

■ GENERAL

This General Specifications document describes the Distributed Network Protocol Version 3.0 (DNP3) Communication Portfolio for STARDOM. The DNP3 Communication Portfolio generates a control application for FCN/FCJ autonomous controllers. Using this portfolio, the FCN/FCJ can perform DNP3 communication via a serial port.

■ OPERATING ENVIRONMENT

● Hardware (FCN)

Means of communication	Module
Serial communication (RS-232-C)	CPU module (*1) (NFCP100, 1 port)

*1: In a dual-redundant configuration, the serial port cannot be used.

Note: The NFLR111/NFLR121 cannot be used.

● Hardware (FCJ)

Means of communication	FCJ
Serial communication (RS-232-C)	1 port (*1)

*1: Only one of the two serial ports can be used.

■ FUNCTION SPECIFICATIONS

● DNP3 Communication Portfolio

DNP3 Communication Portfolio is a POU that enables FCN/FCJ autonomous controllers to easily acquire and set data from and to DNP3 communications protocol support master devices via serial communication. The following communication type is supported:

Means of communication	Communication type
Serial communication (*1)	Slave (level 2)

*1: Serial communication is possible only when the FCN/FCJ is a slave.

■ ACCESSIBLE RANGE

The table below presents the accessible ranges for the different types of data.

● Accessible Device Ranges as a Slave

In a setting where the FCN/FCJ acts a slave and the master device accesses the FCN/FCJ, the accessible device range of the master device is shown in the table below:

Data type		IEC data type	Index number
Binary Input		BOOL	0 to 499
Binary Output		BOOL	0 to 499
Counter	32bit	UDINT	0 to 499
Analog Input	32bit	DINT (*1)	0 to 499
Analog Output			0 to 499
Short Floating Analog Input	32bit	REAL (*1)	0 to 499
Short Floating Analog Output			0 to 499

*1: One of "Analog Input/Output" (DINT) or "Short Floating Analog Input/Output" (REAL) can be used in an FCN/FCJ.

■ LIST OF POU FUNCTIONS

● Slave Mode

The table below presents POUs that are used to access variables in the slave mode:

POU name	Function
SD_CDNP_S_OPEN	Communication task creation and securing a domain for variables
SD_CDNP_S_BI_RD	Reading binary input data
SD_CDNP_S_BO_RD	Reading binary output data
SD_CDNP_S_CT32_RD	Reading 32-bit counter data
SD_CDNP_S_AI32_RD	Reading 32-bit analog input data
SD_CDNP_S_AISF_RD	Reading short floating analog input data
SD_CDNP_S_AO32_RD	Reading 32-bit analog output data
SD_CDNP_S_AOSF_RD	Reading short floating analog output data
SD_CDNP_S_BI_WT	Writing binary input data
SD_CDNP_S_BO_WT	Writing binary output data
SD_CDNP_S_CT32_WT	Writing 32-bit counter data
SD_CDNP_S_AI32_WT	Writing 32-bit analog input data
SD_CDNP_S_AISF_WT	Writing short floating analog input data
SD_CDNP_S_AO32_WT	Writing 32-bit analog output data
SD_CDNP_S_AOSF_WT	Writing short floating analog output data
SD_CDNP_S_DBND	Setting analog input deadband value

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■ Device Profile

● DNP V3.0 Device Profile

The following table provides a "Device Profile Document" in the standard format defined in the DNP 3.0 Subset Definitions Document. While it is referred to in the DNP 3.0 Subset Definitions as a "Document", it is only a component of a total interoperability guide.

DNP V3.0	
DEVICE PROFILE DOCUMENT	
Vendor Name: YOKOGAWA	
Device Name: STARDOM FCN/FCJ	
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):	
32-bit and Short Floating Point Analog Change Events with Time are supported.	
Maximum Data Link Frame Size (octets):	Maximum Application Fragment Size (octets):
Transmitted: 292 Received: 292	Transmitted: 2048 Received: 2048
Maximum Data Link Re-tries:	Maximum Application Layer Re-tries:
<input checked="" type="checkbox"/> None <input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Configurable from _____ to _____	<input checked="" type="checkbox"/> None <input type="checkbox"/> Configurable
Requires Data Link Layer Confirmation:	
<input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable	
Requires Application Layer Confirmation:	
<input type="checkbox"/> Never <input checked="" type="checkbox"/> Always <input type="checkbox"/> When reporting Event Data <input type="checkbox"/> When sending multi-fragment responses <input type="checkbox"/> Sometimes <input type="checkbox"/> Configurable	
Timeouts while waiting for:	
Data Link Confirm:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Fixed at 10sec. <input type="checkbox"/> Variable <input type="checkbox"/> Configurable
Complete Appl. Fragment:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Variable <input type="checkbox"/> Configurable
Application Confirm:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Fixed at 10sec. <input type="checkbox"/> Variable <input type="checkbox"/> Configurable
Complete Appl. Response:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Fixed at _____ <input type="checkbox"/> Variable <input type="checkbox"/> Configurable

