

STM 2448, STM 4896



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Introduction

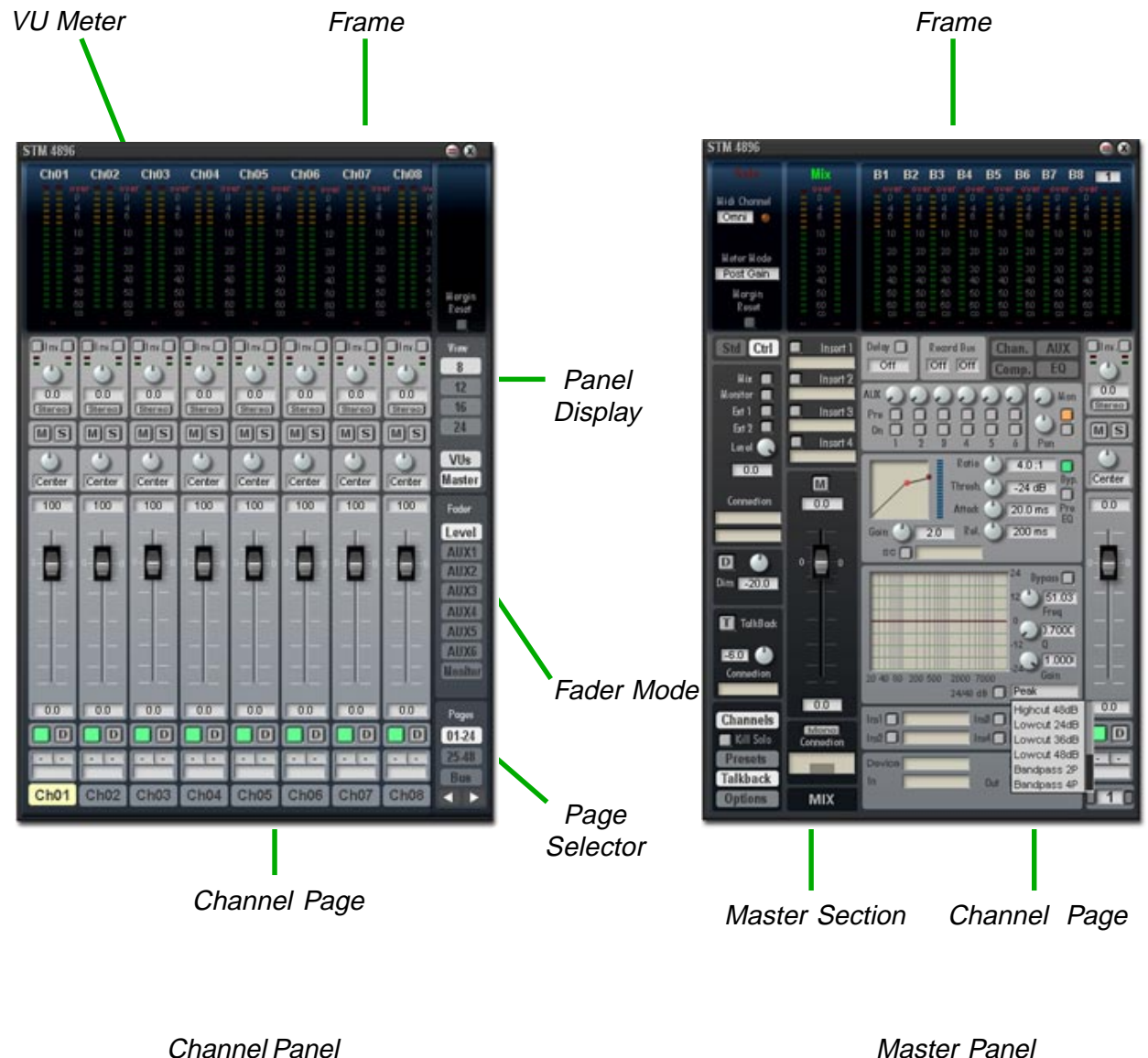
The STM 2448 is a 62 channel mixing console with 6 mono aux channels and a stereo aux channel that also serves as a monitor channel. The STM 4896 is essentially the same as the 2448 but with 24 additional mono/stereo channels on a separate page.

Each of the 24 or 48 mixer channels can operate either in mono or stereo, and can be routed to two of the eight buses. The buses can also be used for subgroups.

An additional 7 stereo returns are available for aux effects, and the mixer provides inputs for two external stereo sources and a talkback microphone.

A versatile solo function is provided to check individual signals.

Two independent graphic panels contain the mixer controls: the Master Panel and the Channel Panel.

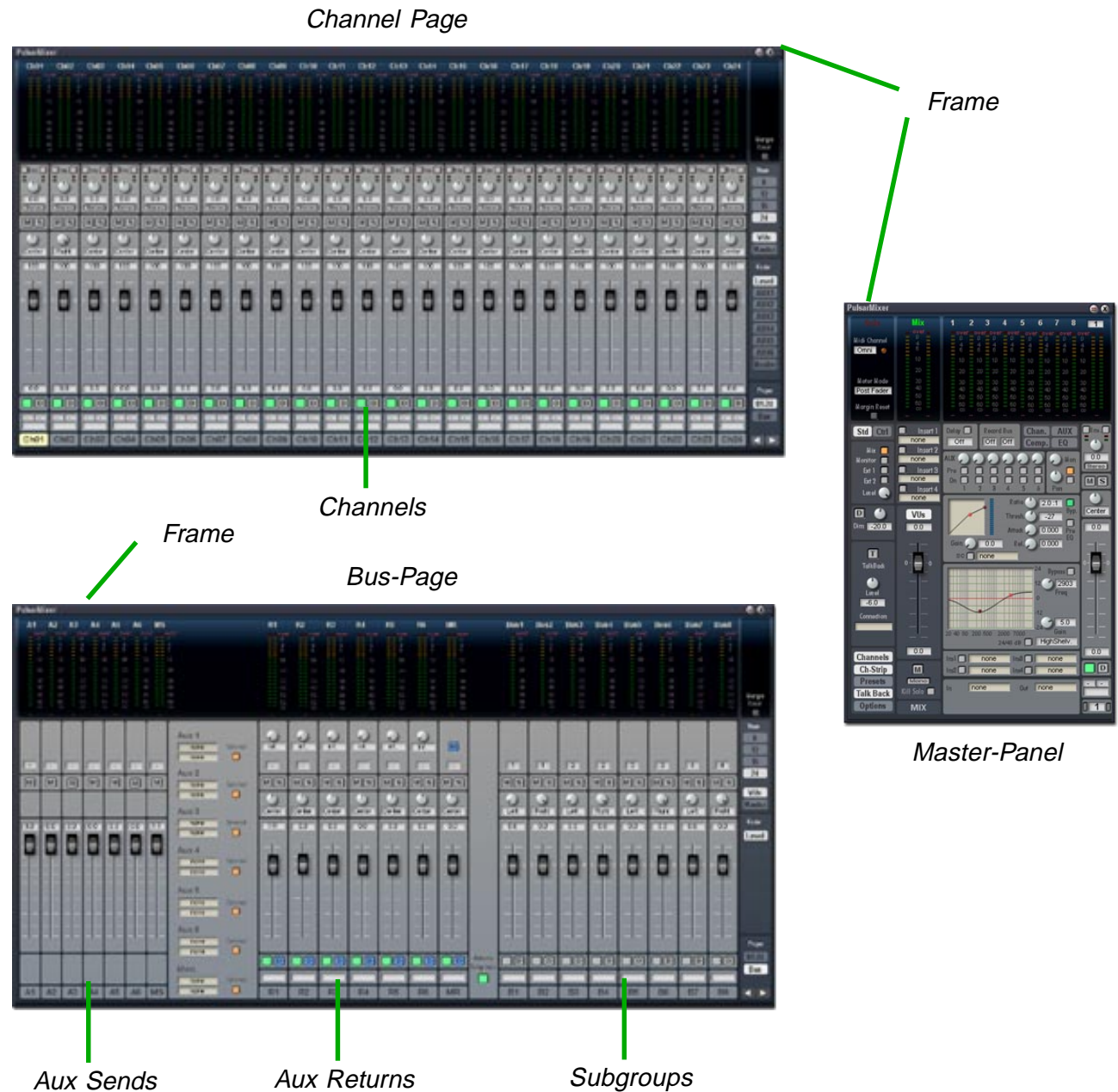


Interface

You can adapt the mixer's Channel Panel to different screen resolutions.

The smallest configuration shows 8 channels at a time while the largest shows all 24 or 48 channels, or all the channels of the bus page. The size of the smaller Master Panel cannot be adjusted.

To move either of the panels, "grab" the outer frame with the mouse and drag it to the desired location.



Connections

To provide the greatest amount of flexibility the mixer offers a large number of inputs and outputs. For example, all 24/48 channels provide direct outputs. The actual number of connections available depends on the relative number of channels configured as stereo or mono.

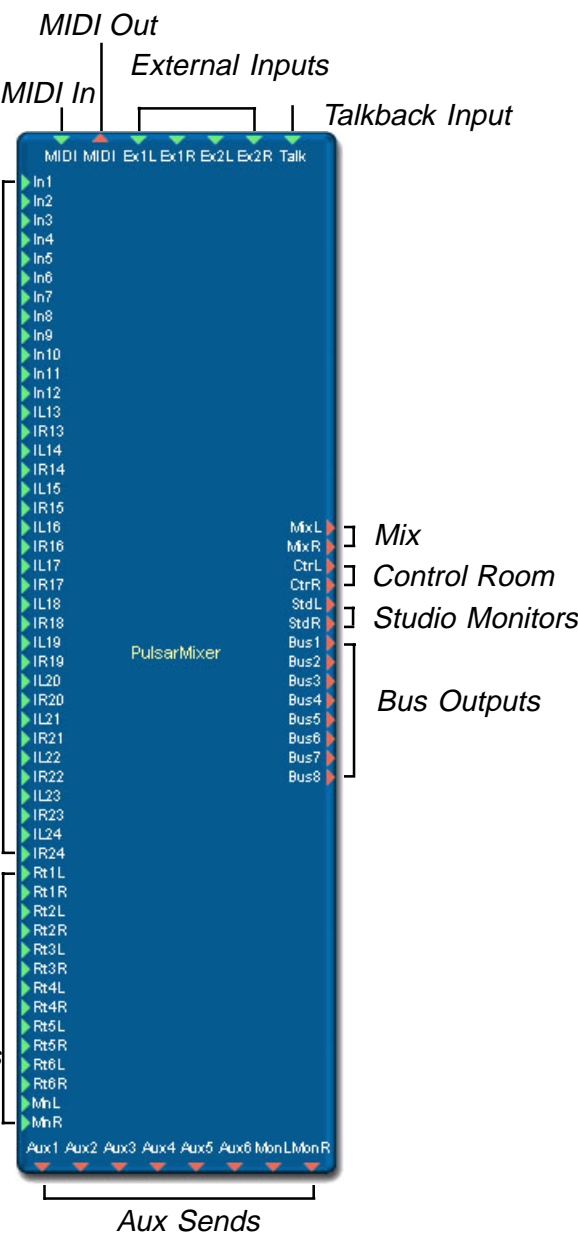
The connections in detail:

Inputs

- MIDI In: **MIDI** input (green)
- Mono channels: **In1** to **In24/48**
- Stereo channels: **I1L/R** to **I24/48L/R**
- Aux Returns:
and **Rt1L/R** to **Rt6L/R**
MnL, MnR for the monitor return.
- External Inputs: **Ex1L/R** and **Ex2L/R**
- Talkback Input: **Talk**

Channel
Inputs

Aux Returns



Outputs

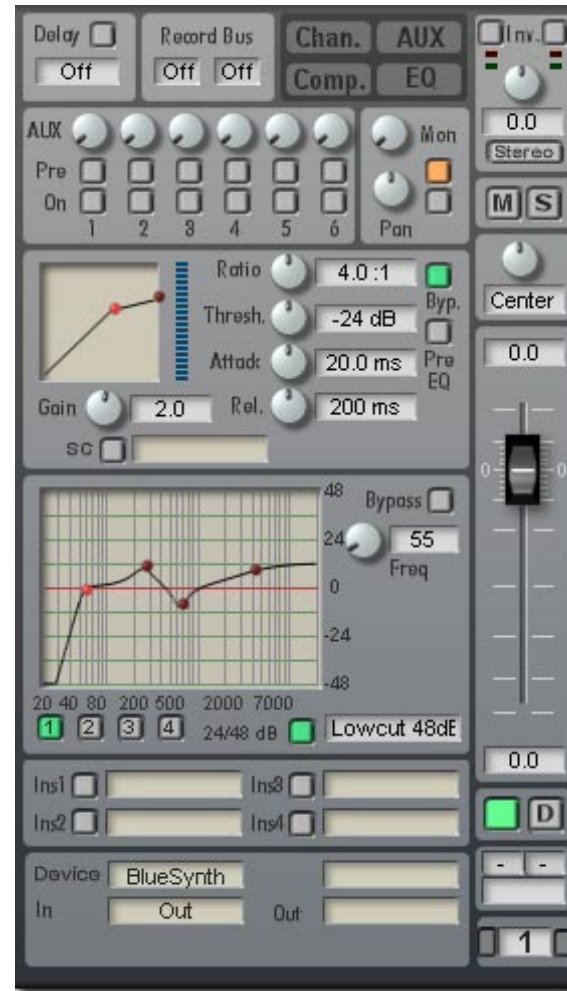
- MIDI Out: MIDI output (red)
- Mix: MixL, MixR
- Control Room: CtrlL, CtrlR
- Studio Monitors: StdL, StdR
- Bus Outputs: Bus1 to Bus8
- Direct Outputs can be removed from the display when not needed (as in illustration):
- Mono Channels (direct outs): D1L/R to D24/48L/R
- Stereo Channels (direct outs): D1L/R to D24/48L/R
- Aux Sends: Aux1 to Aux6 plus MonL, MonR

MIDI

You can control all important mixer functions via MIDI. Controllers are assigned in the usual way. However, the MIDI control number is not assigned directly to the selected onscreen faders or controls on the channel page. Instead, a fader or control on a particular channel page is bound internally to its respective channel number.

