

3PLEX

ADVANCED TRIPLE LINE FILTER DELAY UNIT



Operation Manual

▪ 1. Welcome to 3Plex!

Welcome to Quadelectra 3Plex Advanced Triple Line Filter Delay Unit!

3Plex is a 3 x Stereo Delay Unit, with powerful State Variable Filters, Built-in Modulation Units, plus frankly we are very proud to say that 3Plex, has some very interesting features never before seen in any other device of its kind.

We've put a lot of hard work to bring you a powerful device, with many creative possibilities. A device that truly stands out, a device that's elegant and good looking!

With features like the 3 built in LFO units, pre-post filter chaining, the dedicated AHD envelopes for filter control, and the Global Buss Setup function, 3Plex boldly goes where no other filter delay unit has ever gone before ;-)

As always, we advise you to read the entire manual, to familiarize with the device, and discover its full potentials.

Thank you for purchasing 3Plex. We hope that you'll enjoy using it, and that it will inspire you on your future music quests.

2. Front Panel

The Front Panel is divided in 7 sections. These are from top-left to bottom-right:



- 1 Patch Browser
- 2 Main Controls
- 3 4 5 Stereo Filter Delay Lines
- 6 LFOs
- 7 Global Settings

Fig 2-1: The 3Plex Front Panel with the seven basic sections annotated.

1. **Patch Browser:** This is a typical for Reason devices, and enables you to select, load or save the settings of this device as a patch.
2. **Main Controls:** The main controls affect basic parameters of the sound. Their settings are not saved or loaded / changed within 3Plex'es patches, but with your song.
- 3, 4 & 5. **Delay Line (x3):** The three orange marked rows are the three independent stereo filter delay lines. Each one is divided in to five columns. We'll examine these columns later on.
6. **LFO:** 3Plex comes with its own three low frequency oscillators that you can use to modulate various parameters of the delay lines.
7. **Global Settings:** The Global section provides controls for settings that apply and affect the sound of the entire device.

2.1. The Patch Browser

3Plex comes with a standard device Patch Browser that works exactly like in any other Reason Device. You can scroll through the patches of a directory using the Up / Down buttons, Load and Save your favorite configurations as Patches. The name of the current patch, appears on the green-lit display next to the buttons.

Upon device creation the "Init Patch" configuration is loaded.

2.2. The Main Controls

The “Main Controls” section exposes controls that are per-song specific. Because of their “nature”, these settings will *NOT* be saved within or loaded along with patches. They will rather be saved within your song.

The controls are:

- **Duck:** This knob controls the amount of ducking of the wet signal.

Ducking is the procedure, during which the level of the wet signal is lowered for as long as the dry signal passes through the effect. Once there is no dry signal fed to the effect (silence), the wet signal is gradually restored to its normal level.

This feature is very useful when you want your dry signal to sound clean (f.e. vocals or guitar), in other words without being smudged by the delay effect, and still you want the delay effect to be apparent.

Ducking does just that: It lowers the level of the delay effect by an amount set by the corresponding knob, and restores that level back once the audio source fed to the delay becomes silent.

- **Mix:** Mix controls the analogy between the wet and the dry signal. When at 0% (fully left) the wet (delay) signal is not heard, and you can hear only the dry signal. When at 100% (fully right) it's the other way around: Only the wet signal is heard, and the dry signal is not audible.

For settings up to 50% the dry signal is unaffected, and the wet signal is gradually increased as you rotate the knob clockwise. After 50% the wet signal is unaffected and the dry signal is gradually lost.

At 50% both the dry and the wet signal are fed equally to the audio output of the device.

- **Pan:** Pan as one would expect, the “Pan” knob sets the audio panning position between the speakers.
- **Volume:** And of course the “Volume” knob corresponds to the device's main output volume.

2.3. The Delay Lines

3Plex as mentioned before has 3 separate delay lines. Visually these are represented by three horizontal rows colored orange and marked 1, 2 and 3 respectively.

