YAMAHA

DX7 II·FD/D

DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER

OWNER'S MANUAL

Welcome

Welcome to the DX7 II FD/D, the newest members of the growing family of FM digital synthesizers from Yamaha. Using the industry-standard DX7 as its starting point, the DX II offers a number of important new features, such as improved sound quality, two-layer voice programming, additional FM features, new performance options, an expanded front-panel LCD display, and on-board disk storage (on the DX7IIFD).

Since there is so much material available on the DX7 family of synthesizers (and on the theory of FM digital synthesis), this manual will not be an FM tutorial. Instead, it has been designed to be a "users manual" in the truest sense — it's goal is to help you make music with your new DX7IIFD as quickly as possible.

If you are already familiar with the operation of the original DX7, this manual will help you make the transition to the DX7IIFD in short order. On the other hand, if this is your first FM digital instrument, this manual will guide you into the operation of your new synthesizer with easy-to-follow, step-by-step instructions and explanations.

After you are comfortable with the operation of your new synthesizer, you may want to explore the fascinating world of FM digital voicing. If so, consult the extensive list of reference works on FM synthesis listed in the bibliography at the back of this manual.

Tips

The DX7 II FD/D has been designed for years of trouble-free use. In order to ensure that it remains a healthy member of your family of musical instruments, please keep the following tips in mind:

Installation:

When setting up the DX in your home or studio, avoid exposure to direct sunlight or other sources of heat. Environments with excessive dust, cold, dampness, or vibration can also damage your instrument. Even though the DX is electronic, you should treat it with the same kind of care you would lavish on any other musical instrument.

Also, since the DX is electronic, you should make sure not to set it too close to equipment (such as a television set) that generates electromagnetic fields. Such proximity could cause both malfunctions in the synthesizer's digital circuitry and interference noise in the other unit.

Moving:

When you move your DX, make sure to insert the head protection sheet into the disk drive — the magnetic head of the drive is very sensitive to vibration, and needs this protection if it is to survive road work.

Handling:

The DX is sturdy, but it can do without rough handling. Don't subject it to sudden jolts (such as dropping it), as this can damage the internal circuitry. If you plan to travel with it, be sure to use a road case. Also, make sure not to apply excessive force to any of the keys, buttons, or other controls.

Cleaning:

To clean or dust your DX, use nothing more than a clean, slightly damp cloth. Using chemical solvents will damage the finish, and using too much water may do considerable damage to the internal circuitry.

AC Power & Other Equipment:

When you are using the DX with an amplifier or mixer that has unbalanced outputs, connect both units to the same AC outlet to avoid hum.

If you use a number of electronic instruments in your setup, you may want to consult an electrician, who can make sure that your system does not overtax the available power.

AC Power & Down Time:

Whenever the DX will not be used for an extended period of time, it is best to protect it from potential disaster. Electrical storms and other natural or man-made disasters can give rise to power surges, which may damage the digital circuitry of your DX — even if the power is turned off. Either unplug your instrument when not in use, or invest in power strips with surge protectors to safeguard all of your electronic equipment.

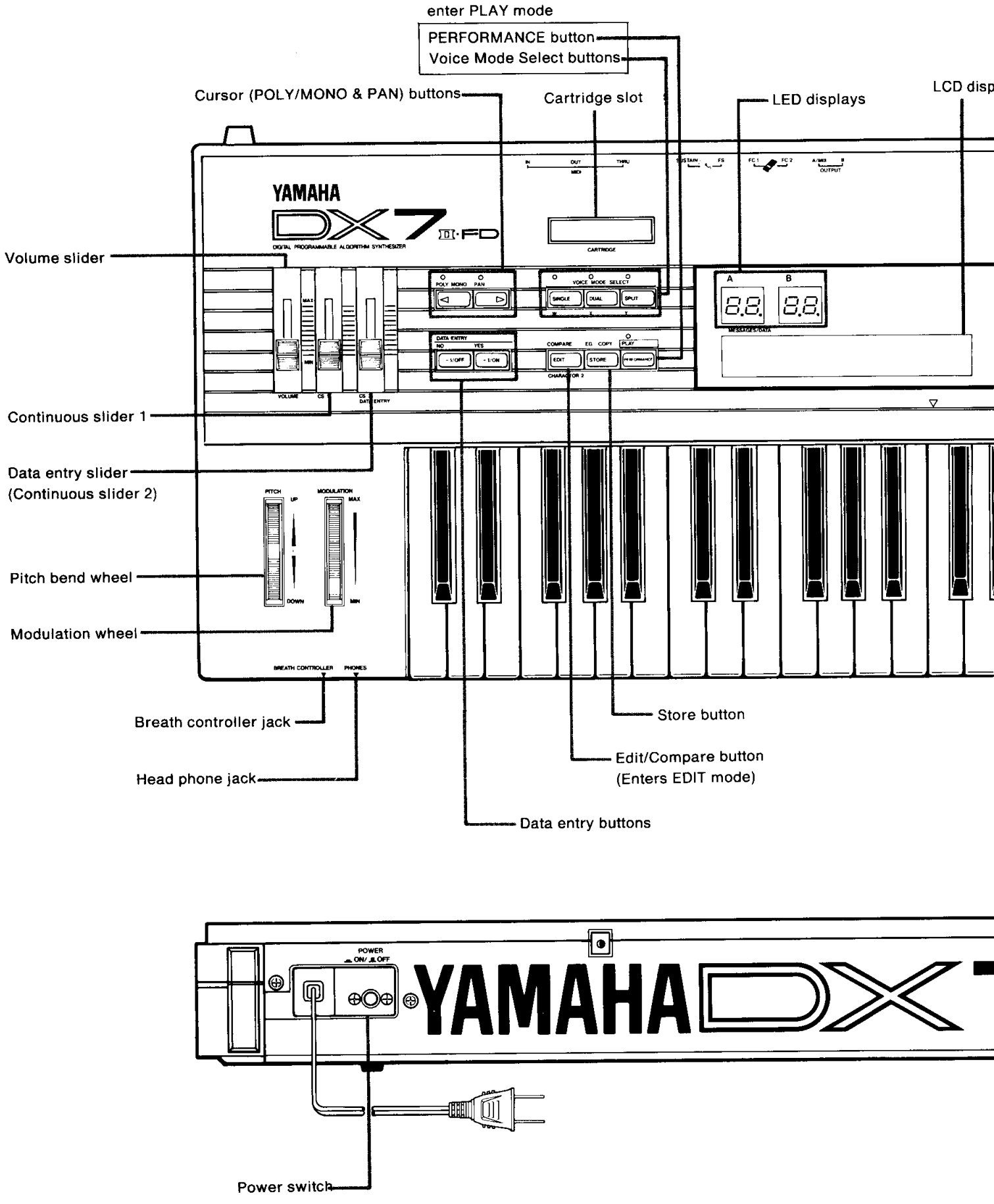
Service & Your Warranty:

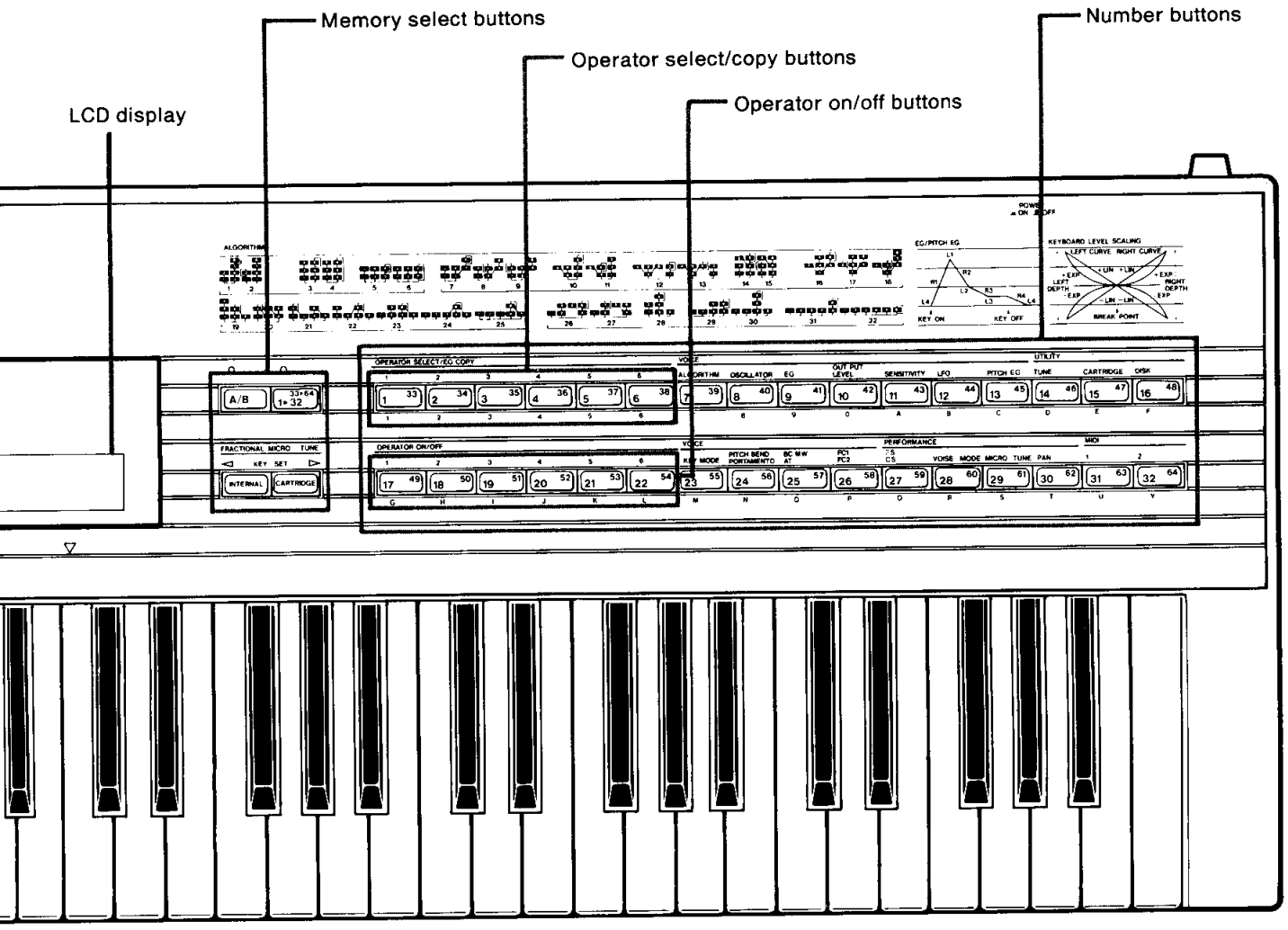
The DX contains no user-serviceable parts. Opening it up or tampering with it in any way will void the warranty, and may also lead you to experience some nasty electrical shocks. If you have a problem with your instrument, please take it to an authorized Yamaha service center.

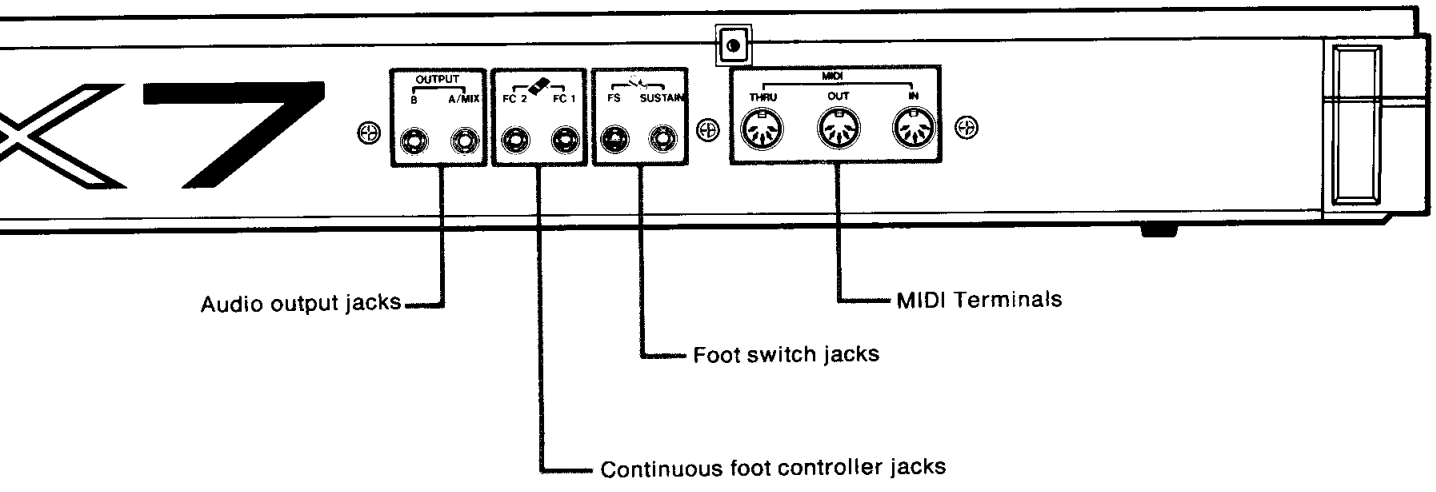
Modifications & Your Warranty:

Unless you are assured to the contrary in writing, you should assume that any modifications made to your DX will void the original product warranty. Therefore, you should make sure that you receive a warranty (or some other kind of guarantee) from the person or company that is responsible for the modification.

Flip open for
DX7II Reference Diagram


enter PLAY mode
PERFORMANCE button
Voice Mode Select buttons
Cursor (POLY/MONO & PAN) buttons
Cartridge slot
LED displays
LCD disp
Volume slider
Continuous slider 1
Data entry slider
(Continuous slider 2)
Pitch bend wheel
Modulation wheel
Breath controller jack
Head phone jack
Store button
Edit/Compare button
(Enters EDIT mode)
Data entry buttons
YAMAHA
DX7
POWER
ON/ OFF
Power switch


Memory select buttons
Number buttons
Operator select/copy buttons
Operator on/off buttons
LCD display


OUTPUT
B
A/MIX
FC 2
FC 1
FS
SUSTAIN
MIDI
THRU
OUT
IN
Audio output jacks
MIDI Terminals
Foot switch jacks
Continuous foot controller jacks

Contents

Section 1

Playing the DX7 II FD/D

Contents

Getting Started

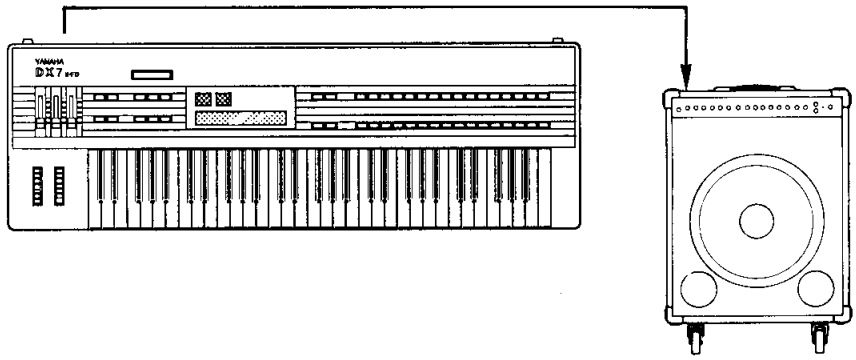
You can begin to enjoy your new DX immediately, without poring through a lot of complicated electronic theory. All you have to do is take the instrument out of it's box and proceed as follows:

Making Audio Connections

There are three different ways to connect the DX to sound reinforcement equipment. The one you choose will depend on your situation:

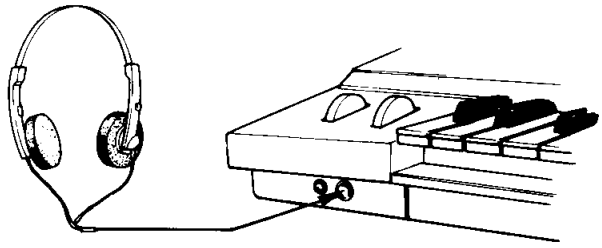
1. If you have a monophonic (single input) amplifier such as a guitar amp, connect the DX's A/Mix output to the amp's input (using a standard 1/4" cable).

Connecting the DX to a single input amplifier.



2. If you are using a multi-channel mixer, connect the DX's two back-panel audio outputs (A/Mix and B) to two of your mixer's inputs (using two 1/4" cables).
3. If you are using a set of standard stereo headphones, plug them into the DX's Phones output.

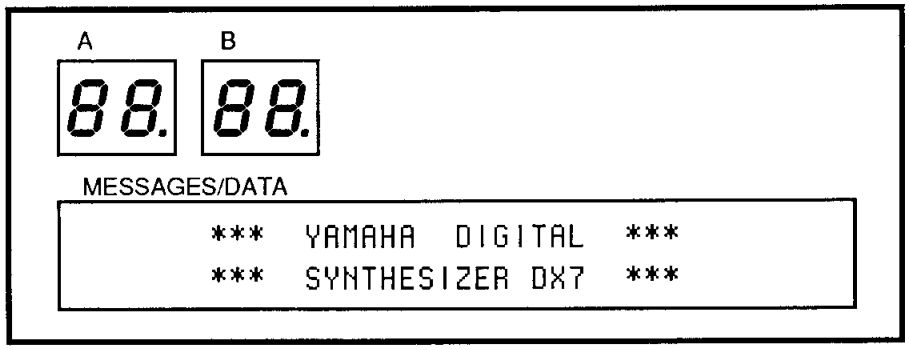
Using stereo headphones with the DX.



Turning On the DX

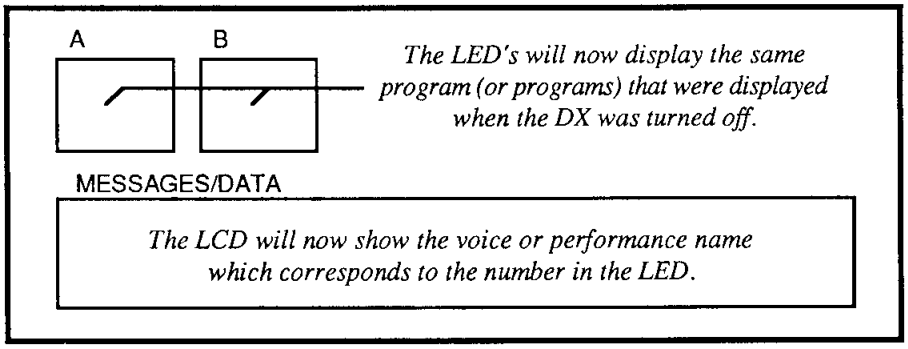
After you have made the audio connection of your choice, turn the DX on by pressing the Power switch located on the right side of the back panel. This is the first display you will see on the main panel:

The DX's "welcome" display.



After a few seconds, this "welcome" display will be replaced by the last Play Mode display selected before the DX was turned off:

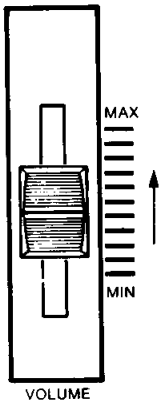
The DX's next initial display.



Setting the Volume Slider

Since the volumes of the various voices differ, start with a setting in the middle of the slider's range; adjust later to suit your taste, depending on the voice or voices being played.

Volume Slider



Setting the Pan and Poly/Mono Buttons

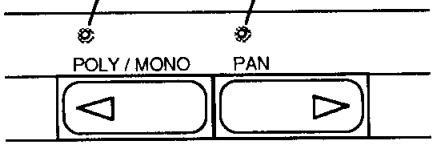
Before you begin to play your new DX, make sure that the settings of the Pan and Poly/Mono buttons are correct for your situation:

To ensure that you are listening to the voices just as they were created, make sure that this light is OFF. If it is ON, press the POLY/MONO button to turn the light OFF. (The reasons for this will be explained later in this manual.)

If you are using stereo outputs or headphones, make sure that this light is lit. If it is not, press the PAN button to turn the light ON.

If you are using a single (mono) output, make sure that this light is not lit. If it is, press the PAN button to turn the light OFF.

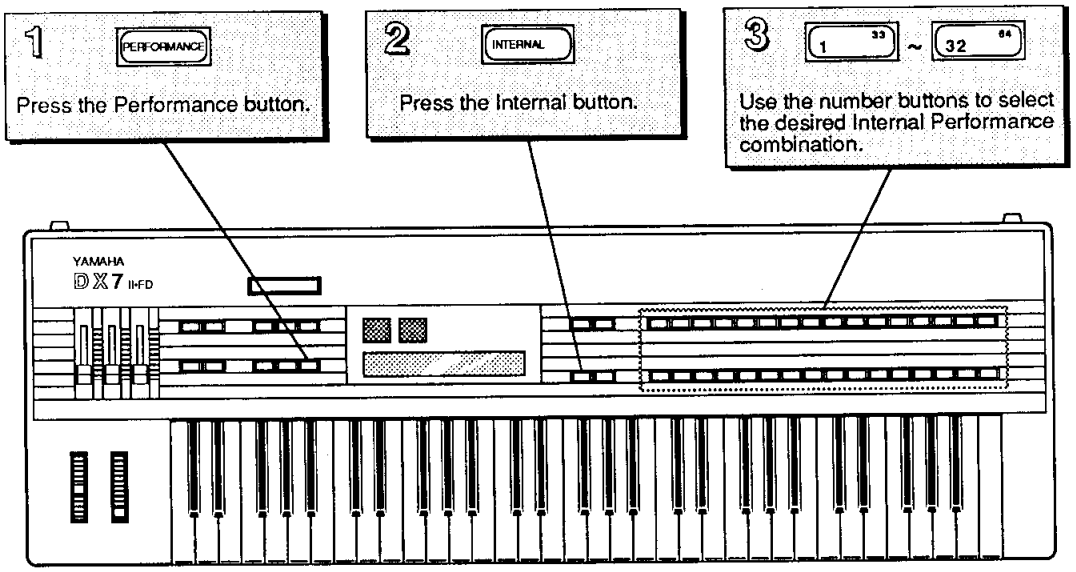
Poly/Mono and Pan Buttons

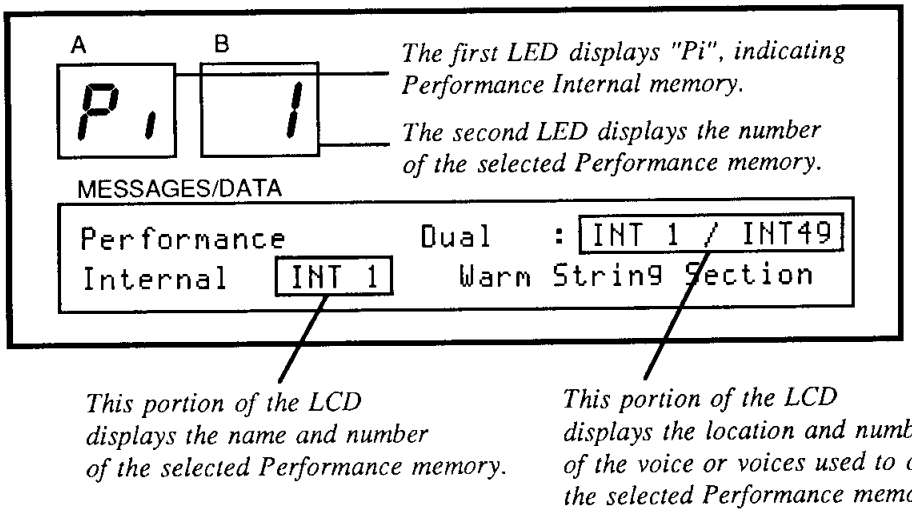


Exploring The New Performance Library

The Performance Mode is a completely new feature for the DX7. It allows you to play two different voices at once, and offers a number of other useful performance-oriented features. These features will be explained in detail in Sections 2 and 3 of this manual. For now, though, just follow the steps below, and explore the richness of the Performance Mode by playing through all of the new sounds available in the Internal and ROM Cartridge memories.

Selecting the Internal Performance Memories



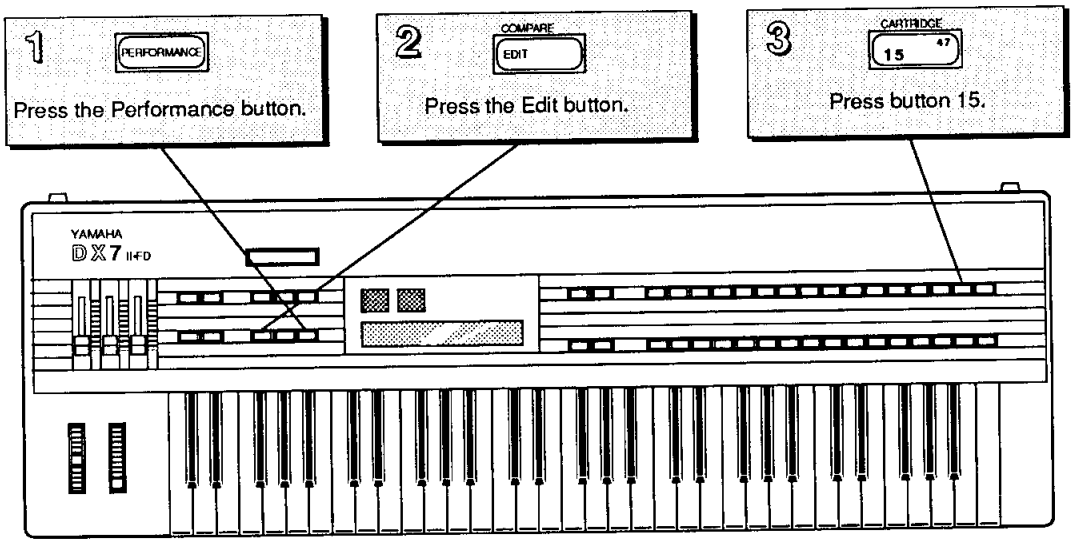


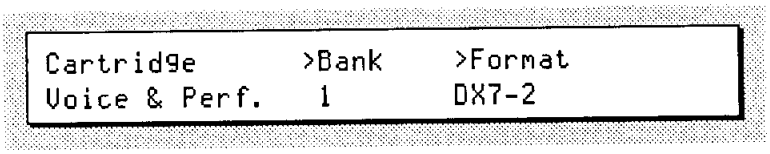
The Internal Performance Memories

Each Performance Name can consist of up to 20 characters; each Voice Name can consist of up to 10 characters.

