CHAPTER 6

EDITING PROGRAMS

OVERVIEW

Synthesizer programming is the art and science of shaping sounds in a particular way by altering the parameters of various modules. Like music itself, learning synth programming is an ongoing process. Although this manual presents information about synthesizer programming, no manual can offer a complete course in programming (at least for a price that customers would be willing to pay!).

If you're new to synthesizer programming, the best way to learn is to adjust different parameters as you play to discover how different parameter values affect the sound. Also, become familiar with the signal and modulation flow within the QS6 (as shown in the various block diagrams included in this manual) so that you can understand the many ways in which you can process a signal as it works its way from oscillator to output.

THE "NORMALIZED" SYNTH VOICE

The first synthesizers were comprised of various hardware modules, some of which generated signals, and some of which processed those signals. These were designed to be general-purpose devices since nobody was quite sure how they would be applied; some engineers used them as signal processors, while keyboard players treated them as musical instruments. Therefore, *patch cords* connected the inputs and outputs of the various signal generating and processing modules (which is why particular synth sounds were called *patches)*. Changing a patch involved manually repositioning patch cords and adjusting knobs and switches; recreating a patch required writing down all the patch settings on paper so they could be duplicated later. Even then, due to the imprecision of analog electronics, the patch might not sound exactly the same.

Over the years, certain combinations of modules seemed to work better than others, and since patch cords were troublesome to deal with, eventually these modules were wired together in a "normalized" configuration. Synthesizers such as the MiniMoog, Prophet-5, and others eliminated the need for patch cords by containing a normalized collection of sound modules (including oscillators, filter, envelopes, LFOs, etc.).

Like its "big brothers" (the QuadraSynth keyboard and S4 sound module), the QS6 offers the best of both worlds. The most commonly-used, normalized configurations are built-in to every program for ease of programming. In addition, the QS Modulation Matrix gives back much of the flexibility of a modular synthesizer, allowing you to map various modulation sources to multiple destinations for special needs. If you're a beginner, all of the normalized pathways are easy to find; as you gain experience you can explore more advanced features.

HOW THE QS6 GENERATES SOUND

The QS6 uses custom integrated circuits, developed by the Alesis engineering team specifically for the QS6. These resemble the types of chips used in computers and other digital devices. In fact, you can think of the QS6 as a special-purpose computer designed to generate and process audio. Although the user interface maintains the metaphor of “modules,” in fact all sounds are simply a set of numbers reflecting how you’ve programmed the various sound parameters. For example, when you change the filter cutoff frequency, you’re not actually messing with a filter; you’re telling the computer to simulate the effect of messing with a filter.

Each “module” is represented by parameters that appear on one or more display pages. The [s VALUE]/[VALUE t] buttons and the [CONTROLLER A] slider let you change these parameters. All “patching” is done via software, so the only patch cords you need are those that go to your mixer or amplifier.

You can take a “snapshot” of the QS6’s parameters and save this in memory as a *program.* The QS6 comes with 512 factory preset programs, and 128 user-editable programs.

PROGRAM SOUND LAYERS

The simplest method of programming is to take one voice, process it through the filter and amp sections, and (if desired) add some effect to it. However, more elaborate Programs usually consist of 2 to 4 layers, with each layer making its own distinct contribution to the sound, for example:

- An organ program with Program Sound 1 set to a sustained organ waveform, and Program Sound 2 set to a percussion waveform with a fast decay.
- A piano program with one layer tuned normally, and a second layer tuned an octave higher.
- A synthesizer program with one layer set to a sharp attack waveform, a second layer set to an acoustic waveform, and a third layer with a slow-attack string waveform.

This may remind you of Mix Play Mode, where playing the keyboard can sound up to 16 different Programs at once. There are many similarities. In Mix Play Mode, you can make the same kind of layered Mix as you can with the four sounds of a Program. But there are differences:

Use Program Layers:

- If you want multiple sounds to respond to a single MIDI channel. For example, if you need to play a layered synthesizer sound that was assembled in Mix Play Mode instead of Program Play Mode, you must send 3 Note On messages from your sequencer (one for each channel) for every note; a layered program would need only one Note On message.
- When layers of a Program are designed to be used together, and the individual layers by themselves wouldn't be used alone (for example, the percussion layer of the organ sound).

Use Mix Play Mode:

- When you want to layer more than four voices. In Mix Play Mode, it is possible (though not advisable) to stack all 64 voices onto a single key.

- When each sound is likely to be used by itself by other setups. For example, if you are programming three different keyboard splits, each of which uses the same left-hand bass patch, it makes sense to use Mix Play Mode.

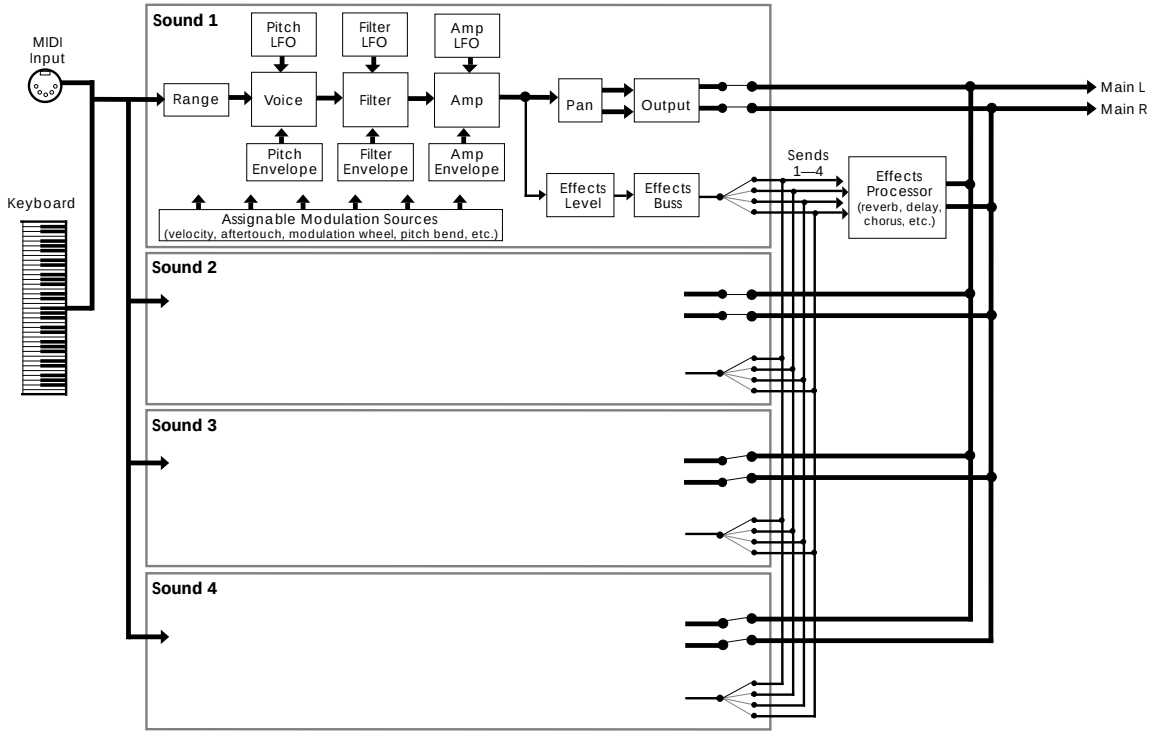
- When you want different sounds to respond to different MIDI channels.

QS6 SIGNAL FLOW

THE FOUR SOUNDS OF A PROGRAM

Each Program is made up of at least one to four sounds. A sound is made up of several components including a voice (the original sound material) which passes through a low-pass filter and an amplifier. The voice, filter and amp modules each have direct modifiers (Pitch LFO, Filter LFO, Amp Envelope) which affect how each will function in the Program. You can layer these sounds together, or divide them into regions of the keyboard, or a combination of these things.

The following diagram illustrates the signal flow within each QS6 Program.



When editing a Program, use the [00] - [30] buttons to select the sound layer you want to edit.

Let's look at each module's function in detail.

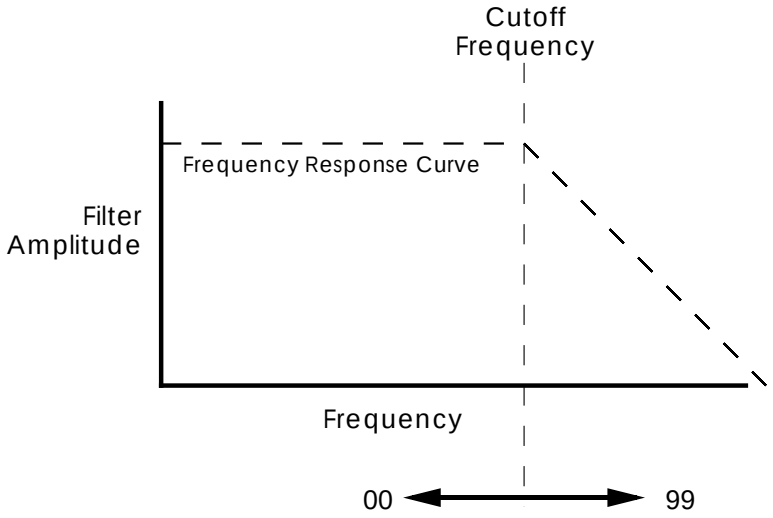
VOICE

This digitally-based oscillator provides the actual raw sounds from the 8 megabyte library of on-board samples. The oscillator's pitch can be tuned to a fixed frequency or *modulated.* Modulation is the process of varying a parameter dynamically over time; the oscillator pitch can be modulated by envelope, keyboard, pressure, pedal, LFO, and other control sources (described later).

Note that the waveforms in the QS6 are different from those found in samplers or many sample-playback units. Because the QS6 has its own filter module and amplitude module for each voice, the pure waveforms are relatively bright--as bright as the original instrument can be--and have a constant sustaining amplitude, like an organ. So if you listen to a piano voice without setting the filter or amp to the correct settings, it won't decay after it is hit, as you might expect. This gives you the freedom to create the timbre and dynamics you want, instead of being chained to the parameters of the original sample.

LOWPASS FILTER

A lowpass filter varies a signal's harmonic content by progressively increasing attenuation above a specified *cutoff frequency.* The higher frequencies are filtered, while the lower frequencies are allowed to “pass-thru.” When the cutoff frequency is set high, the sound becomes brighter; when set low, the sound becomes bassier since fewer harmonics are present.



The cutoff parameter changes the frequency at which the high-frequency response starts to roll off. Lower values give a lower cutoff frequency. A value of 00 will cut all sound off.

Static (non-changing) filter settings can be useful, but varying the filter cutoff dynamically over time often produces more interesting effects. Modulating with velocity produces brighter sounds with louder dynamics, which produces a more accurate acoustic instrument simulation. Modulating with an envelope can create a pre-defined change in harmonic structure, such as having a brighter attack and bassier decay.

AMP

Each voice/filter combination is followed by an amplifier whose level can be controlled by a variety of modulation sources. This allows for creating sounds with percussive or slow attacks, particular types of decays, tremolo, etc.

Filter and amp settings can interact. If the filter cutoff is extremely low, then no signal will get through, no matter how the amp is set. Similarly, setting the amp for a short decay won't let you hear any filtering set for a longer decay. This is because the volume will reach zero before the filter decay finishes.

ABOUT MODULATION

Modulation modifies some aspect of a sound over time. Since oscillators make static sounds (unlike acoustic instruments, whose timbre and dynamics change—often radically—over the duration of a note), modulation is the key to making rich and expressive sounds. The vibrato of a flute, the expression pedal of an organ, a wah-wah pedal on a guitar--all of these are examples of modulation. You're probably familiar with the mod wheel of a synthesizer, which typically adds vibrato to a Program as it is raised. But in synthesizer programming, modulation is used to control even the basic characteristics of a voice: its attack, decay, and release times, for example. Every box in the signal diagram on page 51 pointing towards the Voice, Filter, or Amp boxes is a *modulation source.* The amount of modulation, the time it takes place, and what controls (such as key velocity, footpedals, aftertouch, mod wheel etc.) affect it are important parameters in every Program. The QS6 provides the modulation flexibility of patch cord-based instruments, but with the convenience and ease of use of digital technology.

With some parameters, the modulation amount can be positive or negative. A positive control signal increases the value of the parameter being controlled. A negative control signal *decreases* the value of the parameter being controlled. Setting modulation to 00 turns off the modulation source. *Example:* Keyboard velocity can either make a sound brighter the harder you play, or make it less bright, or have no effect on the Filter at all. You have the freedom to set modulation any way you want, even in ways that are the opposite of what they would be on an acoustic instrument.

