6053/6055 ControlNet Communications Option

Technical Manual

HA468029U001   Issue 3

Compatible with Version 1.x Firmware

Safety Information

Requirements

IMPORTANT: Please read this information BEFORE installing the equipment.

Intended Users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, EMC considerations, and to enable the user to obtain maximum benefit from the equipment.

Complete the following table for future reference detailing how the unit is to be installed and used.

INSTALLATION DETAILS	
Model Number *(see product label)*	
Where installed *(for your own information)*	
Unit used as a: *(refer to Certification for the Inverter)*	Component Relevant Apparatus
Unit fitted:	Wall-mounted Enclosure

Application Area

The equipment described is intended for industrial motor speed control utilising DC motors, AC induction or AC synchronous machines

Personnel

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

Product Warnings

Caution Risk of electric shock	**Caution** Refer to documentation	**Earth/Ground** Protective Conductor Terminal

Safety Information

Hazards

DANGER! - Ignoring the following may result in injury

1. This equipment can endanger life by exposure to rotating machinery and high voltages.

2. The equipment must be permanently earthed due to the high earth leakage current, and the drive motor must be connected to an appropriate safety earth.

3. Ensure all incoming supplies are isolated before working on the equipment. Be aware that there may be more than one supply connection to the drive.

4. There may still be dangerous voltages present at power terminals (motor output, supply input phases, DC bus and the brake, where fitted) when the motor is at standstill or is stopped.

5. For measurements use only a meter to IEC 61010 (CAT III or higher). Always begin using the highest range. CAT I and CAT II meters must not be used on this product.

6. Allow at least 5 minutes for the drive's capacitors to discharge to safe voltage levels (<50V). Use the specified meter capable of measuring up to 1000V dc & ac rms to confirm that less than 50V is present between all power terminals and earth.

7. Unless otherwise stated, this product must NOT be dismantled. In the event of a fault the drive must be returned. Refer to "Routine Maintenance and Repair".

WARNING! - Ignoring the following may result in injury or damage to equipment

SAFETY

Where there is conflict between EMC and Safety requirements, personnel safety shall always take precedence.

- Never perform high voltage resistance checks on the wiring without first disconnecting the drive from the circuit being tested.

- Whilst ensuring ventilation is sufficient, provide guarding and /or additional safety systems to prevent injury or damage to equipment.

- When replacing a drive in an application and before returning to use, it is essential that all user defined parameters for the product's operation are correctly installed.

- All control and signal terminals are SELV, i.e. protected by double insulation. Ensure all external wiring is rated for the highest system voltage.

- Thermal sensors contained within the motor must have at least basic insulation.

- All exposed metalwork in the Inverter is protected by basic insulation and bonded to a safety earth.

- RCDs are not recommended for use with this product but, where their use is mandatory, only Type B RCDs should be used.

EMC

- In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.

- This equipment contains electrostatic discharge (ESD) sensitive parts. Observe static control precautions when handling, installing and servicing this product.

- This is a product of the restricted sales distribution class according to IEC 61800-3. It is designated as "professional equipment" as defined in EN61000-3-2. Permission of the supply authority shall be obtained before connection to the low voltage supply.

CAUTION!

APPLICATION RISK

- The specifications, processes and circuitry described herein are for guidance only and may need to be adapted to the user's specific application. We can not guarantee the suitability of the equipment described in this Manual for individual applications.

RISK ASSESSMENT

Under fault conditions, power loss or unintended operating conditions, the drive may not operate as intended. In particular:

- Stored energy might not discharge to safe levels as quickly as suggested, and can still be present even though the drive appears to be switched off

- The motor's direction of rotation might not be controlled

- The motor speed might not be controlled

- The motor might be energised

A drive is a component within a drive system that may influence its operation or effects under a fault condition. Consideration must be given to:

- Stored energy
- Supply disconnects
- Sequencing logic
- Unintended operation

Contents

6053/6055 CONTROLNET OPTION

System Overview

Product Features

- Available for 690+, and 590+ products
- Compact 5H x 3W x 1D inches
- Easy snap on installation
- Suitable for use with drive models:
  590+ firmware version 5.17 onwards
  690+ firmware version 4.7 onwards
- Connection using RG 59 (75Ω) double shielded coaxial cable
- LED's to indicate board and communications status
- Software-selectable Slave Address
- The ControlNet TechBox is provided as a plug-in drive option.

Product Code

Part Number: 6053-CENT-00 ControlNet TechBox

6055-CENT-00 ControlNet TechBox

DSE Lite Requirements

Software version: 5.14 or higher.

Wiring the System

<div style="border:1px solid;">

WARNING!
Before installing, ensure that the drive wiring is electrically isolated and cannot be made "live" unintentionally by other personnel.
Wait 5 minutes after disconnecting power before working on any part of the system or removing the covers from the drives.

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2
Hardware Installation

6053/CNET/00
TECHBOX

6055/CNET/00
TECHBOX
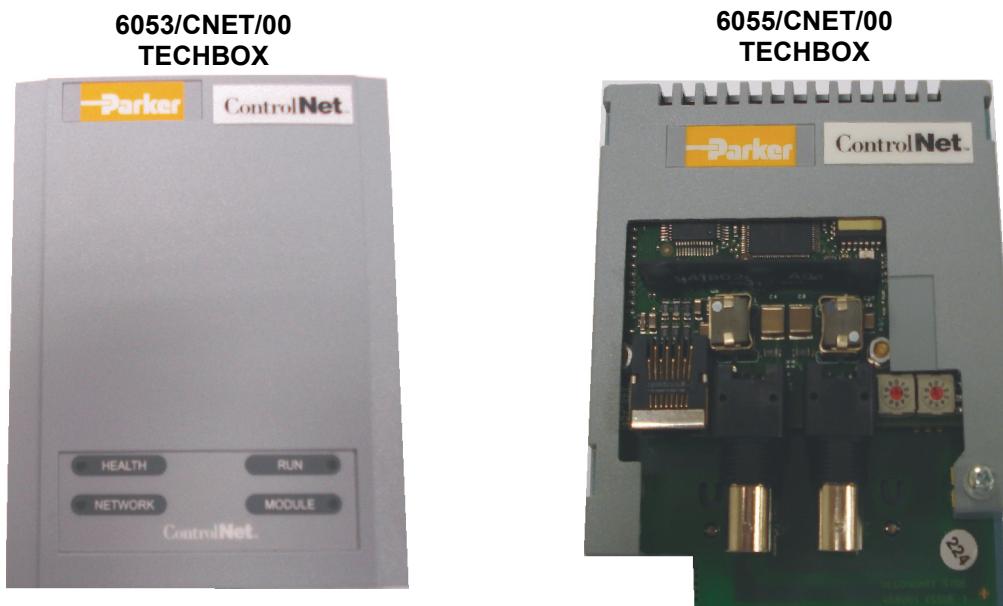
Figure 1. ControlNet TechBoxes

Installing and Connecting the ControlNet TechBox

WARNING! Prior to starting work ensure all sources of power are isolated.

Installing the ControlNet TechBox

The ControlNet TechBox plugs into the drive in the slot provided. With the frame "B"
690+, the TechBox is fitted in place of the keypad. Connect the supplied yellow/green wire
between the metal TechBox case and one of the chassis earth pillars. If use of the keypad
with a 690+ frame "B" is desired use the 6052 remote mounting kit. With the 590+ and the
690+ frame "C" and above the TechBox is installed in the right-hand slot that is located
above the terminal strip on the control board. Refer to Figures 2 and 3.

