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DNP 3.0 Serial (RS232/RS485) and Ethernet (TCP/IP) or Fiber SCADA Interface for A12B and A46 Chargers
Option 21P
Option 57T
Option 57U

Setup Instructions

This manual is only valid for A12B and A46 Chargers equipped with the following:

S2A-525C card with software version P525D1001 and

S2A-383S/DS communication cards

Default Settings

The LaMarche Communications Card is shipped with the following default settings:

Serial Port Settings
Port: RS232
Node Address: 4
Baud Rate: 9600
Data Bits: 8
Stop Bits: 1
Parity: None

Ethernet/TCP/Configuration Port Settings
Protocol: DNP 3.0
Node Address: 4
IP Address: 192.168.0.6
Subnet: 255.255.255.0
Gateway: 192.168.0.1
TCP Port Number: 20000
Ethernet Type: Copper Interface 10/100 Base-T, Fiber Interface 10/100 Base-FX.

Configuring the Communications Settings

Configuration is accomplished through the front panel. Customers requiring a special configuration they are unable to accomplish through the front panel should contact the factory for assistance.

To change the settings use the **Menu** button to access the menus. From the **Settings Menu** scroll to the **Advanced Settings** menu. From the **Advanced Settings** menu scroll to the **Communications** menu. From the **Communications** menu select the **Comm. Settings** menu. In the **Comm. Settings** menu you may select the following;

Read Only Mode
Node Address.
Serial Port
Parity
Baud Rate
IP Address
Subnet Mask
Gateway
TCP Port

Read Only Mode
This setting when set to YES disables the ability to remotely change all settings making the communications read only.

Node Address
Sets the node address. Use the UP and DOWN arrow buttons to set each digit. Use the LEFT arrow button to move to the next digit in the address. Selections are limited to 0 through 65534.

Serial Port
Sets the serial port to be used. Use the UP and DOWN arrow buttons to select from RS485 and RS232. Note: SW4 on board must be set to match this setting. See figures 1 and 2 below for details.

Parity Type
Sets the Parity Type. Use the UP and DOWN arrow buttons to select from NONE, ODD and EVEN.

Baud Rate
Sets the Baud Rate. Use the UP and DOWN arrow buttons to select from 1200, 2400, 4800, 9600, 19200, 38400.

IP Address
Sets the IP Address. Use the UP and DOWN arrow buttons to set each quadrant. Use the LEFT arrow button to move to the next quadrant in the IP Address.

NOTE: The following limitations apply to the IP Address setting
1. IP Address should be a proper IP address.
2. IP address should not be Loop back IP address.
3. IP address should not belong to Class D or Class E IP range.
4. IP address should not be network address or broadcast address.
5. IP address and the gateway should be in same subnet.

Subnet Mask
Sets the Subnet Mask. Use the UP and DOWN arrow buttons to set each quadrant. Use the LEFT arrow button to move to the next quadrant in the IP Address.

Gateway
Sets the Gateway. Use the UP and DOWN arrow buttons to set each quadrant. Use the LEFT arrow button to move to the next quadrant in the IP Address.

NOTE: The following limitations apply to the Gateway setting
1. Gateway may not be set to 0.0.0.0

TCP Port
Sets the TCP Port Number. Use the UP and DOWN arrow buttons to set each digit. Use the LEFT arrow button to move to the next digit in the address. Selections are limited to 0 through 65535.

Communications Board Configuration

When using the Serial Ports you must check the 383S card switch settings and make sure switch settings match the DNP Serial Port setting selected in the Communications menu. SW4 (light blue) sets the card to either RS232 or RS485. SW3 (red) selects the RS485 biasing and termination resistor configuration. The silkscreen on the board shows the switch positions for various settings. J2A is the RS232 connection and this port is wired as DTE. TS1 is the RS485 connection. Only one Serial port is active at a time. No configuration is required when using the Ethernet Port.

