

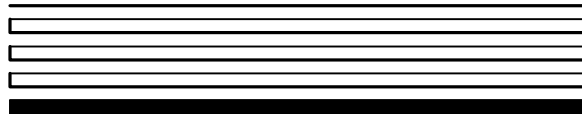
LONWORKS[®]

**PCLTA-21 PCI Interface
User's Guide**

Version 1



078-0271-01A



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PCLTA-21 PCI Interface

Application of Council Directive: 89/336/EEC, Electromagnetic Compatibility Directive (EMC),
73/23/EEC, Low Voltage Directive (LVD)

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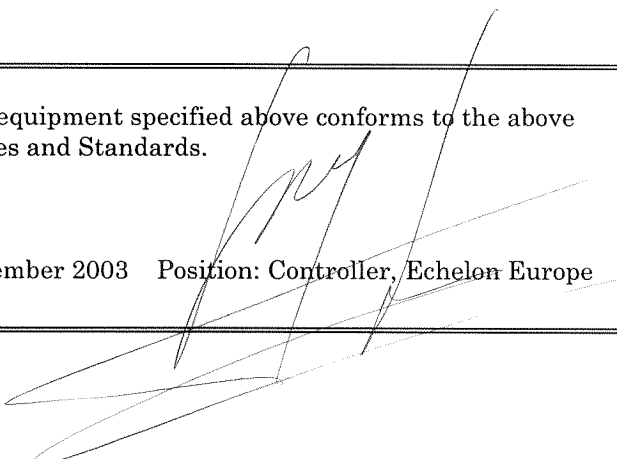
Product Model Number: 74501, 74502, 74503, 74504

Type of Equipment: Information Technology Equipment

Standards to which:	EN 60950:2000	EN 61000-4-4
Conformity is	EN 55022:1998	EN 61000-4-5
Declared	EN 55024:1998	EN 61000-4-6
	EN 61000-4-2	EN 61000-4-8
	EN 61000-4-3	EN 61000-4-11

I, Wim Meijer, hereby declare that the equipment specified above conforms to the above
Directives and Standards.

Place: Amersfoort, The Netherlands Date: November 2003 Position: Controller, Echelon Europe



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FCC Notice
CE Declaration of Conformance

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1

PCLTA-21 Introduction

This guide describes the mechanical characteristics and the hardware and software driver installation for the Echelon PCLTA-21 Interface (Models 74501, 74502, 74503, 74504, and 74505).

Echelon's PCLTA-21 card is a high-performance LONWORKS® interface for desktop and embedded personal computers equipped with a 3 or 5V 32-bit PCI interface and a compatible operating system. Designed for use in LONWORKS networks that require a PC to monitor, manage, or diagnose the network, the PCLTA-21 card is ideal for industrial control, building automation, and process control applications. The PCLTA-21 card features support for TP/XF-78, TP/XF-1250, TP/FT-10, and RS-485 transceivers, downloadable memory, a network management interface, and Plug n' Play capability with Microsoft Windows 98, 2000, and XP operating systems.

The four versions of the PCLTA-21 interface with integral twisted pair transceivers support the TP/FT-10 (Model 74501), TP/XF-78 (Model 74502), TP/XF-1250 (Model 74503), and TP-RS485 (Model 74504) channels, respectively.

The PCLTA-21 card can be used as an LNS® High Performance Network Interface, a standard LNS network interface, or a LonManager API-compatible interface.

Overview

The PCLTA-21 card provides any PC equipped with a 32-bit PCI interface and compatible Windows operating system access to a LONWORKS network.

The PCLTA-21 installation software provides a software-based control panel and a software driver for Microsoft Windows 98, 2000, or XP operating system. Installation software also is available on Echelon's web site at www.echelon.com/downloads. The control panel provides a convenient means of setting and modifying installation parameters, as well as displaying error messages. The adapter supports Windows 98, 2000, and XP Plug n' Play operation, simplifying installation and use.

The PCLTA-21 card operates at 10MHz and includes integral twisted pair transceiver. The network connection is made via a removable screw terminal block.

Firmware for the PCLTA-21 is downloaded from the host PC. This allows the card to be updated as new versions of the software and firmware are released, without modifying or physically accessing the PCLTA-21 card. This feature extends the useful service life of the card, and minimizes the cost and time associated with software and firmware updates. The card is provided with 32Kbytes of off-chip RAM for use as network and application buffers.

Audience

This manual is intended for developers and end users of LONWORKS systems using the PCLTA-21 card.

Related Documentation

The following Echelon publications are suggested for additional information:

- *LONWORKS FTT-10A Free Topology Transceiver User's Guide* (078-0156-01)
- *LONWORKS Junction Box and Wiring Guidelines* (005-0023-01)
- *LONWORKS TPT Twisted Pair Transceiver Module User's Guide* (078-0025-01)
- *LNS for Windows Programmer's Guide* (078-0177-01)
- *LonMaker User's Guide* (078-0168-02)
- *LNS DDE Server User's Guide* (078-0170-01)

2

Installing the PCLTA-21 Card

This chapter describes the procedures for installing the PCLTA-21 card.

PCLTA-21 Card Software Installation

There are two versions of the PCLTA-21 installation software, one for Windows 2000 and XP and one for Windows 98. Each version installs the files required by the associated Windows operating system to recognize the PCLTA-21 card, as well as the downloadable LNS and MIP images.

