the outstation will send a File Transport Status Object (group 70 var 6) using a status code value of file handle expired (0x02).</i>	<input type="checkbox"/> Not applicable, files not supported <input type="checkbox"/> Fixed at _____ms <input checked="" type="checkbox"/> Configurable, range 10 to 3,600 seconds <input type="checkbox"/> Configurable, selectable from ____, ____, ____ms <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	Default = 120 seconds	
1.7.5 Event Buffer Overflow Behaviour:	<input type="checkbox"/> Discard the oldest event <input checked="" type="checkbox"/> Discard the newest event <input type="checkbox"/> Other, explain _____		
1.7.6 Event Buffer Organization: <i>Explain how event buffers are arranged (per Object Group, per Class, single buffer, etc.) and provide their sizes</i>	Events for all objects and variations supported by the RTU32000 are saved in a common event buffer with a capacity of 256 events total.		

1.7 FILL OUT THE FOLLOWING ITEMS FOR OUTSTATIONS ONLY	Capabilities	Current Value	If configurable, list methods
<p>1.7.7 Sends Multi-Fragment Responses:</p> <p><i>Indicates whether an Outstation sends multi-fragment responses (Masters do not send multi-fragment requests).</i></p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>		
<p>1.7.8 DNP Command Settings preserved through a device reset:</p> <p><i>If any of these settings are written through the DNP protocol and they are not preserved through a restart of the Outstation, the Master will have to write them again anytime the Restart IIN bit is set.</i></p>	<p><input type="checkbox"/> Assign Class <input checked="" type="checkbox"/> Analog Deadbands <input type="checkbox"/> Data Set Prototypes <input type="checkbox"/> Data Set Descriptors <input type="checkbox"/> Function Code 31 Activate Configuration</p>		

1.8 OUTSTATION UNSOLICITED RESPONSE SUPPORT	Capabilities	Current Value	If configurable, list methods
<p>1.8.1 Supports Unsolicited Reporting:</p> <p><i>When the unsolicited response mode is configured "off", the device is to behave exactly like an equivalent device that has no support for unsolicited responses. If set to On, the Outstation will send a null Unsolicited Response after it restarts, then wait for an Enable Unsolicited Response command from the master before sending additional Unsolicited Responses containing event data.</i></p>	<input type="checkbox"/> Not Supported <input checked="" type="checkbox"/> Configurable, selectable from On and Off	<ul style="list-style-type: none"> <input checked="" type="radio"/> Off <input type="radio"/> On 	Configuration Program
<p>1.8.2 Master Data Link Address:</p> <p><i>The destination address of the master device where the unsolicited responses will be sent.</i></p>	<input type="checkbox"/> Fixed at _____ <input checked="" type="checkbox"/> Configurable, range 0 to 65,519 <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____		Configuration Program
<p>1.8.3 Unsolicited Response Confirmation Timeout:</p> <p><i>This is the amount of time that the outstation will wait for an Application Layer confirmation back from the master indicating that the master received the unsolicited response message. As a minimum, the range of configurable values must include times from one second to one minute. This parameter may be the same one that is used for normal, solicited, application confirmation timeouts, or it may be a separate parameter.</i></p>	<input type="checkbox"/> Fixed at _____ms <input checked="" type="checkbox"/> Configurable, range 0 to 1000 seconds <input type="checkbox"/> Configurable, selectable from ____, ____, ____ms <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____	2 seconds	Configuration Program Note that this is configured independently of 1.4.6

1.8 OUTSTATION UNSOLICITED RESPONSE SUPPORT	Capabilities	Current Value	If configurable, list methods
<p>1.8.4 Number of Unsolicited Retries:</p> <p><i>This is the number of retries that an outstation transmits in each unsolicited response series if it does not receive confirmation back from the master. The configured value includes identical and regenerated retry messages. One of the choices must provide for an indefinite (and potentially infinite) number of transmissions.</i></p>	<p> <input type="checkbox"/> None <input type="checkbox"/> Fixed at _____ <input checked="" type="checkbox"/> Configurable, range 0 to 100 <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Always infinite, never gives up </p>	10	<p>Configuration Program</p> <p>Note that this is configured independently of 1.4.7</p>

