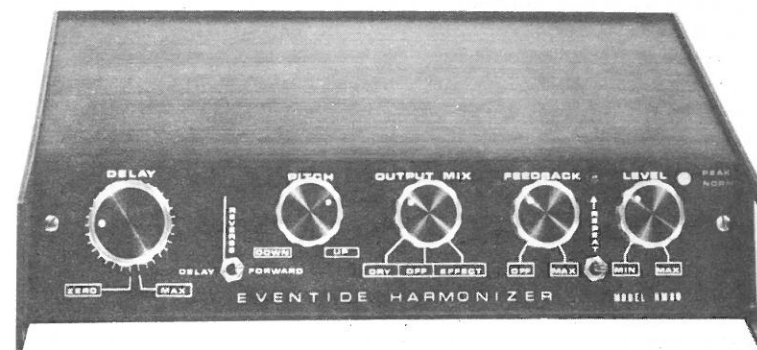


HM80 Harmonizer



INSTRUCTION MANUAL

Eventide
the next step

EVENTIDE MODEL HM80 HARMONIZER

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INTRODUCTION

The EVENTIDE CLOCK WORKS model HM80 Harmonizer is a very versatile special effects device designed to bring several time related processes into the repertoire of the individual musician. Eventide is the premier manufacturer of digital delay lines and digital processing equipment for the recording industry, and this product replicates many of the effects achievable with our studio Harmonizers (models H910 and H949).

PLEASE READ THIS MANUAL BEFORE USING YOUR NEW HARMONIZER! It answers questions about hookup, operation, and warranties, and provides information on getting the best sound out of the unit. If you have any questions whose answers AREN'T COVERED BY THE MANUAL, please feel free to write or call us. We try to be available both during and after normal business hours for the convenience of our out of state (and country) customers.

The HM80 Harmonizer enables the singer and musician to produce time modification effects in the broad categories of :

TIME DELAY: The delay of the output signal with respect to the input;

PITCH CHANGE: The change (transposition) of pitch between the output and input;

REVERB: The rapid repetition with decay of a continuous input signal; CAPTURE and REPEAT: The continuous repetition of a short segment of the input signal; and

REVERSAL: The process of reversing the time-order of successive input signal segments.

In addition to these basic capabilities, the various effects can be utilized in various combinations, and other facilities, such as mixing the input and output signals, are provided as a convenience for users who don't have or don't want to use a mixing console. Each of these capabilities is further described in the appropriate section of this manual.

INPUT/OUTPUT REQUIREMENTS

One of the most important requirements for the proper use of your Harmonizer is that the input and output signals be of the proper type and level for the type of equipment with which the Harmonizer is interfaced. FAILURE TO ADHERE TO THE GUIDELINES GIVEN HERE WILL RESULT IN UNSATISFACTORY OPERATION and/or EXCESSIVE NOISE! Because the unit is expected to be operated under a wide variety of conditions, 2 input connections and 2 output connections have been provided instead of the usual one each. The input connections are designed to accommodate signal levels ranging from those provided by instrument pickups to those from semi-professional and professional recording equipment. The output levels are appropriate for driving instrument amplifiers or semi-pro mixing consoles.

LOW LEVEL INPUT: This jack will accept inputs in the range of 100 millivolts to 2 volts, depending upon the setting of the front panel LEVEL control. The input impedance is approximately 100,000 ohms (100K) and guitar pickups or others providing similar output levels may be

connected to this jack. Note that almost all microphones and phono cartridges WILL NOT PROVIDE SUFFICIENT LEVEL to drive the Harmonizer. If you contemplate using such a source, you MUST provide external pre-amplification. If there is any doubt about whether a source provides sufficient level, connect it to the Harmonizer and turn up the LEVEL control all the way. If the red light cannot be made to flash under any circumstances, then the level is insufficient. Even if the Harmonizer seems to operate properly, there will be excessive noise under most conditions of use.

