

PhaseTwo User's Guide

Audio Damage, Inc.

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Introduction

The Mutron Bi-Phase, made by Musitronics Corp. in the mid to late 70s, is the most sought-after hardware phaser in existence. Highly prized for its wide dynamic range and the liquid, subtle phasing provided by its two six-stage phasers, the Bi-Phase is the benchmark by which all other analog phasers are judged. Unfortunately, these original units are quite rare, and if one is found in good working condition, it commands a premium price.

Enter PhaseTwo. This plug-in is a digital recreation of every aspect of the original Bi-Phase, complete right down to the foot pedal. PhaseTwo features two separately controllable six-stage phasers, and like the original unit, these two phasers can be routed in series or parallel, for everything from subtle stereo washes to full-blown alien attack. Using the extra CC feature, which takes the place of the "Opti-Pedal" in the original unit, you can manually sweep the phaser frequencies with a MIDI controller, such as a mod wheel.

The cel-shaded user interface of PhaseTwo matches the original unit in every respect, so anyone familiar with the vintage unit will feel right at home using the digital recreation. Every object on the interface has Audio Damage's standard MIDI Learn feature, so the unit can be fully controlled from external hardware controllers.

System Requirements

To use PhaseTwo on a Windows computer, you'll need a Steinberg VST-compatible host application, preferably conforming to the VST 2.0 specifications, and a computer capable of running it. For the OSX version, you'll need a VST host, or a host capable of utilizing Apple's Audio Unit plug-ins. The following specifications represent minimum requirements.

For use with Microsoft Windows:

- Windows 98 or later
- 256 MB RAM
- Pentium III 600 MHz CPU
- High Color S-VGA Display

For use with Apple Macintosh:

- Mac OS X version 10.3.9 or later.
- 256 MB RAM
- G4 500 MHz CPU
- Display capable of “thousands of colors”

Installation

Double-click the PhaseTwo Installer icon, and follow the instructions. During the installation process the installer will ask you to enter your registration code. The code can be found in your account in the Audio Damage store. Your registration code uniquely identifies your purchase, and you will need it if you need to reinstall your plug-in (for example, after upgrading to a new computer). Keep a copy of the code in a safe location and please don't share it with your friends. We're delighted if you like our products so much that you want to share them, but please ask your friends to buy their own copy so that we can keep making new products.

Note: you must be logged into an account with administration privileges in order to successfully install and authorize PhaseTwo.

To un-install from OS X, simply delete the plug-in from your VST and/or AudioUnit components folder. To un-install from Windows, use the included un-installer application.

We assume that you are familiar with using VST and Audio Unit plug-ins with your particular host. If you have general questions about using plug-ins with your host, please refer to its documentation. PhaseTwo can process either mono or stereo signals, and can be used as an insert effect or on an effects-send channel in your host's mixer. If used in a stereo context (for example, as an insert on a stereo channel in your DAW's mixer), the left and right channels are processed independently with no summing.

Operation

By today's standards, the Bi-Phase is not a terribly complicated signal processor. It has no presets, no MIDI control, no digital displays, no memory cards, and never needs firmware updates. For the sake of historical perspective, though, we'll reproduce a passage from the introduction of the Bi-Phase's manual:

The Mu-Tron Bi-Phase is a sophisticated and versatile sound modification device which consists of two independent six-stage phase shifters. Both phasors have complete control flexibility, and this, combined with some sophisticated switching and control functions, gives the musician an extremely wide range of effects including many that are simply not possible even with two conventional phasors. However, this same total flexibility means that there are quite a few controls the user must become familiar with before he masters the operation of the Bi-Phase. The musician who takes the time to study this manual and learn the functioning of each control will be well on his way toward understanding the subtleties of the Bi-Phase.

[Yes, they really did use the word "sophisticated" twice in as many sentences.] PhaseTwo's controls reproduce those of the Bi-Phase almost exactly, and while PhaseTwo's operation is no more (or less) complicated than that of the Bi-Phase, we will describe each of its controls below.

The Controls

PhaseTwo's onscreen controls are laid out in the same arrangement as the Bi-Phase's knobs and switches. The controls are grouped by their function, and the groups are delimited with rounded-corner boxes. Each box can be thought of as a functional unit or module within PhaseTwo; the name of the unit appears at the top of the box. The modules and their controls are described below. The orange numbers on the picture correspond to the numbers at the beginnings of the following paragraphs.



