# KURZWEIL
## Music Systems

# THE PC2 MADE EASY

## A Step by Step Guide

## For PC2 Keyboard Models

Includes 34 Different Tutorials Designed For Specific Applications
Plus Programming Tips, Tricks, and Shortcuts

by David Fox

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# PC2 Made Easy

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This document is intended for use with the PC2 and PC2X keyboard models. Although the PC2 rack is very similar, there are some differences with the keyboard version. A separate version for the PC2R is available.

This guide walks you step-by-step through a variety of typical programming applications you might use in the creation of Setups and Programs on the PC2.

The first part of this document reviews some of the basic concepts of the PC2 design and user interface, including editing shortcuts. The second part contains a series of step by step tutorials, each of which demonstrates a different function.

## BASIC CONCEPTS & USER INTERFACE ISSUES

### The Three Play Modes

The PC2 has three basic Play Modes - Internal Voices, KB3, and MIDI Setups. You switch between these three modes using the Internal Voices, KB3, and MIDI Setups buttons in the Sound/Setup Select area.

**Internal Voices Mode**

If you only need to play one regular Program at a time, use Internal Voices mode. (Typically a Program will be just one sound, but there are some Programs that have a couple of sounds layered together, such as Piano & Strings). The PC2 is always in Internal Voices mode when you first power it up. (Also, you should be aware that while the keyboard is only playing one program at atime in Internal Voices Mode, the instrument is still multi-timbral and can receive on all 16 MIDI channels from the MIDI In port).

If you have a PC2 without any additional Expansion Voices options, then you have two banks of 128 Programs per bank that you can access (with version 2.0 or later – earlier versions had only a single bank of 128 Programs). These are most easily accessed by using the 16 Sound Select Buttons, which are labeled by Sound Category. For each bank, under each category, there are 8 variations that you can select, using the Next Group and Previous Group buttons. When you first power up the PC2, you will be in Bank 0, which is the first bank of regular programs. You will notice that the Internal button in the Sound Source section is lit. To switch to Bank 6, which is the second bank of preset programs, press Internal and User at the same time. Both buttons will be lit and the display will show that you are in Bank 6. You can now use the Sound Select Category and Previous/Next Group buttons to select the sounds from that bank.

Notice that when in Internal Voices Mode, the Bank number and name are shown on the top line of the display, and the Program number and name are shown on the lower line. In addition, the Current Sound Select Category (1-16 to match the Sound Select Buttons) and Group (A-H) are shown in the upper right.

If you have one or both of the optional Expansion Voices cards installed in your PC2, then you can press the Exp1 or Exp2 buttons in the Sound Source section to select the programs in those banks. Obviously the names above the Sound Select buttons will not apply at this point, but you can still use the Sound Select and Previous/Next Group buttons to select a specific numbered program.

# PC2 Made Easy

You can also select a Program by typing its number on the numeric keypad and then pressing Enter. Appendix C in the original manual and pages 13 & 14 in the version 2 supplement manual list all the Internal Voice programs and their numbers. In addition, once you are on a program, you can scroll through them in numeric order by using the alpha wheel or the + and - buttons under the wheel.

You can also switch between programs in two different banks using the numeric keypad. To do this you type the bank number, then the "+/-" button, then the program number. For example, if you are in Bank 0 and you want to go to program 52 in Bank 6, you type 6, +/-, 5, 2, and Enter.

The bank assignments in the PC2 for regular programs are as follows:

Bank 0   Internal Voices 1
Bank 1   User Created Voices
Bank 2   Expansion Block 1 Voices
Bank 3   Expansion Block 2 Voices
Bank 6   Internal Voices 2
Bank 7   General MIDI Drum Voices (added when you add the Expansion Block 1)

You will need to know the bank numbers if you are sending the bank controller from an external MIDI device such as a sequencer, or if you switch banks from the numeric keypad, as discussed above. (Note that Bank 0 and Bank 6, the programs in the basic PC2, are referred to as the Internal Voices banks, which is not to be confused with Internal Voices mode. You can play programs from the other banks while in Internal Voices mode. But you are always playing just one program at a time in Internal Voices mode.)

If you edit a sound in any of the preset banks and save it, it will always be stored in the User Bank.

If you are in a different mode (MIDI Setups or KB3) and press the Internal Voices button, it will blink. At that point, you can use one of the methods described above to select a sound. Or, if you press the Internal Voices button again, the PC2 will select the program you were previously playing the last time you were in Internal Voice mode.

**KB3 Mode**

KB3 mode is a special mode for playing KB3 programs. These programs are physical models of a classic tone wheel organ (the Hammond B3). There are two banks for KB3 programs – Internal Preset and User Created. There are only 16 preset KB3 programs, therefore the 16 Sound Select buttons can be used to select them, but the Previous Group and Next Group buttons won't function while you are in the Preset bank. However, there are 128 slots in the KB3 User bank, so they can be used in that bank. Again, obviously, the sound category names above the Sound Select buttons don't apply when selecting a KB3 program.

As in Internal Voices Mode, the Bank number is shown in the top left of the display, but instead of the bank name, the display then shows the program number and name. This is because the bottom line is used to convey other information, including the settings of the nine drawbars and the Chorus/Vibrato setting.

The bank assignments in the PC2 for KB3 programs are as follows:

Bank 4   KB3 Voices
Bank 5   User Created KB3 Voices

Because of the special needs of KB3 programs, buttons and sliders have specific functions while in this mode. KB3 Mode will be discussed in more detail later.

If you are in a different mode (MIDI Setups or Internal Voices) and press KB3 button, it will blink. At that point, you can use one of the methods described above to select a sound. Or, if you press the KB3 button again, the PC2 will select the program you were previously playing the last time you were in KB3 mode.

KB3 programs can only be played on a single MIDI channel. By default, this is channel 1. It can be changed to a different channel by setting the KB3 Channel parameter in the Global menu. But this will cause another change you need to be aware of. If you are in Internal Voices Mode or KB3 Mode, the Keyboard always transmits on a single MIDI channel. In Internal Voices Mode this is channel 1 by default (it can be changed by altering the Internal Voices Setup, which is discussed in tutorial #32). But with KB3 Mode, in order to make sure that you will always be able to play a KB3 program, the MIDI channel will change to whatever channel is selected as the KB3 Channel. If you are just playing the Kurzweil by itself, you will never notice this change. But if you are playing and external MIDI module along with the Kurzweil, then you could get unexpected results when the Kurzweil switches from sending MIDI data on channel 1 to sending on a different channel as soon as you enter KB3 Mode. For this reason, it is generally best to leave the KB3 Channel at the default value of channel 1 unless you have a specific reason to set it to a different channel.

The KB3 Channel will also be an issue if you are sequencing and want to use a KB3 program – you will need to make sure to assign the correct channel to the track you are going to use for playing the KB3 program

**MIDI Setups Mode**

MIDI Setups mode is used when you want to split or layer two or more Programs. You would also use it when you want to control any external MIDI modules or keyboards. MIDI Setups also allow you to program all of the sliders, wheels, pedals, buttons, etc. for specific applications.

MIDI Setups mode allows you to have up to 4 zones, with a different program on each zone. Therefore, the maximum number of programs you can split or layer from the keyboard is four. (But the instrument can still respond on all 16 MIDI channels from an external MIDI controller or sequencer.)

MIDI Setups mode and Internal Voices mode function identically, with only a few exceptions. You will always only have one zone in Internal Voices mode, since you are playing a single Program. (It is possible to start in Internal Voices mode and add zones, but when you go to save what you have done, you will have to save it as a Setup.)

As in Internal Voices Mode, the Sound Source buttons function while you are in MIDI Setups mode, allowing you to call up the preset Internal Setups, or Setups using the Expansion Voices, or User created Setups.

The display differs in MIDI Setups mode. Instead of Bank numbers, the Setups are simply numbered, with the numbers increasing past 128, which would be the limit of

# PC2 Made Easy

MIDI. So the first User Created Setup will be #129. You can't enter the bank number to select a Setup from the front panel, you just enter the Setup number.

However, if you want to call up Setups from another controller that sends MIDI messages, then the PC2 does respond to the bank controller followed by a program change number. Details on how to do this are covered in tutorial #31.

The bank assignments in the PC2 for Setups are as follows:

Bank 0   Internal Setups (1-32, plus 125-128)
Bank 1   User Created Setups (129-256)
Bank 2   Expansion Block 1 Setups (257-?)
Bank 3   Expansion Block 2 Setups (385-?)

If you are in a different mode (Internal Voices or KB3) and press the MIDI Setups button, it will blink. At that point, you can use one of the methods described above to select a Setup. Or, if you press the MIDI Setups button again, the PC2 will select the setup you were previously playing the last time you were in MIDI Setups mode.

## User Interface Basics

The following is a review of some of the information covered in chapter 3 of the manual. If you read nothing else in the manual, you should go back and read that chapter.

The buttons on the front panel are divided into sections.

## Sound/Setup Select

We already mentioned how you can use these buttons to call up programs when in Internal Voices mode, but you can also use them for calling up Setups when in MIDI Setups mode. Notice that the 16 buttons are labeled with the numbers 1-16. By using these buttons along with the Previous Group and Next Group buttons, you have access to 16 different Setups at a time with only one button press. The 16 buttons  can then be used to access the Setups as follows:

Group A        Setups  1-16
Group B        Setups  17-32
Group C        Setups  33-48
etc.

There are only 36 Presets in the Internal Bank, which are number 1-32 (Groups A & B) and 125-128 (Group H, Sound Select Buttons 13-16). ). But when you create and save your own Setups to the User bank, you will have a total of 128 locations, in 8 possible groups (A-H).

**1.** Press the MIDI Setups button.

**2.** Press the #1 Sound Select button (also labeled Acoustic Piano 1). If you have just turned on the instrument, the top line of the display should say S001 Dance C7. If it doesn't, press the Previous Group button repeatedly until it does. You have now called up Setup #1. Notice that the bottom line says A01, showing you that you are in Group

A on the #1 Sound Select button. Following the A01, it will show a number and a Program name. This shows you the name of the Program in the currently selected Zone (more on this later).

**3.** Press the Next Group button. The top line of the display now shows S017 Touch Orch (Setup #17) and the bottom line shows B01. This tells you that you have moved to Group B but you are still on the #1 Sound Select button.

**4.** Press the #2 Sound Select button (also labeled Acoustic Piano 2). Now the display shows S018 One Man Trio on the top line and B02 on the bottom line. Notice that you have stayed in the same group - you are still in Group B but are now on the #2 Sound Select button.

So what's so great about all of this anyway? Let's say that you are creating your own Setups and you need to switch between them quickly in a performance. Maybe you have two different sets you are performing. You can save the Setups for a specific set all within the same group. You save the Setups for the first set between Setups #1-16 in the User bank. Then you save the setups for the second set inn #17-32. Once you go to MIDI Setups mode and press the User button, you can use the Next Group buttons to get to Group A (for the first set) or B (for the second set). Now you can switch between any of your Setups (up to 16) with just a single button press by using the Sound Select buttons!

There is an IMPORTANT DIFFERENCE between MIDI Setups mode and Internal Voices mode. When you are in MIDI Setups mode, pressing the Sound Select buttons will always call up the appropriate Setup within the currently Selected Group - the group won't change unless you press the Previous or Next Group buttons, or use the Data Entry section to go to a Setup in a different Group. But when you are in Internal Voices mode, each Sound Select Button remembers whichever group it was last on.

**1.** Press the Internal Voices button.

**2.** Press the Sound Select #1 Button. Press the Previous Group button until the top line of the display says Bank:0 Internal 1A.

**3.** Press the Sound Select #2 Button. Press the Previous or Next Group Button until the display says Bank:0 Internal 2B.

**4.** Press the Sound Select #1 Button again. Notice that it goes back to Group A. If you go back to Sound Select #2, you will see it jumps back to Group B.

This feature is useful because it allows you to choose your favorite program out of a group and be able to call it up with a single button press when in Internal Voices mode. This is remembered even after you turn the PC2 off.

There is another difference to be aware of. As mentioned before, in Setups Mode, the numbers increment by one as you move through the Sound Select Buttons, so:

Group A          Setups  1-16
Group B          Setups  17-32
Group C          Setups  33-48
etc.

# PC2 Made Easy

This means that if you are on Sound Select button #1, and press the Next Group button repeatedly, the Setup numbers will increment by 16 – starting with 1, then 17, then 33, etc.

But in Internal Voices Mode, it works exactly the opposite. If you press the Sound Select #1 button, and then press the Next Group button repeatedly the program numbers will increment by 1, starting with 0, then 1, then 2 etc. There is an obvious reason for this difference – it allows us to group similar programs with consecutive numbers. In other words:

Acoustic Piano 1 programs   0-7
Acoustic Piano 2 programs   8-15
Electric Piano 1 programs    16-23
etc.

Although this is not normally something you would normally think of when playing the presets, it IS something you want to be aware of when creating User programs. If you want to be able to call up your User programs with a single button press using the Sound Select buttons, then you will want to save them using an appropriate ID number. For instance, if you want to be able to call up one of your programs with the Sound Select #1 button, you would need to save the program as ID# 0-7. If you want to call it up programs with the Sound Select #2 button, you would need to save the program as ID#8-15, etc.

If you are in KB3 Mode, it works the same way as in Internal Voices Mode. Although you won't see a group letter displayed (A-H), each Sound Select button will remember which of the eight possible programs for that button was selected with the Previous/Next Group buttons. In the case of the Internal Bank, there are only 16 preset programs, so the Group Buttons have no effect. But if you are storing your own KB3 programs in the User Bank, then there are 128 available IDs to store the programs and the Group buttons will function.

## Data Entry

This section is very simple and should be familiar to anyone who has used other electronic instruments as well as automated teller machines (ATMs). The alpha wheel allows you to scroll through values quickly. The "+" and "-" buttons let you increment or decrement by single values, and the numeric keypad lets you enter a specific value. It is also used for naming Setups and Programs. You always need to press the Enter button when using the numeric keypad to register the value (except when using the naming function, as described in tutorial #1).

## Zone Parameters

Almost all of the Setup editing features of the PC2 are accessed through this section. Under each button is a series of parameters, which you access using the << and >> buttons under the display. You then use the Data Entry section to change the value of the currently displayed parameter.

**1.** Press the MIDI Setups button twice. Type, 1, 2, 8, then Enter on the numeric keypad.

6

**2.** Press the MIDI Transmit Button. The display shows that you are on the MIDI Channel parameter.

**3.** Press the >> button. You are now on the Destination parameter, which by default is set to Local+MIDI.

**4.** Press the "-" button under the alpha wheel. The value changes to MIDI. Rotate the wheel clockwise. It changes back to Local+MIDI.

Notice that there is an underscore below the letter L in the display. This shows that the parameter is highlighted. Usually there is only one parameter in the display at a time, but sometimes there are two or three.

**5.** Press the KeyRange button. There are two parameters in the display - Low Note and High Note. Notice the underscore under the C. Press the >> button and you will see the underscore move under the G.

## Zone Select Buttons

The four zone select buttons have several different functions, depending on what mode you are in.

### In MIDI Setups Mode

When playing a Setup, they allow you to mute and unmute zones. When you are editing a Setup, they allow you to switch between zones for editing. Since the display has only two lines, there is only enough room to show the value of 1 zone at a time.

**1.** Press the MIDI Setups button, then press 1 on the numeric keypad, then 5, then press Enter. You have called up Setup 015 Piano Trio. On the bottom line of the display, after A15, it should say 1:Upright Bass 2. If it doesn't, press the Zone 1 button once and you will see this info. This shows you the Program that is on zone 1.

**2.** Notice that the Zone 1 and Zone 2 buttons are green and the Zone 3 and Zone 4 buttons are orange. This tells you the Setup has 4 zones, but 2 of the zones are muted. If you play the keyboard, you will hear Piano on the right side and Bass+Ride Cymbal on the left.

**3.** Press the Zone 1 button. It now turns orange. This means that zone is muted. If you play the keyboard, the left side makes no sound. Press Zone 1 and the button turns green again and you will hear the bass.

**4.** Press the Zone 2 button. The bottom line of the display now says A15 2:Grand Piano 44, showing you the Program in zone 2.

**5.** Press the Zone 3 button. The bottom line of the display now says A15 3:Trombones, showing you the Program in zone 3. Press Zone 3 again and the button turns Green. Play the keyboard and you will now hear Trombones layered with the Piano on the right side of the keyboard, and the Bass+Ride still on the left.

An important point that can lead to confusion: If a specific zone is NOT currently in the display, pressing that Zone Select button will bring up that zone in the display. But if

the Zone is already in the display, then pressing the same numbered Zone Select button will mute it (or unmute it if the zone is already muted). As this Setup demonstrates, you can save a Setup with a zone muted, allowing you to call up the Setup and have certain sounds layered or split, and then bring in another zone while you are playing, by pressing the appropriate zone button.

**6.** Press the MIDI Transmit button. The top line now shows Zone 3  0:060. When you are editing any parameter the top line always shows you the current zone, as well as the bank and program number of the program assigned to that zone (in this case, it is the Internal Voices bank 0, Program 60 - Trombones. The bottom line says MIDI Channel:03. showing you that zone 3 is assigned to channel 3.

**7.** Press the Zone 1 button. It shows you that zone 1 has program 111 from the Internal Voices bank and is assigned to channel 1.

**8.** Press the Zone 1 button again. Notice that the Zone 1 button turns orange - the zone is muted. The display also shows a "-" after the zone number in the display, to indicate that it is muted. The mute function works both when playing and editing a Setup. This can be useful when you are creating your Setups - you can temporarily mute a zone to hear the others. Press the Zone 1 button again to unmute the zone.

**9.** Press the Solo button. The Zone 1 button turns red, showing that zone is soloed. If you play the keyboard you will only hear the bass. Press the Zone 2 button. It switches to red and the Zone 1 button to green, soloing the piano.

**10.** Press the Zone 3 button. Now press the "-" button or turn the wheel counter-clockwise until the MIDI Channel says Off. The Zone 3 button is now not lit at all, showing you this zone has been turned off. All of the zone 3 parameter values are still remembered – the zone has simply been turned off.

### In Internal Voices Mode

When you are Internal Voices mode, the zone buttons access the AutoSplit functions (labeled above the buttons), giving you a fast and simple way of creating a basic setup. In Internal Voices mode, you can play one program at a time, since Internal Voices mode is based on the internal setup, which contains a single zone. If you wanted to create a multi-zone setup with different programs in each zone, you could go to MIDI Setups mode, then start programming (editing): assigning MIDI channels and programs to zones, assigning physical controllers, and so on. This gives you a great deal of control and flexibility, but it takes a bit of time.

If you're on stage and you suddenly decide that your solo needs two sounds instead of one, you don't want to take the time to edit a setup; you just want to add another sound as quickly as possible. Fortunately, the PC2 makes it easy to do this kind of thing without doing any actual editing. In this case the 4 zone buttons are used to add a Layer sound to the main sound, add a split sound on the left side of the keyboard, and add a layered sound for the split sound.

As an example, we're going to start with piano, layer it with strings, add a split with bass, then layer the bass with clavinet.

**1.** Press Internal Voices (in the Sound/Setup Select region), then Internal (in the Sound Source region), then the Acoustic Piano 1 Sound Select.

# PC2 Made Easy

**2.** Press Layer (the Zone 2 button). Notice that the Mode buttons change and MIDI Setups is now lit instead of Internal Voices (since we now have 2 zones). Also notice that the top of the display says Zone:2 auto, indicating that AutoSplit is turned on.

**3.** Press the Strings Sound Select button. Now you have piano and strings layered across the entire keyboard.

**4.** Press Split (the Zone 3 button).

**5.** Press the Bass Sound Select button. Now you have a bass from the bottom of the keyboard up to G#3, and layered piano and strings from A 3 up.

**6.** Press Split Layer (the Zone 4 button).

**7.** Press the Clavier Sound Select button. That's it: bass layered with clavinet in the lower part of the keyboard, and piano layered with strings in the upper part. Remember that each sound select button remembers the last program that was chosen for that sound category. If you want a different option, you can simply use the Next and previous Group buttons to choose a different program. If you want to change one of the sounds, simply press the appropriate zone button (Main, Layer, Split, or Split Layer) then select the sound you want.

**8.** If you would like to change where the keyboard is split, you can easily do this. Press the Split and Split Layer buttons simultaneously. The display changes to show you the AutoSplit Key, which is currently G#3. The easiest way to change the key is to hold the Enter button and strike the note that you want on the keyboard. This will be the top note of the left side of the keyboard. You can also use the wheel or + and – buttons to change the value. Press the Split and Split Layer buttons simultaneously again to return to performance mode.

We will cover more on the AutoSplit feature in tutorials 1 & 2.

