



Harmony synthesizer

OWNER'S MANUAL

Originally written by ADA SIGNAL PROCESSORS, INC. Scanned and edited by Jur at 01 June 2003. Original ADA logo edited and rendered by Barend Onneweer of [Raamw3rk](http://www.raamw3rk.com).) The version of this manual is copyrighted and may not be sold or placed on a website without permission of the editor.

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The Harmony Synthesizer is designed to work with voice, guitar, piano, and other musical instruments by taking the input signal and synthesizing a parallel harmony line. This harmony line may be any interval within the range of one octave above the original signal to two octaves below the signal. The effect is not limited to single note melody lines; *each note* of a chord played through the Harmony Synthesizer will be harmonized.

The Harmony Synthesizer can also serve as an analog delay line. This capability allows such effects as "slapback" echo, multiple repeating echoes, thickening/doubling of sounds, "bathtub" reverberation, and more.

Finally, many unusual special effects (such as arpeggiation) may be realized with the Harmony Synthesizer. These effects are covered in detail later in this manual.

LIMITATIONS OF THE HARMONY SYNTHESIZER

There are two major limitations involved with the use of this device. When used as a delay line/echo unit, longer delay times result in less high frequency response for the delayed signal. This effect is common to all solid-state echo units. When used to synthesize harmonies, the harmony line will not have the exact same timbral quality as the original signal; instead, the harmony will sound as if it is running through a tremelo unit. In order to create harmonies, the synthesizer must cut the input signal into sections, and then "splice" them back together in a different form to create the harmony. Every other "splice" creates a volume shift, causing the tremulant effect.

PLUGGING IN

Plug your instrument into the jack labeled "in"; then run a cord from the jack labeled "mix out" to your amplifier (note that the label for each jack is printed just above it on the front panel). Leave the other jacks unconnected for now. Plug the line cord into a 115 VAC, 60 Hz outlet. Countries using other voltages require an adapter. Turn all knobs fully counterclockwise. Next, while playing your instrument, adjust the *LEVEL* control for a pleasing volume level. For low level instruments such as guitar, the knob will generally point straight up; however, if the Harmony Synthesizer distorts during any of the following steps, reduce the setting of this control until the distortion goes away.

USING THE HARMONY SYNTHESIZER AS A DELAY LINE/ECHO UNIT

INITIAL SETUP (see figure 1): Push the EFFECT IN/OUT footswitch until the right-hand LED is on. Push the DELAY ONLY/HARMONY footswitch until the middle LED is off. Push the REGENERATION footswitch until the left-hand LED is off.

Play your instrument, and slowly rotate the MIX control from "dry" to "effect." In the "dry" position, you will hear your instrument only. In the mid-position, you'll hear a slightly delayed repeat along with your instrument. In the "effect" position, you will hear the delayed repeat only, without the original instrument sound.

Return the MIX control to mid-position. Now, start turning the DELAY ONLY control clockwise. This increases the delay time of the repeat.

With the DELAY ONLY control now set fully clockwise, push the REGENERATION footswitch so that the left-hand LED is on. Slowly turn the REGENERATION control clockwise. This will change the echo from a single repeat to multiple repeating echoes, just like a tape echo unit. Note that with extreme clockwise settings of the REGENERATION control, the echoes will repeat until they turn into continuous feedback.

Next, vary the DELAY ONLY, REGENERATION, and MIX controls to become familiar with the range of echo sounds available from the Harmony Synthesizer.