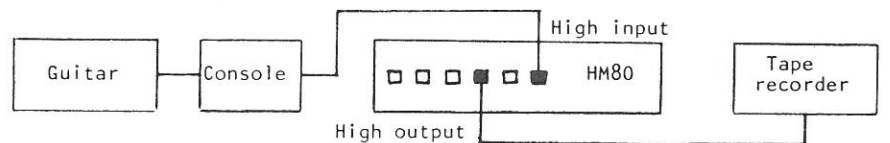
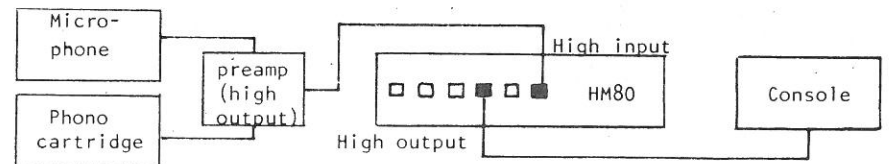
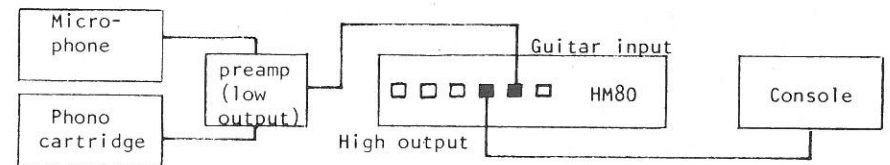
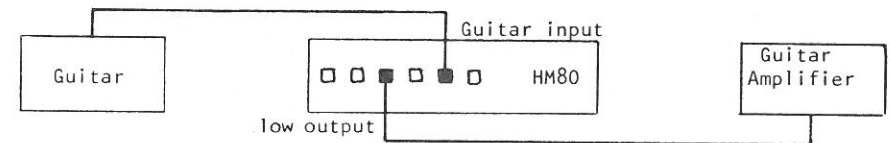
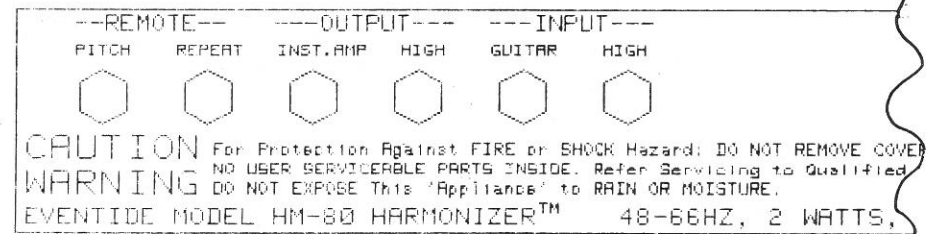
HIGH LEVEL INPUT: This jack is for use with high level signal sources such as professional recording equipment, and attenuates the input by about 20dB with respect to the LOW (Guitar) level input. This jack should be used if your signal source has an output greater than approximately 0dBm or 1V. If you are using the GUITAR input and find that you must consistently set the LEVEL control below 9 o'clock then you should probably be using the HIGH level jack.

When power is first applied to the Harmonizer, the LEVEL LED will flash momentarily both RED and GREEN and then turn off. (If it remains on, see "in case of difficulty".) If a constant level input signal is applied to the unit and the LEVEL control gradually increased from fully counter-clockwise, the GREEN light will be seen to come on, followed by the RED light some rotation later. During normal operation, it is desirable to have the GREEN light on as much as possible, and the RED light on as little as possible. This ideal, unfortunately, can only be approached by very regular signal sources such as organs, signal generators, and the like. Real world signals such as voice and guitar usually exhibit strong peaks, and attempting to adjust the unit to remain "in the green" under all circumstances will result in an unacceptable diminution of dynamic range. For this reason, the LEVEL control should be adjusted so that the RED light flashes on signal peaks. The proper adjustment point varies tremendously depending upon the type of signal and the processing effects used the Harmonizer. Because of processing employed in the Harmonizer, periodic flashing of the RED light does NOT indicate significant distortion is occurring, although an occasional peak may be clipped. The RED indicator must be on a significant portion of the time before AUDIBLE distortion occurs.

To summarize: for the BEST DYNAMIC RANGE (lowest noise compared to signal), the LEVEL control MUST be adjusted to a point where the GREEN light is on most of the time, and SHOULD be adjusted to a point where the RED light is flashing periodically, depending upon the signal source. The BEST adjustment point should be determined by listening to the output, advancing the LEVEL control until audible distortion occurs, and then backing off the control until the signal cleans up.

One final note on the RED/GREEN LED: The GREEN light measures signal level BEFORE the delay chain. The RED light measures signal level AFTER the delay chain. Thus, the current delay setting may be determined approximately by putting an impulse into the Harmonizer input and estimating the delay between the RED and GREEN flashes.

EVENTIDE HARMONIZER MODEL HM-80 REAR VIEW



HM80 HARMONIZER SAMPLE SET-UP CONFIGURATIONS

Note: These diagrams are intended for guidance only. Check the inputs and outputs of your equipment, which may be different from those shown above.

OPERATION of the HARMONIZER

This section begins with descriptions of all the Harmonizer operating controls, with the exception of the LEVEL control, covered earlier. The controls described in this section are those which determine the "effect" or combination of effects created by the Harmonizer, and their individual operation should be well understood before one attempts to operate them in concert (or together, for that matter). For clarity, they will be discussed in an order different from that in which they appear on the front panel. Following this section we will give examples of control settings for specific effects.

OUTPUT MIX (DRY/OFF/EFFECT)

This control serves two functions: The first is as the POWER switch. On 115V versions of the HARMONIZER, the full counter-clockwise position corresponds to POWER OFF, and any other position to POWER ON. The OFF position is inactive in 230V versions and the OFF label may be regarded as an extension of the DRY rotation.

The second function is to determine the relative "MIX" of the direct (input) signal, and the modified (pitch, delay, etc) signal. Referring to the simplified block diagram, one can see that the OUTPUT MIX control gives a continuous selection of the proportion of the output coming from the input amplifier (on the left) vs. that from the digital effects generator (on the right). Note that if the FEEDBACK control is OFF, then the ONLY signal coming out of the Harmonizer is the one which went into it. This signal will be devoid of effects, and will have better frequency response and dynamic range than that specified for the Harmonizer as an effect generator. If it is desired to "bypass" the unit when its effect(s) aren't desired, this control may be used providing that the power remains ON. Note that with the FEEDBACK control operative, one will obtain some of the modified signal even with the control in the DRY position. This seeming anomaly was included in the design because of certain time reversal effects which it permits.

