Stereo Tapped Delay STD-1

OWNER'S MANUAL

Release No.1 for http://www.adadepot.com

Thank you for purchasing the A/DA Stereo Tapped Delay. By doing so, you have qualified yourself as an innovative user of state-of-the-art technology. Since analog delay technology first came to the consumer market in the early seventies, design engineers and manufacturers have steadily increased the performance and features available in signal processing equipment. We feel that the STD-1 represents the very latest in application of electronics to time-domain processing.

Within the STD-1, many new circuit designs have been used which strive to retain maximum usefulness to both musician and recording engineer. Additionally, this design uses two integrated circuits new to the industry. The tapped analog delay line, which is the heart of this system, is a single 1C which provides capabilities for moderately long delays while simultaneously providing five additional signal taps at nonharmonic intervals along the delay line. The result is a single 1C which can serve as any one of six delay lengths, as well as using combinations of taps for more complex effects and ambience. This complex array of taps was originally designed to simulate the multiple repeats and random structures of acoustic reverberation. This is only one clue of the many uses you will find for the Stereo Tapped Delay.

A second novel circuit incorporated into the STD-1 is a noise reduction system designed around the latest version of compressor/expander ICs. The new design allows for faster tracking of attack transients, while still minimizing pumping and tracking errors throughout its range of operation. The result is more accurate noise reduction with less coloration of your signal. This unit contains the equivalent of two full noise reduction systems (one compressor in the input circuit, one expander on each of the two outputs, and one expander in the regeneration circuit) to ensure that the full system will be as noise-free as possible.
While we are sure that you are anxious to put your new Stereo Tapped Delay to work in your latest musical ventures, we ask that you take the time to read through this manual as you set up and first experiment with the unit. There are many unique applications for this unit, and this manual will begin to open those doors for you. Once operation of the front panel is understood, only your experimentation and imagination should limit your application of the STD-1.

SPECIFICATIONS

Dynamic Range	93dB unweighted
Equivalent Input Noise (EIN)	-112 dBV (ref. .775 Vrms)
Bandwidth, dry	10 Hz to 20KHz
delay	20 Hz to 13.5KHz
Distortion (THD) @ 1 KHz	dry, 0 dBV 0.05%
	wet, 0 dBV 0.55%
	dry, +4 dBV 0.065%
	wet, +4 dBV 0.75%
Input (Instrument Version)	40K ohm, single ended, 1/4" phone jack or 1 Megohm, FET input, single ended, 1/4" phone jack (switchable).
Input (Studio Version)	40K ohm, single ended, 1/4" phone jack or 600 ohm, active balanced, XLR connector.
Ouput (Instrument Version)	Two single ended, 1/4 phone jacks, drives 600 ohm.
Output (Studio Version)	Two, single ended, 1/4" phone jacks, drives 600 ohm or two, 600 ohm balanced, transformer coupled, XLR connectors.
Maximum Input Level	+20 dBV, 40K ohm, single ended or balanced +6 dBV, 1 Megohm
Maximum Output	+20 dBM
Gain	-15dB to+27dB
Delay Time	Tap 1 1.3 ms to 6.5 ms
	Tap 2 2.2ms to 11 ms
	Tap 3 4.6 ms to 20 ms
	Tap 4 5.8 ms to 29 ms
	Tap 5 8.3 ms to 46.5 ms
	Tap 6 11.1 ms to 55.5 ms
Sweep Rate	0.1 sec to 25 sec
Sweep Modulation	.01 sec to 0.5 sec
Delay Time C.V. Input	0 to +5 volts
Sweep Speed C.V. Input	0 to +5 volts
C.V. Mix Output	0 to +5 volts
Remote Switch Logic	Grounding terminal engages
Power	100-130 VAC. 50/60 Hz
Power Consumption	12 watts
Option A-Export	220-240 VAC 50/60 Hz
B-Studio	Studio Version (See above)
Accessories	CONTROL PEDAL A
	Dual Remote Footswitch

