EX5/5R/7
Additional Performance Setup Tips

The EX Performance mode can be used to create multi-track setups for song playback, layered or split voices for real-time performance, and it includes a comprehensive range of master keyboard functions. In this small leaflet we'll provide a few extra layering and sequencing tips and techniques that should help you to make full use of the EX synthesizers' advanced capabilities while avoiding timing problems which can occur if you attempt to push the technology beyond its limits.

Layered and Split Setups

Here are a few examples of layered and split setups that you might like to use as a starting point when creating your own. The procedure for creating each setup is oulined briefly below. Refer to the EX owner's manual for full details about the functions and parameters used.

■ Layered Piano & Pad

This is a fairly common layered combination in which a pad voice adds depth and richness to a basic piano sound.

1: Go to the Performance Job mode and execute the Init Perf function (manual page 173).
2: Engage the Performance Edit mode, press [F3] to go to the "MLT" (Multi) display, and assign the "P1-001 Natural Grnd" piano voice to Part 1 (manual page 171).
3: Assign the "P2-002 Warmer" pad voice to Part 2.
4: Scroll down to the Part 2 "Layer Sw" parameter and turn it "On".

■ Split Strings & Solo

In this split setup a strings voice is played on the left-hand section of the keyboard while a solo voice is played on the right-hand section.

1: Go to the Performance Job mode and execute the Init Perf function (manual page 173).
2: Engage the Performance Edit mode, press [F3] to go to the "MLT" (Multi) display, and assign the "P1-097 Swell String" voice to Part 1 (manual page 171).
3: Assign the "P2-093 TriLead" solo voice to Part 2.
4: Scroll down to the Part 2 "Layer Sw" parameter and turn it "On".
5: Scroll down to the "Nt Lmt H" parameter and set the Part 1 high note limit value to "B2".
6: Set the Part 2 "Nt Lmt L" parameter to "C3".
7: Scroll down to the "NoteShft" parameter and set the Part 1 note shift value to "+12".

With these setting all keys to the left of C3 should play the string voice while all keys to the right of (and including) C3 should play the solo voice.

	Lyr		Part 1	Part 2	Part
Bank			P1	P2	P1
Number			001	001	001
Volume	100		100	100	100
Pan	cnt		cnt	cnt	cnt
Rev Send	40		40	40	40
Cho Send	0		0	0	0
InsEF Sw			off	off	off
Out Sel			L&R	L&R	L&R
Detune	+0		+0	+0	+0
MonoPoly	poly		poly	poly	poly
KeyAsign			mlti	mlti	mlti
MDPanVol			off	off	off
Layer Sw			on	on	on
Nt Lmt L			C-2	C-2	C-2
Nt Lmt H			G8	G8	G8
VelLmt L			1	1	1
VelLmt H			127	127	127
NoteShft			+0	+0	+0
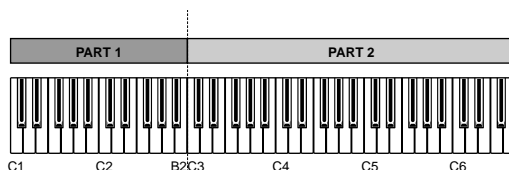
■ Velocity Switching

This setup will produce a piano or brass sound depending on how hard you play on the keyboard.

1: Go to the Performance Job mode and execute the Init Perf function (manual page 173).

2: Engage the Performance Edit mode, press [F3] to go to the "MLT" (Multi) display, and assign the "P1-001 Natural Grnd" piano voice to Part 1 (manual page 171).

3: Assign the "P1-065 Sect" brass voice to Part 2.

4: Scroll down to the Part 2 "Layer Sw" parameter and turn it "On".

5: Scroll down to the "VelLmt L" parameter and set the Part 2 low velocity limit value to 101.

6: Set the Part 1 "VelLmt H" parameter to 100.

Volume

Part 1   Part 2

1   127
Vel Limit High = 100   Vel Limit Low = 101
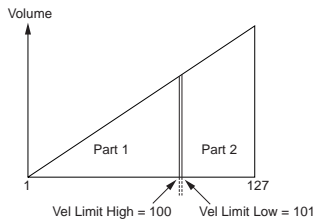
■ Split With Arpeggiator

This example illustrates how the EX Arpeggiator can be used with a split voice.

