MediaMatrix®

A Division of Peavey Electronics Corporation

NWare Device Reference

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Scope

This guide describes each of the devices you can select from the NWare device tree and use in your designs.

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Hardware

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Amplifiers

Crest Amplifier Stack

Purpose

The **Crest Amplifier Stack** block allows you to control and monitor multiple Crest CKi or Ci series amplifiers.

Device properties

Crest Amplifier Stack Properties	
Amplifier Model	The model of amplifier used in the stack.
Number of amplifiers	The number of amplifiers in the stack.
Live Taper	Will make it easier to make fine adjustments at higher gain levels (by decreasing the rate at which the gain changes when it is near the maximum).

Controls

Main	
Field name	**Meaning**
Amp	The amplifier number in the stack.
ID	The two octets of the amplifier ID number in hex format. This is shown on the display at the back of the unit.
IP Address	The IP address of the amplifier. This is shown on the display at the back of the unit.
Link	Lit (green) when a link is established between NWare and the amplifier across the network.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected by the amplifier. Please refer to the amplifier documentation for information on fault conditions.
Rmte (Remote)	Lit (green) when the amplifier is running in remote mode.
Power	Lit (green) when the amplifier is switched on.

	If remote mode is selected on the amplifier, you can switch it on or off using the Power button within NWare.
Mute (number/letter)	Mutes the channel output. The LED is lit (red) when the channel is muted.

Channels	
Field name	**Meaning**
Amp	The amplifier number in the stack.
ID	The two octets of the amplifier ID number in hex format. This is shown on the display at the back of the unit.
IP Address	The IP address of the amplifier. This is shown on the display at the back of the unit.
Link	Lit (green) when a link is established between NWare and the amplifier across the network.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected by the amplifier. Please refer to the amplifier documentation for information on fault conditions.
Rmte (Remote)	Lit (green) when the amplifier is running in remote mode.
Power	Lit (green) when the amplifier is switched on. If remote mode is selected on the amplifier, you can switch it on or off using the Power button within NWare.
Chan	Channel letter or number.
Channel Name	A name for the channel. This label can be used to improve the clarity of the user interface for the end user.
Cobranet Sub Channel	The subchannel numbers for the audio channels.

Input Level (Ci amps only)	Input level in dBu.
Gain	Adjusts the amount of amplification or attenuation to be applied to the channel. Range is -97 to 0 dB.
Mute	Mutes the channel output. The LED is lit (red) when the channel is muted.
Output Level (Ci amps only)	Full scale output level in dBu. Zero dB on the meter is reached at full amp power (assuming an 8 Ohm load). When in 70V mode, full power is reached at about 5dB on the output meter.
Temp	Channel heat sink temperature.
Ther	Lit (red) when a channel's heat sink temperature reaches 75°C (which may indicate an obstructed air supply). The channel will independently protect itself by disconnecting its load and shutting down until it has cooled.
DC	Lit (red) when the amplifier channel detects DC voltage or subsonic frequencies at a channel output. The respective output relay will immediately open to prevent loudspeaker damage.
RTLM (Real Time Load Monitoring)	Lit (red) when the load for the channel exceeds the upper or lower limit. If this indicator is lit, and the RTLM training process has successfully completed, it indicates that the load on the amplifier has altered significantly. This could be because a loud speaker has blown, for example.
User Temp	The user-specified upper limit for the channels' heat sink temperature. If the limit is exceeded, the light will be lit (yellow).
IGM Alert	Lit (yellow) when the Instantaneous Gain Modulation (IGM) circuit detects a load that overstresses the output stage. The channel gain is automatically adjusted to a safe level.
ACL Alert	Lit (yellow) when the Active Clip Limiting (ACL) circuit is active because a channel has reached the clipping point.

RTLM (CKi amp)	
Field name	**Meaning**
Amp	The amplifier number in the stack.
ID	The two octets of the amplifier ID number in hex format. This is shown on the display at the back of the unit.
IP Address	The IP address of the amplifier. This is shown on the display at the back of the unit.
Link	Lit (green) when a link is established between NWare and the amplifier across the network.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected by the amplifier. Please refer to the amplifier documentation for information on fault conditions.
Rmte (Remote)	Lit (green) when the amplifier is running in remote mode.
Power	Lit (green) when the amplifier is switched on. If remote mode is selected on the amplifier, you can switch it on or off using the Power button within NWare.
Chan	Channel letter or number.
Upper	The upper limit for the load level. If the limit is exceeded, the Fault light will be lit.
Lower	The lower limit for the load level. If the limit is exceeded, the Fault light will be lit.
Train	Starts the training process. Used once speakers have been connected to the outputs and audio is running through the amplifier. The process takes between 5 and 10 minutes. The Training light will switch off automatically when the process is complete. **Note:** If the load level is too low, the training process will not complete.
Abort	Aborts the training process. Use this button to stop the

	training process if more than 10 minutes have elapsed since the process was started, and the Training light is still lit.
Training	Lit (green) when Training is in progress.

RTLM (Ci amp)	
Field name	**Meaning**
Amp	The amplifier number in the stack.
ID	The two octets of the amplifier ID number in hex format. This is shown on the display at the back of the unit.
IP Address	The IP address of the amplifier. This is shown on the display at the back of the unit.
Link	Lit (green) when a link is established between NWare and the amplifier across the network.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected by the amplifier. Please refer to the amplifier documentation for information on fault conditions.
Rmte (Remote)	Lit (green) when the amplifier is running in remote mode.
Power	Lit (green) when the amplifier is switched on. If remote mode is selected on the amplifier, you can switch it on or off using the Power button within NWare.
Chan	Channel letter or number.
Enable	Switches RTLM reporting on. Enables collection of RTLM data points.
Disable	Switches RTLM reporting off. Stops the training process, keeping previous training data intact.
Norm Load	Impedance of the channel normalized to 100 ohms.

Char Load	Full spectrum load impedance. The value can change (along the impedance curve) according to the dominant frequency content of the program material. However, if you feed a sine wave into the amplifier, a more accurate impedance can be measured (at that frequency and level).
Enabled	Lit (green) when RTLM reporting is enabled.
Active	Lit (green) when training is in progress and the load on the channel is actively being checked.
Below Threshold	Lit (green) when the channel voltage is below the minimum threshold required to measure load data.
Progress	Indicates the percentage completion of load data collection during training and after a reboot.
Upper	The upper limit for the load level. If the limit is exceeded, the Fault light will be lit.
Lower	The lower limit for the load level. If the limit is exceeded, the Fault light will be lit.
Train	Starts the training process. Used once speakers have been connected to the outputs and audio is running through the amplifier. The process takes between 5 and 10 minutes. The Training light will switch off automatically when the process is complete. **Note:** If the load level is too low, the training process will not complete.
Abort	Aborts the training process. Use this button to stop the training process if more than 10 minutes have elapsed since the process was started, and the Training light is still lit.
Training	Lit (green) when Training is in progress.

Advanced	
Field name	**Meaning**
Amp	The amplifier number in the stack.
ID	The two octets of the amplifier ID number in hex format. This is shown on the display at the back of the unit.

IP Address	The IP address of the amplifier. This is shown on the display at the back of the unit.
Link	Lit (green) when a link is established between NWare and the amplifier across the network.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected by the amplifier. Please refer to the amplifier documentation for information on fault conditions.
Rmte (Remote)	Lit (green) when the amplifier is running in remote mode.
Power	Lit (green) when the amplifier is switched on. If remote mode is selected on the amplifier, you can switch it on or off using the Power button within NWare.
Subnet	The subnet mask for the Ethernet / CobraNet network.
Gateway	The IP address of the router. If there is no router, this will be set to 0.0.0.0.
Input (Line / Cobra)	Selects either analog audio input using Phoenix connectors or digital audio input from the CobraNet network.
Bundle Num.	The audio bundle number for the device. This must correspond with the bundle number specified for the NION associated with the amplifier. You can then make connections to the amplifier using the NION flyoffs.
Gain/Sensitivity (CKi amps only)	Position of the Gain switch at the rear of the amplifier. This can be set to give constant sensitivity, or a constant gain of x20 (26 dB) or x40 (32 dB). Display only.
Volt	Voltage provided to the amplifier. Display only.
Amp	Current provided to the amplifier. Display only.
Watt	Input power provided to the amplifier. Display only.

Version	Firmware version running on the amplifier. Display only.

Ci Amplifier (4 Channels / 8 Channels)

Purpose

The **Ci Amplifier** block allows you to control and monitor Crest Ci series amplifiers.

Device properties

Crest Ci Amplifier Properties	
Live Taper	Will make it easier to make fine adjustments at higher gain levels (by decreasing the rate at which the gain changes when it is near the maximum).
Amplifier Model	The model of amplifier used in the stack.

Controls

Channels	
Field name	**Meaning**
General	
ID	The two octets of the amplifier ID number in hex format. This is shown on the display at the back of the unit.
IP Address	The IP address of the amplifier. This is shown on the display at the back of the unit.
Power	Lit (green) when the amplifier is switched on. If remote mode is selected on the amplifier, you can switch it on or off using the Power button within NWare.
Rmte (Remote)	Lit (green) when the amplifier is running in remote mode.
Link	Lit (green) when a link is established between NWare and the device across the network.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected by the amplifier. Please refer to the amplifier documentation for information on fault conditions.

CobraNet	
Input (A / D)	Selects either analog audio input using Phoenix connectors or digital audio input from the CobraNet network.
Bundle Num.	The audio bundle number for the device. This must correspond with the bundle number specified for the NION associated with the amplifier. You can then make connections to the amplifier using the NION flyoffs.
Channel x	
Fault	Lit (red) if the amplifier enters ACL or IGM or experiences a thermal, DC voltage, or short circuit fault.
Input level	Input level in dBu.
Output level	Full scale output level in dBu. Zero dB on the meter is reached at full amp power (assuming an 8 Ohm load). When in 70V mode, full power is reached at about 5dB on the output meter.
Name	A name for the channel. This label can be used to improve the clarity of the user interface for the end user.
Gain	Adjusts the amount of amplification or attenuation to be applied to the channel. Range is -97 to 0 dB.
Mute	Mutes the channel output. The LED is lit (red) when the channel is muted.
Alerts	
User Temp	The user-specified upper limit for the channels' heat sink temperature. If the limit is exceeded, the light will be lit (yellow).
IGM	Lit (yellow) when the Instantaneous Gain Modulation (IGM) circuit detects a load that overstresses the output stage. The channel gain is automatically adjusted to a safe level.
ACL	Lit (yellow) when the Active Clip Limiting (ACL) circuit is active because a channel has reached the clipping point.
Cobranet	
Subchannel	The subchannel numbers for the audio channels.

Faults	
Temperature	Lit (red) when a channel's heat sink temperature reaches 75°C (which may indicate an obstructed air supply). The channel will independently protect itself by disconnecting its load and shutting down until it has cooled.
DC	Lit (red) when the amplifier channel detects DC voltage or subsonic frequencies at a channel output. The respective output relay will immediately open to prevent loudspeaker damage.
RTLM (Real Time Load Monitoring)	Lit (red) when the load for the channel exceeds the upper or lower limit. If this indicator is lit, and the RTLM training process has successfully completed, it indicates that the load on the amplifier has altered significantly. This could be because a loud speaker has blown, for example.
RTLM	
Upper	The upper limit for the load level. If the limit is exceeded, the Fault light will be lit.
Lower	The lower limit for the load level. If the limit is exceeded, the Fault light will be lit.
Advanced	
Field name	**Meaning**
Subnet Mask	The subnet mask for the Ethernet / CobraNet network.
Gateway	The IP address of the router. If there is no router, this will be set to 0.0.0.0.
Version	Firmware version running on the amplifier. Display only.
AC Power Info	
Volt	Voltage provided to the amplifier. Display only.
Amp	Current provided to the amplifier. Display only.

Watt	Input power provided to the amplifier. Display only.
RTLM	
Channel	The channel number.
Norm Load	Impedance of the channel normalized to 100 ohms.
Char Load	Full spectrum load impedance. The value can change (along the impedance curve) according to the dominant frequency content of the program material. However, if you feed a sine wave into the amplifier, a more accurate impedance can be measured (at that frequency and level).
Enabled	Lit (green) when RTLM reporting is enabled.
Active	Lit (green) when training is in progress and the load on the channel is actively being checked.
Below Threshold	Lit (green) when the channel voltage is below the minimum threshold required to measure load data.
Progress	Indicates the percentage completion of load data collection during training and after a reboot.
Enable	Switches RTLM reporting on. Enables collection of RTLM data points.
Disable	Switches RTLM reporting off. Stops the training process, keeping previous training data intact.
Train	Starts the training process for a channel. Used once speakers have been connected to the outputs and audio is running through the amplifier. The process takes between 5 and 10 minutes. The Training light will switch off automatically when the process is complete. **Notes:** ▪ If the load level is too low, the training process will not complete. ▪ If you are using a Ci amplifier, the training process will not complete successfully unless all the channels are loaded and driven appropriately.

Abort	Aborts the training process for a channel. Use this button to stop the training process if more than 10 minutes have elapsed since the process was started, and the Training light is still lit.

Cki Amp

Purpose

The **CKi Amplifier** block allows you to control and monitor Crest CKi series amplifiers.

Device properties

Crest CKi Amplifier Properties	
Live Taper	Will make it easier to make fine adjustments at higher gain levels (by decreasing the rate at which the gain changes when it is near the maximum).
Amplifier Model	The model of amplifier used in the stack.

Controls

Channels	
Field name	**Meaning**
General	
ID	The two octets of the amplifier ID number in hex format. This is shown on the display at the back of the unit.
IP Address	The IP address of the amplifier. This is shown on the display at the back of the unit.
Power	Lit (green) when the amplifier is switched on. If remote mode is selected on the amplifier, you can switch it on or off using the Power button within NWare.
Rmte (Remote)	Lit (green) when the amplifier is running in remote mode.
Link	Lit (green) when a link is established between NWare and the device across the network.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit,

	has been detected by the amplifier. Please refer to the amplifier documentation for information on fault conditions.
CobraNet	
Input (A / D)	Selects either analog audio input using Phoenix connectors or digital audio input from the CobraNet network.
Bundle Num.	The audio bundle number for the device. This must correspond with the bundle number specified for the NION associated with the amplifier. You can then make connections to the amplifier using the NION flyoffs.
Channel x	
Fault	Lit (red) if the amplifier enters ACL or IGM or experiences a thermal, DC voltage, or short circuit fault.
Name	A name for the channel. This label can be used to improve the clarity of the user interface for the end user.
Gain	Adjusts the amount of amplification or attenuation to be applied to the channel. Range is -97 to 0 dB.
Mute	Mutes the channel output. The LED is lit (red) when the channel is muted.
Alerts	
User Temp	The user-specified upper limit for the channels' heat sink temperature. If the limit is exceeded, the light will be lit (yellow).
IGM	Lit (yellow) when the Instantaneous Gain Modulation (IGM) circuit detects a load that overstresses the output stage. The channel gain is automatically adjusted to a safe level.
ACL	Lit (yellow) when the Active Clip Limiting (ACL) circuit is active because a channel has reached the clipping point.
Cobranet	
Subchannel	The subchannel numbers for the audio channels.
Faults	
Temperature	Lit (red) when a channel’s heat sink temperature reaches 75°C (which may indicate an obstructed air supply). The channel will

	independently protect itself by disconnecting its load and shutting down until it has cooled.
DC	Lit (red) when the amplifier channel detects DC voltage or subsonic frequencies at a channel output. The respective output relay will immediately open to prevent loudspeaker damage.
RTLM (Real Time Load Monitoring)	Lit (red) when the load for the channel exceeds the upper or lower limit. If this indicator is lit, and the RTLM training process has successfully completed, it indicates that the load on the amplifier has altered significantly. This could be because a loud speaker has blown, for example.
RTLM	
Upper	The upper limit for the load level. If the limit is exceeded, the Fault light will be lit.
Lower	The lower limit for the load level. If the limit is exceeded, the Fault light will be lit.
Advanced	
Field name	**Meaning**
Subnet Mask	The subnet mask for the Ethernet / CobraNet network.
Gateway	The IP address of the router. If there is no router, this will be set to 0.0.0.0.
Gain/Sensitivity	Position of the Gain switch at the rear of the amplifier. This can be set to give constant sensitivity, or a constant gain of x20 (26 dB) or x40 (32 dB). Display only.
Version	Firmware version running on the amplifier. Display only.
AC Power Info	
Volt	Voltage provided to the amplifier. Display only.
Amp	Current provided to the amplifier.

	Display only.
Watt	Input power provided to the amplifier. Display only.
RTLM	
Channel	The channel number.
Train	Starts the training process for a channel. Used once speakers have been connected to the outputs and audio is running through the amplifier. The process takes between 5 and 10 minutes. The Training light will switch off automatically when the process is complete. **Notes:** ▪ If the load level is too low, the training process will not complete. ▪ If you are using a Ci amplifier, the training process will not complete successfully unless all the channels are loaded and driven appropriately.
Abort	Aborts the training process for a channel. Use this button to stop the training process if more than 10 minutes have elapsed since the process was started, and the Training light is still lit.

Audio Processing

N3/N6

Purpose

The N3 and N6 devices allow you to control and monitor a NION N3 or a NION N6 installed on the local area network.

For detailed information on how to install and configure NION units, refer to the *NION Hardware Manual*.

Device properties

<table>
<tr><th colspan="3">NioNode Properties</th></tr>
<tr><td>Role name</td><td colspan="2">The name of the role for this node. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment.

Note: You must specify a unique role name in the Role name box. If you do not do this, an error will be displayed when you deploy the project.</td></tr>
<tr><td>NioNode model</td><td colspan="2">The model of NioNode used: N3 or N6.</td></tr>
<tr><td>Expansion Slot 1-x</td><td colspan="2">The types of cards inserted in the available slots at the rear of the unit.

Select the appropriate cards for the slots you are using; for empty slots, leave the selection at None. A tab will be added to the NioNode device for each card. Flyoffs will be created on the Flyoffs tab for each audio connector on each card.</td></tr>
<tr><td>Audio Network Configuration</td><td colspan="2">Specifies configuration settings for the CobraNet CM-1 network interface or that a Dante DLM is to be used instead.

Tip: Unless you are intending to use the NioNode in conjunction with a CAB device, or use a Dante DLM card, you can leave this setting as None.</td></tr>
<tr><td></td><td>CobraNet CM1: 4 8 Channel Bundles</td><td>Audio inputs and outputs on the device will be arranged into four bundles of eight input channels and four bundles of eight output channels.

A CM-1 tab will be added to</td></tr>
</table>

		the NioNode device.
	CobraNet CM1: 8 4 Channel Bundles	Audio inputs and outputs on the device will be arranged into eight bundles of four input channels and eight bundles of four output channels. A CM-1 tab will be added to the NioNode device.
	CobraNet CM1: Advanced	The CM-1 transmitters and receives are listed individually, allowing you to specify which audio input and output channels to include in each bundle. A CM-1 tab will be added to the NioNode device.
	Dante DLM	A Dante DLM card is installed in the NION. For more information, see Using a NioNode on a Dante network.
Network Control Protocol	The type of protocol (RATC1, RATC2 or RATC2 RAW) to use for remote control of a project via the IP network. A tab will be added to the NioNode device for the protocol you choose.	
Network Control Port	The port for RATC communications. The default is 1632.	
RS-422/485 Protocol (COM1:)	The type of protocol (RATC1, RATC2, PASHA/PageMatrix, PASHA/XControl or PASHA/Legacy) to use for remote control of a project via the serial port. If you want to use the *Comms Processor* (on page 236) device to send and receive data via the serial port, or you do not want to use the serial port at all, select *None/Comms processor*.	
RS-232 Protocol (COM2:)	The type of protocol (RATC1, RATC2, PASHA/PageMatrix, PASHA/XControl or PASHA/Legacy) to use for remote control of a project via the serial port. If you want to use the *Comms Processor* (on page 236) device to send and receive data via the serial port, or you do not want to use the serial port at all, select *None/Comms processor*.	

Number of SNMP exported controls	The number of controls to monitor using SNMP. The maximum you can monitor is 512 per NioNode. SNMP flyoffs are created for each control on the **Flyoffs** tab, allowing you to wire them to controls you want to control and monitor. Python scripts can also be controlled by wiring a generic control to both the Python script and the SNMP flyoff. An **SNMP Exports** tab will be added to the NioNode device, allowing you to read and write control values.
Configure GPIO	Select if you want to use the GPIO port on the NION for communicating with external devices. You will be prompted to specify how you want to use each of the pins on the port connector.
Advanced properties	
Note: You do not normally need to change these settings from the defaults. Only change these settings if you are familiar with CobraNet and XDAB and are aware of how the changes will affect your installation.	
CobraNet CM-1 latency	The latency to use when transmitting data across the CobraNet network. A smaller latency means data packets will be transmitted more often, but we do not recommend reducing the latency unless network performance is adequate. The timing of transmission and receipt of packets is fundamental to the operation of a networked audio system. The default is 5.333 ms.
CobraNet Conductor Priority	Determines whether the node will become the CobraNet Conductor on the network. The node with the highest priority will become the conductor. If you want to prevent the node from becoming a conductor, choose **Never**. This is useful when the NION is a part of an XDAB cluster connected to a CobraNet network. If the CobraNet priority on the NION is not set to Never, an interruption in the CobraNet clock packets (*beat packets*) will often cause the CM-1 to briefly attempt to become the Conductor, resulting in an XDAB re-arbitration. This in turn results in a larger than necessary dropout in the audio.
XDAB Clock Master Priority	Determines whether the node will become the XDAB master in a cluster of NioNodes. The node with the highest priority will become the master, providing the audio clock to the other devices in the cluster.
Clock Source	Specifies the source for the CobraNet clock signal. This is used

	to synchronize devices on the network.	
	Automatic	If a CM-1 card is fitted to the NioNode, the clock signal will be received via this interface. If no CM-1 card is fitted, the signal will be generated by the AES card. This is the default setting.
	CM-1	The clock signal will be received via the CM-1 interface.
	I/O slot x	The clock signal will be received from an external source via an AES card in slot x. For information on using this setting, see *Using an external clock source to synchronize devices on a CobraNet network* in the *NWare User Guide*.
Configure NioNode GPIO		
Pin 2-5, 9, 14-21 GIO	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0 VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC) Analog In 1K, 12V (using external 12 VDC power source) Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source) Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder - pins 2, 4, 14, 16 ,18 ,20 only (requires 2 pins and a common) Raw (all modes available, software configurable)	
Pin 6 - GIO/SCLK	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0 VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC)	

	Analog In 1K, 12V (using external 12 VDC power source) Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source) Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder (requires 2 pins and a common) Word clock out Raw (all modes available, software configurable)
Pin 7 - GIO/FCLK	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0 VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC) Analog In 1K, 12V (using external 12 VDC power source) Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source) Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder (requires 2 pins and a common) Frame clock out Raw (all modes available, software configurable)
Pin 8 - GIO/VCLK	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0 VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC) Analog In 1K, 12V (using external 12 VDC power source) Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source)

	Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder (requires 2 pins and a common) Vector clock out Raw (all modes available, software configurable)
Pin 10,11,22,23 - HCO	High current out PWM (Pulse Width Modulation) out.

Controls

Slot x: 4x4

Input	
Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones. **Note**: Check the power requirements of microphones, before connecting them to the NION.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.

Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.
Output	
Peak Analog Output Meters	Post-converter peak analog output level (dBu).
Mute (Relay)	Mutes the channel and switches off the relay on the output.
Maximum Analog Sine Output Level	The maximum analog output signal level as it leaves the card. This is the RMS level of the signal. When the signal level exceeds the peak level (3 dB higher than the RMS level), it is clipped automatically as indicated by the Digital Clip LED. The range is dependent on the type of card you are using.
Peak Digital Output Meters	Pre-Converter Peak Digital Output Level (dB). 23dB equals full-scale digital output.
Digital Clip	Lit (red) when the output signal is clipped. This occurs when the signal exceeds the peak level.
Infinite Clip Hold	When clicked, the hold indicators on the digital output level meters will continually show the maximum signal value. The hold indicators will only change when a higher signal level is detected.
Clip Hold Time	The time in seconds that the hold indicators on the digital output level meters will continually show the maximum signal value. The range is 100ms to 100s.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by

	the A/D converter. The range is to -100dB to 18dB.

Slot x: 8i

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8ml

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Mic (+20dB)	Enables the microphone preamplifier for the channel, boosting the signal by 20dB.
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones.

	Note: Check the power requirements of microphones, before connecting them to the NION.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8mI II

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones.
	Note: Check the power requirements of microphones, before connecting them to the NION.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is

	passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8o

Peak Analog Output Meters	Post-converter peak analog output level (dBu).
Mute (Relay)	Mutes the channel and switches off the relay on the output.
Maximum Analog Sine Output Level	The maximum analog output signal level as it leaves the card. This is the RMS level of the signal. When the signal level exceeds the peak level (3 dB higher than the RMS level), it is clipped automatically as indicated by the Digital Clip LED. The range is dependent on the type of card you are using.
Peak Digital Output Meters	Pre-Converter Peak Digital Output Level (dB). 23dB equals full-scale digital output.
Digital Clip	Lit (red) when the output signal is clipped. This occurs when the signal exceeds the peak level.
Infinite Clip Hold	When clicked, the hold indicators on the digital output level meters will continually show the maximum signal value. The hold indicators will only change when a higher signal level is detected.
Clip Hold Time	The time in seconds that the hold indicators on the digital output level meters will continually show the maximum signal value.

	The range is 100ms to 100s.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8o w/d (with dither)

Peak Analog Output Meters	Post-converter peak analog output level (dBu).
Mute (Relay)	Mutes the channel and switches off the relay on the output.
Maximum Analog Sine Output Level	The maximum analog output signal level as it leaves the card. This is the RMS level of the signal. When the signal level exceeds the peak level (3 dB higher than the RMS level), it is clipped automatically as indicated by the Digital Clip LED. The range is dependent on the type of card you are using.
Peak Digital Output Meters	Pre-Converter Peak Digital Output Level (dB). 23dB equals full-scale digital output.
Digital Clip	Lit (red) when the output signal is clipped. This occurs when the signal exceeds the peak level.
Infinite Clip Hold	When clicked, the hold indicators on the digital output level meters will continually show the maximum signal value. The hold indicators will only change when a higher signal level is detected.
Clip Hold Time	The time in seconds that the hold indicators on the digital output level meters will continually show the maximum signal value. The range is 100ms to 100s.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all

	others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.
Dither Setup (double-click to display settings)	
Mute (X)	Mutes the dither noise generator.
Type	Specifies the type of dithering to use. Low-level white noise is added to the signal in order to randomize quantization errors, which has the effect of turning unpleasant distortion into a more acceptable analog noise.
	Rectangular: The most basic shape: it decorrelates the noise from the signal anywhere within the range.
	Triangular: Gives triangular probability distribution for the noise.
	Shaped Triangular: Adds triangular noise then feeds the signal through a high-shelf filter to push the noise spectrum towards the higher frequencies. This lowers the overall perceived volume of the noise.
Round	Adds 1/2 LSB (Least Significant Bit).
Size	Sets the noise level to match the target number of bits. The range is 2 to 32.

Slot x: AES

Disable SRC	When clicked, the sample rate converter for this channel is disabled. This allows you to use an external device for sample rate conversion. Once you have configured your sample rate converter, you will need to lock the audio output from the device to the sample clock in the NioNode. **Note:** MediaMatrix uses high quality sample rate converters, so

	there is generally no need to use separate devices.	
Error	Lit (red) when an error is detected on the incoming audio data stream. There is a single LED for each digital channel (2 audio channels).	
Professional	Lit (green) when the audio data stream is labeled as *professional* (AES data, for example), or unlit when the data stream is labeled as *consumer* (S/PDIF data, for example). The signal levels required to work with the different standards are controlled by DIP switches on the AES card. For more information, refer to *AES card DIP switches* in the *NION Hardware Manual*.	
Lock	Lit (green) when the device has locked to the incoming audio data stream.	
Copy	Lit (green) when the copy bit on the AES audio stream is set. This means the data is *not* copyright protected.	
Audio	Lit (green) when valid audio data has been detected on an input.	
Ext clock source	Lit (green) when a clock signal is being received from an external source into a connector on the AES card.	
Sample Rate	The sample rate of the incoming AES data stream. This is the sample rate of the input signal before conversion.	
Emphasis	Encoded audio signal emphasis, as described in the AES3-2003: AES standard for digital audio engineering - serial transmission format for two-channel linearly represented digital audio data. For more information, refer to the *standards section of the Audio Engineering Society website* (*http://www.aes.org/publications/standards*).	
	????	Emphasis not specified. Receiver defaults defaults to no emphasis, but may be manually overridden.
	None	No emphasis. Receiver may not be manually overridden.
	50/15 us	Signal has been emphasized using a 50/15 uS filter. Receiver may not be manually overridden.

	CCIT .J17	CCITT J.17 pre-emphasis filter with 6.5 dB insertion loss at 800Hz. Receiver may not be manually overridden.
Origin	Alphanumeric identifier for the origin of the AES data stream. This value can be edited for output channels. Maximum length is 4 characters.	
Destination	Alphanumeric identifier for the destination of the AES data stream. This value can be edited for output channels. Maximum length is 4 characters.	

Slot x: AEC

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones. **Note**: Check the power requirements of microphones, before connecting them to the NION.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by

	the A/D converter. The range is to -100dB to 18dB.
AEC Enable	Switches on echo cancellation for the channel.
Acoustic Echo Cancellation Setup (double-click to display settings)	
AEC Input	Level meter for input to AEC card from near end (microphone) containing echo.
AEC Ref	Level meter for input to AEC card from far end (microphone).
Echo Atten.	Echo attenuation level (echo return loss enhancement (ERLE)).
AEC Out	Level meter for output from AEC card with the echo removed.
AEC Enable	Switches on echo cancellation for the channel.
Adaption Halt	Disables the adaption filter for the channel. If you disable the adaption filter, this will prevent any further tuning of the echo cancellation system for the channel. You may want to disable the filter as soon as the system is found to be working as required and you do not expect any further changes that might affect its operation, such as microphone positioning, for example. When enabled, the filter will continually tune the echo cancellation system using the reference signal from the far end (*AEC Ref*) and the input signal from the near end (*AEC input*).
NLP Enable	Switches on the non-linear processing stage of the AEC system for a channel.
NLP Threshold	Specifies the threshold for an *Expander* (on page 161) device wired to the *AEC Out* signal. For more information, see *Threshold Level* (for Expander device) in the *NWare Device Reference*.
Echo Detect	Lit (green) when an echo is found in the audio signal sent to the AEC card.
Echo Path Change	Lit (green) when the AEC system is converging.
AEC input clipping	Lit (red) when the input level from the near end reaches an internally set threshold and is automatically clipped. **Note**: When clipping occurs, AEC performance will be impaired.

CM-1

Link	Lit (green) when a link is established between NWare and the device across the network.
Conductor	Lit (yellow) when this unit is the CobraNet Conductor. **Note:** Currently, it is not possible to specify the conductor priority manually.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected.
Err Count	The number of errors recorded by the device. **Note:** Errors are recorded when certain routine operations are carried out, including disconnecting cables and rerouting.
TX	Lit (green) when data is being transmitted.
TX ERR	Lit (red) when an error occurs during data transmission.
RX	Lit (green) when data is being received.
RX ERR	Lit (red) when an error occurs during data reception.
Transmitters	
Transmitter / TX	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to transmit. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only

	users familiar with advanced CobraNet practices should use this feature.
Num Chan	The number of audio channels to be included in the bundle. The Num Chan setting, which has a default of 8, controls how many audio channels are sent in a bundle. The value should be set to the number of contiguous channels that will be used, as defined in the Sub-channel Mapping boxes. If Num Chan is set to a value that is greater than the number of channels used, then the bundle will be larger than necessary and will result in wasted bandwidth and processor time. Unused channels with a value of 0 are represented in the bundle by header data only (and no audio data will be included). If the bundle contains subchannel numbers that are not used, they will be sent as full audio channels and consume 1 Mbit of bandwidth per channel.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.
Unicast Mode	Controls how a bundle is transmitted onto to the CobraNet network. There are several modes of operation: ▪ Unicast - the bundle is sent directly to only one receiver. ▪ Multicast - the bundle is sent to all receivers, even if it is not required by the receiver. This mode will always consume bandwidth at all nodes. ▪ Multi-unicast - up to four copies of the same bundle are sent unicast to up to four different receiving nodes. Specify *Always* (the default) to always use unicast, or 1, 2, 3 or 4 to specify the number of receivers for the bundle. If there is only one receiver for a transmission, unicast will be used automatically. If Unicast Mode is set to 1 or greater, unicast will be used unless the number of receivers on the network for a particular bundle number is greater than the value of Unicast Mode; in this case, bundles will be sent as multi-unicast until the number reaches the value of Max Unicast. **Note:** If you specify a bundle number that is less than 256, multicast will always be used and the Unicast Mode setting will be ignored.

	Examples
	Unicast Mode is set to Always. Max Unicast setting is ignored. There are four receivers set to receive the bundle. The bundle will always be sent multicast because the number of receivers for the bundle is greater than 0.
	Bundle number is greater than 256. Unicast Mode is set to Always. Max Unicast setting is ignored. There is just one receiver set to receive the bundle. The bundle will be sent unicast because the number of receivers is less than 2 (and the bundle number is greater than 256, so multicast mode is not enforced).
	Unicast Mode is set to 2. Max Unicast is set to 2 or greater. There are four receivers set to receive the bundle. The receiver bundle count is 4, which is greater than 2, so the bundle will be sent multicast.
Max Unicast	The number of duplicated bundle transmissions (rows with identical settings and the same bundle number) that will be sent in *multi-unicast* mode before true multicast is used.
Receivers	
RX	Lit (green) when data is being received on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want

	to receive. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.

GPIO

Digital Ins	
Pin x	Lit (green) when digital input is detected on the pin.
Digital Outs	
Pin x	Click to enable digital output on the pin.
Clock Outputs	
Word clock	Click to enable NION word clock output on pin 6 for synchronization of external devices. The sample rate used for this clock is the sample rate specified for the project you are running on the NION. To view the project sample rate, on the *File* menu, click *Project Properties*.
Frame clock	Click to enable NION frame clock output on pin 7 for synchronization of external devices.
Vector clock	Click to enable NION vector clock output on pin 8 for synchronization of external devices.
Analog Ins	
Value	Displays a representation of the input voltage level range. The minimum value is represented by zero and the maximum by 1.0.

