



# **NxLink**

## **ETHERNET INTERFACE MODULE**

### **Technical Instruction Manual**

Issue 2.0 ..... 23 August 2022

#### **Nautel Limited**

10089 Peggy's Cove Road,  
Hackett's Cove, NS, Canada B3Z 3J4  
T.877 6 nautel (628835) or +1.902.823.2233  
F.+1.902.823.3183 info@nautel.com

U.S. customers please contact:

#### **Nautel Inc.**

201 Target Industrial Circle, Bangor ME 04401  
T.877 6 nautel (628835) or +1.207.947.8200  
F.+1.207.947.3693 info@nautel.com

e-mail: support@nautel.com

**www.nautel.com**



# Warranty

by Nautel Limited/Nautel Inc. (herein after referred to as **Nautel**)

---

**Nautel guarantees all mechanical and electrical parts of Nautel Transmitters for a period of forty-eight months, and all other Nautel manufactured equipment for a period of twelve months from date of shipment, provided the equipment has been installed, operated and maintained in accordance with Nautel's recommendations, and the equipment has not been misused, neglected or modified. Nautel's liability is limited, at the absolute discretion of Nautel, to repairing or replacing returned equipment that to the satisfaction of Nautel has been found defective.**

**Warranty for third-party items is provided by the Original Equipment Manufacturer. Exercise of such warranty shall be between the Buyer and the Third-Party.**

1. Properly qualified technical personnel must install, maintain, and repair the equipment in accordance with Nautel recommendations and good engineering practice.
2. A "Part Failure" shall be deemed to have occurred when the part has become defective, or does not have the characteristics required for the specified equipment performance:
  - a. when the equipment is operated within the design parameters, and
  - b. when the equipment is installed and adjusted according to Nautel's prescribed procedures as stated in the instruction manual.
3. Nautel shall provide replacements for all "Parts" to the Buyer when they become defective during the warranty period, and upon the return of the defective part. Replacement parts warranty to be 90 days or end of original warranty; whichever comes first.
4. If the Buyer receives a replacement module, as part of Nautel's module exchange program, the old module must be returned to Nautel within 30 days of receipt of the new module, at the buyers expense. If the old module is not received after 30 days, the customer will be invoiced. The buyer is responsible for installing the replacement/repaired module in the transmitter.
5. In the event that a "Part" fails during the warranty period and causes damage to a subassembly which cannot be readily repaired in the field, the entire subassembly so damaged may be returned to Nautel for repair. The repairs will be made without charge to the Buyer.
6. Written authorization must be obtained before returning any equipment or goods for any reason. Equipment or goods returned under this warranty shall be delivered to Nautel's premises at the Buyer's expense. Where no-charge warranty replacements or repairs are provided under items 2, 3, 4, or 5, Nautel will pay that part of the shipping costs incurred in returning the part/assembly to the Buyer. Note: the Buyer is responsible for any and all import fees, duties or taxes.
7. Nautel does not warrant or guarantee, and will not be liable for:
  - a. defects or failures caused in whole or in part by abuse, misuse, unauthorized repair attempts, unauthorized alteration or modification of the equipment;
  - b. equipment built to customer specifications that is later found not to meet customer needs or expectation;
  - c. performance of equipment when it is used in combination with other equipment not purchased, specified, or approved by Nautel;
  - d. damages and performance limitations due to outside forces such as lightning, excessive heat or cold, excessive AC surges or high corrosive environments;
  - e. changes made by personnel other than Nautel authorized personnel, including charges incurred; and
  - f. for any costs for labor performed by the customer without Nautel's prior written approval.
8. Nautel does not warrant that software:
  - a. is free of errors, bugs or defects;
  - b. will be compatible with third party software;
  - c. results, output or data provided through or generated by the software are accurate, complete, or reliable; and
  - d. errors found will be corrected.

9. Nautel shall have the right and shall be provided full access to investigate whether failures have been caused by factors beyond its control.
10. In no event shall Nautel be liable for any consequential damages arising from the use of this equipment
11. This warranty is in lieu of all other express warranties of Nautel, whether express or implied, and Nautel does not assume, nor is any other person authorized to assume on Nautel's behalf, any other obligation or liability.
12. Third-party items ordered, the guarantee/warranty of these items will be from the manufacturer of these items. Exercise of such warranty shall be between the Buyer and the third-party provider.
13. Nautel provides telephone and email support for its products for the life of the product at no charge. After the warranty period, parts and on-site support for the equipment are offered at a rate to be determined upon request.

### **Customer Service Notice**

A 'Technical Assistance' and 'Plug-in Module Exchange' service is available to Nautel users.

All equipment being returned to Nautel and all requests for repairs or replacements should be marked with a Nautel provided RMA number and addressed to the appropriate Nautel facility:

Nautel Limited  
10089 Peggy's Cove Road  
Hackett's Cove, NS, Canada B3Z 3J4  
Tel: 902-823-2233/Fax: 902-823-3183

Nautel Inc.  
201 Target Industrial Circle  
Bangor, ME, USA 04401  
Tel: 207-947-8200/Fax: 207-947-3693

24 Hour Answering Service (902) 823-3900

Toll Free (877) 662-8837

# Factory Support

## TECHNICAL ASSISTANCE

Nautel's field service department provides telephone technical assistance on a 24 hour, seven days a week basis. Requests by other media (facsimile or e-mail) will be responded to the next working day if received after Nautel's normal working hours. Contact the appropriate field service centre from the following:

U.S.A. customers use:	Nautel Inc. 201 Target Industrial Circle Bangor, Maine 04401	T. +1.207.947.8200 (24 hours) or 877 6 nautel (628835) F. +1.207.947.3693
All other customers use:	Nautel Limited 10089 Peggy's Cove Road, Hackett's Cove, NS, Canada B3Z 3J4	T. +1.902.823.3900 (24 hours) or 877 6 nautel (628835) F. +1.902.823.3183 E-Mail support@nautel.com Web www.nautel.com

## MODULE REPAIR SERVICE

During the transmitter's warranty period, repair of modules is performed at no charge to the customer. Once the warranty period has expired, module repairs will be invoiced based on material and labour costs.

## MODULE EXCHANGE SERVICE (*North American Customers Only*)

North American customers can take advantage of Nautel's module exchange service. This service gives customers a fast and efficient solution in the event of a hardware problem. When a customer's transmitter experiences a failure, Nautel can send out a factory rebuilt module to replace the faulty module. Nautel's two locations, Canada and the United States, provide quick turn around times, keeping our customers on the air.

During the transmitter's warranty period, exchange of modules is performed at no charge to the customer. Once the warranty has expired, the cost of a module exchange is only 40% of the list price for the module, provided the faulty module is returned to Nautel within 30 days and can be rebuilt; should the module not be returned an additional invoice for 40% of the list price will be issued.