Windows 2000 and XP Software Installation Procedure

To install the PCLTA-21 software on a Windows 2000 or XP PC, follow the instructions below. The PCLTA-21 software cannot be installed from DOS or a DOS shell. The PCLTA-21 software can support DOS applications via the DOS virtual device driver. The default mode of operation is as an LNS high performance network interface; the LonManager API-compatible MIP mode image may be enabled through the driver software control panel.



Installation of the PCLTA-21 software **MUST** precede insertion of a PCLTA-21 card into a PCI slot.

Failure to install the software before inserting the card will render the card unusable until the software is removed, and then reinstalled.

1. Close all open programs.
2. Insert the installation CD into the PC.
3. Open the Windows Start menu and select the Run command.
4. When prompted for a program name, enter the following:
`E:\Win2K-XP\SETUP.EXE` (where E: represents your CD ROM)
5. When prompted with a list of languages, click on the desired language. A checkmark will appear to the left of the language to be installed.
6. When prompted for a destination directory, enter the desired installation directory. By default this directory is `c:\lonworks`, unless previous LONWORKS products have been installed and registered a different path in the Windows Registry.



The path may be modified using the Browse button; however, if a directory other than c:\lonworks is chosen, the PCLTA-21 images path will have to be specified to enable use of the PCLTA-21 card. This is accomplished during PCLTA-21 Configuration. See Chapter 3, *Configuring and Testing the PCLTA-21 Adapter*.

7. There is a limit of six (6) PCLTA-21 cards in a single PC.
8. The installation software for the Windows 2000 and XP versions will issue a prompt to add a DOS virtual-mode device driver file to the DOS CONFIG.NT file (to support DOS applications) called LON1. This will allow DOS applications to be used in a Windows 2000 or XP DOS shell/window. For more information see *Virtual-Mode DOS Driver* later in this chapter. The following line is added to the CONFIG.NT file:

```
DEVICE=%SYSTEMROOT%\SYSTEM32\PCLTDOS.SYS /D1
```

The argument /D1 names this DOS device as LON1.

9. Software installation is complete. At the prompt to restart the computer, remove the PCLTA-21 installation CD, turn off power, install the PCLTA-21 card, and then reboot the computer. Windows will recognize the PCLTA-21 and complete the installation.

Windows 98 Software Installation Procedure

To install the PCLTA-21 software on a Windows 98 PC, follow the instructions below. The PCLTA-21 software cannot be installed from DOS or a DOS shell.



Installation of the PCLTA-21 software **MUST** precede insertion of a PCLTA-21 card into a PCI slot.

Failure to install the software before inserting the card will render the card unusable until the software is removed, and then reinstalled.

1. Close all open programs.
2. Insert the installation CD into the PC.

3. Open the Windows Start menu and select the Run command.
4. When prompted for a program name, enter the following:
`E:\Win98\SETUP.EXE` (where E: represents your CD ROM)
5. When prompted with a list of languages, click on the desired language. A checkmark will appear to the left of the language to be installed.
6. When prompted for a destination directory, enter the desired installation directory. By default this directory is `c:\lonworks`, unless previous LONWORKS products have been installed and registered a different path in the Windows Registry.



The path may be modified using the Browse button; however, if a directory other than `c:\lonworks` is chosen, the PCLTA-21 images path will have to be specified to enable use of the PCLTA-21 card. This is accomplished during PCLTA-21 Configuration. See Chapter 3, *Configuring and Testing the PCLTA-21 Adapter*.

7. When the 16-bit Application Support prompt appears, select “Yes” to enable the use of 16-bit applications with the PCLTA-21 card. This option is required to support legacy DOS applications. The installation program will then add references to the `DOS CONFIG.SYS` file for the stub device drivers named `PCCLON1` and `PCCLON2`. This allows existing 16-bit applications to recognize these device names and use the PCLTA-21 card as a network interface. If more than two PCLTA-21 cards are installed in the PC, additional stub drivers can be created manually. To do so, add the following lines to the `CONFIG.SYS` file:

```
DEVICE=C:\LONWORKS\BIN\LDVSTUB.SYS /D:PCCLON3  
DEVICE=C:\LONWORKS\BIN\LDVSTUB.SYS /D:PCCLON4
```

There is a limit of six (6) PCLTA-21 cards in a single PC.

8. If the installation software discovers the `SYSTEM.INI` entry that loads the `ECHLMPA.386` ISA bus driver, it will comment out the entry and display the following message, “SETUP has modified your `SYSTEM.INI` file by removing the following entry: `device=echlmpa.386`.” It is not possible to use the ISA-bus protocol analyzer card and the PCLTA-21 card on the same PC.
9. The installation software for the Windows 98 version will issue a prompt to add a DOS virtual-mode device driver file named `LDVVDD.SYS` to the `DOS CONFIG.SYS` file (to support DOS applications) called `LON1`. This will allow

DOS applications to be used in a Windows 98 DOS shell/window. For more information see *Virtual-Mode DOS Driver* later in this chapter. The following line is added to the `CONFIG.SYS` file:

```
DEVICE=C:\LONWORKS\BIN\LDVVDD.SYS /D1
```

10. Software installation is complete. At the prompt to restart the computer, remove the PCLTA-21 installation CD and shut down the computer. Next insert the PCLTA-21 into a PCI slot and turn the computer back on. Windows will discover and recognize the PCLTA-21.

