

NetLinx Control Cards and NetModules

NetLinx Control Cards can be installed in either the NXF CardFrame, NI-4000, or NetModules. This document provides basic specifications and wiring information for the NetLinx Control cards. For detailed information on the cards, refer to the *NetLinx CardFrame, Control Cards, and NetModules Instruction Manual* found on-line at www.amx.com.

NXC-VOL4 Volume Control Card

The NXC-VOL4 Volume Control Card provides four discrete volume control channels with LED feedback. The volume control channels can be programmed for mono or stereo operation, and balanced or unbalanced audio connections. It supports programmable audio levels, audio mute, variable ramp speeds and preset levels. Use the on-board jumpers to set the gain/attenuation (Unity, Pro level (+4dBu) to Consumer level (-10dBu) conversion, or Consumer level to Pro level on each channel).

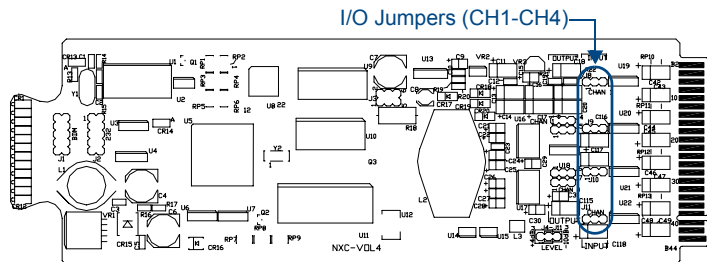


FIG. 1 NXC-VOL4 Volume Control card

Specifications:

NXC-VOL4 Specifications	
Power Requirements	197 mA @ 12 VDC
Volume 1-4	Four volume channels
Status 1-4 (3 LEDs per channel)	Yellow LED shows level-up/down activity. Red LED shows mute mode: <ul style="list-style-type: none"> LED 1: Channel 1 RAISE (yellow) LED 2: Channel 1 LOWER (yellow) LED 3: Channel 1 MUTE (red) LED 4: Channel 2 RAISE (yellow) LED 5: Channel 2 LOWER (yellow) LED 6: Channel 2 MUTE (red) LED 7: Channel 3 RAISE (yellow) LED 8: Channel 3 LOWER (yellow) LED 9: Channel 3 MUTE (red) LED 10: Channel 4 RAISE (yellow) LED 11: Channel 4 LOWER (yellow) LED 12: Channel 4 MUTE (red)
Gain jumpers 1-4	<ul style="list-style-type: none"> Unity Maximum Input Level: +10dBm Pro level to Consumer level conversion (attenuation of +4dBu IN to -10dBu OUT) Maximum Input Level: +10dBm Consumer level to Pro level conversion (gain of -10dBu IN to +4dBu OUT) Maximum Input Level: +6dBm
Connections/wiring	Two 10-pin 3.5 mm captive-screw terminals
Audio Specifications	<ul style="list-style-type: none"> Frequency response of 15 Hz - 25 KHz THD less than .005% at nominal output level S/N ratio greater than 100 dB (IHF A) Crosstalk less than 80 dB Logarithmic attenuation range of 95 dB
Models	<ul style="list-style-type: none"> NXC-VOL4 Volume Card NXM-VOL4 Volume NetModule

Pinouts, Signals, and Functions:

NXC-VOL4 Pinouts, Signals, and Functions			
Pin	Signal	Balanced Function	Unbalanced Function
Channel 1			
1	GND	Audio GND	Audio GND
2	Input 1+	Audio IN	Audio IN (jumper)
3	Input 1-	Audio IN	Audio GND (jumper)
4	Output 1+	Audio OUT	Audio OUT
5	Output 1-	Audio OUT	no connection
Channel 2			
6	GND	Audio GND	Audio GND (jumper)
7	Input 2+	Audio IN	Audio IN (jumper)
8	Input 2-	Audio IN	Audio GND (jumper)
9	Output 2+	Audio OUT	Audio OUT
10	Output 2-	Audio OUT	no connection
Channel 3			
11	GND	Audio GND	Audio GND (jumper)
12	Input 3+	Audio IN	Audio IN (jumper)
13	Input 3-	Audio IN	Audio GND (jumper)
14	Output 3+	Audio OUT	Audio OUT
15	Output 3-	Audio OUT	no connection
Channel 4			
16	GND	Audio GND	Audio GND (jumper)
17	Input 4+	Audio IN	Audio IN (jumper)
18	Input 4-	Audio IN	Audio GND (jumper)
19	Output 4+	Audio OUT	Audio OUT
20	Output 4-	Audio OUT	no connection

NXC-VOL4 Connections/Wiring:

The NXC-VOL4 card contains four audio volume control channels. Each line-level channel is isolated from system ground and can be configured for balanced or unbalanced line operation. It supports programmable audio levels, audio mute, variable ramp speeds, and preset levels. Each audio channel's input to output gain ratio is adjustable via the on-board jumpers shown below.

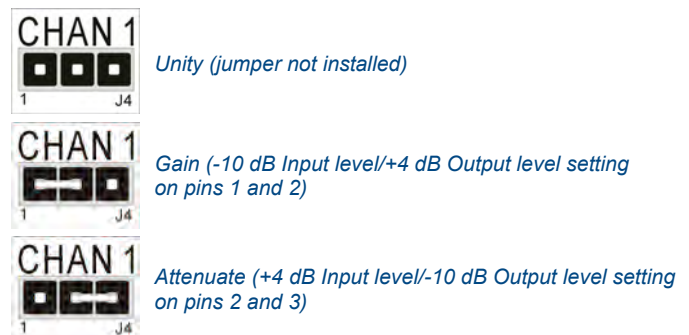


FIG. 2 NXC-VOL4 Volume Control card

NXC-VOL4 Channel Assignments:

The NXC- VOL4 has 2 ports with 2 audio "channels" in each port. The two audio "channels", which can be used as right and left, should not be confused with the *channel assignments* channels, which are sent to and from the card.

