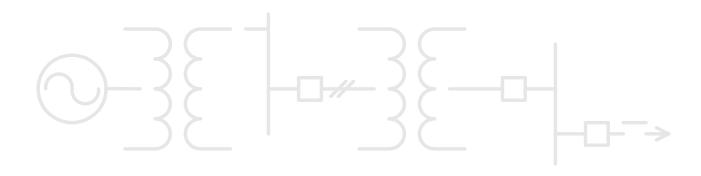
DNP3 Server (DPA) for the Multifunction Controller Platform

Conformance Statement

NTEK-A022M-0CS

Version 2.00 Revision 0

Associated Software Release: Version 2.60



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DNP3 Server Application on MCP - Device Profile Document

This document summarizes the MCP DNP3 Server implementation of the DNP3 protocol.

Several items in the Device Profile Document require additional explanation. All timeouts used by the DNP3 Server are configurable.

Each digital input point configured in the DNP3 Server is monitored for digital input change events. The user configures whether to report these as time-tagged or non-time-tagged digital events.

Counters rollover at whatever variation they are configured for. For example, if the counter is configured for a 32-bit variation, then it rolls over at 32 bits.

Unsolicited responses in the DNP3 Server are enabled and disabled for all classes (class 1, class 2 and class 3). However, if unsolicited responses are disabled in the configuration, unsolicited responses cannot be enabled or disabled during run-time via requests from the master station.

If unsolicited responses are enabled for one or more classes, the following IIN exceptions generate unsolicited responses: device restart, need time synchronization, and digital event buffer overflow.

The default variation of the static objects and change objects are configurable. When the Master requests data with all variations, the DNP3 Server responds with the configured variation. When the Master requests with a specific variation, the DNP3 Server responds with requested variation.

DNP3	DNP3					
DEVICE PROFILE	DOCUMENT					
This document is	This document is accompanied by a table having the following headings:					
Object Group	Request Function Co	Codes Response Function Codes				
Object Variation	Request Qualifiers	Response Qualifiers				
Object Name (opt	tional)					
Vendor Name:	GE Grid Solutions					
Device Name:	MCP DNP3 Server (both Serial and LAN)	J)				
Highest DNP3 Lev	vel Supported:	Device Function:				
For Requests	Level 3	□ Master ■ Outstation				
For Responses	Level 3					
	Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP3 Levels Supported (the complete list is described in the attached table):					
Optionally assigning class 1, 2 or 3 for each point.						
Optionally forcing digital input points.						
Optionally send Unsolicited messages for Indication or Indications and Events.						
Time tagged avai	ilable analog inputs returned.					