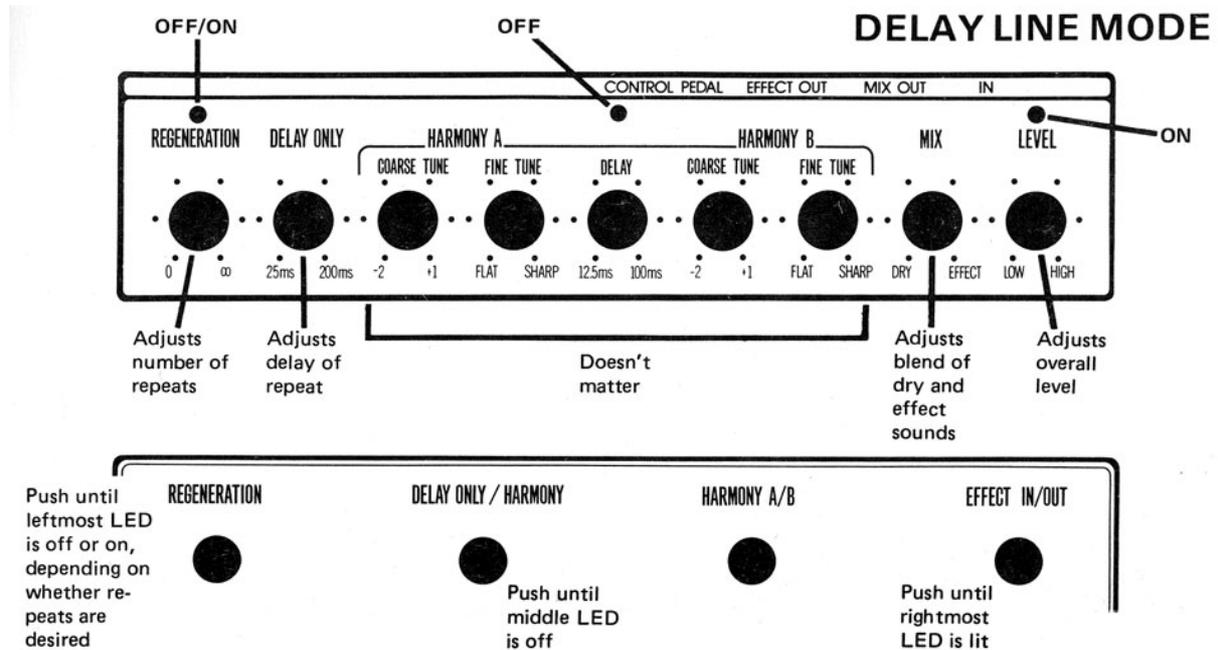


Figure 1

USING THE HARMONY SYNTHESIZER TO CREATE PARALLEL HARMONY LINES.

INITIAL SETUP (see figure 2): Leave the LEVEL control as set for the echo mode. Return the MIX control to mid-position; set the two FINE TUNE controls and the DELAY control (the middle knob) to mid-position; return all other knobs to full counterclockwise position. Push the REGENERATION footswitch so that the lefthand LED is off, and push the DELAY ONLY/HARMONY footswitch so that the middle LED is on. Also, note that the DELAY ONLY control is disconnected in the Harmony mode.

Play a note on your instrument, and slowly turn the HARMONY A, COARSE TUNE control clockwise. You will hear a synthesized note that starts off about 2 octaves below your instrument's note (COARSE TUNE full counterclockwise), and moves upward in pitch until it's about 1 octave above your instrument's note (COARSE TUNE full clockwise). Use the FINE TUNE to zero in on the exact pitch interval you want. Playing more than one note at a time creates additional harmony lines. The MIX control determines the prominence of the harmony line; full counterclockwise adds no harmony line to your signal, mid-position gives an equal blend of harmonized and non-harmonized sounds, and full clockwise gives the harmony sound only.

You should now note the tremulant effect of the harmony line we covered earlier under "limitations." Varying the DELAY control (middle knob) adjusts the splicing rate, and therefore the speed, of the "tremolo". Adjust this control for a sound that best matches the music you're playing. The HARMONY B, COARSE TUNE and FINE TUNE controls have the same function as the HARMONY A controls: they set the pitch of the harmony line. These are intended as pre-set controls when you wish to switch between two different harmony settings. Depressing the HARMONY A/B footswitch switches over to the HARMONY B preset. Note that this is not a locking footswitch; releasing the switch immediately returns control to the HARMONY A settings.



