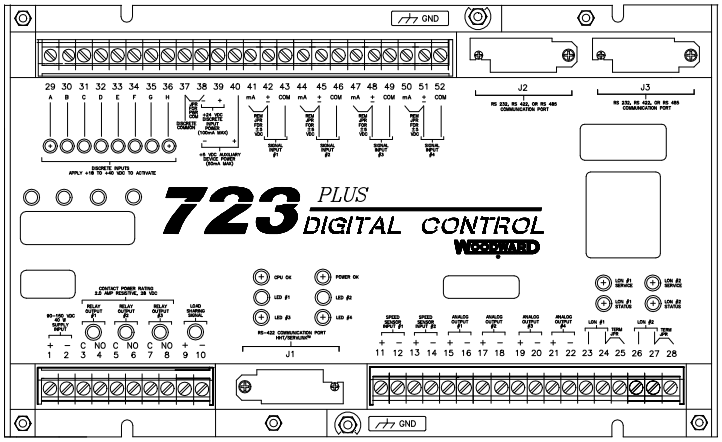
WOODWARD

Product Manual 02831
(Revision C)
Original Instructions



723PLUS Digital DSLC/MSLC Gateway

8280-416, 8280-417

Installation and Operation Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

www.woodward.com/publications

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

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Illustrations and Tables

IMPORTANT

Screenshots from the following document are reprinted with permission of Echelon®: *LonMaker™ User Guide.*

Warnings and Notices

Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE

Battery Charging Device

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Chapter 1.
General Information

Introduction

This manual describes the Woodward 723PLUS DSLC™/MSLC Gateway Control, models 8280-416 (low voltage) and 8280-417 (high voltage).

Declaration of Incorporation

In accordance with the EMC Directive 89/336/EEC and its amendments, this controlling device, manufactured by the Woodward Governor Company, is applied solely as a component to be incorporated into an engine prime mover system. Woodward declares that this controlling device complies with the requirements of EN50081-2 and EN50082-2 when put into service per the installation and operating instructions outlined in the product manual.

NOTICE: This controlling device is intended to be put into service only upon incorporation into an engine prime mover system that itself has met the requirements of the above Directive and bears the CE mark.

Application

This 723PLUS Digital DSLC/MSLC Gateway control can extract generator information from 14 DSLC units and one MSLC via the LON Network. This information is then given a Modbus® * address for monitoring parameters via two serial ports. The two serial channels can interface to a Modbus master device such as a Human/Machine Interface (HMI). In addition, Port 3 allows commands and values to be sent to all network-connected DSLC and MSLC units. Provisions are included for forcing these commands and values for testing purposes.

*—Modbus is a registered trademark of Schneider Automation Inc.

Control Options

Each 723PLUS control requires 40 W of power. A nominal current in-rush of 7 A (low voltage) or 22 A (high voltage) is possible. Acceptable input voltage ranges are:

- low voltage—18 to 40 Vdc
- high voltage—90 to 150 Vdc

Discrete input voltages provide on/off command signals to the electronic control, Each discrete input requires 10 mA at its 24 Vdc nominal voltage rating (2210 Ω load).

723PLUS Digital Speed Control Accessories

A **Hand Held Programmer** (part number 9907-205) is used for adjusting software parameters of the 723PLUS control, including the software options. It plugs into communication port J1 of the control. [Hand Held Programmer part number 9905-292 can also be used.]

IMPORTANT

Before the Hand Held Programmer can work with the 723PLUS, a jumper must be *removed* from the Load Share Signal terminals 9 and 10.

Servlink/Watch Window PC interface is a service tool that loads on a PC and is capable of monitoring and editing real-time control variables, saving and restoring tunable variables, and loading applications. The Watch Window also features an on-line help which gives a detailed description of the above tools. Once the Servlink/Watch Window is running on a PC, a serial cable can be plugged into communication port J1 of the control to interface with the 723PLUS.

IMPORTANT

Before the Servlink/Watch Window PC interface can work with the 723PLUS, a jumper must be *installed across* the Load Share Signal terminals 9 and 10.

A **DSLC** (Digital Synchronizer and Load Control) and **MSLC** (Master Synchronizer and Load Control) system for generator system load management and load sharing control. The 723PLUS Gateway control receives the system and generator parameters through the LON #1 data channel (for the MSLC and DSLC_01 through DSLC_07) and LON #2 data channel (for DSLC_08 through DSLC_14). The system and generator parameters are made available to both communication ports J2 and J3. System and generator commands can be sent to Port 3. To extract the DSLC/MSLC information into the 723PLUS Gateway control, use the LON Binding Kit (part number 8928-158). If the LON hardware is already available, you can order the 723PLUS DSLC/GATEWAY Standard Database (part number 8928-053). Refer to Chapter 4 and Appendix B for detailed binding instructions.

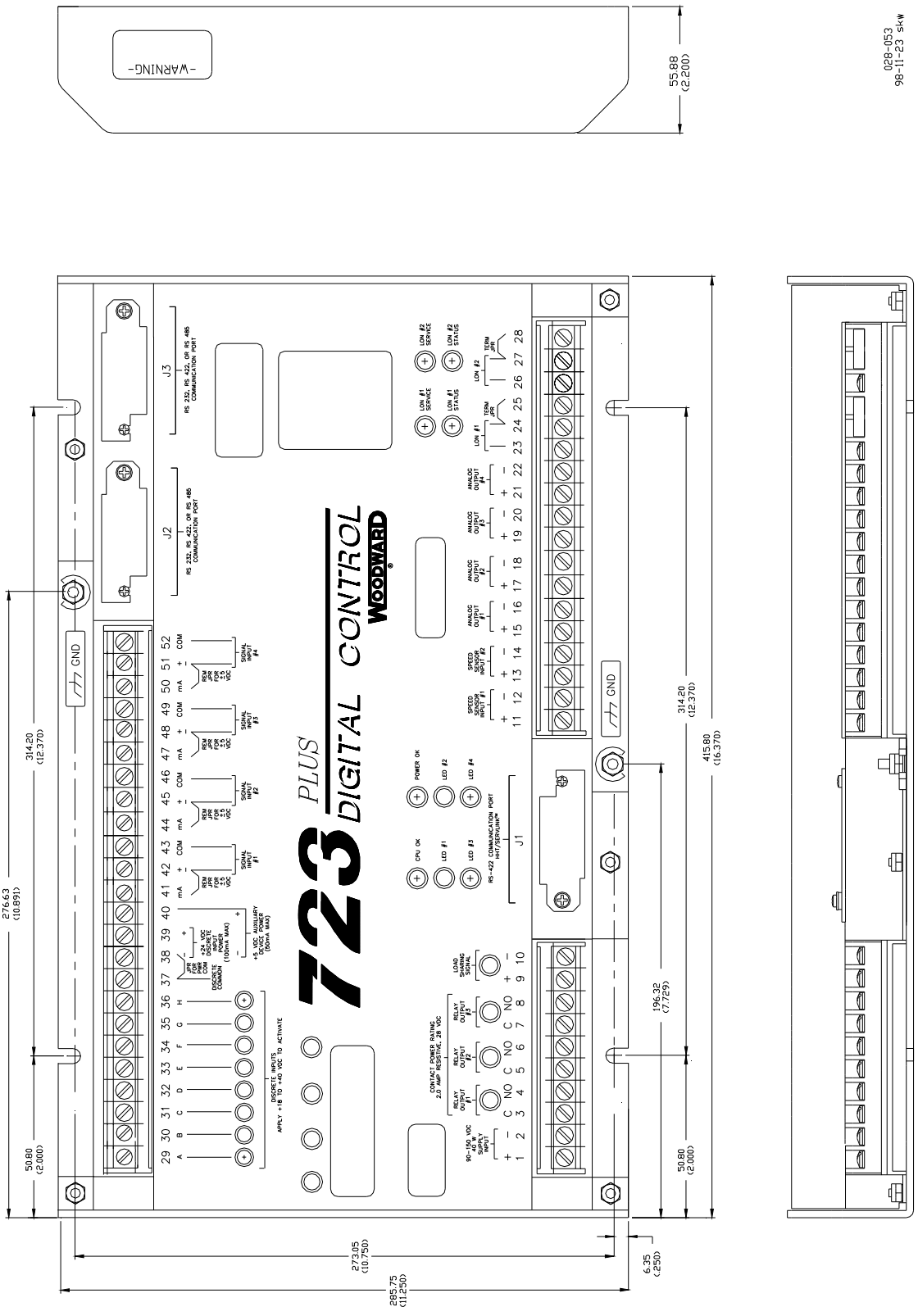
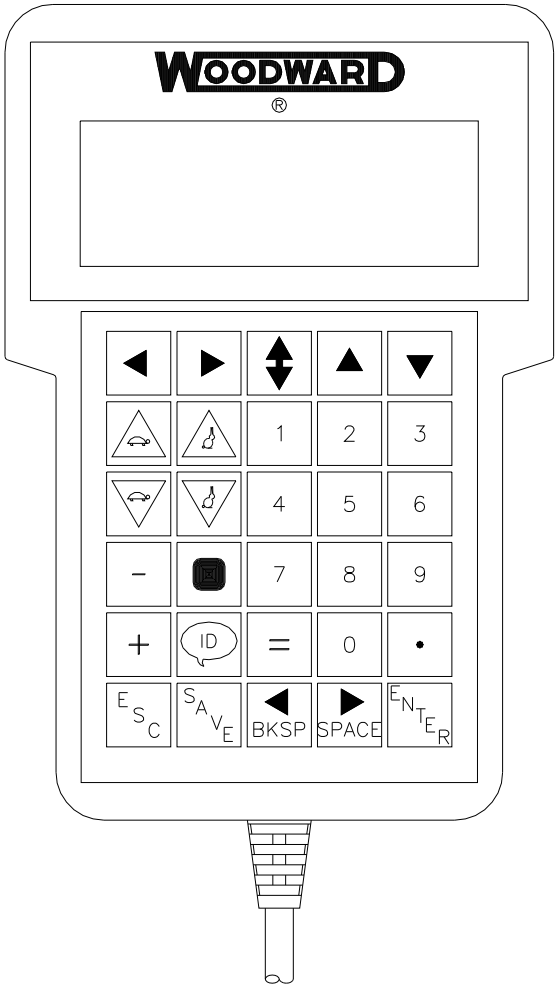
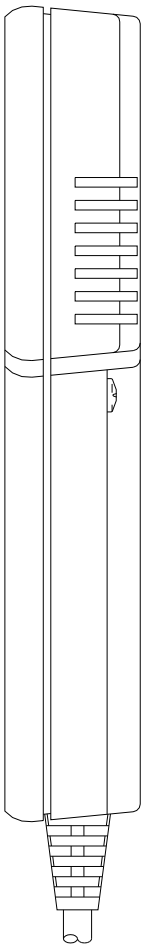
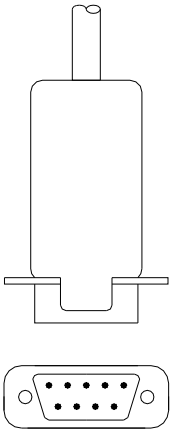


Figure 1-1. 723PLUS Digital Speed Control







RS−422 SIGNAL	DE−9P PIN ASSIGNMENT
GROUND	7
XMIT−	2
RECV−	3
XMIT+	4
RECV+	5
POWER	9

WARNING
This is a class A product based on testing to EN55022 for ITE hardware. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

041−010
96−07−25 skw

Figure 1-2. Hand Held Programmer

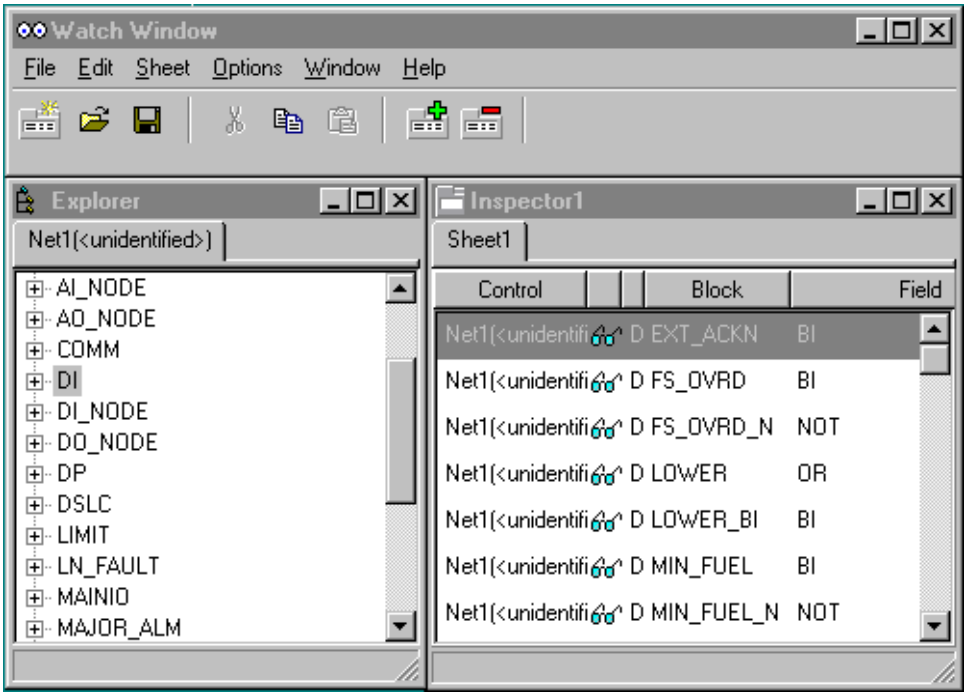


Figure 1-3. Watch Window User Interface

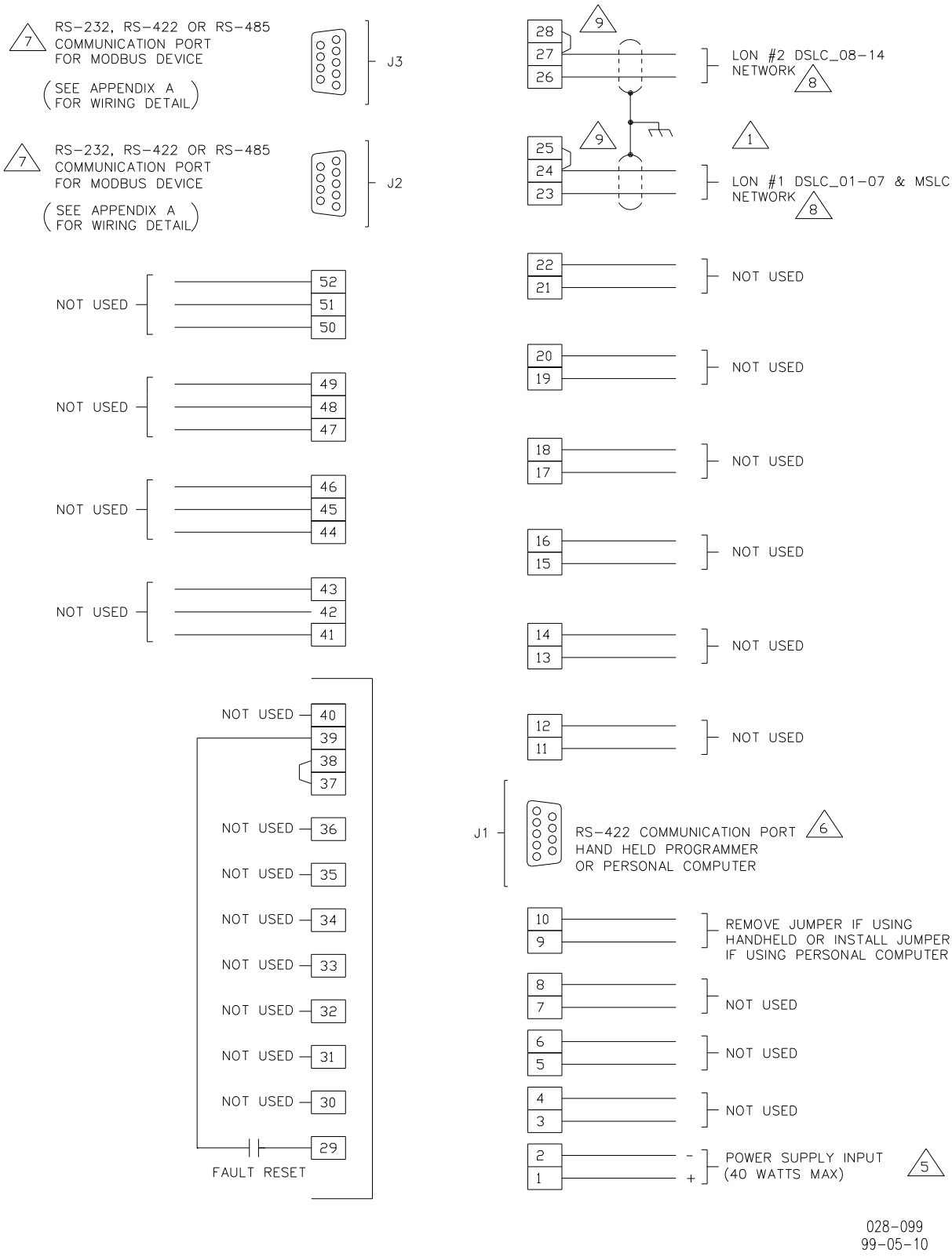


Figure 1-4a. Control Wiring Diagram

NOTES:

1. SHIELDED WIRES ARE TWISTED PAIRS, WITH SHIELD GROUNDED AT ONE END ONLY. WHEN MOUNTING CONTROL TO BULKHEAD, USE THE GROUNDING STUD AND HARDWARE SUPPLIED WITH THE CHASSIS TO ENSURE PROPER GROUNDING.

2. SHIELDS MUST NOT BE GROUNDED AT ANY EXTERNAL POINT UNLESS OTHERWISE NOTED.

3. ALL SHIELDS MUST BE CARRIED CONTINUOUSLY THROUGH ALL TERMINAL BLOCKS AND MUST NOT BE TIED TO OTHER SHIELDS EXCEPT AT THE COMMON GROUND POINT. THE SHIELDS ARE TIED TOGETHER AT THE GROUND STUD

4. DISCRETE INPUTS ARE ISOLATED FROM OTHER CIRCUITS AND CAN BE POWERED BY TERMINAL 39 (+24 VDC) LEAVING THE JUMPER IN PLACE.

5. INTERNAL POWER SUPPLY PROVIDES DC ISOLATION BETWEEN THE POWER SOURCE AND ALL OTHER INPUTS AND OUTPUTS.

6. COMMUNICATION PORT J1:
   A. HAND HELD PROGRAMMER – REMOVE JUMPER BETWEEN TERMINALS 9 AND 10.
   B. PERSONAL COMPUTER – ADD JUMPER BETWEEN TERMINALS 9 AND 10.

7. COMMUNICATION PORT J2 OR J3 CAN BE CONFIGURED AS A RS–232, RS–422 OR RS–485 SERIAL INTERFACE. PORT CONFIGURATION CAN BE DONE IN THE APPLICATION SOFTWARE ONLY. FOR THE PIN ASSIGNMENT OF J2 AND J3 SEE APPENDIX A.

8. THE LON MUST BE CONNECTED USING PROPER CABLE AS DESCRIBED IN APPENDIX B. PORT MUST BE BOUND PER CHAPTER 5. LON#2 CONNECTION IS NOT NEEDED IF THE SYSTEM DOES NOT INCLUDE MORE THAN 7 DSLC CONTROLS.

9. LON NETWORK NEEDS TO BE PROPERLY TERMINATED. THIS CAN BE DONE AT THE 723PLUS BY INSTALLING JUMPERS FROM TERMINALS 24 TO 25 FOR LON #1 AND TERMINALS 27 TO 28 FOR LON #2. REFER TO APPENDIX B FOR FURTHER DETAILS.

028–102
99–05–10

Figure 1-4b. Control Wiring Diagram

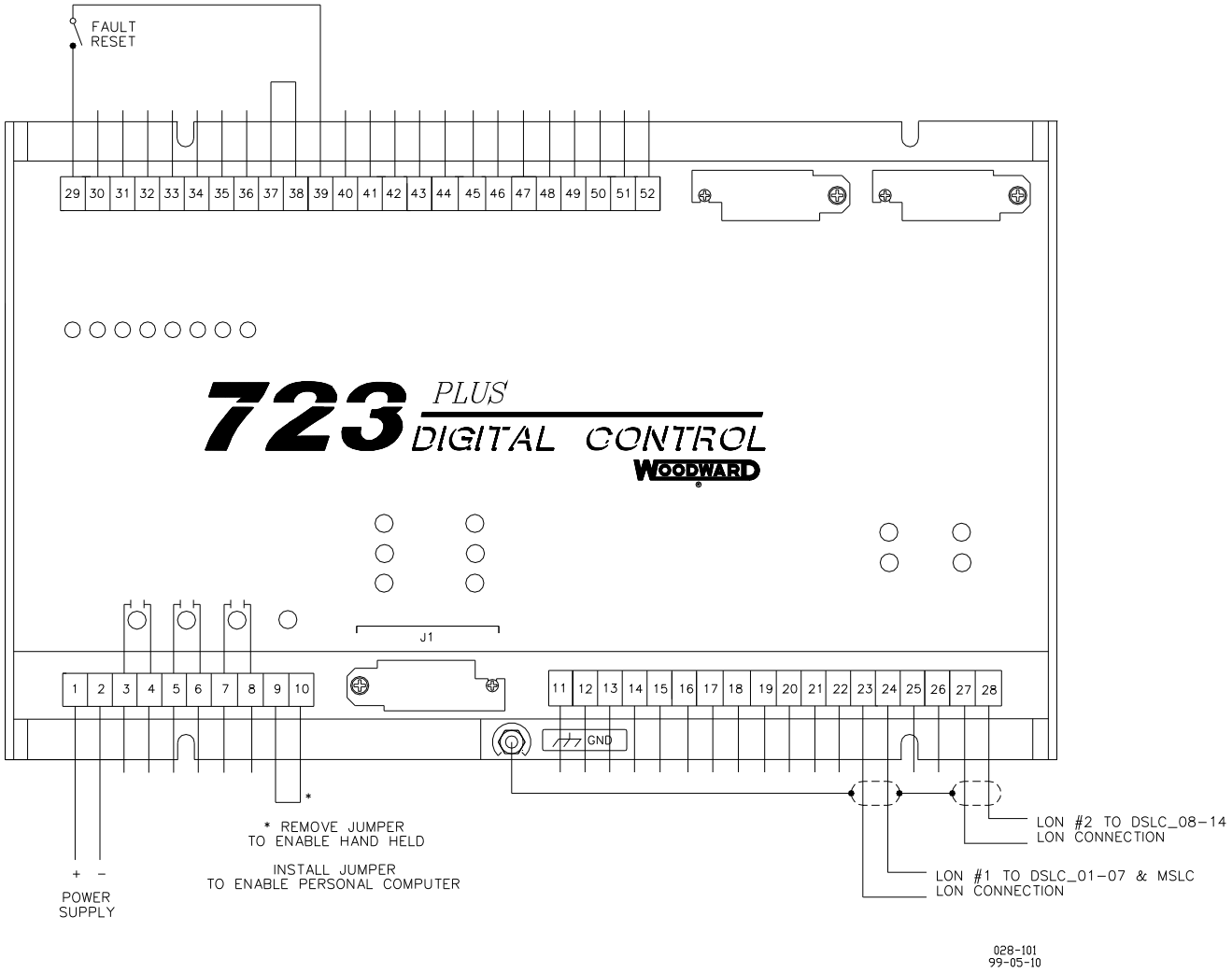
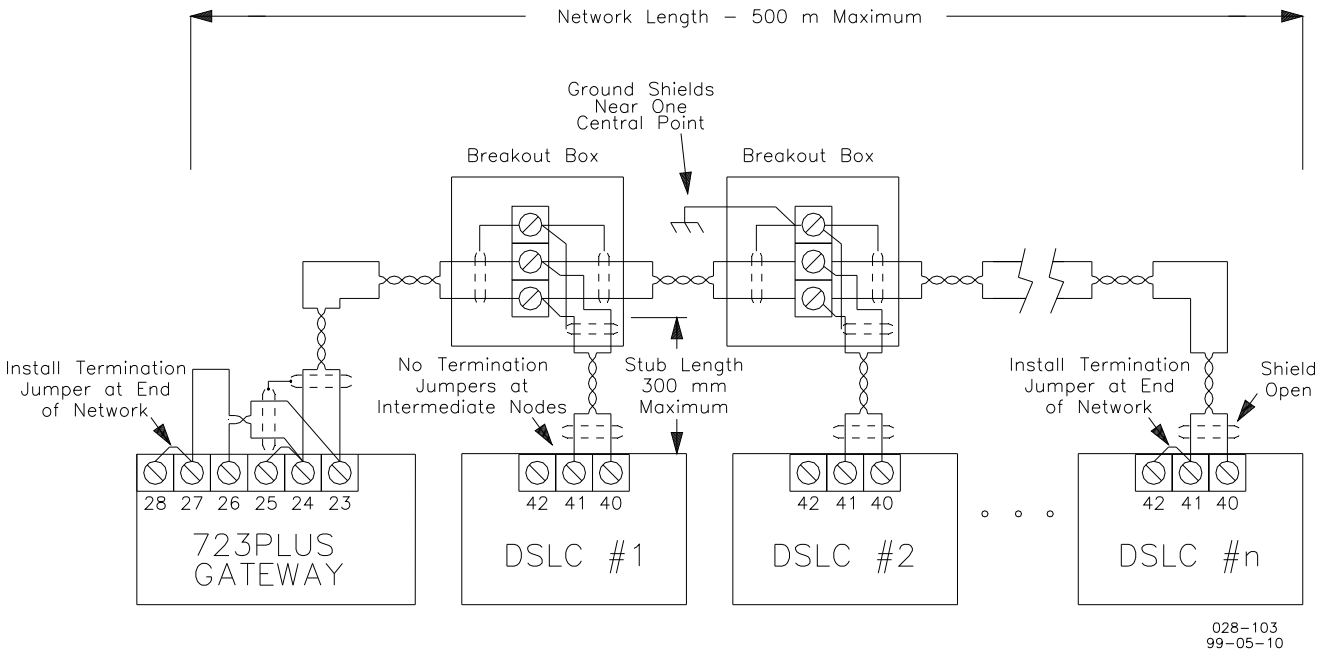
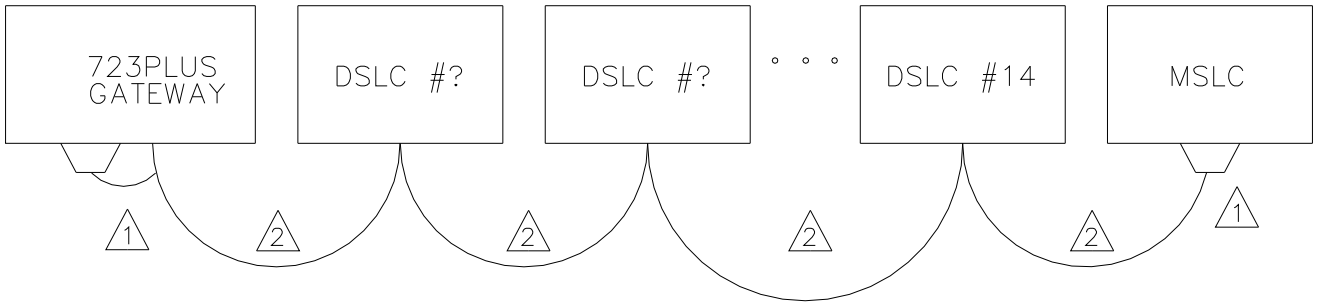


Figure 1-5. Typical 723PLUS Connections



NETWORK WIRED VIA STUBS



DIRECT WIRED NETWORK

1. INSTALL TERMINATION JUMPER ON EACH END OF THE NETWORK LON LINE. THIS CAN BE DONE AT THE 723PLUS BY INSTALLING JUMPERS FROM TERMINALS 27 TO 28 (OR 24 TO 25 IF LON#2 IS NOT CONNECTED).

   THIS CAN BE DONE ON A DSLC BY INSTALLING JUMPERS FROM TERMINALS 41 AND 42.

2. THE LON MUST BE CONNECTED USING PROPER CABLE AS DESCRIBED IN APPENDIX B. PARTS MUST BE BOUND AS DESCRIBED IN APPENDIX B.

028-104
99-05-10

Figure 1-6. Typical LON Setup

Chapter 2. Installation

Introduction

This chapter contains general installation instructions for the 723PLUS control. Power requirements, environmental precautions, and location considerations are included to help you determine the best location for the control. Additional information includes unpacking instructions, electrical connections, and installation checkout procedures.

Unpacking

Before handling the control, read Electrostatic Discharge Awareness (p.iii). Be careful when unpacking the electronic control. Check the control for signs of damage such as bent panels, scratches, and loose or broken parts. If any damage is found, immediately notify the shipper.

Power Requirements

The high-voltage versions of the 723PLUS Digital Speed Control require a voltage source of 90 to 150 Vdc. The low-voltage versions require a voltage source of 18 to 40 Vdc.

NOTICE **To prevent damage to the control, do not exceed the input voltage range.**

IMPORTANT **If a battery is used for operating power, an alternator or other battery-charging device is necessary to maintain a stable supply voltage.**

NOTICE **To prevent damage to the control, make sure that the alternator or other battery-charging device is turned off or disconnected before disconnecting the battery from the control.**

Location Considerations

Consider these requirements when selecting the mounting location:

- adequate ventilation for cooling
- space for servicing and repair
- protection from direct exposure to water or to a condensation-prone environment
- protection from high-voltage or high-current devices, or devices which produce electromagnetic interference
- avoidance of vibration
- selection of a location that will provide an operating temperature range of –40 to +70 °C (–40 to +158 °F)

The control must NOT be mounted on the engine.

Electrical Connections

External wiring connections and shielding requirements for a typical 723PLUS control installation are shown in Figure 1-5. The control wiring connections (Figure 1-4) are explained in the rest of this chapter.

Shielded Wiring

All shielded cable must be twisted conductor pairs. Do not attempt to tin the braided shield. All signal lines should be shielded to prevent picking up stray signals from adjacent equipment. Connect the shields to the nearest chassis ground. Wire exposed beyond the shield should be as short as possible, not exceeding 25 mm (1 inch). The other end of the shields must be left open and insulated from any other conductor. DO NOT run shielded signal wires along with other wires carrying large currents. See Woodward application note 50532, *Interference Control in Electronic Governing Systems* for more information.

Where shielded cable is required, cut the cable to the desired length and prepare the cable as instructed below.

1. Strip outer insulation from BOTH ENDS, exposing the braided or spiral wrapped shield. DO NOT CUT THE SHIELD.

2. Using a sharp, pointed tool, carefully spread the strands of the braided shield.

3. Pull inner conductor(s) out of the shield. If the shield is the braided type, twist it to prevent fraying.

4. Remove 6 mm (1/4 inch) of insulation from the inner conductors.

Installations with severe electromagnetic interference (EMI) may require additional shielding precautions. Contact Woodward for more information.

Power Supply (Terminals 1/2)

Power supply output must be low impedance (for example, directly from batteries). DO NOT power the control from high-voltage sources with resistors and zener diodes in series with the control power input. The 723PLUS control contains a switching power supply which requires a current surge (7 A to 22 A) to start properly.

NOTICE

To prevent damage to the control, do not power a low-voltage control from high-voltage sources, and do not power any control from high-voltage sources with resistors and zener diodes in series with the power input.

Run the power leads directly from the power source to the control. DO NOT POWER OTHER DEVICES WITH LEADS COMMON TO THE CONTROL. Avoid long wire lengths. Connect the positive (line) to terminal 1 and negative (common) to terminal 2. If the power source is a battery, be sure the system includes an alternator or other battery-charging device.

If possible, do NOT turn off control power as part of a shutdown procedure. Use the Minimum Fuel (Run/Stop) discrete input (terminal 36) for shutdown. Leave the control powered except for service of the system and extended periods of disuse.

NOTICE

Do NOT apply power to the control at this time. Applying power may damage the control.

Relay Outputs (Terminals 3/4, 5/6, 7/8)

Not used.

Relay Outputs (Terminals 9/10)

Not used.

Speed Signal Inputs (Terminals 11/12 and 13/14)

Not used.

Analog Output #1 and #2 (Terminals 15/16 and 17/18)

Not used.

Actuator Output #1 (Terminals 19/20)

Not used.

LON #1 and LON #2 (Terminals 23—28)

The 723PLUS control provides two separate LON communication channels for communicating with Echelon® networks.

LON #1 is used to connect up to seven DSLC controls (DSLC_01 to DSLC_07) and one MSLC to provide generating system parameters to the two serial communication ports (J2 and J3). Parameters described in the DSLC manual 02007 Chapter 9 and the MSLC manual 02022 Chapter 9 may be read by either of the two Modbus devices connected to Ports J2 and J3 for generators 1 through 7 and the utility. This connection also allows the Modbus device connected to port 3 (J3) to control loading and synchronizing of the generating system by commands to the DSLC and MSLC controls. This connection requires the binding procedure described in Appendix B.

LON #2 is used to connect up to seven additional DSLC controls (DSLC_08 to DSLC_14) . The monitoring and control functions provided are the same as those for LON #1 and apply only to the additional units. Parameters described in the DSLC manual 02007 Chapter 9 may be read by either of the two Modbus devices connected to Ports J2 and J3 for generators 8 through 14.

No connection is needed to LON #2 for systems of seven or less DSLC units. If this connection is used it requires the binding procedure described in Appendix B.

Discrete Inputs (Terminals 29—36)

Discrete inputs are the switch input commands to the 723PLUS control. They interact in such a way as to allow engine control and power management under a variety of conditions.

Voltage is supplied to the discrete input terminal when an input switch or relay contact closes. This will cause the input state for that discrete input to be “TRUE”. The input terminal will be open circuited when the input switch or relay contact opens. This will cause the input state for that discrete input to be “FALSE”. When the input switch or relay contact is closed, the voltage supplying the discrete inputs should be present from the appropriate discrete input (terminal 29, 30, 31, 32, 33, 34, 35, or 36) to terminal 37 (common). Terminal 37 is the common return path for all of the discrete input channels. A lower voltage indicates that the switch contacts have too high a resistance when closed and should be replaced. These terminals must be isolated from ground. The green light above each input terminal will illuminate for a valid “TRUE” state.

In systems which provide an external low voltage source to power the 723PLUS control (or other systems where external low voltage dc power is available), the discrete inputs may be powered by this external low voltage. The voltage source used must be capable supplying 100 mA at a voltage level of 18 to 40 Vdc. Connect the external low voltage source negative to terminal 37(–). Connect the external low voltage source positive to the appropriate input switch or relay contact and connect the mated switch or relay contact to the corresponding discrete input terminal on the 723PLUS control.

NOTICE

Remove the factory installed jumper between terminal 37 and terminal 38 when using external discrete input power.

In systems which provide a high voltage source to power the 723PLUS control (or systems where the external low voltage dc power is not appropriate), the discrete inputs may be powered by the internal 24 Vdc Discrete Input Power source at terminal 39. This source is capable of supplying 100 mA at a voltage level of 24 Vdc. Connect the internal 24 Vdc voltage source positive from terminal 39 to the appropriate input switch or relay contact, and connect the mated switch or relay contact to the corresponding discrete input terminal on the 723PLUS control. Assure that a connection exists between terminal 37 and terminal 38 when using the internal Discrete Input Power. Do not power other devices with the internal discrete input power source, and assure that the switch or relay contacts used are isolated from any other circuit or system.

Alarm Reset (Input A; Terminal 29)

The input switch or relay contact used to activate the Alarm Reset command connects to terminal 29 (Discrete Input A). This discrete input will issue a reset command to all parameters which can latch into an alarm state. Only those parameters which are in the normal state when the discrete input first goes "TRUE" will be reset to the no-alarm condition. When the external switch or relay contacts are closed (discrete input in the "TRUE" state), internal software will limit the command so that the reset condition will apply only for a short time within the control even if the external contact remains closed. With the contacts open (discrete input in the "FALSE" state), the control will again be ready to respond to the external contacts closing. The Alarm Reset command works in parallel with the command from Port J2, the command from Port J3, and a software switch from the Hand Held Programmer.

Discrete Inputs (Input B; Terminal 30)

Not used.

Discrete Inputs (Input C; Terminal 31)

Not used.

Discrete Inputs (Input D; Terminal 32)

Not used.

Discrete Inputs (Input E; Terminal 33)

Not used.

Discrete Inputs (Input F; Terminal 34)

Not used.

Discrete Inputs (Input G; Terminal 35)

Not used.

Discrete Inputs (Input H; Terminal 36)

Not used.

