

M1 Clinic Articles

2/01

M1 Performance Edits

The M1's editing functions can be instantly accessed while in program mode or combi mode with the eight A-H cursor buttons under the display. From program mode, you can quickly alter the oscillator balance, variable digital filter cutoff, variable digital amplifier level, keyboard tracking, velocity sensitivity, attack time, release time, and effect balance—all without having to enter program edit mode. From combi mode, you can call up a combi's different programs into "slots" and adjust their relative volumes. This is a live performance feature, the changes made with the A-H buttons are temporary and will disappear when a new program or new combi is called up.

Examples: Load Factory Progs/Combis into M1.

1. 00Universe: decrease attack time and release time: PROG 00 F Dn(-05) G Dn(-10)
2. 01Piano16': decrease velocity sensitivity and increase release time: PROG 01 E Dn(-02) G Up(+4)
3. 02Brass1: increase release time: PROG 02 G Up(+4)

Program Mode Edits

While in program mode, eight program parameters can be temporarily edited on-the-spot during a live performance. The original parameter values will return when another program is selected. The A-H buttons select the parameter, indicated by the underline cursor. The Up/Down buttons change the parameter value -10 to +10.

To play an internal program: INT PROG 00-99.

To temporarily edit an internal program: A-H, Up/Dn.

To make the edit permanent: EDITPROG 9 F G.

```
-----
PROG  I00 Universe          OSC Balance
0+05 F+03 L-02 K+10 V-08 A+01 R-01 E+03
-----
  A    B    C    D    E    F    G    H
```

A-H	Abb	Parameter	Description
A	O	Oscillator Balance	Volume balance of OSC1 and OSC2 when set to double.
B	F	Variable Digital Filter Cutoff	Cutoff frequency of VDF1 and VDF2 tonal quality.
C	L	Variable Digital Amplifier Level	Volume of OSC1 and OSC2.
D	K	Keyboard Track	Sensitivity of sound/volume by the part of keyboard played.
E	V	Velocity Sensitivity	Sensitivity of sound/volume by how hard the keyboard is played.
F	A	Attack Time	Attack time of VDF1, VDF2, VDA1, and VDA2.
G	R	Release Time	Release time of VDF1, VDF2, VDA1, and VDA2.
H	E	Effect Balance	Balance of direct sound/sound of Effects1 and Effects2.

Combination Mode Edits

There are five different types of combinations: Single, Layer, Split, Velocity Switch, and Multi. While in combination mode, depending upon which type of combination is selected, some parameters can be temporarily edited on-the-spot during a live performance. The original parameter values will return when another program is selected. The A-H buttons select the parameter, indicated by the underline cursor. The Up/Down buttons change the parameter value -10 to +10.

To play an internal combination: INT COMBI 00-99.

To temporarily edit an internal combination: A-H, Up/Dn.

To make the edit permanent: EDITCOMBI 9 F G.