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DNP3						
DEVICE PROFILE DOCUMENT						
This document is accompanied by a table having the following headings:						
Object Group Request Function Codes Response Function Codes						
Object Variation	Request Qualifiers Response Qualifiers					
Object Name (optional)						
Maximum Data Link Frame S	Size (octets):	Maximum A	Application Fragm	nent Size (oc	tets):	
Transmitted 292		Transmitted	d 100 - 64k	(configural	ole)	
Received (must be	292)	Received 10	00 - 64K (must be	> 249)		
Maximum Data Link Re-tries);	Maximum A	Application Layer	Re-tries:		
□ None		□ None				
□ Fixed at		■ Configur	able, range0_	to32767	, 	
■ Configurable, range0_	to _255	(Fixed is	not permitted)			
Requires Data Link Layer Co	nfirmation:	•				
□ Never						
□ Always						
□ Sometimes	If 'Sometimes', when?					
Configurable	If 'Configurable', how? Us	ser enables o	disables confirm	n service.		
Requires Application Layer (Confirmation:					
□ Never						
□ Always (not recommende	ed)					
□ When reporting Event Do	ita (Slave devices only)					
□ When sending multi-frag	ment responses (Slave de	evices only)				
□ Sometimes If 'Somet'	imes', when?					
■ Configurable If 'Config	urable', how? User	enables or dis	sables confirm se	rvice.		
Timeouts while waiting for:						
Data Link Confirm	□ None □ Fix	ed at	D Vario	able	■ Configurable	
Complete Appl. Fragment	□ None □ Fix	ed at	D Vario	able	□ Configurable	
Application Confirm	□ None □ Fix	ed at	D Vario	able	■ Configurable	
Complete Appl. Response	□ None □ Fix	ed at	D Vario	able	□ Configurable	
Others	· · · · · · · · · · · · · · · · · · ·					
Attach explanation if 'Variab	ole' or 'Configurable' was	checked for a	ny timeout			
Sends/Executes Control Ope	erations:					
WRITE Binary Outputs	□ Never ■ Alv	vays	□ Sometimes	□ Config	urable	
SELECT/OPERATE	□ Never ■ Alv	vays	□ Sometimes	□ Config	urable	
DIRECT OPERATE	□ Never ■ Alv	vays	□ Sometimes	□ Config	urable	
DIRECT OPERATE - NO ACK	□ Never ■ Alv	vays	□ Sometimes	□ Config	urable	
Count > 1	□ Never ■ Alv	vays	□ Sometimes	□ Config	urable	
Pulse On	□ Never ■ Alv	vays	□ Sometimes	□ Config	urable	
Pulse Off	□ Never ■ Alv	vays	□ Sometimes	□ Config	urable	
Latch On	□ Never ■ Alv	vavs	□ Sometimes	□ Config	urable	

DNP3							
DEVICE PROFILE DOCUMENT							
This document is accompo	inied by a table having t	he following h	eadings:				
Object Group	Request Fur	nction Codes	Respoi	nse Function Codes			
Object Variation	Request Que	alifiers	Response Qualif	iers iers			
Object Name (optional)							
Latch Off	□ Never ■	Always	□ Sometimes	□ Configurable			
Queue	□ Never ■	Always	□ Sometimes	□ Configurable			
Clear Queue	□ Never	■ Alwo	ys 🗆 Som	netimes 🗆 Configurable			
Attach explanation if 'Some	etimes' or 'Configurable'	was checked	for any operation.				
FILL OUT THE FOLLOWING	ITEM FOR MASTER DE	VICES ONLY:					
Expects Binary Input Chan	ge Events:						
□ Either time-tagged or n	on-time-tagged for a sir	ngle event					
$\ \square$ Both time-tagged and r	non-time-tagged for a si	ngle event					
□ Configurable (attach ex	planation)						
FILL OUT THE FOLLOWING	ITEMS FOR SLAVE DEV	ICES ONLY:					
Reports Binary Input Chang specific variation requested			me-tagged Binary ariation requested	Input Change Events when no :			
□ Never		□ Never					
□ Only time-tagged		□ Binary	□ Binary Input Change with Time				
□ Only non-time-tagged		□ Binary	□ Binary Input Change with Relative Time				
 Configurable to one or t (attach explanation) 	he other	■ Config	■ Configurable (attach explanation)				
Sends Unsolicited Respons	es:	Sends Sto	itic Data in Unsolic	ited Responses:			
□ Never		□ Never					
■ Configurable (attach ex	planation)	■ When	■ When Device Restarts				
□ Only certain objects		■ When	Status Flags Chan	ge			
□ Sometimes (attach expl	anation)						
■ ENABLE/DISABLE UNSO Function codes support		No other	No other options are permitted.				
Default Counter Object/Va	riation:	Counters	Counters Roll Over at:				
□ No Counters Reported	□ No Co	□ No Counters Reported					
■ Configurable (attach ex	planation)	■ Config	gurable (attach exp	planation)			
□ Default Object		□ 16 Bits	□ 16 Bits				
Default Variation		□ 32 Bits	□ 32 Bits				
□ Point-by-point list attac	hed	□ Other	Value				
		□ Point-l	oy-point list attach	ed			
Sends Multi-Fragment Res	ponses: • Yes	□ No					

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Table 1 explains which objects/variations are used with which Function Codes and Qualifier Codes by the MCP DNP3 Server implementation.