Analog Inputs (Signal Input #1; Terminals 42/43)

Not used.

Analog Inputs (Signal Input #2; Terminals 45/46)

Not used.

Analog Inputs (Signal Input #3; Terminals 48/49)

Not used.

Analog Inputs (Signal Input #4; Terminals 51/52)

Not used.

Communication Ports J2 and J3

Communication Ports J2 and J3 are used to connect two separate Modbus devices to the 723PLUS control. These devices are used to read generating system control parameters from the DSLC and MSLC nodes. The Modbus device connected to J3 can also drive certain 723PLUS control parameters of the DSLC and MSLC nodes. The Modbus device can be any master device capable of communicating with Modbus standard protocol. This includes any Modbus compatible PC, any compatible SCADA system, etc.

Communication Ports J2 and J3 can be software configured for a wide variety of serial communications. Either port can be set to standard specifications for RS-232, RS-422, or RS-485. Additionally the BAUD rates can be independently set for 1200, 2400, 4800, 9600, 19200, or 38400. The only restriction is that if one port is set for a BAUD rate of 38400, the other port must be set to the same rate. Stop bits on either port can be set at 1, 1.5, or 2. Parity can be set for OFF, ODD, or EVEN. The data must be formatted as either ASCII or RTU on Port J2 or Port J3.

Communication Port J2 can read all control parameters. The only information which can be sent to Port J2 is an Alarm Reset command. See Appendix D for complete listings of port addresses and description of values for Port J2.

Communication Port J3 can read all control parameters, send commands and values to all connected DSLC and MSLC outputs, and send an Alarm Reset. See Appendix D for complete listings of port addresses and description of values for Port J3.

To activate a Discrete input via Modbus Boolean Write, you must assert the ‘xxxxxx COMMAND USE NETWORK DISCRETE IN’ for each node (e.g., DSLC01 COMMAND... etc.). Each network DSLC and MSLC device must likewise have the command input setpoint set for ‘network’. Otherwise the DSLC or MSLC devices will use the hardware inputs. This method allows users to choose which nodes to activate by hardware inputs and which nodes ignore the hardware inputs and use the ‘Modbus Boolean Write’ commands. The state of the Discrete Inputs can be monitored by ‘Modbus Boolean Read‘.

The DSLC and MSLC controls can provide a wealth of generating system information to the Modbus device(s). Over fifteen Analog Read values and fifty Boolean Read values per device are furnished (e.g., Real Power, Apparent Power, Reactive Power, Volts, Amps, Gen Frequency, Bus Frequency, Synchronizer in Run Mode, Load Control in Parallel Mode, etc.). The Modbus value for power factor is times 1000 and for frequency is times 100 (that is, at 0.8 power factor the Modbus value is 800 and at 60 Hz the Modbus value is 6000). All other Modbus values are in engineering units. Note that the information from the DSLC or MSLC unit is only available when the DSLC or MSLC LON terminals are connected to the appropriate 723PLUS Gateway LON channel and all devices have gone through the binding process (see Appendix B). 723PLUS Gateway LON #1 connects to the MSLC and DSLC_01 through DSLC_07 devices and LON #2 connects to DSLC_08 through DSLC_14. See Appendix D for complete listings of port addresses and description of values for Port J2 and Port J3.

Installation Checkout Procedure

With the installation complete as described in this chapter, do the following checkout procedure before beginning set point entry (Chapter 3) or initial start-up adjustments (Chapter 4).

1. Check for correct wiring in accordance with the control wiring diagram, Figure 1-4.

2. Check for broken terminals and loose terminal screws.

3. Check for grounds

   Check for grounds by measuring the resistance from all control terminals to chassis. All terminals except terminals 2 and 37 should measure infinite resistance (the resistance of terminals 2 and 37 depends on whether a floating or grounded power source is used). If a resistance less than infinite is obtained, remove the connections from each terminal one at a time until the resistance is infinite. Check the line that was removed last to locate and repair the ground fault.

Chapter 3.
Entering Control Set Points with Hand Held Programmer

Introduction

Because of the variety of installations, plus system and component tolerances, the 723PLUS control must be tuned and configured for each system to obtain optimum performance.

This chapter contains information on how to enter control set points through the control's menu system using the Hand Held Programmer. **See Appendix C for information on how to enter set points using Servlink/Watch Window**. See the next chapter for prestart-up and start-up settings and adjustments.

Hand Held Programmer and Menus

The Hand Held Programmer is a hand-held computer terminal that gets its power from the 723PLUS control. The terminal connects to the RS-422 communication serial port on the control (terminal J1). To connect the terminal, slightly loosen the right-hand screw in the cover over J1 and rotate the cover clockwise to expose the 9-pin connector. Then firmly seat the connector on the terminal into J1. Remove the jumper between terminals 9 and 10 (if installed) to set port J1 for hand held interface.

The programmer does a power-up self-test whenever it is plugged into the control. When the self-test is complete, the screen will display two lines of information pertaining to the application. Press the “ID” key to display the part number and revision level of the software in the control. Refer to this number and revision level in any correspondence with Woodward (write this information in the Programming Checklist, Appendix E).

The programmer screen is a four-line, backlighted LCD display. The display permits you to look at two separate functions or menu items at the same time. Use the “Up/Down Arrow” key to toggle between the two displayed items. The BKSP and SPACE keys will scroll through the display to show the remainder of a prompt if it is longer than the display screen's 19 characters.

The 723PLUS has two sets of menus, the Service menus and the Configure menus. The Service menus allow easy access and tuning while the engine is running. The Configure menus may be entered only if the I/O is shut down.

Configure Menus

To access the Configure menus, the engine(s) must be shut down. Press the “•” key. The display will show, 'To select configure, press enter'. Press the ENTER key and the display will show, 'To shutdown I/O, press enter'. Press the ENTER key and this will allow you into the Configure menus. To move between the menus use the “Right Arrow” and “Left Arrow” keys. To move through the set points within a menu, use the “UP Arrow” and “Down Arrow” keys. Once within a menu, to return to the menu header, press the ESC key.

To leave the Configure menus press the ESC key. The set points will be automatically saved when leaving Configure.

Service Menus

To access the Service menus press the “Down Arrow” key. To move between menus, and to move through set points within menus follow the instructions as for the Configure menus. Also to return to return to the menu header, or to leave Service, follow the Configure instructions.

Adjusting Set Points

To adjust a set point, use the “Turtle Up” or the “Rabbit Up” keys to increase the value, and the “Turtle Down” or “Rabbit Down” keys to decrease the value. The “Rabbit Up” and “Rabbit Down” keys will make the rate of change faster than the “Turtle Up” and “Turtle Down” keys. This is useful during initial setup where a value may need to be changed significantly. Where necessary, to select TRUE, use either the “Turtle Up” or the “Rabbit Up” keys, and to select FALSE, use the “Turtle Down” or “Rabbit Down” keys.

To obtain an exact value, press the = key. Key in the required figure and press ENTER.

IMPORTANT

This may be done in CONFIGURE MODE. This may also be done in SERVICE MODE only when the figure is within 10% of the existing value.

To save set points at any time, use the SAVE key. This will transfer all new set point values into the EEPROM memory. The EEPROM retains all set points when power is removed from the control.

NOTICE

Make sure you save the set points before removing power from the control. Failure to save the set points before removing power from the control causes them to revert to the previously saved settings.

Hand Held Programmer Keys

The programmer keys do the following functions (see Figure 3-1):

(left arrow)	Moves backward through Configure or Service, one menu at a time.
(right arrow)	Advances through Configure or Service, one menu at a time.
(up/down arrow)	Toggles between the two displayed items.
(up arrow)	Moves backward through each menu, one step at a time.
(down arrow)	Advances through each menu, one step at a time. Selects Service from Main Screen.
(turtle up)	Increases the displayed set point value slowly.
(turtle down)	Decreases the displayed set point value slowly.
(rabbit up)	Increases the displayed set point value quickly (about 10 times faster than the turtle keys).
(rabbit down)	Decreases the displayed set point value quickly (about 10 times faster than the turtle keys).
+ (plus)	Increases set point values by one step at a time.
– (minus)	Decreases set point values by one step at a time. Also used for entering negative exact values.
(solid square)	Not used.
ID	Displays the 723PLUS control part number and software revision level (can only be accessed from the TOP main screen).
ESC	To return to menu header or to main screen, or to exit Configure and save set points.
SAVE	Saves entered values (set points).
BKSP	Scrolls left through line of display.
SPACE	Scrolls right through line of display.
ENTER	Used when entering exact values and accessing Configure.
= (equals)	For entering exact values (within 10%).
(decimal)	To select Configure. Also used for entering decimal exact values.

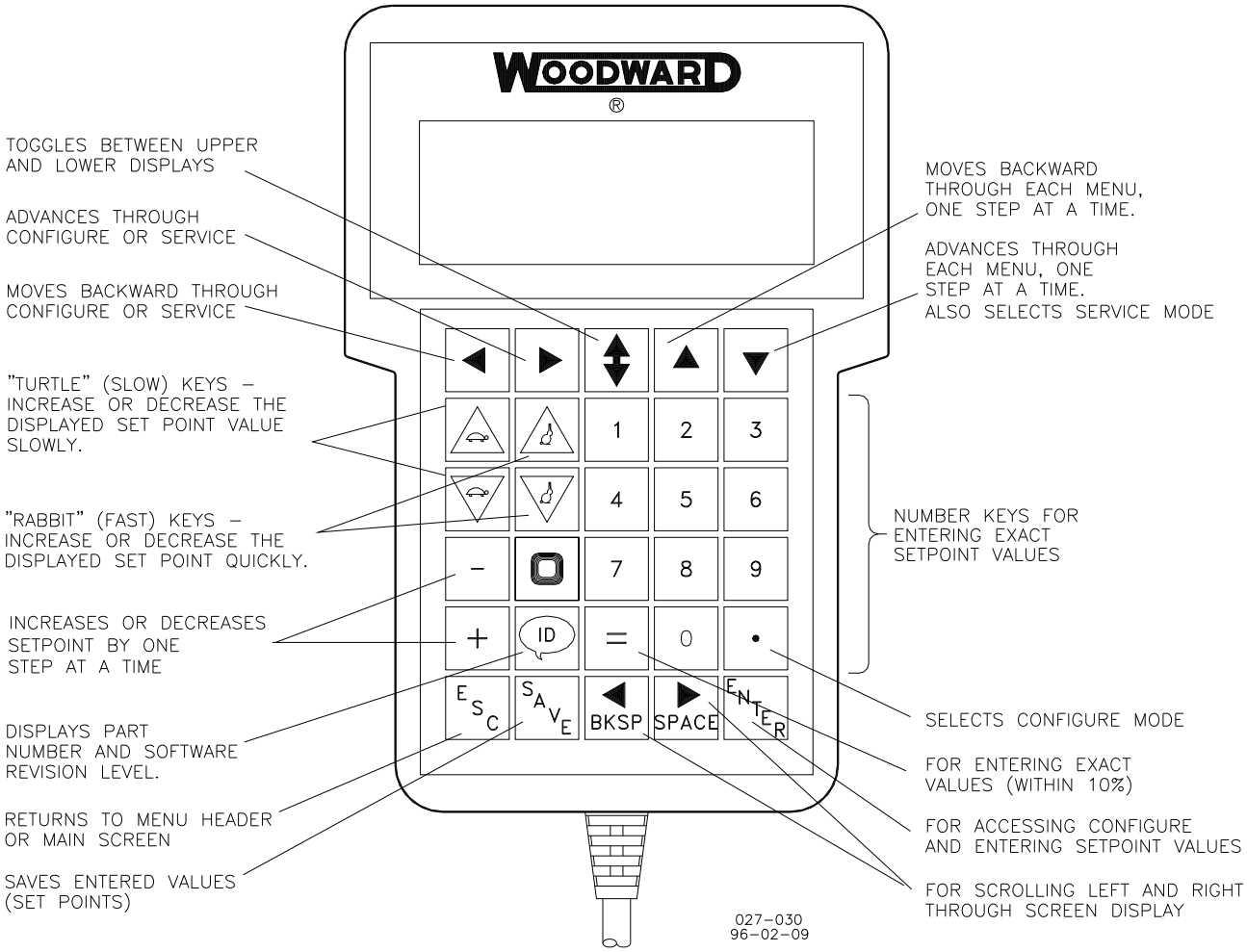


Figure 3-1. Hand Held Programmer Functions

Configuration Menu Descriptions

CFIG Communications

The 723PLUS has two serial ports that are configured to support the Modbus Protocol. The ports are configured in this menu to set the slave address that they will use and to set whether the port uses ASCII or RTU mode. Both ports have monitoring information available that can be retrieved by a Modbus master device such as a PC-based Human Machine Interface (HMI). Both ports support either Modbus ASCII or RTU. Port 3 also allows commands to be sent from the Modbus Master Device to the control.

1. **PORT 2 MODE** determines if port J2 will use the Modbus ASCII or Modbus RTU mode:
   1 = ASCII
   2 = RTU

2. **PORT 2 ADDRESS** determines the port's Modbus address from 1 to 247.

3. **PORT 3 MODE** determines if port J3 will use the Modbus ASCII or Modbus RTU mode.
   1 = ASCII
   2 = RTU

4. **PORT 3 ADDRESS** determines the port's Modbus address from 1 to 247.

5. **FORCE OUTPUTS** should be set to TRUE to enable forced manual control of the 723PLUS discrete and analog outputs to the DSLC and MSLC controls and to disable automatic control. Set to FALSE to disable forced manual control and enable automatic control. Default is FALSE.

REMOTE REF THRESH

This menu is used to configure remote Modbus control of the DSLC and MSLC Remote Reference threshold settings. These settings are only valid if the network is CONNECTED.

1. **MSLC REM IN THRSH** sets the desired amount of mA change in the present MSLC Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

2. **DSLC01 REM IN THRSH** sets the desired amount of mA change in the present DSLC01 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

3. **DSLC02 REM IN THRSH** sets the desired amount of mA change in the present DSLC02 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

4. **DSLC03 REM IN THRSH** sets the desired amount of mA change in the present DSLC03 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

5. **DSLC04 REM IN THRSH** sets the desired amount of mA change in the present DSLC04 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

6. **DSLC05 REM IN THRSH** sets the desired amount of mA change in the present DSLC05 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

7. **DSLC06 REM IN THRSH** sets the desired amount of mA change in the present DSLC06 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

8. **DSLC07 REM IN THRSH** sets the desired amount of mA change in the present DSLC07 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

9. **DSLC08 REM IN THRSH** sets the desired amount of mA change in the present DSLC08 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

10. **DSLC09 REM IN THRSH** sets the desired amount of mA change in the present DSLC09 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

11. **DSLC10 REM IN THRSH** sets the desired amount of mA change in the present DSLC10 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

12. **DSLC11 REM IN THRSH** sets the desired amount of mA change in the present DSLC11 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

13. **DSLC12 REM IN THRSH** sets the desired amount of mA change in the present DSLC12 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

14. **DSLC13 REM IN THRSH** sets the desired amount of mA change in the present DSLC13 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

15. **DSLC14 REM IN THRSH** sets the desired amount of mA change in the present DSLC14 Remote Reference value from the last transmitted Remote Reference value before a new Remote Reference value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

PROCESS SIG THRESH

This menu is used to configure remote Modbus control of the DSLC and MSLC Process Reference threshold settings. These settings are only valid if the network is CONNECTED.

1. **MSLC PR SIG THRSH** sets the desired amount of mA change in the present MSLC Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

2. **DSLC01 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 01 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

3. **DSLC02 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 02 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

4. **DSLC03 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 03 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

5. **DSLC04 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 04 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

6. **DSLC05 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 05 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

7. **DSLC06 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 06 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

8. **DSLC07 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 07 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

9. **DSLC08 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 08 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

10. **DSLC09 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 09 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

11. **DSLC10 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 10 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

12. **DSLC11 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 11 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

13. **DSLC12 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 12 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

14. **DSLC13 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 13 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

15. **DSLC14 PR SIG THRSH** sets the desired amount of mA change in the present DSLC 14 Process Signal value from the last transmitted Process Signal value before a new Process Signal value is propagated onto the LON network. This update rate operates independent of the SOLTIME field update rate listed in the Service LON menu.

USE CB AUX

This menu is used to configure Hardware or remote Modbus control of the DSLC and MSLC CB AUX contact input signal.

1. **MSLC USE CB AUX** determines whether the utility circuit breaker (CB) aux contact used by the MSLC is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the MSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE MSLC input.. MSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

2. **DSLC01 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC01 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC01 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

3. **DSLC02 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC02 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC02 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

4. **DSLC03 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC03 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC03 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

5. **DSLC04 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC04 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC04 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

6. **DSLC05 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC05 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC05 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

7. **DSLC06 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC06 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC06 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

8. **DSLC07 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC07 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC07 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

9. **DSLC08 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC08 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC08 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

10. **DSLC09 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC09 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC09 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

11. **DSLC10 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC10 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC10 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

12. **DSLC11 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC11 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC11 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

13. **DSLC12 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC12 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC12 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

14. **DSLC13 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC13 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC13 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

15. **DSLC14 USE CB AUX** determines whether the generator circuit breaker (CB) aux contact used by DSLC14 is from Modbus Port 3 over the LON network connection or from the CB Aux contact hardware input connected directly to the DSLC. Set FALSE to use the Hardware input. Set TRUE to use the Modbus/LON network input or FORCE DSLC14 input.. DSLC activation will be delayed or blocked if this is set to TRUE. We recommend that this value be set to FALSE.

Service Menu Descriptions

LON

1. **LON SERVICE PIN CH1** tells the LON Channel 1 Neuron Processor to send out its unique ID over the network. This is used in the LON network binding installation procedures.

2. **LON Reset CH1** resets all associated LON Channel 1 software and the NEURON chip in the 723PLUS Gateway control.

3. **LON SERVICE PIN CH2** tells the LON Channel 2 Neuron Processor to send out its unique ID over the network. This is used in the LON network binding installation procedures.

4. **LON Reset CH2** resets all associated LON Channel 2 software and the NEURON chip in the 723PLUS Gateway control.

5. **LON Fail Timeout** value is the maximum amount of time, in seconds, allowed between updates of the 723PLUS Gateway network input variables from the DSLC and MSLC, before latching the Fail to Transmit alarm to true. If the RESET FAILED XMIT value is activated the fault will reset to FALSE. If there still is a fault, five seconds later the fault indication will return to TRUE.

6. **LON Output Update (sec)** is the amount of time, in seconds, between updates of the 723PLUS Gateway network output variables to the DSLC and MSLC onto the StdLON. The update rate can be faster per the REM IN THRSH and the PR SIG THRSH settings.

7. **LON Fail Xmit Reset** allows the user to reset any activated and cleared StdLon transmission fault alarms. Set this value to TRUE and return to FALSE. When this value changes from FALSE to TRUE, a 1 second reset pulse is sent throughout the control.

IMPORTANT **If the unit is not "bound", the fault will always be FALSE.**

J2 Modbus Serial Port

The 723PLUS control has two serial ports that are configured to support the Modbus Protocol. The ports are configured in this menu for the type of hardware interface and other parameters. Both ports have monitoring information available that can be retrieved by a Modbus master device such as a PC-based Human Machine Interface (HMI). Port 2 and Port 3 supports either Modbus ASCII or RTU. This is selected in the Configure Menu CFIG MODBUS.(See the Modbus Register List, Appendixes C and D, for the addresses).

1. **PORT 2 HW CFIG** determines if the port is set for RS-232, RS-422, or RS-485 based on:
   1 = RS-232
   2 = RS-422
   3 = RS-485

IMPORTANT **If RS-422 or RS-485 is selected, then the devices can be in a multi-drop configuration.**

2. **PORT 2 BAUD RATE** determines the port's baud rate, based on:
   1 = 1200
   2 = 1800
   3 = 2400
   4 = 4800
   5 = 9600
   6 = 19200
   7 = 38400

3. **PORT 2 STOP BITS** determines the Stop Bits, based on:
   1 = 1 stop bit
   2 = 1.5 stop bits
   3 = 2 stop bits

4. **PORT 2 PARITY** determines what parity the port uses, based on:
   1 = no parity
   2 = odd parity
   3 = even parity

5. **Modbus J2 Timeout** is the time period, in seconds, that the slave has to respond to a master's question before the link error alarm goes true.

6. **Modbus J2 Ex Error** is latched true when an exception error is detected.

7. **Modbus J2 Link Error** goes true if the slave does not answer the master's question within the TIME_OUT.

8. **Modbus J2 Error Pct** is the exception error divided by the total communication transactions, and reflects the quality of the communications for the port.

9. **Modbus J2 Error Num** is set to the number of the exception error that occurred, based off the below table.

Messages sent by a slave and displayed by Service:
   0 No error
   1 Illegal function
   2 Illegal data address

Messages displayed by Service:
   9 Checksum error
   10 Message garbled

J3 Modbus Serial Port

1. **PORT 3 HW CFIG** determines if the port is set for RS-232, RS-422, or RS-485 based on:
   1 = RS-232
   2 = RS-422
   3 = RS-485

IMPORTANT **If RS-422 or RS-485 is selected, then the devices can be in a multi-drop configuration.**

2. **PORT 3 BAUD RATE** determines the port's baud rate, based on:
   1 = 1200
   2 = 1800
   3 = 2400
   4 = 4800
   5 = 9600
   6 = 19200
   7 = 38400

3. **PORT 3 STOP BITS** determines the Stop Bits, based on:
   1 = 1 stop bit
   2 = 1.5 stop bits
   3 = 2 stop bits

4. **PORT 3 PARITY** determines what parity the port uses, based on:
   1 = no parity
   2 = odd parity
   3 = even parity

5. **Modbus J3 Timeout** is the time period, in seconds, that the slave has to respond to a master's question before the link error alarm goes true.

6. **Modbus J3 Ex Error** is latched true when an exception error is detected.

7. **Modbus J3 Link Error** goes true if the slave does not answer the master's question within the TIME_OUT.

8. **Modbus J3 Error Pct** is the exception error divided by the total communication transactions, and reflects the quality of the communications for the port.

9. **Modbus J3 Error Num** is set to the number of the exception error that occurred, based off the below table.

Messages sent by a slave and displayed by Service:
   0 No error
   1 Illegal function
   2 Illegal data address

Messages displayed by Service:
   9 Checksum error
   10 Message garbled

IMPORTANT **If ports J2 or J3 require 19200 or higher baud rates, the baud rates must be set to the same value for each port.**

DSLC Fail Transmit

1. **MSLC FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for the MSLC.

2. **DSLC 1 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 1.

3. **DSLC 2 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 2.

4. **DSLC 3 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 3.

5. **DSLC 4 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 4.

6. **DSLC 5 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 5.

7. **DSLC 6 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 6.

8. **DSLC 7 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 7.

9. **DSLC 8 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 8.

10. **DSLC 9 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 9.

11. **DSLC 10 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 10.

12. **DSLC 11 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 11.

13. **DSLC 12 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 12.

14. **DSLC 13 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 13.

15. **DSLC 14 FAIL XMIT** latches true if the amount of time, since the last network variable update was received, exceeds LON FAIL TIMEOUT for DSLC 14.

IMPORTANT **Only one LON FAIL TIMEOUT set point is applied for all DSLC and MSLC LON transmissions.**

FORCE MSLC

This menu allows manually forcing the Network discrete and analog output signals from the 723PLUS to the MSLC during installation to test the output loops. This feature and menu is available only when FORCE OUTPUTS on the CFIG COMMUNICATIONS menu is set TRUE.

NOTICE

Before actuating any end device, be sure that forcing the end device to a different state will not cause an unsafe or unwanted condition or event to occur, and take comprehensive safety measures to nullify the effects of forcing the end device to a different state (such as disconnecting power, independently disabling the device by other means, etc.). Have these measures checked by a separate cognizant person prior to forcing the end device to a different state. BE AWARE that incorrect wiring may inadvertently actuate the wrong end device.

1. **REMOTE REFERENCE** is set to the mA value desired for the forced Remote Reference.

2. **PROCESS SIGNAL** is set to the mA value desired for the forced Process Signal.

3. **USE REMOTE REF** is set to TRUE to force the MSLC control to use the forced Remote Reference (see item 1 above). Set the value to FALSE to use the MSLC Hardware Remote Reference.

4. **USE PROCESS SIGNAL** is set to TRUE to force the MSLC to use the forced Process Signal (see item 2 above). Set the value to FALSE to use the MSLC Hardware Process Signal.

5. **CB AUX INPUT** is set to activate the MSLC CB Aux input. This input will not be active unless Configuration menu USE CB AUX item MSLC USE CB AUX is TRUE.

6. **USE NETWORK DISC IN** is set to TRUE to allow the MSLC control to use the forced Discrete Input signals below. Set the value to FALSE to use the MSLC Hardware DI Signals.

IMPORTANT

Be sure to set the MSLC Command for 'Network' if USE NETWORK DISC IN is set TRUE.

7. **CHECK INPUT** is set to activate the MSLC Synchronizer Check input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

8. **PERMISSIVE INPUT** is set to activate the MSLC Synchronizer Permissive input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

9. **RUN INPUT** is set to activate the MSLC Synchronizer Run input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

10. **UTILITY UNLOAD IN** is set to activate the MSLC Utility Unload input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

11. **IMP/EXP CONTROL IN** is set to activate the MSLC Import/Export input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

12. **PROCESS INPUT** is set to activate the MSLC Process Control mode input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

13. **PAUSE INPUT** is set to activate the MSLC Ramp Pause input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

14. **SETPOINT RAISE IN** is set to activate the MSLC Setpoint Raise input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

15. **SETPOINT LOWER IN** is set to activate the MSLC Setpoint Lower input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

16. **VOLTAGE RAISE INPUT** is set to activate the MSLC Voltage Raise input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

17. **VOLTAGE LOWER IN** is set to activate the MSLC Voltage Lower input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

IMPORTANT

Be sure to set the 'FORCE OUTPUTS' on the CFIG Communications menu back to FALSE when MSLC output testing is completed. Failure to do so will hold the output in the last forced state.

FORCE DSLC 'xx'

This menu allows manually forcing the Network discrete and analog output signals from the 723PLUS to DSLC 01 through DSLC 14 during installation to test the output loops. This feature and menu is available only when FORCE OUTPUTS on the CFIG COMMUNICATIONS menu is set TRUE.

NOTICE

Before actuating any end device, be sure that forcing the end device to a different state will not cause an unsafe or unwanted condition or event to occur, and take comprehensive safety measures to nullify the effects of forcing the end device to a different state (such as disconnecting power, independently disabling the device by other means, etc.). Have these measures checked by a separate cognizant person prior to forcing the end device to a different state. BE AWARE that incorrect wiring may inadvertently actuate the wrong end device.

1. **REMOTE REFERENCE** is set to the mA value desired for the forced Remote Reference.

2. **PROCESS SIGNAL** is set to the mA value desired for the forced Process Signal.

3. **USE REMOTE REF** is set to TRUE to force the DSLC 'xx' control to use the forced Remote Reference (see item 1 above). Set the value to FALSE to use the DSLC Hardware Remote Reference.

4. **USE PROCESS SIGNAL** is set to TRUE to force the DSLC 'xx' to use the forced Process Signal (see item 2 above). Set the value to FALSE to use the DSLC Hardware Process Signal.

5. **CB AUX INPUT** is set to activate the DSLC 'xx' CB Aux input. This input will not be active unless Configuration menu USE CB AUX item DSLC 'xx' USE CB AUX is TRUE.

6. **USE NETWORK DISC IN** is set to TRUE to allow the DSLC ‘xx’ control to use the forced Discrete Input signals below. Set the value to FALSE to use the DSLC Hardware DI Signals.

IMPORTANT

Be sure to set the DSLC ‘xx’ Command for ‘Network’ if USE NETWORK DISC IN is set TRUE.

7. **CHECK INPUT** is set to activate the DSLC ‘xx’ Synchronizer Check input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

8. **PERMISSIVE INPUT** is set to activate the DSLC ‘xx’ Synchronizer Permissive input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

9. **RUN INPUT** is set to activate the DSLC ‘xx’ Synchronizer Run input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

10. **VOLTAGE RAISE INPUT** is set to activate the DSLC ‘xx’ Voltage Raise input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

11. **VOLTAGE LOWER INPUT** is set to activate the DSLC ‘xx’ Voltage Lower input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

12. **BASELOAD INPUT** is set to activate the DSLC ‘xx’ Baseload input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

13. **LOAD INPUT** is set to activate the DSLC ‘xx’ Load/Unload input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

14. **PAUSE INPUT** is set to activate the DSLC ‘xx’ Ramp Pause input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

15. **LOAD RAISE INPUT** is set to activate the DSLC ‘xx’ Load Raise input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

16. **LOAD LOWER INPUT** is set to activate the DSLC ‘xx’ Load Lower input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

17. **PROCESS ENABLE IN** is set to activate the DSLC ‘xx’ Process Control input. This input will not be active unless USE NETWORK DISC IN above is TRUE.

IMPORTANT

Be sure to set the ‘FORCE OUTPUTS’ on the CFIG Communications menu back to FALSE when DSLC output testing is completed. Failure to do so will hold the output in the last forced state.

Chapter 4.
Description of Operation

General

This chapter provides an overview of the features and operation of the 723PLUS Digital DSLC™/MSLC Gateway. Table 4-1 show the generator information from 1 of 14 DSLC or 1 MSLC that can be extracted for monitoring via two serial communication ports. The two serial ports can interface to a Modbus master device such as an Human/Machine Interface (HMI). The 723PLUS Gateway control communicates using the LonTalk® protocol to the DSLC and MSLC controls.

To extract the DSLC information to the 723PLUS, use either the DOS LON Binding Kit (part number 8928-158) or the LonMaker™ * for Windows LON Binding Kit (part number 8923-1007). If the LON hardware is already available, you can order the 723PLUS DSLC/MSLC GATEWAY Standard Database (DOS part number 8928-053 or LonMaker for Windows part number 8928-225). Refer to Appendix B for detailed binding instructions.

*—LonMaker is a trademark of Echelon Corporation.

IMPORTANT **Before the 723PLUS Gateway can extract the generator information, the controls need to be bound to each other using the above Binding Kit.**

Table 4-1. LON Information and Modbus Address for DSLC #1

DSLC #	Variable	Modbus Address
DSLC 1	FAIL XMIT RESET	0:0001
DSLC 1	Alarm Relay	1:0061
DSLC 1	Low Limit Alarm	1:0062
DSLC1	High Limit Alarm	1:0063
DSLC1	Load Switch	1:0064
DSLC1	Voltage Lower	1:0065
DSLC1	Voltage Raise	1:0066
DSLC1	Breaker Open	1:0067
DSLC1	Breaker Close	1:0068
DSLC1	Synch Timeout Alarm	1:0069
DSLC1	Synch Reclose Alarm	1:0070
DSLC 1	Load High Limit Alarm	1:0071
DSLC 1	Load Low Limit Alarm	1:0072
DSLC1	Process High Limit Alarm	1:0073
DSLC1	Process Low Limit Alarm	1:0074
DSLC1	Voltage Range Alarm	1:0075
DSLC1	Voltage at Low Limit Alarm	1:0076
DSLC1	Voltage at High Limit Alarm	1:0077
DSLC1	Synch Off Mode	1:0078
DSLC1	Synch Check Mode	1:0079
DSLC1	Synch Permissive Mode	1:0080
DSLC 1	Synch Run Mode	1:0081
DSLC 1	Close Timer Mode	1:0082
DSLC1	Synch Timer Mode	1:0083
DSLC1	In Synch Mode	1:0084
DSLC1	Auto Off Mode	1:0085
DSLC1	Droop Mode	1:0086

DSLC #	Variable	Modbus Address
DSLC1	Unload Base Load Mode	1:0087
DSLC1	Ramp Base Load Mode	1:0088
DSLC1	Base Load Mode	1:0089
DSLC1	Base Load Lower Mode	1:0090
DSLC 1	Base Load Raise Mode	1:0091
DSLC 1	Ramp Remote Mode	1:0092
DSLC1	Remote Base Load Mode	1:0093
DSLC1	Unload Parallel Mode	1:0094
DSLC1	Ramp Parallel Mode	1:0095
DSLC1	Parallel Mode	1:0096
DSLC1	Unload Ramp Mode	1:0097
DSLC1	Process Ramp Mode	1:0098
DSLC1	Process Local Mode	1:0099
DSLC1	Process Lower Mode	1:0100
DSLC 1	Process Raise Mode	1:0101
DSLC 1	Process Remote Mode	1:0102
DSLC1	CHECK Contact Closed	1:0103
DSLC1	PERM Contact Closed	1:0104
DSLC1	RUN Contact Closed	1:0105
DSLC1	CB_AUX Contact Closed	1:0106
DSLC1	VOLTAGE RAISE Contact Closed	1:0107
DSLC1	VOLTAGE LOWER Contact Closed	1:0108
DSLC1	BASE LOAD Contact Closed	1:0109
DSLC1	LOAD Contact Closed	1:0110
DSLC 1	RAMP PAUSE Contact Closed	1:0111
DSLC 1	LOAD RAISE Contact Closed	1:0112
DSLC1	LOAD LOWER Contact Closed	1:0113
DSLC1	PROCESS CONTROL Contact Closed	1:0114
DSLC1	Voltage Reg Driver Shutdown	1:0115
DSLC1	Watchdog	1:0116
DSLC1	LON Transmit Failed	1:0117
DSLC1	Block 1 Message Time	3:0031
DSLC1	Block 2 Message Time	3:0032
DSLC1	Block 3 Message Time	3:0033
DSLC1	Block 4 Message Time	3:0034
DSLC1	A Phase Voltage	3:0035
DSLC1	B Phase Voltage	3:0036
DSLC1	C Phase Voltage	3:0037
DSLC1	3-Phase Average Voltage	3:0038
DSLC1	Bus A Phase Voltage	3:0039
DSLC1	Power Factor(X1000)	3:0040
DSLC1	A Phase Current	3:0041
DSLC 1	B Phase Current	3:0042
DSLC 1	C Phase Current	3:0043
DSLC1	3-Phase Total Current	3:0044
DSLC1	Load Reference	3:0045
DSLC1	Process Reference	3:0046
DSLC1	Real Power	3:0047
DSLC1	Reactive Power	3:0048
DSLC1	Apparent Power	3:0049
DSLC1	Generator Frequency(X10)	3:0050
DSLC1	Bus Frequency(X10)	3:0051
DSLC1	Remote Reference	4:0006
DSLC1	Process Signal	4:0007

The table above lists the generator information for DSLC #1. For a complete list of all 14 DSLC and MSLC units, see Appendix D.

The 723PLUS Digital Control uses a 32-bit microprocessor for all control functions. All control adjustments are made with a hand-held terminal/display or Watch Window/Servlink user interface that communicates with the control via a serial port. The terminal/display or Watch Window/Servlink is disconnected from the control when not in service, to provide security against tampering.

The control has a switching power supply with excellent spike, ripple, and EMI (electromagnetic interference) rejection. Discrete inputs are optically isolated and capable of rejecting EMI and variable resistance in switch or relay contacts. Analog inputs are differential type with extra filtering for common-mode noise rejection.

The 723PLUS control provides two separate serial interfaces for RS-232, RS-422, or RS-485 communications. An industry-standard Modbus is available for both ASCII and RTU protocols.

Chapter 5.
Product Support and Service Options

Product Support Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

1. Consult the troubleshooting guide in the manual.
2. Contact the **OE Manufacturer or Packager** of your system.
3. Contact the **Woodward Business Partner** serving your area.
4. Contact Woodward technical assistance via email (**EngineHelpDesk@Woodward.com**) with detailed information on the product, application, and symptoms. Your email will be forwarded to an appropriate expert on the product and application to respond by telephone or return email.
5. If the issue cannot be resolved, you can select a further course of action to pursue based on the available services listed in this chapter.

OEM or Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full-Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
- A **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.

A current list of Woodward Business Partners is available at **www.woodward.com/directory**.

Product Service Options

Depending on the type of product, the following options for servicing Woodward products may be available through your local Full-Service Distributor or the OEM or Packager of the equipment system.

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime.

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Flat Rate Repair: Flat Rate Repair is available for many of the standard mechanical products and some of the electronic products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option, with the exception that the unit will be returned to you in "like-new" condition. This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:
- return number;
- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.

Packing a Control

Use the following materials when returning a complete control:
- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Replacement Parts

When ordering replacement parts for controls, include the following information:
- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

Engineering Services

Woodward's Full-Service Distributors offer various Engineering Services for our products. For these services, you can contact the Distributor by telephone or by email.

- Technical Support
- Product Training
- Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact.

Product Training is available as standard classes at many Distributor locations. Customized classes are also available, which can be tailored to your needs and held at one of our Distributor locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact one of the Full-Service Distributors listed at **www.woodward.com/directory**.

Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory published at **www.woodward.com/directory**.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used In Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Products Used In Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Products Used In Industrial Turbomachinery Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

For the most current product support and contact information, please visit our website directory at **www.woodward.com/directory**.

Technical Assistance

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

General

Your Name _____

Site Location _____

Phone Number _____

Fax Number

Prime Mover Information

Manufacturer _____

Engine Model Number _____

Number of Cylinders _____

Type of Fuel (gas, gaseous, diesel, dual-fuel, etc.) _____

Power Output Rating _____

Application (power generation, marine, etc.)

Control/Governor Information

Control/Governor #1

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number

Control/Governor #2

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number

Control/Governor #3

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number

Symptoms

Description _____

_____

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

Appendix A.
Serial Communication Port Wiring

The Communication Ports J2 and J3 can be configured for RS-232, RS-422 or RS-485 serial communications. The default settings are for RS-232.

The RS-232 connections are shown in Figure A-1. The maximum distance from the Master Modbus Device to the 723PLUS control is 15 m (50 ft).

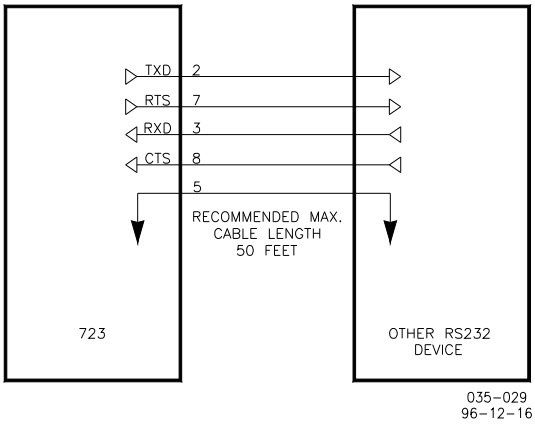


Figure A-1. 723PLUS RS-232 Connections

The RS-422 connections are shown in Figure A-2. The maximum distance from the Master Modbus Device to the 723PLUS control is 1219 m (4000 ft).

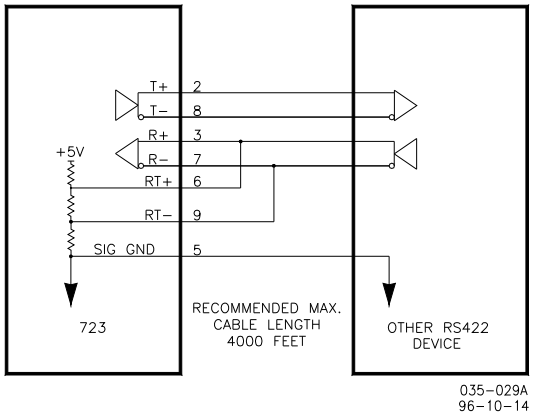


Figure A-2. 723PLUS RS-422 Connections with Optional Termination at Receiver

The RS-485 connections are shown in Figure A-3. The maximum distance from the Master Modbus Device to the 723PLUS control is 1219 m (4000 ft).

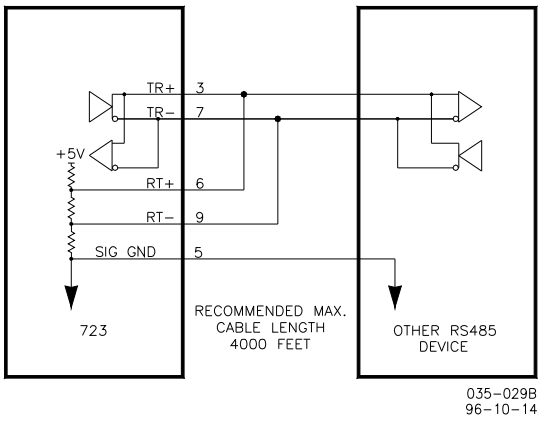


Figure A-3. 723PLUS RS-485 Connections with Optional Termination

RS-422 and RS-485 can use a multi-drop set-up where more than one device is connected to a master device. A termination should be located at the receiver when one or more transmitters are connected to a single receiver. When a single transmitter is connected to one or more receivers, termination should be at the receiver farthest from the transmitter. Figure A-4 is an example.

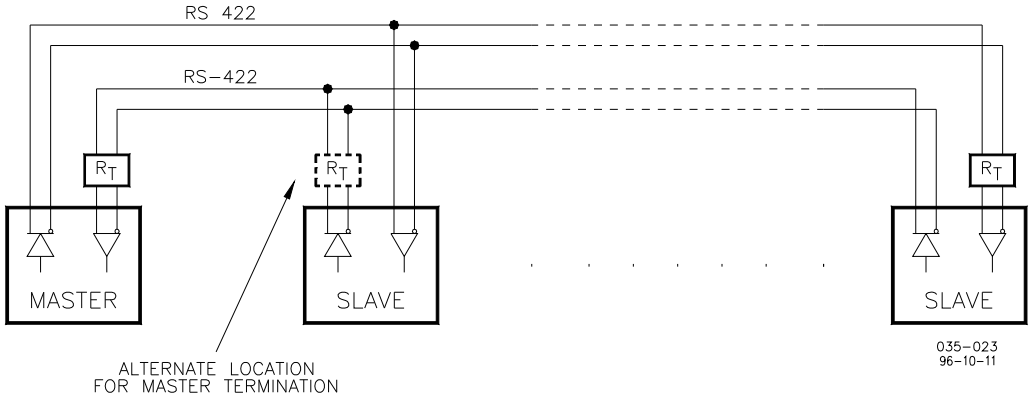


Figure A-4. RS-422 Terminator Locations

Termination is accomplished using a three-resistor voltage divider between a positive voltage and ground. The impedance of the resistor network should be equal to the characteristic impedance of the cable. This is usually about 100 to 120 Ω. The purpose is to maintain a voltage level between the two differential lines so that the receiver will be in a stable condition. The differential voltage can range between 0.2 and 6 V. The maximum voltage between either receiver input and circuit ground must be less than 10 V. There is one termination resistor network for each port located on the 723PLUS board. Connection to this resistor network is made through the 9-pin connectors on pins 6 and 9.

Grounding and Shielding

The RS-422 specifications state that a ground wire is needed if there is no other ground path between units. The preferred method to do this is to include a separate wire in the cable that connects the circuit grounds together. Connect the shield to earth ground at one point only. The alternate way is to connect all circuit grounds to the shield, and then connect the shield to earth ground at one point only. If the latter method is used, and there are non-isolated nodes on the party line, connect the shield to ground at a non-isolated node, not an isolated node. Figures A-5 and A-6 illustrate these cabling approaches.

IMPORTANT

Non-isolated nodes may not have a signal ground available. If signal ground is not available, use the alternate wiring scheme in Figure A-5 with the signal ground connection removed on those nodes only.

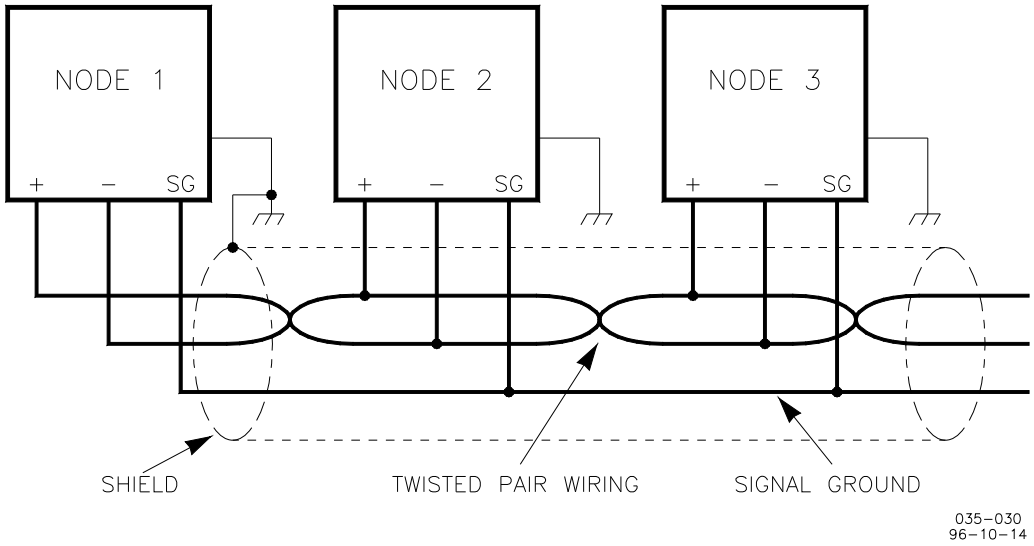


Figure A-5. Preferred Multipoint Wiring Using Shielded Twisted-pair Cable with a Separate Signal Ground Wire

IMPORTANT

The SG (signal ground) connection is not required if signal ground is unavailable.

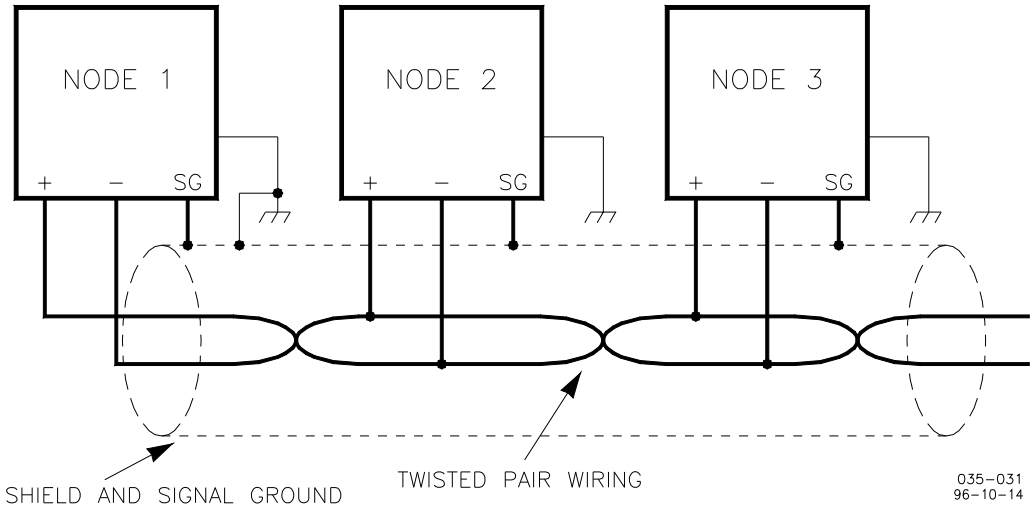


Figure A-6. Alternate Multipoint Wiring Using Shielded Twisted-pair Cable without a Separate Signal Ground Wire

Appendix B.
723PLUS DSLC™/MSLC Gateway
Network Binding Procedure

Introduction

This Appendix describes instructions on the use of the LonMaker™ for Windows® Integration Tool to commission or replace Woodward supplied devices into an Echelon® network. LonMaker for Windows, release 3, was used by Woodward to create and test an engineered network system specifically for the 723PLUS DSLC/MSLC Gateway control. The engineered system database and drawings are provided as a CD-ROM kit. The database and drawings together with the LonMaker for Windows Integration Tool and an SLTA-10 Network Interface are needed to commission or replace the 723PLUS DSLC/MSLC Gateway network devices.

IMPORTANT

These instructions are intended to be specific to the 723PLUS DSLC/MSLC Gateway LonMaker network and are not intended to include extensive LonMaker for Windows instructions. Refer to the LonMaker for Windows User's Guide for extensive instructions.

Requirements

Computer

The LonMaker for Windows Integration Tool requires a PC that meets the following requirements:

- Microsoft Windows® 2000, Windows NT® 4.0 (Service Pack 3 required for NT 4.0) Windows 98, or Windows 95. Windows 2000 is recommended.
- Pentium 200 or faster (Pentium II 350 or better recommended)
- 350 Megabytes (MB) free hard-disk space
- 128 MB of RAM (256 MB recommended)
- High resolution display with 256 colors
- CD-ROM drive
- Mouse or compatible pointing device

Software

LonMaker for Windows

Woodward part number: 1796-055
Follow Echelon's instructions for correctly installing the LonMaker for Windows Integration Tool and the LonWorks® SLTA-10 network driver software.

LonMaker Database/Visio Drawing

Woodward part number: 8928-225
Specific to the master 723PLUS DSLC/MSLC Gateway with capability of 14 DSLC™ (Digital Synchronizer and Load Control) units, one MSLC (Master Synchronizer and Load Control) unit and one master 723PLUS Gateway Digital Control.

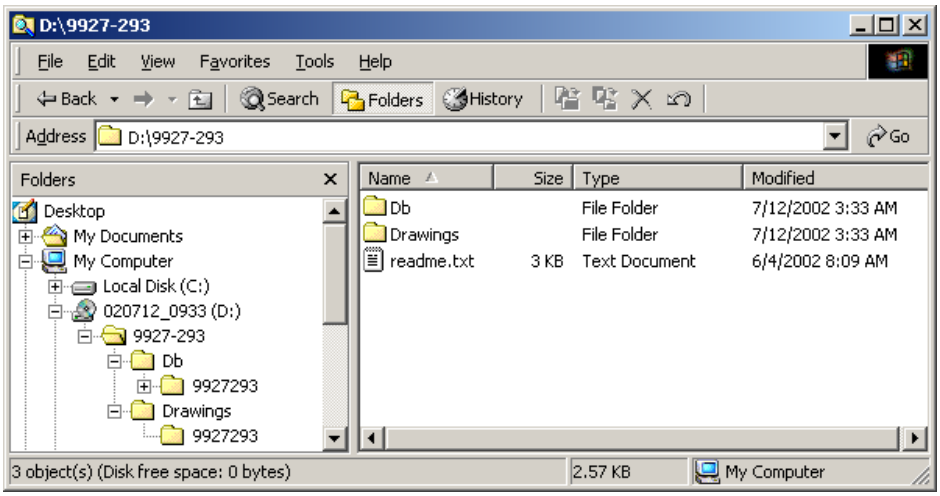
IMPORTANT

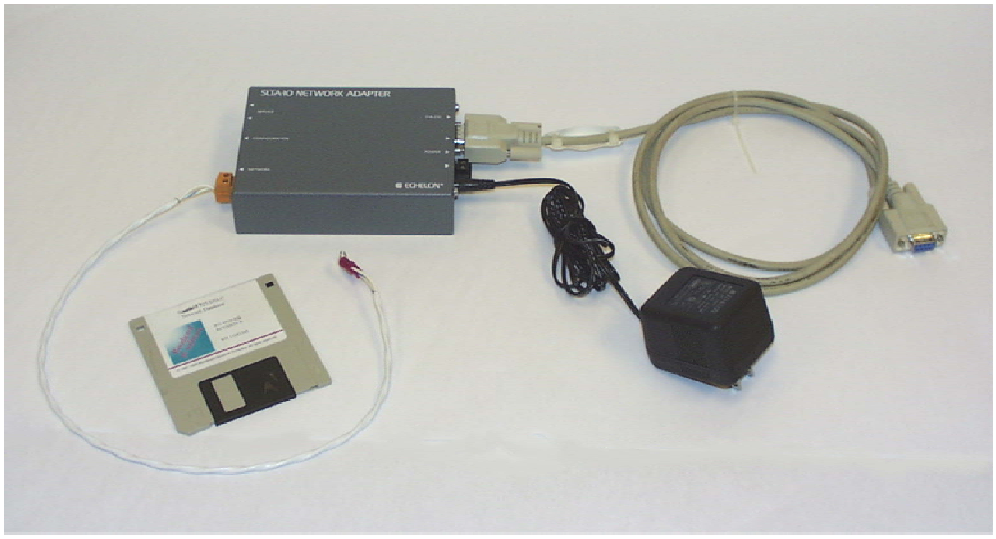
The 8928-225 LonMaker Database/Visio drawing is also designed to commission 723PLUS DSLC Compatible controls and references are included to clarify the commissioning differences.

The "9927293" folders contained under the "Db" and "Drawings" folders on the CD-ROM in kit part number 8928-225 are the actual master 723PLUS DSLC/MSLC Gateway LON Network database and drawing files required by LonMaker for Windows. Copy each "9927293" folder under the "Db" and the "Drawings" folders to C:\LM\Db and C:\LM\Drawings folders respectively.

Even though the folder names (9927293) are the same, the contents are totally different! Be sure to copy each to the correct LonMaker for Windows (LM) folder.

The following shows the contents on the CD-ROM kit 8928-225 on Windows Explorer. 9927-293 is the combined database/drawing part number.





Hardware

Serial LonTalk Adapter (SLTA-10) and associated cables (Woodward part number 8923-492).

IMPORTANT **There is a Woodward "Starter Kit" that contains all the needed software and hardware (part numbers 1796-055, 8928-225, and 8923-492)—Starter Kit number 8923–1007.**

Creating a Network

When an Echelon network is created, each device on the network has to know which devices it is talking to and what information it is receiving or sending. Binding is the process of installing and connecting the correct network inputs and outputs of devices on an Echelon network. For our purposes, binding is required because the DSLC and MSLC information and commands must be made available on a serial network. The binding process must be performed at the initial start-up (commissioning) of a system, and any time a device on the network is replaced (re-commissioned). The binding process is explained in detail under "Installing a Network."

In the power generation master 723PLUS DSLC/MSLC Gateway application, the DSLC and MSLC information and commands are transmitted through the 723PLUS. The 723PLUS functions as a gateway to convert the systems DSLC and MSLC Echelon information into Modbus serial data.

We have considered two network situations with the 723PLUS control:

1. One Unit 723PLUS/DSLC pair on each engine. The maximum capability is 14 engines on one network plus an LSIM option to provide DSLC load sharing with compatible analog systems. The 723PLUS is the engine speed control and a gateway for only the mating DSLC information to a Modbus network for monitoring and commands. The 723PLUS choices for this situation are 8280-412, 8280-413, 8280-466 or 8280-467. Other custom applications may also apply.

2. One master 723PLUS/DSLC/MSLC Gateway connected to a maximum of 14 DSLC controls and one MSLC. The 723PLUS/DSLC/MSLC Gateway control is a gateway only for the entire system DSLC and MSLC information to a Modbus network for monitoring and commands. In this situation, a separate control (such as a 2301D, etc.) is used as the engine speed control. The 723PLUS choices for this situation are 8280-416 and 8280-417.

Each 723PLUS will only be a gateway for those devices, which are connected by the Echelon network. The unit 723PLUS DSLC Compatible control is only connected to a mating DSLC control. The master 723PLUS Gateway control is connected to the entire DSLC and MSLC control system. You will note in the Visio® drawing that the 723PLUS Gateway control has two device designations (Mstr723_1 and Mstr723_2). Mstr723_1 is for the LON 1 port and Mstr723_2 is for the LON 2 port. LON1 connects to the MSLC and DSLC 01 through DSLC 07 devices. LON 2 connects to DSLC 08 through DSLC 14 devices. Mstr723_2 does not need to be installed (commissioned) on systems with 7 or less units.

IMPORTANT

Be sure to install (commission) the correct 723PLUS device(s) using the LonMaker for Windows Integration Tool. Install *either* the unit 723PLUS (i.e., U723 01, U723 02, etc.) control(s) *or* the master 723PLUS Gateway control (i.e., Mstr723_1 and Mstr723_2). The network must be comprised of one or more unit 723PLUS DSLC Compatible controls or one master 723PLUS Gateway control. Do not attempt to mix these 723PLUS network devices. The DSLC devices are installed for either network situation. The MSLC is only installed for the master 723PLUS Gateway network situation.

The LonMaker for Windows Integration Tool is a software package which includes a Visio graphical interface that is used to create and install an Echelon network. The network connections between devices (binding) have been created and tested beforehand by Woodward and are provided on a CD-ROM kit part number 8928-225. Commissioning the network devices while the LonMaker for Windows tool is attached and Onnet completes the LON network binding process. The SLTA-10 Network Interface connects the PC to the Echelon network.

IMPORTANT

The older SLTA/2 network interface will not work with LonMaker for Windows since it is not LNS-compatible.

LonMaker for Windows also defines the communication medium (twisted pair, fiber optics, etc.). All of the Woodward controls communicate over twisted pair at 1.25 MBaud. LonMaker for Windows provides for subdividing the devices into logical groups (subsystems) to organize the network installation. LonMaker for Windows stores its information in a database on your hard drive.

Woodward has created one LonMaker for Windows database/drawing for the unit 723PLUS DSLC Compatible and the master 723PLUS/DSLC/MSLC Gateway situations as previously described. The network drawing has one subsystem for each engine-generator set, one subsystem for the Gateway and one subsystem for the MSLC and LSIM controls. All of the network connections are made for up to 14 engine generators.

With the database and drawing already created, the only function that remains to be done on-site is the actual commissioning of the network devices.

Installing the Network

LonMaker for Windows, Release 3 and the SLTA-10 network interface driver must be installed on the PC that will be used to commission the network. Follow the Echelon instructions for correctly installing the LonMaker for Windows Integration Tool and the LonWorks SLTA-10 network driver software. Folders “LM” and “LonWorks” are created when Lon Maker for Windows is installed.

The database and drawing must be present in the “LM” folder to allow LonMaker for Windows to open the network and commission or replace the network devices. The 8928-225 CD-ROM kit contains the LonMaker for Windows database and Visio drawing for both the unit 723PLUS DSLC Compatible and the master 723PLUS/DSLC/MSLC Gateway networks. To complete preparations for commissioning the unit 723PLUS DSLC Compatible or the master 723PLUS/DSLC/MSLC Gateway network, the database and drawing must be copied from the CD-ROM and pasted into the “LM” folder.

To do this, boot up your PC and insert the CD-ROM, part number 1796-1028 from the disk kit 8928-225, into your CD-ROM drive. Run Windows Explorer and view the contents of the CD-ROM. Open folder 9927-293 and two folders named “Db” and “Drawings” will be found. The contents of each contain a sub-directory named 9927293. Even though the name is the same, the contents of each are totally different. The names are the same because LonMaker for Windows requires the same Network Name for the database and drawing. The Network Name assigned for the unit 723PLUS DSLC Compatible and the master 723PLUS/DSLC/MSLC Gateway network is 9927293.

1. Open the “Db” folder on the CD-ROM and copy the contents (9927293).
2. Open the C:\LM\Db folder. Paste the contents (9927293) into this Db folder.

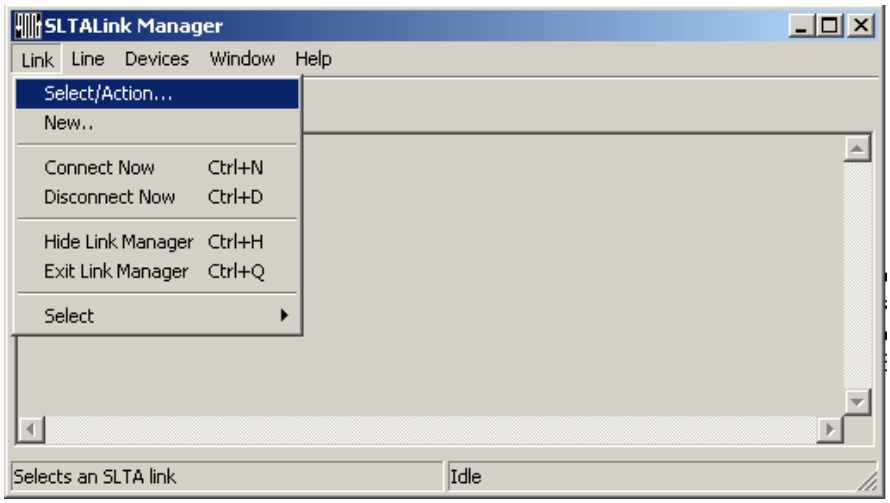
Then,

1. Open the “Drawings” folder on the CD-ROM and copy the contents (9927293).
2. Open the C:\LM\Drawings folder. Paste the contents (9927293) into the Drawings folder.

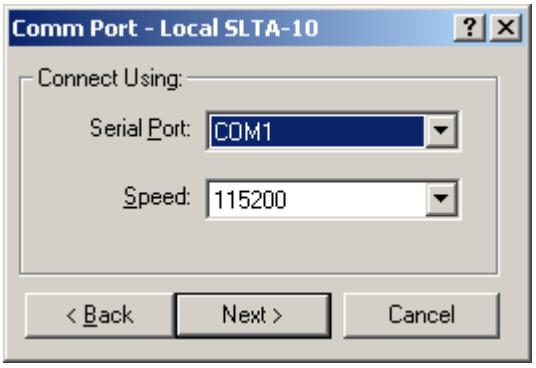
When this is properly completed, the Database Path C:\LM\Db\9927293 will show a db folder, a recovery folder, and other miscellaneous folders and files. The drawing path C:\LM\Drawings\9927293 will show a 9927293.vsd drawing file and a log file.

Connecting the SLTA-10 Network Adapter

Connect the SLTA-10 to the serial port of your computer with the serial cable provided. Set the SLTA-10 configuration DIP switches 1, 2, 3, and 5 “OFF” (down). Set configuration DIP switches 4, 6, 7, and 8 “ON” (up). The SLTA-10 software is defaulted to work on Com Port 1 at 115,200 bps. To change the SLTA-10 software settings, open the Link Manager from the Windows “Start, Programs, Echelon SLTA-10 Network Adapter, SLTALink Manager.” The Link must be disconnected to make changes. Select “Link, Disconnect Now” if necessary. At the following screen, choose “Link, Select/Action.”



This opens the SLTALink Selection screen. Select “Edit.” At the Link Description screen select “Next” and the following screen appears.



The Serial Port and Speed settings may be changed by dropdown menu at this screen. Select “Next” and “Finish” to apply the changes or select “Cancel” to ignore any changes. If the Speed setting is changed, the SLTA-10 configuration DIP switches must be changed to match the new Speed setting. Follow the table adhered to the SLTA-10 Network Adapter.

Use LON cable to connect the SLTA-10 “Network” terminal connector to any point on the physical master 723PLUS/DSLC/MSLC Gateway network. Connect the power supply, and power up the SLTA-10.

IMPORTANT **The older SLTA/2 network interface will not work with LonMaker for Windows since it is not LNS-compatible.**

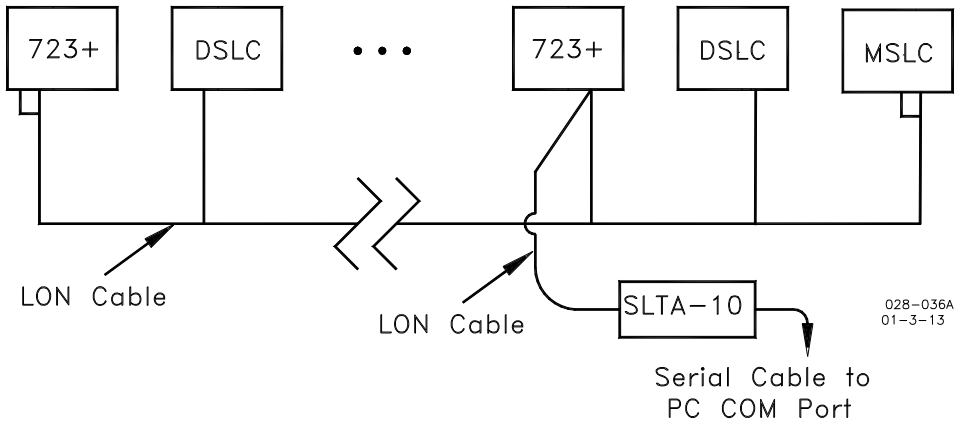
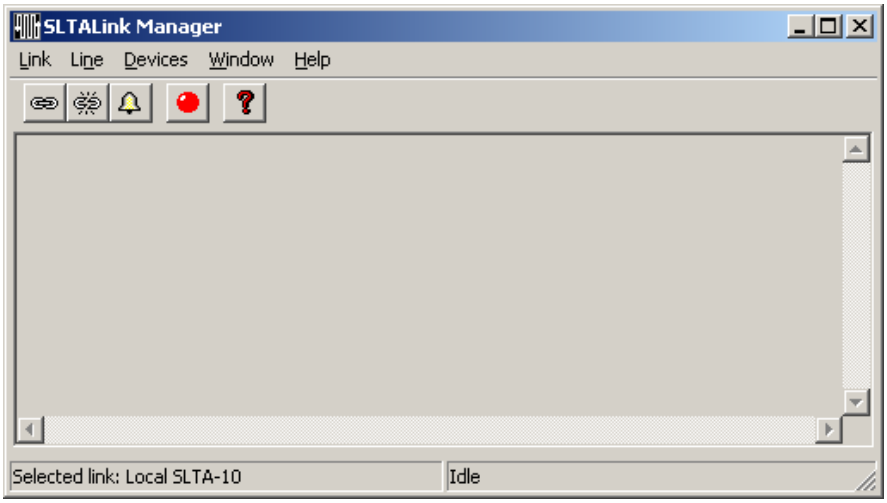


Figure B-1. LON Network

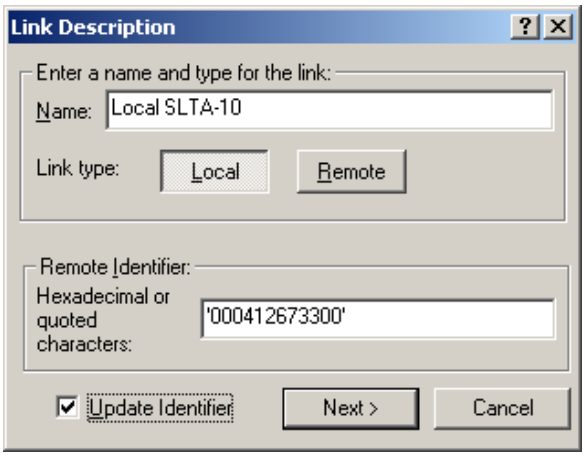
Start the SLTALink Manager from the Windows “Start” menu. The following screen appears.



If the SLTALink Manager is not connected, a red status light will be displayed. Click the “Link” icon to connect the SLTA-10 Network Adapter to the 723PLUS/DSLC/MSLC Gateway network. The red status light will change to green if the connection is made and status messages (“Connected to COM1 at 115200 bps on device 1”, etc) appear in the message block. Check the wiring connections, DIP switch settings and SLTA-10 power if this does not connect properly.

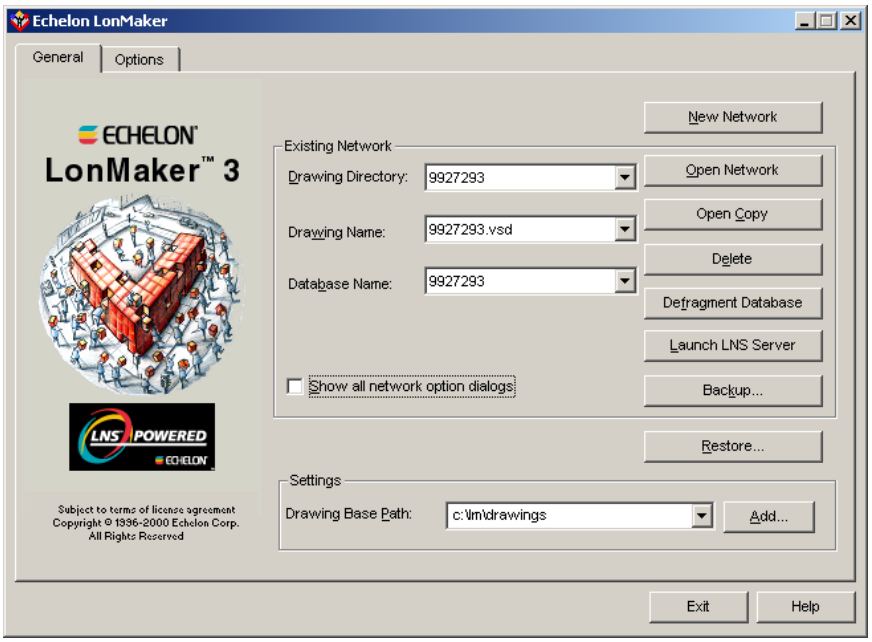
If the message “Remote identifier does not match the link value” appears in the message block, it can be ignored for a local connection. However, to update this identifier and clear the message, choose “Link, Select/Action, Edit” and check the “Update Identifier” on the Link Description screen as shown below, then “Next” twice, then “Finish”.

Connect (link) the SLTA-10 Network Adapter to the 723PLUS/DSLC/MSLC Gateway network.



Opening the 723PLUS/DSLC/MSLC Gateway Network

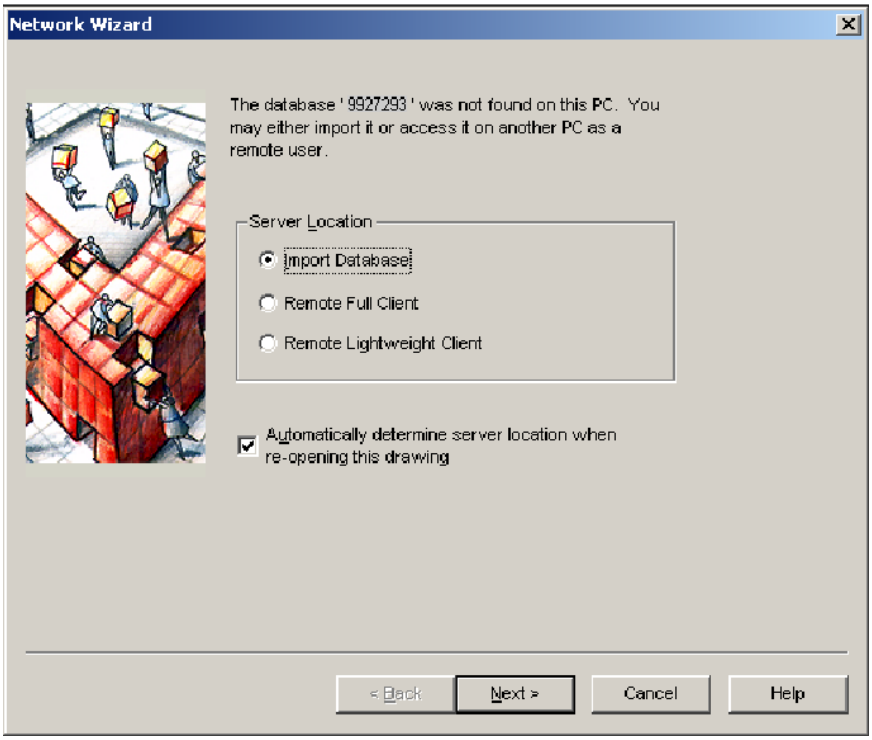
From the Windows “Start” menu select “Program,” then “LonMaker for Windows” to open a network. The following screen appears.



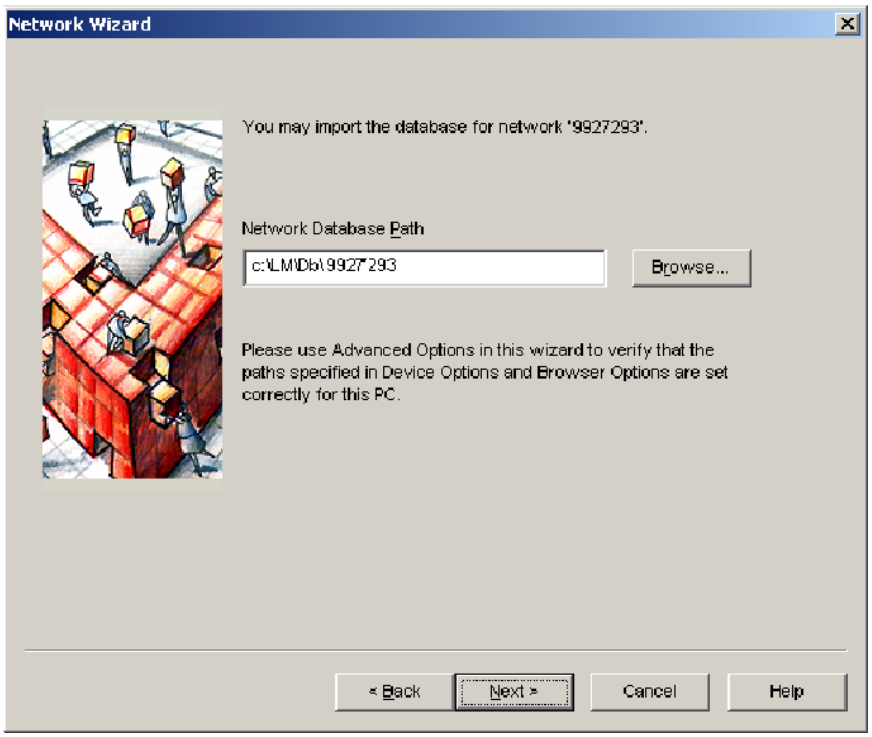
Check all settings and if necessary, select c:\lm\drawings as the Drawing Base Path, 9927293 for the Drawing Directory and 9927293.vsd as the Drawing Name. Select 9927293 as the Database Name. 9927-293 is the Woodward part number for the unit 723PLUS/DSLC Compatible and master 723PLUS/DSLC/MSLC Gateway LON database/drawing software.

