PR-6602

PACKET REPLICATOR

User's Guide

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Firmware Version 1.x

Certifications

FCC Statement

This device complies with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules.

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

RoHS

Some models of this product are available in RoHS versions.

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Chapter 1
Introduction

This chapter provides an overview of the Packet Replicator's features and capabilities.

Congratulations on the purchase of your new EtherSeries PR-6602. This is a simple, easily configured packet replicating device containing three ethernet interfaces.

The PR-6602 replicates UDP packets through any IP network. The PR-6602 has three Ethernet LAN ports and a serial port. The Ethernet ports are 10/100 BaseT, copper, MDI/MDIX auto-sensing. The serial port is used for initial setup to configure the IP address.

The PR-6602 duplicates some or all of the UDP packets passing through it. The original packet is passed unchanged; if selected for duplication, it is duplicated and the duplicates sent to configured addresses.

All UDP packets are candidates for duplication, selected based upon configured criteria. The selection of a packet to be duplicated may be based upon any combination of the source IP address, the destination address, and UDP port number. Additional flexibility is provided with the selection criteria which may include multiple address ranges for the source, destination as well as UDP port selected.

Each packet selected by one of the five selection rules may be duplicated to as many as ten recipient IP addresses. UDP port numbers may be passed intact with no change to the destination port number, or to a different UDP port number substituted for the original one.

The PR-6602 is bidirectional. Packets being returned through the PR-6602 may be passed unchanged, or duplicated according to duplication rules.

As all UDP packets are candidates for selection, the PR-6602 may be used to duplicate SNMP, NTP, SCADA protocols including DNP/UDP, and MODBUS/UDP, as well as all other UDP packets.

The PR-6602 is managed via web browser.

PR-6602 Applications

The PR-6602 is in used SCADA, SNMP, netflow, streaming video, streaming audio, and other applications where it is useful to have a single device send duplicate data streams to multiple devices. In short, may be applied any time a single UDP packet needs to be duplicated.

Since the packets from the PR-6602 appear to be sent from the originating device, any responses to those packets will be returned to the originating device. This back-path is without any action by the PR-6602.

In installations where multicast packets are required and only a unicast path is available, the PR-6602 can translate multicast UDP addressing to unicast UDP addresses in a bidirectional operation.

Features

Other Protocols

The PR-6602 operates only on UDP/IP packets. All other protocols are passed through the device unchanged.

DHCP Protocol

The PR-6602 may be configured as a DHCP client.

Extensive Packet Selection Rules

User defined selection criteria is configured in "rules". Each rule allows packets to be selected based upon source IP address, destination IP address, and destination IP port number. IP address and port entries may be a single value such as one IP address (192.168.2.2 for exapmle) or one port number (for example 3001) or a range such as 192.168.1.2 to 192.168.1.230 or port 5001 through 8000. If no port number is entered, all UDP packets meeting other selection criteria are duplicated. To insure the PR-6602 will replicate the desired packets, the PR-6602 must be inserted in the network path between the original packet's source and original packet's destination. Furthermore, to prevent MAC table corruption in any layer-2 switches, the destination of a replicated packet must also reside on a different LAN port from the original source. To summarize, the original source cannot be located on the same PR-6602 LAN port as the original destination or replicated destination.

Upgradeable Firmware

Firmware upgrades may be installed using any web browser.

Security Features

The web interface used to configure the PR-6602 may be secured using HTTPS SSL. The secure web server operates using the SSL protocol which allows for the use of x509 certificates to identify and authenticate web servers and web browsers. You may generate a pair of x509 certificates within the PR-6602 or import certificates from your external certificate authority.

On-board Tools

The PR-6602 contains diagnostic tools such as extensive logging, statistics, traceroute, ping, and a simple packet sniffer to aid in network troubleshooting.

Installation Location

To insure the PR-6602 will replicate the desired packets, the PR-6602 must be inserted in the network path between the original packet's source and original packet's destination. Furthermore, to prevent MAC table corruption in any layer-2 switches, the destination of a replicated packet must also reside on a different LAN port from the original source. To summarize, the original source cannot be located on the same PR-6602 LAN port as the original destination or replicated destination.

Package Contents

You should find the following items in the package:

- The PR-6602
- Power Adapter
- This User’s Guide CDROM
- 9-pin Remote-PC adapter (Units with serial ports only)

If any of the above are missing, contact your dealer immediately.

Software Requirements

The PR-6602 replicated only UDP/IP packets**. It also bridges any valid Ethernet protocol between it's ethernet ports, similarly to a switch**. The initial IP address may be entered using any terminal or terminal emulation software on a PC, or the default may be used if appropriate for your network.

Any standard web browser may be used for configuration once the PR-6602 is configured with a valid IP address.

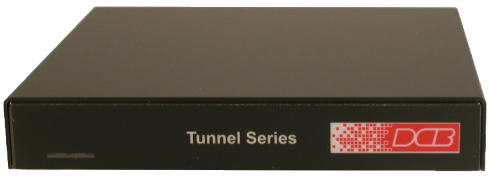
PR-6602 Hardware

Introduction

The PR-6602 three Ethernet ports and two USB ports. There is also a RS-232 serial port used for initial IP address configuration (if needed).

Configuration

This model contains a serial interface to be used in initial setup (if needed). IF the default IP address is not appropriate for your LAN, connect a terminal to the serial port following the instructions in the configuration section. The setup port is always active**.** Follow the command line setup instructions to configure a compatible IP address. Once a compatible IP address is available, the browser setup screens are used to complete the unit's configuration.



PR-6602 Front

PR-6602 Rear

Rear Panel LED Indicators

One set of indicators For Each Ethernet Port

- The left LED is the Ethernet Status indicator. It is lit when there is a valid Ethernet connection, and flashes off with receive activity (incoming to the PR-6602) (even if the activity isn't directly to this unit).
- The right LED indicates that the port is functional. It will be lit with a functional port, and will flash off with transmit (from the PR-6602) activity.

Rear Panel USB Connectors

There are two USB connectors. They are interchangeable, and only the first one that senses a USB device connection is activated. These are only used for transferring certificate files.

Rear Panel RS-232 Connector

The DE-9 (PC 9-pin) connector is used for command line setup. A cross-over cable is required to use this with any standard PC serial port. Terminal configuration is 9600 bps, 8N1 .

Rear Panel Ethernet Connectors

The three 10/100BaseT connectors are auto-sensing and share the same IP address.

Front Panel LED Indicators

- Power indicator. It should be on.

Chapter 2
Installation

This Chapter details the installation process for the PR-6602.

Overview

The PR-6602 is configured using a web browser directed to its address. If the default address of 192.168.0.1 is appropriate for your local network, then plug it in and simply direct your web browser to the PR-6602 (using https if you've configured it to use https, otherwise use http:) without using a proxy and continue with configuration. If this address is not appropriate for your network, the IP address must be configured using the initial terminal method below.

Help Screens and Field Edits

The field names on all configuration screens are hyperlinks to context sensitive help screens. Simply click on the field name to bring up a second window with the help information. Close that window to return to your entry screen.

Entries are always tested for valid values. However, there are many "valid" values that are not appropriate for any given configuration. So, "appropriateness" isn't tested. For example, an IP address of 300.400.500.256 will not be accepted, but the field will accept an IP address that is not appropriate for ***your*** installation.

Installation and Configuration

1. Configure the IP address

If the default address (192.168.0.1) is appropriate for your network, skip to step 2, "Connect the Ethernet Cable".

1. Connect a terminal or PC running terminal emulation program (Hyperterm, Procomm, etc) to the serial port.
2. Start the terminal emulation program using 9600 bps, 8-bits, No parity, No flow control.
3. Power up the unit.

```
Welcome to the PR-6602 v1.00
To start the Setup Program, login with
the name: setup
PR-6602 login:
```

Login Screen

4. It will reboot pausing at a login screen. **For initial setup, enter the login name "setup" in lower case letters. No password is required.**

5. You will then be asked if you wish to set ALL parameters to factory defaults. If you have previously changed any values and want to return to the factory defaults, answer "Y", otherwise answer "N".

```
-------- PR-6602 Setup Program --------

Welcome to Setup.  This setup will establish the PR-6602 in a known state so that you
can configure it via a Web Browser.  It will allow you to configure the Ethernet IP
address subnet mask, and gateway.  You also have the option to set all parameters to
default, which is the only method to remove security
parameters.

HTTP port: 80
 LAN1 Configuration:
IP: 192.168.0.1
SM: 255.255.255.0                                    GW:
Set ALL parameters to default (y/[n])? y
```

Default Screen

6.You are then asked if you wish to configure the unit as a DHCP client. If you want it to pick up a DHCP address from a local DHCP server connected to ethernet A, answer "y", otherwise answer "n".

```
Should LAN1 use DHCP to get an IP address (y/[n])? n
```

DHCP Screen

7. If you answered no to that question, you will be prompted to enter the unit's IP address and subnet mask. Enter the values. Note that all three ports share the same IP address.

8. The configuration is now saved to flash memory. Do not cycle power during this time or the unit may be rendered inoperable.

```
Saving Configuration. Do not cycle power...
Erasing flash sector 0x10fc0000
Storing file [config.tar.gz], size 1541 bytes
Store complete
Setup complete.
After rebooting the system, you will be able to configure
the unit from a Web Browser.  Use the URL
http://11.22.33.44 .
Return Switch 2 to the off (down) position
press <enter> to reboot system...
```

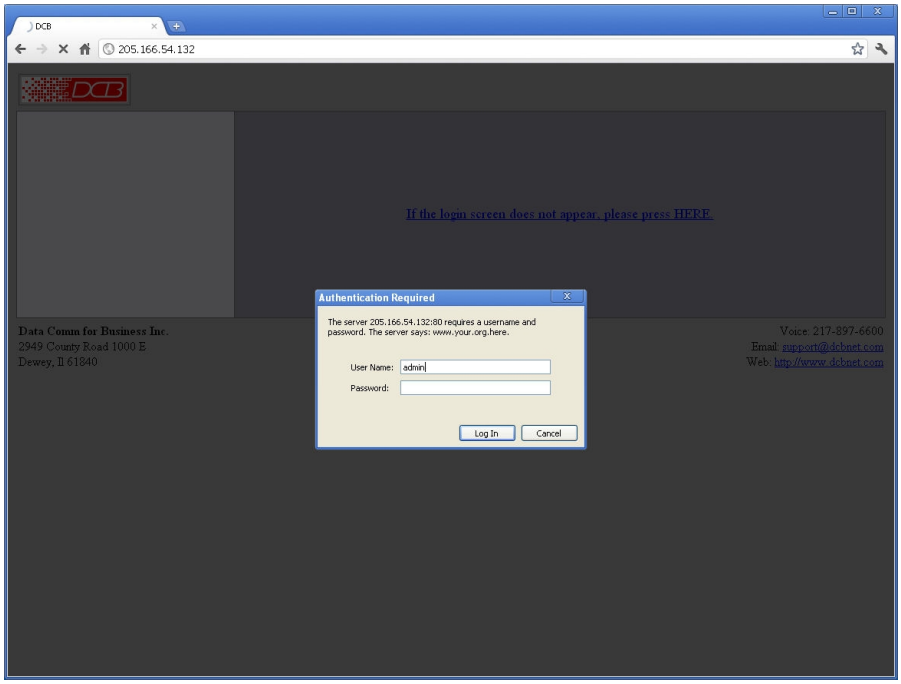
9. The PR-6602 will now reboot.

2. Connect the Ethernet Cable

Connect a LAN cable from your hub or switch to a LAN port. Reboot with a power cycle. The PR-6602 will now be available to any web browser on the same LAN segment. If your web browser does not see it, verify that you do not have a proxy server configured in the browser and are using https instead of http for a secure connection IF you've already changed the unit to HTTPS. If so, properly configure the browser to bypass the proxy server for this URL. The default address is 192.168.0.1. This address must be appropriate for your local LAN and workstation, or step 1 above must be followed.