### In KB3 Mode

When you are in KB3 Mode, these buttons have special functions, which control the Percussion feature in a KB3 program. Percussion is a an extra tone added on top of the regular drawbar pitches, which has a short envelope, adding a little "pop" to the note. The labels below the buttons show the functions, turning Percussion On or Off, and controlling the Volume (Soft or Loud), Decay Rate (Slow or Fast), and Pitch (Low or High harmonic).

## Sliders and Assignable Controller Buttons (SW1-SW5)

The PC2 has 4 sliders and 5 switch buttons which can be assigned to send any MIDI controller message, and can be used to modify the sound of Programs and Setups in a variety of ways. (And of course, there are also 3 switch pedal and 2 continuous controller jacks, plus jacks for a breath controller and option ribbon. Again, these can be assigned to send any MIDI controller message). All these physical controllers are independent for each zone in a MIDI Setup, so that for instance, one slider can send a single message on one or more MIDI channels, or completely different messages for each channel in used in the Setup.

# PC2 Made Easy

The five Switch buttons (Sw1-SW5) section change function depending on whether you are in Internal Voices, MIDI Setups Mode or KB3 Mode.

<u>In Internal Voices Mode</u>

While you are in Internal Voices Mode, the default Internal Voices Setup has the controllers in zone 1 assigned to default values. Although you can customize the Internal Voices Setup (see tutorial #32) and change what messages are sent by the sliders, buttons, etc., you should be aware of the original defaults, since they are already set to give you control over your sound. Appendix C contains a list of all the presets and the specific controller assignments for each program. However, some general rules apply:

Slider A (Controller #93) controls the Wet/Dry Mix for FX-A
Slider B (#91) controls the Wet/Dry Mix for FX-B
Slider C (#6) varies for each program, but is typically some type of timbre change
Slider D (#13) varies for each program, but is often some type of rate control (for vibrato, tremolo, etc.) It is also often used to control the amount of resonance, when Slider C is used to open and close a Low Pass filter. It may be also used for Envelope control (changing the Attack and/or release times).

SW1 (labeled Octave Shift) transposes down one octave.
SW2 (#9) varies for each program
SW3 (#12) varies for each program
SW4 (#116) turns the arpeggiator on and off.
SW5 (#29) varies for each program, but is often used for Layer Enable/Disable, or switching Layers. It can also be used to add Impact (a very brief amplitude boost, especially effective in percussive sounds).

An important note about the Octave Shift (SW1) button. This will shift the keyboard down one octave in Internal Voices Mode and in many Setups. But it is important to understand that this button is NOT specifically dedicated to doing an octave shift. It can, in fact, be programmed to send any MIDI controller you want – we have merely programmed it to do an octave shift as a default. In fact, if you use the Auto Split/Layer function to create a Setup from internal voices mode, you will find that while the button shifts zones 1 & 2 Down one octave, it shifts Zones 3 & 4 UP one octave.

<u>In MIDI Setups Mode</u>

The Sliders and buttons have a variety of different functions in the preset Setups. Appendix C documents the various controls. As mentioned above, you may find that moving a slider  or pressing a button will change just a single zone or several of them.

We will be covering many examples of how you program the various physical controllers in the tutorials that follow.

<u>In KB 3 Mode</u>

# PC2 Made Easy

In KB3 Mode, the sliders function as the drawbars found on a standard tone wheel organ. The bottom SW1-SW3 buttons control the Rotary and Chorus/Vibrato effects. This is covered in detail in tutorial #14.

## Other Buttons in the Zone Select & Assignable Controllers Section

There are two additional buttons in this section. One of these buttons is dedicated to selecting the Global EQ feature. This button will always call up the EQ display no matter what mode you are in. The EQ will affect all Programs and Setups, on all MIDI channels.

Press the EQ button. The display has three parameters that can be adjusted with the first three sliders. Or, you can select the parameters with the left and right arrow buttons and use regular data entry methods to change the values. Each of the three bands can be adjusted plus or minus 12dB. Press EQ again to return to the previous mode you were in. The EQ settings are remembered as long as the PC2 is powered up. Each time you turn the PC2 on, the EQ settings return to 0 dB for each band (Flat EQ).

The final button in this section change function depending on which mode you are in.

In KB3 Mode, this button switches the four sliders to control either the first 4 or second 4 drawbars of the standard 9 drawbars in a tonewheel organ. (The ninth drawbar is controlled by the Mod Wheel.)

When you are in MIDI Setups Mode, this button is used to solo a single zone (as shown previously). If you are in Internal Voices Mode, pressing this button triggers the Auto Split/Layer Function, turning the program into aSetup, and soloing zone 1.

If you have started in Internal Voices mode and have gone into the Program Editor (by pressing Timbre, Envelope, or LFO), then this button will solo the current Layer in the program (more on this in tutorial #16).

## Sound Parameters

The PC2 offers some basic editing of sounds. The three buttons in this section control Timbre, Envelope, and LFOs. The actual parameters that you see in these menus will change depending on whether you are editing a regular program or a KB3 program. In addition, the parameters in the Timbre menu will change, depending on the program you are editing. We will go through some examples of editing programs in tutorials 16 & 17.

## Effects

The PC2 has 2 effects processors, A & B. Only one effects configuration (which includes the setting for both Effects A & B) can be called up at a time. Each Program and Setup can have its own Effects configuration, and when you call up that Program or Setup, its effect configuration is selected. When you are playing a Program or a Setup, it is a simple matter to see the current effect and change it if desired. But if you are sequencing and playing different programs on different channels, then you must choose how you will control the effects, since only one program or master setting can be in control. We will cover how to do this in tutorial #30.

# PC2 Made Easy

**1.** Go to MIDI Setups Mode and call up Setup #5 Synth/E Piano. If the bottom line does not say 1:Serious Classi, press the Zone 1 button. Notice that the FX-A button is lit, showing you that zone 1 is assigned to FX-A.

**2.** Now press the Zone 2 button. The FX-B button is lit, showing you that zone 2 is set to FX-B. If you press FX-A, it now lights and the FX-B button is no longer lit. You have just changed zone 2 to go to FX-A. Press FX-A again, the button light goes out and now this zone is dry (no effects). Press FX-A and FX-B simultaneously to send a zone to both effects processors. Press FX-A again to return zone 2 to its original setting of FX-B.

**3.** Press the Select buttons for FX-A and FX-B. You will see which effect is chosen for each effects bus (Dist Cab EPiano for FX-A and Elegant Hall for FX-B). You can change the effect for each bus by using any data entry method.

**4.** Press the Wet/Dry button. The bottom line shows the wet/dry mix for each effects bus. Notice that FX-A amount is in parenthesis. This shows you that the current zone (zone 2) is not being sent to FX-A. But there is still an amount that is remembered for each bus. So if you switch zone 2 to use FX-A, it will use the currently set value of 76% wet for the Distorted Cabinet effect.

**5.** Each zone in a Setup (and each MIDI channel) can have its own separate wet/dry mix. In zone 2, the wet/dry mix for FX-B is 6%. Press the Zone 3 button. Notice that this zone is set to 8% for the same effects bus. We will show how to set the wet dry mix on a per channel basis in our tutorial on using effects when sequencing.

**6.** Now look at the top line of the display. It says Global A>B 5%. In addition to having to separate effects busses, you can feed the output of FX-A into FX-B, and this parameter allows you to choose how much of the signal from FX-A goes into FX-B. The display says Global, because this amount is the same for all zones (and all MIDI channels).

We will cover more details on using effects in tutorials 18 & 30.

## System

This section has three buttons, Global, MIDI Receive, and Panic.

Pressing Panic will send the MIDI All Notes Off and MIDI All Controllers reset messages on all channels, which will stop any stuck and return controller values to their defaults. We will cover the Global functions at the end of this document, and The MIDI Receive button is covered in tutorial #27.

## Functions

This section has three buttons: Compare, Copy, and Store. We will be covering the use of the Store function in the first tutorial.

Using the Compare function is easy. Press it at any time when you are editing a Program or Setup to compare the currently edited version with the previously stored version. If you are editing a Setup, the Z in the top right hand corner of the display will change to a

C. If you are editing a Program, Lyr will change to Cmp. The Compare button will also blink. You will hear the previously stored version. Press Compare again to return to your currently edited version.

Details on using the Copy function can be found at the end of this document, after all the tutorials.


**Editing Shortcuts**


Following are few tricks to speed up editing of various parameters:


Setting Note Values:


For any parameter whose value is a note, hold Enter and strike the note on the keyboard that you want and the parameter will switch to that note.


Turning a parameter Off or setting it to None:


Typing 0 and pressing Enter will change most parameters to a value of Off or None.


To quickly edit a specific controller:


Each physical controller (sliders, wheels, etc.) has a number of parameters, and there are 17 different physical controllers. All of those parameters are under the same menu, so that is a lot of parameters to scroll through!! If you hold the Controllers button and move a specific controller, the PC2 will jump to the first parameter for that controller. For example, hold Controllers and move Slider A. The display jumps to Slider A Ctrl Num.

Pressing the << and >> buttons simultaneously will jump to the same parameter for the next controller in the list. After following the previous example, press both those buttons and you jump to Slider B Ctrl Num.


Jumping to a specific channel in the MIDI Receive menu:


Holding MIDI Receive and pressing one of the 16 Sound Select buttons will jump to that numbered MIDI channel.


Switching Banks when calling up a Program (in Internal Voices mode or in the Program Menu when editing a Setup):


Type the bank number, then the "+/-" button, then the program number, then press Enter.


Using the Copy Function

# PC2 Made Easy

As you go through the tutorials below, you will find examples of many different things you can do on the PC2. When you start to create your own Setups, you may find that you want two or more zones to have the same types of control oriented functions, with each zone playing a different sound. One way to speed up the creation of your Setups is to copy parameters from one zone to another or even from one Setup to another. The PC2 makes it easy to do this.

Details on using the Copy function can be found at the end of this document, after all the tutorials.

# TUTORIALS

## Intro

These tutorials have been designed to start simply and increase in complexity. To avoid a great deal of duplication, later tutorials will refer to steps from previous tutorials.

There are two ways of creating a Setup – starting in Internal Voices Mode and (typically) use the AutoSplit function, or starting in MIDI Setups Mode.

**Starting in MIDI Setups Mode - Editing from the Default Setup:**

All of the tutorials start from the Setup 128, the Default Setup. One thing you want to be careful of - if you start from an existing Setup and make changes, some of the parameters from that original Setup may be set to do specific things, which will affect what you are trying to do.

For this reason, it is usually easier to start with the Default Setup. If you do start with one of the preset Setups, please be sure to look in Appendix E of the manual to see the controller assignments for that Setup.

Another thing to be aware of - whenever you call up a Setup, the PC2 copies all of the parameter values into an edit buffer. Any changes you make are made in that edit buffer, and the changes don't go into memory until you Store that Setup. If no Setup exists at a specific location, then nothing is copied into the edit buffer, and so the data in the edit buffer is whatever was there from the last real Setup.

For example, let's say you start with a PC2 set to factory defaults (no user Setups saved in memory). Now you call up Setup 1. All the parameters from Setups 1 are placed in the edit buffer. Next you call up Setup #129 in the User bank. But there is no Setup #129 yet in the instrument, so the display says "Not Found". Since nothing existed there, the values from Setup #1 are still in the edit buffer and if you start editing those values will be there unless you change them. As you can imagine, this can lead to confusion.

So again, the best way to create your own Setup is to either start with Setup 128, or start with another existing Setup if you know how its parameters are set and want to make use of those settings.

There are actually four possible "template" Setups you can start with. Setup 128 Default Setup has some of the controllers set to default settings for all 4 zones. For example, the Switch Pedal 1 is set to Sustain and wheel 1 is set to Pitch Bend. Most other controllers are unassigned. Setup 127 A Clear Setup has ALL of the controllers unassigned. Setup 126 Internal Setup is a copy of the default setting for the Internal Voices Setup, which is a special Setup that is used when in Internal Voices Mode. This Setup has every physical controller set to a specific default value. The Sliders and Switch Buttons are set to controller numbers, which typically are used to modify sound and arpeggiator parameters. Setup 125 PC2R Control is a Setup specifically designed for controlling a PC2R from a PC2. It has a different set of controller numbers assigned, which are used in the remapping function of the PC2R.

Typically, it is easiest to start with Setup 128, since you will normally want those basic controllers set to their default values, while the sliders, etc. are left unassigned (because we will be assigning them in the tutorials).

The following tutorials assume you have a switch pedal plugged into the Switch Pedal 1 jack (for Sustain). Some of these tutorials also require that you have a second switch pedal plugged in to the Switch Pedal 2 jack. If you don't have a second pedal, you can still follow the example, using the Switch 1, 2, & 3 buttons in the Assignable Controllers area to do the same thing.

## Starting from Internal Voices Mode

When you start in Internal Voices mode and use the Auto Split/Layer function to begin creating a Setup, you are using a special Setup called the Internal Voices Setup, which already has specific controller values assigned to the various physical controllers. To see what these controller values are, look at the chart on page 59 of the PC2 Version 2 Supplement manual. This shows the values for Setup 126 Internal Setup.

As mentioned above, this setup is a copy of the default Internal Voices Setup. However, it is important to be aware that the two are entirely separate. It is possible to customize the Internal Voices Setup (as shown in tutorial #32). Making changes to the Internal Voices Setup will not affect Setup #126.

## Deciding which mode to start from when creating a Setup

In general, starting from Internal Voices mode and using the Auto Split/Layer feature is great for creating Setups "on the fly" in a performance situation. But if you have more detailed needs for your Setups, you should start in MIDI Setups Mode.

Although we will cover starting from Internal Voices Mode in tutorials #1 & 2, all other tutorials assume you have started in MIDI Setups Mode. As mentioned above, the Internal Voices Setup has specific values assigned to the sliders and buttons, and can therefore give you unexpected results. By starting from the Default setup #128, you are starting with a "blank slate" for those controllers, making it easier to understand what is going on.

Also, the Auto Split/Layer function is great for creating a simple 2 zone layered Setup. But if you want to have 3 zones layered together, you are going to need to edit the zone within MIDI setups Mode, since the zone 3 button is set to split instead of layer (and the zone 4 button will layer with the zone 3 sound).

Finally, you should be aware that the Auto Split/Layer function can be turned On or Off on a per setup basis – you will find the Auto Split and Auto Split Key parameters in the Key Range menu. So if you have created a Setup by starting Internal Voices Mode, and then later use that Setup as a starting point for creating a new Setup, the Auto Split/Layer function will still be on. You may need to turn it off to create the type of Setup you need (for example, if you needed a 3 way split).

## 1. Layering Two or More Programs

To play two or more programs, you must create a Setup with a zone for each program, and each zone set to a different MIDI channel.

As stated in the Tutorials Intro, there are two possible ways to do this – From Internal Voices mode, using the Auto Split/Layer function, or from MIDI Setups mode. We covered using the Auto Split/ Layer Function in the Basics section, but we will review it here.

**Starting from Internal Voices mode:**

**1.** Press the Internal Voices button. Choose the Program you want for the first zone. You can select it by using the alpha wheel, the + and - buttons, or the numeric keypad. (The programs and their numbers are listed in Appendices A & B in the manual.) Or you can use the Sound Select and Next/Previous Group buttons, as in the Basics & User Interface section of this document.

**2.** Press Layer (the Zone 2 button). Notice that the Mode buttons change and MIDI Setups is now lit instead of Internal Voices (since we now have 2 zones). Also notice that the top of the display says Zone:2 auto, indicating that Auto Split/Layer is turned on. Play the keyboard. You should hear both sounds together. Notice that the sustain pedal works for both layers.

**3.** That's it! To save the Setup you have created, see Step 7 in the section below.

Remember that if you want to layer more than 2 zones, you will want to start from MIDI Setups mode. Also remember that the Auto Split/Layer function does not work in KB3 Mode, since the buttons are used for a different purpose.

**Starting from MIDI Setups mode:**

**1.** Press the MIDI Setups button, then type 128, then press Enter on the numeric keypad.

In order to have different programs layered, each zone must be set to a different MIDI channel. As mentioned in the Intro, Setup 128 is already designed as a good starting point for creating a Setup. Notice that the zone 1 button is green indicating it is active. Zone buttons 2-4 are orange, showing they are muted. The four zones are already assigned to channels 1-4.

**2.** Press the Program button. Choose the Program you want for the first zone. You can select it by using the alpha wheel, the + and - buttons, or the numeric keypad. (The programs and their numbers are listed in Appendices A & B in the manual.) Or you can use the Sound Select and Next/Previous Group buttons, as described at the beginning of this document.

**3.** Step 2 will allow you to choose any program from the Internal Voice bank. But if you have one of the ROM block options installed and want to choose a program from one of those ROM blocks (or if you want to choose a KB3 program or user created program), then you need to switch banks. There are three ways to do this.

# PC2 Made Easy

If you know exactly which program you want, then the fastest way is to type the bank number, followed by the "+/-" button, followed by the program number, then Enter. (The bank numbers were listed at the beginning of this document.)

OR

If you want to scroll through the programs in a bank, you can press the Internal, User, Exp1, or Exp2 buttons to switch to that bank, then use the alpha wheel to scroll through the programs in that bank. This method can't be used to select a KB3 program – you must use one of the other two methods if you want to switch from an Internal Voices program to the one of the KB3 banks, or vice versa. (But you could use it to switch between Internal and User KB3 programs.)

OR

Another way to switch banks is to press the << button to get to the Bank parameter. Use the alpha wheel to choose the bank you want. Then press the >> button to get back to the Program parameter.

**4.** Now that you have chosen your first sound, you will choose your layered sound. Press the Zone 2 button. The Zone 2 button turns green, showing that it is active.

**5.** Repeat steps 2 or 3 to assign a program for your second layer. Don't try and select a KB3 program for this zone – remember that KB3 program can only be called up on a single MIDI channel, by default channel 1 (and in this Setup zone 1 is assigned to channel 1). Play the keyboard. You should hear both sounds together. Notice that the sustain pedal works for both layers.

**6.** If you want to add a third or fourth layer, just repeat steps 4 and 5

**7.** That's it! Now all you have to do is Name and Store your Setup. Press Store. The display says "Save Setup 129?". (If you had previously created a Setup, it will pick the first empty number above that.) Press the >> button so that the display says "Rename Setup 129?". Press Enter. Now you are in the naming routine.

You will see an underline cursor under the first character ("D"). Press the <<< or >>> soft buttons to move the cursor. Press a button on the numeric keypad one or more times to enter a character above the cursor. The characters that correspond to the alphanumeric buttons are labeled under each button. If the character that appears is not the one you want, press the button again. For example, pressing 1 once will choose an "A". Pressing it again will choose "B", and one more time will choose "C". Press the +/- button on the alphanumeric pad to switch between upper and lower case characters. Press 0 one or more times to enter the numerals 0 through 9. Press CLEAR (on the alphanumeric keypad) to erase the selected character without moving any other characters. To insert a space, press the "SW1" button in the Assignable Controllers section. To delete a character press the "SW2" button, and to move the cursor instantly to the end of the name in the display, press the "SW3" button.

In addition to letter and number characters there are numerous other characters you can choose. For example, if you layered  piano and strings, you might want to name your Setup "Piano & Strings". You can choose these characters by scrolling with the alpha wheel or the + and - buttons. At the end of this document is a list of all the characters and the order in which they appear.

Once you have the name the way you want it, press Enter.

**8.** The PC2 now jumps back to the Store dialog. The display will read "Save Setup 129?". You can save to any number you want, by scrolling with the wheel or + and – buttons. If a Setup already exists at a numbered location, the display will change from "Save" to "Replace".

Now press Enter. Congratulations - you have created and stored your first Setup!

**A programming note:** As mentioned above Setup 128 starts with all 4 zones assigned to MIDI channels, and with zones 2-4 muted. This means that if you press a zone button once or twice (depending on whether that zone was already in the display), it will unmute and begin playing. If you have created a 2 zone setup and would like to prevent accidentally playing zones 3 or 4 if you pressed their zone buttons, you can turn those zones off. To do this, press the MIDI Transmit button, then press the zone button for the zone you want to turn off. Next press 0, then Enter.

## 2. Splitting Two or More Programs

As with tutorial #1, there are two possible ways to create a Setup with a split – from Internal Voices mode, using the Auto Split/Layer function, or from MIDI Setups mode. We covered using the Auto Split/ Layer Function in the Basics section, but we will review it here.

**Starting from Internal Voices mode:**

**1.** Press the Internal Voices button. Choose the Program you want for the first zone. You can select it by using the alpha wheel, the + and - buttons, or the numeric keypad. (The programs and their numbers are listed in Appendices A & B in the manual.) Or you can use the Sound Select and Next/Previous Group buttons, as described at the beginning of this document.