1: Go to the Performance Job mode and execute the Init Perf function (manual page 173).

2: Engage the Performance Edit mode, press [F3] to go to the "MLT" (Multi) display, and assign the "P2-027 CombiComp" voice to Part 1 (manual page 171).

3: Assign the "P2-010 BrethChoir" voice to Part 2.

4: Scroll down to the "Nt Lmt H" parameter and set the Part 1 high note limit value to "B2".

5: Set the Part 2 "Nt Lmt L" parameter to "C3".

6: Go to the "COM/ARP" (Common/Arpeggiator) display and set the Arpeggiator "NoteLim H" parameter to "B2" (manual page 160).

7: Select the "041 [PulsLine]" Arpeggiator type.

You should now be able to play the choir voice normally on all keys to the right of and including C3, while the Arpeggiator will apply only to the "CombiComp" voice played on all keys to the left of C3.

Layers & Voice Response

EX voices themselves can have from one to four layered elements. Up to 2 of these voices can then be combined (layered or split) in the EX Performance mode for even greater depth and richness. There are limitations, however, and the following points should be kept in mind when combining voices in the Performance mode.

■ Number of Elements

When two voices which use a large number of element layers are combined in the Performance mode, the extra processing power required can result in sluggish response when notes are played on the keyboard. This may be particularly noticeable on percussive voices which depend on a rapid attack for their sound. If this problem occurs, try combining voices which use fewer elements. The number of elements used by each voice appears in the upper left-hand corner of the Voice Edit display.

EL1

```
VOICE EDIT              P1-001[GlassE.P    ]
 ┌EL1┐OSC Wave --------------Bank= DRAM-
    Bank Num Cat          Level Pan Detune
1: DRAM 0093 --:Int-Wave   100 Rcnt R+ 0
2: PRE 0034 Pf:DX7S        100  cnt  + 0
-: --- ---- --:--------    ---  ---  ---
-: --- ---- --:--------    ---  ---  ---
 >PIT> [WAVE-EDIT]        WAVE MIX ZONE
```

■ Simultaneous Notes

● AWM Voices

The maximum simultaneous polyphony of the EX5 and EX5R AWM tone generator is 126 notes, and that of the EX7 is 64 notes. This number decreases, however, as the number of elements and layers used increases. For example, the maximum simultaneous polyphony when a 6-element performance setup is played on the EX5 will be 21 notes ($126 \div 6 = 21$).

● FDSP Voices

As you probably already know, FDSP voices are limited to 16-note polyphony on the EX5/5R (8-notes on the EX7). In the Performance mode, however, you have sufficient polyphony to use several AWM voices in addition to one FDSP voice when creating a song. Here's an example: Part 1 uses an FDSP voice with 2 elements. This voice will use $2 \times 16 = 32$ notes maximum (if 16 notes are actually played at the same time - a relatively rare occurence). In this case, you have 126 - 32 = 94 notes (or 48 on the EX7) available for additional AWM voices in Part 2 and subsequent parts. Each additional FDSP element will reduce the polyphony by another 16 (or 8) notes. Again, try to limit the number of voice elements you use in the Performance mode.

Although the EX instruments offer more than enough simultaneous note capacity for most applications, be aware that unnecessary elements and layers can reduce the available number of notes significantly. Always try to create voices and performance setups that use the capabilities of the EX-series instruments efficiently.

■ Static Control Filter

In addition to the DCF (Dynamic Control Filter) parameters, each voice element has a range of SCF (Static Control Filter) parameters including EQ and filters which can be used to shape the sound of the voice (manual page 86). The SCF parameters require a considerable amount of processing power, however, and can contribute to slow response. For situations in which the fastest possible voice response is essential, it may be better to set the SCF parameters to "Thru".

■ Zone Assignments & Voice Response

In the Voice Edit mode each voice element can be assigned a note and velocity zone (manual page 82). The note zone assignments, in particular, can affect voice response, so a brief explanation is in order. A graphic representation of the zone assignments for the current voice is provided in the Voice Edit/OSC(F2)/ZONE(F8) display.