	The values are shown for 1K, 10K 12V, 10K 24V, 1K self-powered and 10K self-powered. Typically, these inputs are physically connected to a potentiometer. **Tip:** The knob control cannot be gestured, but you can duplicate it and wire the copy to other controls in your design. This enables you to pass the values to other controls.
Calibrate	Sets the range of recognized input values arriving into the analog inputs. After the potentiometer has been installed, and you are ready to set the minimum and maximum values: 1. Click Calibrate to start calibration. 2. Sweep the pot from the minimum to the maximum twice. 3. Click Calibrate again to stop calibration. **Note:** Calibration takes into account the resistance of the wire and the tolerances of the potentiometer.
Min Calibration	The minimum recognized analog input value (set during the calibration process).
Max Calibration	The maximum recognized analog input value (set during the calibration process).
Squelch	A control noise squelch that adjusts the bit resolution of the analog input. The higher the squelch value, the greater the change in value required in the input in order for it to be recognized as a change. This is typically used when the input signal is fluctuating because of noise. We recommend that you use the minimum squelch value possible in order to stop the input signal fluctuating.
Rotary Encoder	
Value	Displays the input value for a rotary encoder wired to the GPIO port. The value increases when the rotary encoder is moved in one direction and decreased when it is moved in the other. You can also set the value manually by gesturing the knob.
Sensitivity	Adjusts the bit resolution of the analog input. The higher the value, the greater the change in value required in order for it to be recognized as a change. This is typically used when the input signal is fluctuating because of noise.

Reverse	When clicked, reverses the direction in which the rotary encoder must be moved in order to increase or decrease the value.
Wrap	When clicked, there will be no minimum or maximum value for the control knob. It can be continually gestured in either direction to adjust its value without reaching any end stops.
Raw	
Special Enable	When clicked, enables the user to monitor the raw (unfiltered) input and output values on a particular GPIO pin.
Output Enable	When clicked, enables the user to monitor the raw (unfiltered) output values by clicking the Output button. This button is used by administrators to control user access to the output monitoring function.
Output	When clicked, switches on the output pin.
Input	Lit (pink) when a voltage of 2V or greater is fed into the input connector.
ADC	Analog to Digital Conversion (of input signals). Shows information on signals arriving on the pin. When a potentiometer is connected to the pin, for example, it will show different readings as the knob is turned.
Encoder	Shows readings for input or output signals, depending on how the pin is being used. Up to 4096 distinct values can be detected for an input.
High Current Outs	
Pin x	Click to enable high current output on the pin. Provides 11.5V DC and up to 500mA of current..
PWM Outs	
Pin x	Adjusts the pulse width on the output pin. The range is 0 to 1. Provides 25KHz PWM output. This is handy for driving LEDs (with the addition of a resistor).

Monitor

Power Supply	The actual voltages provided by the power supply to various components.
Temp	Temperature in degrees centigrade measured at the CPU and at another position inside the case (Sys).
Fan	Speed in RPM x1000 of the CPU and case (Sys) fans.

Net Ctl <protocol>

Net Ctl <protocol>	
Status	The current status of the network control service.
Listening	Lit green when the service is operational and waiting for data to arrive.
Clear Counters	Resets all the counters at the bottom of the tab.
Bytes In	The number of bytes received by the service.
Bytes Out	The number of bytes transmitted by the service.
Commands	The number of commands that the service has received.
Errors	The number of commands that did not execute because they could not be parsed or failed when they were executed.

Serial <protocol>

Comm port	The comm port and serial protocol to use for data transfer.	
Bits per sec	The baud rate (speed) for data transfer.	
Data bits	The number of data bits in each character. Baudot uses 5, true ASCII uses 7. We recommend using 8, as this can be used for any type of data.	
Parity	Specifies that an extra bit is to be included in the data transmission. This can be used for error detection.	
	none	No parity bit is sent. Error detection is handled by the communication protocol.
	even	The parity bit is set to 1 if the number of ones in the set of bits is odd, therefore making the number of ones even.

	odd	The parity bit is set to 1 if the number of ones in the set of bits is even, therefore making the number of ones odd.
	mark	Parity bit is always set to the mark signal condition (logical 1).
	space	Parity bit is always set to the space signal condition.
Stop bits	Bits sent at the end of every character to signify the end of the character in the data transmission. Normally, 1 stop bit is used.	
Rear mode	The operating mode for a data port that supports more than one mode. For example, RS-422 or RS-485.	
Status	The current status of device.	
Listening	Lit (green) when the device is operational and waiting for data to arrive.	
Clear Counters	Resets all the counters at the bottom of the tab.	
Bytes In	The number of bytes received by the device.	
Bytes Out	The number of bytes transmitted by the device.	
Activity	Lit yellow when data is being transmitted or received.	

Mute

Unit	Mutes all audio output from the unit. The Muted LED will be lit (red) when the unit is muted.
System	Mutes all audio output from the unit and all other NioNodes in the project. CABs are also muted. The Muted LED will be lit (red) when the system is muted.

SNMP Exports

Index	The number of the control that will be monitored. This number corresponds to the SNMP flyoff number and the number for the control in the *exportedControlTable* in the SNMP MIB.

	Each NioNode can control and monitor up to 256 controls. **Tip:** Wire SNMP flyoffs to master nodes on controls that you want to monitor or control. To provide SNMP control of a Python script, wire a generic control to both the Python script and to the SNMP flyoff.
R/O	When clicked, sets the control to read-only, so its value cannot be changed via SNMP. When this button is switched off, the value of the control can be read and set using SNMP.
Label	A label for the control, which will be stored under *controlLabel* in the *exportedControlTable* in the SNMP MIB.

nX/nE

Purpose

The nX/nE device allows you to control and monitor a NION nX or nE installed on the local area network.

For detailed information on how to install and configure NION units, refer to the *NION Hardware Manual*.

Device properties

NioNode Properties	
Role name	The name of the role for this node. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. **Note:** You must specify a unique role name in the **Role name** box. If you do not do this, an error will be displayed when you deploy the project.
Expansion Slot 1-x	The types of cards inserted in the available slots at the rear of the unit. Select the appropriate cards for the slots you are using; for empty slots, leave the selection at **None**. A tab will be added to the NioNode device for each card. Flyoffs will be created on the **Flyoffs** tab for each audio connector on each card.
Audio Network Configuration	Specifies configuration settings for the CobraNet CM-1 network interface or that a Dante DLM is to be used instead.

<table>
<tr><td></td><td colspan="2">Tip: Unless you are intending to use the NioNode in conjunction with a CAB device, or use a Dante DLM card, you can leave this setting as None.</td></tr>
<tr><td></td><td>CobraNet CM1: 4 8 Channel Bundles</td><td>Audio inputs and outputs on the device will be arranged into four bundles of eight input channels and four bundles of eight output channels.

A CM-1 tab will be added to the NioNode device.</td></tr>
<tr><td></td><td>CobraNet CM1: 8 4 Channel Bundles</td><td>Audio inputs and outputs on the device will be arranged into eight bundles of four input channels and eight bundles of four output channels.

A CM-1 tab will be added to the NioNode device.</td></tr>
<tr><td></td><td>CobraNet CM1: Advanced</td><td>The CM-1 transmitters and receives are listed individually, allowing you to specify which audio input and output channels to include in each bundle.

A CM-1 tab will be added to the NioNode device.</td></tr>
<tr><td></td><td>Dante DLM</td><td>A Dante DLM card is installed in the NION.

For more information, see Using a NioNode on a Dante network.</td></tr>
<tr><td>Network Control Protocol</td><td colspan="2">The type of protocol (RATC1, RATC2 or RATC2 RAW) to use for remote control of a project via the IP network.

A tab will be added to the NioNode device for the protocol you choose.</td></tr>
<tr><td>Network Control Port</td><td colspan="2">The port for RATC communications. The default is 1632.</td></tr>
<tr><td>RS-422/485 Protocol (COM1:)</td><td colspan="2">The type of protocol (RATC1, RATC2, PASHA/PageMatrix, PASHA/XControl or PASHA/Legacy) to use for remote control of a project via the serial port. If you want to use the Comms Processor (on page 236) device to send and receive</td></tr>
</table>

	data via the serial port, or you do not want to use the serial port at all, select *None/Comms processor*.
RS-232 Protocol (COM2:)	The type of protocol (RATC1, RATC2, PASHA/PageMatrix, PASHA/XControl or PASHA/Legacy) to use for remote control of a project via the serial port. If you want to use the *Comms Processor* (on page 236) device to send and receive data via the serial port, or you do not want to use the serial port at all, select *None/Comms processor*.
Number of SNMP exported controls	The number of controls to monitor using SNMP. The maximum you can monitor is 512 per NioNode. SNMP flyoffs are created for each control on the **Flyoffs** tab, allowing you to wire them to controls you want to control and monitor. Python scripts can also be controlled by wiring a generic control to both the Python script and the SNMP flyoff. An **SNMP Exports** tab will be added to the NioNode device, allowing you to read and write control values.
Configure GPIO	Select if you want to use the GPIO port on the NION for communicating with external devices. You will be prompted to specify how you want to use each of the pins on the port connector.

Advanced properties	
Note: You do not normally need to change these settings from the defaults. Only change these settings if you are familiar with CobraNet and XDAB and are aware of how the changes will affect your installation.	
CobraNet CM-1 latency	The latency to use when transmitting data across the CobraNet network. A smaller latency means data packets will be transmitted more often, but we do not recommend reducing the latency unless network performance is adequate. The timing of transmission and receipt of packets is fundamental to the operation of a networked audio system. The default is 5.333 ms.
CobraNet Conductor Priority	Determines whether the node will become the CobraNet Conductor on the network. The node with the highest priority will become the conductor. If you want to prevent the node from becoming a conductor, choose **Never**. This is useful when the NION is a part of an XDAB cluster connected to a CobraNet network. If the CobraNet priority on the NION is not set to Never, an interruption in the CobraNet clock packets (*beat packets*) will

	often cause the CM-1 to briefly attempt to become the Conductor, resulting in an XDAB re-arbitration. This in turn results in a larger than necessary dropout in the audio.	
Clock Source	Specifies the source for the CobraNet clock signal. This is used to synchronize devices on the network.	
	Automatic	If a CM-1 card is fitted to the NioNode, the clock signal will be received via this interface. If no CM-1 card is fitted, the signal will be generated by the AES card. This is the default setting.
	CM-1	The clock signal will be received via the CM-1 interface.
	I/O slot x	The clock signal will be received from an external source via an AES card in slot x. For information on using this setting, see *Using an external clock source to synchronize devices on a CobraNet network* in the *NWare User Guide*.
Configure NioNode GPIO		
Pin 2-5, 9, 14-21 GIO	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0 VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC) Analog In 1K, 12V (using external 12 VDC power source) Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source) Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder - pins 2, 4, 14, 16 ,18 ,20 only (requires 2 pins and a common) Raw (all modes available, software configurable)	
Pin 6 - GIO/SCLK	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0	

	VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC) Analog In 1K, 12V (using external 12 VDC power source) Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source) Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder (requires 2 pins and a common) Word clock out Raw (all modes available, software configurable)
Pin 7 - GIO/FCLK	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0 VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC) Analog In 1K, 12V (using external 12 VDC power source) Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source) Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder (requires 2 pins and a common) Frame clock out Raw (all modes available, software configurable)
Pin 8 - GIO/VCLK	Digital In (3.0V TTL logic - Low: 0 VDC - 0.8 VDC; High: 2.0 VDC - 24 VDC) Digital Out (3.0V TTL logic - Low: 0V DC - 0.4 VDC; High: 2.4 VDC - 3.3 VDC) Analog In 1K, 12V (using external 12 VDC power source)

	Analog In 10K, 12V (using external 12 VDC power source) Analog In 10K, 24V (using external 24 VDC power source) Analog In 1K, self powered (pin feeds required voltage through pot or switch to common) Analog In 10K, self powered (pin feeds required voltage through pot or switch to common) Rotary Encoder (requires 2 pins and a common) Vector clock out Raw (all modes available, software configurable)
Pin 10,11,22,23 - HCO	High current out PWM (Pulse Width Modulation) out.

Controls

Slot x: 4x4

Input	
Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones. **Note**: Check the power requirements of microphones, before connecting them to the NION.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area.

	The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.
Output	
Peak Analog Output Meters	Post-converter peak analog output level (dBu).
Mute (Relay)	Mutes the channel and switches off the relay on the output.
Maximum Analog Sine Output Level	The maximum analog output signal level as it leaves the card. This is the RMS level of the signal. When the signal level exceeds the peak level (3 dB higher than the RMS level), it is clipped automatically as indicated by the Digital Clip LED. The range is dependent on the type of card you are using.
Peak Digital Output Meters	Pre-Converter Peak Digital Output Level (dB). 23dB equals full-scale digital output.
Digital Clip	Lit (red) when the output signal is clipped. This occurs when the signal exceeds the peak level.
Infinite Clip Hold	When clicked, the hold indicators on the digital output level meters will continually show the maximum signal value. The hold indicators will only change when a higher signal level is detected.
Clip Hold Time	The time in seconds that the hold indicators on the digital output level meters will continually show the maximum signal value. The range is 100ms to 100s.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also

	remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8i

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8ml

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Mic (+20dB)	Enables the microphone preamplifier for the channel, boosting the signal by 20dB.

Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones. **Note**: Check the power requirements of microphones, before connecting them to the NION.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8ml II

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones. **Note**: Check the power requirements of microphones, before connecting them to the NION.

Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8o

Peak Analog Output Meters	Post-converter peak analog output level (dBu).
Mute (Relay)	Mutes the channel and switches off the relay on the output.
Maximum Analog Sine Output Level	The maximum analog output signal level as it leaves the card. This is the RMS level of the signal. When the signal level exceeds the peak level (3 dB higher than the RMS level), it is clipped automatically as indicated by the Digital Clip LED. The range is dependent on the type of card you are using.
Peak Digital Output Meters	Pre-Converter Peak Digital Output Level (dB). 23dB equals full-scale digital output.
Digital Clip	Lit (red) when the output signal is clipped. This occurs when the signal exceeds the peak level.
Infinite Clip Hold	When clicked, the hold indicators on the digital output level meters will continually show the maximum signal value. The hold indicators will only change when a higher signal level is detected.

Clip Hold Time	The time in seconds that the hold indicators on the digital output level meters will continually show the maximum signal value. The range is 100ms to 100s.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.

Slot x: 8o w/d (with dither)

Peak Analog Output Meters	Post-converter peak analog output level (dBu).
Mute (Relay)	Mutes the channel and switches off the relay on the output.
Maximum Analog Sine Output Level	The maximum analog output signal level as it leaves the card. This is the RMS level of the signal. When the signal level exceeds the peak level (3 dB higher than the RMS level), it is clipped automatically as indicated by the Digital Clip LED. The range is dependent on the type of card you are using.
Peak Digital Output Meters	Pre-Converter Peak Digital Output Level (dB). 23dB equals full-scale digital output.
Digital Clip	Lit (red) when the output signal is clipped. This occurs when the signal exceeds the peak level.
Infinite Clip Hold	When clicked, the hold indicators on the digital output level meters will continually show the maximum signal value. The hold indicators will only change when a higher signal level is detected.
Clip Hold Time	The time in seconds that the hold indicators on the digital output level meters will continually show the maximum signal value. The range is 100ms to 100s.

Invert	Inverts the polarity of the signal.	
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.	
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by the A/D converter. The range is to -100dB to 18dB.	
Dither Setup (double-click to display settings)		
Mute (X)	Mutes the dither noise generator.	
Type	Specifies the type of dithering to use. Low-level white noise is added to the signal in order to randomize quantization errors, which has the effect of turning unpleasant distortion into a more acceptable analog noise.	
	Rectangular	The most basic shape: it decorrelates the noise from the signal anywhere within the range.
	Triangular	Gives triangular probability distribution for the noise.
	Shaped Triangular	Adds triangular noise then feeds the signal through a high-shelf filter to push the noise spectrum towards the higher frequencies. This lowers the overall perceived volume of the noise.
Round	Adds 1/2 LSB (Least Significant Bit).	
Size	Sets the noise level to match the target number of bits. The range is 2 to 32.	

Slot x: AES

Disable SRC	When clicked, the sample rate converter for this channel is disabled. This allows you to use an external device for sample rate conversion. Once you have configured your sample rate converter, you will need to lock the audio output from the device to the sample

	clock in the NioNode. **Note:** MediaMatrix uses high quality sample rate converters, so there is generally no need to use separate devices.	
Error	Lit (red) when an error is detected on the incoming audio data stream. There is a single LED for each digital channel (2 audio channels).	
Professional	Lit (green) when the audio data stream is labeled as *professional* (AES data, for example), or unlit when the data stream is labeled as *consumer* (S/PDIF data, for example). The signal levels required to work with the different standards are controlled by DIP switches on the AES card. For more information, refer to *AES card DIP switches* in the *NION Hardware Manual*.	
Lock	Lit (green) when the device has locked to the incoming audio data stream.	
Copy	Lit (green) when the copy bit on the AES audio stream is set. This means the data is *not* copyright protected.	
Audio	Lit (green) when valid audio data has been detected on an input.	
Ext clock source	Lit (green) when a clock signal is being received from an external source into a connector on the AES card.	
Sample Rate	The sample rate of the incoming AES data stream. This is the sample rate of the input signal before conversion.	
Emphasis	Encoded audio signal emphasis, as described in the AES3-2003: AES standard for digital audio engineering - serial transmission format for two-channel linearly represented digital audio data. For more information, refer to the *standards section of the Audio Engineering Society website* (*http://www.aes.org/publications/standards*).	
	????	Emphasis not specified. Receiver defaults defaults to no emphasis, but may be manually overridden.
	None	No emphasis. Receiver may not be manually overridden.
	50/15 us	Signal has been emphasized using a 50/15 uS filter. Receiver may not be manually overridden.

	CCIT .J17	CCITT J.17 pre-emphasis filter with 6.5 dB insertion loss at 800Hz. Receiver may not be manually overridden.
Origin	Alphanumeric identifier for the origin of the AES data stream. This value can be edited for output channels. Maximum length is 4 characters.	
Destination	Alphanumeric identifier for the destination of the AES data stream. This value can be edited for output channels. Maximum length is 4 characters.	

Slot x: AEC

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones. **Note**: Check the power requirements of microphones, before connecting them to the NION.
Maximum Analog Sine Input Level	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control scales the analog input section before the signal is passed to the analog to digital converter. Use it to adjust the sensitivity of the input stage so that the meter display moves across its full range and not just in a small area. The range is dependent on the type of card you are using.
Mute	Mutes the channel.
Invert	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
Digital Gain	The level of gain to be applied to digital signal inside the unit. The signal has already been converted from analog to digital by

	the A/D converter. The range is to -100dB to 18dB.
AEC Enable	Switches on echo cancellation for the channel.
Acoustic Echo Cancellation Setup (double-click to display settings)	
AEC Input	Level meter for input to AEC card from near end (microphone) containing echo.
AEC Ref	Level meter for input to AEC card from far end (microphone).
Echo Atten.	Echo attenuation level (echo return loss enhancement (ERLE)).
AEC Out	Level meter for output from AEC card with the echo removed.
AEC Enable	Switches on echo cancellation for the channel.
Adaption Halt	Disables the adaption filter for the channel. If you disable the adaption filter, this will prevent any further tuning of the echo cancellation system for the channel. You may want to disable the filter as soon as the system is found to be working as required and you do not expect any further changes that might affect its operation, such as microphone positioning, for example. When enabled, the filter will continually tune the echo cancellation system using the reference signal from the far end (*AEC Ref*) and the input signal from the near end (*AEC input*).
NLP Enable	Switches on the non-linear processing stage of the AEC system for a channel.
NLP Threshold	Specifies the threshold for an *Expander* (on page 161) device wired to the *AEC Out* signal. For more information, see *Threshold Level* (for Expander device) in the *NWare Device Reference*.
Echo Detect	Lit (green) when an echo is found in the audio signal sent to the AEC card.
Echo Path Change	Lit (green) when the AEC system is converging.
AEC input clipping	Lit (red) when the input level from the near end reaches an internally set threshold and is automatically clipped. **Note**: When clipping occurs, AEC performance will be impaired.

CM-1

Link	Lit (green) when a link is established between NWare and the device across the network.
Conductor	Lit (yellow) when this unit is the CobraNet Conductor. **Note:** Currently, it is not possible to specify the conductor priority manually.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected.
Err Count	The number of errors recorded by the device. **Note:** Errors are recorded when certain routine operations are carried out, including disconnecting cables and rerouting.
TX	Lit (green) when data is being transmitted.
TX ERR	Lit (red) when an error occurs during data transmission.
RX	Lit (green) when data is being received.
RX ERR	Lit (red) when an error occurs during data reception.
Transmitters	
Transmitter / TX	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to transmit. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only

	users familiar with advanced CobraNet practices should use this feature.
Num Chan	The number of audio channels to be included in the bundle. The Num Chan setting, which has a default of 8, controls how many audio channels are sent in a bundle. The value should be set to the number of contiguous channels that will be used, as defined in the Sub-channel Mapping boxes. If Num Chan is set to a value that is greater than the number of channels used, then the bundle will be larger than necessary and will result in wasted bandwidth and processor time. Unused channels with a value of 0 are represented in the bundle by header data only (and no audio data will be included). If the bundle contains subchannel numbers that are not used, they will be sent as full audio channels and consume 1 Mbit of bandwidth per channel.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.
Unicast Mode	Controls how a bundle is transmitted onto to the CobraNet network. There are several modes of operation: ▪ Unicast - the bundle is sent directly to only one receiver. ▪ Multicast - the bundle is sent to all receivers, even if it is not required by the receiver. This mode will always consume bandwidth at all nodes. ▪ Multi-unicast - up to four copies of the same bundle are sent unicast to up to four different receiving nodes. Specify *Always* (the default) to always use unicast, or 1, 2, 3 or 4 to specify the number of receivers for the bundle. If there is only one receiver for a transmission, unicast will be used automatically. If Unicast Mode is set to 1 or greater, unicast will be used unless the number of receivers on the network for a particular bundle number is greater than the value of Unicast Mode; in this case, bundles will be sent as multi-unicast until the number reaches the value of Max Unicast. **Note:** If you specify a bundle number that is less than 256, multicast will always be used and the Unicast Mode setting will be ignored.

	Examples
	Unicast Mode is set to Always. Max Unicast setting is ignored. There are four receivers set to receive the bundle. The bundle will always be sent multicast because the number of receivers for the bundle is greater than 0.
	Bundle number is greater than 256. Unicast Mode is set to Always. Max Unicast setting is ignored. There is just one receiver set to receive the bundle. The bundle will be sent unicast because the number of receivers is less than 2 (and the bundle number is greater than 256, so multicast mode is not enforced).
	Unicast Mode is set to 2. Max Unicast is set to 2 or greater. There are four receivers set to receive the bundle. The receiver bundle count is 4, which is greater than 2, so the bundle will be sent multicast.
Max Unicast	The number of duplicated bundle transmissions (rows with identical settings and the same bundle number) that will be sent in *multi-unicast* mode before true multicast is used.
Receivers	
RX	Lit (green) when data is being received on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want

	to receive. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.

GPIO

Digital Ins	
Pin x	Lit (green) when digital input is detected on the pin.
Digital Outs	
Pin x	Click to enable digital output on the pin.
Clock Outputs	
Word clock	Click to enable NION word clock output on pin 6 for synchronization of external devices. The sample rate used for this clock is the sample rate specified for the project you are running on the NION. To view the project sample rate, on the *File* menu, click *Project Properties*.
Frame clock	Click to enable NION frame clock output on pin 7 for synchronization of external devices.
Vector clock	Click to enable NION vector clock output on pin 8 for synchronization of external devices.
Analog Ins	
Value	Displays a representation of the input voltage level range. The minimum value is represented by zero and the maximum by 1.0.

	The values are shown for 1K, 10K 12V, 10K 24V, 1K self-powered and 10K self-powered. Typically, these inputs are physically connected to a potentiometer. **Tip:** The knob control cannot be gestured, but you can duplicate it and wire the copy to other controls in your design. This enables you to pass the values to other controls.
Calibrate	Sets the range of recognized input values arriving into the analog inputs. After the potentiometer has been installed, and you are ready to set the minimum and maximum values: 1. Click Calibrate to start calibration. 2. Sweep the pot from the minimum to the maximum twice. 3. Click Calibrate again to stop calibration. **Note:** Calibration takes into account the resistance of the wire and the tolerances of the potentiometer.
Min Calibration	The minimum recognized analog input value (set during the calibration process).
Max Calibration	The maximum recognized analog input value (set during the calibration process).
Squelch	A control noise squelch that adjusts the bit resolution of the analog input. The higher the squelch value, the greater the change in value required in the input in order for it to be recognized as a change. This is typically used when the input signal is fluctuating because of noise. We recommend that you use the minimum squelch value possible in order to stop the input signal fluctuating.
Rotary Encoder	
Value	Displays the input value for a rotary encoder wired to the GPIO port. The value increases when the rotary encoder is moved in one direction and decreased when it is moved in the other. You can also set the value manually by gesturing the knob.
Sensitivity	Adjusts the bit resolution of the analog input. The higher the value, the greater the change in value required in order for it to be recognized as a change. This is typically used when the input signal is fluctuating because of noise.

Reverse	When clicked, reverses the direction in which the rotary encoder must be moved in order to increase or decrease the value.
Wrap	When clicked, there will be no minimum or maximum value for the control knob. It can be continually gestured in either direction to adjust its value without reaching any end stops.
Raw	
Special Enable	When clicked, enables the user to monitor the raw (unfiltered) input and output values on a particular GPIO pin.
Output Enable	When clicked, enables the user to monitor the raw (unfiltered) output values by clicking the Output button. This button is used by administrators to control user access to the output monitoring function.
Output	When clicked, switches on the output pin.
Input	Lit (pink) when a voltage of 2V or greater is fed into the input connector.
ADC	Analog to Digital Conversion (of input signals). Shows information on signals arriving on the pin. When a potentiometer is connected to the pin, for example, it will show different readings as the knob is turned.
Encoder	Shows readings for input or output signals, depending on how the pin is being used. Up to 4096 distinct values can be detected for an input.
High Current Outs	
Pin x	Click to enable high current output on the pin. Provides 11.5V DC and up to 500mA of current..
PWM Outs	
Pin x	Adjusts the pulse width on the output pin. The range is 0 to 1. Provides 25KHz PWM output. This is handy for driving LEDs (with the addition of a resistor).

Monitor

Power Supply	The actual voltages provided by the power supply to various components.
Temp	Temperature in degrees centigrade measured at the CPU and at another position inside the case (Sys).
Fan	Speed in RPM x1000 of the CPU and case (Sys) fans.

Net Ctl <protocol>

Net Ctl <protocol>	
Status	The current status of the network control service.
Listening	Lit green when the service is operational and waiting for data to arrive.
Clear Counters	Resets all the counters at the bottom of the tab.
Bytes In	The number of bytes received by the service.
Bytes Out	The number of bytes transmitted by the service.
Commands	The number of commands that the service has received.
Errors	The number of commands that did not execute because they could not be parsed or failed when they were executed.

Serial <protocol>

Comm port	The comm port and serial protocol to use for data transfer.	
Bits per sec	The baud rate (speed) for data transfer.	
Data bits	The number of data bits in each character. Baudot uses 5, true ASCII uses 7. We recommend using 8, as this can be used for any type of data.	
Parity	Specifies that an extra bit is to be included in the data transmission. This can be used for error detection.	
	none	No parity bit is sent. Error detection is handled by the communication protocol.
	even	The parity bit is set to 1 if the number of ones in the set of bits is odd, therefore making the number of ones even.

	odd	The parity bit is set to 1 if the number of ones in the set of bits is even, therefore making the number of ones odd.
	mark	Parity bit is always set to the mark signal condition (logical 1).
	space	Parity bit is always set to the space signal condition.
Stop bits	Bits sent at the end of every character to signify the end of the character in the data transmission. Normally, 1 stop bit is used.	
Rear mode	The operating mode for a data port that supports more than one mode. For example, RS-422 or RS-485.	
Status	The current status of device.	
Listening	Lit (green) when the device is operational and waiting for data to arrive.	
Clear Counters	Resets all the counters at the bottom of the tab.	
Bytes In	The number of bytes received by the device.	
Bytes Out	The number of bytes transmitted by the device.	
Activity	Lit yellow when data is being transmitted or received.	

Mute

Unit	Mutes all audio output from the unit. The Muted LED will be lit (red) when the unit is muted.
System	Mutes all audio output from the unit and all other NioNodes in the project. CABs are also muted. The Muted LED will be lit (red) when the system is muted.

SNMP Exports

Index	The number of the control that will be monitored. This number corresponds to the SNMP flyoff number and the number for the control in the *exportedControlTable* in the SNMP MIB.

	Each NioNode can control and monitor up to 256 controls. **Tip:** Wire SNMP flyoffs to master nodes on controls that you want to monitor or control. To provide SNMP control of a Python script, wire a generic control to both the Python script and to the SNMP flyoff.
R/O	When clicked, sets the control to read-only, so its value cannot be changed via SNMP. When this button is switched off, the value of the control can be read and set using SNMP.
Label	A label for the control, which will be stored under *controlLabel* in the *exportedControlTable* in the SNMP MIB.

XDAB

Purpose

The XDAB device allows you to control the flow of data between NioNodes that have been physically wired together into an XDAB cluster. Wiring devices together in this way allows available DSP processing capacity to be shared between the group.

Note: XDAB is available on NION n3 and N6 models, but not nX or nE models.

NWare requires that you indicate which NioNodes are wired together by connecting them to an XDAB device. You must also specify which devices will be processed by which nodes.

For information on using XDAB devices in your project design, see *Using XDAB to share DSP resources* in the *NWare User Guide*. For more information on the technical aspects of using XDAB with VLANs and CobraNet networks, see *Using XDAB clusters with VLANs and CobraNet* in the *CobraNet Networking Guide*.

Device properties

XDAB Channel Count (Max 448)	The number of input and output channels on the device block.

Controls

This device does not have any controls.

Expansion (I/O)

CAB 4n CobraNet

Purpose

The CAB 4n device allows you to control and monitor CAB 4n devices on the CobraNet network.

Device properties

CAB 4n Properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
Expansion Slot x	The types of cards inserted in the available slots at the rear of the unit. Select the appropriate cards for the slots you are using. The CAB cards are color-coded to help you identify them.	
	Four channel line input	Black
	Four channel mic input	Green
	Four channel line output	Blue
	Four channel AEC input	Orange
GPIO Pin 1-8	The assignments for the pins on the GPIO connector at the rear of the unit.	
	Digital Output	3.0V TTL logic

		Low: 0VDC - 0.4VDC High: 2.4VDC - 3.3VDC
	Digital Input	3.0V TTL logic Low: 0VDC - 0.8VDC High: 2.0VDC - 24VDC
	Analog Input	Using external, regulated 24VDC supply.
	Rotary encoder	Requires 2 pins and a common.

Advanced properties	
RS485 Raw MAC Enable	When selected, enables a raw, RS-485 MAC configuration to send and receive from non-CobraNet MACs.
ControlMatrix Mode	When selected, will set the baud rate and format defaults and add input wiring nodes to the block for serial bridging MACs when used with ControlMatrix.
Advanced Subchannel Mapping	When selected, NWare allows you to specify how the CobraNet input and output channels will be organized into bundles.

Controls

CAB 4n

Link	Lit (green) when a link is established between NWare and the device across the network.
id	A four digit hexadecimal number between 0000 and FFFF (0000 is off). This number uniquely identifies the CAB on the network. It is specified on the front panel of the CAB hardware using rotary switches. When a valid number is entered, the Link LED will be lit and the LEDs on the CAB will turn from Hardware IDs to meters.
Transmitters	
TX	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight

	sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to transmit. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Num Chan	The number of audio channels to be included in the bundle. The Num Chan setting, which has a default of 8, controls how many audio channels are sent in a bundle. The value should be set to the number of contiguous channels that will be used, as defined in the Sub-channel Mapping boxes. If Num Chan is set to a value that is greater than the number of channels used, then the bundle will be larger than necessary and will result in wasted bandwidth and processor time. Unused channels with a value of 0 are represented in the bundle by header data only (and no audio data will be included). If the bundle contains subchannel numbers that are not used, they will be sent as full audio channels and consume 1 Mbit of bandwidth per channel.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.
Unicast Mode	Controls how a bundle is transmitted onto to the CobraNet network. There are several modes of operation: ▪ Unicast - the bundle is sent directly to only one receiver. ▪ Multicast - the bundle is sent to all receivers, even if it is not required by the receiver. This mode will always consume bandwidth at all nodes. ▪ Multi-unicast - up to four copies of the same bundle are sent unicast to up to four different receiving nodes.

	Specify *Always* (the default) to always use unicast, or 1, 2, 3 or 4 to specify the number of receivers for the bundle. If there is only one receiver for a transmission, unicast will be used automatically. If Unicast Mode is set to 1 or greater, unicast will be used unless the number of receivers on the network for a particular bundle number is greater than the value of Unicast Mode; in this case, bundles will be sent as multi-unicast until the number reaches the value of Max Unicast.
	Note: If you specify a bundle number that is less than 256, multicast will always be used and the Unicast Mode setting will be ignored.
	Examples
	Unicast Mode is set to Always. Max Unicast setting is ignored. There are four receivers set to receive the bundle. The bundle will always be sent multicast because the number of receivers for the bundle is greater than 0.
	Bundle number is greater than 256. Unicast Mode is set to Always. Max Unicast setting is ignored. There is just one receiver set to receive the bundle. The bundle will be sent unicast because the number of receivers is less than 2 (and the bundle number is greater than 256, so multicast mode is not enforced).
	Unicast Mode is set to 2. Max Unicast is set to 2 or greater. There are four receivers set to receive the bundle. The receiver bundle count is 4, which is greater than 2, so the bundle will be sent multicast.
Max Unicast	The number of duplicated bundle transmissions (rows with identical settings and the same bundle number) that will be sent in *multi-unicast* mode before true multicast is used.

Receivers	
RX	Lit (green) when data is being received on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to receive. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.

Slot x: 4 Channel Line Input (black)

Default display (advanced subchannel mapping switched off)	
Bundle (TX/RX)	The bundle number that identifies a group of sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used. As the CAB 4n cards only support 4 channels, the extra slots are not used.

Transmitter	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Input	
Mute	Mutes the channel.
Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -95dBu to +30dBu.
Full Scale	Full scale in the A to D converter. You can select 12dBu, 18dBu, 24dBu or 30dBu.

Slot x: 4 Channel Mic Input (green)

Default display (advanced subchannel mapping switched off)	
Bundle (TX/RX)	The bundle number that identifies a group of sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used. As the CAB 4n cards only support 4 channels, the extra slots are not used.
Transmitter	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Input	
Phantom	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones.
Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -95dBu to +30dBu.

Slot x: 4 Channel Line Output (blue)

Default display (advanced subchannel mapping switched off)	
Bundle (TX/RX)	The bundle number that identifies a group of sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used. As the CAB 4n cards only support 4 channels, the extra slots are not used.
Receiver	Lit (green) when data is being received on one or more of the subchannels in the bundle.
Output	
Mute	Mutes the channel.
Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -95dBu to +30dBu.
Full Scale	Full scale in the D to A converter. You can select 6dBu, 12dBu, 18dBu or 24dBu.