**2.** Press Split (the Zone 3 button). Notice that the Mode buttons change and MIDI Setups is now lit instead of Internal Voices (since we now have 2 zones). Also notice that the top of the display says Zone:3 auto, indicating that Auto Split/Layer is turned on. Play the keyboard. You should hear the two sounds split across the keyboard.

**3.** Notice that if you press the sustain pedal when playing both sides of the split, both sides sustain. Although this might be fine in some circumstances, often you won't want this. For example, if you create a piano and bass split, you will probably want the piano part to sustain, but not the bass.

Hold the Controllers button and step on the sustain pedal. The display jumps to show Zone:3 SwitchPdl1, On Ctrl: 64 Sustain. Press 0, then Enter to set it to None. Now play the keyboard and notice how the sound in zone 1 will sustain but the sound in zone 3 does not.

**4.** If you would like to change where the keyboard is split, you can easily do this. Press the Split and Split Layer buttons simultaneously. The display changes to show you the AutoSplit Key, which is currently G#3. The easiest way to change the key is to hold the Enter button and strike the note that you want on the keyboard. This will be the top note of the left side of the keyboard. You can also use the wheel or + and – buttons to change the value.

**5.** Go through steps 7 and 8 in tutorial #1 to name and save your Setup.

**Starting from MIDI Setups mode:**

**1.** Go through steps 1-3 (in the section on starting from MIDI Setups) in tutorial #1.

**2.** Press the Key Range button. The display will show the key range for zone 1, from C-1 to G9. (C4 is middle C on the keyboard.) You are going to make zone 1 be the right side of the split, so you need to change the lowest note for this zone. The cursor is already under the Low Note parameter. So, simply press and hold the Enter button, then strike the key on the keyboard that you want to be the lowest note for the right side of the split. The display will change to show that note.

**3.** Go through steps 4 and 5 in tutorial #1 to create the second part of your split.

**4.** Press the Key Range button. Since zone 2 is the left side of your split, you need to change the high note so that it doesn't overlap with zone 1. Press the >> to move the cursor to the High Note parameter. Press and hold the Enter button, then strike the note on the keyboard that is one note lower than the note you chose for the lowest note in zone 1. Play the keyboard. You should hear the two sounds split at the notes you chose.

**5.** Notice that if you press the sustain pedal when playing both sides of the split, both sides sustain. Although this might be fine in some circumstances, often you won't want this. For example, if you create a piano and bass split, you will probably want the piano part to sustain, but not the bass.

Hold the Controllers button and step on the sustain pedal. The display jumps to show Zone:2 SwitchPdl1, Sw Type:Momentary. Press the >> to get to the On Control parameter for Switch Pedal 1. Currently it is set to Sustain. Press 0, then Enter to set it to None. Now play the keyboard and notice how the sound in zone 1 will sustain but the sound in zone 2 does not.

**6.** Go through steps 7 and 8 in tutorial #1 to name and save your Setup.

You can easily add zones 3 and 4 using the same methods. Each zone can be set to any range of notes, so you can have various zones layered while they are split with other zones. Or create a 3 or 4 way split. Or overlap the zones only partially.

## 3. Assigning Sliders for Volume in Different Zones

**1.** Go through steps 1-3 (in the section on starting from MIDI Setups) in tutorial #1.

**2.** Hold the Controllers button and move Slider A. The display now shows Zone:1 Slider A, Ctrl Num:None. Press 7, then Enter to assign Slider A to Volume. (Controller #7 is MIDI Volume. For a complete list of all the MIDI controllers, see Appendix F in the manual.)

**3.** Go through steps 4 and 5 in tutorial #1 to create a second zone. Remember that to make zone 2 active so you hear it, you may need to press the zone 2 button twice.

**4.** Hold the Controllers button and move Slider B. The display now shows Zone:2 Slider B, Ctrl Num:None. Press 7, then Enter to assign Slider B to Volume. Play the keyboard and move the two sliders. You can control the volume of each zone independently.

**5.** Go through steps 7 and 8 in tutorial #1 to name and save your Setup.

Of course, you can use the C and D sliders to control volumes on the 3rd and 4th zone in a Setup. Or, you could also assign the same slider to volume in more than one zone. We will show an example of this in tutorial #6.

## 4. Setting Initial Volume Levels for Different Zones

Let's say that you want to create a setup with piano and strings layered but you want the strings to be at much lower volume than the piano, and you need to have the volume levels set to specific amounts when you call up the Setup. You can use entry values to set initial volume levels.

**1.** Go through steps 1-4 of tutorial #3, assigning a piano program to zone 1 and a string program to zone 2.

**2.** Press the >> button four times. Since you are still on zone 2, the display should read Zone:2 Slider B, Entry Value:None. Set the value to 95.

**3.** Press the Zone 1 button. Hold the Controllers Button and move Slider A. Press the >> button four times. The display should now read Zone:1 Slider A, Entry Value:None. Set the value to 127.

**4.** Go through steps 7 and 8 in tutorial #1 to name and save your Setup.

**5.** Now go to a different Setup, then call up your saved Setup again. Play the keyboard. Notice that the strings are quieter than the piano. Since the two sliders are assigned to volume on the two different MIDI channels, they each send a volume message with the Entry value (127 on channel 1 and 95 on channel 2) as soon as you call up the Setup. If you subsequently move the slider, it will send volume messages.

An IMPORTANT point to understand when using Entry values:

Lets say that your B slider happens to be all the way up when you call up the Setup you just made. Volume is now at 95 on channel 2. Now you want to use the slider to fade the strings out. If you move the slider, you wouldn't want it to suddenly jump to the current value; since the slider is all the way up (set to 127), it would jump to 126 the moment you moved the slider down and the volume would suddenly get louder!

To avoid this problem, the PC2 is designed so that once you set an Entry value, the slider won't become active until you pass the point of the Entry value. So as you move the slider down, nothing will happen until you reach 95 and at that point, it will follow the slider as you bring it down, thereby creating a smooth fade out.

Here's an extra tip - let's say that you want to have a piano & strings Setups like the one described above, but you don't want to hear the strings when you call up the Setup. Instead, you want to bring them in later with a slider. To do this, you could set the Entry value for zone 2 to 0. Now let's assume the slider is all the way down when you first call up the Setup. Remember that the slider must go past the Entry value before it becomes active. So the Entry value is 0 and the current position of the slider is also at 0. When you move the slider up, it goes to 1, not 0, and therefore nothing happens as you move the slider up. So you would have to move the slider up slightly, then back down so that it goes to 0, then the next time you move it up the slider will be active.

To avoid having to move the slider up , down, and up again, set the Entry value to a very low number other than 0, such as 5. The value is so low that you won't hear the strings, but as you push up the slider the first time, it will go past 5 and become active.

## 5. Returning Volume Levels to Full Values when Exiting a Setup

OK, so now you have created a Setup with the sliders set to control volume. Let's say that you are performing a song and you have faded out one or more zones and you go to a new Setup. You play the keyboard but don't hear the sounds on those zones!

Keep in mind that all controller information is channel specific. Once a MIDI channel received a message for a controller (like Volume with a value of 0), that MIDI channel stays at that same amount until it either gets a new value of that controller, or it gets the Reset All Controllers message (this is Controller 123, and is sent when you press the Panic button).

To avoid this problem, you can use Exit values.

**1.** Call up the Setup you created in tutorial #4.

**2.** Hold the Controllers button and move Slider A. If the display doesn't show Zone:1, press the zone 1 button. Press the >> button 5 times. The display should now read Zone:1 Slider A, Exit Value:None. Set the value to 127.

**3.** Hold the Controllers button and move Slider B. Press the zone 2 button. Press the >> button 5 times. The display should now read Zone:2 Slider B, Exit Value:None. Set the value to 127.

**4.** Resave your Setup by pressing the Store button. (You can save it back to the same location.)

Now when you leave this Setup, the volume on channels 1 and 2 returns to the full amount, no matter where you have moved the sliders.

Using Exit values is always a good idea when assigning volume to controllers, but it can have many other uses as well. For example, it could be used to turn off the arpeggiator, or return panning to center, etc.

## 6. Adjusting Relative Volumes with One Slider

So far we have only shown assigning a controller to one zone. But there is no reason that you can't use one controller to affect two or more zones. Let's say that you want to create a Setup with three layered zones - Piano, Electric Piano, & Strings. Furthermore, let's say you need to control the Piano and Electric Piano volumes separately, but you want to have the Strings volume controlled with the same slider you use to control the Electric Piano. In addition, you need the Strings to always be quieter than the Electric Piano.

**1.** Follow tutorial #1 to create a 3 zone, layered Setup, with Piano in zone 1, Electric Piano in zone 2, and Strings in zone 3.

**2.** Hold the Controllers button and move Slider A. If the display is not on zone 1, press the Zone 1 button. The display now shows Zone:1 Slider A, Ctrl Num:None. Press 7, then Enter to assign Slider A to Volume.

**3.** Press the Zone 2 button Hold the Controllers button and move Slider B. The display now shows Zone:2 Slider B, Ctrl Num:None. Press 7, then Enter to assign Slider B to Volume.

**4.** Press the Zone 3 button. Press 7, then Enter to assign Slider B to Volume. Play the keyboard and move the two sliders. Notice that Slider B controls the volume on both zones 2 and 3. But the strings are still as loud as the electric piano.

**5(a).** Press the >> button twice. The display now shows Zone:3 Slider B, Ctrl Offset:0. Press the +/- button, then 37, then Enter. The Offset will now be set to -37.

The Offset parameter will subtract (or add if the number is positive) a specific amount to the normal value of the slider. So when the slider is all the way up, the value is 127-37=90. So as you move the slider up and down, the strings are always 37 less in volume than the electric piano.

As you move the slider down to the normal 37 position, the volume level for the strings would be 37-37=0. What happens when you move the slider lower? MIDI can only send values between 0 and 127, so once the value reaches 0, the slider doesn't send any additional messages as you move it lower.

**5(b).** There is a second way to accomplish the same thing, although the end results will be slightly different.

You should still be on the Offset parameter for Zone 3. Set it back to 0 so there is no Offset, and press the << button once. The display now shows Zone:3 Slider B, Ctrl Scale:100%. Press 71, then Enter.

The Scale parameter applies a percentage to the normal slider value. So if you move the slider all the way up, the value will be 127 x .71=90.17 (since MIDI only send integer values this will be truncated to 90). So when the slider is all the way up, it is sending the same value as the example above using Offset.

# PC2 Made Easy

So how are the two methods different? The Offset method will keep a fixed amount of value between the two zones whereas the Scale method will give you a sliding amount of difference, based on the percentage.  If you move the slider to the halfway point, the Offset method would give you 64-37=27 and the Scale method would give you 64 x .71=45.44 (sent as 45). And if you move the slider to the 1/4 point, the Offset method would give you 32-37=-5 (sent as 0) and the Scale method would give you 32 x .71=22.72 (sent as 22 - values to the right of the decimal point are truncated, not rounded up).

So which method is better? It all depends on what you need and how you want the Setup to sound. Try creating two different Setups, using the two different methods. Then play and move the sliders and see which one sounds better to you. Try using different amounts of Offset and Scale to see what works best.

Don't forget to name and save your Setups!

## 7. Crossfading Zones

A nice musical effect is to be able to smoothly fade from one sound into another. You can easily do this with a single slider (or other continuous controller).

**1.** Follow tutorial #1 (from the section on starting from MIDI Setups) to create a 2 zone, layered Setup. To best demonstrate the crossfade effect, you should pick two sustaining sounds for the two zones, such as strings and organ, or two different sounding organs.

**2.** Hold the Controllers button and move Slider A. If the display is not on zone 1, press the Zone 1 button. The display now shows Zone:1 Slider A, Ctrl Num:None. Press 7, then Enter to assign Slider A to Volume.

**3.** Press the >> button once. Notice that Scale is set to 100%. Press >> again. Notice that Offset is set to 0. Press >> again. Set the Curve to Sin+.

**4.** Press the Zone 2 button. Press the << button three times so that you are back to the Ctrl Num parameter. Set this zone to Volume, just like zone 1.

**5.** Press the >> button. Press the +/- button, then 100, then Enter to set the Scale to -100%.

**6.** Press the >> button. Set the Offset to 127.

**7.** Press the >> button. Set the Curve to Cos+. Hold some notes on the keyboard the keyboard and move the slider up and down. You should hear one sound fading into the other.

**8.** Name and save your Setup.

OK, so what is happening? Zone 1 works like normal - moving the slider up sends volume values from 0 up to 127. But in zone 2, the slider starts off at 127 (because of the offset) and then decreases in value to 0 as you move the slider up (because of the negative 100 percent scale).

What about the curve parameters? They change what values are sent as you move the slider from the very bottom to the very top. With a Linear Curve (essentially no curve), the values change in even spacing as you move the slider up. With a Sine+ Curve, the values are spaced close together when you first start to move the slider up, then are gradually spaced farther apart after the halfway point. A Cosine+ Curve works the opposite - the values change slowly when you start moving the slider and then change faster after you reach the midpoint.

So why not use a Linear Curve in the crossfade? It is beyond the scope of this tutorial to detail dB issues involved when you layer sounds, or to cover how instruments respond to MIDI volume in dB terms. The bottom line is that if you use Linear curves, the total amount of amplitude for both zones will be less when the slider is halfway than when it is all the way up or down. By setting zone 1 to Sine+ and zone 2 to Cosine+, you will have a smoother volume transition and the amplitude at the midpoint will be about the same level as when the slider is all the way up or down. Try setting both zones to Linear

and hold notes while you move the slider, and compare that to using the Sine+ and Cosine+ curves. You should be able to hear a difference.

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PC2 Made Easy

**PC2 Made Easy**

## 8. Velocity Switching

You can use how hard you strike the key to switch between zones. This is usually most effective if you have programs that have samples of the same instrument at different velocity levels. Most PC2 programs don't do this, so you would most likely use this technique when controlling an external module. The following example demonstrates the technique with internal PC2 sounds. (The PC2 DOES have some programs, such as many of the acoustic piano programs, which switch velocities between samples within a single program.)

**1.** Create a Setup with two zones, following tutorial #1 (from the section Starting from MIDI Setups Mode). Assign Program #75 Doo stacc. to zone 1 and #74 Baa stacc. to zone 2.

**2.** Press the Velocity button. If you are not on zone 1, press the Zone 1 button. Press the >> button 3 times. The minimum velocity for this zone is 1. Press the >> button again. Change the maximum velocity to 80. Press the Solo button so you hear only zone 1. Play the keyboard with varying degrees of force. The voices gets louder as you strike harder until you reach a velocity of 80, then it does not play at all.

**3.** Press the Zone 2 button. The maximum velocity is set to 127. Press the << button to go back to the Vel Min parameter. Set it to 81. Play the keyboard with varying degrees of force. Notice you hear no sound until you reach a velocity of 81, then zone 2 continues to get louder as you play up to 127. Press the Solo button again to hear both zones. Play the keyboard to hear the switching between the two zones.

Another useful application is to add a zone with velocity. You could create a 2 zone layered Setup. For one zone, you allow it to play through all velocities. But for the second zone, you change the MinVel parameter so that zone only kicks in above a certain velocity. Now when you play the keyboard, you hear one zone or two, depending on how hard you strike the keys. This is great for adding a little extra kick to a sound, if you add some type of short percussive program for the second zone. You may also want to set the volume for that zone lower than the first zone (as described in tutorial #4) so that the effect of adding the second zone is subtler.

Another possible application is to assign the same program to two different zones (make sure each zone is on a different MIDI channel), and then set one zone to FX-A and the other zone to FX-B. Now by choosing a different effect for each effects bus, you can use velocity to switch your program between two different effects.

## 9. Switching from One Setup to Another With a Pedal

If you need to switch between Setups very quickly in performance, it can be useful to do this with a switch pedal. To do the following tutorial, you will need a switch pedal plugged into the Switch Pedal 2 jack in the PC2. (You could use Switch Pedal 1, but then you wouldn't be able to use it for Sustain.)

**1.** Create a Setup with one or more zones, following tutorial #1 (from the section on starting from MIDI Setups).

**2.** Hold the Controllers button and step on the pedal connected to the Switch Pedal 2 jack. The display will read Zone:1 Switch Pdl2, On Ctrl: 66 Sosten. (By default switch pedal 2 is assigned to Sostenuto, which is the function of the middle pedal on an acoustic piano.) If the display shows a different Zone, that is OK. Only one zone is needed to accomplish what you want to do, and it can be any zone, as long as the zone is active.

**3a.** Press 141, then Enter to select Goto Setup for the value. Make sure not to step on the pedal until you have saved your Setup (step 5).

In addition to the 128 MIDI controller messages, there are a number of special functions that can be assigned to a physical controller. They are listed on page B-9 of the manual. You can scroll up to them with the alpha wheel, or enter specific numbers (documented in the manual) to go directly to them.

**4a.** Press the >> button to get to the On Value parameter. You will use this parameter to select the Setup number you want to switch to. HOWEVER, the number you choose will NOT be the actual Setup number. Here is why:

The Goto Setup command only sends a single numeric message, which work just like a program change. But it does not have the ability to specify a bank, since that would require sending two messages (one for the bank and one for the Setup within the bank). Because of this limitation, you can only select Setups in the User bank, using the Goto Setup function.

The User bank starts with setup #129. But MIDI can only send a total of 128 values. So if you set the On Value to 1, pressing the pedal will switch to Setup 129. Setting On Value to 2 will select Setup 130. Etc.

So once you know the number of the Setup that you want to switch to, subtract 128 from that number and you will have the correct value to enter for the On Value parameter.

**3b-4b.** Another option is to use the Setup Increment function instead of the Goto Setup. In this case, you would type 139, then Enter when editing the On Ctrl parameter, then set On Value to 127. This option will cause the PC2 to select the next higher numbered Setup, when you Step on the pedal. You could also use another pedal and assign it to Setup Decrement. Then the two pedals would allow you to step through the setups in ascending or descending order. (But of course, you would need to assign the pedals to these values in each Setup.)

**5.** Name & Save your Setup. It is important you save your Setup before testing the pedal, since stepping on the pedal will cause you to leave the current Setup and if it isn't saved, you will have to program it again. Now step on the pedal. You should see the PC2 jump to the Setup that you have chosen.

Instead of using a pedal, you could accomplish the same thing assigning the Goto Setup to any of the 5 switch controller buttons, but of course, then you have to take your fingers off the keys.

## 10. Switching from One Program to Another with a Pedal

If you have created a multiple zone Setup and only want to change a single program, you can use the Goto Program function instead of using the Goto Setup function. This can be useful if you don't want to make a bunch of extra Setups. It is also great for switching back and forth between two programs while keeping the other zones the same. This tutorial will be set up so that you can switch back and forth.

The limitation for this tutorial is that the program that you switch to must be in the same bank as the program you are switching from.

**1.** Create a multiple zone Setup, following tutorial #1 (from the section on starting from MIDI Setups). For the purposes of this tutorial, make sure that the program that you want to switch from is in the Internal Voices Bank. (The programs in the other zones can be in any bank.) Also for the purposes of this tutorial, we will assume you will use zone 1 as the zone that will switch programs. You will need to remember the program number of the program you choose for zone 1 - you will type in that number in step 6.

**2.** Hold the Controllers button and step on the pedal connected to the Switch Pedal 2 jack. If you are not on zone 1, press the Zone 1 button. The display will now read Zone:1 SwitchPdl 2, On Ctrl: 66 Sosten.

Press the << button. The display will now read Zone:1 SwitchPdl 2, SW Type: Momentary. Use the alpha wheel to switch the value to Toggle.

The difference between Momentary and Toggle is: A Momentary switch is On while you press it and Off when you let go (like a typical sustain pedal). A Toggle Switch stays On when you press and let go and then turns Off when you press again (like a typical power switch).

**3.** Press the >> button to return to the On Ctrl parameter. Press 138, then Enter to choose Goto Program for the On Ctrl.

**4.** Press the >> button. Enter the program number of the program you want to switch to. It must be a program in the current bank (the Internal Voices bank for this tutorial).

**5.** Press the >> button. Notice that the OffCtrl value is set to Goto Program (the same as On Ctrl). Although the On Ctrl and Off Ctrl parameters can be set to send different messages, you would normally expect them to send the same control message (but with different values for On and Off). For this reason, whenever you set the On Ctrl parameter, it also sets the Off Ctrl to the same thing. So if you want a different value for Off Ctrl, you must set it after setting the On Ctrl parameter. We will see an example of this in the next tutorial.

**6.** Press the >> button. Enter the number of the program that you originally assigned for zone 1 (the same number you set with the Program parameter).

**7.** Name and Save your Setup. Now play the setup, then step on the pedal. You should hear the sound from zone 1 switch to your second sound. Step on the pedal and play again. You should hear the original zone 1 sound again.