If a "baseline" setting exists for a parameter, modulation amounts add or subtract values from the existing setting. However, modulation cannot force a value beyond its maximum range. For example, if the Amp is already at its minimum value (lowest level), you could apply positive modulation to raise the level. But applying negative modulation will not affect the Amp level, since it's already at its lowest value and cannot go any lower.

The QS6 lets you assign several modulation sources to one modulation "target" parameter, which allows for interaction between two modulation signals. *Example:* If the Amp parameter responds to both the envelope generator and a pedal, the parameter will follow the general envelope shape but will also be influenced by the pedal.

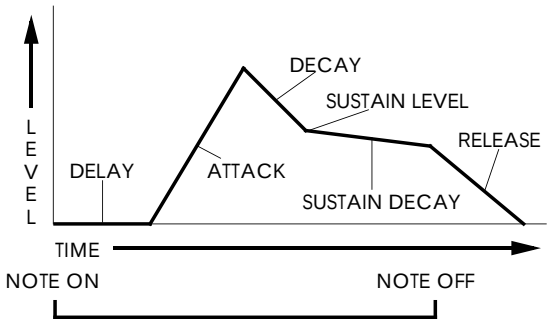
LFO (LOW FREQUENCY OSCILLATOR)

The pitch, filter, and amp modules each have a dedicated LFO module for modulation. The term LFO stands for low frequency oscillator, and comes from how modulation was created in the early synth days (an oscillator set to a low frequency could modulate some aspect of the sound; routing the LFO to the pitch, for example, would create vibrato). The LFO creates a cyclic (periodic) modulation; this amount can be constant and/or varied with a variety of modulation sources (mod wheel is one of the most popular). Each LFO has a waveform shape and speed, along with other controls.

ENVELOPES

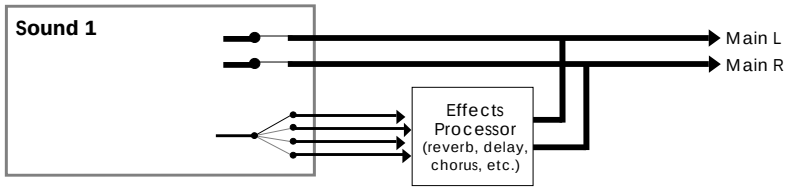
Envelope generators provide a modulation signal that varies over time, from the time you strike the key until after you let go. There are three independent envelope generators (for pitch, filter, and amp) in each Program Sound. An envelope generator has different effects on different modules. *Example:* The Amp Envelope creates level changes. Amplitude that decays over time creates percussive effects (plucked strings, drums, etc.). Amplitude that increases over time gives the effect of brass, woodwind, and some bowed instruments.

Each envelope generator has the standard attack, decay, sustain, and release parameters found on most synthesizers, along with delay, sustain decay, and different triggering options.



ABOUT SIGNAL PROCESSING

The QS6 features a signal processing section based on the Alesis QuadraVerb 2. It is a complete digital signal processing unit with four input buses, simultaneous multiple effects, and flexible signal routing.



Effects parameters are edited separately from either the Program or the Mix, using Effects Edit Mode (more in Chapter 6). In Program Edit Mode, each of the four sounds in the Program has its own Effect Level control and can be assigned to any one of the four effect buses. Effects settings, Effect Level and Bus information are saved with the Program when you store it back into memory.

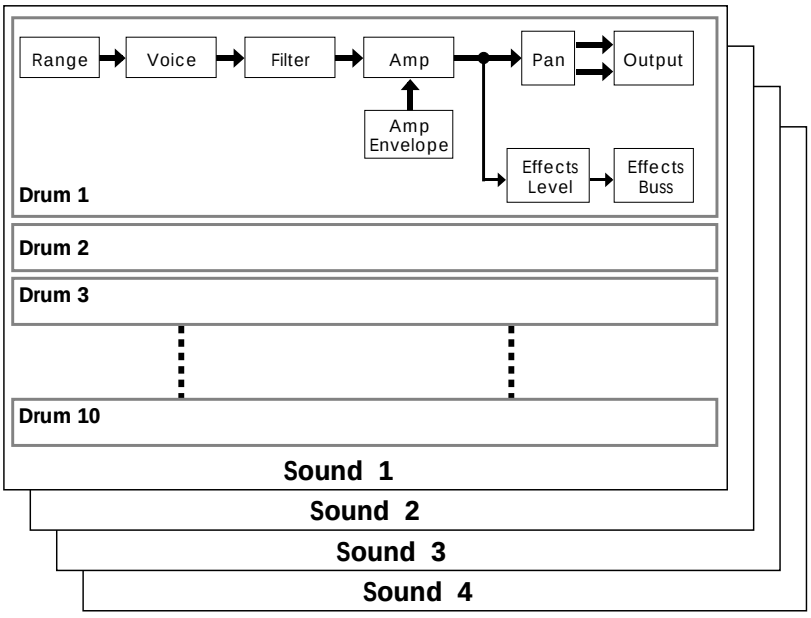
DRUM MODE

Any one or all of the four sounds in a Program can be put into Drum Mode. The Drum Mode parameter is found in the Misc. Function (see last section of this chapter). Note that Drum Mode isn't the only way to hear drums or percussion from a Program. In Standard mode, if you select a kit (such as "Rock Kit 1") as the voice of a Program sound, an entire arrangement of preset, pre-mapped drum sounds will be assigned across the keyboard. If you select a single drum (such as "Timpani") as the voice, that single drum sound will sound across the keyboard range, with a different pitch on each note (the original sample pitch will appear on C3).

However, Drum Mode changes the nature of the VOICE function, allowing you to make up your own drum kit from a selection of over 80 different samples: 7 kicks, 8 snares, 4 hi-hats, 14 toms, 5 cymbals, 31 percussion, 17 percussion effects and 3 synth waves. Plus, there are 44 rhythm beats to choose from (pre-sequenced drum grooves). You can map any of these samples to any note on the keyboard that does not already have a drum assigned to it in that layer. When a sound is in Drum Mode, you can assign 10 different drum sounds to 10 different keys in that layer. If all four sounds in a Program are placed in Drum Mode, you could assemble 40 drum sounds. In Drum mode, individual drums cannot be "stretched" across the entire range of the keyboard -- each occupies a maximum of three keys.

Each of the 10 drum sounds has its own set of parameters in each of the functions in the display (Pitch, Filter, Range, Effects Level, etc.). You can use the [0] – [9] buttons to select which one of the 10 drum sounds to edit in each Function Group ([40] – [120] buttons).

Here is a block diagram of a sound in Drum Mode.

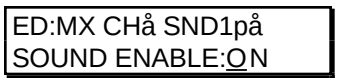


When Drum Mode is enabled, the sound will have fewer parameters for editing. Consequently, not all Function buttons will respond when pressed as when Drum Mode is turned off. Specifically, the LFOs and all Envelopes (with the exception of the Amp Envelope) are unavailable. In addition, the parameters in most other functions will differ.

PROGRAM EDIT FUNCTIONS

To edit a Program you must select Program Edit mode. This is done by pressing the [EDIT SELECT] once from Program Play Mode (each time you press [EDIT SELECT] in Program Mode, the display cycles between Program Edit and Effects Edit Modes). When editing a Program in Program Mode, the letters “ED:PRG” will appear in the display’s edit status section (upper-left corner):

A Program may also be edited from within a Mix. This requires that you press the [EDIT SELECT] button twice from Mix Play Mode (each time you press [EDIT SELECT] in Mix Mode, the display cycles between Mix Edit, Program Edit and Effects Edit Modes). When editing a Program in Mix Mode, the letters “ED:MX CH” will appear in the display’s edit status section (upper-left corner), with the channel number that is being edited immediately following:



VOICE

The Voice function (press [40]) is the most fundamental part of Program editing. It is where you choose the particular sample that forms the basis of a sound. To avoid scrolling through long lists of samples (remember, there are 8 megabytes of sounds in here!), sounds are divided into groups. After selecting the group, you then select the sound within the group.

Sound Enable — Page 1

This is the master on/off switch for the selected sound (1–4) of the current Program.

To avoid using up polyphony unnecessarily, set Sound Enable to OFF for any sounds that will not be used in a Program. Turning sounds off is also a convenient way to isolate a particular sound you are editing. When the sound being edited is disabled, the upper display will show the word “sound” in lowercase letters. When the sound being edited is enabled, the word “SOUND” will appear in uppercase letters. When editing a Program from Mix Mode, the words will letters will appear as “SND” when a sound is enabled, and “snd” when disabled.

TIP: A quick way to turn a sound on and off from anywhere within Program Edit Mode is to hold the corresponding Sound button [00]–[30] and press [t VALUE] to disable or [VALUE s] to enable. *Example:* Holding [00] and pressing [t VALUE] will disable sound 1.

Sound Type — Page 2

This determines whether a Sound layer is going to be in Keyboard Mode or Drum Mode. Drum Mode allows you to assign individual drum sounds to individual keys. To Program a sound in Drum Mode, refer to the next section “Programming Drum Sounds” on page 78.

Sound Group (17 options) Page 3

Choose from among 16 different sample groups (see chart below).

Sound Page 4

Selects one of the available samples by name from the selected group, or OFF (no sample selected). Each group has a variety of samples from which you can choose, although some groups (such as waves) have more samples than others.

Below and on the following page, you'll find a chart listing the various samples in their respective groups.

Group	Voice
Piano	GrandPiano, Dark Piano, BritePiano, PianoModul, NoHamrGrnd, NoHamrBrit, VelAttkPno, VeloPiano1, VeloPiano2, PianoKnock, BriteRoads, Dark Roads, Soft Roads, VeloRoads1, VeloRoads2, VeloRoads3, BrtRdsWave, DrkRdsWave, SftRdsWave, Wirlser, Worlser V1, Wurlser V2, WurlserWav, FM Piano, FM Tines, Soft Tines, VelAtkTine, Vel FM Pno, Clavinet, Harpsicord, VAtkHarpsi, HarpsiWave
Chromatic	Glock, Xylophone, Marimba Hd, Marimba Sf, MarimbaVel, Vibes, Ice Block, Brake Drum, FmTblrBell, FMTub/Null, TubulrWave, TubWv,Null,
Organ	FullDrwbar, Rock Organ, Perc Organ, 16' Drawbar, 5 1/3' bar, 8' Drawbar, 4' Drawbar, 2 2/3' bar, 2' Drawbar, 1 3/5' bar, 1 1/3' bar, 1' Drawbar, Percus 2nd, Percus 3rd, Percus Wav, HollowWave, ChurchOrgn, Principale, Positive, 60's Combo,
Guitar	SteelStrng, NylonGuitr, Nylon/Harm, Hylon/Harp, JazzGuitar, SingleCoil, Sngle/Mute, DoubleCoil, DCoil/Harm, DCoil/Jazz, D/S Coil, MicroGuitr, PwrH/MGtr1, PwrH/MGtr2, MuteGuitar, Mute Velo, Metal Mute, MGtr/MtlMt, MtlMut/Hrm, Fuzz Wave, ClsHarmncs,ElecHarmnc, Pwr Harm 1, Pwr Harm 2, Pwr Harm 3, PwrHrmVel1, PwrHrmVel2, PwrHrmVel3,
Bass	StudioBass, Studio&Hrm, Studio/Hrm,Slp/Studio, Slap Bass, Slap&Harm, Slap/Harm, Slap/Pop, Pop/Slap, Bass Pop, Pop/Harm, Harm/Pop, JazzFingrd, Fingr&Harm, JazzPicked, Pickd&Harm, Jazz Velo, Muted Bass, Stik Bass, Stik&Harm, Stik/Harm, Fretless, Frtls&Harm, AcousBass1, AcoBs1&Hrm, AcousBass2, AcoBs2&Hrm, VelAcoBass, 3-VelBass1, 3-VelBass2, 3-VelBass3, 3-VelBass4, BassHarmnc
String	StringEnsm, AttkString, Violin, Cello, Pizz Sectn, Pizz Split, Strng/Pizz, Pizz/Strng, Harp
Brass	Brass Ensm, Trumpet, MuteTrumpt, Trombone, FrenchHorn, Bari Horn, Tuba,
Wdwind	Bassoon, Oboe, EnglishHrn, Clarinet, Bari Sax, BrthyTenor, Alto Sax, SopranoSax, Velo Sax, Flute, FluteWave, Shakuhachi, PanPipe Hd, PanPipe Md, PanPipe Sf, PanPipeVel, PanWave, BottleBlow, BottleWave, Wood Chiff
Synth	J Pad, M Pad, X Pad, Velo Pad 1, Velo Pad 2, Velo Pad 3, AcidSweep1, AcidSweep2, AcidSweep3, AcidSweep4, AcidSweep5, VeloAcid 1, VeloAcid 2, VeloAcid 3, VeloAcid 4, AnalogSqr1, AnalogSqr2, AnalogSqrV, Sync Lead, Seq Bass, SeqBass Vel, Tek Bass, FatSynBass, TranceBas1, TranceBas2, VeloTrance, FilterBass, FM Bass, FM/FiltVel