To understand the table, consider the third row of Table 1. This row specifies how object 1, variation 2 (Binary Input with Status) is accessed. To access this type of object, the DNP3 Server shall process a request using Function Code 1 (READ) with a Qualifier Code in the range of 00, 01, or 06. The DNP3 Server shall respond with Function Code 129 (RESPONSE), Qualifier Code 01. The DNP3 Server shall also support a request using Function 2 (WRITE).

Table 1 Objects/Variations/Qualifiers/Function Codes supported by the MCP DNP3 Server

Obj.	Var.	Description	Request Function Code	Request Qualifier Codes (Hexadecimal)	Response Function Code	Response Qualifier Codes (Hexadecimal)
1	0	BINARY INPUT-ALL VARIATIONS	1, 22	00, 01, 06	Not Used	Not Used
1	1	BINARY INPUT – PACKED FORMAT	1	00, 01, 06	129	01
1	2	BINARY INPUT WITH STATUS	1	00, 01, 06	129	01
			2	00,01	129	01
2	0	BINARY INPUT CHANGE - ALL VARIATIONS	1	06, 07, 08	Not Used	Not Used
2	1	BINARY INPUT CHANGE WITHOUT TIME	1	06, 07, 08	129, 130	28
2	2	BINARY INPUT CHANGE WITH TIME	1	06, 07, 08	129, 130	28
2	3	BINARY INPUT CHANGE WITH RELATIVE TIME	1	06, 07, 08	129, 130	28
3	0	DOUBLE-BIT BINARY INPUT- ALL VARIATIONS	1, 22	00, 01, 06	Not Used	Not Used
3	1	DOUBLE-BIT BINARY INPUT – PACKED FORMAT	1	00, 01, 06	129	01
3	2	DOUBLE-BIT BINARY INPUT WITH STATUS	1	00, 01, 06	129	01
			2	00, 01	129	01
4	0	DOUBLE-BIT BINARY INPUT CHANGE – ALL VARIATIONS	1	06, 07, 08	Not Used	Not Used
4	1	DOUBLE-BIT BINARY INPUT CHANGE WITHOUT TIME	1	06, 07, 08	129, 130	28
4	2	DOUBLE-BIT BINARY INPUT CHANGE WITH TIME	1	06, 07, 08	129, 130	28
4	3	DOUBLE-BIT BINARY INPUT CHANGE WITH RELATIVE TIME	1	06, 07, 08	129, 130	28
10	0	BINARY OUTPUT - ALL VARIATIONS	1	00, 01, 06	Not Used	Not Used
10	1	BINARY OUTPUT	Not Used	Not Used	Not Used	Not Used
10	2	BINARY OUTPUT STATUS	1	00, 01, 06	129	01