Slot x: 4 Channel AEC Input (orange)

This card has been discontinued.	
Default display (advanced subchannel mapping switched off)	
Bundle (TX/RX)	The bundle number that identifies a group of sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used. As the CAB 4n cards only support 4 channels, the extra slots are not used.
Transmitter	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.

Reference	Input channel number (1 or 2) to use for the AEC reference signal. This is the signal from the far end (microphone).
Input	
Mute	Mutes the channel.
Phantom	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones.
Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -65dBu to +20dBu.
Coarse Gain	Allows gain adjustment in steps. Settings are 0dB, 25dB and 55dB.
AEC Enable	Switches on echo cancellation for the channel.
AEC Level	Can be set to *None* (off), *Soft*, *Medium* or *Aggressive* to control the speed of convergence. **Tip:** We recommend that you test out these options carefully when configuring your system to see which gives the best performance.
NC Enable	Enables noise cancellation.
NC Level	Noise cancellation level. Settings are 0dB, -6dB, -9dB and -12dB.

GPIO

Digital Outs	
Pin x	Click to enable digital output on the pin.
Digital Ins	
Pin x	Lit (green) when digital input is detected on the pin.
Analog Ins	
Value	Displays a representation of the input voltage level range. The minimum value is represented by zero and the maximum by

	1.0. Typically, these inputs are physically connected to a potentiometer. **Tip:** The knob control cannot be gestured, but you can duplicate it and wire the copy to other controls in your design. This enables you to pass the values to other controls.
Rotary Encoders	
Value	Displays the input value for a rotary encoder wired to the GPIO port. The value increases when the rotary encoder is moved in one direction and decreased when it is moved in the other. You can also set the value manually by gesturing the knob.
Relays	
1-4	Buttons that trigger the internal relays. There are four sets of normally closed (NC) or normally open (NO) relays. For more information, see *GPIO overview* in the *Cab4n Hardware Manual*.

RS485

RS-485 Configuration	
Enable	Enable the use of RS-485. **Notes:** ▪ CAB CM-1 cards support 8 and 9 bit serial data. ▪ CAB CM-2 cards support 8 bit serial data only. ▪ CAB Dante does not support RS-485.
Unicast Address	Prevents multicast RS-485 data connections across the network. Only Unicast connections to a single destination may be established.
Format	Set to 9 bit. The 9th data bit is bridged over the Ethernet along with the standard 8 data bits. This value cannot be changed.
Baud Rate	Baud rate for data transmission and reception in bits per second.

	Set to 38400. This value cannot be changed.
Rx MAC	MAC address of the CobraNet Interface from which SCI data will be accepted. This may be any multicast address except 01:60:2B:FD:00:00 through 01:60:2B:FD:FF:FF, which have been reserved by Cirrus Logic for use as *asynchronous global channels*.
Tx MAC	MAC address of the CobraNet interface to which serial data is sent. May be any multicast or unicast address.
RX Channel	The number of the receive channel to which this CAB belongs. This CAB will be able to receive serial data from other CABs transmitting on this channel.
TX Channel	The number of the transmit channel to which this CAB belongs. This CAB will be able to transmit serial data to other CABs receiving on this channel.
PPeriod	The polling period for devices attached to the serial port. The time in milliseconds that elapses after a device has been polled before it is polled again.

Advanced

Buddy Link Mode	Disabled	Disables Buddy Link Mode. This is the default setting.
	Buddy Link	Enables the Buddy Link system that allows CABs to be paired to provide audio input and output redundancy. If you are using a CAB 4n, you can find more information in the section *Link connections* in the *Cab4n Hardware Manual.* Buddy Link mode is normally enabled on the secondary (backup) CAB and disabled on the primary CAB. When the secondary CAB detects that the primary CAB has failed, it takes over.
	External Sync	The CobraNet clock for this device will be automatically synchronized with the clock signal received from external device. **Note:** CAB 4ns only support support 48KHz clock signals from the external

		source.
Buddy Link Force	Used on the secondary (backup) device. Simulates failure of the primary buddy link device so that the secondary device will automatically take over.	
Conductor Priority	The conductor priority of this device. The default is 32. If you leave this setting at the default value, a CobraNet Conductor will be selected automatically. The device with the highest value will become the Conductor, therefore selecting a higher value makes it more likely that this device will become the Conductor.	

CAB 4n Dante

Purpose

The CAB 4n Dante device allows you to control and monitor CAB 4n devices fitted with DLMs.

Device properties

CAB 4n Properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
Expansion Slot x	The types of cards inserted in the available slots at the rear of the unit. Select the appropriate cards for the slots you are using. The CAB cards are color-coded to help you identify them.	
	Four channel line input	Black

	Four channel mic input	Green
	Four channel line output	Blue
	Four channel AEC input	Orange
GPIO Pin 1-4, 14-17	The assignments for the pins on the GPIO connector at the rear of the unit.	
	Digital Output	3.0V TTL logic Low: 0VDC - 0.4VDC High: 2.4VDC - 3.3VDC
	Digital Input	3.0V TTL logic Low: 0VDC - 0.8VDC High: 2.0VDC - 24VDC
	Analog Input	Using external, regulated 24VDC supply.
	Rotary encoder	Requires 2 pins and a common.

Controls

CAB Dante

Link	Lit (green) when a link is established between NWare and the device across the network.
id	A four digit hexadecimal number between 0000 and FFFF (0000 is off). This number uniquely identifies the CAB on the network. It is specified on the front panel of the CAB hardware using rotary switches. When a valid number is entered, the Link LED will be lit and the LEDs on the CAB will turn from Hardware IDs to meters.

Slot x: 4 Channel Line Input (black)

Input	
Mute	Mutes the channel.

Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -95dBu to +30dBu.
Full Scale	Full scale in the A to D converter. You can select 12dBu, 18dBu, 24dBu or 30dBu.

Slot x: 4 Channel Mic Input (green)

Input	
Phantom	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones.
Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -95dBu to +30dBu.

Slot x: 4 Channel Line Output (blue)

Output	
Mute	Mutes the channel.
Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -95dBu to +30dBu.
Full Scale	Full scale in the D to A converter. You can select 6dBu, 12dBu, 18dBu or 24dBu.

Slot x: 4 Channel AEC Input (orange)

Reference	Input channel number (1 or 2) to use for the AEC reference signal. This is the signal from the far end (microphone).
Input	

Mute	Mutes the channel.
Phantom	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones.
Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -65dBu to +20dBu.
Coarse Gain	Allows gain adjustment in steps. Settings are 0dB, 25dB and 55dB.
AEC Enable	Switches on echo cancellation for the channel.
AEC Level	Can be set to *None* (off), *Soft*, *Medium* or *Aggressive* to control the speed of convergence. **Tip:** We recommend that you test out these options carefully when configuring your system to see which gives the best performance.
NC Enable	Enables noise cancellation.
NC Level	Noise cancellation level. Settings are 0dB, -6dB, -9dB and -12dB.

GPIO

Digital Outs	
Pin x	Click to enable digital output on the pin.
Digital Ins	
Pin x	Lit (green) when digital input is detected on the pin.
Analog Ins	
Value	Displays a representation of the input voltage level range. The minimum value is represented by zero and the maximum by 1.0. Typically, these inputs are physically connected to a potentiometer.

	Tip: The knob control cannot be gestured, but you can duplicate it and wire the copy to other controls in your design. This enables you to pass the values to other controls.
Rotary Encoders	
Value	Displays the input value for a rotary encoder wired to the GPIO port. The value increases when the rotary encoder is moved in one direction and decreased when it is moved in the other. You can also set the value manually by gesturing the knob.
Relays	
1-4	Buttons that trigger the internal relays. There are four sets of normally closed (NC) or normally open (NO) relays. For more information, see *GPIO overview* in the *Cab4n Hardware Manual*.

CAB 8n

Purpose

The CAB 8n device allows you to control and monitor CAB 8n devices on the network.

Device properties

CAB 8n Properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Audio 1-8	The function of each audio connector on the device.	
	Input	The audio connector will be used to receive audio signals into the device.
	Output	The audio connector will be used to transmit audio signals from the device.
GPIO Pin 1-8	The assignments for the pins on the GPIO connector at the rear of the unit.	
	Analog Input	10-bit resolution, 12V full-scale, reverse voltage and transient protection.
	Digital Input	2.5V high level (LVTTL) with reverse voltage and transient protection.
	Digital Output	2.5V high level (LVTTL) short circuit current 1.4mA.
	High Current Output	Voltage is as supplied by external DC power (Ext Pwr connector). Absolute max. current draw 0.5A per I/O. Total limited by external PSU. Not available if using PoE.
Advanced properties		
Advanced Subchannel Mapping	When selected, NWare allows you to specify how the CobraNet input and output channels will be organized into bundles.	

Controls

CAB 8n

Link	Lit (green) when a link is established between NWare and the device across the network.
id	A four digit hexadecimal number between 0000 and FFFF (0000 is off). This number uniquely identifies the CAB on the network. It is specified on the front panel of the CAB hardware using rotary switches. When a valid number is entered, the Link LED will be lit.

Conductor Priority	CobraNet Conductor priority. If you leave this setting at the default value, a CobraNet Conductor will be selected automatically. The device with the highest value will become the Conductor, therefore selecting a higher value makes it more likely that this device will become the Conductor.	
Fault	When lit (red) indicates an unexpected condition within the CobraNet interface.	
Failover Mode	Specifies whether this unit will be part of a redundant set up. When redundancy is used, two CAB 8ns are configured so that if one CAB fails, the other takes over and audio will continue to be transferred across the network. The CABs are wired together using the Fault connectors on the rears of the units and audio inputs and outputs are wired to both units.	
	Disabled	This unit will not be used in a redundant set up. This is the default setting.
	Master	This is the primary unit that will be used to transfer audio. It is assumed that a second CAB (physically connected to the first one) has been configured to operate in slave mode.
	Slave	This is the backup unit that will not be used to transfer audio unless the primary unit fails.
Force Failover	Forces a switchover from the master unit to the slave unit. The slave unit will become the master and vice versa.	
Reset Failover	Actions a switchover from the slave unit back to the master unit.	
Persistent configuration	Click to specify that the configuration settings specified on the control surface will be used instead of the default settings when the unit is power cycled.	
Standalone mode	Click to specify that the CAB will continue to send and receive audio data even if it can no longer communicate with the NioNode running the project.	

Default display (advanced subchannel mapping switched off)

Bundle (TX/RX)	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used. The TX bundle will contain all the audio channels set to *input* on the device properties of the CAB 8n. The RX bundle will contain all the audio channels set to output on the device properties of the CAB 8n. The TX and RX channels will be arranged in numerical order within the bundle.
TX	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
RX	Lit (green) when data is being received on one or more of the subchannels in the bundle.

Advanced subchannel mapping display	
Transmitters	
TX	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to transmit. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use

	this feature.
Num Chan	The number of audio channels to be included in the bundle. The Num Chan setting, which has a default of 8, controls how many audio channels are sent in a bundle. The value should be set to the number of contiguous channels that will be used, as defined in the Sub-channel Mapping boxes. If Num Chan is set to a value that is greater than the number of channels used, then the bundle will be larger than necessary and will result in wasted bandwidth and processor time. Unused channels with a value of 0 are represented in the bundle by header data only (and no audio data will be included). If the bundle contains subchannel numbers that are not used, they will be sent as full audio channels and consume 1 Mbit of bandwidth per channel.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.
Unicast Mode	Controls how a bundle is transmitted onto to the CobraNet network. There are several modes of operation: ▪ Unicast - the bundle is sent directly to only one receiver. ▪ Multicast - the bundle is sent to all receivers, even if it is not required by the receiver. This mode will always consume bandwidth at all nodes. ▪ Multi-unicast - up to four copies of the same bundle are sent unicast to up to four different receiving nodes. Specify *Always* (the default) to always use unicast, or 1, 2, 3 or 4 to specify the number of receivers for the bundle. If there is only one receiver for a transmission, unicast will be used automatically. If Unicast Mode is set to 1 or greater, unicast will be used unless the number of receivers on the network for a particular bundle number is greater than the value of Unicast Mode; in this case, bundles will be sent as multi-unicast until the number reaches the value of Max Unicast. **Note:** If you specify a bundle number that is less than 256, multicast will always be used and the Unicast Mode setting will be ignored.

	Examples
	Unicast Mode is set to Always. Max Unicast setting is ignored. There are four receivers set to receive the bundle. The bundle will always be sent multicast because the number of receivers for the bundle is greater than 0.
	Bundle number is greater than 256. Unicast Mode is set to Always. Max Unicast setting is ignored. There is just one receiver set to receive the bundle. The bundle will be sent unicast because the number of receivers is less than 2 (and the bundle number is greater than 256, so multicast mode is not enforced).
	Unicast Mode is set to 2. Max Unicast is set to 2 or greater. There are four receivers set to receive the bundle. The receiver bundle count is 4, which is greater than 2, so the bundle will be sent multicast.
Max Unicast	The number of duplicated bundle transmissions (rows with identical settings and the same bundle number) that will be sent in *multi-unicast* mode before true multicast is used.
Receivers	
RX	Lit (green) when data is being received on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want

	to receive. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.

Audio

Peak Digital Input Meters	Peak digital input level in dB (23 dB equals full-scale digital input).
Inputs	
Phantom Power	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones. **Note:** If PoE is used, the total power consumed by the unit must not exceed 12.5W. If more power is consumed, the unit will automatically shut down.
Maximum Input Signal	The maximum expected analog RMS input level for the channel. The peak level is 3dB higher. This control is used when you are setting up the gain structure. For more information, see *Setting up the gain structure* in the *NWare User Guide*. The valid range is -48dB to +24dB.
Level Control	The level of gain to be applied to the analog signal inside the unit. The gain is applied before A to D conversion takes place. The valid range is -96dB to +0dB.

Analog Clip	Lit (red) when the input signal is clipped. This occurs when the signal level exceeds the maximum analog sine input level plus 3dB.
Mute	Mutes the channel.
Outputs	
Analog Gain	Sets the amount of amplification or attenuation to be applied to the signal. The valid range is -96dBu to +22dBu.
Mute (Relay)	Mutes the channel and switches off the relay on the output.

GPIO

Analog Inputs	
Value	Displays a representation of the input voltage level range. The minimum value is represented by zero and the maximum by 1.0. Typically, these inputs are physically connected to a potentiometer. **Tip:** The knob control cannot be gestured, but you can duplicate it and wire the copy to other controls in your design. This enables you to pass the values to other controls.
Calibrate	Sets the range of recognized input values arriving into the analog inputs. After the potentiometer has been installed, and you are ready to set the minimum and maximum values: 1. Click Calibrate to start calibration. 2. Sweep the pot from the minimum to the maximum twice. 3. Click Calibrate again to stop calibration. **Note:** Calibration takes into account the resistance of the wire and the tolerances of the potentiometer.
Min Calibration Max Calibration	The minimum and maximum recognized analog input values. If you leave these values set to zero, they will be updated automatically by the calibration process. Alternatively, you can specify values by typing in the boxes.

	This allows you to restrict the range of values that can be generated by a potentiometer.
Squelch	A control noise squelch that adjusts the bit resolution of the analog input. The higher the squelch value, the greater the change in value required in the input in order for it to be recognized as a change. This is typically used when the input signal is fluctuating because of noise. We recommend that you use the minimum squelch value possible in order to stop the input signal fluctuating.
Digital Inputs	
Status	Lit (green) when digital input is detected on the pin.
Digital Outputs	
On/Off	Click to enable digital output on the pin. 2.5V high level (LVTTL) short circuit current 1.4mA.
High Current Outputs	
On/Off	Click to enable output on the pin. Voltage is as supplied by external DC power (Ext Pwr connector). Absolute max. current draw 0.5A per I/O. Total limited by external PSU. Not available if using PoE.
Relays	
On/Off	Click to control the contact-closure circuits. Max voltage 30V DC, max current 1A.

Serial

Interface	Specifies the mode for data communications. This can be RS-232 Full Duplex, RS-422 Full Duplex, RS-485 Half Duplex, RS-485 Full Duplex, RS-232, RS-422 or RS-485.
Unicast Address	Prevents multicast RS-485 data connections across the network. Only Unicast connections to a single destination may be established.
Baud Rate	Baud rate for data transmission and reception in bits per second.
RX Channel	The number of the receive channel to which this CAB belongs.

	This CAB will be able to receive serial data from other CABs transmitting on this channel.
TX Channel	The number of the transmit channel to which this CAB belongs. This CAB will be able to transmit serial data to other CABs receiving on this channel.
PPeriod	The polling period for devices attached to the serial port. The time in milliseconds that elapses after a device has been polled before it is polled again.

Status

Status LEDs used to diagnose problems with the operation of the CAB 8n. For more information, contact *MediaMatrix Technical Support* (*mailto:mmtechsupport@peavey.com*).	
Reset Status	Click to reset the LEDs on the control surface.
LED Brightness	Controls the brightness of the LEDs on the front panel of the CAB. The valid range is 1 to 100.

H-DCM CobraNet

Purpose

The H-DCM CobraNet device allows you to control and monitor an H-DCM installed on the local area network.

Device properties

H-DCM CobraNet Properties	
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.
	NWare will decide which role this device belongs to.

		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Advanced properties	
Serial Raw MAC Enable	When selected, enables a raw, RS-485 MAC configuration to send and receive from non-CobraNet MACs.
Advanced Subchannel Mapping	When selected, NWare allows you to specify how the CobraNet input and output channels will be organized into bundles.

Controls

H-DCM

Link	Lit (green) when a link is established between NWare and the device across the network.

IP Address	The IP address of the H-DCM device.

id	A four digit hexadecimal number between 0000 and FFFF (0000 is off). This number uniquely identifies the CAB on the network. It is specified on the front panel of the CAB hardware using rotary switches. When a valid number is entered, the Link LED will be lit and the LEDs on the CAB will turn from Hardware IDs to meters.
Transmitters	
TX	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to

	65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to transmit. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Num Chan	The number of audio channels to be included in the bundle. The Num Chan setting, which has a default of 8, controls how many audio channels are sent in a bundle. The value should be set to the number of contiguous channels that will be used, as defined in the Sub-channel Mapping boxes. If Num Chan is set to a value that is greater than the number of channels used, then the bundle will be larger than necessary and will result in wasted bandwidth and processor time. Unused channels with a value of 0 are represented in the bundle by header data only (and no audio data will be included). If the bundle contains subchannel numbers that are not used, they will be sent as full audio channels and consume 1 Mbit of bandwidth per channel.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.
Unicast Mode	Controls how a bundle is transmitted onto to the CobraNet network. There are several modes of operation: ▪ Unicast - the bundle is sent directly to only one receiver. ▪ Multicast - the bundle is sent to all receivers, even if it is not required by the receiver. This mode will always consume bandwidth at all nodes. ▪ Multi-unicast - up to four copies of the same bundle are sent unicast to up to four different receiving nodes. Specify *Always* (the default) to always use unicast, or 1, 2, 3 or 4 to specify the number of receivers for the bundle. If there is only one receiver for a transmission, unicast will be used automatically.

	If Unicast Mode is set to 1 or greater, unicast will be used unless the number of receivers on the network for a particular bundle number is greater than the value of Unicast Mode; in this case, bundles will be sent as multi-unicast until the number reaches the value of Max Unicast.
	Note: If you specify a bundle number that is less than 256, multicast will always be used and the Unicast Mode setting will be ignored.
	Examples
	Unicast Mode is set to Always. Max Unicast setting is ignored. There are four receivers set to receive the bundle. The bundle will always be sent multicast because the number of receivers for the bundle is greater than 0.
	Bundle number is greater than 256. Unicast Mode is set to Always. Max Unicast setting is ignored. There is just one receiver set to receive the bundle. The bundle will be sent unicast because the number of receivers is less than 2 (and the bundle number is greater than 256, so multicast mode is not enforced).
	Unicast Mode is set to 2. Max Unicast is set to 2 or greater. There are four receivers set to receive the bundle. The receiver bundle count is 4, which is greater than 2, so the bundle will be sent multicast.
Max Unicast	The number of duplicated bundle transmissions (rows with identical settings and the same bundle number) that will be sent in *multi-unicast* mode before true multicast is used.
Receivers	
RX	Lit (green) when data is being received on one or more of the subchannels in the bundle.

Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to receive. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.

Audio

Inputs	
Phantom	Enables the phantom power feature which supplies power to a microphone via the audio cables attached to the device. This feature is used for condenser microphones.
Gain	The level of gain to be applied to the analog signal inside the unit. The gain is applied before A to D conversion takes place. The valid range is 0dB to +60dB.

GPIO

Digital Outs	
On/Off	Click to enable digital output on the pin. 2.5V high level (LVTTL) short circuit current 1.4mA.
Digital Ins	
Status	Lit (green) when digital input is detected on the pin.

Serial

Enable	Enable the serial port for communications.
Unicast Address	Prevents multicast data connections across the network. Only unicast connections to a single destination may be established.
Format	Set to 9 bit. The 9th data bit is bridged over the Ethernet along with the standard 8 data bits. This value cannot be changed.
Baud Rate	Baud rate for data transmission and reception in bits per second. Set to 38400. This value cannot be changed.
Rx MAC	MAC address of the CobraNet Interface from which SCI data will be accepted. This may be any multicast address except 01:60:2B:FD:00:00 through 01:60:2B:FD:FF:FF, which have been reserved by Cirrus Logic for use as *asynchronous global channels*.
Tx MAC	MAC address of the CobraNet interface to which serial data is sent. May be any multicast or unicast address.
PPeriod	The polling period for devices attached to the serial port. The time in milliseconds that elapses after a device has been polled before it is polled again.

Configuration

IP Address	The IP address you would like to use for the network interface on the unit.

Apply	Configures the unit with the specified IP address.
Persist	When clicked, the specified IP address will be used when the unit is power cycled, instead of the current stored address.

Human Interface

D Series

D1V

Purpose

The MediaMatrix D1V is a one-gang Decora panel with four programmable virtual rotary controls and status LEDs. It uses the PASHA/XControl protocol to communicate with the NION hardware. The NWare D1V device is linked to the physical device via its device ID. The NWare device can be wired to other devices in the design to specify exactly what function the physical controls will perform when the user interacts with them.

Device properties

Wall model	The wall controller model. D1V is selected automatically.
Location (optional)	Information on the location of the device. This is displayed on the device block.
Device ID (control aliases)	Identifies an individual D series device attached to a NION on the network. The device ID is set using DIP switches on the physical device. For information on setting the device ID, see *Setting the device ID for a panel* in the *D Series Hardware Manual*. The PASHA control aliases (shown in brackets) are used by NWare to reference controls on the physical device.

Controls

Level x	Controls the level for an individual function. This could be the gain for an audio channel, for example. Functions are assigned to the controls by wiring the output nodes on the device to other blocks in the design.

D4S

Purpose

The MediaMatrix D4S is a one-gang Decora panel with four programmable buttons and status LEDs. It uses the PASHA/XControl protocol to communicate with the NION hardware. The NWare D4S device is linked to the physical device via its device ID. The NWare device can be wired to other devices in the design to specify exactly what function the physical controls will perform when the user interacts with them.

Device properties

Wall model	D4S Switch Mode	In switch mode, each button is independent and does not function as part of a mutually exclusive group. Each button sends alternate on and off commands with each button press. The LED indicates the on/off status for each button separately. This feature is used primarily to turn on specific audio functions, such as a mute, or in conjunction with level controls, switches and simple audio routing.
	D4S Trigger Mode	In trigger mode, each button transmits a momentary signal when pressed. This signal is a one-shot command that the software recognizes as a trigger. A trigger has no on or off state, it is simply a momentary logic signal. When a trigger has been activated, the button LED will illuminate and stay illuminated until another trigger in the same group is activated. The buttons work in the same way as radio buttons in a software application. They can be used as preset selectors in all products, and additionally, as a router (source select) control, in some products. Refer to the product manuals for more information.
Location (optional)	Information on the location of the device. This is displayed on the device block.	

Device ID (control aliases)	Identifies an individual D series device attached to a NION on the network. The device ID is set using DIP switches on the physical device. For information on setting the device ID, see *Setting the device ID for a panel* in the *D Series Hardware Manual*. The PASHA control aliases (shown in brackets) are used by NWare to reference controls on the physical device.

Controls

Trigger Mode	
Trigger x	Transmits a signal momentarily to trigger a device.

Switch Mode	
Switch x	Switches between the on and off states. The button LED is lit when it is switched on.

nControl

Purpose

The nControl device allows you to control and monitor nControl units installed on the local area network. For detailed information on how to install and configure nControl units, refer to the *nControl Hardware Manual*.

Device properties

nControl Properties		
Role name	The name of the role for this node. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. **Note:** You must specify a unique role name in the **Role name** box. If you do not do this, an error will be displayed when you deploy the project.	
Expansion Slot <number>	The type of card installed in each PCI expansion slot.	
	8 ch relay/digital in: PCI-1761	Eight channel digital

		input/output card. For more information, see *advantech.com* (*http://www.advantech.com.tw/products/8-ch-Relay-and-8-ch-Isolated-Digital-Input-PCI-Card/mod_1-2MLHK7.aspx*).
	CobraNet: Audio Science-5416	CobraNet sound card. For more information, see *audioscience.com* (*http://www.audioscience.com/internet/products/sound_cards/asi54xx.htm*).
CobraNet BOOTP	When selected, configures the nControl unit as a CobraNet BOOTP server, providing IP addresses to other devices automatically. **Notes:** ▪ The BOOTP server is recommended for use with CobraNet devices only. ▪ It is unlikely that any device will consistently receive the same address after the nControl is rebooted. ▪ The BOOTP server is designed to support CobraNet devices and uses the more recent BOOTP extensions detailed in RFC 1497. The server is not guaranteed to be backwardly compatible with all BOOTP clients. ▪ It is possible, although unlikely, that the BOOTP server will allocate IP addresses to non-CobraNet devices on the network that are configured to use DHCP. If this problem occurs, we recommend that you switch off the BOOTP server on the nControl unit and use an alternative server.	
SNMP Discovery	Allows you to dynamically locate and identify SNMP enabled devices on your network. The discovery process will retrieve a set of information from each device that includes the MAC address, SNMP Object ID, name, location and contact. **Notes:** ▪ This feature can generate a large amount of network traffic. ▪ This feature must be enabled in order to use the SNMP Agent Discovery device in your design.	
Network Control Protocol	The version of the RATC protocol that can be used to manage the nControl.	

Network Control Port	The port number on which the RATC server (on the nControl unit) will listen. The default is 1632. The valid range is 1-32767.
RS-232 Protocol (COM port)	The type of protocol (RATC1, RATC2, PASHA/PageMatrix, PASHA/XControl or PASHA/Legacy) to use for remote control of a project via the serial port. If you want to use the *Comms Processor* (on page 236) device to send and receive data via the serial port, or you do not want to use the serial port at all, select *None/Comms processor*.

Configure BootP Server	
IP address start	The start IP address for the range that can be allocated to clients requesting IP addresses.
IP address end	The end IP address for the range that can be allocated to clients requesting IP addresses.
Subnet Mask	The subnet mask for the IP address range.

Advanced Properties	
Threads	The maximum number of IP address requests the BOOTP server can process simultaneously. **Tip:** We recommend that you leave the thread count setting set to 2.

Configure Discovery Server	
IP address start	The start IP address for the range that will be scanned during the discovery process. If you want to use a broadcast address, which will provide better performance when scanning a large range of addresses, type the broadcast address. When a large number of devices are discovered, using a broadcast address will greatly reduce the impact on the network. The format of a broadcast address is x.x.x.255. This will broadcast to the entire /24 subnet. You can also use x.x.255.255 to broadcast to a /16 subnet, but the impact of addressing such a large number of devices must be considered carefully.

	Note: Not all SNMP devices will respond to a broadcast addresses. Check that the devices you are using are compatible.
IP address end	The end IP address for the range that will be scanned during the discovery process. If you are using a broadcast address, leave this box blank.
Read community	The read community string (password) for accessing devices on the network during the discovery process.
Update period (mins)	The interval to use between scans for devices on the network.
Switch port support	Allows devices to be detected via the switch port to which they are connected. Both the switch and the device must support SNMP. Furthermore, the device must respond to the SNMP discovery process.

Controls

Slot <number>: PCI-1761	
Digital Ins (1-8)	Lit green when the corresponding input channel on the card is receiving data.
Relays (1-8)	When clicked, the corresponding relay on the card is triggered or reset. Lit green when a relay is triggered.
Present	Lit green when a PC-1761 card is installed in the slot.

Slot <number>: AudioScience 5416

Link	Lit (green) when a link is established between NWare and the device across the network.
Conductor	Lit (yellow) when this unit is the CobraNet Conductor.
	Note: Currently, it is not possible to specify the conductor

	priority manually.
Fault	Lit (red) when a fault condition, e.g. thermal or short circuit, has been detected.
Err Count	The number of errors recorded by the device. **Note:** Errors are recorded when certain routine operations are carried out, including disconnecting cables and rerouting.
TX	Lit (green) when data is being transmitted.
TX ERR	Lit (red) when an error occurs during data transmission.
RX	Lit (green) when data is being received.
RX ERR	Lit (red) when an error occurs during data reception.
Transmitters	
Transmitter / TX	Lit (green) when data is being transmitted on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to transmit. **Tip:** Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.
Num Chan	The number of audio channels to be included in the bundle. The Num Chan setting, which has a default of 8, controls how many audio channels are sent in a bundle. The value should be set to the number of contiguous channels that will be used, as defined in the Sub-channel Mapping boxes. If Num Chan is set to a value that is greater than the number of channels

	used, then the bundle will be larger than necessary and will result in wasted bandwidth and processor time. Unused channels with a value of 0 are represented in the bundle by header data only (and no audio data will be included). If the bundle contains subchannel numbers that are not used, they will be sent as full audio channels and consume 1 Mbit of bandwidth per channel.
Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.
Unicast Mode	Controls how a bundle is transmitted onto to the CobraNet network. There are several modes of operation: ▪ Unicast - the bundle is sent directly to only one receiver. ▪ Multicast - the bundle is sent to all receivers, even if it is not required by the receiver. This mode will always consume bandwidth at all nodes. ▪ Multi-unicast - up to four copies of the same bundle are sent unicast to up to four different receiving nodes. Specify *Always* (the default) to always use unicast, or 1, 2, 3 or 4 to specify the number of receivers for the bundle. If there is only one receiver for a transmission, unicast will be used automatically. If Unicast Mode is set to 1 or greater, unicast will be used unless the number of receivers on the network for a particular bundle number is greater than the value of Unicast Mode; in this case, bundles will be sent as multi-unicast until the number reaches the value of Max Unicast. **Note:** If you specify a bundle number that is less than 256, multicast will always be used and the Unicast Mode setting will be ignored. Examples Unicast Mode is set to Always. Max Unicast setting is ignored. There are four receivers set to receive the bundle. The bundle will always be sent multicast because the number of

	receivers for the bundle is greater than 0.
	Bundle number is greater than 256. Unicast Mode is set to Always. Max Unicast setting is ignored. There is just one receiver set to receive the bundle. The bundle will be sent unicast because the number of receivers is less than 2 (and the bundle number is greater than 256, so multicast mode is not enforced).
	Unicast Mode is set to 2. Max Unicast is set to 2 or greater. There are four receivers set to receive the bundle. The receiver bundle count is 4, which is greater than 2, so the bundle will be sent multicast.
Max Unicast	The number of duplicated bundle transmissions (rows with identical settings and the same bundle number) that will be sent in *multi-unicast* mode before true multicast is used.
Receivers	
RX	Lit (green) when data is being received on one or more of the subchannels in the bundle.
Bundle	The bundle number that identifies a group of up to eight sub-channels. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
Sub-Channel Mapping 1-8	Boxes for each sub-channel in the bundle. In these boxes you specify the corresponding hardware channel number you want to receive.
	Tip: Values in the **Sub-Channel Mapping** boxes may be changed on a dynamic basis. This allows any hardware channel number to be mapped to any bundle sub-channel(s) at any time, greatly expanding signal routing flexibility. However, only users familiar with advanced CobraNet practices should use this feature.

Priority	The priority of the group of sub-channels. **Tip:** You can use the priority setting to implement a redundancy system for transmitters. Specify the priority for a row and then, on a second device, specify the same settings, but use a lower priority. If the transmission of the first row fails, the lower priority row will be transmitted.

Monitor	
Power Supply	The actual voltages provided by the power supply to various components.
Temp	Temperature in degrees centigrade measured at the CPU and at another position inside the case (Sys).
Fan	Speed in RPM x1000 of the CPU and case (Sys) fans.

Serial <protocol>	
Status	The current status of device.
Listening	Lit (green) when the device is operational and waiting for data to arrive.
Clear Counters	Resets all the counters at the bottom of the tab.
Bytes In	The number of bytes received by the device.
Bytes Out	The number of bytes transmitted by the device.
Activity	Lit yellow when data is being transmitted or received.
Comm port	The comm port and serial protocol to use for data transfer.
Bits per sec	The baud rate (speed) for data transfer.
Data bits	The number of data bits in each character. Baudot uses 5, true ASCII uses 7. We recommend using 8, as this can be used for any type of data.

Parity	Specifies that an extra bit is to be included in the data transmission. This can be used for error detection.	
	none	No parity bit is sent. Error detection is handled by the communication protocol.
	even	The parity bit is set to 1 if the number of ones in the set of bits is odd, therefore making the number of ones even.
	odd	The parity bit is set to 1 if the number of ones in the set of bits is even, therefore making the number of ones odd.
	mark	Parity bit is always set to the mark signal condition (logical 1).
	space	Parity bit is always set to the space signal condition.
Stop bits	Bits sent at the end of every character to signify the end of the character in the data transmission. Normally, 1 stop bit is used.	
Rear mode	The operating mode for a data port that supports more than one mode. For example, RS-422 or RS-485.	

BOOTP	
Status	Lit green when the BOOTP server is running. Lit red when the server has stopped.
Served	The number of IP addresses that the BOOTP server has allocated to devices on the network since the nControl unit was last booted.
Failed	The number of requests for IP addresses that were unfulfilled. A failure can occur when all the IP addresses in the range have already been allocated and a further request for an IP address arrives. The list of available IP addresses changes when addresses are allocated to devices and when addresses are reclaimed from devices when they are no longer required.
Message	A status message indicating that a task has been completed

	successfully, or that a problem has occurred.

Discovery	
Status	Lit green when the SNMP discovery feature is enabled. Lit red when the feature is disabled.
Count	The number of devices found during the last scan for devices on the network.
Refresh	Starts the discovery process.
Message	A status message indicating that a task has been completed successfully, or that a problem has occurred.

