HELP FILE

DX1208

12x8 Digital Matrix Mixer and Signal Processor

Introduction

Preface

The DX Navigator application uses standard Windows® keyboard and mouse operating conventions. This helpfile assumes that the reader familiar with using standard Windows UI controls such as: dialog boxes, pull-down and contextual popup menus, standard and radio buttons, text boxes, spinners, checkboxes, keyboard shortcuts, sliders, tabbed windows, list boxes, and drag and drop with the mouse. This helpfile also assumes that the reader has already read the DX1208 Instruction Manual. The manual provides an overview of both the hardware and software necessary to make full use of this helpfile.

Definitions

The following terms are used frequently throughout this helpfile:

- **Device** — Refer to either DX series hardware device, or any electronic appliance or device that can interact with both DX Navigator and DX series hardware devices, such as a computer, Ethernet switch, or printer.
- **Parameter** — This refers to anything in the software or hardware that can be adjusted by the user. For example, equalizer gain, output delay, and automix ratio are all parameters.
- **Control** — A user interface or hardware item that provides the means to control or view a parameter. For example, the equalizer frequency / gain handle in the EQ graph allows you to control both the equalizer frequency and gain parameters by dragging it with the mouse; a UR-1 remote control is a hardware device that allows you to control the assigned parameters using its encoder knob and button; the event log provides a way to view time-stamped hardware events.
- **Setting** — Refers generally or specifically to the values of parameters. For example, '4 dB' can be a setting for a channel or equalizer gain parameter.
- **Select / Selected** — Refers to using the windows cursor, by mouse or keyboard control, to highlight a control or object in a window.

Conventions

To add clarity to the text, this helpfile uses numerous typographical conventions to demarcate the terms or items being described from their normal or conventional use.

- Capitalization — Capitalization is used when referring to specific DX Navigator or Microsoft Windows software object such as a tab, window, button, parameter grouping, or menu names and items. EX: the Settings tab, the Event Log, Permissions. It can also refer to a DX hardware accessory or object. EX: UR-1 Remote Control.
- [abc] — Denotes parameter settings. EX: [4 dB], [Slave], [Low]

- *Italics* — Denotes the names of parameters. EX: *Gain, Automix Ratio*
- **Bold** — Denotes menu commands. EX: **Cut, Rename, Open**
- <ABC> — Computer terminal typeface describes a keyboard or mouse action. EX: <CTRL+CLICK>
- A > B > C — Arrows refer to menu items and commands within a hierarchical menu tree. EX: File > **Open**

Overview

DX Navigator

Description

DX Navigator is a Microsoft Windows® application that provides a single user interface which can control and monitor a large array of EAWC DX series hardware devices at the same time. DX Navigator functions as the system management program for all of these devices by establishing the mode of communication to all of the devices, initiating and maintaining communications to the devices, and providing the means to upload and save unit configuration data to/from each device. Multiple instances of DX Navigator can be run on different computers, allowing for simultaneous control or status monitoring of any device from different physical locations.

DX Navigator can communicate to the DX hardware using whatever hardware interface is supported by the device. The DX series hardware currently supports communication over 10/100 Base-T Ethernet, RS-232, and USB 1.0/2.0. All DX series hardware devices can communicate simultaneously over all supported communications interfaces. For example, a DX1208 can simultaneously communicate with one local instance of DX Navigator via USB, and multiple remote instances via Ethernet. Additionally, multiple external devices, such as AMD/Crestron controllers or EAWC UR-1/UR-2 Remote Controls, can be used to control and monitor system status using the RS-232, RS-485, and/or Logic I/O ports.

DX Navigator runs on both 32-bit Windows XP and Vista operating systems; it does not presently support Windows XP 64-bit and Vista 64-bit operating systems.

Main Window

Launching DX Navigator opens the Main Window. From the Main Window you can configure device communications settings, connect to and control different types of DX series hardware devices, and create and save offline device setups.

The Main Window is divided into three tabs. Each tab is a placeholder for icons that represent DX series hardware devices. Device Icons have different functions depending on the tab they are located in.

- ***Device Library*** — The Device Library tab lists one Device Icon for each type of DX series hardware device currently supported in DX Navigator. Each Device Icon represents a blank (factory default) template from which device designs can be created. Dragging a Device Icon from the Device Library to the Design tab creates a new device design.

- ***Design*** The Design tab is the area where offline device designs are created. Double-clicking a Device Icon in the Design tab opens a Device Window which provides access to all the settings of the device. Design settings can be uploaded directly to hardware devices of the same type, and designs can be created directly from hardware devices. The contents of the Design tab (one or more designs with their respective settings) can also be saved to a Site File on the local hard drive, and restored to the Design tab when the Site File is opened.
- ***Found Devices*** The Found Devices tab adds a Device Icon for each physical hardware device that DX Navigator is able to connect to after going online. Double-clicking a Device Icon in the Found Devices tab allows you to log into and control a hardware device directly from its Device Window.

Device Windows

DX Navigator interfaces to individual hardware devices through floating Device Windows. Each DX series hardware device has its own Device Window that provides the specific controls, configuration settings, and other parameters for operating that device type. Device Windows opened from the Found Devices tab allow the user direct control over every parameter of the selected hardware device, as well as visibility to real-time meter data. Device Windows opened from the Design tab, on the other hand, cannot control hardware directly. They are used instead to create offline designs which can later be uploaded to online hardware devices or saved to Site Files on disk.

Main Window

Communications Setup

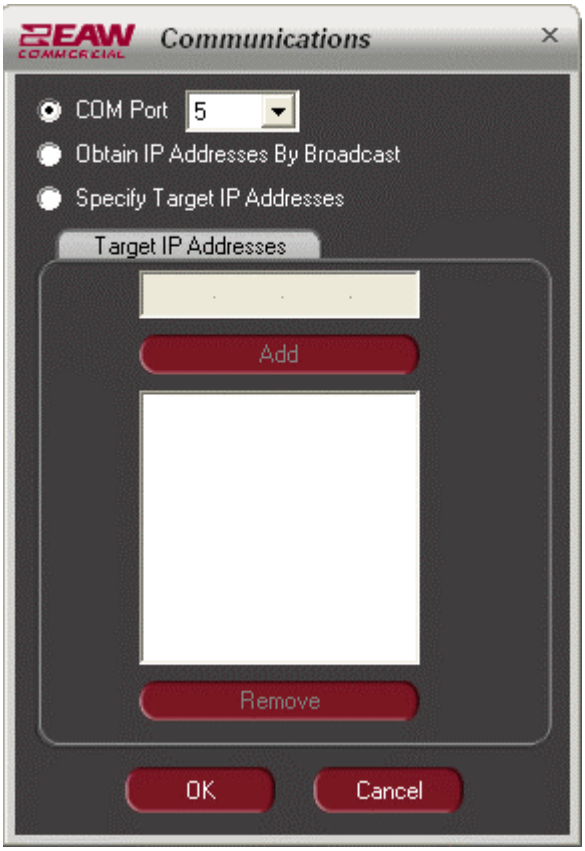
Description

Before you can go online with any DX series device, you must first select the communications protocol you wish to use to communicate with the device(s). DX Navigator offers three choices: RS-232, USB, and Ethernet (static or dynamic). Once a protocol is selected, DX Navigator uses that protocol to discover and communicate with every connected device; protocols may not be selected on a per-device basis.

Parameters

The DX Navigator communications settings are accessed by choosing Tools from the Communications menu in the Main Window when DX Navigator is offline. The Communications settings are automatically saved to the Windows Registry when DX Navigator is closed.

- ***COM Port*** Sets up DX Navigator for either RS-232 or USB communications. The *Com Port* drop-down list displays the port numbers of all COM ports available on your computer. For both RS-232 and USB communications, select from the list the port number to which the DX1208 is connected.



Frequently you will see several COM ports listed. Normally (but not always) the first few port numbers are reserved for RS-232 or other legacy serial device ports, while higher numbered ports represent the USB ports of devices already connected to the computer. The DX1208 must be powered on and connected to a USB port on your computer before opening DX Navigator, or else its USB com port number will not appear in the *COM Port* list.

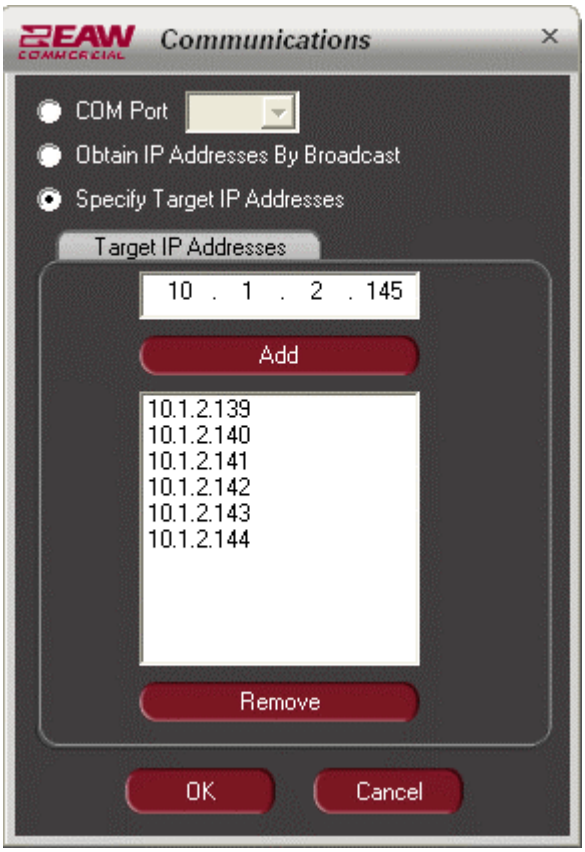
If you are not sure which COM port the DX1208 is connected to, open the Windows Device Manager, and locate 'Ports (COM & LPT)' in the list. You will see 'EAWC DX Family USB Serial Port' followed by a COM port number. Select this COM port number for USB communications, or the appropriate 'Communications Port' number for RS-232 communications.

Selecting the *COM Port* radio button restricts DX Navigator to communicating with only the device connected to the specified COM port, even if there are connected devices that would otherwise be visible to DX Navigator using a different communications protocol.

- ***Obtain IP Addresses By Broadcast*** Sets up DX Navigator to communicate over a local/wide area network via Ethernet. In this mode DX Navigator polls the network using by sending UDP (User Datagram Protocol) broadcast messages to TCP port 30718 looking for any DX devices connected to the network, regardless of whether they are

set for dynamic or static IP operation (see the IP section of this helpfile for information about configuring hardware IP settings). When a unit receives the UDP broadcast message it responds back with its *IP Address* and *Device Name*, and DX Navigator adds it to the Found Devices list in the Main Window. *Obtain IP Addresses By Broadcast* works only when the DX Navigator computer and DX device(s) are on the same subnet.

- ***Specify Target IP Addresses*** Sets up DX Navigator to communicate over a local/wide area network via Ethernet. In contrast to *Obtain IP Addresses By Broadcast*, in this mode DX Navigator polls the network for only those units specified in the *Target IP Addresses* list. All other DX units present on the network are excluded from polling.



Using *Specify Target IP Addresses* requires that the DX devices represented in the list be assigned matching static IP addresses; dynamic IP addressing should never be used, because dynamic addresses can change after a device is powered up or its DHCP 'lease' period expires. See the IP section of this helpfile for more information about using static and dynamic IP addresses.

NOTE: Using targeted IP addresses can solve network communication problems where UDP broadcast messages are blocked by computer OS and network device (routers, gateways) firewalls. *Specify Target IP Addresses* mode does not use UDP

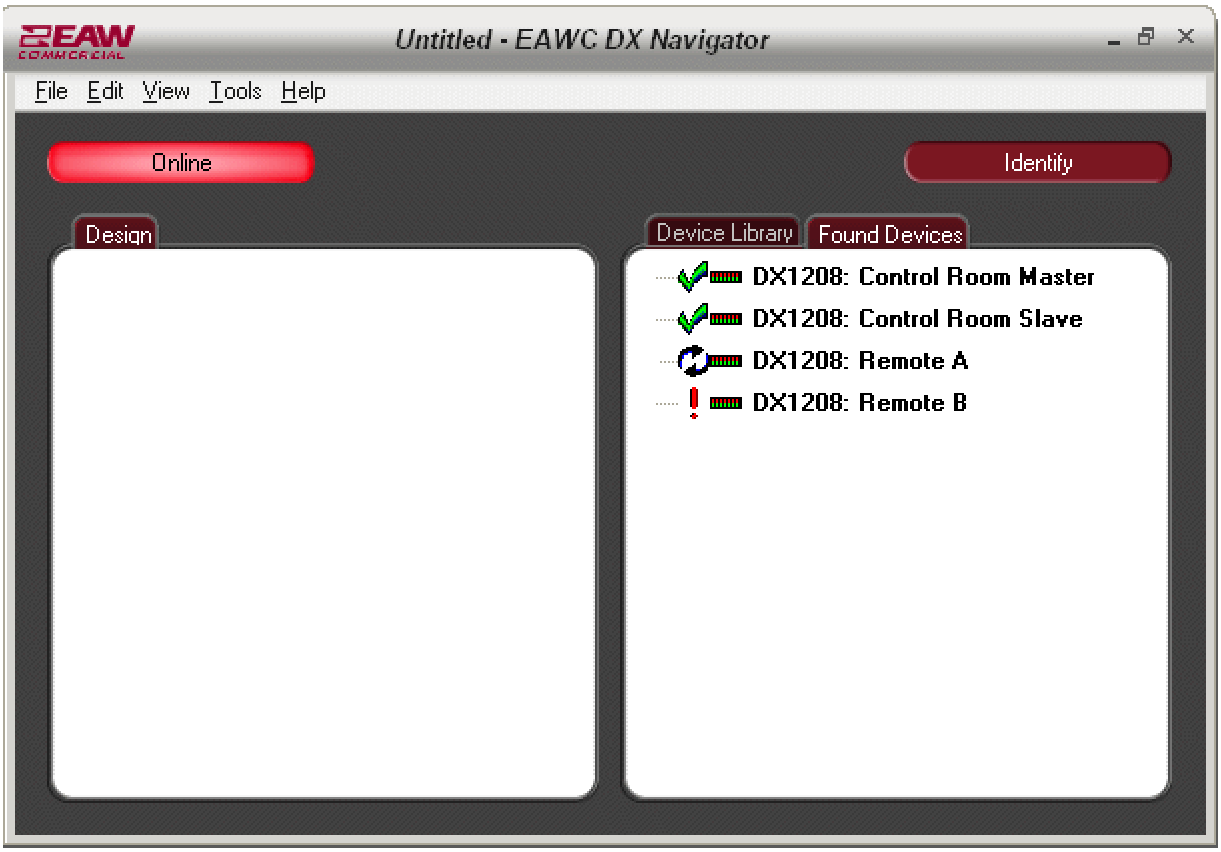
broadcasting, thus allowing DX Navigator to find DX devices within secured networks. In most networks *Specify Target IP Addresses* should be used whenever the computer and DX device(s) are connected to different subnets.

- ***Target IP Addresses*** When *Specify Target IP Addresses* is selected, DX Navigator polls only those units whose IP addresses are listed in the *Target IP Addresses* list. DX units present on the network but whose IPs are excluded from this list are not polled, and therefore will not appear in the Found Devices list.
- ***Add*** Adds the [IP Address] specified in the IP Address text box to the *Target IP Addresses* list.
- ***Remove*** Removes the selected [IP Address] from the *Target IP Addresses* list.

Going Online

Description

In order to control DX hardware devices you must go online. Going online causes DX Navigator to communicate with all devices that are available through the selected Communications protocol, and list all devices it discovers in the Found Devices tab. Once device(s) are found, DX Navigator continuously monitors the status of each device connection. Double-clicking the Device Icon of any online device then allows you to login to and open the unit's Device Window.



Parameters

- **Go Online**

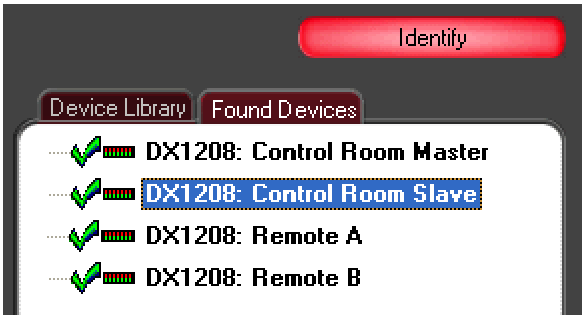
  When Go Online is pressed, DX Navigator sends out a message using the selected communications protocol requesting that all DX devices receiving the message identify themselves to DX Navigator. Devices respond by sending back their *Device Name*, *IP Address* (if Ethernet communications is selected), and device type. Each device that responds is then listed in the Found Devices tab. Devices that are powered on or connected after DX Navigator is online will also appear in the list (Ethernet communication only).

  Once DX Navigator is online, double-clicking the Device Icon of any online device in the list allows you to login to and control the unit through its own Device Window. Pressing the Go Online button again takes DX Navigator offline, closes all open Device Windows, and removes all devices from the Found Devices list.

  NOTE: In DX Navigator 1.0.0, the number of IP connections to any single DX device is limited to three instances of DX Navigator. Therefore if there are 4 or more concurrent instances of DX Navigator running on the network, the device will appear in the Found Devices list of only the first three instances of DX Navigator that connected to it. This limitation will be removed in a later version of DX Navigator.

- **Identify**

  When DX Navigator is online, pressing the Identify button causes the front panel LEDs of whatever device is selected in the Found Devices list to flash in a random pattern. Devices must be online (indicated by green check mark) to be identified. Use this command to correlate DX devices to their corresponding Device Icons in the Found Devices list.



- **Refresh**

  The **Refresh** command forces DX Navigator to reestablish a communication connection with the selected device, but without taking DX Navigator offline. Use **Refresh** whenever the device Status Indicator turns to a red exclamation mark and you are confident he the problem that caused the communication disruption is resolved. To use **Refresh**, first select the Device Icon of the desired device in the Found Devices list, then choose **Refresh** from the Edit or R-click popup menu.

Status Indicators

When DX Navigator isonline, one of three symbols will appear in front of each Device Icon in the Found Devices list to indicate the current status of the device:

-  The cycling arrows indicate that DX Navigator is establishing or refreshing a communications connection with the device. When the device is in this state you cannot open its Device Window (by double-clicking the Device Icon), nor execute any commands from the R-click or Edit menus (except the **Refresh** command).
-  The green check mark indicates that DX Navigator has established a communications connection with the device and that the device is online and available for use. In this state you can login to the device and open its Design Window, identify devices, and use all applicable R-click and Edit menu commands.
- The red exclamation mark indicates that DX Navigator has lost the communications connection with the device. DX Navigator continually monitors the communication connection to every device in the Found Devices list. If a device fails to respond to a message from DX Navigator within a certain time period, then DX Navigator deems that the unit has gone offline and 'drops' the communication connection.

  The connection can be dropped for obvious reasons, such as a faulty comms cable or a device power failure, or not-so-obvious reasons, such as bandwidth limitations through a busy or clogged network. When the device is in this state you cannot open its Device Window (by double-clicking the Device Icon), nor execute any commands from the R-click or Edit menus (except the **Refresh** command). If the unit's Device Window is open when it goes offline, then the Device Window's Online Status indicator also turns red. Use the **Refresh** command to reestablish communication with the device once the device comes back online (without taking DX Navigator offline).

Logging In

Description

All DX series devices have built-in hardware-level security to prevent unauthorized users from controlling or changing device settings. To access a unit's Device Window you must first login to the device by either by double-clicking its Device Icon, or selecting its Device Icon and choosing **Open** from the Edit or R-click popup menu. When the Password dialog opens, select the appropriate *Permission Level* from the drop-down list, and enter the corresponding *Password* for that *Permission Level*.

If the *Password* matches the value stored in the device, DX Navigator opens the unit's Device Window. By default the *Admin* and *User Passwords* are blank. Therefore if the P*assword* for a *Permission Level* is blank, simply clicking the Login button gives the user de facto permission for that selected *Permission Level*. Renaming or editing the device settings (see Edit Operations) also requires you to login if you have not previously done so during the current DX Navigator session.

NOTE: If you are a system administrator and desire to secure access to the hardware, then be sure to setup the *Admin* and *User Passwords* from the Device Window's Settings tab after you first login to the device.

Parameters

- ***Permission Level*** Selects between [Admin] or [User] level access to the device. Administrative permission grants the user full access to the hardware through the Device Window. User permission grants the user the ability only to load *Presets*, view the Event Log, and view the Input/Output Channel Strip through a highly abridged version of the Settings tab.
- ***Password*** *Admin* and *User Passwords* may be up to 16 characters in length, contain any combination alphanumeric characters, and are case-sensitive.

Naming Devices

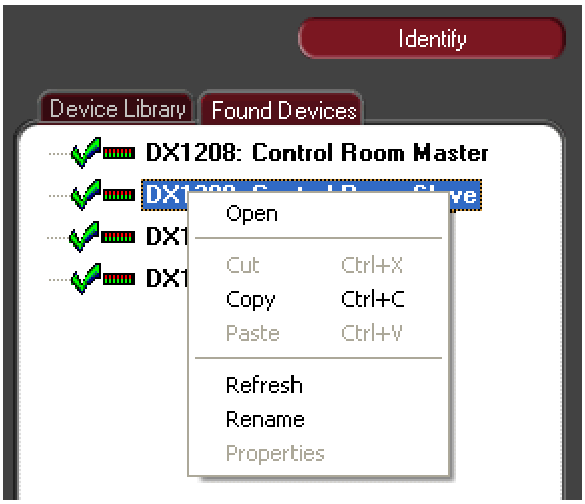
Description

Each DX device can be given a unique name which is stored in the device's non-volatile memory. Whenever DX Navigator establishes a communications connection with a device, it reads the device's name and displays it in the Found Devices tab next to the unit's Device Icon. The *Device Name* also appears in the Title Bar of the unit's Device Window. By default the *Device Name* of all DX devices shipped from the factory are blank.

