



# phaser



user manual

## Introduction

The Empress Phaser was designed to give you maximum control in a small, manageable package. We've combined features that will enable you to realize all your phasing dreams.

You'll recognize the tap feature from our other pedals. And, with the Empress Phaser, we've also introduced the universal control port. Now you can control your phaser from a control voltage (CV), an expression pedal, an external audio input, external tap switch, or via MIDI.

Under the hood we've included a couple switches which allow you to change the pedal's configuration. There's a switch to enable a vibrato mode and a switch that adds some pleasing harmonics to the signal if clean and pristine isn't your thing.

To help you get the most out of this product, we've put up some brief instructional videos on our website:

[www.empresseffects.com](http://www.empresseffects.com)

# Quick Start



Set the knobs and switches to match the picture above. If the blue bypass LED is not already lit, press the **bypass** switch to engage the phaser.

## Operating Modes

The phaser has three modes: knob mode, tap mode and auto mode.

**Knob mode:** The speed of the phaser is set with the **speed** knob and the **speed range** switch. The fastest speed range will give you ring modulator type sounds.

**Tap mode:** The speed is set by tapping in a tempo with the **tap** stomp switch. The speed of the effect will be the tapped tempo, multiplied by the ratio set using the **ratio** knob. For example, if you set the ratio knob at 1:2, the speed of the phaser will be twice as fast as the tempo tapped.

**Auto mode:** In auto mode, the effect parameters are changed based on how you are playing. We've set out an entire section in this manual to explain this very cool and deep mode. You will also find a handy reference chart printed on the front of the pedal.

## Auto Mode

In auto mode, the effect parameters are changed based on how you are playing. The changes follow the envelope of the input signal, or are triggered by sudden changes in the signal volume.

Effects parameters are changed in one of two ways when you use auto mode:

1. Envelope Follower

When following an envelope in auto mode, the pedal tracks the input volume and changes a parameter to follow the changes in the volume level. The envelope follow approach is used in submodes 1 through 4.

2. Trigger Detection

When detecting a trigger in auto mode, the pedal tracks the signal and when a sudden, rapid increase in volume occurs, it changes the parameter from a low to high value. The kind of actions that would set off a trigger might be an aggressive strum on a guitar or a chord hit on a Rhodes. The trigger detection approach is used in submodes 5 and 6.

## The Attack and Release Controls

In submodes 1 through 4, the **attack** switch determines how quickly the pedal reacts to an increase in input signal volume.

For example, with **submode 2** selected and the **attack** set to fast, a sudden increase in volume will increase the phaser rate almost instantly. With the **attack** set to slow, it takes much longer for the speed of the effect to increase.

The **release** knob controls how quickly the pedal reacts to a decrease in input signal volume. Set fully counter-clockwise the release time is the fastest. Set fully clockwise the release time is the slowest.

A slower release time generally sounds a bit smoother and a faster release time, more abrupt and jarring.

In submodes 5 and 6, the **attack** switch sets the speed at which the parameter moves from its minimum to maximum value. The release knob sets the speed at which the parameter returns back to its starting value.

## Sensitivity

The sensitivity knob controls how the pedal listens to your input signal when in auto mode. For softer input signals you should set the sensitivity to a higher value. For louder input signals it should be turned down.

In an auto mode that uses trigger detection, the red LED above the tap switch indicates that a trigger has been detected. If you find the auto mode is missing some of the triggers, increase the sensitivity. If you find the auto mode is triggering when it shouldn't be, decrease the sensitivity.

When the pedal is in a submode that uses envelope detection the red LED above the **tap** switch will light up when it is detecting maximum volume. Ideally, in envelope based submodes, the LED will only light up when you're playing your absolute loudest. This will ensure you are experiencing the full range of parameter sweep.

Setting the expression switch to 'speed' will allow you to control the sensitivity with an expression pedal.

## The Submodes

There are eight submodes available in auto mode.

### **Submode 1:** Phase Shift Follows Envelope

The center of the phase shift changes according to how loud you play. Hitting the **tap** switch inverts the phasing motion for a different tone.

### **Submode 2:** LFO On Envelope

The speed and the center of the phasing effect are both increased as the input signal grows louder. The **tap** switch reverses the changes as the signal grow louder.

### **Submode 3:** Speed Follows Envelope (Sine Waveform)

As the instrument signal gets louder the speed of the phasing effect increases. The waveform selected for this mode is a sine wave with a width of 50%. Press the **tap** switch to have the speed slow down as the instrument volume increases.

Try the **attack** and **release** set fast so that the envelope tracking is very tight. The sensitivity controls the fastest speed that will be reached when the signal is loudest.

#### **Submode 4:** Speed Follows Envelope (Random Waveform)

Similar to submode 3 except it uses a random step waveform. The louder the input signal the more frequently a new speed value is chosen at random for the effect. Hitting the **tap** switch reverses the action so that a louder signal causes the waveform to slow down.

