

SPECTRUMTM SYNTH



user's guide
user's guide



PEAVEY[®]



Intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



Intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

CAUTION: Risk of electrical shock – DO NOT OPEN!

CAUTION: To reduce the risk of electric shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

WARNING: To prevent electrical shock or fire hazard, do not expose this appliance to rain or moisture. Before using this appliance, read the operating guide for further warnings.

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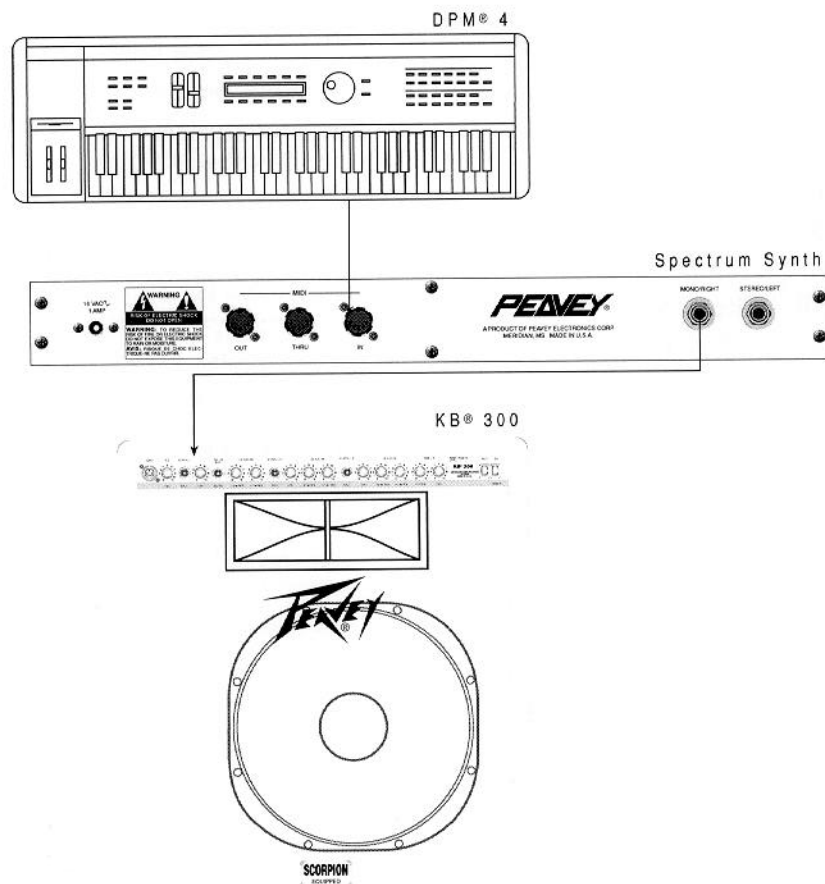
Quick Start

Hey, we know not everyone likes to read manuals or even needs to read manuals, that's why we are providing this quick start section. We want to make using your new Peavey equipment an easy, enjoyable, experience.

▼ To get started quickly

1. Well, the first thing you need to do (after opening the box and removing the Spectrum Synth) is to connect the Spectrum Synth to your system configuration. Here are some things to check first:

- ⌚ Make sure your amplification system is turned off.
- ⌚ Turn the Spectrum Synth's **Volume** knob fully counterclockwise (effectively turning it off).
- ⌚ Plug the MIDI Out from your keyboard to the MIDI In on the Spectrum Synth.
- ⌚ Connect the mono/right audio output of the Spectrum Synth to the input of your keyboard amplifier. (If possible use a stereo connection; you won't be disappointed. Connect the left and right audio outputs to your amplification system with mono cables or use a stereo cable connected to the stereo/left audio output.)
- ⌚ Connect the power jack of the Spectrum Synth to an electrical outlet using the 16-16.5 volt AC 1000 mA adapter provided.
- ⌚ Turn on your amplifier.
- ⌚ See the diagram below.



2. It is now necessary to properly set up your Spectrum Synth to send and receive MIDI information. To do this:

Setting the MIDI Mode

- ⌚ Press the button labeled **Mode** until the **Poly** LED lights. This puts you into poly mode. The poly mode allows you to send and receive MIDI data on one channel only.

Setting the MIDI Channel

- ⌚ Press and hold the button labeled **Channel**; while holding this button, press the ▲ or ▼ button until the MIDI receive channel for the Spectrum Synth matches the MIDI transmit channel of your keyboard. If in doubt, try channel 1.

3. Okay. Now it's time to play.

- ⌚ Start playing your keyboard; as you play, turn the Spectrum Synth's **Volume** knob clockwise until you reach the desired volume.
- ⌚ The Spectrum Synth's display will show the current patch number. To select a different patch, use the ▲ and ▼ buttons.

4. That's it!

ABOUT THIS MANUAL

Can it be? We thought that nobody ever read manuals anymore! Since we seem to be mistaken in our belief that nobody reads manuals, we should probably give you some information that is useful; we'll even try to present it in an interesting manner (won't that be unusual).

This manual covers several distinct sections. These sections are arranged in the same manner that a user may want to learn them (we hope).

We have provided a Quick Start section, in case you suddenly decide that you don't really want to read the manual. Here is a brief description of what can be found in each section.

Chapter 1, **Intro**, provides a brief introduction to the Spectrum Synth along with the Quick Start guide.

Chapter 2, **Overview**, provides a quick overview of the front and back panels of the Spectrum Synth.

Chapter 3, **Setup & Connection**, (it's not *who* you know but *what* you know) shows a couple of common connection schemes in which you might use the Spectrum Synth.

Chapter 4, **Basic Operation**, provides you with some of the more basic knowledge needed to use the Spectrum Synth, such as setting the MIDI channel, selecting the MIDI mode, change patches and tuning the unit.

Chapter 5, **Advanced Operation**, provides users with the information on editing PCTM 1600 patches, some helpful tips and the block diagram.

Appendix A, **MIDI Implementation**, is a chart showing the MIDI implementation that the Spectrum Synth provides.

Appendix B, **System Exclusive**. Turn here for all the information necessary to create, edit and control the Spectrum Synth using MIDI commands (and an external MIDI controller—like the PC 1600).

Introduction

Congratulations and thank you for purchasing the Spectrum™ Synth. The Peavey DPM Spectrum Synth was designed to offer classic synthesizer sound with the advantages of 16-bit resolution (24-bit internal), full MIDI compatibility, 24 oscillators, 12-voice polyphony, and 4-voice multi-timbral capability.

The Spectrum Synth features the classic sawtooth and pulse waves contained in the first-generation analog synths, as well as a full complement of sampled analog and digital waves in a 16-bit waveform ROM. This allows the Spectrum Synth to offer a greater variety of classic analog and complex digital sounds than any instrument available.

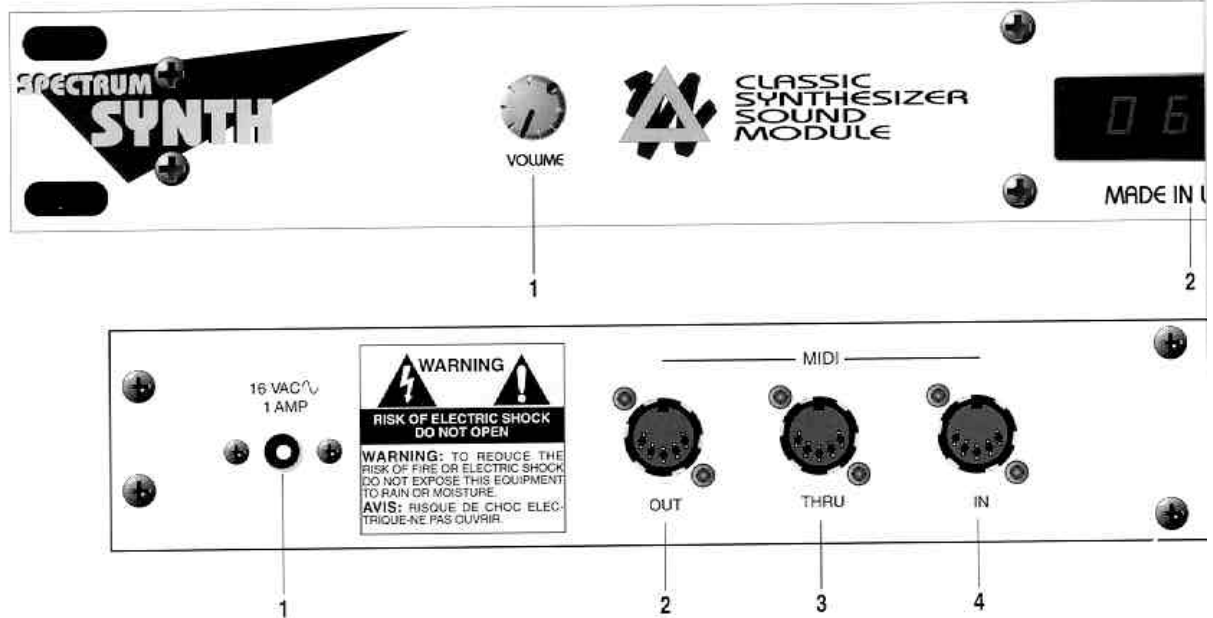
When this impressive palette of waveforms is combined with dynamically modulated resonant filters, the results range from huge, warm analog pads to nasty, biting solo leads to massive layered hybrid synthesizer sounds.

The Spectrum Synth was designed to answer the need for classic analog synthesizer sounds in a package with current MIDI technology, state-of-the-art synthesizer capabilities.

FEATURES

- 2 MB 16-bit classic analog and digital synthesizer waveforms
- 256 presets; 192 ROM/64 RAM
- 24 oscillators (2 oscillators per voice)
- 12-voice polyphonic
- 4-voice multi-timbral
- Hard sync
- 12 dynamically modulated resonant filters
- Soft-button switching
- Digital display of:
 - ▴ Program number
 - ▴ Fine tune
 - ▴ Transpose
 - ▴ MIDI mode
 - ▴ MIDI receive acknowledge

Overview



THE FRONT PANEL

1. Volume Knob

The **Volume** knob adjusts the overall volume of the Spectrum Synth.

2. LCD Display

This is a three-digit seven-segment display.

3. Inc and Dec Buttons (▼ and ▲)

These ▼ and ▲ buttons are used to make changes to global settings and for moving between presets.

4. Channel Button

The **Channel** button is used to select the MIDI receive channel. Channels 1-16 are available.

5. Transpose Button

The **Transpose** button is used to adjust the pitch. The Spectrum Synth may be transposed any number of semitones up to ± 2 octaves.

6. Fine Button

The Fine button is used to perform fine tune adjustment's to the pitch ± 99 cents.

7. Mode Select Button/LEDs

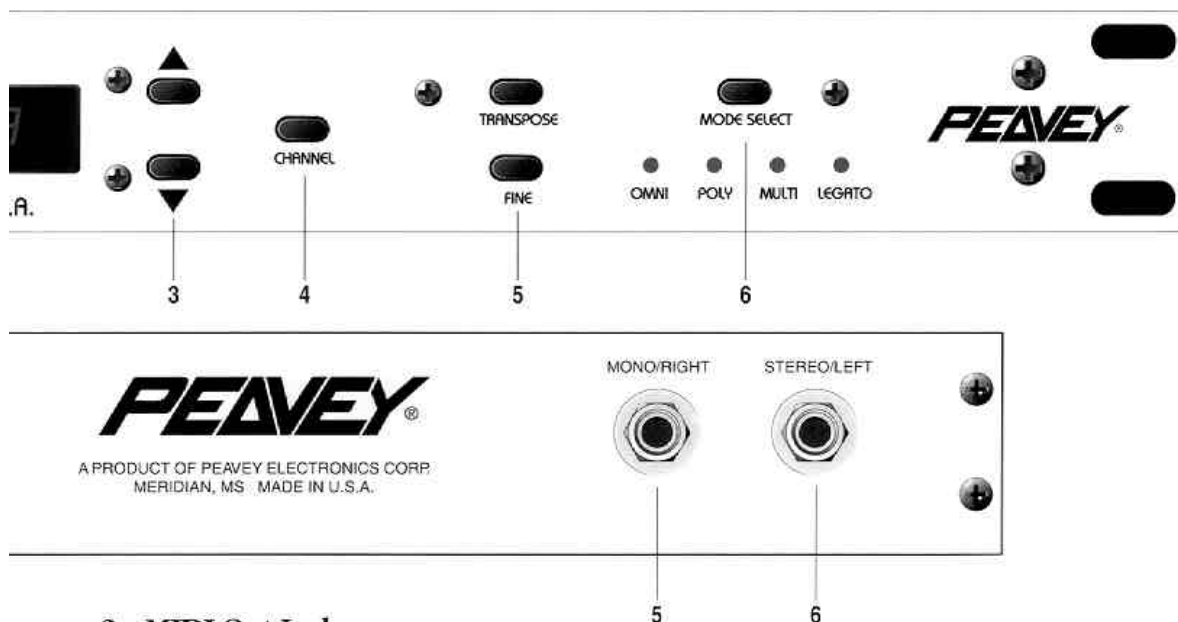
The **Mode Select** button is used to select the MIDI mode. There are six choices available: Omni, Poly, Multi, Legato, Poly-Legato, and Multi-Legato.

