

CS1x CONTROL SYNTHESIZER Owner's Manual

YAMAHA
CS1x
CONTROL SYNTHESIZER

Neat knobs & other realtime controls
3 excellent DSP effect sections
Powerful desktop music options
Piercing arpeggios, plus much more
from this dauntless DJ device

PRECAUTIONS

IMPORTANT! PLEASE READ BEFORE PROCEEDING.

Following the important precautions below will help ensure you many years of trouble free use from your CS1x.

LOCATION

- In order to avoid causing serious damage to the CS1x, do not expose it to direct sunlight, high temperatures, excessive humidity, excessive dust or strong vibration.
- Always place the CS1x on a solid surface such as a keyboard stand or a sturdy table or desk.

POWER SUPPLY

- Turn the power switch off when the CS1x is not in use.
- Use only the supplied PA-3B or an equivalent AC power adaptor. Use of an incompatible adaptor may result in irreparable damage to the CS1x, and could even pose a serious shock hazard.
- The power adaptor should be unplugged from the AC outlet if the CS1x is not to be used for an extended period of time.
- Unplug the CS1x during electrical storms.
- Avoid plugging the CS1x into the same AC outlet as appliances with high power consumption such as electric heaters or ovens. Also avoid using multiple-plug adapters since these can result in reduced sound quality and possibly even damage to the instrument.

UNPLUG ALL INSTRUMENTS WHEN MAKING CONNECTIONS

- To avoid causing damage to the CS1x and other devices to which it is connected, such as a sound system or MIDI instruments, turn off the power and unplug all related devices prior to connecting or disconnecting audio and MIDI cables.

ELECTRICAL INTERFERENCE

- Avoid using the CS1x near televisions, radios or other devices which generate electromagnetic fields, since this may cause the CS1x to malfunction, and possibly generate interference noise in the other devices.

BACK-UP BATTERY

- The CS1x contains a special long-life battery that retains the contents of its User memory when the power is turned off. The back-up battery should last for several years. When it needs to be replaced, the message "Battery Low" will appear in the display when the power is turned on. When this happens, have the backup battery replaced by qualified Yamaha service personnel. *Do not attempt to replace the backup battery yourself.*

HANDLING AND TRANSPORT

- Always handle the CS1x with care. Physical shocks caused by dropping, bumping, or placing heavy objects on it can result in serious damage to the CS1x.
- Never apply excessive force to the controls, connectors or other parts.
- Disconnect all cables before moving the CS1x. Always unplug cables by gripping the plug firmly, and not by pulling on the cable.

CLEANING

- Never use chemical solvents or thinners to clean the CS1x, since these will damage the finish or dull the keys. Wipe the instrument clean with a soft, dry cloth. If necessary, use a soft, clean cloth slightly moistened with a

diluted, mild detergent. Then wipe the instrument thoroughly with a dry cloth.

- Avoid placing vinyl objects on top of the instrument, since vinyl can stick to and discolor the surface.

DATA BACKUP

- Yamaha recommends that you regularly save your music data using an external MIDI data storage device such as the Yamaha MDF2 MIDI Data Filer. Yamaha cannot be held responsible for the accidental loss of CS1x data.

SERVICE AND MODIFICATION

- The CS1x contains no user serviceable parts, so never open the case or tamper with the internal circuitry in any way. Doing so may result in electrical shock or damage to the instrument. Refer all servicing to qualified Yamaha service personnel.

IMPORTANT NOTE

Yamaha cannot be held responsible for damage to the CS1x resulting from improper handling or operation, or for the accidental loss of CS1x data.

NOTICES

- *The company names and product names in this owner's manual are the trademarks or registered trademarks of their respective companies.*
- *The LCD screens as illustrated in this owner's manual are for instructional purposes, and may appear somewhat different from the screens which appear on your instrument.*

Introduction



In the beginning, there was the knob...

And the knob was good. Great, in fact.

You could just reach out and grab it. Turn it left. And turn it right. Interact with it in realtime.

And there were knobs of all kinds. Knobs for changing the attack and release times of a sound. Knobs for setting the cutoff filter and resonance. And knobs for controlling many other aspects of analog synthesizer sounds.

By twisting a knob one way and another, a vast, practically endless variety of electronic sounds could be called forth. Fat sounds. Strange sounds. Beautiful sounds. Magical sounds.

It was the 1960s, and such was the power of the knob that music was changed forever.

And the term *synthesizer* became a household word.

But the knob was not perfect...

From the start the knob was brilliant and easy to grasp. It put the musician in complete control of the sound. And opened up a whole new world of sonic exploration.

It was the 1970s, and some of the greatest recordings in music history were being made. Analog "synths" were finding their way into the stages, studios and professional composing suites of the world.

But as simple, straightforward and powerful as analog synths were, they were also for the most part priced out of reach of the struggling musician. Plus they tended to be sensitive to slight fluctuations in electric current which frequently wreaked havoc with pitch, thus making tuning inherently unstable.

And there was no reliable way to save panel settings and original sounds except for tediously scrawling lists and notes with pencil and paper.

Surely there must be a better way.

Engineers the world over went to work searching for a better way, and great strides were made in the development of more stable, lower cost, and more convenient technologies.

A breakthrough in electronic sound synthesis was imminent.

Then came the miracle of digital...

The beginning of the 1980s saw breakthroughs in digital synthesizer technology which was to once again revolutionize modern music.

Musicians everywhere embraced affordable new technologies like FM, which could accurately reproduce the sound characteristics of acoustic and other instruments, and AWM (PCM), which relied on "samples" of actual instrument sounds to produce an amazing wealth of musical textures and sonic options.

The new spate of digital synthesizers were—on the outside—much more streamlined than analog synths, sporting a minimal array of buttons and a display screen which provided information about each feature.

Overnight the knob was rendered virtually obsolete.

Unstable tunings were a thing of the past. Memory was the future.

Digital synths were—on the inside—more loaded than ever, as hundreds of amazing acoustic and electronic sounds, or voices, could be stored and recalled at the touch of a button. Scores of new and exciting features were available. Entire panel settings and configurations could also be stored for instant recall.

It was the digital revolution that made MIDI, GM, XG, sequencing, sampling, looping, multitimbral play, DSP effects and many other breakthroughs in electronic music technology possible.

Developments that have changed forever the way we teach, compose,

perform and listen to music.

Global design standards ensured that music hardware and software products made by different manufacturers could work together seamlessly.

But alas, digital did not create a perfect world.

Chaos reigned over the land...

As convenient, dynamic and accessible as digital synthesis was, still it was not perfect. It had certain limitations, though different ones than analog synthesis.

Streamlined panel layouts and the demise of the knob meant that all those hundreds of great new features had to be organized and stacked in pages and subpages of hidden menus—which might mean several presses of one or more buttons just to find a feature, and several more to actually manipulate it.

And the steep learning curve of many digital synthesizers became a legend unto itself. Alarming, the synth was on its way to becoming a thing of science, rather than an intuitive musical instrument.

It was, therefore, inevitable that many would come to mourn nostalgically for the days of simplicity—for the knob. For those warm, fat, wonderful analog sounds. For fewer hidden features.

And for a simpler, easier to use electronic instrument.

There was a definite need for an analog-style digital synthesizer that would have intuitive knobs plus all the benefits of digital memories and other convenient—especially interactive—features.

One that could satisfy even the most die-hard advocate of analog or digital synthesis.

A perfectly versatile synthesizer as attractive to first-time synth owners as to desktop music hobbyists, serious amateurs, and even seasoned professionals.

A powerful stand-alone performance instrument with hot dance music and other versatile voices, as suited for the cutting edge as for the classics.

An ideal multitimbral MIDI component which could fit right into even the most sophisticated expanded system.

One with extremely modest pricing for such powerful utility.

It was only a matter of time before the thunder of analog would unite with the lightning of digital to once again challenge convention and ultimately change the landscape of music possibilities yet once more.

And Yamaha heard their cries...

Fortunately Yamaha recognized that something new and significant must be created to bring together the best of both analog and digital worlds.

The result was the Yamaha Control Synthesizer CS1x.

The CS1x takes the best of analog—simplicity of use, natural interactivity, thick sound, and, of course, the knob—and unites it with the best of digital—reliable pitch, plenty of memory, one-touch setting reconfigurations, hundreds of voices, MIDI, and much, much more—to begat a truly unique "control" synthesizer.

One with all the familiar concepts loved by both analog and digital aficionados. One destined to satisfy even the most meticulous purist in each camp.

Nothing to hide...

Perhaps the most striking—certainly refreshing—aspect of the CS1x Control Synthesizer is the way it wears its heart on its sleeve.

What you see is what you get: all features are self-evidently displayed

on the panel.

A collection of six rotary Sound Control Knobs are irresistible to the touch—and provide instant sonic results when turned.

Between the Sound Control Knobs, the clearly labeled panel switches, and the back lit LCD, the current status of the CS1x is always crystal clear.

The numeric keypad and other buttons—including Scenes, or "snapshots" of knob positions—give you quick and easy access to any parameter or setup you need, the moment you need it.

As such, the CS1x is an unprecedented realtime performance instrument.

The hundreds of great sounding AWM2 (Advanced Wave Memory 2) instrument voices (created from high quality recordings of actual instrument and other sounds), three digital effects units (with 11 Reverb, 11 Chorus and 43 Variation type effects) and scores of other parameters can be configured in an almost unlimited variety of ways and stored in memory for instant recall.

Performances, or complete configurations of up to four Layers (voices) playing simultaneously, plus effect and other parameters, and Multis, or a configuration of up to 16 Parts and other parameters for multitimbral play (using an external sequencer or computer), provide a unique array of options which make the CS1x a handy synth for literally any type of music situation.

Thirty-two notes of polyphony ensure that you always have enough available notes to play even the most demanding arrangement.

The on-board arpeggiator which can generate various types of automatic arpeggios or be controlled by an external MIDI clock provides an extremely useful tool for spicing up your masterpieces—or setting the dance floor on fire.

Go forth and multiply...

As simple—yet powerful—as the CS1x is on its own, it has also been specially engineered to easily fit right into any type of expanded music system you wish to create.

General MIDI (GM) compatibility makes the CS1x an ideal multitimbral tone generator for accurately playing any of the many Standard MIDI File or other commercially available GM music data using an external sequencer.

XG compatibility makes the CS1x completely state of the art—conveniently able to take advantage of the expanded sound and expressive capabilities that this exciting new format will offer in the coming months and years.

A TO HOST terminal and HOST SELECT switch provides for direct interface with either PC and Macintosh computers, thus enabling you to easily jump right into the "desktop music" revolution without the need for any additional peripheral interfacing equipment.

If you're a first-time synthesizer owner, the CS1x lets you expand your music system at your own pace.

First you might want to add an affordable Yamaha QY series sequencer and take advantage of the CS1x's powerful multitimbral capabilities. With a QY sequencer you can record and play back up to 16 music "parts", each on an independent MIDI channel—just like a multitrack recorder, but with virtually unlimited editing capabilities.

Next you might want to add the compact, low-cost Yamaha SU10 sampler which lets you capture music phrases and other sounds to add an entirely unique dimension to your music.

Finally you might want to add a computer which will let you take advantage of the many different types of music software products now available plus those yet to come.

With the CS1x at the heart of your system, you're ready to grow your own unique music system and take your musical capabilities as far as you want—*naturally*.

CS1x MAIN FEATURES

The CS1x is specially designed with an intuitive, interactive user interface through lots of dedicated panel controls and sound editing features which can easily be manipulated in realtime during performance. Main features include:

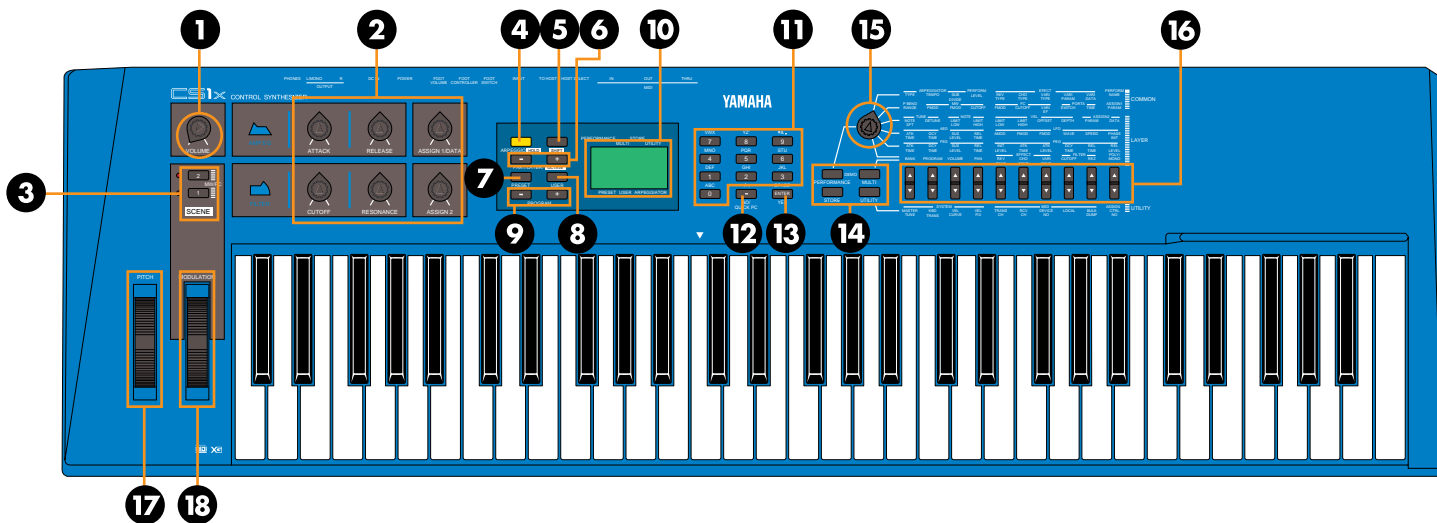
- 6 Sound Control Knobs for direct access to key parameters of the currently selected voice as you play, and 2 Scene memories for instant recall of specified Sound Control Knob positions. You can use the Modulation Wheel or a connected Foot Controller for continuous changes between Scene 1 and Scene 2 parameter values.
- 480 GM- and XG-compatible AWM2 instrument voices and 11 drum voices, or kits, in Multi Play mode. Additional voices are available in Performance mode which can be assigned to the Performances.
- Performance mode with complete configurations of Layers (4 voices either stacked or in sophisticated keyboard and velocity splits), digital effects and other parameters. There are a total of 128 Preset Performances and 128 User Performances.
- Multi Play mode for multitimbral play of up to 16 different Parts (across 16 MIDI channels; when using an external sequencer), with 32-note polyphony. TO HOST terminal and HOST SELECT switch allow direct interface with IBM PC/AT or Apple Macintosh computers.
- 3 independent DSP digital effect units which can be used simultaneously—Reverb (11 types), Chorus (11 types) and Variation (43 types).
- Arpeggiator with 30 types of arpeggiated chords and 10 timing subdivisions. The Arpeggiator's tempo can also be controlled by an external MIDI clock.

CONTENTS

The CS1x At A Glance	6
Getting Started	9
How The CS1x Generates Sound	12
CS1x Main Operating Modes	14
Feature Reference	20
Performance Mode	20
Common Edit 1	22
Common Edit 2	25
Layer Edit 1	27
Layer Edit 2	30
Layer Edit 3	31
Layer Edit 4	33
Multi Play Mode	36
Utility Mode	40
Store Mode	44
Factory Settings	46
Appendix	47
Digital Effects	47
About MIDI	53
Specifications	57
Troubleshooting	58
Error Messages	59
Index	60



THE CS1X AT A GLANCE



Front Panel

1 VOLUME

Turn this knob to set the proper listening level whether using headphones or amplified speakers.

2 SOUND CONTROL KNOBS

The six Sound Control Knobs give you direct access to key parameters of the currently selected Performance/voice. Turning any Sound Control Knob to the left or right will offset the parameter values accordingly (left for negative values, right for positive values) and produce an immediate result; a letter "E" will appear next to the Performance number in the LCD to indicate the original voice has been edited. Each knob has a center detent which represents the original value of the parameter.

- **ATTACK (Knob 1)** - This knob controls the initial attack time of the voice. Turn it left for a faster attack

time; turn it right for a slower attack time. (See page 30)

- **RELEASE (Knob 2)** - This knob controls the release time of the voice. Turn it left for a shorter release time; turn it right for a longer release time. (See page 32.)
- **ASSIGN 1/DATA (Knob 3)** - This knob has two functions. As an ASSIGN 1 knob, you can assign one of 28 parameters—including Performance Volume, Arpeggiator Tempo or Type, Portamento Time, and others—to control by turning it (see page 26). As a DATA entry knob, you can use it to quickly change the edit value of the currently selected edit parameter.
- **CUTOFF (Knob 4)** - This knob determines the cutoff frequency of the filter, or the frequency point above which other frequencies are filtered out. Turn it left for a deeper, more rounded tone; turn it right for a thinner, brighter tone. (See page 25.)
- **RESONANCE (Knob 5)** - This knob determines the amount of filter resonance or emphasis of the cutoff frequency. Turn it left to produce a relatively flat response; turn it right to add overtones and make the sound more resonant. (See page 45.)

- **ASSIGN 2 (Knob 6)** - This knob can be used to control any one of 28 parameters which you can assign to it—including Volume, Note Shift, Pan, Chorus Send, and others. (See page 29.)

3 SCENE 1 & 2

Each Performance has two Scene memories which remember specific positions of the six Sound Control Knobs. (See page 16.)

- Simply press SCENE 1 or SCENE 2 to instantly recall the specified settings. An LED beside each SCENE button will light to indicate which Scene is currently active. You can store your own Scenes in advance using Store mode. (See page 44.)
- By holding one SCENE button and then pressing the other SCENE button, both LED's will light, indicating that you can use the Modulation Wheel or a connected Foot Controller for realtime continuous parameter changes between one Scene and the other. (See page 45.)

4 ARPEGGIATOR

Press this button to activate the on-board Arpeggiator, which lets you create automatic arpeggios simply by playing a chord. An indicator will appear in the lower right area of the LCD when the Arpeggiator is on. (See page 22.)

- There are various Arpeggiator Types and Arpeggiator Timing Subdivisions. These, plus the Arpeggiator Tempo, can be specified with the Common Edit 1 menu parameters. (See page 23.)
- Pressing this button while holding SHIFT will "hold" the arpeggiated chord, or make it continue playing even when you release the keys. Pressing this button again stops the Arpeggiator. (See page 23.)
- An Arpeggiator Split function lets you split the keyboard at C3; the chords you play to the left of the split point will create arpeggiated chords, and the notes and chords you play to the right of the split point will play as normal. (See page 23.)

5 SHIFT

This button lets you transpose the octave up or down as well as activate the Arpeggiator Hold and Split functions. (See page 23.)

- To transpose the octave, hold the SHIFT button and press [-] (octave down) or [+] (octave up)—located directly beneath the SHIFT button. (See page 15.)

6 PART/LAYER [-]/[+]

These buttons let you select one of the four Layers in Performance mode (see page 14), or one of the 16 Parts in Multi Play mode (see page 17). Which Layer or Part is currently selected will be indicated in the lower right area of the LCD.

7 PRESET

In Performance mode, press this button to activate the bank of 128 Preset Performances. (See page 20.)

8 USER

In Performance mode, press this button to activate the bank of 128 User Performances. (See page 20.)

9 PROGRAM [-]/[+]

Press one of these to step up ([+]) or down ([-]) through each Performance (in Performance mode) or voice (in Multi Play mode), one at a time. (See page 20.)

10 BACK LIT LCD

The LCD provides various types of information which clearly indicates the current operating status of the CS1x, depending on which mode or other button on the front panel that you press.

11 NUMERIC KEYPAD

The numeric keypad has several functions, depending on the currently selected mode.

- In Performance mode or Multi Play mode, you can use it to select a specific Performance number or voice number—by punching in the desired number (1~128), then pressing the ENTER button. (See page 20.)
- In Quick Program Change mode, you can use it to select a specific

Performance (Performance mode) or voice (Multi Play mode) within the currently designated group of 10—by simply punching in the last digit (0~9) of the desired Performance or voice number. (See page 21.)

- When editing parameters, you can use it to quickly select a specific value—by punching in the desired number, then pressing ENTER. (See page 20.)
- When naming a User Performance, you can use it to select the letters of the name, as indicated above each button. (See page 24.)

12 [-]/NO/QUICK PC

This button has three functions.

- As a [-] button, you can use it to enter negative values when editing parameters using the numeric keypad. Press it before entering the number, followed by ENTER.
- In Performance mode or Multi Play mode, press it once to engage the Quick Program Change function. The hundredth and tenth digits of the Performance or voice number will be shown as bold characters to indicate they are fixed when Quick Program Change is active. Press the button again to turn off Quick Program Change. (See page 21.)
- In Store mode, this button lets you decline (NO) the store operation if you change your mind.

13 ENTER/YES

This button has three functions.

- When selecting a Performance number (Performance mode) or voice number (Multi Play mode) using the numeric keypad, you must press ENTER to activate the change. (See page 20.)
- When designating edit parameter values using the numeric keypad, you must press ENTER to activate the change. (See page 22.)
- In Store mode, this button lets you confirm (YES) the store operation. (See page 44.)

14 MODE SELECT SWITCHES

Press one of these to select the current operating mode.

- **PERFORMANCE** - In Performance mode you can choose any of the Preset or User Performances, plus perform editing operations using the Edit Parameter Rotary Switch and Parameter Value UP/DOWN buttons. Press PERFORMANCE to enter Performance mode from another mode, or to reselect the Performance select screen in the LCD after performing an edit operation in Performance mode. (See page 20.)
- **MULTI** - Press this button to enter Multi Play mode, which lets you designate up to 16 Parts for multitimbral play when using an external sequencer. Parameters which can be edited in Multi Play mode are printed in a row directly above the Parameter Value UP/DOWN buttons. (See page 36.)
- **STORE** - This button lets you store User Performances, as well as Scenes. (See page 44.)
- **UTILITY** - Press this button to access those "system" parameters which affect the CS1x as a whole—such as Master Tune, MIDI Transmit and Receive Channel numbers, Local On/Off, etc.—as printed directly below each Parameter Value UP/DOWN button. (See page 40.)

15 EDIT PARAMETER ROTARY SWITCH

Turn this knob to select one of the six menus of edit parameters in Performance mode.

- **COMMON** - The Common parameters (Common Edit 1, 2 menus) are those parameters which apply to the entire currently selected Performance; i.e., it doesn't matter which Layer is currently selected, since common parameters (except for Portamento) apply to all layers equally. (See page 14.)
- **LAYER** - The Layer parameters (Layer Edit 1, 2, 3, 4 menus) are those parameters which affect only the currently selected Layer (1~4, as designated by the PART/LAYER buttons) in a Performance. (See page 14.)

16 PARAMETER VALUE UP/DOWN BUTTONS

These ten buttons are used to access specific parameters in Performance, Multi and Utility modes, as well as change the values of the currently selected edit parameter.

- **PERFORMANCE MODE** - After selecting an Edit menu row with the Edit Parameter Rotary Switch, press the Parameter Value UP/DOWN button located beneath the desired parameter once to access the parameter. The parameter name and current value will appear in the LCD. Then press [UP] or [DOWN] to increase or decrease the current parameter value as desired. (See page 14.)
- **MULTI PLAY MODE** - Simply press the Parameter Value UP/DOWN button located beneath the desired parameter as printed on the panel, directly above each button. The parameter name and current value will appear in the LCD. Then press [UP] or [DOWN] to increase or decrease the current parameter value as desired. (See page 17.)
- **UTILITY MODE** - Simply press the Parameter Value UP/DOWN button located above the desired parameter as printed on the panel, directly below each button. The parameter name and current value will appear in the LCD. Then press [UP] or [DOWN] to increase or decrease the current parameter value as desired. (See page 40.)

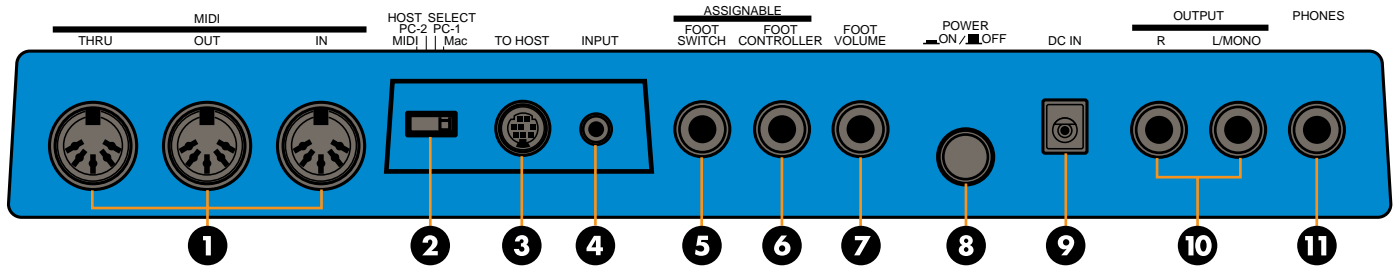
17 PITCH

The Pitch Wheel lets you bend the pitch up or down as you play. It is spring-loaded to automatically return to center position when you let go of it. In Performance mode you can designate the Pitch Bend Range in the Common Edit 2 menu. (See page 25.)

18 MODULATION

The Modulation Wheel lets you apply or set a designated amount of vibrato or tremolo. You can set it to affect filter cutoff, filter modulation, pitch modulation (Common Edit 2 menu, see page 25), as well as other controllable parameters. (see page 43.)

THE CS1x AT A GLANCE



Rear Panel

1 MIDI

MIDI IN, OUT and THRU terminals let you connect other MIDI devices such as a MIDI keyboard, tone generator, sequencer, or computer with a MIDI cable. (Set the HOST SELECT switch to MIDI when using the MIDI terminals.) MIDI IN is for input of MIDI data. MIDI OUT is for output of MIDI data and for data dumps to another CS1x or MIDI data storage device. MIDI THRU is for "daisy-chain" connection of additional MIDI instruments, as the MIDI data received at the CS1x's MIDI IN terminal is passed along unchanged to the CS1x's MIDI THRU terminal. (See page 9.)

2 HOST SELECT

The HOST SELECT switch lets you designate the type of host computer. (See page 10.) Set it to MIDI for normal MIDI transmission and reception when a host computer is not connected.

3 TO HOST

The TO HOST terminal lets you connect the CS1x directly to a host computer which does not have a MIDI interface. (See page 10.)

4 INPUT

Connect an external audio source (such as a keyboard, or CD player) here using either a stereo or mono mini plug, in order to mix its audio signals with the CS1x's voices, for output from the CS1x without the need for an external mixer.

5 FOOTSWITCH

An optional Yamaha FC4 or FC5 footswitch connected to this jack can be used to control hold on/off, portamento on/off and others, determined by the Assign Control Change Number setting in Utility mode. (see page 43.)

6 FOOT CONTROLLER

An optional Yamaha FC7 or FC9 foot controller connected to this jack can be used for control of filter modulation, filter cutoff, and the

Variation effect (Common Edit 2 menu, see page 26), as well as the Control Change Number. (see page 43.)

