

YAMAHA

Advanced Controller Usage

DX7 II-FD/D
DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER
SUPPLEMENTAL BOOKLET

Welcome

This Supplemental Booklet describes the numerous controllers available for the DX7 II, and illustrates how to set them up. It also suggests practical musical applications that can be used as a starting point for your own experimentation.

Section 1 introduces the major categories of controllers.

Section 2 discusses the internal controllers built into the DX7 II.

Section 3 discusses the external controllers that may be plugged into the controller jacks of the DX7 II.

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}.

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Introduction

Introduction

The DX7 II employs a wide range of controllers, both Internal and External, to give the musician control over a wide range of expressive nuance. Controllers may be used in subtle ways, to make minute changes in timbre and volume during a delicate passage, or they may be used in radical ways, to alter the entire character of a sound with keyboard velocity sensitivity or voice parameter changes in real time. A single controller can be used to manage several voice effects simultaneously, or several controllers can be set individually to control effects such as LFO modulation and EG Bias on either or both of the voices available on the DX7 II. The ability to change Voice and Performance parameters quickly and easily—while performing—opens the door to greater creativity in musical performances.

Controllers may be grouped into two categories: 1) on/off switch controllers; and 2) variable-input continuous controllers. Switch controllers do just what their name implies: They are used to turn various settings on and off. For example, a Sustain Pedal is a switch controller that turns sustain ON and OFF on the DX7 II. Continuous controllers, such as Sliders and Foot Controllers, are used to vary an adjustable setting. For example, a continuous controller can be used to adjust the volume output from the DX7 II.

Section 2 of this booklet will discuss Internal Controllers—the sliders, wheels, and controls (including the keyboard itself) that are built into the DX7 II. Section 3 will discuss External Controllers—the Foot Switches, Foot Controllers, and Breath Controller that may be connected to the DX7 II using its numerous controller jacks.

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Internal Controllers

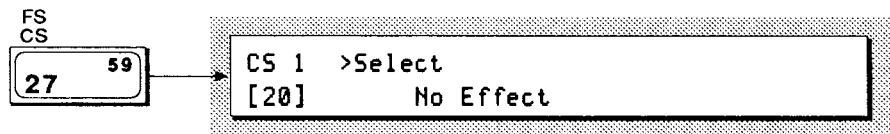
Volume Slider

Continuous Sliders

The Volume Slider may be thought of as a master volume for the DX7 II. It controls the volume from the headphone jack as well as the audio output jacks. In other words, it provides direct audio control (as opposed to MIDI volume control). Its overall effect on loudness for each DX7 II Voice or Performance is dependent on a number of other factors, such as the foot controller settings (since they may also control volume), velocity sensitivity settings (since how hard the keys are struck may affect volume), and the carrier operator output level setting (since they determine the output level of a selected Voice).

Both continuous sliders (CS1 and CS2) can be programmed to control a number of voice parameters, making them a particularly flexible tool for use in live performance. To avoid confusion, remember that CS1 and CS2 perform the “controller” functions assigned to them only in the Play mode. In the Edit Mode, their functions are fixed (as part of the editing process: CS1 controls the volume balance between voices A and B (in either Split or Dual mode), and CS2 becomes the data entry slider. Also, remember that parameter settings for CS1 and CS2 are stored as part of Performance memory (not Voice memory).

To access and change the CS1 and CS2 settings, enter the Edit Mode and push button #27 until the following is displayed:



Use the Data Entry buttons or the data entry slider to scroll through the various parameters that may be controlled by either CS1 or CS2 in the Play Modes. In the Dual and Split modes, the selected parameters can be controlled for either one or both of the DX7 II's voices (A and B). In the Single mode, the ">A" parameter must be ON for a CS slider control to function. A total of 105 parameters are available for control by the CS1 or CS2 sliders, offering an amazing variety of applications.

To explore one example of CS control, follow these steps: First, load the Voice and Performance data from Bank 1 of the DX7 II ROM cartridge (shipped with your unit) into the Internal memory. Next, select Internal Performance 4 (called "Dual Clavinette"). In this Performance memory, CS1 is set to control the Coarse Frequency of operator 5; this allows you to change the timbre and create a "filter sweep" effect. CS2 is set to control the EG Rate 1 of operator 1; this allows you to control the initial attack of the voice. The two sliders can be used to customize the sound to suit your taste. They may also be used to "play" the sound to create a variety of interesting effects. While playing the keyboard, move the sliders up and down, and listen to their effect on the sound. For additional information, refer to the Supplemental Booklet on "Real Time Parameter Change."

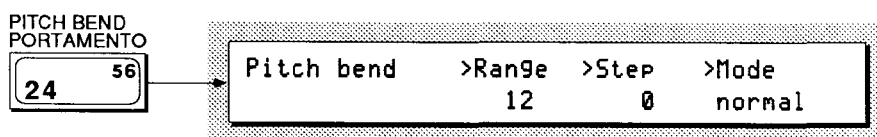
Wheels

Pitch Bend Wheel

The Pitch and Modulation Wheels are continuous controllers with specific functions.

The Pitch Bend Wheel is used exclusively for pitch bend effects, allowing you to “bend” the pitch of a note (or notes) up and down. The range of Pitch Bend is adjustable either continuously or in steps. A unique feature of the DX7 II is the Pitch Bend Mode setting. This allows you to select which notes of a chord are affected (all notes, high note only, or low note only), and whether or not the pitch bend is applied to notes sustained by a foot switch controller (Key On Mode).

To experiment with this control, enter the Edit Mode and push button #24 until the following is displayed:



Edit the Range, Step interval, and Mode parameters for Pitch Bend using the cursor buttons and Data Entry slider (or buttons) to toggle through each possible setting.

The Range may be set to a number from 0 (no effect) to 12 semitones (one octave). This setting defines the amount of pitch bend up or down from the center position. The Pitch Wheel is spring loaded and will always return to the center position (original pitch) when released.

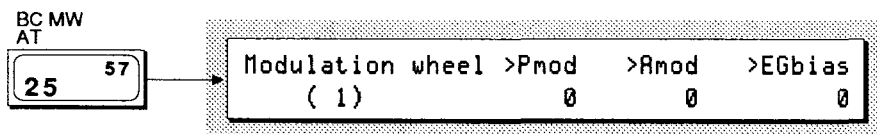
The Step parameter also operates in a range from 0 (no effect) to 12 semitones (one octave). However, this setting refers to the interval of change controlled by the Pitch Wheel. A setting of 0 results in a continuous change over the range determined by the Range setting. A setting of 1 to 12 semitones causes the pitch to be changed in a “stepped” manner: Instead of sliding up or down, the pitch moves in steps whose interval is determined by this setting. If the Step value is anything but 0, the Range value is automatically set to 12 (one octave).

Use the Data Entry buttons to select one of the available Mode settings. The Normal setting allows all notes to be affected by the Pitch Bend Wheel. The Low setting allows only the lowest note in a chord to be affected. The High setting allows only the highest note in a chord to be affected. The Key On setting allows all notes except those sustained by a foot switch to be affected—allowing you to sustain a chord while using the Pitch Bend effect on additional (fingered) notes.

Modulation Wheel

The Modulation Wheel may be programmed to control a number of parameters (such as Pitch Modulation, Amplitude Modulation, and EG Bias) to create vibrato, tremolo, wah-wah, or volume effects. It does not return to its initial position when released, so a setting can be maintained while playing. Mod Wheel effects are programmed and stored as part of Voice memory.

To experiment with this function, enter the Edit Mode and press button #25 until the following is displayed:



Again, use the cursor buttons and Data Entry slider (or buttons) to toggle through each possible setting for Pmod, Amod, and EGBias.

The Pitch Modulation setting adjusts the depth of vibrato effect (pitch change) controlled by the Modulation Wheel. The range of the setting is from 0 (no effect) to 99. Raising the value increases the maximum depth of the vibrato effect (as controlled by the Mod Wheel). This effect is also dependent on the Pitch Modulation Sensitivity setting programmed into the LFO (for all operators). Refer to the Supplemental Booklets on FM Voicing for more detailed information.

Amplitude Modulation operates in the same manner as Pitch Modulation, except that it affects the depth of tremolo (periodic output level change). It is also dependent on the Amplitude Modulation Sensitivity setting in the LFO for each operator.

The EG Bias setting gives you control over operator outputs. Modifying a carrier operator with EG Bias allows you to control the volume. Modifying a modulator operator with EG Bias allows you to control the timbre (brilliance) of a voice. The LFO has no effect on EG Bias. EG Bias operates in conjunction with the Amplitude Modulation Sensitivity setting for each operator in a voice. The range of possible EG Bias values is 0-99.

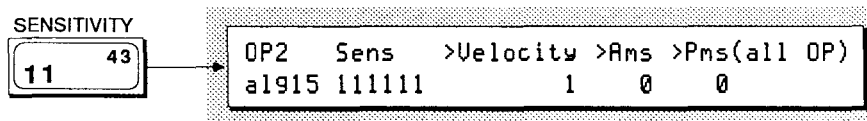
Pitch Modulation and Amplitude Modulation can be very effective for adding vibrato to a string section or tremolo to a flute voice. In the Dual Mode, EG Bias can add a dramatic effect when used to "bring in" a string voice in conjunction with a piano voice.

Keyboard Control

Key Velocity

The keyboard itself is a very powerful and expressive controller. Its sensors can read both “velocity” (the speed with which a key is struck) and “aftertouch” (the additional pressure applied to keys that are already held down).

Numerous aspects of a voice, such as volume or timbre, may be programmed to respond to key velocity. Therefore, a voice may become louder or brighter according to how hard the keyboard is struck. Key Velocity Sensitivity is programmed into each operator. It is accessed by entering the Edit Mode and pressing Button #11 until the following is displayed:



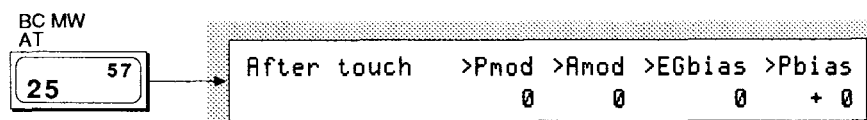
Use the cursor buttons to select Velocity. The range is from 1~7; the amount of sensitivity for each operator is set using the Data Entry buttons or slider. Buttons #1~6 are used to select the operator to be programmed. In the display shown above, Operator 2’s Velocity Sensitivity is set to 1.

The choice of operators determines the way in which the sound is changed by Velocity Sensitivity: If a carrier operator is controlled by Velocity Sensitivity, the result is a change in volume; if a modulator operator is controlled by Velocity Sensitivity, the result is a change in timbre. Thus, the choice of operators determines whether a voice becomes louder or brighter according to how hard the keyboard is struck.

Aftertouch

Aftertouch may be used to control Pitch Modulation, Amplitude Modulation, EG Bias, and Pitch Bias. By increasing the pressure on a key after it is struck, you can create a “swell” in volume or timbre, or can introduce a gradual increase in vibrato or tremolo depth. These capabilities may be programmed independently for each voice.

Aftertouch settings are programmed in the same manner as Modulation Wheel settings. Enter the Edit Mode and press button #25 until the following is displayed:



Again, use the cursor buttons and Data Entry slider (or buttons) to toggle through each possible setting for Pmod, Amod, EG Bias, and Pitch Bias (Pbias). The Pitch Bias setting allows you to bend the pitch up or down with Aftertouch control. The setting range is from zero (0) to ± 50 . A setting of zero (0) produces no effect, while a setting of ± 50 bends the pitch 25 semitones. This function is very useful for producing “string-bending” effects on a guitar voice without removing your hands from the keyboard.

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External Controllers

External Controllers

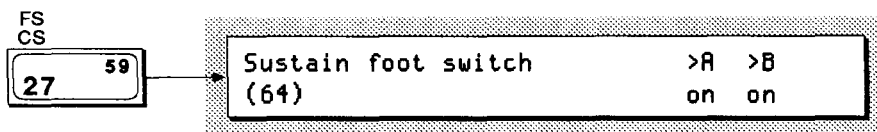
Foot Switches

Sustain Jack

External controllers for the Yamaha DX7 II include one or two optional Yamaha FC4 or FC8 Foot Switches, one or two optional FC7 Foot Controllers, and an optional BC1 or BC2 Breath Controller. These can control many of the voice effect parameters (such as Pitch Modulation, Amplitude Modulation, EG Bias, Pitch Bias, Sustain, Soft Pedal, and Portamento) while leaving both hands free to play the keyboard.

Since Foot Switches are on/off controllers, they are used to control functions that are either ON or OFF. The Yamaha FC4 and FC8 foot switches resemble a piano's foot pedals, and are connected via either one (or both) of the Foot Switch jacks on the back of the DX7 II. They can be used to control the Sustain, Portamento, Key Hold, and Soft Pedal functions. All Foot Switch parameter settings are stored as part of Performance memory.

When an FC4 or FC8 is plugged into the Sustain jack, it functions like a piano's sustain pedal. However, the actual effect of the pedal depends on the Sustain function setting in the currently selected Performance. To access and select a value, enter the Edit Mode and press button #27 until the following is displayed:



Note that the Foot Switch can be used to control the Sustain for outputs A and/or B. If both values are set to OFF in a Performance memory, the Sustain Foot Switch will have no effect on either voice.

FS Jack

When an FC4 or FC8 is plugged into the FS (Foot Switch) jack, it can be set to control any one of four different functions: Sustain, Portamento, Key Hold, or Soft Pedal. To set these controls, enter the Edit Mode and press button #27 until the following is displayed:



The cursor on the display will be flashing on the "Select" option. Press the Data Entry buttons to step through the four possible functions.