THE BACK PANEL

1. Power Jack

Use only the 16-16.5 volt AC 1000 mA adaptor provided. (Peavey Part #00710160)

Caution: Use only the Peavey 16-16.5 volt power supply provided with this product. If the original power supply must be replaced, consult your Peavey dealer or the factory for the correct replacement. Failure to use the correct power supply could result in fire, shock hazard, extensive circuit damage, decreased performance, or non-operation.



2. MIDI Out Jack

This is a standard 5-pin DIN jack used for sending MIDI overflow data from the Spectrum Synth to receiving unit(s), dumping RAM presets, etc.

3. MIDI Thru Jack

This is a standard 5-pin jack used to echo MIDI data received at the MIDI In jack. This means that the receiving unit(s) will receive an exact copy of the MIDI data the Spectrum Synth received.

4. MIDI In Jack

This is a standard 5-pin jack used for receiving MIDI data from the sending unit.

5. Mono/Right Jack

This is a standard 1/4" mono output jack. The output from this jack is the Right channel *if* a plug is inserted into the Stereo/Left jack and is the summed Left and Right channels *if* no plug is inserted into the Stereo/Left jack.

6. Stereo/Left Jack

This is a standard 1/4" stereo output jack. The output from this jack is stereo when used with a stereo cable, with the Left channel on the tip, and the Right channel on the ring.

GETTING TO KNOW YOUR SYNTH

It's pretty simple to tell when the Synth is turned on, first it needs to be plugged in, this is usually a dead giveaway, but if that doesn't convince you it's on, then look at the display, if it's dark the unit's off, if not (as evidenced by a preset number) then it's ALIVE!

Using the Synth is nearly as easy, the following sections provide information on; connecting the Synth, sound editing, front panel editing, MIDI modes and Multi setups, controller usage, autoflow, and of course the ever popular MIDI implementation and system exclusive appendices. Enjoy!

Setup & Connection

SETUP

When you power up the Synth for the first time, you should see the program LED display come to life. In the display will be three numbers, i.e., **001**. This represents the current preset (or patch) number. Once you have connected the Synth to your MIDI keyboard (either using the diagrams in this chapter or the Quick Start guide) you should set the MIDI receive channel. Set the MIDI receive channel by pressing and holding the button labeled **Channel**, then use the ▼ or ▲ button to move to the desired channel. You probably want to set the MIDI mode as well. To do this, press the **Mode Select** button until the LED above the desired mode glows. If you are unsure which mode you want, try using **Poly**. For a more complete description of the MIDI modes see chapter 4.

The rear panel consists of your stereo/mono outputs and MIDI In, Out and Thru jacks.

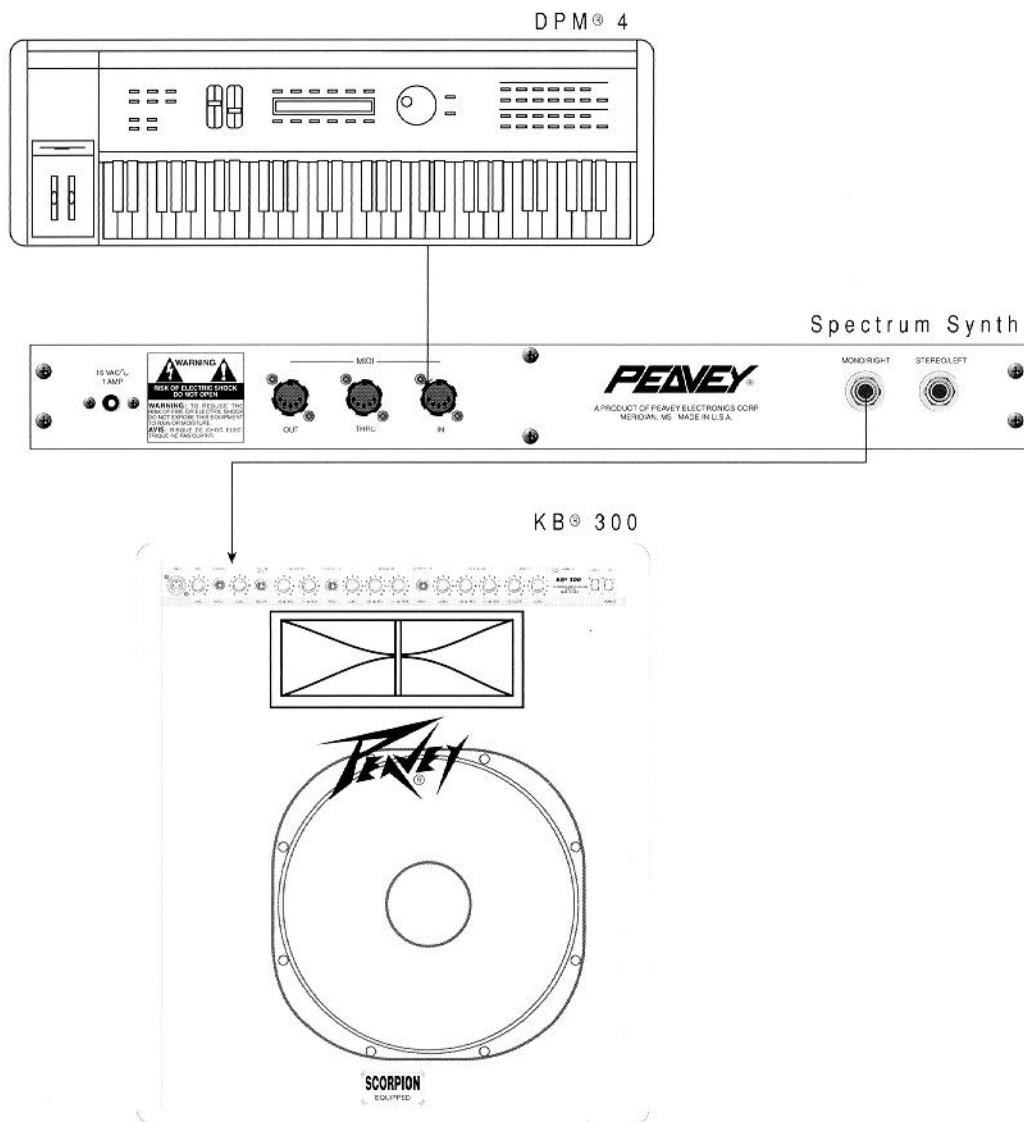
To see if MIDI is being received, send MIDI data (notes, mod wheel, etc.); there should be a little dot in the bottom right corner of the LED display showing the reception of any data.

CONNECTIONS

This chapter shows a couple of common connection schemes. We encourage you to experiment with new ways to use your Synth—who knows, this could be your chance to make it big!

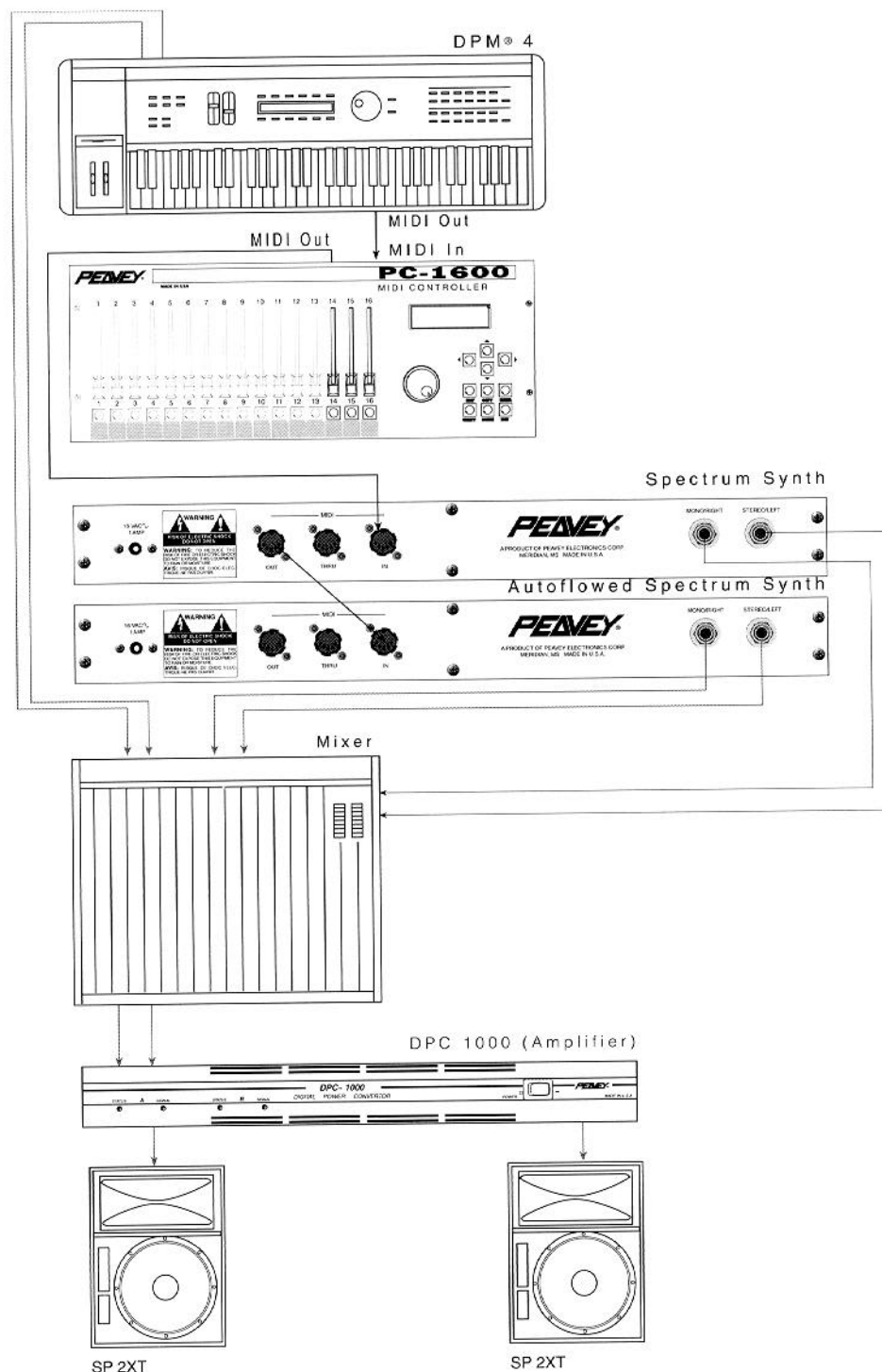
Basic Connection

The following diagram represents what might be considered a “typical” keyboard setup. In this connection we have included the DPM® 4 keyboard, Spectrum Synth and KB® 300 keyboard amplifier.



Advanced Connection

In this diagram, we have taken a DPM 4 keyboard and connected it to a PC™ 1600 MIDI controller; we use this to provide sophisticated patch creating/editing capabilities. To this we have added two Spectrum Synth modules; the second is used to automatically catch and play any overflowed notes. Next, we add an amplification system that includes a mixer (this allows you to connect audio outputs from both the DPM 4 and Synth). The mixer is connected to a DPC™ 1000 digital amplifier and a pair of SP™ 2XT speaker enclosures. Of course everything represented here is made by Peavey and is readily available at your local dealer.