Net Ctl <protocol>	
Status	The current status of the network control service.
Listening	Lit green when the service is operational and waiting for data to arrive.
Clear Counters	Resets all the counters at the bottom of the tab.
Bytes In	The number of bytes received by the service.
Bytes Out	The number of bytes transmitted by the service.
Commands	The number of commands that the service has received.
Errors	The number of commands that did not execute because they could not be parsed or failed when they were executed.

Redundancy	
Active Host Information	
Host Name	The name of the nControl unit that is currently active. This will change to the name of the standby unit if it takes over. This name is specified on the Network page of the web user interface.

Power Off	Powers down the unit. **Note:** When you click this button, you will lose contact with the unit and no longer be able to control it until it has been switched back on and booted.
Failover	Switches control over to the standby unit. This is useful for testing the backup system once it has been configured, or manually switching over to the standby unit when the active unit has stopped functioning.
Standby Host Information	
Host Name	The name of the standby unit.
Address	The IP address of the standby unit.
State	The status of the standby unit.
Last Sync	The date and time the standby unit last synchronized with the active unit.
Status	Lit (green) when NWare can contact the standby nControl unit. If this LED is unlit, check that the redundancy settings on the *Special* tab of the nControl web UI are correct.

nTouch 180

Purpose

The nTouch 180 device allows you to control and monitor an nTouch 180 installed on the local area network.

For detailed information on how to install and configure nTouch 180 units, refer to the *nTouch 180 Hardware Manual*.

Device properties

nTouch 180 Properties	
Role name	The name of the role for this node. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. **Note:** You must specify a unique role name in the **Role name** box. If you do not do this, an error will be displayed when you deploy the project.
CobraNet BOOTP	When selected, configures the nTouch 180 unit as a CobraNet BOOTP server, providing IP addresses to other devices automatically. **Notes:** ▪ The BOOTP server is recommended for use with CobraNet devices only. ▪ It is unlikely that any device will consistently receive the same address after the nTouch 180 is rebooted. ▪ The BOOTP server is designed to support CobraNet devices and uses the more recent BOOTP extensions detailed in RFC 1497. The server is not guaranteed to be backwardly compatible with all BOOTP clients. ▪ It is possible, although unlikely, that the BOOTP server will allocate IP addresses to non-CobraNet devices on the network that are configured to use DHCP. If this problem occurs, we recommend that you switch off the BOOTP server on the nTouch 180 unit and use an alternative server.

SNMP Discovery	Allows you to dynamically locate and identify SNMP enabled devices on your network. The discovery process will retrieve a set of information from each device that includes the MAC address, SNMP Object ID, name, location and contact. **Notes:** ▪ This feature can generate a large amount of network traffic. ▪ This feature must be enabled in order to use the SNMP Agent Discovery device in your design.
Network Control Protocol	The version of the RATC protocol that can be used to manage the nTouch 180.

Network Control Port	The port number on which the RATC server (on the nTouch 180 unit) will listen. The default is 1632. The valid range is 1-32767.
RS-232 Protocol (COM port)	The type of protocol (RATC1, RATC2, PASHA/PageMatrix, PASHA/XControl or PASHA/Legacy) to use for remote control of a project via the serial port. If you want to use the *Comms Processor* (on page 236) device to send and receive data via the serial port, or you do not want to use the serial port at all, select *None/Comms processor*.

Configure BootP Server	
IP address start	The start IP address for the range that can be allocated to clients requesting IP addresses.

IP address end	The end IP address for the range that can be allocated to clients requesting IP addresses.
Subnet Mask	The subnet mask for the IP address range.

Advanced Properties	
Threads	The maximum number of IP address requests the BOOTP server can process simultaneously. **Tip:** We recommend that you leave the thread count setting set to 2.

Configure Discovery Server	
IP address start	The start IP address for the range that will be scanned during the discovery process. If you want to use a broadcast address, which will provide better performance when scanning a large range of addresses, type the broadcast address. When a large number of devices are discovered, using a broadcast address will greatly reduce the impact on the network. The format of a broadcast address is x.x.x.255. This will broadcast to the entire /24 subnet. You can also use x.x.255.255 to broadcast to a /16 subnet, but the impact of addressing such a large number of devices must be considered carefully. **Note:** Not all SNMP devices will respond to a broadcast addresses. Check that the devices you are using are compatible.

IP address end	The end IP address for the range that will be scanned during the discovery process. If you are using a broadcast address, leave this box blank.
Read community	The read community string (password) for accessing devices on the network during the discovery process.

Update period (mins)	The interval to use between scans for devices on the network.
Switch port support	Allows devices to be detected via the switch port to which they are connected. Both the switch and the device must support SNMP. Furthermore, the device must respond to the SNMP discovery process.

Controls

Monitor	
Power Supply	The actual voltages provided by the power supply to various components.

Temp	Temperature in degrees centigrade measured at the CPU and at another position inside the case (Sys).

Serial <protocol>		
Status	The current status of device.	
Listening	Lit (green) when the device is operational and waiting for data to arrive.	
Clear Counters	Resets all the counters at the bottom of the tab.	
Bytes In	The number of bytes received by the device.	
Bytes Out	The number of bytes transmitted by the device.	
Activity	Lit yellow when data is being transmitted or received.	
Comm port	The comm port and serial protocol to use for data transfer.	
Bits per sec	The baud rate (speed) for data transfer.	
Data bits	The number of data bits in each character. Baudot uses 5, true ASCII uses 7. We recommend using 8, as this can be used for any type of data.	
Parity	Specifies that an extra bit is to be included in the data transmission. This can be used for error detection.	
	none	No parity bit is sent. Error detection is handled by the communication protocol.
	even	The parity bit is set to 1 if the number of ones in the set of bits is odd, therefore making the number of ones even.
	odd	The parity bit is set to 1 if the number of ones in the set of bits is even, therefore making the number of ones odd.
	mark	Parity bit is always set to the mark signal condition (logical 1).
	space	Parity bit is always set to the space signal condition.

Stop bits	Bits sent at the end of every character to signify the end of the character in the data transmission. Normally, 1 stop bit is used.
Rear mode	The operating mode for a data port that supports more than one mode. For example, RS-422 or RS-485.

BOOTP	
Status	Lit green when the BOOTP server is running. Lit red when the server has stopped.
Served	The number of IP addresses that the BOOTP server has allocated to devices on the network since the nControl unit was last booted.
Failed	The number of requests for IP addresses that were unfulfilled. A failure can occur when all the IP addresses in the range have already been allocated and a further request for an IP address arrives. The list of available IP addresses changes when addresses are allocated to devices and when addresses are reclaimed from devices when they are no longer required.
Message	A status message indicating that a task has been completed successfully, or that a problem has occurred.

Discovery	
Status	Lit green when the SNMP discovery feature is enabled. Lit red when the feature is disabled.
Count	The number of devices found during the last scan for devices on the network.
Refresh	Starts the discovery process.
Message	A status message indicating that a task has been completed successfully, or that a problem has occurred.

Net Ctl <protocol>	
Status	The current status of the network control service.
Listening	Lit green when the service is operational and waiting for data to arrive.
Clear Counters	Resets all the counters at the bottom of the tab.
Bytes In	The number of bytes received by the service.
Bytes Out	The number of bytes transmitted by the service.
Commands	The number of commands that the service has received.
Errors	The number of commands that did not execute because they could not be parsed or failed when they were executed.

Redundancy	
Active Host Information	
Host Name	The name of the nTouch 180 unit that is currently active. This will change to the name of the standby unit if it takes over. This name is specified on the Network page of the web user interface.
Power Off	Powers down the unit. **Note:** When you click this button, you will lose contact with the unit and no longer be able to control it until it has been switched back on and booted.
Failover	Switches control over to the standby unit. This is useful for testing the backup system once it has been configured, or manually switching over to the standby unit when the active unit has stopped functioning.
Standby Host Information	
Host Name	The name of the standby unit.
Address	The IP address of the standby unit.
State	The status of the standby unit.

Last Sync	The date and time the standby unit last synchronized with the active unit.
Status	Lit (green) when NWare can contact the standby nTouch 180 unit. If this LED is unlit, check that the redundancy settings on the *Special* tab of the nTouch 180 web UI are correct.

nTouch 180HD

Purpose

The nTouch 180HD device allows you to control and monitor an nTouch 180HD installed on the local area network.

Device properties

nTouch 180HD Properties	
Role name	The name of the role for this node. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. **Note:** You must specify a unique role name in the **Role name** box. If you do not do this, an error will be displayed when you deploy the project.

CobraNet BOOTP	When selected, configures the nTouch 180HD unit as a CobraNet BOOTP server, providing IP addresses to other devices automatically. **Notes:** ▪ The BOOTP server is recommended for use with CobraNet devices only. ▪ It is unlikely that any device will consistently receive the same address after the nTouch 180HD is rebooted. ▪ The BOOTP server is designed to support CobraNet devices and uses the more recent BOOTP extensions detailed in RFC 1497. The server is not guaranteed to be backwardly compatible with all BOOTP clients. ▪ It is possible, although unlikely, that the BOOTP server will allocate IP addresses to non-CobraNet devices on the network that are configured to use DHCP. If this problem occurs, we recommend that you switch off the BOOTP server on the nTouch 180HD unit and use an alternative server.
SNMP Discovery	Allows you to dynamically locate and identify SNMP enabled devices on your network. The discovery process will retrieve a set of information from each device that includes the MAC address, SNMP Object ID, name, location and contact. **Notes:** ▪ This feature can generate a large amount of network traffic. ▪ This feature must be enabled in order to use the SNMP Agent Discovery device in your design.

Network Control Protocol	The version of the RATC protocol that can be used to manage the nTouch 180HD.
Network Control Port	The port number on which the RATC server (on the nTouch 180HD unit) will listen. The default is 1632. The valid range is 1-32767.

RS-232 Protocol (COM port)	The type of protocol (RATC1, RATC2, PASHA/PageMatrix, PASHA/XControl or PASHA/Legacy) to use for remote control of a project via the serial port. If you want to use the *Comms Processor* (on page 236) device to send and receive data via the serial port, or you do not want to use the serial port at all, select *None/Comms processor*.

Configure BootP Server	
IP address start	The start IP address for the range that can be allocated to clients requesting IP addresses.

IP address end	The end IP address for the range that can be allocated to clients requesting IP addresses.
Subnet Mask	The subnet mask for the IP address range.

Advanced Properties	
Threads	The maximum number of IP address requests the BOOTP server can process simultaneously. **Tip:** We recommend that you leave the thread count setting set to 2.

Configure Discovery Server	
IP address start	The start IP address for the range that will be scanned during the discovery process. If you want to use a broadcast address, which will provide better performance when scanning a large range of addresses, type the broadcast address. When a large number of devices are discovered, using a broadcast address will greatly reduce the impact on the network. The format of a broadcast address is x.x.x.255. This will broadcast to the entire /24 subnet. You can also use x.x.255.255 to broadcast to a /16 subnet, but the impact of addressing such a large number of devices must be considered carefully. **Note:** Not all SNMP devices will respond to a broadcast addresses. Check that the devices you are using are compatible.

IP address end	The end IP address for the range that will be scanned during the discovery process. If you are using a broadcast address, leave this box blank.
Read community	The read community string (password) for accessing devices on the network during the discovery process.

Update period (mins)	The interval to use between scans for devices on the network.
Switch port support	Allows devices to be detected via the switch port to which they are connected. Both the switch and the device must support SNMP. Furthermore, the device must respond to the SNMP discovery process.

Controls

Monitor	
Power Supply	The actual voltages provided by the power supply to various components.

Temp	Temperature in degrees centigrade measured at the CPU and at another position inside the case (Sys).

Serial <protocol>		
Status	The current status of device.	
Listening	Lit (green) when the device is operational and waiting for data to arrive.	
Clear Counters	Resets all the counters at the bottom of the tab.	
Bytes In	The number of bytes received by the device.	
Bytes Out	The number of bytes transmitted by the device.	
Activity	Lit yellow when data is being transmitted or received.	
Comm port	The comm port and serial protocol to use for data transfer.	
Bits per sec	The baud rate (speed) for data transfer.	
Data bits	The number of data bits in each character. Baudot uses 5, true ASCII uses 7. We recommend using 8, as this can be used for any type of data.	
Parity	Specifies that an extra bit is to be included in the data transmission. This can be used for error detection.	
	none	No parity bit is sent. Error detection is handled by the communication protocol.
	even	The parity bit is set to 1 if the number of ones in the set of bits is odd, therefore making the number of ones even.
	odd	The parity bit is set to 1 if the number of ones in the set of bits is even, therefore making the number of ones odd.
	mark	Parity bit is always set to the mark signal condition (logical 1).
	space	Parity bit is always set to the space signal condition.

Stop bits	Bits sent at the end of every character to signify the end of the character in the data transmission. Normally, 1 stop bit is used.
Rear mode	The operating mode for a data port that supports more than one mode. For example, RS-422 or RS-485.

BOOTP	
Status	Lit green when the BOOTP server is running. Lit red when the server has stopped.
Served	The number of IP addresses that the BOOTP server has allocated to devices on the network since the nControl unit was last booted.
Failed	The number of requests for IP addresses that were unfulfilled. A failure can occur when all the IP addresses in the range have already been allocated and a further request for an IP address arrives. The list of available IP addresses changes when addresses are allocated to devices and when addresses are reclaimed from devices when they are no longer required.
Message	A status message indicating that a task has been completed successfully, or that a problem has occurred.

Discovery	
Status	Lit green when the SNMP discovery feature is enabled. Lit red when the feature is disabled.
Count	The number of devices found during the last scan for devices on the network.
Refresh	Starts the discovery process.
Message	A status message indicating that a task has been completed successfully, or that a problem has occurred.

Net Ctl <protocol>	
Status	The current status of the network control service.
Listening	Lit green when the service is operational and waiting for data to arrive.
Clear Counters	Resets all the counters at the bottom of the tab.
Bytes In	The number of bytes received by the service.
Bytes Out	The number of bytes transmitted by the service.
Commands	The number of commands that the service has received.
Errors	The number of commands that did not execute because they could not be parsed or failed when they were executed.

Redundancy	
Active Host Information	
Host Name	The name of the nTouch 180HD unit that is currently active. This will change to the name of the standby unit if it takes over. This name is specified on the Network page of the web user interface.
Power Off	Powers down the unit. **Note:** When you click this button, you will lose contact with the unit and no longer be able to control it until it has been switched back on and booted.
Failover	Switches control over to the standby unit. This is useful for testing the backup system once it has been configured, or manually switching over to the standby unit when the active unit has stopped functioning.
Standby Host Information	
Host Name	The name of the standby unit.
Address	The IP address of the standby unit.
State	The status of the standby unit.

Last Sync	The date and time the standby unit last synchronized with the active unit.
Status	Lit (green) when NWare can contact the standby nTouch 180HD unit. If this LED is unlit, check that the redundancy settings on the *Special* tab of the nTouch 180HD web UI are correct.

PageMatrix

Purpose

The Peavey PageMatrix system is a paging system that works in conjunction with a MediaMatrix audio system. The NWare PageMatrix device allows you to control paging within a number of zones for a number of paging stations.

This section assumes that you have already installed and connected the PageMatrix system and it is connected to the NION that will host the project.

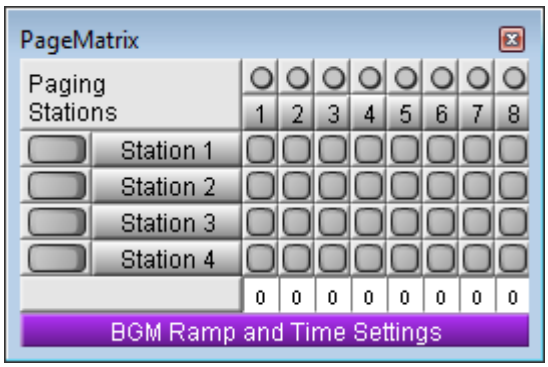
Each paging zone is normally a separate physical area that requires different paging announcements or different background music (referred to as *BGM*) . If two physical areas will always use the same background music and will always need to hear the same pages, then those separate areas could be connected to the same zone output on either the PageMatrix device or the analog audio output on the CAB or NION.

When you add the PageMatrix device to your design, you can choose the number of paging stations and zones. When deciding what number of each to specify, consider the number of physical paging stations being used (and the number of inputs) and round up the number, and the number of output zones (and round up the number).

Understanding the control surface

The buttons on the left of the control surface, under *Paging Stations*, represent the Push-to-talk (PTT) buttons on each station. The buttons under the zone numbers are the pre-assign buttons that assign a station to a paging zone. These are configured using the separate PageMatrix software.

The LEDs above the zone numbers indicate when a station is paging the zone. The numbers in white boxes at the bottom indicate which station number is paging the zone.



Station priority

Station priority is also controlled using the NWare PageMatrix device. When more than one station has its *Push-to-Talk* button pressed, the microphone signal of one of the stations will override any others that are in use. You can set the priority either by assigning a priority level to a station or to a zone. Double-click a station block or a numbered zone block and change the settings inside using the arrow buttons.

Managing device connection limits

A Command center can work with a maximum of 16 individual paging stations. It can also be used with a larger PageMatrix device, but would only allow control of the first 16 stations.

When you create the PageMatrix device, you can select a *compliant* device (with up to 16 stations) or a *non-compliant* device (with up to 99 stations).

So if, for example, the system requires phone paging, or needs a simple PTT microphone to page into all or a few pre-selected zones, a *non-compliant* , twenty zone device could be created. The first 16 inputs would be connected to paging stations. The remaining 4 inputs would be wired to other types of devices: phone, PTT microphone etc. Priority settings would then control whether a paging station or other device would page into a particular zone.

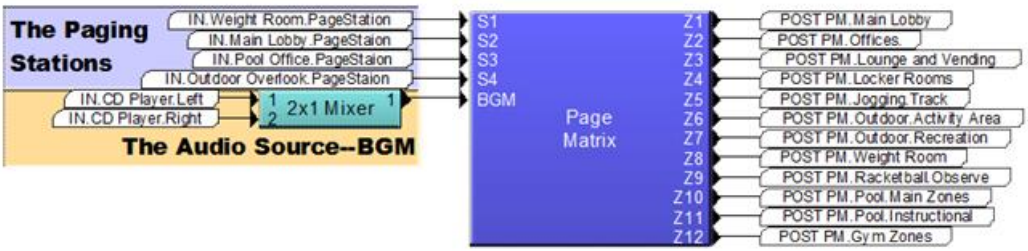
Filibuster mode

This operating mode prevents stations with the same or lower priority from interrupting a page. The station that is in use is allowed to finish the page before another station can start paging the same zone.

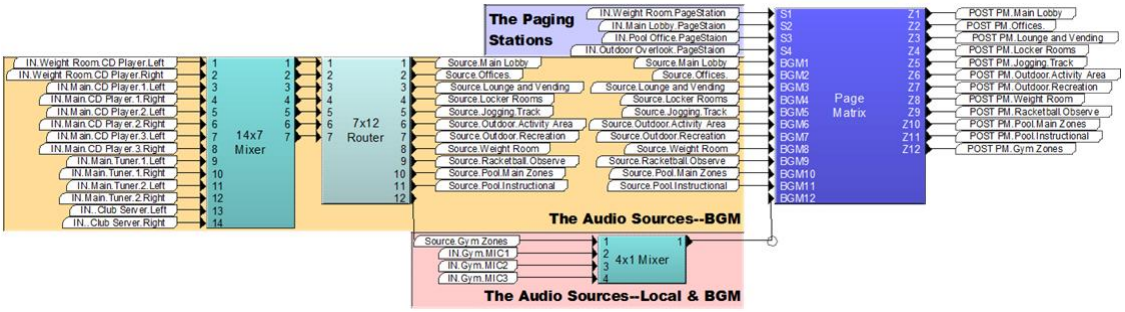
When Filibuster mode is switched off, and the station trying to page has the same priority as the station that is currently paging, the page can be interrupted if the number of the interrupting station is lower. For example, if station #3 and station #2 have the same priority, and station #3 is making a page, station #2 will interrupt station #3, even if it is not finished.

Using BGM inputs

Typically, for an airport, subway, and many other facilities, a single BGM input that is played in every zone is all that is required. The example below shows how the two channels from a CD player can provide the background music input to the PageMatrix device. The music is played when there is no paging in a zone.



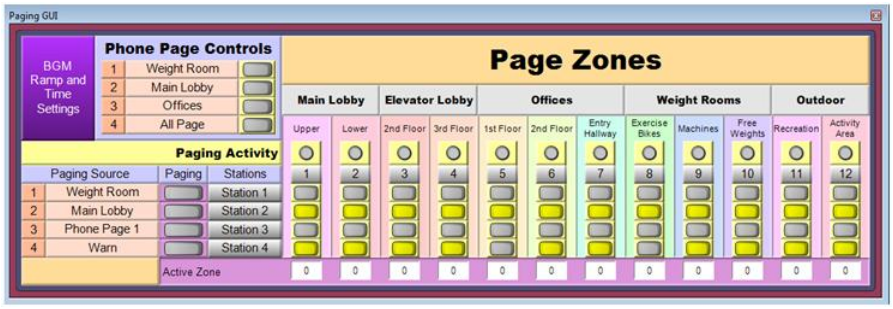
In other installations, however, a range of different BGM sources is required for the different paging zones. When the *Use multiple BGM inputs* option is selected on the device properties of the PageMatrix device, each paging zone will have a separate BGM wiring node.



The BGM sources can be straightforward inputs, as shown by BGM1-BGM11 in the example above; they can also be created by combining multiple sources, as shown by BGM12. The gym has three microphone inputs in addition to the BGM input, mixed down into a single source input. This BGM source will now fade down or *duck*, allowing the page to be easily heard. The zone processing (EQ, compressor/limiting etc.) would normally be done after the PageMatrix device so the paging voice would also be processed to give the best results.

Example PageMatrix GUI

Here is an example of a PageMatrix GUI that could be created for an end user.



This GUI would be made available in Kiosk. The user would be able to change the phone paging zone using the buttons under *Phone Page Controls*. They would also see when someone is paging from a particular place (*Paging Source*) to a particular zone (*Page Zones*).

Device Properties

Number of stations	The number of paging stations that will be connected to the PageMatrix device.	
Number of zones	The number of zones which can be given different messages over a loudspeaker system.	
Command Center Compliance	Non-Compliant	Up to 99 paging stations can be wired to the device. See *Managing device connection limits* (on page 137).

	Compliant	Up to 16 paging stations can be wired to the device.
Use multiple BGM inputs	Allows each paging zone to have a separate BGM source. Audio is played from these inputs to the zones when no paging announcements are made. See *Using BGM inputs* (on page 137).	
Filibuster Mode	Specifies that when a page is in progress from a paging station, only a page from a station with a higher priority can interrupt. See *Filibuster mode* (on page 137).	

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

	Push To Talk (PTT) button for a station. Double-click the *Station* button to select the priority level of the station for the different zones.
	LED that is lit (orange) when the zone is being paged. Double-click the numbered zone button to select the priority level of the different stations for the zone.
	Selects a zone for a station to page.

0 0 0 0	Indicates which stations are paging the zones.
BGM Ramp and Time settings	
BGM Duck Level	The level to duck (lower) the BGM source by when the PTT button is clicked.
Ramp Time	The time taken to duck the BGM source when the PTT button is clicked. **Note:** If you specify a long ramp time, the page could start before the background music is fully ducked.

Chapter 2

Audio

In This Chapter

Delay

Purpose

Delay devices implement an audio time delay. They have the following uses:

- To accomplish architectural delay, that is, to compensate for speech passing through the air and for speaker echo.
- To align the drivers in a speaker array.
- For effects.

Delays are typically used when signals are electrically out of line, but the user wants to align them acoustically.

MultiTap delay devices are available with single and multiple delay taps and with various maximum delay times. The devices have several output wiring nodes, allowing you to implement a delay for a number of devices at the same time.

The level of DSP resources consumed by the delay device is proportional to the number of delay taps and the maximum delay of the device, even if none of the taps are set to the full delay time. Select the smallest delay line which satisfies the requirements of your application.

Device Properties

delay unit	The unit of measurement for the delay. This can be seconds (s), samples (z), meters (m) or feet (f).
Max delay (unit)	The delay (in the selected units) for all taps. **Note:** Selecting a long delay consumes more DSP memory resources, and reduces the resolution of the knob. A short delay consumes less DSP memory, and increases the resolution of the knob. **Tips:** ▪ The word *max* is included in the description because this setting indicates the maximum delay time for all the taps. For example, if there are 16 output wiring nodes (taps) on a 5ms MultiTap device, 5ms is the maximum time it will take for signals to flow through all 16 outputs. ▪ You are not restricted to the delays available from the knob, you can always type in a precise value.
Tap count	The number of delay taps. The range is 1 to 32. An output wiring node is added to the device block for each delay tap.

Advanced properties	
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.
	 The device will use the system sample rate.
	 The user will specify the sample rate manually.
	 This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.
	 NWare will decide which role this device belongs to.
	 The user will specify a role manually.
	 Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the button to change it to the button, and then selecting a DSP in the list.	
	NWare will decide which DSP this device belongs to.	
	The user will specify a DSP manually.	
	This is a composite device. Different DSPs have been selected for the child devices.	

Delay comp combiner	When selected, ensures that signals arriving at each of the input wiring nodes are fed into the device at exactly the same time. If some signals arrive before others, delays are added to the signals that arrive earlier to ensure that they are synchronized with the signals that arrive later.

Controls

Bypass	Mstr (master)	Bypasses all taps (sets the delay of each tap to zero).
	Channel n	Bypasses individual tap (set the delay of the tap to zero).
Mute	Mutes the channel.	
Polarity Inv.	Inverts the polarity of the signal.	
S	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.	
Gain	Sets the amount of amplification or attenuation to be applied to the signal.	
Delay Time	Mstr (master)	Scales the delay time for each tap by the specified amount. For example, specifying 50% halves the delay time set for each

		channel.
	Channel n	Sets the delay time for an individual tap. Each channel operates independently. Setting the delay time to zero effectively bypasses the delay.

DTMF

Decoder

Purpose

The DTMF Decoder device recognizes sequences of DTMF (Dual Tone Multi-Frequency) tones from a standard Touch-Tone phone and asserts control outputs when user specified patterns are matched.

To use the device, it must be graphically connected to an external analog connection that is patched into the phone system. This connection will typically require a line interface circuit, which provides electrical compliance with the telephone system and call progress functions, such as automatic on-hook and off-hook sequencing.

Tips:

- The DTMF decoder is very tolerant of level variations. However, it will work best if signal levels are adjusted for a nominal 0dB to the device. Erratic operation is a good indication that levels may need to be adjusted.
- You can test the DTMF decoder using the DTMF Generator device.

When the decoder detects an incoming sequence that matches any of the strings, the associated LED is lit (green). The LED remains lit until the next DTMF digit is received. To control a NioNode function, control wire the LED to the appropriate NioNode device. A typical application would be recalling a subpreset, for example.

The DTMF Decoder is designed to continuously monitor the incoming audio signal for valid DTMF digits. It discriminates DTMF digits from voice or other interference audio using the duration and spacing of the DTMF tones as the main detection criteria. The DTMF specification calls for a minimum of 40 msec duration and 40 msec spacing. The DTMF decoder works with tones as short as 30 msec for 48 kHz sample rate systems. However, in 32kHz systems the 40 msec minimum timings should be considered the specification.

Device Properties

Pattern count	The number of patterns the user can specify for matching.
FIFO depth	The maximum number of tones in an incoming sequence to buffer before being checked for valid DTMF digits, as part of the monitoring process. The valid range for this setting is 8 to 32.

Controls

Decoded	Displays the decoded DTMF digits and other characters as they are received by the device. As each digit arrives, it is moved to the rightmost position position. You can use this field to confirm that the encoding and decoding process is working successfully.
Pattern n	The string pattern to be matched in the incoming data. It may only contain the digits 0-9,A,B,C,D,*and #. We suggest that the # key be reserved for an enter function. This is an effective way to signal the end of the string and also helps prevent detection of partial strings. We also recommend that command strings are the same length. This is not a requirement, but the designer must be aware that if *string1* is set to *4321#* and *string2* is set to *54321#*, when the input sequence *654321#* arrives, both Match LEDs will be lit. **Tip:** The digits A, B, C and D can be used to secure command sequences, as they are not present on standard phones – only military phones and certain custom dialing devices.
LED	Lit (green) when the corresponding pattern is detected in the incoming data.

Generator

Purpose

The DTMF Generator creates standard DTMF (Dual Tone Multi-Frequency) tones that are useful for controlling phone system equipment.

To use the device, it must be graphically connected to an external analog connection that is patched into the phone system. This connection will typically require a line interface circuit, which provides electrical compliance with the telephone system and call progress functions, such as automatic on-hook and off-hook sequencing.

Tip: You can test the DTMF decoder using the DTMF Generator device.

Transmitted frequencies

The tables below show the frequencies that are transmitted when different characters are sent using the DTMF Generator.

Digit	1	2	3	4	5
Low Frequency	697Hz	697Hz	697Hz	770Hz	770Hz
High Frequency	1.21kHz	1.34kHz	1.48kHz	1.21kHz	1.34kHz

Digit	6	7	8	9
Low Frequency	770Hz	852Hz	852Hz	852Hz
High Frequency	1.48kHz	1.21kHz	1.34kHz	1.48kHz

Digit	A	B	C	D	0	*	#
Low Frequency	697Hz	770Hz	852Hz	941Hz	941Hz	941Hz	941Hz
High Frequency	1.633kHz	1.633kHz	1.633kHz	1.633kHz	1.34kHz	1.21kHz	1.48kHz

Device Properties

Pattern count	The number of patterns the user can specify for matching.
FIFO depth	The maximum number of generated tones to buffer before transferring them on to the device connected to the DTMF Generator. The valid range for this setting is 8 to 32.

Controls

Dialed	Displays the most recently dialed digits and other characters.
Number and character	Buttons you can use to dial the numbers and characters for

keypad	transmission.
	Mutes the audio output.
Level	Controls the output tone level.
Delta	Boosts the high-frequency portion of the output signal. Designed to compensate for the attenuation of higher frequencies by some telephone lines.
Pattern n	The string pattern to be sent as tones. **Tip:** The digits A, B, C and D can be used to secure command sequences, as they are not present on standard phones – only military phones and certain custom dialing devices.
Button	Click to send the corresponding pattern.

Dynamics

Ambient Sensing Leveler (continuous sensing)

Purpose

The Ambient Sensing Leveler provides an automatic *volume control* when the ambient noise levels in a venue start to affect the perceptibility of paging announcements and background music.

The device measures the following:

- The incoming program material level.
- The ambient level from the incoming zone (using a microphone connected to the sense input).
- The output level of the Ambient Sensing Leveler device.

The ambient sound level is measured continuously. The device then applies gain to the input signal based on the detected ambient level. This allows different equalization settings to be selected as the ambient noise level rises in the room.

Controls

Calibration

Start Button	Starts the calibration process. Please read the How To topic for details about the proper calibration procedure.
Calibration LED	Switches to Green when the Start button is pressed and the ambient sense microphone senses input.

Calibration Noise Level	During the Calibration process, sets the level of the noise injected into the room to isolate the speaker leakage from the ambient background noise.
Failure LED	Lights when the Calibration process fails.
Speaker Level Meter	Shows the Speaker audio input level measured by the RMS detector.
Sensor Level Meter	Shows the Sensor audio input level measured by the RMS detector.
Room Gain	When the Calibration process is complete, reports the estimated room gain.

Ambient

Speaker HP Frequency	Sets the frequency above which the speaker input (routed from the audio output block) will be passed as normal. Any input below this value will be attenuated.
Sense HP Frequency	Sets the frequency above which the input from the ambient sense microphone will be passed as normal. Any input below this value will be attenuated.
Sense RMS Time	Sets the sample length for the RMS detector. If this control is set to 1 second, the device will only use events that occur during a 1 second period to derive the calculated ambient level. The smaller the value, the more responsive the system will be to changes. In an industrial or public transportation environment, the time should be short (somewhere in the area of 2 seconds). In other applications, such as casinos and dining rooms, the time should be longer (around 30 seconds).
Ambient Level Meter	Shows the ambient sound input level captured by the sense microphone.

Gain Update

Bypass	When activated, routes the input signal directly to the output channel without passing through the Ambient Sensing Leveler device; however, unity gain is still applied to the output.

Ambient Threshold Level	Sets the input level from the sense microphone above which the device will increase the gain added to the program material, up to the maximum gain level.
Ratio	Sets the ratio of gain applied to the sense microphone input signal once it exceeds the ambient threshold level. For instance, if the ambient level exceeds the ambient threshold level by 3 dB and the ratio control is set to 1.5 dB, the program material output level will increase by 4.5 dB.
Attack Time	Sets the reaction time for the gain circuit to make changes when the calculated ambient level rises above the ambient threshold level.
Release Time	Sets the reaction time for the gain circuit to return from changes made when the calculated ambient level drops below the ambient threshold level.
Minimum Gain	Sets the minimum amount of amplification or attenuation to be applied to the output signal.
Maximum Gain	Sets the maximum amount of amplification or attenuation to be applied to the output signal.
Gain Level Meter	Shows the amount of gain that is added to the output signal. **Note:** This meter does not indicate any gain when Bypass is selected, however, unity is applied.

Ambient Sensing Leveler (gap sensing)

Purpose

The Gap Ambient Sensing Leveler provides an automatic *volume control* when the ambient noise levels in a venue start to affect the perceptibility of paging announcements and background music.

The device measures the following:

- The incoming program material level.
- The ambient level from the incoming zone (using a microphone connected to the sense input).
- The output level of the Ambient Sensing Leveler device.

The ambient sound level is measured during gaps in the program material. The device then applies gain to the input signal based on the detected ambient level.

The Gap version of the Ambient Sensing Leveler is easier to set up and consumes fewer DSP resources than the regular version. Also, the device accurately calculates the necessary gain even when there are long gaps in the program material.

Controls

Now Sensing

Gap Threshold Level	Sets the program input level that triggers the device to start sampling the sense microphone input. When the program input level is above the threshold, the sense microphone is ignored. When the program input level falls below the threshold, the Now Sensing circuit becomes active.
Sense Delay Time	Sets the interval between the program material falling below the threshold level and the device sampling the input from the sense microphone. When correctly set, this delay allows the acoustic signal level in the room to decay by about 10dB so that the program material is not detected by the sense microphone.
Sense RMS Time	Sets the sample rate for the RMS detector. If this control is set to 1 second, the device will only use events that occur during a 1 second period to derive the calculated ambient level. The smaller the value, the more responsive the system will be to changes. In an industrial or public transportation environment, the time should be short (somewhere in the area of 2 seconds). In other applications, such as casinos and dining rooms, the time should be longer (around 30 seconds).

Gain Update

Ambient Threshold Level	Sets the input level from the sense microphone above which the device will increase the gain added to the program material, up to the maximum gain level.
Ratio	Sets the ratio of gain applied to the sense microphone input signal once it exceeds the ambient threshold level. For instance, if the ambient level exceeds the ambient threshold level by 3 dB and the ratio control is set to 1.5 dB, the program material output level will increase by 4.5 dB.