The Database Name selection may not be available. If not, leave this selection blank. Select “Open Network.”

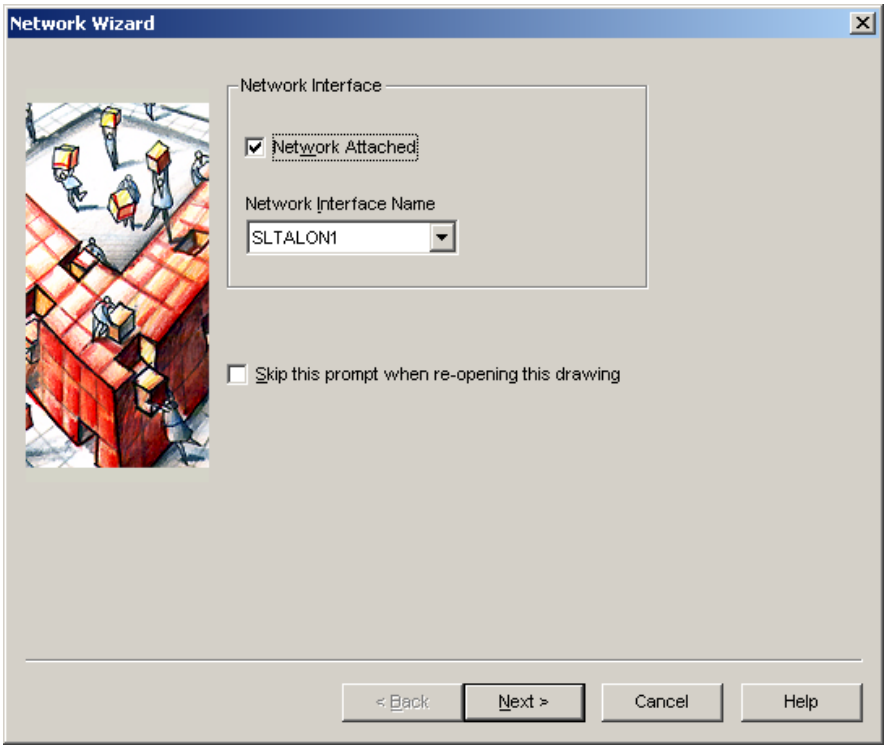
The following prompt may appear. If not, skip to the “Network Interface” screen below. Should this prompt appear choose “Import Database.”



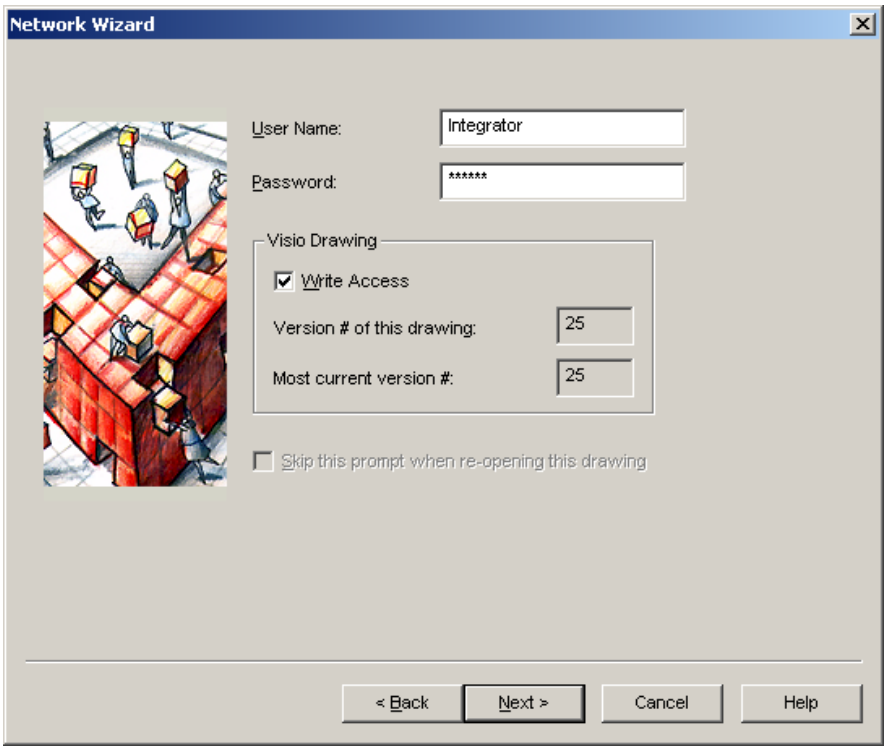
Select “Next” and the following screen will appear. Browse and select the “Network Database Path” for database 9927293.



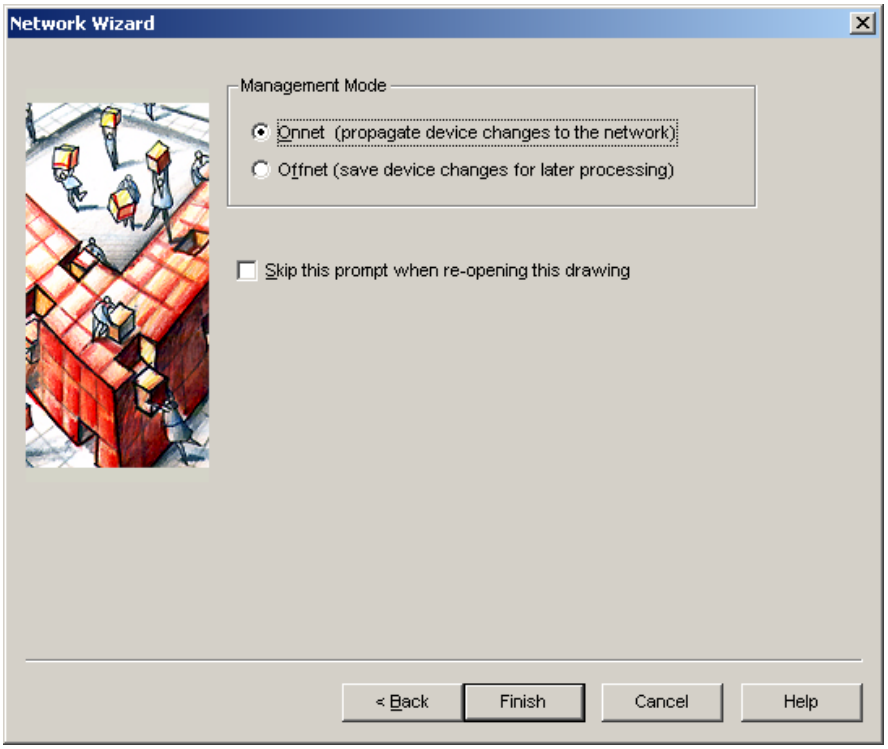
The following screen appears when “Open Network” is selected or “Next” should the above “Import Database” screens appear. Check the “Network Attached” box and select the “SLTALON1” Network Interface Name.



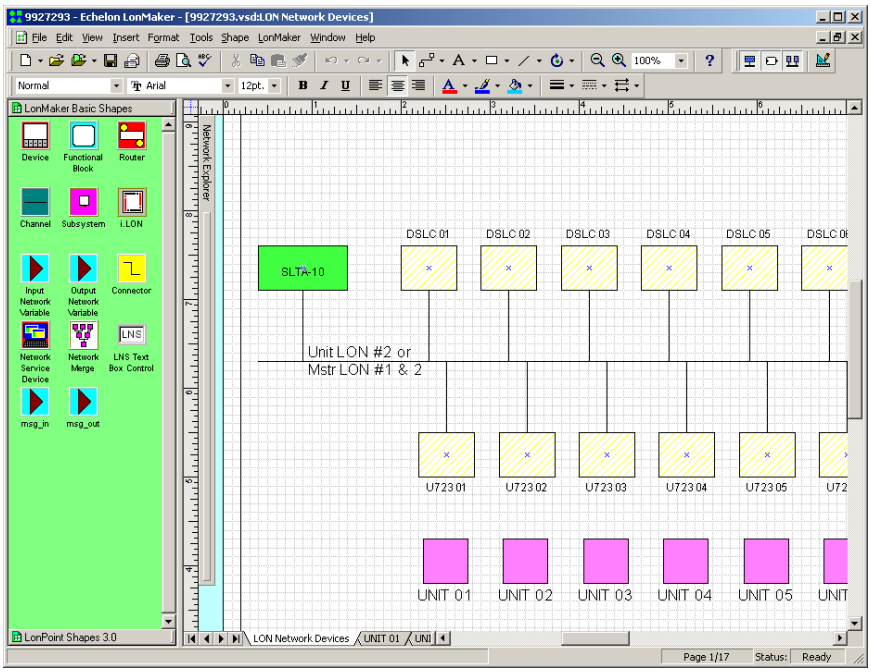
Select “Next.” The following screen appears. Type in “Integrator” for the User Name and “integr” for the Password. Both the user name and password are case sensitive. Integrator privileges permit opening a “read only” network system drawing and database to commission, replace or monitor the network devices. Write privileges to add or modify network devices or connections between devices are reserved for Woodward Administrators.



Select “Next.” The following screen appears. Check “Onnet” to continue with the commissioning process. Onnet mode is necessary to activate the network device LON communication once commissioned (installed).

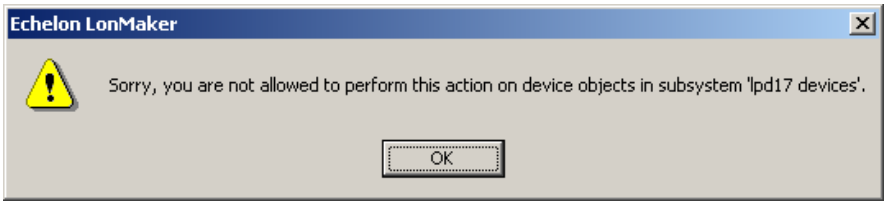


Select “Finish.” The following 9927293.vsd drawing opens. The “LON Network Devices” drawing sheet is shown. The master 723PLUS/DSLC/MSLC Gateway LonMaker network devices are commissioned or replaced from the “LON Network Devices” drawing sheet.



After a device is commissioned, the color changes on the drawing sheet. Devices that have been commissioned are shown with a solid green color. Devices that have not yet been commissioned are shown with a light yellow crosshatch. The drawing above shows that the SLTA-10 network interface adapter has been commissioned, but the remaining “LON Network Devices” devices have not been commissioned.

Subnets identify additional drawing sheets for each Unit, Gateway and MSLC_LSIM control. These drawing sheets define the function blocks and connections for each device. These are “read only” and cannot be changed except by those with network “Administrator” privileges. These sheets are not used for commissioning or replacing devices. The following message is typical when changes are attempted without proper authorization.

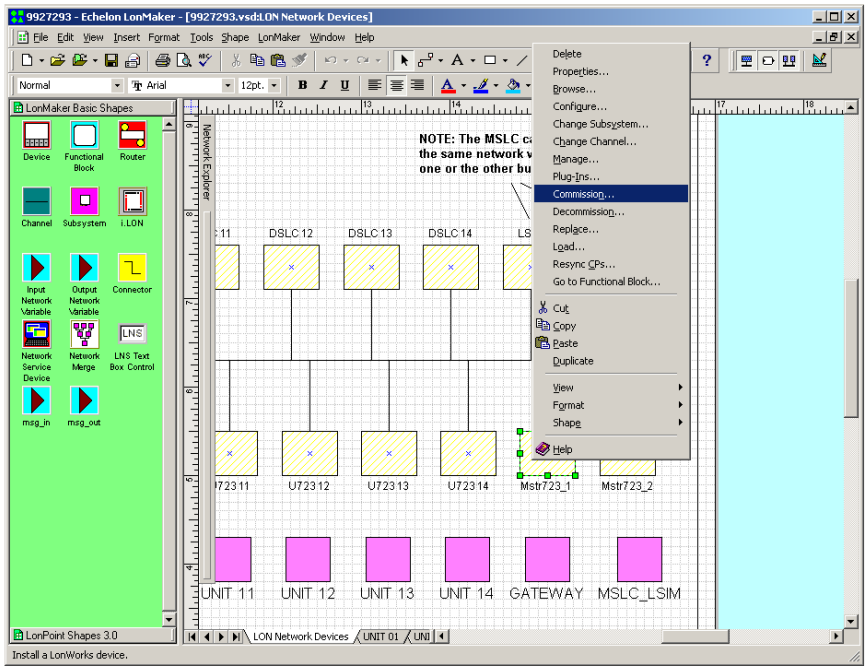


Commissioning the 723PLUS Gateway Network Devices

The process of “commissioning” a device is necessary since a device will not function on the network until the succeeding commissioning process is performed to bind the device into the network. The network connections for each device are predefined in the 723PLUS/DSLC/MSLC Gateway LON database (Database Name 9927293). Commissioning is the final step of assigning these connections, by device name, to the mating physical device on the network. After commissioning, network messages are exchanged between commissioned devices placed “Onnet” based on the predefined database connections.

It is important to note that only the master Gateway, DSLC and MSLC devices are installed for the 723PLUS Gateway LON network situation. Devices U723 01, U723 02, etc. and the LSIM are only used for the 723PLUS/DSLC Compatible network situation and are not used in the 723PLUS Gateway LON network and should not be installed.

To begin commissioning devices, the “LON Network Devices” drawing sheet must be open. With this drawing open, right click the device to be commissioned and the following pop-up menu choices appear.



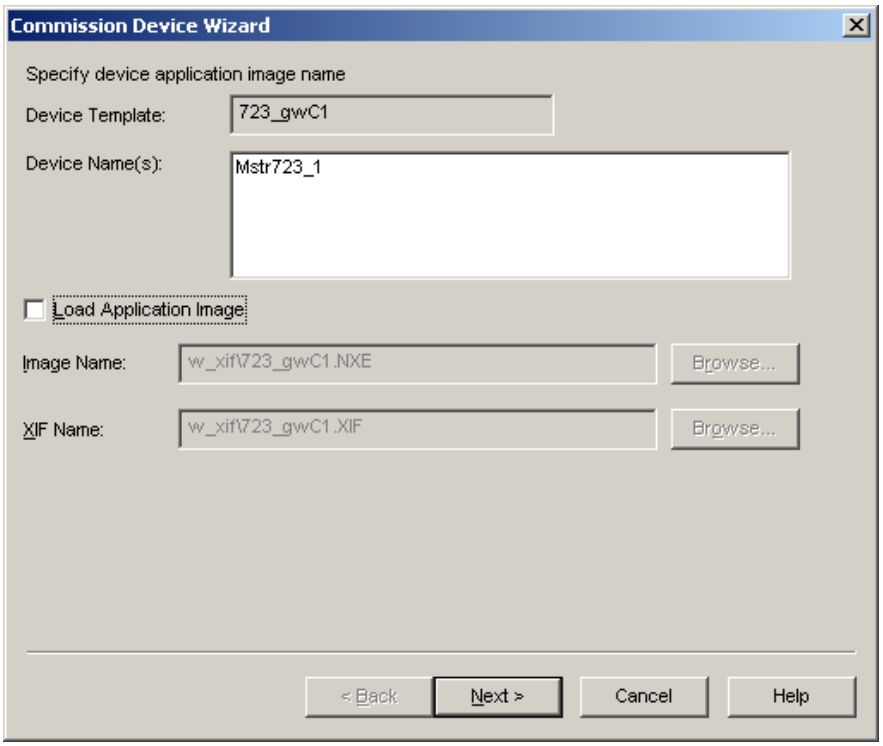
Only those devices that have not been commissioned can be commissioned (although commissioning a device again as the same device is not prohibited). See Replacing the 723PLUS Gateway Network Devices for instructions on replacing a commissioned device.

⚠WARNING

When commissioning or replacing a device, be sure to select the correct device in LonMaker for Windows, and press the service pin on that corresponding physical device. You cannot install two devices with the same name on the same network. In addition, you cannot install one device twice in the same network.

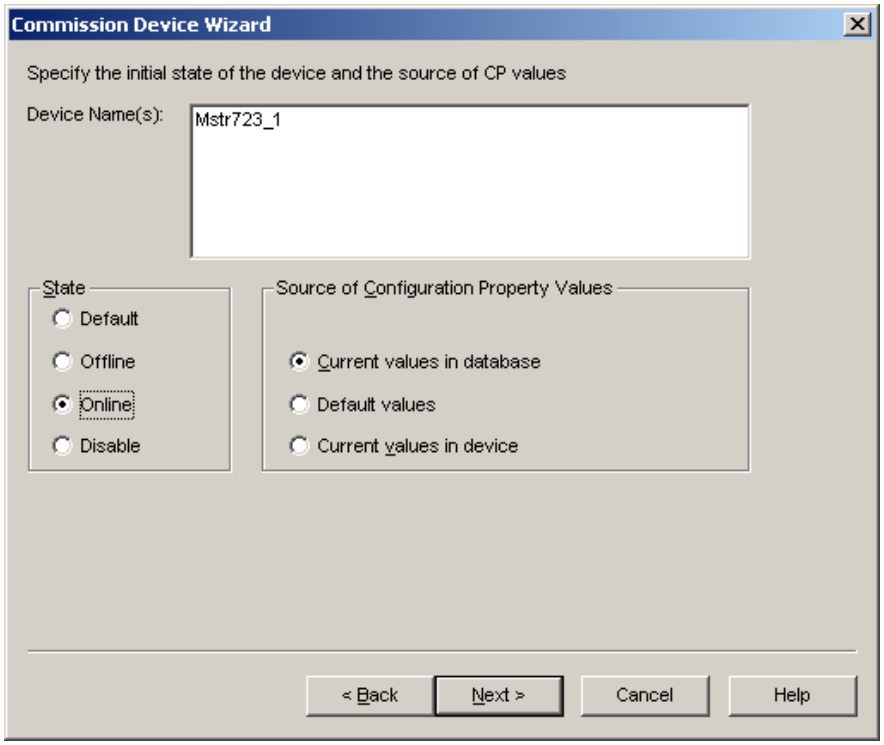
Before commissioning or replacing any of the devices on a network, be sure that all of the engines are shut down and locked out. The load sharing between the DSLC units and the MSLC units will temporarily be removed during the commissioning/replacement process.

Select “Commission” from the menu to commission the selected device (e.g., Mstr723_1) and the following “Commission Device Wizard” screen appears. 723PLUS/DSLC/MSLC Gateway devices use a .xif file in the device template. Do not attempt to load a different application image. Do not check the Load Application Image check box. The application image in the database is correct for all 723PLUS/DSLC/MSLC Gateway devices.



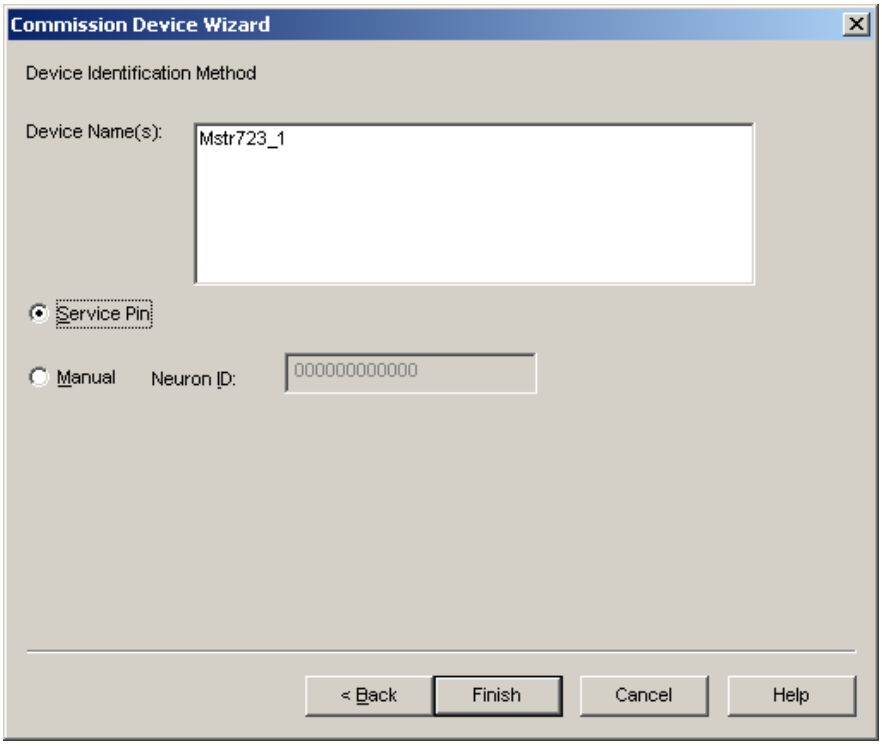
All engines need to be shut down before commissioning devices.

If the correct device was selected, select “Next,” and the following screen appears. If, however, the wrong device was selected, choose “Cancel” then select the correct device.



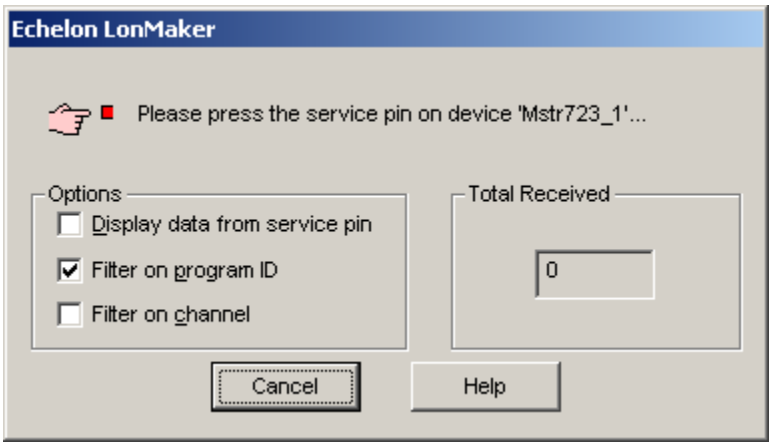
To continue commissioning a device, proceed by setting the device state “Online” to make the device active after it is commissioned. Set the “Source of Configuration Property Values” to “Current values in the database” to make the connections needed for the 723PLUS/DSLC/MSLC Gateway devices.

Select “Next” and the following screen will appear.



Select “Service Pin” as the commissioning method. The 723PLUS/DSLC/MSLC Gateway devices are built to use the Service Pin installation method.

Select “Finish” and the following screen will appear.



Go to the control chosen for commissioning and select the service pin for this device.

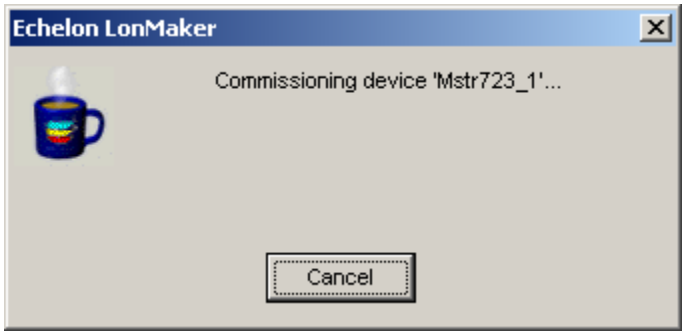
IMPORTANT

Be sure the physical device being commissioned matches the assigned device name on the LonMaker drawing before toggling the device LON Network Service Pin. Commissioning the wrong device is not easy to undo.

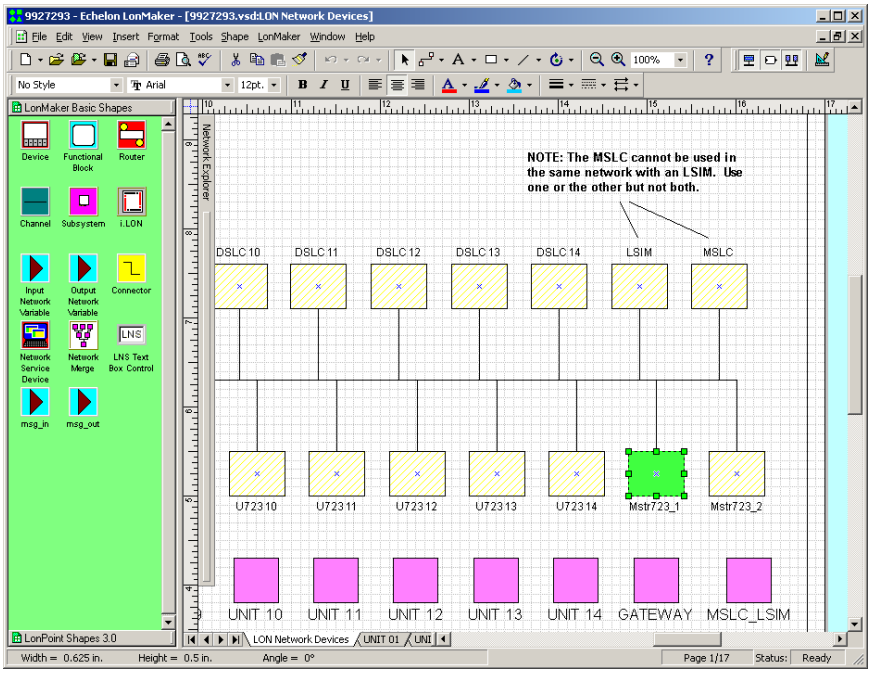
The service pin on the 723PLUS/DSLC/MSLC Gateway control can be found in the “LON” service menu. Either a Hand Held Programmer or Servlink/Watch Window connected to comm port J1 is needed to provide access and control of the 723PLUS/DSLC/MSLC Gateway service pin. The 723PLUS/DSLC/MSLC Gateway service pin will have to be tuned with the rabbit or turtle raise/lower keys to TRUE and then back FALSE. (See Chapter 4 for detailed instructions on the Hand Held Programmer and Servlink/Watch Window.)

The service pin on a DSLC or MSLC control is in “Menu 5.” A Hand Held Programmer must be connected to the comm port and the configuration key will have to be set to 49 to provide access and control of the DSLC or MSLC service pin. The DSLC or MSLC service pin will have to be tuned with the rabbit or turtle raise/lower keys to TRUE and then back FALSE.

When the service pin is toggled, the following screen appears for the device being commissioned.



When the device is successfully commissioned, the Commissioning Device Wizard screens close and the newly commissioned device changes color on the “LON Network Devices” drawing sheet from a light yellow crosshatch (uninstalled) to a solid green (installed) as shown below for “Mstr723_1”.

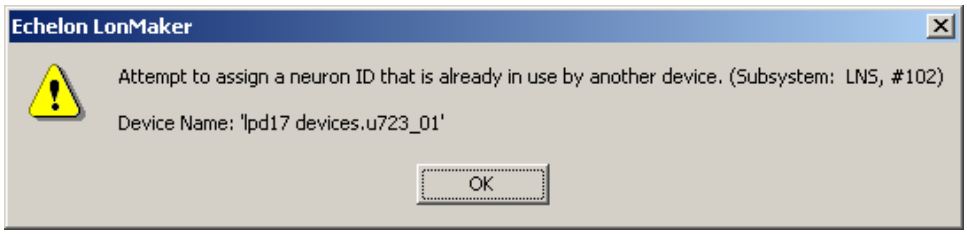


IMPORTANT

When a DSLC or MSLC control is installed with LonMaker for Windows, the self-binding network address (in menu 5) is no longer valid. However, it can cause problems if the DSLC or MSLC control thinks it should be configuring itself, when in reality the LonMaker for Windows is configuring the DSLC and MSLC controls. To eliminate these problems cycle power to all DSLC and MSLC controls after they have been commissioned.

Verify that all the DSLC and MSLC controls are installed by looking at the number of "active DSLCs" in menu 0 on all of the DSLC and MSLC controls. This number should equal the total number of all DSLC and MSLC units installed (commissioned and electrically connected) on the network and powered up.

If an attempt is made to install the same device twice on the same network, the device will not be installed and the following warning will appear.



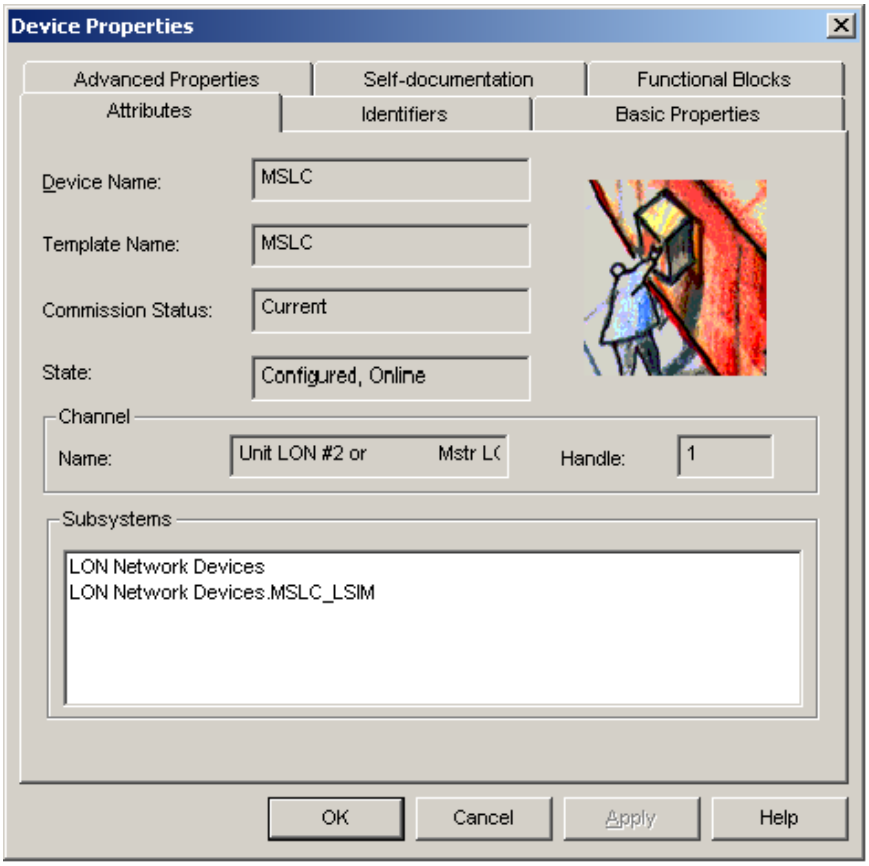
Mistakenly installing the wrong device is not easy to undo.

The easiest workaround is to remove the device from the network and either physically swap it for the device it was commissioned to be or simply replace it with a new un-commissioned device. Do not attempt to decommission a DSLC or MSLC device–this will cause these controls to fail. You may decommission a 723PLUS device.

A somewhat more complicated and lengthy workaround is to blank the binding of the neuron chip on the DSLC or MSLC device. This will generally require the device to be returned to Woodward for blanking. This may be a good choice if a spare unit was commissioned and this unit is now the intended spare. To be useful as a spare the unit must be un-commissioned. Refer to 723PLUS/DSLC/MSLC Gateway Network Management for test details.

723PLUS/DSLC/MSLC Gateway Network Device Properties

To verify the properties of any device, whether commissioned, replaced, or un-commissioned, right click on the device and click “Properties” from the pop-up menu. The following Device Properties screen opens to show the device Attributes, including “Commission Status,” “State,” etc.



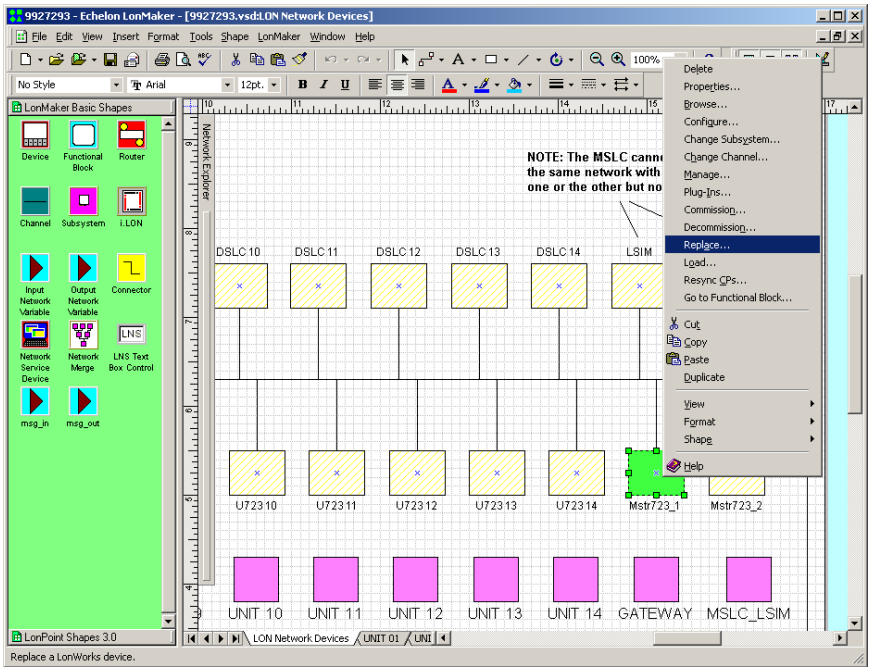
In this example, the Commissioned Status and State Attributes show that device ‘MSLC’ commissioning is current and that the device is configured and online. Of course, these are the properties of the device commissioned for internal testing only. Real commissioning must be performed when the network is actually installed on site. Un-commissioned devices show the Commissioned Status as “Updates pending” and the State as “<Not Available>”.

Refer to LonMaker for Windows User’s Guide for more in depth descriptions.

Replacing the 723PLUS/DSLC/MSLC Gateway Network Devices

The process of “replacing” a device is similar to “commissioning” a device. Replacement is necessary when a commissioned device fails. The replacement device will not function on the network until the following replacement process is performed to bind the replacement device into the network. The commissioned device must be removed and the replacement device installed in its place.

With the “LON Network Devices” drawing sheet open, right click a commissioned device to be replaced (e.g., ‘Mstr723_01’). The following pop-up menu choices appear.

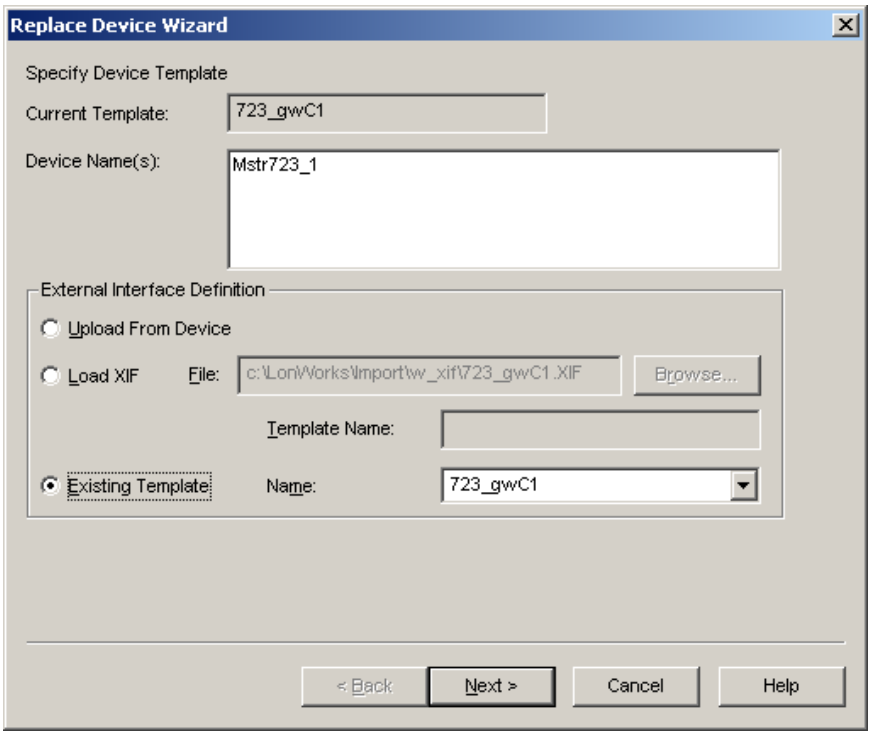


Select “Replace” and the following Replace Device Wizard screen opens.

WARNING

When commissioning or replacing a device, be sure to select the correct device in LonMaker for Windows, and press the service pin on that corresponding physical device. You cannot install two devices with the same name on the same network. In addition, you cannot install one device twice in the same network.