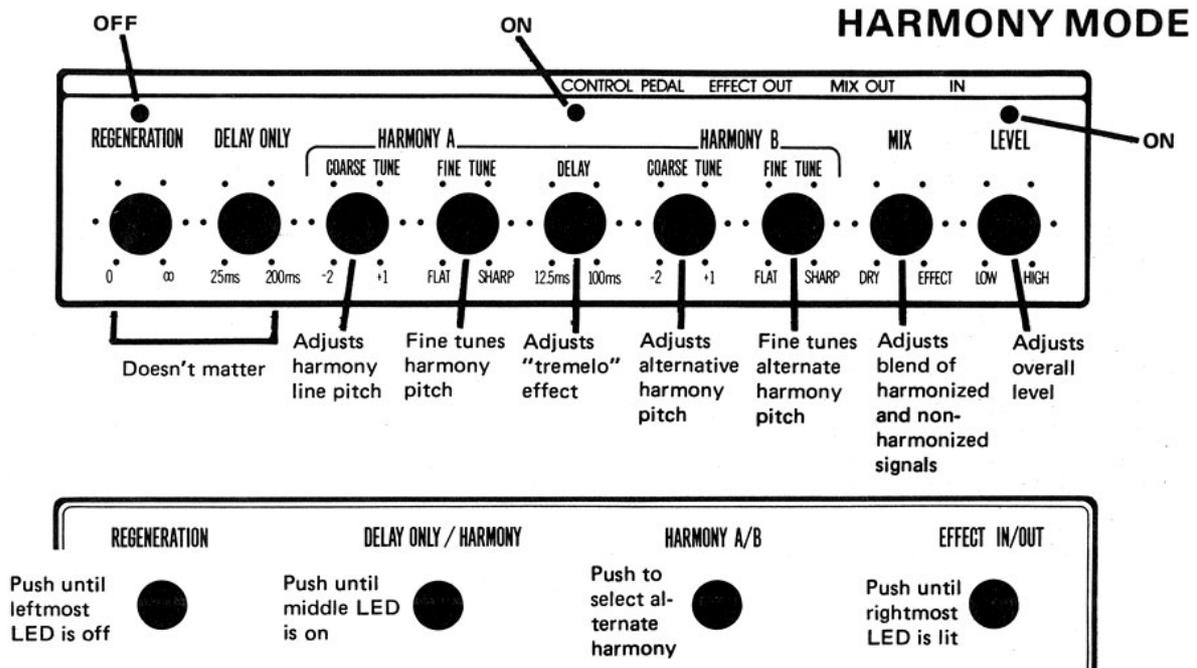


Figure 2

HOW TO CREATE MOVING HARMONY ARPEGGIOS

While in the *harmony* mode, adding regeneration expands the special effects capability of the Harmony Synthesizer. The best way to explain this capability is with some actual examples (refer to figure 3).

With the same control setup needed to produce parallel harmony lines, tune the *COARSE TUNE* control so that the harmony line is slightly higher in pitch than your instrument (about $\frac{1}{2}$ tone or so). Now, push the *REGENERATION* footswitch so that the left-hand LED is *on*. Turn the middle *DELAY* control full clockwise, and slowly turn up the *REGENERATION* control. Now, strike a single, short note on your instrument. The note should rise upward in steps, until it eventually fades out. The rate of arpeggiation depends on the setting of the *DELAY* control; clockwise gives slower rates, counterclockwise gives faster rates that resembles a glissando effect. As with the echo unit effects, extreme clockwise settings of the *REGENERATION* control may produce feedback.

To arpeggiate downward in pitch, simply set the *COARSE TUNE* control so that the initial harmony frequency is slightly *lower* in pitch than your instrument. For example, setting the *COARSE TUNE* a *fifth* below the original signal means that your first repeat will be a fifth below the original signal; the second repeat will be a fifth below the first repeat; the third repeat will be a fifth below the second repeat; and so on.

While it doesn't take much space to describe the process of creating arpeggiation, it does take a fair amount of practice to master this effect.