CONTROL FUNCTIONS

HEADROOM.	An 8-step LED meter with a 36 dB range displaying signal level relative to clipping level.
INPUT LEVEL.	A pad that accepts levels up to +20 dBV.
INPUT IN.	Engages or bypass the effect section of the STD-1 (remotely controllable). LED indicates effect is engaged.
OUTPUT MIX A.	Determines the mix between Buss A and Dry signal to Output A.
OUTPUT MIX B.	Determines the mix between Buss B and Dry signal to Output B.
EFFECT LEVEL.	Adjusts the effect output signal -15 dB to +27 dB.
REGENERATION IN.	Engages or bypasses the Regeneration section (remotely controllable). LED indicates Regeneration is engaged.
REGENERATION LEVEL	Controls the amount of the signal fed back to the input.
REGENERATION HI-CUT.	Reduces the high frequency content in the fed back signal. Adjustable from 12KHz to 800 Hz.
REGENERATION TAP.	Selects Tap 1, 3 or 6 as a source for the regenerated signal.
TAP ASSIGN.	Determines which of six Taps are to be routed to Buss A or B.
DELAY FIXED.	Provides a 1-5X continuously variable delay range from each Tap.
DELAY C.V. MIX.	Determines the proportion of the Sweep voltage and Fix voltage that controls the delay time.
DELAY SWEEP.	Varies the Sweep rate over the entire delay range at slow speeds (25 sec.) and automatically tapers its range at fast sweeps (.1 sec.).
DELAY SWEEP MODULATION.	Superimposes a continuously variable Sweep pattern over the regular Sweep and is disabled when turned fully counterclockwise.

REAR PANEL FUNCTIONS

C.V. IN DLY.	A voltage controlled input that allows direct control of time delay with an externally applied voltage.
C.V. IN SWEEP.	A voltage controlled input that allows direct control of Sweep rate with an externally applied voltage.
C.V. OUT.	A buffered output from the C.V. Mix control.
FOOTSWITCH.	Allows connection of a remote dual footswitch for effect in/out and Regeneration in/out.

INITIAL SETUP

To prepare the STD-1 for first use, set the front panel controls as shown above. In the following sections we will step through the front panel explaining the functions of all controls and providing descriptions of the range and applications of the numerous features available on the STD-1.

Connect the signal source to the INPUT jack on the rear panel. If you are using the standard "instrument" version, note that you are provided with a HI/LO impedance matching switch to allow for use with a wide range of signal sources. Set this switch to the appropriate position for your instrument or, if you are unsure of the level generated by your instrument, set the switch to the HI position. On the Option B "studio" version of the STD-1, both low impedance balanced and mid impedance unbalanced connections are provided. Connect the appropriate input to the signal source, or to the Effects Send output of the studio console. For guitars (without preamps) use the HI impedance setting since it will not load down and damp the high frequency response of the guitar.

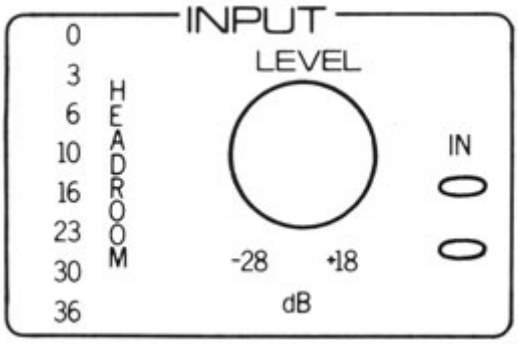
Two outputs are provided, as one of the strengths of the STD-1 is the ability to generate complex stereo signals from a mono source. However, mono processing can still be accomplished through the use of only one output channel, either OUTPUT A or OUTPUT B. Again, note that the "studio" version allows for either balanced or unbalanced connections. In an instrumental setup, the most versatile output connection would be driving two amplifiers separated by enough distance to create the stereo motion or ambience effects. Using a two channel amplifier (such as a guitar amp with a 'normal' and a 'reverb' channel) can still create some interesting effects by setting each channel for different tone and effects levels. However, most effects wiff be more graphic through the use of a stereo reproduction system. In a studio environment the output connections become slightly more complicated depending on inputs available on your console, the effects you are creating, and many other factors. If you are using the Effects Send system as outlined above, you will need to work out an alternative for routing back into the console as true stereo. Most semi-pro consoles will only have a mono Effects Return input. If this is your case, try returning the STD-1 outputs to the AUX INPUTS. Most Auxiliary inputs have level controls which are useful as effects return levels.