Likewise, designs can also be given unique names. *Design Names* are displayed in the Title Bar of Design Windows. Dragging a Device Icon from the Device Library into the Design tab creates a design named "Untitled DX1208"; dragging a device from the Found Devices to the Design tab creates a design named "Copy of [*Device Name*]". To preserve the identity of devices and designs, names are not overwritten when one unit is dropped or pasted onto another (see Edit Operations).

To rename a hardware device:

1. Go online with DX Navigator.
2. In the Found Devices tab, select the device you wish to rename. The device must be online (green check mark appears in front of Device Icon).
3. Either <R+CLICK> on the Device Icon, or select **Rename** from the Edit or R-click popup menu.



4. The Password dialog opens. Login as an administrator.
5. Type a name in the Rename Device dialog, and <CLICK> OK.

Menu Commands

- **Rename** — Changes the name of either a hardware device (from the Found devices tab), or a device design (from the Design tab). Names can be up to 32 alphanumeric characters; double quote and question mark characters are disallowed. *Device Names* are stored in hardware memory, and are retained when the unit is power cycled. *Design Names* are saved in Site Files.

Device Designs

Description

With device designs (also referred to simply as 'designs'), DX Navigator allows you to setup and configure DX devices offline. By opening a generic Device Window for a particular device type, you can edit the device's settings just as though you were controlling the hardware

directly. Later, when you are online, you can upload the design settings to any device of the same type, and download hardware settings to new or existing designs.

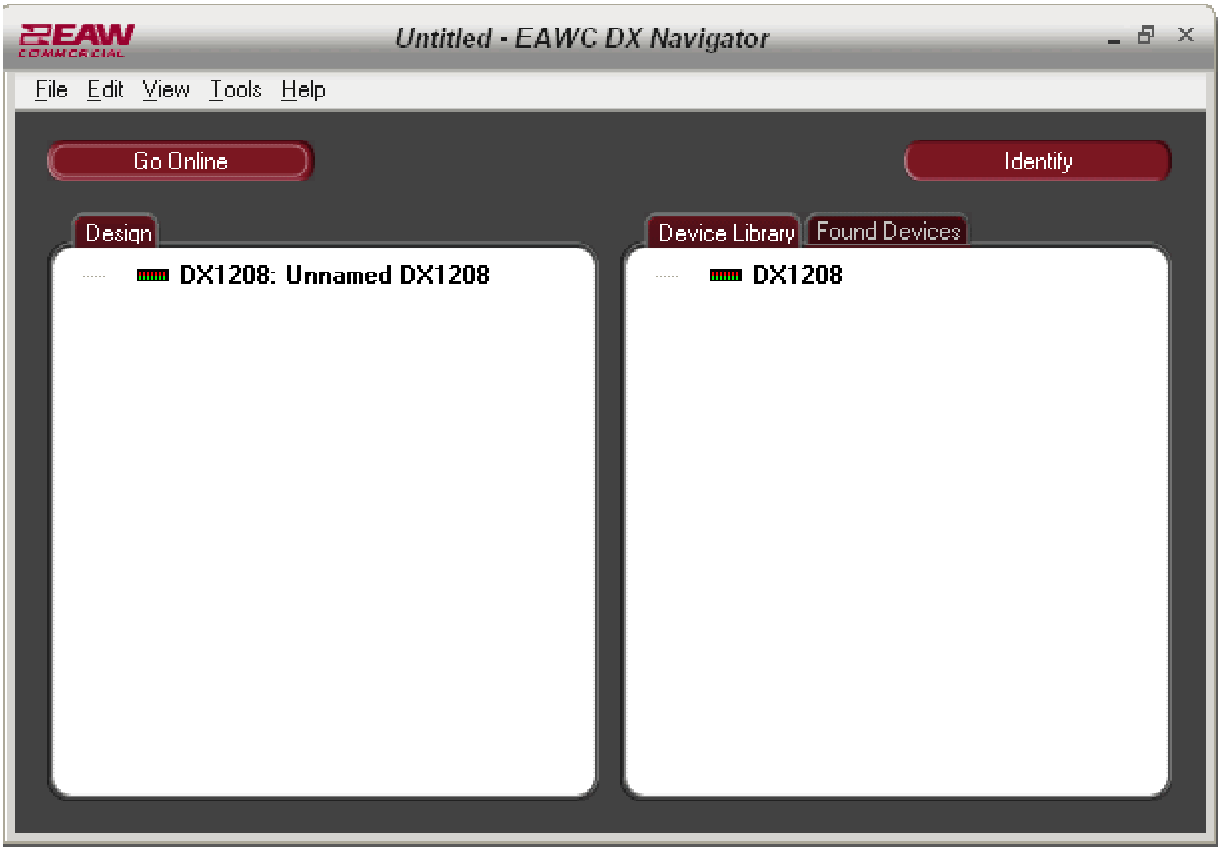
Designs are created in the Design tab. The Design tab functions much like the Found Devices tab, except that Device Windows opened from the Design tab do not control hardware devices, as they do from the Found Devices tab. Design Windows launched in the Design tab do not affect or interact with Design Windows launched from the Found Devices tab except when settings explicitly are copied from one to the other.

Double-clicking a Device Icon in the Design tab opens a Device Window for the design. Because Permissions are hardware based, the Password dialog doesn't appear. The Permissions and Event Log controls are disabled in designs for the same reason. The Design tab can hold any number of designs, and the contents of the Design tab can be archived to a Site File on your local hard drive.

NOTE: Designs do not presently support *Presets*. Only the current Device Window settings can be saved to Site Files, and uploaded to/downloaded from hardware devices (see Edit Operations). This will be corrected in a later version of DX Navigator.

To create a new device design:

1. <CLICK> the Device Library tab to bring it to the front.
2. <CLICK+DRAG> the DX1208 Device Icon from the Device Library tab to the Design tab.
3. A new DX1208 design appears in the Design tab. The default *Device Name* for new design is "Unnamed [*device type*]."



You can also create copies of hardware devices by dragging Device Icons from the Found Devices tab into the Design tab. This operation is covered in more detail under Edit Operations.

To rename the design:

1. In the Design tab, <CLICK> the device you wish to rename.
2. Either <R+CLICK> on the Device Icon, or select **Rename** from the Edit or R-click popup menu. Because designs do not control hardware, there is no need to go online or login as with renaming hardware devices from the Found Devices tab.
3. Type a name in the Rename Device dialog, and <CLICK> OK.

Site Files

Description

DX Navigator allows you to save the entire contents of the Design tab to a file on your computer's hard drive. By saving designs into Site Files, users can archive the settings of one or many DX series hardware devices to a single file on disk. Conversely, by allowing you to work offline, users can setup or reconfigure or and entire DX system without having to be on site or have hardware connected.

Site Files store every device design parameter setting (see Device Designs) for an unlimited number of designs present in the Devices tab. They can be created, saved, and opened without affecting the operation of online hardware devices. Like *Device Names*, Site File names are reflected in the Title Bar of the Main Window. Site Files have the extension '.DXN' and can be saved to any directory on disk.

Menu Commands

The Site File commands are located under the File menu in the Main Window.

- **New** — Clears the contents of the Design tab and creates a new Site File. Launching DX Navigator creates a new Site File by default.
- **Open** — Opens the selected Site File, replacing the current contents of the Design tab with the contents of the Site File.
- **Save** — Stores the current contents of the Design tab to the named Site File. Saving a new, untitled Site File opens the Save As dialog and prompts you to name the new file.
- **Save As** — Stores the current contents of the Design tab to a Site File with a prompt to rename the file. The Main Window Title Bar changes to reflect the new name.
- **Recent File** — At the bottom of the File menu is s list of the four most recently opened Site Files. Selecting any listed Site File opens the file.

Edit Operations

Description

DX Navigator allows you to copy Device Window settings within and between the Design and Found Device tabs using keyboard shortcuts (e.g. CTRL+C for **Copy**, etc.) using commands

from the Edit and R-click pop-up menus, or dragging/dropping with the mouse. The behavior of each edit operation differs slightly depending on the source and destination tabs. For conciseness, the examples given below describe edit operations using only Edit menu commands and drag/drop operations.

Found Devices Tab

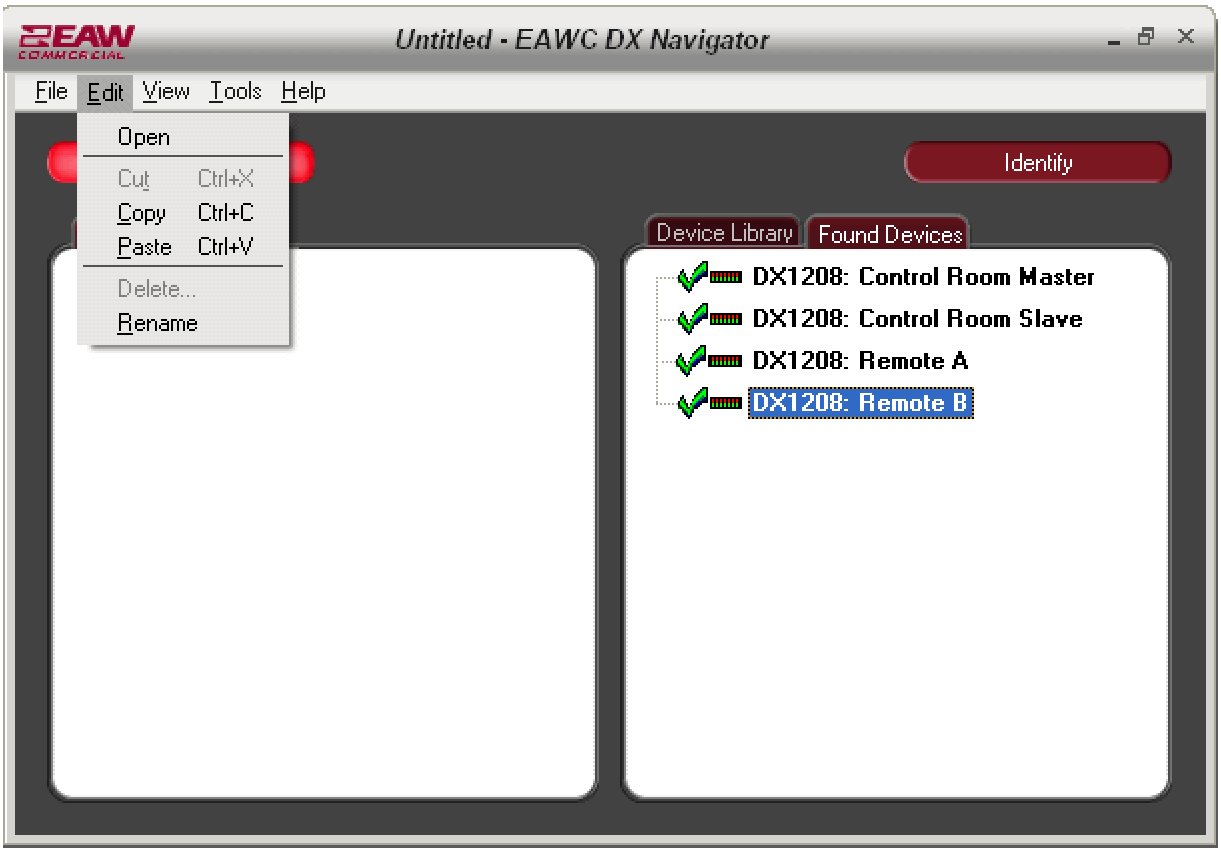
Within the Found Devices tab, device settings can only be copied from one hardware device to another; they cannot be cut or deleted as they can in the Design tab.

To copy the settings from one device to another:

1. <CLICK> the Found Devices tab to select it.
2. With DX Navigator online, <CLICK> on the device whose settings you wish to copy.
3. Select **Copy** from the Edit menu.
4. <CLICK> the device whose settings you wish to overwrite and select **Paste** from the Edit menu.

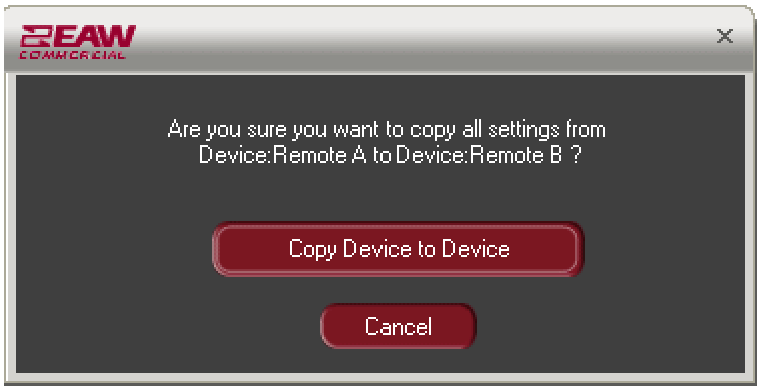
   OR

5. <CLICK+DRAG> the device whose settings you wish to copy and <DROP> it onto the device whose settings you wish to overwrite.



6. The Password dialog opens (if you have not previously logged in during this session). Login as an administrator.

7. A dialog appears asking you to confirm the operation. <CLICK> the Copy Device to Device button.



8. All of the current source device settings are written to the destination device EXCEPT for the *Device Name* and all Settings tab parameters (*Presets*, Permissions, IP settings, Event Log data, and *Master/Slave*). DX Navigator refreshes the destination device connection as the new settings are read back.

Design Tab

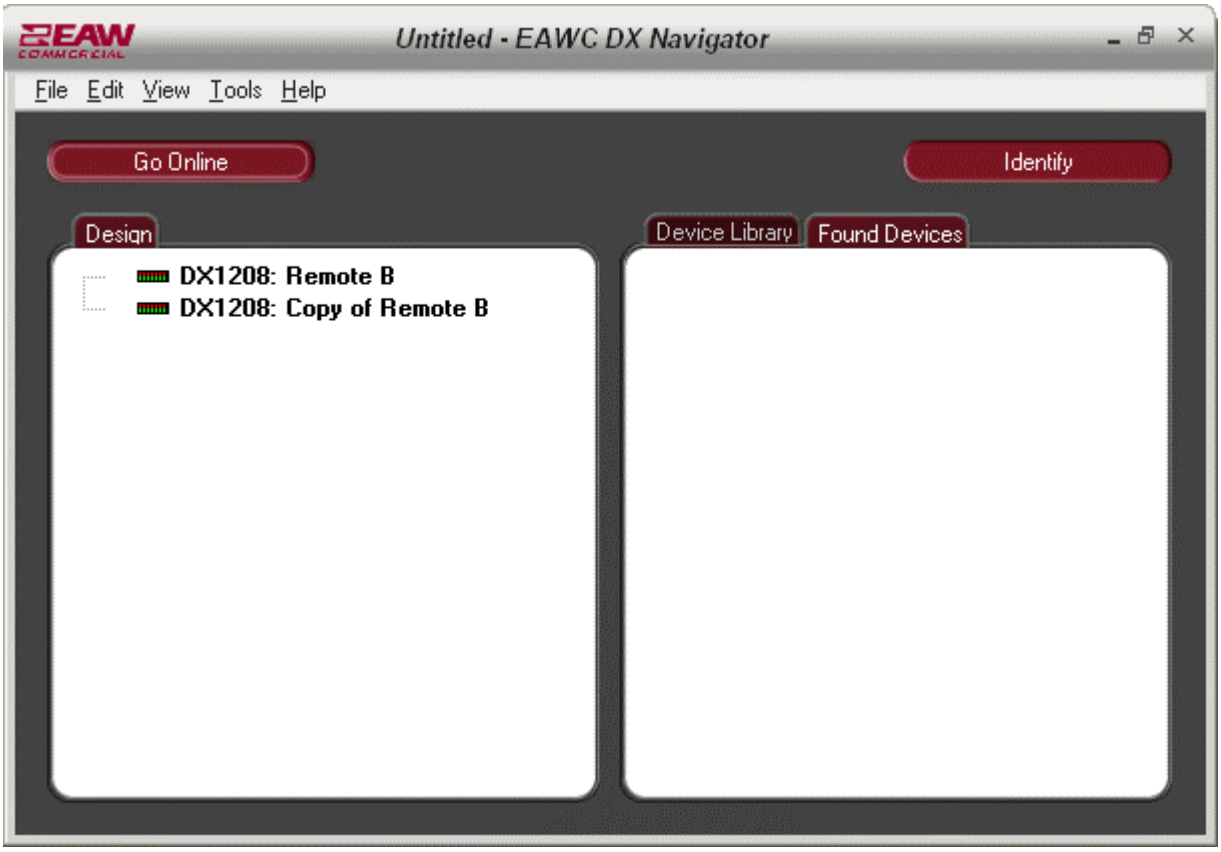
Within the Design tab, settings can be copied from one design to another, and devices can be both created and deleted. The method for copying one design onto another is identical to that described in the previous example, with the exception that you do not need to be online.

To copy of an existing design to a new design:

1. In the Design tab, <CLICK> on the design you wish to copy.
2. Select **Copy** from the Edit menu.
3. <CLICK> in an empty area of the Device tab to deselect the source design, and select **Paste** from the Edit menu.

   OR

4. <CLICK+DRAG> the design whose settings you wish to copy and <DROP> it onto an empty area of the Device tab.



5. A new design named “Copy of [*Design Name*]” appears at the bottom of the list. All of the current source design settings are written to new design EXCEPT for Permissions, Event Log data, and *Presets* (see Note); the IP and *Master/Slave* settings are, however, copied to the new device.

To delete a design:

1. In the Design tab, <CLICK> on the device you wish to delete.
2. Select **Cut** or **Delete** from the Edit menu, or press the <Delete> key. Using the **Cut** command copies the selected device’s settings to the Windows clipboard (for subsequent **Paste** operations), whereas using the **Delete** command simply removes the design without affecting the contents of the clipboard.

Found Devices + Design Tabs

Between the two tabs, design settings can be uploaded to online hardware, and online hardware settings can be downloaded to designs. The examples below illustrates the process of archiving and restoring the current settings of a hardware setup to/from a Site File. While the upload/download operations are nearly identical, there are small differences between them, as noted in the example below.

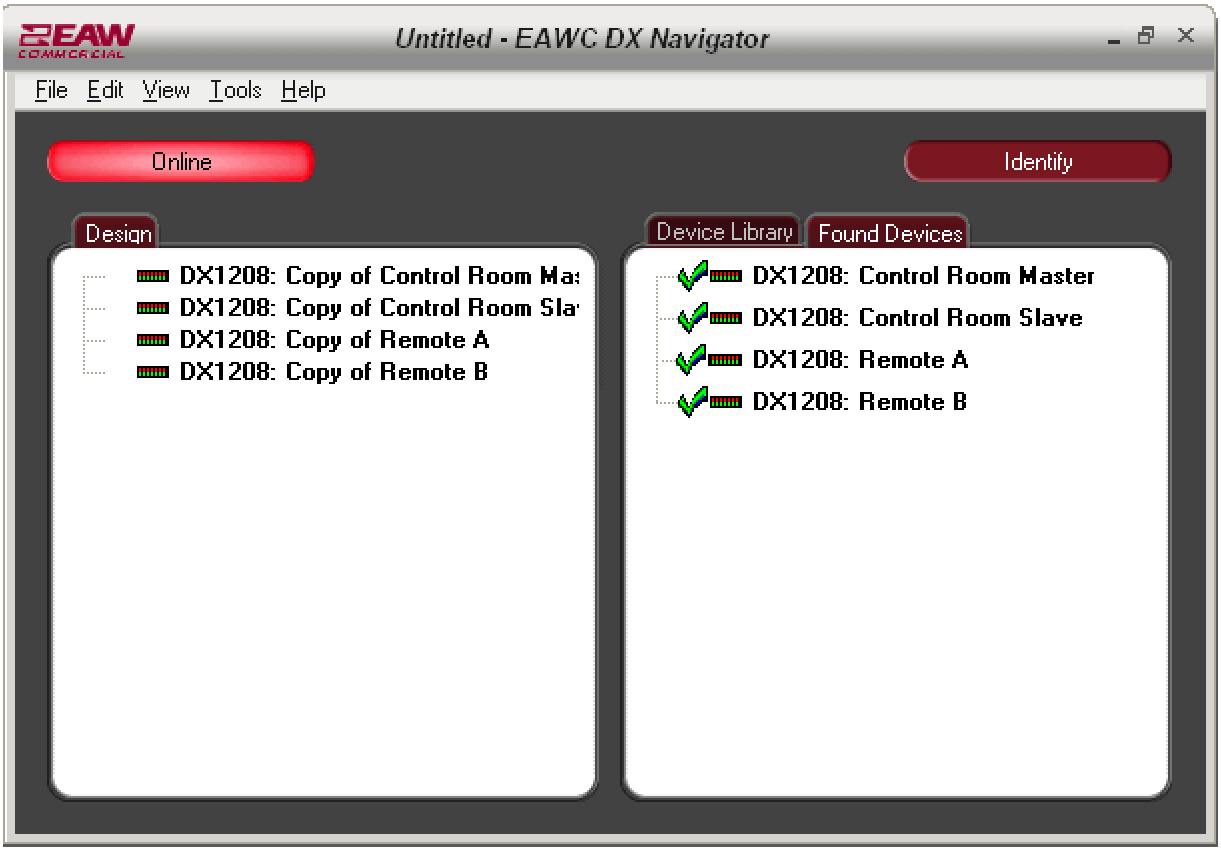
To archive a system to a Site File:

1. In the Main Window, <CLICK> the File menu and select **New**. The Design tab is cleared, and the Title Bar of the Main Window displays “Untitled.”
2. Go online with DX Navigator.

3. In the Found Devices tab, <CLICK> on the first device that you wish to archive to select it.
4. Select **Copy** from the Edit menu.
5. <CLICK> in an empty area of the Design tab, and select **Paste** from the Edit menu.