1.9 OUTSTATION UNSOLICITED RESPONSE TRIGGER CONDITIONS	Capabilities	Current Value	If configurable, list methods
1.9.1 Number of class 1 events:	<input checked="" type="checkbox"/> Class 1 not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____	Any event triggers message	
1.9.2 Number of class 2 events:	<input checked="" type="checkbox"/> Class 2 not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____	Any event triggers message	
1.9.3 Number of class 3 events:	<input checked="" type="checkbox"/> Class 3 not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____	Any event triggers message	
1.9.4 Total number events from any class:	<input type="checkbox"/> Total Number of Events not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ <input checked="" type="checkbox"/> Configurable, range 1 to 100 <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____	Default is 1 event	
1.9.5 Hold time after class 1 event: <i>A configured value of 0 indicates that responses are not delayed due to this parameter.</i>	<input checked="" type="checkbox"/> Class 1 not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ ms <input type="checkbox"/> Configurable, range _____ to _____ ms <input type="checkbox"/> Configurable, selectable from ____, ____, ____ ms <input type="checkbox"/> Configurable, other, describe _____	Hold time is not class dependant	
1.9.6 Hold time after class 2 event: <i>A configured value of 0 indicates that responses are not delayed due to this parameter.</i>	<input checked="" type="checkbox"/> Class 2 not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ ms <input type="checkbox"/> Configurable, range _____ to _____ ms <input type="checkbox"/> Configurable, selectable from ____, ____, ____ ms <input type="checkbox"/> Configurable, other, describe _____	Hold time is not class dependant	

1.9 OUTSTATION UNSOLICITED RESPONSE TRIGGER CONDITIONS	Capabilities	Current Value	If configurable, list methods
<p>1.9.7 Hold time after class 3 event: <i>A configured value of 0 indicates that responses are not delayed due to this parameter.</i></p>	<input checked="" type="checkbox"/> Class 3 not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ ms <input type="checkbox"/> Configurable, range _____ to _____ ms <input type="checkbox"/> Configurable, selectable from _____, _____, _____ ms <input type="checkbox"/> Configurable, other, describe _____	Hold time is not class dependant	
<p>1.9.8 Hold time after event assigned to any class: <i>A configured value of 0 indicates that responses are not delayed due to this parameter.</i></p>	<input type="checkbox"/> Class events not used to trigger Unsolicited Responses <input type="checkbox"/> Fixed at _____ ms <input checked="" type="checkbox"/> Configurable, range 1 to 1000 seconds <input type="checkbox"/> Configurable, selectable from _____, _____, _____ ms <input type="checkbox"/> Configurable, other, describe _____	2 seconds	
<p>1.9.9 Retrigger Hold Timer: <i>The hold-time timer may be retriggered for each new event detected (increased possibly of capturing all the changes in a single response) or not retriggered (giving the master a guaranteed update time).</i></p>	<input type="checkbox"/> Hold-time timer will be retriggered for each new event detected (may get more changes in next response) <input checked="" type="checkbox"/> Hold-time timer will not be retriggered for each new event detected (guaranteed update time)		
<p>1.9.10 Other Unsolicited Response Trigger Conditions:</p>	<hr/> <hr/> <hr/>		

1.10 OUTSTATION PERFORMANCE	Capabilities	Current Value	If configurable, list methods
<p>1.10.1 Maximum Time Base Drift (milliseconds per minute):</p> <p><i>If the protocol is synchronized by DNP, what is the clock drift rate over the full operating temperature range.</i></p>		2 milliseconds	
<p>1.10.2 When does outstation set IIN1.4?</p>	<p><input type="checkbox"/> Never</p> <p><input checked="" type="checkbox"/> Asserted at startup until first Time Synchronization request received</p> <p><input type="checkbox"/> Periodically, range ____ to ____ seconds</p> <p><input type="checkbox"/> Periodically, selectable from ____, ____, ____ seconds</p> <p><input checked="" type="checkbox"/> Range1 to 65,535 minutes after last time sync</p> <p><input type="checkbox"/> Selectable from ____, ____, ____ seconds after last time sync</p> <p><input type="checkbox"/> When time error may have drifted by range ____ to ____ ms</p> <p><input type="checkbox"/> When time error may have drifted by selectable from ____, ____, ____</p>	1440 minutes (24 hours)	
<p>1.10.3 Maximum Internal Time Reference Error when set via DNP (ms):</p> <p><i>The difference between the time set in a DNP Write Time message, and the time actually set in the Outstation.</i></p>		1 millisecond	
<p>1.10.4 Maximum Delay Measurement error (ms):</p> <p><i>The difference between the time reported in the delay measurement response and the actual time between receipt of the delay measurement request and issuing the delay measurement reply.</i></p>		1 millisecond	