• Single

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-----
COMBI I00 BassSingle      Program
  I00 E.Bass      Level=99
-----
```

A	B	C	D	E	F	G	H
---	---	---	---	---	---	---	---

A-H Abb Parameter Description
A Program Selection of program.
D Level Control of volume.

• Layer

COMBI I01 Piano+Trp Layer 1 Program
*I01 A.Piano L70 I02 Trumpet L82

A B C D E F G H

A-H Abb Parameter Description
A Layer1 Program Program of layer1.
D L Layer1 Level Volume of the program assigned to layer1.
E Layer2 Program Program of layer2.
H L Layer2 Level Volume of the program assigned to layer2.

• Split

COMBI I02 Vln/T.Sax Upper Program
*I03 Violin L99 I05 Tenor Sax L99

A B C D E F G H

A-H Abb Parameter Description
A Lower Program Program assigned lower than the split point.
D L Lower Level Volume of the program assigned lower than the split point.
E Upper Program Program assigned higher than the split point.
H L Upper Level Volume of the program assigned higher than the split point.

• Velocity Switch

COMBI I03 Flute/Str Loud Program
*I06 Flute L99 I10 Strings L99

A B C D E F G H

A-H Abb Parameter Description
A Soft Program Program that sounds when keys are struck softly.
D L Soft Level Volume of the program that sounds when keys are struck softly.
E Loud Program Program that sounds when keys are struck hard.
H L Loud Level Volume of the program that sounds when keys are struck hard.

• Multi

COMBI I04 MultiCombi T1=E.Bass
I01 I02 I03 I05 I06 I09 I10 I12

A B C D E F G H

A-H Abb Parameter Description
A Timbre1 Program Program assigned to Timbre1.
B Timbre2 Program Program assigned to Timbre2.
C Timbre3 Program Program assigned to Timbre3.
D Timbre4 Program Program assigned to Timbre4.
E Timbre5 Program Program assigned to Timbre5.
F Timbre6 Program Program assigned to Timbre6.
G Timbre7 Program Program assigned to Timbre7.

H Timbre8 Program Program assigned to Timbre8.
Toggle between the two sets of displays with Page+/- keys.

A-H Abb	Parameter	Description
A	Timbre1 Level	Level assigned to Timbre1.
B	Timbre2 Level	Level assigned to Timbre2.
C	Timbre3 Level	Level assigned to Timbre3.
D	Timbre4 Level	Level assigned to Timbre4.
E	Timbre5 Level	Level assigned to Timbre5.
F	Timbre6 Level	Level assigned to Timbre6.
G	Timbre7 Level	Level assigned to Timbre7.
H	Timbre8 Level	Level assigned to Timbre8.

From Keyboard Magazine 12/88, "Korg M1 Clinic" by Jack Hotop and Jim Aikin.

(OS2) Detune: -50/+50. G
(OS2) Delay Start: 0/99. H

• SELECT A MULTISOUND FOR OSCILLATOR2 (IF OSC MODE = DOUBLE) Page+ (0++)

• SET THE PITCH ENVELOPE GENERATOR FOR OSC1 Page+ (1)

Start Level: -99/+99. A
Attack Time: 0/99. B
Attack Level: -99/+99. C
Decay Time: 0/99. D
Release Time: 0/99. E
Release Level: -99/+99. F
Level Velocity Sensitivity: -99/+99. G
Time Velocity Sensitivity: -99/+99. H

• SET THE PITCH ENVELOPE GENERATOR FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (1+)

• SET THE VARIABLE DIGITAL FILTER 1 FOR OSC1 Page+ (2)

Cutoff: 0/99. D
Envelope Generator Intensity: 0/99. H

• SET THE VDF1 ENVELOPE GENERATOR FOR OSC1 Page+ (2+)

Attack Time: 0/99. A
Attack Level: -99/+99. B
Decay Time: 0/99. C
Break Point: -99/+99. D
Slope Time: 0/99. E
Sustain Level: -99/+99. F
Release Time: 0/99. G
Release Level: -99/+99. H

• SET THE VDF1 VELOCITY SENSITIVITY FOR OSC1 Page+ (2++)

Envelope Generator Intensity: -99/+99. B
Envelope Generator Time: 0/99. D
Attack Time: -,0,+. E
Decay Time: -,0,+. F
Slope Time: -,0,+. G
Release Time: -,0,+. H

• SET THE VDF1 KEYBOARD TRACKING FOR OSC1 Page+ (2+++)

Center Key: C1/G9. A
Cutoff Frequency: -99/+99. B
Envelope Generator Time: 0/99. D
Attack Time: -,0,+. E
Decay Time: -,0,+. F
Slope Time: -,0,+. G
Release Time: -,0,+. H

• SET THE VARIABLE DIGITAL FILTER 2 FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (3)

• SET THE VDF2 ENVELOPE GENERATOR FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (3+)

• SET THE VDF2 VELOCITY SENSITIVITY FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (3++)

• SET THE VDF2 KEYBOARD TRACKING FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (3+++)

• SET THE VDA1 ENVELOPE GENERATOR FOR OSC1 Page+ (4)