3. Verify the IP Address Configuration

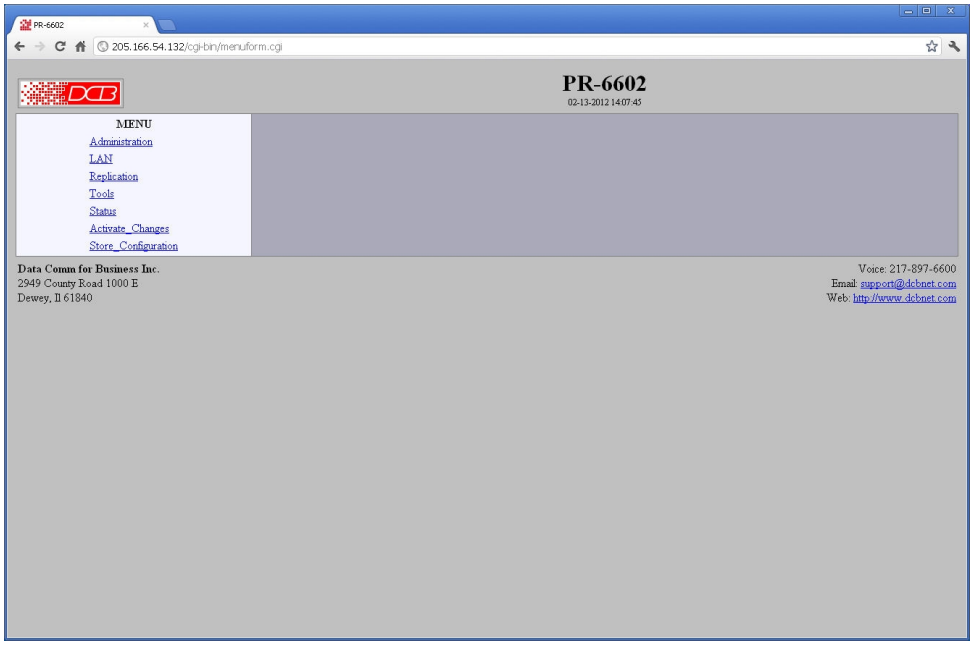
Enter the URL from step 1 (or http://192.168.0.1 if using the default address) into your web browser. The login screen below should be displayed.



Login Screen

Log in using the user name “admin” and no password (blank field). If this screen doesn’t display, check the Troubleshooting Section in Chapter 6.

4. Enter Configuration Values



Initial Main Menu

From this index screen, you can select a section on the left and will be taken to configuration screens for each subsystem. You must enter configuration values specific to your installation.

5. Minimum Configuration

The minimum configuration items required for basic packet replication are:

1. Correct IP address configuration, includes either DHCP or IP address, Gateway, and Netmask.
2. At least one packet replication selection rule.
3. At least one destination detail screen for the packet replication rule

Configure these items using the LAN Configuration and Replication Rule screens and the PR-6602 is ready for use.

Chapter 3
The Configuration Process

This Chapter describes the configuration management process on the PR-6602 using a Web Browser.

Overview

The PR-6602 contains a quite flexible configuration management system. By using this system correctly, one can remotely configure, save copies of that configuration to a PC, make configuration changes for later activation, and remote transfer firmware upgrades to the unit.

There may be up to three configuration "images" in use at any time.

1. The ***active*** configuration. Normally, this is the configuration that was loaded from memory when the unit was last booted. However it may have been changed since boot time as described below. This is the configuration that is currently running the unit.
2. The ***pending*** configuration: This is the current configuration that was loaded form memory during the last boot **along with any changes made by using the configuration screens**. This configuration is NOT the configuration running the PR-6602 at present.
3. The ***stored*** configuration. This is the configuration that was last written to the non-volatile RAM. The next time the PR-6602 is power cycled, it will start running this configuration.

Note that any configuration transfer (with the Administration Configuration Transfer screen) is the ***pending*** configuration. You can load a configuration file from the PC, then either activate it to test it. Or, save it without activation if you don't want to change the currently running configuration.

Using the Configuration Flexibility

When the PR-6602 starts from a power-off condition, it loads an active configuration from its non-volatile memory. This active configuration is also copied to the working memory and is the "pending" configuration.

Whenever the configuration screens are used to change values, **only** the *pending* configuration is changed… not the *active* configuration.

Using the configuration screens will change the pending configuration. You may change the active configuration by copying the pending configuration over it. This change is performed using the "Activate Configuration" screen. Going to this screen activates the pending configuration by copying the pending configuration over the top of the active configuration. This does not store the configuration in non-volatile memory. When the hardware is next reset or powered up, it will begin using the old stored configuration from before the changes were made and activate command clicked.

Using the "store configuration" screen will copy the pending configuration into non-volatile memory. It will not cause this configuration to begin running. However, upon the next reset or power cycle, the PR-6602 will begin using the stored configuration.

It is possible to activate the pending configuration using the Activate Configuration screen and then store the configuration using the Store Configuration screen. This two step process will cause all three configurations to be identical.

Configuration Process Examples

Example 1:

Make configuration changes, test them with Activate, then save them with Save.

This is the most commonly used method for changing the configuration. It allows you to test the configuration prior to saving it. If, during the testing, you notice an abnormality; you can reset the hardware to return to the last good configuration.

Example 2:.

Make configuration changes, save them, reset the hardware to activate the changes.

This method allows one to configure thePR-6602 via an IP network that will not work using the new configuration. Make the changes to the pending configuration and save them. Your current session will not be affected, but when the hardware is next powered on, it will begin using the new configuration. This method is useful when you are configuring to use a new LAN address range while still on the old LAN.

Example 3:

Transfer a saved configuration, save it, reset the hardware to activate the changes.

It is useful to transfer an existing configuration to a PC text file for future use. Then if the hardware must be replaced, simply transfer that stored configuration to the new hardware.

If the PC is in the default IP address range of the new hardware (192.168.0.x subnet), then a new, out-of-the-box unit is easily configured using this method. Start the hardware on the LAN, transfer a stored configuration file from the PC, and store it. When restarted, the PR-6602 will have the proper configuration.

Saved Configuration Files

The saved configuration file is a simply formatted raw text file. Advanced users may wish to edit this file using an appropriate text editor, then transfer the changed configuration to a different unit.

Use care when performing configuration with this technique as the text configuration file must be in the proper format.

This method is ideal for automating the configuration of many units in a large corporate environment.

Chapter 4
Configuration

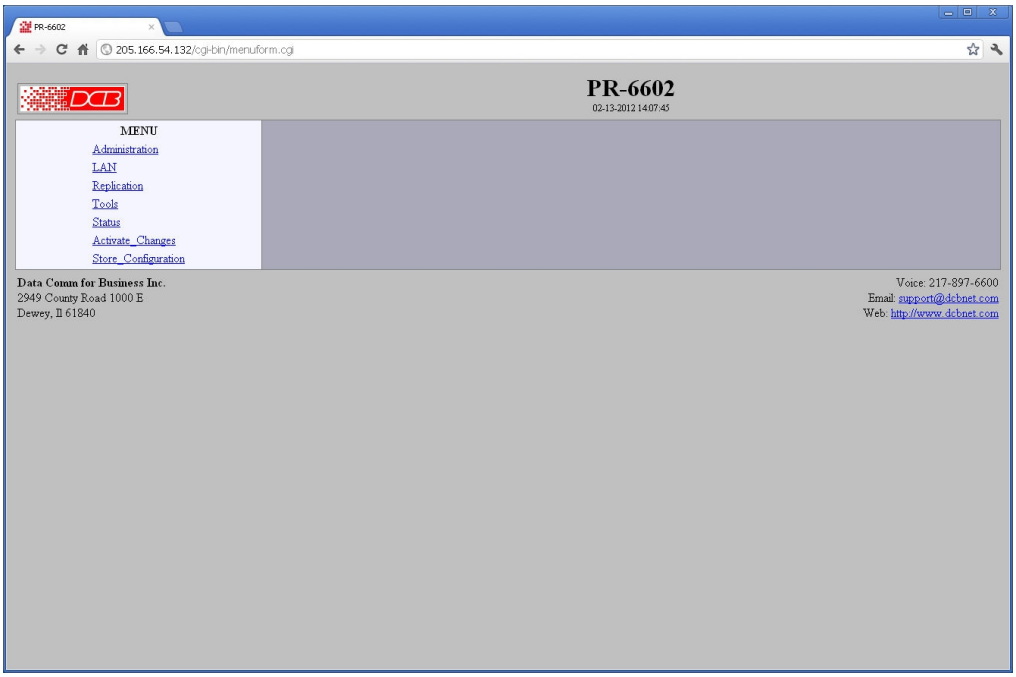
This Chapter describes configuration screens and some configuration hints for the PR-6602

Overview

The PR-6602 is configured using forms displayed on a web browser. In this chapter, we illustrate all entry forms, and describe their use.

All configuration screens are accessed from the main index screen shown below. They are divided into sections with only one layer of screens below the top level.

Some units may be configured to require a secure web browser connection for configuration (https://)



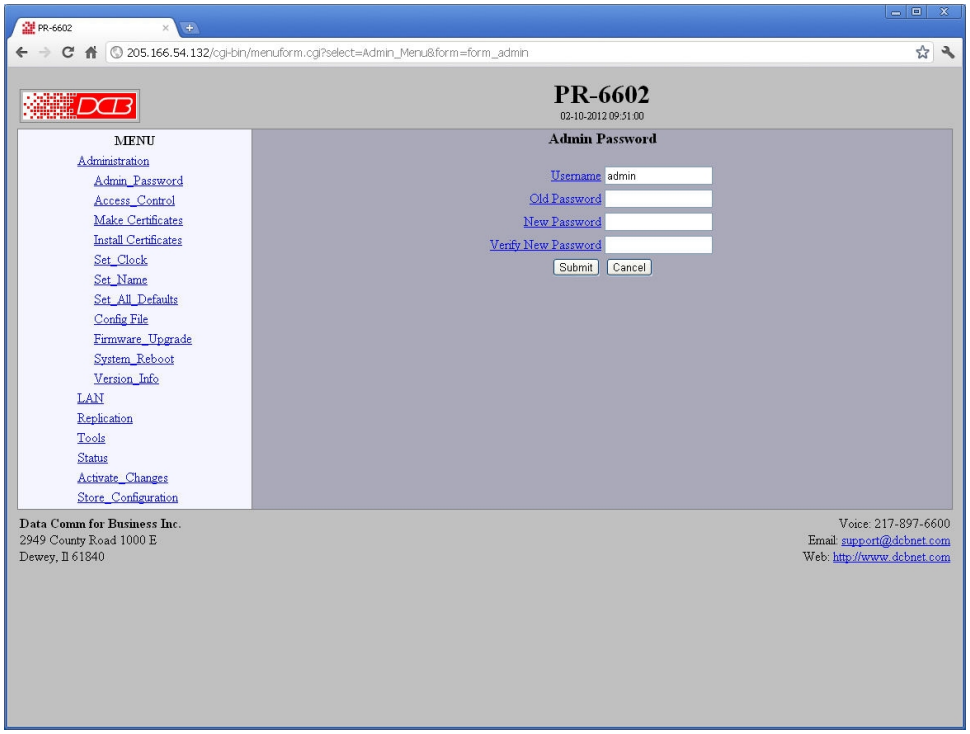
PR-6602 Main Screen

From this index, click on a menu keyword to open the appropriate screen. In this manual, screens are discussed in the order shown on the index screen.

Administration

The Administration section contains screens used to configure system-wide settings and perform a few high level operations.

Admin Password



Admin Password Screen

Access to the configuration web server is protected by HTTP Basic Authentication and may use a secure web server. This is a simple methodology where the Web Server will require a Web Browser to provide a username and password for each page requested. The Web Browser will typically ask the user to enter the username and password once, then will remember it for the duration that the Web Browser is running. For some configurations, use https: (instead of http:) when addressing web browser screens.