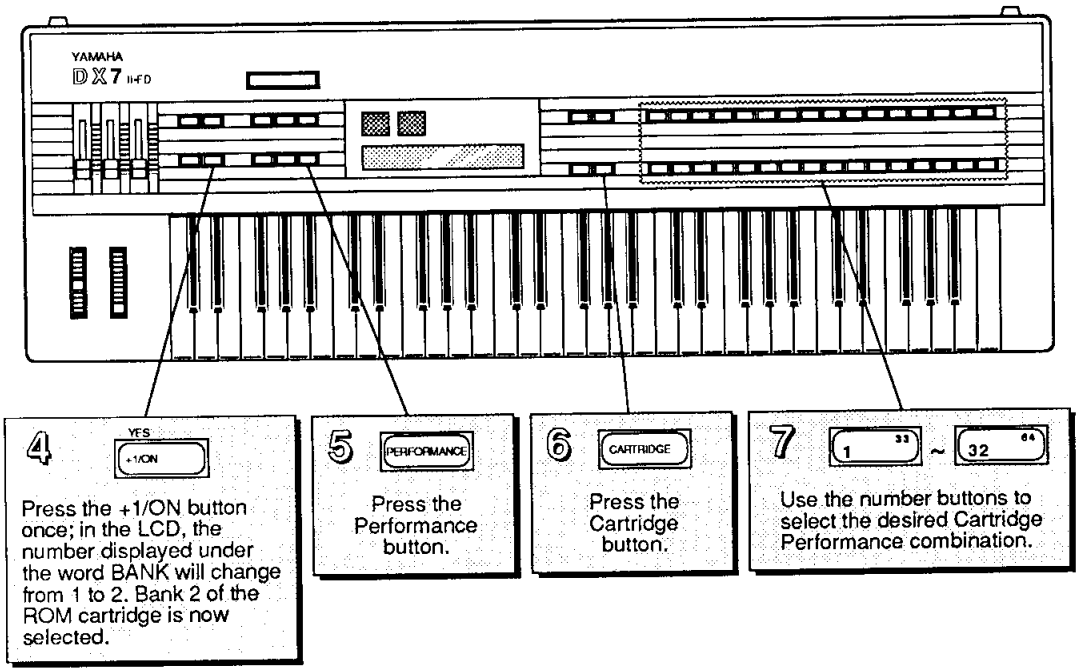
	Performance Name		Voice A		Voice B
1	Warm String Section	INT 1	Warm Stg A	INT 49	Warm Stg B
2	Mallet Brass	INT 63	XyloBrass	INT 25	MalletHorn
3	String Bass-Guitar	INT 27	StringBass	INT 57	GuitarBox
4	Dual Clavinette	INT 22	ClaviStuff	INT 48	Clavinette
5	Rich Grand Piano	INT 9	EbonyIvory		
6	Stereo EletricPiano	INT 50	KnockRoad	INT 62	HardRoads
7	Tubular Bell Wah	INT 43	BellWahh A	INT 56	BellWahh B
8	Electric Rock Organ	INT 32	Shorgan	INT 41	TapOrgan
9	Jamaica Mallet Band	INT 28	SteelCans	INT 21	EchoMallet
10	Mono Poly Synth	INT 7	FMilters	INT 35	ClariSolo
11	Dual Octave Trumpets	INT 14	Trumpet A	INT 24	Trumpet B
12	Angels	INT 10	Whisper A	INT 53	Whisper B
13	Acoustic PickGuitar	INT 3	PickGuitar	INT 40	Titeguitar
14	Multi Brass Ensemble	INT 46	SilvaTrmpt	INT 54	SilvaBrass
15	St. Elmos StringBell	INT 1	Warm Stg A	INT 20	ST.Elmo's
16	Phasar Whasars	INT 7	FMilters	INT 17	Phasers
17	Bass Piano Split	INT 39	SkweekBass	INT 62	HardRoads
18	Grand Harpsichord	INT 64	HarpsiWire	INT 52	HarpsiBox
19	Sea Songs	INT 34	ElectoComb	INT 51	LateDown
20	FM WireStrung Piano	INT 31	WireStrung	INT 5	FullTines
21	Cello Quartet	INT 44	EleCello A	INT 60	EleCello B
22	Touch Jazz Organ	INT 12	TouchOrgan		
23	DoubleHarp-SongFlute	INT 11	HarpStrum	INT 16	SongFlute
24	SynthBrass Ensemble	INT 4	Analog-X	INT 42	PitchaPad
25	Orchestral Violins	INT 61	HallOrch B	INT 58	HallOrch A
26	Stereo TinePiano	INT 5	FullTines		
27	PianoBell Ensemble	INT 19	Ensemble	INT 15	PianoBells
28	MultiPercussionSplit	INT 23	MultiPerc	INT 23	MultiPerc
29	Temple Gong - Shami	INT 38	TempleGong	INT 29	Koto
30	Dual Piano	INT 36	PianoBrite	INT 45	PianoForte
31	Stereo Vibraphone	INT 18	VibraPhone	INT 18	VibraPhone
32	Orchestral Whallop	INT 47	Wallop A	INT 55	Wallop B

Selecting the Cartridge Performance Memories





The LCD should show this display, with the cursor blinking on the arrow next to the word BANK. If not, press button 15 until this display appears.



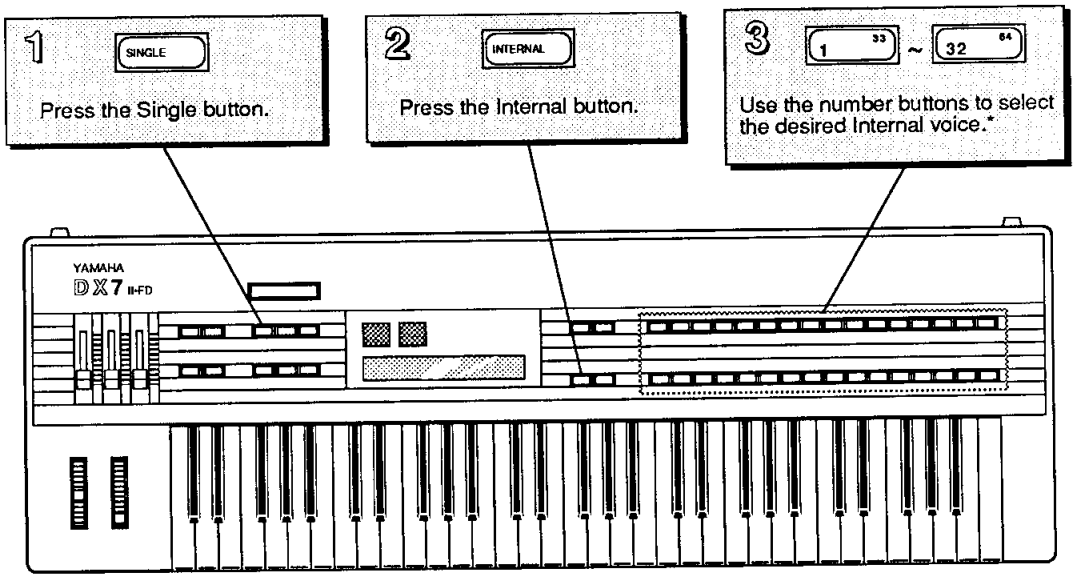
The Cartridge Performance Memories

	Performance Name		Voice A		Voice B
1	Double French Horns	INT 2	MellowHorn	CRT 37	FrenchHorn
2	Pipe Organ	CRT 3	PipeOrgan	CRT 47	PuffOrgan
3	Full Electric Piano	INT 5	FullTines	CRT 7	HardTines
4	PickGuitar-SpitFlute	INT 3	PickGuitar	CRT 12	SpitFlute
5	Rotary Electro Organ	INT 12	TouchOrgan	CRT 21	BriteOrgan
6	SuperBass-BrightClav	INT 6	SuperBass	CRT 1	Clavecin
7	MariBUMba	INT 13	Maribumba	CRT 38	StonePhone
8	CS 80 Brass	CRT 15	HardBones	CRT 34	HardTrumps
9	Organ Choir	CRT 3	PipeOrgan	CRT 52	FC Choir
10	Church Choir	CRT 10	LadyVox	CRT 57	MaleChoir
11	Celeste and Strings	INT 58	HallOrch A	CRT 62	Celeste
12	FatBass-HeavyMetal	CRT 43	OwlBass	CRT 55	YesBunk
13	Old School Harmonium	INT 59	HarmoniumA	CRT 53	HarmoniumB
14	Octave MultiDowns	INT 51	LateDown	CRT 16	OctiLate
15	Classical Strings	CRT 8	Violins	CRT 26	NewOrchest
16	Thunder Storm	CRT 23	Thunderon	CRT 61	Explosion
17	Unison Bass	INT 6	SuperBass	CRT 13	BopBass
18	Piano with BC Brass	INT 9	EbonyIvory	CRT 27	BC Trumpet
19	Funky FingaPicka	INT 33	FingaPicka		
20	-In the Laboratory-	CRT 60	Science		
21	PluckSyn-UniSynth	INT 8	Pluk	CRT 22	WhapSynth
22	Good Licks	CRT 4	ClaviPluck	CRT 31	Plukatan
23	Dingle Bongs	CRT 9	TingVoice	CRT 42	RubberGong
24	StringPad-Englishorn	INT 49	Warm Stg B	CRT 25	Englishorn
25	SnareDrum-Piccolos	CRT 20	Swissnare	CRT 36	Piccolo
26	Inside the VLSI	CRT 14	Glastine A	CRT 33	Glastine B
27	Rubber ElectricPiano	CRT 44	RubbaRoad		
28	Old Upright Piano	INT 45	Pianoforte		
29	Tap Electronic Organ	INT 41	TapOrgan		
30	PizziString Section	CRT 45	PizzReverb	CRT 45	PizzReverb
31	Yamaha MotorCycle	CRT 32	KoikeCycle		
32	Initialized Memory	CRT 64	INIT VOICE	CRT 64	INIT VOICE

Exploring The New Voice Library

The Voices in the new DX were created using techniques like those used on the original DX7. The new Performance Mode opens up a number of exciting possibilities — many of the Voices in the new DX were created specifically to be used in combinations of two. In addition, there are a number of new features available in Voice mode (most of them extensions of the Function mode in the original DX7). All of these features will be discussed in detail in Sections 2 and 4 of this manual. For now, though, just follow the steps below, and play through all of the Voices available in the Internal and ROM Cartridge memories.

Selecting the Internal Voice Memories



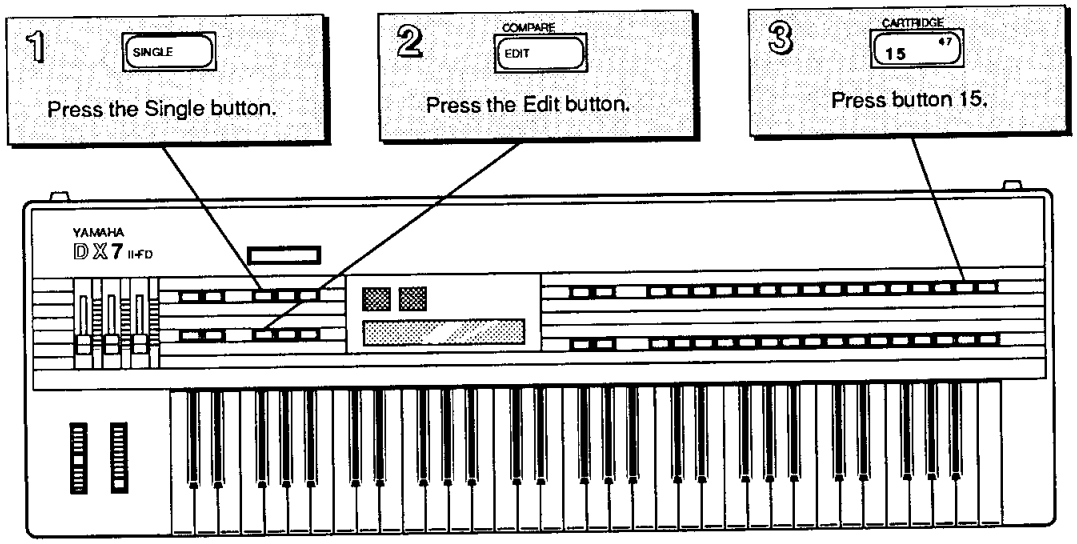
*The 1~32/33~64 light will be off, indicating that voices 1~32 are currently selectable.
To select voices 33~64, press the 1~32/33~64 button.
The light will go on, indicating that voices 33~64 are currently selectable.

The Internal Voice Memories

These are the Voice Memories loaded into the DX when it is shipped from the factory. Since these memories can be adjusted, your DX's Internal Memory may contain different data. If so, reload the Internal Voice & Performance data from Bank 1 of the supplied ROM cartridge.

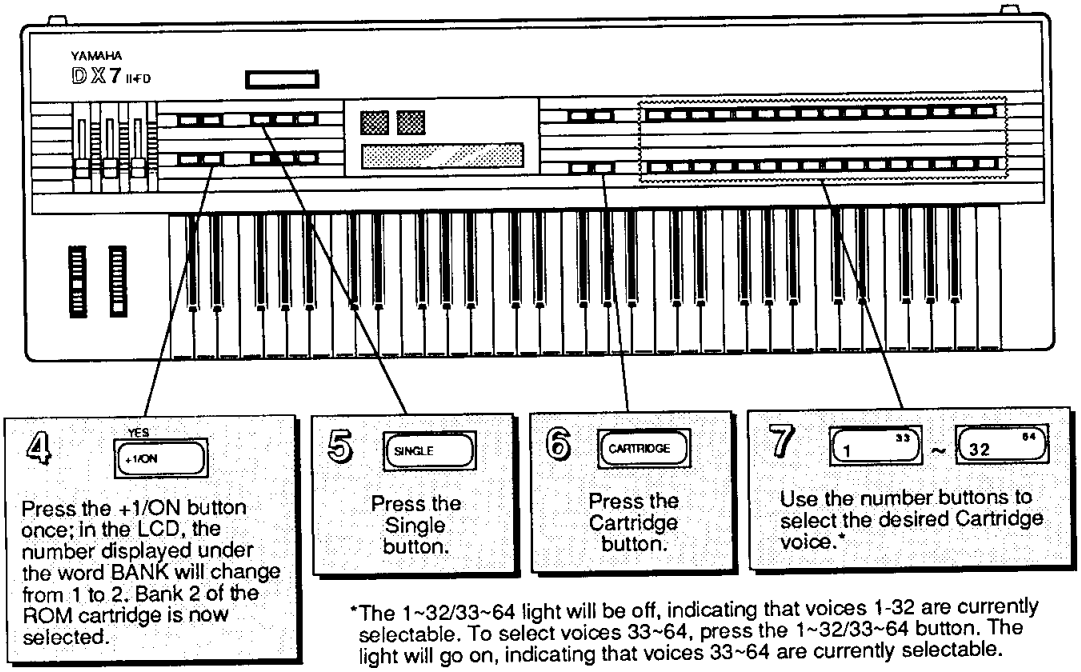
1	Warm Stg A	33	FingaPicka
2	MellowHorn	34	ElectoComb
3	PickGuitar	35	ClariSolo
4	Analog-X	36	PianoBrite
5	FullTines	37	Choir
6	SuperBass	38	TempleGong
7	FMilters	39	SkweekBass
8	Pluk	40	Titeguitar
9	EbonyIvory	41	TapOrgan
10	Whisper A	42	PitchaPad
11	HarpStrum	43	BellWahh A
12	TouchOrgan	44	EleCello A
13	Maribumba	45	PianoForte
14	Trumpet A	46	SilvaTrmpt
15	PianoBells	47	Wallop A
16	SongFlute	48	Clavinette
17	Phasers	49	Warm Stg B
18	VibraPhone	50	KnockRoad
19	Ensemble	51	LateDown
20	St.Elmo's	52	HarpsiBox
21	EchoMallet	53	Whisper B
22	ClaviStuff	54	SilvaBrass
23	MultiPerc	55	Wallop B
24	Trumpet B	56	BellWahh B
25	MalletHorn	57	GuitarBox
26	CongaDrum	58	HallOrch A
27	StringBass	59	HarmoniumA
28	SteelCans	60	EleCello B
29	Koto	61	HallOrch B
30	FM-Growth	62	HardRoads
31	WireStrung	63	Xylo-Brass
32	Shorgan	64	HarpsiWire

Selecting the Cartridge Voice Memories



Cartridge	>Bank	>Format
Voice & Perf.	1	DX7-2

The LCD should show this display, with the cursor blinking on the arrow next to the word BANK. If not, press button 15 until this display appears.



*The 1~32/33~64 light will be off, indicating that voices 1-32 are currently selectable. To select voices 33~64, press the 1~32/33~64 button. The light will go on, indicating that voices 33~64 are currently selectable.

The Cartridge Voice Memories

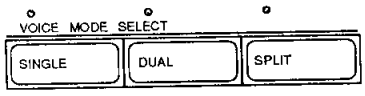
Bank 1 of the supplied ROM cartridge contains the Voice & Performance Memory loaded into the DX's Internal Memory when it is shipped from the factory. Bank 2 contains an entirely different set of Voice & Performance data.

Bank 1			
1	Warm Stg A	33	FingaPicka
2	MellowHorn	34	ElectoComb
3	PickGuitar	35	ClariSolo
4	Analog-X	36	PianoBrite
5	FullTines	37	Choir
6	SuperBass	38	TempleGong
7	FMilters	39	SkweekBass
8	Pluk	40	Titeguitar
9	EbonyIvory	41	TapOrgan
10	Whisper A	42	PitchaPad
11	HarpStrum	43	BellWahh A
12	TouchOrgan	44	EleCello A
13	Maribumba	45	PianoForte
14	Trumpet A	46	SilvaTrmpt
15	PianoBells	47	Wallop A
16	SongFlute	48	Clavinette
17	Phasers	49	Warm Stg B
18	VibraPhone	50	KnockRoad
19	Ensemble	51	LateDown
20	St.Elmo's	52	HarpsiBox
21	EchoMallet	53	Whisper B
22	ClaviStuff	54	SilvaBrass
23	MultiPerc	55	Wallop B
24	Trumpet B	56	BellWahh B
25	MalletHorn	57	GuitarBox
26	CongaDrum	58	HallOrch A
27	StringBass	59	HarmoniumA
28	SteelCans	60	EleCello B
29	Koto	61	HallOrch B
30	FM-Growth	62	HardRoads
31	WireStrung	63	Xylo-Brass
32	Shorgan	64	HarpsiWire

Bank 2			
1	Clavecin	33	Glastine B
2	SmoohBass	34	HardTrumps
3	PipeOrgan	35	Timpani
4	ClaviPluck	36	Piccolo
5	RaspySax	37	FrenchHorn
6	MilkyWays	38	StonePhone
7	HardTines	39	Whasers
8	Violins	40	Fifths
9	TingVoice	41	CongoClave
10	LadyVox	42	RubberGong
11	Harmonica	43	OwlBass
12	SpitFlute	44	RubbaRoad
13	BopBass	45	PizzReverb
14	Glastine A	46	PizzEcho
15	HardBones	47	PuffOrgan
16	OctiLate	48	ElecBrass
17	PuffPipes	49	SpaceVox
18	BC Sax	50	JazzBass
19	ClaviBrass	51	FC Strings
20	Swissnare	52	FC Choir
21	BriteOrgan	53	HarmoniumB
22	WhapSynth	54	Bells
23	Thunderon	55	YesBunk
24	PanFloot	56	ElectroBak
25	Englishorn	57	MaleChoir
26	NewOrchest	58	HardBass
27	BC Trumpet	59	LongGong
28	LeadaPicka	60	Science
29	Handrum	61	Explosion
30	Tuba	62	Celeste
31	Plukatan	63	HarmoSynth
32	KoikeCycle	64	INIT VOICE

The Play Modes

Now that you have an idea of some of the sound combinations available on the new DX, it is time to take a closer look at how the various Play Modes operate. Read on:



Voice Modes and Performance Mode

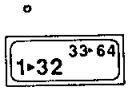
As you have heard from playing through the Performance Memories, it is possible to play two different voices at the same time on the new DX. However, you do not need to be in Performance Mode to try out various combinations of voices. In addition to Performance Play Mode, there are three different Voice Play Modes: Single, Dual, and Split.

Single Mode calls up one voice at a time from the DX's library of voices, as you learned on page 10 of this manual.

Both Dual and Split involve two voices, A and B. In Dual Mode, both voices are played together, over the entire range of the keyboard. In Split Mode, Voice A is played from the left side of the keyboard, while Voice B is played from the right side of the keyboard. When you are in the Voice Split Mode (rather than the Performance Split Mode), the Split Point is always set at C3.

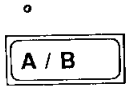
To enter Dual or Split Mode, simply press the appropriate Voice Mode button; the light above the selected Voice Mode button will go on. Only one of these Voice Mode lights can be lit at a time. (These lights also show which Voice Mode is selected when you are in the Performance Mode.)

Once you choose the Voice Mode you want to work with, use the 1~32/33~64, A/B, and number buttons to select specific voices.



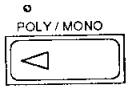
Using the 1~32/33~64 Button

The light above the 1~32/33~64 button tells you which set of voices can be selected: If the light is off, voices 1~32 can be selected using the number buttons; if the light is lit, voices 33~64 can be selected using the number buttons. This holds true for all three Voice Play Modes.



Using the A/B Button

The light above the A/B button tells you which voice location (A or B) is active for voice selection in Dual and Split modes: If the light is off, Voice A is active, and the voice chosen with the number buttons will be shown as Voice A in the LCD display; if the light is on, Voice B is active, and the voice chosen with the number buttons will be shown as Voice B in the LCD display.

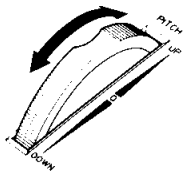


Using the Poly/Mono Button

The light above the Poly/Mono tells you (indirectly) which Key Mode is currently active in Play Mode: If the light is off, the Key Mode remains as programmed; if the light is lit, the opposite Key Mode will be active. Key Modes will be explained further in Section 4.

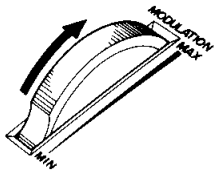
Using Controllers with the DX

The DX is designed to operate with many controllers, each of which can be set to perform one of a number of different effects. The settings for these controllers can be different for each Voice Memory or Performance Memory. To begin your exploration of the expanded musical possibilities available with controllers on the DX, try the examples listed below. Many of you may already be familiar with the operation of the these controllers; for those who are not, each section below begins with instructions on how to locate or attach the controller in question.



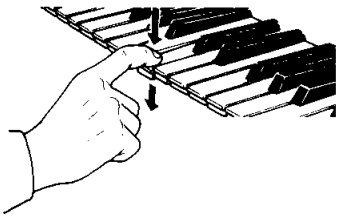
Pitch Bend Wheel

The Pitch Bend Wheel is located to the far left of the keyboard. To get an idea of some of the effects possible with the Pitch Bend Wheel, use it with Internal Voice #1 or Internal Voice #11. Move the Wheel both quickly and slowly as you play.



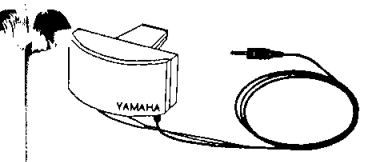
Modulation Wheel

The Modulation Wheel is located to the near left of the keyboard (to the right of the Pitch Bend Wheel). For a taste of the possibilities of the Modulation Wheel, try it with Internal Voice #2 or Internal Voice #28.



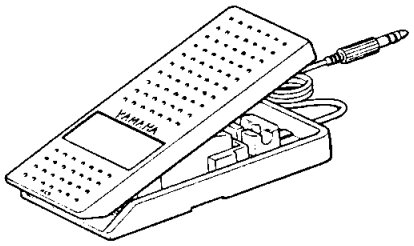
Aftertouch

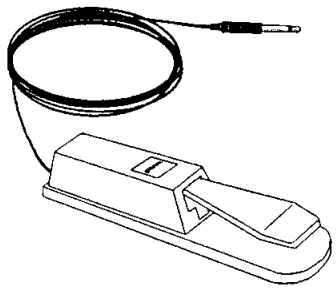
Aftertouch is a keyboard feature that gives you extra control over a voice. It is engaged by pushing down on the keys after they have already been depressed. To try some of the effects available with Aftertouch, call up Internal Voice #3 or Internal Voice #19. After you have played a group of keys, press them down into the key bed and listen to the result.

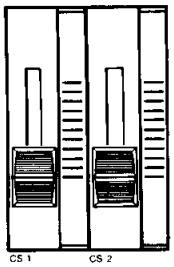


Breath Controller

The Breath Controller plugs into the mini-jack to the left of the Phones plug on the front of the DX. It allows you a great deal of expressive control over the shape of the sounds you play on the keyboard. Try using the Breath Controller in conjunction with Cartridge Voice #18 or Cartridge Voice #27 (from Bank 2 of the ROM). With both of these sounds, you will notice that playing on the keyboard by itself produces no sound: In order to hear the voices, you must hold down keys and blow into the Breath Controller.







Foot Controllers 1 and 2

The Foot Controllers plug into the two Foot Controller plugs on the back panel of the DX. They can give you continuous control over a number of aspects of the sounds. Try using Foot Controller 1 with Cartridge Voice #47 or Cartridge Voice #52 (from Bank 2 of the ROM). Foot Controller 2 is most often used as a volume pedal, but other effects are possible. Play Internal Voice #4 or Internal Voice #6 while experimenting with Foot Controller 2.

Footswitches 1 and 2

The Footswitches plug into the two Footswitch plugs on the back panel of the DX. Footswitch 1 acts much like a sustain pedal on a piano. Try it with Internal Performance #18 or Internal Performance #21 to get an idea of the different effects that are possible. Footswitch 2 can be used to engage a number of effects, including that of the soft pedal on a piano. Try it in conjunction with Cartridge Performance #27 or Cartridge Performance #28 (from Bank 2 of the ROM).

Continuous Sliders 1 and 2

The Continuous Sliders are located to the right of the Volume Slider on the left side of the DX's front panel. They can be programmed to give you control over many aspects of the timbre of the sounds, and can even be used to alter parameters of a voice in real time. Try using Continuous Slider 1 with Internal Performance #1 or Internal Performance #4. Then listen to the effect that Continuous Slider 2 has on Internal Performance #2 or Internal Performance #5.

Section 2

Creating and Storing New Sounds

Contents

Creating New Sounds

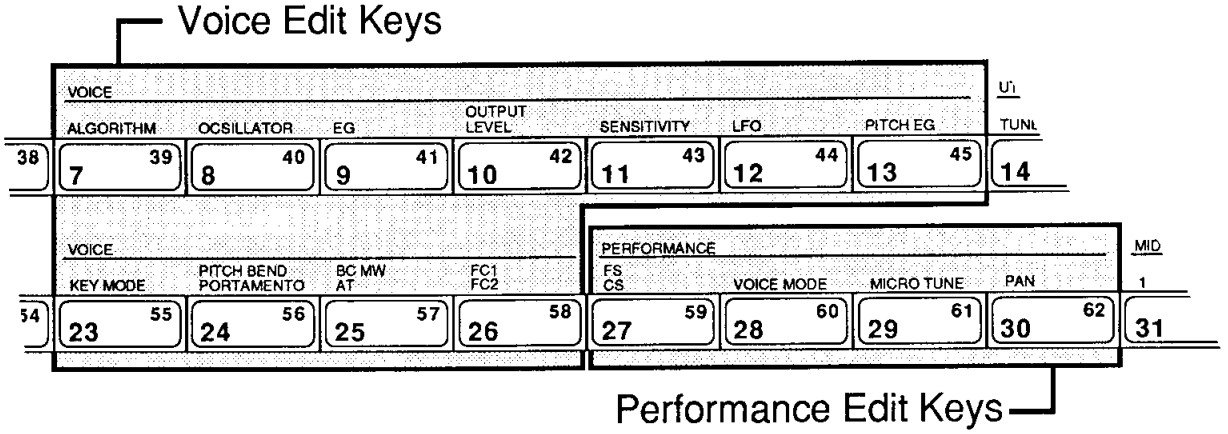
The Voices and Performance setups in the DX are stored as digital information in a computer-like memory. And, like computer memory, the memory of the DX can be altered for different uses. In other words, voices do not exist as unchangeable presets (as they do in electronic organs), but rather as streams of data. This data can be changed (edited) to create new sounds and Performance setups. To find out how this works, read on.

