

Digital CHORUS

After completing this lesson, the student should be familiar with the following concepts:

- Digital chorus is an important effect which is created by modulating a delay unit's delay time. Parameters found on most digital chorus units include delay time, chorus rate, chorus depth, and mix.
- Chorus units are typically connected to a mixer's aux sends and returns, allowing all of the channels to share the chorus unit. Mix depth is set at 100% in this case. Chorus units may also be connected to a mixer channel's insert, but then only one channel may use the chorus unit. In this case, the mix should be set to taste, usually around 50%.
- Applying chorusing to a signal gives it a full, rich character, and brings it out in a mix. Heavily chorusing a signal can move it from the center of the mix farther to the sides of the perceived stereo image.

Glossary for this Lesson:

Depth- A control which determines the chorus unit's impact on the incoming signal. Depth is typically measured in percentage.

Delay Time- The initial (unmodulated) amount of time between the dry and wet signal.

Digital Chorus- An effect which is created by constantly modulating the delay time of a delay unit from 15-35 milliseconds. The human ear perceives a change in pitch as this modulation occurs, and thus a thicker, warmer sound.

Mix- A control which determines how much chorused (effected) signal exits the chorus unit's outputs, and how much dry (uneffected) signal exits the chorus unit's outputs. When the chorus unit is connected to a mixer's aux sends and returns, mix should be set to 100% wet, which is entirely effected signal.

Rate- The speed at which the delay time is modulated (changed). Chorus rate is measured in Hertz (Hz), which tells the number of times per second the delay time changes from its shortest time to its longest time and back again.

LET YOUR STUDENT EXPLORE AND LEARN MORE

Because of the limited scope of this book, there are many issues which can not be dealt with in its pages. Not the least of which is the combination of the different devices presented in different order. Learning to combine effects in different orders and what effect they have is best learned through actual experimentation. Fortunately, you can experiment with these effects virtually without spending a dime. The Swedish company Propellerheads makes a wonderful software program called Reason. You can download a demo of Reason and experiment by running virtual cables between virtual mixers and virtual effects boxes like reverb, chorus, and delay units. You can download a Mac or PC version of Reason at <http://www.propellerheads.se/>.

Digital CHORUS

THE CHANGING DELAY

In lesson Five, we learned all about digital delay. In this lesson, we will learn about a special kind of digital delay called chorus that is used a lot in recording studios.

In the lesson about digital delay, we learned that when we use very short delay times, our ears don't hear an echo but instead we hear something sort of like room ambience. When we use a very short delay time (15-35 milliseconds), it almost seems like we are hearing two of the instrument we put the delay on. If we add a very short delay to someone's voice, it sounds like there are two people singing.

DIGITAL CHORUS

Digital chorus is created by using a very short delay time and then constantly changing the delay time. We don't actually have to turn a knob to change the delay time. The chorus unit does this automatically. When the delay time is constantly changed, we actually hear a change in pitch. To our ears, it sounds like the sound goes a little bit flat, then a little bit sharp. When we mix this chorused signal in with the original signal, we get a very thick, rich sound. We must mix the two sounds together or we can't tell that the sound has been chorused. We can only tell that chorusing is happening when we can hear the original sound and the chorused sound at the same time.

DELAY TIME

There are usually four things that we can change on a chorus effects unit. The first thing we can change is the starting **delay time**. Changing the delay time changes how distinctly separate the original sound is from the chorused sound. We usually want to keep the delay time set from 15-35 milliseconds. We don't want such a long delay time that we can hear a sepa-

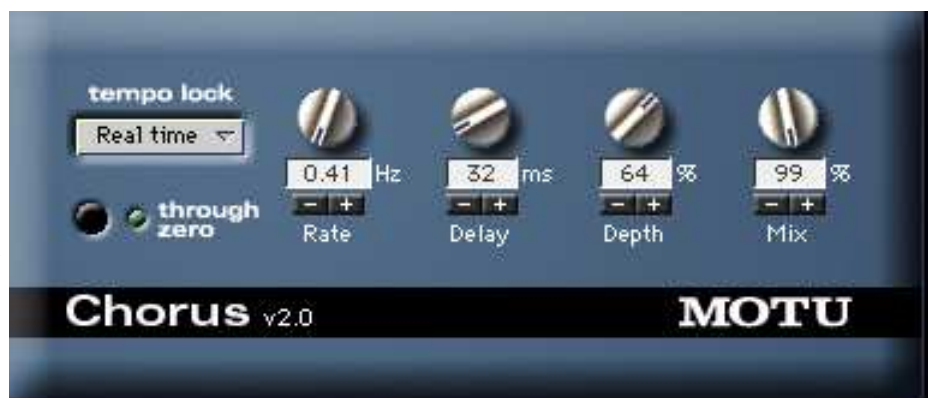
rate echo. You can see the delay knob on the chorus unit in the middle of this page.