Attack Time: 0/99. A
Attack Level: 0/99. B
Decay Time: 0/99. C
Break Point: 0/99. D
Slope Time: 0/99. E
Sustain Level: 0/99. F

Release Time: 0/99. G

• SET THE VDA1 VELOCITY SENSITIVITY FOR OSC1 Page+ (4+)

Amplitude Velocity: -99/+99. B

Envelope Generator Time: 0/99. D

Attack Time: -,0,+. E

Decay Time: -,0,+. F

Slope Time: -,0,+. G

Release Time: -,0,+. H

• SET THE VDA1 KEYBOARD TRACKING FOR OSC1 Page+ (4++)

Center Key: C1/G9. A

Amplitude Keyboard: -99/+99. B

Envelope Generator Time: 0/99. D

Attack Time: -,0,+. E

Decay Time: -,0,+. F

Slope Time: -,0,+. G

Release Time: -,0,+. H

• SET THE VDA2 ENVELOPE GENERATOR FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (5)

• SET THE VDA2 VELOCITY SENSITIVITY FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (5+)

• SET THE VDA2 KEYBOARD TRACKING FOR OSC2 (IF OSC MODE = DOUBLE) Page+ (5++)

• SET PITCH MG Page+ (6)

Waveform: triangle,sawup, sawdown, square. A

Frequency: 0/99. C

Delay: 0/99. D

Intensity: 0/99. E

OSC Select: off, osc1, osc2, both. F

Key Sync: off,on. H

• SET VARIABLE DIGITAL FILTER MG Page+ (6+)

Waveform: triangle,sawup, sawdown, square. A

Frequency: 0/99. C

Delay: 0/99. D

Intensity: 0/99. E

OSC Select: off, osc1, osc2, both. F

Key Sync: off,on. H

• SET AFTERTOUCH Page+ (7)

Pitch: -12/+12. A

Pitch MG: 0/99. B

VDF Cutoff: -99/+99. D

VDF MG: 0/99. E

VDA Amplitude: -99/+99. G

• SET JOYSTICK Page+ (7+)

Pitch Bend: -12/+12. A

VDF Sweep Intensity: -99/+99. B

Pitch MG Intensity: 0/99. D

Pitch MG Frequency: 0/3. E

VDF MG Intensity: 0/99. G

VDF MG Frequency: 0/3. H

• SELECT AN EFFECT1 Page+ (8)

Type: 01/33, no effect. A

Switch: off,on. F

• SET EFFECT PARAMETERS FOR EFFECT1 Page+ (8+)

Each effect 01/33 has up to eight parameters to set using A-H buttons. Refer to Effects Parameters.

- SELECT AN EFFECT2 (OPTIONAL) Page+ (8++)

- SET EFFECT PARAMETERS FOR EFFECT2 (OPTIONAL) Page+ (8+++)

- SET EFFECT PLACEMENT Page+ (8++++)

Placement: parallel, serial. B

Panpot3 Output: off, 100:0/0:100. F

Panpot4 Output: off, 100:0/0:100. H

- EFFECT COPY (OPTIONAL FOR COPYING AN EXISTING EFFECT SETUP) Page+ (8+++++)

Effect Copy From: program, combination, song. B

Slot Number: 00/99, 0/9. E

Execute Copy: copy. G

- WRITE/RENAME THE PROGRAM Page+ (9)

Move Cursor Left: C

Move Cursor Right: D

Change Cursor Character: Up/Dn or Slider (10 chars max)

Write To Memory: F (prog memory protect must = off: Global 6 Dn)

Write Program To Another Slot: 00/99. H Up/Dn F

Advanced M1 Program Editing

Opcode Editor Manual: Korg M1, Overview

From Opcode Systems Inc. c1985-1991, by Bill Thompson and Michael Lee.

Multisound Waveforms

The smallest building block of the M1 is the ROM MultiSound Waveform, of which there are two types: 44 drumsounds and 100 multisounds. You can increase the number by inserting a waveform ROM card into the rear PCM card slot. Unlike multisounds, the drumsounds are mapped to the keyboard and maintain their own audio and effect assignments. These assignments are made in Drum Kits #1-4, contained in Global mode.

Programs

A Program consists of five Modules: an oscillator, a filter (VDF), an amplifier (VDA), modulators, and effects. There are three program types: Single, Double, and Drums. Single employs one system of five modules (one waveform), and Double employs two systems of five modules (two waveforms). Double reduces the available polyphony from 16 down to 8 simultaneous notes. Drum programs refer to a Drum Kit stored in Global, and do not refer to waveforms directly. It is the Drum Kits themselves that refer to the drumsound waveforms.

Combinations

Programs may be used in Combinations or with the internal sequencer in Songs, either of which may exist in internal memory or on a RAM card placed in the M1's top card slot. When used in a combination or song, a program's effects settings are ignored. They are overridden by the combination's or song's effects settings.

There are five combination types: Single, Layer, Split, Velocity Switch, and Multi.

