

**723PLUS/DSLCTM**  
**Network Binding Procedure**

**LonMakerTM for DOS**



### 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

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### 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:

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

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## 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.

# 723PLUS/DSLC™ Compatible Network Binding Procedure LonMaker™ for DOS

## Requirements

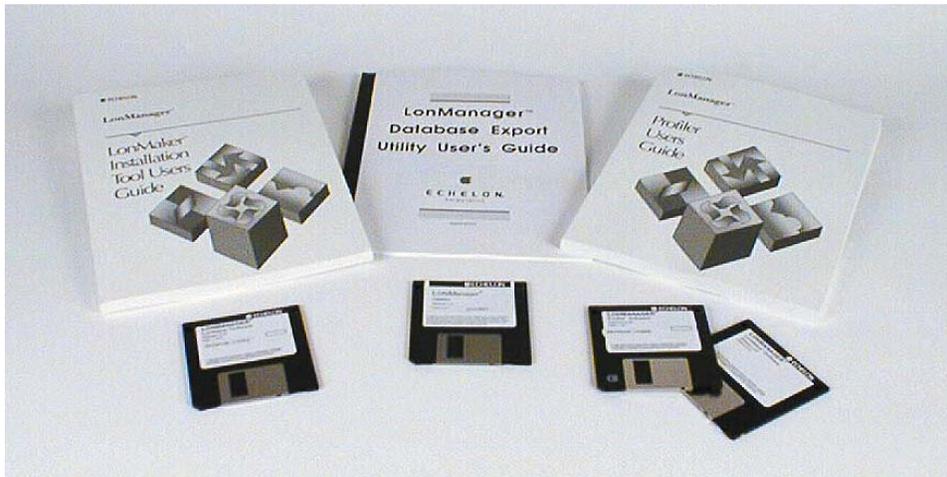
### Computer (for Graphics Version of LonMaker™\* Software)

- ◆ IBM PC compatible with a minimum of an 80386 running at 25 MHz.
- ◆ 640 KB of conventional RAM, with at least 580 KB of this available for LonMaker. A separate boot disk may be required to get 580 KB of memory.
- ◆ 2 MB of expanded or extended memory.
- ◆ 1.1 MB of hard disk storage for the LonMaker software.
- ◆ A serial port (RS-232) for use with the serial network interface.
- ◆ DOS version 3.2 or later.
- ◆ VGA monitor and video card.

\*—LON®, LonTalk®, and LonMaker™ are trademarks of Echelon Corporation.

### **IMPORTANT**

If the text version of the software is used, the computer requirements drop to a minimum of an 8088 with no expanded or extended memory, and the VGA monitor and video card are not needed.



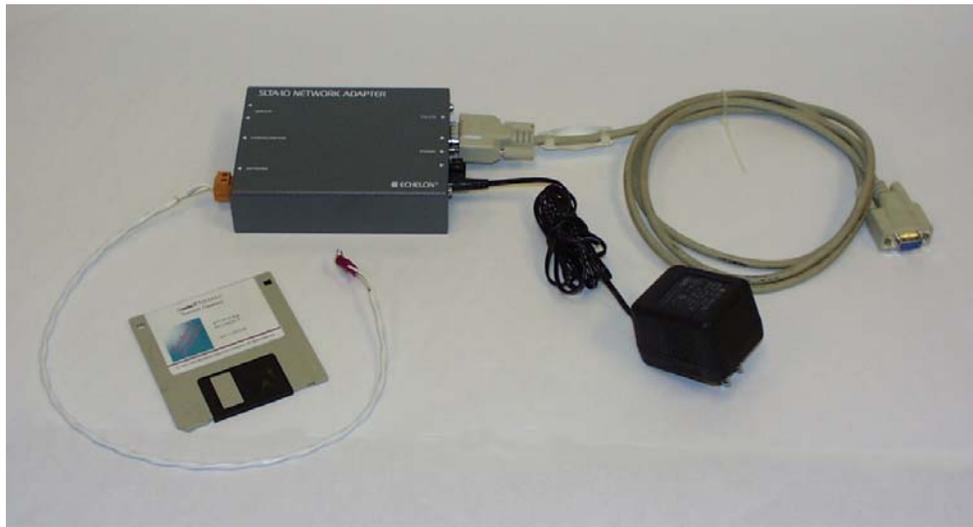
## Software

LonMaker Software—Follow Echelon's instructions for correctly installing on your PC (Woodward part number 1796-031).

