

DNP Device Profile Document – Slave

DNP3	
DEVICE PROFILE DOCUMENT	
Vendor Name: Control Microsystems Inc.	
Device Name: DNP3 Slave Driver (ClearSCADA 2009)	
Highest DNP Level Supported:	Device Function:
For Requests Level 2 For Responses Level 2	<input type="checkbox"/> Master <input checked="" type="checkbox"/> Slave
Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP Levels Supported (the complete list is described in the attached table):	
Obj 0 (Device Attributes)	Obj 40 Var 3 (Short Float Analog Output Status)
Obj 3 Var 1 (Double Bit Binary Inputs packed)	Obj 40 Var 4 (Long Float Analog Output Status)
Obj 3 Var 2 (Double Bit Binary Input w/Status)	Obj 41 Var 1 (32-bit Analog Output Block)
Obj 4 Var 1 (Double Bit Binary Event)	Obj 41 Var 3 (Short Float Analog Output Block)
Obj 4 Var 2 (Double Bit Binary Event w/Time)	Obj 41 Var 4 (Long Float Analog Output Block)
Obj 4 Var 3 (Double Bit Bin Event w/Rel Time)	Obj 42 Var 1 (Analog Output Event 32-bit)
Obj 11 Var 1 (Binary Output Event)	Obj 42 Var 2 (Analog Output Event 16-bit)
Obj 11 Var 2 (Binary Output Event w/Time)	Obj 42 Var 3 (Analog Output Event 32-bit w/Time)
Obj 22 Var 5 (32-bit Ctr Chg Event w/Time)	Obj 42 Var 4 (Analog Output Event 16-bit w/Time)
Obj 22 Var 6 (16-bit Ctr Chg Event w/Time)	Obj 42 Var 5 (Analog Output Event Single-prec float)
Obj 23 Var 1 (32-bit Frz Ctr Chg Event)	Obj 42 Var 6 (Analog Output Event Double-prec flt-pt)
Obj 23 Var 2 (16-bit Frz Ctr Chg Event)	Obj 42 Var 7 (Analog Out Evt Single-prec flt-pt w/Time)
Obj 23 Var 5 (32-bit Frz Ctr Chg Event w/Time)	Obj 42 Var 8 (Analog Out Evt Double-prec flt-pt w/Time)
Obj 23 Var 6 (16-bit Frz Ctr Chg Event w/Time)	Obj 70 Var 1 (File Identifier)
Obj 30 Var 5 (Short Float Analog In)	Obj 70 Var 2 (File Control - Authentication)
Obj 30 Var 6 (Long Float Analog In)	Obj 70 Var 3 (File Control – File Command)
Obj 32, Var 3 (32-bit Ana Chg Event w/Time)	Obj 70 Var 4 (File Control – File Command status)
Obj 32, Var 4 (16-bit Ana Chg Event w/Time)	Obj 70 Var 5 (File Control – File Transport)
Obj 32, Var 5 (Short Float Analog Chg Event)	Obj 70 Var 6 (File Control – File Transport status)
Obj 32, Var 6 (Long Float Analog Chg Event)	Obj 110 (Octet String)
Obj 32, Var 7 (S Float Analog Chg Evt w/Time)	Obj 111 (Octet String Event)
Obj 32, Var 8 (L Float Analog Chg Evt w/Time)	Obj 112 (Virtual Terminal Block)
Obj 40, Var 1 (32-bit Analog Output Status)	Obj 113 (Virtual Terminal Event)

CONTROL MICROSYSTEMS

Func Code 15 (Initialize Data for Counters)		Qualifiers 00 & 01 (8 & 16-bit start/stop point indexes)	
Maximum Data Link Frame Size (octets):		Maximum Application Fragment Size (octets):	
Transmitted	<u>292</u>	Transmitted	<u>2048</u> (if >2048, must be configurable)
Received	(must be 292)	Received	<u>2048</u> (must be > 249)
Maximum Data Link Re-tries:		Maximum Application Layer Re-tries:	
<input type="checkbox"/> None <input type="checkbox"/> Fixed at <input checked="" type="checkbox"/> Configurable, range 0 to 255		<input type="checkbox"/> None <input checked="" type="checkbox"/> Configurable, range 0 to 255 (Fixed is not permitted)	

CONTROL MICROSYSTEMS

Requires Data Link Layer Confirmation:

- Never
 Always
 Sometimes If 'Sometimes', when?
 Configurable If 'Configurable', how? by settings; see Note*1

Requires Application Layer Confirmation:

- Never
 Always (not recommended)
 When reporting Event Data (Slave devices only)
 When sending multi-fragment responses (Slave devices only)
 Sometimes If 'Sometimes', when?
 Configurable If 'Configurable', how? _____

Timeouts while waiting for:

- | | | | | |
|-------------------------|--|---|-----------------------------------|--|
| Data Link Confirm | <input type="checkbox"/> None | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input checked="" type="checkbox"/> Configurable |
| Complete Appl. Fragment | <input type="checkbox"/> None | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input checked="" type="checkbox"/> Configurable |
| Application Confirm | <input type="checkbox"/> None | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input checked="" type="checkbox"/> Configurable |
| Complete Appl. Response | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Fixed at _____ | <input type="checkbox"/> Variable | <input type="checkbox"/> Configurable |

Others _____

Attach explanation if 'Variable' or 'Configurable' was checked for any timeout **see Note*2**

Executes Control Operations:

- | | | | | |
|-------------------------|---|--|------------------------------------|---------------------------------------|
| WRITE Binary Outputs | <input checked="" type="checkbox"/> Never | <input type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| SELECT/OPERATE | <input type="checkbox"/> Never | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| DIRECT OPERATE | <input type="checkbox"/> Never | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| DIRECT OPERATE - NO ACK | <input type="checkbox"/> Never | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Count > 1 | <input type="checkbox"/> Never | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Pulse On | <input checked="" type="checkbox"/> Never | <input type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Pulse Off | <input checked="" type="checkbox"/> Never | <input type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Latch On | <input type="checkbox"/> Never | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Latch Off | <input type="checkbox"/> Never | <input checked="" type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Queue | <input checked="" type="checkbox"/> Never | <input type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |
| Clear Queue | <input checked="" type="checkbox"/> Never | <input type="checkbox"/> Always | <input type="checkbox"/> Sometimes | <input type="checkbox"/> Configurable |

Attach explanation if 'Sometimes' or 'Configurable' was checked for any operation.

FILL OUT THE FOLLOWING ITEM FOR MASTER DEVICES ONLY:

Expects Binary Input Change Events:

- Either time-tagged or non-time-tagged for a single event
 Both time-tagged and non-time-tagged for a single event
 Configurable (attach explanation)

CONTROL MICROSYSTEMS

FILL OUT THE FOLLOWING ITEMS FOR SLAVE DEVICES ONLY:	
<p>Reports Binary Input Change Events when no specific variation requested: (Class Poll or Obj 2 Var 0 read)</p> <p> <input type="checkbox"/> Never <input type="checkbox"/> Only time-tagged <input type="checkbox"/> Only non-time-tagged <input checked="" type="checkbox"/> Configurable to send both, one or the other see Note*3 </p>	<p>Reports time-tagged Binary Input Change Events when no specific variation requested: (Class Poll or Obj 2 Var 0 read)</p> <p> <input type="checkbox"/> Never <input checked="" type="checkbox"/> Binary Input Change With Time <input checked="" type="checkbox"/> Binary Input Change With Relative Time <input checked="" type="checkbox"/> Configurable see Note*4 </p>
<p>Sends Unsolicited Responses:</p> <p> <input type="checkbox"/> Never <input checked="" type="checkbox"/> Configurable see Note*5 <input type="checkbox"/> Only certain objects <input type="checkbox"/> Sometimes (attach explanation) </p> <p>ENABLE/DISABLE UNSOLICITED Function codes supported</p>	<p>Sends Static Data in Unsolicited Responses:</p> <p> <input checked="" type="checkbox"/> Never <input type="checkbox"/> When Device Restarts <input type="checkbox"/> When Status Flags Change </p> <p>No other options are permitted.</p>
<p>Default Counter Object/Variation:</p> <p> <input type="checkbox"/> No Counters Reported <input type="checkbox"/> Configurable (attach explanation) <input checked="" type="checkbox"/> Default Object <u>20</u> Default Variation <u>1</u> <input type="checkbox"/> Point-by-point list attached </p>	<p>Counters Roll Over at:</p> <p> <input type="checkbox"/> No Counters Reported <input type="checkbox"/> Configurable (attach explanation) <input type="checkbox"/> 16 Bits <input checked="" type="checkbox"/> 32 Bits <input type="checkbox"/> Other Value <input type="checkbox"/> Point-by-point list attached </p>
<p>Sends Multi-Fragment Responses: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	

ClearSCADA Slave Driver Device Profile Document NOTES

Note*1

Data Link Layer Confirmation is configurable for the following cases:

- | | | |
|-----------|---|---|
| NEVER | - | never sends data link layer confirm |
| SOMETIMES | - | sends data link layer confirm for multi-frame fragments |
| ALWAYS | - | always sends data link layer confirm |

The *DLL Confirm* mode can be set in appropriate CLEARSCADA objects.