Response Time	Sets the response time of the circuit once it exceeds the ambient threshold level. A short response time will result in a signal that responds very quickly to changes in the ambient level in the room. A long response time will average the signal over a longer period of time, resulting in a slower, but smoother effect. In most applications a short response time is not desirable.
Minimum Gain	Sets the minimum amount of amplification or attenuation to be applied to the output signal.
Maximum Gain	Sets the maximum amount of amplification or attenuation to be applied to the output signal.
Bypass	When activated, routes the input signal directly to the output channel without passing through the Gap Ambient Sensing Leveler device; however, unity gain is still applied to the output.
Now Sensing LED	Switches on when the ambient microphone sensing circuit is active.
Ambient Level Meter	Indicates the ambient sound level from the sense microphone input.
Gain Meter	Shows the amount of gain that is added to the output signal. **Note:** This meter does not indicate unity if Bypass is pressed, although the actual gain applied does equal unity.

Automatic Gain Control

Purpose

The Automatic Gain Control controls signal dynamics so that, despite variations in the input level, the average output level from the device is at a pre-set level. The automatic gain control is typically used to mimic the action of a sound mixer *riding the faders*. The AGC can compensate for loud or soft spoken speakers by automatically raising or lowering the gain. The AGC contains *threshold* and *recovery* circuitry which makes it particularly suited for applications where speech is input.

Device Properties

Detector type	RMS	Use a Mean Square Detector to sample the input signals.

	Peak	Use a Peak Square Detector to sample the input signals.
Channel Count	The number of input and output channels. The valid range is 1-64.	
Side Chain Count	The number of side chain inputs. If the number is zero, each of the input channels is fed into the detector. If the number is greater than zero, the side chain inputs are fed into the detector. The valid range is 0-64.	

Controls

Bypass	Bypasses the AGC gain stage. The Gain Change Meter continues to operate as though the device were active. **Note**: When the bypass is engaged, the AGC continues to compute as the gain changes, and although this computed gain is not applied to the signal passing through the device, the gain change meter continues to function as if bypass were not engaged.
Response Time	Determines how fast the AGC adjusts the gain in response to a change in the side chain signal level.

Threshold Level	The Threshold level and associated logic is intended to detect pauses in speech and suspend operation of the AGC during these pauses. If this feature were not provided, the AGC would eventually turn up a silent input to the Maximum Gain setting. When the RMS input level falls below the threshold level and Gain Recovery is switched off, the AGC enters a *frozen* state. In this state, the gain through the device will longer be updated based on the input signal level. With Gain Recovery enabled, the gain applied to the input signal gradually returns to unity at the rate determined by recovery time setting. **Tip**: For most applications, the threshold level should be set so that the quietest valid source level is above the point where the AGC would enter the *frozen* state by at least 6 dB. An input with no source (such as an open microphone channel) being fed into the AGC should cause the AGC to either remain *frozen* or return to unity. When properly set, only a true source (not background noise) will cause the AGC to become active (as shown by the Below Threshold Indicator).
State	Indicates the current status of the AGC. When Recovery is lit, the gain is in the process of returning to unity.
Maximum Gain	This is the maximum level of the gain that the AGC provides. This prohibits the AGC from applying so much gain to a quiet source that problems such as feedback arise. **Note**: There is no limit to the amount of attenuation the AGC can produce.
Ratio	Sets the attenuation ratio to be applied to the input signals below the threshold, up to the maximum attenuation. For example, if the input signal is at -20dB, a ratio of two will result in the signal being attenuated to -40dB.
Target level	The desired RMS level of the output signal. The AGC will apply an appropriate gain to the input signal in order to achieve this desired output level.
Hold Time	Determines how long the gate will remain open after the side chain signal falls below the threshold. The hold time evens out the response of the device by allowing some time for the signal to exceed the threshold after amplifying the output signal. If recovery is enabled, the hold time value is replaced by the recovery time value.

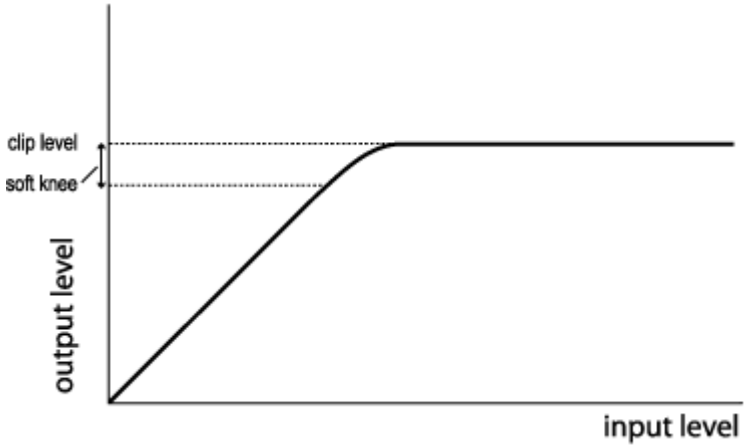
Recovery Time	The time taken for the gain to return to unity once the input signal has fallen below the Threshold Level. **Note:** Gain recovery must be enabled.
Recov Enb	Enables gain recovery.

Compressor Limiter

Purpose

The compressor provides a means of reducing the dynamics in an audio signal to improve the overall sound level (the volume perceived by the audience).

Level response curve



Inputs/Outputs

This device supports a main audio input and a side chain input. The side chain input can be enabled or disabled using the device properties.

If there is a side-chain input, the gain calculation will be made based on its input.

The device has one output node.

Device Properties

Detector Type	Choose between RMS or Peak detectors.
Channel Count	Sets the number of program material inputs. Each channel is input and modified equally.
Sidechain Count	Sets the number of side-chain inputs to use for sampling.

Controls

Byp (bypass)	When activated, routes the input signal directly to the output channel without passing through the Compressor Limiter. The Side Chain input is not bypassed, so the threshold indicators and gain reduction meters continue to update.	
Thresh (threshold level)	Sets the input level above which the compressor will attenuate the input signal. If the level of the signal at the Side Chain input is lower than the Threshold Setting, the compressor routes the signal through the device unaffected (unless a Soft Knee value has been specified).	
Ratio (compression ratio)	Adjusts the severity of gain reduction produced by the compressor once the input signal has exceeded the Threshold Level. Dynamic variations in the input signal will be reduced by a factor equal to the compression ratio.	
Max Atten (maximum attenuation)	Sets the maximum amount of attenuation to be applied to the output signal.	
Signal	Above	Lit when the input signal level exceeds the Threshold level.
	Knee	Lit when the input signal level exceeds the Soft Knee level.
	Below	Lit when the input signal is below the Soft Knee level.
	Note: These indicators sample the actual input signal, before the expander's response.	
Attack time	Sets how quickly the compressor reacts to an increasing input signal.	
Release Time	Sets how long the compressor waits before releasing its attenuation value.	
Gain Reduction Meter	Indicates the amount of attenuation currently being produced by the compressor.	
	Note: The compressor is capable of unlimited attenuation. However, the meter is limited to -35dB.	

Soft Knee	Sets a second threshold level, which attenuates the incoming signal at a reduced compression ratio before it reaches the Threshold level.
Make Up Gain	Increases or decreases the signal level.
Response	Graph showing the compressor limited output level.

Cross Fader - Moto Cross

Purpose

The Cross Fader - MotoCross device is an automatic cross-fading mixer. The device allows you to trigger a timed, automatic crossfade between two sources. It provides a mix of the two inputs during crossfade. The inputs are mixed at equal amplitude at mid-crossfade.

Device Properties

Initial position (%)	The initial position of the motocross. The default is 50% (halfway). The valid range is 0 to 100%.

Advanced properties		
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.	
		The device will use the system sample rate.
		The user will specify the sample rate manually.
		This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume	

	less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.
	 NWare will decide which role this device belongs to.
	 The user will specify a role manually.
	 Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the  button to change it to the  button, and then selecting a DSP in the list.
	 NWare will decide which DSP this device belongs to.
	 The user will specify a DSP manually.
	 This is a composite device. Different DSPs have been selected for the child devices.

delay comp group	The name of the delay compensation group to which the device belongs. Multiple devices are added to the same group by specifying the group name in the device properties for each of the devices. Signals arriving at each of the input wiring nodes of each of the devices in the group are fed into the devices at exactly the same

	time. **Note:** In order for this feature to work, the delay comp combiner check box must be selected.

Delay comp combiner	When selected, ensures that signals arriving at each of the input wiring nodes are fed into the device at exactly the same time. If some signals arrive before others, delays are added to the signals that arrive earlier to ensure that they are synchronized with the signals that arrive later.

Controls

Type	Midpoint	Brings the target source to unity gain before starting to attenuate the current source. The result is a summation of both sources with unity gain at the 50% position.
	Constant Power	At the midpoint of the crossfade, the input sources are summed at a gain of –3dB each. This is referred to a constant power summation for uncorrelated sources. **Tip:** This is the recommended setting.
	Constant Voltage	At the midpoint of the crossfade, the input sources are summed at a gain of –6dB each. This is referred to as constant voltage summation. This works well for highly correlated inputs. For uncorrelated inputs, this setting will result in a 3dB dip in level at the 50% position.
Xfade to A	Fades to gain level on channel input A of the block.	
Xfade to B	Fades to gain level on channel input B of the block.	
Time	The time in seconds that it takes to move the current fade position from 0% to 100% or from 100% to 0%. **Note:** The speed of the transition is only calculated from end to end. If the crossfader is stopped in any position other than 0% or 100%, the crossfade time will be proportionately less than the current crossfade time. In this case, the device is just continuing the	

	crossfade as if it were simply interrupted.
Gain A	The current gain level for channel input A.
Gain B	The current gain level for channel input B.
Position	The relative position of the crossfade transition between channel inputs A and B. **Note:** This control does not accept user input - it is for display purposes only.

Ducker

Purpose

The Ducker provides a means of using one signal to attenuate another.

Device Properties

Type	Specifies the device type. Automatically set to Ducker.
Channel Count	Sets the number of inputs to be configured. Changing the channel count automatically adds a multiplier to the device circuit.
Sidechain Count	Sets the number of real side-chain inputs to user for sampling.

Controls

Bypass	When activated, routes the input signal directly to the output channel without passing through the compressor. the Side Chain input is not bypassed, so the threshold indicators and gain reduction meters continue to update.
State LED	When lit, shows that normal input is being passed through the device with no attenuation
Detect decay (det decay)	Sets the peak detector time.

Hysteresis	Sets the drop in level below the Peak Threshold Level that is necessary to switch back to the side-chain input. When correctly set, hysteresis ensures that an announcement of varying levels does not get dropped during its lower levels.
Peak Threshold	Sets the side-chain input level above which the device will attenuate the main input level by the main input level.
Depth	Sets the amount of attenuation to apply to the main input signal when the side-chain input exceeds the Peak threshold value.
Attack Time	Sets how long the device will wait between detecting side-chain input and attenuating the main input.
Release time	Sets how long after the Hold Time the device will wait before raising the main input level back to its original level.
Gain meter	Shows how much the signal is being attenuated when the Ducker is active.
Hold Time	Sets how long the Ducker will hold the attenuation after the signal drops below the Peak Threshold Value.
Mask time	Sets how long the Ducker will wait before sampling after the attenuation has been released. This control keeps the Ducker from reengaging straight after releasing.

Expander

Purpose

The expander provides a means of exaggerating the dynamics in an audio signal. If the signal is very quiet, it will make it quieter. If the signal is very loud, it will make it louder. The expander is often used as a single-ended noise reduction device that improves the signal-to-noise ratio.

The Compressor and Expander perform in opposite ways: the Expander attenuates signals below the Threshold Level while the Compressor attenuates signals above the Threshold Level. Also, whereas the compressor begins to operate as a Limiter at higher compression ratios, the Expander begins to operate as a Gate at higher expansion ratios.

Inputs/Outputs

This device supports a main audio input and a side chain input. The side chain input can be enabled or disabled using the device properties.

If there is a side-chain input, the gain calculation will be made based on its input.

The device has one output node.

Device Properties

Detector Type	Choose between RMS or Peak detectors
Channel Count	Sets the number of program material inputs to be configured. Each channel is input and modified equally.
Sidechain Count	Sets the number of side-chain inputs to use for sampling.

Controls

Threshold Level	Sets the input level that determines whether the expander attenuates or amplifies the signal. An input signal below the threshold will be attenuated An Input signal above the threshold will be amplified.
Ratio	Sets the attenuation ratio to be applied to input signals below the threshold, up to the maximum attenuation. For example, if the input signal is at -20B, a ratio of two will result in the signal being attenuated to -40.
Maximum Attenuation	Set the maximum amount of attenuation to be applied to the output signal.
Attack Time	Sets how quickly the expander reacts to an increasing input signal level.
Release Time	Sets how the long expander reacts to an increasing input signal level
Soft Knee	Sets a second threshold level, which attenuates incoming signals below the threshold value at a reduced compression ratio before it reach the Threshold level. **Note**: The soft knee features is most useful with a high Ratio setting, as the amplification effect is less noticeable when the expansion ratio is higher.

Signal	These LEDs indicate: Above: When the input signal level exceeds the Threshold level. Knee: When the input signal level exceeds the Soft Knee level. Below: When the input signal is below the Soft Knee level. **Note**: These indicators sample the actual input signal, before the expander's response.
Gain Reduction Meter	Indicates the amount of attenuation currently being produced by the compressor. **Note**: the compressor is capable of unlimited attenuation, however the meters limit is -35dB.
Bypass	When activated, routes the input signal directly to the output channel without passing through the Expander. The Side Chain input is not bypassed. so the threshold indicators and gain reduction meters continue to update.
Response	Expander output level.

Gain

Purpose

The Gain device amplifies or attenuates incoming signals based on the *gain* control's position.

Device Properties

Channel Count	Sets the number of channels to be routed through the gain device. The permitted range is even integers between 2 and 128.
Live Taper	Will make it easier to make fine adjustments at higher gain levels (by decreasing the rate at which the gain changes when it is near the maximum).

Controls

Gain	Master Gain: Sets the amount of amplification or attenuation to be applied to the output signal on all channels. Channel Gain: Overrides the master control by specifying a gain for one specific channel.
Bypass	Master Bypass: when activated, routes the input signal directly to the output port without passing through the gain device. Channel Bypass: when activated, routes the input signal directly to the output port for one specific channel.
Mute	Master Mute: when activated, silences the input signal on all channels. Channel Mute when activated, silences the input signal for the specific channel. **Note**: Mute does not function when the Solo button is also on.
Invert Polarity	Master Invert changes the output signal's polarity by 90 degrees. Channel Mute changes the output signal for the specific channel.

Gate Deluxe

Purpose

The Gate permits signals above a certain level to pass through while prohibiting or reducing the output level of lower level signals. When the Gate is in its *open* state the input signal passes through un-attenuated. When the gate is in its closed state, the input signal is attenuated as specified by the Depth control.

The Gate waits for a zero crossing before switching between open and closed states. This generally keeps the switch action from being audible and allows the gate to open quickly when a adequate signal is detected.

Device properties

Type	Specifies the device type. Automatically set to Gate.
Channel Count	Sets the number of inputs to be configured. Changing the channel count automatically adds a multiplier to the device circuit.

Sidechain Count	Sets the number of real side-chain inputs to user for sampling.

Inputs/Outputs

This device supports a main audio input and a side chain input. The side chain input can be enabled or disabled using the device properties.

The device is opened or closed according to the peak level of the signal detected at the side chain input. Zero cross detection is performed on the signal at the audio input.

The device has one output node. This is the gated audio output.

Controls

Bypass	When activated, routes the input signal directly to the output channel without passing through the compressor. the Side Chain input is not bypassed, so the threshold indicators and gain reduction meters continue to update.
State LED	When lit, shows that normal input is being passed through the device with no attenuation
Detect decay (det decay)	Sets the peak detector time.
Hysteresis	Sets the drop in level below the Peak Threshold Level that is necessary to switch back to the side-chain input. When correctly set, hysteresis ensures that an announcement of varying levels does not get dropped during its lower levels.
Peak Threshold	Sets the side-chain input level above which the device will attenuate the main input level by the main input level.
Depth	Sets the amount of attenuation to apply to the main input signal when the side-chain input exceeds the Peak threshold value.
Attack Time	Sets how long the device will wait between detecting side-chain input and attenuating the main input.
Release time	Sets how long after the Hold Time the device will wait before raising the main input level back to its original level.
Gain meter	Shows how much the signal is being attenuated when the Gate Deluxe is active.
Hold Time	Sets how long the Gate Deluxe will hold the attenuation after the signal drops below the Peak Threshold Value.
Mask time	Sets how long the Gate Deluxe will wait before sampling after the attenuation has been released. This control keeps the Gate Deluxe from reengaging straight after releasing.

Gate (Zero-Crossing)

Purpose

The Gate permits signals above a certain level to pass through while prohibiting or reducing the output level of lower level signals. When the Gate is in its *open* state, the input signal passes through un-attenuated. When the gate is in its closed state, the input signal is attenuated as specified by the Depth control.

The Gate waits for a zero crossing before switching between open and closed states. This generally keeps the switch action from being audible and allows the gate to open quickly when an adequate signal level is detected.

The Zero-Crossing Switched Gate uses fewer DSP resources than the *Deluxe Gate* (on page 164).

Device Properties

Channel Count	Sets the number of inputs to be configured. Changing the channel count automatically adds a multiplier to the device circuit.
Sidechain Count	Sets the number of real side-chain inputs to user for sampling.

Inputs/Outputs

This device supports a main audio input and a side chain input. The side chain input can be enabled or disabled using the device properties.

The device is opened or closed according to the peak level of the signal detected at the side chain input. Zero cross detection is performed on the signal at the audio input.

The device has one output node. This is the gated audio output.

Controls

Bypass	When activated, routes the input signal directly to the output channel without passing through the gate. The Side Chain input is not bypassed, so the state LED continues to update.
Peak Threshold	Sets the input level above which the gate will open.
Depth	Sets the amount of attenuation to apply to the input.

Hold Time	Determines how long the gate will remain open after the side chain signal falls below the threshold. The hold time evens out the response of the device by allowing some time for the signal to exceed the threshold after amplifying the output signal. If recovery is enabled, the hold time value is replaced by the recovery time value.
State LED	When lit, shows that the gate is open (the signal is being passed through the gate with no attenuation). **Note**: The Gate waits for a zero crossing to occur before switching between open and closed states. The Open Indicator accurately reflects the state of the device given this condition. If a DC signal is applied to the input, the gate may not be able to change state because the signal may not invert.
Detect decay (det decay)	Sets the peak detector time.

Hard Limiter

Purpose

The limiter provides a means of limiting the dynamics in an audio signal. Limiters are often used as a last line of defense to prevent clipping and protect speaker drivers.

The main difference between the Limiter and the Compressor is that the Limiter uses a peak level detector on at the Side Chain input whereas the Compressor uses an RMS level detector.

Device Properties

Channel Count	Sets the number of inputs to be configured. Changing the channel count automatically adds a multiplier to the device circuit.
Sidechain Count	Sets the number of real side-chain inputs to use for sampling.

Inputs/Outputs

This device supports a main audio input and a side chain input. The side chain input can be enabled or disabled using the device properties.

If there is a side-chain input, the gain calculation will be made based on its input.

The device has one output node.

Controls

Bypass	When activated, routes the input signal directly to the output channel without passing through the Hard Limiter. The Side Chain input is not bypassed, so the gain reduction meter continues to update.
Threshold	Sets the input level above which the compressor will attenuate the input signal. If the level of the signal at the Side Chain input is lower than the Threshold setting, the hard limiter routes the signal through the device unaffected.
Attack Time	Sets how quickly the compressor reacts to an increasing input signal level.
Release Time	Sets how long the compressor waits before releasing its attenuation value.
Gain Reduction Meter	Indicates the amount of attenuation currently being produced by the hard limiter. **Note**: The hard limiter is capable of unlimited attenuation, however the meter's limit is -35dB.

Level Ramp

Purpose

The Level Ramp device adjusts the gain of the input signal in multiple stages:

1. As soon as the project starts, the gain level specified by the *Initial gain* setting on the device properties is applied.
2. The gain level specified by *Target Gain A* (on the control surface) is applied gradually during the time period specified by the first *Ramp Time* setting.
3. Optionally, the user can click the *Ramp To Target Gain B* button to apply the gain level specified by *Target Gain B*. The gain is applied gradually during the time period specified by the second *Ramp Time* setting.

Device properties

Initial Gain (dB)	The level of gain to apply to the input signal as soon as the project starts. This is applied before the gain is set to Target Gain A. The valid range is -100dB to +24dB.

Advanced properties

<table>
<tr><td>Device sample rate</td><td>Sets the sample rate that the device will use to sample incoming signals.

By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu.

You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.
<table><tr><td>  </td><td>The device will use the system sample rate.</td></tr><tr><td>  </td><td>The user will specify the sample rate manually.</td></tr><tr><td>  </td><td>This is a composite device. Different sample rates have been selected for the child devices.</td></tr></table>
Tip: If you reduce the sample rate for a device, it will consume less DSP resources.</td></tr>
<tr><td>Device latency calculation script</td><td>This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.</td></tr>
<tr><td>Role assign</td><td>The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment.

You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.
<table><tr><td>  </td><td>NWare will decide which role this device belongs to.</td></tr><tr><td>  </td><td>The user will specify a role manually.</td></tr><tr><td>  </td><td>Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.</td></tr></table></td></tr>
<tr><td>DSP assign</td><td>The DSP chip within the node that will process this device.

You can manually assign a device to a DSP by clicking the  button to change it to the  button, and then selecting a DSP in the list.</td></tr>
</table>

		NWare will decide which DSP this device belongs to.
		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Controls

Ramp To Target Gain B	Adjusts the gain level by applying the gain specified by *Target Gain B.*
Stop	Stops the progress of the current ramp operation. Click the Stop button again to continue.
Curr Gain	The total level of gain currently being applied by the Level Ramp.
Target Gain A	The gain level to apply to the input signal after the *Initial gain* setting (on the device properties) has been applied. The time taken to reach this level is set by Ramp Time (A).
Ramp Time (A/B)	The time the ramp operation will take to complete.
Ramp Rate (A/B)	The dB rate per second at which the signal level will change during the ramp operation.
Target Gain B	The gain level to apply to the input signal when the *Ramp To Target Gain B* button is clicked.
Rels Time	The time taken by the compressor to release its attenuation value.
Mute	Mute the output from the Level Ramp.

Panners

Purpose

The Left-Right (LR) and Left-Center-Right (LCR) panners route the input signal into two (or three) different outputs depending on the position of the gain controls. These panners also allow you to adjust the gain proportionately for a specific effect, such as compensating for speaker clusters that are nearer or further from a specific audience position.

The 4-way and 5-way panners route the input signal towards the left, right, front, and back depending on the position of the axes within the control box. They do not have gain or trim controls.

Device Properties

Number of outputs.	enter the desired number of outputs.

Controls

Left-Right and Left-Center-Right Panner Controls

Type	Sets the level at which both the left and right input signals are sent to the output at 0% pan. When the Pan control is adjusted from 0%, one of the input signals is attenuated and the other input signal is amplified according to the amount of panning applied. -3dB is the recommended setting. -6dB works well for highly correlated inputs, but causes a 3dB attenuation of uncorrelated inputs at the 50% position.
Trim	Sets the attenuation for the panner's output signals.
Pan	Sets the proportion of the left and right input signals that are sent to the output. As you pan left, the display will show negative numbers. As you pan right, the display will show positive numbers.
Left Gain	Shows the current level of attenuation or amplification being applied to the signal on the left input.
Right Gain	Shows the current level of attenuation or amplification being applied to the signal on the right input.
Center Gain (LCR Only)	Shows the current level of attenuation or amplification being applied to the center output signal
Mute	When activated, silences the output signal on all outputs.
Invert Polarity	Changes the output signal's polarity by 90 degrees.

4 and 5-way Panner Controls and Indicators

Front-Rear	Between the Front and Rear labels there is a grey position indicator. This indicator corresponds the position of the x-axis in the box. To pan between the front and the rear outputs, click anywhere in the box and hold. While holding, drag the x-axis to the desired position. As you pan towards the rear, the position value will be negative; as you pan towards the front, it will be positive.
Left-Right	Between the Left and Right labels there is a grey position indicator. This indicator corresponds to the position of the y-axis in the box To pan between the front and the rear outputs, click anywhere in the box and hold. While holding, drag the y-axis to the desired position. As you pan towards the left, the position value will be negative; as you pan towards the right, it will be positive.

Equalizers

Graphic Equalizer

Purpose

A graphic equalizer can provide up to 18dB of boost or cut for each frequency band. The center frequency of each band is fixed at standard ISO frequencies. The bandwidth of each filter is fixed and depends on the number of bands in the equalizer. Graphic equalizers are available in a number of octave sizes, including one octave, 2/3 octave, and 1/3 octave.

In a digital system, a graphic equalizer is, in most applications, less efficient than a parametric equalizer. Each band of a graphic equalizer uses approximately the same DSP resources as a single parametric equalizer band. we recommend that parametric equalizers are used when possible. The main advantage of a graphic equalizer over a bank of parametrics is its ease of setup and use.

Device Properties

Bandwidth	The bandwidth for each band in the equalizer. The number of bands is adjusted automatically, depending on the bandwidth setting.

Controls

Band Bypass	Bypasses a single equalizer band. Engaging this button has the same effect as setting the corresponding Band level control to 0+dB

Band Level	Adjusts the amount of boost or cut provided by the frequency band.

Parametric Equalizer

Purpose

The Parametric Equalizer boosts or cuts the signal at a specific, chosen frequency. It is available in a variety of sizes ranging from a single band up to 64 bands. Parametric Equalizers may be wired in series if you desire more bands. A multi-band Parametric consumes less DSP resources than the equivalent series connection of single band Parametric Equalizers.

We recommend the use of Parametric Equalizers for most equalization applications as they provide the most flexibility and are efficient.

Controls

Asymmetric/symmetric	When enabled, sets the equalizer's attenuation response to asymmetric (i.e. the attenuation response will be narrower than the amplification response). Therefore, when disabled, it will act as a graphic equalizer, which has a symmetric frequency response.
Type	Sets the type of frequency response. Choose between Parametric, Low Shelf, and High Shelf.
Bandwidth	Sets the equalizer's frequency range, measured in octaves. For instance, a Bandwidth setting of "1" results in a filter response with 3dB down points, 1 octave apart.
Center frequency	Sets the center of the affected frequencies.
Gain	Sets the amount of attenuation or amplification to be applied at the center frequency.
Bypass	Device Bypass: when activated, routes the input signal directly to the output at 0dB. Channel Bypass: when activated, routes the input signal directly to the output for one band of the equalizer at 0dB.

Device properties

Advanced properties

<table>
<tr><td>Device sample rate</td><td>Sets the sample rate that the device will use to sample incoming signals.

By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu.

You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.

  The device will use the system sample rate.

  The user will specify the sample rate manually.

  This is a composite device. Different sample rates have been selected for the child devices.

Tip: If you reduce the sample rate for a device, it will consume less DSP resources.</td></tr>
<tr><td>Device latency calculation script</td><td>This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.</td></tr>
<tr><td>Role assign</td><td>The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment.

You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.

  NWare will decide which role this device belongs to.

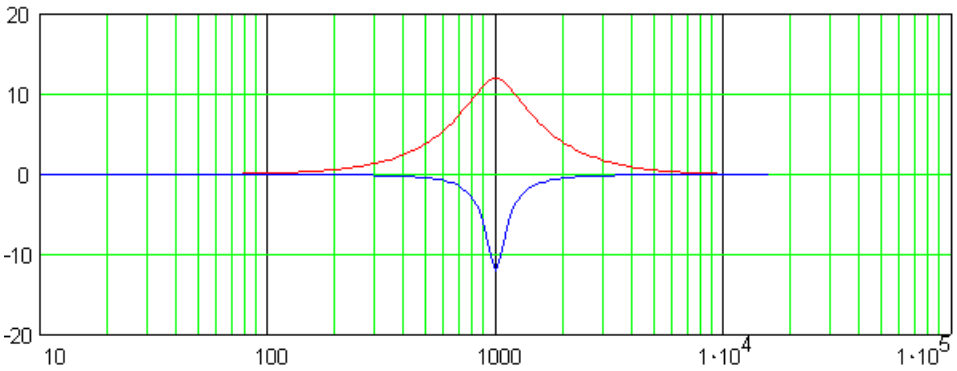
  The user will specify a role manually.

  Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.</td></tr>
<tr><td>DSP assign</td><td>The DSP chip within the node that will process this device.

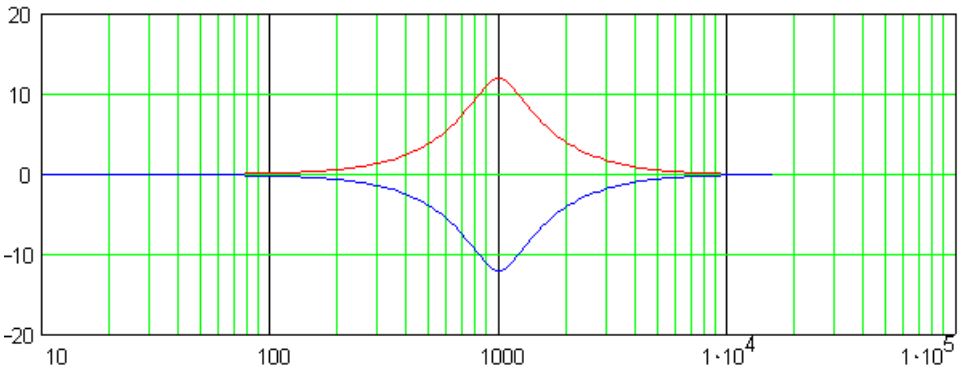
You can manually assign a device to a DSP by clicking the  button to change it to the  button, and then selecting a DSP in the list.</td></tr>
</table>

		NWare will decide which DSP this device belongs to.
		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Parametric Equalizer Frequency Response



Magnitude Response with Symmetry control Off, Center frequency 1000Hz, Gain +12dB (Red) and -12dB (Blue), Bandwidth 0.64.



Magnitude Response with Symmetry control On, Center frequency 1000Hz, Gain +12dB (Red) and -12dB (Blue), Bandwidth 0.64.

Feedback Ferret

Purpose

The Feedback Ferret is an automatic feedback eliminator. Once it has been configured, it automatically detects and controls feedback.

The NWare Feedback Ferret device works in the same way as the hardware version, but uses the DSP resources of the NION instead of dedicated hardware.

Device Properties

Band Count	Number of incoming frequency bands to be examined.

Filter Count	Maximum number of filters that the Feedback Ferret can create, if necessary. Requiring more than six filters can sometimes be the sign of a flaw in the system design.

Controls

Locked Indicator	Indicates that the feedback ferret has detected feedback and is currently attenuating the affected frequency band.
Bandwidth	Shows the width of the frequency band that is being attenuated.
Frequency	Shows which frequency is being attenuated.
Gain	Shows the attenuation level currently being applied to the input signal.

Mode	
Performance	When activated, uses the filters that the feedback ferret has created during the Pre-Show Ringout.
Pre-Show Ringout	When activated, sets up the feedback control filters before Performance mode can be used. To set up the system: 1. Slowly increase the Microphone's input gain control. 2. When feedback is detected, stop increasing the gain and allow the Ferret to create the necessary filter. 3. When you stop hearing signal changes and the Feedback Ferret Filter Statistics area is no longer updating, slowly increase the gain again. 4. Continue until one of the following occurs: ▪ You've reached maximum input gain on the input channel and have feedback. ▪ The Feedback Ferret has locked 6 filters. ▪ System gain before feedback has been increased by 10 dB. Filters set during pre-show are meant to control dominant room modes. For this reason, if more than 6 filters are needed to obtain the necessary sound level, then you should carefully review your system design looking for system design problems.

Filter Control	
Wide Filters	When activated, widens the width of the frequency band to increase the number of frequencies that will be attenuated.
Reset button	The Reset button is a convenient way of clearing the Feedback Ferret's filters when you need to make changes to the system to improve performance. For instance, you may find that extra equalization is needed on one band, and would like to restart the Feedback Ferret once you've changed the equalizer settings. **Cautions**: ▪ Only use the Reset button during pre-show ringout. ▪ Before using the reset button, make sure that the system gain is well below feedback; otherwise, serious system damage is possible. ▪ This control should never appear on the top level of a system view. **Note:** Recompiling the project also resets the Feedback Ferret's filters.

Panic Filters	
Enable button	When activated, the Feedback Ferret will apply a panic filter (a one-octave bandwidth notch filter at -6dB) when it detects sudden uncontrolled blasts of feedback. The filter's response and release time are preset and based on subsequent samples.
Threshold Level	Sets the panic filter threshold. Set this control to just below Nominal operating level (0 dB), unless your design requires more or less headroom. Setting this threshold too low may cause unnecessary filters to be set during normal program material.

High Shelf Equalizer

Purpose

The High Shelving Filter divides the audio spectrum into two. Frequency components above the division may be amplified or attenuated, while frequencies below the division are unaffected.

The transition between the two regions occurs at a fixed 6dB/octave rate. The width of the transition between the shelved and un-shelved is dependent on the magnitude of the amplification or attenuation applied.

Controls

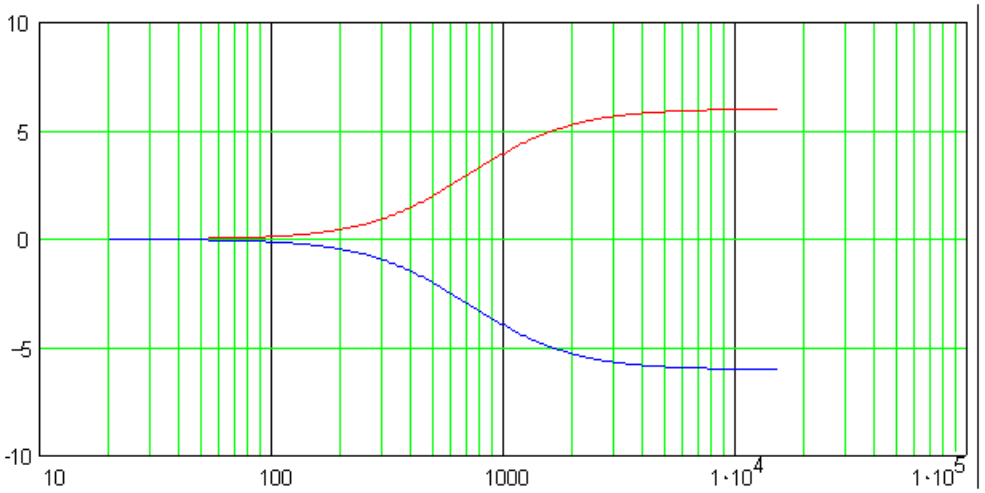
Frequency	Sets the transition frequency of the shelving filter.
Gain	Sets the amplification or attenuation level to be applied to the high frequency shelf. The un-shelved portion of the frequency spectrum is output unchanged.
Bypass	When activated, routes the input signal directly to the output channel at unity gain.