   OR

6. <CLICK+DRAG> the device whose settings you wish to archive and <DROP> it into an empty area of the Design tab. All of the current hardware device settings are written to the design EXCEPT for Permissions, Event Log data, and *Presets*.
7. A new design is created with the name "Copy of [*Device Name*]." Repeat steps three through six for every device you wish to archive.

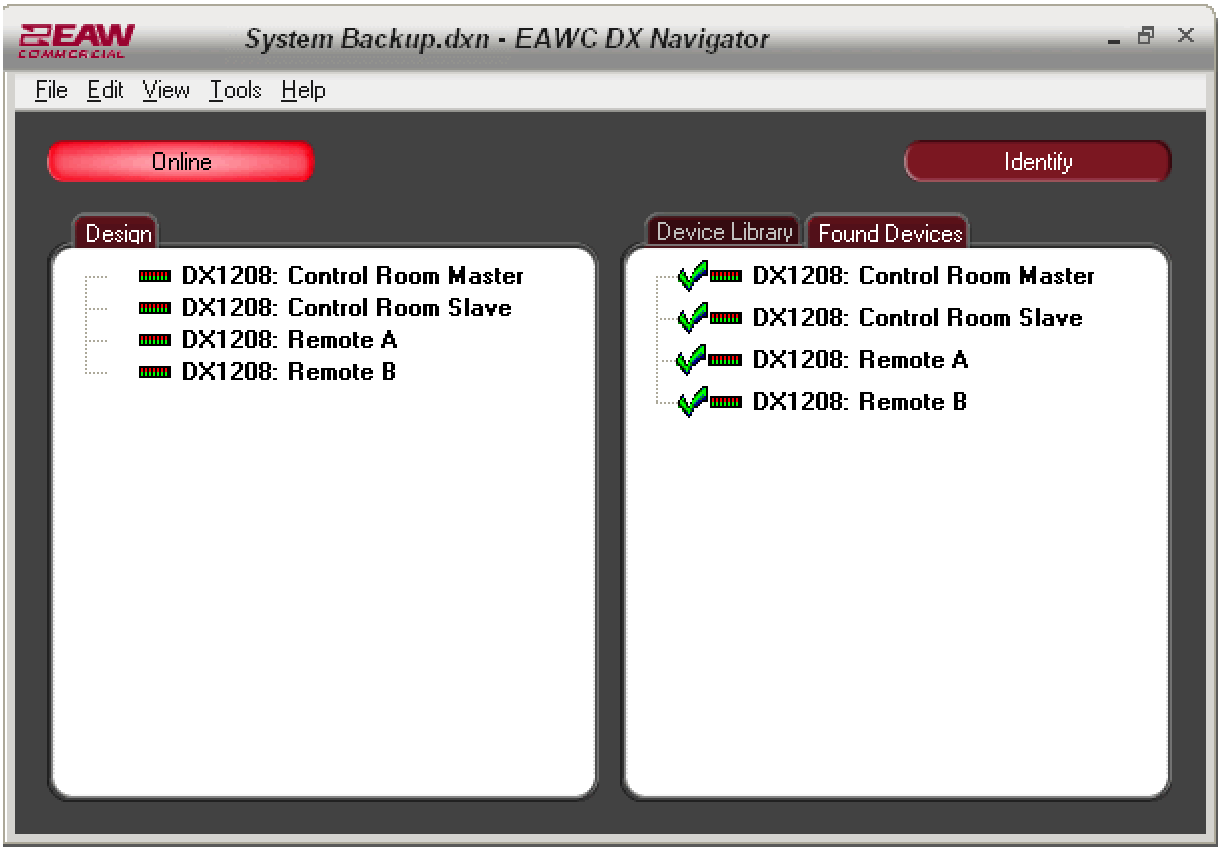


8. If so desired, rename each of the designs to match the names of the hardware devices exactly.
9. <CLICK> **Save** in the File Menu. Enter a name for the Site File in the Save As dialog, and <CLICK> the Save button. The Main Window Title Bar changes to reflect the new Site File name.

To restore a system from a Site File:

1. In the Main Window, select **Open** from the File menu.

2. From the Open dialog, navigate to and select the Site File you wish to open and <CLICK> the Open button. The Design tab is cleared replaced with the designs stored in the Site File. The Title Bar of the Main Window changes to reflect the name of the open Site File.
3. Go online with DX Navigator.



4. In the Design tab, <CLICK> on the first design that you wish to restore.
5. Select **Copy** from the Edit menu.
6. In the Found Devices tab, <CLICK> on the device you want to restore the copied settings to, and select **Paste** from the Edit menu.

   OR
7. From the Design tab, <CLICK+DRAG> the first design you wish to restore and <DROP> it onto the device in the Found Devices tab you want to restore the settings to.
8. If you have not yet logged in for this session, the Password dialog appears. Login as an administrator.
9. A dialog appears asking you to confirm the operation. <CLICK> the Copy Design to Device button.

10. All of the current design settings are written to the destination device EXCEPT for the *Device Name* and all Settings tab parameters (*Presets*, Permissions, IP settings, Event Log data, and *Master/Slave*). Note that IP settings are stored in the Site File for reference only. Uploading a design to a hardware device does not overwrite the device's IP settings to prevent network address conflicts arising from the same design being uploaded to multiple devices. Instead, IP settings must be copied manually.

Edit Menu Commands

Except where noted below, the following Edit commands are available both from the Main Window File menu and the R-click popup menus.

- **Open** — Opens the Device Window of the selected design or hardware device. A login is required for hardware devices the first time Device Windows are opened in a session.
- **Cut** — Deletes the selected design and places the design settings into the Windows Clipboard for subsequent use in **Paste** operations. **Cut** is available only from the Design tab. [Keyboard Shortcut = `CTRL+X]`.
- **Copy** — Places a copy of the current design or hardware device settings onto the Windows Clipboard for subsequent use in **Paste** operations. [Keyboard Shortcut = `CTRL+C]`.
- **Paste** — Overwrites the settings of the selected device/design with the settings placed into the Windows Clipboard via **Cut** or **Copy**. Pasting into an empty area of the Design tab creates a new design based on the contents of the Clipboard. [Keyboard Shortcut = `CTRL+V]`.
- **Delete** — Removes the selected design from the Design tab, but does not copy the settings to the Windows Clipboard. **Delete** is available only from the Design tab. [Keyboard Shortcut = `Delete]`.
- **Properties** — Not implemented in DX Navigator v1.0. Available only from the R-click popup menu.

Menu Items

Description

This section describes Main Window menu items not described elsewhere in this helpfile.

- **File > Exit** Closes DX Navigator and all open Device Windows.
- **View > Toolbar** Hides and reveals the DX Navigator Toolbar for quick access to the following menu items:

Menu	**Commands**
File	**New**, **Open**, **Save**
Edit	**Cut**, **Copy**, **Paste**
Help	DX Navigator Help

- **Tools > *Units*** Selects which unit format to select for distance and temperature parameters. The *Units* setting does not currently affect any DX Navigator 1.0 parameters.

  [SI] Selects SI units (meters, Celsius).

  [US] Selects US units (feet, Fahrenheit).

- **Tools > *PEQ Format*** Selects which format to use when displaying parametric EQ bandwidth.

  [Q] Displays bandwidth in Q (quality factor).

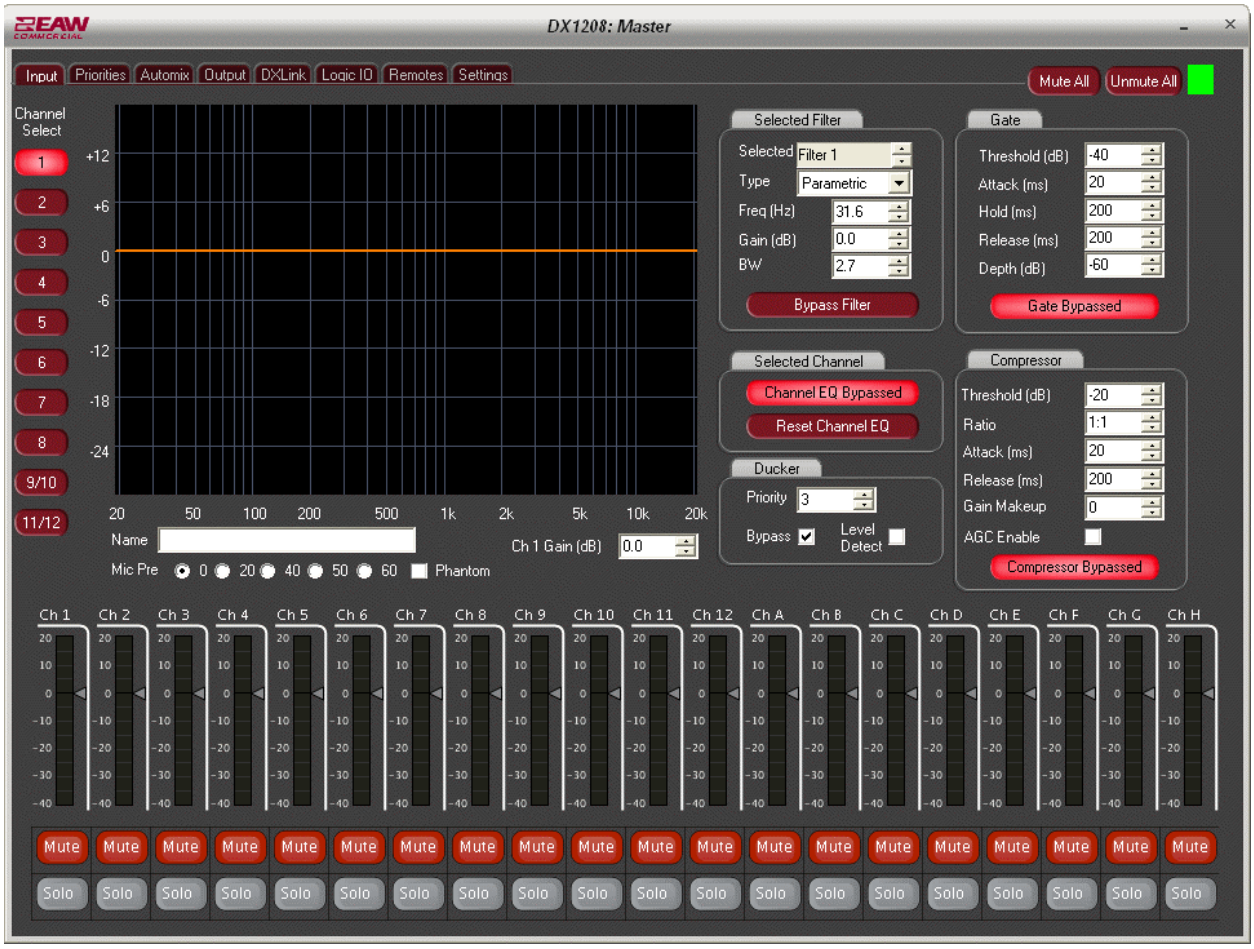
  [BW] Displays bandwidth in fractional octaves [BW = log(F2/F1)/log2].

- **Help > About** Lists the installed version of DX Navigator software. See Firmware Version for more information on obtaining the firmware version of hardware devices.

Device Window - Overview

Overview

DX1208 parameters and controls are accessed through a DX1208 Device Window. The Device Window groups related parameters and controls together and displays them on different tabs which appear (roughly) in the order of signal flow through the unit. From left to right the tabs are: Input, Priorities, Automix, Output, DX Link, Logic IO, Remotes, and Settings. Each tab with its controls and parameters is described in its own section of the helpfile. The DX1208 Device Window with the Input tab selected is shown below.



Common Controls

A number of parameters and controls are common to all Device Window tabs.

Parameters

- ***Mute All*** — Mutes all Input, Output, DX Link Input, and DX Link Output Channels.
- ***Unmute All*** — Unmutes all Input, Output, DX Link Input, and DX Link Output Channels.
- ***Online Status*** — When a unit is online the indicator in the upper right corner of the Device Window is green; when it is offline it is red. The *Online Status* indicator is absent from Design Windows because Design Windows do not control hardware devices.

Input/Output Channel Strip

The Input and Output Channel Meter, *Gain*, *Mute*, and *Solo* controls appear at the bottom of all tabs except the Automix tab. These controls are described in the Input Section of this helpfile.

Device Window – Input Tab

Input Section

Description

The DX1208 has eight analog and four S/PDIF digital input channels. Inputs 1-8 are balanced mic/line level inputs with a max peak input level of +24 dBu, each having switchable phantom power and adjustable preamplifier gain. A second set of stereo unbalanced inputs parallels Inputs 5-8. Each Input has a left and right side that are first summed to mono, then summed with the output of the mic/line preamplifier before A/D conversion. These inputs have a max peak input level of +10 dBV, and have no analog gain control. All Input Channels have digital *Gain*, *Meter*, *Solo*, and *Mute* controls which appear in the Channel Strip at the bottom of all Device Window tabs except the Automix tab.

Parameters

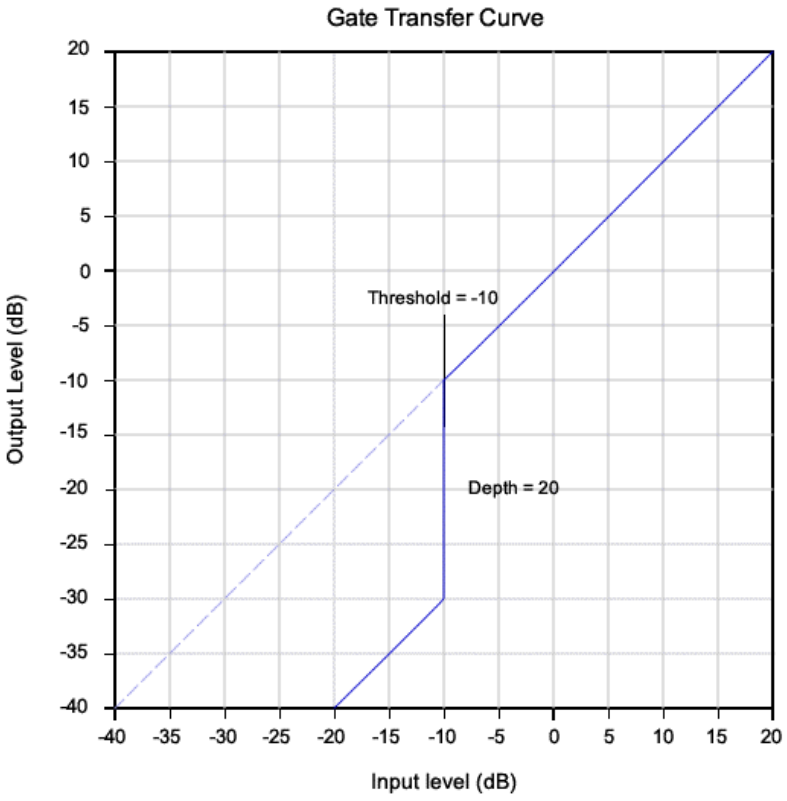
- ***Channel Select*** Selects the Input Channel that is controlled by the Input tab.
- ***Channel Name*** Input Channels can be given a *Channel Name* of up to 32 characters in length.
- ***Mic Pre*** Controls the gain of the analog microphone preamplifier for balanced Inputs 1-8; *Mic Pre* gain can be set to [0], [+20], [+40], [+50], and [+60 dB]. *Mic Pre* gain does not affect unbalanced Inputs 5-8.
- ***Phantom*** Applies P48 phantom power to the eight balanced Analog Input jacks.
- ***Meter*** Displays the instantaneous peak signal level of the Input Channel after the analog microphone preamplifier, but before the *Mute* switch and *Fader*.
- ***Fader / Gain*** Controls the digital (post A/D) gain of the Input Channel, prior to routing to the DSP processes. Gain can be applied from [-99] to [+20 dB] in 0.1dB steps using the *Gain* textbox, or from [-38] to [+20] by dragging the Fader handle; dragging the Fader handle all the way to the bottom sets the *Gain* to [-99 dB]. <CTRL+CLICK> in the channel *Meter* to reset *Gain* to unity.
- ***Mute*** Mutes the Input Channel. The *Mute* is applied between the input Meter and *Fader*.
- ***Solo*** Soloing an Input Channel mutes all Inputs that are not soloed; Soloing an Output Channel mutes all Outputs that are not soloed. However, *Solos* do not override existing *Mutes*, so any channel that is both muted and soloed will not be heard. If both Input and Output Channels are soloed at the same time, make sure that all

Input Channels routed to the soloed Outputs are also soloed, or they will not be heard.

Gate

Description

Each of the twelve DX1208 Input Channels is equipped with a Gate that occurs between the input *Fader* and the Compressor in the DX1208 signal chain. Gates are designed to reduce or eliminate unwanted background noise from an input (typically a microphone input) when the source is not on-mic. For example, in a theater production with many performers using wireless microphones, Gates may be employed on each actor to reduce the amount of stage noise picked up by the microphone when the actor is not speaking, thereby improving speech intelligibility and increasing the gain before feed back of the system. Gates accomplish this task by effectively acting as volume-dependent mute switches: when the signal volume exceeds a defined threshold, then the gate 'opens' (is unmuted), and the signal passes unaffected. When the volume drops below the threshold, the gate 'closes' and the gain is reduced by an amount defined by the depth setting. Depth settings range anywhere from a few dB to -100 dB (equivalent to a hard mute). The rate at which the gain is changed between unity and depth is determined by the attack and release settings. The transfer curve of a DX1208 Gate with a *Threshold* of [-10] and a *Depth* of [20 dB] is shown below.



Some commercial sound processors using gating techniques to perform automixing. The DX1208 employs a different automixing technique based on gain-sharing. Both techniques have their relative strengths and drawbacks. However, when properly configured, the Gates

can be used in combination with the DX1208's Automixer to increase the Automixer's effectiveness. See the Automixer section of this helpfile for more information.

Parameters

- ***Threshold*** When a channel's signal level is below the *Threshold* setting, the gain is reduced by a fixed amount equal to the *Depth* setting. When the signal level exceeds the *Threshold*, the gain is set to unity.
- ***Attack*** Determines the rate at which the Gate increases gain from *Depth* to unity once the signal exceeds the *Threshold*. The rate is determined by the formula (30 dB/[Attack]) dB/second.
- ***Release*** Determines the rate at which the Gate decreases gain from unity to *Depth* once the signal falls below the *Threshold*. The rate is determined by the formula (30 dB/[Attack]) dB/second.
- ***Depth*** Specifies the amount of fixed gain reduction that is applied to the signal when the signal is below the *Threshold*.
- ***Bypass Gate*** Bypasses the Gate without changing the Gate's settings.

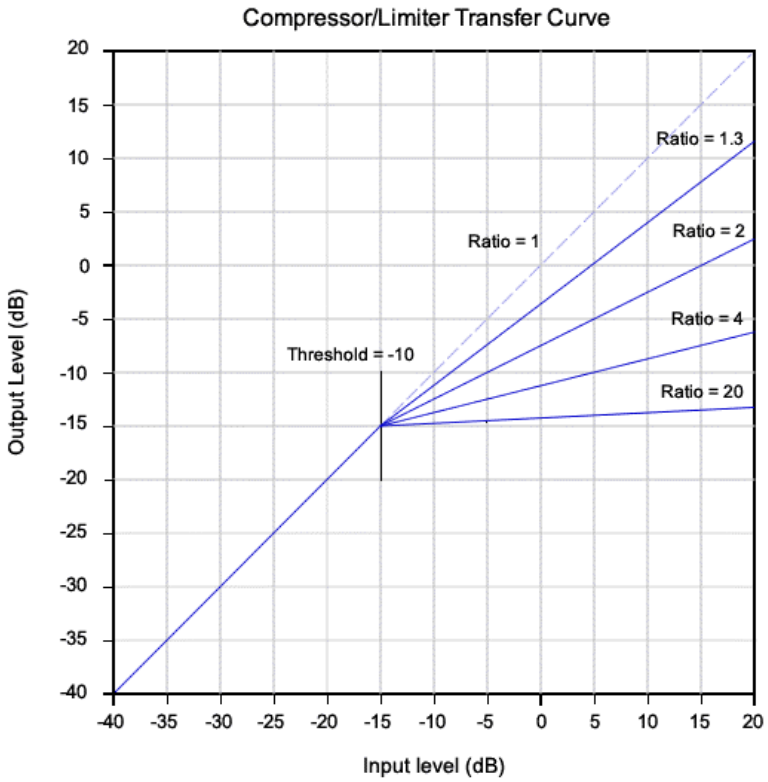
Compressor

Description

Each of the twelve DX1208 Input Channels is equipped with a Compressor that occurs between the Gate and the 6-band EQ in the DX1208 signal chain. Compressors are designed to reduce the dynamic range of signals for effective combination with other processor input sources, as well as optimize the processor output for the amplifiers, speakers, and SPL range of the listening environment.

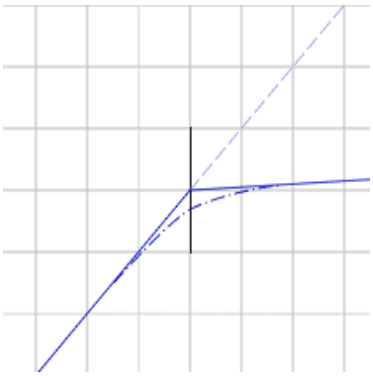
In typical sound reproduction systems, the dynamic range of most input sources, particularly microphones, is much greater than the system can allowably reproduce. This is primarily because there are limits to both the minimum and maximum acceptable SPL level of the system, defined exclusively by the acoustical environment in which the system is installed. The loudest SPL that does not disturb the listeners defines maximum level, and the minimum level necessary to produce acceptable intelligibility above the ambient background noise defines the minimum level. For example, in a popular music concert environment with a large audience and large PA system, this dynamic range may extend from 80 dB_{SPL} to 115 dB_{SPL}, for a working dynamic range of 35 dB. In restaurants, boardrooms or other environments in which permanently installed commercial sound processors such as the DX1208 are deployed, the acceptable range may be only 15 to 25 dB, which is far less than a typical dynamic range of a microphone input, which may range from 30 to 80 dB or more. The amplifier electronics and speaker transducers can also limit the overall dynamic range of the system, but in commercial applications these are usually less of a limiting factor than the acoustic environment.