Figure 2. 690+ Frame B

590+ Frame 1 illustrated

690+ Frame D illustrated
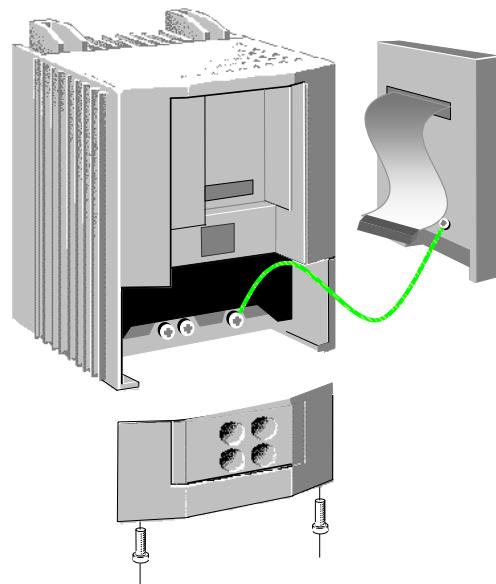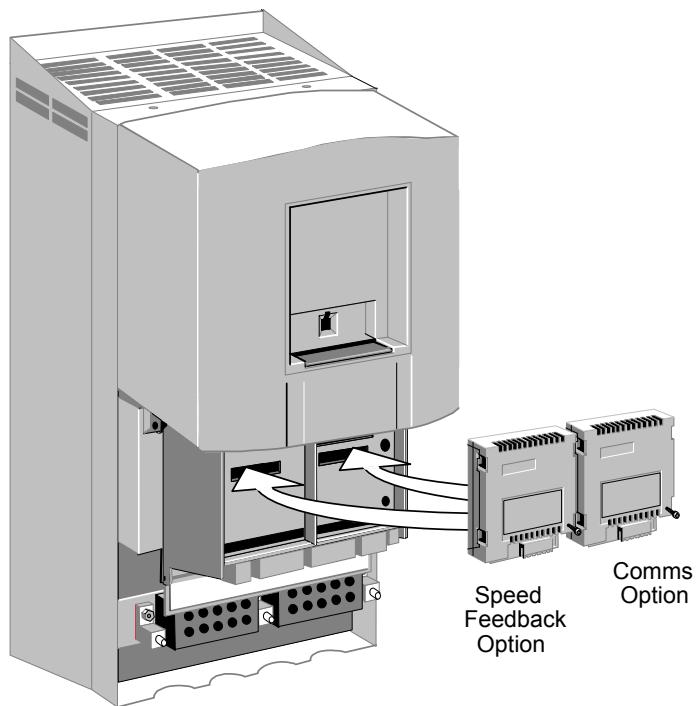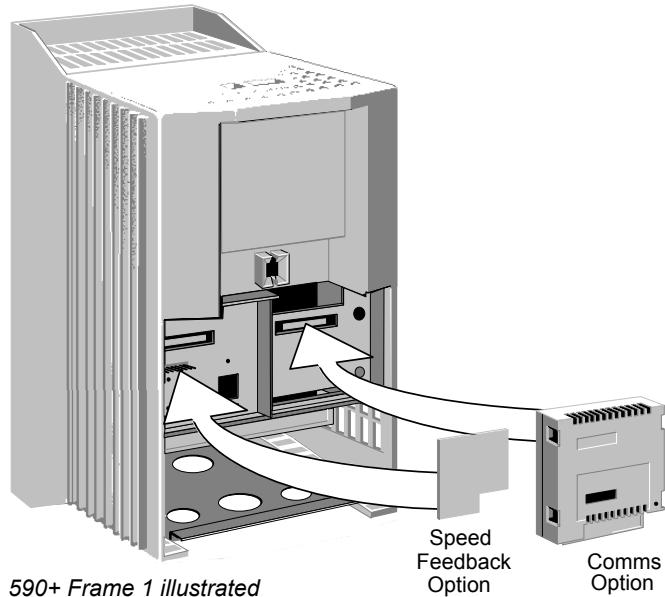
Figure 3. 690+ frames C - J, 590+ all frame sizes

Cable Specifications

Coaxial cable type RG 59, 75 ohms, double shielded (foil and braided), wire size 18awg.

Initial Power on Checks

With the correct connections to the active PLC/SCADA supervisor, the MODULE LED will be ON continuously and the NETWORK LED will flash to indicate the No Connection State.

4
Understanding the LED Indications

Network and Module LED Indications			
Network LED Indicates the state of the connected network.		**Module LED** Indicates the set-up state of the TechBox. The states indicated are those produced by the FAULT parameter of the TechBox function block.	
LED Indication	**Description**	**FAULT Parameter**	**Description**
OFF	Disabled	Hardware	Hardware Fault – external NOT POWERED
SHORT FLASH	No Connection	Self test failed	Card needs commissioning Hardware fault
FLASH	Forced listen mode Checking for moderator Duplicate MAC ID	Wrong module type	Incorrect TechBox option selected
LONG FLASH	On line no connections (No moderator)	Invalid parameter value for module type	Wrong module type selected.
ON	On line with connection (Data exchange)	NONE	Valid set-up, ready for external communications

Figure 4. LED Status Indication

Note: *The NETWORK LED is always in the OFF State when the MODULE LED is **not** ON continuously, indicating that the TechBox is not receiving external communications or the PLC is off.*

Configuring the Drive

Begin by configuring the drive to accept the TechBox. Use the keypad (MMI), or DSE to configure the TEC OPTION function block parameters inside the drive before commissioning the ControlNet technology option.

The parameter names and functions in this function block are inter-dependent and will change with different parameter values and various Options that can be fitted.

When the ControlNet option is fitted and the TYPE parameter is set to display CONTROL NET, the function block parameters take on new identities, as shown in the two cases below.

Note: *When using the MMI, remember to save the set-up via the Parameter Save or Config Save menu.*

The ControlNet MMI View

With the ControlNet option correctly installed, the TEC OPTION function block will contain the following parameter names when viewed using the MMI.

Tec Option

TECH OPTION FAULT	[756]	–	NONE
TECH OPTION VER	[757]	–	0000
NET MODE STATE	[758]	–	0000
CONNECTED	[759]	–	0000

CONTROL NET –	[750]	TYPE
0 –	[751]	MAC ID
0 –	[752]	PARAM MAPPING
0 –	[753]	UNUSED 1
0 –	[754]	UNUSED 2
0 –	[755]	UNUSED 3

ControlNet MMI View

590+ MMI Menu Map

1 SETUP PARAMETERS
2 SERIAL LINKS
3 TEC OPTION
  TYPE
  MAC ID
  PARAM MAPPING
  UNUSED 1
  UNUSED 2
  UNUSED 3
  TECH OPTION FAULT
  TECH OPTION VER
  NET MODE STATE
  CONNECTED

690+ MMI Menu Map

1 SETUP PARAMETERS
2 COMMUNICATIONS
3 TEC OPTION
  TYPE
  MAC ID
  PARAM MAPPING
  UNUSED 1
  UNUSED 2
  UNUSED 3
  TECH OPTION FAULT
  TECH OPTION VER
  NET MODE STATE
  CONNECTED

The Non-specific DSE & MMI View

This is how the TEC OPTION function block looks when viewed using DSE.

The MMI also displays these non-specific parameter names when the ControlNet option is not yet installedinto the drive, or an incorrect TYPE is selected for the fitted Option.

Tec Option

FAULT	[756]	–	NONE
VERSION	[757]	–	0000
OUTPUT 1	[758]	–	0000
OUTPUT 2	[759]	–	0000

NONE –	[750]	TYPE
0 –	[751]	INPUT 1
0 –	[752]	INPUT 2
0 –	[753]	INPUT 3
0 –	[754]	INPUT 4
0 –	[755]	INPUT 5

Non-specific ConfgiEd-Lite & MMI view

590+ MMI Menu Map

1 SETUP PARAMETERS
2 SERIAL LINKS
3 TEC OPTION
  TYPE
  INPUT 1
  INPUT 2
  INPUT 3
  INPUT 4
  INPUT 5
  FAULT
  VERSION
  OUTPUT 1
  OUTPUT 2

690+ MMI Menu Map

1 SETUP PARAMETER
2 COMMUNICATIONS
3 TEC OPTION
  TYPE
  INPUT 1
  INPUT 2
  INPUT 3
  INPUT 4
  INPUT 5
  FAULT
  VERSION
  OUTPUT 1
  OUTPUT 2

Parameter Descriptions

TYPE *Range: Enumerated - see below*

Selects the type of Technology Option.

Enumerated Value : Technology Option

        0 : NONE
        1 : RS485
        2 : PROFIBUS DP
        3 : LINK
        4 : DEVICENET
        5 : CANOPEN
        6 : LONWORKS
        7 : CONTROLNET
        8 : MODBUS PLUS
        9 : ETHERNET

MAC ID *Range: 0 to 99*

ControlNet node address.
Note: 0 is an invalid address, if set the ControlNet interface will be held in the DISABLED state.

PARAM MAPPING *Range: Enumerated - see below*

Used to select the set of Drive parameters to be read and written over ControlNet. See 590+ Polled I/O Connection, page 7, and 690+ Polled I/O Connection, page 12, for description of sets.

Enumerated Value : PARAM MAPPING state

    590+:
            0 : NONE
            1 : SET 1
            2 : SET 2
    690+:
            0 : NONE
            1 : SET 1
            2 : SET 2
            3 : SET 3
            4 : SET 4

UNUSED 1-3

Reserved for future use.

FAULT *Range: Enumerated - see below*

The fault state of the Technology Option.

Enumerated Value : FAULT state

0 : NONE	no faults	
1 : PARAMETER	parameter out-of-range	
2 : TYPE MISMATCH	TYPE parameter not set to CONTROLNET	
3 : SELF TEST	hardware fault - internal	
4 : HARDWARE	hardware fault - external	
5 : MISSING	no option fitted	

VERSION *Range: 0000 to FFFF*

The version of the Technology Option card. If no option is fitted then the version is reset to zero. For example, 0101 is version 1.1.

NET MODE STATE   *Range: Enumerated - see below*

State of the ControlNet network connection.

Enumerated Value : NET MODE STATE

                    0 : ON LINE
                    1 : DUPLICATE
                    2 : FORCED LISTEN
                    3 : I'M ALIVE
                    4 : CHECK MODERATOR
                    5 : WAIT ROUGE
                    6 : CHECK CABLE
                    7 : START-UP
                    8 : INVALID
                    9 : DISABLED

CONNECTED   *Range: FALSE / TRUE*

If TRUE indicates that a ControlNet connection is open, i.e. this node is "owned" by a master.

590+ Polled I/O Connection

Polled I/O connections enable several parameter values to be passed in one transaction. The connections predefined lists of parameters.

Parker SSD Drives predefined several assembly objects. They are defined on the following pages. These sets are specific to Parker SSD Drives products.