Wave	Pure Sine, 10% Pulse, 20% Pulse, 50% Pulse, Velo Pulse, Mini Saw, Saw Fltr 1, Saw Fltr 2, Saw Fltr 3, Saw Fltr 4, RezSaw UK, RezSaw USA, Acid Saw, Velo Saw1, Velo Saw2, Velo Saw3, Velo Saw4, Velo Saw5, AcidRezSqr, VelAcidWav, MiniSquare, Sqr Fltr 1, Sqr Fltr 2, Velo Sqr, Mini Tri, Tri Filter, Velo Tri, Rectanglar, Hard Sync, HSync/Rect, Additive 1, Additive 2, VeloAdditv, Digital 1, Digital 2, Digital 3, Digital 4, Science 1, Science 2, Science 3, Science 4, VelScience, Metal Wave, Inharmonc1, Inharmonc2
Noise	WhiteNoise, Spectral 1, Spectral 2, Crickets, Rain Noise, VeloNoise1, VeloNoise2, VeloNoise3, Noise Loop, Bit Field
Voice	VocalAhhs, Soft Ahhs, Aahs Wave, VocalOohs, Soft Oohs, Oohs/Ahhs, Ahhs/Oohs, Whistle
Ethnic	Sitar, Sitar Wave, Shamisen, Koto, DulcimerHd, DulcimerMd, DulcimerSf, DulcimrVel, DulcmrWave, EuroAccrdn, Harmonia, Banjo, Kalimba, Steel Drum, Tuned Pipe, Asian Drum, Waterphone
Drums	StndrdKit, Rock Kit 1, Rock Kit 2, Dance Kit, Brush Kit, ElctricKit, Tek Kit, Rap Kit 1, Rap Kit 2,IndustrlKit, Metal Kit, HvyMtl Kit, VeloMtlKit, Wild Kit, Octave Kit,, OrchstraKit, Deep Kick, Big O Kick, GarageKick, CrunchKick, Rap Kick, Tek Kick, AnalogKick, GrooveKik1, GrooveKik2, Studio Snr, Big O Snr, PiccoloSnr, ScratchSnr, BrassSnare, Rimshot, Rap Snare1, Rap Snare2, Tek Snare, BrushSnare, Sidestick, Rack Tom, Floor Tom, Cannon Tom, Rap Tom, Hex Tom, Closed Hat, Open Hat, FootClosed, RapClsdHat, RapOpenHat, TekClsdHat, TekOpenHat, RideCymbal, Ride Bell, Crash Cym, Splash Cym, China Cym, Rap Cymbal, Cym Wave 1, Cym Wave 2, Cym Wave 3, Cym Wave 4, Cym Wave 5, Cym Wave 6
Percus	Tympani, Timp/Null, Agogo, Bongo, Cabasa, Castanet, Chimes 1, Chimes 2, Claps, Clave, Conga Hit, Conga Slap, Conga Rap, Cowbell, Cowbell Rap, FingerSnap, Guiro Long, GuiroShort, Maracas, SambaWhstl, ShortWhstl, Shaker, SleighBell, Tabla, Taiko Drum, Taiko Rim, TalkngDrum, Tambourine, Timbale, Triangle, TriangleMt, Vibrasmack, Wood Block
SndFX	Rain, Bird Tweet, Bird Loop, Bird Tuned, Telephone1, Telephone2, Jungle 1, Jungle 2, Pop, Pop Attk, Scratch 1, Scratch 2, Scratch 3, Scratch 4, Scratch Lp, Wipe, Wipe Loop, Orch Hit 1, Orch/Null, Dance Hit, Dance/Null, Zap Attk 1, Zap Attk 2, Zap Attk 3, Fret Noise, Sci Alert
Rhythm	SynDrumLp1, SynKickLp1, SynSnarLp1, Agogo Loop, Bongo Loop, Cabasa Loop, CastanetLp, Claps Loop, CongaLoop1, CongaLoop2, Hat Loop 1, Hat Loop 2, Hat Loop 3, Hat Loop 4, Hat Loop 5, Maracas Lp, Sleigh Lp1, Sleigh Lp2, Shaker Lp1, Shaker Lp2, Tabla Loop, Taiko Lp, TalkDrmLp1, TalkDrmLp2, RattleLoop, Cyrinth, WavLoop1.0, WavLoop1.1, WavLoop1.2, WavLoop1.3, WavLoop1.4, WavLoop1.5, WavLoop1.6, WavLoop1.7, WavLoop1.8, WavLoop2.0, WavLoop2.1, WavLoop2.2, WavLoop2.3, WavLoop2.4, WavLoop2.5, WavLoop2.6, WavLoop2.7, WavLoop 2.8, WavLoop3.0, WavLoop3.1, WavLoop3.2, WavLoop3.3, WavLoop3.4, WavLoop3.5, WavLoop4.0, WavLoop4.1, WavLoop4.2, WavLoop4.3, WavLoop4.4, WavLoop4.5, Kick Loop1, Kick Loop2, Kick Loop3, SnareLoop1, SnareLoop2, Back Beat, CrunchLP1, CrunchLP2, Psi Loop 1, Psi Loop 2, Psi Loop 3, Psi Loop 4, Hit Loop, Pop Loop, Syn Loop, Tri LoopHd, Tri LoopSf

LEVEL

The Level function (press [40]) allows you to control the volume, pan position, output assignment and effects send level for each sound layer. With up to four sounds per program, this allows for a wide variety of stereo effects and level balances between the sounds.

Volume (00 to 99) Page 1

This sets the overall volume for a sound. Higher numbers give higher levels.

Pan (<3 to 3>) Page 2

There are 7 available pan locations in the stereo (two-channel) field: Far left (-3), mid left, near left, center (0), near right, mid right, and far right (+3). The pan value is maintained, even if the Output value is changed (see below).

Output (Main, Aux, or Off) Page 3

The Output parameter has three settings: Main, Aux, or Off. To send the sound's output to the Main outputs, select Main. To send the sound's output to the Aux outputs, select Aux. To turn off the sound's output, set this parameter to Off. (Note, however, that the sound may still feed an Effect Send).

To send a sound to an individual output, use Output in conjunction with Pan. *Example:* Panning a sound full left and selecting the Aux outputs means that the sound will appear at only the left Aux output.

Effect Level (00 to 99) Page 4

The QS6 isn't just a synthesizer; it also has a built-in effects system and mixer, with four effect buses and sends. This section lets you feed the sound to one of the effect buses for processing (see Chapter 7 for more information on editing Effects). The Effect Level parameter determines how much of the sound feeds the chosen effect bus (see below). Higher values mean that the sound will be more effected.

Effect Bus (1 to 4) Page 5

Selects which of the four buses the sound will feed, thereby determining which effect(s) will process the sound. Each Program has its own unique arrangement of effects. *Example:* In Program #12, bus 1 may be a Chorus/Delay/Reverb, while in Program #27, bus 1 may just be a Flanger.

PITCH

The Pitch function (press [60]) lets you control the pitch aspects of each sound layer.

Semitone (-24 to +24 semitones) Page 1

Sets the oscillator pitch in semitone steps, from -24 (transposed down two octaves) to +24 (transposed up two octaves).

Detune (-99 to +99 cents) Page 2

Sets the oscillator pitch in cents, from -99 (transposed down 99/100 of a semitone) to +99 (transposed up 99/100 of a semitone).

Detune Type (Normal or Equal) Page 3

With Normal selected, the *percentage* of detuning remains the same over the entire range of the keyboard, so the effects of detuning sound the same no matter which key you play. With Equal selected, the *absolute amount* of detuning remains the same over the entire keyboard, so any detuning seems less pronounced as you play higher up on the keyboard.

Pitch Wheel Range (0 to 12 semitones) Page 4

Determines the maximum amount of pitch bend when the [PITCH] wheel is full forward. *Example:* When set to 12, the pitch wheel will bend ±1 octave (12 semitones).

Aftertouch Depth (-99 to +99) Page 5

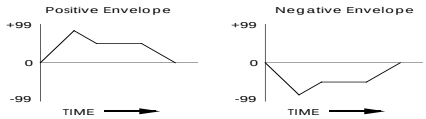
At +00, aftertouch has no effect on pitch. Applying aftertouch (by pressing harder on the keyboard, or via MIDI messages) with this parameter set to a positive value raises the pitch; conversely, applying aftertouch through a negative value lowers the pitch. The higher the number (either positive or negative), the greater the amount of pitch change for a given amount of aftertouch.

Pitch LFO Depth (-99 to +99) Page 6

At +00, the pitch LFO has no effect. Higher positive values increase the amount of Pitch LFO modulation. Negative values give the same apparent effect, but with reversed LFO phase (i.e., if the pitch would normally be increasing with depth set to a positive number, the pitch would instead be decreasing at that same moment had the depth been set to a negative number). Pitch LFO parameters (such as speed and wave shape) are programmed within the Pitch LFO Function (see page 72).

Pitch Envelope Depth (-99 to +99) Page 7

At +00, the Pitch Envelope has no effect. Positive values raise the pitch from the baseline according to the envelope shape, while negative values similarly lower the pitch (see illustration below). The higher the number (negative or positive), the greater the effect. Pitch Envelope parameters (such as attack and decay time) are programmed within the Pitch Envelope Function (see page 61).



Portamento (Exponential, Linear, 1 Speed) Page 8

This provides the sweep's "curve."

- With an exponential curve, the pitch change seems to happen more rapidly at first, then slows down as it approaches the ending pitch.
- A linear curve produces a constant pitch change throughout the glide.
- Normally, the greater the interval (the pitch difference between the two notes), the longer the glide. For example, a glide between two notes a whole step apart would take much less time than a glide between two notes an octave apart. The 1 Speed curve maintains a constant glide rate regardless of the pitch difference between notes.

About portamento: When you play a key and then a second key, normally the sound jumps instantly from one pitch to another. Portamento provides a sweeping glide from one note to another over a variable amount of time. A good example of this type of sound is a steel guitar, where a note slides from one pitch to another.

Portamento Rate (0 to 99) Page 9

Sets the glide duration. Higher numbers give longer glide times. The Rate value is affected by the Portamento value (see above).

Keyboard Mode (Mono, Poly, 1-Pitch or 1-PMono) Page 10

In Mono mode, you can play only one note at a time—just like vintage monophonic synthesizers or wind instruments. Poly mode allows you to play polyphonically. Note that portamento behavior is more predictable in mono mode.

TIP: With a feedback guitar patch that uses one sound for the guitar and one sound for the feedback, setting the feedback sound to Mono Keyboard Mode insures that your feedback "whistle" will be monophonic, which more accurately mimics what happens when you play lead guitar.

Use 1-PITCH mode when you want a program sound layer to play a single pitch polyphonically throughout the entire keyboard range. In 1-PITCH mode, the QS6 will play the sample used for note C3 for all notes in the range. 1-PITCH mode is often used for layering a noise or drum sound behind another sound that is pitched, for example, to fatten up a bass guitar sound with a hint of kick drum, or to have the same cymbal hit every time any note is played. Alternatively, 1-PMONO mode is a monophonic version of 1-PITCH.

Sometimes when playing a monophonic instrument, you will not want the envelopes to retrigger when playing legato, as this would sound realistic. Imagine a flute-player beginning each note in a phrase with a sharp, breathy attack. In reality, the player would only attack the first note in the phrase this way. Therefore, if the Keyboard Mode is set to "Mono", the three envelopes (Pitch Envelope, Filter Envelope and Amp Envelope) will only retrigger when playing legato if the envelope's Trigger Mode is set to either "Reset" or "Reset-Freerun".

FILTER

The Filter function (press [70]) lets you control the tone of each sound layer.

Filter Frequency (00 to 99) Page 1

This sets the filter's initial cutoff frequency. Lower values give a duller sound since this removes more harmonics; higher values let through more harmonics, which gives a brighter sound.

TIP: Signals with complex harmonic structures are most affected by the filter. *Examples:* A sine wave has virtually no harmonics so you will not hear any significant changes as long as the filter cutoff is higher than the note pitch. If the filter cutoff is lower than the note pitch, you will either not hear the note, or it will be very soft. A harmonically-rich sample (such as brass or white noise) will be greatly affected by the filter.