If your AUX INs are not available, look for direct BUSS INPUTS for the submix or output mix stages. If no such source is provided for a stereo effects return, you may be required to use two of the input channels as the return. In this last case, be sure to have all effects and monitor sends at minimum (at least until you become familiar with the operation of the STD-1), and the pan controls at opposite extremes. One additional note to studio users: be sure to check the OUTPUT controls for MIX A and MIX B. In the majority of cases, the original dry signal will be routed to the output mix through internal routing. To avoid excessive dry signal level, lack of effect depth, or blurring of stereo image, the OUTPUT MIX controls should be set fully towards EFFECT.

With inputs and outputs properly terminated, apply power to the unit by connecting to a grounded outlet and selecting the ON position of the rear panel power switch. The power indicator LED at the right of the front panel should now be on. If not, check your power source and the rear panel fuse.

An 8-step HEADROOM LED meter is provided for accurate adjustment of the input signal relative to the clipping level. It is active whether or not the STD-1 effect is in. To properly set the levels for optimum dynamic range, adjust the INPUT LEVEL and OUTPUT EFFECT LEVEL as follows: Find the absolute loudest chord or passage that you will run into the STD-1 and set the INPUT LEVEL control to just barely light the red "0" HEADROOM LED. Set the

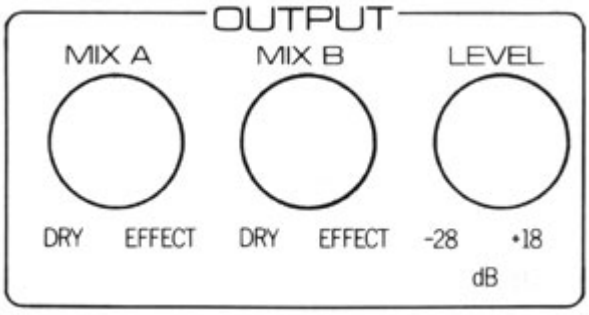
OUTPUT EFFECT LEVEL initially fully-counterclockwise and listen to the output level when the INPUT IN switch is in the OUT or bypass position (down). Now push the INPUT IN switch up into the effect IN position and turn the OUTPUT EFFECT LEVEL clockwise until the output level matches the output level when the INPUT IN switch was down. Go back and forth to get a close level match. The STD-1 is now set-up for use.



INPUT SECTION

As your instrument or signal source is applied to the STD-1 input, you will notice the HEADROOM indicator beginning to flicker. Note that this is a true headroom indicator with the 0 dB position indicating the onset of clipping rather than the normal 0 dB operating level as on most devices. This allows for very careful monitoring of the effects level passing through the internal delay line. The type of signal being processed, along with various settings of the STD-1 front panel, will dictate the actual headroom allowance you will wish to observe. For example, transient or high dynamic instruments such as piano or drums will require more headroom than instruments such as horns or pre-compressed signals, which may be able to ride much closer to the clipping point. Note again that the HEADROOM indicator monitors the signal level entering the delay line, thus the REGENERATION LEVEL control will be able to affect the readings seen here. When performing real-time manipulation of the regeneration effects, always remember to monitor the HEADROOM indicator for possible overloads.