The Administration screen allows you to change the user name and password for the administrator. This is the only user allowed to configure the unit. **If you forget the administrator name or password, the hardware can only be configured by returning it to factory defaults using the serial configuration method as described in chapter, Configuration.**

Fields

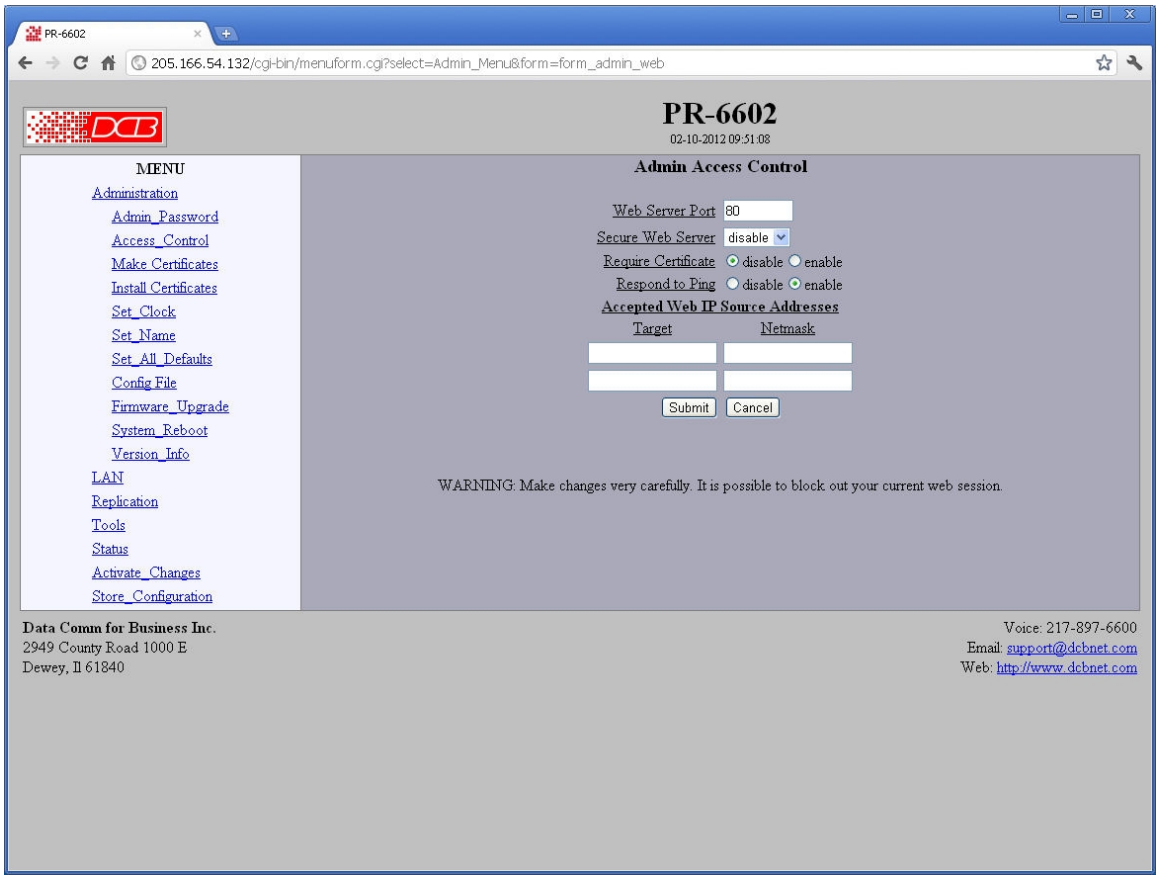
- User Name
  This field may be a string of 0 to 15 printable characters. Do not use space or control characters. If you leave this field blank, you will need to enter a blank username during authentication.
- Old Password
  In order to change the username and password, you must know the old password. When making a change, enter the current password in this field.
- New Password
  When changing the username and password, this field provides the new password. It may be a string of 0 to 15 characters. If you leave this field blank, you will need to enter a blank password during authentication.

- Verify New Password
  Retype the password to verify that it was correctly entered.

Notes

- **If you forget your username or password, you can use the Serial Port Setup to erase the current settings and return the unit to factory defaults.**

Admin Access Control



Administrative Access Control Screen

Access Control allows you to place further restrictions on access to the internal web server.

Fields

- Web Server Port
  This is the TCP Port to use for the internal Web Server. Typically it is set to port 80. However you may set it to any value between 1 and 65535.

  There are several reasons that you may want to change the web server port. By changing it to a non-standard value, you reduce the chance that a random attacker will find the web interface and attempt to break in. A different port may be needed to accommodate local firewalling.

  If you change the web server port number to any value other that 80, remember that you will have to

include the port number in your URL. For example, https://192.168.0.1:7995 OR http://192.168.0.1:7995 .

- Require Certificates
  This option enables certificate based authentication of web browsers attempting to connect to the internal web server. The browser must present the appropriate certificate, otherwise access will be denied. See the help section on making and installing certificates.

  Certificate based authentication is required by some network security departments.

- Respond to Ping
  This item allows you to block ping requests. Ping is a valuable tool for diagnosing network problems, but can also become a security problem. Disabling ping causes the unit to not respond to ping requests for one of its IP addresses. It has no effect on the passing of ping request and responses from other network nodes through it's bridged interfaces.

- Accepted Web IP Source Address
  This table allows you to control what hosts or networks have access to the configuration web server. If empty, any host may access the unit.

  Entries are made by specifying a Target and Netmask. For example, if you want to allow only the host 192.168.10.16 access, you would enter:
  Target: 192.168.10.16 Netmask:255.255.255.255.

  If you wanted to allow access to all hosts in the range 192.168.10.1 to 192.168.10.255, you would enter:

  Target: 192.168.10.0 Netmask: 255.255.255.0

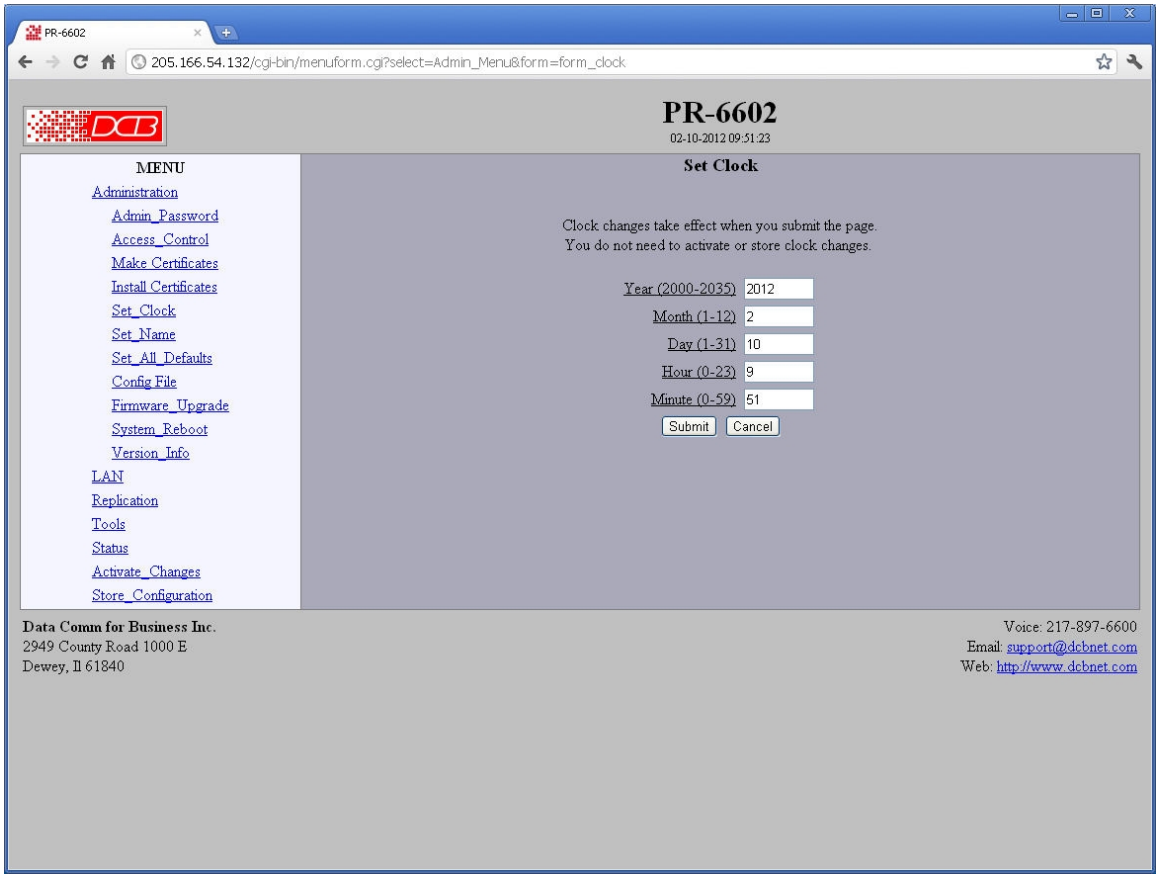
- Target
  Host or Network address.

- Netmask
  If blank or set to 255.255.255.255, target is assumed to be a host address. Otherwise, target is treated as a network address.

Notes

Remember to submit the change by clicking the “SUBMIT” button.

Set Clock



Set Clock Screen

This form allows you to set the hardware clock. The setting will take effect immediately.

Fields

Year Year in the range 2000 to 2035.

Month Numeric value of month in the range 1 to 12.

Day Day of month in the range 1 to 31.

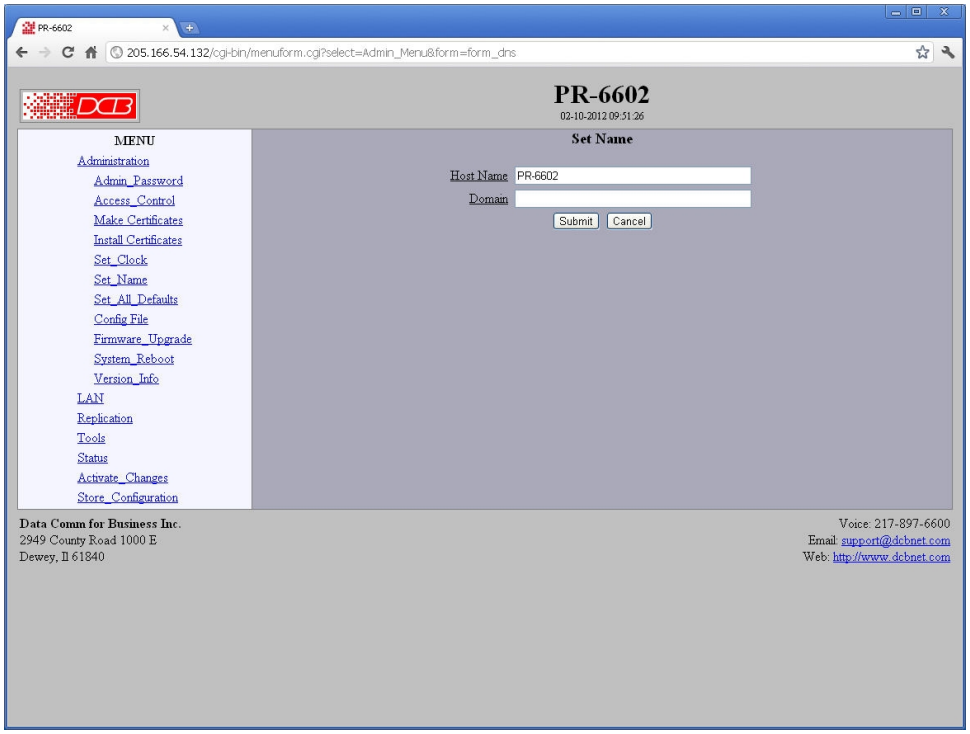
Hour Hour of the day in the range 0 to 23.

Minute Minutes in the range 0 to 59.

Notes

- There is a hardware real-time clock that saves the time between power cycles.

Set Name



Set Name Screen

This form allows you to set the units host name and domain.. The setting will take effect when you "Activate Changes".

Fields

Host Name

The name given to the unit. If you enter a name, it will be displayed as the title of the web pages.

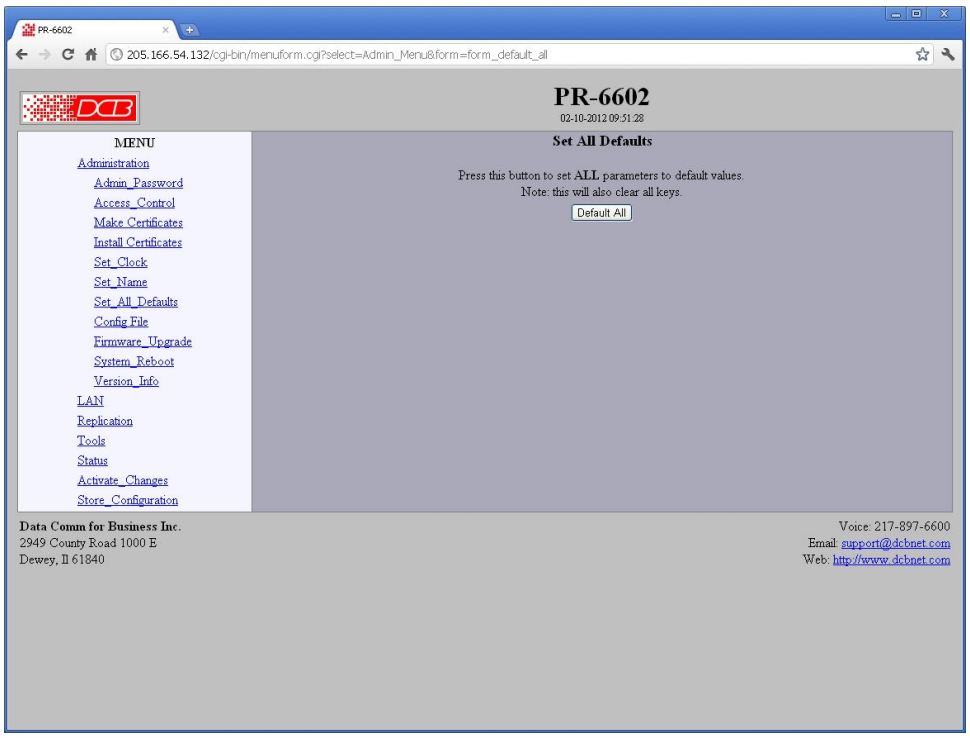
Domain

The name of the local domain. For example: widgets.com

Notes

- If used, these names must be appropriate for your DNS system.