Compressors work by reducing the gain of a signal only when the signal exceeds a defined threshold level. When the signal falls back below the threshold, the volume is returned to unity. The amount of gain reduction is determined by a ratio control; the speed at which the compressor reacts to the signal is defined by the attack and release times. Any overall gain loss from compression can be compensated for using a gain makeup control. An example of a compressor input/output transfer curve is shown below.



Parameters

- ***Threshold*** When a channel's signal level exceeds the *Threshold*, the signal's gain is reduced (i.e. compressed) by an amount determined by the *Ratio.* When the signal is below *Threshold* the gain is returned to unity (i.e. no gain reduction is applied). The DX1208 Input Compressor uses a soft-knee transfer curve to reduce the 'pumping' sound often heard with hard-knee compression. With soft-knee compression gain reduction actually begins 3 dB below the *Threshold*. The figure below illustrates the difference between a hard-knee curve (solid line) and a soft-knee curve with a *Ratio* of [20:1].



Inputs 9/10 and 11/12 employ true stereo compression: the energy sum of both the left and right inputs is applied to the threshold detector, and gain reduction is applied equally to both channels.

- ***Ratio*** Sets the aggressiveness of the Compressor by controlling the slope of the input/output transfer curve. Once the signal exceeds the *Threshold*, the *Ratio* dictates the amount that the input volume must increase (in dB) to produce a 1 dB increase in output volume. For example, with a [4:1] *Ratio*, a 12 dB increase in input volume produces a 3 dB increase in output volume.
- ***Attack*** Determines the rate at which the Compressor reduces gain. The rate is determined by the formula (15/[Attack]) dB/sec.
- ***Release*** Determines the rate at which the Compressor increases gain. The rate is determined by the formula (15/[Release]) dB/sec.
- ***Gain Makeup*** Applies a fixed amount of gain boost at the output of the Compressor to makeup for loss in overall volume caused by high *Ratio* and/or low *Threshold* settings.
- ***Bypass Compressor*** Bypasses the Compressor/AGC without changing the Compressor's settings.

AGC

Description

The DX1208 Compressors can alternately function as an Automatic Gain Control (AGC). AGCs are designed to dynamically normalize the volume of an audio signal to a defined output level, regardless of the input signal level. AGCs are used to 'level' out multiple program sources to roughly equalize their relative volumes or set their volumes in a predefined relationship. For example the outputs from a TV, CD player, and radio may all be distributed through an overhead speaker system to patrons in a restaurant or bar. The program level of the different TV stations, programs and songs will vary widely, but all need to be sent to the speakers at a relatively constant volume so that quiet material will not be drowned out by the background noise, and loud material will not be distracting: When the program material is louder than the 'target' volume level, the AGC reduces the volume; when it is quieter than the target, it increases the volume.

While the AGC retains some of the characteristics of a compressor, there are several key differences between an AGC and Compressor:

- The rate at which an AGC makes its volume adjustments generally closely approximates the rate at which a human might adjust the volume of a source, and therefore program dynamics are preserved. Compressors on the other hand are setup to act much faster and therefore will compress the dynamic range of the signal.
- A compressor only reduces the gain of a signal. An AGC both reduces the gain when the signal level is above the target, and increases the gain when it is below the target.
- The AGC has a 'gain hold' function which prevents the volume from changing once the signal drops below a certain minimum level (usually called the silence threshold). This prevents the AGC from increasing the volume during silence gaps in the program source (as is present in dialog, breaks between songs on a CD, etc.)

Parameters

- ***Target*** The *Target* specifies the 'average' output volume level of the source, and defines the unity gain point on the input/output transfer curve, as illustrated in the graph below. When the source volume exceeds the

Target level, the gain is reduced; when it falls below the *Target* level it is increased, so that the output volume is always being driven towards the *Target*.

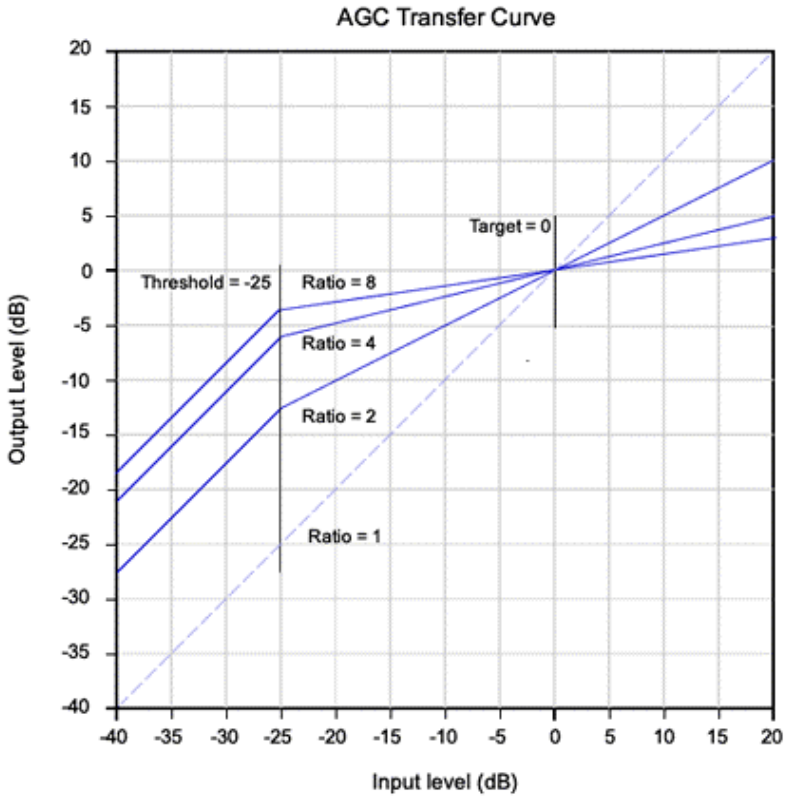
- ***Threshold*** When the input volume exceeds the *Threshold*, the AGC is activated and makes dynamic volume adjustments that drive the output volume level towards the *Target* level. When the input volume drops below the *Threshold, the AGC* stops adjusting the gain and holds it at the last set value. The AGC is most effective when it makes volume adjustments only when a valid program source is present, but not when the source is absent. DX Navigator limits the *Threshold* values to be ≤ the *Target*.

  For example, in a boardroom environment where multiple individuals each have their own microphone, every microphone will pick up the sound not only of the assigned speaker, but also background noise and the sound of every other speaker in the room. To be effective, the AGC should act only on the speaker's voice, but not act on the background noise. Therefore set the *Threshold* just below the minimum volume level of the source to prevent the AGC from acting on background noise. This prevents the AGC from making unwanted gain increases in the presence of background noise which will cause the source to be louder than desired when the source resumes. For sources which slowly fade to silence (as may happen with subscription music feeds and CD music sources), set the *Threshold* approximately [10] to [15 dB] below the *Target*.

- ***Attack*** *Attack* controls the rate of volume change (both increase and decrease) when the source volume exceeds the *Threshold*. *Attack* settings will vary depending on the nature of the source, but generally should be set slower than the rates typically used with compression.

  With slow *Attack* times, very little AGC gain change will occur between when a gap/pause in the source occurs and when the source resumes. However, the AGC will not react as quickly to rapid increases or decreases in the program volume. With faster *Attack* times the AGC will react more quickly to sudden changes in program volume, but greater gain changes will occur between silence gaps and the resumption of the source, potentially causing 'pumping' effects associated with compressors. Set the *Attack* so that the volume change rate change sounds natural to the ear and does not draw attention to itself.

- ***Ratio*** The AGC *Ratio* control determines the ratio at which the output volume increases with respect to the input volume, and in that respect is identical to the Compressor *Ratio* control. The higher the *Ratio*, the less the output volume changes with for any given variance in input volume. However, the input/output transfer curves of each differ with respect to how they intersect with the *Threshold* and *Target* values. In the Compressor, the non-unity portion of the transfer curve passes through the *Threshold*; in the AGC, the non-unity portion passes through the *Target*. The difference is illustrated by the graph below.



In practice the *Ratio* determines how aggressively the AGC tries to drive the output volume toward the *Target*.

- ***AGC Enable*** Toggles the process between Compressor and AGC operation.
- ***Bypass Compressor*** Bypasses the AGC without changing the AGC's settings.

EQ

Description

Each of the twelve DX1208 Input Channels is equipped with a fully-configurable six-band EQ, which occurs in between the Compressor and the Ducker in the DX1208 signal chain. Each EQ band can configured as a parametric, high/low pass, or shelving filter, and can be individually enabled or disabled.

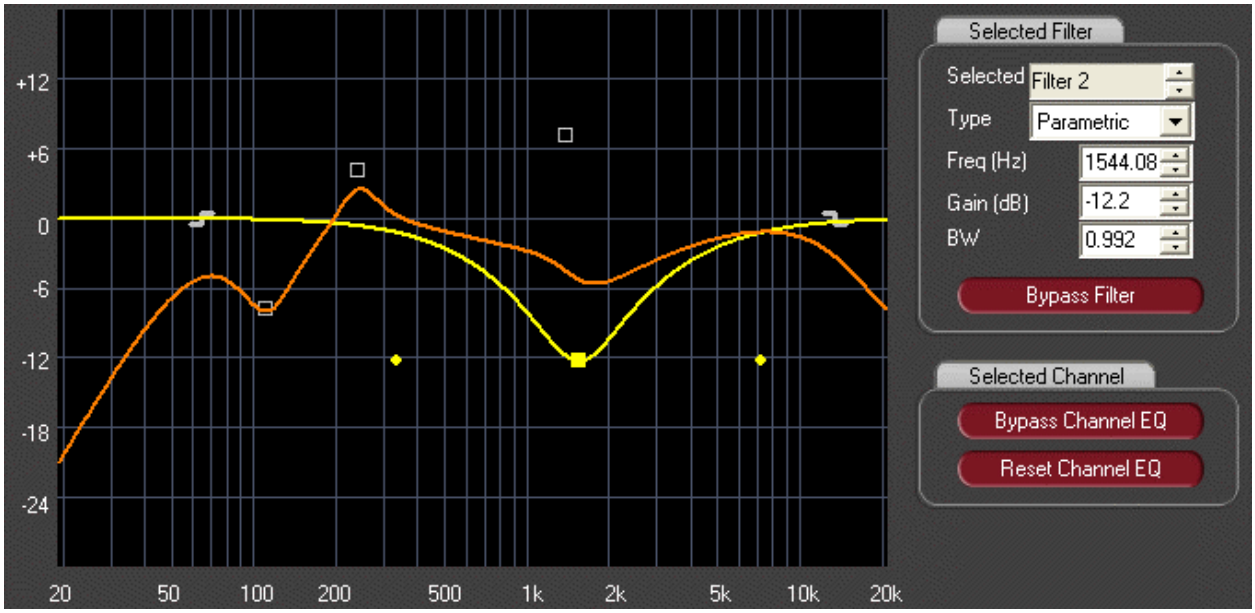
Parameters

- ***Selected*** Determines which Filter the *Type*, *Frequency*, *Gain*, *BW/Q*, and *Bypass Filter* settings apply to.
- ***Type*** Sets the Filter type of the *Selected* filter from amongst the following choices: [Parametric], [6dB Low shelf], [6dB High Shelf], [12dB Low Shelf], [12dB High Shelf], [12dB Low Pass], [12dB High Pass.]
- ***Frequency*** Sets the *Frequency* center of the *Selected* Filter. *Frequency* values range from [20 Hz] to [20 kHz].

- ***Gain*** Sets the gain boost/cut of the *Selected* Parametric or Shelving Filter. *Gain* values range from [+15 dB] to [-15 dB].
- ***Bandwidth / Q*** Sets the *Bandwidth* of the *Selected* Parametric Filter. Setting the *PEQ Format* to [Q] in the Main DX Navigator > Tools menu lets you enter filter width as a 'quality factor' with values ranging from [0.25] to [10]; setting the *PEQ Format* to [BW] lets you enter *Bandwidth* in octaves with values ranging from [2.0] to [0.1]. The bandwidth of the Shelving and Hi/Low Pass Filters is fixed and cannot be changed.
- ***Bypass Filter*** Bypasses the *Selected* Filter band without changing the Filter's settings.
- ***Bypass Channel EQ*** Bypasses all 6 Filter bands at the same time without changing any Filter's settings.
- ***Reset Channel EQ*** Resets all Filter parameters to their factory default settings.

EQ Graph

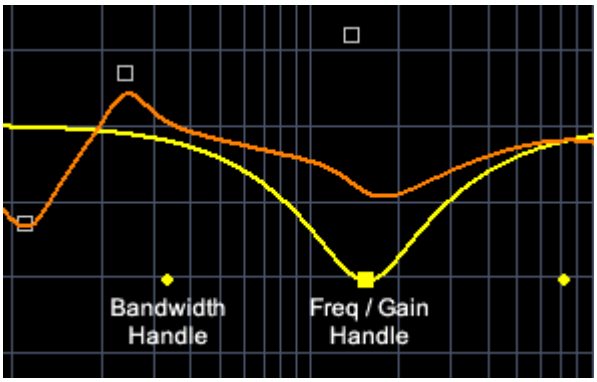
The response of the Input Channel EQ is plotted graphically (shown below). The overall EQ response curve is shown with an orange line, and the response curves of individual Filters are shown with a yellow line.



Selecting a Filter causes its response curve to appear in the graph; only one Filter's curve is visible at a time. Editing a band's parameters changes both the overall and the individual Filter's response curves, so that the contribution of the Filter to the overall EQ response can be easily observed. Bypassing a Filter removes the individual Filter curve from the graph so that it cannot be edited graphically.

Filters can also be edited directly from the EQ graph by dragging their *Edit Handles* on the screen. To edit a Parametric Filter:

1. <CLICK> the square white *Freq/Gain Handle* to select the filter. The previously selected Filter's curve disappears, and the *Selected* Filter's curve appears in yellow with a solid yellow *Freq/Gain Handle*.



2. <DRAG> the *Freq/Gain Handle* up/down to adjust the *Gain*, and left/right to adjust the *Frequency*.
3. <DRAG> the diamond shaped *Bandwidth Handle* left/right to adjust the filter's *Bandwidth*.

To edit a Shelving or Low / High Pass Filter:

1. <CLICK> the s-shaped white *Freq Handle* to select the Filter. The previously selected Filter's curve disappears, and the *Selected* Filter's curve appears in yellow with a yellow *Freq Handle*.

2. For Low/High Pass Filters (shown above), <DRAG> the yellow *Freq Handle* left/right to adjust the *Frequency*; for Shelving Filters <DRAG> the handle up/down to adjust the *Gain*, and left/right to adjust the *Frequency*.

Ducker

Description

Each of the twelve DX1208 Inputs and 16 DX Link Inputs is equipped with a Ducker. On the eight Input Channels the Ducker occurs in between the six-band EQ and the Matrix Mixer. On the DX Link Inputs the Ducker occurs immediately after the DX Link *Mute* and *Fader*. The Input tab contains only a subset of the Input Channel's Ducker controls; the complete set of controls is found in the Ducker Priorities tab. See the Priorities section of this helpfile for complete documentation on the Input and DX Link Duckers.

Device Window – Priorities Tab

Ducker

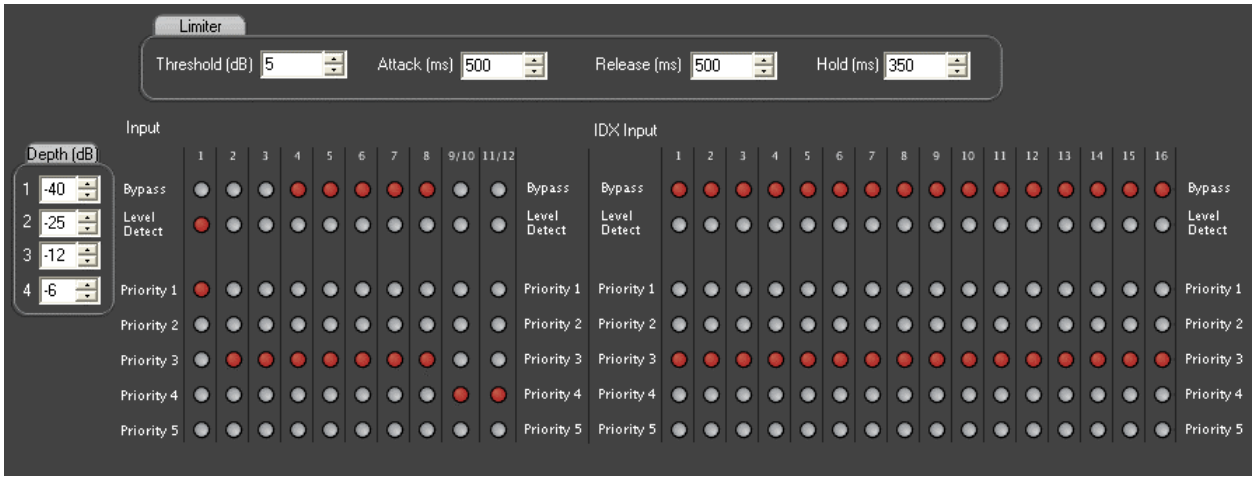
Description

Each of the twelve DX1208 Inputs and 16 DX Link Inputs is equipped with a Ducker. On the twelve Input Channels the Ducker occurs in between the six-band EQ and the Matrix Mixer. On the DX Link Inputs the Ducker occurs immediately after the DX Link *Mute* and *Gain*. The Ducker is the only DSP process that is employed on the DX Link Input Channels.

Duckers are designed to lower the volume of one or more input sources to allow one or more different input sources to be clearly heard. Duckers are based on the concept of assigning a 'priority' to each input, which describes how important it is for listeners to hear that source in relationship to all of the other sources. Sources with a higher priority take precedence over sources with lower priorities. The DX1208 Ducker supports 5 *Priority* levels with adjustable volume *Depths* for each. Ducker *Priorities* can be triggered from Logic Inputs, Remotes, and from signals whose level exceeds a specified *Threshold*. The rate at which the Ducker changes the volume during and after a priority trigger can also be adjusted.

As an example of how a ducker might be used in practice, a typical airport may have many different sources that can be broadcast over the public address system, from background music, to airline representatives announcing flight boarding and departure information, to airport management issuing public service messages, and finally to public officials making airport-wide emergency safety and security alerts. The background music channel is the least important source and is assigned the lowest priority, while the safety and security channel is the most important and is assigned the highest priority. When an airline representative makes a boarding announcement, the music is 'ducked' in volume so that the representative can be heard over the music, but if a security announcement is broadcast at the same time the airline rep is making a boarding call, both the music and the representative will be 'ducked' so that only the security announcement can be heard.

The Priorities tab contains all of the parameters for the Input Channel Duckers, which are shown below.