Editing and Edit Mode

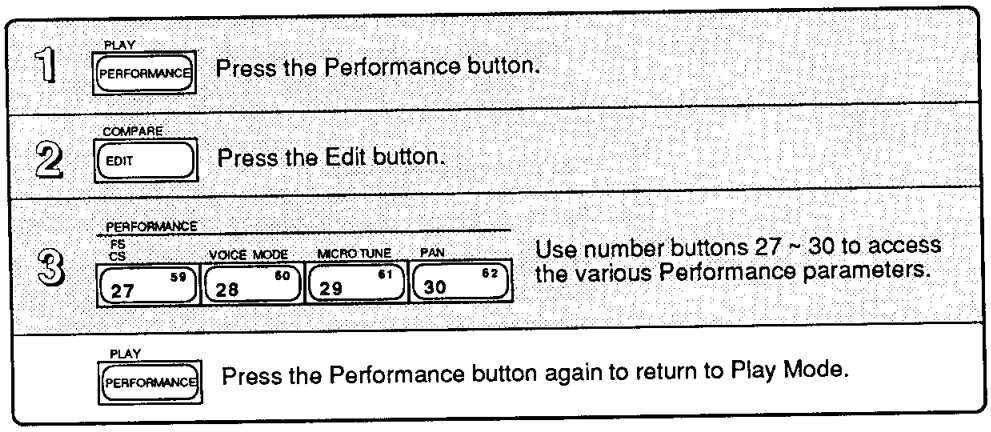
Editing is the process of changing various settings of a Voice or Performance memory. In the DX, this is accomplished in Edit Mode. Usually, you will use Edit Mode to create a new sound or Performance setup, but you can also use it to find out the parameter values for the factory preset Voices and Performance setups.

Most of the buttons on the DX's front panel have multiple functions. You can see this by looking at the way the buttons are labeled on the front panel. For example, the +1 button also functions as YES and ON. On most cases, the buttons will have different functions in different operating modes.

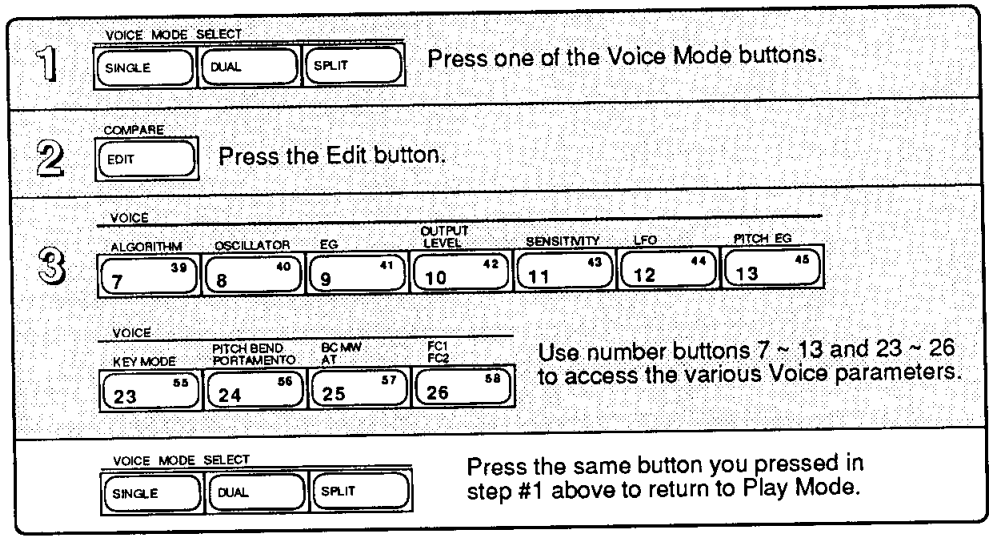
The 32 number buttons are no exception: In the Play Modes, they are used to call up various Voice and Performance memories; but, in the Edit Modes, they are used to access the various parameter values that make up a sound.



Entering Performance Edit Mode



Entering Voice Edit Mode



In both of the above procedures, you enter the Edit Mode after the Edit Button is pressed in step #2. At that time, you can push any or all of the buttons indicated (in step #3) as many times as necessary to make the desired edits.

It is possible - even easy - to edit Voice data in the Performance Edit Mode (or Performance data in the Voice Edit Mode). This, however, is NOT a recommended practice, since *only* Voice data is stored in the Voice Edit Mode, and *only* Performance data is stored in the Performance Edit Mode.

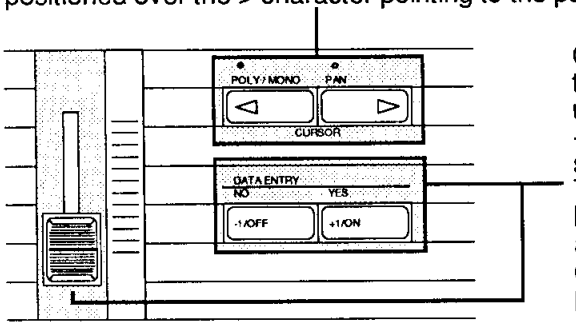
Editing Performance and Voice Data

After entering one of the Edit Modes, use the number buttons to access the parameter whose value you wish to change. Each number button calls up a variety of parameters, often through the use of multiple LCD screen displays. A complete set of these screen displays will be given at the beginning of Section 3 (for Performance Edit Mode) and Section 4 (for Voice Edit Mode). In most cases, each LCD display gives you access to a number of parameters.

Using the Cursor Buttons and the Data Entry Buttons/Slider

Use these buttons to position the LCD cursor next to the parameter you wish to edit. Parameters are listed along the top row of the LCD display, and the cursor should be positioned over the > character pointing to the parameter you wish to edit.

The cursor buttons and the data entry slider/buttons.

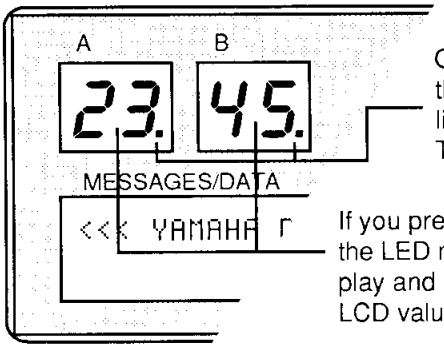


Once you have selected the parameter to edit (using the cursor buttons), use the data entry slider or the +1/-1 buttons to change the value of the selected parameter.
The new values will appear in the bottom row of the LCD, and you will hear the effect of these new values when you play the keyboard.

Edit/Compare

Once you have started to edit a voice, you can compare your new sound to the original by pressing the Edit/Compare button:

The Edit/Compare LED display.



Once you have changed a value in Edit mode, this dot will light, indicating that you are now listening to an edited voice.
The LCD will display edited values.

If you press the Edit/Compare button after editing a voice, the LED number will flash, indicating that you can now play and listen to the original, unedited voice.
LCD values will be those of the original, unedited voice.

Edit/Compare only operates in Voice Edit Mode, not in Performance Edit Mode (with the exception of Micro Tuning Edit Mode, which will be discussed in Section 3 of this manual).

Edit Button Quick Reference Guide

Voice parameters are discussed in more detail in Section 4.

ALGORITHM 7 (39)

>Algorithm
>Feedback Level
>Oscillator Sync
>Transpose
>Voice name

OSCILLATOR 8 (40)

>Oscillator Mode
>Coarse Frequency
>Fine Frequency
>Oscillator Detune

EG 9 (41)

>Rate Scaling
>Rates 1~4
>Levels 1~4

OUTPUT LEVEL 10 (42)

>Scaling Mode

Normal Scaling

>Output Level
>Left Scaling Depth
>Left Scaling Curve
>Break Point
>Right Scaling Depth
>Right Scaling Curve

Fractional Scaling

>Offset
>Scaling Level for note group

SENSITIVITY 11 (43)

>Velocity
>Amplitude Mod
>Pitch Mod

LFO 12 (44)

>Waveshape
>Speed
>Delay before LFO
>Mode
>Pitch Mod Depth
>Amp Mod Depth
>LFO Sync

PITCH EG 13 (45)

>Octave Range
>Velocity
>Rate Scaling
>Rates 1~4
>Levels 1~4

Voice Edit parameters are discussed in more detail in Section 4.

KEY MODE 23 (55)

>Key Mode

>Unison Detune

PITCH BEND PORTAMENTO 24 (56)

Pitch Bend

>Range
>Step Range
>Mode

Portamento

>Mode
>Step Range
>Time

Random Pitch

>Depth

BC MW AT 25 (57)

Breath Control

>Pitch Mod
>Amplitude Mod
>EG Bias
>Pitch Bias

Modulation Wheel

>Pitch Mod
>Amplitude Mod
>EG Bias

Aftertouch

>Pitch Mod
>Amplitude Mod
>EG Bias
>Pitch Bias

FC1 FC2 26 (58)

Foot Control 1

>Control Slider 1
>Pitch Mod
>Amplitude Mod
>EG Bias
>Volume

Foot Control 2

>Pitch Mod
>Amplitude Mod
>EG Bias
>Volume

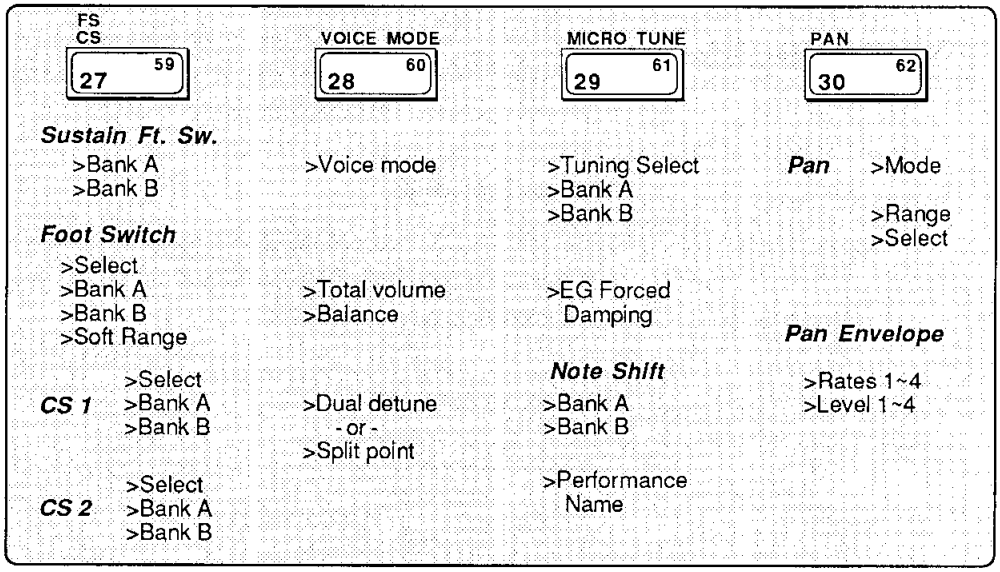
MIDI IN Control

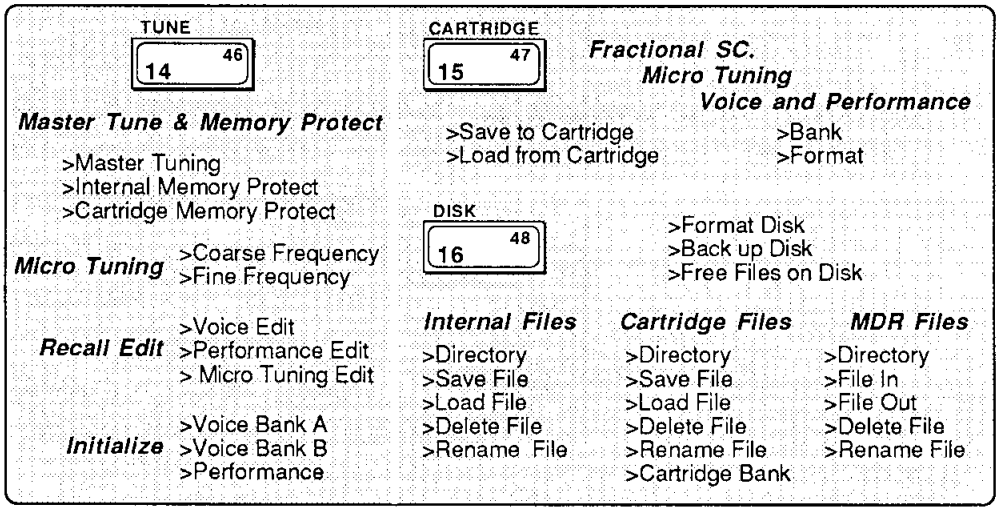
>Pitch Mod
>Amplitude Mod
>EG Bias
>Volume

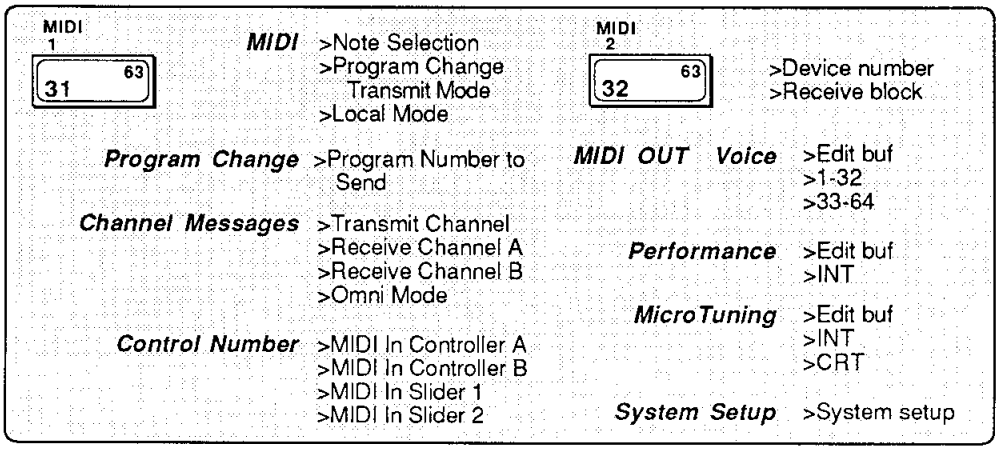
Performance parameters are discussed in more detail in Section 3.

Utility parameters are discussed in more detail in Section 5.

MIDI parameters are discussed in more detail in Section 6.







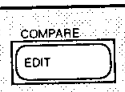
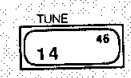
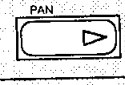
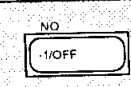
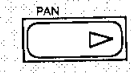
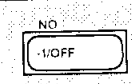
Saving New Sounds

Once you have altered a particular Voice or Performance memory to your liking, you will want to save your new data in one of the DX's memory locations. Single Voice memories and single Performance setups can be saved either to the Internal Memory or to a RAM Cartridge Memory. To do so, proceed as follows:

Memory Protection

Each time the DX is turned on, it automatically powers up with both the Internal and the Cartridge Memory Protect feature turned on. Before you can save data, you must turn off this automatic memory protection.

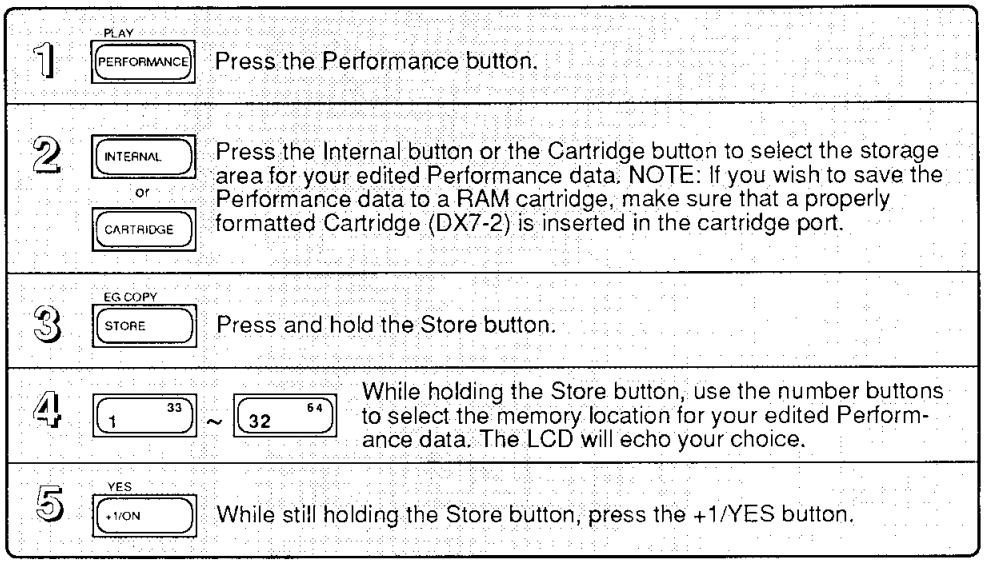
Turning Memory Protect Off

1		Press the Edit button.
2		Press the Tune button (#14) to access the Master tuning/Memory protect display.
3		Press the right cursor button to select INT Memory Protect.
4		Press the -1/NO button to turn the INT Memory Protect off.
5		Press the right cursor button again to select CRT Memory Protect.
6		Press the -1/NO button to turn the CRT Memory Protect off.

Performance Memory

Do not try to edit Performance data while in Voice Edit Mode. If you do, you will hear and see the Performance edits, but they will not be stored as part of memory when you store the Voice data.

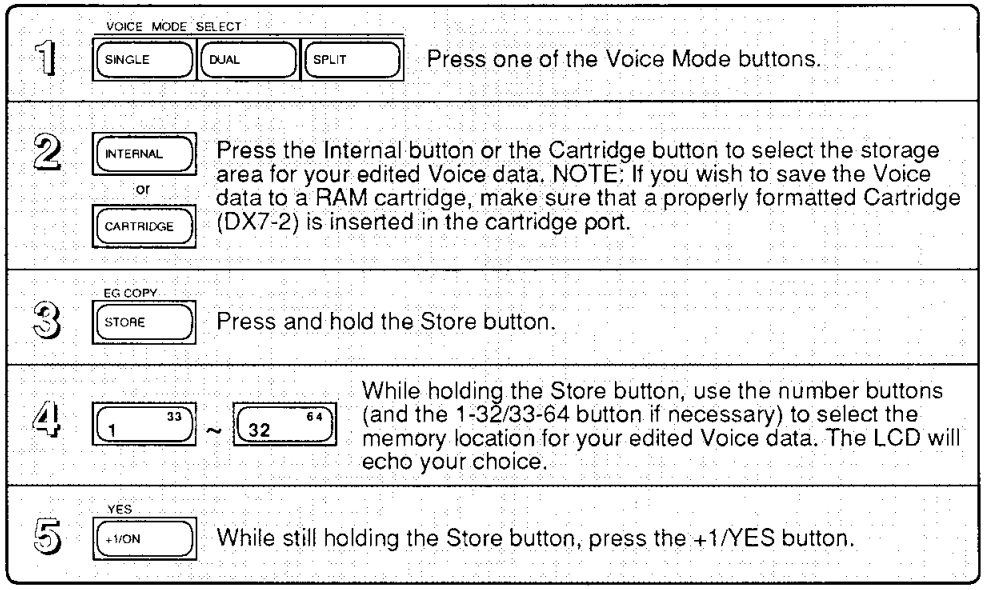
Storing Performance Data to Internal or Cartridge Memory



Voice Memory

Do not try to edit Voice data while in Performance Edit Mode. If you do, you will hear and see the Voice edits, but they will not be stored as part of memory when you store the Performance Data.

Storing Voice Data to Internal or Cartridge Memory



Section 3

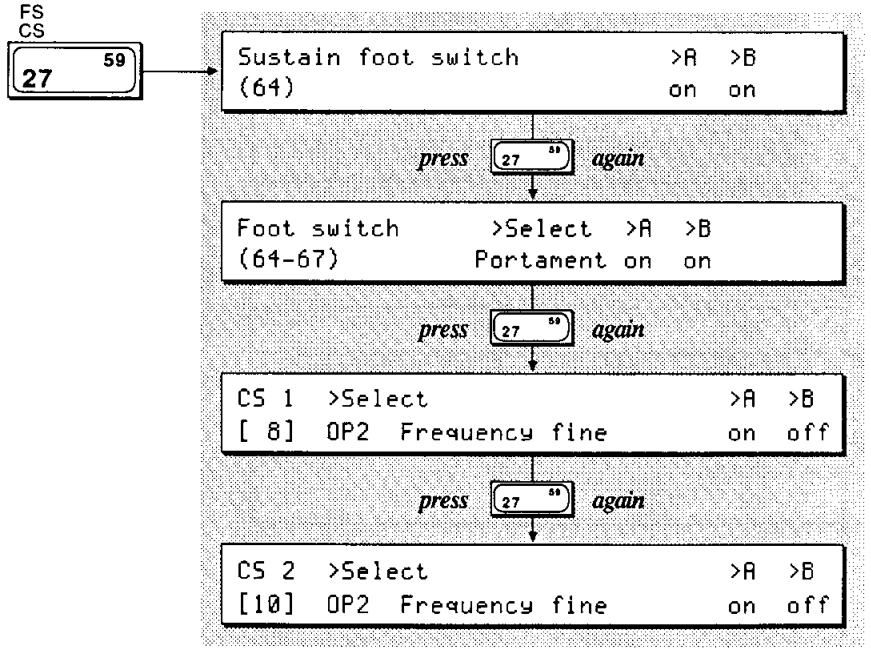
Using the New Performance Features

Contents

Performance Edit Buttons

All of the Performance Mode parameters are adjusted via the LCD displays called up using buttons 27 ~ 30. All of the these buttons call up multiple LCD displays. The charts below show all of the displays called up by each button, and provide a complete list of parameters and value ranges. In some cases, the first LCD display in a chart may not be the first one you see. You may need to cycle through the displays (by pressing the button repeatedly) until you reach the desired LCD display.

Button 27 LCD Displays



>A
Bank A *(off, on)*

>B
Bank B *(off, on)*

>Select
Select *(Sustain, Portamento, Key hold, Soft)*

>A
Bank A *(off, on)*

>B
Bank B *(off, on)*

>Range
Soft Range *(0 - 7)*

>Select
Select *(see Select Table)*

>A
Bank A *(off, on)*

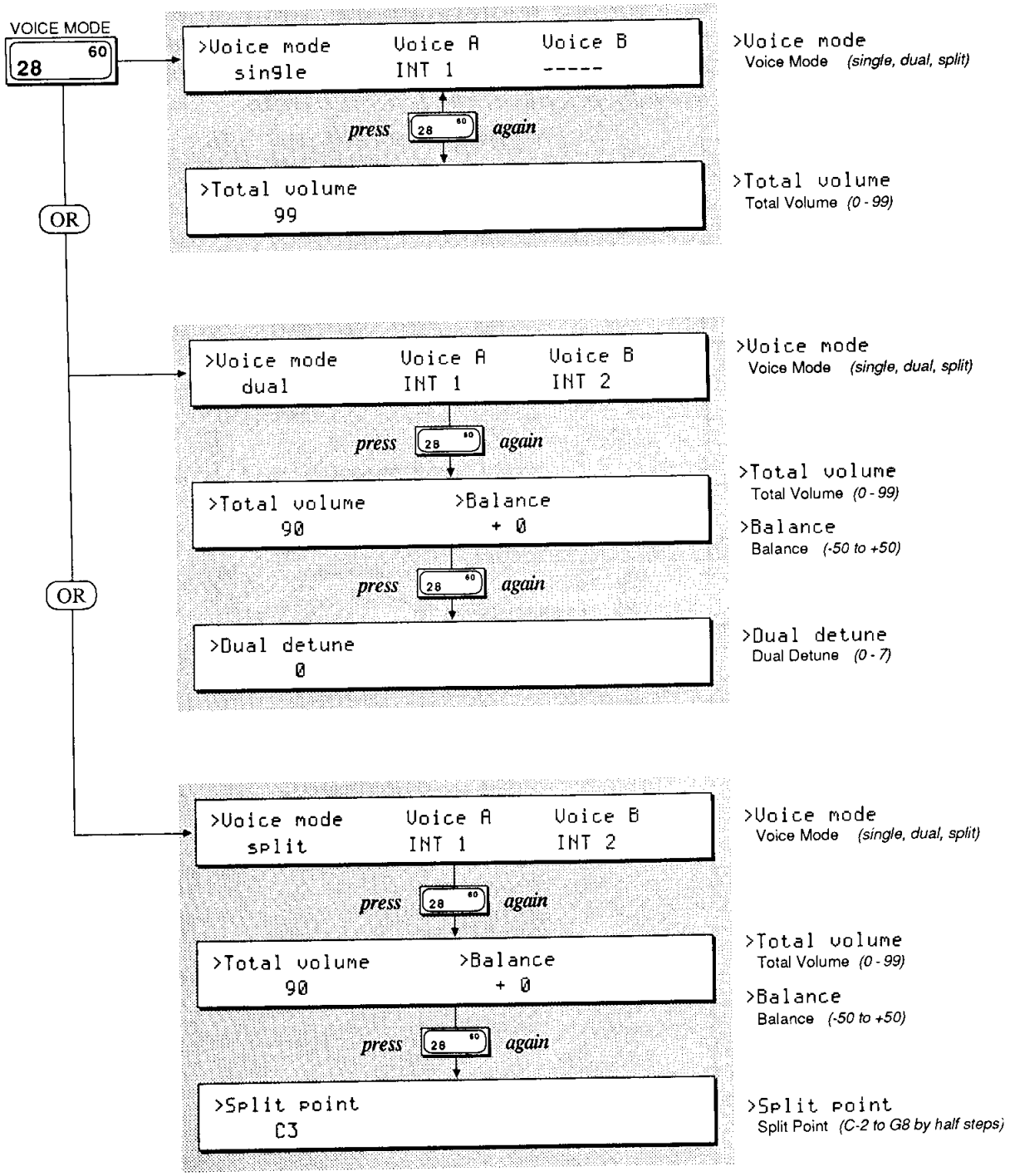
>B
Bank B *(off, on)*

>Select
Select *(see Select Table)*

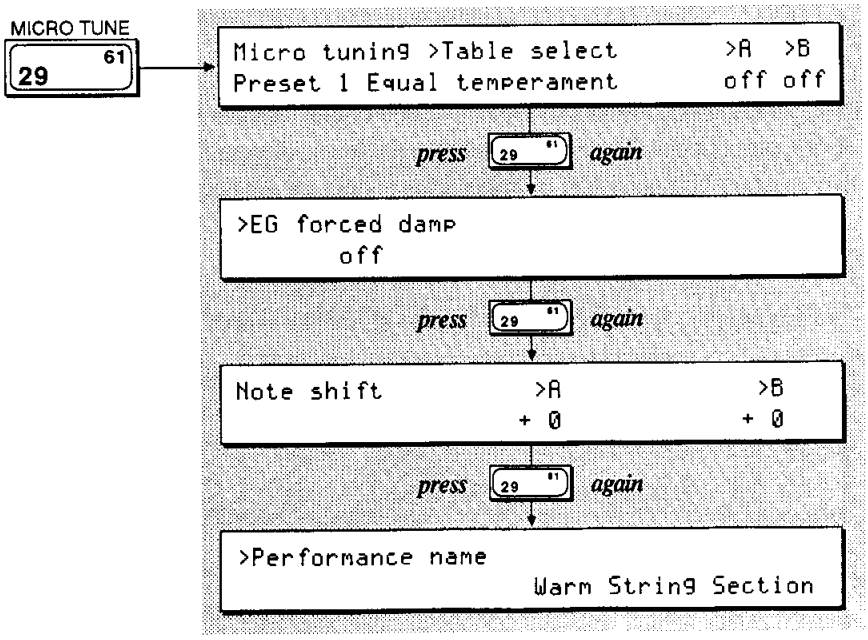
>A
Bank A *(off, on)*

>B
Bank B *(off, on)*

Button 28 LCD Displays



Button 29 LCD Displays



>Table Select
Tuning Table *(Preset 1-11, User 1-2, Cart 1-63)*

>A
Table Bank Switch *(off, on)*

>B
Table Bank Switch *(off, on)*

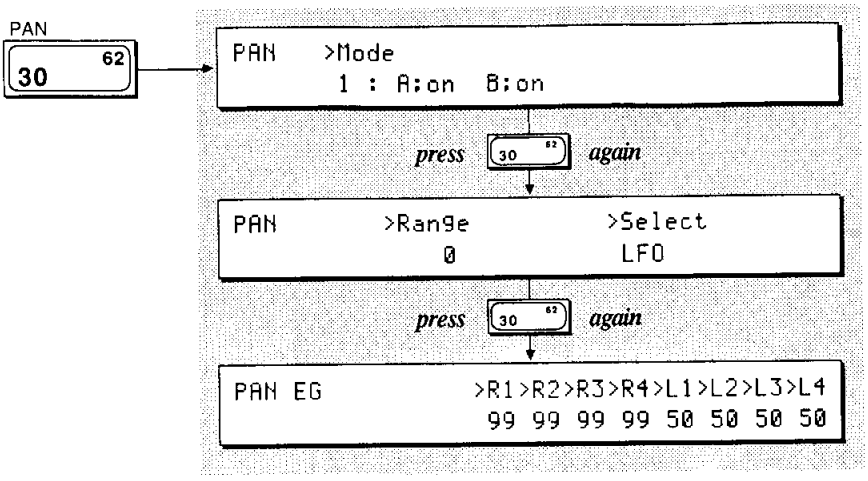
>EG forced damp
EG Forced Damping *(off, on)*

>A
Bank Note Shift *(-24 to +24)*

>B
Bank Note Shift *(-24 to +24)*

>Performance name
Performance Name *(20 character name)*

Button 30 LCD Displays



>Mode
Pan Mode *(0 - 3)*

>Range
Pan Range *(0 - 99)*

>Select
Pan Select *(LFO, Velocity, Note number)*

>R1 >R2 >R3 >R4
Pan Envelope Rates 1 - 4 *(0 - 99)*

>L1 >L2 >L3 >L4
Pan Envelope Levels 1 - 4 *(0 - 99)*

Basic Performance Parameters

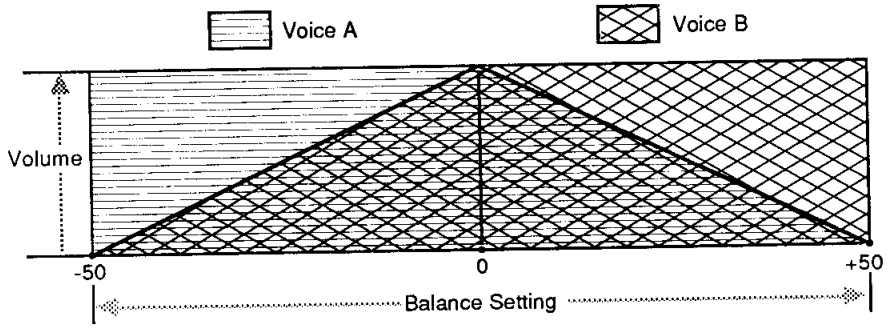
Accessed using buttons 28 and 29, these parameters determine the basic voice relationships in Performance Mode.