Windows 2000 and XP Software Removal Procedure

To remove the PCLTA-21 software under Windows 2000 or XP, follow these steps:

1. Choose the Add/Remove programs icon from the Windows Control Panel.
2. Select “LonWorks® PCLTA-10/21/PCC-10”.
3. Click the Change/Remove button.
4. Confirm the removal at the prompt.
5. If necessary, edit the `CONFIG.NT` file to remove any references to the `PCLTADOS.SYS` driver.

Windows 98 Software Removal Procedure

To remove the PCLTA-21 software, follow these steps:

1. Choose the Add/Remove Programs icon from the Windows Control Panel.
2. Select “LonWorks® PCLTA-10/21/PCC-10”.
3. Click the Add/Remove button.
4. Confirm file removal at the prompt.
5. If necessary, edit the `CONFIG.SYS` file to remove any references to the stub driver.

Windows 2000 and XP Virtual-Mode DOS Driver Installation Results

The Windows 2000 and XP PCLTA-21 installation software will prompt the installer to automatically add the virtual-mode DOS driver. This driver is small in size, and allows a DOS session under Windows to have access to the PCLTA-21 card through the device driver running as a part of Windows. The driver will not function unless a Windows session is running and the PCLTA-21 device driver is installed.

The following line will be added to the config.NT file located in the system32 folder under the Windows system directory:

```
DEVICE=<directory of file>\PCLTDOS.SYS /Dn
```

/Dn where (n) is 1-9. This defines LON1-LON9 and corresponds to devices 1-9 as determined by the PCLTA-21 device driver under Windows.

The following is an example of the line that would be added to the CONFIG.NT file:

```
DEVICE=C:\LONWORKS\BIN\PCLTDOS.SYS /D1
```

Windows 98 Virtual-Mode DOS Driver Installation Results

The Windows 98 PCLTA-21 card installation software will prompt the installer to automatically add the virtual-mode DOS driver. This driver is small in size, and allows a DOS session under Windows to have access to the PCLTA-21 through the device driver running as a part of Windows. The driver will not function unless a Windows session is running and the PCLTA-21 device driver is installed.

The following line will be added to the CONFIG.SYS file:

```
DEVICE=<directory of file>\LDVVDD.SYS /Dn /Ln
```

/Dn where (n) is 1-9. This defines LON1-LON9 and corresponds to devices 1-9 as determined by the PCLTA-21 device driver under Windows. This parameter is optional; the default is "1".

/Ln where (n) is 1-9. This defines the *logical* device 1-9 as determined by the PCLTA-21 device driver under Windows. This parameter is optional, the default is the value determined by the /Dn parameter. This allows overriding the actual device accessed from being based on the /Dn parameter.

For example, using /D9 /L1 will in fact create a DOS driver named LON9 that will actually access the 1st PCLTA-21 in the system. Without the /L1

parameter you would access the 9th device, as determined by the /D9 option. These options are typically needed when more than one LONWORKS network interface is present in the system.

PCLTA-21 Card Hardware Installation



ESD Warning

This product contains devices which are sensitive to static electricity. Before installing or removing the PCLTA-21 card or the network cables, discharge any static electricity which may have accumulated to earth ground by touching the case or power supply.

1. Turn off the PC and remove the power cord.
2. Open the PC case and locate an empty PCI slot. The PCLTA-21 is a Universal card that will work in 3.3V, 5V, 32-bit, and 64-bit PCI slots. Remove the corresponding blank panel from the rear of the PC. Set aside the screw.
3. Insert the PCLTA-21 card into the slot, ensuring that the edge connectors are fully mated and the slot in the rear panel mounting lug of the PCLTA-21 card is aligned with the threaded hole in the PC chassis.
4. Replace the screw to hold the PCLTA-21 card firmly in place.
5. Reinsert the power cord and then restart the PC. A New Hardware Found window will be displayed briefly when Windows recognizes the PCLTA-21 card.

Changing to the Low Profile Bracket

If the PCLTA-21 is too tall to fit inside your computer's enclosure, you can change to the low profile bracket that is shipped in the PCLTA package.

To change brackets:

1. Using a Philips screwdriver, remove the two screws securing the standard bracket to the PCLTA-21 circuit board.
2. Remove the low profile bracket from the PCLTA-21 package.
3. Align the low profile bracket to the PCLTA-21 circuit board and re-attach using the same two screws.

Troubleshooting

As a plug-and-play device, the PCLTA-21 card should operate as desired following completion of the installation process. If the card does not function correctly, the most likely causes are system resource constraints or software incompatibilities. These problems are described in detail in the following sections.

Installing the PCLTA-21 Card before Software Installation

The following section applies to Windows 98 only.

If the PCLTA-21 card was inserted into the PC prior to PCLTA-21 software installation, the Windows operating system will be unable to associate a device driver with the card. When Windows 98 starts up, a New Hardware Found window will appear. Click the Cancel button, then install the PCLTA-21 software as described above.