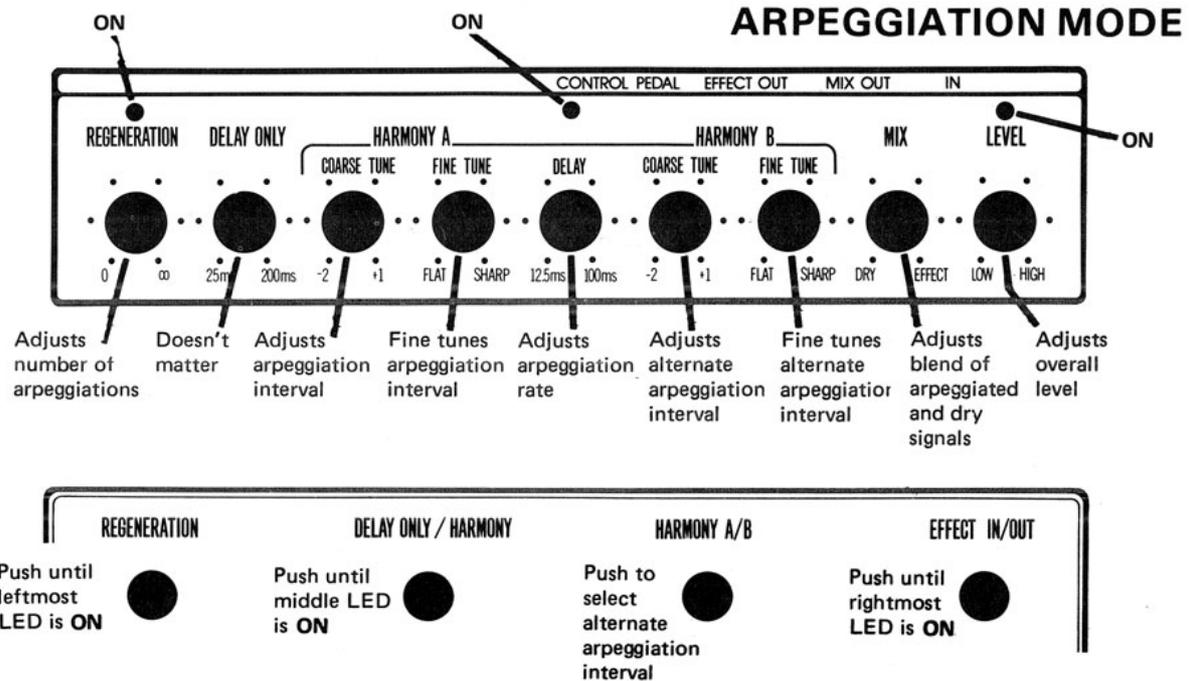


Figure 3

SPECIFIC APPLICATIONS

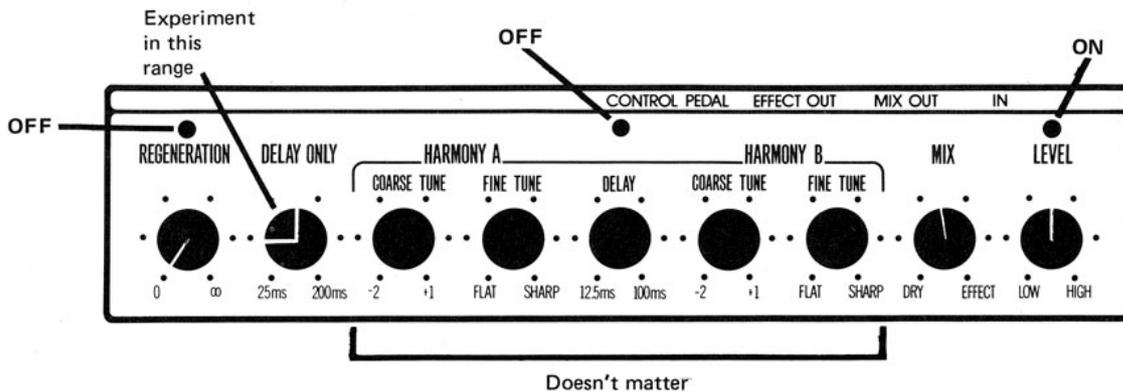
The Harmony Synthesizer offers great flexibility for use either on stage or in the studio. Here are some specific suggested patches; doubtless you'll come up with more.