1.10 OUTSTATION PERFORMANCE	Capabilities	Current Value	If configurable, list methods
<p>1.10.5 Maximum Response time (ms):</p> <p><i>The amount of time an Outstation will take to respond upon receipt of a valid request. This does not include the message transmission time.</i></p>		<p>5 milliseconds</p> <p>Note: Add RTS pre-transmit time if RTS is enabled for push-to-talk.</p>	
<p>1.10.6 Maximum time from start-up to IIN 1.4 assertion (ms):</p>		<p>0</p>	
<p>1.10.7 Maximum Event Time-tag error for local Binary and Double-bit I/O (ms):</p> <p><i>The error between the time-tag reported and the absolute time of the physical event. This error includes the Internal Time Reference Error.</i></p>		<p>Binary Inputs are sampled on 1 millisecond intervals. Response is delayed only by debounce setting.</p>	
<p>1.10.8 Maximum Event Time-tag error for local I/O other than Binary and Double-bit data types (ms):</p>		<p>1 millisecond</p>	

1.11 INDIVIDUAL FIELD OUTSTATION PARAMETERS:	Value of Current Setting	If configurable, list methods
1.11.1 User-assigned location name or code string (same as g0v245):		
1.11.2 User-assigned ID Code/number string (same as g0v246):		
1.11.3 User-assigned name string for the outstation (same as g0v247):		
1.11.4 Device Serial Number string (same as g0v248):	Serial number of processor card.	Assigned by factory, not user configurable.

2 MAPPING TO IEC 61850 OBJECT MODELS

No mapping to IEC 61850 object models.

3 CAPABILITIES AND CURRENT SETTINGS FOR DEVICE DATABASE (OUTSTATION ONLY)

The RTU3200 is a modular RTU available in a large number of IO configurations. A list of all points in the RTU's database can be downloaded by the RTU3200 Configuration Program, and arranged in any order required.

See the RTU3200 User Manual at www.reliatronics.com/files/3200doc.pdf .

3.1 SINGLE-BIT BINARY INPUTS Static (Steady-State) Group Number: 1 Event Group Number: 2	Capabilities	Current Value	If configurable, list methods
3.1.1 Static Variation reported when variation 0 requested:	<input checked="" type="checkbox"/> Variation 1 – Single-bit Packed format <input checked="" type="checkbox"/> Variation 2 – Single-bit with flag <input type="checkbox"/> Based on point Index (add column to table below)	Variation 2 default	Configuration Program
3.1.2 Event Variation reported when variation 0 requested:	<input checked="" type="checkbox"/> Variation 1 – without time <input checked="" type="checkbox"/> Variation 2 – with absolute time <input type="checkbox"/> Variation 3 – with relative time <input type="checkbox"/> Based on point Index (add column to table below)	Variation 2 default	Configuration Program
3.1.3 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. All events are typically reported for Binary Inputs.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events		
3.1.4 Binary Inputs included in Class 0 response: <i>If Binary Inputs are not included in the Class 0 response, Binary Input Events (group 2) may not be reported.</i>	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)	Default – all binary inputs are included.	Number of inputs included is configurable with the Configuration Program.
3.1.5 Definition of Binary Input Point List: <i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input checked="" type="checkbox"/> Other, user can configure custom points list		Binary In points list may be reported in any order, as configured by the Configuration Program.

3.2 DOUBLE-BIT INPUT POINTS Static (Steady-State) Group Number: 3 Event Group Number: 4	Capabilities	Current Value	If configurable, list methods
3.2.1 Static Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – Double-bit Packed format <input type="checkbox"/> Variation 2 – Double-bit with flag <input type="checkbox"/> Based on point Index (add column to table below)	NA	
3.2.2 Event Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – without time <input type="checkbox"/> Variation 2 – with absolute time <input type="checkbox"/> Variation 3 – with relative time <input type="checkbox"/> Based on point Index (add column to table below)	NA	
3.2.3 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. All events are typically reported for Double-bit Inputs.</i>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	NA	
3.2.4 Double-bit Inputs included in Class 0 response: <i>If Double-bit Inputs are not included in the Class 0 response, Double-bit Input Events (group 4) may not be reported.</i>	<input type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)	NA	
3.2.5 Definition of Double-bit Input Point List: <i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input type="checkbox"/> Other, explain_____	NA	