Basic Operation

DID YOU KNOW...

<i>Legato</i>	- A smooth and unbroken transition between successive notes.
<i>Multi-timbral</i>	- More than one distinct preset may sound at a time.
<i>Polyphonic</i>	- The simultaneous combination of two or more sounds.
<i>Portamento</i>	- The pitch glides between notes.
<i>Preset</i>	- A storage location for all parameters pertaining to a sound.
<i>Voice</i>	- The sound that is playing. (i.e., if something is 12-voice, it means that twelve notes can be playing simultaneously.)
<i>Waveform</i>	- A wave (i.e., sine or sawtooth) that is used to create the sounds (voices) generated.

MIDI MODES AND MULTI SETUP

The Mode Select button will advance you through all the possible MIDI modes and variations that the Synth is capable of. This selector will wrap around when advanced past the last selection. The MIDI spec allows for four modes: Omni, Poly, Mono, and Multi. The Synth adheres to the MIDI spec for these modes, but also allows for some new and innovative variations as far as legato playing is concerned.

The Legato mode selection will occupy four channels, each channel playing the same preset in a legato fashion. The selection of these channels is the same as just described above for the Multi mode. This mode is normally used with a guitar or synth MIDI controller (the Peavey CyberBass™, for instance), with each string sending MIDI data on a separate channel.

If legato style playing is desired, yet you don't want to use four MIDI channels in the process, advance the Mode Select button until both the **Poly** and **Legato** LEDs are on. This setting will behave as in straight poly mode except for the allocation of voices (only one voice sounds). A word here on legato footswitch controller (controller #68): The legato footswitch controller is a newly ratified addition to the MIDI controller list, which will toggle the playing mode between normal and legato.

The Synth responds to this controller, and can be used in the Poly and Multi modes to switch to legato playing style. So, say for instance you are playing in Poly mode, and you send the Synth a Legato footswitch message. The Synth will now behave as though you had selected the Poly-Legato mode with the **Mode Select** button (although the LED status will still indicate just **Poly**). Sending a Legato footswitch message below threshold will bring you back into normal playing. This is much more versatile and expressive than a straight Legato mode allows for.

Now, the same sort of playing styles are possible in Multi mode. Advancing the Mode Select button until both the **Multi** and **Legato** LEDs are on will yield a MIDI Multi mode (four channels, each capable of a distinct preset) but with each channel playing in legato fashion. If you happen to be in straight Multi mode and you send the Synth a Legato footswitch message above the threshold value, that channel will then switch to a legato playing style. This allows for a mixture of channels playing legato and normal, with the ability to switch back and forth on any of the four channels in real time.

Other capabilities in Multi Mode (or Multi-Legato Mode) include response to program change messages, and a host of other controller messages (see the section on Controller Usage). The program change messages can

select the preset that a particular channel plays. Multi mode responds to the same program change messages that were explained in the Preset controller section.

The Multi preset selections roll with the MIDI channel selection. Let's take a second to explain this: If the MIDI channel currently selected is 1, then the Synth will respond multi-timbrally on channels 1, 2, 3, and 4. A channel will play whichever preset was selected as a result of a program change message. The Synth is initialized at the factory to play presets 1, 2, 3, and 4. Now, changing the MIDI channel to channel 2, for instance, causes Multi response to shift to channels 2, 3, 4, and 5; BUT, the preset selections remain the same. So, assuming the factory preset described above, if the MIDI channel is set to 2, channel 2 will play preset 1, channel 3 will play preset 2, and so on. This a convenient way to accommodate altering your MIDI setup without having to change presets on each channel.

The last presets sent to each channel are saved at power down, and are available immediately at power up. Also, the current MIDI mode is saved at power down.

CONTROLLER USAGE

The Synth responds to a wealth of MIDI controller messages, adding a variety of expression not normally achieved with a sample playback device.

If your controller lacks the ability to transmit some of these controllers, check out the Peavey PC 1600, which can transmit any controller on sixteen separate sliders, as well as perform real time MIDI mixdown and SysEx control.

In addition to the usual mod wheel, aftertouch, and sustain messages, the Synth responds to the following controllers:

- *Volume Controller (#7)*
This can be used to control the volume via MIDI, either for overall level control as in Poly mode, or to mix the levels of the four channels comprising the Multi.
- *Pan Controller (#10)*
This can be used to control the stereo placement of presets as follows:
Values 0-63 will result in placement from hard left to just left of center.
Values 64-127 will result in placement from center to hard right.
This can be used for a set and forget fixed value stereo placement, or in a real time pan sweep.
- *Legato Footswitch Controller (#68)*
This controller is used to switch the playing style between normal and legato as follows:
Values 0-63 will result in normal playing style.
Values 64-127 will result in legato playing style.
See the section on MIDI Modes for more discussion on legato playing.

PRESET CONTROL

Use the ▼ and ▲ buttons to select a preset. When you power down, the last preset will return on power up. To increase the scrolling speed, press both ▼ and ▲ buttons. For instance, to scroll up faster first press the ▲ button then press the ▼ button.

AUTOFLOW

Autoflow provides a simple and instant way to configure a second Synth module for overflow purposes. When a MIDI cable is connected from the MIDI Out of the first unit to the MIDI In of the second, overflow status is automatically detected. Autoflow will cause the first unit in the chain to send out Note On and other events to the second unit when the maximum polyphony (12 voices) has been exceeded.

Autoflow mode is intended to work with additional Synth modules which have the same configuration as the first in the chain—channel, MIDI Mode, Multi presets, etc. Using Autoflow with any other MIDI tone module may not produce the expected results.

Advanced use with a PC 1600

When using the Synth with a PC 1600 it is possible to create your own patches. When you create a patch it is loaded into the edit buffer overwriting whatever is there. You can create a patch by editing an existing patch or by starting from scratch. It is important to note, however, that any patch you edit or create will be lost—by changing the patch number or turning the power off—so if you like what you have, save it. You can save your creations by dumping them to the Peavey MIDI Streamer™, any other SysEx recorder, or the Synth's internal RAM (64 locations).

▼ To download the Synth creation patches

1. Connect the MIDI Out on the Synth to the MIDI In on the PC 1600.
2. Select the starting patch location on the Synth. Since there are 24 patches to be downloaded you need to select patch 0-25 on the Synth.
3. Press and hold the **Transpose** button then press the **MIDI Mode** button to download the patches.
4. Now reconnect the MIDI cables to their original locations. (i.e., connect the MIDI Out on the PC 1600 to the MIDI In on the Synth.)

PATCH EDITING DESCRIPTIONS

Synth Osc 1

Fader 1—Wave (0-123)

This selects the waveform or tone to be used for the sound of the oscillator.

Fader 2—Coarse Tune (± 24)

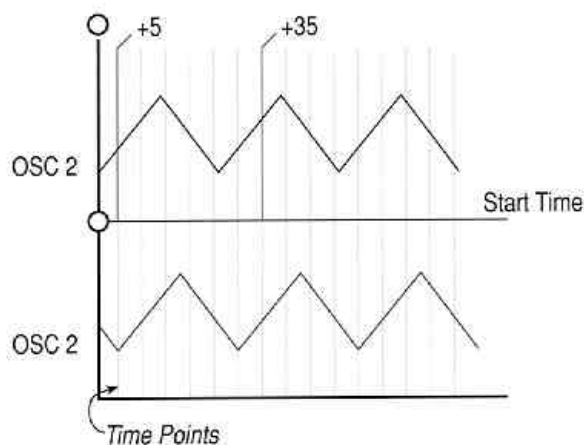
This adjusts the master tuning in semitone steps.

Fader 3—Fine Tune (± 99)

This adjusts the master tuning in cents (1/100 of a semitone).

Fader 4—Wave Start (0-127)

The raw wave is divided into 128 “time points.” The wave can be started from any of the 128 “time points.” Thereby changing the phase relationship when using more than one wave.



Fader 5—Start Mod (0-15)

This applies one of the modulation sources (see table on page 31) to the **Wave Start** point defined above.

Fader 6—Start ModSens (± 99)

This sets the sensitivity (how close to the selected wave start) of when the wave will start. *For example:* If **Wave Start** is set to **5**, **Start Mod** to **9** (LFO 1) and **Start ModSens** to **10**. The starting point of the wave will vary between +5 and +15 depending on the LFO.

Fader 7—Mod Range (0-13)

This sets the pitch modulation range of the modulation source, in semitones, for **Mod Source 1** and **Mod Source 2**.

Mod Range Table

Setting	Value	Setting	Value
0	OFF	7	7 semitones
1	1 semitone	8	8 semitones
2	2 semitones	9	9 semitones
3	3 semitones	10	10 semitones
4	4 semitones	11	11 semitones
5	5 semitones	12	1 octave
6	6 semitones	13	2 octaves

Fader 8—Mod Source 1 (0-15)

This selects one of the modulation sources (see table) to use for the pitch modulation of oscillator 1.

Fader 9—Mod Source 2 (16-31)

This selects a second modulation source from one of the modulation sources (see table) to use for the pitch modulation of oscillator 1.

Fader 10—Mod 1 Sns (± 99)

This sets the sensitivity of **Mod Source 1**. *For example:* To create a vibrato effect: Set the **Mod Source 1** to **9** (LFO 1) and **Mod 1 Sns** to a value between **32** and **36**.

Fader 11—Mod 2 Sns (± 99)

This sets the sensitivity of **Mod Source 2**.

Note: If the **Mod Range** is set to anything other than **0**, the **Mod 1 Sns** (or **Mod 2 Sns**) becomes a way to fine tune the **Mod Range**.

Fader 12—DCA 1 Level (0-99)

This sets the volume of the oscillator (or wave).

Fader 13—DCA 1 Mod Source 1 (0-15)

This selects the modulation source (see table) for DCA 1.

Fader 14—DCA 1 Mod Source 2 (16-31)

This selects a second modulation source for DCA 1 from one of the modulation sources (see table).

Fader 15—DCA 1 Mod 1 Sens (± 99)

This sets the sensitivity of **DCA 1 Mod Source 1**. *For example:* For velocity use modulation source 1 (velocity) and set **DCA 1 Mod 1 Sens** to **70**. This will result in a volume from very quiet to loud. The higher the sensitivity is set, the greater the range.

Fader 16—DCA 1 Mod 2 Sens (± 99)

This sets the sensitivity of **DCA 1 Mod Source 2**.

Button 1—Sync On/Off

Turns the oscillator sync **ON** or **OFF**.

Button 2—Init Edit Bf

This initializes the edit buffer to provide a clean starting point for creating your sounds.

Button 15—Dump All

This allows you to send all RAM patches from the MIDI Out to the Peavey MIDI Streamer™ or any other SysEx recorder.

Button 16—Save Patch

This saves your current edits to the *current patch location* as displayed on the Synth.

Synth Osc 2-4

The Synth contains four oscillators; however, only two of these are “active” at all times. To enable oscillators 3 & 4 see the **Synth Program Type** patch descriptions. Since all of the oscillators have the same parameter options we will describe them only once.

Fader 1—Wave (0-123)

This selects the waveform or tone to be used for the sound of the oscillator.

Fader 2—Coarse Tune (± 24)

This adjusts the master tuning in semitone steps.

Fader 3—Fine Tune (± 99)

This adjusts the master tuning in cents (1/100 of a semitone).

Fader 4—Wave Start (0-127)

The raw wave is divided into 128 “time points.” The wave can be started from any of the 128 “time points,” thereby changing the phase relationship when using more than one wave. (See graph with Osc 1.)

Fader 5—Start Mod (0-15)

This applies one of the modulation sources (see table) to the **Wave Start** point defined above.

Fader 6—Start ModSns (± 99)

This sets the sensitivity (how close to the selected wave start) of when the wave will start. *For example:* If **Wave Start** is set to **5**, **Start Mod** to **9** (LFO 1) and **Start ModSns** to **10**, the starting point of the wave will vary between +5 and +15 depending on the LFO.

Fader 7—Mod Range (0-13)

This sets the pitch modulation range of the modulation source, in semitones, for **Mod Source 1** and **Mod Source 2**. See the table provided above for a complete list.

Fader 8—Mod Source 1 (0-15)

This selects one of the modulation sources (see table) to use for the pitch modulation of oscillator 1.