7 FOOT VOLUME

An optional Yamaha FC7 or FC9 foot controller connected to this jack can be used to regulate overall volume.

8 POWER

Press this switch to turn the CS1x on and off.

9 DC IN

Connect the supplied Yamaha PA-3B Power Adaptor here. (CAUTION: Do not attempt to use an AC adaptor other than the Yamaha PA-3B or equivalent, since the use of an incompatible adaptor may cause irreparable damage to the CS1x, and may even pose a serious shock hazard.)

10 OUTPUT

The stereo OUTPUT jacks let you connect the CS1x to an external stereo amplifier/speaker system. When using a mono system, connect it to the L/MONO jack.

11 PHONES

The PHONES jack lets you connect a set of stereo headphones for private listening.

GETTING STARTED

Setting Up Your CS1x

The Control Synthesizer CS1x literally comes ready to play right out of the box.

Connect the supplied PA-3B DC power adaptor to the CS1x's DC IN connector on the rear panel. Then connect the adaptor to the nearest electrical outlet.

Before switching on the power, connect any peripheral devices such as amplified speakers or MIDI instruments.

There are many ways to incorporate the CS1x into a simple or expanded music system. Below are a few examples to get you started.

CAUTION

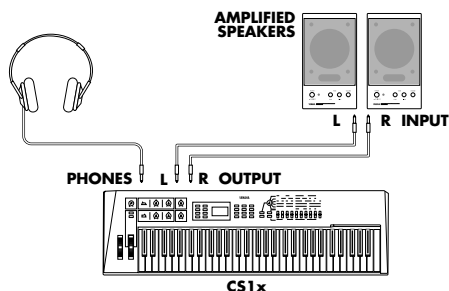
- Do not attempt to use an AC adaptor other than the PA-3B. Use of an incompatible adaptor may result in irreparable damage to the CS1x, and could even pose a serious shock hazard.
- Be sure to disconnect the power adaptor from the electrical outlet when the CS1x is not in use.

The CS1x By Itself

At the simplest level, all you need to do is connect stereo headphones to the PHONES jack located on the rear panel.

As a stand-alone performance instrument, simply connect the CS1x to amplified speakers, as follows:

For stereo use, connect one end of a pair of audio cables to the CS1x's OUTPUT (L/MONO, R) jacks, and the other end to each amplified speaker's input, as shown in the illustration below. (For mono use, connect one end of a single audio cable to the CS1x's L/MONO jack, and the other end to the amplified speaker's input.)



CAUTION

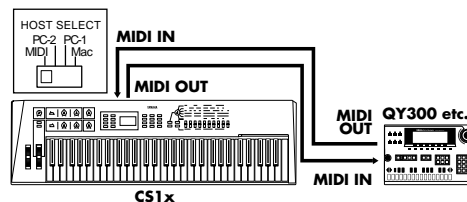
In order to avoid possible damage to the speakers or other connected electronic equipment, before switching on the power of any component, make sure the CS1x's volume level and the volume levels of the connected equipment are set to minimum.

The CS1x With An External Sequencer

The illustration below shows how to use the CS1x with a Yamaha QY series sequencer, which lets you take full advantage of the CS1x's multitimbral capability to play up to 16 different musical instrument Parts at once.

You will need MIDI cables to make the proper connections.

1. Connect a MIDI cable from the CS1x's MIDI OUT terminal to the sequencer's MIDI In terminal, and connect another MIDI cable from the CS1x's MIDI IN terminal to the sequencer's MIDI Out terminal.
2. Set the HOST SELECT switch to MIDI.



In this case, the notes you play on the keyboard will be sent as MIDI note event data to a specified MIDI channel of the sequencer. By selecting different channels, you can record each Part independently, while listening to those Parts you've already recorded.

When recording Parts to an external sequencer, you need to turn the keyboard Local setting to OFF (see page 42). When keyboard Local is turned off, the notes you play on the keyboard will not sound the CS1x's internal tone generator, but note and other performance event data will still be sent from the MIDI OUT terminal.

Since the CS1x's internal tone generator will respond to note and other data it receives at the MIDI IN terminal, the notes you play on the keyboard will be sent to the sequencer, then "echoed back" to the CS1x to play one of the 16 Parts (depending on the current MIDI channel assignment).

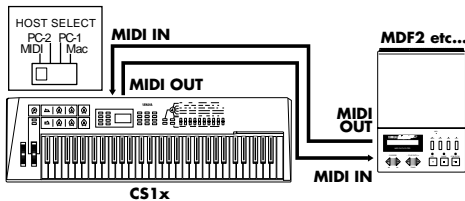
For details about assigning CS1x MIDI channels, see page 41. For details about assigning MIDI channels and other settings for the external devices such as a sequencer, consult the owner's manual of each.

Connecting The CS1x To A MIDI Data Storage Device

You can also connect the CS1x with a MIDI data storage device, such as the Yamaha MDF2 MIDI Data Filer in order to "bulk dump", or save a User Performance ("1 Perf" setting) or all the User Performances and Utility parameters ("All" setting) to floppy disks.

This lets you build up complete libraries of Performance and other data, which you can easily load back into the CS1x. (The MDF2 also lets you play compatible song data on the CS1x directly from the MDF2 itself, without the need for a sequencer.)

For information about how to perform Bulk Dump operations with the CS1x, see page 42. Refer to the owner's manual of the MIDI data storage device for operating instructions about sending and receiving data.

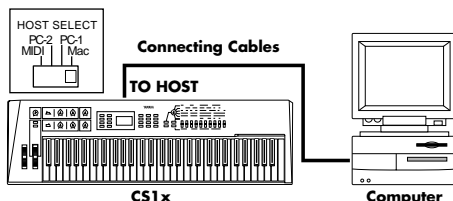


The CS1x In A Desktop Music System

With its built-in host computer interface the CS1x is designed for direct connection to an Apple Macintosh, IBM PC/AT or NEC PC-9800 Series computer—without the need for a special MIDI interface between the computer and the CS1x.

Using the CS1x in a computer music system lets you receive the full benefits of the instrument's true capabilities, as well as take advantage of the ever-expanding world of available music sequencer and other software products which provide you with unlimited potential to achieve your personal music goals.

If your computer already has a MIDI interface installed, you may want to use it rather than using the host computer interface on the CS1x. Otherwise, depending on the computer or interface used, set the HOST SELECT switch to the appropriate setting: MIDI, PC-1 (NEC PC-9800 Series), PC-2 (IBM and clones), or Mac (Macintosh). For information on the types of cables that can be used for connection, see the section *MIDI/Computer Connecting Cables*, at right.



Macintosh

If you have an Apple Macintosh not equipped with an external MIDI interface, perform the following operation:

1. Set the HOST SELECT switch to Mac.
2. Connect the TO HOST terminal on the CS1x to the Modem or Printer port on the Macintosh.
3. Turn on the host computer, then turn on the CS1x.
4. Start up your music software, and set up the appropriate options in the software for operation with the CS1x.

The options you may have to set for the Apple MIDI Driver settings:

MIDI Interface Type (Clock) → 1 MHz

Other options and settings may have to be made as well. Refer to the owner's manual of your particular music software for more information.

IBM PC and Clones

If you have an IBM PC/AT or compatible computer not equipped with an external MIDI interface, perform the following operation:

1. Set the HOST SELECT switch to PC-2.
2. Connect the TO HOST terminal on the CS1x to one of the computer's serial ports, COM 1 or COM 2.
3. Turn on the host computer, then turn on the CS1x.
4. Start up your music software, and set up the appropriate options in the software for operation with the CS1x.

Refer to the owner's manual of your particular music software for more information.

MIDI/Computer Connecting Cables

MIDI

Standard MIDI cable, maximum length 15 meters.

Mac

Apple Macintosh Peripheral cable (M0197), maximum length 2 meters.

PC-1

8-pin MINI DIN to D-SUB 25-pin cable, maximum length 1.8 meters. (If your PC-1 type computer has a 9-pin serial port, use the PC-2 type cable.)

PC-2

8-pin MINI DIN to D-SUB 9-pin cable, maximum length 1.8 meters.

Switching On The Power And Producing Sound

Once all connections have been properly made, you're ready to switch on the power and start having fun with the CS1x.

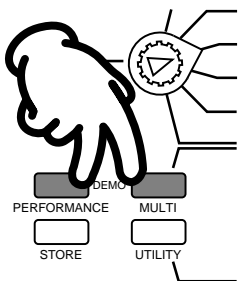
1. Turn the volume of the CS1x to its minimum position.
2. Press the POWER switch, located on the rear panel.
3. After a brief greeting message, the CS1x will power up.
4. Gradually turn the VOLUME knob to the right while playing the keyboard until you achieve a comfortable listening level.

Playing The Demo Songs

Before you dive in and start exploring the many Performances and other versatile features of the CS1x, you may want to listen to the preprogrammed demonstration song.

The Demo provides a dynamic example of just how powerful the CS1x really is. To play the Demo, perform the following operation:

1. In Performance mode, hold the PERFORMANCE button and press the MULTI button.
2. The word "DEMO" will appear in the LCD, and after a brief moment the Demo song will begin, and continue playing.
3. To stop the Demo, simply press a mode button, such as PERFORMANCE.

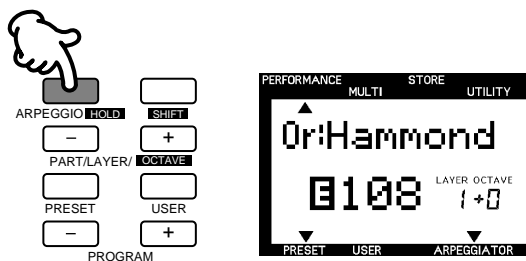


When the Demo mode is engaged, you can select a Demo song from the various Demo songs using the numeric keypad.

Playing Arpeggiated Chords

Take a moment and try out the Arpeggiator function, which creates automatic arpeggios based on the chords you play. First select a Performance with a fast attack, such as a percussive type sound. (Note: The Arpeggiator function only works in Performance mode.)

1. Press ARPEGGIATOR. An indicator will appear in the lower right area of the LCD.
2. Play a chord. The arpeggiated chord will begin playing, based on the Arpeggiator Type, Tempo and Subdivide parameter settings.
3. Change the Arpeggiator Type, Tempo and Subdivide parameters using the Common Edit 1 menu. (See page 22.)



Arpeggiator Hold

The handy Arpeggiator Hold function lets you play a chord to start the automatic arpeggio, then take your hand off the keyboard—the arpeggiated chord will play continuously in a loop. Play another chord and the automatic arpeggios will change accordingly.

1. Hold SHIFT and press ARPEGGIATOR. The Arpeggiator indicator in the LCD will start blinking.
2. Play a series of chords.
3. To stop the arpeggiated chords, press ARPEGGIATOR again.

Arpeggiator Split

The Arpeggiator Split function greatly increases the performance capability of the CS1x. When Arpeggiator Split is engaged, any chord you play to the left of the split point (B2 and below) will produce an arpeggiated chord, while chords you play to the right of the split point will play normally.

1. Press ARPEGGIATOR to activate the Arpeggiator function.
2. Set the Edit Parameter Rotary Switch to the Common Edit 1 menu.
3. Hold SHIFT and press the left-most Parameter Value UP/DOWN button (Arpeggiator Type parameter).
4. Pressing [UP] will turn on the Arpeggiator Split feature (the letter "S" will display in the LCD); pressing [DOWN] will turn it off.

How The CS1x Generates Sound

In order to better understand what's actually happening to the sound as you turn the Sound Control Knobs or modify other parameters, it is helpful to first take a look at the key components which make up the physical nature of sound.

The Nature Of Sound

What is sound? If we could see sounds they would look like waves rippling through the air at a constant speed with high frequencies bunched close together and lower frequencies spread far apart.

Our ears are naturally designed to take these physical vibrations—or sound waves—moving through the air around us at high, mid and low frequencies, and interpret them as a dog barking across the street, someone practicing a violin next door, a jet airplane screaming overhead, or rock music on the stereo in front of you.

Generating Electronic Sounds

There are three basic elements which make up a sound:

- *pitch*, or how low or high it is
- *tone*, or what its overall quality is like
- *amplitude*, or how loud its volume level is

Before we take a look at how the CS1x generates and manipulates pitch, tone and amplitude, lets first take a look at how these elements apply naturally to acoustic musical instruments.

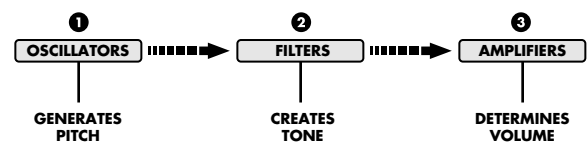
Acoustic musical instruments are specifically designed and carefully built to produce precise sound characteristics when played—which is why a violin always sounds like a violin, a piano always sounds like a piano, and a flute always sounds like a flute.

A musician playing a finely crafted violin will scrape the bow across the string at a certain intensity to generate violin sound waves at a certain volume level (*amplitude*), and produce low or high notes based on fingering positions (*pitch*). The vibrating strings and resonating wood, as well as the playing style and technique of the musician, will determine the overall quality of the violin's sound (*tone*).

Oscillators, Filters And Amplifiers

Synthesizers rely on three key electronic components to imitate the soundwaves of musical instrument voices, as well as create entirely new sounds.

In traditional analog synthesis the source sound pitch is generated by an *oscillator*, its tone is created by a *filter*, and its volume is determined by an *amplifier*.



- 1 The oscillator generates sound wave vibrations at controllable speeds, or frequencies, to create pitch. Synthesizer oscillators usually offer a range of frequencies between 20 Hz and 20kHz, which is the range of the audio spectrum that most human beings can hear. They also usually offer various types of sound waveforms, such as sine, sawtooth, and others.
- 2 Musical instrument sounds are made up of the basic tone that we clearly distinguish, plus additional harmonics, or overtones which exist at each octave above the basic tone, but that we cannot distinctly hear. The filter provides control over these harmonics. By manipulating the filter's cutoff frequency, which decides where to delete—or cut off—the overtones, and resonance settings, you can thus determine the tone.
- 3 An amplifier controls the volume of the tone. An envelope generator (EG) determines the tone's volume over time, through attack, decay, sustain and release settings.

AWM2 Waveforms

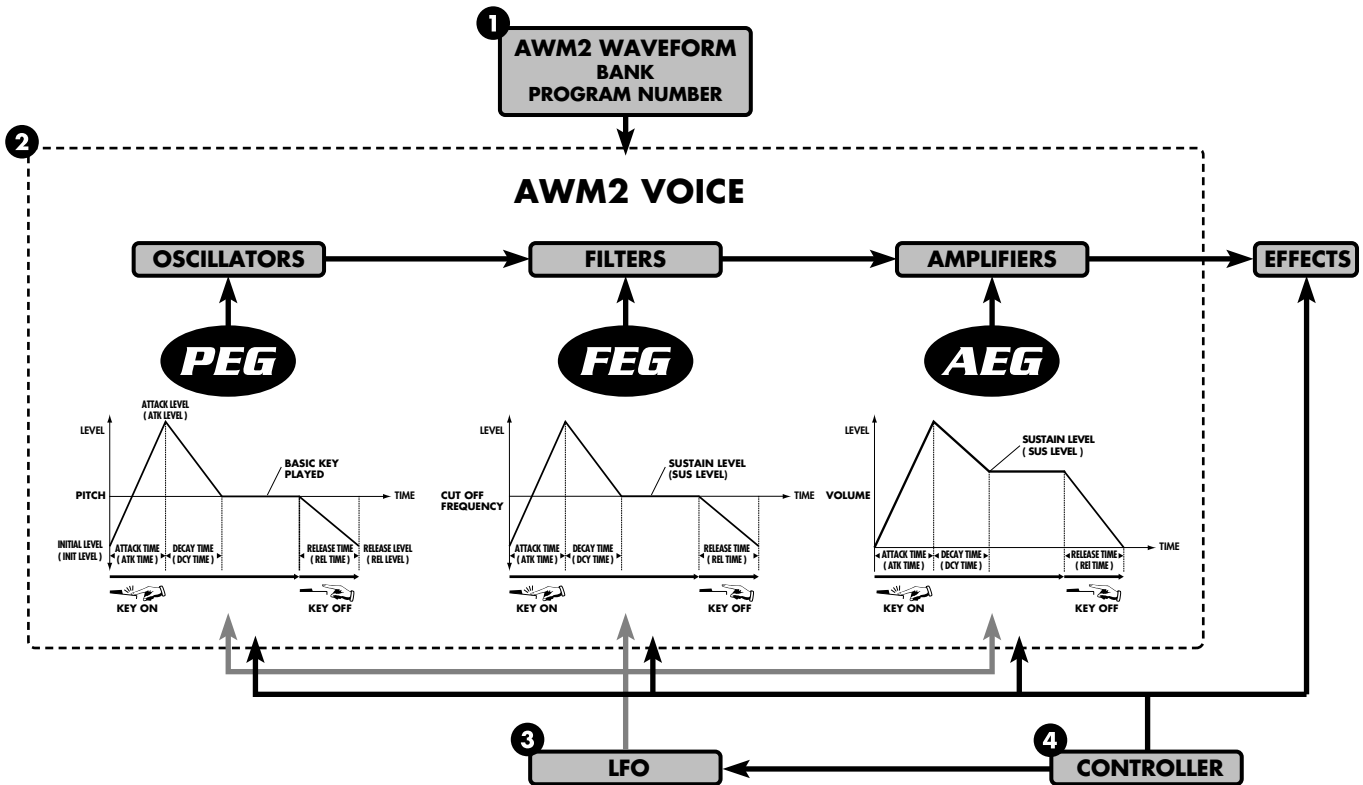
The CS1x takes the familiar concepts and functions of analog synthesis and combines them with the state of the art in digital synthesis technology.

As such, it has hundreds of AWM2 waveforms, or digital recordings ("samples"), of all types of musical instrument and other sounds programmed right inside—including everything from a violin bow scraping a string, to a mallet striking a marimba, to a breath blowing across a flute mouthpiece.

An AWM2 waveform forms the fundamental tone source of a CS1x voice; the rest of the sound is contoured by the oscillator, filter and amplifier settings. CS1x synthesis gives you enormous realtime and other control over detailed aspects of all parameter settings.

CS1x Synthesis

The secret behind the CS1x's exceptional quality sound is its ability to create rich and complex sonic textures in Performances, which are made up of Layers of up to four AWM2 voices—either sounding simultaneously or mapped to various note and velocity zones across the keyboard.



1 AWM2 WAVEFORM - The fundamental source of the CS1x's sound is the sampled AWM2 waveform. There are hundreds preprogrammed in ROM which are used by the Performances. Available waveforms are organized in Banks. Each AWM2 waveform has its own Program Number.

2 AWM2 VOICE - The AWM2 waveform combines with the oscillator, filter and amplifier to make up a CS1x voice.

• **PEG** - The Pitch Envelope Generator controls how the pitch changes over time.

INIT LEVEL (Initial Level) sets the initial pitch level when a key is played.

ATK TIME (Attack Time) determines the time required for a sound to reach its Attack Level after a note is played.

ATK LEVEL (Attack Level) sets the initially targeted level after a note is played.

DCY TIME (Decay Time) determines the time required for a sound to reach its basic pitch from the Attack Level while the key is held.

REL TIME (Release Time) determines the time it takes for the basic pitch to reach the Release Level after the key has been released.

REL LEVEL (Release Level) sets the final targeted level after the key is released.

• **FEG** - The Filter Envelope Generator controls how the timbre changes over time.

ATK TIME (Attack Time) determines the time required for a sound to reach its maximum cutoff frequency level when a note is played.

DCY TIME (Decay Time) determines the time required for a sound to reach its Sustain Level from the maximum level while the key is held.

SUS LEVEL (Sustain Level) sets the Sustain Level; the cutoff frequency will be maintained at this level for as long as the key is held.

REL TIME (Release Time) determines the time it takes for the cutoff frequency to reach the level preset for each voice after the key has been released.

• **AEG** - The Amplitude Envelope Generator controls how the volume changes over time.

ATK TIME (Attack Time) determines the time required for a sound to reach its maximum volume level when a note is played.

DCY TIME (Decay Time) determines the time required for a sound to reach its Sustain Level from the maximum volume level while the key is held.

SUS LEVEL (Sustain Level) sets the Sustain Level; the volume will be maintained at this level for as long as the key is held.

REL TIME (Release Time) determines the time it

takes for a sound to sustain after the key has been released.

3 LFO - The Low Frequency Oscillator generates low frequency signals which can be used to modulate the PEG, FEG and AEG.

• **PMOD** - The LFO can apply Pitch Modulation to the PEG to create vibrato effects.

• **FMOD** - The LFO can apply Filter Modulation to the FEG to create wah-wah types of effects.

• **AMOD** - The LFO can apply Amplitude Modulation to the AEG to create tremolo effects.

4 CONTROLLER - You can use several types of controllers to manipulate various parameters in realtime.

• **MW** - Use the Modulation Wheel to control PMOD, FMOD, and Filter Cutoff.

• **FC** - Use the Foot Controller to control FMOD, Filter Cutoff, and Variation Effect.

• Use the Sound Control Knobs to control AEG Attack Time, Release Time, Filter Cutoff, and Resonance. The ASSIGN 1/2 knobs can be specified to control one of any number of parameters. (See the lists on pages 27 and 29.)

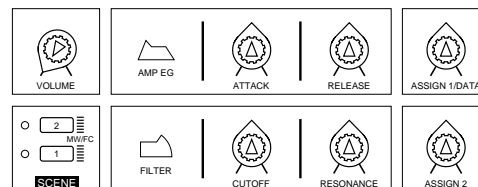
CS1x MAIN OPERATING MODES

The CS1x has two main operating modes: Performance mode and Multi Play mode. The chief distinction between each mode is as follows:

- Performance mode is primarily for realtime performance of *Layers*. It has six menus of Edit parameters.
- Multi Play mode is primarily for multitimbral playback of up to 16 *Parts* when external MIDI devices are connected. It has one menu of Edit parameters. You can also use the CS1x as a MIDI data input device for an external sequencer.

Utility mode lets you modify System and MIDI parameters which affect both Performance and Multi Play mode. (For more information about Utility mode, see page 40.)

Store mode lets you store your own User Performances and Scenes. (For more information about Store mode, see page 44.)



Turning the Sound Control Knobs will give you direct access to the AMP EG and FILTER parameters, thus providing analog-style realtime control over key characteristics of the sound. You can also save up to two "snapshots" of knob positions in Scenes, which can be instantly recalled at the touch of a SCENE button.

Another way to edit a Performance is with the Edit Parameter Rotary Switch and Parameter Value UP/DOWN buttons. These give you control over both "Common" parameters which affect all Layer voices equally, and "Layer" parameters which affect individual Layers, or AWM2 voices.

Performance Mode

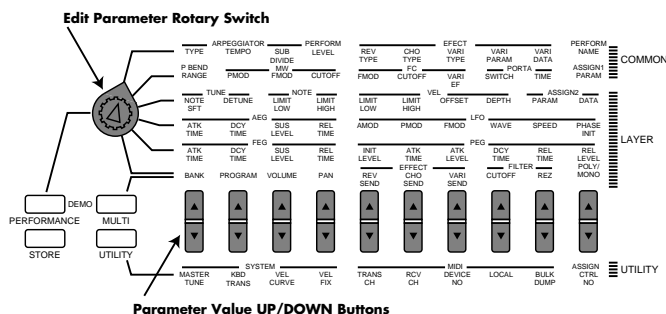
If you're in a different mode, press the PERFORMANCE button to enter Performance mode.

In Performance Play mode you can select a Performance from 128 Preset Performances and 128 User Performances and begin playing.

A *Performance* is comprised of up to four "Layers", or AWM2 voices sounding at once—either playing simultaneously across the length of the keyboard, or playing independently according to specified key and velocity ranges.

There are many Performance parameters which you can edit by *offsetting* parameter values—i.e., adding to or subtracting from the values which are preset for each voice. There are basically two ways to go about offsetting the parameters—by turning the Sound Control Knobs, or using the Edit Parameter Rotary Switch and Parameter Value UP/DOWN buttons.

Changing any parameter will automatically engage Performance Edit mode. (You can easily switch back Performance Play mode by pressing the PERFORMANCE button or PROGRAM [-]/[+] button.)



In Performance mode there are six Edit menus of Common and Layer parameters which can be accessed via the Edit Parameter Rotary Switch and modified with the Parameter Value UP/DOWN buttons.

Try changing the voice assignments to each Layer. This is a quick and effective way to create an entirely new Performance, which you can easily store as a User Performance.

Assigning voices to the Layers is simple. Choose the Layer (1~4) with the PART/LAYER [-]/[+] buttons, and select from a variety of AWM2 instrument voices and drum voices using the Bank and Program Parameters (Layer Edit 4, sixth row from the top).

Basic Operations In Performance Mode

PERFORMANCE PLAY

Performance Play mode lets you select a Preset or User Performance for realtime play.



- Press the PERFORMANCE button to enter Performance mode (if you're in a different mode).
- Press either the PRESET or USER button to select the Preset or User Performance bank.
- Choose a Performance with the PROGRAM [-]/[+] buttons.
- Use realtime control features as you play, including the Pitch Bend and Modulation Wheels.
- Transpose the octave up or down by holding SHIFT and pressing PART/LAYER [-]/[+]. You can transpose the pitch up ([+]) or down ([-]) by as many as three octaves, depending on the Performance. (The transpose value will also be reflected in the Utility mode's Keyboard Transpose function. NOTE: Maximum is ± 3 octaves; however, when you raise or lower the pitch in semitones, for example, three octaves cannot be achieved using the SHIFT button.)

PERFORMANCE EDIT

Making any adjustment—either intentionally or inadvertently—to any parameter will engage Performance Edit mode. When exiting from the Performance Edit mode (by pressing PERFORMANCE or PROGRAM [-]/[+]), an "E" will be displayed in the LCD

next to the Performance number, to indicate that the edited sound has not been stored.



- Offset AMP EG and FILTER parameters to change the shape and tone of the sound as you play by turning the Sound Control Knobs.
- Replace the Layer voice assignment, or edit other Performance Common and Layer parameters, with the Edit Parameter Rotary Switch and Parameter Value UP/DOWN buttons.
- Press ARPEGGIATOR to turn it ON, and play a chord to start the arpeggiated chords. Select Arpeggiator Type, Tempo and other parameters from the Common Edit 1 menu.

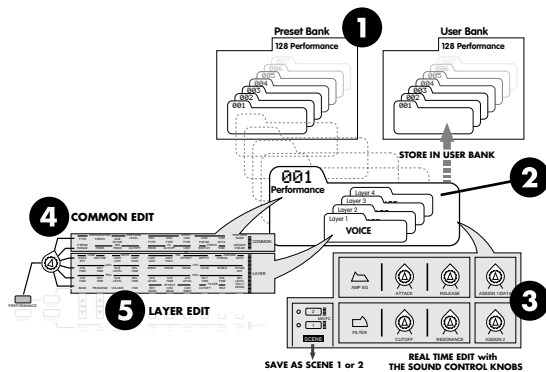
STORE

Store mode lets you store Scenes as well as User Performances for later recall.