Sweep Generators

The Sweep Generators control the two phase shifters in PhaseTwo. A phase shifter creates its distinct effect by introducing a series of notches or cancellations in the frequency content of the signal passing through it. The Sweep Generators move these notches higher and lower in frequency, producing the upward and downward “whooshing” effect usually associated with phase shifters.

1, 5 The **RATE** knobs control the speed of the Sweep Generators. Rotating the knobs clockwise increases the speed. Each knob varies the speed of its sweep generator from 0.1Hz (or one complete sweep every 10 seconds) to 20Hz (20 sweeps every second).

The behaviors of the **RATE** knobs are the only respect in which we deliberately made PhaseTwo differ from the original Bi-Phase. In exploring the Bi-Phase, we found that the Rate knobs do not allow precise control of the lowest sweep rates. The sweep rate jumps from its lowest frequency of 0.1Hz up to several cycles per second within only a small range of rotation of the knob. Since we at Audio Damage prefer slower phase-shifter sweeps, the **RATE** controls on PhaseTwo are scaled so that the lower rates are spread over a greater range of knob rotation than on the Bi-Phase. Hence if you have used a Bi-Phase, you may find that PhaseTwo’s **RATE** knobs have a different “feel” as you rotate them and listen to the sweep rate change. We also found that while the Bi-Phase manual states that the sweep generator rates range from 0.1Hz to 18Hz, both our particular Bi-Phase and our simulations created from its schematics show that the upper rate is approximately 20Hz. We choose 20Hz as the upper limit for PhaseTwo’s sweep generator rates.

2 The **RATE CONTROL** switch allows you to choose whether Sweep Generator 1’s rate is controlled by its **RATE** knob or by the Sweep Control. If the switch is set to **MAN**, the Sweep Generator’s rate is MANually controlled by its **RATE** knob. If it is set to **CC**, the rate is controlled by the Sweep Control. The Sweep Control is a hidden control that replaces the function of the Bi-Phase’s optional foot pedal, allowing you to sweep the frequencies of the phasors and the rate of Sweep Generator 1 with a MIDI controller and/or your host’s automation features. We’ll describe it in more detail later.

3, 4 The **SHAPE** switches allow you to choose between two different shapes for each Sweep Generator. The upper setting chooses a smoothly varying sweep up and down, producing a familiar phase-shifter effect. If the switch is set to the lower setting, the Sweep Generator jumps from one extreme to the other. The front-panel graphics of the Bi-Phase depict a sine wave and a square wave above and below the shape

switch, and the manual describes the two positions as “sine-wave and square-wave sweep”. These terms are somewhat misleading in that the hardware does not really produce either sine waves or square waves. When the switch is in the sine wave position, the Sweep Generator oscillator actually produces a triangle wave. When the switch is in the other position, the oscillator produces a square wave. However, subsequent filtering circuitry, and the sluggish response of the phase shifters themselves, round off the corners of the square wave fairly drastically. At higher rates the so-called square wave becomes a somewhat warped triangle wave. All of these quirks are faithfully reproduced by PhaseTwo.

Phasor A

Phasor A is the first phase shifter. Its input is always connected to the plug-in’s left input and its output is always connected to the plug-in’s left output. (In a mono context, Phasor A is connected to the plug-in’s only input and output.)

6 The **DEPTH** knob determines the range over which the phasing effect varies. If the **DEPTH** knob is rotated fully counter-clockwise, the effect moves through a small range of frequencies. As you turn this knob clockwise, you’ll hear the phase shifter sweep up and down over a wider frequency range (assuming that you have its **SWEEP** switch set to **GEN 1**—there’s more about this switch below).

The Bi-Phase manual makes the following suggestion about setting this control:

At lower speeds, the smoothest-sounding phasing is found at about “8”; as the rate is increased, it will probably be necessary to reduce the depth somewhat to maintain a smooth-sounding phasing effect, although this is a matter of taste and what effect you are looking for.

7 The **FEEDBACK** knob adds a variable amount of the phase shifter’s output back into its input. This produces resonant peaks in the phase shifter’s frequency response, between the notches that it produces. These peaks cause the phase-shifting effect to become more pronounced and somewhat more synthesizer-like. If the knob is rotated fully counter-clockwise, no feedback is added. As you rotate the knob clockwise, the amount of feedback increases. When rotated fully clockwise, you may hear a ringing effect as the resonant peaks coincide with harmonics in the signal passing through the phase shifter.

8 The **SWEEP** switch allows you to choose whether the phase shifter is controlled by Sweep Generator 1 or by the Sweep Control. Set the switch to **GEN 1** to produce the usual up-and-down sweeping effect. Set the switch to **CC** if you wish to sweep the phase shifter with the Sweep Control (described in detail below).