If the option “Do not install a driver (Windows will not prompt you again)” was inadvertently selected, the operating system will mark the PCLTA-21 card as an unknown device. As a result, the card will not function even if the PCLTA-21 software is installed. To correct this problem, remove the device using the following steps:

1. Open the System icon in the Windows Control Panel and select the Device Manager tab.
2. Double-click the Other Devices icon.
3. Select the PCLTA-21 device and click the Remove button.
4. Install the PCLTA-21 software and reboot the PC.

System Resources

Each PCLTA-21 card requires sixteen contiguous bytes of I/O address space starting on a modulo-4 based address, i.e., an address evenly divisible by 4.

Solving IRQ and I/O Conflicts under Windows 98

I/O resource problems are rare under Windows 98 for the PCLTA-21 card since the card can handle a wide range of I/O settings. The Windows 98 operating system handles most allocations of IRQs, but there are some instances where the operating system cannot properly allocate interrupt requests.

IRQ usage in the system can be determined by opening the System icon in the Windows Control Panel. The Device Manager tab allows viewing of devices by type or connection.

The PCLTA-21 LONWORKS Network Interface device icon is found under the LONWORKS Interface device *type*. If there is a problem with the card, there will be a red circle with an exclamation point next to its icon.

IRQ resource problems may generally be resolved by disabling another device in the system. More information can be found in the Hardware Conflict troubleshooting portion of the Windows 98 on-line Help file.

Access the hardware conflict troubleshooter through the procedure outlined below:

1. Open the Windows 98 on-line help by clicking the Windows Start button and selecting Help.
2. In the Help Topics window, choose the Contents tab, or from another Help window, choose the Contents button.
3. Double-click the Troubleshooting topic, and then select the If You Have A Hardware Conflict help topic.

Extensive trouble-shooting documentation can be found in the Microsoft Windows 98 Resource Kit Help File. This help file is part of the Windows 98 Resource Kit, which is available from Microsoft.

Note that if a DOS real-mode driver is in use for a specific device that is installed in the PC, Windows 98 may not know about that device's resource requirements.

There are rare I/O conflict situations of which the Device Manager may be unaware. Such a conflict may occur when an I/O resource is not properly specified for a device, and a new driver overlays onto the true I/O space of that device. In the event of such a conflict, it may become necessary to manually reserve I/O or IRQ resources using the Device Manager. This process is described in the Microsoft Windows on-line help.

Once these resources have been reserved, the Device Manager will recognize and attempt to resolve any resource conflicts between the DOS driver and any Windows drivers. If a conflict still occurs, it will be visible, and may be resolved as described in *Solving IRQ and I/O Conflicts under Windows 98* earlier in this chapter.

If a device resource requirement is hardwired into the PC (i.e., configured by a jumper or not modifiable from the system BIOS), there is little that the Windows 98 operating system can do to free the resources.

Common Resource Problems under Windows 98

The following situations produce an additional drain on system resources that may be hard to manage. Conflicts arising from these situations can generally be resolved by selectively disabling devices to free up the required resources.

- COM ports that may not have a connector, but are consuming resources and cannot be disabled through the BIOS
- Unused IDE controllers that can not be disabled through the BIOS
- Unused/nonexistent PS/2 mouse ports
- Sound cards that support both 8-bit and 16-bit compatibility modes, consuming two IRQs

An additional problem often associated with sound cards is the improper reporting of I/O resource usage. This problem may be recognized by examining a device's I/O address allocation for unusual one-byte assignments (since devices typically use more). For example, if a device's stated I/O range is 0x201-0x201 but its actual range is 0x201-0x204, a conflict will occur if the PCLTA-21 card is assigned an I/O range of 0x204-0x207. If this problem is suspected, manually move the PCLTA-21 card's I/O range to a safer location to prevent I/O overlap.

Software Compatibility

The PCLTA-21 software is designed to be compatible with LONWORKS software. However, the following issues may arise when using the PCLTA-21 adapter with some software.

Device Name Aliasing under Windows 98

The PCLTA-21 card should operate with most third-party LONWORKS software. However, some 16-bit Windows applications are limited in the device names that can be selected. For example, only the names "LON1" through "LON9" may be available, preventing the use of a PCLTA-21 card. This problem can be corrected through the use of device name aliasing. To create a device alias, follow these instructions

1. Open the file named `ECHELON.INI`, which should reside in the Windows directory. If this file does not exist, then create one with a text editor.
2. Create a driver alias section in the file, by adding the following line:
`[DRIVERALIAS]`
3. On the following line, add the following driver alias:
`aliasname=devicename`
where *aliasname* is the device name accessed by the software, such as "LON1", and *devicename* is the device to be used.
4. Add additional aliases, as necessary.

The following example creates a device alias that routes all service requests for LON1 to the PCCLON1 PCLTA-21 card.

```
[DRIVERALIAS]  
LON1=PCCLON1
```

LonManager ISA Protocol Analyzer Compatibility

The device driver for the PCLTA-21 card and the driver for the Model 33100-00 LonManager Protocol Analyzer ISA-bus card share the same Windows VxD identifier. As a result, both types of cards cannot run on a PC at the same time. So, the PCLTA-21 installation software will comment out the SYSTEM.INI entry that loads the ISA-bus driver.