- Store your favorite Scenes, or "snapshots" of Sound Control Knob positions, in the currently selected Performance. (See page 44.)
- Store your own Performances in the 128 User Performance memories. (See page 44.)



Performance Structure



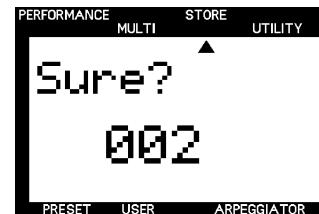
- ❶ **PERFORMANCE BANKS** - The CS1x comes preprogrammed with 128 Preset Performances and 128 User Performances. You can edit the Layers of the currently selected Performance and store it in a User Performance.
- ❷ **LAYERS** - A Performance consists of up to four Layers—each Layer can be assigned its own AWM2 voice. There are many Layer and Common Performance parameters which can be edited.
- ❸ **AMP EG/FILTER** - Turning the Sound Control Knobs will affect all Layers equally by offsetting AMP EG parameters to control the shape of the volume of the sound over time, and FILTER parameters to control the quality of the tone. In Edit mode you can assign which parameters the ASSIGN 1 and ASSIGN 2 knobs will control.
- ❹ **COMMON EDIT 1~2** - These are "Common" parameters which affect all Layers in the Performance equally.
- ❺ **LAYER EDIT 1~4** - These are "Layer" parameters which let you modify the characteristics of each individual Layer. Select the Layer you want to edit using the PART/LAYER [-]/[+] buttons.

Storing User Performances

Storing your own User Performance is a quick and simple operation.

1. To store the current Performance, press the STORE button once.
2. Choose a User Performance number (1~128) using the numeric keypad.
3. Press ENTER.

A "Sure?" prompt will appear in the LCD. Press YES to store the Performance. Press NO to abort the operation.



Scenes

There are two "Scene" memories dedicated to each Performance. Scenes are simply "snapshots" of specific positions of the Sound Control Knobs— instantaneously accessible via the SCENE buttons.

You can select one of the Scenes by pressing the SCENE 1 or SCENE 2 button. Or you can hold one SCENE button and press the other, then use the Modulation Wheel or Foot Controller for realtime continuous parameter changes between one Scene and the other. The default controller is Modulation Wheel. The minimum position of the controller is Scene 1, and the maximum position is Scene 2.

Storing Scenes

You can easily store your own Scenes in a Performance—either temporarily or permanently.

To store a Scene temporarily in the currently selected Performance, hold a SCENE button and press STORE.

This will store the Scene in the edit buffer as long as the current Performance is selected, so that the original Scenes are protected. If you select another Performance, any new Scenes will be lost.

To store a Scene permanently in a Performance, simply perform the Store operation for User Performances. (See *Storing User Performances*, above.)

Multi Play Mode

In Multi Play mode you can select a voice from the GM bank of 128 AWM2 voices (accessible via the PROGRAM [-]/[+] buttons) and start playing in realtime.

Multi Play mode lets you use the CS1x as a master keyboard controller or MIDI note data input device, as well as a multitimbral tone generator.

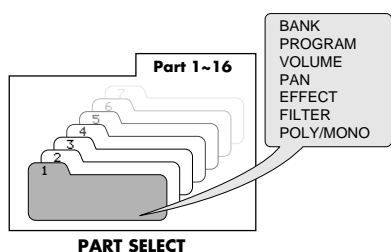
A *Multi* is a configuration of up to 16 instrument "Parts" (each Part is assigned to a MIDI channel) which can be played simultaneously when an external sequencer or computer is connected to the CS1x.

Choose the Part with the PART/LAYER [-]/[+] buttons, and assign a voice to it by selecting from the 480 GM- and XG-compatible AWM2 normal (instrument) voices and 11 drum voices (kits), using the Edit menu Bank and Program Parameter Value UP/DOWN button.

In Multi Play mode there is one menu of Edit parameters which can be accessed via the Parameter Value UP/DOWN button.

Turning the Sound Control Knobs will affect only a single AWM2 voice, i.e., the currently selected Part.

Multi Structure



PART SELECT - In Multi Play mode each "Part" is made up of an AWM2 voice. You can select and play any of the 16 Parts by pressing the PART/LAYER [-]/[+] buttons. Since the notes you play on the keyboard and the buttons you press on the panel are sending MIDI messages, the CS1x is ideal as a MIDI input device.

EDITING PARTS - Select the Part you want to edit using the PART/LAYER [-]/[+] buttons. Each of the Multi parameters are printed above the Parameter Value UP/DOWN button. To set up your own 16 Parts, assign a voice to the Part using the Bank and Program parameters accessible by the first two Parameter Value UP/DOWN buttons. (Note that these settings will not be retained when the power is turned off, since the XG default parameters are always reinstated when the power is turned on. If you

insert voice Program Change messages at the head of your sequences, however, the right Part voices will always be selected automatically when you start your sequencer from the beginning of the song.)

MULTITIMBRAL PLAY - As a GM- and XG-compatible multitimbral MIDI tone generator, the CS1x can receive note and other data on each of the 16 MIDI channels, sent from an external sequencer or computer, thus playing the corresponding 16 Parts.

XG Operation

The CS1x is a fully equipped, stand-alone XG-MIDI tone generator, featuring a total of 480 normal voices and 11 drum voices.

The XG format maintains the universality and compatibility of the MIDI and General MIDI System Level 1 standards, while significantly increasing the range of expressiveness through much greater control over voice modifications and effects.

In addition to supporting the 128 GM voices, the XG format provides for Bank Select messages that significantly expand the number of voices available for use.

Many of the new XG voices are variations of basic GM voices which are stored in additional banks. Each bank is associated with a specific type of variation, so that voices are easy to locate. When using an external sequencer to control the CS1x, additional banks are selected by the appropriate Bank-Select LSB values.

The XG format also supports a full SFX bank of extension effects, which are selected by a Bank-Select MSB value of 40H. Bank-Select MSB 7H, in contrast, can be used to set any channel to rhythm-part play.

The XG format allows creation of extremely expressive control data which can change a voice's Harmonic Contents, Brightness, and many more critical Control Change and other parameters.

The XG format also offers high level effects support, enabling control of effects types, circuit operation, plus internal parameter settings for both basic and elaborate effects. This means you can freely control the parameters of the CS1x's 11 Reverb, 11 Chorus and 43 Variation types of effects independently.

(For more information about MIDI related parameters, see the *Appendix*, page 53.)

The CS1x also features another play mode —TG300B mode— which lets you play back commercially available MIDI files in this format.

Feature Reference



Feature Reference

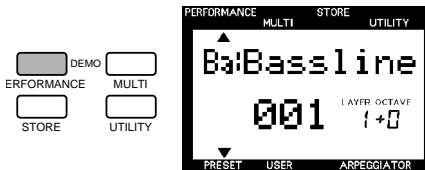
Following is a description of each function in the various modes.

1 Performance Mode

In Performance mode you can choose from 128 Preset and 128 User Performances. A Performance consists of a maximum of four layered sounds (voices). The Performance Edit function lets you easily edit each Layer within a Performance. The various parameters give you the flexibility to create a vast variety of sounds.

Entering Performance Mode

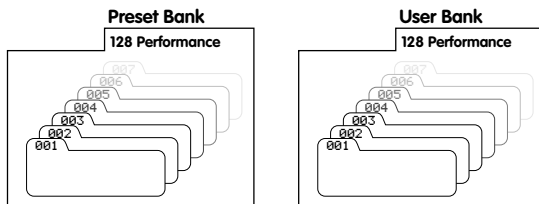
Press the PERFORMANCE button. A [▲] mark will appear in the LCD below the word "PERFORMANCE".



Performance Play Mode

● Selecting a Bank

There are 2 banks, a Preset bank and a User bank. Each bank contains 128 Performances.

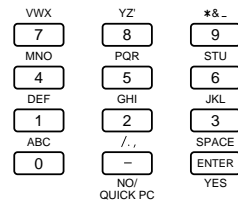


Press the PRESET button or the USER button to select the bank you want. A [▼] mark will appear in the LCD above the word "PRESET" or "USER".



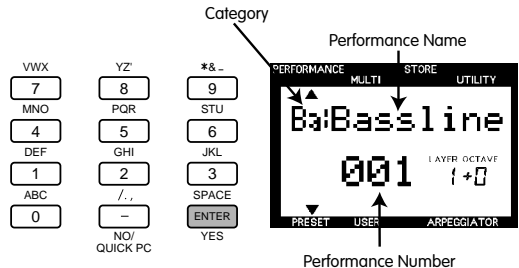
● Selecting a Performance

1. Use the numeric keypad (0 ~ 9) to select the Performance number you want.

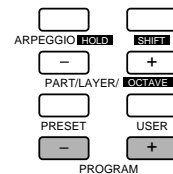


NOTE For more information about each Performance, see the Performance List in the "Data List" book.

2. Press the ENTER button to confirm the Performance number (1~128). The Performance name and number you have selected will display in the LCD. The Category name will be shown next to the Performance name.

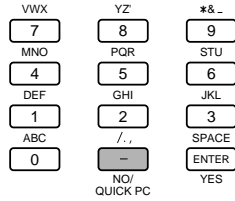


Press the PROGRAM [+] button to select the next Performance number. Press the PROGRAM [-] button to select the previous Performance number.



Quick Program Change

Press the QUICK PC (Quick Program Change) button in the numeric keypad to fix all the numbers except the first digit of the Performance number in the LCD. By pressing a button in the numeric keypad (0-9), you can quickly select the Performance numbers within a group of ten by changing the first digit of the Performance number. The hundredth and tenth digits will be shown as bold characters to indicate they are fixed. This lets you quickly switch between ten types of Performances during a live performance. To cancel the function, press the QUICK PC button again.

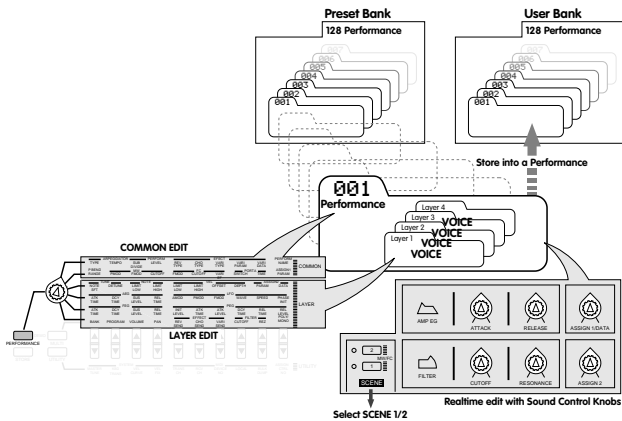


NOTE You can also use the Quick Program Change function when selecting the program number for each Part in Multi Play mode (page 36).

Performance Edit Mode

You can edit any Preset or User Performance to create your own unique Performance by changing the various parameters, including the voice assignment to each Layer. You can then store the Performance you have edited in a User Performance number (1-128).

NOTE Changing any parameter in a Performance will automatically engage Performance Edit mode.

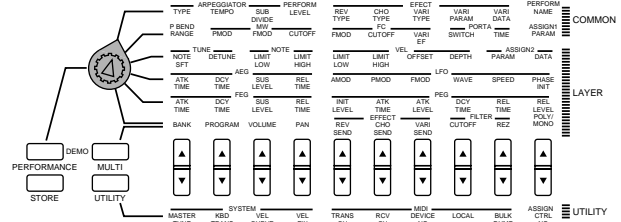


NOTE Edit parameters are basically divided into two groups: Common parameters equally applied to all the Layers in a Performance, and Layer parameters independently set for each Layer in a Performance.

Edit Procedure

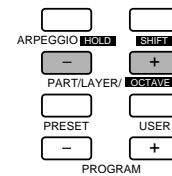
1. Select the Edit function.

Turn the Edit Parameter Rotary switch to choose the Common or Layer Edit menu with the parameter you want to edit.



2. Select a Layer (if you want to change the Layer parameters).

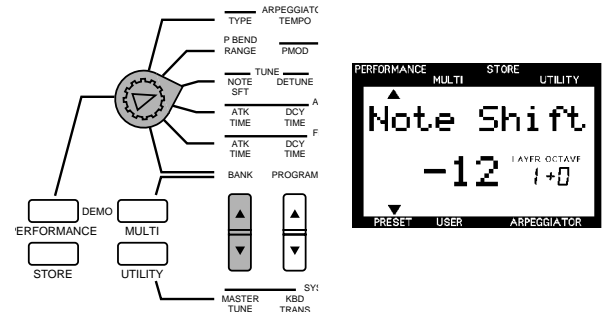
Use the LAYER [-]/[+] buttons to select the Layer you want to edit.



NOTE You do not need to select a Layer if you are editing the Common parameters, since these are applied equally to all Layers in a Performance.

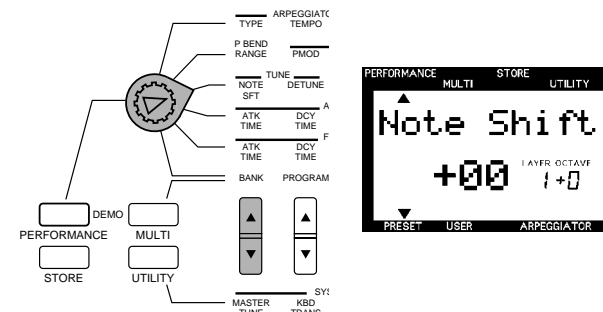
3. Select a parameter.

Press the Parameter Value UP/DOWN button corresponding to the parameter you want to edit once to select the parameter. The current settings will display in the LCD.



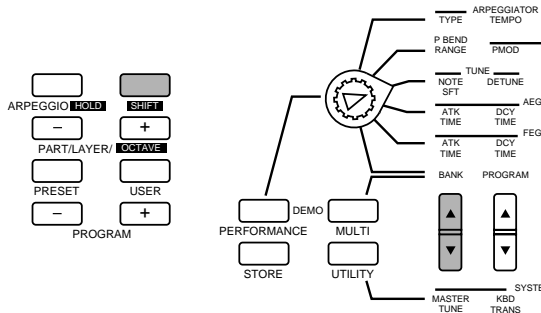
4. Set the value.

Press the Parameter Value UP/DOWN button again to set the value. Holding the Parameter Value UP/DOWN button changes the value continuously. The [UP] button increases the value and the [DOWN] button decreases the value.



NOTE You can also use the numeric keypad (0~9) or the Data Entry knob to change the value.

NOTE To change the value for all four Layers at one time, hold SHIFT and press the Parameter Value UP/DOWN button. When you press SHIFT in Performance Edit mode, a letter "A" (All) will appear in the LCD below the word "LAYER".



NOTE Each voice is preset with optimum settings for the parameters, and the value you set for any parameter will offset (add or subtract) the preset value. If the value of a parameter exceeds the maximum or minimum limit available, the highest or lowest value will be used.

NOTE The actual value is the sum of the value displayed in the LCD and the value set by the Sound Control Knob.

NOTE The original voice can be restored and heard by returning to Performance Play mode and moving the Sound Control Knob to the center position.

NOTE You can replace the voices currently assigned to each Layer with new voices or assign a voice to an empty Layer (up to four voices/Layers for a Performance).

5. Set the other parameters.

As you continue pressing the other Parameter Value UP/DOWN buttons, the other parameters will appear in the display. Set the other parameters to your preference.

6. Store the Performance.

When you have finished editing, store the Performance as a User Performance. For details about how to store a Performance, see page 44.

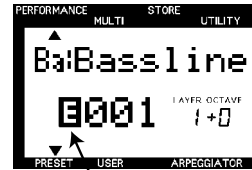
NOTE The edited contents will be retained in memory even if you turn the power off during an edit. The Performance you were editing will still be selected the next time you turn the power on, and you will be able to pick up from where you left off and continue editing the Performance.

CAUTION While editing a Performance, if you select another Performance or press the PERFORMANCE button again to exit Performance Edit mode before you have first stored the data as a User Performance, your edited data will be lost. For details about storing a User Performance, see page 44.

NOTE To exit Performance Edit mode, press the PERFORMANCE button again or the PROGRAM [-]/[+] button. You can enter Multi Play mode directly from Performance mode by pressing the MULTI button.

Edit Mark

Once you have edited a Performance in any way, an edit mark (a reversed type letter "E") will appear to the left of the Performance number. This mark indicates you have edited, but not stored the Performance.



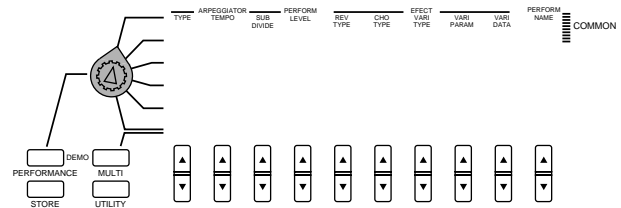
Indicates you have edited, but not stored the Performance.

NOTE The edit mark will also appear simply by making a slight position change to a Sound Control Knob (see page 6).

Description of Each Function

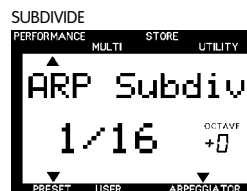
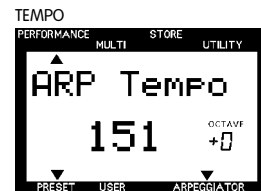
Common Edit 1 (applied to all Layers)

This row provides functions and parameters which are common to all Layers in a Performance, such as the Arpeggiator, and the Performance Level, Effect and Name.



ARPEGGIATOR

The Arpeggiator automatically creates arpeggiated chords based on the chords/melodies you play on the keyboard. There are three Arpeggiator parameters: TYPE, TEMPO and SUBDIVIDE.



To start the Arpeggiator, press the ARPEGGIATOR button to turn it on. A [▼] mark will appear in the LCD above the word "ARPEGGIATOR".

NOTE To turn the Arpeggiator off, press the ARPEGGIATOR button again.

TYPE: Sets the type of arpeggio. You can choose from 30 types. For details about each type, see the Arpeggiator Type List in the "Data List" book.

Arpeggiator Hold

The Arpeggiator Hold function lets you play a chord to start the automatic arpeggio, then take your hand off the keyboard; the arpeggiated chord will play continuously in a loop. Play another chord and the automatic arpeggios will change accordingly.

To activate the Arpeggiator Hold function, perform the following:

1. Hold SHIFT and press ARPEGGIATOR. The Arpeggiator indicator in the LCD will start blinking.
2. Play a series of chords.
3. To stop the arpeggiated chords, press ARPEGGIATOR again.

Arpeggiator Split

If you hold SHIFT and press the Parameter Value [UP] button when the TYPE parameter is displayed in the LCD, the Arpeggiator Split function will be enabled, and a reversed type letter "S" will appear to the right of the Arpeggiator type.

The Split function splits the keyboard from C3 (indicated above the keyboard with [▼]) and will allow you to play the arpeggiated chords on the lower half (below C3) of the keyboard, and play a melody line on the upper half (C3 and above).

To cancel the Split function, hold SHIFT and press the Parameter Value [DOWN] button.

TEMPO: Sets the tempo of the Arpeggiator. The range is MIDI, 40 ~ 240.

Settings:

TEMPO: MIDI, 40 ~ 240 (beats per minute)

NOTE If you want to synchronize the tempo of the Arpeggiator with that of an external MIDI device, set the TEMPO parameter to MIDI.

SUBDIVIDE: Determines the basic note settings (how fine the tempo is divided) of the Arpeggiator.

Settings:

SUBDIVIDE: 3/8= ♩, 1/4= ♩, 3/16= ♩, 1/6= ♩, 1/8= ♩, 3/32= ♩, 1/12= ♩, 1/16= ♩, 1/24= ♩, 1/32= ♩

NOTE The Arpeggiator data cannot be output as the MIDI messages.

■ PERFORM LEVEL

This sets the volume of each Performance.



Settings:

PERFORM LEVEL (Performance Level): 0~127

■ EFFECT

There are five effect parameters: REV TYPE (Reverb Type), CHO TYPE (Chorus Type), VARI TYPE (Variation Type), VARI PARAM (Variation Parameter) and VARI DATA (Variation Data).

For more basic information on each effect, see page 47.

Reverb Type



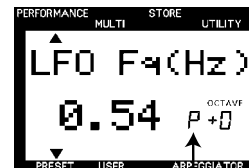
Chorus Type



Variation Type



Variation Parameter



Variation Data



The letter "P" (Parameter) or "d" (Data) displays to distinguish between the Variation Parameter and Variation Data screens.

REV TYPE (Reverb Type): Sets the Reverb type. You can choose from 11 types. For more information about each Reverb type, see [Effect Type List](#) on page 49.

CHO TYPE (Chorus Type): Sets the Chorus type. You can choose from 11 types. For more information about each Chorus type, see [Effect Type List](#) on page 49.

VARI TYPE (Variation Type): Sets the Variation effect type. There are 43 types to choose from. For more information about each Variation effect type, see [Effect Type List](#) on page 49.

VARI PARAM (Variation Parameter): Selects the Variation effect parameters. Parameters will differ depending on the Variation effect type selected in VARI TYPE.

NOTE If you select EFFECT OFF in the Variation Type menu, the layers which have the VARI SEND function set to ON will not sound. When you don't want to use the Variation Effect on the layers, set VARI TYPE to Thru.

NOTE Variation effect works as an Insertion effect in Performance mode. For more information, see page 47.

For more information about each Variation effect parameter, see [Effect Parameter List](#) on page 49.

VARI DATA (Variation Data): Sets the data (value) of the Variation effect parameter selected in VARI PARAM. For more information about each Variation effect data, see the [Effect Data Assign Table](#) on page 51.

NOTE When VARI TYPE is turned off, VARI PARAM and VARI DATA will be disabled.

NOTE The effect depth and other parameters can be controlled using the ASSIGN 1 Sound Control Knob or a Foot Controller. For details, see page 26.

NOTE For more information, see page 47.

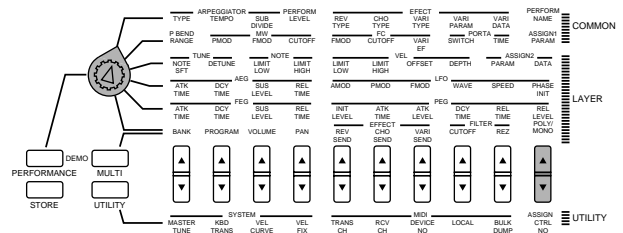
■ PERFORM NAME (Performance Name)

This lets you select the Category and name the User Performances using up to eight letters, numbers, symbols and characters.

1. Use the Parameter Value UP/DOWN button to move the cursor to the position at which you want to enter a character.
2. Move the cursor left-most if necessary (the word "Category" will appear instead of the Performance name) and use the numeric keypad (0-9) to select the Category.

#	LCD	Category Name
0	--	Not specified
1	Pf	Piano
2	Cp	Chromatic Percussion
3	Or	Organ
4	Gt	Guitar
5	Ba	Bass
6	St	Strings/Orchestral
7	En	Ensemble
8	Br	Brass
9	Rd	Reed
10	Pi	Pipe
11	Ld	Synth Lead
12	Pd	Synth Pad
13	Fx	Synth SFX
14	Et	Ethnic
15	Pc	Percussive
16	Se	Sound Effect
17	Dr	Drums
18	Sc	Synth Comping
19	Vo	Vocal
20	Co	Combination
21	Wv	Material Wave
22	Sq	Sequence

3. Move the cursor one position to the right (the current cursor position will start blinking) and use the numeric keypad (0-9) to select the first letter, then right one position more and select the second letter, etc., until you complete your Performance name.

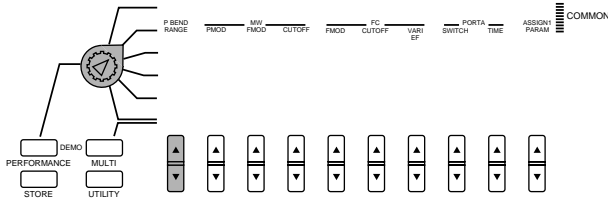


Settings:

ABCDEFGHIJKLMNOPQRSTUVWXYZ 'abcdefghijklmnop
 hijklmnopqrstuvwxyz0123456789-./,* & _
 (space)

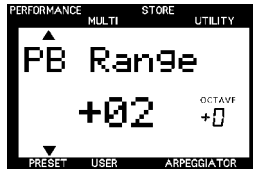
Common Edit 2 (applied to all Layers)

This row provides functions and parameters which are common to all Layers in a Performance (except for "Portament"), including the settings for realtime controllers such as the Pitch Wheel, Modulation Wheel and Foot Controller.



■ P BEND RANGE (Pitch Bend Range)

This sets the Pitch Bend range in semitones. The pitch can be bent up or down within the range set here by moving the Pitch Wheel.



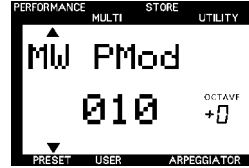
Settings:

-24 ~ +24 semitones

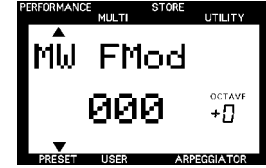
■ MW (Modulation Wheel)

This sets the control parameters of the Modulation Wheel. There are three parameters: PMOD (Pitch Modulation), FMOD (Filter Modulation) and CUTOFF (Cutoff). The parameters set here can be controlled with the Modulation Wheel to add vibrato or tremolo effects to the sound.

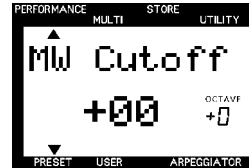
Pitch Modulation



Filter Modulation



Cutoff



PMOD (Pitch Modulation): Sets the pitch modulation depth created by the LFO (Low Frequency Oscillator). The value set here will determine the range of the pitch modulation by the Modulation Wheel. Moving the Modulation Wheel up will increase the depth of the pitch modulation, while moving it down will decrease the depth.

FMOD (Filter Modulation): Sets the filter modulation depth created by the LFO (Low Frequency Oscillator). The value set here will determine the range of the filter modulation by the Modulation Wheel. Moving the Modulation Wheel up will increase the depth of the filter modulation, while moving it down will decrease the depth.

CUTOFF (Cutoff): Sets the range of the cutoff frequency points above which the other frequencies are cut off. The value set here will determine the range of the cutoff frequency points when using the Modulation Wheel. Moving the Modulation Wheel up will raise the cutoff frequency point (i.e., make the voice brighter), while moving it down will lower the cutoff point (i.e., make the voice darker).

Settings:

PMOD (Pitch Modulation): 0~127

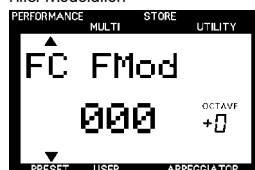
FMOD (Filter Modulation): 0~127

CUTOFF: -64 ~ +63

■ FC (Foot Control)

This sets the parameters controlled by a Foot Controller connected to the FOOT CONTROLLER jack on the rear panel. There are three parameters: FMOD (Filter Modulation), CUTOFF, and VARI EF (Variation Effect).