The three delay lines are identical and work in the same manner. Each line is sub-divided into 5 columns. Just above the delay lines 4 white stripes describe what each column controls.

- The first column is not named. Per delay line the column is painted orange and labeled with a number after the delay line it controls. The only control there is the “Enable” button, which of course enables or disables that delay line.
- **Delay:** The “Delay” column controls parameters related to the delay time and topology. You have the ability to select between steps of synced delay time units such as 1/16 and 1/8T, and non-synced time units, milliseconds...

There's also a micro adjustment knob which will “tilt” the delay units to a shorter or a longer period.

Finally there's a "Pre-Filter" switch that alters the bus chain precedence between the filter and the delay modules.

- **Filter:** The "Filter" section provides controls related to the filter unit of your device. 3Plex comes with a five type State Variable Filter, which can be set to either 2 or 4 poles.

The filter unit also exposes controls that will allow you to modulate the cutoff frequency using the built-in LFOs.

In addition the filter cutoff frequency can be modulated by a dedicated AHD Envelope, the amount of which can be adjusted by the "Env" knob!

- **Envelope:** Each delay line's filter comes with its own AHD Envelope! This is a first for this kind of feature on a delay device.

The dedicated Attack, Hold, Decay envelope is triggered each time the delay line unit starts a new feedback loop. Using it on the cutoff frequency creates unique results, which can get more complex in conjunction with the LFO modulation.

- **Output:** Finally each delay line can be set to have an individual level and pan position. Both level and pan parameters can also be modulated by the built-in LFO units.

NOTE

There is more information about the Delay Lines later on this book.
See: "3. The Filter Delay Line In Depth" .

2.4. LFOs

3Plex comes with its own built-in three Low Frequency Oscillator modules that can be applied independently to the filter frequency, pan position or the output level of the device.

The LFO controls are simple and straightforward:

- **Rate:** The "Rate" knob controls the frequency of the LFO. Depending on the "Sync" switch, this value can be set either to time units (Hertz), or tempo measured units.
- **Waveform:** The "Waveform" LEDs and "Type" button can be used to select or step through the available LFO waveforms respectively. 3Plex has 5 available waveforms:
 - Saw (Ramp Down)
 - Triangular
 - Square
 - Sine
 - Sample & Hold (Random)
- **Sync:** The "Sync" switch changes the "Rate" knob setting to tempo measured units once enabled such as 1, 1T, 2D, 8, 16 etc. When disabled the "Rate" knob sets the oscillator frequency in Hz.

2.5. Global Settings

The Global Settings make changes, and affect the entire output audio of the device. These are:

- **Bus Setup:** The bus setup is yet another first time feature for a delay device. Besides the apparent parallel topology, the three filter delay lines can be configured in chain to process audio serially, or in a combined mode. More info on this feature can be found in section “3.7 The Global Bus Setup”.
- **Input:** The “Input” knob controls the input gain of the incoming audio. Of course audio gain is performed before any processing takes place.
- **Feedback:** The “Feedback” knob controls the feedback amount for all three delay line units. Global Feedback can be set to shorten or prolong the individual feedback amounts from the delay lines. When in middle, this knob does not affect the feedback amount.

Turning the feedback knob from the middle counter-clockwise, reduces individual feedback settings for all delay lines. Turning it the other way around, individual feedback is prolonged up to 200%.

Note that individual delay feedback values are always clamped to 100%.

- **LFO Amount:** The 3 knobs under the “LFO Amount” title, control the global amount of the LFO modulation sent to the Filter, Pan and Level respectively.

Unlike “Feedback”, the LFO Amount knobs cannot increase the modulation effect of their targets. Setting them to their highest value will leave the modulation unaffected, while lower values will gradually diminish the modulation until it's gone at leftmost position.

- **Env:** The Global Envelope / “Env” Knob affects the envelope to filter modulation for all delay lines. Like with its LFO Amount counterparts, the Global Envelope knob will leave the individual “Env” Amounts of the delay lines untouched when set to its higher value. Lower values will diminish the modulation until it disappears.