SOLID STATE ECHO UNIT/DELAY APPLICATIONS

SLAPBACK ECHO

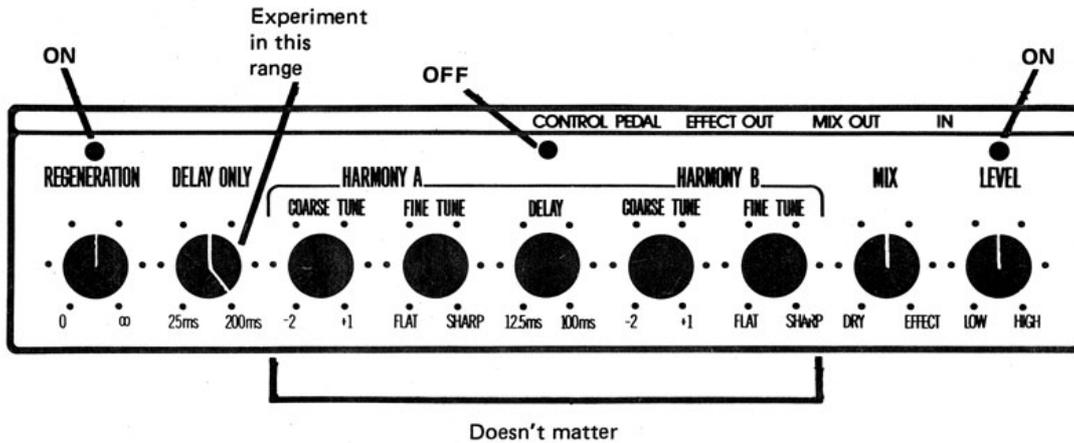
Slapback echo is a *single* echo repeat added to a signal, generally with very little delay time.

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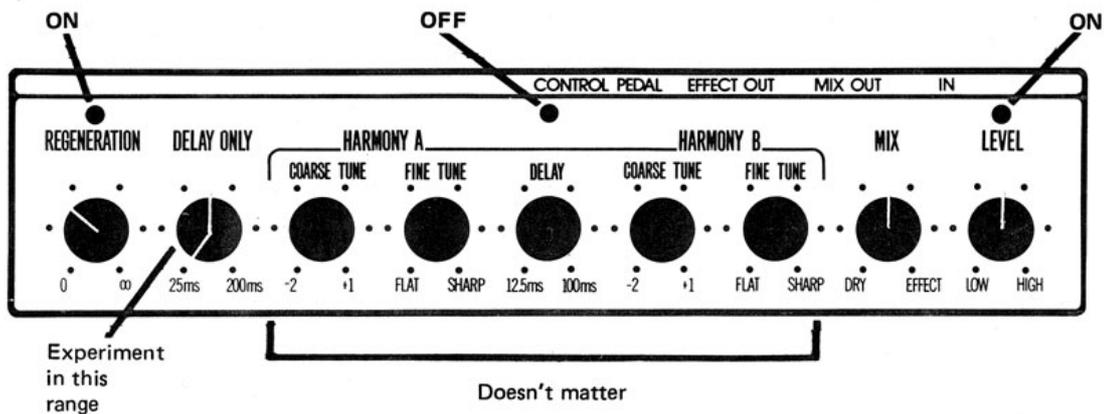
MULTIPLE ECHOES

Fairly long delay times, coupled with *REGENERATION*, give multiple echo effects.



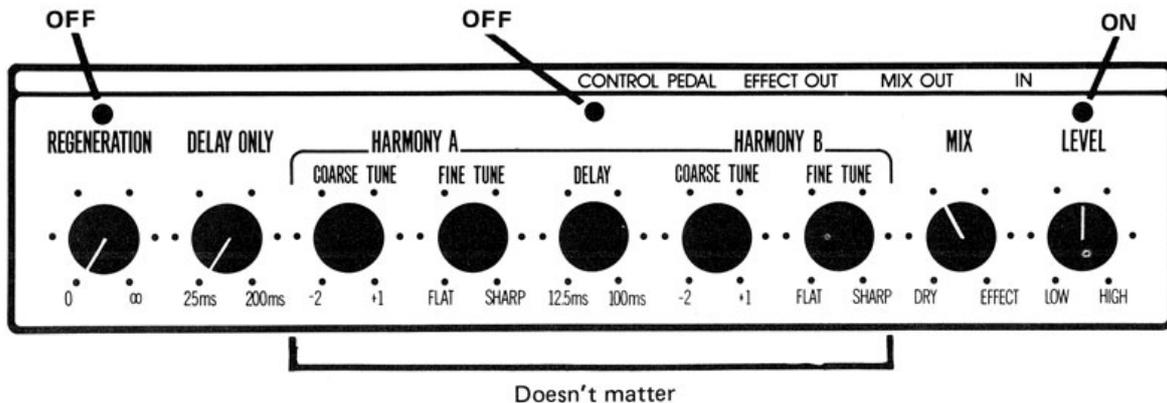
"BATHTUB" REVERBERATION

Very short delay times give a unique reverb sound which is very different from the reverberation effect associated with large concert halls. It is particularly useful for certain drum sounds and other percussive sounds, as well as being applicable to vocals.



