YAMAHA

Voicing Parameter Reference Guide

DX7 II·FD/D

DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER

SUPPLEMENTAL BOOKLET

Welcome

This is the first in a series of booklets designed to provide a practical guide to creating your own sounds on the DX7 II. It describes all of the voice and performance parameters, the range of their values, and the general effect each one has on the final sound. The parameters are not presented in the order of their physical layout on the front panel. Instead, they are presented in the order most conducive to understanding FM synthesis.

Section 1 provides a brief introduction to FM synthesis on the DX7 II.

Section 2 describes the basic voice parameters, which determine the actual timbre of each voice.

Section 3 describes the voice effect parameters, which determine the keyboard and controller configuration of each voice.

Section 4 describes the performance parameters, which determine such things as the combination of different voices and the microtuning they will reflect.

For continuing information concerning the DX7 II FD/D, consult AfterTouch, the official publication of the Yamaha Users Group. Many advanced functions will be discussed in its pages in the coming months. There will also be information regarding the availability of other materials concerning more advanced applications. To receive a free copy of AfterTouch every month, send your request to AfterTouch, P.O. Box 7938, Northridge, CA 91327-7938. On your letter or postcard, be sure to indicate that you are the owner of a DX7 II FD/D.

Contents

1 Introduction

The DX7 II is a digital synthesizer capable of producing an almost infinite variety of sounds using a technique of synthesis known as FM (Frequency Modulation).

Introduction

The process of FM synthesis involves the modulation of one oscillator's frequency with the signal from another oscillator. In the DX7 II, oscillators are known as operators. Those operators which actually produce an audio output are called *carriers*. Operators which modulate the frequency of other operators are called *modulators*. The overall sound which results from combining carriers and modulators depends on many factors, including the specific combination of operators. Another important factor is the output level of each carrier (which affects the volume of the sound) and each modulator (which affects the timbre of the sound).

The DX7 II incorporates two sound modules, each consisting of six operators. The operators in each sound module can be combined into 32 different configurations of carriers and modulators. These configurations, known as algorithms, are depicted on the front panel of the DX7 II. They determine which operators will act as carriers or modulators, as well as their specific combination. In the diagrams shown on the front panel, the operators in the lowest row are carriers. Those appearing above the carriers are modulators. The lines connecting the operators indicate the signal paths.

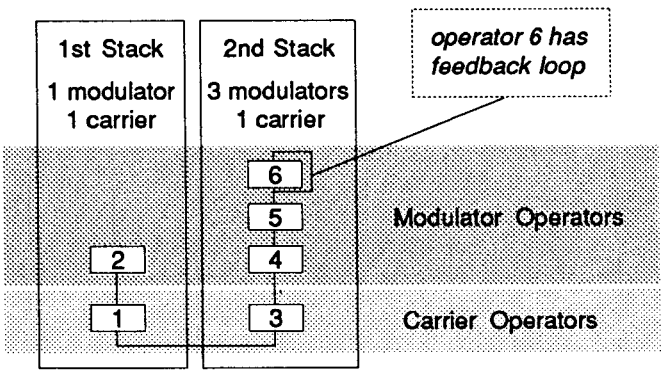
The parameters described in the following pages are accessed by pressing the appropriate button on the front panel. Some buttons display their parameters in several LCD "screens" which are selected by pressing the button repeatedly until the desired screen is displayed. The parameter to be edited is selected by positioning the cursor with the cursor keys. The parameter value is changed using the -1/+1 keys or the data entry slider.

2 Basic Voice Parameters

The basic voice parameters are used to shape the overall character of a voice. They are adjusted in the voice edit mode. This mode is entered by pressing one of the VOICE MODE SELECT buttons from the play mode, selecting the A or B voice with the A/B key, and pressing the EDIT button. The parameters described below are then accessed by pressing the appropriate button.

Algorithm Button (#7)

Algorithms form the foundation of FM synthesis. They determine which operators will act as carriers and modulators, the specific arrangement of operators, and the feedback path (described below). The following diagram represents Algorithm 1, and illustrates the various parts of any algorithm.



The Algorithm button (#7) provides access to the following parameters in a single LCD display.

Alg

The Alg (algorithm) parameter selects the algorithm to be used in a voice.

1 Algorithm 1
⋮
32 Algorithm 32

Algorithms determine the way in which the operators are combined as carriers and modulators. This has a fundamental impact on the types of sounds each algorithm can produce. For example, algorithm 17 creates good flute sounds, and algorithm 32 produces very good organ sounds.

Fbl

Each of the 32 algorithms has one feedback path. The output of one operator (usually a modulator) is directed back to its own or its modulator's input. The Fbl (feedback level) parameter adjusts the level of the signal returning along the feedback path.

0 No feedback
⋮
7 Maximum feedback

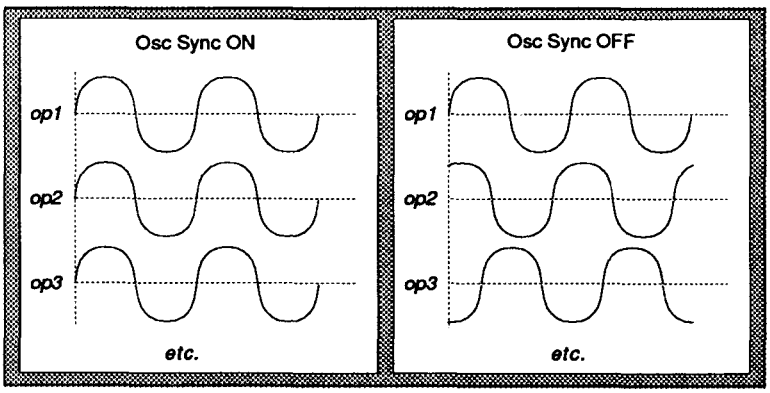
The effect of this self-modulation is not unlike that of modulation by another operator. It is often applied to string and brass sounds, as well as noise sounds with high level settings.

Osc.sync

Each DX7 II operator produces a sine wave. The Osc.sync (oscillator synchronization) parameter determines whether or not the sine waves all begin at phase 0. If they do, the timbre of a voice will evolve in the same way each time a key is pressed.

`off` Do not start operators' sine waves at phase 0 for each keypress.
`on` Start operators' sine waves at phase 0 for each keypress.

The following diagram illustrates the effect of this parameter.



If this parameter is off, the tonal transition will be smoother between notes played legato and more abrupt between notes played staccato. This is often effective for acoustic instruments.

Transpose

Normally, the pitch of the DX7 II keyboard is set so that the key marked with the small triangle corresponds to middle C (C3) with a frequency of 262 Hz. The transpose parameter allows you to shift the pitch of this key (and thus the entire keyboard) for any voice by half steps to as much as two octaves above or below the standard pitch.

`C1` Assign the pitch C1 to the marked key.
:
`C5` Assign the pitch C5 to the marked key.

This parameter is useful for adapting the keyboard range to suit the voice. For example, a flute or piccolo patch would be well served by transposing the keyboard pitch up. A bass sound would need a downward transposition.

Voice name

This parameter lets you name the voice you are editing with up to ten symbols. The available symbols (letters, numbers, etc.) are printed in brown below the Data Entry, Voice Mode Select, EG Copy, Performance, and number buttons.

To enter a name, move the cursor to the voice name parameter and hold down the Edit button, which has the word "Character" printed below it. While holding the Character button, enter the desired symbols by pressing the respective buttons. Pressing the Internal button while holding the Character button will produce lower case letters. The Cartridge button will produce upper case letters.

Output Level Button (#10) Part 1

The Output Level button (#10) provides access to various level and scaling parameters in two LCD displays. For the moment, only the level parameter itself will be described. The other parameters control the level scaling of the voice, and will be described later in this section.

The level parameter is accessed by selecting the normal scaling mode and pressing the Output Level button once.

Level

This parameter determines the output level (amplitude) of the selected operator.

`0` Operator's output level is 0 (operator is off).

⋮

`99` Operator's output level is at maximum.

This parameter is of fundamental importance to FM synthesis. The output level of a carrier influences the volume of the overall sound. Remember that carriers are operators which actually produce an audio signal. A modulator's output level influences the timbre of the overall sound. As the output level of a modulator increases, so do the number and strength of the harmonics in the sound.