3.3 BINARY OUTPUT STATUS AND CONTROL RELAY OUTPUT BLOCK Binary Output Status Group Number: 10 Binary Output Event Group Number: 11 CROB Group Number: 12 Binary Output Command Event Object Num: 13	Capabilities	Current Value	If configurable, list methods
3.3.1 Minimum pulse time allowed with Trip, Close, and Pulse On commands:	<input checked="" type="checkbox"/> Fixed at 1ms (hardware may limit this further) <input type="checkbox"/> Based on point Index (add column to table below)	Pulse time of zero (0) pulses output for default time (configurable).	Configuration Program
3.3.2 Maximum pulse time allowed with Trip, Close, and Pulse On commands:	<input checked="" type="checkbox"/> Fixed at 2 ³² ms (hardware may limit this further) <input type="checkbox"/> Based on point Index (add column to table below)	No limit other than via 4 byte data field (49+ days)	
3.3.3 Binary Output Status included in Class 0 response: <i>If Binary Output Status points are not included in the Class 0 response, Binary Output Status Events (group 11) may not be reported.</i>	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)	Default – all binary outputs are included.	Number of outputs included is configurable with the Configuration Program.
3.3.4 Reports Output Command Event Objects:	<input checked="" type="checkbox"/> Never <input type="checkbox"/> Only upon a successful Control <input type="checkbox"/> Upon all control attempts		
3.3.5 Event Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – without time <input type="checkbox"/> Variation 2 – with absolute time <input type="checkbox"/> Based on point Index (add column to table below)	NA	
3.3.6 Command Event Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – without time <input type="checkbox"/> Variation 2 – with absolute time <input type="checkbox"/> Based on point Index (add column to table below)	NA	
3.3.7 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	NA	

<p>3.3.8 Command Event reporting mode:</p> <p><i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i></p>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	NA	
<p>3.3.9 Maximum Time between Select and Operate:</p>	<input type="checkbox"/> Not Applicable <input type="checkbox"/> Fixed at _____ seconds <input checked="" type="checkbox"/> Configurable, range 1 to 1000 seconds <input type="checkbox"/> Configurable, selectable from____,____,____seconds <input type="checkbox"/> Configurable, other, describe_____ <input type="checkbox"/> Variable, explain _____ <input type="checkbox"/> Based on point Index (add column to table below)	Default 10 seconds	Configuration Program
<p>3.3.10 Definition of Binary Output Status/Control relay output block (CROB) Point List:</p> <p><i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i></p>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input checked="" type="checkbox"/> Other, user can configure custom points list		Binary out points list may be reported in any order, as configured by the Configuration Program.

Point Index	Name	Supported Control Operations										Name for State when value is 0	Name for State when value is 1	Default Class Assigned to Events (1, 2, 3 or none)		Description	
		Select/Operate	Direct Operate	Direct Operate – No Ack	Pulse On	Pulse Off	Latch On	Latch Off	Trip	Close	Count > 1			Cancel Currently Running Operation	Change		Command
All		√	√	√	√		√	√	√	√			off	on	none	none	All relay outputs

3.4 COUNTERS/FROZEN COUNTERS Static Counter Group Number: 20 Static Frozen Counter Group Number: 21 Counter Event Group Number: 22 Frozen Counter Event Group Number: 23	Capabilities	Current Value	If configurable, list methods
3.4.1 Static Counter Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit with flag <input type="checkbox"/> Variation 2 – 16-bit with flag <input checked="" type="checkbox"/> Variation 5 – 32-bit without flag <input type="checkbox"/> Variation 6 – 16-bit without flag <input type="checkbox"/> Based on point Index (add column to table below)		
3.4.2 Counter Event Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit with flag <input type="checkbox"/> Variation 2 – 16-bit with flag <input type="checkbox"/> Variation 5 – 32-bit with flag and time <input type="checkbox"/> Variation 6 – 16-bit with flag and time <input type="checkbox"/> Based on point Index (add column to table below)		
3.4.3 Counters included in Class 0 response: <i>If Counters are not included in the Class 0 response, Counter Events (group 22) may not be reported.</i>	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)	Default – all counters are included.	Number of counters included is configurable with the Configuration Program.
3.4.4 Counter Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. All events are typically reported for Counters.</i>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	NA	
3.4.5 Static Frozen Counter Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit with flag <input type="checkbox"/> Variation 2 – 16-bit with flag <input checked="" type="checkbox"/> Variation 5 – 32-bit with flag and time <input type="checkbox"/> Variation 6 – 16-bit with flag and time <input type="checkbox"/> Variation 9 – 32-bit without flag <input type="checkbox"/> Variation 10 – 16-bit without flag <input type="checkbox"/> Based on point Index (add column to table below)	Same number as for group 20	