Controls for a channel's dynamic EQ or group (Fader Group, Mute Group, Record Bus) cannot be assigned. All other controls can be assigned to MIDI controllers.

While you are assigning controls it does not matter whether you assign them on the Channel Panel or the Master Panel.



Channel strip control panel

Controls

General

VU Meter

The level meters operate as peak meters whereby they display the maximum signal levels (as opposed to averaged levels). A *peak hold* function holds the signal peaks in the display for a brief period of time. A *margin* display lies beneath each meter. This indicates the highest peak level reached so far. A margin reset function clears (resets) all margin displays.

Each 'LED' is associated with a specific signal level and shines when that level is reached or exceeded.

Red LED: The red LED indicates a level of -0.01dB. Strictly speaking this is not an *over* condition, but it does indicate a very high signal level. To be safe you don't allow analog input signals to exceed -3.0dB.

With digital signals, such as those from a wave player, you can let the red LED flash more frequently. This does not indicate overs, just a high signal level. If the digital input signal has been compressed and normalized this LED will light up quite often.

1. Yellow LED: -0.5dB

2. Yellow LED: -3.0dB

3. Yellow LED: -4.0dB

4. Yellow LED: -6.0dB

5. Yellow LED: -8.0dB

6. Yellow LED: -9.0dB



Green LEDs (1-14): -10.0dB, -12.0dB, -18.0dB, -20.0dB, -24.0dB, -28.0dB, -30.0dB, -36.0dB, -40.0dB, -45.0dB, -50.0dB, -55.0dB, -60.0dB,

Signal-LED: -96.0dB

It is normal for the *Signal LED* to remain lit when an analog source is connected to the respective input. This is because most analog devices have a signal-to-noise ratio of less than 96dB.

Channel Panel

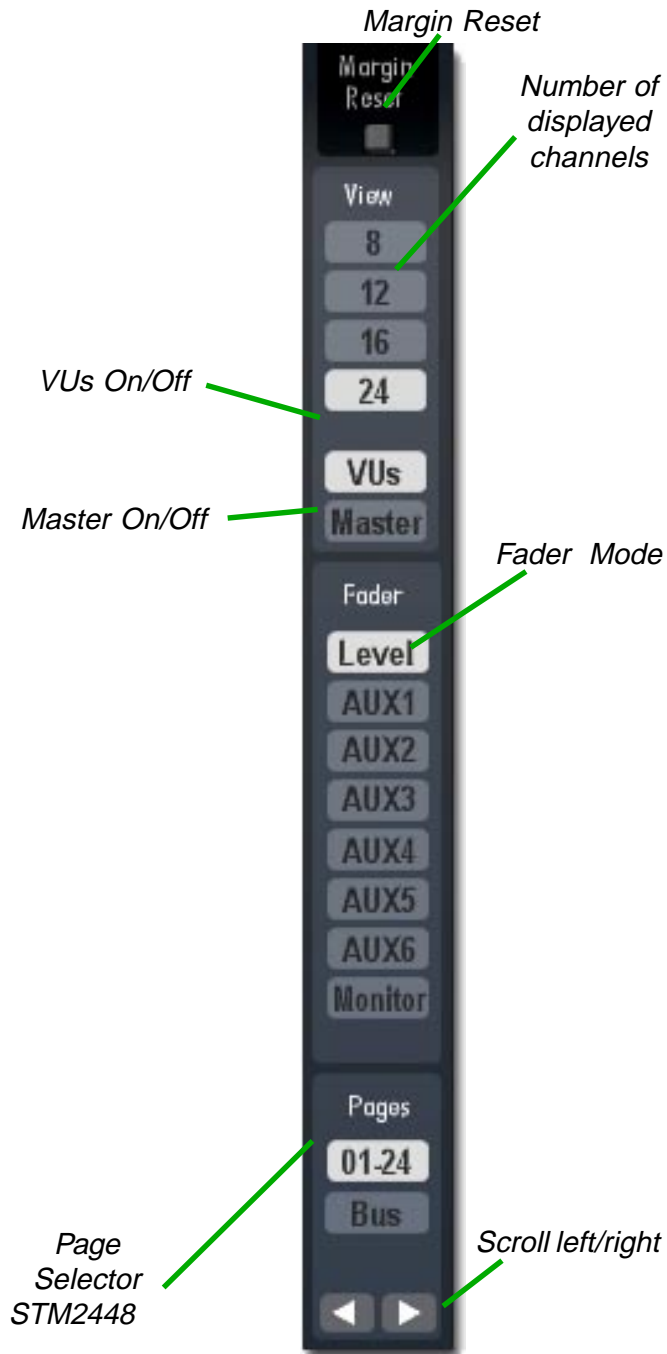
On the right side of the Channel Panel you'll find a sub-panel containing a number of switches to select various options.

On Top: When enabled, this function prevents other windows from being drawn over the mixer panel - the mixer therefore remains "on top" of any other windows. When not enabled, other windows can obscure the mixer.

Close: The Close button removes the mixer panel from the display. To open it again, double click on the mixer module representation in the Routing Window or on the minimized mixer graphic in the Live Bar.

View: Controls the size of the panel. You can choose to display 8, 12, 16, or 24 channels simultaneously.

VUs: Includes the VU Meters in or removes them from the display. The Margin display always remains visible.



Channel Page 1-24

Master: Opens/closes the master panel.

Fader Mode: The channel faders can assume different functions. Their default function is to control the signal level of the respective channel in the mix. If you select Monitor instead, for example, the fader is bound to the Monitor aux send level control. This lets you quickly check the proportion of a signal in the specified channel.

Page Selector: The Channel Panel shows either the input channels, or the bus channels. The Page Selector switches between the two views (pages).

Page 1-24, Page 25-48

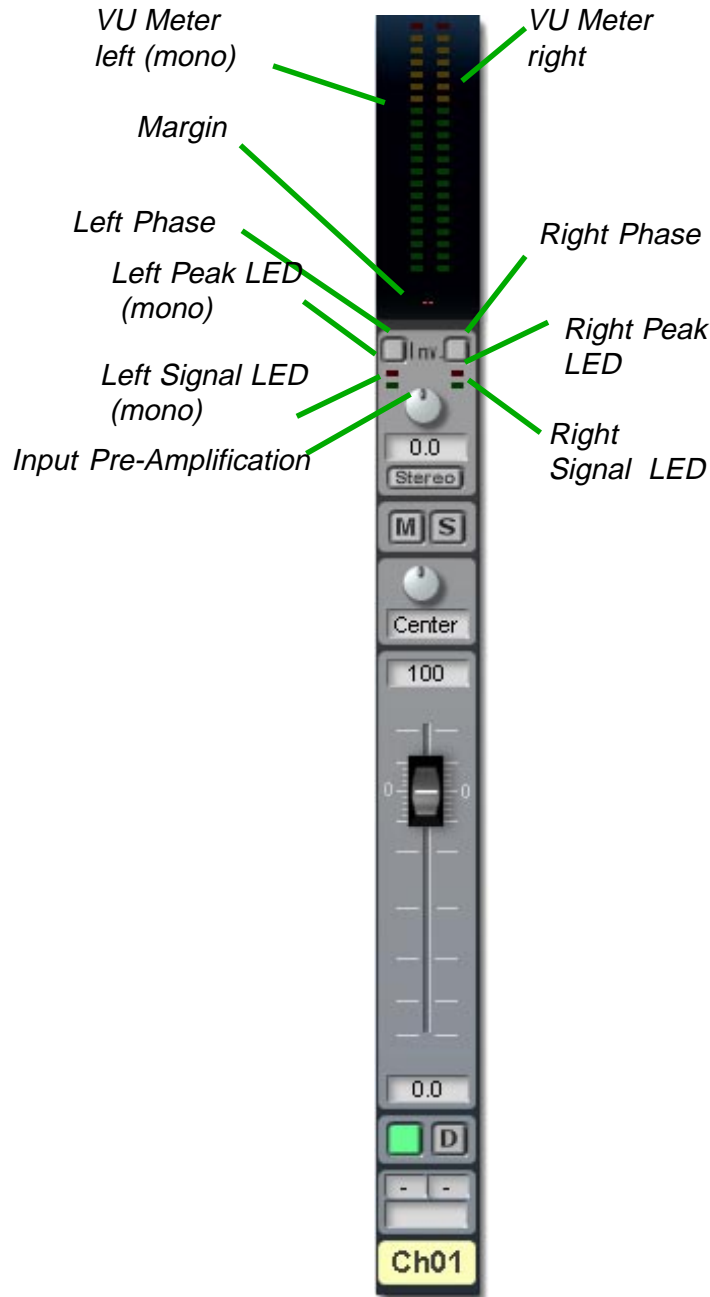
These pages display all input channels.

Channel Strip

VU Meters: If the meters are enabled for display (see *VUs*, above) they indicate the channel's signal level(s). If the channel is set to Mono, only the left meter is used.

Margin: The margin display shows the highest level reached so far in the left and right channels. This value, expressed in dB, remains unchanged until a higher level is detected or until the margin is reset.

Inv.: These buttons invert (shift the phase by 180 degrees) their respective input signals when pressed. For example, if you mic a snare drum from above (left) and below (right), pressing the right Inv button will invert the phase of the lower microphone. In Mono channels only the left button has an effect.



Peak LED: The peak LED (red) indicates a level of -0.01dB. Strictly speaking this is not an *over* condition, but it does indicate a very high signal level. To be safe, don't allow analog input signals to exceed -3.0dB. With digital signals, such as those from a wave player, you can let the red LED flash more frequently. This does not indicate overs, just a high signal level. If the digital input signal has been compressed and normalized this LED will light up quite often.

Signal LED: The signal LED (green) indicates a signal level greater than -96dB.

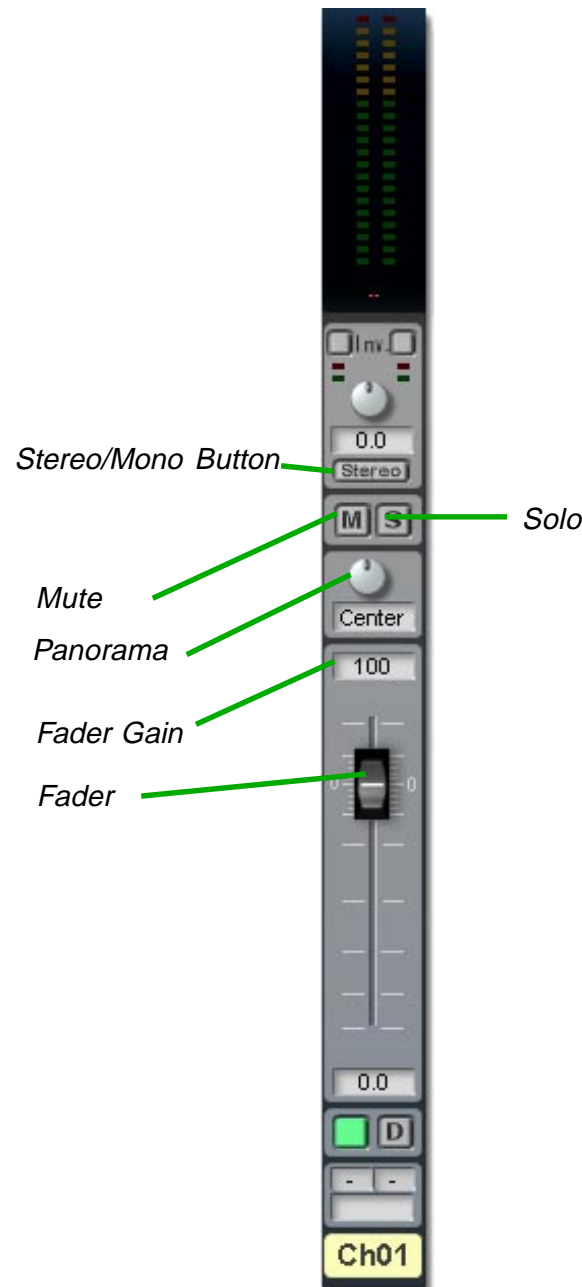
Gain: Sets the pre-amplification level of the input signal. This level affects the channel's entire signal path. The associated text field indicates the amplification level in dB, and allows you to type in a numerical value. The maximum boost is +24dB.

