

ChannelWorks



Network Installer's Guide

Part Number: EK-DECTV-IN. B01

Federal Communications Commission (FCC)

Radio Frequency Interference Statement

The following statement applies only to the ChannelWorks bridge:

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference.

Any changes or modification to this equipment may void the user's authority to operate this equipment.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

ChannelWorks

Network Installer's Guide

February 1994

This manual, in conjunction with the *ChannelWorks Cable TV Installer's Guide* and the *ChannelWorks Management* manual, describes how to install the ChannelWorks bridge. This manual is intended for the hardware installer and network manager.

Supersession/Update Information: This is a revised manual.



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Warning - This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



Achtung - Diese ist ein Gerat Funkstorgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerates Rundfunkstörungen auftreten, in welchen Fallen der Benutzer für entsprechende Gegenmassnahmen verantwortlich ist.



Attention - C'est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

Canadian Department of Communications Compliance Statement

The Canadian Department of Communications label identifies certain equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee that the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

User's should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.



Caution - Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

Acoustics - Declared values per ISO 9296 and ISO 7779

	Sound Power Level L_{WAd} , B	Sound Pressure Level L_{pAm} , dBA (bystander positions)
Product	Idle/Operate	Idle/Operate
DECTV-AA	5.0	35

[Current values for specific configurations are available from Digital representatives.
1 B = 10 dBA.]

Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779

	Schalleistungspegel L_{WAd} , B	Schalldruckpegel L_{pAm} , dBA (Zuschauerpositionen)
Produkt	Leerlauf/Betrieb	Leerlauf/Betrieb
DECTV-AB	5.0	35

[Aktuelle Werte für spezielle Ausstattungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA.]

Nippon - Japan

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Preface

About This Book

The *ChannelWorks Network Installer's Guide* is the first book in the series of cable TV bridge system documentation. It describes how to:

- Unpack the shipping carton(s)
- Connect cable TV network and Ethernet/802.3 network cables
- Use the PC Subscriber Utility to verify the ChannelWorks Bridge's installation parameters
- Power up the ChannelWorks Bridge

The *ChannelWorks Network Installer's Guide* provides illustrated instructions for connecting the necessary cables such as the:

- AUI: 10Base5 Thickwire,
- BNC: 10Base2 ThinWire,
- RJ-45: 10BaseT Unshielded Twisted Pair

for the Ethernet network and the broadband coaxial drop cable for the cable TV network to the ChannelWorks Bridge.

Who Should Read This Book

The *ChannelWorks Network Installer's Guide* is for use by installation technicians trained to perform ChannelWorks Bridge installations.

Document Organization

The *ChannelWorks Network Installer's Guide* is organized as follows:

- Chapter 1, “Introduction,” explains planning and preparing to install the product. This chapter describes required tools and explains verifying whether the cable TV network is ready for ChannelWorks Bridge installation.
- Chapter 2, “Physical Installation,” describes selecting a work area, bridge’s input/output connections, and unpacking instructions. This chapter also graphically identifies cables and connectors you will use during installation.
- Chapter 3, “Set-Up and First Steps,” describes how to interface with the ChannelWorks Bridge using its serial port to verify the unit’s installation parameters.
- Chapter 4, “Starting Up the ChannelWorks Bridge,” explains how to attach the ChannelWorks Bridge to a cable TV network and to an Ethernet network. This chapter also explains how to turn the power on and verify the ChannelWorks Bridge is operational.
- Chapter 5, “Troubleshooting,” provides an introductory level of corrective instruction required if the ChannelWorks Bridge does not work after you perform all installation procedures.

Conventions Used In This Guide

Convention	Meaning
<i>Italic Font</i>	<p>Italic Font is used for titles books or to give special emphasis. For example:</p> <p>For more information, refer to the <i>ChannelWorks Cable TV Installer's Guide</i>.</p>
Special Type	<p>Special Type (Courier Font) indicates messages or prompts from the system that appear on your screen. For example:</p> <p>Configuration successfully installed.</p>
Special Bold Type	<p>Special Bold Type (Courier Bold Font) is used within text instructions and in screen examples to show characters or words that you type. For example:</p> <p>At the prompt, type AA000400AB04.</p> <div data-bbox="664 919 1086 1022" style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center;"><p>prompt> passwd</p></div>
A Capitalized Word	<p>A Capitalized Word within text indicates a key that you press. For example:</p> <p>Press Return.</p> <p>When you see two key names, press and hold the first key, and then type the second character. For example:</p> <p>To press Control-C, press and hold the Control key, and then type an uppercase C.</p>

Associated Documents

Refer to the following documents for further information:

- *ChannelWorks Cable TV Installer's Guide* - Describes setting up the cable TV headend translator, preparing the cable TV network for data communications, configuring and installing the ChannelWorks Bridge, and TransMaster frequency switch settings.
- *ChannelWorks Management* - Describes using the bridge's Management Utility to set up the ChannelWorks Bridge operating parameters, preparing the bridge for Serial Line Interface Protocol operation, using the bridge's enterprise specific MIB variables to diagnose and resolve network problems, and accessing and interpreting the bridge's SNMP enterprise specific MIB Support History file.

Safety Precautions

This preface provides safety precautions to follow when installing the ChannelWorks Bridge.

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all warnings and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source matches the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following international symbols appear in this book when you must perform procedures requiring proximity to electrical current.



Caution - You risk damaging your equipment if you do not heed the instructions.



Achtung - Wenn Sie die Anweisungen nicht beachten, könnten Sie Ihre Geräte beschädigen.



Attention - vous risquez d'endommager votre équipement si vous ne vous conformez pas aux instructions.



Precaución - Se pueden ocasionar daños al equipo si no se siguen atentamente las instrucciones.



Warning - Hazardous voltages are present. To lessen the risk of electrical shock and danger to personal health, follow the instructions carefully.



Warnung - Im Gerät herrscht gefährliche Hochspannung. Beachten Sie die Anweisungen genau, um die elektrische Schläge und Gefahren für Ihre Gesundheit zu vermeiden.



Danger - Présence de tensions dangereuses. Pour limiter les risques d'accidents électriques et de blessures corporelles, suivez les instructions à la lettre.



Aviso - Existe la presencia de tensiones peligrosas. Para disminuir el riesgo de accidentes eléctricos y daños personales, hay que seguir las instrucciones al pie de la letra.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. The ChannelWorks Bridge may not meet regulatory compliance if modified.

Placement of the ChannelWorks Bridge



Caution - To ensure reliable operation of the ChannelWorks Bridge and to protect it from overheating, openings in the equipment must not be blocked or covered. The ChannelWorks Bridge should never be placed near a radiator heat register.



Achtung - Um einen zuverlässigen Betrieb der ChannelWorks-Brücke zu gewährleisten und sie vor Überhitzung zu schützen, dürfen Geräteöffnungen nicht verstopft oder abgedeckt werden. Die ChannelWorks-Brücke sollte nicht in der Nähe von Heizkörpern aufgestellt werden.



Attention - Pour assurer le bon fonctionnement de ChannelWorks Bridge et pour le mettre à l'abri de toute surchauffe, les ouvertures ne doivent être ni entravées, ni recouvertes. ChannelWorks Bridge ne doit jamais être placé à proximité d'un accumulateur de chaleur thermique.



Precaución - Para garantizar el buen funcionamiento de ChannelWorks Bridge y para protegerlo de un eventual recalentamiento, las aberturas no deben quedar obstruidas o recubiertas. ChannelWorks Bridge no debe jamás colocarse cerca de un acumulador de calor térmico.

Power Cord Connection



Warning - The ChannelWorks Bridge is designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug the ChannelWorks Bridge into any other type of power system. Contact your facilities manager or certified electrician if you are not sure what type of power is supplied to your building.



Warnung - Die ChannelWorks-Brücke ist für den Betrieb mit einphasigen Stromversorgungssystemen ausgelegt, die einen geerdeten neutralen Leiter haben. Um die Gefahr elektrischer Schläge zu reduzieren, dürfen Sie das Gerät nicht an andere Stromversorgungssysteme anschließen. Wenn Sie nicht wissen, welche Stromart in Ihrem Gebäude zur Verfügung steht, bitten Sie Ihren Hausverwalter oder einen zugelassenen Elektriker um Auskunft.



Danger - ChannelWorks Bridge est conçu pour un fonctionnement avec des systèmes d'alimentation mono-phasés pourvus d'un conducteur neutre mis à la terre. Pour limiter les risques d'accidents électriques, ne connectez pas ChannelWorks Bridge à un autre type d'alimentation. Contactez le directeur du site ou un électricien certifié si vous ne connaissez pas le type d'alimentation dont est pourvu le bâtiment.



Aviso - ChannelWorks Bridge ha sido concebido para funcionar con sistemas de alimentación monofásicos provistos de un conductor neutro puesto a tierra. Para disminuir el riesgo de accidentes eléctricos, no hay que enchufar este equipo a ningún otro tipo de sistema de alimentación. Hay que ponerse en contacto con el administrador de la instalación o con un electricista autorizado en caso de duda sobre el tipo de alimentación que posee el edificio.



Warning - The ChannelWorks Bridge is shipped with a grounding type (three-wire) power cord. To reduce the risk of shock, always plug the cord into a grounded power outlet.



Warung - Die ChannelWorks-Brücke wird mit einem geerdeten (3 adrigen) Kabel geliefert. Schließen Sie das Gerät immer an eine geerdete Steckdose an, um Stromschläge zu vermeiden.



Danger - ChannelWorks Bridge est livré avec un cordon d'alimentation bipolaire plus terre (3 fils). Pour limiter les risques d'accidents électriques, branchez toujours ce cordon sur une prise de terre.



Aviso - ChannelWorks Bridge se entrega con un cable de alimentación provisto de un contacto a tierra (3 hilos). Para disminuir el riesgo de accidentes eléctricos, hay que conectar siempre este equipo a una toma de alimentación con conexión a tierra.

The ChannelWorks Bridge Cover



Warning - It is not safe to operate the ChannelWorks Bridge without the cover in place. Failure to take this precaution may result in personal injury and system damage.



Warnung - Der Betrieb der ChannelWorks-Brücke ohne Abdeckung ist gefährlich. Wenn Sie diese Vorsichtsmaßnahme nicht beachten, riskieren Sie Personen- und Sachschäden.



Danger - Il est dangereux d'utiliser ChannelWorks Bridge sans son couvercle. Le non-respect de cette précaution peut entraîner des blessures corporelles ou endommager le système.



Aviso - Puede resultar peligroso operar el ChannelWorks Bridge sin su tapa. Si no se observa esta precaución se pueden sufrir daños personales o averiar el sistema.

Known Problems

The following items are under investigation:

1. The ChannelWorks Bridge operation has been verified at frequencies corresponding to standard NCTA channel assignments. For optimal receiver operation avoid using the following forward (RX) frequencies:
 - 79.000 MHz
 - 85.000
 - 93.000
 - 105.000
 - 141.000
 - 429.000
 - 465.000 MHz
2. The LANcity Management Utility (LCM) prevents the user from entering illegal and non-optimized Max Round Trip Delay values. However, the ChannelWorks Bridge software does not prevent the user from entering less than optimal Max Round Trip Delay value when performing SNMP “sets” on the enterprise specific MIB variable `lcmaxrndtripdel` in the ASIC Parameters group.
3. The Support History Log does not consider an error code at two different error levels as unique, which could be misleading as in the following example:

If error 0x35 is logged as a level 2 and at a later time error id 0x35 is logged at a level 4, when displaying the Support History Log the second error as shows as a level 2 crash.
4. The LANcity Subscriber Utility (LCS) and the LCM do not operate properly on a 66 MHz PC.
5. The PROM Monitor’s `printcfg` command displays an incorrect software version value under the “Vers” heading. The “Description” heading displays the correct software version. You can also use the SNMP enterprise specific MIB variable `lcsoftware` in the Revision Levels group to view the correct software version.
6. Counters from the interface group of the MIB-II are not implemented correctly for the serial port.
7. The `IPNetToMediaTable` and the `atTable` of MIB-II cannot be modified via SNMP. The enterprise specific MIB variables `lcmastrx` and `lcbcastrx` from the Sonic Stats group are not implemented.

Introduction

Introduction

This manual explains how to install the ChannelWorks Bridge, a 10 Mb/s, Ethernet-to-cable TV, transparent, spanning-tree bridge. This chapter covers the following topics:

- Tasks that need to be completed before beginning installation
- Tools necessary for installation
- How to tell that the cable TV network is certified for data delivery

Pre-Installation Tasks

This manual assumes that you have completed the following tasks:

- The cable TV network has been prepared to communicate with the unit, that is, certified for data delivery.
- The unit has already been configured with the correct receive and transmit frequencies for this network. The installation materials that are shipped with this manual allow you to verify them but not to change them. If you need to change them, you must have the *ChannelWorks Cable TV Installer's Guide* and authorized software. Refer to Chapter 3, "Set-Up and First Steps," for procedures to verify preconfigured installation parameters.

Required Tools And Materials

- A 7/16-in open end wrench for attaching the cable TV cable to the unit.
- If you are going to be verifying the units' installation parameters, a PC running Windows 3.1, a terminal emulator, and a nine-pin null-modem cable to connect the PC's serial port with the bridge's serial port
- For single-cable, cable TV networks, a subsplit, midsplit or highsplit duplex filter (separately orderable item), if one is not already installed at the site; you will also need short (18-in) attachment cables (RG6) (separately orderable) for the receive and transmit ports of the duplex filters.
- Network connection cables (both cable TV and Ethernet networks).
- If the unit is being rack-mounted or wall-mounted, the Channelworks Bridge Rack Mount or Wall Mount Kits (separately orderable), and the required mounting hardware (listed with the mounting instructions).

How To Tell If The Cable TV Network Is Ready

Before beginning installation of the unit, verify that the cable TV system meets the following criteria, and is ready to accept the unit. Check with the cable installer or cable system owner if necessary:

- The system must be two-way active, and must be capable of carrying signals from the unit inbound to the headend, as well as out-bound from the headend to the unit.
- The signal path must meet conditions as specified in the *ChannelWorks Cable TV Installer's Guide* and documented for your specific installation site in the Pre-Installation Checklist. A sample Pre-Installation Checklist is provided in the Appendix B.
- On single-cable systems, there must be a translator installed at the headend, operating at the correct transmit and receive frequencies.

Before installing the unit, verify that the transmit and receive frequencies that have been assigned to the unit are correct. If the unit is set to the wrong frequencies, it will not operate on the network, and could also disrupt other users of the cable TV system.