NXC-VOL4 Channel Assignments (per port)		
Port 1 Channel:	Port 2 Channel:	Description
1	1	While channel is on, ramps the volume on audio channels 1, 2 up (increase).
2	2	While channel is on, ramps the volume on audio channels 1 and 2 down (decrease).
3	3	While channel is on, the volume on audio channels 1 and 2 are muted (lowest volume), and when channel is turned off the volume levels are restored to their previous levels.
4	4	While channel is on, ramps the volume on audio channel 1 up (increase).
5	5	While channel is on, ramps the volume on audio channel 1 down (decrease).
6	6	While channel is on, the volume on audio channel 1 is muted (lowest volume), and when channel is turned off the volume level is restored.
7	7	While channel is on, ramps the volume for audio channel 2 up (increase).
8	8	While channel is on, ramps the volume for audio channel 2 down (decrease).
9	9	While channel is on, volume for audio channel 2 is muted (lowest volume), and when channel is turned off the volume level is restored.

Ramping a volume channel while the mute channel is on will not automatically turn off the mute channel but the ramping will still occur, and the volume change will be noticed when the mute channel is turned off.

For setting ramp rates and presets, refer to the Send_Commands. For reading current volume levels and displaying bargraphs see CREATE_LEVEL and SEND_LEVEL programming instructions. Volume (audio) channels 1 and 2 use levels 1 and 2 respectively.

Note: When controlling levels, such as with an active bargraph, there is no LED indication of volume changes.

NXC-VOL4 Levels:

Volume (audio) channels 1 and 2 use levels 1 and 2 respectively. For reading current volume levels and displaying bargraphs see CREATE_LEVEL and SEND_LEVEL. The two levels associated with each port of the NXC-VOL4 Control Card are listed in the table below:

NXC-VOL4 Levels			
Port 1		Port 2	
Level	Description	Level	Description
1	Output #1	1	Output #3
2	Output #2	2	Output #4

CREATE_LEVEL

This keyword creates an association between a specified level of a device and a variable that will contain the value of the level. This can only appear in the DEFINE_START section of the program.

```
CREATE_LEVEL DEV, Level, Value
```

Parameters:

- DEV: The device from which to read the level.
- Level: The level of the device to read.
- Value: Variable in which to store the level value.
- DevLev: A DEVLEV structure.
- Value: Variable in which to store the level value CREATE_LEVEL DevLev, Value.

During execution of the program, NetLinx continuously updates the variable to match the level that it represents.

SEND_LEVEL

This keyword sends a value to a specific level on a NetLinx device/port. The syntax follows any one of the four following examples:

```
SEND_LEVEL DEV, Level, Value
SEND_LEVEL DEV[ ], Level, Value
SEND_LEVEL DEVLEV, Value
SEND_LEVEL DEVLEV[ ], Value
```

Parameters:

- DEV: Device containing the specified level
- Level: Number of the level to receive the new value
- Value: New level value
- DEV[]: Device array (each device contains the specified level)
- DEVLEV: Device-level to receive the new value
- DL[]: Device-level array (each will receive the new value)

Programming Information:

These NetLinx Send_Commands control the NXC-VOL4.

NXC-VOL4 Send_Commands	
<p>PL</p> <p>Ramps specified (audio) channel(s) from current level to a specified preset level or percentage at the current rate, or optionally in a specified amount of time.</p>	<p>Syntax:</p> <pre>SEND_COMMAND <DEV> 'P<Output Channel>L<Level>[T<Time>]'</pre> <p>Variables:</p> <ul style="list-style-type: none"> • Output Channel: Target audio channel number (0-2). Output channel 0 means both channels 1 and 2. • Level: Target level (0-255 or 0-100%). Level 0 is lowest volume (mute) and 255 (or 100%) is maximum volume. • Time: Specifies the amount of time (in .10-second increments) it takes to ramp the specified audio channel to the specified level. <p>Example:</p> <pre>SEND_COMMAND MYDEVICE1, 'P0L50%' SEND_COMMAND MYDEVICE2, 'P0L50%'</pre> <p>Respectively, MYDEVICE1 is port 1 or channels 1 and 2 and MYDEVICE2 is port 2 or channels 3 and 4.</p> <p>This ramps both audio channels to 50% volume at the current ramp rate.</p>
<p>PR</p> <p>Sets the ramp rate of the specified channel(s) where Time is the time to ramp the full range both down to up and up to down, or optionally just down to up or just up to down.</p>	<p>If Time is set to 50, it takes 5 seconds to ramp through the full range of 0 to 255 (0-100%). It would take 2.5 seconds to ramp through half of the range and so on.</p> <p>Syntax:</p> <pre>SEND_COMMAND <DEV> 'P<Output Channel>R<Time>[U D]'</pre> <p>Variables:</p> <ul style="list-style-type: none"> • Output Channel: Target channel number (0-2). Output channel 0 means both channels 1 and 2. • Time: Specifies the amount of time (in .10-second increments) that it would take to ramp the full range of 0-100% (down to up and up to down or optionally just down to up or just up to down). • U D: Ramp the specified channel(s) from down to up (U) or from up to down (D). <p>Example:</p> <pre>SEND_COMMAND MYDEVICE 'P0R50'</pre> <p>Sets ramp rate of audio channels 1 and 2 to five seconds full range from down to up and up to down.</p>