If the Filter Frequency is set to maximum, in most cases all other variables in the Filter function will have no effect. Most other filter functions raise the filter frequency, and it can't be greater than 99. So if you want to use filter effects, proper setting of this initial cutoff frequency is crucial. This is the “baseline” from which all other filter parameters will raise or lower (open or close) the filter.

If the Filter Frequency is set to 00, and no other parameters are set to raise it dynamically, no sound will pass through the filter at all--there will be silence. If the Amp settings are wide open and you can't hear anything, check the Filter Frequency setting.

Since the waveforms in ROM are recorded at the brightest possible setting, in many cases dynamic filtering is crucial to making a program sound natural.

Filter Track (On or Off) Page 2

When off, the filter cutoff remains constant across the keyboard. Higher notes will be more affected than lower notes, since the filter cutoff is comparatively lower for higher notes than lower ones.

When on, the filter frequency tracks the keyboard pitch. Therefore, if using the filter creates a particular harmonic structure when you play one key, playing a different key will shift the filter frequency to maintain the same harmonic structure.

Velocity (-99 to +99) Page 3

At +00, velocity has no effect on the filter cutoff. With positive values, playing harder increases the filter cutoff. More positive values drive the cutoff frequency higher for a given amount of velocity. More negative values drive the cutoff frequency lower for a given amount of velocity.

TIP: Many acoustic instruments, such as acoustic guitars, sound brighter when you play them more forcefully. Adding a little positive velocity control over the filter can simulate more realistic acoustic sounds.

Modulation Wheel Depth (-99 to +99) Page 4

Determines how moving the modulation wheel affects the filter cutoff frequency. *Example:* With positive settings, moving the modulation wheel up raises the filter cutoff frequency and moving it down lowers the filter cutoff frequency. With negative settings, moving the modulation wheel up lowers the filter cutoff frequency and moving it down raises the filter cutoff frequency .

Aftertouch Depth (-99 to +99) Page 5

At +00, aftertouch has no effect on the filter cutoff frequency. Applying aftertouch with this parameter set to a positive value raises the filter cutoff frequency; conversely, applying aftertouch with a negative value lowers the filter cutoff frequency. The higher the number (either positive or negative), the greater the effect for a given amount of aftertouch.

TIP: Many acoustic instruments sound brighter as you play them more forcefully; in particular, brass gets brighter as you blow harder. Using aftertouch to increase a sound's brightness can give more control and realism with acoustic instruments.

Filter LFO Depth (-99 to +99) Page 6

At +00, the filter LFO has no effect. Higher positive values increase the amount of filter LFO modulation. Negative values give the same apparent effect, but with reversed LFO phase (i.e., if the filter cutoff frequency would normally be increasing with depth set to a positive number, the cutoff would instead be decreasing at that same moment had the depth been set to a negative number). Filter LFO parameters (such as speed and wave shape) are programmed from within the FLFO Function (see page 74).

TIP: Filter LFO is good for giving wah-wah effects at slower LFO speeds, and for adding "shimmering" with higher LFO speeds.

Filter Envelope Depth (-99 to +99) Page 7

The Filter Envelope is one of the most important settings in making a program. Many programs will use the Filter Envelope to determine the tonal character of the sound over time (attack, decay, sustain, and release). At +00, the filter envelope has no effect. Positive values raise the filter from the baseline cutoff frequency according to the envelope shape, and negative values similarly lower the cutoff frequency. The higher the number (negative or positive), the greater the effect. Filter Envelope parameters (such as attack and decay time) are programmed within the Filter Envelope Function (see page 64).

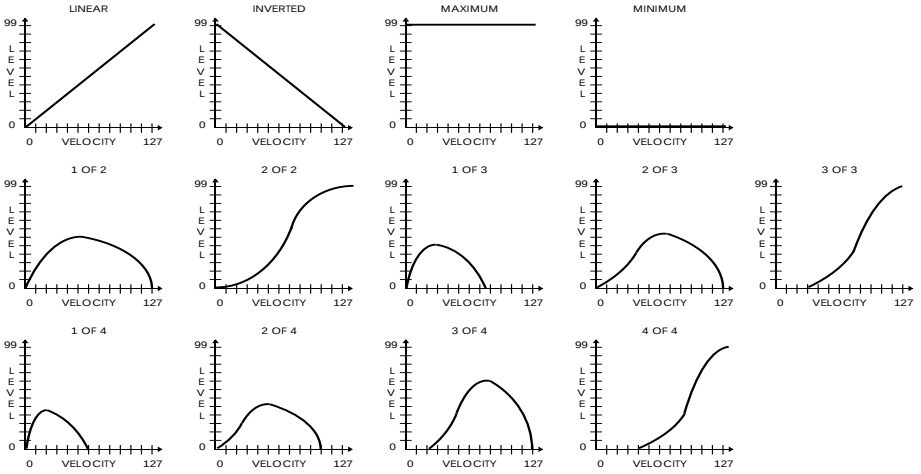
AMP/RANGE

The Amp/Range function (press [80]) lets you control the velocity and keyboard range of each sound layer.

Velocity Curve (13 choices) Page 1

This selects how the sound will respond to the dynamics of your playing the keyboard. A LINEAR curve is the norm, whereby the increase in level is equal to the increase in velocity; the velocity values increase as you play harder. Many of the Velocity Curves make up sets to be used by 2, 3 or 4 sounds in order to facilitate velocity crossfading, whereby a different sound is played depending on how hard or soft the keyboard is played.

As explained earlier, many of the samples to choose from when assigning voices are already velocity switching. These samples usually have the word “Velo” or the letter “V” in their names, indicating that there is actually more than one sample per note which can be selected by how hard or soft each note is played. However, the velocity point at which these sounds change is fixed and cannot be altered. If you want to create your own velocity crossfading Program, assign the single-sample versions of the same samples (“MarimbaVel” is made up of “Marimba Hd” and “Marimba Sf”) to two or more sounds, then use the appropriate velocity curves for each sound (in a three-way velocity split, sound 1 would use curve “1 of 3,” sound 2 would use curve “2 of 3” while sound 3 would use “3 of 3”).



Aftertouch Depth (-99 to +99) Page 2

At +00, aftertouch has no effect on the amplitude. Applying aftertouch with this parameter set to a positive value raises the amplitude; conversely, applying aftertouch with a negative value will make the sound softer the harder you press. The higher the number (either positive or negative), the greater the effect for a given amount of aftertouch.

TIP: Use aftertouch to “swell” the amplitude of brass and horn parts.

Amp LFO Depth (-99 to +99) Page 3

At +00, the Amp LFO has no effect. Higher positive values increase the amount of LFO modulation. Negative values give the same apparent effect, but with reversed LFO phase (i.e., if the amplitude would normally be increasing with depth set to a positive number, the amplitude would instead be decreasing at that same moment had the depth been set to a negative number). Amp LFO parameters (such as speed and wave shape) are programmed within the Amp LFO Function (see page 75).

TIP: Amp LFO set to a triangle wave gives tremolo effects.

Lower Limit (MIDI note 000 to 127/ C-2 to G8) Page 4

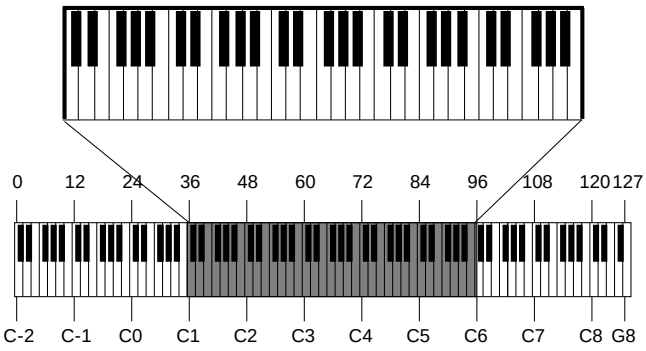
Each sound can be restricted to a specific range of the keyboard. This is ideal for creating splits (e.g., bass in the lower octave and a half, piano in the middle three octaves, and strings in the upper octave).

The Lower Limit specifies the lowest note of the sound's keyboard range. You can set the lower limit by holding [80] and tapping the key on the keyboard you want to set as the lowest note in the range.

High Limit (MIDI note 000 to 127/ C-2 to G8) Page 5

Specifies the highest note of the sound's keyboard range. You can set the high limit by holding [80] and tapping the key on the keyboard you want to set as the highest note in the range.

QS6 Keyboard Range



Program Sound Range

TIP: By setting the lower limit above the high limit, you can create a "hole in the middle" effect. This makes the sound appear to have two zones. All notes from the bottom of the keyboard to the high limit note will play, and all notes from the lower limit to the top of the keyboard will play, but the notes between the high limit and the lower limit will not play. This can be further enhanced in Mix Mode by using the Range function in Mix Edit Mode to cap-off the lower and high limits.

Sound Overlap (00 to 99) Page 6

This determines how many voices can overlap on the same pitch. *Example:* If you hold the sustain pedal down and play the same note over and over, Sound Overlap determines how many voices are available for that note, and thus how many voices will overlap (play simultaneously).

In the old days, different brands of synthesizers offered different voice allocation schemes. One brand used a method called “rotate mode” in which each time a note was struck, a new voice was used. Another brand used a different method called “reassign mode” whereby if a note is played and then played again, the same voice is used both times. In other words, a new voice is used each time a new note of a different pitch is played.

The Sound Overlap value lets you choose a comfortable setting between rotate mode and reassign mode. When the value equals 99, you are always in rotate mode, using up polyphony; if the value is 00, you are always in reassign mode, conserving voices. Set the value anywhere between 00 and 99 and you will get a combination of both, with partiality toward whichever mode the value is closest to.

A piano sound requires some Sound Overlap, but not a lot; it isn’t natural to hear too many voices on the same note. On the other hand, having only one voice per pitch isn’t natural either; let’s say you played a loud note with the sustain pedal held, followed by a soft note--the second note would abruptly cut-off the first. On a real piano, the string would still be resonating from the first (loud) note when the second (soft) note was played; thus the two notes would overlap.

Sound Overlap is especially useful in Drum Mode. In Drum Mode, each drum sound is designated to one note (or sometimes a group of notes). When playing one note for a drum sound, such as a snare, and you attempt to play a roll, the Sound Overlap controls how much of an overlap will exist between each pair of notes. If the Sound Overlap value is set low, you are more likely to hear old notes getting cut-off.
This function has added value when the Program’s Keyboard Mode parameter is set to Mono, instead of Poly. When playing monophonically, Sound Overlap controls the amount of overlap between notes. Normally, even if the sound has a long release time, playing a new note in Mono Mode will cut-off the previous note. By adjusting the Sound Overlap value, you can still hear the previous note fading away after the new note has been played.

J *It is important to note that Sound Overlap can have a negative effect on polyphony.*

If you have Sound Overlap set to 99, hold the sustain pedal and play a series of notes, you will run through all 64 voices in no time. By adjusting the Sound Overlap to a lower value, you decrease the number of voices used by each new note, and thereby ensure there are voices available to play other sounds, if necessary.

PITCH ENVELOPE

The Pitch Envelope function (press [90]) can lead to dramatic effects, since it can cause the pitch of a single key to change drastically over time. It's typically used in special-effect synthesizer programs, but it may also be used more subtly in an acoustic program to simulate the characteristic of some instruments to go sharp on the initial attack, especially when played hard.

J *The following Pitch Envelope variables will have an effect only if the PITCH ENVELOPE DEPTH (on Page 7 of the PITCH function) is set to a value other than 0, or, if Pitch Envelope is a source in the MOD function.*

Attack (00 to 99) Page 1

This is the amount of time the envelope will take until it reaches its maximum output level. Setting the Attack to 0 will make the pitch go to maximum immediately on hitting the key (if the Delay is also set to 0 in Pitch Envelope, Page 5 -- see next page); a setting of 99 will result in a much slower attack, taking many seconds before the envelope gets to maximum.

Decay & Sustain (00 to 99) Pages 2 & 3

As soon as the attack portion of the envelope finishes (when the level reaches maximum), the envelope will decay (decrease in level). The level it reaches is set by the Sustain control; how long it takes to get there is set by the Decay control. In the special case where the Sustain level is all the way up (99), then there is no decrease and the Decay time segment is bypassed. Whatever level the sustain is set to is the level that the decay section of the envelope will head for. Depending on the setting of the Sustain Decay control (see below), the envelope will either hold at the sustain level until you release the note on the keyboard, or decay to 0 at the Sustain Decay rate (which is on page 2 of the envelope). You can create a long "plateau" at the start of a note by setting the Sustain to 98 and the Decay to 99. This will cause the envelope to take the maximum amount of time to get from peak level to a level of 98, before the Sustain Release portion of the envelope begins.