Single combinations refer to just one program. This type is provided primarily to avoid having to switch from combination mode back to program mode during performance or external sequencing. Such switching produces an audible "pop."

Layer, Split, and Velocity Switch combinations refer to two programs. Programs in a Layer combination share the entire keyboard. A Split combination allows playing one program on the lower part of the keyboard and the other program on the higher part, the low/high split point is changeable. A Velocity Switch combination is similar, but rather than splitting the keyboard, it splits by how hard the note is played, where one program is played with low attack velocity and the other with high velocity. Again the split point is changeable.

Multi combinations group up to eight different programs, each assigned to any MIDI channel, Key range, or Velocity range. Multi combinations can be played multi-timbral through external MIDI control.

Korg M1 Clinic

From Keyboard Magazine 12/88, "Korg M1 Clinic" by Jack Hotop and Jim Aikin.

Intro

The M1 can be played in either program mode or combination mode. As you're stepping through the factory presets, you may want to stay in program mode, which lets you hear each preset by itself. Many of the combinations use several presets in splits and layers, so before you start writing your own programs, also step through the combinations and make note of any programs that are used in combinations that you want to keep. If you write a new program into any memory location, you will automatically change the sound of all the combinations that use that memory location.

Even better, store the entire contents of memory before you begin, either in a RAM card or in some form of sysex librarian file. These operations are carried out in global mode. To save on a card, select page 9 using the number buttons and hit the "up" button once to select "prog/combi/seq." To save to an external librarian, select page 7 and hit the "up" button four times to select "all data." Cards are by far the quickest and most convenient form of storage, but they are not as cheap as disks. Also, by keeping at least one card handy, you effectively double the number of programs and combinations that you have immediate access to in performance situations.

Backing up your data is especially important if you want to switch the M1 from its factory default of 100 programs/combinations to the 50 programs/combinations option in order to expand the sequencer memory from 4,200 to 7,700 events.

Double Program Modulation

There's a trick for getting more programs into fewer memory locations. First edit a single program the way you like. Then switch to double program mode (0 Up) and edit a second layer for the same patch (without altering the first layer's settings). Finally, switch back to single mode and save the patch to memory. Now you'll have a good 16-voice sound, but two keystrokes in performance ("edit prog" and the "up" button) will call up the double mode sound.

Double programs offer a Delay Start parameter for the second oscillator. This delay is applied to all aspects of the second sound—its sample playback and also its envelope generators. A little delay can be very effective with sounds that have sharp attacks (such as guitar picks), as it spreads out the attack transients. A short slapback seems to work best with a Delay Start between 5 and 10, while settings of 20 to 40 are good for rhythmic echo effects synced to the music. Since the delayed sound will only play if you're still holding the key, you can use your keyboard technique to get some notes to echo while others don't. Also, the echoed notes will have current pitchbend values, unlike notes running through an audio delay line. By combining the Delay Start with a delay from one of the effects, you can get some fairly complex rhythms from each keystroke.

When doubling a sampled attack transient with a sustaining waveform, try assigning the sustaining wave to the second oscillator and delaying its start slightly. This will let the attack "speak" before the sustain portion starts.