Stereo: Enables this channel as a stereo channel. Any channel can operate either as a stereo or mono channel. Mono channels use only the left level meter, the left Inv button, and the left peak/signal display. When you switch from stereo to mono mode any connections to the right channel are lost. For example, when switching to mono, the left input for channel 1 is renamed from IL1 to In1 and IR1 disappears. The inserts automatically switch from stereo to mono, and any stereo insert effects present are removed.

Mute: The Mute button (**M**) removes the signal from the mix or restores it. If this channel belongs to a group, the other channels in this group are also muted or unmuted. When enabled, the signal passes only to the monitor path, and then only if **Pre** is enabled.

Solo: This button puts the channel in solo mode. The monitors (Studio and Ctrl Room) automatically play the solo signal.

Panorama: Controls the proportion of the signal sent to the left and right master buses. This setting determines the virtual position of the sound in the stereo field. When pan is adjusted to full left (Left) the signal passes only to the left master bus.



In the central position (Center) both sides receive an equal proportion of the signal, and the signal is attenuated by 3 dB (crossfade mode). At the full right (Right) position, the signal is fed only to the right master bus. In the case of stereo channels, the left channel is pre-assigned to the left master bus and the right channel to the right master bus. Therefore there is no cross fading between channels.

When a channel is in stereo mode, the pan control acts as a balance control. In the center position, the input signal is passed through unattenuated and independent of the channel strip's selected pan mode. If the control is turned gradually from center to full left, the right channel signal will be gradually faded down until it is no longer audible, while the level of the left channel signal remains unchanged.

Fader: The fader controls a channel's output level. The text field above the fader indicates the current signal amplification. You can enter values into this field. The range is from no signal (inf.) to about 12dB of amplification. The text field displays values from 0 to 127 (MIDI) where a value of 100 corresponds to 0dB.

Attenuator: Use the attenuator to adjust the fader's control range. The advantage of using the attenuator is that, despite the reduction of the level by the attenuator, the full travel of the fader is still available. This is especially significant when using MIDI automation, where only 127 steps are available.

Mix: This button, normally green, is located on the left beneath the fader. Click this button to remove the signal from the mix, but not from other buses (record and aux buses). You would use this feature, for example, when you have routed several channels to create a subgroup. In this case you should remove the direct signal from the mix as it is a component of the submix that is already being passed to the master bus.

Channel name: Text field provided as a convenience so you can identify the channel by name rather than number (here, 'Ch01').

Solo Defeat: The solo defeat button (**D**) protects the signal from being removed from the mix when another channel is in solo. When enabled, the channel ignores solo activity of other channels.

Effects returns are often assigned to channel strips. If you do this, switching solo defeat *on* permits the external or aux effect to remain in the mix when another 'normal' channel is in solo.

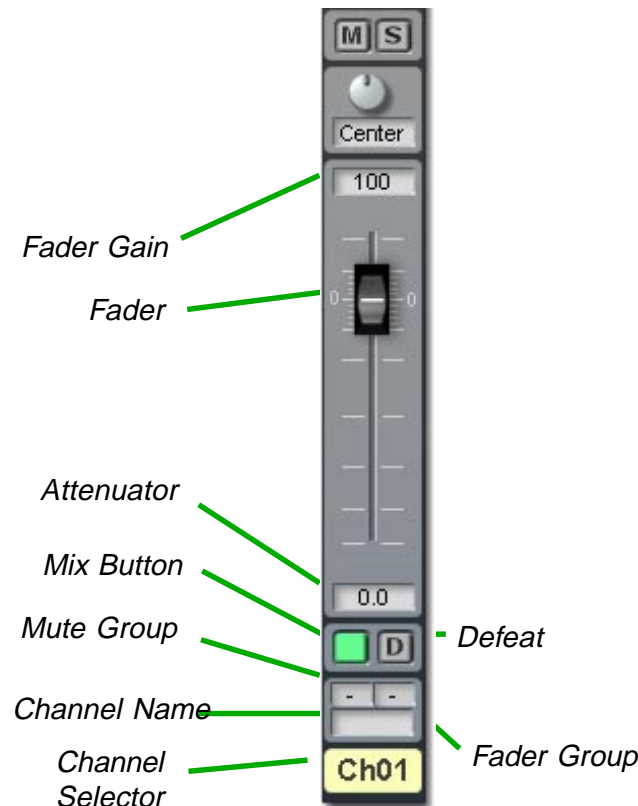
Mute Group: You can assign a channel to a group to link the mute buttons of all channels in that group. Use the Mute Group textfader to select a group number for that channel. When more than one

channel is assigned to the same group, the mute buttons of all channels in the group operate together whenever one of them is pressed. You can choose from among 8 groups.

Fader Group: A fader group is similar to a mute group, but in this case the groups link the master faders instead of the mute buttons. When you move the master fader of a channel assigned to a group, the faders of any other channels in that group will move also. Channels in a fader group maintain their *relative* levels. You can assign a channel to one of 4 fader groups. To resume independent operation for a channel, remove it from any group assignment.

Channel Name: Here you can enter any name you choose to identify the channel (for example, "Bass").

Channel Selector: If you change the channel by clicking with the mouse, the newly selected channel is automatically updated in the Master Panel.



Bus Page (Channel Panel)

The Bus Page contains the Aux Send and Return controls, and the Subgroups.

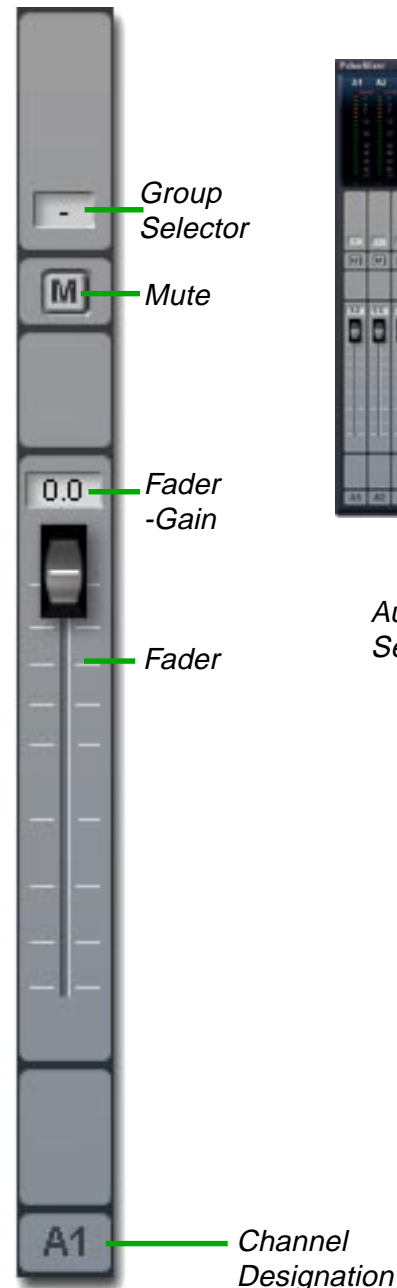
Aux Sends

The Aux Sends control the level of the combined aux signals for the respective aux channels.

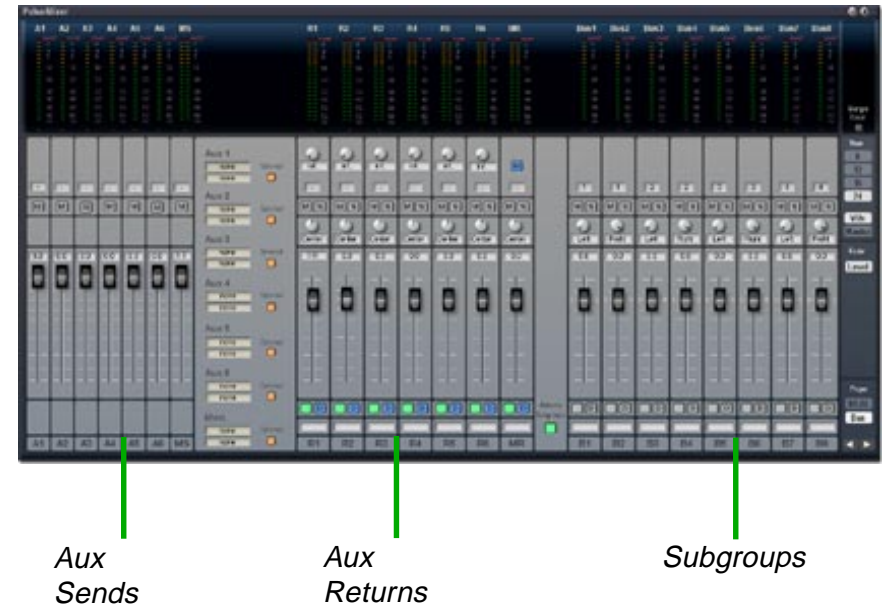
Group Selector: Use this scrolling text field to assign the aux send to one of four possible groups. When two or more channels are assigned to the same group, their faders move together, and they switch in and out of mute simultaneously.

Mute: The Mute button (**M**) blocks the aux send signal or restores it. If this send belongs to a group, the other sends in this group are also muted or restored.

Fader: The fader controls the aux send's output level. The associated text field above indicates the relative output level. You can also type a value into the text field to set the level. The range extends from Inf. (no signal) to 0dB.



Bus Page



Aux Returns

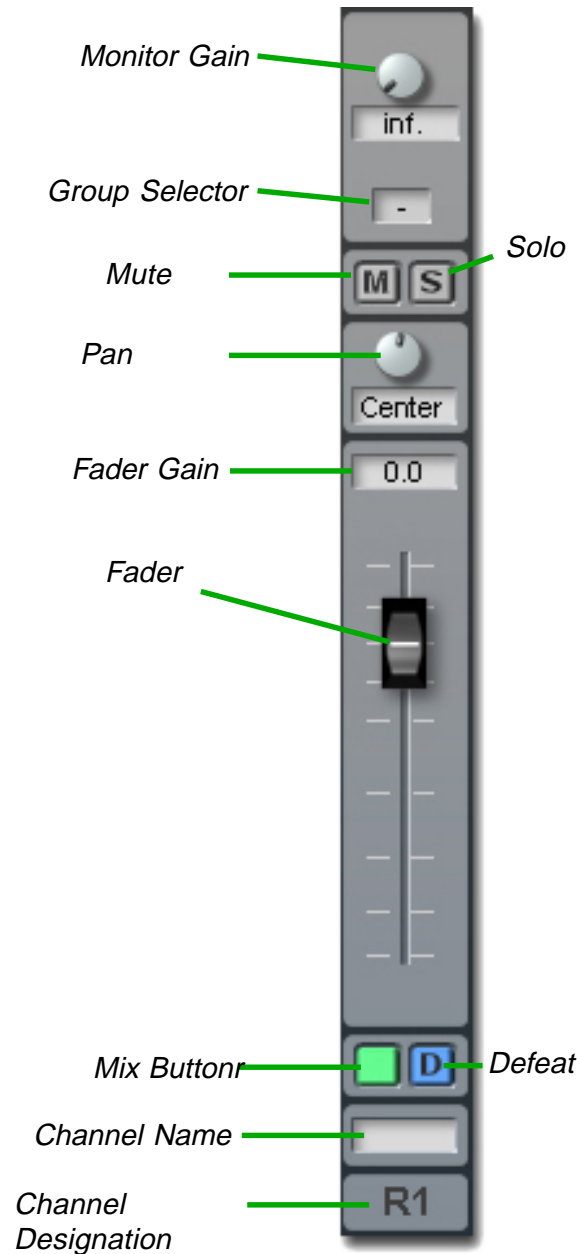
The aux returns are implemented in stereo, and provide most of the features of a stereo channel strip. It is through the aux returns that the signals from the effects devices driven by the aux send signals arrive back into the mix. Because of the special characteristics of the aux returns, there are some limitations on their use.

Monitor Gain: This control determines the proportion of the aux return to be routed to the monitor send. Therefore, it controls the level of the effect signal in the monitor mix.

Group Selector: Use this scrolling text field to assign the aux return to one of four possible groups. When two or more channels are assigned to the same group, their faders move together, and they switch in and out of mute simultaneously.

Mute: The Mute button (M) blocks the aux return signal or restores it. If this return belongs to a group, the other returns in this group are also muted or unmuted.

Solo: In the aux returns, this button enables exclusive-solo mode.



Pan: In the aux returns, the left channel is permanently assigned to the left master bus, and the right channel to the right master bus. Therefore, no crossfading takes place. In the center position the master bus receives the effects signals attenuated by about 3dB. If the pan position is set to hard right (for example) the left channel signal is entirely removed from the mix.

Fader: The fader controls the level of the aux return signal. The associated text field above indicates the output level. You can also type a value into the text field to set the level. The amplification range extends from inf. (no signal at all) to 12dB.