## 11. Switching Banks & Programs with a Pedal

A limitation of the Goto Program function described in the previous tutorial is that it only sends a program change message, and not the bank controller. So what if you want to switch between programs in two different banks. The following tutorial provides a solution for this.

**1.** Create a multiple zone Setup, following tutorial #1 (from the section on starting from MIDI Setups). For the purposes of this tutorial, we will assume you will use zone 1 as the zone that will switch programs. For zone 1, choose a program in the Internal Voices Bank 0.

**2.** Hold the Controllers button and step on the pedal connected to the Switch Pedal 2 jack. If you are not on zone 1, press the Zone 1 button. The display will now read Zone:1 SwitchPdl 2, On Ctrl: 66 Sosten. Press 32, then Enter. The On Controller parameter is now set to controller #32, the bank controller.

(Unlike the previous tutorial, we will not change the Switch Type parameter, so it will remain at its default of Momentary.)

**3.** Press the >> button. Decide which program you want to switch to, making sure that it is in a different bank than the program you previously chose for zone 1. Enter the bank number of the bank your new program is in (the bank numbers were documented at the beginning of this document, but you might want to try #6 Internal 2 and #1 User). The On Value is now set to the bank number.

**4.** Press the >> button. Press, 138, then Enter. The Off Controller parameter is now set to Goto Program.

**5.** Press the >> button. Enter the number of the program you want to switch to. The Off Value is now set to that program number.

**6.** Next, hold the Controllers button and press the SW4 button. Press 32, then Enter. The On Controller parameter is now set to controller #32, the bank controller.

**7.** Press the >> button. Press 0, then Enter. The On Value now sends bank 0.

**8.** Press the >> button three times and set the Entry State parameter to On. (The Exit State parameter should already be set to Off, but if you want to double check this, press the >> button once more.)

**9.** Now press the Program button, then the >> button twice to get to the Bank Mode parameter. Set this to None.

**10.** Name and Save your Setup. Step on the pedal and release it. Zone 1 should switch to the sound you have chosen.

So what is happening? When you step on the pedal it sends the bank change command; when you let go, it sends the program change command, allowing you to switch to any program from any bank.

But what is the reason for steps 6-9? This has to do with an oddity (read bug) with the Bank Mode parameter. This parameter normally determines which bank controller or controllers (0, 32, or 0 and 32 together) are used when the Setup is first selected and the Program change message (which is selected from the Program button) is sent. For some reason when this parameter is set to one of the bank values, it interferes with the bank message that is sent by the pedal. So by setting the parameter to None, it prevents this problem.

However, this means that the bank value associated with the Program you choose in the program menu is not sent. This is the reason for assigning the SW4 button in steps 6-8. We have assigned it to send the bank controller with a value of 0 (since we chose a program from that bank at the beginning of the tutorial). And by setting the Entry State to On, we ensure that the message is sent when the Setup is selected.

The only limitation of this method is that you can only switch in one direction with a single controller - you can't use one pedal to switch back and forth between two different programs. But you could always assign another controller to do the same thing to switch back, or even to a different program.

## 12. Transposing a Zone with a Button

Let's say that you need to be able to play a song in two different keys (maybe you have two different singers for your band) and you have only learned how to play the song in one key. You can use a button to transpose the keyboard so that you can play the same notes but hear it transposed to a different key.

**1.** Create a single zone Setup, following tutorial #1 (from the section on starting from MIDI Setups).

**2.** Hold the Controllers button and press the SW4 controller button (above the pitch bend wheel). The display now shows. Zone:1 Button SW4, On Ctrl: None. Press 145, then Enter to set the On Ctrl to Transpose Up. If you would prefer to transpose down, press 146, then Enter to select Transpose Down.

**3.** Press the >> button. Set the On Value for the number of semi-tones you want to transpose up (or down). For example, if you want to transpose up a minor 3rd, you would set it to 3.

**4.** Press the >> button. Move the alpha wheel 1 click clockwise to set the Off Ctrl to Transpose Down. (If you originally chose Transpose Down in step 2, then set Off Ctrl to Transpose Up.)

**5.** Press the >> button. Set the Off value to the same amount you chose for the On Value.

**6.** Name and Save your Setup. Now play the keyboard, then press the SW4 button and play the same notes again. You will hear the keyboard transposed in the direction and amount that you chose. Pressing the SW4 button will return the keyboard to no transposition.

Keep in mind that if you use this technique on a Setup with more than 1 zone, you will have to program each zone for the same transposition, if you want them all to transpose.

You may have noticed that there is also a button marked Transpose in the Zone Parameter section. If you simply want a zone to always be transposed by a specific amount (for example, to have one zone an octave higher than another zone), then it is much simpler to use the Transpose button instead of programming a controller. But if you need the ability to switch back and forth between transposition and no transposition, the method described above is the way to do it.

Also, you can combine the two methods. For example, you could create a Setup with one zone transposed up an octave from another zone using the Transpose button, then use controller method to move both zones by a minor 3rd.

As we mentioned in the Introduction, the SW1 button is labeled Octave Shift. This will shift the keyboard down one octave in Internal Voices Mode and in some Setups. However, it is important to note that this button is NOT specifically dedicated to doing an octave shift. We have simply assigned this button to Transpose Up or Down, with an On value of 12. In the case of the Internal Voices Setup, zones 1 & 2 transpose Down,

while Zones 3 & 4 transpose up. Some other preset Setups also will transpose various zones up or down one octave. Setup #128, the Default Setup does NOT have this button assigned to transpose.

## 13. Panning Zones Hard Left & Right

If you are using the PC2 in a recording studio or playing live and have the need to run different sounds out of different outputs, then you need to be able to pan individual zones hard right or hard left. To follow this tutorial, you will need to have both outputs of the PC2 plugged into a mixing board or stereo amp. If using a mixing board, make sure that the two channels are panned hard left and right on the board or you won't hear the separation.

**1.** Create a Piano and Bass split Setup, following tutorial #2. Choose a piano program for zone 1 and a bass program for zone 2. If zone 1 is not in the display, press the Zone 1 button.

**2.** Hold the Controllers button and press the SW5 controller button. The display now shows Zone:1, SW Button 5, On Ctrl: None. Press 10, then Enter to set the On Ctrl to Pan (MIDI controller #10).

**3.** Press the >> button. You should see the On Value set to 127 (which is the default value for any switch turned on). This value will pan the piano sound hard right. (If you play the piano now, you won't hear it panned yet, but don't worry.)

**4.** Press the >> button twice. Press 64, then Enter to set the Off Value to 64, which will set the pan back to center.

**5.** Press the >> button. Set the Entry State parameter to On.

**6.** Press the >> button. Set the Exit State parameter to Off.

**7.** Press the Zone 2 button. Now repeat steps 2-6 of this tutorial for zone 2, but in Step 3, set the On value to 0, so that the bass will be panned hard left.

**8.** Name and Save your Setup. Now press the SW5 button and play. You should hear the piano on the right and the bass on the left. Press the SW5 button again. Both zones return to center.

**9.** Select a different Setup, then go back to your panned Setup. Notice that the SW5 button lights up when you select the Setup. This is accomplished by using the Entry State parameter. Chose another Setup. Notice that the SW5 button is no longer lit. This is accomplished by using the Exit State parameter.

The Entry and Exit State parameters are very useful for when you want to assign a controller to send a specific value of something when you select a Setup without having to touch that controller (they work similar to the Entry and Exit value parameters for continuous controllers).

You can set a controller to turn On or Off when you select the setup and when you leave that setup. If the Entry or Exit State is set to None, then the controller remains as it was when you select or leave the Setup. For example, if we left the Exit State to None in this Setup, then the SW5 button would remain turned On when we left this Setup.

This Setup was designed so that simply by calling it up, the zones would be panned the way we wanted, but when we leave the Setup, panning is returned to normal. This way, other Setups that use the same MIDI channels won't be panned. Of course, you might want to have all of your Setups panned in the same manner. But by using the Exit State or Exit Value parameters, you can ensure you don't have any unexpected surprises when you select a different Setup.

## 14. Playing KB3 Programs

KB3 Mode is a special mode designed to work like a classic tone wheel organ (the B3) does. Because of this, there are many differences in the functions of the various buttons, sliders, and other controllers. You will notice that the buttons on the left side of the keyboard and the sliders have labels in orange. These labels apply when you are in KB3 Mode.

**1.** Press the KB3 Mode button and then the #1 Sound Select button (or press 0 on the numeric keypad and Enter). Notice that the display looks different. The top line shows the bank and program number (4:000) and the program name (All Out). The bottom line gives you information about the status of the organ drawbars and the Chorus/vibrato setting.

**2.** A classic tone wheel organ has 9 drawbars, each of which controls the amount of amplitude for the fundamental and various harmonics. Choosing the balance of the harmonics and fundamental is the main thing controlling the sound of an organ program. Since the PC has only 4 sliders, we have set things up so that they can control either the first 4 or next four drawbars at one time. A button marked Drawbar Toggle switches the sliders between controlling the first 4 or next 4 drawbars. The mod wheel functions as the 9th drawbar.

Move the sliders and notice how the display changes for the first 4 numbers on the lower line of the display. Press Drawbar Toggle and move the sliders again. Now the next four numbers change. Finally move the mod wheel and notice that the last number changes. Notice that the numbers move between 0 and 8, just like a real tone wheel organ, which has those 9 distinct values for each drawbar.

If you have ever played a real organ, you know that as you pull the drawbars out (towards you) that increases the volume for that particular harmonic. The sliders on the PC2 follow this same convention, so they work the opposite of the way they work when playing other programs or setups. In a regular (non-KB3) program, when the slider is all the way down, it is at 0 value. But when playing a KB3 program, if the slider is all the way down, it is at full volume, since this is the equivalent of having the drawbar pulled all the way out.

Move some sliders so that at least some of them are set to a value other than 8. Now scroll away from this program and then go back to it. Notice that all the display returns to show all drawbars at a value of 8. Notice also that before the column of 8s it shows "P:". The PC2 gives you the ability to choose a preset setting of each drawbar so that configuration is called up when you select the KB3 program. The "P" shows that the drawbars are set to Preset mode. If you select program number 80 Live Drawbars (you can press the #11 Sound select button), you will see that the "P" is replaced by an "L". In this program, the Drawbars have no preset settings – they are "Live". So sound you hear when you select this program will depend on the current position of the drawbars. Of course, even with a program that has preset drawbars, as soon as you move a slider, the value for that drawbar will change to reflect the slider position. We will talk about how to choose preset values for the sliders in tutorial #17.

**3.** Switch Buttons 1-3 allow you to alter the settings for the Rotary Speaker and Chorus/Vibrato Effects. Press SW1 to turn the rotary speaker emulation on and off, and

play the keyboard to hear the change in the sound of the Rotary speaker. If you would like to be able to control this function with a pedal instead of a button, plug a switch pedal into the Switch pedal 3 jack.

SW2 turns the Chorus/Vibrato Effect on and off. SW3 lets you choose between 3 Chorus settings and 3 Vibrato settings. When you press the button, it will not light up but you will see the display change to show you which setting is currently selected. SW2 must be On (lit up) in order to hear the changes.

**4.** The four buttons above the sliders are used to control the Percussion effect. Percussion is a characteristic feature of tone wheel organs. It's especially useful while soloing, since percussion adds an extra plink (actually an extra tone at a defined harmonic) to the attack.

Percussion is created by a decaying envelope applied to one of the nine drawbars. The percussion effect is "single-triggered," which means that once it's triggered, it won't trigger again until all keys go up. So if no keys are down, and you play a chord, percussion gets applied to all notes in the chord (and in fact, to all notes that are triggered during the short duration of the percussion envelope). Once the envelope runs its course, any notes you play while at least one key is held down get no percussion.

The button above Slider A turns Percussion On or Off. If it is On, then the other buttons are used to control the Volume (soft or loud), the Decay of the envelope (slow or fast), and the pitch (high or low).

Because on a real tone wheel organ, there are only 9 possible pitch sources (one for each drawbar), when you turn Percussion On, one of the drawbars stops working. On a real tone wheel organ, this will be the 9th drawbar. So you will notice when playing any of the KB3 presets that if you turn Percussion On, the mod wheel will no longer function. The PC2 actually gives you the ability to choose which drawbar is stolen, or even to have no drawbar stolen. You can set this when you are in the KB3 Program Editor. We will talk more about this in tutorial #17.

## 15. Using KB3 Programs in a Setup

In the PC2, when you go to KB3 Mode, you are in a special mode that has the sliders and buttons acting in a unique manner, sending specific MIDI controller messages to perform the KB3 functions. Once you put the KB3 program into a Setup, you will need to program the buttons, sliders and pedals to the correct MIDI controller numbers in order for them to work the same way they do when in KB3 Mode.

Luckily we have already done this for you, with Setup #16. This setup is a good template that combines a KB3 program split with a bass and a ride cymbal. The setup is designed to give you easy control over the drawbar settings for the KB3 program, and has the buttons assigned to the controller numbers needed for KB3 functions.

Remember that KB3 program can only be called up on a single MIDI channel. By default that is channel 1. You can change this if you want, by going to the Global Menu and pressing the >> button 13 times to get to the KB3 Channel parameter. So if you are making your own Setups with a KB3 program, be sure to set that zone to channel 1, or whatever other channel you have chosen for the KB3 channel.

There are several issues involved with putting a KB3 program into a Setup.

Drawbar Issues

The first issue is that there are only 4 Sliders that are used for the 8 drawbars. In KB3 Mode a dedicated button switches between having the slider control the first 4 or second 4 drawbars. But in Setup Mode, that Button is used as a Solo button, for soloing a zone. For this reason two zones are needed within the Setup if you want to have control over all eight drawbars.

Here's how it works. When you select setup #16, Zone 1 is soloed (the Solo LED is on, and the Zone 1 LED is red).Sliders A–D control the settings for Drawbars 1–4. When they're adjusted the way you want them, press Zone 2. You'll hear the same organ, because Zone 2 uses the same program. Now, however, Sliders A–D control Drawbars 5–8. The Mod Wheel controls Drawbar 9 with Zone 2 soloed.

When all the drawbars are set the way you want them, press Solo to exit from solo mode, and you'll hear the bass and ride cymbal. (The mod wheel must be down in order to hear the ride cymbal). At this point, both Zone 1 and Zone 2 are muted (their LEDs are amber). Press either Zone 1 or Zone 2, one or more times until its LED turns green, activating the zone. Now the organ plays in the upper range, and the bass/ride plays in the lower range. You can still use Sliders A–D to control the drawbars (Drawbars 1–4 when Zone 1 is active, and Drawbars 5–8 when Zone 2 is active). If you activate both zones, Sliders A–D control the drawbars in pairs (for example, Slider A will control Drawbars 1 and 5 at the same time). However, with both zones active, you will get two notes played for each key you press, so you would normally never want to have both zones active at the same time.

If you are not concerned with changing all 8 of the Drawbars in real time, or just want to use the Drawbar settings defined within the KB3 Program, you can delete the second zone in this setup by turning the zone off in the MIDI transmit menu (set MIDI Channel

to Off). You can also assign the zone to a non-KB3 program by changing the zone to a different MIDI channel, choosing a different program for that zone, and clearing the controller assignments by pressing Controllers, then Copy, then the right arrow button until it says "Clear Zone X?", then Enter). In this situation, the Sliders could still be used to control any 4 of the drawbars that you want. By default, the sliders would control the first 4 drawbars, but you could chose any 4 drawbars you want by assigning the sliders to the specific MIDI controller numbers used for the specific drawbars. The chart on page B-10 of the PC2 manual shows which controller numbers are used for which drawbars, as well as for the other KB3 effects.

Deleting the second zone obviously gives you the advantage of having an extra zone for layering or splitting with other programs, and it also prevents any doubled notes that would occur if you accidentally have both zone 1 and 2 active at the same time, as described above.

Button Issues

In KB3 Mode, the 4 buttons above the sliders are used for various specific KB3 functions, but in Setups Mode, these buttons are used for muting or soloing zones. Therefore these functions have been moved to other buttons.

• Percussion On/Off is controlled by SW5 (above the Mod wheel)
• Percussion Pitch (High/Low) is controlled by SW4 (above the Pitch wheel)
• Percussion Loud/Soft is controlled by section 3 of the Ribbon (you must have the ribbon controller plugged in for this to work, obviously)
• Percussion Decay (Fast/Slow) is not assigned to any controller

The Rotary On/Off and Vibrato/Chorus On/Off buttons function identically in the Setup. In addition, Switch Pedal 3 can also be used to control Rotary On/Off (this is same in KB3 Mode).

The Vibrato/Chorus depth button works differently, however. In KB3 Mode, this button switches between 3 Vibrato and 3 Chorus settings. Since the button only has two states in Setup Mode (On or Off), you can only choose between two different settings. By default, the button switches between Vibrato 1 and Chorus 3. But by editing the On Value and Off Value parameters for that button, you can switch between any two settings (the On Controller and Off Controller parameters are both 93 - you only change the On value and Off value). To select other settings, use the following values:

• Vibrato 1 = 0
• Vibrato 2 = 36
• Vibrato 3 = 58
• Chorus 1 = 79
• Chorus 2 = 100
• Chorus 3 = 122

If you are not certain how to set the On and Off values for a button, please see tutorial #12 – it covers this concept.

Effects Issues

# PC2 Made Easy

If you are starting with the KB3 Setup, then you will be starting with a Setup in which Zone 1 has a KB3 program assigned. If you decide to add a KB3 program to a different Setup and program the controllers yourself, then you should make sure that you put the KB3 program in Zone 1 of the Setup. Here is why:

While some of the KB3 oriented functions that can be controlled by a physical controller are actual KB3 parameters, others are actually controlling the Effects Processor (These are Leslie Slow/Fast, Vibrato/Chorus On/Off and Vibrato/Chorus Select).

Because the Effects are Global to the Setup, only one zone can send controller info to the effects processor for real time control. The MIDI Channel which controls the effects processor is determined by the settings of the FX Chg Mode and FX Channel parameters (see page 5-25 in the manual). By default, they are set to Auto and Current, and you probably want to leave them set that way. If they are set to those values then the MIDI channel assigned to Zone 1 is what is controlling the effects. Therefore, you want to assign the pedals or buttons that will control the Leslie and Vib/Chor parameters to Zone 1, EVEN IF THE KB3 PROGRAM IS ASSIGNED TO A DIFFERENT ZONE. Any pedals or other controllers which you are using to control the regular KB3 parameters should be assigned to the zone that has the KB3 program in it, but the effects control must be done from Zone 1.

## 16. Program Editing – Internal Voices

All programs in the PC2 can be edited. and you can save your edits to the User Bank. All program editing parameters are contained within the Timbre, LFO, and Envelope menus, found in the Sound Parameters section of the front panel.

Both regular and KB3 programs can be edited, and since there are substantial differences between the two types of programs, we cover editing of regular programs in this tutorial and editing of KB3 programs in the following tutorial.

**1.** Press the Internal Voices Button, and select program #80 Solar Lead. Play the program to get a feel for what it sounds like. You should be sure to try moving the different physical controllers to hear the changes in the sound. For example, Slider C opens and closes a filter, Slider D control the amount of resonance applied to the filter, and the SW5 button switches between two different sounds. When you are finished playing, make sure that SW5 is turned off, Slider C is all the way DOWN, and Slider D is all the way UP..

**2.** Press the Timbre Button. Each program can have up to 4 Layers (although many will have fewer). You can tell how many layers are in a program by looking at the four zone buttons. Each button that is lit up represents a layer. Notice that the top line of the display shows Lyr:1 2P Lowpass. This indicates that you are currently editing Layer 1 and the currently selected parameter is a 2 Pole Lowpass Filter setting. You can't add or delete layers in a program, but you can make substantial changes to the existing layers.

**3.** The 4 zone buttons work identically to the way the function in Setups Mode. Pressing a zone button will switch the display to that Layer. Once that Layer is in the display, pressing it a second time will mute that layer. Pressing again will unmute that layer. Unlike with Setups, muting is only temporary. Once you save your changes and exit the program, all layers will be active. The main reason for muting is to allow you to hear the changes you make while you are editing.

Press the Zone 3 button twice. The Zone 3 button turns orange, indicating that layer 3 is muted. Notice there is also a "-" in the display after the layer number, once again indicating it is muted. Press the Zone 4 button twice to mute that layer as well. Now play the keyboard. Notice that you don't hear any difference in the sound. Remember that in step 1, we talked about SW5 switching between layers. Press SW5 to turn it on and play the keyboard again. Now you hear nothing. This is because, in this program, SW5 is programmed to switch between playing Layers 1 & 2 or Layers 3 & 4.