Total Volume

This parameter allows you to set an overall volume for each Performance memory. If you desire, you can use this setting to balance the levels of your Performance memories, so that constant Volume Slider or mixer adjustments are not necessary.

Balance

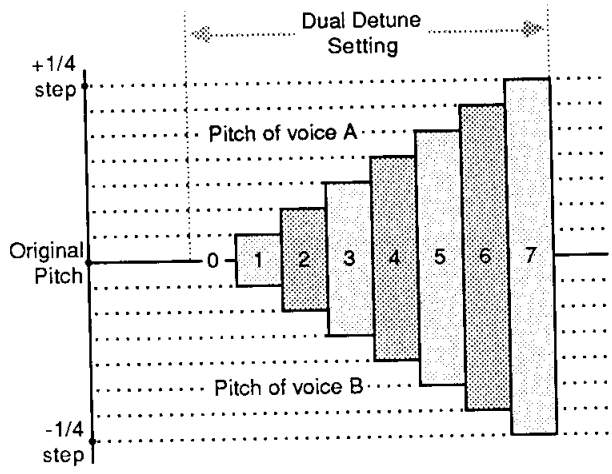
This parameter adjusts the relative volume of the two voices in Dual and Split Modes:



Dual Detune

This parameters shifts the pitch of both voices in Dual and Split Modes. Each voice is shifted an equal amount. Voice A is shifted up, and Voice B is shifted down:

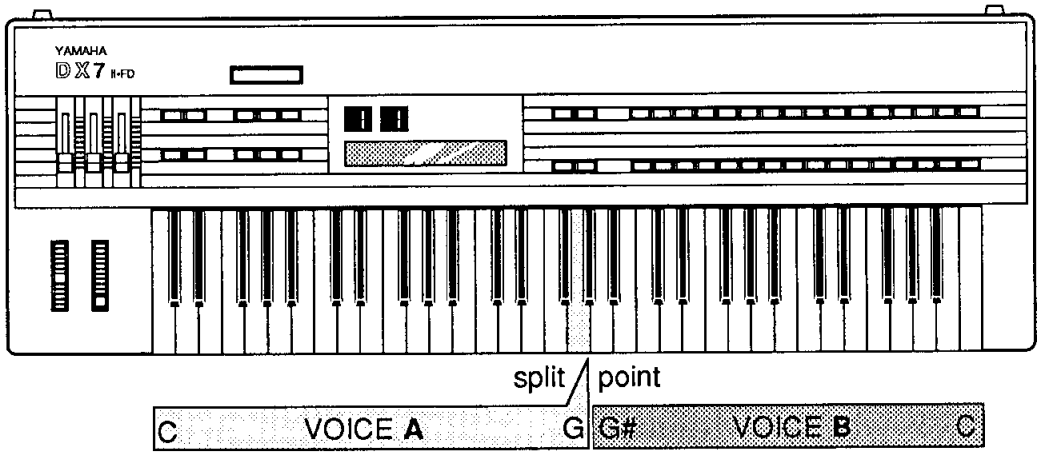
Dual Detune settings and their effect on Voice A and Voice B.



Split Point

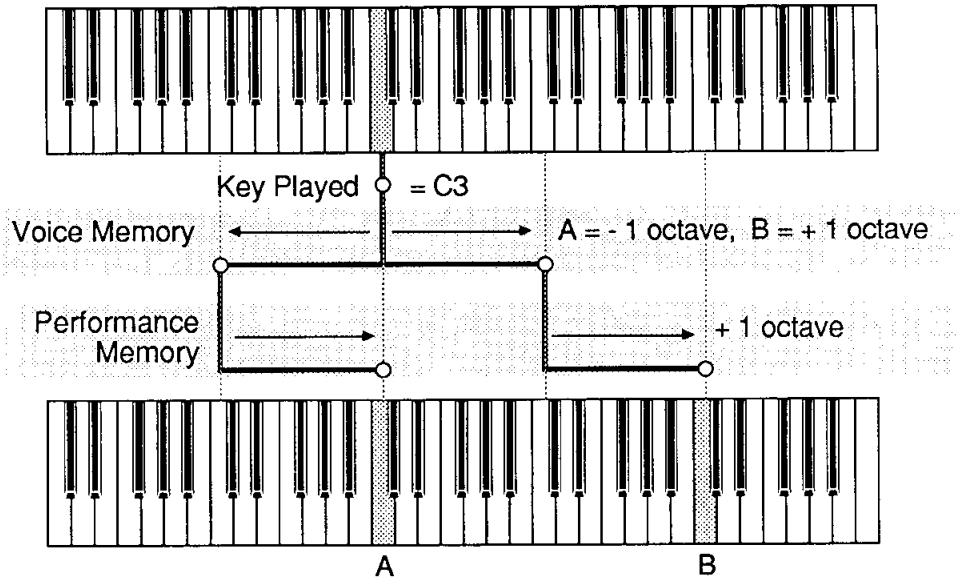
In Performance Mode, the Split Point is adjustable, and is memorized as part of the Performance Memory. The Split Point can be selected using the Data Entry Slider/Buttons or the keyboard: The first note played on the keyboard after accessing the Split Point parameter will be entered as the Split Point in the LCD display.

The Split Point is adjustable in Performance Mode.



Note Shift

This parameter allows you to adjust the transposition of each voice in Dual and Split Modes. Each voice may be adjusted up or down as much as two octaves (in halfsteps). The original transposition of each voice is retained as part of the Voice memory, and the the Note Shift value is added to or subtracted from that Voice setting when you are in Performance Mode.

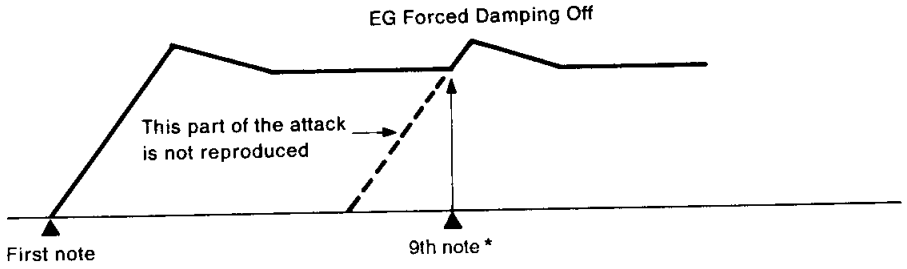


EG Forced Damp

Even though the DX is a 16-voice synthesizer, these voices can be used up quickly when you are in Dual Mode (or when you use a Sustain Footswitch pedal). When you do exceed the DX's note capacity, the first notes played will stop sounding to make way for the new notes being played.

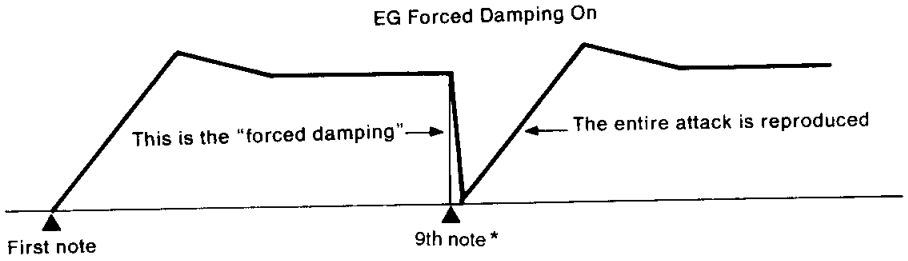
Under normal operating conditions, the DX considers these new notes to be continuations of the first notes; therefore, the initial portions of the attack envelope will not be retriggered:

Under normal conditions, the DX's envelope acts this way.



If you wish to avoid this effect, turn the Forced Damping function on. It will force the envelope to retrigger for each new note played:

Using the EG Forced Damping parameter, the envelope is forced to retrigger itself for each new note played.



* 17th note in the case of single play mode.

Performance Name

You can enter a Performance Name of up to 20 characters. To do so, follow the instructions below.

Since you have a total of twenty characters to define your Performance Memory, make sure that your Performance Name conveys the basic approach of the specific Performance Memory immediately.

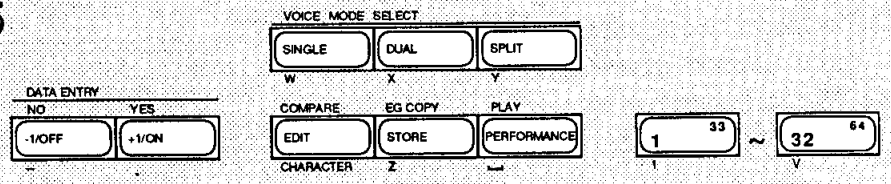
1 PLAY PERFORMANCE — Press the Performance button.

2 COMPARE EDIT — Press the Edit button.

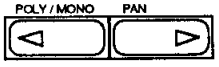
3 MICRO TUNE 29 61 — Press the Micro Tune button (#29) to access the Performance Name display.

4 COMPARE EDIT CHARACTER — Press and hold the Edit/Character button.

5



While holding the Edit/Character button down, type in the desiredPerformance name using the alphanumeric characters under the buttons.



Using the left and right cursor buttons while holding the Edit/Character button lets you to place the cursor over a specific character position. This allows you to easily edit any character within a name.

Pressing the Cartridge button selects UPPER CASE (capital) letters.

Pressing the Internal button selects lower case letters.

Pan

The Pan features represent an entirely new class of Performance controls for the DX. Accessed using button 30, these parameters provide control over the stereo image of the instrument's output.

Basic Pan Functions

In order for Pan effects to operate, you must connect both of the audio outputs on the DX's back panel. In addition, the light over the Pan button must be lit — if it is not, the Pan function is turned off. Pan can be turned on and off only in one of the Play Modes. (In Edit Mode, the Pan button becomes one of the cursor buttons.)

There are four basic Pan Modes. Mode 0 can be used with all Voice Modes, while Modes 1 ~ 3 operate only in Dual and Split Modes.

Pan Modes

Pan Modes are operative only if you are using both of the DX's audio output jacks.

Mode	A	B	Type
0	MIX		Pan
1	ON	ON	Level
2	ON	OFF	Level
3	OFF	ON	Level

If you select Pan Mode 0, the output of the two voices in Dual or Split Modes is combined, and the location of the sound in the stereo panorama is determined by the Pan effect selected. If you select Pan Modes 1 ~ 3, the two voice outputs remain separated, and the relative level of the two voices is determined by the Pan/Level effect selected.

There are three basic types of Pan/Level effects: LFO, Velocity, and Note Number. Each one opens up a number of possibilities:

If LFO is selected, the Pan/Level effect will be controlled by the Voice LFO (the LFO of Voice A in Dual or Split Modes). If you are operating in Pan Mode 0, the LFO controls the position of the audio output in the stereo mix; if you are operating in Pan Modes 1 ~ 3, the LFO controls the level of the selected voices (both, A, or B).

If Velocity is selected, the Pan/Level effect will be controlled by the force of your keyboard touch. If you are operating in Pan Mode 0, Velocity controls the position of the audio output in the stereo mix: Softer touches (slower velocities) will position the sound more in output jack A, while stronger touches (faster velocities) will position the sound more in output jack B. If you are operating in Pan Modes 1 ~ 3, Velocity controls the output volume of the selected voices (both, A, or B).

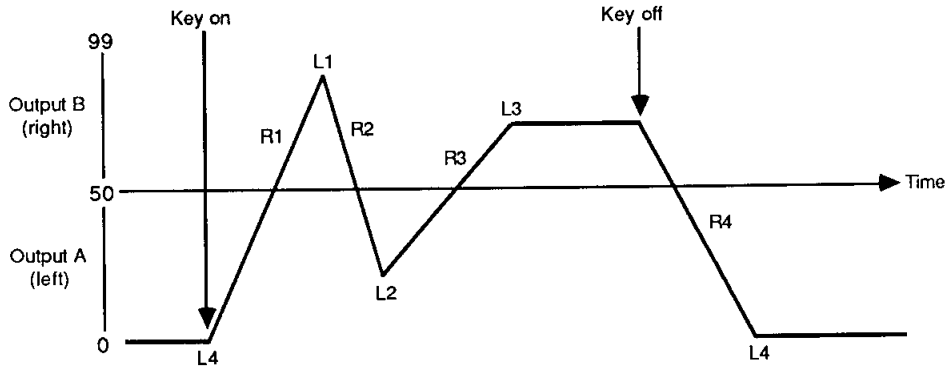
If Key Number is selected, the Pan/Level effect will be controlled by the right/left position of keys played on the keyboard. If you are operating in Pan Mode 0, Key Number controls the position of the audio output in the stereo mix: Notes played to the left of C3 will position the sound more in output jack A, while notes played to the right of C3 will position the sound more in output jack B. If you are operating in Pan Modes 1 ~ 3, Key Number controls the output volume of the selected voices (both, A, or B).

The overall depth (intensity) of these Pan/Level effects is controlled by the Range parameter.

Please note that all of these Pan/Level effects are global, rather than note by note: Each new Velocity input or Key Number input will reposition the audio (or readjust the output) of all notes currently sounding.

Pan EG

The Pan EG allows you to create an envelope for automatic control of Pan (Pan Mode 0) or Level (Pan Modes 1 ~ 3):



Representative Pan Envelope Generator shape.

Controllers

The DX features a greatly expanded set of controller options. The settings for Footswitches 1 and 2 and Continuous Sliders 1 and 2 are adjusted in Performance Edit Mode, using button 27. (The other controller settings are accessed in Voice Edit Mode.)

Sustain Footswitch (FS 1)

Footswitch 1 is set to operate as a Sustain pedal. In Dual and Split Modes, FS 1 can be selected to affect Voice A, Voice B, or both.

Footswitch 2 (FS 2)

Footswitch 2 is a multi-purpose pedal with four selectable functions: Sustain, Portamento, Key Hold, or Soft.

If Sustain is selected, FS 2 operates as a Sustain pedal (just like FS 1).

If Portamento is selected, Voice Portamento effects will operate only when the pedal is depressed.

If Key Hold is selected, only notes that are being held when the pedal is engaged will sustain. This effect is similar to a piano's sostenuto pedal.

If Soft is engaged, the pedal will soften the timbre and volume of the sound, to a degree determined by the Range parameter.

In Dual and Split Modes, FS 2 can be selected to affect Voice A, Voice B, or both.

The Continuous Sliders provide a new avenue for exploration of real-time timbral control.

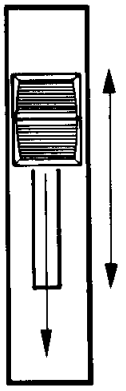
Continuous Sliders

The two Continuous Sliders give you access to real-time control of FM Voice parameters. There are a total of 105 different possibilities:

FM Parameters Assignable to CS 1 and CS2

DATA ENTRY slider

highest position



- •OP 6 Total level
  ≀
  OP 1
- •OP 6 AMP. MOD. SENS
  ≀
  OP 1
- •OP 6 Key velocity
  ≀
  OP 1
- •OP 6 EG Level 4 (L4)
  ≀
  OP 1
- •OP 6 EG Level 3 (L3)
  ≀
  OP 1
- •OP 6 EG Level 2 (L2)
  ≀
  OP 1
- •OP 6 EG Level 1 (L1)
  ≀
  OP 1
- •OP 6 EG Rate 4 (R4)
  ≀
  OP 1
- •OP 6 EG Rate 3 (R3)
  ≀
  OP 1
- •OP 6 EG Rate 2 (R2)
  ≀
  OP 1

lowest position

- •OP 6 EG Rate 1 (R1)
  ≀
  OP 1
- •OP 6 OSC. detune
  ≀
  OP 1
- •OP 6 Frequency fine
  ≀
  OP 1
- •OP 6 Frequency coarse
  ≀
  OP 1
- •Portamento time
- •Pitch EG Level 4
  ≀
  Level 1
- •Pitch EG Rate 4
  ≀
  Rate 1
- •LFO AMD
  PMD
  PMS
  Delay
  Speed
  Wave
- •Feedback level
- •Algorithm
- •Dual detune
- •PAN select
- •Output balance (A/B)
- •Total volume
- •No effect

In Dual and Split Modes, CS 1 and CS 2 can be selected to affect Voice A, Voice B, or both.

Micro Tuning

Micro Tuning is another new feature for the DX. It offers the possibility of performing music using tuning and intonation systems other than Equal Temperament (which is the current standard tuning for both pianos and synthesizers). Micro Tuning data is accessed using button 29. New Micro Tunings are created in Micro Tuning Edit Mode, which is accessed using button 14 in conjunction with button 29.

Selecting a Micro Tuning

The DX is equipped with eleven preset Micro Tunings as part of its permanent memory. In order to hear the sound of these presets, it is necessary to turn Micro Tuning on for Voice A, Voice B, or both (using the A and B parameters in the Micro Tuning LCD display). When Micro Tuning is not on, the DX automatically operates in Equal Temperament.

The Micro Tuning Presets

The new DX contains eleven preset Intonations, which should provide you with a good introduction to possibilities of alternate intonation schemes.

1	Equal Temperament
2	Pure (Major)
3	Pure (Minor)
4	Mean tone
5	Pythagorean
6	Werckmeister
7	Kirnberger
8	Vallotti & Young
9	1/4 Shifted equal
10	1/4 Tone
11	1/8 Tone

In presets 2 ~ 5, the tuning can be adjusted according to the key of the music being played.

Micro Tuning Editing and Storage

If you are interested in alternate tunings and intonations, you may want to create your own sets of Micro Tuning data. The DX provides two memory locations for this purpose: User 1 and User 2. These two sets of data are stored as part of the Internal Memory, and will be stored along with all other Internal data when the Internal Voice & Performance Memory is saved to another storage medium (such as RAM cartridge or disk). In addition, up to 63 Micro Tunings can be saved to RAM cartridge that has been properly formatted for that purpose.

Entering the Micro Tuning Edit Mode

1. PLAY / PERFORMANCE — Press the Performance button.
2. COMPARE / EDIT — Press the Edit button.
3. MICRO TUNE / 29 61 — Press the Micro Tune button (#29) to access the Micro Tuning LCD display.
4. DATA ENTRY / NO -1/OFF / YES +1/ON — Use the +1/-1 buttons to select the Micro Tuning Preset you wish to use as your starting point.
5. TUNE / 14 46 — Press the Tune button (#14) to select the Micro Tuning edit LCD display.

Editing Micro Tuning Data

1. Press and hold the key of the note you wish to edit.
   INTERNAL or CARTRIDGE — While holding the key, press either the Internal or the Cartridge button. The note you have chosen will be displayed in the >>>>> <<<<< section of the LCD display.

   OR

1. FRACTIONAL / MICRO TUNE / KEY SET ◁ ▷ / INTERNAL / CARTRIDGE — Use the Internal and Cartridge buttons as left and right cursors to change the LCD display until the note you wish to edit is in the >>>>> <<<<< section of the LCD display.
2. POLY / MONO ◁ / PAN ▷ — Use the cursor buttons to select the Coarse or Fine tuning parameter
3. DATA ENTRY / NO -1/OFF / YES +1/ON — Use the data entry slider or the +1/-1 buttons to adjust Coarse or Fine tuning parameters to the desired values.

Storing Micro Tuning Data

1. EG COPY / STORE — Press and hold the Store button.
2. INTERNAL or CARTRIDGE — Use the Internal or Cartridge button to select the desired memory location. The LCD will echo your choice. NOTE: If you wish to save the Micro Tuning data to a RAM cartridge, make sure that a properly formatted Cartridge (MTT-Y) is inserted in the cartridge port.
3. 1 33 ~ 32 64 — Use the number buttons (and the 1~32/33~64 button if necessary) to choose the desired location for your Micro Tuning data: 1~2 in Internal memory or 1~63 in Cartridge memory.
4. YES / -1/ON — While still holding the Store button, press the +1/YES button.

Section 4

Using the New Voice Features

Contents

Voice Edit Buttons

All of the Voice Mode parameters are adjusted via the LCD displays called up using buttons 7 ~ 13 and 23 ~ 26. Many of the these buttons call up multiple LCD displays. The charts below show all of the displays called up by each button, and provide a complete list of parameters and value ranges. In some cases, the first LCD display in a chart may not be the first one you see. You may need to cycle through the displays (by pressing the button repeatedly) until you reach the desired LCD display.

Button 7 LCD Display

>Alg
Algorithm *(1 - 32)*

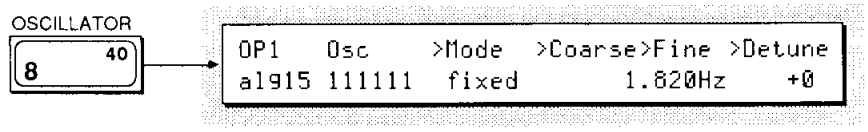
>Fbl
Feedback Level *(0 - 7)*

>Osc. sync
Oscillator Sync *(off, on)*

>Transpose
Transpose *(mid C = C1 to C5)*

>Voice name
Voice Name *(10 character name)*

Button 8 LCD Display



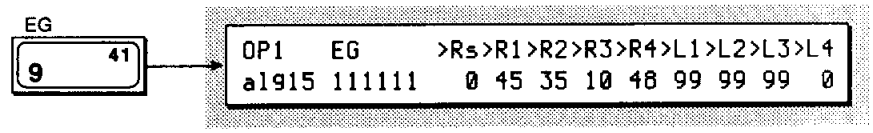
>Mode
Oscillator Mode *(ratio, fixed)*

>Coarse
Coarse Frequency *(varies)*

>Fine
Fine Frequency *(varies)*

>Detune
Oscillator Detune *(-7 to +7)*

Button 9 LCD Display

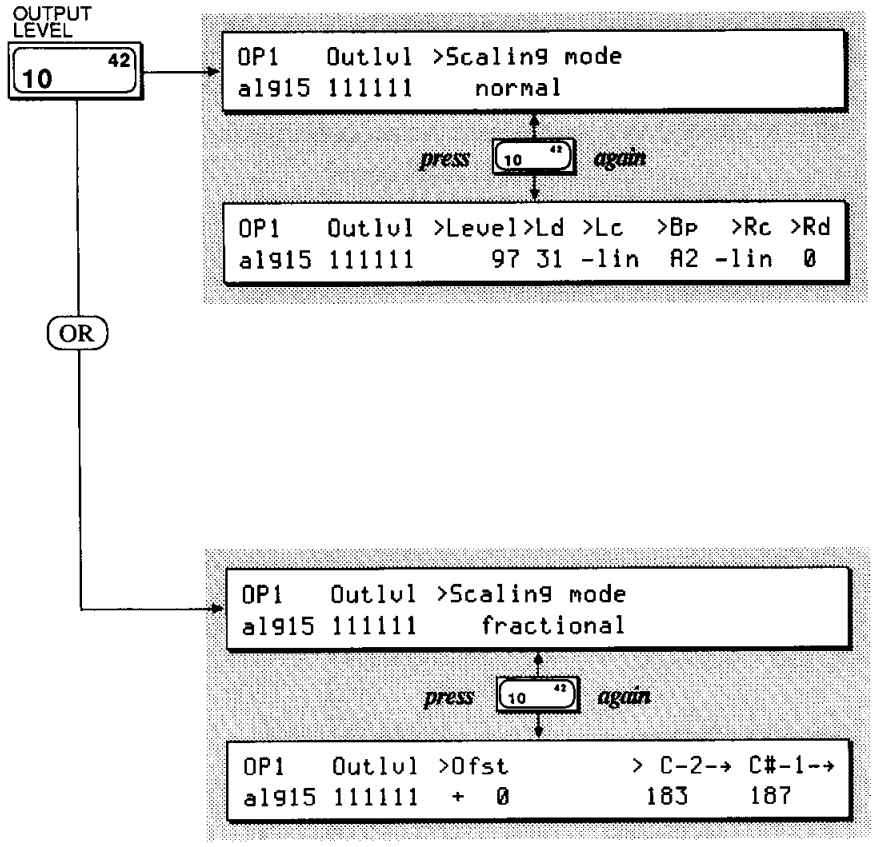


>Rs
Rate Scaling *(0 - 7)*

>R1 >R2 >R3 >R4
Operator Envelope Rates 1 - 4 *(0 - 99)*

>L1 >L2 >L3 >L4
Operator Envelope Levels 1 - 4 *(0 - 99)*

Button 10 LCD Displays



>Scaling mode
Scaling Mode *(normal, fractional)*

>Level
Operator Output Level *(0 - 99)*

>Ld
Left Scaling Depth *(0 - 99)*

>Lc
Left Scaling Curve *(-lin, -exp, +exp, +lin)*

>Bp
Break Point *(A-1 to C8 by half steps)*

>Rc
Right Scaling Curve *(-lin, -exp, +exp, +lin)*

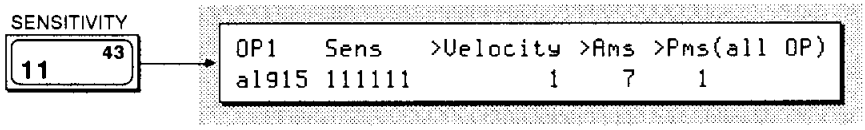
>Rd
Right Scaling Depth *(0 - 99)*

>Scaling mode
Scaling Mode *(normal, fractional)*

>Ofst
Fractional Scaling Offset *(-127 to +127)*

> C-2-→
Scaling Level for key range *(0 - 255)*

Button 11 LCD Display

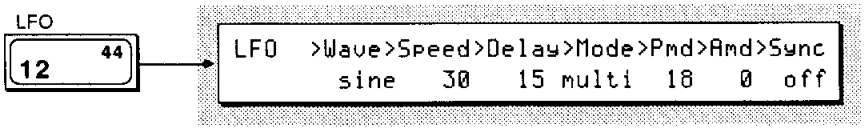


>Velocity
Velocity Sensitivity *(0 - 7)*

>Ams
Amplitude Modulation Sensitivity *(0 - 7)*

>Pms(all OP)
Pitch Modulation Sensitivity *(0 - 7)*

Button 12 LCD Display



>Wave
LFO Waveshape
(triangle, saw down, saw up, square, sine, s/hold)