Mix: The Mix button (shown here in green) switches the aux return signal to the mix.

Solo Defeat: The Solo Defeat button (D) protects an aux return from solo mode. If another channel is solo'd, the return will not be affected (i.e. silenced).

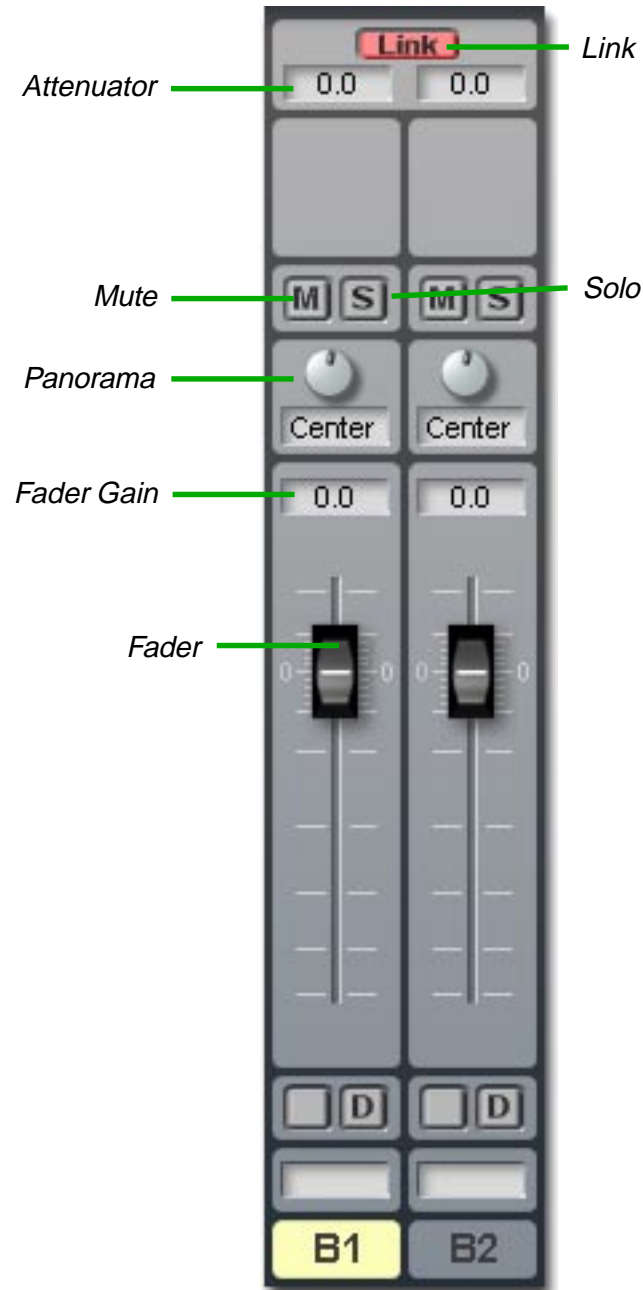
Channel Name: You can type in any identifying name you like here (for example, "Reverb").

Subgroups

Link: Bus pairs B1/B2, B3/B4, B5/B6, and B7/B8 can be linked together. This couples the Faders and Mix controls. In linked buses, inserts are loaded into the left bus only. The two inserts automatically switch to stereo and apply to both buses. Solo Defeat and Mix buttons operate independent of the link status.

Attenuator: Controls the level of the signal before it enters the channel path. With this control you can prevent digital overs and also set the basic bus output level.

Mute: The Mute button (M) blocks the bus signal or restores it. If this bus belongs to a group, the other buses in this group are also muted or unmuted.



Solo: The solo button switches the bus in or out of solo mode. A bus solo makes sense only in exclusive solo mode. For technical reasons, solo buttons in linked buses always switch together.

Pan: In the bus channels, the left channel is permanently assigned to the left master bus, and the right channel to the right master bus. Therefore, no crossfading takes place. In the center position the master bus receives the signals attenuated by about 3dB. If the pan position is set to hard right (for example) the left channel signal is entirely removed from the mix.

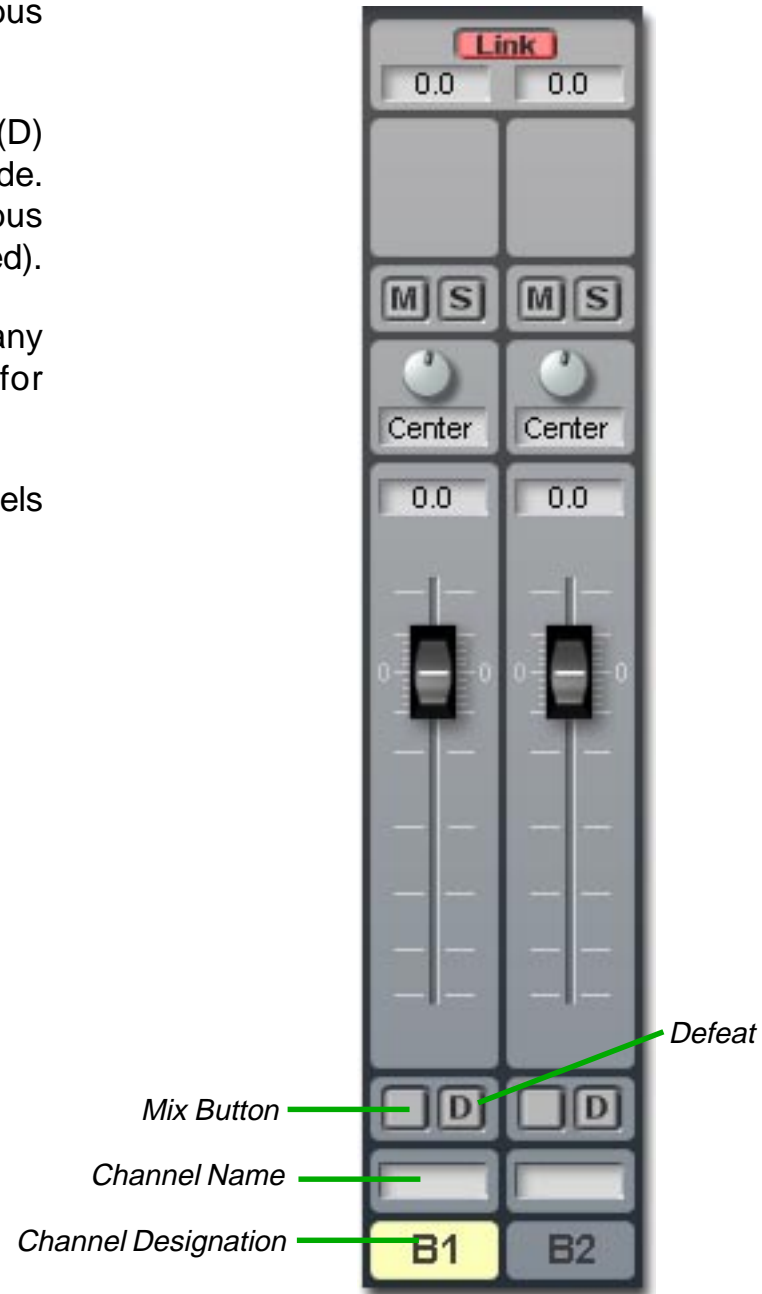
Fader: The fader controls the level of the bus signal. The associated text field above indicates the output level. You can also type a value into the text field to set the level. The amplification range extends from inf. (no signal at all) to 12dB.

Mix: The Mix button switches the bus signal in or out of the main mix.

Solo Defeat: The Solo Defeat button (D) protects a bus channel from solo mode. If another channel is in solo, the bus channel will not be affected (i.e. silenced).

Channel Name: You can type in any identifying name you like here (for example, "Bus 1").

Channel Designation: The bus channels are designated B1 to B8.



Master Panel

All the mixer's global settings are located in the Master section.

General Settings

Meter Mode

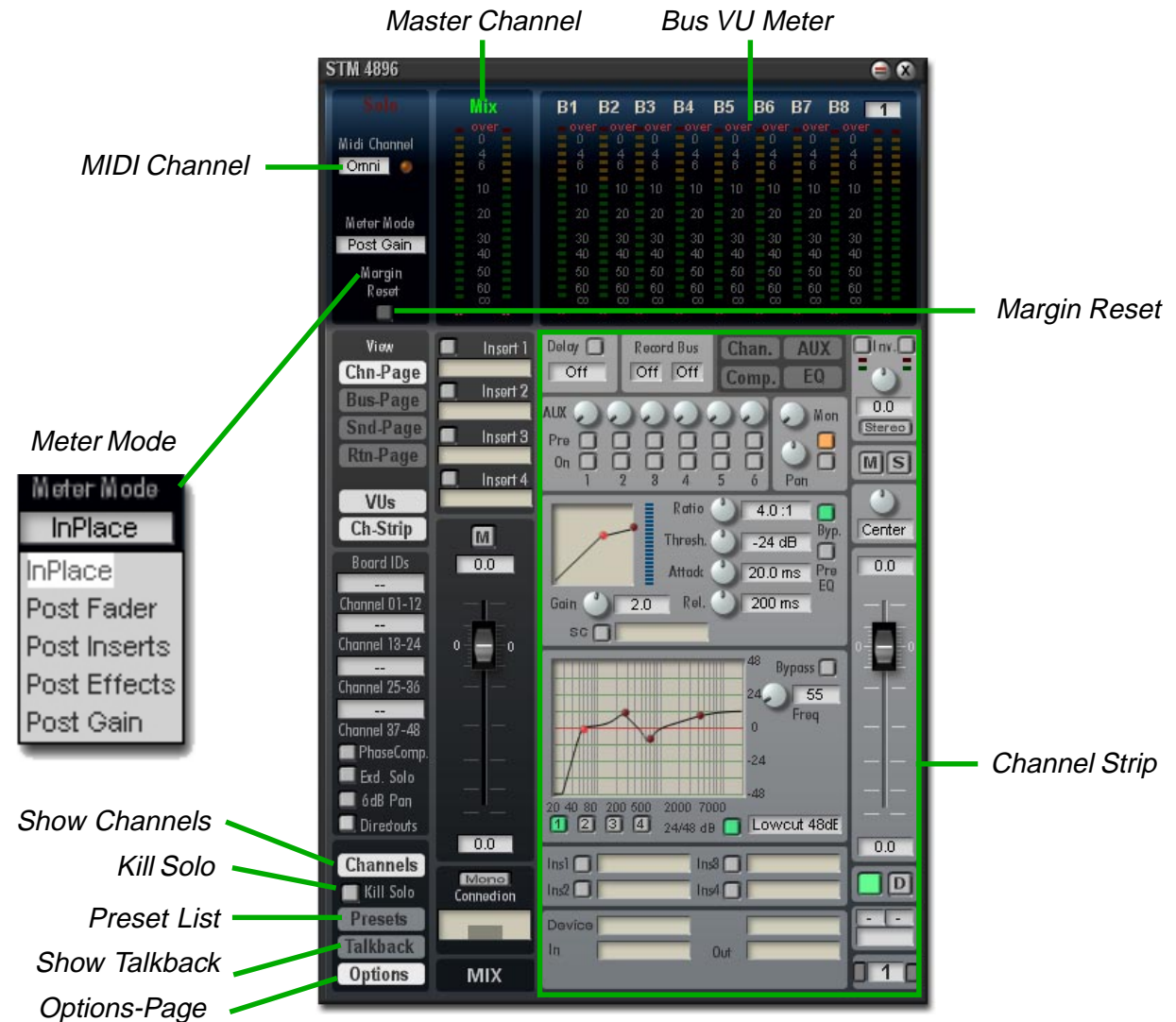
The channel meters can measure the signal level at any of five different locations in the signal path: 1) after the input amplification (*post gain*), 2) after the effects (*post effects*), 3) after the inserts (*post inserts*), 4) after the fader (*post fader*) and, 5) after Pan (*in-place*).

When the mode setting changes, the meters display the new signal level immediately. When a channel is put in solo, you can also hear the level difference the meter shows.

Margin Reset: Sets all the mixer's margin displays to null.

Show Channels: Opens or closes the Channel Panel.

Channels: Opens/closes the channel page.



Kill Solo: Switches any solo-enabled channels out of solo mode.

Presets: Opens/closes the mixer's global presets dialog.

Options/Talkback: Selects whether the Options page or the Talkback page is displayed in the area above.

Option Page

The Master Panel provides four different pages for viewing the various mixer channels. These pages are available only when the channel strip (Ch.-Strip) view is active. All the functions of the Channel Panel are available through these pages.

View

Channel page: Shows the channel strip for the currently selected input channel.

Bus page: Shows the channel strip of the currently selected subgroup.

Send page: Shows the currently selected Aux send channel.

Return page: Shows the currently selected Aux return channel.

VU: Includes or excludes the Channel panel's VU meters.

Ch.-Strip: Opens or closes the channelstrip display.

Board IDs

If you have more than one DSP board installed in your system, and you are using numerous external I/Os with the mixer, you can assign particular channels to specific boards. Correctly configured, this can relieve the DSP system greatly.