Software driver required for the Serial LonTalk® Adapter—LDVSLTA.SYS. LonMaker database with capability of 14 DSLC™ (Digital Synchronizer and Load Control) units and 723PLUS Digital Speed Controls, 1 LSIM (Load Sharing Interface Module), 1 MSLC (Master Synchronizer and Load Control), and 1 723PLUS gateway. For use with the standard DSLC-compatible 723PLUS and the standard Modbus®\* gateway 723PLUS.

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

The database and SLTA driver are supplied on a disk assembly (Woodward part number 8928-053).



## 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 1796-031, 8928-053, and 8923-492)—Starter Kit number 8928-158.

## 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 in an Echelon network. For our purposes, binding is required in applications where it is desired that the DSLC information and commands be made available on a serial network. The binding process must be performed at the initial start-up (first time installation) of a system, and also any time that a device on the network is replaced. The binding process is explained in detail under “Installing a Network”.

In the standard power generation 723PLUS DSLC applications, the DSLC information is transferred via the 723PLUS. The 723PLUS functions as a gateway to convert the DSLC Echelon information into Modbus serial data. Note that only the 723PLUS DSLC/MSLC Gateway control provides MSLC information. The 723PLUS/DSLC does not.

We have considered two different network situations with the standard 723PLUS controls:

1. 723PLUS/DSLC pair on each engine. The maximum capability is 14 engines on one network. The 723PLUS is the speed control. The 723PLUS is also the gateway for the DSLC (only) information to a Modbus network for monitoring and commands. The 723PLUS for this system is 8280-412/-413/-466/-467.
2. One 723PLUS DSLC/MSLC Gateway connected to a maximum of 14 DSLC controls and one MSLC used as a gateway for the DSLC and MSLC information to a Modbus network for monitoring and commands. In this situation, a separate control (such as a 2301A) could be used as the speed control on each engine. The 723PLUS for this system is 8280-416/-417.

**IMPORTANT**

**Be sure to install with LonMaker the appropriate 723PLUS device(s). Install either the individual unit 723PLUS/DSLC (i.e., 723\_01, 723\_02, etc) or the 723PLUS DSLC/MSLC Gateway (i.e., Gateway LON1 and Gateway LON2), but not both. Install only the 723PLUS device(s) intended for use by the Modbus network connection to extract DSLC (MSLC) information and to send DSLC (MSLC) commands.**

There are two separate software programs used to create an Echelon network: LonProfiler and LonMaker. LonProfiler defines each of the devices on a network and creates a parts catalog. The parts catalog contains each device and its network inputs and outputs. This parts catalog is then used by the installation software (LonMaker) to actually create the network connections and “bind” the devices.

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

Woodward has created one LonMaker database for both of the network situations above. All of the network connections are made for up to 14 engines. Also included is the possibility of an MSLC and an LSIM on the network. With the database already created, the only function that will be needed in the field is the actual binding process.

## Installing the Network

The 8928-053 disk assembly contains a LonMaker database and sample `autoexec.bat` and `config.sys` files. Boot up your PC and insert this disk in your 3.5” floppy drive.

The most difficult requirement to meet for LonMaker is to make 580 KB of conventional memory available. If you are using Windows 95 as your operating system, you will probably not have any problems. If you are using DOS or Windows 3.X as your operating system, and LonMaker will not execute because there is not enough memory, you will have to make some changes in your system to free up some conventional memory. If you are running Windows, exit Windows and run LonMaker from DOS. If you are still having problems, create a system disk that only loads the minimum requirements for DOS and LonMaker and boot your computer from this disk. The `sample_c.sys` and `sample_a.bat` files that are supplied on the disk assembly can be used in part or in full as the `config.sys` and `autoexec.bat` for your bootable disk.

No matter which operating system you are using (including Windows 95), the following line has to be added to your `config.sys` file. This system file loads the driver for the Serial LonTalk Adapter (SLTA). Be sure there is a space before and after the "/A":

```
DEVICEHIGH=C:\LNM\LDVSLTA.SYS /A /P1
```

If the LDVSLTA.SYS file is not already located in your C:\LNM directory, put it there. The file is supplied on the 8928-053 disk assembly.