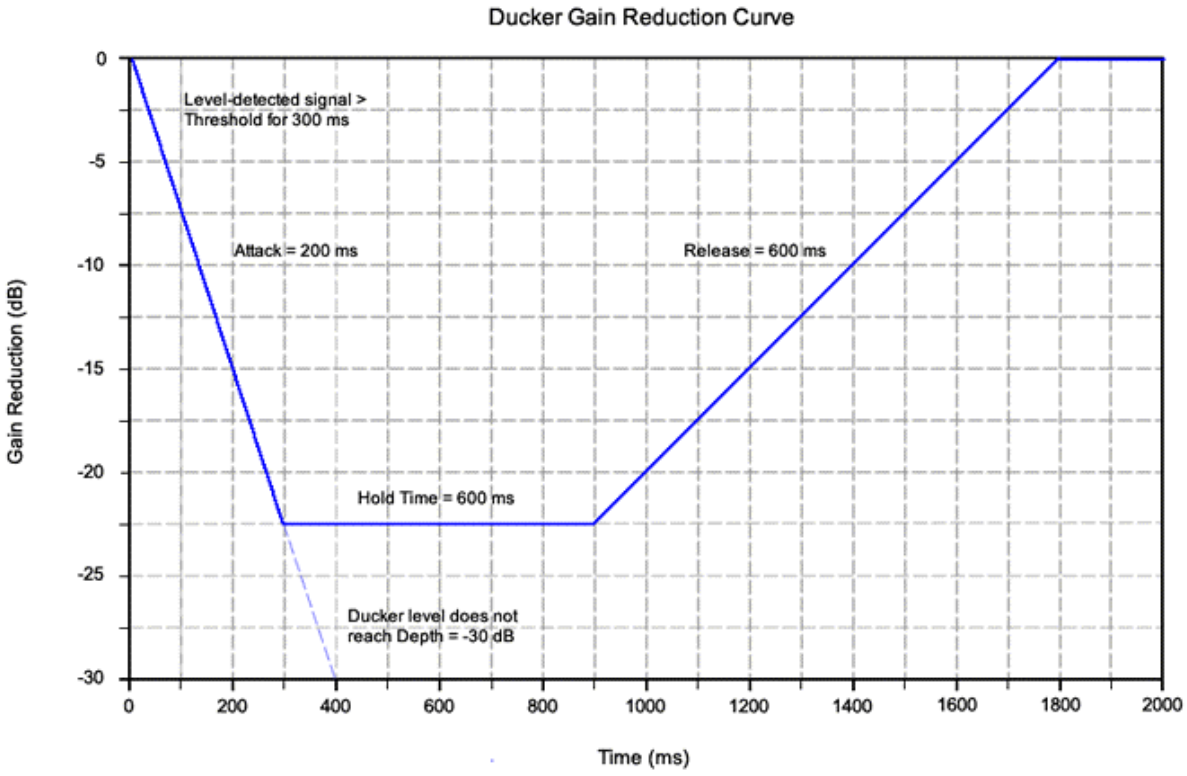


Parameters

- ***Priority*** The DX1208 has five *Priority* levels, numbered [1] through [5]. Channels with a higher *Priority* take precedence over channels of a lower *Priority*. When a *Priority* level is triggered, the gain of lower-*Priority* channels is reduced (ducked), while the gain of channels with the same or higher *Priority* remains unchanged. For example, channels set to *Priority* [1] cannot be ducked by any means; channels set to *Priority* [3] can be ducked by *Priority* [1] and [2] triggers, but not [3] through [5] triggers.
- ***Level Detect*** Ducker activity can be triggered externally by a Remote Control or Logic Input signal, or internally by a channel's signal level. When *Level Detect* is [Enabled], a channel's signal level will trigger ducking on lower *Priority* channels when its signal level at the EQ output (see the signal flow diagram in the *DX1208 Instruction Manual*) exceeds the *Threshold* setting. When *Level Detect* is [Disabled], a channel's signal cannot trigger ducking based on its signal level.
- ***Depth*** When a Ducker priority trigger event occurs, all channels that are both assigned to a lower *Priority* level and are not *Bypassed* are reduced in gain by the amount set by the *Depth* control. If multiple *Priority* levels are triggered simultaneously, then all levels below the lowest activated *Priority* will be ducked using the largest *Depth* setting amongst the triggered levels. For example, if *Priority* [1] and *Priority* [3] are triggered at the same time, then all channels assigned to *Priority* [2] and [3] will be lowered in gain (in dB) by the *Depth 1* setting, and all channels assigned to *Priority* [4] and [5] would be lowered in gain by the larger of the *Depth 1* or *Depth 3* settings.
- ***Bypass*** When [Enabled], the *Bypass* control disables ducking on that channel. *Bypass*ed channels can neither trigger ducking on other channels (through level detection), nor can they be ducked.
- ***Threshold*** When *Level Detect* is enabled on a channel and its signal level exceeds the *Threshold*, then all channels with a lower *Priority* (that are also not *Bypassed*) are ducked.
- ***Attack*** Controls the Ducker gain reduction rate (15 dB per *Attack* period) once a priority trigger event occurs. Set the *Attack* rate so that the ducked channels reach depth quickly enough to avoid interfering with the priority channel(s), but without sounding too abrupt. Avoid using a slow *Attack* with large *Depth* settings, because the Ducker may not reach depth before the priority source commences. This is especially true when both the trigger event length and *Hold* times are short.
- ***Release*** Controls the Ducker gain increase rate (15 dB per *Release* period) once the hold timer expires. Set the *Release* rate so that the ducked channel(s) return to normal volume at a rate which sounds natural and is not distracting. A natural-sounding *Release* rate is typically longer than a natural-sounding *Attack* rate.
- ***Hold*** The *Hold* setting determines the length of the hold period, which begins when the priority trigger ends. When the hold period begins the Ducker stops changing gain, and when the hold period expires, the Ducker

release begins. Therefore if the priority trigger duration is longer than the *Attack* time, then the Ducker will reach depth before the trigger ends and then hold gain at depth for the duration of the hold period. If the trigger is shorter than the *Attack*, then gain will not reach depth when the trigger ends, and the gain will be held at this value for the duration of the hold period. The relationship between priority trigger event length and the *Attack*, *Hold*, *Release*, and *Depth* parameters is illustrated in the graph below.

Using the example from the graph, if a level-detected signal crosses and remains above the *Threshold* for [300 ms], and the *Attack* is set to [200 ms], the *Release* to [600 ms], the *Hold* to [600 ms], and the *Depth* to [-30 dB], then gain is reduced by only -22.5 dB before the hold period begins. However, if the signal remains above *Threshold* for [400ms], the gain reduction would reach depth before the hold period begins.



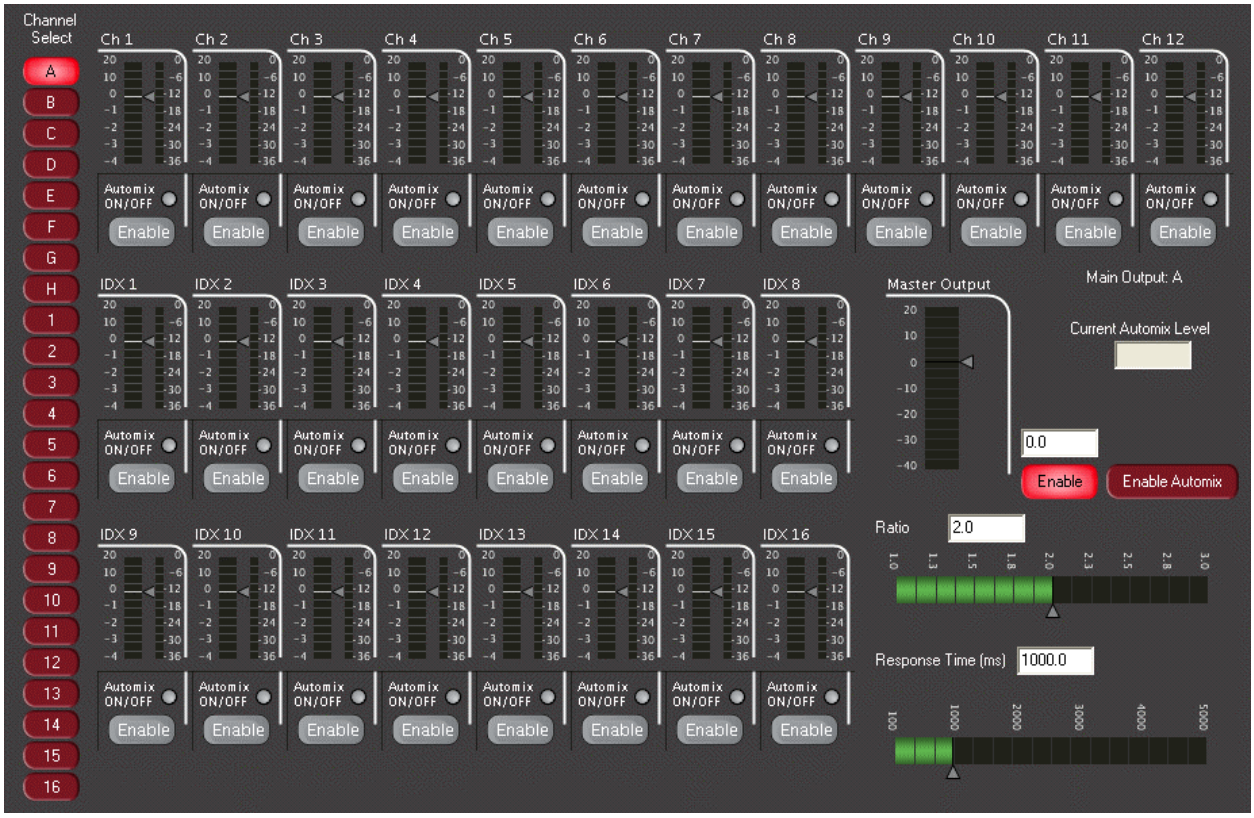
Device Window – Automix Tab

Matrix Mixer

Description

The DX1208 contains a 28x24 Matrix Mixer that allows any of the unit's 12 Analog/Digital and 16 DX Link Inputs to be independently assigned and mixed to any of its 8 Analog and 16 DX Link Outputs. Additionally, the Matrix Mixers have independently functioning Automixers for each of the 8 Analog outputs; any Input assigned to an analog Output Channel can be

assigned to the Matrix with or without automixing applied. The Matrix Mixer and the Automixer controls both share the Automix tab, as shown below.



Signals arrive at the Matrix inputs post-Ducker and are seen immediately by the channel Meters before being routed through the *Enable* switch and the *Fader* (see the signal flow diagram in the *DX1208 Instruction Manual*). The Input Channnel *Fader* controls the input's gain to both the Matrix Master Output, and the Automixer input (if *Automix* is [On]). All [Enabled] input channels are then summed before being routed to the Master Output *Enable* switch and *Fader*. The Master Output Meter is post-*Fader*.

Typical uses for a matrix mixer include creating independent mixes of the same source material for different areas, or zones, within a facility. When combined with automixing, a matrix mixer may be used to setup mixes for clusters of speakers in which open microphones in close proximity to the cluster(s) are lower in volume than in those clusters which are farthest away from the microphones, as in a boardroom or conference facility.

Input Channel Parameters

- ***Enable*** — Assigns the Input Channel to the selected Matrix Output. When a channel is [Disabled], none of that channel's signal is routed to the output, regardless of the channel *Fader* setting, and regardless of whether *Automix* is [On].
- ***Fader / Gain*** — Controls the gain of the Input Channel to both the Matrix Mixer and the Automixer. Adjust the gain by dragging the fader handle (from [+20] to [-39 dB]). <CTRL+CLICK> in the channel Meter to reset the *Fader* to unity.

- ***Meter*** Displays the instantaneous peak signal level of the Input Channel, pre-*Fader* and pre-*Enable*.

Master Output Parameters

- ***Channel Select*** Selects the Matrix Output Channel that is controlled by the Automixer tab.
- ***Enable*** Enables the Matrix Output. When [Disabled], no audio passes to the Output Channel.
- ***Fader / Gain*** Controls the overall gain of the Matrix Output. Adjust the gain either by dragging the fader handle or entering a value (from [+20] to [-99 dB]) into the text box to the right of the Output. <CTRL+CLICK> in the Master Output Meter to reset the *Fader* to unity.
- ***Meter*** Displays the instantaneous peak volume level of the Matrix Output, post-*Fader* and post-*Enable*.
- ***Current Automix Level*** This text box displays the gain (in dB) of the last Matrix Channel whose *Fader* was adjusted.

Automixer

Description

Automixers are designed to emulate a skilled human operator using a traditional mixing console to mix multiple speech inputs together. Typical multi-source speech environments, such as are found in boardrooms, courthouses and city council chambers, conference facilities, and even theaters, present numerous challenges to both human and automatic mixers. Speech intelligibility suffers when unused microphones pick up reverberance and unwanted room noise. Additionally, increasing the number of open microphones decreases the overall system gain before feedback, making it harder in larger systems to apply sufficient gain to make the on-mic sources audible. The fast pace of unscripted dialog exchange also makes it exceedingly difficult to anticipate when gain changes are required, and can lead to speakers' words or sentences being cutoff before the operator can react.

There are two types of automixers commonly used today: gain sharing, and gating automixers. Gating automixers use noise gates on each automix channel that open and close when a user-defined threshold is exceeded. With this method the number of microphones can change from moment to moment, and for this reason the more sophisticated gating automixers allow you limit the number of open microphones (NOM) to prevent feedback. While gating automixers are good in certain applications, in general they are harder to setup (especially with larger systems), and the gating effects can sometimes be heard both on individual channels and in the overall system as background noise is modulated with the NOM.

The DX1208 employs a gain sharing automixer, which works on the basis of expanders, rather than gates. Instead of each microphone being turned on or off, all microphones are on all the time, and the overall system gain is distributed amongst them. As one source gets louder with respect to the other sources, it receives a proportionately larger share of the overall gain; as another gets quieter, it receives a proportionally smaller share of the gain. The advantage of this is that it is easy to optimize the system for maximum gain before feedback, especially in

larger systems, because the overall output gain remains constant for a given number of automix-enabled inputs. And because the overall gain remains the same and microphones are never 'off', gating automixers do not have problems with background noise modulation and gate 'chattering', and are therefore in general more sonically transparent than gating automixers. Both automixer types are superior to human operators in their ability to react quickly to input level changes.

The DX1208 Automixer also measures signal correlation across all assigned inputs. Therefore when signal cancellation occurs between one or more inputs, the cancellation is factored into the gain-sharing calculations so that the gain reduction is appropriately weighted towards the input(s) that are contributing to the energy of the Automixer output signal. Correlation is not measured across Automixers; each Output Channel's Automixer functions independently of the other.

In DX Navigator v1.0, automixing is not available on the DX Link Matrix Outputs.

Parameters

- ***Automix On/Off*** *Automix On/Off* enables automixing for an individual input channel. When set to [Off], the channel is not included in the automix gain calculations, and no automix gain is applied to it. When [On], the channel is both included in the automix gain calculations, and automix gain is applied to it.
- ***Enable Automix*** *Enable Automix* enables automixing for the selected Matrix Output Channel. When [Disabled], then no automix gain reduction is applied to any channel assigned to that Automixer.
- ***GR Meter*** Displays the amount of automix gain reduction applied to an Input Channel whose *Automix On/Off* is [On]; the *GR Meter* is inactive when *Automix On/Off* is [Off]. The maximum Automixer gain reduction is limited to -36db.
- ***Ratio*** The *Ratio* setting controls the slope of the Automixer expander. With a *Ratio* of [1.0], the slope of the transfer curve is at unity (1:1), and the Automixer has no effect. As the *Ratio* increases, the relative gain changes distributed amongst the channels become more and more pronounced. The amount of gain reduction applied to each channel can be calculated based on adding a duplicate set of inputs to the Automixer. As an example, with a single 0 dB sine tone applied to Matrix Input 1, no gain reduction is applied. Adding an identical tone to Matrix Input 2 causes both channels' gain to be reduced 3 dB with a *Ratio* setting of [1.5], 6 dB with [2.0], 9 dB with [2.5], and 12 dB with [3.0]. Adding two more identical tones to Matrix Inputs 3 and 4 causes the same amount of gain reduction again, and so forth.
- ***Response Time*** Controls the rate at which the Automixer changes the gain (30 dB per *Response Time* period) of all automix-enabled channels. This rate is identical for both the attack (gain reduction) and release (gain increase) portions of the Automixer response.

Device Window – Output Tab

Output Section

Description

The DX1208 has eight balanced, line-level Analog Output Channels having a max peak output level of +24 dBu. All Output Channels have digital *Gain*, *Meter*, *Solo*, and *Mute* controls which appear in the Channel Strip at the bottom of all Device Window tabs except the Automix tab.

Parameters

- ***Channel Select*** Selects the Output Channel that is controlled by the Output tab.
- ***Channel Name*** Output Channels can be given a *Channel Name* of up to 32 characters in length.
- ***Meter*** Displays the instantaneous peak signal level of the Output channel immediately prior to the output D/A converter.
- ***Fader / Gain*** Controls the gain of the Output Channel after the Crossover and *Mute* switch, but prior to the Limiter and Delay. Gain can be applied from [-99] to [+20 dB] in [0.1 dB] steps using the *Gain* textbox, or from [-38] to [+20 dB] by dragging the *Fader* handle; dragging the *Fader* handle all the way to the bottom sets the *Gain* to [-99 dB]. <CTRL+CLICK> in the channel Meter to reset *Gain* to unity.
- ***Mute*** *Mutes* the Output Channel. The *Mute* is applied between the Crossover and the *Fader*.
- ***Solo*** *Soloing* an Output Channel mutes all Outputs that are not *Soloed*; *Soloing* an Input Channel mutes all Inputs that are not *Soloed*. However, *Solos* do not override existing *Mutes*, so any channel that is both *Muted* and *Soloed* will not be heard. If both Input and Output Channels are *Soled* at the same time, make sure that all Input Channels routed to the *Soloed* Outputs are also *Soloed*, or they will not be heard.

EQ

Description

Each of the eight DX1208 Output Channels is equipped with a fully-configurable eight-band EQ, which occurs in between the Matrix Mixer Output and the Channel Crossover Filters in the DX1208 signal chain. Each EQ band can configured as a Parametric, High/Low Pass, or Shelving Filter, and can be individually enabled or disabled.

These Filters are functionally identical to the Input Channel Filters described in the Input EQ section of this helpfile. Those Output Channel EQ controls that differ from their Input Channel EQ counterparts are described below.

Parameters

- ***Parametric EQ Bypassed*** Bypasses all eight Filter bands at the same time without changing any Filter's settings. , disabling the entire EQ while

preserving each filter's settings. The two Crossover Filters remain unaffected.

- ***Reset Parametric EQ*** Resets all eight Filter parameters to their factory default settings. The two Crossover Filters remain unaffected.

Crossovers

Description

Each of the eight DX1208 Output Channels is additionally equipped with a pair of Low- and High-Pass Crossover Filters that occur between the Output Filters and the Limiter in the DX1208 signal chain. Each Crossover Filter can be set to any of three standard crossover filter types – Butterworth, Bessel, and Linkwitz-Riley – and adjustable slopes of 6, 12, 18, or 24 dB/octave.

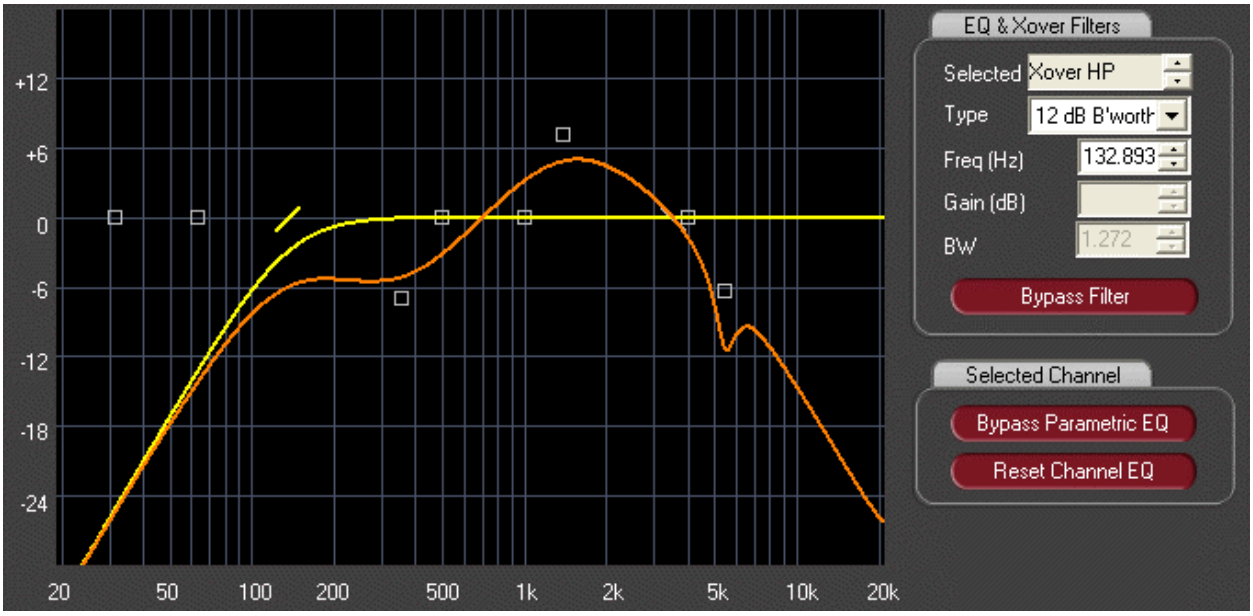
Parameters

- ***Selected*** Determines which Filter the *Type*, *Frequency*, *Gain*, and *BW/Q*, and *Bypass Filter* settings apply to. When a Crossover Filter is *Selected*, the *Gain* and *Bandwith* controls are disabled.
- ***Type*** When a Crossover Filter is *Selected, Type* sets the Filter type from amongst the following choices: [6 dB], [12 dB Butterworth], [12 dB Bessel], [12 dB Linkwitz-Riley], [18 dB Butterworth], [18 dB Bessel], [24 dB Butterworth], [24 dB Bessel], [24 dB Linkwitz-Riley].

  Note: The [6 dB Butterworth] and [6 dB Bessel] filter responses are identical. Therefore only a single 6 dB filter type is presented.
- ***Frequency*** Sets the *Frequency* center of the *Selected* Filter. *Frequency* values range from [20 Hz] to [20 kHz].
- ***Bypass Filter*** Bypasses the *Selected* Crossover Filter band without changing any of the Filter's settings.
- ***Gain*** Disabled when a Crossover Filter is *Selected*.
- ***Bandwidth / Q*** Disabled when a Crossover Filter is *Selected*.

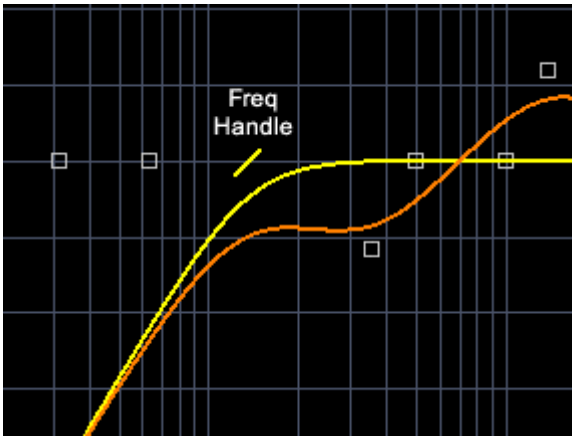
EQ Graph

The response of the Crossover Filters is plotted along with the response curves of the eight Output Channel Filters. A general description of the EQ Graph and how to edit EQ parameters graphically can be found in the Input EQ section of this helpfile.



To edit a Crossover filter from the EQ graph:

1. <CLICK> the diagonal white *Frequency Handle* to select the Crossover. The previously selected Filter's curve disappears, and the *Selected* Crossover's curve appears in yellow with a solid yellow *Frequency Handle*.



2. <DRAG> the *Frequency Handle* left/right to adjust the *Frequency*.

Limiter

Description

Each of the eight DX1208 Output Channels is equipped with a Limiter that occurs between the Output *Fader* and the *Delay* in the DX1208 signal chain. The Output Channel Limiter is in all respects identical to the Input Channel Compressor (see the Input Channel Compressor section of this helpfile), with two small differences. First, the Limiter uses a hard-knee transfer curve, while the Compressor uses a soft-knee transfer curve. Second, the Limiter allows an [Infinite:1] *Ratio*, while the Compressor is limited to a maximum *Ratio* of [20:1].