## MODULE RETURN INSTRUCTIONS

All equipment being returned to Nautel for repair or replacement should be marked with a Nautel provided RMA number and addressed to the appropriate Nautel facility.

Complete and accurate information regarding the equipment will expedite shipment of replacement(s). Refer to the name plate on the transmitter and the appropriate module assembly and include with the shipment:

- Transmitter model number
- Transmitter serial number
- Module name
- Module serial number
- Return shipping address

## RETURN FACILITIES

U.S.A. customers:	RMA # Nautel Inc. 201 Target Industrial Circle Bangor, Maine 04401 USA	Telephone: (207) 947-8200 x 109 Fax: (207) 947-3693
Canadian customers:	RMA # Nautel Limited. Attention: Field Return 10089 Peggy's Cove Road Hackett's Cove, NS B3Z 3J4 Canada	Telephone: (902) 823-3900 x 100 Fax: (902) 823-3183





<b>Contents</b>	<b>Page</b>
<b>1 OVERVIEW</b>	1-1
<b>2 INITIAL SETUP AND CONFIGURATION</b>	2-1
<b>2.1 INITIAL SETUP</b>	2-1
<b>2.2 CONFIGURATION</b>	2-3
<b>2.3 SETUP LINK</b>	<b>2-4</b>
<b>2.3.1 Connected Equipment Settings</b>	2-4
<b>2.3.2 Email Configuration</b>	2-7
<b>2.4 USERS LINK</b>	2-8
<b>3 OPERATION</b>	3-1
<b>4 SOFTWARE UPGRADE</b>	4-1

## List of Figures

1-1	NxLink Hardware	1-2
2-1	NxLink Main Page	2-2
2-2	NxLink Main Page – Logged In	2-3
2-3	Device Setup Page	2-4
2-4	Setup Equipment Page – Configure	2-5
2-5	Setup Equipment Page – Configure, Customize	2-6
2-6	Device Setup Page – Email Configuration	2-7
2-7	User Administration Page	2-8
2-8	User Administration Page – Registered User Settings (Min)	2-9
2-9	User Administration Page – Registered User Settings (Full)	2-10
3-1	Device Status Page	3-1
3-2	Event Log Page	3-2
3-3	Save Page	3-3
3-4	About This Equipment	3-3
4-1	Typical FTP Session	4-2
4-2	Ipswitch WSFTP Client	4-2







## Release Control Record

<b>Issue</b>	<b>Date</b>	<b>Reason</b>
2.0	23 August 2022	Supports new Netburner device hardware (part number UB121) and NxLink SW 2.0.0 software.





# NxLink

## TECHNICAL INSTRUCTION MANUAL

### Section 1 OVERVIEW

---

The NxLink provides remote access to Nautel transmitters over an IP network. A web browser is required to view status and modify transmitter operation. The NxLink can be used with a variety of Nautel transmitter systems, including:

- J1000 AM transmitters
- SC1 system controller units
- V series FM transmitters
- Vector NDB transmitters
- XR series AM transmitters

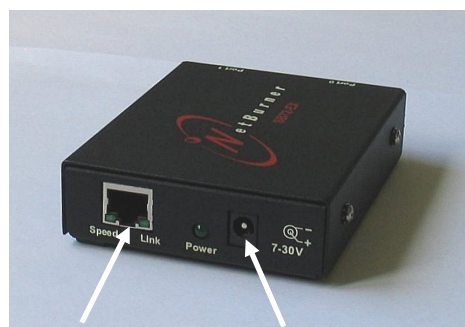
NxLink is a serial to LAN adapter that uses Nautel developed software to convert the remote serial protocol of the equipment to information on web pages.

The features of NxLink include:

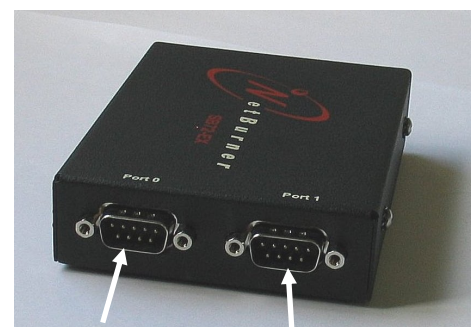
- Remote monitoring and control of Nautel equipment with a web browser
- Remote access to alarm and event logs (retrieval of event logs is not available for all Nautel products; contact Nautel for more detail)
- Configurable Email reporting of critical alarms
- Ability to Save or Email equipment status for later review
- Two browser modes: Normal and single column (suitable for PDAs). To use single column, simply append 'pda' to the NxLink IP address.
- Supports SNMP: NxLink and associated equipment can be controlled and monitored using SNMP Version 1 management software. Contact Nautel for more information.

The NxLink has an RJ45 connector with two indicators. The speed indicator is lit when connected to a 100 Mb LAN. The link indicator flashes with LAN activity. Port 0 is used for device configuration (network parameters). Port 1 is used for equipment communication.

The NxLink software can be easily upgraded over the LAN using an FTP client, or with a direct serial connection to the device (using a terminal program).



RJ45 Power



Port 0 Port 1

Figure 1: NxLink Hardware





# NxLink

## TECHNICAL INSTRUCTION MANUAL

### Section 2 INITIAL SETUP AND CONFIGURATION

---

#### 2.1 INITIAL SETUP

- (a) Obtain an IP address, Gateway address, Netmask and DNS Server address from your LAN administrator.

Some Nautel equipment allows you to configure these settings directly from the GUI. See the associated transmitter manual for NxLink Configuration instructions. For transmitters that do not contain an NxLink configuration screen, proceed as follows:

If the network is configured for DHCP, the IP address will be automatically assigned by the network. To assign a static IP address or retrieve the DHCP assigned IP address, use the method outlined below.

- (b) Using a PC, start up a terminal program such as Hyperterminal. Set the COM settings to:
- Bits per second: 115200
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow Control: None

#### **NOTE**

*For DHCP networks do not press 'A' in step (c). After 20 s, the DHCP defined IP address should appear on the terminal screen and should repeat every 10 s thereafter.*

- (c) Plug the serial port of the PC into Port 0 of the NxLink using a suitable 9-pin null modem serial cable of sufficient length.