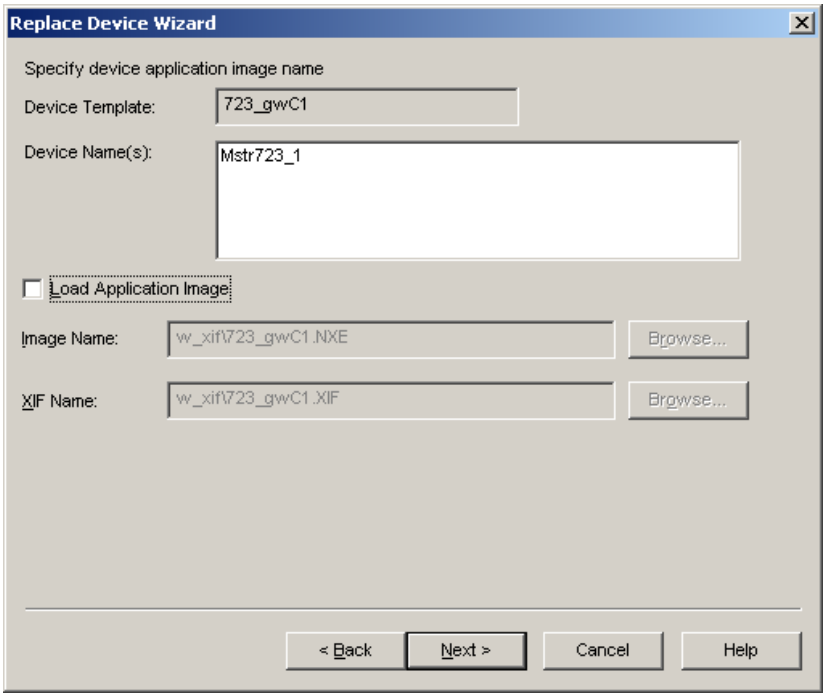
Before commissioning or replacing any of the devices on a network, be sure that all of the engines are shut down and locked out. The load sharing between the DSLC units and the MSLC units will temporarily be removed during the commissioning/replacement process.



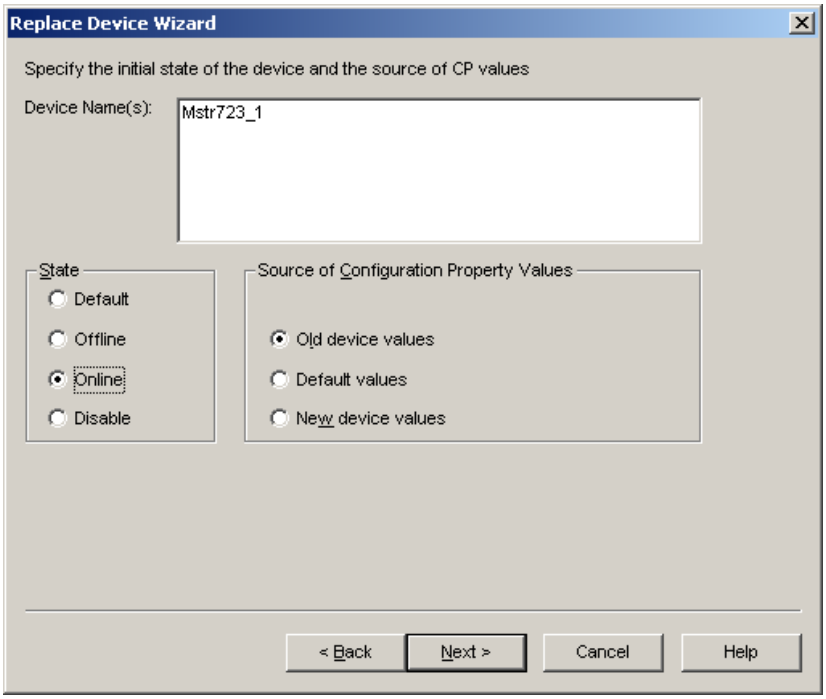
All engines need to be shut down before replacing devices.

Set the External Interface Definition to use an “Existing Template.”

Select “Next” and the following screen will appear.

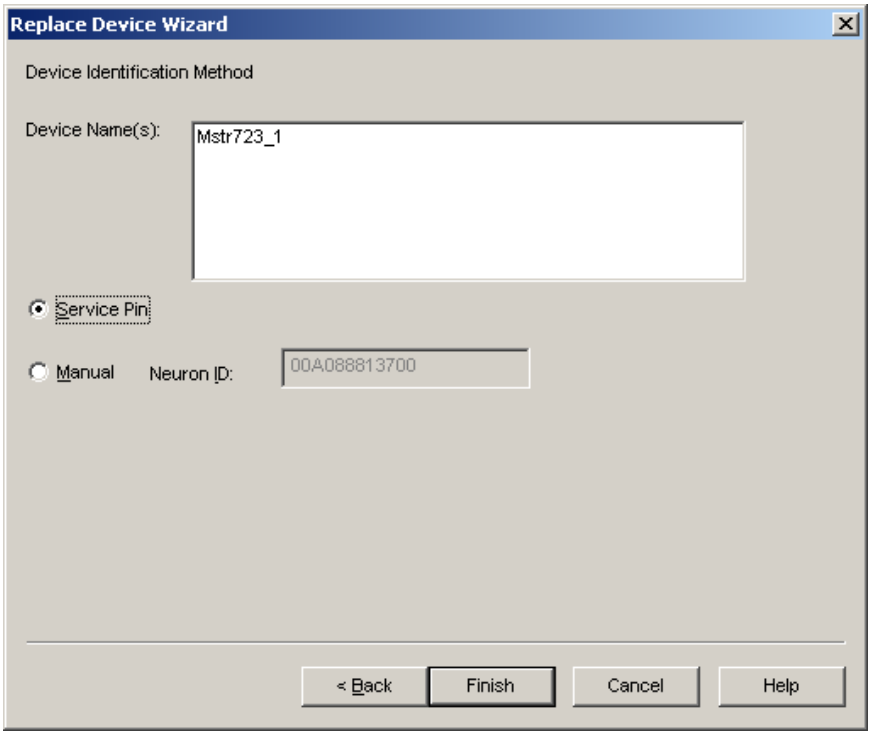


723PLUS/DSLC/MSLC Gateway devices use a .xif file in the device template. Do not attempt to load a different application image. Do not check the Load Application Image check box.



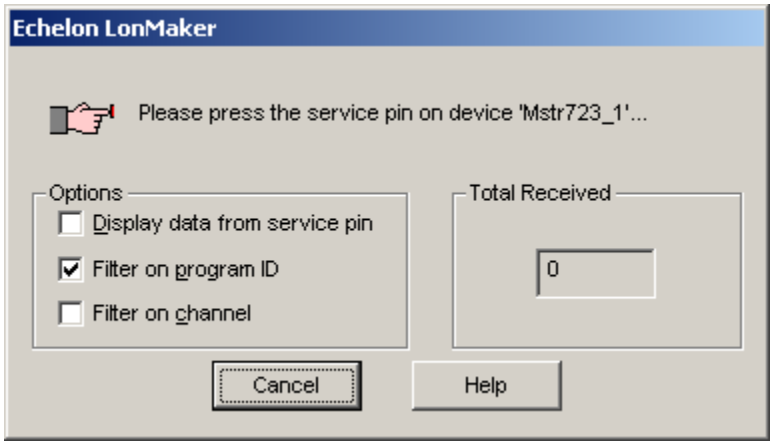
Set the device State “Online” to make the device active after it is replaced. Set the Source of Configuration Property Values to use “Old device values.” The old device connections are needed for the 723PLUS/DSLC/MSLC Gateway replacement device.

Select “Next: and the following screen will appear.



Select “Service Pin” as the commissioning method. The 723PLUS/DSLC/MSLC Gateway devices were built to use the Service Pin.

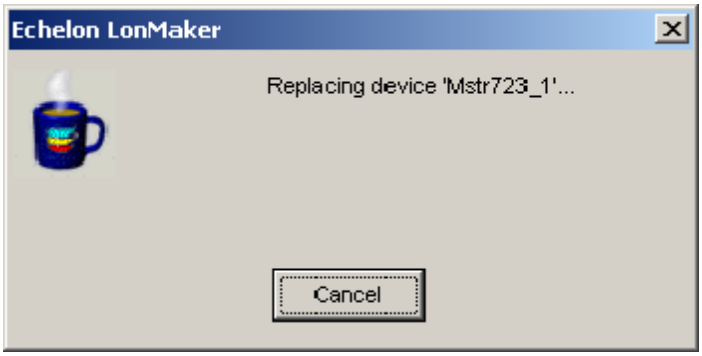
Select “Finish” and the following screen will appear.



IMPORTANT **Be sure the physical device being replaced matches the assigned device name on the LonMaker drawing before toggling the device Service Pin.**

Go to the control chosen for replacement and select the service pin for this device as described earlier in the “Commissioning the 723PLUS Gateway Network Devices” section. Toggle the service pin TRUE then FALSE.

After the service pin is toggled, the following screen appears for the device being replaced.



When the device is successfully replaced, all replacement screens close and the newly replaced device color remains a solid green (installed) color.

IMPORTANT

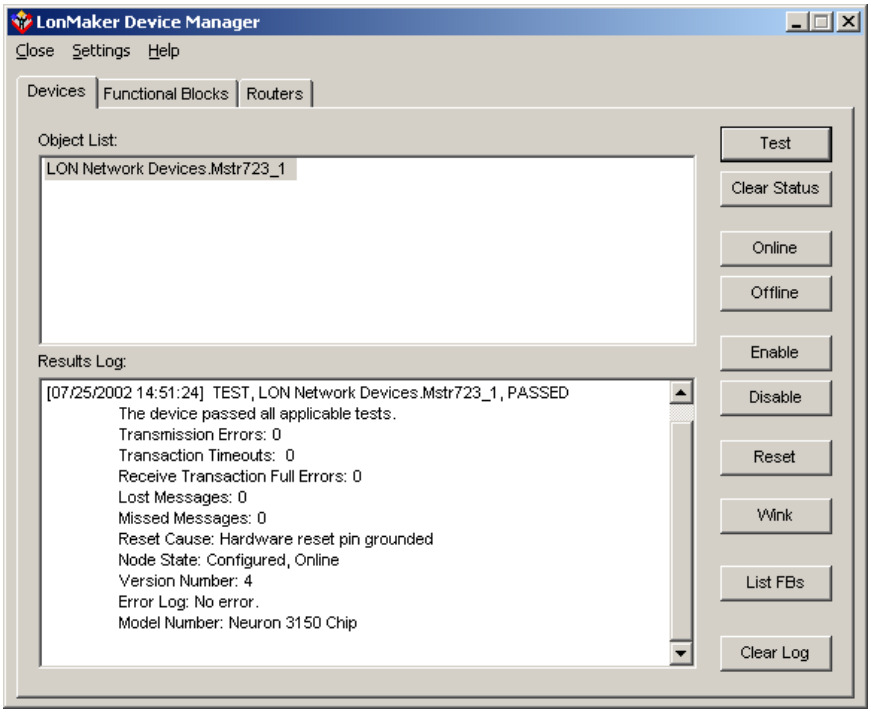
Verify that all the DSLC and MSLC controls are installed by looking at the number of "active DSLCs" in menu 0 on all of the DSLC and MSLC controls. This number should equal the total number of all DSLC and MSLC units installed (commissioned and electrically connected) on the network and powered up.

To further verify the properties of the replacement device, refer to the 723PLUS/DSLC/MSLC Gateway Network Device Properties section. The device should show the commission status is current and the state is configured and online. To change the state, refer to the 723PLUS/DSLC/MSLC Gateway Network Management section.

Refer to LonMaker for Windows User's Guide for more in depth descriptions.

723PLUS/DSLC/MSLC Gateway Network Management

Network Management is used to Test devices, place devices Online, take devices Off line, etc. To open the following “Manage” screen for a particular device, right click on the device and click “Manage” from the pop-up menu.



The “Results Log” on the above screen displays the results of clicking the “Test” button. The Test feature provides considerable information about the selected device.

To place the selected device online, click the “Online” button. To take the selected device offline, click the “Offline” button.

Clicking the “Reset” button causes the device to temporarily stop, reset all values to their initial settings and restart the application. This also places an Offline device Online.

The Enable and Disable functions are not applicable to 723PLUS/DSLC/MSLC Gateway devices.

Refer to LonMaker for Windows User’s Guide for more in depth descriptions.

Quick Reference Guide

Initial Installation:

- Copy drawing/database from 8928-225 CD-ROM Kit to create site directories.
- Attach to the network, start LINKManager, and make the local SLTA-10 "Link" connection.
- Execute LonMaker for Windows from your site directory.
- Open the "LON Network Devices" drawing.
- Right-click the device and select "Commission" from the pop-up menu.
  a. Choose "Online" and "Current values in database."
  b. DO NOT choose "Load application image."
  c. Choose "Service pin."
- Toggle the service pin for the correct device.
- Repeat installation for all Mstr723, DSLC and MSLC controls on the network.
- Cycle power to all DSLC and MSLC controls.
- Verify the number of active DSLC controls in Menu 0 on all DSLC and MSLC controls is correct after all devices are installed. This number should equal the total number of all DSLC and MSLC controls installed and powered.

Replacing:

- Attach to the network, start LINKManager and make the local SLTA-10 "Link" connection.
- Execute LonMaker for Windows from your site directories. If you don't have the site directories, follow the initial installation steps.
- Open the "LON Network Devices" drawing.
- Right-click the device and select "Replace" from the pop-up menu.
  a. Choose "Existing template."
  b. DO NOT choose "Load application image."
  c. Choose "Online" and "Old device values."
  d. Choose "Service pin."
- Toggle the service pin for the correct device.
- Repeat "Replace" process for all devices being replaced.
- Cycle power to all replaced DSLC and MSLC controls.
- Verify the number of active DSLC controls in Menu 0 on all DSLC and MSLC controls is correct after all devices are installed. This number should equal the total number of all DSLC and MSLC controls installed and powered.

IMPORTANT

The network commissioning or replacement can be done on a bench before the physical installation of the device. The device can be commissioned or replaced without being connected to the other devices in the network. Be sure to properly identify which device is being commissioned or replaced so that the correct device is physically placed or replaced on the network. Once the device is installed and electrically connected to the other installed devices, they will start communicating.

Wiring and Proper Cable

All DSLC and MSLC controls communicate with each other and the 723PLUS through shielded twisted-pair wiring. The specifications for the DSLC/MSLC system require that listed level V type cable be used. The Echelon® network is wired with all DSLC and MSLC controls connected to the network via stubs as in Figure B-2. There is no polarity associated with the network wiring. For optimum EMC performance, the network cable shield should be continuous throughout the entire network and the exposed wire length limited to 25 mm (1 inch) or less. At the 723PLUS, the outer insulation should be stripped and the bare shield landed to the chassis grounding stud.

Correct cable is available from Woodward, Belden, or other suppliers providing an equivalent cable.

Woodward part number 2008-349

Belden
PO Box 1980
Richmond IN 47375
Telephone (317) 983-5200

Belden Part Number	Description
9207	PVC 20 AWG shielded. NEC Type CL2, CSA Cert. PCC FT 1.
89207	Teflon 20 AWG shielded, Plenum version. NEC Type CMP, CSA Cert. FT 4.
YR28867	PVC 22 AWG shielded.
YQ28863	Plenum 22 AWG shielded.

Network Cable Length—500 m maximum (–20 to +85 °C) typical.
Network Stub Length—600 mm (0 to 70 °C).

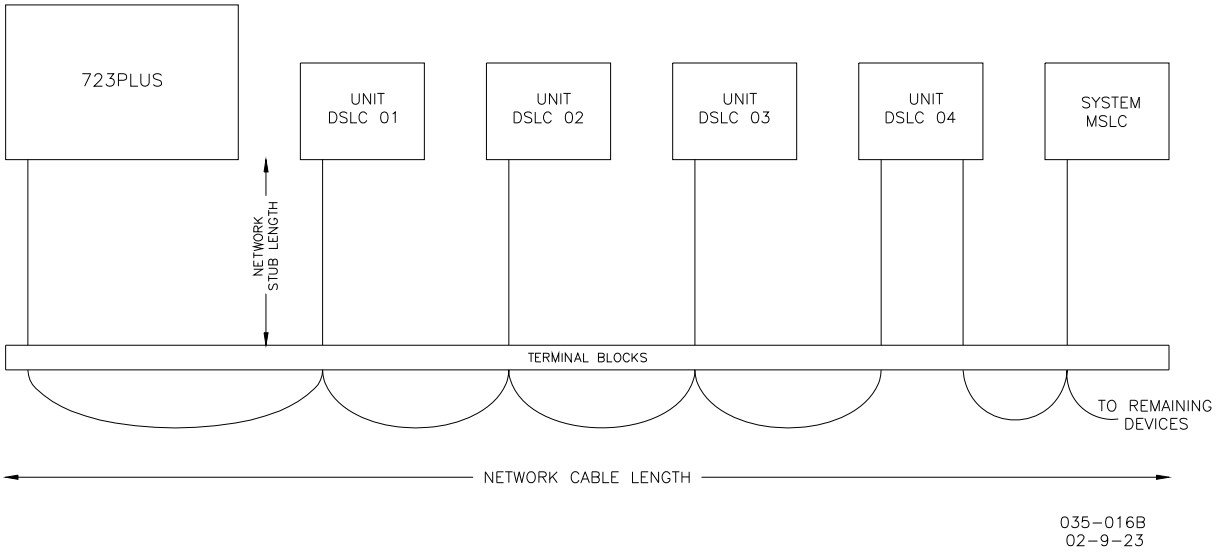


Figure B-2. Echelon Network Wired via Stubs

Appendix C.
Servlink/Watch Window Information

Watch Window Generic PC Interface

Watch Window was developed by Woodward to be a Servlink client software product that provides a generic PC interface to any 723PLUS control. It is a very powerful setup, testing, and troubleshooting tool. Watch Window provides a means of loading the application software into the 723PLUS control, shutting down and placing the control in the configuration mode, saving values in the control EEPROM, and resetting the control. Application tunable values can be uploaded, downloaded, and saved to a file. This software is available for ordering as a disk assembly. If you already have the software disk assembly, you will not need to order another disk.

An “inspector” provides a window for real-time monitoring and editing of all control Configuration and Service Menu parameters and values. Custom “inspectors” can easily be created and saved. Each window can display up to 28 lines of monitoring and tuning parameters *without* scrolling. The number *with* scrolling is unlimited. Two windows can be open simultaneously to display up to 56 parameters without scrolling. Tunable values can be adjusted at the inspector window.

Watch Window communicates with the control through RS-232/RS-422 cable connection to port J1 which is configured as a *point-to-point only* Servlink Server. A jumper between terminals 9 and 10 sets port J1 as a Servlink interface port. Removing this jumper sets port J1 as a Hand Held Programmer interface port. Read “View, Control, Properties” to display the part number and revision level of the software in the control. Refer to this number and revision level in any correspondence with Woodward (write this information in the programming checklist in Appendix E). Read “Getting Started” notepad included with the Watch Window install software.

Appendix D.
Modbus Slave Address Information

Part Numbers 8280-416/-417

This appendix contains the Modbus slave address information for the 723PLUS DSLC/MSLC Gateway.

NOTE:
This listing is for Modbus port J2 except as noted and Modbus port J3.

723 PLUS STANDARD POWERGEN
DSLC/MSLC LON TO MODBUS GATEWAY
UP TO 14 DSLC AND 1 MSLC
MONITORING AND CONTROL

Boolean Writes **PORT 3 ONLY *(Port 2 has BW 0:0001 ONLY)***

Addr	Description
0:0001	ALARM RESET
0:0002	MSLC COMMAND USE REMOTE REFERENCE
0:0003	MSLC COMMAND USE PROCESS SIGNAL
0:0004	MSLC COMMAND CIRCUIT BKR AUX INPUT
0:0005	MSLC COMMAND USE NETWORK DISCRETE IN
0:0006	MSLC COMMAND CHECK INPUT
0:0007	MSLC COMMAND PERMISSIVE INPUT
0:0008	MSLC COMMAND RUN INPUT
0:0009	MSLC COMMAND UTILITY UNLOAD INPUT
0:0010	MSLC COMMAND IMP/EXP CONTROL INPUT
0:0011	MSLC COMMAND PROCESS INPUT
0:0012	MSLC COMMAND PAUSE INPUT
0:0013	MSLC COMMAND SETPOINT RAISE INPUT
0:0014	MSLC COMMAND SETPOINT LOWER INPUT
0:0015	MSLC COMMAND VOLTAGE RAISE INPUT
0:0016	MSLC COMMAND VOLTAGE LOWER INPUT
0:0017	MSLC BOOLEAN WRITE SPARE 17
0:0018	MSLC BOOLEAN WRITE SPARE 18
0:0019	MSLC BOOLEAN WRITE SPARE 19
0:0020	MSLC BOOLEAN WRITE SPARE 20
0:0021	DSLC01 BOOLEAN WRITE SPARE 01
0:0022	DSLC01 COMMAND USE REMOTE REFERENCE
0:0023	DSLC01 COMMAND USE PROCESS SIGNAL
0:0024	DSLC01 COMMAND CIRCUIT BKR AUX INPUT
0:0025	DSLC01 COMMAND USE NETWORK DISCRETE IN
0:0026	DSLC01 COMMAND CHECK INPUT
0:0027	DSLC01 COMMAND PERMISSIVE INPUT
0:0028	DSLC01 COMMAND RUN INPUT
0:0029	DSLC01 COMMAND RAISE VOLTAGE INPUT
0:0030	DSLC01 COMMAND LOWER VOLTAGE INPUT
0:0031	DSLC01 COMMAND BASELOAD INPUT
0:0032	DSLC01 COMMAND LOAD INPUT
0:0033	DSLC01 COMMAND PAUSE INPUT
0:0034	DSLC01 COMMAND RAISE LOAD INPUT
0:0035	DSLC01 COMMAND LOWER LOAD INPUT
0:0036	DSLC01 COMMAND PROCESS ENABLE INPUT
0:0037	DSLC01 BOOLEAN WRITE SPARE 17
0:0038	DSLC01 BOOLEAN WRITE SPARE 18
0:0039	DSLC01 BOOLEAN WRITE SPARE 19
0:0040	DSLC01 BOOLEAN WRITE SPARE 20
0:0041	DSLC02 BOOLEAN WRITE SPARE 01
0:0042	DSLC02 COMMAND USE REMOTE REFERENCE
0:0043	DSLC02 COMMAND USE PROCESS SIGNAL
0:0044	DSLC02 COMMAND CIRCUIT BKR AUX INPUT
0:0045	DSLC02 COMMAND USE NETWORK DISCRETE IN
0:0046	DSLC02 COMMAND CHECK INPUT
0:0047	DSLC02 COMMAND PERMISSIVE INPUT
0:0048	DSLC02 COMMAND RUN INPUT
0:0049	DSLC02 COMMAND RAISE VOLTAGE INPUT

0:0050	DSLC02 COMMAND LOWER VOLTAGE INPUT
0:0051	DSLC02 COMMAND BASELOAD INPUT
0:0052	DSLC02 COMMAND LOAD INPUT
0:0053	DSLC02 COMMAND PAUSE INPUT
0:0054	DSLC02 COMMAND RAISE LOAD INPUT
0:0055	DSLC02 COMMAND LOWER LOAD INPUT
0:0056	DSLC02 COMMAND PROCESS ENABLE INPUT
0:0057	DSLC02 BOOLEAN WRITE SPARE 17
0:0058	DSLC02 BOOLEAN WRITE SPARE 18
0:0059	DSLC02 BOOLEAN WRITE SPARE 19
0:0060	DSLC02 BOOLEAN WRITE SPARE 20
0:0061	DSLC03 BOOLEAN WRITE SPARE 01
0:0062	DSLC03 COMMAND USE REMOTE REFERENCE
0:0063	DSLC03 COMMAND USE PROCESS SIGNAL
0:0064	DSLC03 COMMAND CIRCUIT BKR AUX INPUT
0:0065	DSLC03 COMMAND USE NETWORK DISCRETE IN
0:0066	DSLC03 COMMAND CHECK INPUT
0:0067	DSLC03 COMMAND PERMISSIVE INPUT
0:0068	DSLC03 COMMAND RUN INPUT
0:0069	DSLC03 COMMAND RAISE VOLTAGE INPUT
0:0070	DSLC03 COMMAND LOWER VOLTAGE INPUT
0:0071	DSLC03 COMMAND BASELOAD INPUT
0:0072	DSLC03 COMMAND LOAD INPUT
0:0073	DSLC03 COMMAND PAUSE INPUT
0:0074	DSLC03 COMMAND RAISE LOAD INPUT
0:0075	DSLC03 COMMAND LOWER LOAD INPUT
0:0076	DSLC03 COMMAND PROCESS ENABLE INPUT
0:0077	DSLC03 BOOLEAN WRITE SPARE 17
0:0078	DSLC03 BOOLEAN WRITE SPARE 18
0:0079	DSLC03 BOOLEAN WRITE SPARE 19
0:0080	DSLC03 BOOLEAN WRITE SPARE 20
0:0081	DSLC04 BOOLEAN WRITE SPARE 01
0:0082	DSLC04 COMMAND USE REMOTE REFERENCE
0:0083	DSLC04 COMMAND USE PROCESS SIGNAL
0:0084	DSLC04 COMMAND CIRCUIT BKR AUX INPUT
0:0085	DSLC04 COMMAND USE NETWORK DISCRETE IN
0:0086	DSLC04 COMMAND CHECK INPUT
0:0087	DSLC04 COMMAND PERMISSIVE INPUT
0:0088	DSLC04 COMMAND RUN INPUT
0:0089	DSLC04 COMMAND RAISE VOLTAGE INPUT
0:0090	DSLC04 COMMAND LOWER VOLTAGE INPUT
0:0091	DSLC04 COMMAND BASELOAD INPUT
0:0092	DSLC04 COMMAND LOAD INPUT
0:0093	DSLC04 COMMAND PAUSE INPUT
0:0094	DSLC04 COMMAND RAISE LOAD INPUT
0:0095	DSLC04 COMMAND LOWER LOAD INPUT
0:0096	DSLC04 COMMAND PROCESS ENABLE INPUT
0:0097	DSLC04 BOOLEAN WRITE SPARE 17
0:0098	DSLC04 BOOLEAN WRITE SPARE 18
0:0099	DSLC04 BOOLEAN WRITE SPARE 19
0:0100	DSLC04 BOOLEAN WRITE SPARE 20
0:0101	DSLC05 BOOLEAN WRITE SPARE 01
0:0102	DSLC05 COMMAND USE REMOTE REFERENCE
0:0103	DSLC05 COMMAND USE PROCESS SIGNAL
0:0104	DSLC05 COMMAND CIRCUIT BKR AUX INPUT
0:0105	DSLC05 COMMAND USE NETWORK DISCRETE IN
0:0106	DSLC05 COMMAND CHECK INPUT
0:0107	DSLC05 COMMAND PERMISSIVE INPUT
0:0108	DSLC05 COMMAND RUN INPUT
0:0109	DSLC05 COMMAND RAISE VOLTAGE INPUT
0:0110	DSLC05 COMMAND LOWER VOLTAGE INPUT
0:0111	DSLC05 COMMAND BASELOAD INPUT
0:0112	DSLC05 COMMAND LOAD INPUT
0:0113	DSLC05 COMMAND PAUSE INPUT
0:0114	DSLC05 COMMAND RAISE LOAD INPUT
0:0115	DSLC05 COMMAND LOWER LOAD INPUT
0:0116	DSLC05 COMMAND PROCESS ENABLE INPUT
0:0117	DSLC05 BOOLEAN WRITE SPARE 17
0:0118	DSLC05 BOOLEAN WRITE SPARE 18
0:0119	DSLC05 BOOLEAN WRITE SPARE 19
0:0120	DSLC05 BOOLEAN WRITE SPARE 20
0:0121	DSLC06 BOOLEAN WRITE SPARE 01
0:0122	DSLC06 COMMAND USE REMOTE REFERENCE
0:0123	DSLC06 COMMAND USE PROCESS SIGNAL

0:0124	DSLC06 COMMAND CIRCUIT BKR AUX INPUT
0:0125	DSLC06 COMMAND USE NETWORK DISCRETE IN
0:0126	DSLC06 COMMAND CHECK INPUT
0:0127	DSLC06 COMMAND PERMISSIVE INPUT
0:0128	DSLC06 COMMAND RUN INPUT
0:0129	DSLC06 COMMAND RAISE VOLTAGE INPUT
0:0130	DSLC06 COMMAND LOWER VOLTAGE INPUT
0:0131	DSLC06 COMMAND BASELOAD INPUT
0:0132	DSLC06 COMMAND LOAD INPUT
0:0133	DSLC06 COMMAND PAUSE INPUT
0:0134	DSLC06 COMMAND RAISE LOAD INPUT
0:0135	DSLC06 COMMAND LOWER LOAD INPUT
0:0136	DSLC06 COMMAND PROCESS ENABLE INPUT
0:0137	DSLC06 BOOLEAN WRITE SPARE 17
0:0138	DSLC06 BOOLEAN WRITE SPARE 18
0:0139	DSLC06 BOOLEAN WRITE SPARE 19
0:0140	DSLC06 BOOLEAN WRITE SPARE 20
0:0141	DSLC07 BOOLEAN WRITE SPARE 01
0:0142	DSLC07 COMMAND USE REMOTE REFERENCE
0:0143	DSLC07 COMMAND USE PROCESS SIGNAL
0:0144	DSLC07 COMMAND CIRCUIT BKR AUX INPUT
0:0145	DSLC07 COMMAND USE NETWORK DISCRETE IN
0:0146	DSLC07 COMMAND CHECK INPUT
0:0147	DSLC07 COMMAND PERMISSIVE INPUT
0:0148	DSLC07 COMMAND RUN INPUT
0:0149	DSLC07 COMMAND RAISE VOLTAGE INPUT
0:0150	DSLC07 COMMAND LOWER VOLTAGE INPUT
0:0151	DSLC07 COMMAND BASELOAD INPUT
0:0152	DSLC07 COMMAND LOAD INPUT
0:0153	DSLC07 COMMAND PAUSE INPUT
0:0154	DSLC07 COMMAND RAISE LOAD INPUT
0:0155	DSLC07 COMMAND LOWER LOAD INPUT
0:0156	DSLC07 COMMAND PROCESS ENABLE INPUT
0:0157	DSLC07 BOOLEAN WRITE SPARE 17
0:0158	DSLC07 BOOLEAN WRITE SPARE 18
0:0159	DSLC07 BOOLEAN WRITE SPARE 19
0:0160	DSLC07 BOOLEAN WRITE SPARE 20
0:0161	DSLC08 BOOLEAN WRITE SPARE 01
0:0162	DSLC08 COMMAND USE REMOTE REFERENCE
0:0163	DSLC08 COMMAND USE PROCESS SIGNAL
0:0164	DSLC08 COMMAND CIRCUIT BKR AUX INPUT
0:0165	DSLC08 COMMAND USE NETWORK DISCRETE IN
0:0166	DSLC08 COMMAND CHECK INPUT
0:0167	DSLC08 COMMAND PERMISSIVE INPUT
0:0168	DSLC08 COMMAND RUN INPUT
0:0169	DSLC08 COMMAND RAISE VOLTAGE INPUT
0:0170	DSLC08 COMMAND LOWER VOLTAGE INPUT
0:0171	DSLC08 COMMAND BASELOAD INPUT
0:0172	DSLC08 COMMAND LOAD INPUT
0:0173	DSLC08 COMMAND PAUSE INPUT
0:0174	DSLC08 COMMAND RAISE LOAD INPUT
0:0175	DSLC08 COMMAND LOWER LOAD INPUT
0:0176	DSLC08 COMMAND PROCESS ENABLE INPUT
0:0177	DSLC08 BOOLEAN WRITE SPARE 17
0:0178	DSLC08 BOOLEAN WRITE SPARE 18
0:0179	DSLC08 BOOLEAN WRITE SPARE 19
0:0180	DSLC08 BOOLEAN WRITE SPARE 20
0:0181	DSLC09 BOOLEAN WRITE SPARE 01
0:0182	DSLC09 COMMAND USE REMOTE REFERENCE
0:0183	DSLC09 COMMAND USE PROCESS SIGNAL
0:0184	DSLC09 COMMAND CIRCUIT BKR AUX INPUT
0:0185	DSLC09 COMMAND USE NETWORK DISCRETE IN
0:0186	DSLC09 COMMAND CHECK INPUT
0:0187	DSLC09 COMMAND PERMISSIVE INPUT
0:0188	DSLC09 COMMAND RUN INPUT
0:0189	DSLC09 COMMAND RAISE VOLTAGE INPUT
0:0190	DSLC09 COMMAND LOWER VOLTAGE INPUT
0:0191	DSLC09 COMMAND BASELOAD INPUT
0:0192	DSLC09 COMMAND LOAD INPUT
0:0193	DSLC09 COMMAND PAUSE INPUT
0:0194	DSLC09 COMMAND RAISE LOAD INPUT
0:0195	DSLC09 COMMAND LOWER LOAD INPUT
0:0196	DSLC09 COMMAND PROCESS ENABLE INPUT
0:0197	DSLC09 BOOLEAN WRITE SPARE 17

0:0198	DSLC09 BOOLEAN WRITE SPARE 18
0:0199	DSLC09 BOOLEAN WRITE SPARE 19
0:0200	DSLC09 BOOLEAN WRITE SPARE 20
0:0201	DSLC10 BOOLEAN WRITE SPARE 01
0:0202	DSLC10 COMMAND USE REMOTE REFERENCE
0:0203	DSLC10 COMMAND USE PROCESS SIGNAL
0:0204	DSLC10 COMMAND CIRCUIT BKR AUX INPUT
0:0205	DSLC10 COMMAND USE NETWORK DISCRETE IN
0:0206	DSLC10 COMMAND CHECK INPUT
0:0207	DSLC10 COMMAND PERMISSIVE INPUT
0:0208	DSLC10 COMMAND RUN INPUT
0:0209	DSLC10 COMMAND RAISE VOLTAGE INPUT
0:0210	DSLC10 COMMAND LOWER VOLTAGE INPUT
0:0211	DSLC10 COMMAND BASELOAD INPUT
0:0212	DSLC10 COMMAND LOAD INPUT
0:0213	DSLC10 COMMAND PAUSE INPUT
0:0214	DSLC10 COMMAND RAISE LOAD INPUT
0:0215	DSLC10 COMMAND LOWER LOAD INPUT
0:0216	DSLC10 COMMAND PROCESS ENABLE INPUT
0:0217	DSLC10 BOOLEAN WRITE SPARE 17
0:0218	DSLC10 BOOLEAN WRITE SPARE 18
0:0219	DSLC10 BOOLEAN WRITE SPARE 19
0:0220	DSLC10 BOOLEAN WRITE SPARE 20
0:0221	DSLC11 BOOLEAN WRITE SPARE 01
0:0222	DSLC11 COMMAND USE REMOTE REFERENCE
0:0223	DSLC11 COMMAND USE PROCESS SIGNAL
0:0224	DSLC11 COMMAND CIRCUIT BKR AUX INPUT
0:0225	DSLC11 COMMAND USE NETWORK DISCRETE IN
0:0226	DSLC11 COMMAND CHECK INPUT
0:0227	DSLC11 COMMAND PERMISSIVE INPUT
0:0228	DSLC11 COMMAND RUN INPUT
0:0229	DSLC11 COMMAND RAISE VOLTAGE INPUT
0:0230	DSLC11 COMMAND LOWER VOLTAGE INPUT
0:0231	DSLC11 COMMAND BASELOAD INPUT
0:0232	DSLC11 COMMAND LOAD INPUT
0:0233	DSLC11 COMMAND PAUSE INPUT
0:0234	DSLC11 COMMAND RAISE LOAD INPUT
0:0235	DSLC11 COMMAND LOWER LOAD INPUT
0:0236	DSLC11 COMMAND PROCESS ENABLE INPUT
0:0237	DSLC11 BOOLEAN WRITE SPARE 17
0:0238	DSLC11 BOOLEAN WRITE SPARE 18
0:0239	DSLC11 BOOLEAN WRITE SPARE 19
0:0240	DSLC11 BOOLEAN WRITE SPARE 20
0:0241	DSLC12 BOOLEAN WRITE SPARE 01
0:0242	DSLC12 COMMAND USE REMOTE REFERENCE
0:0243	DSLC12 COMMAND USE PROCESS SIGNAL
0:0244	DSLC12 COMMAND CIRCUIT BKR AUX INPUT
0:0245	DSLC12 COMMAND USE NETWORK DISCRETE IN
0:0246	DSLC12 COMMAND CHECK INPUT
0:0247	DSLC12 COMMAND PERMISSIVE INPUT
0:0248	DSLC12 COMMAND RUN INPUT
0:0249	DSLC12 COMMAND RAISE VOLTAGE INPUT
0:0250	DSLC12 COMMAND LOWER VOLTAGE INPUT
0:0251	DSLC12 COMMAND BASELOAD INPUT
0:0252	DSLC12 COMMAND LOAD INPUT
0:0253	DSLC12 COMMAND PAUSE INPUT
0:0254	DSLC12 COMMAND RAISE LOAD INPUT
0:0255	DSLC12 COMMAND LOWER LOAD INPUT
0:0256	DSLC12 COMMAND PROCESS ENABLE INPUT
0:0257	DSLC12 BOOLEAN WRITE SPARE 17
0:0258	DSLC12 BOOLEAN WRITE SPARE 18
0:0259	DSLC12 BOOLEAN WRITE SPARE 19
0:0260	DSLC12 BOOLEAN WRITE SPARE 20
0:0261	DSLC13 BOOLEAN WRITE SPARE 01
0:0262	DSLC13 COMMAND USE REMOTE REFERENCE
0:0263	DSLC13 COMMAND USE PROCESS SIGNAL
0:0264	DSLC13 COMMAND CIRCUIT BKR AUX INPUT
0:0265	DSLC13 COMMAND USE NETWORK DISCRETE IN
0:0266	DSLC13 COMMAND CHECK INPUT
0:0267	DSLC13 COMMAND PERMISSIVE INPUT
0:0268	DSLC13 COMMAND RUN INPUT
0:0269	DSLC13 COMMAND RAISE VOLTAGE INPUT
0:0270	DSLC13 COMMAND LOWER VOLTAGE INPUT
0:0271	DSLC13 COMMAND BASELOAD INPUT