Hardware Installation

Introduction

This chapter describes:

- Unpacking the unit
- Identifying the contents
- Verifying the packing slip
- Finding a location for the unit
- Physically performing any installation necessary (rack- or wall-mounting)

Unpacking The ChannelWorks Bridge Shipping Carton

To unpack your ChannelWorks Bridge:

- Inspect the shipping carton before removing the bridge.
If there is evidence of damage to the carton, arrange for an agent of the carrier to be present when you remove the ChannelWorks Bridge.
- Remove the bridge and the remaining contents of the shipping carton.
The ChannelWorks Bridge is packed tightly in protective foam molds. Carefully remove it from the carton.

After unpacking the unit, save the box and packaging materials. You can:

- Use them in case you ever have to send the unit back,
- Or
- Return them to the address on the box at no expense to you. The packaging materials will be re-used, and the box will be recycled.

Taking Inventory

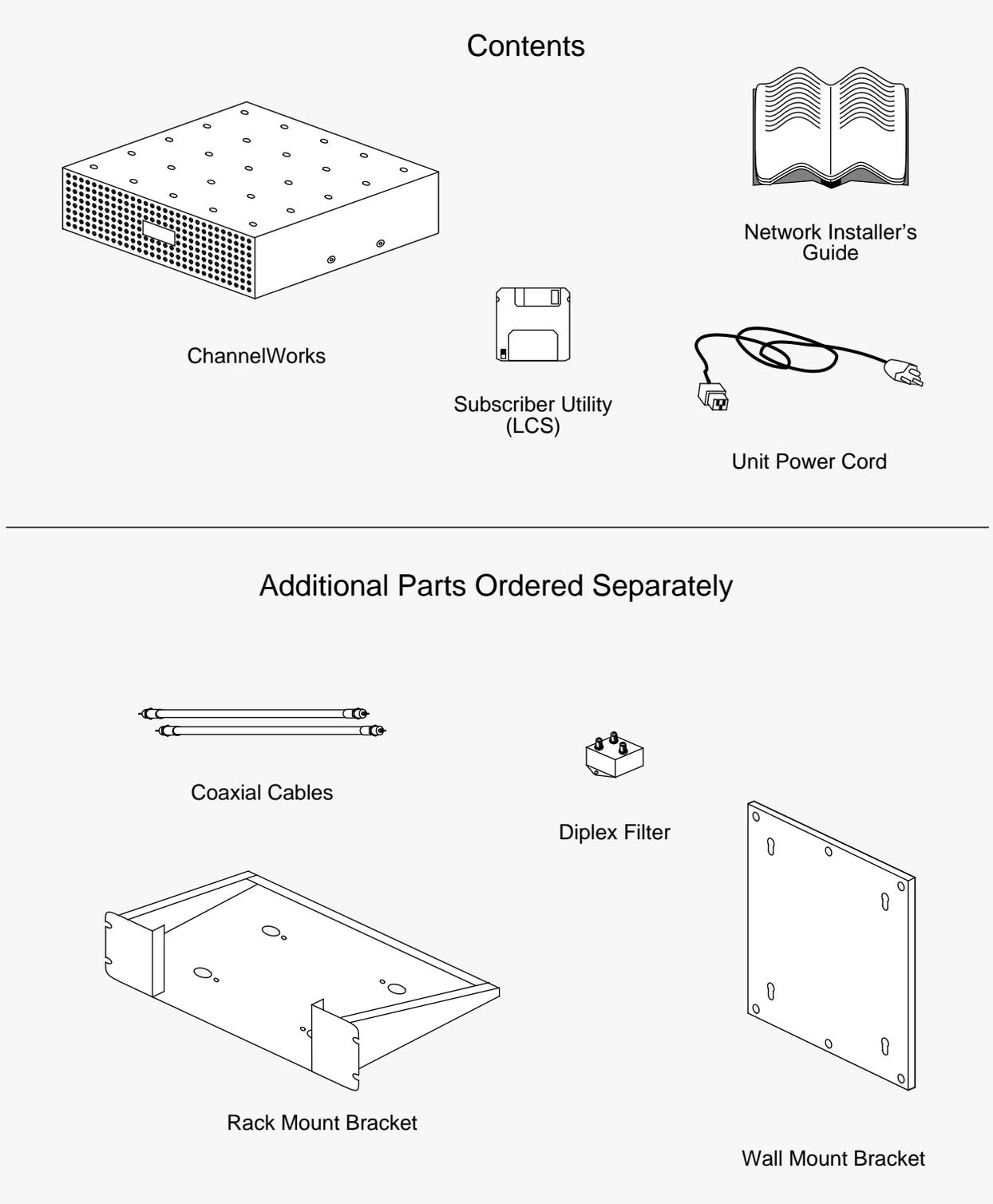
Check the packing slip to verify you have everything you ordered. Figure 2-1 shows the basic parts of the ChannelWorks Bridge. Figure 2-1 also shows additional parts that you may have ordered, such as rack or wall mounts. Refer to the documentation that comes with the separately ordered rack or wall mounts for directions on setting up the ChannelWorks Bridge in a rack or on a wall.

The ChannelWorks Bridge Shipping Container Contents

The ChannelWorks Bridge shipping box contains the following:

- The ChannelWorks Bridge and its power cord
- A 3.5-in floppy disk containing the LANcity[®] Subscriber Utility (LCS) software, a PC based utilities program used to verify the ChannelWorks Bridge operating parameters
- One copy of this document (*ChannelWorks Network Installer's Guide*)

Figure 2-1 Shipping Container Contents With Optional Equipment

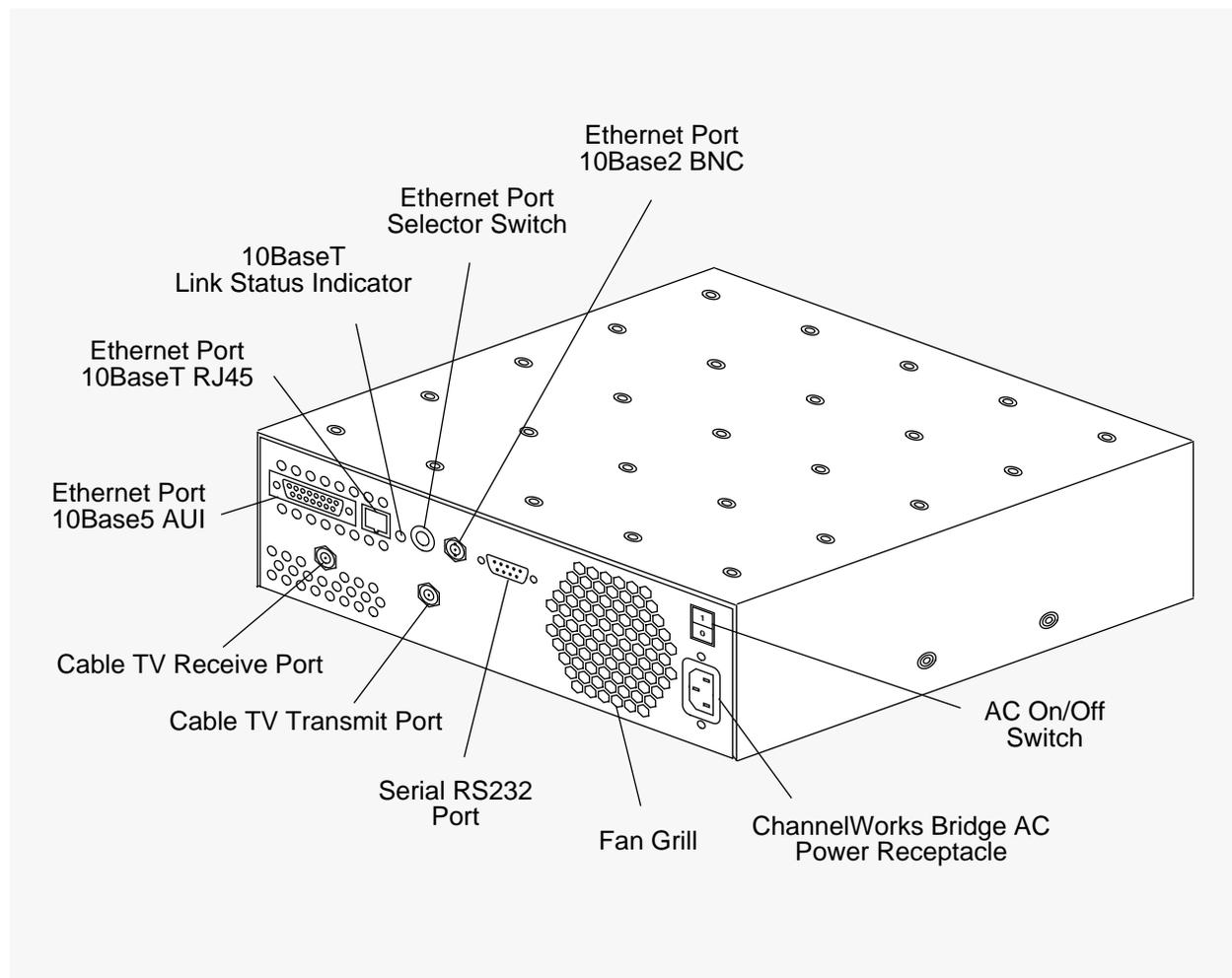


Examining The ChannelWorks Bridge

Examine the ChannelWorks Bridge to locate the parts on the back panel as you connect the rest of the system. Figure 2-2 shows the locations of the following items: Ethernet ports, serial port, cable TV transmit and receive ports, power input receptacle and the AC On/Off switch.

If the unit is intended to be wall- or rack-mounted, you need the ChannelWorks Bridge Wall Mount or Rack Mount kits to complete the installation. Contact your Digital representative for information about ordering these kits. A desktop installation needs no additional hardware.

Figure 2-2 The ChannelWorks Bridge Back Panel

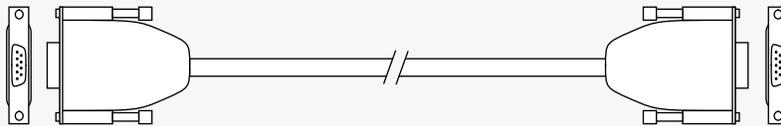


Identifying Cables And Connectors

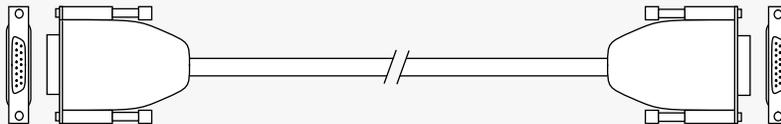
Use Figure 2-3 to identify cables that you need. Refer to this figure as you follow the procedures in Chapter 4 for setting up the system and for installing the ChannelWorks Bridge on the Ethernet and cable TV networks.

Before you can install the ChannelWorks Bridge on your Ethernet you will need an appropriate cable, one of the three types discussed in the “Cable Lengths” section.

Figure 2-3 Cables And Connectors



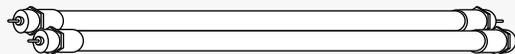
Serial Port Null Modem Cable with 9-Pin Connectors



Ethernet (10Base5 - AUI) Thickwire Cable with 15-Pin Connector



Ethernet (10Base2- BNC) Thinwire Cable with BNC Connector



Diplex Filter Transmit and Receive Coax Cables with F Connectors



Cable TV Coaxial Cable with F Connectors

Selecting An Installation Area

After unpacking the ChannelWorks Bridge, select an appropriate installation area that allows room for the ChannelWorks Bridge, as well as for the cables and power cord.



Caution - The ChannelWorks Bridge has vents on its front panel and a slot along its bottom front edge for air intake. It also has a fan on its back panel. When you place the ChannelWorks Bridge, make sure that objects do not block the vents on the front panel or slot along its bottom or the fan on the back.



Achtung - Die ChannelWorks-Brücke weist zum Lufteinlaß Öffnungen (auf der Frontabdeckung) sowie einen Schlitz entlang der unteren Frontkante auf. Auf der Rückseite kann sich ein Ventilator befinden. Vergewissern Sie sich bei der Aufstellung der ChannelWorks-Brücke, daß die Öffnungen, der Schlitz und der Ventilator frei zugänglich sind.



Attention - ChannelWorks Bridge est doté d'orifices sur le panneau avant et d'une fente le long du bord inférieur avant qui permettent l'entrée de l'air. Le panneau arrière est en outre muni d'un ventilateur. Lorsque vous placez ChannelWorks Bridge, vérifiez qu'aucun objet n'entrave les orifices du panneau avant, la fente de la partie inférieure ou le ventilateur à l'arrière.



Precaución - ChannelWorks Bridge tiene orificios de ventilación en el panel frontal y una ranura a lo largo del borde inferior que permite la entrada de aire. Además, el panel trasero está provisto de un ventilador. Al colocar ChannelWorks Bridge en su emplazamiento, asegurarse de que ningún objeto obstruya los orificios de ventilación del panel frontal, la ranura de la parte inferior o el ventilador de la parte trasera.

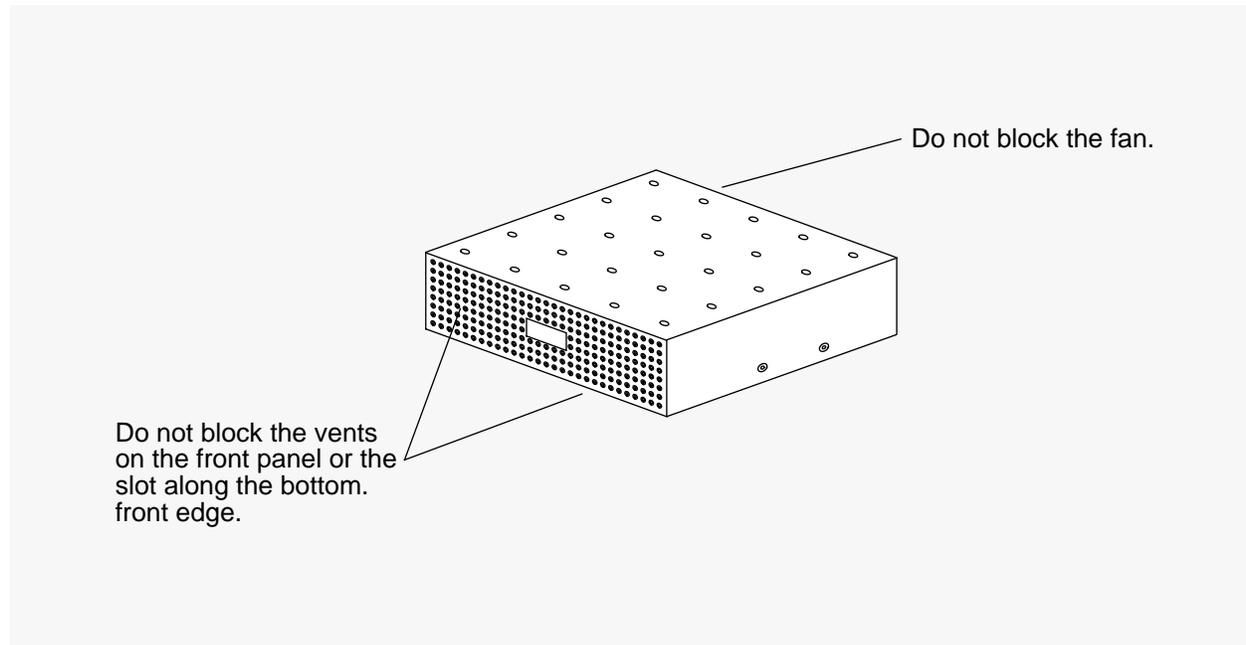
Figure 2-4 illustrates the location of the bridge's vents.