You must also make sure that the LonMaker and LonProfiler directories (C:\LNM & C:\LNP) are in your working path. These directories can be appended to your existing path by adding the following line to your `autoexec.bat` file:

```
SET PATH=%PATH%C:\LNM;C:\LNP;
```

If you edit your `config.sys` or `autoexec.bat` files, be sure to reboot your PC so that the changes will take effect.

On the disk is a Self-Extractor file called 9926803.exe. When executed, the WinZip dialog box will prompt you to unzip to the default directory C:\Echelon. Once the unzip operation has been performed, the database will be stored within your C:\Echelon directory. Within the 9926803 directory are two directories (called DB\_TYPE and DB\_INST) that contain the database files.

Create a directory that identifies the site you are working on (call the directory SITE\_1 for instance) as there will be a separate database for each site. Copy the DB\_TYPE and DB\_INST directories and all the files contained in these directories. Place the copy of these directories in your SITE\_1 directory, making an exact copy of the 9926803 directory. This will create a working directory and a backup directory in the event that you need it.

**WARNING**

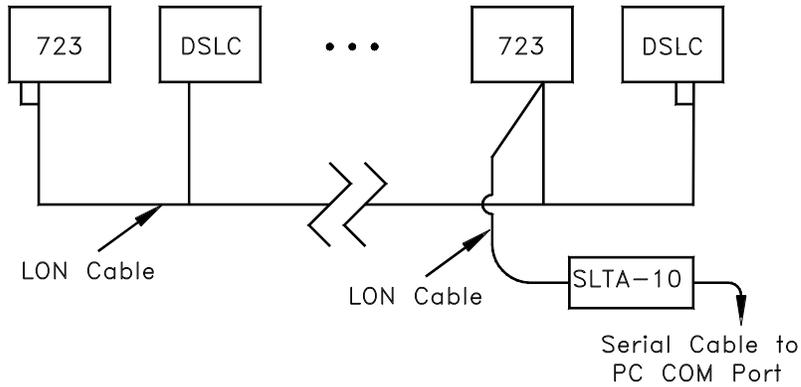
**Before installing any of the devices on a network, be sure that all of the engines are shut down and locked out. The load sharing between the DSL/C units will be temporarily removed during the installation process.**

Connect the SLTA-10 (or SLTA/2) to the serial port of your computer with the serial cable provided. Set SLTA-10 configuration DIP switches 1, 2, 3, 4, 7, and 8 "OFF" (down). Set configuration DIP switches 5 and 6 "ON" (up). The SLTA-10 is defaulted to work on serial port 1. If you need to use port 2, follow these steps:

1. Edit your `config.sys` file with any text editor.

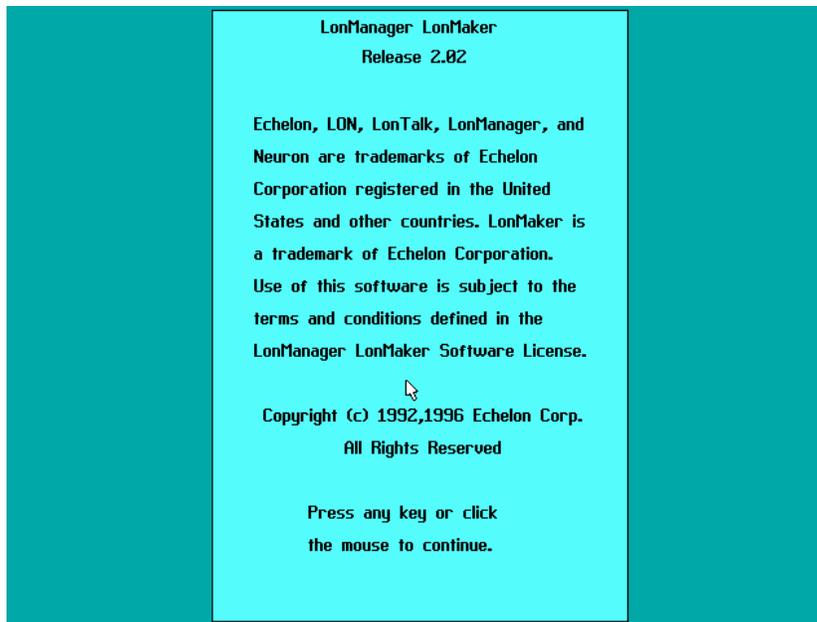
2. Change the line in the `config.sys` file that reads:  
`"devicehigh=c:\lnm\ldvslta.sys /A /P1"` to  
`"devicehigh=c:\lnm\ldvslta.sys /A /P2"`
3. Save the file and reboot your PC.