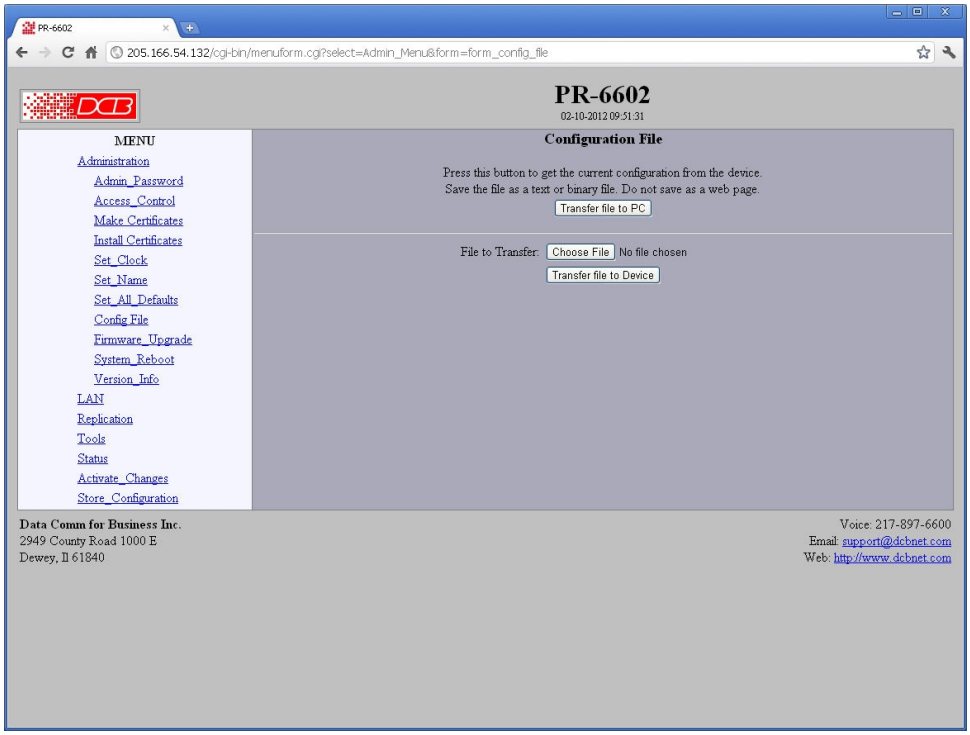
Set All Defaults



Set All Defaults Screen

This form will allow you to set all configurable parameters to their default value. Before you "Activate Changes", you should configure the interface that you are using to access the unit. Otherwise, all interfaces will be configured with the IP address of 192.168.0.1.

Configuration File



Configuration File Screen

This form will allow you to copy the configuration to a file on your PC. You can also use the form to transfer a configuration file from your PC to the PR-6620.

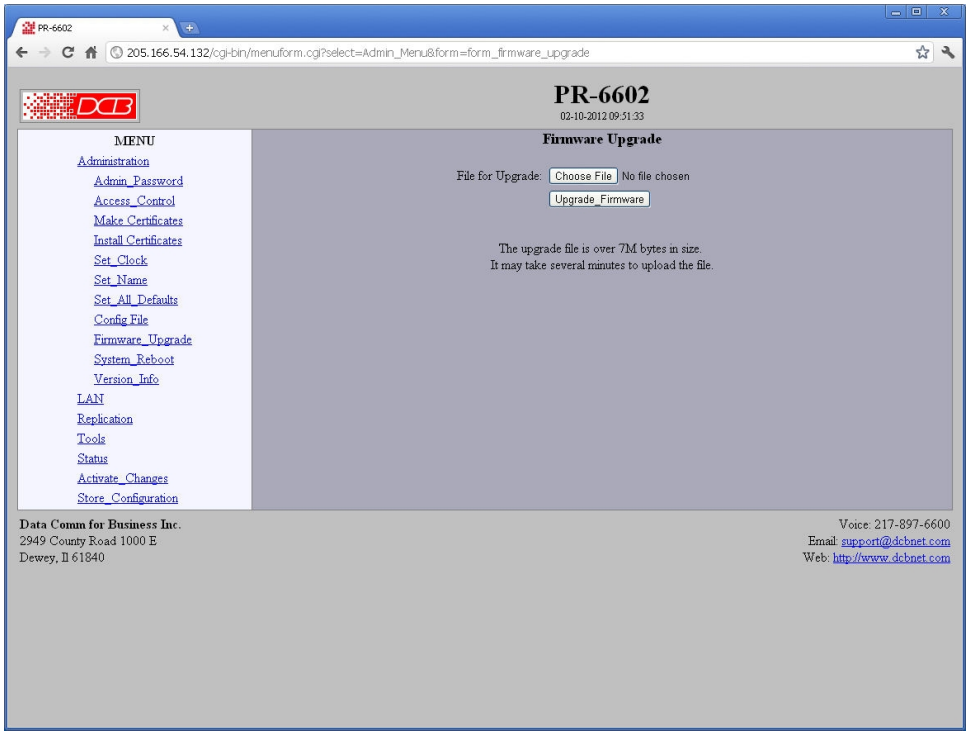
Fields

- File to Transfer
  This is the name of the configuration file on your PC to be transferred to the PR-6602.
- Transfer file to PC (action)
  Transfers the current configuration file to this PC.
- Transfer file to Device (action)
  Transfers the named file to the PR-6602.

Notes

- The configuration file is a specially formatted text file. It may be edited with any text editor.
- You may save multiple configuration files on the PC by using a different name for each.
- After transferring a configuration file to the unit, you may either activate the changes (with the activate screen), or store the changes (with the store configuration screen). If you activate the changes, the hardware will immediately begin using the new configuration. If the changes are stored, the new configuration will be used only after a reboot or reset.
- If you activate the new configuration, first be sure that you have access using the new configuration's IP address. Otherwise, it may be necessary to return to the old stored configuration with a reset.

Firmware Upgrade



Firmware Upgrade Screen

This form will allow you to load new firmware into the PR-6602. The firmware will be saved to non-volatile memory, replacing the current firmware.

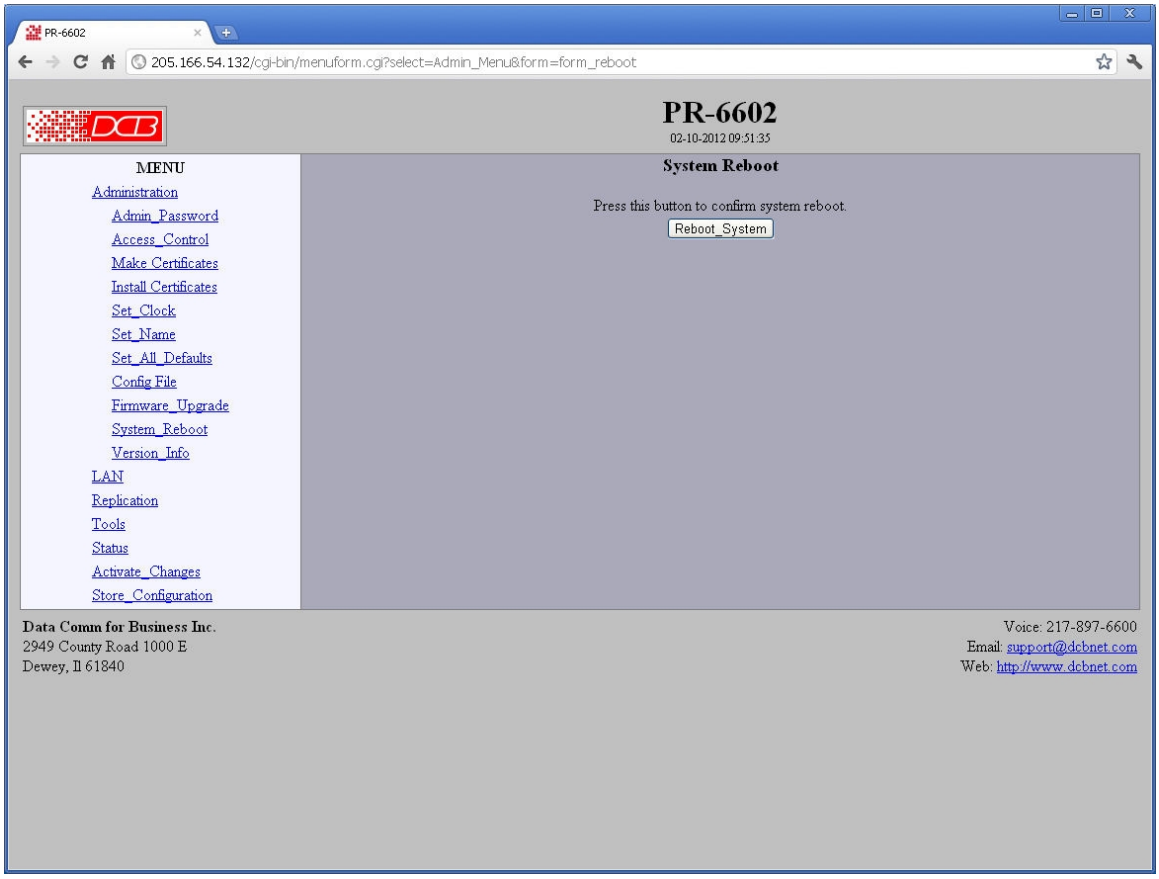
Fields

- File Name
  This is the name of the firmware image file to be transferred to the PR-6602 from your PC.
- Upgrade Firmware (action)
  Pressing this button transfers the firmware image to the PR-6602 and upgrades it.

Notes

You should only use a firmware image obtained directly from DCB.

System Reboot



System Reboot Screen

This form will allow you to reboot the PR-6602. If you have configuration changes that have not been saved to non-volatile memory, they will be lost.

This is a way to revert back to your previously stored configuration.

Fields

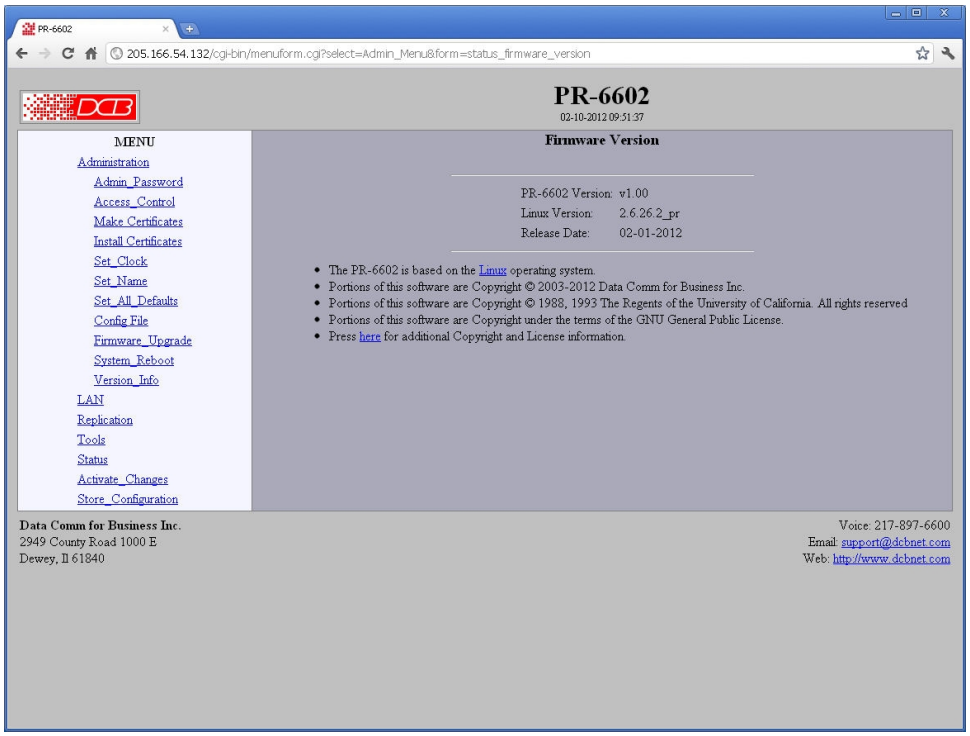
- Reboot System (action)
  This causes a reboot loading its stored configuration.

Notes

- The current configuration is not retained unless it has been previously stored.

