PITTSBURGH MODULAR

ANALOG DELAY
(2X 4096 BBD DELAY LINE)

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www.PittsburghModular.com

What is the Analog Delay?

The Pittsburgh Modular Analog Delay uses a pair of 4096 Bucket Brigade Delay Line (BBD) ICs to produce a distinct analog delay effect. The maximum delay time when shipped is set at 9/10ths of a second. The Analog Delay offers voltage control of the delay time, feedback, and wet signal. A true bypass switch allows the delay to be enabled and disabled quickly.

Analog Delay User Interface

Controls:
FBK: Feedback Control
ON: Bypass Switch (Up-On/Down-Off)
FBK CV: Attenuator for Feedback CV Input
RATE: Delay Time (Left-Shorter/Right-Longer)
RATE CV: Attenuator for Rate CV Input
WET CV: Attenuator for WET CV Input
DRY: Attenuator for Dry Signal sent to Mix Output
WET: Attenuator for WET Signal sent to Mix Output

Input/Output:
IN: Audio Input
FBK CV: Feedback Control Voltage Input
RATE CV: Rate Control Voltage Input
WET CV: Wet Control Voltage Input
FBK OUT: Wet Signal Output
MIX OUT: Mix of Dry and Wet Output

Analog Delay Control Descriptions

Rate Control Knob / Rate CV Input:
The Rate control knob adjusts the delay time of the Analog Delay module. Left is a shorter delay and right is a longer delay. Delay time is controlled internally by a VCA. The Rate control knob controls the delay time by producing a 0-5v control voltage that controls the rate VCA.

The Rate CV Input accepts 0-5v signals. The incoming voltage is added to the voltage produced by the Rate control knob to determine the delay time.

Bypass Switch:
A true bypass switch to enable or disable the analog delay effect.

Feedback Control Knob / Feedback CV Input:
The Feedback control knob adjusts the number of repeats in the wet signal. Left is fewer repeats and right is more repeats. Feedback is controlled internally by a VCA. The Feedback attenuator knob controls the amount of repeats by producing a 0-5v control voltage to to controls the feedback VCA.

The Feedback CV Input accepts 0-5v signals. The incoming voltage is added to the voltage produced by the Feedback control knob to determine the number of repeats.

Wet Control Knob / Wet CV Input:
The Wet control knob attenuates the wet signal available to the Feedback output and Mix output. The amount of wet signal available to the outputs is controlled internally by a VCA. The Wet attenuator knob controls the level of wet output by producing a 0-5v control voltage to to controls the wet VCA.

The Wet CV Input accepts 0-5v signals. The incoming voltage is added to the voltage produced by the Wet attenuator knob to determine the amount of wet signal available to the outputs

Dry Control Knob:
The Dry control knob attenuates the dry signal available to the Mix output.

Analog Delay Control Descriptions Continued...

Feedback Output / Mix Output:
The Feedback output is an output of the wet signal taken after the wet VCA. The Feedback output is the same signal that is sent to the Mix output.

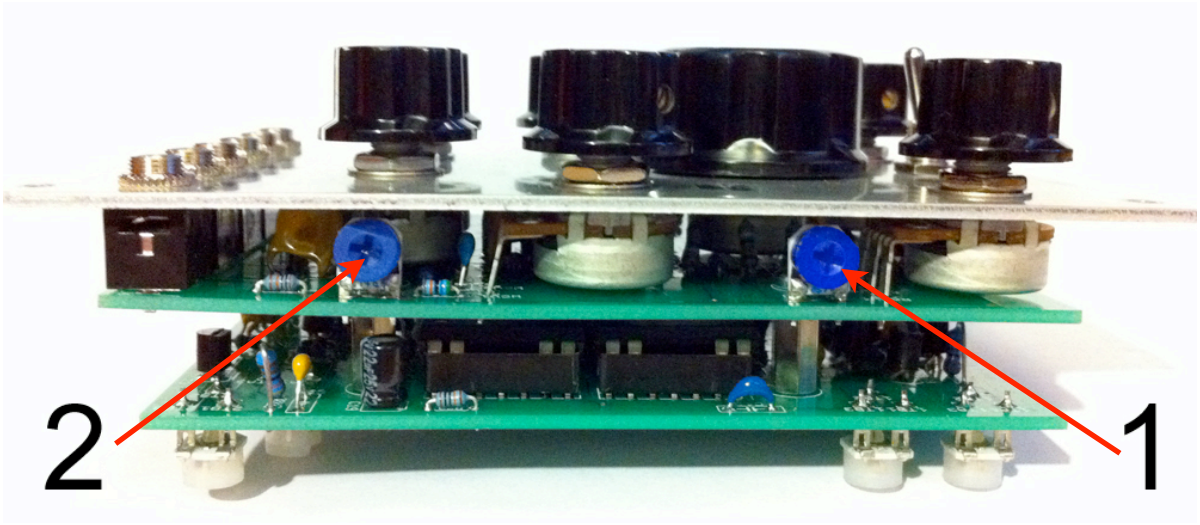
The Mix output is an output of the wet signal taken after the wet VCA and the dry signal taken after the dry control knob.