In general the difference between compressors and limiters lies principally in the way they are configured and used rather than how the DSP processes actually function. Compressors are traditionally used to reduce the dynamic range of signals to within a nominal range that is compatible with the acceptable dynamic range of the entire sound reproduction chain (including amplifiers and speakers) within the context of the acoustic environment in which they are placed. Compressors generally have lower ratios (i.e. less than 4), and thresholds set blow or near the nominal signal level of the system.

Limiters, on the other hand, are used to place a limit on the maximum peak level of a signal in order to prevent clipping (in the analog or digital domain), or to protect downstream devices such as amplifiers and speakers from damage due to clipping and/or driving components above their rated maximum operating levels. Therefore limiters typical use extremely high ratios (from 10 to Infinity) to prevent the signal from exceeding the absolute limit set by the threshold, thresholds at or near signal clip levels, and fast attack times to quickly suppress transient overloads. They also use hard-knee compression so that signals can get as close to the threshold as possible before gain reduction is applied (which adds THD when very fast attack and release times are used.)

The DX1208 gives you the flexibility to configure the Output Limiter as a Limiter, Compressor, or AGC. Because the Limiter occurs AFTER the Output *Fader*, the DX1208 Limiter prevents amplifier overload caused by any other gain stage in the DX1208 Output. How you decide to use the Output Limiter is completely dependent on your application.

AGC

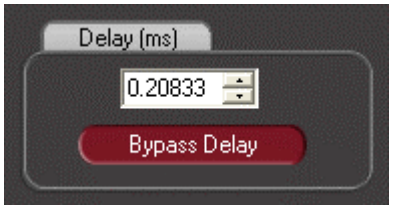
Description

As with the Input Channel Compressors, the Output Channel Limiters can also function as Automatic Gain Controls (AGC). See the Input Channel AGC section of this helpfile for information on the Output Channel AGCs.

Delay

Description

Each of the eight DX1208 Output Channels is equipped with a digital Delay that occurs between the Limiter and the D/A converters in the DX1208 signal chain. Delays can be used to time-align individual drivers within a speaker system (used in combination with the Crossover Filters), or an array of distributed speakers so that sounds from each speaker arrive at the same time within a designated listening area.



Parameters

- ***Delay*** — Output Channels can be individually delayed in single-sample increments (1 sample = 20.83 μs at 48 kHz), up to [2000 ms].

- ***Bypass Delay*** Sets the effective channel delay to [0 ms], regardless of the *Delay* time setting.

Device Window – DX Link Tab

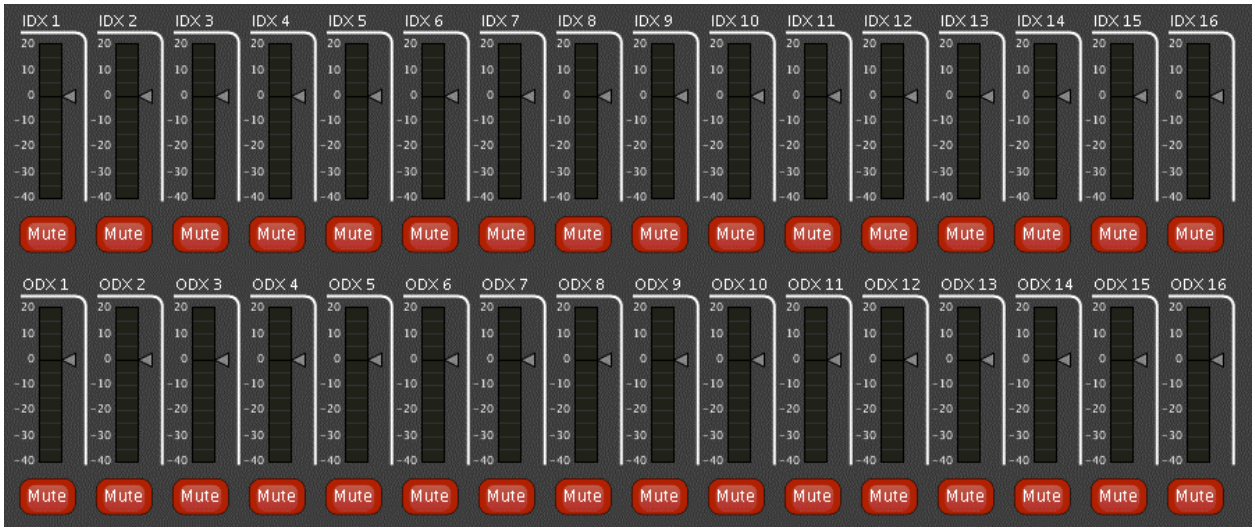
Description

The DX1208 can simultaneously transmit and receive 16 channels of digital audio to/from other DX Link enabled devices via its DX Link Tx (transmit) and Rx (receive) jacks. DX Link audio received from an upstream device is first routed to the *Fader* and *Mute* controls located in the DX Link tab, where they are labeled IDX 1 through IDX 16. The IDX Channels are then routed through the Ducker, and then to the Matrix Mixer, where each channel can be mixed with the rear-panel Analog and Digital Inputs and routed to any combination of DX Link and rear-panel Outputs. Because DX Link Input Channels have no DSP processing except Ducking, IDX Channels do not appear anywhere on the Input tab.

DX Link Output (ODX) Channels originate with the Matrix Mixers located in the Automix tab. Any combination of rear-panel and IDX Channels can be mixed together in the Matrix. From the ODX Matrix Outputs the signals are routed to the *Fader* and *Mute* controls in the DX Link tab, where they are labeled ODX 1 through ODX 16. They are then routed directly to the DX Link Tx jack where they are transmitted to a downstream device. Because DX Link Output Channels have no DSP they do not appear anywhere on the Output tab.

When multiple DX1208 units are connected via DX Link, their sample clocks must be synchronized to a common master clock source. See DX Link Clocking in the Settings tab for information on configuring the software to work with DX Link.

NOTE: DX Link is a proprietary EAW digital audio format that carries only digital audio and clocking data. Though DX Link uses or network cable with RJ-45 connectors, it does not conform to the Ethernet physical or data layer standards, and therefore is not is not compatible with CobraNet® and other AoE (audio over Ethernet) formats. DX Link connections must be made directly between DX1208 units without the use of intervening networking hardware such as switches, hubs, or routers.



Parameters

The controls for both the DX Link Inputs and Outputs are identical.

- ***Meter*** — Displays the instantaneous peak signal levels of IDX Channels at the DX Link Rx (input) jack, pre-IDX *Fader* and *Mute*, and the instantaneous peak signal levels ODX Channels immediately prior to the DX Link Tx (output) jack, post-ODX *Fader* and *Mute*.
- ***Fader / Gain*** — Adjusts the *Gain* of IDX/ODX Channel. IDX *Faders* occurs after the IDX *Mute*, but before the Ducker in the IDX signal path. ODX Faders occur after the ODX *Mute*, but before the DX Link Tx jack in the ODX signal path. *Gain* can be adjusted from [-40] to [+20 dB] in 1 dB steps. Adjust the *Gain* by dragging the *Fader* handle. <CTRL+CLICK> in the channel Meter to reset the *Fader* to unity.
- ***Mute*** — *Mutes* the IDX/ODX Channel. IDX *Mutes* are applied between the DX link Rx jack and the IDX *Fader*; ODX *Mutes* are applied between the Matrix Master Output Fader and the ODX *Fader*.

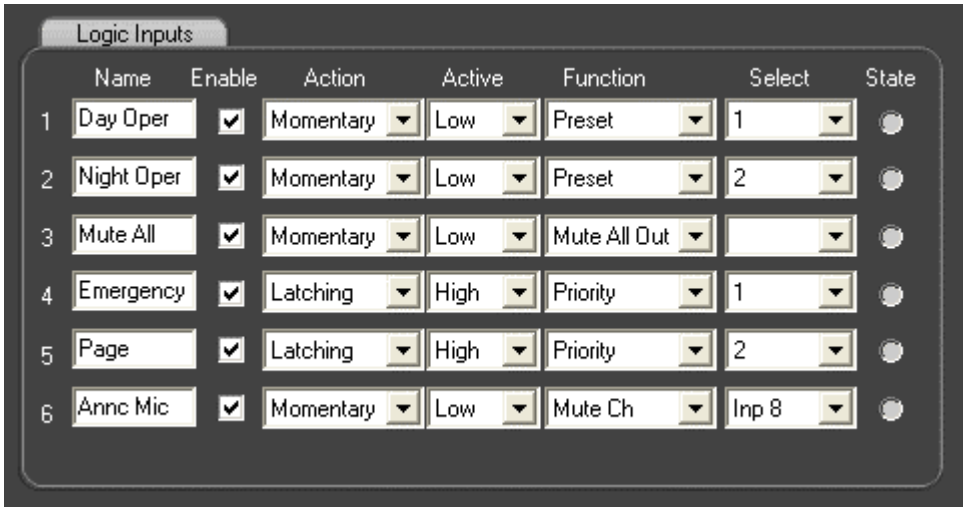
Device Window – Logic I/O Tab

Logic Inputs

Principle of Operation

The DX1208 has six Logic Inputs that can each be assigned to control or trigger different functions within the unit, such as recalling *Presets* or muting channels. The Logic Inputs are internally pulled high to +3.3V through a 10 kohm resistor, and can be activated directly by switch or relay closure, or driven by a TTL/CMOS open-collector Logic Output capable of sinking at least 0.35 mA of current. Momentary contact switches are preferred, as latching switches state can easily get 'out of sync' with the overall state of the system.

Logic Inputs can be set to either momentary or latching operation, and can trigger on a low-to-high, or a high-to-low input signal transition. Momentary triggers require only a single transition, and latching triggers require two transitions. For example, if a normally-open momentary contact switch is connected to a Logic Input that is configured to momentarily mute channel 1 on a low transition, then channel 1 will be muted only as long as the switch is pressed and held; if the input is configured for latching operation, then channel 1 will remain muted after the switch is pressed and released. Pressing the switch a second time unmutes channel 1. Additionally, functions can never be triggered simply by changing a Logic Input setting, even if the change would otherwise cause the trigger to occur. To use the previous example, if the user changes the *Action* from [Low] to [High] with the switch open (and hence the input is logic high from the pull-up resistor), a trigger does not occur, even though the logic condition matches the input condition.



Parameters

- ***Name*** — Each Logic Input can be given a *Name* to identify its function or location.
- ***Enable*** — When *Enable* is checked, a Logic Input can trigger the action defined by the *Function* setting.
- **State** — When the Logic Input meets the condition determined by the *Active* setting, the Logic Input becomes TRUE, and when it does not meet the condition it becomes FALSE. However, how the *Function* is activated or deactivated depends on whether the *Action* is [Latching] or [Momentary]. The *State* indicator lights when the *Function* is active, rather than when the Logic Input is TRUE.
- ***Action*** — The *Action* setting determines whether the input remains active after the trigger signal becomes FALSE.

  [Momentary] With [Momentary] inputs the *Function* is activated when the input is TRUE, and deactivated when the input is FALSE.

  [Latching] With [Latching] inputs the *Function* is activated when the input becomes TRUE, and deactivated when the input becomes FALSE and then TRUE a second time.
- ***Active*** — Defines the logic state required to trigger the logic *Function*.

  [Low] The *Function* is triggered when the Logic Input sees a high-to-low transition.

  [High] The *Function* is triggered when the Logic Input sees a low-to-high transition.
- ***Function*** — Defines which DX1208 parameter(s) the Logic Input controls.

  [None] Disables the Logic Input. Does the same thing as unchecking the *Enable* setting.

[Preset] Recalls the preset number chosen in the associated *Select* setting.

[Priority] Triggers the ducker *Priority* level chosen in the associated *Select* setting.

[Mute All In] Mutes and unmutes all Analog, Digital, and DX Link Inputs.

[Mute All Out] Mutes and unmutes all Analog and DX Link Outputs.

[Mute Ch] Mutes and unmutes only the Input, Output, or DX Link channel chosen in the associated *Select* setting.

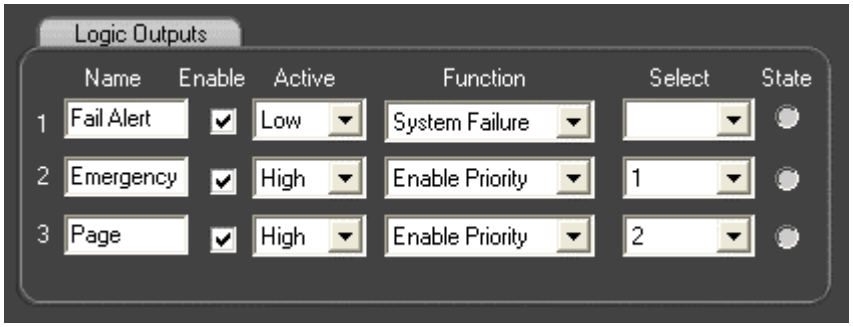
- ***Select*** Assigns a specific *Preset*, *Priority* level, or input/output channel number to the [Preset], [Priority] or [Mute Ch] *Function*.

Logic Outputs

Principle of Operation

The DX1208 has three Logic Outputs which indicate various hardware conditions. The Logic Outputs are open-collector outputs that are pulled high internally to +5V through a 340 ohm resistor. They can sink up to 12 mA of current and drive an LED directly.

Logic Outputs can be set active high (4.8V, unloaded) or active low (0.4V, unloaded). When a Logic Output is inactive, the output is set to the opposite logic level. This is also true when the output *Enable* is unchecked or the *Function* is set to [None]. So, for example, if *Function* is set to [None] and *Active* is set to [Low], then the output will be high.



Parameters

- ***Name*** Each Logic Output can be given a *Name* to identify its function or location.
- ***Enable*** When *Enable* is checked, then when condition defined by the *Function* setting occurs, the Logic Output becomes active.
- ***State*** This indicator lights when the Logic Output is active, and is dim when inactive.
- ***Active*** *Active* defines the logic level of the output when the output is active.

  [Low] When [Low], the Logic Output level is +0.4V (unloaded).

[High] When [High], the Logic Output level is +4.8V (unloaded).

- ***Function*** *Function* defines which DX1208 parameter(s) the Logic Output controls.

  [None] Disables the logic output. Does the same thing as unchecking the *Enable* setting.

  [System Normal] Indicates that the unit is operating normally. This condition is the inverse of the [System Failure] state.

  [System Failure] Indicates that some internal condition has caused the unit to reset itself. This condition remains TRUE after the reset until the unit is power cycled. This state is the inverse of the [System Normal] state.

  [Comm Any] This output represents the logical OR of all five of the comm logic outputs listed below: [Comm Logic], [Comm Remotes], [Comm Ethernet], [Comm UART], and [Comm USB]. It is identical to the green COMM led on the unit's front panel.

  [Comm Logic] This output is active whenever a high-low or low-high transition is detected on any of the 6 logic inputs. This is true regardless of whether the Logic Inputis *Enabled*, and regardless of which *Function* and *Active* states are defined.

  [Comm Remote] This output is active whenever communication is received from an *Enabled* remote control, and regardless of which *Functions* and *Actions* are assigned to the remote(s).

  [Comm Ethernet] Active when communication occurs between DX Navigator and the DX1208 hardware over the Ethernet port.

  [Comm UART] Active when communication occurs between DX Navigator and the DX1208 hardware over the RS-232 port.

  [Comm USB] Active when communication occurs between DX Navigator and the DX1208 hardware over the USB port.

  NOTE: Since the [Comm Ethernet], [Comm UART], and [Comm USB] functions each indicate active communication connections with DX Navigator over their respective ports, activity on more than one of these *Functions* indicates that multiple instances of DX Navigator are connected to the unit.

  [DX Link Lock] Active when a synchronous DX Link signal is present on the DX Link Rx jack. This output is identical to the *DX Link Locked* indicator in the UI Settings tab, and the DX Link Active led on the front panel of the unit.

[Enable Priority] Active when the *Select*ed ducker [Priority] level is triggered by either a Logic Inputor a remote control; priority levels triggered by level detection are not indicated by this output.

[Mute All In] Active when all physical and DX Link inputs are muted.

[Mute All Out] Active when all physical and DX Link outputs are muted.

[Mute Ch] Active when the *Select*ed input or output channel is muted.

- ***Select*** *Select* assigns a specific *Priority* level or Input/Output Channel number to the [Enable Priority] or [Mute Ch] *Function*.

Device Window – Remotes Tab

Description

The DX1208 supports the use of external Remote Controls which can be used to control different DX1208 functions, such as recalling *Presets*, triggering ducker *Priorities*, or changing Input or Output Channel *Gains*. The DX1208 communicates to the Remotes through a single RS-485 port on the rear of the unit that can directly power up to 10 Remote Controls. An external power supply is required to connect more than 10 Remotes (see the *Universal Remote Control - Quick Start Guide* for more information).

Every Remote connected to a DX1208 must be set to a unique bus address (up to 128 addresses are possible). It is not necessary to maintain unique addresses across multiple DX1208 units in a system, since each DX1208 is aware only of the Remotes connected to its own Remote Bus. When the DX1208 powers up it queries the Remote Bus for the presence of Remotes at each of the 128 possible addresses. If it finds a Remote, the DX1208 flashes the Remote's LEDs to indicate that it has been found. Remotes must be connected to the DX1208 at power up to be recognized and function properly. The DX1208 will not recognize a Remote that is connected after power up.

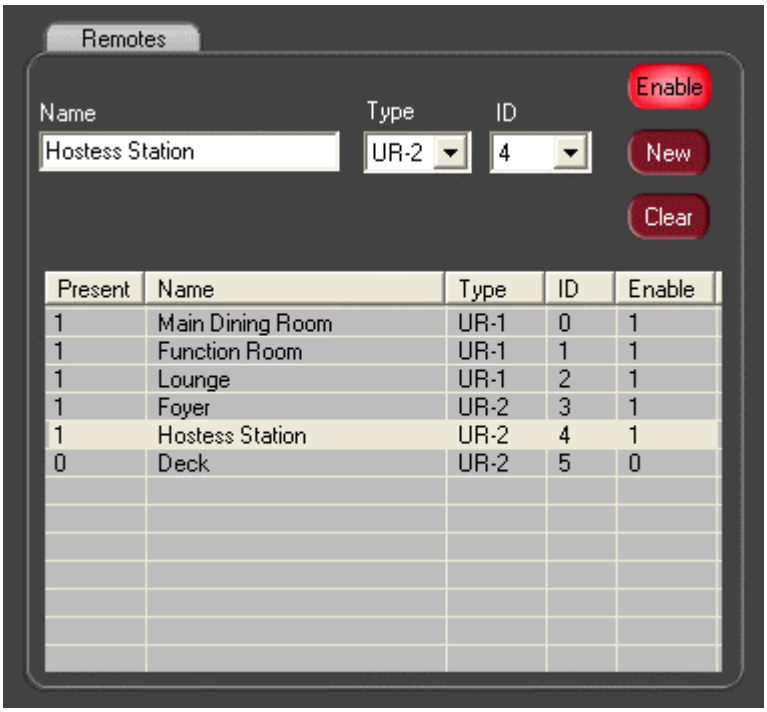
There are three types of DX Remote Controls:

- **UR-1** The UR-1 has a rotary encoder which controls the *Gain* of Input or Output Channels. A ring of 15 LEDs surrounding the encoder displays the channel gain. It also has a single function button that can be programmed for the same actions as the Logic Inputs. When the assigned *Button Function* is activated, the button's LED lights.
- **UR-2** The UR-2 has four function buttons which can each be programmed for the same actions as the Logic Inputs. When the assigned *Button Function* is activated, the button's LED lights.
- **UR-3** The UR-3 is actually a UR-1 and UR-2 grouped together on the same wall plate. As such they must be programmed as two individual Remotes.

The Remotes tab is used to add and configure Remote Controls. All Remote tab settings are stored in non-volatile hardware memory and are therefore retained when a unit is power

cycled. They cannot be stored into or loaded from a *Preset*, but can be saved into a DXN file, or copied from one design/device to another.

A list of all Remotes with their *Names*, *Types*, and *IDs* is shown in the Remotes section of the Remotes tab.



At power-up the hardware scans the Remote Bus and compares the *Type* and *ID* of the hardware-detected Remotes with the *Type* and *ID* of the Remotes in the list. If there is a match, then the detected Remote uses the settings defined by the listed Remote. If there is an *ID* match but a *Type* mismatch, or if there is no *Type* and *ID* match at all, then the detected Remote is automatically added to the Remotes list, along with its *Type* and *ID*. The Remote Controls themselves do not store any configuration information. If a Remote Control is moved to a different DX1208 it must be reconfigured from the Remotes tab of the new DX1208.

Remotes Parameters

- ***Name*** — Each Remote can be given a *Name* to identify its function or location.
- ***Type*** — Selects which type of Remote Control is assigned to the *ID*. Setting the *Type* to [UR-1] enables the UR-1 and disables the UR-2 programming controls. Conversely, setting the *Type* to [UR-2] enables the UR-2 and disables the UR-1 programming controls. The *Type* setting for *Present* Remotes cannot be changed.
- ***ID*** — Sets the *ID* of the Remote. This *ID* must match the physical address as set on the Remote's 8-position DIP switch (see *Universal Remote Control - Quick Start Guide* for instructions on setting the physical address). IDs can range from [0] to [127]. The *ID* setting for *Present* Remotes cannot be changed.