Note: the HM80 is designed to drive output loads of 5000 ohms or greater. Virtually all amplifiers and consoles have input impedances of 10000 ohms or greater. If you attempt to drive a 600 ohm load with the HM80, you will notice a drop in output level as the MIX control is rotated away from either end.

Note: If, while turning the MIX control, you accidentally turn the power OFF, leave it OFF for at least 5 seconds. This will permit the unit to reset itself and prevent erratic operation on turn-ON.

FEEDBACK CONTROL

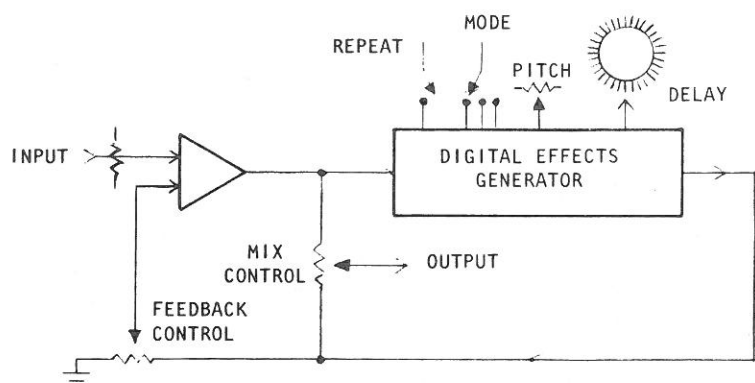
FEEDBACK is the process of taking a signal after it has been processed and applying it to the input of the same processor. In amplifiers, this is usually used to correct "errors" made by the circuitry (so-called "negative feedback"), or to deliberately introduce instability in the circuit to cause it to oscillate or perhaps amplify certain frequencies more than others ("positive feedback"). In the Harmonizer, feedback has an entirely different application: because the processing between the input and output inevitably includes a time delay, the fed-back signal has little relation to the current input signal. Instead of acting instantaneously, there is a delay set by the other controls, and this delay determines how long a chunk of input signal goes by before the beginning of that chunk is re-processed. The FEEDBACK control determines the amplitude, or percentage of the input signal that is fed-back. To see what its effect is, consider the Harmonizer set for maximum delay: If a single, short note were played into the unit, it would be heard at the output after some delay and would also be fed back to the input at the same time. Since the Harmonizer is unconcerned about the source of its signal, it will dutifully repeat the note a second time, at an amplitude determined by the setting of the FEEDBACK control. If the control setting is high, the note will repeat many times before either it decays or, (if the feedback control is set very high) the noise builds up to the point that it is no longer audible as a discrete note.

In addition to the discrete "echo" effect achieved in this example, the FEEDBACK can be operated in conjunction with continuous input signals at very short delays to achieve a sort of constant "flanging", and with the pitch change and time reversal modes to produce startling frequency progressions from simple input signals.

The FEEDBACK and OUTPUT MIX controls are in effect analog mixing controls, and affect the signal directly. The following controls operate on the digital circuitry rather than the signal itself.

REPEAT CONTROL

The REPEAT control is a momentary action toggle switch which performs a very fundamental function on the HM80. When the REPEAT function is active, ANY AND ALL DATA PRESENTLY IN THE MEMORY ARE CAPTURED. Unlike the action of the FEEDBACK control which takes data that has been removed from the memory and modifies it by changing its level, the REPEAT control permits no new data to be stored, while simultaneously keeping the old data. One effect of this pre-emptive storage is that the signal will NEVER decay as long as power is applied to the unit.



HM80 HARMONIZER

SIMPLIFIED BLOCK DIAGRAM

You can literally put a word into the unit and come back to that same word after a world tour (although presumably you would take the unit on a world tour, so this is a bit unlikely). Another effect is that the storage time is not adjustable. A chunk of signal exactly equal to the maximum delay of the Harmonizer will be stored. When in the repeat mode, the RED LED immediately above the toggle switch will flash at a rate equal to the length in time of the signal stored. (This LED is normally ON continuously as long as power is applied, thus doubling as an ON/OFF indicator.)

Although the INPUT to the memory is "frozen" during REPEAT operation, the OUTPUT operates normally. This means that the mode switch and PITCH control work as expected, and it is possible to modify a captured signal just as one can modify a continuous input (although of course the FEEDBACK control has no effect on the INPUT to the delay circuitry).

REMOTE REPEAT

The action of the REPEAT toggle switch can be duplicated by plugging a switch or source of trigger voltage into the REMOTE REPEAT jack on the rear panel. This is a standard stereo phone jack which accepts a 1/4 inch phone plug whose "tip" provides the switch input, whose "ring" has a current limited bias voltage necessary to trigger the REPEAT mode, and whose "sleeve" is a ground reference for both. Connecting the tip and ring together (or providing a positive voltage pulse of between 9V and 11V for several milliseconds) toggles the REPEAT mode. Disconnecting the tip and ring has no effect on operation, but readies the circuitry for the next connection. A second connection of tip and ring exits the REPEAT mode, a third re-enters REPEAT, etc.

MODE switch "DELAY/REVERSE/FORWARD"

The 3 position toggle switch labelled "DELAY/REVERSE/FORWARD" is the MODE switch which determines the basic operational function of the Harmonizer. We will call this the MODE switch for convenience even though it is not labelled as such.