■ 3. The Filter Delay Lines In Depth

As mentioned before the 3 delay lines have identical controls, and perform the same way. In technical terms each filter delay line unit is separated in to 3 different modules:

- The Delay Module
- The Filter Module
- The Amp Module

In terms of interfacing with the user, each filter delay line unit is separated to the 5 different groups of controls, we discussed above in brief. In this chapter we shall examine these controls a bit further, in order to fully understand the delay lines functionality, individually but also as a whole.

The first group contains only the “Enabled” switch which resides above the label with the number of each delay line, and controls whether the line in question will be used or will be silent.

3.1. The Delay Section.

3Plex’es Delay Section, can be configured to feedback input audio either in song tempo or time values.

The “Time Unit” switch will step through 3 different time unit modes.



- **MS (Microseconds):** In this mode the “Time” knob sets the time of the delay loop in microseconds. The allowed value range is from 1ms to 2 seconds.
- **16 (One Sixteenth):** In this mode the “Time” knob sets the time of the delay loop in sixteenths. That is 1/16 of a bar in the current tempo. 4 steps of 1/16 equals 1/4, 8 steps equals 1/2 and so on.
- **8T (One Triplet Of Eight):** The “Time” knob sets the time of the delay loop in one triplet of eight (1/8T). 2 steps on that resolution equal one triplet of a quarter (1/4T), 3 steps equal one 1/4 and so on.

The “Time Fine Adjustment” knob although not labeled, is a smaller silver-black knob lying at the bottom right of the “Time” knob.

You can use this knob to make fine adjustments to the current time setting. Units for the “Time Fine Adjustment” are expressed as a bidirectional percentage offset of the actual time value.

So assuming you set the delay time knob to 400ms a fine adjustment of 10% will increase the actual delay loop to 440ms, whereas a fine adjustment of -10% will decrease the delay loop to 360ms.

Time Fine Adjustment can also be applied to song tempo units. So a fine adjustment setting of -25% to a 4 steps of 1/16 will in fact set the delay loop to 3/16, because reducing by 25% 4 steps will leave a remainder of 3 steps for the delay loop.

NOTE

Setting 2 delay lines to an equal delay time, altering the fine adjustment to one of them, and then panning them left and right respectively, will add a very nice extra width to the stereo image of your delay.

3.2. The Filter Section.

3Plex comes with a very powerful State Variable Filter section, equipped with 5 modes. As in any other filter, a Cutoff Frequency knob, in this case labeled "Freq", controls the base frequency according to which the filter operates. The knob labeled "Reso", controls the filter's resonance. Increasing the filter's resonance, will "pronounce" the cutoff frequency more distinctively, altering the character of the output result.

You can select the filter mode using the "Type" button, to step through the various settings. The five available modes of the filter are:

- **LP (Lowpass):** Allows to pass-through frequencies lower than the cutoff frequency.
- **BP (Bandpass):** Allows low and high frequencies near the cutoff frequency to pass-through.
- **HP (Hipass):** Allows to pass-through frequencies higher than the cutoff frequency.
- **BR (Band Reject / Notch):** Does NOT allow high and low frequencies near the cutoff, to pass-through.
- **PK (Peak):** Amplifies high and low frequencies near the cutoff frequency, while allowing the entire frequency range to pass-through.

