



Pronghorn

ABCSP Module

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Overview

This document details the configuration interface for implementing a Pronghorn Allen-Bradley CSP (TCP/IP) module driver installation. This document assumes the reader is familiar with the Liaison's Pronghorn product. Refer to the *Pronghorn Users Guide* for more detailed information.

The main purpose of this module driver, named *abcsp*, is to provide connectivity to a Allen-Bradley (or compatible) devices via the CSP (Client Server Protocol) protocol. Details on this protocol are detailed in the *Data Highway/Data Highway Plus/DH-485 Communication Protocol and Command Set* reference manual. The module driver uses whatever Ethernet interface card is currently installed on the processor. Refer to any documentation for the installed Ethernet hardware.

Functionality

The module drivers main purpose is to obtain or provide register (file) data to or from a peer device on the network. The module driver, currently, can emulate different types of PLC's as listed below. Programming or downloading are currently not supported.

<i>PLC Type</i>	<i>Supported?</i>
PLC2	No
PLC3	No
PLC4	No
PLC5	Yes
PLC5/250	No
SLC	Yes

Registers

There are many sets of data register files on a PLC device. Many of which are user defined data areas. Different methods for accessing the same data exist. However not all of these are supported. Refer to the list below for details.

<i>Type</i>	<i>Pref</i>	<i>Size</i>	<i>Supported?</i>
Outputs	Ox:yyy/z	16 bits	Yes
Inputs	Ix:yyy/z	16 bits	Yes
Status	Sx:yyy	16 bits	Yes
Binary	Bx:yyy/z	16 bits	Yes
Timers	Tx:yyy/z	16 bits	No
Counters	Cx:yyy/z	16 bits	No
Control	Rx:yyy/z	16 bits	No
Integers	Nx:yyy/z	16 bits	Yes
Floats	Fx:yyy	32 bits	Yes

The *x* represents the file number, *yyy* represents the address element (offset) and *z* represents a sub-element.

There are different addressing methods to access the above data types.

<i>Method</i>	<i>Supported?</i>
PLC2 Logical Addressing	No
PLC2 Physical Addressing	No
PLC3 Logical Addressing	No
PLC3 Physical Addressing	No
PLC3 Symbolic Addressing	No
PLC4 Logical Addressing	No
PLC4 Physical Addressing	No
PLC5 Logical Addressing	Yes
PLC5 Physical Addressing	No
PLC5 Logical ASCII Addressing	No
PLC5/250 Logical Binary Addressing	No
SLC Addressing	Yes

Communication Interface

The CSP protocol uses the generic Ethernet specification for the physical communication layer that is handled by any Ethernet interface hardware. Additionally, sitting between the physical layer and the application layer lies several other layers such as IP, TCP and UDP protocol layers. The CSP protocol uses the TCP/IP protocol layer as its main transport method, which is a connection-based protocol. Consult the hardware documentation for configuration options of the Ethernet interface hardware being used.

Typically this is built in to the processor and no configuration of the interface card/hardware is required.

Network Configuration

The configuration of this module and its network interface card is accomplished through the network comma separated values file (.csv) using software such as Excel or gnumeric. Some of the parameters are standard parameters used to access the Ethernet interface hardware, while others are particular to this module. Most parameters have a default value that will be used if the parameter does not exist. Additionally the parameters can be listed in any order.

<i>Name</i>	<i>Valid Range</i>	<i>Default</i>	<i>Description</i>
Station	0 - 255	0	This identifies the devices (node) unique number on the network. This is not typically used as it is preempted by the IP address.
PLC_Type	Refer to the PLC types supported	PLC5	This is the type of device that the module driver is emulating
Retries	0 – 9	1	The number of times to attempt a retransmit
Card	1 or 2	1	The Ethernet card being used. Typically only 1 Ethernet interface is installed.
TCP_Port	1024 – 65535	2222	This is the TCP port number being used to communicate to another Allen-Bradley device. ⁱ
Timeout	1 – 65000	1000	The number of milliseconds to wait for a reply to read/writes
Open_TMO	1 – 65000	60	The number of seconds to wait before connection open fails

Errors

If any of the validation, for the network configuration parameters, fails a critical error message will be placed in the logs. In addition the module driver will not start. The following is a list of critical message that might be generated.

<i>Msg ID</i>	<i>Mnemonic</i>	<i>Description</i>
108	CRT_BAD_TCPPORT	Invalid TCP port (%d) Must be between 1024 and %d - The specified TCP port is out of range
101	CRT_BAD_CARDNO	Invalid card number (%d) Must be between 1 and %d - The specified card number must be 1 or 2
100	CRT_BAD_TIMEOUT	Invalid timeout value (%d) must be less than %d ms - The time value is out of range.

ⁱ This must be 2222 for Allen-Bradley devices.

Mapping Configuration

The configuration of the module mappings is accomplished through the network comma separated values file (.csv) using software such as Excel or gnumeric. The parameters listed only pertain to this module. Refer the *Pronghorn Users Guide* for a list of the other common parameters used to configure a mapping. Most parameters have a default value that will be used if the parameter does not exist. Additionally the parameters can be listed in any order.