CHORUS RATE

The second thing we can change on a chorus unit is the **chorus rate**. Chorus rate sets how fast the delay time changes. The delay time changes from fast to slow over and over again. The chorus rate control changes how quickly the delay time changes from fast to slow and back again. Chorus rate is measured in Hertz. A chorus rate of 1 Hertz means that the delay time changes from fast to slow and back again one time every second. 2 Hertz means that it changes twice per second and three Hertz means three times per second. We usually use a chorus rate of .01 Hertz to .7 Hertz. Faster chorus times tend to sound so "warbly" that they sound like a funny effect.

WELL, THAT'S A DEEP SUBJECT

The third thing we can change on a chorus unit is the **depth** of the chorus effect. The depth control changes how much longer or shorter the delay time gets as it changes. When we turn the depth control



up, it sounds like the pitch of the sound changes more. We have to experiment with the depth control with each piece we work on. The level will always be different. It is important to set the depth high enough so that we can hear the chorus effect, but not so high that the sound sounds out of tune. Let your ear be your guide. You will know just how much to add.

THE MIX

The final setting of a chorus unit is the **mix** control. The mix control allows us to determine how much chorused signal comes out of the chorus unit compared to how much unchorused signal comes from the unit. Remember that it is very important that we can hear both the original (unchorused) sound and the chorused sound. Otherwise, we are not able to tell that the sound has been chorused. The mix control shows the percentage of chorused signal that the unit is putting out. When it is set to 100%, the chorus unit only puts out chorused signal. When it is set to 0%, the chorus unit only puts out the original, unchorused signal. (This is like turning the chorusing off.) When the mix control is set to 50%, the chorus unit puts out equal amounts of chorused and unchorused signals.

The right amount of mix depends on how you connect the chorus unit. If you connect the chorus unit to a mixer channel's insert, then you need to set the mix amount to about 50% because we have to bring some of the original signal back to the mixer's channel if we want to hear the chorusing effect. If we connect the chorus unit to a mixer's aux send, then we have only sent a copy of the signal to the mixer. The direct signal from the channel will go to

the mixer's outputs, so we only need to get the chorused sound out of the chorus unit. We should set the mix to 100% so that we only get chorused sound coming back to the mixer. We can then decide how much chorused signal we want to use by changing the aux return amount when the chorus unit's outputs are connected.

HOW IS CHORUS USED?

Chorus is used a number of different ways in the studio. First, it can be used to add a special sense of importance to one instrument in a mix. A singer's voice is often chorused slightly to make it sound thicker and richer. Another important use of chorus is in placing sounds in a mix. Chorusing a sound heavily allows us to move a sound from the center of the mix farther out to the sides. In other words, a chorused sound will seem like it is coming from the sides of a room instead of the part of the room you are facing. This is a very cool technique, because we can move instruments out of the way of other sounds. Instruments like guitar and keyboards frequently get chorused so that they are off to the sides of a mix. It is easier for our ears to hear all of the different sounds in a mix when they seem to be coming from different places.

Experiments:

1. Try connecting a hardware chorus unit to a mixer. Which controls do you need to use on the mixer? Is there another way you could connect this unit? When would you want to do this?
2. Can you figure out how to change the delay time and rate? Can you change the depth and mix? What does it sound like when you use only 5-10 milliseconds of delay? When you use a very high delay time? What happens when depth and rate are really high? What settings seem to produce the most pleasing sounds?
3. Try adding chorus to different instruments in a mix. What begins to happen when you put chorus on every instrument in the mix? How is this different from what you heard when we added too much reverb or delay? Try adjusting the amount of chorus being returned to the mixer via the aux returns. How does this affect the sound?
4. Can you use chorus to move an instrument's sound to the sides of the stereo field?

Let's Review

1. How is chorus created? What kind of device creates chorus and how does it actually chorus a signal?
2. What are the four things that we can change about chorus? How do we measure each of these things?
3. How do we usually connect a chorus unit to a mixer?
4. Why is it better to connect a chorus unit to the mixer's aux sends and returns instead of connecting one instrument directly to the chorus unit?
5. What is another way we can connect a chorus unit to a mixer? Why would we want to do this?
6. How are chorus effects used in mixing?

Words to Know:

Do you know the meaning of these words?

Chorus Rate
Chorus Depth

Delay Time
Digital Chorus

Millisecond
Mix

Did you know

Almost every effects unit that is used in the studio today is based on one or two very simple devices, such as a delay. For instance, reverb is just a bunch of delays in quick succession. As we saw in this lesson, chorus is also an effect based on delay. As you learn about more effects, look for parts that might seem familiar.

On the Web:

If you would like to see pictures of some real chorus units or read more about them, check out the following sites :

<http://www.MOTU.com/>
<http://www.tcelectronic.com/>
<http://www.RolandUS.com/>
<http://www.lexicon.com/>
<http://www.alesis.com/>
<http://www.korg.com>
<http://www.propellerheads.se/>
<http://www.appliedresearchandtechnology.com/>
<http://www.digidesign.com/>