Each oscillator has its own pitch envelope generator. These can be used for a variety of effects. Most familiar is the slide up or down at the beginning of the note, which is programmed using the Start Level and Attack Time parameters. The best values here are probably -20 to +20 for Start Level and 01 to 08 for Attack Time (with an Attack Level of 00). An Attack Time of 07 works well with a Time Velocity Sensing setting of around -50, so that only the notes that are played hard will have a pitch slide. If you're using the same or similar sounds for the two oscillators in a double mode program, try giving the two Start Levels opposite values (such as -10 and +10) so that the tones will start out detuned from one another, creating some complex beating during the attack, and then move together into a smooth sustained tone.

For a sustained tone in which the chorusing starts out slow and then speeds up, try setting one oscillator's pitch envelope flat (all 00's) and give the other a pitch envelope Attack Time of 80 or so, an Attack Level of +02, and a Decay Time of 99. This will cause the two oscillators to drift gradually further apart in pitch during the course of each note.

Other pitch modulation effects can be created from the pitch modulation generator (6). When using a square wave for trills, you can tune the interval of the trill by setting the Intensity parameter to one of these values: 10(halfStep), 20(wholeStep), 28(minorThird), 39(majorThird), 50(perfectFourth), 60(tritone), 70(perfectFifth), 79(minorSixth), 84(majorSixth), 89(minorSeventh), 95(majorSeventh), 99(octave). The Delay should be 00, and for best results the Frequency should be between 30 and 80.

In addition to standard trills, you can add harmonic interest by selecting only one of the oscillators for modulation, or by going back to the OSC2 parameters and changing its tuning by some interval. For instance, you could set the trill Interval to a fifth and the oscillator Interval tuning to a minor or major third.

A delayed triangle wave modulating only one of the oscillators can be a good alternative to normal vibrato, adding a less obvious form of animation to a sustained tone. Try a Frequency of 30 to 60, a Delay of 30 to 50, and an Intensity of 05 to 08.

Programming Setup

One of the best ways to start programming the M1 is to choose a double program and replace one or both of its waveforms with others in OSC1 (0+) and OSC2 (0++). When you find a new pair that you like, it's time to fine-tune the envelopes and other parameters. But in an existing program, the waveforms are already being processed in various ways, which can make it tough to tell just what you're listening to. If you want to hear exactly what each waveform sounds like by itself, you need to create a blank "initialized" single program.

1. Choose a program that you don't mind overwriting with a new one.
2. Press the "Edit Program" button to go into edit mode.
3. Set OSC Basic OSC Mode (A) to Single. Move through the remaining steps with the page+ button.
4. Set OSC1 OSC Level (D) to 99 and Octave (E) to 8'.
5. Set all OSC1 Pitch EG values (A-H) to 00.
6. Set VDF1 Cutoff (D) to 99 and EG Intensity (H) to 00.
7. Set all VDF1 EG values (A-H) to 00.
8. Set all VDF1 Velocity Sensitivity values (BDEFGH) to 00.
9. Set Center Key (A) to F#3 and all other VDF1 Keyboard Tracking values (BDEFGH) to 00.
10. Set Attack Time (A) and Release Time (G) to 00, and all other VDA1 EG values (BCDEF) to +99.
11. Repeat steps 8 and 9 for the VDA1 Velocity Sensitivity and VDA1 Keyboard Tracking values.
12. Set Pitch MG Waveform (A) to Triangle, Frequency (C) to 65, Delay (D) and Intensity (E) to 00, OSC Select (F) to Both, and Key Sync (H) Off.
13. Repeat step 12 for the VDF MG.
14. Set all Aftertouch (ABDEG) and Joystick (ABDEGH) values to 0.
15. Set Effect1 (A) to 34: NoEffect, and Select (F)
16. Repeat step 15 for Effect2.
17. Set Effect Placement (B) to Serial, P3 (F) Off, P4 (H) Off.
18. Name the program "BlankPatch" (CD&Slider), and Write to memory (F).