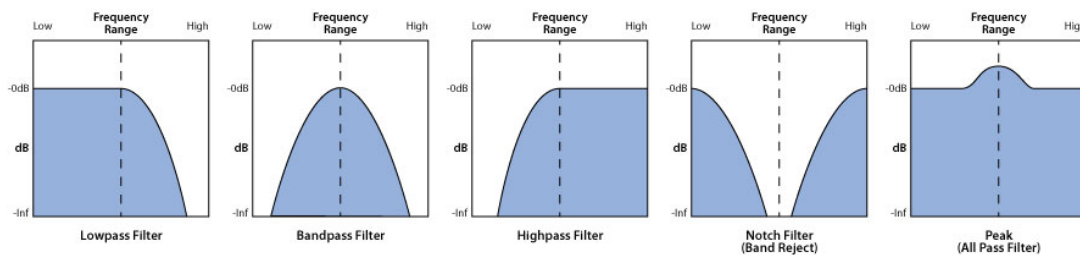


Fig 3.2-1: The five available filter types. The dotted line represents the cutoff frequency. Higher frequencies extend to the right of the CF, while lower frequencies extend to the left.

3Plex's filter is a 2-pole -12db per Octave SVF filter. However there's an option to double its strength to 4-pole -24db per Octave, by clicking the "Poles" switch, right under the "Type" one.

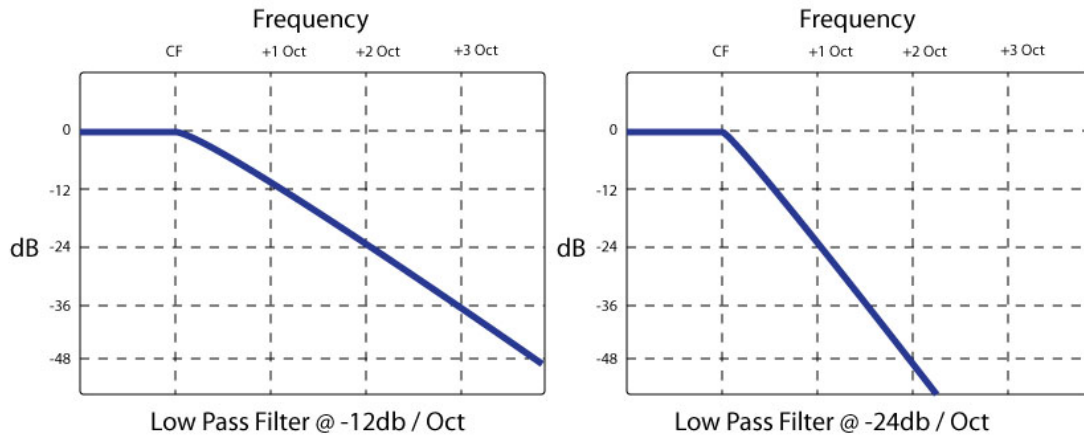
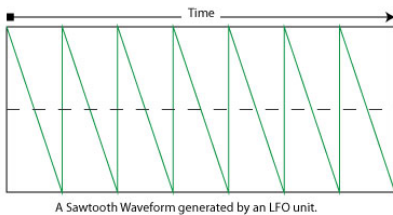


Fig 3.2-2: The frequency responses from a -12db/Oct filter (left) and -24db/Oct filter (right). Notice that in the -24db filter, the output level for each frequency drops twice as much as the one from the -12db.

A 4-pole / 24db filter will “cut” more rapidly neighboring frequencies to the cutoff one. Thus the filtering result will be more precise, and “edgy”.

3.3. LFO Modulation

Your 3Plex device comes with 3 different LFO units that you can use to modulate the pan, the level, and of course the cutoff-frequency for each delay line.



You can pick the LFO modulation source by pressing the “Src” button to step through these units on the upper-left of the filter, in this case, section.

The knob right below “Src” button and LEDs, controls the amount of the modulation from the LFO source you’ve selected to the filter.

The knob is bi-directional. This means that when positioned in the middle there is no modulation effect from the LFO to the filter. Positive values (turning the knob clockwise from the middle - to the right) will modulate the cutoff frequency according to the LFO selected waveform and speed.

However negative values (turning the knob counter-clockwise from middle - to the left) will modulate the cutoff frequency to the inverse direction of that of the waveform.