The three mode names define the major functions of the digital circuitry. We will discuss them in order.

DELAY: In this position, the digital circuitry functions as a straight delay line: the signal comes out of the unit at the same pitch and direction as it goes in, but with a fixed TIME DELAY. A time delay is equivalent to hearing a signal identical to the input, but at a later time. The most common example of this is a tape or disc recording. It is important to know and understand that time delay is NOT an EFFECT in ITSELF, but must be used in conjunction with the ORIGINAL signal or modified version of the original signal to be of use! One anticipated "cockpit error" with the Harmonizer is to set a time delay and complain of hearing no effect. You shouldn't expect to, any more than a record should sound different from the morning to the afternoon! When in the DELAY mode, the DELAY control has a major effect, and the PITCH control has none. Refer to these controls' descriptions for more information.

REVERSE: This mode, advertised as "must be heard to be believed", must be heard to be understood as well. Basically, the REVERSE mode involves storing data in the memory in the normal way, and reading it out backwards. Because of the length of the memory and certain psychoacoustic effects, this mode is most effective with signals which

have significant changes during the processing period, equal to the maximum delay. Listening to an organ note or 10 second sustain backwards won't sound interesting because the reversed signal is virtually identical to the forward version. On the other hand, guitar and bass riffs, spoken and rapidly sung material, piano and other struck or plucked string instruments sound very interesting and totally different under time reversal. Because there is no natural process that produces the same effects, it is impossible to duplicate the REVERSAL effect with any "instrument" other than a synthesizer, which of course does not have the rich tonality and complexity that instrumental and vocal sources have.

In the REVERSE mode, the PITCH control is active. The DELAY control is partially active but will make no noticeable change in the output and is better ignored.

FORWARD

The FORWARD pitch change mode allows one to produce signals which are transposed from the input by up to a full octave in either direction. Unlike the less complex "ring modulators", frequency shifters, and the like, the process employed in the Harmonizer permits ANY type of signal source to be used, and always preserves harmonic ratios, so that instruments do not seem to go out of tune or become cacophonous as the pitch is changed. This is done in a manner analogous to the familiar "doppler effect", in which car horns seem to change pitch as the car goes by. The electronic analog of this effect produces a continuous change in delay, which is equivalent to a continuous change in distance ("motion"), and so a pitch variation. Because the electronic circuitry must compensate for the fact that a continuous change in motion requires either infinite delay or preknowledge of the input signals, both physical impossibilities, a discontinuity or "glitch" is introduced into the signal during pitch change operation. This glitch becomes more severe at very wide pitch ratios and disappears entirely at a pitch ratio of 1:1 (equivalent to DELAY). Because the subjective severity of this glitch varies in a complex fashion with changes in the program material, the pitch ratio, and the listener, it is difficult to predict whether any combination of pitch ratio and program material will give satisfactory results. Because the glitch handling circuitry in our Professional Harmonizers is more sophisticated, we recommend that they be used for recording applications.

Because pitch change is created by continuous delay change, it is necessary that there be some delay in circuit all the time while this mode is engaged. It is THEORETICALLY IMPOSSIBLE to achieve pitch change with zero delay using this process. For this reason, the DELAY control is only partially effective in the PITCH mode. There will always be a small delay before the pitch changed output. This delay may be approximately doubled by placing the DELAY control at any setting between 12 o'clock and MAX.

The DELAY control is active, with minor exceptions noted above, only when the MODE switch is in the DELAY position. The switch has 32 detented positions so that a large number of delay selections is possible. Each position of the switch increases the delay by 1/32 of the maximum delay available, roughly 8.5 milliseconds per step. Because the switch has no stop between the maximum and zero positions, it is

possible to go between no and full delay either gradually or instantaneously. Two minor notes: There is no true zero delay (other than by using the MIX control). The zero position corresponds to some random delay between zero and 8 milliseconds. Delays this small are not perceived as actual delay but rather as frequency cancellation effects and consequently would not be used for specific effects such as "doubling". Also, "clicks" may sometimes be noticed when switching delays while signal is going through the unit. These clicks result from instantaneous splicing of signal segments and are usually of low amplitude and little consequence. There is no noise generated when switching delay with no input.

The PITCH control is active both in the FORWARD pitch change and REVERSAL modes, and determines the ratio of the pitch of the output signal to that of the input. When the control is centered (12 o'clock), the pitch is very close to 1:1. At the counterclockwise extreme, it is close to .5:1 (1 octave DOWN); at the clockwise extreme, 2:1. Internal circuitry "bandspreads" this range so that adjustments close to 1:1 are easier to make, at the expense of those at the extremes.