Release (00 to 99, Hold) Page 4

Eventually, you will let go of the note that you've been holding (either by releasing the note on the keyboard, or releasing the sustain pedal if it was pressed). It is at this point that the Release portion of the envelope takes effect. The Release is the time that the envelope takes to get from its current level back down to nothing. Setting the Release time to 99 will take the envelope a very long time to reach zero level.

The Pitch Envelope is unique from the other two envelopes in that its Release time can be set above 99. When this is done, the value in the display will read "Hold". This indicates that the Pitch Envelope will remain where it is even after the note is released. This is important when you want the pitch effect to continue even after releasing the key. *Example:* If the Pitch Envelope is bending a note up, and you don't want the pitch to fall when you release the key, set the Release parameter to "Hold".

Delay (00 to 99, Hold) Page 5

This is the amount of time that the envelope will wait before doing anything; very useful if you want to affect one element of a sound sometime after the sound starts. When the Delay is set to 0, the envelope attacks right away, without any delay. Play some notes while turning up the delay and see that the time between playing the note and hearing the effect of the Pitch Envelope gets progressively longer as the Delay control is turned up.

If the Delay is set above 99, the display will read “Hold”. This indicates that the Delay stage of the envelope will wait indefinitely until the key is released before continuing on to the remaining envelope stages (Attack, Decay, etc.). This requires that the Pitch Envelope’s Trigger parameter (see next page) is set to “Freerun”. However, when the Delay is set to “Hold”, “Freerun” mode is forced on regardless of the Trigger parameter’s setting.

Sustain Decay (00 to 99) Page 6

This is the amount of time that the envelope will take during the sustain stage to bring the level down to 0. If this is set to 99, the envelope will remain at the Sustain level until the note is released. When set to 0, the envelope’s level will immediately jump down to 0 upon reaching the sustain stage.

Trigger (Normal, Freerun, Reset, Reset-Freerun) Page 7

The Trigger mode determines how the envelope will function. You may select either Freerun or Reset, or both (Reset-Freerun) or neither (Normal). When set to Normal, the envelope will always start at its current level (i.e., if another note had been played which triggered the envelope’s cycle, playing another note in the middle would not interrupt the cycle). Also in Normal mode, the envelope will immediately advance to its release stage upon releasing the note. When set to Freerun, the envelope will complete its entire cycle, even if the note is released in the middle. When set to Reset, the envelope starts at the beginning whenever a new note is played. When set to Reset-Freerun, the envelope will start at the beginning whenever a new note is played and will complete its entire cycle, even if the note is released in the middle.

If a sound layer’s Keyboard Mode parameter (found in the Pitch Function, Page 10) is set to “Mono”, the Pitch Envelope will only retrigger when playing legato if the Trigger Mode is set to either “Reset” or “Reset-Freerun”.

Time Tracking (On or Off) Page 8

This determines whether or not keyboard position will affect the cycle speed of the envelope. When turned on, playing toward the higher end of the keyboard will result in a faster envelope cycle; playing toward the lower end of the keyboard will result in a slower envelope cycle. However, this does not effect the attack time, but only the decay, sustain decay and release segments. This feature will result in only a subtle change. The envelope’s timing doubles or halves over a range of two octaves.

Sustain Pedal (On or Off) Page 9

This determines whether or not the Sustain Pedal will have an effect on the envelope. When turned on, holding down the Sustain Pedal while playing short notes is virtually the equivalent to holding down those notes on the keyboard with some subtle but important differences. If the Delay and Attack are set to 0 and either the Decay is 0 or the Sustain is 99, the envelope will immediately jump to the sustain decay stage (if not already there) when the note is released and the sustain pedal is held down. If a long attack is set, and the envelope does not reach the end of the attack segment when the note is released, it will be skipped and the envelope will jump immediately to the release segment. If a long delay is set, and the envelope has not reached the attack segment before the note is released, the envelope will remain at 0. However, if Freerun is turned on, the envelope will continue through the delay, attack, decay and sustain segments and remain at the sustain decay segment. This is exactly the same as holding down the note on the keyboard. When the Sustain Pedal parameter is turned off, the Sustain Pedal will have no effect on the envelope.

Level (00 to 99) Page 10

This is the overall output level of the envelope. If this is set to 00, the Pitch Envelope will have no output and will have no effect, while at 99 it will have a maximum effect on whatever it is being routed to.

TIP: When selecting Pitch Envelope Level as a modulation destination, set the Pitch Envelope level to 00 if the Modulation Level is above 0 (or, set the Pitch Envelope level to 99 if the Modulation Amount is below 0).

Velocity Modulation (00 to 99) Page 11

This determines how keyboard dynamics will affect the envelope level. When set to 99, note velocity controls the envelope's output; notes played hard will deliver a higher envelope output than notes played soft. When set to 0, note velocity will have no effect on the envelope's output level.

FILTER ENVELOPE

The Filter Envelope function (press [100]) is crucial whenever you want the tonal quality of a note to change over time, differently from its overall level. *Example:* When you want the initial attack of a note to be bright, but want the sustaining part to be filtered.

J *The following Filter Envelope variables will have effect only if the FILTER ENVELOPE DEPTH (on Page 7 of the FILTER function) is set to a value other than 0, or, Filter Envelope is a source in the MOD function.*

Also note that the Filter Envelope may have no effect if some other modulation source, or the basic setting of the filter, has already pushed the filter cutoff frequency to its maximum.

Attack (00 to 99) Page 1

This is the amount of time the envelope will take until it reaches its maximum output level. Setting the Attack to 0 will give a sharp edge to the sound (if the Delay is also set to 0 in Filter Envelope Page 5 -- see next page); a setting of 99 will result in a much slower attack, taking many seconds before the envelope gets to maximum.

Decay & Sustain (00 to 99) Pages 2 & 3

As soon as the attack portion of the envelope finishes (when the level reaches maximum), the envelope will decay (decrease in level). The level it reaches is set by the Sustain control; how long it takes to get there is set by the Decay control. In the special case where the Sustain level is all the way up (99), then there is no decrease and the Decay time segment is bypassed. Whatever level the sustain is set to is the level that the decay section of the envelope will head for. Depending on the setting of the Sustain Decay control (see below), the envelope will either hold at the sustain level until you release the note on the keyboard, or decay to 0 at the Sustain Decay rate (which is on page 2 of the envelope). You can create a long “plateau” at the start of a note by setting the Sustain to 98 and the Decay to 99. This will cause the envelope to take the maximum amount of time to get from peak level to a level of 98, before the Sustain Release portion of the envelope begins.

Release (00 to 99) Page 4

Eventually, you will let go of the note that you’ve been holding (either by releasing the note on the keyboard, or releasing the sustain pedal if it was pressed). It is at this point that the Release portion of the envelope takes effect. The Release is the time that the envelope takes to get from the sustain level back down to nothing. Setting the Release time to 0 is good for playing those short funky riffs that you hear on a clavinet. Setting the Release time to 99 will take the envelope a very long time to reach zero level.

Delay (00 to 99) Page 5

This is the amount of time that the envelope will wait before doing anything; very useful if you want to affect one element of a sound sometime after the sound starts. When the Delay is set to 0, the envelope attacks right away, without any delay. Play some notes while turning up the delay and see that the time between playing the note and hearing the effect of the Filter Envelope gets progressively longer as the Delay control is turned up.

If the Delay is set above 99, the display will read “Hold”. This indicates that the Delay stage of the envelope will wait indefinitely until the key is released before continuing on to the remaining envelope stages (Attack, Decay, etc.). This requires that the Filter Envelope’s Trigger parameter (see next page) is set to “Freerun”. However, when the Delay is set to “Hold”, “Freerun” mode is forced on regardless of the Trigger parameter’s setting.

Sustain Decay (00 to 99) Page 6

This is the amount of time that the envelope will take during the sustain stage to bring the level down to 0. If this is set to 99, the envelope will remain at the Sustain level until the note is released. This is the normal setting for organ-type sounds. When set to 0, the envelope’s level will immediately jump down to 0 upon reaching the sustain stage.

Trigger (Normal, Freerun, Reset, Reset-Freerun) Page 7

The Trigger mode determines how the envelope will function. You may select either Freerun or Reset, or both (Reset-Freerun) or neither (Normal). When set to Normal, the envelope will always start at its current level (i.e., if another note had been played which triggered the envelope’s cycle, playing another note in the middle would not interrupt the cycle). Also in Normal mode, the envelope will immediately advance to its release stage upon releasing the note. When set to Freerun, the envelope will complete its entire cycle, even if the note is released in the middle. When set to Reset, the envelope starts at the beginning whenever a new note is played. When set to Reset-Freerun, the envelope will start at the beginning whenever a new note is played and will complete its entire cycle, even if the note is released in the middle.

If a sound layer’s Keyboard Mode parameter (found in the Pitch Function, Page 10) is set to “Mono”, the Filter Envelope will only retrigger when playing legato if the Trigger Mode is set to either “Reset” or “Reset-Freerun”.

Time Tracking (On or Off) Page 8

This determines whether or not keyboard position will affect the cycle speed of the envelope. When turned on, playing toward the higher end of the keyboard will result in a faster envelope cycle; playing toward the lower end of the keyboard will result in a slower envelope cycle. However, this does not effect the attack time, but only the decay, sustain, sustain decay and release segments. This feature will result in only a subtle change. The envelope’s timing doubles or halves over a range of two octaves.

Sustain Pedal (On or Off) Page 9

This determines whether or not the Sustain Pedal will have an effect on the envelope. When turned on, holding down the Sustain Pedal while playing short notes is virtually the equivalent to holding down those notes on the keyboard with some subtle but

important differences. If the Delay and Attack are set to 0 and either the Decay is 0 or the Sustain is 99, the envelope will immediately jump to the release stage (if not already there) when the note is released and the sustain pedal is held down. If a long attack is set, and the envelope does not reach the end of the attack segment when the note is released, it will be skipped and the envelope will jump immediately to the sustain decay segment. If a long delay is set, and the envelope has not reached the attack segment before the note is released, the envelope will remain at 0. However, if Freerun is turned on, the envelope will continue through the delay, attack, decay and sustain segments and remain at the sustain decay segment. This is exactly the same as holding down the note on the keyboard. When the Sustain Pedal parameter is turned off, the Sustain Pedal will have no effect on the envelope.

Level (00 to 99) Page 10

This is the overall output level of the envelope. If this is set to 00, the Filter Envelope will have no output and will have no effect, while at 99 it will have a maximum effect on whatever it is being routed to.

TIP: When selecting Filter Envelope Level as a modulation destination, set the Filter Envelope level to 00 if the Modulation Level is above 0 (or, set the Filter Envelope level to 99 if the Modulation Amount is below 0).

Velocity Modulation (00 to 99) Page 11

This determines how keyboard dynamics will affect the envelope level. When set to 99, note velocity controls the envelope's output; notes played hard will deliver a higher envelope output than notes played soft. When set to 0, note velocity will have no effect on the envelope's output level.

AMP ENVELOPE

The Amp Envelope function (press [110]) is crucial for all sounds because it sets the basic characteristics of the note--whether it attacks quickly or slowly, sustains or decays. Some Programs may leave the Amp Envelope in a sustaining mode, and provide attack and decay using the Filter Envelope; the effect is slightly different. Unlike the Pitch and Filter Envelopes, the Amp Envelope is always fully active (there is no parameter in the Amp/Range function adjusting how much envelope is applied to the Amp).

Attack (00 to 99) Page 1

This is the amount of time the envelope will take until it reaches its maximum output level. Setting the Attack to 0 will give a sharp edge to the sound (if the Delay is also set to 0 in Amp Envelope Page 5 -- see below); a setting of 99 will result in a much slower attack, taking many seconds before the envelope gets to maximum.

Decay & Sustain (00 to 99) Pages 2 & 3

As soon as the attack portion of the envelope finishes (when the level reaches maximum), the envelope will decay (decrease in level). The level it reaches is set by the Sustain control; how long it takes to get there is set by the Decay control. In the special case where the Sustain level is all the way up (99), then there is no decrease and the Decay time segment is bypassed. Whatever level the sustain is set to is the level that the decay section of the envelope will head for. Depending on the setting of the Sustain Decay control (see below), the envelope will either hold at the sustain

level until you release the note on the keyboard, or decay to 0 at the Sustain Decay rate (which is on page 2 of the envelope). You can create a long "plateau" at the start of a note by setting the Sustain to 98 and the Decay to 99. This will cause the envelope to take the maximum amount of time to get from peak level to a level of 98, before the Sustain Release portion of the envelope begins.

Release (00 to 99) Page 4

Eventually, you will let go of the note that you've been holding (either by releasing the note on the keyboard, or releasing the sustain pedal if it was pressed). It is at this point that the Release portion of the envelope takes effect. The Release is the time that the envelope takes to get from the sustain level back down to nothing. Setting the Release time to 0 is good for playing those short funky riffs that you hear on a clavinet. Setting the Release time to 99 will take the envelope a very long time to reach zero level.