3.4 COUNTERS/FROZEN COUNTERS Static Counter Group Number: 20 Static Frozen Counter Group Number: 21 Counter Event Group Number: 22 Frozen Counter Event Group Number: 23	Capabilities	Current Value	If configurable, list methods
3.4.6 Frozen Counter Event Variation reported when variation 0 requested:	<input checked="" type="checkbox"/> Variation 1 – 32-bit with flag <input type="checkbox"/> Variation 2 – 16-bit with flag <input type="checkbox"/> Variation 5 – 32-bit with flag and time <input type="checkbox"/> Variation 6 – 16-bit with flag and time <input type="checkbox"/> Based on point Index (add column to table below)		
3.4.7 Frozen Counters included in Class 0 response: <i>If Frozen Counters are not included in the Class 0 response, Frozen Counter Events (group 23) may not be reported.</i>	<input type="checkbox"/> Always <input checked="" type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)		
3.4.8 Frozen Counter Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. All events are typically reported for Frozen Counters.</i>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	NA	
3.4.9 Counters Roll Over at:	<input type="checkbox"/> 16 Bits (65,535) <input checked="" type="checkbox"/> 32 Bits (4,294,967,295) <input type="checkbox"/> Other Fixed Value _____ <input type="checkbox"/> Configurable; range _____ to _____ <input type="checkbox"/> Configurable, selectable from ____, ____, ____ <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Based on point Index (add column to table below)		
3.4.10 Counters frozen by means of:	<input checked="" type="checkbox"/> Master Request <input type="checkbox"/> Freezes itself without concern for time of day <input type="checkbox"/> Freezes itself and requires time of day <input type="checkbox"/> Other, explain _____		

3.4 COUNTERS/FROZEN COUNTERS Static Counter Group Number: 20 Static Frozen Counter Group Number: 21 Counter Event Group Number: 22 Frozen Counter Event Group Number: 23	Capabilities	Current Value	If configurable, list methods
3.4.11 Definition of Counter/Frozen Counter Point List: <i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input checked="" type="checkbox"/> Other, user can configure custom points list		Counters may be reported in any order, as configured by the Configuration Program.

3.5 ANALOG INPUT POINTS Static (Steady-State) Group Number: 30 Event Group Number: 32	Capabilities	Current Value	If configurable, list methods
3.5.1 Static Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit with flag <input checked="" type="checkbox"/> Variation 2 – 16-bit with flag <input type="checkbox"/> Variation 3 – 32-bit without flag <input checked="" type="checkbox"/> Variation 4 – 16-bit without flag <input type="checkbox"/> Variation 5 – single-precision floating point with flag <input type="checkbox"/> Variation 6 – double-precision floating point with flag <input type="checkbox"/> Based on point Index (add column to table below)	4	Select variation with Configuration Program
3.5.2 Event Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit without time <input checked="" type="checkbox"/> Variation 2 – 16-bit without time <input type="checkbox"/> Variation 3 – 32-bit with time <input checked="" type="checkbox"/> Variation 4 – 16-bit with time <input type="checkbox"/> Variation 5 – single-precision floating point w/o time <input type="checkbox"/> Variation 6 – double-precision floating point w/o time <input type="checkbox"/> Variation 7 – single-precision floating point with time <input type="checkbox"/> Variation 8 – double-precision floating point with time <input type="checkbox"/> Based on point Index (add column to table below)	4	Select variation with Configuration Program
3.5.3 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event. Only the most recent event is typically reported for Analog Inputs.</i>	<input type="checkbox"/> Only most recent <input checked="" type="checkbox"/> All events		
3.5.4 Analog Inputs Included in Class 0 response: <i>If Analog Inputs are not included in the Class 0 response, Analog Input Events (group 32) may not be reported.</i>	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)		

