

E-Series DNP3 Master Device Profile



CONTROL MICROSYSTEMS

SCADA products... for the distance

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I SCADAPack E-Series DNP3 Master Device Profile

DNP3 DEVICE PROFILE DOCUMENT	<i>February 2008 Revision 3</i>
Vendor Name: Control Microsystems Inc.	
Device Name: SCADAPack E-Series Data Concentrator	
Highest DNP Level Supported: For Requests Level 2 For Responses Level 2	Device Function: √ Master • 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): Group 22, Var 5 (32-bit Counter Chg Evt with Time) Group 22, Var 6 (16-bit Counter Chg Evt with Time) Group 30, Var 5 (Short Floating Pt. Ana Input) Group 32, Var 3 (32-bit Ana Chg Evt with Time) Group 32, Var 4 (16-bit Ana Chg Evt with Time) Group 32, Var 5 (Short Floating Pt. Ana Chg Evt without Time) Group 32, Var 7 (Short Floating Pt. Ana Chg Evt with Time) Group 40, Var 1 (32-bit Ana Output status) Group 40, Var 3 (Short Floating Pt. Ana Output status) Group 41, Var 1 (32-bit Ana Output Block) Group 41, Var 3 (Short Floating Pt. Ana Output Block) Function Code 14 (Warm Restart)	

Maximum Data Link Frame Size (octets): Transmitted <u> 249 </u> Transmitted Received (must be 292)		Maximum Application Fragment Size (octets): <u> 2048 </u> (if >2048, must be configurable) Received <u> 2048 </u> (must be > 249)		
Maximum-Data-Link Re-tries: • None • Fixed at _____ √ Configurable, range <u> 0 </u> to <u> 255 </u>		Maximum Application Layer Re-tries: • None √ Configurable, range <u> 0 </u> to <u> 255 </u> (Fixed is not permitted) see Note*1		
Requires Data Link Layer Confirmation: • Never • Always • Sometimes If 'Sometimes', when? _____ √ Configurable If 'Configurable', how? <u> by settings; see Note*2 </u>				
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	• None	• Fixed at ____	• Variable	√ Configurable
Complete Appl. Fragment	• None	• Fixed at ____	• Variable	√ Configurable
Application Confirm	• None	• Fixed at ____	• Variable	√ Configurable
Complete Appl. Response	√ None	• Fixed at ____	• Variable	• Configurable
Others				
Attach explanation if 'Variable' or 'Configurable' was checked for any timeout see Note*3				

<p>Sends / Executes Control Operations</p> <p>WRITE Binary Outputs SELECT/OPERATE DIRECT OPERATE DIRECT OPERATE - NO ACK</p> <p>Count > 1 Pulse On Pulse Off Latch On Latch Off</p> <p>Queue Clear</p> <p>Attach explanation if 'Sometimes' or 'Configurable' was checked for any operation. see Note*4</p>	<ul style="list-style-type: none"> √ Never • Never • Never √ Never √ Never • Never √ Never √ Never √ Never √ Never 	<ul style="list-style-type: none"> • Always • Always • Always • Always • Always • Always • Always • Always • Always • Always 	<ul style="list-style-type: none"> • Sometimes • Sometimes • Sometimes • Sometimes • Sometimes • Sometimes • Sometimes • Sometimes • Sometimes • Sometimes 	<ul style="list-style-type: none"> • Configurable √ Configurable √ Configurable • Configurable • Configurable √ Configurable • Configurable √ Configurable • Configurable • Configurable
<p>FILL OUT THE FOLLOWING ITEM FOR MASTER DEVICES ONLY:</p>				
<p>Expects Binary Input Change Events:</p> <ul style="list-style-type: none"> √ 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) 				
<p>FILL OUT THE FOLLOWING ITEMS FOR SLAVE DEVICES ONLY:</p>				
<p>Reports Binary Input Change Events when no Events specific variation requested: (Class Poll or Obj 2 Var 0 read)</p> <ul style="list-style-type: none"> • Never • Only time-tagged • Only non-time-tagged • Configurable to send both, one or the other (attach explanation) 	<p>Reports time-tagged Binary Input Change when no specific variation requested: (Class Poll or Obj 2 Var 0 read)</p> <ul style="list-style-type: none"> • Never • Binary Input Change With Time • Binary Input Change With Relative Time • Configurable (attach explanation) 			

<p>Sends Unsolicited Responses:</p> <ul style="list-style-type: none"> • Never • Configurable (attach explanation) • Only certain objects • Sometimes (attach explanation) • ENABLE/DISABLE UNSOLICITED Function codes supported 	<p>Sends Static Data in Unsolicited Responses:</p> <ul style="list-style-type: none"> • Never • When Device Restarts • When Status Flags Change <p>No other options are permitted.</p>
<p>Default Counter Object/Variation:</p> <ul style="list-style-type: none"> • No Counters Reported • Configurable (attach explanation) • Default Object _____ Default Variation _____ • Point-by-point list attached 	<p>Counters Roll Over at:</p> <ul style="list-style-type: none"> • No Counters Reported • Configurable (attach explanation) • 16 Bits • 32 Bits • Other Value _____ • Point-by-point list attached
<p>Sends Multi-Fragment Responses:</p> <ul style="list-style-type: none"> • Yes • No 	

1 DNP3 Device Profile Document

SCADAPack E-Series Data Concentrator

DNP3 Device Profile Document NOTES

This Device Profile document describes the DNP3 Master functionality for the SCADAPack E-Series RTU Data Concentrator facility. The Device Profile document for DNP3 Slave functionality of the SCADAPack E-Series RTU is provided in the E-Series DNP3 Slave Device Profile manual.