All integer values are presented with the low order byte first (in even byte numbers within an assembly object structure) and high order byte last (in odd byte numbers).

The following table provides a summary of the set numbers that are provided.

Set Number	Read/Write	Number of bytes transferred	Drives applicable
1	Read	36	590+
	Write	14	590+
2	Read	20	590+
	Write	20	590+

Refer to Appendix C for Sequence Status and Remote Sequence details.

590+ Set 1 : Read from TechBox

Byte	Description		Drive Tag Number	Range
0, 1	Sequence Status		537	0000-FFFF
2	Bit-field:			
	Bit Number			
	0	Not Program Stop Input B8	80	Binary
	1	Digital Input C3	68	Binary
	2	Digital Input C4	69	Binary
	3	Digital Input C5	70	Binary
	4	Digital Input C6	71	Binary
	5	Digital Input C7	72	Binary
	6	Digital Input C8	73	Binary
	7	Ramping	113	Binary
3	Bit-field:			
	Bit Number			
	0	Digital Output B5	74	Binary
	1	Digital Output B6	75	Binary
	2	Digital Output B7	76	Binary
	3	User Defined Logic 1 (PNO 112)	Indirect 312[1]	Binary
	4	User Defined Logic 2 (PNO 113)	Indirect 313[1]	Binary
	5	User Defined Logic 3 (PNO 114)	Indirect 314[1]	Binary
	6	User Defined Logic 4 (PNO 115)	Indirect 315[1]	Binary
	7	Reserved		
4, 5	Analogue Input 1		50	± 100%
6, 7	Analogue Input 2		51	± 100%
8, 9	Analogue Input 3		52	± 100%
10, 11	Analogue Input 4		53	± 100%
12, 13	Analogue Input 5		54	± 100%
14, 15	Analogue Output 1		55	± 100%
16, 17	Analogue Output 2		56	± 100%
18, 19	Health Store Word		116	0000 - FFFF
20, 21	Health Word		117	0000 - FFFF
22, 23	Speed Feedback %		207	± 100%
24, 25	Speed Demand %		89	± 100%
26, 27	Armature current feedback %		65	± 300%
28, 29	User Defined Value 1 (PNO 120)		Indirect 320[1]	Binary
30, 31	User Defined Value 2 (PNO 121)		Indirect 321[1]	Binary
32, 33	User Defined Value 3 (PNO 122)		Indirect 322[1]	Binary
34, 35	User Defined Value 4 (PNO 123)		Indirect 323[1]	Binary

1. Tags 312 to 323 are indirect parameters. Their values are destination tag numbers for DeviceNet data. For example if the value of tag 320 (PNO 120) is 2, then the value of User Defined Value 1 (bytes 4,5) will be read from tag 2 (Ramp Accel Time). If some of the User Defined parameters are not required, the corresponding destination tag numbers should be set to 0.

2. Refer to Appendix C for Sequence Status and Remote Sequence details.

590+ Set 1 : Write to TechBox

Byte	Description		Drive Tag Number	Range
0, 1	Remote Sequence		536[1]	0000 - FFFF
2	Bit-field:			
	Bit Number			
	0	Aux Start	161	Binary
	1	Aux Jog	227	Binary
	2	Aux Enable	168	Binary
	3	User Defined Logic 1 (miniLINK LOGIC 1)	346	Binary
	4	User Defined Logic 2 (miniLINK LOGIC 2)	347	Binary
	5	User Defined Logic 3 (miniLINK LOGIC 3)	348	Binary
	6	User Defined Logic 4 (miniLINK LOGIC 4)	349	Binary
	7	User Defined Logic 5 (miniLINK LOGIC 5)	350	Binary
3	Reserved			
4, 5	Speed Reference %		309	± 100%
6, 7	User Defined Value 1 (miniLINK VALUE 1)		339	± 100%
8, 9	User Defined Value 2 (miniLINK VALUE 2)		340	± 100%
10, 11	User Defined Value 3 (miniLINK VALUE 3)		341	± 100%
12, 13	User Defined Value 4 (miniLINK VALUE 4)		342	± 100%

1. Tag 536 functions only when Rem Seq Enable (tag 535) is true.
2. Refer to Appendix C for Sequence Status and Remote Sequence details.

590+ Set 2 : Read from TechBox

Bytes	Description		Drive Tag Number	Range
0, 1	Sequence Status		537	0000 - FFFF
2	Bit-field:			
	Bit Number			
	0	User Defined Logic 1 (PNO 112)	Indirect 312[1]	Binary
	1	User Defined Logic 2 (PNO 113)	Indirect 313[1]	Binary
	2	User Defined Logic 3 (PNO 114)	Indirect 314[1]	Binary
	3	User Defined Logic 4 (PNO 115)	Indirect 315[1]	Binary
	4	User Defined Logic 5 (PNO 116)	Indirect 316[1]	Binary
	5	User Defined Logic 6 (PNO 117)	Indirect 317[1]	Binary
	6	User Defined Logic 7 (PNO 118)	Indirect 318[1]	Binary
	7	User Defined Logic 8 (PNO 119)	Indirect 319[1]	Binary
3	Reserved			
4, 5	User Defined Value 1 (PNO 120)		Indirect 320[1]	Tag Dependent
6, 7	User Defined Value 2 (PNO 121)		Indirect 321[1]	Tag Dependent
8, 9	User Defined Value 3 (PNO 122)		Indirect 322[1]	Tag Dependent
10, 11	User Defined Value 4 (PNO 123)		Indirect 323[1]	Tag Dependent
12, 13	User Defined Value 5 (PNO 124)		Indirect 324[1]	Tag Dependent
14, 15	User Defined Value 6 (PNO 125)		Indirect 325[1]	Tag Dependent
16, 17	User Defined Value 7 (PNO 126)		Indirect 326[1]	Tag Dependent
18, 19	User Defined Value 8 (PNO 127)		Indirect 327[1]	Tag Dependent

1. Tags 312 to 323 are indirect parameters. Their values are destination tag numbers for DeviceNet data. For example if the value of tag 320 (PNO 120) is 2, then the value of User Defined Value 1 (bytes 4,5) will be read from tag 2 (Ramp Accel Time). If some of the User Defined parameters are not required, the corresponding destination tag numbers should be set to 0.

2. Refer to Appendix C for Sequence Status and Remote Sequence details.

590+ Set 2 : Write to TechBox

Bytes	Description		Drive Tag Number	Range
0, 1	Remote Sequence		536[1]	0000 - FFFF
2	Bit-field:			
	Bit Number			
	0	User Defined Logic 1 (miniLINK LOGIC 1)	346	Binary
	1	User Defined Logic 2 (miniLINK LOGIC 2)	347	Binary
	2	User Defined Logic 3 (miniLINK LOGIC 3)	348	Binary
	3	User Defined Logic 4 (miniLINK LOGIC 4)	349	Binary
	4	User Defined Logic 5 (miniLINK LOGIC 5)	350	Binary
	5	User Defined Logic 6 (miniLINK LOGIC 6)	351	Binary
	6	User Defined Logic 7 (miniLINK LOGIC 7)	352	Binary
	7	User Defined Logic 8 (miniLINK LOGIC 8)	353	Binary
3	Reserved			
4, 5	User Defined Value 1 (miniLINK VALUE 1)		339	± 100%
6, 7	User Defined Value 2 (miniLINK VALUE 2)		340	± 100%
8, 9	User Defined Value 3 (miniLINK VALUE 3)		341	± 100%
10, 11	User Defined Value 4 miniLINK VALUE 4)		342	± 100%
12, 13	User Defined Value 5 (miniLINK VALUE 5)		343	± 100%
14, 15	User Defined Value 6 (miniLINK VALUE 6)		344	± 100%
16, 17	User Defined Value 7 (miniLINK VALUE 7)		345	± 100%
18, 19	User Defined Value 8 (miniLINK VALUE 8)		379	± 100%

1. Tag 536 functions only when Rem Seq Enable (tag 535) is true.

2. Refer to Appendix C for Sequence Status and Remote Sequence details.

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690+ Polled I/O Connection

Polled I/O connections enable several parameter values to be passed in one transaction. Lists of parameters to be written to the drive and read from it are defined in sets. The user is able to choose from a list of pre-defined parameters.

TechBox sets are detailed below, the sets are specific to Parker SSD Drives products. Parker SSD Drives-specific sets indicate the drive tag number that is accessed in each case.

All integer values are presented with the low order byte first (in even byte numbers within an assembly object structure) and high order byte last (in odd byte numbers).

The following table provides a summary of the set numbers that are provided.

Set Number	Number of bytes transferred	Drives applicable
1	10	690+
2	20	690+
3	36	690+
4	34	690+

Lists of parameters to be written to and from the drive are accessed through Preset blocks 7, 8, Demux block 1 and Mux block 1. The user is able to link these function blocks to achieve the desired operation. The following tables provide a description of the different set numbers and the parameters that are accessed.

Refer to Appendix C for Comms Status and Comms Command details.