Fader 9—Mod Source 2 (16-31)

This selects a second modulation source from one of the modulation sources (see table) to use for the pitch modulation of oscillator 1.

Fader 10—Mod 1 Sns (± 99)

This sets the sensitivity of **Mod Source 1**. *For example:* To create a vibrato effect: Set the **Mod Source 1** to **9** (LFO 1) and **Mod 1 Sns** to a value between **32** and **36**.

Fader 11—Mod 2 Sns (± 99)

This sets the sensitivity of **Mod Source 2**.

Note: If the **Mod Range** is set to anything other than **0**, the **Mod 1 Sns** (or **Mod 2 Sns**) parameter becomes a way to fine tune the **Mod Range**.

Fader 12—DCA 1 Level (0-99)

This sets the volume of the oscillator (or wave).

Fader 13—DCA 1 Mod Source 1 (0-15)

This selects the modulation source (see table) for DCA 1.

Fader 14—DCA 1 Mod Source 2 (16-31)

This selects a second modulation source for DCA 1 from one of the modulation sources (see table).

Fader 15—DCA 1 Mod 1 Sns (± 99)

This sets the sensitivity of **DCA 1 Mod Source 1**. *For example:* For velocity use modulation source 1 (velocity) and set **DCA 1 Mod 1 Sns** to **70**. This will result in a volume from very quiet to loud. The higher the sensitivity is set, the greater the range.

Fader 16—DCA 1 Mod 2 Sns (± 99)

This sets the sensitivity of **DCA 1 Mod Source 2**.

Synth Filter/Synth Filter 2

The Synth contains two filter sections (one per each oscillator pair). To enable filter 2 see the **Synth Program Type** patch descriptions. Since both of these filter sections have the same parameter options, we will describe them only once.

Fader 1—Cutoff (0-99)

This sets the initial cutoff frequency. Lower values remove more harmonics, giving a more dull sound; higher values let more harmonics through, giving a brighter sound. Harmonically complex signals (like saw) are most affected by this control or parameter.

Fader 2—Resonance (0-99)

This sets the amount of gain at the filter's cutoff frequency. Higher settings give sharper, more "whistling" effects. *Caution: High resonance values can lead to distortion at high system levels.*

Fader 3—Mod Source 1 (0-15)

This selects one of the modulation sources (see table) to use for modulation of the filter.

Fader 4—Mod Source 2 (16-31)

This selects a second modulation source from one of the modulation sources (see table) to use for modulation of the filter.

Fader 5—Mod 1 Sns (± 99)

This sets the sensitivity of **Mod Source 1**. *For example:* To create a vibrato effect: Set the **Mod Source 1** to **9** (LFO 1) and **Mod 1 Sns** to a value between **32** and **36**.

Fader 6—Mod 2 Sns (± 99)

This sets the sensitivity of **Mod Source 2**.

Fader 7—Mod Source 3 (0-15)

This selects one of the modulation sources (see table) to use for modulation of the filter.

Fader 8—Mod 3 Sense (± 99)

This sets the sensitivity of **Mod Source 3**.

Fader 9—Res Mod Src 1 (0-15)

This selects one of the modulation sources (see table) to use for resonance modulation of the filter.

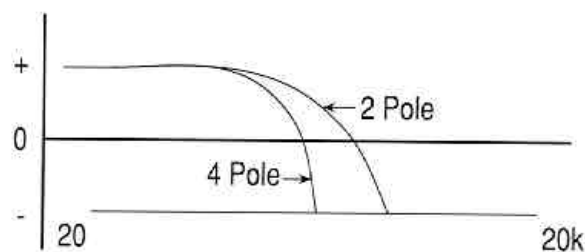
Fader 10—Res Mod Sns (± 99)

This sets the sensitivity of the **Res Mod Src**. *For example:* When **Res Mod Src** is **1** (velocity) and a **Res Mod Sns** is **40**, the resonance increases as you play harder.

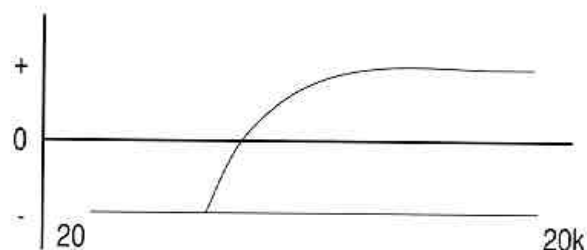
Fader 11—Filter Type (0-3)

This selects the type of filter to be used.

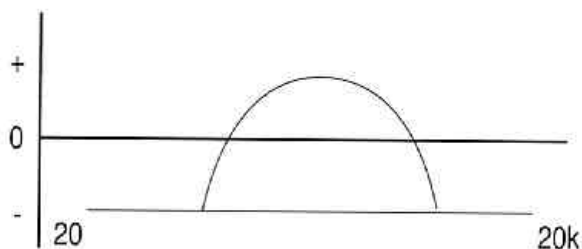
- 0** - *2 pole Low Pass* Passes the frequencies up to the Cutoff point.
- 1** - *4 pole Low Pass* Passes the frequencies up to the Cutoff point with a steeper cutoff rate.
- 2** - *Band Pass* Passes only a narrow band of frequencies.
- 3** - *High Pass* Passes the frequencies above the Cutoff point.



Low Pass



High Pass



Band Pass

Fader 12—Envelope Sensitivity (± 99)

This sets the amount of envelope control applied to the filter.

Synth Mod Squad

Fader 1—KS1Brk Point (0-127)

This sets the key at which the keyboard scale breaks. *For example:* If **KS1Brk Point** is set to **60**, the keyboard break point would be the key that corresponds with this. In this case, C4. These are the MIDI Note numbers from 0-127.

Fader 2—KS1Low Slope (± 127)

This sets how fast or slow the keyboard scaling rises (positive values) or falls (negative values) on the left side of the break point.

Fader 3—KS1HighSlope (± 127)

This sets how fast or slow the keyboard scaling rises (positive values) or falls (negative values) on the right side of the break point.

Fader 4—KS2Brk Point (0-127)

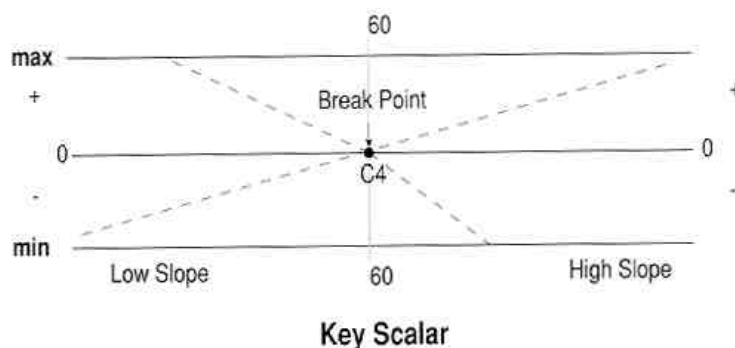
This sets the key at which the keyboard scale breaks. *For example:* If **KS2Brk Point** is set to **60**, the keyboard break point would be the key that corresponds with this. In this case, C4.

Fader 5—KS2Low Slope (± 127)

This sets how fast or slow the keyboard scaling rises (positive values) or falls (negative values) on the left side of the break point.

Fader 6—KS2HighSlope (± 127)

This sets how fast or slow the keyboard scaling rises (positive values) or falls (negative values) on the right side of the break point.



Fader 7—Prog Pan L/R (± 99)

This pans the program left to right. A setting of -99 pans full left, while a setting of 99 pans full right. When this value is zero, the Pan is centered.

Fader 8—Pan Mod Src1 (0-15)

This selects one of the modulation sources (see table) to use for pan modulation.

Fader 9—Pan Mod Src2 (16-31)

This selects a second modulation source from one of the modulation sources (see table) to use for pan modulation.

Fader 10—Pan Mod1 Sns (± 99)

This sets the sensitivity of **Pan Mod Src1**.

Fader 11—Pan Mod2 Sns (± 99)

This sets the sensitivity of **Pan Mod Src2**.

Fader 12—Porta (On/Off)

This sets the portamento to on or off.

Fader 13—Porta-Time (0-99)

This sets the “glide” time between notes. The lower the setting, the faster the glide. A setting of zero turns this off.

Fader 14—Porta-TMod 0-15

Selects one of the modulation sources (see table) to modulate the portamento time.

Fader 15—Porta-TM Sns (± 99)

This sets the sensitivity of the portamento time mod source.

Synth Pan 2

Fader 1—Prog Pan L/R (± 99)

This pans the program left to right. A setting of **-99** pans full left while a setting of **+99** pans full right. When this value is zero the Pan is centered.

Fader 2—Pan Mod Src1 (0-15)

Selects a pan modulation source from one of the modulation sources (see table).

Fader 3—Pan Mod Src2 (16-31)

Selects a second pan modulation source from one of the modulation sources (see table).

Fader 4—Pan Mod1 Sns (± 99)

This sets the sensitivity of Pan Mod Source 1.

Fader 5—Pan Mod2 Sns (± 99)

This sets the sensitivity of Pan Mod Source 2.

Synth Smpl&Hold

Fader 1—Input Src 1 (0-15)

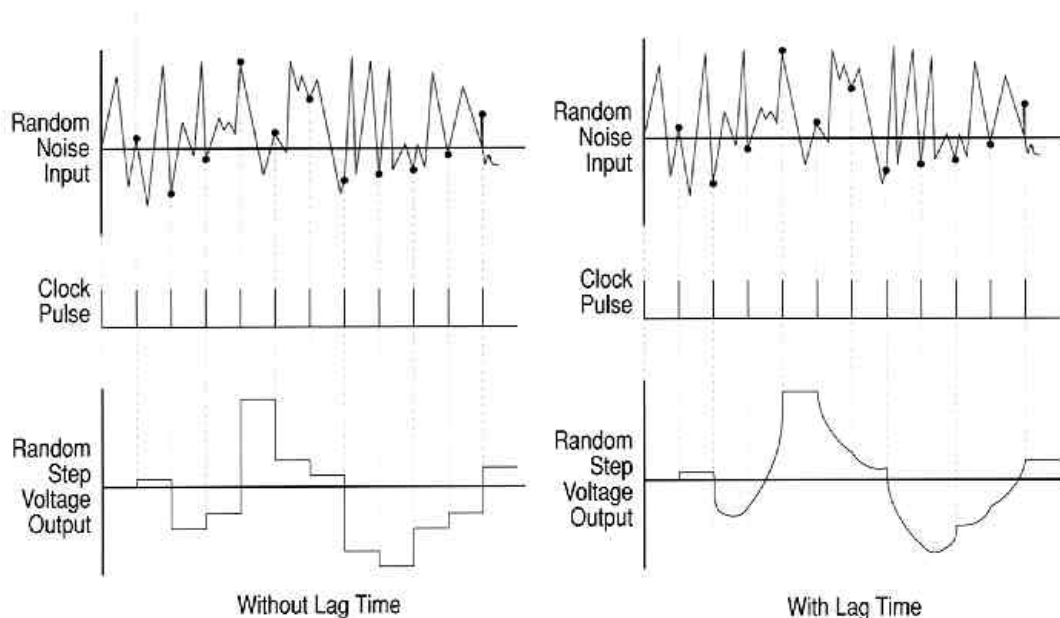
This selects one of the sample and hold input sources (see table on page 31).