If you are editing a program and hear no changes, you might want to mute all layers but that layer and make sure it is currently active. Some times that layer might be limited to a range of notes, or it might have a switch programmed to turn it on or off, as in this example. If you look in appendix C in your manual, you will find a list of all the preset programs and their control sources. It is a good idea to be aware of these settings when you go to edit a program so that you know if a certain physical controller may be affecting what you hear.

Turn SW5 back off and unmute Layers 3 & 4. For the rest of this example, we will only work with editing layers 1 & 2, but you can apply any of the same changes to layers 3 & 4 and use SW5 to switch between the two sets of layers.

**4.** Press the Layer 2 button twice to mute it and play the keyboard. Notice that the remaining layer 1 sound is panned partially to the left. Layers 1 & 2 in this program are very similar sounding with each layer panned partially to opposite sides. (Layers 3 & 4 follow the pattern.) This gives a richer sound to the program. It also means that by editing only one layer, you can get some real variations in the sound by choosing to either change both layers or only one of them.

Press the Layer 1 button once to make it the editable layer. For each layer, there are a number of parameters, including 2 DSP parameters. Although the other parameters remain the same in all programs, the two DSP parameters will change, depending on how that layer of the program has been designed. Each layer can have different DSP parameters. (In this particular program, all layers have the same DSP parameters.) When you press the Timbre parameter, you will always enter the menu at the first DSP parameter.

Now change the value of the 2P Lowpass parameter (the alpha wheel is good for changing in this example.). Notice that as you raise the filter cutoff, the sound gets brighter, and as you lower it, the sound gets duller. The display shows you the cut off of the filter in both a note value and the actual frequency.

Set the parameter as high as it can go (a value of G 10). Now move Slider C. Notice that it has no effect on the sound. The Slider is set to open the filter as you send higher MIDI values, but since the slider is all the way open, it can't be raised any higher. This points out an important concept to remember. The basic parameter settings are initial amounts, and those amounts can then be modified by a MIDI controller (if the program is set up so that the controller will modify that parameter).

Set the value to C 5, the press the zone 2 button twice to unmute it. Now play the keyboard. Notice that the sound is stronger on the left side, since layer 1, which is panned to the left, is brighter. Now move Slider C up while playing the keyboard and notice that the sound moves more to the center. This is because as the filter is opened up and layer 2 gets brighter, it gains in volume. Now move Slider C all the way back down and mute Layer 2 again.

**5.** Press the Layer 1 button to make it active and then press the >> button. Now you are on the Resonance parameter. Resonance is a DSP function in which the amplitude of the frequencies surrounding the filter cutoff frequency are increased or decreased. Try changing the value of this parameter to hear the change in the sound.

As we mentioned earlier, Slider D controls the amount of resonance. This works in the same way as we saw with Slider C – you set the initial amount with the resonance parameter and then you can increase that amount with the slider. Since resonance is tied to the filter cutoff, you will also find a big change in the sound based on the relative settings of both parameters.

**6.** Press the >> button to get to the Amp parameter. This parameter controls the basic overall amplitude of the layer and can be very useful for balancing the volumes of different layers, particularly if they use different keymaps (which we will be exploring in a few more steps).

**7.** Press the >> button again and you will see the first of several Initial Value parameters, this one for the mod wheel. Most programs typically have up to 7 different physical controllers, which can be used to alter the sound in one way or another.

# PC2 Made Easy

(Appendix C in the manual documents the controller assignments). These Initial Values allow you to have the controller be set to a specific amount when the program is first called up, so you can depend on the program always sounding a specific way. At any point after that you can move the controller and the program will respond accordingly.

The initial value parameters include:

> Mod Wheel
> Breath (for the breath controller input)
> Data (Controller #6, which is the default for Slider C)
> Controller #9 (the default for the SW2 button)
> Controller #12, (the default for the SW3 button)
> Controller #13 (the default for Slider D)
> Controller #29 (the default for the SW5 button).

Press the >> button until you get past the Controller #29 Initial Value and you will see "Capture MIDI Vals?". If you press the Yes (Enter) button while on this parameter, all the Initial Value parameters will be set to the current position of the various controllers. This is great because you can play around with the sound, moving the controllers as you desire, and when you find something you like, just go to this parameter and instantly you can set the program to sound this way every time you call it up.

**8.** Now press the Timbre button again. This will jump you back to the First DSP parameter. (You could also press the << button numerous times to get to it – this is just a shortcut). There are a few more parameters in this menu. Press the << button and you will see the Lo and Hi note parameters. These work the same way they do in a Setup. This allows you create a split within a program, using different layers assigned to different note ranges – the same concept as you would do with zones in a Setup. It is not possible to add or delete layers within a program, but starting with a program with more than one layer, you can customize a split.

**9.** Press the << button twice. Now you see the Keymap parameter. A keymap is a collection of individual samples assigned across the keyboard, and will consist either of samples of actual instruments or waveforms. In the current program, layers 1 & 2 use the Sawtooth Wave and layers 3 & 4 use the Saw Wave Dullest. This is why you hear a different sound when you use SW5 to switch between layers.

If Layer 1 is not currently in the display, press the zone 1 button to make it the currently editable layer. Change the Keymap to 179 Square Wave. Now press the zone 2 button and set Layer 2 also to 179 (if the layer is still muted, press the zone 2 button again. Play the keyboard to hear the difference.

As we mentioned earlier it is not possible to change the DSP functions within a given program. But since you can change the keymap for any program, if you find a program that has synthesis parameters that you want to work with, you can edit that program and select the basic sound that you want run through those DSP functions. As you can see, this gives you a great deal of flexibility in editing sounds.

Now press the << button once more. This time you see (Keymap). There are actually two keymap parameters. In the case of stereo samples, one is used for the left side and one for the right. Since this program started with a mono waveform, the second keymap parameter doesn't do anything and can't be changed, as indicated by the "( )". If you start with a program that uses stereo samples, you will find that the two parameters say "Keymap R" and "Keymap L". If you edit one of these programs you can assign any

keymap in the instrument to each side. Obviously however, if you are using a mono sample, it makes no sense to use a program with the two keymap parameters (unless you wanted to do something very strange such as assigning completely different keymaps to each side).

**10.** Now we will move on to another set of sound editing parameters. Press the Envelope button. This menu contains three parameters, for modifying the attack, decay and release times of the program. It is important to understand that the changes you make here are based on envelope settings already programmed. Values of less than 1 will slow down the envelope and value of more than 1 will speed it up.

You should still be on Layer 2. If not press the Zone 2 button to make it current. Press the Zone 2 button to mute Layer 2 and then press the Zone 1 button to make Layer 1 active. Now set the Attack parameter to its lowest value, 0.018, and play the keyboard. You will notice the attack is now slower. Change it to a value of 1.000 and play again. You will hear an immediate attack. Change it to a value above 1.000 and play again. Notice there is no additional change. Since the original attack from this program is an instant attack, no amount higher than 1 can make it quicker. But if you had started with a program that has a slow attack (for example Slow Strings), setting a value higher than 1 will give you a quicker attack.

Now press the >> button to get to the Decay parameter. This program is a sustaining program, which means that there is no decay. Try setting this parameter to a value of 5.000, then strike a key and hold it. You will now hear the note decay. Try a setting of 50.000 and now the note decays almost immediately. If you choose a value less than 1.000, there will be no additional change – since the original program already sustains, there can be no longer decay time. But if you started with a program that did decay and chose a value of less than 1.000, the decay time would get longer as the value got lower.

Set the Decay back to 1.000 and press the >> button to get to the Release parameter. Lower the value to an amount of less than 1.000 and play staccato notes and you will hear a longer release time.

Remember that if you adjust the values of the Envelope parameters and find some settings you would like to save, be sure to change the values for the other layers as well.

**11.** Press the LFO button. A Low Frequency Oscillator (LFO) is a waveform that is so low in pitch, you can't hear it. Instead, it is used as a control for various parts of the sound. Since it is continuously repeating it is often used for things such as vibrato or tremolo, in which there is a steady up and down change in pitch (for vibrato) or amplitude (for tremolo).

The LFOs are already assigned to specific functions for each program, and that can't be changed. What you can change are the rates and the shapes of the LFOs. For instance, in the current program, both the Mod Wheel and Mono Pressure control the amount of LFO applied to Pitch, thereby allowing you to control vibrato. Play some notes and move the mod wheel up or press down on the keys to hear the effect.

In this particular program, the mod wheel and pressure are not only controlling the amount of the LFO controlling the pitch, they are also controlling the speed. But you only have control over the slower amount. So in order to hear the following changes, make sure the mod wheel is no higher than halfway up and try not to press too hard on the keys while holding them down.

# PC2 Made Easy

Now strike a key and hold it, and try changing the value of LFO1 Rate to 2.00 Hz. You should hear the vibrato slow down. If you move the mod wheel all the way up, you will hear the LFO speed back up again as the vibrato gains in intensity.

Now press the >> button to see the LFO1 shape parameter. Try changing the shape and listen to the variations in the vibrato. You will find that the changes are quite subtle, since the amount of vibrato is limited in the program, but the changes are there.

There are two LFOs in the PC2, so you will also see LFO2 Rate and LFO2 Shape parameters. In practical terms, however, the second LFO is rarely used for most programs so changing the settings of these parameters will rarely give you any noticeable end result. Sometimes, instead of LFO2, you will see the display say GLFO. In this case the second LFO is used as a Global LFO, which, means that the settings of this LFO are always the same for all layers in the program. If you do see a program with a GLFO, then it is likely that LFO has been assigned to something and changing the values may give you a noticeable change.

**12.** Finally we will save the program. You may wish to go back to some of the parameters and edit them to your liking. Once you have a program you like, press the Store button. The PC2 will ask if you want to save the Voice. Saving and/or renaming are identical to the dialogs you see when saving a Setup, so we won't go into details here.  Remember that the Layer Mutes don't apply to a saved program – once you call up the program after exiting the editor, all layers will be active. So don't forget to check all the zones in a program before saving it to make sure you have everything the way you want it.

Note: If you simply call up a Program and press Store, because you want to save it to another location without making any changes, you will get the Save Setup dialog. In order to get to the Save Voice dialog, you need to first press one of the Sound Parameter buttons.

## 17. Program Editing – KB3 Programs

Countless blues, jazz, and rock recordings have centered around the distinctive sound created by classic tone wheel organs (such as the Hammond B-3) played through rotating speaker systems like the Leslie. Not only is the sound great, but it's supremely versatile, since the player can control timbre in real-time by adjusting drawbars that add or remove harmonics from the fundamental tone. Other cool sound-shaping tools include a percussive emphasis that can be added to each note and the capability to change speaker rotation speed. Many people, in fact, feel that the tone wheel organ was the first popular synthesizer. And although these organs haven't been made for years, they are still sought after, restored, and lugged about by legions of dedicated keyboard players. This despite archaic electronics, inscrutable wiring, and an unwieldy heft that tops 400 pounds. Duplicating the sound and flexibility of these organs – without the nasty side effects – is the goal of KB3 Mode.

In creating KB3 Mode, we've done extensive testing, measurement, and analysis on several tone wheel organs. From there we've done our own physical modeling to emulate these organs, taking into account even such esoteric matters as the way older organs sound different (and arguably better) as their capacitors begin to leak. (Of course we let you decide if you want your PC2 to sound like an old or new organ.)

We've also recruited the best organ players we could find to try out these programs, and have used their feedback to make sure that all of KB3 Mode's real-time controls are as convenient as they were on the organs of yore. To make it all work, we've created a new type of program – the KB3 program – that is built around a totally new model.

In a nutshell, KB3 programs use 80 oscillators simultaneously (79 for the tone wheel and 1 for the key click), each oscillator having its own pitch and amplitude. KB3 Mode provides two oscillators per voice, so it uses 40 voices of the available 64 voices. Furthermore, all voices start up – albeit silently – when you select a KB3 Mode program. In a regular PC2 program, on the other hand, voices only start when you play a note. What this means is that in a KB3 program, you can actually put your fingers (and hands and arms) on all the keys on the keyboard and hear all the notes being played, just like on a real organ.

It is important to understand that while a KB3 program is called up on the KB3 channel (which by default is channel 1), a specific number of voices are being used, **whether or not you are playing any keys**. So if you create Setups which use a KB3 program and then add regular programs for other zones, the polyphony to play those other programs is limited to 24. Of course, if you have added the polyphony expansion option, then you have an additional 64 voices available.

Although all the KB3 program editing parameters are accessed from the same three menus as a regular program, the parameters are quite different.

**1.** Press the KB3 button and call up Program 000 All Out. Next press the Timbre button. The first two parameters in this menu are Wheel Volume Map and Organ Map. The determine the volume level of the tone wheels and the relative amplitude of each key, per drawbar. Different B3 organs have different levels, and we have measured several different organs and given you some choices based on those measurements. You might want to try playing around with these two parameters, changing the values and playing

the keys to hear the difference. Don't forget to check out the differences with the drawbars at varying positions.

**2.** Press the >> button twice to get to the Chorus/Vibrato Switch parameter. This parameter and the next parameter, Chorus/Vibrato are identical to the settings you can choose with the SW2 and SW3 buttons, which we discussed in the Intro Tutorial. If you change the value in the display, the button will change, and vice versa.

**3.** Press the >> twice button to get to the Rotary Speed parameter. Like the Chorus/Vibrato parameters, this can also be set by a button - in this case the SW1 button.

**4.** Press the >> button to get to the Drawbar Mode parameter. This has two possible values – Preset and Live. If it is set to Preset, then you can choose the settings for each drawbar with the next set of parameters. If you set it to Live, then whatever the physical settings of the Drawbars are will be the setting you hear when the program is selected. KB3 program 080 Live Drawbars is set this way, while all the other stock KB3 programs are set to Preset.

**5.** Press the >> button again. Here you see the settings for each of the 9 drawbars. In this case they are all set to a value of 8, which is fully out (just as you might expect from the name of the program). Each drawbar can be set to a value between 0 and 8. You can use the sliders to change the values, or use the >> and << buttons to scroll to a specific drawbar and then change it with the wheel or + and – buttons. Remember that the Drawbar Toggle button switches the sliders between the first four and second four drawbars. The mod wheel controls the 9$^{th}$ drawbar.

**6.** Press the >> button enough times to get to the next parameter, Drawbar Steps. In a real tone wheel organ, the drawbars have 9 discreet steps, numbered from 0 through 8. As you go from one value to another there is a distinct change in the amplitude for that drawbar. If you set this parameter to Normal, it will mimic those nine steps. If it is set to Smooth, then there are actually 127 different values for the slider (the same as a normal MIDI  controller would have) and you will have a smoother transition of amplitude as you move the slider up and down. The Display still shows the values as 0-8, even though the transition is smoother.

**7.** Press the >> button to get to the Preamp Response parameter. On a real B3, the volume pedal is connected to a preamp. The pedal in this case is more than a volume pedal; it actually functions like a "loudness control," varying the frequency response to compensate for the ear's sensitivity at different volumes. In addition, the preamp provides a de-emphasis curve to compensate for the built-in tone wheel volume pre-emphasis. But some people preferred to modify the organ to have a direct out that skipped this preamp.

On the PC2 if this parameter is set to On, then it mimics the behavior of the Preamp on a regular B3. If it is set to Off, it works just like a direct out. You should note that turning this off will mean that the Expression pedal will no longer control the volume. (You could however, still control volume with the pedal, by putting the KB3 program into a Setup and assigning the pedal to Controller #7, MIDI Volume).

**8.** Press the >> button to get to the Leakage parameter. As mentioned earlier, this allows you to emulate the leakage (Crosstalk and signal "bleed") between adjacent tone wheels, which is common on tone wheel organs. This helps to "dirty up" the sound and make it more realistic. A value of –96dB will give you the purest tone, while a value of 0dB will

# PC2 Made Easy

give you the maximum amount of leakage. Try changing the amount and playing some notes to hear the difference.

**9.** Press the >> button again. This last parameter, Amplitude, gives you an overall volume adjustment for the program.

**10.** Now press the Envelope button. In a KB3 program, this menu is used for controlling the Key Click, Amplitude Envelope, and Percussion.

The first parameter is the Keyclick parameter. On a real B3, there is a slight clicking sound that happens when you press each key. On the PC2, you can turn this On or Off. Press the >> button to get to the KeyClick Volume parameter. This obviously allows you to control the amount of clicking you can hear. (KeyClick volume is also scaled by the drawbar and expression pedal settings.)

**11.** The next two parameters control the Envelope settings for attack and release. The Normal settings are slightly smoothed and emulate a real B3. You can also set them to harder attacks that give you an extra clicking for the attack and/or release of the keys.

**12.** The rest of the parameters in this menu deal with the percussion effect. Percussion is a characteristic feature of tone wheel organs. It's especially useful while soloing, since percussion adds an extra plink (actually an extra tone at a defined harmonic) to the attack of individual notes. When you play more than one note simultaneously, only the first note you play will trigger the envelope of the percussion tone, though notes played shortly afterwards will also be affected by this envelope. When you play chords, all of the notes played simultaneously will get the percussive effect (provided percussion hasn't already been triggered).

The first four parameters correspond to the settings of the zone buttons. Just as with the Chorus/Vibrato and Leslie Slow/Fast parameters, pressing a button will change the value of the matching editable parameter, and vice versa. These including the switch to turn Percussion On or Off, setting the Volume to Loud or Soft, setting the Decay to Slow or Fast, and choosing between a High and Low pitch for the percussion.

The PC2 also gives you additional control of the exact amounts of Amplitude and Decay for the Percussion. Following the first four basic Percussion parameters, there are four sets of three parameters. There are four possible combinations of Volume and Decay: Loud/Fast, Loud/Slow, Soft/Fast, and Soft/Slow. As you scroll through the parameters, you will see the top line change to show you which combination you are editing.

For each combination, you can set three parameters. Level sets the amount of amplitude for the percussion. Decay sets the rate of decay. Volume Adjust allows you to adjust the amplitude of the organ relative to the amplitude of the percussion effect. Try changing these three parameters to hear the difference. Make sure that you have the proper combination of Volume and Decay turned on with the zone buttons that match the combination you are currently editing.

Press the >> button enough times to scroll through all the Volume and Decay parameters and you will come to the Percussion Pitch parameters, which are the last ones in this menu.

For the pitch of the percussion, you can choose any of the pitches assigned to the different drawbars. There are two parameters, Low Harmonic and High Harmonic,

which correspond to the Low and High Pitch settings you can choose with the zone 4 button. On a real B3, the Low Harmonic is the pitch of Drawbar 4, and the High Harmonic is the pitch of Drawbar 5. But with the PC2, you can chose the pitch from any drawbar for each setting.

Finally the last parameter is the Steal Bar parameter. On a real B3, when you turn Percussion On, it disables one of the drawbars in order to be able to produce the Percussion tone. On a real B3, this is always the 9th drawbar. But on the PC2, you can choose any drawbar you want. You will notice that on any KB3 preset, once you turn Percussion On, moving the mod wheel has no effect on the sound, since the 9th drawbar has been turned off.

**13.** Now press the LFO button. The LFO menu contains the same four LFO parameters you see for regular programs. But these LFOs are not used in the KB3 programs. Press the >> button 4 times to get to the Rotor Effects parameters, which ARE used by KB3 programs.

The classic Leslie Rotary Speaker cabinet has two rotating speakers, one for low frequencies and one for high frequencies. The lower speaker rotates counter-clockwise and the higher speaker rotates clockwise. The speakers always rotate, but you could switch between a slow rotation and fast rotation (typically done with a foot pedal on a real Leslie). On the PC2, switching back and forth between the two speeds will ramp up or down at the same rate as a real Leslie speaker does. On the PC2, you can switch between the speeds with either the Rotary Fast/Slow button, or a pedal plugged into Switch Pedal 3.

The PC2 allows you to set both the slow and fast rotating speeds for each of the two "virtual" speakers that are part of the Rotary effect. The Low Rate and High Rate parameters control the slower rotating speed for the low and high "speakers". The Low Adjust and High Adjust parameters control the faster rotating speed for the low and high "speakers". You will notice that on any of our presets, the Low rate and Low Adjust parameters are set to negative values, which equate with the counter-clockwise rotation, while the High Rate and High Adjust parameters are set to positive values, which equate with clockwise rotation.

Try adjusting these 4 parameters and listen to the change in the sound. Be sure to switch back and forth between slow and fast settings to get the full effect.

**14.** Finally we will save the program. You may wish to go back to some of the parameters and edit them to your liking. Once you have a program you like, press the Store button. The PC2 will ask if you want to save the Voice. Saving and/or renaming are identical to the dialogs you see when saving a Setup, so we won't go into details here.

## 18. Effects Editing

Each Program and Setup in the PC2 can have its own effects settings. With the FX Mode parameter set to its default settings, when you call up any individual program from the front panel, you will hear the effects assigned to that program. And when you go to MIDI Setups mode, you will hear the effects assigned to that setup instead of the effects assigned to the individual programs called up in that Setup. (If you are sequencing and playing several programs at a time then only one program can be in control of the effects – more on this in tutorial #30.