Device properties

Advanced properties	
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.
	The device will use the system sample rate.
	The user will specify the sample rate manually.
	This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume less DSP resources.

Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.	
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the  button to change it to the  button, and then selecting a DSP in the list.	
		NWare will decide which DSP this device belongs to.
		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Frequency Response



The response of the High Shelf filter is shown for a Level control setting of +6dB (red) and -6dB (blue) and a Frequency control setting of 1,000Hz.

Kosmos

Purpose

Kosmos is a subharmonic and stereo image enhancement system. It replaces lost atmosphere and stereo separation, as well as bass that gets lost in the normal system chain.

The NWare Kosmos device works in the same way as the hardware version, but uses the DSP resources of the NION instead of dedicated hardware.

Tip: When using Kosmos, we recommend that other equalization devices (especially output equalization devices) be set flat.

Device Properties

Use bitmap version	When selected, displays a background image on the control surface.

Advanced properties

Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Global Bypass	Disables all the functions that the Kosmos device provides, but still passes the signal through the device.
Cut SubBass from Main	Removes the *quake* subharmonics and the *thud* bass from the left and right outputs. **Note:** *Xpanse* is always sent to the left and right outputs (except when globally bypassed) and is not affected by this setting.
Subterranean Shift	Changes the subharmonic tuning between two speaker size settings. When switched off, the device produces a higher epicenter (center frequency) that is more suitable for small speakers. **Tip:** The difference this setting makes is subtle. Listen for its action on bass guitar frequencies. Deeper bass sounds like it is coming from the floor instead of at your chest.
Act	Shows activity from the quake circuit.
Quake	Adds a synthesized bass signal one octave lower than the source signal. This feature generates bass subharmonics that are pleasing to the ear, and does no processing when the input signal is outside of its defined range. It will thicken and deepen

	the bass of most program material and is especially effective on bass (kick) drums, since it boosts the low frequency portion significantly. **Caution**: Care must be taken to prevent amplifier clipping and speaker damage by excessive bass levels.
Thud	Adds a specific band of bass frequencies (natural, not synthesized) to the subharmonics generated by the quake process. It is tuned roughly an octave above the subharmonics and is used to even out the low-end balance.
XPanse	This is a combination control, simultaneously adjusting high-frequency boost and stereo width. The minimum position is the flat setting. As the control is rotated clockwise, the left/right image becomes wider and clarity is increased. This feature is designed to pull vocals more to the front of the mix, while giving them a 3-dimensional quality.

Low Shelf Equalizer

Purpose

The Low Shelving Filter divides the audio spectrum into two. Frequency components below the division may be amplified or attenuated, while frequencies above the division are unaffected.

The transition between the two regions occurs at a fixed 6dB/octave rate. The width of the transition between the shelved and un-shelved is dependent on the magnitude of the amplification or attenuation applied.

Controls

Frequency	Sets the transition frequency of the shelving filter.
Gain	Sets the amplification or attenuation level to be applied to the high frequency shelf. The un-shelved portion of the frequency spectrum is output unchanged.
Bypass	When activated, routes the input signal directly to the output channel at unity gain.

Device properties

Advanced properties

<table>
<tr><td>Device sample rate</td><td>Sets the sample rate that the device will use to sample incoming signals.

By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu.

You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.
<table><tr><td>  </td><td>The device will use the system sample rate.</td></tr><tr><td>  </td><td>The user will specify the sample rate manually.</td></tr><tr><td>  </td><td>This is a composite device. Different sample rates have been selected for the child devices.</td></tr></table>
Tip: If you reduce the sample rate for a device, it will consume less DSP resources.</td></tr>
<tr><td>Device latency calculation script</td><td>This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.</td></tr>
<tr><td>Role assign</td><td>The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment.

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<tr><td>DSP assign</td><td>The DSP chip within the node that will process this device.

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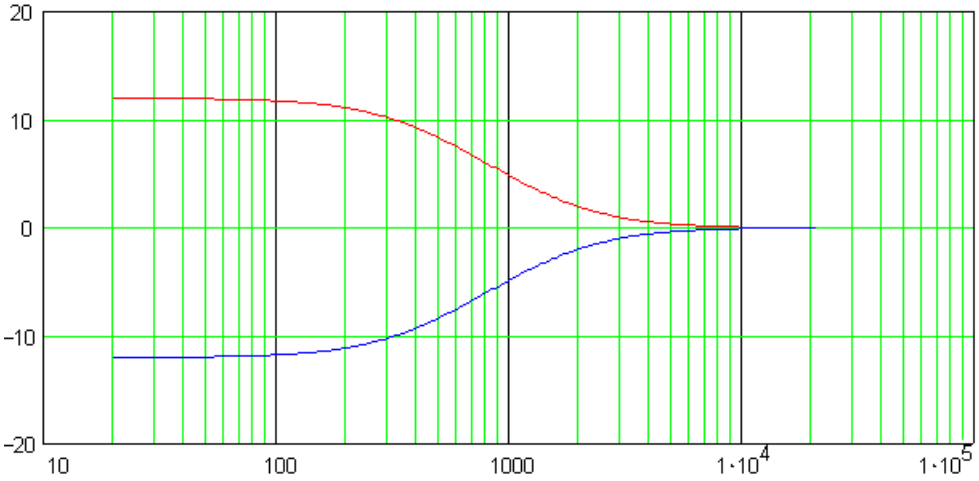
</table>

		NWare will decide which DSP this device belongs to.
		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Frequency Response



The response of the Low Shelf filter is shown for a Level control setting of +6dB (red) and -6dB (blue) and a Frequency control setting of 1,000Hz.

Tone Control Equalizer

Purpose

The Tone Control Equalizer is similar to those found in the audio receivers used in homes and cars.

Controls

Low	Sets the amount of attenuation or amplification to be applied to the low shelving filter in the tone control equalizer. To change the transition frequency of the low tones, open the low shelf filter in the schematic tab and change the frequency control.
Mid	Sets the amount of attenuation or amplification to be applied to the parametric equalizer in the tone control equalizer. To change the center frequency of the mid tones, open the parametric equalizer on the schematic tab and change the frequency control.

High	Sets the amount of attenuation or amplification to be applied to the high shelving filter in the tone control equalizer. To change the transition frequency of the high tones, open the high shelf filter in the schematic tab and change the frequency control.

Filters

Band Pass Filter

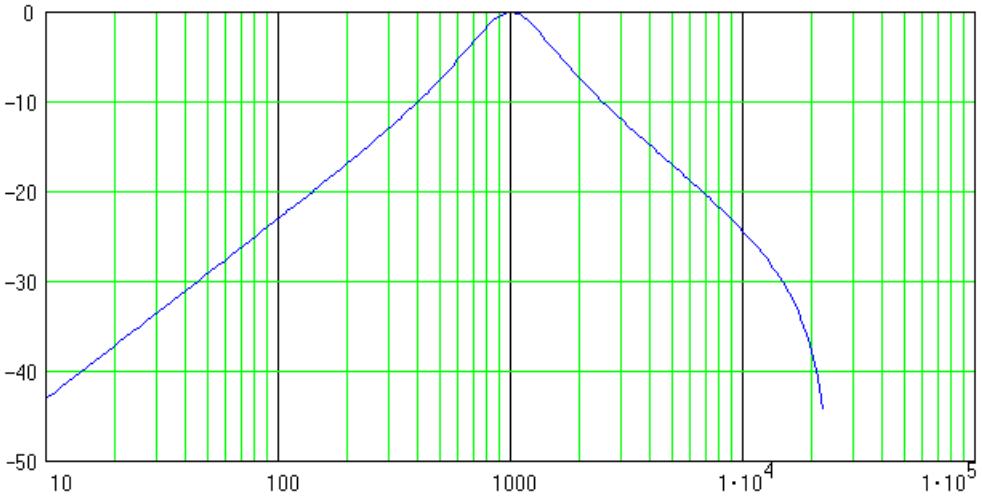
Purpose

The Band Pass Filter passes frequency components in the vicinity of the Center Frequency setting. Frequencies above and below the Center Frequency are rolled off at a 6dB/octave rate. The band pass filter is useful for building spectrum analyzers. These filters can also be created by combining a low pass filter with a high-pass filter. Potential applications for the band pass filter include spectrum analyzers and inexpensive crossovers.

Controls

Mute	When activated, silences the output.
Invert Polarity	When activated, inverts the out signal's polarity.
Bandwidth	Sets the range of frequencies affected by changes in gain. Lower settings produce a sharper response.
Centre Frequency	Selects the center frequency of the filters response.
Gain	Sets the amount of attenuation at the center frequency.
Response	Clicking on the response tab will display the band pass/stop frequency response.

Band Pass Frequency Response



Magnitude response for a Center Frequency of 1kHz and a Bandwidth of 1.

Band Stop

Purpose

A band-stop filter is a filter that passes most frequencies unaltered, but attenuates those in a specific range to very low levels. It is the opposite of a band-pass filter.

Device properties

Advanced properties	
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the button to change it to the button, and then typing a value.
	The device will use the system sample rate.
	The user will specify the sample rate manually.
	This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume

	less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.
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	NWare will decide which DSP this device belongs to.
	The user will specify a DSP manually.
	This is a composite device. Different DSPs have been selected for the child devices.

Controls

Bypass	The input signal is passed directly to the output, bypassing the filter signal processing.
Invert Polarity	When activated, inverts the output signal polarity.
Bandwidth	Sets the range of frequencies affected by changes in gain. Lower settings produce a sharper response.

Centre Frequency	Selects the center frequency of the filters response.
Gain	Sets the amount of attenuation at the center frequency.
Response	Displays the band pass/stop frequency response.

Crossovers

Purpose

Crossovers divide the frequency spectrum into two or more bands that are processed independently and typically sent to separate power amplifiers. Crossovers are constructed of Low Pass and High Pass Filters, and their controls relate to the corresponding controls of their component filter sections. Crossover devices can have 2, 3 and 4 bands and maximum slopes of 24, 36 and 48dB/octave. Crossovers consume DSP resources proportional to the number of bands and their maximum filter slope. Select the smallest Crossover which fulfills the requirements for your application. Once compiled, filter slopes may be adjusted downward with the Slope Controls but no DSP resources will be recovered by doing this.

Notes:

- There is a gain control for each band, whilst the frequency controls divide the bands.
- There are only three crossover points in a 4-way system. For a 3-way system, there are two, and so on.

Crossover Output Invert Recommendations

The Crossover filters generate phase shifts dependent on Filter Type and Slope. For correct combination of frequency components, the Output Invert buttons must be set correctly as described below.

Butterworth Filter Type

Filter Slope	Band 1 Polarity	Band 2 Polarity	Band 3 Polarity	Band 4 Polarity	Combine Response
6dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	0dB 0°
12dB/Octave	+ (Off)	- (On)	+ (Off)	- (On)	+3dB -90°
18dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	0dB -180°
24dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	+3dB -180°
30dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	0dB -180°
36dB/Octave	+ (Off)	- (On)	+ (Off)	- (On)	+3dB +90°
42dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	0dB 0°

48dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	+3dB 0°
54dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	0dB 0°
60dB/Octave	+ (Off)	- (On)	+ (Off)	- (On)	+3dB -90°

Linkwitz-Riley Filter Type

Filter Slope	Band 1 Polarity	Band 2 Polarity	Band 3 Polarity	Band 4 Polarity	Combined Response
12dB/Octave	+ (Off)	- (On)	+ (Off)	- (On)	0dB -90°
24dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	0dB -180°
36dB/Octave	+ (Off)	- (On)	+ (Off)	- (On)	0dB +90°
48dB/Octave	+ (Off)	+ (Off)	+ (Off)	+ (Off)	0dB 0°
60dB/Octave	+ (Off)	- (On)	+ (Off)	- (On)	0dB -90°

Only multiples of 12dB/Octave Filter Slope settings are allowed when the Linkwitz-Riley Filter Type is selected.

Bessel Filter Type

There are no simple alignment rules when the Bessel Filter Type is selected or when different filter slopes are used at different crossover points.

Device Properties

Output Count	Select the number of crossover outputs. This also sets the number of frequency ranges shown in the Control Panel.
Maximum Slope	Select the maximum slope value. The slope values start at 6dB and go up to 48dB in 6dB increments.

Controls

Mute	When activated, silences the input signal.
Invert	When activated, inverts the output signal's polarity by 90 degrees.
Crossover Frequency	Sets the crossover frequency.

Gain	Sets the amount of attenuation to be applied to the signals for the particular output.
Filter Type Buttons	Choose between Butterworth, Linkwitz-Riley and Bessel. **Note:** Each digital filtering technique produces a different response characteristic, allowing the crossover to be used for different applications.
Bessel Normalization Button	When you click the Bessel Normalization button, you can choose between Phase Match, Time Delay, -3dB, -6dB and none.
Slope	Sets the slope of the attenuation response curve for signals below the corner frequency, in 6dB/octave increments (Bessel and Butterworth filters) and 12dB/octave for Linkwitz-Riley filters. The maximum slope possible is 60dB/octave. **Note:** For best results, the Slope settings on adjacent frequency bands should be identical.

High Pass

Purpose

A high-pass filter, or HPF, is an LTI Filter that passes high frequencies but attenuates (that is, reduces the amplitude of) frequencies lower than the filter's cut off frequency. The actual amount of attenuation for each frequency is a design parameter of the filter. It is sometimes called a low-cut filter or bass-cut filter. A high-pass filter is the opposite of a *low-pass filter* (on page 193).

Device Properties

maximum slope	Controls the steepness of the filter of the roll-off between the pass band and the stop band. For Butterworth or Bessel filter types, 6dB/octave to maximum slope in 6dB/octave increments. For Linkwitz-Riley Filter Type, 12 dB/octave to maximum slope in 12db/octave increments.

Advanced properties

<table>
<tr><td>Device sample rate</td><td>Sets the sample rate that the device will use to sample incoming signals.

By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu.

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</table>

		NWare will decide which DSP this device belongs to.
		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Controls

Bypass	The input signal is passed directly to the output, bypassing the filter signal processing.	
Invert Polarity	When activated, inverts the output signal polarity.	
Mute	Mutes the output of the filter.	
Type	Variable Q	Filter characteristics vary with the level of boost or cut applied to the signal (using the Gain control).
	Butterworth	Designed to have as flat a frequency response as possible in the passband, and roll off towards zero in the stopband. For more information, see *http://en.wikipedia.org/wiki/Butterworth_filter* (*http://en.wikipedia.org/wiki/Butterworth_filter*)
	Linkwitz-Riley	An infinite pulse response filter. It consists of a parallel combination of a low-pass and a high-pass Linkwitz-Riley filter. For more information, see *http://en.wikipedia.org/wiki/Linkwitz-Riley_filter* (*http://en.wikipedia.org/wiki/Linkwitz-Riley_filter*)

	Bessel	A type of linear filter with a maximally flat group delay (maximally linear phase response). For more information, see *http://en.wikipedia.org/wiki/Bessel_filter* (*http://en.wikipedia.org/wiki/Bessel_filter*)
Slope	Sets the slope of the attenuation response curve for signals below the corner frequency, in 6dB/octave increments (Bessel and Butterworth filters) and 12dB/octave for Linkwitz-Riley filters.	
Q factor	Adjust the Q-factor, the higher the Q the narrower and shaper the peak.	
Frequency	Adjusts the filter cutoff or corner frequency. Signal components below this frequency are passed, components above are attenuated.	
Gain	Sets the amount of attenuation at center frequency.	
Response	Highpass output level.	

Low Pass

Purpose

A low-pass filter is a filter that passes low-frequency signals but attenuates (reduces the amplitude of) signals with frequencies higher than the cut off frequency. The actual amount of attenuation for each frequency varies from filter to filter. It is sometimes called a high-cut filter, or treble cut filter when used in audio applications. A low-pass filter is the opposite of a *high-pass filter* (on page 190), and a *band-pass filter* (on page 185) is a combination of a low-pass and a high-pass.

Device Properties

maximum slope	Controls the steepness of the filter of the roll-off between the pass band and the stop band.

	For Butterworth or Bessel filter types, 6dB/octave to maximum slope in 6dB/octave increments. For Linkwitz-Riley Filter Type, 12 dB/octave to maximum slope in 12db/octave increments.

Advanced properties	
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.
	 The device will use the system sample rate.
	 The user will specify the sample rate manually.
	 This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.
	 NWare will decide which role this device belongs to.

		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the  button to change it to the  button, and then selecting a DSP in the list.	
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		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Controls

Bypass	The input signal is passed directly to the output, bypassing the filter signal processing.	
Invert Polarity	When activated, inverts the output signal polarity.	
Mute	Mutes the output of the filter.	
Type	Variable Q	Filter characteristics vary with the level of boost or cut applied to the signal (using the Gain control).
	Butterworth	Designed to have as flat a frequency response as possible in the passband, and roll off towards zero in the stopband. For more information, see *http://en.wikipedia.org/wiki/Butterworth_filter* (*http://en.wikipedia.org/wiki/Butterworth_filter*)

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Slope	Sets the slope of the attenuation response curve for signals below the corner frequency, in 6dB/octave increments (Bessel and Butterworth filters) and 12dB/octave for Linkwitz-Riley filters.	
Q factor	Adjust the Q-factor, the higher the Q the narrower and shaper the peak.	
Frequency	Adjusts the filter cutoff or corner frequency. Signal components below this frequency are passed, components above are attenuated.	
Gain	Sets the amount of attenuation at center frequency.	
Response	Highpass output level.	

Generators

Pink Noise Generator

Purpose

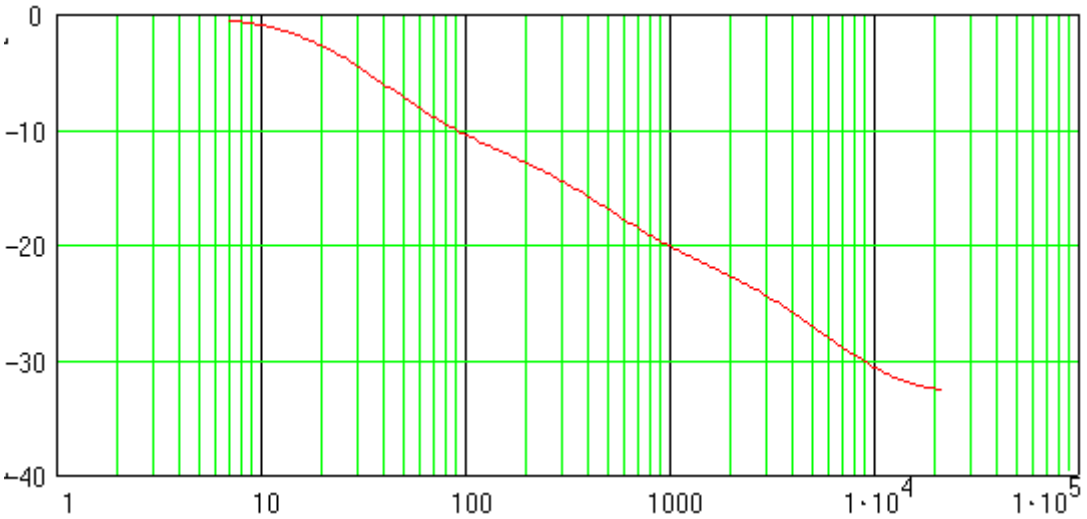
Generates a pink noise test signal. Pink noise is useful since it has equal energy in each equal fraction of an octave. As a result it looks "flat" when viewed on a common 1/3 or 1 octave band Real Time Analyzer.

Controls

Level	Sets the RMS level of the pink noise generated. The peak level for pink noise is approximately 10dB greater than its RMS level.
Mute	Mutes the output of the generator.

Pink Noise Frequency Response

While pink noise looks "flat" when viewed on a 1/3 octave Real Time Analyzer, it actually has a response which decreases with increasing frequency. The analyzer however, averages an increasingly large bandwidth in each band, so the resulting combination looks flat. This is what the actual response of the pink noise looks like.



Magnitude response of the Pink Noise Generator. The slope is -10dB/Decade or -3dB/Octave.

White Noise Generator

Purpose

Generates a white noise test signal. White noise contains equal amounts of energy at each frequency. When viewed on a constant bandwidth analyzer such as an FFT analyzer it will appear flat. However when viewed on a constant percentage bandwidth analyzer such as all the common Real Time Analyzers, it will appear to increase in level with increasing frequency at a rate of 3 dB per octave. For use with RTA's, use the *pink noise generator* (on page 197) instead, which will appear flat on them.

Controls

Level	Sets the RMS level of the noise generated. The peak level for white noise is 4.77dB greater than its RMS level.
Mute	Mutes the output of the generator.

Sine Generator

Purpose

Generates a high frequency sinusoidal signal of selected amplitude and frequency.

Note: The maximum frequency depends on the selected sample rate.

Controls

Frequency	Sets the frequency of the sine wave generated.
Level	Sets the RMS level of the sine wave generated. **Note**: The peak level of a sine wave is 3dB greater than its RMS level.
Mute	Mutes the output of the sine generator.

Media Player

Purpose

The Media Player device allows you to stream audio files on an nControl to another device on the CobraNet network. The audio is streamed via an AudioScience card.

Notes:

- In order to use the Media Player, you must use an nControl node and it must be fitted with an AudioScience card. nTouch 180 nodes do not support this device.
- The Media Player device is not compatible with MP3 files that contain album artwork information.
- When the project is deployed, media files must be located on the same node that hosts the NWare device playing the files. If the files are located on a different node, you will not be able to play them. We recommend that you manually assign the device playing the files to a role and deploy that role to the node that will host the media files.

If you have not already uploaded the files, see *Copying media files to a NION or nControl unit* in the *nControl Hardware Manual*.

Device properties

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Media Player	
File Name	If you want to play a file imported into the project via the Media tab, specify the file name only. If you do not include the file extension, it will be assumed to be *.wav*. If you want to play a file stored on the remote node, specify the

	path and file name of the media file. Here is the format: `ftp/<path>/my_file` **Note:** The project must be deployed before you specify the file name.
	Stop playback.
	Start playback.
	Repeat playback of the track. The LED above the button will flash on and off each time the track repeats. **Tip:** You can use the LED to control logic in your design. For example, you could count the number of repeats or initiate other logic operations each time the track repeats.
	Mutes the audio output.
	Gain. Sets the amount of amplification or attenuation to be applied to the signal.
Error	Error messages indicating problems that have occurred when recording or playing back audio files. If an error is displayed and you are using an nControl node, check that the nControl node has an AudioScience card installed; if you are playing a file stored on the node, connect to it via FTP and check that the file you are referencing exists.
Card	The adapter number of the AudioScience card. Each card shipped from Peavey has an adapter number of 1, which is set using a jumper on the card. If you want to fit more than one AudioScience card to an nControl, you must specify a unique adapter number for each card. For more information, see *Installing multiple Audio Science cards* in the *nControl Hardware Manual*.
Chan	The audio channel number used for playback or recording.

Media Recorder

Purpose

The Media Recorder device allows you to record audio on an nControl from CobraNet sources on the network.

Note: In order to use the Media Recorder, you must use an nControl fitted with an AudioScience card. nTouch 180 nodes do not support this device.

Advanced properties

Advanced Properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

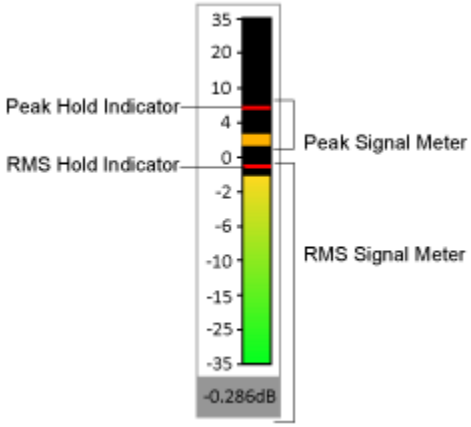
Control	Property
File Name	The name of the file that will store the audio recording. If you do not include the file extension, it will be assumed to be *.wav*. If you want to access the file on the nControl using FTP, specify the file name using the following format: `ftp/<path>/my_file` **Note:** Any path you specify must already exist on the nControl.

	The copy process cannot create folders.
	Stop recording.
	Start recording.
	Pause recording.
Error	Error messages indicating problems that have occurred when recording or playing back audio files. If an error is displayed and you are using an nControl node, check that the nControl node has an AudioScience card installed; if you are playing a file stored on the node, connect to it via FTP and check that the file you are referencing exists.
Card	The adapter number of the AudioScience card. Each card shipped from Peavey has an adapter number of 1, which is set using a jumper on the card. If you want to fit more than one AudioScience card to an nControl, you must specify a unique adapter number for each card. For more information, see *Installing multiple Audio Science cards* in the *nControl Hardware Manual*.
Chan	The audio channel number used for playback or recording.

Meter - Bar (peak and RMS)

Purpose

This meter displays both the current peak signal level and the current Root Mean Square (RMS) signal level.



The peak signal meter displays the highest energy or loudness level that the input signal reaches. The RMS signal meter measures the energy or loudness of a signal and samples the true Root Mean Square signal level.

Two hold indicators, peak hold and RMS hold, indicate the maximum levels that were reached over a specified, or infinite, period of time.

This meter is useful for measuring the dynamic range of a signal. The peak meter is especially useful when adjusting levels through a signal path to accurately indicate the headroom available.

Device Properties

deep mode	Increases the range of the meter to -100dB to +35dB. By default, the range is -35dB to +35dB.
channel count	The number of audio channels to monitor, and therefore the number of meters to display.

Advanced properties	
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu.

	You can manually specify the sample rate by clicking the button to change it to the button, and then typing a value.
	The device will use the system sample rate.
	The user will specify the sample rate manually.
	This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.
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DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the button to change it to the button, and then selecting a DSP in the list.
	NWare will decide which DSP this device belongs to.
	The user will specify a DSP manually.
	This is a composite device. Different DSPs have been

		selected for the child devices.

Controls

Signal meter	Shows a graphical representation of the incoming signal strength. It is divided into color segments: ▪ Green indicates that the input level is below the nominal +0dB. ▪ Yellow indicates that the signal is reaching the headroom provided between +0dB and +20dB. ▪ Red indicates that the level is above +20dB.
Red bars (hold indicators)	Show the highest recent signal levels shown on the meter. The hold indicators are displayed for a set period of time – the hold time.
RMS Response Time	The length of time over which to sample the RMS signal value and derive an average for display on the RMS signal meter.
Peak Decay Time	The length of time to display the last reading of the peak signal meter before it displays to a lower reading.
Hold Time	The length of time to display the peak and RMS hold indicators in their last positions before they are updated.
Infinite Hold	When clicked, the hold indicators on the level meters will continually show the maximum signal value.

Meter - LED (signal presence)

Purpose

This device indicates when the peak level of a signal exceeds the threshold level. When this occurs, the Presence LED is lit (green).

The threshold level is specified manually using the Thresh setting on the control surface of the device. The signal is supplied via the input wiring node on the device.

Device properties

Advanced properties

<table>
<tr><td>Device sample rate</td><td>Sets the sample rate that the device will use to sample incoming signals.

By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu.

You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.
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</table>

		NWare will decide which DSP this device belongs to.
		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Controls

Presence	Lit (green) when the peak input signal level exceeds the Thresh (threshold) value.
Inf Hold	When clicked, if the Presence LED is already lit, it will continue to stay lit, even if the peak signal level drops below the threshold level. When Inf Hold is subsequently switched off, if the signal level drops below the threshold level, the LED will be unlit after the Hold Time has elapsed.
Hold Time	The time in seconds that the Presence LED will continue to be lit after the peak signal level drops below the threshold level. The range is 100ms to 100s.
Thresh	The threshold for the peak signal level. When the level is exceeded, the signal presence LED will be lit (green).

Mixer - Auto Gain Sharing

Purpose

The Gain Sharing Automatic Mixer is used in conferences, teleconferences and boardrooms to assign all the available system gain to the microphones in use. The Gain-Sharing Auto-Mixer improves system performance by:

- Sharing the available system gain smoothly between all active microphones.
- Never letting the system get into feedback due to excess gain when multiple microphones are in use. This is even true if the direct outs are used.
- Being insensitive to high and low frequency noise that will cause problems for other automatic mic mixers.

The Gain-Sharing Automatic Mixer works well in mix-minus designs.

How it works

By default, all input levels are set to the Rest Gain setting (accessed via the Gain Share Setup button on the control surface). The system measures the incoming mid-band speech frequency signal components on all inputs (this reduces the possibility of low or high frequency background noise triggering a gain increase on the input). When an input exceeds the threshold level, the maximum available gain is applied to that input, while the other inputs are attenuated to the Depth setting to maintain the feedback stability margin.

Part of the reason the Gain Sharing Automatic Mixers work so well is that the mics are never shut off. With no one speaking, all the inputs are set to the nominal Rest Gain setting. When someone speaks into a microphone, that input is set to full gain, while the other inputs are set to the lower Depth gain setting. Thus no input is ever gated off, and the changes in gain are made smoothly. When more than one mic is in use at the same time, the available gain is shared between the microphones in use.

Inputs and outputs

You can use one of the Gain Sharing Auto-mixer device presets of 2,4,6,8,12,16, or 32 channels, or you can create a custom device.

Any even number of inputs between 2 and 256 is valid. You can also add high-pass filters and/or expanders to the inputs in the device properties.

On the Gain Sharing Auto Mixer, there are regular outputs and a mix output (labeled M). The mix output provides a convenient way to wire all the outputs to the next device or flyoff in the design using a single output wiring node. If you want to use the mix output for all output channels, you can leave the regular outputs unwired. On the other hand, if you want to use independent equalizers on the outputs, wire them to the individual outputs. You can hide the mix output in the device properties.

Linking Gain-Sharing Automatic Mixers

Sometimes you may want to select which role and/or node hosts the Gain-Sharing Auto-Mixer. If necessary, you can also break up larger devices into two or more smaller devices and link them together.

When you select the Include Link check box on the device properties, an extra input node and output node (both labeled L) are added to the device block.

The links work by forwarding the calculations from one mixer to the next so that the gain-sharing is still updated between devices.

Note: If you have created more than two Gain-Sharing Auto Mixers to be linked, you must add a mixer device to the chain so that all mixer link outputs can be mixed.

In filtered link mode, the inputs to the mixer come from the outputs of the Side Chain filters on the input channels. The output of the mixer is linked directly into the Auto-Mixer Gate.

In non-filtered link mode, the inputs to the mixer come directly from the inputs before the Side Chain filters. The output of the mixer is linked through a Side Chain filter into the Auto-Mixer Gate.

Device Properties

channel count	The number of input channels for the device. An input wiring node is added to the device block for each channel.
Highpass Filter on Inputs	When selected, high pass filters are added to each input. These reduce the amplification of low frequency noise below the speech frequencies.
Expanders on Inputs	When selected, expanders are added to each input. These reduce the influence of room noise on microphone inputs that are not in use.
Include Output Mix	When selected, a mix output (labeled M) is added to the device block.
Include Link	When selected, link input and output wiring nodes are added to the device block, allowing you to wire multiple Gain Sharing Auto-mixers together.
Filtered Link	When selected, the link output signal is filtered.

Controls

Channel	The input channel numbers.
Open	Lit (green) when a channel is sharing the available input gain.
Channel Gain	Meter that shows the gain currently being applied to the input signal. When the Open LED is lit green, the meter shows a value of 0dB or above; when the Open LED is unlit, the meter shows the value specified for either Rest Gain or the Depth (available via the Gain Share Setup button).
Output Mix	Specifies the weight of a particular input, so it will be louder in the output mix.

	Normally, these controls are left set to 0 dB. Since these controls affect the signals after the gain sharing circuitry, they do not affect how much of the shared gain the input receives. For example, an input could be set 6 dB above the other inputs on the input level controls, but turned down 6 dB on the output mix. **Note:** Do not try to kill an individual input using these controls, since the input will still be included in the gain sharing, even though it will not be part of the output mix.
Out	Specifies the amount of amplification or attenuation to be applied to the mix output.
Gain Share Setup	
Depth	The level of attenuation to apply to the closed channels when one or more channels are open. When someone speaks into a microphone, that input is set to full gain, while the other inputs are set to the lower Depth gain setting.
Rest Gain	The level of attenuation to apply to all channels when no channel is open. **Tip:** We suggest using -12 dB as a starting Rest Gain setting. If -3 dB were selected, then there would be little advantage of the automatic mixer over a plain mixer. If -24 dB were selected, then background noise would cause a greater modulation of the gain changes.
Time Const	The sample rate for the gain sharing. **Tip:** We suggest starting with a sample rate of between 30 and 50ms. The most suitable setting will be dependent on many environmental factors, and should be determined in the finished system.

Mixer - Auto Gated

Purpose

The Gated Automatic Mixer is designed for panels, boardrooms and other applications where there are numerous microphones, though generally only a few are in use at any time. The Gated Automatic Mixer improves system performance in these situations with the following features:

- Background noise from inactive microphones is gated out when it enters the system.
- A higher gain is allowed before feedback because the number of open mics (NOM) in the system is controlled and compensated for.
- The pecking order is controlled through a priority logic mechanism.

Inputs and outputs

There is a single input for each source to be automatically mixed.

There is a direct output for each input to the mixer. The gated version of each input is available at these outputs. The last output, labeled M, is the mixed sum of the gated inputs, attenuated by the NOM compensation factor.

Device Properties

channel count	The number of channels in the mixer. The maximum is 64.

Controls

Individual channel controls		
Channel	The input channel numbers.	
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.	
	Inverts the polarity of the signal.	
	Mutes the audio input signal.	
Level	Sets the input signal level before the gate.	
Open mode	The conditions that will cause the channel to be opened when the input signal level exceeds the channel threshold level.	
	Manual	The channel is always open, regardless of the input signal level.

	Filibuster	The channel is opened only if no other channel is open.
	Auto	The channel is opened whenever the input signal exceeds the threshold level.
	Priority	The channel is opened only if no channel with a higher priority is already open.
Priority Level	The priority level for the input channel.	
Open	Lit (green) when the input channel gate is open.	
Hold Time	The length of time in milliseconds that the gate will remain open after the input signal level has dropped below the threshold level.	
Threshold	The input signal level above which the gate will open.	
Hysteresis	Lowers the threshold level so that the gate closes only when the signal drops off. When Hysteresis is set to 0dB, the gate will open when the signal exceeds the threshold level and will close when the signal falls below the threshold level. By adding a few dB of hysteresis, the gate will only close again once the signal drops well below the threshold value. When correctly set, hysteresis ensures that a speaker whose voice gets louder and quieter does not cause the channel to close unnecessarily.	
Gate		
Background Percentage	Sets how much to gradually increase the Threshold setting by when the overall volume of the inputs into the mixer increases. This prevents gates from opening unintentionally as the level of background noise received by the mixer increases.	
Depth	The attenuation provided by the gate when in its closed state.	
NOM (Number Of Microphones)		
Last Mic On	When switched on, holds the last microphone on, even if the signal level falls below the threshold level. The microphone will remain on until the signal level of another input is higher than the threshold level; when this occurs, the microphone in question will stay on until the signal level of the next microphone is higher than the threshold level, and so on.	
NOM	The number of microphone channels currently open.	