Connect the SLTA-10 to any point on the network with the LON® cable. Connect the power supply, and power up the SLTA-10.



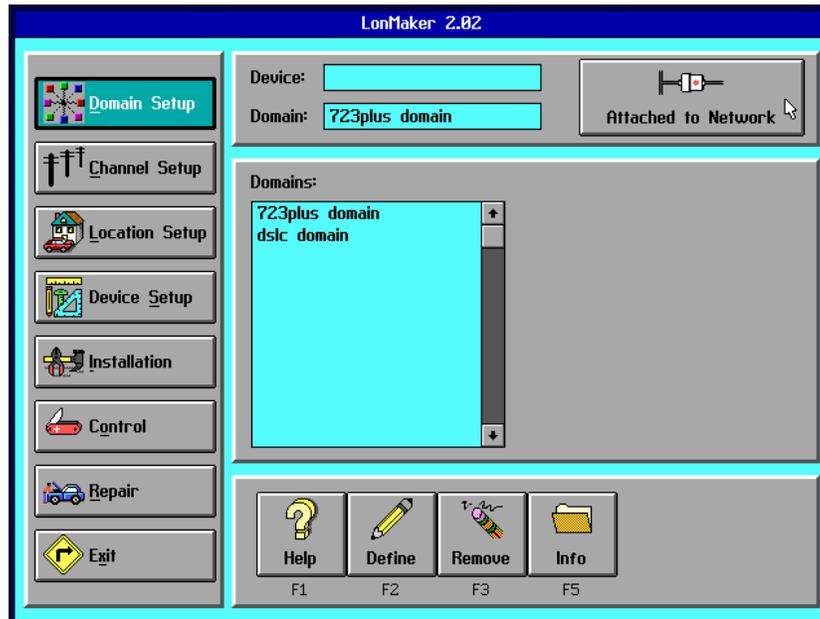
028-036  
97-06-01

While residing in the project directory that you created above, from the DOS prompt type `'lnmg'` (your screen at this point should read `C:\ECHELON\SITE_1>lnmg`) and press `<ENTER>`. This will launch the LonMaker program and use the database stored in the `SITE_1` directory. Your screen will look as follows:



Press any key and LonMaker will start.

Be sure that you are connected to the network. The status is given at the top right hand corner of the screen.



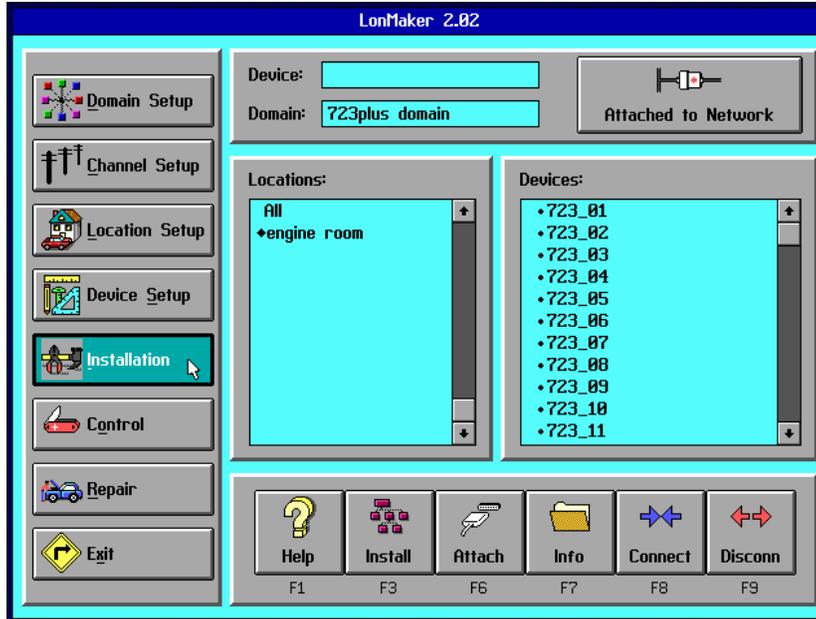
If you are not connected to the network, click on the top right hand button and you will be connected to the network through the SLTA-10. If still not connected, be sure that the SLTA-10 is powered up, cycle power on the SLTA-10, and verify connection from SLTA-10 to PC.