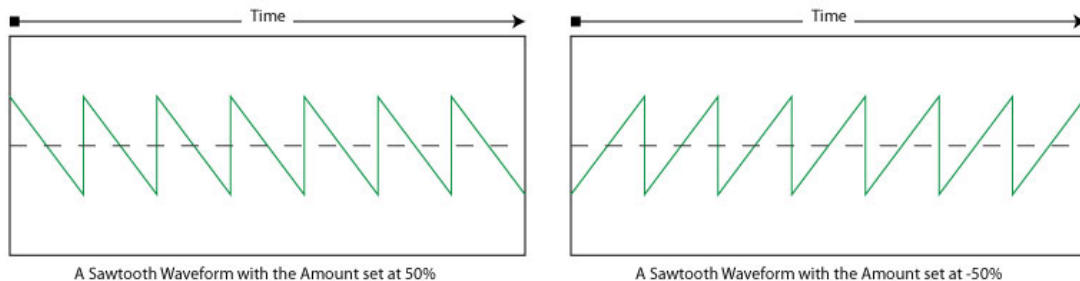


Fig 3.3-2: The LFO wave form after scaled by the “LFO” (LFO Amount) Knob. Notice how the waveform transforms when using negative values.

LFO modulation works in a similar manner for both Level and Pan, as we’ll see in the Output section.

3.4. Pre-Filter & Post-Filter Delay Chain.

3Plex enables you to alter the order between the Filter and Delay modules. The sequence between the two can produce very different results in the output audio.

You change the order between the Filter / Delay modules by enabling or disabling the "Pre Filter" switch located at the bottom-right of the "Delay" Section.

Pre-Filter Configuration ("Pre-Filter" Switch On)

Output from the Delay is fed to the Filter. This configuration will cause all delay feedback to be filtered.



Post-Filter Configuration ("Pre-Filter" Switch Off)

Output from the Filter is fed to the Delay. This configuration will cause the delay to feedback the results of the dry signal after filtration.



Fig 3.4-1: The Pre and Post Filter configurations. Resulting output is significantly different from one configuration to the other.

- Pre-Filter ("Pre-Filter" Switch Enabled): This will cause the output of the delay - feedback loops- both old and new, to be filtered by the corresponding module, under the current cutoff frequency.
- Post-Filter ("Pre-Filter" Switch Disabled): This is an entirely different concept: Incoming audio is filtered first and then fed into the Delay module. The filter will not affect the feedback loop, thus older feedback loops will repeat the filtered audio as it was recorded, and changes in the filter's cutoff frequency will only affect newer feedback loops as they are being recorded.

If you did not understand the above in theory, consider experimenting by doing this:

- Create A Dr. OctoRex and load a loop.
- Create A 3Plex as an insert effect for the Dr. OctoRex.
- Record / Automate the cutoff frequency for a few bars.
- Crank up the filter resonance and feedback to a setting above middle.
- Playback once enabling the "Pre-Filter" switch and once disabling it.

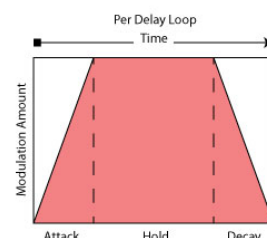
As you can hear changes in the cutoff filter frequency are repeated by the delay when the "Pre-Filter" switch is off. When you enable the switch, the entire delay feedback loop is filtered according to the cutoff frequency.

3.5. The AHD Envelope On The Filter

Another powerful feature of 3Plex is the dedicated Filter AHD Envelope.

AHD stands for Attack, Hold and Decay, which correspond to the 3 modulation stages the envelope provides. These stages are "fired" sequentially over time.

The Envelope "Attack" determines, the rate, how fast, that is, will the filter frequency will change from the lower setting set



by the cutoff frequency knob the highest possible value, which is set by the “Env” knob of the Filter section. The “Attack Stage” of the envelope is the time period, during this procedure takes place.

“Hold” determines the time in seconds, that the envelope will retain its highest value. The envelope remains on the “Hold State” for as long as the “Hold” knob is set.