>Speed
LFO Speed *(0 - 99)*

>Delay
Delay before LFO begins *(0 - 99)*

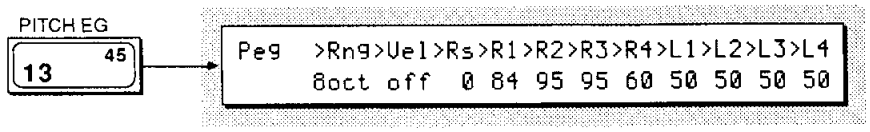
>Mode
LFO Mode *(single, multi)*

>Pmd
Pitch Modulation Depth *(0 - 99)*

>Amd
Amplitude Modulation Depth *(0 - 99)*

>Sync
LFO Sync *(off, on)*

Button 13 LCD Display



>Rng
Octave Range *(1/2, 1, 2, 8)*

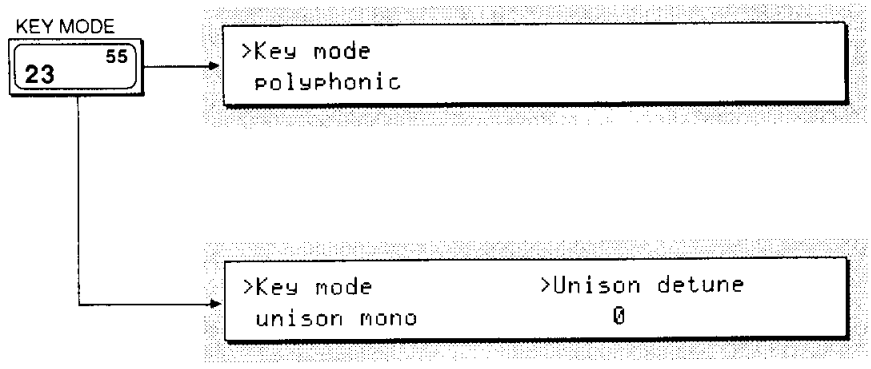
>Vel
Velocity *(off, on)*

>Rs
Rate Scaling *(0 - 7)*

>R1 >R2 >R3 >R4
Pitch Envelope Rates 1 - 4 *(0 - 99)*

>L1 >L2 >L3 >L4
Pitch Envelope Levels 1 - 4 *(0 - 99)*

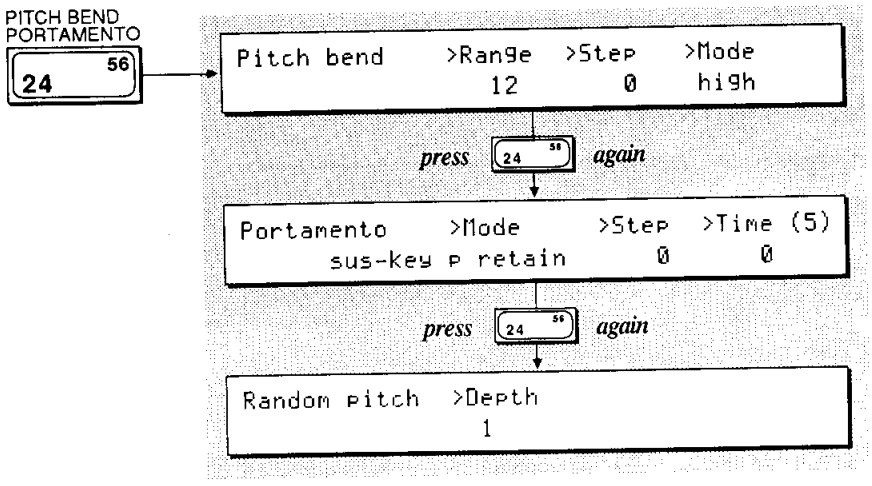
Button 23 LCD Displays



>Key mode
Key Mode
(polyphonic, monophonic, unison poly, unison mono)

>Unison detune
Unison detune *(0 - 7)*
(appears only when Key mode = unison poly or unison mono)

Button 24 LCD Displays



>Range
Pitch Bend Range *(0 - 12)*

>Step
Pitch Bend Step Range *(0 - 12)*

>Mode
Pitch Bend Mode *(normal, low, high, key on)*

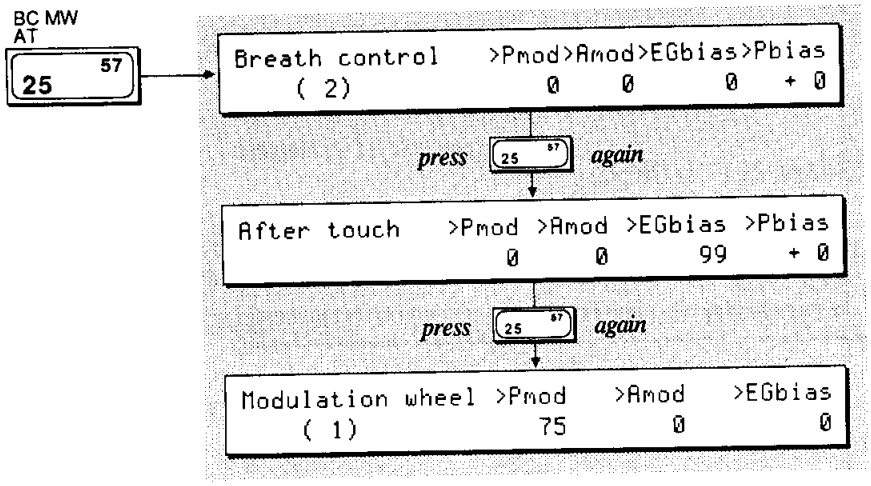
>Mode
Portamento Mode
(sus-key p retain, sus-key p follow)

>Step
Portamento Step Range *(0 -12)*

>Time
Portamento Time *(0 -12)*

>Depth
Random Pitch Depth *(0 -7)*

Button 25 LCD Displays



>Pmod
Pitch Modulation *(0 - 99)*

>Amod
Amplitude Modulation *(0 - 99)*

>EGbias
Envelope Generator Bias *(0 - 99)*

>Pbias
Pitch Bias *(-50 to +50)*

>Pmod
Pitch Modulation *(0 - 99)*

>Amod
Amplitude Modulation *(0 - 99)*

>EGbias
Envelope Generator Bias *(0 - 99)*

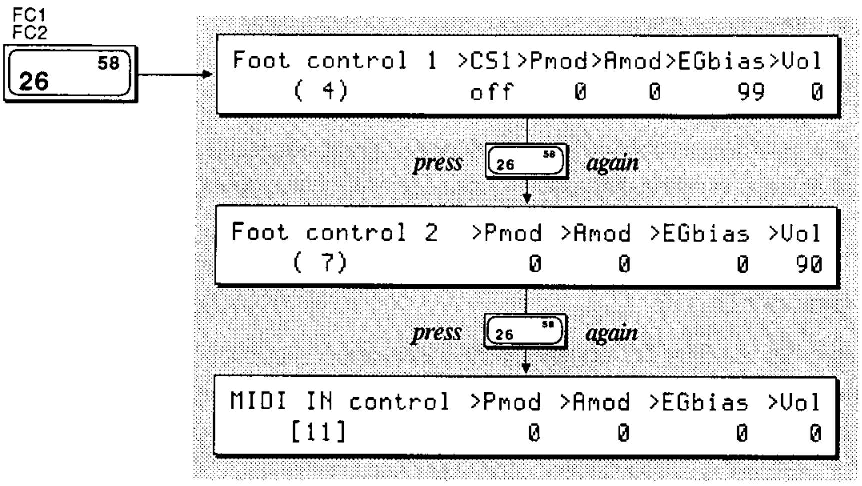
>Pbias
Pitch Bias *(-50 to +50)*

>Pmod
Pitch Modulation *(0 - 99)*

>Amod
Amplitude Modulation *(0 - 99)*

>EGbias
Envelope Generator Bias *(0 - 99)*

Button 26 LCD Displays



>CS1
Control Slider 1 *(off, on)*

>Pmod
Pitch Modulation *(0 - 99)*

>Amod
Amplitude Modulation *(0 - 99)*

>EGbias
Envelope Generator Bias *(0 - 99)*

>Vol
Volume *(0 - 99)*

>Pmod
Pitch Modulation *(0 - 99)*

>Amod
Amplitude Modulation *(0 - 99)*

>EGbias
Envelope Generator Bias *(0 - 99)*

>Vol
Volume *(0 - 99)*

>Pmod
Pitch Modulation *(0 - 99)*

>Amod
Amplitude Modulation *(0 - 99)*

>EGbias
Envelope Generator Bias *(0 - 99)*

>Vol
Volume *(0 - 99)*

Basic Voice Editing Functions

The new DX offers an expanded LCD display, which makes Voice editing much easier than it was with the original DX7. A number of other basic Edit operations have also been simplified, as follows:

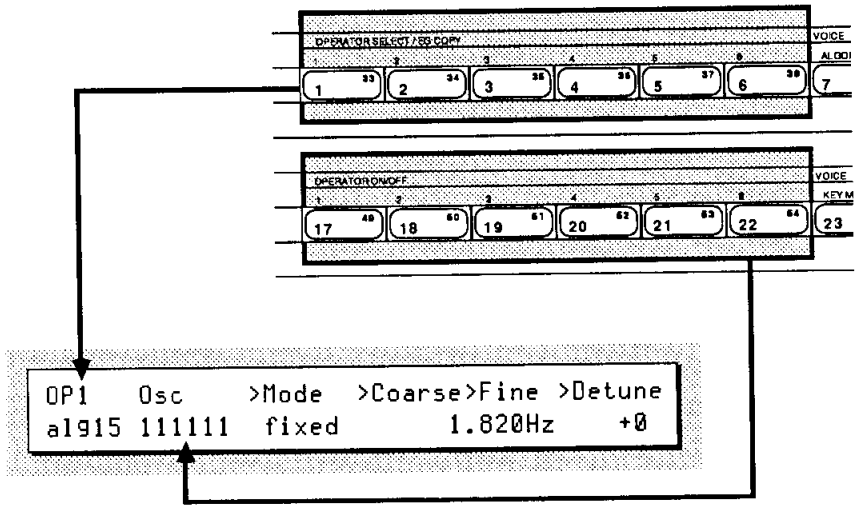
Operator Select

The parameters accessed using buttons 8 ~ 11 are adjustable for each of the six operators. In Voice Edit Mode, buttons 1 ~ 6 provide a quick way to move from one operator to another.

Operator On/Off

In order to adjust the settings for the six operators accurately, it is useful to focus on the sound of certain operators by turning off the output of ones not being edited. In Voice Edit Mode, buttons 17 ~ 22 provide a quick way to turn the six operators on and off.

Voice editing is much easier on the new DX, thanks to the expanded LCD display and the direct operator access provided by buttons 1 ~ 6 and 17 ~ 22.



EG Copy

The EG Copy function from the original DX7 is retained in the new DX, and is made easier through the use of buttons 1 ~ 6. Once you have Envelope data you want to copy displayed in the LCD, simply press and hold the Store/EG Copy button. You can then choose the copy destination using buttons 1 ~ 6.

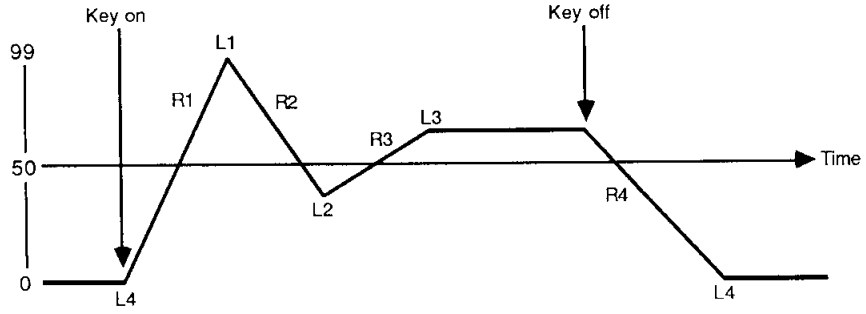
New Voice Parameters

The basic Voice of the new DX is almost exactly the same as that of the original DX7, assuring complete compatibility between the old and new instruments. To discover the additional Voice parameters of the new DX, read on.

Pitch Envelope

The Pitch Envelope operates as it did in the original DX7, but some new features have been added. The potential depth of the Pitch Envelope effect can now be adjusted using the Range parameter:

RNG	Maximum Pitch Change Range
1/2	6 semitones
1	1 octave
2	2 octaves
8	8 octaves



Representative Pitch Envelope Generator shape.

In addition, the Velocity parameter allows you to control the intensity of the Pitch Envelope with keyboard touch.

LFO

There was only one LFO in the original DX7, so all voices were affected in exactly the same way by the LFO settings. In the new DX, there are sixteen LFOs, one for each voice. Even though all sixteen LFOs must have the same settings, they can now operate independently of each other if the LFO Mode parameter is set to Multi. If Mode is set to Single, the LFO will operate as it did in the original DX7.

Key Modes

The new DX offers two Unison Key Modes, which create "fatter" sounds. Since these new Modes use more than one note of the DX's sixteen-note capacity, they will affect the total number of notes available at any one time:

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

In Split Mode, the actual number of voices available will depend on the settings for the two voices involved. For example, if Voice A is set to Polyphonic and Voice B is set for Unison poly, a total of 10 notes can be played simultaneously (8 for Voice A and 2 for Voice B).

Controllers

The new DX features an expanded set of controller options. The settings for Pitch Bend Wheel, Modulation Wheel, Aftertouch, Breath Controller, and Foot Controllers 1 and 2 are adjusted in Voice Edit Mode, using buttons 24 ~ 26. (The other controller settings are accessed in Performance Edit Mode.)

Function Data and Voice Effect Data

The original DX7 separated its operational parameters into two groups: Voice data and Function data. Voice data encompassed all parameters used to create a Voice, and Function data involved settings for the various performance Controllers. The DX7 only had memory to store one set of Function settings, so all Controllers operated in the same way for all Voices.

In the new DX, Function data has been replaced by Voice Effect data (adjusted using buttons 23 ~ 26). This Voice Effect data can be adjusted as part of each Voice Memory — this means that each Voice can have its own Controller settings.

Most of the Voice Effect parameters are exactly the same as the Function parameters of the original DX7. The new parameters are outlined below.

Pitch Bend Modes

The Pitch Bend Wheel in the new DX functions in one of four basic Modes, which operate as follows:

Pitch Bend Modes on the new DX.

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

Foot Controller 1

The new DX provides memory space to set the operation of two Foot Controllers. Foot Controller 1 also has a new parameter possibility: It can be set to control the same Voice parameter as that of Continuous Slider 1. (For more on the available settings for CS 1, see Section 3 of this manual.) Since CS 1 operates in Performance Mode, this use of Foot Controller 1 is also confined to Performance Mode.

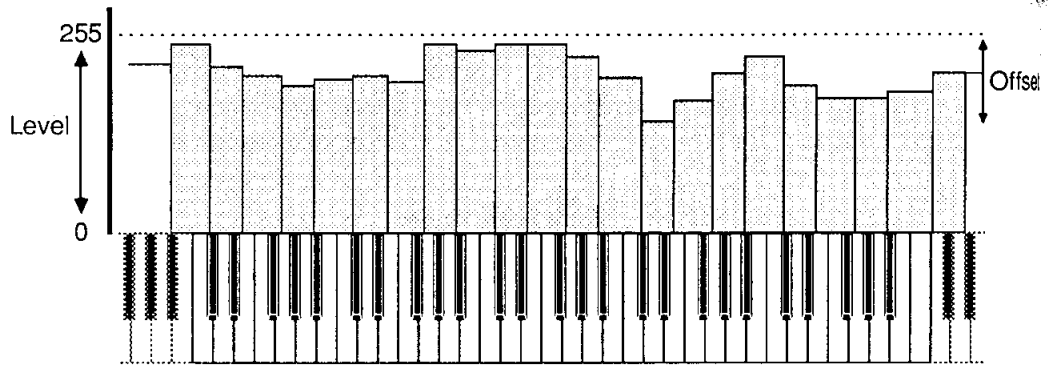
Fractional Scaling

One of the most important aspects of DX7 voicing is Level Scaling, which allows adjustment of each operator's output over the range of the keyboard. The new DX offers the possibility of even more subtle control over operator outputs, through Fractional Scaling.

Fractional Scaling and Level Scaling

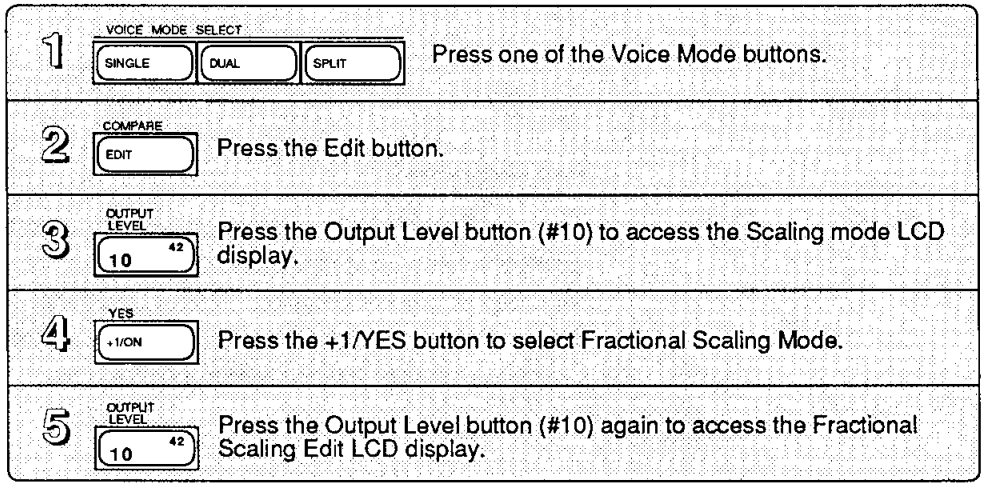
Although the DX7's Level Scaling offers a great deal of interaction between timbre and frequency, Fractional Scaling offers even greater precision: The level can be set independently in groups of three notes, over the entire range of the keyboard. To provide even more control, the resolution of the level settings has been expanded from 0 ~ 99 to 0 ~ 255:

Fractional Scaling allows you to adjust the output level of each operator for three-note groups.



Fractional Scaling Editing and Storage

Entering Fractional Scaling Edit Mode



Editing Fractional Scaling Data

1. PAN ▷ — Press the right cursor button to select the Note Group Edit parameter.

2. OPERATOR SELECT / EG COPY — 1 (33) 2 (34) 3 (35) 4 (36) 5 (37) 6 (38)
   Use the Operator Select buttons (#1~6) to choose the operator whose scaling you wish to edit.

3. Press and hold a key in the note group you wish to edit.

   INTERNAL
   or
   CARTRIDGE
   Press the Internal or the Cartridge button. The note group you have selected will be shown next to the > indicator in the LCD.

   OR

3. FRACTIONAL / MICRO TUNE — ◁ KEY SET ▷ — INTERNAL / CARTRIDGE
   Use the Internal and Cartridge buttons as left and right cursors to move the desired note group into position next to the > indicator in the LCD.

4. DATA ENTRY — NO: -1/OFF — YES: +1/ON
   Use the data entry slider or the +1/-1 buttons to edit the value for the selected note group.

Storing Fractional Scaling Data

1. Make sure that a properly formatted Cartridge (FKS-Y) is inserted in the cartridge port.

2. VOICE MODE SELECT — SINGLE / DUAL / SPLIT
   Press one of the Voice Mode buttons.

3. EG COPY — STORE
   Press and hold the Store button.

4. 1 (33) ~ 32 (64)
   Use the number buttons to select the desired memory location. NOTE: The Fractional Scaling data will be linked to the Internal Performance memory with the same location number.

5. YES — +1/ON
   While still holding the Store button, press the +1/YES button.

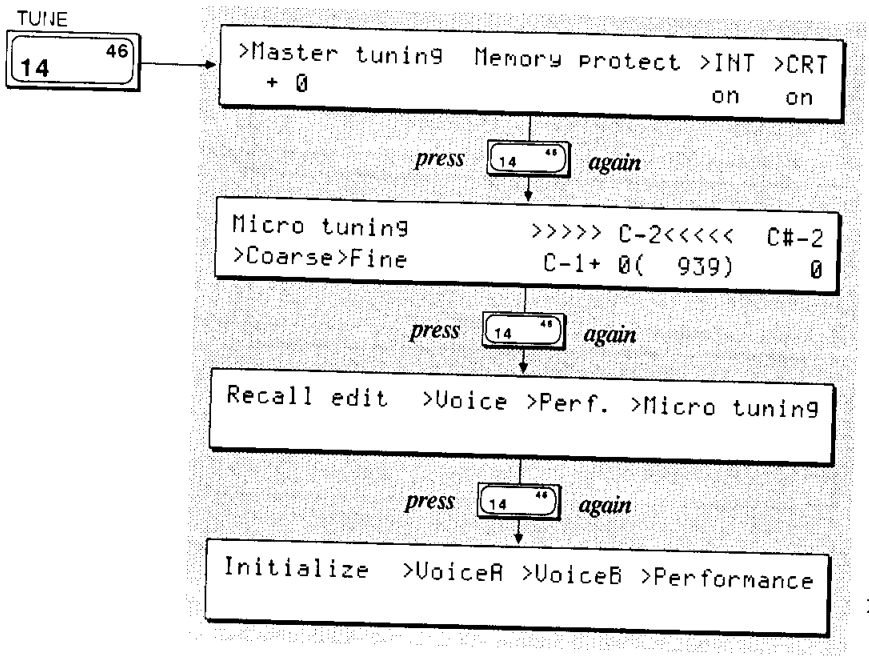
Section 5
Memory Functions

Contents

Utility Buttons

All of the Memory functions (and related utility functions) are adjusted via the LCD displays called up using buttons 14 ~ 16. All of the these buttons call up multiple LCD displays. The charts below show all of the displays called up by each button, and provide a complete list of parameters and value ranges. In some cases, the first LCD display in a chart may not be the first one you see. You may need to cycle through the displays (by pressing the button repeatedly) until you reach the desired LCD display.