NOM Linear	When switched on, linear mode is selected. The output is attenuated by the amount specified by the NOM Gain Step setting for each output channel opened after the first. When switched off, exponential mode is selected. The output is attenuated by the amount specified by the NOM Attenuation Setup control each time the NOM value doubles. The output attenuation is adjusted in fractional attenuation steps, as single channels open and close. The exponential response produces an optimally high gain before feedback for all possible open mic counts. Both options help prevent feedback in a system while keeping the overall sound level reasonable when several participants speak simultaneously.
NOM Response	Determines how quickly the NOM attenuation is applied at the output in response to a change in the NOM value.
NOM Gain Step	The amount of gain by which all inputs will be attenuated when each single additional microphone is added.
NOM Min Gain	The lowest gain level for the microphones. Any microphones added after this level has been reached will not cause the system to change the gain on the open microphones.
Gain	Indicates the attenuation currently applied at the output due to the current number of open microphones and the current NOM Mode and NOM Attenuation Setup settings.
Out	
	Mutes the audio output.
	Inverts the polarity of the signal.
	Controls the output level from the mixer by reducing all contributions to the mix bus.

Mixer - Normal

Purpose

Standard Mixer devices are designed to work in the same way as analog audio mixers. Each input channel has a level knob to control the output mix, and also includes mute, polarity and solo buttons, and fader controls. The controls for the output channels are located to the right of the control surface, and include mute buttons, polarity buttons and fader controls.

Note: Mixer devices can be resource intensive, so we recommend that you configure these devices with the smallest possible number of input and output channels. Several small mixer devices may be a more efficient use of resources than a single, large mixer device. And if you want to present the controls from all the mixer devices in one place, you can copy them out of the individual devices to create a single control panel.

Device Properties

input count	The number of input wiring nodes to add to the device.
output count	The number of output wiring nodes to add to the device.
Live Taper	When selected, will make it easier to make fine adjustments at higher gain levels (by decreasing the rate at which the gain changes when it is near the maximum).

Advanced properties		
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.	
		The device will use the system sample rate.
		The user will specify the sample rate manually.
		This is a composite device. Different sample rates have been selected for the child devices.

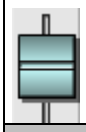
	Tip: If you reduce the sample rate for a device, it will consume less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.
	NWare will decide which role this device belongs to.
	The user will specify a role manually.
	Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the button to change it to the button, and then selecting a DSP in the list.
	NWare will decide which DSP this device belongs to.
	The user will specify a DSP manually.
	This is a composite device. Different DSPs have been selected for the child devices.

delay comp group	The name of the delay compensation group to which the device belongs. Multiple devices are added to the same group by specifying the group name in the device properties for each of the devices.

	Signals arriving at each of the input wiring nodes of each of the devices in the group are fed into the devices at exactly the same time. **Note:** In order for this feature to work, the delay comp combiner check box must be selected.

Delay comp combiner	When selected, ensures that signals arriving at each of the input wiring nodes are fed into the device at exactly the same time. If some signals arrive before others, delays are added to the signals that arrive earlier to ensure that they are synchronized with the signals that arrive later.

Controls

Inputs	
	Controls the level of this input that will appear in the output mix. A row of input level controls is displayed for each of the output channels. **Tip:** The color of each input level control corresponds to the output channel in which it will appear.
	Mutes the audio input signal.
	Inverts the polarity of the signal.
	Solo. Specifies that the channel is to remain open while all others are muted. Any other channel with Solo on will also remain open.
	Input gain control. Controls the level of gain or attenuation to apply to the input signal.
Outputs	
	Mutes the audio output.

	Inverts the polarity of the signal.
	Output gain control. Controls the level of gain or attenuation to apply to the output signal.

Room Combiner

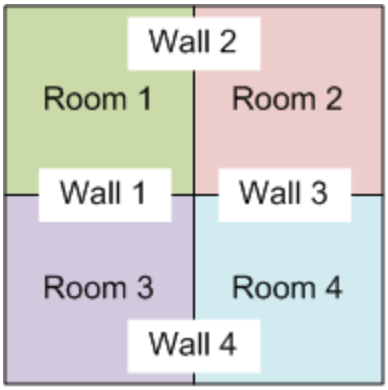
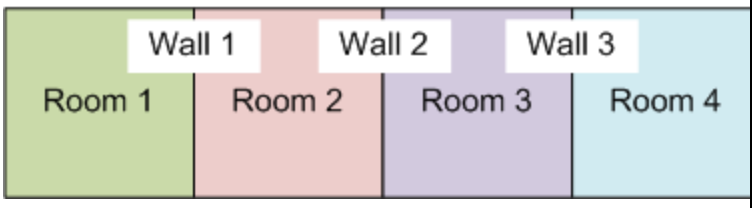
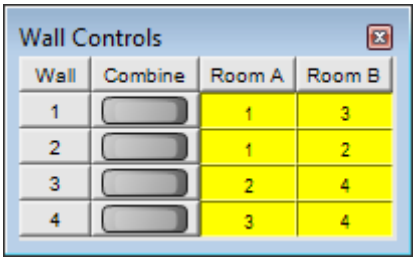
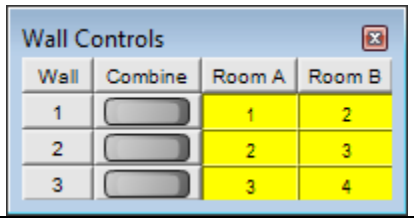
Device Properties

Number of rooms	Adjusts the number of rooms. **Note**:The valid range is 2 to 32.
Number of walls	Adjusts the number of walls separating the rooms. **Note:**The valid range is 1 to 128.

Controls

All Rooms	Combines all the rooms into a single large room.
No Rooms	Turns off all combining, and returns each room to its normal state.
Mute All	Mutes all of the inputs on all of the auto mixers in each room.
Wall Controls	Double-click to display the wall controls.

Wall Controls	
Wall	The number of the wall separating two rooms.
Combine	Combine the two rooms separated by the wall.

Room A, B	The room numbers that are separated by the wall. When the project is emulated or deployed, type the room numbers into the yellow boxes. Here are two examples.   In the first example, wall 1 separates rooms 1 and 3, so those are the values to enter for the *Wall 1* row.  In the second example, wall 1 separates rooms 1 and 2, so those are the values to enter for the *Wall 1* row. 

Deluxe Router

Purpose

The Deluxe Router allows you to connect one or more signal inputs to one or more outputs. It functions as a *patch-bay*.

This device includes the features of a basic router, and it can also switch smoothly between two inputs by crossfading or ramping between them. This extra functionality does, however, mean it consumes more DSP resources than a basic router.

The same input can be used on more than one output, for instance, to send program material to more than one room in a venue, but you cannot use the router to mix inputs on any output, so only one input per output is allowed.

The appearance of the cross-connect depends on the settings selected in the Control Panel Style list in the Device Properties.

Device Properties

Input count	The number of device inputs. The maximum is 256.	
Output count	The number of outputs. The maximum is 256.	
Allow 'off' state	When selected, adds an Off button to the control surface for each output. Clicking the Off button clears the input channel selection for the corresponding output channel. It effectively mutes the output channel.	
Control Panel Style	Auto	When the number of inputs and outputs is 11 or below: Input/output pairings are selected by clicking the button that selects an output channel number for the particular input row. When it is 12 or above: An input channel number is selected from a drop-down list to route it to a particular output channel.
	Crosspoint buttons	Input/output pairings are selected by clicking the button that selects an output channel number for the particular input row. This layout is used regardless of the number of inputs and outputs.

	Combo box	An input channel number is selected from a drop-down list to route it to a particular output channel. This layout is used regardless of the number of inputs and outputs.

Controls

	Mutes the audio output.
Input x	Selects the input channel to connect to the output channel.

Router Setup	
Type	The type of transition to make when switching between two inputs.
Time	The time the device will take to transition between the two inputs.

Basic Router

Purpose

The Basic Router device allows you to connect one or more signal inputs to one or more outputs. It functions as a *patch-bay*.

This type of router does not allow you to cross-fade or ramp between inputs as a deluxe router does, but it consumes fewer DSP resources.

The same input can be used on more than one output, for instance, to send program material to more than one room in a venue, but you cannot use the router to mix inputs on any output, so only one input per output is allowed.

The appearance of the cross-connect depends on the settings selected in the Control Panel Style list in the Device Properties.

Device Properties

Input count	The number of device inputs. The maximum is 256.
Output count	The number of outputs. The maximum is 256.

Allow 'off' state	When selected, adds an Off button to the control surface for each output. Clicking the Off button clears the input channel selection for the corresponding output channel. It effectively mutes the output channel.	
Control Panel Style	Auto	When the number of inputs and outputs is 11 or below: Input/output pairings are selected by clicking the button that selects an output channel number for the particular input row. When it is 12 or above: An input channel number is selected from a drop-down list to route it to a particular output channel.
	Crosspoint buttons	Input/output pairings are selected by clicking the button that selects an output channel number for the particular input row. This layout is used regardless of the number of inputs and outputs.
	Combo box	An input channel number is selected from a drop-down list to route it to a particular output channel. This layout is used regardless of the number of inputs and outputs.

Advanced properties	
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the 

	button to change it to the button, and then typing a value.
	The device will use the system sample rate.
	The user will specify the sample rate manually.
	This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.
	NWare will decide which role this device belongs to.
	The user will specify a role manually.
	Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the button to change it to the button, and then selecting a DSP in the list.
	NWare will decide which DSP this device belongs to.
	The user will specify a DSP manually.
	This is a composite device. Different DSPs have been

		selected for the child devices.

delay comp group	The name of the delay compensation group to which the device belongs. Multiple devices are added to the same group by specifying the group name in the device properties for each of the devices. Signals arriving at each of the input wiring nodes of each of the devices in the group are fed into the devices at exactly the same time. **Note:** In order for this feature to work, the delay comp combiner check box must be selected.

Delay comp combiner	When selected, ensures that signals arriving at each of the input wiring nodes are fed into the device at exactly the same time. If some signals arrive before others, delays are added to the signals that arrive earlier to ensure that they are synchronized with the signals that arrive later.

Controls

	Mutes the audio output.
Input x	Selects the input channel to connect to the output channel.

Signal Probe

Purpose

The signal probe is used to check the audio paths between devices by connecting to the wires in the project.

The *Probe point valid* LED lights when the audio wire or wiring node you are testing is connected to an audio device, e.g. a pink noise generator, and not a logic device, e.g. an AND gate. The device also displays the device ID and port type.

Note: The Signal Probe is designed to be used when the project has been deployed and audio can pass between the devices. The *Probe point valid* LED only works when the project has been deployed.

Tips:

- You can connect the output wiring node on the Signal Probe block to a meter to instantly see when a signal is present at the test point.
- As an alternative to using the Signal Probe device, you can connect an oscilloscope to an output connector on a NioNode to check for the presence of a signal.

Device Properties

Advanced properties	
Device sample rate	Sets the sample rate that the device will use to sample incoming signals. By default, this is set to the system sample rate, which is specified as part of the project properties. You can view the Project Properties by clicking Project Properties on the File menu. You can manually specify the sample rate by clicking the  button to change it to the  button, and then typing a value.
	 The device will use the system sample rate.
	 The user will specify the sample rate manually.
	 This is a composite device. Different sample rates have been selected for the child devices.
	Tip: If you reduce the sample rate for a device, it will consume less DSP resources.
Device latency calculation script	This setting does not normally need to be changed. Only change this setting when under instruction from MediaMatrix Technical Support.

Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
DSP assign	The DSP chip within the node that will process this device. You can manually assign a device to a DSP by clicking the button to change it to the button, and then selecting a DSP in the list.	
		NWare will decide which DSP this device belongs to.
		The user will specify a DSP manually.
		This is a composite device. Different DSPs have been selected for the child devices.

Controls

	Signal Probe icon. Click the icon to start using the signal probe. The cursor will change. Click a connection wire or a wiring node to test the connection. Click the signal probe icon to stop testing.
Probe point ID	Device ID and port type.
Probe point valid	Lit (green) when the audio wire or wiring node you are testing is connected to an audio device, e.g. a pink noise generator, and not a logic device, e.g. an AND gate.

Wave File Players

Purpose

The Wave File Player device allows you to play *.wav* media files that have been uploaded to a NioNode in the project. In order to use the media files, you must import them into NWare via the Media tab, or upload them directly to the NioNode using FTP.

If you import the files using the Media tab, they will be available in the */mnt/hda4/project* folder on the NioNode when the project is deployed. When you use the Wave File Player, you can simply type the file name directly into the *File Name* box without specifying a path.

If you upload the files using ftp, they will be available in the */var/ftp* folder on the NioNode. When you use the Wave File Player, prefix the file name with *ftp/* in the *File Name* box. You do not need to specify a path unless you have stored the files in a sub folder on the NioNode.

For information on uploading files using ftp, see *Copying media files to the NION* in the *NION CobraNet Hardware Manual* or *NION Dante Hardware Manual*.

There are different variants of the device for mono and stereo audio and different sample rates.

Notes:

- The sample rate for the player or recorder device must be set to a multiple of the project sample rate. For example, if the system sample rate is 48KHz (which is typical), then realistic values for the sample rate are 48000, 24000, or 12000.
- The interpolation value (for the player device) or decimation value (for the recorder device) when multiplied with the sample rate must equal the project sample rate. For example, if the sample rate is set to 12000 and the project sample rate is 48000, then the correct setting for interpolation or decimation is 4x.
- When you choose a player or recorder device with a particular sample rate, the interpolation or decimation is set automatically by NWare, according to the project sample rate you are using.
- The number of Wave File Players and Wave File Recorders you can add to your project is limited by the available memory on the NioNode that is hosting the project. If you add too many of these devices, an error will be displayed when the project is deployed. The memory usage is affected by a number of factors, including the sample rate and whether mono or stereo is selected.
- When the project is deployed, media files must be located on the same node that hosts the NWare device playing the files. If the files are located on a different node, you will not be able to play them. We recommend that you manually assign the device playing the files to a role and deploy that role to the node that will host the media files.

Troubleshooting

Symptoms	Explanation
File will not play.	File name is misspelled.
	Bit rate of file is incorrect.

	File was created using a software recorder (ProTools, for example) that uses a broadcast-style header.
	You are trying to specify a file name before the project has been deployed.
File plays, but at a different pitch/speed than the one at which it was recorded.	The sample rate of the media file does not match the player sample rate.

Device properties

Wave file format	The format, i.e. mono or stereo, and the bit rate to use when playing the audio file.
Sample rate	The sample rate used to create the audio file (in Hz). It must be set to a multiple of the project sample rate. For example, if the system sample rate is 48KHz (which is typical), then realistic values for the sample rate are 48000, 24000, or 12000.
Max wave file format	The number of channels, i.e. mono or stereo and the bit rate for the audio file.
sample rate	The sample rate used to create the audio file.
interpolation	The value when multiplied with the sample rate must equal the project sample rate. For example, if the sample rate is set to 12000 and the project sample rate is 48000, then the correct setting for interpolation or decimation is 4x.

Controls

File Name	If you want to play a file imported into the project via the Media tab, specify the file name only. If you do not include the file extension, it will be assumed to be *.wav*. If you want to play a file stored on the remote node, specify the path and file name of the media file. Here is the format: `ftp/<path>/my_file` **Note:** The project must be deployed before you specify the file

	name.
	Stop playback.
	Start playback.
	Pause playback.
	Repeat playback of the track. The LED above the button will flash on and off each time the track repeats. **Tip:** You can use the LED to control logic in your design. For example, you could count the number of repeats or initiate other logic operations each time the track repeats.
	Mutes the audio output.
	Inverts the polarity of the signal.
	Gain. Sets the amount of amplification or attenuation to be applied to the signal.
Error	Error messages indicating problems that have occurred when recording or playing back audio files. If an error is displayed and you are using an nControl node, check that the nControl node has an AudioScience card installed; if you are playing a file stored on the node, connect to it via FTP and check that the file you are referencing exists.

Wave File Recorders

Purpose

The Wave File Recorder device allows you to record stereo or mono audio from devices in your project to a wave file stored on a NioNode. The recorder has either one or two input wiring nodes, depending on whether you are recording mono or stereo audio. The recorded wave file is stored in the */mnt/hda4/project* folder on the NioNode that hosts the Wave File Recorder device.

The device has a special mode called CHIMP, which allows you to stream audio to the sound card in your PC, rather than to a file. This allows you to monitor the audio arriving via the device input wiring nodes. CHIMP mode is selected via a setting on the device properties.

There are different variants of the device for mono and stereo audio and different sample rates.

Notes:

- The sample rate for the player or recorder device must be set to a multiple of the project sample rate. For example, if the system sample rate is 48KHz (which is typical), then realistic values for the sample rate are 48000, 24000, or 12000.
- The interpolation value (for the player device) or decimation value (for the recorder device) when multiplied with the sample rate must equal the project sample rate. For example, if the sample rate is set to 12000 and the project sample rate is 48000, then the correct setting for interpolation or decimation is 4x.
- When you choose a player or recorder device with a particular sample rate, the interpolation or decimation is set automatically by NWare, according to the project sample rate you are using.
- The number of Wave File Players and Wave File Recorders you can add to your project is limited by the available memory on the NioNode that is hosting the project. If you add too many of these devices, an error will be displayed when the project is deployed. The memory usage is affected by a number of factors, including the sample rate and whether mono or stereo is selected.
- By default, each NioNode allocates approximately 116MB to storage of audio files. As you create recordings, the available disk space is consumed, and when it is all used you will not be able to create further recordings or save project files to the node.
- It is not possible to append to an audio file. Therefore, if you start recording to a file, stop recording and then resume recording, you will overwrite the existing content of the file.

Device properties

Wave file format	The format, i.e. mono or stereo, and the bit rate to use when creating the audio file.
Sample rate	The sample rate to use when creating the audio file (in Hz). It must be set to a multiple of the project sample rate. For example, if the system sample rate is 48KHz (which is typical), then realistic values for the sample rate are 48000, 24000, or 12000.
decimation	The value when multiplied with the sample rate must equal the project sample rate. For example, if the sample rate is set to 12000 and the project sample rate is 48000, then the correct setting for interpolation or decimation is 4x.

Advanced properties	
enable CHIMP	When selected, adds a CHIMP button  to the control

	surface. When the project is running and this button is clicked, audio received via the input wiring nodes on the Wave File Recorder is directed to the PC sound card. This allows you to monitor the audio via the PC speakers or headphones.

Controls

File Name	The name of the file that will store the audio recording. If you do not include the file extension, it will be assumed to be *.wav*. If you want to access the file on the NION using FTP, specify the file name using the following format: `ftp/<path>/my_file` **Note:** Any path you specify must already exist on the NION. The copy process cannot create folders. If you use the CHIMP feature to listen to audio, the file name will automatically change to show the IP address of your PC. When a recording is being made or the CHIMP is used, an LED will be lit (green) below the File Name box.
	Stop recording.
	Start recording.
	Gain. Sets the amount of amplification or attenuation to be applied to the signal.
Error	Error messages indicating problems that have occurred when recording or playing back audio files. If an error is displayed and you are using an nControl node, check that the nControl node has an AudioScience card installed; if you are playing a file stored on the node, connect to it via FTP and check that the file you are referencing exists.
	Mutes the audio input signal.
	Inverts the polarity of the signal.
Clip	Lit (red) when the input signal is clipped. This occurs when it exceeds a maximum preset level.
Inf Hold	If the Clip LED is already lit, it will continue to stay lit, even if

	the peak signal level drops below the threshold level. When Inf Hold is subsequently switched off, if the signal level drops below the threshold level, the LED will be unlit after the Hold Time has elapsed.
Hold Time	The time in seconds the Clip LED will continue to be lit after the peak signal level drops below the threshold level.
	Starts CHIMP mode. When enabled, audio received via the input wiring nodes on the Wave File Recorder is directed to the PC sound card. This allows you to monitor the audio via the PC speakers or headphones. To use CHIMP mode, click the *CHIMP* button. The *File Name* box will be updated to show the IP address of the PC and port number used. If you click the button again, a new port number will be used.

Chapter 3

Logic

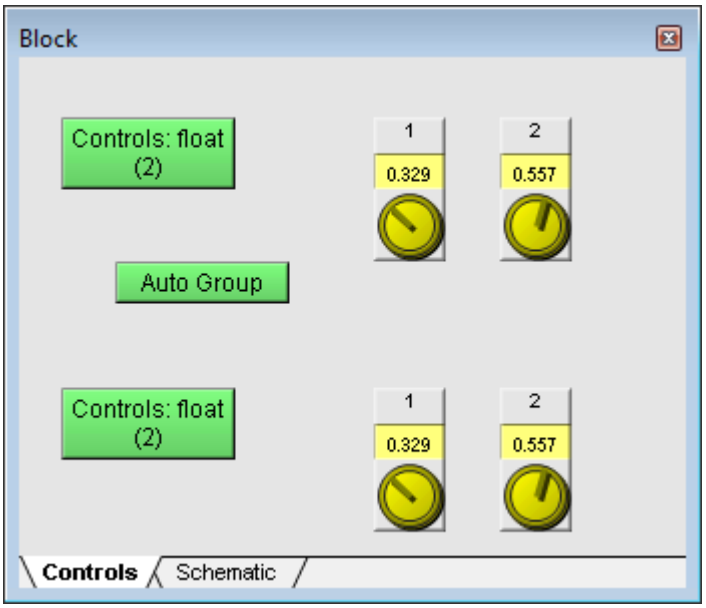
In This Chapter

Auto Group

Purpose

The Auto Group device automatically groups together controls with the same RUID when they are located inside the same block (or inside any blocks located within the block). When controls are grouped, setting a value on one control automatically sets the same value on the other controls in the group.

In the example below, we have a control block containing four knob controls.



Without the presence of an Auto Group device, you can gesture each of the knobs and they move independently. When the Auto Group device is added, gesturing the knob labeled *1* automatically gestures the other knob labeled *1*; gesturing the knob labeled *2* automatically gestures the other knob labeled *2*. This is because the RUIDs of the knobs are the same.

The Auto Group device is useful when creating stereo or multi-channel devices. Changing the settings for one channel can automatically change the settings for the other channel(s) at exactly the same time. This avoids having to use control wiring to synchronize the controls.

Notes:

- The Auto Group device can group many different types of controls – not just knobs, faders etc. If you use the device with other types of controls, we recommend that you test the configuration thoroughly.
- Controls inside blocks within the current block are also grouped – not just the controls located next to the Auto Group device. This means that adjusting the value of a control will also adjust the value of all the controls with the same RUID located inside blocks within the current block, and any blocks within those blocks.

Device Properties

Enabled	Enable or disable the automatic grouping of controls.
Group Name	The name of the group containing the controls.
Exclude controls	The names of the controls to exclude from the group, separated by commas.

Blinking Light

Purpose

Outputs a control signal automatically at a specified interval, for a specified period of time.

This device can be wired to an LED *Generic Control* (on page 246) to switch it on and off.

Device Properties

blink period (ms)	The length of time in milliseconds the Blinker spends in the off or on state. The default is zero. **Note:** If you specify a value for this setting on the device properties, you cannot specify a value for *Period* on the control surface – the control is removed.

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

State	Shows when the blinker is on or off.
Enable	Enables or disables the blinker.
Period	The length of time the blinker is on or off. Half of the period is

	used for the on state and half for the off state. The valid range is 0-120000 milliseconds.

Comms Processor

Purpose

The Comms Processor device allows you to send and receive textual data over a serial or TCP connection. In TCP mode, the device operates as a Telnet TCP client, initiating connections using a specified IP address and port. While the device can initiate outgoing connections, it is not capable of accepting incoming connections and cannot operate as a TCP server.

Notes:

- This device is not supported in Emulation mode.
- If you use the NioNode RS-232 port, it must be configured so that *console mode* is disabled. For more information on console mode, see *Specifying the function of the RS-232 serial port* in the *NION Hardware Manual*.
- When you use TCP mode, the role containing the Comms Processor can be deployed to any NioNode in your project. This is because a TCP connection can be made from any NioNode on the network to the receiving device. When you use a serial connection, however, the receiving device must be physically connected to a particular NioNode. You must therefore deploy the role to this NioNode and not any other in the project.

Device properties

Number of transmit strings	The number of rows of transmit strings that will be available on the device control surface.
Number of receive strings	The number of rows of receive strings that will be available on the device control surface.
Comms Type	Specifies either serial or TCP communications.
Advanced properties	
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.
	 NWare will decide which role this device belongs to.

		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Controls

Transmit Characters	Characters you want to transmit over the serial or TCP connection. Transmission starts when you click the button next to the row of characters. Non-printable characters can be represented using hex values in the format *#xx*, where *xx* is a valid hexadecimal value. For example, `#0D` matches a carriage return, `#0A` matches a line feed and ## represents a hash character. The input wiring nodes on the device block map to the buttons on each transmit row, so the buttons can be triggered by another device.
Transmit Buffer: CLR	Clears the buffer (and display) of characters transmitted to the device.
Receive Characters	Characters you want to find in the stream of characters received via the serial or TCP connection. When a match is found, the LED for the row is lit (green). **Note:** Each row is matched against characters at the end of the incoming data buffer. Therefore, the characters in the row must be found at the end of the buffer in order to light the corresponding LED. The output wiring nodes on the device block map to each LED, so when an LED is lit, a device connected to the corresponding wiring node is triggered. This allows you, for example, to wire an output wiring node to one of the input wiring nodes, so that when a particular string is received, a transmit is actioned to send a string back to the device.
Receive Buffer: CLR	Clears the buffer (and display) of characters received from the device.

Configuration

Comms Type: TCP	
IP address	The IP address of the device you want to contact. This value can be edited.
IP port	The port number on which the device will listen for data transmissions from other devices. This setting must match the port number used by the transmitting device. The default is 0. The valid range is 0-65535.
Status	The current status of device.
Listening	Lit (green) when the device is operational and waiting for data to arrive.
Clear Counters	Resets all the counters at the bottom of the tab.
Bytes In	The number of bytes received by the device.
Bytes Out	The number of bytes transmitted by the device.
Activity	Lit yellow when data is being transmitted or received.

Comms Type: Serial		
Comm port	The comm port and serial protocol to use for data transfer.	
Bits per sec	The baud rate (speed) for data transfer.	
Data bits	The number of data bits in each character. Baudot uses 5, true ASCII uses 7. We recommend using 8, as this can be used for any type of data.	
Parity	Specifies that an extra bit is to be included in the data transmission. This can be used for error detection.	
	none	No parity bit is sent. Error detection is handled by the communication protocol.
	even	The parity bit is set to 1 if the number of ones in the set of bits is odd, therefore making the number of ones even.
	odd	The parity bit is set to 1 if the number of ones in the set of bits is even, therefore making the number of ones odd.

	mark	Parity bit is always set to the mark signal condition (logical 1).
	space	Parity bit is always set to the space signal condition.
Stop bits	Bits sent at the end of every character to signify the end of the character in the data transmission. Normally, 1 stop bit is used.	
Rear mode	The operating mode for a data port that supports more than one mode. For example, RS-422 or RS-485.	
Status	The current status of device.	
Listening	Lit (green) when the device is operational and waiting for data to arrive.	
Clear Counters	Resets all the counters at the bottom of the tab.	
Bytes In	The number of bytes received by the device.	
Bytes Out	The number of bytes transmitted by the device.	
Activity	Lit yellow when data is being transmitted or received.	

Control Delay

Purpose

The Control Delay device performs routine timing and sequencing operations without consuming DSP resources. It can be used to generate:

- a delayed action
- a repetitive action
- complex sequences of events (when multiple devices are linked together).

Note: The device uses either Windows or Linux timing – depending on whether you are using an nControl or NION. Consequently, accuracy of timing intervals is limited. Short delay accuracy is limited to 100 msec and delays from 100 to 3600 seconds are limited to 1 second accuracy.

Device Properties

Maximum delay seconds	The maximum *Delay Time* value that can be specified on the control surface. The maximum time you can set is 10800, or 3 hours.

Maximum pulse seconds	The maximum *Pulse Time* value that can be specified on the control surface. The maximum time you can set is 10800, or 3 hours.

Controls

Trigger	Starts the timing sequence: active - delay - pulse, as indicated by the LEDs on the control surface.
Retrig-able (Retriggerable)	When enabled, trigger pulses during the delay phase cause the timer to reset to the beginning of the delay phase. This allows the timer to be used as a missing pulse detector, or *heartbeat*. Once the timer enters the pulse phase, trigger pulses cause the timer to reset to the beginning of the delay phase. When disabled, additional triggers are ignored while a timing sequence is in process.
Loop	Starts the timing sequence and repeats it indefinitely.
Reset	Stops the timing sequence and clears all LEDs. If Loop is enabled, this button is ignored.
Delay Time	The duration of the delay phase. The timer enters this phase when it is started.
Pulse Time	The duration of the phase that starts after the delay phase.
Active	Lit (yellow) when the device has been triggered and the timing sequence has started. If Loop is enabled, Active is lit continuously.
Delay	Lit (purple) during the delay phase.
Pulse	Lit (light blue) during the pulse phase.

Control Router

Purpose

The Control Router device is a patch-bay. It allows you to manage the flow of control signals from multiple inputs to multiple outputs.

Device Properties

Number of control inputs	The number of inputs to the device. Range is 1-1024.
Number of control outputs	The number of outputs from the device. Range is 1-1024.
Allow 'off' state	Adds an *Off* button to the control surface for each output. This button switches off the output. Without the *Off* button, one of the inputs is always selected.

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Controls	Purpose
Input	Allows you to numerically select to which input, if any, an output is patched to. **Note:** Routing changes made via the Input Select control are reflected in the Cross-Connect buttons and vice-versa.
Off	Turns all inputs off and allows an output to select no input.

Counter Processor

Purpose

The Counter Processor device displays a counter value that is incremented or decremented according to control values received on the input wiring nodes. If a boolean button is wired to the device, for example, the value is incremented or decremented by 1 each time the button is clicked. If more than one input wiring node is present, the value can be incremented or decremented by any of the wired controls.

The counter value is reset to zero when the Reset button is clicked.

If an output wiring node is added to the block (using the *output node* setting on the device properties), the counter value can be passed to other devices in the design.

Device Properties

Input count	The number of input wiring nodes on the device.
Output node	Adds an output wiring node on the device block so that the value can be passed on to another device in the design.

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Counter	The counter value. This value increases and decreases according to the values received on the input wiring nodes. **Note:** The value can be negative if it is reset to zero and then decremented by an input value.
Reset	Resets the counter to zero.

Email Sender

Purpose

The Email Sender device allows you to send emails from a project running on a NioNode, nControl or nTouch 180 using the standard SMTP protocol.

Note: The NioNode or nControl node must have access to an email server.

Tip: If you want to send a secure email (requiring a user name and password) from an nControl or nTouch 180, use the *Email Sender - Secure* (on page 244) device.

Device Properties

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Email Sender - Secure

Purpose

The *Email Sender - Secure* device allows you to send email using a secure SMTP host that requires a password. It is compatible with a NioNode, nControl and nTouch 180.

If you want to use a Gmail account, for example, you can use these settings:

- server: smtp.gmail.com
- port: 587
- security: TLS

Note: The NioNode, nControl or nTouch 180 must have access to the Internet, and DHCP or a DNS server must be configured.

Device properties

Device Type	Normal	Hide the settings on the control surface for sending secure emails.
	Secure	Show the settings on the control surface for sending secure emails.
Advanced Properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Server Configuration		
Server	The IP address or domain name of the mail server. For example, smtp.gmail.com.	
Port	Email server port. For Gmail with TLS, this is 587.	
Security	TLS	*Transport Layer Security* (*http://en.wikipedia.org/wiki/Transport_Layer_Security*).
	SSL	Secure Sockets Layer.
Login	User name for email server.	
Password	Password for email server.	
Message		
From	The email address of the sender. Required. Must be a valid email address.	
To	A comma-separated list of email addresses to which the email will be sent. Up to 100 addresses can be specified. Required. Must be valid email addresses.	
Subject	The subject of the email.	
Message	The main body of the email.	
Controls		
Send	Sends the email.	
Progress	Shows the progress of the mail sending process, which is useful for debugging.	
Status	Shows a result message with a date/time stamp when the process completes successfully. In the event one or more of the recipients is rejected by the server, the addresses of those recipients will be displayed in the Status field.	

Generic Controls

Purpose

The Generic Controls device is used to create a number of different controls in the project, including:

- knobs
- faders
- buttons
- meters.

When you drag a Generic Controls device over to the page, you can specify the type and range of values it will control. You can then open the Controls block that has been created and change the properties of the control inside to select the style: knob, button, meter etc.

For every actual/native control that is used to control the DSP algorithms, there is a generic control that can be used to mimic, as well as *range-limit*, the actual control. A good example is a level control inside a mixer. The normal range for a mixer input level is -100 to 0 dB. A generic level that has min/max values of -18 to 0 dB could be connected to the actual control, which is the control the end-user or external control systems uses. The input is then limited to the values set in the generic control.

Generic controls can be controlled using RATC from applications outside NWare. You can specify values for controls using the controlSet command and read control values using the controlGet command. For more information, see *External Control* in the *External Control User Guide*.

Tips:

- If you set the *Number of controls* value on the device properties to greater than 1, you can create multiple controls of the same type in one operation.
- The options available on the *Style* tab depend on the control style you select. For example, a meter has options for orientation and labels, whereas a text box has options for font size, background, and so on.

Device Properties

Number of controls	The number of controls to create. All the controls will be created inside a single *Controls* block.
Type of control(s)	The type of value the control(s) will store. For example: string, boolean, float etc.
Minimum value	The minimum value in the range that may be selected using the control(s).
Maximum value	The maximum value in the range that may be selected using the control(s).

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

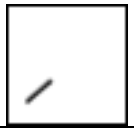
Control Properties

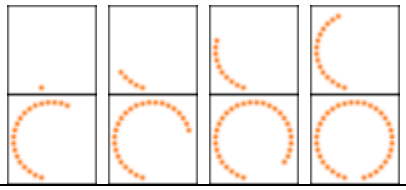
Type

Control Type
The type of control: knob, button, fader, etc.

Options	
Color when off	The color of the control when it is switched off. Click the color sample, then choose a color from the color palette.
Toggle	When clicked, the control switches on and remains on until it is clicked again.
Momentary	While the mouse pointer is over the control and the mouse button is down, the control is switched on. It switches off immediately when the mouse button is released.
Binary	The control is switched on when the position value passed to it from another control is greater than 0.5.