Phasor B

Phasor B is the second phase shifter. It has the same filters and hence the same timbral effect as Phasor A, but it has more signal-routing and sweeping options.

9 The **INPUT** knob allows you to choose from which of three sources Phasor B receives its signal. The Bi-Phase has two input jacks, labeled **IN A** and **IN B**. Since PhaseTwo can be used in either a mono or a stereo context, the effect of its **INPUT** switch is slightly different depending on the context. In a stereo context, Phasor B's output is always connected to the plug-in's right output and the **INPUT** switch works as follows:

- If the switch is set to **IN A**, Phasor B receives its signal from the plug-in's left input. That is, it receives the same signal that Phasor A receives. This setting can be used to synthesize a pseudo-stereo phasing effect from a mono input signal.
- If the switch is set to **OUT A**, Phasor B receives its signal from the output of Phasor A. The two phase shifters are connected in series. This setting produces an unusual asymmetric configuration, because the plug-in's left output consists of the left input signal passed through Phasor A, while the right output consists of the left input signal passed through both Phasor A and Phasor B.
- If the switch is set to **IN B**, Phasor B receives its signal from the plug-in's right input. Phasor A processed the plug-in's left input signal, and Phasor B independently processes the plug-in's right input signal. This setting produces PhaseTwo's (and the Bi-Phase's) only "true stereo" processing configuration.

In a mono context, Phasor B's input and output connections vary somewhat depending on the setting of the Input switch. These connections recreate several possible ways of using the Bi-Phase with only one input

signal. Recall that Phasor A always receives the input signal when the plug-in is used in a mono context. The input switch works as follows:

- If the switch is set to **IN A**, Phasor B receives the same signal that Phasor A receives. Phasor B's output is mixed with Phasor A's output, and the mixed signal is sent out of the plug-in's output. This configuration is not available in the Bi-Phase alone, and would require an external hardware mixer to add the two phase-shifted signals together.
- If the switch is set to **OUT A**, Phasor B receives its signal from the output of Phasor A. The two phase shifters are connected in series. The output of Phasor B is sent out the plug-in's output. The Bi-Phase manual describes this configuration as "the normal setting for using the Bi-Phase with one instrument and one amplifier."
- If the switch is set to **IN B**, Phasor B doesn't receive a signal at all and is effectively disconnected. Use this setting if you need a more subtle effect than that produced by combining both phase shifters.

To set the position of this switch with your mouse, simply click near the control's left side, center, or right side. It is not necessary to click and drag with the mouse pointer to rotate the control.

10 If Phasor A and Phasor B are being swept by the same source (either Sweep Generator 1 or the Sweep Control), the switch reverses the sweep direction of Phasor B with respect to Phasor A. That is, if the **SYNC** switch is set to **REV**, you will hear Phasor A sweeping upward in frequency while Phasor B sweeps downward in frequency, and vice versa. If the **SYNC** switch is set to **NORM**, the two phase shifters will move in the same direction. This switch's effect is most pleasing when PhaseTwo is used in a stereo context, since it makes the two output channels sweep in opposite directions. (Try it when listening with headphones. Ooh, trippy, man.)

To set the position of this switch with your mouse, simply click near the control's left side, center, or right side. It is not necessary to click and drag with the mouse pointer to rotate the control.

11 The **SWEEP** switch works the same way as Phasor A's **SWEEP** switch (see #8 above), but also lets you choose Sweep Generator 2 as the sweep controller for Phasor B. If you set the two **SWEEP** switches to

the same source—either **GEN 1** or **CC**—then the two phase shifters will sweep together. Note that they will sweep over a different range if their **DEPTH** knobs are not at the same position. If the **SWEEP** switches are set to different sources, then the two phase shifters will move independently.

12 The **DEPTH** knob works the same way as Phasor A's **DEPTH** knob (see #6 above).

13 The **FEEDBACK** knob works the same way as Phasor A's **FEEDBACK** knob (see #7 above).

14 The two Bypass switches turn the two phase shifters on and off independently. Click the switches to toggle them between their on and off positions (just like foot switches on a guitar stomp box). If their corresponding LED is illuminated, the phase shifter is turned on. If the LED is darkened, the corresponding phase shifter is turned off and signals pass through it without alteration. Sometimes it is useful to turn on only one phase shifter at a time, either to create a more subtle effect or to more clearly hear exactly what you're doing as you turn the knobs and flip the switches.¹