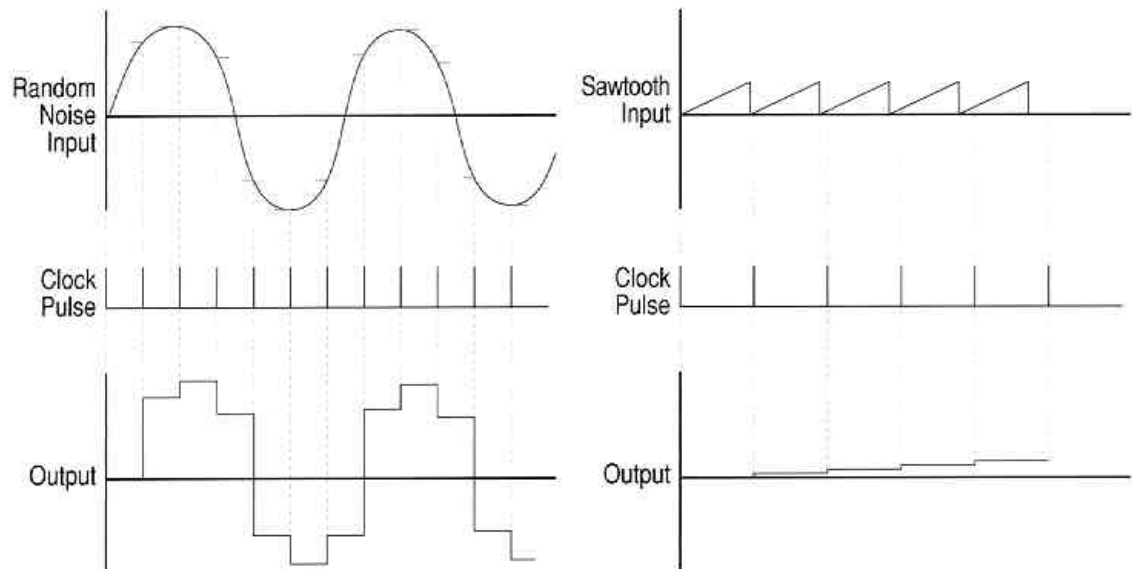
Fader 2—Input Src 2 (16-31)

This selects a second sample and hold input source (see table on page 31).

Fader 3—Clock Rate (0-99)

This determines how many samples are taken from the input source.





Fader 4—Clock Mod (0-15)

This selects one of the modulation sources (see table) to modulate the clock.

Fader 5—Clock ModSns (± 99)

This scales the clock modulation source.

Fader 6—Lag Time (0-99)

This sets the amount of time before **Clock Rate** modulation begins.

Fader 7—Lag Time Mod (0-15)

This sets the glide or smoothing between steps in the output.

Fader 8—Time Mod Sns (± 99)

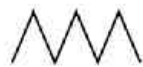
This scales the lag time modulation source.

Synth LFO 1/LFO 2

The Synth contains two LFOs assignable as any modulation source.

Fader 1—Waveshape (0-4)

This allows you to select one of the following waveshapes for the LFO.



TRI (triangle) Equal rise and fall times. Useful for vibrato and tremolo.



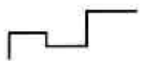
SAW (sawtooth) Rises to maximum level, snaps back to zero.



Ramp Falls to minimum level, snaps back to maximum.



SQR (square) Alternates between minimum and maximum values; useful for trills.



RNDM (random) Each LFO cycle produces a randomly-generated level; useful for sound effects and adding randomized pitch variations.

Fader 2—Rate (0-99)

This sets the speed of the LFO. This goes from slow (0) to fast (99).

Fader 3—Amount (0-99)

This sets the maximum signal level generated by the LFO, from minimum (00) to maximum (99).

Fader 4—Fade In Time (0-99)

This sets the amount of time over which the LFO modulation fades in (unlike delay, where the modulation comes in at the programmed level *after* the delay period has elapsed). Delay settings greater than 0 activate the fade in.

Fader 5—Delay (0-99)

This sets a delay time before the LFO will start.

Fader 6—Sync (0-1)

This turns the sync **ON** (0) or **OFF** (1). When the sync is turned **ON**, the LFO will always restart at the same point on the LFO wave when a key is pressed. When the sync is turned **OFF**, the LFO wave is free running. This provides a random start point on the LFO wave when a key is pressed.

Fader 7—Amt MW Sns (± 99)

Sets the amount of LFO modulation controlled by the mod wheel.

Fader 8—Rate MW Sns (± 99)

This controls the rate (speed) of the LFO from the mod wheel.

Fader 9—Amt Mod Src (0-15)

This selects one of the modulation sources (see table) to modulate the LFO amount.

Fader 10—Amt Mod Sns (± 99)

This sets the sensitivity of the modulator.

Fader 11—Rate Mode Source (16-31)

This selects a second modulation source (see table) to modulate the LFO.

Fader 12—Mod Rate Sensitivity (± 99)

This sets the sensitivity of the modulator.

Synth Prog Type

Fader 1—Prog Type (0-4)

This selects the type of patch you want. The program types are:

- 0** - oscillator pair 1 (uses oscillators 1 and 2)
- 1** - oscillator pair 2 (uses oscillators 3 and 4)
- 2** - oscillator pair 1 & 2 layered (uses all four oscillators and layers them)
- 3** - oscillator pair 1 & 2 cross switch (uses all four oscillators with a switch point to cross from pair 1 to pair 2)
- 4** - oscillator pair 1 & 2 crossfade (uses all four oscillators and crossfades between pair 1 and pair 2)

Fader 2—Pivot Point (0-127)

This is the MIDI note number where the crossfade or switch will occur.

Fader 3—Xfade/Xswtch (0-15)

This selects one of the modulation sources (see table) to modulate the crossfade/cross switch.

Fader 4—Crossfade Region ± 99

This sets the width of the crossfade. This parameter has no effect when any program type other than **4** (crossfade) is selected.

Synth FltrDAHDSR / Fltr2DAHDSR

The Synth contains two filter sections (one per oscillator pair). To enable filter 2 see the **Synth Program Type** patch descriptions. Since both of these filter sections have the same parameter options, we will describe them only once.

Fader 1—Env Sns (± 99)

This sets the amount of envelope control applied to the filter.

Fader 2—Delay (0-127)

This sets the amount of time before the attack of the envelope starts. A setting of **0** has no delay and a setting of **99** has more delay than that.

Fader 3—Attack (0-127)

The sets the amount of time it takes for the filter to reach its set amount as determined by the Envelope Sensitivity. A setting of **0** is a very fast attack, a setting of **99** is an extremely slow attack.

Fader 4—Hold (0-127)

The amount of time the filter maintains its peak level. A value of **0** is a very short hold, a value of **99** is long hold.

Fader 5—Decay (0-127)

This is the amount of time it takes for the filter to reach its sustain level.

Fader 6—Sustain (0-127)

This is the amount of time the filter sustains.

Fader 7—Release (0-127)

The amount of time the filter sustains after the note has been released (key up).

Note: See the graph in the Amp Envelope descriptions.

Synth FEnv Mods / Synth FEnv2 Mods

The Synth contains two filter sections (one per oscillator pair). To enable filter 2 see the **Synth Program Type** patch descriptions. Since both of these filter sections have the same parameter options, we will describe them only once.

Fader 1—Vel Level (± 99)

This applies a velocity level to the filter envelope amount. *For example:* A value of **50** increases the amount of the filter envelope, while a value of **-50** decreases the amount of the filter envelope.

Fader 2—Level ModSrc (0-15)

This selects one of the modulation sources (see table) the envelope amount.

Fader 3—Level ModSns (± 99)

This selects how much the mod source affects the envelope amount.

Fader 4—Delay ModSrc (0-15)

This selects one of the modulation sources (see table) the envelope amount.

Fader 5—Delay ModSns (± 99)

This selects one of the modulation sources (see table) the envelope amount.

Fader 6—Atk ModSrc (0-15)

This selects one of the modulation sources (see table) the envelope amount.

Fader 7—Atk ModSns (± 99)

This selects how much the mod source affects the envelope amount.

Fader 8—Hld ModSrc (0-15)

This selects one of the modulation sources (see table) the envelope amount.

Fader 9—Hld ModSns (± 99)

This selects how much the mod source affects the envelope amount.

Fader 10—Decay ModSrc (0-15)

This selects one of the modulation sources (see table) the envelope amount.

Fader 11—Decay ModSns (± 99)

This selects how much the mod source affects the envelope amount.

Fader 12—Rel ModSrc (0-15)

This selects one of the modulation sources (see table) the envelope amount.

Fader 13—Rel ModSns (± 99)

This selects how much the mod source affects the envelope amount.

Synth AEnvDAHDSR / SynthAEnv2DAHDSR

The Synth contains two amplitude envelopes; however, only one is “active” at all times. To enable **amp env 2** see the **Synth Program Type** patch descriptions. Since both of these envelopes have the same parameter options, we will describe them only once.

Fader 1—Prog Volume (0-99)

Sets the overall patch volume.

Fader 2—Delay (0-127)

This sets the amount of time before the attack of the envelope starts. A setting of **0** has no delay and a setting of **99** has more delay than that.

Fader 3—Attack (0-127)

This sets the amount of time it takes for the wave to reach its set amount as determined by the Envelope Sensitivity. A setting of zero is a very fast attack; a setting of 99 is an extremely slow attack.

Fader 4—Hold (0-127)

The amount of time the envelope maintains its peak level. A value of **0** is very short; a value of **99** is long.

Fader 5—Decay (0-127)

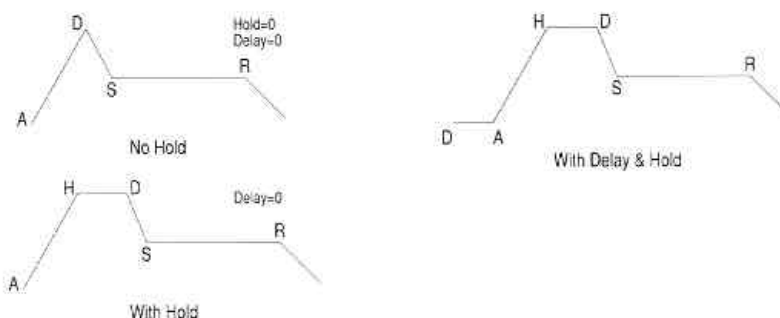
The amount of time it takes for the envelope to reach its sustain level.

Fader 6—Sustain (0-127)

The amount of time the envelope sustains.

Fader 7—Release (0-127)

The amount of time the envelope sustains after the note has been released (key up).



Synth AEnv Mods / Synth AEnv2 Mods

The Synth contains two amplitude envelopes, however, only one is “active” at all times. To enable **amp env 2** see the **Synth Program Type** patch descriptions. Since both of these filters have the same parameter options we will describe them only once.

Fader 1—Vel Level (± 127)

Applies a velocity level to the amplitude envelope amount. *For example:* A value of **50** increases the amount of the amplitude envelope while a value of **-50** decreases the amount of the amplitude envelope.

Fader 2—Level Mod Src (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 3—Level Mod Sns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 4—Delay ModSrc (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 5—Delay ModSns (± 99)

Selects one of the modulation sources (see table) the envelope amount.

Fader 6—Atk Mod Src (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 7—Atk Mod Sns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 8—Hld Mod Src (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 9—Hld Mod Sns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 10—Decay ModSrc (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 11—Decay ModSns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 12—Rel Mod Src (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 13—Rel Mod Sns (± 99)

Selects how much the mod source affects the envelope amount.

Synth Aux1DAHDSR / Synth Aux2DAHDSR

The Synth contains two aux envelopes assignable as a modulation source. Since both of these envelopes have the same parameter options we will describe them only once.

Fader 1—Delay (0-127)

This sets the amount of time before the attack of the envelope starts. A setting of 0 has no delay and a setting of 99 has more delay than that.

Fader 2—Attack (0-127)

The sets the amount of time it takes for the envelope to reach its set amount as determined by the Envelope Sensitivity. A setting of zero is a very fast attack, a setting of 99 is an extremely slow attack.

Fader 3—Hold (0-127)

This is the amount of time the envelope maintains its peak level. A value of **0** is a very short hold, a value of **127** is long hold.

Fader 4—Decay (0-127)

The amount of time it takes for the envelope to reach its sustain level.

Fader 5—Sustain (0-127)

The amount of time the envelope sustains.

Fader 6—Release (0-127)

The amount of time the envelope sustains after the note has been released (key up).

Note: See graph with Amp Envelope DAHDSR.

Synth Aux1 Mods / Synth Aux2 Mods

The Synth contains two aux envelopes assignable as a modulation source. Since both of these envelopes have the same parameter options we will describe them only once.

Fader 1—Vel Level (± 127)

Applies a velocity level to the aux envelope amount. For example: A value of 50 increases the amount of the aux envelope while a value of -50 decreases the amount of the aux envelope.

Fader 2—Level ModSrc (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 3—Level ModSns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 4—Delay ModSrc (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 5—Delay ModSns (± 99)

Selects one of the modulation sources (see table) the envelope amount.

Fader 6—Atk Mod Src (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 7—Atk Mod Sns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 8—Hld Mod Src (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 9—Hld Mod Sns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 10—Decay ModSrc (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 11—Decay ModSns (± 99)

Selects how much the mod source affects the envelope amount.

Fader 12—Rel Mod Src (0-15)

Selects one of the modulation sources (see table) the envelope amount.

Fader 13—Rel Mod Sns (± 99)

Selects how much the mod source affects the envelope amount.

MOD SOURCES/SAMPLE AND HOLD INPUT SOURCES

Mod 1 (Valid Numbers) (0-15)	Mod 2 (Valid Numbers) (16-31)	Mod Source
0	16	Off (*0-15 is mod source 1)
1	17	Velocity (*16-31 is mod source 2)
2	18	Keyboard
3	19	Key Scalar 1
4	20	Key Scalar 2
5	21	Mod Wheel
6	22	Pressure
7	23	Aux Env 1
8	24	Aux Env 2
9	25	LFO 1
10	26	LFO 2
11	27	Sample and Hold Output 1
12	28	Random
13	29	Pitch Wheel
14	30	MIDI Continuous Controller 1
15	31	MIDI Continuous Controller 2

WAVEFORM REFERENCE LIST

Wave Number	Wave Type	Wave Number	Wave Type	Wave Number	Wave Type
0	sine	52	pulse od12	104	noise9
1	tri	53	ringmod1	105	strike
2	trisaw	54	ringmod2	106	synth26
3	sawpul2	55	ringmod3	107	synth29
4	ramp	56	ringmod4	108	buzzbomb
5	saw	57	ringmod5	109	spring pluk
6	lightsaw	58	ringmod6	110	strat pluk
7	squawpulse	59	organ1	111	fmblock
8	subsaw	60	hollow tri	112	percustr
9	square	61	organ2	113	pluk
10	pwm33	62	sharp organ	114	percmp3
11	pwm31	63	phase shift1	115	arpcg2
12	pwm26	64	phase shift2	116	mashta
13	pwm21	65	phase shift3	117	addex2
14	pwm16	66	phase shift4	118	moddemo
15	pwm11	67	phase shift5	119	lostboy
16	pwm6	68	sharp buzz	120	bigmark
17	pwm1	69	rockman	121	faux vox1
18	pwm41	70	highpass saw	122	faux vox2
19	pwm46	71	phase pulsaw	123	zap
20	pwm48	72	sharp lead		
21	pwm49	73	syncpulse		
22	pwm50	74	vocalbass		
23	pwm51	75	fm2		
24	saw overdrive1	76	sawpul1		
25	saw od2	77	gravel1		
26	saw od3	78	gravel2		
27	saw od4	79	gravel3		
28	saw od5	80	gravel4		
29	saw od6	81	cowabunga		
30	saw od7	82	cowabungb		
31	saw od8	83	cowabunge		
32	saw od9	84	cowabungd		
33	saw od10	85	coldtrain1		
34	saw od11	86	coldtrain2		
35	saw od12	87	metal gtr1		
36	saw od13	88	metal gtr2		
37	saw od14	89	cello		
38	saw od15	90	nasty		
39	saw od16	91	synbas		
40	saw od17	92	membs1		
41	pulse overdrive1	93	membs2		
42	pulse od2	94	m851		
43	pulse od3	95	bass5a		
44	pulse od4	96	bass6b		
45	pulse od5	97	bass8a		
46	pulse od6	98	bass7a		
47	pulse od7	99	bass2a		
48	pulse od8	100	turbo1		
49	pulse od9	101	power fifth		
50	pulse od10	102	white noise		
51	pulse od11	103	noise8		

Appendix A MIDI Implementaion

MIDI Implementation

Model: Spectrum Synth

Date: 2/95
Version: 1.0

Function		Transmitted*	Recognized	Remarks
Basic Channel	Default Channel	1 1-16	1 1-16	
Mode	Default Messages Altered	X X X	X X X	Set at front panel
Note Number	True Voice	0-127	24-108	
Velocity	Note On Note Off	0 X	0 X	
After-touch	Key's Ch's	X 0	X 0	Maps to any control change
Pitch Bender		0	0	
Control Change		1 - Mod Wheel 7 - Volume 10 - Pan Controller 64 - Sustain 68 - Legato Footswitch Controller 121 - Reset All Controllers 123 - All Notes Off	1 - Mod Wheel 7 - Volume 10 - Pan Controller 64 - Sustain 68 - Legato Footswitch Controller 121 - Reset All Controllers 123 - All Notes Off	2 assignable controllers 1-119
Program Change	True#	0-127	0-127	
System Exclusive		0	0	
System Common	: Songs Pos : Song Sel : Tune	X X X	X X X	
System Real Time	: Clock : Commands	X X	X X	
Auxiliary Messages	: Local On/Off : All Notes Off : Active Sense : Reset	X 0 X X	X 0 X X	
* Transmitted in overflow				

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO

O : Yes
X : No

Appendix B System Exclusive

SYSTEM EXCLUSIVE AND VOICE ARCHITECTURE

The Synth has a System Exclusive implementation which makes it possible to perform patch editing for a single patch residing in the edit buffer. The contents of this edit buffer are lost on power down.

Spectrum Synth System Exclusive Command Format

F0	System Exclusive Command
00 00 1B	Peavey System Exclusive
02	Keyboard Family I.D.
09	Spectrum Synth I.D.
<CH>	MIDI In Channel
08	Update Edit Buffer Command
<ph, pl, vh, vl>	Updates the Memory Byte at parameter offset ph, pl
F7	End of System Exclusive

Note: Parameter offsets are 7-bitized and values are nibblized.

Example 1:

For a desired Filter 1 resonance value of 27 (1bh), the following string would be sent:

F0 00 00 1B 02 09 00 08 00 22 01 0b F7

This is assuming the Synth is on MIDI channel 1. Notice how the value of 1bh is nibblized.

Example 2:

For a desired osc1 coarse tuning value of -12 (F4h), the following string would be sent:

F0 00 00 1B 02 09 00 08 00 01 0f 04 F7

Notice that negative values are represented in two's complement.

The following is a table of program block offsets for the Synth.

Note: The *offset* values are listed in **hex**, the *range* values are listed in **decimal**.

Variable Name	Offset	Description	Range
Osc1Wave	00	Osc 1 waveshape	0-123
Osc1Coarse	01	Osc 1 coarse tuning	±24
Osc1Fine	02	Osc 1 fine tuning	±99
Reserved	03	Reserved for future use	
Osc1Start	04	Sample Start point	0-127
Osc1StartMod	05	Sample Start Modulation Source	0-15
Osc1SModSens	06	Sensitivity to Start Mod. Source	±99
Reserved	07	Reserved for future use	
Osc1ModRng	08	Pitch Mod. range for Mod Source 1 & 2	0-14
Osc1Mods	09		
Osc1Mod1Sens	0A	Sensitivity to Mod source 1	±99
Osc1Mod2Sens	0B	Sensitivity to Mod source 2	±99

Variable Name	Offset	Description	Range
Dca1Level	0C	Programmed DCA 1 volume	0-99
Dca1Mods	0D	DCA 1 Mod. Source	0-15
Dca1Mod1Sens	0E	Sensitivity to Mod source 1	±99
Dca1Mod2Sens	0F	Sensitivity to Mod source 2	±99
HardSync1	10	Sync On/Off	0-1
Osc2Wave	00	Osc 2 waveshape	0-123
Osc2Coarse	01	Osc 2 coarse tuning	±24
Osc2Fine	02	Osc 2 fine tuning	±99
Reserved	03	Reserved for future use	
Osc2Start	04	Sample Start point	0-127
Osc2StartMod	05	Sample Start Modulation Source	0-15
Osc2SModSens	06	Sensitivity to Start Mod. Source	±99
Reserved	07	Reserved for future use	
Osc2ModRng	08	Pitch Mod. range for Mod Source 1 & 2	0-14
Osc2Mods	09		
Osc2Mod1Sens	0A	Sensitivity to Mod source 1	±99
Osc2Mod2Sens	0B	Sensitivity to Mod source 2	±99
Dca2Level	0C	Programmed DCA 2 volume	0-99
Dca2Mods	0D	DCA 2 Mod. Source	0-15
Dca2Mod1Sens	0E	Sensitivity to Mod source 1	±99
Dca2Mod2Sens	0F	Sensitivity to Mod source 2	±99
Cutoff1	21	Programmed Filter cutoff frequency	0-99
Res1	22	Resonance	0-99
Flt1Mods	23	Filter Mod Source 1	0-15
Flt1Mod1Sens	24	Filter Mod Source 1 Sensitivity	±99
Flt1Mod2Sens	25	Filter Mod Source 2 Sensitivity	±99
Flt1Mod3	26	Filter Mod Source 3	0-15
Flt1Mod3Sens	27	Filter Mod Source 3 Sensitivity	±99
Res1Mod	28	Res 1 Mod Source	0-2
Res1ModSens	29	Res 1 Mod Source Sensitivity	±99
Flt1Type	2A	Filter Type	0-3
Flt1EnvSens	2B	Envelope Sensitivity	±99
KbdScaler1	2C-2E		
ksBreakPt	2C	Keyboard Break Point	0-127
ksLowSlope	2D	Keyboard Scale Low Slope	±99
ksHighSlope	2E	Keyboard Scale High Slope	±99
Flt1EnvBlk	2F-43		
Reserved	2F	Reserved for future use	0-3
ADSRDelay	30	Delay	0-127
ADSRAttack	31	Attack	0-127
ADSRHold	32	Hold	0-127
ADSRDecay	33	Decay	0-127
ADSRSustain	34	Sustain	0-127
ADSRRelease	35	Release	0-127
ADSRVelLev	36	Velocity Level	±99
Reserved	37	Reserved for future use	
ADSRLevMod	38	Level Mod Source	0-15
ADSRLevModSens	39	Sensitivity to Level Mod source	±99
ADSRDelayMod	3A	Delay Mod Source	0-15
ADSRDelModSens	3B	Sensitivity to Delay Mod source	±99

Variable Name	Offset	Description	Range
ADSRAttMod	3C	Attack Mod Source	0-15
ADSRAttModSens	3D	Sensitivity to Attack Mod source	±99
ADSRHoldMod	3E	Hold Mod Source	0-15
ADSRHoldModSens	3F	Sensitivity to Hold Mod source	±99
ADSRDecayMod	40	Decay Mod Source	0-15
ADSRDecModSens	41	Sensitivity to Decay Mod source	±99
ADSRReleasMod	42	Release Mod Source	0-15
ADSRRelModSens	43	Sensitivity to Release Mod source	±99
Pan1	44	Left/Right Pan	±99
Pan1Mods	45	Pan 1 Mod Source	0-15
Pan1Mod1Sens	46	Pan 1 Mod1 Source Sensitivity	±99
Pan1Mod2Sens	47	Pan 1 Mod2 Source Sensitivity	±99
Volume1	48	Patch Volume	0-99
Amp1EnvBlk	49-5D		
Reserved	49	Reserved for future use	0-3
ADSRDelay	4A	Delay	0-127
ADSRAttack	4B	Attack	0-127
ADSRHold	4C	Hold	0-127
ADSRDecay	4D	Decay	0-127
ADSRSustain	4E	Sustain	0-127
ADSRRelease	4F	Release	0-127
ADSRVelLev	50	Velocity Level	±99
Reserved	51	Reserved for future use	
ADSRLevMod	52	Level Mod Source	0-15
ADSRLevModSens	53	Sensitivity to Level Mod source	±99
ADSRDelayMod	54	Delay Mod Source	0-15
ADSRDelModSens	55	Sensitivity to Delay Mod source	±99
ADSRAttMod	56	Attack Mod Source	0-15
ADSRAttModSens	57	Sensitivity to Attack Mod source	±99
ADSRHoldMod	58	Hold Mod Source	0-15
ADSRHoldModSens	59	Sensitivity to Hold Mod source	±99
ADSRDecayMod	5A	Decay Mod Source	0-15
ADSRDecModSens	5B	Sensitivity to Decay Mod source	±99
ADSRReleasMod	5C	Release Mod Source	0-15
ADSRRelModSens	5D	Sensitivity to Release Mod source	±99
AuxEnv1Blk	5E-72		
Reserved	5E	Reserved for future use	0-3
ADSRDelay	5F	Delay	0-127
ADSRAttack	60	Attack	0-127
ADSRHold	61	Hold	0-127
ADSRDecay	62	Decay	0-127
ADSRSustain	63	Sustain	0-127
ADSRRelease	64	Release	0-127
ADSRVelLev	65	Velocity Level	±99
Reserved	66	Reserved for future use	
ADSRLevMod	67	Level Mod Source	0-15
ADSRLevModSens	68	Sensitivity to Level Mod source	±99
ADSRDelayMod	69	Delay Mod Source	0-15
ADSRDelModSens	6A	Sensitivity to Delay Mod source	±99
ADSRAttMod	6B	Attack Mod Source	0-15
ADSRAttModSens	6C	Sensitivity to Attack Mod source	±99
ADSRHoldMod	6D	Hold Mod Source	0-15

Variable Name	Offset	Description	Range
ADSRHoldModSens	6E	Sensitivity to Hold Mod source	±99
ADSRDecayMod	6F	Decay Mod Source	0-15
ADSRDecModSens	70	Sensitivity to Decay Mod source	±99
ADSRReleasMod	71	Release Mod Source	0-15
ADSRRelModSens	72	Sensitivity to Release Mod source	±99
AuxEnv2Blk	73-87		
Reserved	73	Reserved for future use	0-3
ADSRDelay	74	Delay	0-99
ADSRAttack	75	Attack	0-99
ADSRHold	76	Hold	0-99
ADSRDecay	77	Decay	0-99
ADSRSustain	78	Sustain	0-99
ADSRRelease	79	Release	0-99
ADSRVelLev	7A	Velocity Level	±99
ADSRKbdLev	7B	Keyboard Level	±99
ADSRLevMod	7C	Level Mod Source	0-15
ADSRLevModSens	7D	Sensitivity to Level Mod source	±99
ADSRDelayMod	7E	Delay Mod Source	0-15
ADSRDelModSens	7F	Sensitivity to Delay Mod source	±99
ADSRAttMod	80	Attack Mod Source	0-15
ADSRAttModSens	81	Sensitivity to Attack Mod source	±99
ADSRHoldMod	82	Hold Mod Source	0-15
ADSRHoldModSens	83	Sensitivity to Hold Mod source	±99
ADSRDecayMod	84	Decay Mod Source	0-15
ADSRDecModSens	85	Sensitivity to Decay Mod source	±99
ADSRReleasMod	86	Release Mod Source	0-15
ADSRRelModSens	87	Sensitivity to Release Mod source	±99
Lfo1Shape	88	LFO 1 waveshape	0-4
Lfo1Rate	89	Speed of LFO1	0-99
Lfo1Amount	8A	LFO 1 Max signal level	0-99
Lfo1FadeIn	8B	LFO 1 mod fade in time	0-99
Lfo1Delay	8C	LFO 1 delay time	0-99
Lfo1Sync	8D	LFO 1 Sync	0-1
Reserved	8E	Reserved for future use	
L1AmtWhlSens	8F	Amount of mod controlled by Mod Wheel	±99
L1RateWhlSens	90	Amount of mod controlled by Rate Wheel	±99
L1Mods	91	LFO 1 Mod source	0-15
L1AmtSens	92	Sensitivity to Mod Wheel	±99
L1RateSens	93	Sensitivity to Rate Wheel	±99
Lfo2Shape	94	LFO 2 waveshape	0-4
Lfo2Rate	95	Speed of LFO 2	0-99
Lfo2Amount	96	LFO 2 Max signal level	0-99
Lfo2FadeIn	97	LFO 2 mod fade in time	0-99
Lfo2Delay	98	LFO 2 delay time	0-99
Lfo2Sync	99	LFO 2 Sync	0-1
Reserved	9A	Reserved for future use	
L2AmtWhlSens	9B	Amount of mod controlled by Mod Wheel	±99
L2RateWhlSens	9C	Amount of mod controlled by Rate Wheel	±99
L2Mods	9D	LFO 2 Mod source	0-15
L2AmtSens	9E	Sensitivity to Mod Wheel	±99
L2RateSens	9F	Sensitivity to Rate Wheel	±99

Variable Name	Offset	Description	Range
SampleHold1	A0-A8		
Input1	A0	Input 1 Source	0-15
Input2	A1	Input 2 Source	16-31
Reserved	A2	Reserved for future use	
Clk	A3	Clock Rate	0-99
ClkMod	A4	Clock Mod Source	0-15
ClkModSens	A5	Clock Mod Source Sensitivity	±99
LagTime	A6	Amount of Time before clock mod begins	0-99
LagTimeMod	A7	Lag Time Mod Source	0-15
LagTModSens	A8	Lag Time Mod Source Sensitivity	±99
ProgType	A9		
XfadeXSPivot	AA	Crossfade/CrossSwitch Pivot Point	0-127
XfadeXSctrl	AB	Crossfade/CrossSwitch Mod Source	0-15
XfadeRegion	AC	Crossfade Region (width)	±99
PortType	AD	Portamento Type	On/Off
PortTime	AE	Portamento (glide time between notes)	0-99
PortTimeMod	AF	Portamento Time Mod Source	0-15
PortTModSens	B0	Portamento Time Mod Source Sensitivity	±99
SoloMode	B1	Solo Mode	0, 1
BendRange	B2	Bend Range	0-23
Osc3Wave	B3	Osc 3 waveshape	0-123
Osc3Coarse	B4	Osc 3 coarse tuning	±24
Osc3Fine	B5	Osc 3 fine tuning	±99
Reserved	B6	Reserved for future use	
Osc3Start	B7	Sample Start point	0-127
Osc3StartMod	B8	Sample Start Modulation Source	0-15
Osc3SModSens	B9	Sensitivity to Start Mod. Source	±99
Reserved	BA	Reserved for future use	
Osc3ModRng	BB	Pitch Mod. range for Mod Source 1 & 2	0-14
Osc3Mods	BC		
Osc3Mod1Sens	BD	Sensitivity to Mod source 1	±99
Osc3Mod2Sens	BE	Sensitivity to Mod source 2	±99
Dca3Level	BF	Programmed DCA 3 volume	0-99
Dca3Mods	C0	DCA 3 Mod. Source	0-15
Dca3Mod1Sens	C1	Sensitivity to Mod source 1	±99
Dca3Mod2Sens	C2	Sensitivity to Mod source 2	±99
HardSync2	C3	Sync On/Off	0-1
Osc4Wave	C4	Osc 4 waveshape	0-123
Osc4Coarse	C5	Osc 4 coarse tuning	±24
Osc4Fine	C6	Osc 4 fine tuning	±99
Reserved	C7	Reserved for future use	
Osc4Start	C8	Sample Start point	0-127
Osc4StartMod	C9	Sample Start Modulation Source	0-15
Osc4SModSens	CA	Sensitivity to Start Mod. Source	±99
Reserved	CB	Reserved for future use	
Osc4ModRng	CC	Pitch Mod. range for Mod Source 1 & 2	0-14
Osc4Mods	CD		
Osc4Mod1Sens	CE	Sensitivity to Mod source 1	±99
Osc4Mod2Sens	CF	Sensitivity to Mod source 2	±99

Variable Name	Offset	Description	Range
Dca4Level	D0	Programmed DCA 4 volume	0-99
Dca4Mods	D1	DCA 4 Mod. Source	0-15
Dca4Mod1Sens	D2	Sensitivity to Mod source 1	±99
Dca4Mod2Sens	D3	Sensitivity to Mod source 2	±99
Pan2	D4	Left/Right Pan	±99
Pan2Mods	D5	Pan 2 Mod Source	0-15
Pan2Mod1Sens	D6	Pan 2 Mod1 Source Sensitivity	±99
Pan2Mod2Sens	D7	Pan 2 Mod2 Source Sensitivity	±99
Cutoff2	21	Programmed Filter cutoff frequency	0-99
Res2	22	Resonance	0-99
Fil2Mods	23	Filter Mod Source 1	0-15
Fil2Mod1Sens	24	Filter Mod Source 1 Sensitivity	±99
Fil2Mod2Sens	25	Filter Mod Source 2 Sensitivity	±99
Fil2Mod3	26	Filter Mod Source 3	0-15
Fil2Mod3Sens	27	Filter Mod Source 3 Sensitivity	±99
Res2Mod	28	Res 2 Mod Source	0-2
Res2ModSens	29	Res 2 Mod Source Sensitivity	±99
Fil2Type	2A	Filter Type	0-3
Fil2EnvSens	2B	Envelope Sensitivity	±99
KbdScaler2	E3-E5		
ksBreakPt	E3	Keyboard Break Point	0-127
ksLowSlope	E4	Keyboard Scale Low Slope	±99
ksHighSlope	E5	Keyboard Scale High Slope	±99
Fil2EnvBlk	E6-FA		
Reserved	E6	Reserved for future use	0-3
ADSRDelay	E7	Delay	0-127
ADSRAttack	E8	Attack	0-127
ADSRHold	E9	Hold	0-127
ADSRDecay	EA	Decay	0-127
ADSRSustain	EB	Sustain	0-127
ADSRRelease	EC	Release	0-127
ADSRVelLev	ED	Velocity Level	±99
Reserved	EE	Reserved for future use	
ADSRLevMod	EF	Level Mod Source	0-15
ADSRLevModSens	F0	Sensitivity to Level Mod source	±99
ADSRDelayMod	F1	Delay Mod Source	0-15
ADSRDelModSens	F2	Sensitivity to Delay Mod source	±99
ADSRAttMod	F3	Attack Mod Source	0-15
ADSRAttModSens	F4	Sensitivity to Attack Mod source	±99
ADSRHoldMod	F5	Hold Mod Source	0-15
ADSRHoldModSens	F6	Sensitivity to Hold Mod source	±99
ADSRDecayMod	F7	Decay Mod Source	0-15
ADSRDecModSens	F8	Sensitivity to Decay Mod source	±99
ADSRReleasMod	F9	Release Mod Source	0-15
ADSRRelModSens	FA	Sensitivity to Release Mod source	±99
Volume1	FB	Patch Volume	0-99
Amp2EnvBlk	FC-110		
Reserved	FC	Reserved for future use	0-3
ADSRDelay	FD	Delay	0-127
ADSRAttack	FE	Attack	0-127

Variable Name	Offset	Description	Range
ADSRHold	FF	Hold	0-127
ADSRDecay	100	Decay	0-127
ADSRSustain	101	Sustain	0-127
ADSRRelease	102	Release	0-127
ADSRVelLev	103	Velocity Level	±99
Reserved	104	Reserved for future use	
ADSRLevMod	105	Level Mod Source	0-15
ADSRLevModSens	106	Sensitivity to Level Mod source	±99
ADSRDelayMod	107	Delay Mod Source	0-15
ADSRDelModSens	108	Sensitivity to Delay Mod source	±99
ADSRAttMod	109	Attack Mod Source	0-15
ADSRAttModSens	10A	Sensitivity to Attack Mod source	±99
ADSRHoldMod	10B	Hold Mod Source	0-15
ADSRHoldModSens	10C	Sensitivity to Hold Mod source	±99
ADSRDecayMod	10D	Decay Mod Source	0-15
ADSRDecModSens	10E	Sensitivity to Decay Mod source	±99
ADSRReleasMod	10F	Release Mod Source	0-15
ADSRRelModSens	110	Sensitivity to Release Mod source	±99
Reserved	111-143	Reserved for future use	

SAVED PARAMETERS

The Synth has a small EEPROM memory which is used to store global parameters. The following parameters are saved on power down and recalled on power up:

- Fine Tune
- MIDI Mode
- Current Program
- Multi Program Assignments
- Global Bend Range

Continuous controller values (including controller #7) are **not** saved.

BANK SELECT MESSAGES

The Bank Select message has been defined by the MIDI Manufacturers Association to consist of control change numbers 00h and 20h as shown below:

Bn h	Control change status byte on channel n
00h	Bank Select
0vvvvvvv	MSB (zeros for the Spectrum Synth)
20h	Bank Select
0vvvvvvv	LSB (zero or one for the Spectrum Synth)
Cn h	Program Change on channel n
0ppppppp	Program Number

Note that the Bank Select message **must** be followed by a Program Change message.