3.5 ANALOG INPUT POINTS Static (Steady-State) Group Number: 30 Event Group Number: 32	Capabilities	Current Value	If configurable, list methods
3.5.5 How Deadbands are set:	<input type="checkbox"/> A. Global Fixed <input checked="" type="checkbox"/> B. Configurable through DNP <input checked="" type="checkbox"/> C. Configurable via other means <input type="checkbox"/> D. Other, explain _____ <input type="checkbox"/> Based on point Index - column specifies which of the options applies, B, C, or D	Factory default deadband is zero, which disables event reporting for that point	Configuration Program from DNP host (Obj34V1)
3.5.6 Analog Deadband Algorithm: <i>simple - just compares the difference from the previous reported value</i> <i>integrating - keeps track of the accumulated change</i> <i>other - indicating another algorithm</i>	<input checked="" type="checkbox"/> Simple <input type="checkbox"/> Integrating <input type="checkbox"/> Other, explain _____		
3.5.7 Definition of Analog Input Point List: <i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input checked="" type="checkbox"/> Other, user can configure custom points list		Analog in points list may be reported in any order, as configured by the Configuration Program.

3.6 ANALOG OUTPUT STATUS AND ANALOG OUTPUT CONTROL BLOCK Analog Output Status Group Number: 40 Analog Output Control Block Group Number: 41 Analogue Output Event Group Number: 42 Analogue Output Command Event Group Number: 43	Capabilities	Current Value	If configurable, list methods
3.6.1 Static Analog Output Status Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit with flag <input checked="" type="checkbox"/> Variation 2 – 16-bit with flag <input type="checkbox"/> Variation 3 – single-precision floating point with flag <input type="checkbox"/> Variation 4 – double-precision floating point with flag <input type="checkbox"/> Based on point Index (add column to table below)		
3.6.2 Analog Output Status Included in Class 0 response: <i>If Analog Output Status points are not included in the Class 0 response, Analog Output Events (group 42) may not be reported.</i>	<input checked="" type="checkbox"/> Always <input type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)	Can be configured by user, but factory default does not include any analog outputs.	Configuration Program
3.6.3 Reports Output Command Event Objects:	<input checked="" type="checkbox"/> Never <input type="checkbox"/> Only upon a successful Control <input type="checkbox"/> Upon all control attempts		
3.6.4 Event Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit without time <input type="checkbox"/> Variation 2 – 16-bit without time <input type="checkbox"/> Variation 3 – 32-bit with time <input type="checkbox"/> Variation 4 – 16-bit with time <input type="checkbox"/> Variation 5 – single-precision floating point w/o time <input type="checkbox"/> Variation 6 – double-precision floating point w/o time <input type="checkbox"/> Variation 7 – single-precision floating point with time <input type="checkbox"/> Variation 8 – double-precision floating point with time <input type="checkbox"/> Based on point Index (add column to table below)	Not supported	

3.6 ANALOG OUTPUT STATUS AND ANALOG OUTPUT CONTROL BLOCK Analog Output Status Group Number: 40 Analog Output Control Block Group Number: 41 Analogue Output Event Group Number: 42 Analogue Output Command Event Group Number: 43	Capabilities	Current Value	If configurable, list methods
3.6.5 Command Event Variation reported when variation 0 requested:	<input type="checkbox"/> Variation 1 – 32-bit without time <input type="checkbox"/> Variation 2 – 16-bit without time <input type="checkbox"/> Variation 3 – 32-bit with time <input type="checkbox"/> Variation 4 – 16-bit with time <input type="checkbox"/> Variation 5 – single-precision floating point w/o time <input type="checkbox"/> Variation 6 – double-precision floating point w/o time <input type="checkbox"/> Variation 7 – single-precision floating point with time <input type="checkbox"/> Variation 8 – double-precision floating point with time <input type="checkbox"/> Based on point Index (add column to table below)	NA	
3.6.6 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	NA	
3.6.7 Command Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	Not supported	
3.6.8 Maximum Time between Select and Operate:	<input type="checkbox"/> Not Applicable <input type="checkbox"/> Fixed at _____ seconds <input checked="" type="checkbox"/> Configurable, range 1 to 1000 seconds <input type="checkbox"/> Configurable, selectable from_____,_____,____seconds <input type="checkbox"/> Configurable, other, describe _____ <input type="checkbox"/> Variable, explain _____ <input type="checkbox"/> Based on point Index (add column to table below)	Uses same maximum select operate time as binary outputs	

3.6 ANALOG OUTPUT STATUS AND ANALOG OUTPUT CONTROL BLOCK Analog Output Status Group Number: 40 Analog Output Control Block Group Number: 41 Analogue Output Event Group Number: 42 Analogue Output Command Event Group Number: 43	Capabilities	Current Value	If configurable, list methods
3.6.9 Definition of Analog Output Status/Analog Output Control Block Point List: <i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input checked="" type="checkbox"/> Other, there are no physical analog outputs	Index 0-31 are saved to non-volatile memory and can be used for setpoints, etc. Index 32-63 are saved in RAM, and lost with loss of power.	