#### **NOTE**

*A gender changer may be required given that Port 0 of the NxLink is male.*

Ensure the NxLink is connected to the LAN via its RJ45 connector and a Cat5e cable of sufficient length. Apply power (between 7 and 30 V dc) to the NxLink using the transmitter supplied connector or an ac-dc adapter. For DHCP networks, see the **NOTE** after step (b). To proceed with assigning a static IP address, from the PC terminal program, press 'A' when the message "Waiting 10 seconds to start 'A' to abort" appears. A message similar to the following should appear:

```
Netburner MCF5441x Alternate Image Monitor Vx.x date time  
HELP for help  
nb>
```

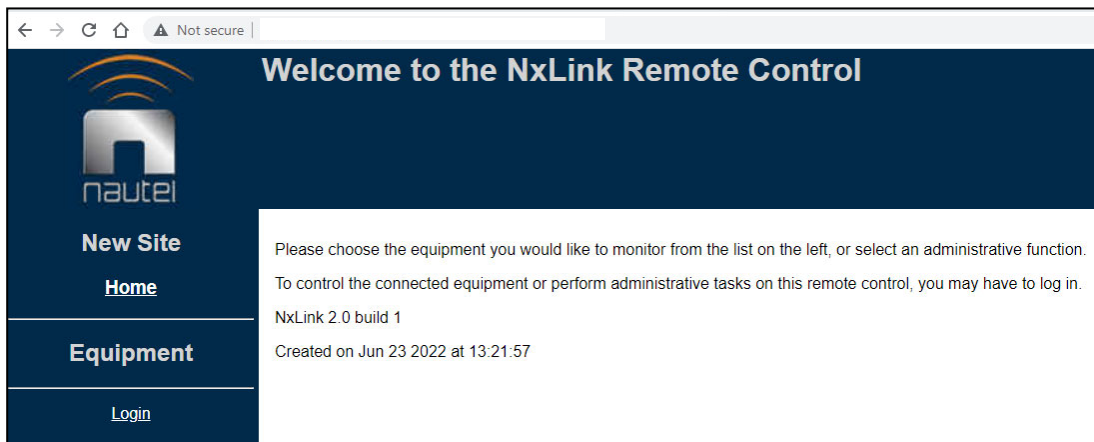


Type “setup” at the nb> prompt. The setup menu should appear. Type “7” and press Enter. When the message “Wait?” appears, type “10” and press Enter. Ensure the following settings are displayed:

```
IP Address: 0.0.0.0
IP Mask: 255.255.255.0
IP Gateway: 0.0.0.0
Wait: 10
DNS Server: 0.0.0.0
```

- Enter “1” to set the IP Address.
- Enter “2” to set the IP Mask.
- Enter “3” to set the IP Gateway.
- Enter “A” to set the DNS server address.
- Enter “S” to save.
- Enter “X” to exit.

- (d) Connect the PC to the LAN, ensuring that the IP address and mask are appropriate.
- (e) Open a web browser and enter the URL of the NxLink. For example, if the IP address was 123.456.7.89 then use http://123.456.7.89 for the NxLink address in the browser. To use single column, simply append ‘\pda’ to the NxLink IP address.
- (f) Verify that the page in Figure 2-1 appears. Proceed to Section 2.2, Configuration.



**Figure 2-1: NxLink Main Page**

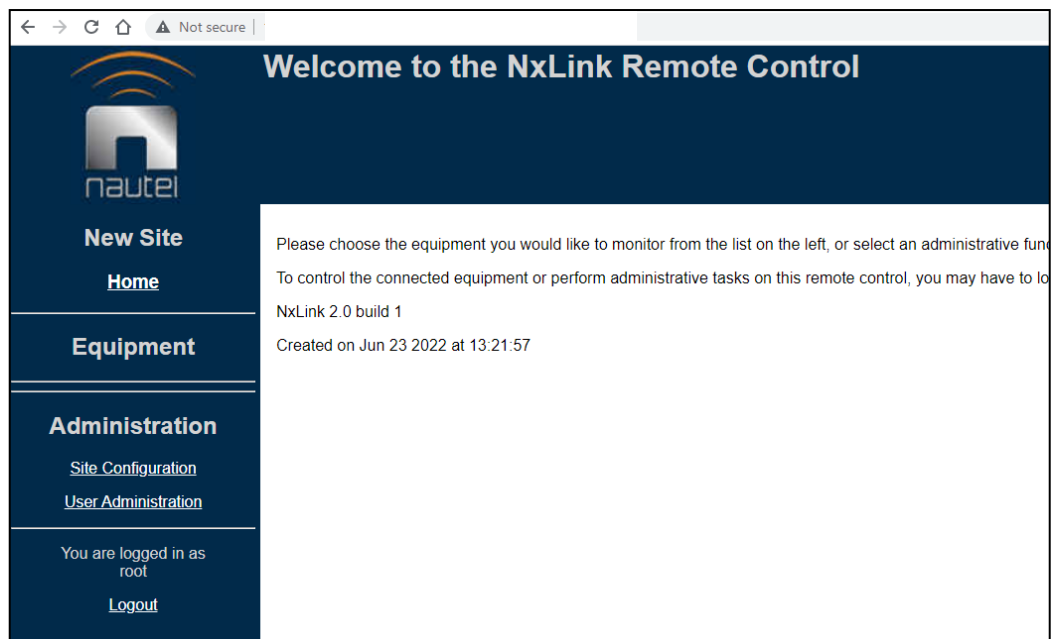
## 2.2 CONFIGURATION

- (a) Click on the Login link and use a username/password that provides full control of the NxLink. If this is the first time that the NxLink is being configured, use the default username/ password of “root/nautel”. This account has full permissions and can be used for initial setup.

### **NOTE**

*For security purposes, Nautel strongly recommends you change your password (see Section 2.4 - Users Link).*

- (b) Once logged in (see Figure 2-2), the left-hand side of the screen will change to show administrative links. Click on the Site Configuration link to select and set up the connected equipment (see Section 2.3.1), and to set up the outgoing email parameters (see Section 2.3.2). Click on the User Administration link to add users and to modify user properties (see 2.4).



**Figure 2-2: NxLink Main Page – Logged In**



## 2.3 SETUP LINK

### 2.3.1 Connected Equipment Settings

All equipment which is to be controlled and monitored by the NxLink must be set up in this dialog. The primary device **MUST** be the transmitter or system controller that the NxLink is serially connected to. Devices further down in the equipment hierarchy are selected as sub-devices. The dropdown box shows all supported equipment.