Filter Modulation



Cutoff



Variation Effect



FMOD (Filter Modulation): Sets the filter modulation depth created by the LFO (Low Frequency Oscillator). The value set here will determine the range of the filter modulation by the Foot Controller. Pressing the Foot Controller will increase the depth of the filter modulation.

CUTOFF: Sets the range of the cutoff frequency points above which other frequencies are cut off. The value set here will determine the range of the cutoff frequency points by the Foot Controller. Pressing the Foot Controller will raise the cutoff frequency point (i.e., make the voice brighter).

VARI EF (Variation Effect): Determines the Variation effect range set by the EFFECT parameters (page 23), controlled by the Foot Controller.

NOTE For details about which parameters the Foot Controller can control, see the Effect Parameter List on page 49.

Settings:

FMOD (Filter Modulation): 0~127

CUTOFF: -64 ~ +63

VARI EF (Variation Effect): -64 ~ +63

■ PORTA (Portamento)

This sets the Portamento function. Portamento continuously changes the pitch from one note to the next, thus letting you glide the pitch from one note to the next. There are two parameters, SWITCH and TIME. Values can be set for each Layer.

Switch



Time



SWITCH: Turns the Portamento on or off. (for each layer)

TIME: Sets the time it takes for the pitch to reach the next note played. (for all layers)

Settings:

SWITCH: on, off

TIME: 0~127

■ ASSIGN1 PARAM (ASSIGN 1 Parameter)

This determines which parameter will be controlled by the ASSIGN 1 Sound Control Knob. You can choose from 28 types of parameters.

The parameter assigned to the ASSIGN1 knob as the default differs depending on the Performance selected.



Settings:

For details about each parameter, see the reference pages as listed on the next page.

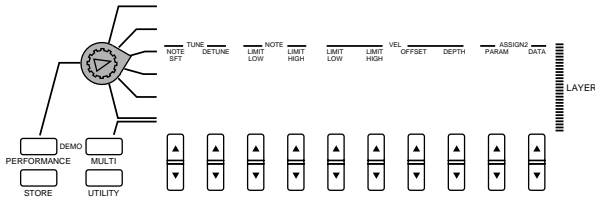
#	LCD
0	off
1	PerfLevel (Performance Level) (page 23)
2	ArpgTempo (Arpeggiator Tempo) (page 23)
3	ArpgType (Arpeggiator Type) (page 23)
4	ArpgSubdiv (Arpeggiator Subdivide) (page 23)
5	MWCCutoff (MW Cutoff) (page 25)
6	MWPModDpth (MW Pitch Modulation Depth) (page 25)
7	MWFModDpth (MW Filter Modulation Depth) (page 25)
8	PBRange (Pitch Bend Range) (page 25)
9	FCCutoff (FC Cutoff) (page 26)
10	FCFModDpth (FC Filter Modulation Depth) (page 26)
11	FCVariDpth (FC Variation Depth) (page 26)
12	PortaTime (Portamento Time) (page 26)
13	*FEGDcyTime (FEG Decay Time) (page 32)
14	*AEGDcyTime (AEG Decay Time) (page 30)
15	*ChoToRev (Chorus Send To Reverb)
16	*VariCntrl (Variation Control)
17	*RevChoSend (Reverb And Chorus Send)
18	*ChorusSend (Chorus Send) (page 38)
19	*ReverbSend (Reverb Send) (page 38)
20	*Pan (page 38)
21	*LFOSpeed (LFO Speed) (page 31)
22	*LFOPMOD (Vibrato Depth) (page 30)
23	*VibDelay (Vibrato Delay)
24	*LFOAMOD (LFO Amplitude Modulation Depth) (page 30)
25	*LFOFMod (LFO Filter Modulation Depth) (page 31)
26	*FEGAikTime (FEG Attack Time) (page 32)
27	*FEGSustLvl (FEG Sustain Level) (page 32)
28	*FEGVelSens (FEG Level Velocity Sensitivity)
29	*Pitch (Oscillator Pitch)

Parameters with an asterisk affect entire Layers in a Performance. You cannot directly edit them from the LCD, but you can assign them to the ASSIGN 1 knob.

You can also select each parameter by inputting the corresponding number using the numeric keypad.

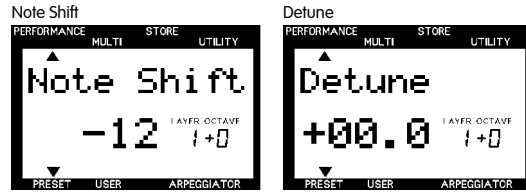
Layer Edit 1 (independently applied to each Layer)

The functions in this row provide various parameters mainly related to the keyboard such as Tune, Note Limit and Velocity. The parameters can be set for each Layer in a Performance.



TUNE

This sets the tuning of a Layer. There are two parameters, NOTE SFT (Note Shift) and DETUNE.



NOTE SFT (Note Shift): Raises or lowers the pitch of the voice in semitones.

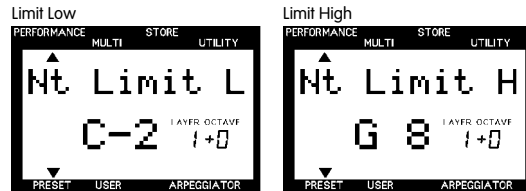
Settings:
-24 ~ +24 (semitones)

DETUNE: Raises or lowers the pitch of the voice in fine increments or decrements (0.1 Hz each).

Settings:
-12.8 Hz ~ +12.7 Hz

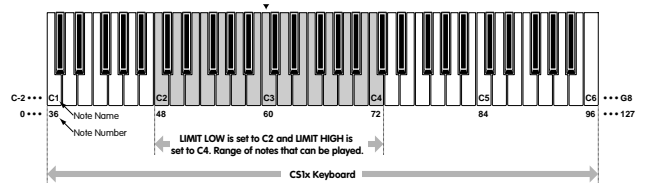
NOTE

This sets the range of notes that each Layer will play. There are two parameters, LIMIT LOW and LIMIT HIGH.



LIMIT LOW: Determines the low note limit, or the lowest note that will be played by the voice.

LIMIT HIGH: Determines the high note limit, or the highest note that will be played by the voice.

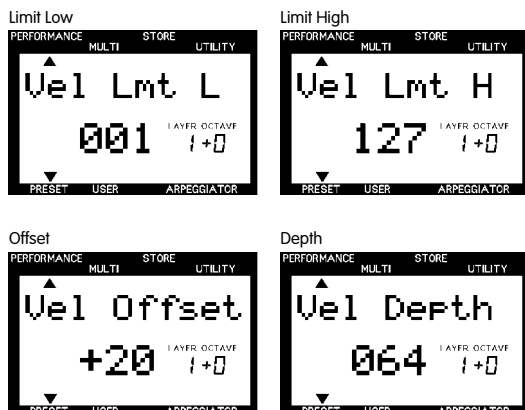


Settings:
LIMIT LOW: C-2 ~ G8
LIMIT HIGH: C-2 ~ G8

NOTE It is not possible to set the LIMIT LOW note above the LIMIT HIGH note, or the LIMIT HIGH note below the LIMIT LOW note.

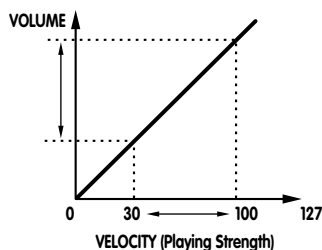
■ VEL (Velocity)

This determines the velocity settings for the voice in each Layer. There are four parameters: LIMIT LOW, LIMIT HIGH, OFFSET and DEPTH.



LIMIT LOW: Determines the lowest velocity value that will be detected when the keyboard is played. No sound will be produced if the keyboard is played with a velocity value weaker than the one set here.

LIMIT HIGH: Determines the highest velocity value that will be detected when the keyboard is played. No sound will be produced if the keyboard is played with a velocity value stronger than the one set here.



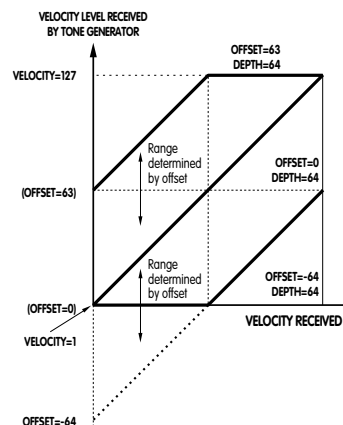
When LIMIT LOW is set to "30" and LIMIT HIGH is set to "100" Velocity range that can be played is limited as shown in the illustration.

Settings:
LIMIT LOW: 1~127
LIMIT HIGH: 1~127

NOTE It is not possible to set the LIMIT LOW note above the LIMIT HIGH note, or the LIMIT HIGH note below the LIMIT LOW note.

OFFSET: Sets the offset value of the velocity. The value set here will be added to or subtracted from the actual velocity value.

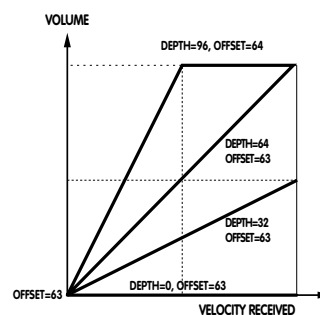
VELOCITY OFFSET GRAPH (When DEPTH = 64)



Settings:
OFFSET: -64 ~ +63

DEPTH: Sets the depth of the velocity. The larger the value, the more sensitive the velocity will be, and playing the keyboard will produce louder sounds.

VELOCITY DEPTH GRAPH (When OFFSET=64)



Settings:
DEPTH: 0~127

■ ASSIGN2

This sets the control parameter and knob sensitivity of the ASSIGN 2 Sound Control Knob. It is possible to assign up to four parameters from 28 types. It is also possible to set the sensitivity (control range of the knob) for each parameter.

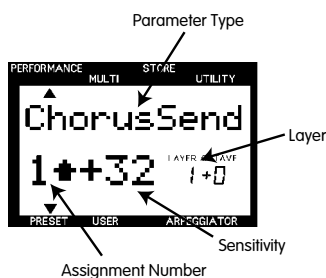
The parameter assigned to the ASSIGN2 knob as the default differs depending on the Performance selected.

1. Select the Layer.

Press the LAYER [-]/[+] button to select the Layer to which you want to assign a parameter.

2. Select the item (parameter type or sensitivity) you want to edit and the assignment number which you want to assign the parameter to.

Press the Parameter Value [UP] button to select the item (parameter type or sensitivity) you want to edit, and the assignment number. Each time you press the (PARAM) Parameter Value [UP] button, the arrow cursor will move as shown in the following illustration.



	▲	▼
Parameter type of assignment number 1	↓	↑
Sensitivity of assignment number 1	↓	↑
Parameter type of assignment number 2	↓	↑
Sensitivity of assignment number 2	↓	↑
Parameter type of assignment number 3	↓	↑
Sensitivity of assignment number 3	↓	↑
Parameter type of assignment number 4	↓	↑
Sensitivity of assignment number 4	↓	↑

Each time you press the (PARAM) Parameter [DOWN] button, the arrow cursor will move in the opposite direction.

3. Move the cursor to the Parameter type area and press the (DATA) Parameter UP/DOWN button to select the parameter type.

Settings:

The following parameters can be assigned to assignment number 1 ~ 4. For details about each parameter, see the reference pages as listed below.

NOTE When voices are not assigned to the Layers (Bank=Off), Parameter type and sensitivity will not display.

#	LCD
0	off
1	Volume (page 33)
2	NoteShift (page 27)
3	Detune (page 27)
4	Pan (page 34)
5	ChorusSend (page 38)
6	ReverbSend (page 38)
7	*Pitch (Oscillator Pitch)
8	VelSnsDpth (Velocity Sensitivity Depth) (page 28)
9	VelSnsOfst (Velocity Sensitivity Offset) (page 28)
10	Cutoff (Filter Cutoff Frequency) (page 34)
11	Resonance (page 34)
12	AEGAtkTime (AEG Attack Time) (page 30)
13	AEGDcyTime (AEG Decay Time) (page 30)
14	AEGSusLvl (AEG Sustain Level) (page 30)
15	AEGRelTime (AEG Release Time) (page 30)
16	LFOSpeed (LFO Speed) (page 31)
17	LFOAMod (LFO Amplitude Modulation Depth) (page 30)
18	LFOPMod (LFO Pitch Modulation Depth) (page 30)
19	LFOFMod (LFO Filter Modulation Depth) (page 31)
20	FEGAtkTime (FEG Attack Time) (page 32)
21	FEGDcyTime (FEG Decay Time) (page 32)
22	FEGSusLvl (FEG Sustain Level) (page 32)
23	FEGRelTime (FEG Release Time) (page 32)
24	PEGInitLvl (PEG Initial Level) (page 32)
25	PEGAtkTime (PEG Attack Time) (page 32)
26	PEGAikLvl (PEG Attack Level) (page 32)
27	PEGDcyTime (PEG Decay Time) (page 32)
28	PEGRelTime (PEG Release Time) (page 32)
29	PEGRelLvl (PEG Release Level) (page 32)

Parameter with an asterisk cannot be modified, but you can assign it to the ASSIGN2 knob.

Each parameter can also be selected by inputting the number with the numeric keypad.

4. Press the (PARAM) Parameter Value UP/DOWN button to move the arrow cursor to the sensitivity area.

5. Press the (DATA) Parameter Value UP/DOWN button to set the knob sensitivity.

Settings:

Parameters can be set between -32 and +32, for assignment numbers 1 ~ 4.

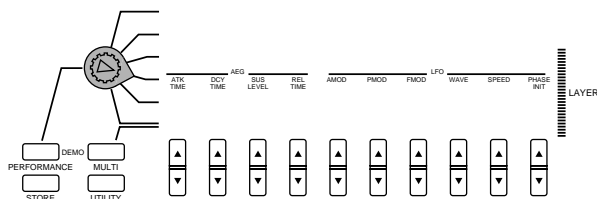
NOTE As an example, say you have selected the Volume parameter and set the knob sensitivity to the positive value "+32". The volume is "0" when the knob is turned counter-clockwise to the far left, and "127" when the knob is turned clockwise to the far right. If the knob sensitivity is set to the negative value "-32", the volume is "127" when the knob is turned to the far left and "0" when the knob is turned to the far right. If the sensitivity value is small, the control range of the knob will be narrowed and limited.

6. Repeat the above steps to set a different parameter/knob sensitivity value to each of the four assignment numbers.

NOTE When the PARAM screen is displayed, you can select the parameter type or change the sensitivity using the Data Entry knob or the numeric keypad.

Layer Edit 2 (independently applied to each Layer)

The functions in this row provide parameters which are essential in creating a voice, such as AEG (Amplitude Envelope Generator) and LFO (Low Frequency Oscillator). The parameters can be set for each Layer in a Performance.



■ AEG (Amplitude Envelope Generator)

This sets the AEG (Amplitude Envelope Generator). The AEG lets you shape how the volume level changes over time, from when a key is hit, then released, and how the sound decays. There are four parameters: ATK TIME (Attack Time), DCY TIME (Decay Time), SUS LEVEL (Sustain Level) and REL TIME (Release Time).

NOTE Each musical instrument has a unique envelope curve which plays an important role in determining its sound characteristics. The AEG simulates the change of the volume envelope curve over time.

NOTE Depending on the voice selected, changing certain parameters may not produce a noticeable effect.

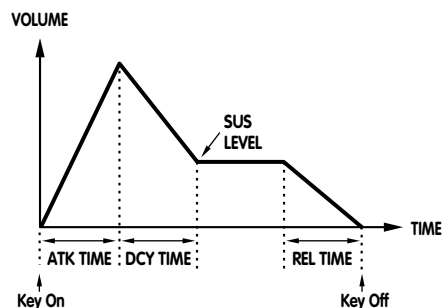


ATK TIME (Attack Time): Determines the time required for a sound to reach its maximum volume level when a note is played.

DCY TIME (Decay Time): Determines the time required for a sound to reach its Sustain Level from a maximum volume level while the key is held.

SUS LEVEL (Sustain Level): Sets the Sustain Level. The volume will be maintained at this level for as long as the key is held.

REL TIME (Release Time): Determines the time it takes for a sound to sustain after the key has been released.



Settings:

ATK TIME (Attack Time): -63 ~ +63

DCY TIME (Decay Time): -63 ~ +63

SUS LEVEL (Sustain Level): -64 ~ +63

REL TIME (Release Time): -63 ~ +63

■ LFO (Low Frequency Oscillator)

This sets the parameters for the LFO (Low Frequency Oscillator). The LFO is an oscillator that generates low frequency signals used to modulate certain aspects of the sound such as pitch, volume or filter level. There are six parameters: AMOD (Amplitude Modulation), PMOD (Pitch Modulation), FMOD (Filter Modulation), WAVE, SPEED and PHASE INIT.

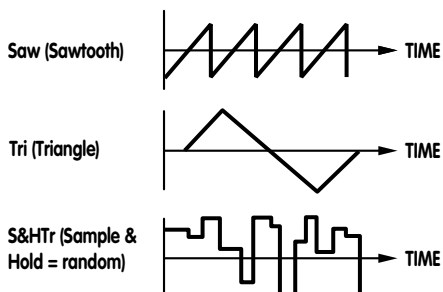


AMOD (Amplitude Modulation): Adds a cyclical change to the volume level by applying LFO frequency modulations, to create a tremolo effect. Larger values widen the range of the volume change.

PMOD (Pitch Modulation): Adds a cyclical change to the pitch by applying LFO frequency modulations, to create a vibrato effect. Larger values widen the range of the pitch change.

FMOD (Filter Modulation): Adds a cyclical change to the filter cutoff frequency by applying LFO frequency modulations, to create wah-wah type effects. Larger values widen the range of cutoff frequency change.

WAVE: Selects the LFO frequency signal used for modulation. You can select from the following types:

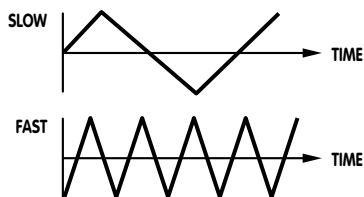


*S&HTr = Adds random changes to the pitch.
 (NOTE: Triangle waves will be applied for the AMOD and FMOD. Triangle wave is applied even if you select S&HTr for PMOD, when controlling the PMOD with the Modulation Wheel.)

ELEM (Element)

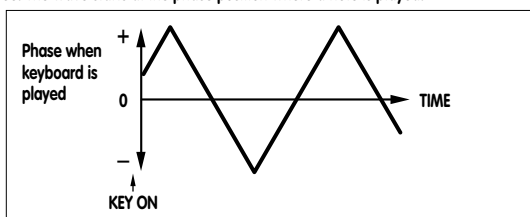
*Default settings of each element depending on the selected voice.

SPEED: Sets the speed of the LFO frequency modulation. Larger values increase the speed.

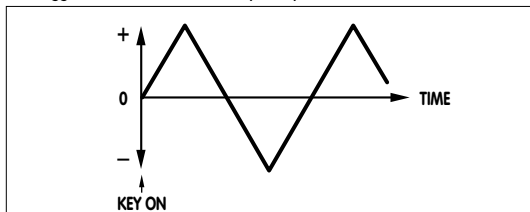


PHASE INIT: Determines if the phase of the LFO frequency modulation wave is reset or not when a note is played. There are three types: Free, Retr (Retrigger) and Elem (Element).

Free: The wave starts at the phase position where a note is played.



Retr (Retrigger): The wave starts at +/-0 phase position.



Elem (Element): The wave starts from the default phase position (Free or Retr) for each element of the voices.

Settings:

AMOD (Amplitude Modulation): -31 ~ +31

PMOD (Pitch Modulation): -63 ~ +63

FMOD (Filter Modulation): -15 ~ +15

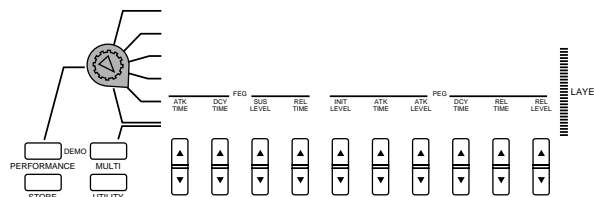
WAVE: Saw, Tri, S&HTr, Elem

SPEED: -63 ~ +63

PHASE INIT: Free, Retr, Elem

Layer Edit 3 (independently applied to each Layer)

The functions in this row provide parameters which are essential in creating a voice, such as FEG (Filter Envelope Generator) or PEG (Pitch Envelope Generator). The parameters can be set for each Layer in a Performance.



FEG (Filter Envelope Generator)

This sets the FEG (Filter Envelope Generator). The FEG lets you shape how the tone, or timbre, of the voice changes over time, from when a key is hit, then released, and how the sound decays. There are four parameters: ATK TIME (Attack Time), DCY TIME (Decay Time), SUS LEVEL (Sustain Level) and REL TIME (Release Time).

NOTE: Generally, filters change the timbre by passing signals within a specific frequency bandwidth and cutting others. The CS1x features an LPF (Low Pass Filter) which passes the signals below the specified frequency point (cutoff frequency) and cuts the signals above it (see page 34). The FEG simulates the change of the filter envelope curve over time.

NOTE: Depending on the voice selected, changing certain parameters may not produce a noticeable effect.

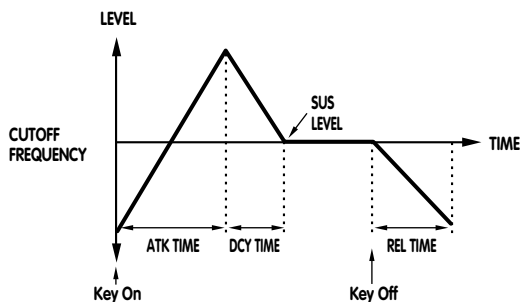


ATK TIME (Attack Time): Determines the time required for a sound to reach its maximum cutoff frequency level when a note is played.

DCY TIME (Decay Time): Determines the time required for a sound to reach its Sustain Level from a maximum level while the key is held.

SUS LEVEL (Sustain Level): Sets the Sustain Level. The cutoff frequency will be maintained at this level for as long as the key is held.

REL TIME (Release Time): Determines the time it takes for the cutoff frequency to reach the level preset for each voice after the key has been released.



Settings:

ATK TIME (Attack Time): -63 ~ +63

DCY TIME (Decay Time): -63 ~ +63

SUS LEVEL (Sustain Level): -64 ~ +63

REL TIME (Release Time): -63 ~ +63

■ PEG (Pitch Envelope Generator)

This sets the PEG (Pitch Envelope Generator). The PEG lets you shape how the pitch of the voice changes over time, from when a key is hit, then released, and how the sound decays. There are six parameters: INIT LEVEL (Initial Level), ATK TIME (Attack Time), ATK LEVEL (Attack Level), DCY TIME (Decay Time), REL TIME (Release Time) and REL LEVEL (Release Level).

NOTE Since the PEG simulates the change of the pitch envelope curve over time, you can create an SFX type effect and the slight pitch change of a wind instrument.

NOTE Depending on the voice selected, changing certain parameters may not produce a noticeable effect.



INIT LEVEL (Initial Level): Sets the initial pitch level when a key is played.

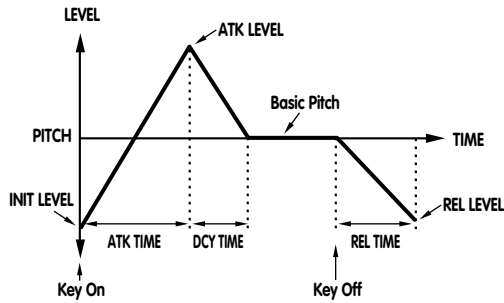
ATK TIME (Attack Time): Determines the time required for a sound to reach its Attack Level after a note is played.

ATK LEVEL (Attack Level): Sets the initially targeted level after a note is played.

DCY TIME (Decay Time): Determines the time required for a sound to reach its basic pitch from Attack Level while the key is held.

REL TIME (Release Time): Determines the time it takes for the basic pitch to reach the Release Level after the key has been released.

REL LEVEL (Release Level): Sets the last targeted level after the key is released.



Settings:

INIT LEVEL (Initial Level): -64 ~ +63

ATK TIME (Attack Time): -63 ~ +63

ATK LEVEL (Attack Level): -64 ~ +63

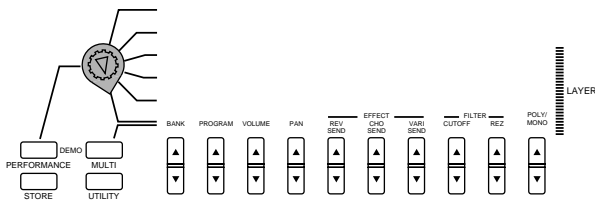
DCY TIME (Decay Time): -63 ~ +63

REL TIME (Release Time): -63 ~ +63

REL LEVEL (Release Level): -64 ~ +63

Layer Edit 4 (independently applied to each Layer)

The functions in this row provide parameters which include fundamental settings such as voice assignment, volume and panning settings for each Layer. The parameters can be set for each Layer in a Performance.



■ BANK

This lets you select a Bank, each of which contains up to 128 normal voices. To select a voice, you must first select a Bank number, and then select a Program number in the PROGRAM parameter, explained below.



Settings: off, XG000, 001, 003, 006, 008, 012, 014, 016~020, 024, 025, 027, 028, 032~043, 045, 064~072, 096~101, SFX, PRE 0~12 (for Performance only)

Bank Conversion Table for Voices Used in Performances

MSB	LSB	Bank	LCD	Remarks
0	0	0	XG000	XG
0	1	1	XG001	↓
↓	↓	↓	↓	↓
0	101	101	XG101	↓
64	0	102	SFX	XG
63	0	103	PRE0	for Performance Only
63	1	104	PRE1	↓
↓	↓	↓	↓	↓
63	7	110	PRE7	↓
63	8	111	PRE8	↓
63	12	115	PRE12	for Performance Only
-	-	999	off	

Each bank can be selected directly by inputting the corresponding Bank number using the numeric keypad.

NOTE For more information about Banks and Programs (voices), see the Voice List in the "Data List" book.

■ PROGRAM

This lets you select a voice, or program, from the Bank previously selected with the BANK parameter, explained above.



Settings:

1~128

NOTE Note that the Program numbers here are 1~128 and the MIDI Program Change numbers are 0~127. To match the MIDI Program Change number when switching programs using an external MIDI device, subtract a value of "1" from the Program number.

NOTE For more information about Banks and Programs (voices), see the Voice List in the "Data List" book.

■ VOLUME

This sets the volume of each Layer. It is possible to assign a different volume setting for each Layer.



Settings:

0~127

■ PAN

This sets the panning (the left or right position in the stereo spectrum) of each Layer. Different panning can be set for each Layer, thus providing for a richly textured stereo image (for stereo output).