#### **Submode 5:** Follow Trigger

A peak in the volume of the input signal will trigger the effect to shift from maximum phasing to minimum phasing. Hitting the **tap** switch inverts the phasing motion for a different tone. The LED above the **tap** switch turns red when a trigger is detected.

#### **Submode 6:** Trigger Random Level

When a trigger is detected the amount of phase is shifted to a new, random amount. This mode sounds close to a random waveform, but the changes can be controlled and triggered by how loud you play your instrument. In this mode, the **release** knob determines how quickly it shifts from the current random level to the next. The **attack** toggle has no effect.

## **Submode 7: Rhythm Mode**

Cycle through preset rhythm patterns by turning the **ratio** knob. Each ratio represents a different pattern. You can change the speed of the rhythm pattern by hitting the **tap** stomp switch. There are five different rhythms available for you to explore. The **release** knob determines how quickly it shifts from the current random level to the next random level in the rhythm. Here are the different patterns:

<b>Ratio Knob</b>	<b>Time Signature</b>	<b>Rhythm</b>
1:1	3/4	
2:3	2/4	
1:2	5/4	
1:3	6/8	
1:4	4/4	

## **Submode 8:** Direct Control Mode

Without an expression pedal plugged in to the control port, this mode operates like submode 5, except that it triggers only when you hit the **tap** stomp switch. Hold down the **tap** switch and the sweep will keep rising to its maximum value. Release the **tap** switch and the sweep will return to its starting value.

If you plug an expression pedal into the **control port**, this submode will allow you to control the degree of phase shift with the expression pedal. The **speed** knob, **width** knob, and **expression** switch are ignored in this mode.

# Controls

**stages:** selects the number of all-pass poles. The 2-pole setting sounds the least effected, 4-pole is the setting you'll find in most one-knob phasers, and 3-pole sounds quite different from both

**power:** + - tip 2.1mm jack. 12V

**speed range:** controls the range of speeds available on the speed/ratio knob

**mode:** set to control the speed with either tap or knob. Select auto mode to use the audio input to control the phaser dynamically

**blend:** controls the mix between the original signal and the phase-shifted signal. Fully clockwise will result in the deepest phase cancellations

**speed/ratio:** with the mode switch set to tap, this knob sets the multiplication ratio for the tapped tempo. With mode set to knob, this controls the speed of the phaser

**tap stompswitch:** use to set the speed of the phaser. Tempo will be multiplied by the current setting on the ratio knob



\* these controls are for tap and knob modes. Auto mode uses the control

# at a Glance

V - 18V DC negative  
0mA or greater



**resonance:** selects the amount of feedback applied, creating resonant peaks in between valleys

**expression:** selects which knob the expression pedal will control via the control port

**gain:** controls the output gain. The point where unity gain lies depends on the pedal's other settings

**waveform:** selects between 8 different waveforms



**width:** determines how far the phase shift varies from the center position

**bypass stompswitch:** when the LED is shining, the phaser effect is applied to the signal. When off, the phaser is being bypassed (true bypass)

Items marked with inverted text. These are outlined in the auto mode section

## Mix/Blend and Vibrato Configuration

The Empress Phaser allows the **blend** knob to be configured either as a **blend** knob, or a **mix** knob.

It ships configured as a **blend** knob. In this configuration there is a constant amount of dry signal. As you turn the **blend** knob clockwise, wet signal is added in.

In **mix** knob mode, with the knob turned 100% clockwise, you hear only phased signal. When the knob is in this position there is no dry signal being added to the wet signal so you'll get a vibrato type effect. The more you increase the width and speed, the more pronounced the effect becomes.

To get a regular phaser sound when the pedal is in the mix configuration, set the knob to the 12 o'clock position. This adds the dry and wet signal at equal volumes giving you maximum phase cancellation.

## Changing the Mix/Blend Configuration

To change the mix/blend configuration, open up the pedal and locate the DIP switches labelled ‘BLEND’.

CONFIGURATION	DIP1	DIP2	DIP3	DIP4
Blend (default)	OFF	ON	OFF	ON
Mix	OFF	OFF	ON	OFF

## Harmonic Enhancement Circuit

The Empress Phaser has a clean and pristine sound by design. In some instances, a dirtier sounding phaser may be desired. To accomplish this, we’ve included a circuit which adds subtle, yet pleasing, even order harmonics to the wet signal.

### Engaging the Harmonic Enhancement Circuit

Engaging the circuit can be done by opening up your phaser and locating the ‘BLEND’ dip array. Switching DIP1 on or off turns the harmonic enhancement circuit on and off accordingly.

# Universal Control Port

## Configuring the Control Port

The control port configuration is set using the dip-switch array inside the unit. When you open the phaser, you'll see a set of 3 dip-switches labelled '**CON JACK CONFIG**'. On power up, the configuration will be changed to the new setting. Here's a table of the dip settings for the various configurations:

MODE	DIP1	DIP2	DIP3
Expression (default)	OFF	OFF	OFF
Control Voltage	ON	OFF	OFF
External Tap – Latching	OFF	ON	OFF
External Tap – Momentary (normally open)	OFF	OFF	ON
External Tap – Momentary (normally closed)	ON	ON	OFF
Audio Input	ON	OFF	ON
MIDI	OFF	ON	ON

## Expression Pedal Configuration

The pedal ships in this configuration. Plug an expression pedal into the **control port**, and use the **expression** switch to select which parameter you'd like to control with the pedal. You can select speed or width when using knob and tap modes. In auto mode the speed and width switch positions will control sensitivity and release, respectively. The expression pedal varies the parameter between zero (or fully counter-clockwise) and the setting on the knob. In other words, the knob sets the maximum.