690+ Set 1: Read from TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Comms Status	272	0000 - FFFF
2,3	Preset 8::Input 0	554	-327.68– 327.67
4,5	Preset 8::Input 1	555	-327.68– 327.67
6,7	Preset 8::Input 2	556	-327.68– 327.67
8,9	Preset 8::Input 3	557	-327.68– 327.67

690+ Set 1: Write to TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Comms Command	271	0000 - FFFF
2,3	Preset 8::Input 4	558	-327.68– 327.67
4,5	Preset 8::Input 5	559	-327.68– 327.67
6,7	Preset 8::Input 6	560	-327.68– 327.67
8,9	Preset 8::Input 7	561	-327.68– 327.67

Refer to Appendix C for Comms Status and Comms Command details.

690+ Set 2: Read from TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Comms Status	272	0000 - FFFF
2,3	Mux 1 Output	598	0000 - FFFF
4,5	Preset 7::Input 0	543	-327.68– 327.67
6,7	Preset 7::Input 1	544	-327.68– 327.67
8,9	Preset 7::Input 2	545	-327.68– 327.67
10,11	Preset 7::Input 3	546	-327.68– 327.67
12,13	Preset 7::Input 4	547	-327.68– 327.67
14,15	Preset 7::Input 5	548	-327.68– 327.67
16,17	Preset 7::Input 6	549	-327.68– 327.67
18,19	Preset 7::Input 7	550	-327.68– 327.67

690+ Set 2: Write to TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Comms Command	271	0000 - FFFF
2,3	Demux 1::Input	599	0000 - FFFF
4,5	Preset 8::Input 0	554	-327.68– 327.67
6,7	Preset 8::Input 1	555	-327.68– 327.67
8,9	Preset 8::Input 2	556	-327.68– 327.67
10,11	Preset 8::Input 3	557	-327.68– 327.67
12,13	Preset 8::Input 4	558	-327.68– 327.67
14,15	Preset 8::Input 5	559	-327.68– 327.67
16,17	Preset 8::Input 6	560	-327.68– 327.67
18,19	Preset 8::Input 7	561	-327.68– 327.67

Refer to Appendix C for Comms Status and Comms Command details.

690+ Set 3: Read from TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Comms Status	272	0000 - FFFF
2,3	Mux 1 Output	598	0000 - FFFF
4,5	Preset 7::Input 0	543	-327.68– 327.67
6,7	Preset 7::Input 1	544	-327.68– 327.67
8,9	Preset 7::Input 2	545	-327.68– 327.67
10,11	Preset 7::Input 3	546	-327.68– 327.67
12,13	Preset 7::Input 4	547	-327.68– 327.67
14,15	Preset 7::Input 5	548	-327.68– 327.67
16,17	Preset 7::Input 6	549	-327.68– 327.67
18,19	Preset 7::Input 7	550	-327.68– 327.67
20,21	Preset 5::Input 0	521	-327.68– 327.67
22,23	Preset 5::Input 1	522	-327.68– 327.67
24,25	Preset 5::Input 2	523	-327.68– 327.67
26,27	Preset 5::Input 3	524	-327.68– 327.67
28,29	Preset 5::Input 4	525	-327.68– 327.67
30,31	Preset 5::Input 5	526	-327.68– 327.67
32,33	Preset 5::Input 6	527	-327.68– 327.67
34,35	Preset 5::Input 7	528	-327.68– 327.67

Refer to Appendix C for Comms Status and Comms Command details.

690+ Set 3: Write to TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Comms Command	271	0000 - FFFF
2,3	Demux 1::Input	599	0000 - FFFF
4,5	Preset 8::Input 0	554	-327.68– 327.67
6,7	Preset 8::Input 1	555	-327.68– 327.67
8,9	Preset 8::Input 2	556	-327.68– 327.67
10,11	Preset 8::Input 3	557	-327.68– 327.67
12,13	Preset 8::Input 4	558	-327.68– 327.67
14,15	Preset 8::Input 5	559	-327.68– 327.67
16,17	Preset 8::Input 6	560	-327.68– 327.67
18,19	Preset 8::Input 7	561	-327.68– 327.67
20,21	Preset 6::Input 0	532	-327.68– 327.67
22,23	Preset 6::Input 1	533	-327.68– 327.67
24,25	Preset 6::Input 2	534	-327.68– 327.67
26,27	Preset 6::Input 3	535	-327.68– 327.67
28,29	Preset 6::Input 4	536	-327.68– 327.67
30,31	Preset 6::Input 5	537	-327.68– 327.67
32,33	Preset 6::Input 6	538	-327.68– 327.67
34,35	Preset 6::Input 7	539	-327.68– 327.67

Refer to Appendix C for Comms Status and Comms Command details.

690+ Set 4: Read from TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Mux 1 Output	598	0000 - FFFF
2,3	Preset 7::Input 0	543	-327.68– 327.67
4,5	Preset 7::Input 1	544	-327.68– 327.67
6,7	Preset 7::Input 2	545	-327.68– 327.67
8,9	Preset 7::Input 3	546	-327.68– 327.67
10,11	Preset 7::Input 4	547	-327.68– 327.67
12,13	Preset 7::Input 5	548	-327.68– 327.67
14,15	Preset 7::Input 6	549	-327.68– 327.67
16,17	Preset 7::Input 7	550	-327.68– 327.67
18,19	Preset 5::Input 0	521	-327.68– 327.67
20,21	Preset 5::Input 1	522	-327.68– 327.67
22,23	Preset 5::Input 2	523	-327.68– 327.67
24,25	Preset 5::Input 3	524	-327.68– 327.67
26,27	Preset 5::Input 4	525	-327.68– 327.67
28,29	Preset 5::Input 5	526	-327.68– 327.67
30,31	Preset 5::Input 6	527	-327.68– 327.67
32,33	Preset 5::Input 7	528	-327.68– 327.67

690+ Set 4: Write to TechBox

Bytes	Description	Drive Tag Number	Range
0,1	Demux 1::Input	599	0000 - FFFF
2,3	Preset 8::Input 0	554	-327.68– 327.67
4,5	Preset 8::Input 1	555	-327.68– 327.67
6,7	Preset 8::Input 2	556	-327.68– 327.67
8,9	Preset 8::Input 3	557	-327.68– 327.67
10,11	Preset 8::Input 4	558	-327.68– 327.67
12,13	Preset 8::Input 5	559	-327.68– 327.67
14,15	Preset 8::Input 6	560	-327.68– 327.67
16,17	Preset 8::Input 7	561	-327.68– 327.67
18,19	Preset 6::Input 0	532	-327.68– 327.67
20,21	Preset 6::Input 1	533	-327.68– 327.67
22,23	Preset 6::Input 2	534	-327.68– 327.67
24,25	Preset 6::Input 3	535	-327.68– 327.67
26,27	Preset 6::Input 4	536	-327.68– 327.67
28,29	Preset 6::Input 5	537	-327.68– 327.67
30,31	Preset 6::Input 6	538	-327.68– 327.67
32,33	Preset 6::Input 7	539	-327.68– 327.67

Configuring the PLC/SCADA Supervisor

This chapter contains an example for configuring a PLC.

1. Start a new program and select the PLC processor and chassis type that is used in your project. Our example uses a 1756-L55 processor and 1756-A7 chassis. Remain Offline until you are ready to download the program.

2. In the I/O configuration, select the ControlNet scanner. Right click on the I/O Configuration folder to select a New Module. Select the type of scanner module that is used in the PLC.
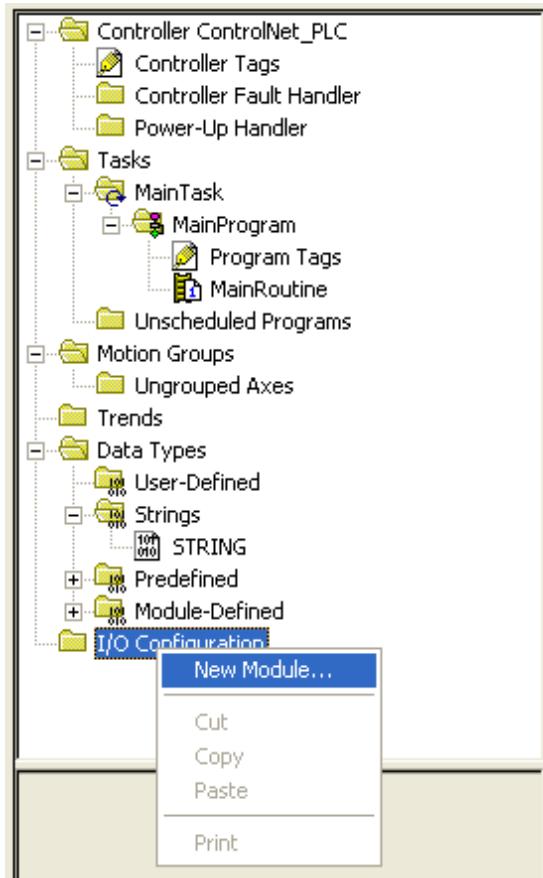
Figure 8. Selecting New Module
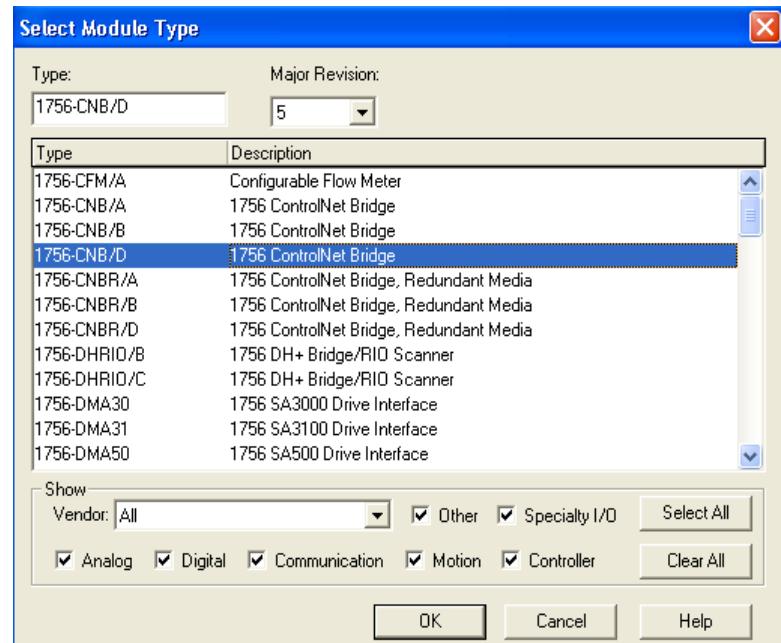
Figure 9. Select Scanner