When set to Sustain, the Foot Switch operates just as if it were plugged into the Sustain jack. The Sustain effect can be set individually for Voice A and Voice B. Use the cursor buttons to select a voice (A or B), then use the Data Entry buttons to turn the control On or Off. This is useful if you want to control the sustain independently for voices A and B, using two Foot Switches.

When the Foot Switch is used to control Portamento, it will turn the Portamento effect ON or OFF for that Performance. The various Portamento parameters are programmed in the voice itself. Foot Switch control can then be assigned independently to voices A and/or B, and stored in a Performance Memory.

The Key Hold feature is similar to the sostenuto feature on an acoustic piano. This allows certain “pedal” tones to be sustained without leaving the fingers on the keys. Additional notes played with the pedal held down will not sustain. To hear how this works, select a piano voice (such as Internal Performance 5) and play a note or chord. While holding the keys down, press and hold the Foot Switch. The note or chord will sustain as long as the Foot Switch is held down, but any notes played afterwards will not. Again, this feature can be set individually to affect voices A and/or B in a Performance Memory.

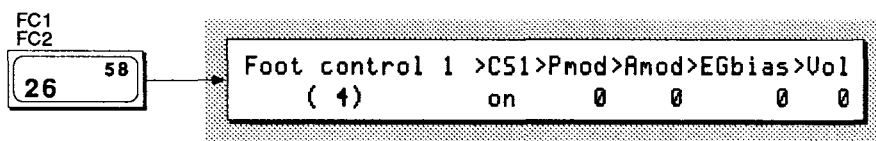
With the Foot Switch assigned to Soft Pedal, it behaves like the “soft pedal” of an acoustic piano. However, unlike the soft pedal on a piano, the effect is adjustable. The range of the Soft Pedal is defined by adjusting the “Range” parameter in the display: a setting of 0 has no effect, and the “softening” effect increases as the value is raised from 1~7.

Both Foot Switch jacks can be used at the same time. The Foot Switch plugged into the Sustain jack always controls Sustain, while a second Foot Switch (plugged into the FS jack) can be used to control Sustain, Portamento, Key Hold, or Soft Pedal effects.

Foot Controllers

An optional Yamaha FC7 Foot Controller, plugged into the FC1 or FC2 jack on the rear panel of the DX7 II, provides continuous control over a variety of functions. The FC7 resembles a volume pedal in operation: rocking the pedal all the way forward selects the maximum setting, and rocking the pedal all the way back selects the minimum setting.

To experiment with Foot Controller functions, enter the Edit Mode and press button #26 until the following is displayed:



By repeatedly pressing button #26, you may choose either Foot Controller 1 (FC1) or Foot Controller 2 (FC2). Use the cursor buttons to toggle through the Pitch Modulation (Pmod), Amplitude Modulation (Amod), EG Bias, and Volume parameters. Then use the Data Entry buttons or slider to enter values.

Notice that Foot Controller 1 has an additional parameter called CS1. This allows you to control any parameter assigned to CS1 from Foot Controller 1. In other words, any of the 105 FM Voice parameters that may be assigned to CS1 in Performance Memory can be controlled by FC1. This both expands the effects available with the Foot Controller and leaves both hands free for playing. (A complete discussion on how to apply this exciting technique is available in the Supplemental Booklet called "Real Time Parameter Change.") Please notice that only Foot Controller 1 (FC1) can be assigned to a CS1 parameter; FC2 has no provision for connection to an internal slider.

The Foot Controller settings for Pitch Modulation, Amplitude Modulation, and EG Bias operate just as they do for the Internal Controllers (such as the Modulation Wheel and Aftertouch), which are discussed in section 2 of this booklet.

When set to control Volume, the Foot Controllers works in conjunction with the Volume slider built into the DX7 II. The internal slider always retains overall control of the output volume. For example, if the Volume slider is at a mid-point setting and the Foot Controller is programmed with a Volume setting of 99 (full effect), the Foot Controller can adjust output Volume only between zero and the mid-point setting of the Volume slider.

Breath Control

An optional Yamaha BC1 or BC2 Breath Controller, plugged into the Breath Controller input on the front of the DX7 II, provides yet another method for control and expression. Blowing into the mouthpiece of a Breath Controller allows you to introduce vibrato, tremolo, volume, and pitch bend effects, all without the use of your hands.

While the programming procedure for the Breath Controller is identical to that of Aftertouch (discussed in section 2 of this booklet), the effects achieved in performance may differ markedly (since the two controllers use distinctly different methods of articulation). The tonguing techniques available with a Breath Controller offer very authentic articulation of a Brass or Saxophone voice.

Notes