Color	The color of the control is specified by a CSS color string value passed to it from another control. For example, if the value *#FF0000* is passed to the control, it will be colored red.
String	The control is switched on when the string value passed to it from another control matches the specified value. For example, if a button is wired to the control in a master/slave configuration, it will pass the value *true* when it is clicked. Therefore, if you specify *true* in the String box, the control will be activated when the master button is clicked.
Linked to	
Page	The page to open when the control is activated. If the control is placed inside a block, all the pages in the block are listed. If the control is placed on a page in the main NWare window, all the top-level pages are listed. **Note:** Hidden pages are also listed, but these pages cannot be opened by activating the control.
Activate	When selected, allows a page to be chosen from the list.
Force visible	Forces a block containing a page to be opened before the page is displayed. This option would be used in the following example scenario: 1. A control is added to a page inside a block and configured to open one of the other pages in the block. 2. The control is duplicated and the copy is placed on a page outside the block. 3. The user wants to click the copy of the control and view the linked page.
Popup Dialog	
Dialog	The dialog to be displayed when the user activates the control in Kiosk2Go.

Enable Dialog Popup	When selected, you can specify a dialog to display.	
Jump to K2G Device		
Device	The Kiosk2Go device to navigate to in the browser when the control is activated.	
Enable Jump to K2G device	When selected, you can specify a Kiosk2Go device to navigate to.	
Enable Decoration	When selected, you can specify images from the Media tab for a Kiosk2Go control.	
Slider Image	The image to display for the handle on a fader.	
Background Image	The image to display for the background on a control.	
Image Filename	The file name of an image to display on a knob control.	
Image Type	Specifies how the image will be used on a knob control. Right-click the Image Type list to change the type.	
	Fixed	Images to display as the background for the knob. Below is an example. 
	Moves	Image to display for the marker on the knob control. This indicates the value selected by the user. The image will be rotated as the value on the control increases. Below is an example (a border has been added for clarity). 

	Series	Images to display as the value of a knob control changes. These could be dots that slowly create a circle, for example, like these (borders have been added for clarity): 
Add	Add a series of images for a knob control to the image file list. Images available on the Media tab are shown.	
Delete	Remove the selected image from the list.	
Up / Down	Move the selected image up or down the list.	
On Image	Image to display when an LED is on (lit).	
Off Image	Image to display when an LED is off (unlit).	
Meter Image	Image to display on a meter control.	
On Style	Image	Displays an image on the control when it is in the *on* state.
	Image and Color	Displays an image on the control and a background color (selected under Drawing Style) when the control is in the *on* state.
Off Style	Image	Displays an image on the control when it is in the *off* state.
	Image and Color	Displays an image on the control and a background color (selected under Drawing Style) when the control is in the *off* state.
Enter each option separated by a colon (:) (Combo box)	Options to display in the combo box. See *Combo box* control style above for an example.	

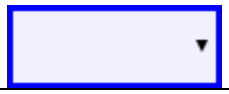
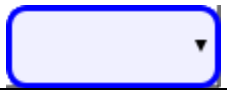
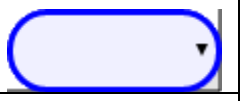
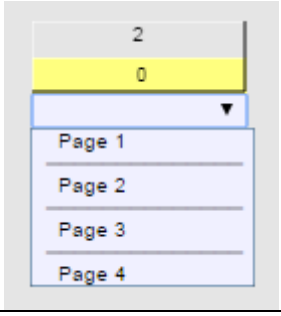
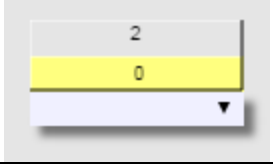
Available Pages	Pages available inside the Kiosk2Go block.
Selected Pages	Pages selected to be displayed in the page selection combo box in Kiosk2Go.
Add	Adds the selected pages to the Selected Pages list.
Remove	Removes the selected pages from the Selected Pages list.
Up	Moves the selected pages up towards the top of the Selected Pages list.
Down	Moves the selected pages down towards the bottom of the Selected Pages list.
Flip default meter orientation	Changes the meter style from a vertical meter (default) to a horizontal meter.
Show gain labels	Displays labels at the side of the meter to indicate the values the meter is showing.
Labels	Labels to show at the side of the meter to indicate the scale. Each label must be separated by a colon (:). Default setting: 35:20:10:4:0:-2:-6:-10:-15:-25:-35
Font Size	Text font size used on the control.
Scale to fit	Scales down large text so that it fits into the control.
Transparent background	Makes the region behind the text transparent.
Alert Text	Text to display on the control when the value of the control is 1.
Drawing Style	
Color	The color of the control when it is switched on. Click the color sample, then choose a color from the color palette.
Draw Border	Draws a raised border around the control.
Gesture	
Control Accepts User Input	Allows the user to change the value of the control by gesturing it with the mouse, or hovering over the control and typing a value.

Size	
Automatically Size	The control will be drawn at its default size.
Width	The width of the control in pixels.
Height	The height of the control in pixels.
Text Box	
None	Hides the text box on the control.
(Position)	Displays a text box on the control at the specified position.

Style

Drawing Style	
Color	The color of the control when it is switched on. Click the color sample, then choose a color from the color palette.
Draw Border	Draws a raised border around the control.
Gesture	
Control Accepts User Input	Allows the user to change the value of the control by gesturing it with the mouse, or hovering over the control and typing a value.
Size	
Automatically Size	The control will be drawn at its default size.
Width	The width of the control in pixels.
Height	The height of the control in pixels.
Text Box	
None	Hides the text box on the control.
(Position)	Displays a text box on the control at the specified position.
Advanced Styles (For combo box controls. Available via the Configure button.)	
Font Name	The name of the font used to render the items in the combo box list.

<table>
<tr><td>Font Size</td><td>The size in points of the font used to render the items in the combo box list.</td></tr>
<tr><td>Text Color</td><td>The color of the text shown in the combo box list.</td></tr>
<tr><td>Background Color</td><td>The color shown behind the combo box. The same color is shown behind the list when it is open or closed.</td></tr>
<tr><td>Border Width</td><td>The width of the border around the edge of the combo box when it is closed.</td></tr>
<tr><td>Border Color</td><td>The color of the border around the edge of the combo box when it is closed.</td></tr>
<tr><td>Corner Radius</td><td>The radius of the curve of the border displayed around the edge of the combo box.

A larger number produces a rounder look for the corners. A smaller number produces a sharper look. Some examples are shown below.
<table>
<tr><td>0</td><td>10</td><td>20</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
</table></td></tr>
<tr><td>Justify</td><td>Specifies the alignment for the list entries: Left, Center or Right.</td></tr>
<tr><td>Separators</td><td>When selected, horizontal lines are shown between each of the options in the list.
 
</td></tr>
<tr><td>Drop Shadow</td><td>When selected, adds a drop shadow to the combo box.
 
</td></tr>
</table>

Label

None	Do not display a label on the device.	
(Position)	Top, Bottom, Left, Right	Displays a label at the specified position.
	Stack	Displays a label at the top of the control, wrapping the text if required.
(text box)	The text for the label.	
Horizontal Alignment	Aligns the label with the left, center or right of the control.	
Vertical Alignment	Aligns the label with the top, center or bottom of the control.	
Draw Border	Displays a border around the edge of the label.	
Hover Text	Tooltip text to display when the mouse is over the label.	
Style - for buttons only		
Font	The name of the font to use for the label text. **Note:** If you are intending to use this control in Kiosk2Go, it is important to check that the selected font is supported in the browser(s) you will be using.	
Text Size	The size of the font in points.	
Color	The color of the font text. Click the color sample to select a new color.	

Help

Help Text	Help text for the Kiosk2Go control, or a reference to help text in an external file. If you want to store the help text with the control properties, just type the text directly into the Help Text box. If you want to reference help text in an external file, type the help ID in the format *#helpID*. For more information, see *Adding context sensitive help to a*

	Kiosk2Go control in the *NWare User Guide*. When you are running Kiosk2Go, click/tap the  button to change it to  , and then click/tap the control to display the help. **Note:** NWare: Kiosk does not support help tooltips – only Kiosk2Go.

Wiring

Control Wiring	Enable master wiring mode	When this control is wired to a slave control, the slave will track this control as it is gestured.
	Enable peer wiring mode	When this control is wired to another peer control, the controls will track each other as they are gestured.
	Enable slave wiring mode	When this control is wired to a master control it will track the value of the master control as it is gestured.
Control Alias	The name to use when referring to the control from an external protocol, like RATC or PASHA. If you are editing a control inside a Kiosk2Go block, the alias will be specified automatically. **Note:** When you specify an alias, NWare will check to see if that alias is already in use by another control. If it is, a warning will be displayed. If you click *Yes*, the control alias will be moved over from the old control to the new control. If you click *No*, the alias will not be moved. If you want to control multiple controls using the same alias, assign the alias to one of the controls and then use control wiring to connect them together in the project.	

Latching Light

Purpose

The Latching Light device has an LED on the control surface that is lit when an input is detected on one of the input wiring nodes. The LED stays lit until the Reset button is clicked.

The LED on the device is suitable for use as a warning light, as unlike a regular LED, it stays lit until the latch is reset, even if there is no longer a signal any of the input connectors.

Device Properties

Number of Inputs	The number of inputs to device. A signal on any of the inputs will light the LED.

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

State	Lit (red) when a signal is detected on one of the input wiring nodes. The LED remains lit until the Reset button is clicked.
Reset	Switches off the LED.

Logger

Purpose

The Logger device allows you to manually or automatically write entries to the log stored on the node hosting the project.

The device can accept input from one or more devices. When the value received on an input node changes, an entry is automatically written to the log.

Tip: To try out the device, you can add a Generic Control of type *string* to your design, change the wiring mode to *master*, and then wire it to one of the input connectors on the Logger device. When you specify a string on the control surface of the Generic Control, it will be passed to the Logger device and written to the log.

The format of the log entry is controlled by the *Format* field on the device properties. You can specify a format manually, or leave this setting blank and NWare will generate a log entry in the format: `The value is <input_1>`, where <*input_1*> is the value received on input node number 1 on the device block.

Device properties

Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.
	 NWare will decide which role this device belongs to.
	 The user will specify a role manually.
	 Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.
Input Ports	The number of input nodes to display on the device block. When the Log button on the control surface is clicked or any of the values received on the input nodes changes, an entry is written to the log. The format of the entry is controlled by the Format field.
Severity (optional)	The severity of the log entry, e.g. warning or fault.
Format (optional)	The default format of string values that will be written to the

	log. If you want the value received on input node 3 to be written to the log, for example, you can specify this string:
	`Value received on third input node is <input_3>`
	If this field is left blank, the following string is written to the log:
	`The value is <input_1>`
	The value received on the first input node of the Logger device is substituted for <*input_1*>.

Controls

Log	When clicked, writes the text shown in the Format field to the log.
Severity	The severity of the log entry.
Format	The format of string values that will be written to the log. If you want the value received on input node 3 to be written to the log, for example, you can specify this string: `Value received on third input node is <input_3>`

Logic Function

Purpose

The Control Operator allows you to set up mathematical and logical expressions between controls efficiently without using Python scripting.

A Control Operator can perform a number of built-in control processing operations, which are selected in its device properties. Some possible operations include: position link, string link, value link, value maximum, value average, position compare, logical OR, and many others.

Inputs and Outputs

- 1 input (default)
- 1 output (default)

With most of the operators, only the first output will receive the control. For others, it goes out all or the same value is sent through all, depending on the specific operator.

Operators

	Control Operation	Inputs	Outputs	Description
	Invert Position	1	1	Output position is the reverse of the input position. Since the position has a range of 0 to 1, the output position is 1 minus the position of the input.
	Negate Value	1	1	Output value is the negative of the input value. **Note:** The output control value will be clamped to remain in range if necessary.
	Absolute Value	1	1	Output value is the absolute value of the input value. Clamping of the output control value may occur.
	Threshold	1	1	Output position is 1 if the input position is greater than 0.5, 0 otherwise.
	Hysteresis	1	1	Output position is either 0 or 1, based on the input position using a threshold with hysteresis. A high output will go low when the input position falls below 0.3; a low output will go high when the input position rises above 0.7. If used with a noisy input, cleans up the signal. If it's a low signal, it has to go to 75% to go high, it then needs to go about 25% to go low.
	Toggle on Rising Edge	1	1	Using a threshold with hysteresis detector as described above, the output position toggles between 0 and 1 on each rising edge of the input.
	Toggle on Falling Edge	1	1	Using a threshold with hysteresis detector as described above, the output position toggles between 0 and 1 on each falling edge of the input.
	Value Sum	>= 2	1	Output value is the sum of the values of all inputs. Clamping may occur if the range of the output control is insufficient.

	Control Operation	Inputs	Outputs	Description
	Value Product	>= 2	1	Output value is the product of the values of all inputs. Clamping may occur.
	Value Average	>= 2	1	Output value is the average of the values of all inputs.
	Value Minimum	>= 2	1	Output value is the minimum of the values of all inputs.
	Value Maximum	>= 2	1	Output value is the maximum of the values of all inputs.
	Value Compare	2	1	Output position is 1 if the value of the first input is greater than or equal to value of the second input, 0 otherwise.
	Value Link	1	1	Output value is the input value.
	Position Sum	>= 2	1	Output position is the sum of the positions of all inputs. If the sum exceeds 1, it will be clamped to 1.
	Position Product	>= 2	1	Output position is the product of the position of all inputs.
	Position Average	>= 2	1	Output position is the average of the positions of all inputs.
	Position Minimum	>= 2	1	Output position is the minimum of the positions of all inputs.
	Position Maximum	>= 2	1	Output position is the maximum of the positions of all inputs.
	Position Compare	2	1	Output position is 1 if the position of the first input is greater than or equal to the position of the second input, 0 otherwise.
	Position Link	1	1	Output position is position of input.
				For the following 6 logi the value True if the inp
	Logical AND	>= 2	1	Output position is the logical AND of the Boolean values of the inputs.

	Control Operation	Inputs	Outputs	Description
	Logical NAND	>= 2	1	Output position is the logical NAND of the Boolean values of the inputs. NAND stands for NOT AND, or the complement of the output of an AND operator.
	Logical OR	>= 2	1	Output position is the logical OR of the Boolean values of the inputs.
	Logical NOR	>= 2	1	Output position is the logical NOR of the Boolean values of the inputs. NOR stands for NOT OR, or the complement of the output of an OR operator.
	Logical XOR	>= 2	1	Output position is the logical XOR of the Boolean values of the inputs. For more than 2 inputs, XOR is defined as True if an odd number of inputs are True, False otherwise.
	Logical NOT XOR	>= 2	1	Output position is the compliment of the logical XOR of the Boolean values of the inputs.
	String Link	1	1	Output string is a copy of the input string.
	Multiplexer	2 to 31	1	The input positions are treated as Booleans by comparing to 0.5. The Booleans are treated as the bits of a binary word, with the first input the least significant bit position. The output value is the value of this binary word.
	Demultiplexer	2 to 31		The input value is treated as a binary word. Each output position is set to either 0 or 1 based on a bit of that word. The first output is the least significant bit. This is the exact complement to the multiplexer.

Preset - Global

Purpose

The Global preset device allows you to save and restore the current settings of all controls in the project.

Note: Each project has a single set of global data to which the Global preset has access. If you add a second Global preset device to your project, it will access exactly the same data as the first Global preset device. It is not possible to keep multiple sets of global data.

Tip: If you want to save and restore settings for a small number of controls, we recommend that you use the *Snapshot* (on page 264) device.

Device properties

Preset name	The name of the preset.
Dataset count	The number of datasets to make available for saving control settings in the project. A column of settings for each dataset will be added to the control surface.
Advanced	
Define the preset domain	When selected, indicates that the device is a subpreset. When cleared, indicates that the device is a global preset.
Include dataset zero	When selected, settings for an extra dataset called *dataset 0* will be added to the control surface. Dataset zero stores the default settings for each control. These settings are configured automatically by NWare when the project is deployed for the first time. When the user subsequently adjusts control settings when they are connected to the project, the changes can be saved as the new defaults or ignored. **Note:** If you connect to the project using NWare, you can choose whether to save new defaults. If you connect using Kiosk, the latest settings are automatically saved as the defaults.

Controls

Dataset	The number of the dataset. Each dataset stores the settings for a group of controls in the project. A preset file can contain several datasets. If the **include dataset zero** check box is selected on the device properties, an extra dataset, called *dataset 0*, is added to the list of available datasets.
Loaded	Lit (green) when the dataset has loaded and the controls have been assigned values.
Loading	Lit (green) when the dataset is loading.
Saved	Lit (red) when the settings of the controls have been saved in the dataset.
Saving	Lit (red) when the dataset is being saved to the preset file. When there is a large number of controls in the dataset, the save operation can take several seconds to complete.
Idle	Lit (blue) when the dataset is not in use – another dataset is being used.
Missing	Lit (yellow) if no preset file has been found. You must save a dataset before you can load it.
Error	Lit (yellow) if an error has occurred. During a load operation, this could occur because some controls specified in the dataset no longer exist in the preset file. This typically is the result of devices being replaced or deleted without resaving the dataset. During a save operation, this could occur cause because: ▪ A preset file could not be written to during the save operation. ▪ There is no available disk space for saving the preset file.
Load	Click to load the dataset from the preset file. If the load is successful, all the controls in the project are set to the values specified by the dataset.
Save	Click to save the current control settings to the dataset in the preset file.

Preset - Snapshot

Purpose

The Snapshot device allows you to save and restore the settings of controls that are wired directly to the Snapshot device.

The device displays the values that are stored for the controls wired to the input nodes. This means you will know exactly what value will be assigned to a particular control when you load values from the snapshot. When you use a Global Preset device or a Subpreset device, however, you will not be able to see the values that will be loaded.

Tip: A Snapshot device is useful for quickly assigning stored values to a small number of controls in the project. If you want to assign values to a large number of controls, we recommend that you use a *Global* (on page 262) Preset device or a *Subpreset* (on page 266) device.

Device properties

Type	String	The control value passed to the Snapshot device will be stored as a string. If you wire a boolean device to the Snapshot device, 0 and 1 will be stored as *true* and *false*. **Tip:** We recommend using this setting for most situations where Snapshot devices are used.
	Value	The control value passed to the Snapshot device will be stored as a decimal value. If you wire a control knob configured with an integer range of 0 to 20 to the Snapshot device, values on this scale will be stored.
	Position	A value in the range 0 to 1 will be stored. This represents the control position as a percentage of the maximum or *fully-on* position. For example, if the control is turned halfway towards the maximum setting, a value of 0.5 is stored, i.e. 50%. This setting is designed to work with generic controls that have been set up with the **Type of control(s)** property on

		the device properties set to **position**.
Number of Controls	The number of controls that will supply settings to the Snapshot device. The current settings of these controls will be stored by the Snapshot device. The maximum number of controls you can wire to the Snapshot device is 256.	
Number of Banks	The number of banks to make available for saving control settings in the project. A column of settings for each bank will be added to the control surface. The maximum number of banks is 64.	

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Bank	The number of the bank. Each bank stores the settings for a group of controls wired to the Snapshot device.
Active	Lit (blue) when an input value has just been loaded from the bank or saved to the bank.
Load	Click to load the saved bank settings. If the load is successful, the Active LED will be lit (blue) and the controls wired to the Snapshot device will be set to the values specified by the bank.
Save	Click to save the current control settings to the bank.

1..n	The values of the settings stored in each bank.

Preset - Subdomain

Purpose

The sub preset device allows you to save and restore the current settings of all controls in the block containing the Sub Preset device.

Tip: If you want to save and restore settings for a small number of controls, we recommend that you use the *Snapshot* (on page 264) device.

Device properties

Preset name	The name of the preset.
Dataset count	The number of datasets to make available for saving control settings in the project. A column of settings for each dataset will be added to the control surface.
Advanced	
Define the preset domain	When selected, indicates that the device is a subpreset. When cleared, indicates that the device is a global preset.
Include dataset zero	When selected, settings for an extra dataset called *dataset 0* will be added to the control surface. Dataset zero stores the default settings for each control. These settings are configured automatically by NWare when the project is deployed for the first time. When the user subsequently adjusts control settings when they are connected to the project, the changes can be saved as the new defaults or ignored. **Note:** If you connect to the project using NWare, you can choose whether to save new defaults. If you connect using Kiosk, the latest settings are automatically saved as the defaults.

Controls

Dataset	The number of the dataset. Each dataset stores the settings for a

	group of controls in the project. A preset file can contain several datasets. If the **include dataset zero** check box is selected on the device properties, an extra dataset, called *dataset 0*, is added to the list of available datasets.
Loaded	Lit (green) when the dataset has loaded and the controls have been assigned values.
Loading	Lit (green) when the dataset is loading.
Saved	Lit (red) when the settings of the controls have been saved in the dataset.
Saving	Lit (red) when the dataset is being saved to the preset file. When there is a large number of controls in the dataset, the save operation can take several seconds to complete.
Idle	Lit (blue) when the dataset is not in use – another dataset is being used.
Missing	Lit (yellow) if no preset file has been found. You must save a dataset before you can load it.
Error	Lit (yellow) if an error has occurred. During a load operation, this could occur because some controls specified in the dataset no longer exist in the preset file. This typically is the result of devices being replaced or deleted without resaving the dataset. During a save operation, this could occur cause because: ▪ A preset file could not be written to during the save operation. ▪ There is no available disk space for saving the preset file.
Load	Click to load the dataset from the preset file. If the load is successful, all the controls in the project are set to the values specified by the dataset.
Save	Click to save the current control settings to the dataset in the preset file.

Python Script - Live

Purpose

The Live Python device allows you to add Python scripts to your project as string control values, rather than creating individual functions on the Script tab. The main benefits are:

- Live editing of scripts at run-time without redeploying the project.

- Copying and pasting of scripts between projects instead of having to export and then import scripts.

The device has an editor icon  on its control surface. Once you have emulated or deployed the project, you can double-click this icon to edit the script in an external editor.

When scripts are stored in Live Python devices, they are encrypted. If you place a Live Python device on a locked page, users who do not have the required access rights will not be able to view the script, either by clicking the editor icon or by viewing the project or plugin file.

Notes:

- Before you can type in or paste in script to the device, you must emulate or deploy the project.
- As Live Python devices allow live editing of script, making manual changes to script when a project is deployed and running must be done with caution, as a change could stop the project from functioning.

Tips:

- If you would like to use a different editor to the default one, on the **Tools** menu, click **User Preferences**, and then specify the path to the new editor in the **Path** box.
- You can automatically update the script in a Live Python device by wiring a Preset to the input node.

For information on writing Python scripts, refer to the Python Developer's Guide.

Device Properties

Input count	The number of input connector nodes for passing values to the script. The valid range is 1 to 256.	
Output count	The number of output connector nodes. The valid range is 1 to 256.	
Watch input	Any	If the values of any of the inputs change, the Python script will be run.
	First	If the value of the first input changes, the Python script will be run.
	Last	If the value of the last input changes, the Python script will be run.
Threaded	When selected, the script will run in its own thread when the device is triggered. Using threads allows multiple scripts to be run simultaneously. If you leave this option cleared, only the script configured for	

	this device will run when it is triggered. Other scripts cannot run simultaneously, even when they are triggered.
Advanced properties	
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.
	 NWare will decide which role this device belongs to.
	 The user will specify a role manually.
	 Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

	When double-clicked, opens the Python script editor. **Note:** Before you can type in or paste in script to the device, you must emulate or deploy the project.
Message	Displays any messages that are included in the code. If there are no messages in the script, this field will be blank.
Error	Displays an error message when a fault occurs in the script.

Python Script - Referenced

Control Scripter

Purpose

The Control Scripter is a control processing device, like the *Control Operator* (on page 258). It allows you to apply a Python script to the output control(s) based on the value of the input control(s).

The Python scripts must be written before they can be used in this device. You can create or import Python scripts using the Script tab on the Utility Frame. For more information, refer to the Python Developer's Guide.

Note: The use of global variables in Python scripting is possible, but is not recommended.

You can select a function name on the device properties of the Control Scripter to assign a Python Script to the device. The number of input and output wiring nodes can also be specified. When the project is deployed, the script begins processing. It runs in a loop, unless the *threaded* option is selected on the device properties.

Tip: You can set the device to watch the inputs; this will trigger the script anytime an input value changes. If you wire a *Blinking Light* (on page 235) device to one of the inputs, it can trigger the Control Scripter regularly after a specified interval.

Device properties

Function name	The Python script function that will be run when one of the inputs on the device is triggered.	
Input count	The number of input connector nodes for passing values to the script. The valid range is 1 to 256.	
Output count	The number of output connector nodes. The valid range is 1 to 256.	
Watch input	Any	If the values of any of the inputs change, the Python script will be run.
	First	If the value of the first input changes, the Python script will be run.
	Last	If the value of the last input changes, the Python script will be run.
Threaded	When selected, the script will run in its own thread when the device is triggered. Using threads allows multiple scripts to be run simultaneously. If you leave this option cleared, only the script configured for this device will run when it is triggered. Other scripts cannot run simultaneously, even when they are triggered.	
Advanced properties		

Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Message	Displays any messages that are included in the code. If there are no messages in the script, this field will be blank.
Error	Displays an error message when a fault occurs in the script.

Schedule Generator

Purpose

The Schedule Generator device allows you to specify configuration settings for triggering events automatically. The settings are stored in a *custom match string*, which can then be passed automatically to a *Scheduler* (on page 273) device by wiring it to the Schedule Generator.

Tip: The control surface of the Schedule Generator features a variety of different configuration options for creating custom match strings, but you can also manually amend the custom match string to make changes to the schedule settings.

Device Properties

Advanced properties

Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the button to change it to the button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Schedule	The details of a schedule, referred to as a *custom match string*. This string is generated automatically when you choose the settings for the schedule using the on screen options. The string is designed to be transferred to a Scheduler device by wiring the output node of the Schedule Generator to the input node of the Scheduler.

hourly	Click to specify an hourly schedule.
x minutes after the hour	The number of minutes past the hour that the event will be triggered.
Every Hour	The event will be triggered every hour.
Working Hours (8am-6pm)	The event will be triggered every hour from 8am until 6pm, but not outside these hours.
Every x Hours	The event will be triggered at the specified hourly interval.

daily	Click to specify a daily schedule.
<hour>:<minute> <AM/PM>	The time at which the event will be triggered.

Every Day	The event will be triggered every day of the week.
Week Days	The event will be triggered on weekdays only (Monday-Friday).
Every x Days	The event will be triggered at the specified daily interval.

weekly	Click to specify a weekly schedule.
<hour>:<minute> <AM/PM>	The time at which the event will be triggered.
Every x weeks on	The event will be triggered at the specified weekly interval.

monthly	Click to specify a monthly schedule.
<hour>:<minute> <AM/PM>	The time at which the event will be triggered.
Day	The day of the month on which the event will be triggered.
The <occurrence> <day>	The event will be triggered on the specified occurrence of the specified day. For example, *2nd Sunday* will mean the event will be triggered on the second Sunday of every month.
in <month>	The month of the year in which the event will be triggered.

once	Click to specify a one-off schedule.
<hour>:<minute> <AM/PM>	The time at which the event will be triggered.
<month> <day> <year>	The date on which the event will be triggered.
<hour>:<minute> <AM/PM>	The time at which the event will be triggered.

Scheduler

Purpose

The Scheduler triggers events automatically at specified times. The settings for the schedule are stored in a custom match string, which can be specified manually or created using the *Schedule Generator* (on page 271) device.

When an event is triggered, the following occurs:

1. The device wired to the **start** output wiring node on the Scheduler block is triggered.
2. The **state** LED is lit for the length of time specified in the **Duration** setting.
3. The **state** LED is unlit.
4. The device wired to the **stop** output wiring node is triggered.

You can manually trigger devices by clicking the trigger button.

You can clear the triggered state by clicking the clear button. When this is done, the State LED will be unlit.

Note: Before using the Scheduler in an installation, it is important to check that the time and date are correctly specified on the node that will host the project. If the settings are inaccurate, tasks may not be performed at the expected times. For information on setting the time and date, refer to the hardware manual for the type of node you are using.

Device Properties

Advanced properties		
Role assign	The role that this device belongs to. Devices in your design are allocated to roles (either manually, or automatically by NWare). Roles are then assigned to MediaMatrix hardware devices for processing during deployment. You can manually assign a device to a role by clicking the  button to change it to the  button, and then selecting a role name in the list.	
		NWare will decide which role this device belongs to.
		The user will specify a role manually.
		Multiple devices have been selected for assignment to a role; some of the devices have already been assigned to a role manually and others have not.

Controls

Config String	Specifies when and how often events are triggered. The Config String consists of a series of space-delimited *matches*. Each match is in the form `unit:spec1,spec2,spec3`, etc. The unit specifies the unit of measurement for the time, e.g. hourly. The spec defines the duration, e.g. 7, so that specifies

<table>
<tr><td></td><td>every seven hours.

Specifying * as a spec will match every number. Using the form <code>/n+m</code> will match when <code>(value+m)%n = 0</code>.
<table>
<tr><th>Unit</th><th>Meaning</th></tr>
<tr><td>yr</td><td>The year minus 1900.

For example, 2004 is represented by 104.</td></tr>
<tr><td>mo</td><td>The month (January = 0).</td></tr>
<tr><td>wy</td><td>Week number in the year (1-51).</td></tr>
<tr><td>wm</td><td>Weekday number in the month. For example, <code>wm:5 dw:0</code> means the 5th Sunday in the month.</td></tr>
<tr><td>dw</td><td>Day of the week (Sunday = 0).</td></tr>
<tr><td>dm</td><td>Day of the month.</td></tr>
<tr><td>dy</td><td>Day of the year.</td></tr>
<tr><td>hr</td><td>Hour.</td></tr>
<tr><td>mn</td><td>Minute.</td></tr>
<tr><th colspan="2">Examples</th></tr>
<tr><td>mn:32 hr:9</td><td>Every day at 9:32 AM.</td></tr>
<tr><td>mn:/15</td><td>Every 15 minutes (at 0, 15, 30, and 45 minutes after the hour).</td></tr>
<tr><td>mn:/15+4</td><td>Every 15 minutes (at 11, 26, 41, and 56 minutes after the hour - when clock minutes+4 is a multiple of 15).</td></tr>
<tr><td>dm:15 mo:8 mn:32 hr:9</td><td>Once a year at 9:32 AM on September 16th.</td></tr>
<tr><td>dw:1,2,3,4,5 mn:32 hr:9</td><td>Every weekday at 9:32 AM.</td></tr>
</table></td></tr>
<tr><td>state</td><td>Lit (red) when an event is triggered. The LED stays lit for the length of time specified by the Duration setting.</td></tr>
<tr><td>trigger</td><td>When clicked, triggers the device wired to the start output wiring node.</td></tr>
<tr><td>clear</td><td>Clears the triggered state.</td></tr>
</table>

Duration	The time that the device will remain in the triggered state.

Chapter 4
Plugins

In This Chapter

Purpose

Plugins store collections of devices from your designs. By creating a series of plugins you can reuse and share custom functionality with other users.

Here are some things you can do with plugins:

- Customize devices to always appear the way you want, with the default values you want.
- Build, reuse, and distribute your own custom design elements and title blocks.
- Create devices to control other products.
- Distribute, either freely or for money, the devices you create.

Plugins can store devices that perform signal processing and control tasks, and can also include images and Python scripts created using the Live Python device.

Notes:

- Plugins cannot include preset datasets, audio .wav files or Python scripts that are not part of Live Python devices.
- In order to create a plugin, Edit mode must be selected. You can switch to this mode by clicking the Edit button  on the toolbar.

For information on adding your own plugins to the device tree, see *Storing and reusing devices using plugins* in the *NWare User Guide*.

nWall

Purpose

The nWall devices allow you to control and monitor different nWall models installed on a CobraNet network. There is a device for each variant of the nWall (0.2, 1.1 and 2.0), and one for the predecessor to the nWall 2.0 (labeled simply *nWall*).

An nWall device requires the IP address of the nWall that it will monitor on the network. When a connection is made to the device, the *Link* LED is lit (green). Once a connection has been made, you can specify a bundle number for transmission or reception of audio via the CobraNet network.

Notes:

- The NWare nWall device requires an nControl or nTouch 180 to function, but you can still use an nWall to pass audio on the CobraNet network without one of these devices. You will need to configure the nWall using CobraNet discovery. For more information, see Using CobraNet Discovery (Disco) in the NWare User Guide.
- Before you can contact an nWall using NWare, it must be assigned an IP address. For more information, see *Adding the nWall device and assigning an IP address and bundle number* in the *NWare User Guide*.

The devices have an input wiring node, which allows an IP address to be passed from another device to the IP address box on the nWall control surface. You can use an Agent Discovery device to discover the nWall on the network using its *Sys Name* property, for example, and then pass the IP address of the nWall over to the nWall device using the input wiring node.

For information on installing an nWall, refer to the *nWall Hardware Manual*.

Controls

IP address	The IP address of the device you want to contact. This value can be edited.
Link	Lit (green) when a link is established between NWare and the device across the network.
Bundle	The bundle number that the nWall will use to transmit or receive audio via the CobraNet network. Each bundle can manage between 1 and 8 channels. The range is 0 to 65,535 (0 is off). For multicast bundles, the number must be in the range 1 to 255. For unicast bundles, the number must be in the range 256 to 65,279. Numbers in the range 65280 to 65535 are reserved and cannot be used.
	For an nWall 0.2, the bundle will contain two output channels: ▪ The line output for the first XLR connector and first mini-jack. ▪ The line output for the second XLR connector and second mini-jack.
	For an nWall 1.1, two bundle numbers are used. When the device is transmitting audio onto the network, the two channels inside the transmitter bundle contain two *separate* audio streams: ▪ audio from the mini-jack on channel 1. ▪ audio from the XLR connector on channel 2. When the device is receiving audio from the network, the two channels of audio inside the receiver bundle are used as follows: ▪ The mini-jack receives audio from channel 1. ▪ The XLR connector receives audio from channel 2.
	For an nWall 2.0, the bundle will contain two input channels: ▪ The mic input from the first XLR connector summed with the line input from the first mini-jack. ▪ The mic input from the second XLR connector summed with the line input from the second mini-jack.
Transmitting	Lit (green) when the nWall is transmitting audio data onto the CobraNet network, and another device is receiving the audio stream.

Receiving	Lit (green) when the nWall is receiving audio data from the CobraNet network.

Device Properties

audio input count	The number audio input wiring nodes.
audio output count	The number of audio output wiring nodes.
control input count	The number of control input wiring nodes.
control output count	The number of control output wiring nodes.
Create Control Page	When selected, adds a control page to the block. You can drag devices to this page and wire them to the input and output wiring nodes.

Advanced properties	
Create Schematic Page	When selected, adds a schematic page to the block. You can drag devices to this page and wire them to the input and output wiring nodes.

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