3. Under the scanner card, add a new module. Right click on the scanner module and select New Module. Select Generic ControlNet module.
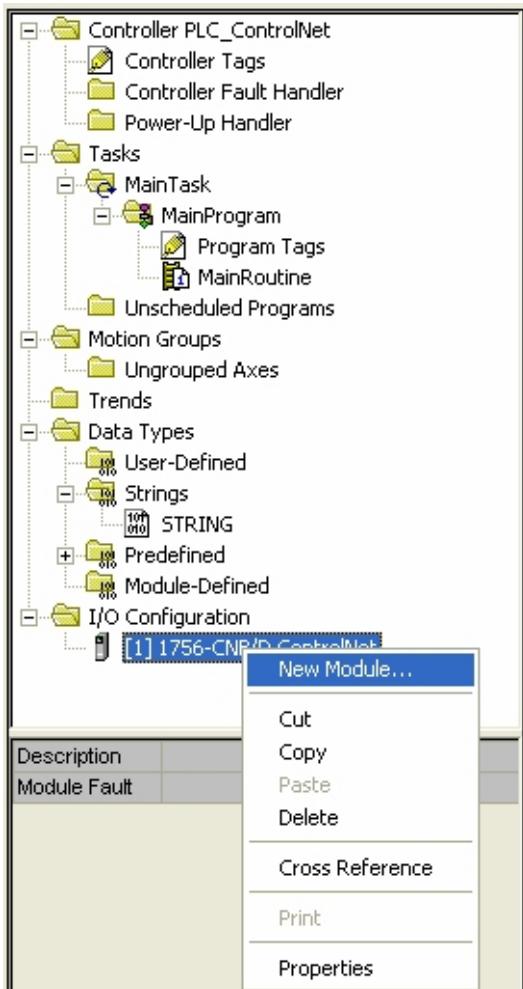
Figure 10. Select New Remote Module
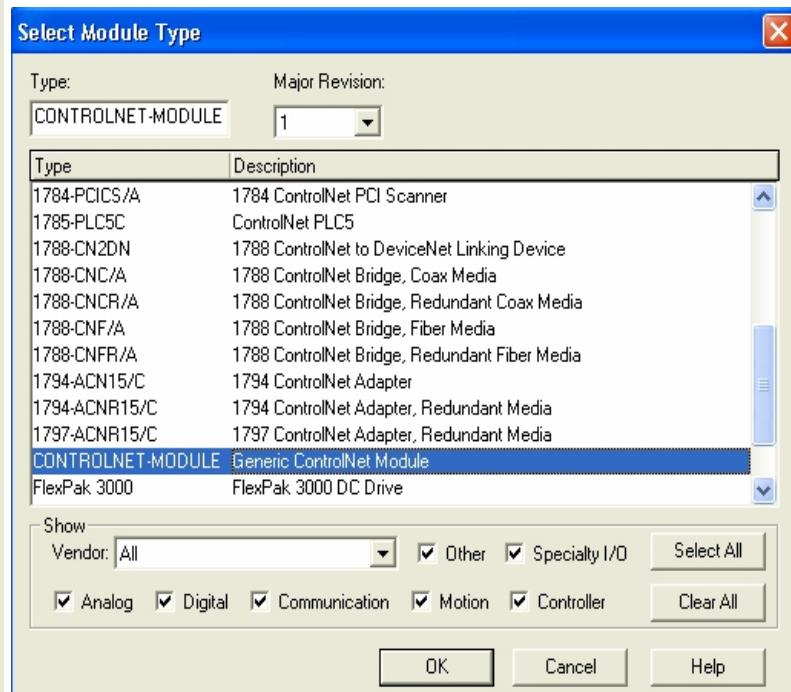
Figure 11. Select Remote Module Type

4. Module properies window allows you to name the module and to set the network address, data type (data-int), and data size. The input assembly instance is 100 and the size is the configured number of words plus 2. The output assembly instance is 150 and the size is the number of words you are sending to the TechBox. The configuration assembly instance is 1 and the size is 0. The Comms Format is set for "DATA-INT" to allow transferring 16 bit words. Refer to Figure 12.

5. Click the NEXT button to enter the settings for the Requested Packet Interval. The default setting should be sufficient for most applications. When finished with the Requested Packet Interval screen, click the FINISH button to exit. Refer to Figure 13.
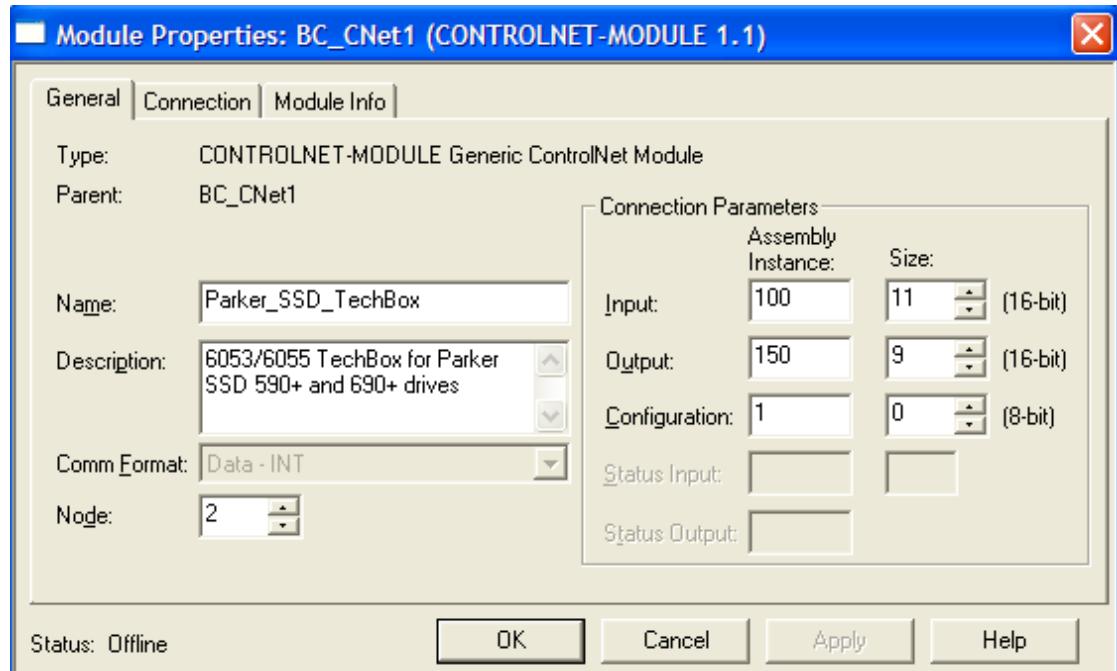
**Figure 12. Defining the Module Name and Data Size**
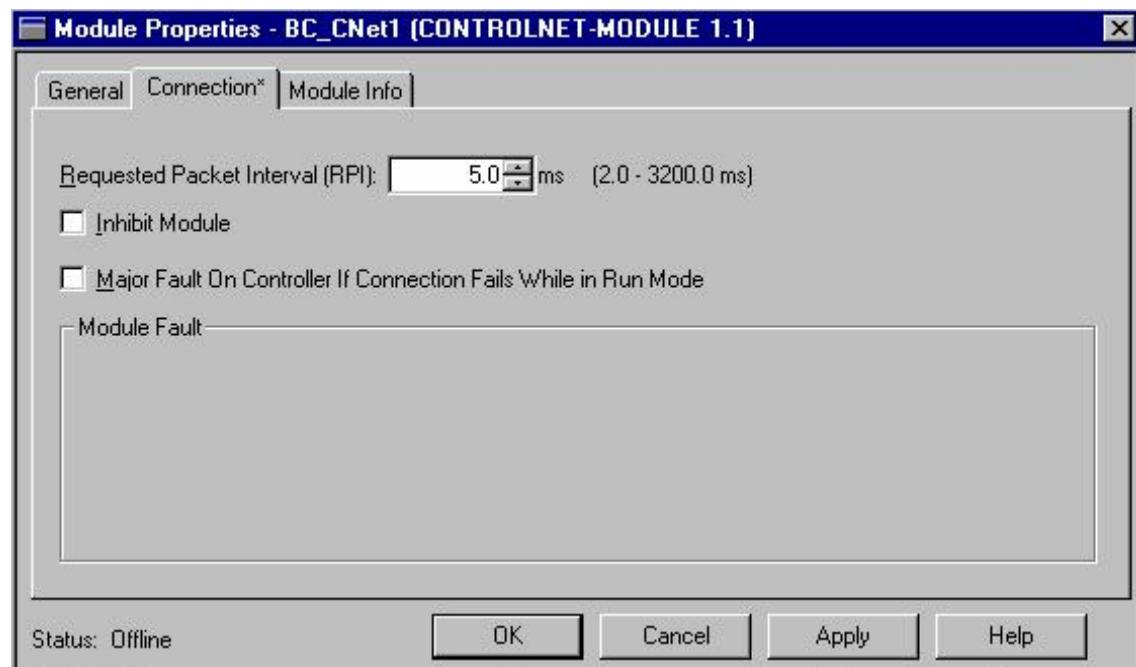
Figure 13. Packet Rate Selection

6. The RSLogix 5000 program configures your data types and I/O data points automatically. Once the PLC program is configured for the TechBox, the program can be downloaded to the PLC. The program needs to be loaded in the PLC prior to configuring the ControlNet interface using RSNetWorx. This will ensure proper configuration for the ControlNet network.