INSTRUMENT/VOCAL "DOUBLING"

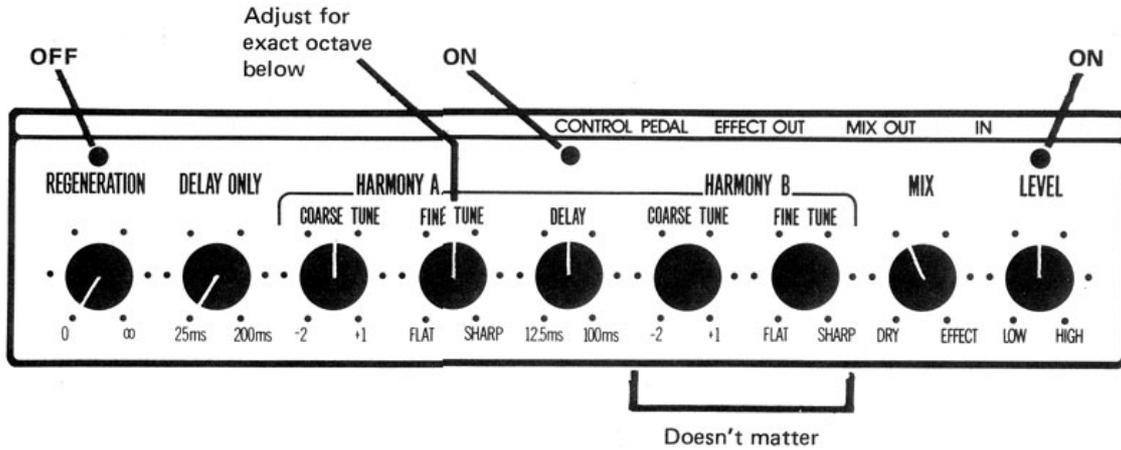
One popular studio technique is to lay down a vocal or instrumental track, then have the player add *another* identical track along with the original track. Slight differences between the two parts create a "doubled," larger-than-life sound. Adding some delay with the Harmony Synthesizer simulates this sound.



HARMONY PATCHES

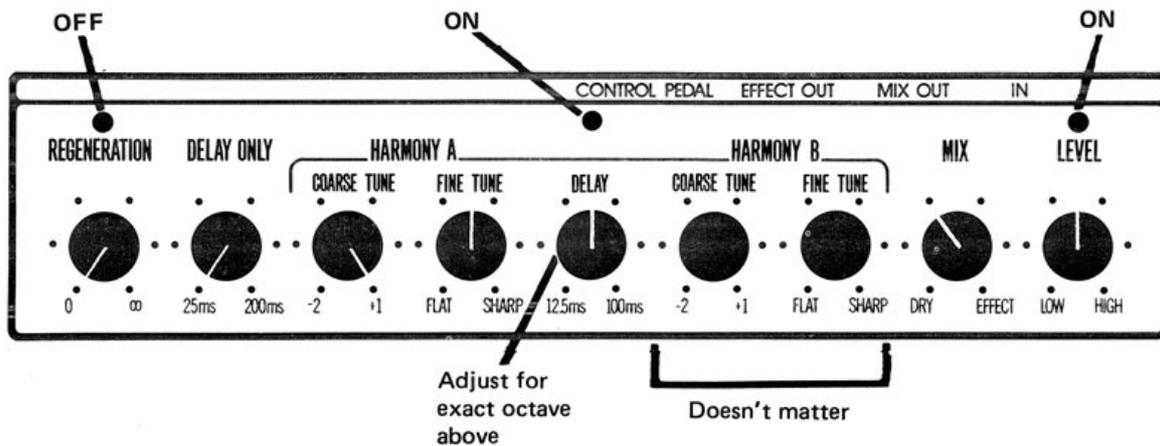
POLYPHONIC OCTAVE DIVIDER

Most octave dividers are restricted to use with one note; the Harmony Synthesizer can divide every note of a chord. This effect is most useful for adding a type of "bass ambience" to a