Any expression pedal used with the Empress Phaser should have:

Tip - signal

Ring - power

Sleeve - ground

## Control Voltage Configuration

In this configuration, width and speed parameters can be controlled by an external control voltage. The Empress Phaser works with control voltages which sweep between 0V and 5V.

## **External Tap Switch Configuration**

In this configuration you can plug an external tap switch into the **control port** to set the tap time. This is useful if you have more than one tap-tempo pedal, so that you can set them all with one switch. The Empress Phaser is able to accept both latching and momentary external tap switches.

## **External Audio Configuration**

In this configuration you can plug an audio signal into the **control port** to override the normal input. The auto modes will use the external audio signal to detect triggers or generate the envelope rather than the signal at the input. Try connecting a drum machine to this input.

In some cases, plugging in an external audio source may create a ground loop. If you hear hum introduced in the output signal when an external audio signal is plugged in you should lift the ground of the incoming signal.

## MIDI Control

The Empress Phaser allows all of its digital parameters to be controlled via MIDI control change messages, and to have its tempo changed with MIDI clock messages. To use MIDI with your phaser you'll have to:

1. Attach the Empress Midibox using a ¼" patch cable to the **control port**. This is a simple device which converts the signal on a standard MIDI cable to a ¼" cable you can plug into your phasers control port. (Not included with the phaser)
2. Configure the pedal for MIDI control by setting the internal **control port** dip switches to the MIDI mode.
3. Configure the unit's MIDI channel by setting the internal dip switches labelled '**MIDI CH**'. Select a channel that won't conflict with the other devices in your MIDI rig.

## Control Change Messages

The Empress Phaser can be controlled with MIDI control change messages. Almost all MIDI controllers or digital audio workstation software will be able to output these messages. Refer to your product's documentation for help on how to do this. Below is a table that shows which MIDI control change message controls each phaser parameter.

Phaser Parameter	CC #:	Note:
Speed/Ratio/Sensitivity	20	Sending a value of 0 would be equivalent to the knob completely counter clock-wise, sending 127 is equivalent to fully clock-wise.
Width/Release	21	
Waveform/AutoMode	22	Sending a value of 1 will set it to waveform/auto-mode 1; sending 2 waveform/auto-mode 2, etc.
Mode	23	Sending 1 will set it to tap mode, 2 knob mode, and 3 auto mode.
Speed Range/Attack	24	Sending 1 will set it to slow, 2 medium, 3 fast.
Tap Switch	35	Sending a value of 127 simulates the switch being pressed. Sending a value of 0 simulates releasing the switch.
Bypass Switch	36	

Direct Control	40	Sending this message overrides all other digital settings (speed, width, waveform, mode) and lets you set the amount of phase shift directly with MIDI values. Sending a value of zero would correspond to minimum phase shift and 127 the maximum.  This mode would allow you to draw your own waveforms in a digital audio workstation and send them to the phaser.
Exit Direct Control	50	Sending this message with any value will cause the pedal to exit direct control.
MIDI Clock Listener	51	Sending a value of 0 causes the pedal to ignore MIDI Clock messages. Sending a value of 127 causes the pedal to listen for MIDI Clock messages.  By default, the pedal listens for MIDI Clock messages.

## MIDI Channel Dip Configuration

Channel	DIP1	DIP2	DIP3
1	OFF	OFF	OFF
2	ON	OFF	OFF
3	OFF	ON	OFF
4	ON	ON	OFF
5	OFF	OFF	ON
6	ON	OFF	ON
7	OFF	ON	ON
8	ON	ON	ON

## **MIDI Clock (aka MIDI Beat Clock)**

The Empress Phaser will respond to MIDI Clock messages when it is in tap and normal mode. MIDI Clock specifies quarter notes, subdivided into 24 MIDI Messages. Each quarter note corresponds to 1 period of the phaser's waveform.

**Warning:** Changing the speed/ratio knob when MIDI clock is being sent will confuse the phaser. It will momentarily switch to the knob setting, and then switch back to the MIDI clock setting causing general chaos.

# Specifications

Input Impedance:	1MΩ
Output Impedance:	2KΩ
Frequency Response (-3dB):	35Hz – 17kHz
Distortion (All dry signal):	0.03%
Noise:	-104.1dB
Input Voltage:	9VDC – 18VDC +  -
Required Current:	120mA
Power Input Connector:	2.1mm Barrel Connector
Height (enclosure only):	1.5"
Height (including controls):	2"
Length:	3.5"
Width:	4.5"
Weight:	1lbs

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