7. The PLC automatically creates a configuration data block. The block always ends in a "C". This block is part of every configuration. Parker_SSD_TechBoxC: 0 was created for this module. The type and size of the data is fixed, (Type: SINT, Size: 400 bytes). This configuration data block is created regardless of the configuration size.

Figure 14. ControlNet Data allocation for the PLC

Configuring RSNetworx for ControlNet

The fastest way to configure the ControlNet interface is online using RSNetworx and with all the nodes connected to the network.

1. The EDS file is available on our web site, www.ssddrives.com. Load the EDS file first. Using the Tools menu, select EDS Wizard. The EDS wizard will guide you through the process.

2. Set the scanner network address using the two rotary switches located on the top of the scanner card. If different hardware is being used, refer to instruction manual for the hardware. This example uses an Allen-Bradley model 1756-CNB/D.
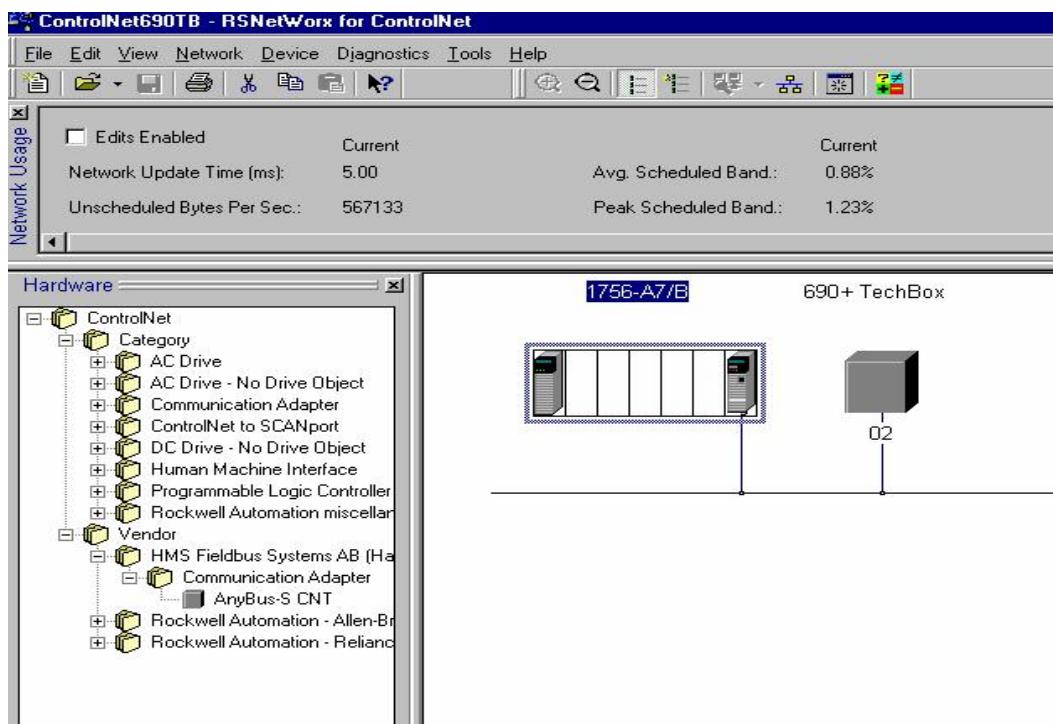

Figure 15 RSNetworx configuration screen

3. The RSNetworx software queries the network and reads the PLC configuration to generate the proper network configuration.

4. RSNetworx should see the nodes on the network. The scanner card is the only image you see for the PLC. Enable the edits enabled checkbox to configure the rack and the PLC processor. Right click on the scanner card and choose the Edit Chassis option. Select the rack, processor and any other cards that are in the PLC.

5. RSNetworx is used to configure the network update time. Right click in the area outside of the modules and select Properties. Enter the update time and other network parameters as needed. The only requirement is that the network update time is shorter than the PLC Requested Packet Interval. After configuring the rack and setting the network update time, you should have updates pending to the network.

6. A File-Save saves the configuration to your file and to the network at the same time. After the network changes have been saved, the network and the I/O should become healthy. The network and TechBox LEDs should be solid green.

7. The ControlNet tags can be monitored online using PLC software. Select Controller Tags to change the view to display the tags. The tag names match the module name that is being monitored.
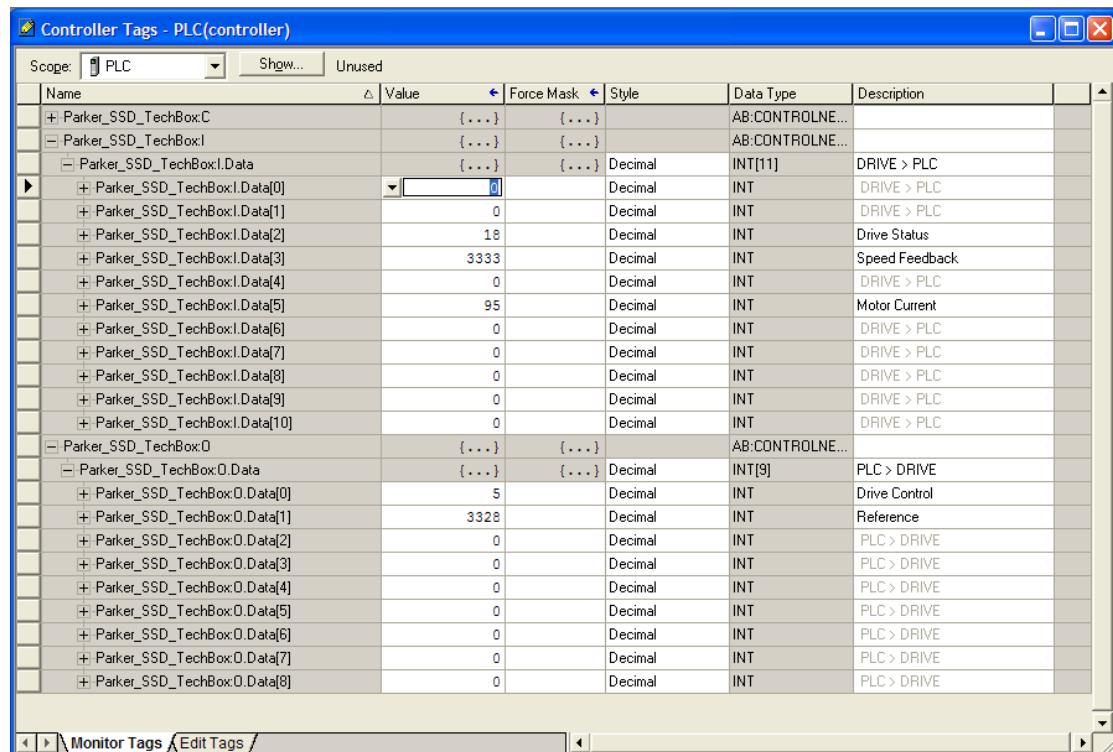
Figure 16 PLC monitor screen

Appendix A : Commissioning Tips

1. Configure the ControlNet scanner (RSNetworx) last. The scanner acts as the moderator bringing the drive and PLC on-line together.

2. The L5354 LinkCard and the 6053/6055 Cnet TechBox use the same EDS file.

3. Define the total amount of data you wish to send to and from the ControlNet scanner. The limit for the 6053/6055 Cnet TechBox is defined by the selected parameter set.

4. Inputs are words transmitted from the TechBox module to the PLC.

5. The TechBox transmits two status words so the total number of input words will be your data size plus two.

6. The ControlNet Node Address for the TechBox is assigned through the MMI. The rotary switches on the TechBox are set to 00.

