


X2/X3

MUSIC WORKSTATION

Reference Guide

GENERAL
MIDI
INSTRUMENT

 AI² Synthesis System

KORG

®

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Table of Contents

About This Manual	1
Chapter 1: Program Play Mode	3
Entering Program Play Mode	3
Selecting Programs	3
Program Play Mode & MIDI	3
Using a Pedal Switch to Select Programs	3
Using MIDI to Select Programs	4
Editing in Program Play Mode (Performance Editing)	5
Chapter 2: Program Edit Mode	7
Entering Program Edit Mode	7
Compare Function	7
Undo Function	8
Program Editing Notes	8
Performance Functions	9
1A Global Oscillator Setup	10
1B Oscillator1 Setup	11
1C Oscillator2 Setup	13
2A Pitch EG	14
3A VDF1 Cutoff & EG	16
3B VDF1 Velocity Sensitivity & Keyboard Tracking	18
3C VDF2 Cutoff & EG	21
3D VDF2 Velocity Sense & Keyboard Tracking	21
4A VDA1 EG	22
4B VDA1 Velocity Sensitivity & Keyboard Tracking	23
4C VDA2 EG	26
4D VDA2 Velocity Sensitivity & Keyboard Tracking	26
5A Pitch1 Modulation	27
5B Pitch2 Modulation	28
5C VDF Modulation	29
6A After Touch & Joystick Control	30
7A–7G Effects	32
8A Program Write	32
8B Program Rename	33
8C Program Oscillator Copy	33
8D Oscillator Copy & Swap	34
8E Program Initialize	34
Chapter 3: Combination Play Mode	35
Entering Combination Play Mode	35
Selecting Combinations	35
Combination Play Mode & MIDI	35
Using a Pedal Switch to Select Combinations	35
Using MIDI to Select Combinations	36
Combination Notes	37
Editing in Combination Play Mode (Performance Editing)	37
Soloing Individual Timbres	38
Chapter 4: Combination Edit Mode	39
Entering Combination Edit Mode	39
Compare Function	39
Undo Function	40
Combination Editing Notes	40

1A Program Select	41
1B Timbre Mode	42
2A Level	43
2B Panpot	44
2C Send C & D	45
3A MIDI Channel	46
4A Key Window Top	47
4B Key Window Bottom	48
4C Velocity Window Top	49
4D Velocity Window Bottom	50
5A Transpose	51
5B Detune	51
6A Program Change Filter	52
6B Damper Pedal Filter	52
6C After Touch Filter	53
6D Control Change Filter	53
7A–7G Effects	54
8A Combination Write	54
8B Combination Rename	55
8C Combination Initialize	55
Chapter 5: Effects	57
Effect Types	57
7A Effect1 Setup	58
7B Effect1 Parameters	59
7C Effect2 Setup	59
7D Effect2 Parameters	59
7E Effect Placement	59
7F Effects Copy	62
7G Effect Copy/Swap	62
Effects Types & Parameters	63
No Effect	63
Reverb	63
Early Reflection	65
Stereo Delay	66
Dual Mono Delay	67
Multi-Tap Delay	68
Chorus	70
Symphonic Ensemble	73
Flanger	74
Exciter	75
Enhancer	75
Distortion	76
Phaser	77
Rotary Speaker	78
Tremolo	79
Parametric EQ	80
Combination Effects: Serial	81
Combined Effects: Parallel	82
Mono Delay/Reverb	83
Mono Delay/Modulated Delay	84
Mono Delay/Distortion, Overdrive	86
Mono Delay/Phaser	87
Mono Delay/Rotary	88
Effect Parameter Table	90

Chapter 6: Sequencer Mode	93
X2/X3 Sequencer Specs	93
What's in a Song?	94
What's in a Pattern?	95
Sequencer Data, RAM Cards, & Floppy Disks	95
Ways to Record Tracks	95
Ways to Record Patterns	95
Real-Time Recording & Patterns	96
Entering Sequencer Mode	96
Playing Songs	96
Soloing Individual Tracks	97
Erase All Sequencer Data	98
Real-Time Recording	99
Multitrack Recording—MultiREC	104
Synchronization	105
Real-Time Record/Play Parameters	106
Chapter 7: Sequencer Edit Mode	113
Entering Sequencer Edit Mode	113
Opening Patterns	113
Compare Function	113
Quick Undo	113
1A Send C & D	114
1B Track Status	114
1C Program Change Filter & Pitch Bend Range	115
1D Transpose & Detune	115
1E Velocity Window	116
1F Key Window	116
2A Step-Time Track Recording	117
2B Event Edit	121
2C Erase Track	129
2D Bounce Track	129
2E Copy Track	130
2F Append Song	130
2G Erase Song	131
3A Quantize	131
3B Shift Note	133
3C Modify Velocity	134
3D Create Controller Data	135
4A Delete Measure	137
4B Erase Measure	138
4C Copy Measure	139
4D Insert Measure	140
4E Put to Track	141
4F Copy to Track	142
5A Real-Time Pattern Record/Edit	143
5B Step-Time Pattern Recording	145
5C Pattern Event Edit	146
5D Pattern Setup Parameters	147
6A Erase Pattern	148
6B Get from Track	148
6C Bounce Pattern	149
6D Copy Pattern	149
7A–7G Effects	150
8A Rename Song	150
8B Song Base Resolution	151
8C Next Song	152

8D Metronome	152
8E Copy from Combination	153
8F GM Song Mode	154
Chapter 8: Global Mode	155
Entering Global Mode	155
Saving Global Setup Data	155
1A Master Tune	155
1B Transpose	156
1C After Touch & Velocity Response Curve	157
2A Scale	158
3A Global MIDI Channel & MIDI Clock Source	160
3B Local Control & Note Filter	161
3C MIDI Filter1	162
3D MIDI Filter2	163
4A Program Memory Protect	164
4B Combination Memory Protect	164
4C Sequencer Memory Protect	164
4D Page Memory On/Off	164
5A MIDI Data Dump	165
6A Load Programs & Combinations from Card	166
6B Load Sequencer Data from Card	167
6C Save Programs & Combinations to Card	168
6D Save Sequencer Data to Card	169
7A Drum Kit Setup1	170
7B Drum Kit Setup2	172
7C Drum Kit Copy	172
8A LCD Contrast (X3 only)	173
8B Assignable Pedal/SW Setup	173
8C Damper Pedal Polarity	174
Chapter 9: Disk Mode	175
What Type of Floppy Disk?	175
Handling Floppy Disks	175
Write Protect Tab	175
Inserting a Floppy Disk	176
Ejecting a Floppy Disk	176
Disk Drive Head Cleaning	176
X2/X3 File Types	177
Entering Disk Mode	178
Loading & Saving Notes	178
Naming Files	178
1A Load All Data	179
1B Load P/C/G Data	179
1C Load Sequencer Data	180
2A Load 1 Combination	181
2B Load 1 Program	182
2C Load 1 Song	183
2D Load 1 Pattern	184
2E Load 1 Drum Kit	185
3A Save All Data	186
3B Save P/C/G Data	187
3C Save Sequencer Data	188
4A Load MIDI Exclusive Data	189
4B Save MIDI Exclusive Data	190
MIDI Exclusive Notes	190
5A Load SMF (Standard MIDI File)	191

5B Save SMF (Standard MIDI File)	192
6A Rename File	193
6B Delete File	194
7A Set Date	195
7B Set Time	195
8A Format Disk	196
Chapter 10: Data Cards	197
PCM Data Cards	197
PROG/SEQ Data Cards	197
RAM Card Write Protect Switch	198
Inserting & Removing Data Cards	198
Formatting RAM cards	198
Ram Card Battery	198
Appendix	199
General Troubleshooting	199
Floppy Disk & Data Card Troubleshooting	200
General Error Messages	201
Program Edit Mode & Combination Edit Mode Error Messages ..	201
Sequencer Mode Error Messages	201
Disk Mode Error Messages	202
Global Mode Error Messages	202
Specifications	203
Options	203
MIDI Implementation Chart	205
MIDI Data Format	206
LCD Screen Index	218
Index	220

About This Manual

The following chart shows how the explanations in this guide are organized.

Related LCD screen group Section title Section summary LCD screens in the group

1A Global Oscillator Setup

These parameters are used to set the type of Program.

1A OSC Mode DOUBLE	>	1A OSC1 ASN:POLY HLD:OFF	<
1A-1		1A-2	

LCD	Parameter	Range	Description
1A-1	Oscillator Mode (OSC Mode)	SINGLE DOUBLE DRUMS	Oscillator 1 Oscillator1 and Oscillator2 A drum kit
1A-2	Assign (ASN)	POLY MONO	Polyphonic Monophonic
	Hold (HLD)	ON/OFF	Note hold after key release (set to ON for DRUMS mode)

LCD screen or function button numbers. For example, 1A-1 means the first LCD screen in group 1A.

Parameters on each LCD screen

Parameter range or available settings

Brief description. A full description is provided in the text below each parameter table.

MIDI Data Values

In general, decimal values are used throughout this *Reference Guide*. Numbers that are enclosed by square brackets are hexadecimal.



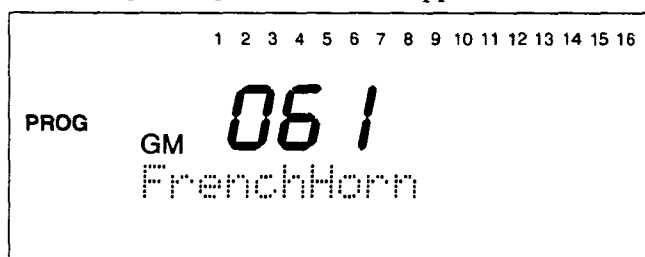
Chapter 1: Program Play Mode

Program Play mode allows you to select and play Programs. Some Program parameters can also be adjusted, allowing you to edit parameters in real time—as you play. See “Editing in Program Play Mode (Performance Editing)” on page 5.

The following Programs can be selected: 00–99 in Bank A, 00–99 in Bank B, and G01–136 in Bank GM. If a PROG/SEQ data card is inserted, Programs 00–99 in Bank C and 00–99 in Bank D can also be selected. Program banks A and B are internal RAM banks, bank GM is an internal ROM bank, and banks C and D are PROG/SEQ data card banks. Bank GM contains 136 Programs. Programs G01 to 128 conform to the GM Standard, and Programs 129 to 136 are ROM drum kits 1 to 8. Drum Program 129 corresponds to the GM drum kit. Drum Programs 130 to 136 are not used with GM drum data. They can, however, be used with data that is similar to GM.

Entering Program Play Mode

Press the [PROG] button. PROG appears on the LCD.



The numbers 1 to 16 at the top of the LCD correspond to MIDI Channels. The flashing number indicates the Global MIDI Channel setting. When MIDI Note On/Off messages are received, a box below the corresponding number flashes. This works as a MIDI monitor.

Selecting Programs

- 1) Press the [BANK] button to select a Program bank.
Pressing the [BANK] button will cycle through the available banks: A→B→GM→
- 2) Enter the required Program number using the number keypad. For example, to select Program 61 in the GM bank, press the [BANK] button to select the GM bank, then press [6] followed by [1], and finally, press [ENTER]. Alternatively, press the [▲/YES] and [▼/NO] buttons repeatedly to select a Program.

Program Play Mode & MIDI

In Program Play mode, MIDI data is transmitted and received on the Global MIDI channel. See “3A Global MIDI Channel & MIDI Clock Source” on page 160.

The X2/X3 responds to MIDI Controllers such as After Touch and Pitch Bend. See “Controller Event Edit Notes” on page 126 for a list of all usable MIDI Controllers.

Using a Pedal Switch to Select Programs

You can also select Programs using a pedal switch.

- 1) Connect an optional Korg PS-1 or PS-2 pedal switch to the ASSIGNABLE PEDAL/SW connector on the rear panel.
- 2) In Global mode, you need to assign the pedal to either Program Up or Program Down. See “8B Assignable Pedal/SW Setup” on page 173. When set to Program Up, each pedal press selects the next Program up. When set to Program Down, each pedal press selects the next Program down.

Using MIDI to Select Programs

You can also select Programs using MIDI Program Change messages.

- 1) Connect a MIDI device capable of sending MIDI Program Change messages to the X2/X3 MIDI IN.
- 2) Set the Global MIDI Channel parameter so that it matches that of the device sending the Program Change messages. See "3A Global MIDI Channel & MIDI Clock Source" on page 160.
- 3) In Global mode, you need to set Filter1 to ENA. See "3C MIDI Filter1" on page 162.

The X2/X3 also responds to MIDI Bank Select messages, which can be used to select Program banks. MIDI instrument makers implement Bank Select messages differently, so refer to the relevant operating manual for full details. If you want the X2/X3 to ignore MIDI Bank Select messages, in Global mode, set Filter1 to NUM. See "3C MIDI Filter1" on page 162 for full details.

The following table shows how the X2/X3 responds to MIDI Bank Select and Program Change messages.

MIDI			X2/X3	
Bank Select		Program Change No.	Bank	Program No.
MSB	LSB			
00	00	00-99	A	00-99
00	01	00-99	B	00-99
00	02	00-99	C	00-99
00	03	00-99	D	00-99
56	00	00-127	GM	01-128
3EH	00H	00-15, 56-63, 72-127		129
		16-23		130
		25		131
		32-39		132
		40-47		133
		64-71		134
		24, 26-31		135
		48-55		136

MSB: first pair of digits

LSB: second pair of digits

To select a bank, send Controller 0 for MSB and Controller 32 for LSB. Then send the Program Change message to select the Program.

You can select a Program by sending just a Program Change message. In this case, the Program will be selected from the current Bank.

* If you want to input MIDI data using hexadecimal values, see "MIDI Data Format" on page 206.

The method for selecting MIDI banks varies between MIDI instrument makers, so please refer to the relevant instructions.

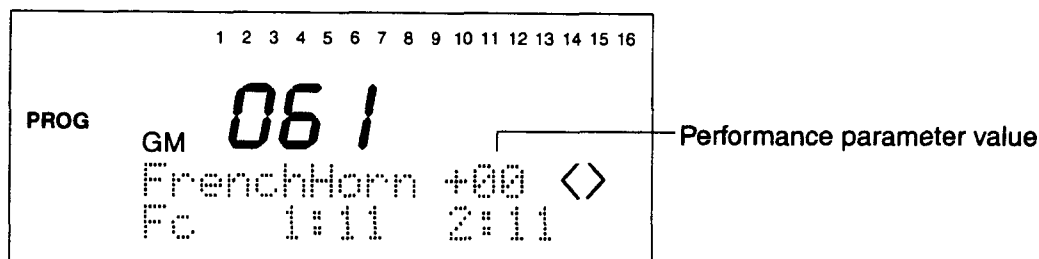
Editing in Program Play Mode (Performance Editing)

As well as playing Programs, Program Play mode allows you to edit some Program parameters. This is called performance editing, because you can actually edit parameters while performing. The editable parameters are: Octave, Cutoff, VDF EG Intensity, Attack Time, Release Time, Level, Velocity, and Effect Balance.

- 1) Select a Program.
- 2) Use the function buttons [1] to [8] to select a parameter.
The following table shows which function buttons select which parameters.
- 3) Use the VALUE slider or the [▲/YES] and [▼/NO] buttons to adjust the selected parameter. To edit the parameter more precisely, go to Program Edit mode.

If the Program uses Double Oscillator mode, which is set in Program Edit mode, the selected parameter will be adjusted for both oscillators.

On the following LCD screen, the VDF Cutoff Frequency parameter has been selected by pressing function button [2]. The parameter value on the bottom line of the screen will change as the performance parameter value is adjusted. The angle bracket symbols indicate that there are other screens to the left and right of this one where you can edit parameters. These screens can be selected using the [←] and [→] cursor buttons.



When you've finished editing, press the [↓] cursor button to return to the previous LCD screen.

If you want to write the edited Program to memory, press the [REC/WRITE] button. The message "Are You Sure OK?" will appear. Press the [▲/YES] button to write the Program, or the [▼/NO] button to cancel. Note that if you write the Program, you will overwrite the Program that already exists with that number. To write the Program to a different Program number, or change its name, see "8A Program Write" on page 32. The GM bank is a ROM bank, so you cannot write Programs to it. If you do select it, however, bank A will be selected instead.

Ephemerals +00 >	Ephemerals +00 <>	Ephemerals +00 <>	Ephemerals +00 <>
Oct. 1: 8' 2: 8'	Fc 1:28 2:54	FEG 1:58 2:80	Atk 1:00 2:00
[1] OCTAVE	[2] CUTOFF	[3] VDF EG	[4] ATTACK

Ephemerals +00 <>	Ephemerals +00 <>	Ephemerals +00 <>	Ephemerals +00 <
Re.A 1:86 2:86	Lev 1:99 2:50	V.A.I 1:+50 2:+50	Eff 10:90 50:50
[5] RELEASE	[6] LEVEL	[7] VELOCITY	[8] EFFECT

Function Button	Parameter		Range	
			Displayed	Actual Increment per Step
[1] OCTAVE	OSC1, OSC2 Octave (Oct)	1B 1C	-3...+3	1 octave
[2] CUTOFF	VDF1, VDF2 Cutoff Frequency (Fc)	3A 3C	-10...+10	±5
[3] VDF EG	VDF1, VDF2 EG Intensity (FEG)	3A 3C	-10...+10	±5
[4] ATTACK	VDA1, VDA2 Attack Time (Atk)	4B 4D	-10...+10	±5
[5] RELEASE	VDA1, VDA2 Release Time (Re.A) VDF1, VDF2 Release Time (Re.F)	4B 4D 3B 3D	-10...+10	±5
[6] LEVEL	OSC1, OSC2 Level (Lev)	1B 1C	-10...+10	±5

Function Button	Parameter	Range	
		Displayed	Actual Increment per Step
[7] VELOCITY	VDA1, VDA2 Vel. Sensitivity Amp. (V.A1)	4B 4D	
	VDA1, VDA2 Vel. Sensitivity EG Time (V.AT)	4B 4D	
	VDF1, VDF2 Vel. Sensitivity EG Int (V.FI)	3B 3D	-10...+10
	VDF1, VDF2 Vel. Sensitivity EG Time (V.FT)	3B 3D	
	Color1, Color2 Velocity (V.Co)	3A 3C	
[8] EFFECT	Dry:Effect Balance (Eff)	7A 7C	-10...+10

In the previous table, Actual Increment per Step indicates the amount of parameter change. 1B 1C, 3A 3C, etc., indicate the corresponding Program Edit mode LCD screens.

OCTAVE: this parameter sets the oscillator Octave. One step equals one octave.

CUTOFF: this parameter affects the Program Cutoff Frequency. One step equals ± 5 .

VDF EG: this parameter determines how the Program Cutoff Frequency changes over time. One step equals ± 5 .

ATTACK: this parameter sets the VDA Attack Time (i.e., the time it takes a sound to start). One step equals ± 5 .

RELEASE: this parameter sets the VDA Release Time (i.e., the time it takes a sound to finish). One step equals ± 5 .

LEVEL: this parameter sets the Program Volume. One step equals ± 5 .

VELOCITY: this parameter determines how VDA and VDF parameters respond to note velocity (strength of a key press). One step equals ± 5 .

EFFECT: this parameter sets the balance between dry signal and effected signal. One step equals ± 5 .

Note: There are actually two parameters for Release [5], and five parameters for Velocity [7]. To access them, press RELEASE [5], then press the [→] button. Use the [▲/YES] and [▼/NO] buttons to select them. Press VELOCITY [7] to access the other velocity parameters.

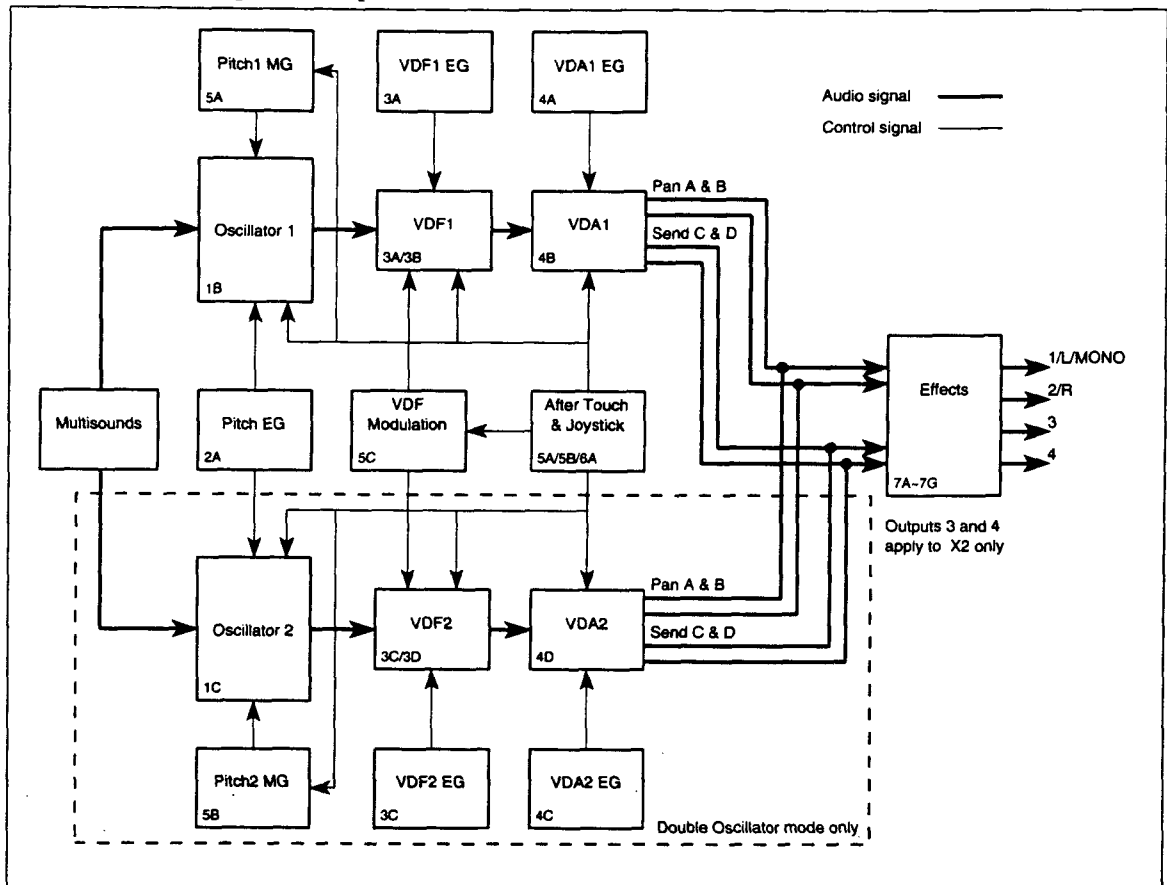
Note: If a parameter is already set to the minimum or maximum limit of its range, the displayed value will change, but the actual value will not.

Note: When one of the above parameters is selected, the VALUE slider will control that parameter, not the dynamic modulation. To use the VALUE slider to control dynamic modulation, press the [↓] cursor button to return to the normal Program Play LCD screen.

When the MIDI System Exclusive Filter (3D-1 Global mode) is set to ENA, the respective MIDI System Exclusive data will be output while performance editing. Likewise, X2/X3 parameters will be controlled when the respective System Exclusive data is received.

Chapter 2: Program Edit Mode

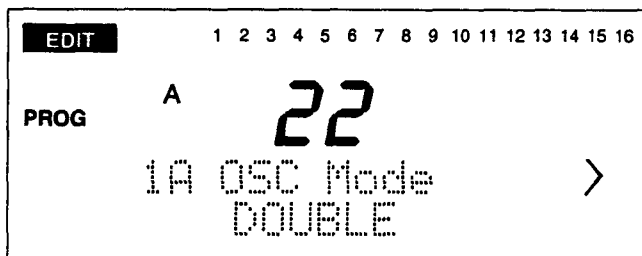
Program Edit mode allows you to edit Programs. You can create new Programs or simply edit existing ones. The following illustration shows the various parts that make up a Program. The numbers in the bottom left-hand corner of each box indicate the group of LCD screens that are used to set up that particular part.



Entering Program Edit Mode

- 1) Select the Program that you want to edit in Program Play mode.
- 2) Press the [EDIT] button.

PROG and EDIT appear on the LCD screen.



Compare Function

While editing, you can press the [COMPARE] button to listen to the original unedited Program. That is, how the Program was before you started editing it. While the Compare function is active, COMPARE is shown on the LCD. Pressing the [COMPARE] button again will return you to the edited version of the Program.

Note: If you edit a parameter while the Compare function is active, the settings of the Program that you were editing will be lost.

Undo Function

To reset a parameter to the value that it was before you edited it, press the [▲/YES] and [▼/NO] buttons simultaneously.

Program Editing Notes

Be sure to write the Program you have just finished editing before selecting another Program. Otherwise, your edits will be lost. To write the edited Program into the currently selected Program number, use the [REC/WRITE] button. To write to another bank, use LCD screen [8A]. See "8A Program Write" on page 32.

GM Bank: you can edit Programs in the Bank GM, however, you cannot overwrite them. So if you edit a Bank GM Program, you must write it to a different bank: A, B, C, or D.

Pitch Bend: pitch bend range is typically ± 12 semitones. However, for some Multisounds the full range is not available.

Double Mode Programs: the same function button can be used to select the corresponding LCD screens for Oscillator1 and Oscillator2. For example, if you select 3A-2 VDF1 EG (Oscillator2 VDF EG), then press function button [3], 3C-2 VDF2 EG (Oscillator2 VDF EG) will appear. Pressing the button again will return to 3A-2 VDF1 EG. This applies to the following LCD screens:

1B — 1C Function button [1] (Oscillator Setup)

3A — 3C Function button [3] (VDF Cutoff & EG)

3B — 3D Function button [3] (VDF Velocity Sensitivity & Keyboard Tracking)

4A — 4C Function button [4] (VDA EG)

4B — 4D Function button [4] (VDA Velocity Sensitivity & Keyboard Tracking)

5A — 5B Function button [5] (Pitch Modulation)

Parameter Interaction: due to the way that some of the VDF EG and VDF Modulation parameters interact with VDF parameters, you may find that increasing or reducing a parameter value has no effect. This is usually because that VDF parameter is already set to its maximum or minimum value. The same applies to level parameters such as Oscillator Level, VDA Attack Level, etc. If increasing the Oscillator Level does not increase the output level, it could be that VDA Level parameters are already set to their maximum values. The overall oscillator output level is limited to the range that the VDA can handle.

Always Write Programs: remember to write an edited Program to memory before selecting another Program. Otherwise, the edited Program will be lost.

When the MIDI System Exclusive Filter (3D-1 Global mode) is set to ENA, the respective MIDI System Exclusive data will be output when a parameter is edited. Likewise, X2/X3 parameters will be edited when the respective System Exclusive data is received.

Performance Functions

The following functions allow you to add greater expression to a live performance:

- **Note velocity:** can be used to control the Pitch EG VDF and VDA. See “2A Pitch EG” on page 14, “3B VDF1 Velocity Sensitivity & Keyboard Tracking” on page 18, and “4B VDA1 Velocity Sensitivity & Keyboard Tracking” on page 23.
- **After Touch:** can be used to control Pitch1 and Pitch2 Modulation, and some VDF and VDA parameters. See “5A Pitch1 Modulation” on page 27 and “6A After Touch & Joystick Control” on page 30.
- **Joystick:** can be used to control Pitch1 and Pitch2 Modulation, and some VDF and VDA parameters. See “5A Pitch1 Modulation” on page 27, “5B Pitch2 Modulation” on page 28, and “6A After Touch & Joystick Control” on page 30.
- **Dynamic modulation:** can be used to control effect parameters. See “7A Effect1 Setup” on page 58.
- **Assignable pedal:** can be used to control Volume, VDF Cutoff Frequency, and switch effects on and off. See “8B Assignable Pedal/SW Setup” on page 173.

1A Global Oscillator Setup

These parameters are used to set the type of Program.

1A OSC Mode DOUBLE	>	1A OSC1 ASN:POLY HLD:OFF	<
1A-1		1A-2	

LCD	Parameter	Range	Description
1A-1	Oscillator Mode (OSC Mode)	SINGLE DOUBLE DRUMS	Oscillator1 Oscillator1 and Oscillator2 A drum kit
1A-2	Assign (ASN)	POLY MONO	Polyphonic Monophonic
	Hold (HLD)	ON/OFF	Note hold after key release (set to ON for DRUMS mode)

1A-1 Oscillator mode: there are three Oscillator modes: Single, Double, and Drums. In Single mode, only Oscillator1 is used, and 32-note polyphony is available. In Double mode, Oscillator1 and Oscillator2 are used, and different Multisounds can be selected for each oscillator, each with independent VDF and VDA. Polyphony is 16 notes.

In Drum mode, a drum kit is used instead of a Multisound. Drum kits are set up in Global mode. See "7A Drum Kit Setup1" on page 170. There are 16 drum kits available: four internal RAM kits, four card kits, and eight internal ROM kits.

1A-2 Assign: this parameter sets the Program to either polyphonic or monophonic. In Polyphonic mode, a number of notes up to the maximum available can be played simultaneously: 32 in Single mode and 16 in Double mode. In Monophonic mode, one note only can be played at a time.

Hold: this parameter determines whether or not notes continue to sound even after the corresponding MIDI Note Off message has been received. That is, even after keys are released. Typically, this parameter should be set to off, unless you want notes to drone on for eternity. However, when the Oscillator mode is set to DRUMS, this parameter should be set to ON. This will ensure that drum sounds are played in their entirety regardless of MIDI Note length or how long you hold down a key.

1B Oscillator1 Setup

These parameters are used to set up Oscillator1. In Double Oscillator mode, pressing function button [1] will take you to 1C Oscillator2 Setup.

1B OSC1 SOUND 000:A.Piano 1	1B OSC1 Level199 OCT 8'	1B OSC1 EGint+00 Pan=CHT	1B OSC1 SEND C = 5 D = 5
1B-1	1B-2	1B-3	1B-4

LCD	Parameter	Range	Description
1B-1	Multisound (SOUND)	0-340 (0-339 on X3) C00- 0-15	Internal Multisounds Card Multisounds (if card inserted) If Oscillator mode is DRUMS, select a drum kit
1B-2	Oscillator Level (Level)	0-99	Level
	Octave (OCT)	32' 16' 8' 4'	2 octaves down 1 octave down Normal pitch 1 octave up
1B-3	Pitch EG Intensity (EGint)	-99...+99	The amount of control that the Pitch EG exerts over pitch
	Pan (Pan)	OFF, A, 14A-CNT-14B, B- - -	Output pan to buses A and B (when Osc mode = Single or Double on)
1B-4	Send C (SEND C)	0-9	Output level to bus C
	Send D (D)	0-9	Output level to bus D

1B-1 Multisound: this parameter is used to select an internal Multisounds for Oscillator1. The X2 has 341 Multisounds. The X3 has 340. Multisounds are the basic sound elements that make up a Program and provide the basic characteristics of a Program. If an optional PCM data card is inserted, Multisounds can also be selected from that card. Data card Multisound numbers have the prefix C. Press the [10's HOLD] button to select card Multisounds.

Multisounds with NT (No Transpose) at the end of their names, for example, 187 StadiumNT, produce the same pitch regardless of what note is played, or MIDI Note received.

Note: Since each Multisound has an upper limit to its pitch range, some Multisounds may not produce sound when high notes are played, or high MIDI Notes received.

Note: When X2 Program 340: A.Piano3 is selected, the Pan (1B-3) parameter cannot be set.

If the Oscillator mode (1A-1) is set to DRUMS, you can select a drum kit from the following table. You must insert an optional PCM data card to select drum kits 4-7. For drum kit setup details, see "7A Drum Kit Setup1" on page 170.

Range	Drum Kit	Bank
0	Drum Kit A1	Internal
1	Drum Kit A2	
2	Drum Kit B1	
3	Drum Kit B2	
4	Card D.Kit1	Data Card
5	Card D.Kit2	
6	Card D.Kit3	
7	Card D.Kit4	
8	Rom D.Kit1	ROM
:	:	
15	Rom D.Kit8	

Drum maps for drum kits 0-3 and 8-15 are provided at the back of the *Basic Guide*.

1B-2 Oscillator Level: this parameter is used to set the volume level of Oscillator1.

Note: *For some Multisounds, a high Oscillator Level may result in distortion when playing chords. If this occurs, reduce the Oscillator Level.*

Octave: this parameter allows you to shift a Multisound up or down in one octave steps. If the Oscillator mode (1A-1) is set to DRUMS, this parameter should be set to 8', otherwise some drum sounds will be moved out of their playable range. If this parameter is set to anything other than 8', take care when setting the VDA and VDF Keyboard Tracking parameters.

1B-3 Pitch EG Intensity: this parameter determines the amount of control that the Pitch EG exerts over the pitch of Oscillator1. A negative value inverts the pitch levels set for the Pitch EG (2A-1 to 2A-3).

Pan: this parameter is used to pan the output of Oscillator1 between buses A and B. These buses feed the effects processors. See "7E Effect Placement" on page 59. When OFF is selected, no signals are sent on buses A and B. The CNT setting means center: signals of equal level are fed to buses A and B. For X2 Program 340: A.Piano3, pan has already been set for each key. The pan value appears as "---" and you cannot change it.

Note: *When the Oscillator mode (1A-1) is set to DRUMS, the pan settings for each drum in the kit are used. See "7A Drum Kit Setup1" on page 170 and "7B Drum Kit Setup2" on page 172.*

1B-4 Send C, Send D: these parameters are used to set the level of the Oscillator1 signals sent to buses C and D. These buses feed the effects processors. See "7E Effect Placement" on page 59.

Note: *If the Oscillator mode (1A-1) is set to DRUMS, these parameters are multiplied by the settings for each drum in the kit, then output to Send C and Send D. See "7A Drum Kit Setup1" on page 170.*

1C Oscillator2 Setup

These parameters are used to set up Oscillator2. These parameters are available only when the Oscillator mode is set to DOUBLE. See "1A Global Oscillator Setup" on page 10. In Double Oscillator mode, pressing function button [1] will take you to 1B Oscillator1 Setup.

1C OSC2 SOUND > 000:A.Piano 1	1C OSC2 <> Level99 OCT16'	1C OSC2 <> EGint+00 Pan=CNT	1C OSC2 <> SEND C = 5 D = 5	1C OSC2 SOUND <> Intvl+00 Detn+03
1C-1	1C-2	1C-3	1C-4	1C-5

1C OSC2 < Delay=00
1C-6

LCD	Parameter	Range	Description
1C-1	Multisound (SOUND)	0-340 (0-339 on X3) C00-	Internal Multisounds Card Multisounds (if card inserted)
1C-2	Oscillator Level (Level)	0-99	Oscillator2 level
	Octave (OCT)	32' 16' 8' 4'	2 octaves down 1 octave down Normal pitch 1 octave up
1C-3	Pitch EG Intensity (EGint)	-99...+99	The amount of control that the Pitch EG exerts over pitch
	Pan (Pan)	OFF, A, 14A-CNT-14B, B	Output pan to buses A and B
1C-4	Send C (SEND C)	0-9	Output level to bus C
	Send D (D)	0-9	Output level to bus D
1C-5	Interval (Intvl)	-12...+12	Pitch shift relative to Oscillator1
	Detune (Detn)	-50...+50	Oscillator1 and Oscillator2 detune
1C-6	Delay Start (Delay)	0-99	Oscillator2 sound output delay relative to Oscillator1

Apart from the fact that they control Oscillator2, most of these parameters work the same as they do for Oscillator1. See "1B Oscillator1 Setup" on page 11. The following parameters, however, 1C-5 and 1C-6, apply to Oscillator2 only.

1C-5 Interval: this parameter pitch shifts Oscillator2 relative to Oscillator1 in semitone steps. This can be used, for example, to form simple 2-note chords.

Detune: this parameter de-tunes oscillators 1 and 2. This is useful for creating a thicker, richer sound. For a positive (+) Detune value, the pitch of Oscillator1 is lowered and the pitch of Oscillator2 is raised. For a negative (-) Detune value, the pitch of Oscillator1 is raised and the pitch of Oscillator2 is lowered. In other words, as the Detune value is increased, both oscillators are detuned by the same amount, but in opposite directions. Odd Detune values will lower and raise oscillator pitches in half cent steps.

Detune	Oscillator1	Oscillator2
+50	-25	+25
+25	-12.5	+12.5
0	0	0
-12	+6	-6
-50	+25	-25

1C-6 Delay Start: this parameter allows you to set Oscillator2 so that it starts producing sound after Oscillator1. A setting of 0 means no delay. This is normally set to 0.

2A Pitch EG

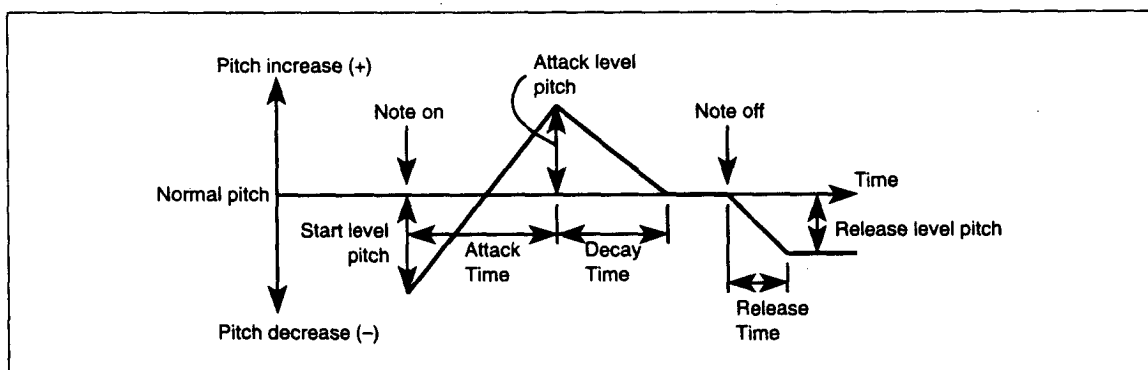
The Pitch EG (Envelope Generator) determines how the pitches of Oscillator1 and Oscillator2 vary over time.

2A PITCH EG SL+00 AT00 AL+00	2A PITCH EG DT00 RT00 RL+00	2A PITCH EG Vel Levl=+99 Tim=+00
2A-1	2A-2	2A-3

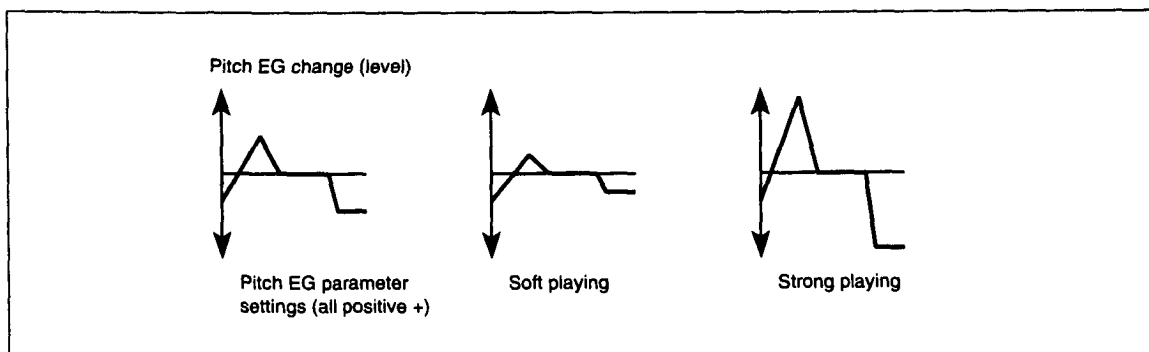
LCD	Parameter	Range	Description
2A-1	Start Level (SL)	-99...+99	Amount of pitch change when key is first pressed
	Attack Time (AT)	0-99	Time to reach Attack level pitch when key pressed
	Attack Level (AL)	-99...+99	Amount of pitch change when attack time ends
2A-2	Decay Time (DT)	0-99	Time to reach normal pitch once attack time ends
	Release Time (RT)	0-99	Time to reach Release level pitch when key is released
	Release Level (RL)	-99...+99	Amount of pitch change when key is released
2A-3	EG Level Velocity Sensitivity (Levl)	-99...+99	Pitch EG level sensitivity to keyboard velocity
	EG Time Velocity Sensitivity (Tim)	-99...+99	Pitch EG time sensitivity to keyboard velocity

The Pitch EG can change the oscillator pitch by up to ± 1 octave. A level setting of 99 is approximately 1 octave. The extent to which the Pitch EG affects the oscillator pitch is set independently for each oscillator using the Pitch EG Intensity (EGint) parameters. See "1B Oscillator1 Setup" on page 11 and "1C Oscillator2 Setup" on page 13.

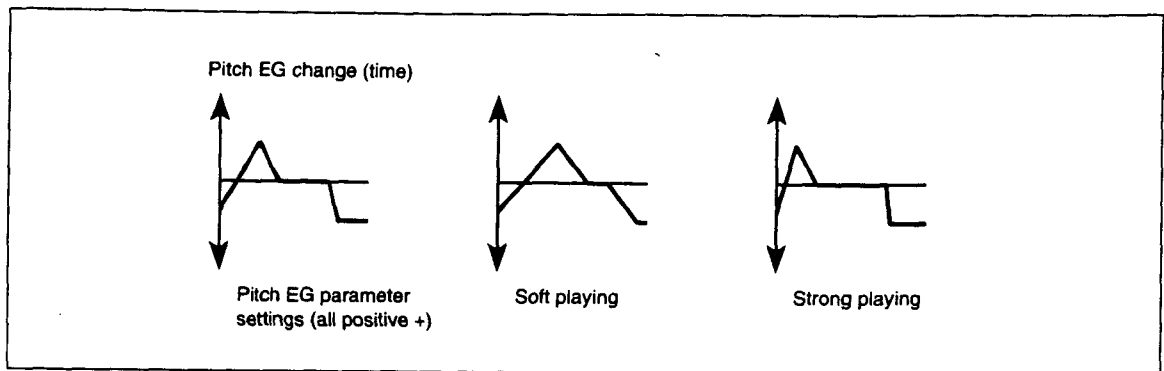
Probably the best way to understand the Pitch EG is to edit a Program, adjust the above parameters, and listen to the results. The main thing to remember is that the Level parameters specify the amount of pitch change, and the time parameters specify the time it takes to reach pitch changes relative to note on and note off. Negative (-) levels mean lowered pitch and positive (+) levels mean raised pitch. The following illustration should help.



2A-3 EG Level Velocity Sensitivity: this parameter allows you to control the Pitch EG pitch levels using note velocity. For a positive value (+), the amount of pitch change will increase as note velocity increases. A negative value (-) will have the opposite effect.



EG Time Velocity Sensitivity: this parameter allows you to control the Pitch EG Time parameters using note velocity. For a positive value (+), time parameters will become shorter as note velocity increases. A negative value (-) will have the opposite effect.



3A VDF1 Cutoff & EG

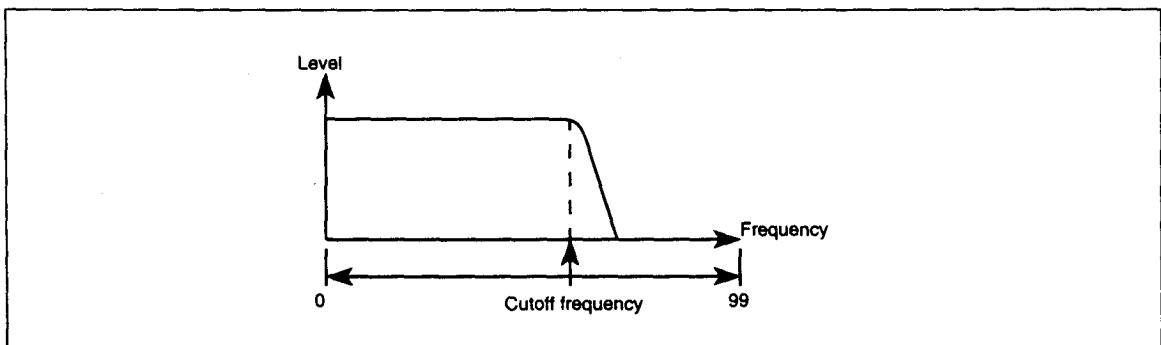
These parameters are used to set up the VDF (Variable Digital Filter) for Oscillator1. In Double Oscillator mode, pressing function button [3] will take you to 3C VDF2 Cutoff & EG.

3A VDF 1 Fc=19 EGint=65	3A VDF1 EG AT09 AL+08 DT00	3A VDF1 EG BP+00 ST00 SL+00	3A VDF1 EG RT00 RL+00	3A COLOR 1 Int=00 Vel=+00
3A-1	3A-2	3A-3	3A-4	3A-5

LCD	Parameter	Range	Description
3A-1	VDF Cutoff Frequency (Fc)	0-99	Cutoff frequency
	EG Intensity (EGint)	0-99	The amount of control that the following EG parameters exert over the VDF Cutoff Frequency parameter
3A-2	Attack Time (AT)	0-99	Time to reach Attack Level after key pressed
	Attack Level (AL)	-99...+99	Amount of Cutoff Frequency change when Attack Time ends
	Decay Time (DT)	0-99	Time to reach Break Point once Attack Time ends
3A-3	Break Point (BP)	-99...+99	Amount of Cutoff Frequency change when Decay Time ends
	Slope Time (ST)	0-99	Time to reach Sustain Level once Decay Time ends
	Sustain Level (SL)	-99...+99	Amount of Cutoff Frequency change until key released
3A-4	Release Time (RT)	0-99	Time to reach Release Level when key released
	Release Level (RL)	-99...+99	Amount of Cutoff Frequency change once Release Time ends
3A-5	Color Intensity (Int)	0-99	Amount of color
	Color Velocity (Vel)	-99...+99	Color sensitivity to keyboard velocity

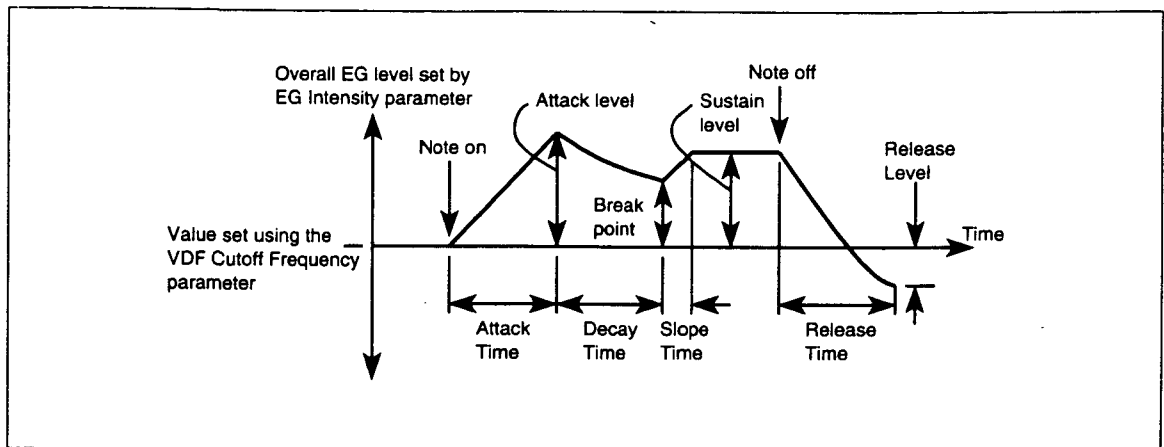
This VDF is basically a low-pass filter with a variable Cutoff Frequency parameter. It can be used to change the tonal quality of a Program. The VDF EG (Variable Digital Filter Envelope Generator) parameters allow you to determine how the Cutoff Frequency changes over time.

3A-1 VDF Cutoff Frequency: the Cutoff Frequency can be set from 0 to 99. As the value is reduced, high frequencies are filtered, thus producing a duller (softer) tone.



EG Intensity: this parameter determines the amount of control that the VDF EG exerts over the VDF Cutoff Frequency parameter. Basically, it sets the overall level of the VDF EG.

VDF EG: the eight parameters on LCD screens 3A-2 to 3A-4 are used to set up the VDF EG. Level parameters specify the amount of VDF Cutoff Frequency change, and time parameters specify the time it takes to reach Cutoff Frequency changes relative to note on and note off. Positive values cause the Cutoff Frequency to increase, negative values cause it to decrease.



3A-5 Color Intensity: this parameter determines the amount of VDF color. By boosting the level around the Cutoff Frequency, the Color parameter adds character to a sound.

Color Velocity: this parameter determines how the color parameter responds to note velocity. For positive values, stronger playing will increase the amount of color. Negative values will have the opposite effect.

3B VDF1 Velocity Sensitivity & Keyboard Tracking

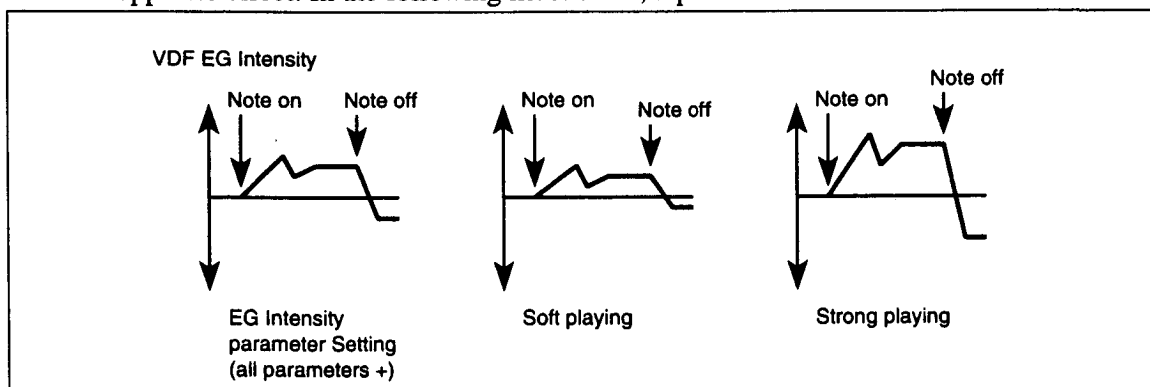
VDF1 Velocity Sensitivity parameters determine how VDF1 EG responds to note velocity. The Keyboard Tracking parameters determine how different areas of the keyboard affect VDF1. In Double Oscillator mode, pressing function button [3] will take you to 3D VDF2 Velocity Sensitivity & Keyboard Tracking.

3B VDF1 V.SENS > EGint+77 EGtm00	3B VDF1 V.SENS <> AT0 DT0 ST0 RT0	3B VDF1 K.TRK <> KeyF#4 Mode=ALL	3B VDF1 K.TRK <> Int=+00 EGtm=00	3B VDF1 K.TRK < AT0 DT0 ST0 RT0
3B-1	3B-2	3B-3	3B-4	3B-5

LCD	Parameter	Range	Description
3B-1	Velocity Sensitivity EG Intensity (EGint)	-99...+99	VDF1 EG Intensity parameter sensitivity to keyboard velocity
	Velocity Sensitivity EG Time (EGtm)	0-99	VDF1 EG Time parameter sensitivity to keyboard velocity
3B-2	Attack Time (AT)	-, 0, +	The direction in which VDF1 EG Time parameters are affected by keyboard velocity
	Decay Time (DT)	-, 0, +	
	Slope Time (ST)	-, 0, +	
	Release Time (RT)	-, 0, +	
3B-3	Keyboard Tracking Key (Key)	C-1 to G9	For Low and High keyboard tracking modes, the key from which keyboard tracking starts. For All mode, the key at which VDF Cutoff Frequency and VDF EG Time parameters are not affected
	Keyboard Tracking Mode (Mode)	OFF LOW HIGH ALL	No keyboard tracking Keyboard tracking below the specified key Keyboard tracking above the specified key Keyboard tracking over the entire keyboard
3B-4	Keyboard Tracking Intensity (Int)	-99...+99	VDF1 cutoff to keyboard tracking
	Keyboard Tracking EG Time (EGtm)	0-99	VDF1 EG Time parameter sensitivity to keyboard tracking
3B-5	Attack Time (AT)	-, 0, +	The direction in which VDF1 EG Time parameters are affected by keyboard tracking
	Decay Time (DT)	-, 0, +	
	Slope Time (ST)	-, 0, +	
	Release Time (RT)	-, 0, +	

Note: Some of the parameters mentioned in this section operate in conjunction with parameters in "3A VDF1 Cutoff & EG" on page 16, so refer to that section also.

3B-1 Velocity Sensitivity EG Intensity: this parameter determines how the VDF1 EG Intensity parameter is affected by note velocity. For positive values, soft playing will reduce the value of the VDF1 EG Intensity parameter, strong playing will increase the value. Negative values will have the opposite effect. In the following illustration, a positive value has been set.

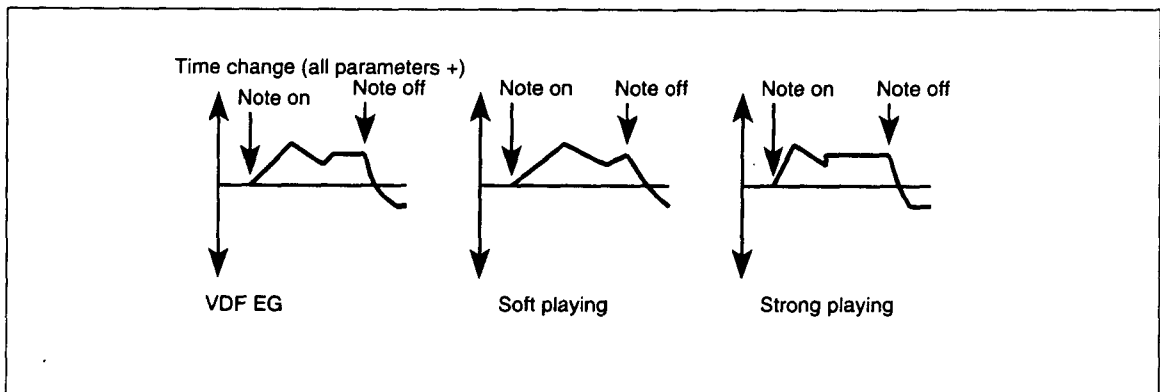


Many acoustic instruments often produce less high-frequency energy when played softly. Soft playing produces a darker sound, while strong playing creates many high frequency harmonics that brighten the sound. This natural phenomenon can be simulated by setting the VDF Cutoff Frequency parameter to a fairly low value, and the VDF EG Intensity, VDF EG Sustain Level, and Velocity Sensitivity EG Intensity parameters to positive values.

Note: This parameter does not affect the VDF Cutoff Frequency parameter directly, it affects the EG Intensity parameter. So if the EG Intensity parameter, or all other VDF EG parameters are set to 0, it will have no effect.

Velocity Sensitivity EG Time: this parameter determines how the VDF1 EG Time parameters are affected by note velocity. It affects the VDF1 EG Attack, Decay, Slope, and Release Time parameters equally. Although, the direction of change can be set independently for each parameter.

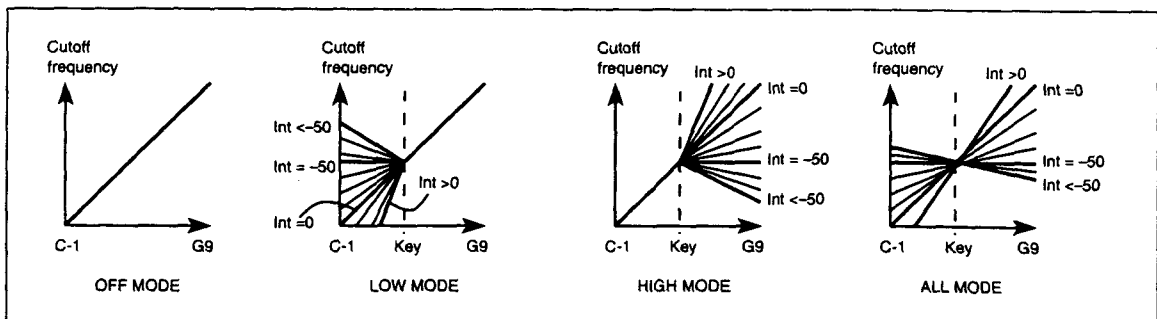
3B-2 Attack, Decay, Slope, Release Times: these parameters determine whether the VDF1 EG Time parameters are reduced or increased with changing note velocity. For a negative (-) value, they are increased, for a positive (+) value reduced. A setting of 0 means no effect. In the following illustration, each parameter is set to positive.



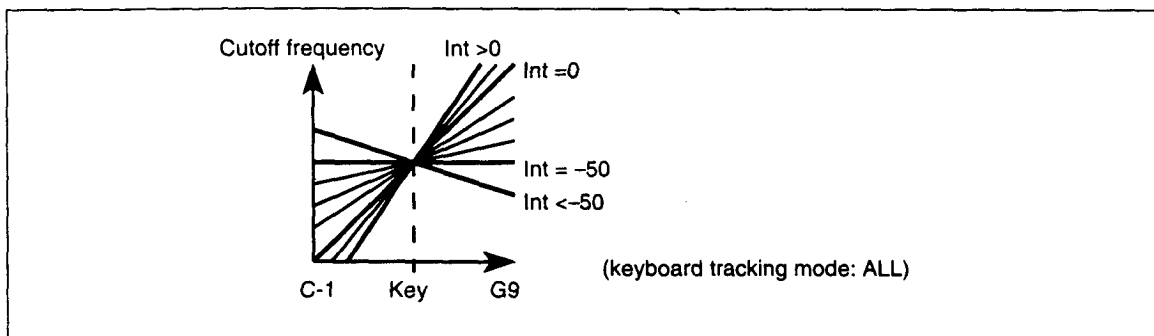
3B-3 Keyboard Tracking Key: for Low and High keyboard tracking modes, this parameter specifies the key from which keyboard tracking starts. For All mode, it specifies the key around which keyboard tracking will take place. At the specified key, keyboard tracking will have no effect.

The tracking key can be set by pressing a keyboard key while holding down the [ENTER] button.

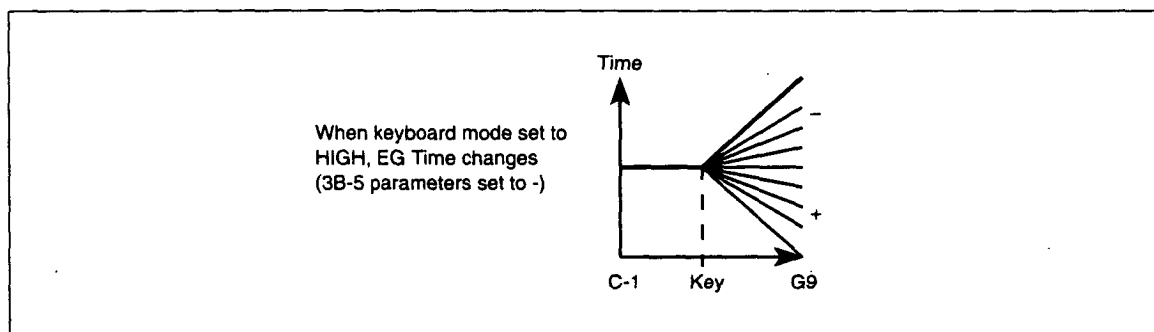
Keyboard Tracking Modes: keyboard tracking determines how the VDF affects different areas of the keyboard. There are four Keyboard Tracking modes: Off, Low, High, and All. When Off is selected, there is no keyboard tracking and the Keyboard Tracking Intensity and Keyboard Tracking EG Time parameters are disabled. When Low is selected, keyboard tracking is active on keys below the specified Keyboard Tracking Key. When High is selected, keyboard tracking is active on keys above the specified Keyboard Tracking Key. When All is selected, keyboard tracking will be active across the entire keyboard.



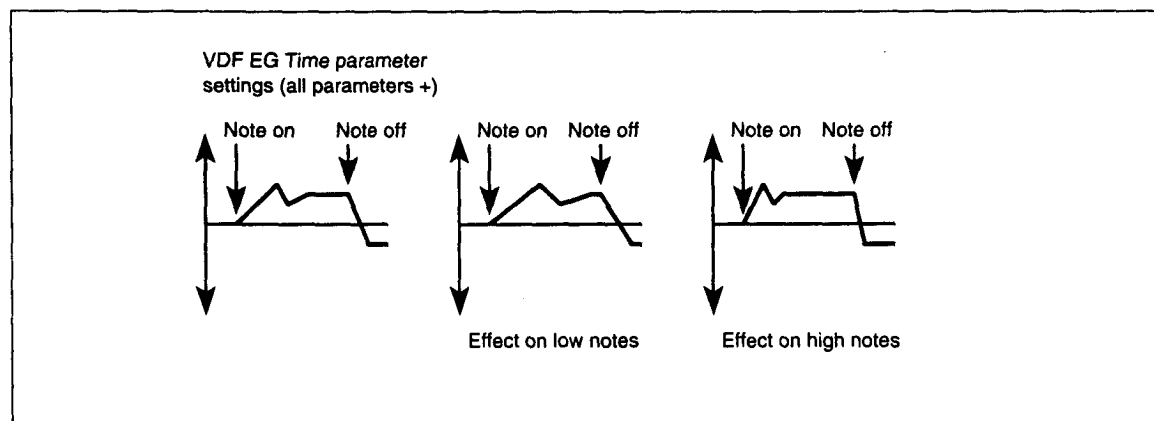
3B-4 Keyboard Tracking Intensity: this parameter determines keyboard tracking intensity for the specified keyboard area. Positive values will make high notes brighter. Negative values have the opposite effect. For a value of 0, the Cutoff Frequency changes linearly with regard to key pitch. For a value of -50, the Cutoff Frequency is the same for all notes.



Keyboard Tracking EG Time: this parameter determines how the VDF1 EG Time parameters are affected by keyboard tracking. It affects the VDF1 EG Attack, Decay, Slope, and Release Time parameters equally. Although, the direction of change can be set independently for each parameter. The Keyboard Tracking mode and Key parameters can be used to specify the keyboard area that is affected.



3B-5 Attack, Decay, Slope, Release Times: these parameters determine whether the VDF1 EG Time parameters are reduced or increased with keyboard tracking. For a negative (-) value, notes above the specified key will have their VDF EG times increased. For a positive (+) value, notes above the specified key will have their VDF EG times decreased. A setting of 0 means no effect.



3C VDF2 Cutoff & EG

These parameters are used to set up the VDF (Variable Digital Filter) for Oscillator2. Operation is the same as for VDF1. See "3A VDF1 Cutoff & EG" on page 16. In Double Oscillator mode, pressing function button [3] will take you to 3A VDF1 Cutoff & EG.

3C VDF 2 Fc=19 EGint=65	>	3C VDF2 EG AT09 AL+00 DT00	<>	3C VDF2 EG BF+00 ST00 SL+00	<>	3C VDF2 EG RT00 RL+00	<>	3C COLOR 2 Int=00 Ua1=+00	<
3C-1		3C-2		3C-3		3C-4		3C-5	

3D VDF2 Velocity Sense & Keyboard Tracking

VDF2 Velocity Sensitivity parameters determine how VDF2 EG responds to note velocity. The Keyboard Tracking parameters determine how different areas of the keyboard affect VDF2. Operation is the same as for VDF1. See "3B VDF1 Velocity Sensitivity & Keyboard Tracking" on page 18. In Double Oscillator mode, pressing function button [3] will take you to 3B VDF1 Velocity Sensitivity & Keyboard Tracking.

3D VDF2 V.SENS EGint+77 EGtm00	>	3D VDF2 V.SENS AT0 DT0 ST0 RT0	<>	3D VDF2 K.TRK KeyF#4 Mode=ALL	<>	3D VDF2 K.TRK Int=+00 EGtm=00	<>	3D VDF2 K.TRK AT0 DT0 ST0 RT0	<
3D-1		3D-2		3D-3		3D-4		3D-5	

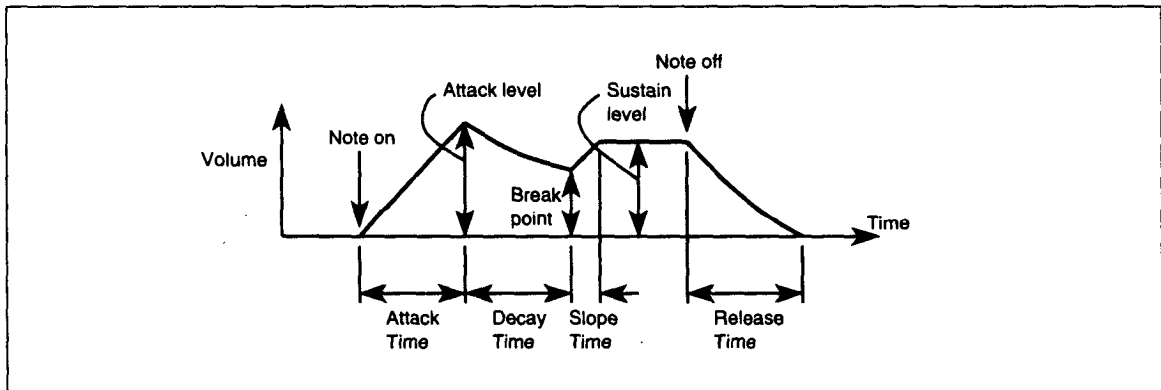
4A VDA1 EG

VDA1 EG (Variable Digital Amplifier Envelope Generator) determines how the volume of Oscillator1 varies over time. In Double Oscillator mode, pressing function button [4] will take you to 4C VDA2 EG.

4A VDA1 EG AT00 AL99 DT15	>	4A VDA1 EG BP20 ST88 SL00	<	4A VDA1 EG RT60	<
4A-1		4A-2		4A-3	

LCD	Parameter	Range	Description
4A-1	Attack Time (AT)	0-99	Time to reach Attack Level after key pressed
	Attack Level (AL)	0-99	Volume level when Attack Time ends
	Decay Time (DT)	0-99	Time to reach Break Point once Attack Time ends
4A-2	Break Point (BP)	0-99	Volume level when Decay Time ends
	Slope Time (ST)	0-99	Time to reach Sustain Level once Decay Time ends
	Sustain Level (SL)	0-99	Volume level when Slope Time ends
4A-3	Release Time (RT)	0-99	Time to reach zero volume when key released

The following illustration shows how the VDA1 EG parameters affect the VDA (Variable Digital Amplifier).



4B VDA1 Velocity Sensitivity & Keyboard Tracking

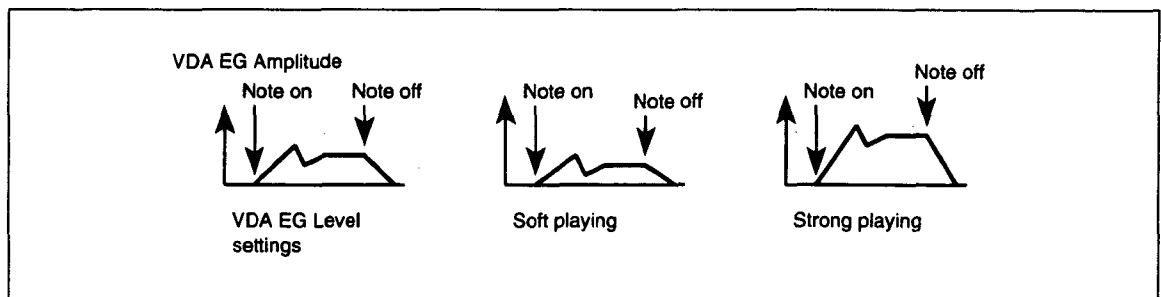
VDA1 Velocity Sensitivity parameters determine how VDA1 EG responds to note velocity. The Keyboard Tracking parameters determine how different areas of the keyboard affect VDA1. In Double Oscillator mode, pressing function button [4] will take you to 4D VDA2 Velocity Sensitivity & Keyboard Tracking.

4B VDA1 U.SENS > Amp=+99 EGtm=00	4B VDA1 U.SENS <> AT0 DT0 ST0 RT0	4B VDA1 K.TRK <> KeyC#1 Mode=OFF	4B VDA1 K.TRK <> Amp=+00 EGtm=00	4B VDA1 K.TRK < AT0 DT0 ST0 RT0
4B-1	4B-2	4B-3	4B-4	4B-5

LCD	Parameter	Range	Description
4B-1	Velocity Sensitivity Amplitude (Amp)	-99...+99	VDA1 EG sensitivity to note velocity
	Velocity Sensitivity EG Time (EGtm)	0-99	VDA1 EG Time parameter sensitivity to note velocity
4B-2	Attack Time (AT)	-, 0, +	The direction in which VDA1 EG Time parameters are affected by note velocity
	Decay Time (DT)	-, 0, +	
	Slope Time (ST)	-, 0, +	
	Release Time (RT)	-, 0, +	
4B-3	Keyboard Tracking Key (Key)	C-1 to G9	For Low and High keyboard tracking modes, the key from which keyboard tracking starts. For All mode, the key at which VDA1 EG parameters are not affected
	Keyboard Tracking Mode (Mode)	OFF LOW HIGH ALL	No keyboard tracking Keyboard tracking below the specified key Keyboard tracking above the specified key Keyboard tracking over the entire keyboard
4B-4	Keyboard Tracking Amplitude (Amp)	-99...+99	VDA1 EG sensitivity to keyboard tracking
	Keyboard Tracking EG Time (EGtm)	0-99	VDA1 EG Time parameter sensitivity to keyboard tracking
4B-5	Attack Time (AT)	-, 0, +	The direction in which VDA1 EG Time parameters are affected by keyboard tracking
	Decay Time (DT)	-, 0, +	
	Slope Time (ST)	-, 0, +	
	Release Time (RT)	-, 0, +	

Note: Some of the parameters mentioned in this section operate in conjunction with parameters in "4A VDA1 EG" on page 22, so refer to that section also.

4B-1 Velocity Sensitivity Amplitude: this parameter determines how the overall level of VDA1 EG is affected by note velocity. For positive values, soft playing will reduce the volume. For negative values, soft playing will increase the volume. In the following illustration, a positive value has been selected.

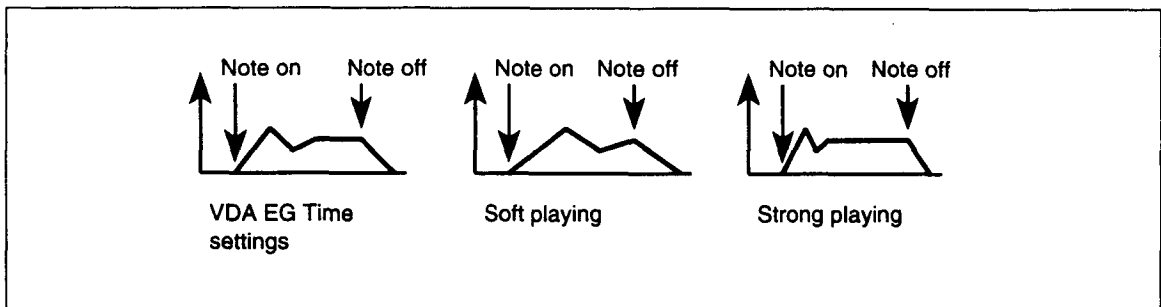


By setting the Velocity Sensitivity Amplitude parameter for VDA1 to a positive value and the Velocity Sensitivity Amplitude parameter for VDA2 to a negative value, a velocity crossfade effect can be achieved. This allows you to fade between two sounds as your playing changes from soft to strong and vice versa.

Keyboard velocity can also be used to control output panning. Set Oscillator1 and Oscillator2 parameters the same (use the "8C Program Oscillator Copy" on page 33), set the Velocity Sensitivity Amplitude parameters for VDA1 and VDA2 as described above, then set Oscillator1 Pan to A and Oscillator2 Pan to B. As you play softly, Oscillator2 will be sent to the right output. As your playing gradually gets stronger, the level of Oscillator2 will reduce and Oscillator1 will be sent to the left output. Because both oscillators are set identical, the Program will appear to pan from right to left as your playing gets stronger.

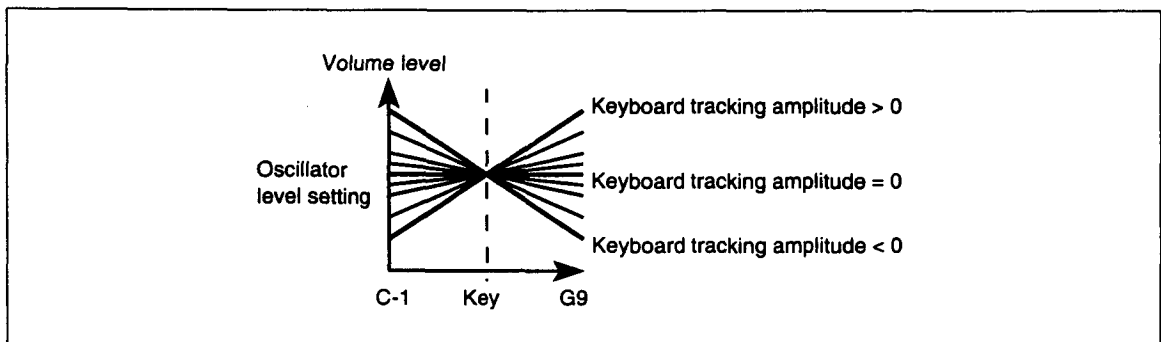
Velocity Sensitivity EG Time: this parameter determines how the overall level of VDA1 EG time parameters are affected by note velocity. It affects the VDA1 EG Attack, Decay, Slope, and Release Time parameters equally. Although, the direction of change can be set independently for each parameter.

- 4B-2 Attack, Decay, Slope, Release Times:** these parameters determine whether the VDA1 EG time parameters (4B-1) are reduced or increased with changing note velocity. For a negative (-) value, they are increased the stronger you play, for a positive (+) value they are reduced the stronger you play. In other words, for a positive setting, the stronger you play, the shorter the Attack, Decay, Slope, and Release times become. This is especially effective on string type Programs. In the following illustration, all parameters are set to positive.



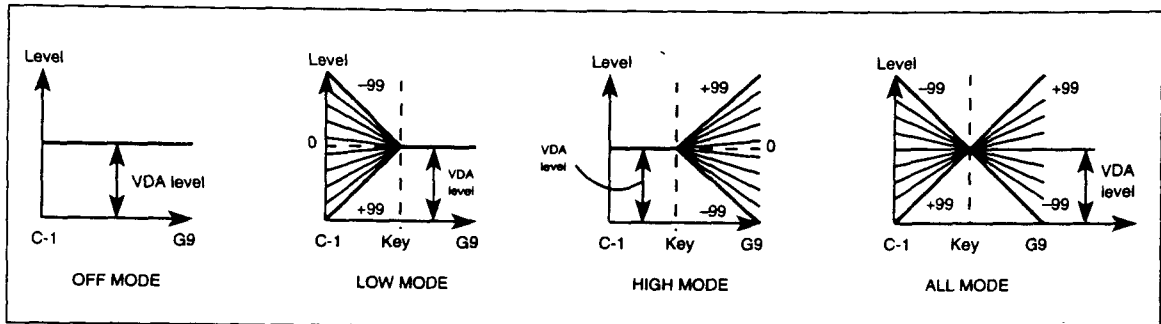
- 4B-3 Keyboard Tracking Key:** for Low and High keyboard tracking modes, this parameter specifies the key from which keyboard tracking starts. For All mode, it specifies the key around which keyboard tracking will take place. At the specified key, keyboard tracking will have no effect.

The tracking key can be set by pressing a key while holding down the X2/X3 [ENTER] button.



Keyboard Tracking Modes: keyboard tracking determines how the VDA EG applies to different areas of a keyboard. There are four Keyboard Tracking modes: Off, Low, High, and All. When Off is selected, there is no keyboard tracking and the Keyboard Tracking Amplitude and Keyboard Tracking EG Time parameters are disabled. When Low is selected, keyboard tracking is active on

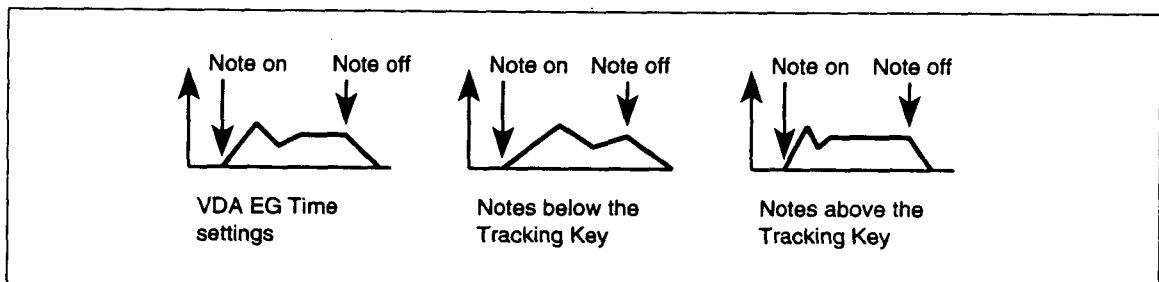
keys below the specified Keyboard Tracking Key. When High is selected, keyboard tracking is active on keys above the specified Keyboard Tracking Key. When All is selected, keyboard tracking is active across the entire keyboard.



4B-4 Keyboard Tracking Amplitude: this parameter determines keyboard tracking amplitude for the specified keyboard area. Positive values make high notes louder. Negative values have the opposite effect.

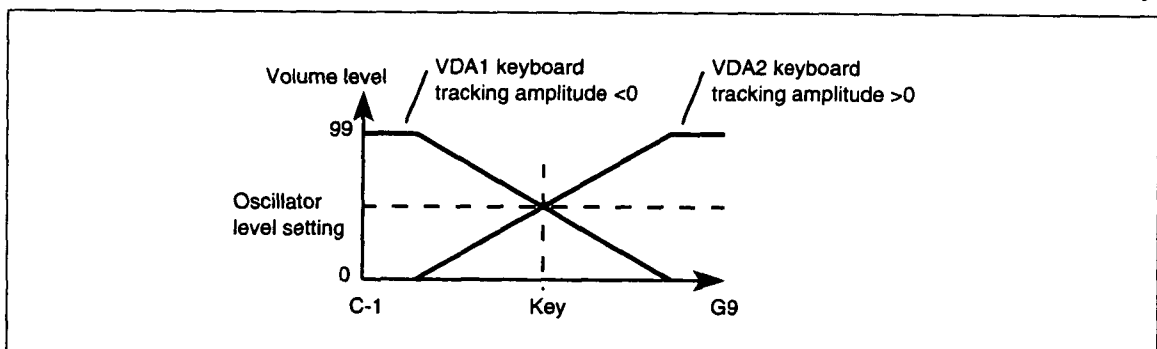
Keyboard Tracking EG Time: this parameter determines how the overall level of the VDA1 EG time parameters are affected by keyboard tracking. It affects the VDA1 EG Attack, Decay, Slope, and Release time parameters equally. Although, the direction of change can be set independently for each parameter. The Keyboard Tracking mode and Key parameters can be used to specify the keyboard area that is affected.

4B-5 Attack, Decay, Slope, Release Times: these parameters determine whether the VDA1 EG Time parameters are reduced or increased with keyboard tracking. For a negative (-) value, notes above the specified key have their VDA EG times increased. For a positive (+) value, notes above the specified key have their VDA EG times decreased. In the following illustration, all parameters are set to positive.



Creating a Positional Crossfade

You can specify a keyboard position at which one oscillator will fade out and the other will fade in. Set VDA1 (4B-3) and VDA2 (4D-3) to the same Keyboard Tracking Key, for example, C4, then set VDA1 (4B-4) to a positive Keyboard Tracking Amplitude value and VDA2 (4D-4) to a negative Keyboard Tracking Amplitude value. The following illustration shows this more clearly.



4C VDA2 EG

VDA2 EG (Variable Digital Amplifier Envelope Generator) determines how the volume of Oscillator2 varies over time. Operation is the same as for VDA1. See “4A VDA1 EG” on page 22. In Double Oscillator mode, pressing function button [4] will take you to 4A VDA1 EG.

4C VDA2 EG >	4C VDA2 EG <>	4C VDA2 EG <
AT00 AL99 DT15	BP20 ST88 SL00	RT60
4C-1	4C-2	4C-3

4D VDA2 Velocity Sensitivity & Keyboard Tracking

VDA2 Velocity Sensitivity parameters determine how VDA2 EG responds to note velocity. The Keyboard Tracking parameters determine how different areas of the keyboard affect VDA2 EG. Operation is the same as for VDA1. See “4B VDA1 Velocity Sensitivity & Keyboard Tracking” on page 23. In Double Oscillator mode, pressing function button [4] will take you to 4B VDA1 Velocity Sensitivity & Keyboard Tracking.

4D VDA2 V.SENS >	4D VDA2 V.SENS <>	4D VDA2 K.TRK <>	4D VDA2 K.TRK <>	4D VDA2 K.TRK <
Amp=+99 EGtm=00	AT0 DT0 ST0 RT0	KeyC#1 Mode=OFF	Amp=+00 EGtm=00	AT0 DT0 ST0 RT0
4D-1	4D-2	4D-3	4D-4	4D-5

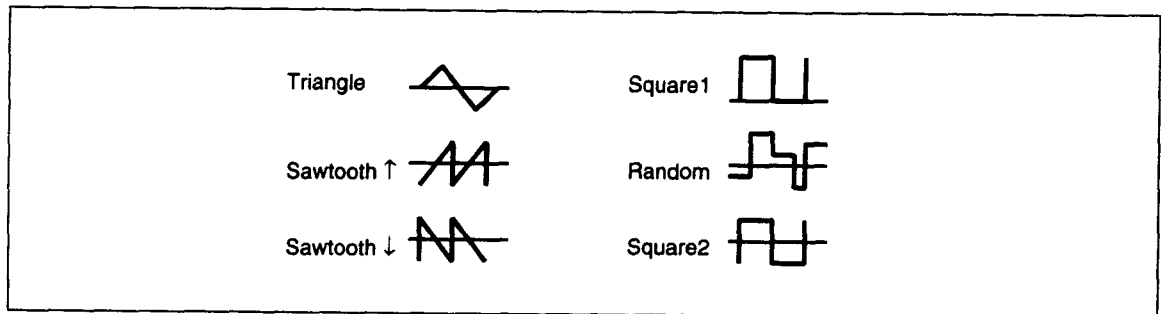
5A Pitch1 Modulation

These parameters allow you to modulate the pitch of Oscillator1. Modulation frequency and intensity can also be controlled using After Touch and Pitch Bend. In Double Oscillator mode, pressing function button [5] will take you to 5B Pitch2 MG.

5A PITCH 1 MG > TRI Freq00 Int00	5A PITCH 1 MG <> Delay00 FadeIn00	5A PITCH 1 MG <> K.Sync:OFF	5A PMG1 FREQ <> K.TRK+00 A+J=0	5A PMG1 INT < Aft=00 JoyUP=00
5A-1	5A-2	5A-3	5A-4	5A-5

LCD	Parameter	Range	Description
5A-1	Waveform	TRI SAW↑ SAW↓ SQR1 RAND SQR2	Triangle Sawtooth ↑ Sawtooth ↓ Square1 Random Square2
	Frequency (Frq)	0-99	Modulation Speed
	Intensity(Int)	0-99	Modulation Intensity
5A-2	Delay (Delay)	0-99	Time from key press to modulation start
	Fade In Time (FadeIn)	0-99	Rate at which modulation reaches specified Intensity
5A-3	Keyboard Sync (K.Sync)	OFF ON	Modulation will continue for subsequent notes Modulation will restart for each new note
5A-4	Keyboard Tracking (K.TRK)	-99...+99	Modulation sensitivity to keyboard tracking
	After Touch & Joystick (A+J)	0-9	Modulation frequency control by After Touch and Pitch Bend
5A-5	After Touch Modulation Intensity (Aft)	0-99	Modulation intensity controlled by After Touch
	Joystick Modulation Intensity (JoyUp)	0-99	Modulation intensity controlled by the Pitch Bend

5A-1 Waveform: this parameter selects the type of modulation waveform.

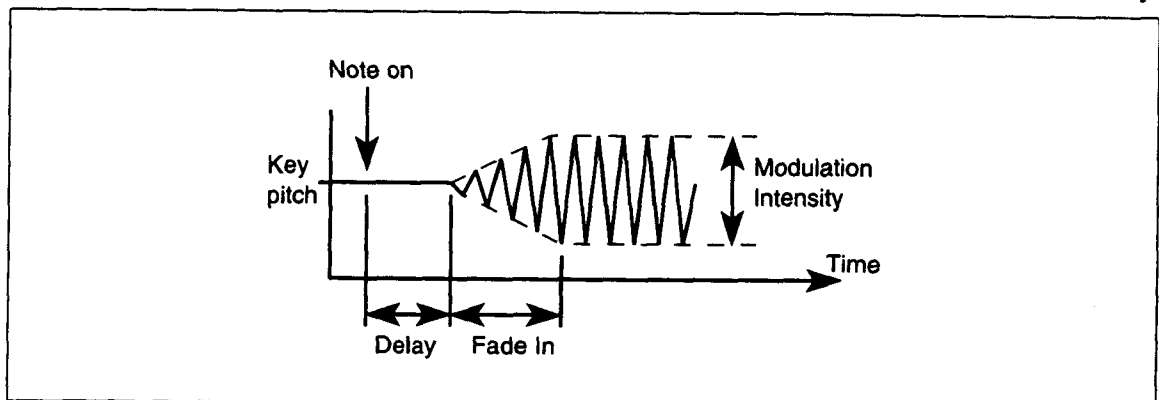


Frequency: this parameter determines the modulation frequency (speed).

Intensity: this parameter determines the modulation intensity (depth).

5A-2 Delay: this parameter determines how long after a key press modulation starts.

Fade In time: this parameter specifies the time it takes modulation to reach maximum intensity.



5A-3 Keyboard Sync: determines how subsequent notes are affected by modulation. For a setting of OFF, modulation is applied to subsequent notes in the same way that it is currently being applied to notes that are already held down. That is, subsequent notes will not be affected by the Delay and Fade In Time parameters. For a setting of ON, modulation restarts for each new note.

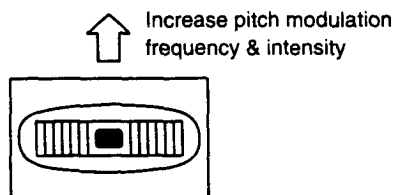
5A-4 Keyboard Tracking: keyboard tracking determines how modulation affects different areas of the keyboard. For positive values, the modulation frequency will increase as higher notes are played. For negative values, the modulation frequency will decrease as higher notes are played.

When Keyboard Sync is set to OFF, the modulation speed is determined by the position of the first key pressed. When keyboard tracking is set to +99, playing a key 1 octave higher will double the modulation speed. When the oscillator Octave parameter is set to 8', key C4 is the keyboard tracking center key.

After Touch & Joystick: this parameter specifies how much the modulation frequency will be increased in response to After Touch and the joystick (Pitch Modulation MIDI Controller).

5A-5 After Touch Modulation Intensity: this parameter determines to what extent After Touch affects the modulation intensity.

Joystick Modulation Intensity: this parameter determines to what extent the joy stick affects the modulation intensity.



5B Pitch2 Modulation

These parameters allow you to modulate the pitch of Oscillator2. Modulation frequency and intensity can also be controlled using After Touch and the joystick (Pitch Modulation MIDI Controller). Operation is the same as for Pitch1 Modulation. See "5A Pitch1 Modulation" on page 27. In Double Oscillator mode, pressing function button [5] will take you to 5A Pitch1 MG.

5B PITCH 2 MG TRI Freq00 Int00	5B PITCH 2 MG Delay00 FadeIn00	5B PITCH 2 MG K.Sync:OFF	5B PMG2 FREQ K.TRK+00 A+J=0	5B PMG2 INT Aft=00 JoyUP=00
5B-1	5B-2	5B-3	5B-4	5B-5

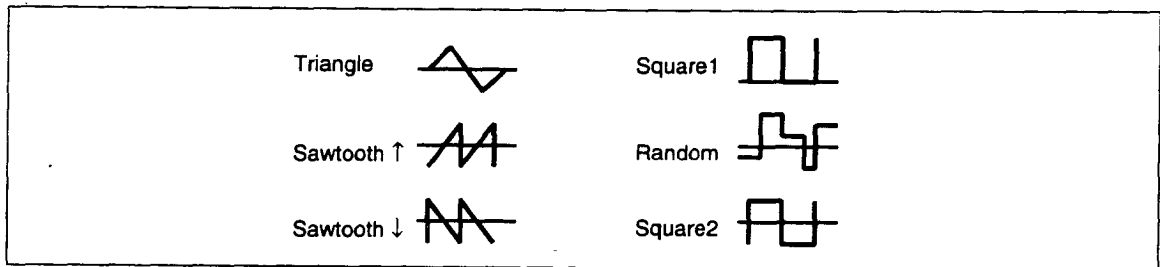
5C VDF Modulation

These parameters allows you to modulate the Cutoff Frequency of VDF1, VDF2, or both.

5C VDF MG RAND Fr=00 Int=00	5C VDF MG Del=00 OSC=BOTH	5C VDF MG K.Sync=OFF
5C-1	5C-2	5C-3

LCD	Parameter	Range	Description
5C-1	Waveform	TRI SAW↑ SAW↓ SQR1 RAND SQR2	Triangle Sawtooth ↑ Sawtooth ↓ Square1 Random Square2
	Frequency (Frq)	0-99	Modulation Speed
	Intensity (Int)	0-99	Modulation Intensity
5C-2	Delay	0-99	Time from key press to modulation start
	Oscillator Select (OSC)	OFF OSC1 OSC2 BOTH	Modulation off Modulation for VDF1 Modulation for VDF2 modulation for VDF1 and VDF2
5C-3	Keyboard Sync (K.Sync)	OFF ON	OFF: modulation will continue for subsequent notes ON: modulation will restart for each new note

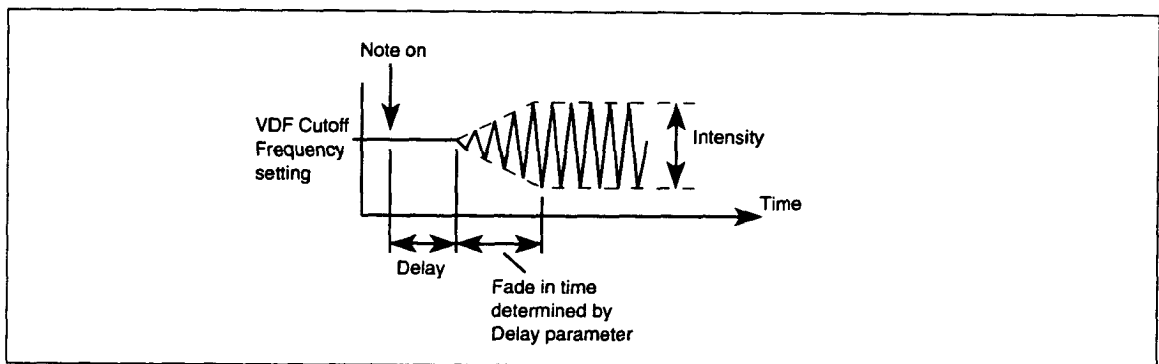
5C-1 Waveform: this parameter selects the type of modulation waveform.



Frequency: this parameter determines the modulation frequency (speed).

Intensity: this parameter determines the modulation intensity (depth).

5C-2 Delay: this parameter determines how long after a note on modulation starts. Modulation starts with a fade in time that is determined by this parameter.



Note: When Square 1 is selected and the filter is completely open, the Cutoff Frequency does not change.

Oscillator Select: this parameter allows you to apply modulation to VDF1, VDF2, or both.

5C-3 Keyboard Sync: determines how subsequent notes are affected by modulation. For a setting of OFF, modulation is applied to subsequent notes in the same way that it is currently being applied to notes that are already held down. That is, subsequent notes will not be affected by the Delay parameter. For a setting of ON, modulation restarts for each new note.

6A After Touch & Joystick Control

These parameters determine how a Program responds to After Touch and the joystick (VDF Modulation MIDI Controller).

6A AFT CTRL P.Bend+12 Fc+00	6A AFT CTRL VDF.MG00 Amp+00	6A J,STK Down VDF.MG=99	6A BEND CTRL P.Bend+00 UDF+00
6A-1	6A-2	6A-3	6A-4

LCD	Parameter	Range	Description
6A-1	After Touch Pitch Bend (P.Bend)	-12...+12	After touch pitch bend range
	After Touch VDF Cutoff Frequency (Fc)	-99...+99	VDF Cutoff Frequency sensitivity to After Touch
6A-2	After Touch VDF MG Intensity (VDF.MG)	0-99	VDF modulation sensitivity to After Touch
	After Touch VDA Amplitude (Amp)	-99...+99	VDA1 sensitivity to After Touch
6A-3	Joystick VDF MG Intensity (VDF.MG)	0-99	VDF modulation sensitivity to the VDF Modulation MIDI Controller (joystick)
6A-4	Joystick Pitch Bend Range (P.Bend)	-12...+12	Joystick pitch bend range and direction
	Joystick VDF Sweep Intensity (VDF)	-99...+99	VDF modulation sensitivity to the VDF Modulation MIDI Controller (joystick)

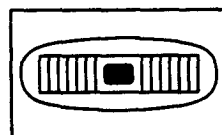
6A-1 After Touch Pitch Bend: this parameter determines the After Touch pitch bend range (± 1 octave).

After Touch VDF Cutoff Frequency: this parameter determines how the VDF Cutoff Frequency responds to After Touch. For positive values, After Touch increases the Cutoff Frequency, thus making the sound brighter. Negative values have the opposite effect. For this parameter to have any affect, you must set the VDF Cutoff Frequency to something other than 99.

6A-2 After Touch VDF MG Intensity: this parameter determines how VDF modulation responds to After Touch. When After Touch is applied, the VDF Cutoff Frequency is modulated. The higher the value, the greater the modulation intensity. For this parameter to have any affect, you must set the VDF Cutoff Frequency to something other than 99, the VDF Modulation Frequency to something other than 0, and the VDF Modulation Oscillator to OSC1, OSC2, or BOTH.

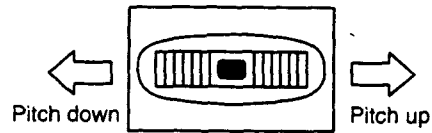
After Touch VDA Amplitude: this parameter determines how the VDA responds to After Touch. In other words, how After Touch affects the volume of Oscillator1. For positive values, increasing After Touch (pressing down on a held key) increases the volume. Negative settings have the opposite effect.

6A-3 Joystick VDF MG Intensity: this parameter determines how VDF modulation responds to the joystick (Pitch Modulation MIDI Controller). When the joystick is moved down, the VDF Cutoff Frequency is modulated. The higher the value, the greater the modulation intensity. For this parameter to have any affect, you must set the VDF Cutoff Frequency to something other than 99, the VDF Modulation Frequency to something other than 0, and the VDF Modulation Oscillator to OSC1, OSC2, or BOTH.

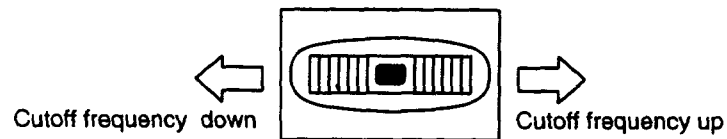


↓ Increase VDF modulation

6A-4 Joystick Pitch Bend Range: this parameter determines the pitch bend range (± 1 octave) and pitch bend direction. For positive values, the pitch increases as the joystick is moved from left to right. For negative values, the pitch increases as the joystick is moved from right to left.



Joystick VDF Sweep Intensity: this parameter determines how the VDF Cutoff Frequency responds to pitch bend. For positive values, the Cutoff Frequency increases as the joystick is moved from left to right. For negative values, the Cutoff Frequency increases as the joystick is moved from right to left.



7A–7G Effects

Effects are explained fully in Chapter 5: “Effects” on page 57.

Effects settings made in Program Edit mode only apply to Programs in Program Play mode and Program Edit mode. They do not apply when Programs are used in Combinations or songs. Effect settings for Programs used in Combinations are set in Combination Edit mode. For Programs in songs, they are set in Sequencer Edit mode.

Program parameters Pan A, Pan B, Send C, and Send D are used to control the levels of the oscillator signals sent to the effects.

When you’ve edited a Program’s effect settings, always remember to write the Program. Otherwise, the settings will be lost when you select another Program.

8A Program Write

This function allows you to write a Program to Program bank A or B. If a PROG/SEQ data card is inserted, you can also write to bank C or D. This function can also be used to reorganize Program numbering by writing Programs to different destinations. You cannot write to the GM bank.

```
8A PROG WRITE
Write→A00 OK?
```

8A-1

LCD	Parameter	Range	Description
8A-1	Write→xxx	A00–A99 B00–B99 C00–C99 D00–D99	Select the Program write destination
	OK to Write	OK?	Executes Program write

Note: To write a Program, the Program Memory Protection function must be set to OFF. See “4A Program Memory Protect” on page 164.

Note: To write a Program to a PROG/SEQ data card, it must already contain Programs and its write protect switch must be set to off. You cannot save to a card bank that contains sequencer data.

To write a Program, specify the write destination, position the cursor on OK?, then press the [▲/YES] button. The message “Are You Sure OK?” will appear. Press the [▲/YES] button to write the Program, or the [▼/NO] button to cancel. If you write the Program, the destination Program will be selected automatically.

Note: The Program that already exists at the selected write destination will be lost when you execute the Program Write function.

While editing, you may want to write a Program as you proceed. To do this, press the [REC/WRITE] button. The message “Are You Sure OK?” will appear. Press the [▲/YES] button to write the Program, or the [▼/NO] button to cancel.

To write all Programs, Combinations, and Global settings to floppy disk, see “3B Save P/C/G Data” on page 187.

8B Program Rename

This function allows you to rename Programs.

```
8B RENAME
A00:E.Piano
```

8B-1

LCD	Parameter	Range	Description
8B-1	Rename	See character table below	Rename a Program

To rename a Program, use the [←] and [→] cursor buttons to position the cursor, and the [▲/YES] [▼/NO] buttons, or VALUE slider to select characters. Available characters are shown in the table below. Program names can be up to 10 characters.

	!	"	#	\$	%	&	^	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[¥]	^	_
^	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	{	|	}	+	=

Use the number keypad to insert numbers. Use the [10's HOLD/-] button to switch between uppercase and lowercase characters. Press and hold down the [ENTER] button, then press the [←] button to delete the current character. Press and hold down the [ENTER] button, then press the [→] button to insert a character.

8C Program Oscillator Copy

This function allows you to copy the oscillator parameter settings from a Program to Oscillator1 or Oscillator2 of the currently selected Program.

```
8C Copy OSC
OSC1← A00 OK?
```

8C-1

LCD	Parameter	Range	Description
8C-1	Copy Destination	OSC1, OSC2	The oscillator to which the oscillator settings are to be copied
	Program Source	A00-A99 B00-B99 C00-C99 D00-D99 G01-136	The Program from which the oscillator settings are to be copied
	OK to Copy	OK?	Executes oscillator copy

To copy an oscillator, specify the copy destination, the Program source, and Oscillator source. Position the cursor on OK?, then press the [▲/YES] button. The message "Are You Sure OK?" will appear. Press the [▲/YES] button to copy, or the [▼/NO] button to cancel.

The following parameter settings are copied: Oscillator Setup (1B or 1C), VDF Cutoff & EG (3A or 3C), VDF Velocity Sensitivity & Keyboard Tracking (3B or 3D), VDA EG (4A or 4C), VDA Velocity Sensitivity & Keyboard Tracking (4B or 4D), Pitch Modulation (5A or 5B), and the VDF Modulation Oscillator Select parameter (5C-2).

If you copy to or from a Drum Program, the Multisound and Octave parameters are not copied.

If the Program source is the same as the program that you are currently editing, the edited parameter settings will be copied, not the parameter settings saved in that Program.

Note that it's meaningless to copy OSC2 for Single mode Programs.

8D Oscillator Copy & Swap

This function allows you to copy and swap oscillator settings between oscillators.

```
8D Swap OSC1-2
OSC1-->OSC2  OK?
8D-1
```

LCD	Parameter	Range	Description
8D-1	Oscillator Copy/Swap	OSC1 → OSC2	Copy OSC1 to OSC2
		OSC1 ← OSC2	Copy OSC2 to OSC1
		OSC1 ↔ OSC2	Swap OSC1 and OSC2
	OK to Copy/Swap	OK?	Executes oscillator copy/swap

To copy/swap an oscillator, specify the copy/swap direction, position the cursor on OK?, then press the [▲/YES] button. The message “Are You Sure OK?” will appear. Press the [▲/YES] button to copy/swap, or the [▼/NO] button to cancel.

The following parameter settings are copied: Oscillator Setup (1B or 1C), VDF Cutoff & EG (3A or 3C), VDF Velocity Sensitivity & Keyboard Tracking (3B or 3D), VDA EG (4A or 4C), VDA Velocity Sensitivity & Keyboard Tracking (4B or 4D), Pitch Modulation (5A or 5B), and the VDF Modulation Oscillator Select parameter (5C-2).

8E Program Initialize

This function resets all Program parameters to their initial settings. This is useful when you want to create a new Program from scratch.

```
8E INIT PROG
OK?
8E-1
```

LCD	Parameter	Range	Description
8E-1	INIT PROG	OK?	Executes initialize Program

To initialize a Program, press the [▲/YES] button. The message “Are You Sure OK?” will appear. Press the [▲/YES] button to initialize, or the [▼/NO] button to cancel. Parameters are initialized as follows: Oscillator mode set to Single, Oscillator Level set to 50, VDF Cutoff Frequency to 99, VDA EG Attack and Release Times to 0, VDA EG Levels to 99, Modulation to off, and no effects.

Chapter 3: Combination Play Mode

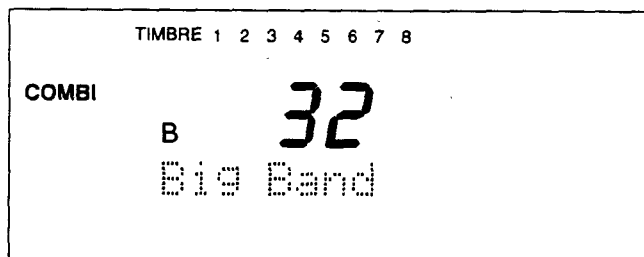
Combination Play mode allows you to select and play Combinations. Some Combination parameters can also be adjusted, allowing you to edit parameters in real time—as you play. This mode is selected when the X2/X3 is powered on.

The following Combinations can be selected: 00–99 in Bank A and 00–99 in Bank B. If a PROG/SEQ data card is inserted, Combinations 00–99 in Bank C and 00–99 in Bank D can also be selected.

Entering Combination Play Mode

Press the [COMBI] button.

COMBI appears on the LCD screen.



The numbers 1 to 8 at the top of the LCD correspond to Timbres 1 to 8. They appear for both EXT and INT mode Timbres. When MIDI Note On/Off messages are received, a box below the corresponding number flashes. This works as a MIDI monitor.

Selecting Combinations

- 1) Press the [BANK] button repeatedly to select a Combination bank.
- 2) Enter the required Combination number using the number keypad. For example, to select Combination 32 in bank B, press the [BANK] button to select bank B, then press [3] and [2]. Alternatively, press the [▲/YES] and [▼/NO] buttons repeatedly to select a Combination.

Combination Play Mode & MIDI

In Combination Play mode, the X2/X3 outputs Assignable Pedal Switching data and Program Change messages when Combinations are selected. This data is sent on the Global MIDI Channel. See “3A Global MIDI Channel & MIDI Clock Source” on page 160. When a Combination that contains an EXT mode Timbre is selected, a Program Change message corresponding to that Timbre’s Program is output.

The X2/X3 responds to MIDI Controllers such as After Touch and Pitch Bend. See “Controller Event Edit Notes” on page 126 for a list of all usable MIDI Controllers.

Using a Pedal Switch to Select Combinations

You can also select Combinations using a pedal switch.

- 1) Connect an optional Korg PS-1 or PS-2 pedal switch to the ASSIGNABLE PEDAL/SW connector on the rear panel.
- 2) In Global mode, you need to assign the pedal to either Program Up or Program Down. See “8B Assignable Pedal/SW Setup” on page 173. When set to Program Up, each pedal press selects the next Combination up. When set to Program Down, each pedal press selects the next Combination down.

Using MIDI to Select Combinations

You can also select Combinations using MIDI Program Change messages.

- 1) Connect a MIDI device capable of sending MIDI Program Change messages to the X2/X3 MIDI IN.
- 2) Set the Global MIDI Channel parameter so that it matches that of the device sending the Program Change messages. See "3A Global MIDI Channel & MIDI Clock Source" on page 160.
- 3) In Global mode, you need to set the MIDI Program Change filter to ENA or NUM. See "3C MIDI Filter1" on page 162.

The following table shows how the X2/X3 responds to MIDI Bank Select and Program Change messages in Combination Play mode.

MIDI			X2/X3	
Bank Select		Program Change No.	Bank	Combination No.
MSB	LSB			
00	00	00-99	A	00-99
00	01	00-99	B	00-99
00	02	00-99	C	00-99
00	03	00-99	D	00-99

MSB: first pair of digits

LSB: second pair of digits

To select a bank, send Controller 0 for MSB and Controller 32 for LSB. Then send the Program Change message to select the Combination.

You can select a Combination by sending a Program Change message only. In this case, the Combination will be selected from the current Bank.

Combination Notes

Polyphony: 32-note polyphony is available for a Combination. That is, 32 notes are available to the Timbres within a Combination. Timbre Programs that use Double Oscillator mode will obviously reduce the number of available notes. For example, eight Single Oscillator mode Programs in a Combination would allow up to 32-note polyphony. Whereas, eight Double Oscillator mode Programs would allow up to 16-note polyphony.

Playing Timbres: to play a Combination Timbre from the keyboard, you must set that Timbre's T.Mode to INT, and its MIDI Channel so that it matches the Global MIDI Channel. See "1B Timbre Mode" on page 42 and "3A MIDI Channel" on page 46.

MIDI Control: Combinations can be selected and Effects controlled via the Global MIDI Channel. See "3A Global MIDI Channel & MIDI Clock Source" on page 160.

Program Effects: in Combination Play mode, the individual effect settings for each Program are ignored, and the effect settings for that Combination are used.

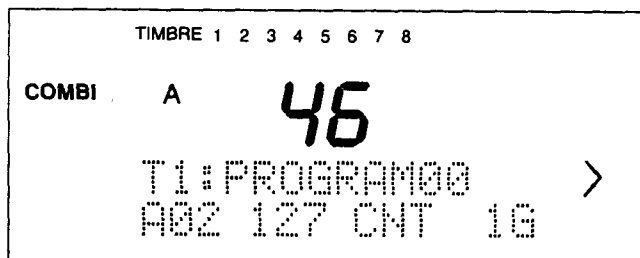
Editing a Combination Program: if you have just edited one of the Programs used by a Combination Timbre, the edited version of that Program (saved or not) will be used when that Combination is selected.

Editing in Combination Play Mode (Performance Editing)

As well as playing Combinations, Combination Play mode allows you to edit some Combination parameters. This is called performance editing, because you can actually edit parameters while performing. The parameters are: Program number, Level, Pan, and MIDI Channel.

- 1) Select a Combination.
- 2) Use the function buttons [1] to [8] to select a Timbre.
Function buttons [1] to [8] correspond to Timbres 1 to 8.
- 3) Use the [←] and [→] cursor buttons to select a parameter.
- 4) Use the VALUE slider or the [▲/YES] and [▼/NO] buttons to adjust the selected parameter.

On the following LCD screen, the Program Select parameter of Timbre 1 is selected. The angle bracket symbol indicates that other parameters can be displayed using the [→] cursor button.



When you've finished editing, press the [↓] cursor button or the [COMBI] button to return to the previous LCD screen.

If you want to write the edited Combination to memory, press the [REC/WRITE] button. The message "Are You Sure OK?" will appear. Press the [▲/YES] button to write the Combination, or the [▼/NO] button to cancel. Note that if you write the Combination, you will overwrite the Combination that already exists with that number. To write the Combination to a different Combination number, or change its name, see "8A Combination Write" on page 54.

T1:PROGRAM00 >
A00 100 CNT 16
[1] Timbre 1

T8:PROGRAM00 <
A00 100 CNT 16
[8] Timbre 8

Function Button	Parameter	Range	Description
[1]	Program	OFF A00-A99 B00-B99 C00-C99 D00-D99 G01-136 p000-p127	Selects a Program. P numbers indicate that a Timbre is set to EXT T.Mode. See "1A Program Select" on page 41.
	Level	000-127	Timbre volume level. See "2A Level" on page 43.
[8]	Panpot	OFF, A, 14A-CNT-14B, B PRG	Timbre output panning. See "2B Panpot" on page 44.
	MIDI Channel	1-16	Timbre MIDI Channel. See "3A MIDI Channel" on page 46.

Refer to the pages listed in the above table for a full explanation of each parameter.

Note: When one of the above parameters is selected, the VALUE slider does not control dynamic modulation, it controls the selected parameter. To control dynamic modulation using the VALUE slider, press the [↓] button to exit performance edit. See *Dynamic Modulation* on page 58.

When the MIDI System Exclusive Filter (3D-1 Global mode) is set to ENA, the respective MIDI System Exclusive data is output while performance editing. Likewise, X2/X3 parameters are controlled when the respective System Exclusive data is received.

Soloing Individual Timbres

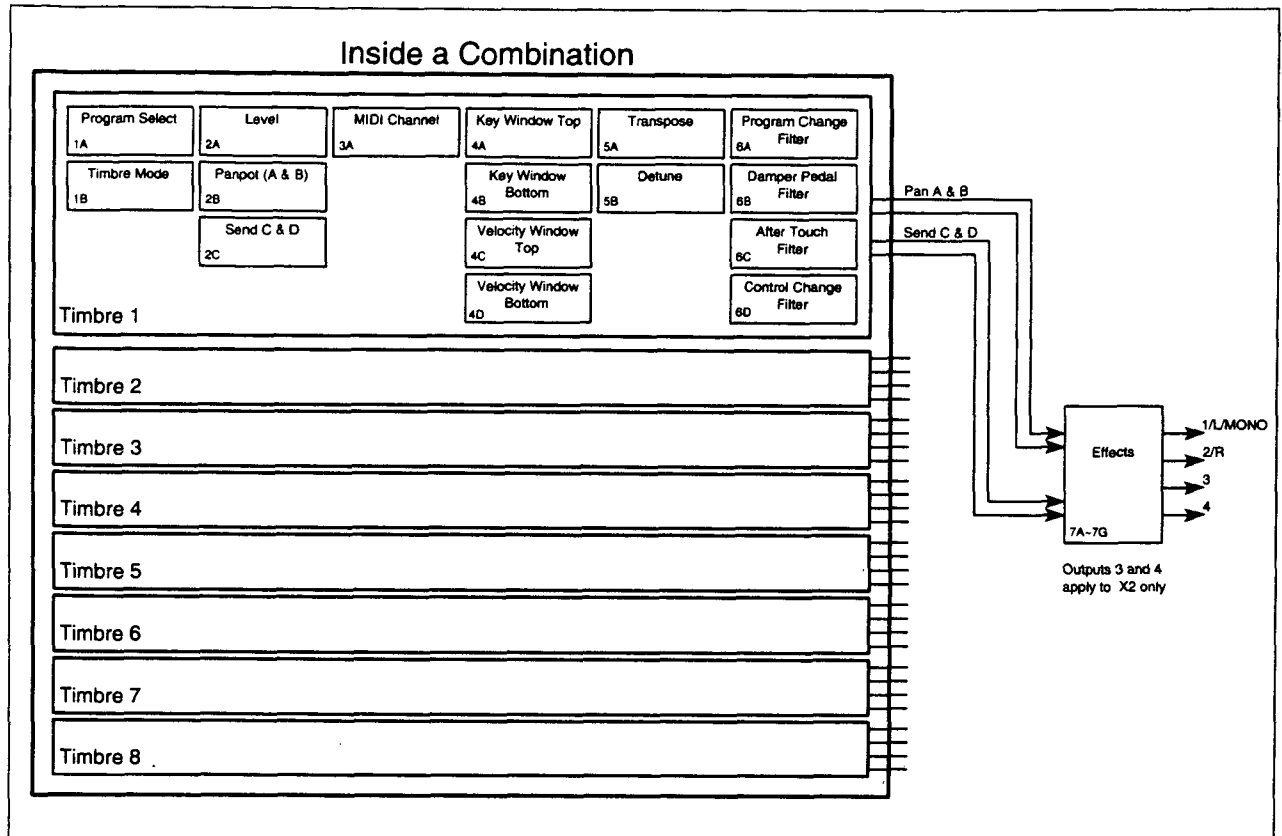
When a number of Timbres are layered together, you may find it difficult to distinguish between them. The Solo function allows you to listen to Timbres individually. To solo a Timbre, double-click the corresponding function button. For example, to solo Timbre 6, double-click function button [6]. SOLO appears on the LCD, as shown below.

TIMBRE 1 2 3 4 5 6 7 8
COMBI SOLO
A 46
T1:PROGRAM00 >
A02 127 CNT 16

To cancel Solo, double-click the respective function button, or press the [COMBI] button.

Chapter 4: Combination Edit Mode

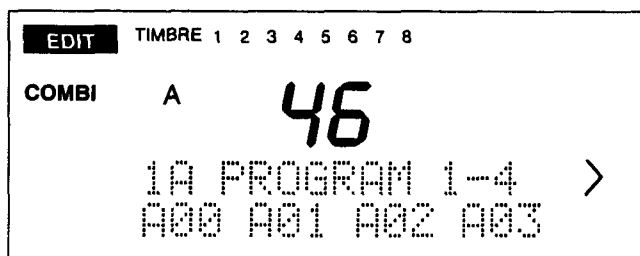
Combination Edit mode allows you to edit Combinations. You can create new Combinations or simply edit existing ones. The following illustration shows the eight Timbres that make up a Combination and what's inside them. The numbers in the bottom left-hand corner of each box indicate the group of LCD screens that are used to set up that particular item.



Entering Combination Edit Mode

- 1) Select the Combination that you want to edit.
- 2) Press the [EDIT] button.

COMBI and EDIT appear on the LCD screen.



Compare Function

While editing, you can press the [COMPARE] button to listen to the original unedited Combination. That is, how the Combination was before you started editing it. While the Compare function is active, COMPARE is shown on the LCD. Pressing the [COMPARE] button again will return you to the edited version of the Combination.

Note: If you edit a parameter while the Compare function is active, the settings of the Combination that you were editing will be lost.

Undo Function

To reset a parameter to the value that is was before you edited it, press the [▲/YES] and [▼/NO] buttons simultaneously.

Combination Editing Notes

Always Write Combinations: remember to write an edited Combination to memory before selecting another Combination. Otherwise, the edited Combination will be lost.

When the MIDI System Exclusive Filter (3D-1 Global mode) is set to ENA, the respective MIDI System Exclusive data is output when a parameter is edited. Likewise, X2/X3 parameters are edited when the respective System Exclusive data is received.

1A Program Select

These parameters allow you to assign Programs to Timbres.

Timbres 1-4		Timbres 5-8	
1A PROGRAM 1-4 >		1A PROGRAM 5-8 <	
A00 A01 B02 A03		A04 G01 G99 128	
1A-1		1A-2	

LCD	Parameter	Range	Description
1A-1	Timbre 1 Program Select	A00-A99 B00-B99 C00-C99 D00-D99 G01-136 p000-p127	Assign a Program to a Timbre (C00-C99 and D00-D99 are available only when a PROG/SEQ card is inserted)
	Timbre 2 Program Select		
	Timbre 3 Program Select		
	Timbre 4 Program Select		
1A-2	Timbre 5 Program Select		
	Timbre 6 Program Select		
	Timbre 7 Program Select		
	Timbre 8 Program Select		

Use the [10's HOLD] button to select Program banks, and the VALUE slider or [▲/YES] and [▼/NO] buttons to select Programs. An optional PROG/SEQ data card must be inserted before you can select Programs from banks C and D.

For INT mode Timbres (see "1B Timbre Mode" on page 42), MIDI Program Change messages received on the corresponding MIDI channel can be used to select Programs. However, if the Timbre's MIDI Channel is the same as the Global MIDI Channel, operation will depend on the MIDI Program Change Filter1 parameter setting. For example, if the filter is set to PRG, MIDI Program Change messages received on the Global MIDI Channel will still select Timbre Programs. If it is set to either ENA or NUM, they will select Combinations. See "3C MIDI Filter1" on page 162.

P000-P127: for EXT mode Timbres (see "1B Timbre Mode" on page 42) you can select a MIDI Program Change number, as indicated by the prefix P. When a Combination that contains EXT mode Timbres is selected, the specified MIDI Program Change number is output. This allows you to select Programs (voices, patches) on other MIDI devices such as synthesizers and tone generators simply by selecting the appropriate Combination on the X2/X3. It could also be used to select effect programs on an external effects units.

Note: If the MIDI Channel of an EXT mode Timbre is the same as the Global MIDI Channel, a MIDI Program Change message is not output by that Timbre when a Combination is selected.

1B Timbre Mode

These parameters allow you to set the operating mode for each Timbre. In other words, the sound source and the way that each Timbre works with MIDI data from external MIDI devices.

Timbres 1-4				Timbres 5-8			
1B T.MODE	1-4	>		1B T.MODE	5-8	<	
INT	INT	EXT	EXT	INT	INT	OFF	OFF
1B-1				1B-2			

LCD	Parameter	Range	Description
1B-1	Timbre 1 Timbre Mode	OFF	Timbre is off
	Timbre 2 Timbre Mode		
	Timbre 3 Timbre Mode		
	Timbre 4 Timbre Mode		
1B-2	Timbre 5 Timbre Mode	INT	Use an internal program
	Timbre 6 Timbre Mode		
	Timbre 7 Timbre Mode		
	Timbre 8 Timbre Mode		
		EXT	Use an external program, for use with other MIDI instruments

OFF: this turns Timbres off. Turn off any Timbres that you are not going to use. When a Timbre is turned OFF, the corresponding number on the top line of the LCD screen disappears.

INT: when this mode is selected, you can assign an X2/X3 Program to a Timbre using Program Select. See “1A Program Select” on page 41. This mode should be selected when you want to use an X2/X3 Program.

MIDI Program Change messages received on a corresponding Timbre’s MIDI channel can be used to select Programs. If, however, the Timbre’s MIDI Channel is the same as the Global MIDI Channel, the Combination will be changed. See “3C MIDI Filter1” on page 162 for more details.

EXT: when a Combination is selected on the X2/X3, you can select a MIDI Program Change number using Program Select. See “1A Program Select” on page 41. This mode should be selected when you want to use Programs (voices, patches) from other MIDI devices, such as synthesizers and tone generators, as part of a Combination. It can also be used to select effect programs on external effects units. When a Combination that contains EXT mode Timbres is selected, the specified MIDI Program Change numbers (1A) and Volume are output on the MIDI Channel set in 3A. You can also apply the filter to the Program Change messages and volume data for each Timbre using [6A]–[6D].

When you play the X2/X3 keyboard, or operate the joystick, the corresponding MIDI data is transmitted on the Global MIDI Channel, and any MIDI Channel that is assigned to an EXT mode Timbre.

Note: If the MIDI Channel of an EXT mode Timbre is the same as the Global MIDI Channel, a MIDI Program Change message is not output when a Combination is selected.

2A Level

These parameters allow you to set the volume level of each Timbre in a Combination.

Timbres 1-4		Timbres 5-8	
2A LEVEL 1-4	>	2A LEVEL 5-8	<
127 099 011 127		055 127 127 127	
2A-1		2A-2	

LCD	Parameter	Range	Description
2A-1	Timbre 1 Level	0-127	Sets the volume level of each Timbre
	Timbre 2 Level		
	Timbre 3 Level		
	Timbre 4 Level		
2A-2	Timbre 5 Level		
	Timbre 6 Level		
	Timbre 7 Level		
	Timbre 8 Level		

For EXT mode Timbres (see "1B Timbre Mode" on page 42), MIDI Volume message Controller 7 [Bn.07.xx] is sent when level parameters are adjusted. This allows you to control the volume level of other MIDI devices.

Note: If the MIDI Channel of an EXT mode Timbre is the same as the Global MIDI Channel, MIDI Volume messages are not sent.

For INT mode Timbres, the volume level is determined by this parameter multiplied by MIDI Volume Controller No. 7, or Expression Controller No. 11.

2B Panpot

These parameters allow you to pan the output of each Timbre between buses A and B. These buses feed the effects processors. See “7E Effect Placement” on page 59.

Timbres 1-4				Timbres 5-8			
2B PANPOT 1-4 >				2B PANPOT 5-8 <			
A	B	CNT	CNT	10A	10B	CNT	PRG
2B-1				2B-2			

LCD	Parameter	Range	Description
2B-1	Timbre 1 Panpot	OFF, A, 14A-CNT-14B, B, PRG	Pans the outputs of each Timbre between buses A and B
	Timbre 2 Panpot		
	Timbre 3 Panpot		
	Timbre 4 Panpot		
2B-2	Timbre 5 Panpot		
	Timbre 6 Panpot		
	Timbre 7 Panpot		
	Timbre 8 Panpot		

OFF: nothing is output to buses A and B.

A, 14A-CNT-14B, B: for a setting of A, Timbre output is to bus A only. For a setting of B, to bus B only. And for a setting of CNT, equally to buses A and B. You can set different output levels for buses A and B with settings 14A to 14B.

PRG: when this setting is selected, the pan settings that have been set for a Program in Program Edit mode are used. See “1B Oscillator1 Setup” on page 11 and “1C Oscillator2 Setup” on page 13. When X2 Program 340: A.Piano3 is selected, the Pan (1B-3) parameter assigned to each key is used.

If a Program is using a drum kit, the pan settings for each drum sound will be used when PRG is selected. See “7A Drum Kit Setup1” on page 170 and “7B Drum Kit Setup2” on page 172.

For a setting other than OFF or PRG, these parameters can be controlled using MIDI Pan Controller No. 10. See “MIDI Panpot, Send Data” on page 128 for details about the relationship between pan value and MIDI Controller value.

Pan adjustments are not sent as MIDI data.

2C Send C & D

These parameters allow you to set the output level of each Timbre sent to buses C and D. These buses feed the effects processors. See “7E Effect Placement” on page 59.

Timbres 1-4		Timbres 5-8	
2C SendCD 1-4	>	2C SendCD 5-8	<
9:0 0:9 5:5 5:5		5:5 5:5 0:0 P:P	
2C-1		2C-2	

LCD	Parameter	Range	Description
2C-1	Timbre 1 Send C	0-9, P	Sets the output level of each Timbre sent to buses C and D
	Timbre 1 Send D		
	Timbre 2 Send C		
	Timbre 2 Send D		
2C-2	Timbre 3 Send C		
	Timbre 3 Send D		
	Timbre 4 Send C		
	Timbre 4 Send D		
	Timbre 5 Send C		
	Timbre 5 Send D		
	Timbre 6 Send C		
	Timbre 6 Send D		
2C-2	Timbre 7 Send C		
	Timbre 7 Send D		
	Timbre 8 Send C		
	Timbre 8 Send D		

0-9: when a Program is used in a Combination, its Send C and Send D parameters are ignored, and these settings are active. Oscillators 1 and 2 use the same settings. Likewise, when the Program is set to DRUM mode, the Send C and Send D settings of the individual drums within the kit are ignored, and these settings are active.

P: when this setting is selected, the Send C and Send D settings that have been set for a Program in Program Edit mode are used. See “1B Oscillator1 Setup” on page 11 and “1C Oscillator2 Setup” on page 13. If a Program is using a drum kit, the settings for each drum sound will be used. See “7A Drum Kit Setup1” on page 170 and “7B Drum Kit Setup2” on page 172.

For settings from 0-9, the Send C parameters can be controlled using MIDI Reverb Level Controller No. 91. MIDI Chorus Level Controller No. 93 can be used to control Send D.

See “MIDI Panpot, Send Data” on page 128 for details about the relationship between send value and MIDI Controller value.

Send C and D adjustments are not sent as MIDI data.

3A MIDI Channel

These parameters allow you to set the MIDI Channel that each Timbre uses to send and receive MIDI data.

Timbres 1-4				Timbres 5-8			
3A MIDI CH 1-4 >	2	3	4	3A MIDI CH 5-8 <	6	7	8
16				5			
3A-1				3A-2			

LCD	Parameter	Range	Description
3A-1	Timbre 1 MIDI Channel	1-16	Sets the MIDI Channel that each Timbre uses to send and receive MIDI data
	Timbre 2 MIDI Channel		
	Timbre 3 MIDI Channel		
	Timbre 4 MIDI Channel		
3A-2	Timbre 5 MIDI Channel		
	Timbre 6 MIDI Channel		
	Timbre 7 MIDI Channel		
	Timbre 8 MIDI Channel		

If you want to play a Combination from the keyboard, you should set each Timbre's MIDI Channel so that it matches the Global MIDI Channel. If you are using an external MIDI sequencer, set each Timbre's MIDI Channel so that it matches the corresponding sequencer track's MIDI channel. This allows you to use the X2/X3 as an 8-part multitimbral tone generator.

Combinations can be selected using the X2/X3 front panel controls, or the Assignable Pedal. When a Combination is selected, the corresponding MIDI Program Change message is output on the Global MIDI Channel. When a Combination that contains an EXT mode Timbre is selected, a Program Change message corresponding to that Timbre's Program is also output.

For EXT mode Timbres, MIDI data corresponding to volume, After Touch, damper pedal, and joystick movements is received and sent on the selected MIDI channel. However, you can filter some of this MIDI data. For example, you may not want to send joystick data to another MIDI device. These filters can be set for each Timbre individually on LCD screens 6A, 6B, 6C, and 6D.

Note: *Volume, After Touch, damper pedal, and joystick MIDI data is always sent on the Global MIDI Channel, so, if the Global MIDI Channel and selected Timbre MIDI Channel are the same, even with the filters set, MIDI data is sent. This applies to INT mode and EXT mode Timbres alike. For this reason, it's a good idea to set the Global MIDI Channel and Timbre MIDI Channels differently.*

When you play the X2/X3 keyboard, or operate the joystick, the corresponding MIDI data is transmitted on the Global MIDI Channel, and any MIDI Channel that is assigned to an EXT mode Timbre.

For an INT mode Timbre (see "1B Timbre Mode" on page 42), MIDI Program Change messages received on the corresponding MIDI channel can be used to select Programs. However, if the Timbre's MIDI Channel is the same as the Global MIDI Channel, operation will depend on the Filter1 parameter setting. See "3C MIDI Filter1" on page 162.

If the selected MIDI Channel is the same as the Global MIDI Channel, a G will appear next to the selected channel number.

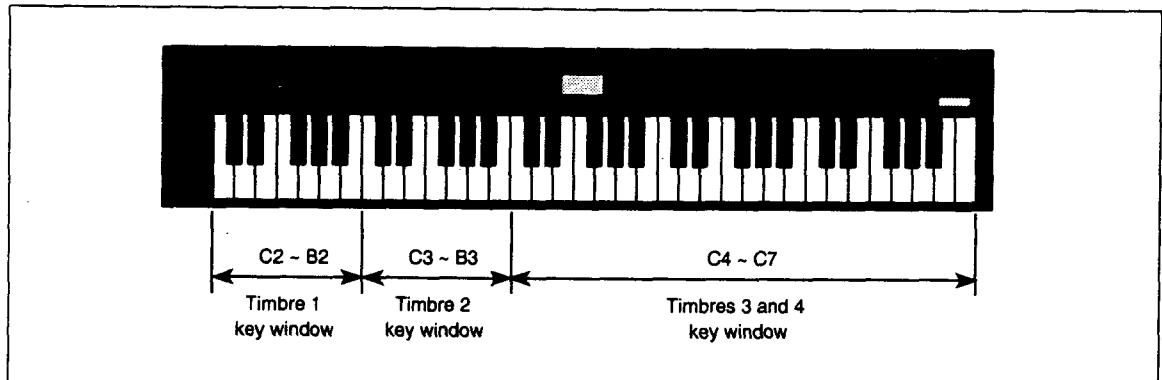
4A Key Window Top

These parameters allow you to set the top note for each Timbre's key window.

Timbres 1-4		Timbres 5-8	
4A KW TOP 1-4	>	4A KW TOP 5-8	<
69 69 69 69		B4 69 69 69	
4A-1		4A-2	

LCD	Parameter	Range	Description
4A-1	Timbre 1 Key Window Top	C-1 to G9	Specifies the top note for each Timbre's key window (If a note lower than the Key Window Bottom parameter is selected, that parameter will automatically use this value)
	Timbre 2 Key Window Top		
	Timbre 3 Key Window Top		
	Timbre 4 Key Window Top		
4A-2	Timbre 5 Key Window Top		
	Timbre 6 Key Window Top		
	Timbre 7 Key Window Top		
	Timbre 8 Key Window Top		

A key window is the range of keys (notes) that can be used to play a Timbre. Used in conjunction with the Key Window Bottom parameters, you can designate sections of a keyboard to certain Timbres. For example, you could designate the bottom half of a keyboard to a bass Timbre, and the top half to a piano Timbre. In the example shown below, Timbres 1 and 2 have been designated their own key windows, while the key window for Timbres 3 and 4 have been set the same.



As well as using the VALUE slider and the [▲/YES] and [▼/NO] buttons to set Key Window Top and Bottom parameters, you can use the X2/X3 keyboard as follows. Select a Key Window parameter, press and hold down the [ENTER] button, then press the desired key.

4B Key Window Bottom

These parameters allow you to set the bottom note for each Timbre's key window. Refer to "4A Key Window Top" on page 47 for more details.

Timbres 1-4				Timbres 5-8			
4B KW BTM 1-4	>	4B KW BTM 5-8	<				
C-1 C-1 C-1 C-1		C-1 C-1 C-1 C-1					
4B-1				4B-2			

LCD	Parameter	Range	Description
4B-1	Timbre 1 Key Window Bottom	C-1 to G9	Specifies the bottom note for each Timbre's key window. (If a note higher than the Key Window Top parameter is selected, that parameter will automatically use this value)
	Timbre 2 Key Window Bottom		
	Timbre 3 Key Window Bottom		
	Timbre 4 Key Window Bottom		
4B-2	Timbre 5 Key Window Bottom		
	Timbre 6 Key Window Bottom		
	Timbre 7 Key Window Bottom		
	Timbre 8 Key Window Bottom		

4C Velocity Window Top

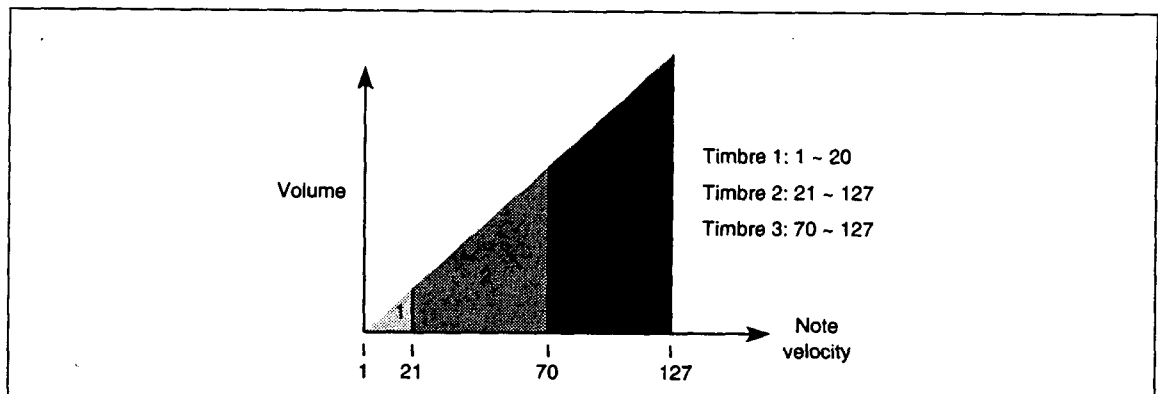
These parameters allow you to set the maximum velocity for each Timbre's velocity window.

Timbres 1-4		Timbres 5-8	
4C UW TOP 1-4	>	4C UW TOP 5-8	<
127 127 127 127		127 127 127 127	
4C-1		4C-2	

LCD	Parameter	Range	Description
4C-1	Timbre 1 Velocity Window Top	1-127	Specifies the maximum velocity for each Timbre's Velocity window
	Timbre 2 Velocity Window Top		
	Timbre 3 Velocity Window Top		
	Timbre 4 Velocity Window Top		
4C-2	Timbre 5 Velocity Window Top		
	Timbre 6 Velocity Window Top		
	Timbre 7 Velocity Window Top		
	Timbre 8 Velocity Window Top		

A velocity window determines the note velocity range that can be used to play a Timbre. Used in conjunction with the Velocity Window Bottom parameters, you can specify a note velocity range for each Timbre. For example, you could set a soft strings Timbre to a low velocity window, and hard strings Timbre to a high velocity window. Then, soft playing will play the soft strings, and stronger playing will play the hard strings. This technique is called velocity switch. You can also set the velocity windows so that their ranges overlap.

In the example shown below, Timbre 1 will play when the note velocity is between 1 and 20, Timbre 2 between 21 and 127, and Timbre 3 between 70 and 127. Note that Timbres 2 and 3 overlap.



If a Timbre is set to EXT mode (see "1B Timbre Mode" on page 42), MIDI Notes whose velocity falls within the velocity window range are output.

4D Velocity Window Bottom

These parameters allow you to set the minimum velocity for each Timbre's velocity window. Refer to "4C Velocity Window Top" on page 49 for more details.

Timbres 1-4	Timbres 5-8
4D UW BTM 1-4 > 001 001 001 001	4D UW BTM 5-8 < 001 001 001 001
4D-1	4D-2

LCD	Parameter	Range	Description
4D-1	Timbre 1 Velocity Window Bottom	1-127	Specifies the minimum velocity for each Timbre's Velocity window
	Timbre 2 Velocity Window Bottom		
	Timbre 3 Velocity Window Bottom		
	Timbre 4 Velocity Window Bottom		
4D-2	Timbre 5 Velocity Window Bottom		
	Timbre 6 Velocity Window Bottom		
	Timbre 7 Velocity Window Bottom		
	Timbre 8 Velocity Window Bottom		

5A Transpose

These parameters allow you to transpose Timbres.

Timbres 1-4		Timbres 5-8	
5A TRANS 1-4	>	5A TRANS 5-8	<
+00 +07 +00 +00		+00 +00 +00 +00	
5A-1		5A-2	

LCD	Parameter	Range	Description
5A-1	Timbre 1 Transpose	-24...+24	Transpose Timbre in semitone steps
	Timbre 2 Transpose		
	Timbre 3 Transpose		
	Timbre 4 Transpose		
5A-2	Timbre 5 Transpose		
	Timbre 6 Transpose		
	Timbre 7 Transpose		
	Timbre 8 Transpose		

If you transpose an INT mode Timbre ("1B Timbre Mode" on page 42), the Timbre's pitch will change, but the pitch of the MIDI note data that is output when you play will not.

If you select a MIDI Channel other than the Global MIDI Channel for an EXT mode Timbre, the MIDI note data output on that MIDI Channel will be transposed.

5B Detune

These parameters allow you to detune Timbres.

Timbres 1-4		Timbres 5-8	
5B DETUNE 1-4	>	5B DETUNE 5-8	<
+00 +03 +00 +00		+00 +00 +00 +00	
5B-1		5B-2	

LCD	Parameter	Range	Description
5B-1	Timbre 1 Detune	-50...+50	Detune each Timbre in one cent steps
	Timbre 2 Detune		
	Timbre 3 Detune		
	Timbre 4 Detune		
5B-2	Timbre 5 Detune		
	Timbre 6 Detune		
	Timbre 7 Detune		
	Timbre 8 Detune		

Detune settings are not sent as MIDI data.

6A Program Change Filter

These parameters determine how EXT mode Timbres work with MIDI Program Change messages.

Timbres 1-8

```
6A PROG CHANGE
E E D D E E E E
```

6A-1

LCD	Parameter	Range	Description
6A-1	Timbre 1 Program Change Filter	D: Disable E: Enable	Program Change messages ignored Program Change messages can be received and sent
	Timbre 2 Program Change Filter		
	Timbre 3 Program Change Filter		
	Timbre 4 Program Change Filter		
	Timbre 5 Program Change Filter		
	Timbre 6 Program Change Filter		
	Timbre 7 Program Change Filter		
	Timbre 8 Program Change Filter		

Enable: with this setting, received Program Change messages select Programs for a Timbre. A Combination that includes EXT mode Timbres (1B) will send the corresponding Program Change messages when it is selected.

Note: *If the Global mode MIDI Program Change Filter1 is set to DIS (“3C MIDI Filter1” on page 162), Program Change messages are completely disabled. This setting overrides the above settings. Furthermore, if the Global mode MIDI Program Change Filter1 is set to ENA, Program Change messages received on the Global MIDI Channel will select Combinations. For this reason, it’s a good idea to set the Global MIDI Channel and Timbre MIDI Channels differently.*

Disable: with this setting, Program Change messages are neither sent nor received.

6B Damper Pedal Filter

These parameters determine how Timbres respond to damper pedal movements.

Timbres 1-8

```
6B DAMPER
E E E E E E E E
```

6B-1

LCD	Parameter	Range	Description
6B-1	Timbre 1 Damper Pedal Filter	D: Disable E: Enable	Timbre will ignore the damper pedal Timbre will respond to the damper pedal
	Timbre 2 Damper Pedal Filter		
	Timbre 3 Damper Pedal Filter		
	Timbre 4 Damper Pedal Filter		
	Timbre 5 Damper Pedal Filter		
	Timbre 6 Damper Pedal Filter		
	Timbre 7 Damper Pedal Filter		
	Timbre 8 Damper Pedal Filter		

Enable: with this setting, INT mode Timbres respond to damper pedal movements.

Disable: with this setting, damper pedal movements are ignored.

6C After Touch Filter

These parameters determine how Timbres respond to After Touch.

Timbres 1-8

```
6C AFTER TOUCH
E E E E E E E E
```

6C-1

LCD	Parameter	Range	Description
6C-1	Timbre 1 After Touch Filter	D: Disable	Timbre will ignore After Touch
	Timbre 2 After Touch Filter		
	Timbre 3 After Touch Filter		
	Timbre 4 After Touch Filter		
	Timbre 5 After Touch Filter	E: Enable	Timbre will respond to After Touch
	Timbre 6 After Touch Filter		
	Timbre 7 After Touch Filter		
	Timbre 8 After Touch Filter		

Enable: with this setting, INT mode Timbres respond to After Touch. Ext mode Timbres using keyboard After Touch output the corresponding MIDI data.

Disable: with this setting, After Touch is ignored.

Note: If the Global mode MIDI After Touch Filter1 is set to DIS ("3C MIDI Filter1" on page 162), After Touch messages are completely disabled. This setting overrides the above settings.

Applying even just a little After Touch creates a lot of continuous data. You can save memory when recording to the X2/X3, or to a sequencer that does not use After Touch, by setting AFT 3C-1 MIDI Filter to DIS. See "3C MIDI Filter1" on page 162.

6D Control Change Filter

These parameters determine whether Timbres respond to MIDI Controllers.

Timbres 1-8

```
6D CONTROL CHG
E E E E E E E E
```

6D-1

LCD	Parameter	Range	Description
6D-1	Timbre 1 Control Change Filter	D: Disable	Timbre will ignore controllers
	Timbre 2 Control Change Filter		
	Timbre 3 Control Change Filter		
	Timbre 4 Control Change Filter		
	Timbre 5 Control Change Filter	E: Enable	Timbre will respond to controllers
	Timbre 6 Control Change Filter		
	Timbre 7 Control Change Filter		
	Timbre 8 Control Change Filter		

Enable: with this setting, INT mode Timbres respond to controllers.

Disable: with this setting, controllers are ignored.

7A–7G Effects

In a Combination the individual effect settings of each Program are ignored, and the settings for that Combination are used. If you want to use a Program's effect settings for a Combination, use Effects Copy. See "7F Effects Copy" on page 62.

Effects are explained in Chapter 5: "Effects" on page 57.

Combination parameters Pan A, Pan B, Send C, and Send D are used to control the levels of the Timbres sent to the effects.

When you've edited a Combination's effects settings, always remember to write the Combination. Otherwise, the settings will be lost when you select another Combination.

8A Combination Write

This function allows you to write a Combination to Combination bank A or B. If a PROG/SEQ data card is inserted, you can also write to banks C and D. This function can also be used to reorganize Combination numbering by writing Combinations to different destinations.

```
8A COMB WRITE
Write→A00  OK?
```

8A-1

LCD	Parameter	Range	Description
8A-1	Write→xxx	A00–A99 B00–B99 C00–C99 D00–D99	Select the Combination write destination (C00–C99 and D00–D99 are available only when a PROG/SEQ card is inserted)
	OK to Write	OK?	Executes write

Note: To write a Combination, the Combination Memory Protection function must be set to OFF. See "4B Combination Memory Protect" on page 164.

To write a Combination to a PROG/SEQ data card, it must already contain Programs and its write protect switch must be set to off. See "6C Save Programs & Combinations to Card" on page 168.

To write a Combination, specify the write destination, position the cursor on OK?, then press the [▲/YES] button. The message "Are You Sure OK?" will appear. Press the [▲/YES] button to write the Combination, or the [▼/NO] button to cancel. If you write the Combination, the destination Combination will be selected automatically.

Note: The Combination that already exists at the selected write destination will be lost when you execute this function.

You can write Combinations at any time. To do this, press the [REC/WRITE] button. The message "Are You Sure OK?" will appear. Press the [▲/YES] button to write the Combination, or the [▼/NO] button to cancel.

To write all Combinations, Programs, and Global settings to floppy disk, see "3B Save P/C/G Data" on page 187.

8B Combination Rename

This function allows you to rename Combinations.

```
8B RENAME
A00:Organ
```

8B-1

LCD	Parameter	Range	Description
8B-1	Rename	See character table below	Rename a Combination

To rename a Combination, use the [←] and [→] cursor buttons to position the cursor, and the [▲/YES] [▼/NO] buttons or VALUE slider to select characters. Available characters are shown in the table below. Combination names can use up to 10 characters.

	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[]	^	_	
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	{	}	~	+	

Use the number keypad to insert numbers. Use the [10's HOLD/-] button to switch between uppercase and lowercase characters. Press and hold down the [ENTER] button, then press the [←] button to delete the current character. Press and hold down the [ENTER] button, then press the [→] button to insert a character.

8C Combination Initialize

This function resets all Combination parameters to their initial settings.

```
8C INIT COMB
OK?
```

8C-1

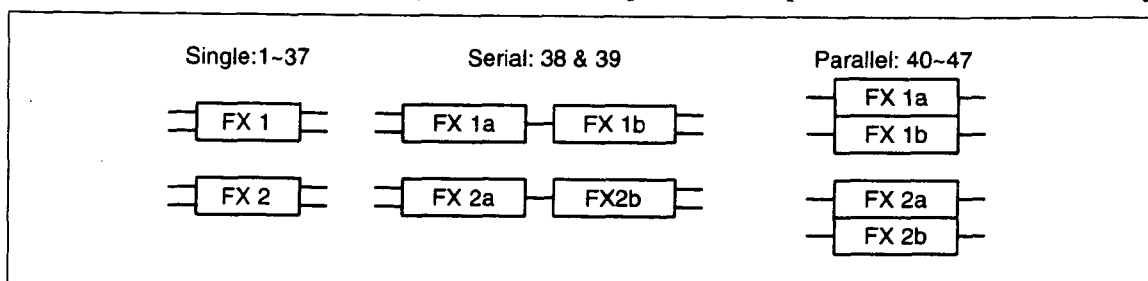
LCD	Parameter	Range	Description
8C-1	Initialize Combination	OK?	Executes initialize

To initialize a Combination, press the [▲/YES] button. The message "Are You Sure OK?" will appear. Press the [▲/YES] button to initialize, or the [▼/NO] button to cancel.

Parameters are initialized as follows: Timbres 1 to 8 are assigned Programs A00 to A07, Timbre mode is set to INT, volume set to maximum, Pan is set to CNT, Send C and Send D are set to 0, key and velocity windows are fully open, MIDI Channels are assigned from 1 to 8, transpose and detune are +00, all filters are E (Enabled), and there are no effects.

Chapter 5: Effects

The X2/X3 contains two digital multi-effects processors. Each processor can be set to produce one of 47 effects. The effects section consists of four inputs (A, B, C, D), two effects processors (Effect1, Effect2), and two panpots (pan 3, 4). The X2 has four outputs (1/L/MONO, 2/R, 3, 4). The X3 has two outputs (L/MONO, R). X2 effects processors can be assigned any one of six placements. X3 effects processors can be assigned any one of four placements. See "7E Effect Placement" on page 59. Effects 1 to 37 are single effects, 38 and 39 are serial effects, and 40 to 47 are parallel effects. The parallel type effects allow up to four independent effects simultaneously.



Effect parameters can be edited and stored with individual Programs, Combinations, and sequencer songs. Effect parameters for a Program should be edited in Program Edit mode, a Combination in Combination Edit mode, and for a song in Sequencer mode. In all modes the effect LCD screens are numbered 7A to 7G.

When you play a Combination, the individual effect settings for each Program in that Combination are ignored, and the effect settings for that Combination are used. Likewise, for sequencer songs, the individual Program effect settings are ignored and the effect settings for that particular song are used.

Effect Types

Effect No.	Effect
0	No Effect
1	Hall
2	Ensemble Hall
3	Concert Hall
4	Room
5	Large Room
6	Live Stage
7	Wet Plate
8	Dry Plate
9	Spring Reverb
10	Early Reflection 1
11	Early Reflection 2
12	Early Reflection 3
13	Stereo Delay
14	Cross Delay
15	Dual Mono Delay
16	Multi-Tap Delay 1
17	Multi-Tap Delay 2
18	Multi-Tap Delay 3
19	Chorus 1
20	Chorus 2
21	Quadrature Chorus
22	Crossover Chorus
23	Harmonic Chorus

Effect No.	Effect
24	Symphonic Ensemble
25	Flanger 1
26	Flanger 2
27	Crossover Flanger
28	Exciter
29	Enhancer
30	Distortion
31	Overdrive
32	Stereo Phaser 1
33	Stereo Phaser 2
34	Rotary Speaker
35	Auto Pan
36	Tremolo
37	Parametric EQ
38	Chorus-Delay
39	Flanger-Delay
40	Delay/Hall Reverb
41	Delay/Room Reverb
42	Delay/Chorus
43	Delay/Flanger
44	Delay/Distortion
45	Delay/Overdrive
46	Delay/Phaser
47	Delay/Rotary Speaker

7A Effect1 Setup

These parameters are used to set up Effect1.

7A EFFECT 1=01 >	7A Hall	<	7A Hall
Hall	OFF	DRY:EFF=75:25	Src:JS(+Y) I+10
7A-1		7A-2	7A-3

LCD	Parameter	Range	Description
7A-1	Effect Type (Effect1)	0-47	Select an effect type
	Switch	OFF, ON	Turn the effect on or off.
7A-2	Dry:Effect Balance (DRY:EFF)	DRY 99:1-1:99 FX	Dry signal only Dry:effect mix Effect signal only
7A-3	Dynamic Modulation Control Source (Src)	NONE	Dynamic modulation off
		JS(+Y)	Joystick +Y
		JS(-Y)	Joystick -Y
		AFTT	After Touch
		PEDAL1	Foot pedal1
		PEDAL2	Foot pedal2 (MIDI Controller No. 13)
		VDA EG	Sum of all 32 VDA EGs
		SLIDER	VALUE slider
		S+J(+)	VALUE slider & joystick +Y
		S+J(-)	VALUE slider & joystick -Y
		S+AFTT	VALUE slider & After Touch
		S+PDL1	VALUE slider & foot pedal1
		S+PDL2	VALUE slider & foot pedal2
		S+VDA	VALUE slider & VDA EG
	Dynamic Modulation Intensity (I)	-15...+15	Set the depth of dynamic modulation

7A-1 Effect type: each time a different effect is selected, parameters that you set for the previously selected effect are reset to their initial values. When effect 24:Symphonic Ensemble is selected for one processor, certain effects cannot be selected for the other processor. See “Symphonic Ensemble” on page 73.

Switch: is used to turn the effects processors on and off. Effects processors can also be turned on and off using a foot pedal that is connected to the ASSIGNABLE PEDAL/SW connector. In Global mode, set the ASSIGNABLE PEDAL/SW parameter to “Effect 1 on/off”. See “8B Assignable Pedal/SW Setup” on page 173.

By sending MIDI Controller 92 for Effect1, and MIDI Controller 94 for Effect2, effects can be switched on and off by a sequencer, or other MIDI device. Each time a Controller message is sent, the corresponding effect is switched on or off.

Note: The high and low EQ for the following effects is valid even when the effect is set to OFF: 13: Stereo Delay, 14: Cross Delay, 19: Chorus 1, 20: Chorus 2, 28: Exciter, 35: Autopan, 36: Tremolo. To bypass these effects completely select 0: No Effect.

7A-2 Dry:Effect balance: this parameter allows you to set the level balance between the dry signal and effected signal. A setting of DRY means no affected signal. A setting of FX means all effect signal.

7A-3 Dynamic modulation control source: allows you to adjust certain effect parameters, such as mix balance and modulation speed, while you play. This provides greater control for musical expression during a performance. The modulation source can be set to any one of seven controls, such as joystick and foot pedal, with up to 13 different settings available. You can control one effect parameter using dynamic modulation, but the modulation source and intensity can be set independently for Effect1 and Effect2. See “Effects Types & Parameters” on page 63.

The SLIDER and S+ dynamic modulation control sources refer to the VALUE slider. This slider can be used to control dynamic modulation in Program Play mode and Combination Play mode, so long as you are not performance editing (i.e., using the VALUE slider to edit parameters). To control dynamic modulation using a foot pedal, set Pedal Assign in Global mode to Effect Control. See “8B Assignable Pedal/SW Setup” on page 173. When a foot pedal that is connected to the

ASSIGNABLE PEDAL/SW connector is operated, MIDI Effect Control [Bn, 0C, vv] Controller 12 is output. This controls the effect whose dynamic modulation source is set to PEDAL1. MIDI Effect Control [Bn, 0D, vv] Controller 13 is transmitted when the dynamic modulation source is set to PEDAL2.

To control dynamic modulation via MIDI, set the MIDI Channel of the control source to that of the Global MIDI Channel. To control dynamic modulation using control data recorded on the sequencer, set the MIDI Channel of the track that contains the control data to that of the Global MIDI Channel.

Note: When performance editing in Program Play mode or Combination Play mode, the VALUE slider cannot be used to control dynamic modulation.

Dynamic Modulation Intensity: the dynamic modulation intensity can be set from -15 to +15. Positive values cause dynamic modulation to increase the value of the effect parameter being controlled. Negative values have the opposite effect.

7B Effect1 Parameters

Effect parameters are explained in detail from page 63 onwards.

7C Effect2 Setup

These parameters are used to set up Effect2. Operation is the same as for "7A Effect1 Setup" on page 58.

7D Effect2 Parameters

Effect parameters are explained in detail from page 63 onwards.

7E Effect Placement

7E PLACEMENT >	7E EFF1PANPOT <	7E E1/E2 LEVEL <
Serial	3= L 4= R	L=5 R=5 L=5 R=5
7E-1	7E-2	7E-3

LCD	Parameter	Range	Description
7E-1	Effect Placement	Serial (Serial) Parallel 1 (Parallel 1) Parallel 2 (Parallel 2) Parallel 3 (Parallel 3) Serial Sub (Serial Sub) Parallel Sub (Parallel Sub)	Effect routing configurations (Serial Sub and Parallel Sub X2 only)
7E-2	Panpot 3	OFF	No signal output
	Panpot 4	L 99:1-1:99 R	Signal is panned hard left Panned between L and R (50:50 pan center) Signal is panned hard right (this LCD screen appears when Serial, Parallel 1, or Parallel 2 is selected)
7E-3	Level 1L (L)	0-9	Set the output level of each effect when Parallel 3 is selected. (this LCD is available only when Parallel 3 placement is selected)
	Level 1R (R)		
	Level 2L (L)		
	Level 2R (R)		

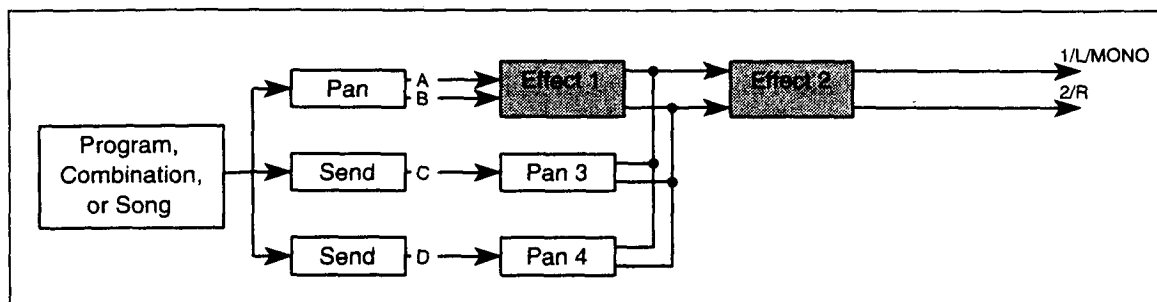
X2 effects processors can be used in any one of six placements X3 effects processors can be used in any one of four placements. Placements affect the way in which the four input buses (A, B, C, D) are routed through the effects.

The Panpot, Send C Level, and Send D Level parameters are set as part of an individual Program, Combination, or song. The Pan 3 and Pan 4 parameters are set in the Effect1 and Effect2 setup. If the Parallel 3 placement is selected, pan 3 and pan 4 are replaced by four independent level controls. When Serial Sub or Parallel Sub is selected on an X2, four outputs can be used

(1/L/Mono, 2/R, 3, 4). When a Serial or Parallel 1–3 placement is selected, two outputs can be used (1/L/Mono, 2/R). When a GM System On message is received, or the “8F GM Song Mode” function on page 154 is used, the following settings are made: Placement—Parallel3. Effect1—Hall. Effect2—Chorus.

When a Program is initialized in Program Edit mode, or a Combination is initialized in Combination Edit mode, the following effects settings are made: Placement—Serial. Effect1—No Effect. Effect2—No Effect.

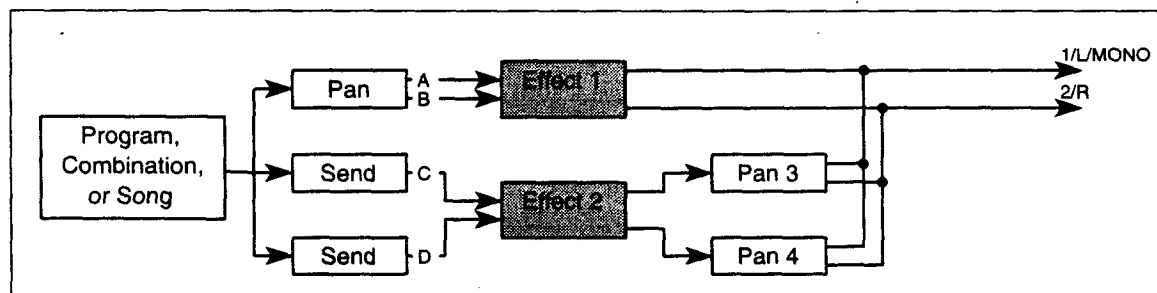
Serial Placement



With the Serial placement, buses A and B are sent to Effect1, Effect2, then output from 1/L/MONO and 2/R. Buses C and D are mixed with the output of Effect1, sent to Effect2, and then output.

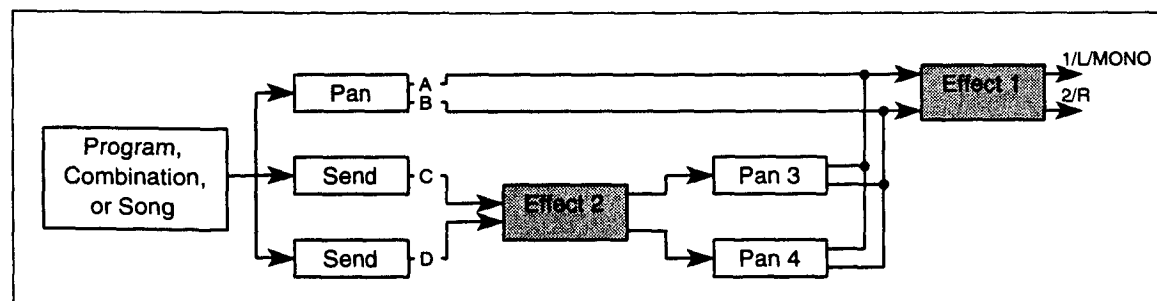
Buses C and D allow you to avoid applying Effect1 to a sound, or to apply Effect1 to a specific sound and then apply Effect2 to all sounds.

Parallel 1 Placement



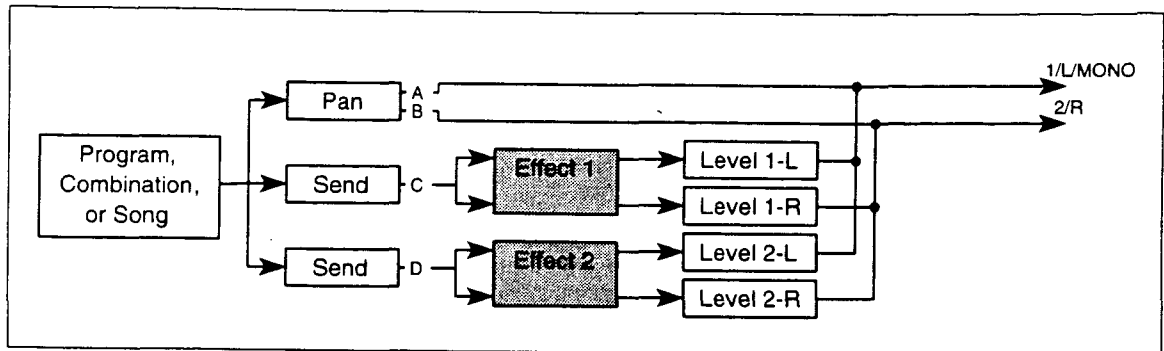
With the Parallel 1 placement, buses A and B are sent to Effect1, then output from 1/L/MONO and 2/R. Buses C and D are sent to Effect2, mixed with the output of Effect1, then output.

Parallel 2 Placement



With the Parallel 2 placement, buses A and B are sent to Effect1, then output from 1/L/MONO and 2/R. Buses C and D are sent to Effect2, mixed with the input to Effect1, then output.

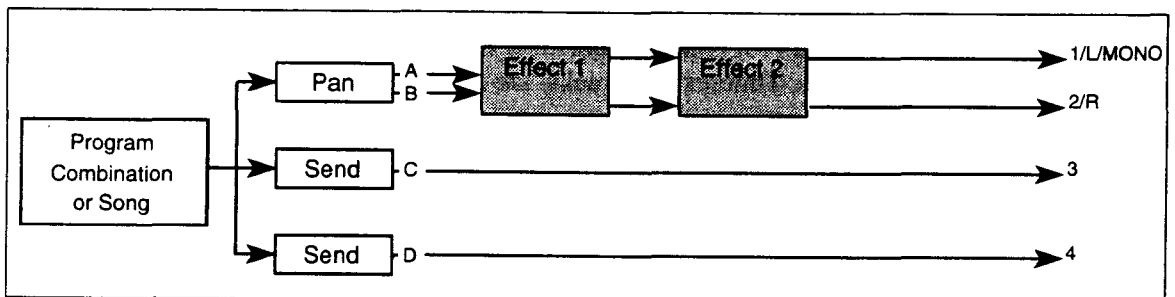
Parallel 3 Placement



With the Parallel 3 placement, buses A and B are sent straight to the outputs. Bus C signal is sent to Effect 1 and bus D signal is sent to Effect 2. The effect outputs, each with independent level control, are then mixed down to the 1/L/MONO and 2/R outputs. This placement works well when playing GM compatible songs.

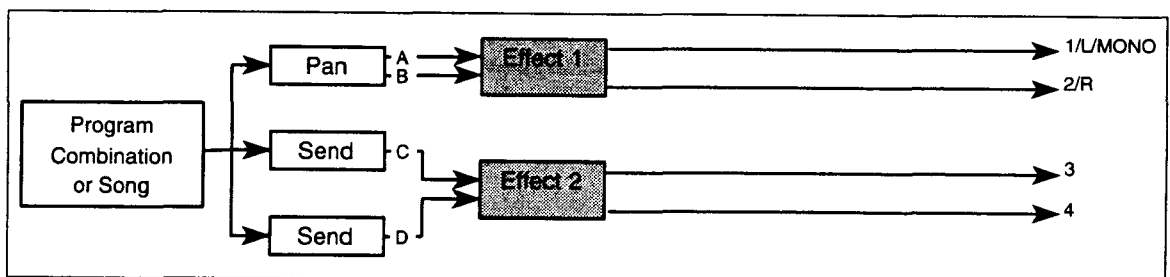
Note: For Serial, Parallel 1, and Parallel 2 placements, if Pan 3 or Pan 4 is set to off, signals sent to bus C and bus D are not output.

Serial Sub Placement (X2 only)



With the Serial Sub placement, buses A and B are fed to Effect 1 and Effect 2, then output from 1/L/MONO and 2/R. Buses C and D are sent straight to outputs 3 and 4. In this case, you can use buses C and D to output dry sounds for use with external effects.

Parallel Sub Placement (X2 only)



With the Parallel Sub placement, buses A and B are fed to Effect 1, then output from 1/L/MONO and 2/R. Buses C and D are fed to Effect 2, then output from 3 and 4.

Note: Outputs 3 and 4 are used only when the Serial Sub or Parallel Sub Placement is selected. You cannot monitor sends C and D using headphones.

7F Effects Copy

This function allows you to copy the effect parameter settings from a Program, Combination, or song to the currently selected Program, Combination, or song.

```
7F COPY EFF
PROG A00 OK?
```

7F-1

LCD	Parameter	Range		Description
7F-1	Effect Copy Source	PROG COMBI SONG		Select the effect copy source
	Source Number	Programs	A00-B99 C00-D99 G01-136	Select the source number
		Combinations	A00-B99 C00-D99	
		Songs	S10-S19 SC0-SD9	
OK to copy	OK?		Executes effect copy	

To copy effect parameters, select the effect copy source, the source number, position the cursor on OK?, then press the [▲/YES] button. The message "Are You Sure OK?" appears. Press the [▲/YES] button to continue, or the [▼/NO] button to cancel. The effect parameters are copied to the currently selected Program, Combination, or Song. Pan, Send C, and Send D settings, which are set for oscillators, Timbres, and tracks, are not copied.

7G Effect Copy/Swap

This function allows you to copy or swap effect parameter settings between Effect1 and Effect2.

```
7G SWAP FX1-2
FX1↔FX2 OK?
```

7G-1

LCD	Parameter	Range	Description
7G-1	Copy/Swap direction	FX1↔FX2 FX1→FX2 FX1←FX2	Swap FX1 with FX2 Copy FX1 to FX2 Copy FX2 to FX1
	OK to copy	OK?	Executes effect copy/swap

To copy/swap effect parameters, set the copy/swap direction, position the cursor on OK?, then press the [▲/YES] button. The message "Are You Sure OK?" appears. Press the [▲/YES] button to continue, or the [▼/NO] button to cancel.

Effects Types & Parameters

Different parameters are available for different effects. Effect 0 (No Effect) through effect 47 (Delay/Rotary Speaker) can be selected for Effect1 and Effect2. Effect1 LCD screens are numbered 7A through 7B. Effect2 LCD screens are numbered 7C through 7D. Effect1 LCD screen numbers are used in this *Reference Guide*.

No Effect

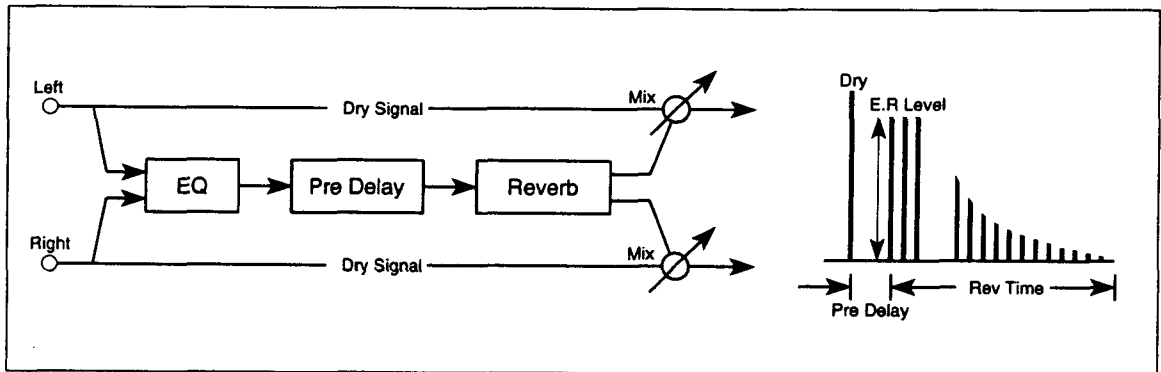
0: No Effect

When NO EFFECT is selected, the effect processors are bypassed.

Effects can be turned off using "7A Effect1 Setup" and "7C Effect2 Setup". However, for some effects, the high and low EQ are still active. Selecting 0:No Effect allows you to bypass these effects completely.

Reverb

These effects simulate reverberant acoustics, adding ambience to the sound.



1: Hall

This effect simulates the reverb characteristics and natural ambience of a medium size hall.

2: Ensemble Hall

This effect simulates the reverb characteristics and natural ambience of an ensemble hall. Ideal for string and brass ensembles.

3: Concert Hall

This effect simulates the reverb characteristics and natural ambience of a large hall with pronounced early reflections.

4: Room

This effect simulates the reverb characteristics and natural ambience of a small room.

5: Large Room

This effect simulates the reverb characteristics and natural ambience of a large room with pronounced reverb density. Reverb time settings of about 0.5 seconds produce an effect similar to gated reverb.

6: Live Stage

This effect simulates the reverb characteristics and natural ambience of a large, live-performance space.

7: Wet Plate

This effect simulates the reverb characteristics of a steel-plate reverb, with pronounced density.

8: Dry Plate

This effect simulates the reverb characteristics of a steel-plate reverb, with a light density.

9: Spring Reverb

This effect simulates the reverb characteristics of a spring reverb.

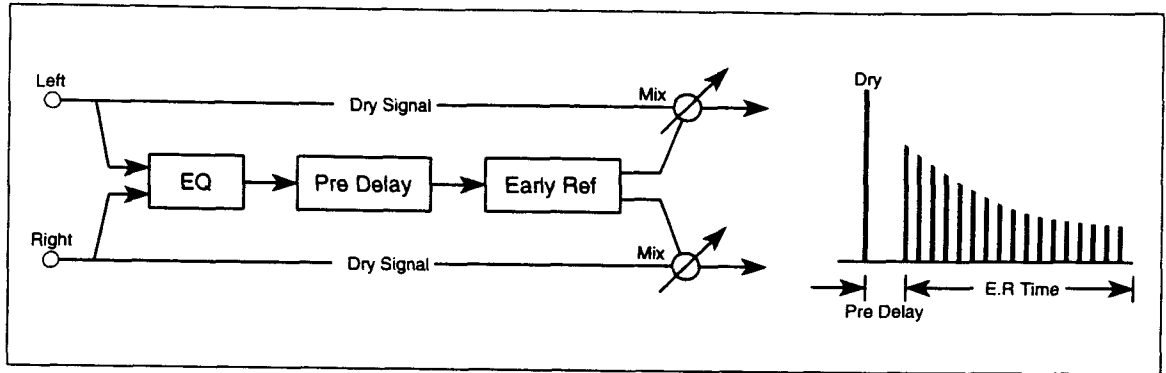
7B Hall Time3.2 H.Dmp30	>	7B Hall P.Dly060ms E.R62	<>	7B Hall EQ.L 04dB H+00dB	<
7B-1		7B-2		7B-3	

LCD	Parameter	Range	Description
7B-1	Reverb Time (Time)	0.2–9.9 sec 0.2–4.9 sec 00–99	The time over which the reverb effect will last Hall type Room type Plate/spring type
	High Damp (H.Dmp)	0–99%	High frequency decay 0 = bright reverb 99 = dark reverb
7B-2	Pre Delay (P.Dly)	0–200 ms	The delay between the original sound and the early reflections
	Early Reflection Level (E.R)	0–99 1–10	The level of the early reflections Hall/Room type Plate/spring type
7B-3	EQ Low (EQ.L)	–12...+12 dB	Low EQ cut and boost
	EQ High (H)	–12...+12 dB	High EQ cut and boost

For effects 1 to 9, dynamic modulation (7A–3) can be used to control the DRY:EFF balance.

Early Reflection

The Early Reflection effects create the early reflections that are an important element in determining the qualities of an acoustic environment. Using the Early Reflection Time parameter you can create a variety of effects, such as sound thickening and echo-like reflections.



10: Early Reflection 1

Early reverb reflections are a crucial element of naturally occurring reverb. They transmit details such as room size, distance, acoustic damping, etc. This effect emphasizes the low frequency range, and is ideal for percussive sounds such as drums.

11: Early Reflection 2

This effect is similar to Early Reflection 1, although, the level of the early reflections change over time in a different way.

12: Early Reflection 3

This effect applies a reverse envelope to the early reflections. This produces an effect that is similar to playing a tape backwards, and it is ideally to sounds that have a fast attack such as crash cymbals.

7B EarlyRef1 E.R Time=220ms	>	7B EarlyRef1 <> Pre Delay= 015ms	<	7B EarlyRef1 < EQ.L+03dB H+05dB
7B-1		7B-2		7B-3

LCD	Parameter	Range	Description
7B-1	Early Reflection Time (E.R Time)	100-800 ms	Early reflection time in 10 ms steps
7B-2	Pre Delay (Pre Delay)	0-200 ms	The delay between the original sound and the early reflections
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effects 10 to 12, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

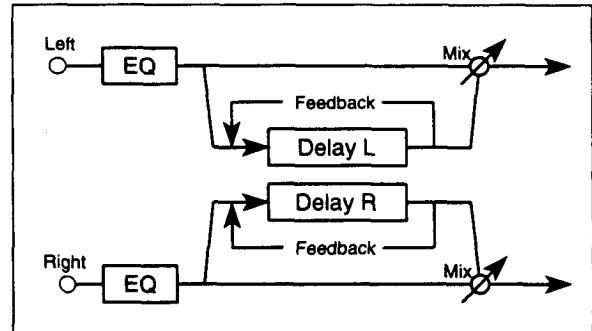
Stereo Delay

These effects create stereo delay patterns in which you can set the left and right delay times independently. Using the High Damp parameter, you can make delays decay in a natural way.

13: Stereo Delay

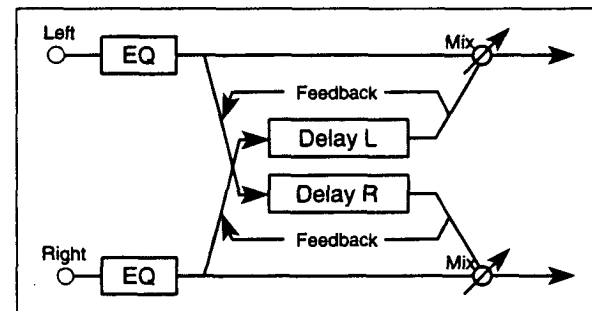
This is a stereo delay effect with feedback. The delay time can be set independently for the left and right channels.

The high damp parameter can be used to produce a more natural echo effect by gradually attenuating the high frequencies of successive delay repeats.



14: Cross Delay

This is a stereo delay effect with independent delay parameters for the left and right channels. The delay outputs are crossed over, and each delay receives the other delay's feedback signal. Thus, the delay repeats appear to move between the left and right outputs.



7B StereoDly >	7B StereoDly <>	7B StereoDly <
D.TimeL=250 R260	FB+40 H.Dmp30	EQ.L+00dB H+00dB
7B-1	7B-2	7B-3

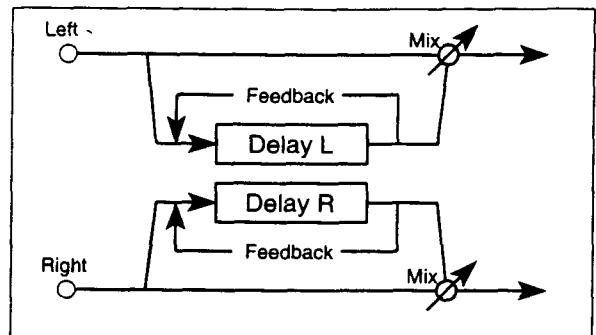
LCD	Parameter	Range	Description
7B-1	Delay Time Left (D.Time L)	0-500 ms	Delay time for the left channel
	Delay Time Right (R)	0-500 ms	Delay time for the right channel
7B-2	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase
	High Damp (H.Dmp)	0-99%	High frequency decay 0 = bright delay 99 = dark delay
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effects 13 and 14, dynamic modulation (7A-3) can be used to control the DRY:EFF balance. The EQ part of these effects is active even when the Effect is switched off (7A-1). To bypass these effects completely, select 0:No Effect.

Dual Mono Delay

15: Dual Mono Delay

This effect consists of two mono delays with independent delay time, feedback, and high damp parameters for each channel.



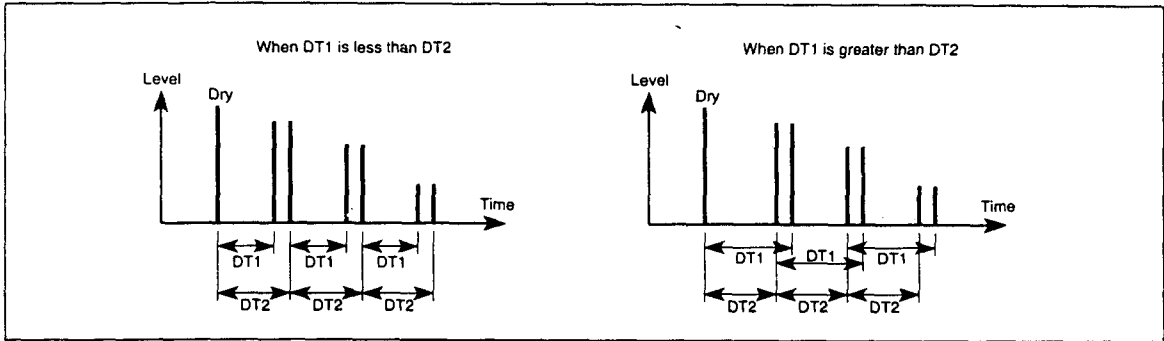
7B D.M D19(L) >	7B D.M D19(L) <>	7B D.M D19(R) <>	7B D.M D19(R) <
D.Time=250ms	FB+50 H.Dmp=10	D.Time=250ms	FB+50 H.Dmp=10
7B-1	7B-2	7B-3	7B-4

LCD	Parameter	Range	Description
7B-1	Delay Time Left (D.Time)	0-500 ms	Delay time for the left channel
7B-2	Feedback Left (FB)	-99...+99%	The amount of delay signal that is fed back into the left channel effect. Minus values invert the feedback signal phase
	High Damp Left (H.Dmp)	0-99%	High frequency damping for the left channel
7B-3	Delay Time Right (D.Time)	0-500 ms	Delay time for the right channel
7B-4	Feedback Right (FB)	-99...+99%	The amount of delay signal that is fed back into the left channel effect. Minus values invert the feedback signal phase
	High Damp Right (H.Dmp)	0-99%	High frequency damping for the right channel

For effect 15, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

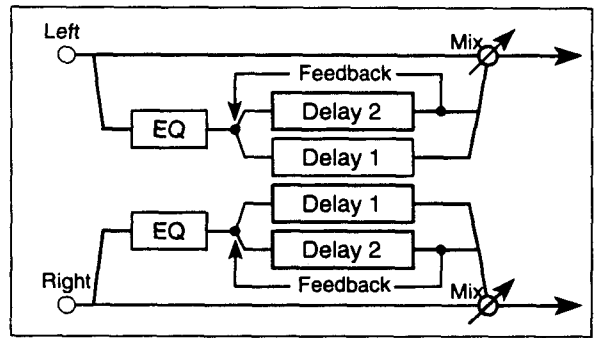
Multi-Tap Delay

In these effects, an equalizer is applied to each effect input, then the signals are fed to two independent series-connected delays. The output of one delay is fed back to the input.



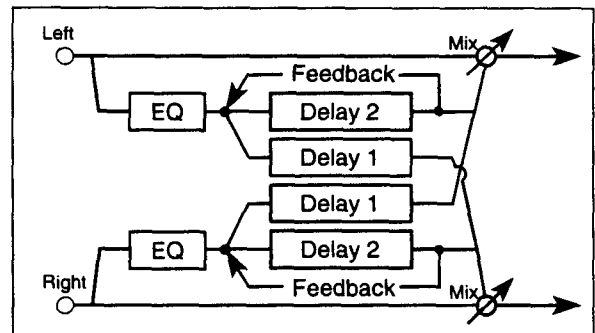
16: Multi-Tap Delay 1

This is a two-channel multi-repeat delay. It consists of two parallel delays for each channel. The delay time for each delay can be set independently. The output of delay 2 is fed back to the inputs of delay 1 and delay 2.



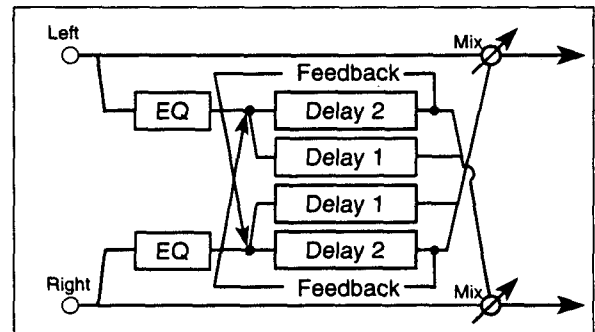
17: Multi-Tap Delay 2

This is a two-channel multi-repeat delay with cross panning.



18: Multi-Tap Delay 3

This is a two-channel multi-repeat delay with crossed feedback.



7B M.Tap01y1 D1T300 D2T400	> 7B M.Tap01y1 FB+50	<> 7B M.Tap01y1 EQ.L+00dB H+00dB	<
7B-1	7B-2	7B-3	

LCD	Parameter	Range	Description
7B-1	Delay Time 1 (D1T)	0-500 ms	Delay time for delay 1
	Delay Time 2 (D2T)	0-500 ms	Delay time for delay 2
7B-2	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

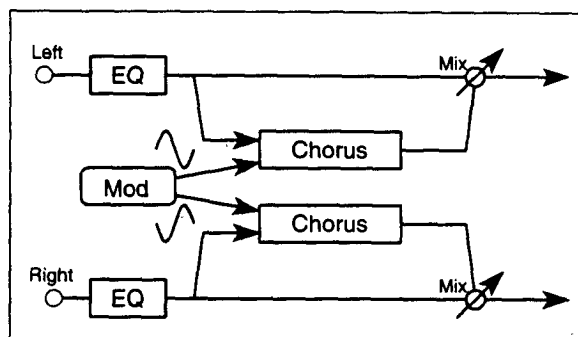
For effects 16, 17, and 18, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

Chorus

These are stereo-type effects that use two chorus units. They're an effective way to add spaciousness and depth to any type of sound: piano, strings, brass, etc.

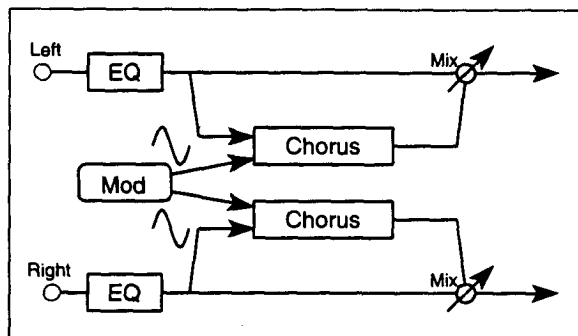
19: Chorus 1

In this chorus effect, the left channel modulation signal is out of phase with the right channel modulation signal. This produces a wide stereo chorus effect.



20: Chorus 2

In this chorus effect, left and right channel modulation signals are in phase.



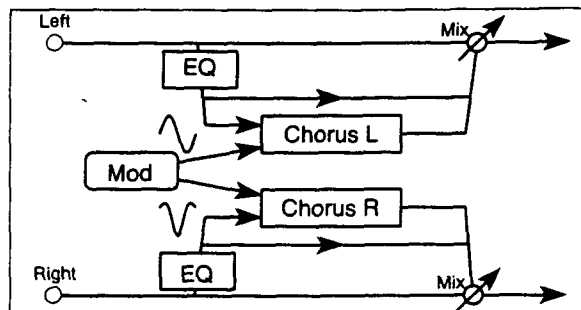
7B Chorus 1 D.Time 010ms TRI	7B Chorus 1 Mod60 M.SP0.30Hz	7B Chorus 1 EQ.L+00dB H+00dB
7B-1	7B-2	7B-3

LCD	Parameter	Range	Description
7B-1	Delay Time (D.Time)	0-200 ms	Delay time
	Mod Waveform	Sine (SIN) Triangle (TRI)	Modulation waveform type
7B-2	Mod Depth (Mod)	0-99	Modulation intensity
	Mod Speed (M.SP)	0.03-30 Hz	Modulation speed
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effects 19 and 20, dynamic modulation (7A-3) can be used to control the DRY:EFF balance. The EQ part of these effects is active even when the Effect is switched off (7A-1). To bypass these effects completely, select 0:No Effect.

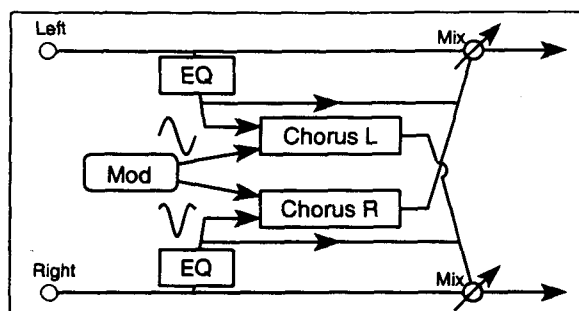
21: Quadrature Chorus

The modulation signals fed to each channel of this stereo chorus effect are 90 degrees out of phase with each other.



22: Crossover Chorus

The modulation signals fed to each channel of this stereo chorus effect are 90 degrees out of phase with each other. The chorused signals are mixed with the other channels output.



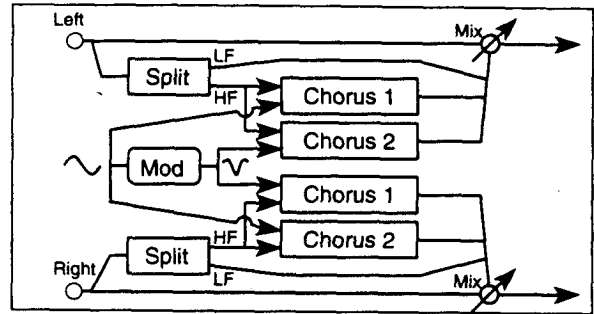
7B Quad. Cho D.TimeL=011 R023	>	7B Quad. Cho Mod50 ModSP=33	<	7B Quad. Cho ModShape=T+00	<	7B Quad. Cho EQ.L+00dB H+00dB
7B-1		7B-2		7B-3		7B-4

LCD	Parameter	Range	Description
7B-1	Delay Time L (D.TimeL)	0-250 ms	Left channel delay time
	Delay Time R (R)	0-250 ms	Right channel delay time
7B-2	Mod Depth (Mod)	0-99	Modulation depth
	Mod Speed (ModSP)	1-99	Modulation speed
7B-3	Mod Shape (ModShape)	T+10...T-10, S-10...S+10	Modulation waveform shape. T-Triangle, S-Sine. The range from +10 to -10 effects the waveform symmetry
7B-4	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effects 21 and 22, dynamic modulation (7A-3) can be used to control the Mod Speed.

23: Harmonic Chorus

This effect splits the signal into two bands: HF (high frequency) and LF (low frequency). The HF band is then fed to the quadrature type chorus, and the LF band is fed directly to the output. This effect is useful for low frequency instruments such as bass.



7B Harmo. Cho D1T004 D2T012	> 7B Harmo. Cho <> Mod99 ModSP=35	< 7B Harmo. Cho < F.Split Point=01
7B-1	7B-2	7B-3

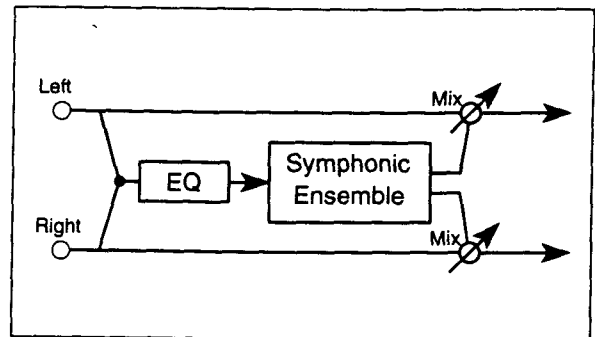
LCD	Parameter	Range	Description
7B-1	Delay Time 1 (D1T)	0-500 ms	Channel 1 delay time
	Delay Time 2 (D2T)	0-500 ms	Channel 2 delay time
7B-2	Mod Depth (Mod)	0-99	Modulation depth
	Mod Speed (ModSP)	1-99	Modulation speed
7B-3	Frequency Split Point (F.Split Point)	0-18	The frequency at which the input signal is split into HF and LF bands

For effect 23, dynamic modulation (7A-3) can be used to control the Mod Speed.

Symphonic Ensemble

24: Symphonic Ensemble

This effect is basically a multiple chorus type effect. It produces a rich, thickening effect, ideal for strings.



7B Symf. Ens. >	7B Symf. Ens. <
Mod80	EQ.L+00dB H+00dB
7B-1	7B-2

LCD	Parameter	Range	Description
7B-1	Mod Depth (Mod)	0-99	Modulation depth
7B-2	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effect 24, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

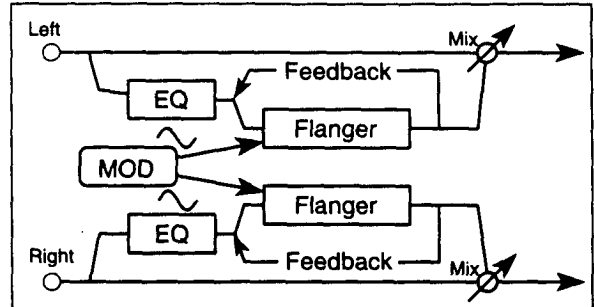
Note: When this effect is selected, the following effect types cannot be selected for the other effect: Choruses 19-23, Symphonic Ensemble 24, Flangers 25-27, Phasers 32-33, Rotary Speaker 34, Tremolos 35-36, Chorus Flanger/Delay 38-39, Delay/Chorus 42, Delay/Flanger 43, Delay/Phaser 46, and Delay/Rotary Speaker 47.

Flanger

These effects add feedback to a chorus effect. When used on sounds that contain a lot of high-frequency energy, such as cymbals, they not only create modulation effects, they add a sense of pitch to non-pitched sounds, too.

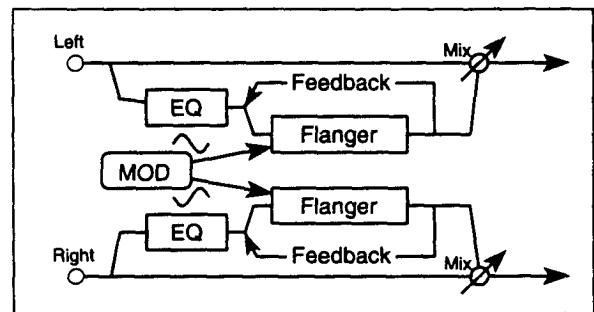
25: Flanger 1

In this effect, inphase modulation is fed to both flanger channels.



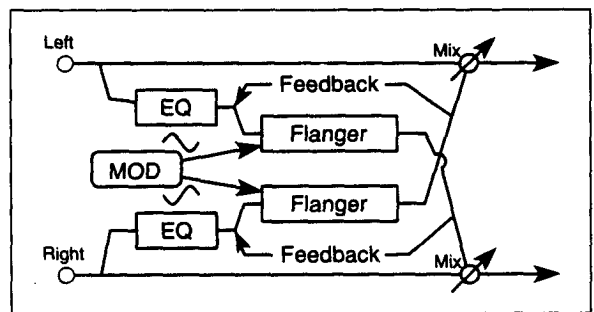
26: Flanger 2

In this effect, the left channel modulation signal is in phase and the right channel modulation signal is out of phase. This produces a wide, stereo flange effect.



27: Crossover Flanger

In this effect, two flangers are modulated out of phase. The flanged output signals are mixed with the other channels output.



7B Flanger1 D.Time005 Res+85	7B Flanger1 Mod99 ModSP=20	7B Flanger1 EQ.L+00dB H+00dB
7B-1	7B-2	7B-3

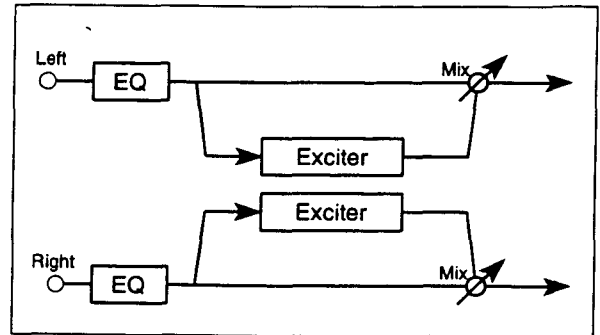
LCD	Parameter	Range	Description
7B-1	Delay Time (D.Time)	0-200 ms	Delay time
	Resonance (Res)	-99...+99	Amount of output signal fed back to the input (feedback)
7B-2	Mod Depth (Mod)	0-99	Modulation depth
	Mod Speed (ModSP)	1-99	Modulation speed
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effects 25 to 27, dynamic modulation (7A-3) can be used to control the Mod Speed.

Exciter

28: Exciter

This effect increases the clarity of a sound and gives it greater definition.



7B Exciter Blend=+50	>	7B Exciter Emph Point=05	<>	7B Exciter EQ.L+04dB H+00dB	<
7B-1		7B-2		7B-3	

LCD	Parameter	Range	Description
7B-1	Blend (Blend)	-99...+99	Mix of dry and effected signal
7B-2	Emphatic Point (Emph Point)	1-10	The central frequency around which sounds are excited
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

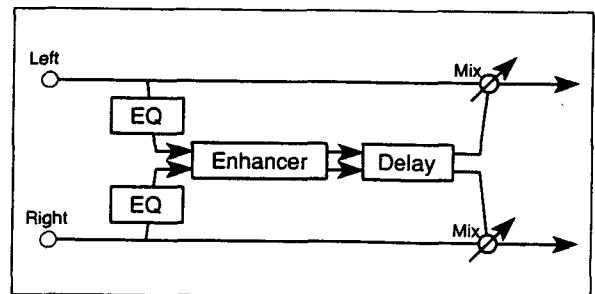
For effect 28, dynamic modulation (7A-3) can be used to control the DRY:EFF mix level.

The EQ sections of this effect are active even when the effect is switched OFF. To bypass this effect completely, select 0:No Effect.

Enhancer

29: Enhancer

This is a two-channel enhancer that includes a delay to give a sound more spaciousness. An enhancer makes the sound clearer and more defined, giving the sound more presence and bringing it up front in the mix.



7B Enhancer Harm Density=80	>	7B Enhancer Hot Spot=01	<>	7B Enhancer S.W=50 D.Time=25	<>	7B Enhancer EQ.L+01dB H+01dB	<
7B-1		7B-2		7B-3		7B-4	

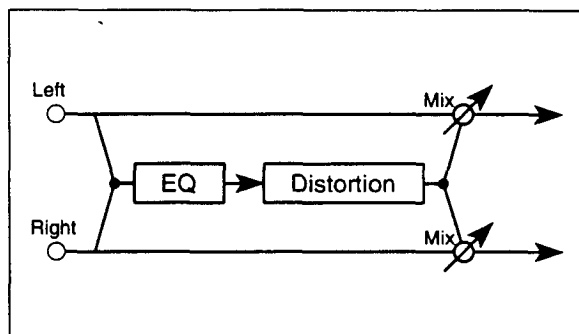
LCD	Parameter	Range	Description
7B-1	Harmonic Density	1-99	Level of the enhanced signal
7B-2	Hot Spot	1-20	The central frequency around which sounds are enhanced
7B-3	Stereo Width (S.W)	0-99	The width of the stereo image that is opened up by the delay
	Delay Time (D.Time)	1-99	Delay time
7B-4	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effect 29, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

Distortion

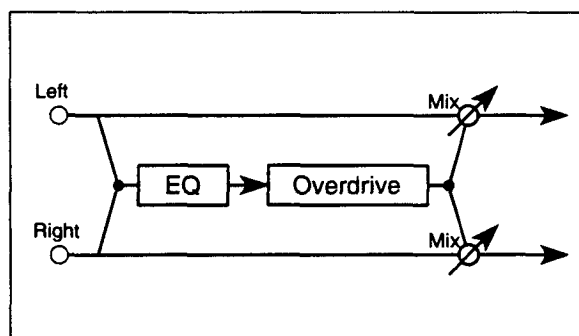
30: Distortion

This effect can provide everything from subtle distortion through to mega-power distortion—ideal for ripping solos. The Hot Spot and Resonance parameters allow you to tune in for a wah type effect, and the Hot Spot parameter can be controlled in real time using dynamic modulation.



31: Overdrive

This effect produces a smooth overdrive. As with the previous distortion effect, dynamic modulation allows real-time control of the wah filter's Hot Spot parameter.



7B Dist Drive=111 Res=80	7B Dist H.Spot05 Level10	7B Dist EQ.L+02dB H 12dB
-----------------------------	-----------------------------	-----------------------------

7B-1

7B-2

7B-3

LCD	Parameter	Range	Description
7B-1	Drive (Drive)	1-111	Distortion/Overdrive level
	Resonance (Res)	0-99	Gain of the resonant wah filter
7B-2	Hot Spot (H.Spot)	0-99	Wah filter centre frequency
	Out Level (Level)	0-99	Distortion output level
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

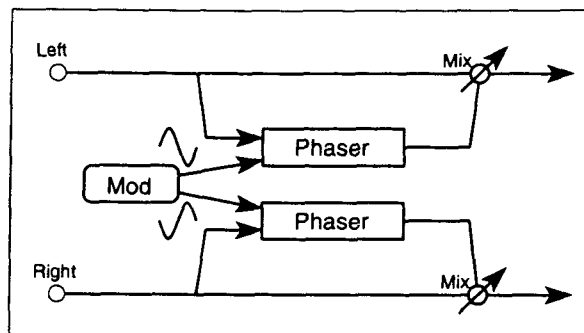
For effects 30 and 31, dynamic modulation (7A-3) can be used to control the Hot Spot parameter. This is useful for creating a wah-wah type effect.

Phaser

These are two-channel stereo phase shifters. Using delay and phase changes, they produce a modulation effect that is clearer than chorus or flanger. These effects are especially suitable for electric piano and guitar. Chorus and flanger produce their effects by modulating the delay time. However, phasers, modulate the phase of the input signal, creating an effect that has a different character to that of chorus or flanger.

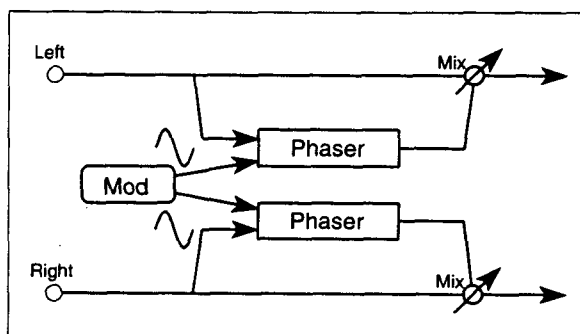
32: Stereo Phaser 1

In Phaser 1, the left channel modulation signal is in phase and the right channel modulation signal is out of phase. This produces a wide stereo phaser effect.



33: Stereo Phaser 2

This stereo effect contains two phasers. In-phase modulation is fed to both channels.



7B Phaser 1 Manual=99	> 7B Phaser 1 Mod60 M.SP0.69Hz	<> 7B Phaser 1 FB+75 SIN	<
7B-1	7B-2	7B-3	

LCD	Parameter	Range	Description
7B-1	Manual (Manual)	0-99	The central frequency around which phase shifting is concentrated
7B-2	Mod Depth (Mod)	0-99	Modulation depth
	Mod Speed (M.SPO.)	0.03-30 Hz	Modulation speed
7B-3	Feedback (FB)	-99...+99%	The amount of phased signal that is fed back into the effect. Minus values invert the feedback signal phase
	Mod Waveform	Sine (SIN) Triangle (TRI)	Modulation waveform

For effects 32 and 33, dynamic modulation (7A-3) can be used to control the Mod Speed.

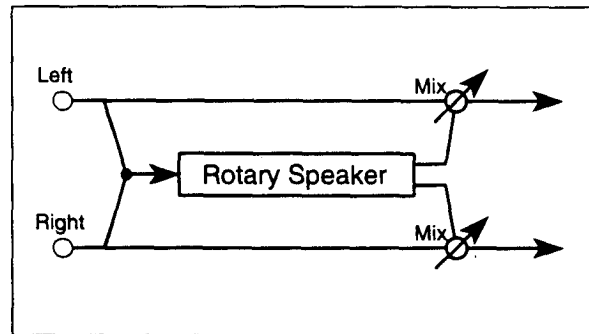
Rotary Speaker

This effect simulates the rotary speaker effect that is popular for organs.

34: Rotary Speaker

The effect is popular with organ type sounds. The rotation speed continuously cycles between the two speed settings at a rate determined by the Acceleration parameter.

Dynamic modulation can be used to switch from slow to fast speed. The rotor speed will change at a rate specified by the Acceleration parameter regardless of how rapidly you move the dynamic modulation controller.



7B Rot.Spk Vibrato Depth=09	>	7B Rot.Spk Acceleration=04	<>	7B Rot.Spk Speed S=25 F=70	<
7B-1		7B-2		7B-3	

LCD	Parameter	Range	Description
7B-1	Vibrato Depth (Vibrato Depth)	0-15	Effect depth
7B-2	Acceleration (Acceleration)	1-15	Time taken to change from one speed to the other
7B-3	Slow Speed (S)	1-99	Slow rotation speed
	Fast Speed (F)	1-99	Fast rotation speed

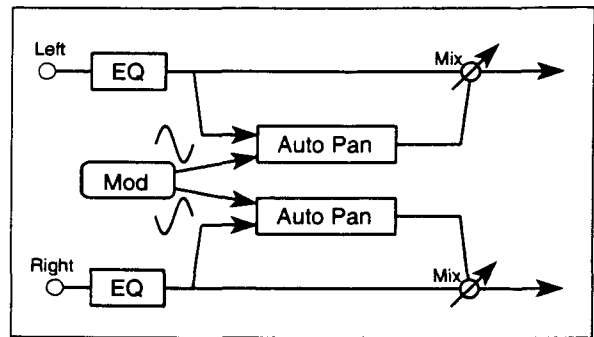
For effect 34, dynamic modulation (7A-3) can be used to switch from slow to fast speed.

Tremolo

This effect cyclically varies the volume.

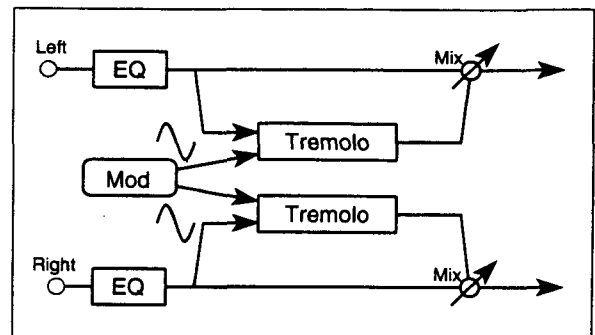
35: Auto Pan

This effect pans the signal continuously across the stereo image. The speed of panning (Mod Speed) can be set relative to song tempo, or left to produce a natural drift across the stereo image.



36: Tremolo

The tremolo effect modulates the signal amplitude to produce regular variations in volume level.



7B Auto Pan > SIN ModShape+99	7B Auto Pan <> Mod80 M.SP1.59Hz	7B Auto Pan < EQ.L+00dB H+00dB
7B-1	7B-2	7B-3

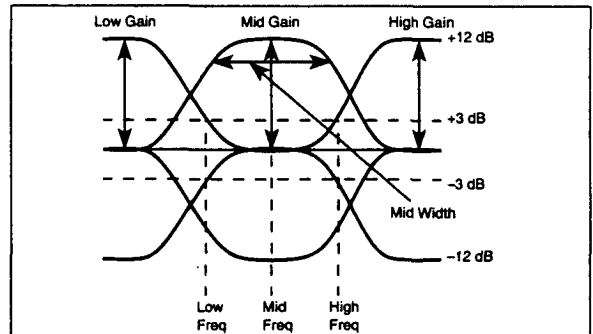
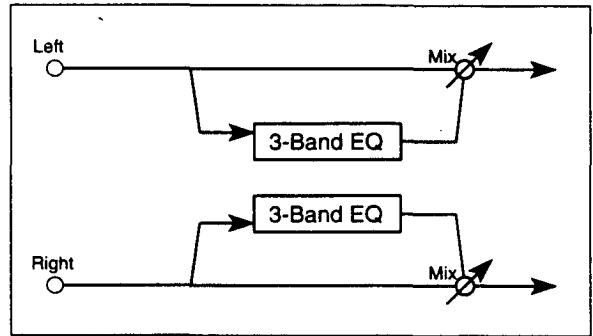
LCD	Parameter	Range	Description
7B-1	Mod Waveform	Sine (SIN) Triangle (TRI)	Modulation waveform
	Mod Shape (Mod Shape)	-99...+99	
7B-2	Mod Depth (Mod)	0-99	Modulation depth
	Mod Speed (M.SP)	0.03-30 Hz	Modulation speed
7B-3	EQ Low (EQ.L)	-12...+12 dB	Low EQ cut and boost
	EQ High (H)	-12...+12 dB	High EQ cut and boost

For effects 35 and 36, dynamic modulation (7A-3) can be used to control the DRY:EFF balance. The EQ sections of this effect are active even when the effect is switched OFF. To bypass this effect completely, select 0:No Effect.

Parametric EQ

37: Parametric EQ

This is a 3-band parametric equalizer, with independent gain and frequency controls for each band. The width of the mid-frequency band is variable.



7B Para. EQ >	7B Para. EQ <>	7B Para. EQ <>	7B Para. EQ <
LowFrq12 Gain+12	MidFrq08 Gain+12	MidWidth=50	Hi Frq20 Gain+12
7B-1	7B-2	7B-3	7B-4

LCD	Parameter	Range	Description
7B-1	Low Freq (LowFrq)	0-29	Low cutoff frequency
	Low Gain (Gain)	-12...+12 dB	Low EQ cut and boost
7B-2	Mid Freq (MidFrq)	0-99	Mid center frequency
	Mid Gain (Gain)	-12...+12 dB	Mid EQ cut and boost
7B-3	Mid Width (MidWidth)	0-99	Mid band width
7B-4	High Freq (Hi Frq)	0-29	High cutoff frequency
	High Gain (Gain)	-12...+12 dB	High EQ cut and boost

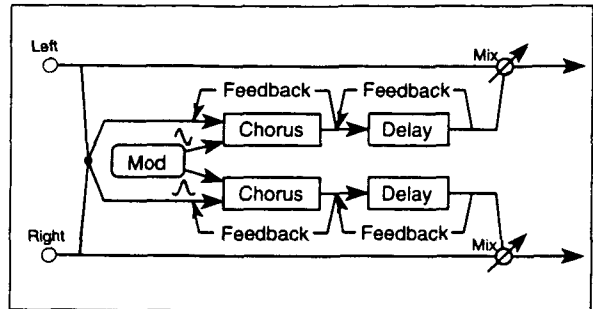
For effect 37, dynamic modulation (7A-3) can be used to control the Mid Freq parameter. This is useful for creating a wah type effect.

Combination Effects: Serial

Effects 38 and 39 use mono input–stereo output chorus/flangers in series with stereo delays.

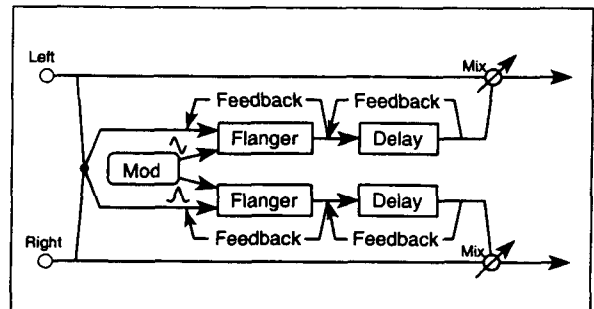
38: Chorus–Delay

This effect consists of a chorus and delay in series. The input signals are summed, then fed to two chorus units. The modulation signals fed to each chorus are 90 degrees out of phase with each other. Feedback parameters are available for both chorus and delay.



39: Flanger–Delay

This effect consists of a flanger and delay in series. The input signals are summed, then fed to two flanger units. The modulation signals fed to each flanger are 90 degrees out of phase with each other. Feedback parameters are available for both flanger and delay.



7B Chor-D1y >	7B Chor-D1y <>	7B Chor-D1y <
Cho.DT11ms FB+10	Cho.Mod50 M.SP30	D1y.DT110 FB-10
7B-1	7B-2	7B-3

Chorus, Flanger

LCD	Parameter	Range	Description
7B-1	Delay Time (Cho.DT)	0–50 ms	Chorus/Flanger delay time
	Feedback (FB)	–99...+99%	The amount of effected signal that is fed back into the effect. Minus values invert the feedback signal phase
7B-2	Mod Depth (Cho.Mod)	0–99	Modulation depth
	Mod Speed (M.SP)	1–99	Modulation speed

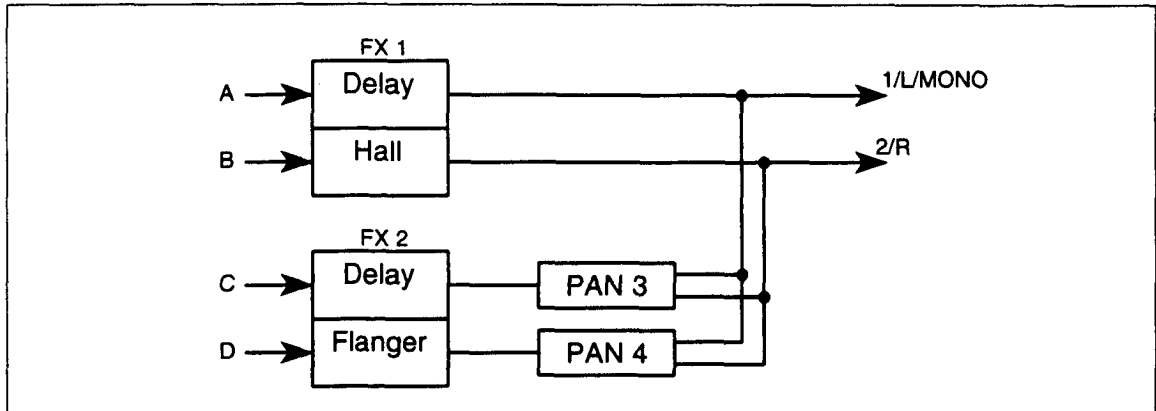
Delay

LCD	Parameter	Range	Description
7B-3	Delay Time (Dly.DT)	0–450 ms	Delay time (set in 2 ms steps)
	Delay Feedback (FB)	–99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase

For effects 38 and 39, dynamic modulation (7A–3) can be used to control the DRY:EFF balance.

Combined Effects: Parallel

Effects 40 to 47 are arranged in parallel. This means that two signals can be fed independently to two separate effects. For Example, with effect 40 (Delay/Hall Reverb), the left channel feeds a delay, while the right channel feeds a hall reverb.

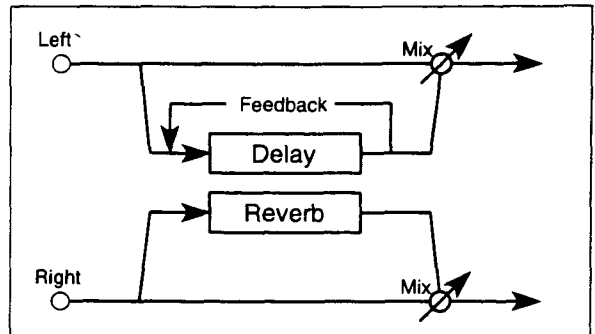


For details about the individual effects used in these combined effects, refer to the descriptions for effects 1 to 34.

Mono Delay/Reverb

40: Delay/Hall Reverb

This effect consists of two independent effects: delay on the left channel and hall type reverb on the right.



41: Delay/Room Reverb

This effect consists of two independent effects: delay on the left channel and room type reverb on the right.

7B Delay(L) Time250ms FB+50	7B Delay(L) H.Dmp10	7B Hall(R) Time3.5s H.Dmp40	7B Delay(R) P.Dly055ms
7B-1	7B-2	7B-3	7B-4

Delay

LCD	Parameter	Range	Description
7B-1	Delay Time (Time)	0-500 ms	Delay time
	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase
7B-2	High Damp (H.Dmp)	0-99%	High frequency decay

Hall, Room

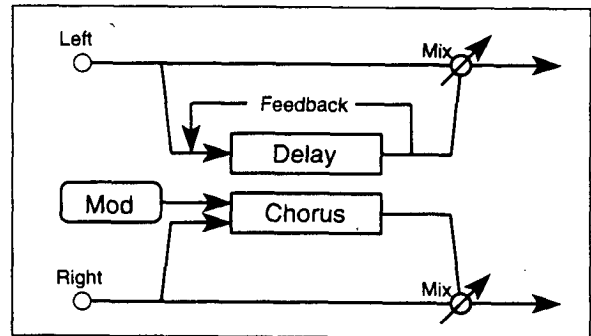
LCD	Parameter	Range	Description
7B-3	Reverb Time (Time)	0.2-9.9 sec (Hall)	The time over which the reverb effect will last
		0.2-4.9 sec (Room)	
	High Damp (H.Dmp)	0-99%	High frequency decay 0 = bright reverb 99 = dark reverb
7B-4	Pre Delay (P.Dly)	0-150 ms	The delay between the original sound and the early reflections

For effects 40 and 41, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

Mono Delay/Modulated Delay

42: Delay/Chorus

This effect consists of two independent effects: delay on the left channel and chorus on the right.



7B Delay(L) > Time250ms FB+50	7B Delay(L) <> H.Dmp10	7B Chorus(R) <> Mod60 M.SP0.30Hz	7B Chorus(R) < TRI
7B-1	7B-2	7B-3	7B-4

Delay

LCD	Parameter	Range	Description
7B-1	Delay Time (Time)	0-500 ms	Delay time
	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase
7B-2	High Damp (H.Dmp)	0-99%	High frequency decay

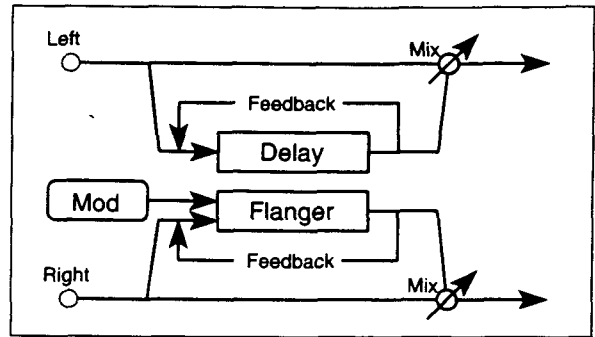
Chorus

LCD	Parameter	Range	Description
7B-3	Mod Depth (Mod)	0-99%	Modulation depth
	Mod Speed (M.SP)	0.03-30 Hz	Modulation speed
7B-4	Mod Waveform	Sine (SIN) Triangle (TRI)	Modulation waveform

For effect 42, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

43: Delay/Flanger

This effect consists of two effects: delay on the left channel and flanger on the right.



7B Delay(L) Time250ms FB+50	>	7B Delay(L) H.Dmp10	<	7B Flanger(R) Mod70 M.SP0.18Hz	<	7B Flanger(R) FB-75
7B-1		7B-2		7B-3		7B-4

Delay

LCD	Parameter	Range	Description
7B-1	Delay Time (Time)	0-500 ms	Delay time
	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase
7B-2	High Damp (H.Dmp)	0-99%	High frequency decay

Flanger

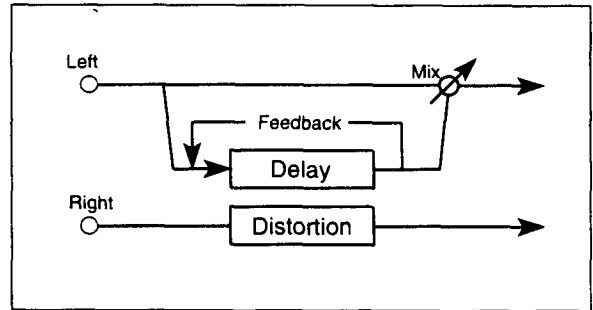
LCD	Parameter	Range	Description
7B-3	Mod Depth (Mod)	0-99%	Modulation depth
	Mod Speed (M.SP)	0.03-30 Hz	Modulation speed
7B-4	Feedback (FB)	-99...+99%	The amount of effected signal that is fed back into the effect. Minus values invert the feedback signal phase

For effect 43, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

Mono Delay/Distortion, Overdrive

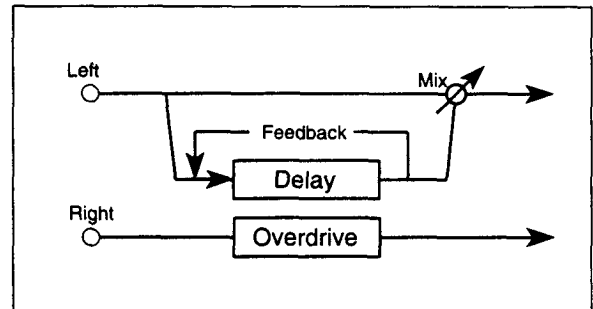
44: Delay/Distortion

This effect consists of two effects: delay on the left channel and distortion on the right.



45: Delay/Overdrive

This effect consists of two effects: delay on the left channel and overdrive on the right.



7B Delay(L) Time250ms FB+40	>	7B Dist(R) Drive=111 Res=75	<>	7B Dist(R) H.Spot50 Level05	<
7B-1		7B-2		7B-3	

Delay

LCD	Parameter	Range	Description
7B-1	Delay Time (Time)	0-500 ms	Delay time
	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase

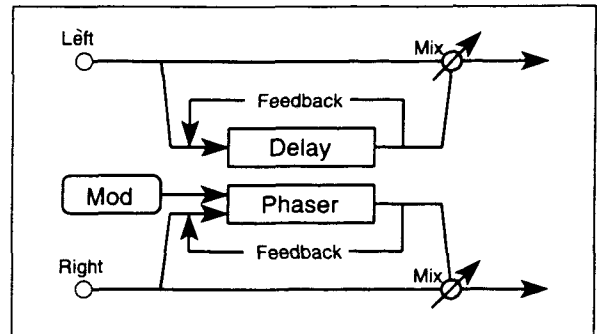
Distortion, Overdrive

LCD	Parameter	Range	Description
7B-2	Drive (Drive)	1-111	Distortion/Overdrive level
	Resonance (Res)	0-99	Gain of the resonant wah filter
7B-3	Hot Spot (H.Spot)	1-99	The wah filter frequency where it all happens
	Level (Level)	1-99	Distortion output level

Mono Delay/Phaser

46: Delay/Phaser

This effect consists of two effects: delay on the left channel and phaser on the right.



7B Delay(L)	>	7B Delay(L)	<>	7B Phaser(R)	<>	7B Phaser(R)	<
Time250ms		FB+50		H.Dmp10		Mod60	
				M.SP0.69Hz			
7B-1		7B-2		7B-3		7B-4	

Delay

LCD	Parameter	Range	Description
7B-1	Delay Time (Time)	0-500 ms	Delay time
	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase
7B-2	High Damp (H.Dmp)	0-99%	High frequency decay

Phaser

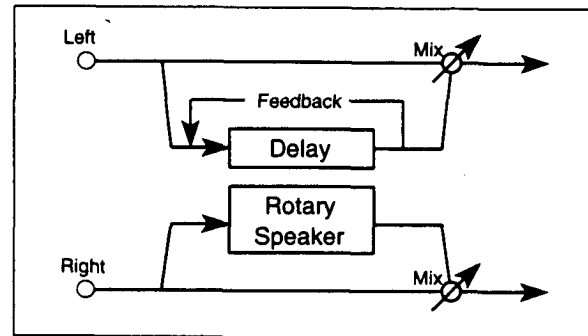
LCD	Parameter	Range	Description
7B-3	Mod Depth (Mod)	0-99%	Modulation depth
	Mod Speed (M.SP)	0.03-30 Hz	Modulation speed
7B-4	Feedback (FB)	-99...+99%	The amount of phased signal that is fed back into the effect. Minus values invert the feedback signal phase

For effect 46, dynamic modulation (7A-3) can be used to control the DRY:EFF balance.

Mono Delay/Rotary

47: Delay/Rotary Speaker

This effect consists of two effects: delay on the left channel and rotary speaker on the right.



7B Delay(L) Time250ms FB+40	>	7B Rot.SP(R) Acceleration=04	<>	7B Rot.SP(R) Speed S=25 F=70	<
7B-1		7B-2		7B-3	

Delay

LCD	Parameter	Range	Description
7B-1	Delay Time (Time)	0-500 ms	Delay time
	Feedback (FB)	-99...+99%	The amount of delay signal that is fed back into the effect. Minus values invert the feedback signal phase

Rotary Speaker

LCD	Parameter	Range	Description
7B-2	Acceleration (Acceleration)	1-15	Time taken to change from one speed to the other
7B-3	Slow Speed (S)	1-99	Slow rotation speed
	Fast Speed (F)	1-99	Fast rotation speed

For effect 47, dynamic modulation (7A-3) can be used to switch the speed change direction.

Effect Parameter Table

		Reverb Time		Pre Delay					
1	Hall	0.2 - 9.9 sec	(2.3)	0 - 200 ms	(60)	0 - 99	(62)	0 - 99%	(31)
2	Ensemble Hall	0.2 - 9.9 sec	(3.1)	0 - 200 ms	(15)	0 - 99	(23)	0 - 99%	(32)
3	Concert Hall	0.2 - 9.9 sec	(3.3)	0 - 200 ms	(80)	0 - 99	(46)	0 - 99%	(41)
4	Room	0.2 - 4.9 sec	(1.3)	0 - 200 ms	(8)	0 - 99	(68)	0 - 99%	(36)
5	Large Room	0.2 - 4.9 sec	(2.4)	0 - 200 ms	(25)	0 - 99	(51)	0 - 99%	(32)
6	Live Stage	0.2 - 4.9 sec	(2.2)	0 - 200 ms	(12)	0 - 99	(81)	0 - 99%	(36)
7	Wet Plate	0 - 99	(59)	0 - 200 ms	(29)	1 - 10	(7)	0 - 99%	(51)
8	Dry Plate	0 - 99	(30)	0 - 200 ms	(26)	1 - 10	(5)	0 - 99%	(47)
9	Spring Reverb	0 - 99	(25)	0 - 200 ms	(0)	1 - 10	(9)	0 - 99%	(30)
		ER Time		Pre Delay					
10	Early Reflection 1	100 - 800 ms	(220)			0 - 200 ms	(0)		
11	Early Reflection 2	100 - 800 ms	(180)			0 - 200 ms	(30)		
12	Early Reflection 3	100 - 800 ms	(300)			0 - 200 ms	(90)		
		Delay Time L		Delay Time R		Feedback		Mix	
13	Stereo Delay	0 - 500 ms	(185)	0 - 500 ms	(370)	-99 - +99%	(-40)	0 - 99%	(10)
14	Cross Delay	0 - 500 ms	(190)	0 - 500 ms	(380)	-99 - +99%	(+40)	0 - 99%	(10)
		Delay Time L		Feedback					
15	Dual Mono Delay	0 - 500 ms	(20)	-99 - +99%	(0)	0 - 99%	(0)	Dry - Effect	(50:50)
		Delay Time L		Feedback					
16	Multi-Tap Delay 1	0 - 500 ms	(175)	0 - 500 ms	(350)			-99 - +99%	(+30)
17	Multi-Tap Delay 2	0 - 500 ms	(200)	0 - 500 ms	(400)			-99 - +99%	(0)
18	Multi-Tap Delay 3	0 - 500 ms	(250)	0 - 500 ms	(500)			-99 - +99%	(+20)
		Delay Time		Feedback		Mix			
19	Chorus 1	0 - 200 ms	(3)	0.03 - 30 Hz	(0.33)	0 - 99	(99)	SIN, TRI	(TRI)
20	Chorus 2	0 - 200 ms	(2)	0.03 - 30 Hz	(0.42)	0 - 99	(84)	SIN, TRI	(TRI)
		Delay Time		Feedback		Mix			
21	Quadrature Chorus	0 - 250 ms	(24)	0 - 250 ms	(12)	● 1 - 99	(30)	0 - 99	(50)
22	Crossover Chorus	0 - 250 ms	(2)	0 - 250 ms	(24)	● 1 - 99	(16)	0 - 99	(99)
		Delay Time L		Feedback		Mix			
23	Harmonic Chorus	0 - 500 ms	(4)	0 - 500 ms	(12)			● 1 - 99	(36)
		Delay Time		Feedback		Mix			
24	Symphonic Ensemble	0 - 99	(92)						
		Delay Time		Feedback		Mix			
25	Flanger 1	0 - 200 ms	(5)	0 - 99	(50)	● 1 - 99	(20)		
26	Flanger 2	0 - 200 ms	(24)	0 - 99	(99)	● 1 - 99	(42)		
27	Crossover Flanger	0 - 200 ms	(1)	0 - 99	(60)	● 1 - 99	(22)		
		Delay Time		Feedback		Mix			
28	Exciter	-99 - +99	(+60)			1 - 10	(1)		
		Delay Time		Feedback		Mix			
29	Enhancer	1 - 99	(28)	1 - 20	(3)	0 - 99	(85)	1 - 99	(25)
		Delay Time		Feedback		Mix			
30	Distortion	1 - 111	(107)	● 0 - 99	(99)	0 - 99	(7)	-12 - +12 dB	(0)
31	Overdrive	1 - 111	(85)	● 0 - 99	(70)	0 - 99	(63)	-12 - +12 dB	(0)
		Delay Time		Feedback		Mix			
32	Stereo Phaser 1	0 - 99	(98)	● 0.03 - 30 Hz	(0.24)	0 - 99	(90)	-99 - +99%	(+96)
33	Stereo Phaser 2	0 - 99	(96)	● 0.03 - 30 Hz	(0.24)	0 - 99	(90)	-99 - +99%	(+90)
		Delay Time		Feedback		Mix			
34	Rotary Speaker *	0 - 15	(2)			1 - 15	(12)	1 - 99	(25)
		Delay Time		Feedback		Mix			
35	Auto Pan	SIN, TRI	(TRI)	-99 - +99	(+96)	0.03 - 30 Hz	(0.21)	0 - 99	(96)
36	Tremolo	SIN, TRI	(TRI)	-99 - +99	(-99)	0.03 - 30 Hz	(3.9)	0 - 99	(99)
		Delay Time		Feedback		Mix			
37	Parametric EQ	0 - 29	(15)	-12 - +12 dB	(+6)	● 0 - 99	(50)	-12 - +12 dB	(+6)
		Delay Time		Feedback		Mix			
38	Chorus-Delay	0 - 50 ms	(24)	-99 - +99%	(+24)	1 - 99	(12)	0 - 99	(75)
39	Flanger-Delay	0 - 50 ms	(1)	-99 - +99%	(+80)	1 - 99	(4)	0 - 99	(99)
		Delay Time		Feedback		Mix			
40	Delay/Hall Reverb	0 - 500 ms	(30)	-99 - +99%	(0)	0 - 99%	(0)	● Dry - Effect	(FX)
41	Delay/Room Reverb	0 - 500 ms	(20)	-99 - +99%	(0)	0 - 99%	(0)	● Dry - Effect	(FX)
		Delay Time		Feedback		Mix			
42	Delay/Chorus	0 - 500 ms	(220)	-99 - +99%	(+15)	0 - 99%	(50)	● Dry - Effect	(70:30)
		Delay Time		Feedback		Mix			
43	Delay/Flanger	0 - 500 ms	(400)	-99 - +99%	(+20)	0 - 99%	(60)	● Dry - Effect	(70:30)
		Delay Time		Feedback		Mix			
44	Delay/Distortion	0 - 500 ms	(250)	-99 - +99%	(+40)			● Dry - Effect	(79:21)
45	Delay/Overdrive	0 - 500 ms	(350)	-99 - +99%	(+50)			● Dry - Effect	(75:25)
		Delay Time		Feedback		Mix			
46	Delay/Phaser	0 - 500 ms	(300)	-99 - +99%	(+15)	0 - 99%	(60)	● Dry - Effect	(60:40)
		Delay Time		Feedback		Mix			
47	Delay/Rotary Speaker *	0 - 500 ms	(280)	-99 - +99%	(+15)			Dry - Effect	(70:30)

● A parameter that can be controlled using dynamic modulation

* Dynamic modulation can be used to change the cycle-speed direction

Values in parenthesis indicate initial parameter values

	EQ Low		EQ High		
	-12 ~ +12 dB (-3)		-12 ~ +12 dB (-1)		● Dry - Effect (80:20)
	-12 ~ +12 dB (-1)		-12 ~ +12 dB (-3)		● Dry - Effect (80:20)
	-12 ~ +12 dB (-2)		-12 ~ +12 dB (-4)		● Dry - Effect (80:20)
	-12 ~ +12 dB (+1)		-12 ~ +12 dB (+2)		● Dry - Effect (78:22)
	-12 ~ +12 dB (-1)		-12 ~ +12 dB (+2)		● Dry - Effect (78:22)
	-12 ~ +12 dB (-5)		-12 ~ +12 dB (-4)		● Dry - Effect (75:25)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (-4)		● Dry - Effect (80:20)
	-12 ~ +12 dB (+2)		-12 ~ +12 dB (+2)		● Dry - Effect (80:20)
	-12 ~ +12 dB (+2)		-12 ~ +12 dB (-4)		● Dry - Effect (78:22)
	EQ Low		EQ High		
	-12 ~ +12 dB (-4)		-12 ~ +12 dB (-4)		● Dry - Effect (68:32)
	-12 ~ +12 dB (+1)		-12 ~ +12 dB (0)		● Dry - Effect (65:35)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (75:25)
	EQ Low				
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (80:20)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (80:20)
Delay Time R	Feedback R				
0 ~ 500 ms (40)	-99 ~ +99% (0)	0 ~ 99%	(0)		● Dry - Effect (50:50)
	EQ Low				
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (80:20)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (70:30)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (75:25)
	EQ Low				
	-12 ~ +12 dB (+4)		-12 ~ +12 dB (+4)		● Dry - Effect (50:50)
	-12 ~ +12 dB (+3)		-12 ~ +12 dB (+4)		● Dry - Effect (60:40)
Mod Waveform	EQ Low				
T+10 ~ S+10 (T+00)	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		Dry - Effect (50:50)
T+10 ~ S+10 (T+00)	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		Dry - Effect (50:50)
Mod Depth	EQ Low				
0 ~ 99 (99)	0 ~ 18 (3)				Dry - Effect (25:75)
	EQ Low				
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (67:33)
Resonance	EQ Low				
-99 ~ +99% (+80)	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		Dry - Effect (50:50)
-99 ~ +99% (+36)	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		Dry - Effect (50:50)
-99 ~ +99% (+80)	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		Dry - Effect (50:50)
	-12 ~ +12 dB (+3)		-12 ~ +12 dB (+3)		● Dry - Effect (50:50)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (50:50)
EQ High					
-12 ~ +12 dB (0)	0 ~ 99 (6)				Dry - Effect (50:50)
-12 ~ +12 dB (0)	0 ~ 99 (8)				Dry - Effect (50:50)
Mod Envelope					
SIN, TRI (TRI)					Dry - Effect (50:50)
SIN, TRI (SIN)					Dry - Effect (50:50)
Dist Speed					
1 ~ 99 (69)					Dry - Effect (34:66)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (20:80)
	-12 ~ +12 dB (0)		-12 ~ +12 dB (0)		● Dry - Effect (50:50)
Mid Width					
0 ~ 99 (50)	0 ~ 29 (12)	-12 ~ +12 dB (+6)			Dry - Effect (50:50)
Reverb Time					
0 ~ 450 ms (120)	-99 ~ +99% (+16)				● Dry - Effect (60:40)
0 ~ 450 ms (300)	-99 ~ +99% (+30)				● Dry - Effect (50:50)
Reverb Time					
0.2 ~ 9.9 sec (3.0)	0 ~ 150 ms (68)	0 ~ 99% (34)			● Dry - Effect (70:30)
0.2 ~ 4.9 sec (1.1)	0 ~ 150 ms (0)	0 ~ 99% (28)			● Dry - Effect (65:35)
Mod Speed	Mod Depth				
0.03 ~ 30 Hz (0.39)	0 ~ 99 (99)	SIN, TRI (TRI)			● Dry - Effect (50:50)
Mod Speed	Mod Depth				
0.03 ~ 30 Hz (0.21)	0 ~ 99 (96)	-99 ~ +99% (-75)			● Dry - Effect (50:50)
Drive	Hot Spot				
1 ~ 111 (105)	1 ~ 99 (99)	0 ~ 99 (7)		1 ~ 99 (10)	
1 ~ 111 (65)	1 ~ 99 (90)	0 ~ 99 (63)		1 ~ 99 (20)	
Mod Speed	Mod Depth	Feedback			
0.03 ~ 30 Hz (0.69)	0 ~ 99 (90)	-99 ~ +99% (+99)			● Dry - Effect (25:75)
Acceleration	Slow Speed	Fast Speed			
1 ~ 15 (10)	1 ~ 99 (25)	1 ~ 99 (69)			● Dry - Effect (30:70)



Chapter 6: Sequencer Mode

In Sequencer mode you can playback songs and record in real time. In Sequencer Edit mode you can edit your real-time recordings, record in step time, and create patterns in either step time or real time. See “Sequencer Edit Mode” on page 113.

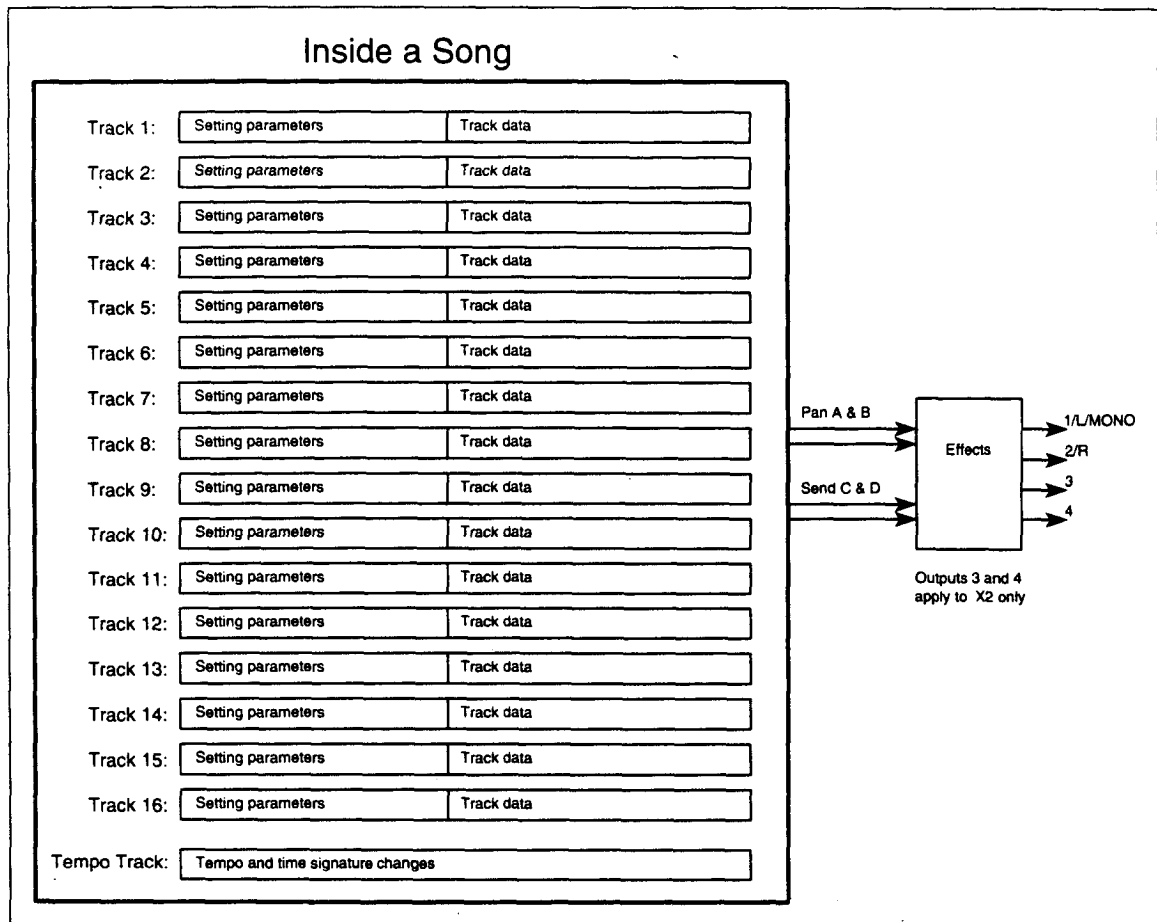
As well using the X2/X3 with its own sequencer, you can also use it as a 16-part multitimbral tone generator with an external sequencer.

X2/X3 Sequencer Specs

- 10 songs and 100 patterns can be held in memory simultaneously.
- 32,000 events can be recorded in 10 songs and 100 patterns (one track or pattern can contain a maximum of 16,000 events).
- A song can be up to 16 tracks.
- A track can contain up to 999 measures.
- A pattern can contain up to 99 measures.
- Base Resolution can be either 48 PPQN or 96 PPQN (Pulses Per Quarter Note).
- Effects can be set individually for each song.
- Song 9 can be conformed for use with General MIDI.
- Song data can be saved to floppy disk in the Standard MIDI File (SMF) format.
- SMF files can be loaded into the X2/X3.
- Program Change messages can be used to select different Programs.
- EXT mode tracks allow external MIDI device control.
- Up to 32 notes are available among tracks.
- All sequencer data is retained in memory when the power is off (we recommend that you save your data at regular intervals).
- Sequencer tracks respond to MIDI Controllers such as After Touch and Pitch Bend. See “Controller Event Edit Notes” on page 126 for a list of all usable MIDI Controllers.
- Track Programs can be selected using MIDI Bank Select and Program Change messages. See “Using MIDI to Select Programs” on page 4 for details about how the X2/X3 responds to MIDI Bank Select and Program Change messages.

What's in a Song?

The following illustration shows what's in a song.



Setting parameters determine the playback environment. Setting Parameters listed in the following table that are marked with a (*) can be adjusted and recorded by the sequencer. During playback, these adjustments will be carried out automatically. This means that the parameter value at any point during playback may be different to its original value. When the [RESET] button is pressed, these parameters are reset to their original values. Setting parameters can be copied from a Combination. See "8E Copy from Combination" on page 153.

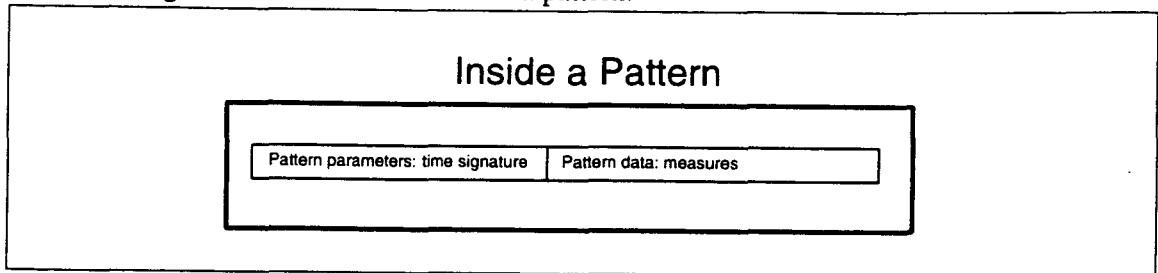
Setting Parameters	Track Data
Prog No. *	Note on/off
Volume *	Pitch Bend
Pan *	After Touch
MIDI Channel	Prog Change (Include bank Select)
Send C *	Poly After
Send D *	Controllers (0-101)
Status	
Bend Range *	
Transpose *	
Tune *	
Vel Window	
Key Window	

X2/X3 songs contain a Tempo track. This controls the tempo and time signature of all 16 tracks.

What's in a Pattern?

As well as songs, you can have up to 100 patterns. By making a repetitive drum phrase into a pattern, you can save sequencer memory. Patterns can be played by putting them into tracks. A pattern can be used in one track only. Patterns can be from 1 to 99 measures long.

The following illustration shows what's in a pattern.



Sequencer Data, RAM Cards, & Floppy Disks

Sequencer data on a floppy disk must be loaded before you can play, or edit it. Sequencer data on a PROG/SEQ data card, however, can be played without loading. Although, you must load it before editing. A PROG/SEQ data card can store up to 7,000 events. See "6D Save Sequencer Data to Card" on page 169. Note that if the amount of free sequencer memory is less than 77%, the sequencer data cannot be saved to card. In this case, save to floppy disk. See "3C Save Sequencer Data" on page 188.

Ways to Record Tracks

- **Real-Time Track Recording:** is similar to recording on a tape machine—you select a track, start recording, start playing, then stop. Real-time recording is carried out in Sequencer mode. See "Real-Time Recording" on page 99.
- **Step-Time Track Recording:** allows you enter notes one by one—you select a position, specify the note, its velocity, and length, then insert it into a track. Step-time recording is carried out in Sequencer Edit mode. See "2A Step-Time Track Recording" on page 117.
- **Patterns:** can contain up to 99 measures. They allow you to use sections of song data many times. Patterns can be copied to tracks or put to tracks. Putting a pattern to a track means that you do not have to duplicate (copy) the data. Thus, saving sequencer memory. Any changes made to a put pattern will be reflected in all tracks into which that pattern has been put. This makes it simple to, for example, update the snare drum pattern used in all choruses.

Ways to Record Patterns

- **Real-time Pattern Recording:** this is similar to real-time track recording except the pattern repeats while recording, allowing you to build up patterns by overdubbing. For example, you could record a bass drum in the first pass, a snare drum in the second, hi-hats in the third, and so on. See "5A Real-Time Pattern Record/Edit" on page 143.
- **Step-Time Pattern Recording:** allows you enter notes one by one—you select a position, specify the note, its velocity, and length, then insert it into a pattern. See "5B Step-Time Pattern Recording" on page 145.
- **Copy Data from a Track:** you can select a number of measures from a track, and copy the data into a pattern. The pattern can then be edited, and put or copied into other tracks. See "6B Get from Track" on page 148.

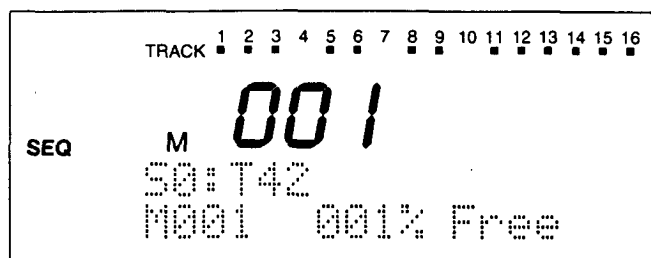
Real-Time Recording & Patterns

If a pattern overlaps the specified range for real-time recording, that pattern will be opened automatically when recording stops. However, if there is not enough sequencer memory available to open the pattern, the options YES and NO will appear. Press the [▲/YES] button to copy the pattern data into the track, or the [▼/NO] button to discard the data just recorded.

Entering Sequencer Mode

- 1) Press the [SEQ] button.

SEQ appears on the LCD screen.



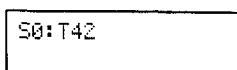
The numbers at the top of the display correspond to the track numbers. The number of the currently selected track flashes. Normally, there is only one currently selected track, however, for multitrack recording any number of tracks can be selected. When a track is muted, its number disappears. When a track is soloed, all other track numbers disappear. A box underneath a track number indicates that a track contains data. During playback, and when MIDI data is received, this box flashes.

Playing Songs

This section explains how to play songs.

Songs can be in any one of three places: in the internal sequencer memory, on a PROG/SEQ data card, or on a floppy disk. If the song that you want to play is in the sequencer memory or on a PROG/SEQ data card, proceed to step 1. If it is on a floppy disk, you must load it into the sequencer memory before it can be played. See "1C Load Sequencer Data" on page 180, and "5A MIDI Data Dump" on page 165. To play Standard MIDI File compatible song data that is on floppy disk, the song data must first be loaded into the sequencer memory. See "5A Load SMF (Standard MIDI File)" on page 191.

- 1) If you haven't already, press the [SEQ] button to enter Sequencer mode.
- 2) Press function button [8]. The following LCD screen will appear.



- 3) Use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select a song. If the song is on a PROG/SEQ data card, press the [BANK] button, then select the song.
- 4) Press the [START/STOP] button to start playback.

Press the [START/STOP] button again to pause playback.

To continue playback, press the [START/STOP] button again. Playback will continue from the point at which playback was paused.

To return to the beginning of the song, press the [RESET] button. Tracks whose status is set to EXT will send the corresponding MIDI Bank Select, Program Change, volume, etc., messages, so external MIDI devices will be ready to start playback from the first measure.

At the end of the song, playback will stop, and the song will return to the first measure. If a Next Song has been specified, that song will played. See "8C Next Song" on page 152.

Playback from a Specific Measure

To start playback from a specific measure in a song, press function button [1] to select the Measure Position & Free Memory LCD screen shown below.

```
SEQ:T42
M001 001% Free
```

Position the cursor on the measure parameter (M001), use the VALUE slider, [▲/YES] button, or number keypad to select a measure, then press the [START/STOP] button to start playback. At the end of the song, the song will return to the measure at which playback was started. See “Measure Position & Free Memory” on page 106.

Muting Individual Tracks

You can mute individual tracks during song playback.

- 1) Press function button [3]. The following LCD screen appears.

```
B09:Rave Kit
Tr01 Ch:01G PLAY
```

- 2) Position the cursor on the Tr01 parameter, then use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select the track that you want to mute. See “Track Program, Level, & Pan” on page 106.
- 3) Position the cursor on the PLAY parameter, then use the VALUE slider, or the [▲/YES] and [▼/NO] buttons to select MUTE.

Select PLAY again for normal playback.

Soloing Individual Tracks

The Solo function allows you to listen to tracks individually. To solo a track, press function button [2] or [3], then move the cursor to “Tr”. Use the VALUE slider, the [▲/YES] and [▼/NO] buttons, or the number keypad to select a track, then double-click function button [2]; SOLO will appear on the LCD. The currently selected track only will be heard. To listen to other tracks, select the Tr parameter, and use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad.

On the LCD screen shown below, track 3 has been soloed.

```
TRACK SOLO
SEQ M 001
B76:HouseBass2
Tr03 Ch:03 PLAY
```

To cancel the Solo function, double-click function button [2] (TRACK).

Song Playback Notes

You can edit a song's effect settings during playback. This allows you to try different effects and edit effect parameters, just like a real mixdown. Press the [EDIT] button, then function button [7] to access the effects. See "7A-7G Effects" on page 150.

Program, level, and pan parameters can also be edited during playback. See "Track Program, Level, & Pan" on page 106.

Note: *If you sometimes use an external MIDI clock to synchronize the X2/X3 sequencer, remember to set the X2/X3's Clock Source back to INT when not using that external clock. Otherwise, the X2/X3 will not playback. See "3A Global MIDI Channel & MIDI Clock Source" on page 160.*

Erase All Sequencer Data

To erase all the sequencer data, press and hold down the [SEQ] button and function button [8] (DELETE), then press the X2/X3 power switch to power on the X2/X3. Sequencer free memory will become 100%.

Note: *This will erase the 10 songs, 100 patterns, and initialize the Setting Parameters. So make sure that you save your important data to either floppy disk or card beforehand. See "6C Save Programs & Combinations to Card" on page 168, "6D Save Sequencer Data to Card" on page 169, and "3A Save All Data" on page 186.*

Real-Time Recording

This section explains how to record in real time.

- 1) Press the [SEQ] button to enter Sequencer mode.
- 2) Press function button [1], and check the amount of free memory.

If you think there isn't enough free sequencer memory for your new song, save another song to floppy disk ("3C Save Sequencer Data" on page 188), or a PROG/SEQ data card ("6D Save Sequencer Data to Card" on page 169), then erase it from the X2/X3 ("2G Erase Song" on page 131). Alternatively, see "Erase All Sequencer Data" on page 98.

- 3) Press function button [8]. The following LCD screen appears.

```
58:New Song
```

- 4) Use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select a new song.
- 5) Now you must set the song's base resolution, because once you record something, it cannot be changed. Press the [EDIT] button to enter Sequencer Edit mode, then locate the LCD screen shown below, 8B.

```
8B B.Reso
High(1/96) OK?
```

Set the base resolution to either 1/48 or 1/96. See "8B Song Base Resolution" on page 151.

- 6) Press the [SEQ] button to return to Sequencer mode.
- 7) Press function button [2]. The following LCD screen appears.

```
G01:Piano
Tr01 A00 100 CNT
```

- 8) Select a track for recording. Then select a Program, and set the level and pan parameters. See "Track Program, Level, & Pan" on page 106. If you change any of these parameters while recording, the changes are recorded.

If you want to record a General MIDI compatible song, see "8F GM Song Mode" on page 154.

If you are re-recording tracks, make sure that the track protect parameter is set to off. See "1B Track Status" on page 114. This will be set to off if you are recording a new song.

To turn the metronome on and off, press function button [6].

To record using quantize, press function button [5]. See "Real-Time Quantize" on page 111.

- 9) Press the [REC/WRITE] button.

The word REC appears on the LCD screen.

- 10) Press function button [4]. The following LCD screen appears.

```
G01:Piano
J=120:MAN 04/04
```

Set the song tempo and time signature parameters as required.

- 11) Press function button [7]. The following LCD screen appears.

```
00WR
MultiREC:OFF
```

If you want to record one track only, set the MultiREC parameter to OFF. If you want to record on more than one track simultaneously, set it to ON. See "Multitrack Recording—MultiREC" on page 104 for more details about multitrack recording.

- 12) Move the cursor to the Recording mode parameter (in this case OVWR), then use the VALUE slider or the [▲/YES] and [▼/NO] buttons to select a Recording mode. See “Recording Mode” on page 112.

What you do next depends on the Recording mode that you selected. Recording modes are explained in the following sections.

Overwriting—OVWR

In OVWR Recording mode, existing data in the selected track is overwritten from the measure at which you start recording.

- 1) Follow the steps for “Real-Time Recording” on page 99, and select OVWR as the Recording mode.
- 2) To select the start measure, press function button [1]. The following LCD screen appears.

```

50:New Song
M001 065% Free

```

Position the cursor on the measure parameter (M001), use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select a measure.

- 3) Press the [START/STOP] button.

After the specified count-in (“8D Metronome” on page 152), recording will begin. Other tracks that contain data play depending on their Track Status (“1B Track Status” on page 114).

- 4) To stop recording, press the [START/STOP] button.

The song returns to the measure at which recording started. Press the [START/STOP] button again to start playback.

If you record on a section of a track that contained a put pattern, the put-pattern data and the newly recorded data will be added to the track.

Overdubbing—OVDB

In OVDB Recording mode, existing data in the selected track is merged with the new data.

- 1) Follow the steps for “Real-Time Recording” on page 99, and select OVDB as the Recording mode.
- 2) To select the start measure, press function button [1]. The following LCD screen appears.

```

50:New Song
M001 065% Free

```

Position the cursor on the measure parameter (M001), use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select a measure.

- 3) Press the [START/STOP] button.

After the specified count-in (“8D Metronome” on page 152), recording will begin. Other tracks that contain data play depending on their Track Status (“1B Track Status” on page 114).

- 4) To stop recording, press the [START/STOP] button.

The song returns to the measure at which recording started. Press the [START/STOP] button again to start playback.

If you record on a section of a track that contained a put pattern, the put-pattern data and the newly recorded data will be added to the track.

Auto Punch In/Out Recording—AUTP

In AUTP Recording mode, you can re-record a specific measure(s) on a track that already contains data. The old data will be deleted.

- 1) Follow the steps for “Real-Time Recording” on page 99, and select AUTP as the Recording mode.

The options for AUTP appear, as shown below.

```
AUTP M001 +001
MultiREC:OFF
```

- 2) Use the VALUE slider, or [▲/YES] and [▼/NO] buttons to specify the punch in and punch out measures.
- 3) Press function button [1]. The following LCD screen appears.

```
S0:New Song
M001 065% Free
```

Position the cursor on the measure parameter (M001), and select a measure that is several measures before the specified punch in measure.

- 4) Press the [START/STOP] button.

After the specified count-in (“8D Metronome” on page 152), playback begins.

When the specified punch in measure is reached, recording begins.

When the specified punch out measure is reached, recording stops (playback will continue).

- 5) Press the [START/STOP] button to stop playback.

The song returns to the measure at which recording started. Press the [START/STOP] button to start playback. If you don’t like what you just recorded and you want to do it again, return to step 3.

If you punch in/out on measures that contain Controller data, such as Pitch Bend or Damper Pedal, a Controller may become stuck at a value other than its natural resting place. In this case, you will probably have to use the Event Edit function to correct the data. Alternatively, erase the Controller data using Create Controller Data. See “3D Create Controller Data” on page 135.

If you record on a section of a track that contained a put pattern, the put-pattern data and the newly recorded data will be added to the track.

Manual Punch In/Out Recording—MANP

MANP Recording mode is similar to Auto punch in/out except that you use the [REC/WRITE] button, or a pedal switch to punch in/out.

- 1) Follow the steps for “Real-Time Recording” on page 99, except step 9 (do not press the [REC/WRITE] button), and select MANP as the recording mode.
- 2) Press function button [1]. The following LCD screen appears.

50:New Song
M001 065% Free

Position the cursor on the measure parameter (M001), and select a measure that is several measures before the point at which you want to manually punch in.

- 3) Press the [START/STOP] button.

Playback will begin.

- 4) When the point at which you want to punch-in is reached, press the [REC/WRITE] button to start recording.
- 5) To punch-out, press the [REC/WRITE] button again.

Steps 4 and 5 can also be performed using a pedal switch. Connect an optional Korg PS-1 or PS-2 pedal switch to the ASSIGNABLE PEDAL/SW connector. Then, in Global mode, assign the pedal to SEQ punch in/out. See “8B Assignable Pedal/SW Setup” on page 173. Instead of pressing the [REC/WRITE] button in steps 4 and 5, press the pedal switch.

If you punch in/out on measures that contain Controller data, such as Pitch Bend or Damper Pedal, a Controller may become stuck at a value other than its natural resting place. In this case, you will probably have to use the Event Edit function to correct the data. Alternatively, erase the Controller data using Create Controller Data. See “3D Create Controller Data” on page 135.

If you record on a section of a track that contained a put pattern, the put-pattern data and the newly recorded data will be added to the track.

Loop Recording—LOOP

In LOOP Recording mode, you can add and remove new data while a specified number of measures play continuously (loop).

- 1) Follow the steps for “Real-Time Recording” on page 99, and select LOOP as the recording mode.

The options for LOOP recording appear, as shown below.

```
LOOP M001 +001
```

- 2) Use the VALUE slider, or [▲/YES] and [▼/NO] buttons to specify the punch in and punch out measures.
- 3) Press function button [1]. The following LCD screen appears.

```
S0:New Song
M001 065% Free
```

Position the cursor on the measure parameter (M001), and select a measure that is several measures before the specified loop start measure.

- 4) Press the [START/STOP] button.

After the specified count-in (“8D Metronome” on page 152), playback begins. The measure is shown in the center of the LCD.

When the specified loop start measure is reached, recording begins.

When the specified loop end measure is reached, recording restarts from the specified loop start measure. Data that is recorded on subsequent passes through the specified loop is merged (overdubbed) with the existing data.

- 5) To stop recording, press the [START/STOP] button.

Press the [START/STOP] button to start playback. If you don't like what you just recorded and you want to do it again, return to step 3.

If you record on a section of a track that contained a put pattern, the put-pattern data and the newly recorded data will be added to the track.

Deleting All Data while Loop Recording

To delete all data while LOOP recording, press and hold down function button [8] (DELETE). For the time that you hold down the button, all data is deleted. Release the button to stop deleting.

Deleting Specific Data while Loop Recording

When you start loop recording, what you play is added (overdubbed) to the any existing data, and the word [ADD] is shown on the bottom line of the LCD screen. In this case, you can delete only the specified Controller data. After pressing the [START/STOP] button as described above in step 4), press function button [7] to see the Recording mode. By positioning the cursor on [ADD], and pressing the [▲/YES] button, you can select [RMV]. In this mode, any note data corresponding to a keyboard key that you press and hold will be deleted. While using the joystick you can delete only joystick data. Likewise, while applying After Touch you can delete only After Touch data. Record looping must actually be in progress to use this function.

Note: When Loop Recording mode is selected, playback also loops.

Multitrack Recording—MultiREC

In MultiREC Recording mode, you can record a number of tracks simultaneously. This mode can also be used to record a number of tracks directly from an external MIDI sequencer. In this case, MIDI data received via the MIDI IN connection is recorded to tracks whose MIDI Channels correspond the MIDI Channels being used by the data.

- 1) In Global mode, set the Clock Source parameter to EXT. See “3A Global MIDI Channel & MIDI Clock Source” on page 160.

When recording from an external MIDI sequencer, the X2/X3 must source its clock from the sequencer. Otherwise, data may not be recorded correctly. See “3A Global MIDI Channel & MIDI Clock Source” on page 160.

- 2) Press the [SEQ] button to enter Sequencer mode.
- 3) Press function button [7] to select the Recording mode LCD screen, then set the MultiREC parameter to ON.

Follow the steps for “Real-Time Recording” on page 99, and select a Recording mode. You cannot select LOOP.

DWR MultiREC:ON

- 4) Press function button [3] to select the track that you want to record, play, or mute. See “Track MIDI Channel & Mode” on page 108.
- 5) Press the [REC/WRITE] button to enter Record Ready mode.
- 6) Start playback on the external sequencer.

The X2/X3 sequencer will automatically start recording. This is because the external sequencer sends a MIDI Start message to the X2/X3.

- 7) To stop recording, press the [START/STOP] button on the X2/X3, or stop the external sequencer.

When you stop the external sequencer, the X2/X3 sequencer will automatically stop recording. This is because the external sequencer sends a MIDI Stop message to the X2/X3.

The X2/X3 sequencer can record the following types of MIDI data from an external device.

Note On/Off
Pitch Bend
Program Change
Channel Pressure After Touch
Polyphonic Key Pressure After Touch
Controllers 0–101

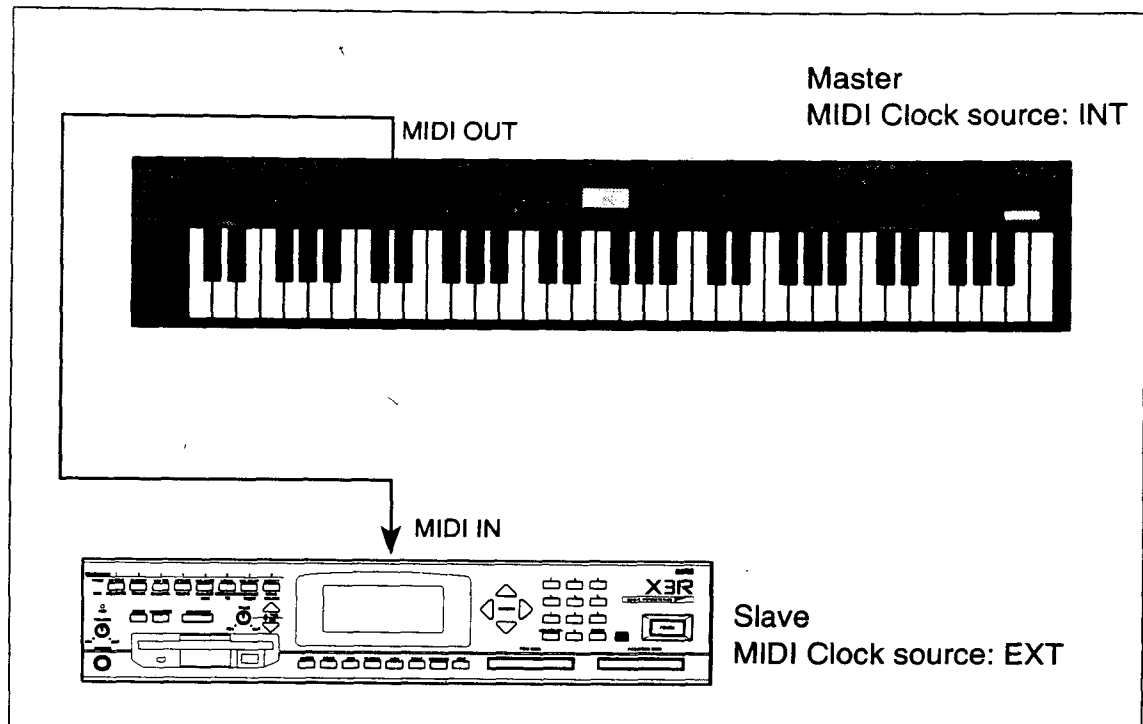
If one track on the external sequencer contains far more data than the other tracks, a memory full message may appear even though there is enough free sequencer memory. In this case, mute the large track, record the other tracks, then record the large track after.

See “Controller Event Edit Notes” on page 126 for a list of X2/X3 compatible MIDI Controllers.

Synchronization

The X2/X3 sequencer can be synchronized to other MIDI devices, such as sequencers and drum machines. It can be used as either master or slave device.

To synchronize an external sequencer to the X2/X3, connect the X2/X3 MIDI OUT to the MIDI IN of the slave device, as shown below.



Set the Clock Source of X2/X3 to INT (Internal), and the Clock Source of the external sequencer to EXT (External). See "3A Global MIDI Channel & MIDI Clock Source" on page 160. The slave device follows the start/stop operations of the X2/X3 sequencer. The tempo of the slave device automatically matches that of the X2/X3.

To use the X2/X3 as a slave device, set its Clock Source to EXT, and set the master device's Clock Source to INT. The X2/X3 follows the start/stop operations of the master device, and its tempo automatically matches that of the master device.

Using the X2/X3 as a Multi-Timbral Tone Generator

When the X2/X3 is used as a 16-part multi-timbral tone generator with an external MIDI sequencer, Track Program numbers should be set to match those of the corresponding sequencer tracks. To playback GM song data, you should execute the "8F GM Song Mode" function on page 154 beforehand. In this case, you don't have to match up the Program numbers. In Sequencer mode (1B), set the Track Status to either INT or BOTH.

You can use the X2/X3 as an 8-part multitimbral tone generator in Combination Play mode.

Note: When song data that contains a GM System On message is received, song 9 is automatically conformed to the GM Standard.

Real-Time Record/Play Parameters

Measure Position & Free Memory

These parameters indicate the current measure and the amount of free sequencer memory.

```
50:New Song
M001 065% Free
```

[1] Measure

Function Button	Parameter	Range	Description
[1]	Measure Position (M)	001-999	Indicates and selects the current measure

The current measure is also indicated by the three large digits on the LCD screen.

On the bottom line of the LCD screen, the amount of free sequencer memory is shown (1% is approximately 320 events).

Track Program, Level, & Pan

These parameters allows you to select a Program and set the volume level and pan for each track.

```
60: Piano
Tr01 60 127 CNT
```

[2] Track

Function Button	Parameter	Range	Description
[2]	Track (Tr)	1-16	Select a track
	Program	OFF A00-A99 B00-B99 C00-C99 D00-D99 G01-136	Select a Program for each track (C00-C99 and D00-D99 are available only when a PROG/SEQ card is inserted)
	Level	0-127	Set the level for each track
	Pan	OFF, A, 14A-CNT-14B, B, PRG	Set the pan for each track

Track: this parameter allows you to select a track for recording—the current track. When you play the keyboard, the Program assigned to the track will sound. Programs of other tracks assigned to the same MIDI Channel will also sound.

The corresponding track number flashes at the top of the LCD screen, as shown below.

```
TRACK 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
      5
SEQ   M   001
      50:New Song
      M001 065% Free
```

Program: this parameter allows you to select a Program for each track. If you select OFF, no sound will be produced. Programs can also be selected using MIDI Program Change messages. See "Using MIDI to Select Programs" on page 4.

Level: this parameter allows you to set the level of each track. When the X2/X3 receives MIDI Volume Controller No. 7, this setting is changed. The actual volume is determined by this setting multiplied by the MIDI Expression Controller No. 11 data.

Pan: this parameter is used to pan tracks between buses A and B. These buses feed the effects processors. See "7E Effect Placement" on page 59. Tracks can be sent to Send C and Send D in Sequencer Edit mode. See "1A Send C & D" on page 114. When PRG is selected, the selected Program's pan settings are used. See "1B Oscillator1 Setup" on page 11 and "1C Oscillator2 Setup" on page 13. For the X2 Program 340: A.Piano3, however, the pan settings assigned to each key are used. If the selected Program is using a drum kit, the pan settings that have been set in Global mode will be used. See "7A Drum Kit Setup1" on page 170. For Double mode Programs, the pan settings for each oscillator are used.

For a setting other than OFF or PRG, these parameters can be controlled using MIDI Panpot Controller No. 10. See "MIDI Panpot, Send Data" on page 128 for details about the relationship between panpot value and MIDI Controller value.

The Program, Level, and Pan parameters can be adjusted during playback. This is useful when, for example, you want to try a different Program for a track. Note that previously recorded parameter changes will reset these parameters during playback. For example, if at the beginning of a song you adjust the volume, but then some volume data that was previously recorded in the track is played, the volume will be reset by the recorded volume data.

When recording in real time, you can select other Programs and adjust the Level and Pan parameters. These adjustments are recorded along with other events (notes, etc.), and they can be edited using Event Edit. See "2B Event Edit" on page 121. They can also be adjusted using Create Controller Data. See "3D Create Controller Data" on page 135.

Pan adjustments made during playback or recording affect subsequent notes, not notes that are currently playing. The corresponding values of Program, Level, and Pan adjustments recorded in a track are displayed during playback.

Track MIDI Channel & Mode

These parameters allow you to select a MIDI Channel and Track mode for each track.

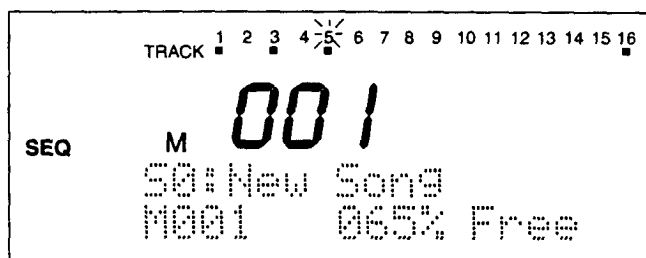
```
001:Piano
Tr01 Ch:01G MUTE
```

[3] Channel

Function Button	Parameter	Range	Description
[3]	Track (Tr)	1-16	Select a track for recording, editing, soloing, muting, etc.
	MIDI Channel (Ch)	1-16	Select a MIDI Channel for each track
	Track Mode	REC PLAY MUTE	Track will be recorded Track will playback Track muted

Track: this parameter allows you to select a track for recording—the current track. When you play the keyboard, the Program assigned to the track will sound. Programs of tracks assigned to the same MIDI Channel will also sound.

The corresponding track number flashes on the LCD screen, as shown below.



MIDI Channel: this parameter determines the MIDI Channel that each track uses to send and receive MIDI data. If the selected MIDI Channel is the same as the Global MIDI Channel (Global mode 3A), a G will appear after the Channel number.

By assigning two or more tracks to the same MIDI Channel, and selecting different Programs for each, you can play Programs in unison. This is sometimes called layering. In addition, you could record note data on one track, Controller data on another track, and set both tracks to the same MIDI Channel to play one Program.

Tracks with a Track Status of EXT use this MIDI Channel to send and receive MIDI data to and from other MIDI devices. Tracks with a Track Status of INT use this MIDI Channel to receive MIDI data. With the BOTH setting, tracks send and receive MIDI data. See “1B Track Status” on page 114.

Track Mode: this parameter determines the status of the recording track. When PLAY is selected, data on the track plays. When Mute is selected, data on the track does not play and the corresponding track number disappears from the LCD screen. When REC is selected, the track is armed for recording and the corresponding track number will flash on the LCD.

When a track contains performance data, a small box appears under the corresponding track number.

For MultiREC recording (“Recording Mode” on page 112), use the Track Mode parameter to select which tracks you want to play, record, and mute.

Song Tempo, Tempo Mode, & Time Signature

These parameters allow you to set the song tempo, Tempo mode, and time signature.

```
GB1:Piano
J=120:MAN 16/16
```

[4] Tempo

Function Button	Parameter	Range	Description
[4]	Tempo (♩)	40–240, EXT	Set the song tempo (EXT when MIDI Clock Source is EXT)
	Tempo Mode	MAN AUT REC	Recording
		MAN AUT	Playback
	Time Signature	1/4–9/4 1/8–16/8 1/16–16/16	Time Signature (Low base resolution)
1/4–5/4 1/8–10/8 1/16–16/16		Time Signature (High base resolution)	

Tempo: this parameter determines the song tempo.

When the MIDI Clock Source parameter is set to EXT (“3A Global MIDI Channel & MIDI Clock Source” on page 160), the tempo value will show EXT. In this case, the tempo is determined by the tempo of the external MIDI device.

Note: Before adjusting the tempo, set the Tempo mode to MAN.

Tempo Mode: this parameter determines how the Tempo track works during playback and recording. Three options, MAN, AUT, and REC, can be selected in Record Ready mode, and two options, MAN and AUT, during playback. Setting the Tempo mode to MAN allows you to adjust the tempo. If AUT is selected, the tempo changes according to the tempo data in the Tempo track, and you cannot manually change the tempo.

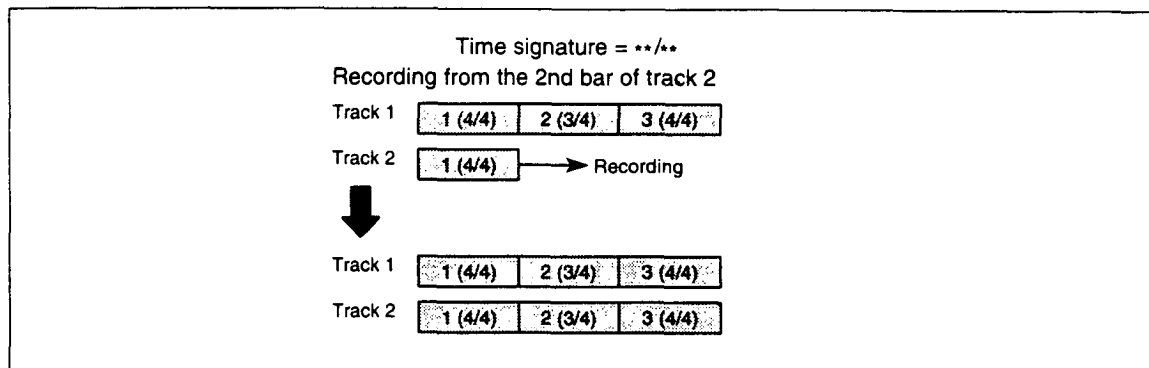
To record some tempo changes on the Tempo track, press the [REC/WRITE] button, then select REC. Move the cursor to the tempo value, and press the [START/STOP] button to adjust the tempo as required. To playback the tempo changes, select AUT. If MAN is selected, the recorded tempo changes will not affect recording or playback tempo.

Time Signature: this parameter determines the time signature. Available time signatures depend on the song’s base resolution: High or Low. See “8B Song Base Resolution” on page 151.

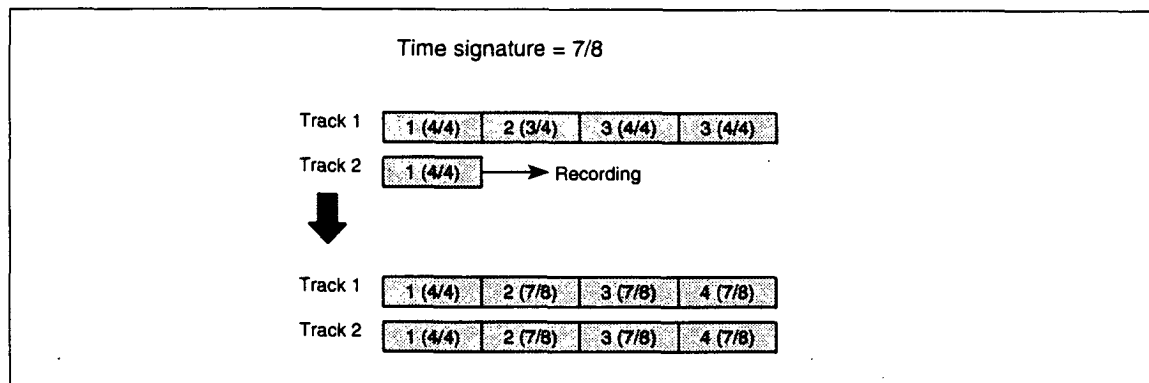
The time signature can be set in Record Ready mode after the [REC/WRITE] button has been pressed.

Base Resolution	Time Signature
Low	1/4, 2/4, 3/4, 4/4, 5/4, 6/4, 7/4, 8/4, 9/4 1/8, 2/8, 3/8, 4/8, 5/8, 6/8, 7/8, 8/8, 9/8, 10/8, 11/8, 12/8, 13/8, 14/8, 15/8, 16/8 1/16, 2/16, 3/16, 4/16, 5/16, 6/16, 7/16, 8/16, 9/16, 10/16, 11/16, 12/16, 13/16, 14/16, 15/16, 16/16
High	1/4, 2/4, 3/4, 4/4, 5/4 1/8, 2/8, 3/8, 4/8, 5/8, 6/8, 7/8, 8/8, 9/8, 10/8 1/16, 2/16, 3/16, 4/16, 5/16, 6/16, 7/16, 8/16, 9/16, 10/16, 11/16, 12/16, 13/16, 14/16, 15/16, 16/16

Once a measure has been recorded, the same time signature is used for all subsequent recordings. A value of **/** means that the previous time signature is being used, as shown below.



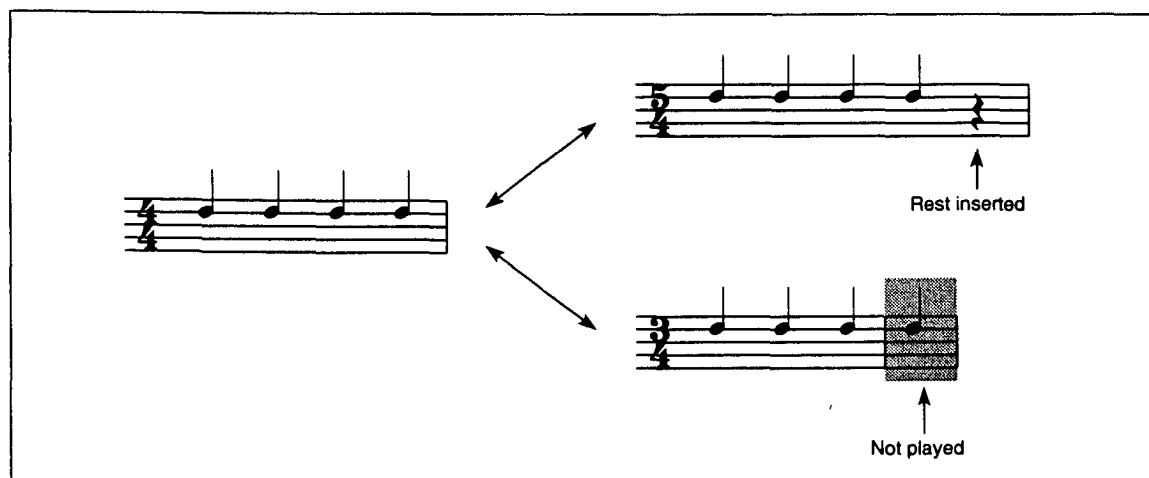
If you want to change the time signature, change the **/** value. After recording a different time signature, the time signature of other track measures occurring at the same time will be changed. For example, if you record the second measure of track 2 using 7/8 time, existing second measures on all other tracks will also change to 7/8 time.



By assigning different time signatures to measures, you can change the time signature at any point in a song. However, measures that occur at the same time in different tracks cannot have different time signatures.

If you change a measure's time signature by recording or editing, the time signature of other track measures occurring at the same time will be changed. For example, if you change the fifth measure of track 6 to 3/4 time, the fifth measure on all other tracks will also change to 3/4 time. Likewise, if you record the fifth measure of track 6 using 3/4 time, existing fifth measures on all other tracks will also change to 3/4 time.

Measures that become longer will have rests inserted into them, and measures that become shorter will not play the data that exceeds the new length of the measure. However, this data will not be lost, and if you change the measure back to its original time signature, the data will play again.



Real-Time Quantize

Recording quantize determines how the timing accuracy of your playing is corrected while recording.

G01:Piano
Real Quant:HI

[5] Quantize

Function Button	Parameter	Range	Description
[5]	Recording Quantize (Real Quant)	HI	Timing resolution of recording data

For a setting of HI, the quantize value is determined by the song's base resolution without timing correction. See "8B Song Base Resolution" on page 151.

For a setting of everything you play will be recorded at quarter note (crochet) intervals.

In the following illustration, the quantize value is set to .

Recording continuously variable data such as After Touch and joystick uses a lot of memory. You can reduce the amount of memory used by setting the quantize to a value other than HI. However, before recording you should check to make sure that the quantize value is not too low. With too low a value the continuous data may become jerky and unnatural. See "1C After Touch & Velocity Response Curve" on page 157.

Metronome

This is where you set up the metronome.

G01:Piano
Metronome:ON

[6] Metronome

Function Button	Parameter	Range	Description
[6]	Metronome (Metronome)	OFF ON REC	Metronome off Metronome for playback and recording Metronome for recording only

When the metronome is set to ON or REC, the metronome symbol appears on the LCD screen.

For the instant that the metronome sounds, the 32-note polyphony is reduced by one.

Even when the metronome is set to OFF it will sound during the count-in.

Recording Mode

These parameters allow you to set the Recording mode.

OVWR
MultiREC:OFF

[7] Rec mode

Function Button	Parameter	Range	Description
[7]	Recording Mode	OVWR OVDB AOTP MANP LOOP	Overwrite (see page 99) Overdub (see page 100) Auto punch in (see page 101) Manual punch in (see page 102) Loop (page 103)
	Start Measure (M)	001-999	Measure at which recording will start (AOTP & LOOP only)
	End Measure	001-999	Measure at which recording will end (AOTP & LOOP only)
	Add/Remove	[ADD] [RMV]	(Loop only) (Loop only)
	MultiREC (MultiREC)	OFF, ON	Multitrack recording (except loop)

Recording Mode: there are five recording modes. For details about each mode, see the pages listed in table above.

When the Recording mode is set to LOOP, playback also loops between the specified start and end measures.

Start & End Measure: these parameters are available only when AOTP or LOOP Recording mode is selected. For loop mode recording, function button [8] can be used to delete. See "Loop Recording—LOOP" on page 103.

[ADD] / [RMV]: These functions work only for Loop recording. When ADD is selected, played notes will be recorded. When RMV is selected, they will be removed.

MultiREC: when this parameter is set to on, you can record up to 16 tracks simultaneously (multitrack recording). This function is not available when the Recording mode is set to LOOP. See "Multitrack Recording—MultiREC" on page 104. When set to OFF you can record tracks individually.

Song Select

This parameter allows you to select songs for playback and recording.

S0:Kora A

[8] Song

Function Button	Parameter	Range	Description
[8]	Song Select	S0-S9	Select a song to play or record

- 1) Use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select songs.

You can also select songs using MIDI Song Select messages.

Sequencer data on a PROG/SEQ data card can be played without loading. Although, you must load it before editing. See "6B Load Sequencer Data from Card" on page 167. To play a song on a PROG/SEQ data card, press the [BANK] button, then select the song. The selected bank is indicated on the LCD: C or D. To play Standard MIDI File song data that is on a floppy disk, or external MIDI device, you must load the data into the X2/X3 sequencer memory. See "Playing Songs" on page 96.

Chapter 7: Sequencer Edit Mode

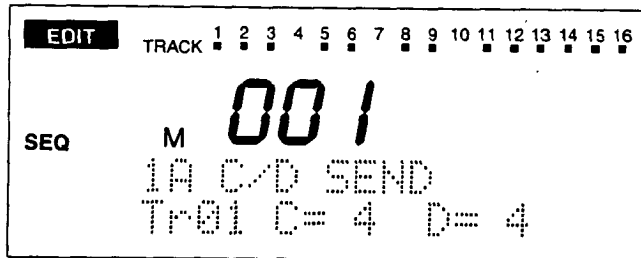
In Sequencer Edit mode you can edit your real-time recordings, record in step time, and create patterns in either step time or real time. In Sequencer mode you can playback songs and record in real time and step time. See “Sequencer Mode” on page 93.

Entering Sequencer Edit Mode

- 1) Press the [SEQ] button.
- 2) Press the [EDIT] button.

SEQ and EDIT appear on the LCD screen.

When editing a pattern using LCD screens 5A through 6D, PATTERN appears.



Opening Patterns

For many of the edit functions in this mode you will be asked “Pat Open Are You Sure?” (i.e., whether you want to open patterns) when you try to execute them. If you want to continue with the chosen edit function, press the [▲/YES] button. In this case, the pattern’s data will be recorded into the track, and the function executed. The pattern itself is unaffected by this. The same result could be achieved by copying the pattern into the track (“4F Copy to Track” on page 142), then executing the edit function. If you do not want to continue, press the [▼/NO] button.

In some cases, an error message may appear when trying to execute an edit function. See “Sequencer Mode Error Messages” on page 201.

Compare Function

If you execute an edit function by mistake, you can press the [COMPARE] button to restore the previous data. For example, if after quantizing a pattern you decide that you do not like the results, press the [COMPARE] button to restore the previous data.

If you execute a function when there is not much free memory, the undo function may not be available. In this case, you will be asked whether you want to continue with the chosen function. Press the [▲/YES] button to execute the function, or the [▼/NO] button to cancel.

Note: *The Compare function can only undo the last function executed. So, before executing a number of functions, the results of which you are not sure of, save your sequencer data to floppy disk or RAM card.*

Quick Undo

To reset a parameter to the value that it was when you first selected it, press the [▲/YES] and [▼/NO] buttons simultaneously.

1A Send C & D

These parameters allow you to set the output level of each track sent to buses C and D. These buses feed the effects processors. See “7E Effect Placement” on page 59. The output levels to buses A and B are set in Sequencer mode. See “Track Program, Level, & Pan” on page 106.

```
1A C/D SEND
Tr:01 C = 4 D = 4
```

1A-1

LCD	Parameter	Range	Description
1A-1	Track (Tr)	1-16	Select a track
	Send C (C)	0-9, PRG	Set the output level sent to bus C for the selected track
	Send D (D)	0-9, PRG	Set the output level sent to bus D for the selected track

1A-1 Track: this is used to select a track for editing. This parameter is the same for 1B through 1F.

Send C, Send D: when PRG is selected, the Send C Send D settings that have been set for a Program in Program Edit mode are used. See “1B Oscillator1 Setup” on page 11 and “1C Oscillator2 Setup” on page 13.

If a Program is using a drum kit Multisound, the Send C & D settings that have been set in Global mode will be used when PRG is selected. See “7A Drum Kit Setup1” on page 170 and “7B Drum Kit Setup2” on page 172.

For a setting other than PRG, these parameters can be controlled using MIDI Panpot Controller No. 10. See “MIDI Panpot, Send Data” on page 128 for details about the relationship between panpot value and MIDI Controller value.

1B Track Status

These parameters allow you to set the status of each track, and protect tracks.

```
1B STAT/PROT
Tr:01 BOTH ON
```

1B-1

LCD	Parameter	Range	Description
1B-1	Track (Tr)	1-16	Select a track
	Status	INT EXT BOTH	Track will play an internal Program Track will output data to external MIDI device via MIDI OUT Track will play an internal Program and output MIDI data
	Protect	OFF ON	Unprotected Protected

1B-1 Status: this parameter determines the status of each track.

When set to INT, a track plays the internal Program selected for that particular track. The data is not output via MIDI.

When set to EXT, the track data is output via MIDI.

When set to BOTH, track data plays the internal Program selected for that particular track, and track data is output via MIDI.

Protect: this parameter allows you to protect tracks against editing, accidental over-recording, and deletion.

1C Program Change Filter & Pitch Bend Range

These parameters determine how a track works with MIDI Program Change messages, and its pitch bend range.

```
1C P.CHG/BEND
Tr:01 ENA +02
```

1C-1

LCD	Parameter	Range	Description
1C-1	Track (Tr)	1-16	Select a track
	Program Change Filter	DIS ENA	Program Change messages ignored Program Change messages select track Programs
	Pitch Bend Range	-12...+12, PRG	Set a track's pitch bend range

1C-1 Program Change Filter: when set to DIS, received Program Change messages are ignored. When set to ENA, received Program Change messages select Programs for tracks. To select a Program using a MIDI Program Change message, set the track's MIDI channel so that it matches that of the device sending the Program Change message. These parameters do not affect Program Change messages sent by the X2/X3.

Pitch Bend Range: this parameter determines a track's pitch bend range. For positive values, the pitch will increase as a joystick is moved from left to right. For negative values, the pitch will increase as a joystick is moved from right to left.

When set to PRG, the pitch bend range specified for the track's Program will be used. See "6A After Touch & Joystick Control" on page 30.

For a setting other than PRG, MIDI RPN Pitch Bend Range Controller can be used to set the pitch bend range. See "Controller Event Edit Notes" on page 126.

1D Transpose & Detune

These parameters allow you to transpose and detune tracks.

```
1D TRANS/DETUNE
Tr:01 T+00 D+00
```

1D-1

LCD	Parameter	Range	Description
1D-1	Track (Tr)	1-16	Select a track
	Transpose (T)	-24...+24	Transpose each track in semitone steps
	Detune (D)	-50...+50	Detune each track in one cent steps (100 cents = 1 semitone)

These transpose and detune parameters have no effect on a track's MIDI output.

MIDI RPN Coarse Tune Controller can be used to set the Transpose parameter. MIDI RPN Fine Tune can be used to set the Detune parameter. See "Controller Event Edit Notes" on page 126.

1E Velocity Window

These parameters determine the range of note velocities that each track's Program responds to.

```
1E VEL WINDOW
Tr01 001 →127
```

1E-1

LCD	Parameter	Range	Description
1E-1	Track (Tr)	1-16	Select a track
	Velocity Window Bottom	1-127	Specify the velocity window bottom note
	Velocity Window Top	1-127	Specify the velocity window top note

- 1) Select a track.
- 2) Specify the Velocity Window Top and Bottom parameters.

These parameters affect the X2/X3 tone generator only. All note data is recorded and transmitted regardless of these settings. Recorded notes outside of the specified range do not playback.

If the bottom value is set higher than the top, it will automatically become the top value. Likewise, if the top value is set lower than the bottom value, it will automatically become the bottom value.

By setting two or more tracks to the same MIDI Channel, but with different velocity windows, you can record and playback velocity switching Programs.

1F Key Window

These parameters determine the range of notes (keys) that each track's Program responds to.

```
1F KEY WINDOW
Tr01 C-1 →G9
```

1F-1

LCD	Parameter	Range	Description
1F-1	Track (Tr)	1-16	Select a track
	Key Window Top	C-1 to G9	Specify the key window top note
	Key Window Bottom	C-1 to G9	Specify the key window bottom note

- 1) Select a track.
- 2) Specify the Key Window Top and Bottom parameters.

These parameters affect the X2/X3 tone generator only. All note data is recorded and transmitted regardless of these settings. Recorded notes outside of the specified range do not playback.

As well as using the VALUE slider and the [▲/YES] and [▼/NO] buttons to set Key Window Top and Bottom parameters, you can also use a MIDI keyboard as follows. Select a Key Window parameter so that it is flashing, press and hold down the [ENTER] button, then press the desired key.

If the bottom value is set higher than the top, it will automatically become the top value. Likewise, if the top value is set lower than the bottom value, it will automatically become the bottom value.

With Global mode Transpose set to 0, the X2 can be set from E1 to G7. The X3 can be set from C2 to C7.

By setting two or more tracks to the same MIDI Channel, but with different key windows, you can record and playback Program splits.

2A Step-Time Track Recording

This section explains how to record and edit a track in step time. Step-time recording allows you to enter notes one by one, specifying the duration, velocity, and value for each note. This is useful when recording something that is difficult to record in real time.

If the amount of free memory is low, delete an unnecessary song or some sequence data. See “2G Erase Song” on page 131, and “Erase All Sequencer Data” on page 98.

Note: If you step-time record on a measure that already contains some data, that data will be lost.

```
2A Step Rec
Tr:01 M311
```

2A-1

LCD	Parameter	Range	Description
2A-1	Track (Tr)	1-16	Select a track to record/edit
	Measure (M)	1-999	Select measure at which to start recording

- 1) Select the track that you want to record or edit.
- 2) Press the [→] button, then select the measure at which you want to start recording.

The following LCD screen appears.

```
2A M++P+ P+-. .
Tr:01 M523
```

2A-2

The above screen shows 10 measures (1 character per measure), with the current measure at the far left. The meaning of each character is explained below.

- + event exists
- no data in measure
- track has finished
- F pattern has been put
- ÷ pattern overlapping from previous measure

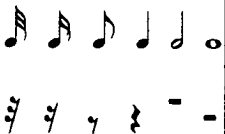
- 3) Press the [REC/WRITE] button.
- 4) Press the [START/STOP] button.

STEP appears on the LCD screen, as shown below.

```

EDIT  TRACK 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
          004 REC
SEQ      M          STEP
          1:00      04/04
          J- 0064 085%
```

The value indicated on the top line, left-hand side of the LCD screen indicates the current position within the measure. The current measure is indicated by the three large digits on the LCD screen. The measure number is not shown during recording.

LCD	Parameter	Range	Description
2A-2	Time Signature	1/4-9/4 1/8-16/8 1/16-16/16	Time signature (Base resolution = Low)
		1/4-5/4 1/8-10/8 1/16-16/16	Time signature (Base resolution = High)
	Note Type		Note/Rest (rests not shown on LCD)
	Triplet Normal Dot	3 — .	Triplet note of specified Note Duration Note as specified by Note Duration Dotted note of specified Note duration
	Velocity	V2-V126 Key	Specify note velocity Set velocity by pressing key
	Note Length	1-100%	Note length
	Note	C-1 to G9	Note range

Function Buttons

























[5]	Rest	Inserts a rest
[6]	Tie	Inserts a tie
[8]	Delete	Delete current step and go back one step

5) If you are recording a new track, specify the time signature.

If you have already recorded some tracks, the time signature set for those tracks will be selected. If you change the time signature here, it will be changed for those tracks, too.

6) Specify the note type and whether it's a dot, triplet, or normal.

The following table shows how normal note durations are affected by dots and triplets.

Note Type						
Normal	 0:12	 0:24	 0:48	 1:00	 2:00	 4:00
Dot	 0:18	 0:36	 0:72	 1:48	 3:00	 6:00
Triplet	 0:08	 0:16	 0:32	 0:64	 1:32	 2:64

7) Specify the note length from 1 to 100%.

A note length of 80% is normal.

A note length of 50% makes a note staccato.

A note length of 100% makes a note tenuto.

8) Specify the note velocity from 2 to 126. If key is selected, the velocity of the key you press in the next step will be used. The note velocity can be set to even values only.

- 9) Press a key, or play a chord to enter the corresponding notes. When entering a chord, timing is not critical, because as long as one note is held down, all subsequent notes will be entered at the current step. When all keys are released, the next step is selected automatically.

The note type, note value, velocity, and length are displayed when keys are pressed.

- 10) Repeat steps 6 to 9 to enter more notes.
11) To end step-recording, press the [START/STOP] button.

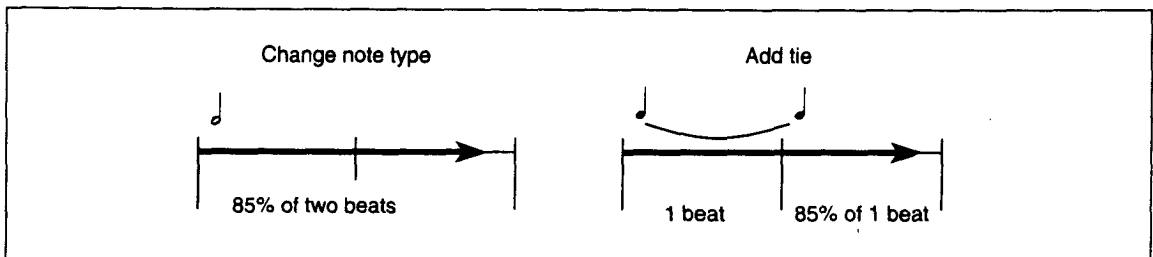
Entering Rests

To enter a rest at the current step, specify the note type (step 6) and the note length (step 7), then press function button [5] (REST). The current position will be moved forward by the amount specified in steps 6 and 7.

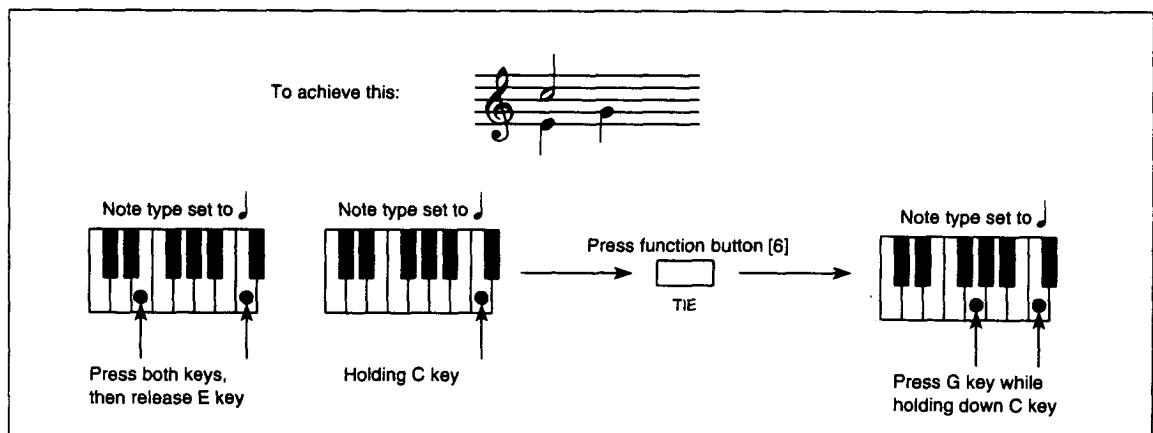
Entering Ties

To tie the previously entered note, press function button [6] (TIE). The note length will be increased by the amount specified in steps 6 and 7.

To enter a note that is longer than the specified note type, you can either change the note type, or use a tie. The resultant note length is different for each method.



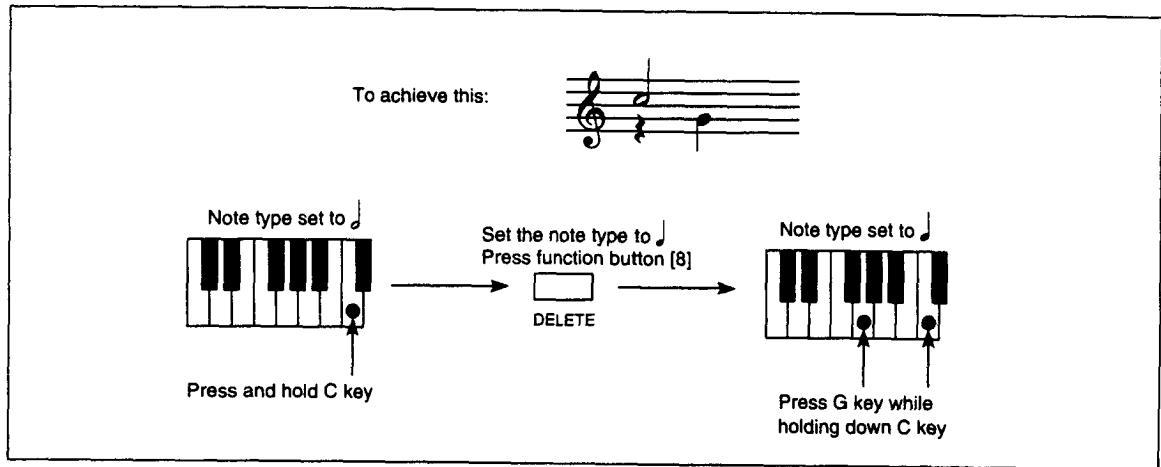
Ties can also be entered while entering notes. Press and hold down a key, then press function button [6] (TIE). The note length will be increased by the specified note type. Because the entered tie only applies to notes whose corresponding key is held down, you can use this technique to apply different note lengths to individual notes within a chord, as shown below.



Deleting Notes

Press function button [8] (DELETE) to delete data at the current step and go back one step.

Function button [8] (DELETE) can also be used to enter different note types, as shown in the illustration below.



Step Recording & Controller Data

You cannot enter Controller data while step-time recording. However, you can record Controller data in real time, then use bounce track ("2D Bounce Track" on page 129). Alternatively, use event edit ("2B Event Edit" on page 121), or create the controller data ("3D Create Controller Data" on page 135).

2B Event Edit

This section explains how to edit, insert, and delete events recorded in a track. Note type events consist of note value, velocity, and length. Other event types, Pitch Bend, After Touch, Controllers, Program Change, etc., usually consist of just one variable. A Bar Beat event sets the time signature, and a Tempo Change event sets the tempo. End of Track and Pattern In Measure events are displayed, but cannot be edited.

Note: When you edit events, you are actually editing data in the track. So, if you make a mistake, you cannot restore the original data. Beware of this while editing.

2B Event Edit
 Tr01 NOTE:ENA
 2B-1

LCD	Parameter	Range	Description
2B-1	Track	Tr01–Tr16, Temp	Edit track
	Event Filter	NOTE CTRL AFTT BEND PROG PAFT	Note data Controller data After Touch data Pitch Bend data Program Change data Polyphonic After Touch data
	DIS/ENA	DIS ENA	Editing disabled Editing enabled

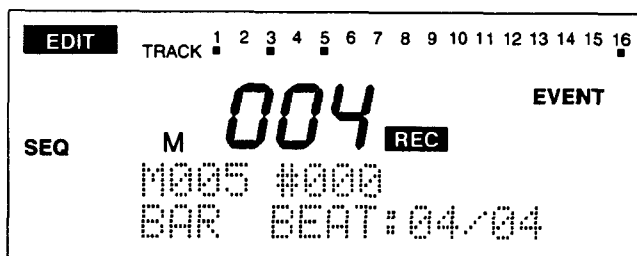
- 1) Select a track.
- 2) Disable or enable event types as required.

Disabled event types cannot be edited.

If you selected the Tempo track, only tempo related events can be edited. Tempo events cannot be disabled.

- 3) Press the [REC/WRITE] button.
- 4) Press the [START/STOP] button.

The following LCD screen appears.



- 5) Use the [↑] and [↓] cursor buttons to select events.

To quickly locate events in a song, press the [START/STOP] button to start playback, press the [START/STOP] button again to stop playback, then enter select this Event Edit function. The measure at which playback was stopped will be selected automatically.

Measures that contain patterns cannot be edited.

- 6) Use the [▲/YES] and [▼/NO] buttons, or number keypad to edit event values.
- 7) When you've finished editing, press the [START/STOP] button.

The following LCD screens are available for event editing. The tempo LCD screen appears only when the Tempo track has been selected.

Beat

```
M001 #001 1:00
BAR BEAT:12/16
```

The Beat LCD screen shows the beat.

Note Event

```
M001 #001 1:00
C#2 V064 0:72
```

The note event LCD screen shows note value (C#2), velocity (V064), and length (0:72).

Note velocity cannot be set to an odd value.

Note events will play as you edit them.

Pitch Bend

```
M001 #002 1:00
BEND +3281
```

The pitch bend LCD screen shows the pitch bend value (+3281).

After Touch

```
M001 #003 1:00
AFTT 058
```

The After Touch LCD screen shows the After Touch value (058).

Program Change

```
M001 #004 1:00
PROG A:125
```

The Program Change LCD screen shows the bank (A) and Program Change number (125).

Controller

```
M001 #005 1:00
CTRL 007:127
```

The Program Controller LCD screen shows the Controller type (007) and Controller value (127).

Polyphonic After Touch

```
M001 #006 1:00
PAFT C#4:098
```

The polyphonic After Touch LCD screen shows the note value (C#4) and amount of After Touch (098).

Tempo

M001 #001 1:00
TEMPO 120

The tempo LCD screen shows the tempo.

	Event Type	BAR C-1 to G9 BEND AFTT PROG CTRL PAFT TEMPO	Bar line Note Pitch bend Channel After Touch Program Change Controller Polyphonic After Touch Tempo (Tempo track only)
	Beat	1/4-9/4 1/8-16/8 1/16-16/16	Base resolution = Low
		1/4-5/4 1/8-10/8 1/16-16/16	Base resolution = High
	Velocity Bend After Touch Program Bank Controller No. Poly After touch Key Tempo	2-126 -8192...+8191 0-127 A, B, C, D, 4-127, GM, GMD, ... 0-101 C-1 to G9 40-240	(for notes) (even number steps) (for Pitch Bend) (for channel) (for program changes) (for control changes) (for poly After Touch) (for tempo changes) (Tempo track only)
	Length Program Number Data Value Data Tempo	0:00-9:00, TIE 00-127 0-127 0-127 40-240	Note length (for notes) (for program changes) (Control No. = 10 Pan) Control data (for control changes) Tempo change data

Function Buttons

[7]	Insert	Insert a note event
[8]	Delete	Delete the current note event

The following three values are shown on all event edit LCD screens. They are, from left to right, Current Measure (M001), Event Index Number (#001), and Event Time In Measure (1:00). Use the [↑] and [↓] buttons, or change the Measure and Index No. values to select events for editing.

Measure	1-999	Select measure to edit
Index No.	0-	Event Index number
Event time	1:00-9:95, TIE	Time of event in measure

Each event in a measure has an index number. When an event is deleted, moved, or new events inserted, existing events are re-indexed (reordered).

The event time corresponds to the beat in the bar and the beat clock. For example, 2:48 indicates an event 48 clock ticks after the second beat in a measure.

Beats are divided into 96 clock ticks (one MIDI Clock tick is equivalent to four X2/X3 clock ticks). However, in Low base resolution ("8B Song Base Resolution" on page 151), beats are divided into 48 clock ticks. So adjustments will be in steps of two.

Event Edit Notes

Time Signature: the following bar beat LCD screen appears at the beginning of each measure.

```
M001 #000
BAR BEAT:04/04
```

If the time signature (beat) is changed, that change is reflected across all tracks.

End of Track: when the end of the track is reached, the following message appears.

```
M001 #007
End Of Track
```

Patterns in Measures: if a measure contains a pattern, the pattern name will be shown, as below.

```
M002 PAT00(H)
BAR BEAT:04/04
```

The (H) indicates that the head of the pattern (start) is within the measure.

Polyphonic After Touch: the X2/X3 tone generator does not support Polyphonic After Touch. However, this type of event can be recorded and played by the sequencer for use with external MIDI devices.

Moving Events

Events can be moved within a measure.

- 1) Select the event that you want to move.
- 2) Position the cursor on the event time field.
- 3) Use the [▲/YES] and [▼/NO] buttons or the number keypad to change the event time.

When events are moved, index numbers are reordered automatically.

Deleting Events

- 1) Select the event that you want to delete.
- 2) Press function button [8] (DELETE).

If you delete an event by mistake, press function button [7] (INSERT) to retrieve it. For tied notes, only the note will be restored, you'll have to add the tie yourself.

Inserting New Events

- 1) Press function button [7] (INSERT) to insert one event just before the currently selected event.
- 2) Edit the event time and event type as required.

If you have just deleted an event, that event will be inserted when function button [7] is pressed.

Events can also be inserted into a new track. Although, you must insert some measures first. See "4D Insert Measure" on page 140.

Cutting & Pasting Events between Measures

You can cut and paste events using the Delete and Insert functions.

- 1) Select the event, and press function button [8] (DELETE).
- 2) Select another measure, and press function button [7] (INSERT).

The event cut in step 1 will be inserted. Adjust the event data as required.

Tied Notes

Notes that overlap bar lines are treated as tied notes. The following LCD screens show a note that overlaps measures 2 and 3.

A	B
M002 #001 1:00	M003 #001 TIE
C#2 0004 TIE	C#2 2:04

LCD screen A shows the note value and velocity. Length is shown as TIE. LCD screen B shows the same note value and index number as A. However, its event time is shown as TIE, and the length of the tied note is shown.

To edit the note value and velocity, use LCD screen A. LCD screen B will be updated automatically. If the note length value on LCD screen A is changed to anything other than TIE, an event time of 1:00 will be set on LCD screen B.

To edit the note length, use LCD screen B. If you delete on LCD screen B only, the note will continue to the end of the measure in which it starts.

Deleting a tied note on LCD screen A will also delete a tied note on LCD screen B.

To insert tied A and B notes, insert a note at 1:00 in B, then insert note A and set its note length to TIE. Set the note value and velocity for both notes the same. This procedure also applies to tied notes that overlap measures.

Controller Event Edit Notes

The following table shows which Controllers the X2/X3 supports.

Controller No.	Controller	Value	Notes
0	Bank Select (MSB)	0-127	MSB of MIDI Bank Select message
1	Pitch Modulation	0 (off)-127	Move the joystick up
2	VDF Modulation	0 (off)-127	Move the joystick down
4	Foot Controller	0-63 (main) 64-127 (sub)	Select scale (main, sub)
6	Data Entry	0-127	For RPN Edit (MSB) *3
7	Volume	0-127	Volume *2
10	Panpot	0-127	AB pan (see "MIDI Panpot, Send Data" on page 128)
11	Expression	0-127	Same as volume *2
12	Effect Control 1	0-127	Effect dynamic modulation 1
13	Effect Control 2	0-127	Effect dynamic modulation 2
32	Bank Select (LSB)	0-127	LSB of MIDI Bank Select message *1
38	Data Entry	0-127	For RPN Edit (LSB) *3
64	Damper Switch	0-63 (off), 64-127 (on)	
72	Release Time	0-64-127	Play mode edit release time *4
73	Attack Time	0-64-127	Play mode edit attack time *4
74	Brightness	0-64-127	Play mode edit cutoff *5
91	Reverb Level	000-013 : 0 014-026 : 1 027-040 : 2 041-053 : 3 054-067 : 4 068-080 : 5 081-094 : 6 095-107 : 7 108-121 : 8 122-127 : 9	Send C Level (see "MIDI Panpot, Send Data" on page 128)
92	Effect1 on/off	0 (off), 1-127 (on)	Effect 1 on/off
93	Chorus Level	000-013 : 0 014-026 : 1 027-040 : 2 041-053 : 3 054-067 : 4 068-080 : 5 081-094 : 6 095-107 : 7 108-121 : 8 122-127 : 9	Send D Level (see "MIDI Panpot, Send Data" on page 128)
94	Effect2 on/off	0 (off), 1-127 (on)	Effect 2 on/off
96	Data Increment	00	RPN data increment *3
97	Data Decrement	00	RPN data decrement *3
100	RPN	0 = Pitch Bend Sensitivity 1 = Fine Tune 2 = Coarse Tune	Registered parameter No. (LSB) *3
101	RPN	00	Registered parameter No. (MSB) *3

Controllers 12, 13, 92, 94, (Effect Control 1 and 2, and Effect 1 and 2 On/Off) use the Controller data on the track that matches the Global MIDI Channel.

Note *1: Usually, Bank Select is set as part of a Program Change event. However, some MIDI devices may not respond. In this case, set the MSB (first pair of digits) and LSB (second pair of digits) for the Bank Select message. Refer to the MIDI device's operating manual to see how it responds to Bank Select messages.

Note *2: The X2/X3 volume is determined by multiplying Volume Controller No. 7 and Expression Controller No. 11. When the [RESET] button is pressed, the volume is reset to its starting value, and expression is set to maximum (127).

Note *3: Use RPN to select a parameter for editing, then use the Data Entry parameter to set the selected parameter. Control number 100 (value: 00-02) and 101 (value: 00 fixed) will select a parameter. The following tables show the various parameters that respond to Data Entry Controllers No. 6 and No. 38.

Controller No.		
06	38	Pitch Bend (semitone)
00	00	0
01	00	+1
:	:	:
12	0	+12

Controller No.		
06	38	Coarse Tune (semitone)
40	00	-24
52	00	-12
64	00	0
88	00	+24

Controller No.		
06	38	Fine Tune (cent)
32	00	-50
:	:	:
48	00	-25
:	:	:
64	00	0
:	:	:
96	00	+50

For example, if you wish to set Transpose (Coarse Tune) of a track on MIDI Channel 1 to -12, transmit [B0,64,02] and [B0,65,00] to the X2/X3 to select Coarse Tune RPN. Then send [B0,06,34] and [B0,26,00] to set the value to -12.

To select Coarse Tune RPN on most sequencers, you set the MIDI Channel for Control Change to 1, and set Controller 100 to 02, and Controller 101 to 00. To set the value to -12, set Controller 6 to 52 (which corresponds to -12) and Controller 38 to 00.

Note *4: When the value is 64, the Program setting will be used. Settings below 64 reduce the time, and settings above 64 increase the time.

Note *5: When the value is 64, the Program setting will be used. Setting below 64 make the sound darker, while settings above 64 make the sound brighter.

MIDI Panpot, Send Data

Panpot	
MIDI IN Pan Data	X2/X3 Pan
0-2	A
3-6	14A
7-10	13A
11-15	12A
16-19	11A
20-23	10A
24-27	9A
28-32	8A
33-36	7A
37-40	6A
41-44	5A
45-49	4A
50-53	3A
54-57	2A
58-62	1A
63-66	CNT
67-70	1B
71-74	2B
75-79	3B
80-83	4B
84-87	5B
88-91	6B
92-96	7B
97-100	8B
101-104	9B
105-108	10B
109-113	11B
114-117	12B
118-121	13B
122-125	14B
126-127	B

On the X2/X3, use Send Level C controller to control Reverb Depth [Bn, 5B, vv], and Send Level D controller to control Chorus Depth [Bn, 5D, vv].

Send	
MIDI IN Send Data	X2/X3 Send
0-13	0
14-26	1
27-40	2
41-53	3
54-67	4
68-80	5
81-94	6
95-107	7
108-121	8
122-127	9

2C Erase Track

This function allows you to erase a track.

```
2C Erase Track
Tr01      OK?
```

2C-1

LCD	Parameter	Range	Description
2C-1	Track (Tr)	1-16	Select track to erase
	OK to Erase Track	OK?	Executes track erase

- 1) Select a track.
- 2) Position the cursor on OK?, and press the [▲/YES] button.

Quick Undo

If you erase a track by mistake, press the [COMPARE] button to restore it.

2D Bounce Track

This function allows you to merge data from two tracks into one.

```
2D Bounce Track
Tr01+Tr02  OK?
```

2D-1

LCD	Parameter	Range	Description
2D-1	Source Track (Tr)	1-16	Select a source track
	Destination Track (Tr)	1-16	Select a destination track
	OK to Bounce Track	OK?	Executes track bounce

- 1) Select the source track.
- 2) Select the destination track.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

If either track contains patterns that have been put into them, you will be asked whether you want to open the patterns. Press the [▲/YES] button to open the patterns, copy their data to the tracks, and merge as required, or the [▼/NO] button to ignore the pattern data.

The data in the source track will be erased.

Track settings such as Program and MIDI Channel are determined by the destination track.

Note: If the source and destination tracks both contain MIDI Controller data, the resulting Controller data will probably be unusable. In this case, use the "4B Erase Measure" function on page 138 to erase the MIDI Controller data before bouncing.

2E Copy Track

This function allows you to copy data from one track to another.

```
2E Copy Track
Tr01+Tr02  OK?
```

2E-1

LCD	Parameter	Range	Description
2E-1	Source Track (Tr)	1-16	Select a source track
	Destination Track (Tr)	1-16	Select a destination track
	OK to Copy Track	OK?	Executes track copy

- 1) Select the source track.
- 2) Select the destination track.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

2F Append Song

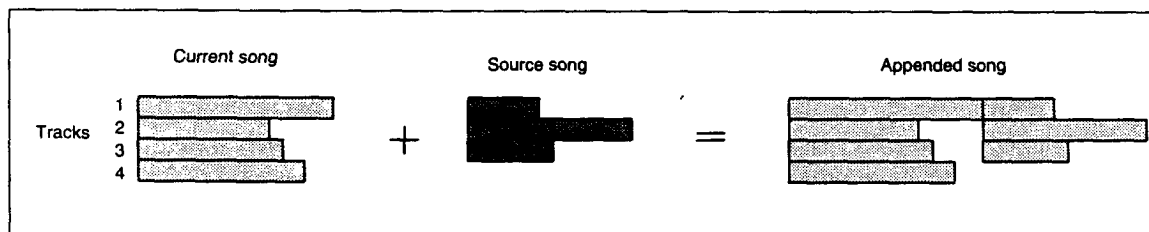
This function allows you to append a song onto the end of the current song. It can also be used to copy songs.

```
2F Append Song
SONG0  OK?
```

2F-1

LCD	Parameter	Range	Description
2F-1	Source Song (SONG)	0-9	Select a source song
	OK to Append Song	OK?	Executes append

- 1) Select the source song.
- 2) Position the cursor on OK?, and press the [▲/YES] button.



Track settings such as Program and MIDI Channel are determined by the current song.

If the current song has some unused measures at the end of it, delete them. See “4A Delete Measure” on page 137.

The source song is not affected by this function.

Note: You cannot append songs that have different base resolutions.

Song Copy

“2F Append Song” can also be used to copy songs.

- 1) Make sure that there is no data in the current song. If there is, erase it. See “2C Erase Track” on page 129.
- 2) Select the source song.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

2G Erase Song

This function allows you to erase all the data in the currently selected song.

```
2G Erase Song
SONGB OK?
```

2G-1

LCD	Parameter	Range	Description
2G-1	OK to Erase Song	OK?	Executes song erase

1) Press the [▲/YES] button.

If you want to erase a song other than the currently selected song, in Sequencer mode, press function button [8] to select the Song Select LCD screen. Select a song, then return to this function to erase it. The song's name is not erased.

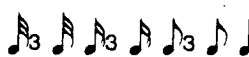
3A Quantize

This function allows you to improve the timing of data recorded in a track.

```
3A Quantize > 3A Quantize <
Tr01 M123+135 HI ALL 0+00 100 OK?
```

3A-1

3A-2

LCD	Parameter	Range	Description
3A-1	Track	Tr1-Tr16, Tempo Track	Select a track to be quantized
	Start Measure (M)	1-999	Select first measure to be quantized
	End Measure	1-999	Select last measure to be quantized
	Quantize Resolution	HI 	
3A-2	Data to Quantize (Track 1-16 only)	ALL NTE CNT ATT BND PRG	All data Note data Controller data After touch data Pitch bend data Program Change data
	Offset (O)	-96...+96	Quantize offset
	Intensity	0-100%	Quantize intensity
	OK to Quantize	OK?	Executes quantizing erase

- 1) Select a track.
- 2) Select the start and end measures.
When the Start Measure and End Measure parameters are selected, the status of the 10 measures after the currently selected measure are shown on the LCD.
- 3) Set the Quantize Resolution.
- 4) Select the data to be quantized. This option does not appear when the Tempo track is selected.
- 5) Set the Offset and Intensity.
- 6) Position the cursor on OK?, and press the [▲/YES] button.

This quantize function does not affect note length.

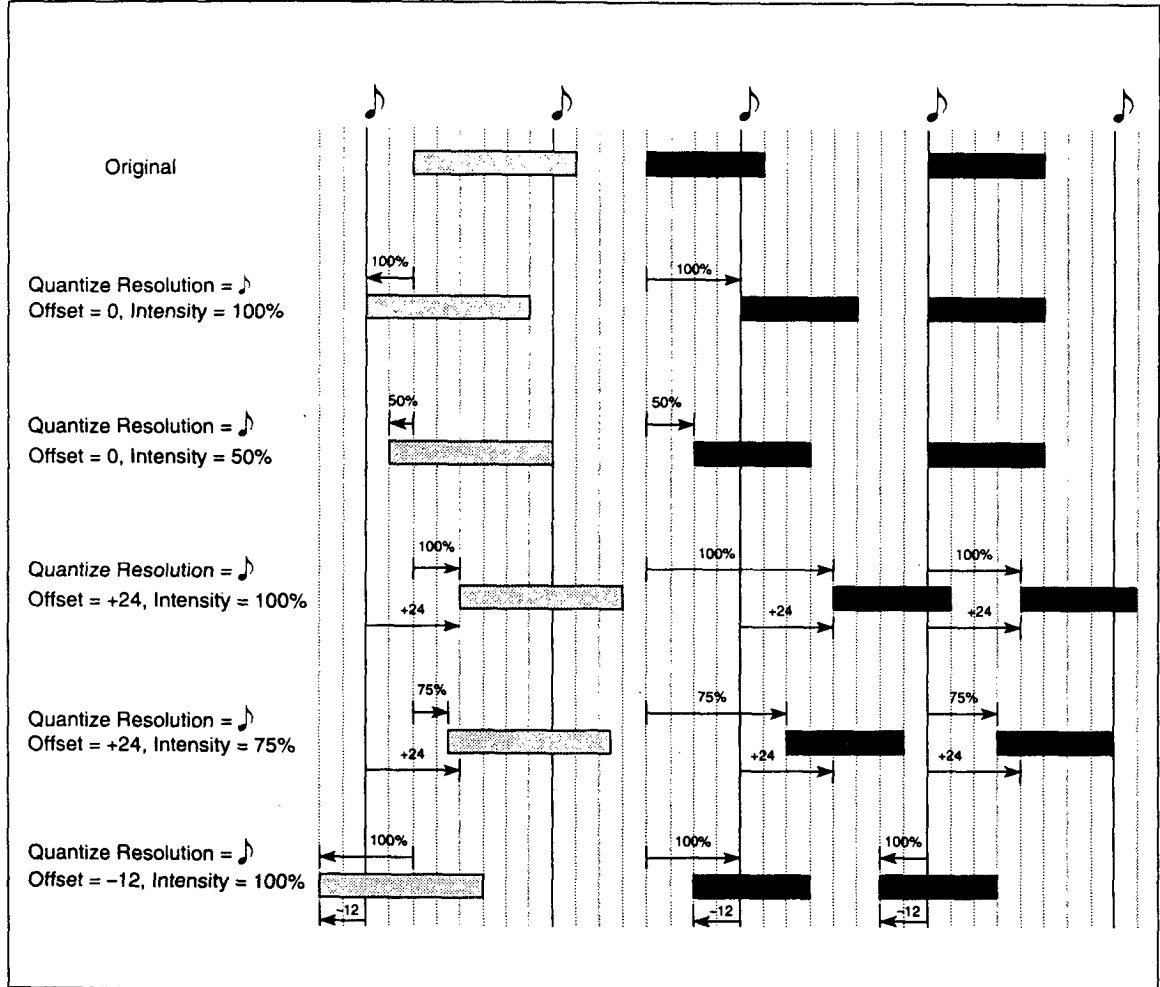
If the quantize resolution is set to HI, data will be quantized at the same resolution as that set for the song. See "8B Song Base Resolution" on page 151. In this case, note data is unaffected. This allows you to thin out Controller data and free up sequencer memory.

Recording continuously variable data such as After Touch and joystick uses a lot of memory. You can reduce the amount of memory used by quantizing. However, before quantizing you should check to make sure that the quantize value is not too low. With too low a value the continuous data may become jerky and unnatural.

3A-2 Data to Quantize: when ATT is selected, Channel After Touch data and Polyphonic After Touch data is quantized. The X2/X3 tone generator does not support Polyphonic After Touch. However, this type of event can be recorded and played by the sequencer for use with external MIDI devices.

When CNT is selected, all Controller data is combined into one event. This allows you to thin out Controllers and free up sequencer memory.

The following illustrated examples show how notes are affected by the Offset and Intensity parameters.



3B Shift Note

This function allows you to shift the pitch of a specified range of notes in specified measures.

3B Shift Note Tr01 M123+135	>	3B Shift Note C-1+C-1 S+00 OK?	<
3B-1		3B-2	

LCD	Parameter	Range	Description
3B-1	Track (Tr)	1-16	Select a track
	Start Measure (M)	1-999	Select first measure for note shift
	End Measure	1-999	Select last measure for note shift
3B-2	Note Range Bottom	C-1 to G9	Set the lowest note in the range
	Note Range Top	C-1 to G9	Set the highest note in the range
	Note Shift Amount (S)	-24...+24	Amount of pitch shift in semitones
	OK to Note Shift	OK?	Executes note shift

- 1) **Select a track.**
- 2) **Select the start and end measures.**
When the Start Measure and End Measure parameters are selected, the status of the 10 measures after the currently selected measure are shown on the LCD.
- 3) **Set the low and high notes of the range. Notes outside this range are unaffected.**
- 4) **Set the amount of pitch shift.**
- 5) **Position the cursor on OK?, and press the [▲/YES] button.**

If the specified range of measures contains a pattern that has been put into the track, you will be asked whether you want to open the pattern. Press the [▲/YES] button to open the pattern, copy the pattern data into the track, and pitch shift it, or the [▼/NO] button to ignore the pattern data.

The Note Range Bottom and Note Range Top parameters can also be set by pressing a key on the keyboard while holding down the [ENTER] button.

3C Modify Velocity

This function allows you to modify note velocity over a number of measures. This is useful for creating crescendo type effects.

3C Modify Vel >	3C Modify Vel <
Tr01 M123+135 C1	002+126 I000 OK?
3C-1	3C-2

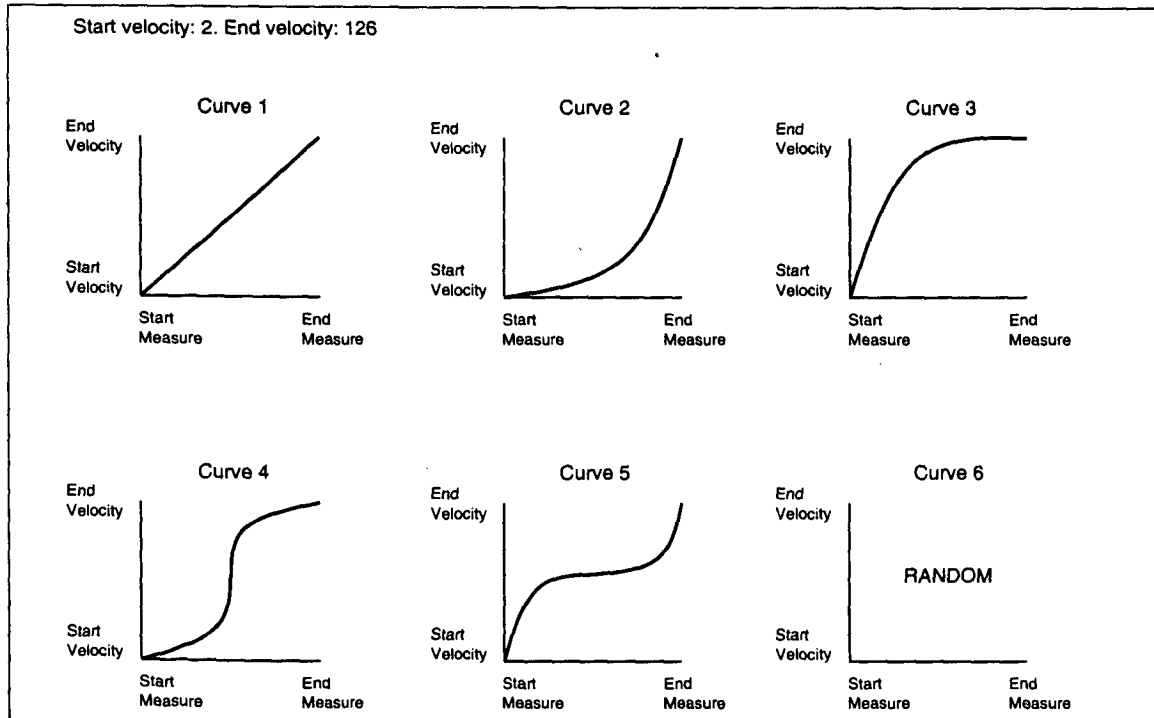
LCD	Parameter	Range	Description
3C-1	Track (Tr)	1-16	Select a track
	Start Measure (M)	1-999	Select first measure for note shift
	End Measure	1-999	Select last measure for note shift
	Curve (C)	1-6	Velocity curve
3C-2	Start Velocity	2-126	Velocity value for the first note in the selected start measure
	End Velocity	2-126	Velocity value for the last note in the selected end measure
	Intensity (I)	0-100%	Modify velocity intensity
	OK to Modify Velocity	OK?	Executes modify velocity

- 1) Select a track.
- 2) Select the start and end measures.

When the Start Measure and End Measure parameters are selected, the status of the 10 measures after the currently selected measure are shown on the LCD.
- 3) Select a velocity curve.
- 4) Set the Start and End Velocity values.
- 5) Set the Intensity.
- 6) Position the cursor on OK?, and press the [▲/YES] button.

3C-2 Intensity: for a setting of 0%, there is no change. For a setting of 100%, note velocities are changed as specified by the Start Velocity and End Velocity parameters.

If the specified range of measures contains a pattern that has been put into the track, you will be asked whether you want to open the pattern. Press the [▲/YES] button to open the pattern, copy the pattern data into the track, and modify velocity, or the [▼/NO] button to ignore the pattern data.



3D Create Controller Data

This function allows you to edit controller data such as Pitch Bend and After Touch.

3D Create Ctl Tr01 M123 1:00	>	3D Create Ctl M126 1:00 0000	<>	3D Create Ctl 120+000	<	OK?
3D-1		3D-2		3D-3		

LCD	Parameter	Range	Description
3D-1	Track	1-16, Tempo Track	Select a track
	Start Measure (M)	1-999	Select the start measure
	Start Location	1:00-9:95	Specify a position within the start measure
3D-2	End Measure (M)	1-999	Select the end measure
	End Location	1:00-9:95	Specify a position within the end measure
	Controller (track 1-16 only)	BEND AFTT CNT 000-101	Select a Controller to edit (see the table in "Controller Event Edit Notes" on page 126 for a list of X2/X3 compatible Controllers)
3D-3	End Value (END)	ERA, -8192...+8191	Pitch bend
		ERA, 40-240	Tempo data (only for Tempo track)
		ERA, 0-127	Other Controllers
	OK to Create Control Data	OK?	Executes create control data

- 1) Select a track.
- 2) Select the start measure and the position within that measure from where you want to edit.

When the Start Measure and End Measure parameters are selected, the status of the 10 measures after the currently selected measure are shown on the LCD.

The start and end locations correspond to the beat in the bar and the beat clock. For example, 2:48 indicates an event 48 clock ticks after the second beat in a measure.

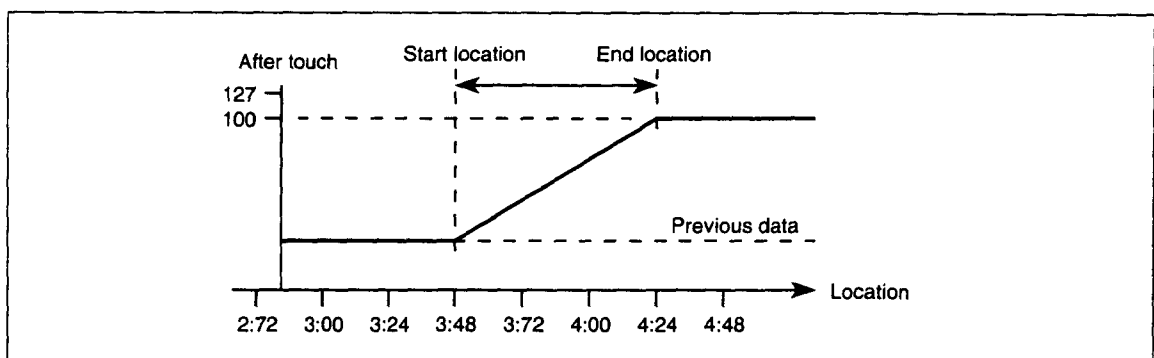
Beats are divided into 96 clock ticks. However, in Low base resolution ("8B Song Base Resolution" on page 151), beats are divided into 48 clock ticks. So adjustments are in steps of two.

- 3) Select the end measure and the position within the measure where you want to stop editing.
- 4) Select the Controller that you want to edit.
- 5) Specify the end value for the Controller data.

If you specify ERA, the specified Controller data in the specified range is erased.

- 6) Position the cursor on OK?, and press the [▲/YES] button.

In the following example, the start location is set to 3:48, the end location to 4:24, the Controller type is AFTT, and the end value is 100. The value of the After Touch data rises to the new value of 100, between the specified start and end locations.



If a pattern is located between the specified start and end locations that have been put into the track, you will be asked whether you want to open the pattern. Press the [▲/YES] button to open the pattern, copy its data into the track, and edit the Controller data as necessary, or the [▼/NO] button to ignore the pattern data.

Editing a lot of Controller data uses a large amount of sequencer memory, so, if there isn't much sequencer memory available, you may not be able to edit the Controller data. In this case, thin out the Controller data using the quantize function. See "3A Quantize" on page 131. Alternatively, apply quantization to the data inserted using the Create Control Data function.

X2/X3 Programs can be panned to any one of 31 positions. Some MIDI devices can be panned to any one of 128 positions (0–127). However, this type of pan data uses a lot of sequencer memory, so editing uses a lot of sequencer memory. Pan data is best recorded in real time or using Event Edit.

4A Delete Measure

This function allows you to delete measures. Unlike "4B Erase Measure" on page 138, this function deletes measures and moves subsequent measures forward.

4A Delete Meas >	4A Delete Meas <
Tr01 M123+135	OK?
4A-1	4A-2

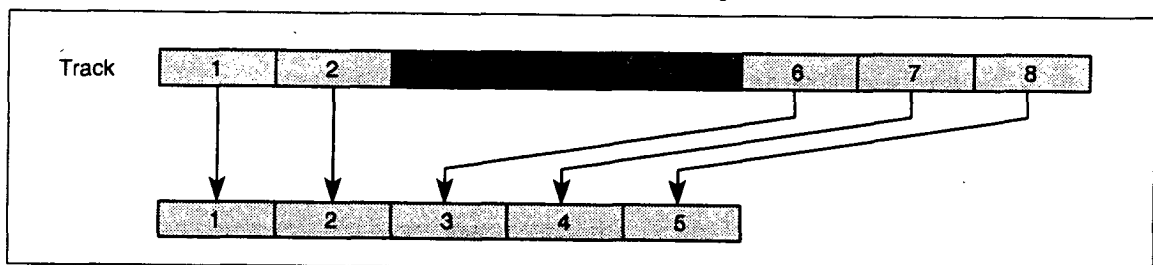
LCD	Parameter	Range	Description
4A-1	Track	Tr1-Tr16, ALL	Select a track
	Start Measure (M)	1-999	Select first measure for deletion
	End Measure	1-999	Select last measure for deletion
4A-2	OK to Delete Measure	OK?	Executes delete measure

- 1) Select a track.
- 2) Select the start and end measures.

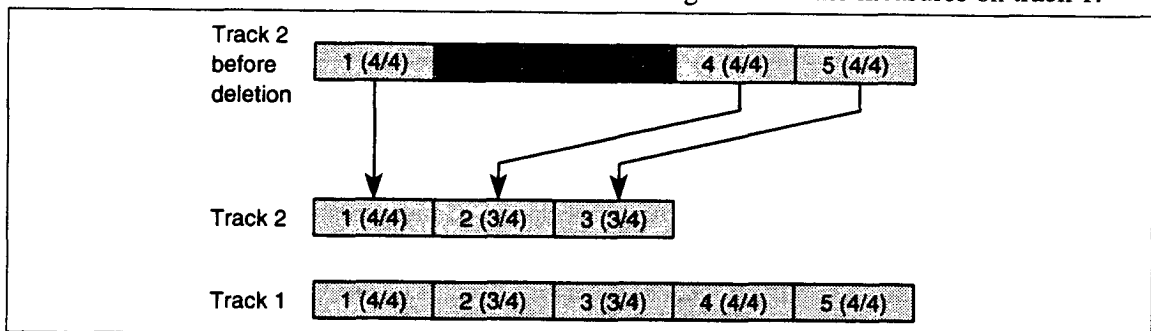
When the Start Measure and End Measure parameters are selected, the status of the 10 measures after the currently selected measure are shown on the LCD.

- 3) Position the cursor on OK?, and press the [▲/YES] button.

The start measure, end measure, and any measures in-between are deleted. Subsequent measures after the end measure are moved forward. In the following illustration, measures 3 to 5 have been deleted, and measures 6, 7, and 8 move forward to take the place of the deleted measures.



Measures that are moved forward use the same time signature as measures in other tracks. For example, in the following illustration, two 3/4 time measures are deleted from track 2. Subsequent measures are moved forward, and set to the same time signature as the measures on track 1.



When ALL tracks are deleted, the Tempo track (with time signature and tempo) is not affected. So, subsequent measures that are moved forward use these time signature and tempo settings.

If the Track parameter is set to ALL, the specified measures from all tracks are deleted, including the Tempo track. If a note overlaps the range of measures being deleted, that note will be shortened accordingly.

Note: Even if part of a tied note is in the area to be deleted, it is only notes that are actually inside the area that are deleted. This applies to Controller data, too.

If the start measure or end measure overlaps a pattern that has been put into the track, you will be asked whether you want to open the pattern. Press the [▲/YES] button to record the pattern data into the track, and delete as necessary, or the [▼/NO] button to ignore the pattern data.

4B Erase Measure

This function allows you to erase data within a pattern. Unlike the Delete Measure function that actually deletes the measure, this function deletes only the data in the measure.

4B Erase Meas > Tr01 M123+M135	4B Erase Meas < ALL OK?
4B-1	4B-2

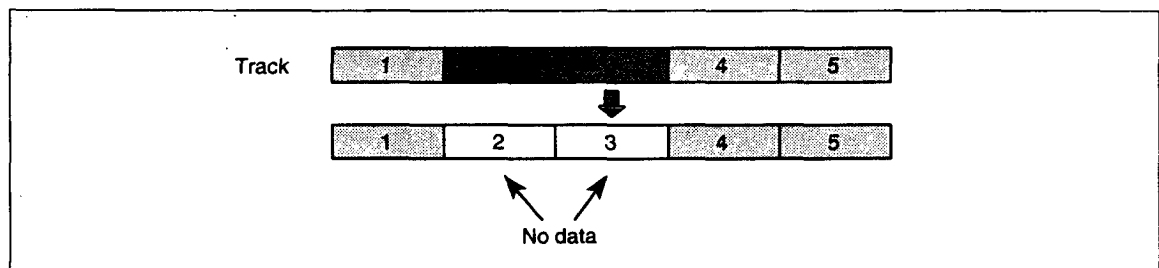
LCD	Parameter	Range	Description
4B-1	Track	Tr1-Tr16, ALL/	Select a track
	Start Meas (M)	1-999	Select first measure to be erased
	End Measure	1-999	Select last measure to be erased
4B-2	Data to Erase	ALL NTE CNT ATT BND PRG	All data Note data Controller data After Touch data Pitch bend data Program Change data
	OK to Erase Measure	OK?	Executes erase measure

- 1) Select a track.
- 2) Select the start and end measures. The status of each measure is shown on the LCD.

When the Start Measure and End Measure parameters are selected, the status of the 10 measures after the currently selected measure are shown on the LCD.

- 3) Select the data that you want to erase.
- 4) Position the cursor on OK?, and press the [▲/YES] button.

The start measure, end measure, and any measures in-between are erased. In the following illustration, measures 3 to 5 have been deleted.



When ATT is selected, Channel After Touch data and Polyphonic After Touch data are erased. The X2/X3 tone generator does not support Polyphonic After Touch. However, this type of event can be recorded and played by the sequencer for use with external MIDI devices.

If the track parameter is set to ALL, the specified measures will be erased from all tracks, including the Tempo track.

To delete just the tempo track, use the Event Edit, or Create Control data function. See "2B Event Edit" on page 121 and "3D Create Controller Data" on page 135.

If a note overlaps the range of measures, only the overlap will be erased.

If the start measure or end measure overlaps a pattern that has been put into the track, you will be asked whether you want to open the pattern. Press the [▲/YES] button to copy the pattern data into the track, and erase as necessary, or the [▼/NO] button to ignore the pattern data.

If you erase a measure that contains Controller data, such as Pitch Bend or Damper Pedal, a Controller may become stuck at a value other than its natural resting place. In this case, you will probably have to use the Event Edit function to correct the data. Alternatively, erase the Controller data. See "3D Create Controller Data" on page 135.

Note: Even if part of a tied note is in the area to be deleted, it is only notes that are actually inside the area that are erased. This applies to Controller data, too.

4C Copy Measure

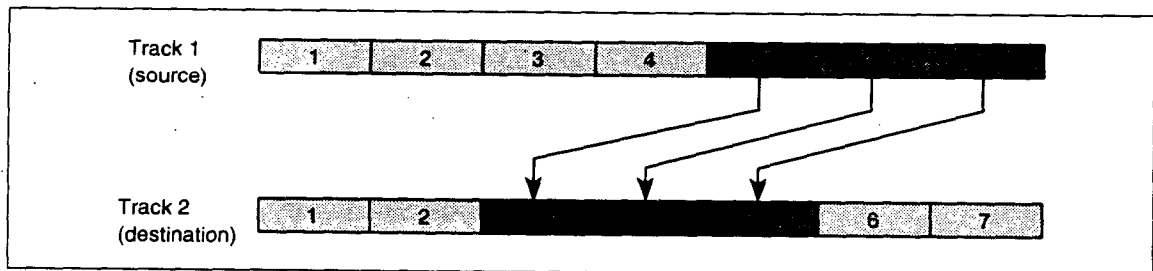
This function allows you to copy measures to other tracks.

4C Copy Meas Tr01 M123+135	>	4C Copy Meas Tr02 M001	<	OK?
4C-1		4C-2		

LCD	Parameter	Range	Description
4C-1	Source Track	Tr1-Tr16, ALL	Select a source track
	Source Start Measure (M)	1-999	Select first measure to be copied
	Source End Measure	1-999	Select last measure to be copied
4C-2	Destination Track	1-16, ALL	Select a destination track
	Destination Start Measure (M)	1-999	Select a destination start measure
	OK to Copy Measure	OK?	Executes measure copy

- 1) Select a source track.
- 2) Select the source start and end measures.
- 3) Select the destination track.
- 4) Select the destination start measure.
- 5) Position the cursor on OK?, and press the [▲/YES] button.

In the following example, the source is track 1, the start measure is set to 5, the end measure to 7, the destination track to 2, and the destination start measure to 3. Hence, track 1 measures 5 to 7 are copied to track 2 measures 3 to 5. Existing data in track 2, measures 3 to 5, is overwritten.



Existing data in the specified destination measures is overwritten.

If you specify some source measures that contain no data, empty measures are copied.

Copied measures use the same time signature as corresponding measures in other tracks (if any other tracks exist).

If the source track parameter is set to ALL, the specified measures from all tracks including the tempo track are copied. This is useful when creating repetitive song sections such as choruses, verses, etc.

If the source start measure or source last measure overlaps a pattern at the destination that consists of multiple measures, you will be asked whether you want to open the pattern. Press the [▲/YES] button to record and copy its data, or the [▼/NO] button to ignore the pattern data.

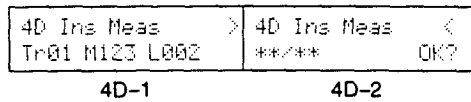
If the last measure of the copy destination contains a pattern that has been put into the track, it will be ignored, and the copied data will play.

If the destination start measure contains a pattern that has been put into the track, measures starting at this point will be replaced with the copied measures.

If the start measure contains a pattern that has been put into the track, subsequent measures that also used that pattern will no longer use it after the start measure has been erased.

4D Insert Measure

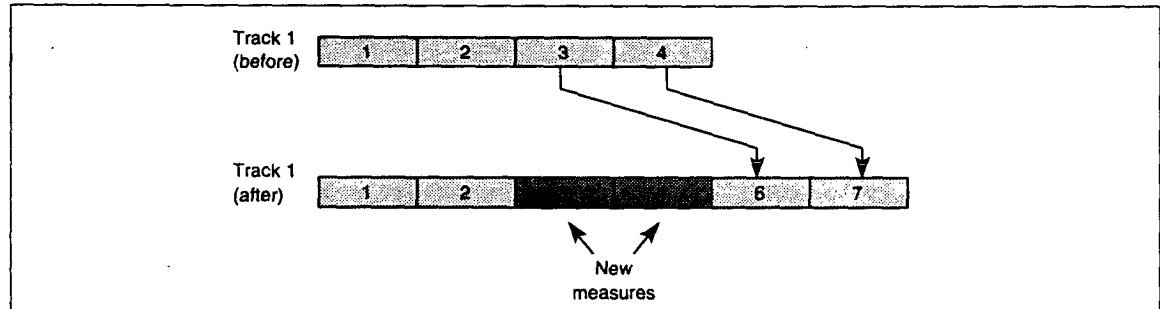
This function allows you to insert new measures into tracks.



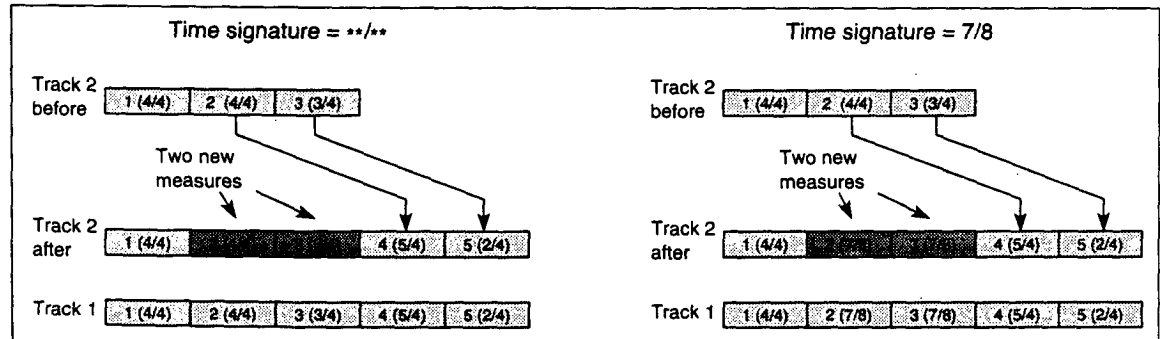
LCD	Parameter	Range	Description
4D-1	Destination Track	Tr1-Tr16, ALL	Select a destination track
	Destination Measure (M)	1-999	Specify where to insert measure(s)
	Number of Measures (L)	1-999	Specify the number of measures to be inserted
4D-2	Time Signature	**/**	Use time signature of measures in other tracks
		1/4-9/4 1/8-16/8 1/16-16/16	Low base resolution
		1/4-5/4 1/8-10/8 1/16-16/16	High base resolution
	OK to Insert Measure	OK?	Executes measure insert

- 1) Select the destination track, and specify the destination measure.
- 2) Specify the number of new measures to be inserted.
- 3) Specify the time signature for the new measures. If you don't want to change the time signature, select **/** (the time signature set previously will be used).
- 4) Position the cursor on OK?, and press the [▲/YES] button.

In the following example, two measures are inserted in track 1; the destination measure is set to 3.



If the time signature parameter is set to **/**, the new measures will use the time signature of corresponding measures in other tracks. If a time signature value is set, the new measures and all corresponding track measures will use that value. The following example shows both cases.



If the track parameter is set to ALL, new measures will be inserted into all tracks. If an existing note overlaps into the specified destination measure, it will be divided into two notes. If new measures are inserted into a section of a pattern, you will be asked whether you want to open the pattern. Press the [▲/YES] button to record the pattern data, and insert the new measures, or the [▼/NO] button to ignore the pattern data.

4E Put to Track

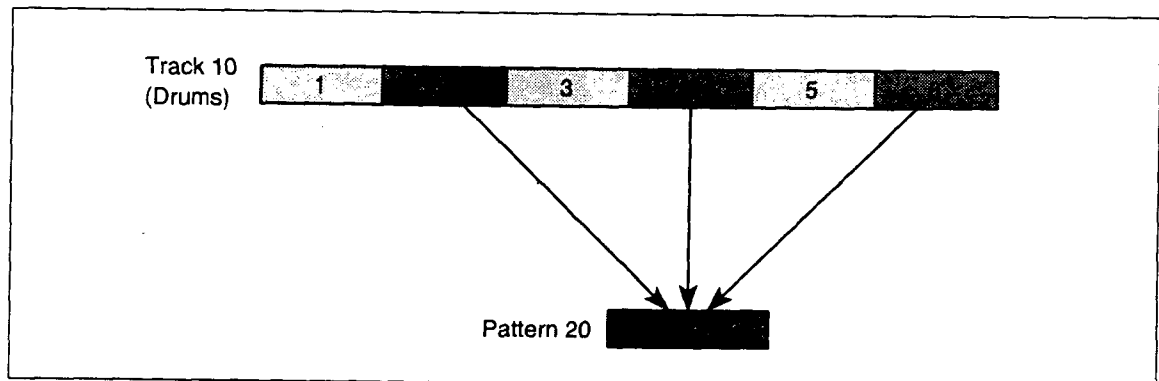
This function allows you to assign patterns to tracks. Unlike the Copy to Track function, however, the track does not contain the pattern data, just its number. In the computer world, this is sometimes referred to as an alias or link. It allows you to share common patterns in tracks and songs without having to duplicate (copy) the same data, which would use more sequencer memory. This could be used, for example, with a drum pattern that is used for each chorus. Rather than copy the data, make a pattern, then put that pattern into the track at the required times. Any changes made to that pattern are reflected in all tracks in which that pattern has been put.

4E Put To Tr P00 Tr01	>	4E Put To Tr M123	<	OK?
4E-1		4E-2		

LCD	Parameter	Range	Description
4E-1	Pattern (P)	0-99	Select pattern to put in track
	Destination Track (Tr)	1-16	Select destination track
4E-2	Destination Measure (M)	1-999	Select destination measure
	OK to Put to Track	OK?	Executes put to track

- 1) Select the pattern to put.
- 2) Select the track and measure into which the pattern is to be put.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

In the following example, Pattern 20 has been put to measures 2, 4, and 6 in Track 10.



Existing data in the destination measure is deleted, and subsequent measures are moved forward depending on the number of measures in the pattern. For example, if you put a pattern that contains only one measure, data in the destination measure is deleted, and subsequent measures do not move. However, if you put a pattern that contains three measures, data in the destination measure is deleted, and subsequent measures move forward by two measures.

The pattern's base resolution and time signature will be adjusted to match that of the put destination measure.

Track Controller data such as Pitch Bend (not Volume) is reset when a pattern is put. If you want to use Pitch Bend and Damper pedal, you must write the data directly to the pattern.

4F Copy to Track

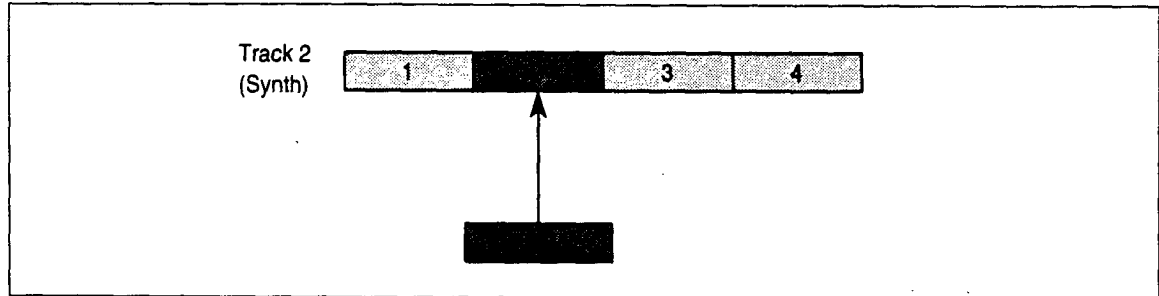
This function allows you to copy patterns into tracks.

4F Copy To Tr P00 Tr01	>	4F Copy To Tr M123 OK?	<
4F-1		4F-2	

LCD	Parameter	Range	Description
4F-1	Pattern (P)	0-99	Select pattern to copy to track
	Destination Track (Tr)	1-16	Select destination track
4F-2	Destination Measure (M)	1-999	Select destination measure
	OK to Copy to Track	OK?	Executes copy to track

- 1) Select the pattern to copy.
- 2) Select the track and measure into which the pattern is to be copied. The status of each measure is displayed.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

In the following example, the SynthSolo pattern is put into track 2.



Existing data in the destination measure is deleted, and subsequent measures are moved forward depending on the number of measures in the pattern. For example, if you copy a pattern that contains only one measure, data in the destination measure is deleted, and subsequent measures do not move. However, if you copy a pattern that contains three measures, data in the destination measure is deleted, and subsequent measures move forward by two measures.

The copied pattern's base resolution is adjusted to match that of the destination song.

The pattern uses the same time signature as the corresponding measures in other tracks.

5A Real-Time Pattern Record/Edit

Here we explain how to record and edit patterns in real time. Patterns can be built up in layers.

5A Real Rec P00 J=120 Q:HI	>	5A Real Rec MM:ON	<
5A-1		5A-2	

LCD	Parameter	Range	Description
5A-1	Pattern (P)	0-99	Select pattern to record/edit
	Tempo (♩)	40-240, EXT	Set the pattern tempo (EXT when MIDI Clock Source is EXT)
	Metronome (MM)	OFF ON REC	Metronome off Metronome for playback only Metronome for playback and recording
5A-2	Recording Quantize (Q)	HI	
	Add/Remove	[ADD] [RMV]	Overdubs data on subsequent passes through the pattern Removes corresponding data while a key is held down

Function Buttons

[8]	Delete		Deletes data while held down (only when recording)
-----	--------	--	--

Before recording a pattern, select the track that you intend to use the pattern in. The selected track's Program will be used while you record the pattern. If, after recording, a pattern is copied to another track, it will use the Program assigned to that track.

- 1) Set the "5D Pattern Setup Parameters" on page 147.
- 2) Select the pattern that you want to record or edit.
Patterns that were recorded in step time can also be selected.
- 3) Set the tempo, metronome, and recording quantize parameters as required.
- 4) Press the [REC/WRITE] button to engage Record Ready mode.
- 5) Press the [START/STOP] button to start recording, then start playing.

When the end of the last measure in the pattern is reached, recording continues from the first measure in the pattern, just like loop recording a song. What you play on subsequent passes through the pattern is overdubbed onto the previously recorded data. This allows you to build up a pattern in layers.

- 6) To stop recording, press the [START/STOP] button.

To play the pattern, press the [START/STOP] button.

If you want to add more to the pattern, repeat steps 4 to 6.

If you want to erase some data that you have just recorded, see below.

Deleting Data while Recording

There are two ways to delete data:

- 1) Start recording, then press and hold down function button [8] (DELETE). Data will be deleted while the button is held down. Release the button to stop deleting.
- 2) Start recording, position the cursor on [ADD], then press the [▲/YES] button. [ADD] will change to [RMV]. To delete a specific note, press the corresponding keyboard key. All corresponding notes will be deleted while that key is held down.

This technique can also be used to delete After Touch data. Just before the After Touch data that you want to delete is played, move the joystick. While the joystick is not in its normal resting position, all After Touch data is deleted.

The [RMV]/[ADD] parameter is set to [ADD] automatically when recording is started in the OVDB (Overdub) Recording mode.

Real-Time Pattern Record Notes

If you record Controller data such as Joystick, Pitch Bend, & Pedal, etc., make sure that the controller is returned to its normal resting position before the end of the pattern is reached. Otherwise, Controller data is loop recorded, and it affects the top of the pattern. When the song that includes the pattern is played, the top of the pattern is affected by unnecessary data. Overdubbing Controller data will probably produce unusable results, so it is best avoided.

When recording at a high resolution, a note that you played right at the beginning of a pattern may sometimes be added to the end the pattern. Recording at a low resolution will prevent this.

5B Step-Time Pattern Recording

This section explains how to record and edit patterns in step time.

5B Step Rec
P00

5B-1


LCD	Parameter	Range	Description
5B-1	Pattern (P)	0-99	Select pattern to record/edit

Before recording a pattern, select the track that you intend to use the pattern in. The selected track's Program will be used while you record the pattern. If after recording a pattern is copied to another track, it will use the Program assigned to that track.

- 1) Set the "5D Pattern Setup Parameters" on page 147.
- 2) Select the pattern that you want to record or edit.
- 3) Press the [REC/WRITE] button to engage Record Ready mode.
- 4) Press the [START/STOP] button. The following LCD screen appears, and the following note parameters are available.

1:00 16/16
J- 0064 875% C#1

The value at the left-hand side of the top line indicates the current position within the pattern.

LCD	Parameter	Range	Description
	Time Signature	1/4-9/4 1/8-16/8 1/16-16/16	Time Signature (Low base resolution)
		1/4-5/4 1/8-10/8 1/16-16/16	Time Signature (High base resolution)
	Note Type		Note duration
	Triplet Normal Dot	3 — .	Triplet note of specified Note Duration Note as specified by Note Duration Dotted note of specified Note duration
	Velocity	2-126 Key	Specify note velocity Set velocity by pressing key
	Note Length	1-100%	Note length

Function Buttons

[5]	Rest		Inserts a rest
[6]	Tie		Inserts a tie
[8]	Delete		Delete current step and go back one step

- 5) Follow the procedure for "2A Step-Time Track Recording" on page 117.

Unlike step-time track recording, which continues until you press the [START/STOP] button, step-time pattern recording continues from the first measure in the pattern when the end of the last measure in the pattern is reached. What you play on subsequent passes through the pattern is overdubbed onto the previously recorded data. This allows you to build up patterns in layers.

- 6) To stop recording, press the [START/STOP] button.

5C Pattern Event Edit

This section explains how to edit event data in a pattern.

5C Event Edit
 P00 NOTE:ENA

5C-1

LCD	Parameter	Range	Description
5C-1	Pattern (P)	0-99	Select pattern for event editing
	Event Filter	NOTE CTRL AFTT BEND PROG PAFT	Note data Controllers After Touch Pitch Bend Program Change Polyphonic After Touch
	DIS/ENA	DIS ENA	Event type cannot be edited Event type can be edited

- 1) Select the pattern that you want to edit.
- 2) Disable or enable event types as required.
Disabled event types cannot be edited.
- 3) Press the [REC/WRITE] button.
- 4) Press the [START/STOP] button.
- 5) Follow the procedure for "2B Event Edit" on page 121.
- 6) Press the [START/STOP] button to finish event editing.

5D Pattern Setup Parameters

These parameters allow you to set up a pattern before recording, and modify a pattern after recording.

5D Pat Param >	5D Pat Param <
P00 16/16 L01	B.Res:Hi OK?
5D-1	5D-2

LCD	Parameter	Range	Description
5D-1	Pattern (P)	0-99	Select a pattern
	Time Signature	1/4-9/4 1/8-16/8 1/16-16/16	Time Signature (Low base resolution)
		1/4-5/4 1/8-10/8 1/16-16/16	Time Signature (High base resolution)
	Pattern Length (L)	1-99	Number of measures in pattern
5D-2	Base Resolution	Low (LOW) High (HIGH)	48 pulses per quarter note 96 pulses per quarter note
	OK to Set Parameters	OK?	Set the specified parameters

- 1) Select the pattern to set up.
- 2) Set the parameters as required.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

If a pattern has already been put into a song, the message "Pat In Use Continue OK?" will appear. Press the [▲/YES] button to continue, or the [▼/NO] button to cancel.

5D-2 Base Resolution: this parameter determines the timing precision for a pattern. When set to Low, the timing resolution is 48 PPQN (pulses per quarter note), i.e., 1/48 of a quarter note. When set to High, the timing resolution is 96 PPQN (pulses per quarter note), i.e., 1/96 of a quarter note. See also "8B Song Base Resolution" on page 151.

For High resolution, the location can be varied in one clock steps. For Low resolution, the location can be varied in two clock steps. One MIDI clock is equivalent to four X2/X3 clocks.

If the base resolution of a pattern is different to that of the song it is being used in, the pattern data is modified accordingly. When you put the pattern, the data is played back with the setting of the destination song, but the pattern's setting is not modified.

Note: Once a parameter has been set, the Compare function does not work.

6A Erase Pattern

This function allows you to erase patterns.

6A Erase Pat P00 OK?

6A-1

LCD	Parameter	Range	Description
6A-1	Pattern (P)	0-99	Select pattern to erase
	OK to Erase Pattern	OK?	Executes pattern erase

- 1) Select a pattern.
- 2) Position the cursor on OK?, and press the [▲/YES] button.

If a pattern has already been put into a song, the message “Pat In Use Continue OK?” will appear. Press the [▲/YES] button to continue, or the [▼/NO] button to cancel.

6B Get from Track

This function allows allow you to copy data from a track into a pattern.

6B Get From Tr > P00 S0 Tr01 M123	6B Get From Tr < OK?
--------------------------------------	-------------------------

6B-1 6B-2

LCD	Parameter	Range	Description
6B-1	Destination Pattern (P)	0-99	Select destination pattern
	Source Song (S)	0-9	Select the source song
	Source Track (Tr)	1-16	Select the source track
	Source Start Measure (M)	1-999	Select the source start measure
6B-2	OK to Get from Track	OK?	Executes get from track

- 1) Select the destination pattern.
- 2) Select the source song.
- 3) Select the source track.
- 4) Select the source start measure.
- 5) Position the cursor on OK?, and press the [▲/YES] button.

The length of the destination pattern (“5D Pattern Setup Parameters” on page 147) determines the number of measures that are copied.

If the specified range of measures contains a pattern, you will be asked whether you want to open the pattern. Press the [▲/YES] button to open the pattern and copy its data, or the [▼/NO] button to ignore the pattern data.

The destination pattern’s base resolution and time signature are determined by the source song.

The original pattern data is deleted, and the data got from the track is inserted into the pattern. If a tied note overlaps the specified range of measures, as determined by the Destination Pattern parameter, it is erased.

Pattern Edit Note

If you want to use track editing functions such as quantize, create control data, etc., on a pattern, copy the pattern to an empty track (“4F Copy to Track” on page 142), do your editing, then use this function to copy the data back to a pattern.

6C Bounce Pattern

This function merges data from two patterns into one.

```
6C Bnce Pat
P00+P01   OK?
```

6C-1

LCD	Parameter	Range	Description
6C-1	Source Pattern (P)	0-99	Select the source pattern
	Destination Pattern (P)	0-99	Select the destination pattern
	OK to Bounce pattern	OK?	Executes pattern bounce

- 1) Select a source pattern.
- 2) Select a destination pattern.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

The data is merged into the destination pattern. The source pattern is not changed.

The time signature, pattern length, and base resolution are determined by the destination pattern.

6D Copy Pattern

This function allows you to copy data between patterns.

```
6D Copy Pat
P00+P01   OK?
```

6D-1

LCD	Parameter	Range	Description
6D-1	Source Pattern (P)	0-99	Select the source pattern
	Destination Pattern (P)	0-99	Select the destination pattern
	OK to Copy pattern	OK?	Executes pattern copy

- 1) Select a source pattern.
- 2) Select a destination pattern.
- 3) Position the cursor on OK?, and press the [▲/YES] button.

The time signature, pattern length, and base resolution are determined by the source pattern.

7A–7G Effects

In a song, the individual effect settings, panpot settings, and send C and D settings of each Program are ignored, and the settings for that song are used. If you want to use a Program or Combination's effect settings in a song, use the 7F Effects Copy function. See "7F Effects Copy" on page 62.

Song track parameters Pan A, Pan B, Send C, and Send D are used to control the levels of the tracks sent to the effects.

Effects are explained in Chapter 5: "Effects" on page 57.

Dynamic Modulation & the Sequencer

To record and playback dynamic modulation data for the effects, set the track to be used to record the data to the same MIDI Channel as that used by the Global MIDI Channel.

8A Rename Song

This function allows you to rename songs.

```
8A RENAME
50: SongName00
```

8A-1

LCD	Parameter	Range	Description
8A-1	Rename Song	See character table below	Rename a song

To rename a song, use the [←] and [→] cursor buttons to position the cursor, and the [▲/YES] [▼/NO] buttons, or VALUE slider to select characters. Available characters are shown in the table below. Song names can use up to 10 characters.

	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[]	^	_	
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	

Use the number keypad to insert numbers. Use the [10's HOLD/-] button to switch between uppercase and lowercase characters. Press and hold down the [ENTER] button, then press the [←] button to delete the current character. Press and hold down the [ENTER] button, then press the [→] button to insert a character.

Note: Once a song has been renamed, you cannot use the Compare function to restore the previous name.

Saving SMF (Standard MIDI File) Notes

When a song is saved in the SMF file format, the file name uses the eight left-most characters, lowercase characters become uppercase, and symbols are converted to "_". Hence, there is a possibility that the new SMF file name becomes the same as that of an existing file. Note that this affects the file name only, the full song name is saved inside the file. So after reloading the SMF file into an X2/X3, the full song name appears.

8B Song Base Resolution

This parameter allows you to set the base resolution for songs.

```

8B B. Reso
High(J/96)  OK?
  
```

8B-1

LCD	Parameter	Range	Description
8B-1	Base Resolution	Low High	48 pulses per quarter note 96 pulses per quarter note
	OK to set base resolution	OK?	Sets base resolution

Note: *The base resolution must be set before recording. Once a song contains some data, it cannot be changed.*

8B-1 Base Resolution: this parameter determines the timing precision for each song. When set to Low, the timing resolution is 48 PPQN (pulses per quarter note), i.e., 1/48 of a quarter note. When set to High, the timing resolution is 96 PPQN (pulses per quarter note), i.e., 1/96 of a quarter note.

To capture your real-time recording with greater accuracy, i.e., capture the subtle nuances of your playing, set the base resolution to High.

The selected base resolution affects the number of time signature values that are available. More are available when the base resolution is set to Low, as shown in the table below.

Base Resolution	Time Signature
Low	1/4, 2/4, 3/4, 4/4, 5/4, 6/4, 7/4, 8/4, 9/4
	1/8, 2/8, 3/8, 4/8, 5/8, 6/8, 7/8, 8/8, 9/8, 10/8, 11/8, 12/8, 13/8, 14/8, 15/8, 16/8
	1/16, 2/16, 3/16, 4/16, 5/16, 6/16, 7/16, 8/16, 9/16, 10/16, 11/16, 12/16, 13/16, 14/16, 15/16, 16/16
High	1/4, 2/4, 3/4, 4/4, 5/4
	1/8, 2/8, 3/8, 4/8, 5/8, 6/8, 7/8, 8/8, 9/8, 10/8
	1/16, 2/16, 3/16, 4/16, 5/16, 6/16, 7/16, 8/16, 9/16, 10/16, 11/16, 12/16, 13/16, 14/16, 15/16, 16/16

When the Recording Quantize parameter (“Real-Time Record/Play Parameters” on page 106), or the Quantize Resolution parameter (“3A Quantize” on page 131) is set to HI, the base resolution specified using this function determines the quantize resolution.

Step Recording (“2A Step-Time Track Recording” on page 117), Create Control Data (“3D Create Controller Data” on page 135), and Event Edit (“2B Event Edit” on page 121) advance two steps when the base resolution parameter is set to Low, and one step when it is set to High.

Note: *The Compare function cannot be used to reset the Song Base Resolution parameters.*

8C Next Song

This function allows you to specify the next song to be played after the current song.

```
8C NEXT SONG
SD=OFF PLAY
```

8C-1

LCD	Parameter	Range	Description
8C-1	Next Song	OFF, 0-9	Select the next song
	Next Song Mode	STOP PLAY	Press [START/PLAY] to play next song Next song plays automatically

8C-1 Next Song: this parameter specifies the next song to be played when the current song ends. When set to OFF, no song playbacks when the current song ends.

Next Song Mode: this parameter determines how the next song will play. When PLAY is selected, the next song will start playing when the current song ends. When STOP is selected, playback will stop when the current song ends, and you will have to press the [START/STOP] button to start the next song playing.

If, while the next song is playing, the [START/STOP] or [RESET] button is pressed, the top song is selected.

Note: *The Compare function cannot be used to reset the Next Song parameters.*

8D Metronome

These parameters allow you to set the metronome lead-in, level, and pan.

```
8D METRONOME
I=2 L=99 P=A+B
```

8D-1

LCD	Parameter	Range	Description
8D-1	Lead In (I)	0-2	Number of measures for count-in
	Level (L)	0-99	Metronome level
	Pan (P)	A, A+B, B, C, C+D, D, ALL	Metronome output pan

8D-1 Lead-In: this parameter determines the number of lead-in measures before recording starts.

Level: this parameter determines the level of the metronome.

Pan: this parameter determines which buses the metronome is output on. On the X2, the metronome cannot be heard in the headphones when Serial Sub or Parallel Sub placements are selected and the above Pan parameter is set to C, C+D, or D.

For the instant that the metronome sounds, note polyphony is reduced by one.

Note: *The Compare function cannot be used to reset the Metronome parameters.*

8E Copy from Combination

This function allows you to copy Combination Timbre settings to tracks 1 to 8 or tracks 9 to 16.

```
8E Copy Combi
No=A00+T1-8 OK?
```

8E-1

LCD	Parameter	Range	Description
8E-1	Source Combination (No=)	A00-A99 B00-B99 C00-C99 D00-D99	Select the Combination to copy
	Destination Tracks (T)	1-8, 9-16	Select the eight destination tracks
	OK to Copy from Combination	OK?	Executes Combination copy

The following Timbre parameter settings are copied: Program, Volume, Transpose, Detune, Pan, Send C, Send D, Key Window, Velocity Window, MIDI Channel, and Timbre mode (track status). The Combination's effect settings are also copied. Other song parameters remain the same.

Timbre mode becomes track status. So an EXT mode Timbre becomes an EXT mode track. When a song containing an EXT mode track is selected, MIDI Program Change, Volume, and Pan data is transmitted from the EXT mode track.

If some track's MIDI Channels are set the same, the same track data will play the Programs assigned to those tracks.

Note: *The Compare function cannot be used to reset the Copy from Combination function.*

8F GM Song Mode

This function conforms a song to the GM (General MIDI) settings. It should be used when you want to make a new GM compatible song from scratch, or when you want to playback GM sequence data that you received in the SMF format.

```
8F Set To GM
SONG00 OK?
```

8F-1

LCD	Parameter	Range	Description
8F-1	OK to set Song to GM Mode	OK?	Sets song to GM mode

The selected song's parameters are set as follows. Track 10 is set for drums.

Parameter	Tracks 1-9 & 11-16	Track 10	
Program	G01	G129 (Drum kit)	*
Level	100	100	*
Pan	CNT	PRG	*
Send C & D	2, 2	PRG, 0	*
Transpose	0	0	*
Detune	0	0	*
Pitch Bend Range	+2	0	*
Program Change Filter	ENA	ENA	
Velocity Window	1-127	1-127	
Key Window	C-1 to G9	C-1 to G9	
Effect 1	—	—	Hall
Effect 2	—	—	Chorus
Effect Placement	—	—	Parallel 3
MIDI Channel	1-9, 11-16	10	

* Can be set via MIDI

If you are playing a GM song file, track Programs are selected automatically when the song starts playing. GM song files contain Program Change messages that specify the required program for each track.

If you are creating a new GM compatible song from scratch, you can select Programs for tracks as required.

When a MIDI GM System On message [F0, 7E, nn, 09, 01, F7] is received, these parameters are set automatically, and song 9 is conformed to the GM Standard. Track Protect is ignored.

Note: *The Compare function cannot be used to reset the GM Song Mode function.*

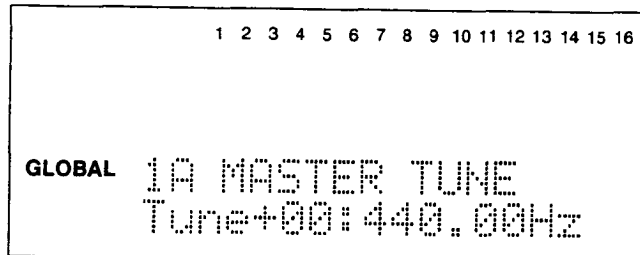
Chapter 8: Global Mode

Global mode functions allow you to set parameters that affect the overall performance of the X2/X3. For example, Master Tuning, MIDI, Memory Protection, PROG/SEQ data cards, and drum kits.

Entering Global Mode

- 1) Press the [GLOBAL] button.

GLOBAL appears on the LCD screen.



The numbers at the top of the display correspond to MIDI Channels. The number of the Global MIDI Channel flashes. When MIDI data is received, a box underneath the corresponding MIDI Channel number flashes.

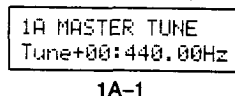
Saving Global Setup Data

All global settings are stored when the X2/X3 is powered off.

Global settings (except LCD Contrast and Memory Protect) related to a specific project can be saved to floppy disk or data card. They are saved in bank A. See "6C Save Programs & Combinations to Card" on page 168 and "3B Save P/C/G Data" on page 187.

1A Master Tune

This function allows you to tune the X2/X3.



LCD	Parameter	Range	Description
1A-1	Master Tune (Tune)	-50...+50	Used to tune the X2/X3 in 1 cent steps

The selected tuning is indicated in steps and Hz. 0 cents is equal to 440 Hz (A4).

The X2/X3 can also be tuned from external MIDI devices that can output MIDI RPN Fine Tune messages (the X2/X3 cannot output these messages). In Sequence mode, these messages are received on the MIDI Channels specified for each track and they control the Detune parameters. In all other modes, they are received on the Global MIDI Channel and they control this Master Tune function. See "Controller Event Edit Notes" on page 126.

1B Transpose

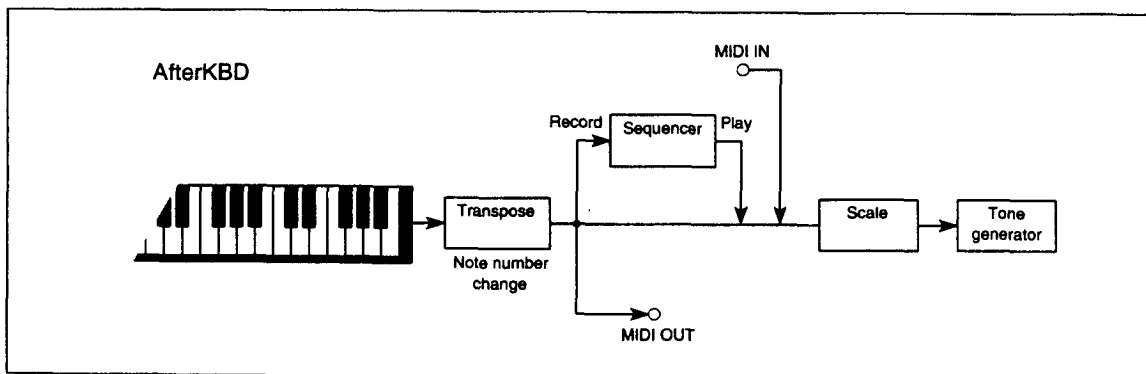
This function allows you to transpose the X2/X3. This is useful when you want to play a song in a different key. The Transpose function can be positioned after the keyboard, or before the X2/X3 tone generator.

1B TRANSPOSE > Trans+00	1B POSITION < AfterKBD
1B-1	1B-2

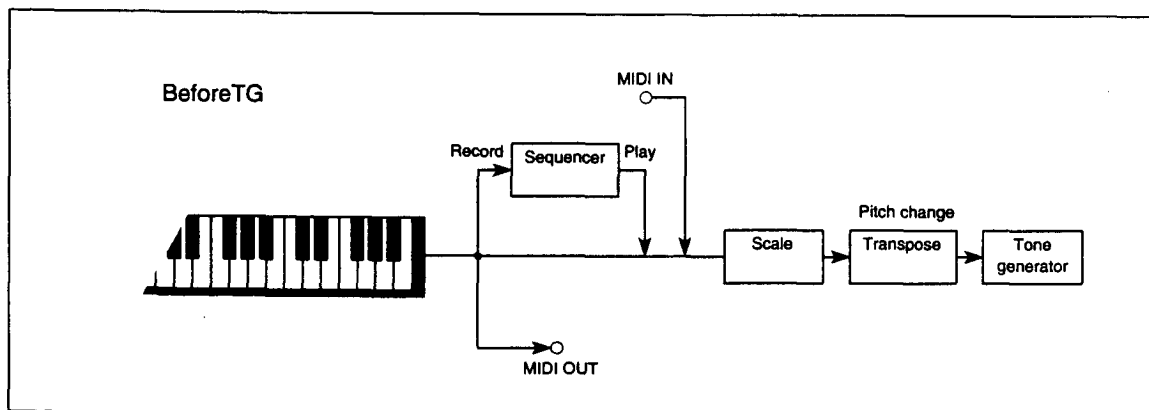
LCD	Parameter	Range	Description
1B-1	Transpose	-12 ~ +12	Used to transpose the X2/X3 in 1 semitone steps
1B-2	Position	AfterKBD BeforeTG	Transpose function after keyboard Transpose function before tone generator

AfterKBD: with this setting, transpose is after the keyboard, so note numbers are changed. This affects the keyboard data recorded by the sequencer, the keyboard data played by the tone generator, and the keyboard data output via MIDI OUT. MIDI IN data and sequencer playback data is not affected. Use this setting when using the X2/X3 as a MIDI master keyboard.

The X2 outputs note numbers 28–103 with transpose set to 0, 16–91 when set to -12, and 40–115 when set to +12. The X3 outputs note numbers 36–96 with transpose set to 0, 24–84 when set to -12, and 48–108 when set to +12.



BeforeTG: with this setting, transpose is before the tone generator, so played notes will change. This affects the keyboard data played by the tone generator and MIDI IN data. Keyboard data and sequencer playback data sent to the MIDI OUT is not affected. Use this setting when using the X2/X3 as a MIDI tone generator.



1C After Touch & Velocity Response Curve

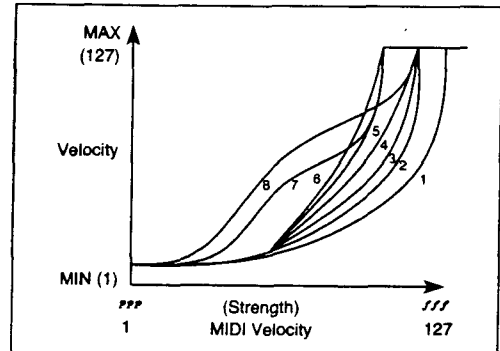
These functions allow you to set the After Touch and Velocity Response to suit your playing style.

```
1C CURVE
Vel=5  Aft=1
```

1C-1

LCD	Parameter	Range	Description
1C-1	Velocity Response (Vel)	1-8	Velocity response curve
	After Touch Response (Aft)	1-8	After Touch response curve

1C-1 Velocity Response: this parameter allows you to adjust velocity response. For a low setting, strong playing is required to achieve the maximum value (insensitive). For a high setting, maximum value will be achieved with soft playing (sensitive). Select one of the eight curves to suit your playing style. This function affects the data played by the tone generator, data output to the MIDI OUT, and the data recorded by the sequencer. It does not affect MIDI IN data and sequencer playback data.

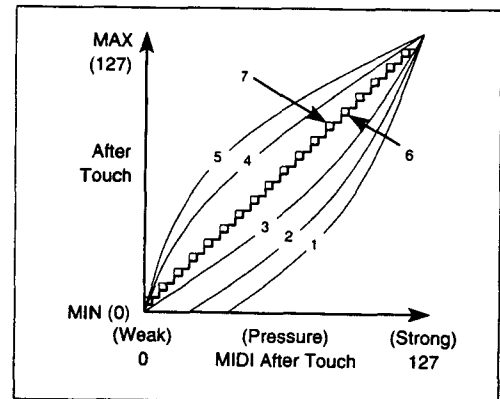


Curves 7 and 8 are suitable when you do not need velocity, or when you wish to make the intensity of the sound even, since changes are not obvious when playing moderately. However, they are difficult to control, because soft playing creates significant changes.

For curves 1 and 2, strong playing produces an obvious effect. Curves 3, 4, and 5 are standard curves. With curve 6, moderate playing produces an obvious effect. Curve 7 produces small changes and a constant effect with moderate playing. Curve 8 is similar to Curve 7, but slightly flatter.

After Touch Response: this parameter allows you to adjust the After Touch response. For a low setting, a keyboard must be pressed hard to activate After Touch (insensitive). For a high setting, pressing softly will activate After Touch (sensitive). Select one of the eight curves to suit your playing style.

This function affects the data generated by the tone generator, data output to the MIDI OUT, and the data recorded by the sequencer. It does not affect MIDI IN data and sequencer playback data.



For curves 1 and 2, strong playing produces an obvious effect. Curves 3 and 4 are standard curves. With curve 5, moderate playing produces an obvious effect. Curves 6 and 7 change in steps of 24 and 12, respectively. To save sequencer memory when recording, use curve 6 or 7. If you think that the After Touch is a little bit coarse, however, use curves 1 to 5. Curve 7 changes in steps of 12, and allows the pitch to change in semitones when pitch shift width for After Touch is set to one octave. Curve 8 is random. You can use this when you wish to achieve a special effect or give an irregular pitch shift through After Touch.

2A Scale

This function allows you to select scales. You can also create your own User scale.

2A SCALE TYPE > User Scale	2A SCALE KEY <> Key=C	2A User Scale <> C+00 C#+00 D+00	2A User Scale <> D#+00 E+00 F+00	2A User Scale <> F#+00 G+00 G#+00
2A-1	2A-2	2A-3	2A-4	2A-5

2A User Scale <> A+00 A#+00 B+00	2A Copy Scale <> from Slendro OK?	2A SUB SCALE <> Equal Temp	2A SUB KEY < Key=C
2A-6	2A-7	2A-8	2A-9

LCD	Parameter	Range	Description	
2A-1	Scale Type	Equal Temperament	Most commonly used equal temperament scale. Songs can easily be transposed into different keys.	
		Equal Temperament2	Like equal temperament, but with slight random pitch variations between subsequent key presses. This is useful for simulating the unstable pitch of an acoustic instrument.	
		Pure Major	Intervals such as third and fifth are perfectly in tune. Other intervals will correspondingly be out of tune, so you must specify a key. See LCD screen 2A-2.	
		Pure Minor	Like the pure major scale, but minor.	
		Arabic (quarter tone scales often used in Arabic music)	Scale	Key
			RAST DO / BAYATI RE	C
			RAST FA / BAYATI SOL	F
			RAST SOL / BAYATI LA	G
			RAST RE / BAYATI MI	D
			RAST Sib / BAYATI DO	A \sharp (B \flat)
		Pythagorean	Ancient Greek tuning, useful when playing melodies	
		Werkmeister	Equal temperament style that was used in the latter part of the baroque period.	
		Kirnberger	Developed in the 18th Century, used mainly for harpsichord.	
Slendro	Indonesian gamelan tuning with 5 notes per octave. When key is set to C, notes C, D, F, G, A are used. Other notes are set to equal temperament.			
Pelog	Like the slendro scale, but with 7 notes per octave. When key is set to C, notes C, D, E, F, G, A, B are used.			
User Scale	This allows you to create your own tuning, and is set up using LCD screens 2A-3 to 2A-6.			
2A-2	Key	C-B	Specifies the tonic (key note) of the scale.	
2A-3	User Scale	C	-99...+99	Used to tune the individual notes for the user scale in 1 cent steps
		C#		
		D		
2A-4		D#		
		E		
		F		
		F#		
2A-5		G		
	G#			
	A			
2A-6	A#			
	B			
2A-7	Copy Scale	Same as 2A-1 (except User scale)	Copy a preset scale to the user scale (key not copied)	
	OK to Copy	OK?	Executes scale copy	
2A-8	Sub Scale	Same as 2A-1	See 2A-1 descriptions above (excluding User Scale)	
2A-9	Sub Scale Key	C-B	Specifies the tonic (key note) of the sub scale	

2A-1 Scale Type: as well as the usual equal temperament scale, 11 other scales including a user definable scale are available.

User Scale: this scale allows you to define your own personal tuning scale. The tuning of each keyboard note can be adjusted ± 99 cents on LCD screens 2A-3 to 2A-6. To edit one of the preset scales, first copy it (2A-7), then edit it as a user scale.

The User Scale settings are used by both the main and the sub.

Note: *The 2A-2 Key and 2A-9 Sub Scale Key parameters are affected by the 1B Transpose function, when the transpose position is set to AfterKBD. They are not affected when it is set to BeforeTG.*

If 1B Transpose Position is set to AfterKBD, the 1B Transpose is set to +1, and in the user scale you tune note C up +10 cents and leave note B set at 00, C +10 cents will sound when you play a B on the X2/X3 keyboard, and C# will sound when you play a C.

2A-8 Sub Scale: it is possible to switch between two scales, main and sub, using a pedal switch.

- 1) **Connect an optional Korg PS-1 or PS-2 pedal switch to the ASSIGNABLE PEDAL/SW connector.**
- 2) **In Global mode, assign the pedal to Scale Switching. See "8B Assignable Pedal/SW Setup" on page 173.**

When the pedal is pressed, the Sub Scale is selected and MIDI message [Bn, 04, 7F] is output. When the main scale is selected, the message [Bn, 04, 7F] is output.

If MIDI message [Bn, 04, 00-Bn, 04, 3F] is received, the main scale is selected. If the MIDI message [Bn, 04, 40-Bn, 04, 7F] is received, the sub scale is selected. In Combination mode, scales can be selected by any Timbre. In Sequencer mode, by any Track.

These messages are normally sent on the Global MIDI Channel. In Combination mode, they are sent on the MIDI Channels of EXT mode Timbres. So, for example, you could have one Timbre playing the melody with Arabic scale, and another Timbre playing the backing with an Equal Temperament scale.

3A Global MIDI Channel & MIDI Clock Source

These parameters allow you to set the Global MIDI Channel and select a MIDI Clock source.

3A CH/CLOCK 1 INT 3A-1

LCD	Parameter	Range	Description
3A-1	Global MIDI Channel	1-16	Set the Global MIDI Channel
	Clock Source	INT EXT	Use the X2/X3's internal MIDI Clock Use an external MIDI Clock

3A-1 Global MIDI Channel: the Global MIDI Channel is used as follows: to receive MIDI data in Program mode, to select Combinations in Combination mode (except when MIDI Filter 1 is set to PRG), to control effects, and for MIDI Data Dump.

MIDI data for individual Timbres in a Combination and tracks in a song is received on the MIDI Channels specified in Combination Edit mode (Timbres) and Sequencer mode (tracks), respectively. In Combination mode, when a Program Change message is received on the Global MIDI Channel, a Combination is selected. So, to play a Combination from an external MIDI device, set the Global MIDI Channel and the Timbre MIDI Channels differently. When you play a Combination using the X2/X3 keyboard, set them the same.

MIDI data on the Global MIDI channel is used to control the effects (ON/OFF and Dynamic Modulation). To control them using the X2/X3 sequencer, match the channel of the track containing the control data with the Global MIDI channel.

Clock Source: to synchronize another MIDI device (external sequencer, drum machine, etc.) to the X2/X3, set the Clock Source to INT. In this mode, MIDI Clock data such as Start, Stop, Continue, Song Select, and Song Position is output when the X2/X3 sequencer is used.

To synchronize the X2/X3 to another MIDI device, set the Clock Source to EXT. In this mode, the X2/X3 sequencer responds to MIDI Clock data such as Start, Stop, Continue, Song Select, and Song Position received through MIDI IN, and the X2/X3 tempo setting has no effect. For X2/X3 multitrack recording, set the Clock Source to EXT.

MIDI Real-Time Messages

Start: starts song playback from the top.

Stop: stops playback.

Continue: starts song playback from the point at which it was stopped.

Song Position Pointer: song position data (specified by clock and bar).

MIDI Clock data: timing data related to song tempo. A slave sequencer will synchronize to this data. Twenty-four clocks equals one quarter note.

Note: *If you are not synchronizing the X2/X3 to an external MIDI Clock source, select INT.*

3B Local Control & Note Filter

The Local Control parameter determines whether the X2/X3 keyboard and joystick control the X2/X3. The Note Receive Filter determines whether the X2/X3 responds to even notes, odd notes, or all notes from the keyboard and MIDI IN connection.

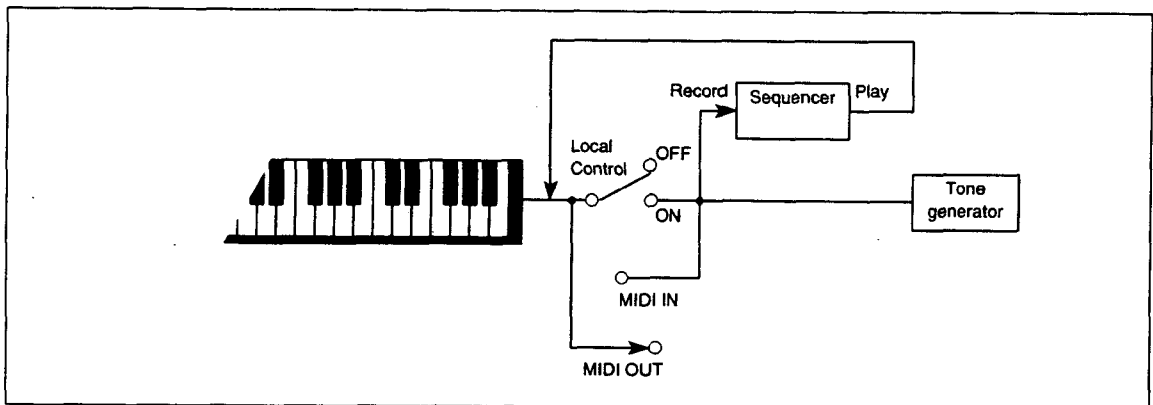
3B LOCAL/NoteR
ON ALL

3B-1

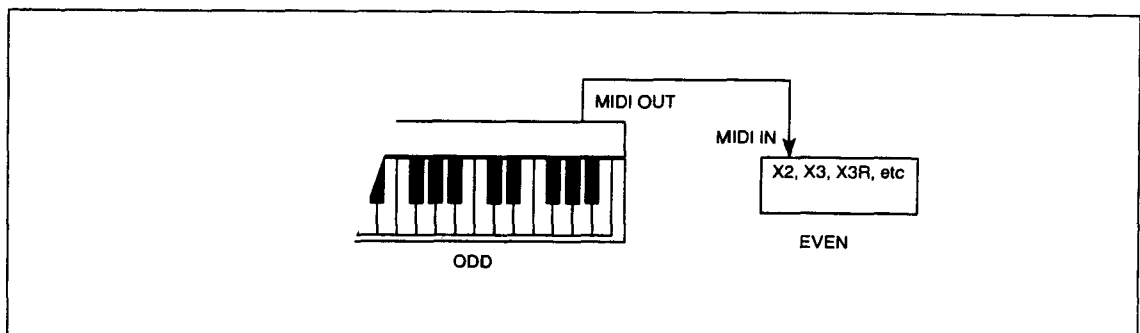
LCD	Parameter	Range	Description
3B-1	Local Control	ON OFF	X2/X3 keyboard and joystick control of tone generator off X2/X3 keyboard and joystick control of tone generator on
	Note Receive Filter	EVEN ODD ALL	Respond to even notes only Respond to odd notes only Respond to all notes

Local Control: when set to OFF, the X2/X3 keyboard and joystick do not control the X2/X3 tone generator. However, MIDI data generated by the keyboard and joystick is still sent. The X2/X3 sequencer sends and receives MIDI data only, that is, it does not respond to the X2/X3 keyboard.

Normally, this parameter should be set to ON. However, to prevent a MIDI data loop when using the X2/X3 with, for example, an external sequencer, set this to OFF. In this case, MIDI data from the X2/X3 keyboard is sent to the sequencer via the MIDI OUT, and if the sequencer's MIDI thru or echo function is turned on, returned back to the X2/X3 via MIDI IN.



Note Receive Filter: normally, this should be set to ALL. However, if you want to double the number of available notes by using another X2/X3 or tone generator simultaneously, feed data to both tone generators, and set one to ODD and the other to EVEN.



3C MIDI Filter1

MIDI Filter1 determines how the X2/X3 sends and receives MIDI Program Change messages and After Touch.

```
3C FILTER1
PROG:ENA AFT:ENA
```

3C-1

LCD	Parameter	Range	Description
3C-1	Program Change Filter (PROG)	DIS ENA PRG NUM	Program Change operation disabled Program Change messages select Combinations & Programs Program Change messages select Timbre Programs MIDI Bank Select messages ignored
	After Touch Filter (AFT)	DIS ENA	After touch send / receive disabled After touch send / receive enabled

3C-1 Program Change Filter

When DIS is selected, MIDI Program Change messages are neither sent nor received.

When ENA is selected, MIDI Program Change messages received on the Global MIDI Channel select Programs in Program mode, and Combinations in Combination mode. MIDI Bank Select messages select banks in the selected mode. In Combination mode, MIDI Program Change messages received on other channels select Programs for corresponding Timbres. If the Global MIDI Channel and a Timbre's MIDI Channel are set the same, the Global MIDI Channel has priority. So a Combination is selected, and the Timbre's Program remains the same. In Sequencer mode, MIDI Program Change messages select Programs on tracks set to the corresponding MIDI Channel.

When PRG is selected, MIDI Program Change messages received on the Global MIDI Channel select Programs in Program mode, but in Combination mode they select Timbre Programs. MIDI Bank Select messages select banks in the selected mode.

When NUM is selected, operation is basically the same as for ENA except that MIDI Bank Select messages are ignored.

The following table shows the Program Change and Bank Select receive conditions.

Mode		DIS	ENA	PRG	NUM
Program Play	Program No.	X	O	O	Δ
Combination Play	Combination No.	X	O	X	Δ
Combination Play	Timbre Program No.	X	O	O	Δ
Sequencer Play	Track Program No.	X	O	O	Δ

X — Not received

Δ — Program Change received only

O — Program Change and Bank Select received

Program Change messages recorded in a song are not affected by this filter during playback.

3C-2 After Touch Filter

The X2/X3 uses Channel After Touch only, not Polyphonic After Touch. The X2/X3 sequencer, however, can record both types.

Disabling After Touch is useful when, for example, you are recording to the sequencer and you do not want to record After Touch data. Because After Touch is a continuous type of controller, it consumes sequencer memory quickly. After Touch data recorded in a song is not affected by this filter during playback.

3D MIDI Filter2

MIDI Filter2 determines how the X2/X3 responds to MIDI Controllers and System Exclusive data.

```
3D FILTER2
CTRL:ENA EX:DIS
```

3D-1

LCD	Parameter	Range	Description
3D-1	MIDI Controller Filter (CTRL)	DIS ENA	MIDI Controller operation disabled MIDI Controllers sent and received
	System Exclusive Filter (EX)	DIS ENA	System Exclusive operation disabled System Exclusive data sent and received

When the MIDI Controller filter is set to DIS, MIDI Controller messages such as Pitch Bend, Damper Pedal, Volume, And Joystick are neither sent nor received by the X2/X3, and the sequencer does not record them.

When the MIDI System Exclusive Filter is set to DIS, System Exclusive data for parameter editing is neither sent nor received by the X2/X3. Normally, this should be set to DIS, however, when using an X2/X3 editing program on a personal computer, set it to ENA.

By connecting the MIDI OUT of one X2/X3 to the MIDI IN of another X2/X3, and setting both System Exclusive filters to ENA, both X2/X3s can be edited simultaneously.

4A Program Memory Protect

This function allows you to protect Program memory.

```
4A PROTECT
PROGRAM:OFF
```

4A-1

LCD	Parameter	Range	Description
4A-1	Program Protect (PROGRAM)	OFF ON	Program memory is not protected Program memory is protected

When set to on, Programs cannot be written to Program banks A and B.

To protect PROG/SEQ card data, use the protect tab on the card.

4B Combination Memory Protect

This function allows you to protect Combination memory.

```
4B PROTECT
COMBINATION:OFF
```

4B-1

LCD	Parameter	Range	Description
4B-1	Combination Protect (COMBINATION)	OFF ON	Combination memory is not protected Combination memory is protected

When set to on, Combinations cannot be written to Combination banks A and B.

To protect PROG/SEQ card data, use the protect tab on the card.

4C Sequencer Memory Protect

This function allows you to protect sequencer memory.

```
4C PROTECT
SEQUENCE:OFF
```

4C-1

LCD	Parameter	Range	Description
4C-1	Sequencer Protect (SEQUENCE)	OFF ON	Sequencer memory is not protected Sequencer memory is protected

When set to on, sequencer data cannot be written to the sequencer memory.

To protect PROG/SEQ card data, use the protect tab on the card.

4D Page Memory On/Off

The Page Memory function remembers which LCD screen is selected when you exit a mode. Next time you enter that particular mode that LCD screen is selected automatically.

```
4D PAGE MEMORY
OFF
```

4D-1

LCD	Parameter	Range	Description
4D-1	Page Memory	OFF ON	Page Memory function off Page Memory function on

5A MIDI Data Dump

MIDI Data Dump allows you to save X2/X3 data to an external MIDI device, such as a MIDI data recorder, MIDI computer, Korg X3R, or another X2/X3.

When screen 5A-1 is selected, MIDI Dump data can be sent and received even when the System Exclusive filter on 3D-1 MIDI Filter2 is set to DIS.

```

5A MIDI DUMP
PROGRAM      OK?
  
```

5A-1

LCD	Parameter	Range	Description
5A-1	MIDI Data Dump	Program Combination Global Drum kit Sequence All data	Dump 200 Programs in banks A and B Dump 200 Combinations in banks A and B Dump Global setup data Dump 4 drum kits from banks A and B Dump all sequencer data (10 songs, 100 patterns) Dump all the above data
	OK to Data Dump	OK?	Executes Data Dump

Saving Data with MIDI Data Dump

To save X2/X3 data using MIDI Data Dump, you must connect a MIDI device capable of receiving MIDI Data Dump to the X2/X3 MIDI OUT. If you are saving the data to a MIDI data filer, you do not need to set the MIDI Channels. However, if you are transferring the data to an X2, X3, or X3R, the Global MIDI Channel on both devices should be set the same. Specify the X2/X3 data that you want to save, position the cursor on OK?, then press the [▲/YES] button to dump.

Note: While dumping, do not press any buttons.

The following table lists the approximate data size and dump time for each Data Dump.

Type of Data Dump	Approx. Data Size	Approx. Dump Time (Seconds)
Program	37.5KB	12.0
Combination	31.1KB	9.9
Global setup	39 bytes	0.1
Drum kit	1.9KB	0.6
Sequence	4.2KB-150.5KB	1.4-48.2
All data	74.8KB-221.0KB	24.0-70.8

Loading Data with MIDI Data Dump

To load the MIDI data back into the X2/X3, connect the external MIDI device to the X2/X3 MIDI IN, and make sure that the external devices MIDI Channel matches the X2/X3 Global MIDI Channel. If you are loading Program, Combination, or sequence data, make sure that the respective memory protect function is set to off. See "4A Program Memory Protect" on page 164, "4B Combination Memory Protect" on page 164, or "4C Sequencer Memory Protect" on page 164. Send the MIDI data.

When you switch from Program Play mode to Performance Edit mode, or Program Edit mode, the parameters of the Program selected in Program Play mode are transmitted. If you select a Combination in Combination Play mode, the parameters of that Combination are transmitted.

If you are transferring data between X2/X3s, make sure that both X2/X3s are set to the same Global MIDI Channel, and the respective memory protect functions are set to off.

X2/X3 MIDI Dump data is compatible with that of the X3R. However, there is a slight difference in parameters. X3R does not have the X2/X3 Global mode Damper Pedal Polarity parameter. In addition, the X2 and X3R have six effect placements, while X3 has four. X2 has 341 Multisounds, while X3 and X3R have 340 Multisounds.

While the above MIDI DUMP LCD screen is shown, MIDI Dump data can be received regardless of the System Exclusive Filter setting ("3D MIDI Filter2" on page 163). However, to receive MIDI Data Dump while other LCD screens are shown, the filter must be set to ENA. For more detailed information on MIDI Data Dumps, see "MIDI Implementation Chart" on page 205.

6A Load Programs & Combinations from Card

This function allows you to load Programs, Combinations, drum kits, and Global setup data from PROG/SEQ data card banks.

```
6A Load Card
P/C C + A OK?
```

6A-1

LCD	Parameter	Range	Description
6A-1	Source Bank (P/C)	C D C+D	Load data from card bank C Load data from card bank D Load data from card banks C and D
	Destination Bank	A B A+B	Load to internal bank A Load to internal bank B Load to internal bank A and B
	OK to Load	OK?	Executes load

Each card bank can contain 100 Programs, 100 Combinations, 2 drum kits, and the global settings, or sequencer data (10 songs, 100 patterns). See "6B Load Sequencer Data from Card" on page 167 for details about loading sequencer data.

To load the data, insert a PROG/SEQ data card, select the card bank that you want to load and the destination, position the cursor on OK?, then press the [\blacktriangle /YES] button.

When C+D is selected as the source, A+B is automatically selected as the destination. Data must already be saved in banks C and D. See "6C Save Programs & Combinations to Card" on page 168. Data from card bank C is loaded into internal bank A, and data from card bank D is loaded into internal bank B.

Note: Existing bank data is overwritten when this function is executed. So be careful that you don't overwrite (lose) some valuable data.

Note: You cannot load Programs or Combinations if the corresponding memory protect function is set to on. See "4A Program Memory Protect" on page 164 and "4B Combination Memory Protect" on page 164.

Note: Global settings are stored in bank A, so when you load into bank A, you overwrite the current Global settings (except LCD Contrast and Memory Protect).

6B Load Sequencer Data from Card

This function allows you to load sequencer data from a PROG/SEQ data card.

```

6B Load Card
SEQ C    OK?
  
```

6B-1

LCD	Parameter	Range	Description
6B-1	Load Sequencer Data (SEQ)	C D	Load sequencer data from card bank C Load sequencer data from card bank D
	OK to load	OK?	Executes Sequencer data load

Sequencer data consists of 10 songs and 100 patterns.

To load the sequencer data, insert a PROG/SEQ data card, select the card bank that you want to load, position the cursor on OK?, then press the [▲/YES] button.

Note: Existing sequencer data is overwritten when this function is executed. So be careful that you don't overwrite (lose) some valuable data.

Note: Card sequencer data can be played directly from a card. However, to edit the data you must load it first.

Note: You cannot load Sequencer data if the corresponding memory protect function is set to on. See "4C Sequencer Memory Protect" on page 164.

6C Save Programs & Combinations to Card

This function allows you to save Programs, Combinations, drum kits, and the Global setup data to PROG/SEQ data card banks. This data cannot be saved in the same bank as sequencer data.

```
6C Save Card
P/C A + C  OK?
```

6C-1

LCD	Parameter	Range	Description
6C-1	Source Bank (P/C)	A B A+B	Save data from internal bank A Save data from internal bank B Save data from internal banks A and B
	Destination Bank	C D C+D	Save to card bank C Save to card bank D Save to card banks C and D
	OK to Save	OK?	Executes Save

Each card bank can contain 100 Programs, 100 Combinations, 2 drum kits, and the global settings, or sequencer data (10 songs, 100 patterns). See “6D Save Sequencer Data to Card” on page 169 for details about saving sequencer data.

PROG/SEQ data cards are formatted automatically when you save data to them. There are no card formatting functions.

When you save Programs, Combinations, etc., using this function, the destination card bank is formatted for storing Programs, Combinations, etc. If you save sequencer data using “6D Save Sequencer Data to Card”, the destination card bank is formatted for storing sequencer data. In either case, once data has been saved to a bank, it can be loaded, re-saved, and played directly from the card bank.

Note: Existing data in the selected destination bank is overwritten when this function is executed. So be careful that you don't overwrite (lose) some valuable data.

Note: Make sure that the card's write protect switch is set to off.

Note: Since Global data is stored in bank A only, if the source bank is set to B or A+B, the source bank for global settings will be bank A.

To save your data, insert a PROG/SEQ data card, select the internal bank that you want to save and the destination bank, position the cursor on OK?, then press the [▲/YES] button. The message “Are You Sure OK?” appears. Press the [▲/YES] button to save, or the [▼/NO] button to cancel.

When A+B is selected as the source, C+D is automatically selected as the destination. Data from internal bank A is saved to card bank C, and data from internal bank B is saved to card bank D.

6D Save Sequencer Data to Card

This function allows you to save sequencer data to a PROG/SEQ data card.

```

6D Save Card
SEQ  C  OK?
6D-1
  
```

LCD	Parameter	Range	Description
6D-1	Source Bank (SEQ)	C D	Save sequencer data to card bank C Save sequencer data to card bank D
	OK to Save	OK?	Executes Sequencer data Save

Sequencer data consists of 10 songs and 100 patterns, and can be saved to card bank C or D.

Note: Existing data in the selected bank is overwritten when this function is executed. So be careful that you don't overwrite (lose) some valuable data.

Note: Make sure that you set the card's write protect tab to OFF before trying to save.

To save your sequencer data, insert a PROG/SEQ data card, select the card bank that you want to save to, position the cursor on OK?, then press the [▲/YES] button. The message "Are You Sure OK?" appears. Press the [▲/YES] button to save, or the [▼/NO] button to cancel.

While saving, the selected card bank is formatted for use with sequencer data.

Note: If the amount of free sequencer memory is less than 78%, sequencer data cannot be saved to card. In this case, save to floppy disk. See "3C Save Sequencer Data" on page 188.

7A Drum Kit Setup1

These parameters allow you to set up drum kits. Before entering Global mode to edit a drum kit, you must select a Program that is using that drum kit. That is, a Program whose Oscillator mode is set to DRUMS.

Because drum kits are selected like Multisounds in a Program, adjustable parameters in Program Edit mode can also be used when editing a drum kit. For example, VDF, VDA, joystick, pitch bend, and even drum modulation is possible.

7A DRUM A1 #01 > 105:Timpani	7A KEY/TUNE/L <> D#4 T+019 L+65	7A DECAY/ASGN <> Dcy+00 Asgn:EX1	7A PAN/SEND < Pan=CNT C=0 D=0
7A-1	7A-2	7A-3	7A-4

LCD	Parameter	Range	Description
7A-1	Drum Kit	A1, A2, B1, B2 C1, C2, D1, D2 ROM kits 1-8	Select a drum kit for editing
	Index (#)	0-59	Select an index
	Drum Sound	---, 000-163	Select a drum sound for an index
7A-2	Key	C0-G8	Select a key (note) for an index
	Tune (T)	-120...+120	Tune an index (1 = 10 cents)
	Level (L)	-99...+99	Set the index volume level
7A-3	Decay (Dcy)	-99...+99	Set the index decay
	Group Assign (Asgn)	---, EX1-EX6, SLF	Assign an index to an exclusive group
7A-4	Pan (Pan)	OFF, A, 14A-CNT-14B, B	Output pan to buses A and B
	Send C (C)	0-9	Output level to bus C
	Send D (D)	0-9	Output level to bus D

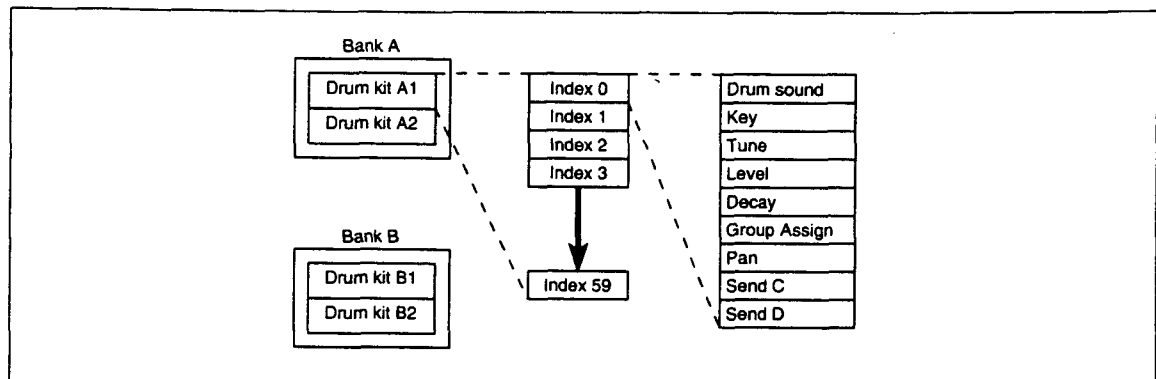
7A-1 Drum Kit: this parameter allows you to select a drum kit for editing. You can edit internal drum kits A1, A2 and B1, B2. PROG/SEQ data card drum kits, C1, C2, D1, and D2, can be viewed using this group of LCD screens, however, they cannot be edited. To edit one of these drum kits, copy it to internal drum kit A1, A2, B1, or B2. See "7C Drum Kit Copy" on page 172.

Rom drum kits 1 to 8 are used in GM Programs 129 to 136. These kits can be viewed using this group of LCD screens, however, they cannot be edited. To edit one of these drum kits, copy it to internal drum kit A1, A2, B1, or B2. See "7C Drum Kit Copy" on page 172. ROM drum kits cannot be overwritten.

Index: X2/X3 drum kits consist of indexes. Think of an index as an empty drum case, into which you put a drum sound, select a keyboard note, set a volume level, and pan. Parameters 7A-1 to 7A-4 affect the selected index.

As well as using the VALUE slider and the [▲/YES] and [▼/NO] buttons to select indexes, you can also use the X2/X3 keyboard. Position the cursor on the index parameter, press and hold down the [ENTER] button, then press a key. The index assigned to that key is selected.

Indexes that have not been assigned a drum sound display the message “No Assign” when selected.

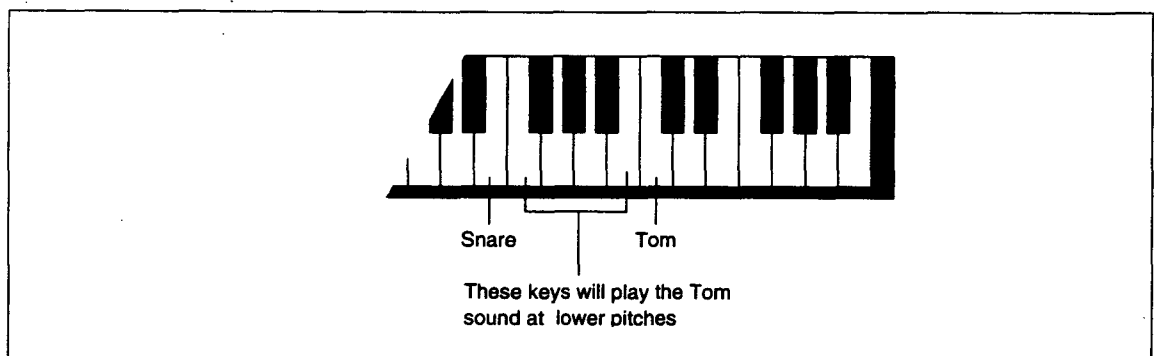


Drum Sound: this parameter allows you to select a drum sound for the currently selected index. If an optional PCM data card that contains drum sounds is inserted, those drum sounds can also be selected. The same drum sound can be selected for any number of indexes. A setting of --- means that no drum sound is selected. See Chapter 12 of the *Basic Guide “Performance Notes”* for available drum sounds.

7A-2 Key: this parameter allows you to select the note that will trigger the index. It is not possible to select the same key for two indexes. So, if you want to select a key that is being used by another index, set the other index to a different key first.

As well as using the VALUE slider and the [▲/YES] and [▼/NO] buttons to select keys, you can also use a MIDI keyboard. Select the Key parameter, press and hold down the [ENTER] button, then press a key.

If a key is selected for an index, but no drum sound is assigned to that index, the drum sound assigned to the next key up plays when that key is pressed. The pitch of the drum sound is lowered one semitone. This can be corrected using the Tune parameter.



Tune: this parameter allows you to tune individual indexes ± 120 (10 = 1 semitone, 120 = 1 octave). For example, you may use the same snare drum sound for two indexes, but tune them differently. Use this parameter to make hi, mid, and low tom-toms from one tom drum sound.

Level: this parameter allows you to set the level of individual indexes. You can use this parameter to set up your drum mix. The overall volume level is determined by the current Program's Oscillator Level parameter.

7A-3 Decay: this parameter allows you to set the decay time of individual indexes. This parameter works in conjunction with the Program's VDA EG Decay Time parameter. So, depending on that parameter setting, you may find that increasing or decreasing this value has little or no affect.

Group Assign: this parameter determines how an index is played in relation to other indexes. In an exclusive group (EX1 to EX6), only one index can play at a time (monophonic). If while an index is playing another index in that group is triggered, the first index stops, and the new index

plays. This is useful for creating realistic hi-hats. By assigning an open hi-hat and a closed hi-hat to the same exclusive group, the sound of the open hi-hat can be cut short by triggering the closed hi-hat. Just like pressing a real hi-hat pedal.

When SLF is selected, the index will be monophonic. In other words, while a long drum sound such as a crash cymbal is playing, if it is re-triggered, the original cymbal sound is cut short, and the drum sound plays again from the beginning.

7A-4 Pan: this parameter is used to pan the index between buses A and B. These buses feed the effects processors. See “7E Effect Placement” on page 59. When OFF is selected, no signal is sent on buses A and B. The CNT setting means center: signals of equal level are fed buses A and B. This parameter can be used to simulate the stereo spread of a real drum kit with, for example, tom toms panned between the stereo outputs.

Send C, Send D: these parameters are used to set the level of the index sent to buses C and D. These buses feed the effects processors. See “7E Effect Placement” on page 59.

On the X2, when either the Serial Sub or Parallel Sub placement selected, a drum sound is output to outputs 3 and 4 and its level is controlled using Send C and Send D. In this case, you cannot listen to the C and D outputs in the headphones.

Note: The Program’s Pan parameter is ignored when its Oscillator mode is set to DRUMS. In this case, the drum kit Pan parameter specified on LCD screen 7A-4 is used.

7B Drum Kit Setup2

These parameters allow you to set up a drum kit. Operation is the same as for “7A Drum Kit Setup1” on page 170.

7B DRUM A1 #01 > 105:TimPani	7B KEY/TUNE/L <> D#4 T+019 L+65	7B DECAY/ASN <> Decy+00 Asgn:EX1	7B PAN/SEND < Pan: CNT C=0 D=0
7B-1	7B-2	7B-3	7B-4

7C Drum Kit Copy

This function allows you to copy a drum kit to an internal drum kit.

7C Copy D.Kit ROM1 + A2 OK?
7C-1

LCD	Parameter	Range	Description
7C-1	Drum Kit Source	A1, A2, B1, B2 C1, C2, D1, D2 ROM 1-8	Select the source drum kit
	Drum Kit Destination	A1, A2, B1, B2 C1, C2, D1, D2	Select the destination drum kit
	OK to Copy	OK?	Executes the copy

Drum kits C1, C2, D1, and D2 can be copied only when a PROG/SEQ data card is inserted.

To copy a drum kit, select the source and destination, position the cursor on OK?, then press the [▲/YES] button. The message “Are You Sure OK?” will appear. Press the [▲/YES] button to copy, or the [▼/NO] button to cancel.

Note: The drum kit at the specified destination is overwritten when this function is executed. So be careful that you don’t overwrite (lose) a valuable drum kit.

8A LCD Contrast (X3 only)

This function allows you to adjust the LCD contrast. When the LCD screen is viewed from a different height or angle, you may need adjust the LCD contrast to maintain good readability.

```
8A LCD CONT
3
```

8A-1

LCD	Parameter	Range	Description
8A-1	LCD Contrast	0-7	Adjusts the LCD contrast for good readability

If you power on the X3, but cannot see anything on the LCD screen (sometimes caused by extremely low temperatures), press the [GLOBAL] button, then function button [8], and use the VALUE slider or the [▲/YES] and [▼/NO] buttons to adjust the LCD contrast.

On the X2, use the CONTRAST control on the rear panel to adjust the LCD contrast.

8B Assignable Pedal/SW Setup

This parameter assigns a function to the ASSIGNABLE PEDAL/SW.

```
8B ASGN PEDAL
Scale Switch
```

8B-1

LCD	Parameter	Range	Pedal	Description
8B-1	Pedal Assign	OFF		No function
		Program Up	F/S	Increment Programs in Program mode and Combinations in Combination mode. When pressed, a corresponding MIDI Program Change message is output.
		Program Down		Decrement Programs in Program mode and Combinations in Combination mode. When pressed, a corresponding MIDI Program Change message is output.
		SEQ start/stop		Start and stop the sequencer. When pressed, the corresponding MIDI Start or Stop message is output.
		SEQ punch in/out		Punch in and punch out the sequencer in Manual Punch In/Out recording.
		Effect 1 on/off		Switch Effect 1 on and off. When pressed, the corresponding MIDI Effect 1 on or off message is output.
		Effect 2 on/off		Switch Effect 2 on and off. When pressed, the corresponding MIDI Effect 2 on or off message is output.
		Scale Switch		Switch between the main and sub scales. See "2A Scale" on page 158.
		Volume		F/C	Control the X2/X3 volume. When pressed, the corresponding MIDI Volume messages are output.
		Expression	Operates the same as volume. Although, a different MIDI message is output.	
		VDF cutoff	Control the VDF Cutoff Frequency parameter. Pressing the foot controller increases the Cutoff Frequency.	
		Effect control	Control effect dynamic modulation. When pressed, MIDI Effect Control messages are output. See "7A Effect1 Setup" on page 58.	
		Data entry	Adjusts the selected parameter in Program Edit mode, Combination Edit mode, and Sequencer Edit mode, just like using the VALUE slider.	

The Pedal column indicates the type of pedal needed for each function. For F/S, use an on/off type footswitch such as the Korg PS-1 or PS-2 foot pedals. For F/C, use a continuous foot controller such as the Korg EXP-2 or XVP-10.

8C Damper Pedal Polarity

This parameter sets the damper (sustain) pedal polarity. Open or closed type pedals can be used.

8C DAMPER POL
-

8C-1

LCD	Parameter	Range	Description
8C-1	Damper Pedal Polarity	+ -	Positive polarity foot pedal Negative polarity foot pedal (Korg PS-1, DS-1)

If you are using a Korg PS-1 foot pedal, set this to (-) negative polarity. Be aware that some pedals require a (+) positive polarity setting. If the sound does not sustain when you depress the pedal, try changing the polarity. When no pedal is connected, set this to (-) negative polarity.

Chapter 9: Disk Mode

In this mode you can save and load data to and from the X2/X3's internal floppy disk drive. The floppy disk drive is recessed into the left-hand side of the X2/X3.

What Type of Floppy Disk?

Use only 3.5 inch 2DD floppy disks with the X2/X3.

The X2/X3 disk format is the same as that used on MS-DOS 720KB disks.

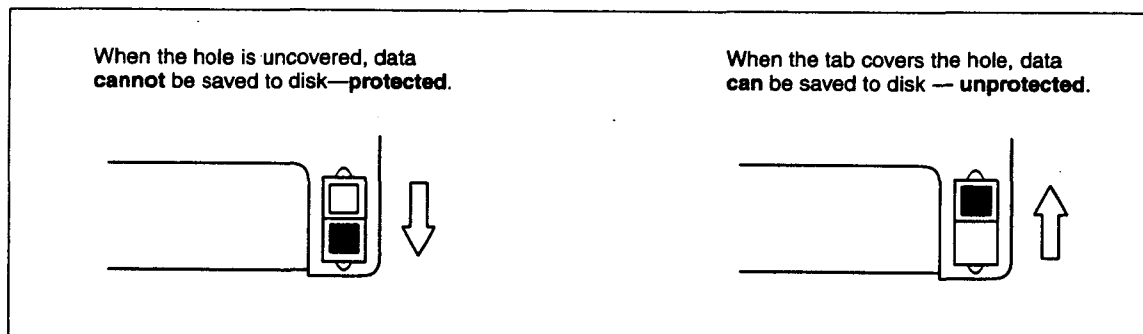
Handling Floppy Disks

Observe the following precautions when handling floppy disks.

- Do not open the shutter or touch the surface of a disk.
- Do not transport the X2/X3 with a floppy disk in the disk drive. Vibration may cause the disk drive head to scratch the disk, making it unusable.
- Do not store or place floppy disks near to a television, computer monitor, loudspeaker, power transformer, or any other device that generates a magnetic field. Doing so may render the disk unusable.
- Do not store or place floppy disks in locations subject to extremes of temperature and humidity, direct sunlight, or excessive dust and dirt.
- Do not place objects on top of a floppy disk.
- Always return disks to their protective cases after use.

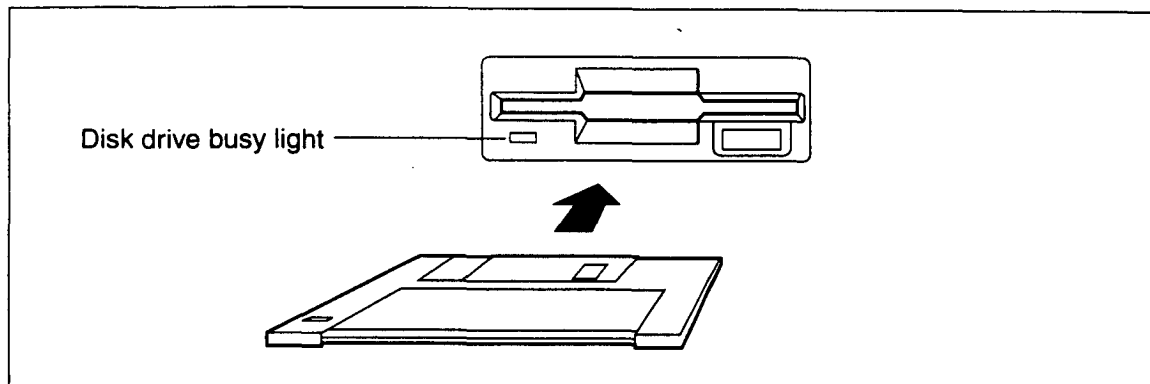
Write Protect Tab

A disk's write protect tab allows you to protect valuable data from being accidentally overwritten. Use a pen or other pointed object to set the tab as shown below.



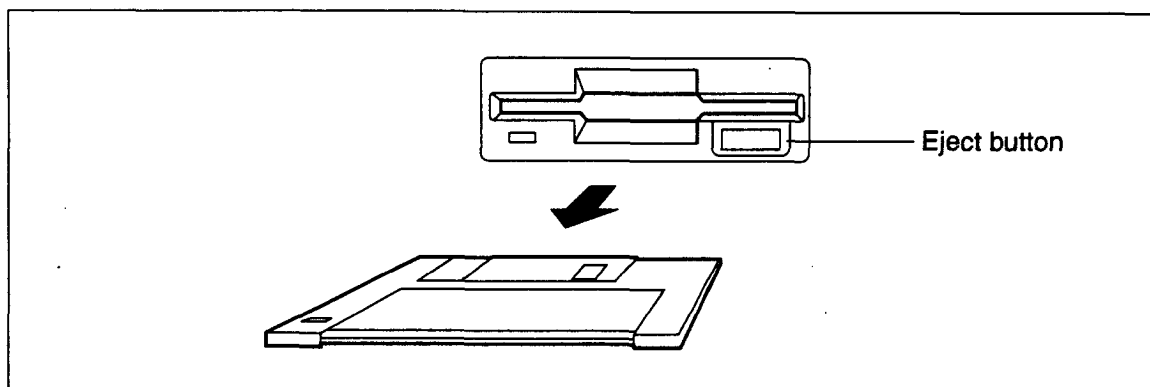
Inserting a Floppy Disk

Insert the disk into the disk drive label side up, shutter first. Push it in until it clicks into place. Do not force disks into the drive. Make sure that you hold the disk straight while inserting it.



Ejecting a Floppy Disk

Before ejecting a disk, make sure that the disk drive busy light is off, and that no "Loading" or "Saving" messages are shown on the LCD. Then press the eject button, and remove the disk.



Disk Drive Head Cleaning

If after a prolonged period of use, disk save and load errors become frequent, the disk drive head may need cleaning. This can be done using a good-quality fluid-type head cleaning kit for 3.5 inch DD (double-sided) disk drives. Do not use a cleaning kit intended for single-sided disk drives.

- 1) **Moisten the cleaning disk with cleaning fluid.**
- 2) **Insert the cleaning disk into the disk drive.**
- 3) **Execute any type of load function. An error message will appear. This is normal.**
- 4) **After approximately 10 seconds, eject the disk.**

Do not use the disk drive for about 5 minutes.

X2/X3 File Types

The X2/X3 has four file types.

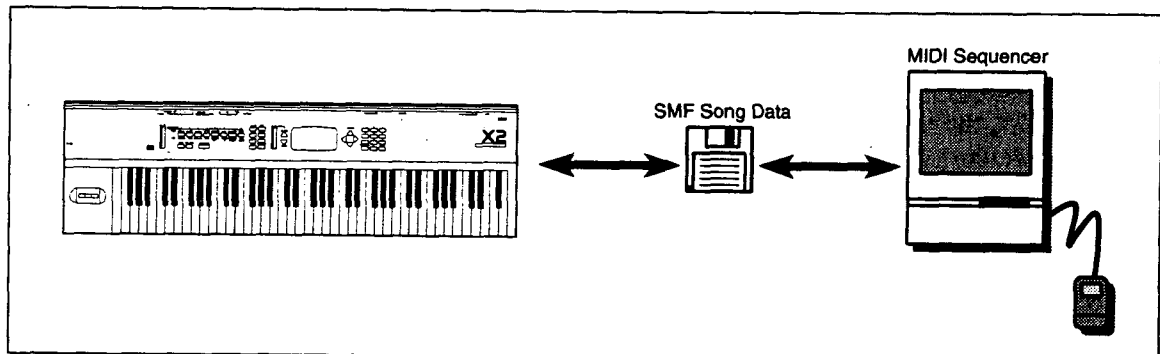
File Type		File Contents		File Extension
1	Program/Combination/Global	Programs	A00-A99, B00-B99	.PCG
		Combinations	A00-A99, B00-B99	
		Drum kits	A1, A2, B1, B2	
		Global settings		
2	Sequence	Songs	0-9	.SNG
		Patterns	00-99	
3	MIDI Exclusive data	MIDI Exclusive data		.EXL
4	SMF (Standard MIDI File)	1 SMF format song		.MID

Program/Combination/Global: this type of file contains 200 Programs from banks A and B, 200 Combinations from banks A and B, four drum kits, and the Global mode settings. The LCD contrast and memory protect function settings are not saved in this file.

Sequence: this type of file contains 10 songs and 100 patterns.

MIDI Exclusive Data: this type of file allows you to use the X2/X3 as a MIDI data recorder. It can be used to store MIDI Exclusive data from external MIDI devices to X2/X3 floppy disks.

SMF (Standard MIDI File): this type of file contains songs in the SMF format. This format can be read by many different sequencers, making it ideal for transferring songs between systems. You can save X2/X3 sequencer songs in the SMF (Standard MIDI File) format. The X2/X3 can also read SMF format songs from third party suppliers.

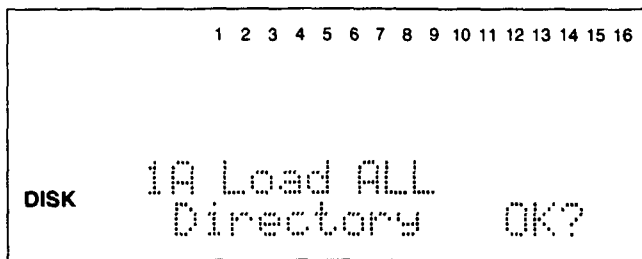


SMF songs can be transferred between computers using 720KB 2DD MS-DOS floppy disks.

Entering Disk Mode

- 1) Press the [DISK] button.

DISK appears on the LCD screen.



Loading & Saving Notes

Important: Do not attempt to eject a floppy disk while a “Loading” or “Saving” message is shown. Doing so may damage the X2/X3 disk drive. Wait until a “Completed” message is shown and the busy indicator goes off.

New Disks: new floppy disks, and disks that have been used on other equipment must be formatted before you can save data to them. See “8A Format Disk” on page 196.

Directory: when you insert a disk or change disks, load functions will display “Directory”, and “OK?” will flash on the LCD screen. At this point, the X2/X3 does not know what files are on the disk. Press the [▲/YES] button, and the X2/X3 will read the disk. Available files can then be selected using the VALUE slider or the [▲/YES] and [▼/NO] buttons.

Valuable Data: existing X2/X3 data is overwritten when you use the various load functions. Make sure that you have any valuable data saved to disk or card.

Memory Protect: if a Program, Combination, or Sequencer memory protect function is set to ON, the respective data cannot be loaded from floppy disk into the X2/X3. See “4A Program Memory Protect” on page 164, “4B Combination Memory Protect” on page 164, and “4C Sequencer Memory Protect” on page 164.

Disk Write Protect: make sure that the floppy disk’s write protect tabs are set to unprotected before attempting to save data. See “Write Protect Tab” on page 175.

Always Name Files: if you save a file with the same name as that of a file already stored on a disk, the existing file will be overwritten.

File Name Extensions: these are the three characters after the period in a file name. They are added automatically. You do not have to specify them yourself.

Loading & Saving Errors: when a load or save operation has finished, the message “Completed” should appear. At this point, the floppy disk can be ejected. If an error message appears instead of the “Completed” message, reinsert the disk, and try again. See “Disk Mode Error Messages” on page 202.

Naming Files

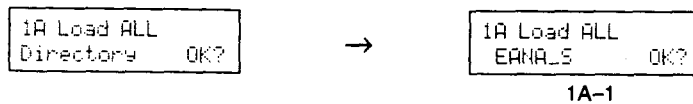
The following characters are available.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P	Q	R	S	T	U	U	W	X	Y	Z	-

Names can be up to eight characters long. Spaces are not allowed. Numbers 0 through 9 can be entered using the number keypad.

1A Load All Data

This function allows you to load a .PCG (Program/Combination/drum kit/Global) file and a .SNG (Sequencer) file simultaneously, both files must have the same name. Both files can be saved to floppy disk with the same name using the "3A Save All Data" function on page 186.



LCD	Parameter	Range	Description
1A-1	Source file	Files on disk	Select a file name (.PCG and .SNG files with same name)
	OK to Load	OK?	Executes the load function

1) Insert a floppy disk that contains the data into the disk drive.

The message "Directory OK?" appears.

2) Press the [▲/YES] button.

3) Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a name.

Only file names with a .PCG and .SNG extensions appear.

4) Position the cursor on OK?

5) Press the [▲/YES] button.

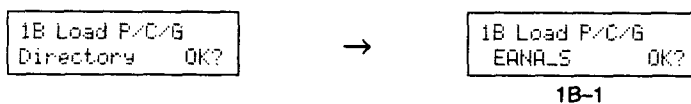
The message "Are You Sure OK?" appears.

6) If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

First, the .PCG file is loaded, then the .SNG file. If either file cannot be found, an error message appears. When finished, the message "Completed" appears.

1B Load P/C/G Data

This function allows you to load a .PCG (200 Programs/200 Combinations/4 drum kits/Global settings) file from floppy disk.



LCD	Parameter	Range	Description
1B-1	Source File	Files on disk	Select a file
	OK to Load	OK?	Executes the load function

1) Insert a floppy disk that contains the data into the disk drive.

The message "Directory OK?" appears.

2) Press the [▲/YES] button.

3) Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a file.

Only file names with a .PCG extension appear.

4) Position the cursor on OK?

5) Press the [▲/YES] button.

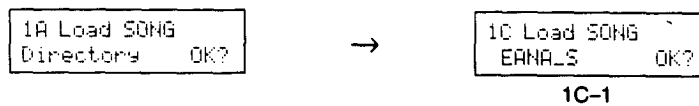
The message "Are You Sure OK?" appears.

6) If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the file is being loaded, the message "Now Loading .PCG" is shown. When finished, the message "Completed" appears.

1C Load Sequencer Data

This function allows you to load a .SNG (10 songs, 100 patterns) file from floppy disk. To load the Programs used in a song, see “1B Load P/C/G Data” on page 179.



LCD	Parameter	Range	Description
1C-1	Source file	Files on disk	Select a file
	OK to Load	OK?	Executes the load function

- 1) **Insert a floppy disk that contains the data into the disk drive.**
The message “Directory OK?” appears.
- 2) **Press the [▲/YES] button.**
- 3) **Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a file.**
Only file names with a .SNG extension appear.
- 4) **Position the cursor on OK?**
- 5) **Press the [▲/YES] button.**
The message “Are You Sure OK?” appears.
- 6) **If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.**
While the file is being loaded, the message “Now Loading .SNG” is shown.
When finished, the message “Completed” appears.

2A Load 1 Combination

This function allows you to load one Combination from a .PCG file. You may need to load the Programs used by the Combination Timbres, too. See "2B Load 1 Program" on page 182.



LCD	Parameter	Range	Description
2A-1	Source File	Files on disk	Select a file
2A-2	Source Combination	A00-A99, B00-B99	Select a Combination to load
	Destination	A00-A99, B00-B99	Select the destination
	OK to Load	OK?	Executes the load function

- 1) **Insert a floppy disk that contains the data into the disk drive.**
The message "Directory OK?" appears.
- 2) **Press the [▲/YES] button.**
- 3) **Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a file.**
Only file names with a .PCG extension appear.
- 4) **Press the [→] button.**
- 5) **Select the Combination to load.**
The X2/X3 may take a few seconds to check what Combinations are available on disk. After which, names of available Combinations are shown.
- 6) **Press the [→] button.**
- 7) **Select the destination.**
- 8) **Position the cursor on OK?**
- 9) **Press the [▲/YES] button.**
The message "Are You Sure OK?" appears.
- 10) **If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.**
While the Combination is being loaded, the message "Now Loading..." is shown.
When finished, the message "Completed" appears.

2B Load 1 Program

This function allows you to load one Program from a .PCG file. If the Program uses a drum kit, you'll have to load that, too. See "2E Load 1 Drum Kit" on page 185.



LCD	Parameter	Range	Description
2B-1	Source File	Files on disk	Select a file
2B-2	Source Program	A00-A99, B00-B99	Select a Program to load
	Destination	A00-A99, B00-B99	Select the destination
	OK to Load	OK?	Executes the load function

1) Insert a floppy disk that contains the data into the disk drive.

The message "Directory OK?" appears.

2) Press the [▲/YES] button.

3) Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a file.

Only file names with a .PCG extension appear.

4) Press the [→] button.

5) Select the Program to load.

The X2/X3 may take a few seconds to check what Programs are available on disk. After which, names of available Programs are shown.

6) Press the [→] button.

7) Select the destination.

If you are loading a Program that is used in a Combination or song, select that Program.

8) Position the cursor on OK?

9) Press the [▲/YES] button.

The message "Are You Sure OK?" appears.

10) If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the Program is being loaded, the message "Now Loading..." is shown.

When finished, the message "Completed" appears.

2C Load 1 Song

This function allows you to load one song from a .SNG file. You may need to load some patterns, too. In this case, load the patterns first. See “2D Load 1 Pattern” on page 184. To load a Program that is used in a song, see “2B Load 1 Program” on page 182.



LCD	Parameter	Range	Description
2C-1	Source File	Files on disk	Select a file
2C-2	Song to Load (SONG)	SONG1-SONG9	Select a song to load
	Destination (SONG)	SONG1-SONG9	Select the destination song
	OK to Load	OK?	Executes the load function

1) Insert a floppy disk that contains the data into the disk drive.

The message “Directory OK?” appears.

2) Press the [▲/YES] button.

3) Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a file.

Only file names with a .SNG extension appear.

4) Press the [→] button.

5) Select the song to load.

The X2/X3 may take a few seconds to check what songs are available on disk. After which, names of available songs are shown.

6) Press the [→] button.

7) Select the destination.

8) Position the cursor on OK?

9) Press the [▲/YES] button.

The message “Are You Sure OK?” appears.

10) If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the song is being loaded, the message “Now Loading...” is shown.

When finished, the message “Completed” appears.

2D Load 1 Pattern

This function allows you to load one pattern from a .SNG file.



LCD	Parameter	Range	Description
2D-1	Source File	Files on disk	Select a file
2D-2	Pattern to Load (P)	P00-P99	Select a pattern to load
	Destination (P)	P00-P99	Select the destination pattern
	OK to Load	OK?	Executes the load function

- 1) **Insert a floppy disk that contains the data into the disk drive.**
The message "Directory OK?" appears.
- 2) **Press the [▲/YES] button.**
- 3) **Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a file.**
Only file names with a .SNG extension appear.
- 4) **Press the [→] button.**
- 5) **Select the pattern to load.**
- 6) **Press the [→] button.**
- 7) **Select the destination.**
- 8) **Position the cursor on OK?**
- 9) **Press the [▲/YES] button.**
The message "Are You Sure OK?" appears.
- 10) **If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.**
While the pattern is being loaded, the message "Now Loading..." is shown.
When finished, the message "Completed" appears.

2E Load 1 Drum Kit

This function allows you to load one drum kit from a .PCG file.



LCD	Parameter	Range	Description
2E-1	Source File	Files on disk	Select a file
2E-2	Drum Kit to Load	A1, A2, B1, B2	Select a drum kit to load
	Destination	A1, A2, B1, B2	Select the destination drum kit
	OK to Load	OK?	Executes the load function

1) Insert a floppy disk that contains the data into the disk drive.

The message "Directory OK?" appears.

2) Press the [▲/YES] button.

3) Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select a file.

Only file names with a .PCG extension appear.

4) Press the [→] button.

5) Select the drum kit to load.

6) Press the [→] button.

7) Select the destination.

To load a drum kit that is used in a Program, select that drum kit.

8) Position the cursor on OK?

9) Press the [▲/YES] button.

The message "Are You Sure OK?" appears.

10) If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the drum kit is being loaded, the message "Now Loading..." is shown.

When finished, the message "Completed" appears.

3A Save All Data

This function allows you to save all data to floppy disk. That is, a .PCG (Program/Combination/Global) file and a .SNG (Sequencer) file simultaneously. Both files are saved with the same name (different file extensions).

```

3A Save ALL
NEW_NAME  OK?
  
```

3A-1

LCD	Parameter	Range	Description
3A-1	File Name		Name the files (.PCG and .SNG files will use same name)
	OK to Save	OK?	Executes the save function

- 1) Set the write protect tab on an X2/X3 formatted floppy disk to unprotected. See "Write Protect Tab" on page 175.
- 2) Insert the floppy disk into the disk drive.
- 3) Use the [←] and [→] cursor buttons to position the cursor, and the VALUE slider, [▲/YES] and [▼/NO] buttons, or the number keypad to select characters. See "Naming Files" on page 178.
- 4) Position the cursor on OK?
- 5) Press the [▲/YES] button.

The message "Are You Sure OK?" appears.

- 6) If you are sure that you want to save the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

First, the .PCG file is saved, then the .SNG file.

When finished, the message "Completed" appears.

If a file with the same name already exists on the disk, the message "PCG(SNG) exists OK?" will appear. In this case, press the [▲/YES] button to save (overwriting the existing file), or the [▼/NO] button to cancel.

3B Save P/C/G Data

This function allows you to save a .PCG (Programs/Combinations/Global) file to floppy disk.

```

3B Save P/C/G
NEW_NAME  OK?
3B-1
  
```

LCD	Parameter	Range	Description
3B-1	File Name		Name the file
	OK to Save	OK?	Executes the save function

- 1) Set the write protect tab on an X2/X3 formatted floppy disk to unprotected. See "Write Protect Tab" on page 175.
- 2) Insert the floppy disk into the disk drive.
- 3) Use the [←] and [→] cursor buttons to position the cursor, and the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select characters. See "Naming Files" on page 178.
- 4) Position the cursor on OK?
- 5) Press the [▲/YES] button.

The message "Are You Sure OK?" appears.

- 6) If you are sure that you want to save the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the data is being saved, the message "Now Saving..." is shown.

When finished, the message "Completed" appears.

If a file with the same name already exists on the disk, the message "File exists OK?" will appear. In this case, press the [▲/YES] button to save (overwriting the existing file), or the [▼/NO] button to cancel.

3C Save Sequencer Data

This function allows you to save a .SNG file (10 songs, 100 patterns) to floppy disk.

```
3C Save SONG
NEW_NAME  OK?
```

3C-1

LCD	Parameter	Range	Description
3C-1	File Name		Name the file
	OK to Save	OK?	Executes the save function

- 1) Set the write protect tab on an X2/X3 formatted floppy disk to unprotected. See "Write Protect Tab" on page 175.
- 2) Insert the floppy disk into the disk drive.
- 3) Use the [←] and [→] cursor buttons to position the cursor, and the VALUE slider or [▲/YES] and [▼/NO] buttons to select characters. See "Naming Files" on page 178.
- 4) Position the cursor on OK?
- 5) Press the [▲/YES] button.

The message "Are You Sure OK?" appears.

- 6) If you are sure that you want to save the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the Sequencer data is being saved, the message "Now Saving .SNG" is shown.

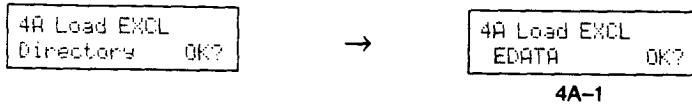
When finished, the message "Completed" will appear.

The extension of the file saved is SNG.

If a file with the same name already exists on the disk, the message "File exists OK?" will appear. In this case, press the [▲/YES] button to save (overwriting the existing file), or the [▼/NO] button to cancel.

4A Load MIDI Exclusive Data

This function allows you to transmit MIDI Exclusive data that is stored on an X2/X3 floppy disk to other MIDI devices. The Exclusive data for a particular MIDI device must have been saved to disk first. In other words, you cannot send MIDI Exclusive data saved from a drum machine to an effects unit. See "4B Save MIDI Exclusive Data" on page 190.



LCD	Parameter	Range	Description
4A-1	Source File	Files on disk	Select an Exclusive data file to load
	OK to Load	OK?	Executes the load function

- 1) **Connect the X2/X3 MIDI OUT to the receiving device's MIDI IN.**
- 2) **Insert the floppy disk that contains the data you want to send.**
The message "Directory OK?" appears.
- 3) **Press the [▲/YES] button.**
- 4) **Select the MIDI Exclusive file that you want to send.**
- 5) **Position the cursor on OK?**
- 6) **Press the [▲/YES] button.**

The message "Transmitting..." appears.

When finished, the message "Completed" appears.

Note: Before you can use the MIDI Exclusive data on the external device, you must set the receive MIDI Channel the same as it was when the data was originally saved.

4B Save MIDI Exclusive Data

This function allows you to use the X2/X3 as a MIDI data filer. It can be used to store MIDI Exclusive data from other MIDI devices. The X2/X3 does not use the data, it just saves it to disk.

4B Save EXCL Awaiting data	>	4B Save EXCL MYSETTING OK?	<
4B-1		4B-2	

LCD	Parameter	Range	Description
4B-1	Awaiting data		Exclusive data receive
4B-2	Name		Name the EXCL file to be saved
	OK to Save	OK?	Executes the Save function

- 1) Connect the MIDI OUT of the sending device to the X2/X3 MIDI IN.
- 2) Set the write protect tab on an X2/X3 formatted floppy disk to unprotected. See "Write Protect Tab" on page 175.
- 3) Insert a formatted X2/X3 floppy disk into the disk drive.
- 4) With this function selected, send the MIDI Exclusive data from the external MIDI device. Refer to the device's operating manual for details about sending MIDI Exclusive data, sometimes referred to as MIDI Bulk Dump.

When the external device has finished sending its data, the amount of data received is shown on the X2/X3 LCD screen. The X2/X3 can receive up to 64KB of System Exclusive data.

- 5) Press the [→] cursor button.
- 6) Use the [←] and [→] cursor buttons to position the cursor, and the VALUE slider or [▲/YES] and [▼/NO] buttons to select characters. See "Naming Files" on page 178.
- 7) Position the cursor on OK?
- 8) Press the [▲/YES] button.
- 9) If you are sure that you want to save the data, press the [▲/YES] button again. The Exclusive data will be saved to floppy disk.

The message "Now Saving .EXL" appears.

When finished, the message "Completed" appears.

The "4A Load MIDI Exclusive Data" function on page 189 can be used to transmit the Exclusive data back to the external MIDI device.

Note: If you select an LCD screen other than 4B-1 or 4B-2, the received data will be lost.

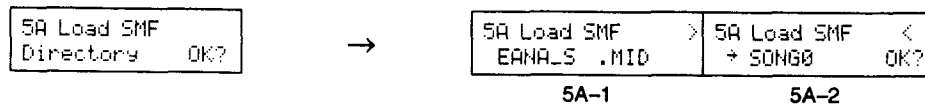
MIDI Exclusive Notes

For the Load and Save MIDI Exclusive Data functions, MIDI Exclusive data is loaded and saved regardless of the X2/X3 Global MIDI Channel setting and the Global mode MIDI Exclusive Filter setting.

Up to 64KB of MIDI Exclusive data can be received and saved by the X2/X3. This is approximately 21 seconds of continuous data reception. Free sequencer memory must be more than 52%. If more data is received, the error message "Memory Overflow" appears.

5A Load SMF (Standard MIDI File)

This function allows you to load an SMF (Standard MIDI File) from a floppy disk to the X2/X3. This is useful when you want to use a MIDI song that was recorded on a different type of MIDI sequencer system. SMF songs can be transferred between computers using 720KB 2DD disks.



LCD	Parameter	Range	Description
5A-1	Source File	Files on disk	Select an SMF file to load
5A-2	Destination Song (SONG)	0-9	Select the load destination
	OK to Load	OK?	Executes the load function

- 1) Insert the floppy disk that contains the SMF carefully into the disk drive.
The message "Directory OK?" appears.
- 2) Press the [▲/YES] button.
- 3) Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select the SMF to load.
X2/X3 SMF files use the file extension "MID". Other manufacturers may use something else.
- 4) Press the [→] button.
- 5) Select the load destination.
- 6) Position the cursor on OK?
- 7) Press the [▲/YES] button.
The message "Are You Sure OK?" appears.
- 8) If you are sure that you want to load the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the file is being loaded, the message "Now Loading..." is shown.

When finished, the message "Completed" appears.

Note: When an X2/X3 SMF file is loaded back into the X2/X3, track settings such as Meta events are loaded into the destination song. Program No., Volume, and Pan settings at the beginning of the song are ignored.

Note: If sequencer data from a MIDI device other than the X2/X3 contains incompatible data, it cannot be loaded.

Note: When playing a SMF from another device, you may find that some of the parts are played by the wrong Program. This should not occur if the SMF contains GM compatible song data.

5B Save SMF (Standard MIDI File)

This function allows you to save an X2/X3 song in the SMF (Standard MIDI File) format. The SMF format sequence data can be read by many different sequencers, making it ideal for transferring songs between systems.

5B Save SMF SONG0: YOURSONG	>	5B Save SMF Format0	<	OK?
5B-1		5B-2		

LCD	Parameter	Range	Description
5B-1	Source Song (SONG)	Song 0-9	Select a song to save in SMF format
	Name		Name the SMF file to be saved
5B-2	SMF Format	0, 1	Select an SMF format
	OK to Save	OK?	Executes the save function

- 1) Make sure that the floppy disk's write protect tabs are set to unprotected. See "Write Protect Tab" on page 175.
- 2) Insert the floppy disk carefully into the disk drive.
The floppy disk must be formatted before it can be used. See "8A Format Disk" on page 196.
- 3) Use the VALUE slider, [▲/YES] and [▼/NO] buttons, or number keypad to select the song that you want to save.
- 4) If you want to change the file name, use the [←] and [→] cursor buttons to position the cursor within the existing name, and the VALUE slider or [▲/YES] and [▼/NO] buttons to select characters. See "Naming Files" on page 178. In addition to the characters shown on page 178, lower case roman characters and some symbols can be used. When you select songs, the first eight characters of the song name are displayed, these are used as the file name when you save.

Note: X2/X3 song names can be up to 10 characters long. However, file names can use 8 characters only. So the last two characters of a 10 character song name are not used.

- 5) Press the [→] cursor button.
- 6) Select either Format 0 or format 1.

Format 0: MIDI data from the 16 tracks is merged into one track.

Format 1: MIDI data is saved as individual tracks, maintaining track integrity.

Normally, Format 1 should be selected. If, however, the MIDI device that you are transferring to cannot read Format 1, or if there are not enough tracks, use Format 0.

- 7) Position the cursor on OK?
- 8) Press the [▲/YES] button.
The message "Are You Sure OK?" appears.
- 9) If you are sure that you want to save the data, press the [▲/YES] button again. Press the [▼/NO] button to cancel.

While the file is being saved, the message "Now Saving .MID..." is shown.

When finished, the message "Completed" appears.

If a file with the same name already exists, the message "File Exists" appears. Press the [▲/YES] button to overwrite the existing file, or the [▼/NO] button to cancel.

Note: Songs that contain a lot of patterns can become quite large when saved in SMF format. In some cases you may not be able to load the SMF back into the X2/X3.

Note: When saving a standard MIDI file, the settings for each track of the song to be saved are added as Meta events. Also, track settings (Program number, Volume, and Pan) are added as events at the beginning of the tracks, assuming that a sequencer other than the X2/X3 is used to load the file. Refer to the Note for "5A Load SMF (Standard MIDI File)" on page 191.

6A Rename File

This function allows you to rename floppy disk files.



LCD	Parameter	Range	Description
6A-1	File Name	Files on disk	Select a file to rename
6A-2	Rename		
	OK to Rename	OK?	Executes the rename function

- 1) **Make sure that the floppy disk's write protect tabs are set to unprotected.** See "Write Protect Tab" on page 175.
- 2) **Insert the floppy disk carefully into the disk drive.**
The message "Directory OK?" appears.
- 3) **Press the [▲/YES] button.**
- 4) **Use the VALUE slider or [▲/YES] and [▼/NO] buttons to select the file to rename.**

Note: When selecting files, pay attention to file names and extensions. Remember that when you Save All Data, .PCG and .SNG files are saved with the same name. See "X2/X3 File Types" on page 177.

- 5) **Press the [→] cursor button.**
- 6) **Use the [←] and [→] cursor buttons to position the cursor within the existing name, and the [▲/YES] and [▼/NO] buttons to select characters.** See "Naming Files" on page 178.

Important: Do not change the three letter extension at the end of the file name (the three characters after the period). If you do, the X2/X3 will not be able to read the file. The file extension can be changed back to something that the X2/X3 can read using an MS-DOS based personal computer.

- 7) **Position the cursor on OK?**
- 8) **Press the [▲/YES] button.**
The message "Are You Sure OK?" appears.
- 9) **If you are sure that you want to rename the file, press the [▲/YES] button again. Press the [▼/NO] button to cancel.**

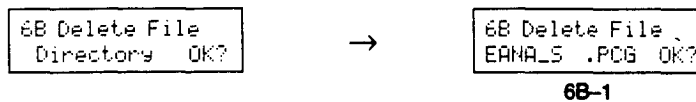
While the file is being renamed, the message "Processing..." is shown.

If a file already exists with the name you specify, the message "Same name found" appears. In this case, choose another name.

You can rename files on an MS-DOS based personal computer.

6B Delete File

This function allows you to delete floppy disk files.



LCD	Parameter	Range	Description
6B-1	Delete File	Files on disk	Select a file to delete
	OK to Delete	OK?	Executes the delete file function

- 1) Make sure that the floppy disk's write protect tabs are set to unprotected. See "Write Protect Tab" on page 175.
- 2) Insert the floppy disk carefully into the disk drive.
- 3) Press the [▲/YES] button.
- 4) Use the [▲/YES] and [▼/NO] buttons to select the file to delete.

Note: When selecting files, pay attention to file names and extensions (the three characters after the period). Remember that when you Save All Data, .PCG and .SNG files are saved with the same name. See "X2/X3 File Types" on page 177.

- 5) Position the cursor on OK?
- 6) Press the [▲/YES] button.
- 7) The message "Are You Sure OK?" will appear. Press the [▲/YES] button to delete the file, or the [▼/NO] button to cancel.

While the file is being deleted, the message "Processing..." is shown.

When finished, the message "Completed" appears.

You can delete files on an MS-DOS based personal computer.

7A Set Date

This function allows you to date stamp files. This date setting is stored, but it is not updated when the X2/X3 is powered off.

A file's date cannot be displayed on the X2/X3. However, this function may be useful if you manage your X2/X3 floppy disk files using an MS-DOS based personal computer.

```
7A Set Date
JAN - 01 - 1993
```

7A-1

LCD	Parameter	Range	Description
7A-1	Month	JAN-DEC	Set the month
	Day	01-31	Set the day
	Year	1980-2079	Set the year

7B Set Time

This function allows you to time stamp files. This time setting is stored, but it is not updated when the X2/X3 is powered off.

A file's time cannot be displayed on the X2/X3. However, this function may be useful if you manage your X2/X3 floppy disk files using an MS-DOS based personal computer.

```
7B Set Time
00 : 00
```

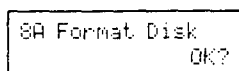
7B-1

LCD	Parameter	Range	Description
7B-1	Hour	0-23	Set the hour
	Minute	00-59	Set the minute

8A Format Disk

This function allows you to format floppy disks. Floppy disks have to be formatted before you can save data on them. Formatting prepares the disk so that it is ready to store X2/X3 data.

Use only 3.5 inch 2DD type floppy disks with the X2/X3.



8A-1

LCD	Parameter	Range	Description
8A-1	OK to Format	OK?	Executes the disk format function

1) **Make sure that the floppy disk's write protect tabs are set to unprotected. See "Write Protect Tab" on page 175.**

2) **Insert the floppy disk carefully into the disk drive.**

Important: Any data already stored on the floppy disk will be deleted during disk formatting. Now might be a good time to check the disk contents to see if there is any data that you want to keep.

3) **Press the [▲/YES] button.**

4) **The message "Are you Sure OK?" will appear. Press the [▲/YES] button to format the disk, or the [▼/NO] button to cancel.**

While disk formatting is in progress, the message "Now Formatting..." is shown. Disk formatting takes approximately two minutes.

When finished, the message "Completed" appears. The floppy disk can then be used to save X2/X3 data.

When you have saved some X2/X3 data to disk, write on the disk label what is stored on the disk.

Note: If instead of the message "Completed" an error message appears, eject the disk, reinsert it, then format it again. If the same error message appears, try another disk. Faulty floppy disks are not uncommon.

Floppy disks can also be formatted on a personal computer: MS-DOS 720KB format.

Chapter 10: Data Cards

Using X2/X3 data cards you can expand the number of available Multisounds, experiment with third-party Programs and Combinations, and save your own Programs and sequencer data. See your Korg dealer for more information about available data cards.

PCM Data Cards

PCM data cards typically contain Multisounds. As you know, Multisounds are the basic elements that make up Programs. Hence, increasing your library of Multisounds gives you the power to create some exciting new Programs. Which can, of course, be used in Combinations and songs. Some PCM data cards also contain drum sounds. A PCM card is a type of ROM card.

See "1B Oscillator1 Setup" on page 11 for details about selecting PCM data card Multisounds.

PROG/SEQ Data Cards

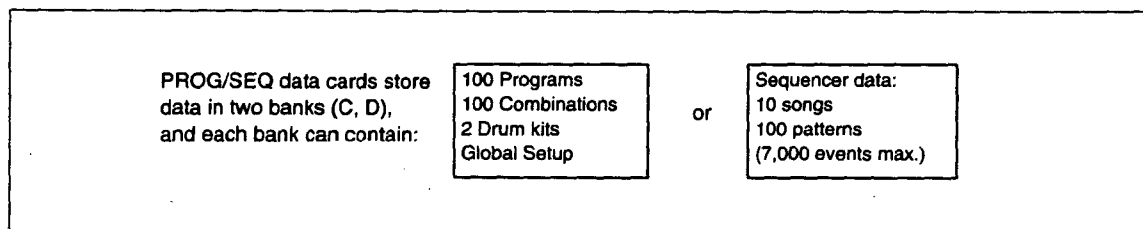
PROG/SEQ data cards can be either RAM or ROM type cards.

ROM cards typically contain third-party Programs, Combinations, or both. They allow you to expand your Program and Combination libraries with ease.

RAM cards can be used to save Programs, Combinations, and sequencer data. Although you can also save this data to floppy disk, you have to load it into the X2/X3 before you can use it.

Whereas, Programs, Combinations, and sequencer data stored on a RAM card can be accessed at any time (sequencer data can be played, but you must load it for recording and editing).

The following illustration shows how PROG/SEQ data cards can be used.



See Global mode pages 166 and 168 for details about saving and loading Programs, Combinations, and sequencer data. The following table lists the various PROG/SEQ data card load and save functions.

Type of Data	Save	Load
100 Programs 100 Combinations 2 Drum kits Global Setup	See "6C Save Programs & Combinations to Card" on page 168.	See "6A Load Programs & Combinations from Card" on page 166.
Sequencer data: 10 songs 100 patterns	See "6D Save Sequencer Data to Card" on page 169.	See "6B Load Sequencer Data from Card" on page 167.
1 Program	See "8A Program Write" on page 32.	See "Selecting Programs" on page 3.
1 Combination	See "8A Combination Write" on page 54.	See "Selecting Combinations" on page 35.
1 Drum kit	See "7C Drum Kit Copy" on page 172.	See "7C Drum Kit Copy" on page 172.

RAM Card Write Protect Switch

Data on RAM cards can be protected by setting the RAM card's write protect switch to ON. In this case, data cannot be saved to the card, and existing card data is protected against accidental erasure. The write protect switch is located on the side of the RAM card.

Set the RAM card's write protect switch to OFF when you want to save data to the card.

When you are not using a card, to prolong the battery life, set the write protect switch to ON.

Inserting & Removing Data Cards

- Insert data cards with the label facing upwards.
- Do not insert or remove data cards while the X2/X3 is producing sound.
- Do not insert PROG/SEQ data cards in the PCM DATA card slot, and vice versa.

Formatting RAM cards

A new RAM card is formatted automatically the first time that you save data to it in Global mode.

Using the "6C Save Programs & Combinations to Card" on page 168 or "6D Save Sequencer Data to Card" on page 169 function will format a new RAM data card. Individual Programs or Combinations cannot be written to a card that has not been formatted using one of these functions. You cannot save sequencer data to a card bank that contains Programs or Combinations. Likewise, you cannot save Programs or Combinations to a card bank that contains sequencer data.

Ram Card Battery

RAM cards need a long-life lithium battery to be able to store data. A battery, type CR2016, should be included when you buy a RAM card, however, you have to install it yourself. See below for details. When the battery voltage becomes low, the message "Battery Low" appears.

Installing the RAM Card Battery

- 1) Turn the RAM card over so that its contacts are facing down.
- 2) Locate the battery slot in the card.
- 3) Install the battery so that its positive (+) side is facing upwards.

Replacing the RAM Card Battery

We recommend that you replace the RAM card battery once every year to protect the data stored on the card. Battery life is reduced if stored at temperatures above 40°C (104°F). CR2016 type lithium batteries are available from your Korg dealer.

- 1) Power on the X2/X3, and insert the RAM card into the PROG/SEQ slot.
- 2) Remove the old battery.
- 3) Insert the new battery.
- 4) Remove the RAM card.

If you replace the battery while the RAM card is not inserted in a powered on X2/X3, data is lost.

Appendix

General Troubleshooting

Trouble	What To Do
The X2/X3 cannot be powered up.	Check that the power cable is connected to a suitable AC receptacle.
	Check that the X2/X3's rear panel POWER ON/OFF switch is on.
	Check the power cable plug fuse (if fitted).
	If the X2/X3 still cannot be powered up, consult your Korg dealer.
The X2/X3 appears to be powered up, but nothing is displayed on the LCD.	Check the LCD contrast. For X2, adjust the CONTRAST knob. For X3, see "8A LCD Contrast (X3 only)" on page 173.
The X2/X3 does not produce any sound.	Check the connections to your amplifier, mixer, etc.
	Check that your amplifier, mixer, etc., is switched on, and the correct settings have been made.
	Check that the X2/X3 VOLUME slider is up.
	Is Local Control turned off? It should be on. See "3B Local Control & Note Filter" on page 161.
The wrong sounds are produced.	If you are using PCM data cards, is the inserted PCM data card the same one that you used when creating the current Program?
	If you are using PROG/SEQ data cards, is the inserted PROG/SEQ data card the same one that you used when creating the current Combination?
Sound cannot be stopped.	Make sure that the current Program's Hold parameter is not set to ON. See "1A Global Oscillator Setup" on page 10.
	Is the Damper Polarity parameter set incorrectly?
The selected song cannot be played.	Does the song contain any data?
	Make sure that the MIDI Clock source is set to INT. If you are using an external clock source, make sure that the MIDI Clock source is set to EXT and the external device is sending the MIDI clock data correctly.
	Make sure that the song's tracks are set to either INT or BOTH mode.
Cannot record with the sequencer.	Make sure that the sequencer memory is not protected. See "4C Sequencer Memory Protect" on page 164.
	Is the selected track protected? See "1B Track Status" on page 114.
	Is the sequencer memory 0%?
	If you are using an external clock source, make sure that the MIDI Clock source is set to EXT and the external device is sending the MIDI clock data correctly.
The X2/X3 does not respond to incoming MIDI data.	Make sure that all MIDI cables are connected correctly.
	Make sure that the X2/X3 is set to receive MIDI data on the channel that the sending device is using? For Programs, see "3A Global MIDI Channel & MIDI Clock Source" on page 160. For Combinations, see "3A MIDI Channel" on page 46.
	Make sure that the X2/X3 is not set to filter out the incoming MIDI data. See "3B Local Control & Note Filter" on page 161, "3C MIDI Filter1" on page 162, and "3D MIDI Filter2" on page 163. For Combinations, see the various MIDI filters explained in "Combination Edit Mode" on page 39.
In Combination Play mode, Combinations cannot be selected using MIDI Program Change messages.	Make sure that MIDI Filter1's Program Change Filter is set to ENA or NUM. See "3C MIDI Filter1" on page 162.
In Combination Play mode, Timbre Programs cannot be selected using MIDI Program Change messages.	Make sure that each Combination Timbre's Program Change Filter parameter is set to E. See "6A Program Change Filter" on page 52.

Trouble	What To Do
In Combination Play mode, sound is produced only when certain keys are played.	Maybe some Timbres' Key Window parameters are set to produce a keyboard split. See "4A Key Window Top" on page 47.
Cannot select VDF2, VDA2, or Pitch2 Modulation parameters.	The currently selected Program is not Double mode. See "1A Global Oscillator Setup" on page 10.
Cannot write a Program or Combination.	Is the Program or Combination memory protect function set to ON? See "4A Program Memory Protect" on page 164.
Some drum sounds in a Program cannot be played.	Does the drum kit use drum sounds from a PCM data card that is not inserted?
Keys do not play the specified drum sounds.	Is the Transpose function set to something other than +00? See "1B Transpose" on page 156.
	Is the oscillator octave parameter set to 8'?
Cannot play GM compatible song data.	Make sure that the song data is GM compatible.
	If you are sending GM compatible song data to the X2/X3 via MIDI, you must conform the selected X2/X3 song to GM. See "8F GM Song Mode" on page 154.

Floppy Disk & Data Card Troubleshooting

Trouble	What To Do
Cannot format a floppy disk.	Are you using 3.5 inch 2DD type floppy disks?
	Make sure that the disk is inserted correctly.
	Make sure that the disk's write protect tab is not set to protect.
Cannot save data to floppy disk.	Make sure that the disk is inserted correctly.
	Has the disk been formatted correctly?
	Make sure that the disk's write protect tab is not set to protect.
Cannot load data from floppy disk.	Make sure that the disk is inserted correctly.
	Does the disk contain any data?
	Is the memory protected. See "4A Program Memory Protect" on page 164, "4B Combination Memory Protect" on page 164, and "4C Sequencer Memory Protect" on page 164
Cannot save data to card.	Make sure that the card's write protect switch is not set to protect.
	Make sure that you are not using a ROM card. You can save data to RAM type cards only.
	Make sure that the card is inserted correctly.
	When a Program or Combination is saved to a card bank, that bank is formatted for storing Programs and Combinations. Are you trying to save sequencer data to such a card bank?
Cannot load data from card.	Make sure that the card is inserted correctly.
	Does the card contain any data?
	Is the memory protected. See "4A Program Memory Protect" on page 164, "4B Combination Memory Protect" on page 164, and "4C Sequencer Memory Protect" on page 164

General Error Messages

Error Message	Meaning
Battery Low	The voltage of the internal battery is low. Please contact your Korg dealer to have the battery replaced. Do not attempt to replace the battery yourself.

Program Edit Mode & Combination Edit Mode Error Messages

Error Message	Meaning
No Card	The PCM card that you used when making a Program is not inserted.
Memory Protected	The memory into which you are trying to load data is protected. See "4A Program Memory Protect" on page 164, "4B Combination Memory Protect" on page 164, and "4C Sequencer Memory Protect" on page 164.
Write Error	Data was not saved to the card correctly. Reinsert the card and try again.

Sequencer Mode Error Messages

Error Message	Meaning
Beat or Length Mismatch	You are trying to place a track or pattern data into a track with a different time signature, or to bounce or copy patterns of different lengths.
Blank Measure	No data in the specified source measure.
Blank Pattern	No data in the specified source pattern.
Blank Track	No data in the specified source track.
Can't Open Pat	The pattern cannot be opened.
Can't Undo	Cannot perform undo due to insufficient memory.
Card Memory Full	The sequencer data is too large to save to a PROG/SEQ card. Internal sequencer memory capacity is 32,000 events. PROG/SEQ cards can store 7,000 events.
Measure Overflow	The operation you are trying will exceed the 999 measure limit for a track.
Memory Full	The total number of events used by all songs and patterns has reached 32,000—the maximum.
Mismatch B Resol	Song's base resolution is different.
No Events Exist	The track or pattern selected for event editing does not contain any data.
Ocpd by Pat	A pattern overlaps into the measure that you have specified for punch in/out or the measure that you have specified for a measure edit destination.
Pat Across Src	If you are copying from a track, the specified source contains part of a pattern. If you are executing the Get From Track function, the specified source contains part, or all of a pattern.
Pat Confl Event	You are trying to bounce a track that contains a pattern with a track that contains an event or pattern in the same measure.
Pattern Used in Song	The pattern cannot be loaded because it is used in a song.
Song Not Empty	The selected song contains data.
Src Across Dst	While copying measures within a track, the source and destination data overlaps.
Track Protected	The selected track is protected. See "1B Track Status" on page 114.

Disk Mode Error Messages

Error Message	Meaning
Can't Make File	There are 112 files on the disk—the maximum.
Data Error	The data that was saved to disk or read from disk is incomplete or meaningless. Or the disk is not for use with the X2/X3. Data errors also occur if: a disk is scratched, the wrong disk type is used, or the disk drive heads are dirty. If a data error message appears, try the following: Eject the disk, reinsert it, then try again. Try a new floppy disk. Clean the disk drive. See "Disk Drive Head Cleaning" on page 176.
Disk Full	The disk is full. Use another disk.
Disk Type Error	The disk is not for use with the X2/X3 (MS-DOS 720KB)
Drive Not Ready	No disk in the disk drive.
File Protected	File is set to read only.
File Type Error	The file has a .PCG, .SNG, .EXL file extension, but the file format is different.
Illegal SMF Data	The SMF that you have loaded contains some errors.
Illegal SMF Divi	The file that you have loaded is timecode based.
Illegal SMF FMT	The file that you have loaded is not a format 0 or format 1 SMF.
Measure Overflow	The SMF that you are trying to load contains more than 999 measures.
Memory Full	When loading SMF, sequencer memory becomes full.
Memory Overflow	While saving MIDI data via MIDI filer, the received data exceeded 64kbytes.
No Combination	You have tried to Load 1 COMB from a Korg i2 or i3 .PCG file.
No Data	No events in the loaded SMF No MIDI data for MIDI filer to save.
No File	The file specified does not exist on the disk.
Not Enough Mem	There is not enough memory for the MIDI filer to save the data.
Same File	A file with that name already exists.
Song Data Error	When saving or loading sequencer data, the data contains an error.
Src Is Empty	When saving SMF, there are no track events.
Tr Memory Over	The SMF that you are trying to load contains a track with more than 16,000 events.
Tr Number Over	The SMF that you are trying to load contains more than 16 tracks.
Write Protected	The disk's write protect tab is set to the protected position. See "Write Protect Tab" on page 175.

Global Mode Error Messages

Message	Meaning
CARD Battery Low	The voltage of the card battery is low. Replace the battery. See "Ram Card Battery" on page 198.
Card Format Mismatch	The data that you are trying to load does not exist on the card.
Combi/Prog in the Bank (C/D)	The card bank from which you tried to load sequencer data contains Programs, Combinations, or both.
Invalid Bank (C/D)	The card bank does not contain any data.
Invalid (Unformatted) CARD	The card does not contain any data, or it is not for use with the X2/X3.
No CARD Inserted	No card is inserted.
ROM Protected	You cannot write to a ROM card, or a RAM card whose write protect switch is set to ON.
SEQ in the Bank (C/D)	The card bank from which you tried to load Programs, Combinations, and/or drum kits contains sequencer data.

Specifications

	X2	X3
Tone Generation System	AI ² (Advanced Integrated) Synthesis	
Tone Generator	Single mode: 32 voice, 32 oscillators	
	Double mode: 16 voice, 32 oscillators	
	Dynamic voice allocation	
Keyboard	76 key	61 key
PCM Waveform Memory	8MB	6MB
Effects	Two digital multi-effects processors	
Programs	336 (200 internal RAM, 136 internal ROM), 536 with PROG/SEQ card	
Combinations	200 internal RAM, 400 with PROG/SEQ card	
Sequencer	16 tracks	
	10 songs	
	100 patterns	
	32,000 event capacity	
Control Inputs	Assignable pedal, Damper pedal	
Outputs	1/L/MONO, 2/R, 3, 4 (1/4 inch jack)	L/MONO, R (1/4 inch jack)
	PHONES (1/4 inch jack)	
Floppy Disk Drive	3.5 inch 2DD	
Card Slots	PCM DATA	
	PROG/SEQ DATA	
MIDI Connections	IN, OUT, THRU	
LCD	Custom LCD with backlight	
Power Consumption	10 W	
Dimensions (W x D x H)	1288.8 x 338.3 x 106.4 mm (50.7" x 13.3" x 4.2")	1055 x 338.3 x 96 mm (41.5" x 13.3" x 3.8")
Weight	13.9 kg (30.6 lbs)	10 kg (22 lbs)

Appearance and specifications subject to change without notice.

Options

Cards	SRC-512 RAM card (PROG/SEQ RAM card)
	PCM data card (Multisound, drum sound ROM card)
	ROM card (PROG/SEQ ROM card)
Foot Pedals	PS-1 pedal switch
	PS-2 pedal switch
	DS-1 Damper Pedal
	EXP-2 Expression Pedal

MIDI Implementation Chart

Function		Transmitted	Recognized	Remarks
Basic Channel	Default	1-16	1-16	Memorized
	Changed	1-16	1-16	
Mode	Default		3	
	Messages	X	X	
	Altered	*****		
Note Number:		X2:16-115 X3: 24-108	0-127	0-127 when seq. data is transmitted
	True Voice	*****	0-127	
Velocity	Note On	O 9n, V=1-127	O 9n, V=1-127	2-126 when seq. data is transmitted
	Note Off	X	X	
After Touch	Keys	O	O	Seq data keys only *A
	Chs	O	O	*A
Pitch bend		O	O	*C
Control Change	0, 32	O	O	Bank Select (MSB, LSB) *P
	1, 2	O	O	Modulation (pitch, cutoff) *C
	4, 64	O	O	Pedal (scale, damper) *C
	6, 38	O	O	Data Entry (MSB, LSB)
	7, 11	(7 : O, 11 : X)	O	Volume, expression *C
	10, 91, 93	O	O	A:B panpot, send C, D *C
	12, 13	(12 : O, 13 : X)	O	Effect controller 1, 2 *C
	72, 73, 74	X	O	EG time (release, attack), brightness *C
	92, 94	O	O	Effects 1, 2 on/off *C
	96, 97	X	O	Data Inc, Dec
100, 101	X	O	RPN (LSB, MSB) *1	
120, 121	X	O	All sound off, Reset all Cntrls	
0-101	O	O	(Sequencer data)	
Program Change	True#	O 0-127	O 0-127	*P
		*****	0-127	0-99 except bank GM
System Exclusive		O	O	*2 *E
System Common	Song pos	O	O	*3
	Song Sel	O 0-29	O 0-29	*3
	Tune	X	X	
System Real Time	Clock	O	O	*3
	Command	O	O	*3
Aux Messages	Local On/Off	X	O	
	All Notes Off	X	O (123-127)	
	Active Sense	O	O	
	Reset	X	X	
Notes	<p>*C, *P, *A, *E: Sent and received when MIDI Filter (Controller, Program Change, After touch, System Exclusive) set to ENA.</p> <p>*1: LSB, MSB = 00,00: pitch bend range, =01,00: fine tune, =02,00: coarse tune.</p> <p>*2: Applies to Inquire message, GM system, master balance, master volume, Korg Exclusive.</p> <p>*3: When clock set to internal, sent, but not received. When set to external, received, but not sent.</p>			

Mode 1:OMNI ON, POLY
Mode 3:OMNI OFF, POLY

Mode 2:OMNI ON, MONO
Mode 4:OMNI OFF, MONO

O: Yes
X: No

MIDI Data Format

MIDI IMPLEMENTATION

1. TRANSMITTED DATA

1-1 CHANNEL MESSAGES

Status (Hex)	Second (Hex)	Third (Hex)	Description	ENA
1000 nnnn (8n)	0kkk kkkk (kk)	0100 0000 (40)	Note Off kkk kkkk=16~115 (X2 : 76Keys+Transpose) =24~108 (X3 : 61Keys+Transpose)	A
1001 nnnn (9n)	0kkk kkkk (kk)	0vvv vvvv (vv)	Note On kkk kkkk=16~115 (X2 : 76Keys+Transpose) 24~108 (X3 : 61Keys+Transpose) vvv vvvv=1~127	A
1010 nnnn (An)	0kkk kkkk (kk)	0vvv vvvv (vv)	Poly Key Pressure (Seq Recorded Data)	T,Q
1011 nnnn (Bn)	0000 0000 (00)	0mmn nmmn (mm)	Bank Select(MSB) (BANK Key, etc) *1,2	P
1011 nnnn (Bn)	0000 0001 (01)	0vvv vvvv (vv)	Modulation 1 (Joy Stick(+Y))	C
1011 nnnn (Bn)	0000 0010 (02)	0vvv vvvv (vv)	Modulation 2 (Joy Stick(-Y))	C
1011 nnnn (Bn)	0000 0100 (04)	0000 0000 (00)	Foot Pedal (Select Main Scale)	C
1011 nnnn (Bn)	0000 0100 (04)	0111 1111 (7F)	Foot Pedal (Select Sub Scale)	C
1011 gggg (Bg)	0000 0110 (06)	0vvv vvvv (vv)	Data Entry (MSB) (Value Slider)	A
1011 nnnn (Bn)	0000 0111 (07)	0vvv vvvv (vv)	Volume (Assign Pedal, etc) *1	C
1011 nnnn (Bn)	0000 1010 (0A)	0vvv vvvv (vv)	Panpot (by A:B Panpot)	C
1011 gggg (Bg)	0000 1100 (0C)	0vvv vvvv (vv)	Effect Control (Assignable Pedal)	C
1011 nnnn (Bn)	0010 0000 (20)	0bbb bbbb (bb)	Bank Select(LSB) (BANK Key, etc) *1,2	P
1011 gggg (Bg)	0010 0110 (26)	0vvv vvvv (vv)	Data Entry (LSB) (Value Slider)	A
1011 nnnn (Bn)	0100 0000 (40)	0000 0000 (00)	Hold 1 Off (Damper Pedal)	C
1011 nnnn (Bn)	0100 0000 (40)	0111 1111 (7F)	Hold 1 On (Damper Pedal)	C
1011 nnnn (Bn)	0ccc cccc (cc)	0vvv vvvv (vv)	Control Data (Seq Recorded Data) ccc cccc=00~101	C,Q
1100 nnnn (Cn)	0ppp pppp (pp)	-----	Program Change (Prog/Comb Change) *1,2	P
1101 nnnn (Dn)	0vvv vvvv (vv)	-----	Channel Pressure (After Touch)	T
1110 nnnn (En)	0bbb bbbb (bb)	0bbb bbbb (bb)	Bender Change (Joy Stick(X))	C

nnnn : MIDI Channel No.(0~15) Usually Global Channel. When using Sequencer, each track's channel, and when in Combination Mode, each timbre's channel.

gggg : Always Global Channel No.(0~15)

vvvv : Value

ENA = A : Always Enabled

C : Enabled when Control Filter in GLOBAL Mode is ENA

P : Enabled when Program Filter in GLOBAL Mode is ENA

T : Enabled when After Touch Filter in GLOBAL Mode is ENA

Q : Enabled when Sequencer is Playing(Trans),Recording(Receive)

T,Q: T and Q

C,Q: C and Q

*1 : When change the Combination No., Transmits [Bank Select],[Program Change] of Selected Combination, and Each Timbre's(Mode=EXT) [Bank Select],[Program Change],[Volume].

*2 :	Program	:	MIDI Out (Hex)		
	BankA 00~99 :	mm,bb,pp =	00,00,00~63	BankG 134 :	mm,bb,pp = 3E,00,40
	" B 00~99 :	"	00,01,00~63	" G 135 :	" 3E,00,18
	" C 00~99 :	"	00,02,00~63	" G 136 :	" 3E,00,30
	" D 00~99 :	"	00,03,00~63		
	" G 01~128 :	"	38,00,00~7F		
	" G 129 :	"	3E,00,00	Combination :	MIDI Out (Hex)
	" G 130 :	"	3E,00,10	BankA 00~99 :	mm,bb,pp = 00,00,00~63
	" G 131 :	"	3E,00,19	" B 00~99 :	" 00,01,00~63
	" G 132 :	"	3E,00,20	" C 00~99 :	" 00,02,00~63
	" G 133 :	"	3E,00,28	" D 00~99 :	" 00,03,00~63

1-2 SYSTEM COMMON MESSAGES

Status (Hex)	Second (Hex)	Third (Hex)	Description
1111 0010 (F2)	0sss ssss (ss)	0ttt tttt (tt)	Song Position Pointer sss ssss : Least significant (LSB) *3 ttt tttt : Most significant (MSB) *3
1111 0011 (F3)	000s ssss (ss)	-----	Song Select s ssss : Song No. = 0~29 (10~29:Card)

Transmits when in Sequencer Mode (Internal Clock)

When change the Song No., Transmits [Song Select] and Each Track's(Status=EXT,BOTH) [Bank Select],[Program Change],[Volume],[Panpot], Last of all [Song Position Pointer].

*3 : For Example Time Signature = 4/4, 8/8
tt,ss = 00,10 / Measure

1-3 SYSTEM REALTIME MESSAGES

Status (Hex)	Description
1111 1000 (F8)	Timing Clock *4
1111 1010 (FA)	Start *4
1111 1011 (FB)	Continue *4
1111 1100 (FC)	Stop *4
1111 1110 (FE)	Active Sensing

*4 : Transmits when in Sequencer Mode (Internal Clock)

1-4 UNIVERSAL SYSTEM EXCLUSIVE MESSAGES (DEVICE INQUIRY REPLY)

Byte (Hex)	Description
1111 0000 (F0)	Exclusive Status
0111 1110 (7E)	Non Realtime Message
0000 gggg (0g)	MIDI GLOBAL CHANNEL (DEVICE ID)
0000 0110 (06)	INQUIRY MESSAGE
0000 0010 (02)	IDENTITY REPLY
0100 0010 (42)	KORG ID (MANUFACTURERS ID)
0011 0101 (35)	X Series ID (FAMILY CODE (LSB))
0000 0000 (00)	(" " (MSB))
0000 00mm (0m)	(MEMBER CODE (LSB))
0000 0000 (00)	(" " (MSB))
0*** **** (**)	ROM No. 1~ (Minor Ver. (LSB))
0000 0000 (00)	(" " (MSB))
0*** **** (**)	SOFT VER. 1~ (Major Ver. (LSB))
0000 0000 (00)	(" " (MSB))
1111 0111 (F7)	END OF EXCLUSIVE

Transmits when INQUIRY MESSAGE REQUEST Received

mm = 0 : X3
= 1 : X3R
= 2 : X2

1-5 STRUCTURE OF KORG SYSTEM EXCLUSIVE MESSAGES

1st Byte = 1111 0000 (F0) : Exclusive Status
 2nd Byte = 0100 0010 (42) : KORG ID
 3rd Byte = 0011 *zzzz* (3g) : Format ID g:Global ch. EX.Header
 4th Byte = 0011 0101 (35) : X Series ID
 5th Byte = 0fff ffff (ff) : Function Code (See Func Code List)
 6th Byte = 0ddd dddd (dd) : Data
 LastByte = 1111 0111 (F7) : End of Exclusive EOX

1-6 Transmits Function Code List

Func	Description	R	D	E	C
42	MODE DATA	○			
47	ALL DRUM SOUND(PCN CARD) NAME DUMP	○			
45	ALL MULTISOUND(PCN CARD) NAME DUMP	○			
4E	MODE CHANGE				○*5
41	PARAMETER CHANGE				○*6
53	DRUMKIT PARAMETER CHANGE				○*7
40	PROGRAM PARAMETER DUMP				○*8
4C	ALL PROGRAM PARAMETER DUMP	○	○		
49	COMBINATION PARAMETER DUMP	○	○		○*9
4D	ALL COMBINATION PARAMETER DUMP	○	○		
48	ALL SEQUENCE DATA DUMP	○	○		
51	GLOBAL DATA DUMP	○	○		
52	DRUMS DATA DUMP	○	○		
50	ALL DATA(GLOBAL, DRUM, COMBI, PROG, SEQ) DUMP	○	○		
26	RECEIVED MESSAGE FORMAT ERROR	○		○	
23	DATA LOAD COMPLETED (ACK)			○	
24	DATA LOAD ERROR (NAK)			○	
21	WRITE COMPLETED			○	
22	WRITE ERROR			○	

Transmitted when

- R : Request Message is received
- D : Data dump by Panel SW (Doesn't respond to Exclusive ENA,DIS)
- E : EX.Message received
- C : Mode or No. is changed by Panel SW

Some Request Message is not received in some mode. See 2-6.

* When transmits series of EX Messages to X Series, Wait until [DATA LOAD COMPLETED] or [WRITE COMPLETED] of Several Messages was received.

- *5 : Transmits when change a Mode.
- *6 : Transmits when edit a parameter in EDIT PROGRAM, EDIT COMBINATION, and PROGRAM (Performance Edit) Mode.
- *7 : Transmits when edit a DrumKit's parameter in GLOBAL Mode.
- *8 : Transmits when Enter to EDIT PROGRAM Mode, or Edit a Performance Edit's parameter.
- *9 : Transmits when change a Combination No.