A REMOTE PITCH input is available at the rear panel for those who wish to control the unit with a foot pedal or synthesizer output. This input requires approximately +1.5V to increase the pitch one octave, and -1.5V for a corresponding decrease. The sensitivity may be decreased by connecting a resistor in series with the tip of the plug. The input resistance is 100K, and adding a 100K resistor will cut the sensitivity in half.

combination effects from the HM80 Eventide Harmonizer	delayed feedback	dry + effect mix	repeat	effect only
pitch change	yes	yes	yes	yes
delay	yes	yes	yes	yes
reverse	yes	yes	yes	yes
pitch change + delay	yes*	yes*	no	yes*
pitch change + reverse	yes	yes	yes	yes

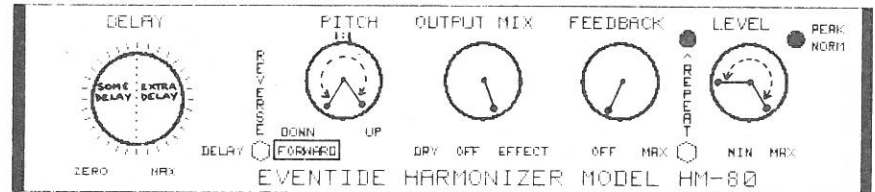
*limited delay selection

CONTROL SETTINGS TO OBTAIN VARIOUS EFFECTS FROM THE HM80 HARMONIZER

The section which follows illustrates some popular effects, and some totally new ones, and shows how these may be achieved. It is not intended to be exhaustive, but rather to act as an introduction to the capabilities of the unit. Take the control settings as a starter, and vary them to suit your own taste and requirements.

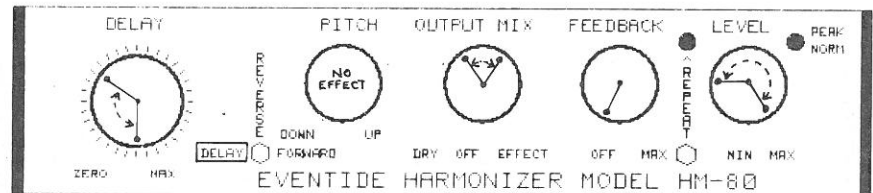
PITCH CHANGE

The control settings below show the HM80 Harmonizer set up for PITCH CHANGE operation. Only the pitch changed signal is output, and the input is suppressed.



'DOUBLING'

The settings shown below will give a 'doubled' effect. The input signal is added to its delayed replica, and both signals are output. Longer delays will tend to result in discrete echoes, especially with plucked-string instruments. Shorter delays will tend to sound 'flanged'. Delays in the middle of the range shown are recommended for guitars and similar instruments. Longer delays are recommended for voices.



REVERB

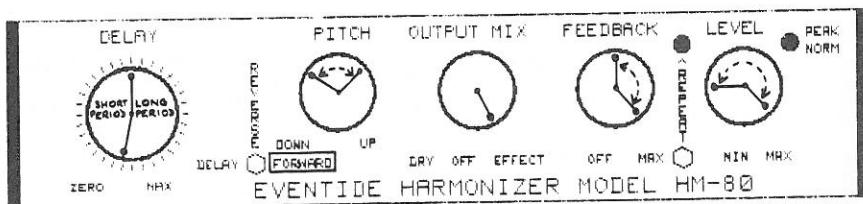
The settings shown below give a discrete reverb effect. Increasing the DELAY control from zero to maximum increases the reverb time, and the length of the signal segment affected. Increasing the FEEDBACK control affects the reverb time (how many repetitions of the signal occur). Increasing the FEEDBACK to maximum may result in a rapid increase of the signal level, which is usually undesirable but may be used for certain effects.



REVERB WITH PITCH CHANGE

By varying the PITCH control while utilizing various amounts of feedback, a continuous transposition of the input signal is performed. Each time the signal goes around the feedback loop, it is transposed by an amount proportional to the setting of the PITCH control, so that a continuous upward or downward progression is obtained.

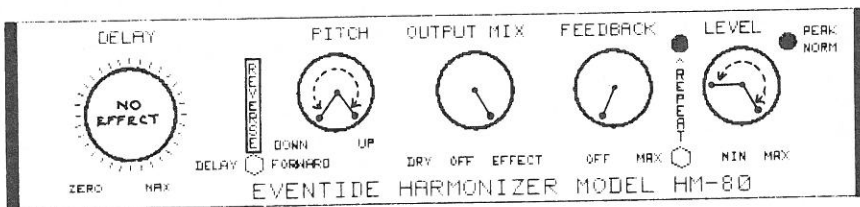
Note that excessive pitch change will result in fewer transpositions (recirculations), due to frequency response limitations of the Harmonizer and succeeding equipment.



TIME REVERSAL

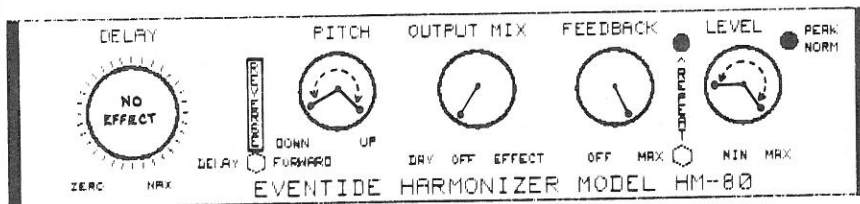
Placing the unit in the REVERSE mode and setting the MIX control to EFFECT results in a time-reversed output. This is an effect unique to the Harmonizer, and one which is suitable for vocal and speech effects, as well as for instrumental ones. In this mode it is impossible to understand spoken words, because they sound just like a tape going backwards.

Varying the PITCH control changes the length of the signal segment being reversed, and also changes the pitch of the output.