You can customize the effects for programs in the User banks as well as the preset banks. You do not need to save a program to the User bank in order to change and save the effects for one of the presets.

We already covered choosing the FX bus and setting the wet/dry mix in the Basic Concepts section. We will be covering changing and editing the effects themselves in this tutorial.

**1.** Start in Internal Voices Mode and call up program 17 Serious Classic. Notice that the FX-A button is lit. This electric piano program uses a simple hall reverb. Play the program to hear what it sounds like.

**2.** Press the wet/dry button. Notice that A is set to 10%. Change this to 75% and play the program. The reverb is much wetter. We are going to keep the wet/dry level set this high so as we make changes, they will be quite noticeable.

**3.** Now press the FX-A Select button. The display shows the current effect is Grandiose Hall. Change it to Effect #151, Sweet Flange. Play the keyboard and notice the difference in the sound. The simplest form of effects editing is to change the overall effect. There are several different flange effects. Try switching through all the effects between 150 and 155, playing the keyboard after each change to hear the difference. Then set it back to #151.

**4.** Once you have chosen the effect you want, you can make further changes. Each effect will have up to 4 parameters that you can edit. Press the >> button. The first parameter is LFO Period and its value is 10 bts (beats). Press >> again to see LFO Tempo, which is set to 120BPM.

Flanging is the process of taking a signal, duplicating it and displacing the duplicated signal in time, and the adding or subtracting the two signals together. This gives you a series of notches in the frequency spectrum, generally referred to as a comb filter. The end result is a classic sound that most people recognize.

The 2 LFO parameters are related to each other. An LFO is used to sweep the two signals back and forth, creating the flanging effect. You set the amount of time it takes to sweep back and forth based on a tempo and the number of 1/4 note beats for that tempo.

Change the LFO Tempo to 60 BPM and play some notes. Then try setting it to 180 BPM and play some notes again to hear the difference.

# PC2 Made Easy

**5.** Press the >> button to get to the Feedback parameter. Try choosing different amounts to hear the change the in the sound. You can choose both positive and negative amounts. Once you have an amount you like, you might want to go back to the Wet/Dry button and bring the wet/dry amount back down to make the effect more subtle.

**6.** Once you have created the effect you want, you can save it. As we mentioned at the beginning of the tutorial, you can save the effects for preset programs as well as for user created programs. This allows you to customize the effects for the presets without having to use one of the User slots just for effects changes.

Press the Store button. The PC2 asks if you want to Store Effects for that program. If you answer Yes, then Program 17 will now always have this new effect you have created. (If you don't want to do this, just press No to Exit out of the dialog, then press Internal Voices twice to exit out of the editor.)

**7.** One other parameter that you should be aware of is Stored FX. Press FX Mode, then the >> button twice. (You must either store the effect you were editing or press the Internal Voices button twice to exit out of the editor without saving before you can go to the FX Mode button.)

Stored FX can be set to User or Factory. It is normally set to User. If you have customized effects for a number of the presets and want to get everything back to Factory defaults, you can set this parameter to Factory. Your customized effects still remain in memory, and you can choose them again by setting the parameter back to User.

## 19. Using the Arpeggiator

One often-overlooked feature of the PC2 is the arpeggiator. This can be a lot of fun to play with - you can get many interesting and unusual effects. Basically, an arpeggiator takes notes that you play and repeats them in a pattern. Typically, you might use it to arpeggiate chords that you play, but it can have other uses such as playing percussion patterns.

This tutorial will be a bit different from the others - instead of creating a specific arpeggiator effect, we will experiment with various parameters and hear the different results.

You can use the Arpeggiator in both the Internal Voices and MIDI Setups mode. We will start in Internal Voices mode, but if you find a specific set of parameter values that you like as you explore through the tutorial, you can simply press the Store button to save the settings as a single zone Setup.

**1.** Start in Internal voices and call up any sound that you want to work with. To best hear the effects of the arpeggiator, you might want to start with a program that has a percussive attack and also decays, such as piano, marimba, guitar, etc.

**2.** Press the Arpeggiator button. Turn the Arp Active parameter On. Play a chord on the keyboard. You should hear the notes arpeggiated. If you hear nothing at all, go to the Global Menu and check to make sure the Clock parameter is set to Internal. If you hear notes but they aren't arpeggiated, press the >> three times to make sure Zone Enable is On and once more to make sure Latch Mode is set to Keys.

Try playing a single note. Notice that it is repeated. Try adding more notes. As you press them they are added to the arpeggio. Let go of one of the keys. Notice that note is dropped from the arpeggio while the others continue. Notice that the arpeggiator plays the notes in the specific order that you strike them. Also notice that the loudness of the arpeggiated notes depends on how hard you strike the keys.

Hold the sustain pedal and let go of the keys. Notice that even though the notes ring out like they would when you press the sustain pedal, the arpeggiation stops. In order for the arpeggiator to work, the keys must be held down, or otherwise latched (we will cover various latching methods in the next tutorial).

Now turn the Arp Active parameter back to Off.

**3.** Hold the Controllers button and press the SW4 controllers button. Press the << button and set the Switch Type to Toggle. Press the >> button, then 116, then Enter. The PC2 uses MIDI controller 116 to turn the arpeggiator on and off. Press the >> button and set the On Value to 64. Press the >> button twice and set the Off Value to 0. Since a Switch controllers has only two states (On or Off), any value between 0 and 63 is considered Off and any value between 64 and 127 is On. Now if you turn the button on and strike the keys, you will hear arpeggiation. If you turn the button off, then you will just hear the notes you played. Leave the button turned on.

As a side note – SW4 is assigned to #116 in the Default Internal Voices Setup, so any time you are in Internal Voices Mode, you can use this button turn arpeggiation on.

# PC2 Made Easy

**4.** As long as we are programming the controllers, we will set something else that we will use later. Hold the Controllers button, strike any key and press down. The display will change to show Zone:1 Mpressure, Ctrl Num: Pressure. The MPressure (Mono Pressure) controller is also referred to as aftertouch. After you strike a key, as you press down on the key, a pressure strip senses how hard you are pressing and generates controller data. Aftertouch is similar to the pitch wheel, in that it functions like a spring - it returns to 0 as you let go of the key. Like the sliders, wheels, and continuous control pedals, you can assign any MIDI controller number to aftertouch. However typically, aftertouch is assigned to Pressure, which is a separate MIDI message. If for some reason, this parameter is not set to Pressure, press 132, then Enter to assign Pressure to the MPressure controller.

One final thing to understand: There are actually two different types of aftertouch - Mono Pressure and Poly Pressure. Mono Pressure has a single strip running across the keyboard, so pressing down on any note will generate controller info that will affect ALL the notes played on that MIDI channel. Poly Pressure has a separate sensor for each key so pressing down on a key only affects that key. The PC2 uses Mono Pressure.

**5.** Press the Arpeggiator button, then press the >> button once to get to the Key Range display and >> once more so that the cursor is on the High Note parameter. Hold Enter and strike Middle C to set the High Note to C4. Now play a chord in the bass and a melody in the treble. Notice that any notes up to C4 are arpeggiated but all notes above that are played as normal. The Key Range parameter lets you set a range of notes that will be affected by the arpeggiator while others can be played regularly.

Hold Enter and strike the top note on the PC2 to put the arpeggiator back to playing across the keyboard.

**6.** Press the >> button. You are now on the Zone Enable parameter. This allows you to have some zones in your Setup that are arpeggiated while other zones play normally. Several of the preset Setups utilize this parameter. For example, Setup 23 Rhythmic Chase has arpeggiated percussion layered with the Piano and the Neptune programs, which do not arpeggiate. Or Setup 20 Ambients, which has an arpeggiated bass split with some melodic programs.

**7.** Press the >> button. The next parameter is Latch Mode, which we will cover in tutorial #20.

**8.** Press the >> button. The Play Order parameter lets you determine how the notes are arpeggiated. The current setting should be Played, which is the default. As we noticed before, the notes arpeggiate in the order in which you hold them down. Try changing this parameter to each of its possible values and play chords on the keyboard to hear the difference. It should be obvious how most of the possibilities work, but for definitions of the various values, see pages 5-20 & 5-21 of the manual.

**9.** Press the >> button. You can set the beat subdivision for the arpeggiated notes. This is based on Tempo, which is measured in Beats Per Minute. So if your clock is set to 120 BPM and you set the Beats to 8th notes, you will hear the equivalent of 240 arpeggiated notes in one minute.

**10.** Press the >> Button. You can set the Tempo for the arpeggiation here. However, more control is possible. Hold the Controllers Button and move Slider D. Press 133, then Enter to assign Tempo for the slider. (You might want to check the Scale, Offset, and

56

# PC2 Made Easy

Curve parameters for Slider to make sure they are at their defaults of 100%, 0, and Linear. You will find these parameters by pressing the >> button. )

When you call up a Setup, the initial tempo will normally be set to the value you set in the Tempo parameter. However, if you have a controller (such as a slider) assigned to Tempo AND you set an Entry value for that slider, that Entry value will override the Tempo setting in the Arpeggiator menu. If you do use an Entry value for a controller assigned to Tempo, you will notice that two numbers are displayed. The first number will be a value between 0 and 127, while the second number will be the actual BPM value (between 20 and 300 BPM).

A final note - the Tempo parameter only applies as long as the Clock parameter in the Global menu is set to Internal. If you set it to External, it will follow the tempo of any clock messages detected at the MIDI IN port. If no clock is detected, there will be no arpeggiation (no sound will be heard when you press the keys).

**11.** Press the Arpeggiator button, then press >> seven times to return to Tempo, and once again to go to Duration. This lets you set the duration of each note being played by the arpeggiator. Try setting different values to hear the difference. At 100%, it is completely legato. The lower you set the number, the more staccato the notes are played.

**12.** Press the >> button. The Velocity Mode parameter determines what velocities are used to create the notes. The current setting should be Played, which is the default. As we noticed before, the notes get softer or louder in the arpeggio depending on how hard you strike the keys. Try setting this parameter to different values to see the difference. If it is set to Fixed, then a specific velocity is used for all notes, determined by the Fixed Vel parameter (the next parameter, accessed with the >> button). If it is set to Last, then all of the arpeggiated notes use the velocity of the last note you strike. Try playing a 3 note chord softly, then striking a fourth note hard - all of the notes will now be loud. If you then restrike just that one note softly, all the notes are soft.

Setting the value to Pressure means the velocities will be controlled by aftertouch. As you push down on any key, the velocities will be come louder. As with Last, pushing down on any one key will affect all the notes. (This setting will only work if the MPressure controller is assigned to Pressure, which we did in step 4.)

The final value is Ctrl 117, which allows you to control the velocities from a MIDI controller. This is covered in tutorial #21.

**13.** Press >> twice to get to the Note Shift parameter. This parameter and the following two parameters are used in conjunction with each other. Note Shift will take the notes that you play and transpose them up or down. Each time the arpeggio pattern is repeated, the notes will transpose by the amount you set. Set the Note Shift to 2, then play a chord. The notes will arpeggiate, then transpose up a whole step and repeat the pattern, then transpose up a whole step again and repeat the pattern.

Press the >> button. The next parameter, Shift Limit will determine how far the PC2 will keep shifting from the original pitches. Set the Shift Limit to 12 and play the keys again. Notice that the pattern will shift up in whole steps till it reaches an octave transposition, then the pattern starts shifting down in whole steps till it reaches the original notes you played, then starts shifting up again.

Press the >> button. The Limit Option parameter determines what happens once the arpeggiator reaches the Limit. With the default value of Unipolar, it shifts up and down,

as you have seen. Try setting this to different values and listen to the end results. Complete descriptions of all these values are found in the manual on pages 5-23 & 5-24.

These three parameters allow you to do some pretty wild things with the arpeggiator. The best thing to do is just experiment with different settings. When you find something you like, you can save it as a Setup.

**14.** Press the >> button. If you turn the last parameter, Glissando, to On, then the arpeggiator will not only play the notes you strike, it will also play all the notes in between the notes you strike.

In addition to making regular arpeggios with pitched instruments, you can get interesting effects with by using the arpeggiator with drum and percussion programs. The PC2 itself has somewhat limited abilities in this area since you can't edit the placement of the drum sounds in the drum programs, but if you use the PC2 to control an external sound module in which you can edit the sounds, you can create many interesting patterns.

The key to this is to create programs that have no sample assigned to specific notes. That way, by including those notes in your arpeggiated pattern, you can get the equivalent of rests, to create more varied rhythmic patterns.

You may want to go through the various parameters we have described to create an arpeggiator setting you want to work with. Then Name and Save this Setup - we will be using it as a starting point for the next few tutorials.

## 20. Using the Various Arpeggiator Latch Modes

The Latch Mode parameter allows you great variation in deciding which notes that you play should be used (latched) by the arpeggiator. In the previous tutorial, Latch Mode was set to Keys, so that the arpeggiator simply latched any note you pressed and held it only as long as the key was held down. But there are many other possibilities.

**1.** Start with the Setup you created in the last tutorial. If it is not already on, press the SW2 button to turn the arpeggiator on. Hold the Controllers button and press the SW3 controllers button. Press << to get to Switch Type and set it to Toggle. Press the >> button. Set the On Ctl to 119 Arp Latch1. Press the >> button and set the On Value to 64. Press the >> button twice and set the Off Value to 0. Make sure the button is turned Off (the button itself is not lit).

**2.** Press the Arpeggiator button. Press the >> button 4 times to get to the Latch Mode parameter. Change the value to Overplay. Play some notes on the keyboard. Notice they do not arpeggiate. Now hold some notes and press the SW3 button. The notes start arpeggiating. Let go of the keys. They still continue to arpeggiate. Play some more notes. Notice they are not added to the arpeggio. When you use Overplay mode, only the notes held when the switch is turned on will be arpeggiated.

**3.** Turn the SW3 button Off. Change the value of the Latch Mode to Arpeg. Hold some notes on the keyboard, and turn the SW3 button on. Let go of the keys. So far, it works identically to Overplay mode. Now press and hold another key. Notice that the note is added to the arpeggio. Let go of the key. The new note is removed from the arpeggio, but the other notes continue to play.

**4.** Turn the SW3 button Off. Change the value of the Latch Mode to Add. Hold some notes on the keyboard, and turn the button on. Let go of the keys. Again, so far it works identically to Overplay mode. Now press another key. As with Arpeg mode, the note is added to the arpeggio. Let go of the key. Notice that it continues to be arpeggiated. You can keep striking keys and they will keep being added.

Note that with Arpeg and Add modes, you don't have to be holding any notes when you turn on theSW3 button. You can turn it on and then play notes and they will start arpeggiating. But if you then let go of the notes, they will stop playing in Arpeg mode but keep playing in Add mode (since you played the keys after turning on the Latch).

**5.** Turn the SW3 button Off. Change the value of Latch Mode to Auto. The previous 3 modes all used controller 119 to latch the notes for the arpeggiator. Auto does not use controller 119. Play a chord. The notes arpeggiate. Press another key. The note gets added to the arpeggio. Let go of the key. Notice that the note is still part of the arpeggio. In fact you can let go of all keys but one, and every key that you pressed will still be part of the arpeggio. That is the difference between Auto and Keys (our original Latch mode). With Keys, once you let go of the key, the note is removed from the arpeggio. But with auto you can keep striking as many keys as you want to keep adding notes, and as long as you hold one note, you will hear all of the arpeggiated.

**6.** Finally, change the value of Latch Mode to Pedals. Hold the Controllers button and press the pedal connected to the Switch Pedal 1 jack. Press the << button and make

sure that the Switch Type is set to Momentary. Press the >> button, then 119, then Enter, to set the pedal to Latch 1.

If you have a second switch pedal, make sure it is plugged into the Switch Pedal 2 jack. Hold the Controllers button and step on that pedal. If you don't have a second pedal, hold the Controllers button and press the SW5 button. Press the << button and make sure that the Switch Type is set to Momentary. Press the >> button, then 118, then Enter, to set the pedal to Latch 2.

**7.** Now, both pedals (or pedal and button) are used to Latch the arpeggiator. Play a chord. The notes are arpeggiated. Let go of the keys. The arpeggiation stops. In Pedals mode, if both are off, then the arpeggiator works as if it is in Keys mode - any notes you play are arpeggiated.

Hold a chord and step on the Pedal 1 and hold it down. Let go of the keys. The notes continue to arpeggiate. Play a few more notes. They are added to the arpeggio. With Controller 119 On in Pedals mode, the arpeggiator works as if it is Add mode. Let go of Pedal 1. The arpeggiation stops.

Hold a chord and step on Pedal 2 (or press the SW5 button) and hold it down. Let go of the keys. Again the notes continue to arpeggiate. Play a few more notes. This time they are NOT added to the arpeggio. With Controller 118 On in Pedals, mode, the arpeggiator works as if it is Overplay mode. Let go of Pedal 2 (or button E). The arpeggiation stops.

The reason we call this Pedals mode is that the two controllers work similarly to the way the two pedals work when they are assigned to Sustain and Sostenuto. With Controller 119, any notes held when you step on the pedal, PLUS any notes played while the pedal is still down are arpeggiated (similar to the way a piano sustains with the sustain pedal). With Controller 118, any notes held when you step on the pedal are arpeggiated, but any notes played after pedal is depressed are NOT arpeggiated (similar to the way a piano sustains with the sostenuto pedal, which is the middle pedal on a 3 pedal piano).

As you can see, the latching modes give you a great deal of control over which notes get arpeggiated. We encourage you to play around with these modes as well as the other arpeggiation parameters to see what interesting uses you can find for it.

One last thing to remember is that if you have a controller assigned to turn the Arpeggiator On and Off (which we did by assigning SW4 to this function in tutorial #19), the arpeggiator must be turned On in order for any of the latching functions to work.

One final note – we used the SW3 button for controller #119 in this tutorial because in the Default Internal Voices Setup, #119 is assigned to SW3 in zones 2, 3, & 4 (zone 1 has the button assigned to controller #29, which is typically used for timbre control within programs). Since all arpeggiator parameters apply to all zones (except for the Zone Enable parameter), it does not matter which zone you use to send controller #119 or 118. (Of course, the zone itself must be turned on in order to send a controller message.)

## 21. Assigning a Slider to Arpeggiator Velocities

**1.** Start with the Setup you created in tutorial #19. Press the Arpeggiator button, then press the >> button 9 times to get to the Vel Mode parameter. Change the value to Ctrl 117.

**2.** Hold the Controllers button and move Slider C. Press 117, then Enter to assign Arp Vel for the slider. (You might want to check the Scale, Offset, and Curve parameters for Slider to make sure they are at their defaults of 100%, 0, and Linear).

**3.** Now hold some keys and move the slider up and down. The arpeggiated notes increase and decrease in volume. The slider controls the velocities used for the notes created by the arpeggiator. You could use this effect to fade arpeggiated notes in with an non-arpeggiated layer.

You could create a similar end result by assigning the slider to MIDI volume for each zone that uses the arpeggiator. However, there is a difference. If a single program switched between different samples based on the velocity of the note, then using the slider to control velocity instead of volume would let you switch between those different samples in the arpeggio.

## 22. Using the Arpeggiator with a Sequencer or External Controller

If you are sequencing and create a Setup that uses the Arpeggiator, then the PC2 will send the actual notes that were generated by the arpeggiator to the sequencer. When you play back the sequence, it simply sends back those notes and does not actually play the arpeggiator itself. (For more on using the PC2 with a sequencer, see tutorial #28.)

But if, for some reason, you need to have the sequencer or other external controller send notes to the arpeggiator itself, you must use the Remap function in the PC2. To do this, press the Global button, the press >> 6 times to get to the MIDI In parameter. If you set this to Remap, then ALL incoming MIDI note messages will be treated as if you played those notes on the keyboard of the PC2 itself.

The MIDI channel info on the incoming data is ignored - it simply takes the note numbers and sends them to each zone based on the note range settings for that zone - again, it is the same as playing that note on the keyboard itself. So you probably wouldn't want to send more than one channel of MIDI information from an external controller, since the note messages will get mixed together.

Another thing to be aware of is that all controller messages will be sent to all zones. So, for example, if you have a Setup with zones assigned to channels 1, 2, 3, & 4, then a sustain message coming in would be sent to all four MIDI channels.

## 23. Using the PC2 to Control External Slaves

All of the techniques you have learned in the previous tutorials can be applied to playing an external keyboard or module instead of the internal PC2 sounds. There is really only one parameter you need to set.

**1.** Start with Setup #128 Default Setup. Press the MIDI Transmit button. Set the channel to the channel number that you wish to use to control your external slave.