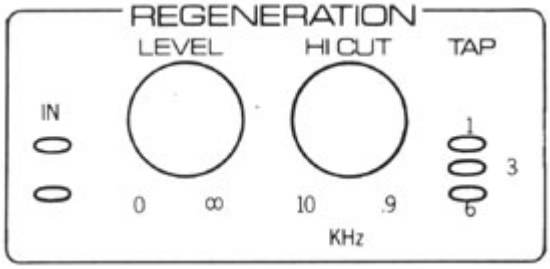
With all of the above in mind, proceed with adjusting the INPUT LEVEL control for an appropriate deflection of the HEADROOM indicator. If you are using the "instrument" version of the STD-1 and are unable to achieve sufficient signal level, try changing the rear panel Input Impedance switch to the LO position.



OUTPUT SECTION

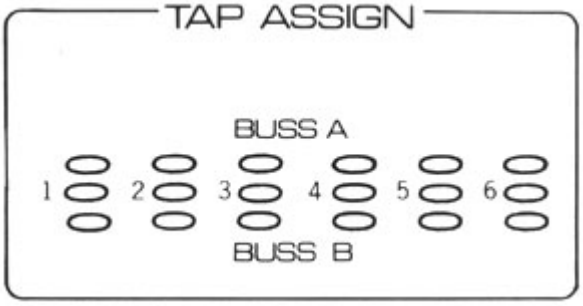
At this point you should be getting sound through your STD-1. Lift the Effect IN/OUT switch located in the INPUT section. Your source signal should sound noticeably fuller...more specifically you should be hearing slapback echo. Note that each of the two outputs has its own Tap Assignment buss, and here in the Output Section the MIX A and MIX B controls each allow mixing the respective Tap Assignment buss with any blend of the dry input signal.

Users of the "instrument" version will most commonly be mixing dry and effects signals in the center range of these controls. Studio users will find the unit most useful with the MIX controls fully towards Effect, so the processed signal can be remixed manually with the console Effects Return system.
The adjacent EFFECT LEVEL control provides capabilities for balancing the overall level (both channels simultaneously) of the Effect against the adjusted Input level. This avoids overpowering effects levels when using footswitch or remote systems, as well as adjusting for Effects Return levels required by various consoles.



REGENERATION SECTION

This section operates much like the regeneration systems in standard delay lines...signals leaving the delay line are allowed to fold back to the input to generate more repeats for a reverb-like effect. Flip the Regeneration IN/OUT switch to the upper position; the LED should glow. The LEVEL control will now allow settings varying from 0 repeats to extended decays lasting several seconds. When using shorter taps on the delay line (see the next section), the regeneration system will act more as an emphasis or resonance control for flanging and chorusing.
Most expensive studio delay systems provide complex capabilities for processing the signal in the regeneration path. This is due to the fact that acoustic reverb and echo signals are typically quite different from the original signal due to such factors as absorption of the room, reflective surface angles, whether there are people in the room, and much more. In the STD-1, these factors can be simulated by rolling off the higher frequencies with the HIGH CUT control. With this control at minimum, the delayed signal is passed unprocessed for special effects, stereo reprocessing of mono signals, and other applications where full frequency response is desired. In the maximum position, all regeneration signal content above the mid-range frequencies is attenuated to recreate acoustic properties.
The rightmost switch in this section determines where you select your regeneration signal. Since there are six taps from this delay line, and since you will be using different taps for audibly different processing jobs, it makes sense that you should not be limited to any one specific tap for your regeneration. In the upper position, the TAP SELECT switch will route the first tap back to the input. The center position will select the third tap, while the lower position selects tap #6. As a general rule, you will want to begin your experimentation for new sounds using a tap which is similar to the tap(s) being used for your primary output. However, do not hesitate to try other taps once your basic sound settings have been adjusted. Many times a change in the TAP SELECT switch will yield radically different effects for special effects.

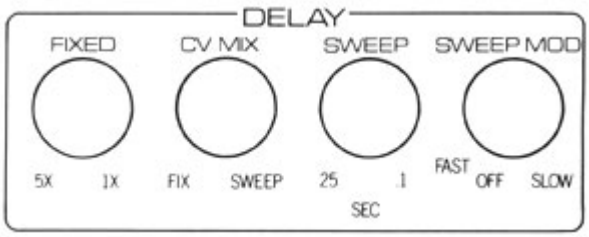


TAP ASSIGN SECTION

This section of the front panel contains six three-position switches which allow for sending each of the delay line taps to either the A output, the B output, or disabling the tap. Tap 1 is the shortest delay time; Tap 6 is the longest. The actual amount of delay time is shown in the chart below.