Version Information Screen

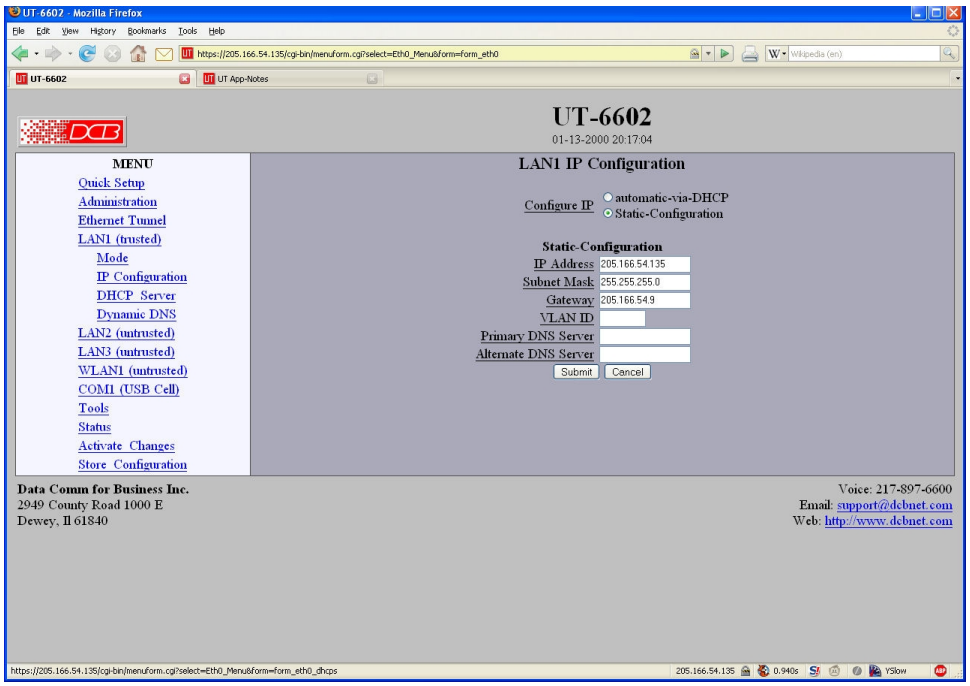
Version Information Screen



This screen displays current firmware and hardware version information as well as some copyright notices.

1.

LAN IP Configuration



Lan 1 IP Configuration Screen

This hardware contains three Ethernet interfaces which are bridged together (similar to an ethernet switch). They all share the same IP addressing. . This screen is used to configure IP parameters for the entire unit.

Fields

- Configure IP
  Select DHCP or a static configuration. If DHCP is selected, the static-configuration is ignored.
- IP Address
  An IP address is a numeric identifier given to an interface. It consists of four 8-bit numbers and is represented in a dotted notation. An example of an IP address is "192.168.0.10". An Ethernet IP address must be unique within your network. If you are directly connected to the Internet, it must globally unique.
  This field is not used if DHCP Client has been enabled. The DHCP server will assign the IP address.
- Subnet Mask
  A subnet mask is a bit mask applied against the IP address. It specifies which portion of the IP address is the subnet identifier and which portion is the host identifier. For example, many subnets have a mask of 255.255.255.0. This means the first 24 bits of the address is the subnet identifier and the last 8 bits is the host identifier.

  This field is not used if DHCP Client has been enabled. The subnet mask will be assigned by the DHCP server.
- Gateway

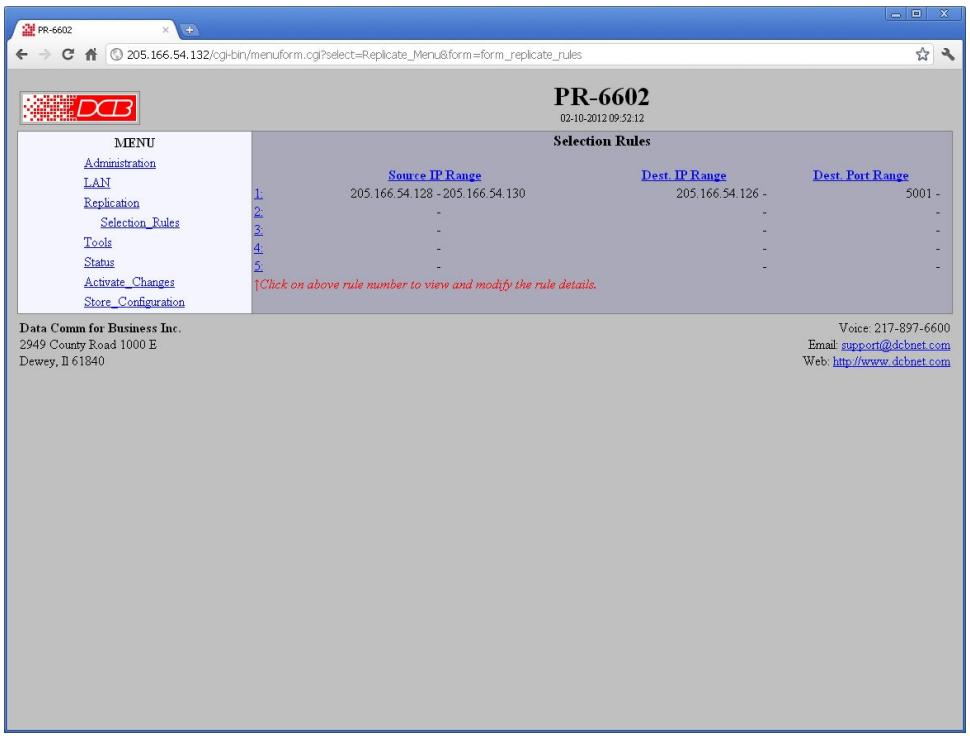
  The Gateway specifies the address of the gateway router on the local subnet. Packets destined for a host not on the local subnet are forwarded to the gateway router. Note that additional gateway routes

may be specified on the “Static Routes” screen.

- Primary DNS
  The IP address of the primary DNS server. This server will be used to resolve host names into ip addresses.

- Secondary DNS
  The IP address of the secondary DNS server. This server will be used to resolve host names into ip addresses in the event that the primary name server does not respond or is unable to resolve an name.

Replication Selection Rules



Replication Selection Rules Screen

The PR-6602 monitors all UDP packets passing through it. All packets received into any port of the PR-6602 are bridged unchanged and transmitted out the other ports of the PR-6602. Any UDP packets meeting user-defined selection criteria will be replicated and sent to one or more additional destinations. The replicated packets will appear as if they were sent from the original source.

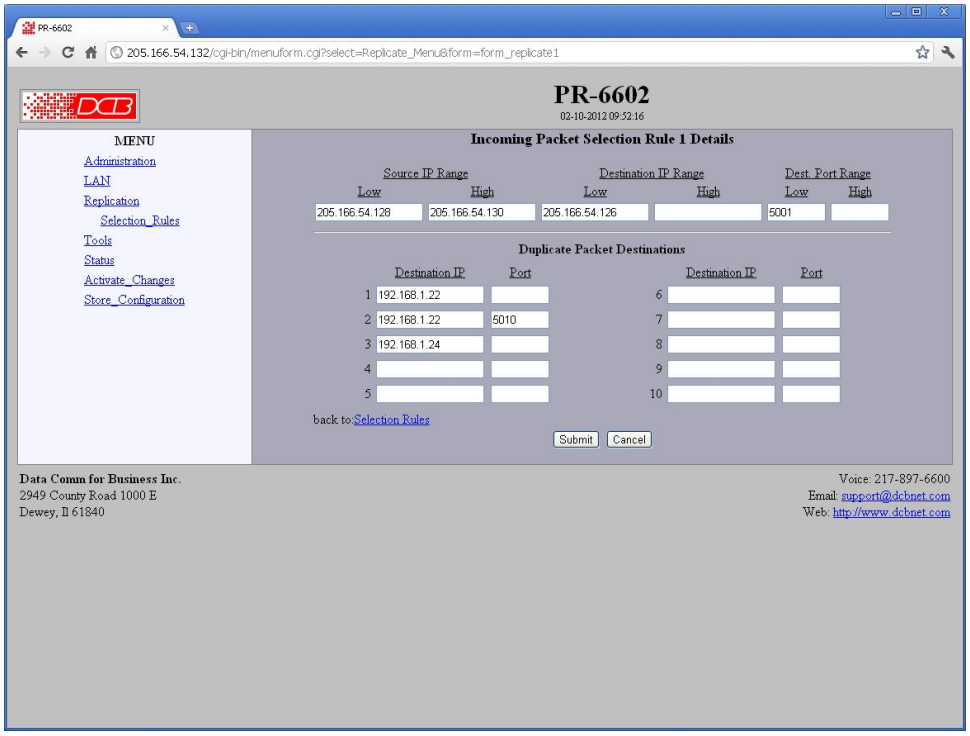
User defined selection criteria is configured in "rules". Each rule allows packets to be selected based upon source IP address, destination IP address, and destination IP port number. IP address and port entries may be a single value such as one IP address (192.168.2.2 for example) or one port number (for example 3001) or a range such as 192.168.1.2 to 192.168.1.230 or port 5001 through 8000. If no port number is entered, all UDP packets meeting other selection criteria are duplicated. To insure the PR-6602 will replicate the desired packets, the PR-6602 must be inserted in the network path between the original packet's source and original packet's destination. Furthermore, to prevent MAC table corruption in any layer-2 switches, the destination of a replicated packet must also reside on a different LAN port from the original source. To summarize, the original source cannot be located on the same PR-6602 LAN port as the original destination or replicated destination.

When the PR-6602 is replicating packets to a multicast or a broadcast address, the PR-6602 will not spoof the sender's MAC address, but instead will replace the original sender's MAC address with the PR-6602's MAC address, as is normal practice with multicast repeaters. This is to prevent MAC table corruption in layer-2 switches. The packet will retain the original sender's IP address.

Fields

- Rule Number
  This is the number of a rule defined on this line. Click on the Rule Number field to display the Selection Details screen, where you will configure the destinations for duplicated packets.
- Source IP Range
  These fields specify the inclusive range of source addresses for the packet selection criteria. If both fields are blank then all source addresses are assumed. If only a single address is entered, then only that one address is used.
- Destination IP Range
  These fields specify the inclusive range of destination addresses for the packet selection criteria. If both fields are blank then all destination addresses are assumed. If only a single address is entered, then only that one address is used.
- Destination Port Range
  These fields specify the inclusive range of destination UDP port numbers for the packet selection criteria. If both fields are blank then all port numbers in the range 1 - 65535 are assumed. If only a single port number is entered, then only that one port is used.

Replication Rules Destinations Screen



Replication Rules Destinations Screen

This screen is used to configure and display the destinations for replicated packets.

The PR-6602 monitors all UDP packets passing through it. All packets received into any port of the PR-6602 are bridged unchanged and transmitted out the other ports of the PR-6602. Any UDP packets meeting user-defined selection criteria will be replicated and sent to one or more additional destinations. The replicated packets will appear as if they were sent from the original source.

User defined selection criteria is configured in "rules". Each rule allows packets to be selected based upon source IP address, destination IP address, and destination IP port number. IP address and port entries may be a single value such as one IP address (192.168.2.2 for example) or one port number (for example 3001) or a range such as 192.168.1.2 to 192.168.1.230 or port 5001 through 8000. If no port number is entered, all UDP packets meeting other selection criteria are duplicated. To insure the PR-6602 will replicate the desired packets, the PR-6602 must be inserted in the network path between the original packet's source and original packet's destination. Furthermore, to prevent MAC table corruption in any layer-2 switches, the destination of a replicated packet must also reside on a different LAN port from the original source. To summarize, the original source cannot be located on the same PR-6602 LAN port as the original destination or replicated destination.

When the PR-6602 is replicating packets to a multicast or a broadcast address, the PR-6602 will not spoof the sender's MAC address, but instead will replace the original sender's MAC address with the PR-6602's MAC address, as is normal practice with multicast repeaters. This is to prevent MAC table corruption in layer-2 switches. The packet will retain the original sender's IP address.