NORMAL SIGNAL WITH REVERSED FEEDBACK

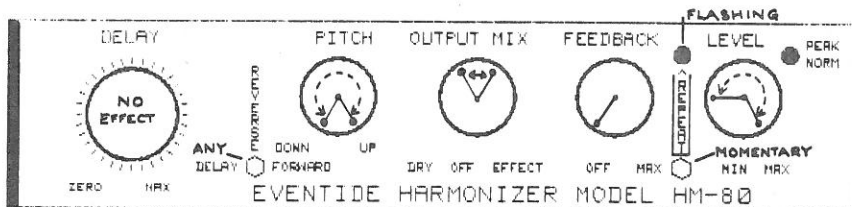
A very interesting effect, which permits the listener to 'understand' the output even though the REVERSE mode is in effect is depicted below. With the FEEDBACK control up, the output of the effects generator is audible even in the DRY position. By using the REVERSE mode with feedback, but monitoring in the DRY position, both the reversed and the normal signals are available.



NORMAL SIGNAL MIXED WITH CAPTURED (REPEAT) SIGNAL

Using the REPEAT mode, a signal may be captured in the Harmonizer's memory, where it remains, without decaying, until power to the Harmonizer is turned off, or the REPEAT switch is depressed. This captured fragment of material can be 'played' by using the MODE switch and the PITCH control. By having the MIX control in a mid position, both the captured signal and the input signal are mixed at the output. The PITCH control has different effects, depending upon the MODE switch setting:

- REVERSE Both PITCH and SEGMENT LENGTH are proportional to PITCH SETTING
- FORWARD Only the PITCH is varied
- DELAY PITCH control has no effect



REMOTE PITCH CONTROL CONSIDERATIONS

If you wish to use a foot pedal to control PITCH remotely, you may either provide a voltage source as mentioned above or use the built-in bias source. If you use a stereo phone plug, the ring will be connected to a voltage source in series with a resistor which can go to the "top" of a potentiometer (variable resistor) in the foot pedal. The bottom of the pot should be connected to the sleeve (ground) of the plug, and the wiper of the pot connected to the tip. Any value of pot from 10K to 100K should be satisfactory, providing that the pot has a "linear" taper. Volume control pedals may not be satisfactory. If the footpedal gives too much variation, place a resistor in series with the wiper to reduce the control input sensitivity. Note that inserting the plug in the REMOTE input DOES NOT DEFEAT the MANUAL PITCH control on the front panel. The two controls are additive, and the front panel pot may be used to adjust the upper, lower, or other pitch limit of the pedal as desired.

Using the HM80 with most synthesizers should pose no problems: If the synthesizer has a negative output voltage, set the front panel control to +1 octave and let the synthesizer vary it from +1 octave (no control voltage) to -1 octave (-3V). Likewise if the synthesizer has a positive output, the front panel control may be set to -1 octave and the synthesizer used to increase the output pitch. Note that if the control range of the Harmonizer is exceeded, the following will occur:

- EXCESSIVE POSITIVE EXCURSION: The pitch will not increase above 2:1, but noise and noise-like effects may become more prominent;
- EXCESSIVE NEGATIVE EXCURSION: The pitch will gradually decrease to 0. Whistles and spurious frequency components may become more prominent, depending upon the program material.

Although it is possible to "play" a signal source using the Harmonizer and synthesizer combination much as one can play a VCO, one should not expect the same degree of accuracy as can be obtained with a VCO, especially over the full 2 octave range. There is no guaranteed "log conformity" specification for the HM80. If this characteristic is necessary, we recommend our professional series units which may be phase-locked to synthesizers.

HARMONIZER COMPARISON

The HM80 is one of several models available from Eventide. Each has its own application area, features, and characteristics. The HM80 has been designed primarily for the individual musical and 'semi-pro' recordist. As such, it is somewhat more versatile in terms of input/output requirements and mixing capabilities, and somewhat less capable in terms of such critical recording features as dynamic range and frequency response. The chart below summarizes the specifications of our current units.

SPECIFICATION	HM80	H910	H949
Maximum delay	270 ms	112.5 ms	400 ms
Delay increments	8.5 ms	7.5 ms	6.25 ms
Number of outputs	1	2	2
Frequency response	10 kHz	12 kHz	15 kHz
Pitch ratio readout	no	yes	yes
Dynamic range	80 dB	90 dB	96 dB
Keyboard available	no	yes	yes
Time reversal mode	yes	no	yes
External controls:			
Pitch	yes	yes	yes
Delay setting	no	no	optional
Repeat mode	yes	no	optional
Flanging	no	yes (requires ext. mixing)	yes
Repeat	yes	no	yes
Max/min pitch	+ 1 octave	+ 1 octave	+1, -2 octaves
Pitch algorithms	1	1	2
Feedback control	yes	yes, main output only	yes, both outputs
Feedback EQ	no	no	yes
Input level indicator	2-color LED	peak LED	5 LED's
Input level required	Guitar, -10/+10 dBv	-10/+22 dBv	-10/+22 dBv
Output Level available	Instrument amp, or -10/0 dBm	+22 dBm	+22 dBm
Connectors	¼" phone jack	terminal strip	XLR
Physical size	10½"x8¼"x2¼"	3½" rack, 8" deep	3½" rack, 11" deep
Weight	3 lbs	10 lbs	12 lbs
Power consumption	2 watts	25 watts	40 watts

Please note:

This chart is for comparison purposes only, and is not intended to replace the individual product specification sheets.