The acceptable environmental ranges are:

- Temperature between 10 and 40 degrees Celsius
- Humidity between 10 percent and 95 percent non condensing
- Dust (Keep the work area as dust-free as possible.)

The distance allowed between the ChannelWorks Bridge and its Ethernet user device(s) is determined by IEEE 802.3 specifications.

Figure 2-4 The ChannelWorks Bridge Ventilation Areas



Power And Grounding Requirements

The ChannelWorks Bridge uses nominal input voltages of 100 to 120 V or 220 to 240 V at 60 or 50 Hz, respectively. The ChannelWorks Bridge is designed to work with single-phase power systems having a grounded neutral conductor.



Warning - The ChannelWorks Bridge is designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug the ChannelWorks Bridge into any other type of power system. Contact your facilities manager or certified electrician if you are not sure what type of power is supplied to your building.



Warnung - Die ChannelWorks-Brücke ist für den Betrieb mit einphasigen Stromversorgungssystemen ausgelegt, die einen geerdeten neutralen Leiter haben. Um die Gefahr elektrischer Schläge zu reduzieren, dürfen Sie das Gerät nicht an andere Stromversorgungssysteme anschließen. Wenn Sie nicht wissen, welche Stromart in Ihrem Gebäude zur Verfügung steht, bitten Sie Ihren Hausverwalter oder einen zugelassenen Elektriker um Auskunft.



Danger - ChannelWorks Bridge est conçu pour un fonctionnement avec des systèmes d'alimentation mono-phasés pourvus d'un conducteur neutre mis à la terre. Pour limiter les risques d'accidents électriques, ne connectez pas ChannelWorks Bridge à un autre type d'alimentation. Contactez le directeur du site ou un électricien certifié si vous ne connaissez pas le type d'alimentation dont est pourvu le bâtiment.



Aviso - ChannelWorks Bridge ha sido concebido para funcionar con sistemas de alimentación monofásicos provistos de un conductor neutro puesto a tierra. Para disminuir el riesgo de accidentes eléctricos, no hay que enchufar este equipo a ningún otro tipo de sistema de alimentación. Hay que ponerse en contacto con el administrador de la instalación o con un electricista autorizado en caso de duda sobre el tipo de alimentación que posee el edificio.

Cable Lengths

The power cord supplied with the ChannelWorks Bridge is long enough to meet your installation needs. The power cord conforms with engineering and safety standards.

You need to provide other cables required for the ChannelWorks Bridge operation. For example, the ChannelWorks Bridge connects to your Ethernet via any of the following Ethernet ports:

- 10Base5 (AUI)
- 10Base2 (BNC)
- 10BaseT (RJ45)

The ChannelWorks Bridge also connects to your cable TV network via the cable TV's 75-ohm, RG6 coaxial drop cable. Your cable TV system may use either a single drop cable or a dual drop cable. The ChannelWorks Bridge can be connected to the cable TV network by either single or dual drop cable. For details about connecting the ChannelWorks Bridge to the cable TV network, refer to Chapter 4.



Caution - Using an inappropriate cable TV or Ethernet cable may degrade the performance of the ChannelWorks Bridge and may also be hazardous.



Achtung - Die Verwendung eines ungeeigneten TV- oder Ethernet-Kabels kann die Leistungen der ChannelWorks-Brücke mindern oder sogar gefährlich sein.



Attention - L'utilisation d'un câble TV ou Ethernet inapproprié peut réduire les performances de ChannelWorks Bridge et présenter un caractère dangereux.



Precaución - La utilización de un cable TV o un cable Ethernet inadecuado puede degradar el rendimiento de ChannelWorks Bridge y además, resultar peligroso.

Set-Up and First Steps

Introduction

This chapter covers the following topics:

- Installing the LANcity[®] Subscriber Utility (LCS) on a PC
- Setting up LCS user accounts
- Connecting a PC to the ChannelWorks Bridge serial port
- Understanding user access levels
- Reading the ChannelWorks Bridge parameters
- Verifying the ChannelWorks Bridge parameters
- Modifying and loading the ChannelWorks Bridge parameters

To perform the functions described in this section, you will need:

- PC capable of running Microsoft Windows, with a 3.5-in floppy drive and an available serial port
- Windows[®] version 3.1
- A nine-pin null modem cable
- A terminal emulator application such as Procomm[®] Plus for Windows or Windows' Terminal

You must be familiar with Windows applications and the operation of a PC.

The following sections describe how to verify the ChannelWorks Bridge parameters and modify the bridge's parameters using LCS.

Installing The LANcity Subscriber Utility On A PC

You use the LCS to access the bridge's NVRAM and verify the bridge's parameters. The LCS floppy is shipped with the ChannelWorks Bridge. Refer to Figure 2-1 in Chapter 2, "Physical Installation" for a description of items included in the ChannelWorks Bridge shipping container.

Perform the following procedure to install the LCS on your PC's hard drive:

1. Insert the LCS floppy in the PC's 3.5-in drive.
2. From the Window's Program Manager choose File, Run.
3. At the command line type in the letter of your PC's 3.5-in drive followed by
:\setuplcs.exe

The PC displays the LCS Install Utility dialog box, as shown in Figure 3-1.

4. To install the utility in a directory other than the one in the utility's dialog box, change the default path and choose OK. The utility creates the directory chosen, copies the program files to the directory, and displays the LCS Install Utility program group creation dialog box, as shown in Figure 3-2.
5. Click on OK. LCS Install Utility creates the LCS Bridge Manager program group. The utility places an icon for the LCS executable, an icon for a Readme file and one for the LCS Release Notes.

Refer to the "Setting Up User Accounts" section to set up valid user names and passwords.

Figure 3-1 Directory Location Dialog Box

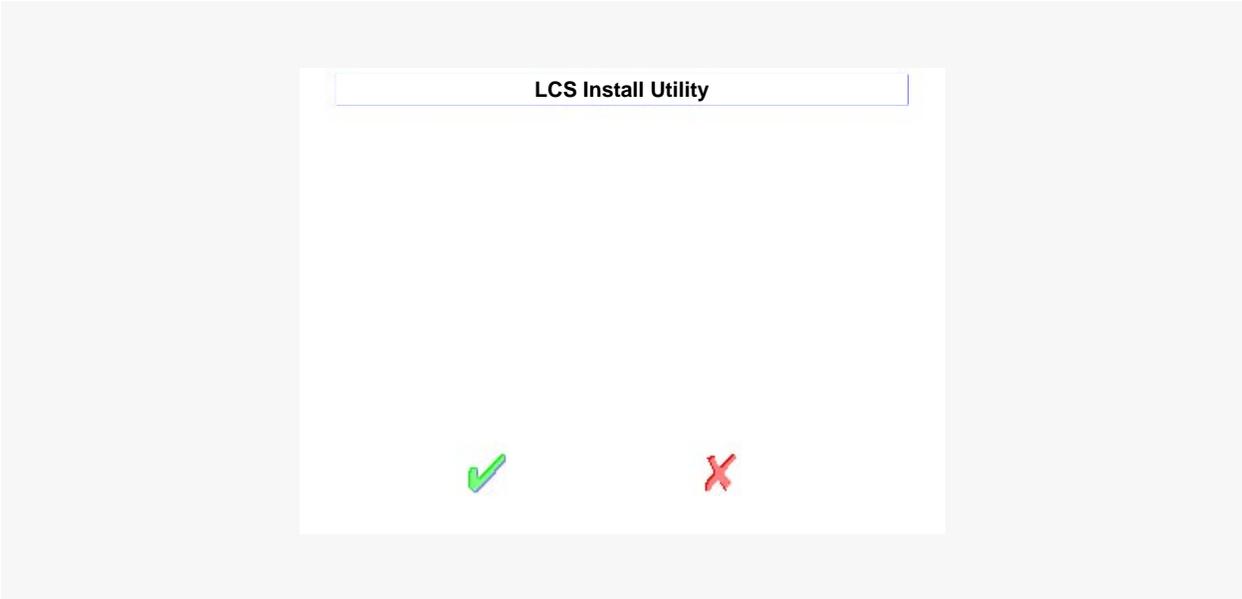
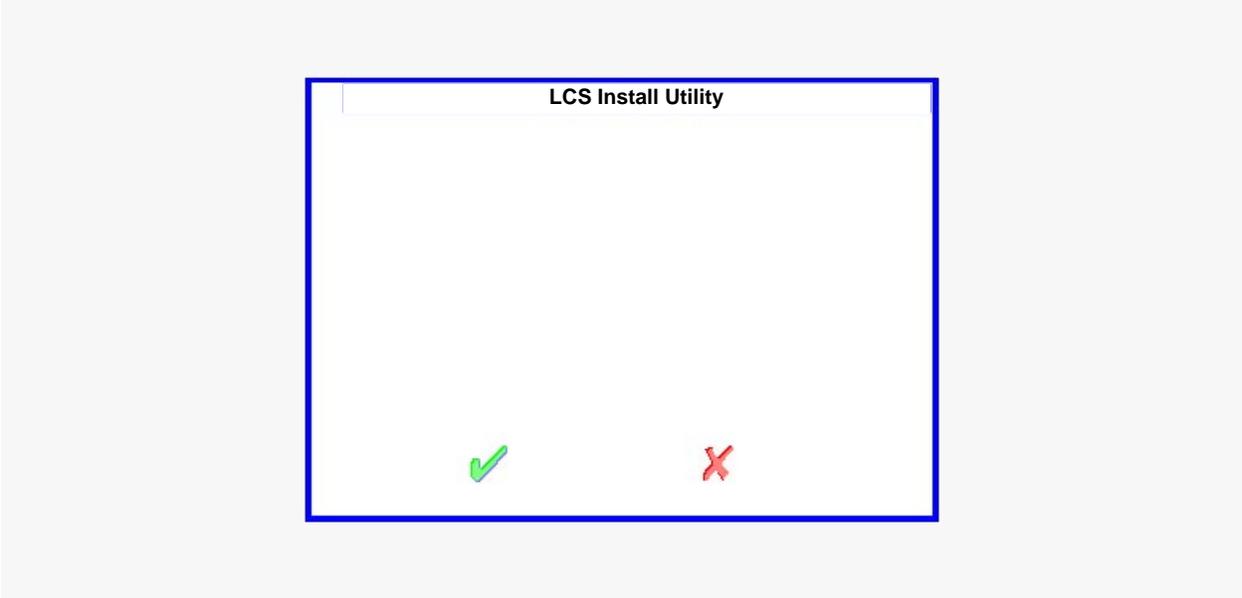


Figure 3-2 Create Program Group Dialog Box



Setting Up User Accounts

You use LCS to perform verification and modification of ChannelWorks Bridge operating parameters. To access LCS, you must have a user name, password and level stored in the utility's database.

Perform the following procedure to add a user. This procedure assumes that you have installed the utility on your PC's hard drive and you have opened the Windows' LCS Bridge Manager program group. If you have not installed LCS, refer to the "Installing The LANcity Subscriber Utility On A PC" section.

1. Click on the LCS icon. The utility displays the LCS login window.
2. Type **Manager** as the user name and press Tab.
3. Type **bscaccess** and click on OK.
4. Click on Admin. The utility displays the LCS Add User/Delete User pull down menu as shown in Figure 3-3.
5. Click on Add User from the Admin Pull Down menu.

The Utility displays the Add User entry window with a default User Name, User Password and User Level entered as shown in Figure 3-4.

Note: The default User Name, User Password and User Level are not operational. They are provided as examples.

6. Using the mouse or keyboard, highlight the User Name and either delete it using the DEL key or type in a new user's name.
7. Using the mouse or keyboard highlight the User Password and either delete it using the DEL key or type in a new user's password.
8. Click on the desired User Level, and click OK.

Note: User Levels for the LCS Utility are: Level One, Level Two, and Admin. Refer to the "User Levels" section for a description of the Utility's access levels and functions.

The Utility displays the Add User to Database window.

9. Click on Yes.

If there is a duplicate user name in the Utility's database, the Utility displays the User Status window indicating that there is a duplicate name and requests that you choose another name. Otherwise, the User Status window indicates that the new user was added successfully.

10. In either case, click on OK.

The Utility returns you to the Main Menu.