You can assign the first 12 mono/stereo channels and the entire Master section to one board, and the next 12 channels (13-24) either to the same board, or TO another. With the STM 4896 an additional two groups of 12 channels can be independently assigned.

Example: If your external hardware is connected to several mixer channels (e.g. through an ADAT source module) you can ensure that the channels are processed by the same board that contains the I/O port. If a lot of channels are in use this saves STDm connections. Distributing the DSP processing to a specific or additional boards can also improve the DSP performance. Experiment with these settings a little.



Option Page

Talkback Page

Phase Compensation

The switchable phase compensation feature permits phase-aligned operation of all mixer input channels. It makes no difference whether the input signal comes from an internal device (synthesizer, sampler etc.) or via an I/O module. Thus, external signals can also be handled in the mixer in a phase-accurate manner, as long as they arrive phase-aligned at the hardware inputs.

Phase compensation of all inputs is not always necessary. Activation of this feature imposes an additional demand upon DSP computing capacity and should therefore be enabled only when it is truly useful.

Compensation balances short delays on the order of a few samples. These delays are significant only under certain conditions. For example, uncorrelated signals such as a piano and a separately recorded voice can be shifted by a handful of samples relative to one another with no real audible effect. These differences are too small to be perceived as timing shifts.

When, on the other hand, a piano has been recorded simultaneously via multiple microphones, the spatial image will be correctly reproduced only if all of these highly-correlated signals are processed without delays relative to one another. Thus, the use of phase compensation is advisable when mixing recordings of a single sound source or image made with multiple microphones. The less correlated the signals are, the less critical is the maintenance of proper phase alignment. A delay of a few samples in one signal corresponds to a distance difference of a few centimeters. Thus, the effects of phase shifts in this range are greatest with close micing.

Note that precise phase alignment is often achievable without explicitly activating phase compensation, since channels are inherently phase-aligned with one another within specific groups in each mixer. In the STM2448, these groups are: channels 1-3, 4-6, 7-9, 10-12, 13-15, 16-18, 19-21 and 22-24. In the STM4896 they are additionally: 25-48.

The extent to which the difference between compensated and uncompensated signals is audible depends upon the signals themselves, and especially upon the degree of correlation between them. You can easily assess the extent of the effect directly by mixing a multitrack recording with the STM2448 (without using any effects) and switching on phase compensation. Each channel includes a switchable delay which can be varied between 0 and 200 samples. A delay in one channel of 2-4 samples corresponds to the sort of delays which may be encountered in a real situation if compensation is not used. Check whether this delay seems to in any way alter the perceived spatial image. If not, crank up the delay further. The delay is now beyond that which might realistically be encountered, but makes the effect more noticeable.

Problems with mono compatibility, such as a noticeable loss of highs in the mono mix as compared with the stereo mix, can also occur. Use the Mono button in the Master section to check this.

Solo Mode

Directly above the meter mode indicator is the solo mode indicator. If solo is enabled for one or more channels, this indicator lights up.

Two solo modes are available: normal and exclusive. The solo signal is routed automatically to Ctrl or Studio according to the mode.

Normal: Normal mode allows you to enable solo on several channels simultaneously. The master bus is used as the solo bus. If you switch on solo defeat for the aux channels, you can also hear the aux effects when you solo a channel or channels.

Exclusive: In this mode, only one channel can be in solo at a time. The master bus is not used in this mode, so its signal is unaffected when you place a channel in solo.

The currently adjusted meter mode determines which part of the signal to use.

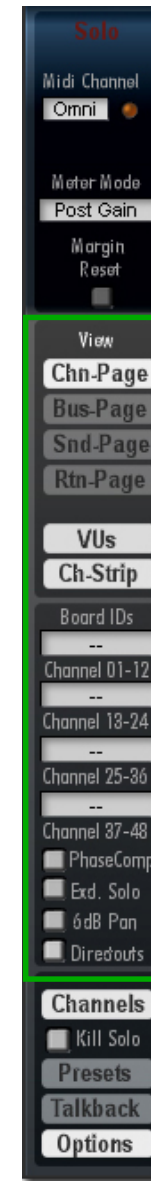
For aux returns and subgroups the meter mode has no effect. With the buses, the output channels are always switched to solo.

Pan Mode

Two panning modes are available: cross-fade (3dB) and linear (6dB). The selected setting applies to all mono channels and to the channels of the subgroups.

Directouts

The mixer features left and right direct outputs for each of the 24 channels. With this button you can hide this multiplicity of connections, while retaining their signals.



Talkback Page

Monitor Selector

You can monitor the studio and/or playback through one of two possible stereo output pairs - Studio or Ctrl. Each stereo output has its own volume level and monitor signal. All settings are restored automatically when the solo function switches the signal from solo back to the mix.

Mix: When selected, Mix sends the master mix signal to the studio or control room speakers.

Monitor: Allows you to check the monitor mix in the studio or control room speakers.

Ext 1, Ext 2: If you have connected external audio devices, such as a CD player, to the Ext1L/R or Ext2L/R inputs you can listen to them by selecting the respective input pair with these buttons.

Dim

With the Dim button you can temporarily reduce the volume level of the studio or control room speakers by a pre-determined amount (in dB) without adjusting the master level.

Talkback

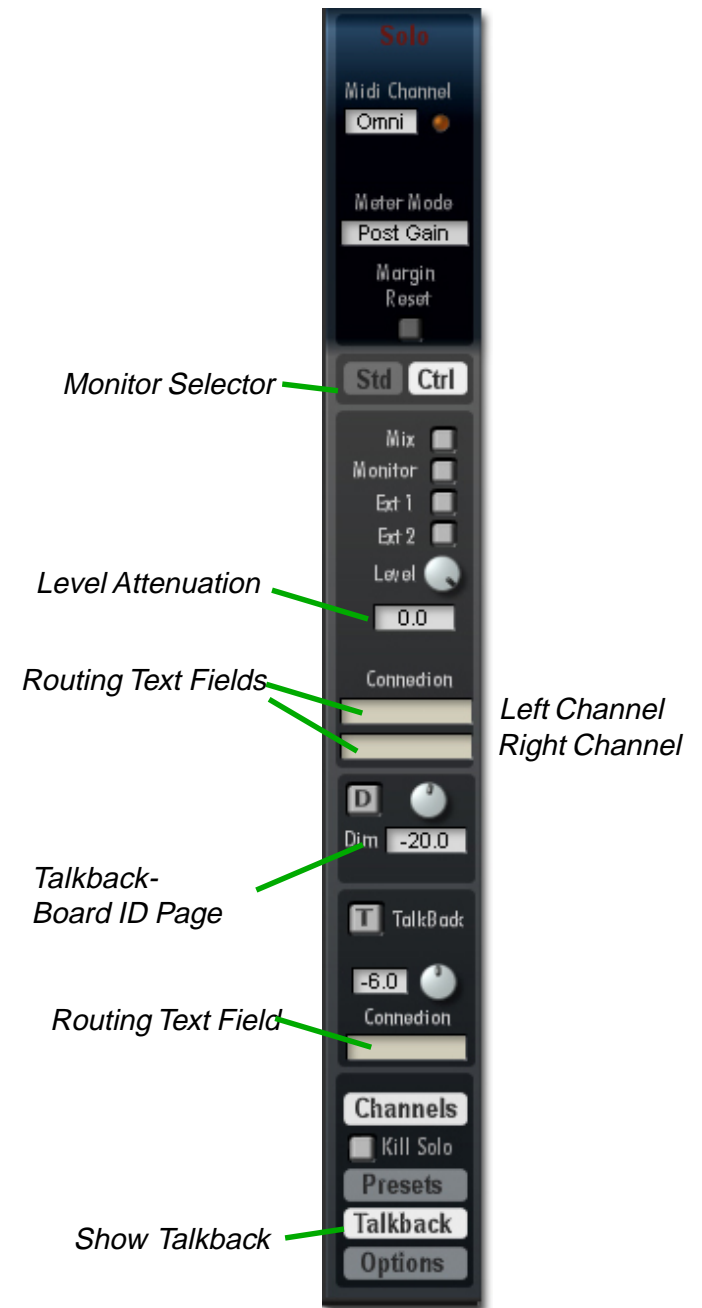
The Talkback feature lets the engineer or producer in the control room communicate with the performers on the studio floor.

To use talkback, first connect a pre-amplified microphone to one of the hardware inputs. Then, in the Routing Window, connect this input to the Talk input on the mixer module (or create the connection in the Connection field in the context menu).

When talkback is engaged, anything you say in the talkback mic is sent over the Monitor outs. When you press the talkback button, the Dim button is also engaged. The actual talkback level depends therefore on both the Dim and the Talkback level settings.

Because talkback is sent over the monitor bus you can, for example, use it when overdubbing to cue a singer or other performer.

Routing Text Fields: Click to open a menu containing a list of possible devices to connect to. Double-clicking an existing connection deletes it (disconnects the device).



Master Channel

All the signals of the overall mix are combined in the Master Channel.

VU Meters: The VU Meters indicate the overall level of the mix. Use the fader to reduce the level if it is too hot.

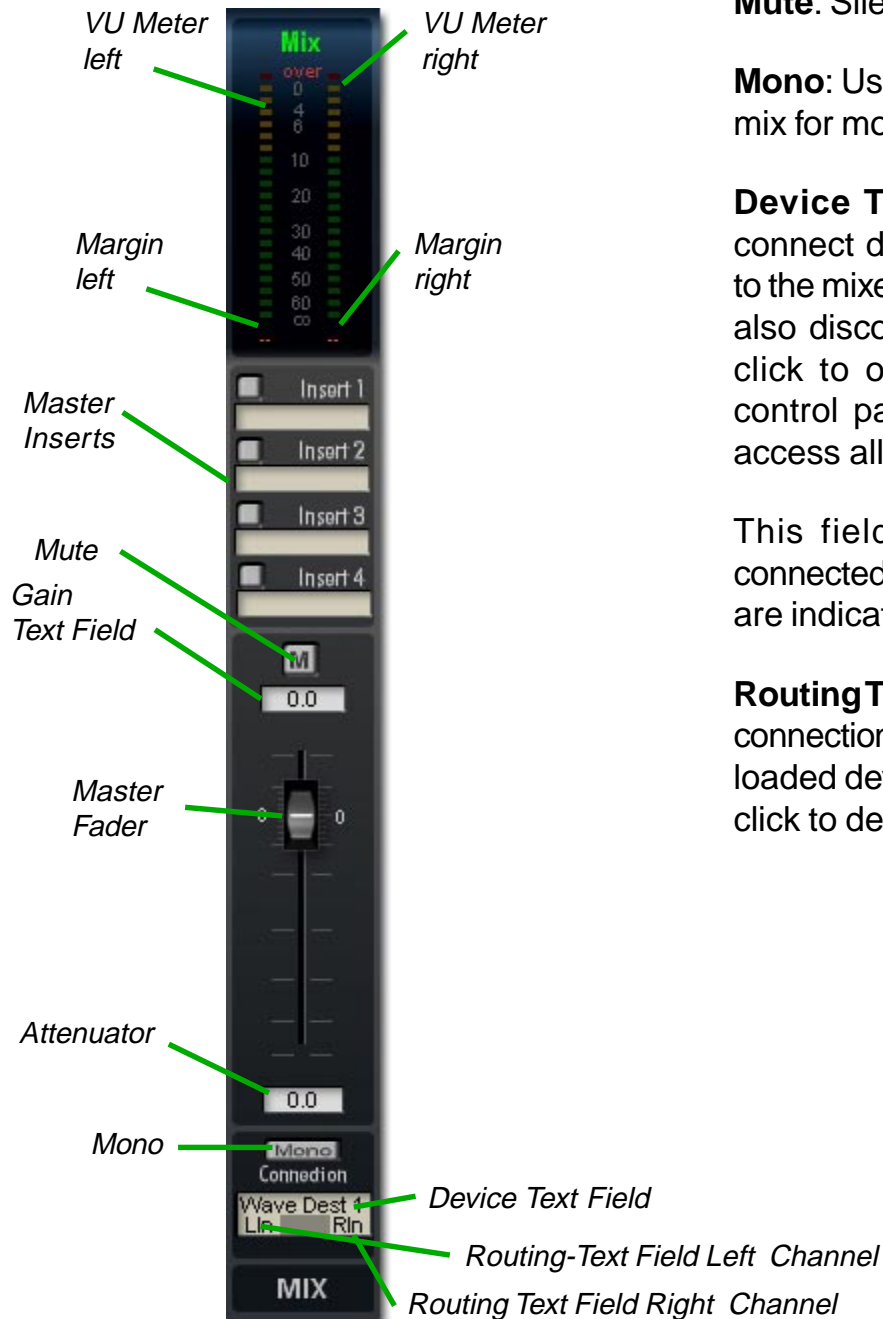
Margin: The margin displays show the highest level reached so far in the left and right channels. This value, expressed in dB, remains unchanged until a higher level is measured, or until the margin is reset.

Master Inserts: For final signal processing, four inserts are available ahead of the master fader.

