

# TETRA4

## Operation Manual



*Dave Smith*  
I N S T R U M E N T S



# **Tetra**

## **Operation Manual**

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With FCC Standards  
FOR OFFICE USE



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:  
(1) This device may not cause harmful interference and  
(2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

For Technical Support, email: [support@davesmithinstruments.com](mailto:support@davesmithinstruments.com)

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# Quick Start

Thanks for purchasing your Tetra synthesizer! Listen to the sounds, twiddle some knobs, have some fun!

## Please Register!

Please go to [www.davesmithinstruments.com](http://www.davesmithinstruments.com) and register your synth. If you purchased directly from us, there is no need to register — we already have your contact information.

## Powering Up

So, plug in the power supply, connect (in stereo!) to your mixer/sound system, and start playing!

You can use the PUSH IT switch to trigger sounds without a keyboard. If you're using a MIDI keyboard, try applying keyboard pressure (aftertouch) and the mod wheel. Many sounds are fairly simple at first, and then come alive when you use the controllers. With other sounds, you may need to hold the notes a while to let the sound unfold. Playing in different ways has a big effect on the programs.

## Selecting and Editing Programs, Combos, and Global Settings

Use SELECT or the increment and decrement (+ and -) switches to step through the programs. Hold the switches down briefly to increment or decrement the bank. There are 4 banks of 128 programs. Banks 1 and 2 are the Prophet '08 factory programs.

If you want to edit a program, just turn any knob. The new value will be displayed in the bottom line of the LCD (the top line displays the programmed value for handy reference).

After turning knobs, just press the Mode (PROGRAM/COMBO/GLOBAL) switch to exit Edit Mode and return to Program Mode, allowing you to change programs again.

While in Program Mode, press the Mode switch again to change to Combo Mode. Combos contain a combination of four different programs—one per voice—that can be used to play polyphonically or in unison, or to play four different sequences simultaneously.

Press and hold the Mode switch briefly to display the Global menu and change higher level parameters such as MIDI channel number, Transpose/Detune, and so on. The SELECT knob changes the displayed page and increment and

decrement change the values. These settings are remembered when the synth is turned off.

## **Summary**

You should be up and running now; for more operation information, read on. Or, just look up specific parameters for detailed notes. Pages 41 through 43 contain a handy reference for mod destinations and sources. At some point you should read through the manual to discover all the little features that you might not notice at first.

Don't forget you get a free editor for Mac OS or Windows with your purchase. Download it from [www.soundtower.com/tetra](http://www.soundtower.com/tetra).

I should mention that this manual does not include explanations of basic analog synthesizer functions. It assumes you already know what an oscillator is, how a low-pass filter affects the sound, what an ADSR envelope looks like, and so on.

Fortunately, these days it is quite easy to find such resources on the Internet. If you want to learn the lingo and the basics, just try a search in Google (or the search engine of your choice), something like "analog synthesizer tutorial." You'll find plenty of good reading material.

Have fun!

Dave Smith

Special thanks to:

Tim Ande, Dave Polich, Ravi Sharma, James Terris, Stefan Trippler, and Jason Ware for their voicing work. Thanks also to the authors of the Prophet '08 programs, many of which are used in Tetra. Finally, the DSI Team: Chris Hector, Andrew McGowan, Joanne McGowan, and Tracy Wadley.



# Getting Connected

Tetra has several inputs and outputs on its back panel.

**Power Input** — Connect the power supply included with your Tetra. The power supply comes with different AC adaptor prongs that allow it to work anywhere in the world. If for whatever reason you need to use a different supply, it must match the specifications printed on the front panel.

**Note:** The power supply label says “Evolver” on it; we use the same supply for the mono Evolvers, Mophos, and the Prophets.

**USB** — Tetra transmits and receives MIDI data via this standard, Type B, USB receptacle.

**MIDI In** — To receive MIDI data from another device, connect this to the other device's MIDI Out.

**MIDI Out** — To send MIDI data to another device, connect this to the other device's MIDI In. This output can also be configured as a MIDI Thru using the MIDI Out Select parameter in the Global menu.

**Poly Chain Out** — Up to four Tetras can be chained for increased polyphony and multiple Tetras can be poly chained with a Prophet '08 or Mopho Keyboard. For details, see *Using Poly Chain* on page 36.

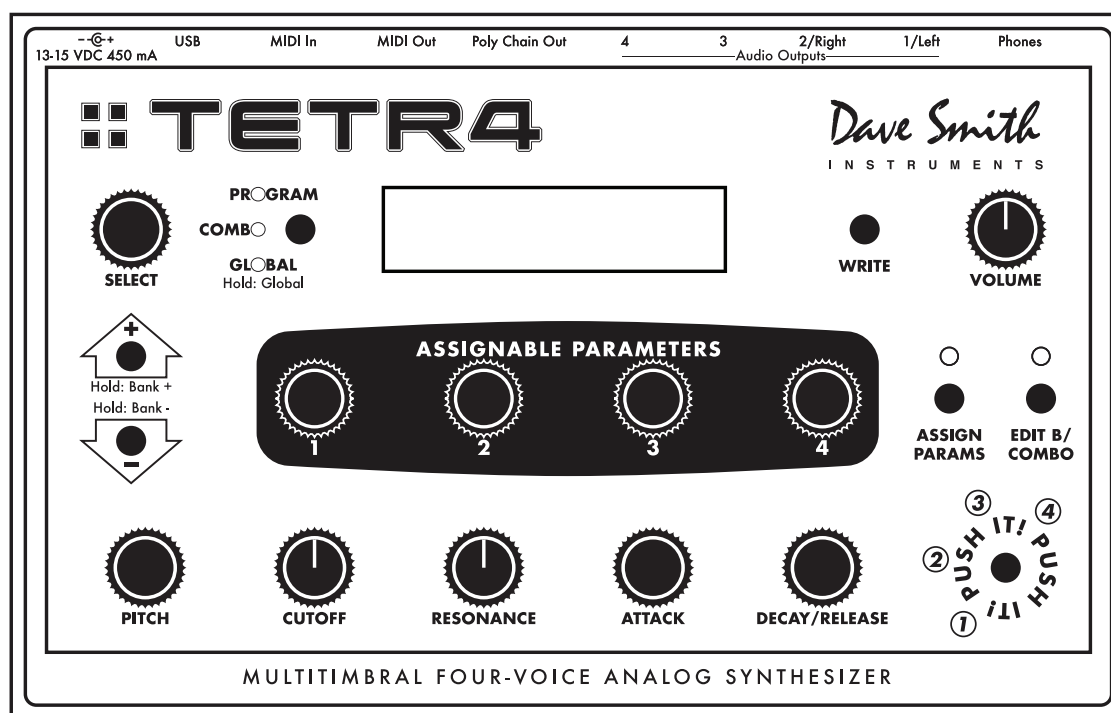
**Note:** When Poly Chain is turned off in the Global menu, the Poly Chain Out simply mirrors the MIDI Out and transmits the same data.