Figure 3-3 Admin Pull Down Menu

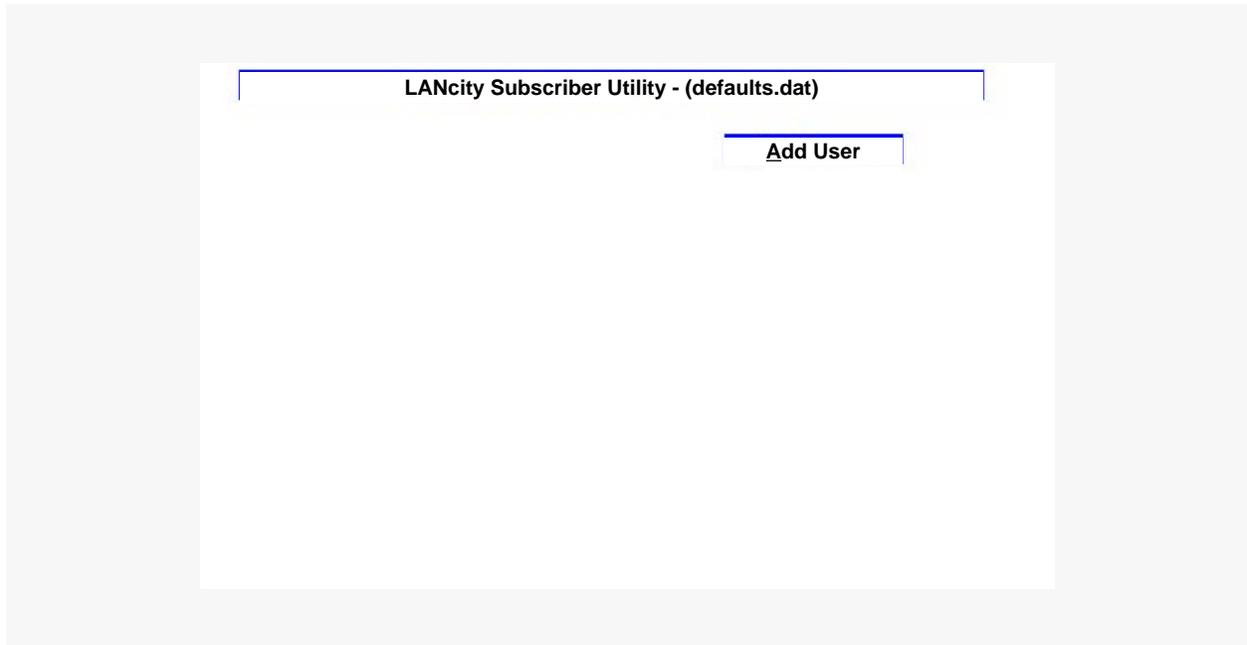
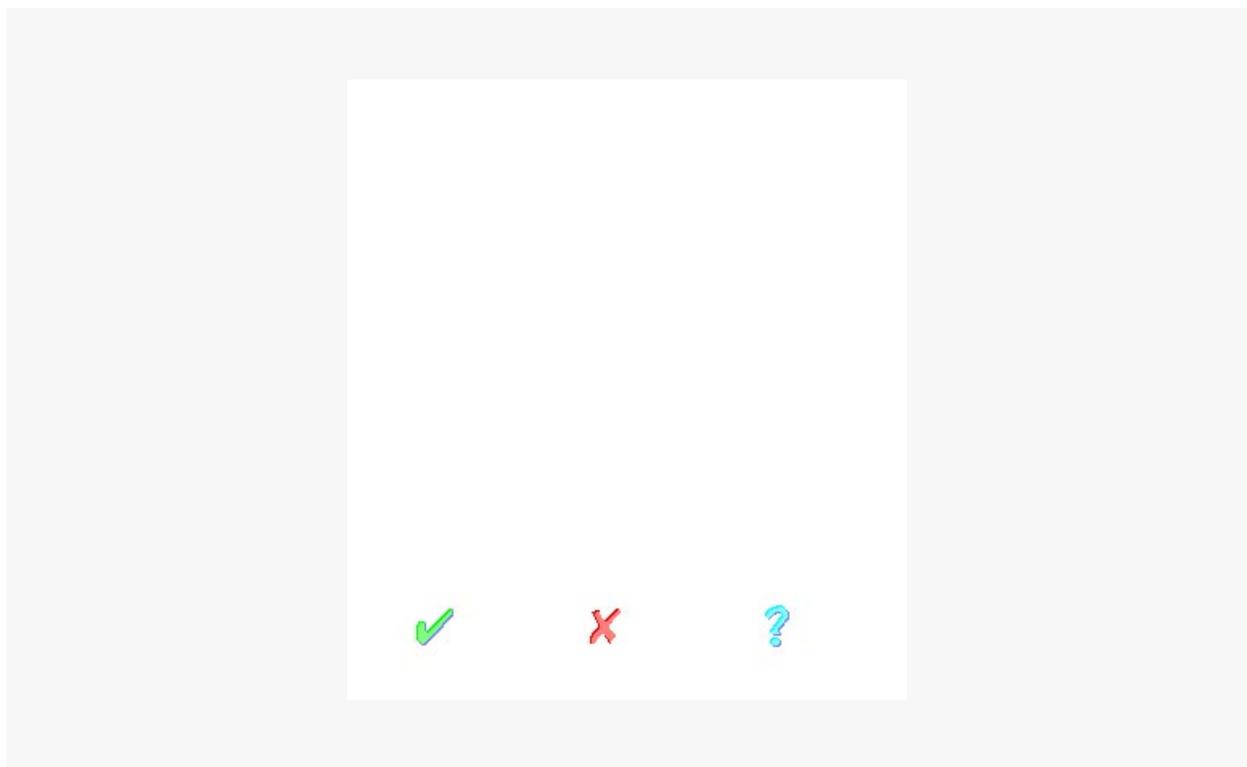


Figure 3-4 Add User Entry Window



User Levels

There are three levels of access for the LCS. The following is a description of the LCS access levels and ultimately the amount of access a user has to the bridge's operating parameters.

Level One

This level only allows the user to:

- Read the bridge's NVRAM
- View the current operating parameters of the bridge
- Start the terminal emulator
- Choose and initialize the PC's serial port

Level Two

This level allows the user to:

- Read the bridge's NVRAM
- View the current operating parameters of the bridge
- Modify the following parameters from the Parameters pull down menu:
 - Bridge Control Group
 - Download Group
 - Dump Server Group
 - Filter Control Group
 - Network Management Control Group
 - System Group
 - Unique IP Addresses Group
- Load the above listed parameters from the individual group windows or from the Bridge Load Parameters window
- Start the terminal emulator
- Choose and initialize the PC's serial port
- Open and save parameter files

Level Three

This level allows the user to add and delete users for levels of access described above.

Connecting A PC To The ChannelWorks Bridge Serial Port

Perform the following procedure to connect a PC to the ChannelWorks Bridge serial port: This procedure assumes that you have installed LCS on your PC. If you have not installed LCS on your PC, refer to the “Installing The LANcity Subscriber Utility On A PC” section.

1. Plug the unit into its power outlet.

Note: Do not connect the network cables at this time and do not turn the ChannelWorks Bridge on yet.

2. Plug in the PC and attach the nine-pin null modem cable between the PC and the ChannelWorks Bridge.
3. Bring the PC up through its normal power sequence; start Windows.
4. Click on the LCS icon. The utility displays the LCS login window.
5. Type your user name and password and click OK. The utility displays the terminal emulator launch window.

Note: Refer to the “Setting Up A User Account” for the procedure to add a user with a valid password.

6. Click on Yes. The utility displays Microsoft Windows’ Terminal program.

Note: Microsoft Windows Terminal must be installed in your windows directory for this feature to work. Otherwise, you must start a terminal emulation program at this step.

7. Set the terminal emulator’s communications parameters to:
 - Connector: PC port from step 2 (COM1, COM2, etc.)
 - Baud Rate: 9600
 - Data Bits: 8
 - Stop Bits: 1
 - Parity: None

Note: Refer to the “Selecting The Communications Port” section for directions to select your PC’s COM port from LCS.

8. Turn the ChannelWorks Bridge power on.

Note: When you turn the unit on, you should observe a delay of approximately 3 seconds in the power light coming on. If not, refer to Chapter 5. Figure 3-5 is an example of a terminal emulator as it displays the ChannelWorks Bridge power-on diagnostics.

9. Verify that the ChannelWorks Bridge passes its “ASIC Interrupt and Loopback Test.”

This is the last test of the ChannelWorks Bridge power-on diagnostics.

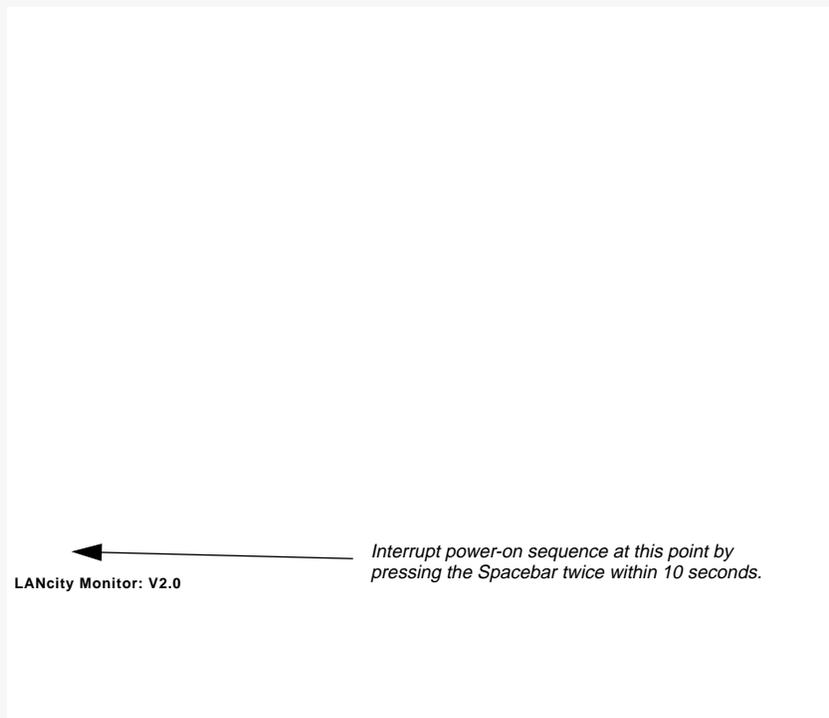
10. Press the Spacebar twice, within 10 seconds after the ChannelWorks Bridge power-on diagnostics passes the ASIC Interrupt and Loopback Test and displays three periods in the left margin.

This action prevents the ChannelWorks Bridge from performing its application boot at the end of its power up process. Approximately 30 seconds after you press the Spacebar, the ChannelWorks Bridge lists its memory sizes and displays its PROM monitor prompt of two greater than signs (>>). This allows access to the Channelworks Bridge NVRAM.

11. Close the terminal emulator application.

This releases the PC's serial port for use by other programs such as the LCS. Use the LCS application to perform the remaining procedures in this chapter.

Figure 3-5 ChannelWorks Bridge Power On Diagnostics



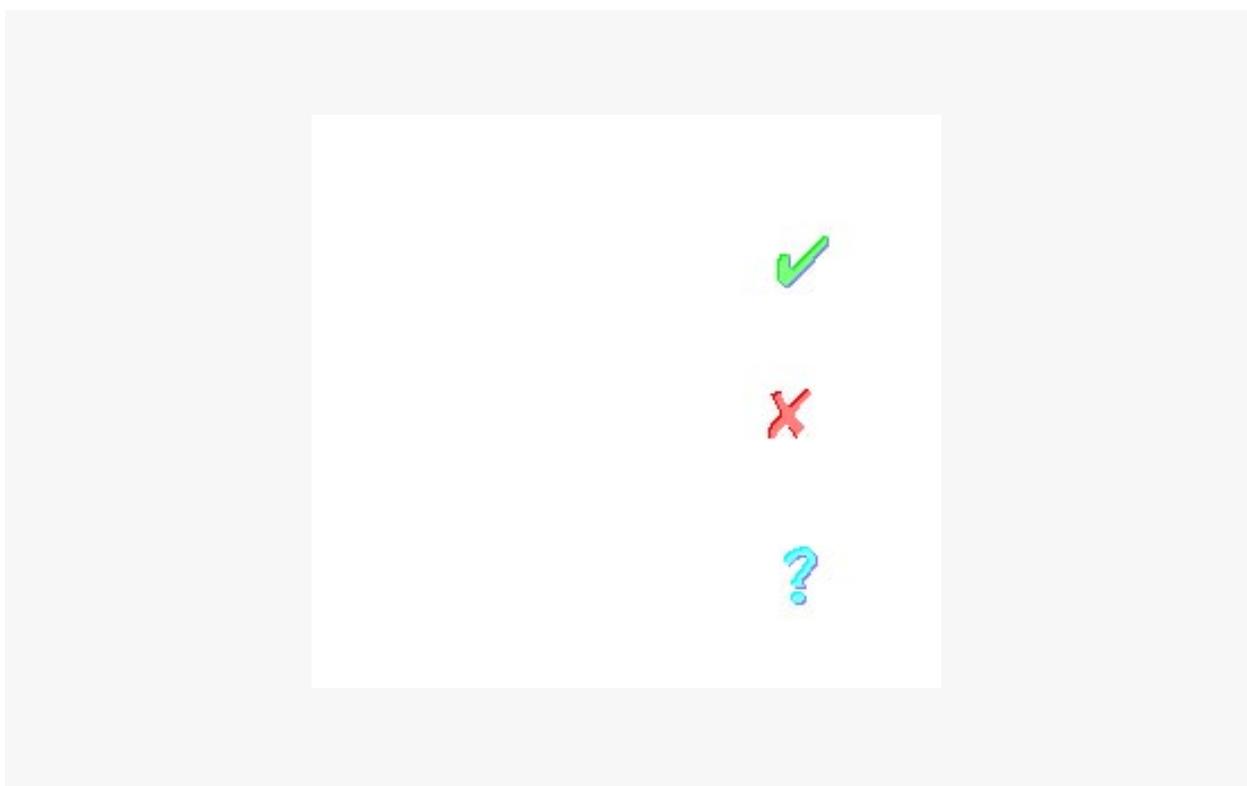
Selecting The Communications Port

Perform the following procedure to select the serial port that connects your PC to the ChannelWorks Bridge:

Note: This procedure assumes that you have performed the procedures in the “Installing The LANcity Subscriber Utility on A PC” section and the procedures in the “Connecting A PC to The ChannelWorks Bridge Serial Port” section.

1. With LCS displaying its Main Menu, click on Communication. The utility displays the Communications Pull Down Menu.
2. Click on Serial Port Connection. The utility displays the Serial Port Connection window as shown in Figure 3-6.
3. Click on the COM number that your PC is using to connect to the bridge, and click OK. The utility displays the Intialize The Serial Port Chosen screen.
4. Click on Yes. The utility prepares the port for LCS use and returns you to the Main Menu.

Figure 3-6 Serial Port Connection Window



Reading The ChannelWorks Bridge Parameters

To access the ChannelWorks Bridge NVRAM and read the bridge's current operating parameters, perform the following procedure:

Note: This procedure assumes that you have performed the procedures in the “Installing The LANcity Subscriber Utility on A PC” section and the procedures in the “Connecting A PC to The ChannelWorks Bridge Serial Port” section.