Master Fader: Controls the overall volume level of the mix. The maximum amplification is 12dB (dependent also on the Attenuation setting).

VUs: Click this button to alternately show and hide the Master channel's VU meters.

Attenuator: The Attenuator adjusts the control range of the Fader. The advantage is that, although the overall maximum level output has been reduced, the fader still operates over its full track.



Mute: Silences the Master channel.

Mono: Use the Mono button to check the mix for mono compatibility.

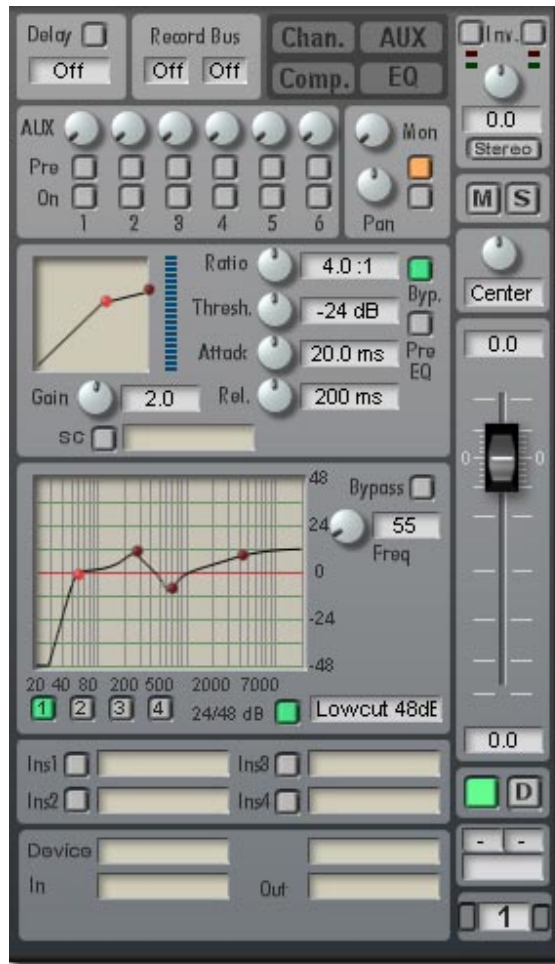
Device Text Field: Use this field to connect devices loaded into the project to the mixer's master mix outputs. You can also disconnect a device here. Double-click to open the connected device's control panel. Use the field's menu to access all other functions.

This field displays the name of the connected device. The actual connections are indicated in the Routing text field.

Routing Text Field: Not only displays the connections, but also lets you connect any loaded device through its menu. Double-click to delete a connection.

Channel Page

The channel page is the main control panel for each of the 24/48 channels. All the available controls for a single channel are available here. The panel always controls the currently selected channel.



Delay: Each channel is furnished with an internal delay adjustable up to 200 samples. When the delay is switched off, it is no longer in the signal path.



Record Bus: This textfader determines which record bus the channel signals are routed to. The buses are coupled, 1/2, 3/4, 5/6, 7/8, or not routed at all (off).



To route a signal to only one bus (for example, bus 1) set the routing to 1/2, and then adjust the pan to hard left. To route the signal only to bus 2, select the same routing (1/2) but set the pan to hard right.

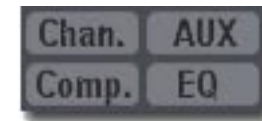
Channel Presets

Chan: Opens/closes the Preset List for this channel. This preset stores all the channel settings for this channel.

Comp: Opens/closes the compressor preset list. This preset stores all the compressor settings.

Aux: Opens/closes the Aux preset list. This preset stores all aux channel settings.

EQ: Opens/closes the EQ preset list. All EQ settings are stored in this preset.



Aux and Monitor

Aux: The rotary controls adjust the proportion of the channel signal passed to the respective aux bus. Directly beneath the rotary controls are the Pre/Post buttons. (**Pre**). Use these to select whether to tap the signal before or after the fader. The lower buttons (**On**) let you switch each of the 6 mono aux channels on or off independently.



Monitor: The controls for the monitor path lie to the right of the aux controls. The upper rotary control (**Mon**) adjusts the proportion of the channel's signal to be sent to the monitor bus, which is implemented as a stereo bus. You can control the position of the signal in the stereo image with the **Pan** control. The upper button is the Pre/Post switch. Pre takes the signal from just after the input gain control. When set to Post, monitor behaves like a stereo aux switched to Post. Beneath the Pre/Post button is the **On** button to switch the monitor path on or off for this channel.



Compressor

Each channel has an integrated compressor. To enable the compressor, click its **On** button.



You can adjust the compression ratio and threshold directly within the graphic display on the left. Click the red node on the left and drag it along the diagonal to adjust the threshold. Click and drag the red node on the right to adjust the ratio. For very fine adjustment, use the corresponding controls on the right.

The Gain Reduction indicator next to the graphic display shows the momentary effect of the compressor on the signal.

Gain: To compensate for the loss of signal level due to compression, the overall compressed signal level can be increased using this control. The range is 0dB to 18dB.

If the Gain setting is too high, it can cause internal distortion.

Ratio: The ratio setting is the degree of signal compression expressed as a ratio. The range is from 1:1 (no compression) all the way to inf:1 (maximum compression). The compressor operates with a 'soft knee' compression curve-the transition from signals to be left alone to those to be compressed is a smooth one. The soft-knee curve is less pronounced at high compression ratios, and at the maximum ratio it disappears completely (in which case, the compressor is performing as a limiter).

Thresh.: (Threshold) When the input signal exceeds the threshold level, compression begins after the specified attack time. When the signal again falls below the threshold level, compression processing stops after the amount of time specified in the release parameter. The adjustable threshold range is from 0 to -60dB.



Attack: The reaction time of the compressor-the amount of time from the moment a threshold level is reached and the compression begins. The range is adjustable from 0.1ms to 200ms.

Rel: (Release) The time it takes after the signal has fallen below the threshold level for the compression to return to 1:1 from the adjusted ratio. The range is from 20ms to 2000ms.

Byp.: (Bypass) This button temporarily removes the compressor from the signal path for this channel. In Bypass mode the compressor does not require DSP processing power.

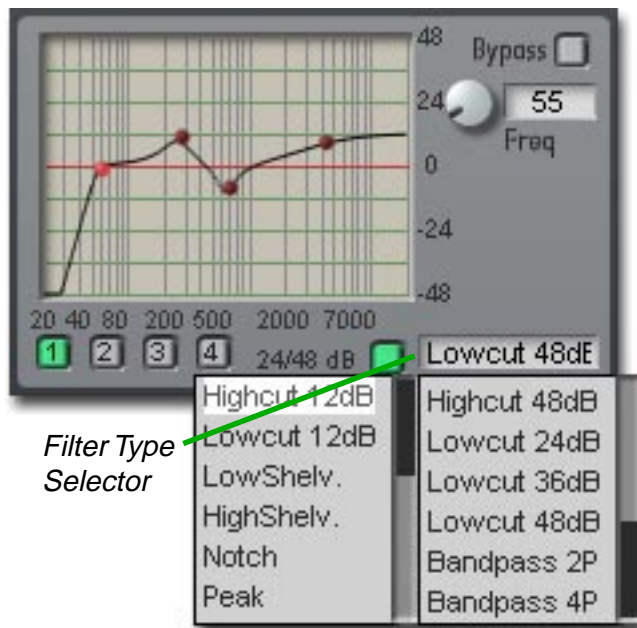
Pre EQ: (Pre EQ) This button lets you change the point at which the compressor lies in the signal path for this channel strip. Compression can take place before the EQ section (Pre is On) or after it (Pre is Off). If, for example, low frequencies are strongly filtered by the EQ, the compressor will treat the signal more accurately if it lies downstream from the EQ (Pre off).

SC: SC stands for 'Side Chain'. This option enables the side chain input to control compression from one of the mixer outputs. Click with the right mouse button on the text field next to the SC button to bring up a list of possible side chain sources. Select a mixer output to use (two for stereo channels).

The side chain signal, rather than the channel's signal itself, now controls the compression processing of the channel signal.

EQ

Each channel includes a four-band equalizer. Each band can be independently switched on or off.



Only if a filter band is switched on does it use any DSP resources.

For each band you can specify which type of filter to implement. For easier operation you can open a larger version of the graphic interface. The graphic area on the left shows a typical filter curve.

To add a band to the EQ, double-click in the graphic area. To remove an existing band, double-click on its node marker. You can also use the four buttons under the graphic display to enable a filter band or select it for editing.

Normally you will use a combination of filter types; for example, lowcut or low shelving for the low frequencies, a peak filter for middle frequencies, and highcut or high shelving filters above about 5kHz.

Bypass: Removes the EQ completely from the signal path.

Freq: Sets either the cutoff frequency or the center frequency of the selected band.

Q: This parameter (Quality) is available only for notch and bell filters. It controls the slope of the bell or notch curve. The range is from 0.7 to 20.

Gain: This controls the amount of cut or boost of the selected filter band. The range is from -12dB to +12dB. This parameter is available only for the bell and shelving filters.

To select a filter type, click the text field beneath the Gain control and drag the mouse up or down to scroll through the choices.

Highcut 12dB: Filters the frequencies above the cutoff frequency at a fixed slope of 12dB/octave.

Lowcut 12dB: Filters the frequencies below the cutoff frequency at a fixed slope of 12dB/octave slope.

The highcut and lowcut filters are also available with steeper slopes (24dB, 36dB, 48dB).

low shelving: Cuts or boosts the frequencies below the cutoff frequency (+/-12dB).

high shelving: Cuts or boosts the frequencies above the cutoff frequency (+/-12dB).

Notch: Filters (cuts) the frequencies at or near the center frequency.

Peak: Fully parametric peak filter.

Bandpass: A bandpass filter is so named because it passes a small band of frequencies and rejects others, both higher and lower. The range and amount of rejection depends on the basic slope and the quality factor (Q).

24/48dB: Switches between the two display ranges: a +/-24dB window or a +/-48dB window.

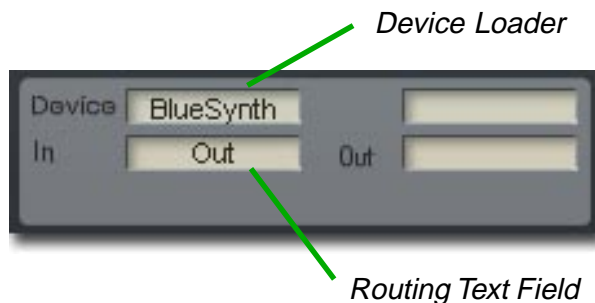
Inserts



Four Insert slots are available for each channel. A slot is empty when its text field is blank. To load an effect into a slot, use drag and drop to pull the effect from the file browser into the slot. The effect is then loaded, and its name appears in the slot. To enable the effect, click on the insert on/off button (Ins1-Ins4) next to the slot.

If a slot is switched on, but no effect is loaded, the signal flow is interrupted (blocked). There will be no output from that channel to the master bus.

Input and Output



These text fields manage the input and output routing for the selected channel. A channel consumes DSP power only when something is connected to it.

Device Loader: With this text field you can load a new device to connect to the channel, or connect a device already loaded into the Routing window. You can also use it to delete a device and its connections. Double-clicking on the field opens the device's control panel. Other functions are available in the context menu.

The name of the device appears in the text field, and its connections in the associated routing text fields.

Outputs, such as the Direct outs, cannot be associated with a device in this way. Devices can be loaded only for inputs.



When the device is loaded the channel automatically switches to mono or stereo as required, and any loaded inserts are removed. If a device has more than two outputs, only the first two will be connected.

Routing Text Fields: These fields indicate the connections, and through their context menus are also used to connect any devices loaded into the Routing window. Double-clicking on a field deletes a connection.

Navigation

The channel strip duplicated in the channel panel is identical to the channel strips in the channel pages, except it also has *previous* and *next* navigation buttons on each side of the channel number at the bottom. Use these to select the previous or next adjacent channel.

You can also jump to any channel by using the channel number scrolling textfield. Click on the channel number and drag the mouse up or down to register the desired channel. Or, click on the channel number and then use the computer's <Page Up> and <Page Down> keys to cycle through the channels.

Aux Send Page

This page shows the channel path of the selected Aux send (here Send1). In addition to providing all the parameters available on the Channel page, you can also establish connections with the Routing text fields on this page.

Device Text Field: Use this field to connect devices in the Routing Window to the outputs of the aux send bus. You can also disconnect devices here. Double-click on the text field to open the connected device's control panel. Access other functions through the context menu.

The name of the device connected to this channel appears in the text field. The actual connections are indicated in the Routing text fields.

Routing Text Field: This field indicates the connections, and through its context menu is also used to connect any device loaded into the Routing Window. Double-clicking on a field deletes a connection.



*Routing Text
Field*

*Device Text
Field*

Navigation

The aux send channels control the level of the respective summed aux signals.

Group Selector: Use this scrolling text field to assign the aux send to one of four possible groups. When two or more channels are assigned to the same group, their faders are coupled, and they switch in and out of mute simultaneously.