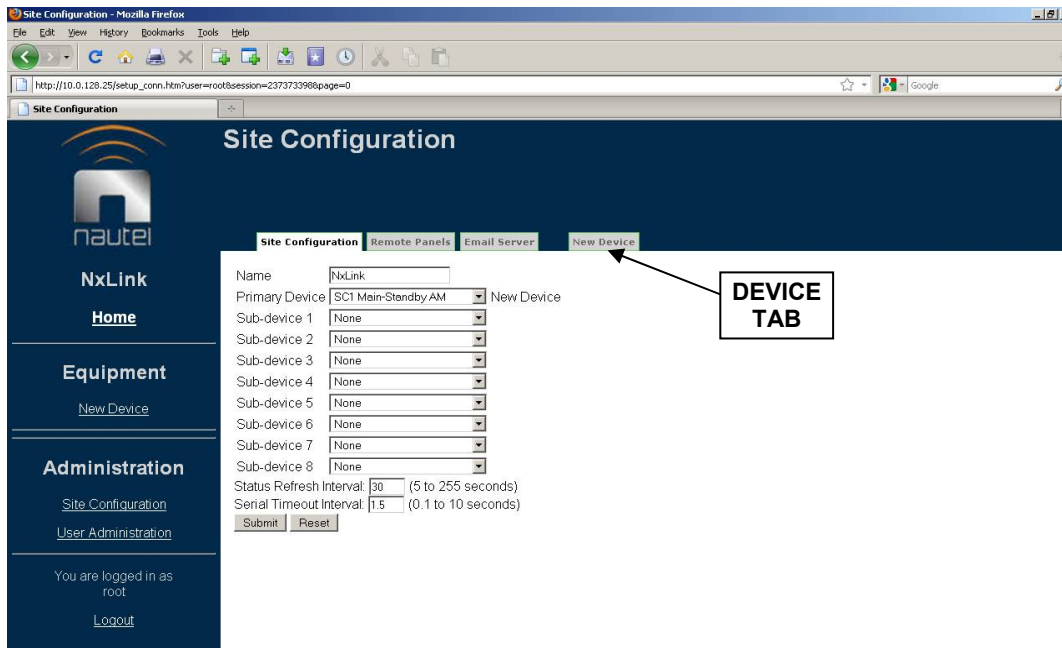
The supported equipment is listed by common name (e.g., V5) and Nautel type (e.g., NARF45). There can be several versions of supported equipment, as indicated with unique type; therefore, it is important that the correct type be selected. You can check the equipment label (on the back) for equipment type or contact Nautel if you cannot identify your equipment.

Each piece of equipment that is added is assigned a tab in the navigation bar and a hyperlink under Equipment on the left side of the page. The device tabs will appear in the same order as they appear in the sub-device list. Clicking on the device's assigned tab will allow it to be configured using the dialog illustrated in Figure 2-3.

#### **NOTE**

*In a combined system with two V10s, the primary device would be an SC1 System Controller and each V10 would be listed as sub-devices.*

Enter the Status Refresh Interval (between 5 and 255 seconds). This setting determines how often the NxLink updates the Status pages. Ensure that connection speeds are sufficient for the desired refresh rate.



**Figure 2-3: Device Setup Page**

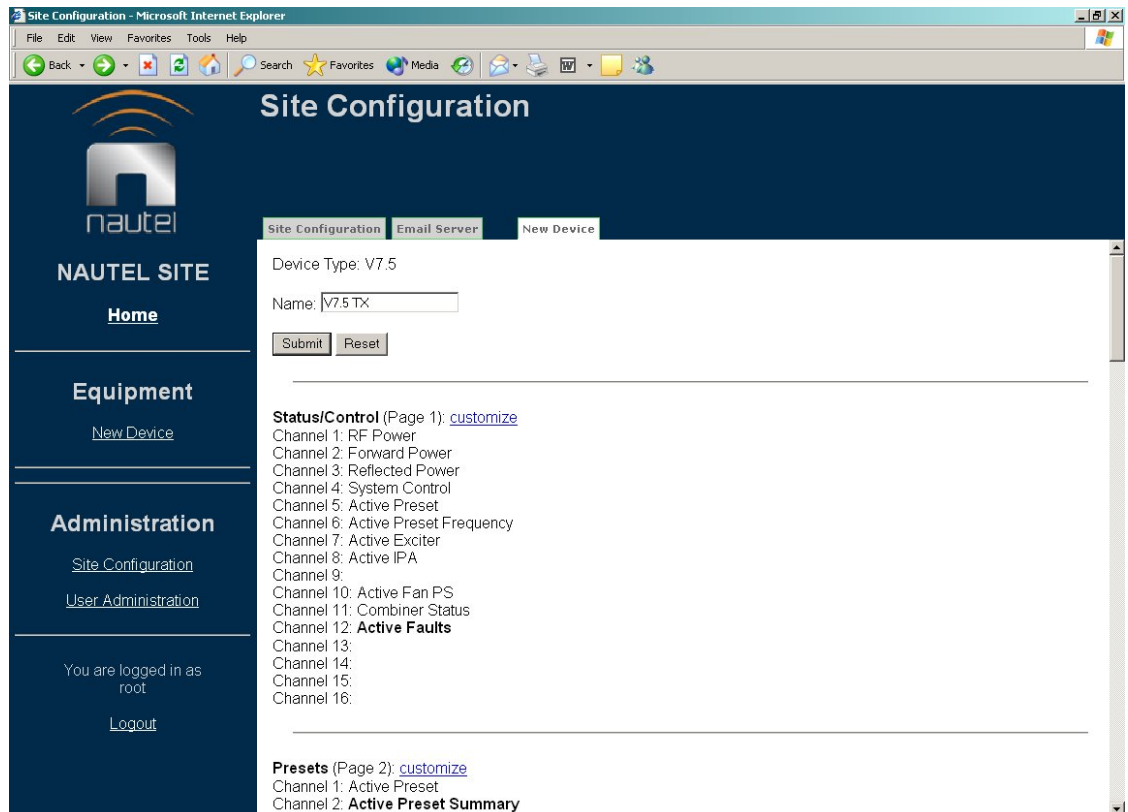


Enter the Serial Timeout Interval (between 0.1 and 10 seconds). This setting determines the time duration that the NxLink will wait for a response from the transmitter after the NxLink sends a request. If the NxLink is directly connected to the transmitter using a serial cable, do not modify the Serial Timeout Interval setting from the default value. If the NxLink is connected to the transmitter using a high latency link (e.g., wireless GSM modem), modify the Serial Timeout Interval setting as required for link latency.

There are eight configurable information pages available for each device (scroll down to see all pages), and each page can contain up to 16 channels of equipment data.

Selecting the Customize link on any page in the list allows modification of the channel data, as shown in Figures 2-4 and 2-5.

Selecting the device hyperlink under Equipment displays this information in a page-by-page format using selectable tabs (e.g., System Summary, Presets, Meters, etc.).