Note*2

Configurable timeouts can be set in appropriate CLEARSCADA objects. Value units are indicated for each parameter (e.g. mS, S, Min) and are generally entered in the range 0-65535.

Note*3

In response to an event class poll request or Obj 2 Var 0 read request, the RTU will send one type of binary event as set by the Event Object configuration parameters. CLEARSCADA allows configuration for each event object type (i.e. binary, analog, float). The event objects available are those supported by CLEARSCADA as defined by the Device Profile.

Note*4

The CLEARSCADA Event Object configuration can be set for:

- Binary Input Change With Time (Obj 2 Var 2 will be sent), or
- Binary Input Change With No Time (only Obj 2 Var 1 will be sent), or
- Binary Input Change With Relative Time

When the RTU Binary Event Object configuration is set for Obj 2 Var 2, all binary input events will be sent with an absolute time. When the RTU Binary Event Object configuration is set for Obj 2 Var 3, all binary events transmitted will be Binary Input Change with Relative Time events (preceded by an Obj 51 Var 1 CTO object).

Note*5

All DNP data points configured for access by a SCADA system can be optionally assigned an event class.

CONTROL MICROSYSTEMS

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DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
1	0*	Binary Input - All Variations	1	06	129	00,01
1	1	Binary Input			129	00,01
1	2	Binary Input with Status			129	00,01
2	0*	Binary Input Change Event- All Var	1	06,07,08	129	17,28
2	1	Binary Input Change without time	1	06,07,08	129,130	17,28
2	2	Binary Input Change with time	1	06,07,08	129,130	17,28
2	3	Binary Input Chg with relative time	1	06,07,08	129,130	17,28
3	0*	Double-bit Binary Input	1	06	129	00,01
3	1	Double-bit Binary Input			129	00,01
3	2	Double-bit Binary Input with Status			129	00,01
4	0*	Double-bit Binary Input Event	1	06,07,08	129	17,28
4	1	Double-bit Binary In Event w/out time	1	06,07,08	129,130	17,28
4	2	Double-bit Binary In Event w/time	1	06,07,08	129,130	17,28
4	3	Double-bit Binary In Event w/rel time	1	06,07,08	129,130	17,28
10	0*	Binary Output - All Variations	1	06	129	00,01
10	1	Binary Output			129	00,01
10	2	Binary Output status			129	00,01
11	0	Binary Output Event	1	06,07,08	129	17,28
11	1	Binary Output Event - Status w/out time	1	06,07,08	129	17,28
11	2	Binary Output Event - Status with time	1	06,07,08	129	17,28
12	1	Control Relay Output Block	3,4,5,6	17,28	129	Echo of req
20	0*	Binary Counter - All Variations	1, 7,8,9,10, 15	06	129	00,01
20	1	32-bit Binary Counter			129	00,01
20	2	16-bit Binary Counter			129	00,01
20	5	32-bit Binary Counter without flag			129	00,01
20	6	16-bit Binary Counter without flag			129	00,01
21	0	Frozen Counter - All Variations	1	06	129	00,01
21	1	32-bit Frozen Counter			129	00,01
21	2	16-bit Frozen Counter			129	00,01
21	9	32-bit Frozen Counter without flag			129	00,01
21	10	16-bit Frozen Counter without flag			129	00,01
22	0*	Counter Change Event -All Var	1	06,07,08	129	17,28
22	1	32-bit Counter Change Event			129,130	17,28
22	2	16-bit Counter Change Event			129,130	17,28
22	5	32-bit Counter Chg Event w/Time			129,130	17,28
22	6	16-bit Counter Chg Event w/Time			129,130	17,28
23	0*	Frozen Counter Change Event -All Var	1	06,07,08	129	17,28
23	1	32-bit F Counter Change Event			129,130	17,28
23	2	16-bit F Counter Change Event			129,130	17,28
23	5	32-bit F Counter Chg Event w/Time			129,130	17,28
23	6	16-bit F Counter Chg Event w/Time			129,130	17,28
30	0*	Analog Input - All Variations	1	06	129	00,01
30	1	32-bit Analog Input			129	00,01
30	2	16-bit Analog Input			129	00,01
30	3	32-bit Analog Input without flag			129	00,01
30	4	16-bit Analog Input without flag			129	00,01
30	5	Short Floating Point Analog Input			129	00,01
30	6	Double Floating Point Analog Input			129	00,01
32	0*	Analog Change Event - All Var	1	06,07,08	129	17,28
32	1	32-bit Analog Chg Evnt without Time			129,130	17,28
32	2	16-bit Analog Chg Evnt without Time			129,130	17,28