The third and final “Decay Stage” is the exact opposite of the “Attack Stage”, so “Decay” refers to the speed needed to lower the filter frequency from the highest value back to the lowest.

The entire procedure is repeated (the envelope is retriggered) every delay loop. If the AHD values construct an envelope with longer execution period than the delay loop, the envelope will be stopped in its current stage and retriggering will be forced upon the new delay loop.

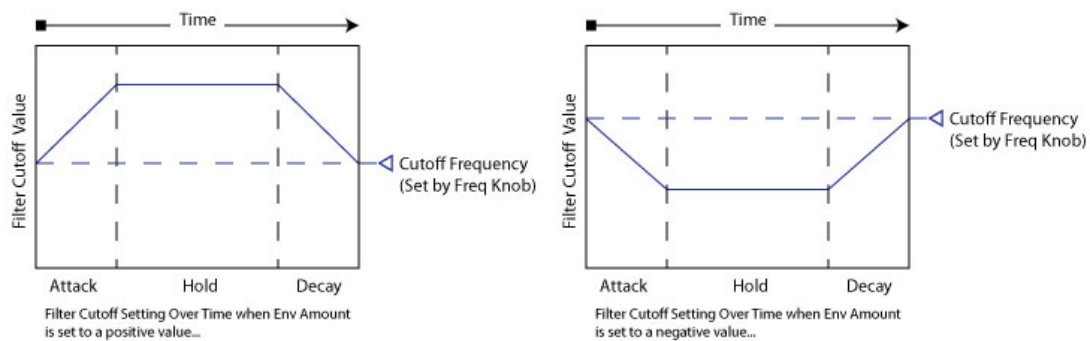


Fig 3.5-2: The Envelope Modulation on Cutoff Frequency over time. Notice that the resulting value is added to the value of the filter’s Cutoff Frequency.

The “Env” knob of the filter is bidirectional just like the “LFO” Knob we saw before. So - again- setting it to the middle position the envelope will have no effect on the filter.

Positive values (turning the knob from the middle clockwise) will add the envelope modulation amount to the cutoff frequency of the filter, while negative values (turning the knob counter-clockwise from the middle) will subtract the modulation amount from the value of the cutoff frequency. Figure 3.5-2 illustrates this behavior over time.

3.6. Output

The “Output” column exposes functionality of the “Amp Module” to the user. Settings to the Level and Pan can be made from here.

Both “Level” And “Pan” knobs provide constant (and of course, automatable if desired) values for their respective properties, but you have also the ability to apply LFO modulation to them as well.



The appliance of LFO modulation is similar to the one in filter: You can select a source by stepping through the 3 units using the “Src” button and set the modulation amount using the “LFO” bi-directional knob underneath.

3.7. The Global Bus Setup

One of the most powerful features of 3Plex is not to be found on the Delay Lines themselves but under the “Global” section of the device. The Global Bus setup actually takes the possibilities of 3Plex many miles ahead...

What the Global Bus Setup does, is that it changes the topology of the 3 delay lines!

Up to now similar devices exposed multiple delay lines that worked only in parallel mode. This means that the audio input was processed separately from each delay line and their individual outputs were mixed to produce the final result.

3Plex'es Global Bus Setup, gives you the ability to arrange the delay lines in a serial chain - one after the other, or in a combined setup with one delay line feeding its output to the other two!

The Global Bus Setup offers these three modes:

- **Serial:** Delay line #1 receives the audio input and feeds its output to delay line input #2. Delay line #2 feeds its output to delay line #3 input and finally delay line #3 outputs its audio to the audio out of the device.
- **Combo:** Delay line #1 receives the audio input and feeds its output to both delay lines #2 and 3. Delay lines #2 and #3 output their audio to the device's audio out.
- **Parallel (Default):** All lines receive the audio input and output their result to the device's audio out.