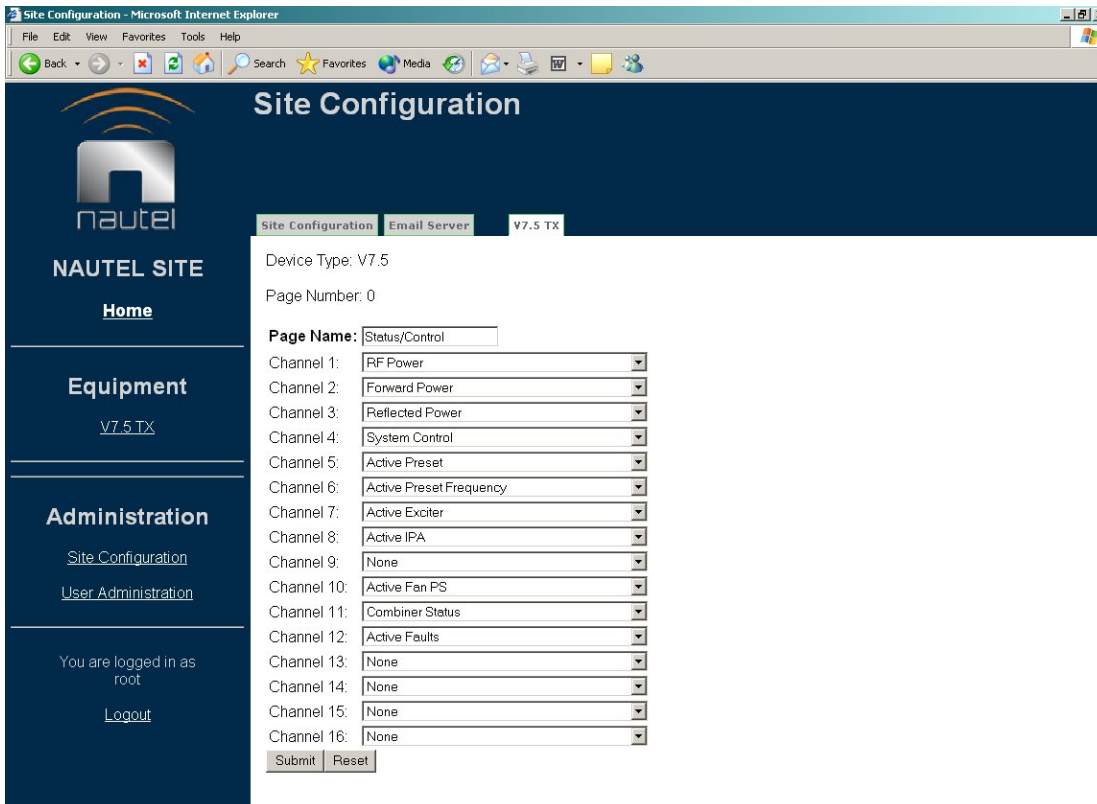
**Figure 2-4: Setup Equipment Page - Configure**

Each page of equipment data can be named, and any available equipment data can be assigned to any channel. There are factory default page names (e.g., System Summary, Presets, Meters, Alarms, etc.), that are linked to tabs, and channel names (e.g., RF Power, System Control, Active Faults).



Choose the drop-down box on any channel to see the list of available equipment data. Some data are complex (indicated in bold text) in that they can be selected as a single type but will show as multiple data. An example is **Active Faults**, which will show all faults.

Click **Submit** (bottom of screen) to save changes or click **Reset** (bottom of screen) to restore previously saved settings.



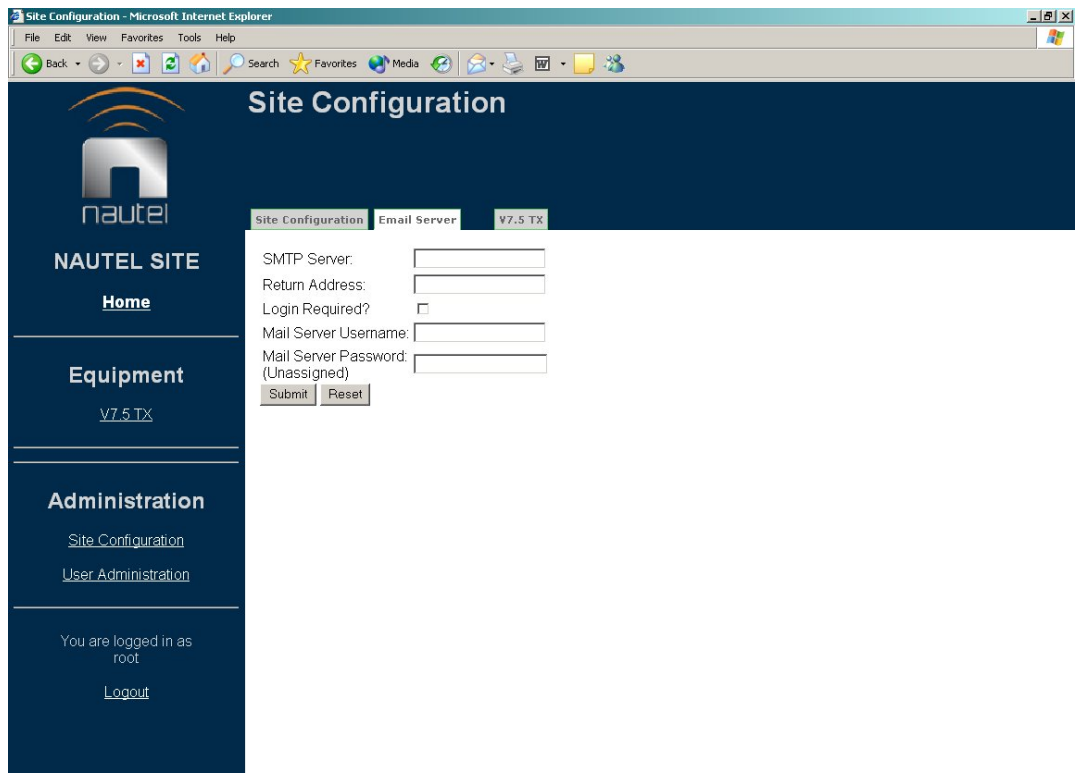
**Figure 2-5: Setup Equipment Page – Configure, Customize**

### 2.3.2 Email Configuration

The dialog in Figure 2-6 is accessed by selecting the Email Server tab at the top of the page. Use it to set up the outgoing email parameters. To use the feature (discussed later) of the NxLink, whereby it can send emails when events occur in the equipment, the email server must be configured. Enter the server name and an email address (which will appear in emails from the NxLink as the sender). If the email server requires login, check the Login Required box and enter a username and password to the email server.

Consider the following when entering the Email Server fields:

- SMTP Server can be an IP address; email server port defaults to port 25
- Return Address should be the email address used in the 'From' line of the email received. Note that some anti-spam software operating in mail servers may reject attempts to use a Return Address that does not match the Mail Server Username.
- Mail Server Username depends on the requirements of the mail server, but in many cases, it is an email address. Consult your mail server software's documentation or with your IT manager. This field has a 20-character limit.
- Gmail email is no longer compatible with the NxLink. Gmail now requires TLS 1.2 which is not present on the NxLink.



The screenshot shows a web browser window titled "Site Configuration - Microsoft Internet Explorer". The page has a dark blue header with the "nautel" logo and the title "Site Configuration". Below the header, there are three tabs: "Site Configuration", "Email Server", and "V7.5 TX". The "Email Server" tab is active. The main content area contains the following fields and controls:

- SMTP Server:
- Return Address:
- Login Required?:
- Mail Server Username:
- Mail Server Password (Unassigned):
- Submit  Reset

On the left side, there is a navigation menu with the following items:

- NAUTEL SITE
- Home
- Equipment
- V7.5 TX
- Administration
- Site Configuration
- User Administration
- You are logged in as root
- Logout

**Figure 2-6: Device Setup Page – Email Configuration**

Click **Submit** (bottom of screen) to save any changes. Click **Reset** (bottom of screen) to restore original settings.