Settings:

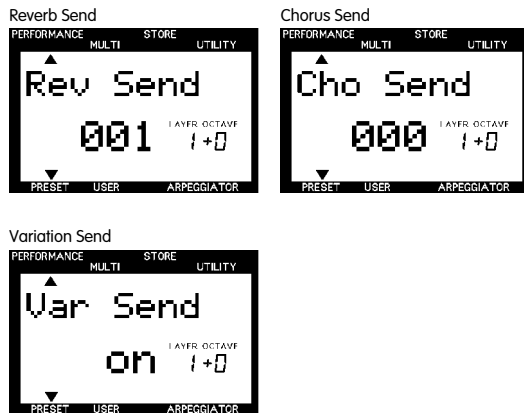
Random, L63 (far left in the stereo image) to L01 to C00 (center in the stereo image) to R01 to R63 (far right in the stereo image)

NOTE When set to "Random", the pan position of each Layer will alternate between left and right each time a Performance is played.

NOTE Some of the voices are preset and have a fixed panning of "left" in the lower register and "right" in the higher register. In such a case, you cannot modify the pan setting.

■ EFFECT

This sets the effect send (output) level of each Layer. There are three parameters: REV SEND (Reverb Send), CHO SEND (Chorus Send) and VARI SEND (Variation Send). Each effect send level set here will be output to the Reverb, Chorus, and Variation effect sections as previously selected (see page 23).



REV SEND (Reverb Send): Determines the send level of the Reverb effect.

CHO SEND (Chorus Send): Determines the send level of the Chorus effect.

VARI SEND (Variation Send): Enables or disables the output of the Variation effect.

Settings:

REV SEND (Reverb Send): 0~127

CHO SEND (Chorus Send): 0~127

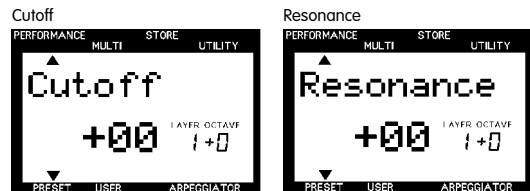
VARI SEND (Variation Send): OFF, ON

NOTE The value of some Layers may forcibly be changed when using the Variation effect.

NOTE For more information, see page 47.

■ FILTER

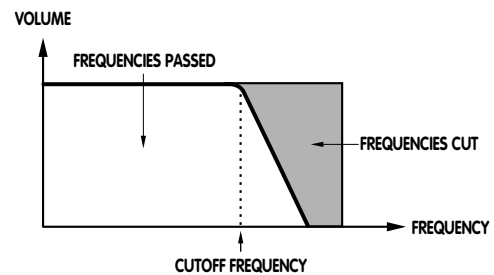
This sets the filter parameters for each Layer. There are two parameters, CUTOFF and REZ (Resonance).



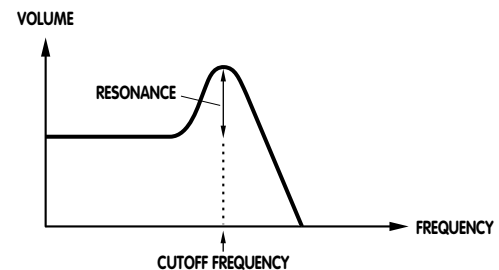
NOTE Generally, filters change the timbre by passing signals within a specific frequency bandwidth and cutting others. The CS1x features an LPF (Low Pass Filter) which passes the signals below the specified frequency point (cutoff frequency) and cuts the signals above it.

NOTE Depending on the voice selected, changing certain parameters may not produce a noticeable effect.

CUTOFF: Determines the cutoff frequency of the filter, or the frequency point above which other frequencies are filtered out. Higher settings result in brighter tones and lower settings result in darker tones.



REZ (Resonance): Sets the amount of filter resonance or emphasis around the cutoff frequency. Higher settings produce a higher resonant peak, while lower settings produce a relatively flat response.



Settings:

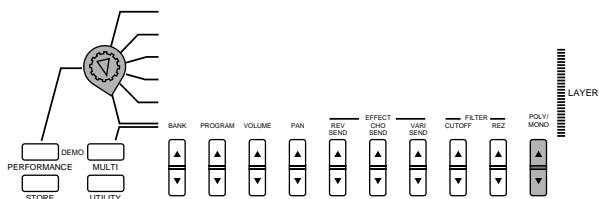
CUTOFF: -64 ~ +63

REZ (Resonance): -64 ~ +63

■ POLY/MONO

This determines whether the voice in each Layer is played monophonically (only one note at a time) or polyphonically (up to 32 notes at a time).

Generally, Polyphonic mode is selected to generate multiple sounds at one time. There are cases, however, where it is more effective to select Monophonic mode, such as when using a bass sound, brass sound, or an analog synthesizer sound.



Settings:

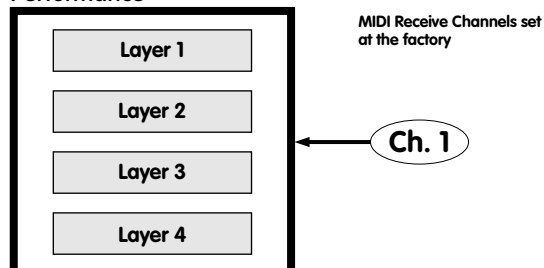
POLY (Polyphonic), MONO (Monophonic)

NOTE You can play up to 32 notes at a time. However, the number of notes may be reduced or truncated if you use voices which consist of two elements and/or play a rather complicated song which uses too many notes.

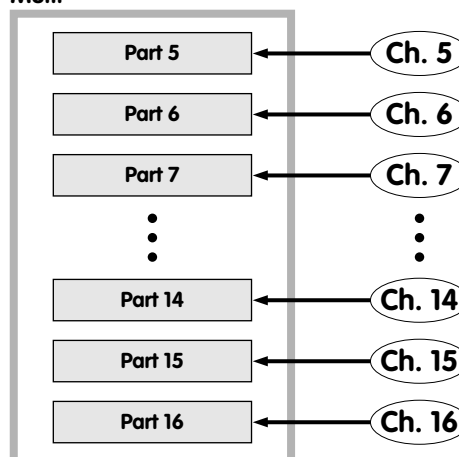
■ Tips About Performance Mode

- In Performance Mode, you can use a Performance (voice) and 12 Parts (Part 5~16) for Multi. Though the receive channels are set in the factory as shown in the illustration, you can change the receive channels using RCV CH (Receive Channel) in Utility Mode.

Performance

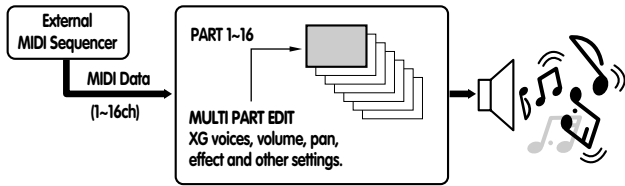


Multi



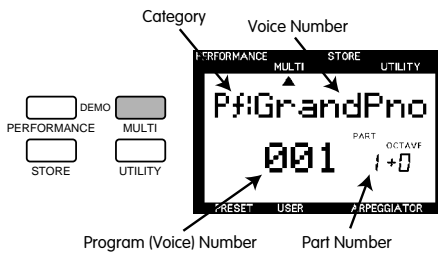
- If a channel is selected for both Performance and one of the Parts, the two will be played simultaneously, producing two sounds at one time. Check the settings for the receive channels when you play the Performance and get an unintentional sound besides the Performance.
- In Performance Mode, you cannot modify the Multi settings on the panel except for the receive channel setting. Use an external MIDI device such as sequencer to modify the Multi settings.
- You can play only one Performance at one time. It is not possible to use the Performances as Parts for the Multi or to configure the Layers using the Performances.

In Multi Play mode you can play up to 16 Parts using an external MIDI sequencer. This mode is mainly used when the CS1x is used as an XG-compatible tone generator or as a data input device in a computer music system. You can use any XG voice from the 480 normal voices and 11 drum voices. When playing back from or recording to an external sequencer, you can use the Multi Part Edit function to edit the volume and effect of each Part.



Entering Multi Play Mode

Press the MULTI button. A [▲] mark will appear below the word "MULTI" in the LCD.



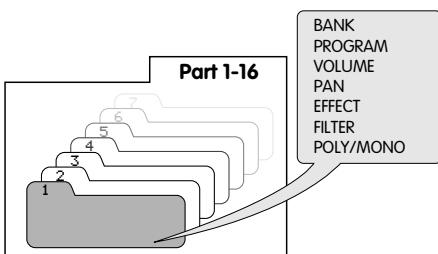
Playing the keyboard will play the voice of the Part currently displayed in the LCD. The Category name for the selected voice will be shown next to the voice name.

You can also select a voice from the XG000 (GM) Bank by pressing the PROGRAM [-]/[+] buttons.

NOTE When you enter Multi Play mode from Performance mode, the CS1x automatically resets the internal tone generator to XG ON (001 Grand Piano) status.

Multi Part Edit

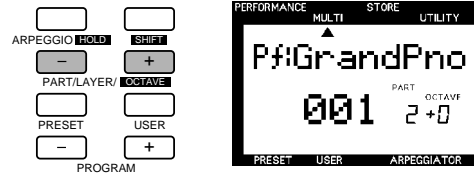
You can edit each Part in realtime. You can assign a voice to each Part and set the volume, pan and effect. **These settings are temporary and cannot be stored.** Therefore, entering Performance mode will clear this data.



Editing Procedures

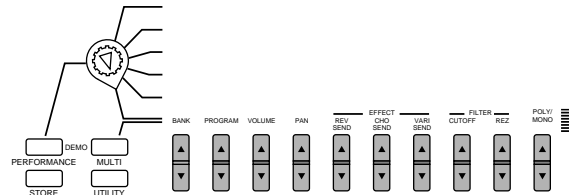
1. Select a Part.

Use the PART [-]/[+] button to select the Part you want to edit.



2. Select the parameter.

Press the Parameter Value UP/DOWN button corresponding to the parameter you want to edit once to select the parameter and display the settings.

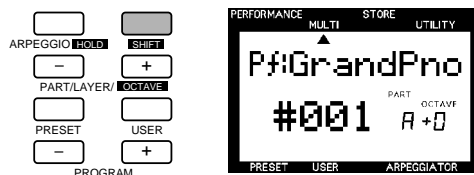


3. Set the value.

Press the Parameter Value UP/DOWN button again to set the value. Holding the Parameter Value UP/DOWN button changes the value continuously. The [UP] button increases the value and the [DOWN] button decreases the value.

NOTE You can also use the numeric keypad (0~9) or the Data Entry knob to change the value.

NOTE To change the value for all Parts at one time, hold SHIFT and press the Parameter Value UP/DOWN button. When you press SHIFT in Multi Part Edit, a letter "A" (All) will appear in the LCD below the word "PART".



NOTE Other parameters will appear in the LCD when you press the other Parameter Value UP/DOWN buttons. Continue setting the other parameters.

NOTE To exit from the Multi Part Edit, press the MULTI button again. The display will return to the Voice name screen. You can also exit Multi Play mode by pressing the PERFORMANCE button to enter Performance mode.

● Description of Each Function

■ BANK

This lets you select a Bank. Various normal voice banks containing up to 128 normal voices, a bank with different drum voices (kits), plus SFX banks are available to choose from. To select a voice, you must first select a Bank number, and then select a Program number in the PROGRAM parameter, explained below.



Settings:

off, XG000, 001, 003, 006, 008, 012, 014, 016~020, 024, 025, 027, 028, 032~043, 045, 064~072, 096~101, SFX, SFXKIT, DRUM

Bank Conversion Table for Multi

MSB	LSB	Bank	LCD
0	0	0	XG000
0	1	1	XG001
↓	↓	↓	↓
0	101	101	XG101
64	0	102	SFX
126	0	126	SFXKIT
127	0	127	DRUM
-	-	999	Off

Each bank can be selected directly by inputting the corresponding number with the numeric keypad.

NOTE For more information about Banks and Programs (voices), see the XG Voice List in the "Data List" book.

■ PROGRAM

This lets you select a voice, or program, from the Bank previously selected with the BANK parameter, explained above.



Settings:

1~128

NOTE Note that the Program numbers here are 1~128 and the MIDI Program Change numbers are 0~127. When switching programs using an external MIDI device, subtract a value of "1" from the Program number to match the MIDI Program Change number.

NOTE For more information about Banks and Programs (voices), see the XG Voice List in the "Data List" book.

NOTE It is also possible to change the Program number quickly by using the Quick Program Change function, the same way as in Performance mode. For details, see page 21.

Normal Voices and Drum Voices

The available voices are divided into two groups: normal voices and drum voices. In Multi Play mode you can select and play both normal and drum voices.

In general a "normal" voice is simply a pitched voice which can be played on a musical scale from low to high, such as a piano or trumpet. In Multi Play mode there are 480 XG normal voices.

A "drum" voice is a complete set of drum and other percussion sounds, each sound having a fixed pitch. Each sound is assigned to a specific MIDI Note number which also corresponds to a key on a MIDI keyboard. In Multi Play mode there are 11 XG drum voices. For a list of the drum and percussion sound assignments to each key, see the XG Drum Voice List in the "Data List" book.

TG300B Mode

There are two tone generator modes: XG mode and TG300B mode. Normally the CS1x plays in XG mode. However, it automatically recognizes which mode to select based on incoming MIDI data, i.e., through MIDI System Exclusive messages that you can program using an external MIDI sequencer.

In TG300B mode the CS1x will play multitimbral music data created for TG300B-compatible tone generators. TG300B mode also provides compatibility with the GM System Level1 format.

In TG300B mode the CS1x can:

- Play up to 16 Parts.
- Choose from 579 Normal Voices and 10 Drum Voices.

■ VOLUME

This sets the volume of each Part. Different volume levels can be set for each Part.

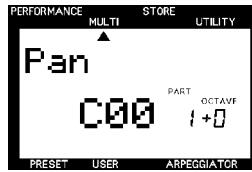


Settings:

0~127

■ PAN

This sets the panning (the left or right position in the stereo spectrum) for each Part. Different pannings can be set for each Part (for stereo output).



Settings:

Random, L63 (far left in the stereo image) to L01 to C00 (center of a stereo image) to R01 to R63 (far right in the stereo image)

NOTE When set to "Random", the panning of each Part will alternate between left and right each time a voice is played.

NOTE Some of the voices are preset and fixed to a panning of "left" in the lower register and "right" in the higher register. In such a case, you cannot modify the pan setting.

■ EFFECT

This sets the effect send (output) level for each Part. There are three parameters: REV SEND (Reverb Send), CHO SEND (Chorus Send) and VARI SEND (Variation Send). You can change the effect send level for each effect in realtime when you are playing back XG song data containing effect settings using an external MIDI device.

NOTE When you enter Multi Play mode (reset to XG ON) by pressing the MULTI button, each effect will be reset to the default settings: Hall 1 (Reverb), Chorus 1 (Chorus) and Delay L,C,R (Variation). In this case, the Reverb send level is set to 64, and the Chorus and Variation send levels are set to 0.

Depending on the XG song data being played, the effect types and their parameters used in the song may differ.

Note that the effect types and their parameters in the Performance Edit mode have no relation to the effect settings here.

Reverb Send



Chorus Send



Variation Send



REV SEND (Reverb Send): Determines the send level of the Reverb effect.

CHO SEND (Chorus Send): Determines the send level of the Chorus effect.

VARI SEND (Variation Send): Enables or disables the output of the Variation effect.

Settings:

REV SEND (Reverb Send): 0~127

CHO SEND (Chorus Send): 0~127

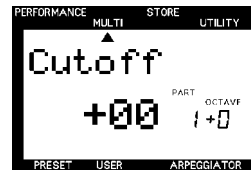
VARI SEND (Variation Send): OFF, ON (or 0~127)

NOTE The Variation send parameters are OFF or ON when the Variation effect is used as the Insertion effect. They are 0~127 when used as the System effect. Normally, the Variation effect works as an Insertion Effect when not receiving parameter change messages to switch to System Effect from an external MIDI sequencer. For more information about Insertion and System effects, see page 47.

■ FILTER

This sets the parameters of the filter for each Part. There are two parameters, CUTOFF and REZ (resonance).

Cutoff



Resonance



Generally, filters change the timbre by passing signals within a specific frequency bandwidth and cutting others. The CS1x features an LPF (Low Pass Filter) which passes the signals below the specified frequency point (cutoff frequency) and cuts the signals above it.

NOTE Depending on the voice selected, changing certain parameters may not produce a noticeable effect.

CUTOFF: Determines the cutoff frequency of the filter, or the frequency point above which other frequencies are filtered out. Higher settings result in brighter sounds and lower settings result in darker sounds.

REZ (Resonance): Sets the amount of filter resonance or emphasis around the cutoff frequency. Higher settings produce a higher resonant peak, while lower settings produce a relatively flat response.

Settings:

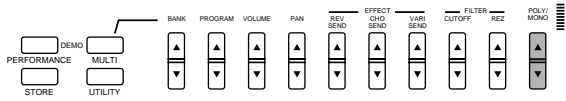
CUTOFF: -64 ~ +63

REZ (Resonance): -64 ~ +63

■ POLY/MONO

This determines whether the voice in each Layer is played monophonically (only one note at a time) or polyphonically (up to 32 notes at a time).

Generally, Polyphonic mode is selected to generate multiple sounds at one time. There are cases, however, where it is more effective to select Monophonic mode, such as when using a bass sound, brass sound, or an analog synthesizer sound.



Settings:

POLY (Polyphonic), MONO (Monophonic)

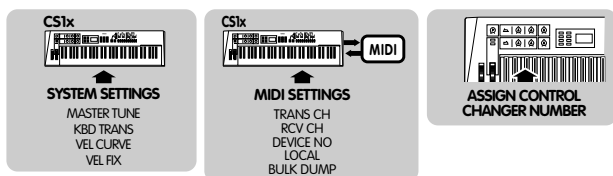
NOTE You can play up to 32 notes at a time. However, the number of notes may be reduced or truncated if you use voices which consist of two elements and/or play a rather complicated song which uses too many notes.

■ Using the Multi Play Mode

- Multi Play Mode is specifically aimed at playing CS1x as a tone generator using the external device such as sequencer. Consequently, the changes made in Multi Play Mode are temporary and cannot be stored.
- The Arpeggiator function is not available in Multi Play Mode. It can only be applied to the Performances in Performance Mode.

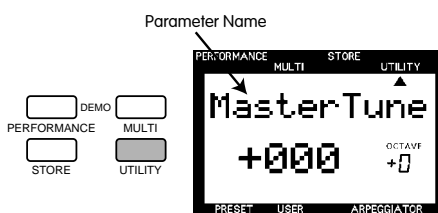
CS1x Utility Mode

In Utility mode you can set the CS1x system and MIDI parameters.



Entering Utility Mode

Press the UTILITY button. A [▲] mark appears in the LCD below the word "UTILITY".

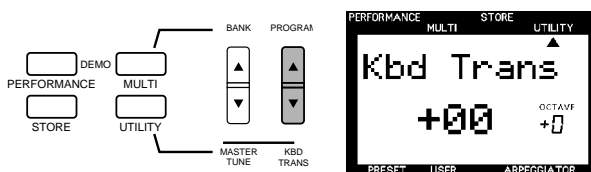


NOTE The LCD will display the parameter settings previously selected in Utility mode. The first time you press the UTILITY button after turning the power on, the LCD will display the first page (Master Tune) in Utility mode.

Procedure

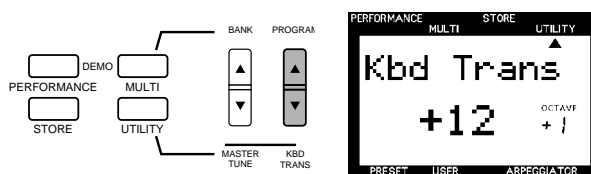
1. Select the parameter.

Press the Parameter Value UP/DOWN button corresponding to the parameter you want to edit once to select the parameter and display the settings in the LCD.



2. Set the value.

Press the Parameter Value UP/DOWN button again to set the value. Holding the Parameter Value UP/DOWN button changes the value continuously. The [UP] button increases the value and the [DOWN] button decreases the value.



NOTE You can also use the numeric keypad (0~9) or the Data Entry knob to change the value.

NOTE Other parameters will appear in the LCD when you press the other Parameter Value UP/DOWN buttons. Continue setting the other parameters.

NOTE Press the PERFORMANCE button or the MULTI button to exit Utility mode and return to each respective mode.

NOTE It is not necessary to store changes made in the Utility mode. The CS1x will remember any changes you make in this mode.

Description of Each Function

SYSTEM

This sets the tuning and other keyboard settings for the CS1x tone generator. There are four parameters: MASTER TUNE, KBD TRANS (Keyboard Transpose), VEL CURVE (Velocity Curve) and VEL FIX (Velocity Fix).

MASTER TUNE

This tunes the CS1x's tone generator. Basic pitch is 440 Hz at note A3. Master tuning can be adjusted 1 Hz at a time.



Settings:

-102 Hz to 0 (A3=440 Hz) to +102 Hz

KBD TRANS (Keyboard Transpose)

This lets you transpose the pitch in semitones. The transpose value will also be reflected in the Octave Shift function on the panel.



Settings:

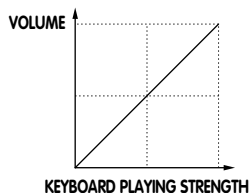
-36 to 0 (standard) to +36

NOTE This function setting is related to OCTAVE SHIFT on the panel, the indication may be changed after using the OCTAVE SHIFT function.

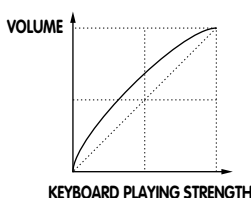
■ VEL CURVE (Velocity Curve)

The velocity curve set here determines the way the CS1x's tone generator responds to playing velocity when the VEL FIX parameter (see below) is set to OFF. The following six types of curves are available:

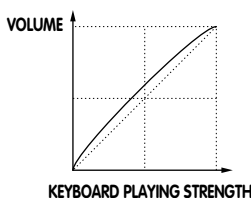
Norm (Normal): The velocity is in proportion to the strength (how hard you play the keyboard).



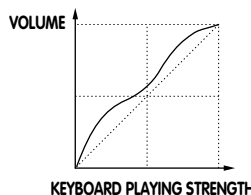
Soft1: This curve is designed to increase the volume level with a softer playing style. This is suitable for people with a soft key touch.



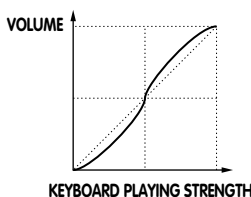
Soft2: This curve is also designed to increase the volume level with a softer playing style. This is close to Normal compared with Soft1.



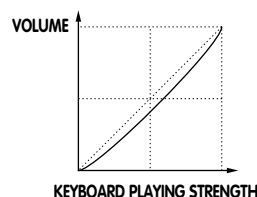
Easy: In general, this curve is also designed to increase the volume level with a softer playing style. However, the volume level is stable in all registers since the velocity curve in the mid range is close to Normal.



Wide: This curve is designed to lower the volume level with a softer playing style and increase the volume level with a stronger playing style. As a result, you feel a wider dynamic range.



Hard: This curve is designed to increase the volume level with a stronger playing style. This is suitable for people with a strong key touch.



Settings:
Norm, Soft1, Soft2, Easy, Wide, Hard

■ VEL FIX (Velocity Fix)

This sets the velocity of the CS1x keyboard to a specific value. This is used when you want to play the sound at a fixed velocity regardless of keyboard touch.



Settings:
1 ~ 127, off

NOTE Set the parameter in VEL FIX to OFF to enable the velocity curve previously selected in the VEL CURVE (Velocity Curve) parameter.

MIDI

The MIDI parameters let you exchange MIDI data between the CS1x and an external MIDI device. There are five parameters: TRANS CH (Transmit Channel), RCV (Receive Channel), DEVICE NO (Device Number), LOCAL (Local On/Off) and BULK DUMP (Performance Bulk Dump).

■ TRANS CH (Transmit Channel)

This sets the MIDI transmit channel from the CS1x to an external MIDI device such as a sequencer.



Settings:
1~16ch (channel)

NOTE You can use the CS1x to play and control an external MIDI device. For details, see page 9.

■ RCV CH (Receive Channel)

In Performance Mode, this sets the MIDI receive channel for controlling the CS1x with an external device such as a MIDI sequencer or computer.

In Multi Play mode, the CS1x resets the internal tone generator to XG ON (001 Grand Piano) status and automatically receives the external data.



Settings:

LAYER A (Layer All for a Performance) = 1~16ch, Part 5~16 = 1~16, off

NOTE In Performance Mode, the receive channels can be used for a Performance and 12 Parts (Part 5~16) for Multi. However, you cannot use the Insertion effect for Parts 5~16.

■ DEVICE NO (Device Number)

This sets the MIDI device number. When transmitting or receiving system exclusive messages such as bulk dump or parameter change messages with an external MIDI device, you must match the device numbers for both the CS1x and the external device.



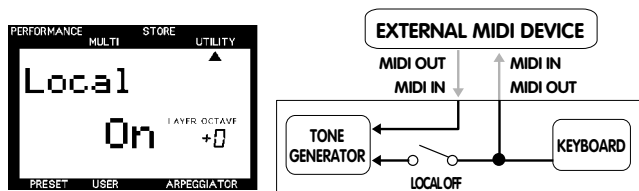
Settings:

1~16, all, off

■ LOCAL (Local On/Off)

This determines whether the keyboard is connected to the CS1x's internal tone generator. When Local is set to OFF, the keyboard is disconnected from the tone generator. The internal tone generator will not respond to the keyboard (no sound will be produced), but it will respond to incoming MIDI data from an external device. However, the keyboard still transmits MIDI messages from the MIDI OUT jack.

For normal play, local should be set to ON.



Settings:

on, off

■ BULK DUMP (Performance Bulk Dump)

This lets you send Performance data from the CS1x in bulk to another CS1x or to the Yamaha MIDI Data Filer MDF2. This is convenient for backing up, storing, or managing your important Performance data.

NOTE To enable transmission, first connect the MIDI devices. (For details about setting up each device, see the respective owner's manuals of the external MIDI devices.) It is necessary to match the device number of the CS1x with the device number of the external MIDI device. (See the DEVICE NO parameter, above.)

Bulk Dump Send

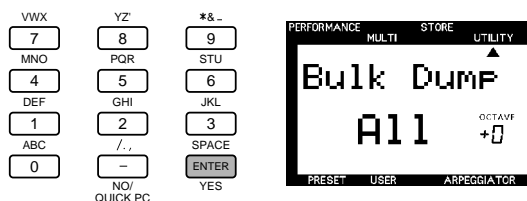
1. Select the type of data you want to send by pressing the Parameter Value UP/DOWN button. You can select from the following types:



1Perf: The Preset or User Performance data currently selected in Performance mode.

all: All of the User Performance data and the System data.

2. Press the ENTER/YES button to execute the bulk dump operation. "End" will appear in the LCD when the operation is completed, and the LCD will return to the original display.



Bulk Dump Receive

This lets you retrieve CS1x Performance data from an external device, loading it back into the CS1x in bulk.