0:0272	DSLC13 COMMAND LOAD INPUT
0:0273	DSLC13 COMMAND PAUSE INPUT
0:0274	DSLC13 COMMAND RAISE LOAD INPUT
0:0275	DSLC13 COMMAND LOWER LOAD INPUT
0:0276	DSLC13 COMMAND PROCESS ENABLE INPUT
0:0277	DSLC13 BOOLEAN WRITE SPARE 17
0:0278	DSLC13 BOOLEAN WRITE SPARE 18
0:0279	DSLC13 BOOLEAN WRITE SPARE 19
0:0280	DSLC13 BOOLEAN WRITE SPARE 20
0:0281	DSLC14 BOOLEAN WRITE SPARE 01
0:0282	DSLC14 COMMAND USE REMOTE REFERENCE
0:0283	DSLC14 COMMAND USE PROCESS SIGNAL
0:0284	DSLC14 COMMAND CIRCUIT BKR AUX INPUT
0:0285	DSLC14 COMMAND USE NETWORK DISCRETE IN
0:0286	DSLC14 COMMAND CHECK INPUT
0:0287	DSLC14 COMMAND PERMISSIVE INPUT
0:0288	DSLC14 COMMAND RUN INPUT
0:0289	DSLC14 COMMAND RAISE VOLTAGE INPUT
0:0290	DSLC14 COMMAND LOWER VOLTAGE INPUT
0:0291	DSLC14 COMMAND BASELOAD INPUT
0:0292	DSLC14 COMMAND LOAD INPUT
0:0293	DSLC14 COMMAND PAUSE INPUT
0:0294	DSLC14 COMMAND RAISE LOAD INPUT
0:0295	DSLC14 COMMAND LOWER LOAD INPUT
0:0296	DSLC14 COMMAND PROCESS ENABLE INPUT
0:0297	DSLC14 BOOLEAN WRITE SPARE 17
0:0298	DSLC14 BOOLEAN WRITE SPARE 18
0:0299	DSLC14 BOOLEAN WRITE SPARE 19
0:0300	DSLC14 BOOLEAN WRITE SPARE 20

Boolean Reads

Addr	Description
1:0001	MSLC ALARM RELAY
1:0002	MSLC LOW LIMIT ALARM RELAY
1:0003	MSLC HIGH LIMIT ALARM RELAY
1:0004	MSLC LOAD SWITCH #1 RELAY
1:0005	MSLC LOAD SWITCH #2 RELAY
1:0006	MSLC GENERATOR OPEN RELAY
1:0007	MSLC UTILITY BREAKER OPEN RELAY
1:0008	MSLC UTILITY BREAKER CLOSED RELAY
1:0009	MSLC SYNCH TIMEOUT ALARM
1:0010	MSLC SYNCH RECLOSE ALARM
1:0011	MSLC UTILITY HIGH LIMIT ALARM
1:0012	MSLC UTILITY LOW LIMIT ALARM
1:0013	MSLC PROCESS HIGH LIMIT ALARM
1:0014	MSLC PROCESS LOW LIMIT ALARM
1:0015	MSLC VOLTAGE AT HIGH LIMIT ALARM
1:0016	MSLC VOLTAGE AT LOW LIMIT ALARM
1:0017	MSLC GENERATOR BUS AT HIGH LIMIT
1:0018	MSLC GENERATOR BUS AT LOW LIMIT
1:0019	MSLC SYNCH IN OFF MODE
1:0020	MSLC SYNCH IN CHECK MODE
1:0021	MSLC SYNCH IN PERMISSIVE MODE
1:0022	MSLC SYNCH IN RUN MODE
1:0023	MSLC SYNCH IN CLOSE TIMER MODE
1:0024	MSLC SYNCH IN SYNC TIMER MODE
1:0025	MSLC SYNCH IN SYNC MODE
1:0026	MSLC SYNCH IN AUTO OFF MODE
1:0027	MSLC LD CTRL IN OFFLINE MODE
1:0028	MSLC LD CTRL IN BASE LOAD MODE
1:0029	MSLC LD CTRL IN BASE LOAD LOWER MODE
1:0030	MSLC LD CTRL IN BASE LOAD RAISE MODE
1:0031	MSLC LD CTRL IN REMOTE BASE LOAD MODE
1:0032	MSLC LD CTRL IN UTILITY UNLOAD MODE
1:0033	MSLC LD CTRL IN PROCESS RAMP MODE
1:0034	MSLC LD CTRL IN PROCESS CONTROL MODE
1:0035	MSLC LD CTRL IN PROCESS LOWER MODE
1:0036	MSLC LD CTRL IN PROCESS RAISE MODE
1:0037	MSLC LD CTRL IN PROCESS REMOTE MODE
1:0038	MSLC LD CTRL IN IMP/EXP RAMP MODE
1:0039	MSLC LD CTRL IN IMP/EXP CONTROL MODE
1:0040	MSLC LD CTRL IN IMP/EXP LOWER MODE
1:0041	MSLC LD CTRL IN IMP/EXP RAISE MODE

1:0042	MSLC LD CTRL IN IMP/EXP REMOTE MODE
1:0043	MSLC CHECK INPUT CLOSED
1:0044	MSLC PERMISSIVE INPUT CLOSED
1:0045	MSLC RUN INPUT CLOSED
1:0046	MSLC CB AUX INPUT CLOSED
1:0047	MSLC UTILITY UNLOAD INPUT CLOSED
1:0048	MSLC IMPORT/EXPORT INPUT CLOSED
1:0049	MSLC PROCESS ENABLE INPUT CLOSED
1:0050	MSLC RAMP PAUSE INPUT CLOSED
1:0051	MSLC I/E SETPOINT RAISE INPUT CLOSED
1:0052	MSLC I/E SETPOINT LOWER INPUT CLOSED
1:0053	MSLC VOLTAGE RAISE INPUT CLOSED
1:0054	MSLC VOLTAGE LOWER INPUT CLOSED
1:0055	MSLC VOLT REG OUTPUT DRIVER SHUTDOWN
1:0056	MSLC WATCHDOG TIMER
1:0057	MSLC LON FAIL TO TRANSMIT
1:0058	MSLC SPARE BOOLEAN READ 58
1:0059	MSLC SPARE BOOLEAN READ 59
1:0060	MSLC SPARE BOOLEAN READ 60
1:0061	DSLC01 ALARM RELAY
1:0062	DSLC01 LOW LIMIT RELAY
1:0063	DSLC01 HIGH LIMIT RELAY
1:0064	DSLC01 LOAD SWITCH RELAY
1:0065	DSLC01 VOLTAGE LOWER RELAY
1:0066	DSLC01 VOLTAGE RAISE RELAY
1:0067	DSLC01 BREAKER OPEN RELAY
1:0068	DSLC01 BREAKER CLOSE RELAY
1:0069	DSLC01 SYNCH TIMEOUT ALARM
1:0070	DSLC01 SYNCH RECLOSE ALARM
1:0071	DSLC01 LOAD AT HIGH LIMIT ALARM
1:0072	DSLC01 LOAD AT LOW LIMIT ALARM
1:0073	DSLC01 PROCESS AT HIGH LIMIT ALARM
1:0074	DSLC01 PROCESS AT LOW LIMIT ALARM
1:0075	DSLC01 VOLTAGE RANGE ALARM
1:0076	DSLC01 VOLTAGE AT LOW LIMIT ALARM
1:0077	DSLC01 VOLTAGE AT HIGH LIMIT ALARM
1:0078	DSLC01 SYNCH IN OFF MODE
1:0079	DSLC01 SYNCH IN CHECK MODE
1:0080	DSLC01 SYNCH IN PERMISSIVE MODE
1:0081	DSLC01 SYNCH IN RUN MODE
1:0082	DSLC01 SYNCH IN CLOSE TIMER MODE
1:0083	DSLC01 SYNCH IN SYNC TIMER MODE
1:0084	DSLC01 SYNCH IN SYNC MODE
1:0085	DSLC01 SYNCH IN AUTO OFF MODE
1:0086	DSLC01 LD CTRL IN DROOP MODE
1:0087	DSLC01 LD CTRL IN UNLOAD BASELOAD MODE
1:0088	DSLC01 LD CTRL IN BASE LOAD RAMP MODE
1:0089	DSLC01 LD CTRL IN BASE LOAD MODE
1:0090	DSLC01 LD CTRL IN BASE LOAD LOWER MODE
1:0091	DSLC01 LD CTRL IN BASE LOAD RAISE MODE
1:0092	DSLC01 LD CTRL IN REMOTE RAMP MODE
1:0093	DSLC01 LD CTRL IN BASELOAD REMOTE MODE
1:0094	DSLC01 LD CTRL IN UNLOAD PARALLEL MODE
1:0095	DSLC01 LD CTRL IN PARALLEL RAMP MODE
1:0096	DSLC01 LD CTRL IN PARALLEL MODE
1:0097	DSLC01 LD CTRL IN UNLOAD RAMP MODE
1:0098	DSLC01 LD CTRL IN PROCESS RAMP MODE
1:0099	DSLC01 LD CTRL IN PROCESS LOCAL MODE
1:0100	DSLC01 LD CTRL IN PROCESS LOWER MODE
1:0101	DSLC01 LD CTRL IN PROCESS RAISE MODE
1:0102	DSLC01 LD CTRL IN PROCESS REMOTE MODE
1:0103	DSLC01 CHECK INPUT CLOSED
1:0104	DSLC01 PERMISSIVE INPUT CLOSED
1:0105	DSLC01 RUN INPUT CLOSED
1:0106	DSLC01 CB AUX INPUT CLOSED
1:0107	DSLC01 VOLTAGE RAISE INPUT CLOSED
1:0108	DSLC01 VOLTAGE LOWER INPUT CLOSED
1:0109	DSLC01 BASE LOAD INPUT CLOSED
1:0110	DSLC01 LOAD/UNLOAD INPUT CLOSED
1:0111	DSLC01 RAMP PAUSE INPUT CLOSED
1:0112	DSLC01 LOAD RAISE INPUT CLOSED
1:0113	DSLC01 LOAD LOWER INPUT CLOSED
1:0114	DSLC01 PROCESS ENABLE INPUT CLOSED
1:0115	DSLC01 VOLT REG OUTPUT DRIVER SHUTDOWN

1:0116	DSLC01 WATCHDOG TIMER
1:0117	DSLC01 LON FAIL TO TRANSMIT
1:0118	DSLC01 SPARE BOOLEAN READ 58
1:0119	DSLC01 SPARE BOOLEAN READ 59
1:0120	DSLC01 SPARE BOOLEAN READ 60
1:0121	DSLC02 ALARM RELAY
1:0122	DSLC02 LOW LIMIT RELAY
1:0123	DSLC02 HIGH LIMIT RELAY
1:0124	DSLC02 LOAD SWITCH RELAY
1:0125	DSLC02 VOLTAGE LOWER RELAY
1:0126	DSLC02 VOLTAGE RAISE RELAY
1:0127	DSLC02 BREAKER OPEN RELAY
1:0128	DSLC02 BREAKER CLOSE RELAY
1:0129	DSLC02 SYNCH TIMEOUT ALARM
1:0130	DSLC02 SYNCH RECLOSE ALARM
1:0131	DSLC02 LOAD AT HIGH LIMIT ALARM
1:0132	DSLC02 LOAD AT LOW LIMIT ALARM
1:0133	DSLC02 PROCESS AT HIGH LIMIT ALARM
1:0134	DSLC02 PROCESS AT LOW LIMIT ALARM
1:0135	DSLC02 VOLTAGE RANGE ALARM
1:0136	DSLC02 VOLTAGE AT LOW LIMIT ALARM
1:0137	DSLC02 VOLTAGE AT HIGH LIMIT ALARM
1:0138	DSLC02 SYNCH IN OFF MODE
1:0139	DSLC02 SYNCH IN CHECK MODE
1:0140	DSLC02 SYNCH IN PERMISSIVE MODE
1:0141	DSLC02 SYNCH IN RUN MODE
1:0142	DSLC02 SYNCH IN CLOSE TIMER MODE
1:0143	DSLC02 SYNCH IN SYNC TIMER MODE
1:0144	DSLC02 SYNCH IN SYNC MODE
1:0145	DSLC02 SYNCH IN AUTO OFF MODE
1:0146	DSLC02 LD CTRL IN DROOP MODE
1:0147	DSLC02 LD CTRL IN UNLOAD BASELOAD MODE
1:0148	DSLC02 LD CTRL IN BASE LOAD RAMP MODE
1:0149	DSLC02 LD CTRL IN BASE LOAD MODE
1:0150	DSLC02 LD CTRL IN BASE LOAD LOWER MODE
1:0151	DSLC02 LD CTRL IN BASE LOAD RAISE MODE
1:0152	DSLC02 LD CTRL IN REMOTE RAMP MODE
1:0153	DSLC02 LD CTRL IN BASELOAD REMOTE MODE
1:0154	DSLC02 LD CTRL IN UNLOAD PARALLEL MODE
1:0155	DSLC02 LD CTRL IN PARALLEL RAMP MODE
1:0156	DSLC02 LD CTRL IN PARALLEL MODE
1:0157	DSLC02 LD CTRL IN UNLOAD RAMP MODE
1:0158	DSLC02 LD CTRL IN PROCESS RAMP MODE
1:0159	DSLC02 LD CTRL IN PROCESS LOCAL MODE
1:0160	DSLC02 LD CTRL IN PROCESS LOWER MODE
1:0161	DSLC02 LD CTRL IN PROCESS RAISE MODE
1:0162	DSLC02 LD CTRL IN PROCESS REMOTE MODE
1:0163	DSLC02 CHECK INPUT CLOSED
1:0164	DSLC02 PERMISSIVE INPUT CLOSED
1:0165	DSLC02 RUN INPUT CLOSED
1:0166	DSLC02 CB AUX INPUT CLOSED
1:0167	DSLC02 VOLTAGE RAISE INPUT CLOSED
1:0168	DSLC02 VOLTAGE LOWER INPUT CLOSED
1:0169	DSLC02 BASE LOAD INPUT CLOSED
1:0170	DSLC02 LOAD/UNLOAD INPUT CLOSED
1:0171	DSLC02 RAMP PAUSE INPUT CLOSED
1:0172	DSLC02 LOAD RAISE INPUT CLOSED
1:0173	DSLC02 LOAD LOWER INPUT CLOSED
1:0174	DSLC02 PROCESS ENABLE INPUT CLOSED
1:0175	DSLC02 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0176	DSLC02 WATCHDOG TIMER
1:0177	DSLC02 LON FAIL TO TRANSMIT
1:0178	DSLC02 SPARE BOOLEAN READ 58
1:0179	DSLC02 SPARE BOOLEAN READ 59
1:0180	DSLC02 SPARE BOOLEAN READ 60
1:0181	DSLC03 ALARM RELAY
1:0182	DSLC03 LOW LIMIT RELAY
1:0183	DSLC03 HIGH LIMIT RELAY
1:0184	DSLC03 LOAD SWITCH RELAY
1:0185	DSLC03 VOLTAGE LOWER RELAY
1:0186	DSLC03 VOLTAGE RAISE RELAY
1:0187	DSLC03 BREAKER OPEN RELAY
1:0188	DSLC03 BREAKER CLOSE RELAY
1:0189	DSLC03 SYNCH TIMEOUT ALARM

1:0190	DSLC03 SYNCH RECLOSE ALARM
1:0191	DSLC03 LOAD AT HIGH LIMIT ALARM
1:0192	DSLC03 LOAD AT LOW LIMIT ALARM
1:0193	DSLC03 PROCESS AT HIGH LIMIT ALARM
1:0194	DSLC03 PROCESS AT LOW LIMIT ALARM
1:0195	DSLC03 VOLTAGE RANGE ALARM
1:0196	DSLC03 VOLTAGE AT LOW LIMIT ALARM
1:0197	DSLC03 VOLTAGE AT HIGH LIMIT ALARM
1:0198	DSLC03 SYNCH IN OFF MODE
1:0199	DSLC03 SYNCH IN CHECK MODE
1:0200	DSLC03 SYNCH IN PERMISSIVE MODE
1:0201	DSLC03 SYNCH IN RUN MODE
1:0202	DSLC03 SYNCH IN CLOSE TIMER MODE
1:0203	DSLC03 SYNCH IN SYNC TIMER MODE
1:0204	DSLC03 SYNCH IN SYNC MODE
1:0205	DSLC03 SYNCH IN AUTO OFF MODE
1:0206	DSLC03 LD CTRL IN DROOP MODE
1:0207	DSLC03 LD CTRL IN UNLOAD BASELOAD MODE
1:0208	DSLC03 LD CTRL IN BASE LOAD RAMP MODE
1:0209	DSLC03 LD CTRL IN BASE LOAD MODE
1:0210	DSLC03 LD CTRL IN BASE LOAD LOWER MODE
1:0211	DSLC03 LD CTRL IN BASE LOAD RAISE MODE
1:0212	DSLC03 LD CTRL IN REMOTE RAMP MODE
1:0213	DSLC03 LD CTRL IN BASELOAD REMOTE MODE
1:0214	DSLC03 LD CTRL IN UNLOAD PARALLEL MODE
1:0215	DSLC03 LD CTRL IN PARALLEL RAMP MODE
1:0216	DSLC03 LD CTRL IN PARALLEL MODE
1:0217	DSLC03 LD CTRL IN UNLOAD RAMP MODE
1:0218	DSLC03 LD CTRL IN PROCESS RAMP MODE
1:0219	DSLC03 LD CTRL IN PROCESS LOCAL MODE
1:0220	DSLC03 LD CTRL IN PROCESS LOWER MODE
1:0221	DSLC03 LD CTRL IN PROCESS RAISE MODE
1:0222	DSLC03 LD CTRL IN PROCESS REMOTE MODE
1:0223	DSLC03 CHECK INPUT CLOSED
1:0224	DSLC03 PERMISSIVE INPUT CLOSED
1:0225	DSLC03 RUN INPUT CLOSED
1:0226	DSLC03 CB AUX INPUT CLOSED
1:0227	DSLC03 VOLTAGE RAISE INPUT CLOSED
1:0228	DSLC03 VOLTAGE LOWER INPUT CLOSED
1:0229	DSLC03 BASE LOAD INPUT CLOSED
1:0230	DSLC03 LOAD/UNLOAD INPUT CLOSED
1:0231	DSLC03 RAMP PAUSE INPUT CLOSED
1:0232	DSLC03 LOAD RAISE INPUT CLOSED
1:0233	DSLC03 LOAD LOWER INPUT CLOSED
1:0234	DSLC03 PROCESS ENABLE INPUT CLOSED
1:0235	DSLC03 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0236	DSLC03 WATCHDOG TIMER
1:0237	DSLC03 LON FAIL TO TRANSMIT
1:0238	DSLC03 SPARE BOOLEAN READ 58
1:0239	DSLC03 SPARE BOOLEAN READ 59
1:0240	DSLC03 SPARE BOOLEAN READ 60
1:0241	DSLC04 ALARM RELAY
1:0242	DSLC04 LOW LIMIT RELAY
1:0243	DSLC04 HIGH LIMIT RELAY
1:0244	DSLC04 LOAD SWITCH RELAY
1:0245	DSLC04 VOLTAGE LOWER RELAY
1:0246	DSLC04 VOLTAGE RAISE RELAY
1:0247	DSLC04 BREAKER OPEN RELAY
1:0248	DSLC04 BREAKER CLOSE RELAY
1:0249	DSLC04 SYNCH TIMEOUT ALARM
1:0250	DSLC04 SYNCH RECLOSE ALARM
1:0251	DSLC04 LOAD AT HIGH LIMIT ALARM
1:0252	DSLC04 LOAD AT LOW LIMIT ALARM
1:0253	DSLC04 PROCESS AT HIGH LIMIT ALARM
1:0254	DSLC04 PROCESS AT LOW LIMIT ALARM
1:0255	DSLC04 VOLTAGE RANGE ALARM
1:0256	DSLC04 VOLTAGE AT LOW LIMIT ALARM
1:0257	DSLC04 VOLTAGE AT HIGH LIMIT ALARM
1:0258	DSLC04 SYNCH IN OFF MODE
1:0259	DSLC04 SYNCH IN CHECK MODE
1:0260	DSLC04 SYNCH IN PERMISSIVE MODE
1:0261	DSLC04 SYNCH IN RUN MODE
1:0262	DSLC04 SYNCH IN CLOSE TIMER MODE
1:0263	DSLC04 SYNCH IN SYNC TIMER MODE

1:0264 DSLC04 SYNCH IN SYNC MODE
1:0265 DSLC04 SYNCH IN AUTO OFF MODE
1:0266 DSLC04 LD CTRL IN DROOP MODE
1:0267 DSLC04 LD CTRL IN UNLOAD BASELOAD MODE
1:0268 DSLC04 LD CTRL IN BASE LOAD RAMP MODE
1:0269 DSLC04 LD CTRL IN BASE LOAD MODE
1:0270 DSLC04 LD CTRL IN BASE LOAD LOWER MODE
1:0271 DSLC04 LD CTRL IN BASE LOAD RAISE MODE
1:0272 DSLC04 LD CTRL IN REMOTE RAMP MODE
1:0273 DSLC04 LD CTRL IN BASELOAD REMOTE MODE
1:0274 DSLC04 LD CTRL IN UNLOAD PARALLEL MODE
1:0275 DSLC04 LD CTRL IN PARALLEL RAMP MODE
1:0276 DSLC04 LD CTRL IN PARALLEL MODE
1:0277 DSLC04 LD CTRL IN UNLOAD RAMP MODE
1:0278 DSLC04 LD CTRL IN PROCESS RAMP MODE
1:0279 DSLC04 LD CTRL IN PROCESS LOCAL MODE
1:0280 DSLC04 LD CTRL IN PROCESS LOWER MODE
1:0281 DSLC04 LD CTRL IN PROCESS RAISE MODE
1:0282 DSLC04 LD CTRL IN PROCESS REMOTE MODE
1:0283 DSLC04 CHECK INPUT CLOSED
1:0284 DSLC04 PERMISSIVE INPUT CLOSED
1:0285 DSLC04 RUN INPUT CLOSED
1:0286 DSLC04 CB AUX INPUT CLOSED
1:0287 DSLC04 VOLTAGE RAISE INPUT CLOSED
1:0288 DSLC04 VOLTAGE LOWER INPUT CLOSED
1:0289 DSLC04 BASE LOAD INPUT CLOSED
1:0290 DSLC04 LOAD/UNLOAD INPUT CLOSED
1:0291 DSLC04 RAMP PAUSE INPUT CLOSED
1:0292 DSLC04 LOAD RAISE INPUT CLOSED
1:0293 DSLC04 LOAD LOWER INPUT CLOSED
1:0294 DSLC04 PROCESS ENABLE INPUT CLOSED
1:0295 DSLC04 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0296 DSLC04 WATCHDOG TIMER
1:0297 DSLC04 LON FAIL TO TRANSMIT
1:0298 DSLC04 SPARE BOOLEAN READ 58
1:0299 DSLC04 SPARE BOOLEAN READ 59
1:0300 DSLC04 SPARE BOOLEAN READ 60
1:0301 DSLC05 ALARM RELAY
1:0302 DSLC05 LOW LIMIT RELAY
1:0303 DSLC05 HIGH LIMIT RELAY
1:0304 DSLC05 LOAD SWITCH RELAY
1:0305 DSLC05 VOLTAGE LOWER RELAY
1:0306 DSLC05 VOLTAGE RAISE RELAY
1:0307 DSLC05 BREAKER OPEN RELAY
1:0308 DSLC05 BREAKER CLOSE RELAY
1:0309 DSLC05 SYNCH TIMEOUT ALARM
1:0310 DSLC05 SYNCH RECLOSE ALARM
1:0311 DSLC05 LOAD AT HIGH LIMIT ALARM
1:0312 DSLC05 LOAD AT LOW LIMIT ALARM
1:0313 DSLC05 PROCESS AT HIGH LIMIT ALARM
1:0314 DSLC05 PROCESS AT LOW LIMIT ALARM
1:0315 DSLC05 VOLTAGE RANGE ALARM
1:0316 DSLC05 VOLTAGE AT LOW LIMIT ALARM
1:0317 DSLC05 VOLTAGE AT HIGH LIMIT ALARM
1:0318 DSLC05 SYNCH IN OFF MODE
1:0319 DSLC05 SYNCH IN CHECK MODE
1:0320 DSLC05 SYNCH IN PERMISSIVE MODE
1:0321 DSLC05 SYNCH IN RUN MODE
1:0322 DSLC05 SYNCH IN CLOSE TIMER MODE
1:0323 DSLC05 SYNCH IN SYNC TIMER MODE
1:0324 DSLC05 SYNCH IN SYNC MODE
1:0325 DSLC05 SYNCH IN AUTO OFF MODE
1:0326 DSLC05 LD CTRL IN DROOP MODE
1:0327 DSLC05 LD CTRL IN UNLOAD BASELOAD MODE
1:0328 DSLC05 LD CTRL IN BASE LOAD RAMP MODE
1:0329 DSLC05 LD CTRL IN BASE LOAD MODE
1:0330 DSLC05 LD CTRL IN BASE LOAD LOWER MODE
1:0331 DSLC05 LD CTRL IN BASE LOAD RAISE MODE
1:0332 DSLC05 LD CTRL IN REMOTE RAMP MODE
1:0333 DSLC05 LD CTRL IN BASELOAD REMOTE MODE
1:0334 DSLC05 LD CTRL IN UNLOAD PARALLEL MODE
1:0335 DSLC05 LD CTRL IN PARALLEL RAMP MODE
1:0336 DSLC05 LD CTRL IN PARALLEL MODE
1:0337 DSLC05 LD CTRL IN UNLOAD RAMP MODE

1:0338	DSLC05 LD CTRL IN PROCESS RAMP MODE
1:0339	DSLC05 LD CTRL IN PROCESS LOCAL MODE
1:0340	DSLC05 LD CTRL IN PROCESS LOWER MODE
1:0341	DSLC05 LD CTRL IN PROCESS RAISE MODE
1:0342	DSLC05 LD CTRL IN PROCESS REMOTE MODE
1:0343	DSLC05 CHECK INPUT CLOSED
1:0344	DSLC05 PERMISSIVE INPUT CLOSED
1:0345	DSLC05 RUN INPUT CLOSED
1:0346	DSLC05 CB AUX INPUT CLOSED
1:0347	DSLC05 VOLTAGE RAISE INPUT CLOSED
1:0348	DSLC05 VOLTAGE LOWER INPUT CLOSED
1:0349	DSLC05 BASE LOAD INPUT CLOSED
1:0350	DSLC05 LOAD/UNLOAD INPUT CLOSED
1:0351	DSLC05 RAMP PAUSE INPUT CLOSED
1:0352	DSLC05 LOAD RAISE INPUT CLOSED
1:0353	DSLC05 LOAD LOWER INPUT CLOSED
1:0354	DSLC05 PROCESS ENABLE INPUT CLOSED
1:0355	DSLC05 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0356	DSLC05 WATCHDOG TIMER
1:0357	DSLC05 LON FAIL TO TRANSMIT
1:0358	DSLC05 SPARE BOOLEAN READ 58
1:0359	DSLC05 SPARE BOOLEAN READ 59
1:0360	DSLC05 SPARE BOOLEAN READ 60
1:0361	DSLC06 ALARM RELAY
1:0362	DSLC06 LOW LIMIT RELAY
1:0363	DSLC06 HIGH LIMIT RELAY
1:0364	DSLC06 LOAD SWITCH RELAY
1:0365	DSLC06 VOLTAGE LOWER RELAY
1:0366	DSLC06 VOLTAGE RAISE RELAY
1:0367	DSLC06 BREAKER OPEN RELAY
1:0368	DSLC06 BREAKER CLOSE RELAY
1:0369	DSLC06 SYNCH TIMEOUT ALARM
1:0370	DSLC06 SYNCH RECLOSE ALARM
1:0371	DSLC06 LOAD AT HIGH LIMIT ALARM
1:0372	DSLC06 LOAD AT LOW LIMIT ALARM
1:0373	DSLC06 PROCESS AT HIGH LIMIT ALARM
1:0374	DSLC06 PROCESS AT LOW LIMIT ALARM
1:0375	DSLC06 VOLTAGE RANGE ALARM
1:0376	DSLC06 VOLTAGE AT LOW LIMIT ALARM
1:0377	DSLC06 VOLTAGE AT HIGH LIMIT ALARM
1:0378	DSLC06 SYNCH IN OFF MODE
1:0379	DSLC06 SYNCH IN CHECK MODE
1:0380	DSLC06 SYNCH IN PERMISSIVE MODE
1:0381	DSLC06 SYNCH IN RUN MODE
1:0382	DSLC06 SYNCH IN CLOSE TIMER MODE
1:0383	DSLC06 SYNCH IN SYNC TIMER MODE
1:0384	DSLC06 SYNCH IN SYNC MODE
1:0385	DSLC06 SYNCH IN AUTO OFF MODE
1:0386	DSLC06 LD CTRL IN DROOP MODE
1:0387	DSLC06 LD CTRL IN UNLOAD BASELOAD MODE
1:0388	DSLC06 LD CTRL IN BASE LOAD RAMP MODE
1:0389	DSLC06 LD CTRL IN BASE LOAD MODE
1:0390	DSLC06 LD CTRL IN BASE LOAD LOWER MODE
1:0391	DSLC06 LD CTRL IN BASE LOAD RAISE MODE
1:0392	DSLC06 LD CTRL IN REMOTE RAMP MODE
1:0393	DSLC06 LD CTRL IN BASELOAD REMOTE MODE
1:0394	DSLC06 LD CTRL IN UNLOAD PARALLEL MODE
1:0395	DSLC06 LD CTRL IN PARALLEL RAMP MODE
1:0396	DSLC06 LD CTRL IN PARALLEL MODE
1:0397	DSLC06 LD CTRL IN UNLOAD RAMP MODE
1:0398	DSLC06 LD CTRL IN PROCESS RAMP MODE
1:0399	DSLC06 LD CTRL IN PROCESS LOCAL MODE
1:0400	DSLC06 LD CTRL IN PROCESS LOWER MODE
1:0401	DSLC06 LD CTRL IN PROCESS RAISE MODE
1:0402	DSLC06 LD CTRL IN PROCESS REMOTE MODE
1:0403	DSLC06 CHECK INPUT CLOSED
1:0404	DSLC06 PERMISSIVE INPUT CLOSED
1:0405	DSLC06 RUN INPUT CLOSED
1:0406	DSLC06 CB AUX INPUT CLOSED
1:0407	DSLC06 VOLTAGE RAISE INPUT CLOSED
1:0408	DSLC06 VOLTAGE LOWER INPUT CLOSED
1:0409	DSLC06 BASE LOAD INPUT CLOSED
1:0410	DSLC06 LOAD/UNLOAD INPUT CLOSED
1:0411	DSLC06 RAMP PAUSE INPUT CLOSED

1:0412	DSLC06 LOAD RAISE INPUT CLOSED
1:0413	DSLC06 LOAD LOWER INPUT CLOSED
1:0414	DSLC06 PROCESS ENABLE INPUT CLOSED
1:0415	DSLC06 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0416	DSLC06 WATCHDOG TIMER
1:0417	DSLC06 LON FAIL TO TRANSMIT
1:0418	DSLC06 SPARE BOOLEAN READ 58
1:0419	DSLC06 SPARE BOOLEAN READ 59
1:0420	DSLC06 SPARE BOOLEAN READ 60
1:0421	DSLC07 ALARM RELAY
1:0422	DSLC07 LOW LIMIT RELAY
1:0423	DSLC07 HIGH LIMIT RELAY
1:0424	DSLC07 LOAD SWITCH RELAY
1:0425	DSLC07 VOLTAGE LOWER RELAY
1:0426	DSLC07 VOLTAGE RAISE RELAY
1:0427	DSLC07 BREAKER OPEN RELAY
1:0428	DSLC07 BREAKER CLOSE RELAY
1:0429	DSLC07 SYNCH TIMEOUT ALARM
1:0430	DSLC07 SYNCH RECLOSE ALARM
1:0431	DSLC07 LOAD AT HIGH LIMIT ALARM
1:0432	DSLC07 LOAD AT LOW LIMIT ALARM
1:0433	DSLC07 PROCESS AT HIGH LIMIT ALARM
1:0434	DSLC07 PROCESS AT LOW LIMIT ALARM
1:0435	DSLC07 VOLTAGE RANGE ALARM
1:0436	DSLC07 VOLTAGE AT LOW LIMIT ALARM
1:0437	DSLC07 VOLTAGE AT HIGH LIMIT ALARM
1:0438	DSLC07 SYNCH IN OFF MODE
1:0439	DSLC07 SYNCH IN CHECK MODE
1:0440	DSLC07 SYNCH IN PERMISSIVE MODE
1:0441	DSLC07 SYNCH IN RUN MODE
1:0442	DSLC07 SYNCH IN CLOSE TIMER MODE
1:0443	DSLC07 SYNCH IN SYNC TIMER MODE
1:0444	DSLC07 SYNCH IN SYNC MODE
1:0445	DSLC07 SYNCH IN AUTO OFF MODE
1:0446	DSLC07 LD CTRL IN DROOP MODE
1:0447	DSLC07 LD CTRL IN UNLOAD BASELOAD MODE
1:0448	DSLC07 LD CTRL IN BASE LOAD RAMP MODE
1:0449	DSLC07 LD CTRL IN BASE LOAD MODE
1:0450	DSLC07 LD CTRL IN BASE LOAD LOWER MODE
1:0451	DSLC07 LD CTRL IN BASE LOAD RAISE MODE
1:0452	DSLC07 LD CTRL IN REMOTE RAMP MODE
1:0453	DSLC07 LD CTRL IN BASELOAD REMOTE MODE
1:0454	DSLC07 LD CTRL IN UNLOAD PARALLEL MODE
1:0455	DSLC07 LD CTRL IN PARALLEL RAMP MODE
1:0456	DSLC07 LD CTRL IN PARALLEL MODE
1:0457	DSLC07 LD CTRL IN UNLOAD RAMP MODE
1:0458	DSLC07 LD CTRL IN PROCESS RAMP MODE
1:0459	DSLC07 LD CTRL IN PROCESS LOCAL MODE
1:0460	DSLC07 LD CTRL IN PROCESS LOWER MODE
1:0461	DSLC07 LD CTRL IN PROCESS RAISE MODE
1:0462	DSLC07 LD CTRL IN PROCESS REMOTE MODE
1:0463	DSLC07 CHECK INPUT CLOSED
1:0464	DSLC07 PERMISSIVE INPUT CLOSED
1:0465	DSLC07 RUN INPUT CLOSED
1:0466	DSLC07 CB AUX INPUT CLOSED
1:0467	DSLC07 VOLTAGE RAISE INPUT CLOSED
1:0468	DSLC07 VOLTAGE LOWER INPUT CLOSED
1:0469	DSLC07 BASE LOAD INPUT CLOSED
1:0470	DSLC07 LOAD/UNLOAD INPUT CLOSED
1:0471	DSLC07 RAMP PAUSE INPUT CLOSED
1:0472	DSLC07 LOAD RAISE INPUT CLOSED
1:0473	DSLC07 LOAD LOWER INPUT CLOSED
1:0474	DSLC07 PROCESS ENABLE INPUT CLOSED
1:0475	DSLC07 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0476	DSLC07 WATCHDOG TIMER
1:0477	DSLC07 LON FAIL TO TRANSMIT
1:0478	DSLC07 SPARE BOOLEAN READ 58
1:0479	DSLC07 SPARE BOOLEAN READ 59
1:0480	DSLC07 SPARE BOOLEAN READ 60
1:0481	DSLC08 ALARM RELAY
1:0482	DSLC08 LOW LIMIT RELAY
1:0483	DSLC08 HIGH LIMIT RELAY
1:0484	DSLC08 LOAD SWITCH RELAY
1:0485	DSLC08 VOLTAGE LOWER RELAY