7. The bottom coaxial connector is for the primary ControlNet network.

8. The minimum Network Update Time for the card is 5ms.

Sample Configurations
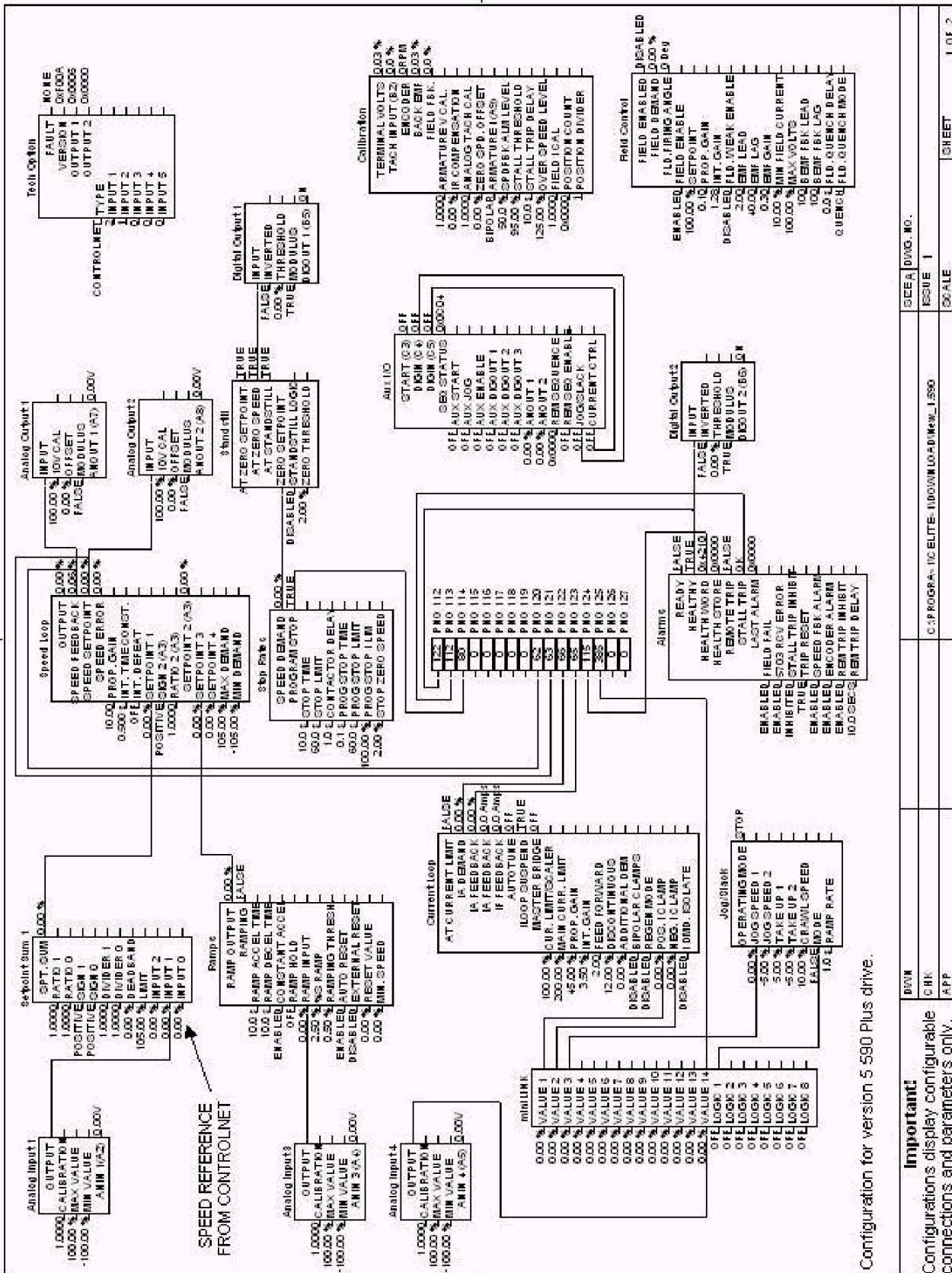
590+ Sample Configuration
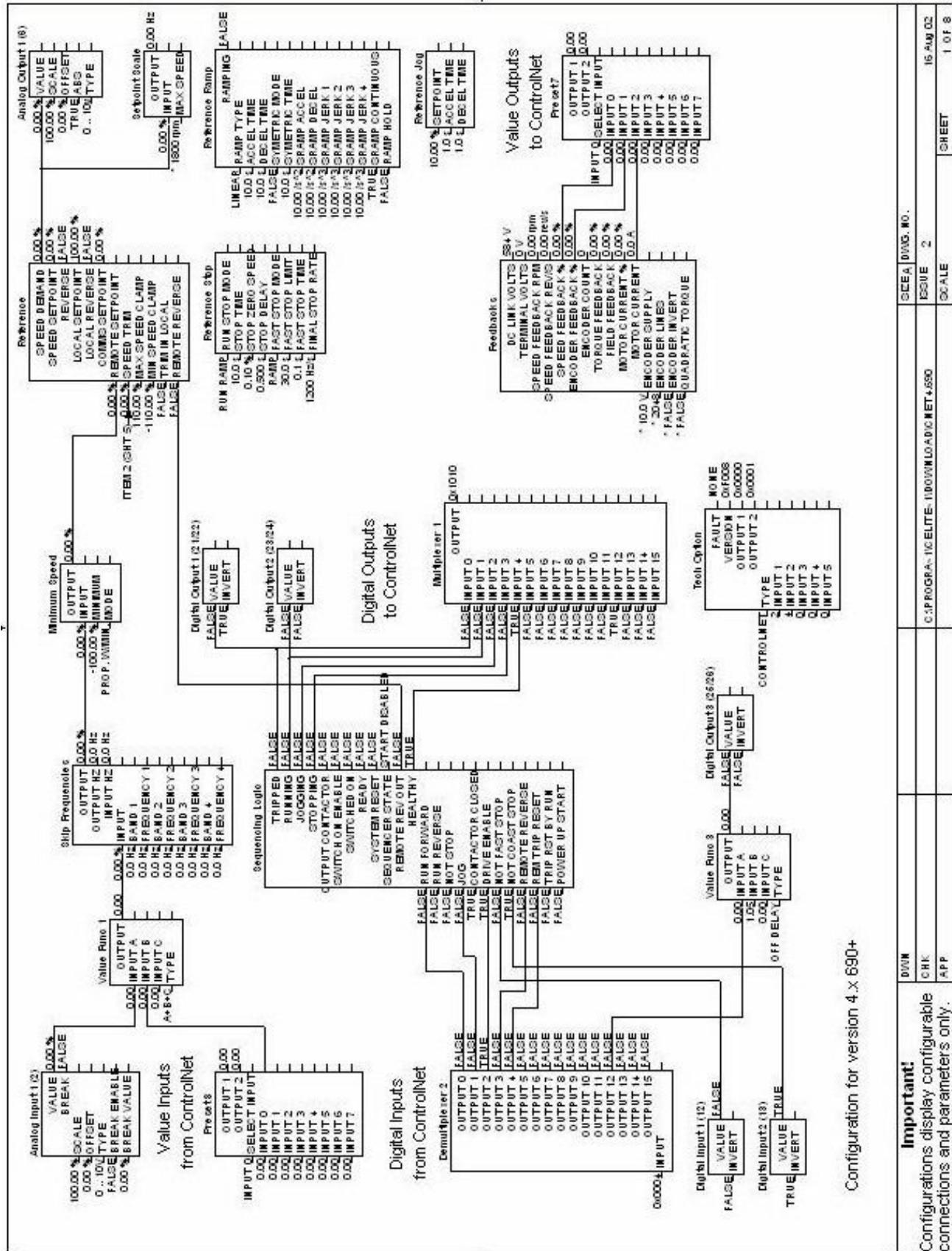
690+ Sample Configuration using Set 4

Appendix B : Troubleshooting

6053/6055 ControlNet TechBox Status LED

Table 1

Network LED Indicates the state of the connected network.		Module LED Indicates the set-up state of the TechBox. The states indicated are those produced by the FAULT parameter of the TechBox function block.	
LED Indication	Description	FAULT Parameter	Description
OFF	Disabled	Hardware	Hardware Fault – external NOT POWERED
SHORT FLASH	No Connection	Self test failed	Card needs commissioning Hardware fault
FLASH	Forced listen mode Checking for moderator Duplicate MAC ID	Wrong module type	Incorrect TechBox option selected
LONG FLASH	On line no connections (No moderator)	Invalid parameter value for module type	Wrong module type selected.
ON	On line with connection (Data exchange)	NONE	Valid set-up, ready for external communications

Table 2

NETWORK STATES		
0	ON-LINE	Communicating with Master
1	DUPLICATE	Duplicate Address
2	FORCED LISTEN	Receive Only Mode
3	I'M ALIVE	Querying Network for Master
4	CHECK MODERATOR	Scanner Problems
5	WAIT ROUGE	
6	CHECK CABLE	Inspect Cable for Continuity
7	START-UP	TechBox not Commissioned
8	INVALID	Wrong TechBox Selection
9	DISABLED	MAC ID 0 or Invalid Polled Assembly number

Appendix C : External Control of the Drive

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REM. SEQUENCE

Tag 536, Default = 0x0000

Reserved bits are undefined when read and should be set Zero when written.