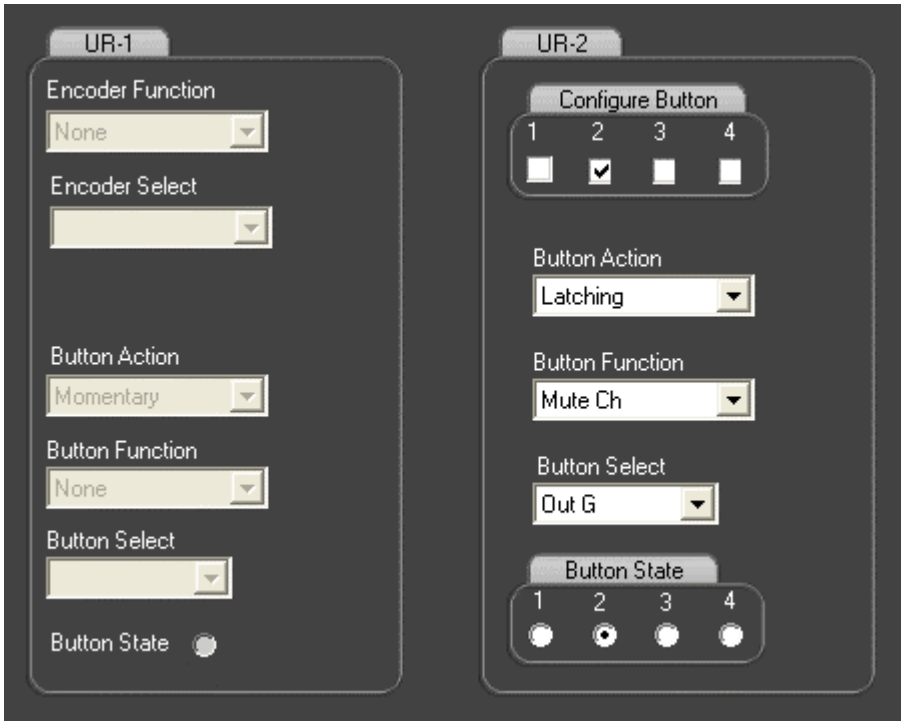
- ***Enable*** Allows the selected Remote to control the DX1208. Enabled Remotes are indicated by a [1]; disabled Remotes are indicated by a [0]. Disabling a Remote Control prevents it from changing the assigned *Functions*. However, even when disabled, a Remote's LEDs continue to display the current state of the assigned *Functions*. For example, if the encoder of a disabled UR-1 is assigned to an [I/O Gain], then the encoder LED ring will reflect any changes to that *Gain* setting made from DX Navigator. All new Remotes that are detected at power-up are enabled by default.

- ***New*** Adds a new Remote to the Remotes list. New Remotes are added starting at the lowest unused ID. Up to 100 Remotes can be added to the Remotes list, inclusive of all Remotes present at power-up.

- ***Clear*** Removes the selected Remote from the Remotes list. *Clearing* a Present Remote clears the *Name* and *Enable* parameters and all *Functions* assigned to the Remote, but does not remove the Remote from the list; Present Remotes cannot be removed from the list unless the Remotes become disconnected from the Bus for more than 10s.

- ***Present*** Indicates whether a Remote is detected on the RS-485 Remote Bus when the unit is powered-up. Detected Remotes are indicated by a [1]; user-defined Remotes and detected Remotes that later become disconnected from the DX1208 for more than 10s are indicated by a [0]. Remotes must be connected to the DX1208 prior to power-up to be detected; if they are connected afterwards the DX1208 will not recognize them.

UR-1 Parameters



- ***Encoder Function*** Defines which DX1208 parameter(s) the Remote controls

  [None] Disables the encoder knob.

  [I/O Gain] Allows gain adjustment of any of the 12 Input or 8 Output Channels.

- ***Encoder Select*** Assigns a specific Input or Output Channel to the [I/O Gain] *Encoder Function*.

- ***Button Action*** Determines whether the button action is momentary or latching.

  [Momentary] The *Button Function* is activated only as long as the button is pressed and held.

  [Latching] The *Button Function* is activated when the button is first pressed and remains activated when released; it is deactivated when pressed and released second time.

- ***Button Function*** Defines which DX1208 parameter(s) the Remote controls.

  [None] Disables the Remote button.

  [Preset] Recalls the *Preset* number chosen in the *Button Select* setting.

  [Priority] Triggers the ducker *Priority* level chosen in the *Button Select* setting.

  [Mute All In] Mutes and unmutes all Analog, Digital, and DX Link Inputs.

  [Mute All Out] Mutes and unmutes all Analog and DX Link Outputs.

[Mute Ch] Mutes and unmutes only the Input, Output, or DX Link channel chosen in the *Button Select* setting.

- ***Button Select*** Assigns a specific *Preset*, *Priority* level, or Input/Output Channel number to the [Preset], [Priority] or [Mute Ch] *Button Function*.
- ***Button State*** This indicator lights when the *Button Function* is active, and is dim when inactive.

UR-2 Parameters

The UR-2 parameters are identical to the UR-1 *Button Action* and *Function* parameters described above, except that a different *Button Function* can be assigned to each of the 4 buttons.

- ***Select*** Selects which of the four buttons to which the *Button Action*, *Function*, and *Select* controls apply.

Device Window – Settings Tab

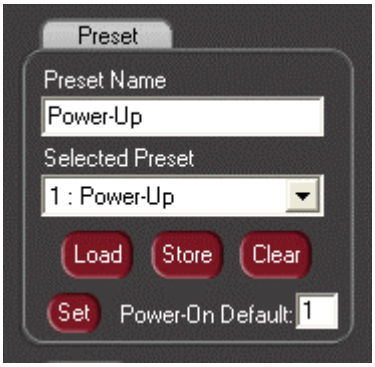
Presets

Description

The DX1208 allocates 24 namable *Preset* memories for storing and loading DX1208 parameter settings. *Presets* are stored in non-volatile memory, and so are retained when the unit is powered off. When the unit is powered on again, the designated *Power-on Default Preset* is loaded. *Preset* loads can be triggered from Remotes, Logic Inputs, dedicated RS-232 controllers, as well as DX Navigator.

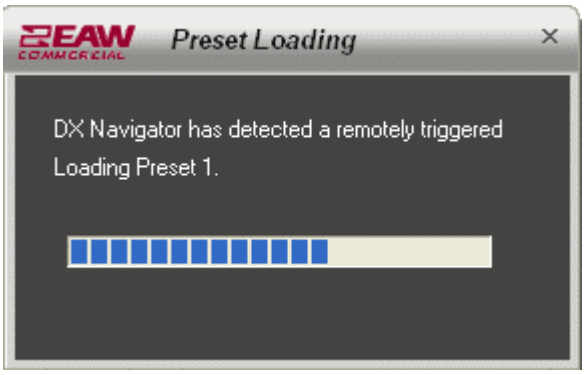
All user-editable parameters are stored to *Presets* except for the following:

- *Preset Power-on Default*
- *Admin* and *User Passwords*
- DX Link *Master / Slave* setting
- IP settings (all)
- Remote settings (all)
- Logic I/O settings (all)



Parameters

- ***Preset Name*** — Each *Preset* can be given a user-defined name of up to 16 characters in length. When a *Preset* is loaded, the name of the loaded *Preset* appears in the *Preset Name* text box; when a *Preset* is stored, the name currently in the *Preset Name* textbox is stored into the *Selected Preset* along with the other DX1208 parameter settings.
- ***Selected Preset*** — Selects the *Preset* that will be used for *Load*, *Store*, *Clear*, and *Set* operations.
- ***Load*** — Loads the parameter values stored in the *Selected Preset* into active memory. After pressing *Load*, the Preset Loading progress dialog appears, showing the number of the *Preset* being loaded, and whether or not the *Preset* was triggered locally or remotely. *Preset* loads usually take several seconds to complete while the current device parameters are updated to the new values.



- ***Store*** — Stores the current values of all device parameters (except where noted above) as well as the *Preset Name* into the *Selected Preset*.
- ***Clear*** — Erases the *Selected Preset*, and marks the cleared *Presets* as '(default)' in the *Selected Preset* list. *Loading* a cleared *Preset* resets the unit to a factory default state.
- ***Set*** — Makes the *Selected Preset* the *Preset* that is automatically loaded when the unit is powered on.
- ***Power-On Default*** — Displays which of the 24 available *Presets* will be automatically loaded when the unit is powered on. If the *Power-on Default Preset* has been cleared, then the unit will be reset to the factory default state on power up.

Permissions

Description

The DX1208 can be secured against unauthorized use by requiring users to log into the hardware to gain access to Device Windows. The DX1208 supports two user access levels, called Permissions: Administrative and User. Administrative Permission grants the user full

access to the hardware through the Device Window. User Permission grants the user the ability only to load *Presets*, view the Event Log, and view the Input/Output Channel Strip through a highly abridged version of the Settings tab. Permissions do not prevent individuals from controlling units from Logic Inputs and Remotes; Permissions only restrict control from the Device Window and RS-232 port. Design Windows are not access-restricted because they do not directly control hardware.

When Permissions are active, a *Password* is required to login to the Device Window. Double-clicking a hardware unit's Device Icon in the Found Devices tab of the main DX Navigator window opens the DX1208 Password dialog, as shown here:

To login, select a *Permission Level* and enter the appropriate password for that *Level*. As shipped from the factory, the DX1208 *Admin* and *User Passwords* are both blank. If the *Password* for either *Permission Level* is blank, then simply clicking the Login button gives the user de facto permission for the selected *Permission Level*. Once a *Password* is set the change takes effect immediately; the next time you login you must enter a *Password* to gain access to that *Permission Level*. Setting a blank P*assword* removes the Permission for that *Level*, once again allowing de facto access to that *Level*.

Administrative Permission is required to create or change Permissions. Make sure that you don't leave the *Admin Password* blank after setting the *User Password*, otherwise users will still have unrestricted access to the hardware.

Passwords are stored within each unit in non-volatile memory, and each unit may have its own unique *User* and *Admin Password*. Therefore for any given hardware unit, the same *Admin* and *User Passwords* are required to login from any instance of DX Navigator, regardless of where the computer is located. System administrators can use this feature to segment larger topologies into subsystems by login Permissions.

Parameters

- ***Admin*** — Sets the for Administrative-level access. *Admin Passwords* may be up to 16 characters in length, contain any combination alphanumeric characters, and are case-sensitive.
- ***User*** — Sets the *Password* for User-level access. *User Passwords* may be up to 16 characters in length, contain any combination alphanumeric characters, and are case-sensitive.
- ***Set Password*** — Sends the (*User* or *Admin*) *Password* to the DX1208 hardware. Once set, all subsequent logins will require you to enter the *Password* to gain (*User* or *Admin*) access to the Device window. Pressing *Set Password* with the *Admin* or *User* fields blank will effectively disable that Permission.

IP

Description

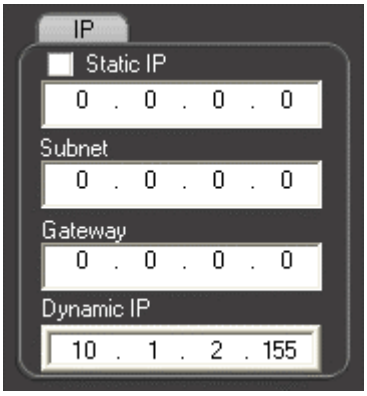
All DX series hardware devices can be configured to communicate with DX Navigator over a local (LAN) or wide-area (WAN) Ethernet network using either static or dynamic IP addressing methods. They can also communicate over peer-peer Ethernet connections using an Ethernet 'crossover' cable to connect the computer directly to the hardware without intervening nodes (including routers, hubs, switches, etc.).

Always consult with the network administrator before connecting any DX device to a non-dedicated corporate network. The network administrator will determine an acceptable range of IP settings that are compatible with the logical configuration and topology of the network. Failure to adhere to the administrator's IP assignment conventions may cause communications failures not only with the DX device, but also with other devices connected to the network.

Therefore to prevent such problems, configure the device's IP settings with the device disconnected from the network using a COM (USB or RS-232) connection. When finished, power cycle the unit, then connect the device to the network; IP setting changes do not take effect until after the device is power cycled. On some networks it may take several minutes after making IP setting changes before your DX device becomes visible to DX Navigator.

Dynamic IP

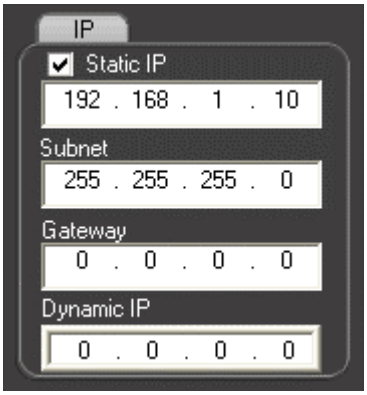
Dynamic IP allows a device's IP settings to be automatically configured by a DHCP server (typically a router or gateway device). When configured for dynamic IP operation, DX devices will request an IP configuration from a DHCP server each time they are powered on or connected to the network. If a DHCP server is present on the network, then the device automatically configures its IP settings using the settings provided by the server. Therefore a DX device's IP settings may change each time it connects to the network, or whenever the DHCP lease period for that device expires. Therefore whenever a device is configured for dynamic IP, you must set the DX Navigator communications mode to *Obtain IP Address By Broadcast* (see Communications Setup) in order to communicate with it.



All DX series hardware devices come factory configured for dynamic IP operation. Since most corporate networks employ DHCP servers, a general rule you will not need to change a DX device's IP settings before placing it onto a corporate network. However, if you are not sure if there is a DHCP server on the network, ask your network administrator.

Static IP

With static IP operation, DX devices are manually set to a specific IP address. Static IP operation is required whenever there is no DHCP server on the network, as is normally the case in peer-peer connections, or in small networks using only switches and hubs to connect all of the devices. It is also required when either DX Navigator or one or more DX devices are connected to different subnets (see Communications Setup). An example of this would be where you have a computer running DX navigator at your office, and want to connect to the devices at a client's site over the internet.



Static IP operation can also be used on networks that have DHCP servers. DHCP servers can usually be programmed to automatically assign dynamic IP addresses within a certain address range, and reserve other addresses for static IP assignments. In larger networks, it is often the case that static IPs will be assigned to certain devices like printers, web servers, and file servers, while the vast majority of remaining devices (desktop / portable computer systems) will be assigned IPs dynamically. Consult with your network administrator to find out which static IP address ranges are available for use.

Parameters

- ***IP Mode*** The *IP Mode* checkbox (not labeled) determines whether the device is configured for dynamic or static IP operation.

[Dynamic] When unchecked, the unit is set for dynamic (automatic) IP configuration by a DHCP server. A DHCP server must be present on the network to use this setting.

[Static] When checked, the unit is set for static IP operation using the *Static IP*, *Subnet*, and *Gateway* settings.

- ***Static IP*** Sets the static IP address of the unit. For private networks (i.e. networks in which the IP addresses of its host devices are not visible on the public Internet – as is almost always the case in home, small office, and corporate networks), RFC1918 defines a range of IPv4 addresses that can be used:

Name	IP Address Range
24-bit block	10.0.0.0 – 10.255.255.255
20-bit block	172.16.0.0 – 172.31.255.255
16-bit block	192.168.0.0 – 192.168.255.255

- ***Subnet*** Sets the subnet mask of the unit. The subnet mask is used to divide a larger network into smaller subnetworks. It is extremely important to note that while devices can use any valid IP address within the prescribed range, all devices placed on the same subnet MUST use the same subnet mask. The largest subnet masks corresponding to the private IP address ranges listed above are as follows:

Name	Subnet Mask
24-bit block	255.0.0.0
20-bit block	255.240.0.0
16-bit block	255.255.0.0

- ***Gateway*** Sets the IP address of the network gateway. A gateway is a network computer or device (like a router) that acts as a bridge to another subnet within the same network, or an external network (such as the Internet). In small networks where all devices (including the DX navigator computer) are connected to the same subnet, the *Gateway* setting can be left blank [0.0.0.0].
- ***Dynamic IP*** Displays the IP address currently assigned to the device by the network DHCP server when set to [Dynamic] operation.

Small Network Setup Example

Network design and configuration depends greatly on how devices are meant to communicate with each other as well as what devices are meant to be able to communicate. While the topic of network setup and configuration is beyond the scope of this manual, this section illustrates how to setup a small private network using static IP in the absence of a DHCP server. Such a

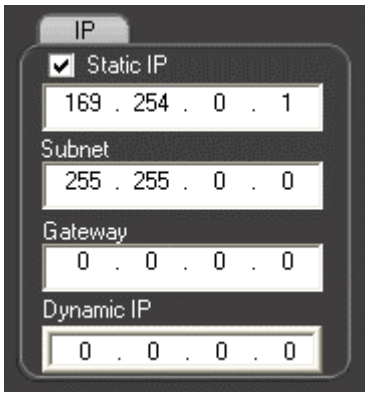
network can be easily created by connecting one or more computers running DX Navigator to one or more DX series hardware devices through Ethernet switches or hubs. This example also applies to setting up a peer-peer network by connecting a computer directly to a DX device using an Ethernet crossover cable.

Every device that is connected to an Ethernet network (computer, printers, DX series hardware devices, etc.) must have a unique IP address. As long as your network doesn't connect to any other network, you can assign each device an arbitrary IP Address. However, each device must be set to the same subnet mask.

In the absence of a DHCP server, Windows XP and Windows Vista computers are typically setup automatically configure their own IP addresses using link-local addresses based on the zeroconf addressing techniques. RFC 3927 recommends that link local addresses fall within the range between 169.254.0.0 and 169.254.255.255, and use a subnet mask of 255.255.0.0. For purposes of this example, let each Windows computer configure its own IP address. Because DX devices do not support zeroconf link-local addressing, their IP address will need to be manually configured to be compatible with the computer's link-local addresses.

To setup one or more DX devices for operation with zeroconf-addressed Windows computers:

1. Connect the first DX device to any computer using USB communications (see Communcations Setup).
2. Launch DX Navigator and go online (see Going Online).
3. Login to the device, and change the following settings in the IP section of the Settings tab:
   a. Check the *IP Mode* checkbox.
   b. Enter [169.254.0.1] into the *Static IP* textbox.
   c. Enter [255.255.0.0] into the *Subnet* textbox.
   d. Because the network in this example does not connect to any other network, the *Gateway* setting is not used and can be left set to [0.0.0.0].



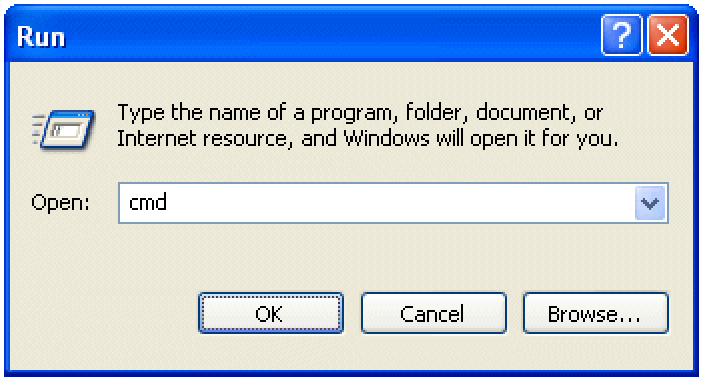
4. Close the Device Window and go offline with DX Navigator.
5. Power cycle the DX1208 for the IP setting to take effect.
6. Connect the DX device to a hub or switch using a standard Ethernet cable; OR if setting up a peer-peer connection, connect the DX device directly to the computer using an Ethernet crossover cable.

7. Repeat steps one through six for each DX device you are connecting to the network. Set the *Static IP* of the second device to [169.254.0.2], the third to [169.254.0.3], and so forth.
8. Now connect each of the computers you will be using to the network. Each computer will automatically configure its IP address using zeroconf addressing negotiation. It may take several minutes for the computers to finish configuring themselves.
9. The network setup is now complete. If you wish to know the IP addresses of each computer or DX Navigator is unable to see one or more devices, refer to the Troubleshooting section below.

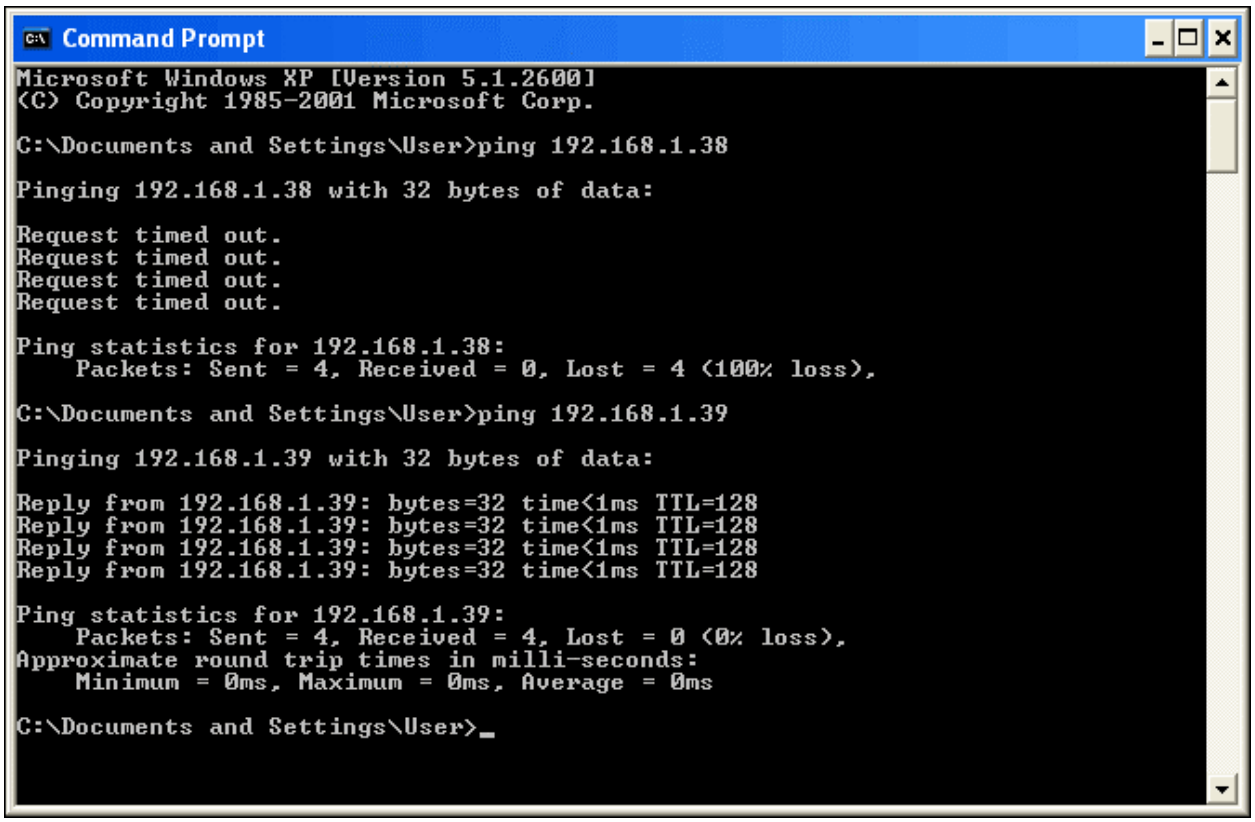
Troubleshooting

If DX Navigator is having trouble discovering one or more units on the network, then you can use Windows' built-in IP communications verification applet to determine whether your computer is able to send and receive IP packets from a particular device. To use this applet, your computer and the device in question should be located on the same subnet.