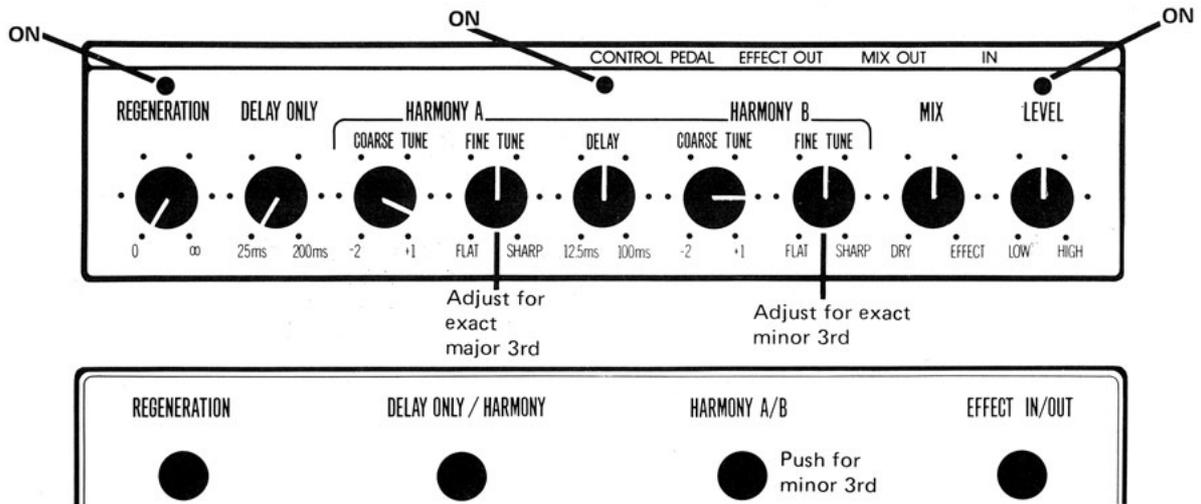
POLYPHONIC OCTAVE MULTIPLIER

Similar to above, but adds notes an octave higher. Again, this effect is most effective when used to add ambience to a sound, so be sparing with the *MIX* control. This effect is excellent



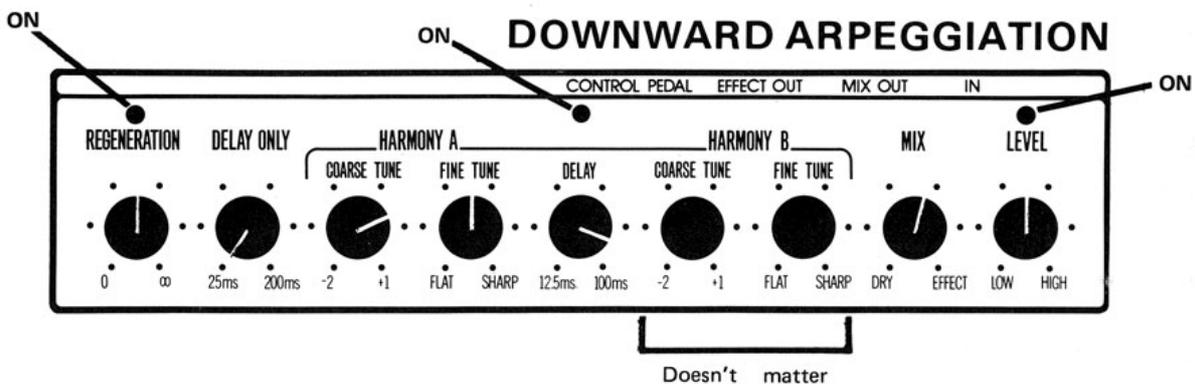
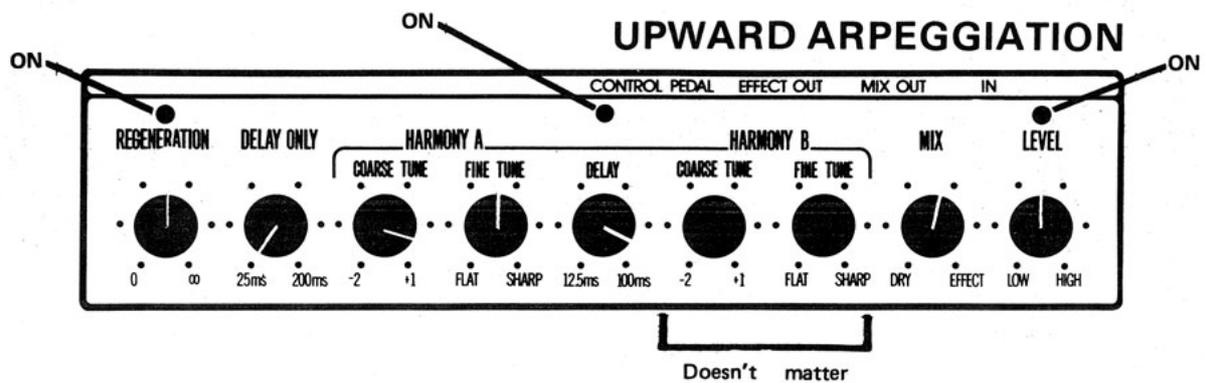
MAJOR/MINOR HARMONY GENERATOR