WHAT TO DO IN CASE OF DIFFICULTY

The Harmonizer model HM80 is a carefully designed product which should continue to give service indefinitely. Special attention was given to preventing damage caused by unusual operating conditions and the normal physical conditions experienced "on the road". Nonetheless, it is possible that trouble may be experienced, either due to electrical failure or physical damage. If you have a problem with the unit, please follow the procedure given below.

First, be sure that there actually is a problem! In the case of electrical malfunction, be sure to check all cords, including the AC power cable. If the PEAK/NORM indicator flashes but there is no output signal, try plugging the unit into a different amp (with a different patch cord). If the light doesn't flash, try connecting a different signal source/instrument to the input.

If the unit does not work immediately after purchase or upon initial turn-on, please be sure that you fully understand its connection requirements and its capabilities. If possible, take it back to the point of purchase and either compare it with a known-good unit, or have the dealer check it. If it's been working OK and suddenly isn't, please make certain that nothing in YOUR setup has changed, even if it seems irrelevant.

If all of the above checks indicate a definite problem with the Harmonizer, skip to the return shipping instructions below.

MECHANICAL PROBLEMS

Because the Harmonizer is a travelling unit, it may from time to time be kicked, dropped, crunched, or worse. The usual casualties in such cases are the protruding parts such as the knobs, jacks, etc. It is feasible for a non-factory service technician to replace these items, and a spare parts price list for these items is included in this manual. Front panel knobs and line cords (230V only) can be replaced by anyone. If the defective component(s) cannot be seen from the outside of the unit, they should not be adjusted or replaced except at the factory.

If a unit is returned to the factory, there are a few commonsense rules which MUST be followed so that your unit can be returned speedily (or at all!) The primary, most important, absolute requirement is that a TROUBLE REPORT BE INCLUDED WITH THE PHYSICAL UNIT! This trouble report MUST include, as a minimum, the following:
 Shipper's name and address.
 Nature of the trouble (as detailed as possible)
 Copy of purchase invoice (for in-warranty units)
 Authorization to ship COD or other instructions (out-of-warranty units).

PLEASE PLEASE don't skip item number 2, no matter how silly you think it is!!! If your unit was run over by a tank and you think that the problem is obvious, think about this: WE don't know whether you returned it because a LED didn't work and it got destroyed during shipment. This may or may not be the case, but if you don't tell us, we must write to you to find out whether you want to file a damage claim with the carrier. If the problem is a simple one (LED's light, no output under any circumstances), then that's all you have to say. If

the problem is more subtle (excessive noise at a particular setting of the delay control only during the pitch change mode), or if the problem is intermittent (sometimes unit doesn't work in REPEAT mode during the full moon), give us as detailed information as is possible. Remember, whether the unit is in or out of warranty, it will take longer to return it if we must search for the problem as well as the solution.

Further notes on this important subject: Do not "phone in" the trouble report! PUT IT IN WRITING, and ATTACH it to the unit. If you put it in an envelope on the outside of the box, put a spare copy inside in case the outer one is removed or destroyed during shipping. Feel free to 'phone us if you are not sure whether to return the unit, but if we say you should, all of the above applies despite the 'phone call.

One more note: We cannot accept collect or COD shipments, or shipments from overseas unless they are delivered free of customs requirements. For your protection, we WILL NOT accept shipments in damaged shipping containers, but rather request the carrier to return them to the shipper so that he may decide whether to file a damage claim.

We realize that it is sometimes difficult to deal with far away mysterious companies, and the following discussion will hopefully ease your fears about shipping your Harmonizer back home for temporary R&R&R.

The first thing to realize is that most companies hope to BREAK EVEN on their service organizations. We are not looking to make a fortune by overcharging for repairs, and any charges for your repair will be, within a small percentage either way, exactly what the repair costs us. We make our profits selling equipment and hope that nothing EVER goes wrong with it. If something does, we want it back in your hands and working as soon as possible.

When a unit comes in for repair, it is immediately opened and inspected for shipping damage and the presence of a trouble report as detailed earlier. If it IS damaged and the trouble report doesn't indicate that it was damaged prior to shipping, we write to the shipper giving details and requesting instructions. If the unit is received without a trouble report, we write to the shipper requesting one. Absent either of these conditions, the unit is given to a service technician who attempts to verify that the trouble report is accurate. If it is, and if the problem is a simple one such as a failed component, the unit is repaired and immediately returned. Under these circumstances, it is not unusual to return the unit the same day it comes in! If the report cannot be verified, if different problems are found, or the trouble is described as an intermittent and it doesn't manifest itself immediately, it may be necessary to keep the unit longer, communicate with the shipper, or both. Under these circumstances, it can take from two days to several weeks. If we need information from the shipper and cannot obtain it for whatever reason, it may be necessary to return the unit unrepaired. It is very unusual for components in current products to be "out of stock", so you shouldn't worry about indefinite delays for this cause.

Our repair department is quick and conscientious. Given the information we need (by YOU), your unit should be on its way back to you within a week of its being sent.

SHIPPING HINTS

The following are recommendations based on years of experience shipping small packages. You don't have to follow them, of course, and circumstances may alter with time, but here goes.