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DEVICE PROFILE DOCUMENT

Sends/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 checked="" type="checkbox"/> Never	<input type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input type="checkbox"/> Configurable
Pulse On	<input type="checkbox"/> Never	<input checked="" type="checkbox"/> Always	<input type="checkbox"/> Sometimes	<input type="checkbox"/> Configurable
Pulse Off	<input type="checkbox"/> Never	<input checked="" 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

Sequential File Transfer Support:

Append File Mode	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Custom Status Code Strings	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Permissions Field	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
File Events Assigned to Class	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
File Events Poll Specifically	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Multiple Blocks in a Fragment	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Max Number of Files Open	0	

Default Status Object/Variation:

- No Status object reported
- Configurable(attach explanation)
- Default Static Object 1
- Default Static Variation 2
- Default Event Object 2
- Default Event Variation 2
- Point-by-point list attached

Default Analog Object/Variation:

- No Analog object reported
- Configurable(attach explanation)
- Default Static Object 30
- Default Static Variation 5
- Default Event Object 32
- Default Event Variation 7
- Point-by-point list attached

Default Counter Object/Variation:

- No Counter object reported
- Configurable(attach explanation)
- Default Static Object 20
- Default Static Variation 5
- Default Event Object 22
- Default Event Variation 5
- Point-by-point list attached

Counter Roll Over at:

- No Counters Reported
- Configurable(attach explanation)
- 16 Bits
- 32 Bits
- Other Value _____
- Point-by-point list attached

Analog Deadbands:

- Fixed
- Configurable
 - Per Point
 - Per Analog Type
 - Global

Configuring Analog Deadbands:

- Not Applicable
- Configuration Software
- Using Object 34 from the master station
- Both configuration software and Object 34

Are the update deadband values preserved through a device reset:

- YES
- NO**

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● DNP V3.0 Implementation Table

The following table identifies the variations, function codes, and qualifiers supported by FCN/FCJ in both request messages and in response messages.

OBJECT			REQUEST (FCN/FCJ may send)		RESPONSE (FCN/FCJ will parse)	
Object Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
1	0	Binary Input – Any Variation	1 (read)	00, 01 (start-stop) 17, 28 (index)		
1	1	Binary Input	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
1	2	Binary Input with Status	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01, 02 (start-stop) 17, 27, 37, 18, 28, 38, 19, 29, 39 (index)
2	0	Binary Input Change – Any Variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
2	1	Binary Input Change without Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
2	2	Binary Input Change with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
2	3	Binary Input Change with Relative Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
10	0	Binary Output Status – Any Variation	1 (read)	00, 01 (start-stop) 17, 28 (index)		
10	1	Binary Output	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
10	2	Binary Output Status	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
20	0	Binary Counter – Any Variation	1 (read)	00, 01 (start-stop) 17, 28 (index)		
20	1	32-Bit Binary Counter (with Flag)	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
20	5	32-Bit Binary Counter without Flag	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
22	0	Counter Change Event – Any Variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
22	1	32-Bit Counter Change Event without Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
22	5	32-Bit Counter Change Event with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
30	0	Analog Input - Any Variation	1 (read)	00, 01 (start-stop) 17, 28 (index)		
30	1	32-Bit Analog Input	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
30	3	32-Bit Analog Input without Flag	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
30	5	Short Floating Point Analog Input	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)

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OBJECT			REQUEST (FCN/FCJ may send)		RESPONSE (FCN/FCJ will parse)	
Object Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
32	0	Analog Change Event - Any Variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
32	1	32-Bit Analog Change Event without Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
32	3	32-Bit Analog Change Event with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
32	5	Short Floating Point Analog Change Event without Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
32	7	Short Floating Point Analog Change Event with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol resp)	17, 28 (index)
34	0	Analog Input Deadband (Variation 0 is used to request default variation)	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)		
34	2	32-Bit Analog Input Deadband	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
			2 (write)	00, 01 (start-stop) 07, 08 (limited qty) 17, 28 (index)		
34	3	Short Floating Point Analog Input Deadband	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
			2 (write)	00, 01 (start-stop) 07, 08 (limited qty) 17, 28 (index)		
40	0	Analog Output Status (Variation 0 is used to request default variation)	1 (read)	00, 01 (start-stop) 17, 28 (index)		
40	1	32-Bit Analog Output Status	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
40	3	Short Floating Point Analog Output Status	1 (read)	00, 01 (start-stop) 17, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index)
50	0	Time and Date - Any Variation				
50	1	Time and Date	1 (read)	07 (quantity = 1)	129 (response)	07 (quantity = 1)
			2 (write)	07 (quantity = 1)		
60	0	Not Defined				
60	1	Class 0 Data	1 (read)	06 (no range, or all)		
60	2	Class 1 Data	1 (read)	06 (no range, or all)		
60	3	Class 2 Data	1 (read)	06 (no range, or all)		
60	4	Class 3 Data	1 (read)	06 (no range, or all)		

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■ MODEL AND SUFFIX CODES

		Description
Model	NT8036J	DNP3 Communication Portfolio License
Suffix Codes	-L	License
	W	Issued online via the Internet
	1	Always 1
	1	Always 1
	A	Standard

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■ ORDERING INSTRUCTIONS

Specify the model and suffix codes when ordering.

For the type of software media supplied, refer to the separate GS, "Application Portfolios" (publication number GS 34P02P20-01E).

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