15 The **ASSIGN CC** button is obviously not one of the Bi-Phase's controls. It allows you to assign a MIDI controller to the hidden Sweep Control. (Remember when earlier we said we'd describe the Sweep Control in more detail? Now's the time.) The Sweep Control replaces the foot pedal that Mu-Tron sold as an optional accessory for the Bi-Phase. This control, like the foot pedal, lets you to sweep the frequencies of the phasors and/or the rate of Sweep Generator 1 with a MIDI controller and/or your host's automation features. If you

¹ A footnote about foot switches: The Bi-Phase came with a small box with two foot switches, just like the one pictured in PhaseTwo's user interface. The relative sizes shown by PhaseTwo are correct: the Bi-Phase is a large signal processor, particularly by today's standards. It's about 14 inches wide. The case has a socket for a microphone stand on its underside so that you can mount it at some convenient height and leave the foot switch on the floor. PhaseTwo saves you from having to find space for a 14-inch-wide phase shifter and another mic stand.

set one or both of the Sweep switches to **CC** and then manipulate the Sweep Control, you'll hear the phase shifters moving in response. The Sweep Control itself is not visible in PhaseTwo's user interface. You can use the alternate, generic plug-in interface provided by your host to manipulate it, but the real fun is had by using a hardware MIDI controller such as your keyboard's Mod wheel to twiddle it.

The **ASSIGN CC** button works like this: click the button, then wiggle whatever hardware MIDI controller you wish. PhaseTwo will assign this controller to the Sweep Control. Now, when you move the MIDI controller, you will hear the phase shifters moving in response.

Of course, all of PhaseTwo's other controls can be assigned to hardware MIDI controllers; that's the topic of the next section. You can also use your host's controller automation features to move the Sweep Control. For example, you can create tempo-synchronized sweeps by drawing appropriate curves, using the Sweep Control as the automation parameter.

Important note for AudioUnit users: the **ASSIGN CC** button is **not present** in the AudioUnit version of PhaseTwo. Use the MIDI mapping features of your AU host to assign a MIDI controller to this parameter. It's usually the last parameter on the list, unless your host alphabetizes AU parameters.

MIDI Controllers

PhaseTwo responds to MIDI continuous controller messages. You can use hardware MIDI controllers, such as MIDI slider boxes or the knobs found on some MIDI keyboards, to adjust PhaseTwo's parameters. Every control in PhaseTwo's user interface can be manipulated with a MIDI controller.

PhaseTwo has a simple "MIDI Learn" mode for assigning its parameters to MIDI controllers. To assign a parameter to a MIDI controller:

1. Hold down the **SHIFT** and **CTRL** keys on your PC's keyboard, or **SHIFT** and **CMD** keys if you're using a Mac, and click once on the parameter's control. A white box will be drawn around the control to indicate that it is ready to learn which MIDI controller it will be assigned to.

2. Move the MIDI controller to send a continuous controller message—turn the knob, press the button, move the slider, whatever is appropriate.
3. The white box will disappear. Now PhaseTwo’s control will move when you manipulate the MIDI controller.

PhaseTwo waits until it has received two consecutive continuous controller messages with the same controller number before it makes an assignment. This filters out extraneous data sent by some MIDI controllers. If you are assigning a button or switch on a MIDI controller, you may have to press or move the switch twice before PhaseTwo recognizes the controller and assigns it to the desired parameter.

- To assign a different MIDI controller to a control, repeat the same procedure using a different controller.
- To cancel MIDI Learn mode without assigning a controller, hold down the SHIFT and CTRL keys (SHIFT and CMD keys on a Mac) and click in any empty area in PhaseTwo’s window (i.e., don’t click on another control).
- To remove a MIDI controller assignment from a control, SHIFT and CTRL keys, (SHIFT and CMD keys on a Mac) click on the control once so that the white box appears, then click again on the same control.

PhaseTwo’s MIDI controller assignments, including those set with the **ASSIGN CC** button, are stored with the plug-in’s preset data. If you use MIDI controllers frequently, you may find it helpful to store a template preset that contains the controller assignments that you usually use. Use this template preset as a starting point when making new presets so that you do not have to reassign the MIDI controllers every time.

Important note for AudioUnit users: because of foibles inherent in Apple’s implementation of AudioUnits which receive MIDI data directly, the method described above is **not implemented** in the AudioUnit version of PhaseTwo. Use the MIDI mapping features of your AU host to assign MIDI controllers to PhaseTwo’s parameters.

And Finally...

Thanks again for purchasing PhaseTwo. We make every effort to ensure your satisfaction with our products, and want you to be happy with your purchase. Please write support@audiodamage.com if you have any questions or comments.