Button 14 LCD Displays



>Master tuning
Master Tuning *(-64 to +63)*

>INT
Internal Memory Protect *(off, on)*

>CRT
Cartridge Memory Protect *(off, on)*

>Coarse
Coarse Frequency *(C#-2 to G8 by half steps)*

>Fine
Fine Frequency *(-42 to +42)*

>Voice
Recall Voice Edit

>Perf.
Recall Performance Edit

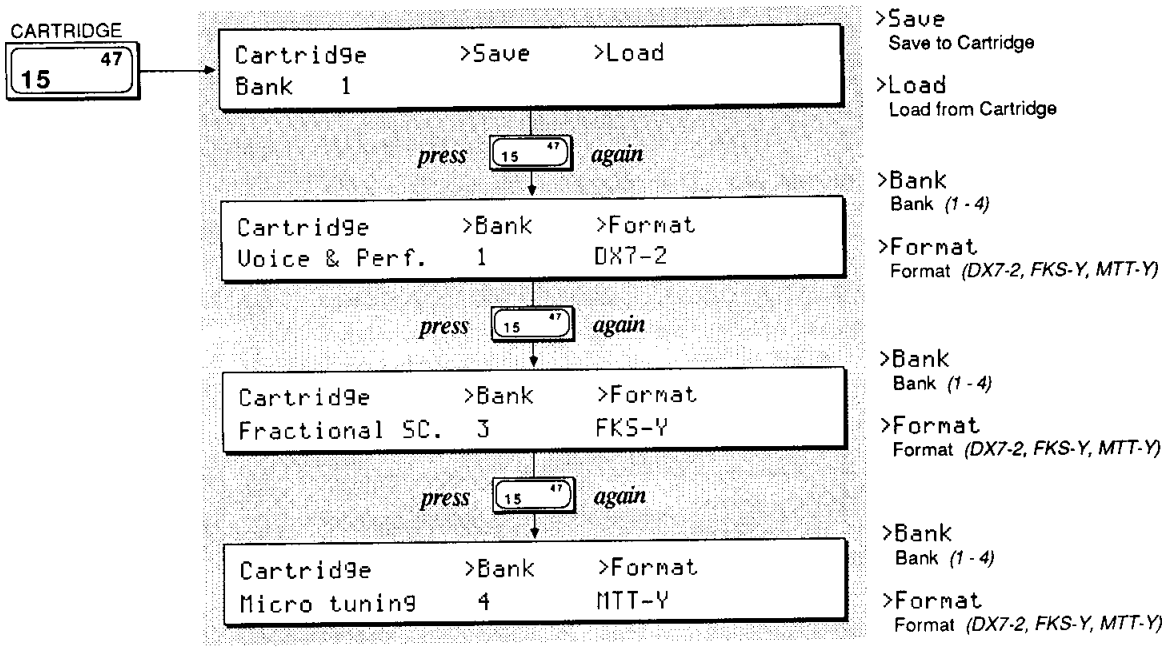
>Micro tuning
Recall Micro Tuning Edit

>VoiceA
Initialize Voice Bank A

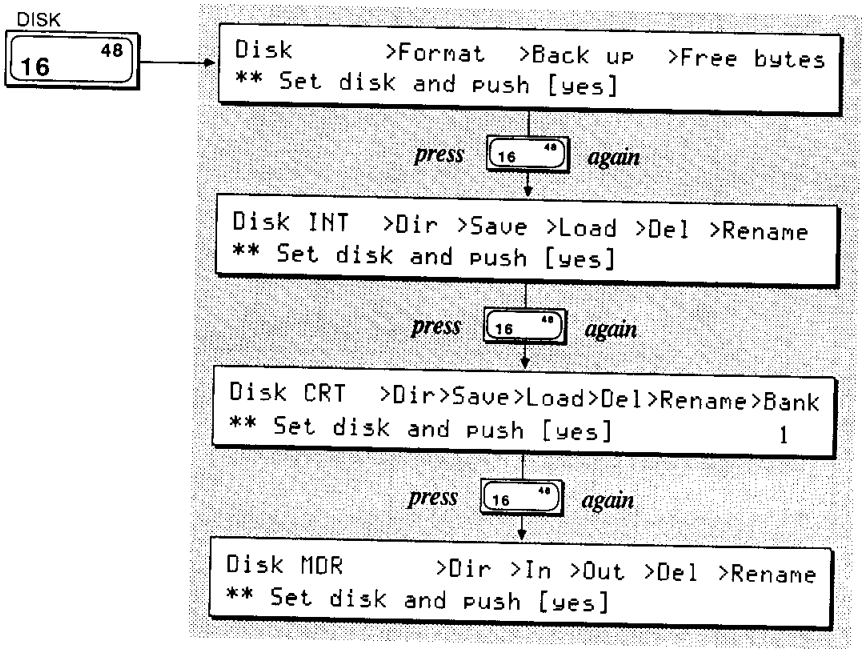
>VoiceB
Initialize Voice Bank B

>Performance
Initialize Performance

Button 15 LCD Displays



Button 16 LCD Displays



>Format
Format Disk

>Back up
Back Up Disk

>Free bytes
Free Files On Disk *(1 - 44)*

>Dir
Internal Files Directory

>Save
Save Internal File

>Load
Load Internal File

>Del
Delete Internal File

>Rename
Rename Internal File

>Dir
Cartridge Files Directory

>Save
Save Cartridge File

>Load
Load Cartridge File

>Del
Delete Cartridge File

>Rename
Rename Cartridge File

>Bank
Cartridge Bank *(1 - 4)*

>Dir
MDR Files Directory

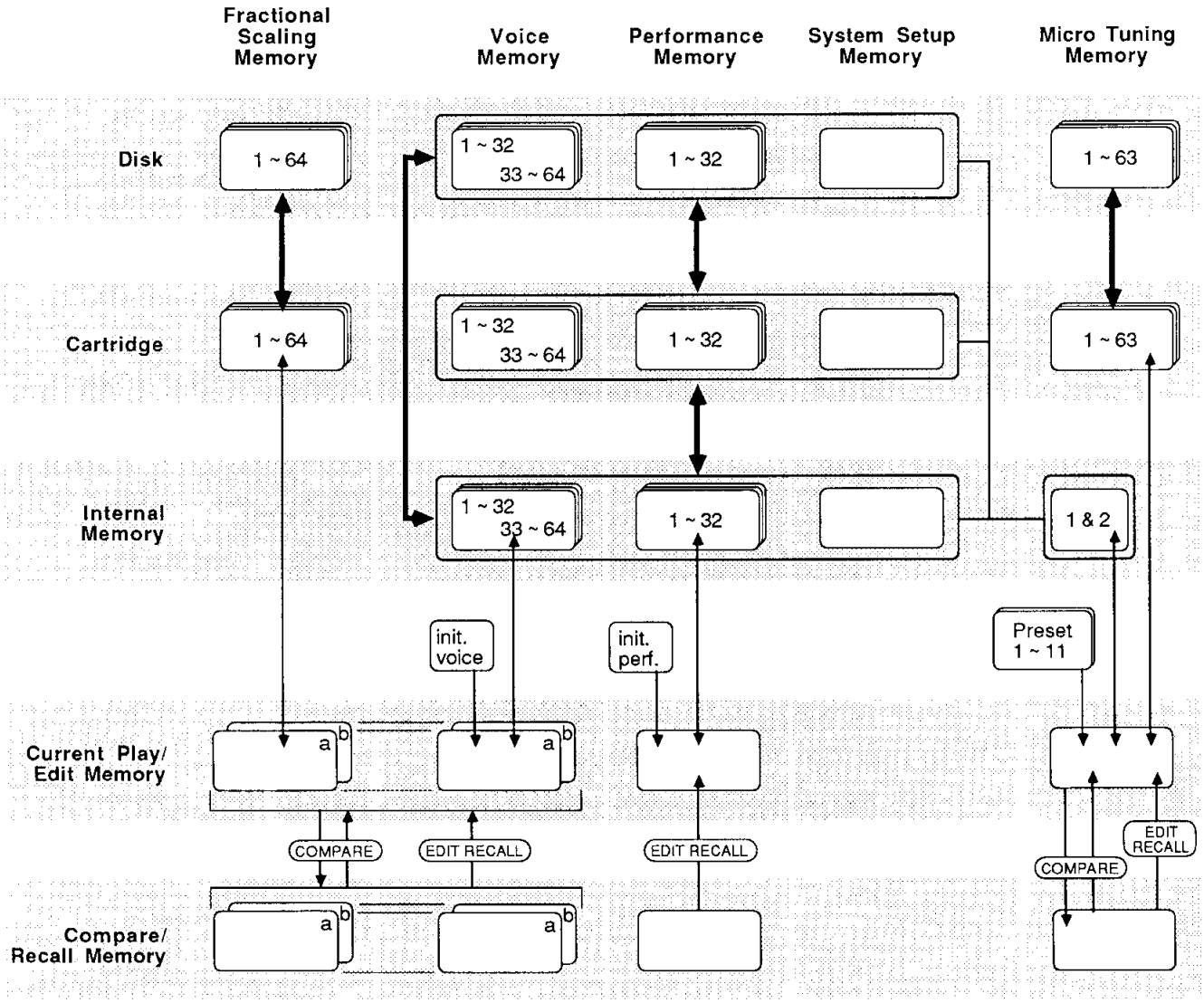
>In
MDR File In

>Out
MDR File Out

>Del
Delete MDR File

>Rename
Rename MDR File

Memory Layout



Memory Types

As you can see from the diagram on the facing page, there are many facets to the Memory layout of the new DX. To understand all of these types of memory, study the diagram and read the explanation below:

Voice & Performance Memory

This Memory block includes data for 64 Voice Memories and 32 Performance Memories, plus one System Setup Memory and two User-defined Micro Tunings.

System Setup Memory

System Setup Memory contains a number of basic MIDI settings, plus Master Tuning and Cartridge Bank number settings. System Setup is always retained in Internal Memory, along with the Voice & Performance Memory and the two User-defined Micro Tunings. For more information on System Setup Memory, see Section 6 of this manual.

Micro Tuning Memory

The DX contains eleven Micro Tunings as part of its permanent memory. In addition, two User-defined Micro Tunings are stored as part of Voice & Performance Memory. Using a RAM cartridge, it is also possible to store up to 63 Micro Tuning Memories.

Fractional Scaling Memory

Fractional Scaling data cannot be stored in the DX's Internal Memory. In order to use Fractional Scaling data with Internal Voice Memories, the data must reside in a RAM (or ROM) cartridge installed in the DX's cartridge port.

Initialized Memory

For those who wish to create Voice Memories or Performance Memories from scratch, the DX provides both Voice and Performance "blank Page" data as part of its permanent memory. If you want to start from ground zero (instead of working from an already-existing Voice or Performance Memory), call up the DX's Init Voice or Init Performance data (using button 14 in Edit Mode).

Current Play/Edit Memory

Whenever you call up a Voice Memory or Performance Memory in Play Mode, you are actually sending it to a special location in the DX — the current Play/Edit Memory. As the name indicates, this is also the location where Voice or Performance data is edited. In computer terminology, this memory location is often called the Edit Buffer.

Compare/Recall Memory

When you are editing a Voice and use the Edit/Compare feature, the original Voice data is loaded into the Play/Edit Memory (so you can hear it). The edited Voice data is moved temporarily into another memory location, the Compare/Recall Memory. In computer terms, this memory location might be called the Compare Buffer. When you engage the Recall Edit function for the various Internal Memory types, you are actually recalling the last data moved to the Compare/Recall Memory.

Memory Storage Types

In addition to having a number of distinct types of memory, the new DX offers a number of ways to store these various memories. To understand how the various memory storage possibilities interact, read on.

Internal Memory

The DX's Internal Memory holds a standard Voice & Performance Memory block, which consists of the following: 64 Voice Memories, 32 Performance Memories, 1 System Setup Memory, and 2 User-defined Micro Tuning Memories. Voice & Performance Memory can also be stored in Cartridge Memory or in Disk Memory.

Cartridge Memory

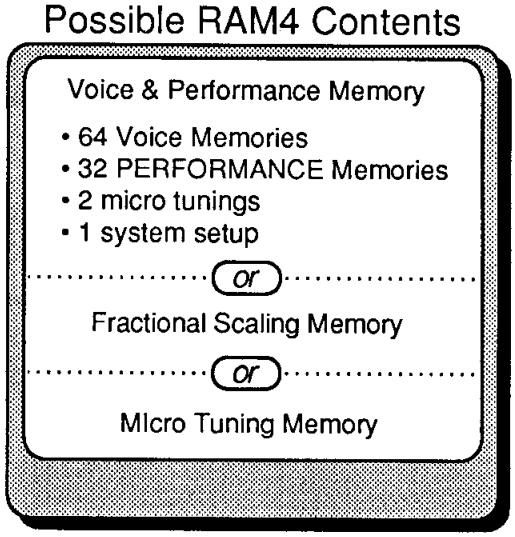
A DX RAM4 cartridge can store three different types of data: Voice & Performance, Fractional Scaling, and Micro Tuning.

The RAM Voice & Performance Memory is equivalent to the Internal Voice & Performance Memory.

The RAM Fractional Scaling Memory holds up to 64 Fractional Scalings, which are tied to the 64 Voices in the DX's Internal Memory.

The RAM Micro Tuning Memory holds up to 63 Micro Tunings.

The RAM4 cartridge can be used to store one of three possible kinds of data.

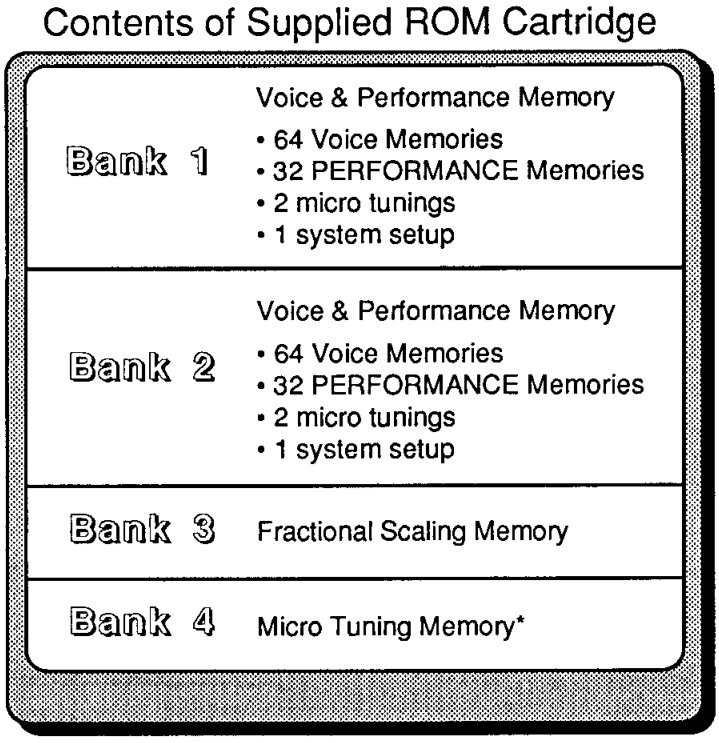


Each of these kinds of Memory can be stored from cartridge to disk (FD only).

The supplied ROM cartridge holds a number of different kinds of DX memory.

ROM Cartridge

The supplied ROM cartridge contains 4 banks, which can be accessed using button 15 in Edit Mode:



* may all be equal tempered data

Disk Memory (FD Only)

Disk memory can be used to store the following: Voice & Performance Memories from the DX's Internal Memory; Voice & Performance, Fractional Scaling, or Micro Tuning Memories from Cartridge Memory; and MIDI data from an external unit via the DX's MIDI ports.

Basic Utility Functions

Most of the basic Internal Memory Utility functions are accessed using button 14 in Edit Mode, as follows:

Master Tune

This sets the tuning of the DX relative to its internal A-440 reference. This setting is stored as part of the DX's System Setup Memory.

Recall Edit

These functions can be used to recall Voice, Performance, or Micro Tuning data from the DX's Compare/Recall Memory.

Initialize

These functions can be used to call up the DX's Initialized Voice or Performance Memories, if you wish to create Voice or Performance data from scratch.

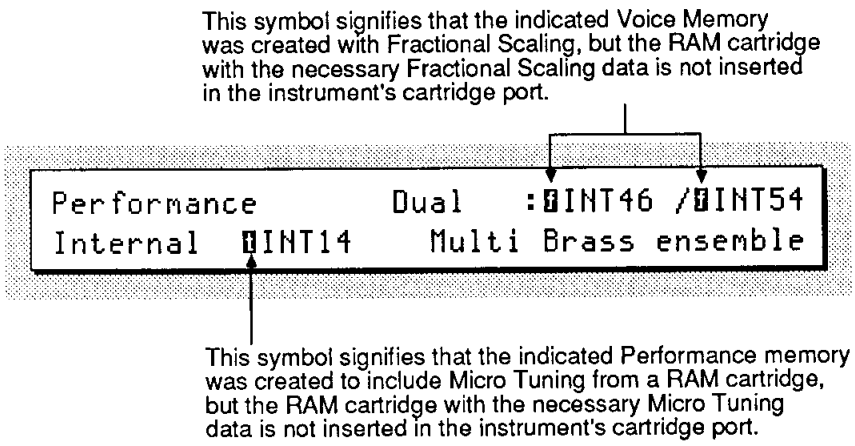
Cartridge Memory Functions

RAM cartridges are useful storage centers for Voice & Performance data. In addition, they are the only storage source from which Fractional Scaling data and Micro Tuning data can be accessed for immediate use with DX Internal Voice & Performance data. To understand the basic Cartridge Utility functions, read on.

Using Cartridge Data

Except for the two User-defined Micro Tunings that are part of the DX's Internal Voice & Performance Memory, Cartridge Memory is the only location from which Fractional Scaling and Micro Tuning data may be recalled for immediate use. Fractional Scaling data and Micro Tuning data can be stored on disk, but cannot be used directly with Internal Memory from disk: In order to interact with Internal Voice & Performance data, Fractional Scaling and Micro Tuning data must reside in a cartridge plugged into the DX's Cartridge port. If you create Voice or Performance data that involves Cartridge Memory (for either Fractional Scaling or Micro Tuning), the DX will remind you as follows:

LCD display indicating that required Fractional Scaling or Micro Tuning data is not available. When the needed data is supplied via a RAM cartridge, these displays disappear.

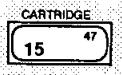


Formatting a RAM Cartridge

1. Insert an unformatted RAM cartridge in the cartridge port.

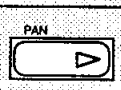
2. 

Press the Edit button.

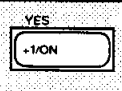
3. 

Press the Cartridge button (#15) until you get the LCD display for the type of formatting you desire:

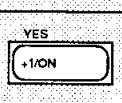
   - To create a Voice & Performance cartridge, press button #15 until the "Voice & Perf." display appears.
   - To create a Fractional Scaling cartridge, press button #15 until the "Fractional SC." display appears.
   - To create a Micro tuning cartridge, press button #15 until the "Micro tuning" display appears.

4. 

Once you reach the display you want, press the right cursor button.

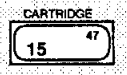
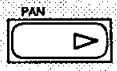
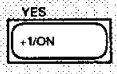
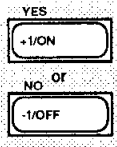
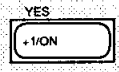
5. 

Now press the +1/YES button. The LCD display will ask "**Are you sure?".

6. 

Press the +1/YES button once more.

Loading Voice & Performance Data from a RAM Cartridge

1		Insert a Voice & Performance RAM cartridge into the cartridge port.
2		Press the Edit button.
3		Press the Cartridge button (#15) to access the Cartridge Save/Load LCD display.
4		Press the right cursor.
5		Press the +1/YES button. The display will ask "Load without system?"
6		Answer by pressing either the +1/YES or the -1/NO button.* The display will ask "**Are you sure?"
7		Press the +1/YES button once more.

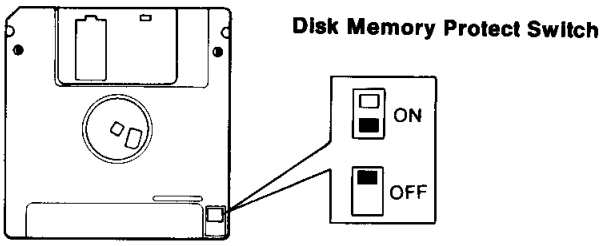
*If you answer NO, you are telling the DX to load the RAM Cartridge data with *System Setup data. If you answer YES, you are telling the DX to load the RAM *Cartridge without System Setup data.

Disk Memory Functions (FD Only)

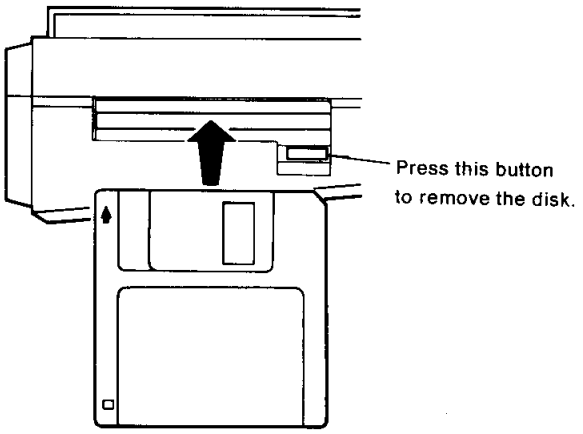
The FD's disk drive is capable of storing any information that resides in the DX's Internal Memory or Cartridge Memory. In order to access this data for performance, it must be loaded into the DX's Internal or Cartridge Memory — the disk drive only operates as a storage medium.

Using and Handling Disks

The DX7 II FD uses 3.5" micro floppy disks. These disks have a Memory Protect function that is similar to that of the RAM4 cartridge:

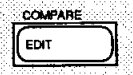
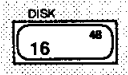
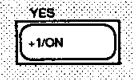
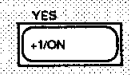


Even though 3.5" disks are relatively sturdy, you should handle them with care when inserting them into or removing them from the DX's disk drive:

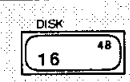
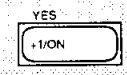
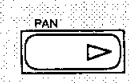
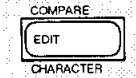
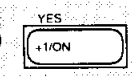
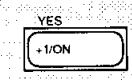


Basic Disk Drive Operations

Formatting a Disk

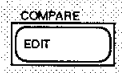
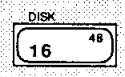
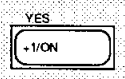
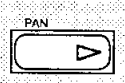
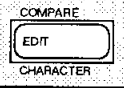
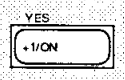
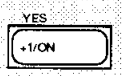
1		Press the Edit button.
2		Press the Disk button (#16) to access the Disk format LCD display.
3		Insert a 3.5" disk into the disk drive slot on the left side of the instrument.
4		Press the +1/YES button. The LCD display will ask "***Are you sure?"
5		Press the +1/YES button again. The formatting process will take about 70 seconds.

Saving Internal Memory to Disk

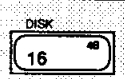
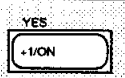
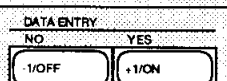
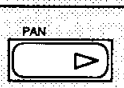
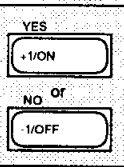
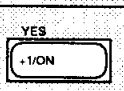
1		Press the Edit button.
2		Press the Disk button (#16) to access the Disk INT LCD display.
3		Press the +1/YES button. Then use the +1/-1 buttons to move to a blank file location.*
4		Press the right cursor button once.
5		Press and hold the Edit/Character button, and type in a name for the file you wish to save to disk.
6		Press the +1/YES button again. The display will ask "***Are you sure?"
7		Press the +1/YES button once again.

*It is possible to store files on top of files already loaded (which will erase the original data). Make sure to select a blank file location before moving to the Save function.

Saving Cartridge Memory to Disk

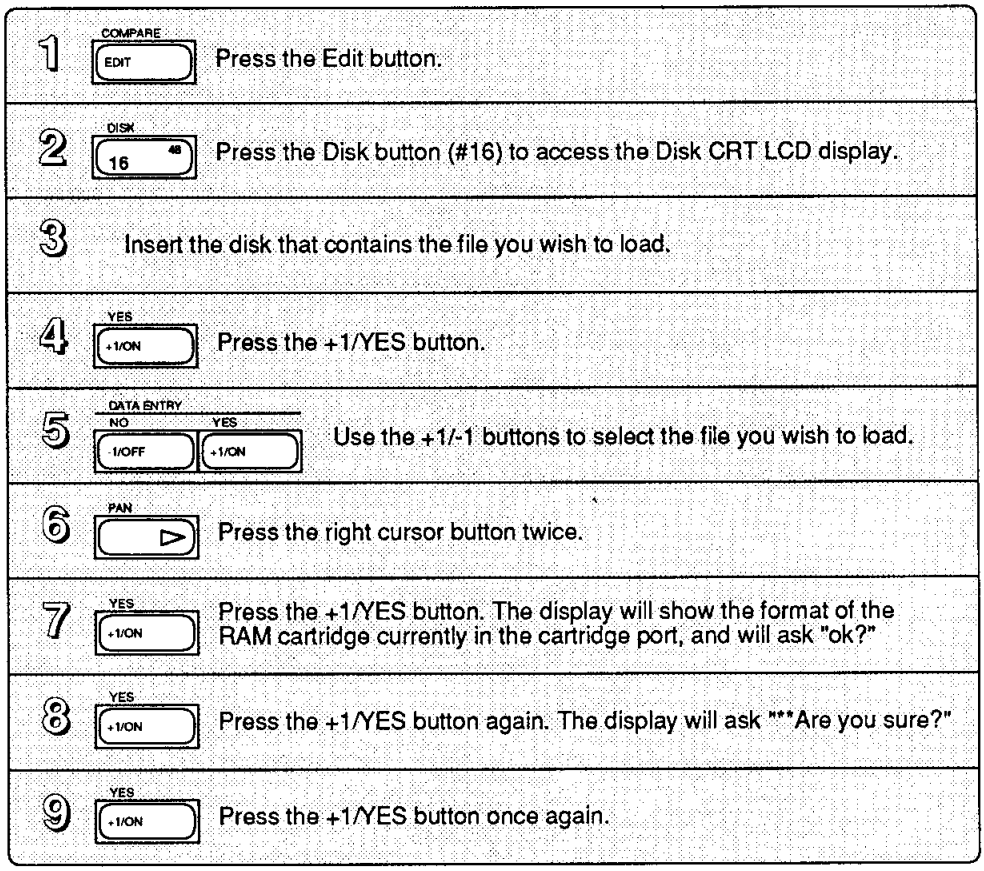
1		Press the Edit button.
2		Press the Disk button (#16) to access the Disk CRT LCD display.
3		Press the +1/YES button. Then use the +1/-1 buttons to move to a blank file location.
4		Press the right cursor button once.
5		Press and hold the Edit/Character button, and type in a name for the file you wish to save to disk.
6		Press the +1/YES button again. The display will ask "**Are you sure?"
7		Press the +1/YES button once again.

Loading Internal Memory from Disk

1		Press the Edit button.
2		Press the Disk button (#16) to access the Disk INT LCD display.
3		Insert the disk that contains the file you wish to load.
4		Press the +1/YES button.
5		Use the +1/-1 buttons to select the file you wish to load.
6		Press the right cursor button twice. The display will ask "Load without system?"
7		Answer by pressing either the +1/YES or the -1/NO button.* The display will ask "**Are you sure?"
8		Press the +1/YES button again.

*If you answer NO, you are telling the DX to load the Internal data with System Setup data. If you answer YES, you are telling the DX to load the Internal data without System Setup data.

Loading Cartridge Memory from Disk



Disk MDR

The DX7 II FD's disk drive can also be used as a MIDI Data Recorder, to record MIDI information from external instruments via the DX's MIDI ports. The DX's disk can record external MIDI data into files of up to 20K bytes. To use this MIDI record function, make the proper MIDI connections and follow the prompts in the DX's LCD display.

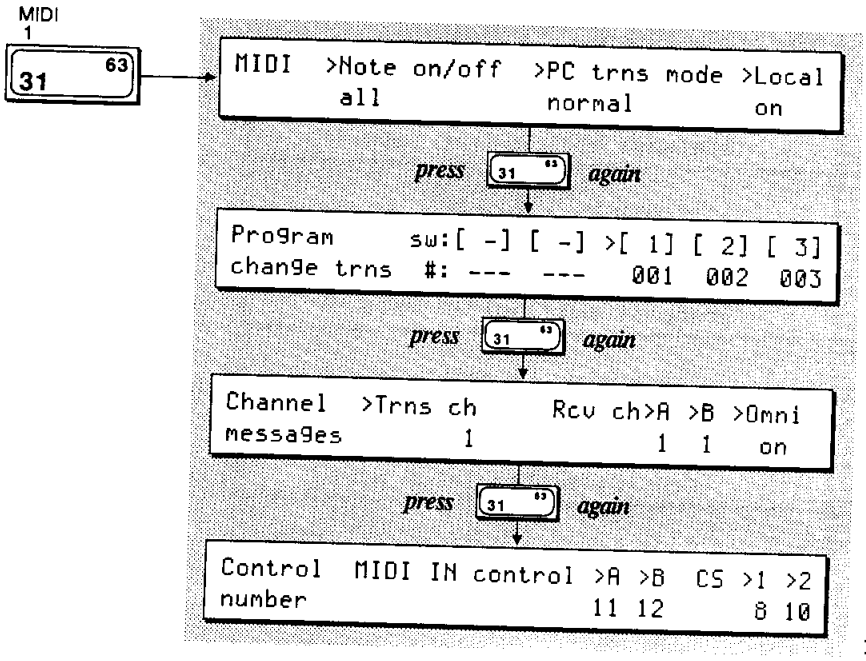
Section 6
MIDI Functions

Contents

MIDI Buttons

All of the MIDI functions and parameters are adjusted via the LCD displays called up using buttons 31 ~ 32. All of the these buttons call up multiple LCD displays. The charts below show all of the displays called up by each button, and provide a complete list of parameters and value ranges. In some cases, the first LCD display in a chart may not be the first one you see. You may need to cycle through the displays (by pressing the button repeatedly) until you reach the desired LCD display.

Button 31 LCD Displays



>Note on/off
Note Selection *(all, odd, even)*

>PC trns mode
Program Change Transmit Mode *(off, normal, programmable)*

>Local
Local Mode *(off, on)*

>[1] [2] [3]
Program Number to Send *(001 - 128)*

>Trns ch
Transmit Channel *(1 - 16, off)*

>A
Receive Channel A *(1 - 16, off)*

>B
Receive Channel B *(1 - 16, off)*

>Omni
Omni Mode *(off, on)*

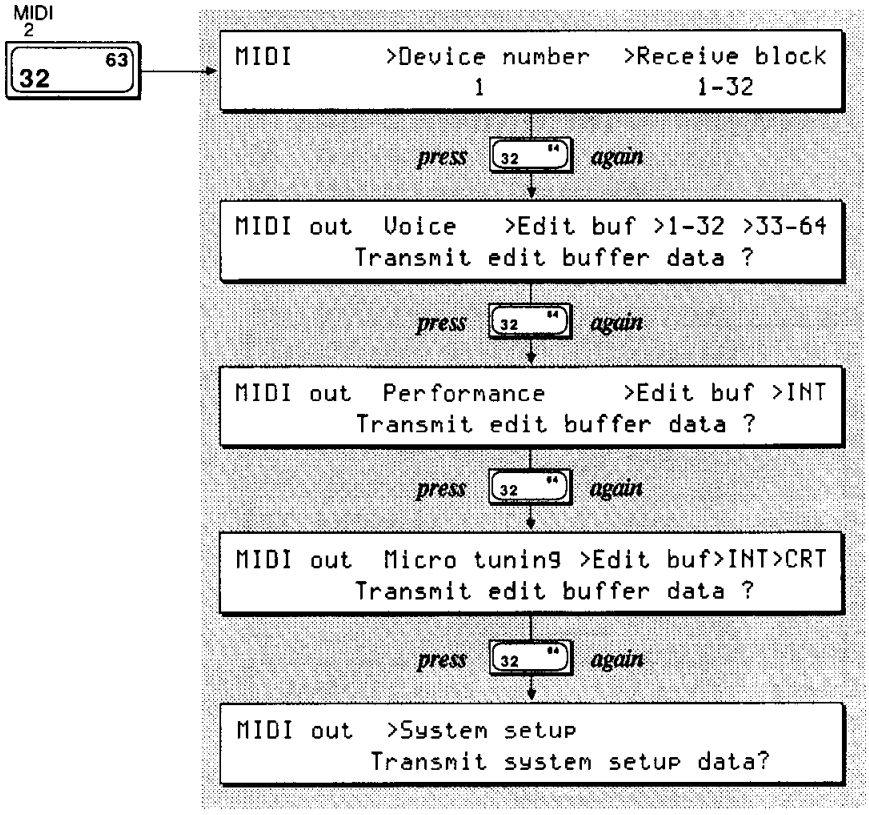
>A
MIDI In Controller A *(11 - 31)*

>B
MIDI In Controller B *(11 - 31)*

>1
MIDI In Slider 1 *(5 - 31)*

>2
MIDI In Slider 2 *(5 - 31)*

Button 32 LCD Displays



>Device number
Device Number *(1 - 16, off)*

>Receive block
Receive Block *(1 - 32, 33 - 64)*

>Edit buf
Transmit Voice Edit Buffer

>1-32
Transmit Voice Data 1-32

>33-64
Transmit Voice Data 33-64

>Edit buf
Transmit Performance Edit Buffer

>INT
Transmit Internal Performance Memory

>Edit buf
Transmit Micro Tuning Edit Buffer

>INT
Transmit Internal Micro Tuning Memory

>CRT
Transmit Cartridge Micro Tuning Memory

>System setup
Transmit System Setup

System Setup

Since the use of many basic MIDI functions might depend on the contents of a specific set of Voice & Performance data, the new DX provides a special memory location, System Setup Memory, to store basic MIDI parameters and other data in conjunction with a Voice & Performance Memory block. This System Setup Memory contains settings for the following parameters:

Channel Messages

This LCD display allows you to set the DX's MIDI transmission channel, MIDI receive channels (for Voice A and Voice B in Performance Mode), and MIDI Omni Mode reception (on or off — if on, the receive channel settings are inactive).