	MINIMUM DELAY	MAXIMUM DELAY
Tap 1	1.3 milliseconds	6.5 milliseconds
Tap 2	2.2 milliseconds	11 milliseconds
Tap 3	4.6 milliseconds	20 milliseconds
Tap 4	5.8 milliseconds	29 milliseconds
Tap 5	8.3 milliseconds	46.5 milliseconds
Tap 6	11.1 milliseconds	55.5 milliseconds

The variation of the delay times (from minimum to maximum) is accomplished with the DELAY section of the front panel. Using the initial setup patch shown earlier you will be hearing a stereo slapback echo. If you are using only one output channel you will still hear the slapback effect, but those working in stereo will note that the sound is unusually full for a simple slapback effect. This extra fullness will be apparent in most of the effects generated with the STD-1 due to the fact that different delay times will always be assigned to different output channels. This single factor contributes additional complex phase and time delays to produce what some have termed "3 dimensional" mix capabilities. Rather than hearing only the special effect in a simple stereo placement mix, many of the flanging, chorusing, and delay settings on the STD-1 will cause the source signal to appear to move forwards and backwards in the stereo field as well as left and right. After becoming familiar with all the controls, spend some extra time working with the complex ambience techniques available with this unit. Many recent effects devices have been released with "complementary" type stereo outputs. While this is an effective, low cost means of generating stereo effects, these types of devices cannot be used in a stereo recording capacity due to the fact that the stereo effect will totally cancel itself when a mono mix is performed. Only a "true" stereo device, with differing signals on each side (such as the STD-1), can hold up to retaining the effect in a mono mix.



DELAY SECTION

The controls located here are actually delay modulation or control settings. You will probably make more setting adjustments in this section than elsewhere on the front panel. This is where most patches will be "fine tuned."

The FIXED control allows for setting the initial static delay time of the STD-1. Using the standard initial setup patch once again you will hear the slapback echo sound. To more accurately define what you are hearing, return to the Tap Delay Time chart in the previous section. The times listed for Taps 5 and 6 at maximum delay are 46.5 mS and 55.5 mS respectively. This is what you are hearing. Note that when the FIXED control is set to the 5X extreme, you will achieve maximum delay from each tap. Advance this control fully clockwise and notice that the delay gets shorter. Using the Tap Delay chart, look up the minimum delay times which you are now hearing.

The CV MIX control allows you to fade between the static setting of the FIXED control and the sweeping voltage of the internal low frequency oscillator. Return the FIXED control to the 5X position and note that you hear no automatic sweeping or modulation of the "echo" times. As the CV MIX control is advanced to mid-position, you will hear an increasing amount of automatic sweeping (probably manifesting itself as massive pitch detuning). One of the reasons the pitch alteration is so great is because we are at a long delay setting. While CV MIX is at mid-position, the FIXED control will still have an effect on the delay time setting. So, turn the FIXED control up to the 1X setting. The pitch sweeps should be less severe, but still happening. Advancing the CV MIX control all the way to SWEEP will restore a higher level of detuning, but notice that the FIXED control now has no effect. Thus, the CV MIX control acts as a panning control to select either the FIXED control, the SWEEP oscillator, or any blend of the two.

With the sweeping still occuring, adjust the SWEEP control and note that an extremely wide range of sweep effects are available. The extremely slow sweeps will be useful for chorusing, flanging, and subtle effects; faster sweeps can produce vibrato, fast flanging or rotating speaker simulation.