**Audio Outputs** — Tetra has four, unbalanced, ¼ inch outputs. 1/Left and 2/Right are the summed outputs of all four voices in Stereo or Mono mode and are typically used for “normal” polyphonic or unison playing. They are also the direct outputs of voices 1 and 2 in Quad mode. Outputs 3 and 4 are the direct outputs of voices 3 and 4, respectively, and are always mono. The individual, direct outputs are typically used in Multi Mode or Combo Mode, so that each voice can be mixed and processed separately. For more about the Audio Out and Multi Mode parameters, see *Global Parameters* on page 13.

**Phones** — A ¼ inch stereo headphone jack.



# Front Panel Controls



**Select** — Use SELECT to change and scroll through programs and combos. When ASSIGN PARAMS is on, SELECT changes the value of the current parameter. Also used to select parameters in Global mode.

**Mode (Program/Combo/Global)** — Tetra has four modes of operation: program, combo, global, and edit. Press the button to toggle between Program and Combo Mode.

When in Program Mode, the display shows the name, number, and bank of the current program. Editing any of the parameters puts Tetra into Edit Mode and displays the last parameter edited and its stored and edited values. To return to Program Mode, simply press the mode switch. See *Program Parameters* starting on page 17 for more information.

In Combo Mode, the display shows the name and number of the current combo. Editing any of the parameters puts Tetra into Edit Mode and displays the voice (V1, V2, V3, or V4) being edited, the last parameter edited and its edited value. To return to Combo Mode, simply press the mode switch. See *Combos* on page 33 for more information.

Global mode is accessed by briefly holding down the mode button. The Global menu is displayed. Use SELECT to scroll the Global menu and the increment and decrement (+ and -) buttons to change the settings. To return to Program or Combo Mode, simply press the mode button. See *Global Parameters* on page 13 for more information.

**Write** — Use WRITE to save an edited program or combo to any of Tetra's memory locations. To execute the write operation, press the increment (+) button.

To store a program or combo in a different location, press the WRITE button and change the destination using the SELECT knob before executing the write.

**Note:** You can also change program banks by holding the increment (+) and decrement (-) buttons, but be careful! If you hit the increment button quickly, it saves the program wherever you are at that point. If you want to change banks, just be sure to hold the button until you see the bank change.

To cancel a write, press WRITE, decrement (-), or the mode button. WRITE is also used to execute certain operations in the Global menu.

**Volume** — The master volume control for all of Tetra's audio outputs and the headphone output.

**Increment/Decrement** — The increment and decrement (+ and -) controls are used to step through programs in Program Mode, combos in Combo Mode, to change values in the Global menu, and to confirm or cancel various operations. In Edit Mode they increase/decrease the parameter value. They are also used to select Tetra's four program banks. Hold increment briefly to switch to the next highest bank; hold decrement to switch to the next lowest bank.

**Assignable Parameters 1-4** — Any of Tetra's program parameters can be edited from the front panel using the ASSIGNABLE PARAMETERS controls and the assignments for the controls are saved per program, to best suit that program. In other words, the assignments for the controls can be completely different from one program to another.

In Combo Mode, each of the four controls is routed to the respective voice. That is, parameter 1 controls an assigned parameter for voice 1, parameter 2 controls voice 2, etc.

See also *Edit B/Combo* below for more information.

**Assign Parameters** — When the ASSIGN PARAMETERS LED is lit, turn any of the ASSIGNABLE PARAMETERS controls to select from the list of program parameters. Press ASSIGN PARAMETERS again (turn the LED off) to use the ASSIGNABLE PARAMETERS controls to edit the selected parameters. For a description of the parameters, see *Program Parameters* beginning on page 17. For a list of the parameters, see page 44.

Alternately, with ASSIGN PARAMETERS on, choose a parameter to edit with any of the ASSIGNABLE PARAMETERS controls, and change the parameter's value using SELECT or the increment (+) or decrement (-) buttons.

**Edit B/Combo** — This button behaves differently depending upon the current mode. In Program Mode, it switches between program layers. Each program has two layers, A and B. Each layer can be a complete, separate patch. The layers are used in conjunction with the KeyMode parameter for creating stacked or split programs. When EDIT B/COMBO is active, the front panel controls the B layer.

**Note:** The ASSIGNABLE PARAMETERS are the same for both layers.

In Combo Mode, EDIT B/COMBO is used to access various combo parameters. Press EDIT B/COMBO once to edit voice 1 parameters. Press the button repeatedly to cycle through the voices and exit Edit Mode. See *Combos* on page 33 for more information.

**Note:** In Combo Mode or when Multi Mode is turned on in the Global menu, a program's B layer is ignored.

**Pitch** — Controls the base frequency of the oscillators. The relative interval between the two oscillators in each voice is maintained, even when the extremes are reached.

**Cutoff** — Controls the filter cutoff.

**Resonance** — Controls filter resonance.

**Note:** The filter will only self oscillate when in 4-pole mode. See *Low-pass Filter Parameters* on page 19 for more information.

**Attack** — Simultaneously adjusts the attack portion of all envelope generators: filter, amplifier, and Envelope 3.

**Decay/Release** — Simultaneously adjusts the decay and release portions of all envelope generators: filter, amplifier, and Envelope 3.

**Push It!** — The PUSH IT button is a manual trigger to play Tetra. In Program Mode, it can trigger a specific note (at a specific velocity) or a gated sequence, latch notes or sequences on and off, and manually step through a sequence. For more information, see *Program Parameters*, beginning on page 17.

In Combo Mode, the PUSH IT button cycles through the voices for polyphonic combos and plays all voices simultaneously when unison is on. See *Combos* on page 33 for more information.



# Basic Operation

Tetra has multiple personalities. It is a four-voice, analog poly synth, a sort of “mini Prophet.” But the voice architecture is based on Mopho, so it has a couple of sonic tricks up its sleeve—specifically sub-octave generators and feedback—that are absent from the Prophet. Tetra is also a four-part, multitimbral synth with separate outputs, essentially four Mophos in one *very* compact box. And it’s a voice expander for other Tetras or for a Prophet ’08. (Program banks 1 and 2 are the Prophet ’08 factory programs.)

In designing Tetra, the goal was to make a great sounding synth that was also affordable. Toward that end, we wanted to give players enough control over parameters to make it useful for performance, so we came up with a combination of “hard-wired” commonly used controls and user-assignable controls. Any of Tetra’s parameters can be edited in real time from the front panel controls. But we also recognize that may not be the quickest or easiest way to program sounds from scratch. A free editor for Mac OS and Windows gives you easy access to all of Tetra’s program parameters. Download it here: [www.soundtower.com/tetra](http://www.soundtower.com/tetra). Also, an advanced version of the editor with more features can be purchased from our Web site.

**Note:** The Prophet ’08’s controls map directly to Tetra’s, so if you have a Prophet ’08, you can use it as a MIDI control surface for Tetra.

## Programs

When Tetra first powers up, it is in Program Mode. The top line of the LCD shows the Program (1...128) and Bank (1...4) number of the currently selected program, and the bottom line shows the 16-character name of the program. SELECT changes the program. The program can also be changed by pressing the increment (+) or decrement (-) switches. To increment to the next bank, hold the increment switch briefly; to decrement to the previous bank, hold the decrement switch.

To edit a program, simply turn any knob. The ASSIGNABLE PARAMETERS knobs have been preset to useful parameters for the factory programs. To change a knob’s assignment, press ASSIGN PARAMETERS to light the LED. Turning any of the ASSIGNABLE PARAMETERS knobs now will scroll through the list of available parameters. Choose one or more parameters to edit and then press ASSIGN PARAMETERS again to exit the assignment mode (ASSIGN PARAMETERS LED should now be off). Alternately, turn ASSIGN PARAMETERS on, use any of the ASSIGNABLE PARAMETERS knobs to choose a parameter, and change the value with SELECT or the increment (+) and decrement (-) buttons. See *Program Parameters* on page 17 for a detailed list of all parameters and their functions. After editing parameters, press the Mode (PROGRAM/COMBO/GLOBAL) switch to exit Edit Mode and return to Program Mode.

## Combos

When in Program Mode, press the Mode switch to enter Combo Mode. Combos are combinations of four programs, one for each voice. In Combo Mode, use SELECT and increment/decrement to change combos. Each of the ASSIGNABLE PARAMETERS knobs controls a parameter for its respective voice: knob 1 for voice 1, knob 2 for voice 2, and so on. And the bottom row of knobs affects all voices and programs in the combo. For more about combos, see *Combos* on page 33.

## Saving a Program or Combo

To save a program or combo, press WRITE. To store in a different location, use SELECT to choose the target destination, and hold the increment or decrement switch to choose a different bank (programs only; there is only one bank of combos). Press increment (+) to complete the write operation or decrement (-) to cancel (or press WRITE again).

## Voice Architecture and Feedback

As you can see from the illustration on the following page, the left Audio Output goes through a programmable-gain pre-amp (controlled by the Feedback Gain parameter), then through a VCA for feedback volume control, and then to the filter input. Turning up the Feedback Volume will cause varying amounts of the audio output to be mixed back in pre-filter, individually per voice. For most purposes, small amounts of feedback are most useful and the resulting effect is similar to an overdrive distortion. Higher levels of feedback can get very squirrely and rude (which may be exactly the effect you're looking for).

FEEDBACK GAIN also affects the level of the feedback signal, so you'll typically want to start with FEEDBACK GAIN turned down.

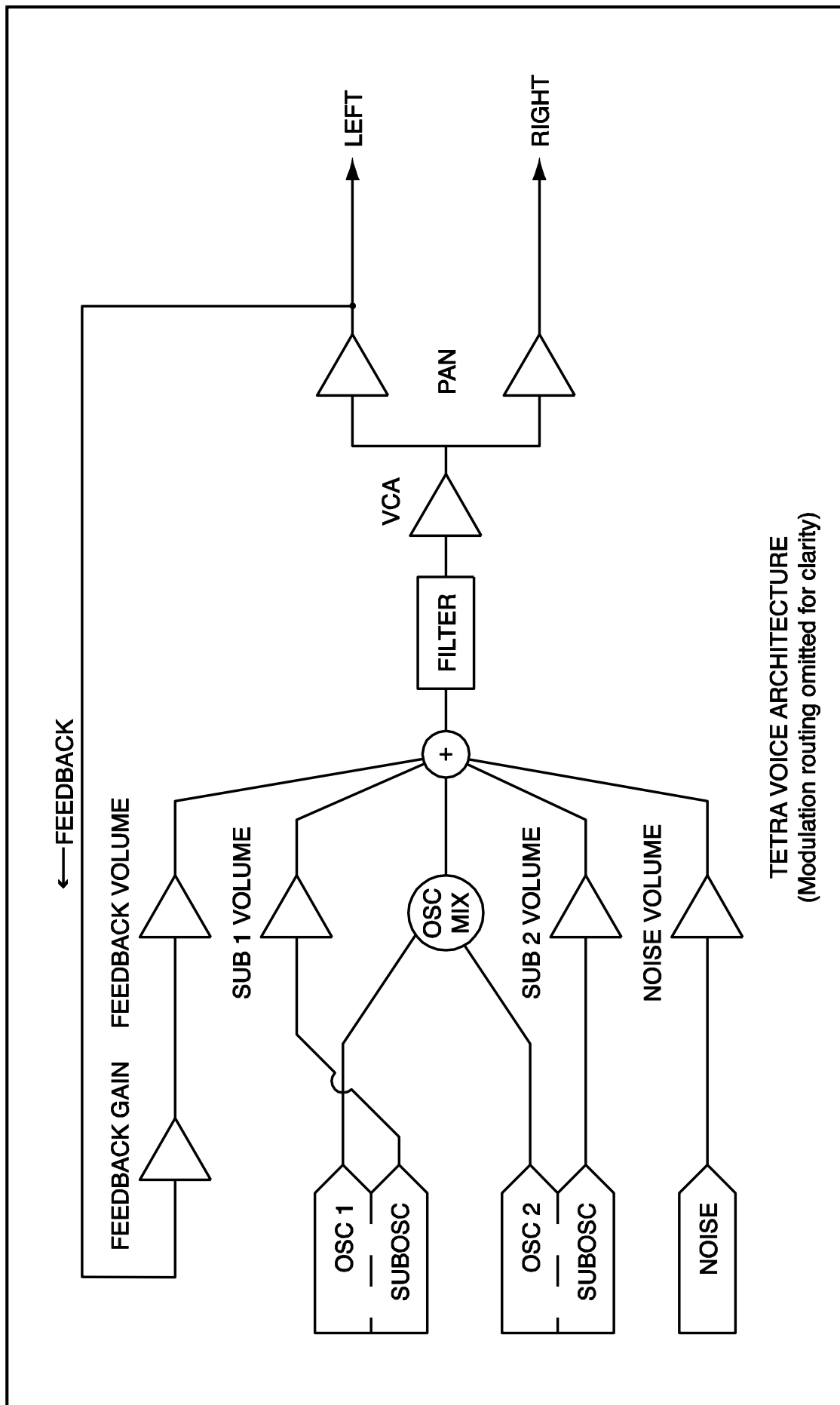
Several of the factory programs already have some level of feedback programmed in, as often indicated by the letters "FB" following the name. To hear the effect of Feedback Volume and Feedback Gain, call up one of those programs and vary those parameters.

## Further Reading

For information about using Tetra multitimbrally, see "Multi Mode" and "Audio Out" in *Global Parameters* on page 13.

For information about using Tetra as a voice expander with a Prophet '08 or another Tetra, or using Mopho as an additional voice for Tetra, see *Using Poly Chain* on page 36.







# Global Parameters

Tetra's Global parameters affect all programs globally. Examples include MIDI channel and fine tune. To edit the Global parameters, hold down the Mode switch (Program/Combo/Global) until the GLOBAL LED lights. The SELECT knob changes the global parameter and the increment and decrement buttons change the value.

**Transpose:** -12...+12 — Master Transpose control, 0 is centered. Steps in semitones.

**Fine Tune:** -50...+50 — Master Fine Tune control; 0 centered. Steps in cents (50 cents = 1/2 semitone).

**MIDI Channel:** ALL, 1...16 — Selects which MIDI channel to send and receive data, 1 to 16. All receives on all 16 channels.

**Clock:** see table — Selects the MIDI clock status.

| Display     | MIDI Clock Setting                                                     |
|-------------|------------------------------------------------------------------------|
| Internal    | MIDI clock is neither sent nor received                                |
| V1 Master   | Voice 1 provides the master clock for all 4 voices when in Combo mode. |
| MIDI Out    | MIDI clock is sent                                                     |
| MIDI In     | MIDI clock is received                                                 |
| Midi In/Out | MIDI clock is received and transmitted                                 |

**MIDI Parameter Send:** NRPN, CC, Off — Changes to the values of Tetra's front panel controls are transmitted via MIDI as Non-registered Parameter Number (NRPN) controllers or as Continuous Controllers (CC). Transmission of parameters can also be turned off. See *MIDI Implementation* on page 45 for details.

**Note:** NRPNs are the preferred method of parameter transmission, since they cover the complete range of all parameters, while CCs only handle the main parameters.

**MIDI Parameter Receive:** All, NRPN, CC, Off — Sets the method by which Tetra receives parameter changes via MIDI. As with transmission, NRPNs are the preferred method, though some controllers may only be able to send CCs.

**MIDI Control:** Off, On — When On, the synth will respond to MIDI controllers, including Pitch Wheel, Mod Wheel, Pedal, Breath, Volume, and Expression.

**MIDI SysEx:** Off, On — When On, the synth will respond to received MIDI SysEx messages, and will transmit them, when prompted, to the MIDI Out. See *Sysex Messages* on page 62 for details.

**MIDI Out Select:** Out, Thru — MIDI Out can be switched to MIDI Thru to daisychain multiple MIDI devices.

**Poly Chain:** Off, Out 1, Out 4, Out 8, Out 12, In End, InOut4, InOut8 — Using Poly Chain, up to four Tetras can be chained together for increased polyphony. One or two Tetras can also be chained with a Prophet '08 for twelve- or sixteen-note polyphony. And a Tetra and Mopho can be chained for five-note polyphony. For a more complete description of Poly Chain and how to use it, see *Using Poly Chain* on page 36.

**Multi Mode:** Off, On — Multi Mode enables Tetra to respond to four separate MIDI channels for multitimbral playback. With Multi Mode on, voice one responds to the base MIDI channel and the other three voices respond to the next three consecutive channels. For example, if Tetra's base channel setting is 3, voice one responds to MIDI channel 3, voice two to MIDI channel 4, and so on.

**Note:** For all four voices to play in Multi Mode, the base channel must be 13 or lower.

**Local Control:** Off, On — When on (the default), the front panel controls directly affect Tetra. When off, the controls are transmitted via MIDI but do not directly affect the “local” device (that is, Tetra). This is primarily useful for avoiding MIDI data loops that can occur with some external sequencers.

**Mode Lock:** Off, Prog, Combo — Prevents Tetra from being switched from Program mode to Combo mode or vice versa. This prevents the loss of unsaved edits caused by unintentional mode changes.

**Audio Out:** Stereo, Mono, Quad, Q LR34 — Tetra has four audio outputs: 1/Left, 2/Right, 3, and 4. Stereo operation is the default. When set to Stereo, a stereo mix of all voices is available via the Left and Right outputs.

**Note:** Outputs 3 and 4 are always direct outputs for voices 3 and 4 and are mono, regardless of the Audio Out mode. Inserting a plug into output 3 or 4 does not remove that voice from the mix outputs when in Stereo or Mono mode.

When set to Mono, this parameter defeats all pan settings and modulation, effectively making each of the Left and Right outputs a mono output.

Quad directs each of the four voices to its respective, mono output.

**Note:** Outputs 3 and 4 are noticeably louder than the other two outputs. This is normal. Outputs 3 and 4 are always monophonic and, therefore, do not require as much headroom as the mix outputs, which have to accommodate up to four voices at one time without distorting. The higher level provides optimum signal-to-noise ratio. Compensate for differences in level with a mixer.

Choosing “Q LR34” is similar to Quad, but voices 1 and 2 retain whatever panning effects are present in the assigned programs and the stereo outputs of those voices are present at both the Left and Right outputs.

**PotMode:** Relative, Passthru, Jump –Tetra’s Cutoff, Resonance, and Volume controls are potentiometers or “pots.” There are three pot modes to determine how the synth reacts when the programmable parameters—Cutoff and Resonance—are edited. (Master volume is not programmable, so these modes don’t apply.)

When set to Relative, changes are relative to the stored setting. In Relative mode, the full value range is not available until either the minimum or maximum value and the respective lower or upper limit of the pot’s travel is reached.

For example, the Resonance parameter has a value range of 0 to 127. Let’s say the physical position of the Resonance pot is the equivalent of a value of 100. If you switch to a program that has a stored Resonance setting of 63 and turn the pot all the way up, it will only go to 90. To get to the maximum value of 127, you first have to turn down until the value is at the other extreme and the pot is at the limit of its travel (in this case, 0 and fully counter-clockwise, respectively).

In Passthru mode, turning the pot has no effect until after the edited value equals the preset value (that is, until the edited value “passes through” the stored value).

Jump mode uses an absolute value based upon the position of the pot when edited: turn a pot and the value jumps immediately from the stored value to the edited value.

**Balance V 1 - 4:** -14...+14 — Adjusts the left/right balance of each voice by approximately +/- 4 dB.

**Basic Patch** — Press the WRITE button to load a basic patch into the edit buffer. (The patch will not actually be written to the current program location unless intentionally written to memory in Program Mode using the WRITE button.)

**Reset Globals** — Tetra does not have a full hardware reset, but select this parameter and press WRITE to reset the global parameters to their factory defaults.

**MIDI SysEx Dump:** see table — Allows dumping of programs and combos in SysEx format via MIDI.

| Display           | Data to be dumped to SysEx                 |
|-------------------|--------------------------------------------|
| Current Program   | Dump current program                       |
| Current Prog Bank | Dump all 128 programs in current bank      |
| All Progrm Banks  | Dump all programs in all 4 banks           |
| Current Combo     | Dump current combo                         |
| Combo Bank        | Dump all combos                            |
| All Progs Combos  | Dump all program banks and combos          |
| Current Prog P08  | Dump current program in Prophet '08 format |
| CurrentProgMopho  | Dump current program in Mopho format       |
| Program Bank P08  | Dump current bank in Prophet '08 format    |
| Prog Bank Mopho   | Dump current bank in Mopho format          |

Press the WRITE switch to start transmission. This feature is handy for saving Programs on a computer in SysEx format, or for sending them to another Tetra via a direct MIDI connection. The dumps include Program and Bank numbers, so when received, the programs will be stored in the same location.

Programs can also be exported in Mopho and Prophet '08 formats. Features/parameters not available on those instruments are stripped out. For example, Mopho does not support layers, so only layer A is exported. The Prophet '08 does not have feedback or sub-octave generators.

**Program Copy Utility** — Enables layer A or layer B of a program to be copied to layer A or B of the same or a different program. The top line displays the current bank and program. Use increment (+) or decrement (-) to choose the layer to be copied. Then use SELECT to select the destination bank, program, and layer and increment/decrement to change the values.

# Program Parameters

All Program parameters can be edited using any of ASSIGNABLE PARAMETERS controls. To assign a parameter to a control, press the ASSIGN PARAMETERS button to light the LED, and then turn any of the knobs (1 through 4) to select a parameter. A full list of the parameters can be found on page 44. The selected parameter and value appear in the LCD display. The top line of the LCD displays the programmed value for reference; the bottom line displays the edited value.

To then change the value of the parameter you selected, hit the ASSIGN PARAMETERS button again, and the same knob will now change the value. You can also use the increment and decrement switches to adjust parameter values.

**Note:** Once you are done editing a program, before you save it, you should consider what parameters you want to access when playing the new program. Generally, when making a program, we try to assign each of the 4 knobs to a different parameter that makes sense for that particular program, providing extra live control.

Though it is certainly possible to perform detailed program generation and editing using these controls, it is usually much faster to use the free editor available for Mac OS or Windows. The minimal front panel of the Tetra is designed for fast, real-time changes in live performance.

Following are descriptions of each Tetra Program parameter.

## Oscillator Parameters

Tetra has two analog oscillators per voice. The basic controls for each oscillator are the same.

**Note:** There are additional modulation controls that can affect the pitch of Oscillators 1 and 2. These are covered in other sections of the Parameter definitions.

**Osc Freq:** C 0...C 10 — Sets the base oscillator frequency over a 10 octave range, from 8 Hz to 8KHz, stepping in semitones. C3 is middle C, the first octave is 0 (C0, C#0, etc.), the second octave is 1 (C1, C#1, etc.), and so on.

**Fine Freq:** -50...+50 — Fine Tune control; 0 centered. Steps in cents (50 cents = 1/2 semitone).

**Shape:** see table — Selects the oscillator waveshape as follows:

| Display  | Waveshape                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Osc Off  | No output                                                                                                                                                                                                            |
| Sawtooth | Sawtooth                                                                                                                                                                                                             |
| Triangle | Triangle                                                                                                                                                                                                             |
| Saw-Tri  | Sawtooth — Triangle mix                                                                                                                                                                                              |
| Pulse xx | Pulse Wave, with pulse width ranging from minimum (0) to maximum (99). The pulse width will turn off at the two extremes — this allows some interesting modulation possibilities. A square wave will be at Pulse 50. |

**Glide:** 0...127 — Sets the oscillator glide (portamento) rate. Glide can be set independently for each oscillator. Low values are faster. See “Glide Mode” below in *Miscellaneous Oscillator Parameters* for additional Glide settings.

**Keyboard:** On, Off — Turns keyboard tracking for the oscillator on and off.

**Sub Osc 1:** 1...127 — Sub-oscillator 1 generates a square wave pitched one octave below oscillator 1. This parameter controls the level.

**Sub Osc 2:** 1...127 — Sub-oscillator 2 generates a square wave pitched two octaves below oscillator 2. This parameter controls the level.

## Miscellaneous Oscillator Parameters

**Sync 2-> 1:** Off, On — Turns oscillator hard sync on. With sync on, whenever oscillator 2 resets, it will force oscillator 1 to reset for the classic hard sync sound.

**Glide Mode:** see table — Sets the way the oscillators respond to Glide settings.

| Display   | Glide mode                                                                                                                     |
|-----------|--------------------------------------------------------------------------------------------------------------------------------|
| FixRate   | The Glide rate is fixed. The time to transition from one note to another varies depending upon the interval between the notes. |
| FixRate A | The same, but Glide is only applied when played legato; that is, when a new note is hit while another note is still held.      |
| FixTime   | The Glide time is fixed. The time to transition from one note to another is the same, regardless of the interval.              |
| FixTime A | The same, but Glide only is applied when played legato; that is, when a new note is hit while another note is still held.      |

**Osc Slop:** 0...5 — The amount of random oscillator frequency slop. The analog oscillators in Tetra are very accurate, and will not drift. This works great for



accurate sounds, and allows precise de-tuning. The Oscillator Slop parameter allows subtle amounts of frequency drift. For larger amounts, use a random LFO or white noise mod.

**Pitch Wheel Range:** 0...12 — Sets the bend range, in semitones, of the pitch wheel. The setting is the range in the positive or negative direction. For example, a setting of 7 lets you bend a note up or down by a fifth.

## Mixer Parameters

**Osc Mix:** 0...127 — Enables the outputs of Oscillators 1 and 2 to be mixed in varying amounts. A setting of 0 is equivalent to 100% Oscillator 1 and 0% Oscillator 2. A setting of 127 is just the opposite. A setting of 64 is essentially a 50-50 mix of both oscillators.

**Noise Level:** 0...127 — Controls the volume of white noise mixed into the filter.

## Feedback Parameters

**Feedback Volume:** 0...127 — This controls the amount of audio from the left channel of each voice fed back into that voice's mixer pre-filter. As the value increases, so does the effect of the feedback.

**Feedback Gain:** 0...127 — Feedback Gain boosts the level of the feedback signal and is interactive with and dependent upon Feedback Volume. If Feedback Volume is set to 0, then Feedback Gain has no effect. (There is no feedback signal to boost.) However, Feedback Gain combined with higher levels of Feedback Volume can result in effects ranging from pleasing distortion to squirrely harmonic weirdness.

## Low-pass Filter Parameters

Each of Tetra's voices utilizes a switchable, 2- or 4-pole analog low-pass filter coupled with a 4-stage (plus delay) ADSR envelope generator.

**Frequency:** 0...164 — Sets the base filter cutoff frequency over more than 13 octaves. This control steps in semitones.

**Resonance:** 0...127 — Sets the Resonance level of the filter. At high settings the filter will self-oscillate in 4-pole mode. If the filter does not oscillate, switch to 4-pole mode.

**Keyboard Amount:** 0...127 — Sets the amount of keyboard (MIDI note) to the filter cutoff. A setting of 64 will step the filter one semitone for each note, 32 would be half-semitones, and so on.

**Audio Mod:** 0...127 — Controls the amount of audio from Oscillator 1 used to modulate the filter cutoff frequency. For filter-only audio, set OSCILLATOR MIX to 127, OSCILLATOR 2 SHAPE to Off, and OSCILLATOR 1 SHAPE to the desired waveshape. This is useful for bell-like FM sounds. A wide range of sounds can also be made using AUDIO MOD with the oscillators routed normally through the filter.

**Config:** 2 Pole, 4 Pole — Selects either 2- or 4-pole operation for the filter.

**Envelope Amount:** -127...+127 — Sets the amount of filter envelope routed to the cutoff frequency. This can be positive or negative, allowing inverted envelope control of the filter.

**Envelope Velocity:** 0...127 — Amount of key velocity controlling the level of the filter envelope.

**Delay:** 0...127 — Sets a delay between the time the filter envelope is triggered and when the Attack portion actually begins.

**Attack:** 0...127 — Sets the Attack time of the filter ADSR envelope generator.

**Decay:** 0...127 — Sets the Decay time.

**Sustain:** 0...127 — Sets the Sustain level.

**Release:** 0...127 — Sets the Release time.

## VCA Parameters

**VCA Level:** 0...127 — Sets a base level for the VCA (Voltage Controlled Amplifier). This allows the VCA to be essentially bypassed, which is necessary for Programs that drone.

**Note:** If VCA LEVEL is on full, Envelope Amount has no effect. You normally want VCA LEVEL set to zero. For droning sounds you will probably turn the VCA Level up.

**Env Amount:** 0...127 — Sets the amount of VCA envelope to the VCA level.

**Env Velocity:** 0...127 — Sets the amount of keyboard velocity controlling the level of the VCA envelope.

**Delay:** 0...127 — Sets a delay between the time the amplifier envelope is triggered and when the Attack portion actually begins.

**Attack:** 0...127 — Sets the Attack time of the VCA ADSR envelope generator.

**Decay:** 0...127 — Sets the Decay time.

**Sustain:** 0...127 — Sets the Sustain level.

**Release:** 0...127 — Sets the Release time.

**Pan Spread:** 0...127 — There is a pan circuit after the VCA that pans the audio in the stereo field individually per voice. With a Pan Spread of 0, all four voices are panned dead center. As you turn up Pan Spread, each voice is gradually moved away from the center by different amounts. Every other voice goes in a different direction, left or right. This provides a wide stereo field as the voices play.

**Note:** Any modulation to pan will individually move each voice from its static position as set by Pan Spread.

**Program Volume:** 0...127 — Sets the volume of the current program to match volumes between programs.

**Note:** There is enough gain in the synth voice that with some settings, some mild clipping distortion may be heard. If this happens, try lowering the Voice Volume, and/or the VCA Envelope Amount (or VCA Velocity Amount).

## LFO Parameters

Tetra has four Low Frequency Oscillators (LFOs). The same parameters are available for each.

**Frequency:** 0...150, sync — Sets the LFO frequency. Range 0—150 for un-synced LFO; speed ranges from slow (30 seconds) to very fast — at 90 (8 HZ, C-2) and above the speed steps in semitones, up to 150 (261 Hz, middle C).

**Note:** Some of the analog functions may not respond well to the fastest LFO speeds, due to speed limitations of the control voltages; but they will certainly generate some interesting sounds.

Above 150, the sync speeds are as follows:

| Display  | Timing Sync                                                     |
|----------|-----------------------------------------------------------------|
| 32 Steps | Sequence speed divided by 32; i.e. one LFO cycle takes 32 steps |
| 16 Steps | Sequence speed divided by 16                                    |
| 8 Steps  | Sequence speed divided by 8                                     |
| 6 Steps  | Sequence speed divided by 6                                     |
| 4 Steps  | Sequence speed divided by 4                                     |

| Display   | Timing Sync                   |
|-----------|-------------------------------|
| 3 Steps   | Sequence speed divided by 3   |
| 2 Steps   | Sequence speed divided by 2   |
| 1.5 Step  | Sequence speed divided by 1.5 |
| 1 Step    | One cycle per step            |
| 2/3 Step  | Two cycles every three steps  |
| 1/2 Step  | Two cycles per step           |
| 1/3 Step  | Three cycles per step         |
| 1/4 Step  | Four cycles per step          |
| 1/6 Step  | Six cycles per step           |
| 1/8 Step  | Eight cycles per step         |
| 1/16 Step | Sixteen cycles per step       |

**Shape:** see table — Selects the LFO waveshape:

| Display  | LFO Shape                                                   |
|----------|-------------------------------------------------------------|
| Triangle | Triangle                                                    |
| Rev Saw  | Reverse Sawtooth                                            |
| Sawtooth | Sawtooth                                                    |
| Square   | Square Wave                                                 |
| Random   | Random — changes once per cycle for sample-and-hold effects |

**Amount:** 0...100 — Sets the amount of LFO routed to the destination.

**Key Sync:** Off, On — When on, the LFO is re-started each time a new note is played. Key Sync is set independently on each LFO.

**Destination** — See *Modulation Destinations* on page 39 for a list of possible destinations.

## Envelope 3 Parameters

Envelope 3 is an auxiliary envelope for modulating various destinations. It can even be used as a sort of LFO using the Repeat parameter, which is unique to Envelope 3.

**Destination** — Sets the Envelope 3 destination. See *Modulation Destinations* on page 39 for a list of possible destinations.

**Amount:** -127...+127 — Sets the amount of Envelope 3.

**Env Velocity:** 0...127 — Sets the amount of key velocity controlling the level of envelope 3.

**Env Delay:** 0...127 — Sets a delay between the time Envelope 3 is triggered and when the Attack portion actually begins.

**Env Attack:** 0...127 — Sets the Attack time of Envelope 3.

**Env Decay:** 0...127 — Sets the Decay time.

**Env Sustain:** 0...127 — Sets the Sustain level.

**Env Release:** 0...127 — Sets the Release time.

**Repeat:** Off, On — When on, causes the delay, attack, decay, and sustain portions of Envelope 3 to loop for as long as the envelope is gated on.

## Modulation Parameters

The Modulation Parameters let you configure the modulation routing and amount for Tetra's four general-purpose modulation slots as well as for MIDI controllers (Mod Wheel, Key Pressure, Breath Control, Velocity, and Foot Controller).

Since each Tetra mod source has a single destination, the four general purpose Mods provide a way to send a mod source (such as a sequence or LFO) to additional destinations, with a different amount. There are also additional mod sources available here, such as Noise, allowing a wide variety of possibilities.

To configure a general-purpose modulation slot, select the appropriate modulator (Mod 1, Mod 2, Mod 3, or Mod 4), and use the Source, Destination, and Amount parameters to route the modulation as desired.

To configure modulation for a standard MIDI controller, select the desired controller and amount, and then set the destination.

**Source** — Selects a modulation source. See *Modulation Sources* on page 43 for possible sources.

**Amount:** -127...+127 — Sets the amount of modulation.

**Destination** — Selects a modulation destination. See *Modulation Destinations* on page 39 for a list of possible destinations.

**Mod Wheel Amount:** -127...+127 — Sets the maximum amount of modulation that can be applied from MIDI Continuous Controller 1 (mod wheel).

**Mod Wheel Destination** — Selects the destination to which the mod wheel is routed. See *Modulation Destinations* on page 39 for a list of possible destinations.

**Press Amount:** -127...+127 — Sets the maximum amount of modulation that can be applied from MIDI Channel Pressure (aftertouch).

**Press Destination** — Selects the destination to which the Channel Pressure is routed. See *Modulation Destinations* on page 39 for a list of possible destinations.

**Breath Amount:** -127...+127 — Sets the maximum amount of modulation that can be applied from MIDI Continuous Controller 2 (breath controller).

**Breath Destination** — Selects the destination to which the breath control is routed. See *Modulation Destinations* on page 39 for a list of possible destinations.

**Veloc Amount:** -127...+127 — Sets the maximum amount of modulation that can be applied from MIDI note-on velocity.

**Veloc Destination** — Selects the destination to which the note-on velocity is routed. See *Modulation Destinations* on page 41 for a list of possible destinations.

**Foot Amount:** -127...+127 — Sets the maximum amount of modulation that can be applied from MIDI Continuous Controller 4 (foot controller).

**Foot Destination** — Selects the destination to which the foot control is routed. See *Modulation Destinations* on page 41 for a list of possible destinations.

## Unison Parameters

**Unison Mode:** see table — Sets how voices are allocated and tuned when unison is on.

| Display      | Key mode                                                                                   |
|--------------|--------------------------------------------------------------------------------------------|
| 1 Voice      | Classic, two oscillator, monophonic mode                                                   |
| All Voices   | All available voices stacked in unison                                                     |
| AllDetune1-3 | All available voices stacked in unison with increasing levels of detuning among the voices |

**Unison Assign:** see table — Determines how Tetra responds to keyed notes when unison is on.

| Display    | Key mode                                     |
|------------|----------------------------------------------|
| Low Note   | Low note priority                            |
| LowRetrig  | Low note priority, re-trigger envelopes      |
| HighNote   | High note priority                           |
| HighRetrig | High note priority, re-trigger envelopes     |
| LastNote   | Last note hit priority                       |
| LastRetrig | Last note hit priority, re-trigger envelopes |

**Unison:** On, Off — Turns unison on or off. When unison is on, Tetra behaves like a monophonic synth.

## Push It Switch Parameters

These parameters determine the behavior of the PUSH IT switch, Tetra's manual trigger.

**Note:** C0...C10 — Sets the note that plays when PUSH IT is pressed.

**Velocity:** 0...127 — Sets the MIDI note-on velocity.

**Mode:** Normal, Toggle — When set to Normal, PUSH IT responds like a key: press it and a note plays, release it and the note ends. But when set to Toggle, PUSH IT turns the note on with one press and off with a second press. This is handy for making a note drone or for latching a gated sequence on.

## Keyboard Mode Parameters

The keyboard mode parameters determine how programs are mapped to a MIDI keyboard or other MIDI controller and provide compatibility with the Prophet '08's keyboard modes.

**Note:** These parameters only appear in Program Mode, not Combo Mode, and only for layer A.

**Split Point:** C0...C10 — When in Split mode, sets the key at which the split occurs. Layer A (voices 1 and 2) is mapped below the split point. Layer B (voices 3 and 4) is mapped to the chosen split point and above.

**Key Mode:** Normal, Stack, Split — Determines how the layers respond to MIDI note data in Program Mode. For Normal, layer A plays for the entire key range. Press EDIT B/COMBO to switch to layer B.

For Stack, both layers respond to MIDI notes for the entire key range, enabling two patches to be played simultaneously with a single key stroke. Voices 1 and 2 are assigned to layer A, 3 and 4 are assigned to layer B.

Split assigns layer A from the lowest note to below the split point (see previous parameter) and layer B from the split point to the highest note.

**Note:** In Combo Mode and Multi Mode, layer B is ignored.

## Clock Parameters

The sequencer and arpeggiator share the BPM and CLOCK DIVIDE settings.

**BPM:** 30...250 — Sets the programmed tempo for the sequencer in BPM (beats per minute).

**Clock Divide:** see table — Sets the note value for each sequence step relative to the BPM.

| Display | Tempo    | Timing Division                   |
|---------|----------|-----------------------------------|
| Half    | BPM/2    | Half note                         |
| Quartr  | BPM      | Quarter note                      |
| Eighth  | BPM x 2  | Eighth note                       |
| 8 half  | BPM x 2  | Eighth note, half swing timing    |
| 8swing  | BPM x 2  | Eighth note, full swing timing    |
| 8 trip  | BPM x 3  | Eighth note triplets              |
| 16th    | BPM x 4  | Sixteenth note                    |
| 16half  | BPM x 4  | Sixteenth note, half swing timing |
| 16swing | BPM x 4  | Sixteenth note, full swing timing |
| 16trip  | BPM x 6  | Sixteenth note triplets           |
| 32nd    | BPM x 8  | Thirty-second note                |
| 32trip  | BPM x 12 | Thirty-second note triplets       |
| 64trip  | BPM x 24 | Sixty-fourth note triplets        |

## Arpeggiator Parameters

Tetra's arpeggiator has four different operating modes and can be synced to a MIDI clock source.

**Note:** If the arpeggiator does not seem to be working, check the GLOBAL parameters to make sure Clock is set to Internal. If Clock is set to use an external clock source, Tetra must be receiving MIDI clock messages in order for the arpeggiator to run.

The tempo and note value are determined by the Clock Parameters.



**Mode:** see table — Sets the order in which the arpeggiator plays notes.

| Mode        | Behavior                                                                                                    |
|-------------|-------------------------------------------------------------------------------------------------------------|
| Up          | Plays from lowest to highest note.                                                                          |
| Down        | Plays from highest to lowest note.                                                                          |
| Up Down     | Plays from lowest to highest and back to lowest.                                                            |
| Assign      | Plays notes in the order keys were pressed.                                                                 |
| Random      | Randomly plays notes.                                                                                       |
| 2oct Up     | Plays keyed notes and the same notes one octave higher, from lowest to highest.                             |
| 2oct Down   | Plays keyed notes and the same notes one octave higher, from highest to lowest.                             |
| 2oct UpDown | Plays keyed notes and the same notes one octave higher, from lowest to highest and back to lowest.          |
| 2oct Assign | Plays a keyed note, then the same note one octave higher, in the order keys were pressed.                   |
| 2oct Random | Randomly plays keyed notes and the same notes one octave higher.                                            |
| 3oct Up     | Plays keyed notes and the same notes one and two octaves higher, from lowest to highest.                    |
| 3oct Down   | Plays keyed notes and the same notes one and two octaves higher, from highest to lowest.                    |
| 3oct UpDown | Plays keyed notes and the same notes one and two octaves higher, from lowest to highest and back to lowest. |
| 3oct Assign | Plays a keyed note, then the same note one and two octaves higher, in the order keys were pressed.          |
| 3oct Random | Randomly plays keyed notes and the same notes one and two octaves higher.                                   |