PCC-10 and PCLTA-21 Compatibility

The LONWORKS Plug n' Play control panel can only support one type of downloadable-image network adapter at a time. As a result, both types of cards cannot run on the PC at the same time.

Automatic Flush Cancel Issues

If the PCLTA-21 card appears to install and test normally, but still will not communicate on the network, check to be sure that the Automatic Flush Cancel checkbox in the LONWORKS Plug 'n Play control panel applications is checked. For more information, see the **Automatic Flush Cancel** section in Chapter 3.

3

Configuring and Testing the PCLTA-21 Card

This chapter explains how to configure and test the PCLTA-21 card using the Control Panel application installed in Chapter 2.

PCLTA-21 Configuration

PCLTA-21 configuration is accomplished by using the LONWORKS Plug 'n Play control panel application. Open the control panel application by selecting the LONWORKS® Plug 'n Play icon in the Windows Control Panel.

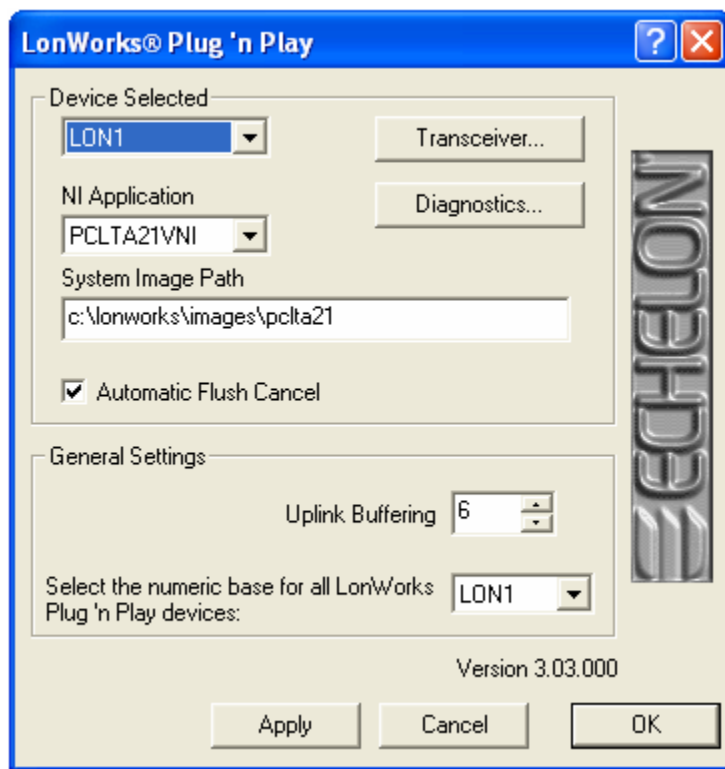


Figure 3.1 PCLTA-21 Control Panel and Icon

The LONWORKS Plug 'n Play control panel application is divided into three parts: a device selection area, a general settings area, and a control section. The device selection area contains configuration settings and diagnostic controls that are specific to an individual PCLTA-21 card and its device driver. The general settings area contains settings for all PCLTA-21 cards used with the PC. The control section contains buttons for accepting or canceling the changes made in the control panel.

PCLTA-21 Initialization

In most cases, PCLTA-21 initialization occurs automatically upon installation of the card and subsequent power-up of the computer. Manual initialization will be required following software installation to a directory other than `c:\lonworks`, or after moving the PCLTA-21 system images.

To manually initialize the PCLTA-21 card, verify that the control panel application's System Image Path entry is correct, then click the Apply button.

An error will be reported if an attempt is made to view the transceiver type before the PCLTA-21 card is initialized. Testing the card with the Diagnostics button produces the diagnosis: "Image file not found." In this case, return to the control panel application's main window and manually initialize the PCLTA-21 card.

Device Specific Settings

The PCLTA-21-specific options consist of five separate controls (figure 3.2). These controls are defined as follows:

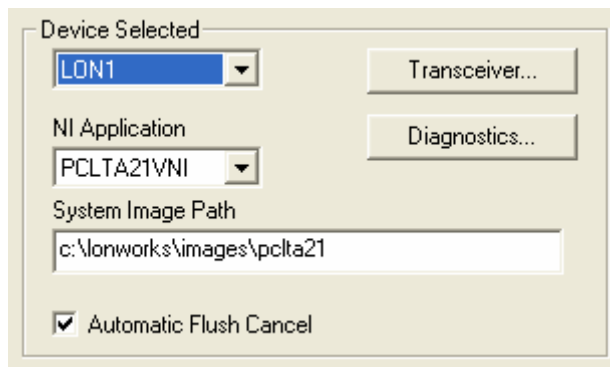


Figure 3.2 PCLTA-21-specific Controls

Device Selected

Controls which PCLTA-21 card is selected for configuration. The PCCLON1 and PCCLON2 drivers are installed by the installation software. If additional drivers have been manually installed, they also will be available.