Obj.	Var.	Description	Request Function Code	Request Qualifier Codes (Hexadecimal)	Response Function Code	Response Qualifier Codes (Hexadecimal)
12	0	CONTROL RELAY OUTPUT BLOCK - ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
12	1	CONTROL RELAY OUTPUT BLOCK	3, 4, 5, 6	17, 28	129	Echo of request qualifier codes
12	2	PATTERN CONTROL BLOCK	5, 6	17,28	129	Echo of request qualifier codes
12	3	PATTERN MASK	5, 6	00,01	129	Echo of request qualifier codes
20	0	BINARY COUNTER - ALL VARIATIONS	1, 7, 8, 9, 10, 22	00, 01, 06	Not Used	Not Used
20	1	32-BIT BINARY COUNTER	1, 7, 8, 9, 10	00, 01, 06	129	01
20	2	16-BIT BINARY COUNTER	1, 7, 8, 9, 10	00, 01, 06	129	01
20	3	32-BIT DELTA COUNTER	Not Used	Not Used	Not Used	Not Used
20	4	16-BIT DELTA COUNTER	Not Used	Not Used	Not Used	Not Used
20	5	32-BIT BINARY COUNTER WITHOUT FLAG	1, 7, 8, 9, 10	00, 01, 06	129	01
20	6	16-BIT BINARY COUNTER WITHOUT FLAG	1, 7, 8, 9, 10	00, 01, 06	129	01
20	7	32-BIT DELTA COUNTER WITHOUT FLAG	Not Used	Not Used	Not Used	Not Used
20	8	16-BIT DELTA COUNTER WITHOUT FLAG	Not Used	Not Used	Not Used	Not Used
21	0	FROZEN COUNTER - ALL VARIATIONS	1, 22	00, 01, 06	Not Used	Not Used
21	1	32-BIT FROZEN COUNTER	1	00, 01, 06	129	01
21	2	16-BIT FROZEN COUNTER	1	00, 01, 06	129	01
21	3	32-BIT FROZEN DELTA COUNTER	Not Used	Not Used	Not Used	Not Used
21	4	16-BIT FROZEN DELTA COUNTER	Not Used	Not Used	Not Used	Not Used
21	5	32-BIT FROZEN COUNTER WITH TIME OF FREEZE	1	00, 01, 06	129	01
21	6	16-BIT FROZEN COUNTER WITH TIME OF FREEZE	1	00, 01, 06	129	01
21	7			Not Used	Not Used	
21	8	16-BIT FROZEN DELTA Not Used Not Used Not Used COUNTER WITH TIME OF FREEZE		Not Used		
21	9	32-BIT FROZEN COUNTER WITHOUT FLAG	1	00, 01, 06	129	01
21	10	16-BIT FROZEN COUNTER WITHOUT FLAG	1	00, 01, 06	129	01

Obj.	Var.	Description Request Function Code		Request Qualifier Codes (Hexadecimal)	Response Function Code	Response Qualifier Codes (Hexadecimal)
21	11	32-BIT FROZEN DELTA COUNTER WITHOUT FLAG	1	00, 01, 06	Not Used	Not Used
21	12	16-BIT FROZEN DELTA COUNTER WITHOUT FLAG	1	00, 01, 06	Not Used	Not Used
22	0	COUNTER CHANGE EVENT - ALL VARIATIONS	1	06, 07, 08	Not Used	Not Used
22	1	32-BIT COUNTER CHANGE EVENT WITHOUT TIME	1	06, 07, 08	129, 130	28
22	2	16-BIT COUNTER CHANGE EVENT WITHOUT TIME	1	06, 07, 08	129, 130	28
22	3	32-BIT DELTA COUNTER CHANGE EVENT WITHOUT TIME	Not Used	Not Used	Not Used	Not Used
22	4	16-BIT DELTA COUNTER CHANGE EVENT WITHOUT TIME	Not Used	Not Used	Not Used	Not Used
22	5	32-BIT COUNTER CHANGE EVENT WITH TIME	1	06, 07, 08	129, 130	28
22	6	16-BIT COUNTER CHANGE EVENT WITH TIME	1	06, 07, 08	129, 130	28
22	7	32-BIT DELTA COUNTER CHANGE EVENT WITH TIME	Not Used	Not Used	Not Used	Not Used
22	8	16-BIT DELTA COUNTER CHANGE EVENT WITH TIME	Not Used	Not Used	Not Used	Not Used
23	0	FROZEN COUNTER - ALL VARIATIONS	1	06, 07, 08	Not Used	Not Used
23	1	32-BIT FROZEN COUNTER EVENT WITHOUT TIME	1	06, 07, 08	129, 130	28
23	2	16-BIT FROZEN COUNTER EVENT WITHOUT TIME	1	06, 07, 08	129, 130	28
23	3	32-BIT FROZEN DELTA COUNTER EVENT WITHOUT TIME	Not Used	Not Used	Not Used	Not Used
23	4	16-BIT FROZEN DELTA COUNTER EVENT WITHOUT TIME	Not Used	Not Used	Not Used	Not Used
23	5	32-BIT FROZEN COUNTER EVENT WITH TIME	1	06, 07, 08	129, 130	28
23	6	16-BIT FROZEN COUNTER EVENT WITH TIME	1	06, 07, 08	129, 130	28
23	7	32-BIT FROZEN DELTA COUNTER EVENT WITH TIME	Not Used	Not Used	Not Used	Not Used
23	8	16-BIT FROZEN DELTA COUNTER EVENT WITH TIME	Not Used	Not Used	Not Used	Not Used
30	0	ANALOG INPUT – ALL VARIATIONS	1, 22	00, 01, 06	Not Used	Not Used