When the full range of notes is assigned to all four elements in a four-element voice, for example, all four elements will sound when any single key is played so the total polyphony is reduced to 1/4, and the processing requirements are increased fourfold.
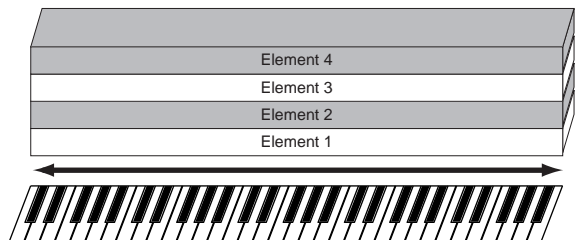
In the example below each element is assigned a different range of notes and none of the zones overlap, so only one element sounds when any single key is played. In this case the polyphony and processing requirements are the same as for a single-element voice.
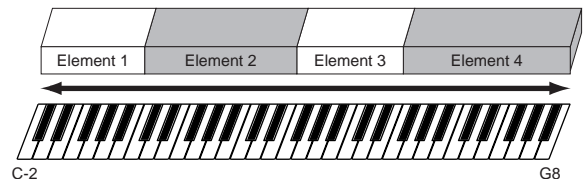
By expanding the above example it is possible to create as many as 8 split zones on the keyboard. It may be possible, for example, to assign more than 2 voices (which is the limit in the Performance Mode) to the keyboard. That way you can combine 2 voices each using up to 4 of the above zone assignments (with limited keyboard ranges) in order to achieve the desired results.

3

Tips For Creating Sequence Data

With a little care and forethought it is also possible to take maximum advantage of the EX instruments' capabilities when creating multi-track performance setups for sequence playback.

■ Polyphony vs. Simultaneous MIDI Note-on Timing

Although a synthesizer's "polyphony" specification indicates the number of notes that may play simultaneously at the same time, this is not the same as the number of notes which may be played via MIDI control with precisely the same note-on timing. For example, let's consider a MIDI sequence in which 128 notes have exactly the same note-on timing. The MIDI protocol usually requires about 1 millisecond to process a single note-on command. 128 note-on commands will thus require at least 128 milliseconds to process completely. At a tempo of 120, this is roughly equivalent to one 16th note! Clearly, this will result in audible delays.

■ Minimizing Audible Note Delays

Here are a couple of techniques you can use to minimize audible delays and general sluggishness when creating sequences with a large number of simultaneous note-on events.

● Clock Shift

In a sequencer with a quarter-note resolution of 480 clocks (the EX sequencer has 480-clock resolution), each clock corresponds to approximately one millisecond. Keeping this in mind, it is possible to set voices which must fall right on the beat to the precise note timing, while the timing of voices with a slower attack - strings, pads, etc., - can be shifted 2 or 3 clocks later. This type of fine adjustment can go a long way toward reducing the sluggishness of a "heavy" sequence.

Clock shifting can be easily accomplished in the EX sequencers by using the Play Effects feature (Manual page 189) to individually try out different amounts of clock shift for each track without actually changing the original data.

● Track Numbers

Another technique is to take advantage of the track-processing order of the particular sequencer used. The EX sequencer, for example, processes sequencer tracks in order from the lowest-numbered tracks to the highest. Thus timing-critical voices can be placed in the lowest-numbered tracks while less critical slow-attack voices can be placed in the higher-numbered tracks. The overall effect is similar to the clock-shift technique described above. Please note, however, that the effectiveness of this technique will depend on the track-processing order of the sequencer used for playback, and thus may not be suitable for sequence data destined for playback on a range of different sequencers.

● Playing SMF/GM MIDI Data On the EX Sequencer

> **NOTE**
>
> • Since the EX5, EX5R, and EX7 are not directly compatible with GM and XG files, such files may not play as expected.

In most SMF (Standard MIDI File) sequences, including GM and XG files, drums are assigned to track 10 and thus tone generators designed specifically to play back this type of MIDI data usually give playback priority to track 10 to ensure proper drum and percussion timing. Since the EX5, EX5R, and EX7 are primarily synthesizers, and have been designed for maximum user flexibility, track-10 playback priority is not employed. If you notice that the drum/percussion track of SMF data sounds sluggish when played back on the EX sequencer, try shifting the drum track 2 or 3 clocks earlier as described in the "Clock Shift" section, above.

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