1:0486	DSLC08 VOLTAGE RAISE RELAY
1:0487	DSLC08 BREAKER OPEN RELAY
1:0488	DSLC08 BREAKER CLOSE RELAY
1:0489	DSLC08 SYNCH TIMEOUT ALARM
1:0490	DSLC08 SYNCH RECLOSE ALARM
1:0491	DSLC08 LOAD AT HIGH LIMIT ALARM
1:0492	DSLC08 LOAD AT LOW LIMIT ALARM
1:0493	DSLC08 PROCESS AT HIGH LIMIT ALARM
1:0494	DSLC08 PROCESS AT LOW LIMIT ALARM
1:0495	DSLC08 VOLTAGE RANGE ALARM
1:0496	DSLC08 VOLTAGE AT LOW LIMIT ALARM
1:0497	DSLC08 VOLTAGE AT HIGH LIMIT ALARM
1:0498	DSLC08 SYNCH IN OFF MODE
1:0499	DSLC08 SYNCH IN CHECK MODE
1:0500	DSLC08 SYNCH IN PERMISSIVE MODE
1:0501	DSLC08 SYNCH IN RUN MODE
1:0502	DSLC08 SYNCH IN CLOSE TIMER MODE
1:0503	DSLC08 SYNCH IN SYNC TIMER MODE
1:0504	DSLC08 SYNCH IN SYNC MODE
1:0505	DSLC08 SYNCH IN AUTO OFF MODE
1:0506	DSLC08 LD CTRL IN DROOP MODE
1:0507	DSLC08 LD CTRL IN UNLOAD BASELOAD MODE
1:0508	DSLC08 LD CTRL IN BASE LOAD RAMP MODE
1:0509	DSLC08 LD CTRL IN BASE LOAD MODE
1:0510	DSLC08 LD CTRL IN BASE LOAD LOWER MODE
1:0511	DSLC08 LD CTRL IN BASE LOAD RAISE MODE
1:0512	DSLC08 LD CTRL IN REMOTE RAMP MODE
1:0513	DSLC08 LD CTRL IN BASELOAD REMOTE MODE
1:0514	DSLC08 LD CTRL IN UNLOAD PARALLEL MODE
1:0515	DSLC08 LD CTRL IN PARALLEL RAMP MODE
1:0516	DSLC08 LD CTRL IN PARALLEL MODE
1:0517	DSLC08 LD CTRL IN UNLOAD RAMP MODE
1:0518	DSLC08 LD CTRL IN PROCESS RAMP MODE
1:0519	DSLC08 LD CTRL IN PROCESS LOCAL MODE
1:0520	DSLC08 LD CTRL IN PROCESS LOWER MODE
1:0521	DSLC08 LD CTRL IN PROCESS RAISE MODE
1:0522	DSLC08 LD CTRL IN PROCESS REMOTE MODE
1:0523	DSLC08 CHECK INPUT CLOSED
1:0524	DSLC08 PERMISSIVE INPUT CLOSED
1:0525	DSLC08 RUN INPUT CLOSED
1:0526	DSLC08 CB AUX INPUT CLOSED
1:0527	DSLC08 VOLTAGE RAISE INPUT CLOSED
1:0528	DSLC08 VOLTAGE LOWER INPUT CLOSED
1:0529	DSLC08 BASE LOAD INPUT CLOSED
1:0530	DSLC08 LOAD/UNLOAD INPUT CLOSED
1:0531	DSLC08 RAMP PAUSE INPUT CLOSED
1:0532	DSLC08 LOAD RAISE INPUT CLOSED
1:0533	DSLC08 LOAD LOWER INPUT CLOSED
1:0534	DSLC08 PROCESS ENABLE INPUT CLOSED
1:0535	DSLC08 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0536	DSLC08 WATCHDOG TIMER
1:0537	DSLC08 LON FAIL TO TRANSMIT
1:0538	DSLC08 SPARE BOOLEAN READ 58
1:0539	DSLC08 SPARE BOOLEAN READ 59
1:0540	DSLC08 SPARE BOOLEAN READ 60
1:0541	DSLC09 ALARM RELAY
1:0542	DSLC09 LOW LIMIT RELAY
1:0543	DSLC09 HIGH LIMIT RELAY
1:0544	DSLC09 LOAD SWITCH RELAY
1:0545	DSLC09 VOLTAGE LOWER RELAY
1:0546	DSLC09 VOLTAGE RAISE RELAY
1:0547	DSLC09 BREAKER OPEN RELAY
1:0548	DSLC09 BREAKER CLOSE RELAY
1:0549	DSLC09 SYNCH TIMEOUT ALARM
1:0550	DSLC09 SYNCH RECLOSE ALARM
1:0551	DSLC09 LOAD AT HIGH LIMIT ALARM
1:0552	DSLC09 LOAD AT LOW LIMIT ALARM
1:0553	DSLC09 PROCESS AT HIGH LIMIT ALARM
1:0554	DSLC09 PROCESS AT LOW LIMIT ALARM
1:0555	DSLC09 VOLTAGE RANGE ALARM
1:0556	DSLC09 VOLTAGE AT LOW LIMIT ALARM
1:0557	DSLC09 VOLTAGE AT HIGH LIMIT ALARM
1:0558	DSLC09 SYNCH IN OFF MODE
1:0559	DSLC09 SYNCH IN CHECK MODE

1:0560	DSLC09 SYNCH IN PERMISSIVE MODE
1:0561	DSLC09 SYNCH IN RUN MODE
1:0562	DSLC09 SYNCH IN CLOSE TIMER MODE
1:0563	DSLC09 SYNCH IN SYNC TIMER MODE
1:0564	DSLC09 SYNCH IN SYNC MODE
1:0565	DSLC09 SYNCH IN AUTO OFF MODE
1:0566	DSLC09 LD CTRL IN DROOP MODE
1:0567	DSLC09 LD CTRL IN UNLOAD BASELOAD MODE
1:0568	DSLC09 LD CTRL IN BASE LOAD RAMP MODE
1:0569	DSLC09 LD CTRL IN BASE LOAD MODE
1:0570	DSLC09 LD CTRL IN BASE LOAD LOWER MODE
1:0571	DSLC09 LD CTRL IN BASE LOAD RAISE MODE
1:0572	DSLC09 LD CTRL IN REMOTE RAMP MODE
1:0573	DSLC09 LD CTRL IN BASELOAD REMOTE MODE
1:0574	DSLC09 LD CTRL IN UNLOAD PARALLEL MODE
1:0575	DSLC09 LD CTRL IN PARALLEL RAMP MODE
1:0576	DSLC09 LD CTRL IN PARALLEL MODE
1:0577	DSLC09 LD CTRL IN UNLOAD RAMP MODE
1:0578	DSLC09 LD CTRL IN PROCESS RAMP MODE
1:0579	DSLC09 LD CTRL IN PROCESS LOCAL MODE
1:0580	DSLC09 LD CTRL IN PROCESS LOWER MODE
1:0581	DSLC09 LD CTRL IN PROCESS RAISE MODE
1:0582	DSLC09 LD CTRL IN PROCESS REMOTE MODE
1:0583	DSLC09 CHECK INPUT CLOSED
1:0584	DSLC09 PERMISSIVE INPUT CLOSED
1:0585	DSLC09 RUN INPUT CLOSED
1:0586	DSLC09 CB AUX INPUT CLOSED
1:0587	DSLC09 VOLTAGE RAISE INPUT CLOSED
1:0588	DSLC09 VOLTAGE LOWER INPUT CLOSED
1:0589	DSLC09 BASE LOAD INPUT CLOSED
1:0590	DSLC09 LOAD/UNLOAD INPUT CLOSED
1:0591	DSLC09 RAMP PAUSE INPUT CLOSED
1:0592	DSLC09 LOAD RAISE INPUT CLOSED
1:0593	DSLC09 LOAD LOWER INPUT CLOSED
1:0594	DSLC09 PROCESS ENABLE INPUT CLOSED
1:0595	DSLC09 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0596	DSLC09 WATCHDOG TIMER
1:0597	DSLC09 LON FAIL TO TRANSMIT
1:0598	DSLC09 SPARE BOOLEAN READ 58
1:0599	DSLC09 SPARE BOOLEAN READ 59
1:0600	DSLC09 SPARE BOOLEAN READ 60
1:0601	DSLC10 ALARM RELAY
1:0602	DSLC10 LOW LIMIT RELAY
1:0603	DSLC10 HIGH LIMIT RELAY
1:0604	DSLC10 LOAD SWITCH RELAY
1:0605	DSLC10 VOLTAGE LOWER RELAY
1:0606	DSLC10 VOLTAGE RAISE RELAY
1:0607	DSLC10 BREAKER OPEN RELAY
1:0608	DSLC10 BREAKER CLOSE RELAY
1:0609	DSLC10 SYNCH TIMEOUT ALARM
1:0610	DSLC10 SYNCH RECLOSE ALARM
1:0611	DSLC10 LOAD AT HIGH LIMIT ALARM
1:0612	DSLC10 LOAD AT LOW LIMIT ALARM
1:0613	DSLC10 PROCESS AT HIGH LIMIT ALARM
1:0614	DSLC10 PROCESS AT LOW LIMIT ALARM
1:0615	DSLC10 VOLTAGE RANGE ALARM
1:0616	DSLC10 VOLTAGE AT LOW LIMIT ALARM
1:0617	DSLC10 VOLTAGE AT HIGH LIMIT ALARM
1:0618	DSLC10 SYNCH IN OFF MODE
1:0619	DSLC10 SYNCH IN CHECK MODE
1:0620	DSLC10 SYNCH IN PERMISSIVE MODE
1:0621	DSLC10 SYNCH IN RUN MODE
1:0622	DSLC10 SYNCH IN CLOSE TIMER MODE
1:0623	DSLC10 SYNCH IN SYNC TIMER MODE
1:0624	DSLC10 SYNCH IN SYNC MODE
1:0625	DSLC10 SYNCH IN AUTO OFF MODE
1:0626	DSLC10 LD CTRL IN DROOP MODE
1:0627	DSLC10 LD CTRL IN UNLOAD BASELOAD MODE
1:0628	DSLC10 LD CTRL IN BASE LOAD RAMP MODE
1:0629	DSLC10 LD CTRL IN BASE LOAD MODE
1:0630	DSLC10 LD CTRL IN BASE LOAD LOWER MODE
1:0631	DSLC10 LD CTRL IN BASE LOAD RAISE MODE
1:0632	DSLC10 LD CTRL IN REMOTE RAMP MODE
1:0633	DSLC10 LD CTRL IN BASELOAD REMOTE MODE

1:0634	DSLC10 LD CTRL IN UNLOAD PARALLEL MODE
1:0635	DSLC10 LD CTRL IN PARALLEL RAMP MODE
1:0636	DSLC10 LD CTRL IN PARALLEL MODE
1:0637	DSLC10 LD CTRL IN UNLOAD RAMP MODE
1:0638	DSLC10 LD CTRL IN PROCESS RAMP MODE
1:0639	DSLC10 LD CTRL IN PROCESS LOCAL MODE
1:0640	DSLC10 LD CTRL IN PROCESS LOWER MODE
1:0641	DSLC10 LD CTRL IN PROCESS RAISE MODE
1:0642	DSLC10 LD CTRL IN PROCESS REMOTE MODE
1:0643	DSLC10 CHECK INPUT CLOSED
1:0644	DSLC10 PERMISSIVE INPUT CLOSED
1:0645	DSLC10 RUN INPUT CLOSED
1:0646	DSLC10 CB AUX INPUT CLOSED
1:0647	DSLC10 VOLTAGE RAISE INPUT CLOSED
1:0648	DSLC10 VOLTAGE LOWER INPUT CLOSED
1:0649	DSLC10 BASE LOAD INPUT CLOSED
1:0650	DSLC10 LOAD/UNLOAD INPUT CLOSED
1:0651	DSLC10 RAMP PAUSE INPUT CLOSED
1:0652	DSLC10 LOAD RAISE INPUT CLOSED
1:0653	DSLC10 LOAD LOWER INPUT CLOSED
1:0654	DSLC10 PROCESS ENABLE INPUT CLOSED
1:0655	DSLC10 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0656	DSLC10 WATCHDOG TIMER
1:0657	DSLC10 LON FAIL TO TRANSMIT
1:0658	DSLC10 SPARE BOOLEAN READ 58
1:0659	DSLC10 SPARE BOOLEAN READ 59
1:0660	DSLC10 SPARE BOOLEAN READ 60
1:0661	DSLC11 ALARM RELAY
1:0662	DSLC11 LOW LIMIT RELAY
1:0663	DSLC11 HIGH LIMIT RELAY
1:0664	DSLC11 LOAD SWITCH RELAY
1:0665	DSLC11 VOLTAGE LOWER RELAY
1:0666	DSLC11 VOLTAGE RAISE RELAY
1:0667	DSLC11 BREAKER OPEN RELAY
1:0668	DSLC11 BREAKER CLOSE RELAY
1:0669	DSLC11 SYNCH TIMEOUT ALARM
1:0670	DSLC11 SYNCH RECLOSE ALARM
1:0671	DSLC11 LOAD AT HIGH LIMIT ALARM
1:0672	DSLC11 LOAD AT LOW LIMIT ALARM
1:0673	DSLC11 PROCESS AT HIGH LIMIT ALARM
1:0674	DSLC11 PROCESS AT LOW LIMIT ALARM
1:0675	DSLC11 VOLTAGE RANGE ALARM
1:0676	DSLC11 VOLTAGE AT LOW LIMIT ALARM
1:0677	DSLC11 VOLTAGE AT HIGH LIMIT ALARM
1:0678	DSLC11 SYNCH IN OFF MODE
1:0679	DSLC11 SYNCH IN CHECK MODE
1:0680	DSLC11 SYNCH IN PERMISSIVE MODE
1:0681	DSLC11 SYNCH IN RUN MODE
1:0682	DSLC11 SYNCH IN CLOSE TIMER MODE
1:0683	DSLC11 SYNCH IN SYNC TIMER MODE
1:0684	DSLC11 SYNCH IN SYNC MODE
1:0685	DSLC11 SYNCH IN AUTO OFF MODE
1:0686	DSLC11 LD CTRL IN DROOP MODE
1:0687	DSLC11 LD CTRL IN UNLOAD BASELOAD MODE
1:0688	DSLC11 LD CTRL IN BASE LOAD RAMP MODE
1:0689	DSLC11 LD CTRL IN BASE LOAD MODE
1:0690	DSLC11 LD CTRL IN BASE LOAD LOWER MODE
1:0691	DSLC11 LD CTRL IN BASE LOAD RAISE MODE
1:0692	DSLC11 LD CTRL IN REMOTE RAMP MODE
1:0693	DSLC11 LD CTRL IN BASELOAD REMOTE MODE
1:0694	DSLC11 LD CTRL IN UNLOAD PARALLEL MODE
1:0695	DSLC11 LD CTRL IN PARALLEL RAMP MODE
1:0696	DSLC11 LD CTRL IN PARALLEL MODE
1:0697	DSLC11 LD CTRL IN UNLOAD RAMP MODE
1:0698	DSLC11 LD CTRL IN PROCESS RAMP MODE
1:0699	DSLC11 LD CTRL IN PROCESS LOCAL MODE
1:0700	DSLC11 LD CTRL IN PROCESS LOWER MODE
1:0701	DSLC11 LD CTRL IN PROCESS RAISE MODE
1:0702	DSLC11 LD CTRL IN PROCESS REMOTE MODE
1:0703	DSLC11 CHECK INPUT CLOSED
1:0704	DSLC11 PERMISSIVE INPUT CLOSED
1:0705	DSLC11 RUN INPUT CLOSED
1:0706	DSLC11 CB AUX INPUT CLOSED
1:0707	DSLC11 VOLTAGE RAISE INPUT CLOSED

1:0708	DSLC11 VOLTAGE LOWER INPUT CLOSED
1:0709	DSLC11 BASE LOAD INPUT CLOSED
1:0710	DSLC11 LOAD/UNLOAD INPUT CLOSED
1:0711	DSLC11 RAMP PAUSE INPUT CLOSED
1:0712	DSLC11 LOAD RAISE INPUT CLOSED
1:0713	DSLC11 LOAD LOWER INPUT CLOSED
1:0714	DSLC11 PROCESS ENABLE INPUT CLOSED
1:0715	DSLC11 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0716	DSLC11 WATCHDOG TIMER
1:0717	DSLC11 LON FAIL TO TRANSMIT
1:0718	DSLC11 SPARE BOOLEAN READ 58
1:0719	DSLC11 SPARE BOOLEAN READ 59
1:0720	DSLC11 SPARE BOOLEAN READ 60
1:0721	DSLC12 ALARM RELAY
1:0722	DSLC12 LOW LIMIT RELAY
1:0723	DSLC12 HIGH LIMIT RELAY
1:0724	DSLC12 LOAD SWITCH RELAY
1:0725	DSLC12 VOLTAGE LOWER RELAY
1:0726	DSLC12 VOLTAGE RAISE RELAY
1:0727	DSLC12 BREAKER OPEN RELAY
1:0728	DSLC12 BREAKER CLOSE RELAY
1:0729	DSLC12 SYNCH TIMEOUT ALARM
1:0730	DSLC12 SYNCH RECLOSE ALARM
1:0731	DSLC12 LOAD AT HIGH LIMIT ALARM
1:0732	DSLC12 LOAD AT LOW LIMIT ALARM
1:0733	DSLC12 PROCESS AT HIGH LIMIT ALARM
1:0734	DSLC12 PROCESS AT LOW LIMIT ALARM
1:0735	DSLC12 VOLTAGE RANGE ALARM
1:0736	DSLC12 VOLTAGE AT LOW LIMIT ALARM
1:0737	DSLC12 VOLTAGE AT HIGH LIMIT ALARM
1:0738	DSLC12 SYNCH IN OFF MODE
1:0739	DSLC12 SYNCH IN CHECK MODE
1:0740	DSLC12 SYNCH IN PERMISSIVE MODE
1:0741	DSLC12 SYNCH IN RUN MODE
1:0742	DSLC12 SYNCH IN CLOSE TIMER MODE
1:0743	DSLC12 SYNCH IN SYNC TIMER MODE
1:0744	DSLC12 SYNCH IN SYNC MODE
1:0745	DSLC12 SYNCH IN AUTO OFF MODE
1:0746	DSLC12 LD CTRL IN DROOP MODE
1:0747	DSLC12 LD CTRL IN UNLOAD BASELOAD MODE
1:0748	DSLC12 LD CTRL IN BASE LOAD RAMP MODE
1:0749	DSLC12 LD CTRL IN BASE LOAD MODE
1:0750	DSLC12 LD CTRL IN BASE LOAD LOWER MODE
1:0751	DSLC12 LD CTRL IN BASE LOAD RAISE MODE
1:0752	DSLC12 LD CTRL IN REMOTE RAMP MODE
1:0753	DSLC12 LD CTRL IN BASELOAD REMOTE MODE
1:0754	DSLC12 LD CTRL IN UNLOAD PARALLEL MODE
1:0755	DSLC12 LD CTRL IN PARALLEL RAMP MODE
1:0756	DSLC12 LD CTRL IN PARALLEL MODE
1:0757	DSLC12 LD CTRL IN UNLOAD RAMP MODE
1:0758	DSLC12 LD CTRL IN PROCESS RAMP MODE
1:0759	DSLC12 LD CTRL IN PROCESS LOCAL MODE
1:0760	DSLC12 LD CTRL IN PROCESS LOWER MODE
1:0761	DSLC12 LD CTRL IN PROCESS RAISE MODE
1:0762	DSLC12 LD CTRL IN PROCESS REMOTE MODE
1:0763	DSLC12 CHECK INPUT CLOSED
1:0764	DSLC12 PERMISSIVE INPUT CLOSED
1:0765	DSLC12 RUN INPUT CLOSED
1:0766	DSLC12 CB AUX INPUT CLOSED
1:0767	DSLC12 VOLTAGE RAISE INPUT CLOSED
1:0768	DSLC12 VOLTAGE LOWER INPUT CLOSED
1:0769	DSLC12 BASE LOAD INPUT CLOSED
1:0770	DSLC12 LOAD/UNLOAD INPUT CLOSED
1:0771	DSLC12 RAMP PAUSE INPUT CLOSED
1:0772	DSLC12 LOAD RAISE INPUT CLOSED
1:0773	DSLC12 LOAD LOWER INPUT CLOSED
1:0774	DSLC12 PROCESS ENABLE INPUT CLOSED
1:0775	DSLC12 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0776	DSLC12 WATCHDOG TIMER
1:0777	DSLC12 LON FAIL TO TRANSMIT
1:0778	DSLC12 SPARE BOOLEAN READ 58
1:0779	DSLC12 SPARE BOOLEAN READ 59
1:0780	DSLC12 SPARE BOOLEAN READ 60
1:0781	DSLC14 ALARM RELAY

1:0782	DSLC14 LOW LIMIT RELAY
1:0783	DSLC14 HIGH LIMIT RELAY
1:0784	DSLC14 LOAD SWITCH RELAY
1:0785	DSLC14 VOLTAGE LOWER RELAY
1:0786	DSLC14 VOLTAGE RAISE RELAY
1:0787	DSLC14 BREAKER OPEN RELAY
1:0788	DSLC14 BREAKER CLOSE RELAY
1:0789	DSLC14 SYNCH TIMEOUT ALARM
1:0790	DSLC14 SYNCH RECLOSE ALARM
1:0791	DSLC14 LOAD AT HIGH LIMIT ALARM
1:0792	DSLC14 LOAD AT LOW LIMIT ALARM
1:0793	DSLC14 PROCESS AT HIGH LIMIT ALARM
1:0794	DSLC14 PROCESS AT LOW LIMIT ALARM
1:0795	DSLC14 VOLTAGE RANGE ALARM
1:0796	DSLC14 VOLTAGE AT LOW LIMIT ALARM
1:0797	DSLC14 VOLTAGE AT HIGH LIMIT ALARM
1:0798	DSLC14 SYNCH IN OFF MODE
1:0799	DSLC14 SYNCH IN CHECK MODE
1:0800	DSLC14 SYNCH IN PERMISSIVE MODE
1:0801	DSLC14 SYNCH IN RUN MODE
1:0802	DSLC14 SYNCH IN CLOSE TIMER MODE
1:0803	DSLC14 SYNCH IN SYNC TIMER MODE
1:0804	DSLC14 SYNCH IN SYNC MODE
1:0805	DSLC14 SYNCH IN AUTO OFF MODE
1:0806	DSLC14 LD CTRL IN DROOP MODE
1:0807	DSLC14 LD CTRL IN UNLOAD BASELOAD MODE
1:0808	DSLC14 LD CTRL IN BASE LOAD RAMP MODE
1:0809	DSLC14 LD CTRL IN BASE LOAD MODE
1:0810	DSLC14 LD CTRL IN BASE LOAD LOWER MODE
1:0811	DSLC14 LD CTRL IN BASE LOAD RAISE MODE
1:0812	DSLC14 LD CTRL IN REMOTE RAMP MODE
1:0813	DSLC14 LD CTRL IN BASELOAD REMOTE MODE
1:0814	DSLC14 LD CTRL IN UNLOAD PARALLEL MODE
1:0815	DSLC14 LD CTRL IN PARALLEL RAMP MODE
1:0816	DSLC14 LD CTRL IN PARALLEL MODE
1:0817	DSLC14 LD CTRL IN UNLOAD RAMP MODE
1:0818	DSLC14 LD CTRL IN PROCESS RAMP MODE
1:0819	DSLC14 LD CTRL IN PROCESS LOCAL MODE
1:0820	DSLC14 LD CTRL IN PROCESS LOWER MODE
1:0821	DSLC14 LD CTRL IN PROCESS RAISE MODE
1:0822	DSLC14 LD CTRL IN PROCESS REMOTE MODE
1:0823	DSLC14 CHECK INPUT CLOSED
1:0824	DSLC14 PERMISSIVE INPUT CLOSED
1:0825	DSLC14 RUN INPUT CLOSED
1:0826	DSLC14 CB AUX INPUT CLOSED
1:0827	DSLC14 VOLTAGE RAISE INPUT CLOSED
1:0828	DSLC14 VOLTAGE LOWER INPUT CLOSED
1:0829	DSLC14 BASE LOAD INPUT CLOSED
1:0830	DSLC14 LOAD/UNLOAD INPUT CLOSED
1:0831	DSLC14 RAMP PAUSE INPUT CLOSED
1:0832	DSLC14 LOAD RAISE INPUT CLOSED
1:0833	DSLC14 LOAD LOWER INPUT CLOSED
1:0834	DSLC14 PROCESS ENABLE INPUT CLOSED
1:0835	DSLC14 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0836	DSLC14 WATCHDOG TIMER
1:0837	DSLC14 LON FAIL TO TRANSMIT
1:0838	DSLC14 SPARE BOOLEAN READ 58
1:0839	DSLC14 SPARE BOOLEAN READ 59
1:0840	DSLC14 SPARE BOOLEAN READ 60
1:0841	DSLC14 ALARM RELAY
1:0842	DSLC14 LOW LIMIT RELAY
1:0843	DSLC14 HIGH LIMIT RELAY
1:0844	DSLC14 LOAD SWITCH RELAY
1:0845	DSLC14 VOLTAGE LOWER RELAY
1:0846	DSLC14 VOLTAGE RAISE RELAY
1:0847	DSLC14 BREAKER OPEN RELAY
1:0848	DSLC14 BREAKER CLOSE RELAY
1:0849	DSLC14 SYNCH TIMEOUT ALARM
1:0850	DSLC14 SYNCH RECLOSE ALARM
1:0851	DSLC14 LOAD AT HIGH LIMIT ALARM
1:0852	DSLC14 LOAD AT LOW LIMIT ALARM
1:0853	DSLC14 PROCESS AT HIGH LIMIT ALARM
1:0854	DSLC14 PROCESS AT LOW LIMIT ALARM
1:0855	DSLC14 VOLTAGE RANGE ALARM

1:0856 DSLC14 VOLTAGE AT LOW LIMIT ALARM
1:0857 DSLC14 VOLTAGE AT HIGH LIMIT ALARM
1:0858 DSLC14 SYNCH IN OFF MODE
1:0859 DSLC14 SYNCH IN CHECK MODE
1:0860 DSLC14 SYNCH IN PERMISSIVE MODE
1:0861 DSLC14 SYNCH IN RUN MODE
1:0862 DSLC14 SYNCH IN CLOSE TIMER MODE
1:0863 DSLC14 SYNCH IN SYNC TIMER MODE
1:0864 DSLC14 SYNCH IN SYNC MODE
1:0865 DSLC14 SYNCH IN AUTO OFF MODE
1:0866 DSLC14 LD CTRL IN DROOP MODE
1:0867 DSLC14 LD CTRL IN UNLOAD BASELOAD MODE
1:0868 DSLC14 LD CTRL IN BASE LOAD RAMP MODE
1:0869 DSLC14 LD CTRL IN BASE LOAD MODE
1:0870 DSLC14 LD CTRL IN BASE LOAD LOWER MODE
1:0871 DSLC14 LD CTRL IN BASE LOAD RAISE MODE
1:0872 DSLC14 LD CTRL IN REMOTE RAMP MODE
1:0873 DSLC14 LD CTRL IN BASELOAD REMOTE MODE
1:0874 DSLC14 LD CTRL IN UNLOAD PARALLEL MODE
1:0875 DSLC14 LD CTRL IN PARALLEL RAMP MODE
1:0876 DSLC14 LD CTRL IN PARALLEL MODE
1:0877 DSLC14 LD CTRL IN UNLOAD RAMP MODE
1:0878 DSLC14 LD CTRL IN PROCESS RAMP MODE
1:0879 DSLC14 LD CTRL IN PROCESS LOCAL MODE
1:0880 DSLC14 LD CTRL IN PROCESS LOWER MODE
1:0881 DSLC14 LD CTRL IN PROCESS RAISE MODE
1:0882 DSLC14 LD CTRL IN PROCESS REMOTE MODE
1:0883 DSLC14 CHECK INPUT CLOSED
1:0884 DSLC14 PERMISSIVE INPUT CLOSED
1:0885 DSLC14 RUN INPUT CLOSED
1:0886 DSLC14 CB AUX INPUT CLOSED
1:0887 DSLC14 VOLTAGE RAISE INPUT CLOSED
1:0888 DSLC14 VOLTAGE LOWER INPUT CLOSED
1:0889 DSLC14 BASE LOAD INPUT CLOSED
1:0890 DSLC14 LOAD/UNLOAD INPUT CLOSED
1:0891 DSLC14 RAMP PAUSE INPUT CLOSED
1:0892 DSLC14 LOAD RAISE INPUT CLOSED
1:0893 DSLC14 LOAD LOWER INPUT CLOSED
1:0894 DSLC14 PROCESS ENABLE INPUT CLOSED
1:0895 DSLC14 VOLT REG OUTPUT DRIVER SHUTDOWN
1:0896 DSLC14 WATCHDOG TIMER
1:0897 DSLC14 LON FAIL TO TRANSMIT
1:0898 DSLC14 SPARE BOOLEAN READ 58
1:0899 DSLC14 SPARE BOOLEAN READ 59
1:0900 DSLC14 SPARE BOOLEAN READ 60

Analog Reads

Addr	Description
3:0001	MSLC BLOCK #1 MESSAGE TIME (ms)
3:0002	MSLC BLOCK #2 MESSAGE TIME (ms)
3:0003	MSLC BLOCK #3 MESSAGE TIME (ms)
3:0004	MSLC BLOCK #4 MESSAGE TIME (ms)
3:0005	MSLC A PHASE VOLTAGE
3:0006	MSLC B PHASE VOLTAGE
3:0007	MSLC C PHASE VOLTAGE
3:0008	MSLC 3-PHASE AVG VOLTAGE
3:0009	MSLC GENERATOR BUS VOLTAGE
3:0010	MSLC SYS POWER FACTOR (p.f. * 1000)
3:0011	MSLC A PHASE CURRENT (AMPS)
3:0012	MSLC B PHASE CURRENT (AMPS)
3:0013	MSLC C PHASE CURRENT (AMPS)
3:0014	MSLC 3-PHASE TOTAL CURRENT
3:0015	MSLC IMP/EXP REFERENCE (% RATED)
3:0016	MSLC PROCESS REFERENCE (uA)
3:0017	MSLC SYS ACTIVE POWER OUTPUT (KW)
3:0018	MSLC SYS REACTIVE POWER OUTPUT (KVAR)
3:0019	MSLC SYS APPARENT POWER OUTPUT (KW)
3:0020	MSLC GEN FREQUENCY (Hz * 100)
3:0021	MSLC UTILITY FREQUENCY (Hz * 100)
3:0022	MSLC SPARE ANALOG READ 22
3:0023	MSLC SPARE ANALOG READ 23
3:0024	MSLC SPARE ANALOG READ 24
3:0025	MSLC SPARE ANALOG READ 25

3:0026	MSLC SPARE ANALOG READ 26
3:0027	MSLC SPARE ANALOG READ 27
3:0028	MSLC SPARE ANALOG READ 28
3:0029	MSLC SPARE ANALOG READ 29
3:0030	MSLC SPARE ANALOG READ 30
3:0031	DSLC01 BLOCK #1 MESSAGE TIME (ms)
3:0032	DSLC01 BLOCK #2 MESSAGE TIME (ms)
3:0033	DSLC01 BLOCK #3 MESSAGE TIME (ms)
3:0034	DSLC01 BLOCK #4 MESSAGE TIME (ms)
3:0035	DSLC01 A PHASE VOLTAGE
3:0036	DSLC01 B PHASE VOLTAGE
3:0037	DSLC01 C PHASE VOLTAGE
3:0038	DSLC01 3-PHASE AVG VOLTAGE
3:0039	DSLC01 BUS VOLTAGE
3:0040	DSLC01 POWER FACTOR (p.f. * 1000)
3:0041	DSLC01 A PHASE CURRENT (AMPS)
3:0042	DSLC01 B PHASE CURRENT (AMPS)
3:0043	DSLC01 C PHASE CURRENT (AMPS)
3:0044	DSLC01 3-PHASE TOTAL CURRENT
3:0045	DSLC01 LOAD REFERENCE (% RATED)
3:0046	DSLC01 PROCESS REFERENCE (uA)
3:0047	DSLC01 ACTIVE POWER OUTPUT (KW)
3:0048	DSLC01 REACTIVE POWER OUTPUT (KVAR)
3:0049	DSLC01 APPARENT POWER OUTPUT (KW)
3:0050	DSLC01 GEN FREQUENCY (Hz * 100)
3:0051	DSLC01 BUS FREQUENCY (Hz * 100)
3:0052	DSLC01 SPARE ANALOG READ 22
3:0053	DSLC01 SPARE ANALOG READ 23
3:0054	DSLC01 SPARE ANALOG READ 24
3:0055	DSLC01 SPARE ANALOG READ 25
3:0056	DSLC01 SPARE ANALOG READ 26
3:0057	DSLC01 SPARE ANALOG READ 27
3:0058	DSLC01 SPARE ANALOG READ 28
3:0059	DSLC01 SPARE ANALOG READ 29
3:0060	DSLC01 SPARE ANALOG READ 30
3:0061	DSLC02 BLOCK #1 MESSAGE TIME (ms)
3:0062	DSLC02 BLOCK #2 MESSAGE TIME (ms)
3:0063	DSLC02 BLOCK #3 MESSAGE TIME (ms)
3:0064	DSLC02 BLOCK #4 MESSAGE TIME (ms)
3:0065	DSLC02 A PHASE VOLTAGE
3:0066	DSLC02 B PHASE VOLTAGE
3:0067	DSLC02 C PHASE VOLTAGE
3:0068	DSLC02 3-PHASE AVG VOLTAGE
3:0069	DSLC02 BUS VOLTAGE
3:0070	DSLC02 POWER FACTOR (p.f. * 1000)
3:0071	DSLC02 A PHASE CURRENT (AMPS)
3:0072	DSLC02 B PHASE CURRENT (AMPS)
3:0073	DSLC02 C PHASE CURRENT (AMPS)
3:0074	DSLC02 3-PHASE TOTAL CURRENT
3:0075	DSLC02 LOAD REFERENCE (% RATED)
3:0076	DSLC02 PROCESS REFERENCE (uA)
3:0077	DSLC02 ACTIVE POWER OUTPUT (KW)
3:0078	DSLC02 REACTIVE POWER OUTPUT (KVAR)
3:0079	DSLC02 APPARENT POWER OUTPUT (KW)
3:0080	DSLC02 GEN FREQUENCY (Hz * 100)
3:0081	DSLC02 BUS FREQUENCY (Hz * 100)
3:0082	DSLC02 SPARE ANALOG READ 22
3:0083	DSLC02 SPARE ANALOG READ 23
3:0084	DSLC02 SPARE ANALOG READ 24
3:0085	DSLC02 SPARE ANALOG READ 25
3:0086	DSLC02 SPARE ANALOG READ 26
3:0087	DSLC02 SPARE ANALOG READ 27
3:0088	DSLC02 SPARE ANALOG READ 28
3:0089	DSLC02 SPARE ANALOG READ 29
3:0090	DSLC02 SPARE ANALOG READ 30
3:0091	DSLC03 BLOCK #1 MESSAGE TIME (ms)
3:0092	DSLC03 BLOCK #2 MESSAGE TIME (ms)
3:0093	DSLC03 BLOCK #3 MESSAGE TIME (ms)
3:0094	DSLC03 BLOCK #4 MESSAGE TIME (ms)
3:0095	DSLC03 A PHASE VOLTAGE
3:0096	DSLC03 B PHASE VOLTAGE
3:0097	DSLC03 C PHASE VOLTAGE
3:0098	DSLC03 3-PHASE AVG VOLTAGE
3:0099	DSLC03 BUS VOLTAGE