1. With LCS displaying its Main Menu, click on Bridge. The utility displays the Bridge Pull Down Menu as shown in Figure 3-7.
2. Click on Read NVRAM. The utility displays the Read NVRAM window as shown in Figure 3-8.
3. Click on Read All Groups and click on OK. The utility displays the Read NVRAM Warning.
4. Click on OK. The utility displays the names of the parameter groups in its menu bar.

Note: Depending on your PC, it takes approximately one to three minutes to read the bridge's NVRAM.

5. When complete, the utility displays the Read NVRAM Initialized Group Dialogue window. Click OK.

Figure 3-7 Bridge Pull Down Menu

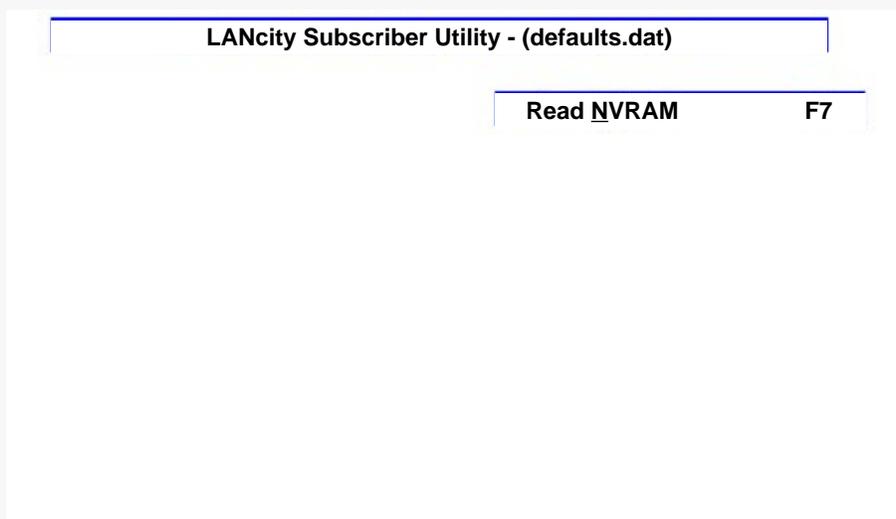
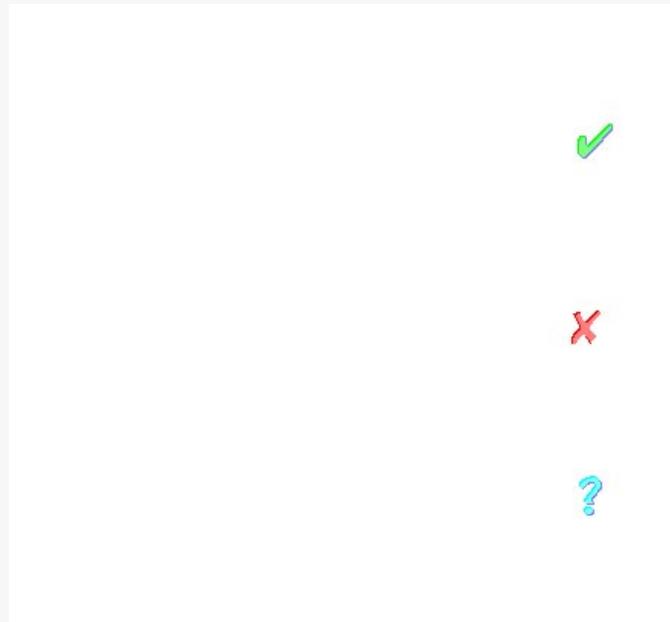


Figure 3-8 Read NVRAM Window



Verifying The ChannelWorks Bridge Parameters

Table 3-1 is a list of the ChannelWorks Bridge operating parameters. Common parameters are underlined and must be set correctly and exactly the same in all bridges on the network in order for any of the bridges to boot and operate properly.

Note: Level One and Level Two users cannot modify the bridge's transmit and receive frequencies.

Verify that you have a list of the ChannelWorks Bridge parameters to check the parameter values against. Refer to "Appendix B" for an example of the Pre-Installation Checklist. Use the LCS to verify current parameters or modify the parameters that you can access.

If the common parameters of the ChannelWorks Bridge do not match your list, stop the installation procedure. If access to verify any of the parameters is denied to you, stop the installation procedure. If access to modify any of the Level Two parameters is denied to you, stop the installation procedure.

Table 3-1 ChannelWorks Bridge Operating Parameters

Control Group/Parameter Name	Usage	Example
Bridge Control Group		
Pacer Echo Test	If set a bridge that is the Pacer will participate in echo test	Enabled/Disabled
Non Pacer Echo Test	If set a bridge that is not the Pacer will participate in echo test	Enabled/Disabled
IP Address Mask	Mask used for IP Address Filter	255.255.255.0
IP Broadcast Address	Broadcast Address for IP	255.255.255.255
Download Group		
Load Server IP Address	IP Address of Load Server	190.190.190.3
Load Server Gateway IP Addr	IP Address of Gateway/Router to Load Host	190.190.190.3
Load Server Filename	Path name of Load File	LC2.exe
Number of Retries	Number of attempts to load file	5
Dump Server Group		
Dump Server IP Address	IP Address of Dump Server	192.190.3.10
Dump Server Gateway IP Addr	IP Address of Gateway to Dump Server	192.190.57.95
Dump Server Filename	Filename of dumped file	lcdmp.dat
Number of Retries	Number of attempts to load file	5
Filter Control Group		
Broadcast Filter	Filters Broadcast packets	Enable/Disable
Multicast Filter	Filters Multicast packets	Enable/Disable
Packet Type Filter	Enables packet type filtering	Enable/Disable
Packet Type 1 - Packet Type 8	Value of standard Ethernet packet type	Enable/Disable
Packet Pass/Block	Passes/filters defined packet types	Pass/Block
Security Group Filter	Enables Security Group filtering	Enable/Disable
Simple/Shared	Specifies type of security group	2 ³¹ Simple/31 Shared
Modem Control Group		
<u>Modem Transmit Frequency</u>	Frequency used to transmit data on cable TV network	20.75
<u>Modem Receive Frequency</u>	Frequency used to receive data from cable TV network	313.00
Modem Frequency Security	Set at installation, must be set to modify frequencies via SNMP	manager

Table 3-1 ChannelWorks Bridge Operating Parameters (Cont.)

Control Group/Parameter Name	Usage	Example
Network Mngmnt Control Group		
SNMP Get Community	Must be present in the SNMP get request messages	public
SNMP Set Community	Must be present in the SNMP set request messages	private
SNMP Trap Community	Imbedded in the bridge generated SNMP trap messages	public_trap
SNMP Trap IP Address	Must be IP Address of network management station	192.190.8.63
NM Gateway IP Address	IP Address of the gateway or router to the network management station	192.190.8.63
NM Slip IP Address	IP Address of a remote network management station	192.190.8.63
Spanning Tree Parameters		
Bridge Hello Time	Must be between 1 - 10	2
Bridge Max Age	Must be between 6 - 40	20
Bridge Forward Delay	Must be between 4 - 30	15
Bridge Priority	Must be between 0 - 65535	32768
Ethernet Port Priority	Must be between 0 - 255	128
UniLINK Port Priority	Must be between 0 - 255	128
Ethernet Port Cost	Must be between 0 - 65535	100
UniLINK Port Cost	Must be between 0 - 65535	110
Filter Database Age Time	Must be between 10 - 1000000	300
Transit Delay Time	Time interval in seconds for held messages	4
System Group		
SysContact	Individual responsible for unit	Administrator
SysName	Identification of unit	bridge
SysLocation	Location of unit	2nd floor
Timer Task Control Group		
Stats Time	Time interval in minutes for stats	30
Check RX Level Time	Time interval in minutes for RX levels	30
Loop Delay Check Interval	Must be between 5- 255	30
UniLINK Group		
<u>Maximum Loop Delay</u>	The round trip propagation delay	96
UniLINK Pacer Allowed	When set, this unit can become Pacer	Enabled/Disabled
UniLINK Pacer Preferred	When set, the probability increases that this unit will become Pacer	Enabled/Disabled
Unique IP Address		
Slip IP Address	IP Address of Console Port	195.190.4.27
Ethernet IP Address	IP Address of Ethernet Port	195.190.3.27

Modifying And Loading The ChannelWorks Bridge Parameters

Note: This procedure assumes that you have performed the procedures in the “Installing The LANcity Subscriber Utility on A PC” section and the procedures in the “Connecting A PC to The ChannelWorks Bridge Serial Port” section.

When the utility starts up, it loads its own parameter fields with default values. This operation does not affect the ChannelWorks Bridge attached to the PC. Also these values do not reflect the actual state of the bridge.

You can change these fields and cause them to be loaded into the bridge without having first read the bridge’s NVRAM. However, to avoid confusion you should read the bridge’s NVRAM before making any changes. Once you program a bridge, you can save the parameter settings to a file, and on subsequent visits, read those parameters in from the file rather than reading the bridge’s NVRAM, in order to save time.

Note: The LCS Utility can save all the bridge’s operating parameters except for the Unique IP Addresses. This function prevents the user from adding duplicate IP Addresses on a network.

If working from the default values assigned by the utility is convenient for you, skip to the next paragraph. Otherwise:

- To read the contents of NVRAM, refer to the “Reading The ChannelWorks Bridge Parameters” section.
- To read parameter values that were previously saved to a file, use the “Open File” command, located in the File pull down menu.

Modify parameter values as follows:

1. Click on Parameter. The utility displays the Parameter Pull Down Menu as shown in Figure 3-9.
2. Click on the parameter group you wish to modify. The Utility displays the selected parameter group items.

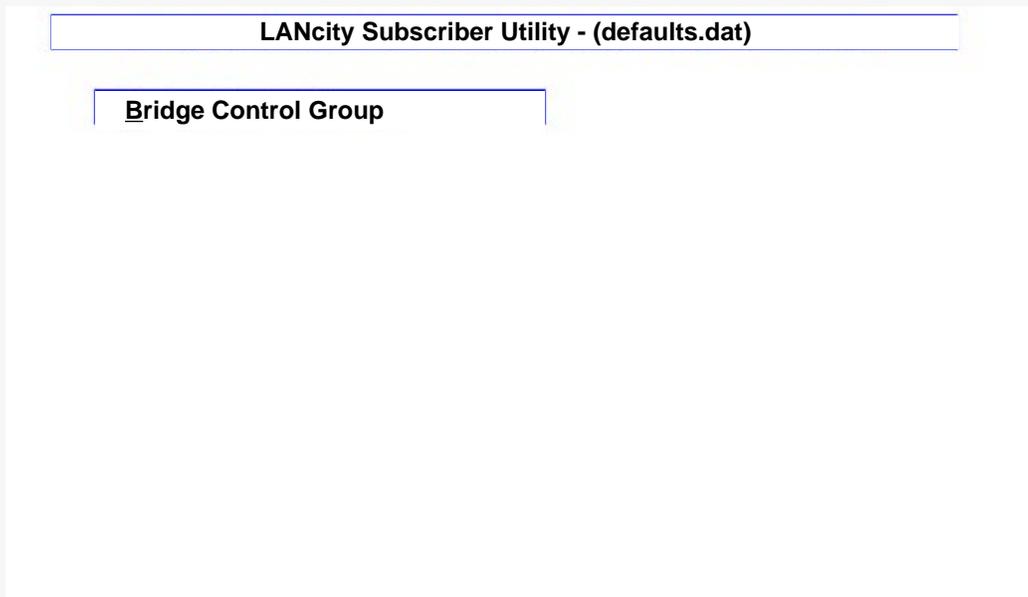
Note: Your User Level determines whether the Utility displays and allows you access to the desired parameter or blanks it and denies you access to the desired parameter. Refer to the “User Levels” section for more information.

3. Using the mouse, click on or highlight the parameter information you wish to change and type in the new parameter.

4. Verify that the information entered is correct, then click on Load to load the parameter in the unit's NVRAM now. The Utility displays the Load parameter confirmation window.
5. Click on Yes if you wish to load the parameter. The Utility loads the parameter and returns you to the Main Menu.

Once you have changed (loaded) all the parameters that you wanted to change, you should re-read the entire NVRAM, and double check that all values are now correct.

Figure 3-9 Parameter Pull Down Menu



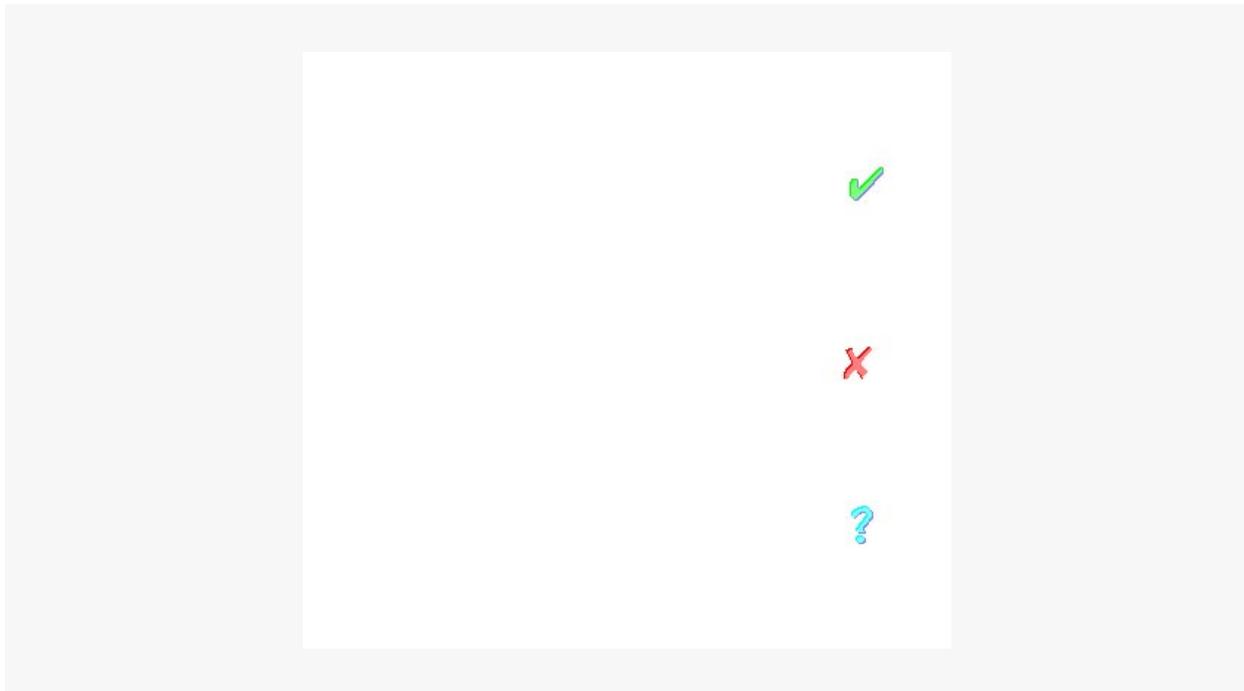
Loading Modified Select Parameter Groups

To load parameters that you have modified and saved for loading at a later time, perform the following procedure:

Note: This procedure assumes that you have performed the procedures in the “Installing The LANcity Subscriber Utility on A PC” section and the procedures in the “Connecting A PC to The ChannelWorks Bridge Serial Port” section.