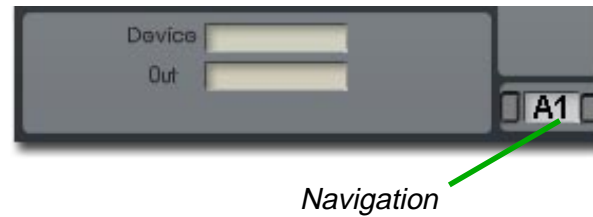
Mute: The Mute button (M) blocks the aux send signal or restores it. If this channel belongs to a group, the other channels in this group are also muted or unmuted.

Fader: The fader controls the level of the overall aux send signal. The associated text field indicates the output level. You can also type a value into the text field to set the level. The amplification range extends from inf. (no signal) to 0dB.

Navigation

The channel strip duplicated in the channel panel is identical to the channel strips in the channel pages, except it also has *previous* and *next* navigation buttons on each side of the channel number at the bottom right. Use these to select the previous or next adjacent channel.

You can also jump to any channel by using the channel number scrolling textfield. Click on the channel number and drag the mouse up or down to register the desired channel. Or, click on the channel number and then use the computer's <Page Up> and <Page Down> keys to cycle through the channels.



Aux Return Page

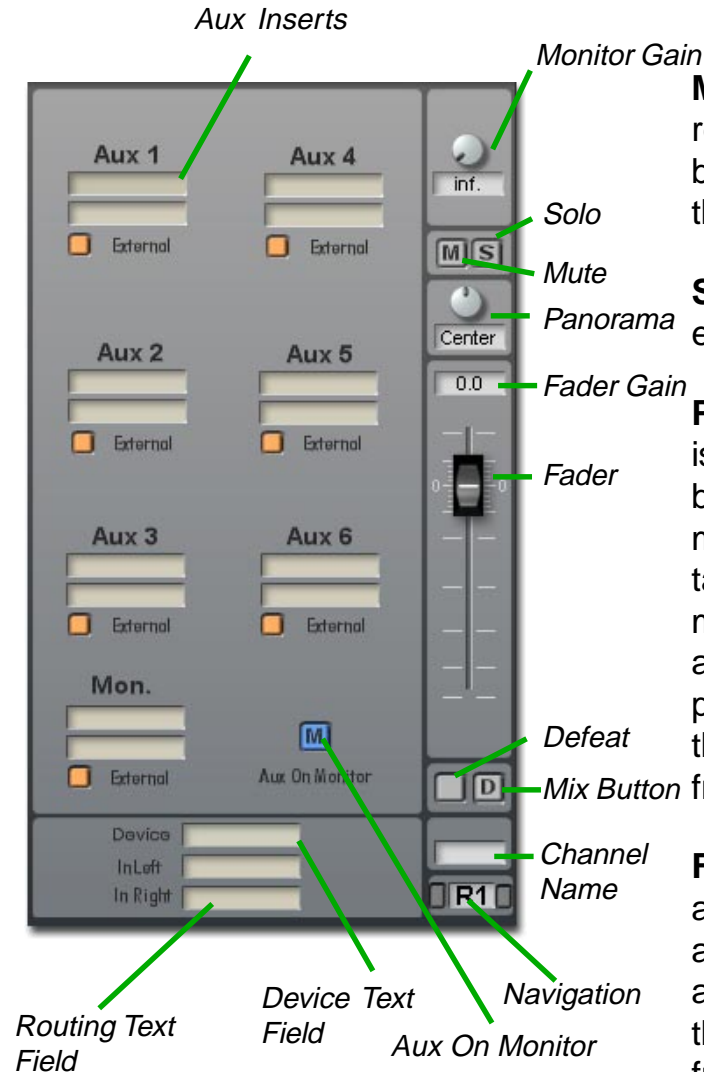
In addition to providing all the parameters available on the Channel page, you can also establish connections through the Routing text fields on this page.

This page also provides the Insert slots for the Aux Returns.

The aux returns are implemented in stereo, and provide most of the features of a stereo channel strip. It is through the aux returns that the signals from the effects devices driven by the aux send signals arrive back into the mix. Because of the special characteristics of the aux returns, there are some limitations on their use.

Monitor Gain: This control determines the proportion of the aux return to be routed to the monitor send. Therefore, it controls the level of the effect signal in the monitor mix.

Group Selector: Use this scrolling text field to assign the aux return to one of four possible groups. When two or more channels are assigned to the same group, their faders move together, and they switch in and out of mute simultaneously.



Mute: The Mute button (M) blocks the aux return signal or restores it. If this return belongs to a group, the other returns in this group are also muted or unmuted.

Solo: In the aux returns, this button enables exclusive-solo mode.

Pan: In the aux returns, the left channel is permanently assigned to the left master bus, and the right channel to the right master bus. Therefore, no crossfading takes place. In the center position the master bus receives the effects signals attenuated by about 3dB. If the pan position is set to hard right (for example) the left channel signal is entirely removed from the mix.

Fader: The fader controls the level of the aux return signal. The associated text field above indicates the output level. You can also type a value into the text field to set the level. The amplification range extends from inf. (no signal at all) to 12dB.

Mix: The Mix button (shown here in green) switches the aux return signal to the mix.

Solo Defeat: The Solo Defeat button (D) protects an aux return from solo mode. If another channel is solo'd, the return will not be affected (i.e. silenced).

Channel Name: You can type in any identifying name you like here (for example, "Reverb").

Device Text Field: Use this field to connect devices in the Routing Window to the inputs of the bus. You can also disconnect devices here. Double-click on the text field to open the connected device's control panel. Access other functions through the context menu.

The name of the device connected to this channel appears in the text field. The actual connections are indicated in the Routing text fields.

Routing Text Field: This field indicates the connections, and through its context menu is also used to connect any device loaded into the Routing Window. Double-clicking on a field deletes a connection.



Internal Aux Effects

Two insert slots are provided for each of the PulsarMixer's aux returns. In external mode, these slots can be used for processing of the return signal – for example, to apply a gate and EQ to the effect signal of an external reverb device.

When external mode is deactivated, the associated send and returns are connected to one another and hidden, so that they no longer appear in the Routing Window. The send output is connected to both of the return inputs. In this mode, the second (lower) slot continues to function as an additional effect slot – however, the first insert slot must already contain an effect in order to use the second slot. (The External switch should be left on when no return effect is being used in an aux path.)

When the board ID assignment for the first 12 channels is made, the Master section is included. Therefore, the aux return effects will also be loaded onto the specified board (provided that they are already loaded at the time the assignment is made).

Bus Page (Master Panel)

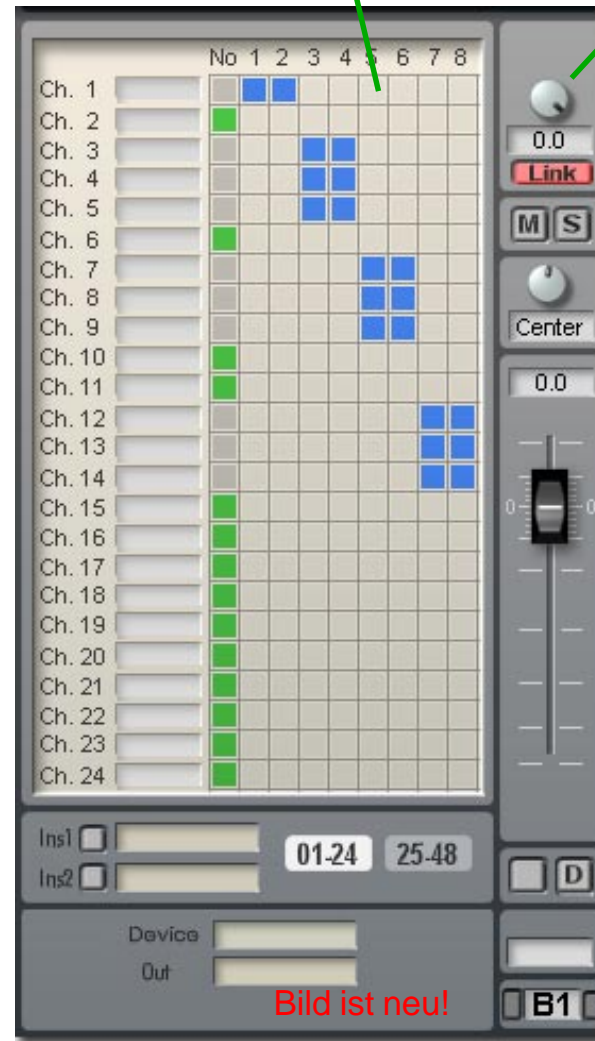
This page shows the selected bus channel path (here Bus1). In addition to the controls available on the channel page, this page provides the bus inerts and the ability to establish connections through the Routing text field.

This page also provides an overview of the bus routings for all individual channels. You can also change the channel bus assignments here.

Attenuator: Adjusts the level of the input signal before it passes through the bus channel path. Use this control to prevent overloading of the channel, and to set its basic level.

Link: Bus pairs B1/B2, B3/B4, B5/B6, and B7/B8 can be linked together. This couples the Faders and Mix controls. In linked buses, inserts are loaded into the left bus only. The two inserts automatically switch to stereo and apply to both buses. Solo Defeat and Mix buttons operate independent of the link status.

Bus Assignment



Bus Channel Strip

Solo: The solo button switches the bus in or out of solo mode. A bus solo makes sense only in exclusive solo mode. For technical reasons, solo buttons in linked buses always switch together.

Pan: In the bus channels, the left channel is permanently assigned to the left master bus, and the right channel to the right master bus. Therefore, no crossfading takes place. In the center position the master bus receives the signals attenuated by about 3dB. If the pan position is set to hard right (for example) the left channel signal is entirely removed from the mix.

Fader: The fader controls the level of the bus signal. The associated text field above indicates the output level. You can also type a value into the text field to set the level. The amplification range extends from inf. (no signal at all) to 12dB.

Mix: The Mix button switches the bus signal in or out of the mix.

Mute: The Mute button (**M**) blocks the aux send signal or restores it. If this send belongs to a group, the other sends in this group are also muted or restored.

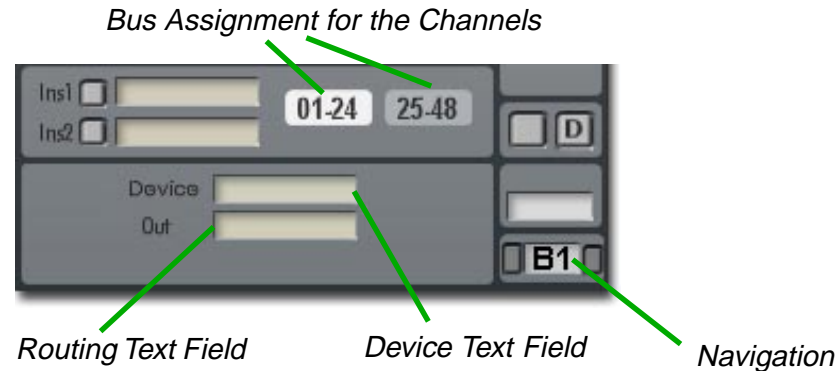
Solo Defeat: The Solo Defeat button (D) protects a bus channel from solo mode. If another channel is in solo, the bus channel will not be affected (i.e. silenced).

Channel Name: You can type in any identifying name you like here (for example, "Bus 1").

Channel Designation: The bus channels are designated B1 to B8.

Inserts: Two Insert slots are available for each channel. A slot is empty when its text field is blank. To load an effect into a slot, use drag and drop to pull the effect from the file browser into the slot. The effect is then loaded, and its name appears in the slot. To enable the effect, click the insert on/off button next to the slot.

If a slot is switched on, but no effect is loaded, the signal flow is interrupted (blocked). There will be no output from that channel to the master bus.



Device Text Field: Use this field to connect devices in the Routing Window to the bus outputs. You can also disconnect devices here. Double-click on the text field to open the connected device's control panel. Access other functions through the context menu.

The name of the device connected to this channel appears in the text field. The actual connections are indicated in the Routing text fields.

Routing Text Field: This field indicates the connections, and through its context menu is also used to connect any device loaded into the Routing Window. Double-clicking on a field deletes a connection.

Navigation

The channel strip duplicated in the channel panel is identical to the channel strips in the channel pages, except it also has *previous* and *next* navigation buttons on each side of the channel number at the bottom. Use these to select the previous or next adjacent channel.