The most commonly used harmony lines add either a major third or a minor third to individual notes. Set the controls on *HARMONY A* for a major third (i.e. if you play an E, the harmony should be G#), and the controls on *HARMONY B* for a minor third (i.e. if you play an E, the



UPWARD AND DOWNWARD ARPEGGIATION

Many unusual sounds are available through artificial arpeggiation. We suggest experimenting with the *REGENERATION*, *HARMONY A COARSE TUNE/FINE TUNE*, and *DELA Y* controls as the key to getting good arpeggiation effects. One effect we've found is to tune the harmony pitch a minor third below your instrument's pitch. As the harmony re-circulates, you'll hear a diminished chord. Also, you may arpeggiate in microtonal intervals by setting the



SPEECH COMPRESSION

Set the Harmony A controls for a harmony line one octave below a specific input pitch (see the POLYPHONIC OCTAVE DIVIDER control settings). By recording this one-octave-below speech on tape at 7½ IPS, then playing the tape back at 15 IPS, the speech will occur at twice the normal rate, but with normal pitch characteristics. This technique will also work if you record the speech at 3½ IPS, and play the tape back at 7½ IPS.

ADDITIONAL INFORMATION

USING THE EFFECT OUT JACK

The effect out jack gives the effect sound (delayed, harmonized, or whatever) regardless of the setting of the MIX control. This is useful for stereo applications, or when further processing of the effect sound is desired.

USING THE A/DA PEDAL

The A/DA Pedal may plug into the voltage control input jack on the back of the enclosure, in which case the pedal overrides the HARMONY A controls. Dramatic pitch sweeps, both upwards and downwards, are possible with this pedal. A/DA offers two pedals: the Model A sweeps the full range of the HARMONY A, COARSE TUNE control; Model B, in addition to sweeping the full range, has adjustable electronic stop points to set the upper and lower limits.

OTHER HINTS

The REGENERATION control if set to extreme clockwise positions, will produce feedback. The only way to cancel this feedback is to reduce the knob setting; switching the effect in and out will not stop the feedback. For parallel harmony lines with guitar, the tremulant effect caused by the "splice" may be somewhat objectionable. Using a fuzz before the Harmony Synthesizer and an echo unit (or reverberation) after it will often minimize the tremulant effect.

The Harmony Synthesizer functions best at room temperature. If the unit has been out overnight in a cold van, give it a little time to warm up before expecting normal operation. If you come up with any interesting or novel uses for the Harmony Synthesizer, we'd like to hear about them. Thank you.

A/DA wishes to thank Craig Anderton for his assistance in the preparation of this manual. Contents are copyright © 1978 by Analog/Digital Associates.

SPECS

Input impedance	100 K ohm
Input sensitivity	-38 dBm
Output impedance	300 ohm
Delay Only	25 msec to 200 msec
Harmony range	+1 to -2 octaves
Delay of Harmony signal	12.5 msec to 100 msec
Regeneration	0 to infinity
Power Requirements	117 VAC, 50/60 Hz (optional: 230 VAC, 50/60 Hz)
Power Consumption	7 watts
Weight	65 lbs (14.33 Kg)
Dimensions,	height 3.25 in (8.26 cm) length 9.25 in (23.5 cm) width 11.5 in (29.2cm)