1. With LCS displaying its Main Menu, click on Bridge. The utility displays the Bridge Pull Down Menu.
2. Click on the Load Parameters selection. LCS displays the Bridge Load window. Figure 3-10 shows an example.
3. Click on the Select Groups box.
4. Click on the parameter selections that you modified and saved to load at this time.
5. Click on OK. LCS loads the ChannelWorks Bridge NVRAM with the selected parameters.
6. Close the Main Menu and continue setting up the ChannelWorks Bridge for operation.

Figure 3-10 Bridge Load Window



Loading All Parameter Groups

To load all parameters, perform the following procedure:

Note: This procedure assumes that you have performed the procedures in the “Installing The LANcity Subscriber Utility on A PC” section and the procedures in the “Connecting A PC to The ChannelWorks Bridge Serial Port” section.

1. With LCS displaying its Main Menu, click on Bridge. The utility displays the Bridge Pull Down Menu.
2. Click on the Load Parameters selection. LCS displays the Bridge Load window. Figure 3-10 shows an example.
3. Click on the Load All Groups box.
4. Click on OK. LCS loads the ChannelWorks Bridge NVRAM with all group parameters.
5. Close the Main Menu and continue setting up the ChannelWorks Bridge for operation.

Starting The ChannelWorks Bridge

Introduction

This chapter covers the following topics:

- Verifying start up
- Locating the Cable TV and Ethernet Network Connections
- Attaching the ChannelWorks Bridge to your cable TV network
- Attaching the ChannelWorks Bridge to your Ethernet network
- Powering up the ChannelWorks Bridge
- Verifying the ChannelWorks Bridge is operational

Verifying Start Up

Leave the PC attached while you start up the unit. Turn the ChannelWorks Bridge power switch off.

Verify the following:

- Cable TV network is ready; transmit (TX) and receive (RX) frequencies have been assigned.
- Physical placement (desk, rack or wall-mounting) of the unit is complete.
- Air flow is not blocked (clearance to front and rear surfaces).
- The unit is turned off.
- PC may be attached to console port.
- Installation parameters have been completed, according to guidelines in Chapter 3.

Locating The Cable TV And Ethernet Network Connections

Refer to the following sections to verify that these systems are ready for the ChannelWorks installation.

Cable TV Network

Perform the following checks to verify your cable TV network is ready for ChannelWorks installation:

1. Verify that there is signal continuity between the assigned forward and return channels for each install location.
2. If the system is a dual-cable system, you must have two taps and two cables. You can attach the cables to the cable TV taps. (Do not attach them to the ChannelWorks Bridge yet.)
3. If the system is a single-cable system, you should have one tap, a diplex filter, and three cables. Verify the diplex filter is the right type for your cable TV network (subsplit, midsplit or highsplit). Refer to Chapter 2 of the *ChannelWorks Cable TV Installer's Guide* for information on Cable TV Network Topologies. Connect a cable from the cable TV tap to the diplex filter's common port, and attach the other two cables to the diplex filter's other ports. Do not attach the cables to the ChannelWorks Bridge yet.

Ethernet Network

Prior to connecting the ChannelWorks Bridge to the Ethernet network, perform the following checks to verify that you have the correct connection available.

- For a thickwire Ethernet, you must have an AUI cable and a Media Attachment Unit (MAU, also known as a transceiver) (separately ordered items). Connect the MAU to the thickwire, and the AUI cable to the MAU. Do not connect the AUI cable to the ChannelWorks Bridge yet.
- For a ThinWire Ethernet, you should have the ThinWire cable and a T connector. If you are installing the ChannelWorks Bridge to the end of an Ethernet ThinWire segment, remove the existing 50-ohm terminator from the T connector, connect the new ThinWire cable and T connector to the existing cable, and relocate the 50-ohm terminator to the end of the new T connector. (Do not connect the middle leg of the T connector to the ChannelWorks Bridge yet.)
- For twisted-pair Ethernet, you should have an eight-pin RJ-45 modular jack connectorized patch cable and a 10BaseT concentrator (separately ordered items). (Do not connect it to the ChannelWorks Bridge unit yet.)

Start Up

Before starting the sequence below, read through the steps thoroughly and make sure you understand them. If the following process fails at any point, turn off the power and refer to Chapter 5. To start up the unit, perform the following steps:

1. Turn the unit off, but leave it connected to the power outlet. Do not connect any of the network cables.
2. Attach the cable TV cables to the ChannelWorks Bridge. Follow the procedure that describes your particular cable TV network.

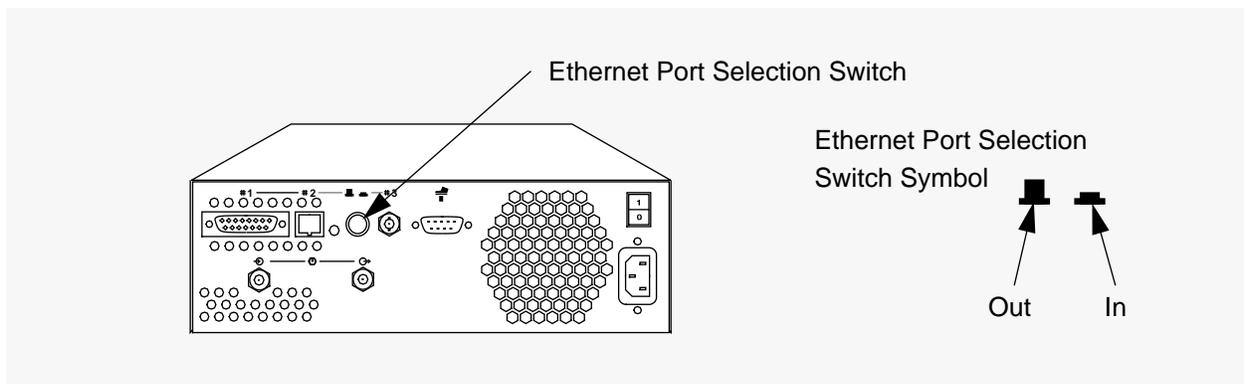
For single-cable networks, “Connecting to A Single-Cable, Cable TV Network.” For dual-cable networks, “Connecting to A Dual-Cable, Cable TV Network.” These procedures immediately follow this one.

3. Attach the Ethernet network cable to the appropriate port on the ChannelWorks Bridge.

Follow the procedure that describes your particular Ethernet network, “Connecting to the AUI Port,” “Connecting to the BNC Port,” or “Connecting to the RJ-45 Port.” These procedures are located at the end of this chapter.

- If you are using ThinWire Ethernet (BNC connector), make sure the Ethernet Port Selection Switch on the back of the unit is in its In position. (Refer to Figure 4-1 for the location of the Ethernet Port Selection Switch.)
- If you are using thickwire or Twisted-Pair Ethernet, make sure the Ethernet Port Selection Switch, on the back of the unit, is in its Out position.

Figure 4-1 Ethernet Port Selection Switch Location And Identifying Symbol





Caution - The Ethernet Selection Switch must be correctly set in order for the unit to work properly. Also, the unit does not work properly if you attempt to connect more than one Ethernet cable to the unit at any time.



Achtung - Der Ethernet-Wahlschalter muß richtig eingestellt sein, damit das Gerät einwandfrei funktionieren kann. Zudem kann das Gerät nicht einwandfrei funktionieren, wenn Sie gleichzeitig mehr als ein Ethernet-Kabel anschließen.



Attention - Le commutateur de sélection doit être correctement réglé pour que l'unité fonctionne de manière adéquate. L'unité ne fonctionnera pas correctement non plus, si vous essayez d'y connecter plus d'un câble Ethernet.



Precaución - El conmutador de selección Ethernet debe estar en la posición correcta para que la unidad funcione adecuadamente. Por otro lado, si se conectan simultáneamente varios cables Ethernet a la unidad, ésta no funcionará bien.

Continue with the following steps after completing your specific Ethernet and cable TV connection procedures:

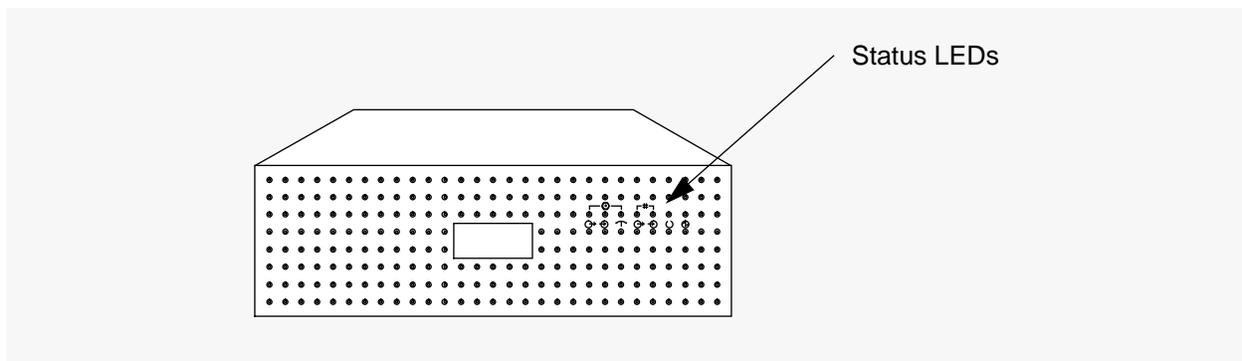
4. Turn the power switch on the unit on.
5. The Power LED  on the front of the unit activates within approximately 3 seconds of turning the power switch on, as does the fan. Refer to Figure 4-2 for the location of the Power LED and for other ChannelWorks Bridge LEDs. If these things do not happen, turn off the power and refer to Chapter 5.
6. After approximately 30 seconds, the Status LED  on the front of the unit blinks slowly. This indicates that the unit has passed its internal diagnostics and is ready to boot its software. If this does not happen, turn the unit off and refer to Chapter 5.
7. After approximately 40 seconds, the Status LED  blinks rapidly. This means the unit has loaded its software correctly and is ready to become operational. If it does not blink, refer to Chapter 5.

8. Within approximately 40 seconds, the Block Sync LED  on the front of the unit comes on, indicating the unit has properly synchronized itself to the cable TV system. If this does not happen, turn off the power IMMEDIATELY and refer to Chapter 5.

Note: If the cable TV network's cables are improperly connected, the Block Sync LED will not come on.

9. If there is traffic on either network, you will see the activity lights blink.

Figure 4-2 The ChannelWorks Bridge LED Indicators



Connecting To A Single-Cable, Cable TV Network

Referring to Figure 4-3 and continuing from step 1 of the Start Up procedure, perform the following procedure to attach the ChannelWorks Bridge to a single-cable, cable TV network:

1. Attach the single-cable TV network's drop cable to the common F connector of the diplex filter.
2. Attach one end of the short coaxial cable to the return (transmit $\ominus \rightarrow$) F connector of the ChannelWorks Bridge.
3. Attach the other end of the short coaxial cable to the diplex filter's LOW F connector. Low indicates low frequencies. The low frequencies are typically used as the return frequencies on single-cable plants that allow bi directional communications.
4. Attach one end of the short coaxial cable to the forward (receive $\rightarrow \oplus$) F connector of the ChannelWorks Bridge.
5. Attach the other end of the short coaxial cable to the diplex filter's HIGH F connector. High indicates high frequencies. The high frequencies are typically used as the forward frequencies on single-cable plants that allow bi directional communications.

Note: Tighten the coaxial cable connectors with a torque wrench to no more than 7 in/lbs.



Caution - Use only approved diplex filters. Inferior diplex filters can impair the network and reduce performance.



Achtung - Verwenden Sie ausschließlich zugelassene Diplex-Filter. Minderwertige Diplex-Filter können das Netzwerk beeinträchtigen und zu einer Herabsetzung der Leistungsfähigkeit führen.

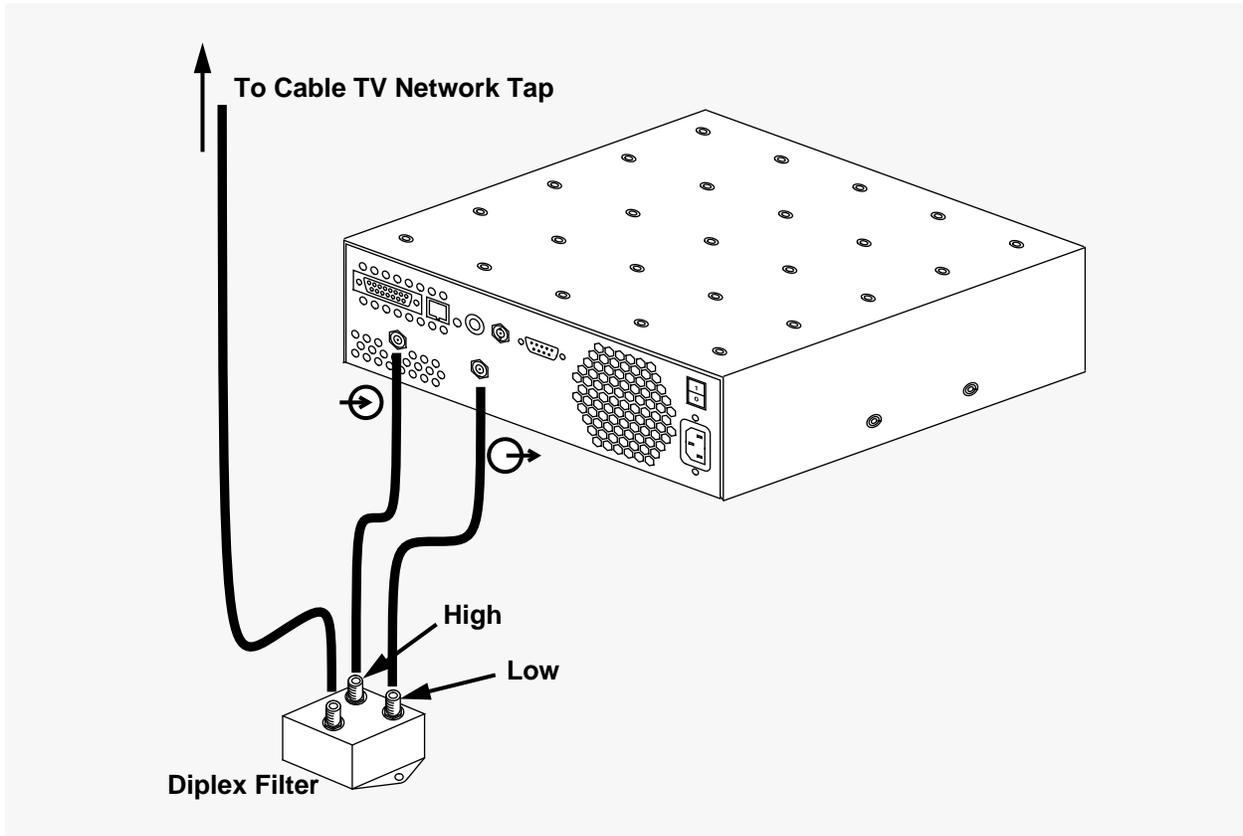


Attention - N'utilisez que des filtres diplex homologués. Des filtres diplex inférieurs peuvent entraver le réseau et réduire ses performances.