**2.** Press the >> button. Set the Destination to MIDI. That's it! Now just edit any other parameters you need to control your slave (such as setting the bank and program change, controller settings, etc.).

When you set the Program parameter, for zones assigned to MIDI only, the Program parameter will display External Program, since - of course - the PC2 doesn't know the names of the programs on your external slave. But you will always see the program and bank numbers.

There is one exception to this, however. If your slave is a General MIDI instrument, you can set the PC2 to display the GM program names. In this case, press the Program button, then press the >> button four times to get to the Pname Disp parameter and change it to Gen. MIDI.

If you want to make a Setup where you layer PC2 sounds with external sounds, the simplest way to is to set some zones to MIDI (to play the external slave) and other zones to Local (to play the PC2). It is possible to have a zone set to Local+MIDI (and in fact that is the default). In this case, one zone can play both the PC2 and external slave. But keep in mind that since a zone can only send a single program change message, if you want to layer a specific external sound with a specific PC2 sound, you would have to edit your external synth so that program is stored at the same numbered location as the one you are choosing for the PC2. (Or you can edit a PC2 program and save it into the User Bank at the same numbered location you are using on your external synth – but remember that if the external synth responds to the bank controller, it would have use the same bank number as the PC2.)

One final thing. Typically, you will always use different MIDI channels for each zone, if you want to play different sounds on different zones. But if for some reason, you need to, you can use the same MIDI channel for a Local only zone as you use for a MIDI only zone. Since the two zones send the MIDI information to only one place or the other, both zones could be on the same MIDI channel and have different program change values (or anything else) selected.

## 24. Bank Controller Issues for External Slaves

This is less a tutorial than an explanation. Since most keyboards these days will have more than 128 different programs, and since MIDI only allows 128 values for any message, the bank controller was added to allow you to have multiple banks of programs with each bank having up to 128 programs in it.

There are actually TWO bank controllers: Controller #0 and Controller #32. Some manufacturers use just 0, some use just 32, and some use both. Since each bank controller can have 128 values, that means that the total number of possible banks is 128 x 128 = 16,384 (numbered as 0-16,383). Since each bank can have 128 programs in it, that means the total number of possible programs in an instrument is 2,097,152! (Think of how long it would take just to listen to that many programs.) Anyway, in practice, most instruments tend to have 10 or fewer banks.

The PC2 uses controller #32 (although you can send both without problems). It is possible to have up to 8 banks, numbered 0-7. The bank values were described in the Basic Concepts chapter.

When working with external slaves however, you may find they require very different values for the banks. Many Roland keyboards, for example use values of 80 or 81 for controller #0.

The PC2 actually has a parameter called Bank Mode, within the Program menu. This allows you to chose either 0 or 32 or 0/32 for an individual zone. However, if the value of this parameter is not the same as a similar bank mode parameter that is found in the Global menu, it causes the PC2 to display the bank values in a very confused manner. Therefore, we recommend that you DO NOT use this parameter - leave it set at the default value of 0/32, which is the same as the default Global Bank Mode value.

So if you have a device such as a Roland, which uses just a value of controller #0, you have to know how to calculate the bank number. Controller #0 is the Most Significant Byte (MSB) and Controller #32 is the Least Significant Byte (LSB). If you see the two bank controllers together, they are normally shown as MSB/LSB. This means that you count by incrementing the number in the LSB column before incrementing the MSB. In essence, you are counting in base 128. To make it obvious for the majority of us who prefer to think in base 10, the following numbers show how the banks increment:

| Controller 0/32 | Bank Number Equivalent |
|---|---|
| 0/0 | 0 |
| 0/1 | 1 |
| 0/2 | 2 |
| etc. | |
| 0/127 | 127 |
| 1/0 | 128 |
| 1/1 | 129 |
| 1/2 | 130 |
| etc. | |
| 1/127 | 255 |
| 2/0 | 256 |
| 2/1 | 257 |

etc.

When you are on the Bank parameter in the PC2, it shows you both the 0/32 value and the bank number equivalent. When you are on other parameters, it will only show you the bank number equivalent, followed by a ":", followed by the program number.

To scroll through all the bank numbers with the alpha wheel can take a long time, so you will probably want to enter the bank number on the numeric keypad.

So to figure out which bank number equivalent you need, follow this formula: MSB x 128 + LSB. Using the Roland example, if they require you send controller #0 with a value of 80 and no value of controller #32, then you would have 80 x 128 + 0 = 10,240. If you type 10240, then press Enter when you are on the Bank parameter, you will see the display show both 80/0 and 10240.

Another example: If the Roland required you to send controller 0 with a value of 81 and controller 32 with a value of 2, then you would have 81 x 128 + 2 = 10,370. Again, entering 10370 for the Bank parameter will show both 81/2 and 10370.

## 25. Switching Programs on External Slaves without Playing Them

If you are performing and have two keyboards, you might run into a situation where you playing each keyboard separately (that is, each keyboard is playing its own sound), but you need to be able to quickly change the sounds on both keyboards. In this case, you can create a Setup on the PC2 that will switch the sounds on your other keyboard, but won't send any MIDI note data to it. This is easily done.

This tutorial also shows an example of copying a zone from one Setup to another.

**1.** Press MIDI Setups, then 127 then Enter. You have called up Clear Setup. Press Copy, then Enter. You have now copied a zone from this Setup into the edit buffer.

**2.** Press the MIDI Setups, then 128, then Enter. You have called up Default Setup. Press Copy, Press the >> button. The Display should now say "Paste into zone 1?". Press the Zone 2 button, then Enter. (The display will say "Zone pasted", then revert back to "Paste into zone 2?".)You have now pasted all the parameter values from zone 1 of Setup 127 into zone 2 of Setup 128.

**3.** Press the MIDI Transmit button. Set the MIDI channels that you want for zones 1 and 2. Press the >> button. Set zone 1 to Local and zone 2 to MIDI.

**4.** Press the Program button and choose the programs that you want for zones 1 and 2. If you need to set a bank number for a zone, press the << to get to the Bank parameter. Then you can return to the Program parameter and select the program number.

**5.** Make sure that the display is on zone 2. Press the Key Range button. Press the >> button twice to get to the Note Map parameter. Press 0, then Enter to set it to Off.

**6.** Name and Save your Setup.

Now when you call up the Setup, it will send a program change to your external keyboard, but since the note map for that zone is turned off, no note information is sent to the external keyboard when you play the PC2.

Why did we go to the trouble of copying and pasting zones? Even though the keyboard isn't sending any notes on that zone, any controller messages will still be sent. For example, Switch Pedal 1 is assigned to Sustain in all zones in the Default Setup. So if you simply edited zone 2 of the Default Setup, then when you stepped on that pedal, you would be sending sustain messages to the external keyboard in addition to the PC2, which you probably don't want. So you would need to go to the various Controller parameters and assign the Control Number (for continuous controllers) and On Control (for switch controllers) to None. In Setup 128, wheel 1 and all three switch pedals are set to values other than None, so those would be the ones you want to edit. Rather than go through the steps of unassigning those four controllers for zone 2, we imported a zone from Clear Setup, which has the all the controllers set to None.

The techniques above could also be used to send program changes to other devices, such as effects processors, etc. without sending any other info to them.

You can also use the same technique for zones assigned to the PC2 itself! Let's say you have two keyboards. On the PC2 keyboard, you want to play an internal program or programs (up to three). On your external keyboard, you want to play its own sounds and ALSO play a program from the PC2. But your external keyboard doesn't have the abilities the PC2 has for calling up different programs. So you create a zone in the PC2 Setup to call up the internal sound you want, but set the Note Map for that zone to Off. So when you call up the Setup, it chooses the PC2 sound you want to be played from the external keyboard, but the PC2 keyboard won't play that zone.

## 26. Playing Programs on External Slaves without sending Program Changes

This is the opposite of the previous tutorial. What if you have an external module or keyboard that you want to play from the PC2, but you don't want to send program changes to it? (Maybe you want to leave that module always on the same sound, or you want the ability to choose the sounds directly from the front panel of that external module or keyboard).

**1.** Create a 2 zone Setup, following tutorial #1. Set zone 1 to Local and Zone 2 to MIDI.

**2.** Make sure the display is on zone 2. Press the Program button. Press the >> button. Set the Entry Transmit to Off.

**3.** Name and Save this Setup. Now when you call up the Setup, it won't send any program changes to your slave, but the note and controller info will still be sent.

## 27. Using MIDI Receive Mode

MIDI Receive Mode allows you access to all 16 MIDI channels that the PC2 listens on. It is important to be aware that the PC2 is always listening on all 16 MIDI channels, no matter which mode you are in. So if you are in MIDI Setups mode and playing on four channels from the keyboard, the other channels are still accessible via the MIDI In port. (The only time this is not true is if you change the MIDI In parameter in the Global menu to Remap. The MIDI IN parameter is covered in more detail in the additional information section at the end of this document.)

The most obvious reason you would want to use MIDI Receive Mode is if you are sequencing or using another external controller.

**1.** Press the MIDI Receive button. If this is the first time you have gone to this mode since powering up the unit, the display will show you Channel 1. If you have previously been to this mode and chose a different channel, it will return to that channel. This display also shows if that channel is turned On or Off, and if it is On, it will show you the program currently on this channel. You can scroll to the On/Off and Program parameters by pressing the >> button.

Although you will normally want to leave all channels turned On, you might need to turn a channel off if you have more than one MIDI instrument and are sequencing using a sequencer or MIDI interface with only a single MIDI Out. In this case, since all MIDI devices need to be chained together, you can direct specific channels to each MIDI instrument by turning off selected channels in each instrument. For example, you might turn off channels 9-16 in the PC2 and channel 1-8 in your other MIDI instrument.

**2.** To select a different MIDI channel, you can either keep pressing the MIDI Receive button to increment through the channels, or use any data entry method to select the channel you want, while the cursor is on the Channel parameter. Another easy way to select a specific channel is to hold the MIDI Receive button and press one of the numbered Sound Select buttons. The PC2 will jump to that channel number.

**3.** Press the >> button 3 times to scroll past the On/Off and Program parameter and the display will change to show Volume and Pan parameters. Press >> two times and the display changes again to show the FX Routing parameter. Finally, press >> once more to show the wet/dry levels for the effects. If you press >> three more times, you will go to the next MIDI channel.

As you can see, in addition to selecting a program for each channel, you have the ability to manually set MIDI volume and pan levels independently for each channel, along with the FX routing and wet/dry mix for FX-A and FX-B. Remember that the A>B wet/dry amount is global and therefore if you change it while on any MIDI channel, you will see the same amount when you go to the next MIDI channel.

Although you may want to manually set these values from the MIDI Receive page, it is also possible to send MIDI program change and controller messages from your sequencer so that you can automate selecting the correct amount for each track in each individual sequence you have. To change volume and pan, you would send the standard controller #7 and #10. For the effects parameters, #91 controls FX-B wet/dry, #92 controls the Global A>B wet/dry, #93 controls FX-A wet/dry, and #94 controls the FX Routing.

The wet/dry parameters obviously respond to all 128 possible values, For FX Routing, which has only four possible values, the PC2 responds to controller #94 as follows:

- Values of 0-31 select no effect
- Values of 32-63 select FX-A
- Values of 64-95 select FX-B
- Values of 96-127 select Both FX-A and FX-B

**4.** Unlike some other types of modules, you can't save a multi-timbral configuration in the PC2. There is only a single global setting of these parameters. Each channel will stay on its current settings until you either change it from the front panel or send MIDI program change and/or controller messages. This also means that if you go to MIDI Setups Mode, any channels used by a Setup you select will be changed to the settings found in that Setup, and the next time you go to MIDI Receive mode, you will see those changes reflected in the display. For this reason, it is a good idea when sequencing to put as much of this controller info into your tracks, to assure you have your settings the way you want for each song.

We will cover more details on using effects when sequencing in tutorial #30.

## 28. Working With an External Sequencer

There are a few issues you will want to understand when working with an external sequencer. The first one is that no matter which mode you are in, the PC2 is normally multi-timbral and can respond to all 16 MIDI channels independently. For the most part, you will want to be either in Internal Voices or MIDI Receive Mode when you are sequencing, since you are likely to be sequencing a single track at a time, playing a single program. The biggest difference between using those two modes when sequencing will be the way in which you control the effects. For details on this, please see tutorial #30. For information on using a Setup when sequencing, see tutorial #29.

Note: The only time when the PC2 would not respond multi-timbrally in any mode is if you change the MIDI In parameter on the Global page from its default value of Normal, to either Remap or Auto. This is detailed in the section on Global Parameters in the final tutorial.

Setting Up for sequencing

**1.** To state the obvious, you need to have MIDI cables going from the Out of the PC2 to the In of the sequencer or MIDI interface, and the In of the PC2 hooked to the Out of the sequencer.

**2a.** The first thing you need to do when using ANY keyboard hooked to ANY external sequencer is to turn Local Control Off. This is to avoid causing a MIDI loop problem. If the Patch Thru function of the sequencer (sometimes referred to as Soft Thru or Echo) is turned on, the sequencer takes all information coming into the MIDI In port and sends it back out the MIDI Out port on whatever MIDI channel is assigned to the currently record enabled track.

If you don't turn Local Control Off, the note gets played twice - once by the PC2 playing itself and once by the note going out to the sequencer and coming back. By turning Local Control Off, the keyboard only sends data out the MIDI Out port, and not to itself. So the signal just goes to the sequencer and is sent back, and does not get played twice.

Some software sequencers (Cakewalk is one example) will send the Local Control Off message automatically when you boot up the program. If you program doesn't do this, you will need to do it yourself.

There are two ways you can turn Local Control Off. The first and easiest way is to press the Global button, then set the Local Control parameter to Off.

**2b.** The second method of turning Local Control Off actually involves creating a very simple Setup. Start from Setup #128 Default Setup. Press the MIDI Transmit button and select a MIDI Channel (it really doesn't matter which one, but channel 1 is a logical choice). Press the >> button. Set the Destination to MIDI (instead of Local+MIDI). Name and Save the Setup - you might want to name it something Like Local Off or Seq. Control, etc.

# PC2 Made Easy

Now you have a single zone setup that only sends data out of the MIDI Out port - which gives you the same thing as turning Local Control Off and playing in Internal Voices mode.

There are several reasons why you may want to use this second method. First of all, Local Control resets back to On each time you power up the PC2. The second reason is that you can edit this Setup to assign the controllers to specific values you might want to use when sequencing.

The final reason has to do with selecting programs. Typically the best way to choose the individual programs you want for each track is to choose them in your sequencer. If you have a patch list for the PC2, you can call up the programs by name, otherwise you can put the program and bank change messages in the track.

However some people like to call up the sounds on the instrument itself. The MIDI Receive button can be used to call up different programs on different MIDI channels. But the way the PC2 is designed, when you turn Local Control Off globally, it won't send the program changes internally to the MIDI Channel, even in the MIDI Receive menu. So what happens is that when you go to the MIDI Receive button and call up a sound for a specific channel, the sound doesn't actually change to the new sound!

Since with the second method, Local Control is not turned off globally, when you go to the MIDI Receive button, you will be able to change the programs for individual channels. So whenever you want to sequence, just call up this Setup.

Calling up Programs and sending initial setup info to each track.

Unlike some instruments by other manufacturers, the PC2 does not allow you to save multi-timbral configurations (such as a "Combi" or "Performance"). Instead, you will need to put program and bank changes, along with any other initial information such as volume (controller #7) and pan (controller #10) settings into the tracks in your sequencer. This way, once you call up a sequence and start playing it, the correct programs and other settings will be immediately set for each channel. If you have a patch list (also called an instrument definition file) for the PC2, you can call up programs by name instead of number. We have a FreeMIDI Patch List and Cakewalk Instrument Definition file for the PC2 available on our FTP site, at
ftp://ftp.youngchang.com/pub/Kurzweil/Pro_Products/Other_Pro_Products/Information/

If you need another format for a patch list, you should contact the manufacturer of that sequencer. Or you can make one yourself by typing in the program names and number in the format they require. When setting up the patch lists for banks, you only need to send controller #32 (the LSB Bank Controller) with values between 0 and 7. (the bank values are documented in the intro tutorial.) If your sequencer always sends both controller #0 (the MSB) plus #32, send a value of 0 for controller #0, along with the appropriate value for controller #32.

## 29. Recording Setups to a Sequencer

Again, this is less of a tutorial than an explanation. The thing that you need to remember about a Setup is that it transmits MIDI information on multiple MIDI channels, playing different programs on different channels. This is the same thing a sequencer does - you have different tracks, sending information on different channels. But on most sequencers, a track can only be assigned to a single channel. Therefore one track can't play a Setup, it can only play a Program since it is sending on one channel.

Therefore in order to record a Setup, you must set a sequencer to multi-record. Typically this involves recording to 2 or more tracks simultaneously, with each track set to a different channel. (There are some sequencers which let you multi-record to a single track, and the sequencer keeps the various channels of information separate even though they are on one track.) As you record into the sequencer, the data is then routed to different tracks depending on what channel the information is on. Then once you play back the sequence, each track plays the individual programs on the different channels, exactly the same way you played them in the Setup.

You will have to consult your sequencer manual to find out how to set it up for multi-recording.

Another issue when recording a Setup to a sequencer is that you may not be hearing the effects that are assigned to that Setup. We will cover this issue in the next tutorial.

You should also remember that if a zone in your Setup has the Destination parameter set to Local, the information won't be sent to the sequencer.

## 30. Using Effects when Sequencing

As we mentioned in the Basic Concepts Tutorial, only a single effects configuration can be called up at any one time. With the PC2 at its default values, if you are in Internal Voices, KB3, or MIDI Setups Mode, the current Program or Setup is controlling the effects, determining which effects get called up for each bus, along with the routing and wet/dry amounts.

But once you start sequencing, things get a bit more complicated. You need to be able to determine which effects get called up and what the routing and wet/dry amounts for each individual MIDI channel will be. There are several different ways to control the effects in this situation, and we will take a look at the different methods and their advantages and disadvantages.

As we saw in tutorial #27, by going to MIDI Receive Mode, you have the ability to set the FX Routing and wet/dry levels for each channel, and to control those settings via MIDI controllers. This allows you to set initial amounts for each track, or even change the amounts throughout the sequence.

What you CAN'T do via MIDI is select the Effects themselves directly. This must be done either manually from the front panel, or by calling up a program that selects the effect you want.

**1.** Press the FX Mode button. The display shows the FX Change Mode parameter. It has two possible values, Auto and Panel. Auto is the default. Change it to Panel.

When set to Panel, the PC2 ignores the individual effects settings found in each program and Setup. Instead, whatever effects you choose with the FX Select buttons will be the effects you hear. You can also select the FX Routing and wet/dry settings for the channel you are currently transmitting on (by default, channel 1). The advantage to this method is that it is obviously quite simple – just select the effects you want and you are ready to go.

However, there are a couple of disadvantages to this method. If you are working on several different songs, using different effects, you have to manually set them correctly each time you go to work on the song. In addition, if you have FX Routing or wet/dry settings in your tracks, the channel you are transmitting on will not respond to the FX routing or FX-A and FX-B controller messages while you are in Internal Voices mode. If you switch to MIDI Receive Mode, the channel WILL respond to those messages. (All other channels will respond correctly no matter what mode you are in.) Also, if you go back and forth between sequencing and playing live, you will need to set FX Change Mode back to Auto or you won't hear the correct effects you have chosen for your Programs and Setups.

**2.** Instead of manually selecting an effect, you can set things up so that you assign the effects you want to a specific program, then call up that program in the sequence, thereby automating your effects selection.

First set FX Change Mode back to Auto. Then start by editing one of the programs you are using in your sequence and set the effects the way you want them. We covered editing the effects and saving them in tutorial #18.

Next, press the FX Mode button, then press the >> button to select the FX Channel parameter. This can be set to Current or any MIDI Channel. The default is Current.

When this parameter is set to current, whichever program is assigned to the channel that you are currently transmitting on will be the program that calls up the effects. If you go to MIDI Receive Mode, whatever program is on the Channel currently in the display will call up the effects. And if you go to MIDI Setups Mode, the program on Zone 1 will call up the effects.

With this method, as long as you make sure that the program you saved for controlling your effects is called up on channel 1 (assuming you use the default transmit channel when in Internal Voices mode), you will hear the correct effects for your sequence. One advantage to this method is that if you need to switch back and forth between sequencing and performing, everything will always work. Whatever program or Setup you call up for performing will have its correct effects assigned, and things will also sound correct when you are sequencing, as long as you make sure you don't change your transmit channel.

The disadvantage to this method is that if you go to MIDI receive Mode and start switching channels, you will stop hearing the correct effect. Also, it does force you to use your transmit channel for playing the program you are using to control the effects, and this might not be convenient in every instance.