1: U.S. Mail is for LETTERS. Never ship anything other than paper and small parts by post. At the risk of seeming (al right, deliberately BEING) facetious, the Post Office slogan about snow, sleet, etc. may be true, but it frequently seems as if they deliberately route packages THROUGH snow, sleet, etc. just to slow them down. We strongly recommend UPS (United Parcel Service), which now has service throughout the United States, and parts of Canada. We further recommend shipment by UPS BLUE LABEL (air service), as the marginal cost increase for such a light package is rarely of consequence, although the delays of ground shipment are.

2: If you are in an exceptional hurry, use an air freight service such as Emery or Federal. These companies offer 1 day service to/from almost all parts of the country, at, of course, a premium price. If you wish us to return a unit by air freight, we will be happy to do so, although the shipment will be collect regardless of warranty status. We suggest that you avoid using the individual airlines' freight services unless you have ascertained that they will DELIVER packages rather than leave them at the airport for pickup. We have no facilities for collecting packages and the shipper must arrange for delivery.

3: If you MUST mail a unit to us, please be sure to give us your STREET/RFD address rather than a PO BOX. We cannot ship to Post Office Boxes, and if this is the only address we have, we will have to write to it to get your delivery address.

4: Be sure that you pack your Harmonizer well. Use a box large and strong enough so that small dents and creases will not find their way to the unit inside. Within reasonable limits, carriers charge by weight and not size, so don't try to make the package as small as possible. (Please don't ship it in a road case either! Just a good, strong, relatively new cardboard container.)

ELECTRICAL SAFETY

Although the HM80 model Harmonizer uses very low power, it requires precisely regulated power supplies which are best achieved by connection with the AC power line. Because it is connected to the AC line, there is always POTENTIAL danger (no pun intended), although any ACTUAL danger is extremely unlikely. There are two versions of the unit, one designed to U.S. standards, and which requires 115VAC, 50-60Hz, and the other designed to European standards and which requires 230VAC, 50-60Hz. The US version uses an approved line cord, and ALL METAL PARTS are INSULATED from the AC LINE. The European model uses an IEC standard 3-wire connector, which provides a separate ground pin which is connected to the chassis. As with any electrical device, if the power cord is damaged, broken, or frayed, it MUST be REPLACED with a properly approved cord to avoid LETHAL shock hazard.

Looking at the rear panel of the Harmonizer, you will see additional safety warnings. They are all common-sense, and all intended to be taken seriously. While one would not expect to take the Harmonizer for a swim, remember that the main ingredient of Coca Cola and Milk Shakes is WATER, and a spilled Coke is more concentrated than rain. If the unit does get wet it must be dried thoroughly, both internally and externally. It might be added that, although the unit is protected by its interlocking chassis against casual sprays of moisture, it is NOT proof against immersion, and immersion in almost any liquid will SERIOUSLY DAMAGE the circuitry, in addition to the shock hazard engendered thereby.

Again, to summarize:

KEEP YOUR LINE CORDS IN GOOD CONDITION AND YOUR EQUIPMENT DRY!

SERVICING:

THERE ARE NO USER-SERVICABLE PARTS INSIDE! Because of the complexity of the digital circuitry combined with the small size and easy shippability of the HM80, we strongly recommend that USERS attempt NO REPAIRS, and that service facilities strictly limit themselves to repairing MECHANICAL DAMAGE such as damaged switches and controls. See "In case of difficulty" for further information on service and returns.

LIMITED WARRANTY

The Harmonizer model HM80 IS WARRANTED FOR A PERIOD OF ONE YEAR from the date of purchase from Eventide or an authorized dealer, against defects in material or workmanship. In case of difficulty, consult Eventide or your dealer for instructions.

This warranty does not apply to mechanical defects caused by use or rough handling, or to damage caused by improper operation not in accordance with this manual. Cause of defect is in the sole judgement of Eventide. There are no other express or implied warranties, and no warranty of merchantability or fitness for a particular purpose.

The warranty is voidable at Eventide's option under the following circumstances:

- If the unit is connected to an improper voltage supply (correct voltage is specified on the back of the unit)
- If the user makes unauthorized modifications of any type. If such modifications are made, user agrees to pay for any time or parts necessary to remove the modification before repair.

Eventide will under no circumstances be responsible for consequential damages caused by failure of equipments of its manufacture, or for any other reason. Our sole liability is for repair or replacement of defective parts, under the terms of the warranty.

The warranty covers return shipping in the continental US except Alaska. Return shipments will not be insured unless the customer requests and agrees to pay for same. If a more expensive form of shipment is requested, customer will be charged for same.

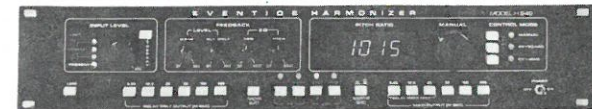
See earlier manual sections for how to return equipment for repair.

Eventide
the next step

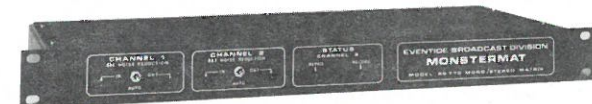
digital delay lines
instant flangers
omnipressors
harmonizers
monstermats



BD955 Broadcast Audio Delay Line



H949 Harmonizer



**RD770 Monstermat
Mono/Stereo Matrix Unit**



**Real-Time Analyzer
AIB232 for Apple Computer**