Select the 'Domain Setup' category on the top left corner of the screen and select the Domain that you will be working in (723PLUS or DSLC). The domain is simply a way of organizing the network. Communication between domains is not allowed. All the DSLC-to-DSLC communication is done in the DSLC domain. All the DSLC-to-723PLUS communication is done in the 723PLUS domain. You will find that the DSLC controls are in both domains, so when you are working with them, the domain is not important. DSLC controls can be installed from either domain. The 723PLUS controls are found only in the 723PLUS domain. The LSIM is only in the DSLC domain because there is no communication between the 723PLUS and the LSIM.

<u>DSLC Domain</u>	<u>723PLUS Domain</u>
DSLC units	723PLUS/DSLC compatible controls
MSLC	723PLUS Gateway
LSIM	DSLC units
	MSLC

Select the 'Channel Setup' category and select channel 1 (there is only one channel).

Setting up locations is a way to further subdivide the network (engine room, control room, etc.). In this example, there is only one location which we called 'engine room'. Select the 'Location Setup' category and select 'All' locations. Select the 'Installation' button on the left hand side of the screen. At this point, none of the devices are installed as indicated by the • symbol next to the name of the device. Refer to the following figure.



Note that 723\_01 and DSLC\_01 (as well as 723\_02 and DSLC\_02, etc) are a pair and should be installed as a pair. If the 723PLUS controls and DSLC units are not physically installed as a pair, the information supplied by the 723PLUS could be for the wrong unit. If 723\_01 is installed on unit #1 and DSLC\_01 is installed on unit #2, then the generator information supplied by 723\_01 would actually be coming from unit #2.

Note also that the 723PLUS Gateway has two device designations, one for LON1 and another for LON2. LON1 connects to the MSLC and DSLC\_01 through DSLC\_07. LON2 connects to DSLC\_08 through DSLC\_14.

## **WARNING**

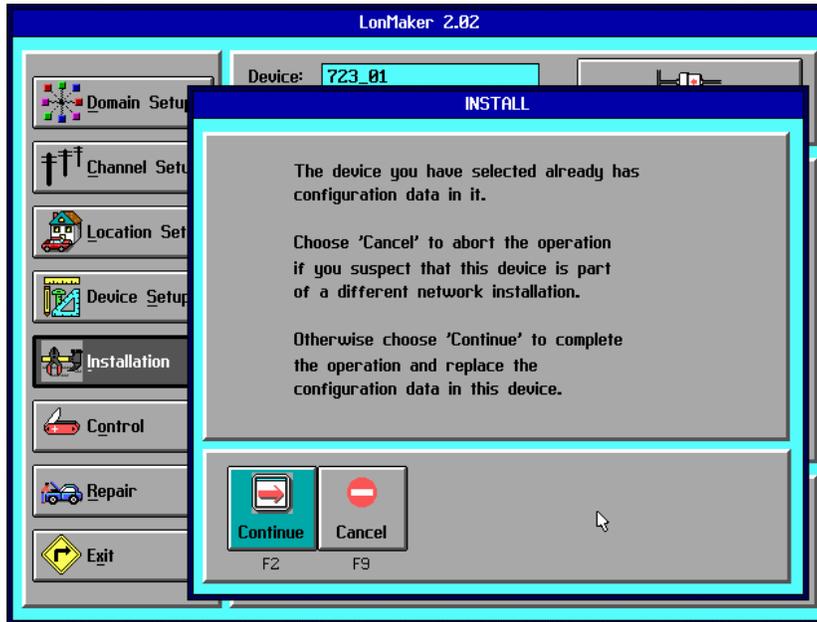
Whenever you are installing or replacing a device, be sure to select the correct device in LonMaker, and press the service pin on that corresponding physical device. You cannot install two devices with the same name on the same network. And you cannot install one device twice in the same network.