NI Application

Controls the type of image or application to be used on the PCLTA-21 card. A PCLTA-21 card can only hold one image at a time. Loading a new image will replace the currently loaded image. The choices for these images are determined by the image files (.NBI extension) found in the system image path specified under General Settings for Windows 98 and Device Specific Settings for Windows XP and 2000. Some of the possibilities include the following:

Network Image	Windows XP or 2000	Windows 98
LNS Fast Network Image (LNS 3 and newer)	PCLTA21VNI TX LED lights every time the PCLTA-21 sends a packet. RX LED lights every time the PCLTA-21 sees a packet, whether or not it is addressed to the PCLTA-21.	PCL10VNI
LNS Network Image Interface (LNS 1 and 2)	PCLTA21NSI TX and RX LEDs do not function with this image.	NSIPCLTA
Basic Network Interface Application (MIP and older API Applications)	PCLTA21L7 TX LED lights every time the PCLTA-21 sends a packet. RX LED lights every time the PCLTA-21 sees a packet, whether or not it is addressed to the PCLTA-21.	PCC10L7

System Image Path

Specifies the full directory path for the PCLTA-21 system images. This path is set by the PCLTA-21 Installation Software but may be modified by the user.

Automatic Flush Cancel

If you are using an LNS application, keep this box checked, which is the default. For non-LNS images, this function controls whether the device driver will automatically force the network interface for the selected PCLTA-21 card to leave the post-reset flush state whenever it is reset; an LNS network interface does not and cannot come up in the flush state. The post-reset flush state prevents any inbound or outbound network traffic following a reset. **If this box is not checked, it is up to the client application to manage this state.**

Transceiver

Opens the PCLTA-21 Transceiver dialog (figure 3.3). Choosing this option will retrieve the transceiver configuration of the selected PCLTA-21 card. If there is no PCLTA-21 card currently installed in a PCI-bus slot, a message appears stating that the operating system has removed, or has not loaded, the PCLTA-21 device driver.

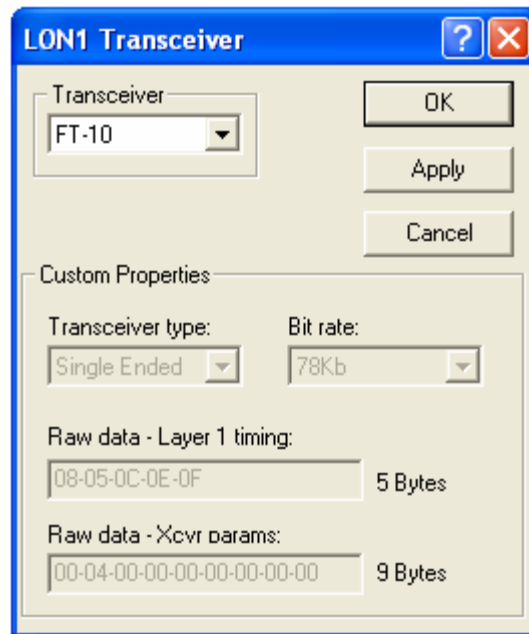


Figure 3.3 PCLTA-21 Transceiver Dialog Box

Diagnostics

Opens the PCLTA-21 Diagnostics dialog. For more information, see the section on PCLTA-21 Diagnostics, later in this chapter.

General Settings

The PCLTA-21-generic options consist of four controls (figure 3.4). These controls are defined as follows:

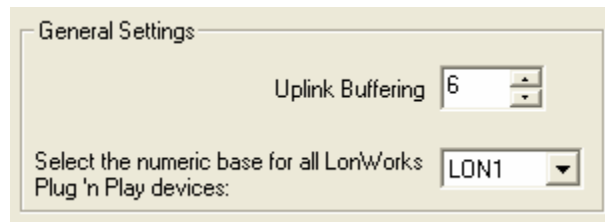


Figure 3.4 PCLTA-21 Generic Controls

Uplink Buffering

For Windows 2000 and XP, this controls the number of 4Kbyte operating system pages that are allocated for message buffering within the driver. The default setting is 6 pages. This value should be appropriate for most applications; embedded systems may need to change the number of buffering pages.

For Windows 98, the term “**Layer6 Buffering**” refers to the same parameter as Uplink Buffering. There is also a “**Layer2 Buffering**” setting that should always be left at its default value of 20.

PCLTA-21 Diagnostics

A number of diagnostic and testing services are provided by the PCLTA-21 control panel application. Clicking the Diagnostics button in the main control panel window displays the PCLTA-21 Diagnostics dialog. This dialog contains buttons for the diagnostic commands and displays the version number and current status of the PCLTA-21 device driver. If no PCLTA-21 card is installed in a PCI-bus slot, the Diagnostics window will display “(no driver found)”.