Example 1:

The Spectrum Synth will move to the program 27 in bank 1 if the following string is sent:

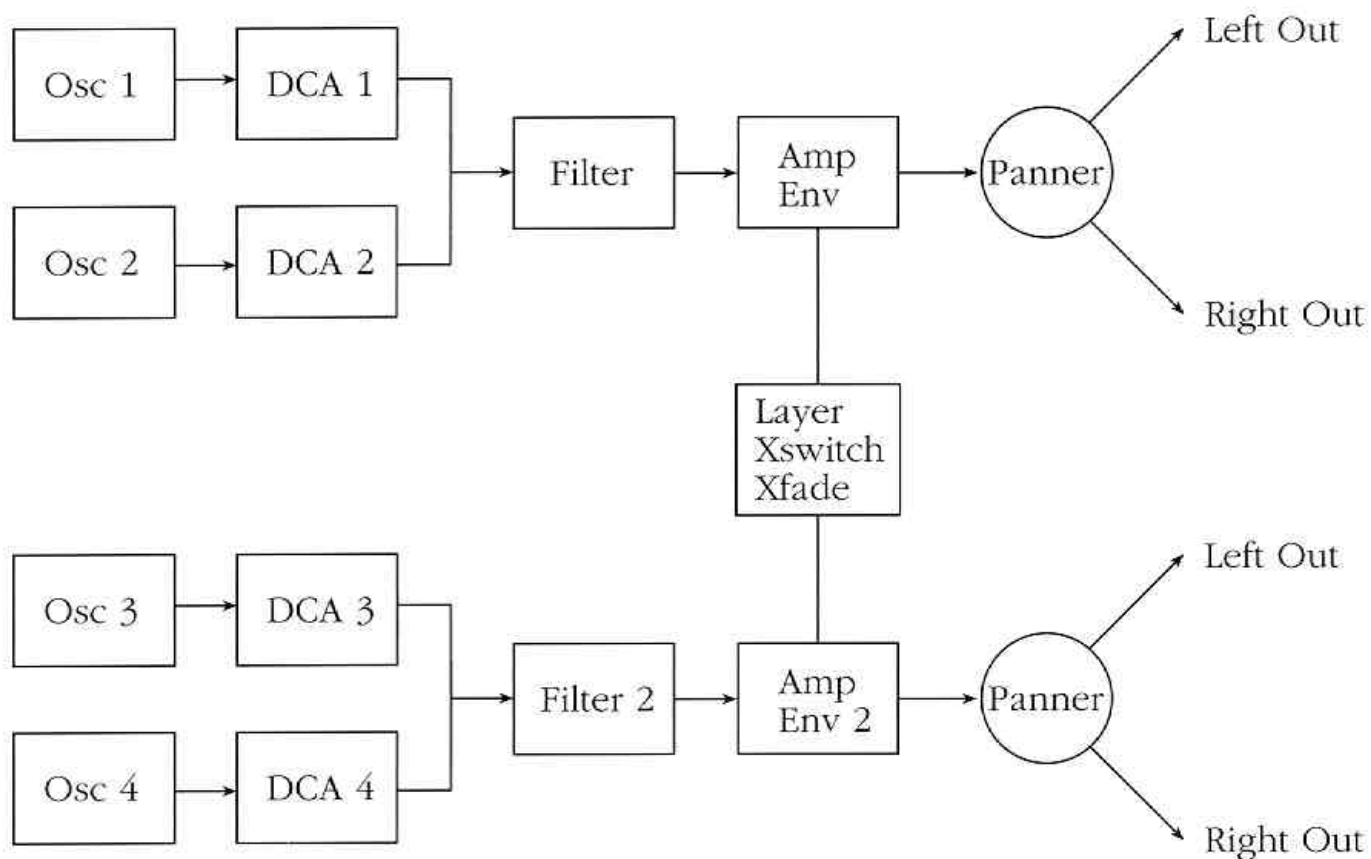
B0 00 00 20 01 C0 1a

Example 2:

The Spectrum Synth (on MIDI Channel 16) will move to program 27 in bank 0 (zero) if the following string is sent:

Bf 00 00 20 00 Cf 1a

VOICE ARCHITECHTURE



THIS LIMITED WARRANTY VALID ONLY WHEN PURCHASED AND REGISTERED IN THE UNITED STATES OR CANADA. ALL EXPORTED PRODUCTS ARE SUBJECT TO WARRANTY AND SERVICES TO BE SPECIFIED AND PROVIDED BY THE AUTHORIZED DISTRIBUTOR FOR EACH COUNTRY.

Ces clauses de garantie ne sont valables qu'aux Etats-Unis et au Canada. Dans tous les autres pays, les clauses de garantie et de maintenance sont fixées par le distributeur national et assurées par lui selon la législation en vigueur.

Diese Garantie ist nur in den USA und Kanada gültig. Alle Export-Produkte sind der Garantie und dem Service des Importeurs des jeweiligen Landes unterworfen. Esta garantía es válida solamente cuando el producto es comprado en E.U. continentales o en Canada. Todos los productos que sean comprados en el extranjero, están sujetos a las garantías y servicio que cada distribuidor autorizado determine y ofrezca en los diferentes países.

PEAVEY ONE-YEAR LIMITED

WARRANTY/REMEDY

PEAVEY ELECTRONICS CORPORATION ("PEAVEY") warrants this product, EXCEPT for covers, footswitches, patchcords, tubes and meters, to be free from defects in material and workmanship for a period of one (1) year from date of purchase, PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is subject to the conditions, exclusions, and limitations hereinafter set forth:

PEAVEY 90-DAY LIMITED WARRANTY ON TUBES AND METERS

If this product contains tubes or meters, Peavey warrants the tubes or meters contained in the product to be free from defects in material and workmanship for a period of ninety (90) days from date of purchase; PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and is also subject to the conditions, exclusions, and limitations hereinafter set forth.

CONDITIONS, EXCLUSIONS, AND LIMITATIONS OF LIMITED WARRANTIES

These limited warranties shall be void and of no effect, if:

- The first purchase of the product is for the purpose of resale; or
- The original retail purchase is not made from an AUTHORIZED PEAVEY DEALER; or
- The product has been damaged by accident or unreasonable use, neglect, improper service or maintenance, or other causes not arising out of defects in material or workmanship; or
- The serial number affixed to the product is altered, defaced, or removed.

In the event of a defect in material and/or workmanship covered by this limited warranty, Peavey will:

- In the case of tubes or meters, replace the defective component without charge.
- In other covered cases (i.e., cases involving anything other than covers, footswitches, patchcords, tubes or meters), repair the defect in material or workmanship or replace the product, at Peavey's option; and provided, however, that, in any case, all costs of shipping, if necessary, are paid by you, the purchaser.

THE WARRANTY REGISTRATION CARD SHOULD BE ACCURATELY COMPLETED AND MAILED TO AND RECEIVED BY PEAVEY WITHIN FOURTEEN (14) DAYS FROM THE DATE OF YOUR PURCHASE.

In order to obtain service under these warranties, you must:

- Bring the defective item to any PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER and present therewith the ORIGINAL PROOF OF PURCHASE supplied to you by the AUTHORIZED PEAVEY DEALER in connection with your purchase from him of this product.

If the DEALER or SERVICE CENTER is unable to provide the necessary warranty service you will be directed to the nearest other PEAVEY AUTHORIZED DEALER or AUTHORIZED PEAVEY SERVICE CENTER which can provide such service.

OR

- Ship the defective item, prepaid, to:
PEAVEY ELECTRONICS CORPORATION

International Service Center
326 Hwy. 11 & 80 East
MERIDIAN, MS 39301

including therewith a complete, detailed description of the problem, together with a legible copy of the original PROOF OF PURCHASE and a complete return address. Upon Peavey's receipt of these items:

If the defect is remedied under these limited warranties and the other terms and conditions expressed herein have been complied with, Peavey will provide the necessary warranty service to repair or replace the product and will return it, FREIGHT COLLECT, to you, the purchaser.

Peavey's liability to the purchaser for damages from any cause whatsoever and regardless of the form of action, including negligence, is limited to the actual damages up to the greater of \$500.00 or an amount equal to the purchase price of the product that caused the damage or that is the subject of or is directly related to the cause of action. Such purchase price will be that in effect for the specific product when the cause of action arose. This limitation of liability will not apply to claims for personal injury or damage to real property or tangible personal property allegedly caused by Peavey's negligence. Peavey does not assume liability for personal injury or property damage arising out of or caused by a non-Peavey alteration or attachment, nor does Peavey assume any responsibility for damage to interconnected non-Peavey equipment that may result from the normal functioning and maintenance of the Peavey equipment.

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THESE LIMITED WARRANTIES ARE IN LIEU OF ANY AND ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE; PROVIDED, HOWEVER, THAT IF THE OTHER TERMS AND CONDITIONS NECESSARY TO THE EXISTENCE OF THE EXPRESSED, LIMITED WARRANTIES, AS HEREINABOVE STATED, HAVE BEEN COMPLIED WITH, IMPLIED WARRANTIES ARE NOT DISCLAIMED DURING THE APPLICABLE ONE-YEAR OR NINETY-DAY PERIOD FROM DATE OF PURCHASE OF THIS PRODUCT.

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THESE LIMITED WARRANTIES ARE THE ONLY EXPRESSED WARRANTIES ON THIS PRODUCT, AND NO OTHER STATEMENT, REPRESENTATION, WARRANTY, OR AGREEMENT BY ANY PERSON SHALL BE VALID OR BINDING UPON PEAVEY.

In the event of any modification or disclaimer of expressed or implied warranties, or any limitation of remedies, contained herein conflicts with applicable law, then such modification, disclaimer or limitation, as the case may be, shall be deemed to be modified to the extent necessary to comply with such law.

Your remedies for breach of these warranties are limited to those remedies provided herein and Peavey Electronics Corporation gives this limited warranty only with respect to equipment purchased in the United States of America.

INSTRUCTIONS — WARRANTY REGISTRATION CARD

1. Mail the completed WARRANTY REGISTRATION CARD to:

PEAVEY ELECTRONICS CORPORATION
POST OFFICE BOX 2898
MERIDIAN, MISSISSIPPI 39302-2898

- a. Keep the PROOF OF PURCHASE. In the event warranty service is required during the warranty period, you will need this document. There will be no identification card issued by Peavey Electronics Corporation.
2. IMPORTANCE OF WARRANTY REGISTRATION CARDS AND NOTIFICATION OF CHANGES OF ADDRESSES:
 - a. Completion and mailing of WARRANTY REGISTRATION CARDS — Should notification become necessary for any condition that may require correction, the REGISTRATION CARD will help ensure that you are contacted and properly notified.
 - b. Notice of address changes — If you move from the address shown on the WARRANTY REGISTRATION CARD, you should notify Peavey of the change of address so as to facilitate your receipt of any bulletins or other forms of notification which may become necessary in connection with any condition that may require dissemination of information or correction.
 3. You may contact Peavey directly by telephoning (601) 483-5365.

IMPORTANT SAFETY INSTRUCTIONS

WARNING: When using electric products, basic cautions should always be followed, including the following.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e., a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
7. This product should not be placed near a source of heat such as a stove, radiator, or another heat producing amplifier.
8. Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding, write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
11. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
12. If this product is to be mounted in an equipment rack, rear support should be provided.
13. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag or an ammonia-based household cleaner if necessary. Disconnect unit from power supply before cleaning.
14. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
15. This unit should be checked by a qualified service technician if:
 - a. The power supply cord or plug has been damaged.
 - b. Anything has fallen or been spilled into the unit.
 - c. The unit does not operate correctly.
 - d. The unit has been dropped or the enclosure damaged.
16. The user should not attempt to service this equipment. All service work should be done by a qualified service technician.
17. This product should be used only with a cart or stand that is recommended by Peavey Electronics.
18. Exposure to extremely high noise levels may cause a permanent hearing loss. Individuals vary considerably in susceptibility to noise induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a sufficient time.

The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the following permissible noise level exposures.

Duration Per Day In Hours	Sound Level dBA, Slow Response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

According to OSHA, any exposure in excess of the above permissible limits could result in some hearing loss.

Ear plugs or protectors in the ear canals or over the ears must be worn when operating this amplification system in order to prevent a permanent hearing loss if exposure is in excess of the limits as set forth above. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels such as this amplification system be protected by hearing protectors while this unit is in operation.

SAVE THESE INSTRUCTIONS!



Features and specifications subject to change without notice.

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