Select the device that you want to install by clicking on it. Press the 'Install' button along the bottom of the screen or press F3. A screen will pop up asking you to press the service pin on the device that you are installing, as shown below.



Go to the control and select the service pin. On a 723PLUS/DSL/MSLC compatible control, the service pin can be found in the "**COMM PORT SETUP**" menu. On a 723PLUS DSL/MSLC Gateway, the service pin can be found in the '**LON**' service menu. Refer to the corresponding 723PLUS manual for details on the service pin location for other 723PLUS controls. The 723PLUS service pin will have to be tuned to TRUE and then back FALSE. The service pin on a DSL/MSLC control is in **menu 5**, and the configuration key will have to be set to 49. The LSIM has a physical service **button** located above terminal 11.

If the device you selected has been used in a network before, LonMaker will give you a warning as shown in the picture below. This simply means that the control has been configured in a network some time previously in its life. You will see this warning on DSLCL controls because they are configured from the factory for self-binding. You may or may not see the warning when you install a 723PLUS. This is a good time to verify that you pressed the service pin on the correct device. Click on 'Continue' and LonMaker will install the device.



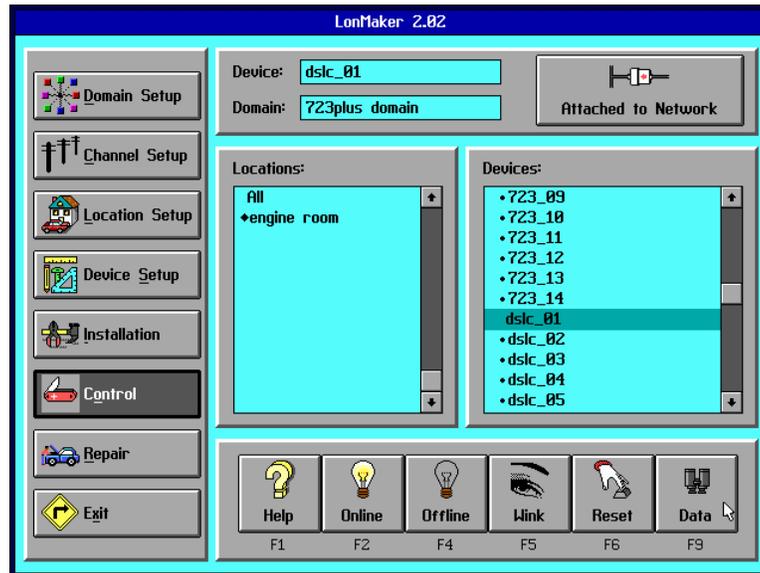
Once a DSLCL unit, LSIM, or MSLC is installed with LonMaker, it will not load share with the remaining DSLCL units until they are also installed with LonMaker. Follow the procedure above to install the remaining devices on the network, including the MSLC or LSIM if applicable.

## IMPORTANT

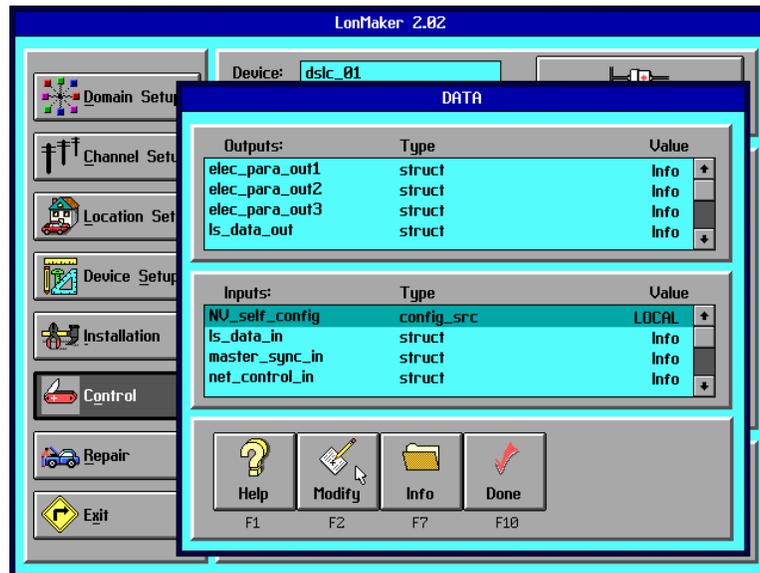
Verify that all the DSLCL controls, the MSLC, and the LSIM are installed by looking at the number of "active DSLCLs" in menu 0 on all of the DSLCL controls and the MSLC. This number should equal the total number of all DSLCL units, MSLC, and LSIM installed on the network and powered up.