3.7 SEQUENTIAL FILE TRANSFER Group Number: 70	Capabilities	Current Value	If configurable, list methods
3.7.1 File Transfer Supported:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (do not complete any further entries in section 3.7)		
3.7.2 File Authentication: <i>Indicates whether a valid authentication key must be obtained prior to open and delete requests.</i>	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes, explain _____ <input checked="" type="checkbox"/> Never		
3.7.3 File Append Mode: <i>Indicates if a file can be opened and appended to versus just overwritten.</i>	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes, explain _____ <input checked="" type="checkbox"/> Never		
3.7.4 Permissions Support: <i>Indicates the device is capable of using the indicated permissions.</i>	<input checked="" type="checkbox"/> Owner Read Allowed: 0x0100 <input checked="" type="checkbox"/> Owner Write Allowed: 0x0080 <input type="checkbox"/> Owner Execute Allowed: 0x0040 <input checked="" type="checkbox"/> Group Read Allowed: 0x0020 <input checked="" type="checkbox"/> Group Write Allowed: 0x0010 <input type="checkbox"/> Group Execute Allowed: 0x0008 <input checked="" type="checkbox"/> World Read Allowed: 0x0004 <input checked="" type="checkbox"/> World Write Allowed: 0x0002 <input type="checkbox"/> World Execute Allowed: 0x0001		
3.7.5 Multiple Blocks in a Fragment: <i>File data is transferred in a series of blocks of a maximum specified size. This indicates whether only a single block or multiple blocks will be sent in fragment.</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
3.7.6 Max number of Files Open at one time:	<input checked="" type="checkbox"/> Fixed at 1 <input type="checkbox"/> Configurable, range _____ to _____ <input type="checkbox"/> Configurable, selectable from _____, _____, _____ <input type="checkbox"/> Configurable, other, describe _____		
3.7.7 Definition of File Names that may be read or written:	<input checked="" type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input type="checkbox"/> Other, explain _____		

File Name	Default Class Assigned to Events (1, 2, 3 or none)	Authentication Required for:			Description
		Read	Write	Delete	
f3200_p00X_XX.bin	none				RTU3200 firmware
m3200_s16_XX.bin	none				Status input module RTU3200-16S firmware
m3200_r08_XX.bin	none				Relay output module RTU3200-8R firmware
m3200_acvx_XX.bin	none				AC analog input module RTU3200-ACVI or -ACVV firmware

3.8 OCTET STRING POINTS Static (Steady-State) Group Number: 110 Event Group Number: 111	Capabilities	Current Value	If configurable, list methods
3.8.1 Event reporting mode: <i>When responding with event data and more than one event has occurred for a data point, an Outstation may include all events or only the most recent event.</i>	<input type="checkbox"/> Only most recent <input type="checkbox"/> All events	Not supported	
3.8.2 Octet Strings Included in Class 0 response: <i>If Octet Strings are not included in the Class 0 response, Octet String Events (group 111) may not be reported.</i>	<input type="checkbox"/> Always <input checked="" type="checkbox"/> Never <input type="checkbox"/> Only if point is assigned to Class 1, 2, or 3 <input type="checkbox"/> Based on point Index (add column to table below)		
3.8.3 Definition of Octet String Point List: <i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input type="checkbox"/> Other, explain _____	Not supported	

3.9 VIRTUAL TERMINAL PORT NUMBERS (POINTS) Static (Steady-State) Group Number: 112 Event Group Number: 113	Capabilities	Current Value	If configurable, list methods
3.9.1 Definition of Virtual Terminal Port Numbers: <i>List all addressable points. Points that do not exist (for example, because an option is not installed) shall be omitted from the table.</i>	<input type="checkbox"/> Fixed, list shown in table below <input type="checkbox"/> Configurable(current list may be shown in table below) <input type="checkbox"/> Other, explain _____	Not supported	