As you're playing the waveforms with your blank patch, be sure to play in the various registers of the keyboard. You'll find that a few of the sounds have very distinct register changes, because of the way they were sampled. Multisound waveforms 08 Guitar1 and 09 Guitar2 have a sample of a harmonic in the top octave and a fifth of the keyboard, and waveform 16 Fretless has a break at the A above middle C, and another one in the top fifth of the keyboard. Once you know where these breaks are, you can plan your keyboard parts accordingly. Most of the waveforms were used in the factory programs, but there are some unused ones that can provide good starting points for creating your own patches.

The M1's waveforms fall into five basic categories: sampled instrument sounds (short or long loops), drums/percussion (unlooped), looped rhythmic patterns, attack transients, and single-cycle waveforms. Transients are most effective when they are mixed in double programs or combinations with other samples or waveforms. Try creating a single mode program using waveform 66 Bass Thumb. This is an attack transient whose fundamental pitch has been removed. It can easily be layered in combination mode with a wide variety of plucked and percussive sounds (bass, sitar, clav, kalimba).

Cross-Fades & Splits

In VDA Velocity Sensitivity (4+), the Amplitude (B) parameter can be set positive or negative. By setting it + for one oscillator and - for the other, you can set up a program that cross-fades from one waveform to another depending on how hard you play. For a complete cross-fade, use values of +99 and -99. Values in the range within -20/+20 will cause the blend to change without cancelling either oscillator completely.

The VDF Velocity Sensitivity (2++) EG Intensity (B) parameter lets you vary the brightness along with the loudness—or invert one with reference to the other: you could set a double program where one oscillator would get brighter but also quieter as you play harder. The disadvantage of velocity cross-fading is that you must use a double program which immediately reduces the polyphony from 16 to 8. When it makes musical sense, you might prefer a velocity cross-switch, which is done with a combination. Cross-switching between single voices preserves 16-note polyphony for each sound.

Cross-fading from key pressure can't be done within a single program, but you can easily set up a combination that does this. Choose the two programs that you want to pressure-fade between and go to Aftertouch (7) in each program. Give one a VDA Amplitude (G) of -70 and the other +70. In order to get the +70 to have an audible effect, you'll also have to set its Oscillator2 Level (0++D) to 00,

so that the program will only be audible when pressure is applied.

The usual way to set up a keyboard split in the M1 is to use a combination. Because of the dynamic voice allocation you can have both halves of a split combi (or all three regions of a multiple split combi) be layers, without reducing the polyphony. In some circumstances, though, you might want to create a split program. One advantage of this is that you can access more sounds without having to do program changes. Also, if you step through programs with a footswitch or make MIDI program changes with an external sequencer, you can call up a split program without having to go to combination mode.

1. To create a split double program, press the “Edit Program” button to go into edit mode. If “(Double)” does not appear in the lower left of the display, press the “Program” button and try another, repeating until you find a double program.
2. Go to VDF1 Keyboard Track (2+++). Set Center Key (A) to the desired keyboard split point (middle C = C4) and Cutoff (B) to -99 to play the lower sound.
3. Go to VDA1 Keyboard Track (4++) and repeat step 2.
4. Go to VDF2 Keyboard Track (3+++). Set Center Key (A) to the same keyboard split point and Cutoff (B) to +99 to play the upper sound.
5. Go to VDA2 Keyboard Track (5++) and repeat step 4.

Level Control