When a DSLCL control, LSIM, or MSLC is installed with LonMaker, the network address (in menu 5 on a DSLCL unit) is no longer valid. However, it can cause problems if the DSLCL unit thinks it should be configuring itself, when in reality the LonMaker is configuring the DSLCL control. To eliminate these problems, there is a variable in the DSLCL control that tells it whether it is configured from an external source or locally. This variable must be set to EXTERNAL when a DSLCL control has been installed using LonMaker. This variable is defaulted to LOCAL and can only be set from LonMaker as follows:

From the 'Control' category, select an installed DSLC unit and select the 'Data' button on the far bottom right.

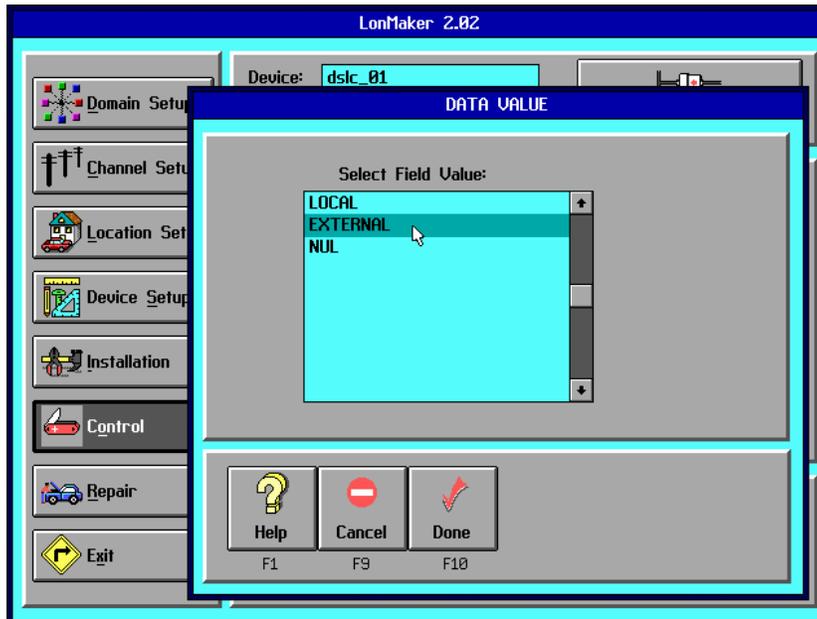


Under the 'Inputs:' window, select the variable called NV\_self\_config. This variable will either be set to 'LOCAL' or 'EXTERNAL'.



If the current state is 'EXTERNAL', press 'Done'. Select the next DSLC control and repeat the procedure above. Remember to check the LSIM and MSLC also.

However, if the current state is 'LOCAL', select the 'Modify' button along the bottom of the screen (or press F2).



From the menu select 'EXTERNAL' and select DONE (or press F10).

After a moment, the DATA window should reflect the change. Select 'Done'. Repeat this procedure for all of the DSLCL controls on the network as well as the LSIM and MSLC if applicable.