CONTROL MICROSYSTEMS

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DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

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OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
32	3	32-bit Analog Chg Event with Time			129,130	17,28
32	4	16-bit Analog Chg Event with Time			129,130	17,28
32	5	Short Floating Point Ana Chg Evnt			129,130	17,28
32	6	Double Float Point Ana Chg Evnt			129,130	17,28
32	7	Short Flt Pt Ana Chg Event w/ Time			129,130	17,28
32	8	Dble Flt Pt Ana Chg Event w/ Time			129,130	17,28
40	0*	Analog Output Status - All Variations	1	06	129	00,01
40	1	32-bit Analog Output Status			129	00,01
40	2	16-bit Analog Output Status			129	00,01
40	3	Short Floating Pnt Ana Outp Status			129	00,01
40	4	Dble Floating Pnt Ana Outp Status			129	00,01
41	1	32-bit Analog Output Block	3,4,5,6	17,28	129	echo of req
41	2	16-bit Analog Output Block	3,4,5,6	17,28	129	echo of req
41	3	Short Floating Pnt Ana Output Block	3,4,5,6	17,28	129	echo of req
41	4	Double Floating Pnt Ana Output Block	3,4,5,6	17,28	129	echo of req
42	0*	Analog Output Change Event - All Var	1	06,07,08	129	17,28
42	1	32-bit Analog OP Chg Evnt without Time			129,130	17,28
42	2	16-bit Analog OP Chg Evnt without Time			129,130	17,28
42	3	32-bit Analog OP Chg Event with Time			129,130	17,28
42	4	16-bit Analog OP Chg Event with Time			129,130	17,28
42	5	Short Floating Point Ana OP Chg Evnt			129,130	17,28
42	6	Double Float Point Ana OP Chg Evnt			129,130	17,28
42	7	Short Flt Pt Ana OP Chg Event w/Time			129,130	17,28
42	8	Dble Flt Pt Ana OP Chg Event w/Time			129,130	17,28
50	1	Time and Date	1,2	07 (qty=1)	129	07 (qty=1)
51	1	Time and Date CTO			129, 130	07 (qty=1)
52	2	Time Delay Fine			129	07 (qty=1)
60	1	Class 0 Data	1	06		
60	2	Class 1 Data	1,20,21	06,07,08		
60	3	Class 2 Data	1,20,21	06,07,08		
60	4	Class 3 Data	1,20,21	06,07,08		
70	1	File Control - File Identifier	2	1B	129	1B
70	2	File Control - Authentication	29	5B	129	5B
70	3	File Control - File Command	25, 27	5B	129	5B
70	4	File Control - File Command status	26,30	5B	129	5B
70	5	File Control - File Transport	1,2	5B	129	5B
70	6	File Control - File Transport status			129	5B
80	1	Internal Indications	2	00 (index = 7 only)	129	
110	Length	String Octet	1,2	00,01	129	00,01
111	0	String Octet Event	1	06,07,08	129,130	17,28
112	Length	Virtual Terminal Output Block	2	00,01	129	
113	0	Virtual Terminal Event Data	1	06,07,08	129,130	17,28
No Object		Cold Restart	13		129 (obj 52 var 2)	07 (qty=1)
No Object		Warm Restart	14		129 (obj 52 var 2)	07 (qty=1)
No Object		Delay Measurement	23		129 (obj 52 var 2)	07 (qty=1)

* Default Variation for static object is returned (i.e. as per user configuration - system).