Obj.	Var.	Description	Request Function Code	Request Qualifier Codes (Hexadecimal)	Response Function Code	Response Qualifier Codes (Hexadecimal)
30	1	32-BIT ANALOG INPUT	1	00, 01, 06	129	01
30	2	16-BIT ANALOG INPUT	1	00, 01, 06	129	01
30	3	32-BIT ANALOG INPUT WITHOUT FLAG	1	00, 01, 06	129	01
30	4	16-BIT ANALOG INPUT WITHOUT FLAG	1	00, 01, 06	129	01
30	5	32-BIT FLOATING POINT ANALOG INPUT	1	00, 01, 06	129	01
31	0	FROZEN ANALOG INPUT - ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
31	1	32-BIT FROZEN ANALOG INPUT	Not Used	Not Used	Not Used	Not Used
31	2	16-BIT FROZEN ANALOG INPUT	Not Used	Not Used	Not Used	Not Used
31	3	32-BIT FROZEN ANALOG INPUT WITH TIME OF FREEZE	Not Used	Not Used	Not Used	Not Used
31	4	16-BIT FROZEN ANALOG INPUT WITH TIME OF FREEZE	Not Used	Not Used	Not Used	Not Used
31	5	32-BIT FROZEN ANALOG Not Used Not Used INPUT WITHOUT FLAG		Not Used	Not Used	
31	6	16-BIT FROZEN ANALOG INPUT WITHOUT FLAG	Not Used	Not Used	Not Used	Not Used
32	0	ANALOG CHANGE EVENT - ALL VARIATIONS	1	06, 07, 08	Not Used	Not Used
32	1	32-BIT ANALOG CHANGE EVENT WITHOUT TIME	1	06, 07, 08	129, 130	28
32	2	16-BIT ANALOG CHANGE EVENT WITHOUT TIME	1	06, 07, 08	129, 130	28
32	3	32-BIT ANALOG CHANGE EVENT WITH TIME	1	06, 07, 08	129, 130	28
32	4	16-BIT ANALOG CHANGE EVENT WITH TIME	1	06, 07, 08	129, 130	28
32	5	32-BIT FLOATING POINT ANALOG CHANGE EVENT WITHOUT TIME	1	06, 07, 08	129, 130	28
32	7	32-BIT FLOATING POINT ANALOG CHANGE EVENT WITH TIME	1	06, 07, 08	129, 130	28
33	0	FROZEN ANALOG EVENT - ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
33	1	32-BIT FROZEN ANALOG EVENT WITHOUT TIME	Not Used	Not Used	Not Used	Not Used
33	2	16-BIT FROZEN ANALOG EVENT WITHOUT TIME	Not Used	Not Used	Not Used	Not Used
33	3	32-BIT FROZEN ANALOG EVENT WITH TIME	Not Used	Not Used	Not Used	Not Used