Precaución - Hay que utilizar únicamente filtros diplex homologados. Si se utilizan filtros diplex inferiores se puede perturbar el funcionamiento de la red y disminuir su rendimiento.

Figure 4-3 Connecting To A Single-Cable, Cable TV Network

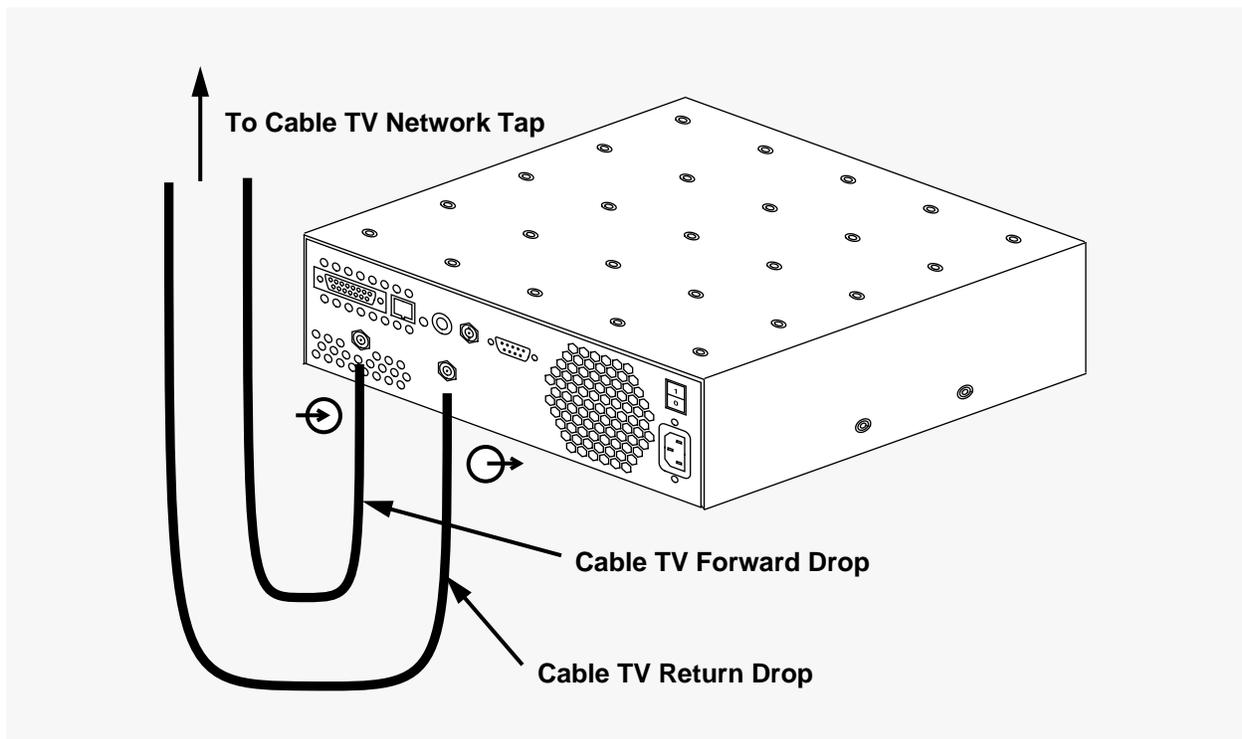


Connecting To A Dual-Cable, Cable TV Network

On dual-cable, cable TV networks, one cable handles the forward signals (signals originating and being transmitted from the headend), and, the other cable handles the return signals (signals originating and being transmitted from the ChannelWorks Bridge). Your cable TV operator will tell you which cable is for forward signals and which cable is for return signals.

Referring to Figure 4-4, and continuing from step 1 of the Start Up procedure, connect the cable TV network's forward cable to the ChannelWorks Bridge RX (receive \ominus) port. Then, connect the cable TV network's return cable to the ChannelWorks Bridge TX (transmit \ominus) port.

Figure 4-4 Connecting To A Dual-Cable, Cable TV Network



Connecting To The AUI Port

Continuing from step 2 of the Start Up procedure, perform the following procedure to connect the ChannelWorks Bridge to the Ethernet network using the AUI port:

1. Push the slide latch of the ChannelWorks Bridge AUI port to the left.
2. Attach the Ethernet network's AUI cable to the ChannelWorks Bridge AUI port.
3. Push the ChannelWorks Bridge AUI port's slide latch to the right until it snaps into the locking position, securing the connector and cable.
4. Gently pull on the cable to verify the latch is secure.
5. Select the AUI port by setting the Ethernet Port Selection Switch to the Out position.



Caution - You risk damaging the ChannelWorks Bridge and causing network problems if you attempt to connect more than one Ethernet media to the ChannelWorks Bridge at the same time.



Achtung - Wenn Sie gleichzeitig mehr als einen Ethernet-Träger an ChannelWorks anschließen, besteht die Gefahr, daß Sie die ChannelWorks-Brücke beschädigen und Probleme in ihrem Netzwerk verursachen.



Attention - Vous risquez d'endommager ChannelWorks Bridge et de causer des perturbations sur le réseau si vous tentez de connecter simultanément plusieurs supports Ethernet à ChannelWorks Bridge.



Precaución - Se pueden ocasionar daños al ChannelWorks Bridge, o causar problemas en la red, si se conectan simultáneamente varios soportes Ethernet a ChannelWorks Bridge.

Connecting To The BNC Port

Continuing from step 2 of the Start Up procedure, perform the following procedure to connect the ChannelWorks Bridge to Ethernet network using the BNC port:



Caution - When connecting to ThinWire, make sure cables are properly terminated. Unterminated cables connected in this process could also hang your existing network.



Achtung - Achten Sie beim Anschluß an ThinWire darauf, daß die Kabel ordnungsgemäß mit einem Abschlußstecker versehen wurden. Kabel ohne Abschlußstecker, die an diesen Prozeß angeschlossen sind, könnten auch ihr vorhandenes Netzwerk beeinträchtigen.



Attention - Lors d'une connexion à ThinWire, vérifiez que les câbles comportent les terminaisons appropriées. Les câbles dépourvus de terminaisons et connectés selon la procédure décrite risquent de provoquer l'arrêt intempestif du réseau existant.



Precaución - Al realizar una conexión a ThinWire, asegurarse de que los cables tengan los terminadores correspondientes. La inclusión de cables desprovistos de terminadores en una conexión de este tipo puede provocar la parada de la red existente.

1. Connect the ChannelWorks Bridge to the Ethernet network by attaching a ThinWire T connector to the BNC port on the rear of the ChannelWorks Bridge and then connecting a segment of ThinWire cable to the ThinWire T connector.
2. Connect the rest of the Ethernet network to the other side of the ThinWire T connector or attach a 50-Ohm terminator, if the connection ends here.
3. Select the BNC port by pushing the Ethernet Port Selection Switch In.

The switch is located on the rear of the unit between the RJ-45 port and the BNC port.

Connecting To The RJ-45 Port

Continuing from step 2 of the Start Up procedure, perform the following procedure to connect the ChannelWorks Bridge to the Ethernet network using the RJ-45 port:

1. Connect the ChannelWorks Bridge to the Ethernet network by attaching a segment of RJ-45 cable to the bridge's RJ-45 port.
2. Observe the Link Status LED on back of unit. If the Ethernet network is operational, the Link Status LED will be lit, indicating an active link.
3. Select the RJ-45 port by setting the Ethernet Port Selection Switch to the Out position.

Troubleshooting

Introduction

This chapter covers the following topics:

- Power
- Status
- Block Sync
- Activity

Power LED

If the power LED does not come on when you plug in the unit and turn the power switch on:

- The power system is not on, or the power cord is not plugged in.
- Make sure both ends of the power cord are plugged in.
- Make sure the power system is working (no tripped circuit breakers, etc.).
- Disconnect the PC, cable TV cables, and Ethernet cables from the unit.

Wait 30 seconds, then power up the unit.

If the power LED and/or fan still fail to come on, the unit is defective. Call your service rep for a replacement unit.

Status LED

If the status LED does not come on within 30 seconds of powering up the unit:

- Disconnect the cable TV and Ethernet cables, and leave the PC plugged in.
- Power up the unit again.
- If nothing works, call your support team.

Block Sync LED

If the block sync LED does not come on steadily approximately 40 seconds after power up:

- Verify that all cables are connected.
- The unit may not be properly configured for your particular cable TV network.



Caution - The unit may unintentionally be disrupting other users of the cable TV system. Detach the unit from the cable TV system. Do not re-attach the unit, until you complete the following steps:



Achtung - Die Verwendung des Geräts kann zur unabsichtlichen Störung anderer Benutzer des Kabelfernsehsystems führen. In diesem Fall trennen Sie das Gerät vom Kabelfernsehsystem ab. Schließen Sie das Gerät erst wieder an, nachdem Sie folgende Schritte ausgeführt haben:



Attention - L'unité est susceptible de déranger d'autres utilisateurs du système *Câble TV*. Débranchez l'unité du système de câble TV. Ne la reconnectez pas avant d'avoir effectué les opérations suivantes:



Precaución - La unidad puede interrumpir a otros usuarios del sistema de cable TV. Desconectar la unidad del sistema de cable TV. No volver a conectarla hasta no haber completado los siguientes pasos:

- Double-check that the transmit and receive frequency assignments match those assigned for operation.
- Double-check the transmit and receive frequencies set-up on the unit using the procedures in Chapter 3.
- Double-check that there is a translator at the headend, it is set to the proper transmit and receive frequencies, and it is powered on.
- Verify with someone who is responsible for the cable TV system that tap RF levels comply with specification.
- Verify that the unit's parameters are consistent with the rest of the system.

Activity LEDs (,)

Ethernet and cable TV LEDs should flicker at least every 2 seconds, indicating spanning-tree packets are being transmitted. If the activity LEDs do not come on:

- There may be no devices locally or remotely connected to the network.
- Verify that you have active devices locally on the network, and at a remote site that is attached to the same cable TV system through the ChannelWorks Bridge, on the same frequencies.
- Try to send traffic from one Ethernet device to another, transfer a file for example.
- If running TCP/IP, try “pinging” each installed ChannelWorks Bridge.

If you are still having problems, call your support team.

Appendix A

Cables for Serial Devices

Introduction

To manage the ChannelWorks Bridge remotely, you can connect to its serial port through a dial-up connection using a 9600-baud modem. This appendix covers the following topics:

- Serial cables to connect the ChannelWorks Bridge to PCs and modems
- Serial modem cable wiring
- Null modem cable wiring
- Null modem cable pinouts

General Description

There are two basic types of cables for serial devices:

- Serial modem cables are used to connect modems.
- Serial null modem cables are used to connect personal computers.

Note: You must use shielded cables to maintain compliance with FCC and other regulatory agencies' radio frequency emission limits.

Serial Modem Cables

A modem cable is a type of serial cable that is used to connect a modem to the ChannelWorks Bridge. If you are connecting a Hayes[®] or Hayes-compatible modem, you must obtain a cable with a male connector for the modem end (normally 25 pins) and a female connector for the ChannelWorks Bridge end (9 pins).

In a serial modem cable, the pins in the connectors are wired straight through. This means that the pins function identically on the two connectors at either end of the cable.

You can obtain a serial modem cable from most computer dealers or computer supplies stores.

Null Modem Cables

Null modem cables are another type of serial cable used to connect a PC to the ChannelWorks Bridge. Null modem cable wires are attached to the pins in the connectors differently from how they are attached in a modem cable. The cable should have a 9-pin female connector for the ChannelWorks Bridge end, and a 9-pin female connector for the PC end.

You can obtain ready-made null modem connectors from most computer dealers or computer supplies stores.

The serial null modem cable is designed for devices that send and receive data on the same pins. Like the ChannelWorks Bridge, PCs are DTE devices—both expect to send data on pin 2 and receive it on pin 3. Because both devices are trying to send and receive on the wire, these wires must be crossed.