Power Connection:
The power header accepts +12v on the top and -12v on the bottom.

Calibrating the Analog Delay

Adjusting the Maximum Delay Time
Maximum delay time is set using the two blue trim pots mounted on the side of the module. Maximum delay time can be adjusted from 80ms to around 2 seconds. The modules are shipped with around 9/10ths of a second of delay when the Rate control knob is turned full clockwise. This setting offers the best balance between sound quality and long delay time. Setting the maximum delay time above 1 second will reduce the sound quality of the delayed signal.

As the delay time increases, the delayed signal becomes grainier and more distorted, also the clock noise will become louder.



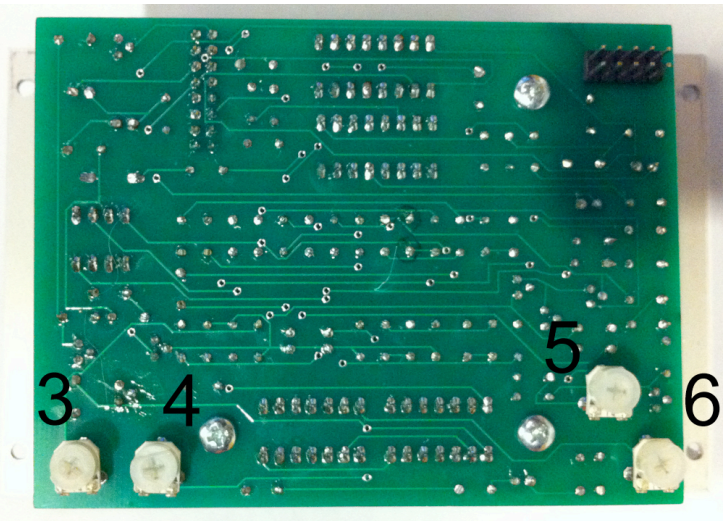
The trim pot closer to the top of the module (1) is the main control for setting the maximum delay length. The second trim pot (2) adjusts the range of the delay length available from the rate control and also affects the delay length.

Procedure:
First set the Rate control knob to full right. Setting trim pot 2 between 12 o'clock and 12:30 is a good place to start. Once trim pot 2 is set, adjust trim pot 1 while listening to the delay time. Start with trim pot 1 set at 12 o'clock. Turning trim pot 1 to the left increases the delay time, turning trim pot 1 to the right decreases the delay time.

Calibrating the Analog Delay Continued...

Adjusting the Audio Quality and Feedback Amount

Audio quality is determined by the four trim pots on the back of the module (3,4,5, and 6). Trim pots 3 and 4 adjusts the audio signal between the BBD ICs. Trim pots 5 and 6 adjusts the audio signal after the second BBD IC.



Trim pots 3 and 5 have direct control over the quality of the delay signal. The delay will work within a small range of the trim pots. The best sound quality is available when the trim pots are set to the middle of this range.

Trim pot 4 controls the amount of feedback available. Turned full left will allow the maximum amount of feedback, turned full right will allow the minimum amount of feedback. Trim pot 4 has an effect on the overall sound quality of the delayed signal. Turned full left will offer the worst sound quality, turned full right will provide the best sound quality. Adjusting this pot will require the adjustment of trim pot 5 as well.

Trim pot 6 controls filters out hum and noise from the audio signal. The best sound quality is available when the trim pot is set properly. Set the Rate control knob to full right. Listen to the Mix Out. Adjust trim pot 6 until no constant hum is heard. The correct setting is typically between 11 and 12 o'clock. Set this trim pot before adjusting trim pots 3, 4, and 5.

Calibrating the Analog Delay Continued...

Procedure:
Use a sine wave from an oscillator to calibrate the Analog Delay. Set trim pot 6 as described above. Set the Rate control knob to 12 o'clock and listen to the mix output. Adjust trim pot 4 as described above to set the desired feedback level.

Adjust trim pot 3 and 5 so that the delay signal is audible. Typical settings are trim pot 3 between 10 and 12 o'clock and trim pot 5 between 9 and 11 o'clock. Once a signal is audible, adjust trim pot 3 left until the delay signal fades then adjust trim pot 3 right until the delay signal returns and fades. The delay signal will sound best when the trim pot is set in the middle of these settings. Next adjust trim pot 5 left until the delay signal fades then adjust trim pot 5 right until the delay signal returns and fades. The delay signal will sound best when the trim pot is set in the middle of these settings. Continue to switch between trim pot 3 and trim pot 5 until the delay signal sounds clean and clear. Once the calibration is finished, test the delay with other waveforms.

Analog Delay Specs

Size: 16hp
Depth: 35mm
Power: +-12v
Power Usage: TBD
Power Cable is attached negative voltage (-12v) down.

Questions, Comments, Support: richard@pittsburghmodular.com