4.3 Implementation Table **Bold font indicates “required for level II conformance”.**

DNP OBJECT GROUP & VARIATION			REQUEST Master may issue Outstation must parse	RESPONSE Master must parse Outstation may issue		
Group Num	Var Num	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
1	0	Binary Input – Any Variation	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)		
1	1	Binary Input – Packed format	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
1	2	Binary Input – With flags	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
2	0	Binary Input Event – Any Variation	1(read) , 20, 21,(unsol) 22 (assign class)	06 (no range, or all) 07, 08 (limited qty)		
2	1	Binary Input Event – Without time	1(read) , 20, 21,(unsol) 22 (assign class)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
2	2	Binary Input Event – With absolute time	1(read) , 20, 21,(unsol) 22 (assign class)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
2	3	Binary Input Event – With relative time	1(read) , 20, 21,(unsol) 22 (assign class)	06 (no range, or all) 07, 08 (limited qty)	129(response) 130 (unsol. resp)	17, 28 (index)
10	0	Binary Output – Any Variation	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)		
10	1	Binary Output – Packed format	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
10	2	Binary Output – Output status with flags	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
12	1	Binary Command – Control relay output block (CROB)	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, no ack) 22 (assign class)	17, 28 (index)	129 (response)	echo of request
20	0	Counter – Any Variation	1 (read) 7 (freeze) 8 (freeze noack) 9 (freeze clear) 10 (frz. cl. noack) 22 (assign class)	00,01,(start-stop) 06 (no range, or all)		
20	1	Counter – 32-bit with flag	1 (read) 7 (freeze) 8 (freeze noack) 9 (freeze clear) 10 (frz. cl. noack) 22 (assign class)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
20	5	Counter – 32-bit without flag	1 (read) 7 (freeze) 8 (freeze noack) 9 (freeze clear) 10 (frz. cl. noack) 22 (assign class)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
21	0	Frozen Counter – Any Variation	1 (read)	00,01,(start-stop) 06 (no range, or all)		
21	1	Frozen Counter – 32-bit with flag	1 (read)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
21	9	Frozen Counter – 32-bit without flag	1 (read)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
22	0	Counter Event – Any Variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
30	0	Analog Input – Any Variation	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)		
30	2	Analog Input – 16-bit with flag	1 (read) , 22 (assign class)		129 (response)	00, 01 (start-stop)

DNP OBJECT GROUP & VARIATION			REQUEST Master may issue Outstation must parse		RESPONSE Master must parse Outstation may issue	
Group Num	Var Num	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
30	4	Analog Input – 16-bit without flag	1 (read) , 22 (assign class)		129 (response)	00, 01 (start-stop)
32	0	Analog Input Event – Any Variation	1(read), 20, 21,(unsol) 22 (assign class)	06 (no range, or all) 07, 08 (limited qty)		
32	2	Analog Input Event – 16-bit without time	1(read), 20, 21,(unsol) 22 (assign class)		129 (response) 130 (unsol. resp)	17, 28 (index)
32	4	Analog Input Event – 16-bit with time	1(read), 20, 21,(unsol) 22 (assign class)		129 (response) 130 (unsol. resp)	17, 28 (index)
40	0	Analog Output Status – Any Variation	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)		
40	2	Analog Output Status – 16-bit with flag	1 (read) , 22 (assign class)	00,01,(start-stop) 06 (no range, or all)	129 (response)	00, 01 (start-stop)
41	2	Analog Output – 16-bit	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, no ack) , 22 (assign class)	17, 28 (index)	129 (response)	echo of request
50	1	Time and Date – Absolute time	2 (write)	07 (limited qty = 1)		
50	3	Absolute time at last recorded time	2 (write)	07 (limited qty = 1)		
60	1	Class Objects – Class 0 data	1 (read)	06 (no range, or all)		
60	2	Class Objects – Class 1 data	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
60	3	Class Objects – Class 2 data	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
60	4	Class Objects – Class 3 data	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
70	3	File Control - Command	25 (open), 27(close)	0x5B	129 (response)	
70	4	File Control – Command Status		0x5B	129 (response)	
70	5	File Control - Transport	1 (read), 2(write)	0x5B	129 (response)	
70	6	File Control – Transport Status		0x5B	129 (response)	
80	1	Internal Indications – Packed format	2 (write)	00 (start-stop) index=7		
No Object (function code only)			13 (cold restart)			
No Object (function code only)			14 (warm restart)			
No Object (function code only)			23 (delay meas.)			
No Object (function code only)			24 (record current time)			