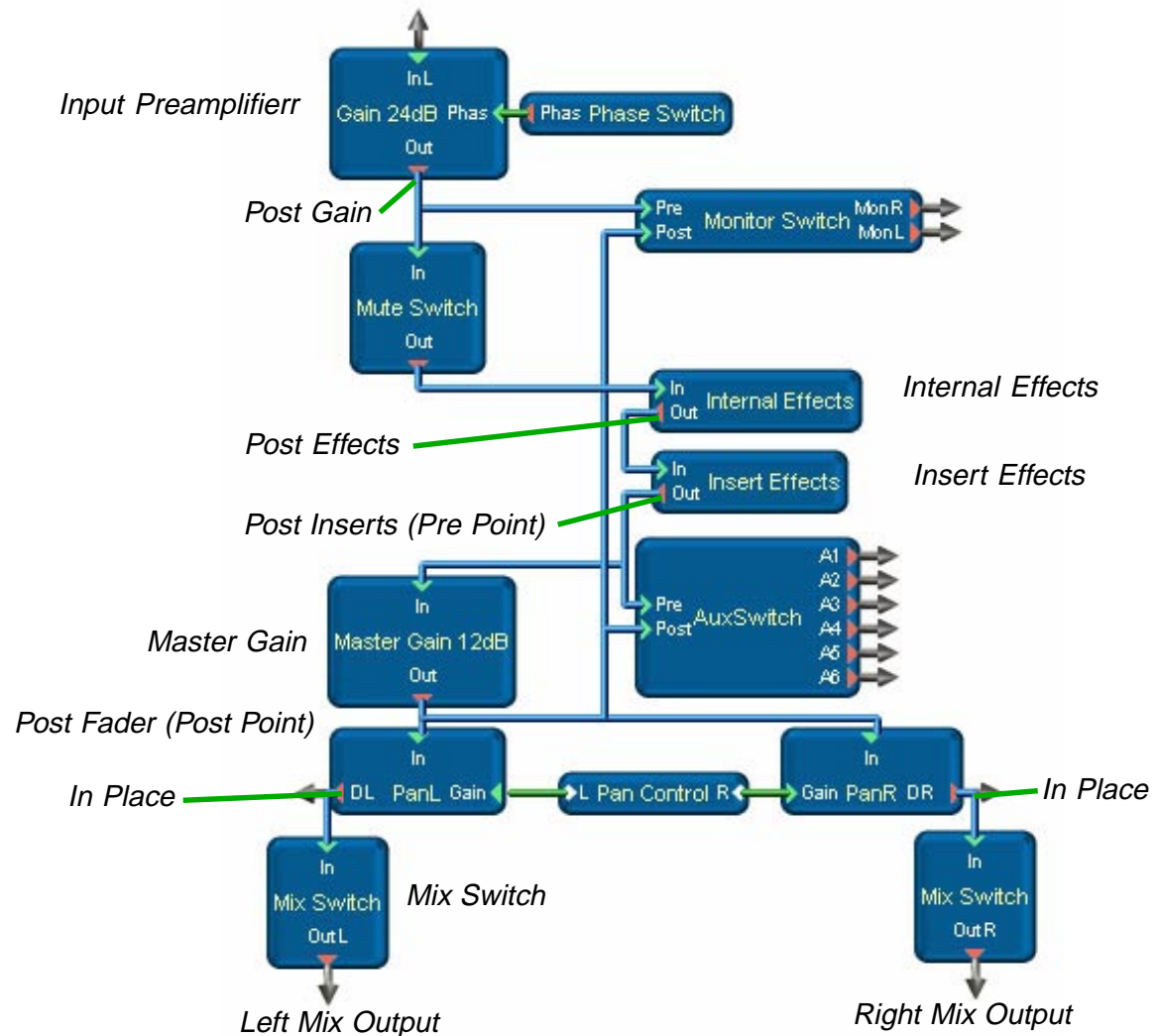
You can also jump to any channel by using the channel number scrolling textfield. Click on the channel number and drag the mouse up or down to register the desired channel. Or, click on the channel number and then use the computer's <Page Up> and <Page Down> keys to cycle through the channels.

Signal Flow

To better understand how your mixer works it is helpful to visualize the signal flow. The illustration at right shows the signal path for a single mono channel.

Input Amplifier: The channel input corresponds directly with the input connection on the mixer module. The signal arrives at the input amplifier where it is pre-amplified (Gain 24dB) and the phase is inverted (Phase switch) if desired. If the Monitor is set to Pre, the signal branches at the input amplifier's output creating a second, independent audio stream. If monitor is switched to Post, the signal branches from the post point instead (Post Master Gain).

Mute Switch: The next module in the signal path is the mute switch. When the mute switch is on, the signal is effectively blocked at this point.



Internal Effects: Downstream from the Mute switch lie the internal effects (EQ, Delay, Compressor). Each of the three effects can be bypassed (Bypass switch) so that the signal remains unaffected. The compressor can be connected before or after the EQ. The delay, however, is always upstream from the compressor. If the sidechain is disabled, it serves as a look-ahead delay.

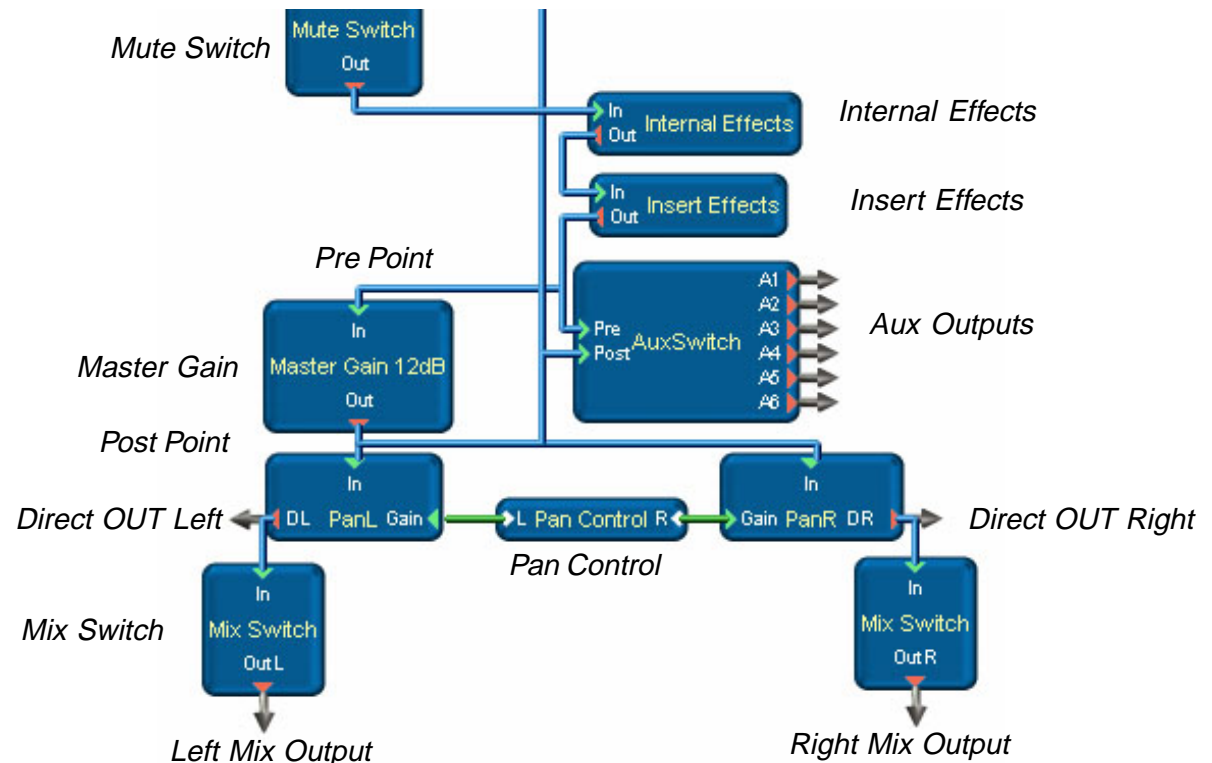
Inserts: The insert slots lie downstream from the internal effects. If a slot is enabled, but no effect is loaded into it, the signal is blocked as if Mute were switched on.

After passing through four insert slots, the signal branches again. The main signal goes to the Master Gain module, and the other branches across the Pre switch to the Pre point.

Aux Switches: The Aux switches determine which aux channels will receive a proportion of the channel signal.

Pre Point: The upstream point from which the aux signals branch (Pre on).

Master Gain: This module contains the Master Fader and therefore controls the overall output level of the channel.



Post Point: The downstream point from which the aux signals branch (Pre off)

The direct signal now passes to the Pan module.

Pan Control: This module contains the channel panel's Pan control. In 3dB mode it operates as a crossfade pan. In 6dB mode it is a linear pan. The outputs are connected to the record bus and to the

direct outs for the channel. Buses 1, 3, 5, and 7 are connected to the DL output and buses 2, 4, 6, 8 to DR. Pan control is always coupled to an odd-even pair so the bus can be used in mixdown as a subgroup.

Mix Switch: This switch determines whether the channel's signal will be sent to the left/right master bus or not.

Meter Mode

The level meters can read the channel signal or exclusive solo signal at any of 5 different points in the signal path:

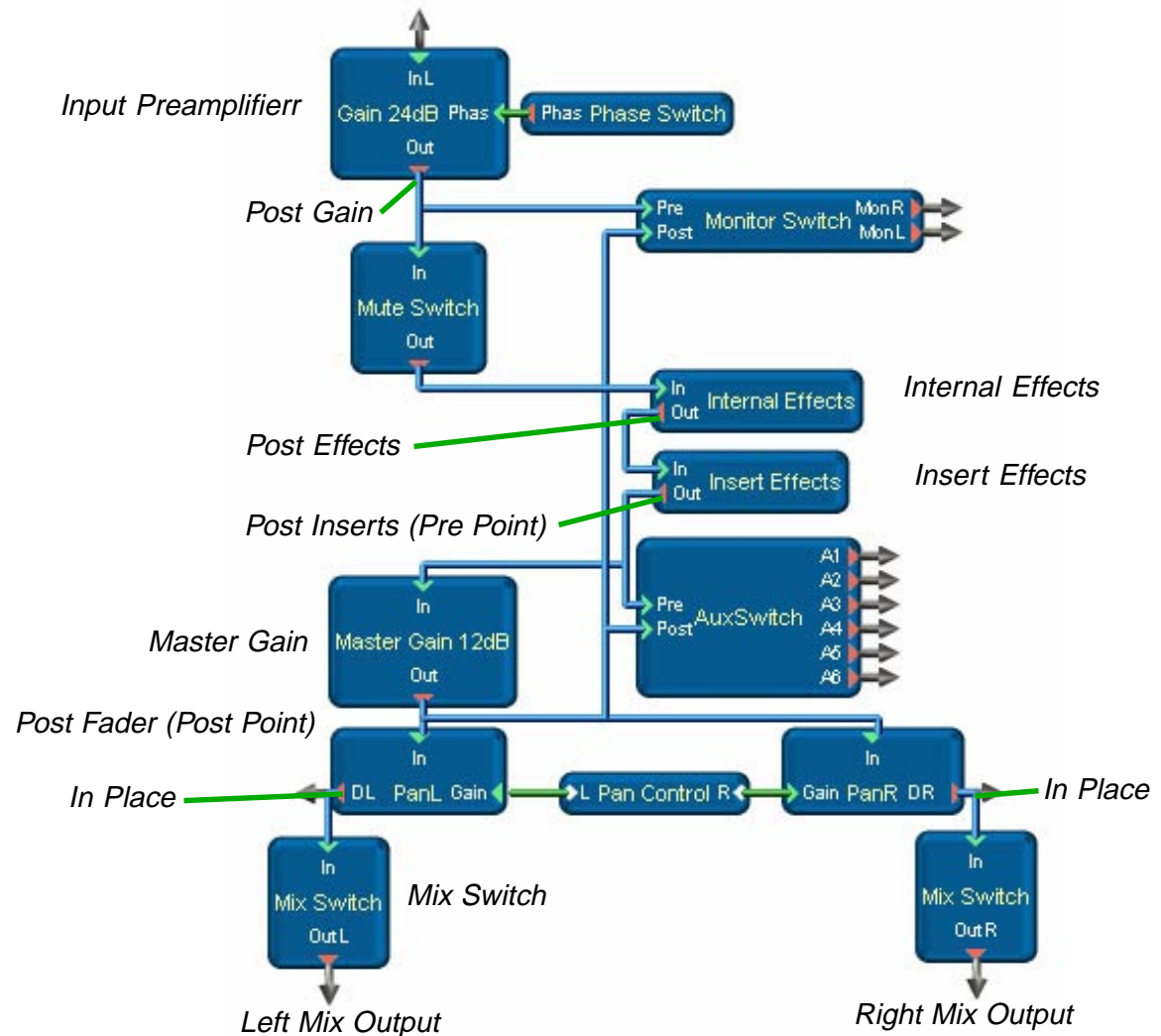
Post Gain: After the input pre-amplifier.

Post Effects: After the internal effects.

Post Inserts: After the insert effects.

Post Fader: After the master gain fader.

In Place: The signal as it exists in the master mix.



Headroom

All buses operate with 24dB of headroom. This means that you can process up to 15 phase-aligned signals peaking at 0dB without risk of internal overs. Since this never happens with real-world music signals you can use all channels without encountering any distortion.

If, however, you feel this is not sufficient, you can set all attenuators to, for example, -12dB and use the channel fader above 0dB. This gives you another 12dB of headroom - or 36dB - should you need it.

Internally, SFP operates at a 186dB dynamic range (32 bit) so that even 36dB of headroom is not audible, as 150dB of internal range is still available.

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