<i>Name</i>	<i>Valid Range</i>	<i>Default</i>	<i>Description</i>
IP	Host name ⁱⁱ	0	The IP or host name of the device being accessed
PLC_Type	Refer to the PLC types supported	PLC5	Identifies the type of device being accessed
Address	Refer to the Register types	00:0	The file area and offset to access on the peer device

Errors

If any of the validation, for the mapping configuration parameters, fails an error message will be placed in the logs. In addition that particular mapping item will not be added to the internal mapping list. However the module continues with any remaining mappings.

<i>Msg ID</i>	<i>Mnemonic</i>	<i>Description</i>
2002	ERR_NO_HOSTNAME	(Item %d, A valid host name or IP address must be specified - The IP was not specified or entered incorrectly.
2007	ERR_BAD_PLC	(Invalid PLC type (%s), must be one of (SLC, PLC2, PLC3, PLC4 or PLC5) - The specified PLC type was not entered correctly or is not supported.
2001	ERR_ADDRESS_RANGE	Item: %d, Address is out of range (addr=%s, len=%d) - The files type and address offset + length was out of bounds
2003	ERR_NO_SUB	Item %d, Sub-Elements not allowed for unsolicited commands - The address sub-element number should not be used
65	ERR_BAD_DATATYPE	Map item %d has invalid Data Type (%s) - The specified file type is not valid

ⁱⁱThis is typically a dotted notation address (i.e. 192.168.1.1) or can optionally be a host name listed in the */etc/hosts* file.

Status Counters

This module driver maintains a set of status counters for recording the operational status of the module and the network.

<i>Msg ID</i>	<i>Mnemonic</i>	<i>Description</i>
2019	CNT_MSG_SENT	Number of Messages transmitted - Keeps track of the number packets sent
2020	CNT_MSG_RECV	Number of Messages received - Keeps track of the number of packets received
2021	CNT_CMD_SENT	Number of commands transmitted - Keeps track of the number of request sent
2022	CNT_CMD_RECV	Number of commands received - Keeps track of the number of request received
2023	CNT_REPLY_SENT	Number of replies transmitted - Keeps track of the number of command replies sent
2024	CNT_REPLY_RECV	Number of replies received - Keeps track of the number of command replies received
2025	CNT_ERR_SENT	Number of errors sent - Keeps track of the number of error replies sent
2026	CNT_ERR_RECV	Number of errors received - Keeps track of the number of error replies received
2027	CNT_RETRIES	Number of retries - Keeps track of the number of retransmits sent
2028	CNT_REPLY_TIMEOUTS	Response timeouts - Keeps track of the number of no responses
2029	CRD_CHAR_SENT	Number of characters transmitted - The number of bytes sent, which is kept track by the hardware interface
2030	CRD_CHAR_RECV	Number of characters received - The number of bytes received, which is kept track by the hardware interface

Other Messages

In the normal operation of this module certain types of message may appear in the logs. Refer to the *Pronghorn Users Guide* for a list of the common messages that can be seen in the logs. In addition the following message may appear in the logs.

<i>Msg ID</i>	<i>Mnemonic</i>	<i>Description</i>
2004	ERR_WRONG_NODE	Response from wrong node (actual=%d, expected=%d) - The packet response from unexpected device
2006	ERR_WRONG_RESPONSE	Expected a Response but received a Request - Invalid or wrong packet received
2008	ERR_WRONG_TNS	Transaction ID mismatch (actual=%d, expected=%d) - The transaction number is not what was expected
2009	ERR_WRONG_LENGTH	Transaction length mismatch (actual=%d, expected=%d) - The number of bytes is not what was expected
2010	ERR_NO_SESSION	Session not established with %s - Handshaking with the peer device not complete
2011	ERR_WHILE_READING	Error while processing Network Read (rc=%d) - An error occurred while trying to process a solicited read request
2012	ERR_WHILE_WRITING	Error while processing Network Write (rc=%d) - An error occurred while trying to process a solicited write

<i>Msg ID</i>	<i>Mnemonic</i>	<i>Description</i>
		request
2013	ERR_UNREAD	Error while processing unsolicited Read (%s, Addr=%s, Len=%d) - An error occurred while trying to process an unsolicited read request
2014	ERR_UNWRITE	Error while processing unsolicited Write (%s, Addr=%s, Len=%d) - An error occurred while trying to process an unsolicited write request
2015	ERR_RESPONSE	Response with error status (Cmd=0x%x, Tns=%d, Sts=0x%02x%02x) - Received a error reply packet
2017	NTC_RETRY	Retry #%d, due to error %d - A notice, identifying a retry attempt
2018	NTC_SESSION_ESTABLISHED	Session established with %s, connection ID=%d - A notice, identifying handshaking with peer device complete

In Addition, there are messages that are generated from the ABLIB routines, common to all Allen-Bradley module drivers.

<i>Msg ID</i>	<i>Mnemonic</i>	<i>Description</i>
52	ERR_NOT_FOUND	Did Not Find '%s' in 'AB Data Type list' - The data type in a PLC5 write reply is not valid
73	ERR_NOT_HANDLED	Command/Type 0x%x not handled in this context - A command packet or type field is not supported
75	ERR_WRONG_RESPONSE	Unexpected Response 0x%x, s/b 0x%x - The response received is not what was expected
109	ERR_NETWORK	Network error rc=%d (0x%x) '%s' - An network exception packet was received
61	ERR_BAD_OFFSET	Offset is out of range (dt=%s, off=%d, len=%d) - The specified address + length is out of range
62	ERR_BAD_LENGTH	Length is out of range (dt=%s, off=%d, len=%d) - The length is larger than maximum supported