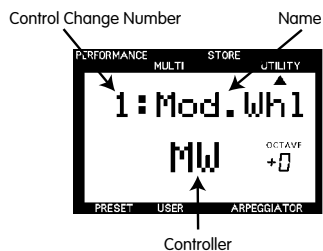
The data that can be received will differ depending on the mode. For details about the MIDI data format, see the "Data List" book. It is necessary to match the device number of the CS1x with the device number of the external MIDI device. (See the DEVICE NO parameter, above.)

■ ASSIGN CTRL NO (Assign Control Change Number)

This lets you assign Control Change Numbers to controllers such as the Modulation Wheel or Sound Control Knobs. This is mainly used to control external devices connected via MIDI.

NOTE The main function of the Sound Control Knobs will not be changed.

You can designate whether the Modulation Wheel or the Foot Controller is used for Scene Control (page 16).



Following are the Control Change Numbers and Names that can be assigned to the various controllers:

Controller	LCD
Modulation Wheel	MW
Sound Control Knob 1 (ATTACK)	Knob1
Sound Control Knob 2 (RELEASE)	Knob2
Sound Control Knob 3 (ASSIGN 1/DATA)	Knob3
Sound Control Knob 4 (CUTOFF)	Knob4
Sound Control Knob 5 (RESONANCE)	Knob5
Sound Control Knob 6 (ASSIGN 2)	Knob6
Footswitch connected to the FOOTSWITCH jack on the rear panel	FS
Foot Controller connected to the FOOT CONTROLLER jack on the rear panel	FC
Foot Volume pedal connected to the FOOT VOLUME jack on the rear panel	FV

NOTE In the Scene Control settings, you can choose from Mod. Wheel (Modulation Wheel) or FootCtrl (Foot Controller).

SCENE 1 or 2 buttons (only for the Scene Control)	Scene
---	-------

Assignable Control Change Numbers and Names

Control Change Number	Name	LCD
1	Modulation Wheel	Mod.Whl
5	Portament Time	PortaTm
6	Data Entry MSB	DataMSB
7	Main Volume	MainVal
10	Panpot	Panpot
11	Expression	Expres.
16	General purpose1	Gener1
17	General purpose2	Gener2
18	General purpose3	Gener3
19	General purpose4	Gener4
38	Data Entry LSB	DataLSB
64	Hold 1(Damper/Sustain)	Hold1
65	Portament Switch	PortaSW
66	Sostenute	Sostnut
67	Soft Pedal	Soft
71	Harmonic Contents	Harmonic
72	Release Time	RelTime
73	Attack Time	AtkTime
74	Brightness	Bright.
84	Portament Control	PortaCt
91	Reverb Depth	Reverb
93	Chorus Depth	Chorus
94	Variation Depth	Vari
Others	-----	-----

NOTE General Purpose: With the CS1x, General Purpose 1 is for FC, 2 for knob 3 (ASSIGN1), 3 for knob 6 (ASSIGN2) and 4 for no setting.

Assigning the Controllers

1. Move the controller on the panel to which the Control Change Number is to be assigned. The parameters of the controller will appear in the LCD.



NOTE Press the SCENE1 or SCENE 2 button to display the Scene Control parameters.

2. Press the Parameter Value UP/DOWN button to select the Control Change Number and Name.

3. Repeat steps 1 and 2 to assign the Control Change Numbers and Names to each controller.

NOTE This function is convenient for controlling an external MIDI device with the CS1x. For details, see page 53.

■ Tips About the Sound Control Knobs

The changes made by the Sound Control Knobs can be output as the MIDI messages.

The MIDI messages output via MIDI OUT can be assigned using the ASSIGN CTRL NO function shown at the left.

The assignments set at the factory:

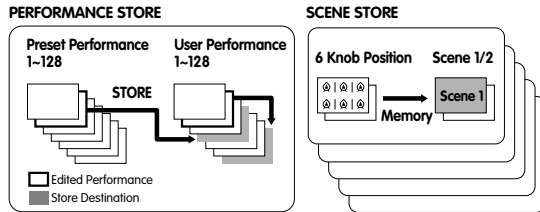
Sound Control Knob 1	73: Attack Time
Sound Control Knob 2	72: Release Time
Sound Control Knob 3	17: General purpose2
Sound Control Knob 4	74: Brightness
Sound Control Knob 5	71: Harmonic Contents
Sound Control Knob 6	18: General purpose3

- When the CS1x receives the data assigned to each Knob from an external MIDI device, the parameter printed on the panel for the Knob will be affected. For example, the Attack Time will be affected, when the Brightness (74) is assigned to the Knob 1 and the Attack Time (73) is assigned to the Knob 3, and then the message for the Brightness (74) are transmitted from an external device.

- Both data assigned to the Knob using the ASSIGN CTRL NO function and Knob data which parameter name is printed on the panel are sent to the internal tone generator when turning the Knob. For example, both Brightness (74) and Attack Time will be affected when the Brightness (74) is assigned to the Knob 1 and the Knob 1 is turned.

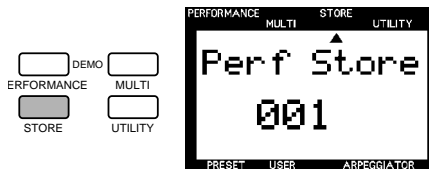
In Store mode you can store edited Performances or Scenes in the CS1x's internal memory. To enter Store Mode, you must first be in Performance Mode.

NOTE You cannot enter Store mode from Multi Play mode or Utility mode.



Storing a Performance

1. After editing a performance, press the STORE button to enter Store mode.



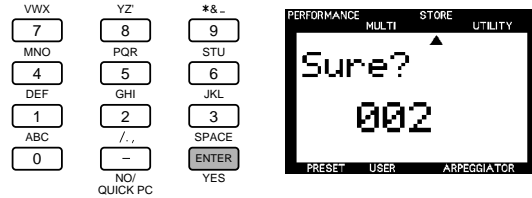
2. Select the User Performance number in which you want to store the Performance, using the numeric keypad (0-9), PROGRAM [-]/[+] buttons, or Data Entry knob.



CAUTION If you write over an existing User Performance, the data previously stored there will be lost. To be safe, always store your important data to an external device such as the Yamaha MIDI Data Filer MDF2. If you want, you can reset the User Performances back to the original factory settings. For details, see [Factory Settings](#), page 46.

NOTE To rename the Performance, select the Performance Name parameter in Performance Edit mode (see page 24).

3. Press the ENTER/YES button. "Sure?" will appear in the LCD.



To audition the sound, simply play the keyboard.

4. Press the YES/ENTER button again to execute the storing operation. The display will return to the Performance Play mode screen after the data is stored.

Press the NO button to cancel the storing operation.

NOTE Pressing the PERFORMANCE button exits Store mode.



When storing a Performance, the position of each Sound Control Knob will also be stored. Therefore, when selecting the stored User Performance in Performance Play mode, the CS1x will produce the sound affected by each Sound Control Knob position at that time. (Turning the Knob will restore the sound with the current Sound Control Knob positions.)

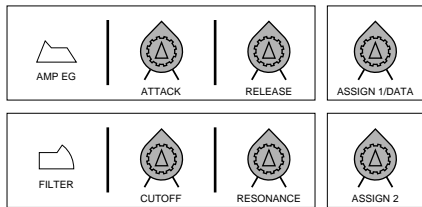
Storing a Scene

There are two "Scene" memories dedicated to each Performance. This function is used to assign a Scene, or the position of the six Sound Control Knobs, to the SCENE 1 or SCENE 2 button. This is convenient for live performances or recording sessions, since it lets you access a particular setting simply by pressing a button.

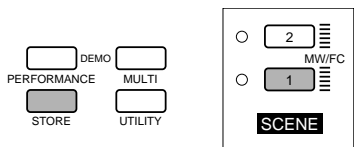
NOTE Two Scenes can be stored in each Performance.

CAUTION Once you have stored a Scene to the edit buffer (temporary save), to store the Scene data permanently you must perform the Performance store operation, above. (Before executing the Performance Store operation to record the Scene as a part of the performance, turn all the sound control knobs to their center positions.) Otherwise, you will lose the Scene settings if you select another Performance or enter Multi Play mode.

1. Set each Sound Control Knob to your preference.



2. Hold STORE and press the SCENE 1 button to store the current Sound Control Knob settings to the SCENE 1 button memory. To store another set of Sound Control Knob settings, hold STORE and press the SCENE 2 button.



The following message will appear in the LCD when the Scene is stored to the edit buffer.



Example: Settings stored to the SCENE 1 button.

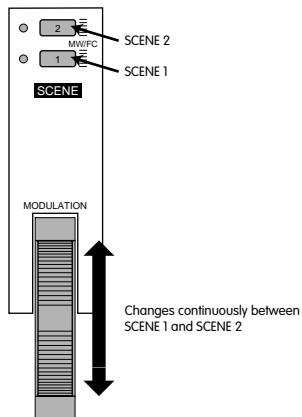
3. Store the Scene to the currently selected Performance using the Performance store operation.

Selecting a Scene

First select the Performance to which you have stored a Scene. Then press the SCENE 1 or SCENE 2 button to select the Scene. The LED by the button will light to indicate that you have activated the Scene settings.

Each Sound Control Knob will be disabled when a Scene is selected, and you will not be able to change the parameters using the knobs.

You can use the Modulation Wheel or Foot Controller to change the parameters (Scene settings) continuously between the SCENE 1 and SCENE 2 settings in realtime. The minimum position of the controller is Scene1, and the maximum position is Scene 2. For details about which controller is used to change between two Scenes, see page 43.



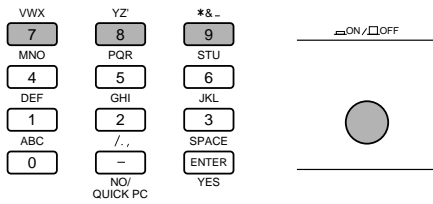


Factory Settings

You can reset all of the settings in the CS1x (Performance, Scene, System and MIDI settings) to the original factory (initial) settings.

NOTE Executing this function will replace all of your existing data. As such, always store your important data to an external device such as the Yamaha MIDI Data Filer MDF2 beforehand.

Turn the power of the CS1x off, then, while holding the 7, 8, and 9 keys on the numeric keypad, turn the power back on.



APPENDIX

Digital Effects

The CS1x features three independent digital effects units, Reverb, Chorus and Variation, which can be applied to the voices in a variety of ways to provide a wide range of sound processing capabilities.

In Performance mode you can choose the Reverb, Chorus and Variation effect types, as well as set additional parameters for the Variation effect. In Multi Play mode, system exclusive (MIDI) data programmed in a song sequence (of an external sequencer or computer) can change the various CS1x effect parameters at specific points in the song to greatly enhance the sound and impact of the playback.

■ Type 1: Reverb

Reverb recreates the sounds of various environments by adding room ambiance through delays or reflections. There are 11 Reverb types to choose from. (See page 49.)

■ Type 2: Chorus

Chorus creates a variety of rich, spacious-sounding effects which are especially dramatic in stereo. There are 11 Chorus effect types, including Chorus and Flanger. (See page 49.)

■ Type 3: Variation

Variation is a special section of various effects including Reverb and Chorus, plus many others not found in the other sections, such as Distortion, Wah, and Auto Pan. There are 43 Variation effect types. (See page 49.)

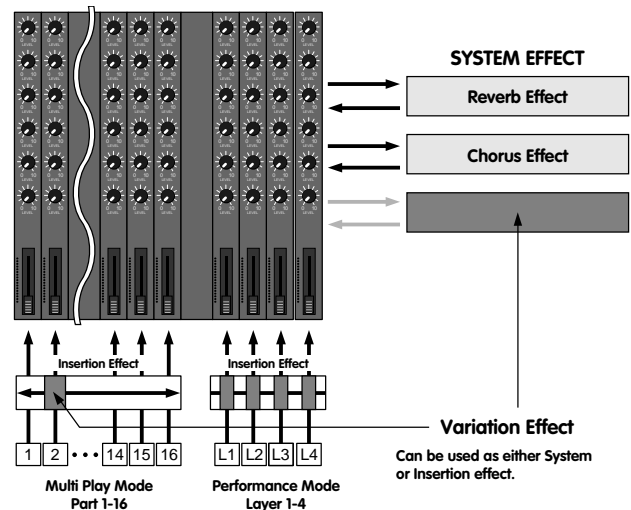
System and Insertion Effects

The CS1x effects sections can be designated as either System or Insertion effects. Reverb and Chorus are always System effects, which means they can be applied to any or all Parts. The Variation effect can also be a System effect, or it can be designated as an Insertion effect, which means it can be dedicated to a specific Part.

Basically, CS1x System and Insertion effects work the same way as in a sound mixer, as shown in the diagram at right. For example, System effects can be applied to musical instruments (i.e., Parts) which are connected to the various mixer channels; the amount of each System effect is determined by channel "send" and system "return" level controls. An Insertion effect can be connected ("inserted") into the signal flow of a specific channel in order to process the sound of that instrument (i.e., Layer/Part) only.

With the CS1x, in Performance mode the Insertion effect (Variation) can be applied to one or more of the four Layers, while in Multi Play mode it can only be applied to a single Part.

The System and Insertion effect configurations can be controlled in detail by XG song data (signified by the XG mark) when the CS1x is in Multi Play mode.



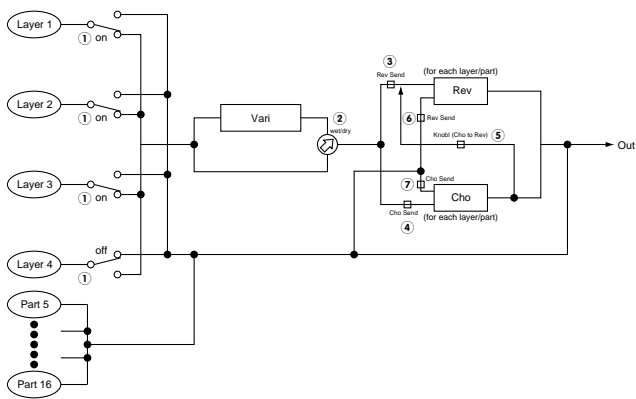
Performance Mode

The diagram below shows the signal flow of the three effects when the CS1x is in Performance mode. In this case the Variation effect is fixed as the Insertion effect.

The Variation Send On/Off switch ① determines which Layers the Variation effect is applied to. The Performance Layer Edit 4 menu EFFECT VARI SEND parameter turns the Variation effect ON/OFF for each Layer (see page 34).

The Variation effect wet/dry balance ② determines the ratio of effected (wet) signal to original (dry) signal. The resulting Variation effect signal is then sent to the Reverb effect via the Reverb send control ③, and to the Chorus effect via the Chorus send control ④; the Send Chorus To Reverb signal ⑤ can be controlled by the ASSIGN 1 knob. The Performance Layer Edit 4 menu EFFECT REV SEND ⑥ and CHO SEND ⑦ parameters determine the respective Reverb and Chorus send levels applied to each Layer (see page 34). Layers which are switched off ①, as well as Parts 5-16, can still have System Reverb and Chorus effects applied to them.

PERFORMANCE



NOTE Reverb and Chorus send levels for Layers with the Variation Send On/Off switch set to ON are determined by the highest numbered Layer. For example, if Layers 1, 2 and 3 are switched on, then the Reverb and Chorus send level for Layer 3 will determine the amount of effect applied to each Layer.

NOTE In Performance mode effect send levels for Parts 5~16 (as well as Layers 1~4) can be controlled by an external MIDI sequencer. The Variation effect cannot be applied to Parts 5~16.

Multi Play Mode

The diagram below shows the signal flow of the three effects when the CS1x is in Multi Play mode and the Variation effect is designated as an Insertion effect.

NOTE In Multi Play mode the various effect settings can be controlled by MIDI system exclusive Parameter Change messages (received from an external sequencer or computer). The illustrations at right show the Reverb, Chorus and Variation send parameters which can be controlled from the CS1x panel. For details about the others, refer to each page number as listed in the following explanation.

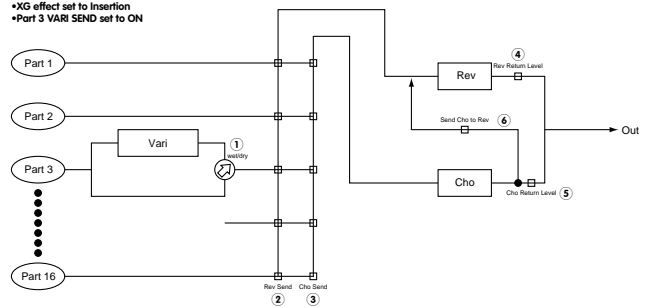
NOTE When the CS1x is in Multi Play mode, the Variation Effect is automatically reset as an Insertion Effect. If you want to set the Variation Effect as a System Effect, you need to send a parameter change message to the CS1x from an external MIDI sequencer.

The Variation (Insertion) effect can be applied to any one of the 16 Parts at a time, designated by switching the Multi Edit EFFECT VARI SEND parameter to ON (page 38). The ratio of Variation effect (wet) signal to original (dry) signal is determined by the wet/dry balance ①, which in turn controls the amount of Variation effect signal applied to the Part (page 38).

Although only one Part at a time can have the Variation effect applied to it, all Parts, including the Part with Variation effect, can have Reverb and Chorus applied, determined by the Reverb send ② and Chorus send ③ level settings (between 0~127) of the Multi Edit EFFECT REV SEND and CHO SEND parameters, respectively (page 38). Reverb return ④ and Chorus return ⑤ levels can also be controlled to determine the amount of each effect applied. The Send Chorus to Reverb ⑥ level from the Chorus effect to the Reverb effect can also be controlled in a series, if you assign it to the ASSIGN 1 knob (page 26); in this case, the Chorus return ⑤ level should be set to "0".

MULTI

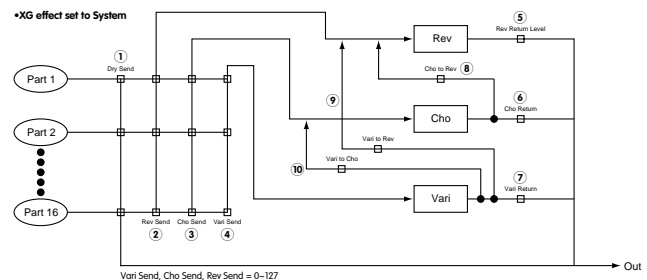
- XG effect set to Insertion
- Part 3 VARI SEND set to ON



The diagram below shows the signal flow of the three effects when the CS1x is in Multi Play mode and the Variation effect is designated as a System effect.

Each of the 16 Parts has a Dry send ① level which controls the amount of original signal for each Part (page 38). Reverb send ②, Chorus send ③, and Variation send ④ levels control the amount of effect applied to each Part, determined by the Multi Edit EFFECT REV SEND, CHO SEND and VARI SEND parameters (between 0~127), respectively (page 38). Reverb return ⑤, Chorus return ⑥ and Variation return ⑦ levels can also be controlled to determine the amount of each effect applied (page 38).

The Send Chorus to Reverb ⑧ level is sent from the Chorus effect to the Reverb effect (page 38). The Send Variation to Reverb ⑨ and Send Variation to Chorus ⑩ levels are sent from the Variation effect to the Reverb and Chorus effects, respectively (page 38). These three parameters let you make series and parallel effect configurations which provide enormous sound enhancement flexibility.



NOTE If you select Effect Off in the Variation Type menu, the Layers which have the VARI SEND function set to ON will not sound. When you don't want to use the Variation Effect on the Layers, set the VARI TYPE to Thru.

Effect Type List

Reverb Types

Following are descriptions of the Reverb types.

No.	Exclusive MSB	LSB	Effect Type	Description
0	0	0	NO EFFECT	Effect turned off.
1	1	0	HALL1	Reverb simulating the resonance of a hall.
2	1	1	HALL2	Reverb simulating the resonance of a hall.
3	2	0	ROOM1	Reverb simulating the resonance of a room.
4	2	1	ROOM2	Reverb simulating the resonance of a room.
5	2	2	ROOM3	Reverb simulating the resonance of a room.
6	3	0	STAGE1	Reverb appropriate for a solo instrument.
7	3	1	STAGE2	Reverb appropriate for a solo instrument.
8	4	0	PLATE	Reverb simulating a metal plate reverb unit.
9	10	0	WHITE ROOM	A unique short reverb with a bit of initial delay.
10	11	0	TUNNEL	Simulation of a tunnel space expanding to left and right.
11	13	0	BASEMENT	A bit of initial delay followed by reverb with a unique resonance.

Chorus Types

Following are descriptions of the Chorus types.

No.	Exclusive MSB	LSB	Effect Type	Description
0	0	0	NO EFFECT	Effect turned off.
1	41	0	CHORUS1	Conventional chorus program that adds natural spaciousness.
2	41	1	CHORUS2	Conventional chorus program that adds natural spaciousness.
3	41	2	CHORUS3	Conventional chorus program that adds natural spaciousness.
4	41	8	CHORUS4	Chorus with stereo input. The pan setting specified for the Part will also apply to the effect sound.
5	42	0	CELEST1	A 3-phase LFO adds modulation and spaciousness to the sound.
6	42	1	CELEST2	A 3-phase LFO adds modulation and spaciousness to the sound.
7	42	2	CELEST3	A 3-phase LFO adds modulation and spaciousness to the sound.
8	42	8	CELEST4	CELEST with stereo input. The pan setting specified for the Part will apply to the effect sound.
9	43	0	FLANGER1	Adds a jet-airplane effect to the sound.
10	43	1	FLANGER2	Adds a jet-airplane effect to the sound.
11	42	8	FLANGER3	Adds a jet-airplane effect to the sound.

Variation Types

NOTE When the effect type is set to Effect OFF while the Insertion effect is used, no sound is output. If you don't want to use the Variation effect, select Thru to pass the signal through the Variation effect without applying any effect.

Following are descriptions of the Variation types.

No.	Exclusive MSB	LSB	Effect Type	Description
0	0	0	NO EFFECT	Effect turned off.
1	1	0	HALL1	Reverb simulating the resonance of a hall.
2	1	1	HALL2	Reverb simulating the resonance of a hall.
3	2	0	ROOM1	Reverb simulating the resonance of a room.
4	2	1	ROOM2	Reverb simulating the resonance of a room.
5	2	2	ROOM3	Reverb simulating the resonance of a room.
6	3	0	STAGE1	Reverb appropriate for a solo instrument.
7	3	1	STAGE2	Reverb appropriate for a solo instrument.
8	4	0	PLATE	Reverb simulating a metal plate reverb unit.
9	5	0	DELAY L,C,R	A program that creates three delay sounds, L, R, and C (center).
10	6	0	DELAY L,R	A program that creates two delay sounds, L and R. Two feedback delays are provided.
11	7	0	ECHO	Two delays (L and R) and independent feedback delays for L and R.
12	8	0	CROSS DELAY	A program that crosses the feedback of two delays.
13	9	0	ERI	An effect that produces only the early reflection component of reverb.
14	9	1	EF2	An effect that produces only the early reflection component of reverb.
15	A	0	GATE REVERB	A simulation of gated reverb.
16	B	0	REVERSE GATE	A program that simulates gated reverb played backwards.
17	14	0	KARAOKE 1	A delay with feedback of the same type as used for karaoke reverb.
18	14	1	KARAOKE 2	A delay with feedback of the same type as used for karaoke reverb.
19	14	2	KARAOKE 3	A delay with feedback of the same type as used for karaoke reverb.
20	41	0	CHORUS1	A conventional chorus program, providing natural spaciousness.
21	41	1	CHORUS2	A conventional chorus program, providing natural spaciousness.
22	41	2	CHORUS3	A conventional chorus program, providing natural spaciousness.
23	41	8	CHORUS4	Chorus with stereo input.
24	42	0	CELEST1	A 3-phase LFO adds modulation and spaciousness to the sound.
25	42	1	CELEST2	A 3-phase LFO adds modulation and spaciousness to the sound.
26	42	2	CELEST3	A 3-phase LFO adds modulation and spaciousness to the sound.
27	42	8	CELEST4	Chorus with stereo input.
28	43	0	FLANGER1	Adds a jet-airplane effect to the sound.
29	43	1	FLANGER2	Adds a jet-airplane effect to the sound.
30	43	8	FLANGER3	Adds a jet-airplane effect to the sound.
31	44	0	SYMPHONIC	A multi-phase version of CELEST1.
32	45	0	ROTARY SPEAKER	A simulation of a rotary speaker. You can use an AC1 (assignable controller) etc. to control the speed of rotation.
33	46	0	TREMOLO	An effect that cyclically modulates the volume.
34	47	0	AUTO PAN	A program that cyclically moves the sound image to left and right, front and back.
35	48	0	PHASER1	Cyclically changes the phase to add modulation to the sound.
36	48	8	PHASER2	Phaser with stereo input.
37	49	0	DISTORTION	Adds a sharp-edged distortion to the sound.
38	4A	0	OVER DRIVE	Adds mild distortion to the sound.
39	4B	0	AMP SIMULATOR	A simulation of a guitar amp.
40	4C	0	3BAND EQ (MONO)	A mono EQ with adjustable LOW, MID, and HIGH equalizing.
41	4D	0	2BAND EQ (STEREO)	A stereo EQ with adjustable LOW and HIGH. Ideal for drum parts.
42	4E	0	AUTO WAH (LFO)	Cyclically modulates the center frequency of a wah filter. With an AC1 etc. this can function as a pedal wah.
43	4D	0	THRU	Bypass without applying an effect.

*MSB, LSB is represented in hexadecimal. *LSB = 0 is the basic effect type.