Fields

Incoming Packet Selection Rule Details

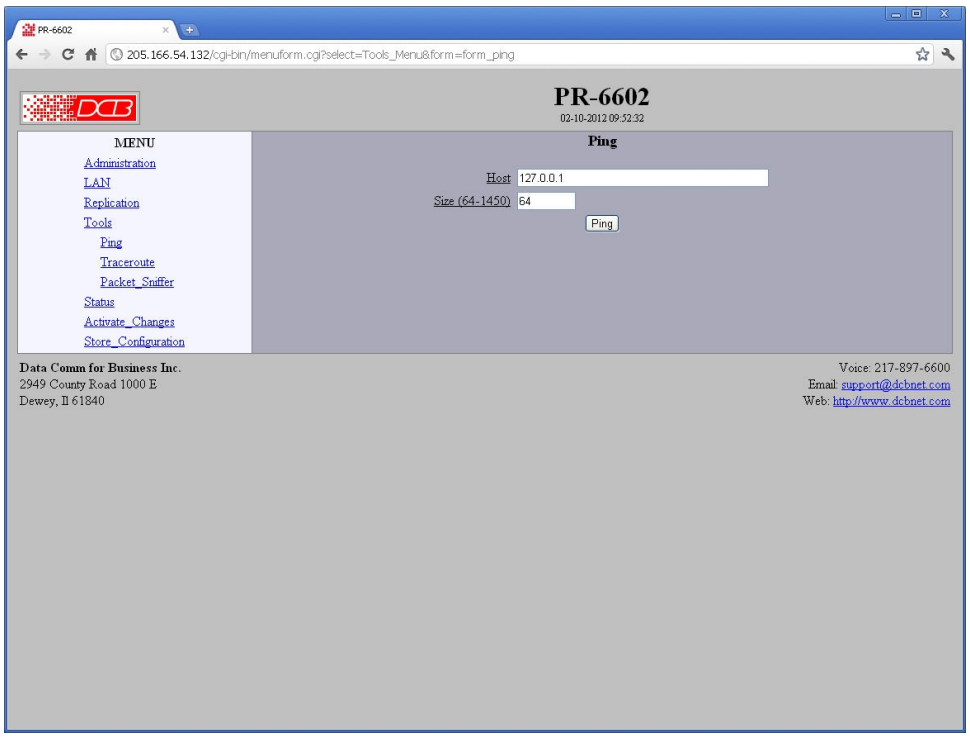
- Rule Number
  This is the number of a rule defined on this line. Click on the Rule Number field to display the Selection Details screen, where you will configure the destinations for duplicated packets.
- Source IP Range
  These fields specify the inclusive range of source addresses for the packet selection criteria. If both fields are blank then all source addresses are assumed. If only a single address is entered, then only that one address is used.
- Destination IP Range
  These fields specify the inclusive range of destination addresses for the packet selection criteria. If both fields are blank then all destination addresses are assumed. If only a single address is entered, then only that one address is used.
- Destination Port Range
  These fields specify the inclusive range of destination UDP port numbers for the packet selection criteria. If both fields are blank then all port numbers in the range 1 - 65535 are assumed. If only a single port number is entered, then only that one port is used.

Duplicate Packet Destinations

- Destination IP
  These fields specify the inclusive range of destination addresses for packet delivery. Each packet rule allows delivery to up to 10 different addresses.
- Destination Port
  These fields specify the destination UDP port number for packet delivery. If the field is blank then the original port number is used.

Notes

Ping Screen



Ping Screen

Ping will send four ICMP echo requests to the specified host. It will wait approximately 16 seconds for a response.

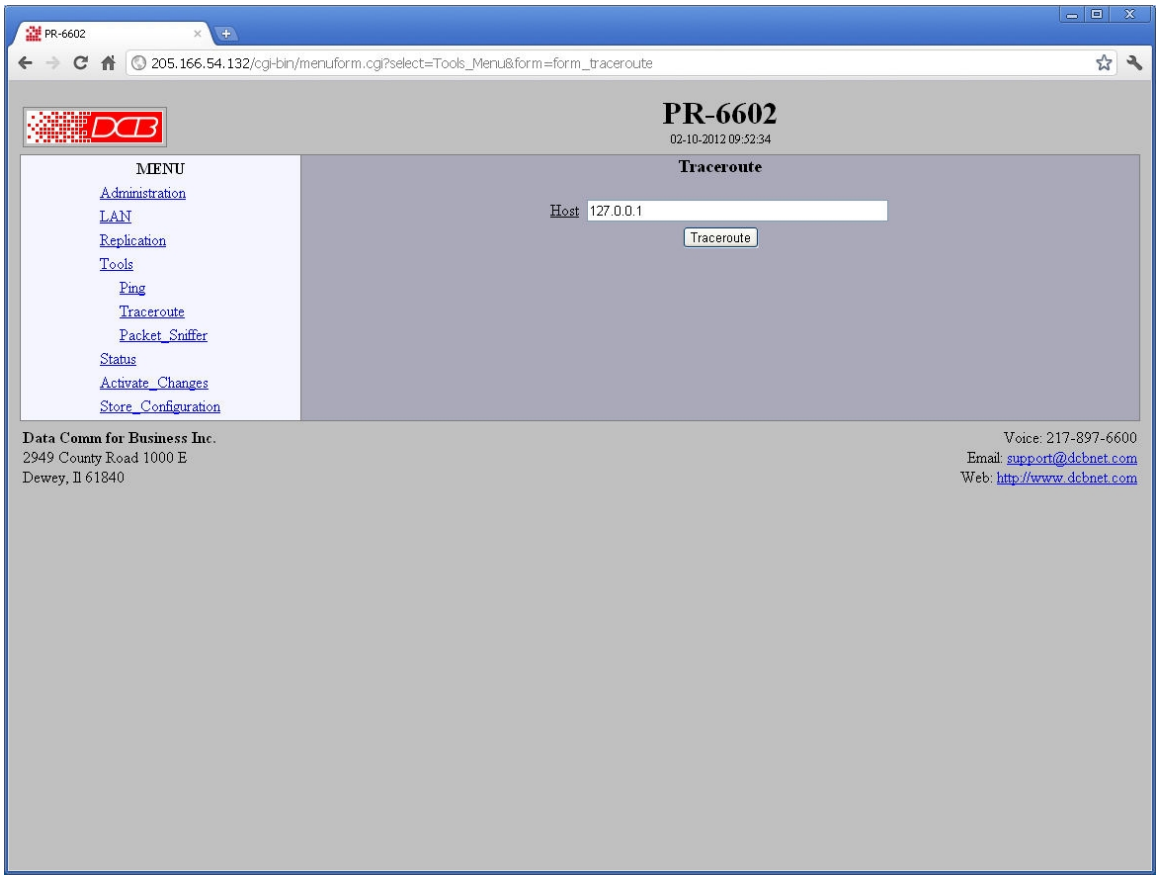
Fields

- Host
  IP address of the target host. If hostname DNS is enabled, you may use a host name.
- Interface
  Which interface to use. This controls the default gateway to be chosen in the event the target host is not on a local network segment.
- Size
  Number of data bytes to send.

Notes

- Ping and traceroute are useful tools to determine if routing is correct.

Traceroute Screen



Traceroute Screen

Traceroute displays the route that a packet will take to reach another host. This is performed by sending UDP packets to port 33434 with progressively larger Time-to-Live values and listening for ICMP TIME-EXCEEDED responses from the routers along the way.

Fields

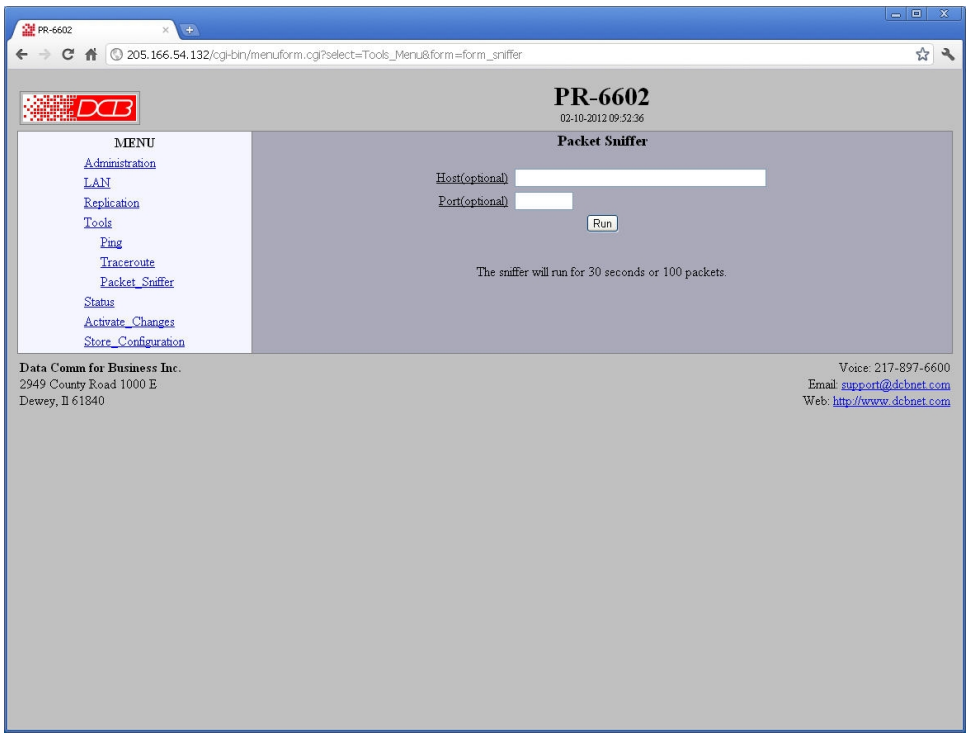
Host

IP address of the target host. If hostname DNS is enabled, you may use a hostname.

Interface
Which interface to use. The routing table is bypassed.

Notes

Packet Sniffer Screen



Packet Sniffer Screen

The Packet Sniffer allows you to take a snapshot of the network traffic passing through an interface.

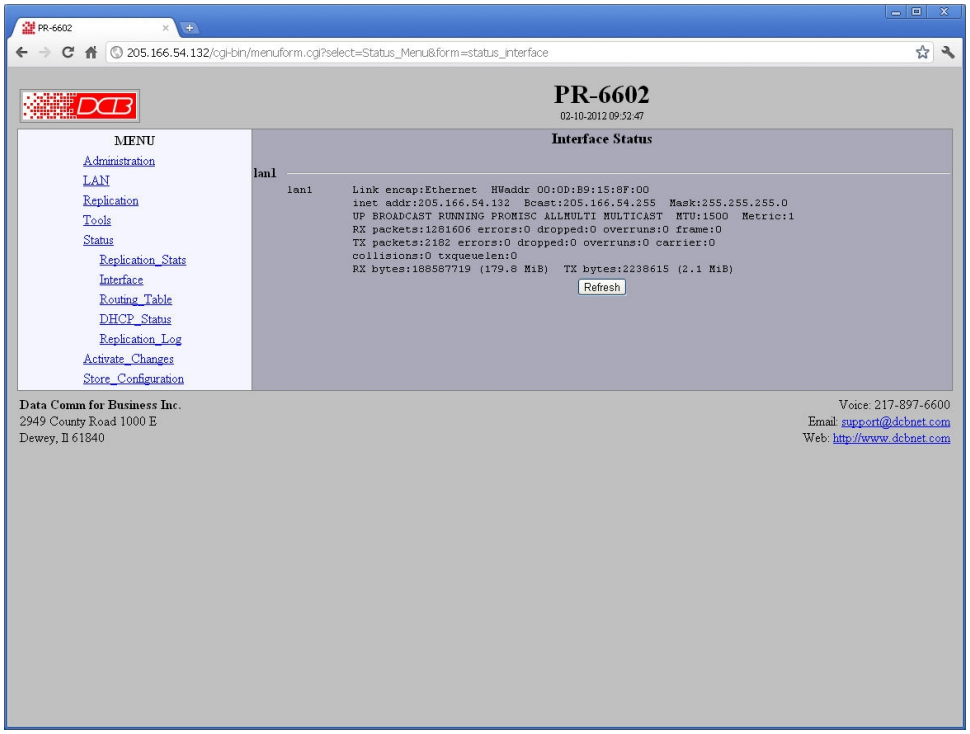
Fields

- Host
  This applies a host filter. Only packets with a matching source or destination IP address will be included in the trace.
- Port
  This applies a port number filter. Only TCP or UDP packets with a matching source or destination port number will be included in the trace..

Notes

- Only packet headers are shown. You will not be able to see the data contents of the packets.