Obj.	Var.	Description	Request Function Code	Request Qualifier Codes (Hexadecimal)	Response Function Code	Response Qualifier Codes (Hexadecimal)
33	4	16-BIT FROZEN ANALOG EVENT WITH TIME	Not Used	Not Used	Not Used	Not Used
40	0	ANALOG OUTPUT STATUS - ALL VARIATIONS	1	00, 01, 06	Not Used	Not Used
40	1	32-BIT ANALOG OUTPUT STATUS	1	00, 01, 06	129	01
40	2	16-BIT ANALOG OUTPUT STATUS	1	00, 01, 06	129	01
41	0	ANALOG OUTPUT BLOCK - ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
41	1	32-BIT ANALOG OUTPUT BLOCK	3, 4, 5, 6	17, 28	129	Echo of request qualifier codes
41	2	16-BIT ANALOG OUTPUT BLOCK	3, 4, 5, 6	17, 28	129	Echo of request qualifier codes
50	0	TIME AND DATE - ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
50	1	TIME AND DATE	1, 2	07, where quantity = 1	129	07, Quantity = 1
50	2	TIME AND DATE WITH Not Used Not Used Not Used INTERVAL		Not Used	Not Used	
51	0	TIME AND DATE CTO - ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
51	1	TIME AND DATE CTO	Not Used	Not Used	129, 130	07, Quantity = 1
51	2	UN-SYNCHRONIZED TIME AND DATE CTO	Not Used	Not Used	129, 130	07, Quantity = 1
52	0	TIME DELAY – ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
52	1	TIME DELAY COARSE	Not Used	Not Used	Not Used	Not Used
52	2	TIME DELAY FINE	Not Used	Not Used	129	07, Quantity = 1
60	0	CLASS DATA – ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
60	1	CLASS 0 DATA	1	06	Not Used	1
60	2	CLASS 1 DATA	1	06, 07, 08	Not Used	Not Used
			20, 21, 22	06		
60	3	CLASS 2 DATA	1	06, 07, 08	Not Used	Not Used
			20, 21, 22	06		
60	4	CLASS 3 DATA	1	06, 07, 08	Not Used	Not Used
			20, 21, 22	06		
70	1	FILE IDENTIFIER	Not Used	Not Used	Not Used	Not Used
80	1	INTERNAL INDICATIONS	1	00,01	129, 130	00
			2	00		

Obj.	Var.	Description	Request Function Code	Request Qualifier Codes (Hexadecimal)	Response Function Code	Response Qualifier Codes (Hexadecimal)
81	0	STORAGE OBJECT - ALL VARIATIONS	Not Used	Not Used	Not Used	Not Used
81	1	STORAGE OBJECT	Not Used	Not Used	Not Used	Not Used
82	1	DEVICE PROFILE	Not Used	Not Used	Not Used	Not Used
83	1	PRIVATE REGISTRATION OBJECT	Not Used	Not Used	Not Used	Not Used
83	2	PRIVATE REGISTRATION OBJECT DESCRIPTOR	Not Used	Not Used	Not Used	Not Used
90	1	APPLICATION IDENTIFIER	Not Used	Not Used	Not Used	Not Used
100	1	SHORT FLOATING POINT	Not Used	Not Used	Not Used	Not Used
100	2	LONG FLOATING POINT	Not Used	Not Used	Not Used	Not Used
100	3	EXTENDED FLOATING POINT	Not Used	Not Used	Not Used	Not Used
101	1	SMALL-PACKED BINARY CODED DECIMAL	Not Used	Not Used	Not Used	Not Used
101	2	MEDIUM-PACKED BINARY CODED DECIMAL	Not Used	Not Used	Not Used	Not Used
101	3	LARGE-PACKED BINARY CODED DECIMAL	Not Used	Not Used	Not Used	Not Used

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MODIFICATION RECORD

VERSION	REV.	DATE	CHANGE DESCRIPTION
1.00	0	2 nd May, 2019	Created.
2.00	0	18 th October, 2021	Added support for Double-Bit Binary Inputs.