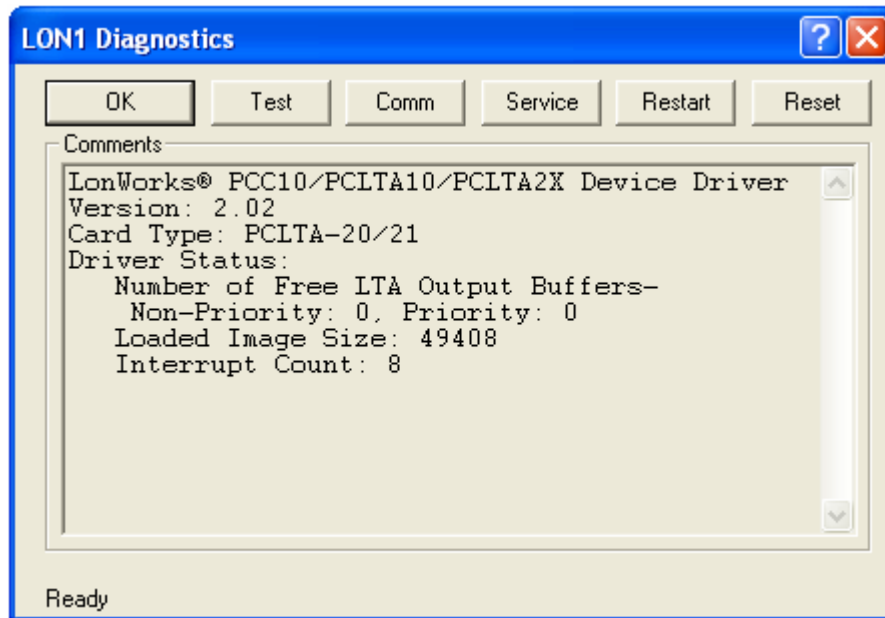


Figure 3.5 PCLTA-21 Diagnostics Dialog Box

Driver Status

The content of the device driver status displayed in the Diagnostics window is as follows:

- Number of Free PCLTA-21 Output Buffers:
 - Non-Priority: the non-priority application output buffer count, as calculated by the driver based on information retrieved from the PCLTA-21 card's non-volatile EEPROM.
 - Priority: the priority application output buffer count, as calculated by the driver based on information retrieved from the PCLTA-21 card's non-volatile EEPROM.

- Loaded Image Size: the size, in bytes, of the currently-loaded PCLTA-21 system image. This may be zero if the PCLTA-21 card is in the initial boot state.
- Interrupt Count: the number of interrupts the driver has processed for this device. This value is set to zero when the device is physically reset.

Diagnostic Commands

The diagnostic commands are invoked by clicking one of the buttons displayed in figure 3.6. If a diagnostic command results in the “Image file not found” error message, close the Diagnostics dialog by clicking the OK button, then click the Apply button in the PCLTA-21 control panel application. This re-initializes the card and allows use of the diagnostic commands.

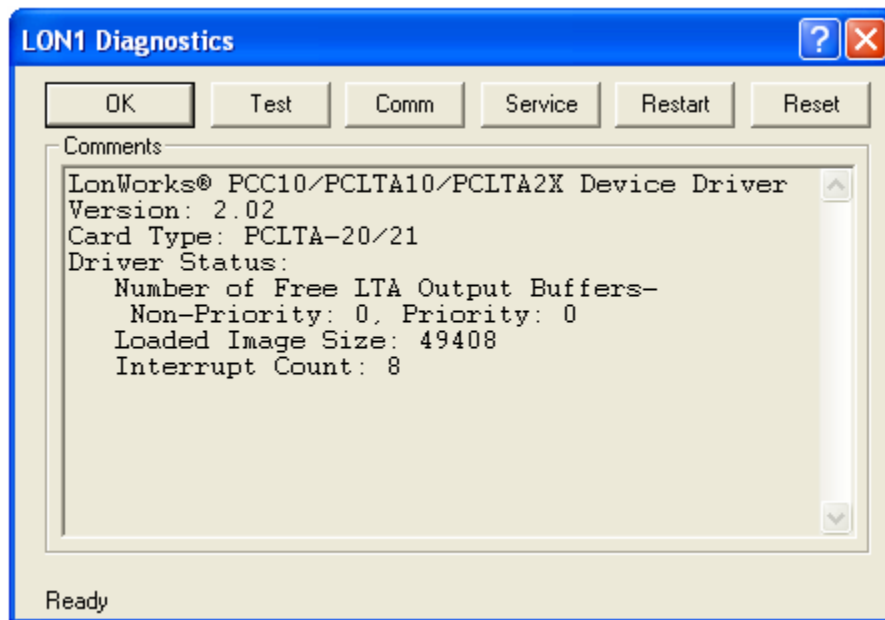


Figure 3.6 Diagnostics Dialog Box Commands

Test

The Test button retrieves status and error counts from the PCLTA-21 card. The results of this message will be displayed in the format shown in figure 3.7.

```

----- Network Interface Node Status -----
CRC Errors:                [00000]
TX Timeouts:               [00000]
Lost (APP) Messages:      [00000]
Missed (NET) Messages:    [00000]
Node State:                Unconfigured
Most recent error:         0
Reset Cause:               Internal

```

Figure 3.7 Example Network Diagnostics Status Response

Comm



The Comm button is not available if you are using the PCLTA21VNI image. If you are using the PCLTA21VNI image, first select the PCLTA21NSI image, click Apply, run the Comm test, then reselect the PCLTA21VNI image, and click Apply.

The Comm feature is not designed to work across routers.

The Comm button verifies communications between the PCLTA-21 card and another device on the network. When this function is chosen, a dialog will appear asking for confirmation of this command, as follows:

This procedure will configure the Network Interface for a zero-length domain if it is not already configured. Do you want to proceed?

Choosing OK causes the control panel to first check the network interface for the configured state. If it is already in the configured state, it will not be modified further. If it is not in the configured state it will install the network interface with a zero-length domain on index 0, a subnet of 1, and a node ID of 126, and then change its state to configured.

Once the device is in the configured state, the control panel application enters the receive-ready state and displays the following message while waiting for a service pin message from another device on the network:

Now waiting for a service pin message.