## 2.4 USERS LINK

Selecting the User Administration link will bring up a page that displays, as a minimum, the registered users. Depending on permissions assigned to the logged-on user, other information may be presented. As shown in Figure 2-7, the logged in user is 'root', who has full permissions. As a result, this user is allowed to add new users. Adding a new user requires entering username, password, and permissions.

There are four levels of permissions, each with their own specific function: User Administration, Site Configuration, Equipment Control and none. They can be selected in any combination. If none are selected, no permission is granted. Any user, regardless of permission level, can change their own password and email parameters.

- **User Administration:** Only level that can add, remove, and modify other users. No site configuration or equipment control functions.
- **Site Configuration:** Allowed to do all Setup link functions (see 2.3). No administrative or equipment control functions.
- **Equipment Control:** Equipment can be monitored and controlled. No administrative or site configuration functions.
- **None** (no permission boxes checked): Only allowed to monitor equipment data.

### NOTE

To perform software upgrades (see section 4), a user must have both User Administration and Site Configuration permissions checked.

With User Administration permissions, all registered users will show as an active hyperlink. Any other permission level will only show the logged in user as an active hyperlink. Clicking on a user hyperlink allows user configuration to be modified as shown in Figure 2-8 and 2-9.

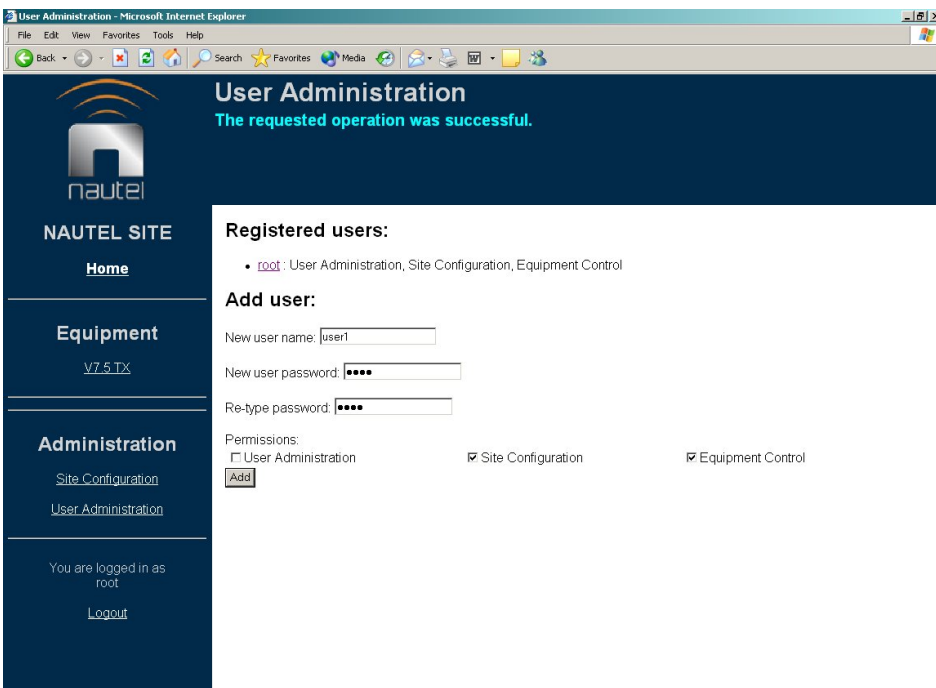


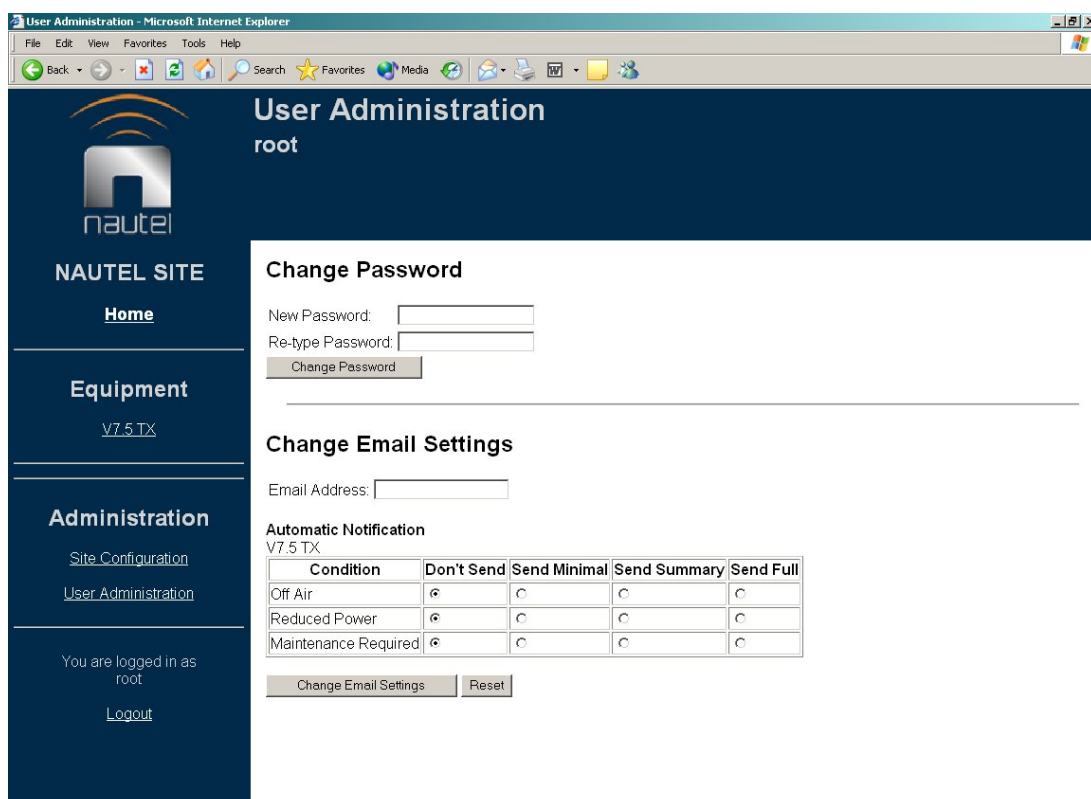
Figure 2-7: User Administration Page



A logged in user without User Administration permission will see a page similar to that shown in Figure 2-8. The user may change their own password, email address and email alert settings. There are three levels of email alert: Off-Air, Reduced Power and Maintenance Required, as well as four levels of information: None, Minimal, Summary and Full.

Each equipment event is categorized into one of the three alert levels, so if an alert level is selected for either Minimal, Summary or Full, an email will be sent to the user whenever an event with the specified alert level occurs.