Bit Number	Mask	Name	Comment
0 (lsb)	0x0001	Remote Enable	
1	0x0002	Remote Start	
2	0x0004	Remote Jog	
3	0x0008	Remote Jog Mode	Selects Jog Speed
4	0x0010	Reserved	
5	0x0020	Reserved	
6	0x0040	Reserved	
7	0x0080	Reserved	
8	0x0100	Remote Alarm Ack	Alarm Acknowledge
9	0x0200	Remote/Remote Trip	Remote Trip (High for OK)
10	0x0400	Reserved	
11	0x0800	Reserved	
12	0x1000	Reserved	
13	0x2000	Reserved	
14	0x4000	Reserved	
15	0x8000	Reserved	

SEQ STATUS

Tag 537, (Read Only) , Default = 0x0000

Reserved bits are undefined when read.

Bit Number	Mask	Name	Comment
0 (lsb)	0x0001	Coast Stop	Coast Stop demanded
1	0x0002	Program Stop	Program (Fast) Stop demanded
2	0x0004	Disable	/Enable demanded
3	0x0008	Run	Drive Start demanded
4	0x0010	Jog	Drive Jog demanded
5	0x0020	Reserved	Undefined
6	0x0040	Alarm	Unacknowledged alarm (Health Store != 0)
7	0x0080	Reserved	Undefined
8	0x0100	Running	Contactor in and drive ready to be enabled
9	0x0200	Enabled	Drive is enabled.
10	0x0400	Zero Speed	Zero speed Output TAG 17
11	0x0800	Healthy Output	Healthy Output TAG 12
12	0x1000	Ready	Ready Output TAG 559
13	0x2000	Reserved	Undefined
14	0x4000	Reserved	Undefined
15	0x8000	Reserved	Undefined

Useful Bit Patterns

Sequence Status	Comment
0x1B0B	Running
0x044B	Tripped, Run High
0x0447	Tripped, Run Low, Enable Low
0x0C47	Trip Acknowledged, Healthy o/p TRUE Alarm stays high until drive is restarted.

Useful Commands using EI-ASCII - REM. SEQUENCE

Tag 536, Default = 0x0C07

	/Remote Trip	Alarm Ack	Jog Mode	Jog	Start	Enable	Command
Start Drive	1	0	X	0	1	1	0x0203
Stop Drive	1	0	X	0	0	1	0x0201
Disable Drive	1	0	X	X	X	0	0x0200
Jog Setpoint 1	1	0	0	1	0	1	0x0205
Jog Setpoint 2	1	0	1	1	0	1	0x020C
Remote Trip	0	0	X	X	X	X	0x0000
Reset Alarm a)	1	1	0	0	0	0	0x0300
Reset Alarm b)							Healthy Output Bit 11
Reset Alarm c)	1	0	50	0	0	0	0x0200

Drive Enable

To Enable the drive in remote mode the following parameters must be TRUE:

REM.SEQ.ENABLE[535] and REM SEQUENCE [536] BIT 1.

Drive Start

To Start the drive in remote mode the following parameters must be TRUE:

REM.SEQ.ENABLE[535] and REM SEQUENCE [536] BIT 0.

Drive Jog

To Jog the drive in remote mode the following parameters must be TRUE:

REM.SEQ.ENABLE[535] and REM SEQUENCE [536] BIT 3.

Jog Mode

To select the jog setpoint in remote mode the following parameters must be TRUE:

REM.SEQ.ENABLE[535] and REM SEQUENCE [536] BIT 4.

ACK Alarm

To Acknowledge an alarm the following parameter must be TRUE:

REM SEQUENCE [536] BIT 8.
NOTE: if remote sequencing is not enabled then REM SEQUENCE [536] BIT 8 is forced TRUE.

Remote Trip Alarm

The Remote trip alarm is designed to signal a network fault to the drive. When using the Profibus interface, all outputs are set to zero on link fail. If one of the outputs is REM SEQUENCE [536] the drive will trip after a delay specified by REM TRIP DELAY (541). The Drive will then need a low - > high transition on ACK Alarm and Start before the drive may run again.

REM TRIP INHIBIT [540]	REM TRIP DELAY [541]	REMOTE TRIP [542]
Disable remote trip.	Delay before trip becomes active after bit being cleared.	Status of the Remote trip alarm, OK, Warning (Remote Seq Bit 9 FALSE and delay not expired), Active (Trip active, timer expired and remote not inhibited).

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Communications Command

When sequencing is in the Remote Comms mode, the sequencing of the Inverter is controlled by writing to the hidden parameter COMMS COMMAND (Tag 271). This parameter can only be written to using a communications interface. The output parameter (Tag 273) COMMS COMMAND of the COMMS CONTROL function block is provided as a diagnostic.

The COMMS COMMAND parameter is a 16-bit word based on standard fieldbus drive profiles. Some bits are not implemented in this release (see "Supported" column of the table below).

Bit	Name	Description	Supported	Required Value
0	Switch On	OFF1 Operational	√	
1	(Not) Disable Voltage	OFF2 Coast Stop	√	
2	(Not) Quick Stop	OFF3 Fast Stop	√	
3	Enable Operation		√	
4	Enable Ramp Output	=0 to set ramp output to zero		1
5	Enable Ramp	=0 to hold ramp		1
6	Enable Ramp Input	=0 to set ramp input to zero		1
7	Reset Fault	Reset on 0 to 1 transition	√	
8				0
9				0
10	Remote	=1 to control remotely		1
11				0
12				0
13				0
14				0
15				0

Switch On

Replaces the RUN FWD, RUN REV and NOT STOP parameters of the SEQUENCING LOGIC function block. When Set (=1) is the same as :

RUN FWD	=	TRUE
RUN REV	=	FALSE
NOT STOP	=	FALSE

When Cleared (= 0) is the same as :

RUN FWD	=	FALSE
RUN REV	=	FALSE
NOT STOP	=	FALSE

(Not) Disable Voltage

ANDed with the NOT COAST STOP parameter of the SEQUENCING LOGIC function block. When both Set (=1) is the same as:

=	TRUE

When either or both Cleared (= 0) is the same as :

NOT COAST STOP	=	FALSE

(Not) Quick Stop

ANDed with the NOT FAST STOP parameter on the SEQUENCING LOGIC function block. When both Set (=1) is the same as:

NOT FAST STOP	=	TRUE

When either or both Cleared (= 0) is the same as :

NOT FAST STOP	=	FALSE

Enable Operation

ANDed with the DRIVE ENABLE parameter on the SEQUENCING LOGIC function block. When both Set (=1) is the same as:

DRIVE ENABLE	=	TRUE

When either or both Cleared (= 0) is the same as :

DRIVE ENABLE	=	FALSE

Enable Ramp Output, Enable Ramp, Enable Ramp Input

Not implemented. The state of these bits must be set (=1) to allow this feature to be added in the future.

Reset Fault

Replaces the REM TRIP RESET parameter on the SEQUENCING LOGIC function block. When Set (=1) is the same as:

REM TRIP RESET	=	TRUE

When Cleared (= 0) is the same as :

REM TRIP RESET	=	FALSE

Remote

Not implemented. It is intended to allow the PLC to toggle between local and remote. The state of this must be set (=1) to allow this feature to be added in the future.

Example Commands
0x047F hexadecimal to RUN
0x047E hexadecimal to STOP

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Communications Status

The COMMS STATUS parameter (Tag 272) in the COMMS CONTROL function block monitors the sequencing of the Inverter. It is a 16-bit word based on standard fieldbus drive profiles. Some bits are not implemented in the initial release and are set to 0 (see "Supported" column of the table below).

Bit	Name	Description	Supported
0	Ready To Switch On		√
1	Switched On	Ready for operation (refer control bit 0)	√
2	Operation Enabled	(refer control bit 3)	√
3	Fault	Tripped	√
4	(Not) Voltage Disabled	OFF 2 Command pending	√
5	(Not) Quick Stop	OFF 3 Command pending	√
6	Switch On Disable	Switch On Inhibited	√
7	Warning		
8	SP / PV in Range		
9	Remote	= 1 if Drive will accept Command Word	√
10	Setpoint Reached		
11	Internal Limit Active		
12			
13			
14			
15			

Ready To Switch On
Same as the SWITCH ON ENABLE output parameter of the SEQUENCING LOGIC function block.

Switched On
Same as the SWITCHED ON output parameter of the SEQUENCING LOGIC function block.

Operation Enabled
Same as the RUNNING output parameter of the SEQUENCING LOGIC function block.

Fault
Same as the TRIPPED output parameter of the SEQUENCING LOGIC function block.

(Not) Voltage Disabled
If in Remote Comms mode, this is the same as Bit 1 of the COMMS COMMAND parameter. Otherwise it is the same as the NOT COAST STOP input parameter of the SEQUENCING LOGIC function block.

(Not) Quick Stop
If in Remote Comms mode, this is the same as Bit 2 of the COMMS COMMAND parameter. Otherwise it is the same as the NOT FAST STOP input parameter of the SEQUENCING LOGIC function block.

Switch On Disable
Set (=1) only when in START DISABLED state, refer to the Software Product Manual, HA465038Uxxx, Section 4 : Sequencing Logic States.

Remote
This bit is set (= 1) if the Inverter is in Remote mode AND the parameter REMOTE COMMS SEL of the COMMS CONTROL function block is Set (= 1).