**3.** The final method is to choose a specific MIDI channel for your effects control. You can choose a typically unused MIDI channel and set the FX Channel parameter to this channel number. Channel 15 can be a good option, since people often use channel 16 for a click, and if you start from the lowest channel and work upwards for your tracks, 15 will be the last one you hit before the click channel.

Once you have chosen a channel, you can then edit and save a "dummy" program that has the effects you want assigned to that program. Since you are only using this program to call up the effects settings you want, you don't have to worry about the actual sounds in the program – just the effects settings.

Finally, in your sequence, you create a track that calls up this particular program and assign the track to the MIDI channel you have chosen for effect control.

The advantage to this method is that no matter what mode you go to, you will always hear the correct effects for your sequence, as long as you have the proper program and bank change info to call up the correct "dummy" program on the correct channel. The disadvantage to this method is that if you go to MIDI setups mode or Internal Voices Mode for performance purposes, you won't end up hearing the correct effect, unless you have chosen channel 1 for your effect channel. (And this assumes zone 1 of your Setup is assigned to channel 1).

## 31. Selecting Setups from an External Controller

You can call up a Setup from an external controller or a sequencer, by sending a bank controller and program change message on a specified channel. This would most typically be done in a performance situation where you need to automate calling up Setups.

**1.** First you need to choose a MIDI channel you will use to send the bank and program change messages. A good rule of thumb is to dedicate a specific channel for this function and not use that channel for sending any other MIDI info. Press the Global button, and then press the >> button 5 times to get to Setup Chg Chan. Set this to the channel you have chosen.

**2.** Press the MIDI Setups button. At this point, sending bank and program change messages from your external controller on the specified channel will call up the appropriate Setup.

There are a couple of things to be aware of.:

First, of all, MIDI Setups are displayed starting numbering at 1 instead of 0. Because of this, there will be an offset of 1 in response to the standard program changes of 0-127. To call up Setup number 1, send program change 0, to call up Setup number 2, send program change 1.

Second, although the User Setups start numbering at 129, MIDI only has 128 values (0-127). So the User Setups are actually in another bank. Sending the bank controller (controller #32) with a value of 1 followed by program change 0 will call up Setup 129, controller #32 with a value of 1 followed by program change 1 will call up Setup 130 etc. If you need to quickly know which program change number to send when calling up a User Setup, simply subtract 129 from the Setup number and you will know the correct value for the program change message.

If no bank controller is sent, the PC2 will always revert to the first bank (the preset Setups). If you ARE sending the bank controller and want to get to a preset Setup, you would send controller #32 with a value of 0.

## 32. Customizing the Internal Voices Mode

Now that you have learned about various programming techniques for Setups, you might want to apply some of these things to the Internal Voices mode. Essentially, when you are in Internal Voices mode, you are playing a single zone setup. So all of the zone programming parameters apply. For example, you might want to assign a slider to Tempo Control for the Arpeggiator. This is easily done.

**1.** Start in Internal Voices mode.

**2.** Edit any of the parameters found within the MIDI Transmit, Program, Key Range, Transpose, Velocity, Controllers, and Arpeggiator buttons.

**3.** Press Store. The display will ask if you want to save a Setup and will pick the first empty Setup location.

**4.** Press the Internal Voices. The display now asks if you want to save to Internal Voices. Press Enter, and you are done.

Since there is only one location for the Internal Voices parameters in memory, any changes you make using this method will wipe out the defaults that currently exist for those parameters. But if you Reset the PC2, those defaults will return. You can reset the PC2 from the Global Menu.

Don't confuse the Internal Voices Setup with MIDI Setup 126, which is named Internal Voices. The two are actually separate things. You can edit one without changing the other. However, if you have not changed the default values of the Internal Voices Setup, it does have the parameters set to the same values that you will find in Setup 126.

There are two parameters that can't be changed from the defaults - the Program and the Bank. Whenever you turn on the PC2, it will always call up Program 0 Stereo Grand in the Internal Voices Bank. After that, whatever sound you call up in Internal Voices mode is remembered and the PC2 will switch to that sound if you switch to Internal Voices mode from MIDI Setups mode. In addition, the Effects settings aren't set by the above method. Since each individual Program can have its own Effects, the regular method of choosing an Effect setting for a program (as described in the intro section of this document) still applies.

## 33. Using SysEx to Store Your Setups

If you start to create your own Setups, Programs, and Effects, you will want to store them externally, in case anything happens to your battery backed memory, or you need to create more Setups than you have room for in the PC2. Since the PC2 does not have its own disk drive, you must save this info by sending a system exclusive dump to an external device such as a sequencer or sysex recorder.

You can either dump the entire User memory in one shot, or you can dump individual Setups or Programs. (None of the presets are dumped, only what you edit and saave yourself.)

To dump the entire memory:

**1.** Connect a MIDI cable from the Out of the PC2 to the In of your external device.

**2.** Press the Global button, then press the >> button until you see "Dump all objects?" in the display.

**3.** Start the recording on your external device and press Enter on the PC2. The MIDI Receive light will blink and the display will show you the Setups being dumped. Once it is finished, stop recording.

A note for K2000/K2500/K2600 users: The sequencer in the K2000/K2500/K2600 can only allow songs up to 64k. A dump of the entire PC2 memory is larger than 64k. So you can't use this method. Instead you must dump individual objects.

To dump individual Setups or Programs:

**1.** Connect a MIDI cable from the Out of the PC2 to the In of your external device.

**2.** Call up the Setup you want to Dump. Press the Store button, then press the >> button twice. The display will now show "Dump setup ...?".

**3.** Start the recording on your external device and press Enter on the PC2. The MIDI Receive light will blink and the display will tell when the dump is finished. Once it is finished, stop recording.

This same method works for Programs. Start in Internal Voices Mode, call up the Program you want, press one of the three Sound Parameter buttons, press Store and then the >> button twice. The display will now show "Dump voice ...?".

To load a dump back into the PC2:

**1.** Connect a MIDI cable from the In of the PC2 to the Out of your external device.

**2.** Play back the sequence, or initiate the dump playback from your external device. That's it. You don't have to put the PC2 in any special mode to receive the dump.

When a dump is sent back to the PC2, the information goes to the memory location for that Setup. It does NOT update the edit buffer, which is where the current Setup is played from. Therefore you have to call up that object after the dump to hear it. For example, let's say you have dumped Setup #132 previously and have since edited that Setup and have #132 currently called up. If you dump the Setup back into the PC2 and then play the keyboard, you won't hear the older version - you have to call up the Setup by typing in 132 and Enter on the keypad, or scrolling away and back to it.

It is always a good idea to test your dumping procedure to make sure everything worked correctly, before making massive changes. You wouldn't want to delete several months of work only to find out the sysex dump wasn't correctly recorded. A simple way to test to make some easy change and save it, then send the dump back to make sure it is received correctly. For example, you can dump the Setup, then change one letter in the Setup name and save that change. Then dump the Setup back to see if the name changes back to the original. Don't forget that you have to call up the Setup after dumping it back in.

## 34. Trouble Shooting

If you run into problems while playing or programming, there are several things you can do to help troubleshoot the problem.

First of all if you are not getting the expected results from your programming or are having strange results when hooked to an external device, you can use the MIDIScope utility to see exactly what MIDI messages are being received by the PC2's sound engine.

Press the Global button, the press >> until you see MIDIScope. (Or you can hold the >> button and it will quickly scroll through the parameters.) Then press Enter. The display says "MIDIScope Any Button Quits". Now the display will show EVERY MIDI message that the sound engine part of the PC2 receives, whether that message comes from PC2 itself or from the MIDI In Port. You will see exactly what type of message it is along with the value of that message. For example, a note on message will show you the note number, along with the attack velocity. A controller message will show the controller number along with the controller value. It also shows you the MIDI channel of the message. To leave MIDIScope, just press any button on the PC2.

The only limitation of MIDIScope is that it can only display one message at a time. Therefore it can be confusing if you are sending multiple channels of information at the same time. If you are testing the PC2 itself, it is best to mute all the zones but one so that you can see what info that zone is sending (or you could use the Solo button). If you are testing info coming from an external source, such as a sequencer, you would also want to mute all the tracks but one.

If the unit is working but is acting very strange, a hard reset may return it to normal conditions. To do a hard reset, turn the unit on, and while the display says "Please Wait", press and release the Panic button. Press the right arrow button till the display says "Hard RESET". Press Enter, then the button under "Yes" in the display. You should be aware that this will erase any user created Programs, Setups, or Effects.

If you suspect a physical problem with the PC2, you can use the diagnostics to test it. The diagnostics are covered in Appendix A of the manual.

# ADDITIONAL INFORMATION

## A Note About the Physical Controllers

The tutorials above specify that you select a particular physical controller. But you can always choose a different controller if you want. For example, you might like to switch a function with a button instead of a pedal. The programming steps are exactly the same - you simply choose a different controller.

The thing to remember is that the controllers fall into two different types. Switch controllers are designed to have only two states - On or Off. Continuous controllers will send a range of values between 0 and 127. Logically, you will want to pick a particular controller based on what type of message you are trying to send. If you only need to send two different values, then you would typically use a switch controller, whereas if you need to send a range of values, you have to use a continuous controller.

The MIDI Controller numbers are grouped by type - Controllers 0-63, are designated for continuous control, 64-69, 96, 97, & 120-127 are switch functions. Others may be continuous or switch depending on how they are used.

But there is no reason you can't use a continuous controller for a switch type function, or assign a switch controller to a MIDI continuous controller number.

For example, you could assign a Slider to the Arpeggiator On/Off function (controller #116 in the PC2). If the slider is moved to the halfway point or higher it is On, and if the slider is moved below the halfway point, it is Off.

Or, you could assign a button to MIDI Volume and use it to toggle between two different specific volume levels. Another example of this is found in tutorial #13, where we used a button to set pan positions.

Finally, you should keep in mind that there are actually two different types of continuous controllers. the Sliders, CC pedals, and Wheel 1, will stay wherever you move them to, but Wheel 2 (which is almost always assigned to pitch bend), the Mono Pressure strip, and the breath controller return to 0 when you let go of them. You would probably never want to assign MIDI Volume to Mono Pressure or you would have to press hard on the keys all the time to hear anything. If you have the optional ribbon controller that plugs into the PC2, it can be set to either spring back to a fixed point (which you can set) or to stay where it is when you let go of the ribbon.

## Some info on the Global Parameters

Several of the previous tutorials have touched on some of the parameters found within the Global menu. Following is some information on some of the other parameters that may be useful to you. See the manual for complete descriptions of all the parameters.

Some of the Global parameters will revert to their defaults on power up, so you may need to set them each time you turn on the unit, if you are not using the default values.

# PC2 Made Easy

**Chg Setups** - This parameter determines when a change from one Setup to the next will happen. In Immediate mode (the default), the setup changes as soon as you call it up from any of the various methods. In Keys Up mode, the change won't happen until you let go of all the keys.

**Tuning** - You can tune the PC2 up or down one semi-tone, in one cent increments. This can be useful if you are playing along with a recording, or playing with other acoustic instruments that can't be easily retuned.

**Recv Trans** - This allows you to transpose the instrument globally, for all MIDI channels. (Using the Transpose function in the zone parameters will only affect individual zones in a Setup, or if changed in Internal Voices mode, would affect any program you play on the keyboard, but not any information coming in the MIDI In port.)

**All Notes Off** - If you set this to Ignore, the PC2 will ignore the MIDI All Notes Off message. Some instruments and sequencers (notably older Roland instruments) will send this message when no notes are being held, even if the sustain pedal is still held. If you are hooked to a Roland sequencer and find that the PC2 doesn't seem to sustain, set this parameter to Ignore and the problem will go away.

**General MIDI** - Turn this parameter On if you want the PC2 to function as a GM instrument (you need the ROM-1 Expansion board for this).

**MIDI In** – This parameter is useful if you have second controller that you want to use along with the PC2.

The default value is Normal. In this case, incoming MIDI data is unchanged. Any MIDI information coming in will be sent on to the sound module part of the instrument unchanged, and the PC2 will respond to the data, unless you have turned a MIDI channel off and the data is being sent on that channel. All data will also be sent to the MIDI Thru port unchanged (this assumes you have the Thru/Out switch on the rear panel of the PC2 set to Thru).

If it is set to Merge, then all incoming information is merged with the data you are creating on the PC2 itself and sent to the MIDI Out port along. (The PC2 will also respond to the incoming information if the channel is turned on). Incoming data is also sent to the MIDI Thru port, the same as when this parameter is set to Normal. The main application for using a setting of Merge would be if you had an additional controller and wanted both the PC2 and that second controller to be able to play a third MIDI instrument simultaneously.

The Remap setting is the most complicated option. In general, this setting is mostly needed for PC2R owners (and is in fact the default for the PC2R is Auto, discussed below, which is a variation of Remap). If for some reason, you have another controller that you want to use to play the PC2 and will not be using the PC2 itself as a controller, this setting will give you the possibilities. If you have no need for this feature, you may wish to skip reading the rest of this section, since it is complicated, and you will not be using it.

With this setting, then the PC2 processes incoming data as if it were generated by the PC2 itself. The MIDI channel of the incoming data is ignored. Instead the incoming information is "rechannelized" and sent on to the sound module part of the PC2, based on what you currently have called up on the PC2. If you are in Internal Voices Mode, it

82

will simply play the program you currently have called up (it will be sent on channel 1, assuming you have not changed the default setting of the Internal Voices Setup). If you are MIDI Setups Mode, then the information will be sent to various channels based on how the zones are programmed in your Setup. For example, if you have a Setup with two zones that are layered for channels 1 ands 2, all incoming information will be sent on to the sound module part of the PC2 on both channels 1 and 2. But if you have a Setup with a split, then the information would be sent on either channel 1 or channel 2, depending on the note ranges you have set for the zones.

When using Remap, it is important to understand that in Internal Voices or MIDI Setups Mode, ALL incoming MIDI information will be sent to the channel or channels assigned in the current Setup. This means that you would not want to have a controller that has its own Setup sending on more than one channel. For example, if your external controller had Setup with 2 zones layered, then each channel being accessed on the PC2 would get double note events. Indeed, the whole reason for having a Remap feature is so that some one using an external controller which is limited to sending on one MIDI channel could still play Setups on a PC2R (or a PC2 if you so choose).

If you are in MIDI Receive Mode, all data is remapped to whichever channel is currently in the display.

The final setting for the MIDI In parameter is Auto. This is identical to Remap, with one exception. With a setting of Auto, remapping will NOT occur when you are in MIDI Receive Mode. Instead all incoming MIDI messages are sent to the appropriate MIDI channels unchanged.

There is another feature of Remapping – certain incoming MIDI controller numbers will be remapped, based on the settings within a PC2 Setup. This allows you to access the special controller functions (for example the arpeggiator functions, Goto Setup, etc.) that can be assigned in a PC2 Setup, by sending regular controller numbers from your external controller. It also allows you to play the Preset Setups and have access to all the functions programmed into them, by sending a standard set of controller messages.

For example, if you send MIDI controller #88 from your external controller when the PC2 is Internal Voices mode, it will turn on SW1, activating the Octave shift function (which will transpose the notes down by an octave). Or if you are playing a Setup which has slider A assigned to Volume in Zone 1, then MIDI controller #6 coming from your external controller will be turned in to MIDI Controller #7 and sent on to the channel assigned to that zone.

The controller numbers that are remapped are the ones that are assigned to the physical controllers in the Setup #125, PC2R Control. Only these controllers are remapped – all others are left unchanged. Following is the list of controllers that remap and the parameters they remap to:

| Incoming Controller numbers below will be remapped… | …to the Controller number (or special controller function) assigned to this physical controller |
| --- | --- |
| MIDI 1 (Mod Wheel) | Mod Wheel (Wheel 2) |
| MIDI 6 | Slider A |
| MIDI 22 | Slider B |
| MIDI 23 | Slider C |
| MIDI 24 | Slider D |
| MIDI 11 (Expression) | CC Pedal 1 |
| MIDI 4 (Foot) | CC Pedal 2 |
| MIDI 2 (Breath) | Breath Controller |
| MIDI 88 | SW1 |
| MIDI 80 | SW2 |
| MIDI 81 | SW3 |
| MIDI 82 | SW4 |
| MIDI 83 | SW5 |
| MIDI 64 | Switch Pedal 1 |
| MIDI 66 | Switch Pedal 2 |
| MIDI 67 | Switch Pedal 3 |
| MIDI 21 | Ribbon Section 1 |
| MIDI 86 | Ribbon Section 2 |
| MIDI 87 | Ribbon Section 3 |
| Pitch Bend | Pitch bend Wheel (Wheel 1) |
| Mono Pressure | Pressure |

## Using the Copy Function

To copy all the parameters from one zone to another:

**1.** Call up the Setup. If you have already entered the Setup Editor, make sure you are NOT on one of the parameters within the Controllers, Arpeggiator, or Effects menu.

**2.** Press Copy, then press the zone button for the zone you want to copy. Then press Enter.

**3.** Press the >> button, then press the Zone button for the zone you want to paste into. Then press Enter.

To copy all the parameters from one zone to a zone in a different Setup:

**1.** Call up the Setup that has the zone that you want to copy. If you have already entered the Setup Editor, make sure you are NOT on one of the parameters within the Controllers, Arpeggiator, or Effects menu.

**2.** Press Copy, then press the zone button for the zone you want to copy. Then press Enter.

**3.** Press the MIDI Setups button. Select the Setup that you want to paste into.

**4.** Press the Copy button. Press the >> button, then press the Zone button for the zone you want to paste into. Then press Enter.


To copy all the controller parameters from one controller to another:

**1.** Call up the Setup that has the controller data that you want to copy. Hold the Controllers button and move the controller that you want to copy, to bring up the first parameter for that particular controller. If you are not on the zone that has the controller parameters you want to copy, press the zone button for the correct zone.

**2.** Press Copy, Enter.

**3a.** If you want to copy the data to the same controller but in a different zone, press the appropriate Zone button, then press the >> button to get to the Paste parameter, then Enter.

**3b.** If you want to copy the data to a different controller, hold the Controllers button and move the new controller. You can also choose a different zone at this point by pressing the appropriate zone button. (For example, you might want to copy all the Zone 1, Slider A parameters to Zone 2, Slider B.) Press the Copy button, then the >> button, then Enter.

**3c.** You can also copy the controller parameters into a different Setup. Press the MIDI Setups button and select the Setup you want to paste into. Hold the Controllers button and move the appropriate controller. Press the Zone button for the appropriate Zone. Press the Copy button, then the >> button, then Enter.

It is important to keep in mind that you can only copy and paste into similar controllers - the parameters for a switch controller can only go to another switch controller, and those for a continuous controller can only go to another continuous controller.


To copy all the Arpeggiator parameters from one Setup to another:

**1.** Call up the Setup that has the arpeggiator data that you want to copy. Press the Arpeggiator button.

**2.** Press Copy, Enter.

**3.** Press the MIDI Setups button. Select the Setup that you want to paste into. Press the Arpeggiator button.

**4.** Press the Copy button. Press the >> button, then Enter.

You should be aware that this will only copy the parameters found within the Arpeggiator menu. If you have any controllers assigned to function such as Arp Latch or Arp Switch, they will not be copied.

# PC2 Made Easy

To copy the Effects configuration from one Setup to another or one Program to another:

This will copy both the effects (FX-A and FX-B) and their editable parameters. It does NOT copy the FX Routing or Wet/Dry mixes for each zone in a setup

**1.** Call up the Setup (or Program) which has the effects data that you want to copy. Press the FX-A Select or FX-B Select button.

**2.** Press Copy, Enter.

**3.** Press the MIDI Setups (or Internal Voices) button. Select the Setup (or Program) that you want to paste into. Press the FX-A Select or FX-B Select button.

**4.** Press the Copy button. Press the >> button, then Enter.

## Special characters for naming Setups and Programs

Following is a list of all of characters available for Setup and Program names, in the order in which they are found. The easiest way to get to them is to press one of the alphanumeric buttons to select a character close to the one you want, then scroll to it with the alpha wheel. Here's the whole list:
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9
: ; < = > ? @ A through Z
[ \ ] ^ _ ' a through z (space).

## Updating your Operating System

The PC2 has Flash ROM, which holds the operating System as well as all the preset objects (Programs, Setups, etc.). As new versions of the OS are released, or when you add one or more of the ROM Expansion options, you can update the OS and preset Objects, by using a MIDI sequencer or other software capable of sending MIDI sysex data. The current versions of the operating system and setups are available for downloading from our web site, www.kurzweilmusicsystems.com. Once the files have been downloaded and unzipped, you will find a ReadMe text file that has detailed instructions on how to update your PC2.

We hope this tutorial has been helpful and you now have a much better understanding of how to program the PC2. If you have any questions or comments, please send email to support@kurzweilmusicsystems.com.