Note*1

Application retries are applicable to Data Concentrator requests to an RTU where a matching response is not received to a request after the Complete Application Fragment Timeout.

Note*2

Data Link Layer Confirmation is configurable for the following cases for each DNP communication port:

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 via RTU configuration software.

Note*3

Configurable timeouts can be set via RTU configuration software. Values units are indicated for each parameter (eg. mS, S, Min) and are generally entered in the range 0-65535. Data link confirm timeouts are individually configurable for each DNP communication port on the SCADAPack E-Series RTU. A default complete application fragment timeout applies for the entire Data Concentrator. The application timeout may be varied for each communication request generated by the Data Concentrator.

Note*4

Indication of supported features refers to controls originating at the Data Concentrator.

Configurable control types can be set via RTU configuration software for each defined range of DNP control points. Control points can be configured for Latch, Trip/Close, or Close/Trip with Direct Operate or Select Before Operate.

CROB controls that originate at a DNP3 Master station and are received by the Data Concentrator retain the original Function Codes and Control Codes when sent to an outstation.

1.1 INTEROPERABILITY TABLE - Part 1

SCADAPack E-Series Data Concentrator

DNP3 Device Profile Document

INTEROPERABILITY TABLE - 1 of 2

Object Group	Object Variation	Object Name / Description	(master sends)		(master parses)	
			Request Func Code	Request Qual (hex)	Response Func Code	Response Qual (hex)
1	0	Binary Input – All Variations				
1	1	Binary Input			129	00,01
1	2	Binary Input Status			129	00,01
2	0	Binary Input Change Event- All Var				
2	1	Binary Input Change without time			129,130	17,28
2	2	Binary Input Change with time			129,130	17,28
2	3	Binary Input Chg with relative time			129,130	17,28
10	0	Binary Output - All Variations				
10	1	Binary Output				
10	2	Binary Output Status			129,130	00,01
12	1	Control Relay Output Block	3,4,5,6	17,28	129	echo of req
20	0	Binary Counter - All Variations				
20	1	32-bit Binary Counter			129,130	00,01
20	2	16-bit Binary Counter			129,130	00,01
20	5	32-bit Binary Counter without flag			129,130	00,01
20	6	16-bit Binary Counter without flag			129,130	00,01
21	0	Frozen Counter - All Variations				
21	1	32-bit Frozen Counter			129,130++	
21	2	16-bit Frozen Counter			129,130++	
21	5	32-bit Frozen Counter with Time of Fz				
21	6	16-bit Frozen Counter with Time of Fz				

21	9	32-bit Frozen Counter without flag		129,130++	
21	10	16-bit Frozen Counter without flag		129,130++	
22	0	Counter Change Event –All Var			
22	1	32-bit Counter change evnt no time		129,130	17,28
22	2	16-bit Counter change evnt no time		129,130	17,28
22	5	32-bit Counter change evnt with time		129,130	17,28
22	6	16-bit Counter change evnt with time		129,130	17,28

++ Object not implemented. *Parse only* support.

1.2 INTEROPERABILITY TABLE - Part 2

SCADAPack E-Series Data Concentrator

DNP3 Device Profile Document

INTEROPERABILITY TABLE - 2 of 2

Object Group	Object Variation	Object Name / Description	(master sends)		(master parses)	
			Request Func Code	Request Qual (hex)	Response Func Code	Response Qual (hex)
30	0	Analog Input - All Variations				
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
32	0	Analog Change Event - All Var				
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
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	7	Sht Flt Point Ana Chg Evnt with Time			129,130	17,28
40	0	Analog Output Status - All Variations				
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
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
50	1	Time and Date	2	07 (qty=1)	129	07 (qty=1)

51	1	Time and Date CTO			129,130	07 (qty=1)
51	2	Unsynchronised Time and date CTO			129,130	07 (qty=1)
52	1	Time Delay Course			129	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		
60	3	Class 2 Data	1,20,21	06		
60	4	Class 3 Data	1,20,21	06		
70	1	File Identifier			129++	
80	1	Internal Indications	2	00 (index=7)	129	00
No	Object	Cold Restart	13		129 (grp 52 var 2)	07 (qty=1)
No	Object	Warm Restart	14		129 (grp 52 var 2)	07 (qty=1)
No	Object	Delay Measurement	23		129 (grp 52 var 2)	07 (qty=1)

++ Object not implemented. *Parse only* support.

(grp *nn* var *nn*) indicates object group & variation returned