## NOTICE

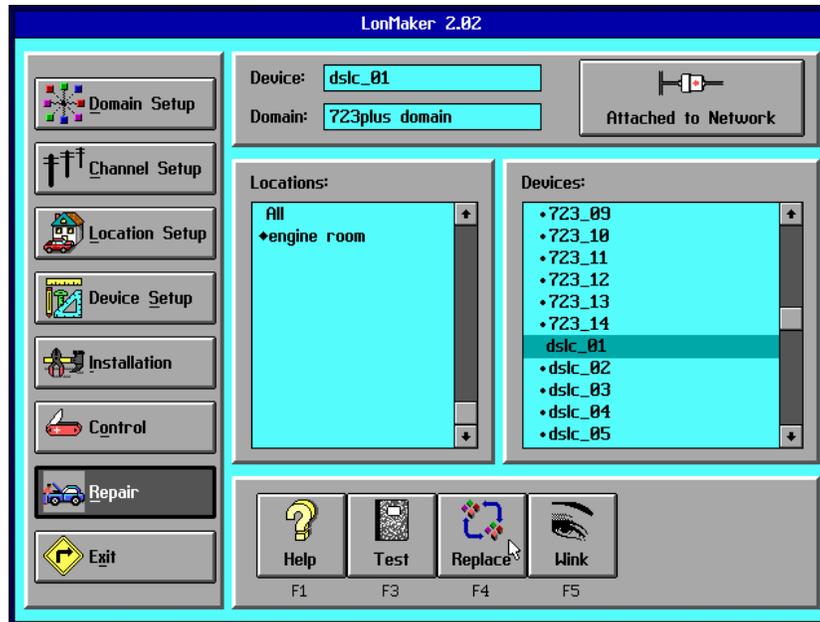
Changing the NV\_self\_config value back to 'LOCAL' will NOT make the DSLCL unit self-binding again, but it will cause problems in your LonMaker network. Once a DSLCL unit has been installed with LonMaker, it is good only for that network and cannot be used as a self-binding control as before. It is possible to reset a DSLCL unit and make it self-binding again, but this involves a PROM change in an electrostatic-discharge-safe environment.

At this point all the network devices should be installed and the DSLCL units, MSLC, and LSIM should be set to external configuration. You can exit LonMaker now by pressing the 'Exit' button (lower left side of the screen).

## Replacing a Device

If one of the DSLCL, MSLC, or LSIM units, or 723PLUS controls is replaced, the LonMaker software will be required to install the new device. The software replacement can be done on a bench before physically replacing the device, or it can be done on-site after the device is physically installed. Remember that the device will not receive network information until the software replacement is done.

The software replacement is similar to the installation. Connect your PC to the network through the SLTA-10 and boot up your PC using the 8928-053 disk. Execute the 'lnmg' program from the directory that contains the same database (e.g., site 1) that was used for installation. Verify that you are connected to the network. On the left side of the screen, select the repair category. Select the device that you want to replace.



Select the 'Replace' button from the menu along the bottom of the screen. Press the service pin on the device that you are replacing. LonMaker will download the correct information for the device that you are replacing.

## IMPORTANT

If you don't have the database that was used during the installation, you could use a fresh database and go through the installation procedure above. You will only have to install the device that you are replacing. It is a good idea to keep an up-to-date database so that you know which devices are installed in the event that you add more.

## Quick Reference Guide

### Initial Installation:

1. Create Site database from 8928-053 disk assembly.
2. Execute LonMaker from your site directory.
3. Attach to the network.
4. Select the domain.
5. Select the device and press install from the Installation menu.
6. Toggle the service pin for the correct device.
7. Repeat installation for all 723PLUSs, DSLC units, MSLC, and LSIM on the network.
8. Change NV\_self\_config variable to 'EXTERNAL' on all DSLC units, MSLC, and LSIM.
9. Once all devices are installed, verify that there are the correct number of active DSLC controls in Menu 0 on all of the DSLC units and MSLC. The number should be equal to all of the DSLC units, MSLC, and LSIM on the network.

### Replacing:

1. Execute LonMaker from your existing site directory. If you don't have the site directory, follow the initial installation steps, but only install the device(s) that is being replaced.
2. Attach to the network.
3. Select the device and press Replace from the Repair menu.
4. Toggle the service pin for the correct device.
5. Repeat replace process for all devices that are being replaced.
6. Change NV\_self\_config variable to 'EXTERNAL' on all DSLC units, MSLC, and LSIM that were replaced.
7. Once all devices are replaced, verify that there are the correct number of active DSLC controls in Menu 0 on all of the DSLC units and MSLC. The number should be equal to all of the DSLC units, MSLC, and LSIM on the network.

### **IMPORTANT**

Remember that the network replace (or installation) can be done on a bench before the physical installation of the device. The device can be replaced (or installed) without being connected to the other devices in the network. When the device is physically connected to the other installed devices, they will start communicating.

We appreciate your comments about the content of our publications.

Send comments to: [icinfo@woodward.com](mailto:icinfo@woodward.com)

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