Set the CV MIX for full sweeping effects, and adjust the SWEEP speed towards minimum for a slow but audible sweep. For this particular experiment, it may be helpful to enable the regeneration section with the regeneration LEVEL near maximum. This will allow you to more audibly hear the delay time changes we are about to discuss. Slowly begin advancing the SWEEP MOD control and listen for the point where the delayed signal begins "trembling." Note that the master sweep continues to slowly modulate the delay, but the auxiliary Sweep Mod oscillator now superimposes a higher frequency sweep onto the master sweep pattern. Continue advancing the SWEEP MOD control and note that the frequency of the "trembling" gets slower. The discerning listener will also hear that the slower sweep mod frequencies affect the delay time in greater amounts. The circuitry of the STD-1 automatically compensates for the typically large pitch shifts that occur when faster sweep frequencies are used. The result is a complex sweep modulation circuit which does not significantly alter the musical usefulness of a patch when engaged or altered during a performance or mix. There are many interesting effects which can be achieved with this control which simply cannot be obtained with standard LFO designs, such as vibrato at the same time you are doing a slow flange. By setting the master LFO and the Sweep Mod circuit to enharmonic speed ratios, a pseudorandom sweep pattern can be set up. By taking this pseudorandom sweep,

attenuating it by placing the CV MIX around 25%, turning the FIXED delay setting to approximately 3X to 5X, and selecting several TAPs in a stereo assignment, you can achieve an extremely thick chorus sound.
At this point, you should sufficiently understand the panel operations of the STD-1 to begin experimenting with the patches shown in the rear of this manual. Note that the patches given are approximate. Don't be afraid to experiment or fine tune the patches to your taste. There are many more settings from this unit than we could even begin to cover. Be sure to mark your favorite settings on the blank charts provided in this manual. If you wish to share your favorite settings with others, please send copies of your settings to A/DA for use in future releases of this manual.

EXTERNAL CONTROL

Four jacks are provided on the rear panel of the STD-1 to allow external control during live performance, or as remote operation in a studio. These jacks also provide capabilities for more complex control structures than are available from the internal circuitry alone.
The FOOTSWITCH jack is a stereo connector designed to accept standard dual footswitches, such as those used with guitar amps. For those building custom installations, the "tip" must be shorted to ground (the connector "sleeve") to enable the master Effect In/Out. Note that the front panel switch may still be used when the footswitch is connected, however the panel switch must be in the OFF position to allow operation of the remote. The "ring" of the connector is shorted to ground to switch the Regeneration in and out. The regeneration foot-switch interacts with the front panel switch as described for the effect footswitch. In emergency situations, single footswitches with mono connectors may be used, but the Regeneration will always be ON, and the front panel Regeneration LEVEL must be used to fade the regeneration in and out.
The remaining three jacks are used for control voltage interfacing, using the standard 0 to +5 volt control range available from most pedals and synthesis equipment. Both CV IN jacks have provisions for internally generating a +5 volt level which can self-power standard footpedals. The levels of voltage available at the connector are shown below. To use a standard A/DA CONTROL PEDAL A, use the three conductor cable provided with the pedal. For custom installations, apply the external control voltage between the "ring" and the "sleeve," with the sleeve being ground and the ring being the positive voltage. No connection need be made to the "tip" for this application. For applications where no remote power is provided, a control can be wired across the tip voltage as shown below, with the wiper of the control returning to the "ring" at point 2. In emergency setups, standard "volume control" pedals may be used by obtaining a stereo splitter cord adapter which has a stereo plug on one end and two mono jacks at the other. The jack carrying the +5 volts mates with the cord running to the "Instrument In" of the pedal. The ring connection return jack is fed to the "Amp Out" of the pedal.

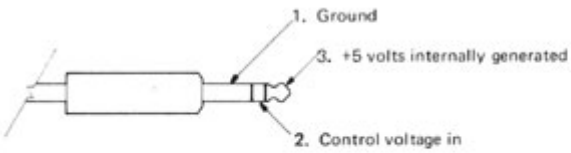


Figure 1

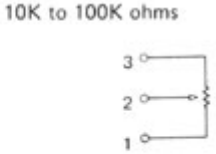


Figure 2

The DELAY jack is used to input control signals which will directly control the amount of delay time for signals running through the STD-1. This input is functionally equivalent to the front panel FIXED control. In fact, the front panel FIXED control is switched out of the circuit when a plug is inserted into the DELAY CV IN jack. Similarly, the SWEEP CV IN jack is used to control the speed of the primary low frequency oscillator. Again, the front panel SWEEP control is disabled when an external control is applied.