Note On/Off

This parameter is usually set to off, meaning that all keys played produce a note. Other settings (Odd, Even) can be used in conjunction with other MIDI instruments to produce a variety of interesting effects.

Program Change Transmission

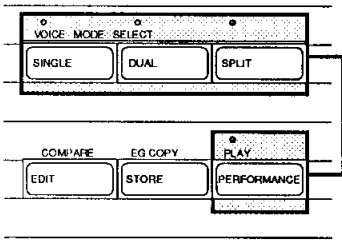
If the new DX is connected to another MIDI instrument, various levels of MIDI communication are possible. The MIDI Program Change Mode determines how the DX will relate to an external MIDI instrument: If Mode is set to Off, program changes on the DX will have no effect on the external unit; if Mode is set to Normal, a program change on the DX will send the same Program number to the external unit; if Mode is set to Programmable, the program changes sent will be be those programmed in the Program Change Trans LCD display.

Local On/Off

This parameter allows you to turn the DX's internal synthesizer on and off (as part of a MIDI system). If Local is set to Off, notes played on the DX keyboard will not engage the DX's internal sound mechanism.

Immediate MIDI Program Change Out

If you wish to send a quick MIDI Program Change Message to an external MIDI unit, use the following procedure:



In any of the Play Modes (Single, Dual, Split, or Performance), press and hold the button of the current Play Mode (the one with the lit LED). You will see this LCD display:

```
Performance        Dual    : INT46 / INT54
Sending program change  No.---
```

Now, while still holding the Play Mode button, type in the program change number you desire (1~128) using the 1~10 number buttons (1 through 0 character buttons). All three positions in the LCD must be filled: for example, to send program #1, type in 001.

Once you have typed in the third number, the program change you have typed in will be sent over MIDI to the instrument connected to your DX7 II.

Control Number

These parameters set the MIDI Controller numbers for external MIDI Controllers that may interact with the DX. The function of these Controllers is set via button 26 in Edit Mode.

In addition, these parameters set the MIDI function of CS 1 and CS 2 (as Controllers of external MIDI instruments), and also set the Controller number of an external MIDI Controller that can be used to control the Voice parameters connected to CS 1 and CS 2 in Performance Mode. If Controller values of 5 ~ 8 are selected, only MIDI transmission is possible.

Other System Setup Parameters

In addition to all of these MIDI settings, The System Setup Memory stores the Master Tune setting (button 14) and the Cartridge Bank setting (button 15). Whenever you load Voice & Performance data from Cartridge Memory or Disk Memory to Internal Memory, you have the option of loading with or without the System Setup stored with the Voice & Performance data.

System Setup Data	Button
Master Tuning	14
Cartridge Bank Number	15
MIDI Trns ch, Rcv ch, Omni Mode	31
Local	31
Control Number	31
Note on/off	31
PC trans mode	31
Program change out	31

MIDI Data Communications

If you use the new DX as part of a MIDI system, there are a number of advanced MIDI functions available for your use:

MIDI Device Number

If the DX is connected to another Yamaha product, this parameter must be used to set a Yamaha System Exclusive Device Number for MIDI System Exclusive data reception or transmission. This parameter is also used when the FD's disk drive is used as a MIDI data recorder.

Receive Block

This parameter allows you to set the Memory Reception block as either Internal Voices 1 ~ 32 or Internal Voices 33 ~ 64.

MIDI Out

These LCD displays allow you to transmit various kinds of MIDI System Exclusive data from the DX's Internal Memory to an external instrument. Obviously, these functions are useful only if you are transmitting data to another instrument (such as another DX7 II) that is capable of understanding and using it.

Appendix 1: Supplemental Information

As mentioned at the outset, this manual has not attempted to cover all of the functions of the new DX in exhaustive detail. To do so would have required a manual of large scale and density, one in which it would have been very difficult to locate specific information needed to begin using the DX.

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 concerning the availability of other material concerning more advanced applications. Some areas that will be covered in AfterTouch or in supplemental booklets include the following:

Quick Reference Guide
Memory Management
Fractional Scaling
Micro Tuning (Basic)
Micro Tuning (Advanced)
FM Voice Programming (Basic)
FM Voice Programming (Advanced)
Real-Time Parameter Changes
Advanced Controller Usage
Advanced MIDI Applications
MIDI Technical Data & Charts

To receive a free copy of AfterTouch every month, send your request to Aftertouch, P.O. Box 2338, Northiridge, CA 91323-2338. On your letter or postcard, be sure to indicate that you are the owner of a DX7 II FD/D.

Appendix 2: Bibliography

Many of the basic functions of the DX7 II FD/D are the same as those of the original DX7. Since there is a wealth of material available on the operation of the original DX7, this manual has focused on the new functions and features. For more information on the parameters and features that the new DX shares with the original DX7, consult the following:

DX7 Owner's Manual. (Available through your local authorized Yamaha dealer).

The Complete DX7, by Howard Massey; published by Amsco Publications; 1986.

FM Theory and Application, by Dr. John Chowning and David Bristow; published by Yamaha Music Foundation; 1986.

How to Understand and Program the Yamaha DX7, by Lorenz M. Rychner; published by Alexander Publishing; 1985.

The Secrets of Analog and Digital Synthesis, by Steve de Furia; published by Hal Leonard Publishing; 1985.

Yamaha Easy DX7; published by Yamaha Music Foundation and Hal Leonard Publishing; 1986.

Appendix 3: MIDI Implementation Chart

[Digital Programmable Algorithm Synthesizer] Date : 11/21, 1986
Model DX7-2 MIDI Implementation Chart Version : 1.0

Function ...		Transmitted	Recognized	Remarks
Basic Channel	Default	1 - 16	1 - 16	memorized
	Changed	1 - 16	1 - 16	
Mode	Default	3	1, 2, 3, 4	memorized
	Messages	x	POLY, MONO(M=1)	
	Altered	XXXXXXXXXXXXX	x X2	
Note Number		36 - 96 X1	0 - 127 X2	
	True voice	XXXXXXXXXXXXX	1 - 127	
Velocity	Note ON	o 9nH,v=1-127	o v=1-127	
	Note OFF	x 9nH,v=0	x	
After Touch	Key's	x	x	
	Ch's	o X1	o X2	
Pitch Bender		o X1	o 0-12 semi X2	7 bit resolution
Control Change	1	o X1	o X2	Modulation wheel
	2	o X1	o X2	Breath control
	4	o X1	o X2	Foot Controller
	5	x	o X2	Portamento time
	6	o X1	x	Data entry knob
	7	o X1	o X2	Volume
	8/10	x / x	o / o X2	Balance / Pan
	64	o X1	o X2	Sustain foot sw
	65	o X1	o X2	Portamento f sw
	66	o X1	o X2	Sostenuto
	67	o X1	o X2	Soft
	96/97	o / o X1	o / o X2	Data entry +1/-1
	5-31	o X1	o (11-31) X2	Continuous slidr
Prog Change		o 0 - 127 X1	o 0 - 127 X2	
	True #	XXXXXXXXXXXXX	0 - 127	64-127:Cartridge
System Exclusive		o X3	o X3	Voice parameters
System Common	Song Pos	x	x	
	Song Sel	x	x	
	Tune	x	x	
System Real Time	Clock	x	x	
	Commands	x	x	
Aux Mes- sages	Local ON/OFF	x	x	
	All Notes OFF	x	o (126,127)	
	Active Sense	o	o	
	Reset	x	x	

Notes: X1 = transmit if transmit channel is not off.
X2 = receive if receive channel is not off.
X3 = transmit/receive if device number is not off.

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

DX7 II·FD/D

Voice name :

Date : / /

ALGORITHM	
ALG	
FBL	
OSC.Sync	
Transpose	
L F O	
Wave	
Speed	
Delay	
Mode	
PMS	
PMD	
AMD	
Sync	
Pitch E G	
Range	
Velocity	
RS	
R1	
R2	
R3	
R4	
L1	
L2	
L3	
L4	

OSCILLATOR	OP	1	2	3	4	5	6
Mode							
Coarse·Fine							
Detune							
E G	OP	1	2	3	4	5	6
RS							
R1							
R2							
R3							
R4							
L1							
L2							
L3							
L4							
Output Level	OP	1	2	3	4	5	6
Scaling mode							
Output Level							
LD							
LC							
BP							
RC							
RD							
Sensitivity	OP	1	2	3	4	5	6
Velocity							
AMS							

Key mode	
Key assign mode	
Unison detune	
Pitch Bend	
Range	
Step	
Mode	
Portamento	
Mode	
Step	
Time	
Random pitch S.	
Modulation Wheel	
P. MOD	
A. MOD	
EG. B	
Breath Control	
P. MOD	
A. MOD	
EG. B	
P. Bias	
After Touch	
P. MOD	
A. MOD	
EG. B	
P. Bias	

Foot control 1	
P. MOD	
A. MOD	
EG. B	
P. Bias	
Foot control 2	
P. MOD	
A. MOD	
EG. B	
P. Bias	
MIDI IN control	
P.MOD	
A. MOD	
EG. B	
P. Bias	

Blank Voice Data Chart

Blank Performance Data Chart

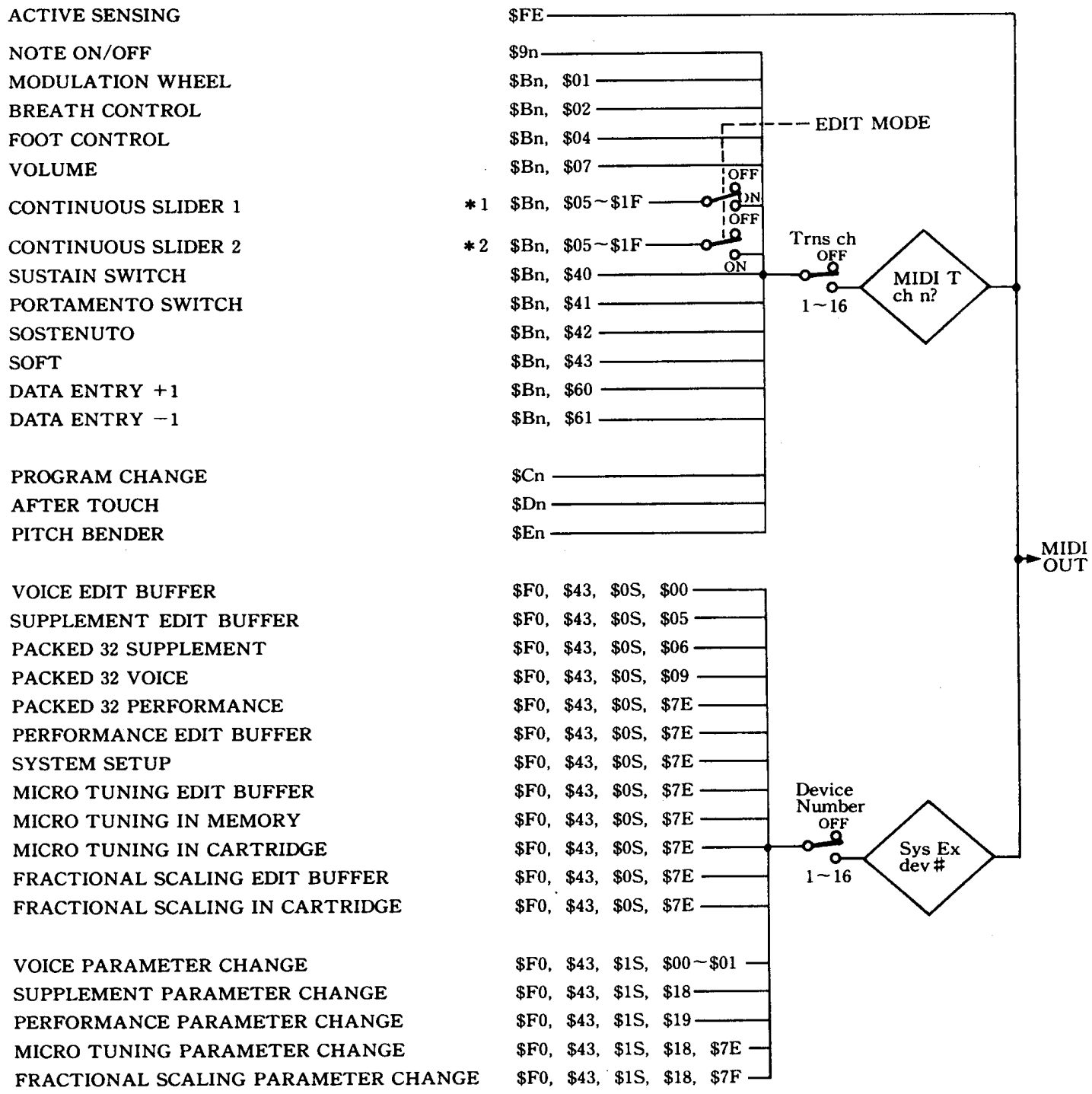
DX7 II-FD/D

Performance name :

	A		B	
Voice mode				
Voice No(name)				
Total volume				
Balance				
Dual detune				
Split point				
Sustain foot switch				
Foot switch ( )RNG				
Continuous slider 1 ( )				
Continuous slider 2 ( )				
Micro tuning table select ( ) Key=				
EG forced damping				
Note shift				
PAN mode				
PAN range				
PAN select				
PAN EG	R1	R2	R3	R4
	L1	L2	L3	L4

MIDI DATA FORMAT

1. Transmission Requirements



*1 BALANCE $Bn, $08 in EDIT MODE

2. Transmission Data

2-1. Channel Information

Transmission is possible only when 1~ 16 is specified as the transmission channel.

1) Channel voice message

1 Key ON/OFF

Status	1 0 0 1 n n n n	(9n)	n=channel No.
Note No.	0 k k k k k k k		k=36(C1)~96(C6)
Velocity	0 v v v v v v v	(v=0)	Key ON
	0 0 0 0 0 0 0 0	(v=0)	Key OFF

2 Control change

Status	1 0 1 1 n n n n	(Bn)	n=channel No.
Control No.	0 c c c c c c c		
Control Value	0 v v v v v v v		

Control No.

c=1	Modulation wheel	v=0~127
c=2	Breath control	v=0~127
c=4	Foot control	v=0~127
c=5	Portamento time	v=0~127
c=7	Volume	v=0~127
c=5~ c=31	Continuous slider	v=0~127
c=64	Sustain SW	v=0: OFF, 127: ON
c=65	Portamento SW	v=0: OFF, 127: ON
c=66	Sostenuto	v=0: OFF, 127: ON
c=67	Soft	v=0: OFF, 127: ON

3 Program change

Status	1 1 0 0 n n n n	(Cn)	n=channel No.
Program No.	0 p p p p p p p		p=0~63: INTERNAL p=64~127: CARTRIDGE

4 After touch

Status	1 1 0 1 n n n n	(Dn)	n=channel No.
Value	0 v v v v v v v		v=0~127

5 Pitch bender

Status	1 1 1 0 n n n n	(En)	n=channel No.
Value (LSB)	0 u u u u u u u		
Value (MSB)	0 v v v v v v v		

Resolution 7bit

The transmission data are as follows:

MSB		LSB		
00000000	(00)	00000000	(00)	Min.
01000000	(40)	00000000	(00)	Mid.
01111111	(7F)	01111110	(7E)	Max.

2-2. System Information

1) System real time message

Active sensing

Status	1 1 1 1 1 1 1 0	(FE)

2) System exclusive message

Transmission is possible only when the device No. is set to 1~16.

1 Parameter change

Status	1 1 1 1 0 0 0 0	(F0)
ID No.	0 1 0 0 0 0 1 1	(43)
Substatus/ device No.	0 0 0 1 n n n n	(1n)
Parameter group No.	0 g g g g g h h	
Parameter No.	0 p p p p p p p	
Data	0 d d d d d d d 0 d d d d d d d	Single or multiple bytes
EOX	1 1 1 1 0 1 1 1	(F7)

There are seven parameter group Nos. and parameter Nos.

Parameter	g	h	p	No. of data byte
Voice	0	0	0~127	1
	0	1	0~28	1
Supplement Note 3)	6	0	0~73	1
Performance	6	1	0~52	1
System set-up	6	1	64~	1
Micro tuning	6	0	126	3 Note 1)
Fractional scaling	6	0	127	4 Note 2)

NOTE 1

Data bytes

0kkkkkkk	key number		total of 3 bytes
0hhhhhhh	data (high)	0-84 binary	
01111111	data (low)	0-127 binary	

NOTE 2

Data bytes

00000ppp	operator number		total of 4 byte
00kkkkkk	key group number		
0hhhhhhh	data (high)	0-1 binary	
01111111	data (low)	0-127 binary	

NOTE 3

Under the Supplement parameter change, DX7 function parameter change will be transmitted along with the above.

- **Fractional Scaling Parameter Change**

Operator number

P	Operator
0	op 6
1	op 5
2	op 4
3	op 3
4	op 2
5	op 1

Key group number

K	Key	Data
0	offset	−127 ~ 127 (Complement of 2)
1	C -2~ C-1	0 ~255 (Binary)
2	C#-1~D#-1	
3	E-1 ~F#-1	
4	G-1 ~ A-1	
5	A#-1~ C0	
6	C#0 ~ D#0	
7	E0 ~ F#0	
8	G0 ~ A0	
9	A#0 ~ C1	
10	C#1 ~ D#1	
11	E1 ~ F#1	
12	G1 ~ A1	
13	A#1 ~ C2	
14	C#2 ~ D#2	
15	E2 ~ F#2	
16	G2 ~ A2	
17	A#2 ~ C3	
18	C#3 ~ D#3	
19	E3 ~ F#3	
20	G3 ~ A3	
21	A#3 ~ C4	
22	C#4 ~ D#4	
23	E4 ~ F#4	
24	G4 ~ A4	
25	A#4 ~ C5	
26	C#5 ~ D#5	
27	E5 ~ F#5	
28	G5 ~ A5	
29	A#5 ~ C6	
30	C#6 ~ D#6	
31	E6 ~ F#6	
32	G6 ~ A6	
33	A#6 ~ C7	
34	C#7 ~ D#7	
35	E7 ~ F#7	
36	G7 ~ A7	
37	A#7 ~ C8	
38	C#8 ~ D#8	
39	E8 ~ F#8	
40	G8	

2 Bulk data

For { Voice edit buffer / Supplement edit buffer / Packed 32 supplement / Packed 32 voice }

Status	1 1 1 1 0 0 0 0	(F0)
ID No.	0 1 0 0 0 0 1 1	(43)
Substatus/ device No.	0 0 0 0 n n n n	(0n)
Format No.	0 f f f f f f f	
Byte count (MSB)	0 b b b b b b b	
Byte count (LSB)	0 b b b b b b b	
Data	0 d d d d d d d ↓ 0 d d d d d d d	
Checksum	0 e e e e e e e	
EOX	1 1 1 1 0 1 1 1	(F7)

Format No.	Data	Byte count
0	Voice edit buffer	155
5	Supplement edit buffer	49
6	Packed 32 supplement	1120
9	Packed 32 voice	4096

- **When using universal Bulk Damp**

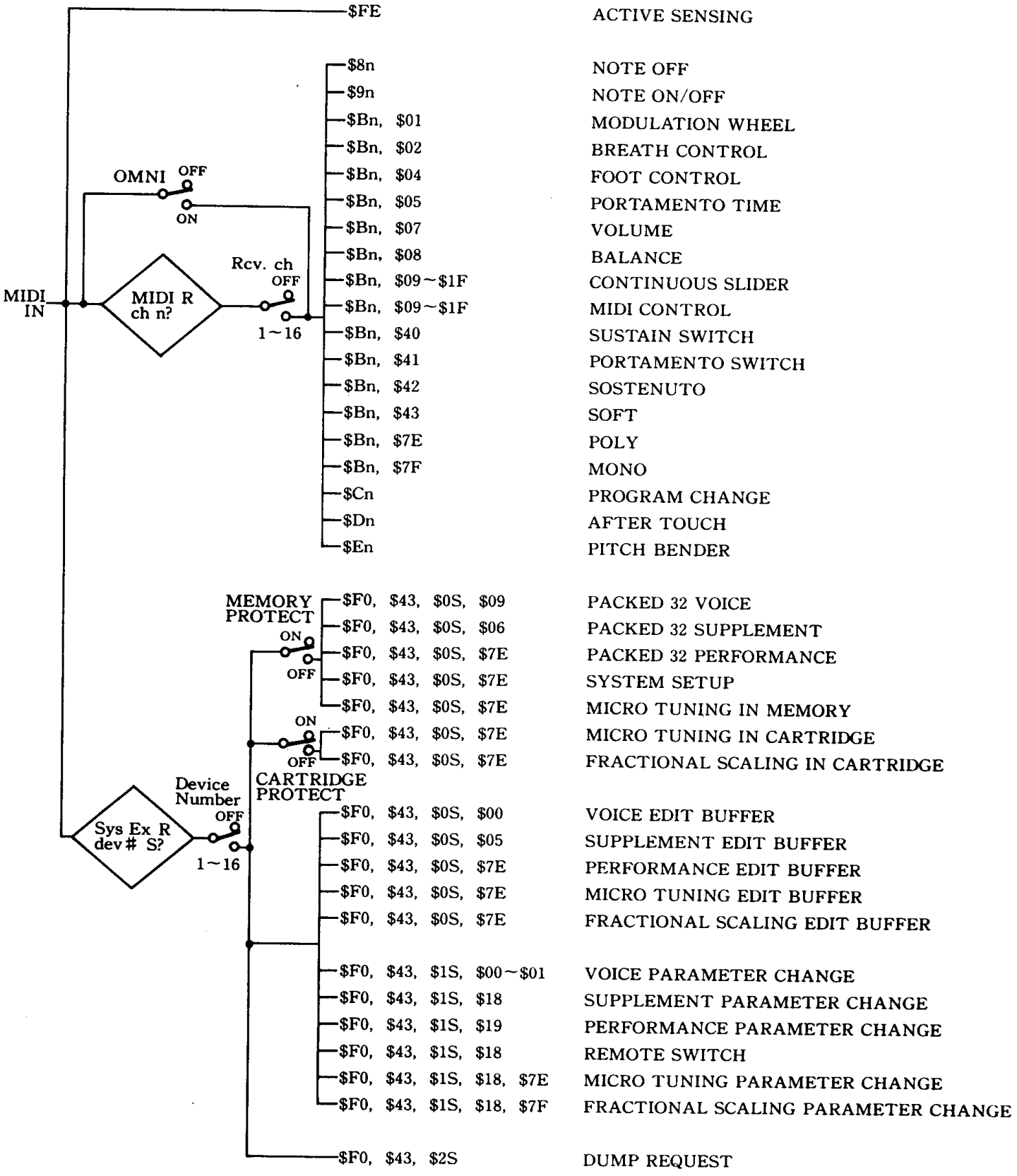
Status	1 1 1 1 0 0 0 0	(F0)	
ID No.	0 1 0 0 0 0 1 1	(43)	
Substatus/ device No.	0 0 0 0 n n n n	(0n)	
Format No.	0 1 1 1 1 1 1 0	(7E)	
Byte count (MSB)	0 b b b b b b b		
Byte count (LSB)	0 b b b b b b b		
Classification	0 a a a a a a a	ASCII	'L
name	0 a a a a a a a		'M
(4 bytes)	0 a a a a a a a		'—
	0 a a a a a a a		'—
Data format	0 m m m m m m m	ASCII	
name (6 bytes)	↓		
	0 m m m m m m m		
Data	0 d d d d d d d		
	↓		
	0 d d d d d d d		
Checksum	0 e e e e e e e		
EOX	1 1 1 1 0 1 1 1	(F7)	

Repeat group

Data	Byte count	Classification name	Data format name	No. of repeats
DX7 II Performance Edit Buffer	61	LM␣␣	8973P E	1
DX7 II Packed 32 Performance	1642	LM␣␣	8973P M	1
DX7 II System Set-up	112	LM␣␣	8973 S␣	1
Micro Tuning Edit Buffer	266	LM␣␣	MCRYE	1
Micro Tuning with Memory #x	266	LM␣␣	MCRYMx	1
Micro Tuning Cartridge	266	LM␣␣	MCRYC␣	64
Fractional Scaling Edit Buffer	502	LM␣␣	FKSYE␣	1
Fractional Scaling in Cartridge with Memory #	502	LM␣␣	FKSYC␣	32

Note 1) The x of MCRYMx is a memory No. expressed in binary form, 0 or 1.
Note 2) When the number of repeats is 64, the data group from byte count to checksum will be transmitted 64 times.

3. Reception Requirements



4. Reception Data

4-1. Channel Information

There are two types of MIDI reception channels for channel messages: A and B.

Single mode : Only A is effective
Dual mode : Only A is effective
Split mode : A, B independent
The split point function is effective when A = B, assigning A to the lower half and B to the upper half.

1) Channel voice message

1 Key OFF

Status	1 0 0 0 n n n n	(8n)	n = channel No.
Note No.	0 k k k k k k k		k = 0(C_{-2}) ~ 127(G_8)
Velocity	0 v v v v v v v		Ignore vs

2 Key ON/OFF

Status	1 0 0 1 n n n n	(9n)	n = channel No.
Note No.	0 k k k k k k k		k = 0(C_{-2}) ~ 127(G_8)
Velocity	0 v v v v v v v		v = 1 ~ 127 Key ON
	0 0 0 0 0 0 0 0		Key OFF

3 Control change

Status	1 0 1 1 n n n n	(Bn)
Control No.	0 c c c c c c c	
Control Value	0 v v v v v v v	

c = 1	Modulation wheel	v = 0 ~ 127
c = 2	Breath control	v = 0 ~ 127
c = 4	Foot control	v = 0 ~ 127
c = 5	Portamento time	v = 0 ~ 127
c = 8	Balance	v = 0 ~ 127
c = 9-31	Continuous slider	v = 0 ~ 127
c = 9-31	MIDI control	v = 0 ~ 127
c = 64	Sustain SW	v = 0 ~ 63: OFF, 64 ~ 127: ON
c = 65	Portamento SW	v = 0 ~ 63: OFF, 64 ~ 127: ON
c = 66	Sosutenuto	v = 0 ~ 63: OFF, 64 ~ 127: ON
c = 67	Soft	v = 0 ~ 63: OFF, 64 ~ 127: ON

The continuous sliders can be assigned to certain internal effects.
MIDI control can be assigned in the same way as foot control.