In order to get the best signal-to-noise ratio from the M1, set the highest possible volume levels when creating programs and combinations. This doesn't mean that you should automatically increase the levels in all of your presets to +99. Amplitude modulation programs require soft and loud levels, but level settings can also be used to match levels for performance situations. To do this, find the softest sound that you'll be using (the one that needs the most boost), and set its levels to +99. Then balance the other sounds against it by reducing their levels. Setting levels too high can overdrive the VDF, VDA, or effects, depending on the waveform selected and on how many notes are played at a time. The 10% pulse, 25% pulse, and digital3 waveforms can cancel out when the level and filter cutoff are set too high.

Output & Effects Routing

Sound placement and signal processing can be the icing on the cake for any program or combination. The M1 has four audio outs and two effects processors, but the signal routing used with these can be confusing. Sound enters one of four inputs (A, B, C, D) which serial route or parallel route sound into effects, with the option of passing through a panpot filter before exiting one of four outputs (1,2,3,4).

Serial Routing:	Parallel Routing:
A-Effect1-Effect2 = 1/LeftStereo	A-Effect1----- = 1/LeftStereo
B-Effect1-Effect2 = 2/RightStereo	B-Effect1----- = 2/RightStereo
C----- = 3	C-Effect2----- = 3
C-PanPot3-Effect2 = 1/LeftStereo	C-Effect2-PanPot3 = 1/LeftStereo
C-PanPot3-Effect2 = 2/RightStereo	C-Effect2-PanPot3 = 2/RightStereo
D----- = 4	D-Effect2----- = 4
D-PanPot4-Effect2 = 1/LeftStereo	D-Effect2-PanPot4 = 1/LeftStereo
D-PanPot4-Effect2 = 2/RightStereo	D-Effect2-PanPot4 = 2/RightStereo

Serial A or B routing should always be used with single and double programs. Serial A, B, C, or D routing should be used for drum kits. Combinations can have either serial or parallel effects routing.

Let's look at an application for output routing in combinations. Parallel routing can be used in a layer combination to give the two elements of the layer their own reverb or delay by routing P3 to 1/L and P4 to 2/R. Try using a flanger on a sustaining program with a cross-delay on a percussive attack. Experiment with various options for putting effects before or after one another. Normally a chorus or flanger would go before reverb, but try putting it after the reverb, so that the reverb itself is chorused. With this combination, you can go to Effect1 (8), set Effect Type (A) to 12 (StereoChorus1), and Switch (F) to on. Go to Effect1 Parameters (8+), set MOD Depth (A) to 12, MOD Speed (B) to 5, and Dry:Eff Balance (H) to eff (effect only). The reverb will have vibrato—not a real natural sound, but useful for some types of music.

The Velocity Switch combination is used to add a bit of punch to a program at high velocities by layering a second program on top of it. But it's easy enough to use velocity switching with effects routing, so that when you play hard you'll get exactly the same sound, but out of the other speaker. Use the same program in two different slots within the combination, and give one a 1/L output routing and the other a 2/R output routing. Another way to use this concept would be to give the program different effects depending on whether you play soft or hard. Depth or speed of chorusing could be controlled this way.

When programming, it's a good idea to switch off the effects and listen to your work dry, even if you're planning to use effects in the finished product. You may later want to use your creation in a combination or sequence, where you may be forced to make compromises with the effects needed by other sounds. By getting your filter cutoff and other settings as good as possible when the sound is dry, you'll minimize problems that might crop up later. The EQ parameters of nearly all of the effects are still active even when the effect is switched off. In order to eliminate the EQ you must either set it to 00 or select "no effect."

Factory drum kits 1, 2, and 3 route most of their sounds through the A or B inputs for stereo, but in sequence work you may want to reassign some of them. In this case, you can use the panpots to bring C and D back into your stereo outputs until you're ready to record the mix, at which time the panpots would be adjusted to "off."