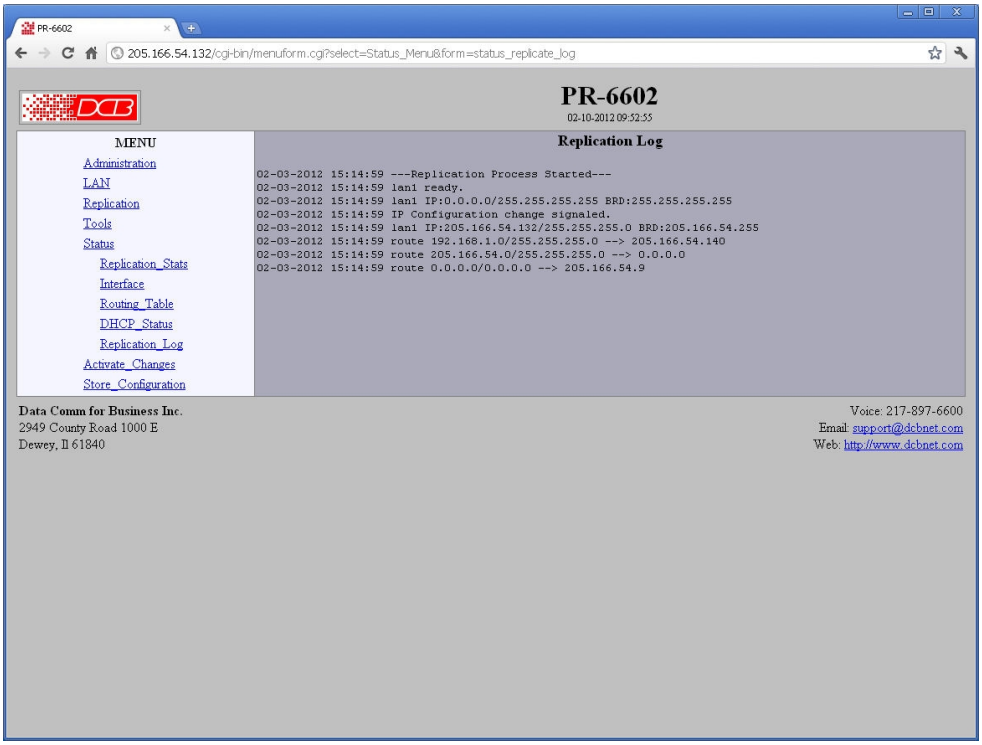
Interface Status Screen



Interface Status Screen

The Interface Status screen shows port status and packet counters for each interface on the UT.

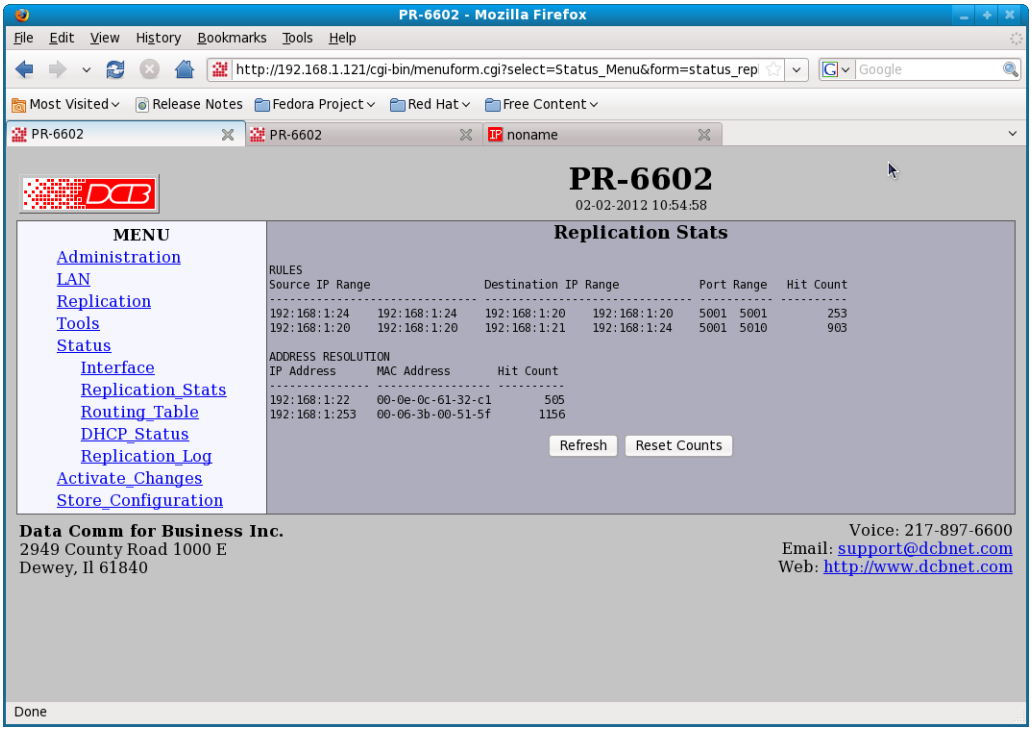
Replication Log Screen



Replication Log Screen

The Tunnel Log screen shows important events logged for each interface on the UT.

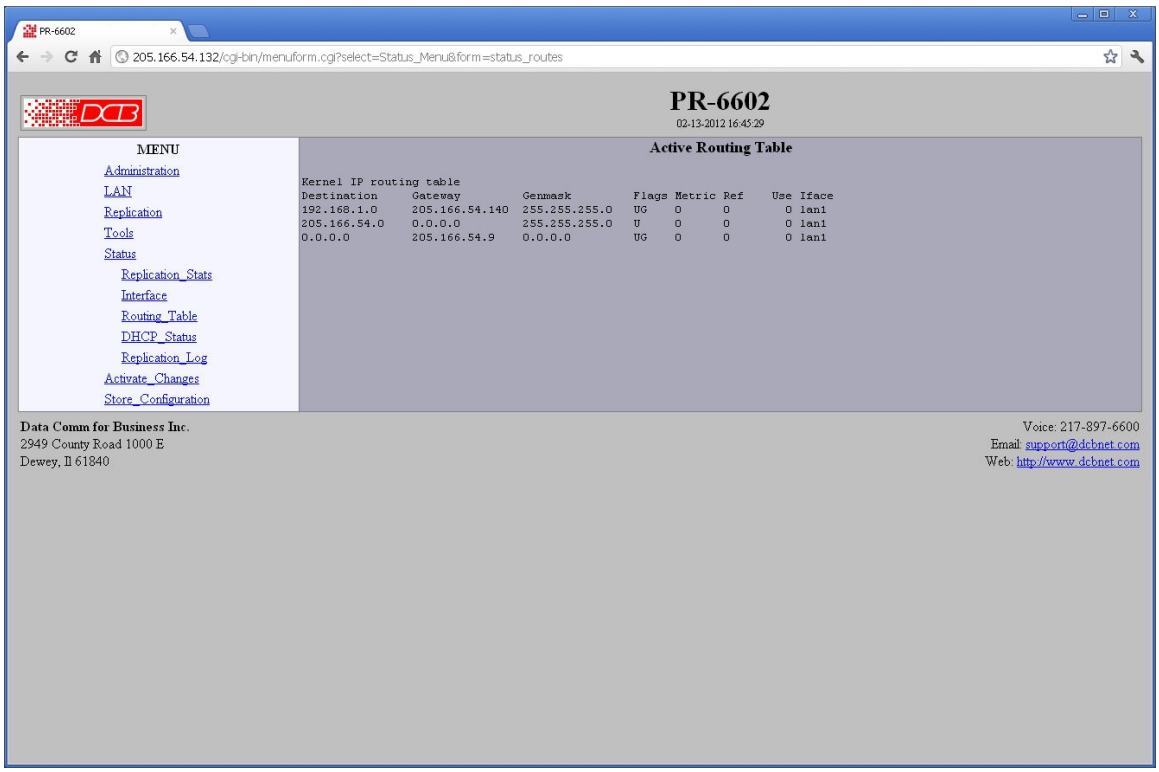
Replication Statistics Screen



Replication Statistics Screen

The Replication Statistics Screen shows the number of hits attributed to each replication rule. It also displays the latest Address Resolution (ARP) Table. The ARP table may time out, but is useful to diagnose problems caused by non-responding IP addresses.

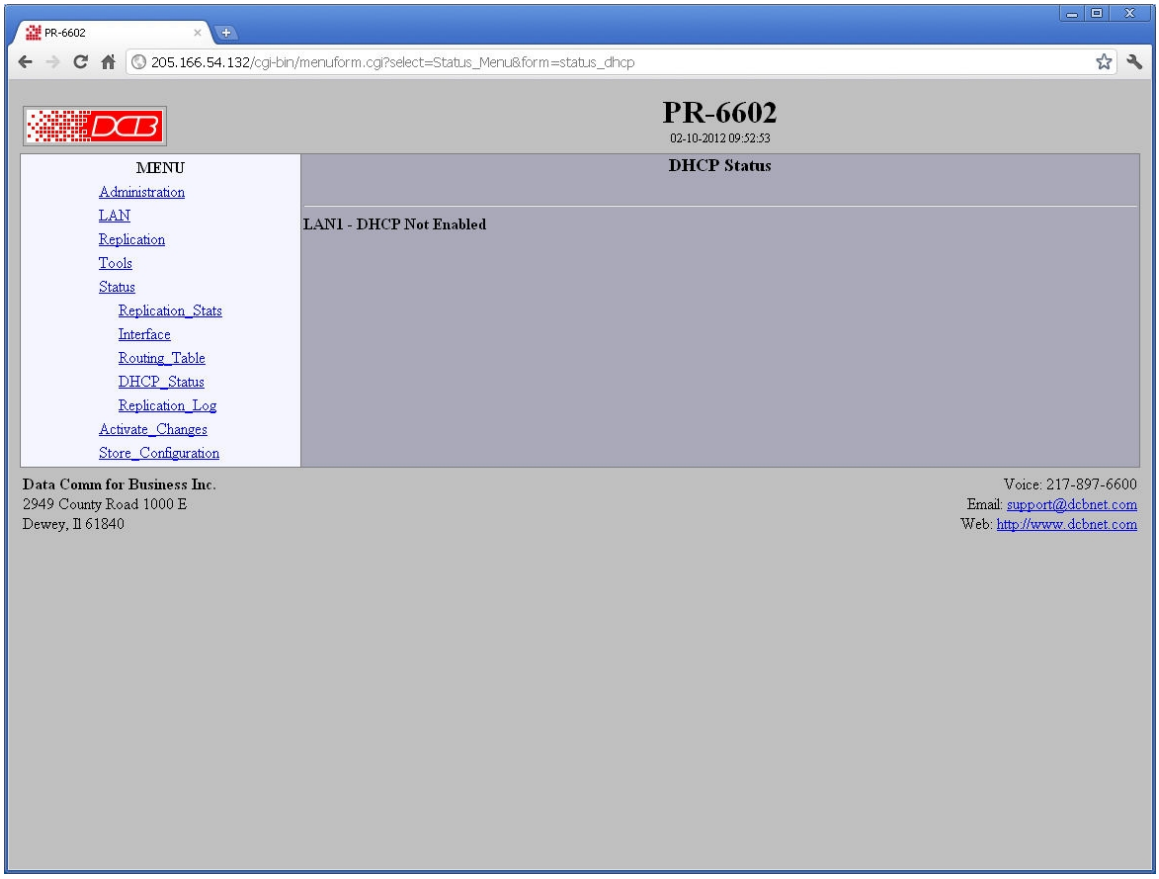
Routing Table Screen



Routing Table Screen

The Routing Table screen shows all configured and learned routes.

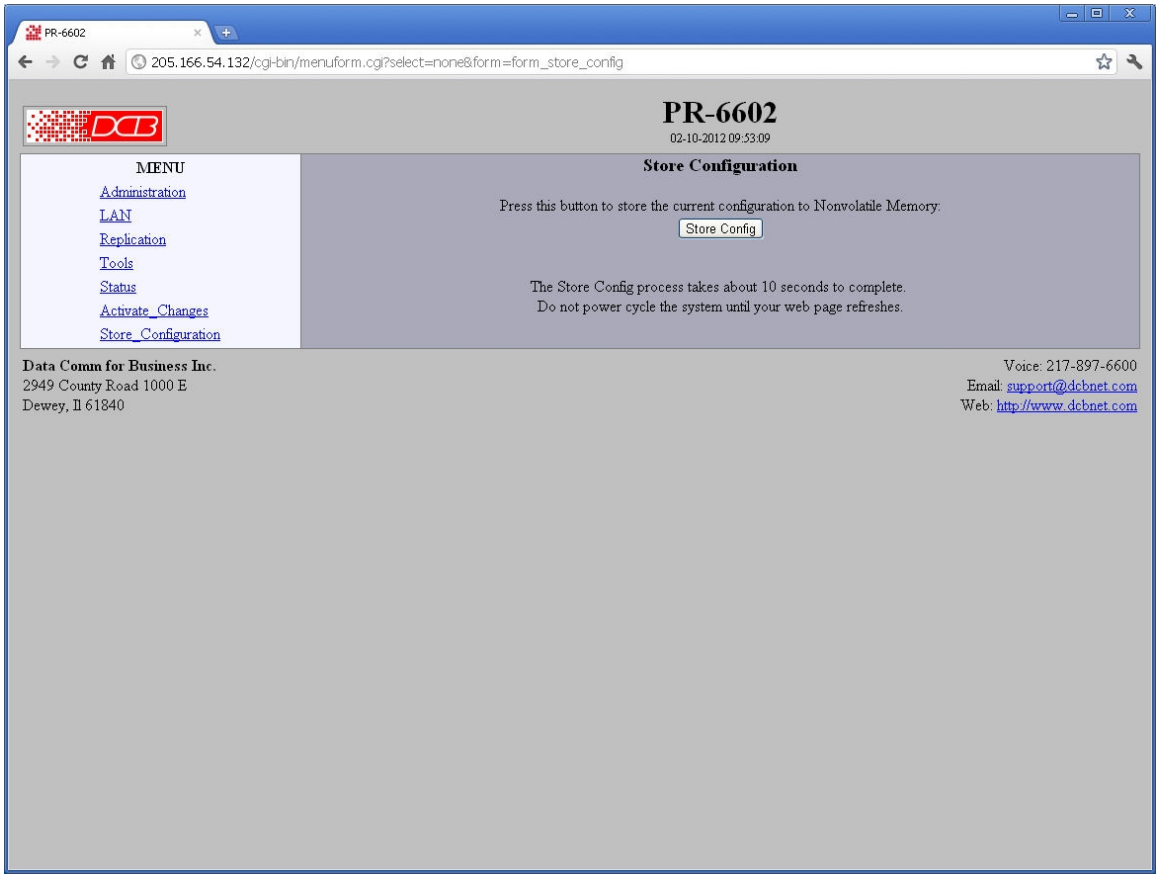
DHCP Status Screen



DHCP Status Screen

The DHCP Status Screen displays recent history of DHCP server activity if the DCHP client mode is enabled.