Delay (00 to 99) Page 5

This is the amount of time that the envelope will wait before doing anything; very useful if you want to affect one element of a sound sometime after the sound starts. When the Delay is set to 0, the envelope attacks right away, without any delay. Play some notes while turning up the delay and see that the time between playing the note and hearing the effect of the Amp Envelope gets progressively longer as the Delay control is turned up.

If the Delay is set above 99, the display will read "Hold". This indicates that the Delay stage of the envelope will wait indefinitely until the key is released before continuing on to the remaining envelope stages (Attack, Decay, etc.). This requires that the Amp Envelope's Trigger parameter (see next page) is set to "Freerun". However, when the Delay is set to "Hold", "Freerun" mode is forced on regardless of the Trigger parameter's setting.

Sustain Decay (00 to 99) Page 6

This is the amount of time that the envelope will take during the sustain stage to bring the level down to 0. If this is set to 99, the envelope will remain at the Sustain level until the note is released. When set to 0, the envelope's level will immediately jump down to 0 upon reaching the sustain stage.

Trigger (Normal, Freerun, Reset, Reset-Freerun) Page 7

The Trigger mode determines how the envelope will function. You may select either Freerun or Reset, or both (Reset-Freerun) or neither (Normal). When set to Normal, the envelope will always start at its current level (i.e., if another note had been played which triggered the envelope's cycle, playing another note in the middle would not interrupt the cycle). Also in Normal mode, the envelope will immediately advance to its release stage upon releasing the note. When set to Freerun, the envelope will complete its entire cycle, even if the note is released in the middle. When set to Reset, the envelope starts at the beginning whenever a new note is played. When set to Reset-Freerun, the envelope will start at the beginning whenever a new note is played and will complete its entire cycle, even if the note is released in the middle. If a sound layer's Keyboard Mode parameter (found in the Pitch Function, Page 10,) is set to "Mono", the Amp Envelope will only retrigger when playing legato if the Trigger Mode is set to either "Reset" or "Reset-Freerun".

Time Tracking (On or Off) Page 8

This determines whether or not keyboard position will affect the cycle speed of the envelope. When turned on, playing toward the higher end of the keyboard will result in a faster envelope cycle; playing toward the lower end of the keyboard will result in a slower envelope cycle. However, this does not effect the attack time, but only the decay, sustain, sustain decay and release segments. This feature will result in only a subtle change. The envelope's timing doubles or halves over a range of two octaves.

Sustain Pedal (On or Off) Page 9

This determines whether or not the Sustain Pedal will have an effect on the envelope. When turned on, holding down the Sustain Pedal while playing short notes is virtually the equivalent to holding down those notes on the keyboard with some subtle but important differences. If the Delay and Attack are set to 0 and either the Decay is 0 or the Sustain is 99, the envelope will immediately jump to the release stage (if not already there) when the note is released and the sustain pedal is held down. If a long attack is set, and the envelope does not reach the end of the attack segment when the note is released, it will be skipped and the envelope will jump immediately to the sustain decay segment. If a long delay is set, and the envelope has not reached the attack segment before the note is released, the envelope will remain at 0. However, if Freerun is turned on, the envelope will continue through the delay, attack, decay and sustain segments and remain at the sustain decay segment. This is exactly the same as holding down the note on the keyboard. When the Sustain Pedal parameter is turned off, the Sustain Pedal will have no effect on the envelope.

Level (00 to 99) Page 10

This is the overall output level of the envelope. If this is set to 00, the Amp Envelope will have no output and will have no effect, while at 99 it will have a maximum effect on whatever it is being routed to.

TIP: When selecting Amp Envelope Level as a modulation destination, set the Amp Envelope level to 00 if the Modulation Level is above 0 (or, set the Amp Envelope level to 99 if the Modulation Amount is below 0).

NAME

The Name Function (press [120]) allows you to change the Program's name. The Program name can be up to 10 characters long. Use the [◀ PAGE] and [PAGE ▶] buttons to position the cursor. The [s VALUE]/[VALUE t] buttons and the [CONTROLLER A] slider let you change the character. Here is a chart of available characters:

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

MOD 1 – MOD 6

About General Purpose Modulation

Although there are several dedicated modulators in the QS6 (e.g., the pitch can always be modulated by the pitch LFO and Pitch Envelope), sophisticated synthesizer programming demands the ability to use as many modulation sources as possible to modulate as many modulation destinations as desired.

The QS6 arranges its modulation source outputs and modulation destination inputs into a “matrix” so that any selected source can connect to any of several destinations.

There are six general purpose matrix modulators, which allows you to control up to six parameters with any of several control sources.

Use the MOD functions to setup your own customized control of a program, such as:

- Using the PEDAL 1 input or the Controller A Slider to control volume, brightness (filter cutoff), effect level, LFO speed, etc.
- Using velocity to increase or decrease the attack speed of an envelope, so playing softly makes the sound fade in, while playing hard causes an immediate attack.
- Using release velocity to increase/decrease the release time of an envelope, so quick releases of the keys cut off the end of the sound, while slow key releases allow the sound to fade away gradually.

The MOD functions give you the freedom to go beyond the standard modulation sources built-in to other functions.

Selecting the Modulator (1 to 6)

Use the [0] – [5] buttons to select one of the six modulators (modulator 1 is [0], modulator 2 is [1], modulator 3 is [2], etc.). All modulators work in the same way, so only the pages of one will be described here.

Modulation Source **Page 1**

Select from the following modulation sources:

- **Note #** provides a modulation signal that corresponds to the note played on the keyboard (higher keys give higher values). Example: Use this modulation source to obtain a different chorus sound in the upper and lower keyboard ranges.
- **Velocity** relates to how fast a key goes from the key up (note off) to the key down (note on) position, and therefore represents the dynamics of your playing.
- **Release velocity** relates to how fast a key goes from the key down (note on) to the key up (note off) position. Example: Use this to affect the rate of a sound’s release based on how fast you remove your fingers from the keys.
- **Aftertouch** Pressing on the keys after they’re down generates this control signal. Aftertouch is also called channel pressure, and represents an average of

all keys being pressed. This affects any keys that are held down. The harder you press on the keys, the greater the degree of modulation.

- **Polyphonic Pressure** This is similar to aftertouch, but each key can respond to individual pressure messages. Although the QS6 keyboard does not generate poly pressure, the sound generators can respond to poly pressure signals entering via the MIDI In. *Example:* Assign poly pressure to the sound's amplitude in a string ensemble patch. You can then increase the level of selected notes of a held chord to "pull" some notes out of the chord.

- **Modulation Wheel** The rightmost wheel, Modulation, is traditionally assigned to LFO amount (level) so that rotating the wheel away from you introduces vibrato. However it is also well-suited to controlling timbre, vibrato speed, and many other parameters.

- **Pitch Wheel** The two wheels to the left of the keyboard are modulation sources (see below). The leftmost wheel, Pitch, always controls the oscillator pitch but can be tied to other parameters as well.

- **MIDI Volume** MIDI can produce a variety of controller messages (see the MIDI supplement in the back of this manual). Of these, controller #7, which controls channel volume, is one of the most frequently used. Example: Assign the filter cutoff as the destination, and you can have the signal become less bright as it becomes lower in volume.

- **Sustain Pedal** The sustain switch plugged into the sustain pedal jack provides this modulation signal.

- **Pedal 1** The pedal plugged into the Pedal 1 jack provides this modulation signal. The default setting assigns Pedal 1 to MIDI Controller 7 to act as a volume pedal.

- **Pedal 2** The MIDI controller defined as Pedal 2 provides this modulation signal. Pedal 2 can be assigned to any MIDI controller from Global Edit Mode, page 12.

- **Pitch LFO** This is the same modulation signal provided by the Pitch LFO. The **Frequency LFO** and **Amplitude LFO** can also be selected as modulation sources.

- **Pitch Envelope** This is the same modulation signal provided by the Pitch Envelope. The **Frequency Envelope** and **Amplitude Envelope** can also be selected as modulation sources.

- **Random** This provides a different modulation value every time you hit a key. Example: With vintage analog synth patches, use pitch as the destination and apply a very slight amount of random modulation. Each note will have a slightly different pitch, which simulates the natural tuning instability of analog circuits.

- **Trigrate** This is a Trigger Rate Follower, which monitors how fast notes are being played on the keyboard. For example, if routed to the Effect send of a Program, you could automatically have more effect when playing slowly, and less effect when playing quickly.

- **Controllers (A, B, C, D)** Four incoming MIDI controllers can be recognized by the QS6 and used as modulation sources. These controllers are assigned as A–D in Global Mode (see Chapter 8). In Program Play Mode and Mix Play Mode, the [CONTROLLER A] slider can be used to control Controller A directly.

- **Tracking Generator** This accepts the output of a signal processed by the Tracking Generator module (see page 81).

- **Stepped Tracking Generator** This accepts the output of a signal processed by the Tracking Generator module in stepped mode (see page 81).

Modulation Destination Page 2

Select from the following modulation destinations. You can find out more about these parameters and how they affect the sound in their respective sections (to learn how Pitch Envelope Attack affects the sound, see page 74 on Pitch Envelopes).

- Pitch
- Effect Send
- Pitch LFO Delay
- Pitch Envelope Decay
- Pitch Envelope Amp
- Filter LFO Delay
- Filter Envelope Decay
- Filter Envelope Amp
- Amp LFO Delay
- Amp Envelope Decay
- Amp Envelope Amp
- Filter Cutoff
- Pitch LFO Speed
- Pitch Envelope Delay
- Pitch Envelope Sustain Decay
- Filter LFO Speed
- Filter Envelope Delay
- Filter Envelope Sustain Decay
- Amp LFO Speed
- Amp Envelope Delay
- Amp Envelope Sustain Decay
- Portamento Rate
- Amplitude
- Pitch LFO Amp
- Pitch Envelope Attack
- Pitch Envelope Release
- Filter LFO Amp
- Filter Envelope Attack
- Filter Envelope Release
- Amp LFO Amp
- Amp Envelope Attack
- Amp Envelope Release

Modulation Level (-99 to +99) Page 3

At +00, the modulation source has no effect on the destination. Higher positive values increase the amount of modulation. Negative values also increase the amount of modulation, but with negative phase (i.e., if the modulation would normally be increasing with depth set to a positive number, the modulation would instead be decreasing at that same moment had the depth been set to a negative number).

Gate Mode (Off or On) Page 4

The Gate Mode function is available only on modulation routings 1 through 4. When Gate Mode is on, the Modulator will only be routed while notes are being played. In other words, you can gate the effect of the Modulator so that it stops when you are not playing any notes. This can be used on sounds with medium to long release times, where an interesting effect (like tremolo) is intended to be active while holding notes down, but deactivated as the sound is fading away after being released.

Quantize Mode (Off or On)

The Quantize Mode function is only available in modulation routings 4 through 6. When Quantize Mode is on, the modulation effect will be stepped. When off, the effect will be smooth, or linear. *Example:* If you were to route the Modulation Wheel to Pitch with an amplitude of +99, moving the Mod Wheel while the Quantize parameter was off would cause the pitch of a held note to slide up, much the same way it does when the Pitch Bend Wheel is used. However, moving the Mod Wheel while the Quantize parameter was on would cause the pitch of a held note to rise in half-step increments.

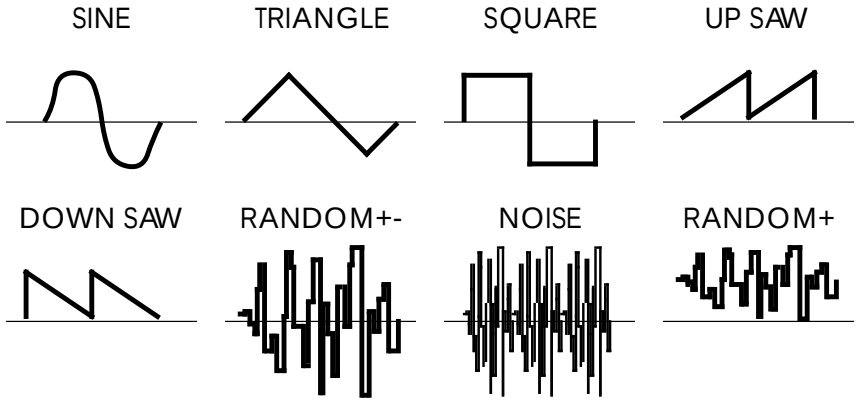
PITCH LFO

The Pitch LFO function (press [7]) is most often used to apply vibrato to a sound.

J *The following Pitch LFO variables will make a difference in the sound only if the PITCH LFO DEPTH (on Page 6 of the PITCH function) is set to a value other than 0, or, if the Pitch LFO is a source in the MOD function.*

Wave (8 choices) Page 1

The waveform determines the shape of the LFO. Select either Sine, Triangle, Square, Up Saw, Down Saw, Random+-, Noise or Random+. Note that the two Sawtooth waves and the Random+ wave are unipolar and the rest are bipolar:

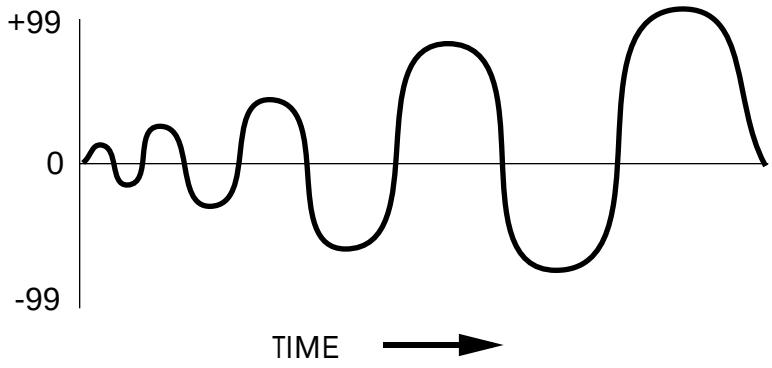


Speed (00 to 99) Page 2

Controls the speed or rate of the LFO. For fast modulation, increase this value. For slower modulation, decrease this value.

Delay (00 to 99) Page 3

This is the amount of time that is to occur before the LFO fades in. Sometimes, it is desirable to have modulation come in a moment or two after a note has been played, rather than starting instantly. The higher the value, the slower the LFO fades in.



Trigger (Mono, Poly, Key Mono, or Key Poly) Page 4

The Trigger parameter determines how the LFO should be triggered, or started. There are four possible settings: Mono, Poly, Key Mono and Key Poly. When playing multiple voices in a single sound, each voice has its own LFO. However, the LFO Trigger parameter determines whether or not they should be in sync, and whether or not they can be retriggered independent from one another.

Mono. All voices' LFOs are in sync with each other. If you hold a chord and then play new notes on top of the chord, all voices' LFOs will be moving in the same direction and at the same speed. Because of this, modulating the LFO Speed using a voice-specific source (such as velocity or one of the envelopes, for example) will have no effect (you will be allowed to do this, but you won't hear any difference). This is because these modulation sources are meant for polyphonic purposes. These include: Note Number, Velocity, Release Velocity, Pitch/Filter/Amp LFO, Pitch/Filter/Amp Envelope, Random, Trig Rate and Tracking Generator. However, modulation sources which are not voice-specific will still have an effect while the LFO Trigger is set to MONO. These include: Aftertouch, Mod Wheel, Pitch Wheel, MIDI Volume, Sustain Pedal, Pedal 1, Pedal 2, and Controllers A—D.

Poly. Each voice's LFO is independent. If you hold a chord, some voices' LFOs will be moving in one direction while others move in the other direction. If the LFO Speed is being modulated (by one of the envelopes, for example), the LFO's of each voice may be running at different speeds.

Key Mono. This is identical to MONO, but whenever a new note is played, the LFO is retriggered, instead of continuing from wherever it may be in its cycle.

Key Poly. This is almost identical to POLY, but whenever a new note is played, the LFO is retriggered, instead of continuing from wherever it may be in its cycle.

Level (00 to 99) Page 5

This is the base output level of the Pitch LFO. If you want to have a constant value of vibrato, even without using the Mod Wheel or Aftertouch, set LEVEL above 00. The Mod Wheel and Aftertouch will add or subtract from this base level. *Example:* If Level is set to 10 and the Mod Wheel parameter is set to 10, there will always be some vibrato, and raising the Mod Wheel will add more vibrato. On the other hand, if the Mod Wheel parameter is set to -10, raising the Mod Wheel to the top will cancel out all vibrato.

Mod Wheel Depth (-99 to 99) Page 6

This is the modulation amount of the Mod Wheel over the Pitch LFO's Level. A positive value raises the level when the Mod Wheel is moved up, and lowers the level when moved down. Negative settings of this parameter will decrease the output level of the Pitch LFO as the Mod Wheel is raised. Since the output level of the Pitch LFO cannot be less than zero, a negative setting of the Mod Wheel parameter will have no effect unless either the Aftertouch or the Level is set to raise the Pitch LFO output. If both the Level and Aftertouch are set to 00, and the Mod Wheel parameter is set to -99, the Mod Wheel will have no effect on the vibrato from the Pitch LFO.

Aftertouch Depth (-99 to 99) Page 7

This is the modulation amount of Aftertouch over the Pitch LFO's Level. A positive value raises the level as more Aftertouch is applied. A negative value will lower the amount of Pitch LFO level as more Aftertouch is applied.

FILTER LFO

The Filter LFO function (press [7]) is most often used to apply tremolo-like or "wah-wah" effects to a sound.

J *The following Filter LFO variables will affect the sound only if the FILTER LFO DEPTH (on Page 6 of the FILTER function) is set to a value other than 0 , or, if Filter LFO is a source in the MOD function.*

Also note that the Filter LFO may have no effect if some other modulation source or setting has already pushed the filter cutoff frequency to its maximum.

Wave (8 choices) Page 1

The waveform determines the shape of the LFO. Select either Sine, Triangle, Square, Up Sawtooth, Down Sawtooth, Random+-, Noise or Random+. For a graphic representation of these waveforms, see the diagram in the Wave section of the Pitch LFO description on page 72.

Speed (00 to 99) Page 2

Controls the speed or rate of the LFO. For fast modulation, increase this value. For slower modulation, decrease this value.

Delay (00 to 99) Page 3

This is the amount of time that is to occur before the LFO fades in. Sometimes, it is desirable to have modulation come in a moment or two after a note has been played, rather than starting instantly. The higher the value, the slower the LFO fades in.

Trigger (Mono, Poly, Key Mono, or Key Poly) Page 4

The Trigger parameter determines how the LFO should be triggered, or started. There are four possible settings: Mono, Poly, Key Mono and Key Poly. A description of these settings is found in the Trigger section of the Pitch LFO description on page 73.

Level (00 to 99) Page 5

This is the base output level of the Filter LFO. If you want to have a constant value of tremolo to the filter, even without using the Mod Wheel or Aftertouch, set LEVEL above 00. The Mod Wheel and Aftertouch will add or subtract from this base level. *Example:* If Level is set to 10 and the Mod Wheel parameter is set to 10, there will always be some filter tremolo, and raising the Mod Wheel will add more tremolo. On the other hand, if the Mod Wheel parameter is set to -10, raising the Mod Wheel to the top will cancel out all tremolo.

Mod Wheel Depth (-99 to 99) Page 6

This parameter sets how much the Mod Wheel will increase or decrease the Filter LFO's Level. A positive value raises the level when the Mod Wheel is moved up, and lowers the level when moved down. Negative settings of this parameter will decrease the output level of the Filter LFO as the Mod Wheel is raised. Since the output level of the Filter LFO cannot be less than zero, a negative setting of the Mod Wheel parameter will have no effect unless either the Aftertouch or the Level is set to raise the Filter LFO output. If both the Level and Aftertouch are set to 00, and the Mod Wheel parameter is set to -99, the Mod Wheel will have no effect on the tremolo from the Filter LFO.

Aftertouch Depth (-99 to 99) Page 7

This is the modulation amount of Aftertouch over the Filter LFO's Level. A positive value raises the level as more Aftertouch is applied. A negative value will lower the amount of Filter LFO level as more Aftertouch is applied.

AMP LFO

The Amp LFO function (press [8]) is usually used to add tremolo to a sound.

J *The Amp LFO variables will have an effect only if the AMP LFO DEPTH (in the AMP function, page 3) is set to a value other than 0 , or, if Amp LFO is a source in the MOD function.*

Wave (8 choices) Page 1

The waveform determines the shape of the LFO. Select either Sine, Triangle, Square, Up Sawtooth, Down Sawtooth, Random+-, Noise or Random+. See the diagram in the Wave section of the Pitch LFO description on page 72.

Speed (00 to 99) Page 2

Controls the speed or rate of the LFO. For fast modulation, increase this value. For slower modulation, decrease this value.

Delay (00 to 99) Page 3

This is the amount of time that is to occur before the LFO fades in. Sometimes, it is desirable to have modulation come in a moment or two after a note has been played, rather than starting instantly. The higher the value, the slower the LFO fades in.

Trigger (Mono, Poly, Key Mono, Key Poly) Page 4

The Trigger parameter determines how the LFO should be triggered, or started. There are four possible settings: Mono, Poly, Key Mono and Key Poly. A description of these settings is found in the Trigger section of the Pitch LFO description on page 73.

Level (00 to 99) Page 5

This is the base output level of the Amp LFO. If you want to have a constant value of tremolo, even without using the Mod Wheel or Aftertouch, set Level above 00. The Mod Wheel and Aftertouch will add or subtract from this base level. *Example:* If Level is set to 10 and the Mod Wheel parameter is set to 10, there will always be some tremolo, and raising the Mod Wheel will add more tremolo. On the other hand, if the Mod Wheel parameter is set to -10, raising the Mod Wheel to the top will cancel out all tremolo.

Mod Wheel Depth (-99 to 99) Page 6

This is the modulation amount of the Mod Wheel over the Amp LFO's Level. A positive value raises the level when the Mod Wheel is moved up, and lowers the level when moved down. Negative settings of this parameter will decrease the output level of the Amp LFO as the Mod Wheel is raised. Since the output level of the Amp LFO cannot be less than zero. A negative setting of the Mod Wheel parameter will have no effect unless either the Aftertouch or the Level is set to raise the Amp LFO output. If both the Level and Aftertouch are set to 00, and the Mod Wheel parameter is set to -99, the Mod Wheel will have no effect on the tremolo from the Amp LFO.

Aftertouch Depth (-99 to 99) Page 7

This is the modulation amount of Aftertouch over the Amp LFO's Level. A positive value raises the level as more Aftertouch is applied. A negative value will lower the amount of Amp LFO level as more Aftertouch is applied.

TRACKING GENERATOR

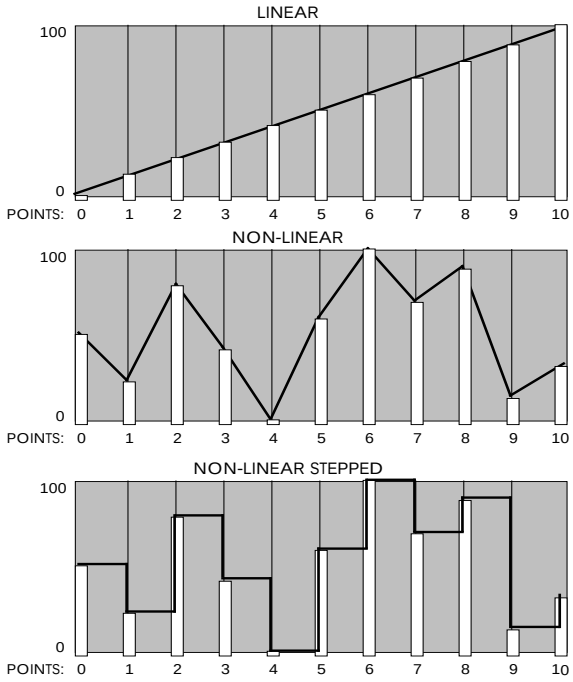
The Tracking Generator function (press [9]) is used to scale a modulation source. For example, normally you could modulate the Amp (volume) of a sound using velocity; the harder you play, the louder the sound gets. The amount of change in volume is equal to the change in velocity; this is called linear control. If instead, however, you set the Tracking Generator's input to "velocity", and then routed the Tracking Generator to the Amp (using the Mod function), you can make your own customized "map" of the control velocity has over the sound's level.

The Tracking Generator divides the range of the input into 11 points (0–10), each of which can be set between 0 and 100. If you boost the value of one of the lower points, you make the input more sensitive in its lower register. By creating a non-linear curve using the velocity example above, you can scale the velocity's control over the sound's volume just the way you want.

When selecting the Tracking Generator as a modulation source in the Mod Function, these two choices will be available. When "TRACKGEN" is selected as the modulation source, the Tracking Generator functions normally, scaling its input as determined by its parameter settings.

When "STEPTRACK" is selected as a modulation source, the Tracking Generator's output will be stepped, or interpolated. This means that instead of scaling the input linearly from point to point, the input is kept at each point's value setting until it goes beyond the following point's value setting, at which point it jumps to that setting. This feature is very useful in creating "mini-sequences" if the modulation destination is set

to “Pitch” and the Tracking Generator’s input is an LFO using an “Up Sawtooth” as its waveform.



TIP: The Tracking Generator can be used to turn a variable control, such as the Mod Wheel or velocity, into a switch by setting all of the points to 0 except for point 10. Only near the maximum input will anything other than 0 come out of the Tracking generator. You can patch the Mod Wheel somewhere else in addition to the Tracking Generator, giving you gradual control of one function with the full range of the Mod Wheel, while switching on a second function only at the top of the wheel.

However, the Tracking Generator interpolates between steps; this is sort of like playing “connect the dots.” In other words, the Tracking Generator does not step directly from one point to the next, but ramps from point to point.

Tracking Input — Page 1

Select the input of the Tracking Generator from the following sources:

- Note Number
- Velocity
- Release Velocity
- Aftertouch
- Poly Pressure
- Mod Wheel
- Pitch Wheel
- MIDI Volume
- Sustain Pedal
- Pedal 1
- Pedal 2
- Pitch LFO
- Filter LFO
- Amp LFO
- Pitch Envelope
- Filter Envelope
- Amp Envelope
- Random
- Trig Rate
- Cont. A–D

For detailed descriptions of each of these sources, see the section “Modulation Source” in the Mod section on pages 67–69.

Tracking Points 0 – 10 (00–100) — Pages 2–12

The remaining pages of the TRACK function control the levels of points 0–10.

PROGRAMMING DRUM SOUNDS

To program a sound in Drum Mode, you must first set the Sound Type to “Drum” for that particular sound in the Voice Function, page 2 (see previous section). The [0] – [9] buttons are used to select a Drum (1–10), regardless of which Function or Page is selected (except Effect, Name and Misc.). For an explanation of the basics of Drum Mode, see page 56.

VOICE

The Voice function (press [40]) is where you choose the particular sample for the selected drum (1–10). Similar to the normal Assign Voice function, sounds are divided into groups. After selecting the group (on page 3), you then select the sample within the group (on page 4). Here is a chart listing the various drum samples in their respective groups.

Group	Voice
Kick	Stab Kick, Deep Kick, Spike Kick, Flap Kick, GarageKick, PillowKic, Elect Kick
Snare	Studio Snr, TurboSnare, PiccoloSnr, Crisp Snr, Power Snr, Dance Snr, Rimshot, Side Stick
Hi Hat	Closed Hat, Edge Hat, Open Hat, FootClosed
Toms	Hi Pwr Tom, Lo Pwr Tom, Hi Mid Tom, Mid Tom, Lo Mid Tom, Hi Flr Tom, Floor Tom, Lo Flr Tom, Hi Slam Tom, Md Slam Tom, Lo Slam Tom, Hi Cannon, Mid Cannon, Lo Cannon
Cymbal	Cym Ride, Cym Bell, Cym Crash, Cym China, Cym Splash
Percus	Tympani, TbularBell, Asian Drum, Cabasa, Castanet, Clave, High Agogo, Low Agogo, Bongo Hi, Bongo Low, Conga High, Conga Lo, Conga Slap, Cowbell, Triangle, TriangleMt, Guiro Long, GuiroShort, Hand Clap, Shaker, Maracas, Tambourine, Timbale Hi, Timbale Lo, Log Drum, Vibrasmack, WoodBlk Hi, WoodBlk Lo, Waterphone, SambaWhstl, ShortWhstl, Alert, Android, Cyborg, Meteor, Supernova
Percus FX	Zap Attk 1, Zap Attk 2, Zap Attk 3, Mini Attk, Pop, Pop Attk, Bottle Hit, Metal Attk1, Metal Attk2, Fingersnap,Voice EFX1, Voice EFX2, Voice EFX3
Wave	HiWhitNoiz, MidWhitNoiz, LowWhitNoiz, High Sine, Mid Sine, Low Sine, HiSpectrl1, LoSpectrl1, HiSpectrl2, LoSpectrl2, HiCrickets, LoCrickets, Inharm 1, Inharm 2, High Saw, Low Saw, High Pulse, Low Pulse, HiAcidRez, LoAcidRez, Metal Wave, HiMetlMute, LoMetlMute, Hi DistGtr, LowDistGtr, Hi PwrHarm, LowPwrHarm, Hi FunkGtr, LowFunkGtr, Hi MuteGtr, LowMuteGtr, HiElecHarm, LoElecHarm, ClsclHarm, HiBassHarm, MidBassHrm, LowBassHrm, HiSlpBass, LoSlpBass, Hi BassPop, LowBassPop, Muted Bass, Stik Bass, StudioBass, JazzFingrd, JazzPicked, Fretless, AcousBass, 60's Combo, Hi Piano, Mid Piano, High Sync, Low Sync, Hi Synth, LowSynth, Ahhs Low, Ahhs Mid, Ahhs High, Oohs Low, Oohs Mid, Oohs High
Rhythm	PsiBeat 1, PsiBeat 2, PsiBeat 3, PsiBeat 4, PsiBeat 5, Kick Loop1, Kick Loop2, Kick Loop3, Kick Loop4, Kick Loop5, SnareLoop1, SnareLoop2, SnareLoop3, Backbeat, ClsdHHLoop, OpenHHLoop1, OpenHHLoop2, FootHHLoop, Ride Loop1, Ride Loop2, Ride Loop3, Tick Talk, Swingset, Bongo Loop, BlockLoop1, BlockLoop2, BlockLoop3, HiTriLpHd, HiTriLpSf, LoTriLpHd, LoTriLpSf, Tamb Loop1, Tamb Loop2, ShakerLoop, ShuflShakr, PopperLoop, BottleLoop, Motor, MiniNoizLp, HvyMetalLp, Machine Lp, Kah Loop, Bass Loop, SynBass Lp,

LEVEL

Each of the 10 drums in a sound can have its own level, pan position, and output assignment. The Level function (press [50]) provides these controls. Use page 1 to adjust the selected drum's level (00 to 99), page 2 to adjust pan position (<3 to >3), page 3 to select the Output assignment (Main, Aux or Off). Page 4 lets you adjust the Effect Send level (00 to 99), and page 5 lets you select the Effects Bus (1, 2, 3 or 4).

To send a drum to an individual output, use Output in conjunction with Pan. *Example:* Panning a drum full left and selecting the Aux outputs means that the drum will appear at only the left Aux output.

PITCH

The Pitch function (press [60]) lets you transpose the selected drum up or down one octave in micro-step (1/4th of a half step) increments, and lets you modulate the drum's pitch with velocity.

Tune (-12.00 to +12.00) Page 1

Determines the tuning of the selected drum (±12.00).

Velocity>Pitch (0 to 7) Page 2

Selects how much velocity will affect the selected drum's tuning (0-7). When this value is set to 7, the drum will be played sharp when the associated note is played hard; when played soft, the drum's tuning will be unaltered.

FILTER

Velocity>Filter (0 to 3) Page 1

The Filter function (press [70]) lets you control the "brightness" of the selected drum by modulating the filter frequency with velocity. When set to 3, playing the associated note will result in a brighter sound (more high frequencies), while playing softer will result in a duller sound (less high frequencies). When this parameter is set to 0, velocity will have no affect on the filter.

AMP/RANGE

Velocity Curve (13 choices) Page 1

Page 1 of the Amp/Range function (press [80]) lets you select one of 13 velocity curves. This determines how the drum will respond to the dynamics of your playing the keyboard. A LINEAR curve is the norm, whereby the increase in level is equal to the increase in velocity; the velocity values increase as you play harder. Many of the Velocity Curves make up sets to be used by 2, 3 or 4 drums in order to facilitate velocity crossfading, whereby a different drum is played depending on how hard or soft the keyboard is played. However, each drum must be in a different sound layer of the Program in order to be stacked on the same note.

If you want to create your own velocity crossfading Program, assign the related versions of the same drum samples ("Conga High" and "Conga Lo") the same key in different Program Sound layers, then use the appropriate velocity curves for each drum (in a three-way velocity split, drum 1 would use curve "1 of 3," drum 2 would

use curve “2 of 3” while drum 3 would use “3 of 3”). For more details about the 13 velocity curves, see the illustration on page 64.

Note # (000 to 127/C-2 to G8) Page 2

Each drum can be assigned to a single note which will trigger the drum sound when played. You can also set the note assignment by holding [80] and tapping the key on the keyboard you want to set as the note for the drum.

J *Only one drum can be assigned to a single note within a single Program sound . If more than one drum in a sound is assigned to the same note, only the higher number drum will sound.*

Note # Range (0 to +3) Page 3

Each drum can be assigned a range of notes (up to 3) above the root note which will trigger the drum sound when played. This parameter specifies the note range of the selected drum (0 to +3).

AMP ENVELOPE

Decay (0 to 99, Gate00 to Gate99) Page 1

Page 1 in the Amp Envelope (press [110]) Function lets you adjust the Decay time of the selected drum (00 to 99, Gate00 to Gate99). If this is set to 0, only the very beginning of the drum sample is played; setting this to 99 will cause the entire drum sample to play. When set above 99, the Decay uses a gated mode. The Decay can still be set between 0 and 99, but in 5-step increments (e.g., Gate00 = Decay setting of 0 with gating, Gate05 = Decay setting of 5 with gating, etc.). Gating means that the drum sound will continue to be played as long as the key is held. This is useful for longer sounds, like cymbals, when you wish to hear a short crash by playing a short note but can still hear a longer crash by keeping the note held down.

Mute Group (Off, 1, 2, or 3) Page 2

This is an important feature when using multiple sounds of the same instrument. Mute Groups allow multiple drums to share a single voice. For example, if you have assigned a Closed Hat and an Open Hat to two different notes, playing either note should cut-off the other (if it had recently been played). This creates a more realistic sound, since an actual Hi Hat is only capable of making one sound at a time.

In the Amp Envelope function, Page 2 is used to assign the selected drum to one of the three Mute Groups. In our example above, both Hi Hat drums would be assigned to the same Mute Group. The additional Mute Groups can be used by other sounds that you wish to cut-off each other, but do not want to interfere with the Hi Hat sounds.

COPYING SOUNDS

While editing a Program, it is helpful to be able to copy a sound to another sound in either the same Program or a different Program, especially if you are building a split or layered Program. This can be done very easily from within the Store function. To copy a Sound to another sound in the same Program, or to the same sound in a different Program:

¿ From Program Edit mode, press [STORE].

¡ Press [PAGE ▶] twice to select Page 2 of the Store function.

¬ Use the [s VALUE] and [VALUE t] buttons to select which sound (1–4) in the currently selected Program to copy from.

÷ Press [PAGE ▶] to advance the cursor to the lower line of the display.

ƒ Use the [s VALUE] and [VALUE t] buttons to select which sound (1–4) in the currently selected Program to copy to; or to select which Program (00–127) to copy to.

a Press [STORE] to copy the sound.

COPYING EFFECTS

While editing a Program, it is helpful to be able to copy the Effects Patch from a different Program. This can be done very easily from within the Store function.

J *Be sure to save your changes to the edited Program before going to a new Program. Otherwise, all your changes will be lost.*

To copy the Effects Patch from a Program to another Program:

¿ Recall the Program which contains the Effects Patch you wish to copy.

¡ Press [STORE].

¬ Press [PAGE ▶] twice to select Page 2 of the Store function.

÷ Press [s VALUE] four times to select “EFFECT”, which is the Effects Patch in the currently selected Program to copy from.

ƒ Press [PAGE ▶] to advance the cursor to the lower line of the display.

a Use the [s VALUE] and [VALUE t] buttons to select which Program (0–127) to copy to.
When selecting another Program location, the selected sound will be copied into the same sound location in the selected Program. If you select to copy sound 2 to Program 45, the sound will be copied into sound 2 of Program 45.

D Press [STORE] to copy the sound.

INITIALIZING PROGRAMS

If you want to start programming from “scratch”, you can easily reset all parameters to their default settings by re-initializing the software. Make sure your mod wheel is all the way down before re-initializing, otherwise the "zero" position of the mod wheel will be incorrect.

To re-initialize the QS6:

¿ Turn the power off.

¡ While holding down both Buttons [0] and [3], turn on the power.

The QS6 will come on showing Program 01 of Preset Bank 1, with the “*” flag showing in the display and no Program Name. This is the Program Mode edit buffer, set to the default settings. Re-initializing will also reset all Global parameters to their default settings, and will initialize all edit buffers so that all Mix and Program parameters are reset to their default settings. However, none of the Programs or Mixes are changed when re-initializing the unit. You can proceed to edit, then [STORE] at any Program location you like.