Effect Parameter List

HALL1,HALL2, ROOM1,ROOM2,ROOM3 ,STAGE1,STAGE2 ,PLATE

No.	Parameter	Display	Value	See Table	Control
1	Reverb Time	0.3~30.0s	0-69	table#4	
2	Diffusion	0~10	0-10		
3	Initial Delay	0.1~99.3ms	0-63	table#5	
4	HPF Cutoff	Thru~8.0kHz	0-52	table#3	
5	LPF Cutoff	1.0kHz~Thru	34-60	table#3	
6					
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Rev Delay	0~63	0-63	table#5	
12	Density	0~3	0-3		
13	Er/ Rev Balance	E63> R- E=R - E<R63	1-127		
14					
15	Feedback Level	-63~+63	1-127		
16					

WHITE ROOM ,TUNNEL, BASEMENT

No.	Parameter	Display	Value	See Table	Control
1	Reverb Time	0.3~30.0s	0-69	table#4	
2	Diffusion	0~10	0-10		
3	Initial Delay	0~63	0-63	table#5	
4	HPF Cutoff	Thru~8.0kHz	0-52	table#3	
5	LPF Cutoff	1.0k~Thru	34-60	table#3	
6	Width	0.5~10.2m	0-37	table#8	
7	Height	0.5~20.2m	0-73	table#8	
8	Depth	0.5~30.2m	0-104	table#8	
9	Wall Vary	0~30	0-30		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Rev Delay	0~63	0-63	table#5	
12	Density	0~3	0-3		
13	Er/ Rev Balance	E63> R- E=R - E<R63	1-127		
14					
15	Feedback Level	-63~+63	1-127		
16					

DELAY L,C,R

No.	Parameter	Display	Value	See Table	Control
1	Lch Delay	0.1~715.0ms	1-7150		
2	Rch Delay	0.1~715.0ms	1-7150		
3	Cch Delay	0.1~715.0ms	1-7150		
4	Feedback Delay	0.1~715.0ms	1-7150		
5	Feedback Level	-63~+63	1-127		
6	Cch Level	0~127	0-127		
7	High Damp	0.1~1.0	1-10		
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz~2.0kHz	8-40	table#3	
14	EQ Low Gain	-12~+12dB	52-76		
15	EQ High Frequency	500Hz~16.0kHz	28-58	table#3	
16	EQ High Gain	-12~+12dB	52-76		

DELAY L,R

No.	Parameter	Display	Value	See Table	Control
1	Lch Delay	0.1~715.0ms	1-7150		
2	Rch Delay	0.1~715.0ms	1-7150		
3	Feedback Delay 1	0.1~715.0ms	1-7150		
4	Feedback Delay 2	0.1~715.0ms	1-7150		
5	Feedback Level	-63~+63	1-127		
6	High Damp	0.1~1.0	1-10		
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz~2.0kHz	8-40	table#3	
14	EQ Low Gain	-12~+12dB	52-76		
15	EQ High Frequency	500Hz~16.0kHz	28-58	table#3	
16	EQ High Gain	-12~+12dB	52-76		

ECHO

No.	Parameter	Display	Value	See Table	Control
1	Lch Delay1	0.1~355.0ms	1-3550		
2	Lch Feedback Level	-63~+63	1-127		
3	Rch Delay1	0.1~355.0ms	1-3550		
4	Rch Feedback Level	-63~+63	1-127		
5	High Damp	0.1~1.0	1-10		
6	Lch Delay2	0.1~355.0ms	1-3550		
7	Rch Delay2	0.1~355.0ms	1-3550		
8	Delay2 Level	0~127	0-127		
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz~2.0kHz	8-40	table#3	
14	EQ Low Gain	-12~+12dB	52-76		
15	EQ High Frequency	500Hz~16.0kHz	28-58	table#3	
16	EQ High Gain	-12~+12dB	52-76		

CROSS DELAY

No.	Parameter	Display	Value	See Table	Control
1	L->R Delay	0.1~355.0ms	1-3550		
2	R->L Delay	0.1~355.0ms	1-3550		
3	Feedback Level	-63~+63	1-127		
4	Input Select	L,R,L&R	0-2		
5	High Damp	0.1~1.0	1-10		
6					
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz~2.0kHz	8-40	table#3	
14	EQ Low Gain	-12~+12dB	52-76		
15	EQ High Frequency	500Hz~16.0kHz	28-58	table#3	
16	EQ High Gain	-12~+12dB	52-76		

NOTE The parameter depth marked with a ● can be controlled by the ASSIGN 1 Sound Control Knob or Foot Controller when properly assigned.

The parameter numbers at far left correspond to the parameter suffix numbers in MIDI Data Table <1-4> (MIDI Data Format) in the "Data List" book.

EARLY REF1,EARLY REF2

No.	Parameter	Display	Value	See Table	Control
1	Type	S-H, L-H, Rdm, Rvs, Plt, Spr	0-5		
2	Room Size	0.1-7.0	0-44	table#6	
3	Diffusion	0-10	0-10		
4	Initial Delay	0.1-99.3ms	0-63	table#5	
5	Feedback Level	-63-+63	1-127		
6	HPF Cutoff	Thru-8.0kHz	0-52		
7	LPF Cutoff	1.0k-Thru	34-60		
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Liveness	0-10	0-10		
12	Density	0-3	0-3		
13	High Damp	0.1-1.0	1-10		
14					
15					
16					

GATE REVERB,REVERSE GATE

No.	Parameter	Display	Value	See Table	Control
1	Type	TypeA,TypeB	0-1		
2	Room Size	0.1-7.0	0-44	table#6	
3	Diffusion	0-10	0-10		
4	Initial Delay	0.1-99.3ms	0-63	table#5	
5	Feedback Level	-63-+63	1-127		
6	HPF Cutoff	Thru-8.0kHz	0-52		
7	LPF Cutoff	1.0k-Thru	34-60		
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Liveness	0-10	0-10		
12	Density	0-3	0-3		
13	High Damp	0.1-1.0	1-10		
14					
15					
16					

KARAOKE1,2,3

No.	Parameter	Display	Value	See Table	Control
1	Delay Time	0-400.0ms	0-127	table#7	
2	Feedback Level	-63-+63	1-127		
3	HPF Cutoff	Thru-8.0kHz	0-52		
4	LPF Cutoff	1.0k-Thru	34-60		
5					
6					
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14					
15					
16					

CHORUS1,2,3,4, CELESTE1,2,3,4

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	
2	LFO PM Depth	0-127	0-127		
3	Feedback Level	-63-+63	1-127		
4	Delay Offset	0.0-50.0ms	0-127	table#2	
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14					
15	Input Mode	mono/stereo	0-1		
16					

FLANGER1,FLANGER2,FLANGER3

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	
2	LFO Depth	0-127	0-127		
3	Feedback Level	-63-+63	1-127		
4	Delay Offset	0.0-6.3ms	0-63	table#2	
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14	LFO Phase Difference	-180-+180deg	4-124	resolution=3deg.	
15					
16					

SYMPHONIC

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	
2	LFO Depth	0-127	0-127		
3	Delay Offset	0.0-50.0ms	0-127	table#2	
4					
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14					
15					
16					

ROTARY SPEAKER

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	●
2	LFO Depth	0-127	0-127		
3					
4					
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		
11					
12					
13					
14					
15					
16					

TREMOLO

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	●
2	AM Depth	0-127	0-127		
3	PM Depth	0-127	0-127		
4					
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10					
11					
12					
13					
14	LFO Phase Difference	-180-+180deg	4-124	resolution=3deg.	
15	Input Mode	mono/stereo	0-1		
16					

AUTO PAN

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	●
2	L/R Depth	0-127	0-127		
3	F/R Depth	0-127	0-127		
4	PAN Direction	L<->R,L->R,L<-R,Lturn,Rturn,L/R	0-5		
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10					
11					
12					
13					
14					
15					
16					

PHASER1, PHASER2

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	
2	LFO Depth	0-127	0-127		
3	Phase Shift Offset	0-127	0-127		
4	Feedback Level	-63-+63	1-127		
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Stage	6-10(phaser1) / 3-5(phaser2)	3-10		
12	Diffusion	Mono/Stereo	0-1		
13	LFO Phase Difference	-180-+180deg.	4-124	Phaser2	
14					
15					
16					

NOTE The parameter depth marked with a ● can be controlled by the ASSIGN 1 Sound Control Knob or Foot Controller when properly assigned.

The parameter numbers at far left correspond to the parameter suffix numbers in MIDI Data Table <1-4> (MIDI Data Format) in the "Data List" book.

DISTORTION/OVERDRIVE

No.	Parameter	Display	Value	See Table	Control
1	Drive	0-127	0-127		●
2	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
3	EQ Low Gain	-12-+12dB	52-76		
4	LPF Cutoff	1.0k-Thru	34-60	table#3	
5	Output Level	0-127	0-127		
6					
7	EQ Mid Frequency	500Hz-10.0kHz	28-54	table#3	
8	EQ Mid Gain	-12-+12dB	52-76		
9	EQ Mid Width	1.0-12.0	10-120		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		
11	Edge(Clip Curve)	0-127	0-127	mild-sharp	
12					
13					
14					
15					
16					

GUITAR AMP SIMULATOR

No.	Parameter	Display	Value	See Table	Control
1	Drive	0-127	0-127		●
2	AMP Type	Off,Stack,Combo,Tube	0-3		
3	LPF Cutoff	1.0k-Thru	34-60	table#3	
4	Output Level	0-127	0-127		
5					
6					
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		
11	Edge(Clip Curve)	0-127	0-127	mild-sharp	
12					
13					
14					
15					
16					

MONO EQ(3-BAND)

No.	Parameter	Display	Value	See Table	Control
1	EQ Low Gain	-12-+12dB	52-76		
2	EQ Mid Frequency	500Hz-10.0kHz	28-54	table#3	
3	EQ Mid Gain	-12-+12dB	52-76		
4	EQ Mid Width	1.0-12.0	10-120		
5	EQ High Gain	-12-+12dB	52-76		
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
8					
9					
10					
11					
12					
13					
14					
15					
16					

STEREO EQ(2-BAND)

No.	Parameter	Display	Value	See Table	Control
1	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
2	EQ Low Gain	-12-+12dB	52-76		
3	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
4	EQ High Gain	-12-+12dB	52-76		
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

AUTO WAH

No.	Parameter	Display	Value	See Table	Control
1	LFO Frequency	0.00-39.7Hz	0-127	table#1	
2	LFO Depth	0-127	0-127		
3	Cutoff Frequency Offset	50Hz-14.0kHz	0-127	table#9	●
4	Resonance	1.0-12.0	10-120		
5					
6	EQ Low Frequency	50Hz-2.0kHz	8-40	table#3	
7	EQ Low Gain	-12-+12dB	52-76		
8	EQ High Frequency	500Hz-16.0kHz	28-58	table#3	
9	EQ High Gain	-12-+12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		
11					
12					
13					
14					
15					
16					

NOTE The parameter depth marked with a ● can be controlled by the ASSIGN 1 Sound Control Knob or Foot Controller when properly assigned.

The parameter numbers at far left correspond to the parameter suffix numbers in MIDI Data Table <1-4> (MIDI Data Format) in the "Data List" book.

Effect Data Assign Table

Table#1

LFO Frequency							
Data	Value	Data	Value	Data	Value	Data	Value
0	0.00	32	1.35	64	2.69	96	8.41
1	0.04	33	1.39	65	2.78	97	8.75
2	0.08	34	1.43	66	2.86	98	9.08
3	0.13	35	1.47	67	2.94	99	9.42
4	0.17	36	1.51	68	3.03	100	9.76
5	0.21	37	1.56	69	3.11	101	10.10
6	0.25	38	1.60	70	3.20	102	10.80
7	0.29	39	1.64	71	3.28	103	11.40
8	0.34	40	1.68	72	3.37	104	12.10
9	0.38	41	1.72	73	3.45	105	12.80
10	0.42	42	1.77	74	3.53	106	13.50
11	0.46	43	1.81	75	3.62	107	14.10
12	0.51	44	1.85	76	3.70	108	14.80
13	0.55	45	1.89	77	3.87	109	15.50
14	0.59	46	1.94	78	4.04	110	16.20
15	0.63	47	1.98	79	4.21	111	16.80
16	0.67	48	2.02	80	4.37	112	17.50
17	0.72	49	2.06	81	4.54	113	18.20
18	0.76	50	2.10	82	4.71	114	19.50
19	0.80	51	2.15	83	4.88	115	20.90
20	0.84	52	2.19	84	5.05	116	22.20
21	0.88	53	2.23	85	5.22	117	23.60
22	0.93	54	2.27	86	5.38	118	24.90
23	0.97	55	2.31	87	5.55	119	26.20
24	1.01	56	2.36	88	5.72	120	27.60
25	1.05	57	2.40	89	6.06	121	28.90
26	1.09	58	2.44	90	6.39	122	30.30
27	1.14	59	2.48	91	6.73	123	31.60
28	1.18	60	2.52	92	7.07	124	33.00
29	1.22	61	2.57	93	7.40	125	34.30
30	1.26	62	2.61	94	7.74	126	37.00
31	1.30	63	2.65	95	8.08	127	39.70

Table#2

Modulation Delay Offset							
Data	Value	Data	Value	Data	Value	Data	Value
0	0.0	32	3.2	64	6.4	96	9.6
1	0.1	33	3.3	65	6.5	97	9.7
2	0.2	34	3.4	66	6.6	98	9.8
3	0.3	35	3.5	67	6.7	99	9.9
4	0.4	36	3.6	68	6.8	100	10.0
5	0.5	37	3.7	69	6.9	101	11.1
6	0.6	38	3.8	70	7.0	102	12.2
7	0.7	39	3.9	71	7.1	103	13.3
8	0.8	40	4.0	72	7.2	104	14.4
9	0.9	41	4.1	73	7.3	105	15.5
10	1.0	42	4.2	74	7.4	106	17.1
11	1.1	43	4.3	75	7.5	107	18.6
12	1.2	44	4.4	76	7.6	108	20.2
13	1.3	45	4.5	77	7.7	109	21.8
14	1.4	46	4.6	78	7.8	110	23.3
15	1.5	47	4.7	79	7.9	111	24.9
16	1.6	48	4.8	80	8.0	112	26.5
17	1.7	49	4.9	81	8.1	113	28.0
18	1.8	50	5.0	82	8.2	114	29.6
19	1.9	51	5.1	83	8.3	115	31.2
20	2.0	52	5.2	84	8.4	116	32.8
21	2.1	53	5.3	85	8.5	117	34.3
22	2.2	54	5.4	86	8.6	118	35.9
23	2.3	55	5.5	87	8.7	119	37.5
24	2.4	56	5.6	88	8.8	120	39.0
25	2.5	57	5.7	89	8.9	121	40.6
26	2.6	58	5.8	90	9.0	122	42.2
27	2.7	59	5.9	91	9.1	123	43.7
28	2.8	60	6.0	92	9.2	124	45.3
29	2.9	61	6.1	93	9.3	125	46.9
30	3.0	62	6.2	94	9.4	126	48.4
31	3.1	63	6.3	95	9.5	127	50.0

Table#3

EQ Frequency			
Data	Value	Data	Value
0	THRU(20)	32	800
1	22	33	900
2	25	34	1.0k
3	28	35	1.1k
4	32	36	1.2k
5	36	37	1.4k
6	40	38	1.6k
7	45	39	1.8k
8	50	40	2.0k
9	56	41	2.2k
10	63	42	2.5k
11	70	43	2.8k
12	80	44	3.2k
13	90	45	3.6k
14	100	46	4.0k
15	110	47	4.5k
16	125	48	5.0k
17	140	49	5.6k
18	160	50	6.3k
19	180	51	7.0k
20	200	52	8.0k
21	225	53	9.0k
22	250	54	10.0k
23	280	55	11.0k
24	315	56	12.0k
25	355	57	14.0k
26	400	58	16.0k
27	450	59	18.0k
28	500	60	THRU(20.0k)
29	560		
30	630		
31	700		

Table#4

Reverb time

Data	Value	Data	Value	Data	Value
0	0.3	32	3.5	64	17.0
1	0.4	33	3.6	65	18.0
2	0.5	34	3.7	66	19.0
3	0.6	35	3.8	67	20.0
4	0.7	36	3.9	68	25.0
5	0.8	37	4.0	69	30.0
6	0.9	38	4.1		
7	1.0	39	4.2		
8	1.1	40	4.3		
9	1.2	41	4.4		
10	1.3	42	4.5		
11	1.4	43	4.6		
12	1.5	44	4.7		
13	1.6	45	4.8		
14	1.7	46	4.9		
15	1.8	47	5.0		
16	1.9	48	5.5		
17	2.0	49	6.0		
18	2.1	50	6.5		
19	2.2	51	7.0		
20	2.3	52	7.5		
21	2.4	53	8.0		
22	2.5	54	8.5		
23	2.6	55	9.0		
24	2.7	56	9.5		
25	2.8	57	10.0		
26	2.9	58	11.0		
27	3.0	59	12.0		
28	3.1	60	13.0		
29	3.2	61	14.0		
30	3.3	62	15.0		
31	3.4	63	16.0		

Table#5

Delay Time(200.0ms)

Data	Value	Data	Value	Data	Value	Data	Value
0	0.1	32	50.5	64	100.8	96	151.2
1	1.7	33	52.0	65	102.4	97	152.8
2	3.2	34	53.6	66	104.0	98	154.4
3	4.8	35	55.2	67	105.6	99	155.9
4	6.4	36	56.8	68	107.1	100	157.5
5	8.0	37	58.3	69	108.7	101	159.1
6	9.5	38	59.9	70	110.3	102	160.6
7	11.1	39	61.5	71	111.9	103	162.2
8	12.7	40	63.1	72	113.4	104	163.8
9	14.3	41	64.6	73	115.0	105	165.4
10	15.8	42	66.2	74	116.6	106	166.9
11	17.4	43	67.8	75	118.2	107	168.5
12	19.0	44	69.4	76	119.7	108	170.1
13	20.6	45	70.9	77	121.3	109	171.7
14	22.1	46	72.5	78	122.9	110	173.2
15	23.7	47	74.1	79	124.4	111	174.8
16	25.3	48	75.7	80	126.0	112	176.4
17	26.9	49	77.2	81	127.6	113	178.0
18	28.4	50	78.8	82	129.2	114	179.5
19	30.0	51	80.4	83	130.7	115	181.1
20	31.6	52	81.9	84	132.3	116	182.7
21	33.2	53	83.5	85	133.9	117	184.3
22	34.7	54	85.1	86	135.5	118	185.8
23	36.3	55	86.7	87	137.0	119	187.4
24	37.9	56	88.2	88	138.6	120	189.0
25	39.5	57	89.8	89	140.2	121	190.6
26	41.0	58	91.4	90	141.8	122	192.1
27	42.6	59	93.0	91	143.3	123	193.7
28	44.2	60	94.5	92	144.9	124	195.3
29	45.7	61	96.1	93	146.5	125	196.9
30	47.3	62	97.7	94	148.1	126	198.4
31	48.9	63	99.3	95	149.6	127	200.0

Table#6

Room Size

Data	Value	Data	Value
0	0.1	32	5.1
1	0.3	33	5.3
2	0.4	34	5.4
3	0.6	35	5.6
4	0.7	36	5.7
5	0.9	37	5.9
6	1.0	38	6.1
7	1.2	39	6.2
8	1.4	40	6.4
9	1.5	41	6.5
10	1.7	42	6.7
11	1.8	43	6.8
12	2.0	44	7.0
13	2.1		
14	2.3		
15	2.5		
16	2.6		
17	2.8		
18	2.9		
19	3.1		
20	3.2		
21	3.4		
22	3.5		
23	3.7		
24	3.9		
25	4.0		
26	4.2		
27	4.3		
28	4.5		
29	4.6		
30	4.8		
31	5.0		

Table#7

Delay Time(400.0ms)

Data	Value	Data	Value	Data	Value	Data	Value
0	0.1	32	100.9	64	201.6	96	302.4
1	3.2	33	104.0	65	204.8	97	305.5
2	6.4	34	107.2	66	207.9	98	308.7
3	9.5	35	110.3	67	211.1	99	311.8
4	12.7	36	113.5	68	214.2	100	315.0
5	15.8	37	116.6	69	217.4	101	318.1
6	19.0	38	119.8	70	220.5	102	321.3
7	22.1	39	122.9	71	223.7	103	324.4
8	25.3	40	126.1	72	226.8	104	327.6
9	28.4	41	129.2	73	230.0	105	330.7
10	31.6	42	132.4	74	233.1	106	333.9
11	34.7	43	135.5	75	236.3	107	337.0
12	37.9	44	138.6	76	239.4	108	340.2
13	41.0	45	141.8	77	242.6	109	343.3
14	44.2	46	144.9	78	245.7	110	346.5
15	47.3	47	148.1	79	248.9	111	349.6
16	50.5	48	151.2	80	252.0	112	352.8
17	53.6	49	154.4	81	255.2	113	355.9
18	56.8	50	157.5	82	258.3	114	359.1
19	59.9	51	160.7	83	261.5	115	362.2
20	63.1	52	163.8	84	264.6	116	365.4
21	66.2	53	167.0	85	267.7	117	368.5
22	69.4	54	170.1	86	270.9	118	371.7
23	72.5	55	173.3	87	274.0	119	374.8
24	75.7	56	176.4	88	277.2	120	378.0
25	78.8	57	179.6	89	280.3	121	381.1
26	82.0	58	182.7	90	283.5	122	384.3
27	85.1	59	185.9	91	286.6	123	387.4
28	88.3	60	189.0	92	289.8	124	390.6
29	91.4	61	192.2	93	292.9	125	393.7
30	94.6	62	195.3	94	296.1	126	396.9
31	97.7	63	198.5	95	299.2	127	400.0

Table#8

Reverb Width;Depth;Height

Data	Value	Data	Value	Data	Value	Data	Value
0	0.5	32	8.8	64	17.6	96	27.5
1	0.8	33	9.1	65	17.9	97	27.8
2	1.0	34	9.4	66	18.2	98	28.1
3	1.3	35	9.6	67	18.5	99	28.5
4	1.5	36	9.9	68	18.8	100	28.8
5	1.8	37	10.2	69	19.1	101	29.2
6	2.0	38	10.4	70	19.4	102	29.5
7	2.3	39	10.7	71	19.7	103	29.9
8	2.6	40	11.0	72	20.0	104	30.2
9	2.8	41	11.2	73	20.2		
10	3.1	42	11.5	74	20.5		
11	3.3	43	11.8	75	20.8		
12	3.6	44	12.1	76	21.1		
13	3.9	45	12.3	77	21.4		
14	4.1	46	12.6	78	21.7		
15	4.4	47	12.9	79	22.0		
16	4.6	48	13.1	80	22.4		
17	4.9	49	13.4	81	22.7		
18	5.2	50	13.7	82	23.0		
19	5.4	51	14.0	83	23.3		
20	5.7	52	14.2	84	23.6		
21	5.9	53	14.5	85	23.9		
22	6.2	54	14.8	86	24.2		
23	6.5	55	15.1	87	24.5		
24	6.7	56	15.4	88	24.9		
25	7.0	57	15.6	89	25.2		
26	7.2	58	15.9	90	25.5		
27	7.5	59	16.2	91	25.8		
28	7.8	60	16.5	92	26.1		
29	8.0	61	16.8	93	26.5		
30	8.3	62	17.1	94	26.8		
31	8.6	63	17.3	95	27.1		

Table#9

Cutoff Frequency Offset

Data	Value	Data	Value	Data	Value	Data	Value
0	50	32	500	64	2.14k	96	6.20k
1	55	33	530	65	2.22k	97	6.38k
2	60	34	560	66	2.31k	98	6.56k
3	66	35	590	67	2.40k	99	6.75k
4	72	36	620	68	2.49k	100	6.95k
5	80	37	650	69	2.58k	101	7.15k
6	86	38	680	70	2.67k	102	7.35k
7	94	39	720	71	2.77k	103	7.56k
8	100	40	760	72	2.87k	104	7.78k
9	110	41	800	73	2.97k	105	8.00k
10	120	42	840	74	3.08k	106	8.22k
11	130	43	880	75	3.19k	107	8.44k
12	140	44	920	76	3.30k	108	8.67k
13	150	45	960	77	3.41k	109	8.90k
14	162	46	1.00k	78	3.53k	110	9.14k
15	174	47	1.05k	79	3.65k	111	9.38k
16	186	48	1.10k	80	3.77k	112	9.63k
17	200	49	1.15k	81	3.90k	113	9.90k
18	215	50	1.20k	82	4.03k	114	10.2k
19	230	51	1.26k	83	4.16k	115	10.4k
20	245	52	1.32k	84	4.29k	116	10.7k
21	260	53	1.38k	85	4.43k	117	10.9k
22	280	54	1.43k	86	4.57k	118	11.2k
23	300	55	1.50k	87	4.72k	119	11.5k
24	315	56	1.56k	88	4.87k	120	11.8k
25	335	57	1.62k	89	5.02k	121	12.1k
26	355	58	1.69k	90	5.18k	122	12.4k
27	380	59	1.76k	91	5.34k	123	12.7k
28	400	60	1.83k	92	5.50k	124	13.0k
29	425	61	1.90k	93	5.67k	125	13.3k
30	450	62	1.98k	94	5.84k	126	13.7k
31	475	63	2.06k	95	6.02k	127	14.0k

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.

The CS1x can control a MIDI device by transmitting note related data and various types of controller data. The CS1x can be controlled by the incoming MIDI messages which automatically determine tone generator mode, select MIDI channels, voices and effects, change parameter values, and of course play the voices specified for the various Parts.

MIDI Messages Transmitted/Received by the CS1x

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 the CS1x can receive/transmit.

1. CHANNEL MESSAGES

Channel messages are the data related to the performance on the keyboard for the specific channel.

1.1 Note On/Note Off (Key On/Key Off)

Messages which are generated when the keyboard is played.

Reception note range = C-2 (0) - G8 (127), C3 = 60

Velocity range = 1 - 127 (Only the Note On velocity is received)

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.

1.2 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.

1.2.1 Bank Select MSB (Control #000) Bank Select LSB (Control #032)

Messages which select variation voice bank numbers by combining and sending the MSB and LSB from an external device.

MSB and LSB functions differently depending on the tone generator mode.

In XG mode, MSB numbers select voice type (Normal Voice or Drum Voice), and LSB numbers select voice banks.

In TG300B mode, LSB is fixed, and MSB numbers select voice banks.

(For more information about Banks and Programs, see Voice List in the "Data List" book.)

A new bank selection will not become effective until the next Program Change message is received.

1.2.2 Modulation (Control #001)

Messages which control vibrato depth using the Modulation Wheel.

Setting the value to 127 produces maximum vibrato and 0 results in vibrato off.

1.2.3 Portamento Time (Control #005)

Messages which control the duration of portamento, or a continuous pitch glide between successively played notes.

When the parameter 1.2.10 Portamento Switch is set to on, the value set here can adjust the speed of pitch change.

Setting the value to 127 produces maximum portamento time and 0 results in minimum portamento time.

1.2.4 Data Entry MSB (Control #006) Data Entry LSB (Control #038)

Messages which set the value for the parameter specified by 1.2.23RPN MSB/LSB and 1.2.22 NRPN MSB/LSB.

Parameter value is determined by combining MSB and LSB.

1.2.5 Main Volume (Control #007)

Messages which control the volume of each Part.

Setting the value to 127 produces maximum volume and 0 results in volume off.

The messages 007 (Main Volume) or 011 (Expression) will be transmitted using an optional controller connected to the FOOT VOLUME jack on the rear panel if an appropriate setting is selected in the Assign Control Number section in Utility mode.

1.2.6 Pan (Control #010)

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.

1.2.7 Expression (Control #011)

Messages which control intonation expression of each Part during performance.

Setting the value to 127 produces maximum volume and 0 results in volume off.

The messages 007 (Main Volume) or 011 (Expression) will be transmitted using an optional controller connected to the FOOT VOLUME jack on the rear panel if an appropriate setting is selected in the Assign Control Number section in Utility mode.

1.2.8 General Purpose 1, 2, 3, 4 (Control #016, 017, 018, 019)

Control #016 are messages which are transmitted by operating the connected Foot Controller, used to control specific parameter such as voice parameters and Variation effect parameters. Control #017 and Control #018 are messages which are transmitted by operating the ASSIGN1 and ASSIGN2 knobs, respectively. Control #019 is undefined.

1.2.9 Hold1 (Control #064)

Messages which control sustain on/off.

Setting the value between 64 - 127 turns the sustain on, between 0 - 63 turns the sustain off.

1.2.10 Portamento Switch (Control #065)

Messages which control portamento on/off.

Setting the value between 64 -127 turns the portamento on, between 0 - 63 turns the portamento off.