The CV OUT jack is a buffered source of 0 to +5 volt output which represents the mixture of all control settings within the front panel DELAY section. The actual mix which you create with the CV MIX control is what you will receive at this output. This output allows you to have multiple STD-1 units (for stereo signal to quad processing, for example) which all use a single control section for synchronized effects. To implement this particular patch, connect the CV OUT jack of the master unit to the DELAY CV IN of the slave. NOTE that the CV MIX control in the Delay section of the slave must be at minimum AND that a special adapter cord will be needed to mate with the stereo CV IN jack (as shown in Figure 3).
Another possibility for the CV OUT jack is to use the internal complex DELAY modulation settings to control other effects units which do not have as extensive an array of controfs. Use your imagination, as that is the only thing which will limit the applications you find for these remote capabilities.

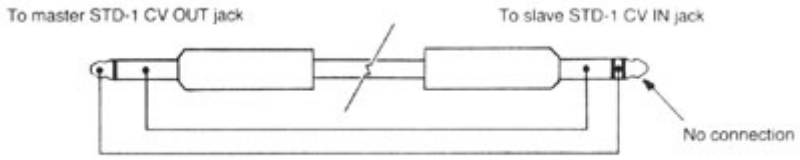
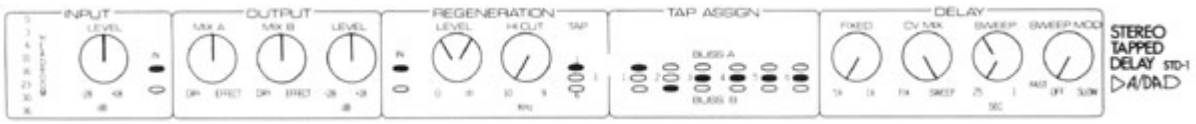


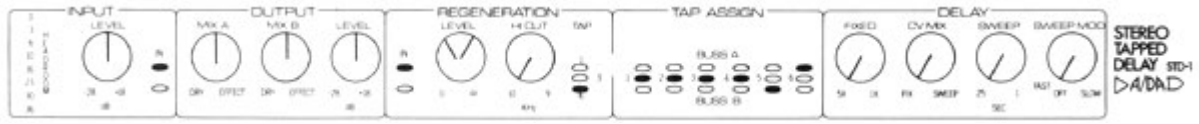
Figure 3 CV-SLAVE CORD

PRESETS



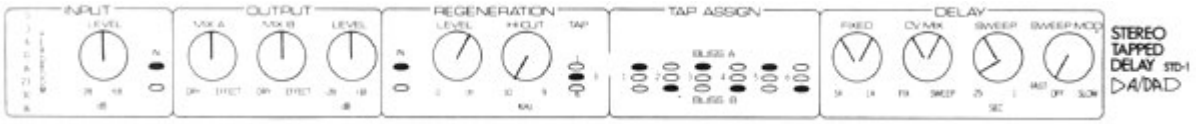
STEREO FLANGING

The patch shown above produces standard flanging effects. Variation of the Regeneration Level will produce more or less depth. In the Delay section, the LFO Sweep control should be adjusted for the speed required. The CV Mix will change the register and depth of the sweep; the Fixed control acts as a manual flanging control when the CV Mix is at minimum. Experimenting with Tap Assigns for both delay and regeneration will change the nature of the effect produced with this patch.