Figure 1 – 10/100 Base FX Fiber Interface

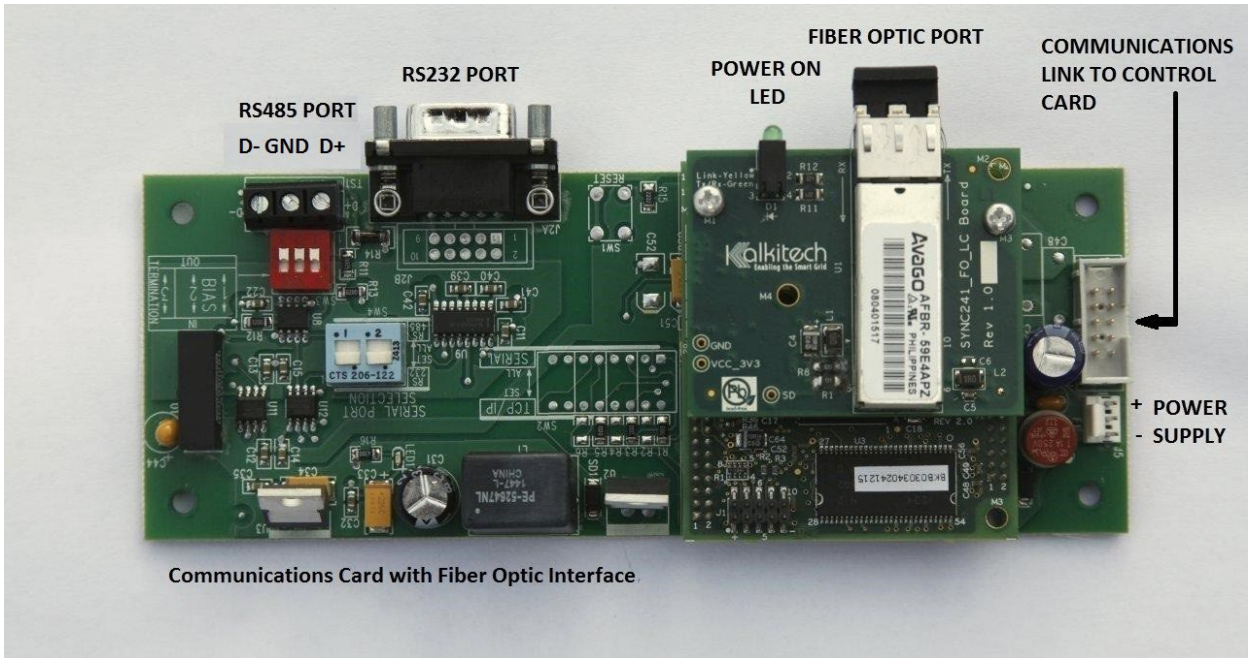
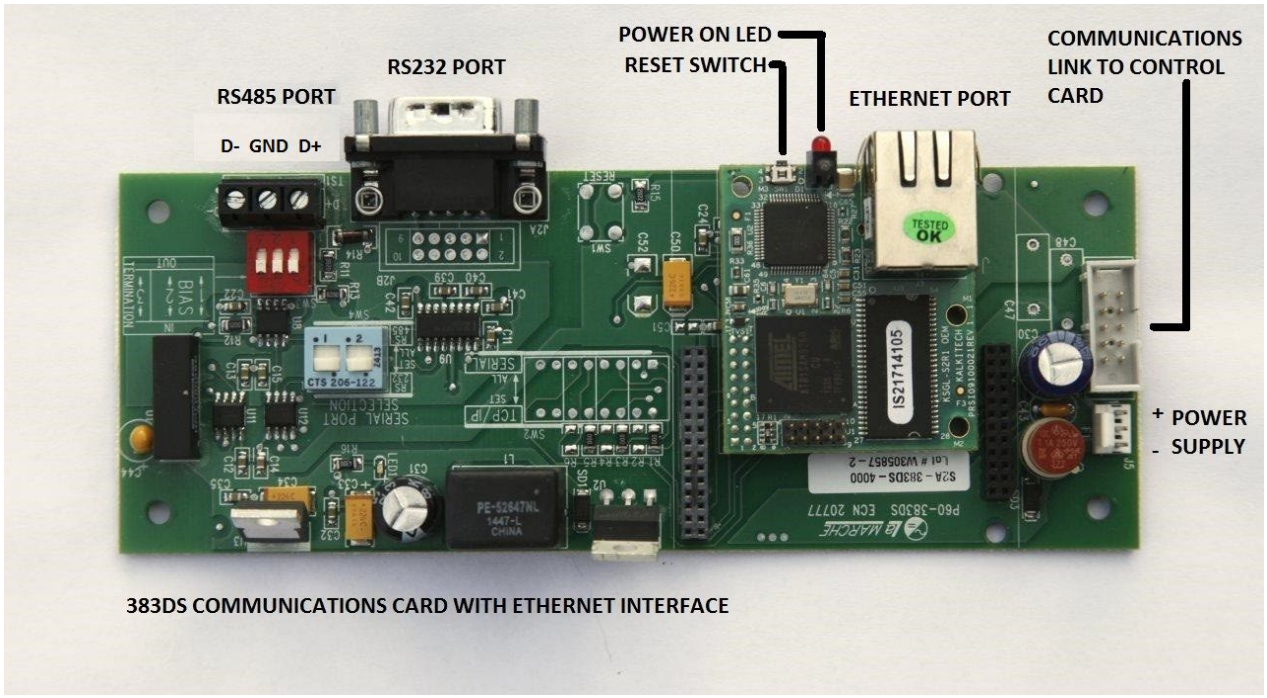


Figure 2 – 10/100 Base-T Copper Interface



383DS COMMUNICATIONS CARD WITH ETHERNET INTERFACE

A

Appendix A - DNP 3.0 Slave Interface Interoperability

This document in conjunction with the DNP 3.0 Basic 4 Document Set and the DNP Subset Definitions Document provides complete information on how to communicate via the DNP 3.0 Slave protocol Interface in SYNC.

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 in fact a table, and only a component of a total interoperability guide. The table, in combination with the Implementation Table, and the Point List Tables should provide a complete configuration/interoperability guide for communicating with SYNC DNP3 Slave Interface.

DNP 3.0 Device Profile

DNP V3.0 **DEVICE PROFILE DOCUMENT** (Also see the DNP 3.0 Implementation Table.)	
Vendor Name: **Kalki Communication Technologies Ltd. [Kalkitech]**	
Device Name: **SYNC - DNP3 Slave Interface**	
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: **For static (non-change-event) object requests, request qualifier codes 07 and 08 (limited quantity), and 17 and 28 (index) are supported. Static object requests sent with qualifiers 07, or 08, will be responded with qualifiers 00 or 01.**	

16-bit, 32-bit and Floating Point Analog Change Events with Time may be requested.
Floating Point Analog Output Status and Output Block Objects 40 and 41 are supported.

Maximum Data Link Frame Size (octets): Transmitted: **292** Received **292**	Maximum Application Fragment Size (octets): Transmitted: **2048** Received **2048**
Maximum Data Link Re-tries: ☐ None ☐ Fixed ☒ **Configurable from 0 to 255**	Maximum Application Layer Re-tries: ☒ **None** ☐ Configurable

Requires Data Link Layer Confirmation:

☐ Never
☐ Always
☐ Sometimes
☒ **Configurable as: Never, Only for multi-frame messages, or Always**

Requires Application Layer Confirmation:

☐ Never
☐ Always
☐ When reporting Event Data (Slave devices only)
☐ When sending multi-fragment responses (Slave devices only)
☐ Sometimes
☒ **Configurable as: "Only when reporting event data", or "When reporting event data or multi-fragment messages."**

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: **Transmission Delay, configurable**
Select/Operate Arm Timeout, configurable
Need Time Interval, configurable
Need Restart IIN, configurable as 'Set on device restart' / 'Not to set on device restart'

Unsolicited Notification Delay, configurable
Unsolicited Response Retry Delay, configurable
Unsolicited Offline Interval, configurable

Sends/Executes Control Operations:

WRITE Binary Outputs	☒ **Never**	☐ Always	☐ Sometimes	☐ Configurable
SELECT/OPERATE	☐ Never	☐ **Always**	☐ Sometimes	☒ Configurable
DIRECT OPERATE	☐ Never	☐ **Always**	☐ Sometimes	☒ Configurable
DIRECT OPERATE – NO ACK	☐ Never	☐ **Always**	☐ Sometimes	☒ Configurable
Count > 1	☒ **Never**	☐ Always	☐ Sometimes	☐ Configurable
Pulse On	☐ Never	☒ **Always**	☐ Sometimes	☐ Configurable
Pulse Off	☐ Never	☒ **Always**	☐ Sometimes	☐ Configurable
Latch On	☐ Never	☒ **Always**	☐ Sometimes	☐ Configurable
Latch Off	☐ Never	☒ **Always**	☐ Sometimes	☐ Configurable
Queue	☒ **Never**	☐ Always	☐ Sometimes	☐ Configurable
Clear Queue	☒ **Never**	☐ Always	☐ Sometimes	☐ Configurable

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

The control points shall be configured as 'Select required' or 'Select not required', while configuring the database. Control points configured with 'Select required' option shall accept SELECT/OPERATE, and for other points DIRECT OPERATE and DIRECT OPERATE – NO ACK will be accepted.

Reports Binary Input Change Events when no specific variation requested:	Reports time-tagged Binary Input Change Events when no specific variation requested:
☐ Never ☐	☐ Never ☐

Only time-tagged ☐ Only non-time-tagged ☒ **Configurable to send one or the** **other**	Binary Input Change With Time ☐ Binary Input Change With Relative Time ☒ **Configurable**
Sends Unsolicited Responses: ☐ Never ☒ **Configurable** ☐ Only certain objects ☐ Sometimes (attach explanation) ☒ **ENABLE/DISABLE UNSOLICITED Function codes supported**	Sends Static Data in Unsolicited Responses: ☒ **Never** ☐ When Device Restarts ☐ When Status Flags Change No other options are permitted.
Default Counter Object/Variation: ☐ No Counters Reported ☒ **Configurable** ☐ Default Object Default Variation: ☒ **Point-by-point list attached**	Counters Roll Over at: ☐ No Counters Reported ☐ Configurable (attach explanation) ☐ 16 Bits ☒ **32 Bits** ☐ Other Value: _____ ☐ Point-by-point list attached

Sends Multi-Fragment Responses: ☐ Yes ☐ No ☒ **Configurable**
Sequential File Transfer Support: Append File Mode ☐ **Yes** ☒ No Custom Status Code Strings ☐ Yes ☒ **No** Permissions Field ☐ **Yes** ☒ No File Events Assigned to Class ☐ **Yes** ☒ No File Events Send Immediately ☐ **Yes** ☒ No Multiple Blocks in a Fragment ☐ Yes ☒ **No** Max Number of Files Open

Table 6: DNP 3.0 Device Profile

DNP 3.0 Implementation Table

The following table identifies which object variations, function codes, and qualifiers the SYNC DNP 3.0 Slave Interface supports in both request messages and in response messages. For static (non-change-event) objects, requests sent with qualifiers 00, 01, 06, 07, or 08, will be responded with qualifiers 00 or 01. Requests sent with qualifiers 17 or 28 will be responded with qualifiers 17 or 28. For change-event objects, qualifiers 17 or 28 are always responded.

In the table below, text shaded as 00, 01 (start stop) indicates Subset Level 3 functionality (beyond Subset Level 2).

In the table below, text shaded as 07, 08 (limited qty) indicates functionality beyond Subset Level 3.

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
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) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)		
1	1 (default – see note 1)	Binary Input	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
1	2	Binary Input with Status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
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 (default – see note 1)	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)
3	0	Double Bit Input – Any Variation	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)		
3	1 (default – see note 1)	Double Bit Input	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 1)
3	2	Double Bit Input with Status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 1)
4	0	Double Bit Input Change – Any Variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
4	1	Double Bit Input Change without Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
4	2 (default – see note 1)	Double Bit Input Change with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
4	3	Double Bit 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 – Any Variation	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)		