1.2.11 Sostenuto (Control #066)

Messages which control sostenuto on/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.

Setting the value between 64 -127 turns the sostenuto on, between 0 - 63 turns the sostenuto off.

1.2.12 Soft Pedal (Control #067)

Messages which control soft pedal on/off.

Notes played while holding the soft pedal will be dampened.

Setting the value between 64 -127 turns the soft pedal on, between 0 - 63 turns the soft pedal off.

1.2.13 Harmonic Content (Control #071)

Messages which adjust the filter resonance set for each voice.

The value set here is an offset value which will be added to or subtracted from the voice data.

Higher values will result in a more characteristic, resonant sound.

Depending on the voice, the effective range may be narrower than the range available for adjustment.

1.2.14 Release Time (Control #072)

Messages which adjust the EG release time set for each voice.

The value set here is an offset value which will be added to or subtracted from the voice data.

1.2.15 Attack Time (Control #073)

Messages which adjust the EG attack time set for each voice.

The value set here is an offset value which will be added to or subtracted from the voice data.

1.2.16 Brightness (Control #074)

Messages which adjust the filter cutoff frequency set for each voice.

The value set here is an offset value which will be added to or subtracted from the voice data.

Lower values will result in a softer sound.

Depending on the voice, the effective range may be narrower than the range available for adjustment.

1.2.17 Portamento Control (Control #084)

Messages which apply a portamento between the currently-sounding note and the subsequent note.

Portamento Control is transmitted specifying the note-on key of the currently-sounding note.

Specify a Portamento Source Key number between 0 - 127.

When a Portamento Control message is received, the currently sounding pitch will change with a Portamento Time of 0 to the next note-on key on the same channel.

For example, the following settings would apply a portamento from note C3 to C4.

90H 3CH 7FH	C3 Note on
B0H 54H 3CH	Source key number set to C3
90H 48H 7FH	C4 Note on (When C4 is on, C3 is raised by a portamento to C4.)

1.2.18 Effect1 Depth (Reverb Send Level) (Control #091)

Messages which adjust the send level for the Reverb effect.

1.2.19 Effect3 Depth (Chorus Send Level) (Control #093)

Messages which adjust the send level for the Chorus effect.

1.2.20 Effect4 Depth (Variation Effect Send Level) (Control #094)

Messages which adjust the send level for the Variation effect.

If Variation effect uses System effect, this message sets the send level for the Variation effect. If it uses Insertion effect, this setting is invalid.

1.2.21 Data Increment (Control #096)

Decrement (Control #097) for RPN

Messages which increase or decrease the MSB value of pitch bend sensitivity, fine tune, or coarse tune in steps of 1. You are required to assign one of those parameters using the RPN in the external device in advance.

The data byte is ignored.

When the maximum value or minimum value is reached, the value will not be incremented or decremented further.

(Incrementing the fine tune will not cause the coarse tune to be incremented.)

1.2.22 NRPN (Non-Registered Parameter Number)LSB (Control #098)

NRPN (Non-Registered Parameter Number)MSB (Control #099)

Messages which adjust a voice's vibrato, filter, EG, drum setup or other parameter settings.

First send the NRPN MSB and NRPN LSB to specify the parameter which is to be controlled. Then use 1.2.4 Data Entry to set the value of the specified parameter.

Note that once the NRPN has been set for a channel, subsequent data entry will be recognized as the same NRPN's value change. Therefore, after you use the NRPN, you should set a Null (7FH, 7FH) value to avoid an unexpected result.

The following NRPN numbers can be received.

NRPN MSB	NRPN LSB	PARAMETER
01	08	Vibrato Rate
01	09	Vibrato Depth
01	0A	Vibrato Delay
01	20	Filter Cutoff Frequency
01	21	Filter Resonance
01	63	EG Attack Time
01	64	EG Decay Time
01	66	EG Release Time
14	rr	Drum Filter Cutoff Frequency
15	rr	Drum Filter Resonance
16	rr	Drum EG Attack Rate
17	rr	Drum EG Decay Rate
18	rr	Drum Pitch Coarse
19	rr	Drum Pitch Fine
1A	rr	Drum Level
1C	rr	Drum Pan
1D	rr	Drum Reverb Send Level
1E	rr	Drum Chorus Send Level
1F	rr	Drum Variation Send Level

*rr = Note number for each drum voice instrument.

1.2.23 RPN (Registered Parameter Number)LSB (Control #100)

RPN (Registered Parameter Number)MSB (Control #101)

Messages which offset, or add or subtract values from a Part's pitch bend sensitivity, tuning, or other parameter settings.

First send the RPN MSB and RPN LSB to specify the parameter which is to be controlled. Then use 1.2.21 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 an unexpected result.

The following RPN numbers can be received.

RPN MSB	RPN LSB	PARAMETER
00	00	Pitch Bend Sensitivity
00	01	Fine Tune
00	02	Coarse Tune
7F	7F	Null

1.2.24 Channel Mode Messages

The following Channel Mode Messages can be received.

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

1.2.24.1 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.

1.2.24.2 Reset All Controllers (Control #121)

The values of the following controllers will be reset to the defaults.

CONTROLLER	VALUE
Pitch Bend Change	0 (center)
Aftertouch	0 (off)
Modulation	0 (off)
Foot Controller	0 (min)
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	Number not specified; internal data will not change

* In Performance mode, 1 (on).

1.2.24.3 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.

1.2.24.4 Mono (Control #126)

Performs the same function as when an All Sounds Off message is received, and if the 3rd byte (mono number) is in the range of 0 - 16, sets the corresponding channel to Mono Mode (Mode 4 : m = 1).

1.2.24.5 Poly (Control #127)

Performs the same function as when an All Sounds Off message is received, and sets the corresponding channel to Poly Mode (Mode 3).

1.3 Program Change

Messages which 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.

1.4 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.

1.5 Polyphonic Key Pressure

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.

1.6 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.

2. SYSTEM MESSAGES

System messages are the data related to the overall system of the device.

2.1 System Exclusive Messages

System Exclusive messages control various functions of the CS1x, including master volume and master tuning, tone generator mode, effect type and various other parameters.

2.1.1 General MIDI Mode On

When General MIDI mode on is received, the tone generator mode will be changed to XG mode.

When this happens, the CS1x will receive the MIDI messages which are compatible with GM System Level 1, and consequently will not receive NRPN and Bank Select messages.

Since approximately 50ms is required to execute this message, be sure to leave an appropriate interval before the subsequent message.

F0 7E 7F 09 01 F7 (Hexadecimal)

2.1.2 Master Volume

When received, the Volume MSB will be effective for the System Parameter.

F0 7F 7F 04 01 ll mm F7 (Hexadecimal)

* mm(MSB) = appropriate volume value, ll(LSB) = ignored

2.1.3 XG System On

When this data is received, the CS1x will switch to XG mode and all the parameters will be initialized accordingly, and XG-compatible messages such as NRPN and Bank Select messages can be received.

Since approximately 50ms is required to execute this message, be sure to leave an appropriate interval before the subsequent message.

F0 43 1n 4C 00 00 7E 00 F7 (Hexadecimal)

*n = device number

TG300B Reset

F0 41 1n 42 12 40 00 7F 00 41 F7 (Hexadecimal)

*n = device number

2.2 Active Sensing (Receive only)

Once FE (Active Sensing) has been received, if no MIDI data is subsequently received for longer than an interval of approximately 300msec, the CS1x 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 FE is not monitored.

Refer to the MIDI Data Format in the "Data List" book for more information on the various messages.

Specifications

KEYBOARD	61 keys with Initial Touch		
TONE GENERATOR	AWM2 (Wave ROM 4.5MB)		
POLYPHONY	32 notes		
MULTI TIMBRE	16 (DVA)		
PERFORMANCE	128 Presets, 128 Users		
VOICE	Normal Voice	XG	480
		TG300B	579
	Voices For Performances		
	Drum Voice	XG	11
TG300B		10	
ARPEGGIATOR	30		
EFFECT	Reverb	11	
	Chorus	11	
	Variation	43	
CONTROLS	POWER, VOLUME, PITCH, MODULATION, Sound Control Knobs 6, SCENE 1/2, Numeric Keypad, ENTER, Mode Select (PERFORMANCE, MULTI, STORE, UTILITY), ARPEGGIATOR, SHIFT/OCTAVE, PART/LAYER +/-, PRESET, USER, PROGRAM +/-, Edit Parameter Rotary Switch, Parameter Value Up/Down buttons 10		
DISPLAY	LCD (Back Lit)		
TERMINALS	PHONES(Stereo Phone), OUTPUT(Phone): L(MONO)/R, DC IN, FOOT VOLUME, FOOT CONTROLLER, FOOTSWITCH, INPUT, TO HOST, HOST SELECT, MIDI IN/OUT/THRU		
POWER SUPPLY	AC adaptor PA-3B		
OUTPUT IMPEDANCE	Line: 10k Ω , Phones: 33 Ω		
DIMENSIONS	976(W) \times 285(D) \times 103(H)mm (38 3/8" \times 11 1/4" \times 4 1/16")		
WEIGHT	5.7kg (12 lbs., 9 oz.)		
ACCESSORIES	Yamaha AC Adaptor PA-3B Owner's Manual, Data List		

Specifications and descriptions in this owner's manual are for information purposes only. Yamaha Corp. reserves the right to change or modify products or specifications at any time without prior notice. Since specifications, equipment or options may not be the same in every locale, please check with your Yamaha dealer.

Troubleshooting

The following table provides troubleshooting hints and page references for some common problems. Most problems may be simply the result of incorrect settings. Before calling for professional service, refer to the troubleshooting advice below to see if you can find and correct the cause of the problem.

No sound.

- Is the volume set appropriately? (Page 6)
- When the Foot Controller is connected to the FOOT VOLUME jack, is the Foot Volume pressed down? (Page 8)
- Are the volume settings for each Layer/Part appropriate? (Page 33, 37)
- Are the effect settings appropriate? (Page 24, 49)
- Is the Bank set to off? (Page 33, 37)
- Is the receive channel set to off? (Page 42)
- Is the audio equipment connected appropriately? (Page 9)
- Is Local set to off? (Page 42)
- If you are playing back song data using an external device, are the volume related settings for the song appropriate?
- Are the Note Limit settings and/or Velocity Limit settings appropriate? (Page 27, 28)

No Arpeggiator sound.

- Are the settings for the Velocity Limit appropriate? Set Velocity Limit Low to "0" and Velocity Limit Hi to "127". (Page 28)

Distorted sounds.

- Are the effect settings appropriate? (Page 23, 34, 38)
- Is the volume level set too loud?

Small sounds.

- Is the MIDI volume or MIDI expression set too low?

Wrong pitch.

- Are the tuning-related parameters set to "0"? Check the Note Shift setting (page 27), Detune setting (page 27), Master Tuning (page 40) and Keyboard Transpose setting (page 40).

Sound is choppy and interrupted.

- The maximum polyphony of 32 notes (the number of notes that can be played simultaneously) has been exceeded. (Page 35, 39)

Sound Control Knobs do not work.

- Is a Scene key turned on? (Page 16)

Only one note sounds at a time.

- Is the play mode set to MONO? (Page 35, 39)

Cannot enter Store mode.

- Is Performance mode selected? (Page 44)

Error Messages

The following messages may appear during operation, indicating problems or incorrect operation. Follow the instructions in the explanations below to remedy the problem.

Battery Low

The memory-backup battery is low; memory cannot be backed up. Store the necessary data to a MIDI data storage device such as Yamaha MIDI Data Filer MDF2, and have the battery changed by your local Yamaha dealer or any other authorized Yamaha service personnel.

Device No.=off Error

Cannot send MIDI bulk data since the Device Number is set to off.

Device Number Error

Cannot receive MIDI bulk data, due to improper Device Number setting. Match the device numbers for both the CS1x and the external device.

TG-B Mode Error

When TG300B mode is accidentally selected by receiving a TG300B reset message from an external device, you cannot perform edit operations. Press PERFORMANCE or MULTI button to exit the TG300B mode.

Receiving

Displays when the CS1x receives the bulk data with the compatible format. Continue normal operation.

Rx Mode Error

Displays when receiving Performance bulk data in Multi Play mode or XG effect bulk in Performance mode.

Index

[–]/NO/QUICK PC button 7

A

About MIDI 53
AEG (Amplitude Envelope Generator) 30
ARPEGIATOR 11, **22**
ARPEGIATOR button 6
ASSIGN 1 PARAM (Parameter) 26
ASSIGN 2 29
ASSIGN CTRL NO (Assign Control Change Number) 43

B

BANK **33**, 37
BULK DUMP (Performance Bulk Dump) 42

C

Common Edit 1 22
Common Edit 2 25

D

DC IN jack 8
Demo Song 11
DEVICE NO (Device Number) 42
Drum Voices 37

E

Edit Parameter Rotary Switch 7
EFFECT **23**, 34, 38
Effect Data Assign Table 51
Effect Parameter List 49
Effect Type List 49
Effects (System and Insertion) 47
ENTER/YES button 7
Error Messages 59

F

Factory Settings 46
FC (Foot Control) 26
FEG (Filter Envelope Generator) 31
FILTER **34**, 38
FOOT CONTROLLER jack 8
FOOT VOLUME jack 8
FOOTSWITCH jack 8

H

HOST SELECT switch 8

I

INPUT jack 8

K

KBD TRANS (Keyboard Transpose) 40

L

Layer Edit 1 27
Layer Edit 2 30
Layer Edit 3 31
Layer Edit 4 33
Layers 16
LCD 7
LFO (Low Frequency Oscillator) 30
LOCAL (Local On/Off) 42

M

MASTER TUNE 40
MIDI 41
MIDI terminals 8
Mode Select Switches 7
MODULATION wheel 7

Multi 17
Multi Part Edit 36
Multi Play Mode 17, **36**
Multi Structure 17
MW (Modulation Wheel) 25

N

NOTE 27
Normal Voices 37
Numeric Keypad 7

O

OUTPUT jacks 8

P

P BEND RANGE (Pitch Bend Range) 25
PAN **34**, 38
Parameter Value UP/DOWN Buttons 7
PART/LAYER button 7
PEG (Pitch Envelope Generator) 32
PERFORM LEVEL 23
PERFORM NAME 24
Performance Edit mode 21
Performance Mode 14, **20**
Performance Play mode 20
Performance Structure 16
PHONES jack 8
PITCH wheel 7
POLY/MONO **35**, 39
PORTA (Portamento) 26
POWER switch 8
PRESET button 7
PROGRAM **33**, **37**
PROGRAM [–]/[+] button 7

Q

Quick Program Change 21

R

RCV CH (Receive Channel) 42

S

SCENE 1 & 2 buttons 6
Scenes **16**, 45
SHIFT button 7
SOUND CONTROL KNOBS 6
Store Mode 44
SYSTEM 40

T

TG300B Mode 37
TO HOST terminal 8
TRANS CH (Transmit Channel) 41
TUNE 27

U

USER button 7
Utility Mode 40

V

VEL (Velocity) 28
VEL CURVE (Velocity Curve) 41
VEL FIX (Velocity Fix) 41
VOLUME **33**, 37
VOLUME knob 6

X

XG Operation 17

For details of products, please contact your nearest Yamaha or the authorized distributor listed below.

Pour plus de détails sur les produits, veuillez-vous adresser à Yamaha ou au distributeur le plus proche de vous figurant dans la liste suivante.

Die Einzelheiten zu Produkten sind bei Ihrer unten aufgeführten Niederlassung und bei Yamaha Vertragshändlern in den jeweiligen Bestimmungsländern erhältlich.

Para detalles sobre productos, contacte su tienda Yamaha más cercana o el distribuidor autorizado que se lista debajo.

NORTH AMERICA

CANADA

Yamaha Canada Music Ltd.
135 Milner Avenue, Scarborough, Ontario,
M1S 3R1, Canada
Tel: 416-298-1311

U.S.A.

Yamaha Corporation of America
6600 Orangethorpe Ave., Buena Park, Calif. 90620,
U.S.A.
Tel: 714-522-9011

MIDDLE & SOUTH AMERICA

MEXICO

**Yamaha De Mexico S.A. De C.V.,
Departamento de ventas**
Javier Rojo Gomez No.1149, Col. Gpe Del
Moral, Deleg. Iztapalapa, 09300 Mexico, D.F.
Tel: 686-00-33

BRASIL

Yamaha Musical Do Brasil LTDA.
Ave. Reboucas 2636, São Paulo, Brasil
Tel: 011-853-1377

PANAMA

Yamaha De Panama S.A.
Edificio Interseco, Calle Elvira Mendez no.10,
Piso 3, Oficina #105, Ciudad de Panama, Panama
Tel: 507-69-5311

OTHER LATIN AMERICAN COUNTRIES AND CARIBBEAN COUNTRIES

Yamaha Music Latin America Corp.
6101 Blue Lagoon Drive, Miami, Florida 33126,
U.S.A.
Tel: 305-261-4111

EUROPE

THE UNITED KINGDOM

Yamaha-Kemble Music (U.K.) Ltd.
Sherbourne Drive, Tilbrook, Milton Keynes,
MK7 8BL, England
Tel: 01908-366700

IRELAND

Danfay Ltd.
61D, Sallynoggin Road, Dun Laoghaire, Co. Dublin
Tel: 01-2859177

GERMANY/SWITZERLAND

Yamaha Europa GmbH.
Siemensstraße 22-34, 25462 Rellingen,
F.R. of Germany
Tel: 04101-3030

AUSTRIA

Yamaha Music Austria
Schleiergasse 20, A-1100 Wien Austria
Tel: 0222-60203900

THE NETHERLANDS

Yamaha Music Nederland
Kanaalweg 18G, 3526KL, Utrecht, The Netherlands
Tel: 030-2828411

BELGIUM

Yamaha Music Belgium
Keiberg Imperiastraat 8, 1930 Zaventem, Belgium
Tel: 02-7258220

FRANCE

**Yamaha Musique France,
Division Professionnelle**
BP 70-77312 Marne-la-Valée Cedex 2, France
Tel: 01-64-61-4000

ITALY

**Yamaha Musica Italia S.P.A.,
Combo Division**
Viale Italia 88, 20020 Lainate (Milano), Italy
Tel: 02-935-771

SPAIN

Yamaha-Hazen Electronica Musical, S.A.
Jorge Juan 30, 28001, Madrid, Spain
Tel: 91-577-7270

PORTUGAL

Valentim de Carvalho CISA
Estrada de Porto Salvo, Paço de Arcos 2780 Oeiras,
Portugal
Tel: 01-443-3398/4030/1823

GREECE

Philippe Nakas S.A.
Navarinou Street 13, P.Code 10680, Athens, Greece
Tel: 01-364-7111

SWEDEN

Yamaha Scandinavia AB
J. A. Wettergrens Gata 1
Box 30053
S-400 43 Göteborg, Sweden
Tel: 031 89 34 00

DENMARK

YS Copenhagen Liaison Office
Generatorvej 8B
DK-2730 Herlev, Denmark
Tel: 44 92 49 00

FINLAND

Warner Music Finland OY/Fazer Music
Aleksanterinkatu 11, P.O. Box 260
SF-00101 Helsinki, Finland
Tel: 0435 011

NORWAY

Narud Yamaha AS
Grini Næringspark 17
N-1345 Østerås, Norway
Tel: 67 14 47 90

ICELAND

Skifan HF
Skeifan 17 P.O. Box 8120
IS-128 Reykjavik, Iceland
Tel: 525 5000

OTHER EUROPEAN COUNTRIES

Yamaha Europa GmbH.
Siemensstraße 22-34, 25462 Rellingen, F.R. of
Germany
Tel: 04101-3030

AFRICA

**Yamaha Corporation,
International Marketing Division**
Nakazawa-cho 10-1, Hamamatsu, Japan 430
Tel: 053-460-2312

MIDDLE EAST

TURKEY/CYPRUS

Yamaha Europa GmbH.
Siemensstraße 22-34, 25462 Rellingen,
F.R. of Germany
Tel: 04101-3030

OTHER COUNTRIES

**Yamaha Corporation,
International Marketing Division**
Nakazawa-cho 10-1, Hamamatsu, Japan 430
Tel: 053-460-2312

ASIA

HONG KONG

Tom Lee Music Co., Ltd.
11/F., Silvercord Tower 1, 30 Canton Road,
Tsimshatsui, Kowloon, Hong Kong
Tel: 730-1098

INDONESIA

**PT. Yamaha Music Indonesia (Distributor)
PT. Nusantik**
Gedung Yamaha Music Center, Jalan Jend. Gatot
Subroto Kav. 4, Jakarta 12930, Indonesia
Tel: 21-520-2577

KOREA

Cosmos Corporation
#131-31, Neung-Dong, Sungdong-Ku, Seoul
Korea
Tel: 02-466-0021~5

MALAYSIA

Yamaha Music Malaysia, Sdn., Bhd.
16-28, Jalan SS 2/72, Petaling Jaya, Selangor,
Malaysia
Tel: 3-717-8977

PHILIPPINES

Yupangco Music Corporation
339 Gil J. Puyat Avenue, P.O. Box 885 MCPO,
Makati, Metro Manila, Philippines
Tel: 819-7551

SINGAPORE

Yamaha Music Asia Pte., Ltd.
Blk 17A Toa Payoh #01-190 Lorong 7
Singapore 1231
Tel: 354-0133

TAIWAN

Kung Hsue She Trading Co., Ltd.
No. 322, Section 1, Fu Hsing S. Road,
Taipei 106, Taiwan. R.O.C.
Tel: 02-709-1266

THAILAND

Siam Music Yamaha Co., Ltd.
865 Phornphrapha Building, Rama I Road,
Patumwan, Bangkok 10330, Thailand
Tel: 2-215-3443

THE PEOPLE'S REPUBLIC OF CHINA AND OTHER ASIAN COUNTRIES

**Yamaha Corporation,
International Marketing Division**
Nakazawa-cho 10-1, Hamamatsu, Japan 430
Tel: 053-460-2317

OCEANIA

AUSTRALIA

Yamaha Music Australia Pty. Ltd.
17-33 Market Street, South Melbourne, Vic. 3205,
Australia
Tel: 3-699-2388

NEW ZEALAND

Music Houses of N.Z. Ltd.
146/148 Captain Springs Road, Te Papapa,
Auckland, New Zealand
Tel: 9-634-0099

COUNTRIES AND TRUST TERRITORIES IN PACIFIC OCEAN

**Yamaha Corporation,
International Marketing Division**
Nakazawa-cho 10-1, Hamamatsu, Japan 430
Tel: 053-460-2317

SPECIAL MESSAGE SECTION (USA)

This product utilizes batteries or an external power supply (adapter). DO NOT connect this product to any power supply or adapter other than one described in the manual, on the name plate, or specifically recommended by Yamaha.

WARNING: Do not place this product in a position where anyone could walk on, trip over, or roll anything over power or connecting cords of any kind. The use of an extension cord is not recommended! IF you must use an extension cord, the minimum wire size for a 25' cord (or less) is 18 AWG. NOTE: The smaller the AWG number, the larger the current handling capacity. For longer extension cords, consult a local electrician.

This Product should be used only with the components supplied or; a cart, rack, or stand that is recommended by Yamaha. If a cart, etc., is used, please observe all safety markings and instructions that accompany the accessory product.

SPECIFICATIONS SUBJECT TO CHANGE:

The information contained in this manual is believed to be correct at the time of printing. However, Yamaha reserves the right to change or modify any of the specifications without notice or obligation to update existing units.

This product, either alone or in combination with an amplifier and headphones or speaker/s, may be capable of producing sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist. **IMPORTANT:** The louder the sound, the shorter the time period before damage occurs.

Some Yamaha products may have benches and/or accessory mounting fixtures that are either supplied with the product or as optional accessories. Some of these items are designed to be dealer assembled or installed. Please make sure that benches are stable and any optional fixtures (where applicable) are well secured BEFORE using.

Benches supplied by Yamaha are designed for seating only. No other uses are recommended.

NOTICE:

Service charges incurred due to lack of knowledge relating to how a function or effect works (when the unit is operating as designed) are not covered by the manufacturer's warranty, and are therefore the owners responsibility. Please study this manual carefully and consult your dealer before requesting service.

ENVIRONMENTAL ISSUES:

Yamaha strives to produce products that are both user safe and environmentally friendly. We sincerely believe that our products and the production methods used to produce them, meet these goals.

In keeping with both the letter and the spirit of the law, we want you to be aware of the following:

Battery Notice:

This product MAY contain a small non-rechargeable battery which (if applicable) is soldered in place. The average life span of this type of battery is approximately five years. When replacement becomes necessary, contact a qualified service representative to perform the replacement.

This Product may also use "household" type batteries. Some of these may be rechargeable. Make sure that the battery being charged is a rechargeable type and that the charger is intended for the battery being charged.

When installing batteries, do not mix old batteries with new, or with batteries of a different type. Batteries MUST be installed correctly. Mismatches or incorrect installation may result in overheating and battery case rupture.

Warning:

Do not attempt to disassemble, or incinerate any battery. Keep all batteries away from children. Dispose of used batteries promptly and as regulated by the laws in your area.

Note: Check with any retailer of household type batteries in your area for battery disposal information.

Disposal Notice:

Should this Product become damaged beyond repair, or for some reason its useful life is considered to be at an end, please observe all local, state, and federal regulations that relate to the disposal of products that contain lead, batteries, plastics, etc. If your dealer is unable to assist you, Please contact Yamaha directly.

NAME PLATE LOCATION:

The name Plate is located on the bottom of the product. The model number, serial number, power requirements, etc., are located on this plate. You should record the model number, serial number, and the date of purchase in the spaces provided below and retain this manual as a permanent record of your purchase.

Model _____

Serial No. _____

Purchase Date _____

PLEASE KEEP THIS MANUAL

FCC INFORMATION (U.S.A)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!

This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.

2. IMPORTANT: When connecting this product to accessories and/or another product use only high quality shielded cables.

Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the user's manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures :

Relocate either this product or the device that is being affected by the interference.

Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

In the case of radio or TV interference, relocate/reorient the antenna.

If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

If these corrective measures do not produce satisfactory results, please contact the your local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA 90620

The above statements apply ONLY to those products distributed by Yamaha Corporation of America or its subsidiaries.

ADVARSEL!

Lithiumbatteri—Eksplodingsfare ved fejlig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

VARNING

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

NEDERLAND NETHERLAND

- Dit apparaat bevat een lithium batterij voor geheugen back-up.
- This apparatus contains a lithium battery for memory back-up.
- Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat aan het einde van de levensduur afdankt of de volgende Yamaha Service Afdeling:
Yamaha Music Nederland Service Afdeling
Kanaalweg 18-G, 3526 KL UTRECHT
Tel. 030-2828425
- For the removal of the battery at the moment of the disposal at the end of the service life please consult your retailer or Yamaha Service Center as follows:
Yamaha Music Nederland Service Center
Address : Kanaalweg 18-G, 3526 KL UTRECHT
Tel : 030-2828425
- Gooi de batterij niet weg, maar lever hem in als KCA.
- Do not throw away the battery. Instead, hand it in as small chemical waste.