Once the service pin is activated on the other device and a service pin message is received, the control panel application sends a diagnostic message to the other device using Neuron ID addressing. It will repeat this message, referred to as a “ping,” once per second until either the OK or the Quit button is chosen (the Quit button will appear in place of the Comm button).

This series of tests confirms that the PCLTA-21 card can be configured and can communicate with a device on the network. The Comm function is intended to eliminate the PCLTA-21 card, the card drivers, the network connection, the hardware of the other device, and the topology configuration from the list of possible problem points or points of failure during network troubleshooting. The Comm function test does *not* eliminate the possibility that the wrong type of media has been used. Be sure that the medium is suitable for use with the selected channel type. The Comm function also does not eliminate the possibility of a missing or improper network termination.

The network wiring may work for this test but may fail if multiple devices are communicating. Be sure to verify that the proper termination is used when troubleshooting communication problems.

Service



The Service button is not available if you are using the PCLTA21VNI image. If you are using the PCLTA21VNI image, first select the PCLTA21NSI image, click Apply, click the Service button, then reselect the PCLTA21VNI image, and click Apply.

The Service button will cause the PCLTA-21 card to broadcast a service pin message on the network. The service pin message will not be sent if the card is in the post-reset flush state (see **Automatic Flush Cancel**).

Restart

The Restart button clears the card's Neuron Chip image and places the device into the boot state. This is the device state found following a re-boot of the Windows operating system. When this function is chosen a dialog will appear asking for confirmation of this command.

Reset

The Reset button causes a reset of the card's Neuron Chip, but does not clear its Neuron Chip image.

4

Electrical and Mechanical Interfaces

This chapter describes the hardware interfaces and mechanical layout of the PCLTA-21 card.

PCLTA-21 Board Layout

Figure 4.1 shows the layout of the PCLTA-21 card Models 74501, 74502, 74503, and 74504. Model 74504 (TP-RS485) includes jumpers that must be configured to set the correct speed on the RS-485 channel (figure 4.2).



Figure 4.1 PCLTA-21 Models 74401-74404 Mechanical Layout and Interfaces

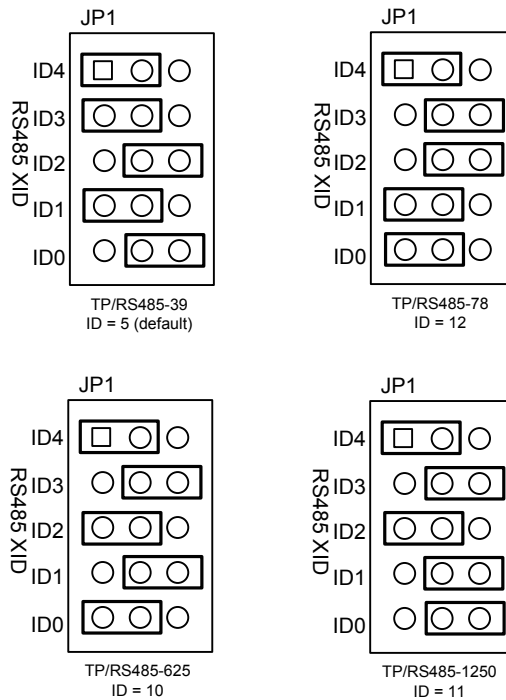


Figure 4.2 PCLTA-21 TP-RS485 Jumper Settings

P1 and P2 PCI Bus Connector

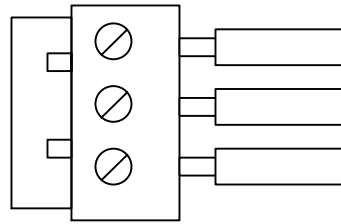
The pinout of the PCI connector is the standard pinout for the 32-bit PCI bus used in Windows-compatible PCs. The power drawn from the host is 250mA @ 5VDC, typical.

Network Connector

The PCLTA-21 Model 74501-74503 cards are supplied with a removable two terminal, BLZ 5180/2/180 for the network connection. The wiring to the twisted pair channel is polarity insensitive. The connector will accept 12 to 26AWG (1.2mm to 0.45mm) wire. See the *Junction Box and Wiring Guidelines for Twisted Pair LONWORKS Networks*, *LONWORKS FTT-10A Free Topology Transceiver User's Guide* or the *LONWORKS TPT Twisted Pair Transceiver Module User's Guide* for information on suitable cables and cable distances.

The PCLTA-21 Model 74504 card is supplied with a removable three terminal, BLZ 5108/3/180 for the RS-485 network connection. The wiring to the RS-485 twisted pair channel is **polarity sensitive**. The connector will accept 12 to 26AWG (1.2mm to 0.45mm) wire. The terminals are connected as follows (with terminal 3 being closest to the service LED):

<i>Terminal</i>	<i>Connection</i>
3	Shield
2	RS-485 -
1	RS-485+



Use only shielded cabling suitable for an RS-485 channel. The use of unshielded cabling could result in damage to the adapter due to common mode voltage associated with differences in ground potential between different devices.

Mechanical Considerations

PCLTA-21 Models 74401 – 74404 measure 2.54” (6.5cm) H x 4.72” (12cm) L. All models are equipped with a full-height chassis bracket and a low profile bracket.