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
10	1	Binary Output	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 1)
			1 (write	00, 01 (start-stop)		
10	2 (default – see note 1)	Binary Output Status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
12	1	Control Relay Output Block	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, noack)	17, 28 (index)	129 (response)	echo of request
20	0	Binary Counter – Any Variation	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)		
			7 (freeze) 8 (freeze noack) 9 (freeze clear) 10 (frz. cl. noack)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty)		
20	1	32-Bit Binary Counter (with Flag)	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
20	2	16-Bit Binary Counter (with Flag)	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
20	5 (default – see note 1)	32-Bit Binary Counter without Flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
20	6	16-Bit Binary Counter without Flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
21	0	Frozen Counter – Any Variation	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)		
21	1	32-Bit Frozen Counter (with Flag)	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
21	2	16-Bit Frozen Counter (with Flag)	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
21	5	32-Bit Frozen Counter with Time Of Freeze	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 1)
21	6	16-Bit Frozen Counter with Time Of Freeze	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 1)
21	9 (default – see note 1)	32-Bit Frozen Counter without Flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
21	10	16-Bit Frozen Counter without Flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
22	0	Counter Change Event – Any Variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
22	1 (default – see note 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	2	16-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)
22	6	16-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)
23	0	Frozen Counter Event (Variation 0 is used to request default variation)	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
23	1 (default – see note 1)	32-Bit Frozen Counter Event	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17,28 (index)
23	2	16-Bit Frozen Counter Event	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17,28 (index)
23	5	32-Bit Frozen Counter Event with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
23	6	16-Bit Frozen Counter Event with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
30	0	Analog Input - Any Variation	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)		
30	1	32-Bit Analog Input	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
30	2	16-Bit Analog Input	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index –see note 2)
30	3 (default – see note 1)	32-Bit Analog Input without Flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
30	4	16-Bit Analog Input without Flag	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
30	5	short floating point	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
30	6	long floating point	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 1)
32	0	Analog Change Event – Any Variation	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
32	1 (default – see note 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	2	16-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 (default – see note 1)	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	4	16-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	6	long 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)

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
32	8	long 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)
40	0	Analog Output Status	1 (read) 22 (assign class)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)		
40	1	32-Bit Analog Output Status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
40	2 (default – see note 1	16-Bit Analog Output Status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
40	3	short floating point Analog Output Status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
40	4	long floating point Analog Output Status	1 (read)	00, 01 (start-stop) 06 (no range, or all) 07, 08 (limited qty) 17, 27, 28 (index)	129 (response)	00, 01 (start-stop) 17, 28 (index – see note 2)
41	1	32-Bit Analog Output Block	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, noack)	17, 28 (index) 27 (index)	129 (response)	echo of request
41	2	16-Bit Analog Output Block	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, noack)	17, 28 (index) 27 (index)	129 (response)	echo of request
41	3	short floating point Analog Output Block	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, noack)	17, 27, 28 (index)	129 (response)	echo of request
41	4	long floating point Analog Output Block	3 (select) 4 (operate) 5 (direct op) 6 (dir. op, noack)	17, 27, 28 (index)	129 (response)	echo of request
43	8	long floating point Analog Output Command Event with Time	1 (read)	06 (no range, or all) 07, 08 (limited qty)	129 (response) 130 (unsol. resp)	17, 28 (index)
50	0	Time and Date				
50	1 (default – see note 1)	Time and Date	1 (read)	07, (limited qty = 1)	129 (response)	07 (limited qty = 1)
			2 (write)	07 (limited qty = 1)		

OBJECT			REQUEST (Library will parse)		RESPONSE (Library will respond with)	
Object Number	Variation Number	Description	Function Codes (dec)	Qualifier Codes (hex)	Function Codes (dec)	Qualifier Codes (hex)
50	3	Time and Date Last Recorded Time	2 (write)	07 (limited qty)		
51	1	Time and Date CTO			129 (response) 130 (unsol. resp)	07 (limited qty) (qty = 1)
51	2	Unsynchronized Time and Date CTO			129 (response) 130 (unsol. resp)	07 (limited qty) (qty = 1)
52	1	Time Delay Coarse			129 (response)	07 (limited qty) (qty = 1)
52	2	Time Delay Fine			129 (response)	07 (limited qty) (qty = 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) 07, 08 (limited qty)		
			20 (enbl. unsol.) 21 (dab. unsol.) 22 (assign class)	06 (no range, or all)		
60	3	Class 2 Data	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
			20 (enbl. unsol.) 21 (dab. unsol.) 22 (assign class)	06 (no range, or all)		
60	4	Class 3 Data	1 (read)	06 (no range, or all) 07, 08 (limited qty)		
			20 (enbl. unsol.) 21 (dab. unsol.) 22 (assign class)	06 (no range, or all)		
80	1	Internal Indications	1 (read)	00, 01 (start-stop)	129(response)	00, 01(start-stop)
			2 (write) (see note 3)	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)			

Table 7: DNP 3.0 Implementation Table

Note 1: A Default variation refers to the variation responded when variation 0 is requested and/or in class 0, 1, 2, or 3 scans. Default variations are configurable; however, default settings for the configuration parameters are indicated in the table above.