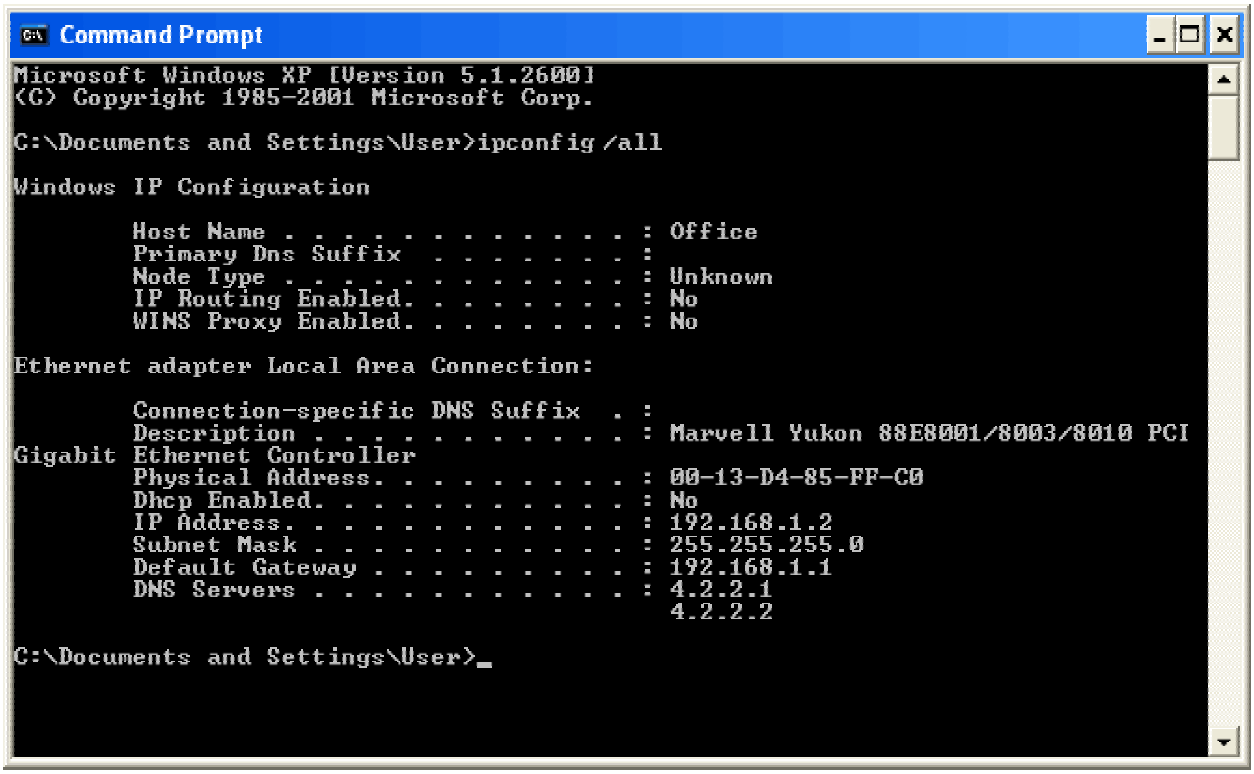
1. <CLICK> Start on the Windows Taskbar and select Run from the Start menu.
2. In the Run dialog, type 'cmd', then <CLICK> the OK button. The Command Prompt window opens.



3. At the prompt, type 'ping' followed by a space, then the full IP address of the device. Windows begins sending IP packets to the device. If it finds a device at that address it reports that it received a reply from the device along with the total latency of the communications loop. If it does not find a device it reports that the 'request timed out'.



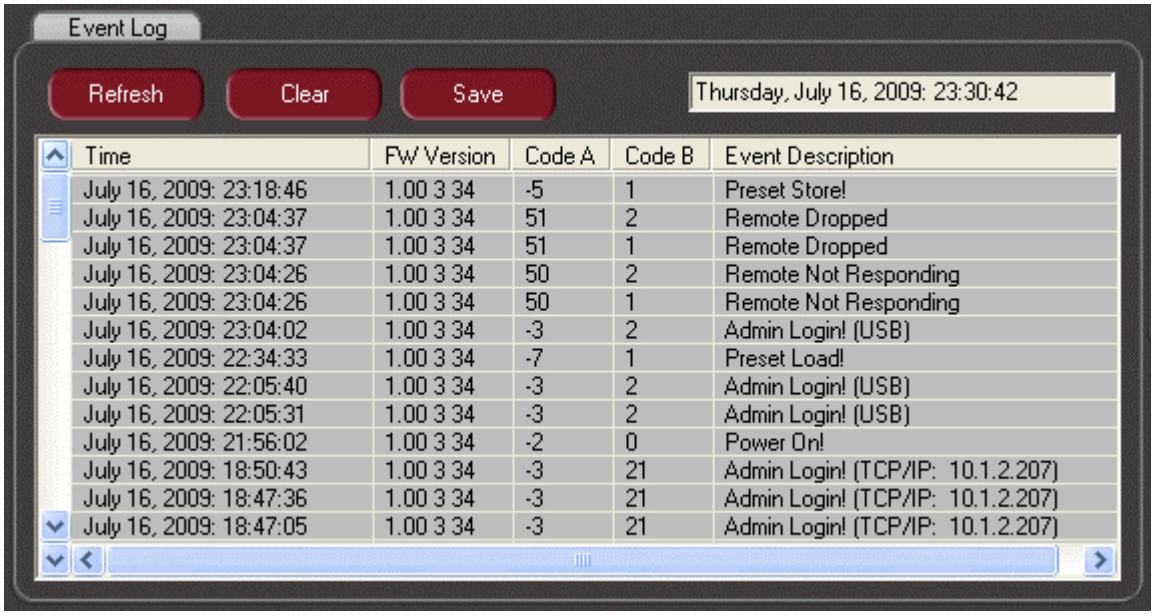
4. To verify the current network IP settings of the computer you are using, type '`ipconfig /all`' at the prompt. The computer returns both the IP settings of the device as well as other useful information, such as the NIC card's MAC address, and the DHCP enable status.



Event Log

Description

The Event Log records details of all significant events that occur within the DX1208 hardware. The Event Log can store up to 2048 events, which are written to non-volatile memory and retained indefinitely after the power is turned off. When the Event Log becomes full, the oldest 1024 events are deleted and replaced by new events until the Event Log fills up again. Event types include administrator and user logins, power-ons, and error messages. Contents of the event log are displayed in the UI in a tabular format. Each log of the line records a single event with the date and time of its occurrence, a brief event description, some status/diagnostic codes, and the DX1208 firmware version running at the time of the event. Users can save the displayed contents of the Event Log to a tab-delineated text file to assist with troubleshooting or create permanent records of unit activity.

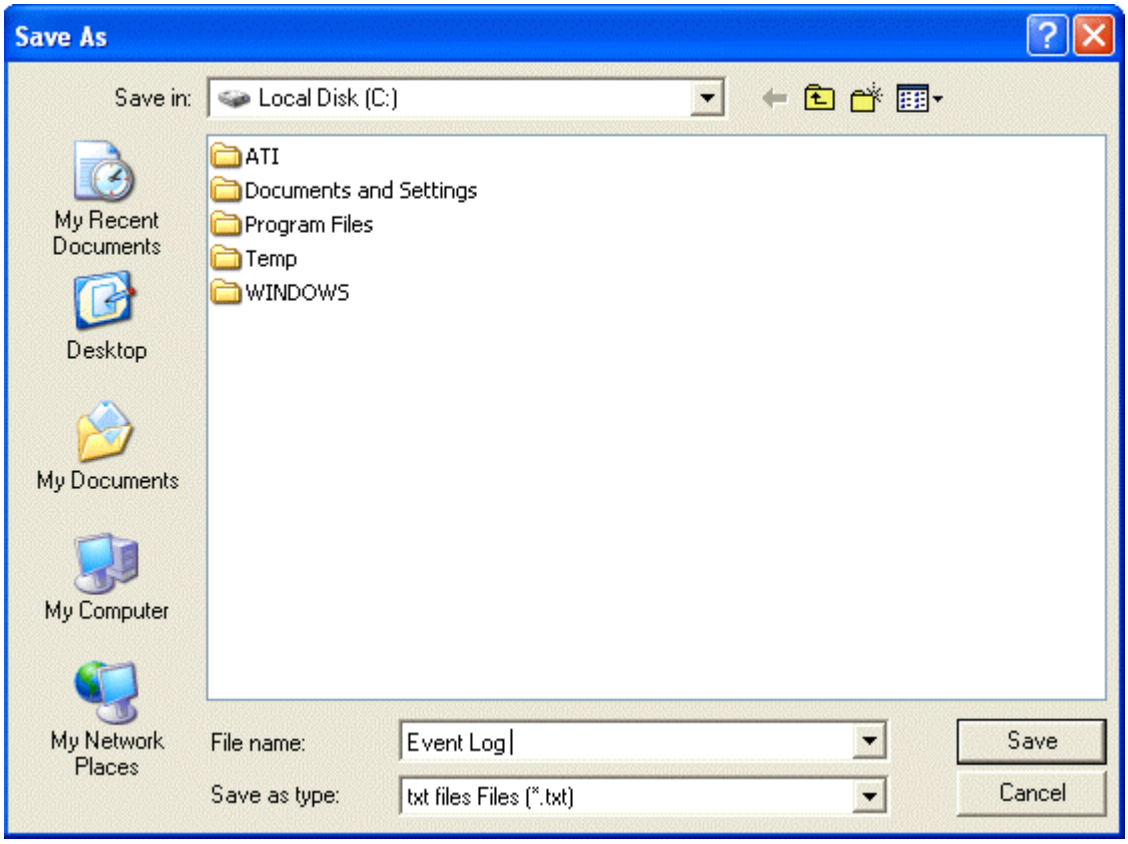


Commands

- **Refresh** Refresh sends a request to the hardware to return the current contents of the Event Log. The log is not updated in real-time; a Refresh command must be sent to view any events that have posted to the log since the last Refresh command.
- **Clear** Clear erases the contents of the Event Log memory in hardware and clears the DX Navigator Event Log display.
- **Save** Saves the current contents of the Event Log to a tab-delineated text file for archiving or for assisting with hardware troubleshooting.
- **Current Time** The Current Time display mirrors your computer's date and time settings. The Event Log time-stamps all events relative to the Current Time. Setting up your computer to automatically synchronize to an internet time server will insure that all logged events will be referenced to the national time standard (atomic clock). This is especially important if you need to correlate event times across multiple computers running DX Navigator.

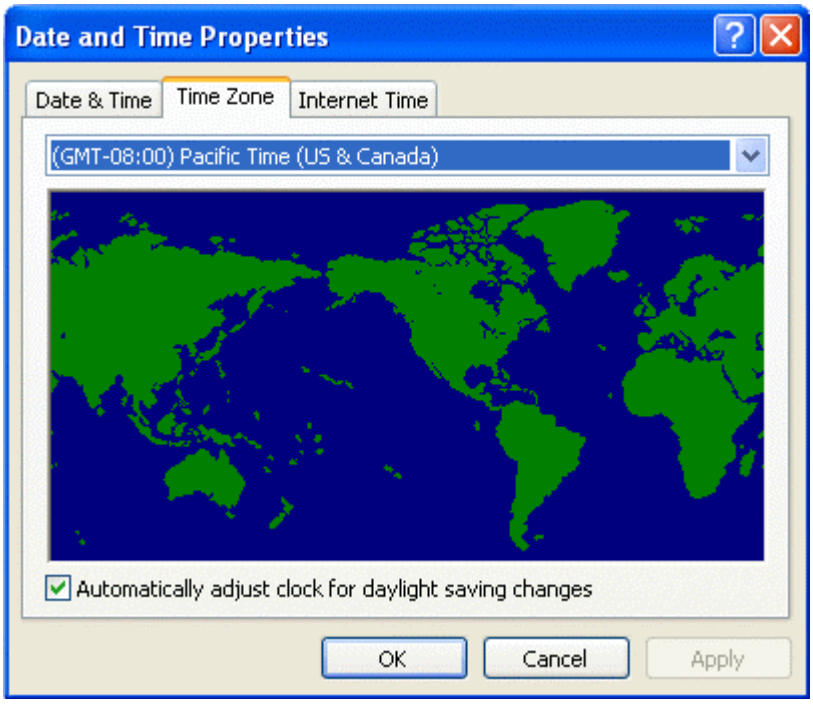
Saving the Event Log

1. <CLICK> the Event Log Save button.
2. In the Save As dialog, navigate to the folder where you want to store the file.
3. Enter the name of the file in the Filename text box, and <CLICK> Save.

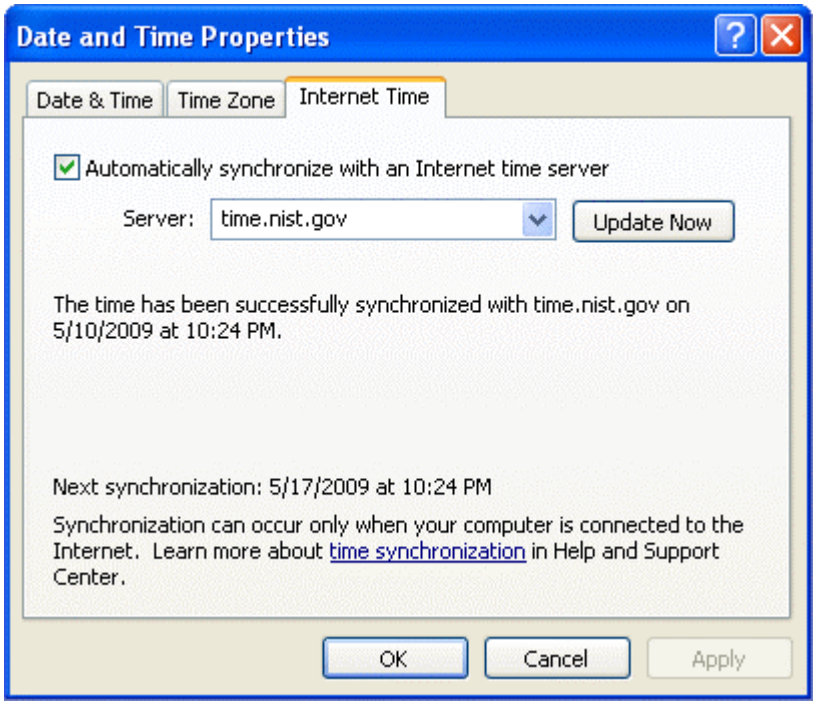


Synchronizing Current Time to an Internet Time Server

1. Open the Windows Date and Time Properties window:
   - ❖ Select Start on the Windows Taskbar and then choose Control Panel > Date & Time; or
   - ❖ <DOUBLE-CLICK> on the Time Display in the lower-right corner of your computer's screen.
2. Select the Time Zone tab and choose the Time Zone (relative to GMT) in which your computer is located.



3. Select the Internet Time tab and choose one of the time servers listed in the Server drop-down menu. <CLICK> the 'Automatically synchronize with an Internet time server' checkbox, and press the Update Now button. <CLICK> OK when done.



DX Link Clocking

Description

When multiple DX1208 units are connected via DX Link, their sample clocks must be synchronized to a common master clock source. One DX1208 must be set as the master device, and all others must be set to slave devices, regardless of how many units are connected together.

NOTE: Failure to configure a multi-unit system exactly as described will cause sample clock conflicts between one or more devices. This in turn will cause no audio to pass through one or more DX Link connections.

Parameters

- ***Master/Slave*** Sets whether the device is a clock [Master] or clock [Slave].

DX Link Status

Description

These two LEDs indicate the status of any signal present at the units DX Link Rx (receive) jack.

Indicators

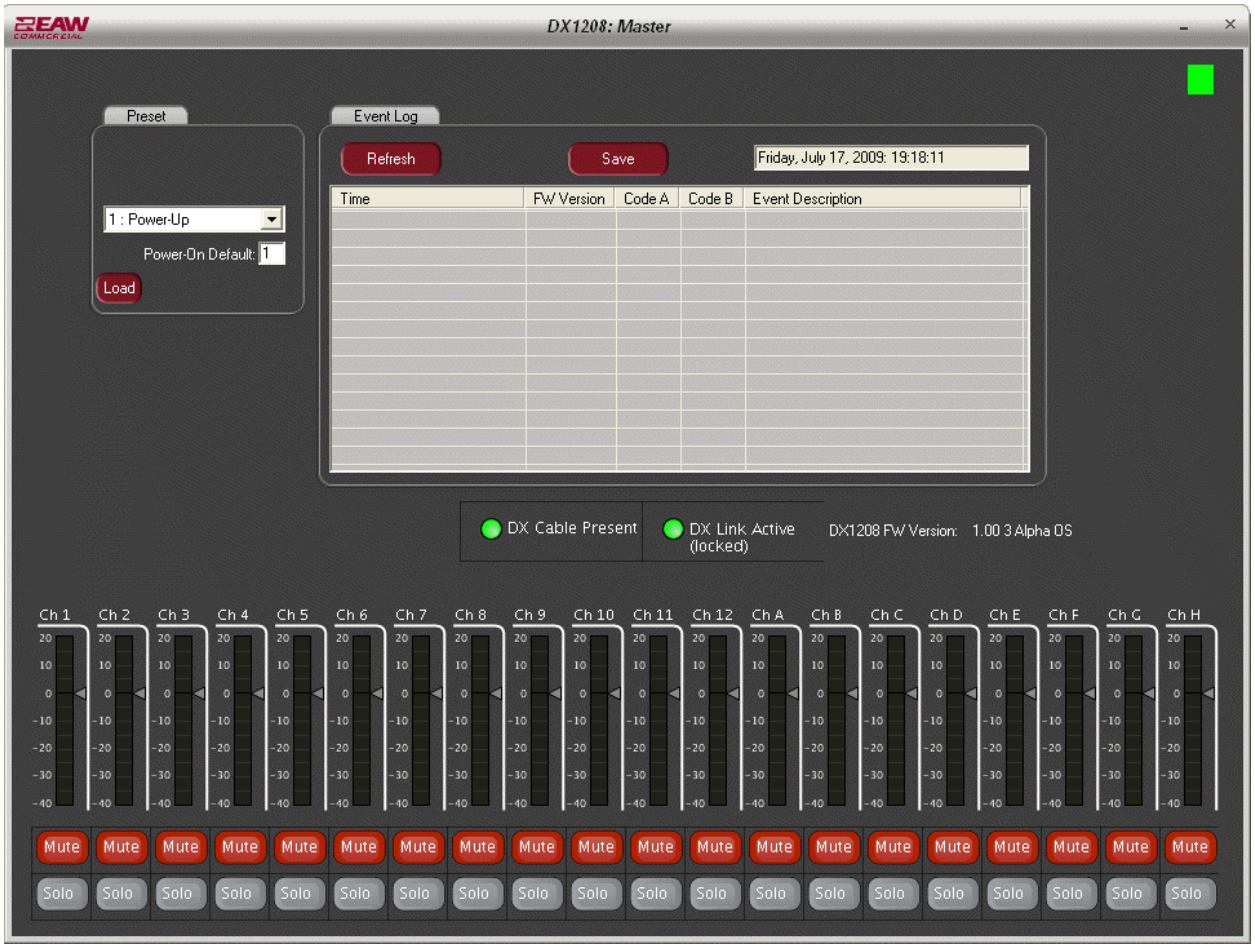
- ***DX Cable Present*** Lights when a signal is present at the unit's DX Link Rx (receive) jack. If this indicator is lit but the *DX Link Active* indicator is not, then the signal is either not valid, or the signal is asynchronous with respect to the unit's internal sample clock. When this condition occurs verify that the DX Link *Master/Slave* settings for all units have been correctly configured (see DX Link Clocking), and that all DX Link cables are properly seated in their jacks.
- ***DX Link Active*** Lights when the signal present at the unit's DX Link Rx jack is synchronous with the transmitting unit and the audio is valid.

Firmware Version

For Device Windows this text fields lists the current embedded firmware version of the connected DX1208 device. For Design Windows these fields are blank. Consult the release notes for the version of DX Navigator you are running to verify whether the DX1208 devices in your system are running compatible firmware. It is particularly important in larger systems with multiple locations and/or DX Navigator client installations that both software and firmware be upgraded for the entire system at one time to avoid compatibility issues between DX Navigator and the installed firmware.

Device Window - User Tab

When an individual logs into the DX1208 as a User, an abridged version of the Settings tab appears. All other tabs are hidden. From this window users may load *Presets*, refresh and save the Event Log, and view the DX Link Status. They can also view the Input/Output Channel Strip controls (Meters, *Gains*, and *Solo* and *Mute* status), but cannot change any of their settings.



4. e.