4 Program change

Status	1 1 0 0 n n n n	(Cn)	n = channel No.
Program No.	0 p p p p p p p		p = 0 ~ 127

0 ~ 31 select internal PERFORMANCE combinations in PERFORMANCE mode.
32 ~ 63 select cartridge PERFORMANCE combinations. Values over 63 repeat this order of selection (INT 1 ~ 32 → CRT 1 ~ 32).
In Single, Dual or Split mode, 0 ~ 63 select INT voices, 64 ~ 127 CRT voices.

5 After touch

Status	1 0 1 1 n n n n	(Dn)	n = channel No.
Value	0 v v v v v v v		v = 0 ~ 127

6 Pitch bender

Status	1 1 1 0 n n n n	(En)	n = channel No.
Value (LSB)	0 u u u u u u u		
Value (MSB)	0 v v v v v v v		

Operates with only the MSB data.

MSB

00000000	Min.
01000000	Mid.
01111111	Max.

2) Channel mode message

1 MONO/All note off

1 0 1 1 n n n n (Bn)
0 1 1 1 1 1 1 0 (7E) Mono/All note off
0 m m m m m m m Set to the Mono mode with only m = 1 recognized.
Ignore when m ≠ 1.

2 POLY/All note off

1 0 1 1 n n n n (Bn)
0 1 1 1 1 1 1 1 (7F)
0 0 0 0 0 0 0 0
Poly/All note off

4-2. System Information

1) System real time messages

Active sensing
Status 1 1 1 1 1 1 1 0 (FE)

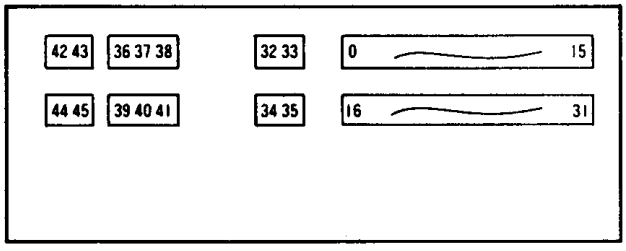
Upon reception of the code, sensing will start. When there is no status byte or data for 300 msec, the MIDI reception buffer is cleared and the on-going sound turned OFF.

2) System exclusive messages

1 Parameter change (Switch remote)

Status	1 1 1 1 0 0 0 0	(F0)
ID No.	0 1 0 0 0 0 1 1	(43)
Substatus/ device No.	0 0 0 1 n n n n	(1n)
Parameter group No.	0 0 0 1 1 0 1 1	(1B)
Switch No.	0 m m m m m m m	
Data	0 d d d d d d d	d = 0: OFF d = 127: ON
EOX	1 1 1 1 0 1 1 1	(F7)

All the panel switches are controlled.
The switch numbers are follows:



2 Parameter change
Same as for transmission

3 Bulk data
Same as for transmission

4 Dump request

For
- Voice edit buffer (f = 0)
- Supplement edit buffer (f = 5)
- Packed 32 supplement (f = 6)
- Packed 32 voice (f = 9)

Status	1 1 1 1 0 0 0 0	(F0)
ID No.	0 1 0 0 0 0 1 1	(43)
Substatus/ device No.	0 0 1 0 n n n n	(2n)
Format No.	0 f f f f f f f	f = 0, 5, 6, 9
EOX	1 1 1 1 0 1 1 1	(F7)

- **Universal bulk dump**

Status	1 1 1 1 0 0 0 0	(F0)
ID No.	0 1 0 0 0 0 1 1	(43)
Substatus/ device No.	0 0 1 0 n n n n	(2n)
Format No.	0 1 1 1 1 1 1 0	(7E)
Classification name (ASCII 4 letters)	0 a a a a a a a ↓ 0 a a a a a a a	
Data format name (ASCII 6 letters)	0 m m m m m m m ↓ 0 m m m m m m m	
EOX	1 1 1 1 0 1 1 1	

Classification name and data format name are same as for transmission.

5-1. Voice Parameter (VCED format)

g	h	P.NO	PARAMETER	DATA	NOTES		INIT
0	0	0	R1	0 - 99	EG RATE1	21 42 63 84 105	99
		1	R2	0 - 99	EG RATE2	22 43 64 85 106	99
		2	R3	0 - 99	EG RATE3	23 44 65 86 107	99
		3	R4	0 - 99	EG RATE4	24 45 66 87 108	99
		4	L1	0 - 99	EG LEVEL1	25 46 67 88 109	99
		5	L2	0 - 99	EG LEVEL2	26 47 68 89 110	99
		6	L3	0 - 99	EG LEVEL3	27 48 69 90 111	99
		7	L4	0 - 99	EG LEVEL4	28 49 70 91 112	00
		8	BP	0 - 99	BREAK POINT	29 50 71 92 113	39
		9	LD	0 - 99	LEFT DEPTH	30 51 72 93 114	0
		10	RD	0 - 99	RIGHT DEPTH	31 52 73 94 115	0
		11	LC	0 - 3	LEFT CURVE	32 53 74 95 116	0
		12	RC	0 - 3	RIGHT CURVE	33 54 75 96 117	0
		13	RS	0 - 7	RATE SCALING	34 55 76 97 118	0
		14	AMS	0 - 3	MODULATION SENSITIVITY	35 56 77 98 119	0
		15	TS	0 - 7	TOUCH SENSITIVITY	36 57 78 99 120	0
		16	TL	0 - 99	TOTAL LEVEL	37 58 79 100 121	(OP1:99)0
		17	PM	0 - 1	FREQUENCY MODE	38 59 80 101 122	0
		18	PC	0 - 31	FREQUENCY COURSE	39 60 81 102 123	1
		19	PF	0 - 99	FREQUENCY FINE	40 61 82 103 124	0
		20	PD	0 - 14	DETUNE	41 62 83 104 125	7
		126	PR1	0 - 99	PEG RATE1		99
		127	PR2	0 - 99	PEG RATE2		99
0	1	128	PR3	0 - 99	PEG RATE3		99
		129	PR4	0 - 99	PEG RATE4		99
		130	PL1	0 - 99	PEG LEVEL1		50
		131	PL2	0 - 99	PEG LEVEL2		50
		132	PL3	0 - 99	PEG LEVEL3		50
		133	PL4	0 - 99	PEG LEVEL4		50
		134	ALS	0 - 31	ALGORITHM SELECTOR		0
		135	FBL	0 - 7	FEED BACK LEVEL		0
		136	OPI	0 - 1	OSC.PHASE INIT		1
		137	LFS	0 - 99	LFO SPEED		35
		138	LFD	0 - 99	LFO DELAY TIME		0
		139	LPMD	0 - 99	PITCH MODULATION DEPTH		0
		140	LAMD	0 - 99	AMPLITUDE MODULATION DEPTH		0
		141	LFKS	0 - 1	LFO KEY SYNC		1
		142	LFW	0 - 5	LFO WAVE		0
		143	LPMS	0 - 7	LFO PITCH MODULATION SENSITIVITY		3
		144	TRNP	0 - 48	TRANSPOSE		24
		145	VNAM1	ASC	VOICE NAME		I
		146	VNAM2	ASC	VOICE NAME		N
		147	VNAM3	ASC	VOICE NAME		I
		148	VNAM4	ASC	VOICE NAME		T
		149	VNAM5	ASC	VOICE NAME		
		150	VNAM6	ASC	VOICE NAME		V
		151	VNAM7	ASC	VOICE NAME		O
		152	VNAM8	ASC	VOICE NAME		I
		153	VNAM9	ASC	VOICE NAME		C
		154	VNAM10	ASC	VOICE NAME		E
		155	OPE	0 - 63	OPERATOR ENABLE B5:OP1,--,B0:OP6		
		156	OPSEL	0 - 5	OPERATOR SELECT 0:OPI,--,5:OP6		

5-2. Additional Parameters (ACED format)

g	h	P.NO	PARAMETER	DATA	INIT	NOTES
6	0	0	SCM	0 - 1	0	OP6 scaling mode normal/fraction
		1	SCM	0 - 1	0	OP5 scaling mode normal/fraction
		2	SCM	0 - 1	0	OP4 scaling mode normal/fraction
		3	SCM	0 - 1	0	OP3 scaling mode normal/fraction
		4	SCM	0 - 1	0	OP2 scaling mode normal/fraction
		5	SCM	0 - 1	0	OP1 scaling mode normal/fraction
		6	AMS	0 - 7	0	OP6 amplitude modulation sensitivity
		7	AMS	0 - 7	0	OP5 amplitude modulation sensitivity
		8	AMS	0 - 7	0	OP4 amplitude modulation sensitivity
		9	AMS	0 - 7	0	OP3 amplitude modulation sensitivity
		10	AMS	0 - 7	0	OP2 amplitude modulation sensitivity
		11	AMS	0 - 7	0	OP1 amplitude modulation sensitivity
		12	PEGR	0 - 3	0	pitch EG range 8va/4va/1va/1/2va
		13	LTRG	0 - 1	0	LFO key trigger (delay) single/multi
		14	VPSW	0 - 1	0	pitch EG by velocity switch off/on:0/1
		15	PMOD	0 - 3	0	bit0;poly/mono , bitl;unison off/on
		16	PBR	0 - 12	2	pitch bend range
		17	PBS	0 - 12	0	step
		18	PBM	0 - 2	0	mode low/high/k.on
		19	RNDP	0 - 7	0	ramdom pitch fluctuation off/5c-41c
		20	PORM	0 - 1	0	portamento mode rtn/fllw fngrd/flltm
		21	PQNT	0 - 12	0	step
		22	POS	0 - 99	0	time
		23	MWPM	0 - 99	0	modulation wheel pitch mod range
		24	MWAM	0 - 99	0	amplitude mod range
		25	MWEB	0 - 99	0	EG bias range
		26	FC1PM	0 - 99	0	foot controler 1 pitch mod range
		27	FC1AM	0 - 99	0	amplitude mod range
		28	FC1EB	0 - 99	0	EG bias range
		29	FC1VL	0 - 99	0	volume range
		30	BCPM	0 - 99	0	breath controler pitch mod range
		31	BCAM	0 - 99	0	amplitude mod range
		32	BCEB	0 - 99	0	EG bias range
		33	BCPB	0 - 100	50	pitch bias range
		34	ATPM	0 - 99	0	after touch pitch mod range
		35	ATPM	0 - 99	0	amplitude mod range
		36	ATEB	0 - 99	0	EG bias range
		37	ATPB	0 - 100	50	pitch bias range
		38	PGRS	0 - 7	0	pitch EG rate scaling depth
		39-63	reserved			
		64	FC2PM	0 - 99	0	pitch mod. range
		65	FC2AM	0 - 99	0	amp mod. range
		66	FC2EB	0 - 99	0	EG bias range
		67	FC2VL	0 - 99	0	volume range
		68	MCPM	0 - 99	0	pitch mod. range
		69	MCAM	0 - 99	0	amp mod. range
		70	MCEB	0 - 99	0	EG bias range
		71	MCVL	0 - 99	0	volume range
		72	UDTN	0 - 7	0	unison detune depth
		73	FCCS1	0 - 1	0	foot cntl.1 use as CS1 switch off/on:0/1

5-3. PERFORMANCE Parameters (PCED, PMEM format)

g	h	P.NO	PARAMETER	DATA	NOTES	INIT
6	1	0	PLMD	0 - 2	0/1/2 : SINGLE/DUAL/SPLIT	1
		1	VNMA	0 - 127	A-CH VOICE NUMBER	0
		2	VNMB	0 - 127	B-CH VOICE NUMBER	0
		3	MCTB	0 - 74	MICRO TUNING TABLE SELECT	0
		4	MCKY	0 - 11	MICRO TUNING KEY	0
		5	MCSW	0 - 3	MICRO TUNING SWITCH BIT0:A,BIT1:B 0/1:OFF/ON	0
		6	DDTN	0 - 7	DUAL DETUNE	0
		7	SPPT	0 - 127	SPLIT POINT	60
		8	FDMP	0 - 1	EG FORCED DAMPING SWITCH 0/1:OFF/ON	0
		9	SFSW	0 - 3	SUSTAIN FOOT SWITCH BIT0:A,BIT1:B 0/1:OFF/ON	3
		10	FSAS	0 - 3	FOOT SWITCH ASSIGN 0:SUS,1:POR,2:KHLD,3:SFT	1
		11	FSW	0 - 3	FOOT SWITCH BIT0:A,BIT1:B 0/1:OFF/ON	3
		12	SPRNG	0 - 7	SOFT PEDAL RANGE	0
		13	NSFTA	0 - 48	NOTE SHIFT RANGE FOR SINGLE,DUAL,SPLIT(A)	24
		14	NSFTB	0 - 48	NOTE SHIFT RANGE FOR SPLIT(B)	24
		15	BLNC	0 - 100	VOLUME BALANCE (-50 -+50)	0
		16	TVLM	0 - 99	TOTAL VOLUME	99
		17	CSLD1	0 - 105	CONTINUOUS SLIDER 1	0
		18	CSLD2	0 - 109	CONTINUOUS SLIDER 2	0
		19	CSSW	0 - 3	CONTINUOUS SLIDER ASSIGN SWITCH b1,3:B,b0,2:A	0
		20	PNMD	0 - 3	PAN MODE 0:MIX,1:ON-ON,2:ON-OFF,3:OFF-ON	1
		21	PANRNG	0 - 99	PAN CONTROLL RANGE	0
		22	PANASN	0 - 2	PAN CONTROLL ASSIGN 0/1/2:LFO/VELOCITY/KEY#	0
		23	PNEGR1	0 - 99	PAN EG RATE 1	99
		24	PNEGR2	0 - 99	PAN EG RATE 2	99
		25	PNEGR3	0 - 99	PAN EG RATE 3	99
		26	PNEGR4	0 - 99	PAN EG RATE 4	99
		27	PNEGL1	0 - 99	PAN EG LEVEL 1	50
		28	PNEGL2	0 - 99	PAN EG LEVEL 2	50
		29	PNEGL3	0 - 99	PAN EG LEVEL 3	50
		30	PNEGL4	0 - 99	PAN EG LEVEL 4	50
		31	PNAM	ASCII	PERFORMANCE NAME	I
		32	〃	〃	〃	N
		33	〃	〃	〃	I
		34	〃	〃	〃	T
		35	〃	〃	〃	
		36	〃	〃	〃	P
		37	〃	〃	〃	E
		38	〃	〃	〃	R
		39	〃	〃	〃	F
		40	〃	〃	〃	
		⋮	〃	〃	〃	
		50	〃	〃	〃	

5-4. Voice Data (VMEM format)

NO		BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0	
0	R1				R1				17 34 51 68 85
1	R2				R2				18 35 52 69 86
2	R3				R3				19 36 53 70 87
3	R4				R4				20 37 54 71 88
4	L1				L1				21 38 55 72 89
5	L2				L2				22 39 56 73 90
6	L3				L3				23 40 57 74 91
7	L4				L4				24 41 58 75 92
8	BP				BP				25 42 59 76 93
9	LD				LD				26 43 60 77 94
10	RD				RD				27 44 61 78 95
11	RC	-	-	-		RC		LC	28 45 62 79 96
12	PD			PD			RS		29 46 63 80 97
13	TS	-	-		TS			AMS	30 47 64 81 98
14	TL				TL				31 48 65 82 99
15	PC	-			PC			PM	32 49 66 83 100
16	PF				PF				33 50 67 84 101
102	PR1				PR1				
103	PR2				PR2				
104	PR3				PR3				
105	PR4				PR4				
106	PL1				PL1				
107	PL2				PL2				
108	PL3				PL3				
109	PL4				PL4				
110	ALS	-	-		ALS				
111	OPI	-	-	-	OP1		FBL		
112	LFS				LFS				
113	LFD				LFD				
114	LPMD				LPMD				
115	LAMD				LAMD				
116	LPMS		LPMS			LFW		LFKS	
117	TRNP				TRNP				
118	VNAM1				VNAM1				
119	VNAM2				VNAM2				
120	VNAM3				VNAM3				
121	VNAM4				VNAM4				
122	VNAM5				VNAM5				
123	VNAM6				VNAM6				
124	VNAM7				VNAM7				
125	VNAM8				VNAM8				
126	VNAM9				VNAM9				
127	VNAM10				VNAM10				

5-5. Additional Data (AMEM format)

NO		BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
0	SCM	-	OP1	OP2	OP3	OP4	OP5	OP6
1	AMS	-		OP5			OP6	
2	AMS	-		OP3			OP4	
3	AMS	-		OP1			OP2	
4	PEGR		RNDP		VPSW	LTRG	PEGR	
5	PMOD	-		PBR			PMOD	
6	PBS	-		PBM		PBS		
7	RNDP	-	-			PQNT		PORM
8	POS				POS			
9	MWPM				MWPM			
10	MWAM				MWAM			
11	MWEB				MWEB			
12	FC1PM				FC1PM			
13	FC1AM				FC1AM			
14	FC1EB				FC1EB			
15	FC1VL				FC1VL			
16	BCPM				BCPM			
17	BCAM				BCAM			
18	BCEB				BCEB			
19	BCPB				BCPB			
20	ATPM				ATPM			
21	ATAM				ATAM			
22	ATEB				ATEB			
23	ATPB				ATPB			
24	PGRS						PGRS	
25	----				RESERVED			
26	FC2PM				FC2PM			
27	FC2AM				FC2AM			
28	FC2EB				FC2EB			
29	FC2VL				FC2VL			
30	MCPM				MCPM			
31	MCAM				MCAM			
32	MCEB				MCEB			
33	MCVL				MCVL			
34	UDTN				FCCS1		UDTN	

5-6. System Set-up Parameters

* ..... SYSTEM memory 102 bytes g=6,h=1

p#	name	data	init	notes
64 0	TXCH	0-15	0	* MIDI TX channel
65 1	CVMSW	0-1	1	* MIDI channel voice message TRANS switch
66 2	RXCHA	0-16	0	* MIDI RX channel 16:off
67 3	RXCHB	0-16	0	* MIDI RX channel 16:off
68 4	OMNI	0-1	1	* MIDI OMNI MODE SWITCH 0/1:OFF/ON
69 5	MCONTA	11-31	12	* MIDI CONTROLER NUMBER
70 6	MCONTB	11-31	13	* MIDI CONTROLER NUMBER
71 7	MCSNUM1	11-31	14	* CONTINUOUS SLIDER 1 CONTROLL MUMBER
72 8	MCSNUM2	11-31	15	* CONTINUOUS SLIDER 2 CONTROLL NUMBER
73 9	MKOEFG	0-2	0	* MIDI key on/off normal/odd/even:0/1/2 flag
74 10	PPCMOD	0-2	1	* PROGRAM CHANGE TRANS MODE FLAG 0/1/2:of/nor/prg
75 11	LOCAL	0-1	0	* LOCAL SWITCH 0/1:OFF/ON
76 12	MTBFLG	0-1	0	* MIDI transmit block flag
77 13	MRBFLG	0-1	0	* MIDI recieve block flag
78 14	SCMCH	0-15	0	* MIDI system common message RX channel (device No.)
79 15	SCMSW	0-1	1	* MIDI system common message switch
80 16	APTBNK1	0-15	0	* cartridge appoint bank number
81 17	APTBNK2	0-15	2	* cartridge appoint bank number
82 18	APTBNK3	0-15	3	* cartridge appoint bank number
83 19	PROTECT	0-3	3	* memory protect --- bit0=INT. bit1=CRT.
g=1,h=0				
64 37	MSTUNE	0-127	64	* master tune
-38-101	PPCBUF	0-127	sw#	* PROGRAMMABLE PROGRAM CHANGE TRANS SET BUFFER

5-7. Micro Tuning Parameters

BYTE	KEY NAME	DATA	NOTES					
0	C-2	0 - 84	MSB	48 C0	96 C2	144 C4	192 C6	240 C8
1	C-2	0 -127 0-10794	LSB	49	97	145	193	241
2	C#-2	0 - 84	MSB	50	98	146	194	242
3	C#-2	0 -127 0-10794	LSB	51	99	147	195	243
4	D-2	0 - 84	MSB	52	100	148	196	244
5	D-2	0 -127 0-10794	LSB	53	101	149	197	245
6	D#-2	0 - 84	MSB	54	102	150	198	246
7	D#-2	0 -127 0-10794	LSB	55	103	151	199	247
8	E-2	0 - 84	MSB	56	104	152	200	248
9	E-2	0 -127 0-10794	LSB	57	105	153	201	249
10	F-2	0 - 84	MSB	58	106	154	202	250
11	F-2	0 -127 0-10794	LSB	59	107	155	203	251
12	F#-2	0 - 84	MSB	60	108	156	204	252
13	F#-2	0 -127 0-10794	LSB	61	109	157	205	253
14	G-2	0 - 84	MSB	62	110	158	206	254
15	G-2	0 -127 0-10794	LSB	63	111	159	207	255
16	G#-2	0 - 84	MSB	64	112	160	208	
17	G#-2	0 -127 0-10794	LSB	65	113	161	209	
18	A-2	0 - 84	MSB	66	114	162	210	
19	A-2	0 -127 0-10794	LSB	67	115	163	211	
20	A#-2	0 - 84	MSB	68	116	164	212	
21	A#-2	0 -127 0-10794	LSB	69	117	165	213	
22	B-2	0 - 84	MSB	70	118	166	214	
23	B-2	0 -127 0-10794	LSB	71	119	167	215	
24	C-1			72 C1	120 C3	168 C5	216 C7	
25				73	121	169	217	
26				74	122	170	218	
27				75	123	171	219	
28				76	124	172	220	
29				77	125	173	221	
30				78	126	174	222	
31				79	127	175	223	
32				80	128	176	224	
33				81	129	177	225	
34				82	130	178	226	
35				83	131	179	227	
36				84	132	180	228	
37				85	133	181	229	
38				86	134	182	230	
39				87	135	183	231	
40				88	136	184	232	
41				89	137	185	233	
42				90	138	186	234	
43				91	139	187	235	
44				92	140	188	236	
45				93	141	189	237	
46				94	142	190	238	
47				95	143	191	239	

5-8. *Fractional Key Scaling Parameters*

OPG				OP5	OP4	OP3	OP2	OP1	DATA
0	OFS			41	82	123	164	205	-128 -127
1	C-2	–	C-1	42	83	124	165	206	0 -255
2	C#-1	–	D#-1	43	84	125	166	207	0 -255
3	E-1	–	F#-1	44	85	126	167	208	0 -255
4	G-1	–	A-1	45	86	127	168	209	0 -255
5	A#1	–	C0	46	87	128	169	210	0 -255
6	C#0	–	D#0	47	88	129	170	211	0 -255
7	E0	–	F#0	48	89	130	171	212	0 -255
8	G0	–	A0	49	90	131	172	213	0 -255
9	A#0	–	C1	50	91	132	173	214	0 -255
10	C#1	–	D#1	51	92	133	174	215	0 -255
11	E1	–	F#1	52	93	134	175	216	0 -255
12	G1	–	A1	53	94	135	176	217	0 -255
13	A#1	–	C2	54	95	136	177	218	0 -255
14	C#2	–	D#2	55	96	137	178	219	0 -255
15	E2	–	F#2	56	97	138	179	220	0 -255
16	G2	–	A2	57	98	139	180	221	0 -255
17	A#2	–	C3	58	99	140	181	222	0 -255
18	C#3	–	D#3	59	100	141	182	223	0 -255
19	E3	–	F#3	60	101	142	183	224	0 -255
20	G3	–	A3	61	102	143	184	225	0 -255
21	A#3	–	C4	62	103	144	185	226	0 -255
22	C#4	–	D#4	63	104	145	186	227	0 -255
23	E4	–	F#4	64	105	146	187	228	0 -255
24	G4	–	A4	65	106	147	188	229	0 -255
25	A#4	–	C4	66	107	148	189	230	0 -255
26	C#5	–	D#5	67	108	149	190	231	0 -255
27	E5	–	F#5	68	109	150	191	232	0 -255
28	G5	–	A5	69	110	151	192	233	0 -255
29	A#5	–	C6	70	111	152	193	234	0 -255
30	C#6	–	D#6	71	112	153	194	235	0 -255
31	E6	–	F#6	72	113	154	195	236	0 -255
32	G6	–	A6	73	114	155	196	237	0 -255
33	A#6	–	C7	74	115	156	197	238	0 -255
34	C#7	–	D#7	75	116	157	198	239	0 -255
35	E7	–	F#7	76	117	158	199	240	0 -255
36	G7	–	A7	77	118	159	200	241	0 -255
37	A#7	–	C8	78	119	160	201	242	0 -255
38	C#8	–	D#8	79	120	161	202	243	0 -255
39	E8	–	F#8	80	121	162	203	244	0 -255
40	G8	–		81	122	163	204	245	0 -255

NOTE:

For the bulk data transmission, 8 bit (0~255) data will be divided in half: lower 4 bits and higher 4 bits, to be converted into ASCII codes.

SPECIFICATIONS

- **Keyboard** 61 keys ($C_1 \sim C_6$), with Initial/After touch
- **Tone Generator** FM tone Generator (6 operators 32 algorythms)
- **Simultaneous Note Output (Reverse priority)**
  1-voice: 16 notes (single play)
  2-voice: 8 notes (Dual play)
  2-voice: 16 notes (Split play)
- **Internal Memory** 64 voices/32 performances, 2 micro tunings, 1 system set-up
- **External ROM Memory**
  128 voices/64 performances, micro tuning, fractional level scaling
- **External Memory** RAM cartridge (Optional, RAM4) = Internal Memory x 1
  * Micro floppy disk (Optional, MF2DD) = Internal Memory x 40, MIDI exclusive data
- **Control Sliders and switches**
  Volume slider, Continuous sliders CS1, CS2 (Data entry)
  Data entry switch x 2, Mode setting switch x 12, Voice switch x 32
- **Controls** PITCH BEND WHEEL, MODULATION WHEEL
- **External Control Terminals**
  BREATH CONTROL, SUSTAIN, FOOT SWITCH (Sustain, Portamento, Key hold, Soft), FOOT CONTROL 1 (Volume, Modulation, Voice parameter), FOOT CONTROL2 (Volume, Modulation).
  RAM·ROM CARTRIDGE SLOT
  MIDI IN — OUT — THRU
- **Output Terminals** Output A/MIX-B, Headphones
- **Disk Drive** 3.5" Micro Floppy Disk Drive, built-in.
  2DD IM Bytes (720K bytes when formatting)
- **Display** LC: 40 letters x 2 lines (illuminated)
  LED: 7 segments x 2
- **Dimensions (W x H x D), Weight**
  999 x 85.8 x 333.7 mm, 10.5 kg/11.2 kg* (* DX7 II FD)
- **Power Supply, Power Consumption**
  U.S & Canadian Models: 120V, 50/60Hz
  General Model: 110V/220V/240V 50/60Hz
- **Standard Accessories**
  Music holder, ROM cartridge, 3.5" Micro floppy disk (MF2DD)
- **Optional Accessories**

RAM Cartridge	RAM4
Flight Case	LC-7IIF
Hard Case	LC-7IIH
Soft Case	SC-7IIS
Cartridge Adaptor	ADP1

Foot Switch FC4/FC5, Foot Controller FC7, Breath Controller BC1, Head Set Breath Controller BC2, Stand LG-100, MIDI Cable MIDI 01/03/15, 3.5" Micro Floppy Disk MF2DD.

SINCE 1887 YAMAHA

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