If you are making your own null modem cable, you must connect the wires as follows (see Figure A-1):

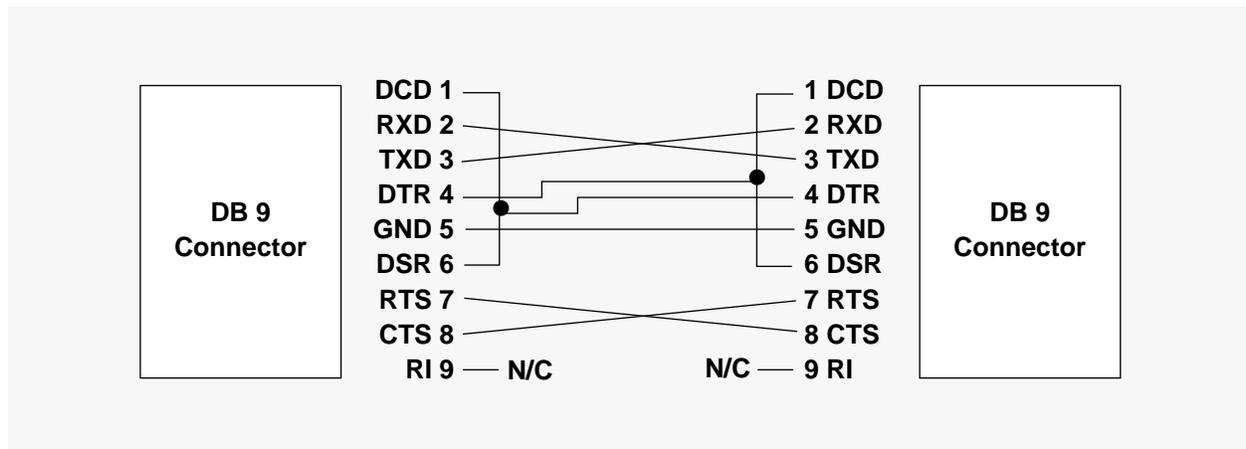
- Connect the wire from pin 2 on the bridge end of the cable to pin 3 on the PC end.
- Connect the wire from pin 3 on the bridge end of the cable to pin 2 on the PC end.
- Connect the wire from pin 7 on the bridge end of the cable to pin 8 on the PC end.
- Connect the wire from pin 8 on the bridge end of the cable to pin 7 on the PC end.

A null modem cable also disables certain features of a peripheral device by moving jumper wires from one pin to another on the same connector. Figure A-1 shows pins 1 and 6 connected and then connected to pin 4.

A cable wired like the one shown in Figure A-1 will properly connect a PC to the ChannelWorks Bridge.

If you have a PC without a 9-pin serial port, consult the service manual of the PC to determine which pins are active. You will have to wire the cable connectors according to the needs of both the PC and the ChannelWorks Bridge serial ports.

Figure A-1 Null Modem Cable Wiring



Appendix B

Pre-Installation Checklist

Introduction

This appendix provides a sample copy of the Pre-Installation Checklist.

CHANNELWORKS
PRE-INSTALLATION CHECK LIST

CONTENTS:

Cable Plant -- Headend Evaluation
Cable Plant Site Evaluation
Ethernet Site Evaluation
Site Topology

PREPARED FOR:

Name
Company
Address
City, State, Zip

REQUESTED BY:

Digital Corporation

Date

GENERAL

Purpose

The purpose of this checklist is to verify proper conditions at a customer site prior to installation of a ChannelWorks network. It is assumed that the customer has access to an operational, two way Cable TV cable plant and that working Ethernet compatible equipment exists at the designated installation sites. The completion of the items in this checklist by both Cable TV and data communication personnel will help to assure a smooth installation of ChannelWorks equipment. In summary this list consists of four separate sections.

Cable Plant - Headend Evaluation
Cable Plant - Site Evaluation
Ethernet Site Verification
Network Management, LCS, LCM, LCC

TO BE COMPLETED BY PERSON RESPONSIBLE FOR MEASUREMENT:
• NAME _____
• PHONE # _____
• FAX # _____
• DATE DATA RECORDED: _____
• COMMENTS: _____

Cable Plant -- Headend

Operation of a ChannelWorks network requires the installation of the LCT "TransMaster", a single channel frequency agile translator, in the Cable TV headend for use in single Cable TV plant. The basic translator specifications are given in Table 1. Note the rack space and power requirements.

Input Frequency	8.75 MHz to 174 MHz
Output Frequency	54 to 550 MHz
Input Level	0 to +10 dBmV
Gain	30 to 50 dB, Adjustable
AC Power	115 VAC @ 60 Hz 15 watts
Mounting Requirements	1.75" high, standard EIA 19" rack mount

Table 1. LCT "TransMaster" Specifications

CABLE PLANT - HEADEND EVALUATION

Please answer the following questions. Please use additional pages to illustrate the proposed headend configuration with the translator installed.

1→ What is the assigned return center frequency? _____MHz

2→ What is the return signal level that will be presented to the input of the translator? _____dBmV

3→ Is this level based on:

Actual return carrier? Yes_____ No_____

Type (i.e. pilot carrier, adjacent video carrier, etc.) _____
Frequency _____MHz

OR

Preferred Measured with a CW signal injected at the outlet? Yes_____ No_____

Injected Signal Level _____dBmV

OR

Estimated? Yes_____ No_____

Assumed Signal Level Injected At Outlet _____dBmV

4→ What is the assigned forward center frequency? _____MHz

5→ What signal level is required at the output of the translator to achieve proper balance with the neighboring carriers (equivalent to video carrier level of a modulator) _____dBmV

6→ What type of services do you currently have installed on your broadband network?

_____ Video _____ Data _____ Voice _____ Other _____

7→ Who maintains your broadband network?

_____ Internal Department _____ Third Party _____ Cable TV Co. _____ Other _____

8→ Do you have unlimited access to the broadband network headend facility?

_____ No _____ Yes (if no, can access be easily scheduled to coordinate with planned installation date/time? _____)

9→ When was the last time the broadband network was certified/inspected?

_____ within the last year _____ under 2 years _____ unknown

10→ Is there a broadband status monitoring system installed on the system?

_____ No _____ Yes (*if yes, what vendor and type?*)

11→ Is there any fiber optic cable integrated into your broadband system? (in each direction Forward and Reverse)

_____ No _____ Yes (*if yes, briefly describe/illustrate how and whose equipment*)

12→ What type of broadband/RF test equipment do you have that may be used during the installation?

_____ Spectrum Analyzer _____
_____ RF Power Meter _____
_____ RF Signal Generator _____
_____ Other _____

13→ Who is the vendor of your Broadband active component?

14→ What are the model numbers for these active components?

15→ Are there any concerns, restrictions, or requirements?

CABLE PLANT - SITE EVALUATION

Cable Plant -- Site Evaluation

This section is intended to record the parameters requiring verification at each site where ChannelWorks equipment will be installed. The parameters are divided into two groups. It is preferred that recorded values in the first group be based on actual measurements to facilitate ease of installation and eliminate any potential surprises. The values recorded in the second group may be based on actual measurements or on data recorded at a recent cable plant certification.

The required specifications for a ChannelWorks network are given in Table 2. Note that one of the required measurements is outlet to outlet variation. This is a target variation between signals transmitted at the network outlets as measured at the input to the translator. This is a network wide specification based on data taken at individual sites. To determine this value, complete all the individual site measurements and, from that data, record the following:

Maximum Return Path Loss _____ dB
 Minimum Return Path Loss _____ dB

Calculate:

Return Outlet to Outlet Variation _____ dB
 Max Return Path Loss - Min Return Path Loss

Transmit Center Frequency	10 MHz to 174 MHz
Transmit Power	+54 dBmV typical
Receive Center Frequency	54 to 550 MHz
Receive Level	-5 to +15 dBmV
Outlet to Outlet RX Level (at headend) Variation	6 dB
Amplitude Flatness	± 1 dB
Carrier to Noise Ratio	≥ 30 dB
Carrier to Hum Ratio	≥ 40 dB
Carrier to Second Order Beat	≥ 60 dB
Carrier to Third Order Beat	≥ 51 dB

Table 2. Unit/Cable Plant Specifications

Use additional sheets to describe the test setup/equipment used for the measurements and to record any interfering signals* or other possible problems observed while testing.

* = It is highly desirable to obtain operating channel peak hold plot recorded over a 24 hour period at the headend.

CABLE PLANT SITE EVALUATION

(to be completed for each install location)

Site Name:	_____
Site Location:	_____

Contact Name:	_____
Phone:	_____
Fax:	_____

- 1 → What is the one-way cable distance (in feet) of this location from the headend? _____
- 2 → What is the number of amplifiers between this location and the headend? _____

Grp 1 → What does the system require for a transmit signal level at the outlet to insure proper input level at first amplifier? _____ dBmV

From Outlet Location

- Inject a CW signal on the assigned return center frequency at the outlet.
 Measure at the headend. Record:
- | | |
|--|------------|
| Injected Signal Level at outlet | _____ dBmV |
| Measured Signal Level at headend | _____ dBmV |
| Equivalent Translator Input Level
(if not the same as test point) | _____ dBmV |
- Vary injected CW signal ± 3 MHz* from center in 500 KHz increments.
 Measure at the headend. Record:
- | | |
|---------------------------------|------------------------|
| Injected Signal Level at outlet | _____ dBmV |
| Minimum Signal Level at headend | _____ dBmV @ _____ MHz |
| Maximum Signal Level at headend | _____ dBmV @ _____ MHz |

From Headend

- Inject a signal on the assigned forward center frequency at the headend.
 Measure at the outlet. Record:
- | | |
|---|------------|
| Injected Signal Level at headend | _____ dBmV |
| Equivalent Translator Output Level
(if not the same as test point) | _____ dBmV |
| Measured Signal Level at outlet | _____ dBmV |
- Vary injected signal ± 3 MHz* from center in 500 KHz increments.
 Measure at the outlet. Record:
- | | |
|----------------------------------|------------------------|
| Injected Signal Level at headend | _____ dBmV |
| Minimum Signal Level at outlet | _____ dBmV @ _____ MHz |
| Maximum Signal Level at outlet | _____ dBmV @ _____ MHz |

- Grp 2 → Carrier to Noise Ratio _____ dB
- Carrier to Hum Ratio _____ dB
- Carrier to 2nd Order Beat _____ dB
- Carrier to 3rd Order Beat _____ dB

*NOTE: You use an LCT, which employs a 5.2 MHz filter, on single cable, cable TV plants. Therefore, inject the CW signal ± 2.50 MHz from center.

ETHERNET SITE EVALUATION

Provide the following information for each site. Note that the Ethernet attachment to the ChannelWorks unit is made via one of three media types 10BASE5, 10BASE2, or 10BASE-T. Connections to 10BASE5 requires an external transceiver. if possible, include sketches of the configuration.

• NAME _____
• PHONE # _____
• FAX # _____
• DATE DATA RECORDED: _____
• COMMENTS: _____

1→ Briefly describe the service(s) that your network provides to its users:

2→ What other Ethernet Bridges do you have installed on your Ethernet Network? (*Please list*)

3→ Do the bridges listed in question #2 support the 802.1d Spanning Tree Protocol?

_____ No _____ Yes

4→ What physical media do you utilize on your subnets?

_____ ThinWire _____ Thickwire _____ Twisted Pair _____ Other _____

5→ Are there Servers employed on your Ethernet subnets?

_____ No _____ Yes (*if yes, are they:*)
 _____ DOS Based
 _____ Unix Based
 _____ Other

6→ What are some of the typical applications and protocols that are run on/over your networks? (*i.e. client/server, file transfers, IPX, DECnet, TCP/IP, etc.....*)

→ LAN Data Link/Physical

- Ethernet V1
- Ethernet V2
- IEEE 802.3 10 base 2 = ThinWire
- " 10 base 5 = Thickwire
- " 10 base T = UTP

→ Protocols

- DECNET
- NFS
- IPX
- TCP/IP
- Others _____
- Appletalk
- XNS

→ Network Operating System

- Netware PC/LAN Program
- Vines
- 3 COM Open
- Other _____

→ Computer Types "Processors"

- 80286 68030
- 80386 68040
- 80486 SPARCS
- 68020 MIPS
- MAC Mainframe
- Others Micro

→ Interconnection Device

- Adapter Cards
- Bridge
- Gateway
- Router
- Brouter
- Active MAU
- Repeater

→ Server Status

- File Server Data Base Server
- Terminal Server
- Graphical Server
- Other _____

7→ Does this site have an assigned IP network number?

___ No ___ Yes (if yes, _____ IP Network _____ IP Sub-Net Mask)

8→ Is there a host address in this network number available for ChannelWorks?

___ No ___ Yes (if yes, _____ ChannelWorks Assigned IP Address)

9→ Please utilize the following form to document the Ethernet and Cable Plant topology for each site by sketching below the appropriate configuration. Please make additional copies of this form as necessary.

Site #1 Ethernet Site Topology

Site #1 Cable TV Site Topology

Only one of the following conditions:
 10Base5 = Thickwire = AUI - 15 Pin-D
 10Base2 = ThinWire = BNC
 10BaseT = UTP = 8 Wire Modular Jack

Cable TV TX Port
 Cable TV RX Port

NETWORK MANAGEMENT STATION NMS, LCS/LCM & LCC

The ChannelWorks Bridge is managed via industry standard SNMP. This standard provides full flexibility for any customer to manage their network via an already existing network management platform (NMS) that supports this industry standard "SNMP." Specifically MIB II and the Bridge MIB.

There are various industry standard NMS platforms, ChannelWorks supports both UNIX and MS-DOS versions of these systems, and can provide you with the appropriate distribution media type of its MIBs (LCC-Cable TV Management Tools) that can be compiled for use and management of the Cable TV side. A standard SNMP platform can manage the Ethernet portion of the ChannelWorks bridge by utilizing standard MIB II or Bridge MIB.

LCS/LCM is utilized by customers/installers to set-up the customized parameters for LCB such as IP address, etc.

Answers to the following questions will assist us with providing you the proper LCS/LCM and LCC.

- 1→ Do you currently utilize a SNMP based network manager platform?
Yes _____ No _____ (if yes, whose & what version _____)
- 2→ Do you have a 386 or higher PC with 2 MB of memory running Windows 3.1 with one available serial port and 2 MB free disk space?
Yes _____ No _____ (if no, what kind of PC do you have _____)
- 3→ Does your current SNMP manager allow you to compile enterprise specific MIBs?
Yes _____ No _____
- 4→ Does your SNMP NMS support SLIP (Serial Line Interface Protocol)?
Yes _____ No _____ (if yes, can Digital be given access? _____)
- 5→ Do you have a direct phone line available for use in remote management/diagnostics and upgrades?
Yes _____ No _____ (if yes, do you also have a 9600 baud modem? _____)
- 6→ Do you have access to the Internet?
Yes _____ No _____
- 7→ Do you have an interface to a Wide Area Network?
Yes _____ No _____ (if yes, who's and/or what type? _____)
- 8→ Do you prefer to receive LCC-Cable TV Management Tools (SNMP MIBs) DOS 3.5" floppy or UNIX QIC Tape?

- 9→ Is there any additional information you feel Digital should know?

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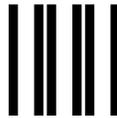
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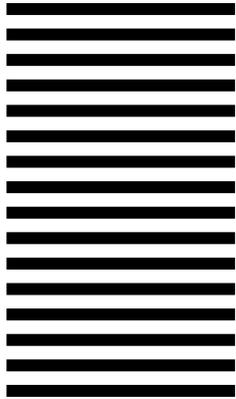
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