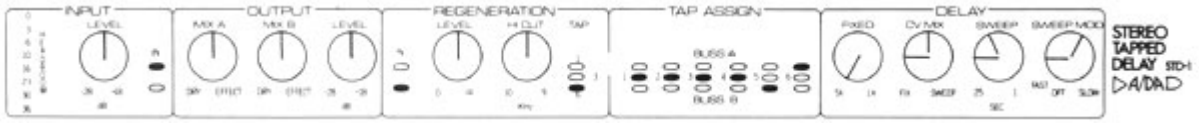
SLAPBACK ECHO

While the STD-1 is not capable of long echo delay times, there is sufficient delay to generate some interesting slapback or ambience echoes. From the basic patch above, experiment with the Regeneration Level in the upper 50% of its range to adjust the decay time; the High Cut control will also add more realism to the delayed signals. In the Delay section, the Fixed control adjusts the length of delay time in conjunction with the Tap Assign switches selected. Most echo effects will not use delay modulation, however many interesting special effects can be accomplished with the other controls in the Delay section. Also note the ambiences which can be created by assigning various Taps to each of the outputs in differing patterns.



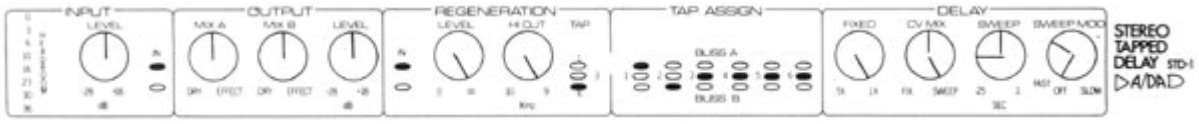
HIGH INTENSITY FLANGING

With the STD-1 configured as shown, the stereo flanging produced is especially resonant and thick. The Regeneration Tap Select is used to select the range of strongest harmonic processing, with Tap 3 being more in the midrange and Tap 1 emphasizing the high frequency harmonics. If the Effects Level and Regeneration Level are carefully adjusted, you can obtain very sharp reinforcement of harmonics as the flanger sweeps through its range. This can, with some instruments, cause a harmonic "arppegiation" effect which is quite pleasing.



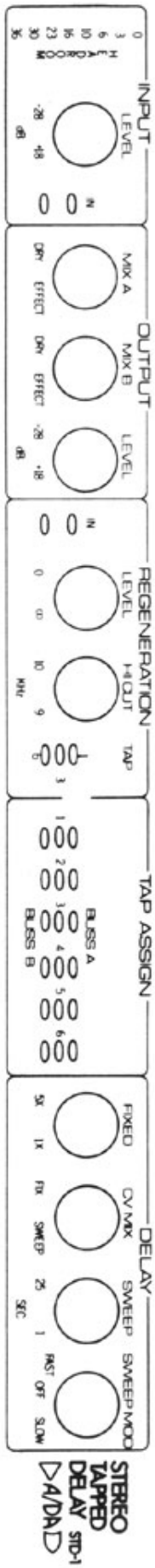
PSEUDORANDOM CHORUSING

Using the long delay Tap Assigns as shown, some interesting voice doubling and chorusing effects can be obtained. The CV Mix control will determine the amount of chorusing, while the Sweep speed should be adjusted to taste. Adding the Sweep Mod level is what causes the pseudorandom fluctuations in delay time for the chorus effect. Set this control carefully, as different ratios between the frequencies of the LFO and the Sweep Mod will produce differing amounts of apparent randomness. Also experiment with adding Tap Assign 3 and 4 for additional voices of chorusing or more stereo effect. Regeneration is commonly unused in chorusing devices; experiment with this section however, as many special effects can be produced with regeneration in chorusing.



CLOUDED FLANGING

This patch encompasses a basic short delay flange. Note, however, that the Regeneration Tap Select comes from Tap 6 rather than a shorter tap. The result is that the extra delay before regeneration causes an extensive pitch shift on the regeneration signal. With the High Cut advanced past midposition, the shifted and delayed signal takes on a more distant effect with the final effect being that of a "cloud" of notes diffusely following the primary flanged signal. Varying the CV Mix will alter the background density. The Sweep speed control determines the amount of pitch shift produced. Increasing the Sweep Mod control will add even more "clouding" to this basic sound.



PATCH NAME:

NOTES:

VARIATIONS: