YAMAHA

MUSIC SYNTHESIZER

S90XS
S70XS

Reference Manual

How to Use This Manual

The S90 XS/S70 XS Reference Manual created via the PDF format is equipped with special features that are exclusive to electronic files, such as the Link function and the Search function which let you jump to the desired page by clicking the specific term.

Contents List

The list indicated at the right of each page is equivalent to the table of contents.
By clicking the desired item from this list, you can jump to the corresponding page.
The list in the "Reference" section is equivalent to the function tree of this instrument, which allows you to find desired parameters easily.
If you come across an unfamiliar parameter on the instrument's display, find the corresponding parameter from this list then click it to call up the page which describes the parameter in detail.

Search Function

This function built in the viewer software is very useful if you want to know the meaning of unfamiliar terms.
When using Adobe Reader to read this manual, enter a specific word in the search box, then press the <Enter> key of your computer keyboard to call up the relevant section in this manual.

NOTE Make sure to check and download the latest version of the Adobe Reader from the following site.
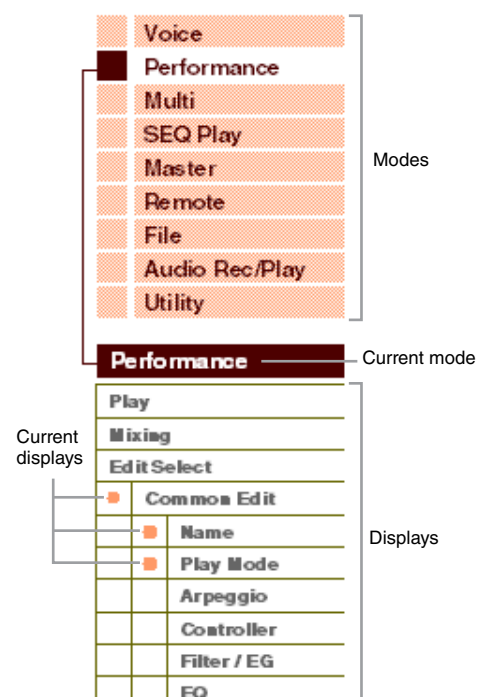http://www.adobe.com/products/reader/

Previous Page View/Next Page View

When using Adobe Reader, click to return to the previous page view/go to the next page view via the buttons in the toolbar.
This function is very useful if you want to return to the previous page view when jumping to a link page.

NOTE If the previous page view/next page view buttons are not shown in the toolbar, hold the <Alt> key and press
<←>/<→> keys to move to the previous/next page view.

NOTE For more information on these and other functions in the software, refer to the owner's manual of the software.

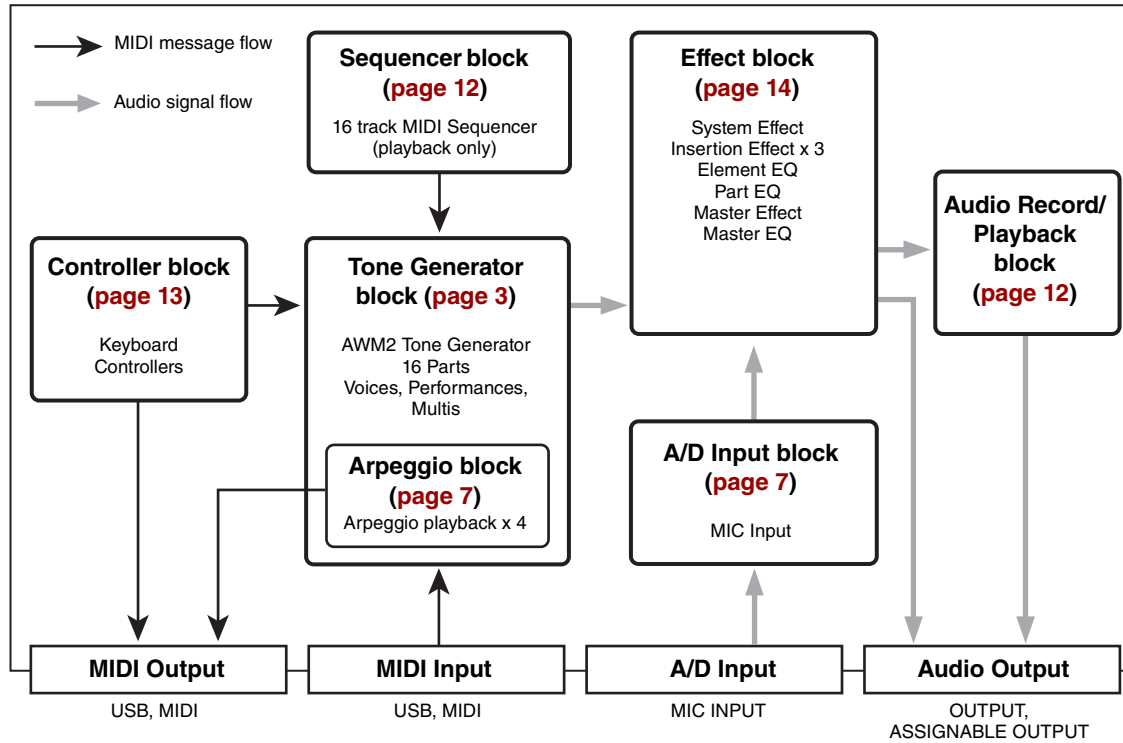**Example: Reference section, Performance mode**

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Modes

Performance — Current mode

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| Edit Select |
| Common Edit |
| Name |
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| Filter / EG |
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Current displays

Displays

Basic Structure

The Seven Functional Blocks

The S90 XS/S70 XS system consists of seven main functional blocks: Tone Generator, A/D Input, Sequencer, Arpeggio, Controller, Effect, and Audio Record/Playback.

S90 XS/S70 XS

MIDI message flow

Audio signal flow

Sequencer block (page 12)
16 track MIDI Sequencer (playback only)

Effect block (page 14)
System Effect
Insertion Effect x 3
Element EQ
Part EQ
Master Effect
Master EQ

Audio Record/ Playback block (page 12)

Controller block (page 13)
Keyboard Controllers

Tone Generator block (page 3)
AWM2 Tone Generator
16 Parts
Voices, Performances, Multis

Arpeggio block (page 7)
Arpeggio playback x 4

A/D Input block (page 7)
MIC Input

MIDI Output
USB, MIDI

MIDI Input
USB, MIDI

A/D Input
MIC INPUT

Audio Output
OUTPUT, ASSIGNABLE OUTPUT

AWM2 (Advanced Wave Memory 2)

This instrument is equipped with an AWM2 tone generator block. AWM2 (Advanced Wave Memory 2) is a synthesis system based on sampled waves (sound material), and is used in many Yamaha synthesizers. For extra realism, each AWM2 Voice uses multiple samples of a real instrument's waveform. Furthermore, a wide variety of parameters—envelope generator, filter, modulation, and others—can be applied.

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Tone Generator Block

The tone generator block is what actually produces sound in response to the MIDI messages received from the Sequencer block, the Controller block, the Arpeggio block and from the external MIDI instrument via the MIDI IN connector or the USB connector. The MIDI messages are assigned to sixteen independent channels, and this synthesizer is capable of simultaneously playing sixteen separate parts, via the sixteen MIDI channels. However, the sixteen-channel limit can be overcome by using separate MIDI "ports," each supporting sixteen channels. The tone generator block of this instrument can handle MIDI messages over Port 1. The structure of the tone generator block differs depending on the mode.

Tone Generator Block in the Voice Mode

Part structure in the Voice mode

Only one MIDI channel can be recognized in the Voice mode because only one part is available in this mode. This status is referred to as a "single timbre" tone generator. A Voice is played from the keyboard, using a single part.

To set the MIDI receive channel for single timbre operation (Voice and Performance modes), use the Basic Receive Ch parameter (page 137) in the Utility MIDI display. In the Voice mode, the instrument recognizes only data over MIDI Port 1.

NOTE If you want to play song data on an external MIDI sequencer or computer consisting of multiple MIDI channels, make sure to use the Multi mode (page 6).

Voice

A program that contains the sonic elements for generating a specific musical instrument sound is referred to as a "Voice." Internally, there are two Voice types: Normal Voices and Drum Voices. Normal Voices are mainly pitched musical instrument type sounds that can be played over the range of the keyboard.

Each Voice consists of up to eight Elements (Normal Voice) or up to 73 keys (Drum Voice).

An Element or Drum Key is the basic and the smallest unit for a Voice. This means that only one Element or key can produce the musical instrument sound. In addition, a Normal Voice can produce the realistic sound or various types of sound by combining multiple Elements. Each Voice is created by editing parameters unique to each element/key (Element Edit parameters/Key Edit parameters) and parameters common to all the elements/keys (Common Edit parameters). In Element Edit and Key Edit, you can edit the parameters only on the S90 XS/S70 XS Editor.

NOTE For instructions on editing a Normal Voice, see page 34. For instructions on editing a Drum Voice, see page 58.

Normal Voices & Drum Voices

Normal Voices

This is a Voice which is played conventionally from the keyboard, with standard pitches sounding for each key. A Normal Voice consists of up to eight Elements. Depending on the settings in the Voice Edit mode, these Elements are sounded simultaneously, or the different Elements are sounded according to the note range, velocity range and the XA (Expanded Articulation) settings.

The illustration is an example of a Normal Voice. Since the six Elements here are distributed across both the note range of the keyboard and the velocity range, a different Element sounds depending on which note you play and how strongly you play it. In the note distribution, Elements 1 and 2 sound in the lower range of the keyboard, Elements 3 and 4 sound in the middle range, and Elements 5 and 6 sound in the higher range. In the velocity distribution, Elements 1, 3 and 5 sound when playing the keyboard softly, while Elements 2, 4 and 6 sound when playing it strongly. In a practical example of this in use, a piano Voice could be composed of six different samples. Elements 1, 3 and 5 would be the sounds of the piano played softly, over the respective note ranges, while Elements 2, 4 and 6 would be strongly played sounds, for each respective note range. Actually, the S90 XS/S70 XS is even more flexible than this, since it allows up to eight independent Elements.
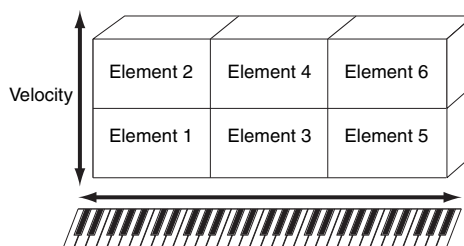
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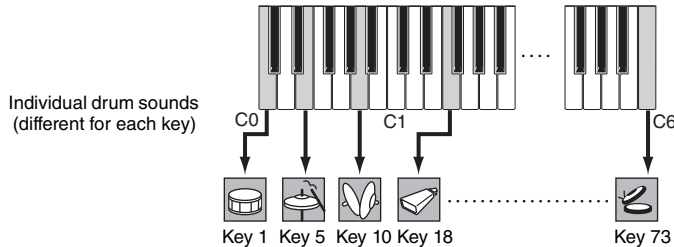- Performance
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Drum Voice

Drum Voices are mainly percussion/drum sounds that are assigned to individual notes on the keyboard. A collection of assigned percussion/drum waves or Normal Voices is known as a Drum Kit.
Unlike Elements, the Drum key is equivalent to the corresponding note, meaning that you cannot change its range. Drum or percussion sounds are assigned to each Drum Key. You can create various types of Drum Voices by changing the drum or percussion sound assigned to each key and edit the parameters such as pitch and EG.

Individual drum sounds (different for each key)

C0   C1   C6

Key 1 Key 5 Key 10 Key 18   Key 73

Expanded Articulation (XA)

Expanded Articulation (XA) is a specially designed tone generation system that provides greater performance flexibility and acoustic realism.
This feature, adopted from the MOTIF XS synthesizer, allows you to more effectively recreate realistic sound and natural performance techniques—such as legato and staccato—and provides other unique modes for random and alternate sound changes as you play.

Realistic legato performance

Conventional synthesizers recreate a legato effect by continuing the volume envelope of a previous note on to the next one, in the mono mode. However, this results in an unnatural sound different from that of an actual acoustic instrument. Like the technology of the MOTIF XS series, the S90 XS/S70 XS more accurately reproduces a legato effect by allowing specific Elements to be sounded when playing legato and other Elements to be played normally (with the XA Control parameter settings "normal" and "legato").

Authentic note release sound

Conventional synthesizers are not good at realizing the sound produced when the note of the acoustic instrument is released. The S90 XS/S70 XS realizes the sound produced when the note of the acoustic instrument is released, by setting the XA Control parameter of a certain Element to "key off sound."

Subtle sound variations for each note played

Conventional synthesizers attempt to reproduce this by randomly changing the pitch and/or filter. However, this produces an electronic effect and is different from the real sound changes on an acoustic instrument. The S90 XS/S70 XS more accurately reproduces these subtle sound variations by using the XA Control parameter settings, "wave cycle" and "wave random."

Switching among different sounds to recreate the natural performance on an acoustic instrument

Acoustic instruments have their own unique characteristics—even specific, unique sounds that are produced only at certain times in a performance. These include the flutter tonguing on a flute or the playing of high harmonics on an acoustic guitar. Conventional synthesizers (before the MOTIF XS series) could realize such sounds, for example, by triggering them through high (strong) velocity. The S90 XS/S70 XS, on the other hand, recreates these special sounds by allowing you to switch between the sounds while you play-using the ASSIGNABLE FUNCTION buttons and the XA Control parameter settings, "AF 1 on," "AF 2 on" and "all AF off." This gives you a level of natural, expressive control previously unavailable.

NOTE You can turn the ASSIGNABLE FUNCTION [1]/[2] button on or off also by transmitting the Control Change number specified as "A Func 1/2 Ctrl No." (page 139) in the Utility Controller display from an external device.

New sounds and new styles of playing

The highly versatile functions above can be applied effectively not only to acoustic sounds but also to synthesizer and electronic Voices as well. The XA feature opens up enormous potential for realizing authentic sounds, performing expressively and coming up with creative new styles of playing.

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Elements and Drum Keys

Elements and Drum Keys are the smallest "building blocks" in this synthesizer that comprise a Voice; in fact, only one Element or one Drum Key could be used to create a Voice. These small sound units can be built, enhanced and processed by a variety of traditional synthesizer parameters, such as Oscillator, Pitch Filter, Amplitude, and LFO (shown below).

IMPORTANT
In Element Edit and Key Edit, you can edit the parameters only on the S90 XS/S70 XS Editor installed to your computer connected to the S90 XS/S70 XS.
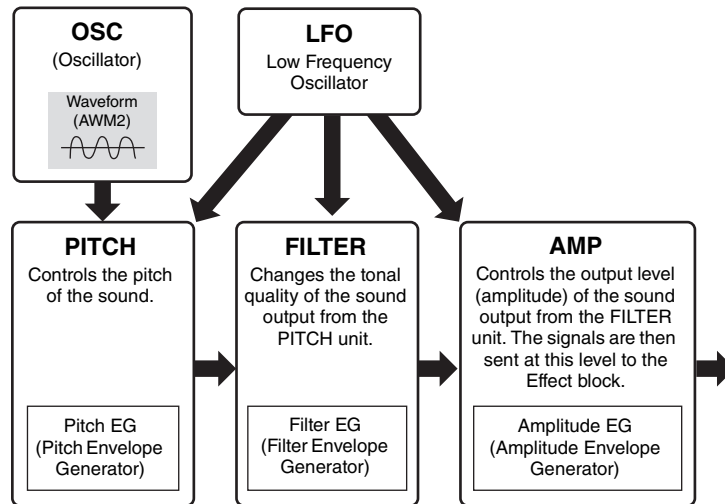
Oscillator

This unit outputs waves which determine the basic pitch. From the Oscillator setup window of the S90 XS/S70 XS Editor, you can assign a waveform (the basic sound "building block") to each Element of a Normal Voice or each Key of a Drum Voice. In the case of a Normal Voice, you can set the note range for the Element (the range of notes on the keyboard over which the Element will sound) as well as the velocity response (the range of note velocities within which the Element will sound). In addition, the XA related parameters can be set in this unit.
Each waveform consists of the sample(s) created by recording the actual instrument's sound and assigned to the set(s) of the keyboard and velocity.
For information on the Oscillator parameters, refer to pages 46 and 60.

Pitch

This unit controls the pitch of the sound (wave) output from the Oscillator. In the case of a Normal Voice, you can detune separate Elements, apply Pitch Scaling and so on. Also, by setting the PEG (Pitch Envelope Generator), you can control how the pitch changes over time. Pitch-related parameters can be set on the S90 XS/S70 XS Editor.
For details, refer to pages 47, 48, and 61.

Filter

This unit modifies the tone of the sound output from Pitch by cutting the output of a specific frequency portion of the sound. Also, by setting the FEG (Filter Envelope Generator), you can control how the Cutoff Frequency of the Filter changes over time. The Filter parameters can be set from the S90 XS/S70 XS Editor.
For details, refer to pages 50, 51, 53 and 61.

Amplitude

This unit controls the output level (amplitude) of the sound output from the Filter block. The signals are then sent at this level to the Effect block. Also, by setting the AEG (Amplitude Envelope Generator), you can control how the volume changes over time. The Amplitude parameters can be set from the S90 XS/S70 XS Editor.
For details, refer to pages 53, 55, 62 and 62.

LFO (Low Frequency Oscillator)

As its name suggests, the LFO produces a low frequency wave.

These waves can be used to vary the pitch, filter or amplitude of each Element to create effects such as vibrato, wah and tremolo. LFO can be set independently for each Element; it can also be set globally for all Elements. The LFO parameters can be set from the S90 XS/S70 XS Editor.

For details, refer to pages 40 and 56.

Memory structure of Voice

Normal Voice

Preset Banks 1 – 8	1024 Normal Voices (128 Voices for each Bank)
GM Bank	128 Voices
User Banks 1 – 4	512 Voices (128 Voices for each Banks)

Drum Voice

Preset Drum Bank	64 Voices
GM Drum Bank	1 Voice
User Drum Bank	32 Voices

Tone Generator Block in the Performance Mode

Part structure in the Performance mode

In this mode, the tone generator block receives MIDI data over a single channel. This status is referred to as a "single timbre" tone generator. This mode lets you play a Performance (which multiple Voices (Parts) are combined—in a layer, or in other configurations) using the keyboard. Keep in mind that song data on an external sequencer consisting of multiple MIDI channels will not play back properly in this mode. If you are using an external MIDI sequencer or computer to play the instrument, make sure to use the Multi mode.

Performance

A program in which multiple Voices (Parts) are combined in a layer, or in other configurations is referred to as a "Performance." Each Performance can contain up to four different Parts (Voices). Each Performance can be created by editing parameters unique to each Part and parameters common to all the Parts in the Performance mode (page 69).

Memory structure of Performance

Four User Banks are provided. Each Bank contains 128 Performances. Accordingly, a total of 512 User Performances are provided.

Tone Generator Block in the Multi Mode

Part structure in the Multi mode

The Multi mode lets you use 16 Parts and assign different Voices to be played back for each Part. Since different MIDI channels can be set for each Part of the tone generator block, you can use an external MIDI sequencer or computer to play the sounds. The sequence data of each track plays the corresponding Parts (those having the same MIDI channel assignment) in the tone generator block. A MIDI tone generator that simultaneously receives over multiple MIDI channels and plays multiple instrument Parts is referred to as a "multi-timbral" tone generator.

To play the tone generator block in the Multi mode, set the Port of the external sequencer to 1 then set the MIDI Receive Channel of each Part as "Receive Ch" (page 101) in the Voice display of the Multi Part Edit.

Multi

A program in which multiple Voices are assigned to Parts for multi-timbral play in the Multi modes is referred to as a "Multi." Each Multi can contain up to 16 Parts.

Memory structure of Multi

128 Multi programs are provided in the User Bank.

Maximum Polyphony

Maximum polyphony refers to the highest number of notes that can be sounded simultaneously from the internal tone generator of the instrument.

The maximum polyphony of this synthesizer is 128. When the internal tone generator block receives a number of notes exceeding the maximum polyphony, previously played notes are cut off. Keep in mind this may be especially noticeable with Voices not having decay.

Furthermore, the maximum polyphony applies to the number of Voice Elements used, not the number of Voices. When Normal Voices that include up to eight Elements are used, the maximum number of simultaneous notes may be less than 128.

A/D Input Block

This block handles the audio signal input from the MIC INPUT jack. Audio Signals from the MIC INPUT jack can be transmitted to the Insertion Effect, System Effect, Master Effect, and Master EQ of the Effect Block.
The A/D Input related parameters can be set in the following display.

Mode	Display	Pages
Voice	Voice A/D Out display and Voice A/D FX display in the Utility mode	Pages 140 and 141
Performance	A/D Out display and A/D FX display in the Performance Common Edit	Pages 78 and 79
Multi	A/D Out display and A/D FX display in the Multi Common Edit	Pages 98 and 99

Arpeggio Block

This function lets you automatically trigger musical and rhythmic phrases using the current Voice by simply pressing a note or notes on the keyboard. The Arpeggio sequence also changes in response to the actual notes or chords you play, giving you a wide variety of inspiring musical phrases and ideas—both in composing and performing. Four Arpeggio types can be played back at the same time even in the Song mode and Pattern mode.

Arpeggio Category

The Arpeggio types are divided into 18 categories as listed below. The categories are based on the musical instrument.

Category List

ApKb	Acoustic Piano & Keyboard		Lead	Synth Lead
Organ	Organ		PdMe	Synth Pad / Musical Effect
GtPl	Guitar / Plucked		CPrc	Chromatic Percussion
GtMG	Guitar for "MegaVoice"		DrPc	Drum / Percussion
Bass	Bass		Seq	Synth Seq
BaMG	Bass for "MegaVoice"		Chord	Chord Seq
Strng	Strings		Hybrd	Hybrid Seq
Brass	Brass		Cntr	Control
RdPp	Reed / Pipe		DrEnd	Drum Ending

NOTE Categories named "GtMG" and "BaMG" include Arpeggio types appropriate for using with a Mega Voice.

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Mega Voices and Mega Voice Arpeggios

Normal Voices use velocity switching to make the sound quality and/or level of a Voice change according to how strongly or softly you play the keyboard. This makes these Voices respond naturally. However Mega Voices have a very complex structure with many different layers that are not suitable for playing manually. Mega Voices were developed specifically to be played by Mega Voice arpeggios to produce incredibly realistic results. You should always use Mega Voices with Mega Voice Arpeggios (included in "GtMG" and "BaMG" category). For information about the Arpeggio type appropriate for each Mage Voice, refer to the Voice Type of the Arpeggio Type list in the Data List (separate PDF documentation).

Sub Category

The Arpeggio categories are divided into sub categories as listed below. Because the sub categories are listed based on the music genre, it is easy to find the sub category appropriate for your desired music style.

Sub Category List

Rock	Rock
R&B	R&B
Elect	Electronic
Jazz	Jazz
World	World
Genrl	General
Comb	Combination
Zone	Zone Velocity*

Z.Pad	Zone Velocity for Pad*
Filtr	Filter
Exprs	Expression
Pan	Pan
Mod	Modulation
Pbend	Pitch Bend
Asign	Assign 1/2

NOTE Arpeggio types belonging to the Sub Categories marked with an asterisk (*) contain certain velocity ranges, to each of which a different phrase is assigned. When a type of these categories is selected in the Voice mode, it is a good idea to set the Velocity Limit of each Element to the same range as below.

Velocity ranges of each Arpeggio type
2Z_*****: 1 – 90, 91 – 127
4Z_*****: 1 – 70, 71 – 90, 91 – 110, 111 – 127
8Z_*****: 1 – 16, 17 – 32, 33 – 48, 49 – 64, 65 – 80, 81 – 96, 97 – 108, 109 – 127
PadL_*****: 1 – 1, 2 – 2, 3 – 127
PadH_*****: 1 – 112, 113 – 120, 121 – 127

Arpeggio Type Name

The Arpeggio Types are named according to certain rules and abbreviations. Once you understand these rules and abbreviations, you will find it easy to browse through and select the desired Arpeggio Types.

Arpeggio type with "_ES" at the end of the type name (example: HipHop1_ES)

These Arpeggio types use the same multi track Arpeggio architecture as the MOTIF ES. This ES type of arpeggio has the following benefits: These arpeggios can create complex notes and chords even when triggered by one note. The arpeggio closely follows the notes played on the keyboard (but the area where the arpeggio is assigned) allowing a good deal of harmonic freedom and the possibility to "solo" using these arpeggios. For details, see .

Arpeggio type with "_XS" at the end of the type name (example: Rock1_XS)

These Arpeggios use a newly developed chord recognition technology to determine what notes should be played back by the Arpeggio. This XS type of arpeggio has the following benefits: The arpeggios respond only to any area on the keyboard where an XS type of arpeggio is assigned. Other areas of the keyboard do not effect the chord recognition. This allows very natural keyboard playing across the entire keyboard with arpeggio generated bass and backing parts. The arpeggio will always play harmonically correct parts. These are especially useful for bass and chordal backing parts. See for more details.

Arpeggio type with a normal name (example: UpOct1)

In addition to the above types, there are three playback types: the Arpeggios created for use of Normal Voices and played back using only the played notes and their octave notes (), the Arpeggios created for use of Drum Voices (), and Arpeggios containing mainly non-note events ().

How to Use the Arpeggio Type List

The Arpeggio Type list in the Data List (separate PDF documentation) contains the following columns.

Main Category	Sub Category	ARP No.	ARP Name	Time Signature	Length	Original Tempo	Accent	Random SFX	Voice Type
ApKb	Rock	1	70sRockB	4 / 4	2	130			Acoustic Piano
ApKb	Rock	2	70sRockC	4 / 4	1	130			:
ApKb	Rock	3	70sRockD	4 / 4	2	130			
ApKb	Rock	4	70sRockE	4 / 4	4	130			
ApKb	Rock	5	70sRockF	4 / 4	2	130			
ApKb	Rock	6	70sRockG	4 / 4	1	130			
ApKb	Rock	7	70sRockH	4 / 4	1	130			

NOTE Note that this list is for illustration purposes only. For a complete listing of the Arpeggio Types, refer to the Data List (separate PDF documentation).

❶ Main Category

Indicates an Arpeggio Category.

❷ Sub Category

Indicates an Arpeggio Sub Category.

❸ ARP No (Arpeggio Number)

Indicates the number of the Arpeggio type.

❹ ARP Name (Arpeggio Name)

Indicates the Arpeggio Name.

❺ Time Signature

Indicates the time signature or meter of the Arpeggio type.

❻ Length

Indicates the data length (amount of measures) of the Arpeggio type. When the Loop parameter* is set to "off," the Arpeggio plays back for this length and stops.

❼ Original Tempo

Indicates the appropriate tempo value of the Arpeggio type. Note that this tempo is not set automatically when selecting an Arpeggio type.

❽ Accent

The circle indicates that the Arpeggio uses the Accent Phrase feature (page 10).

❾ Random SFX

The circle indicates that the Arpeggio uses the SFX feature (page 10).

❿ Voice Type

Indicates the voice type appropriate for the Arpeggio Type.
When the Voice With Arpeggio parameter (page 104) is set to "on" in the Arp Edit display of the Multi Part Edit mode, the voice of this type is automatically selected.

*The "Loop" can be set in the Arp Edit display (page 36) of the Voice Edit, Arp Edit display (page 84) of the Performance Part Edit and Arp Edit display (page 104) of the Multi Part Edit.

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Arpeggio Related Settings

There are several methods for triggering and stopping the Arpeggio playback. In addition, you can set whether or not SFX sounds and special Accent Phrases are triggered along with the normal sequence data. This section covers the Arpeggio related parameters which can be set in the Voice, Performance, and Multi modes.

Turning Arpeggio playback on/off

The following operations are available.

To play the Arpeggio only when the note is pressed:	"Hold"="off," "Trigger Mode"="gate"
To continue the Arpeggio even if the note is released:	"Hold"="on," "Trigger Mode"="gate"
To toggle the Arpeggio playback on/off whenever the note is pressed:	"Trigger Mode"="toggle" (The Hold parameter can be set to either "on" or "off.")

NOTE The Hold and Trigger Mode can be set in the Arp Edit display (page 36) of the Voice Edit, Arp Edit display (page 84) of the Performance Part Edit and Arp Edit display (page 104) of the Multi Part Edit.

NOTE When receiving the MIDI sustain message (control #64) with "Arp Sw" set to "on," you can obtain the same result by setting "Arp Hold" to "on."

Accent Phrase

Accent Phrases are composed of sequence data included in some Arpeggio types, sounding only when you play notes at a velocity higher (stronger) than that specified in the Accent Velocity Threshold parameter.
If it is hard to play at velocities necessary to trigger the Accent Phrase, set the Accent Velocity Threshold parameter to a lower value.

NOTE The "Accnt Vel Th (Accent Velocity Threshold)" can be set in the Arp Edit display (page 36) of the Voice Edit, Arp Edit display (page 84) of the Performance Part Edit and Arp Edit display (page 104) of the Multi Part Edit.

NOTE For information on Arpeggio types that use this function, refer to the Arpeggio Type List in the Data List (separate PDF documentation).

Random SFX

Some Arpeggio types feature a Random SFX function which will trigger special sounds (such as guitar fret noises) when the note is released. The following parameters affecting Random SFX are provided.

For turning the Random SFX on/off:	Random SFX
For setting the volume of the SFX sound:	SFX Vel Offset
For determining whether or not the volume of the SFX sound is controlled by velocity:	SFX Key on Ctrl

NOTE The "Random SFX," "SFX Vel Offset," and "SFX Key on Ctrl" can be set in the Arp Edit display (page 36) of the Voice Edit, Arp Edit display (page 84) of the Performance Part Edit and Arp Edit display (page 104) of the Multi Part Edit.

NOTE For information on Arpeggio types that use this function, refer to the Arpeggio Type List in the Data List (separate PDF documentation).

Arpeggio Playback Types

The Arpeggio playback features three main playback types as described below.

Arpeggios for Normal Voices

Arpeggio types (belonging to the categories except for the DrPC and Cntr) created for use of Normal Voices have the following three playback types.

Playback only of the played notes
The Arpeggio is played back using only the played note and its octave notes.

Playback of a programmed sequence according to the played notes
These Arpeggio types have the several sequences each of which is suited for a certain chord type. Even if you press only one note, the Arpeggio is played back using the programmed sequence—meaning that notes other than the ones you play may be sounded. Pressing another note triggers the transposed sequence regarding the pressed note as a root note. Adding notes to those already held changes the sequence accordingly. An Arpeggio with such a playback type has "_ES" at the end of the type name.

Playback of a programmed sequence according to the played chord
These Arpeggio types created for use with Normal Voices are played back to match the chord type determined by detecting the notes you play on the keyboard. An Arpeggio with such a playback type has "_XS" at the end of the type name.

NOTE When the Key Mode parameter is set to "sort" or "sort+direct," the same sequence is played back no matter what order you play the notes. When the Key Mode parameter is set to "thru" or "thru+direct," a different sequence is played back depending on the order you play the notes.

NOTE Since these types are programmed for Normal Voices, using them with Drum Voices may not give musically appropriate results.

Arpeggios for Drum/Percussion Voices—Category: DrPc, DrEnd

These arpeggio types are programmed specifically for use with Drum Voices, giving you instant access to various rhythm patterns. Three different playback types are available.

Playback of a drum pattern
Pressing any note(s) will trigger the same rhythm pattern.

Playback of a drum pattern, plus additional played notes (assigned drum instruments)
Pressing any note will trigger the same rhythm pattern. Adding notes to the one already held produces additional sounds (assigned drum instruments) for the drum pattern.

Playback only of the played notes (assigned drum instruments)
Playing a note or notes will trigger a rhythm pattern using only the notes played (assigned drum instruments). Adding notes to the one already held produces additional sounds (assigned drum instruments) for the drum pattern. Keep in mind that even if you play the same notes, the triggered rhythm pattern differs depending on the order of the notes played. This gives you access to different rhythm patterns using the same instruments simply by changing the order in which you play the notes when the Key Mode parameter is set to "thru" or "thru+direct."

NOTE The three playback types above are not distinguished by category name or type name. You'll have to actually play the types and hear the difference.

NOTE Since these types are programmed for Drum Voices, using them with Normal Voices may not give musically appropriate results.

Arpeggios containing mainly non-note events—Category: Cntr

These arpeggio types are programmed primarily with Control Change and Pitch Bend data.
They are used to change the tone or pitch of the sound, rather than play specific notes. In fact, some types contain no note data at all. When using a type of this category, set the Key Mode parameter to "direct," "thru+direct," or "sort+direct."

NOTE The "Key Mode" can be set in the Arp Edit display (page 36) of the Voice Edit, Arp Edit display (page 84) of the Performance Part Edit and Arp Edit display (page 104) of the Multi Part Edit.

Tips for Arpeggio playback

It not only provides inspiration and full rhythmic passages over which you can perform, it gives you quality MIDI data you can use in creating songs, or fully formed backing parts to be used in your live performances. For details, refer to "Arpeggio" in the printed Owner's Manual.

Sequencer Block

This block lets you play the Standard MIDI file including the 16 parts in the Multi/Sequence Play mode. The MIDI messages played in the Sequencer block will be transmitted to the tone generator block.

Audio Recording/Playback Block

This block lets you record your keyboard performance as audio data to the USB storage device or internal flash memory and play back the recorded audio data.

Audio Recording

The sound output from the tone generator block of this instrument and the sound input via the MIC INPUT jack will be transferred to the Effect block then recorded as audio data. The audio data is recorded and saved as the WAVE file (44.1kHz/16-bit/stereo).

Audio Playback

You can directly play back the files stored on the internal flash memory or saved on the external USB storage device. The playback sound will bypass the Effect block before being output.

Controller Block

This block consists of the keyboard, Pitch Bend and Modulation Wheels, Ribbon Controller, Knobs, Sliders and so on. The keyboard itself doesn't generate sounds, but instead generates/transmits note on/off, velocity and other information (MIDI messages) to the synthesizer's tone generator block when you play notes. The controllers also generate/transmit MIDI messages. The synthesizer's tone generator block produces the sound according to the MIDI messages transmitted from the keyboard and controllers.

Keyboard

The keyboard transmits the note on/off messages to the Tone Generator Block (for sounding). The keyboard is also used for triggering Arpeggio playback. You can change the note range of the keyboard in octaves by using the OCTAVE [+]/[-] buttons, transpose the notes by using the TRANSPOSE [-]/[+] buttons and set (in the General display of the Utility mode) how the actual velocity is generated according to the strength with which you play notes.

Pitch Bend Wheel

Use the Pitch Bend wheel to bend notes up (roll the wheel away from you) or down (roll the wheel toward you) while playing the keyboard. Move the wheel up or down to bend the pitch up or down. This wheel is self-centering and will automatically return to normal pitch when released. Each preset Voice has its own default Pitch Bend Range setting. The Pitch Bend Range setting for each Voice can be changed in the Play Mode display (page 34) of the Voice Edit mode. From this display you can also reverse the Pitch Bend function—so that moving the wheel up lowers the pitch, and moving it down raises the pitch. Functions other than Pitch Bend can be assigned to the Pitch Bend wheel in the Controller display (page 39) of the Voice Edit mode.

Pitch Up

Pitch Down
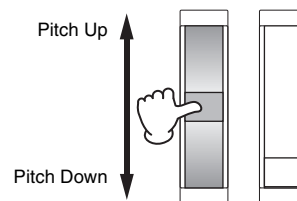
Modulation Wheel

Even though the Modulation wheel is conventionally used to apply vibrato to the sound, many of the preset Voices have other functions and effects assigned to the wheel.
The more you move this wheel up, the greater the effect that is applied to the sound. To avoid accidentally applying effects to the current Voice, make sure the Modulation wheel is set to minimum before you start playing. Various functions can be assigned to the Modulation wheel in the Controller display (page 39) of the Voice Edit mode.

Maximum

Minimum
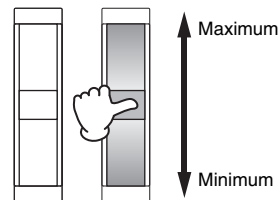
Assignable Function Buttons

According to the XA Mode (Expanded Articulation Mode) settings (page 4), you can call up specific Elements of the selected Voice by pressing each of these buttons during your keyboard performance. Assignable functions can be set on the S90 XS/S70 XS Editor. You can select how the on/off status of these buttons is switched by using the Assignable Function 1 Mode and Assignable Function 2 Mode parameters in the Controller display (page 39) of the Voice Edit mode. Furthermore, you can assign various functions to these buttons (other than calling up specific Elements).

Knob/Slider

These four knobs let you change various aspects of the Voice's sound in real time—while you play. The four sliders let you adjust the volume of the Voice Elements, Performance Parts and Mixing Parts.

DAW Remote

Press the [DAW REMOTE] button to enter the Remote mode. Entering the Remote mode will change the functions of the panel buttons—with the exception of [MIC INPUT ON/OFF], OCTAVE [+]/[-] buttons, TRANSPOSE [+]/[-] buttons and [UTILITY] buttons—to those exclusive to this mode. For details, refer to page 123.

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- Functional Blocks
- Tone Generator
- A/D Input
- Arpeggio
- Sequencer
- Audio Record/Play
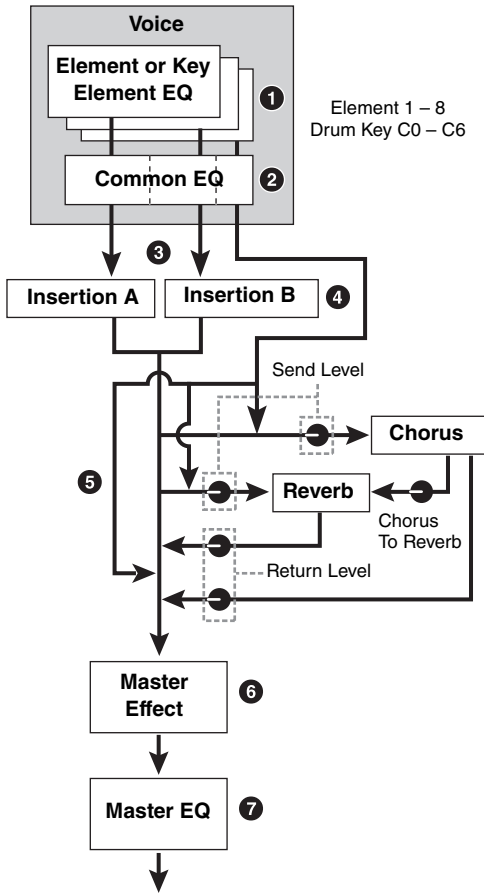● Controller
- Effect
- Internal Memory

Reference

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- Master
- Remote
- File
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Effect Block

This block applies effects to the output of the tone generator block, and audio input block, processing and enhancing the sound. Effects are applied in the final stages of editing, letting you change the sound as desired.

Effect Structure

System Effects—Reverb and Chorus

System Effects are applied to the overall sound. With System Effects, the sound of each Part is sent to the effect according to the Effect Send Level for each Part. The processed sound (referred to as "wet") is sent back to the mixer, according to the Return Level, and output—after being mixed with the unprocessed "dry" sound.
This instrument is equipped with the Reverb and Chorus as System Effects.
In addition, you can set the Send Level from Chorus to Reverb. This parameter is used to apply the Reverb to the signals output from the Chorus. You can get the natural effect by applying the Reverb depth to the Chorus sound with the same level as that of the dry sound.

Insertion Effect

Insertion Effects can be applied individually to each Part. Insertion Effects are mainly used to directly process a single Part, Voice. Each Voice features one set of Insertion effects (A and B units). The different Effects can be assigned to the A and B respectively on the Effect Parameter display () of the Voice Edit.
This instrument features eight sets of Insertion Effects (each set has two units, A and B). They can be applied to a maximum of eight Parts selectable from Parts 1 – 16 and A/D Input Part in the Multi mode.

Master Effect

This block applies effects to the final stereo output signal of the entire sound. Multiple Effect types are available.

Element EQ

The Element EQ is applied to each Element of the Normal Voice and each key of the Drum Voice. You can specify which shape is used among three types: Parametric EQ of 2-band shelving type, Parametric EQ of 1-band peaking type and boost EQ. These parameters can be set only on the S90 XS/S70 XS Editor.

Common EQ/Part EQ

The Part EQ, the 3-band parametric EQ, is applied to each Voice or each part of the Multi. The high band and low band are the shelving type. The middle band is the peaking type. The Common EQ parameters offset the settings of the Part EQ parameters.

Master EQ

Master EQ is applied to the final (post-effect), overall sound of the instrument. In this EQ, all five bands can be set to peaking, or the lowest and highest bands can also be set to shelving.

Effect Connection in Each Mode

In the Voice mode

Voice

Element or Key
Element EQ ❶

Element 1 – 8
Drum Key C0 – C6

Common EQ ❷

❸

Insertion A | Insertion B ❹

Send Level

Chorus

❺ Reverb

Chorus
To Reverb

Return Level

Master
Effect ❻

Master EQ ❼

❶ **Element EQ applied to each Element (for a Normal Voice) and each Key (for a Drum Voice)**

Can be set in the EQ section (pages 57 and 62) of the Voice Element Edit/Voice Key Edit on the S90 XS/S70 XS Editor.

❷ **Common EQ applied to all the Elements and Drum Keys**

Can be set in the 3 Band EQ display (page 44) of Voice Edit.

❸ **Selection which Insertion Effect, A or B is applied to each Element/Key**

Can be set in the Effect display (page 44) of the Voice Edit on the S90 XS/S70 XS Editor.

❹ **Insertion Effect A/B related parameters**

Can be set in the Effect Parameter display (page 45) for "Ins A" and "Ins B" of Voice Edit.

❺ **Reverb and Chorus related parameters**

Can be set in the Effect Parameter display (page 45) for "Reverb" and "Chorus" of Voice Edit.

❻ **Master Effect related parameters**

Can be set in the Voice Master FX display (page 142) of the Utility mode.

❼ **Master EQ related parameters**

Can be set in the Voice Master EQ display (page 143) of the Utility mode.

NOTE Regarding the Audio Input signal from the MIC INPUT jack in the Voice mode, when the "Output Select" parameter (page 141) is set to something other than "L&R," the signal can be applied at only ❸ – ❹ settings as shown above and output.

In the Performance mode

Performance

Voice | Part EQ
Insertion A/B ❶

❷ Part 1 – 4

Send Level

Chorus

❸ Reverb

Chorus
To Reverb

Return Level

Master
Effect ❹

Master EQ ❺

❶ **Part EQ applied to each Part**

Can be set in the 3 Band EQ display (page 88) of Performance Part Edit.

❷ **Selection to which Parts the Insertion Effect is applied**

Can be set in the Fx Send display (page 89) of Performance Edit.

❸ **Reverb and Chorus related parameters**

Can be set in the Effect Parameter display (page 77) for "Reverb" and "Chorus" of Performance Common Edit and the Fx Send display (page 89) of Performance Part Edit.

❹ **Master Effect related parameters**

Can be set in the Effect Parameter display (page 77) for "Master" of Performance Common Edit Effect Select.

❺ **Master EQ related parameters**

Can be set in the EQ display (page 76) of Performance Common Edit.

NOTE The Effect settings of ❶, ❸, and ❹ in the Voice mode are available for up to eight parts for which the Insertion Effect is turned on.

NOTE The audio signals of the parts for which the "Output Select" parameter (page 78)is set to something other than "L&R" can be applied only at the ❶ and ❷ settings as shown above and output.

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Functional Blocks
Tone Generator
A/D Input
Arpeggio
Sequencer
Audio Record/Play
Controller
● Effect
Internal Memory

Reference

Voice
Performance
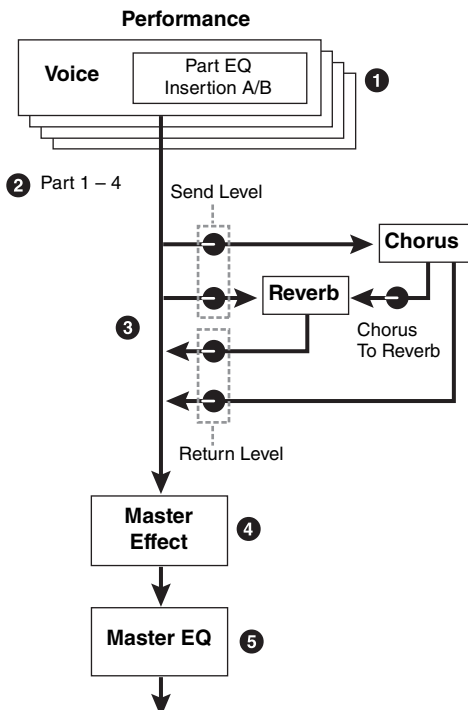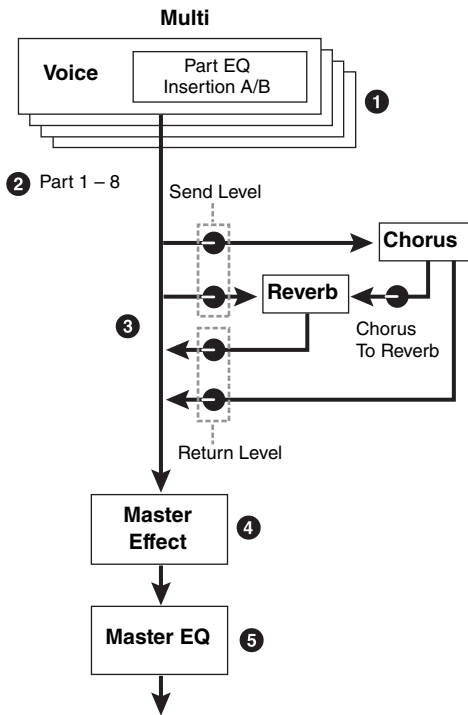Multi
SEQ Play
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In the Multi mode

Multi

Voice

Part EQ
Insertion A/B ❶

❷ Part 1 – 8

Send Level

Chorus

Reverb

Chorus
To Reverb

❸

Return Level

Master
Effect ❹

Master EQ ❺

❶ **Part EQ applied to each Part**

Can be set in the 3 Band EQ display (page 108) of Multi Part Edit.

❷ **Selection to which Parts the Insertion Effect is applied**

Can be set in the Fx Send display (page 109) of Multi Part Edit on the S90 XS/S70 XS instrument and the Effect display of Multi Common Edit in the S90 XS/S70 XS Editor.

❸ **Reverb and Chorus related parameters**

Can be set in the Effect Parameter display (page 97) for "Reverb" and "Chorus" of Multi Common Edit and the Fx Send display (page 109) of Multi Part Edit.

❹ **Master Effect related parameters**

Can be set in the Effect Parameter display (page 96) for "Master" of Multi Common Edit.

❺ **Master EQ related parameters**

Can be set in the Master EQ display (page 97) of Multi Common Edit.

NOTE The Effect settings of ❶, ❸, and ❹ in the Voice mode illustrated on page 15 are available for up to eight parts for which the Insertion Effect is turned on.

NOTE The audio signals of the parts for which the "Output Select" parameter (page 98) is set to something other than "L&R" can be applied only at the ❶ and ❷ settings as shown above and output.

Effect Types Divided into Effect Categories

This instrument provides such a wide and extensive variety of Effect types that it may be difficult to find the desired Effect type out of the great number that are available. This is why all the Effect types are divided into convenient Effect categories. This section explains the Effect categories and their types.

The Effect Type list described below for each category contains the columns: Rev (Reverb), Cho (Chorus), Ins (Insertion) and Mas (Master Effect). The checkmarks indicated in these columns means the Effect Type is available for each block. These Effect types (with the checkmarks indicated in each list) can be selected from the panel controls.

Reverb

Also called "reverberation," this refers to the sound energy remaining in a room or closed space after the original sound stops. Similar to yet different from echo, reverb is the indirect, diffuse sound of reflections from the walls and ceiling that accompany the direct sound. The characteristics of this indirect sound depends on the size of the room or space and the materials and furnishings in the room.

Effect Type	Rev	Cho	Ins	Description
REV-X HALL	✓	—	—	Reverb emulating the acoustics of a concert hall using the REV-X technology.
R3 HALL	✓	—	—	Reverb emulating the acoustics of a concert hall using the algorithm derived from the Yamaha ProR3.
SPX HALL	✓	✓	✓	Reverb emulating the acoustics of a concert hall derived from the Yamaha SPX1000.
REV-X ROOM	✓	—	—	Reverb emulating the acoustics of a room using the REV-X technology.
R3 ROOM	✓	—	—	Reverb emulating the acoustics of a room using the algorithm derived from the Yamaha ProR3.
SPX ROOM	✓	✓	✓	Reverb emulating the acoustics of a room derived from the Yamaha SPX1000.
R3 PLATE	✓	—	—	Reverb emulating a metal plate using the algorithm derived from the Yamaha ProR3.
SPX STAGE	✓	✓	✓	Reverb appropriate for a solo instrument derived from the Yamaha SPX1000.
SPACE SIMULATOR	✓	—	—	Reverb which lets you set the space size by specifying the width, height, and depth.

Delay

An effect (or device) that delays an audio signal for ambient or rhythmic effects.

Effect Type	Cho	Ins	Mas	Description
CROSS DELAY	✓	✓	—	The feedback of the two delayed sounds is crossed.
TEMPO CROSS DELAY	✓	✓	—	Cross delay synchronized with the tempo of Song/Pattern/Arpeggio.
TEMPO DELAY MONO	✓	✓	—	Mono delay synchronized with the tempo of Song/Pattern/Arpeggio.
TEMPO DELAY STEREO	✓	✓	—	Stereo delay synchronized with the tempo of Song/Pattern/Arpeggio.
CONTROL DELAY	—	✓	—	Delay with delay time controllable in real time
DELAY LR	✓	✓	—	Produces two delayed sounds: L and R.
DELAY LCR	✓	✓	—	Produces three delayed sounds: L, R and C (center).
DELAY LR (Stereo)	✓	✓	✓	Produces two delayed sounds in stereo: L and R.

Chorus

Depending on the particular chorus type and parameters, this can make a voice sound "larger," as if several identical instruments were playing in unison, or it can give a voice greater warmth and depth.

Effect Type	Cho	Ins	Description
G CHORUS	✓	✓	A Chorus Effect that produces a richer and more complex modulation than normal chorus.
2 MODULATOR	✓	✓	A Chorus Effect consisting of the pitch modulation and the amplitude modulation.
SPX CHORUS	✓	✓	An effect which uses a 3-phase LFO to add modulation and spaciousness to the sound.
SYMPHONIC	✓	✓	A multi-stage version of SPX CHORUS modulation.
ENSEMBLE DETUNE	✓	✓	Chorus effect without modulation, created by adding a slightly pitch-shifted sound.

Flanger

The flanger creates a swirling, metallic sound.

Effect Type	Cho	Ins	Description
VCM FLANGER	✓	✓	Flanger with VCM technology producing a vintage sound.
CLASSIC FLANGER	✓	✓	Conventional type of flanger.
TEMPO FLANGER	✓	✓	Tempo-synchronized flanger.
DYNAMIC FLANGER	—	✓	Dynamically controlled flanger.

Phaser

Cyclically modulates the phase to add modulation to the sound.

Effect Type	Cho	Ins	Description
VCM PHASER MONO	✓	✓	Mono phaser with VCM technology producing a vintage sound.
VCM PHASER STEREO	✓	✓	Stereo phaser with VCM technology producing a vintage sound.
TEMPO PHASER	✓	✓	Tempo-synchronized phaser.
DYNAMIC PHASER	—	✓	Dynamically controlled phase shifter.

Tremolo & Rotary

The Rotary Speaker effect simulates the characteristic vibrato effect of a rotary speaker.

Effect Type	Ins	Description
AUTO PAN	✓	An effect which cyclically moves the sound left/right and front/back.
TREMOLO	✓	An effect which cyclically modulates the volume.
ROTARY SPEAKER	✓	Simulation of a rotary speaker.

Distortion

This type can be used mainly for guitar, adding distortion with an edge to the sound.

Effect Type	Ins	Mas	Description
AMP SIMULATOR 1	✓	—	A simulation of a guitar amp.
AMP SIMULATOR 2	✓	—	A simulation of a guitar amp.
COMP DISTORTION	✓	—	Since a Compressor is included in the first stage, steady distortion can be produced regardless of changes in input level.
COMP DISTORTION DELAY	✓	✓	Compressor, Distortion and Delay are connected in series.

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- Functional Blocks
- Tone Generator
- A/D Input
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Compressor

Compressor is an effect commonly used to limit and compress the dynamics (softness/loudness) of an audio signal. When used with gain to boost the overall level, this creates a more powerful, more consistently high-level sound. Compression can be used to increase sustain for electric guitar, smooth out the volume of a vocal, or bring a drum kit or rhythm pattern further up-front in the mix.

Effect Type	Ins	Mas	Description
VCM COMPRESSOR 376	✓	✓	Compressor with VCM technology.
CLASSIC COMPRESSOR	✓	—	Conventional type of compressor.
MULTI BAND COMP	✓	✓	3-band type compressor.

Wah

This effect cyclically modulates the tone brightness (cutoff frequency of a filter). Auto Wah modulates the tone via LFO, Touch Wah modulates the tone via volume (note on velocity) and Pedal Wah modulates the tone the pedal control.

Effect Type	Ins	Description
VCM AUTO WAH	✓	Modulates the tone via the LFO.
VCM TOUCH WAH	✓	Modulates the tone via the volume (note on velocity).
VCM PEDAL WAH	✓	Modulates the tone via the pedal control. For best results, assign the Pedal Control parameter of this Effect type to the Foot Controller in the Controller Set display, then use the Foot Controller to control this effect in real time.

Lo-Fi

This effect intentionally degrades the audio quality of the input signal via several methods, including lowering of the sampling frequency.

Effect Type	Ins	Mas	Description
LO-FI	✓	✓	Degrades the audio quality of the input signal to get a lo-fi sound.
NOISY	✓	—	Adds the noise to the current sound.
DIGITAL TURNTABLE	✓	—	Simulates the noise of an analog record.

Tech

This effect radically changes the tonal characteristics by using a filter and modulation.

Effect Type	Ins	Mas	Description
RING MODULATOR	✓	✓	An effect that modifies the pitch by applying amplitude modulation to the frequency of the input.
DYNAMIC RING MODULATOR	✓	—	Dynamically controlled Ring Modulator
DYNAMIC FILTER	✓	✓	Dynamically controlled filter
AUTO SYNTH	✓	—	Processes the input signal into a synthesizer-type sound.
ISOLATOR	✓	✓	Controls the level of a specified frequency band of the input signal.
SLICE	✓	✓	Slices the AEG of the Voice sound.
TECH MODULATION	✓	—	Adds a unique feeling of modulation similar to ring modulation.

Vocoder

The Vocoder effect does not belong to any category.

Effect Type	Ins	Description
VOCODER	✓	This effect extracts characteristics from the microphone sound and applies it to the Voice played from the keyboard. This creates a distinctive, "robot voice" effect which is generated when you play the keyboard and sing or speak into the microphone at the same time.

Misc

This category includes effect types not included in the other categories.

Effect Type	Cho	Ins	Description
VCM EQ 501	—	✓	Vintage 5-band parametric EQ with VCM technology.
HARMONIC ENHANCER	—	✓	Adds new harmonics to the input signal to make the sound stand out.
TALKING MODULATOR	—	✓	Adds a vowel sound to the input signal.
DAMPER RESONANCE	—	✓	Simulates the resonance produced when the damper pedal of the piano is pressed.
PITCH CHANGE	—	✓	Changes the pitch of the input signal.
EARLY REFLECTION	✓	✓	This effect isolates only the early reflection components of the reverb.
NOISE GATE+COMP+EQ	—	✓	This effect combines Noise Gate, Compressor and 3-Band EQ, to provide optimum processing of the microphone input, especially vocals.

VCM (Virtual Circuitry Modeling)

VCM is a technology that enables you to model element levels in analog circuits (such as resistors and capacitors). Effect types using the VCM technology produce the uniquely warm characteristics of vintage processing gear.
This instrument features the following eight VCM Effect types.

VCM Compressor 376

This effect emulates the characteristics of analog compressors, which are used as a standard effect in recording studios. It frames and thickens the sound, and is suitable for drum and bass sounds.

VCM Equalizer 501

This effect emulates the characteristics of analog equalizers used in 1970s. It adds drive to the sound by reproducing distortion typical to analog circuits. This effect consists of two shelving filters and three peaking filters.

VCM Flanger

This effect emulates the characteristics of analog flanger used in the 1970s, recreating a warm, high-quality flanger effect.

VCM Phaser Mono, VCM Phaser Stereo

These effects emulate the characteristics of analog phasers used in the 1970s, recreating a warm, high-quality phaser effect.

VCM Auto Wah, VCM Touch Wah, VCM Pedal Wah

These effects emulate the characteristics of analog Wah used in the 1970s, recreating a warm, high-quality wah-wah effect.

REV-X

REV-X is a reverb algorithm developed by Yamaha. It provides high-density, richly reverberant sound quality, with smooth attenuation, spread and depth that work together to enhance the original sound. This instrument features two types of REV-X effects: REV-X Hall and REV-X Room.

Effect Parameters

Each of the Effect Types has parameters that determine how the Effect is applied to the sound. A variety of sounds can be obtained from a single effect type by setting these parameters.
For information about the Effect parameters, see below.

Preset settings for Effect parameters

Preset settings for parameters of each effect type are provided as templates and can be selected in the Effect Type selection display. To get a desired effect sound, try first selecting one of the Presets close to your imagined sound, then change the parameters as necessary.
To get a desired effect sound, try first selecting one of the Presets close to your imagined sound, then change the parameters as necessary. For details about the preset settings of each effect type, refer to the Data List (separate PDF documentation).

Effect parameters

Effect parameters making up the affect of the Effect Type are listed here in alphabetical order.

NOTE   Each name of the parameters listed below is indicated with its full or complete spelling, although it is indicated with the abbreviated spelling on the LCD. The discrepancy in the name may make it difficult to find the desired parameter. In such a case, confirm the parameters belonging to the Effect Type you want to edit by referring to the Effect Parameter List in the Data List (separate PDF documentation).

NOTE   Some parameters below may appear in different effect types with the same name, but actually have different functions depending on the particular effect type. For these parameters, two or three types of explanations are given. The Effect type corresponding to each explanation is described at the top of the sentences.

Parameter name	Descriptions
AEG Phase	Offsets the phase of the AEG.
AM Depth	Determines the depth of the amplitude modulation.
AM Inverse R	Determines the phase of the amplitude modulation for the R channel.
AM Speed	Determines the amplitude modulation speed.
AM Wave	Selects the wave for modulating the amplitude.
AMP Type	Selects the amplifier type to be simulated.
Analog Feel	Adds the characteristics of an analog flanger to the sound.
Attack	Determines the amount of time that elapses between the playing of a key and the start of the compressor effect.
Attack Offset	Determines the amount of time that elapses between the playing of a key and the start of the wah effect.
Attack Time	Determines the attack time of the envelope follower.
Bit Assign	Determines how the Word Length is applied to the sound.
Bottom[*1]	Determines the minimum value of the wah filter.
Click Density	Determines the frequency at which the click sounds.
Click Level	Determines the click level.
Color[*2]	Determines the fixed phase modulation.
Common Release	This is a parameter of "Multi Band Comp." This parameter determines the amount of time that elapses between the releasing of a note and the end of the effect.
Compress	Determines the minimum input level at which the compressor effect is applied.
Control Type	This is a parameter of "Control Delay." When set to "Normal," the delay effect is always applied to the sound. When set to "Scratch," the delay effect is not applied if both the Delay Time and Delay Time Offset are set to "0."
Damper Control	When the half-damper compatible FC3 footswitch is connected to the SUSTAIN jack, the Damper Control parameter is controlled by the FC3 over a range of 0 – 127, allowing for partial damper effects, such as is available on an actual grand piano.
Decay	Controls how the reverb sound decays.
Delay Level C	Determines the level of the delayed sound for the center channel.
Delay Mix	Determines the level of the delayed mixed sound when multiple effects are applied.
Delay Offset	Determines the offset value of the delay modulation.
Delay Time	Determines the delay of the sound in note value or absolute time.
Delay Time C, L, R	Determines the delay time for each channel: center, left and right.
Delay Time L>R	Determines the amount of time between the moment the sound is input from the L channel and the moment the sound is output to the R channel.
Delay Time Ofst R	Determines the delay time for the R channel as offset.
Delay Time R>L	Determines the amount of time between the moment the sound is input from the R channel and the moment the sound is output to the L channel.
Delay Transition Rate	Determines the speed (rate) at which the delay time is changed from the current value to the specified new value.
Density	Determines the density of the reverberations or reflections.
Depth	When "Space Simulator" is selected, this parameter determines the depth of the simulated room.
	When "VCM Flanger" is selected, this parameter determines the amplitude of the LFO wave which controls the cyclic change of the delay modulation.
	When "Phaser Type" is selected, this parameter determines the amplitude of the LFO wave which controls the cyclic change of the phase modulation.
Detune	Determines the amount of pitch to be detuned.
Device	Selects the device for changing how to distort the sound.
Diffusion	Determines the spread of the selected effect.
Direction	Determines the direction of the modulation controlled by the envelope follower.
Divide Freq High	Determines the high frequency for dividing the entire sound into three bands.
Divide Freq Low	Determines the low frequency for dividing the entire sound into three bands.
Divide Min Level	Determines the minimum level of the portions extracted via the slice effect.
Divide Type	Determines how the sound (wave) is sliced by the note length.
Drive	When one of the distortion, noisy and slice effects is selected, this parameter determines the extent to which the sound is distorted.
	When one of the misc effects is selected, this parameter determines the extent to which the enhancer is applied.
Drive Horn	Determines the depth of the modulation generated via the rotation of the horn.

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Drive Rotor	Determines the depth of the modulation generated via the rotation of the rotor.
Dry Level	Determines the level of the dry sound (to which the effect is not applied).
Dry LPF Cutoff Frequency	Determines the cutoff frequency of the low pass filter applied to the dry sound.
Dry Mix Level	Determines the level of the dry sound (to which the effect is not applied).
Dry Send to Noise	Determines the level of the dry signal sent to the noise effect.
Dry/Wet Balance	Determines the balance of the dry sound and effect sound.
Dyna Level Offset	Determines the offset value added to the output from the envelope follower.
Dyna Threshold Level	Determines the minimum level at which the envelope follower starts.
Edge	Sets the curve that determines how the sound is distorted.
Emphasis	Determines the change of the characteristics in high frequencies.
EQ Frequency	Determines the center frequency for each band of the EQ.
EQ Gain	Determines the level gain of the EQ center frequency for each band.
EQ High Frequency	Determines the center frequency of the high EQ band that is attenuated/boosted.
EQ High Gain	Determines the amount of boost or attenuation applied to the high EQ band.
EQ Low Frequency	Determines the center frequency of the low EQ band that is attenuated/boosted.
EQ Low Gain	Determines the amount of boost or attenuation applied to the low EQ band.
EQ Mid Frequency	Determines the center frequency of the middle EQ band that is attenuated/boosted.
EQ Mid Gain	Determines the amount of boost or attenuation applied to the middle EQ band.
EQ Mid Width	Determines the width of the middle EQ band.
EQ Width	Determines the width of the EQ band.
ER/Rev Balance	Determines the level balance of the early reflection and reverb sound.
F/R Depth	This parameter of "Auto Pan" (available when PAN Direction is set to "L turn" and "R turn") determines the depth of the F/R (front/rear) pan.
FB Hi Damp Ofst R	Determines the amount of decay in high frequencies for the R channel as offset.
FB Level Ofst R	Determines the feedback level for the R channel as offset.
Feedback	Determines the level of the sound signal output from the effect block and returned to its own input.
Feedback High Damp	Determines how the high frequencies of the feedback sound decay.
Feedback Level	When one of the reverb and early reflection effects is selected, this parameter determines the feedback level of the initial delay.
	When one of the delay, chorus, flanger, comp distortion delay, and TEC effects is selected, this parameter determines the feedback level output from the delay and returned to the input.
	When "Tempo Phaser" or "Dynamic Phaser" is selected, this parameter determines the feedback level output from the phaser and returned to the input.
Feedback Level 1, 2	Determines the feedback level of the delayed sound in each of the 1st and 2nd series.
Feedback Time	Determines the delay time of the feedback.
Feedback Time 1, 2, L, R	Determines the time of the feedback delay 1, 2, L and R.
Filter Type	When "Lo-Fi" is selected, this parameter selects the tonal characteristic type.
	When "Dynamic Filter" is selected, this parameter determines the filter type.
Fine 1, 2	Determines the pitch finely for each of the 1st series and 2nd series.
Gate Time	Determines the gate time of the sliced portion.
Height	Determines the height of the simulated room.
Hi Resonance	Adjusts the resonance of the high frequencies.
High Attack	Determines the amount of time from the moment a note is pressed to the moment the compressor is applied to the high frequencies.
High Gain	Determines the output gain for the high frequencies.
High Level	Determines the level of the high frequencies.
High Mute	Switches the mute status of the high frequencies.
High Ratio	When "REV-X Hall" or "REV-X Room" is selected, this parameter determines the ratio of the high frequencies.
	When "Multi Band Comp" is selected, this parameter determines the ratio of the compressor for the high frequencies.
High Threshold	Determines the minimum input level at which the effect is applied to the high frequencies.
Horn Speed Fast	Determines the speed of the horn when the slow/fast switch is set to "fast."
Horn Speed Slow	Determines the speed of the horn when the slow/fast switch is set to "slow."
Initial Delay	Determines the amount of time that elapses between the direct, original sound and the initial reflections.
Initial Delay 1, 2	Determines the delay time until the initial reflection for each of the 1st series and 2nd series.
Initial Delay Lch, Rch	Determines the amount of time that elapses between the direct, original sound and the initial reflections (echoes) that follow it for each of R and L channels.
Input Level	Determines the input level of the signal to which the compressor is applied.
Input Mode	Selects mono or stereo configuration for the input sound.
Input Select	Selects an input channel.
L/R Depth	Determines the depth of the L/R pan effect.
L/R Diffusion	Determines the spread of the sound.
Lag	Determines the lagging time additionally applied to the delayed sound specified via a note length.
LFO Depth	When one of "SPX Chorus," "Symphonic," "Classic Flanger," and "Ring Modulator" is selected, this parameter determines the depth of the modulation.
	When "Tempo Phaser" is selected, this parameter determines the frequency of the phase modulation.

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Parameter name	Descriptions
LFO Phase Difference	Determines the L/R phase difference of the modulated wave.
LFO Phase Reset	Determines how to reset the initial phase of the LFO.
LFO Speed	When any of the chorus effects, flanger effects, tremolo and ring modulator is selected, this parameter determines the frequency of the modulation.
	When "Tempo Phaser" or "Tempo Franger" is selected, this parameter determines the modulation speed via a note type.
	When "Auto Pan" is selected, this parameter determines the frequency of the Auto Pan.
LFO Wave	When any of the flanger effects and "Ring Modulator," this parameter selects the wave for modulation.
	When "Auto Pan" is selected, this parameter determines the panning curve.
	When "VCM Auto Wah" is selected, this parameter selects the wave, sine or square.
Liveness	Determines the decay characteristic of Early Reflection.
Low Attack	Determines the amount of time from the moment a note is pressed to the moment the compressor is applied to the low frequencies.
Low Gain	Determines the output gain for the low frequencies.
Low Level	Determines the output level for the low frequencies.
Low Mute	Determines whether the low frequency band is off or on.
Low Ratio	When "REV-X Hall" or "REV-X Room" is selected, this parameter determines the ratio of the low frequencies.
	When "Multi Band Comp" is selected, this parameter determines the ratio of the compressor for the low frequencies.
Low Threshold	Determines the minimum input level at which the effect is applied to the low frequencies.
LPF Resonance	Determines the resonance of the low pass filter for the input sound.
Manual	When "VCM Flanger" is selected, this parameter determines the offset value of the delay modulation.
	When "VCM Phaser mono" or "VCM Phaser stereo" is selected, this parameter determines the offset value of the phase modulation.
Meter	Changes the meter.
Mic L-R Angle	Determines the L/R angle of the microphone.
Mid Attack	Determines the amount of time from the moment a note is pressed to the moment the compressor is applied to the mid frequencies.
Mid Gain	Determines the output gain for the mid frequencies.
Mid Level	Determines the output level for the mid frequencies.
Mid Mute	Switches the mute status of the mid frequencies.
Mid Ratio	Determines the ratio of the compressor for the mid frequencies.
Mid Threshold	Determines the minimum input level at which the effect is applied for the mid frequencies.
Mix	Determines the volume of the effect sound.
Mix Level	Determines the level of the effect sound mixed to the dry sound.
Mod Depth	Determines the depth of the modulation.
Mod Depth Ofst R	Determines the depth of the modulation for R channel as offset.
Mod Feedback	Determines the feedback level to the modulation.
Mod Gain	Determines the gain of the modulation.
Mod LPF Cutoff Frequency	Determines the cutoff frequency of the low pass filter applied to the modulated sound.
Mod LPF Resonance	Determines the resonance of the low pass filter for the modulated sound.
Mod Mix Balance	When "Noisy" is selected, this parameter determines the mix level of the modulated element.
	When "Tech Modulation" is selected, this parameter determines the volume of the modulated sound.
Mod Speed	Determines the modulation speed.
Mod Wave Type	Selects the wave type for modulation.
Mode	Determines the phaser type, or more specifically, the factor for forming the phaser effect.
Modulation Phase	Determines the L/R phase difference of the modulated wave.
Move Speed	Determines how long it takes to move the sound from the current status to the sound specified via the Vowel parameter.
Noise Level	Determines the noise level.
Noise LPF Cutoff Frequency	Determines the cutoff frequency of the low pass filter applied to the noise.
Noise LPF Q	Determines the resonance of the low pass filter applied to the noise.
Noise Mod Depth	Determines the depth of the noise modulation.
Noise Mod Speed	Determines the speed of the noise modulation.
Noise Tone	Determines the characteristics of the noise.
On/Off Switch	Turns the isolator on or off.
OSC Frequency Coarse	Determines the frequency at which the sine wave modulates the amplitude of the input wave.
OSC Frequency Fine	Determines the frequency finely at which the sine wave modulates the amplitude of the input wave.
Output	Determines the level of the signal output from the effect block.
Output Gain	Determines the gain of the signal output from the effect block.
Output Level	Determines the level of the signal output from the effect block.
Output Level 1, 2	Determines the level of the signal output from the 1st block and 2nd block respectively.
Over Drive	Determines the degree and character of the distortion effect.
Pan 1, 2	Determines the pan for each of the 1st series and 2nd series.
Pan AEG Min Level	This parameter of the Slice effect determines the minimum level of the AEG applied to the panned sound.

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Parameter name	Descriptions
Pan AEG Type	This parameter of the Slice effect determines the type of the AEG applied to the panned sound.
Pan Depth	Determines the depth of the pan effect.
Pan Direction	Determines the direction toward which the stereo pan position of the sound moves.
Pan Type	Determines the pan type.
Pedal Control	When "VCM Pedal Wah" is selected, this parameter determines the cutoff frequency of the wah filter. For best results, assign the this parameter to the Foot Controller in the Controller Set display, then use the Foot Controller to control this parameter.
Pedal Response	Determines how the sound responds to the change of the damper control.
Phase Shift Offset	Determines the offset value of the phase modulation.
Pitch 1, 2	Determines the pitch in semitones for each of the 1st series and 2nd series.
PM Depth	Determines the depth of the pitch modulation.
Pre Mod HPF Cutoff Frequency	Determines the Cutoff frequency of the High Pass Filter before the modulation.
Pre-LPF Cutoff Frequency	Determines the Cutoff frequency of the Low Pass Filter before the modulation.
Pre-LPF Resonance	Determines the Resonance of the Low Pass Filter for the input sound.
Presence	This parameter of the guitar amp effect controls high frequencies.
Ratio	Determines the ratio of the compressor.
Release	Determines the amount of time that elapses between the releasing of a key and the end of the compressor effect.
Release Curve	Determines the release curve of the envelope follower.
Release Time	Determines the release time of the envelope follower.
Resonance	Determines the resonance of the filter.
Resonance Offset	Determines the resonance as offset.
Reverb Delay	Determines the delay time from the early reflections until the reverberations.
Reverb Time	Determines the reverb time.
Room Size	Determines the size of the room in which the instrument sounds.
Rotor Speed Fast	Determines the speed of the rotor when the slow/fast switch is set to "fast."
Rotor Speed Slow	Determines the speed of the rotor when the slow/fast switch is set to "slow."
Rotor/Horn Balance	Determines the volume balance of the horn and rotor.
Sampling Freq. Control	Controls the sampling frequency.
Sensitivity	When one of "Dynamic Flanger," "Dynamic Phaser," and the TEC effects is selected, this parameter determines the sensitivity of the modulation applied to the input change.
	When one of the VCM Touch Wah effects is selected, this parameter determines the sensitivity of the wah filter's change applied to the input change.
Slow-Fast Time of Horn	Determines how long it takes for the rotation speed of the horn to change from the current speed (slow or fast) to the other one (fast or slow) when the rotation speed is switched.
Slow-Fast Time of Rotor	Determines how long it takes for the rotation speed of the rotor to change from the current speed (slow or fast) to the other one (fast or slow) when the rotation speed is switched.
Space Type	Selects the type of space simulation.
Speaker Type	Selects the type of speaker simulation.
Speed	When "VCM Flanger" is selected, this parameter determines the frequency of the LFO wave which controls the cyclic change of the delay modulation.
	When any of the phaser types is selected, this parameter determines the frequency of the LFO wave which controls the cyclic change of the phase modulation.
	When "VCM Auto Wah" is selected, this parameter determines the speed of the LFO.
Speed Control	Switches the rotary speed.
Spread	Determines the spread of the sound.
Stage	Determines the step number of the phase shifter.
Threshold	Determines the minimum input level at which the effect is applied.
Top [*3]	Determines the maximum value of the wah filter.
Type	When "VCM Flanger" is selected, this parameter determines the flanger type.
	When any of the wah effects is selected, this parameter determines the type of the Auto Wah.
	When "Early Reflection" is selected, this parameter determines the type of the reflection sound.
Vowel	Selects a vowel type.
Wall Vary	Determines the wall status of the simulated room. Higher settings produces more diffuse reflections.
Width	Determines the width of the simulated room.
Word Length	Determines the degree of sound roughness.

*1: The Bottom parameter is available only when the value is less than that of the Top parameter.
*2: The Color parameter may not be effective depending on the values of the Mode and Stage parameters.
*3: The Top parameter is available only when the value is more than that of the Bottom parameter.

Internal Memory

As you use this instrument, you will create many different kinds of data, including Voices, Performances, and Multis. This section describes how to maintain the various types of data and use the memory devices/media for storing them.

Internal memory of the S90 XS/S70 XS
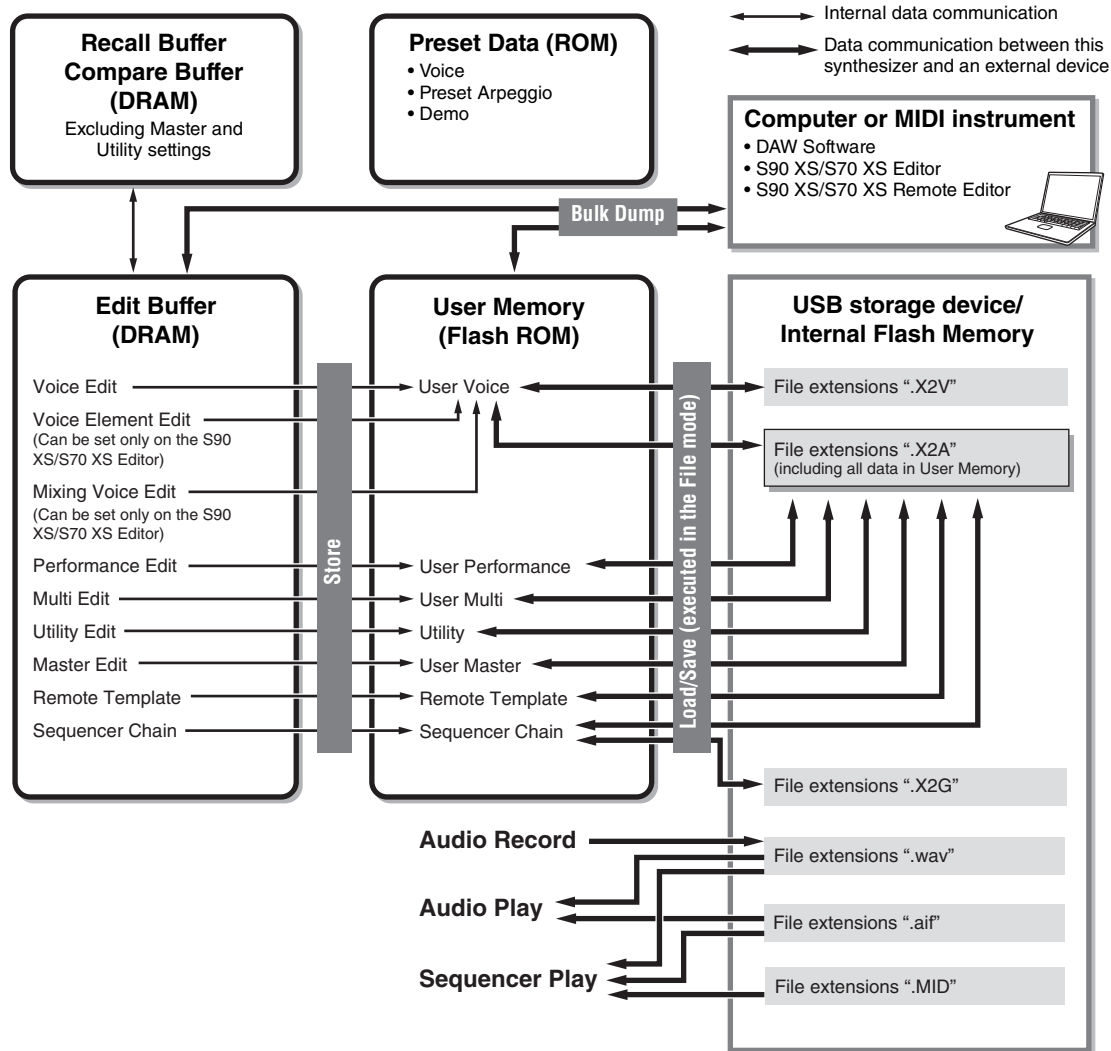
In the Audio Record/Play mode and Sequence Play mode, this type of memory will be accessed directly by using the functions of these modes.

Flash ROM

ROM (Read Only Memory) is memory designed specifically for reading out data, and as such data cannot be written to it. Unlike conventional ROM, Flash ROM can be overwritten—allowing you to store your own original data. The contents of Flash ROM are maintained even when the power is turned off.

DRAM

RAM (Random Access Memory) is memory designed specifically for data writing and data reading operations. There are two different kinds of RAM, depending on the condition for storing the data: SRAM (Static RAM) and DRAM (Dynamic RAM). This instrument is equipped with only DRAM. Because data contained in DRAM is lost when the power is turned off, you should always save any data residing in DRAM to a USB storage device or internal flash memory in the File mode before turning off the power.

Edit Buffer and User Memory

The edit buffer is the memory location for edited data of these types: Voice, Performance, Master, and Multi. Data edited in this location will be stored to the User Memory.
If you select another Voice, Performance, Master, or Multi, the entire contents of the edit buffer will be rewritten with the newly selected Voice/Performance/Master/Multi data. Make sure to store any important data before selecting another Voice, etc.

Edit Buffer and Recall Buffer

If you've selected another Voice/Performance/Multi without storing the one you were editing, you can recall your original edits, since the edit buffer's contents are stored in backup memory.

NOTE   Keep in mind that the recall buffer is not available in the Master Edit mode.

Internal Flash Memory

In addition to the above memory types, this instrument also features the internal flash memory which can be used like an external USB storage device. The internal flash memory can be used as destination of the files handled in the File mode and audio data created in the Audio Record/Play mode (). This memory also can be used as destination of data backup because the data saved here is maintained even when turning the power off.

NOTE   The capacity of the internal flash memory is 192MB.

⚠ **CAUTION**

Executing the Factory Set will format the internal flash memory. Make sure to save any important data to a USB storage device before executing the Factory Set.

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This section covers in detail all of the parameters and settings available on the S90 XS/S70 XS and S90 XS/S70 XS Editor. In Element Edit and some parameters in Common Edit, you can edit the parameters only on the S90 XS/S70 XS Editor. When the editing is synchronized between the S90 XS/S70 XS Editor and the S90 XS/S70 XS instrument, editing a parameter on the S90 XS/S70 XS Editor affects the same parameter on the S90 XS/S70 XS instrument and vice versa. In other words, any editing you do on either the software Editor or the hardware is automatically reflected on both. This provides a smooth, seamless interface, and makes it very easy to create and edit your data. For details about how to synchronize data between the two, refer to the owner's manual of the S90 XS/S70 XS Editor.

About EDITOR (EDITOR) marks

In the Reference section, the parameters that are available only on the S90 XS/S70 XS Editor are marked with EDITOR marks.

How to use the Edit display

① ② ③ ④

```
MULTI  PART  ▼PlayMode 1/4  P1
Volume                      100
Pan                           C
Voice Elm Pan                on
Assign 1 Value               +0
Assign 2 Value               +0
```

⑤
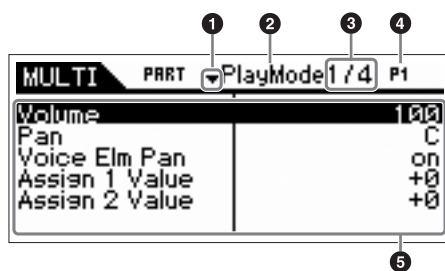
① These marks mean that up (▲) or down (▼) additional hidden pages. The next or previous page is displayed by pressing the Cursor [▲]/[▼] buttons to move the cursor in the display.

② This indicates the name of the Edit display that is currently selected for your edit operations.

③ This number means the currently displayed page number of the selected Edit display. For example, the symbol "2/4" indicates that the currently selected Edit display has four pages, and the second page is displayed.

④ This indicates the currently selected Part in the Performance/Multi mode. You can change the part with the [PART SELECT] buttons in the Performance mode. You can select the part by pressing the [PART] button (the lamp lights) then pressing the desired Number button in the Multi mode.

⑤ The currently editable parameters are displayed. You can select the desired parameter for editing by using the Cursor [▲]/[▼]/[◄]/[►] buttons and change the settings with the Data Dial.

Voice Mode

Voice Play

The Voice mode is used for selecting, playing, and editing a desired Voice. The Voice Play mode is the main "portal" by which you enter the Voice mode, and it is here where you select and play a Voice. Some of the Voice settings can also be edited in this mode.

Operation	Press the [VOICE] button.

Voice Play display

Selecting a preset Voice

This synthesizer has Voices in each of 16 Banks: Preset 1 – 8, User 1 – 4, GM, Preset Drum, User Drum, and GM Drum. The Bank consists of eight Groups (A to H), each of which contains 16 Voices. To select the desired Voice, select the Bank, Group, then Number.
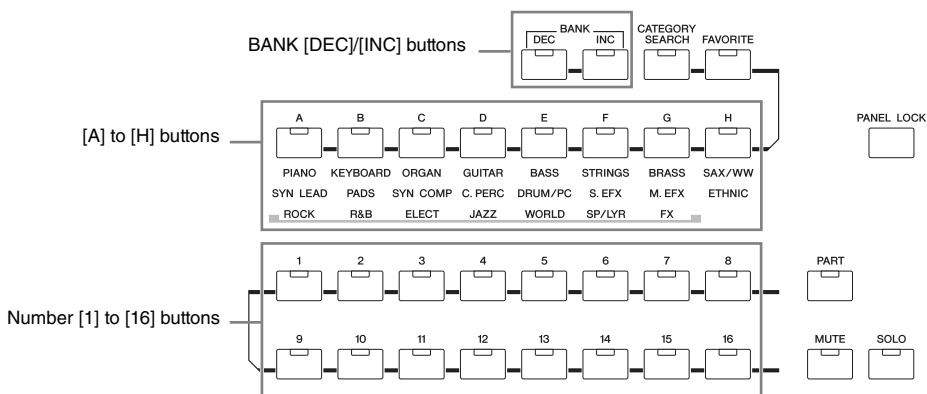
1 Press the [VOICE] button.
This calls up the Voice Play display. (The [VOICE] button lamp lights.)

2 Select a Voice Bank with the BANK [DEC]/[INC] buttons.
In this condition, playing the keyboard sounds the Voice indicated in the display.

3 Select a Group.
Press one of the [A] to [H] buttons to select a Voice. If you've selected a Preset/User Drum Bank in the previous step, press one of the [A] to [D] (Preset) or [A] to [B] (User) buttons to select a Group. Note that the GM Drum Bank contains only one Drum Voice, indicating that you cannot select a Group.

4 Select a Voice.
Press one of the Number [1] to [16] buttons to select a Voice.

In this way (steps 2 – 4), you can call up your desired Voice.

NOTE: When selecting the Voice within the same Bank or Group, it is not necessary to select the Bank or Group again. You can use the [DEC] and [INC] buttons or Data Dial to select the Voice number. This operation lets you call up Voices in subsequent or previous Groups and Banks.
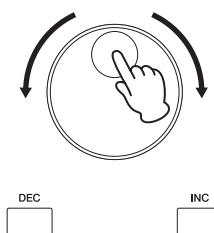
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Voice

Play
Normal Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
      Arp Edit
      Arp 1-5 Type
    Controller
    LFO
    Filter/EG
    3 Band EQ
    Effect
  Element Edit
    OSC
    Tune
    PEG
    Filter Type
    FEG
    Filter Scale
    AMP Level/Pan
    AEG
    AMP Scale
    LFO
    EQ
Drum Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
    Controller
    Filter/EG
    3 Band EQ
    Effect
  Key Edit
    OSC
    Tune
    Filter Type
    AMP Level/Pan
    AEG
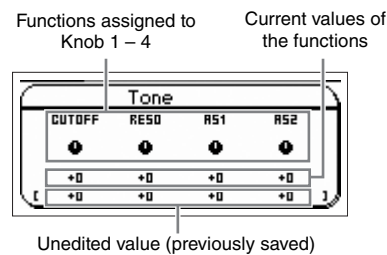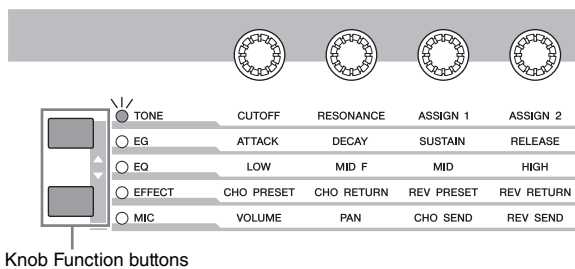   EQ
Job
  Recall
  Bulk
Supplementary Info.

Appendix

Using the Category Search function

The Voices are conveniently divided into certain Categories, irrespective of their bank locations. The categories are divided based on the general instrument type or sound characteristics. The Category Search function gives you quick access to the sounds you want.

1 **Press the [CATEGORY SEARCH] button in the Voice Play Mode.**
The Category Search dialog appears.

2 **Turn the Data Dial to select the Main Category.**

3 **Move the cursor position to "Sub" (Sub Category) with the Cursor [▼] button, and turn the Data Dial to select the Sub Category.**

4 **Press the [ENTER] button, or Cursor [▶] button to actually call up the Category.**
The Voice List of the selected category is shown.

5 **Select a Voice via the Cursor [▲]/[▼] buttons, [DEC]/[INC] buttons, or Data Dial.**
If you want to change the Category, press the Cursor [◀] button or [EXIT] button and go back to step 2.

6 **Press the [ENTER] button to actually call up the Voice.**
This closes the Category Search dialog.

Main Category
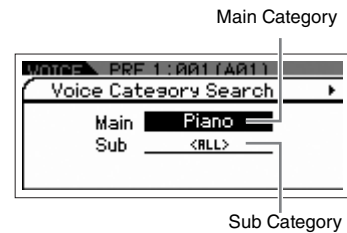
Sub Category

Currently selected Main Category and Sub Category

Voice list of currently selected category.

Grouping your most-used Voices together—Favorite Category

Category Search also has a convenient Favorite Category that lets you bring together your most often used and favorite Voices for easy selection. This is one more useful way you can quickly select the Voices you need from the huge number available on the instrument.

Registering your favorite Voices to the Favorite Category

1 **Perform steps 1 through 4 of the "Using the Category Search Function" on page 28 to call up the Voice List of the selected Category.**

2 **Press the Cursor [▶] button to move the cursor position to the Favorite check box column.**

3 **Press the Cursor [▲]/[▼] buttons, [DEC]/[INC] buttons, or turn the Data Dial to select the favorite Voice.**

4 **Press the [ENTER] button to place a check in the Favorite check box.**
The checkmark will be put to the box, and the selected Voice will be registered to the Favorite Category. To remove the checkmark from the box, press the [ENTER] button or again.
To register other Voices, repeat steps 3 through 4.

> **NOTE** The Favorite Category is automatically stored immediately after checking the box.

Favorite check box column

5 **When you complete registering Voices to the Favorite Category, press the [VOICE] button to return to the Voice Play display.**
The Voice selected in the Category Search dialog is shown.
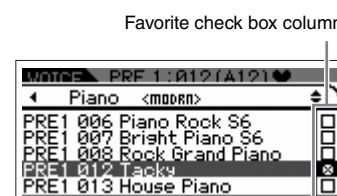
To register/remove the current Voice to/from the Favorite Category, simply hold the [SHIFT] button then press the [FAVORITE] button.

Selecting a Voice from the Favorite Category

1 **Press the [FAVORITE] button in the Voice Play mode.**
The list of Voices registered to the Favorite Category will be shown.

2 **Select a Voice via the Cursor [▲]/[▼] buttons, [DEC]/[INC] buttons, or Data Dial.**

3 **Press the [ENTER] button to actually call up the Voice.**

Using Knobs and Sliders

These let you adjust a variety of parameters for the current Voice, such as effect depth, attack/release characteristics, tonal color, and others. Five functions can be assigned to each knob, alternatively selected via the Knob Function buttons. Each time the button is pressed, the lamp lights alternatively in descending order, TONE | EG | EQ | EFFECT | MIC.

Functions assigned to Knobs

Knob Function buttons

Functions assigned to Knob 1 – 4

Current values of the functions

Unedited value (previously saved)

When the TONE lamp is turned on:		
Knob 1	CUTOFF	Raises or lowers the Filter Cutoff Frequency to adjust the tone brilliance.
Knob 2	RESONANCE	Raises or lowers the Resonance to boost the level of the signal in the area of the cutoff frequency. By emphasizing the overtones in this area, this can produce a distinctive "peaky" tone, making the sound brighter and harder.
Knob 3	ASSIGN 1	A variety of functions can be assigned to these Knobs. To check which functions are currently assigned to the Knobs, call up the Knob Popup display by operating the Knob. The Controller display in the Voice Common Edit mode lets you assign the functions to these Knobs.
Knob 4	ASSIGN 2	

When the EG lamp is turned on:		
Knob 1	ATTACK	Increases or decreases the EG Attack Time of the current Voice. The smaller the value, the faster the attack.
Knob	DECAY (Decay Time)	Increases or decreases the AEG Decay Time of the current Voice, controlling how fast the volume falls from maximum attack level to the sustain level. The smaller the value, the faster the decay.
Knob 3	SUSTAIN	Increases or decreases the EG Sustain Level at which the volume will continue while a key is held, after the initial attack and decay. Turn the knob counter-clockwise to make the sound cut off more sharply after the decay.
Knob 4	RELEASE	Increases or decreases the EG Release Time of the sound to determine how fast the volume falls from the sustain level to zero when a key is released. The lower the value, the faster the release.

When the EQ lamp is turned on:		
Knob 1	LOW (Low Gain)	Increases or decreases the EQ Low Gain to change the sound.
Knob 2	MID F (Middle Frequency)	Increases or decreases the EQ Middle Frequency around which the band is adjusted via Knob 3 (MID).
Knob 3	MID (Middle Gain)	Increases or decreases the EQ Middle Gain to change the sound.
Knob 4	HIGH (High Gain)	Increases or decreases the EQ High Gain to change the sound.

When the EFFECT lamp is turned on:		
Knob 1	CHO PRESET (Chorus Preset)	Switches the Chorus preset. Changing the preset allows you to simultaneously set a variety of important related parameters.
Knob 2	CHO RETURN (Chorus Return)	Adjusts the Chorus Return Level
Knob 3	REV PRESET (Reverb Preset)	Switches the Reverb Preset. Changing the preset allows you to simultaneously set a variety of important related parameters.
Knob 4	REV RETURN (Reverb Return)	Adjusts the Reverb Return Level

| When the MIC lamp is turned on:		
Knob 1	VOLUME	Adjusts the volume of the signals that are input from the rear panel MIC INPUT jack
Knob 2	PAN	Adjusts the panning of the signals that are input from the rear panel MIC INPUT jack
Knob 3	CHO SEND (Chorus Send)	Adjusts the Chorus Send Level
Knob 4	REV SEND (Reverb Send)	Adjusts the Reverb Send Level

Function assigned to Sliders

Four functions can be assigned to each Slider, alternatively selected via the Slider Function button. Each time the button is pressed, the lamp lights alternatively in descending order, VOLUME | PAN | CHO SEND | REV SEND.

Current value   Function of currently operated Slider

Unedited value (previously saved)
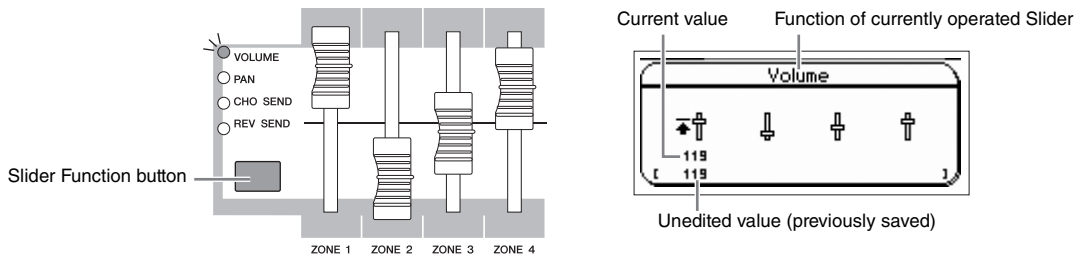
The Slider 1 is only available in the Voice mode. The four sliders let you adjust the parameters of the Play Mode display in the Voice Edit mode.

VOLUME	Adjusts the level of the Voice
PAN	Adjusts the stereo pan position of the current Voice.
CHO SEND (Chorus Send)	Adjusts the Chorus Send Level
REV SEND (Reverb Send)	Adjusts the Reverb Send Level

NOTE: When all the lamps are turned off by pressing the Slider Function button a few times in the Voice Edit mode, you can adjust Element levels 1 – 4 by using the Sliders 1 – 4.

The Edit (◳) indicator

When changing the value of the parameter in the Voice Play or Edit mode, the Edit (◳) Indicator will appear on the top right corner of the LCD display. This gives a quick confirmation that the current Voice has been modified but not yet stored. To store the current edited status, press the [STORE] button to store the edited Voice.

Storing the created Voice

1 Press the [STORE] button to call up the Voice Store display.

2 Set the destination for storing the Voice.

Select a Voice Bank and Number as destination by using the Data Dial, [DEC] and [INC] buttons. You can use the [A] – [H] buttons and [1] – [16] buttons to select a Voice number.

NOTE When this display is shown, you can hear the original sound at the destination by pressing the [EDIT] button to call up the Compare mode. Pressing the [EDIT] button again will exit from the Compare mode.

3 Press the [ENTER] button. (The display prompts you for confirmation.)

To cancel the Store operation, press the [EXIT] button.

4 Press the [ENTER] button to execute the Store operation.

After the Voice has been stored, a "Completed" message appears and operation returns to the Voice Play display.

⚠ **CAUTION**

When you execute the Store operation, the settings for the destination memory will be overwritten. Important data should always be saved to the internal flash memory or a USB storage device connected to the USB TO DEVICE terminal. For detailed instructions on saving, see .

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

- Play
- Normal Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Controller
    - LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Element Edit
    - OSC
    - Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
      Play Mode
      Arpeggio
      Controller
      Filter/EG
      3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
    - AEG
    - EQ
- Job
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Appendix

Keyboard MIDI transmit channel setting

You can set the MIDI transmit channel over which the keyboard/controller performance sends MIDI data (to an external sequencer, tone generator, or other device).
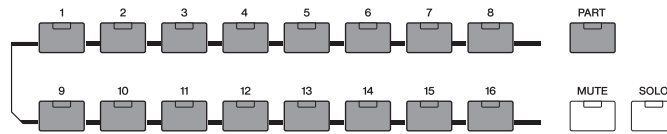
1 Press the [PART] button.
The [PART] button lights.

2 Press one of the Number [1] – [16] buttons to determine the MIDI transmit channel.

**3 After setting, press the [PART] button to return to the original status.**
The lamp of [PART] button goes off.

NOTE: This parameter is same as the Keyboard Transmit Channel (page 137) in the MIDI display of the Utility mode. Making a setting here automatically changes the setting of that parameter as well.

Keyboard Octave/Transpose Setting

To shift the pitch range in playing the keyboard, use the OCTAVE [-]/[+] buttons and TRANSPOSE [-]/[+] buttons.
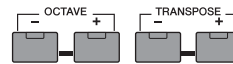
The OCTAVE [-]/[+] button lets you shift the pitch of the keyboard in octave and by up to three octaves. For example, you may want to shift the pitch down lower to get extra bass notes, or shift up to get higher notes for leads and solos. The OCTAVE [-]/[+] controls let you do this quickly and easily. The range is from -3 to +3, with 0 being standard pitch. Pressing the [-] and the [+] buttons together at the same time will return the setting to the initial value (0). The current octave range can be confirmed via the status of the LED lamp of the OCTAVE [-]/[+] buttons. When set to one octave down or up, the corresponding lamp lights. When set to two octaves down or up, the corresponding lamp flashes slowly. When set to three octaves down or up, the corresponding lamp flashes quickly.

The TRANSPOSE [-]/[+] button lets you shift the pitch of the keyboard in semitones (up to 11 semitones). This function allows you to play the same position even if the song data or another instrument player transposes the pitch. The Transpose Up/Down controls let you do this quickly and easily. Pressing the [-] and the [+] buttons together at the same time will return the setting to the initial value (0). When set to one semitone down or up, the corresponding lamp lights.

NOTE: This parameter is same as the Keyboard Octave and Keyboard Transpose (page 133) in the MIDI display of the Utility mode. Making a setting here automatically changes the setting of that parameter as well.

Using the Arpeggio Function

The Arpeggio function lets you trigger rhythm patterns, riffs and phrases using the current Voice by simply playing notes on the keyboard.

Arpeggio types

This instrument features 6,779 Arpeggio types (in 18 categories) including Synthesizer, Piano, Guitar, Bass, Strings, Drum, etc.

Turning the Arpeggio On/Off

To turning Arpeggio playback on or off, press the [ARP ON/OFF] button on the panel.
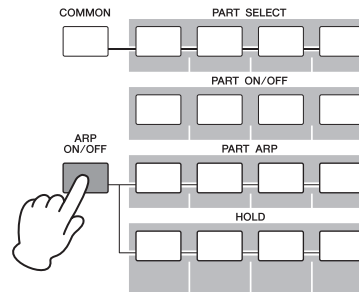
Selecting the drum pattern (Arpeggio Type)

1 Press the [EDIT] button in the Voice mode.

2 Select "Arpeggio" by using the Cursor button then press the [ENTER] button.

3 Select "Arp Select," and select the desired Arp 1 – 5 by using the Data Dial.
When selecting the "ARP SELECT" via the Arpeggio/Effect Function button, you can select the Arp 1 to 5 via the Function buttons.

4 Select "Arp 1 – 5 Type," then press [ENTER] button.

5 Select the desired pattern in changing the Main Category/Sub Category/Type by the Data Dial.

6 Store the Arpeggio Pattern by pressing the [STORE] button.

Selecting the Arpeggio 1 – 5

To change the Arpeggio from five types, use the Arpeggio/Effect Function button and Function buttons.

Arpeggio/Effect Function button
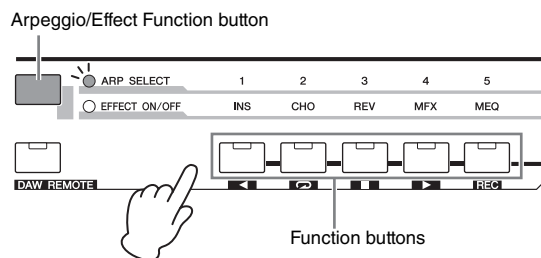
Function buttons

1 To turn the Arpeggio function on, press the [ARP ON/OFF] button.

2 Select "ARP SELECT" by pressing the Arpeggio/Effect Function button.

3 Change the Arpeggio type via the Function buttons.

Using the MIC INPUT jack

By connecting a microphone to the MIC INPUT jack located on the rear panel of this instrument, you can enjoy singing along with your own performance. To the signal input via the MIC INPUT jack, you can apply the Effect of this instrument, including the Vocoder Effect. The example below assumes you want to sing while playing the keyboard.

1 Connect the microphone to the MIC INPUT jack.

2 To turn the Mic Input on, press the [MIC ON/OFF] button.

3 Use the INPUT GAIN knob to adjust the input level of the signal.
Adjust the input gain so that the PEAK lamp flashes briefly when you play at your loudest level.

4 Select "MIC" by pressing the Knob Function button then adjust the volume by using the knob to which the VOLUME is assigned.

5 As necessary, adjust PAN, CHO SEND, REV SEND by using the assigned knobs.

Enhancing the Sound with Effects

You can also apply various effects to your voice.

1 Press the [UTILITY] button to enter the Utility mode.

2 Select the "Voice" in the Utility Select display, then press [ENTER] button.

3 Select "A/D FX," then press the [ENTER] button.

4 Select "InsA," then press the [ENTER] button.

5 Move the cursor to the Effect category, then select the desired category by using the Data Dial, [DEC] and [INC] buttons.

6 Move the cursor to the Type, then select the desired effect type by using the Data Dial, [DEC] and [INC] buttons.

Other Functions

Calling up the Simple display

In the Voice Play mode, you can select the design of display called "Simple" display by holding the [SHIFT] button then pressing the cursor [◄][►] buttons. The Simple display shows the Voice Name in a large font. Three types of character are available and can be selected.

Simple display 1	Simple display 2	Simple display 3

NOTE: When changing to the Simple display, the displayed Voice name scrolls. To stop scrolling, press the [EXIT] button. Press the [ENTER] button to scroll the Voice name again.

Panel Lock Function

The panel lock function can temporarily disable the panel operation and prevent unintended operation during live performance. When you press the [PANEL LOCK] button, its lamp will light and all the buttons/Knobs/Sliders except for the Master Volume/Input Gain/Pitch Bend wheel/Modulation wheel/foot switch will be locked. Press the [PANEL LOCK] button again to cancel the Panel Lock.

NOTE: You can set the buttons to which the Panel Lock function is applied in the Panel Lock display (page 145) of Utility. When setting the target of the panel lock as except to "All," the [PANEL LOCK] button will flash while turned on.

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

- Play
- Normal Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Controller
    - LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Element Edit
    - OSC
    - Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
    - AEG
    - EQ
- Job
  - Recall
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Appendix

Normal Voice Edit

A Normal Voice, which contains pitched musical instrument-type sounds that can be played over the range of the keyboard, can consist of up to eight Elements. There are two types of Normal Voice Edit displays: those for Common Edit to edit the settings common to all Elements, and those for Element Edit to edit individual Elements.
In this section, we'll cover the Normal Voice parameters.

Common Edit

These parameters are for making global (or common) edits to all four Elements of the selected Normal Voice.

Operation	[VOICE] → Select Normal Voice → [EDIT] → Select the desired display in the Voice Edit Select display → [ENTER] → Edit display

Voice Edit Select display
(Normal Voice)

Edit display
(example: Name display)
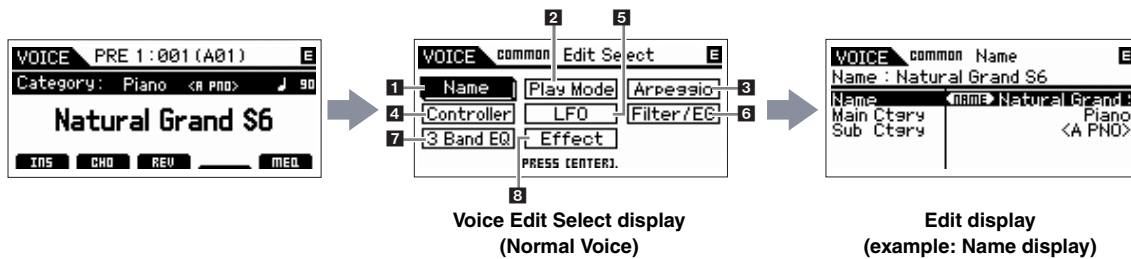
1 Name

Name

Enters the desired name for the Voice. When you move the cursor to "Name," pressing the [ENTER] button calls up the Naming dialog, allowing you to enter the desired name. The Voice name can contain up to 20 characters. For detailed instructions on inputting a character, refer to the S90 XS/S70 XS Owner's Manual.

Main Ctgry (Main Category)
Sub Ctgry (Sub Category)

Determines the Main Category and Sub Category of the Voice.
"Category" can be used as a keyword representing the characteristic of the Voice. The appropriate setting makes it easy to find the desired Voice from a variety of Voices.
There are 17 Main Categories which indicate types of instruments. There are up to six Sub Categories for each Main Category, indicating more detailed types of instruments.

Settings: Refer to the Voice Category List on .

2 Play Mode

Volume

Determines the output level of the Voice. Set this parameter to adjust the balance between the current Voice and other Voices. This parameter can be changed via the Slider directly.

Settings: 0 – 127

Pan

Determines the stereo pan position of the Voice. This parameter can be changed via the Slider directly.

Settings: L63 (far left) – C (center) – R63 (far right)

NOTE: Note that this Voice Pan parameter may have little or no audible effect if the Pan for a specific element is set to the left position and the Pan for another element is set to the right position.

Note Shift

Determines the transpose setting for the amount (in semitones) by which the pitch is raised or lowered.

Settings: -24 – +0 – +24

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

Play
Normal Voice Edit
- ● Common Edit
  - ● Name
  - ● Play Mode
  - Arpeggio
    - Arp Edit
    - Arp 1-5 Type
  - Controller
  - LFO
  - Filter/EG
  - 3 Band EQ
  - Effect
- Element Edit
  - OSC
  - Tune
  - PEG
  - Filter Type
  - FEG
  - Filter Scale
  - AMP Level/Pan
  - AEG
  - AMP Scale
  - LFO
  - EQ
Drum Voice Edit
- Common Edit
  - Name
    Play Mode
    Arpeggio
    Controller
    Filter/EG
    3 Band EQ
  - Effect
- Key Edit
  - OSC
  - Tune
  - Filter Type
  - AMP Level/Pan
  - AEG
  - EQ
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Appendix

PB Range Upper (Pitch Bend Range Upper)
PB Range Lower (Pitch Bend Range Lower)

Determines the maximum Pitch Bend range in semitones.

Setting the Upper parameter to +12 would result in a maximum pitch rise of one octave when the Pitch Bend wheel is moved upwards. On the other hand, the Lower setting of -12 would result in the pitch being lowered up to a maximum of one octave (12 semitones) when the Pitch Bend wheel is moved downwards.

Settings: -48 semi – +0 semi – +24 semi

Mono/Poly

Selects whether the Voice is played monophonically (only one note at a time) or polyphonically (multiple notes sounding simultaneously).

Settings: mono, poly

mono	When set to "mono," the selected Voice is played back monophonically (only a single note is played back simultaneously). For many instrument sounds (such as bass and synth lead), this allows a more natural and smooth sounding legato performance than when this parameter is set to "poly."
poly	When set to "poly," the selected Voice is played back polyphonically (multiple notes can be played back simultaneously or a chord is played back).

Key Assign Mode

This is useful when two or more instances of the same note are received nearly simultaneously, or without a corresponding Note Off message.

Settings: single, multi

single	When this is set to "single" and double playback of the same note are transmitted to the internal tone generator, the first note will be stopped then the next note will be sounded.
multi	When this is set to "multi" and double playback of the same note are transmitted to the internal tone generator, all the notes are sounded simultaneously.

Porta Sw (Portamento Switch)

Determines whether Portamento is applied to the current Voice or not.

Settings: off, on

Porta Time (Portamento Time)

Determines the pitch transition time when Portamento is applied. The effect of the parameter differs depending on the settings of the "Portamento Time Mode." Higher values result in a longer pitch change time, or a slow speed.

Settings: 0 – 127

Porta Mode (Portamento Mode)

Determines how Portamento is applied to your keyboard performance.

Settings: fingered, fulltime

fingered	Portamento is only applied when you play legato (playing the next note before releasing the previous one).
fulltime	Portamento is applied to all notes.

Porta Time Mode (Portamento Time Mode)

Determines how the pitch changes in time.

Settings: rate1, time1, rate2, time2

rate1	Pitch changes at the specified rate.
time1	Pitch changes in the specified time.
rate2	Pitch changes at the specified rate within a octave.
time2	Pitch changes in the specified time within an octave.

Porta Lgt Slope (Portamento Legato Slope)

When the Mono/Poly is set to "mono," legato playing may produce an unnatural attack depending on the waveform assigned to the selected Voice. To solve such a problem, you can use this parameter to adjust the attack of the Voice. Normally, this should be set to a low value for waveforms with short attack times, and should be set to a high value for waveforms with long attack times.

Settings: 0 – 7

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

Play
Normal Voice Edit
● Common Edit
   Name
●   Play Mode
   Arpeggio
     Arp Edit
     Arp 1-5 Type
   Controller
   LFO
   Filter/EG
   3 Band EQ
   Effect
  Element Edit
   OSC
   Tune
   PEG
   Filter Type
   FEG
   Filter Scale
   AMP Level/Pan
   AEG
   AMP Scale
   LFO
   EQ
Drum Voice Edit
  Common Edit
   Name
   Play Mode
   Arpeggio
   Controller
   Filter/EG
   3 Band EQ
   Effect
  Key Edit
   OSC
   Tune
   Filter Type
   AMP Level/Pan
   AEG
   EQ
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Appendix

Micro Tune Bank (Micro Tuning Bank)

Determines the Micro Tuning Bank.

Settings: preset, user

preset	Contains the 13 preset Micro Tuning types.
user	Contains your original Micro Tuning types created in the Micro Tune display (page 140) of the Utility mode.

Micro Tune No. (Micro Tuning Number)

Determines the Micro Tuning number. The Preset Bank provides 13 types including the most common "equal temperament." For detail about Micro Tuning, refer to the "Micro Tuning" (page 64) section in the Supplementary information.

Settings: Preset Bank: 1 – 13 (See the Micro Tuning list on page 64)
User Bank: 1 – 8

Micro Tune Root (Micro Tuning Root)

Sets the base note for each scale. For some scales this setting may not be necessary.

Settings: C – B

3 Arpeggio

Determines whether the item being edited will commonly affect all five Arpeggios assigned to each Voice ("Arp Edit"), or affect only the selected Arpeggio ("Arp 1 – 5 Type").

Arp Sw (Arpeggio Switch)

Determines whether Arpeggio is on or off. You can also turn Arpeggio on/off from the front panel with the [ARP ON/OFF] button.

Settings: off, on

Arp Select (Arpeggio 1 – 5 Select)

Select one of "ARP1" – "ARP5." The 8th note icon shown in the settings indicates that one of the Arpeggio Types (other than "off") is selected for the Arpeggio. When the Arpeggio/Effect Function button is set to "ARP SELECT," you can select one of Arp 1 – Arp 5 via the Function buttons.

Settings: Arp 1 – Arp 5

Arp Edit (Arpeggio Edit)

Determines the item being edited will commonly affect all five Arpeggios assigned to each Voice.

Arp Sw (Arpeggio Switch)

Determines whether Arpeggio is on or off. This parameter is same as the "Arp Select" on the Arp Select display in the Voice Edit.

Settings: off, on

Arp Hold (Arpeggio Hold)

When this is set to "on," the Arpeggio cycles automatically, even if you release your fingers from the keys, and it continues to cycle until the next key is pressed.

Settings: sync-off (see below), off, on

sync-off	When set to "sync-off," the Arpeggio playback continues to run silently, even when you release the keys. Pressing any key turns the Arpeggio playback on again.

NOTE: You can obtain the same result by receiving the Control Change "SUSTAIN" (Control #64) when "Arp Sw" is set to on.

Arp Tempo (Arpeggio Tempo)

Determines the tempo for the Arpeggio.

Settings: 5 – 300

NOTE: If you are using this instrument with an external sequencer, DAW software, or MIDI device, and you want to synchronize it with that device, set the MIDI Sync parameter in the Utility MIDI display (page 137) to "external" or "auto." When MIDI Sync is set to "auto" (only when MIDI clock is transmitted continuously) or "external," the Tempo parameter here indicates "external" and cannot be changed.

Reference

Velocity Rate

Determines how much the velocity of the Arpeggio playback is offset from the original value. A setting of 100% means the original velocities are used. Settings below 100% will shorten the velocities of the Arpeggio notes, whereas settings above 100% will lengthen them. If the resultant Velocity value is less than zero it will be set to 1, and if the resultant Velocity value is greater than 127 it will be set to 127.

Settings: 0 – 200%

Gate Time Rate

Determines how much the Gate Time (length) of the Arpeggio notes is offset from the original value. A setting of 100% means the original gate times are used. Settings below 100% will shorten the gate times of the Arpeggio notes, whereas settings above 100% will lengthen them. The Gate Time cannot be decreased beyond its normal minimum of 1; any values outside that range will automatically be limited to the minimum.

Settings: 0 – 200%

Unit Multiply

Adjusts the Arpeggio playback time based on tempo. By using this parameter, you can create a different Arpeggio type from the original one. For example, if you set a value of 200%, the playback time will be doubled (tempo is halved). On the other hand, if you set a value of 50%, the playback time will be halved and the tempo doubled. Normal playback time is 100%.

Settings: 50%, 66%, 75%, 100%, 133%, 150%, 200%

Quantize Value

Determines to what beats the note data in the Song will be aligned, or determines to what beats in the Song the swing is applied. The number shown at right of each value indicates the resolution of the quarter notes in clocks.

Settings: 60 (32nd note), 80 (16th note triplet), 120 (16th note), 160 (8th note triplet), 240 (8th note), 320 (1/4 note triplet), 480 (1/4 note)

Quantize Strngth (Quantize Strength)

Sets the "strength" by which note events are pulled toward the nearest quantize beats. A setting of 100% produces exact timing set via the Quantize Value parameter above. A setting of 0% results in no quantization. A setting of 50% result that the note events are pulled to the half point between the 0% and 100%.

Settings: 0% – 100%

Swing

Delays notes on even-numbered beats (backbeats) to produce a swing feel. Settings above 1 delay the Arpeggio notes, whereas settings below 1 advance them. A setting of 0 produces exact timing set via the Quantize Value, resulting in no swing. Judicious use of this setting lets you create swing rhythms and triplet feels, such as shuffle and bounce.

Settings: -120 – +120

NOTE: When the Quantize Value parameter is set to the triplet value, the Swing is applied to the last note of each triplet.

Octave Range

Specifies the maximum Arpeggio range in octaves. Positive value settings increase the octave range of the Arpeggio playback upward, whereas negative value settings increase it downward.

Settings: -3 – +0 – +3

Change Timing

Determines the actual timing at which the Arpeggio type is switched when you select another type during Arpeggio playback. When set to "realtime," the Arpeggio type is switched immediately. When set to "measure," the Arpeggio type is switched at the top of the next measure.

Settings: realtime, measure

Velocity Mode

Adjusts the velocity of the Arpeggio notes when receiving the Note On message.

Settings: original, thru

original	The Arpeggio plays back at the preset velocities included in the Arpeggio sequence data.
thru	The Arpeggio plays back according to the velocity of your playing. For example, if you play the notes strongly, the playback volume of the Arpeggio increases.

Basic Structure

Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Voice

Play
Normal Voice Edit
- Common Edit
  - Name
  - Play Mode
  - Arpeggio
    - Arp Edit
    - Arp 1-5 Type
  - Controller
  - LFO
  - Filter/EG
  - 3 Band EQ
  - Effect
- Element Edit
  - OSC
  - Tune
  - PEG
  - Filter Type
  - FEG
  - Filter Scale
  - AMP Level/Pan
  - AEG
  - AMP Scale
  - LFO
  - EQ
- Drum Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
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    - EQ
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Key Mode

Determines how the Arpeggio plays back when receiving Note On messages.

Settings: sort, thru, direct, sort+direct, thru+direct

sort	When you play specific notes (for example, the notes of a chord), the same sequence plays, no matter what order you play the notes.
thru	When you play specific notes (for example, the notes of the chord), the resulting sequence differs depending on the order of the notes.
direct	Note events of the Arpeggio sequence do not play; only the notes you play on the keyboard are heard. When the Arpeggio plays back, events such as Pan and Brightness are applied to the sound of your tone generator performance. Use this setting when the Arpeggio types include non-note data or when the Category type "Ctrl" is selected.
sort+direct	The Arpeggio is played back according to the "sort" setting here, and the note pressed is also sounded.
thru+direct	The Arpeggio is played back according to the "thru" setting here, and the note pressed is also sounded.

NOTE: Some Arpeggio types belonging to the "Cntr" Category may not have note events. When such an Arpeggio type is selected and the Key Mode is set to "sort" or "thru," no sound is produced even if you press a note on the keyboard.

Note Limit Lo/Hi (Note Limit Low/High)

Determines the lowest and highest notes in the Arpeggio's note range. Notes received in this range trigger the Arpeggio. For example, setting a Note Limit of "C5 – C4" lets you trigger the Arpeggio by playing notes in the two ranges of C -2 to C4 and C5 to G8; notes played between C4 and C5 have no effect on the Arpeggio.

Settings: C -2 – G8

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Velocity Limit Lo/Hi (Velocity Limit Low/High)

Determines the lowest and highest velocity which can trigger the Arpeggio playback. Arpeggio will only playback for notes received within its specified velocity range. For example, setting a Velocity Limit of 93 – 34 lets you play the Arpeggio from two separate velocity ranges: soft (1 – 34) and hard (93 – 127).

Settings: 1 – 127

Octave Shift

Shifts the pitch of the Arpeggio up or down in octaves.

Settings: -10 – +10

Loop

When this is set to "on," the Arpeggio cycles while notes are held. When this is set to "off," the Arpeggio plays only once even if notes are held.

Settings: off, on

Trigger Mode

When this is set to "gate," pressing the note starts Arpeggio playback and releasing the note stops it. When this is set to "toggle," pressing the note starts/stops Arpeggio playback and releasing the note does not affect Arpeggio playback. Normally, this parameter should be set to "gate."

Settings: gate, toggle

NOTE: The Trigger Mode "toggle" setting overcomes the Arp Hold settings in the Arp Edit display (). In other words, even when the Arp Hold parameter is set to "on" or "sync-off," pressing the note either starts or stops Arpeggio playback when the Trigger Mode is set to "toggle."

Accnt Vel Th (Accent Velocity Threshold)

Some Arpeggio types include special sequence data called "Accent Phrases," which will be played back only when the velocities higher than a specified value are received. This parameter determined the minimum velocity that will trigger the Accent Phrase.

Settings: off, 1 – 127

Accnt Strt Qtz (Accent Start Quantize)

Determines the start timing of the Accent Phrase when the Velocity specified in Accent Velocity Threshold above is received. When set to off, the Accent Phrase starts as soon as the Velocity is received. When set to on, the Accent Phrase starts on the beat specified for each Arpeggio type after the Velocity is received.

Settings: off, on

Basic Structure

- **Voice**
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

Play
Normal Voice Edit
- ● Common Edit
  - Name
  - Play Mode
  - ● Arpeggio
    - ● Arp Edit
      - Arp 1-5 Type
  - Controller
  - LFO
  - Filter/EG
  - 3 Band EQ
  - Effect
- Element Edit
  - OSC
  - Tune
  - PEG
  - Filter Type
  - FEG
  - Filter Scale
  - AMP Level/Pan
  - AEG
  - AMP Scale
  - LFO
  - EQ
Drum Voice Edit
- Common Edit
  - Name
  - Play Mode
  - Arpeggio
  - Controller
  - Filter/EG
  - 3 Band EQ
  - Effect
- Key Edit
  - OSC
  - Tune
  - Filter Type
  - AMP Level/Pan
  - AEG
  - EQ
Job
- Recall
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Supplementary Info.

Appendix

Random SFX

Some Arpeggio types feature a Random SFX function which will trigger special sounds (such as guitar fret noises) when a Note Off message is received. This parameter determines whether the Random SFX is active or not.

Settings: off, on

SFX Vel Offset (Random SFX Velocity Offset)

Determines the offset value by which the Random SFX notes will be shifted from their original velocities. If the resultant Velocity value is less than 1 it will be set to 1, and if the resultant Velocity value is greater than 127 it will be set to 127.

Settings: -64 – +0 – +63

SFX Key on Ctrl (Random SFX Key On Control)

When this is set to "off," the Random SFX special sound is played with the pre-programmed velocity. When this is set to "on," the Random SFX special sound is played with the velocity generated when the note is pressed.

Settings: off, on

Arp 1 – 5 Type (Arpeggio 1 – 5 Type)

Determines the settings of the Arpeggio selected on the "Arp Select".

Main Ctgry (Main Category)
Sub Ctgry (Sub Category)

Determines the Arpeggio Main Category and Sub Category including the desired Arpeggio type.

Settings: Refer to the Arpeggio Category List on .

Type (Arpeggio Type)

Determines the desired Arpeggio Type number from the specified Category. The number and name of the selected Arpeggio Type is shown at the second line on the display. Refer to the Arpeggio Type List in Data List (separate PDF documentation).

Settings: off, pre0001 – 6779, usr0001 – 0256

NOTE: For details about how to use the Arpeggio Type List in Data List (separate PDF documentation), see .

Vel Rate (Velocity Rate Offset)

Determines the offset value by which the Arpeggio notes will be shifted from their original velocities. If the resultant Velocity value is less than 1 it will be set to 1, and if the resultant Velocity value is greater than 127 it will be set to 127.

Settings: -100% – +0% – +100%

GTime Rate (Gate Time Rate Offset)

Determines the Gate Time (length) of the Arpeggio notes. The Gate Time cannot be decreased beyond its normal minimum of 1; any values outside that range will automatically be limited to the minimum.

Settings: -100% – +0% – +100%

4 Controller

Assign 1 Value
Assign 2 Value

Determines the offset value by which the functions assigned to the Assign 1/2 knobs will be shifted from their original settings.

Settings: -64 – +0 – +63

NOTE: The functions assigned to the Assign 1/2 Knobs can be set in "Ctrl Set 1 – 6 Src" of the Controller display.

A. Func 1 Mode (Assignable Function 1 Mode)
A. Func 2 Mode (Assignable Function 2 Mode)

Determines whether the ASSIGNABLE FUNCTION [1] and [2] buttons functions as a latch type or momentary type. When set to "latch," pressing the button alternates the lamp status between on and off. When set to "momentary," pressing/holding the button turns the lamp on and releasing the button turns the lamp off.

Settings: momentary, latch

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

- Play
- Normal Voice Edit
  - ● Common Edit
    - Name
    - Play Mode
    - ● Arpeggio
      - ● Arp Edit
      - ● Arp 1-5 Type
    - ● Controller
    - LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Element Edit
    - OSC
    - Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
    - AEG
    - EQ
- Job
  - Recall
  - Bulk
- Supplementary Info.

Appendix

Ctrl Set 1 – 6 Src (Controller Set 1 – 6 Source)

Determines which panel controller is to be assigned and used for the selected Set. You can also assign multiple functions to a controller.

Settings: PitchBend (Pitch Bend Wheel), ModWheel (Modulation Wheel), AfterTch (After Touch), FootCtrl1 (Foot Controller 1), FootSw (Foot Switch), Ribbon (Ribbon Controller), Breath (Breath Controller), Assign 1, Assign 2, FootCtrl2 (Foot Controller 2), A. Func 1 (Assignable Function 1), A. Func 2 (Assignable Function 2)

NOTE: The Control Number in Controller display in the Utility mode can be selected for the controller which can be changed in this parameter.

NOTE: You can determine the degree to which the Pitch Bend wheel affects the Destination parameter (below) by setting the Pitch Bend Range Upper and Pitch Bend Range Lower in the Play Mode display (page 35).

Ctrl Set 1 – 6 Dest (Controller Set 1 – 6 Destination)

Determines the parameter that is controlled by the Source controller (above). You can select a parameter for each controller from the 101 parameters, such as volume, pitch and LFO depth.

Settings: Refer to the Control List in the Data List (separate PDF documentation).

NOTE: Regarding "Insertion Effect A Parameter 1 – 16," "Insertion Effect B Parameter 1 – 16" and "Vocoder 1 – 32" described in the Control List, the actual parameter names of the selected Effect type are shown on the display. If "insA/B---(Prm 1 – 16)" is shown instead of a clear name, no function is assigned to that parameter.

NOTE: When at least one of the "Controller Set 1 – 6 Element Sw" parameters is set to "off" and the Element related parameters are assigned to any of the "Ctrl Set 1 – 6 Dest" parameters, an exclamation mark ("!") is shown at the beginning of the value for "Ctrl Set 1 – 6 Src," "Ctrl Set 1 – 6 Dest" and "Ctrl Set 1 – 6 Depth." This indicates that the function specified as destination is not applied to all the Elements.

Ctrl Set 1 – 6 Depth (Controller Set 1 – 6 Depth)

Determines the degree to which the Source controller affects the Destination parameter. For negative values, the controller operation is reversed; maximum controller settings produce minimum parameter changes.

Settings: -64 – +0 – +63

Controller Set 1 – 6 Element Sw (Controller Set 1 – 6 Element Switch) `EDITOR`

Determines whether or not the selected controller affects each individual Element. This parameter is disabled when the "Ctrl Set 1 – 6 Dest" described above is set to a parameter unrelated to the Voice Elements. When some buttons are set to "on," the corresponding Elements are to be affected by the selected controller.

5 LFO (Common LFO)

Determines how the vibrato, tremolo and wah effect are produced by using the LFO (Low Frequency Oscillator). From the following displays, you can set the basic LFO parameters common to all Elements of the Voice.

Wave

Selects the Wave and determines how the LFO waveform modulates the sound.

Settings: triangle, triangle+, saw up, saw down, squ1/4 (Square 1/4), squ1/3 (Square 1/3), square, squ2/3 (Square 2/3), squ3/4 (Square 3/4), trapezoid, S/H1 (Sample and Hold 1), S/H2 (Sample and Hold 2), user

user	You can create your original LFO wave by selecting this. Creating LFO waves is available only on the S90 XS/S70 XS Editor. For details, refer to "User LFO Template" section (page 43).

Play Mode

Determines whether the LFO cycles repeatedly (loop) or only once (one shot).

Settings: loop, one shot

Speed

Determines the speed of the LFO Wave. The higher the value, the faster the speed. This parameter is disable when the "Tempo Sync" is set to on.

Settings: 0 – 63

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

- Play
- Normal Voice Edit
  - ● Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - ● Controller
    - ● LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Element Edit
    - OSC
    - Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
      Play Mode
      Arpeggio
      Controller
      Filter/EG
      3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
    - AEG
    - EQ
- Job
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Appendix

Phase

Determines the starting phase point for the LFO Wave when it is reset.

Settings: 0°, 90°, 120°, 180°, 240°, 270°
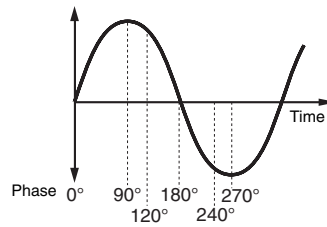
Tempo Sync

Determines whether or not the LFO speed is synchronized to the tempo of the Arpeggio.

Settings: off (not synchronized), on (synchronized)

NOTE: When this parameter is set to "on" and the MIDI sync parameter in the MIDI display of the Utility mode is set to "auto" (only when MIDI clock is received continuously) or "external," the LFO speed is synchronized with the external clock.

Tempo Speed

This parameter is available only when Tempo Sync above has been set to "on." It allows you to make detailed note value settings that determine how the LFO pulses in sync with the Arpeggio.

Settings:

16th	8th/3 (eighth-note triplets)	16th. (dotted sixteenth notes)	8th
4th/3 (quarter-note triplets)	8th. (dotted eighth notes)	4th (quarter notes)	2nd/3 (half-note triplets)
4th. (dotted quarter notes)	2nd (half notes)	whole/3 (whole-note triplets)	2nd. (dotted half notes)
4th x 4 (quarter-note quadruplets; four quarter notes to the beat)	4th x 5 (quarter-note quintuplets; five quarter notes to the beat)	4th x 6 (quarter-note sextuplets; six quarter notes to the beat)	4th x 7 (quarter-note septuplets; seven quarter notes to the beat)
4th x 8 (quarter-note octuplets; eight quarter notes to the beat)	4th x 16 (sixteen quarter notes to the beat)	4th x 32 (32 quarter notes to the beat)	4th x 64 (64 quarter notes to the beat)

NOTE: The note type setting above is synchronized with the tempo of the Arpeggio playback.

Key on Reset

Determines whether or not the LFO is reset each time a Note On message is received. The following three settings are available.

Settings: off, each-on, 1st-on

off
The LFO cycles freely with no key synchronization. Pressing a key starts the LFO wave at whatever phase the LFO happens to be at that point.
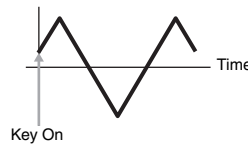
each-on
The LFO resets with each note you play and starts a wave at the phase specified by the Phase parameter (above).
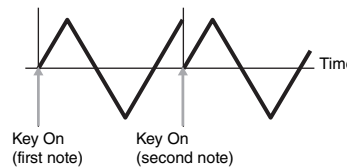
1st-on
The LFO resets with each note you play and starts a waveform at the phase specified by the Phase parameter (above). If you play a second note while the first is being played (Note Off has not been received), the LFO does not reset to the specified phase (no synchronization) with the second note and after.
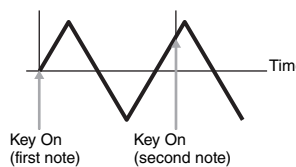
NOTE: The starting phase is determined by the "Phase" parameter although the starting phase is shown as 0 in the illustration.

Random Speed

Determines the degree to which the LFO speed changes at random. A setting of "0" results in the original speed. Higher values result in a larger degree of speed change. This parameter is disabled when the "Tempo Sync" is set to on.

Settings: 0 – 127

Delay Time

Determines the delay time between the moment a Note On message is received to the moment the LFO comes into effect. A higher value results in a longer delay time.

Settings: 0 – 127

Fade in Time

Determines the amount of time for the LFO effect to fade in after the Delay time has elapsed. A higher value results in a slower fade-in. When set to "0," the LFO effect will not fade in and reach the maximum level immediately after the Delay time has elapsed.

Settings: 0 – 127

Hold Time

Determines the length of time for which the LFO is held at its maximum level. A higher value results in a longer Hold time. A setting of "hold" produces no fade out.

Settings: 0 – 126, hold

Fade out Time

Determines the amount of time for the LFO effect to fade out (after the Hold time has elapsed). A higher value results in a slower fade-out.

Settings: 0 – 127

LFO Set 1 – 3 Dest (LFO Set 1 – 3 Destination)

Determines the parameters which are to be controlled (modulated) by the LFO Wave. Three Destinations can be assigned, and you can choose from several parameters per Destination.

Settings: insA1 – insA16, insB1 – insB16, voco1 – voco32, A mod, P mod, F mod, reso, pan, LFOspd

Effect Parameters (insA1 – insA16, insB1 – insB16, voco 1 – voco 32)	Each parameter of the selected Effect type is modulated cyclically. When one of those parameters is selected, the corresponding parameter name of the selected Effect type is shown at the lower section of the display.
A mod (Amplitude Modulation Depth)	A tremolo effect produced by cyclically modulating the volume.
P mod (Pitch Modulation Depth)	A vibrato effect produced by cyclically modulating the pitch.
F mod (Filter Modulation Depth)	A wah effect produced by cyclically modulating the tonal brightness.
reso (Resonance)	A special wah effect produced by cyclically modulating the resonance.
pan	An effect produced by cyclically modulating the stereo pan position.
LFOspd (Element LFO Speed)	When this is selected, the Common LFO speed cyclically modulates the Element LFO speed.

NOTE: When at least one of the "LFO Set 1 – 3 Element Sw" parameters is set to "off" and the Element related parameters are assigned to any of the "Ctrl Set 1 – 3 Dest" parameters, an exclamation mark ("!") is shown at the beginning of the value for "Ctrl Set 1 – 3 Dest" and "Ctrl Set 1 – 3 Depth." This indicates that the function specified as destination is not applied to all the Elements.

LFO Set 1 – 3 Depth

Determines the LFO Wave Depth.

Settings: 0 – 127

LFO Set 1 – 3 Element Sw (LFO Set 1 – 3 Element Switch) EDITOR

Determines whether or not each Element is to be affected by the LFO on the S90 XS/S70 XS Editor. When some buttons are set to "on," the corresponding Elements are to be affected by the LFO.

Settings: on, off

LFO Set 1 – 3 Depth Offset EDITOR

Determines the offset values of the LFO Set 1 – 3 Depth parameter (above) for the respective Elements. If the resultant LFO Set 1 – 3 Depth value is less than zero it will be set to 0, and if the resultant LFO Set 1 – 3 Depth value is greater than 127 it will be set to 127.

Settings: 0 – 127

LFO Phase Offset EDITOR

Determines the offset values of the Phase parameter for the respective Elements on the S90 XS/S70 XS Editor.

Settings: 0°, 90°, 120°, 180°, 240°, 270°

User LFO Cycle EDITOR

Determines the amount of steps for creating the wave on the S90 XS/S70 XS Editor.

Settings: 2, 3, 4, 6, 8, 12, 16

User LFO Slope EDITOR

Determines the slope or ramp characteristics of the LFO wave on the S90 XS/S70 XS Editor.

Settings: off, up, down, up&down

off	Creates no slope.
up	Creates an upward slope.
down	Creates a downward slope.
up&down	Creates an upward then downward slope.

User LFO Template EDITOR

You can select a pre-programmed template for the LFO wave on the S90 XS/S70 XS Editor.

Settings:

all 0	Values of all the steps are set to 0.
all -64	Values of all the steps are set to -64.
all +63	Values of all the steps are set to +63.
saw up	Creates a saw shaped upward wave.
saw down	Creates a saw shaped downward wave.
even step	Values of all odd steps are set to +63, and values of all even steps are set to -64.
odd step	Values of all even steps are set to +63, and values of all odd steps are set to -64.
random	Creates a base wave at random. Each time you click the random button, a different LFO wave appears on the display randomly.

User LFO Step Value 1 – 16 EDITOR

Determines the value for each step on the S90 XS/S70 XS Editor.

Settings: -64 – +0 – +63

6 Filter/EG

You can set the basic Filter/EG parameters common to all elements of the Voice. These settings let you control the sound transition from the moment a key is pressed to the moment at which it is released.

Cutoff

Determines the common offset value of filter Cutoff Frequencies for all Elements (page 50). This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

Resonance

Determines the common offset value of filter Resonance/Width for all Elements (page 50). This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

FEG Attack/Decay/Release/Depth (FEG Attack Time/Decay Time/Release Time/Depth)

Determines the FEG (Filter Envelope Generator) parameters for the Voice. Using the Filter EG, you can control the transition in tonal color (Cutoff Frequency) from the moment the sound starts to the moment the sound stops. The settings made here will be applied to the same parameters in the Filter EG (page 51) of Element Edit as offset. "FEG Sustain" is not available here.

Settings: -64 – +0 – +63

AEG Attack/Decay/Sustain/Release (AEG Attack Time/Decay Time/Sustain Level/Release Time)

These can be used to control the change in volume from the moment a note is played to the moment the sound stops. The settings made here will be applied to the same parameters in the Amplitude EG (page 54) of Element Edit as offset. Each of the Amplitude EG parameters can be changed directly via the Knob.

Settings: -64 – +0 – +63

Basic Structure

- **Voice**
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

- Play
- Normal Voice Edit
  - ● Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Controller
    - ● LFO
    - ● Filter/EG
    - 3 Band EQ
    - Effect
  - Element Edit
    - OSC
    - Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
    - AEG
    - EQ
- Job
  - Recall
  - Bulk
- Supplementary Info.

Appendix

7   3 Band EQ

Low Freq (Low Frequency)   **Mid Freq (Middle Frequency)**   **High Freq (High Frequency)**
Low Gain   **Mid Gain (Middle Gain)**   **High Gain**
       Mid Q (Middle Q)

This is a parametric EQ featuring three bands (High, Mid and Low). You can attenuate or boost the level of each frequency band (High, Mid, Low) to change the Voice sound. For the Mid band, you can also set the Q. The parameter except to "Low Freq", "High Freq" and "Mid Q" can be changed directly via the Knob.

Freq (Frequency)

Determines the frequency for each frequency band. Set the value to the frequency around which you wish to attenuate or boost.
Settings: Low Freq: 50.1Hz – 2.00kHz, Mid Freq: 139.7Hz – 10.1kHz, High Freq: 503.8Hz – 14.0kHz

Gain

Determines the level gain for the Frequency (set above), or the amount the selected frequency band is attenuated or boosted. The higher the value, the greater the Gain. The lower the value, the lesser the Gain.
Settings: -12.00dB – +0dB – +12.00dB

Q

Determines the Q for the Mid band. The higher the value, the smaller the bandwidth. The lower the value, the wider the bandwidth.
Settings: 0.7 – 10.3
NOTE: The Q setting is available only for the Mid band, which is a Peaking type EQ. Peaking (referring to the "peak" shape) lets you attenuate/boost a specific frequency and allows you to control how wide or narrow the bandwidth is. On the other hand, the EQ shape of the High and Low band is the Shelving type which lets you attenuate/boost the signal at frequencies above or below the specified Frequency setting.

8   Effect
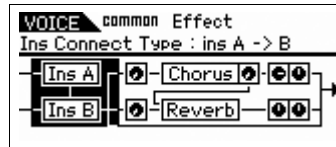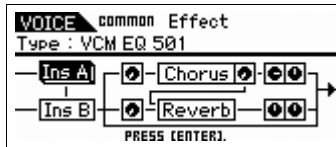
Ins Connect Type (Insertion Connection Type)
Determines the effect routing for Insertion Effects A and B. The setting changes are shown on the diagram in the display, giving you a clear picture of how the signal is routed. For details, see .
Settings: parallel, ins A -> B, ins B -> A, vocoder

parallel	Signals processed with the Insertion Effect A and B block will be sent to Master Effect, Master EQ, Reverb and Chorus block.
ins A -> B	Signals processed with the Insertion Effect A will be sent to the Insertion Effect B and signals processed with the Insertion Effect B is sent to Master Effect, Master EQ, Reverb and Chorus block.
ins B -> A	Signals processed with the Insertion Effect B will be sent to the Insertion Effect A and signals processed with the Insertion Effect A is sent to Master Effect, Master EQ, Reverb and Chorus block.
vocoder	The Insertion Effects A and B are unified, then used as the Vocoder. Signals processed with the Vocoder block will be sent to the Master Effect, Master EQ, Reverb and Chorus blocks.

Chorus Send

Adjusts the chorus send level. The higher the value, the more pronounced the Chorus. This parameter can be changed via the Slider directly.
Settings: 0 – 127

Chorus Return

Determines the Return level of the Chorus Effect. This parameter can be changed via the Knob directly.
Settings: 0 – 127

Chorus Pan

Determines the pan position of the Chorus Effect sound.
Settings: L63 (far left) – C (center) – R63 (far right)

Chorus To Reverb

Determines the Send level of the signal sent from the Chorus Effect to the Reverb Effect. The higher the value, the deeper the Reverb that is applied to the Chorus-processed signal.

Settings: 0 – 127

Reverb Send

Adjusts the reverb send level. The higher the value, the more pronounced the Reverb. This parameter can be changed via the Slider directly.

Settings: 0 – 127

Reverb Return

Determines the Return level of the Reverb Effect. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Reverb Pan

Determines the pan position of the Reverb effect sound.

Settings: L63 (far left) – C (center) – R63 (far right)

Element Out 1 – 8 `EDITOR`

Determines which Insertion Effect (A or B) is used to process each individual Element on the S90 XS/S70 XS Editor. The "thru" setting lets you bypass the Insertion Effects for the specified element.

Settings: thru (through), ins A (Insertion A), ins B (Insertion B)

Ins A (Insertion Effect A)
Ins B (Insertion Effect B)
Vocoder
Chorus
Reverb

When the cursor is located here, pressing the [ENTER] button calls up the Effect Parameter display.

Effect Parameters

Switch

Determines whether or not the Master Effect can be used. This parameter cannot be selected from this display.

Category
Type

From the Category column, you can select one of the Effect Categories, each of which contains similar Effect types. From the Type column, you can select one of the Effect Types listed in the selected Category.

Settings: Details about the Effect categories and the Effect types are described on page 16.

NOTE: You need not set the "Category" in the Reverb or the Vocoder parameter display because these Effects have only one category respectively.

Preset

This lets you call up pre-programmed settings for each Effect type, designed to be used for specific applications and situations. You can change how the sound is affected by the selected pre-programmed settings.

NOTE: For a list of the Effect presets, see the Data List (separate PDF documentation).

Effect Parameter 1 – 16

For fine adjustment of the effect parameters.
The effect parameter differs depending on the currently selected effect type. Refer to page 19 for details about the Effect parameters. For a complete list of the available Effect Types for each Effect block, refer to the Effect Type List in the Data List (separate PDF documentation).

NOTE: The Vocoder parameters include 1 to 32.

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

| Play |
| Normal Voice Edit |
| ● Common Edit |
| Name |
| Play Mode |
| Arpeggio |
| Arp Edit |
| Arp 1-5 Type |
| Controller |
| LFO |
| Filter/EG |
| 3 Band EQ |
| ● Effect |
| Element Edit |
| OSC |
| Tune |
| PEG |
| Filter Type |
| FEG |
| Filter Scale |
| AMP Level/Pan |
| AEG |
| AMP Scale |
| LFO |
| EQ |
| Drum Voice Edit |
| Common Edit |
| Name |
| Play Mode |
| Arpeggio |
| Controller |
| Filter/EG |
| 3 Band EQ |
| Effect |
| Key Edit |
| OSC |
| Tune |
| Filter Type |
| AMP Level/Pan |
| AEG |
| EQ |
| Job |
| Recall |
| Bulk |
| Supplementary Info. |

Appendix

Element Edit EDITOR

If you wish to edit the sounds that make up a Voice and the basic parameters that determine the sound, such as Oscillator, Pitch, Filter, Amplitude, and EG (Envelope Generator), call up the Element Edit display. These parameters can be edited only on the S90 XS/S70 XS Editor, and not the device itself. For details on each parameter setting window, refer to the owner's manual of the S90 XS/S70 XS Editor.

NOTE: The S90 XS/S70 XS lets you set the Element level, turn the Element Switch on/off, and change the Solo Element. The Number [1] – [8] buttons let you select the Element while the Number [9] – [16] buttons let you switch the Element on/off and select the Solo Element. By pressing the [MUTE] button so that the [MUTE] lamp lights, you can switch the Element on/off via the Number [9] – [16] buttons. By pressing the [SOLO] button so that the [SOLO] lamp lights, you can select the Solo Element via the Number [9] – [16] buttons.
In the Voice Edit mode, you can also use the Sliders to control the Element level of the normal Voice when the Slider Function button is set to "REV SEND" and you press the Slider Function button several times so that all the lamps of the Slider Function are turned off.

OSC (Oscillator)

Element Switch 1 – 8

Determines whether the currently selected Element is on or off. When this is set to off, the currently edited Element will not sound.

Settings: off (inactive), on (active)

Wave Bank (Waveform Bank)
Category (Waveform Category)
Number (Waveform Number)
Name (Waveform Name)

Determines the Waveform assigned to the Element. Only Preset Banks are available for the Waveform Bank. For details about Preset Waveforms, see the Waveform list in the Data List (separate PDF documentation).

XA Control (Expanded Articulation Control)

Expanded Articulation (XA) is a special feature of the S90 XS/S70 XS that provides greater performance flexibility and realism. This parameter determines how the XA feature of the Element works. Try setting this parameter referring to the five types of the XA Mode described below. You can realize the desired sound depending on your performance articulation by assigning the same Elm Group (Element Group) to the Elements having the same type of the XA mode.

Settings: normal, legato, key off sound, wave cycle, wave random, all AF off, AF 1 on, AF 2 on

normal	When this is selected, the Element will sound normally each time you press the note.
legato	When this is selected and the Mono mode is selected, an alternate Element (different from the one used when XA Control is set to "normal") will be played when you play the keyboard in legato fashion (playing the next note of a single-note line or melody before releasing the previous note).
key off sound	When this is selected, the Element will sound each time you release the note.
wave cycle	When this is selected for multiple Elements, each Element sounds alternately according to its numerical order each time you play a note. (In other words, playing the first note will sound Element 1, the second note will sound Element 2, and so on.)
wave random	When this is selected for multiple Elements, each Element will sound randomly each time you press the note.
all AF off	When this is selected, the Element will sound when both of the ASSIGNABLE FUNCTION buttons are turned off.
AF 1 on	When this is selected, the Element will sound when the ASSIGNABLE FUNCTION [1] button is turned on.
AF 2 on	When this is selected, the Element will sound when the ASSIGNABLE FUNCTION [2] button is turned on.

Elm Group (Element Group)

Determines the XA Control group so that the Elements of the same group are called up in order or randomly. Assign the same group number to the Elements having the same type of XA mode.
The setting here is not available when the XA mode parameters of all Elements are set to "normal."

Settings: 1 – 8

Key on Delay

Determines the time (delay) between the moment that you press a note on the keyboard and the point at which the sound is actually played. The higher the value, the longer the delay time.

Settings: 0 – 127

Tempo Sync (Delay Tempo Sync)

Determines whether or not the Key on Delay parameter is synchronized to the tempo of the Arpeggio.

Settings: off (not synchronized), on (synchronized)

Tempo (Delay Tempo)

Determines the timing of the Key on Delay when the Tempo Sync (Delay Tempo Sync) is set to on.

Settings:

16th	8th/3 (eighth-note triplets)	16th. (dotted sixteenth notes)	8th
4th/3 (quarter-note triplets)	8th. (dotted eighth notes)	4th (quarter notes)	2nd/3 (half-note triplets)
4th. (dotted quarter notes)	2nd (half notes)	whole/3 (whole-note triplets)	2nd. (dotted half notes)
4th x 4 (quarter-note quadruplets; four quarter notes to the beat)	4th x 5 (quarter-note quintuplets; five quarter notes to the beat)	4th x 6 (quarter-note sextuplets; six quarter notes to the beat)	4th x 7 (quarter-note septuplets; seven quarter notes to the beat)
4th x 8 (quarter-note octuplets; eight quarter notes to the beat)			

Vel Cross Fade (Velocity Cross Fade)

This determines how gradually the sound of an Element decreases in volume in proportion to the distance of velocity changes outside the Velocity Limit setting. A setting of 0 produces no sound outside the Velocity Limit. The higher the value, the more gradual the level decreases. The practical application of this parameter is to create natural-sounding velocity cross fades, in which different Elements (Waveforms) change gradually depending on how strongly or softly you play.

Settings: 0 – 127

Velocity Limit

Determines the minimum and maximum values of the velocity range within which each Element will respond. Each Element will only sound for notes played within its specified velocity range. For example, this lets you have one Element sound when you play softly and have a different one sound when you play strongly. If you specify the maximum value first and the minimum value second, for example "93 to 34," then the velocity range covered will be "1 to 34" and "93 to 127."

Settings: 1 – 127

Note Limit

Determines the lowest and highest notes of the keyboard range for each Element. The selected Element will sound only when you play notes within this range. If you specify the highest note first and the lowest note second, for example "C5 to C4," then the note range covered will be "C -2 to C4" and "C5 to G8."

Settings: C -2 – G8

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Tune

Coarse (Coarse Tuning)

Determines the pitch of each Element in semitones.

Settings: -48semi – +0semi – +48semi

Fine (Fine Tuning)

Determines the pitch of each Element in cents.

Settings: -64cent – +0cent – +63cent

Vel Sens (Velocity Sensitivity)

Determines how the pitch of the Drum Key responds to velocity. Positive settings will cause the pitch to rise the more strongly you play the keyboard and negative settings will cause it to fall. A setting of 0 results in no change in pitch.

Settings: -64 – +0 – +63

Basic Structure

- Voice
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- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

- Play
- Normal Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Controller
    - LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - ● Element Edit
    - ● OSC
    - ● Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
    - AEG
    - EQ
- Job
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- Supplementary Info.

Appendix

Fine Scaling (Fine Scaling Sensitivity)

Determines the degree to which the notes (specifically, their position or octave range) affect the pitch in fine tuning (set above) of the selected Element, assuming C3 as the basic pitch. A positive setting will cause the pitch of lower notes to change lower and that of higher notes to change higher. A negative setting will have the opposite effect.

Settings: -64 – +0 – +63

Random

This lets you randomly vary the pitch of the Element for each time a Note On message is received. The higher the value, the greater the pitch variation. A value of "0" results in no pitch change.

Settings: 0 – 127

Pitch Key Follow Center Key

Determines the central note number for Pitch Key Follow. The note number set here is the same pitch as normal regardless of the Pitch Key Follow setting.

Settings: C -2 – G8

Pitch Key Follow (Pitch Key Follow Sensitivity)

Determines the sensitivity of the Key Follow effect (the pitch interval of adjacent notes), assuming the pitch of the "Pitch Key Follow Center Key" as standard. At +100% (the normal setting), adjacent notes are pitched one semitone (100 cents) apart. At 0%, all notes are the same pitch specified as the Center Key. For negative values, the settings are reversed.

Settings: -200% – +0% – +200%

NOTE: This parameter is useful for creating alternate tunings, or for use with sounds that do not need to be spaced in semitones, such as pitched drum sounds in a Normal Voice.

Pitch Key Follow and Center Key

When Pitch Key Follow is set to 100%
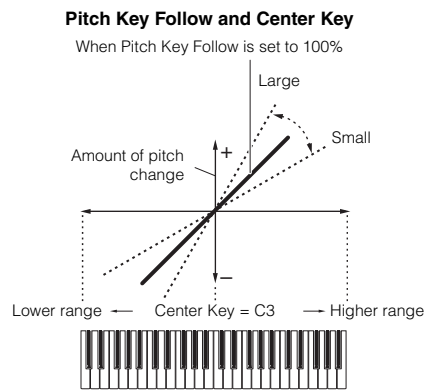
PEG (Pitch EG)

Time

Determines the Pitch EG transition time. The Time parameters let you set the time between the adjoining points of the Level parameters below. A higher value results in a longer time until reaching the next level.

Settings: 0 – 127

Hold Time	Determines the time between the moment you press a note and the moment the envelope starts to rise.
Attack Time	Determines the speed of attack from the initial pitch (Hold Level) to the normal pitch (Attack Level) of the Voice after the hold time has elapsed.
Decay 1 Time	Determines how fast the envelope falls from the normal pitch (Attack Level) of the Voice to the pitch specified as the Decay 1 Level.
Decay 2 Time	Determines how fast the envelope falls from the pitch specified as the Decay 1 Level to the pitch specified as the Decay 2 Level.
Release Time	Determines how fast the envelope falls to the pitch specified as the Release Level when the note is released.
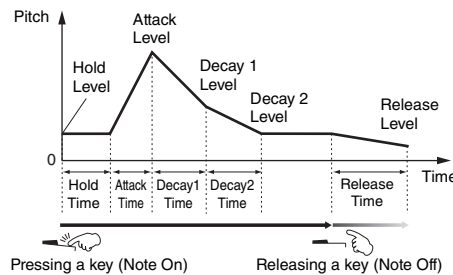
Level

Determines the level settings for the Pitch EG. The Level parameters let you set the amount of the pitch deviation based on the standard pitch specified at the Coarse Tuning and Fine Tuning in the Tune display at each envelope point.

Settings: -128 – +0 – +127

Hold Level	Determines the initial pitch at the moment of the note is pressed.
Attack Level	Determines the normal pitch of the pressed note.
Decay 1 Level	Determines the level which the pitch of sound reaches from the Attack Level after the Decay1 time elapses.
Decay 2 Level	Determines the sustain-level pitch which will be maintained while a note is held.
Release Level	Determines the final pitch reached after the note is released.

Time Velocity Sens (EG Time Velocity Sensitivity)

Determines how the Pitch EG transition time (speed) responds to velocity, or the strength with which the note is pressed. When this is set to a positive value, high velocities result in a fast Pitch EG transition speed while low velocities result in a slow speed, as shown below. When this is set to a negative value, high velocities result in a slow Pitch EG transition speed while low velocities result in a fast speed. When this is set to 0, the Pitch EG transition speed does not change no matter what the velocity.

Settings: -64 – +0 – +63

High Velocity　　Low Velocity
Fast pitch transition　　Slow pitch transition

Segment (EG Time Velocity Sensitivity Segment)

Determines the part of the Pitch EG affected by the Time Velocity Sens parameter.

Settings: attack, atk+dcy, decay, atk+rls, all

attack	Time Velocity Sens affects the Attack Time and Hold Time.
atk+dcy (attack+decay)	Time Velocity Sens affects the Attack Time, Decay 1 Time, and Hold Time.
decay	Time Velocity Sens affects the Decay 1/2 Time.
atk+rls (attack+release)	Time Velocity Sens affects the Attack Time, Release Time, and Hold Time.
all	Time Velocity Sens affects all the Pitch EG Time parameters.

EG Depth

Determines the range over which the pitch envelope changes. A setting of 0 will cause the pitch not to change. The farther from 0 the value is, the larger the pitch range. For negative values, the pitch change is reversed.

Settings: -64 – +0 – +63

EG Depth Vel Sens (EG Depth Velocity Sensitivity)

Determines how the pitch range of the Element responds to velocity. When this is set to a positive value, high velocities cause the pitch range to expand and low velocities cause it to contract, as shown below. When this is set to a negative value, high velocities cause the pitch range to contract and low velocities cause it to expand. When this is set to 0, the pitch envelope does not change no matter what the velocity.

Settings: -64 – +0 – +63

High Velocity　　Low Velocity
Large range　　Small range
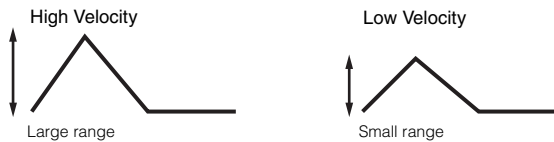
EG Depth Curve (EG Depth Velocity Sensitivity Curve)

The five curves determine how the pitch range will be generated according to the velocity (strength) with which you play notes on the keyboard. The horizontal axis of the graph is the velocity, and the vertical axis is the pitch range.

Settings: Curve 0 – 4
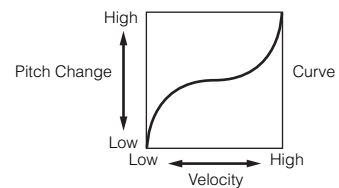
High　Pitch Change　Curve 0　Low　Low　High　Velocity

Time Key Follow Center Key
(EG Time Key Follow Sensitivity Center Key)

Determines the central note for the "Time Key Follow." When the Center Key note is played, the Pitch EG behaves according to its actual settings.

Settings: C -2 – G8

Positive value　Negative value　Faster speed　+63　+30　-40　Lower range　Higher range　Slower speed　Center key

Time Key Follow (EG Time Key Follow Sensitivity)

Determines the degree to which the notes (specifically, their position or octave range) affect the Pitch EG times of the selected Element. When this is set to a positive value, high notes result in a high Pitch EG transition speed while low notes result in a slow speed. When this is set to a negative value, the opposite effect is produced: High notes result in a slow Pitch EG transition speed while low notes result in a high speed. When this is set to 0, the Pitch EG transition speed does not change no matter what note is pressed.

Settings: -64 – +0 – +63

Filter Type

Type

Determines the Filter Type for the current Element. For details about each type, refer to "Filter Type List" in the Supplementary information ().

Settings: LPF24D, LPF24A, LPF18, LPF18s, LPF12, LPF6, HPF24D, HPF12, BPF12D, BPFw, BPF6, BEF12, BEF6, Dual LPF, Dual HPF, Dual BPF, Dual BEF, LPF12+BPF6, thru

Cutoff

The Cutoff Frequency is the center frequency at which unwanted frequencies of the audio are cut. This determines the Cutoff Frequency for the Filter to adjust the Filter effect. The tonal characteristics of the Voice and function of the Cutoff Frequency differ depending on which Filter type is selected. Set this parameter while confirming the Filter graph shown on the display.

Settings: 0 – 255

Cutoff Velocity Sens (Cutoff Velocity Sensitivity)

Determines how the Cutoff Frequency (specified in Cutoff above) responds to velocity, or the strength with which you play notes. Positive settings will cause the Cutoff Frequency to rise the harder you play the keyboard. A setting of 0 will cause the Cutoff Frequency not to change no matter what velocity. Negative settings will cause the Cutoff Frequency to rise the more softly you play the keyboard.

Settings: -64 – +0 – +63

Distance

Determines the distance between the two Cutoff frequencies, for the Dual Filter types (which feature two identical filters combined in parallel), and the LPF12 + BPF6 type. When any of other filter types is selected, this parameter is not available.

Settings: -128 – +0 – +127

Resonance/Width

This parameter's function varies according to the selected Type. If the selected filter is an LPF, HPF, BPF (excluding the BPFw), or BEF, this parameter is used to set the Resonance. For the BPFw, it is used to adjust the Width of the band. This can be used in combination with the cutoff frequency parameter to add further character to the sound. The Width parameter is used to adjust the width of the band of signal frequencies passed by the filter with the BPFw. When the Filter Type is set to "LPF6" or "thru," this parameter is not available.

Settings: 0 – 127

Resonance Velocity Sens (Resonance Velocity Sensitivity)

Determines the degree to which resonance responds to velocity, or the strength with which you play notes. For positive values, the higher the velocity, the greater the resonance. A setting of 0 results in no change of the Resonance value. For negative values, the lower the velocity, the greater the resonance.

Settings: -64 – +0 – +63

Gain

Determines the Gain of the signal sent to the filter. The lower the value, the lower the Gain. The tonal characteristics generated by the filter differ depending on the value set here.

Settings: 0 – 255

Center Key (Cutoff Key Follow Sensitivity/HPF Cutoff Key Follow Sensitivity Center Key)

This indicates that the central note for Cutoff Key Follow and HPF Key Follow above is C3. The value cannot be changed. Keep in mind that this is for display purposes only.

Basic Structure

- Voice
  - Performance
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  - Master
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  - Audio Rec/Play
  - Utility

Voice

- Play
- Normal Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Controller
    - LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - ● Element Edit
    - OSC
    - Tune
    - PEG
    - ● Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
      Play Mode
      Arpeggio
      Controller
      Filter/EG
      3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
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Appendix

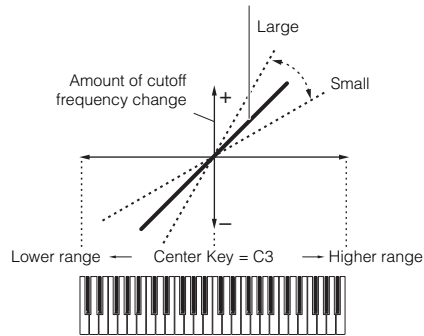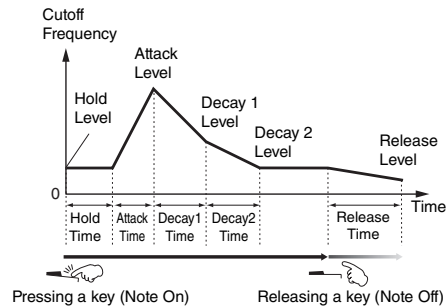## Cutoff Key Follow (Cutoff Key Follow Sensitivity)

Determines the degree to which the notes (specifically, their position or octave range) affect the "Cutoff" (set above) of the selected Element, assuming C3 as the basic pitch. A positive setting will lower the Cutoff frequency for lower notes and raise it for higher notes. A negative setting will have the opposite effect.

Settings: -200% − +0% − +200%

HPF Cutoff (High Pass Filter Cutoff Frequency)

Determines the central frequency for the Key Follow parameter (below) of the HPF. This parameter is available only when filter types LPF12 or LPF6 are selected.

Settings: 0 − 255

HPF Key Follow (High Pass Filter Cutoff Key Follow Sensitivity)

Determines the degree to which the notes (specifically, their position or octave range) affect the "Cutoff" (set above) of the HPF. A positive setting will lower the Cutoff frequency for lower notes and raise it for higher notes. A negative setting will have the opposite effect. A setting of 0 will result in no change in the note. This parameter is available only when filter types LPF12 or LPF6 are selected.

Settings: -200% − +0% − +200%

Cutoff Key Follow and Center Key

When Cutoff Key Follow is set to 100%

Large

Amount of cutoff frequency change

Small

Lower range ← Center Key = C3 → Higher range

FEG (Filter EG)

Time

Determines the Filter EG transition time. The Time parameters let you set the time between the adjoining points of the level parameters below. When the current Level setting is the same as the next, the corresponding Time indicates the length of time for which the Level is held at the current setting. A higher value results in a longer time until reaching the next level.

Settings: 0 − 127

Hold Time	Determines the time between the moment you press a note on the keyboard and the moment the envelope starts to rise.
Attack Time	Determines the speed of attack from the initial cutoff frequency (Hold Level) to the maximum level (Attack Level) of the Voice after the hold time has elapsed.
Decay 1 Time	Determines how fast the envelope falls from the maximum cutoff frequency (Attack Level) to the cutoff frequency specified as the Decay 1 Level.
Decay 2 Time	Determines how fast the envelope falls from the cutoff frequency specified as the Decay 1 Level to the cutoff frequency specified as the Decay 2 Level.
Release Time	Determines how fast the envelope falls to the cutoff frequency specified as the Release Level when the note is released.

Cutoff Frequency

Attack Level

Hold Level

Decay 1 Level

Decay 2 Level

Release Level

0

Hold Time / Attack Time / Decay1 Time / Decay2 Time / Release Time

Time

Pressing a key (Note On)   Releasing a key (Note Off)

Level

Determines the Filter EG transition time. The Level parameters let you set the amount of the filter change at each point based on the cutoff frequency specified in the Filter Type display (page 50).

Settings: -128 − +0 − +127

Hold Level	Determines the initial cutoff frequency at the moment the note is pressed.
Attack Level	Determines the maximum cutoff frequency which the envelope reaches after a note is pressed.
Decay 1 Level	Determines the cutoff frequency to which the sound changes from the Attack Level after the Decay 1 Time elapses.
Decay 2 Level	Determines the cutoff frequency which will be maintained while a note is held.
Release Level	Determines the final pitch reached after the note is released.

Time Velocity Sens (EG Time Velocity Sensitivity)

Determines how the Filter EG transition time (speed) responds to velocity, or the strength with which the note is pressed. When this is set to a positive value, high velocities result in a fast Filter EG transition speed while low velocities result in a slow speed, as shown below. When this is set to a negative value, high velocities result in a slow Filter EG transition speed while low velocities result in a fast speed. When this is set to 0, the Filter EG transition speed does not change no matter what the velocity.

Settings: -64 – +0 – +63

Playing hard
(High velocity)

Playing softly
(Low velocity)

Fast speed

Slow speed
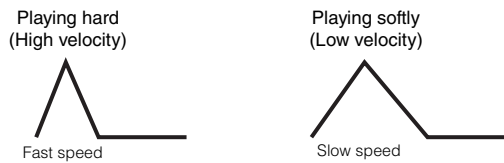
Segment (EG Time Velocity Sensitivity Segment)

Determines the part of the Filter EG affected by the Time Velocity Sens parameter.

Settings: attack, atk+dcy, decay, atk+rls, all

For details on the above settings, see "Segment" (page 49) in the "PEG."

EG Depth

Determines the range over which the cutoff frequency of the Filter EG changes. A setting of 0 will result in no change in the cutoff frequency. The farther from 0 the value is, the larger the range of the cutoff frequency. For negative values, the change of the cutoff frequency is reversed.

Settings: -64 – +0 – +63

EG Depth Vel Sens (EG Depth Velocity Sensitivity)

Determines how the range of the cutoff frequency responds to velocity. When this is set to a positive value, high velocities cause the Filter EG range to expand and low velocities cause it to contract, as shown below. When this is set to a negative value, high velocities cause the Filter EG range to contract and low velocities cause it to expand. When this is set to 0, the Filter EG range does not change no matter what the velocity.

Settings: -64 – +0 – +63

High Velocity

Low Velocity

Large range

Small range

EG Depth Curve (EG Depth Velocity Sensitivity Curve)

The five curves determine how the Filter EG transition range changes according to the velocity (strength) with which you play notes on the keyboard. The horizontal axis of the graph is the velocity, and the vertical axis is the Cutoff Frequency range.

Settings: Curve 0 – 4
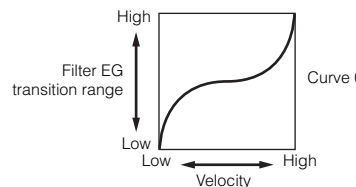
High

Filter EG transition range

Low

Low

High

Velocity

Curve 0

Time Key Follow Center Key (EG Time Key Follow Sensitivity Center Key)

Determines the central note for the "Time Key Follow." When the Center Key note is played, the Filter EG behaves according to its actual settings.

Settings: C -2 – G8

Time Key Follow (EG Time Key Follow Sensitivity)

Determines the degree to which the notes (specifically, their position or octave range) affect the Filter EG times of the selected Element. When this is set to a positive value, high notes result in a fast Filter EG transition speed while low notes result in a slow speed. When this is set to a negative value, the opposite effect is produced: High velocities result in a slow Filter EG transition speed while low notes result in a fast speed. When this is set to 0, the Filter EG transition speed does not change no matter what note is pressed.

Settings: -64 – +0 – +63

Positive value

Negative value

Faster speed

+63

+30

Lower range

Higher range

-40

Slower speed

Center key

Filter Scale

Break Point 1 – 4

Determines the four Break Points by specifying the respective note numbers.

Settings: C -2 – G8

NOTE: Break Point 1 to Break Point 4 will be automatically arranged in ascending order across the keyboard.

Cutoff Offset 1 – 4

Determines the offset value to the Cutoff parameter at each Break Point. For details about Filter Scaling, refer to "Setting example of Filter Scaling" (page 67) of the Supplementary information.

Settings: -128 – +0 – +127

NOTE: Regardless of the size of these Offsets, the minimum and maximum Cutoff limits (values of 0 and 127, respectively) cannot be exceeded.

NOTE: Any note played below the Break Point 1 note results in the Break Point 1 Level setting. Likewise, any note played above the Break Point 4 note results in the Break Point 4 Level setting.

AMP Level/Pan (Amplitude Level/Pan)

Level

Determines the output level of the Element.

Settings: 0 – 127

Level Velocity Sens (Level Velocity Sensitivity)

Determines how the output level of the Element responds to velocity. Positive settings will cause the output level to rise the harder you play the keyboard. A setting of 0 will cause the output level not to change. Negative settings will cause the output level to rise the more softly you play the keyboard.

Settings: -64 – +0 – +63

Level Velocity Curve (Level Velocity Sensitivity Curve)

The five curves determine how the actual velocity will be generated according to the velocity (strength) with which you play notes on the keyboard. The horizontal axis of the graph represents velocity, and the vertical axis represents volume range.

Settings: Curve 0 – 4
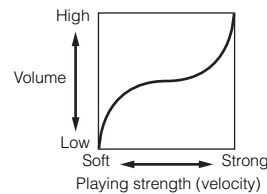
Level Velocity Offset (Level Velocity Sensitivity Offset)

Raises or lowers the level specified in Level Velocity Sens above. A setting of 64 results in the original Level Velocity Sens values being used. Settings above 64 will raise the level specified in Level Velocity Sensitivity. Settings below 64 will reduce the level.

Settings: 0 – 127

Level Key Follow Center Key (Level Key Follow Sensitivity Center Key)

This indicates that the central note for Level Key Follow above is C3. the value cannot be changed. Keep in mind that this is for display purposes only.

Level Key Follow (Level Key Follow Sensitivity)

Determines the degree to which the notes (specifically, their position or octave range) affect the amplitude level (set above) of the selected Element, assuming C3 as the basic pitch. A positive setting will lower the output level for lower notes and raise it for higher notes. A setting of 0 will cause the output level not to change. A negative setting will have the opposite effect.

Settings: -200% – +0% – +200%

Level Key Follow and Center Key

Pan

Adjusts the stereo pan position of the sound.

Settings: L63 (far left) – C (center) – R63 (far right)

Alternate Pan

Determines the amount by which the sound is panned alternately left and right for each note you press, assuming the pan position set above as center. Higher values increase the width of the Pan range.

Settings: L64 – C – R63

Random Pan

Determines the amount by which the sound of the selected Element is panned randomly left and right for each note you press. The Pan setting (above) is used as the Center Pan position.

Settings: 0 – 127

Scaling Pan

Determines the degree to which the notes (specifically, their position or octave range) affect the Pan position (set above), left and right, of the selected Element. At note C3, the main Pan setting (above) is used for the basic Pan position. A positive setting will move the pan position leftward for lower notes and move it rightward for higher notes. A negative setting will have the opposite effect.

Settings: -64 – +0 – +63

AEG (Amplitude EG)

Time

Determines the Amplitude EG transition time. The Time parameters let you set the time between the adjoining points of the Level parameters below. A higher value results in a longer time until reaching the next level.

Settings: 0 – 127

Attack Time	Determines how quickly the sound reaches its maximum level after the note is pressed.
Decay 1 Time	Determines how fast the envelope falls from the Attack Level to the Decay 1 Level.
Decay 2 Time	Determines how fast the envelope falls from the Decay 1 Level to the Decay 2 Level (sustain level).
Release Time	Determines how fast the volume falls from the sustain level to zero when the note is released.
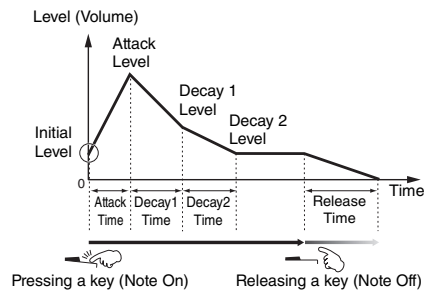
Level

Determines the Level settings for the Amplitude EG. The Level parameters let you set the amount of the transition at each point based on the level specified in the Level/Pan display ().

Settings: 0 – 127

Initial Level	Determines the initial level at the moment the note is pressed.
Attack Level	Determines the maximum level which the envelope reaches after a note is pressed.
Decay 1 Level	Determines the level to which the envelope reaches from the Attack Level after the Decay 1 Time elapses.
Decay 2 Level	Determines the level which will be maintained while a note is held from the Decay 1 Level.

Time Vel Sens (EG Time Velocity Sensitivity)

Determines how the Amplitude EG transition time (speed) responds to velocity, or the strength with which the note is pressed. When this is set to a positive value, high velocities result in a fast Amplitude EG transition speed while low velocities result in a slow speed, as shown below. When this is set to a negative value, high velocities result in a slow Amplitude EG transition speed while low velocities result in a fast speed. When this is set to 0, the Amplitude EG transition speed does not change no matter what the velocity.

Settings: -64 – +0 – +63

Segment (EG Time Velocity Sensitivity Segment)

Determines the part of the Amplitude EG affected by the Time Vel Sens parameter.

Settings: attack, atk+dcy, decay, atk+rls, all

attack	Time Vel Sens affects the Attack Time.
atk+dcy (attack+decay)	Time Vel Sens affects the Attack Time and Decay 1 Time.
decay	Time Vel Sens affects the Decay 1/2 Time.
atk+rls (attack+release)	Time Vel Sens affects the Attack Time and Release Time.
all	Time Vel Sens affects all the Amplitude EG Time parameters.

Half Damper (Half Damper Switch)

When the Half Damper Switch is set to on, you can produce a "half-pedal" effect just as on a real acoustic piano by using the external Controller assigned to control change number 64.

Settings: off, on

Half Damper Time

Determines how quickly the sound decays to silence after the key is released while holding down the Foot Controller FC3 with the Half Damper parameter turned on. After releasing the key, you can control the decay time of the sound via the Foot Controller position, with the Half Damper Time of the Amplitude EG being the maximum decay value and the Release Time of the Amplitude EG being the minimum decay value. When you release the pedal, the decay time after the key is released is equivalent to the AEG Release Time. You can create a piano-like effect by setting the Release Time to a small value and setting the Half Damper Time to a large value.

The setting here is available only when the Half Damper parameter is set to on and you use the optional FC3 connected to the rear panel.

Settings: 0 – 127

Time Key Follow Center Key
(EG Time Key Follow Sensitivity Center Key)

Determines the central note for the "Time Key Follow." When the Center Key note is played, the Amplitude EG behaves according to its actual settings.

Settings: C -2 – G8

Time Key Follow (EG Time Key Follow Sensitivity)

Determines the degree to which the notes (specifically, their position or octave range) affect the Amplitude EG times of the selected Element. When this is set to a positive value, high notes result in a fast Amplitude EG transition speed while low notes result in a slow speed. When this is set to a negative value, high velocities result in a slow Amplitude EG transition speed while low notes result in a fast speed. When this is set to 0, the Amplitude EG transition speed does not change no matter what the pressed note.

Settings: -64 – +0 – +63
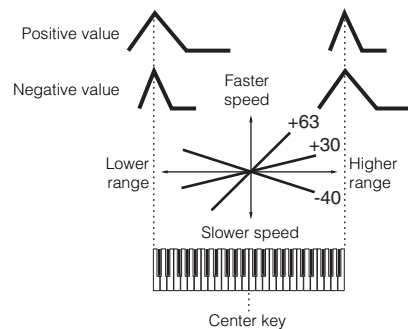
AMP Scale (Amplitude Scale)

Break Point 1 – 4

Determines the four Break Points by specifying the respective note numbers.

Settings: C -2 – G8

NOTE: Break Point 1 to Break Point 4 will be automatically arranged in ascending order across the keyboard.

Level Offset 1 – 4

Determines the offset value to the level at each Break Point. For details about Amplitude Scaling, refer to "Setting example of Amplitude Scaling" (page 67) in the Supplementary information.

Settings: -128 – +0 – +127

LFO

LFO Wave

Selects the Wave and determines how the LFO waveform modulates the sound.

Settings: saw, triangle, square

Speed

Determines the speed of the LFO Wave. The higher the value, the faster the speed.

Settings: 0 – 63

Key on Reset

When this is set to on, the LFO waveform is reset every time a note is played.

Settings: off, on

off	The LFO cycles freely with no key synchronization. Pressing a key starts the LFO wave at whatever phase the LFO happens to be at that point.
on	The LFO resets with each received note and starts a waveform at the phase specified by the Phase parameter.

Delay

Determines the delay time between the moment you press a note on the keyboard to the moment the LFO comes into effect. A higher value results in a longer delay time.

Settings: 0 – 127

Fade in Time

Determines the amount of time for the LFO effect to fade in after the Delay time has elapsed. A higher value results in a slower fade-in. When set to "0," the LFO effect will not fade in and reach the maximum level immediately after the Delay time has elapsed.

Settings: 0 – 127

P Mod (Pitch Modulation)

Determines the amount (depth) by which the LFO wave varies (modulates) the pitch of the sound. The higher the setting, the greater the depth of control.

Settings: 0 – 127

F Mod (Filter Modulation)

Determines the amount (depth) by which the LFO wave varies (modulates) the Filter Cutoff frequency. The higher the setting, the greater the depth of control.

Settings: 0 – 127

A Mod (Amplitude Modulation)

Determines the amount (depth) by which the LFO wave varies (modulates) the amplitude or volume of the sound. The higher the setting, the greater the depth of control.

Settings: 0 – 127

EQ

Type (EQ Type)

Determines the EQ Type. The number of parameters and values available differs depending on the selected EQ type.

Settings: 2 Band (2 Band EQ), P.EQ (Parametric EQ), Boost 6 (Boost +6dB), Boost 12 (Boost +12dB), Boost18 (Boost +18dB), thru

2 Band	This is a "shelving" equalizer, which combines separate high and low frequency bands.
P.EQ	The Parametric EQ for the single band is used to attenuate or boost signal levels (gain) around the Low Freq according to the settings of Low Gain. Determines the bandwidth with which the sound will be boosted or cut in the "Q" parameter.
Boost 6 Boost 12 Boost 18	Boosts the entire band of the selected Element by +6dB, +12dB, and +18dB respectively. These settings have no adjustable parameters.
thru	The equalizers are bypassed and the entire signal is unaffected.

Low Freq (Low Frequency)

This parameter is available only when the Type (EQ Type) parameter is set to "2 Band" or "P.EQ." When setting to "2 Band," this determines the amount by which signals below the "Low Freq" will be boosted/attenuated. When setting to "P.EQ," this determines the center frequency.

Settings: When the Type is set to "2 Band": 50.1Hz – 2.00kHz, When the Type is set to "P.EQ": 139.7Hz – 12.9kHz

High Freq (High Frequency)

This parameter is available only when the Type (EQ Type) parameter is set to "2 Band." Determines the center frequency of the higher EQ band.

Settings: 503.8Hz – 10.1kHz

Low Gain

This parameter is available only when the Type (EQ Type) parameter is set to "2 Band" or "P.EQ." When setting to "2 Band," this determines the amount by which signals below the "Low Freq" will be boosted/attenuated. When setting to "P.EQ," this determines the amount by which signals in the area of the center frequency will be boosted/attenuated.

Settings: -12.00dB – +0.00dB – +12.00dB

High Gain

This parameter is available only when the Type (EQ Type) parameter is set to "2 Band." This determines the amount by which signals above the "High Freq" will be boosted/attenuated.

Settings: -12.00dB – +0.00dB – +12.00dB

Q

This parameter is available only when the Type (EQ Type) parameter is set to "P.EQ." Determines the Q for the band. The lower the setting, the greater the bandwidth. The higher the setting, the smaller the bandwidth.

Settings: 0.7 – 10.3

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　Common Edit
　　Name
　　Play Mode
　　Arpeggio
　　　Arp Edit
　　　Arp 1-5 Type
　　Controller
　　LFO
　　Filter/EG
　　3 Band EQ
　　Effect
● Element Edit
　　OSC
　　Tune
　　PEG
　　Filter Type
　　FEG
　　Filter Scale
　　AMP Level/Pan
　　AEG
　　AMP Scale
　　LFO
　● EQ
Drum Voice Edit
　Common Edit
　　Name
　　Play Mode
　　Arpeggio
　　Controller
　　Filter/EG
　　3 Band EQ
　　Effect
　Key Edit
　　OSC
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Appendix

Drum Voice Edit

Each Drum Voice can consist of up to 73 Drum Keys, assigned to notes (C0 to C6). There are two types of Drum Voice Edit: those for Common Edit to edit the settings common to all keys, and those for Key Edit to edit individual keys. In this section, we'll show you how to edit a Drum Voice.

Common Edit

These parameters are for making global (or common) edits to all keys of the selected Drum Voice.

Operation	[VOICE] → Select desired Drum Voice → [EDIT] → Select desired display in the Voice Edit Select display → [ENTER] → Edit display
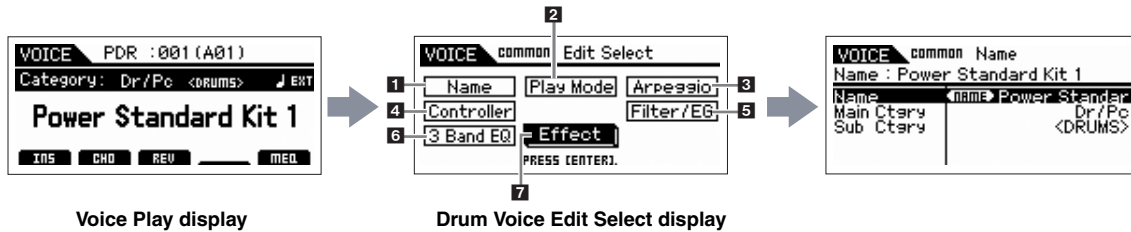
Voice Play display   **Drum Voice Edit Select display**

1 Name

Same as the Name display in Normal Voice Common Edit (page 34).

2 Play Mode

Same as the Play Mode display in Normal Voice Common Edit (page 34). The following settings are not available for Drum Voice:
Note Shift settings, Mono/Poly settings, Key Assign mode settings, Portamento settings, Micro tuning settings.

3 Arpeggio

Same as the General display in Normal Voice Common Edit. See page 36.

4 Controller

Same as the Controller display in Normal Voice Common Edit (page 39). The Element Switch parameters on the S90 XS/S70 XS Editor are not available for Drum Voice.

5 Filter/EG

Same as the Filter/EG display in Normal Voice Common Edit (page 43). The following parameters are not available for Drum Voice:
FEG Attack Time, FEG Decay Time, FEG Release Time, FEG Depth, AEG Sustain Level, AEG Release Time.

6 3 Band EQ

Same as the 3 Band EQ display in Normal Voice Common Edit (page 44).

7 Effect

Same as the Effect in Normal Voice Common Edit (). The main difference is that the Insertion Effect Out parameter on the S90 XS/S70 XS Editor is set for each Drum Key. In addition to that, four parameters are available. In this section, we'll describe only those parameters which are different from the Normal Voice.

Key Out (Drum Key Out) `EDITOR`

Determines which Insertion Effect (A or B) is used to process each individual Drum Key. This Parameter can be set for each Drum Key selected in the Key parameter.

Settings: thru (through), Ins A (Insertion A), Ins B (Insertion B)

Key `EDITOR`

Determines the Drum Key to be edited. You can select the key by clicking the keyboard on the S90 XS/S70 XS Editor. The parameters Key Out, Reverb Send (Key Reverb Send) and Chorus Send (Key Chorus Send) can be set for each Drum Key.

Settings: C0 – C6

Chorus Send (Key Chorus Send) `EDITOR`

Determines the level of the Drum Key sound (the bypassed signal) that is sent to Chorus effect. The setting here is available only when the Key Out parameter is set to "thru."

Settings: 0 – 127

Reverb Send (Key Reverb Send) `EDITOR`

Determines the level of the Drum Key sound (the bypassed signal) that is sent to Reverb effect. The setting here is available only when the Key Out parameter is set to "thru."

Settings: 0 – 127

Chorus Ins Send (Insertion Chorus Send) `EDITOR`

When the Key Out parameter is set to "Ins A" or "Ins B," this determines the level of the Drum Key sound (output from Insertion Effect A or B) that is sent to the Chorus effect.

Settings: 0 – 127

Reverb Ins Send (Insertion Reverb Send) `EDITOR`

When the Key Out parameter is set to "Ins A" or "Ins B," this determines the level of the Drum Key sound (output from Insertion Effect A or B) that is sent to the Reverb effect.

Settings: 0 – 127

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Arpeggio
Arp Edit
Arp 1-5 Type
Controller
LFO
Filter/EG
3 Band EQ
Effect
Element Edit
OSC
Tune
PEG
Filter Type
FEG
Filter Scale
AMP Level/Pan
AEG
AMP Scale
LFO
EQ
Drum Voice Edit
● Common Edit
Name
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Key Edit ᴇᴅɪᴛᴏʀ

If you wish to edit the sounds that make up a Voice and the detailed parameters that determine the sound, such as Oscillator, Pitch, Filter, Amplitude, and EG (Envelope Generator), call up the Key Edit display. These parameters can be edited only on the S90 XS/S70 XS Editor, and not the device itself. For details on each parameter setting window, refer to the owner's manual of the S90 XS/S70 XS Editor.

OSC (Oscillator)

Key

Determines the desired drum key. You can also select the key by clicking the keyboard on the S90 XS/S70 XS Editor.

Settings: C0 – C6

Key Sw (Key Switch)

Determines whether the currently selected Key is used or not. When this is set to off, the currently edited Key will not sound.

Settings: off (inactive), on (active)

Wave Bank (Waveform Bank)
Category (Waveform Category)
Number (Waveform Number)
Name (Waveform Name)

Determines the Waveform assigned to the Drum Key. Only Preset Banks are available for the Waveform Bank. For details about Preset Waveforms, see the Waveform list in the Data List (separate PDF documentation).

Assign Mode

This is useful when two or more instances of the same note are received nearly simultaneously, or without a corresponding note off message. To allow playback of each instance of the same note, set this to "multi." To allow playback of each instance of the same note, set this to "multi." In general, you should probably set this to "multi"—especially for tambourine and cymbal sounds that you would want to ring out to their full decay, when playing them multiple times in succession. Please keep in mind that the "multi" setting consumes the overall polyphony and it may cause sounds to be cut off.

Settings: single, multi

single	When this is set to "single" and double playback of the same note are transmitted to the internal tone generator, the first note will be stopped then the next note will be sounded.
multi	When this is set to "multi" and double playback of the same note are transmitted to the internal tone generator, all the notes are sounded simultaneously.

Receive Note Off

Determines whether or not the selected Drum Key responds to MIDI Note Off messages. This should be set to on when the selected Drum Key has a sustained, non-decaying sound (such as a snare roll), so that you can stop the sound by releasing the note.

Settings: off, on

Alternate Group

Determines the Alternate Group to which the key is assigned. In a real drum kit, some drum sounds cannot physically be played simultaneously, such as open and closed hi-hats. You can prevent keys from playing back simultaneously by assigning them to the same Alternate Group. You can also select "off" here if you wish to allow the simultaneous playback of sounds.

Settings: off, 1 – 127

Ins Effect Output (Insertion Effect Output)

Determines which Insertion Effect (A or B) is used to process each individual Drum Key. This parameter is same as Key Out () in the Effect section in Drum Voice Common Edit. Making a setting here automatically changes the setting of that parameter as well.

Settings: thru (through), Ins A (Insertion A), Ins B (Insertion B)

Reverb Send (Key Reverb Send)

Determines the level of the Drum Key sound (the bypassed signal) that is sent to Reverb effect. The setting here is available only when the "Ins Effect Output" parameter is set to "thru." This parameter is same as Reverb Send () in the Effect section in Drum Voice Common Edit. Making a setting here automatically changes the setting of that parameter as well.

Settings: 0 – 127

Chorus Send (Key Chorus Send)

Determines the level of the Drum Key sound (the bypassed signal) that is sent to Chorus effect. The setting here is available only when the "Ins Effect Output" parameter is set to "thru." This parameter is same as Chorus Send () in the Effect section in Drum Voice Common Edit. Making a setting here automatically changes the setting of that parameter as well.

Settings: 0 – 127

Output Select

Determines the specific output(s) for the individual Drum key signal. You can assign each individual Drum Key sound to be output from a specific hardware output jack on the rear panel. This function is useful when you wish to apply a connected external effect to a specific drum instrument. The setting here is available only when the "Ins Effect Output" parameter is set to "thru."

Settings: For details, refer to the "Output Select List" () of the Supplementary information.

Tune

Coarse (Coarse Tuning)

Determines the pitch of each Drum Key in semitones.

Settings: -48semi – +0semi – +48semi

Fine (Fine Tuning)

Determines the pitch of each Drum Key in cents.

Settings: -64cent – +0cent – +63cent

Vel Sens (Pitch Velocity Sensitivity)

Determines how the pitch of the Drum Key responds to velocity. Positive settings will cause the pitch to rise the more strongly you play the keyboard and negative settings will cause it to fall. A setting of 0 will cause the pitch not to change. Negative settings will cause the pitch to rise the more softly you play the keyboard.

Settings: -64 – +0 – +63

Filter Type

Cutoff

Raises or lowers the cutoff frequency of the low pass filter to adjust the tone brilliance. The sound can be brightened by raising the cutoff frequency, and darkened or muffled by lowering it.

Settings: 0 – 255

Cutoff Vel Sens (Cutoff Velocity Sensitivity)

Determines how the Cutoff Frequency responds to velocity, or the strength with which you play notes. Positive settings will cause the Cutoff Frequency to rise the harder you play the keyboard. A setting of 0 will cause the Cutoff Frequency not to change depending on velocity. Negative settings will cause the Cutoff Frequency to rise the more softly you play the keyboard.

Settings: -64 – +0 – +63

Resonance

Determines the emphasis given to the Cutoff Frequency to add further character to the sound. Higher values result in a more pronounced effect. This can be used in combination with the cutoff frequency parameter to add further character to the sound.

Settings: 0 – 127

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- Normal Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Controller
    - LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Element Edit
    - OSC
    - Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Key Edit
    - OSC
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    - Filter Type
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HPF Cutoff (High Pass Filter Cutoff Frequency)

Determines the Cutoff Frequency of the High Pass Filter. Higher values result in a more pronounced effect. This can be used in combination with the cutoff frequency parameter to add further character to the sound.

Settings: 0 – 255

AMP Level/Pan (Amplitude Level/Pan)

Level

Determines the output level of the Drum Key.

Settings: 0 – 127

Velocity Sens (Velocity Sensitivity)

Determines how the output level of the Drum Key responds to velocity. Positive settings will cause the output level to rise the harder you play the keyboard. A setting of 0 will cause the output level not to change. Negative settings will cause the output level to rise the more softly you play the keyboard.

Settings: -64 – +0 – +63

Pan

Adjusts the stereo pan position of the sound.

Settings: L63 (far left) – C (center) – R63 (far right)

Alternate Pan

Determines the amount by which the sound is panned alternately left and right for each note you press, assuming the pan position parameter above is set to center. Higher values increase the width of the Pan range.

Settings: L64 – C – R63

Random Pan

Determines the amount by which the sound of the selected Drum Key is panned randomly left and right for each note you press. The Pan setting (above) is used as the Center Pan position.

Settings: 0 – 127

AEG (Amplitude EG)

Time

Determines the Amplitude EG transition time. A higher value results in a longer time until reaching the next level.

Settings: Attack (Attack Time), Decay 1 (Decay 1 Time): 0 – 127, Decay 2 (Decay 2 Time): 0 – 126, hold

Attack (Attack Time)	Determines how long it takes for the sound to reach full volume (Attack Level) when a note is pressed.
Decay 1 (Decay 1 Time)	Determines how long it takes for the sound to fall from the Attack Level to the Decay1 Level after the note is pressed.
Decay 2 (Decay 2 Time)	Determines how quickly the sound decays from the Decay1 Level to silence after the note is released.

Level

Determines the Level settings for the Amplitude EG.

Settings: 0 – 127

Decay 1 (Decay 1 Level)	Determines the level which the Amplitude EG level reaches from the Attack Level after the Decay1 time elapses.

EQ

From this display, you can set the EQ parameters for each Drum Key. This is the same as in Normal Voice Common Edit. See .

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- Voice
  - Performance
  - Multi
  - SEQ Play
  - Master
  - Remote
  - File
  - Audio Rec/Play
  - Utility

Voice

Play
Normal Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
      Arp Edit
      Arp 1-5 Type
    Controller
    LFO
    Filter/EG
    3 Band EQ
    Effect
  Element Edit
    OSC
    Tune
    PEG
    Filter Type
    FEG
    Filter Scale
    AMP Level/Pan
    AEG
    AMP Scale
    LFO
    EQ
Drum Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
    Controller
    Filter/EG
    3 Band EQ
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    ● EQ
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Voice Job

The Voice Job mode features convenient data initialization and archiving tools.

Operation	[VOICE] → Select Voice Program → [JOB] → Voice Job Select display
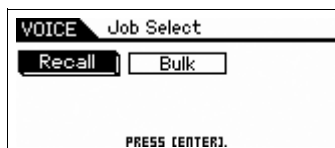
Recall

If you are editing a Voice but you have not stored it before switching to another Voice, the edits you have made will be cleared. If this happens, you can use the Recall function to restore the Voice with your latest edits intact. Press the [ENTER] button to execute the Recall.

Bulk (Bulk Dump)

This function lets you send your edited parameter settings for the currently selected Voice to a computer or another MIDI device for data archiving. Press the [ENTER] button to execute the Bulk Dump.

NOTE: To execute this function, simultaneously hold down the [SHIFT] button and press the [VOICE] button.

NOTE: In order to execute Bulk Dump, you will need to set the correct MIDI Device Number. About the MIDI Device Number setting, refer to .

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

Play
Normal Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
      Arp Edit
      Arp 1-5 Type
    Controller
    LFO
    Filter/EG
    3 Band EQ
    Effect
  Element Edit
    OSC
    Tune
    PEG
    Filter Type
    FEG
    Filter Scale
    AMP Level/Pan
    AEG
    AMP Scale
    LFO
    EQ
Drum Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
    Controller
    Filter/EG
    3 Band EQ
    Effect
  Key Edit
    OSC
    Tune
    Filter Type
    AMP Level/Pan
    AEG
    EQ
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Appendix

Supplementary Information

Voice Category List

This is the list of the Main Categories and their Sub Categories to which the respective Voices of the S90 XS/S70 XS belong.

Main Category	Sub Category					
Piano (Acoustic Piano)	APno (Acoustic Piano)	Layer	Modrn (Modern)	Vintg (Vintage)	Arp (Arpeggio)	---
Keys (Keyboard)	EP (Electric Piano)	FM (FM Piano)	Clavi	Synth	Arp	---
Organ	Tn Whl (Tone Wheel)	Combo	Pipe	Synth	Arp	---
Guitar	A. Gtr (Acoustic Guitar)	E.Cln (Electric Clean)	E. Dst (Electric Distortion)	Synth	Arp	---
Bass	ABass (Acoustic Bass)	EBass (Electric Bass)	SynBs (Synth Bass)	Arp (Arpeggio)	---	
String (Strings)	Solo	Ensem (Ensemble)	Pizz (Pizzicato)	Synth	Arp	---
Brass	Solo	BrsEn (Brass Ensemble)	Orche (Orchestra)	Synth	Arp	---
SaxWW (Sax/Woodwind)	Sax (Saxophone)	Flute	WWind (Woodwind)	RPipe (Reed/Pipe)	Arp	---
SynLd (Synth Lead)	Analg (Analog)	Digtl (Digital)	H Hop (Hip Hop)	Dance	Arp	---
Pads (Synth Pad/Choir)	Analg (Analog)	Warm	Brite (Bright)	Choir	Arp	---
SyCmp (Synth Comp)	Analg (Analog)	Digtl (Digital)	Fade	Hook	Arp	---
CPerc (Chromatic Percussion)	Malet (Mallet Percussion)	Bell	SynBl (Synth Bell)	PDrum (Pitched Drum)	Arp	---
Dr / Pc (Drum/Percussion)	Drums	Perc (Percussion)	Synth	Arp (Arpeggio)	---	
S.EFX (Sound Effect)	Move (Moving)	Ambie (Ambient)	Natur (Nature)	SciFi (Sci-Fi)	Arp	---
M. EFX (Musical Effect)	Move	Ambie	Sweep	Hit	Arp	---
Ethnc (Ethnic)	Bowed	Pluk (Plucked)	Struk (Struck)	Blown	Arp	---
Vocoder	---	---	---	---	---	---
--- (No Assign)	---	---	---	---	---	---

Micro Tuning

In the sections that follow, we'll explain in detail about the "Micro Tune" parameter in the Play Mode display (page 36) of the Voice Edit parameters.

What is Micro Tuning?

This function lets you change the keyboard scale from normal tuning (equal temperament) to one of a variety of special scales. You can determine the scale type for each voice by simply selecting a Tuning number. You can also use original Micro Tuning types that you've created in the Micro Tune display (page 140) of the Utility parameters.

Micro Tuning List

| Micro Tuning No.	Type	Micro Tuning Root	Comments
1	Equal	—	The "compromise" tuning used for most of the last 200 years of Western music, and found on most electronic keyboards. Each half step is exactly 1/12 of an octave, and music can be played in any key with equal ease. However, none of the intervals are perfectly in tune.
2	PureMajor	C – B	This tuning is designed so that most of the intervals (especially the major third and perfect fifth) in the major scale are pure. This means that other intervals will be correspondingly out of tune. You need to specify the key (C – B) you will be playing in.
3	PureMinor	C – B	
4	Werckmeist	C – B	Andreas Werckmeister, a contemporary of Bach, designed this tuning so that keyboard instruments could be played in any key. Each key has a unique character.
5	Kirnberger	C – B	Johann Philipp Kirnberger, an 18th century composer, created this tempered scale to allow performances in any key.
6	Vallot&Yng	C – B	Francescatonio Vallotti and Thomas Young (both mid-1700s) devised this adjustment to the Pythagorean tuning, in which the first six fifths are lowered by the same amount.
7	1/4 Shift	—	This is the normal equal tempered scale shifted up 50 cents.
8	1/4 tone	—	Twenty-four equally spaced notes per octave. (Play twenty-four notes to move one octave.)
9	1/8 tone	—	Forty-eight equally spaced notes per octave. (Play forty-eight notes to move one octave.)
10	Indian	—	Usually observed in Indian music (white keys only).
11	Arabic 1	C – B	Usually observed in Arabic music.
12	Arabic 2		
13	Arabic 3		

Setting examples of the Destination

In this section, we'll show you some useful examples how to set the "Ctrl Set 1 – 6 Dest (Controller Set Destination)" assignments of the Control display in the Voice Common Edit parameters (page 40).

To control the volume:	Volume (volume)
To apply vibrato to the Voice:	Common LFO Depth1 – 3 (C-LFO dpth1 – 3)[*1]
To change the pitch:	Element Pitch (coarse tune)[*2]
To control the brightness of the Voice:	Element Filter Frequency (cutoff)[*2]
To change the speed of the Rotary Speaker:	Insertion A/B Parameter 1 (ins A/B Rotor Slow)[*3]
To apply wah pedal effect to the Voice:	Insertion A/B Parameter 1 (ins A/B Pedal Ctrl)[*4]

Concerning *1 – *4, the following settings are necessary in addition to the above setting.

*1   Select the "LFO" in the Voice Edit Select display | [ENTER] | "Play Mode" = "loop"
       Select the "LFO" in the Voice Edit Select display | [ENTER] | "Dest 1 – 3" = "P mod"

*2   Controller Set in the Voice Common Edit on the S90 XS/S70 XS Editor | "SW (Element Switch)" = "on"

*3   Select the "Effect" in the Voice Edit Select display | [ENTER] | select the "Ins A/B" | [ENTER] | "Type" = "Rotary Speaker"
       Effect in the Voice Common Edit on the S90 XS/S70 XS Editor | "Element Out" / "Key Out" = ins A/B (assigned to "Rotary Speaker"
       type)

*4   Select the "Effect" in the Voice Edit Select display | [ENTER] | select the "Ins A/B" | [ENTER] | "Type" = "VCM Pedal Wah"
       Effect in the Voice Common Edit on the S90 XS/S70 XS Editor | "Element Out" / "Key Out" = ins A/B (assigned to "VCM Pedal Wah"
       type)

Filter Type List ▣EDITOR

In the sections that follow, we'll explain the Filter Type specified in the Filter Type display (page 50) of the Voice Element Edit.

■ LPF (Low Pass Filter)

This is a Filter type that only passes signals below the Cutoff Frequency. The sound can be brightened by raising the cutoff frequency of the filter. On the other hand, the sound can be darkened by lowering the cutoff frequency of the filter. You can then use Resonance to add further character to the sound. This filter type is most popular and useful for producing classic synthesizer sounds.

LPF24D
A dynamic 24 dB/oct low-pass filter with a characteristic digital sound. Compared to the LPF24A type (below), this filter can produce a more pronounced resonance effect.

LPF24A
A digital dynamic low-pass filter with characteristics similar to a 4-pole analog synthesizer filter.

LPF18
A 3-pole (-18db/oct) dynamic LPF.

LPF18s
A 3-pole (-18db/oct) dynamic LPF. but with a shallower frequency curve.
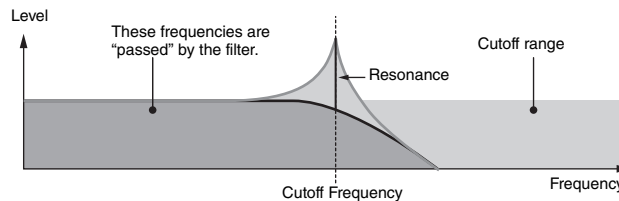
■ HPF (High Pass Filter)

This is a Filter type that only passes signals above the Cutoff Frequency. You can then use the Resonance to add further character to the sound.

HPF24D
A dynamic 24 dB/oct high-pass filter with a characteristic digital sound. This filter can produce a pronounced resonance effect.

HPF12
12 dB/oct dynamic high-pass filter.

Basic Structure

- **Voice**
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Voice

- Play
- Normal Voice Edit
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Controller
    - LFO
    - Filter/EG
    - 3 Band EQ
    - Effect
  - Element Edit
    - OSC
    - Tune
    - PEG
    - Filter Type
    - FEG
    - Filter Scale
    - AMP Level/Pan
    - AEG
    - AMP Scale
    - LFO
    - EQ
- Drum Voice Edit
  - Common Edit
    - Name
      Play Mode
      Arpeggio
      Controller
      Filter/EG
      3 Band EQ
    - Effect
  - Key Edit
    - OSC
    - Tune
    - Filter Type
    - AMP Level/Pan
    - AEG
    - EQ
- Job
  - Recall
  - Bulk
- Supplementary Info.

Appendix

■ BPF (Band Pass Filter)

This Filter type is a combination of a LPF and HPF. When this Filter Type is selected, you can set the Cutoff Frequency around which the audio signal is passed.
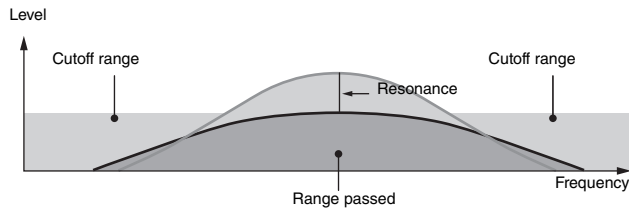
BPF12D
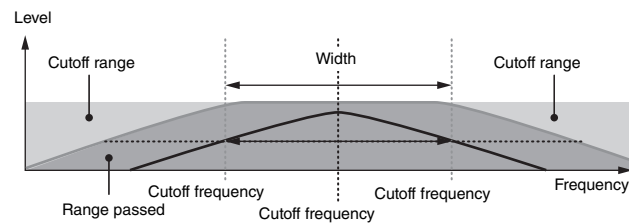The combination of a -12 dB/oct HPF and LPF with a characteristic digital sound.
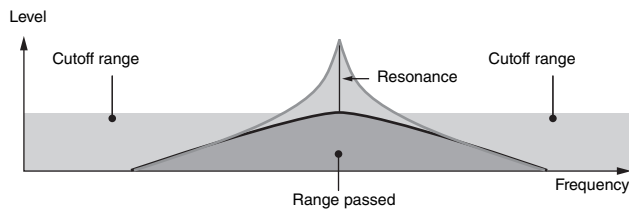
BPF6
The combination of a -6 dB/oct HPF and LPF.

BPFw
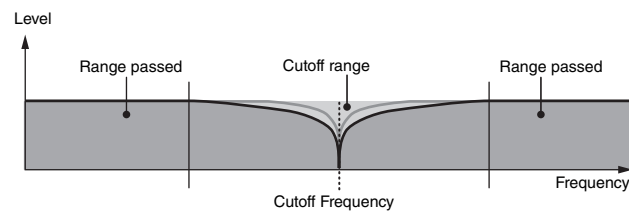A 12 dB/oct BPF that combines HPF and LPF filters to allow wider bandwidth settings.

■ BEF (Band Elimination Filter)

When this Filter Type is selected, you can set the Cutoff Frequency around which the audio signal is muted or eliminated. The Band Elimination Filter has an opposite effect on the sound compared to the Band Pass Filter.

BEF12

BEF6

■ Dual Type Filter

This type is a combination of two same filter types. You can edit the distance between the two Cutoff Frequencies. You can edit the distance between the two Cutoff Frequencies.

Dual LPF
Two 12 dB/oct low-pass filters connected in parallel.

Dual HPF
Two -12 dB/oct high-pass filters connected in parallel.

Dual BPF
Two -6 dB/oct band-pass filters connected in parallel.
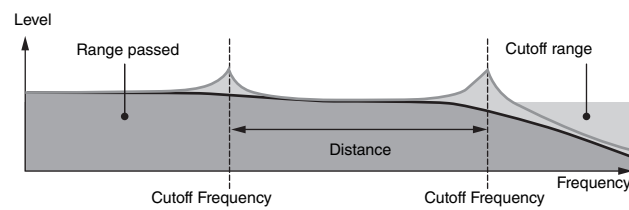
Dual BEF
Two -6 dB/oct band-elimination filters connected in parallel.

■ Combination Type Filter

This type is a combination of two different filter types. You can edit the distance between the two Cutoff Frequencies.

LPF12+HPF12

A combination of a -12 dB/oct low-pass filter and high-pass filter. When this Filter Type is selected, HPF Cutoff and HPF Key Follow can be set. Only the LPF graph is shown on the display.

LPF6+HPF6

A combination of a -6 dB/oct low-pass filter and high-pass filter. When this Filter Type is selected, HPF Cutoff and HPF Key Follow can be set. Only the LPF graph is shown on the display.

LPF12+BPF6

A combination of a low-pass filter and band-pass filter. You can edit the distance between the two Cutoff Frequencies.
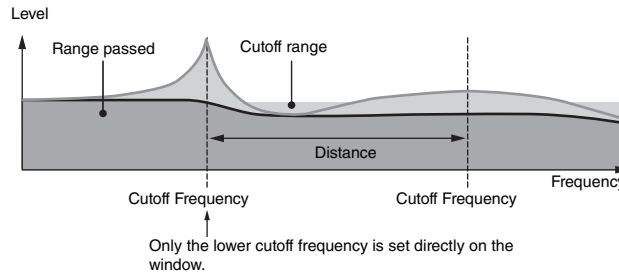
Setting example of Filter Scaling [EDITOR]

Here we'll show you the setting example of Filter Scaling in Filter Scale (page 53) of the Voice Element Edit parameters. For the settings shown in the example below, the basic Cutoff frequency value is 127, and the various Cutoff Offset values at the selected Break Point settings change that basic value accordingly. The Cutoff frequency changes in a linear fashion between successive Break Points as shown.

	1	2	3	4
Break Point	C#1	D#2	C3	C4
Cutoff Offset	-4	+10	+17	+4
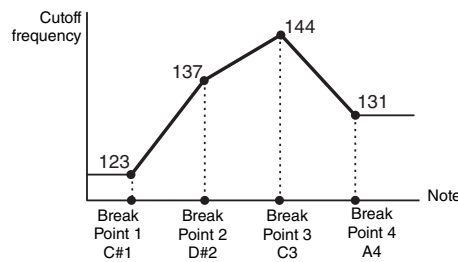
Setting example of Amplitude Scaling [EDITOR]

Here we'll show you an example Amplitude Scaling setting in AMP Scale (page 55) of the Voice Element Edit parameters. For the settings shown in the example below, the basic Amplitude (volume) value for the selected Element is 80, and the various Level Offset values at the selected Break Point settings change that basic value accordingly. The Amplitude changes in a linear fashion between successive Break Points as shown.

	1	2	3	4
Break Point	C1	C2	C3	C4
Level Offset	-4	+10	+17	+4

Basic Structure

Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Voice

Play
Normal Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
      Arp Edit
      Arp 1-5 Type
    Controller
    LFO
    Filter/EG
    3 Band EQ
    Effect
  Element Edit
    OSC
    Tune
    PEG
    Filter Type
    FEG
    Filter Scale
    AMP Level/Pan
    AEG
    AMP Scale
    LFO
    EQ
Drum Voice Edit
  Common Edit
    Name
    Play Mode
    Arpeggio
    Controller
    Filter/EG
    3 Band EQ
    Effect
  Key Edit
    OSC
    Tune
    Filter Type
    AMP Level/Pan
    AEG
    EQ
Job
  Recall
  Bulk
Supplementary Info.

Appendix

Output Select List `EDITOR`

In the sections that follow, we'll explain the Output Select settings that let you determine the output assignments for the signals. Output Select is specified in several different places: OSC (Oscillator) of the Drum Key Edit parameters on the S90 XS/S70 XS Editor, the Voice A/D Out and A/D FX display of the Utility parameters, and Click Output Sel of the Utility General parameter.

Display indication	Output destination	Stereo/Mono
L&R	OUTPUT L and R	Stereo
asL&R	ASSIGNABLE OUTPUT L and R	Stereo
asL	ASSIGNABLE OUTPUT L	Mono
asR	ASSIGNABLE OUTPUT R	Mono
drum	See below*	See below*

* The "drum" setting can be selected in the Multi Part Edit display of the Parts assigned to the Drum Voice. To the edited Part, the sound will be output via the destination set in the Drum Key Edit window as the "Output Select."

NOTE: When the Output Select is set the value other than "L&R" or "drum," the Reverb/Chorus Send is automatically fixed to 0 and the Dry Level is automatically fixed to 127.

Performance Mode

Performance Play

The Performance mode is used for selecting, playing, and editing the desired Performance. Performances can be made up of a maximum of four Parts (Voices), selected from the internal tone generator Parts 1 – 4. The Performance Play mode is the main "portal" by which you enter the Performance mode, and it is here where you select and play a Performance. Some of the Performance settings can also be edited in this mode.

Operation	Press the [PERFORM] button.

Selecting a Performance

The S90 XS/S70 XS contains 128 Performances in each of the User Banks 1 – 4.
Selecting Performances is done in basically the same way as selecting Voices. Refer to page 27. As in the Voice Play mode, you can use the Category Search (page 28) and Favorite Category (page 28) functions in the Performance Play mode.

Switching a Part on/off

The Performance Play mode lets you turn the four Parts of the current Performance on or off as desired. You can enable this by pressing the [PERFORM] button to enter the Performance Play mode.

Part on/off

You can switch the Part on/off by using the [PART ON/OFF] 1 – 4 buttons of the Performance Control Buttons. When the lamp is turned on, the corresponding Part is set to on.
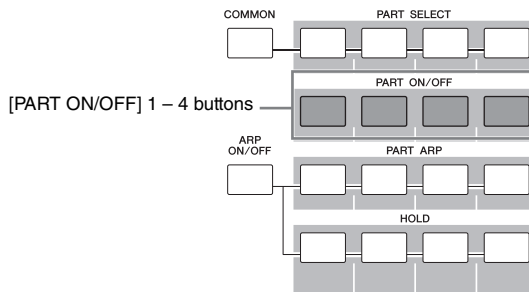
Part mute/solo

You can switch the mute/solo of the Parts by using the [MUTE]/[SOLO] buttons and Number [1] – [4] buttons. When the [MUTE]/[SOLO] lamp is turned on, the on/off status of the Mute and Solo for each Part can be switched respectively via the Number [1] – [4] buttons. From the Number [1] – [4] buttons, in both cases, only the Parts which are turned on via the [PART ON/OFF] buttons are switched.
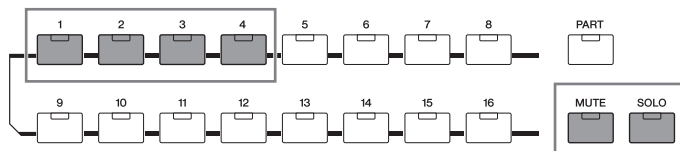
Basic Structure

- Voice
- **Performance**
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Performance

- Play
- Mixing
- Edit Select
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter / EG
    - EQ
    - Effect
      - Parameter
    - A/D Out
    - A/D FX
      - Parameter
  - Part Edit
    - Voice
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Filter / EG
    - 3 Band EQ
    - Rcv Sw
    - FX Send
- Job Select
  - Recall
  - Bulk
  - Copy
  - Initialize
- Supplementary Info.

Appendix

Using the Arpeggio Function

The Arpeggio function lets you trigger rhythm patterns, riffs and phrases using the current Voice by simply playing notes on the keyboard. In the Performance mode, each of four Arpeggio types is assigned to each of four Parts. This means four Arpeggio types can be played back simultaneously. Try selecting different Performances and check out the various Arpeggio types.

**NOTE:** For details about Arpeggio, see page 7.

Playing an Arpeggio

Since the preset Performances already have their own Arpeggio types pre-assigned, you can play the Arpeggio by selecting the desired Performance, turning on the [ARP ON/OFF] button, then pressing any note.
Instructions on using Arpeggio are basically the same as in the Voice mode (page 32).

Turning Arpeggio playback on/off for each Part

You can switch the Part on/off by using the [PART ARP] 1 – 4 buttons in the Performance Control buttons.

Turning the Arpeggio Hold parameter on/off for each Part

You can turn the Arpeggio Hold parameter (page 84) on or off for each Part of the Performance by using the [HOLD] 1 – 4 buttons. When the Arpeggio Hold parameter is set to "on," the Arpeggio playback continues even if the note is released.

[PART ARP] 1 – 4 buttons
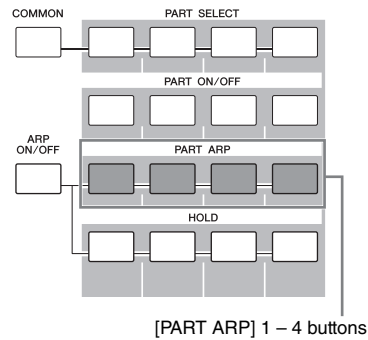
Using Knobs

One of the more powerful performance features of the S90 XS/S70 XS is its extensive set of real-time controls—especially the Knobs. These let you adjust a variety of parameters for the current Performance, such as effect depth, attack/release characteristics, tonal color, and others. These real-time controls can be used to change the sound as you play or to quickly edit and customize the Performance.
The function assigned to each knob affects the Part selected via the [COMMON] button or [PART SELECT] 1 – 4 buttons in the Performance Control buttons. You can change the function by using the Knob Function buttons.

[COMMON] button, [PART SELECT] 1 – 4 buttons

Knob Function buttons
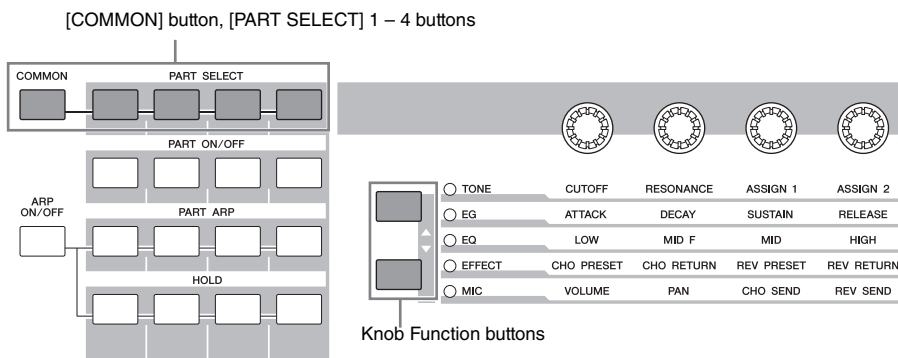
1 **Select the function setting to be assigned to the Knobs.**

Press the Knob Function buttons several times to select the function assigned to the Knobs. Each time the button is pressed, the lamp lights alternatively in the following order: TONE, EG, EQ, EFFECT, and MIC. The functions assigned to the Knobs are changed according to the lamp status.

2 **Change tonal color.**

Moving the Knobs changes various aspects of the Voice's sound in real time—while you play. The same functions as Voice mode are assigned to the Knob 1 – 4. For details, see page 29.

NOTE: When pressing the [COMMON] button, each function assigned to the knob is applied to all the Parts. By pressing the one of the [PART SELECT] 1 – 4 buttons, Knob operations will be applied only to the selected Part. Note that the parameters assigned to ASSIGN 1/2 and EFFECT of TONE are always applied to all the Parts.

Controlling the Volume, Pan, and Effect by using the Slider

The far left four sliders adjust the Volume, Pan, Chorus Send and Reverb Send for each of four Parts. You can change the function by using the Slider Function buttons.

Mark (current value)

Slider Function button
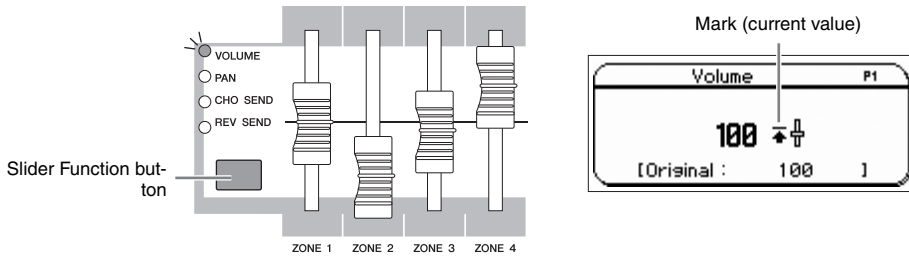
NOTE: When the "Slider Mode" parameter is set to "catch" on the General display (page 135) of the Utility mode, if a mark appears, moving the slider does not affect the sound. Once you move the Slider past this point, the mark disappears and moving the Slider affects the sound.

The Performance Play display

You can call up the Performance Play display by pressing the [PERFORM] button.

❶ Performance Bank
❷ Performance Number

Indicates the Bank and Number of the selected Performance.
A Bank is a memory location that includes data of 128 different Performances. Four Banks (User 1 – 4) are provided.
Each Performance within a Bank is assigned to a Performance Number of 001 to 128. This format corresponds to the [A] – [H] buttons and the Number [1] – [16] buttons. The Performance Numbers and the corresponding Group/Numbers are listed below.

❸ Category (Main Category <Sub Category>)

Indicates the Category of the selected Performance. "Category," consisting of Main Category and Sub Category, is a keyword that indicates the instrument characteristics or the type of sound. Each Performance can be registered to a Main Category and its Sub Category. The Category settings can be edited in the Name display (page 73) of the Performance Common Edit mode.

❹ Performance Name

Indicates the name of the current Performance.
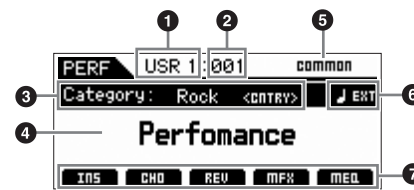
❺ Current Part

Indicates the selected Part.

❻ Tempo

Indicates the tempo for the arpeggio.

❼ On/Off Status of the Effects

Indicates the on/off status of the Effects in the current Performance.

Performance number	Group/Number
001 – 016	A01 – 16
017 – 032	B01 – 16
033 – 048	C01 – 16
049 – 064	D01 – 16
065 – 080	E01 – 16
081 – 096	F01 – 16
097 – 112	G01 – 16
113 – 128	H01 – 16

The Edit (▤) indicator

When changing the value of the parameter in the Performance Play or Edit mode, the Edit (▤) Indicator will appear on the top right corner of the LCD display. This gives a quick confirmation that the current Performance has been modified but not yet stored. To store the current edited status, follow the instructions below.

Storing the created Performance

1 **Press the [STORE] button to call up the Performance Store display.**

```
Perf Store
USR1_001
USR1 001
PerformancePlay
PRESS [EDIT] TO COMPARE.
```

2 **Set the destination for storing the Performance.**

Select a Performance Bank and Number as destination by using the Data Dial, [DEC] and [INC] buttons. You can use the [A] – [H] buttons and [1] – [16] buttons to select a Performance number.

NOTE   When you press the [EDIT] button in the Store display, you can check the sound of the Voice/Performance/Multi at the storing destination.

NOTE   You can also determine the store destination with the Category Search function.

3 **Press the [ENTER] button. (The display prompts you for confirmation.)**

To cancel the Store operation, press the [EXIT] button.

4 **Press the [ENTER] button to execute the Store operation.**

After the Performance has been stored, a "Completed" message appears and operation returns to the Performance Play display.

⚠️ **CAUTION**

When you execute the Store operation, the settings for the destination memory will be overwritten. Important data should always be saved to the internal flash memory or a USB storage device connected to the USB TO DEVICE terminal. For details on operation, refer to the Owner's Manual.

Mixing

The Mixing display shows the information about each Part of the Performance and lets you make various settings. The Mixing display lets you exchange the Voice between the different Parts and make the settings such as volume, pan and split, allowing you to finalize the mix on the instrument itself.

Operation	**[PERFORM] ➔ [MIXING]**

```
PERF  USR 1:001    common E
01 P1 001 Natural Grand S6
02 P4 024 Octave Ensemble     ▶
03 GM 108 Koto
04 PD 001 Power Standard Kit 1
```
```
PERF  USR 1:001    common E
01   Volume 100   Pan  C
02 ◀ Volume 100   Pan  C  ▶
03   Volume 100   Pan  C
04   Volume 100   Pan  C
```
```
PERF  USR 1:001    common E
01 C 2 - G 8  both  SPLIT C 3
02 C 2 - G 8  both
03 C -2 - C 2 both
04 C -2 - C 2 lower
```

On the Mixing display, the Voice Bank/Number, Volume, Pan, Note Limit, Split Lower/Upper, and Split Point can be set up. Edit the parameter (selected via the Cursor buttons) by using the data dial or [DEC]/[INC] buttons.

NOTE: When the cursor is at the parameter of the end of the page, pressing the Cursor [◀]/[▶] buttons calls up the next page. Holding the [SHIFT] button then pressing the Cursor [◀]/[▶] buttons calls up the next page regardless of the cursor location.

NOTE: When the cursor is at the Note Limit/Split Point, you can determine the Note Limit/Split Point by holding the [SHIFT] button then pressing the desired note on the keyboard.

NOTE: In order to enable the Split, it is necessary to set the "Split Sw" to "on" in the Play Mode display (page 74) of the Performance Common Edit.

Basic Structure

- Voice
- **Performance**
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Performance

- Play
- Mixing
- Edit Select
  - Common Edit
    - Name
    - Play Mode
    - Arpeggio
    - Controller
    - Filter / EG
    - EQ
    - Effect
      - Parameter
    - A/D Out
    - A/D FX
      - Parameter
  - Part Edit
    - Voice
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Filter / EG
    - 3 Band EQ
    - Rcv Sw
    - FX Send
  - Job Select
    - Recall
    - Bulk
    - Copy
    - Initialize
 - Supplementary Info.

Appendix

Performance Edit

Performance Edit consists of the Common Edit parameters for editing the settings common to all Parts, and Part Edit parameters for editing the individual Parts.
This section covers the Performance Edit parameters.

Common Edit

Common Edit lets you edit the parameters common to all Parts of the selected Performance.

Operation	[PERFORM] → Select Performance program → [EDIT] → Select the desired display in the Performance Edit Select display → [ENTER] → Edit display
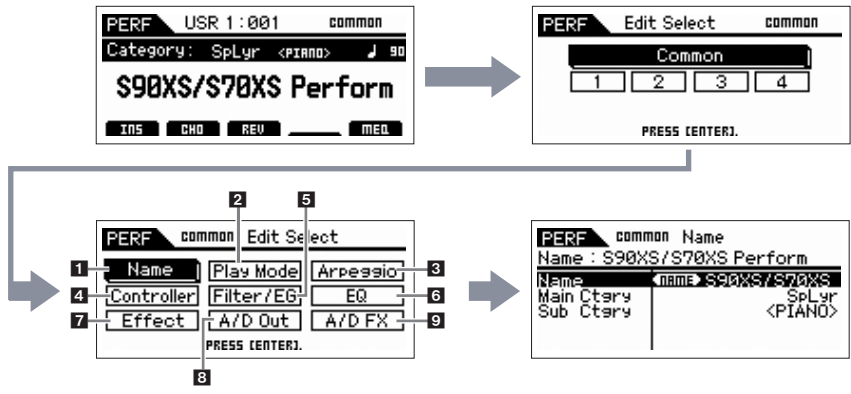
1 Name

Name (Performance Name)

Enter the desired name for the currently edited Performance. When you move the cursor to "Name," pressing the [ENTER] button calls up the Naming dialog, allowing you to enter the desired name. The name can contain up to 20 characters. Use the data dial and cursor buttons to select the desired character (in the lower section of the dialog) then use the [INC] or [DEC] button to move the cursor (in the top line of the dialog) to the desired location. Repeat this operation until the desired name is complete. After completing the name, press the [ENTER] button to actually enter the name, or press the [EXIT] button to cancel naming and return to the original display.

Main Ctgry (Main Category)
Sub Ctgry (Sub Category)

Determines the Main Category and Sub Category of the Performance.
"Category" can be used as a keyword representing the characteristic of the Performance. The appropriate setting makes it easy to find the desired Performance from a variety of Performances.
There are seven Main Categories which indicate types of music or sound type. There are up to twelve Sub Categories for each Main Category, indicating more detailed types of instruments.
Settings: Refer to the Performance Category List on

2 Play Mode

Volume

Determines the output level of the entire Performance.
Settings: 0 – 127

Pan

Determines the stereo pan position of the Performance.
Settings: L63 (far left) – C (center) – R63 (far right)
NOTE: Note that this Pan parameter may have little or no audible effect if the Pan setting for a specific Part of the Voice is set to the left position and the Pan for another Part is set to the right position.

Basic Structure

| Voice |
| Performance |
| Multi |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Performance

Play
Mixing
Edit Select
● **Common Edit**
  ●   Name
  ●   Play Mode
     Arpeggio
     Controller
     Filter / EG
     EQ
     Effect
       Parameter
     A/D Out
     A/D FX
       Parameter
Part Edit
     Voice
     Play Mode
     Arpeggio
       Arp Edit
       Arp 1-5 Type
     Filter / EG
     3 Band EQ
     Rcv Sw
     FX Send
Job Select
     Recall
     Bulk
     Copy
     Initialize
Supplementary Info.

Appendix

Chorus Send

Adjusts the chorus send level. The higher the value, the more pronounced the Chorus.

Settings: 0 – 127

Reverb Send

Adjusts the reverb send level. The higher the value, the more pronounced the Reverb.

Settings: 0 – 127

Split Sw (Split Switch)

Determines whether the settings of the Split Point and the Split Lower/Upper position in the Part parameter are enabled (on) or disabled (off).

Settings: on, off

Split Point

Determines the note number of the Split point, which divides the keyboard into two different sections.

Settings: C -2 – G8

NOTE: When the Split Lower/Upper parameter of each Part is set to "both," this parameter will have no effect.

NOTE: Sound is produced only when you play notes within the area that matches both the Split setting and Note Limit setting.

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Porta Sw (Portamento Common Switch)
Porta Part 1 Sw / Part 2 Sw / Part 3 Sw / Part 4 Sw

Determines whether Portamento is applied to the current Performance or not. You can determine the Portamento on/off setting for each Part when the Portamento Common Switch is set to on. The Portamento Switch of each Part is not available when the Portamento Common Switch is set to off ("---" is displayed at each Part Switch).

Settings: on, off

NOTE: This parameter is not available for the Drum Part.

Time Offset (Portamento Time Offset)

Determines the pitch transition time when Portamento is applied. You can adjust Portamento time for the Voice assigned to each Part as offset. Higher values result in a longer pitch change time, or a slow speed.

Settings: -64 – +63

3 Arpeggio

Determines whether the item being edited will commonly affect all five Arpeggios assigned to each Voice ("Arp Edit"), or affect only the selected Arpeggio ("Arp 1 – 5 Type").

Arp Common Sw (Arpeggio Common Switch)

Determines whether Arpeggio is on or off. You can also turn Arpeggio on/off from the front panel with the [ARP ON/OFF] button.

Settings: off, on

Arp 1 – 5 Select (Arpeggio 1 – 5 Select)

Select one of "ARP1" – "ARP5." The 8th note icon shown in the settings indicates that one of the Arpeggio Types (other than "off") is selected for the Arpeggio. When selecting "ARP SELECT" via the Arpeggio/Effect Function button, you can select Arp 1 to 5 via the Function buttons.

Settings: Arp 1 – Arp 5

Arpeggio/Effect Function button

Function buttons

Arp Tempo (Arpeggio Tempo)

Determines the tempo for the Arpeggio.

Settings: 5 – 300

NOTE: If you are using this instrument with an external sequencer, DAW software, or MIDI device, and you want to synchronize the Arpeggio with that device, set the MIDI Sync parameter in the Utility MIDI display (page 137) to "external" or "auto." When MIDI Sync is set to "auto" (only when MIDI clock is received continuously) or "external," the Tempo parameter here indicates "external" and cannot be changed.

Sync Qntz Val (Sync Quantize Value)

Determines the actual timing at which the next Arpeggio playback starts when you trigger it while the Arpeggio of a certain Part is played back. When set to "off," the next Arpeggio starts as soon as you trigger it.

Settings: off, 60 (32nd note), 80 (16th note triplet), 120 (16th note), 160 (8th note triplet), 240 (8th note), 320 (1/4 note triplet), 480 (1/4 note)

4 | Controller

A. Func 1 Mode (Assignable Function 1 Mode)
A. Func 2 Mode (Assignable Function 2 Mode)

Determines whether the ASSIGNABLE FUNCTION [1] and [2] buttons functions as a latch type or momentary type. When set to "latch," pressing the button alternates the lamp status between on and off. When set to "momentary," pressing/holding the button turns the lamp on and releasing the button turns the lamp off.

Settings: momentary, latch

5 | Filter/EG

Cutoff

Raises or lowers the cutoff frequency of the low pass filter to adjust the tone brilliance. The sound can be brightened by raising the cutoff frequency, and darkened or muffled by lowering it. This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

Resonance

Determines the emphasis given to the Cutoff Frequency to add further character to the sound. Higher values result in a more pronounced effect. This can be used in combination with the cutoff frequency parameter to add further character to the sound. This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

FEG Attack/Decay/Release/Depth (FEG Attack Time/Decay Time/Release Time/Depth)

Determines the FEG (Filter Envelope Generator) parameters for each Part. Using the Filter EG, you can control the transition in tonal color (Cutoff Frequency) from the moment the sound starts to the moment the sound stops. The settings made here will be applied to the same parameters in the Filter EG (page 51) of each Voice as offset. "FEG Sustain" is not available here.

Settings: -64 – +0 – +63

AEG Attack/Decay/Sustain/Release (AEG Attack Time/Decay Time/Sustain Level/Release Time)

These can be used to control the change in volume from the moment a note is played to the moment the sound stops. The settings mode here will be applied to the same parameters in the Amplitude EG (page 62) of each Part as offset. Each of the AEG parameters can be changed directly via the Knob.

Settings: -64 – +0 – +63

Basic Structure

	Voice
	Performance
	Multi
	SEQ Play
	Master
	Remote
	File
	Audio Rec/Play
	Utility

Performance

Play
Mixing
Edit Select
● Common Edit
　Name
　Play Mode
　Arpeggio
　Controller
　Filter / EG
● EQ
　Effect
　　Parameter
　A/D Out
　A/D FX
　　Parameter
Part Edit
　Voice
　Play Mode
　Arpeggio
　　Arp Edit
　　Arp 1-5 Type
　Filter / EG
　3 Band EQ
　Rcv Sw
　FX Send
Job Select
　Recall
　Bulk
　Copy
　Initialize
Supplementary Info.

Appendix

6　EQ

3 Band EQ

Low Freq (Low Frequency)	Mid Freq (Middle Frequency)	High Freq (High Frequency)
Low Gain	Mid Gain (Middle Gain)	High Gain
	Mid Q (Middle Q)	

This is a parametric EQ featuring three bands (High, Mid and Low). You can attenuate or boost the level of each frequency band (High, Mid, Low) to change the Performance sound. For the Mid band, you can also set the Q. These parameters, with the exception of "Low Freq," "High Freq" and "Mid Q," can be changed directly via the Knobs. The settings here are applied as offsets to the EQ settings of each Part.

Freq (Frequency)
Determines the frequency for each frequency band. Set the value to the frequency around which you wish to attenuate or boost.
Settings: Low Freq: -64 – +0 – +63, Mid Freq: -64 – +0 – +63, High Freq: -64 – +0 – +63

Gain
Determines the level gain for the Frequency (set above), or the amount the selected frequency band is attenuated or boosted. The higher the value, the greater the Gain. The lower the value, the lesser the Gain.
Settings: -64 – +0 – +63

Q
Determines the Q for the Mid band. The higher the value, the smaller the bandwidth. The lower the value, the wider the bandwidth.
Settings: -64 – +0 – +63
NOTE: The Q setting is available only for the Mid band, which is a Peaking type EQ. Peaking (referring to the "peak" shape) lets you attenuate/boost a specific frequency and allows you to control how wide or narrow the bandwidth is. On the other hand, the EQ shape of the High and Low band is the Shelving type which lets you attenuate/boost the signal at frequencies above or below the specified Frequency setting.

Master EQ

From this display you can apply five-band equalization to all parts of the selected Performance.

Shape
Enables you to select one of two equalizer shapes: shelving or peaking. This parameter is available for Low and High.
Settings: shelv, peak

shelv (Shelving type)
This type of EQ shape lets you attenuate/boost the signal at frequencies above or below the specified Frequency setting.

peak (Peaking type)
This type of EQ shape lets you attenuate/boost the signal at the specified Frequency setting.

Freq (Frequency)
Frequencies around this point are attenuated /boosted by the "Gain" setting below.
Settings: Low
　When the Shape is set to "shelv": 32Hz – 2.0kHz
　When the Shape is set to "peak": 63Hz – 2.0kHz
　Lo-Mid, Mid, Hi-Mid
　100Hz – 10.0kHz
　High
　500Hz – 16.0kHz

Gain
Determines the level gain for the Frequency (set above), or the amount the selected frequency band is attenuated or boosted.
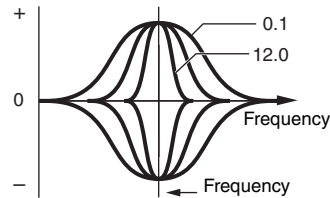**Settings:** -12dB – +0dB – +12dB

Q

This varies the signal level at the "Freq" (Frequency) setting to create various frequency curve characteristics. The higher the setting, the smaller the bandwidth. The lower the setting, the greater the bandwidth.

Settings: 0.1 – 12.0

NOTE: When the Shape parameters of the Low and High are set to "shelv," the "Q" parameters of Low and High are not available.

7 Effect

❶ Chorus Return

Determines the Return level of the Chorus Effect. This parameter can be changed via the Knob directly.

Settings: 0 – 127

❷ Chorus Pan

Determines the pan position of the Chorus effect sound.

Settings: L63 (far left) – C (center) – R63 (far right)

❸ Chorus To Reverb

Determines the Send level of the signal sent from the Chorus Effect to the Reverb Effect. The higher the value, the deeper the Reverb that is applied to the Chorus-processed signal.

Settings: 0 – 127

❹ Reverb Return

Determines the Return level of the Reverb Effect. This parameter can be changed via the Knob directly.

Settings: 0 – 127

❺ Reverb Pan

Determines the pan position of the Reverb effect sound.

Settings: L63 (far left) – C (center) – R63 (far right)

❻ Chorus
❼ Reverb
❽ Master

When the cursor is located here, pressing the [ENTER] button calls up the Effect Parameter display.
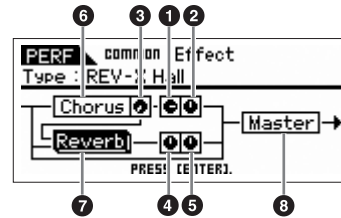
Effect Parameters

Switch

Determines whether or not the Master Effect can be used. This parameter cannot be selected from this display. When the Arpeggio/Effect Function is set to "EFFECT ON/OFF," you can turn each effect on/off via the Function buttons.

Category
Type

From the Category column, you can select one of the Effect Categories, each of which contains similar Effect types. From the Type column, you can select one of the Effect Types listed in the selected Category.

Settings: Details about the Effect categories and the Effect types are described on .

NOTE: The "Category" is not edited in the Reverb and the Master effect parameter display because there is only one Reverb/Master category.

Preset

This lets you call up pre-programmed settings for each Effect type, designed to be used for specific applications and situations.

You can change how the sound is affected by the selected pre-programmed settings.

NOTE: For a list of the Effect presets, see the Data List (separate PDF documentation).

Effect Parameter 1 – 16

The effect parameter differs depending on the currently selected effect type. Refer to page 19 for details about the Effect parameters. For a complete list of the available Effect Types for each Effect block, refer to the Effect Type List in the Data List (separate PDF documentation).

8 A/D Out (A/D Output)

From this display, you can set output settings applied to the A/D Input part signal in the Performance mode.

Volume

Determines the output level of the A/D Input part. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Pan

Determines the stereo pan position of the A/D Input part. This parameter can be changed via the Knob directly.

Settings: L63 (far left) – C (center) – R63 (far right)

Output Select

Determines the output jack assignment for the A/D Input part.

Settings: See below.

Display indication	Output destination	Stereo/Mono
L&R	OUTPUT L and R	Stereo
asL&R	ASSIGNABLE OUTPUT L and R	Stereo
asL	ASSIGNABLE OUTPUT L	Mono
asR	ASSIGNABLE OUTPUT R	Mono
vocoder	Insertion Effect for Part 1	—

Chorus Send

Determines the Send level of the Audio Input Part signal sent to the Chorus effect. The higher the value, the more pronounced the Chorus. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Reverb Send

Determines the Send level of the Audio Input Part signal sent to the Reverb effect. The higher the value, the more pronounced the Reverb. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Dry Level

Determines the level of the A/D Input Part which has not been processed with the System Effects (Reverb, Chorus).

Settings: 0 – 127

Ins Effect Sw (Insertion Effect Switch)

Determines whether the Insertion effects are applied to the A/D Input Part signal.

Settings: off, on

NOTE: The Reverb Send, Chorus Send, and Dry Level parameters are not available unless Output Select is set to "L&R."

Basic Structure

| Voice |
| Performance |
| Multi |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Performance

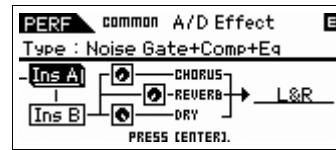| Play |
| Mixing |
| Edit Select |
| ● Common Edit |
| Name |
| Play Mode |
| Arpeggio |
| Controller |
| Filter / EG |
| EQ |
| ● Effect |
| ● Parameter |
| ● A/D Out |
| A/D FX |
| Parameter |
| Part Edit |
| Voice |
| Play Mode |
| Arpeggio |
| Arp Edit |
| Arp 1-5 Type |
| Filter / EG |
| 3 Band EQ |
| Rcv Sw |
| FX Send |
| Job Select |
| Recall |
| Bulk |
| Copy |
| Initialize |
| Supplementary Info. |

Appendix

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9 | A/D FX (A/D Effect)

From this display, you can set the Insertion Effect applied to the A/D Input Part signal in the Performance mode. You can call up the detailed setting display of Insertion Effect A/B from this display.

Ins Connect Type (Insertion Connection Type)

Determines the connection between Insertion Effects A and B. The setting changes are shown on the diagram in the display, giving you a clear picture of how the signal is routed. The Effect Type is shown at the top of the display.

Settings: ins A -> B, ins B -> A

ins A -> B	Signals processed with Insertion Effect A will be sent to Insertion Effect B and signals processed with Insertion Effect B are sent to Reverb and Chorus.
ins B -> A	Signals processed with Insertion Effect B will be sent to Insertion Effect A and signals processed with Insertion Effect A are sent to Reverb and Chorus.

Chorus Send

Adjusts the Chorus send level for the A/D Input Part. The higher the value, the more pronounced the Chorus. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Reverb Send

Adjusts the Reverb send level for the A/D Input Part. The higher the value, the more pronounced the Reverb. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Dry Level

Determines the level of each Part which has not been processed with the System Effects (Reverb, Chorus).

Settings: 0 – 127

Output Select

Sets the monitor output destination.

Settings: See below.

Display indication	Output destination	Stereo/Mono
L&R	OUTPUT L and R	Stereo
asL&R	ASSIGNABLE OUTPUT L and R	Stereo
asL	ASSIGNABLE OUTPUT L	Mono
asR	ASSIGNABLE OUTPUT R	Mono
vocoder	Insertion Effect for Part 1	—

NOTE: The Reverb Send and Chorus Send values are set to "0", and Dry Level is set to "127" when Output Select is not set to "L&R."

Ins A (Insertion Effect A)
Ins B (Insertion Effect B)

When the cursor is located here, pressing the [ENTER] button calls up the Effect Parameter display.

Effect Parameters

Switch

Determines whether or not the Master Effect can be used. This parameter cannot be selected from this display.

Category
Type

From the Category column, you can select one of the Effect Categories, each of which contains similar Effect types. From the Type column, you can select one of the Effect Types listed in the selected Category.

Settings: Details about the Effect categories and the Effect types are described on page 16.

NOTE: The "Category" is not edited in the Reverb effect parameter display because there is only one Reverb category.

Preset

This lets you call up pre-programmed settings for each Effect type, designed to be used for specific applications and situations.
You can change how the sound is affected by the selected pre-programmed settings.

NOTE: For a list of the preset of each effect type, see the Data List (separate PDF documentation).

Effect Parameter 1 – 16

The effect parameter differs depending on the currently selected effect type. Refer to page 19 for details about the Effect parameters. For a complete list of the available Effect Types for each Effect block, refer to the Effect Type List in the Data List (separate PDF documentation).
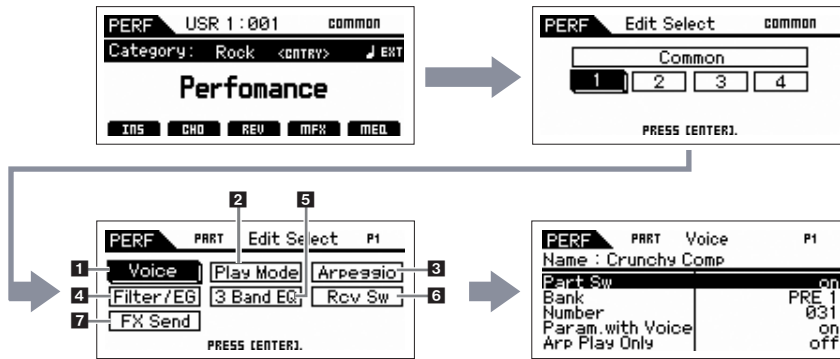
Part Edit

These parameters are for editing the individual Parts that make up a Performance.

Operation	[PERFORM] → Select Performance programs → [EDIT] → Select the desired Part "1" – "4" in the Performance Edit Select display → [ENTER] → Select the desired display in the Performance Part Edit Select display → [ENTER] → Edit display

1 Voice

Part Sw (Part Switch)

Determines whether the currently edited Part is on or off. When this is set to off, the currently edited Part will not sound. This button works in unison with the [PART ON/OFF] button.

Settings: off (inactive), on (active)

Bank
Number

Determines the Voice assigned to the current Part by specifying the Voice Bank and Number.

NOTE: You can select a program by using the BANK [DEC]/[INC] buttons, [A] – [H] buttons, and Number [1] – [16] buttons in the "Bank" or "Number" section when the [PART]/[MUTE]/[SOLO] lamps are turned off. You can select the Voice corresponding to the current Part by pressing the [CATEGORY SEARCH] button.

Param. with Voice (Parameter with Voice)

Determines whether or not the following parameter settings of the selected Voice are copied from the Voice to the current Part when you change a Voice for the current Part individually.

Arpeggio settings, Filter Cutoff Frequency, Filter Resonance, Amplitude EG, Filter EG, Pitch Bend Range (Upper/Lower), Note Shift, Assignable 1/2

NOTE: Regardless of the Parameter with Voice setting, the following settings are always copied when a Normal Voice is selected: Mono/Poly, Porta Sw (Portamento Part Switch), Porta Time (Portamento Time) and Porta Mode (Portamento Mode).

Settings: off (not copied), on (copied)

Arp Play Only (Arpeggio Play Only)

Determines whether or not the current Part plays only the note events of the Arpeggio playback. When this parameter is set to on, only the note events of the Arpeggio playback affect the tone generator block.

Settings: off, on

2 Play Mode

Volume

Adjusts the Volume for each Part. Use this parameter to adjust the balance between the current Part and other Parts. This parameter can be changed directly via the Slider.

Settings: 0 – 127

Pan

Determines the stereo pan position for the Part. This parameter can be changed directly via the Slider.

Settings: L63 (far left) – C (center) – R63 (far right)

NOTE: Note that this Part Pan parameter may have little or no audible effect if the Pan for a specific Element of the Voice is set to the left position and the Pan for another Element is set to the right position.

Voice Elm Pan (Voice Element Pan)

Determines whether the individual pan settings for each Element (of the Voice assigned to the selected Part) are applied or not. When this is set to "off," the basic pan position for the selected Part is set to center.

Settings: on, off

Assign 1 Value
Assign 2 Value

Determines the offset value by which the functions assigned to the Assign 1/2 knobs will be shifted from their original settings. This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

Note Shift

Adjusts the pitch of the Part in semitones.

Settings: -24 – +0 – +24

Detune

Adjusts the tuning of the Part in 0.1 Hz increments.

Settings: -12.8Hz – +0Hz – +12.7Hz

PB Range Upper (Pitch Bend Range Upper)
PB Range Lower (Pitch Bend Range Lower)

Determines the maximum Pitch Bend range in semitones. Setting the Upper parameter to +12 would result in a maximum pitch rise of one octave when the Pitch Bend wheel is moved upwards. On the other hand, a Lower setting of -12 would result in the pitch being lowered up to a maximum of one octave when the Pitch Bend wheel is moved downwards.

Settings: -48semi – +0semi – +24semi

Mono / Poly

Selects whether the Voice of the Part is played monophonically (only one note at a time) or polyphonically (multiple notes sounding simultaneously).

Settings: mono, poly

mono	When set to "mono," the selected Voice is played back monophonically (only a single note is played back simultaneously). For many instrument sounds (such as bass and synth lead), this allows a more natural and smooth sounding legato performance than when this parameter is set to "poly."
poly	When set to "poly," the selected Voice is played back polyphonically (multiple notes can be played back simultaneously or a chord is played back).

NOTE: For Parts to which the Drum Voice is assigned, this parameter is not available.

Note Limit Lo/Hi (Note Limit Low/High)

Sets the lowest and highest notes of the keyboard range for each Part. Each Part will only sound for notes played within its specified range. If you specify the highest note first and the lowest note second, for example "C5 to C4," then the note range covered will be "C -2 to C4" and "C5 to G8."

Settings: C -2 – G8

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Basic Structure

| Voice |
| Performance |
| Multi |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Performance

Play

Mixing

Edit Select

   Common Edit

      Name

      Play Mode

      Arpeggio

      Controller

      Filter / EG

      EQ

      Effect

         Parameter

      A/D Out

      A/D FX

         Parameter

●   Part Edit

      Voice

●   Play Mode

      Arpeggio

         Arp Edit

         Arp 1-5 Type

      Filter / EG

      3 Band EQ

      Rcv Sw

      FX Send

Job Select

   Recall

   Bulk

   Copy

   Initialize

Supplementary Info.

Appendix

Velocity Limit Lo/Hi (Velocity Limit Low/High)

Determines the minimum and maximum values of the velocity range within which each Part will respond. Each Part will only sound for notes played within its specified velocity range. If you specify the maximum value first and the minimum value second, for example "93 to 34," then the velocity range covered will be "1 to 34" and "93 to 127."

Settings: 1 – 127

NOTE: You can also set the Velocity value directly from the Keyboard, by holding down the [SHIFT] button and pressing a key.

Split Lo/Up (Split Lower/Upper)

Determines which area of the keyboard will produce the sound. When "upper" is selected, the notes of the Split Point (Common parameter) or upper will produce the sound. When "lower" is selected, the notes lower than the Split Point (Common parameter) will produce the sound. When "both" is selected, all the notes of the entire keyboard will produce the sound. Actually, the sound is produced by playing the notes within the area that matches both the settings here and the Note Limit setting.

Settings: both, lower, upper

Porta Sw (Portamento Switch)

Determines whether Portamento is applied to each Part or not.

Settings: off, on

NOTE: For Parts to which the Drum Voice is assigned, this parameter is not available.

Porta Time (Portamento Time)

Determines the pitch transition time. Higher values result in a longer pitch change time, or a slow speed.

Settings: 0 – 127

NOTE: For Parts to which the Drum Voice is assigned, this parameter is not available.

Porta Mode (Portamento Mode)

Determines how Portamento is applied to your keyboard performance.

Settings: fingered, fulltime

fingered	Portamento is only applied when you play legato (playing the next note before releasing the previous one).
fulltime	Portamento is applied to all notes.

NOTE: For Parts to which the Drum Voice is assigned, this parameter is not available.

Output Select

Determines the specific output(s) for the individual Part. The following settings are available. You can assign each individual Part sound to be output from a specific hardware output jack on the rear panel.
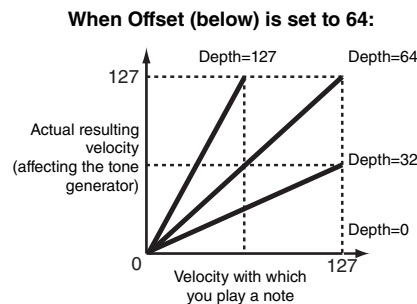
NOTE: The Reverb Send, Chorus Send and Dry Level parameters are not available when Output Select is set to something other than "L&R."

Settings: L&R, asL&R, asL, asR, drum (only Drum Voice)

Vel Sens Depth (Velocity Sensitivity Depth)

Determines the degree to which the resulting volume of the tone generator responds to your playing strength. The higher the value, the more the volume changes in response to your playing strength (as shown at the right). When this is set to 0, the volume remains the same no matter how strongly or softly you play. This would be useful, for example, for authentic playing of an Organ Voice.

Settings: 0 – 127

When Offset (below) is set to 64:

Actual resulting velocity (affecting the tone generator)

Velocity with which you play a note

Depth=127 Depth=64 Depth=32 Depth=0

127 0 127

Vel Sens Offset (Velocity Sensitivity Offset)

Determines the amount by which played velocities are adjusted for the actual resulting velocity effect. This lets you raise or lower all velocities by the same amount—allowing you to automatically compensate for playing too strongly or too softly. If the result is 1 or less, the value is set to 1. If the result is higher than 127, the value is set to 127.
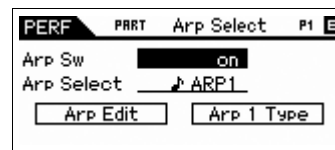
Settings: 0 – 127

When Depth = 64 and Offset =32

127

Actual resulting velocity (affecting the tone generator)

0   64   127
Velocity with which you play a note

When Depth = 64 and Offset =96

127

Actual resulting velocity (affecting the tone generator)

0   64   127
Velocity with which you play a note

When Depth = 64 and Offset =64

127

Actual resulting velocity (affecting the tone generator)

0   64   127
Velocity with which you play a note

---

3 Arpeggio

Arp Sw (Arpeggio Switch)

Determines whether Arpeggio is on or off. You can also turn the Arpeggio Switch on/off from the front panel with the [ARP ON/OFF] button.

Settings: off, on

Arp Select (Arpeggio 1 – 5 Select)

Select one of "ARP1" – "ARP5." The 8th note icon shown in the settings indicates that one of the Arpeggio Types (other than "off") is selected for the Arpeggio. When the Arpeggio/Effect Function is set to "ARP SELECT," you can select Arp 1 – 5 via the Function buttons.

Settings: Arp 1 – Arp 5

Arp Edit (Arpeggio Edit)

Determines how the item being edited will commonly affect all five Arpeggios assigned to each Voice.

Arp Sw (Arpeggio Switch)

Determines whether Arpeggio is on or off. This parameter is same as the "Arp Select" on the Arp Select display in the Voice Edit.

Settings: off, on

Arp Hold (Arpeggio Hold)

When this is set to "on," the Arpeggio cycles automatically, even if you release your fingers from the keys, and it continues to cycle until the next key is pressed.

Settings: sync-off (see below), off, on

sync-off	When set to "sync-off," the Arpeggio playback continues to run silently, even when you release the keys. Pressing any key turns the Arpeggio playback on again.

NOTE: You can obtain the same result by receiving the Control Change "SUSTAIN" (Control #64) when "Arp Sw" is set to on.

Arp MIDI Out Sw (Arpeggio MIDI Output Switch)

When this is set to on, Arpeggio playback data is output from the MIDI terminal.

Settings: off (not output), on (output)

Arp Transmit Ch (Arpeggio Transmit Channel)

Determines the MIDI transmit channel for Arpeggio playback data. When the parameter is set to "kbd-ch," the transmit channel is set to the same MIDI channel as the "Keyboard Transmit Ch" () in Utility MIDI display.

Settings: 1 – 16, kbd-ch (Keyboard Channel)

Voice with Arp (Voice with Arpeggio)

Each Arpeggio type is assigned a specific Voice best suited to the type. This parameter determines whether or not the appropriate Voice registered to each Arpeggio type is assigned to the edited Part. When set to "on," the appropriate Voice is assigned to the edited Part in place of the currently assigned Voice. When set to "off," the appropriate Voice is not assigned to the edited Part. The currently assigned Voice is maintained.

Settings: off (not copied), on (copied)

Velocity Rate

Determines the offset value by which the Arpeggio notes will be shifted from their original velocities. If the resultant velocity value is less than 1 it will be set to 1, and if the resultant velocity value is greater than 127 it will be set to 127.

Settings: 0 – 200%

Gate Time Rate

Determines how much the Gate Time (length) of the Arpeggio notes is offset from the original value. A setting of 100% means the original gate times are used. Settings below 100% will shorten the gate times of the Arpeggio notes, whereas settings above 100% will lengthen them. The Gate Time cannot be decreased beyond its normal minimum of 1; any values outside that range will automatically be limited to the minimum.

Settings: 0 – 200%

Unit Multiply

Adjusts the Arpeggio playback time based on tempo. By using this parameter, you can create a different Arpeggio type from the original one. For example, if you set a value of 200%, the playback time will be doubled (tempo is halved). On the other hand, if you set a value of 50%, the playback time will be halved and the tempo doubled. Normal playback time is 100%.

Settings: 50%, 66%, 75%,100%, 133%, 150%, 200%

Quantize Value

Determines to what beats the note data in the Arpeggio will be aligned, or determines to what beats in the Arpeggio the swing is applied. The number shown at right of each value indicates the resolution of the quarter notes in clocks.

Settings: 60 (32nd note), 80 (16th note triplet), 120 (16th note), 160 (8th note triplet), 240 (8th note), 320 (1/4 note triplet), 480 (1/4 note)

Quantize Strngth (Quantize Strength)

Sets the "strength" by which note events are pulled toward the nearest quantize beats. A setting of 100% produces exact timing set via the Quantize Value parameter above. A setting of 0% results in no quantization. A setting of 50% result that the note events are pulled to the half point between the 0% and 100%.

Settings: 0% – 100%

Swing

Delays notes on even-numbered beats (backbeats) to produce a swing feel. Settings above 0 delay the Arpeggio notes, whereas settings below 0 advance them. A setting of 0 produces exact timing set via the Quantize Value, resulting in no swing. Judicious use of this setting lets you create swing rhythms and triplet feels, such as shuffle and bounce.

Settings: -120 – +120

NOTE: When the Quantize Value parameter is set to the triplet value, the Swing is applied to the last note of each triplet.

Octave Range

Specifies the maximum Arpeggio range in octaves. Positive value settings increase the octave range of the Arpeggio playback upward, whereas negative value settings increase it downward.

Settings: -3 – +0 – +3

Change Timing

Determines the actual timing at which the Arpeggio type is switched when you select another type during Arpeggio playback. When set to "realtime," the Arpeggio type is switched immediately. When set to "measure," the Arpeggio type is switched at the top of the next measure.

Settings: realtime, measure

Velocity Mode

Adjusts the velocity of the Arpeggio notes when receiving the Note On messages.

Settings: original, thru

original	The Arpeggio plays back at the preset velocities included in the Arpeggio sequence data.
thru	The Arpeggio plays back according to the velocity of your playing. For example, if you play the notes strongly, the playback volume of the Arpeggio increases.

Key Mode

Determines how the Arpeggio plays back when playing the keyboard.

Settings: sort, thru, direct, sort+direct, thru+direct

sort	When you play specific notes (for example, the notes of a chord), the same sequence plays, no matter what order you play the notes.
thru	When you play specific notes (for example, the notes of the chord), the resulting sequence differs depending on the order of the notes.
direct	Note events of the Arpeggio sequence do not play; only the notes you play on the keyboard are heard. When the Arpeggio plays back, events such as Pan and Brightness are applied to the sound of your tone generator performance. Use this setting when the Arpeggio types includes non-note data or when the Category type "Ctrl" is selected.
sort +direct	The Arpeggio is played back according to the "sort" setting here, and the note pressed is also sounded.
thru +direct	The Arpeggio is played back according to the "thru" setting here, and the note pressed is also sounded.

NOTE: Some Arpeggio types belonging to the "Cntr" Category may not have note events. When such an Arpeggio type is selected and the Key Mode is set to "sort" or "thru," no sound is produced even if you press a note on the keyboard.

Note Limit Lo/Hi (Note Limit Low/High)

Determines the lowest and highest notes in the Arpeggio's note range. Notes received in this range trigger the Arpeggio. For example, setting a Note Limit of "C5 – C4" lets you trigger the Arpeggio by playing notes in the two ranges of C -2 to C4 and C5 to G8; notes played between C4 and C5 have no effect on the Arpeggio.

Settings: C -2 – G8

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Velocity Limit Lo/Hi (Velocity Limit Low/High)

Determines the lowest and highest velocity which can trigger the Arpeggio playback. Arpeggio will only playback for notes received within its specified velocity range. For example, setting a Velocity Limit of 93 – 34 lets you play the Arpeggio from two separate velocity ranges: soft (1 – 34) and hard (93 – 127).

Settings: 001 – 127

NOTE: You can also set the value directly from the Keyboard, by holding down the [SHIFT] button and pressing a key.

Octave Shift

Shifts the pitch of the Arpeggio up or down in octaves.

Settings: -10 – +10

Loop

When this is set to "on," the Arpeggio cycles while notes are held. When this is set to "off," the Arpeggio plays only once even if notes are held.

Settings: off, on

Trigger Mode

When this is set to "gate," pressing the note starts Arpeggio playback and releasing the note stops it. When this is set to "toggle," pressing the note starts/stops Arpeggio playback and releasing the note does not affect Arpeggio playback. Normally, this parameter should be set to "gate."

Settings: gate, toggle

NOTE: The Trigger Mode "toggle" setting overcomes the Hold "on" setting in the Arpeggio Edit display (page 84). In other words, even when the Hold parameter is set to "on," pressing the note start/stops Arpeggio playback when the Trigger Mode is set to "toggle."

Accnt Vel Th (Accent Velocity Threshold)

Some Arpeggio types include special sequence data called "Accent Phrase," which will be played back only when the velocities higher than a specified value are received. This parameter determined the minimum velocity that will trigger the Accent Phrase.

Settings: off, 1 – 127

Accnt Strt Qtz (Accent Start Quantize)

Determines the start timing of the Accent Phrase when the Velocity specified in Accent Velocity Threshold above is received. When set to off, the Accent Phrase starts as soon as the Velocity is received. When set to on, the Accent Phrase starts on the beat specified for each Arpeggio type after the Velocity is received.

Settings: off, on

Random SFX

Some Arpeggio types feature a Random SFX function which will trigger special sounds (such as guitar fret noises) when Note Off messages are received. This parameter determines whether the Random SFX is active or not.

Settings: off, on

SFX Vel Offset (Random SFX Velocity Offset)

Determines the offset value by which the Random SFX notes will be shifted from their original velocities. If the resultant Velocity value is less than 1 it will be set to 1, and if the resultant Velocity value is greater than 127 it will be set to 127.

Settings: -64 – +0 – +63

SFX Key on Ctrl (Random SFX Key On Control)

When this is set to "off," the Random SFX special sound is played with the pre-programmed velocity. When this is set to "on," the Random SFX special sound is played with the velocity generated when the note is pressed.

Settings: off, on

Arp 1 – 5 Type (Arpeggio 1 – 5 Type)

Determines the settings of the Arpeggio selected on the "Arp Select".

Main Ctgry (Main Category)
Sub Ctgry (Sub Category)

Determines the Arpeggio Main Category and Sub Category including the desired Arpeggio type.

Settings: Refer to the Arpeggio Category List on .

Type (Arpeggio Type)

Determines the desired Arpeggio Type number from the specified Category. The number and name of the selected Arpeggio Type is shown at the second line on the display. Refer to the Arpeggio Type List in Data List (separate PDF documentation).

NOTE: For details about how to use the Arpeggio Type List in Data List (separate PDF documentation), see .

Vel Rate (Velocity Rate Offset)

Determines the offset value by which the Arpeggio notes will be shifted from their original velocities. If the resultant Velocity value is less than 1 it will be set to 1, and if the resultant Velocity value is greater than 127 it will be set to 127.

Settings: -100% – +0% – +100%

GTime Rate (Gate Time Rate Offset)

Determines the Gate Time (length) of the Arpeggio notes. The Gate Time cannot be decreased beyond its normal minimum of 1; any values outside that range will automatically be limited to the minimum.

Settings: -100% – +0% – +100%

Basic Structure

- Voice
- **Performance**
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Performance

Play

Mixing

Edit Select

　Common Edit

　　Name
　　Play Mode
　　Arpeggio
　　Controller
　　Filter / EG
　　EQ
　　Effect
　　　Parameter
　　A/D Out
　　A/D FX
　　　Parameter

● Part Edit

　　Voice
　　Play Mode
● 　Arpeggio
● 　　Arp Edit
● 　　Arp 1-5 Type
　　Filter / EG
　　3 Band EQ
　　Rcv Sw
　　FX Send

Job Select

　Recall
　Bulk
　Copy
　Initialize

Supplementary Info.

Appendix

---

4   Filter/EG

Cutoff

Determines the cutoff frequency for the Filter, The frequency set here is the center frequency at which the signals are affected when they pass through each filter. This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

Resonance

This parameter's function varies according to the selected Filter Type. If the selected filter is an LPF, HPF, BPF (excluding the BPFw), or BEF, this parameter is used to set the Resonance. If the selected filter is a BPFw, this parameter is used to adjust the frequency bandwidth.

Resonance is used to set the amount of Resonance (harmonic emphasis) applied to the signal at the cutoff frequency. This can be used in combination with the cutoff frequency parameter to add further character to the sound .

The Width parameter is used to adjust the width of the band of signal frequencies passed by the filter with the BPFw.

The settings made here will be applied as offsets to the same parameters in the Filter display (page 50) of Voice Common Edit.

This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

FEG Attack/Decay/Release/Depth (FEG Attack Time/Decay Time/Release Time/Depth)
AEG Attack/Decay/Sustain/Release (AEG Attack Time/Decay Time/Sustain Level/Release Time)

Determines the basic EG settings, both volume and filter, for the selected Part. The parameter values offset the same parameters of the assigned Element set in Voice Element Edit. For details about Amplitude EG/Filter EG, refer to the Filter/EG display (page 43) in Voice Edit. However in the case of the Drum Voices, only AEG Attack and AEG Decay are available. Each of the AEG parameters can be changed directly via the Knob.

Settings: -64 – +0 – +63

5   3 Band EQ

You can apply 3-band parametric EQ to each Part to adjust the sound. The EQ shapes for Low and High are fixed as shelving types.

Freq (Frequency)

Frequencies around this point are attenuated /boosted by the "Gain" setting below. Higher values produce higher frequencies. The Mid Freq parameter can be changed directly via the Knob.

Settings: Low: 50.1Hz – 2.0kHz, Mid: 139.7Hz – 10.1kHz, High: 503.8Hz – 14.0kHz

Gain

Determines the level gain for the Frequency (set above), or the amount the selected frequency band is attenuated or boosted. This parameter can be changed via the Knob directly.

Settings: -12dB – +0dB – +12dB

Q

This varies the signal level at the "Freq" (Frequency) setting to create various frequency curve characteristics. The higher the setting, the smaller the bandwidth. The lower the setting, the greater the bandwidth.

Settings: 0.7 – 10.3

Basic Structure

| Voice |
| Performance |
| Multi |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Performance

Play
Mixing
Edit Select
  Common Edit
    Name
    Play Mode
    Arpeggio
    Controller
    Filter / EG
    EQ
    Effect
      Parameter
    A/D Out
    A/D FX
      Parameter
● Part Edit
    Voice
    Play Mode
    Arpeggio
      Arp Edit
      Arp 1-5 Type
  ● Filter / EG
  ● 3 Band EQ
    Rcv Sw
   FX Send
Job Select
  Recall
  Bulk
  Copy
  Initialize
Supplementary Info.

Appendix

6 Rcv Sw (Receive Switch)

From this display you can set how each individual Part responds to various MIDI data, such as Control Change messages. When the relevant parameter is set to "on," the corresponding Part responds to the appropriate MIDI data. Each of the Controller names in this display indicates the MIDI data generated by using the corresponding Controller.

NOTE: For Parts to which the Drum Voice is assigned, Sustain is not available.

NOTE: The settings Bank Select, Program Change and Pan are not available in the Performance mode.

NOTE: If "Control Change" here is set to "off," Control Change related parameters are not available.

Settings: off, on

7 FX Send (Effect Send)

Chorus Send

Determines the Send level of the selected Part signal sent to the Chorus effect. The higher the value, the more pronounced the Chorus. This parameter can be changed via the Slider directly.

Settings: 0 – 127

Reverb Send

Determines the Send level of the selected Part signal sent to the Reverb effect. The higher the value, the more pronounced the Reverb. This parameter can be changed via the Slider directly.

Settings: 0 – 127

Dry Level

Determines the level of the selected Part which has not been processed with the System Effects (Reverb, Chorus).

Settings: 0 – 127

NOTE: The Reverb Send, Chorus Send, and Dry Level parameters are not available when Output Select is set to something other than "L&R."

Ins Effect Sw (Insertion Effect Switch)

Determines the Parts available for the Insertion Effect. When this switch is set to on, the Insertion Effect of the Voice assigned to the Part is enabled.

Settings: off, on

Basic Structure

| Voice |
| Performance |
| Multi |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Performance

Play
Mixing
Edit Select
  Common Edit
    Name
    Play Mode
    Arpeggio
    Controller
    Filter / EG
    EQ
    Effect
      Parameter
    A/D Out
    A/D FX
      Parameter
● Part Edit
    Voice
    Play Mode
    Arpeggio
      Arp Edit
      Arp 1-5 Type
    Filter / EG
    3 Band EQ
    ● Rcv Sw
   ● FX Send
Job Select
    Recall
    Bulk
    Copy
    Initialize
Supplementary Info.

Appendix

Performance Job

The Performance Job mode features some convenient data organization and initialization tools, for use when creating Performances and archiving them.

Operation	[PERFORM] → Select Performance → [JOB] → Performance Job Select display
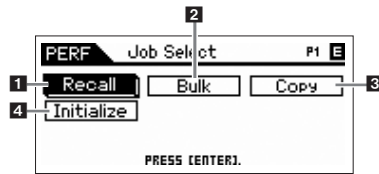
1 Recall

If you are editing a Performance but you have not stored it before switching to another Performance, the edits you have made will be cleared. If this happens, you can use the Recall function to restore the Performance with your latest edits intact. Press the [ENTER] button to execute the Recall.

2 Bulk (Bulk Dump)

This function lets you send your edited parameter settings for the currently selected Performance to a computer or another MIDI device for data archiving. Press the [ENTER] button to execute the Bulk Dump.

NOTE: You can execute this function by holding down the [SHIFT] button and pressing the [PERFORM] button.

NOTE: In order to execute Bulk Dump, you will need to set the correct MIDI Device Number. For information on the MIDI Device Number setting, refer to .

3 Copy

Part

This convenient operation lets you copy Common Edit and Part Edit settings of a certain Performance to the currently edited Performance. This is useful if you are creating a Performance and wish to use some parameter settings of another Performance.

NOTE: When this display is shown, you can hear the original sound at copy source by pressing the [EDIT] button to call up the Compare mode. Pressing the [EDIT] button again will exit from the Compare mode.
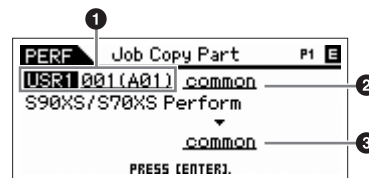
❶ Source Performance
Determines the Bank and the Performance number to be copied. When "current" is selected, the current Performance is specified as Source Performance. Accordingly, you can copy the parameter settings from a Part to a different Part of the same Performance.
Settings: Bank: USR1 – 4, ---
Performance number: 001(A01) – 128 (H16), current

NOTE: You can select the Performance by pressing the [CATEGORY SEARCH] button when the cursor is at Source Performance.

❷ Data type of the source
Determines the source data type including the Part number. According to the setting here, the Data type of the destination will be automatically set to the appropriate item.
Settings: common, part 1 – 4, A/D

❸ Data type of the destination
Determines the destination data type including the Part number. According to the setting here, the Data type of the source will be automatically set to the appropriate item.
Settings: common, part 1 – 4, A/D

Voice

This convenient operation lets you copy Effect and Master EQ settings of a certain Voice assigned to a certain Performance to the currently edited Performance. This would come in handy when a certain Voice has settings that you want to use in your Performance program.

NOTE: When this display is shown, you can hear the original sound at copy source by pressing the [EDIT] button to call up the Compare mode. Pressing the [EDIT] button again will exit from the Compare mode.
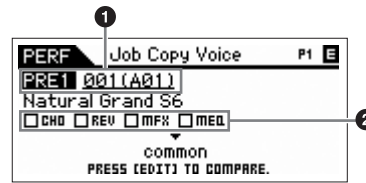
❶ Source Voice

Determines the Bank and the Voice number to be copied.

Settings: Bank: PRE1 – 8, USR1 – 4, GM, GMDR, PDR, UDR
Voice number: 001 (A01) – 128 (H16)

❷ Determines which Effect units are copied

Determines which Effect or Master EQ settings of the Source Voice will be copied to the current Performance. You can select Effect units to be copied from Reverb, Chorus, Master Effect and Master EQ.

NOTE: Even when each of the Reverb and Chorus is set to "on," executing the Job does not copy the Send Level from the Voice to the Performance. If you want to apply the same depth of the Reverb and Chorus as in the Voice mode to the copied Voice, set the Reverb Send and Chorus Send in the Voice Output display of the Performance Part Edit mode to the same value manually as in the Voice Edit mode.

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4 | Initialize

This function lets you reset (initialize) all Performance parameters to their default settings. It also allows you to selectively initialize certain parameters, such as Common settings, settings for each Part, and so on.
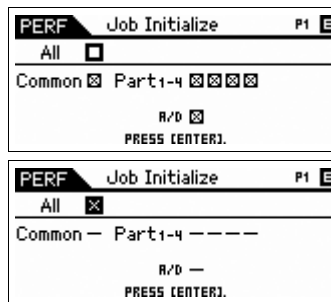
All (All Parameters)

All settings for the selected Performance are initialized. When this is set to on, the cursor cannot be moved.

Common (Common Parameters)

Common parameter settings for the selected Performance are initialized.

NOTE: The Insertion Effect Switch is a Part parameter. Therefore, checkmark the desired boxes of Parts 1 – 4 (described below) if you wish to initialize the Insertion Effect Switch parameter settings.

Part 1 – 4 (Part 1 – 4 Parameters)

Parameter settings for Parts which are turned on are initialized.

A/D (A/D Input Parameters)

This is the Part input from the external audio equipment connected to the MIC INPUT jack. When this is checkmarked, parameter settings for the A/D Input Part (page 78) of Common Edit are initialized.

Basic Structure

| Voice |
| Performance |
| Multi |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Performance

Play

Mixing

Edit Select
  Common Edit
    Name
    Play Mode
    Arpeggio
    Controller
    Filter / EG
    EQ
    Effect
      Parameter
    A/D Out
    A/D FX
      Parameter
  Part Edit
    Voice
    Play Mode
    Arpeggio
      Arp Edit
      Arp 1-5 Type
    Filter / EG
    3 Band EQ
    Rcv Sw
    FX Send
Job Select
  Recall
  Bulk
  ● Copy
  ● Initialize
Supplementary Info.

Appendix

Supplementary Information

Performance Category List

This is the list of the Main Categories and their Sub Categories to which the respective Performances of the S90 XS/S70 XS belong.

Main Category	Sub Category											
Rock (Rock / Pops)	Top40	Clsic (Classic Rock)	Hard (Hard Rock)	Cntry (Country)	Blues	Folk	Balad (Ballad)	Film	---			
R&B (R&B / Hip Hop)	HipHp (Hip Hop)	Modrn (Modern R&B)	Clsic (Classic R&B)	Funk	---							
Elect (Electronic)	Tekno (Techno)	Trnce (Trance)	House (Dance Pop / House)	D&B (Breakbeats / D&B)	Chill (Chillout / Ambient)	---						
Jazz	Swing	Modrn (Modern Jazz)	Smoth (Smooth Jazz)	JzFnk (Jazz Funk)	Club (Club Jazz)	---						
World	Latin	Regae (Reggae / Dancehall)	Ethno (Ethnic / World)	---								
SpLyr (Splits & Layers)	Piano	Organ	Synth	Symph (Symphonic)	String (Strings)	WWind (Wood-wind)	Brass	Guitr (Guitar)	Bass	Cperc (Chromatic Percussion)	Pad	---
FX	Seq (Sequence)	Hard	Soft	S.EFX (Sound Effect)	---							
--- (No Assign)	---	---	---	---	---	---	---	---	---	---	---	---

Multi Mode

The Multi mode lets you set up the S90 XS/S70 XS as a multi-timbral tone generator for use with computer-based music software or external sequencers. If each track in a song file uses a different MIDI channel, you can independently assign each of the Parts in a Multi to those MIDI channels. In this way, you can play back the song data on a sequencer with each track playing a different Voice. You can create a Multi containing up to 16 Parts using the internal tone generator (page 6). Since there is only one bank for the Multis, you need not select a Multi Bank.

NOTE: **About the User Bank of Multis**
When shipped from the factory, this tone generator contains a full set of specially programmed 128 User Multis in the User Bank. If a Multi in a User Bank is overwritten, the User Multi will be lost. When you store the edited Multi, be careful not to overwrite any important User Multis.

Multi Play

In the Multi Play mode, you can select and play any of the Multis.

Operation	Press the [MULTI/SEQ PLAY] button.

Multi Play display (default)   **Simple display**

Selecting a Program

The S90 XS/S70 XS features 128 specially programmed Multis, stored to internal User Memory. The Bank consists of eight Groups (A to H), each of which contains 16 Multi programs. Selecting Multis is done in basically the same way as selecting Voices. To call up the desired Multi program, select the appropriate Group and Number via the [A] – [H] buttons and the Number [1] – [16] buttons.

Multi Play display

❶ **Multi Number**
❷ **Part Number**
❸ **Multi Name**
❹ **Arpeggio Tempo**
❺ **Bank/Number/Name of the current Voice**
❻ **Ins, Cho, Rev, Master Effect, Master EQ on/off status**
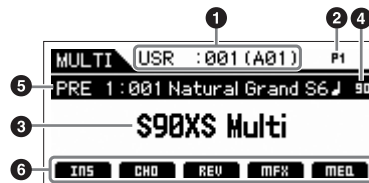
NOTE: To change the view to the Simple display, keep holding down the [SHIFT] button and press the Cursor [◄]/[►] button.
NOTE: You can select the Voice corresponding to the current Part by pressing the [CATEGORY SEARCH] button.

The Edit (▣) indicator

When changing the value of the parameter in the Multi Play or Edit mode, the Edit (▣) Indicator will appear on the top right corner of the LCD display. This gives a quick confirmation that the current Multi has been modified but not yet stored. To store the current edited status, follow the instructions below.

Basic Structure

Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Multi

Play
Mixing
Edit Select
Common Edit
Name
Arpeggio
Controller
Effect
Parameter
Master EQ
A/D Out
A/D FX
Parameter
Part Edit
Voice
Play Mode
Arpeggio
Arp Edit
Arp 1-5 Type
Filter/EG
3 Band EQ
Rcv Sw
FX Send
Job Select
Recall
Bulk
Copy
Initialize

Appendix

Storing the created Multi

1 Press the [STORE] button to call up the Multi Store display.

2 Set the destination for storing the Multi.
Select a Multi Number as destination by using the Data Dial, [DEC] and [INC] buttons. You can use the [A] – [H] buttons and [1] – [16] buttons to select a Multi number.

NOTE When you press the [EDIT] button in the Store display, you can check the sound of the Multi at the storing destination.

3 Press the [ENTER] button. (The display prompts you for confirmation.)
To cancel the Store operation, press the [EXIT] button.

4 Press the [ENTER] button to execute the Store operation.
After the Multi has been stored, a "Completed" message appears and operation returns to the Multi Play display.

⚠️ **CAUTION**
When you execute the Store operation, the settings for the destination memory will be overwritten. Important data should always be saved to the internal flash memory or a USB storage device connected to the USB TO DEVICE terminal. For details on operation, refer to the Owner's Manual.

Mixing

The settings of the tone generator block for song playback in the Multi mode is referred to as Mixing. The Mixing mode lets you change the Voice and effect settings for each Part.

Operation	**[MULTI/SEQ PLAY] → [MIXING]**

Currently selected parameter

Currently selected Part
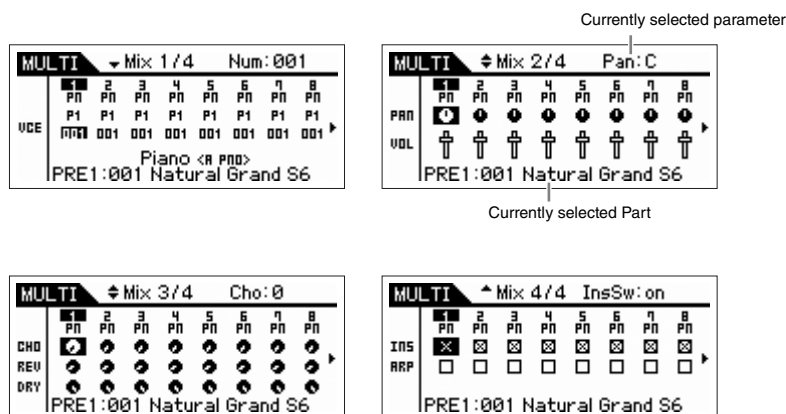
On the Mixing display, the major parameters for the eight Parts are listed and can be edited. When the cursor is located on Part 8, press the Cursor [▶] to show the list of Parts 9 to 16. When the cursor is located on Part 16, press the Cursor [▶] button to show the list of A/D Part. The controllable parameters in this display are the following parameters in the Part Edit. Refer to the Part Edit section for more information.

- Bank/Number
- Pan
- Volume
- Chorus Send
- Reverb Send
- Dry Level
- Ins Effect Sw (Insertion Effect Switch)
- Arp Sw (Arpeggio Switch)

Basic Structure

- Voice
- Performance
- **Multi**
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Multi

- Play
- Mixing
- Edit Select
  - Common Edit
    - Name
    - Arpeggio
    - Controller
    - Effect
      - Parameter
    - Master EQ
    - A/D Out
    - A/D FX
      - Parameter
  - Part Edit
    - Voice
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Filter/EG
    - 3 Band EQ
    - Rcv Sw
    - FX Send
  - Job Select
    - Recall
    - Bulk
    - Copy
    - Initialize

Appendix

Multi Edit

Multi Edit consists of the Common Edit parameters for editing the settings common to all Parts, and Part Edit parameters by editing the individual Parts. Common Edit lets you edit the global settings common to all Parts, such as the Master Effect, the Master EQ, and the Controller settings. Part Edit lets you adjust various parameters for each of 16 Parts according to the corresponding tracks of the Song data.
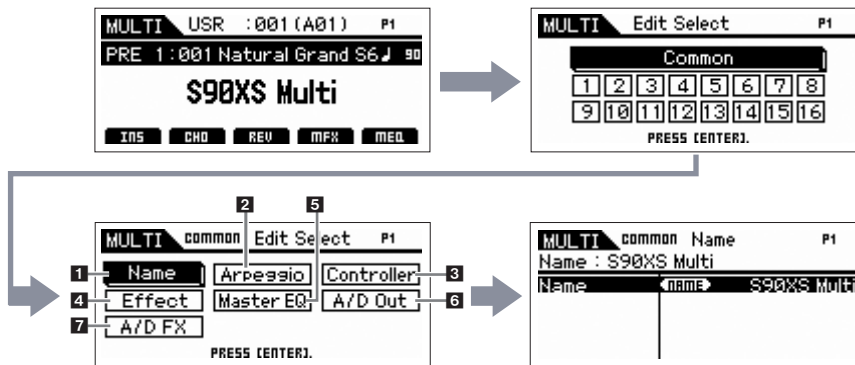
This section covers the Multi Edit parameters.

Common Edit

Common Edit lets you edit the parameters common to all Parts of the selected Multi.

Operation	[MULTI] → Select Multi program → [EDIT] → Select the Common display in the Multi Edit Select display → [ENTER] → Edit display

1   Name

Name (Multi Name)

Enter the desired name for the currently edited Multi. When you move the cursor to "Name," pressing the [ENTER] button calls up the Naming dialog, allowing you to enter the desired name. The name can contain up to 20 characters. Use the data dial and cursor buttons to select the desired character (in the lower section of the dialog) then use the [INC] or [DEC] button to move the cursor (in the top line of the dialog) to the desired location. Repeat this operation until the desired name is complete. After completing the name, press the [ENTER] button to actually enter the name, or press the [EXIT] button to cancel naming and return to the original display.

2   Arpeggio

Determines whether the item being edited will commonly affect all five Arpeggios assigned to each Voice ("Arp Edit"), or affect only the selected Arpeggio ("Arp 1 – 5 Type").

Arp Common Sw (Arpeggio Common Switch)

Determines whether Arpeggio is on or off. You can also turn the Arpeggio Switch on/off from the front panel with the [ARP ON/OFF] button.

Settings: off, on

Arp 1 – 5 Select (Arpeggio 1 – 5 Select)

Select one of "ARP1" – "ARP5." The 8th note icon shown in the settings indicates that one of the Arpeggio Types (other than "off") is selected for the Arpeggio. When the Arpeggio/Effect Function is set to "ARP SELECT," you can select Arp 1 – 5 via the Function buttons.

Settings: Arp 1 – Arp 5

Arp Tempo (Arpeggio Tempo)

Determines the tempo for the Arpeggio.

Settings: 5 – 300

NOTE: If you are using this instrument with an external sequencer, DAW software, or MIDI device, and you want to synchronize the Arpeggio with that device, set the MIDI Sync parameter in the Utility MIDI display (page 137) to "external" or "auto." When MIDI Sync is set to "auto" (only when MIDI clock is received continuously) or "external," the Tempo parameter here indicates "external" and cannot be changed.

Sync Qntz Val (Sync Quantize Value)

Determines the actual timing at which the next Arpeggio playback starts when you trigger it while the Arpeggio of a certain Part is played back. When set to "off," the next Arpeggio starts as soon as you trigger it.

Settings: 60 (32nd note), 80 (16th note triplet), 120 (16th note), 160 (8th note triplet), 240 (8th note), 320 (1/4 note triplet), 480 (1/4 note), off

---

3 Controller

A. Func 1 Mode (Assignable Function 1 Mode)
A. Func 2 Mode (Assignable Function 2 Mode)

Determines whether the ASSIGNABLE FUNCTION [1] and [2] buttons functions as a latch type or momentary type. When set to "latch," pressing the button alternates the lamp status between on and off. When set to "momentary," pressing/holding the button turns the lamp on and releasing the button turns the lamp off.

Settings: momentary, latch

---

4 Effect

❶ Chorus Return

Determines the Return level of the Chorus Effect. This parameter can be changed via the Knob directly.

Settings: 0 – 127

❷ Chorus Pan

Determines the pan position of the Chorus effect sound.

Settings: L63 (far left) – C (center) – R63 (far right)

❸ Chorus To Reverb

Determines the Send level of the signal sent from the Chorus Effect to the Reverb Effect. The higher the value, the deeper the Reverb that is applied to the Chorus-processed signal.

Settings: 0 – 127

❹ Reverb Return

Determines the Return level of the Reverb Effect. This parameter can be changed via the Knob directly.

Settings: 0 – 127

❺ Reverb Pan

Determines the pan position of the Reverb effect sound.

Settings: L63 (far left) – C (center) – R63 (far right)

❻ Chorus
❼ Reverb
❽ Master (Master Effect)

When the cursor is located here, pressing the [ENTER] button calls up the Effect Parameter display.
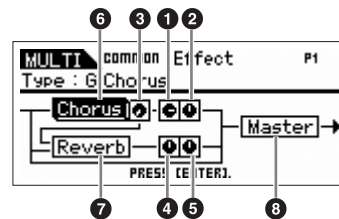
Basic Structure

| Voice |
| Performance |
| **Multi** |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Multi

| Play |
| Mixing |
| Edit Select |
●	Common Edit
	Name
	●	Arpeggio
	●	Controller
	●	Effect
		Parameter
	Master EQ
	A/D Out
	A/D FX
		Parameter
	Part Edit
	Voice
	Play Mode
	Arpeggio
		Arp Edit
		Arp 1-5 Type
	Filter/EG
	3 Band EQ
	Rcv Sw
	FX Send
Job Select
	Recall
	Bulk
	Copy
	Initialize

Appendix

Effect Parameters

Switch

This parameter is available only for the Master Effect.

Category
Type

From the Category column, you can select one of the Effect Categories, each of which contains similar Effect types. From the Type column, you can select one of the Effect Types listed in the selected Category.

Settings: Details about the Effect categories and the Effect types are described on page 16.

NOTE: The "Category" is not edited in the Reverb and the Master effect parameter display because there is only one Reverb/Master category.

Preset

This lets you call up pre-programmed settings for each Effect type, designed to be used for specific applications and situations. You can change how the sound is affected by the selected pre-programmed settings.

NOTE: For a list of the preset of each effect type, see the Data List (separate PDF documentation).

Effect Parameter 1 – 16

The effect parameter differs depending on the currently selected effect type. For details about the Effect parameters, refer to page 19. For a complete list of the available Effect parameters for each Effect type, refer to the Effect Type List in the Data List (separate PDF documentation).

5   Master EQ

From this display you can apply five-band equalization to all parts of the selected Multi.

Shape

Enables you to select one of two equalizer shapes: shelving or peaking. This parameter is available for Low and High.

Settings: shelv, peak

shelv (Shelving type)
This type of EQ shape lets you attenuate/boost the signal at frequencies above or below the specified Frequency setting.

peak (Peaking type)
This type of EQ shape lets you attenuate/boost the signal at the specified Frequency setting.

Freq (Frequency)

Frequencies around this point are attenuated /boosted by the "Gain" setting below.

Settings: Low
When the Shape is set to "shelv": 32Hz – 2.0kHz, When the Shape is set to "peak": 63Hz – 2.0kHz

Lo-Mid, Mid, Hi-Mid
100Hz – 10.0kHz

High
500Hz – 16.0kHz

Gain

Determines the level gain for the Frequency (set above), or the amount the selected frequency band is attenuated or boosted.

Settings: -12dB – +0dB – +12dB

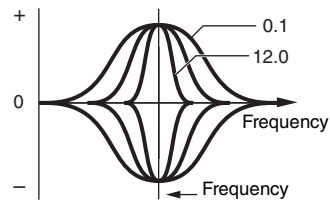## Q

This varies the signal level at the "Freq" (Frequency) setting to create various frequency curve characteristics. The higher the setting, the smaller the bandwidth. The lower the setting, the greater the bandwidth.

Settings: 0.1 – 12.0

NOTE: When the Shape parameters of the Low and High are set to "shelv," the "Q" parameters of Low and High are not available.

---

6 A/D Out (A/D Output)

From this display, you can set output settings applied to the A/D Input part signal in the Multi mode.

Volume

Determines the output level of the A/D Input part. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Pan

Determines the stereo pan position of the A/D Input part. This parameter can be changed via the Knob directly.

Settings: L63 (far left) – C (center) – R63 (far right)

Output Select

Determines the output jack assignment for the A/D Input part.

Settings: See below.

Display indication	Output destination	Stereo/Mono
L&R	OUTPUT L and R	Stereo
asL&R	ASSIGNABLE OUTPUT L and R	Stereo
asL	ASSIGNABLE OUTPUT L	Mono
asR	ASSIGNABLE OUTPUT R	Mono
vocoder	Insertion Effect of the Part 1 Voice	----

Chorus Send

Determines the Send level of the Audio Input Part signal sent to the Chorus effect. The higher the value, the more pronounced the Chorus. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Reverb Send

Determines the Send level of the Audio Input Part signal sent to the Reverb effect. The higher the value, the more pronounced the Reverb. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Dry Level

Determines the level of the A/D Input Part which has not been processed with the System Effects (Reverb, Chorus).

Settings: 0 – 127

Ins Effect Sw (Insertion Effect Switch)

Determines whether the Insertion effects are applied to the A/D Input Part signal.

Settings: off, on

NOTE: The Reverb Send, Chorus Send, and Dry Level parameters are not available when Output Select is not set to "L&R."

Basic Structure

Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Multi

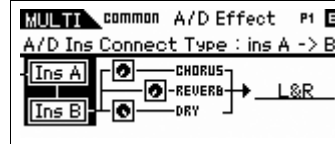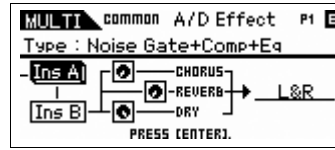|		
Play		
Mixing		
Edit Select		
●	**Common Edit**	
		Name
		Arpeggio
		Controller
		Effect
		Parameter
	●	**Master EQ**
	●	**A/D Out**
		A/D FX
		Parameter
	Part Edit	
		Voice
		Play Mode
		Arpeggio
		Arp Edit
		Arp 1-5 Type
		Filter/EG
		3 Band EQ
		Rcv Sw
		FX Send
	Job Select	
		Recall
		Bulk
		Copy
		Initialize

Appendix

7 A/D FX (A/D Effect)

From this display, you can set the Insertion Effect Types applied to the Audio Input signal in the Multi mode. The display for setting the Insertion Effect A/B parameters can be called up from this display.

Ins Connect Type (Insertion Connection Type)

Determines the effect routing for Insertion Effects A and B when the cursor is located around the Ins A/B. The setting changes are shown on the diagram in the display, giving you a clear picture of how the signal is routed. The Effect Type is shown at the top of the display.

Settings: ins A -> B, ins B -> A

ins A -> B	Signals processed with Insertion Effect A will be sent to Insertion Effect B and signals processed with Insertion Effect B are sent to Reverb and Chorus.
ins B -> A	Signals processed with Insertion Effect B will be sent to Insertion Effect A and signals processed with Insertion Effect A are sent to Reverb and Chorus.

Chorus Send

Determines the level sent to the Chorus Effect. The higher the value, the more pronounced the Chorus. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Reverb Send

Determines the level sent to the Reverb Effect. The higher the value, the more pronounced the Reverb. This parameter can be changed via the Knob directly.

Settings: 0 – 127

Dry Level

Determines the level which has not been processed with the System Effects (Reverb, Chorus).

Settings: 0 – 127

Output Select

Determines the output destination.

Settings: See below.

Display indication	Output destination	Stereo/Mono
L&R	OUTPUT L and R	Stereo
asL&R	ASSIGNABLE OUTPUT L and R	Stereo
asL	ASSIGNABLE OUTPUT L	Mono
asR	ASSIGNABLE OUTPUT R	Mono
vocoder	Insertion Effect of the Part 1 Voice	----

NOTE: The Reverb Send and Chorus Send values are set to "0", and Dry Level is set to "127" when Output Select is not set to "L&R."

Ins A (Insertion A)
Ins B (Insertion B)

When the cursor is located here, pressing the [ENTER] button calls up the Insertion Effect Parameter display.

Effect Parameters

Switch

This parameter is available only for the Master Effect. This cannot be edited here.

Category
Type

From the Category column, you can select one of the Effect Categories, each of which contains similar Effect types.
From the Type column, you can select one of the Effect Types listed in the selected Category.

Settings: Details about the Effect categories and the Effect types are described on page 16.

Preset

This lets you call up pre-programmed settings for each Effect type, designed to be used for specific applications and situations. You can change how the sound is affected by the selected pre-programmed settings.

NOTE: For a list of the preset of each effect type, see the Data List (separate PDF documentation).

Effect Parameter 1 – 16

The effect parameter differs depending on the currently selected effect type. For details about the Effect parameters, refer to page 19. For a complete list of the available Effect parameters for each Effect type, refer to the Effect Type List in the Data List (separate PDF documentation).

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Multi

| Play |
| Mixing |
| Edit Select |
| ● Common Edit |
	Name
	Arpeggio
	Controller
	Effect
		Parameter
	Master EQ
	A/D Out
	● A/D FX
	● Parameter
	Part Edit
	Voice
	Play Mode
	Arpeggio
		Arp Edit
		Arp 1-5 Type
	Filter/EG
	3 Band EQ
	Rcv Sw
	FX Send
Job Select
	Recall
	Bulk
	Copy
	Initialize

Appendix

Part Edit

Part Edit lets you edit the parameters of the individual Parts that make up a Multi.

Operation	[MULTI/SEQ PLAY] ➔ Select Multi programs ➔ [EDIT] ➔ Select the desired Part "1" – "16" in the Multi Edit Select display ➔ [ENTER] ➔ Select the desired display in the Multi Part Edit Select display ➔ [ENTER] ➔ Edit display
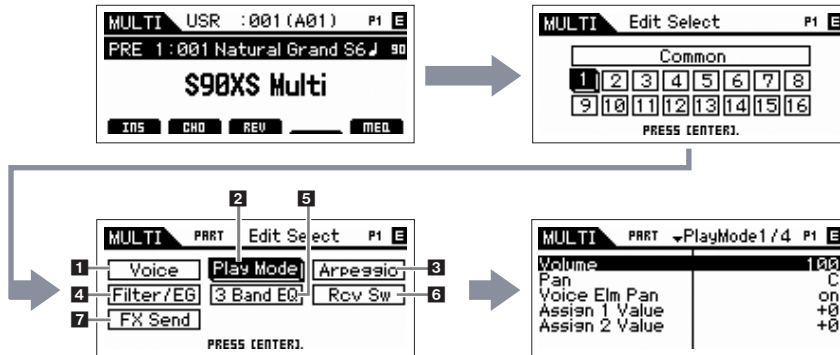
1 Voice

Receive Ch (Receive Channel)

Determines the MIDI receive channel for the selected Part. The MIDI transmit channel for the real-time changing of the controlled data is the same as this parameter setting.

Settings: 01 – 16, off

Bank
Number

Determines the Voice assigned to the current Part by specifying the Voice Bank and Number.

NOTE: You can select a program by using the BANK [INC]/[DEC] buttons, [A] – [H] buttons, and Number [1] – [16] buttons in the "Bank" or "Number" section when the cursor is located at "Bank" or "Number" and the [PART]/[MUTE]/[SOLO] lamps are turned off. You can select the Voice corresponding to the current Part by pressing the [CATEGORY SEARCH] button.

Param. with Voice (Parameter with Voice)

Determines whether or not the following parameter settings of the selected Voice are copied from the Voice to the current Part when you change a Voice for the current Part individually.
Arpeggio settings, Filter Cutoff Frequency, Filter Resonance, Amplitude EG, Filter EG, Pitch Bend Range (Upper/Lower), Note Shift, Assignable 1/2

NOTE: Regardless of the Parameter with Voice setting, the following settings are always copied when a Normal Voice is selected: Mono/Poly, Porta Sw (Portamento Part Switch), Porta Time (Portamento Time) and Porta Mode (Portamento Mode).

Settings: off (not copied), on (copied)

Arp Play Only (Arpeggio Play Only)

Determines whether or not the current Part plays only the note events of the Arpeggio playback. When this parameter is set to on, only the note events of the Arpeggio playback affect the tone generator block.

Settings: off, on

2 Play Mode

Volume

Adjusts the Volume for each Part. Use this parameter to adjust the balance between the current Part and other Parts. This parameter can be changed via the Slider directly.

Settings: 0 – 127

Pan

Determines the stereo pan position for the Part. This parameter can be changed via the Slider directly.

Settings: L63 (far left) – C (center) – R63 (far right)

NOTE: Note that this Part Pan parameter may have little or no audible effect if the Pan for a specific Element of the Voice is set to the left position and the Pan for another Element is set to the right position.

Voice Elm Pan (Voice Element Pan)

Determines whether the individual pan settings for each Element (of the Voice assigned to the selected Part) are applied or not. When this is set to "off," the basic pan position for the selected Part is set to center.

Settings: on, off

Assign 1 Value
Assign 2 Value

Determines the offset value by which the functions assigned to the Assign 1/2 knobs will be shifted from their original settings. This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

Note Shift

Adjusts the pitch of the Part in semitones.

Settings: -24 – +0 – +24

Detune

Adjusts the tuning of the Part in 0.1 Hz increments.

Settings: -12.8Hz – +0Hz – +12.7Hz

PB Range Upper (Pitch Bend Range Upper)
PB Range Lower (Pitch Bend Range Lower)

Determines the maximum Pitch Bend range in semitones. Setting the Upper parameter to +12 would result in a maximum pitch rise of one octave when the Pitch Bend wheel is moved upwards. Similarly, setting the Lower parameter to -12 would result in a maximum pitch down of one octave when the wheel is moved downwards.

Settings: -48semi – +0semi – +24semi

Mono/Poly

Selects whether the Voice of the Part is played monophonically (only one note at a time) or polyphonically (multiple notes sounding simultaneously).

Settings: mono, poly

| mono | When set to "mono," the selected Voice is played back monophonically (only a single note is played back simultaneously). For many instrument sounds (such as bass and synth lead), this allows a more natural and smooth sounding legato performance than when this parameter is set to "poly." |
| poly | When set to "poly," the selected Voice is played back polyphonically (multiple notes can be played back simultaneously or a chord is played back). |

Note Limit Lo/Hi (Note Limit Low/High)

Set the lowest and highest notes of the keyboard range for each Part. Each Part will only sound for notes played within its specified range. If you specify the highest note first and the lowest note second, for example "C5 to C4," then the note range covered will be "C -2 to C4" and "C5 to G8."

Settings: C -2 – G8

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Velocity Limit Lo/Hi (Velocity Limit Low/High)

Determines the minimum and maximum values of the velocity range within which each Part will respond. Each Part will only sound for notes played within its specified velocity range. If you specify the maximum value first and the minimum value second, for example "93 to 34," then the velocity range covered will be "1 to 34" and "93 to 127."

Settings: 1 – 127

NOTE: You can also set the velocity value directly from the Keyboard, by holding down the [SHIFT] button and pressing a key.

Porta Sw (Portamento Part Switch)

Determines whether Portamento is applied to each Part or not.

Settings: off, on

Porta Time (Portamento Time)

Determines the pitch transition time. Higher values result in a longer pitch change time, or a slow speed.

Settings: 0 – 127

Porta Mode (Portamento Mode)

Determines how Portamento is applied to your keyboard performance.

Settings: fingered, fulltime

fingered	Portamento is only applied when you play legato (playing the next note before releasing the previous one).
fulltime	Portamento is applied to all notes.

Output Select

Determines the specific output(s) for the individual Part. The following settings are available. You can assign each individual Part sound to be output from a specific hardware output jack on the rear panel.

Settings: L&R, asL&R, asL, asR, drum (only Drum Voice)

Vel Sens Depth (Velocity Sensitivity Depth)

Determines the degree to which the resulting volume of the tone generator responds to your playing strength. The higher the value, the more the volume changes in response to your playing strength (as shown at the right). When this is set to 0, the volume remains the same no matter how strongly or softly you play. This would be useful, for example, for authentic playing of an Organ Voice.

Settings: 0 – 127

**When Offset (below) is set to 64:**


Vel Sens Offset (Velocity Sensitivity Offset)

Determines the amount by which played velocities are adjusted for the actual resulting velocity effect. This lets you raise or lower all velocities by the same amount—allowing you to automatically compensate for playing too strongly or too softly. If the result is 1 or less, the value is set to 1. If the result is higher than 127, the value is set to 127.
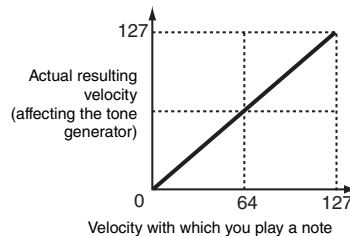
Settings: 0 – 127

When Depth = 64 and Offset =32
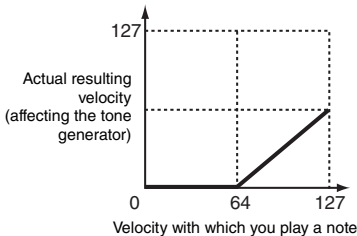
When Depth = 64 and Offset =96
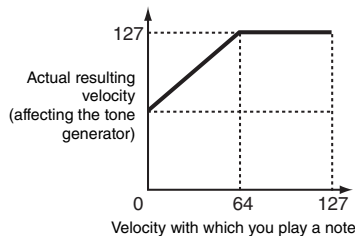
When Depth = 64 and Offset =64

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Multi

- Play
- Mixing
- Edit Select
  - Common Edit
    - Name
    - Arpeggio
    - Controller
    - Effect
      - Parameter
    - Master EQ
    - A/D Out
    - A/D FX
      - Parameter
  - ● Part Edit
    - Voice
    - ● Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Filter/EG
    - 3 Band EQ
    - Rcv Sw
    - FX Send
  - Job Select
    - Recall
    - Bulk
    - Copy
    - Initialize

Appendix

3 Arpeggio

Arp Sw (Arpeggio Switch)

Determines whether Arpeggio is on or off. You can also turn the Arpeggio Switch on/off from the front panel with the [PART ARP] 1 – 4 buttons.

Settings: off, on

Arp Select (Arpeggio 1 – 5 Select)

Select one of "ARP1" – "ARP5." The 8th note icon shown in the settings indicates that one of the Arpeggio Types (other than "off") is selected for the Arpeggio. When the Arpeggio/Effect Function is set to "ARP SELECT," you can select Arp 1 – 5 via the Function buttons. This parameter can be set to on for up to four Parts.

Settings: Arp1 – Arp 5

Arp Edit (Arpeggio Edit)

Determines the item being edited will commonly affect all five Arpeggios assigned to each Voice.

Arp Sw (Arpeggio Switch)

Determines whether Arpeggio is on or off. This parameter is same as the "Arp Select" on the Arp Select display in the Part Edit.

Settings: off, on

Arp Hold (Arpeggio Hold)

When this is set to "on," the Arpeggio cycles automatically, even if you release your fingers from the keys, and it continues to cycle until the next key is pressed. You can also switch this parameter via the [HOLD] 1 – 4 buttons on the panel.

Settings: sync-off (see below), off, on

sync-off	When set to "sync-off," the Arpeggio playback continues to run silently, even when you release the keys. Pressing any key turns the Arpeggio playback on again.

NOTE: You can obtain the same result by receiving the Control Change "SUSTAIN" (Control #64) when "Arp Sw" is set to on.

Arp MIDI Out Sw (Arpeggio MIDI Output Switch)

When this is set to on, Arpeggio playback data is output from the MIDI terminal.

Settings: off (not output), on (output)

Arp Transmit Ch (Arpeggio Transmit Channel)

Determines the MIDI transmit channel for Arpeggio playback data. When the parameter is set to "kbd-ch," Arpeggio playback data will be transmitted via the MIDI channel specified as "Receive Ch" of the current Part.

Settings: 1 – 16, kbd-ch (Keyboard Channel)

Voice with Arp (Voice with Arpeggio)

Each Arpeggio type is assigned a specific Voice best suited to the type. This parameter determines whether or not the appropriate Voice registered to each Arpeggio type is assigned to the edited Part. When set to "on," the appropriate Voice is assigned to the edited Part in place of the currently assigned Voice. When set to "off," the appropriate Voice is not assigned to the edited Part. The currently assigned Voice is maintained.

Settings: off (not copied), on (copied)

Velocity Rate

Determines the offset value by which the Arpeggio notes will be shifted from their original velocities. If the resultant velocity value is less than 1 it will be set to 1, and if the resultant velocity value is greater than 127 it will be set to 127.

Settings: 0 – 200%

Gate Time Rate

Determines how much the Gate Time (length) of the Arpeggio notes is offset from the original value. A setting of 100% means the original gate times are used. Settings below 100% will shorten the gate times of the Arpeggio notes, whereas settings above 100% will lengthen them. The Gate Time cannot be decreased beyond its normal minimum of 1; any values outside that range will automatically be limited to the minimum.

Settings: 0 – 200%

Unit Multiply

Adjusts the Arpeggio playback time based on tempo. By using this parameter, you can create a different Arpeggio type from the original one. For example, if you set a value of 200%, the playback time will be doubled (tempo is halved). On the other hand, if you set a value of 50%, the playback time will be halved and the tempo doubled. Normal playback time is 100%.

Settings: 50%, 66%, 75%, 100%, 133%, 150%, 200%

Quantize Value

Determines to what beats the note data in the Arpeggio will be aligned, or determines to what beats in the Arpeggio the swing is applied. The number shown at right of each value indicates the resolution of the quarter notes in clocks.

Settings: 60 (32nd note), 80 (16th note triplet), 120 (16th note), 160 (8th note triplet), 240 (8th note), 320 (1/4 note triplet), 480 (1/4 note)

Quantize Strngth (Quantize Strength)

Sets the "strength" by which note events are pulled toward the nearest quantize beats. A setting of 100% produces exact timing set via the Quantize Value parameter above. A setting of 0% results in no quantization. A setting of 50% result that the note events are pulled to the half point between the 0% and 100%.

Settings: 0% – 100%

Swing

Delays notes on even-numbered beats (backbeats) to produce a swing feel. Settings above 0 delay the Arpeggio notes, whereas settings below 0 advance them. A setting of 0 produces exact timing set via the Quantize Value, resulting in no swing. Judicious use of this setting lets you create swing rhythms and triplet feels, such as shuffle and bounce.

Settings: -120 – +120

NOTE: When the Quantize Value parameter is set to the triplet value, the Swing is applied to the last note of each triplet.

Octave Range

Specifies the maximum Arpeggio range in octaves. Positive value settings increase the octave range of the Arpeggio playback upward, whereas negative value settings increase it downward.

Settings: -3 – +0 – +3

Change Timing

Determines the actual timing at which the Arpeggio type is switched when you select another type during Arpeggio playback. When set to "realtime," the Arpeggio type is switched immediately. When set to "measure," the Arpeggio type is switched at the top of the next measure.

Settings: realtime, measure

Velocity Mode

Adjusts the velocity of the Arpeggio notes when receiving the Note On message.

Settings: original, thru

| original | The Arpeggio plays back at the preset velocities included in the Arpeggio sequence data. |
| thru | The Arpeggio plays back according to the velocity of your playing. For example, if you play the notes strongly, the playback volume of the Arpeggio increases. |

Key Mode

Determine how the Arpeggio plays back when playing the keyboard.

Settings: sort, thru, direct, sort+direct, thru+direct

sort	When you play specific notes (for example, the notes of a chord), the same sequence plays, no matter what order you play the notes.
thru	When you play specific notes (for example, the notes of chord), the resulting sequence differs depending on the order of the notes.
direct	Note events of the Arpeggio sequence do not play; only the notes you play on the keyboard are heard. When the Arpeggio plays back, events such as Pan and Brightness are applied to the sound of your tone generator performance. Use this setting when the Arpeggio types include non-note data or when the Category type "Ctrl" is selected.
sort +direct	The Arpeggio is played back according to the "sort" setting here, and the note pressed is also sounded.
thru +direct	The Arpeggio is played back according to the "thru" setting here, and the note pressed is also sounded.

NOTE: Some Arpeggio types belonging to the "Cntr" Category may not have note events (page 12). When such an Arpeggio type is selected and the Key Mode is set to "sort" or "thru," no sound is produced even if you press a note on the keyboard.

Note Limit Lo/Hi (Note Limit Low/High)

Determines the lowest and highest notes in the Arpeggio's note range. Notes received in this range trigger the Arpeggio. For example, setting a Note Limit of "C5 – C4" lets you trigger the Arpeggio by playing notes in the two ranges of C -2 to C4 and C5 to G8; notes played between C4 and C5 have no effect on the Arpeggio.

Settings: C -2 – G8

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Velocity Limit Lo/Hi (Velocity Limit Low/High)

Determines the lowest and highest velocity which can trigger the Arpeggio playback. Arpeggio will only playback for notes received within its specified velocity range. For example, setting a Velocity Limit of 93 – 34 lets you play the Arpeggio from two separate velocity ranges: soft (1 – 34) and hard (93 – 127).

Settings: 1 – 127

NOTE: You can also set the velocity value directly from the Keyboard, by holding down the [SHIFT] button and pressing a key.

Octave Shift

Shifts the pitch of the Arpeggio up or down in octaves.

Settings: -10 – +10

Loop

When this is set to "on," the Arpeggio cycles while notes are held. When this is set to "off," the Arpeggio plays only once even if notes are held.

Settings: off, on

Trigger Mode

When this is set to "gate," pressing the note starts Arpeggio playback and releasing the note stops it. When this is set to "toggle," pressing the note starts/stops Arpeggio playback and releasing the note does not affect Arpeggio playback. Normally, this parameter should be set to "gate."

Settings: gate, toggle

NOTE: The Trigger Mode "toggle" setting overcomes the Hold "on" setting in the Arpeggio Edit display (page 104). In other words, even when the Hold parameter is set to "on," pressing the note start/stops Arpeggio playback when the Trigger Mode is set to "toggle."

Accnt Vel Th (Accent Velocity Threshold)

Some Arpeggio types include special sequence data called "Accent Phrase," which will be played back only when the velocities higher than a specified value are received. This parameter determined the minimum velocity that will trigger the Accent Phrase.

Settings: off, 1 – 127

Accnt Strt Qtz (Accent Start Quantize)

Determines the start timing of the Accent Phrase when the Velocity specified in Accent Velocity Threshold above is received. When set to off, the Accent Phrase starts as soon as the Velocity is received. When set to on, the Accent Phrase starts on the beat specified for each Arpeggio type after the Velocity is received.

Settings: off, on

Basic Structure

- Voice
- Performance
- **Multi**
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Multi

- Play
- Mixing
- Edit Select
  - Common Edit
    - Name
    - Arpeggio
    - Controller
    - Effect
      - Parameter
    - Master EQ
    - A/D Out
    - A/D FX
      - Parameter
  - ● Part Edit
    - Voice
    - Play Mode
    - ● Arpeggio
      - ● Arp Edit
      - Arp 1-5 Type
    - Filter/EG
    - 3 Band EQ
    - Rcv Sw
    - FX Send
  - Job Select
    - Recall
    - Bulk
    - Copy
    - Initialize

Appendix

Random SFX

Some Arpeggio types feature a Random SFX function which will trigger special sounds (such as guitar fret noises) when Note Off messages are received. This parameter determines whether the Random SFX is active or not.

Settings: off, on

SFX Vel Offset (Random SFX Velocity Offset)

Determines the offset value by which the Random SFX notes will be shifted from their original velocities. If the resultant Velocity value is less than zero it will be set to 0, and if the resultant Velocity value is greater than 127 it will be set to 127.

Settings: -64 – +0 – +63

SFX Key on Ctrl (Random SFX Key On Control)

When this is set to "off," the Random SFX special sound is played with the pre-programmed velocity. When this is set to "on," the Random SFX special sound is played with the velocity generated when the note is pressed.

Settings: off, on

Arp 1 – 5 Type (Arpeggio 1 – 5 Type)

Determines the settings of the Arpeggio selected on the "Arp Select".

Main Ctgry (Main Category)
Sub Ctgry (Sub Category)

Determines the Arpeggio Main Category and Sub Category including the desired Arpeggio type.

Settings: See "Category List" in the Basic Structure ().

Type (Arpeggio Type)

Determines the desired Arpeggio Type number from the specified Category. The number and name of the selected Arpeggio Type is shown at the second line on the display. Refer to the Arpeggio Type List in Data List (separate PDF documentation).

NOTE: For details about how to use the Arpeggio Type List in Data List (separate PDF documentation), see .

Vel Rate (Velocity Rate Offset)

Determines the offset value by which the Arpeggio notes will be shifted from their original velocities. If the resultant Velocity value is less than 1 it will be set to 1, and if the resultant Velocity value is greater than 127 it will be set to 127.

Settings: -100% – +0% – +100%

GTime Rate (Gate Time Rate Offset)

Determines the Gate Time (length) of the Arpeggio notes. The Gate Time cannot be decreased beyond its normal minimum of 1; any values outside that range will automatically be limited to the minimum.

Settings: -100% – +0% – +100%

Basic Structure

- Voice
- Performance
- **Multi**
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Multi

- Play
- Mixing
- Edit Select
  - Common Edit
    - Name
    - Arpeggio
    - Controller
    - Effect
      - Parameter
    - Master EQ
    - A/D Out
    - A/D FX
      - Parameter
  - Part Edit
    - Voice
    - Play Mode
    - Arpeggio
      - Arp Edit
      - Arp 1-5 Type
    - Filter/EG
    - 3 Band EQ
   - Rcv Sw
    - FX Send
  - Job Select
    - Recall
    - Bulk
    - Copy
    - Initialize

Appendix

---

4 Filter/EG

Cutoff

Determines the cutoff frequency for the Filter, The frequency set here is the center frequency at which the signals are affected when they pass through each filter. This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

Resonance

This parameter's function varies according to the selected Filter Type. If the selected filter is an LPF, HPF, BPF (excluding the BPFw), or BEF, this parameter is used to set the Resonance. If the selected filter is a BPFw, this parameter is used to adjust the frequency bandwidth.
Resonance is used to set the amount of Resonance (harmonic emphasis) applied to the signal at the cutoff frequency. This can be used in combination with the cutoff frequency parameter to add further character to the sound.
The Width parameter is used to adjust the width of the band of signal frequencies passed by the filter with the BPFw.
The settings made here will be applied as offsets to the same parameters in the Filter display (page 50) of Voice Common Edit.
This parameter can be changed via the Knob directly.

Settings: -64 – +0 – +63

FEG Attack/Decay/Release/Depth (FEG Attack Time/Decay Time/Release Time/Depth)
AEG Attack/Decay/Sustain/Release (AEG Attack Time/Decay Time/Sustain Level/Release Time)

Determines the basic EG settings, both volume and filter, for the selected Part. The parameter values offset the same parameters of the assigned Element set in Voice Element Edit of the assigned Voice. For details about Amplitude EG/ Filter EG, refer to the Filter/EG display (page 43) in Voice Edit. However in the case of the Drum Voices, only AEG Attack and AEG Decay are available. Each of the AEG parameters can be changed directly via the Knob.

Settings: -64 – +0 – +63

5 3 Band EQ

You can apply 3-band parametric EQ to each Part to adjust the sound. The EQ shapes for Low and High are fixed as shelving types.

Freq (Frequency)

Frequencies around this point are attenuated /boosted by the "Gain" setting below. Higher values produce higher frequencies. The Mid Freq parameter can be changed directly via the Knob.

Settings: Low: 50.1Hz – 2.0kHz
Mid: 139.7Hz – 10.1kHz
High: 503.8Hz – 14.0kHz

Gain

Determines the level gain for the Frequency (set above), or the amount the selected frequency band is attenuated or boosted. This parameter can be changed via the Knob directly.

Settings: -12dB – +0dB – +12dB

Q

This varies the signal level at the "Freq" (Frequency) setting to create various frequency curve characteristics. The higher the setting, the smaller the bandwidth. The lower the setting, the greater the bandwidth.

Settings: 0.7 – 10.3

6 Rcv Sw (Receive Switch)

From this display you can set how each individual Part responds to various MIDI data, such as Control Change messages. When the relevant parameter is set to "on," the corresponding Part responds to the appropriate MIDI data. Each of the Controller names in this display indicates the MIDI data generated by using the corresponding Controller.

NOTE: For Parts to which the Drum Voice is assigned, Sustain is not available.

NOTE: If "Control Change" here is set to "off," Control Change related parameters are not available.

Settings: off, on

7 FX Send (Effect Send)

Chorus Send
Determines the Send level of the selected Part signal sent to the Chorus effect. The higher the value, the more pronounced the Chorus. This parameter can be changed via the Slider directly.

Settings: 0 – 127

Reverb Send
Determines the Send level of the selected Part signal sent to the Reverb effect. The higher the value, the more pronounced the Reverb. This parameter can be changed via the Slider directly.

Settings: 0 – 127

Dry Level
Determines the level of the selected Part which has not been processed with the System Effects (Reverb, Chorus).

Settings: 0 – 127

NOTE: The Reverb Send, Chorus Send, and Dry Level parameters are not available when Output Select is not set to "L&R."

Ins Effect Sw (Insertion Effect Switch)
Determines the Parts available for the Insertion Effect. When this switch is set to on, the Insertion Effect of the Voice assigned to the Part is enabled. Make sure that this parameter is set to on for any Parts/Voices to which you need to apply Insertion Effects.
The S90 XS/S70 XS features eight Insertion effect systems, letting you set this parameter to on for up to eight Parts. If eight Parts are already turned on, the parameter cannot be turned on for additional Parts.

Settings: off, on

Multi Job

The Multi Job mode features convenient data initialization and archiving tools.

Operation	[MULTI/SEQ PLAY] → Select Multi program → [JOB] → Multi Job Select display
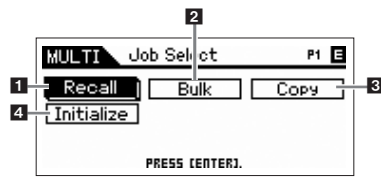
1 Recall

If you are editing a Multi but you have not stored it before switching to another Multi, the edits you have made will be cleared. If this happens, you can use the Recall function to restore the Multi with your latest edits intact. Press the [ENTER] button to execute the Recall.

2 Bulk (Bulk Dump)

This function lets you send your edited parameter settings for the currently selected Multi to a computer or another MIDI device for data archiving. Press the [ENTER] button to execute the Bulk Dump.

NOTE: You can execute this function by holding down the [SHIFT] button and pressing the [MULTI/SEQ PLAY] button.

NOTE: In order to execute Bulk Dump, you will need to set the correct MIDI Device Number. For information on the MIDI Device Number setting, refer to page 138.

3 Copy
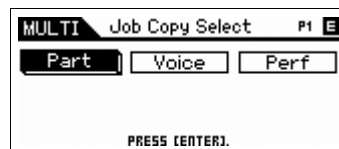
Copy Select display

Part

This convenient operation lets you copy Common Edit and Part Edit settings of a certain Multi to the currently edited Multi. This is useful if you are creating a Multi and wish to use some parameter settings of another Multi.

NOTE: When this display is shown, you can hear the original sound at copy source by pressing the [EDIT] button to call up the Compare mode. Pressing the [EDIT] button again will exit from the Compare mode.
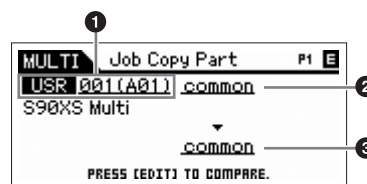
❶ Source Multi

Determines the Multi number to be copied. When "current" is selected, the current Multi is specified as Source Multi. This means that you can copy the parameter settings from a Part to a different Part within the current Multi. Accordingly, you can copy the parameter settings from a Part to a different Part of the same Multi.

Settings: Multi number: 001 (A01) – 128 (H16), current

❷ Data type of the source

Determines the source data type including the Part number. According to the setting here, the Data type of the destination below will be automatically set to the appropriate item.

Settings: common, part 1 – 16, A/D

❸ Data type of the destination

Determines the destination data type including the Part number. According to the setting here, the Data type of the destination below will be automatically set to the appropriate item.

Settings: common, part 1 – 16, A/D

Voice

This convenient operation lets you copy Effect and Master EQ settings of a certain Voice to the currently edited Multi. This would come in handy when a certain Voice has effect settings that you want to use in your Multi.

NOTE: When this display is shown, you can hear the original sound at copy source by pressing the [EDIT] button to call up the Compare mode. Pressing the [EDIT] button again will exit from the Compare mode.
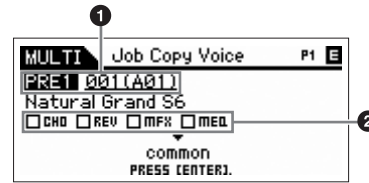
❶ Source Voice

Determines the Bank and the Voice number to be copied.

Settings: Bank: PRE1 – 8, USR1 – 4, PDR, UDR, GM, GMDR, Voice number: 001 (A01) – 128 (H16)

❷ Determines which Effect units are copied

Determines which Effect or Master EQ settings of the Source Voice will be copied to the current Multi. You can select Effect units to be copied from Reverb, Chorus, Master Effect and Master EQ.

NOTE: Even when each of the Reverb and Chorus is set to "on," executing the Job does not copy the Send Level from the Voice to the Multi. If you want to apply the same depth of the Reverb and Chorus as in the Voice mode to the copied Voice, set the Reverb Send and Chorus Send in the Multi Mixing display of the Multi Part Edit mode to the same value manually as in the Voice Edit mode.

Perf (Performance)

This convenient operation lets you copy Effect and Master EQ settings of a certain Performance to the currently edited Multi. This would come in handy when a certain Performance has effect settings that you want to use in your Multi.

NOTE: When this display is shown, you can hear the original sound at copy source by pressing the [EDIT] button to call up the Compare mode. Pressing the [EDIT] button again will exit from the Compare mode.
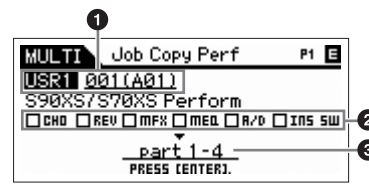
❶ Source Performance

Determines the Bank and the Performance number to be copied.

Settings: Bank: USR1 – 4, Performance number: 001(A01) – 128(H16)

❷ Determines which Effect units are copied

The Copy Job will copy all the parameters from the specified Performance to the specified Multi, basically. You can select Effect units to be copied from Reverb, Chorus, Master EQ, Master Effect, A/D, Ins Sw.

❸ Data type of the destination

Determines the Part of the destination Multi.

Settings: part 1 – 4, part 5 – 8, part 9 – 12, part 13 – 16

NOTE: The MIDI Receive Channel of the current Multi is specified as follows depending on the target parts.

part 1 – 4	Ch 1	part 9 – 12	Ch 9
part 5 – 8	Ch 5	part 13 – 16	Ch 13

4 Initialize

This function lets you reset (initialize) all Multi parameters to their default settings. It also allows you to selectively initialize certain parameters, such as Common settings, settings for each Part, and so on.

All (All Parameters)

All settings for the selected Multi are initialized. When this is set to on, the cursor cannot be moved.

Common (Common Parameters)

Common parameter settings for the selected Multi are initialized.

NOTE: The Insertion Effect Switch is a Part parameter. Therefore, checkmark the desired boxes of Parts 1 – 16 (described below) if you wish to initialize the Insertion Effect Switch parameter settings.

Part 1 – 16 (Part 1 – 16 Parameters)

Parameter settings for Parts which are turned on are initialized.

A/D (A/D Input Parameters)

This is the Part input from the external audio equipment connected to the MIC INPUT jack. Parameter settings for the A/D input Part (page 98) of Common Edit are initialized.
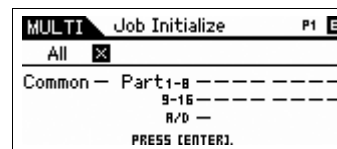
Basic Structure

	Voice
	Performance
■	Multi
	SEQ Play
	Master
	Remote
	File
	Audio Rec/Play
	Utility

Multi

Play
Mixing
Edit Select

	Common Edit
	Name
	Arpeggio
	Controller
	Effect
	Parameter
	Master EQ
	A/D Out
	A/D FX
	Parameter
	Part Edit
	Voice
	Play Mode
	Arpeggio
	Arp Edit
	Arp 1-5 Type
	Filter/EG
	3 Band EQ
	Rcv Sw
	FX Send
	Job Select
	Recall
	Bulk
●	Copy
●	Initialize

Appendix

Sequence Play Mode

Sequence Play

In the Sequence Play mode you can directly play back SMF (Standard MIDI File Format 0/1) song data or audio files (.wav and .aif files in 44.1kHz/16-bit/stereo), without the need of a computer or external sequencer.
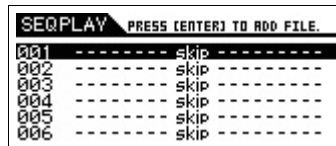
⚠️ **CAUTION**
Never attempt to remove/insert the USB storage device while the Sequence Play mode is active.

Operation	[MULTI/SEQ PLAY] → Multi Play display → [MULTI/SEQ PLAY] → Sequence Play display

Sequence Play display

Setting the playback order of MIDI/audio files (Chain)

From the Sequence Play display, you can set the order of the MIDI/audio files to be played, the particular Multi to be used for each MIDI file, and the stop location of the chain program by assigning each of them to each Chain Step. The program set here is executed in the order of the Chain Step number. A maximum number of 100 Chain Steps can be programmed; after reaching 100, playback returns to 001.

1 **Selecting a Multi to play the MIDI file**
Select the Chain Step number with the Cursor [▲]/[▼] buttons, then select a Multi using the Data Dial or the [DEC]/[INC] buttons.

2 **Selecting a MIDI/audio file**
Select a Chain Step number and press the [ENTER] button to call up the File Load display. You can select a MIDI/audio file stored to internal flash memory or the external USB storage device. After selecting the file, press the [EXIT] button to return to the Sequence Play display.

3 **Assigning the parameters to each Chain Step**
The following parameters can be assigned to the Chain Steps:
• skip: Skips this Chain Step and the Chain program will jump to the next Chain Step.
• end: Stops then returns to Chain Step number 001.
• stop: Stops the Chain program.
These parameters can be selected with the Data Dial or [DEC]/[INC] buttons.

4 **Play/Stop playback with the [START/STOP] button**
While the Chain program is playing back, the [START/STOP] button flashes. If you want to stop playback during the middle of the Chain program (in other words, before reaching "stop"), press the [START/STOP] button. Even if you do not press the [START/STOP] button, playback will stop automatically when the Chain program reaches "end" or "stop."

Changing the Playback Tempo

When playing a MIDI file, you can change the playback tempo with the Data Dial or the [DEC]/[INC] buttons. When you start playback of the song, it is normal that a tempo value contained in the song file is automatically set to this parameter. If necessary, you can change the playback tempo.

NOTE: You cannot change the playback tempo when the "MIDI Sync" parameter in Utility MIDI display (page 137) is set to "external" or set to "auto" while receiving external MIDI clock.

Storing the order of the Chain Steps

If you want to store the settings in the Sequence Play mode, press the [STORE] button before turning the power off. When the confirmation message (called up via the [STORE] button) appears, press the [ENTER] button to actually store the settings.

Sequence Play Edit

In Sequence Play Edit, you can make MIDI settings for each MIDI file assigned to each Chain Step and playback volume settings for each Audio file assigned to each Chain Step.

Operation	Press the [EDIT] button in the Sequence Play display.
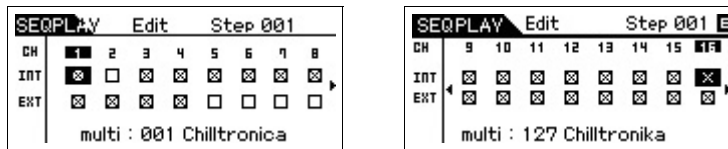
CH 1 – 8 display/CH 9 – 16 display

INT (Internal Switch)

Determines whether musical performance data of each track is sent to the internal tone generator block or not. If you use the internal tone generator, move the cursor to the desired channel then enter the checkmark with the [INC] button. When removing the checkmark with the [DEC] button, data over the specified MIDI channel will not affect the internal tone generator.

EXT (External Switch)

Determines whether musical performance data of each track is sent to an external MIDI device or not. If you use an external MIDI device, move the cursor to the desired channel then enter the checkmark with the [INC] button. When removing the checkmark with the [DEC] button, data over the specified MIDI channel will not affect the external MIDI device.

Audio Setting display

When the cursor is located at the parameter in CH16, pressing the Cursor [▶] button calls up the Audio Setting display. The Audio Setting display shows the current play position of the MIDI/audio file with a slider icon and time value. Here, you can set the audio playback level by using the Data Dial or [DEC]/[INC] buttons.

NOTE: The Audio Setting display can be called up only when selecting the Chain Step to which the MIDI/audio file is assigned then pressing the [EDIT] button.

Sequence Play Job

The Sequence Play Job lets you insert/delete the Chain Steps, or lets you initialize the entire order of the Chain Steps.

Operation	[MULTI/SEQ PLAY] → Sequence Play display → [JOB]

Sequence Play Job Select display

INSERT

Inserts a Chain Step assigned "skip" into the current Chain Step, and increases the numbers of all the already-programmed steps after the cursor location by 1.

NOTE: When a value other than "skip" is assigned to the Chain Step number 100 (last step), you cannot insert a new Chain Step.