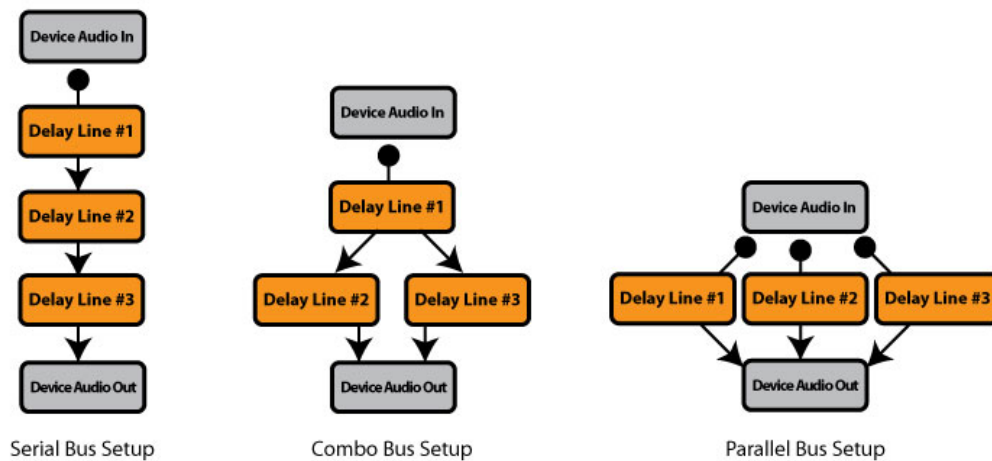


Fig 3.7-1: The Global Bus Setup Modes schematic.

Along with the filtering and the individual leveling and panning of each delay line, the Global Bus Setup enables you to achieve complex and "weird" results, with ease of use like never before.

4. The Back Panel

3Plex's Back Panel, is separated into 4 regions. On the left of the back panel, you will find inputs and outputs that deal with the device as a whole. While on the right of the back panel, you'll find 3 different regions, one per delay line.



Fig 4-1: The 3Plex Back Panel.

4.1. Audio Inputs / Outputs

3Plex is a true stereo device. A stereo audio input and a stereo audio output are provided.

In case of a mono input, left input is passed to the right input, before any processing.

4.2. Global CV Inputs / Outputs

The global CV Inputs affect global device parameters. The provided inputs are:

- Pan CV In: Modulates the main Pan Position
- Global Env Amt CV In: Modulates the global Envelope Amount
- Dry / Wet Mix CV In: Modulates the main Dry / Wet Mix Amount.
- Global Feedback Amt CV In: Modulates the Global Feedback Amount
- Volume CV In: Modulates the main Volume / Level.
- Input Level CV In: Modulates the amount of Input Gain.

The device also provides output CV connections from the LFO units.

4.3. Delay Line CV Inputs / Outputs

Per delay line these CV Inputs are provided:

- Level CV In: Modulates the Output Level.
- Pan CV In: Modulates the Output Pan.
- Filter CV In: Modulates the Filter Cutoff Frequency.
- Resonance CV In: Modulates the Filter Resonance.
- Feedback CV In: Modulates the Feedback Amount.
- Time CV In: Modulates the current Time amount (Steps or MS depending on the Time Unit Setting)

Each delay line region outputs the dedicated filter envelope.

▪ **APPENDIX I: Device Specifications**

Name:	3Plex Advanced Triple Line Filter Delay Unit
Size:	5U
Type:	Stereo Filter Delay Unit x 3 with configurable topology.
Audio Inputs:	1 x Stereo Input
Audio Outputs:	1 x Stereo Output
CV Inputs:	Global: Pan, Global Env Amount, Dry / Wet Mix, Global Feedback Amount, Volume, Input Gain. Per Delay Line: Pan, Level, Filter Cutoff, Filter Resonance, Feedback Amount, Time Amount.
CV Outputs:	LFO 1 Out, LFO 2 Out, LFO 3 Out, Delay Line 1 Env Out, Delay Line 2 Env Out, Delay Line 3 Env Out.