2. RECOGNIZED RECEIVE DATA

2-1 CHANNEL MESSAGES

Status (Hex)	Second (Hex)	Third (Hex)	Description	ENA
1000 nnnn (8n)	0kkk kkkk (kk)	0xxx xxxx (xx)	Note Off	A
1001 nnnn (9n)	0kkk kkkk (kk)	0000 0000 (00)	Note Off	A
1001 nnnn (9n)	0kkk kkkk (kk)	0vvv vvvv (vv)	Note On	A
		vvv vvvv=1~127		
1010 nnnn (An)	0kkk kkkk (kk)	0vvv vvvv (vv)	Poly Key Pressure (For Seq.Recording)	T,Q
1011 nnnn (Bn)	0000 0000 (00)	0aaa aaaa (aa)	Bank Select(MSB) #1	P
1011 nnnn (Bn)	0000 0001 (01)	0vvv vvvv (vv)	Modulation1 Depth (Pitch Modulation)	C
1011 nnnn (Bn)	0000 0010 (02)	0vvv vvvv (vv)	Modulation2 Depth (Cutoff Modulation)	C
1011 nnnn (Bn)	0000 0100 (04)	00vv vvvv(≤3F)	Foot Pedal Off (Select Main Scale)	C
1011 nnnn (Bn)	0000 0100 (04)	01vv vvvv(≤40)	Foot Pedal On (Select Sub Scale)	C
1011 nnnn (Bn)	0000 0110 (06)	0vvv vvvv (vv)	Data Entry (MSB) (For RPN & DynaMod Slider)	C
1011 nnnn (Bn)	0000 0111 (07)	0vvv vvvv (vv)	Volume	C
1011 nnnn (Bn)	0000 1010 (0A)	0vvv vvvv (vv)	Panpot (A:B Panpot)	C
1011 nnnn (Bn)	0000 1011 (0B)	0vvv vvvv (vv)	Expression	C
1011 <i>zzzz</i> (Bg)	0000 1100 (0C)	0vvv vvvv (vv)	Effect Control (Dyna Mod Src= PEDAL1)	C
1011 <i>zzzz</i> (Bg)	0000 1101 (0D)	0vvv vvvv (vv)	Effect Control (Dyna Mod Src= PEDAL2)	C
1011 nnnn (Bn)	0010 0000 (20)	0bbb bbbb (bb)	Bank Select(LSB) #1	P
1011 nnnn (Bn)	0010 0110 (26)	0vvv vvvv (vv)	Data Entry (LSB) (For RPN & DynaMod Slider)	C
1011 nnnn (Bn)	0100 0000 (40)	00xx xxxx(≤3F)	Hold Off (Damper Off)	C
1011 nnnn (Bn)	0100 0000 (40)	01xx xxxx(≥40)	" On (Damper On)	C
1011 nnnn (Bn)	0100 1000 (48)	0vvv vvvv (vv)	Release Time (Perf Edit Rel Time)#4	C
1011 nnnn (Bn)	0100 1000 (48)	0vvv vvvv (vv)	Attack Time (" " Atk Time)#4	C
1011 nnnn (Bn)	0100 1000 (4A)	0vvv vvvv (vv)	Brightness (" " Cutoff) #4	C
1011 nnnn (Bn)	0101 1011 (5B)	0vvv vvvv (vv)	Reverb Level (Send C Level)	C
1011 <i>zzzz</i> (Bg)	0101 1100 (5C)	0000 0000 (00)	Effect1 Level (FX1 Off)	C
1011 <i>zzzz</i> (Bg)	0101 1100 (5C)	0xxx xxxx (≥1)	" " (FX1 On)	C
1011 nnnn (Bn)	0101 1101 (5D)	0vvv vvvv (vv)	Chorus Level (Send D Level)	C
1011 <i>zzzz</i> (Bg)	0101 1110 (5E)	0000 0000 (00)	Effect2 Level (FX2 Off)	C
1011 <i>zzzz</i> (Bg)	0101 1110 (5E)	0xxx xxxx (≥1)	" " (FX2 On)	C
1011 nnnn (Bn)	0110 0000 (60)	0000 0000 (00)	DATA Increment (For RPN Edit)	C
1011 nnnn (Bn)	0110 0001 (61)	0000 0000 (00)	DATA Decrement (For RPN Edit)	C
1011 nnnn (Bn)	0110 0100 (64)	0000 00rr (0r)	RPN Parameter No.(LSB) #3	A
1011 nnnn (Bn)	0110 0101 (65)	0000 0000 (00)	RPN Parameter No.(MSB) #3	A
1011 nnnn (Bn)	0111 1000 (78)	0000 0000 (00)	All Sound Off	C
1011 nnnn (Bn)	0111 1001 (79)	0000 0000 (00)	Reset All Controllers	C
1011 nnnn (Bn)	0ccc cccc (cc)	0vvv vvvv (vv)	Control Data (For Seq.Recording) C,Q	
		ccc cccc=00~101		
1011 <i>zzzz</i> (Bg)	0111 1010 (7A)	0000 0000 (00)	Local Control Off	A
1011 <i>zzzz</i> (Bg)	0111 1010 (7A)	0111 1111 (7F)	Local Control On	A
1011 nnnn (Bn)	0111 1011 (7B)	0000 0000 (00)	All Notes Off	A
1011 nnnn (Bn)	0111 110x (7x)	0000 0000 (00)	Omni Mode Off/On (All Notes Off)	A
1011 nnnn (Bn)	0111 1110 (7E)	000m mmmm(≤10)	Mono Mode On (All Notes Off)	A
		m mmmm=0~16		
1011 nnnn (Bn)	0111 1111 (7F)	0000 0000 (00)	Poly mode On (All Notes Off)	A
1100 nnnn (Cn)	0ppp pppp (pp)	-----	Program Change (Prog,Combi CHG) #1,2	P
1101 nnnn (Dn)	0vvv vvvv (vv)	-----	Channel Pressure (After Touch)	T
1110 nnnn (En)	0bbb bbbb (bb)	0bbb bbbb (bb)	Bender Change (Pitch Bend)	C

nnnn : MIDI Channel No.(0~15) Usually Global Channel.

When in Combi/Seq Mode, each timbre's/Track's channel.

zzzz : Always Global Channel No.(0~15)

x : Random

ENA Same as TRANSMITTED DATA

*1 : MIDI In (Hex) Program
 mm,bb,pp = 00,00,00~63 : BankA 00~99
 00,00,64~7F : " A 00~27
 00,01,00~63 : " B 00~99
 00,01,64~7F : " B 00~27
 00,02,00~63 : " C 00~99
 00,02,64~7F : " C 00~27
 00,03,00~63 : " D 00~99
 00,03,64~7F : " D 00~27
 38,xx,00~7F : " G 01~128
 39,xx,00~7F : " G 01~128
 3A~3D,xx,xx : OFF #1-1
 3E,xx,00~0F : BankG 129
 3E,xx,10~17 : " G 130
 3E,xx,18 : " G 135
 3E,xx,19 : " G 131
 3E,xx,1A~1F : " G 135
 3E,xx,20~27 : " G 132
 3E,xx,28~2F : " G 133
 3E,xx,30~37 : " G 136
 3E,xx,38~3F : " G 129
 3E,xx,40~47 : " G 134
 3E,xx,48~7F : " G 129
 3F,xx,xx : OFF #1-1

MIDI In (Hex) Combination
 mm,bb,pp = 00,00,00~63 : BankA 00~99
 00,00,64~7F : " A 00~27
 00,01,00~63 : " B 00~99
 00,01,64~7F : " B 00~27
 00,02,00~63 : " C 00~99
 00,02,64~7F : " C 00~27
 00,03,00~63 : " D 00~99
 00,03,64~7F : " D 00~27

xx : Random
 #1-1: When in PROGRAM Mode,
 It is ignored.

*2 : After Processing (While Exclusive ENA),
 Transmits Exclusive Message[DATA LOAD COMPLETED]or[DATA LOAD ERROR].

*3 : rr = 0 : Pitch Bend Sens (Only in SEQ Mode).
 = 1 : Detune ("). When Received Ch = Global Ch,
 = 2 : Transpose ("). Act as Master Tune (Other Mode).

*4 : vv 3F : Fast or Dark
 =40 : Doesn't change
 41 : Slow or Bright

2-2 SYSTEM COMMON MESSAGES

Status (Hex)	Second (Hex)	Third (Hex)	Description
1111 0010 (F2)	0sss ssss (ss)	0ttt tttt (tt)	Song Position Pointer
1111 0011 (F3)	000s ssss (ss)	---- ----	Song Select

Receive when in Sequencer Mode (External Clock)

2-3 SYSTEM REALTIME MESSAGES

Status (Hex)	Description	
1111 1000 (F8)	Timing Clock	#5
1111 1010 (FA)	Start	#5
1111 1011 (FB)	Continue	#5
1111 1100 (FC)	Stop	#5
1111 1110 (FE)	Active Sensing	

*5 : Receive when in Sequencer Mode (External Clock)

2-4 UNIVERSAL SYSTEM EXCLUSIVE MESSAGE (NON REALTIME)

Byte (Hex)	Description	
1111 0000 (F0)	EXCLUSIVE STATUS	
0111 1110 (7E)	NON REALTIME MESSAGE	
0gkk kkkk (gg)	MIDI CHANNEL	#6
0000 aaaa (0a)	SUB ID 1	#7
0000 00bb (0b)	SUB ID 2	#7
1111 0111 (F7)	END OF EXCLUSIVE	

*6 : gg = 0~F : Receive if Global Channel
 = 7F : Receive any Channel

*7 : a,b = 08,01 : INQUIRY MESSAGE REQUEST
 = 09,01 : GENERAL MIDI MODE ON
 (Receive anytime except for Seq playing/Recording, DATA FILER Page)

2-5 UNIVERSAL SYSTEM EXCLUSIVE MESSAGE (REALTIME)

Byte (Hex)	Description	
1111 0000 (F0)	EXCLUSIVE STATUS	
0111 1111 (7F)	REALTIME MESSAGE	
0gkk kkkk (gg)	MIDI CHANNEL	#6
0000 0100 (04)	SUB ID 1	
0000 00bb (0b)	SUB ID 2	#8
0vvv vvvv (vv)	VALUE(LSB)	#8
0mmn mmmn (mm)	VALUE(MSB)	#8
1111 0111 (F7)	END OF EXCLUSIVE	

*8 : b = 01 : MASTER VOLUME (mm,vv = 00,00~7F,7F : Min~Max)
 = 02 : MASTER BALANCE (mm,vv = 00,00~40,00~7F,7F : L~Center~R)

2-6 SYSTEM EXCLUSIVE MESSAGES

* Doesn't receive when Sequencer is Playing,Recording and If in the DATA FILER Page, It is saved.

Function Code List

Func	Description	G	C	P	A	No.
12	MODE REQUEST	○	○	○	○	42
1F	ALL DRUM SOUND (PCM CARD)NAME DUMP REQUEST	○	○	○	○	47
18	ALL MULTISOUND (PCM CARD)NAME DUMP REQUEST	○	○	○	○	45
10	PROGRAM PARAMETER DUMP REQUEST			○	○	40
1C	ALL PROGRAM PARAMETER DUMP REQUEST	●	○	○	○	4C
19	COMBINATION PARAMETER DUMP REQUEST		○	○	○	49
1D	ALL COMBINATION PARAMETER DUMP REQUEST	●	○	○	○	4D
18	ALL SEQUENCE DATA DUMP REQUEST	●	○	○	○	48
0E	GLOBAL DATA DUMP REQUEST	●	○	○	○	51
0D	DRUMS DATA DUMP REQUEST	●	○	○	○	52
0F	ALL DATA(GLOBAL,DRUMS,COMBI,PROG,SEQ)DUMP REQ	●	○	○	○	50
11	PROGRAM WRITE REQUEST			○		21
1A	COMBINATION WRITE REQUEST		○			21
40	PROGRAM PARAMETER DUMP			○		23
4C	ALL PROGRAM PARAMETER DUMP	●	○	○	○	23
49	COMBINATION PARAMETER DUMP			○		23
4D	ALL COMBINATION PARAMETER DUMP	●	○	○	○	23
48	ALL SEQUENCE DATA DUMP	●	○	○	○	23
51	GLOBAL DATA DUMP	●	○	○	○	23
52	DRUMS DATA DUMP	●	○	○	○	23
50	ALL DATA(GLOBAL,DRUMS,COMBI,PROG,SEQ) DUMP	●	○	○	○	23
4E	MODE CHANGE	○	○	○	○	23
41	PARAMETER CHANGE	○	○	○		23
53	DRUM KIT PARAMETER CHANGE	○				23

Receive when in
 G : GLOBAL Mode
 (● Doesn't respond to Exclusive ENA,DIS in DATA DUMP Page)
 C : COMBI, E.COMBI Mode
 P : PROG, E.PROG Mode
 A : ANY OTHER Mode

No. : MIDI Out Function No.
 (transmitted after the message has been received.)

3. MIDI EXCLUSIVE FORMAT (R:Receive, T:Transmit)

See 1-5 STRUCTURE OF KORG SYSTEM EXCLUSIVE MESSAGES'

(1) MODE REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 0010 (12)	MODE REQUEST	12H
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=42 message.

(2) PROGRAM PARAMETER DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 0000 (10)	PROGRAM PARAMETER DUMP REQUEST	10H
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=40 or Func=24 message.

(3) ALL DRUM SOUND (PCM CARD) NAME DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 1111 (1F)	ALL DRUM SOUND NAME DUMP REQUEST	1FH
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=47 or Func=24 message.

(4) ALL MULTISOUND (PCM CARD) NAME DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 0110 (16)	ALL MULTISOUND NAME DUMP REQUEST	16H
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=45 or Func=24 message.

(5) ALL PROGRAM PARAMETER DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 1100 (1C)	ALL PROGRAM PARAMETER DUMP REQUEST	1CH
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=4C or Func=24 message.

(6) COMBINATION PARAMETER DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 1001 (19)	COMBINATION PARAMETER DUMP REQUEST	19H
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=49 or Func=24 message.

(7) ALL COMBINATION PARAMETER DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 1101 (1D)	ALL COMBI. PARAMETER DUMP REQUEST	1DH
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=4D or Func=24 message.

(8) ALL SEQUENCE DATA DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 1000 (18)	ALL SEQUENCE DATA DUMP REQUEST	18H
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=48 or Func=24 message.

(9) GLOBAL DATA DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0000 1110 (0E)	GLOBAL DATA DUMP REQUEST	0EH
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=51 or Func=24 message.

(10) DRUMS DATA DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0000 1101 (0D)	DRUMS DATA DUMP REQUEST	0DH
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=52 or Func=24 message.

(11) ALL DATA (GLOB, DRUMS, COMBI, PROG, SEQ) DUMP REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0000 1111 (0F)	ALL DATA (GLB, CMB, PRG, SEQ) DUMP REQ	0FH
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message, and transmits Func=50 or Func=24 message.

(12) PROGRAM WRITE REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 0001 (11)	PROGRAM WRITE REQUEST	11H
0000 00bb (0b)	Write Program Bank	(NOTE 1)
0ppp pppp (pp)	Write Program No.(0-99)	
1111 0111 (F7)	EOX	

Receives this message, writes the data and transmits Func=21 or Func=22 message.

If pp > 99 pp ← pp-100
Don't change a Bank

(13) COMBINATION WRITE REQUEST R

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0001 1010 (1A)	COMBINATION WRITE REQUEST	1AH
0000 00bb (0b)	Write Combination Bank	(NOTE 1)
0ppp pppp (pp)	Write Combination No.(0-99)	
1111 0111 (F7)	EOX	

Receives this message, writes the data and transmits Func=21 or Func=22 message.

If pp > 99 pp ← pp-100
Don't change a Bank

(14) PROGRAM PARAMETER DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 0000 (40)	PROGRAM PARAMETER DUMP	40H
0ddd dddd (dd)	Data	(NOTE 2,3)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.

Receives Func=10 message, and transmits this message & data.

When Enter the EDIT PROGRAM Mode or Edit the PERFORMANCE EDIT by SW, transmits this message & data.

(15) ALL PROGRAM(BANK A,B) PARAMETER DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 1100 (4C)	ALL PROGRAM PARAMETER DUMP	4CH
0000 0000 (00)		
0ddd dddd (dd)	Data	(NOTE 2,4)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.
Receives Func=1C message, and transmits this message & data.
Transmits this message & data when DATA DUMP is executed.

(16) COMBINATION PARAMETER DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 1001 (49)	COMBINATION PARAMETER DUMP	49H
0000 0000 (00)		
0ddd dddd (dd)	Data	(NOTE2,5)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.
Receives Func=19 message, and transmits this message & data.
When the Combi No. is changed by SW, transmits this message & data.

(17) ALL COMBINATION(BANK A,B) PARAMETER DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 1101 (4D)	ALL COMBINATION PARAMETER DUMP	4DH
0000 0000 (00)		
0ddd dddd (dd)	Data	(NOTE 2,6)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.
Receives Func=1D message, and transmits this message & data.
Transmits this message & data when DATA DUMP is executed.

(18) ALL SEQUENCE DATA (INTERNAL) DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 1000 (48)	ALL SEQUENCE DATA DUMP	48H
0000 0000 (00)		
0sss ssss (ss)	Seq. Data Size	(NOTE 7-1)
0ddd dddd (dd)	Control Data	(NOTE 2,7-2)
0ddd dddd (dd)	Sequence Data	(NOTE 2,7-3)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.
Receives Func=18 message, and transmits this message & data.
Transmits this message & data when DATA DUMP is executed.

(19) GLOBAL DATA DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0101 0001 (51)	GLOBAL DATA DUMP	51H
0000 0000 (00)		
0ddd dddd (dd)	Data	(NOTE 2,8)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.
Receives Func=0E message, and transmits this message & data.
Transmits this message & data when DATA DUMP is executed.

(20) DRUMS DATA(BANK A,B) DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0101 0010 (52)	DRUMS DATA DUMP	52H
0000 0000 (00)		
0ddd dddd (dd)	Data	(NOTE 2,9)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.
Receives Func=0D message, and transmits this message & data.
Transmits this message & data when DATA DUMP is executed.

(21) ALL DATA(GLOBAL,DRUMS,COMBI,PROG,SEQ.) DUMP R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0101 0000 (50)	ALL DATA(GLBL,COMBI,PROG,SEQ.) DUMP	50H
0000 0000 (00)		
0sss ssss (ss)	Seq. Data Size	(NOTE 7-1)
0ddd dddd (dd)	Data	(NOTE 2,10)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.
Receives Func=0F message, and transmits this message & data.
Transmits this message & data when DATA DUMP is executed.

(22) MODE CHANGE R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 1110 (4E)	MODE CHANGE	4EH
0000 mmmm (0m)	Mode Data	(NOTE 11)
0000 0000 (00)		
1111 0111 (F7)	EOX	

Receives this message & data, changes the Mode, and transmits Func=23 or Func=24.
When the Mode is changed by SW, transmits this message & data.

(23) PARAMETER CHANGE R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 0001 (41)	PARAMETER CHANGE	41H
0ppp pppp (pp)	Parameter No. (LSB)	(TABLE 8~9)
0ppp pppp (pp)	Parameter No. (MSB)	(TABLE 8~9)
0vvv vvvv (vv)	Value (LSB bit6~0)	(NOTE 12)
0vvv vvvv (vv)	Value (MSB bit13~7)	(NOTE 12)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message. When the Parameter No. is changed by SW, transmits this message & data.

(24) DRUM KIT PARAMETER CHANGE R, T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0101 0011 (53)	DRUM KIT PARAMETER CHANGE	53H
0000 00kk (Ok)	DRUM KIT No.	(NOTE 17)
00ss ssss (ss)	Index No. (ss=00~59)	
0000 pppp (Op)	Parameter No.	(TABLE10)
0vvv vvvv (vv)	Value (LSB bit6~0)	(NOTE 12)
0vvv vvvv (vv)	Value (MSB bit13~7)	(NOTE 12)
1111 0111 (F7)	EOX	

Receives this message & data, and transmits Func=23 or Func=24 message.

(25) ALL DRUM SOUND (PCM CARD)NAME T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 0111 (47)	ALL DRUM SOUND NAME	47H
0000 0000 (00)		
0nnn nnnn (nn)	Number of Drum Sound	(NOTE 13-1)
0ddd dddd (dd)	Data	(NOTE 13-2)
⋮	⋮	
1111 0111 (F7)	EOX	

Receives Func=1F message, and transmits this message & data or transmits Func=24 message.

(26) ALL MULTISOUND (PCM CARD)NAME T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 0101 (45)	ALL MULTISOUND NAME	45H
0000 0000 (00)		
0nnn nnnn (nn)	Number of Multisound	(NOTE 14-1)
0ddd dddd (dd)	Data	(NOTE 14-2)
⋮	⋮	
1111 0111 (F7)	EOX	

Receives Func=16 message, and transmits this message & data or transmits Func=24 message.

(27) MODE DATA T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0100 0010 (42)	MODE DATA	42H
0000 00mm (0m)	Mode Data	(NOTE 11)
0000 0000 (00)		
00cc 00vv (cv)	Card Variation	(NOTE 15)
0000 01cc (0c)	PCM Memory Status	(NOTE 16)
1111 0111 (F7)	EOX	

Receives Func=12 message, and transmits this message & data.

(28) MIDI IN DATA FORMAT ERROR T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0010 0110 (26)	MIDI IN DATA FORMAT ERROR	26H
1111 0111 (F7)	EOX	

Transmits this message when there is an error in the MIDI IN message (ex.data length).

(29) DATA LOAD COMPLETED (ACK) T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0010 0011 (23)	DATA LOAD COMPLETED	23H
1111 0111 (F7)	EOX	

Transmits this message when DATA LOAD,PROCESSING have been completed.

(30) DATA LOAD ERROR (NAK) T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0010 0100 (24)	DATA LOAD ERROR	24H
1111 0111 (F7)	EOX	

Transmits this message when DATA LOAD,PROCESSING have not been completed (ex.protected).

(31) WRITE COMPLETED T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0010 0001 (21)	WRITE COMPLETED	21H
1111 0111 (F7)	EOX	

Transmits this message when DATA WRITE MIDI has been completed.

(32) WRITE ERROR T

Byte	Description	
F0,42,3g,35	EXCLUSIVE HEADER	
0010 0010 (22)	WRITE ERROR	22H
1111 0111 (F7)	EOX	

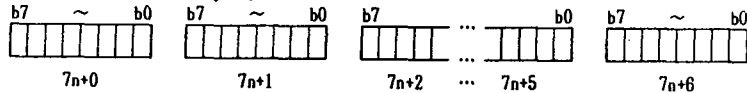
Transmits this message when DATA WRITE MIDI has not been completed.

NOTE 1 : PROGRAM, COMBINATION BANK
 bb=0 : Bank A
 1 : Bank B
 2 : Bank C (Card)
 3 : Bank D (Card)

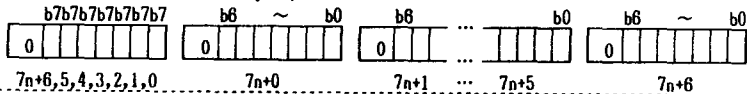
NOTE 2 :

DUMP DATA CONVERT n=0~ for NOTE 3, 4, 5, 8, 7-2, 7-3, 8, 9, 10, 13-2, 14-2

DATA (1set = 8bit x 7Byte)



MIDI DATA (1set = 7bit x 8Byte)



NOTE 3 : PROGRAM PARAMETER (IN CURRENT BUFFER) DUMP FORMAT (See TABLE 1 , NOTE 2)
 [Parameter No.00], ..., [Parameter No.183]
 184Byte = 7x23+3 → 8x23+(1+3) = 188Byte

NOTE 4 : ALL PROGRAM PARAMETER (IN INTERNAL MEMORY) DUMP FORMAT (See NOTE 2)
 [Prog A 00 (184Byte)], ..., [Prog B 99 (184Byte)]
 164x200Byte = 7x4885+5 → 8x4885+(1+5) = 37486Byte (12.0Sec)

NOTE 5 : COMBINATION PARAMETER (IN CURRENT BUFFER) DUMP FORMAT (See TABLE 2 , NOTE 2)
 [Parameter No.00], ..., [Parameter No.135]
 136Byte = 7x19+3 → 8x19+(1+3) = 156Byte

NOTE 6 : ALL COMBINATION PARAMETER (IN INTERNAL MEMORY) DUMP FORMAT (See NOTE 2)
 [Combi A 00 (136Byte)], ..., [Combi B 99 (136Byte)]
 136x200Byte = 7x3885+5 → 8x3885+(1+5) = 31086Byte (9.9Sec)

NOTE 7 : ALL SEQUENCE DATA (IN INTERNAL MEMORY) DUMP FORMAT
 7-1 : Sequence Data Size (2Byte) 4Step(16Byte)/1Size (See 7-3)
 [Data Size (bit6~0)],
 [Data Size (bit13~7)]

7-2 : Control Data Dump Format (3702Byte) (See TABLE 5-1 , NOTE 2)
 [Control Data (Song Size(298) x 10 = 2980Byte)],
 [Pattern Data (200Byte)],
 [Song0-Tr.1 Addr (2Byte)], ..., [Song0-Tr.16 Addr], [Song0-Tempo Track Addr],
 [Song1-Tr.1 Addr], ..., [Song9-Tr.16 Addr], [Song9-Tempo Track Addr] (340Byte),
 [Pattern0 Addr (2Byte)], ..., [Pattern99 Addr] (200Byte),
 [Pattern End Addr (2Byte)]

7-3 : Sequence Data Dump Format (See TABLE 5-2 , NOTE 2)
 [Sequence 1st Data(4Byte)], ..., [Seq.nth Data]
 n : Seq.Data Step = 0 ~ 32000
 3702Byte+4x[Seq.Data Step]Byte = 7xA+B → 8xA+(1+B)Byte
 ∴ 7-1, 7-2, 7-3 = 2+8xA+(1+B)Byte (1.4~48.2Sec)

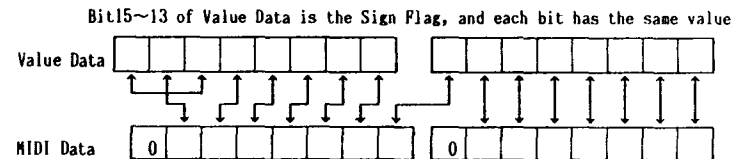
NOTE 8 : GLOBAL DATA (IN INTERNAL MEMORY) DUMP FORMAT (See TABLE 3 , NOTE 2)
 [Global Data (28Byte)]
 28=7x4+0 → 8x4 =32Byte

NOTE 9 : DRUMS DATA (IN INTERNAL MEMORY) DUMP FORMAT (See TABLE 4 , NOTE 2)
 [Drum Kit Data (7x60x2x2Byte)]
 1680Byte =7x240+0 → 8x240 =1920Byte (0.6Sec)

NOTE 10 : ALL DATA (GLOBAL, DRUMS, COMBI, PROG, SEQ) DUMP FORMAT (See NOTE 2)
 [Global Data], (See NOTE 8)
 [Drums Data], (See NOTE 9)
 [All Combination Parameter Data], (See NOTE 6)
 [All Program Parameter Data], (See NOTE 4)
 [All Sequence Data] (See NOTE 7-2, 7-3)
 28+1680+27200+32800+3702+4x[Seq.Data Step]Byte = 7xC+D
 → 8xC+(1+D)Byte (24.0~70.8Sec)

NOTE 11 : mmm = 0 : COMBINATION 3 : EDIT PROG. 6 : GLOBAL
 1 : EDIT COMBI. 4 : SEQUENCER 7 : DISK
 2 : PROGRAM 5 : EDIT SEQUENCER

NOTE 12 : VALUE DATA FORMAT (Use at PARAMETER CHANGE, DRUM KIT PARAMETER CHANGE)



NOTE 13-1 : NUMBER OF DRUMSOUND
 nnn nnnn = 1 ~

NOTE 13-2 : ALL DRUM SOUND (PCM CARD) NAME DATA FORMAT
 [Drum Sound 1 Name (10Byte)], ..., [Drum Sound n Name (10Byte)]
 n : Number of DrumSound (Data ... ASCII Format)

NOTE 14-1 : NUMBER OF MULTISOUND
 nnn nnnn = 1 ~

NOTE 14-2 : ALL MULTISOUND (PCM CARD) NAME DATA FORMAT
 [Multisound 1 Name (10Byte)], ..., [Multisound n Name (10Byte)]
 n : Number of Multisound (Data ... ASCII Format)

NOTE 15 : cc, vv = 0, 0 : Card Off
 = 0, 1 : NG Card (ROM or protected RAM)
 = 0, 2 : " (RAM)
 cc = 1 : ROM Card vv = bit0~Bank C, bit1~Bank D
 = 2 : RAM Card (Protect Off) = 0 : Prog/Combi Data
 = 3 : " (" On) = 1 : Seq Data

NOTE 16 : cc = 0 : Card Off
 = 1 : NG Card
 = 2 : PCM Card In

NOTE 17 : kk = 00 : Bank A DrumKit1
 01 : " A " 2
 02 : " B " 1
 03 : " B " 2

SEQUENCER CONTROL DATA

No.	PARAMETER	DATA(Hex) : VALUE
SONG 0 CONTROL DATA		
00	MIDI Channel(Tr.1)	00~0F : 1~18
15	MIDI Channel(Tr.16)	
16	STATUS (Tr.1)	*11
31	STATUS (Tr.16)	
32	BEND RANGE (Tr.1)	00~0C : 00~12
47	BEND RANGE (Tr.16)	
48	BEAT	*12
49	TEMPO	28~F0 : 40~240
50	PROTECT (Tr.1)	bit0=0:OFF, =1:ON
51	PROTECT (Tr.8)	bit7
51	PROTECT (Tr.9)	bit0=0:OFF, =1:ON
51	PROTECT (Tr.16)	bit7
52	NEXT SONG NO.	*14
53	SONG NAME (Head)	20~7F : ' ' ~ '←'
62	SONG NAME (Tail)	
63	(RESERVE)	00
64	EFFECT PARAMETER	*17
92		
TRACK 1 CONTROL DATA		
93	PROGRAM NO.	*8
94	OUTPUT LEVEL	00~7F : 00~127
95	KEY TRANSPOSE	E8~18 : -24~24
96	DETUNE	CE~32 : -50~50
97	A:B PAN	00~1E,1F,FF *5
98	D SEND LEVEL	bit0~3 : 0~9,PRG
98	C SEND LEVEL	bit4~7 : 0~9,PRG
99	KEY WINDOW TOP	00~7F : C-1~GB
100	KEY WINDOW BOTTOM	00~7F : C-1~GB
101	VEL WINDOW TOP	01~7F : 01~127
102	VEL WINDOW BOTTOM	01~7F : 01~127
103	CONTROL FILTER	*7
104	MIDI CHANNEL	00~0F : 1~18
TRACK 2~16 CONTROL DATA		
105	SAME AS TRACK 1(93~104) x 15	
284		
285~290	(RESERVE)	00
291	METRONOME LEVEL	00~63 : 0~99
292	METRONOME PAN	00~06 : *15
293	METRONOME LEAD IN	0~2 : 0~2
294	TEMPO TRACK ON/OFF	0:OFF, 1:ON
295	(RESERVE)	00
SONG 1~9 CONTROL DATA		
296	SAME AS SONG 0 (00~295) x 9	
2959		

(TABLE 5-1)

PATTERN 0 CONTROL DATA		
2960	BEAT	*12
2961	LENGTH	01~63 : 1~99
PATTERN 1~99 CONTROL DATA		
2962	SAME AS PATTERN 0(2960,2961) x 99	
3150		
SONGO-TRACK1 DATA ADDRESS		
3180	DATA ADDRESS(LSB)	0000 (Start Addr)
3181	" " (MSB)	
SONGO-TRACK2 ~ TRACK16 DATA ADDRESS		
3182	SAME AS SONGO-TRACK1 ADDRESS(3180,3181)	x 15
3191		
SONGO TEMPO TRACK DATA ADDRESS		
3192	DATA ADDRESS (LSB)	
3193	" " (MSB)	
SONG1~9 TRACK DATA ADDRESS		
3194	SAME AS SONGO TRACK ADDRESS(3180~3193)	x 9
3499		
PATTERN 0 DATA ADDRESS		
3500	DATA ADDRESS (LSB)	
3501	" " (MSB)	
PATTERN 1 ~ PATTERN 99 DATA ADDRESS		
3502	SAME AS PATTERN 0(3500,3501)	
3699		
3700	End Pattern Addr(L)	
3701	" " " (H)	

SEQUENCE DATA (TABLE 5-2)

No.	PARAMETER	DATA(Hex) : VALUE
SEQUENCE DATA 1		
3702	DATA (1-L)	*16
3703	DATA (1-H)	*16
3704	DATA (2-L)	*16
3705	DATA (2-H)	*16
SEQUENCE DATA 2 ~		
3706	SAME AS SEQUENCE DATA 1(3702~3705)	

- *8 : 0 : OFF
 1 : PROGRAM(COMBINATION) UP
 2 : " " DOWN
 3 : SEQUENCER START/STOP
 4 : SEQUENCER PUNCH IN/OUT
 5 : EFFECT 1 ON/OFF
 6 : " 2 "
 7 : SCALE CHANGE
 8 : VOLUME
 9 : EXPRESSION
 A : VDP CUTOFF
 B : EFFECT CONTROL
 C : DATA ENTRY

- *9 : 0 : EQUAL TEMP
 1 : EQUAL TEMP 2
 2 : PURE MAJOR
 3 : PURE MINOR
 4 : ARABIC
 5 : PYTHAGOREAN
 6 : WERKMEISTER
 7 : KIRNBERGER
 8 : SLENDRO
 9 : PELOG
 A : USER SCALE

- *10 : bit0~4 = 00 : A
 |
 | OF : CNT
 |
 | 1E : B
 | 1F : OFF

- bit5~7 = 0 : EX Off
 1 : EX Group1
 |
 | 6 : EX Group6
 | 7 : Self

- *11 : bit0,1 = 0 : OFF
 1 : INT
 2 : EXT
 3 : BOTH
 bit2 = 0 : Play, = 1 : Mute

- *12 : bit0~5 10~18 : 1/4 ~ 9/4
 20~2F : 1/8 ~ 16/8
 30~3F : 1/16 ~ 16/16
 bit7 = 0 : High Resolution
 1 : Low Resolution

- *13 : When at Single/Double Mode
 0000 : Int Multisound 0
 |
 | 0153 : Int Multisound 339 (X3)
 | 0153 : Int Multisound 340 (X2)
 | 1000 : Card Multisound 0
 |
 | 1??? : Card Multisound ?

- When at Drum Mode
 00 : Drum Kit A1
 |
 | 07 : " D2
 | 08 : ROM Drum Kit 1
 |
 | 0F : " 8

- *14 : bit0~6 = 0 : Song0
 |
 | 9 : Song9
 | 7F : OFF
 bit 7 = 0 : Stop, =1 : Play

- *15 : 0 : A 3 : C 6 : ALL
 1 : A+B 4 : C+D
 2 : B 5 : D

- *16 : SEQUENCE DATA FORMAT
 DATA(1-H) DATA(1-L) DATA(2-H) DATA(2-L)
 ↓ ↓ ↓ ↓

*16-1 NOTE ON/OFF

lvvv vvv t	tttt tttt	kkkk kkk g	EEEE EEEE
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Velocity Event Time Key No. Length
 t =30 : J, t =1FE : Tie from Last Bar
 g =30 : J, g =1FE : Tie to Next Bar

*16-2 PITCH BEND

0001 000 t	tttt tttt	0 vvv vvvv	0 vvv vvvv
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Event Time Value(H) Value(L)

*16-3 AFTER TOUCH

0010 000 t	tttt tttt	0000 0000	0 vvv vvvv
------------	-----------	-----------	------------

Event Time Value

*16-4 PROGRAM CHANGE

0011 000 t	tttt tttt	bbbb bbbb	Oppp pppp
------------	-----------	-----------	-----------

Event Time Bank Program No.
 b= 0~3 : A~D (INT), 0~7F : 0~127 (EXT)
 80 : GM, 81 : Drum Prog, 82 : No Bank
 p= 00~C7 : 00~99

*16-5 CONTROL CHANGE

0100 000 t	tttt tttt	vvvv vvvv	0ccc cccc
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Event Time Value Control No.
 c= 00~65 : Same as MIDI Control Change
 = 66 : Assignable Pedal

*16-6 POLY KEY PRESSURE

0101 000 t	tttt tttt	0 vvv vvvv	0 kkk kkkk
------------	-----------	------------	------------

Event Time Value Key No.

*16-7 BAR

0110 00bb	bbbb bbbb	xx ss ssss	Oppp pppp
-----------	-----------	------------	-----------

Bar No. Type Beat Pattern No.
 xx= 00 : Doesn't use Pattern
 = 10 : Pattern continual
 = 11 : Pattern Start
 s= 10~18 : 1/4~9/4
 = 20~2F : 1/8~16/8
 = 30~3F : 1/16~16/16

*16-8 TRACK END

0111 000 t	tttt tttt	0000 00bb	bbbb bbbb
------------	-----------	-----------	-----------

Event Time Last Bar No.

*17 EFFECT PARAMETER

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Effect 1 Type No., Effect 1 Parameter, Effect 1 Mod Source, Effect 1 Mod Amount, Effect 2 Parameter, Effect 2 Mod Source, Effect 2 Mod Amount.

*17-1 : 00 : Off *17-2 : 01 : R bit0=0:Efct1 L-Ch Off,=1:0n 02 : 01:09 bit1=0: " 1 R-Ch Off,=1:0n 04 : 00:01 bit2=0: " 2 L-Ch Off,=1:0n 08 : 00:01 bit3=0: " 2 R-Ch Off,=1:0n 16 : L bit4,5=0:Serial

1:Parallel 2:Parallel 2 3:Parallel 3 4:Serial Sub (X2) 5:Parallel Sub (X2)

*17-3 : Effect Parameter (8Byte) 47 Type

Table with 3 columns: offset, PARAMETER, DATA(Hex) : VALUE. Rows include Reverb Time, High Damp, Pre Delay, E.R Level, EQ High, EQ Low.

Doesn't display NUL from here, and that must be 0 7:Wet Plate, 8:Dry Plate, 9:Spring

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Pre Delay(L), E.R Level, Reverb Time, High Damp, EQ Low, EQ High.

13:Stereo Delay, 14:Cross Delay

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time L (L), Feed Back, High Damp, Delay Time R (L), EQ High, EQ Low.

15:Dual Delay

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time L (L), Feed Back L, High Damp L, Delay Time R (L), Feed Back R, High Damp R.

18~18:Multi Tap Delay 1,2,3

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time 1(L), Delay Time 2(L), Feed back, EQ Low, EQ High.

19,20:Stereo Chorus 1,2

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Mod Depth, Mod Speed, MG Status, Delay Time, EQ High, EQ Low.

21:Quadrature Chorus, 22:X Over Chorus

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time L, Delay Time R, Mod Speed, Mod Depth, Mod Waveform, EQ Low, EQ High.

23:Harmonic Chorus

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time L (L), Delay Time R (L), Mod Speed, Mod Depth, Filter Split Point.

24:Symphonic Ensemble

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Mod Depth, EQ High, EQ Low.

25,26:Flanger1,2, 27:X Over Flanger

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time, Mod Depth, Mod Speed, Resonance, EQ Low, EQ High.

28:Exciter

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Blend, Emphatic Point, EQ High, EQ Low.

29:Enhancer

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Harmonic Density, Hot Spot, Stereo Width, Delay, EQ Low, EQ High.

30:Distortion, 31:Over Drive

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Drive (Edge), Hot Spot, Resonance, Out Level, EQ Low, EQ High.

32,33:Phaser 1,(2)

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Mod Depth, Mod Speed, MG Status, Feedback, Manual.

34:Rotary Speaker

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Vibrato Depth, Acceleration, Slow Speed, Fast Speed.

35:Auto Pan, (36:Tremolo)

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Depth, Speed, MG Status, Shape, EQ High, EQ Low.

37:Parametric EQ

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Low Freq, Low Gain, Mid Freq, Mid Gain, Mid Width, High Freq, High Gain.

38:Chorus-Delay, 39:Flanger-Delay

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time, Mod Speed, Mod Depth, Feed back, Delay Time, Feed back.

40:Delay / Hall

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time (L), Delay Time (H), Feed Back, High Damp, Reverb Time, High Damp, Pre Delay.

41:Delay / Room

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Parameter, Reverb Time, High Damp, Pre Delay.

42:Delay / Chorus, (43:Delay / Flanger)

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Parameter, Depth, Speed, MG Status, Feed Back.

44:Delay / Distortion, 45:Delay / Over Drive

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time (L), Feed back, Drive, Hot Spot, Resonance, Out Level.

48:Delay / Phaser

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Parameter, Depth, Speed, Feedback.

47:Delay / Rotary Speaker

Table with 3 columns: No., PARAMETER, DATA(Hex) : VALUE. Rows include Delay Time (L), Feed back, Acceleration, Slow Speed, Past Speed.

- *17-3-1 : Delay Parameter
Same as 40-(00)~(03)
- *17-3-2 : Data(Hex) Value[Hz]
00~63 0.03~ 3.00 (0.03step)
64~C7 3.1 ~13.0 (0.1 step)
C8~D8 14 ~30.0 (1 step)
- *17-3-3 : MG Status
bit0 : Wave Form =0:Sin, =1:Tri
bit1 : Phase =0:0°, =1:180°
bit2 : Wave Shape =0: Normal
=1: for Flanger
- *17-3-4 : Waveform
EB : T+10
: :
FF : T-10
00 : S-10
: :
14 : S+10
- *17-4 : Dynamic Modulation Source
0 : None
1 : Joy Stick (+Y)
2 : Joy Stick (-Y)
3 : After Touch
4 : Asgn Pedal 1
5 : Asgn Pedal 2
6 : VDA EG
7 : Value Slider
8 : V.S + J.S(+Y)
9 : V.S + J.S(-Y)
A : V.S + A.Touch
B : V.S + Pedal 1
C : V.S + Pedal 2
D : V.S + VDA EG

PROGRAM PARAMETERS PARAMETER No. for PARAMETER CHANGE (TABLE 6)

No.	PARAMETER	No. of TABLE 1
OSCILLATOR		
00	OSC MODE	10
01	ASSIGN	11 bit0
02	HOLD	11 bit1
PITCH EG		
03	START LEVEL	21
04	ATTACK TIME	22
05	ATTACK LEVEL	23
06	DECAY TIME	24
07	RELEASE TIME	25
08	RELEASE LEVEL	26
09	EG INT BY VEL SENSE	28
10	EG TIME BY VEL SENSE	27
CUTOFF MG		
11	WAVE FORM	29 bit0~2
12	FREQUENCY	30
13	INTENSITY	32
14	DELAY	31
15	OSC SELECT	29 bit5,6
16	KEY SYNC	29 bit7
AFTER TOUCH		
17	PITCH BEND RANGE	33
18	VDF CUTOFF	34
19	VDF MG INT	35
20	VDA AMPLITUDE	38
JOY STICK		
21	VDF MG INT	39
22	PITCH BEND RANGE	37
23	VDF SWEEP INT	38
OSC-1		
24	MULTISOUND	12,13
25	LEVEL	65
26	OCTAVE	14
27	PITCH EG INT	40
28	A:B PAN	86
29	C SEND LEVEL	82 bit4~7
30	D SEND LEVEL	82 bit0~3
VDF-1		
31	CUTOFF VALUE	50
32	EG INTENSITY	53
COLOR-1		
33	INTENSITY	83
34	INT BY VEL SENSE	84
VDF-1 EG		
35	ATTACK TIME	57
36	ATTACK LEVEL	58
37	DECAY TIME	59
38	BREAK POINT	60
39	SLOPE TIME	61
40	SUSTAIN LEVEL	62
41	RELEASE TIME	63
42	RELEASE LEVEL	64
43	EG INT BY VEL SENSE	58
44	EG TIME BY VEL SENSE	55

VDF-1 EG TIME MOD BY VEL SENSE		
45	ATTACK TIME	79 bit0,4
46	DECAY TIME	79 bit1,5
47	SLOPE TIME	79 bit2,6
48	RELEASE TIME	79 bit3,7
VDF-1 KBD TRACK		
49	KBD TRACK KEY	51
50	MODE	85 bit0,1
51	CUTOFF	52
52	EG TIME	54
VDF-1 EG TIME MOD BY KBD TRACK		
53	ATTACK TIME	78 bit0,4
54	DECAY TIME	78 bit1,5
55	SLOPE TIME	78 bit2,6
56	RELEASE TIME	78 bit3,7
VDA-1 EG		
57	ATTACK TIME	71
58	ATTACK LEVEL	72
59	DECAY TIME	73
60	BREAK POINT	74
61	SLOPE TIME	75
62	SUSTAIN LEVEL	76
63	RELEASE TIME	77
64	EG INT BY VEL SENSE	68
65	EG TIME BY VEL SENSE	70
VDA-1 EG TIME MOD BY VEL SENSE		
66	ATTACK TIME	81 bit0,4
67	DECAY TIME	81 bit1,5
68	SLOPE TIME	81 bit2,6
69	RELEASE TIME	81 bit3,7
VDA-1 KBD TRACK		
70	KBD TRACK KEY	66
71	MODE	85 bit4,5
72	INTENSITY	67
73	EG TIME	69
VDA-1 EG TIME MOD BY KBD TRACK		
74	ATTACK TIME	80 bit0,4
75	DECAY TIME	80 bit1,5
76	SLOPE TIME	80 bit2,6
77	RELEASE TIME	80 bit3,7
OSC-1 PITCH MG		
78	WAVE FORM	41 bit0~2
79	FREQUENCY	42
80	INTENSITY	45
81	DELAY	43
82	FADE IN	44
83	KEY SYNC	41 bit7
84	FREQ MOD BY KBD TRACK	46
85	FREQ MOD BY A.T+J.S	49
86	INTENSITY MOD BY A.T	47
87	INTENSITY MOD BY J.S	48

OSCILLATOR-2		
88	INTERVAL	18
89	DETUNE	19
90	DELAY START	20
OSC-2 PARAMETER		
91	SAME AS OSC-1 (24~87)	87
154		133
EFFECT PARAMETER		
155		
187		(TABLE 6-1)

EFFECT PARAMETERS (TABLE 6-1)

No. of TABLE 6, 7		
PROG	COMB	PARAMETER
155	136	EFFECT 1 TYPE
156	137	EFFECT 2 TYPE
157	138	EFFECT 1 OFF/ON
158	139	EFFECT 2 OFF/ON
159	140	OUT3 PANPOT (Seri, Para1, 2)
160	141	OUT4 PANPOT (Seri, Para1, 2)
161	142	OUT 3-L LEVEL (Para3)
162	143	OUT 3-R LEVEL (Para3)
163	144	OUT 4-L LEVEL (Para3)
164	145	OUT 4-R LEVEL (Para3)
165	146	PLACEMENT
EFFECT 1		
166	147	DYNAMIC MOD SOURCE
167	148	DYNAMIC MOD INT
168	149	PARAMETER 1
174	155	PARAMETER 7
175	156	BALANCE 1
176	157	BALANCE 2
EFFECT 2		
177	150	SAME AS EFFECT 1
|	|	( 168 ~ 176 : PROG)
187	168	(147 ~ 157 : COMB)

In PROGRAM Mode (TABLE 7)

No.	PARAMETER
00	PERFORMANCE EDIT OSC OCTAVE
01	" VDF CUTOFF
02	" VDF EG INTENSITY
03	" VDA ATTACK TIME
04	" VDF, A RELEASE TIME
05	" VDA LEVEL
06	" VELOCITY SENSE
07	" EFFECT LEVEL

COMBINATION PARAMETER

PARAM No. for PARAM CHANGE (TABLE 8)
n = 0~7 (: Timbre 1~8)

No.	PARAMETER	No. of TABLE 2
0+n	PROGRAM NO.	40, 50, 51+12n *
8+n	OUTPUT LEVEL	41+12n
16+n	MIDI CHANNEL	51+12n b0~3
24+n	KEY WINDOW TOP	46+12n
32+n	KEY WINDOW BOTTOM	47+12n
40+n	VEL. WINDOW TOP	48+12n
48+n	VEL. WINDOW BOTTOM	49+12n
56+n	TRANSPOSE	42+12n
64+n	DETUNE	43+12n
72+n	PROGRAM CHANGE FILTER	50+12n b0
80+n	DAMPER FILTER	50+12n b1
88+n	AFTER TOUCH FILTER	50+12n b2
96+n	CONTROL CHANGE FILTER	50+12n b3
104+n	A:B PAN	44+12n
112+n	C SEND LEVEL	45+12n b4~7
120+n	D SEND LEVEL	45+12n b0~3
128+n	TIMBRE MODE	51+12n b4,5
EFFECT PARAMETER		
138		
|		( TABLE 6-1)
168		

* Value	40+12n	50+12n b6,7	51+12n b4
00	----	----	1
01~100	00~99	0,0	0
101~236	0~135	0,1	0

In COMBINATION Mode
n = 0~7 (: Timbre 1~8) (TABLE 9)

No.	PARAMETER
0+n	PERFORMANCE EDIT PROGRAM NO.
8+n	" OUTPUT LEVEL
16+n	" PANPOT
24+n	" MIDI CHANNEL

DRUM KIT PARAMETERS

PARAM No. for DRUM PARAM CHANGE (TABLE 10)
n : 0~59 (: Index)

No.	PARAMETER	No. of TABLE 4
0	INST NO.	0+7n
1	KEY	1+7n
2	TUNE	3+7n
3	OUTPUT LEVEL	4+7n
4	DECAY	5+7n
5	EXCLUSIVE ASSIGN	2+7n b5~7
6	A:B PAN	2+7n b0~4
7	C SEND LEVEL	6+7n b4~7
8	D SEND LEVEL	6+7n b0~3

LCD Screen Index

Combination

- 1A – Program Select 41
- 1B – Timbre Mode 42
- 2A – Level 43
- 2B – Panpot 44
- 2C – Send C& D 45
- 3A – MIDI Channel 46
- 4A – Key Window Top 47
- 4B – Key Window Bottom 48
- 4C – Velocity Window 49
- 4D – Velocity Window Bottom 50
- 5A – Transpose 51
- 5B – Detune 51
- 6A – Program Change Filter 52
- 6B – Damper Pedal Filter 52
- 6C – After Touch Filter 53
- 6D – Control Change Filter 53
- 7A–7G Effects 54
- 8A – Combination Write 54
- 8B – Combination Rename 55
- 8C – Combination Initialize 55

Disk

- 1A – Load All Data 179
- 1B – Load P/C/G Data 179
- 1C – Load Sequencer Data 180
- 2A – Load 1 Combination 181
- 2B – Load 1 Program 182
- 2C – Load 1 Song 183
- 2D – Load 1 Pattern 184
- 2E – Load 1 Drum Kit 185
- 3A – Save All Data 186
- 3B – Save P/C/G Data 187
- 3C – Save Sequencer Data 188
- 4A – Load MIDI Exclusive Data 189
- 4B – Save MIDI Exclusive Data 190
- 5A – Load SMF (Standard MIDI File) 191
- 5B – Save SMF (Standard MIDI File) 192
- 6A – Rename File 193
- 6B – Delete File 194
- 7A – Set Date 195
- 7B – Set Time 195
- 8A – Format Disk 196

Effect

- 7A – Effect 1 Setup 58
- 7B – Effect 1 Parameters 59
- 7C – Effect 2 Setup 59
- 7D – Effect 2 Parameters 59
- 7E – Effect Placement 59
- 7F – Effects Copy 62
- 7G – Effect Copy/Swap 62

Global

- 1A – Master Tune 155
- 1B – Transpose 156
- 1C – After Touch & Velocity Response Curve 157
- 2A – Scale 158
- 3A – Global MIDI Channel & MIDI Clock Source 160
- 3B – Local Control & Note Filter 161
- 3C – MIDI Filter1 162
- 3D – MIDI Filter2 163
- 4A – Program Memory Protect 164
- 4B – Combination Memory Protect 164
- 4C – Sequencer Memory Protect 164
- 4D – Page Memory On/Off 164
- 5A – MIDI Data Dump 165
- 6A – Load Programs & Combinations from Card 166
- 6B – Load Sequencer Data from Card 167
- 6C – Save Programs & Combinations to Card 168
- 6D – Save Sequencer Data to Card 169
- 7A – Drum Kit Setup1 170
- 7B – Drum Kit Setup2 172
- 7C – Drum Kit Copy 172
- 8A – LCD Contrast 173
- 8B – Assignable Pedal Setup 173
- 8C – Damper Pedal Polarity 174

Program

- 1A – Global Oscillator Setup 10
- 1B – Oscillator1 Setup 11
- 1C – Oscillator2 Setup 13
- 2A – Pitch EG 14
- 3A – VDF1 Cutoff & EG 16
- 3B – VDF1 Velocity Sensitivity & Keyboard Tracking 18
- 3C – VDF2 Cutoff & EG 21
- 3D – VDF2 Velocity Sense & Keyboard Tracking 21
- 4A – VDA1 EG 22
- 4B – VDA1 Velocity Sensitivity & Keyboard Tracking 23
- 4C – VDA2 EG 26
- 4D – VDA2 Velocity Sensitivity & Keyboard Tracking 26
- 5A – Pitch1 Modulation 27
- 5B – Pitch2 Modulation 28
- 5C – VDF Modulation 29
- 6A – After Touch & Joystick Control 30
- 7A–7G – Effects 32
- 8A – Program Write 32
- 8B – Program Rename 33
- 8C – Program Oscillator Copy 33
- 8D – Oscillator Copy & Swap 34
- 8E – Program Initialize 34

Sequencer

- 1A – Send C & D 114
- 1B – Track Status 114
- 1C – Program Change Filter & Pitch Bend Range 115
- 1D – Transpose & Detune 115
- 1E – Velocity Window 116
- 1F – Key Window 116
- 2A – Step-Time Track Recording 117
- 2B – Event Edit 121
- 2C – Track Erase 129
- 2D – Bounce Track 129
- 2E – Copy Track 130
- 2F – Append Song 130
- 2G – Erase Song 131
- 3A – Quantize 131
- 3B – Shift Note 133
- 3C – Modify Velocity 134
- 3D – Create Controller Data 135
- 4A – Delete Measure 137
- 4B – Erase Measure 138
- 4C – Copy Measure 139
- 4D – Insert Measure 140
- 4E – Put to Track 141
- 4F – Copy to Track 142
- 5A – Real-Time Pattern Record/Edit 143
- 5B – Step-Time Pattern Recording 145
- 5C – Pattern Event Edit 146
- 6A – Pattern Setup Parameters 147
- 6B – Erase Pattern 148
- 6C – Get from Track 148
- 6D – Bounce Pattern 149
- 6E – Copy Pattern 149
- 7A-7G Effects 150
- 8A – Rename Song 150
- 8B – Song Base Resolution 151
- 8C – Next Song 152
- 8D – Metronome 152
- 8E – Copy from Combination 153
- 8F – GM Song Mode 154

Index

A

About this manual 1
 After touch
 MIDI filter 162
 pitch bend range 30
 pitch1 modulation 27
 pitch2 modulation 28
 response 157
 timbre filter 53
 VDA amplitude 30
 VDF cutoff frequency 30
 VDF modulation 30
 After touch response 157
 AfterKBD, transpose 156
 Append song 130
 Appendix 199
 Arabic, keyboard scale 158
 Assign, oscillator 10
 Assignable pedal setup 173
 Auto pan, effect 79
 Auto punch in/out recording 101
 AUTP recording 101

B

Banks
 Combinations 35
 Programs 3
 Base resolution 151
 Battery
 RAM card 198
 BeforeTG, transpose 156
 Bounce pattern 149
 Bounce track 129
 Bulk dump 165

C

Chorus 1 & 2, effects 70
 Chorus-delay, effect 81
 Clock source, MIDI 160
 Color
 VDF1 16
 VDF2 21
 Combination Edit mode 39
 compare function 39
 entering 39
 notes 40
 Combination Play mode 35
 editing 37
 notes 37
 Combinations
 copy to song 153
 effects 54
 initialize 55
 key window bottom 48
 key window top 47
 load 1 from floppy disk 181
 load from card 166

loading from floppy disk 179
 memory protect 164
 Program select 41
 rename 55
 save to card 168
 save to floppy disk 187
 selecting 35
 selecting via MIDI 36
 selecting with a pedal switch 35
 soloing Timbres 38
 Timbre mode 42
 velocity window bottom 50
 velocity window top 49
 write 54
 Compare
 Combination Edit mode 39
 Program Edit mode 7
 Concert hall, effect 63
 Controller data, create 135
 Controller, MIDI filter 163
 Copy
 drum kits 172
 effects 62
 from Combination 153
 measure 139
 oscillator 33
 pattern 149
 songs 130
 to track 142
 track 130
 Copy/swap effects 62
 Create controller data 135
 Cross delay, effect 66
 Crossover chorus, effect 71
 Crossover flanger, effect 74
 Cutoff frequency
 VDF1 16
 VDF2 21

D

Damper pedal filter, Timbres 52
 Data cards 197
 Data dump 165
 loading 165
 saving 165
 Data entry using foot controller 173
 Date set, for disk files 195
 Delay start, oscillator2 13
 Delay/chorus, effect 84
 Delay/distortion, effect 86
 Delay/flanger, effect 85
 Delay/hall reverb, effect 83
 Delay/overdrive, effect 86
 Delay/phaser, effect 87
 Delay/room reverb, effect 83
 Delay/rotary speaker, effect 88
 Delete floppy disk file 194
 Delete measure 137

Detune
 oscillator2 13
 Timbres 51
 tracks 115
 Disk mode 175
 entering 178
 Distortion, effect 76
 Double mode, Programs 10
 Drum kits
 copy 172
 index 170
 load 1 from floppy disk 185
 setup1 170
 setup2 172
 Drums mode, Programs 10
 Dry plate, effect 64
 Dual mono delay, effect 67
 Dynamic modulation 58

E

Early reflections 1, 2, 3, effects 65
 Editing
 in Combination Play mode 37
 in Program Play mode 5
 Effects
 copy 62
 copy/swap 62
 dynamic modulation 58
 Effect1 setup 58
 Effect2 setup 59
 for Combinations 54
 for Programs 32
 for songs 150
 parameter table 90
 parameters 63
 placements 59
 types 57
 Enhancer, effect 75
 Ensemble hall, effect 63
 Equal Temperament2, keyboard scale 158
 Erase
 measures 138
 patterns 148
 songs 131
 tracks 129
 Error messages
 Disk mode 202
 general 201
 Global mode 202
 Sequencer mode 201
 Event edit
 controllers 126
 cut & paste 124
 deleting 124
 inserting 124
 moving 124
 patterns 146

tied notes 125
 tracks 121
 Exciter, effect 75
 EXL, file type 177
 Expression, foot controller 173
 EXT mode, Timbres 42

F

File types, floppy disk 177
 Files
 delete from disk 194
 rename 193
 Flanger 1 & 2, effects 74
 Flanger-delay, effect 81
 Floppy disk drive cleaning 176
 Floppy disks
 date set 195
 delete files 194
 ejecting 176
 file types 177
 formatting 196
 handling 175
 inserting 176
 load 1 Combination 181
 load 1 drum kit 185
 load 1 pattern 184
 load 1 Program 182
 load 1 song 183
 load MIDI Exclusive 189
 loading & saving notes 178
 loading all data 179
 loading sequencer data 180
 naming files 178
 rename files 193
 save all data 186
 save MIDI Exclusive 190
 save Programs & Combinations 187
 save sequencer data 188
 time set 195
 what type of disk? 175
 write protect tab 175
 Foot controller setup 173
 Footswitch setup 173
 Formatting
 floppy disks 196
 PROG/SEQ data cards 198
 Free memory display 106

G

General MIDI
 song mode 154
 Get from track 148
 Global MIDI Channel 160
 Global mode 155
 entering 155
 saving settings 155
 Global Oscillator setup 10
 Global settings
 loading from floppy disk 179
 saving to floppy disk 187
 Group assign, drum kit setup 170

H

Hall, effect 63
 Harmonic chorus, effect 72
 Hold, oscillator 10

I

Implementation chart 205
 Index
 drum kit setup 170
 Initialize
 Combination 55
 Program 34
 Insert measures 140
 INT mode, Timbres 42
 Interval
 oscillator2 13

J

Joystick
 pitch bend range 30
 pitch1 modulation 27
 pitch2 modulation 28
 VDF modulation intensity 30
 VDF sweep intensity 30

K

Key window bottom 48
 Key window top 47
 Key window, tracks 116
 Keyboard sync
 pitch1 27
 pitch2 28
 VDF modulation 29
 Keyboard tracking
 modes 23
 VDA1 23
 VDA2 26
 VDF1 18
 VDF2 21
 Kirnberger, keyboard scale 158

L

Large room, effect 63
 LCD contrast 173
 Live stage, effect 64
 Loading all data 179
 LOOP recording 103

M

MANP recording 102
 Manual punch in/out recording 102
 Master tune 155
 Measures
 copy 139
 current position 106

delete 137
 erase 138
 insert 140
 playback from 97
 shift notes 133
 time signature 109
 Memory protect
 Combinations 164
 Programs 164
 sequencer data 164
 Metronome 111
 setup 152
 MID, file type 177
 MIDI
 clock source 160
 Controller filter 163
 data dump 165
 data format 206
 Exclusive data, load from disk 189
 Exclusive data, save to disk 190
 external sync 105
 filter1 162
 filter2 163
 Global MIDI Channel 160
 implementation chart 205
 load standard MIDI file 191
 note filter 161
 save standard MIDI file 192
 selecting Combinations 36
 selecting Programs 4
 System Exclusive filter 163
 Timbre After Touch filter 53
 Timbre Control Change filter 53
 Timbre MIDI Channel 46
 Timbre Program Change filter 52
 track MIDI Channel 108
 track Program Change filter 115
 Modify velocity 134
 MultiREC recording 104
 Multisounds, for Programs 11
 Multi-tap delays 1, 2, 3, effects 68
 Muting tracks 97

N

Naming files 178
 Next song 152
 No effect 63
 Note filter 161
 NT, no transpose 11

O

Octave, oscillator parameter 11
 Opening patterns 113
 Options 203
 Oscillator copy 33
 Oscillator copy & swap 34
 Oscillator1 setup 11
 Oscillator2 setup 13
 Overdrive, effect 76

P

Page memory on/off 164
 Panpot
 drum kit setup 170
 effects 59
 oscillator1 11
 oscillator2 13
 Timbres 44
 tracks 106
 Parallel Sub effect placement 61
 Parallel1 effect placement 60
 Parallel2 effect placement 60
 Parallel3 effect placement 61
 Parametric EQ, effect 80
 Patterns
 bounce 149
 copy 149
 copy from track 148
 copy to track 142
 erase 148
 event edit 146
 load 1 from floppy disk 184
 opening 113
 put to track 141
 real-time recording 143, 145
 setup 147
 ways to record 95
 what's in them? 95
 PCG, file type 177
 PCM data cards
 what are they? 197
 Pedal switch
 selecting Combinations 35
 selecting Programs 3
 Pelog, keyboard scale 158
 Pitch bend
 joystick range 30
 track range 115
 Pitch EG 14
 Pitch1 modulation 27
 Pitch2 modulation 28
 Placements, effects 59
 Playing songs 96
 Positional crossfade, between OSC1 &
 OSC2 25
 PROG/SEQ data cards
 battery 198
 formatting 198
 load Combinations 166
 load Programs 166
 load sequencer data 167
 save Combinations 168
 save Programs 168
 save sequencer data 169
 what are they? 197
 write protect switch 198
 Program Change, MIDI filter 162
 Program Edit mode 7
 compare function 7
 entering 7
 notes 8
 Program Play mode 3
 editing 5

Programs

after touch setup 30
 effects 32
 global oscillator setup 10
 initialize 34
 joystick control 30
 load 1 from floppy disk 182
 load from card 166
 loading from floppy disk 179
 memory protect 164
 oscillator copy 33
 oscillator copy & swap 34
 oscillator1 setup 11
 oscillator2 setup 13
 pitch EG 14
 pitch1 modulation 27
 pitch2 modulation 28
 positional crossfade 25
 rename 33
 save to card 168
 save to floppy disk 187
 selecting 3
 selecting via MIDI 4
 selecting with a pedal switch 3
 VDA1 EG 22
 VDA1 keyboard tracking 23
 VDA1 velocity sensitivity 23
 VDA2 EG 26
 VDA2 keyboard tracking 26
 VDA2 velocity sensitivity 26
 VDF modulation 29
 VDF1 cutoff & EG 16
 VDF1 keyboard tracking 18
 VDF1 velocity sensitivity 18
 VDF2 cutoff & EG 21
 VDF2 keyboard tracking 21
 VDF2 velocity sensitivity 21
 write 32
 Pure Major, keyboard scale 158
 Pure Minor, keyboard scale 158
 Put to track 141
 Pythagorean, keyboard scale 158

Q

Quadrature chorus, effect 71
 Quantize
 real time 111
 tracks 131
 Quick undo, sequencer edits 113

R

Real-time pattern recording 143
 Real-time recording 99
 Recording modes 112
 Recording with quantize 111
 Rename
 Combination 55
 floppy disk file 193
 Program 33
 songs 150
 Rests, step-time recording 119

Room, effect 63

Rotary speaker, effect 78

S

Save
 Combinations 54
 Programs 32
 Save all data to floppy disk 186
 Scale
 keyboard 158
 Scale switch, via foot pedal 173
 Selecting
 Combinations 35
 Combinations via MIDI 36
 Combinations with a foot pedal 35
 Programs 3
 Programs via MIDI 4
 Programs with a foot pedal 3
 songs 112
 Send C & D
 drum kit setup 170
 oscillator1 11
 oscillator2 13
 Timbres 45
 tracks 114
 SEQ, file type 177
 Sequencer
 auto punch in/out 101
 base resolution 151
 create controller data 135
 effects 150
 event edit 121
 free memory display 106
 general MIDI 154
 load data from card 167
 loading data from floppy disk 180
 loop recording 103
 manual punch in/out 102
 memory protect 164
 metronome 111
 multiREC recording 104
 muting tracks 97
 opening patterns 113
 playing songs 96
 quantize tracks 131
 quantize, recording 111
 real-time recording 99
 recording modes 112
 save data to card 169
 save data to floppy disk 188
 soloing tracks 97
 song select 112
 song tempo 109
 specs 93
 step-time track recording 117
 synchronization 105
 time signature 109
 track level 106
 track pan 106
 ways to record patterns 95
 ways to record tracks 95
 Sequencer Edit mode 113
 entering 113

Sequencer mode 93
 entering 96
 Serial effect placement 60
 Serial Sub effect placement 61
 Set date, for disk files 195
 Set time, for disk files 195
 Shift note 133
 Single mode, Programs 10
 Slendro, keyboard scale 158
 SMF
 load from disk 191
 save to disk 192
 Solo
 sequencer tracks 97
 Timbres 38
 Songs
 append 130
 base resolution 151
 copy 130
 copy from Combination 153
 effects 150
 erase 131
 general MIDI 154
 load 1 from floppy disk 183
 next song 152
 playback notes 98
 playing 96
 rename 150
 selecting 112
 tempo 109
 time signature 109
 what's in them? 94
 Specifications 203
 Spring reverb, effect 64
 Standard MIDI files
 load from disk 191
 save to disk 192
 Step-time pattern recording 145
 Step-time track recording 117
 Stereo delay, effect 66
 Stereo phasers 1 & 2, effects 77
 Sub scale, keyboard scale 158
 Swap oscillators 34
 Switch pedal
 setup 173
 Symphonic ensemble, effect 73
 Synchronization 105
 System Exclusive, MIDI filter 163

T

Tempo
 mode 109
 song 109
 Ties, step-time recording 119
 Timbres
 After Touch filter 53
 Control Change filter 53
 damper pedal filter 52
 detune 51
 key window bottom 48
 key window top 47
 level 43
 MIDI Channel 46

mode 42
 panpot 44
 Program Change filter 52
 send C & D 45
 soloing 38
 transpose 51
 velocity window bottom 50
 velocity window top 49
 Time set, for disk files 195
 Time signature
 song 109
 Tracks
 bounce 129
 copy 130
 copy from pattern 142
 copy to pattern 148
 detune 115
 erase 129
 key window 116
 level 106
 MIDI Channel 108
 mode 108
 pan 106
 pitch bend range 115
 Program Change filter 115
 protection 114
 put to track 141
 quantize 131
 send C & D 114
 status 114
 step-time recording 117
 transpose 115
 velocity window 116
 ways to record 95
 Transpose
 global mode 156
 Timbres 51
 tracks 115
 Tremolo, effect 79
 Troubleshooting
 floppy disk & data card 200
 general 199

U

Undo, sequencer edits 113
 User Scale, keyboard scale 158

V

VDA1 EG 22
 VDA1 keyboard tracking 23
 VDA1 velocity sensitivity 23
 VDA2 EG 26
 VDA2 keyboard tracking 26
 VDA2 velocity sensitivity 26
 VDF modulation 29
 VDF1 cutoff & EG 16
 VDF1 keyboard tracking 18
 VDF1 velocity sensitivity 18
 VDF2 cutoff & EG 21
 VDF2 keyboard tracking 21
 VDF2 velocity sensitivity 21

Velocity response curve 157
 Velocity window bottom 50
 Velocity window top 49
 Velocity window, tracks 116
 Velocity, tracks 134
 Volume, control with foot controller 173

W

Werkmeister, keyboard scale 158
 Wet plate, effect 64
 Write
 Combinations 54
 Programs 32
 Write protect switch, RAM cards 198
 Write protect tab, floppy disk 175

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