- A Minimal email only contains the event type and time.
- A Summary email contains event type and time, plus a collection of important meters (equipment type dependent), and a list of active faults.
- A Full email includes all available equipment data.

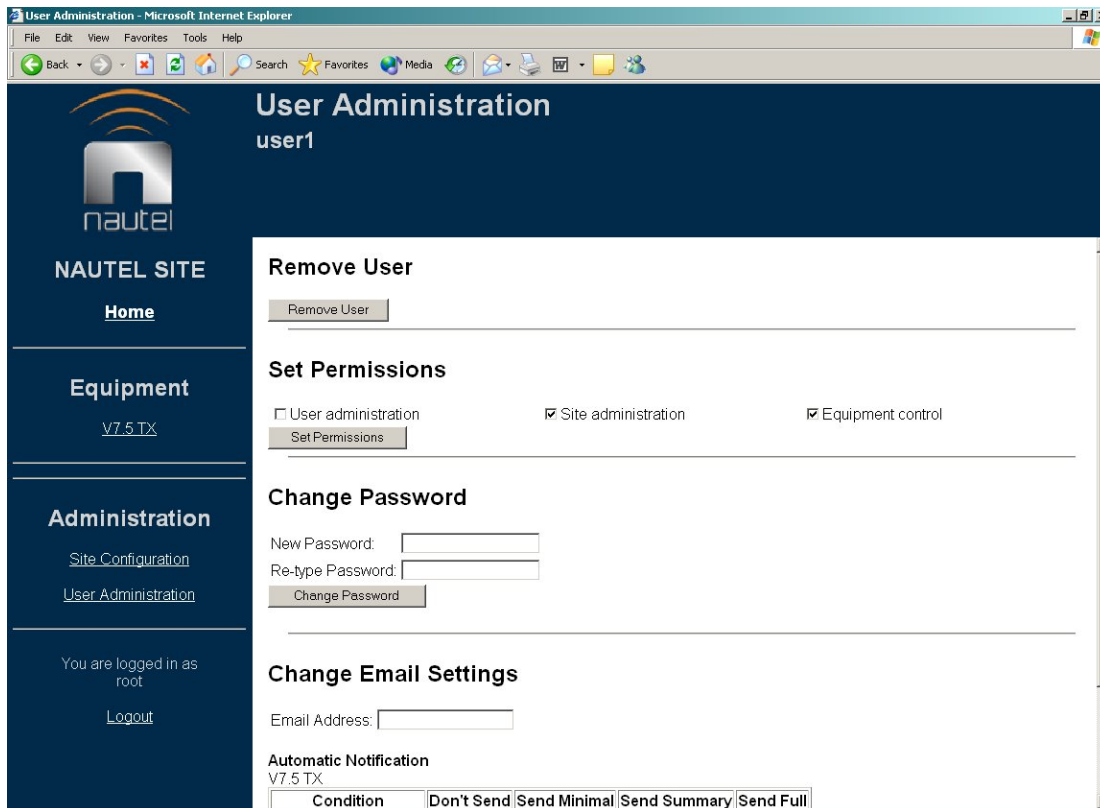


**Figure 2-8: User Administration Page – Registered User Settings (Minimum)**

A user logged in with Administration permission, who selects another user, will see the information described previously, plus options to change the selected user's password or to remove the selected user.

In the example shown in Figure 2-9, user1 has been selected. All functions (Remove User, Set Permissions, Change Password and Change Email Settings) would apply to user1.





**Figure 2-9: User Administration Page – Registered User Settings (Full)**

**NOTE**

*The Email Address field in Change Email Settings supports only one email address per user.*

# NxLink

## TECHNICAL INSTRUCTION MANUAL

### Section 3 OPERATION

Click the link to the equipment from the list on the left side of the page to view its information. If you are not logged in, or do not have sufficient account privileges, then it is only possible to view information.

Figure 3-1 shows the first page of status as a logged in user with privileges to control the equipment. The page to be viewed is chosen by selecting the appropriate tab at the top of the page. Any equipment information that may be modified (i.e., controlled) is shown with a drop box, buttons, or a data entry box on the right side of the page. If you are not logged in or have insufficient privilege, then the status information is shown but controls are not.



**Figure 3-1: Device Status Page**

It is possible to customize the information and title of each page as illustrated in Figure 2-5. The information line shows the time that the data shown was collected from the equipment. Whenever a control is attempted, the information line will indicate success or failure (and why it failed). For example, if the equipment is in Local mode, some controls will not be allowed.

When viewing any of the Status pages, the NxLink will automatically refresh them based on the Status Refresh Interval setting (see Section 2.3.1), or whenever a change is submitted. Pages are also refreshed when a control is selected (i.e., On, Off, or when the browser refresh is selected).



The automatic refresh on status pages means that a user will only be logged off by selecting the Logout link on the left side of the page. On any other page, lack of user activity of 30 minutes will cause an automatic logout.

Selecting the “Event Log” tab displays the event logs in the equipment. See Figure 3-2. Each log in the list shows the timestamp and type. Clicking on a log will change all the data on the status pages to show logged data instead of live data. The “Event Log” tab is not available for all transmitters.

When viewing log data, another tab will appear, labelled ‘Live Status’. Clicking this tab will change the data in the status pages to live data.

The information line above the status page tabs will indicate that logged data is being shown along with log timestamp and type.

### **NOTE**

*Controls cannot be used when logged data is shown.*



**Figure 3-2: Event Log Page**

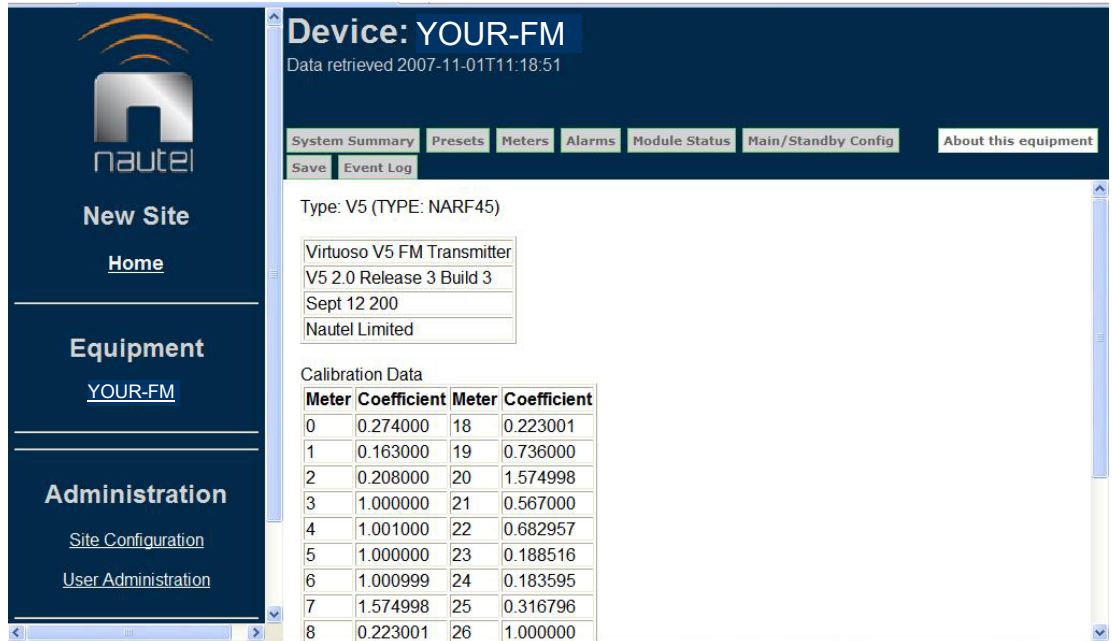
Selecting the “Save” tab allows a snapshot of the event log, at its current state, to be saved. The file may be saved as plain text on the disk of the machine being used to browse the device, or alternatively, be sent to an Email recipient. See Figure 3-3.