DELETE

Deletes the currently selected Chain Step, and decreases the numbers of all the already-programmed steps after the cursor location by 1. When deleting the last Chain Step, a Chain Step to which "skip" is assigned will be inserted to the last Chain Step.

INITIALIZE

Initializes all the Chain Steps.

Reference

Master Mode

Basic Structure

The Master mode offers the following two features:
• Up to 128 programs consisting of either a Voice, a Performance, or a Multi can be created, stored and called up.
• For each Master program, four independent keyboard Zones can be set.

You can use the Master mode to memorize the settings you use most often including the information which mode is used, and call them up instantly anytime you need them with a single button press. Furthermore, you can memorize the settings for controlling external MIDI devices to the Master, resulting that you can change external MIDI tone generators connected to this instrument in sequence while performing on the live stage.

Master Play

To enter the Master Play mode and call up the Master Play display, press the [MASTER] button from the current mode.

Operation	Press the [MASTER] button

Selecting a Master Program

The S90 XS/S70 XS features 128 specially programmed Masters, stored to internal User Memory. The Bank consists of eight Groups (A to H), each of which contains 16 Master programs. Selecting a Master is done in basically the same way as selecting Voices. To call up the desired Master program, select the appropriate Group and Number.
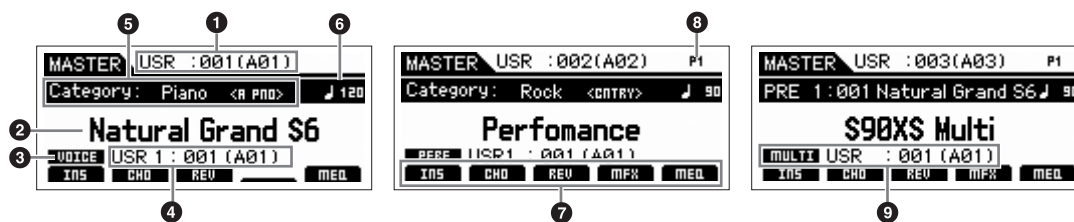
❶ **Master Program Number (Group/Number)**
❷ **Master Program Name**
❸ **Mode**
❹ **Program Number (Group/Number)**
❺ **Category <Sub Category>**
❻ **Arpeggio Tempo**
❼ **On/off status of the Insertion Effect/Chorus/Reverb/Master Effect/Master EQ**
❽ **Part Number (Performance/Multi)**
❾ **Voice Bank/Number/Voice Name of the current Part (Multi)**

Storing the created Master

1 Press the [STORE] button to call up the Master Store display.

2 Set the destination for storing the Master.
Select a Master Number as destination by using the Data Dial, [DEC] and [INC] buttons. You can use the [A] – [H] buttons and [1] – [16] buttons to select a Master number.

3 Press the [ENTER] button. (The display prompts you for confirmation.)
To cancel the Store operation, press the [EXIT] button.

4 Press the [ENTER] button to execute the Store operation.
After the Master has been stored, a "Completed" message appears and operation returns to the Master Play display.

⚠ **CAUTION**
When you execute the Store operation, the settings for the destination memory will be overwritten. Important data should always be saved to the internal flash memory or a USB storage device connected to the USB TO DEVICE terminal. For details on the operation, refer to the Owner's Manual.

Basic Structure
Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Master
Play
Edit Select
Common Select
Name
Memory
Zone Sw
Zone Edit Select
Transmit
Note
Preset
Knob/Slider
Job Select
Bulk
Initialize

Appendix

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Master Edit

The Master Edit mode lets you create your own original Master programs—containing up to four different Zones (keyboard areas)—by editing the various parameters.
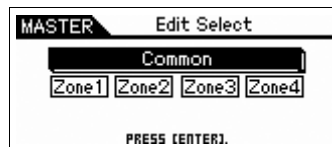
| **Operation** | **[MASTER] → Select Master program → [EDIT] → Master Edit Select display** |

Common Edit and Zone Edit

In the Master mode, you can divide the keyboard into (up to) four independent areas (called "Zones"). To each Zone can be assigned different MIDI channels and different functions of the Knobs and Sliders.
This makes it possible to control several Parts of the multi-timbral tone generator simultaneously by a single keyboard or to control Voices of an external MIDI instrument over several different channels in addition to the internal Voices of this synthesizer itself—letting you use the S90 XS/S70 XS to effectively do the work of several keyboards.
There are two types of Master Edit displays: those for editing parameters common to all eight Zones and those for editing individual Zones.

Common Edit

Lets you edit the parameters common to all Zones.

| **Operation** | **[MASTER] → Select Master program → [EDIT] → Select the "Common" in the Master Edit Select display → [ENTER] → Master Common Edit Select display** |
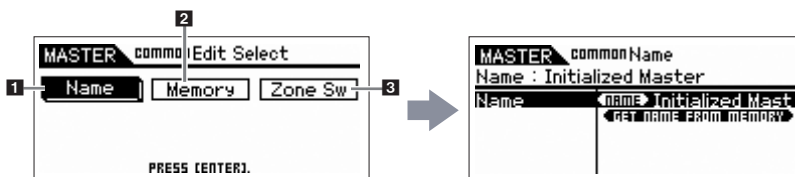
1 Name

Specify the name for the Master. The function is the same as the Name Edit of the Multi mode. When the cursor is at the "Get Name From Memory" icon, pressing the [ENTER] button copies the name of the Voice/Performance/Multi to the name of the Master.

2 Memory

Determines the Program number that is called up when the Master is selected. The name of the selected Voice/Performance/Multi is shown.
You can select Voices and Performances via the Category Search function.

Basic Structure
Voice / Performance / Multi / SEQ Play / Master / Remote / File / Audio Rec/Play / Utility

Master
Play / Edit Select / Common Select / Name / Memory / Zone Sw / Zone Edit Select / Transmit / Note / Preset / Knob/Slider / Job Select / Bulk / Initialize

Appendix

3 | Zone Sw (Zone Switch)

Zone Switch

Determines whether or not the keyboard will be divided into (up to) eight
independent areas (called "Zones").
Settings: off, on
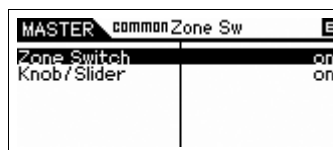
Knob/Slider

When the "Zone Switch" is set to "on," the Knobs and Sliders work as the Zone controllers, when set to "off," they work
as the controller selected by the Knob/ Slider Functions.
When set to "on," the Knob Function lamps and the Slider Function lamps go out, then the Knobs and Sliders work as
the Zone controller. When the Knobs and Sliders work as the Zone controller, you can determine which functions will be
assigned to the Knobs and Sliders in the Edit display of each Zone.
Settings: off, on
NOTE: When the "Zone Switch" is set to "on," you can select the on/off status via pressing the Knob Functions buttons.

Zone Edit

Determines the parameters of the Zones.

Operation	[MASTER] → Select Master program → [EDIT] → Select the "Zone1 – 4" in the Master Edit Select display → [ENTER] → Master Zone Edit Select display

Basic Structure

Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Master

Play
Edit Select
  Common Select
    Name
    Memory
    Zone Sw
  ● Zone Edit Select
    ● Transmit
    Note
    Preset
    Knob/Slider
Job Select
  Bulk
  Initialize

Appendix
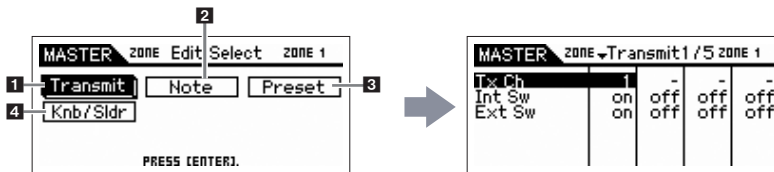
1 Transmit

From this display you can set how each Zone transmits MIDI messages when you play the keyboard.

Tx Ch (Transmit Channel)

Determines the MIDI Transmit Channel for each Zone.

Settings: 1 – 16

Int Sw (Internal Switch)

Determines whether or not MIDI data for each Zone is transmitted to the internal tone generator.

Settings: on (transmitted), off

NOTE: When the Local Control parameter is set to "off" on the MIDI display (page 137) in the Utility mode, MIDI data for each Zone will not be transmitted to the internal tone generator, even if the Int Sw parameter is set to "on."

Ext Sw (External Switch)

Determines whether or not MIDI data for each Zone is transmitted to an external MIDI device.

Settings: on (transmitted), off

Int Bank Sel (Internal Bank Select)
Ext Bank Sel (External Bank Select)
Int PC (Internal Program Change)
Ext PC (External Program Change)

From this display, you can determine whether or not MIDI messages controlling Voice selection for each Zone are transmitted to the internal/external tone generator.

Settings: on, off, ---

NOTE: When the "Ins Sw"/"Ext Sw" is set to "off," none of these parameters is available.

Pitch Bend | Sustain (Sustain Pedal)
After Touch (Channel After Touch) | Foot Switch
Modulation | Knob
Foot Ctrl 1, 2 (Foot Controller 1, 2) | Slider
 | A. Func 1, 2 (Assignable Function 1, 2)

Vol/Express (Volume/Expression)
Pan

From this display, you can determine whether or not MIDI messages controlling non-Voice-related settings such as Control Change, Pitch Bend and Channel Aftertouch are transmitted to the internal/external tone generator. When you wish to transmit a certain MIDI message from a certain Zone to the internal/external tone generator, checkmark the corresponding box.

Settings: on, off, ---

NOTE: When the "Ins Sw"/"Ext Sw" is set to "off," each parameter is not available.

2 Note

From this display you can set the pitch- and keyboard-related parameters for each Zone — allowing you to set up Zone splits and determine the pitch range for each Zone.

Octave (Octave Shift)

Determines the amount in octaves by which the range of the Zone is shifted up or down. You can adjust the offset up or down over a maximum range of three octaves.

Settings: -3 – +0 (Default) – +3

Transpose

Determines the amount in semitones by which the range of the Zone is shifted up or down.

Settings: -11 – +0 (Default) – +11

Note Lmt Lo (Note Limit Low)
Note Lmt Hi (Note Limit High)

Determines the lowest and highest notes of the range for each Zone.

Settings: C -2 – G8

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

3 Preset

From this display you can make the Voice-related settings for each Zone which will be transmitted as MIDI messages automatically when the Master is selected.

Bank MSB (Bank Select MSB)
Bank LSB (Bank Select LSB)
PC (Program Change Number)

Determines the Voice-related settings for each Zone in the selected Master. The selected Voices depend on the external MIDI devices.

Settings: Bank MSB (Bank Select MSB): 000 – 127
      Bank LSB (Bank Select LSB): 000 – 127
      PC (Program Change): 001 – 128

Volume

Determines the Volume settings for each Zone in the selected Master.

Settings: 000 – 127

Pan

Determines the Pan settings for each Zone in the selected Master.

Settings: L64 – C – R63

MIDI Send Sw (MIDI Send Switch)

Determines whether the MIDI message is transmitted (on) or not when setting the parameters on this display. When set to "on," changing the value in this display transmits the corresponding MIDI messages to an external/internal tone generator.

Settings: off, on

NOTE: Note that this setting automatically returns to off at power-off.

Basic Structure

	Voice
	Performance
	Multi
	SEQ Play
■	Master
	Remote
	File
	Audio Rec/Play
	Utility

Master

	Play	
	Edit Select	
	Common Select	
		Name
		Memory
		Zone Sw
●	Zone Edit Select	
		Transmit
	●	Note
	●	Preset
		Knob/Slider
	Job Select	
	Bulk	
	Initialize	

Appendix

---

4 Knob/Slider

From this display, you can determine which Control Change numbers are transmitted to an external/internal tone generator when you use the Knobs and Sliders for each Zone.

NOTE: This setting will be in effect only when the "Knob/Slider" parameter in Zone Switch is set to on. In other words, the Knobs and Sliders work as Zone controllers when the Knob Function lamps and the Slider Function lamps go out.

**Knob
Slider**

Determines which Control Change numbers are transmitted when you use the Knobs/Sliders for each Zone. Knobs 1 – 4 and Sliders 1 – 4 work as the Knobs/Sliders for Zones 1 – 4.

Settings: off, 01 – 95

Master Job

The Master Job mode features convenient data initialization and archiving tools. To enter the Master Job mode, press the [JOB] button in the Master mode. Press the [EXIT] button to return to the original display.

Operation	[MASTER] → Select Master programs → [Job] → Master Job Select display

Bulk (Bulk Dump)

This function lets you send all your edited parameter settings for the currently selected Master to a computer or another MIDI device for data archiving.
Press the [ENTER] button to execute the Bulk Dump.

NOTE: In order to execute Bulk Dump, you will need to set the correct MIDI Device Number (page 138). When a bulk message is transmitted from the S90 XS/S70 XS with the Device number is set to "all," the S90 XS/S70 XS is recognized as Device Number 1; when the Device number is set to "off," the S90 XS/S70 XS does not transmit the bulk message.

NOTE: You can also send the Bulk Dump from the Keyboard, by holding down the [SHIFT] button and pressing the [MASTER] button.

Initialize

This function lets you reset (initialize) all Master parameters to their default settings. It also allows you to selectively initialize certain parameters, such as Common settings and Zone settings.

❶ All (All Parameters)

Determines whether or not all settings for the selected Master are initialized. When set to "on," other parameters in this display cannot be set.
Settings: on (transmitted), off

❷ Common

Determines whether or not all Common parameter settings for the selected Master are initialized. When set to "on," executing the Job initializes all the parameter settings of Common Edit.
Settings: on (transmitted), off

❸ Zone

Determines whether or not all Zone parameter settings for the selected Master are initialized. When set to "on," executing the Job initializes all the parameter settings of Zone Edit. You can select the settings after an initialize operation via ❹ Init Type.
When this parameter is set to off, the parameter (❹ – ❼) are not available.
Settings: on (transmitted), off

❹ Init Type (Initialize Type)

Determines how the Zone parameter settings for the selected Master are initialized. Three methods of Initializing are available. If you want to determine other settings, initialize via the nearest type, then edit the Zone Edit parameters.
**Settings:** split, zone, layer

split
Sets the Zone 1 and Zone 2 to on, then splits the keyboard range using Zone 1 and Zone 2. "Upper Ch" determines the MIDI transmit channel of the upper range of the keyboard, "Lower Ch" determines the MIDI transmit channel of the lower range of the keyboard, and "Split Point" determines the note (C -2 – G8) number which separates the upper range and lower range of the keyboard. .

zone
See below.

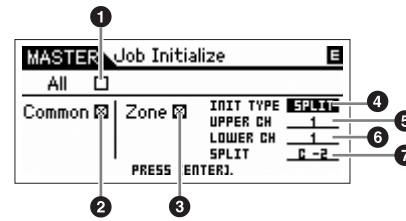| zone	Tx Ch	Int Sw	Ext Sw	Note Low	Note High
1	1	on	on	C -2	B0
2	2	on	on	C1	B2
3	3	on	on	C3	B4
4	4	on	on	C5	G8
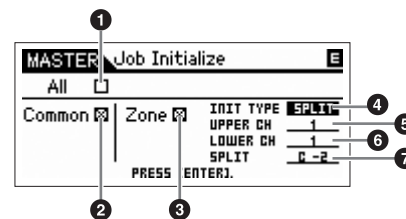
layer

Sets the Zone 1 and Zone 2 to on, then lets you layer two Parts. "Upper Ch" and "Lower Ch" determine the MIDI transmit channels of the two Zones respectively. This capability is referred to as "Layer."

❺ Upper Ch (Upper Channel)

❻ Lower Ch (Lower Channel)

Determines the MIDI transmit channels of Zone 1 and Zone 2 respectively when the Initialize Type is set to "layer" or "split."

Settings: 1 – 16

❼ Split Point

Determines the Split Point that divides the keyboard into the Zone 1 and Zone 2 when the Initialize Type is set to "split." By setting this parameter, the Note Limit High of Zone 1 is automatically set to the note one semitone lower than the Split Point set here and the Note Limit Low of Zone 2 is automatically set to the note same as the Split Point set here.

Settings: C -2 – G8

NOTE: The Note Limit High and Note Limit Low parameters can be set in the Note display () of the Zone Edit.

NOTE: You can also set the Note directly from the Keyboard, by holding down the [SHIFT] button and pressing the desired key.

Basic Structure

	Voice
	Performance
	Multi
	SEQ Play
	Master
	Remote
	File
	Audio Rec/Play
	Utility

Master

	Play	
	Edit Select	
	Common Select	
		Name
		Memory
		Zone Sw
	Zone Edit Select	
		Transmit
		Note
		Preset
		Knob/Slider
	Job Select	
	Bulk	
●	Initialize	

Appendix

Basic Structure

Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Remote

Appendix

Remote Mode

In the Remote mode, you can use the sliders, knobs and buttons of this instrument to control the sequencer tracks and mixer channels of the DAW software on the computer. For example, you can start/stop playback of the DAW software on the computer by using the Function buttons and control the song position on the DAW software by using the Data Dial, instead of using the mouse or keyboard of the computer.

The DAW applications Cubase, Logic Pro, SONAR and Digital Performer can be controlled by the Remote mode of the S90 XS/S70 XS. The Tuning setting is found in the Utility pages.

Operation	Press the [DAW REMOTE] button.

The REMOTE display appears (like those shown below), and the panel controls (such as buttons, Knobs, Sliders, and data dial) are enabled for Remote operation of the computer software (their normal functions are disabled). Press this button again to exit from the Remote mode.
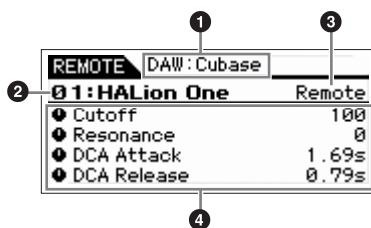
❶ The DAW software name

Shows the DAW software name which is set in the Utility mode (page 143).

❷ Control Template Number/Template Name

Up to fifty Control Templates can be saved in the S90 XS/S70 XS. Use the S90 XS/S70 XS Remote Editor for editing the Control Template. For details, refer to the S90 XS/S70 XS Remote Editor owner's manual.

❸ Parameter Values of the Knob Output Select in each Template

Shows the parameter values of the Knob Output Select set in the Remote Template. The Knob Output Select of the Remote Template can be set with the S90 XS/S70 XS Editor. In the following situation, the setting of the Knob Out Select parameter will be shown as "CC" automatically.
• The MIDI In/Out is set to "MIDI."
• The DAW Select is set to a value other than "Cubase."

❹ Parameter name

Shows the parameters which can be changed via the Knobs and Sliders on the panel. The displayed parameters are the last four parameters that have been operated via Knobs and Sliders.
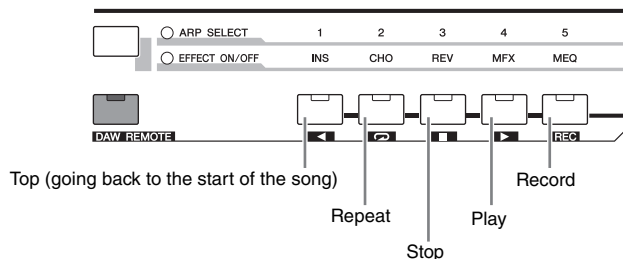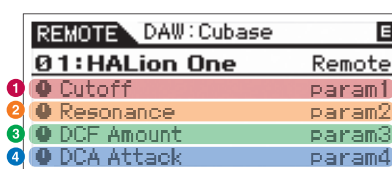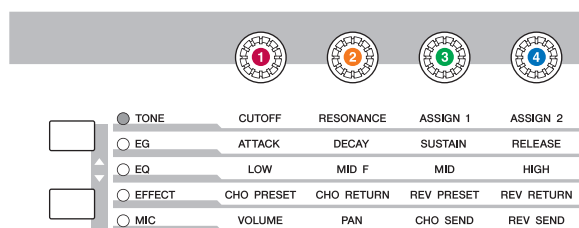
Operation in the Remote mode

Transport

In the Remote mode, the Function buttons will work as transport control buttons.

Top (going back to the start of the song)
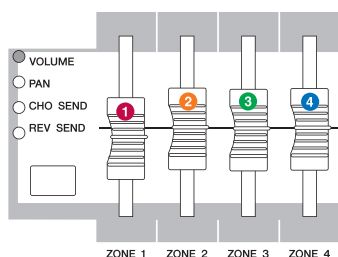Repeat
Stop
Play
Record

Knobs

In the Remote mode, two functions can be assigned to each Knob. You can change the function by using the Knob Function buttons. Four functions can be assigned to each Knob Function button (Upper/Lower). The assigned function will be shown on the display when pressing the Knob Function button. When pressing the upper Knob Function button, the "TONE" lamp will flash. When pressing the lower Knob Function button, the "MIC" lamp will flash.

TONE	CUTOFF	RESONANCE	ASSIGN 1	ASSIGN 2
EG	ATTACK	DECAY	SUSTAIN	RELEASE
EQ	LOW	MID F	MID	HIGH
EFFECT	CHO PRESET	CHO RETURN	REV PRESET	REV RETURN
MIC	VOLUME	PAN	CHO SEND	REV SEND

```
REMOTE  DAW:Cubase        E
01:HALion One       Remote
1  Cutoff              param1
2  Resonance           param2
3  DCF Amount          param3
4  DCA Attack          param4
```

Sliders

In the Remote mode, a function can be assigned to each Slider. The assigned function will be shown on the display when pressing the Slider Function button. When pressing the Slider Function button, the "VOLUME" lamp will flash.

VOLUME
PAN
CHO SEND
REV SEND

ZONE 1 ZONE 2 ZONE 3 ZONE 4

```
REMOTE  DAW:Cubase
01:HALion One       Remote
1  Volume              -0.69
2  Pan Left-Right          C
3  *No Assign
4  *No Assign
```

NOTE: Note that you need to use the S90 XS/S70 XS Remote Editor to assign functions to the Knobs and Sliders. For details on operation, refer to the S90 XS/S70 XS Remote Editor Owner's Manual.

NOTE: When using Cubase series as DAW software, you need to install the S90 XS/S70 XS Remote Tools to your computer beforehand. The S90 XS/S70 XS Remote Editor and the S90 XS/S70 XS Extension will be installed to your computer when installing the S90 XS/S70 XS Remote Tools. The S90 XS/S70 XS Extension is software which integrates the S90 XS/S70 XS with Cubase. The S90 XS/S70 XS Remote Tools can be downloaded from the following URL: http://www.yamahasynth.com/download/

Main Operation by Using the Buttons in the Remote mode

[SHIFT]	When operating the knob with holding this button, the value will be changed slowly.
OCTAVE [-]/[+]	Allows the pitch of the keyboard to be shifted down or up in octave steps.
TRANSPOSE [-]/[+]	Determines the amount in semitones by which the range of the keyboard is shifted up or down.
Slider Function	Shows the Slider Function on the display.
Slider 1 – 4	Controls the assigned parameter.
Knob Function (Upper/Lower)	Shows the Knob Function (Upper/Lower) on the display.
Function	Works as transport for the DAW software.
[UTILITY]	Shows the Remote display in the Utility mode.
[EXIT]	Goes back to the default display from the Remote display.
[STORE]	Stores the edited Control Template.
[DEC]/[INC]	Sends Program Change messages.
Data Dial	Changes the location of transport.
BANK SELECT [DEC]/[INC]	Changes Control Templates.
[MUTE]/[SOLO]	Mutes or solos the selected track in Cubase.
[A] – [H]	Works as Function Keys 1 – 8

NOTE: The Data Dial and [A] – [H] buttons are not available when using Digital Performer.

Other Functions

Velocity Meter

When the Velocity Meter is set to on in the Remote display of the Utility mode, the [COMMON], [PART SELECT] 1 – 4, [PART ON/OFF], [ARP ON/OFF], [PART ARP], and [ARP HOLD] lamps will flash as a Velocity Meter according to the velocity of the keyboard performance.

HID Device Function

The following keys will work as a USB HID device, in the same way as a computer keyboard.

Cursor [▲]/[▼]/[◄]/[►]	Cursor Keys
[ENTER]	Enter Key
[EXIT]	Esc Key
Number [1] – [10]	Numeric Keys
Number [14]	. (period) Key
Number [15]	- Key
Number [16]	+ Key

Learning Function

When the mouse cursor position is at a parameter on the VST instrument in Cubase series Version 4.5 or later, operating the Knob/Slider with holding the Knob Function/Slider Function button can assign the required parameter to the Knob/Slider. Press the [STORE] button to save the setting to the current Control Template.

NOTE: This function is not available depending on the particular software. For the most recent information, refer to the following URL: http://www.yamahasynth.com/

About MIDI Ports

The S90 XS/S70 XS uses two MIDI ports to control DAW software. Each port handles the following messages:

Port 1

• MIDI messages of keyboard, Pitch Bend, and Modulation Wheel.
• Control Change messages via the Knobs when the Knob Out Select is set to "CC" in the Control Template.
• Program Change message when the PC Change Mode is set to "PC" or "PC + Remote" in the Remote display of the Utility mode.

Port 2

• Messages only for Remote Control via operation of the panel of the instrument.
• Remote messages via the Knobs when the Knob Out Select is set to "Remote" in the Control Template.
• Program Change message when the PC Change Mode is set to "Remote" or "PC + Remote" in the Remote display of the Utility mode.
• Communication with Cubase series software.

File Mode

The File mode provides tools for transferring data (such as Voice and Performance) between this instrument and an external USB storage device connected to the USB TO DEVICE terminal.

Operation	**[UTILITY] ➔ File Select display ➔ Select "Save" or "Load" ➔ [ENTER]**

Terminology in the File mode

It is necessary to understand various terms for using the File mode. This section explains terminology specific to the File mode.

File

Just as with a computer, various data types such as Voice and Performance created on this instrument can be treated as a file and saved to an external USB storage device. Each file features a file name and file extension described below.

File Name

Just as with a computer, you can assign the name to the file in the File mode. The file name can contain up to 20 alphabetical characters on the display of this instrument. Files having the same name cannot be saved in the same directory.

Extension

The three letters following the file name (after the period) such as ".mid" and ".wav" are referred to as a file "extension." The extension indicates the type of file and cannot be changed by the panel operation of this instrument. The File mode of this instrument supports ten different extension types, according to the particular data.

File size

This refers to the memory amount of the file. The file size is determined by the amount of data saved to the file. Generally, the size of an audio file including the Waveforms is much larger than the size of a MIDI file. File sizes are indicated in conventional computer terms by B (byte), KB (kilobyte), MB (megabyte) and GB (gigabyte). 1KB is equivalent to 1024 bytes, 1MB is equivalent to 1024KB, and 1GB is equivalent to 1024MB.

Storage

Refers to a memory storage unit (such as a hard disk) to which the file is saved. This instrument can handle and mount various types of USB storage devices connected to the USB TO DEVICE terminal.

Directory (Dir)

This is an organizational feature on a data storage device (such as hard disk), allowing you to group data files together according to type or application. The "directory" is equivalent to the computer term "folder." The File mode allows you to assign a name to a directory like a file. Please note that the directory name does not contain an extension.

Hierarchical Structure (Tree Structure)

If you've saved a large number of files to memory or hard disk, you'll want to organize those files into proper folders. Also, if you have a large number of files and folders, you'll want to organize those folders into a hierarchical structure, where multiple folders are grouped into relevant 'parent' folders, and so on. The very top location for all your folders (which is called up when you first open the memory location or hard disk) is called the "root directory."
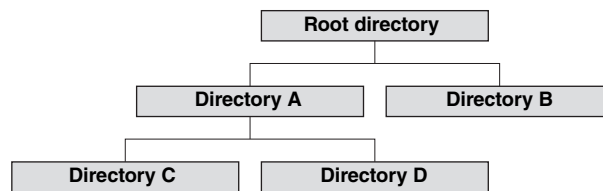
Changing the current directory (folder)

Using the illustration as an example, this shows you how to change the current directory. First, open the root directory to find directories A and B. Next, open directory A to find directories C and D. Finally, open directory C to find only the files saved in directory C. This allows you to call up folders nested down in the lower levels of the folder hierarchy. To select a different directory higher up (for example, moving from directory C to directory B), first go to the next highest level (directory A). Next, go up one more level (to the root directory). Now that both A and B are available, open directory B. In this way you can move up or down through the folder hierarchy.

```
                    Root directory
                    /           \
            Directory A        Directory B
            /        \
    Directory C    Directory D
```

■ Save

You can save the data you've created on this instrument. Only files which can be saved to USB memory storage or internal flash memory are displayed on the Save display. As a volume label to save, USB memory storage is expressed as "xxx_usb*-*" (name of USB memory storage and number), and internal flash memory as "internal."
Use the Cursor [▲]/[▼] buttons to select files in the same directory, use the Cursor [◀]/[▶] buttons to enter the directory, use the [ENTER] button to save the file, and use the [EXIT] button to go back to the parent directory.
If the [ENTER] button or the Cursor [▶] button is pressed when cursor is at the [NEW FILE] in the top of each directory, the file type selection dialog will be displayed.

Select a file type and press the [ENTER] button to call up the Naming display. After naming the file, press the [ENTER] button to display the confirmation display. Press the [ENTER] button again to save the file.
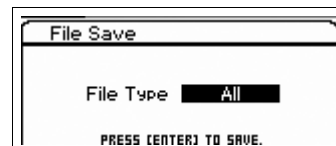
The following file types can be saved.

All	All data in this synthesizer's internal User Memory (Flash ROM) is treated as a single file, and can be saved to the USB storage device. This file type includes also the Control Template of the Remote mode.	.X2A
All Voice	All the User Voice data in this synthesizer's internal User Memory (Flash ROM) is treated as a single file, and can be saved to the USB storage device.	.X2V
Seq Chain	The Chain data of the Sequence Play mode is treated as a single file and saved to the USB storage device.	.X2C

■ Load

In the File Load display, the contents in the specified file is loaded to the instrument.
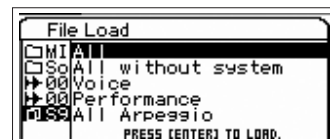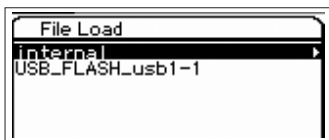
File types which can be loaded are listed below.

S90 XS/S70 XS File Types	All (.X2A), All Voice (.X2V), Seq Chain (.X2C), S90 XS/S70 XS Editor (.X2E)
S90 ES File Types	All (.S7A), All Voice (.S7V), S90 ES Voice Editor (.S7E)
MOTIF XS File Types	All (.X0A), All Voice (.X0V), All Arpeggio (.X0G), MOTIF XS Editor (.X0E)
MOTIF-RACK XS File Types	MOTIF-RACK XS Editor (.X1E)
Other File Types	Wave (.wav), AIFF (.aif), SMF format 0/1 (.mid) (For Wave and AIFF files, only files of 44.1kHz/16-bit are supported.)

Basic Structure

	Voice
	Performance
	Multi
	SEQ Play
	Master
	Remote
	File
	Audio Rec/Play
	Utility

File

File Select	
●	Save
●	Load
File Job	
	Delete
	Rename
	New Directory
	Format
	Copy

Appendix

Loading an "All" file

When loading the "All" file, you can load only a specific data (Bank or Program) as well as all the data included in the "All" file. Select the "All" file then press the [ENTER] button or Cursor [▶] button to call up the display which lets you select one of the following items.

All
When this is selected, all the data will be loaded.

All without system
When this is selected, all the data except for the Utility settings will be loaded.

Voice
When this is selected, press the [ENTER] button to load all User Voices or press the Cursor [▶] button to call up the Bank Select display.

Performance
When this is selected, press the [ENTER] button to load all User Performances or press the Cursor [▶] button to call up the Bank Select display.

All Arpeggio
When this is selected, all the Arpeggio data will be loaded.

Seq Chain
When this is selected, all the Chain data of the Sequence Play mode will be loaded.

Bank Select display
From this display that appears when Voice data and Performance data are loaded, you can select the Load source and Load destination of the Bank.
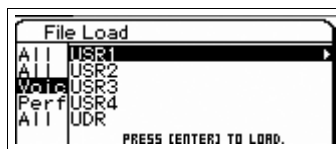
Load source selection display   **Load destination selection display**
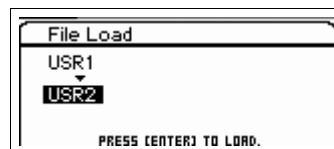
On the Load source display, select whether all the Voices of the Bank are loaded or just a specific program. Move the cursor to the desired Bank to be loaded, then press the [ENTER] button to call up the Load destination display. Press the Cursor [▶] button on the Load source display to call up the Program selection display.

Program Selection display
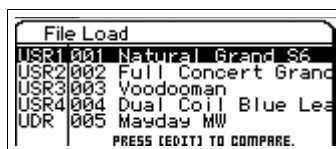
Load source selection display   **Load destination selection display**
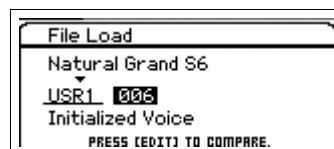
On the Load source selection display, select the program to be loaded, then press the [ENTER] button or Cursor [▶] button to call up the Load destination selection display. Select the Bank and Number then press the [ENTER] button to open the confirmation display.

NOTE: You can select a program by using the BANK [INC]/[DEC] buttons, [A] – [H] buttons, and Number [1] – [16] buttons in the "Bank" or "Number" section when the [PART]/[MUTE]/[SOLO] lamps are turned off. You can select the Voice corresponding to the current Part by pressing the [CATEGORY SEARCH] button.

NOTE: When this display is shown, you can hear the original sound at the destination by pressing the [EDIT] button to call up the Compare mode. Pressing the [EDIT] button again will exit from the Compare mode.

Loading the All Voice data

This is the same function as selecting the "Voice" when loading the All data. When selecting and loading All Voice, it is possible to load all the Voices or to load via each Bank, or just load one Program.

Loading the Seq Chain data

Loads the Chain data of the Sequence Play mode. This is the same function as selecting the "Seq Chain" when loading the All data.

Loading the Editor data

You can load the User Voice data from S90 XS/S70 XS Editor files. The procedure and parameters for loading are the same as the loading "All Voice" of the All data.

Loading the All Arpeggio data

You can load All Arp files saved on the MOTIF XS. Only loading all of the User Arpeggio data is available. This is the same function as selecting "All Arp" when loading the All data.

Loading other data

You can load audio files (.wav/.aif) and Standard MIDI Files to add to the required Steps in the Sequence Play mode. Select a file and press the [ENTER] button to call up the File Load display. Select the Step to which the file is to be loaded, then press the [ENTER] button to open the confirmation display.
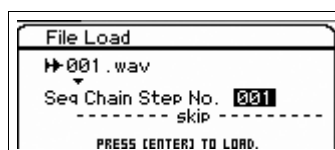
File Job

In the File Job display, deleting a file/directory, changing the name of a file/directory, creating a directory, and formatting the storage are available.

Operation	[FILE] → File Select display → Select "Save" or "Load" → [ENTER] → Select a file or directory → [JOB]

Delete

Deletes the currently selected file or directory. When selecting a storage device or [NEW FILE], this parameter is not shown.

Rename

Changes the name of the currently selected file or directory. Enter the file name on the Naming dialog. The name can contain up to 20 characters.

NOTE: This parameter is not available when a storage device or [NEW FILE] is selected.

New Directory

Creates a new directory in the current directory. Enter the directory name in the Naming dialog. The name can contain up to 20 characters. When selecting a storage device, this parameter is not shown.

Format

Formats the current USB storage device or the internal flash memory.

NOTE: You cannot change the name for the volume label of the internal flash memory (internal).

NOTE: The file system is FAT32 when formatting a USB storage device.

Copy

Copies the selected file to the root directory of a storage device. This function is shown only when a file is selected. From the display for selecting a storage device called up by executing this job, select the desired storage device, then press the [ENTER] button to copy the file. If a file of the same name already exists, a confirmation message will appear.

Audio Record/Play Mode

In the Audio Record/Play mode, your keyboard performance can be recorded and will be saved as an audio file to the root directory of the external USB storage device or the internal flash memory and you can play back the audio file on the specified storage device.

Operation	[AUDIO REC/PLAY] button ➜ Audio Record/Play Select display

Rec (Record)

This section explains how to record your keyboard performance as a Wave file at 44.1 kHz/16-bit. Your keyboard performance can be recorded for up to 74 minutes at a fixed recording level.

NOTE: The recordable time differs depending on the USB storage device. Up to 18 minutes of your performance can be recorded to internal flash memory.

Rec Storage (Record Storage)
The highest directory of the volume label selected here will be used as recording destination.
As recording destination, the internal flash memory or a USB storage device can be selected. Please keep in mind that the directories within each of the Volume Labels cannot be selected. The File name is automatically assigned.
Settings: internal, USB storage device

Trigger Level
Determines the signal level at which recording will begin. For best results, set this as low as possible to capture the entire signal, but not so low as to record unwanted noise. Press the [ENTER] button to call up the Record Standby display. When "manual" is selected, pressing the [ENTER] button starts recording immediately.
Settings: manual, 1 – 127

Recordable Time (Indication only)
Indicates the available recording time according to the available memory. The time indicated here is calculated assuming a stereo signal at a recording frequency of 44.1 kHz.

STANDBY display
Determines the value of the Rec Storage and Trigger Level.

WAITING display
This indicates that the instrument is waiting for a level exceeding the Trigger Level. When the playing level is over than the Trigger Level, recording will start. Pressing the [ENTER] button will start recording in this display. Press the [EXIT] button to return to the Standby display.

RECORDING display
This indicates that recording is ongoing. The Recordable Time decreases during recording. Press the [ENTER] button after your performance is finished. At the confirmation message (for saving or not), select "Yes" to save the file to the storage device. Select "No" to go back to the Standby display.
When pressing the [EXIT] button during recording, you can go back to the Audio Record/Play Select display and continue recording. The [AUDIO REC/PLAY]
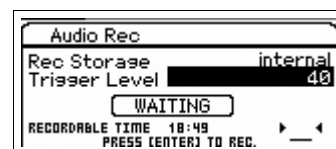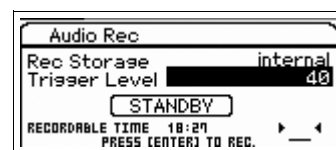
Basic Structure
Voice / Performance / Multi / SEQ Play / Master / Remote / File / Audio Rec/Play / Utility

Audio Record/Play
Audio Rec/Play Select / ● Rec / Play / Audio Play Job / Delete / Rename / New Directory / Format / Copy

Appendix

lamp flashes during recording, allowing you to easily confirm the recording status. You can also change programs of the current mode in this situation. Hold the [SHIFT] button and press the [AUDIO REC/PLAY] button to go back to the Record display, then press the [ENTER] button to finish recording.

Play

You can directly play the audio file stored on the internal flash memory or the external USB storage device. The available audio file format is .wav/.aif file at 44.1kHz/16-bit/stereo. The operation procedure and the icon of the display is the same as the File mode (page 126). When finishing recording in the Audio Record/Play mode, this display will appear automatically.
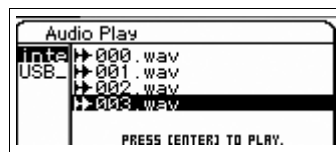
File Select display

File Select display

You can select the audio file to play.
Select the audio file then press the [ENTER] button or Cursor [▶] button to open the Play display and start playback. Press the [ENTER] button again to call up the Play Standby display. Press the [EXIT] button or Cursor [◀] button to go back the File Select display.
NOTE: If you try to play an unavailable audio file, an error message appears.

Play File display

The display is shown during playback of the audio file.
At the top of this display, the file name is shown. At the bottom of this display, the total time and the time of the current playback position of the audio file are shown as both numeric values and status bars. At the right section of this display, the playback level meter is shown. The value of the playback level is shown under the level meter.
You can adjust the playback level of the audio file via the [DEC]/[INC] buttons or the Data Dial. When the playback level is set to "255," the audio file will be played at the original recorded level. Press the [ENTER] button to stop playback briefly.
**NOTE:** The internal Effects cannot be applied to the audio playback sound.
NOTE: The playback audio cannot be recorded internally.
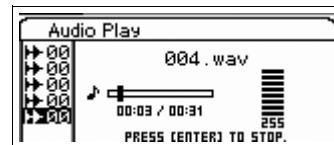
Play Standby display

This display appears when pressing the [ENTER] button in the Play File display. Press the [ENTER] button again to start playback from the position in the song at which playback was last stopped. Press the [EXIT] button or Cursor [◀] button to go back to the File Select display.
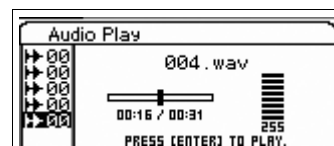
Audio Play Job

Select an audio file, then press the [JOB] button to delete/rename the file.
NOTE: This function is the same as the "Delete" and "Rename" function in the File mode (page 130).

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- **Audio Rec/Play**
- Utility

Audio Record/Play

Audio Rec/Play Select
- Rec
- Play

Audio Play Job
- Delete
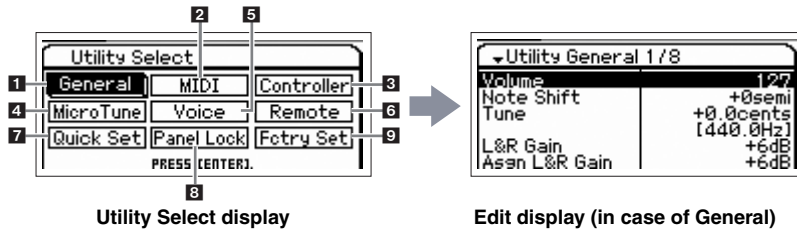- Rename
- New Directory
- Format
- Copy

Appendix

Utility Mode

In the Utility mode, you can set parameters that apply to the entire system of this instrument. To enter the Utility mode, press the [UTILITY] button. Pressing the [EXIT] button returns to the original display.

Operation	[UTILITY] → Select the desired display in the Utility Select display → [ENTER] → Edit display

Utility Select display   **Edit display (in case of General)**

1   General

Volume
Determines the overall volume of the instrument.
Settings: 0 – 127

Note Shift
Determines the amount (in semitones) by which the pitch of all notes is shifted.
Settings: -24 semi – +0 semi – +24 semi

Tune
Determines the tuning of the S90 XS/S70 XS's overall sound. You can adjust the tuning in cent increments.
Settings: -102.4 cents [414.7Hz] – +0 cents [440.0Hz] – +102.3 cents [466.8Hz]

L&R Gain
Determines the output gain of the OUTPUT L/MONO and R jacks.
Settings: 0dB, +6dB

Asgn L&R Gain (Assign L&R Gain)
Determines the output gain of the ASSIGNABLE OUT L and R jacks.
Settings: 0dB, +6dB

Kbd Octave (Keyboard Octave)
Determines the amount in octaves by which the range of the keyboard is shifted up or down. This setting can be changed also by pressing any of the OCTAVE buttons.
Settings: -3 – +0 – +3

Kbd Transpose (Keyboard Transpose)
Determines the amount in semitones by which the range of the keyboard is shifted up or down. This setting can be changed also by pressing any of the TRANSPOSE buttons.
Settings: -11 semi – +0 semi – +11 semi

Basic Structure
- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- **Utility**

Utility
- Utility Select
- ● **General**
  - Layer/Split/Drum Assign
- MIDI
- Controller
- Micro Tune
- Voice Select
  - Arpeggio
  - A/D Out
  - A/D FX
  - Master FX
  - Master EQ
- Remote
- Quick Set
- Panel Lock
- Fctry Set

Appendix

Kbd Vel Curve (Keyboard Velocity Curve)

The five curves determine how the actual velocity will be generated and transmitted according to the velocity (strength) with which you play notes on the keyboard.

Settings: normal, soft, hard, wide, fixed

normal	This linear "curve" produces one-to-one correspondence between the strength of your keyboard playing (velocity) and the actual sound change.
soft	This curve provides increased response, especially for lower velocities.
hard	This curve effectively lessens the overall response in comparison to the "norm" curve.
wide	This setting provides opposite response curves for lower and higher velocities. It widens the apparent dynamic range of the controller, producing less sound change in the softer range and more change in the higher range.
fixed	This setting produces the same amount of sound change (set in Fixed Velocity below), no matter what your playing strength.

Kbd Fixed Vel (Keyboard Fixed Velocity)

This parameter is available only when you select the "fixed" Velocity Curve above. The velocity of the note you play is fixed at the value set here.

Settings: 1 – 127

FS Sustain Pedal (Footswitch Sustain Pedal Select)

Determines which model of an optional Foot Controller connected to the FOOT SWITCH SUSTAIN jack is recognized.

When the FC3 is used:

When you connect an optional FC3 (equipped with the half-damper feature) for producing the special "half-damper" effect (as on a real acoustic piano), set this parameter to "FC3 (half on)." If you don't need the half-damper feature or want to disable and still use an FC3, set this parameter to "FC3 (half off)."

When the FC4 or FC5 is used:

Select "FC4/5." The FC4 and FC5 are not equipped with the half-damper feature.

**Settings:** FC3 (half on), FC3 (half off), FC4/5

NOTE: Note that this setting is not necessary when controlling the half-damper feature via Control Change messages from an external MIDI device to the instrument.

## Knb/Sldr Disp Time (Knob/Slider Display Time)

Determines whether or not operating one of the Knobs or Sliders will cause the Knob popup or Slider popup to appear.

Settings: off, 1 sec, 1.5 sec, 2 sec, 3 sec, 4 sec, 5 sec, keep

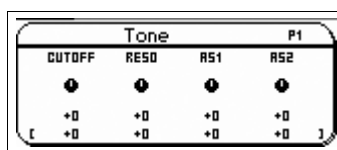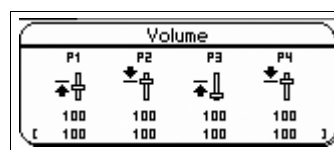| off	When this selected, the popup is not called up even if you operate the Knobs and Sliders.
1 sec – 5 sec	Operating the Knob/Slider will cause the popup to appear for 1 – 5 seconds, before being automatically closed.
keep	Operating the Knob/Slider will cause the popup to appear. When the popup is open, calling up a different display/dialog/popup or pressing the [ENTER] button/[EXIT] button will cause it to close.
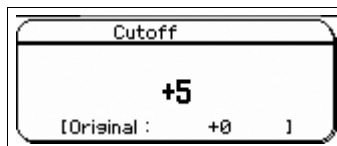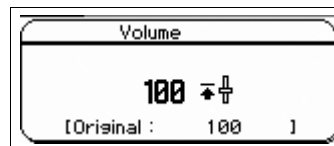
Knob popup display   **Slider popup display**

Knb/Sldr Func Disp Sw (Knob/Slider Function Display Switch)

Determines whether or not pressing the Knob Function button or Slider Function button will cause the Knob Function popup (page 29) or Slider Function popup (page 30) to appear. Unlike with the Knob popup and Slider popup, it is impossible to set the time for which the popup is shown.

Settings: off, on

Knob Function popup display   **Slider Function popup display**

Knob Curve

Adjusts the touch response sensitivity in five steps. Larger values provide higher sensitivity, letting you make large changes to the actual value even with slight turning of the Knob.

Settings: 1 – 5

Slider Mode

Determines how the parameter value is affected when you operate the Slider.

Settings: catch, jump

| catch | The Slider operation will not affect the value immediately while it will affect the value after the Slider position reaches the position corresponding to the current value. |
| jump | The Slider operation will change the value immediately from the current value to the new value corresponding to the Slider position. |

Bank Wrap Around

When using the BANK [DEC]/[INC] buttons to change the Bank/Part of the Voice/Performance mode, this determines whether pressing the cursor [right] button alternately moves continuously and changes from the last Bank/Part to the first Bank/Part and vice versa (last to first). When this parameter is set to "on," continuous change is available.

Settings: off, on

Auto Load

Determines whether the Auto Load function is on or off. When this is on, the instrument will automatically load the specified files (from the USB storage device or internal flash memory) to User memory—whenever the power is turned on. The file to be loaded is shown on this display. The Auto Load file will be specified in the File Load display called up via the [ENTER] button.

Settings: off, on

Power on Mode

This determines the default power-on mode (and memory bank)—letting you select which condition is automatically called up when you turn the power on.

Settings: performance, voice (USER1), voice (PRE1), voice (GM), master, multi

performance	When turning the power on next time, the Performance mode is entered and the first program number (USR: 001) is selected automatically.
voice (USER1)	When turning the power on next time, the Voice mode is entered and the first program number of the User Voices (USR1: 001) is selected automatically.
voice (PRE1)	When turning the power on, the Voice mode is entered and the first program number of the Preset Voices (PRE1: 001) is selected automatically.
voice (GM)	When turning the power on next time, the Voice mode is entered and the first program number of the Preset Voices (GM: 001) is selected automatically.
master	When turning the power on next time, the Master mode is entered and the first program number (001) is selected automatically.
multi	When turning the power on next time, the Multi mode is entered and the first program number (001) is selected automatically.

NOTE: Make sure to store the Utility settings to the internal memory by pressing the [STORE] button before turning the power off. Please keep in mind that the Utility settings will be lost if you turn off the power without executing the Store operation.

LCD Mode

Switches the backlight of the LCD.

Settings: normal, reverse

Click Sw (Click Switch)

Switches the click (metronome) sound on/off. This parameter can be set also by holding the [SHIFT] button and pressing the [START/STOP] button.

Settings: off, on

Click Beat

Determines the time signature of the click (metronome). The accent is applied to the first beat of the time signature set here. The time signature of the Standard MIDI file selected in the Sequence Play mode overrides the value set here.

Settings: 1/4 – 16/4, 1/8 – 16/8, 1/16 – 16/16

Click Tempo

Determines the tempo of the click (metronome) sound. The tempo set here will be applied to the Arpeggio playback. When MIDI Sync is set to "external" or "auto" with the MIDI clock (F8) received, "external" is shown here, and the tempo cannot be set.

Settings: 5 – 300, external

NOTE: This parameter can be set also by holding the [SHIFT] button and pressing the [ENTER] button a few times at the desired tempo. This function is referred to as "Tap Tempo."

Click Volume

Determines the volume level of the click (metronome) sound.

Settings: 0 – 127

Click Type

Determines the tonal type (Voice) of the click (metronome) sound. Ten types are available.

Settings: 1 – 10

Click Output Sel (Click Output Select)

Determines the output destination of the click (metronome) sound.

Settings: L&R, asL&R, asL, asR

Layer/Split/Drum Assign

Determines the parameters for the Performance Creator ([LAYER]/[SPLIT]/[DRUM ASSIGN] buttons).

Type

Determines which Voice is assigned first when using the Performance Creator. When "manual" is selected, the Voice specified as Bank/Number below is assigned. When "random" is selected, a Voice is assigned at random.

Settings: manual, random

Bank
Number
Name

Determines the Voice assigned first when using the Performance Creator. Select the desired Voice by setting the Bank and Number. The Name is determined automatically.

Settings: Bank: PRE1 – 8, USR1 – 4, PDR, UDR, GM, GMDR
Number: 001 – 128
Name: Indication only

Split Lo/Up (Split Lower/Upper)

Determines the keyboard area to which the first Voice is assigned when executing the Split of the Performance Creator. When "both" is selected, the first Voice is assigned to all the notes on the keyboard. When "lower" is selected, the first Voice is assigned to the area lower than the Split Point. When "upper" is selected, the first Voice is assigned to the Split Point and higher.

**Settings:** both, lower, upper

2 MIDI

This lets you set the MIDI settings of this instrument.

Local Control

This determines whether or not the tone generator of the instrument responds to your keyboard playing. If you set "Local Control" to "off," the Knobs, Sliders, keyboard and any controllers on the panel are internally disconnected from the tone generator. Even if this is set to "off," the data will be transmitted via MIDI. Also, the internal tone generator will respond to messages received via MIDI.

Settings: off, on
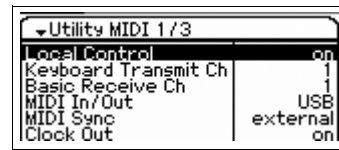
Keyboard Transmit Ch (Keyboard Transmit Channel)

Determines the MIDI channel over which the instrument sends MIDI data (to an external sequencer, tone generator, or other device). This parameter is available in the single-timbre tone generator mode (Voice/Performance modes).

Settings: 1 – 16, off

NOTE: In the Multi mode, the MIDI data created by playing the keyboard/knobs/wheels is sent to the tone generator block or the external MIDI devices via the MIDI channel same as the MIDI Receive channel of the currently selected Part. The Receive channel for each Part can be set in the Voice display (page 101) of Multi Part Edit.

Basic Receive Ch (Basic Receive Channel)

Determines the MIDI receive channel when this synthesizer is set to single-timbre tone generator mode (Voice/Performance modes).

Settings: 1 – 16, omni, off

NOTE: In the Multi mode, the Receive channel for each Part can be set in the Voice display (page 101) of Multi Part Edit.

MIDI In/Out

Determines which physical output/input terminal(s) will be used for transmitting/receiving MIDI data.

Settings: MIDI, USB

NOTE: When a USB cable is not connected to the S90 XS/S70 XS, the MIDI terminal will be automatically used for transmitting/receiving MIDI data, even if this parameter is set to "USB."

MIDI Sync

Determines whether Arpeggio playback will be synchronized to the instrument's internal clock or an external MIDI clock.

Settings: internal, external, auto

internal	Synchronization to internal clock. You can use this setting when this tone generator is to be used alone or as the master clock source for other equipment.
external	Synchronization to a MIDI clock received from an external MIDI instrument via MIDI. You can use this setting when the external device is to be used as master.
auto	When MIDI clock is transmitted continuously from an external MIDI device or computer, the internal clock of the S90 XS/S70 XS is not effective and the S90 XS/S70 XS is synchronized with the external clock. When MIDI clock is not transmitted from the external MIDI device or computer, the internal clock of the S90 XS/S70 XS continues to run in sync with the latest received tempo of the external MIDI device or computer (DAW software). This setting is useful when you wish to alternate between external clock and internal clock.

NOTE: When setting this instrument so that Arpeggio playback is synchronized to an external MIDI clock, make sure to set the devices so that the MIDI clock from the DAW software/ external MIDI device is properly transmitted to this instrument.

Clock Out

Determines whether MIDI clock (F8H) messages will be transmitted via MIDI.

Settings: off, on

NOTE: When "MIDI Sync" is set to "external," MIDI clock of this instrument is not transmitted to an external device.

Seq Control (Sequencer Control)

Determines whether Sequencer Control signals—start (FAH), continue (FBH), stop (FCH), and song position pointer (F2H)—will be received and/or transmitted via the MIDI OUT/USB terminal.

Settings: off, in, out, in/out

off	Not transmitted/recognized.
in	Recognized but not transmitted.
out	Transmitted but not recognized.
in/out	Transmitted/recognized.

Bank Select Sw (Bank Select Switch)

This switch enables or disables Bank Select messages, both in transmission and reception. When this is set to "on," this tone generator responds to incoming Bank Select messages, and it also transmits appropriate Bank Select messages (when using the panel). When this is set to "off," Bank Select messages cannot be transmitted/received.

Settings: off, on

Prg Change Sw (Program Change Switch)

This switch enables or disables Program Change messages, both in transmission and reception. When this is set to "on," this tone generator responds to incoming Program Change messages, and it also transmits appropriate Program Change messages (when using the panel). When this is set to "off," Program Change messages cannot be transmitted/received.

Settings: off, on

Controller Reset

Determines the status of the controllers (Modulation Wheel, Aftertouch, Foot Controller, Breath Controller, Knobs, etc.) when switching between voices. When this is set to "hold," the controllers are kept at the current setting. When this is set to "reset," the controllers are reset to the default states (below).

Settings: hold, reset

If you select "reset," the controllers will be reset to the following states/positions:

Pitch Bend:	Center
Modulation Wheel:	Minimum
Aftertouch:	Minimum
Foot Controller:	Maximum
Foot switch:	Off

Ribbon Controller:	Center
Breath Controller:	Maximum
Assignable Function:	Off
Expression:	Maximum

Receive Bulk

Determines whether or not Bulk Dump data from the DAW software or the external MIDI devices can be received.

Settings: protect (not received), on (received)

Bulk Interval

Determines the interval time of the Bulk Dump transmission when the Bulk Dump function is used or the Bulk Dump Request is received. The Bulk Dump function lets you save the current Voice/Performance/Multi data in the Edit buffer (DRAM) and transmit as Bulk data (System Exclusive message) to the DAW software on a computer or an external MIDI instrument.

Settings: 0 – 900ms

Device No. (Device Number)

Determines the device number used by the S90 XS/S70 XS in receiving or transmitting data. This number must match the Device Number of the DAW software or the external MIDI device when transmitting/receiving Bulk Dump data, parameter changes or other System Exclusive messages.

Settings: 1 – 16, all, off

all	When this is selected, system exclusive messages for all MIDI device numbers are received. This instrument is recognized as Device Number 1.
off	When this is selected, system exclusive messages such as bulk dump and parameter change cannot be transmitted or received. When you try to execute transmission or reception of system exclusive messages, an error message appears.

Basic Structure

| Voice |
| Performance |
| Multi |
| SEQ Play |
| Master |
| Remote |
| File |
| Audio Rec/Play |
| Utility |

Utility

Utility Select
    General
        Layer/Split/ Drum Assign
    MIDI
● Controller
    Micro Tune
    Voice Select
        Arpeggio
        A/D Out
        A/D FX
        Master FX
        Master EQ
    Remote
    Quick Set
    Panel Lock
    Fctry Set

Appendix

3 Controller

Determines Controller Assign settings common to the entire system of this instrument. You can assign MIDI Control Change Numbers to the knobs on the front panel and the external controllers. For example, you could use the ASSIGN 1 and 2 knobs to control effect depth for two different effects, while using the Foot Controller to control modulation. These Control Change Number assignments are known as "Controller Assign."

```
▾Utility Controller 1/2
RB   Ctrl No.             22
FC 1 Ctrl No.            11
FC 2 Ctrl No.             4
FS   Ctrl No.            88
```

RB Ctrl No. (Ribbon Control Number)

Determines the Control Change number which the instrument recognizes as operation of the Ribbon Controller.

Settings: off, 1 – 95

FC 1 Ctrl No. (Foot Controller 1 Control Number)
FC 2 Ctrl No. (Foot Controller 2 Control Number)

Determines the Control Change number which this instrument recognizes as operation of the Foot Controller 1/2.

Settings: off, 1 – 95

FS Ctrl No. (Footswitch Control Number)

Determines the Control Change number which this instrument recognizes as operation of the Footswitch.

Settings: off, 1 – 95, arp sw, play/stop, PC inc, PC dec, octave reset

AS 1 Ctrl No. (Assignable 1 Control Number)
AS 2 Ctrl No. (Assignable 2 Control Number)

Determines the Control Change number corresponding to the ASSIGN 1 knob and ASSIGN 2 knob.

Settings: off, 1 – 95

A. Func 1 Ctrl No. (Assignable Function 1 Control Number)
A. Func 2 Ctrl No. (Assignable Function 2 Control Number)

Determines the Control Change number which this instrument recognizes as operation of the ASSIGNABLE FUNCTION [1]/[2] button.

Settings: off, 1 – 95

BC Ctrl No. (Breath Controller Control Number)

Determines the Control Change number which this instrument recognizes as the Breath Controller.

Settings: off, 1 – 95

4   Micro Tune (Micro Tuning)

From this display, you can create your original Micro Tuning in the User Bank. Tuning one octave will affect the notes of all octaves from C -2 to G8.

Number (Micro Tuning Number)

Determines 1 – 8 Parts to which the created Micro Tuning setting is stored.

Settings: 1 – 8

Name (Micro Tuning Name)

Enters the desired name for the Micro Tuning. When the cursor is located here, pressing the [ENTER] button or the Encoder knob calls up the Naming dialog, where you can enter the desired name. The name can contain up to 20 characters.

C – B (C Tuning Offset – B Tuning Offset)

Lets you tune the individual notes in cents to create your original Micro Tuning.

Settings: -99 cent – +0 cent – +99 cent
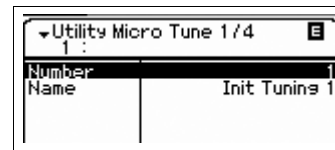
5   Voice Select

Let you select the display including the parameters applied to the entire Voice mode.

Voice Select display

Arpeggio (Voice Arpeggio)

From this display you can make the MIDI settings for the Arpeggio in the Voice mode.

Arp MIDI Out Sw (Arpeggio MIDI Output Switch)

Determines whether Arpeggio playback data in the Voice mode is output to the external devices as MIDI messages. When this is set to on, the data is output.

Settings: off, on

Voice Arpeggio display

Arp Transmit Ch (Arpeggio Transmit Channel)

Determines the MIDI transmit channel through which Arpeggio playback data will be sent to the external devices as MIDI messages (when the Switch parameter above is set to on).

Settings: 1 – 16

A/D Out (Voice A/D Output)

You can set parameters such as output destination, volume, pan and Insertion Effect related to the audio signal input from the MIC INPUT jack in the Voice mode.

Voice A/D Output display

Volume

Determines the volume level of the audio signal input from the MIC INPUT jack. This parameter can be changed directly via the Knob.
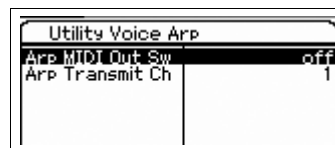
Settings: 0 – 127

Pan

Determines the stereo pan position of the audio signal input from the MIC INPUT jack. This parameter can be changed directly via the Knob.
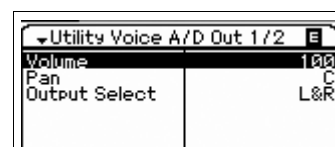
Settings: L63 (far left) – C (center) – R63 (far right)

Output Select

Determines the output destination of the audio signal input from the MIC INPUT jack.

Settings: See below.

Display indication	Output destination	Stereo/Mono
L&R	OUTPUT L and R	Stereo
asL&R	ASSIGNABLE OUTPUT L and R	Stereo
asL	ASSIGNABLE OUTPUT L	Mono
asR	ASSIGNABLE OUTPUT R	Mono
vocoder	Insertion Effect of the Voice	----

Chorus Send

Determines the Send level of the MIC INPUT signal sent to the Chorus effect. The higher the value, the more pronounced the Chorus. This parameter can be changed directly via the Knob.

Settings: 0 – 127

Reverb Send

Determines the Send level of the MIC INPUT signal sent to the Reverb effect. The higher the value, the more pronounced the Reverb. This parameter can be changed directly via the Knob.

Settings: 0 – 127

## Dry Level

Determines the level of the MIC INPUT signal which has not been processed with the System Effects (Reverb, Chorus).

Settings: 0 – 127

NOTE: When the Output Select is set the value other than "L&R," the Reverb/Chorus Send is automatically fixed to 0 and the Dry Level is automatically fixed to 127.
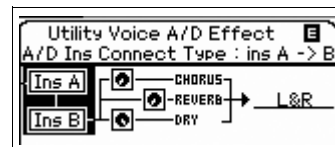
A/D FX (Voice A/D Effect)

From this display, you can set the Insertion Effect Types applied to the Audio Input signal in the Performance mode. The display for setting the Insertion Effect A/B parameters can be called up from this display.
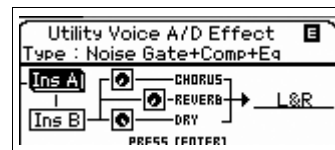
Ins Connect Type (Insertion Connection Type)

Determines the effect routing for Insertion Effects A and B when the cursor is located around the Ins A/B. The setting changes are shown on the diagram in the display, giving you a clear picture of how the signal is routed. The parameter name and value are shown at the top of the display.

Settings: ins A -> B, ins B -> A

ins A -> B	Signals processed with Insertion Effect A will be sent to Insertion Effect B and signals processed with Insertion Effect B are sent to Reverb and Chorus.
ins B -> A	Signals processed with Insertion Effect B will be sent to Insertion Effect A and signals processed with Insertion Effect A are sent to Reverb and Chorus.

Chorus Send

Determines the level sent to the Chorus Effect. The higher the value, the more pronounced the Chorus. This parameter is same as Chorus Send in the Voice A/D Output display. This parameter can be changed directly via the Knob.

Settings: 0 – 127

Reverb Send

Determines the level sent to the Reverb Effect. The higher the value, the more pronounced the Reverb. This parameter is same as Reverb Send in the Voice A/D Output display. This parameter can be changed directly via the Knob.

Settings: 0 – 127

Dry Level

Determines the level which has not been processed with the System Effects (Reverb, Chorus). This parameter is same as Dry Level in the Voice A/D Output display.

Settings: 0 – 127

Output Select

Determines the output destination.

Settings: See below.

Display indication	Output destination	Stereo/Mono
L&R	OUTPUT L and R	Stereo
asL&R	ASSIGNABLE OUTPUT L and R	Stereo
asL	ASSIGNABLE OUTPUT L	Mono
asR	ASSIGNABLE OUTPUT R	Mono
vocoder	Insertion Effect of the Voice	----

NOTE When the Output Select is set the value other than "L&R," the Reverb/Chorus Send is automatically fixed to 0 and the Dry Level is automatically fixed to 127.

Ins A (Insertion A)
Ins B (Insertion B)

When the cursor is located here, pressing the [ENTER] button calls up the Insertion Effect Parameter display.

Effect Parameters

Switch

This parameter is available only for the Master Effect and cannot be edited here.

Category
Type

From the Category column, you can select one of the Effect Categories, each of which contains similar Effect types. From the Type column, you can select one of the Effect Types listed in the selected Category.

Settings: Details about the Effect categories and the Effect types are described on page 16.

Preset

This lets you call up pre-programmed settings for each Effect type, designed to be used for specific applications and situations. You can change how the sound is affected by the selected pre-programmed settings.

NOTE: For details about the preset settings of each effect type, refer to the Data List (separate PDF documentation).

Effect Parameter 1 – 16

The effect parameter differs depending on the currently selected effect type. For details about the Effect parameters, refer to page 19. For a complete list of the available Effect parameters for each Effect type, refer to the Effect Type List in the Data List (separate PDF documentation).

Master FX (Voice Master Effect)

Determines Master Effect parameters in the Voice mode. The settings here affect all Voices.

Switch

Determines whether the Master Effect is applied to the Voice or not. When this is set to "on," the Master Effect will be applied.

Settings: off, on

Category
Type

From the Category column, you can select one of the Effect Categories, each of which contains similar Effect types. From the Type column, you can select one of the Effect Types listed in the selected Category.

Settings: Details about the Effect categories and the Effect types are described on page 16.

Preset

This lets you call up pre-programmed settings for each Effect type, designed to be used for specific applications and situations. You can change how the sound is affected by the selected pre-programmed settings.

NOTE: For details about the preset settings of each effect type, refer to the Data List (separate PDF documentation).

Effect Parameter 1 – 16

The effect parameter differs depending on the currently selected effect type. For details about the Effect parameters, refer to page 19. For a complete list of the available Effect parameters for each Effect type, refer to the Effect Type List in the Data List (separate PDF documentation).

Basic Structure

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Utility

Utility Select
- General
  - Layer/Split/ Drum Assign
- MIDI
- Controller
- Micro Tune
- ● Voice Select
  - Arpeggio
  - A/D Out
  - ● A/D FX
  - ● Master FX
  - Master EQ
- Remote
- Quick Set
- Panel Lock
- Fctry Set

Appendix

Master EQ (Voice Master EQ)

This display lets you set Master EQ parameters in the Voice mode, allowing you to control EQ over five independent frequency bands. The settings here affect all Voices.
The parameters are the same as those in the Master EQ display in Multi Common Edit (page 97).

6 Remote

Lets you the set the Remote parameters. You can directly call up the Remote display by pressing the [DAW REMOTE] button on the panel to enter the Remote mode then pressing the [UTILITY] button.
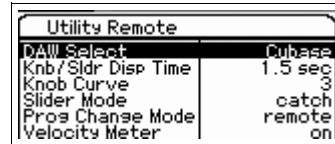
DAW Select

Determines the DAW application software to be controlled from the panel operation of this instrument.

Settings: Cubase, LogicPro, DigiPerf, SONAR

NOTE: When the [DAW REMOTE] lamp is turned on, simply selecting a DAW type calls up the Remote settings automatically.

#### Knb/Sldr Disp Time (Knob/Slider Display Time)

Determines whether or not operating one of the Knobs or Sliders will cause the Knob popup or Slider popup to appear.

Settings: off, 1 sec, 1.5 sec, 2 sec, 3 sec, 4 sec, 5 sec, keep

off	When this selected, the popup is not called up even if you operate the Knobs and Sliders.
1 sec – 5 sec	Operating the Knob and Slider will cause the popup to appear for 1 – 5 seconds, and then the display will automatically be closed.
keep	Operating the Knob and Slider will cause the popup display to appear. When the popup display is open, calling up a different display/dialog/popup or pressing the [ENTER] button/ [EXIT] button will cause it to close.
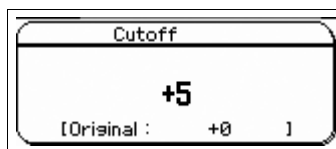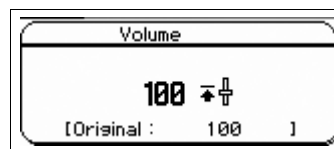
Knob popup display   **Slider popup display**

Knob Curve

Adjusts the touch response sensitivity in five steps. Larger values provide higher sensitivity, letting you make large changes to the value with just a little turning of the Knob.

Settings: 1 – 5

NOTE: The parameters here can be set also in the General display of Utility.

Slider Mode

Determines how the parameter value is affected when you operate the Slider.

Settings: catch, jump

catch	The Slider operation will not affect the value immediately while it will affect the value after the Slider position reaches the position corresponding to the current value.
jump	The Slider operation will change the value immediately from the current value to the new value corresponding to the Slider position.

Prog Change Mode (Program Change Mode)

Determines what messages will be transmitted to the computer when you operate the [DEC]/[INC] buttons or data dial. When "PC" is selected, Program Change messages will be transmitted via MIDI Port 1. When "remote" is selected, Remote Control messages will be transmitted via MIDI Port 2. When "PC+remote" is selected, both types of messages will be transmitted via MIDI Ports 1 and 2.

Settings: PC+remote, PC, remote

NOTE: This parameter is fixed to "PC" when the "DAW Select" is set to the value other than "Cubase."

Velocity Meter

Determines whether or not the velocities generated by your keyboard performance will be indicated with the Performance Control buttons. When set to "on," the Performance Control buttons function as a velocity meter.

Settings: off, on

7 Quick Set (Quick Setup)

This lets you call up the parameter settings related to the external connection in the Performance mode/Multi mode simply by selecting the one from the Preset. This conveniently lets you set the parameters in various displays to the appropriate values with just a single operation.

Quick Setup

When the cursor is located here, pressing the [ENTER] button calls up the Quick Setup dialog (page 144). This instrument has three combinations of the following parameter settings that are appropriate for common MIDI sequencing operations:

- Local Control
- MIDI Sync
- Clock Out
- Arp MIDI Out Sw (Arpeggio MIDI Output Switch)

These combinations can be selected and executed at the Quick Setup dialog, letting you instantly change all settings depending on your particular application or intended use. The three combinations can be changed by setting the following parameters in this Utility Quick Setup display.

Setup 1 – 3 Local Control
Setup 1 – 3 MIDI Sync
Setup 1 – 3 Clock Out
Setup 1 – 3 Arp MIDI Out Sw

Adjusts each value of the Quick Setup 1 – 3.

Settings: See below.

Local Control	off, on
MIDI Sync	internal, external, auto
Clock Out	off, on
Arp MIDI Out Sw	all off, all on

Quick Setup dialog

This dialog allows you to execute the Quick Setup by selecting the Quick Setup Number and pressing the [ENTER] button.

❶ Quick Setup Number

This parameter lets you select three types of settings registered to Quick Setup. Three types of the Initial Settings are shown below.

Settings: 1 – 3

Quick Setup Number	Description	Parameters	Remarks
1	When recording performance data other than Arpeggio data to a DAW software on a computer.	Local control: off MIDI: auto Clock Out: off Arp MIDI Out Sw: all off	Make sure that Echo Back (MIDI Thru) on the DAW software is set to "on."
2	When recording performance data including Arpeggio data to a DAW software on a computer.	Local control: on MIDI: auto Clock Out: off Arp MIDI Out Sw: all on	Make sure that Echo Back (MIDI Thru) on the DAW software is set to "off."
3	When using the S90 XS/S70 XS as a stand-alone device, without connecting to a DAW software or other MIDI devices.	Local control: on MIDI: internal Clock Out: on Arp MIDI Out Sw: all off	

❷ Quick Setup parameters (indication only)

Displays the parameters for Quick Setup.

❸ Current settings for each parameter (indication only)

❹ New settings after executing Quick Setup for each parameter (indication only)
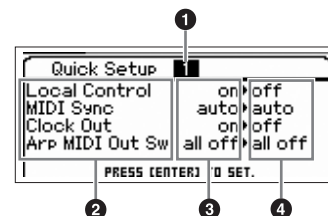
Basic Structure

Voice
Performance
Multi
SEQ Play
Master
Remote
File
Audio Rec/Play
Utility

Utility

Utility Select
General
Layer/Split/ Drum Assign
MIDI
Controller
Micro Tune
Voice Select
Arpeggio
A/D Out
A/D FX
Master FX
Master EQ
Remote
Quick Set
● Panel Lock
● Fctry Set

Appendix

8 Panel Lock

Determines which buttons become unavailable when turning on the [PANEL LOCK] button on the panel.

All (Panel Lock Section All)
Octave & Transpose (Panel Lock Section Octave and Transpose)
### Number 1 – 16 (Panel Lock Section Number 1 – 16)

When the checkbox of "All" is entered, all buttons and controllers become unavailable, except for the following.
- Pitch Bend wheel
- Modulation wheel
- INPUT GAIN knob
- Master Volume slider
- Keyboard

When the checkbox of "Octave & Transpose" is entered, the OCTAVE and TRANSPOSE buttons become unavailable. When the checkbox of "Number 1 – 16" is entered, the Number [1] – [16] buttons become unavailable.

Settings: on, off
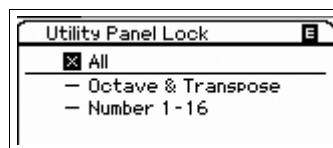
9 Fctry Set (Factory Set)

You can restore this tone generator's User memory () to the factory default settings (Factory Set). Please note that the setting of the Power On Auto Factory Set on this display will be stored automatically by executing Factory Set.

⚠ **CAUTION**
When you restore the factory default settings, the internal flash memory as well as the internal User memory data (all the User Voices, Multis, and system settings in the Utility you created) will be overwritten with the factory defaults. Take care so as not to lose important data. You should back up any important data to a USB storage device as a file with the "All" type in the File mode or a computer by using the Bulk Dump function ().

Auto Factory Set (Power On Auto Factory Set)

When this parameter is set to "on," turning the power on will restore the User memory to the factory default settings. If you change this setting, make sure to execute the Factory Set function to finalize the change.

Settings: off, on

⚠ **CAUTION**
When setting Auto Factory Set to "on" and executing Factory Set, the Factory Set function will automatically be executed each time you turn the power on. For this reason, this normally should be set to "off."

About MIDI

MIDI is an acronym that stands for Musical Instrument Digital Interface, which allows electronic musical instruments to communicate with each other, by sending and receiving compatible Note, Control Change, Program Change and various other types of MIDI data, or messages. Data communication is assured even between musical instruments and equipment from different manufacturers.

This synthesizer can control other MIDI devices by transmitting note related data and various types of controller data. It can also be controlled by incoming MIDI messages which automatically determine the tone generator mode, select MIDI channels, voices and effects, change parameter values, and of course play the voices specified for the various Parts.

Many MIDI messages listed in the MIDI Data Format are expressed in decimal numbers, binary numbers and hexadecimal numbers. Hexadecimal values have "H (hexadecimal)" at the beginning of the data line or at the end of the values. Other lowercase characters (usually "n" or "x") represent any number.
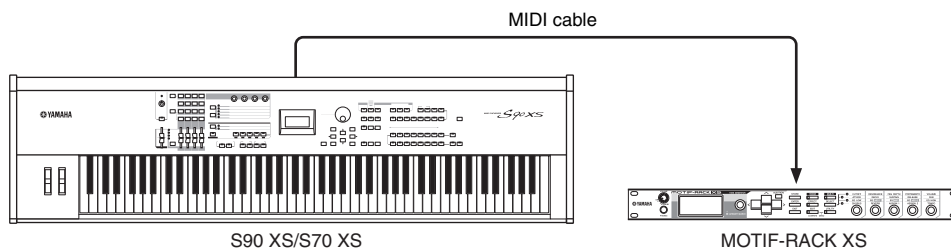
MIDI Channel

MIDI performance data is assigned to one of sixteen MIDI channels. This allows the performance data for sixteen different instrument parts to be simultaneously sent over one MIDI cable.

Think of the MIDI channels as TV channels. Each TV station transmits its broadcasts over a specific channel. Your home TV set receives many different programs simultaneously from several TV stations and you select the appropriate channel to watch the desired program.
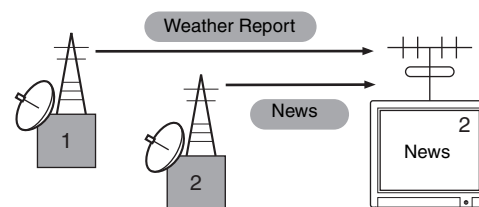
MIDI operates on the same basic principle. The transmitting instrument sends MIDI data on a specific MIDI channel (MIDI Transmit Channel) via a single MIDI cable to the receiving instrument. If the receiving instrument's MIDI channel (MIDI Receive Channel) matches the Transmit Channel, the receiving instrument will sound according to the data sent by the transmitting instrument.

For detailed information on how to set the MIDI transmit channel and the MIDI receive channel, refer to .

MIDI channels and MIDI ports

MIDI data is assigned to one of sixteen channels, and this synthesizer is capable of simultaneously playing sixteen separate Parts, via the sixteen MIDI channels. However, the sixteen-channel limit can be overcome by using separate MIDI "ports," each supporting sixteen channels. While a single MIDI cable is equipped to handle data over up to sixteen channels simultaneously, a USB connection is capable of handling far more—thanks to the use of MIDI ports. Each MIDI port can handle sixteen channels, and the USB connection allows up to eight ports, letting you use up to 128 channels (8 ports x 16 channels) on your computer. When connecting this instrument to a computer using a USB cable, the MIDI ports are defined as follows:

Port 1

The tone generator block in this instrument can recognize and use only this port. When playing the S90 XS/S70 XS as a tone generator from the external MIDI instrument or computer, you should set the MIDI Port to 1 on the connected MIDI device or computer.

Port 2

This port is used to control the DAW software on the computer from the S90 XS/S70 XS by using the Remote Control feature.

Port 3

This port is used as the MIDI Thru Port.

The MIDI data received over Port 3 via the USB TO HOST terminal will be re-transmitted to an external MIDI device via the MIDI OUT terminal. The MIDI data received over Port 3 via the MIDI IN terminal will be re-transmitted to an external device (computer, etc.) via the USB TO HOST terminal.

Port 4

This port is used only for data communication of the S90 XS/S70 XS Editor. No other software or device can use this port.

Port 5

This port is used only for data communication of the S90 XS/S70 XS Remote Editor. No other software or device can use this port.

When using a USB connection, make sure to match the MIDI transmit port and the MIDI receive port as well as the MIDI transmit channel and the MIDI receive channel. Make sure to set the MIDI port of the external device connected to this instrument according to the above information.

MIDI messages transmitted/recognized by this synthesizer

MIDI messages can be divided into two groups: Channel messages and System messages. Below is an explanation of the various types of MIDI messages which this synthesizer can recognize/transmit. The messages transmitted/recognized by this synthesizer are shown in the MIDI Data Format and MIDI Implementation Chart of the Data List (separate PDF document).

Channel Messages

Channel messages contain data related to the performance on the keyboard for the specific channel.

Note ON/OFF

Messages which are generated when the keyboard is played.
Note On: Generated when a key is pressed.
Note Off: Generated when a key is released.
Each message includes a specific note number which corresponds to the key which is pressed, plus a velocity value based on how hard the key is struck.
Reception note range = C -2 (0) – G8 (127), C3 = 60
Velocity range = 1 – 127 (only the Note On velocity is received)

Control Change

Control Change messages let you select a voice bank, control volume, panning, modulation, portamento time, brightness and various other controller parameters, through specific Control Change numbers which correspond to each of the various parameters.

Bank Select MSB (Control #0)
Bank Select LSB (Control #32)

Messages which select variation voice bank numbers by combining and sending the MSB and LSB from an external device. The functions of MSB and LSB messages differ depending on the tone generator mode.
MSB numbers select voice type (Normal Voice or Drum Voice), and LSB numbers select voice banks.
A new bank selection will not become effective until the next Program Change message is received.
To change the voices (including the voice banks), transmit Bank Select MSB, LSB, then Program Change in this order as a set.
For more information about Banks and Programs, see Voice List in the Data List (separate PDF document).

Modulation (Control #1)

Messages which control vibrato depth using the Modulation Wheel. Setting the value to 127 produces maximum vibrato and 0 results in vibrato off.

Portamento Time (Control #5)

Messages which control the duration of portamento, or a continuous pitch glide between successively played notes. Setting the value to 127 produces maximum portamento time and 0 results in minimum portamento time.

When the parameter Portamento Switch (Control #65) is set to on, the value set here can adjust the speed of pitch change.

Data Entry MSB (Control #6)
Data Entry LSB (Control #38)

These parameters specify the value of RPN MSB and RPN LSB events. Parameter value is determined by combining the MSB and LSB.

Main Volume (Control #7)

Messages which control the volume of each Part. Setting the value to 127 produces maximum volume and 0 results in volume off. This provides detailed control over the level balance among the parts.

Pan (Control #10)

Messages which control the stereo panning position of each Part (for stereo output). Setting the value to 127 positions the sound to the far right and 0 positions the sound to the far left.

Expression (Control #11)

Messages which control intonation expression of each Part during performance. Setting the value to 127 produces maximum volume and 0 results in volume off. This parameter produces volume variations during playback.

Hold1 (Control #64)

Messages which control sustain on/off. Notes playing when the pedal is pressed will be sustained. Values between 64 – 127 turn the sustain on, while values between 0 – 63 turn the sustain off.

Portamento (Control #65)

Messages which control portamento on/off. When the value is set to "0" – "63," portamento is OFF; when set to "64" – "127," portamento is ON.

When "Mono/Poly" is set to "mono," if this parameter is set to ON, you can effectively perform legato passages by playing successive notes smoothly with no breaks between notes (in other words, holding down one key and not releasing it until the next is played).

The length (degree) of the portamento effect is controlled by Portamento Time (Control #5).

Sostenuto (Control #66)

Messages which control sostenuto on/off. Values between 64 – 127 turn sostenuto on, while values between 0 – 63 turn sostenuto off.

Holding specific notes and then pressing and holding the sostenuto pedal will sustain those notes as you play subsequent notes, until the pedal is released.

Harmonic Content (Control #71)

Messages which adjust the filter resonance set for each Part. The value set here is an offset value which will be added to or subtracted from the voice data.

Release Time (Control #72)

Messages which adjust the AEG release time set for each Part.
The value set here is an offset value which will be added to or subtracted from the voice data.

Attack Time (Control #73)

Messages which adjust the AEG attack time set for each Part.
The value set here is an offset value which will be added to or subtracted from the voice data.

Basic Structure

- Functional Blocks
- Tone Generator
- A/D Input
- Arpeggio
- Sequencer
- Audio Record/Play
- Controller
- Effect
- Internal Memory

Reference

- Voice
- Performance
- Multi
- SEQ Play
- Master
- Remote
- File
- Audio Rec/Play
- Utility

Appendix

- ● **About MIDI**
- Display Messages
- Troubleshooting

Brightness (Control #74)

Messages which adjust the filter cutoff frequency set for each Part. The value set here is an offset value which will be added to or subtracted from the voice data.

Decay Time (Control #75)

Messages which adjust the AEG decay time set for each Part. The value set here is an offset value which will be added to or subtracted from the Voice data.

Effect1 Depth (Reverb Send Level) (Control #91)

Messages which adjust the send level for the Reverb effect.

Effect2 Depth (Chorus Send Level) (Control #93)

Messages which adjust the send level for the Chorus effect.

Data Increment (Control #96)
Data Decrement (Control #97)

Messages which increase or decrease the MSB value of pitch bend sensitivity, fine tune, or coarse tune in steps of 1. You will need to assign one of those parameters using the RPN in the external device in advance.

RPN LSB (Registered Parameter Number LSB) (Control #100)
RPN MSB (Registered Parameter Number MSB) (Control #101)

Used primarily as offset values for pitch bend sensitivity, tuning, and other part settings.
First send the RPN MSB and RPN LSB to specify the parameter which is to be controlled. Then use Data Increment/Decrement to set the value of the specified parameter.
Note that once the RPN has been set for a channel, subsequent data entry will be recognized as the same RPN's value change. Therefore after you use the RPN, you should set a Null (7FH, 7FH) value to avoid unexpected results.
The following RPN numbers can be received.

RPN MSB	RPN LSB	PARAMETER
00H	00H	Pitch Bend Sensitivity
00H	01H	Fine Tune
00H	02H	Coarse Tune
7FH	7FH	Null

Channel Mode Messages

2nd BYTE	3rd BYTE	MESSAGE
120	0	All Sounds Off
121	0	Reset All Controllers
123	0	All Notes Off
126	0 – 16	Mono
127	0	Poly

All Sounds Off (Control #120)

Clears all sounds currently sounding on the specified channel.
However, the status of channel messages such as Note On and Hold On is maintained.

Reset All Controllers (Control #121)

Resets all controllers to their initial values.
The following parameters are affected:

CONTROLLER	VALUE
Pitch Bend Change	0 (center)
Aftertouch	0 (off)
Polyphonic Aftertouch	0 (off)
Modulation	0 (off)
Expression	127 (max.)
Hold1	0 (off)
Portamento	0 (off)
Sostenuto	0 (off)
Soft Pedal	0 (off)
Portamento Control	Cancels the Portamento source key number
RPN	Number not specified; internal data will not change
NRPN	

All Notes Off (Control #123)

Clears all notes currently on for the specified channel. However, if Hold1 or Sostenuto is on, notes will continue sounding until these are turned off.

Mono (Control #126)

Performs the same operation as when an All Sound Off message is received. If the 3rd byte parameter (the parameter that determines the mono number) is 0 – 16, the Parts corresponding to those channels are set to mono.

Poly (Control #127)

Performs the same function as when an All Sounds Off message is received, and sets the corresponding channel to Poly Mode.

Program Change

Messages that determine which voice to select for each Part. With a combination of Bank Select, you can select not only basic voice numbers, but also variation voice bank numbers.
For a list of the Voices, see the Data List (separate PDF document).

NOTE When you specify a program change as a number in the range of 0 – 127, specify a number that is one less than the program number listed in the Voice List. For example, to specify program number 128, you would actually enter program change 127.

Pitch Bend

Pitch Bend messages are continuous controller messages that allow the pitch of designated notes to be raised or lowered by a specified amount over a specified duration.

Channel Aftertouch

Messages which let you control the sounds by the pressure you apply to the keys after the initial striking of the keys, over the entire channel.

Polyphonic Aftertouch

Messages which let you control the sounds by the pressure you apply to the keys after the initial striking of the keys, for each individual key.

System Messages

System messages are the data related to the overall system of the device.

System Exclusive Messages

The Device number of the synthesizer must match the Device Number of the external MIDI device when transmitting/receiving bulk data, parameter changes or other system exclusive messages. System Exclusive messages control various functions of this synthesizer, including master volume and master tuning, tone generator mode, effect type and various other parameters.
Some System Exclusive messages are called "Universal message" (ex. GM System ON), and do not require the Device Number.

General MIDI (GM) System On

When "General MIDI system on" is received, the synthesizer will receive the MIDI messages which are compatible with GM System Level 1, and consequently will not receive Bank Select messages.
When the instrument receives the GM System On, each receive channel of Parts 1 – 16 (in a Multi) will be assigned to "1 – 16."

F0 7E 7F 09 01 F7 (Hexadecimal)

NOTE Make sure that the interval between this message and the first note data of the song is at least a quarter note or greater in length.

MIDI Master Volume

When received, the Volume MSB will be effective for the System Parameter.
* mm (MSB) = appropriate volume value, ll (LSB) = ignored

F0 7F 7F 04 01 ll mm F7 (Hexadecimal)

Mode Change

When received, the mode of the synthesizer will be switched.
* n = Device Number ()
* m = 0 – 6 (0: Voice, 1: Performance, 2 – 3: not used, 4: Master, 5: Multi, 6: Demo)

F0 43 1n 7F 0D 0A 00 01 0m F7 (Hexadecimal)

System Realtime Messages

Active Sensing (FEH)

Once FEH (Active Sensing) has been received, if no MIDI data is subsequently received for longer than an interval of approximately 300 msec, the S90 XS/S70 XS will perform the same function as when All Sounds Off, All Notes Off, and Reset All Controllers messages are received, and will then return to a status in which FEH is not monitored.

Timing Clock (F8H)

This message is transmitted with a fixed interval (24 times per 1/4 note) to synchronize connected MIDI instruments. You can select whether the sequencer block uses the internal Timing Clock, or external Timing Clock messages received via MIDI IN by setting the MIDI Sync parameter: [UTILITY] → MIDI → MIDI Sync.

Display Messages

LCD Indication	Description
All data is initialized upon power-on. Continue?	Confirms whether you want to turn on the "Power on auto factory set switch" parameter or not.
Are you sure?	Confirms whether you want to execute a specified operation or not.
Assign Vocoder Voice to Part 1. Continue?	Confirms whether you want to select a Vocoder Voice via the Category Search display when setting the Output Select of the A/D Input part to "Vocoder" when Part 1 is not a Vocoder Voice in the Performance/Multi mode.
Assign Vocoder Voice. Continue?	Confirms whether you want to select a Vocoder Voice via the Category Search display when setting the Output Select of the A/D Input part to "Vocoder" when the Voice is not a Vocoder Voice in the Voice mode.
Audio Rec stopped due to lack of memory space.	This message appears when memory space has run out and audio recording has been stopped.
Bad disk or memory.	The external storage device connected to this synthesizer is unusable. Format the external storage device and try again.
Bulk data protected.	Bulk Data cannot be received because of the setting in the Utility mode.
Can't execute.	The synthesizer cannot execute because of the settings or situations.
Click off.	The Click (metronome) has been turned off.
Click on.	The Click (metronome) has been turned on.
Completed.	The specified load, save, format, or other Job has been completed.
Connecting to USB device...	Recognizing the USB storage device connected to the USB TO DEVICE terminal.
Copied Arpeggio type.	Copied Arpeggio type.
Device number is off.	Bulk data cannot be transmitted/received since the device number is off.
Device number mismatch.	Bulk data cannot be transmitted/received since the device numbers don't match.
Directory is not empty.	You have attempted to delete a folder that contains data.
Disk or memory is full.	The external storage device is full and no more data can be saved. Use a new external storage device, or make space by erasing unwanted data from the storage device.
Disk or memory is write-protected.	The external storage device is write protected, or you have attempted to write to a read-only medium such as CD-ROM.
Disk or memory read/write error.	An error occurred while reading or writing to/from an external storage device.
Executing…	Executing the processing.
Executing… ****.wav	This message appears when creating a audio file via Audio Record function. "***" is the name of the file.
Executing… Please keep power on.	This message appears when processing with writing to the internal memory. Please keep power on while this message is shown.
File already exists.	A file having the same name as the one you are about to save already exists.
File is not found.	The specified file was not found on the external storage device during a load operation.
File path is too long.	The file or directory you tried to access cannot be accessed because the amount of characters indicating the path is too long.
Illegal bulk data.	An error occurred while receiving the Bulk data or Bulk Request message.
Illegal file name.	The specified file name is invalid. Try entering a different name.
Illegal file.	The file specified for loading is unusable by this synthesizer or cannot be loaded in the current mode.
Learning…	This message appears when learning a parameter to the Knob/Slider in the Remote mode.
Load All Arpeggios. Are you sure?	Confirms whether you want to load the "All Arpeggio" or not in the File mode.
Load All Performances. Are you sure?	Confirms whether you want to load the "All Performances" or not in the File mode.
Load All Voices. Are you sure?	Confirms whether you want to load the "All Voices" or not in the File mode.

LCD Indication	Description
Load All without system. Are you sure?	Confirms whether you want to load the "All without system" or not in the File mode.
Load All. Are you sure?	Confirms whether you want to load the "All" or not in the File mode.
Load Seq Chain file. Are you sure?	Confirms whether you want to load the "Seq Chain file" or not in the File mode.
MIDI buffer full.	Failed to process the MIDI data because too much data was received at one time.
MIDI checksum error.	An error occurred when receiving bulk data.
Mixing Voice full.	The Mixing Voice cannot be stored because the number of Voices already stored has exceeded the maximum capacity.
No read/write authority to the file.	No permission for reading/writing on the external storage device.
Now executing Factory set... Please keep power on.	Indicates this synthesizer is restoring the factory-programmed settings.
Now loading...	Indicates that a file is being loaded.
Now receiving MIDI bulk data...	Indicates this synthesizer is receiving MIDI bulk data.
Now saving...	Indicates that a file is being saved.
Now scanning autoload file...	Scanning for the files specified for Auto Load.
Now transmitting MIDI bulk data...	Indicates this synthesizer is transmitting MIDI bulk data.
Overwrite. Are you sure?	A save operation will overwrite data on the external storage device as destination, and this message confirms whether it is OK to continue or not. Press [ENTER] (Yes) or [EXIT] (No) as required.
Part x is used for Drum Assign.	This message appears when the Part switches of all Parts are set to on, and the Drum Assign function used Part "x" for the Drum Part in Performance mode.
Part x is used for Layer.	This message appears when the Part switches of all Parts are set to on, and the Layer function used Part "x" for the Layer Part in the Performance mode.
Part x is used for Split.	This message appears when the Part switches of all Parts are set to on, and the Split function used Part "x" for the Split Part in the Performance mode.
Please stop Audio Play/Rec.	The operation you have attempted to execute cannot be done during Audio Rec/Play recording or playback.
Please stop sequencer.	The operation you have attempted to execute cannot be done during SEQ PLAY playback.
Save Audio Rec file?	Confirming whether you want to save the recorded file or not in Audio Rec/Play mode.
Seq Chain stored.	This message appears when the Seq Chain settings has been stored.
Sequence memory full.	The internal memory for Sequence data is full, preventing any further operation (such as recording, editing, Job execution, MIDI reception/transmission, or loading from the external storage device). Try again after erasing unwanted Song, Pattern, or User Phrase data.
Set Part 1 Ins Sw to on to use Vocoder.	Set the Insertion Switch of Part 1 to on to use the Vocoder when setting the Output Select of the A/D Input part to "Vocoder."
MIDI data overload.	The amount of MIDI data is too large to play.
Store Voice?	Confirms you want to store the editing Voice when executing the Performance Creator (Layer/Split/Drum Assign) feature to the editing Voice in the Voice mode.
The received MIDI bulk data's type is not compatible with the current mode/voice type.	This message appears when MIDI bulk data is received in a different mode other than the currently selected mode. The bulk data is received in the same mode as the transmitting mode. This message also appears when the Voice type (Normal Voice/Drum Voice) of the destination Mixing Parts is different from the bulk-dump-transferred Voice type. The destination Parts assigned to the same Voice type as the bulk-dump-transferred Voice type are selected.
This Performance uses User Voices.	The loaded Performance uses User Voices. Confirm whether the same Voices as at the time of saving are stored at the same User Bank/Number or not.
USB connection terminated. Press any button.	A break in the connection with the USB storage device has occurred because of an abnormal electric current. Disconnect the USB storage device from the USB TO DEVICE connector, then press any of the panel buttons.
Utility stored.	The settings in the Utility mode have been stored.

Troubleshooting

The following table provides troubleshooting hints and page references for some common problems. You may solve your problem by executing the Factory Set (page 145) after backing up your data to an external storage device. If the problem persists, then contact your Yamaha dealer or service center.

No Sound

■ **Is the S90 XS/S70 XS properly connected to related external equipment (e.g., amplifier, speaker, headphone) via audio cables?**

Since the S90 XS/S70 XS has no built-in speakers, You will need an external audio system or a set of stereo headphones to properly monitor it.

■ **Is the power of this synthesizer and any external equipment connected to this synthesizer turned on?**

■ **Have you made all the appropriate level settings—including the Master Volume on this synthesizer and the volume settings on any connected external equipment?**

Is the Foot Controller pressed down (when it is connected to the FOOT CONTROLLER jack)?

■ **Are all four sliders set to appropriate levels (other than zero or minimum)?**

■ **Is the Local Control set to OFF?**

If this is set to off, the internal tone generator will not sound.
[UTILITY] → MIDI → Local Control (page 137)

■ **Are the MIDI volume or MIDI expression settings too low when using the external controller?**

■ **Are the effect and filter settings appropriate?**

If you are using the filter, try changing the cutoff frequency. Some cutoff settings may filter out all of the sound.
[VOICE] → [EDIT] → Effect (page 44)
[VOICE] → [EDIT] → Filter/EG (page 43)
[PERFORM] → [EDIT] → Common → Effect (page 77)
[PERFORM] → [EDIT] → Common → Filter/EG (page 75)
[PERFORM] → [EDIT] → Part selection → Filter/EG (page 88)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Common → Effect (page 96)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Filter/EG (page 108)

■ **Is "Vocoder" selected as the Insertion Effect Type of the Voice?**

If so, set the parameters related to the AD Input Part and MIC INPUT connector to the appropriate values then play the keyboard while inputting your voice into the microphone connected to the S90 XS/S70 XS. Check whether or not the INPUT GAIN knob on the panel is set to the minimum position.
[VOICE] → [EDIT] → Effect → Ins Connect Type: vocoder (page 44)
[UTILITY] → [VOICE] → A/D Out → Output Select: vocoder (page 141)

■ **Are the volume or expression settings too low?**

[UTILITY] → General → Volume (page 133)
[VOICE] → [EDIT] → Play Mode → Volume (page 34)
[VOICE] → [EDIT] → Easy Element Edit mode via the Slider Function button → Sliders (page 30)
[PERFORM] → [EDIT] → Common → Play Mode → Volume (page 73)
[PERFORM] → [EDIT] → Part selection → Play Mode → Volume (page 82)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Play Mode → Volume (page 102)

■ **Are the parameter settings such as Element Switch, Part Switch, Note Limit and Velocity Limit appropriate?**

[VOICE] → [EDIT] → [MUTE] (lighting) → Number [9] – [16] buttons
[PERFORM] → [PART ON/OFF] (page 69)
[PERFORM] → [EDIT] → Part selection → Play Mode → Note Limit Lo/Hi (page 82)
[PERFORM] → [EDIT] → Part selection → Play Mode → Velocity Limit Lo/Hi (page 83)

■ **When the Performance/Multi produces no sound, has a Voice been assigned to each Part?**

[PERFORM] → [EDIT] → Part selection → Voice (page 81)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Voice (page 101)

■ **When the Performance/Multi produces no sound, is the output setting of each Part set appropriately?**

[PERFORM] → [EDIT] → Part selection → Play Mode → Output Select (page 83)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Play Mode → Output Select (page 103)

■ **When the Multi produces no sound, are the output port/channel of each track in the external sequencer and the receive channel of each Part in the Multi set appropriately?**

[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Voice → Receive Ch (page 101)

■ **When the Performance/Multi produces no sound, is the "Arpeggio Play Only" parameter of each Part turned on?**

[PERFORM] → [EDIT] → Part selection → Voice → Arp Play Only (page 81)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Voice → Arp Play Only (page 101)

No sound from the MIC INPUT jack

■ **Is the microphone switch turned on?**

■ **Is the cable between the microphone and the synthesizer properly connected?**

■ **Is the [MIC ON/OFF] button set to on (lamp lights)?**

■ **Is the INPUT GAIN knob turned fully counter-clockwise (to the minimum)?**

■ **Are the volume settings of the A/D Input Part too low?**

Selecting "MIC" via the Knob Function button → VOLUME knob (page 29)

■ **Are the effect settings appropriate?**

[UTILITY] → Voice → A/D FX (page 141)
[PERFORM] → [EDIT] → Common → A/D FX (page 79)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Common → A/D FX (page 99)

■ **Is the output setting of the A/D Input Part set appropriately?**

[UTILITY] → Voice → A/D Out → Output Select (page 141)
[PERFORM] → [EDIT] → Common → A/D Out → Output Select (page 78)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Common → A/D Out → Output Select (page 99)

Split does not work via the external MIDI device

■ **The settings of the "Split Sw" parameter and "Split Lower/Upper" parameter in the Performance mode work only when playing the keyboard of the instrument itself.**

Playback continues without stopping

■ **When the [ARP ON/OFF] button is turned on, press it so that its lamp is turned off.**

■ **In Sequence Play Mode, press the [START/STOP] button.**

■ **When the click (metronome) sound continues, hold down the [SHIFT] button and press the [START/STOP] button to stop the sound.**

The sound is distorted

■ **Are the effect settings appropriate?**
Use of an effect at certain settings may produce distortion.
[VOICE] ➔ [EDIT] ➔ Effect (page 44)
[PERFORM] ➔ [EDIT] ➔ Common ➔ Effect (page 77)
[MULTI/SEQ PLAY] (selecting Multi mode) ➔ [EDIT] ➔ Common ➔ Effect (page 96)

Use of the Master Effect at certain settings may produce distortion.
[UTILITY] ➔ Voice ➔ Master FX (page 142)
[PERFORM] ➔ [EDIT] ➔ Common ➔ Effect ➔ Master (page 77)
[MULTI/SEQ PLAY] (selecting Multi mode) ➔ [EDIT] ➔ Common ➔ Effect ➔ Master (page 96)

■ **Are the filter settings appropriate?**
Excessively high filter resonance settings can cause distortion.
[VOICE] ➔ [EDIT] ➔ Filter/EG (page 43)
[PERFORM] ➔ [EDIT] ➔ Common ➔ Filter/EG (page 75)
[PERFORM] ➔ [EDIT] ➔ Part selection ➔ Filter/EG (page 88)
[MULTI/SEQ PLAY] (selecting Multi mode) ➔ [EDIT] ➔ Part selection ➔ Filter/EG (page 108)

■ **Are any of the following volume parameters set so high that clipping is occurring?**
[UTILITY] ➔ General ➔ Volume (page 133)
[UTILITY] ➔ General ➔ L&R Gain (page 133)
[VOICE] ➔ [EDIT] ➔ Play Mode ➔ Volume (page 34)
[PERFORM] ➔ [EDIT] ➔ Common ➔ Play Mode ➔ Volume (page 73)
[PERFORM] ➔ [EDIT] ➔ Part selection ➔ Play Mode ➔ Volume (page 82)
[MULTI/SEQ PLAY] (selecting Multi mode) ➔ [EDIT] ➔ Part selection ➔ Play Mode ➔ Volume (page 102)

Sound is cut off

■ **Is the entire sound (via your keyboard playback and Sequence playback) exceeding the maximum polyphony of the synthesizer? (page 7)**

Only one note sounds at a time

■ **When this situation occurs, the Mono/Poly parameter in the current mode is set to "mono."**
If you wish to play chords, set this parameter to "poly."
[VOICE] ➔ [EDIT] ➔ Play Mode ➔ Mono/Poly (page 35)
[PERFORM] ➔ [EDIT] ➔ Part selection ➔ Play Mode ➔ Mono/Poly (page 82)
[MULTI/SEQ PLAY] (selecting Multi mode) ➔ [EDIT] ➔ Part selection ➔ Play Mode ➔ Mono/Poly (page 102)

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Wrong pitch or unexpected pitch

■ **Is the Tune parameter in the Utility mode set to a value other than "0"?**
[UTILITY] → General → Tune (page 133)

■ **Is the Note Shift parameter in the Utility mode set to a value other than "0"?**
[UTILITY] → General → Note Shift (page 133)

■ **When the Voice produces a wrong pitch, is the appropriate tuning system selected from Micro Tune parameter in the Voice Edit mode?**
[UTILITY] → Micro Tune (page 140)

■ **When the Performance/Multi produces a wrong pitch, is the Note Shift parameter of each Part set to a value other than "0"?**
[PERFORM] → [EDIT] → Part selection → Play Mode (page 82)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Play Mode (page 102)

No effect is applied

■ **Have the REVERB and CHORUS Knobs/Sliders been turned fully to the minimum?**

■ **Have any or all of the effect types been set to "thru" or "off"?**

■ **Is the EFFECT ON/OFF parameter of each Effect set to OFF?**

■ **When this occurs in the Performance/Multi mode, check whether the Insertion Switch (Ins Effect Sw) parameters are set properly or not.**
[PERFORM] → [EDIT] → Part selection → FX Send → Ins Effect Sw (page 89)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → FX Send → Ins Effect Sw (page 109)

Vocoder does not work when selecting a Vocoder Voice

■ **Is the output of the A/D Input Part set to "vocoder"?**
[UTILITY] → Voice → A/D Out → Output Select (page 141)
[PERFORM] → [EDIT] → Common → A/D Out → Output Select (page 78)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Common → A/D Out → Output Select (page 98)

The Edit Indicator appears, even when parameters are not being edited

■ **Keep in mind that even though the Edit mode is not active, simply moving a Knob/ Slider changes the current Voice, Performance, or Multi, causing the Edit Indicator to appear.**

■ **Some Arpeggio types include MIDI Control Change messages. When you play back such an Arpeggio type, the sound of the current Voice may inadvertently be changed and the Edit Indicator may appear in the top right of the display.**

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Cannot start the Arpeggio

■ **Check whether the [ARP ON/OFF] button is turned on or off.**

■ **Is the MIDI Sync parameter set to auto or internal (using internal clock)?**
[UTILITY] → MIDI → MIDI Sync (page 137)

■ **Have you selected a User Arpeggio type (with no User Data)?**
To use the User Arpeggios, the User Arpeggio data created in the MOTIF XS must be loaded to the S90 XS/S70 XS (page 129).

■ **Are the Arpeggio related parameters such as Note Limit and Velocity Limit set appropriately?**
[VOICE] → [EDIT] → Arpeggio → Arp Edit → Note Limit Lo/Hi (page 38)
[VOICE] → [EDIT] → Arpeggio → Arp Edit → Velocity Limit Lo/Hi (page 38)
[PERFORM] → [EDIT] → Part selection → Arpeggio → Arp Edit → Note Limit Lo/Hi (page 82)
[PERFORM] → [EDIT] → Part selection → Arpeggio → Arp Edit → Velocity Limit Lo/Hi (page 83)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Arpeggio → Arp Edit → Note Limit Lo/Hi (page 102)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Arpeggio → Arp Edit → Velocity Limit Lo/Hi (page 103)

■ **When this situation occurs in the Performance/Multi mode, check the Arpeggio Switch parameter.**
[PERFORM] → [EDIT] → Part selection → Arpeggio → Arp Edit → Arp Sw (page 84)
[MULTI/SEQ PLAY] (selecting Multi mode) → [EDIT] → Part selection → Arpeggio → Arp Edit → Arp Sw (page 104)

Cannot stop the Arpeggio

■ **When Arpeggio playback does not stop even when you release the key, set the Arpeggio Hold parameter to "off" via the [ARP HOLD] 1 – 4 buttons.**

The Voice assigned to the Performance produces a different sound from the one in the Voice mode

■ **This is normal because the Voice sound is determined by the parameter settings in the Performance mode. For the Performance Parts, you will need to apply basically the same parameter settings as those used in the Voice mode. Regarding the Effect settings except for the send level, you can copy the settings in the Voice mode to the Performance part in the following display. By executing this Job, you can ensure that the Voice will sound the same in the Performance mode as it does in the Voice mode.**
[PERFORM] → [JOB] → Copy → Voice (page 91)
[PERFORM] → [EDIT] → Part selection → FX Send (page 89)

Data communication between the computer and the S90 XS/S70 XS does not work properly

■ **Check whether the Port setting on the computer is appropriate or not.**

■ **Check whether the MIDI In/Out settings of the instrument are appropriate or not.**
[UTILITY] → [MIDI] → MIDI In/Out (page 137)

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The S90 XS/S70 XS does not sound properly even when playing back the song data on the computer or the MIDI instrument connected to the S90 XS/S70 XS

■ **Is the S90 XS/S70 XS set to the Multi mode?**

Select the Multi mode to play multiple channels simultaneously.

MIDI bulk data transmission/reception does not work properly

■ **Is the Receive Bulk parameter set to off?**

Set the Receive Bulk parameter to on.
[UTILITY] → [MIDI] → Receive Bulk (page 138)

■ **If the data was saved with the Bulk Dump function of the S90 XS/S70 XS, you need to set the Device Number to the same number before Bulk Dump transmission.**

[UTILITY] → [MIDI] → Device No. (page 138)

■ **When transmission does not work properly, is the device number of the MIDI instrument connected to the S90 XS/S70 XS set to match the Device Number Parameter in the Utility mode?**

[UTILITY] → [MIDI] → Device No. (page 138)

Cannot save data to the external USB storage device

■ **Is the USB storage device being used write protected? (Write-protect should be set to off for saving data.)**

■ **Is the USB storage device being used properly formatted?**

[FILE] → Save → Selecting USB storage device → [JOB] → FORMAT (page 130)

Cannot play an audio file

■ **Is the format of the audio file correct?**

The S90 XS/S70 XS can play only stereo WAVE (.wave)/IFF (.aif) files at 44.1kHz/16-bit.

Cannot enter the Edit mode

■ **Is the S90 XS/S70 XS in the File mode?**

After exiting from the File mode, press the [EDIT] button.

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