3:0100	DSLC03 POWER FACTOR (p.f. * 1000)
3:0101	DSLC03 A PHASE CURRENT (AMPS)
3:0102	DSLC03 B PHASE CURRENT (AMPS)
3:0103	DSLC03 C PHASE CURRENT (AMPS)
3:0104	DSLC03 3-PHASE TOTAL CURRENT
3:0105	DSLC03 LOAD REFERENCE (% RATED)
3:0106	DSLC03 PROCESS REFERENCE (uA)
3:0107	DSLC03 ACTIVE POWER OUTPUT (KW)
3:0108	DSLC03 REACTIVE POWER OUTPUT (KVAR)
3:0109	DSLC03 APPARENT POWER OUTPUT (KW)
3:0110	DSLC03 GEN FREQUENCY (Hz * 100)
3:0111	DSLC03 BUS FREQUENCY (Hz * 100)
3:0112	DSLC03 SPARE ANALOG READ 22
3:0113	DSLC03 SPARE ANALOG READ 23
3:0114	DSLC03 SPARE ANALOG READ 24
3:0115	DSLC03 SPARE ANALOG READ 25
3:0116	DSLC03 SPARE ANALOG READ 26
3:0117	DSLC03 SPARE ANALOG READ 27
3:0118	DSLC03 SPARE ANALOG READ 28
3:0119	DSLC03 SPARE ANALOG READ 29
3:0120	DSLC03 SPARE ANALOG READ 30
3:0121	DSLC04 BLOCK #1 MESSAGE TIME (ms)
3:0122	DSLC04 BLOCK #2 MESSAGE TIME (ms)
3:0123	DSLC04 BLOCK #3 MESSAGE TIME (ms)
3:0124	DSLC04 BLOCK #4 MESSAGE TIME (ms)
3:0125	DSLC04 A PHASE VOLTAGE
3:0126	DSLC04 B PHASE VOLTAGE
3:0127	DSLC04 C PHASE VOLTAGE
3:0128	DSLC04 3-PHASE AVG VOLTAGE
3:0129	DSLC04 BUS VOLTAGE
3:0130	DSLC04 POWER FACTOR (p.f. * 1000)
3:0131	DSLC04 A PHASE CURRENT (AMPS)
3:0132	DSLC04 B PHASE CURRENT (AMPS)
3:0133	DSLC04 C PHASE CURRENT (AMPS)
3:0134	DSLC04 3-PHASE TOTAL CURRENT
3:0135	DSLC04 LOAD REFERENCE (% RATED)
3:0136	DSLC04 PROCESS REFERENCE (uA)
3:0137	DSLC04 ACTIVE POWER OUTPUT (KW)
3:0138	DSLC04 REACTIVE POWER OUTPUT (KVAR)
3:0139	DSLC04 APPARENT POWER OUTPUT (KW)
3:0140	DSLC04 GEN FREQUENCY (Hz * 100)
3:0141	DSLC04 BUS FREQUENCY (Hz * 100)
3:0142	DSLC04 SPARE ANALOG READ 22
3:0143	DSLC04 SPARE ANALOG READ 23
3:0144	DSLC04 SPARE ANALOG READ 24
3:0145	DSLC04 SPARE ANALOG READ 25
3:0146	DSLC04 SPARE ANALOG READ 26
3:0147	DSLC04 SPARE ANALOG READ 27
3:0148	DSLC04 SPARE ANALOG READ 28
3:0149	DSLC04 SPARE ANALOG READ 29
3:0150	DSLC04 SPARE ANALOG READ 30
3:0151	DSLC05 BLOCK #1 MESSAGE TIME (ms)
3:0152	DSLC05 BLOCK #2 MESSAGE TIME (ms)
3:0153	DSLC05 BLOCK #3 MESSAGE TIME (ms)
3:0154	DSLC05 BLOCK #4 MESSAGE TIME (ms)
3:0155	DSLC05 A PHASE VOLTAGE
3:0156	DSLC05 B PHASE VOLTAGE
3:0157	DSLC05 C PHASE VOLTAGE
3:0158	DSLC05 3-PHASE AVG VOLTAGE
3:0159	DSLC05 BUS VOLTAGE
3:0160	DSLC05 POWER FACTOR (p.f. * 1000)
3:0161	DSLC05 A PHASE CURRENT (AMPS)
3:0162	DSLC05 B PHASE CURRENT (AMPS)
3:0163	DSLC05 C PHASE CURRENT (AMPS)
3:0164	DSLC05 3-PHASE TOTAL CURRENT
3:0165	DSLC05 LOAD REFERENCE (% RATED)
3:0166	DSLC05 PROCESS REFERENCE (uA)
3:0167	DSLC05 ACTIVE POWER OUTPUT (KW)
3:0168	DSLC05 REACTIVE POWER OUTPUT (KVAR)
3:0169	DSLC05 APPARENT POWER OUTPUT (KW)
3:0170	DSLC05 GEN FREQUENCY (Hz * 100)
3:0171	DSLC05 BUS FREQUENCY (Hz * 100)
3:0172	DSLC05 SPARE ANALOG READ 22
3:0173	DSLC05 SPARE ANALOG READ 23

3:0174	DSLC05 SPARE ANALOG READ 24
3:0175	DSLC05 SPARE ANALOG READ 25
3:0176	DSLC05 SPARE ANALOG READ 26
3:0177	DSLC05 SPARE ANALOG READ 27
3:0178	DSLC05 SPARE ANALOG READ 28
3:0179	DSLC05 SPARE ANALOG READ 29
3:0180	DSLC05 SPARE ANALOG READ 30
3:0181	DSLC06 BLOCK #1 MESSAGE TIME (ms)
3:0182	DSLC06 BLOCK #2 MESSAGE TIME (ms)
3:0183	DSLC06 BLOCK #3 MESSAGE TIME (ms)
3:0184	DSLC06 BLOCK #4 MESSAGE TIME (ms)
3:0185	DSLC06 A PHASE VOLTAGE
3:0186	DSLC06 B PHASE VOLTAGE
3:0187	DSLC06 C PHASE VOLTAGE
3:0188	DSLC06 3-PHASE AVG VOLTAGE
3:0189	DSLC06 BUS VOLTAGE
3:0190	DSLC06 POWER FACTOR (p.f. * 1000)
3:0191	DSLC06 A PHASE CURRENT (AMPS)
3:0192	DSLC06 B PHASE CURRENT (AMPS)
3:0193	DSLC06 C PHASE CURRENT (AMPS)
3:0194	DSLC06 3-PHASE TOTAL CURRENT
3:0195	DSLC06 LOAD REFERENCE (% RATED)
3:0196	DSLC06 PROCESS REFERENCE (uA)
3:0197	DSLC06 ACTIVE POWER OUTPUT (KW)
3:0198	DSLC06 REACTIVE POWER OUTPUT (KVAR)
3:0199	DSLC06 APPARENT POWER OUTPUT (KW)
3:0200	DSLC06 GEN FREQUENCY (Hz * 100)
3:0201	DSLC06 BUS FREQUENCY (Hz * 100)
3:0202	DSLC06 SPARE ANALOG READ 22
3:0203	DSLC06 SPARE ANALOG READ 23
3:0204	DSLC06 SPARE ANALOG READ 24
3:0205	DSLC06 SPARE ANALOG READ 25
3:0206	DSLC06 SPARE ANALOG READ 26
3:0207	DSLC06 SPARE ANALOG READ 27
3:0208	DSLC06 SPARE ANALOG READ 28
3:0209	DSLC06 SPARE ANALOG READ 29
3:0210	DSLC06 SPARE ANALOG READ 30
3:0211	DSLC07 BLOCK #1 MESSAGE TIME (ms)
3:0212	DSLC07 BLOCK #2 MESSAGE TIME (ms)
3:0213	DSLC07 BLOCK #3 MESSAGE TIME (ms)
3:0214	DSLC07 BLOCK #4 MESSAGE TIME (ms)
3:0215	DSLC07 A PHASE VOLTAGE
3:0216	DSLC07 B PHASE VOLTAGE
3:0217	DSLC07 C PHASE VOLTAGE
3:0218	DSLC07 3-PHASE AVG VOLTAGE
3:0219	DSLC07 BUS VOLTAGE
3:0220	DSLC07 POWER FACTOR (p.f. * 1000)
3:0221	DSLC07 A PHASE CURRENT (AMPS)
3:0222	DSLC07 B PHASE CURRENT (AMPS)
3:0223	DSLC07 C PHASE CURRENT (AMPS)
3:0224	DSLC07 3-PHASE TOTAL CURRENT
3:0225	DSLC07 LOAD REFERENCE (% RATED)
3:0226	DSLC07 PROCESS REFERENCE (uA)
3:0227	DSLC07 ACTIVE POWER OUTPUT (KW)
3:0228	DSLC07 REACTIVE POWER OUTPUT (KVAR)
3:0229	DSLC07 APPARENT POWER OUTPUT (KW)
3:0230	DSLC07 GEN FREQUENCY (Hz * 100)
3:0231	DSLC07 BUS FREQUENCY (Hz * 100)
3:0232	DSLC07 SPARE ANALOG READ 22
3:0233	DSLC07 SPARE ANALOG READ 23
3:0234	DSLC07 SPARE ANALOG READ 24
3:0235	DSLC07 SPARE ANALOG READ 25
3:0236	DSLC07 SPARE ANALOG READ 26
3:0237	DSLC07 SPARE ANALOG READ 27
3:0238	DSLC07 SPARE ANALOG READ 28
3:0239	DSLC07 SPARE ANALOG READ 29
3:0240	DSLC07 SPARE ANALOG READ 30
3:0241	DSLC08 BLOCK #1 MESSAGE TIME (ms)
3:0242	DSLC08 BLOCK #2 MESSAGE TIME (ms)
3:0243	DSLC08 BLOCK #3 MESSAGE TIME (ms)
3:0244	DSLC08 BLOCK #4 MESSAGE TIME (ms)
3:0245	DSLC08 A PHASE VOLTAGE
3:0246	DSLC08 B PHASE VOLTAGE
3:0247	DSLC08 C PHASE VOLTAGE

3:0248	DSLC08 3-PHASE AVG VOLTAGE
3:0249	DSLC08 BUS VOLTAGE
3:0250	DSLC08 POWER FACTOR (p.f. * 1000)
3:0251	DSLC08 A PHASE CURRENT (AMPS)
3:0252	DSLC08 B PHASE CURRENT (AMPS)
3:0253	DSLC08 C PHASE CURRENT (AMPS)
3:0254	DSLC08 3-PHASE TOTAL CURRENT
3:0255	DSLC08 LOAD REFERENCE (% RATED)
3:0256	DSLC08 PROCESS REFERENCE (uA)
3:0257	DSLC08 ACTIVE POWER OUTPUT (KW)
3:0258	DSLC08 REACTIVE POWER OUTPUT (KVAR)
3:0259	DSLC08 APPARENT POWER OUTPUT (KW)
3:0260	DSLC08 GEN FREQUENCY (Hz * 100)
3:0261	DSLC08 BUS FREQUENCY (Hz * 100)
3:0262	DSLC08 SPARE ANALOG READ 22
3:0263	DSLC08 SPARE ANALOG READ 23
3:0264	DSLC08 SPARE ANALOG READ 24
3:0265	DSLC08 SPARE ANALOG READ 25
3:0266	DSLC08 SPARE ANALOG READ 26
3:0267	DSLC08 SPARE ANALOG READ 27
3:0268	DSLC08 SPARE ANALOG READ 28
3:0269	DSLC08 SPARE ANALOG READ 29
3:0270	DSLC08 SPARE ANALOG READ 30
3:0271	DSLC09 BLOCK #1 MESSAGE TIME (ms)
3:0272	DSLC09 BLOCK #2 MESSAGE TIME (ms)
3:0273	DSLC09 BLOCK #3 MESSAGE TIME (ms)
3:0274	DSLC09 BLOCK #4 MESSAGE TIME (ms)
3:0275	DSLC09 A PHASE VOLTAGE
3:0276	DSLC09 B PHASE VOLTAGE
3:0277	DSLC09 C PHASE VOLTAGE
3:0278	DSLC09 3-PHASE AVG VOLTAGE
3:0279	DSLC09 BUS VOLTAGE
3:0280	DSLC09 POWER FACTOR (p.f. * 1000)
3:0281	DSLC09 A PHASE CURRENT (AMPS)
3:0282	DSLC09 B PHASE CURRENT (AMPS)
3:0283	DSLC09 C PHASE CURRENT (AMPS)
3:0284	DSLC09 3-PHASE TOTAL CURRENT
3:0285	DSLC09 LOAD REFERENCE (% RATED)
3:0286	DSLC09 PROCESS REFERENCE (uA)
3:0287	DSLC09 ACTIVE POWER OUTPUT (KW)
3:0288	DSLC09 REACTIVE POWER OUTPUT (KVAR)
3:0289	DSLC09 APPARENT POWER OUTPUT (KW)
3:0290	DSLC09 GEN FREQUENCY (Hz * 100)
3:0291	DSLC09 BUS FREQUENCY (Hz * 100)
3:0292	DSLC09 SPARE ANALOG READ 22
3:0293	DSLC09 SPARE ANALOG READ 23
3:0294	DSLC09 SPARE ANALOG READ 24
3:0295	DSLC09 SPARE ANALOG READ 25
3:0296	DSLC09 SPARE ANALOG READ 26
3:0297	DSLC09 SPARE ANALOG READ 27
3:0298	DSLC09 SPARE ANALOG READ 28
3:0299	DSLC09 SPARE ANALOG READ 29
3:0300	DSLC09 SPARE ANALOG READ 30
3:0301	DSLC10 BLOCK #1 MESSAGE TIME (ms)
3:0302	DSLC10 BLOCK #2 MESSAGE TIME (ms)
3:0303	DSLC10 BLOCK #3 MESSAGE TIME (ms)
3:0304	DSLC10 BLOCK #4 MESSAGE TIME (ms)
3:0305	DSLC10 A PHASE VOLTAGE
3:0306	DSLC10 B PHASE VOLTAGE
3:0307	DSLC10 C PHASE VOLTAGE
3:0308	DSLC10 3-PHASE AVG VOLTAGE
3:0309	DSLC10 BUS VOLTAGE
3:0310	DSLC10 POWER FACTOR (p.f. * 1000)
3:0311	DSLC10 A PHASE CURRENT (AMPS)
3:0312	DSLC10 B PHASE CURRENT (AMPS)
3:0313	DSLC10 C PHASE CURRENT (AMPS)
3:0314	DSLC10 3-PHASE TOTAL CURRENT
3:0315	DSLC10 LOAD REFERENCE (% RATED)
3:0316	DSLC10 PROCESS REFERENCE (uA)
3:0317	DSLC10 ACTIVE POWER OUTPUT (KW)
3:0318	DSLC10 REACTIVE POWER OUTPUT (KVAR)
3:0319	DSLC10 APPARENT POWER OUTPUT (KW)
3:0320	DSLC10 GEN FREQUENCY (Hz * 100)
3:0321	DSLC10 BUS FREQUENCY (Hz * 100)

3:0322	DSLC10 SPARE ANALOG READ 22
3:0323	DSLC10 SPARE ANALOG READ 23
3:0324	DSLC10 SPARE ANALOG READ 24
3:0325	DSLC10 SPARE ANALOG READ 25
3:0326	DSLC10 SPARE ANALOG READ 26
3:0327	DSLC10 SPARE ANALOG READ 27
3:0328	DSLC10 SPARE ANALOG READ 28
3:0329	DSLC10 SPARE ANALOG READ 29
3:0330	DSLC10 SPARE ANALOG READ 30
3:0331	DSLC11 BLOCK #1 MESSAGE TIME (ms)
3:0332	DSLC11 BLOCK #2 MESSAGE TIME (ms)
3:0333	DSLC11 BLOCK #3 MESSAGE TIME (ms)
3:0334	DSLC11 BLOCK #4 MESSAGE TIME (ms)
3:0335	DSLC11 A PHASE VOLTAGE
3:0336	DSLC11 B PHASE VOLTAGE
3:0337	DSLC11 C PHASE VOLTAGE
3:0338	DSLC11 3-PHASE AVG VOLTAGE
3:0339	DSLC11 BUS VOLTAGE
3:0340	DSLC11 POWER FACTOR (p.f. * 1000)
3:0341	DSLC11 A PHASE CURRENT (AMPS)
3:0342	DSLC11 B PHASE CURRENT (AMPS)
3:0343	DSLC11 C PHASE CURRENT (AMPS)
3:0344	DSLC11 3-PHASE TOTAL CURRENT
3:0345	DSLC11 LOAD REFERENCE (% RATED)
3:0346	DSLC11 PROCESS REFERENCE (uA)
3:0347	DSLC11 ACTIVE POWER OUTPUT (KW)
3:0348	DSLC11 REACTIVE POWER OUTPUT (KVAR)
3:0349	DSLC11 APPARENT POWER OUTPUT (KW)
3:0350	DSLC11 GEN FREQUENCY (Hz * 100)
3:0351	DSLC11 BUS FREQUENCY (Hz * 100)
3:0352	DSLC11 SPARE ANALOG READ 22
3:0353	DSLC11 SPARE ANALOG READ 23
3:0354	DSLC11 SPARE ANALOG READ 24
3:0355	DSLC11 SPARE ANALOG READ 25
3:0356	DSLC11 SPARE ANALOG READ 26
3:0357	DSLC11 SPARE ANALOG READ 27
3:0358	DSLC11 SPARE ANALOG READ 28
3:0359	DSLC11 SPARE ANALOG READ 29
3:0360	DSLC11 SPARE ANALOG READ 30
3:0361	DSLC12 BLOCK #1 MESSAGE TIME (ms)
3:0362	DSLC12 BLOCK #2 MESSAGE TIME (ms)
3:0363	DSLC12 BLOCK #3 MESSAGE TIME (ms)
3:0364	DSLC12 BLOCK #4 MESSAGE TIME (ms)
3:0365	DSLC12 A PHASE VOLTAGE
3:0366	DSLC12 B PHASE VOLTAGE
3:0367	DSLC12 C PHASE VOLTAGE
3:0368	DSLC12 3-PHASE AVG VOLTAGE
3:0369	DSLC12 BUS VOLTAGE
3:0370	DSLC12 POWER FACTOR (p.f. * 1000)
3:0371	DSLC12 A PHASE CURRENT (AMPS)
3:0372	DSLC12 B PHASE CURRENT (AMPS)
3:0373	DSLC12 C PHASE CURRENT (AMPS)
3:0374	DSLC12 3-PHASE TOTAL CURRENT
3:0375	DSLC12 LOAD REFERENCE (% RATED)
3:0376	DSLC12 PROCESS REFERENCE (uA)
3:0377	DSLC12 ACTIVE POWER OUTPUT (KW)
3:0378	DSLC12 REACTIVE POWER OUTPUT (KVAR)
3:0379	DSLC12 APPARENT POWER OUTPUT (KW)
3:0380	DSLC12 GEN FREQUENCY (Hz * 100)
3:0381	DSLC12 BUS FREQUENCY (Hz * 100)
3:0382	DSLC12 SPARE ANALOG READ 22
3:0383	DSLC12 SPARE ANALOG READ 23
3:0384	DSLC12 SPARE ANALOG READ 24
3:0385	DSLC12 SPARE ANALOG READ 25
3:0386	DSLC12 SPARE ANALOG READ 26
3:0387	DSLC12 SPARE ANALOG READ 27
3:0388	DSLC12 SPARE ANALOG READ 28
3:0389	DSLC12 SPARE ANALOG READ 29
3:0390	DSLC12 SPARE ANALOG READ 30
3:0391	DSLC13 BLOCK #1 MESSAGE TIME (ms)
3:0392	DSLC13 BLOCK #2 MESSAGE TIME (ms)
3:0393	DSLC13 BLOCK #3 MESSAGE TIME (ms)
3:0394	DSLC13 BLOCK #4 MESSAGE TIME (ms)
3:0395	DSLC13 A PHASE VOLTAGE

3:0396	DSLC13 B PHASE VOLTAGE
3:0397	DSLC13 C PHASE VOLTAGE
3:0398	DSLC13 3-PHASE AVG VOLTAGE
3:0399	DSLC13 BUS VOLTAGE
3:0400	DSLC13 POWER FACTOR (p.f. * 1000)
3:0401	DSLC13 A PHASE CURRENT (AMPS)
3:0402	DSLC13 B PHASE CURRENT (AMPS)
3:0403	DSLC13 C PHASE CURRENT (AMPS)
3:0404	DSLC13 3-PHASE TOTAL CURRENT
3:0405	DSLC13 LOAD REFERENCE (% RATED)
3:0406	DSLC13 PROCESS REFERENCE (uA)
3:0407	DSLC13 ACTIVE POWER OUTPUT (KW)
3:0408	DSLC13 REACTIVE POWER OUTPUT (KVAR)
3:0409	DSLC13 APPARENT POWER OUTPUT (KW)
3:0410	DSLC13 GEN FREQUENCY (Hz * 100)
3:0411	DSLC13 BUS FREQUENCY (Hz * 100)
3:0412	DSLC13 SPARE ANALOG READ 22
3:0413	DSLC13 SPARE ANALOG READ 23
3:0414	DSLC13 SPARE ANALOG READ 24
3:0415	DSLC13 SPARE ANALOG READ 25
3:0416	DSLC13 SPARE ANALOG READ 26
3:0417	DSLC13 SPARE ANALOG READ 27
3:0418	DSLC13 SPARE ANALOG READ 28
3:0419	DSLC13 SPARE ANALOG READ 29
3:0420	DSLC13 SPARE ANALOG READ 30
3:0421	DSLC14 BLOCK #1 MESSAGE TIME (ms)
3:0422	DSLC14 BLOCK #2 MESSAGE TIME (ms)
3:0423	DSLC14 BLOCK #3 MESSAGE TIME (ms)
3:0424	DSLC14 BLOCK #4 MESSAGE TIME (ms)
3:0425	DSLC14 A PHASE VOLTAGE
3:0426	DSLC14 B PHASE VOLTAGE
3:0427	DSLC14 C PHASE VOLTAGE
3:0428	DSLC14 3-PHASE AVG VOLTAGE
3:0429	DSLC14 BUS VOLTAGE
3:0430	DSLC14 POWER FACTOR (p.f. * 1000)
3:0431	DSLC14 A PHASE CURRENT (AMPS)
3:0432	DSLC14 B PHASE CURRENT (AMPS)
3:0433	DSLC14 C PHASE CURRENT (AMPS)
3:0434	DSLC14 3-PHASE TOTAL CURRENT
3:0435	DSLC14 LOAD REFERENCE (% RATED)
3:0436	DSLC14 PROCESS REFERENCE (uA)
3:0437	DSLC14 ACTIVE POWER OUTPUT (KW)
3:0438	DSLC14 REACTIVE POWER OUTPUT (KVAR)
3:0439	DSLC14 APPARENT POWER OUTPUT (KW)
3:0440	DSLC14 GEN FREQUENCY (Hz * 100)
3:0441	DSLC14 BUS FREQUENCY (Hz * 100)
3:0442	DSLC14 SPARE ANALOG READ 22
3:0443	DSLC14 SPARE ANALOG READ 23
3:0444	DSLC14 SPARE ANALOG READ 24
3:0445	DSLC14 SPARE ANALOG READ 25
3:0446	DSLC14 SPARE ANALOG READ 26
3:0447	DSLC14 SPARE ANALOG READ 27
3:0448	DSLC14 SPARE ANALOG READ 28
3:0449	DSLC14 SPARE ANALOG READ 29
3:0450	DSLC14 SPARE ANALOG READ 30

Analog Writes **PORT 3 ONLY** ***(Port 2 has no Analog Writes)***

Addr	Description
4:0001	MSLC REMOTE REFERENCE (uA)
4:0002	MSLC PROCESS SIGNAL (uA)
4:0003	MSLC SPARE ANALOG WRITE 03
4:0004	MSLC SPARE ANALOG WRITE 04
4:0005	MSLC SPARE ANALOG WRITE 05
4:0006	DSLC01 REMOTE REFERENCE (uA)
4:0007	DSLC01 PROCESS SIGNAL (uA)
4:0008	DSLC01 SPARE ANALOG WRITE 03
4:0009	DSLC01 SPARE ANALOG WRITE 04
4:0010	DSLC01 SPARE ANALOG WRITE 05
4:0011	DSLC02 REMOTE REFERENCE (uA)
4:0012	DSLC02 PROCESS SIGNAL (uA)
4:0013	DSLC02 SPARE ANALOG WRITE 03
4:0014	DSLC02 SPARE ANALOG WRITE 04
4:0015	DSLC02 SPARE ANALOG WRITE 05

4:0016	DSLC03 REMOTE REFERENCE (uA)
4:0017	DSLC03 PROCESS SIGNAL (uA)
4:0018	DSLC03 SPARE ANALOG WRITE 03
4:0019	DSLC03 SPARE ANALOG WRITE 04
4:0020	DSLC03 SPARE ANALOG WRITE 05
4:0021	DSLC04 REMOTE REFERENCE (uA)
4:0022	DSLC04 PROCESS SIGNAL (uA)
4:0023	DSLC04 SPARE ANALOG WRITE 03
4:0024	DSLC04 SPARE ANALOG WRITE 04
4:0025	DSLC04 SPARE ANALOG WRITE 05
4:0026	DSLC05 REMOTE REFERENCE (uA)
4:0027	DSLC05 PROCESS SIGNAL (uA)
4:0028	DSLC05 SPARE ANALOG WRITE 03
4:0029	DSLC05 SPARE ANALOG WRITE 04
4:0030	DSLC05 SPARE ANALOG WRITE 05
4:0031	DSLC06 REMOTE REFERENCE (uA)
4:0032	DSLC06 PROCESS SIGNAL (uA)
4:0033	DSLC06 SPARE ANALOG WRITE 03
4:0034	DSLC06 SPARE ANALOG WRITE 04
4:0035	DSLC06 SPARE ANALOG WRITE 05
4:0036	DSLC07 REMOTE REFERENCE (uA)
4:0037	DSLC07 PROCESS SIGNAL (uA)
4:0038	DSLC07 SPARE ANALOG WRITE 03
4:0039	DSLC07 SPARE ANALOG WRITE 04
4:0040	DSLC07 SPARE ANALOG WRITE 05
4:0041	DSLC08 REMOTE REFERENCE (uA)
4:0042	DSLC08 PROCESS SIGNAL (uA)
4:0043	DSLC08 SPARE ANALOG WRITE 03
4:0044	DSLC08 SPARE ANALOG WRITE 04
4:0045	DSLC08 SPARE ANALOG WRITE 05
4:0046	DSLC09 REMOTE REFERENCE (uA)
4:0047	DSLC09 PROCESS SIGNAL (uA)
4:0048	DSLC09 SPARE ANALOG WRITE 03
4:0049	DSLC09 SPARE ANALOG WRITE 04
4:0050	DSLC09 SPARE ANALOG WRITE 05
4:0051	DSLC10 REMOTE REFERENCE (uA)
4:0052	DSLC10 PROCESS SIGNAL (uA)
4:0053	DSLC10 SPARE ANALOG WRITE 03
4:0054	DSLC10 SPARE ANALOG WRITE 04
4:0055	DSLC10 SPARE ANALOG WRITE 05
4:0056	DSLC11 REMOTE REFERENCE (uA)
4:0057	DSLC11 PROCESS SIGNAL (uA)
4:0058	DSLC11 SPARE ANALOG WRITE 03
4:0059	DSLC11 SPARE ANALOG WRITE 04
4:0060	DSLC11 SPARE ANALOG WRITE 05
4:0061	DSLC12 REMOTE REFERENCE (uA)
4:0062	DSLC12 PROCESS SIGNAL (uA)
4:0063	DSLC12 SPARE ANALOG WRITE 03
4:0064	DSLC12 SPARE ANALOG WRITE 04
4:0065	DSLC12 SPARE ANALOG WRITE 05
4:0066	DSLC13 REMOTE REFERENCE (uA)
4:0067	DSLC13 PROCESS SIGNAL (uA)
4:0068	DSLC13 SPARE ANALOG WRITE 03
4:0069	DSLC13 SPARE ANALOG WRITE 04
4:0070	DSLC13 SPARE ANALOG WRITE 05
4:0071	DSLC14 REMOTE REFERENCE (uA)
4:0072	DSLC14 PROCESS SIGNAL (uA)
4:0073	DSLC14 SPARE ANALOG WRITE 03
4:0074	DSLC14 SPARE ANALOG WRITE 04
4:0075	DSLC14 SPARE ANALOG WRITE 05

Appendix E.
Programming Checklist

We recommend you write down the final value of each menu item here so you will have a record if you later need to reprogram or replace the control.

From the Main Menu Header press 'ID' to get the Software Part Number and revision level. Record Here _____

WOODWARD GOVERNOR COMPANY
INDUSTRIAL CONTROLS DIVISION
Configure and Service Items
8280-416
8280-417

723 PLUS STANDARD POWERGEN
DSLC/MSLC LON TO MODBUS GATEWAY
UP TO 14 DSLC AND 1 MSLC
MONITORING AND CONTROL

Configure Menus

CONFIGURE: CONFIG MODBUS	**Default (Low, High)**
Modbus J2 Mode	#2 (1, 2)
Modbus J2 Address	#1 (1, 247)
Modbus J3 Mode	#2 (1, 2)
Modbus J3 Address	#1 (1, 247)
Force Outputs	#FALSE
CONFIGURE: REMOTE REF THRESH	**Default (Low, High)**
MSLC REM IN THRSH	#1.0 (0.1, 20.0)
DSLC01 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC02 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC03 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC04 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC05 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC06 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC07 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC08 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC09 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC10 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC11 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC12 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC13 REM IN THRSH	#1.0 (0.1, 20.0)
DSLC14 REM IN THRSH	#1.0 (0.1, 20.0)
CONFIGURE: PROCESS SIG THRESH	**Default (Low, High)**
MSLC PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC01 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC02 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC03 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC04 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC05 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC06 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC07 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC08 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC09 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC10 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC11 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC12 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC13 PR SIG THRSH	#1.0 (0.1, 20.0)
DSLC14 PR SIG THRSH	#1.0 (0.1, 20.0)

CONFIGURE: USE CB AUX	Default
MSLC USE CB AUX	#FALSE
DSLC01 USE CB AUX	#FALSE
DSLC02 USE CB AUX	#FALSE
DSLC03 USE CB AUX	#FALSE
DSLC04 USE CB AUX	#FALSE
DSLC05 USE CB AUX	#FALSE
DSLC06 USE CB AUX	#FALSE
DSLC07 USE CB AUX	#FALSE
DSLC08 USE CB AUX	#FALSE
DSLC09 USE CB AUX	#FALSE
DSLC10 USE CB AUX	#FALSE
DSLC11 USE CB AUX	#FALSE
DSLC12 USE CB AUX	#FALSE
DSLC13 USE CB AUX	#FALSE
DSLC14 USE CB AUX	#FALSE

Service Menus

SERVICE: LON	Default (Low, High)
LON Service Pin CH1	*FALSE
LON Reset CH1	*FALSE
LON Fail Timeout (sec)	*5.0 (1.0, 120.0)
LON Output Update (sec)	*1.0 (0.1, 120.0)
LON Fail Xmit Reset	*FALSE
SERVICE: MODBUS J2	**Default (Low, High)**
Modbus J2 HW CONFIG	*1 (1, 3)
Modbus J2 BAUD RATE	*6 (1, 7)
Modbus J2 STOP BITS	*1 (1, 3)
Modbus J2 PARITY	*1 (1, 3)
Modbus J2 TIME OUT	*10.0 (0.0, 100.0)
Modbus J2 EX ERROR	
Modbus J2 LINK ERR	
Modbus J2 ERROR PCT	
Modbus J2 ERROR NUM	
SERVICE: MODBUS J3	**Default (Low, High)**
Modbus J3 HW CONFIG	*1 (1, 3)
Modbus J3 BAUD RATE	*6 (1, 7)
Modbus J3 STOP BITS	*1 (1, 3)
Modbus J3 PARITY	*1 (1, 3)
Modbus J3 TIME OUT	*10.0 (0.0, 100.0)
Modbus J3 EX ERROR	
Modbus J3 LINK ERR	
Modbus J3 ERROR PCT	
Modbus J3 ERROR NUM	
SERVICE: DSLC FAIL XMIT	**Display Only**
MSLC FAIL XMIT	
DSLC 01 FAIL XMIT	
DSLC 02 FAIL XMIT	
DSLC 03 FAIL XMIT	
DSLC 04 FAIL XMIT	
DSLC 05 FAIL XMIT	
DSLC 06 FAIL XMIT	
DSLC 07 FAIL XMIT	
DSLC 08 FAIL XMIT	
DSLC 09 FAIL XMIT	
DSLC 10 FAIL XMIT	
DSLC 11 FAIL XMIT	
DSLC 12 FAIL XMIT	
DSLC 13 FAIL XMIT	
DSLC 14 FAIL XMIT	

SERVICE: FORCE MSLC	Default (Low, High)
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
UTILITY UNLOAD IN	*FALSE
IMP/EXP CONTROL IN	*FALSE
PROCESS INPUT	*FALSE
PAUSE INPUT	*FALSE
SETPOINT RAISE IN	*FALSE
SETPOINT LOWER IN	*FALSE
VOLTAGE RAISE INPUT	*FALSE
VOLTAGE LOWER INPUT	*FALSE
SERVICE: FORCE DSLC 01	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 02	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE

SERVICE: FORCE DSLC 03	Default (Low, High)
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 04	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 05	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE

SERVICE: FORCE DSLC 06	Default (Low, High)
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 07	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 08	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE

SERVICE: FORCE DSLC 09	Default (Low, High)
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 10	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 11	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE

SERVICE: FORCE DSLC 12	Default (Low, High)
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 13	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE
SERVICE: FORCE DSLC 14	**Default (Low, High)**
REMOTE REFERENCE (uA)	*4.0 (0.0, 20.0)
PROCESS SIGNAL (uA)	*4.0 (0.0, 20.0)
USE REMOTE REF	*FALSE
USE PROCESS SIGNAL	*FALSE
CB AUX INPUT	*FALSE
USE NETWORK DISC IN	*FALSE
CHECK INPUT	*FALSE
PERMISSIVE INPUT	*FALSE
RUN INPUT	*FALSE
RAISE VOLTAGE INPUT	*FALSE
LOWER VOLTAGE INPUT	*FALSE
BASELOAD INPUT	*FALSE
LOAD INPUT	*FALSE
PAUSE INPUT	*FALSE
RAISE LOAD INPUT	*FALSE
LOWER LOAD INPUT	*FALSE
PROCESS ENABLE IN	*FALSE

723PLUS Control Specifications

Woodward Part Numbers:	
8280-416	723PLUS with low-voltage power supply
8280-417	723PLUS with high-voltage power supply
9907-205	Hand Held Programmer
8923-932	Watch Window Installation
Power Supply Rating	18–40 Vdc (24 or 32 Vdc nominal) 90–150 Vdc (125 Vdc nominal)
Power Consumption	40 W nominal
Inrush Current (low voltage)	7 A for 0.1 ms
Inrush Current (high voltage)	22 A for 15 ms
Steady State Speed Band	±0.25% of rated speed
Magnetic Pickup	400–15 000 Hz (200–2100 rpm)
Proximity Switch	30–1000 Hz (200–2100 rpm)
Discrete Inputs (8)	10 mA at 24 Vdc, impedance 2.3 kΩ
Analog Inputs (4)	4–20 mA or 1–5 Vdc
Analog Outputs #1 & #2	4–20 or 0–1 mA (not used)
Analog Output #3	4–20 or 0–200 mA (not used)
Analog Output #4	4–20 or 0–200 mA (not used)
Relay Outputs (3)	(not used)
Relay Contact Ratings	Resistive—2.0 A at 28 Vdc, 0.1 A at 115 Vac 50 to 400 Hz Inductive—0.75 A at 28 Vdc 0.2 Henry, 0.1 A at 28 Vdc Lamp
Programmer Serial Port (J1)	RS-422, 9-pin D connector, 1200 baud, full duplex
Communication Ports (J2, J3)	RS-232, RS-422, RS-485, 9-pin connector, 1200 to 38 400 baud, full duplex
Ambient Operating Temperature	–40 to +70 °C (–40 to +158 °F)
Storage Temperature	–55 to +105 °C (–67 to +221 °F)
Humidity	95% at +20 to +55 °C (+68 to +131 °F) Lloyd's Register of Shipping Specification Humidity Test 1
EMI/RFI Susceptibility	Lloyd's Register of Shipping, EN50081-2 and EN50082-2
Mechanical Vibration	Lloyd's Register of Shipping Specification Vibration Test 1
Mechanical Shock	US MIL-STD 810C, Method 516.2, Procedure I (basic design test), Procedure II (transit drop test, packaged), Procedure V (bench handling)

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 02831C.

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