■ APPENDIX II: MIDI CC Implementation

MIDI CC	Parameter
7	Main Volume
8	Dry / Wet Mix
10	Pan
16	Duck
20	Input Level (Gain)
80	Global: Filter LFO Amount
81	Global: Pan LFO Amount
82	Global: Volume LFO Amount
83	Global: Env Amount
85	Global: Bus Setup
86	Global: Feedback Amount
130	Delay Line 1: Enabled
131	Delay Line 1: Time Unit Select
132	Delay Line 1: Time Unit (ms)
133	Delay Line 1: Time Unit (Steps)
134	Delay Line 1: Time Micro Adjust
135	Delay Line 1: Feedback
136	Delay Line 1: Pre-Filter Switch
137	Delay Line 1: Filter Env Amount
138	Delay Line 1: Filter LFO Amount
139	Delay Line 1: Filter LFO Source
140	Delay Line 1: Filter Cutoff Frequency
141	Delay Line 1: Filter Resonance
142	Delay Line 1: Filter Type
143	Delay Line 1: Filter Poles
144	Delay Line 1: Envelope Attack
145	Delay Line 1: Envelope Hold
146	Delay Line 1: Envelope Decay
147	Delay Line 1: Level LFO Amount
148	Delay Line 1: Level LFO Source

149	Delay Line 1: Level
150	Delay Line 1: Pan LFO Amount
151	Delay Line 1: Pan LFO Source
152	Delay Line 1: Pan
155	LFO 1: Sync Switch
156	LFO 1: Rate (ms)
157	LFO 1: Rate (Units)
158	LFO 1: Waveform
160	Delay Line 2: Enabled
161	Delay Line 2: Time Unit Select
162	Delay Line 2: Time Unit (ms)
163	Delay Line 2: Time Unit (Steps)
164	Delay Line 2: Time Micro Adjust
165	Delay Line 2: Feedback
166	Delay Line 2: Pre-Filter Switch
167	Delay Line 2: Filter Env Amount
168	Delay Line 2: Filter LFO Amount
169	Delay Line 2: Filter LFO Source
170	Delay Line 2: Filter Cutoff Frequency
171	Delay Line 2: Filter Resonance
172	Delay Line 2: Filter Type
173	Delay Line 2: Filter Poles
174	Delay Line 2: Envelope Attack
175	Delay Line 2: Envelope Hold
176	Delay Line 2: Envelope Decay
177	Delay Line 2: Level LFO Amount
178	Delay Line 2: Level LFO Source
179	Delay Line 2: Level
180	Delay Line 2: Pan LFO Amount
181	Delay Line 2: Pan LFO Source
182	Delay Line 2: Pan
185	LFO 2: Sync Switch
186	LFO 2: Rate (ms)

187	LFO 2: Rate (Units)
188	LFO 2: Waveform
190	Delay Line 3: Enabled
191	Delay Line 3: Time Unit Select
192	Delay Line 3: Time Unit (ms)
193	Delay Line 3: Time Unit (Steps)
194	Delay Line 3: Time Micro Adjust
195	Delay Line 3: Feedback
196	Delay Line 3: Pre-Filter Switch
197	Delay Line 3: Filter Env Amount
198	Delay Line 3: Filter LFO Amount
199	Delay Line 3: Filter LFO Source
200	Delay Line 3: Filter Cutoff Frequency
201	Delay Line 3: Filter Resonance
202	Delay Line 3: Filter Type
203	Delay Line 3: Filter Poles
204	Delay Line 3: Envelope Attack
205	Delay Line 3: Envelope Hold
206	Delay Line 3: Envelope Decay
207	Delay Line 3: Level LFO Amount
208	Delay Line 3: Level LFO Source
209	Delay Line 3: Level
210	Delay Line 3: Pan LFO Amount
211	Delay Line 3: Pan LFO Source
212	Delay Line 3: Pan
215	LFO 3: Sync Switch
216	LFO 3: Rate (ms)
217	LFO 3: Rate (Units)
218	LFO 3: Waveform