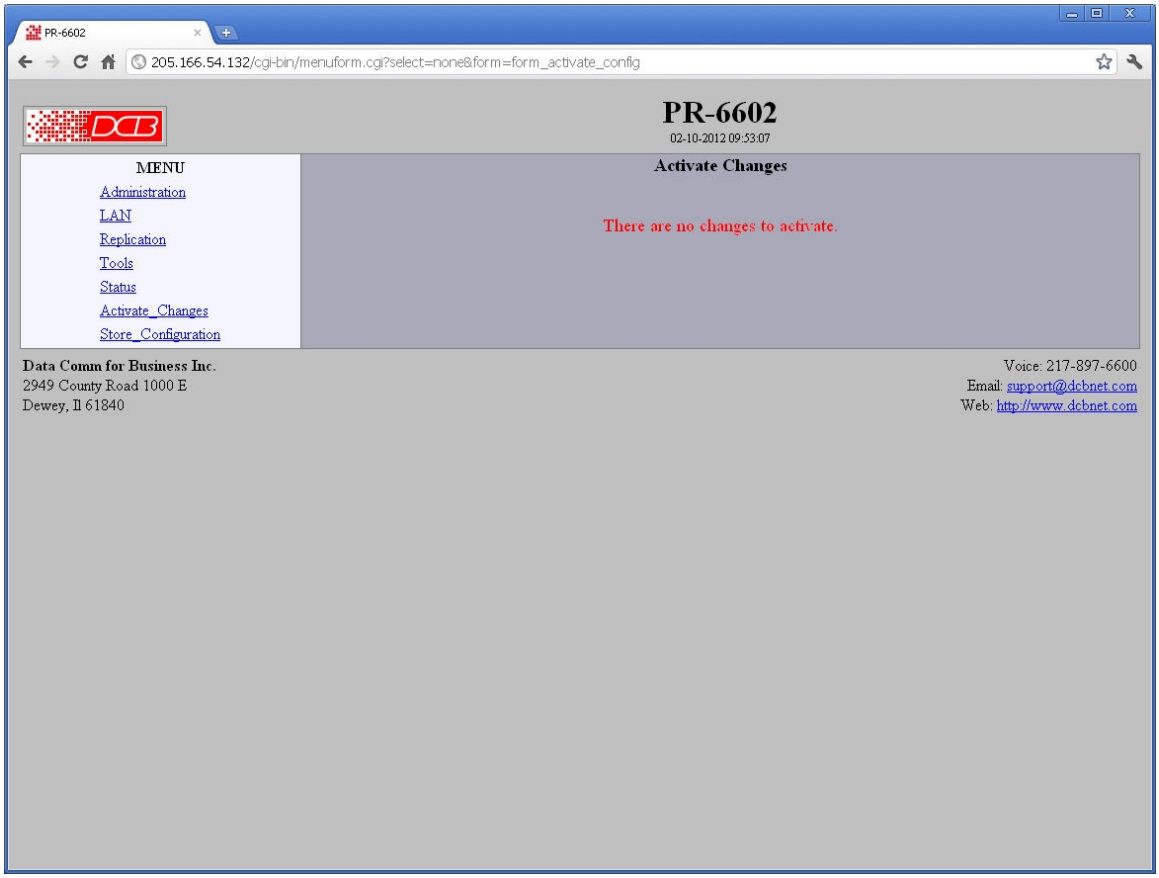
Store Configuration Screen



Store Configuration Screen

The Store configuration screen is used to store the current configuration to non-volatile memory. This does not activate configuration changes. Configuration changes are made to a temporary area. They may be "activated" using the Activate Changes screen, in which case they will become immediately active, overwriting the pre-existing configuration for the duration of this session; or they may be "stored" using this screen, in which case they will be written to non-volatile memory and used at the next reset or power-up. **Refer to the configuration process section for details about the configuration process.**

Activate Configuration Screen



Activate Configuration Screen

The Activate configuration screen is used to activate the current changes. Configuration changes are made to a temporary area. These changes will become immediately active, overwriting the pre-existing configuration for the duration of this session. Changes may be "stored" using the store configuration screen, in which case they will be written to non-volatile memory and used at the next reset or power-up.

Chapter 5
Operation

This Chapter explains how to use the PR-6602, once it is installed and configured.

Common Uses – Overview

The PR-6602 monitors all UDP packets passing through it. All packets received into any port of the PR-6602 are bridged unchanged and transmitted out the other ports of the PR-6602. Any UDP packets meeting user-defined selection criteria will be replicated and sent to one or more additional destinations. The replicated packets will appear as if they were sent from the original source.

User defined selection criteria is configured in "rules". Each rule allows packets to be selected based upon source IP address, destination IP address, and destination IP port number. IP address and port entries may be a single value such as one IP address (192.168.2.2 for exapmle) or one port number (for example 3001) or a range such as 192.168.1.2 to 192.168.1.230 or port 5001 through 8000. If no port number is entered, all UDP packets meeting other selection criteria are duplicated. To insure the PR-6602 will replicate the desired packets, the PR-6602 must be inserted in the network path between the original packet's source and original packet's destination. Furthermore, to prevent MAC table corruption in any layer-2 switches, the destination of a replicated packet must also reside on a different LAN port from the original source. To summarize, the original source cannot be located on the same PR-6602 LAN port as the original destination or replicated destination.

When the PR-6602 is replicating packets to a multicast or a broadcast address, the PR-6602 will not spoof the sender's MAC address, but instead will replace the original sender's MAC address with the PR-6602's MAC address, as is normal practice with multicast repeaters. This is to prevent MAC table corruption in layer-2 switches. The packet will retain the original sender's IP address.

Typical Application Diagrams

A typical use would be to insert the PR-6602 in the ethernet path between a video camera streaming UDP packets and multiple recipient devices. Most video camera streams are limited to the number of destination devices they support. The PR-6602 allows more recipients for camera streams.

It may be inserted in the ethernet path between a PC and multiple electronic signs. The PC would be streaming UDP packets containing data for electronic signs, and the PR-6602 would broadcast a single UDP data stream to multiple devices on various subnets.

It may be used to broadcast netflow or SNMP datagram packets to multiple management workstations.

Chapter 6
Troubleshooting

This chapter outlines some problems that may occur during installation or operation and some possible solutions to them.

If you follow the suggested troubleshooting steps and the PR-6602 still does not function properly, please contact your dealer for further advice.

Hardware Problems

Before anything else, check that all cables are wired correctly and properly connected.

***P*:** All the LEDs are off.
S: Check the power supply or power connection.

***P*:** No Ethernet response, Ethernet ports not work.
S: Check the switch or hub's link LED for the port to which it is connected. If it is off, make sure the network cable to the hub is in good condition.

Can't Connect via the LAN

***P*:** Can't connect with a Web Browser.
S: Check the following:

- Insure that you are addressing the PR correctly ie. https:// instead of http:// depending upon configuration.
- Start troubleshooting from a known state. Power the unit OFF and ON to reboot.
- Is a proper IP address configured in the unit and PC?
- "Ping" it to see if it responds. From the Windows command prompt or "Run" dialog box, use the command:

  ```
  ping IP_Address
  ```

  Where `IP_Address` is the IP Address of the unit (e.g. `ping 192.168.0.1`). If it does not respond, then check all LAN connections. If the LAN connection are OK, the problem is in the LAN addresses or routing **The most common problem cause is incorrect IP address configurations. Make sure the workstation and PR have compatible IP addresses.**
- It may be that your "ARP table" contains invalid entries. You can clear the "ARP table" by rebooting, or, on Windows, by typing the following command at the command prompt or *Run* dialog box.: `ARP * -d` **. This is a common problem with test-bench setups.**
- In some cases, "smart" hubs and switches must be power-cycled to clear their internal ARP cache. This **is often a problem on test bench setups where IP addresses are moved between different equipment or a unit is moved between ethernet switch receptacles.**

Other Problems

***P*:** Can't run the initial configuration program using a serial cable connection.
S: Check that:

- The communication parameters are set properly on the terminal device.
- Hold the configuration button depressed for at least 3 or 4 seconds.
- Power is available... an LED is on.
- The terminal program is operating properly. Try a loopback connector at the PR-6602 end of the cable to verify program operation and the proper COM: port.
- The most common problems causing this symptom are incorrect RS-232 wiring or the Windows Hyperterm program not operating correctly.

***P*:** How to set the hardware back to factory defaults?
S: If you know the IP address, you may browse to the Administration screen – Set All Defaults. If the IP address is unknown, use the serial connection setup method (Chapter 2), and answer Yes then asked if you wish to reset the unit to factory defaults. The factory default IP address for the ethernet port (Port A) is 192.168.0.1 .

If you need to reset the unit to defaults temporarily, this can be done using the mode switch on the front of the unit.

The process is to apply power to the unit. There are two versions of BIOS loader:

On one version, the BIOS will illuminate all 3 LEDs, then turn off LEDs 2 and 3.

On the second version, the BIOS will illuminate LEDs 1 and 2, then turn off LED 2.

At this point, press and hold the mode switch until LED 2 is flashed (about 8 seconds later). You may then release the switch. The unit will be running on default values and the serial setup re-enabled.

The default values are not automatically stored using this method.

Note: The mode switch is covered by the front label on some units. An sharp ice pick and x-ray vision may be required for this procedure on some units. The hole is just under the "e" and "i" in the word "series" on the front panel label. Carefully make a hole in the label to use a small wire (paperclips work well) to press the button.

Appendix A

Specifications

PR-6602 Packet Replicator Specifications

- LAN Interfaces: 10/100BaseTx, Autosense
- Serial Port (1) RS-232 port for setup
- OS: uClinux
- Throughput: greater than 10 Mbps
- Supports 5 replication packet selection rules
- 10 replication destination configurations for each selection rule
- Power: 7-20 VDC 4 watts or Optional power supplies. Supplied with 100-240 VAC external supply
- Switch: Serial configuration press-button
- LED:7 (LAN Activity, Power)
- Default LAN 1 IP address: 192.168.0.1 (shared by all three physical ports)
- Browser Management port: 80 (HTTP) or 443 (HTTPS), configurable
- Operational Temperature -50C to +85C
- Dimensions 6 ¼ x 6 x 1

Cables

Commonly used cables:

PR-6602 to hub or ethernet switch

Use any commercially available 10/100BaseT cable. If using 100BaseT, an appropriately rated cable is required.

PR-6602 to PC crossover ethernet cable

A crossover cable is not requred for the PR-6602. All ethernet ports on the PR-6602 are MDI/MDIX compatible.

Appendix B

Open Source Software Information

Some models of the product were designed in conjunction with Open Source Linux software.

Introduction

Some models of this product were designed and programmed with Open Source Linux software in mind. The core Linux operating system is uClinux, available from http://www.uclinux.org . DCB supports the Open Source software effort and is appreciative of the contribution many open source developers have made to the community

Other open source software used in this product may be obtained from the original developers, and is made available in accordance with GNU licensing terms.

Obtaining the Source Code

For more information on obtaining the source modules for open source code used in this product, send a written request to the following address. Code is provided on CDROM. According to GNU licensing terms, a duplication fee may be charged.

Open Source Software Administrator
Data Comm for Business, Inc.
2949 CR 1000 E
Dewey, IL. 61840