**Figure 3-3: Save Page**

Selecting “About this equipment” displays information about the device being monitored. Information includes equipment type and software version(s). See Figure 3-4.



**Figure 3-4 About This Equipment**





# NxLink

## TECHNICAL INSTRUCTION MANUAL

### Section 4 SOFTWARE UPGRADE

---

The NxLink software is upgradeable using the following procedure:

#### **NOTE**

*The logged in user must have both Administration and Site permissions to perform a software upgrade.*

- Obtain the appropriate software upgrade file from Nautel.
- Open an FTP session between the computer with the upgrade file and the Nxlink. Terminal settings are listed in 2.1 step (b). Follow the steps shown in the typical FTP session (see Figure 4-1, use the IP address programmed into the NxLink).
- Upload the file to the NxLink.
- Close the FTP session.

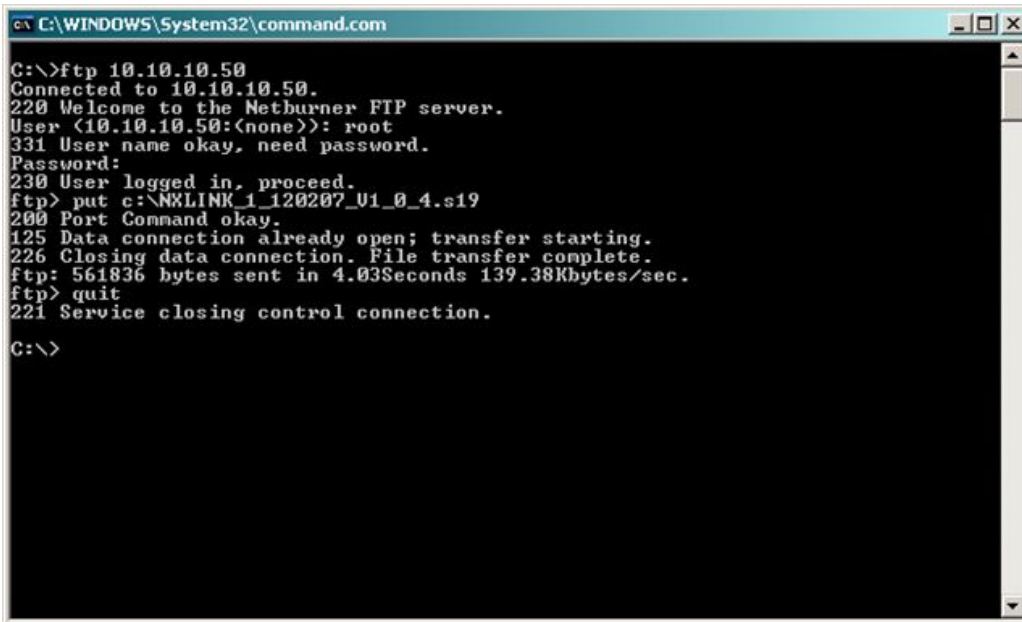
Figure 4-1 illustrates a typical FTP session run from the Windows command line.

Other FTP clients such as Ipswitch WSFTP (see Figure 4-2) may be used instead of the command line type FTP application.

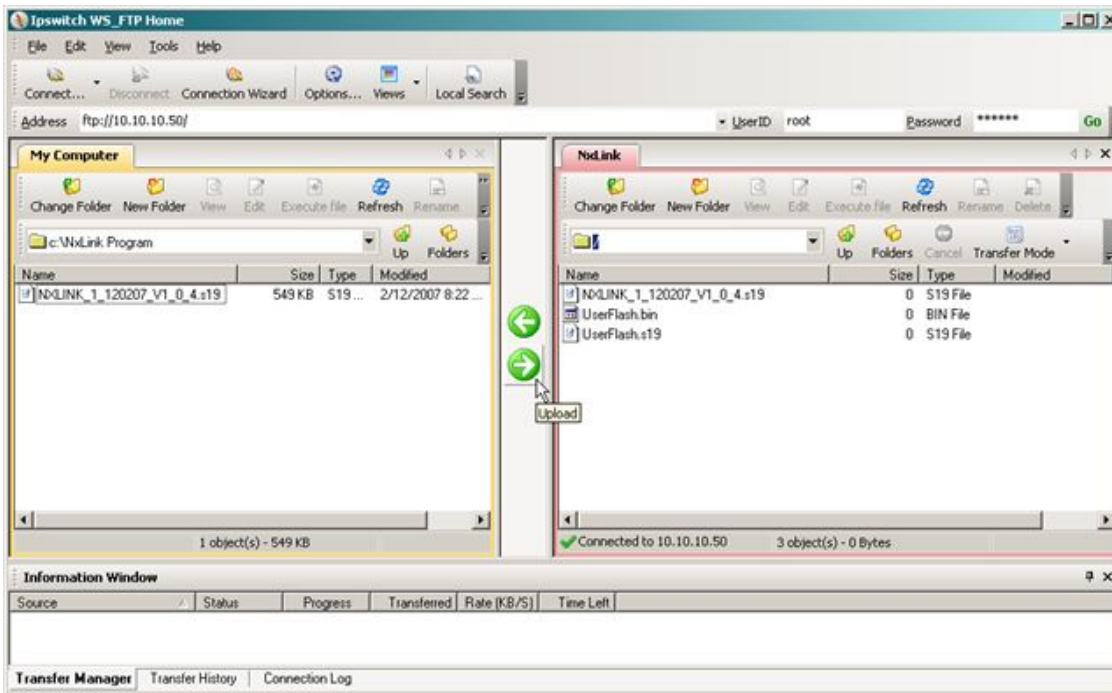
The NxLink will re-boot upon closing the FTP session and will restart running the upgraded software.

Unless specifically mentioned in Nautel's release notes, a software upgrade will not result in the loss of any previously entered equipment or user information.





**Figure 4-1: Typical FTP Session**



**Figure 4-2: Ipswitch WSFTP Client**