Oscillator Button (#8)

The Oscillator button (#8) provides access to the following parameters in a single LCD display.

Mode

This parameter determines whether or not the pitch of the selected operator will vary as different keys are pressed.

`Ratio` Specifies that the selected operator will vary in pitch as different keys are pressed.

`Fixed` Specifies that the pitch of the selected operator will remain unchanged regardless of the keys being played.

The ratio mode is generally used by carriers to produce different musical notes as different keys are played. The fixed mode is useful for special effects sounds, and for the noise component found in many acoustic instrument sounds—such as the breath of a flute or the plucking of a harpsichord string.

Coarse/Fine

The frequency (pitch) produced by each operator is controlled primarily by the coarse and fine frequency parameters. The coarse parameter adjusts the pitch of the selected operator in large increments. The fine parameter performs the same task in small increments. They are used together to establish a pitch for the selected operator. The coarse parameter's maximum value is less than the highest possible total frequency value. The fine parameter is used to increase the total value beyond the maximum coarse value.

In fixed mode, the coarse and fine parameters specify the frequency of the operator in Hertz (Hz). In ratio mode, the frequency of the operator depends on the key being played. The coarse and fine parameters specify the interval between the operator and the standard pitch associated with each key. For example, setting the coarse and fine parameters to a value of 2.00 in ratio mode will cause the operator to sound one octave higher than the standard pitch level of the keyboard. A setting of 0.50 causes the operator to sound one octave lower than standard pitch.

Fixed mode values (in Hz)

1.000Hz	Lowest fixed mode value.
⋮	
1000 Hz	Highest coarse value
⋮	
9772 Hz	Highest fixed mode value.

Ratio mode values

0.50	Operator sounds one octave below standard pitch.
⋮	
1.00	Operator sounds at standard pitch.
⋮	
2.00	Operator sounds one octave above standard pitch.
⋮	
31.00	Highest coarse value (nearly 5 octaves above standard pitch).
⋮	
61.69	Highest ration mode value (nearly 6 octaves above standard pitch).

Remember that doubling the coarse and fine parameter values raises the pitch of the operator by one octave. In ratio mode, octaves below and above the standard pitch are obtained at values of 0.50, 1.00, 2.00, 4.00, 8.00, and so on. The ratio value forming a fifth with the standard pitch is obtained at 1.50 and the ratio value forming a third with the standard pitch is obtained at 1.25.

Detune

The detune parameter provides a "super fine" frequency control for each operator. It is used to shift the frequency of an operator by as much as 2 cents up or down (1 cent = 1/100th of a semitone). This parameter is independent of the coarse and fine parameters.

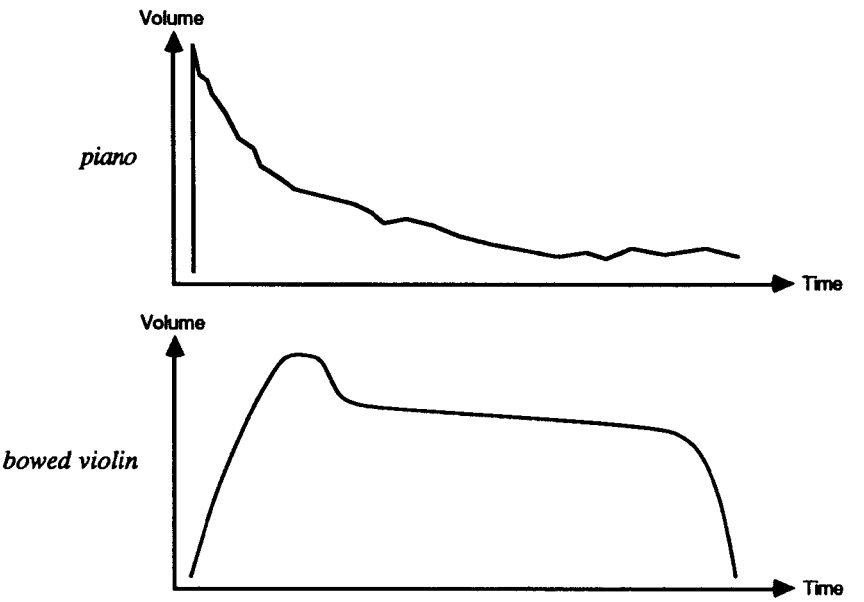
-7	Shift operator frequency down 2 cents.
⋮	
0	Do not shift operator frequency.
⋮	
+7	Shift operator frequency up 2 cents.

This parameter has many uses, particularly when simulating acoustic instruments. By nature, such instruments are never in mathematically perfect tune anyway. Small detune values increase harmonics, while large values create a chorus effect useful for large ensemble voices such as brass or strings.

EG Button (#9)

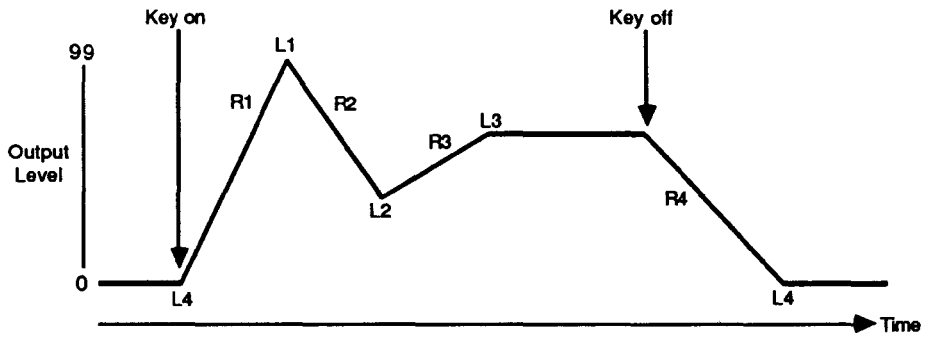
Each operator includes an envelope generator (EG), which allows you to specify how the operator's output level will vary over time from the moment a key is pressed until after it is released. This is used to create the envelope or "shape" of a sound.

For example, think of the difference between the sound of a note played by striking a piano key or bowing on a violin string. The volume of the piano note peaks almost immediately and decays very slowly until the key is released. The violin sound reaches its peak more slowly and retains a high level as the bow moves across the string.



All acoustic instruments have characteristic envelopes which shape the volume, timbre, and even the pitch of each note. The EG associated with each operator provides a means of simulating these envelopes in any DX7 II voice. By controlling an operator's output level over time, the EG of a carrier affects the shape of the volume envelope of a voice. The EG of a modulator affects the shape of the timbre envelope of a voice.

Each operator's EG is specified by four rates and four levels. These parameters are explained in detail below. The following diagram illustrates the output of a typical EG.



The EG button (#9) provides access to the following envelope parameters in a single LCD display.

L1-L4

Each envelope consists of four levels which affect the output level of the selected operator. These envelope levels are relative to the overall output level specified by the oscillator level parameter.

0 Level is 0 (silent)
⋮
99 Maximum level value

If an EG level is set to 0, the operator with which it is associated will produce no signal once that level is reached. Once an EG level of 99 is reached, the operator's signal will be at the amplitude specified by the oscillator output level parameter.

Level 1 (L1) is the first level reached after pressing a key. L2 and L3 are intermediate levels reached while a key is held down. Once L3 is reached, the operator output remains at this level until the key is released. L4 is reached after the key is released. Since most sounds fade to silence after a key is released, L4 in a carrier EG is almost always set to 0. The time it takes to reach each of the EG levels is determined by the rates, which are described below.

The envelope architecture employed by the EGs provides much more flexibility than the ADSR (Attack-Decay-Sustain-Release) envelopes found on older analog synthesizers. For example, the volume envelope of a flute cannot be simulated using an ADSR EG. However, it is a simple matter to simulate such an envelope with the EGs found on the DX7 II.

R1-R4

The time it takes to reach an EG level parameter during the course of a note is determined by the corresponding rate parameter.

0 Slowest rate (longest time) from one EG level to the next.
⋮
99 Fastest rate (shortest time) from one EG level to the next.

Rate 1 (R1) determines the rate at which the operator's level rises from L4 of the previous note (almost always 0) to L1. R2 specifies the rate at which the level move from L1 to L2, R3 specifies the rate at which the level moves from L2 to L3, and R4 specifies the rate at which the level moves from L3 to L4 after the key has been released.

Used in conjunction with EG levels, rates provide a completely flexible means of creating various volume and timbre envelopes. These can be used to simulate acoustic instrument envelopes or to invent new envelopes never before heard.

Rs

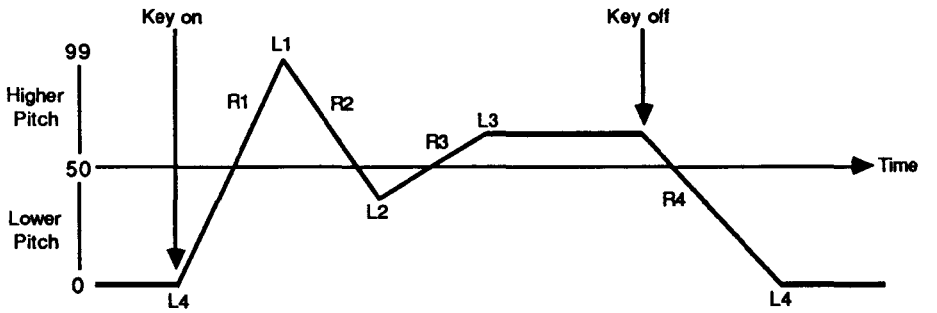
The first parameter in the EG display is the Rs (rate scaling) parameter. This parameter determines the extent to which EG rates will speed up as higher notes are played on the keyboard.

0 EG rates will not be affected by playing higher keys.
⋮
7 EG rates will be strongly affected by playing higher keys.

Rate scaling is used to simulate the change in the envelope of higher pitched notes evident in many acoustic instruments. For example, if you play the lowest and highest notes on a piano with equal force and hold the keys down, you will notice that the highest note dies away long before the lowest note. As higher notes are played, the EG rates become faster. Rate scaling allows you to duplicate this effect in your own DX7 II voices.

Pitch EG Button (#13)

Many musical sounds vary in pitch as well as in volume or timbre during the course of a note. The DX7 II includes a separate envelope generator that is applied to pitch, in addition to the individual operator level EGs. As with each operator's EG, the pitch EG is specified by four rates and four levels. These parameters are explained in detail below. The following diagram illustrates the output of the pitch EG.



Note:

The pitch EG affects only those operators set to the ratio oscillator mode described with the Oscillator button (#8) above.

The Pitch EG button (#13) provides access to the following pitch envelope parameters in a single LCD display.

L1-L4

The level parameters of the pitch EG are very similar to their counterparts in the operator EGs. The main difference lies in the fact that the pitch EG levels refer to pitch rather than output level. A pitch level of 50 represents the standard pitch of the instrument.

0 Lowest pitch level.
⋮
50 Standard pitch level.
⋮
99 Highest pitch level.

The difference in pitch between level values of 0 and 99 is determined by the range (Rng) parameter, which is described below.

R1-R4

The pitch EG rates are identical in function to the rates found in the operator EGs.

0 Slowest rate (longest time) from one pitch level to the next.
⋮
99 Fastest rate (shortest time) from one pitch level to the next.

When a note is played, its pitch level starts at L4 from the last note played. The pitch level moves to L1 at rate R1, then to L2 at rate R2, and then to L3 at rate R3. The pitch stays at L3 until the key is released at which time it moves to L4 at rate R4. Unlike the operator EGs, L4 is not necessarily set to 0.

Pitch envelopes can be very effective for a number of voices such as electric bass or plucked strings. However, it can become difficult to stay in tune with other instruments when you have set L4 to a value other than 50. To avoid this, set the pitch EG rate R4 to 0 or shorten the voice's release time by increasing the R4 rate in the carrier envelope(s).

Rng

The Rng (range) parameter determines the difference between the pitch level values 0 and 99.

`1/2oct`	Maximum pitch difference is 6 semitones (½ octave).
`1oct`	Maximum pitch difference is 1 octave.
`2oct`	Maximum pitch difference is 2 octaves.
`8oct`	Maximum pitch difference is 8 octaves.

Special effect voices often use large pitch range values to produce some rather crazy sounds.

Vel

The Vel (velocity) parameter allows you to control the intensity of the pitch EG's effect with key velocity. As the keys are played harder (faster), the changes in pitch specified by the pitch EG become larger.

`off`	Key velocity has no effect on pitch EG.
`on`	Key velocity effects pitch EG.

This parameter gives you very realistic control over "natural" voices such as bass, and can add a great deal of expression to "synth" voices.

Rs

This parameter performs the same function as the operator EG rate scaling. In this case, it affects the pitch EG. It determines the extent to which the pitch EG rates will speed up as higher notes are played on the keyboard.

0	Pitch EG rates will not be affected by playing higher keys.
⋮	
7	Pitch EG rates will be most strongly affected by playing higher keys.

As you play higher notes on the keyboard, the pitch EG rates become faster. Like operator EG rate scaling, this aids in creating more natural sounding voices.

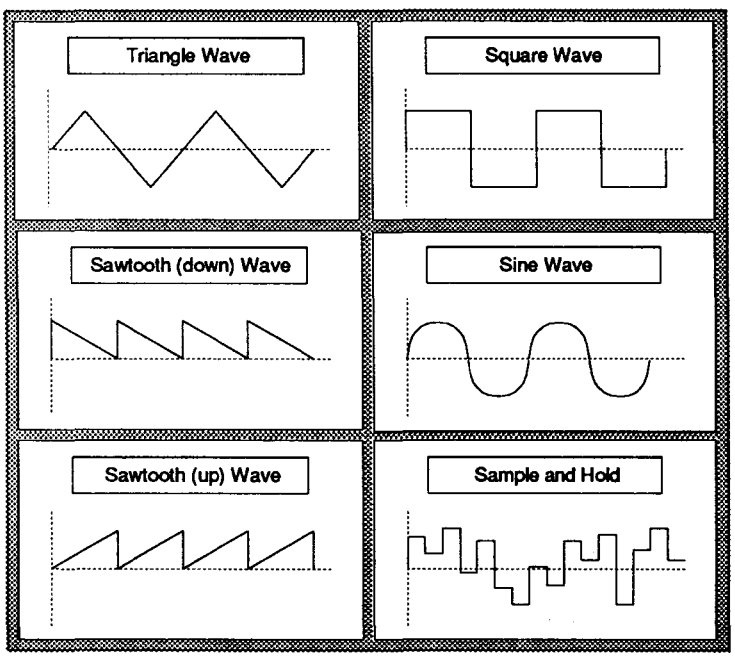
LFO Button (#12)

Vibrato and tremolo effects are achieved using a low frequency oscillator (LFO). An LFO generates a slow waveform at a frequency usually well below the range of human hearing. This waveform is used to modulate the pitch or output level of the operators. For example, applying LFO to the pitch produces vibrato. Application to operator output levels produces tremolo (for carriers) or a "wah-wah" effect (for modulators).

The LFO button (#12) provides access to the following LFO parameters in a single LCD display.

Wave

The waveform generated by the LFO is specified with this parameter. The available waveforms are shown below.



The best way to get acquainted with the effect each of these waveforms has on the overall sound is to try each one after learning how to adjust the LFO parameters. For example, the triangle or sine waveforms produce the most natural sounding vibrato and tremolo effects. The sample & hold waveform produces a random signal which can result in some very unusual effects.

Speed

The speed parameter adjusts the frequency of the LFO.

0 LFO frequency is 0 (LFO off).
⋮
99 Maximum LFO frequency.

Try the entire range of speeds to become familiar with this parameter's effect.

Delay

Most acoustic musical sounds do not begin with vibrato or tremolo immediately. These expressive techniques are usually employed after a certain delay. This parameter allows you to simulate this by specifying a delay time before the LFO signal is applied.

0 No delay time. LFO is applied from the beginning of each note.
⋮
99 Maximum delay time.

Experimentation is the best way to become familiar with the effect of this parameter.

Mode

This parameter can also be called the trigger mode. It is used to specify whether you wish all notes played to respond to the signal from a single LFO or to the signal from their own individual LFOs.

`Single` All notes respond to a single LFO.
`Multi` All notes respond to individual LFOs.

The DX7 II includes 16 LFOs, one for each of the 16 notes it can produce simultaneously. In single mode, the signal of one LFO is applied to all notes regardless of the rhythm or relationship between them. The LFO is applied to the first note played and all subsequent notes with the same phase. In multi mode, a separate LFO is invoked and applied to each note played, so the LFOs on the various notes will not be in phase with each other. This can be used to achieve uncanny realism in string ensemble voices, particularly with an adequate LFO delay. Since there is only one set of LFO parameters to specify on the DX7 II, the parameter values apply to all LFOs equally.

Pmd

There are two ways to produce vibrato by applying LFO to pitch: "automatic" (LFO is applied to any played note) and "controlled" (LFO is applied by operating a continuous controller such as the mod wheel). The PMD (pitch modulation depth) parameter controls the amplitude or intensity of the LFO signal as it is applied to pitch "automatically." This parameter acts like an output gain control for the LFO signal routed to modulate the pitch. (The intensity of "controlled" vibrato is determined by the Pmod parameter, which is described in the next section.)

`0` No LFO is applied automatically to pitch.
:
`99` LFO is applied automatically to pitch at maximum amplitude.

It is largely up to your discretion whether or not a voice should include automatic vibrato. It depends on the musical context and your playing style.

Amd

As with vibrato, the application of LFO to the operator output levels can be "automatic" or "controlled." The AMD (amplitude modulation depth) parameter controls the amplitude or intensity of the LFO signal as it is applied to output level "automatically." As with Pmd, this parameter acts as an output gain control for the LFO signal routed to modulate the operators' level. (The intensity of "controlled" tremolo or "wah-wah" is determined by the Amod parameter, which is described in the next section.)

`0` No LFO is applied automatically to output level.
:
`99` LFO is applied automatically to output level at maximum amplitude.

As you may recall, application of LFO to the output level of a carrier modulates the volume of the voice, producing a tremolo effect. Application of LFO to the output level of a modulator produces a "wah-wah" effect as the timbre of the voice is modulated.

Sync

The Sync (key synchronization) parameter performs a function similar to that of the Osc.sync parameter. In this case, it determines whether or not the waveform produced by the LFO will begin at phase 0 every time a key is pressed.

`off` LFO waveform does not start at phase 0 for each keypress.
`on` LFO waveform starts at phase 0 for each keypress.

Turning the Sync on is useful at slow LFO speeds for producing an identical effect during the attack of each note. Turning the Sync off produces more natural chorus or rotary speaker effects, since the LFO cycle is not influenced by the keys being played.

Sensitivity Button (#11)

The sensitivity parameters provide separate control over the intensity of effect the LFO and keyboard velocity have on each operator. Following the analogy drawn above, these parameters act as input gain controls for each individual operator.

The Sensitivity button (#11) provides access to the following parameters in a single LCD display. The operator to which they apply is selected in the usual manner using the operator select keys (#1-6).

Velocity

This parameter controls the effect of key velocity on each operator's output level.

0 Key velocity has no effect on operator's output level.
⋮
7 Key velocity has maximum effect on operator's output level.

Setting this parameter to a high value for a carrier will enable you to regulate the voice's volume by key velocity. Application to a modulator will provide key velocity control over the voice's timbre.

Ams

The Ams (amplitude modulation sensitivity) parameter adjusts the sensitivity of each operator's output level to the effect of the LFO.

0 Selected operator's output level will not respond to LFO.
⋮
7 Selected operator's output level will respond with maximum sensitivity to LFO.

This parameter is used with both "automatic" and "controlled" amplitude modulation.

Pms

The Pms (pitch modulation sensitivity) parameter is the exception among the sensitivity controls in that it affects all operators equally. It provides an input gain control for pitch modulation in the same way that Ams provides it for amplitude modulation.

0 Pitch will not respond to LFO.
⋮
7 Pitch will respond with maximum sensitivity to LFO.

As with Ams, this parameter is used with both "automatic" and "controlled" pitch modulation.

Output Level Button (#10) Part 2

Now that most of the basic voice parameters have been presented, it is time to finish with the rest of the output level parameters. In part 1 above, you learned how to adjust the basic output level of each operator. Other parameters are used to modulate this output level. The rest of the output level parameters can also be used to modify the output level of each operator independently.

Pressing the Output level button (#10) toggles between two different LCD displays. The first screen allows you to select the scaling mode, which is described below. The second screen depends on which scaling mode you have selected.

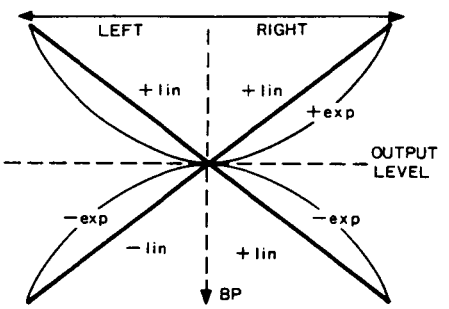
Scaling mode

The keyboard level scaling mode determines which scaling mode is used to alter the output level of the operators relative to the range of keys played on the keyboard. This allows you to change the volume or timbre of a voice in different regions of the keyboard. Keyboard level scaling is extremely important in creating realistic acoustical instrument voices. For example, consider the piano. The timbre changes as notes of different pitch are played. In addition, hitting the top and bottom keys with equal force does not produce sounds of equal volume. These effects can be simulated with keyboard level scaling.

The two scaling modes are described below. Each is accompanied by descriptions of the *parameters which appear in the second LCD display for that mode.*

Normal Scaling

The normal scaling mode is illustrated by the diagram on the front panel of the DX7 II. It is reproduced here for easy reference.



The meaning of this diagram will become evident as you read about the various normal scaling parameters.

Level

The level parameter is described in Output Level Button - Part 1 above.

Bp

The Bp (break point) parameter determines which key serves as the boundary between the right and left sections of the keyboard. The operator output levels of notes to the right of the break point are scaled according to the right curve and depth settings. Notes to the left of the break point are scaled according to the left curve and depth settings.

`A-1` Break point is located at A-1.
:
`C8` Break point is located at C8.

Setting this parameter is the first step in determining the keyboard scaling for a voice. The keys near the break point will be least affected by the keyboard scaling, and will therefore produce the fundamental timbre and volume of the voice on which you are working.

Lc/Rc

The right and left scaling curves determine whether the selected operator's output level will increase or decrease as keys to the right or left of the break point are played. In addition, the scaling curves describe how the output level will change as different keys are played. The Lc (left curve) and Rc (right curve) parameters can each be assigned the following values.

`-lin` Level will decrease linearly with increasing distance from the break point.
`-exp` Level will decrease exponentially with increasing distance from the break point.
`+lin` Level will increase linearly with increasing distance from the break point.
`+exp` Level will increase exponentially with increasing distance from the break point.

The negative curves decrease the output level as the distance from the break point increases. The positive curves increase the output level in a similar manner. The linear curves produce a more radical change in the output level than the exponential curves, which correspond more closely to the way in which we perceive sound. Exponential curves are therefore better suited to simulate natural volume and timbre changes found in acoustic instruments, while linear curves produce a more extreme effect.

After determining the break point, the right and left scaling curves should be selected. Consider whether you want the volume or timbre to become stronger (positive curve) or weaker (negative curve), in which direction (left or right of the break point), and with what type of scaling (exponential for more natural sounds, linear for more extreme effects).

Ld/Rd

The Ld (Left depth) and Rd (right depth) parameters determine the intensity with which the scaling curves will affect the selected operator's output level as keys to the left or right of the break point are played.

0 Left or right scaling curves will have no effect on the output level.
:
99 Left or right scaling curves will have maximum effect on the output level.

Fractional Scaling

Fractional scaling provides you with even finer control over the relationship between output level and key position than normal scaling. The output level of each operator can be scaled independently for individual groups of three keys across the entire keyboard. This allows you to create your own scaling curves to fit any type of voice.

To display the fractional scaling parameters, press the Output Level button (#10) until you see the scaling mode screen. Select fractional scaling and press the Output Level button again.

Ofst

The Ofst (offset) parameter allows you to increase or decrease the overall level setting of all key groups (each consisting of three keys).

-127 Decrease all level settings by the maximum amount.
:
0 Leave level settings unchanged.
:
+127 Increase all level settings by the maximum amount.

This parameter is a great help when you have just finished adjusting twenty key groups and you would prefer generally higher or lower level values.

C-2~G8
(Key Groups)

In the fractional scaling parameter LCD display, you will see note names separated with right-pointing arrows. Each note name is the lowest note of a key group. The number appearing below each note name represents the scaling value for that key group.

0 Minimum level scaling when keys in the selected key group are played.
:
255 Maximum level scaling when keys in the selected key group are played.

Key groups are selected using the Fractional/Micro Tune Key Set buttons (also labeled Internal and Cartridge). The note name in the center of the display is selected for editing its key group scaling value. The notes representing adjacent key groups appear to the right and left of the selected note name. The scaling value is edited using the +1/-1 buttons or the data entry slider. Should you wish to jump to an entirely different key group, press and hold either of the Key Set buttons and press a key corresponding to the desired key group.

Using the EG COPY Button

With nine EG parameters and many more keyboard scaling parameters to adjust for each operator, setting this data for several operators can be quite a chore. In many cases, however, identical or nearly identical data can be used for most, or all, of the operators in an algorithm. Once the EG and scaling parameters for one operator are set, you can copy these values to any other operator using the EG COPY button. This is an extremely handy procedure as you will learn when you start creating your own voices.

For example, while displaying the fractional scaling data for operator 1, press and hold the EG COPY button; you will see the message "EG & Scaling Copy OP1 to OP?" Select the desired destination operator by pressing one of the OPERATOR SELECT/EG COPY buttons (#2-6). Releasing the EG COPY button completes the operation.

3

Voice Effect Parameters

This section of the booklet describes the majority of voice effect parameters available on the DX7 II. These parameters are stored along with the basic voice data. They are described separately because they do not determine the basic timbre or volume. Instead, they control the effects that can be applied to voices by the keyboard and other controllers during a performance. These parameters are applied to voices as a whole, not to individual operators.

About Voice Effect Parameters

The voice effect parameters are conveniently accessed by the second row of voice buttons (#23-26). With the exception of the Key Mode button, all of the voice effect buttons display several LCD screens by repeatedly pressing them. The displays and their parameters are described below.

Key Mode Button (#23)

The Key Mode button (#23) provides access to the following parameters in a single LCD display.

Key mode

The DX7 II contains enough sound generators to produce up to 16 different notes simultaneously. The key mode determines whether one note or several can be played at the same time. In addition, it determines whether one or more sound generators are assigned to keys as they are played. This parameter is used in conjunction with the voice mode, a performance parameter which is described in the next section. The following table lists the possible key modes and the number of simultaneous notes available by combining them with the various voice modes.

Key Mode	Voice Mode		
	Single	Dual	Split
Polyphonic	16	8	8 + 8
Monophonic	1	1	1 + 1
Unison poly	4	2	2 + 2
Unison mono	1	1	1 + 1

The "normal" key modes assign one sound generator to each key played. The unison modes assign four sound generators to each key played. This results in a "fatter" sound in the unison modes. The normal modes have a cleaner, more delicate sound.

Note:

The DX7 II follows the principle of "last note priority." If you play more keys simultaneously than the maximum number allowed by a certain mode combination, the notes played later will sound while those played first will disappear.

Unison detune

In the unison key modes, an additional parameter appears in the key mode LCD display. This unison detune parameter works in a similar manner to the detune parameter found in the basic voice data. It shifts the pitch of the four sound generators assigned to a note away from each other.

0 No pitch shift among the four sound generators.
⋮
7 Maximum pitch shift among the four sound generators.

By slightly altering the pitch of the sound generators, a "fat" chorus or ensemble effect can be achieved. This is useful for sounds such as string or brass ensembles.

Pitch Bend/ Portamento Button (#24)

This button provides access to a variety of voice effect parameters. The three LCD screens are displayed by pressing the button repeatedly until the desired screen appears.

Pitch bend

The pitch bend parameters regulate the effect of the pitch bend wheel (labeled "Pitch") to the left of the keyboard. They also regulate the effect of a pitch bend message received at the MIDI In jack from an external instrument.

Range

The range parameter determines the range of pitch bend you can achieve with the pitch wheel.

0 The pitch wheel will have no affect on the pitch of the instrument.
1 The pitch wheel will bend the pitch by as much as 1 semitone (half step) up or down.
⋮
12 The pitch wheel will bend the pitch by as much as 12 semitones (1 octave) up or down.

The range parameter is used in conjunction with the step parameter described below.

Step

In most musical circumstances, you will use the pitch wheel to create a smooth bending or "sliding" of the pitch. However, sometimes you may wish to hear a "stepped" pitch bend, during which the pitch is shifted by discrete steps as the pitch wheel is moved. The step parameter provides this capability.

0 The pitch wheel bends the pitch smoothly with no steps.
1 The pitch is bent in steps of 1 semitone.
⋮
12 The pitch is bent in steps of 12 semitones (steps of 1 octave).

The step parameter has priority over the range parameter. If the step parameter is set to anything other than 0, the range is automatically set to its maximum value of 12 and cannot be adjusted.

Mode

The pitch bend mode parameter allows you to specify which notes of a chord will be affected by the pitch wheel. In addition, it determines whether or not pitch bend is applied to notes sustained by the sustain pedal. The four available mode values have the following effect on the pitch bend effect.

Pitch Bend Mode	Chord notes affected	Applied to sound sustained by sustain pedal?
Normal	all notes	yes
Low	lowest note only	yes
High	highest note only	yes
Key on	all notes	no

There are many applications for this parameter. Try the high mode setting with normal (or 1 semitone stepped) full range pitch bend combined with the LFO multi mode vibrato on a string ensemble voice. You can use the pitch wheel to play a high melody while the rest of the notes are being sustained with the right hand.

Portamento

Portamento is a voice effect found on even the earliest synthesizers. It allows you to "glide" smoothly from one note to another. For example, a piano cannot be played with portamento. A violin, trombone, or even a human voice can glide from note to note very easily. The DX7 II provides very flexible portamento parameters which are described below.

Mode

Portamento mode determines the type of gliding between notes in conjunction with the key mode. The following parameters are available when a polyphonic key mode has been selected.

`sus-key p retain` (sustain: key pitch retain) Portamento will not affect notes being sustained by a hold pedal. Pitch of sustained notes is retained.

`sus-key p follow` (sustain: key pitch follow) Portamento will affect the pitch of sustained notes. The pitch of the sustained sound glides to the pitch of the next key(s) played, "following" those keys.

In either of the mono key modes, the following portamento modes are available.

`fingered` Glide will occur only if a second key is pressed before the first key is released. This gives you finger-tip control over the portamento effect. A slightly "portato" playing style (releasing a key very briefly before playing the second key) avoids portamento. An exaggerated legato playing style (releasing a key an instant after playing the next one) will provide portamento between notes.

`full time` Portamento is applied to all notes at all times. Pitch gliding is applied even when playing staccato.

The best way to understand these two sets of modes is to try them out. Be sure that the time parameter (see below) is set to 70 or so in order to hear the effects.

Step

Like the pitch bend step function, the portamento step parameter allows pitch gliding to occur in "steps" or jumps. These steps are selected by the following values.

0 Portamento occurs smoothly with no steps.
1 Portamento occurs in steps of 1 semitone.
⋮
12 Portamento occurs in steps of 12 semitones (steps of 1 octave).

This parameter is used to create the effect of rapidly played scales. A step value of 1 causes chromatic scales to be played between notes.

Time

This parameter determines the time it will take to glide from one note to the next.

0 No time between notes. This turns portamento off altogether.
1 Shortest time from one note to the next.
⋮
99 Longest time from one note to the next.

At a value of 1, the portamento effect is generally not perceived unless the notes are very far apart. At the maximum value, the pitch changes most slowly. Incidentally, portamento can be turned on and off with foot switch 2 if so programmed. In this case, the time setting should not be 0.

Random pitch

Depth

The third LCD display accessed by button #24 allows the specification of the random pitch depth. This parameter detunes all the keys on the keyboard at random. The range of detuning grows as the setting increases.

0 No random detuning.
⋮
7 Widest range of detuning.

This function is used primarily for sound effects. If you want to hear something wild, though, try setting the depth to 7 and playing familiar chords using a standard instrument sound.

BC/MW/AT Button (#25)

This button provides access to the breath controller (BC), modulation wheel (MW), and aftertouch (AT) parameters. Each set of parameters is displayed by pressing the button repeatedly until the desired screen appears.

Breath control/Aftertouch

Breath control and aftertouch have identical parameters, and so are combined in this booklet. While the programming procedure is the same for both voice effects, their use is not.

A breath controller is plugged into the jack located next to the headphone jack at the front of the DX7 II. It is a device into which air is blown in order to achieve wind-like articulations as the keys are played. The following parameters will have no effect if there is no breath controller connected to the instrument.

Aftertouch is activated by pressing down on the keys after a note has been played. As with the breath controller, this can be used to affect the pitch or output level of the operators in a voice. The harder a key is pressed down, the greater the effect.

Pmod

The Pmod (pitch modulation) parameter adjusts the intensity of LFO vibrato effect as it is invoked by the breath controller or aftertouch. As the value of this parameter increases, so does the range over which the pitch is modulated by the LFO whenever breath controller or aftertouch are used.

0 BC or AT will not invoke pitch modulation at all.
⋮
99 Pitch modulation will be at maximum amplitude when BC or AT is applied.

Remember that the PMS parameter must be adjusted accordingly if you plan to use breath controller or aftertouch to invoke vibrato.

Amod

The Amod (amplitude modulation) parameter provides the same control over output level modulation (tremolo or "wah-wah") as Pmod does over pitch modulation.

0 BC or AT will not invoke level modulation at all.
⋮
99 Level modulation will be at maximum amplitude when BC or AT is applied.

Remember that the AMS parameter must be adjusted accordingly if you plan to use breath controller or aftertouch to invoke tremolo, "wah-wah," or other output level modulation effects.

EGbias

The EGbias parameter provides direct breath or aftertouch control over the output level of operators whose AMS parameter has been adjusted to a high value. This function does not involve the LFO at all.

0 BC or AT have no effect on the output level of operators with appropriate AMS values.
⋮
99 BC or AT have maximum effect on the output level of operators with appropriate AMS values.

This parameter allows you to regulate changes in the volume or timbre of a voice with the breath controller or aftertouch.

Pbias

The Pbias (pitch bias) parameter enables you to produce pitch bend effects using the breath controller or aftertouch. The value of this parameter determines the pitch bend range and direction.

-50 Application of BC or AT produces maximum pitch bend downward.
:
0 Application of BC or AT produces no pitch bend.
:
+50 Application of BC or AT produces maximum pitch bend upward.

This is handy when you are playing the keyboard with both hands and need to bend the pitch.

Modulation wheel

This LCD display allows you to program the modulation wheel parameters. They are identical to the breath controller and aftertouch parameters with the exception that there is no Pbias. This means that you can program the modulation wheel to invoke pitch modulation, amplitude modulation, and direct output level control. It cannot be programmed to produce pitch bend; this is accomplished with the neighboring pitch bend wheel.

In the descriptions of the Pmod, Amod, and EGbias parameters above, simply substitute the words "modulation wheel" for "breath controller or aftertouch." These descriptions will then relate to the modulation wheel.

FC1/FC2 Button (#26)

This button allows you to program two continuous foot controllers which can be connected to the DX7 II rear panel foot controller jacks 1 and 2. These foot controllers are used to regulate various effects in a manner similar to the breath controller, aftertouch, and modulation wheel. The foot control parameters have no effect unless FC-7 foot controllers are connected to the corresponding jacks on the rear panel of the DX7 II.

The parameters available for each foot controller are displayed by pressing the button repeatedly until the desired screen appears. In addition, this button provides access to a third LCD display containing several MIDI control parameters. As the foot control parameters for each foot controller are nearly identical, their descriptions are combined below.

Foot control 1/2

If you look at the Foot control 1 and 2 LCD displays, you will notice that they are essentially similar. The familiar parameters Pmod, Amod, and EGbias are programmed in exactly the same manner as they are for breath controller, aftertouch, and modulation wheel. Please refer to the descriptions of these parameters above and remember that, in this case, they relate to the foot controllers.The new parameters are described below.

CS1

This parameter is available only for foot controller 1. Turning on the CS1 (continuous slider 1) parameter duplicates the function(s) currently programmed for continuous slider 1 (located next to the data entry slider) with foot controller 1.

`on` Duplicate the function(s) programmed for CS1 with FC1.
`off` Do not duplicate the function(s) programmed for CS1 with FC1.

This provides additional flexibility to control various voice effects with CS1 or FC1. The available CS1 functions are described in the next section of this booklet.

Vol

This parameter allows you to use either or both of the foot controllers as volume pedals, one of the major means of expression for synthesizers. The parameter value determines the volume control range for each foot controller.

`0` Foot controller does not affect volume.
:
`99` Widest range of volume control.

For example, you could program one foot controller with a narrow range for more "delicate" passages and the other foot controller with a wide range for stronger expression.

MIDI IN control

This display allows you to program the effect of an external MIDI controller such as the modulation wheel or foot controller of an external MIDI instrument whose MIDI Out jack is connected to the MIDI In jack of the DX7 II.

The parameters themselves include Pmod, Amod, EGbias, and Vol. As you'll recall, these are the same parameters as those available for foot controller 2. They perform the same function here, except that they apply to an external MIDI controller rather than an internal DX7 II controller. Please refer to the descriptions of these parameters above. The values should be set to 0 if no external MIDI controller is connected to the MIDI In jack.

The number appearing under the display label "MIDI IN Control" is the controller number affected by the parameter values. A list of these numbers and the controllers they represent can be found in the MIDI 1.0 Specification published by the International MIDI Association, 11857 Hartsook St., North Hollywood, CA 91607, (818) 505-8964.

4 Performance Parameters

Until now, only those parameters pertaining to a single voice have been described. The DX7 II is capable of combining two entirely different voices to produce even richer and fuller sounds. The performance parameters determine the way in which voices are combined. These settings are stored in the performance memories (as opposed to the voice memories) for later use and modification.

About Performance Parameters

Performance parameters are adjusted in the performance edit mode. This mode is entered by pressing the Performance button followed by the Edit button. The #27-30 buttons then provide access to the performance parameters. These buttons each display several LCD screens. Press the appropriate button repeatedly until the desired screen is displayed.

The following descriptions are presented in an order conducive to learning rather than in the order of their appearance on the front panel. This presentation also suggests the order in which the parameters should be programmed.

Voice Mode Button (#28)

The parameters made available with the Voice Mode button are among the first to consider when programming a performance configuration. This button provides access to three LCD displays. The parameters in these displays are described below.

Voice mode

This parameter performs exactly the same function as the three voice mode select buttons on the front panel of the DX7 II. It selects the voice mode for your performance configuration.

`single` Play Voice A only across the entire keyboard. Provides up to 16 note polyphony.

`dual` Combine Voices A and B across the entire keyboard. Provides up to 8 note polyphony.

`split` Play Voice A only with the keys to the left of the split point and Voice B only with the keys to the right of the split point. Provides each voice with up to 8 note polyphony.

Notice that the currently selected voices (A & B) are displayed in this LCD screen as well. To select different voices for your performance configuration, follow the procedure below.

1. Press the Performance button to enter performance mode.
2. Press and hold the Performance button, and press the Voice Mode Select button that corresponds with the voice mode specified by the voice mode parameter (i.e. the Select button with a lit LED above it); if the Performance button is not held down you will get an initialized performance. You can now release both buttons.
3. If you have specified the dual or split voice mode, press the A/B button if necessary to select voice A or B for new voice selection.
4. Use the number buttons (and the 1-32/33-64 button if necessary) to select the desired voice.
5. Repeat steps 2 & 3 if necessary to select the other voice.
6. Press the Edit button to return to the performance parameters.

The voice mode parameter allows you to combine different voices in various ways. For example, the right side of the keyboard could be used to play a piano voice while the left side plays a bass voice in split mode. Dual mode allows you to combine or layer sounds such as two different components of a complex sound.

Total volume

The next two parameters appear in the same LCD display. The total volume parameter provides control over the total volume of a performance configuration.

0 Total volume is 0 (no sound will be heard at all).
:
99 Total volume is at maximum.

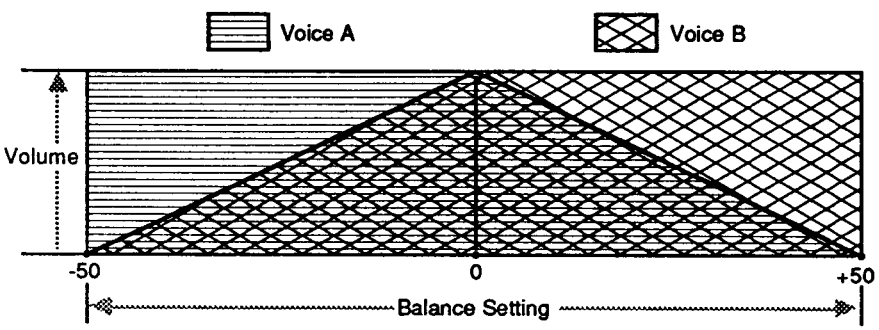
This allows you to obtain similar volume levels for all performance configurations.

Balance

The volume balance between voices A and B in the dual and split voice modes is adjusted with this parameter. It does not appear if the single voice mode is selected.

-50 Volume of voice A is maximum, volume of voice B is 0.
:
0 Both voices A and B are at their maximum volume.
:
+50 Volume of voice B is maximum, volume of voice A is 0.

The diagram below illustrates the relationship between the parameter values and the actual balance.



A value of 0 will not necessarily achieve an equal volume level between the voices. If voice A is a "loud" sound and voice B is a "soft" sound by virtue of their respective carrier levels, voice A will dominate if the balance is set to 0.

Dual detune

This parameter appears only in dual voice mode. Its function is similar to that of the oscillator detune parameter. Instead of affecting the frequencies of the operators within one voice, the dual detune parameter shifts the pitch of the two voices away from each other.

0 Voices A and B are not detuned with respect to each other.
⋮
7 Voices A and B are detuned by ¼ of a semitone (25 cents).

This parameter is used to achieve a richer sound and chorus effects, particularly with ensemble voices such as brass, strings, and electric organ.

Split point

Effective only in the split voice mode, this parameter determines the key which divides the keyboard between voices A and B. Voice A is always controlled by the lower half of the keyboard, including the split point key.

C-2 Set split point at C-2.
⋮
G8 Set split point at G8.

Setting this parameter can be accomplished using the +1/-1 buttons or the data entry slider. In addition, it can be set using the keyboard itself. With the split point parameter in the LCD display, simply play the key you wish to be the split point.

To change the split point in the same way after selecting it in this manner, you must cycle through the LCD displays by repeatedly pressing the voice mode button (#28) until the split point display appears again. A new split point can then be selected by playing any key on the keyboard. The +1/-1 buttons and the data entry slider can be used to change the split point at any time.

Pan Button (#30)

The pan parameters are among the most impressive effects in the DX7 II. You may be familiar with the pan controls on audio mixers. These controls allow sound to be shifted anywhere between the extreme left and extreme right of the stereo field. The pan parameters of the DX7 II control the placement of the voice(s) in the audio output stereo image.

There are three basic pan functions.

1. Independent output of voices A and B from the two audio jacks in dual and split voice modes.
2. A panning function which allows you to move the stereo position of an A+B voice mix (or a single voice) between the two audio outputs in any voice mode.
3. A level control for each of the voice A and B volume levels in dual and split voice modes.

While all three functions cannot be used simultaneously, functions 1 and 3 always work in conjunction with each other. Functions 2 and 3 can be regulated by LFO, key velocity, key position, and EG.

The pan parameters are effective only with stereo amplification (or with headphones connected directly to the DX7 II). Also, the small LED above the right cursor button must be on. If it isn't, return to play mode by pressing the Performance button or one of the voice mode select buttons. The right cursor button acts as the pan on/off button only in play mode. In edit mode, it must be available to position the cursor. Press the right cursor button while in play mode to activate the pan functions.

Note:

If the pan function has been turned off (indicated by no light above the right cursor button), the two audio outputs and both channels of the headphone output will deliver the same sound (a mix of voices A and B). No panning effects are possible in this case.

No descriptions can do justice to the pan effects. The best way to fully understand them is to try them out as soon as you learn about each one.

Mode

There are four pan modes available in the dual or split voice modes. Mode 0 is automatically selected for single voice mode. These pan modes are described below.

`0: Mix` The sound of voice A (mixed with B in dual or split voice mode) is sent equally to both audio outputs. The panning function (#2 above) operates in this setting only. This allows the sound to be moved in the stereo field between the audio output jacks according to the selected factor described below.

`1: A;on B;on` Both voices are sent independently to their respective audio outputs, A/Mix and B. The level control function (#3 above) is operative for both voices.

`2: A;on B;off` Both voices are sent independently to their respective audio outputs. The level control function (#3 above) is operative for voice A only.

`3: A;off B;on` Both voices are sent independently to their respective audio outputs. The level control function (#3 above) is operative for voice B only.

Range

Range determines the intensity of the effect programmed with the select parameter described below.

`0` Disables selected effect.

⋮

`99` Intensity of selected effect is maximum.

Select

This parameter determines which of the available effects will be applied to the panning function (available only in pan mode 0) or the level function (available in pan modes 1-3).

`LFO` The selected function (panning or level) is controlled by the LFO of the voice used (in the dual and split voice modes, the LFO of voice A). The apparent location of the sounds varies between the two outputs periodically with the frequency and waveform of the LFO.

`Velocity` The selected function is controlled by the velocity with which you play the keys, in the following ways:

Key Velocity	Panning Function (PAN MODE = 0)	Level Function (PAN MODE = 1 ~ 3)
Slower	Greater audio output from the A/MIX jack	Greater audio output of voice A from the A/MIX jack
Faster	Greater audio output from the B jack	Greater audio output of voice B from the B jack

`Note number` The selected function is controlled by the distance from C3 of the played keys in the following ways:

Key Location	Panning Function (PAN MODE = 0)	Level Function (PAN MODE = 1 ~ 3)
Farther left from C3	Greater audio output from the A/MIX jack	Greater audio output of voice A from the A/MIX jack
Farther right from C3	Greater audio output from the B jack	Greater audio output of voice B from the B jack

Be sure to listen to the effects described above, setting the range value to 99.

Pan EG

The pan EG is a special envelope generator which can be used to control the panning or level functions over the duration of a note. This EG shapes the way in which the voice(s) are distributed between the audio outputs.

R1-R4 The rates behave in an identical manner to those of the level and pitch EGs. They determine the speed with which one level changes to the next.

0 Slowest speed from one level to the next.
⋮
99 Fastest speed from one level to the next.

L1-L4 The levels of this EG have different meanings than the ones in the level or pitch EGs. These meanings depend on the selected stereo function.

Level	Panning Function (PAN MODE = 0)	Level Function (PAN MODE = 1 ~ 3)
0 ~ 49	Greater audio output from the A/MIX jack	Greater audio output of voice A from the A/MIX jack
51 ~ 99	Greater audio output from the B jack	Greater audio output of voice B from the B jack

Notice that there is no mention above of a level value of 50. A level of 50 places the stereo image in the middle between the output jacks. To turn this effect off, set all of the levels to 50.

FS/CS Button (#27)

This button provides the opportunity to program the function of an optional FC-4 or FC-5 on/off footswitch connected to the FS and/or Sustain FS jacks on the back panel of the DX7 II. In addition, this button allows the programming of the two continuous sliders (CS1 and CS2) located next to the volume slider on the left side of the front panel. CS2 becomes the data entry slider in edit mode.

The FS/CS button displays several LCD screens. Press the button repeatedly until each of the screens described below appears. In these screens, the A and B parameters are used to individually turn the effect of each foot switch and continuous slider on or off for voices A and B in dual or split mode.

Sustain foot switch

A/B

The sustain foot switch (connected to the sustain foot switch jack) is used to hold notes after their keys have been released. This screen determines whether or not the sustain foot switch will affect voice A (and/or B in dual or split voice mode). Move the cursor to the A or B parameter and specify ON or OFF.

Foot switch

This screen provides control over the foot switch connected to the FS jack.

Select

The specific effect controlled by the foot switch is selected with this parameter. The choices are described below.

`Sustain`	Provides another sustain pedal, which can be used in conjunction with the sustain foot switch to apply sustain independently to the two voices in dual or split modes.
`Portamento`	Allows you to switch the portamento function on and off using the foot switch.
`Key hold`	Provides a "sostenuto" effect. Only those keys which are held down when the foot switch is pressed are sustained. Notes played after the foot switch is pressed will not sustain.
`Soft`	Softens the timbre of notes played while the foot switch is pressed.

Range

This range parameter appears only when the soft function described above is selected. It determines the intensity of the softening effect.

0 No softening effect is produced even if the soft function is selected.
⋮
7 Softening effect is at maximum.

CS1/CS2

The last two LCD displays allow you to program the two continuous sliders (CS1 and CS2). A total of 105 different parameters are available to apply with each of the continuous sliders. This lets you use these sliders as very fine and flexible performance controls.

Select

The following parameters are available for selection in each of the CS screens. In the edit mode, CS2 becomes the data entry slider which is used to select the parameter to be affected by either of the continuous sliders back in the play mode. Using a slider in the edit mode to select the effect it will have in the play mode may be a bit confusing at first, but you'll soon get the hang of it.

The available parameters are listed from the top to the bottom position of the data entry slider as it is used to select them.

```
OP6-1 Total level
OP6-1 AMP. MOD. SENS.
OP6-1 Key Velocity
OP6-1 EG Level 4-1 (L4-L1)
OP6-1 EG Rate 4-1 (R4-R1)
OP6-1 OSC. detune
OP6-1 Frequency fine
OP6-1 Frequency coarse
Portamento time
Pitch EG Level 4-1
Pitch EG Rate 4-1
LFO A MOD. Depth
LFO P MOD. Depth
LFO P MOD. SENS.
LFO Delay time
LFO Speed
LFO Wave
Feedback level
Algorithm
Dual detune
PAN control
Output balance(A/B)
Total volume
No Effect
```

In the dual or split voice modes, the selected parameters can be controlled for either or both of the A and B voices. In single mode, the A parameter must be on for CS control to be effective. Notice that in selecting Output balance (A/B), only the A parameter is turned on and off.

Micro Tune Button (#29)

This button provides access to some of the most fascinating performance parameters to be found in the DX7 II. These parameters allow you to select different "microtunings" stored in the instrument's memory. These microtunings are the result of individually tuning each key on the keyboard to a pitch value which may or may not correspond to one of the twelve pitches usually found on synthesizers, pianos, and other contemporary musical instruments. This allows music to be played in scales and temperaments other than the familiar "equal tempered" scale used today.

The theory behind microtuning and the procedures for implementing it on the DX7 II are found in the microtuning series of supplemental booklets from Yamaha. Please refer to these booklets for detailed information on microtuning and the DX7 II.

As with all of the performance buttons, this one displays different LCD screens by repeatedly pressing the button. Some of these screens present parameters which have nothing to do with microtuning.

Micro tuning

This screen provides access to the microtuning performance parameters.

Table select

The DX7 II has eleven preset microtunings in its permanent memory. A detailed description of these presets can be found in the Supplemental Booklet "Exploring the Preset Microtunings." In addition, there are two internal memory and 63 cartridge locations where you can store your own microtunings. This parameter allows you to select any one of the preset, internal, or cartridge microtunings to apply to either or both of the voices. Remember, your cartridge must be properly formatted to store and recall cartridge microtunings.

```
Preset  1 Equal temperament
Preset  2 Pure (Major)
Preset  3 Pure (Minor)
Preset  4 Mean tone
Preset  5 Pythagorean
Preset  6 Werckmeister
Preset  7 Kirnberger
Preset  8 Vallotti & Young
Preset  9 1/4 Shifted equal
Preset10 1/4 Tone
Preset11 1/8 Tone
User    1 Programmed tune
User    2 Programmed tune
CRT     1 Cartridge tune
          :
CRT    63 Cartridge tune
```

Key

When using presets 2-5, the actual tuning will vary according to the key in which the music is played. This parameter allows you to select any one of the twelve available keys for music to be played with one of these presets.

A/B

These two parameters turn the microtuning function on and off individually for each voice. Turning the microtuning function off automatically sets the voice to equal temperament. Turning it on applies the microtuning specified by the table select parameter to the voice. In single voice mode, you need only to turn on the A parameter to apply the selected microtuning.

Note shift

A/B

This parameter lets you shift or transpose the pitch of the entire keyboard for either or both of the voices. It can be applied to each voice individually.

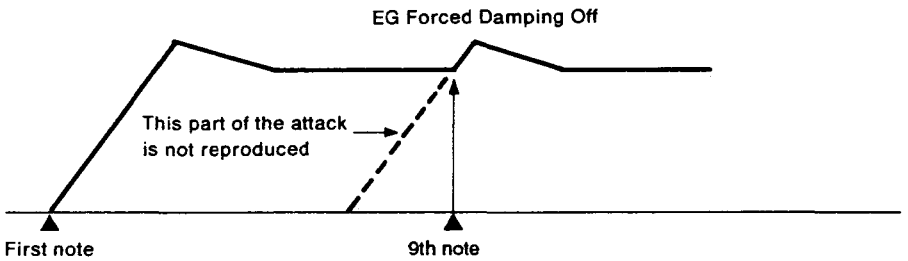
-24 Shift the pitch down by 24 semitones (2 octaves).
:
0 No pitch shift.
:
+24 Shift the pitch up by 24 semitones (2 octaves).

When shifting the pitch in the single voice mode, use the A parameter to specify the transposition.

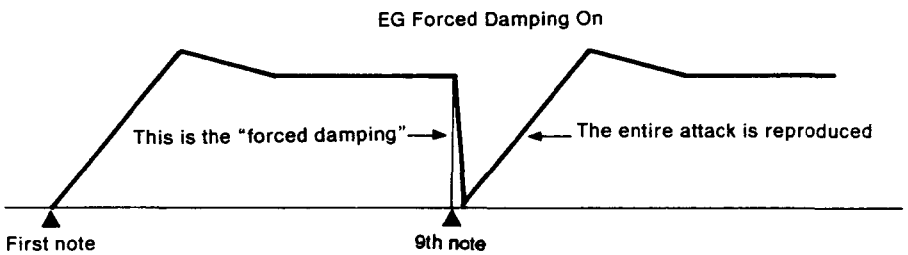
EG forced damp

As you know, the DX7 II is a 16 voice polyphonic instrument capable of playing as many as 16 notes simultaneously in single or split voice mode. In dual mode, up to 8 notes can be played together. In this case, and when using the sustain pedal, the number of notes you try to play may exceed the number of notes playable by the instrument.

If this happens, the first notes to be played will cease in order to "make room" for the new notes. Since these later notes are considered by the DX7 II to be "continuations" of the notes that have ceased to sound, part of the attack of the new notes may not be reproduced. The result of turning forced EG damping off is shown in the diagram below.



This can be avoided if desired by turning EG forced damping on. Doing so forces the envelope to quickly drop to 0 (referred to as "damping") so that the new sound can start with a complete attack.



This function is particularly effective for sounds—such as brass voices—in which timbre changes during the attack are very important. If forced damping is not used with these voices, the notes exceeding the note limit will not sound brass-like, because the attack portion is missing.

Note:

Due to the very short time it takes to damp the previous envelope, using this function will slightly delay the attack of notes exceeding the note limit. It should not be used when playing voices such as piano or organ where the attack is very fast.

Performance name

As with voices, performance configurations can be named for easy identification. Performance names can be twice as long as voice names—up to 20 characters. The available symbols are those used in the voice names, identified by their brown color and position under many of the buttons on the front panel. Naming is also performed in an identical manner.