Note 2: For static (non-change-event) objects, qualifiers 17 or 28 are only responded when a request is sent with qualifiers 17 or 28, respectively. Otherwise, static object requests sent with qualifiers 00, 01, 06, 07, or 08, will be responded with qualifiers 00 or 01. (For change-event objects, qualifiers 17 or 28 are always responded.)

Note 3: Writes of Internal Indications are only supported for index 7 (Restart IIN1-7).

DNP V3.0 Point List

The tables below identify all the data points provided by the implementation.

Binary Input Points Static (Steady-State) Object Number: **1** Static Variation reported when variation 0 requested: **1 (Binary Input 2 without status)**	
Point Index	**Name/Description**
0	AC or Breaker Tripped Indicator (FAILURE=1)
1	High Voltage Alarm Indicator (FAILURE=1)
2	High Voltage Shutdown Alarm Indicator (FAILURE=1)
3	Low Current Alarm Indicator (FAILURE=1)
4	Ground Detection Enabled (ENABLED=1)
5	Positive Ground Alarm Indicator (FAILURE=1). *Point will always read 0 when Ground Detection Enabled (Binary Input Point 5) is 0.*
6	Negative Ground Alarm Indicator (FAILURE=1). *Point will always read 0 when Ground Detection Enabled (Binary Input Point 5) is 0.*
7	Summary Alarm Indicator (FAILURE=1)
8	End of Discharge Alarm Indicator (FAILURE=1).
9	Overload Alarm Indicator (FAILURE=1)
10	Charger Failure Alarm Status (FAILURE=1)
11	S2A-407/417S Board Failure Alarm (FAILURE=1) *Only applicable to chargers equipped with option.*
12	Read Only Mode. When this point is read as 1 remote setting changes are not allowed.
13	Fan Failure Alarm (FAILURE=1) *Only applicable to chargers equipped with option.*
14	Battery Breaker Trip Alarm (FAILURE=1) *Only applicable to chargers equipped with option.*
15	AC Low Alarm Indicator (FAILURE=1) *Only applicable to chargers equipped with the AC Sensing option.*
16	AC High Alarm Indicator (FAILURE=1) *Only applicable to chargers equipped with the AC Sensing option.*
17	Over Temperature Alarm Indicator (FAILURE=1)
18	Float/EQ Mode Indicator (FLOAT=0, EQUALIZE=1)

Binary Output Status Points Object Number: **10** Default Variation reported when variation 0 requested: **2 (Binary Output Status)** **Control Relay Output Blocks** Object Number: **12**	
Point Index	**Name/Description**
0	Float/EQ Mode Indicator (FLOAT=0, EQUALIZE=1)

Analog Inputs Static (Steady-State) Object Number: **30** Static Variation reported when variation 0 requested: **4 (16-Bit Analog Input w/o Flag)**		
Point Index	**Description, Units**	**Scale Factor**
0	Heartbeat. Increments continuously to indicate communications between Controller board and communications board are working.	None
1	Board Number. Will read 525 for 525DS card.	None
2	Software Version	None
3	Voltage, Volts	0.1
4	Current, Amps	0.1
5	Equalize Cycle Time Hours Remaining, Hours, Minutes *Note: The last two digits are the minutes.*	None
6	Auto Equalize Timer, Days	None
7	Auto Equalize Timer, Hours, Minutes *Note: The last two digits are the minutes*.	None
8	Low DC Current Alarm Low Limit, Amps. Setting the Low DC Current Alarm below this will result in disabling the Low DC Current Alarm Status Indicator.	0.1
9	Temperature Probe Reading, Degrees C *Note: Reading will always read 0 when charging system is not equipped with a 340S card. A shorted probe will give a reading of –273 and an open probe will give a reading of+273*	None
10	Maximum Alarm Voltage, MAXAV, Volts	0.1
11	Maximum Alarm Current, MAXAI, Amps	0.1
12	Battery Voltage, Volts *Note: This is an optional reading and only valid when the charger is equipped with the P60-407S board.*	0.1
13	Low Voltage Alarm Status (0=NO ALARM, 1=LOW VOLTAGE ALARM 2=LOW BATTERY VOLTAGE ALARM	None
14	PHASE 1, ACV Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read -1 when charger is not equipped with the option and -2 when the optional board is unable to provide the reading.	0.1
15	PHASE 2, ACV Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read -1 when charger is not equipped with the option or when the charger is single phase and -2 when the optional board is unable to provide the reading.	0.1

Analog Inputs Static (Steady-State) Object Number: **30** Static Variation reported when variation 0 requested: **4 (16-Bit Analog Input w/o Flag)**		
Point Index	**Description, Units**	**Scale Factor**
16	PHASE 3, ACV Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read -1 when charger is not equipped with the option or when the charger is single phase and -2 when the optional board is unable to provide the reading.	0.1
17	PHASE 1, ACA Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read -1 when charger is not equipped with the option and -2 when the optional board is unable to provide the reading.	0.1
18	PHASE 2, ACA Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read -1 when charger is not equipped with the option or when the charger is single phase and -2 when the optional board is unable to provide the reading.	0.1
19	PHASE 3, ACA Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read -1 when charger is not equipped with the option or when the charger is single phase and -2 when the optional board is unable to provide the reading.	0.1
20	Over Temperature Probe, C	0.1
21	Ground Detection Alarm Threshold, mA, (1.0 to 4.0) Note: This point should only be monitored when the charger is equipped with optional Adjustable Ground Detection. Point will read 9999 when charger is not equipped with the option.	0.1
22	Equalize Timer Mode (0,1 2,3,4)	
23	Equalize Timer Setting (0 to 144)	None
24	Low Voltage Alarm Threshold, Volts, (0 to MAXAV)	0.1
25	High Voltage Alarm Threshold, Volts, (0 to MAXAV)	0.1
26	High Voltage Shutdown Alarm Threshold, Volts, (0 to MAXAV)	0.1
27	Low DC Current Alarm Threshold, Amps, (0 to MAXAI)	0.1
28	End of Discharge Alarm Threshold, Volts, (0 to MAXAV)	0.1
29	Overload Alarm Current, Amps	0.1
30	RTC Month, (1 to 12)	None
31	RTC Day, (1 to 31)	None
32	RTC Year, (0 to 4095)	None
33	RTC Hours, (0 to 23)	None
34	RTC Minutes, (0 to 59)	None
35	RTC Seconds, (0 to 59)	None
36	Logging Interval, Minutes, (0 to 60, 0=OFF)	None
37	AC Low Alarm Threshold, Volts, (83% of AC Voltage Rating to 1000.0) *Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read 0 when charger is not equipped with the option.*	0.1

Analog Inputs
Static (Steady-State) Object Number: **30**
Static Variation reported when variation 0 requested: **4 (16-Bit Analog Input w/o Flag)**

Point Index	Description, Units	Scale Factor
38	AC High Alarm Threshold, Volts, (83% of AC Voltage Rating to 1000.0) *Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read 0 when charger is not equipped with the option.*	0.1

Analog Outputs
Static (Steady-State) Object Number: **40**
Static Variation reported when variation 0 requested: **2 (16-Bit Analog Output Status)**

Point Index	Description, Units, Valid Settings/Range	Scale Factor
0	Equalize Timer Mode (0,1 2,3,4)	None
1	Equalize Timer Setting (0 to 144)	None
2	Low Voltage Alarm Threshold, Volts, (0 to MAXAV)	0.1
3	High Voltage Alarm Threshold, Volts, (0 to MAXAV)	0.1
4	High Voltage Shutdown Alarm Threshold, Volts, (0 to MAXAV)	0.1
5	Low DC Current Alarm Threshold, Amps, (0 to MAXAI)	0.1
6	End of Discharge Alarm Threshold, Volts, (0 to MAXAV)	0.1
7	Overload Alarm Current, Amps, READ ONLY	None
8	RTC Month, (1 to 12)	None
9	RTC Day, (1 to 31)	None
10	RTC Year, (0 to 4095)	None
11	RTC Hours, (0 to 23)	None
12	RTC Minutes, (0 to 59)	None
13	RTC Seconds, (0 to 59)	None
14	Logging Interval, Minutes, (0 to 60, 0=OFF)	None
15	AC Low Alarm Threshold, Volts, (83% of AC Voltage Rating to 1000.0) *Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read 0 when charger is not equipped with the option.*	0.1
16	AC High Alarm Threshold, Volts, (83% of AC Voltage Rating to 1000.0) *Note: This point should only be monitored when the charger is equipped with the optional AC Sensing Board. Point will read 0 when charger is not equipped with the option.*	0.1