**On/Off:** Off, On — Turns the arpeggiator on and off. Turning it on will turn off the Sequencer if it is on.

## Sequencer Parameters

**Seq Trigger:** see table — Sets the triggering mode for the Sequencer.

| Display  | Trigger mode                                                                                                                                             |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Normal   | Sequence plays from the first step when a key is held, and resets to step 1 each time a new note is played. Each sequence step retriggers the envelopes. |
| No Reset | The same, but does not reset to step 1 on every note.                                                                                                    |
| No Gate  | The keyboard triggers the envelopes; the sequence steps do not.                                                                                          |
| NoGateNR | Same, but does not reset with subsequent notes.                                                                                                          |

| Display  | Trigger mode                                    |
|----------|-------------------------------------------------|
| Key Step | Striking a key advances the sequencer one step. |

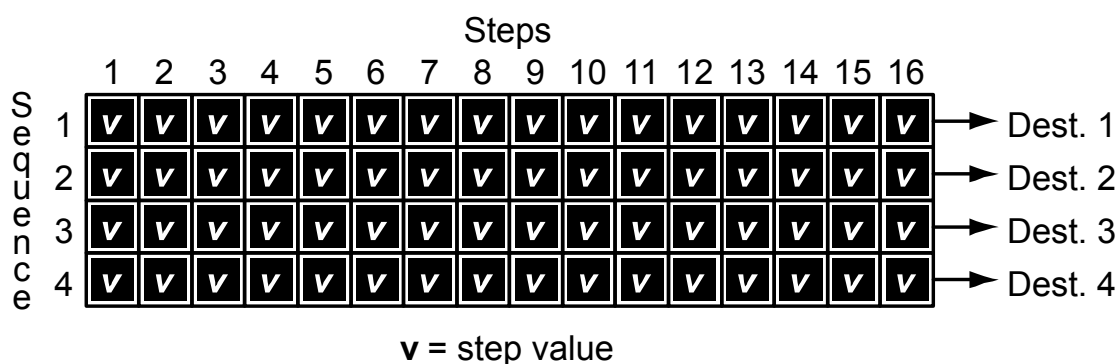
**On/Off:** Off, On — Turns the sequencer on and off.

**Seq 1, 2, 3, or 4 Destinations** — Sets the destination for each of the four sequence tracks. For a complete list, see *Modulation Destinations* on page 41.

**Seq 1, 2, 3, or 4 Steps:** C0...D5+ or 0...125, Reset, Rest — Sets each step value for each of the four sequence tracks. The values are displayed as both relative note values and as simple numerical values. Note values are displayed in quarter tones with a plus sign (+) indicating that the pitch is a quarter tone higher than the displayed note number. The two highest values are Reset and Rest. Reset causes the sequence to reset to the first step, enabling sequences of fewer than 16 steps or even sequences in which the tracks are different lengths. Rest inserts a rest on the selected step.

## About the Sequencer

For many musicians, the term sequencer has become synonymous with MIDI sequencer; that is, a computer-based application or dedicated hardware device for recording and playing back notes and performance gestures via MIDI. But sequencers were around long before MIDI. Tetra's sequencer is much more like the original analog sequencers typically associated with modular synthesizer systems. The sequencer comprises four 16-step sequences that play in parallel. Each sequence can be routed to a chosen destination, and each step in a sequence can be set to a different value used to modulate that destination. Each of the four voices has its own sequencer.



Strictly speaking, Tetra's sequencer does not play notes, nor does it transmit MIDI data. If none of the sequence destinations are routed to oscillator frequency, the sequencer may not even affect the pitch. In Tetra terms, a sequence is just a series of events at timed intervals that changes the value of one of the synth's parameters in discrete steps. Because the four sequences play in parallel, up to four parameters can be affected by each step, one per sequence.

For the most part, the sequence destinations are the same as the modulation destinations, which is appropriate: a sequence is just another modulation source.

For each sequence step, the envelopes are gated on for half the step's duration. The duration varies according to the BPM and Clock Divide settings (or the MIDI clock, if synced to an external source). The envelope settings of the current program ultimately determine how long each step plays, though, and longer (more legato) or shorter (more staccato) effects can be achieved by editing the envelope rates.

Tetra's sequencer is a gated sequencer. That means it requires a note to be gated on—that is played from the PUSH IT button or via MIDI—in order for the sequencer to run. There is no dedicated start or play button and it does not respond to MIDI start/stop/continue messages, but it can still sync to an external clock. Simply turn on the sequencer and then play and hold a note to start. Or use the PUSH IT button's toggle feature to latch a note on with one push and release it with another; in this case, the PUSH IT button is essentially a Start/Stop control.

## Reset and Rest

Sequences have a maximum of 16 steps, but they can have fewer—from 1 to 15—using Reset. (Sequences of 16 steps reset automatically.) Reset appears immediately after the highest value setting for a step. Setting a step to Reset causes the sequence to jump back to the first step and continue playing.

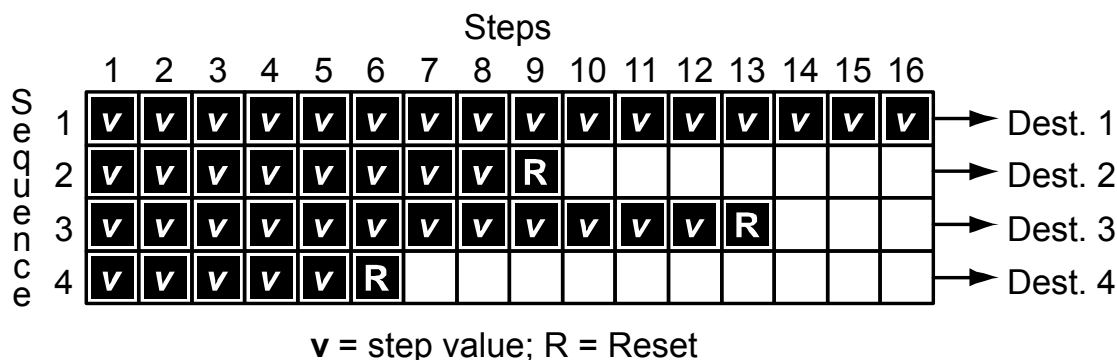
Reset is set separately for each of the four sequences, so it must be set at the same step in all four sequences to shorten all the sequences equally. The following illustration shows an example in which all the sequences are eight steps in length.

|          |   | Steps |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |   |         |
|----------|---|-------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---|---------|
|          |   | 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |   |         |
| Sequence | 1 | v     | v | v | v | v | v | v | v | R |    |    |    |    |    |    |    | → | Dest. 1 |
|          | 2 | v     | v | v | v | v | v | v | v | R |    |    |    |    |    |    |    | → | Dest. 2 |
|          | 3 | v     | v | v | v | v | v | v | v | R |    |    |    |    |    |    |    | → | Dest. 3 |
|          | 4 | v     | v | v | v | v | v | v | v | R |    |    |    |    |    |    |    | → | Dest. 4 |

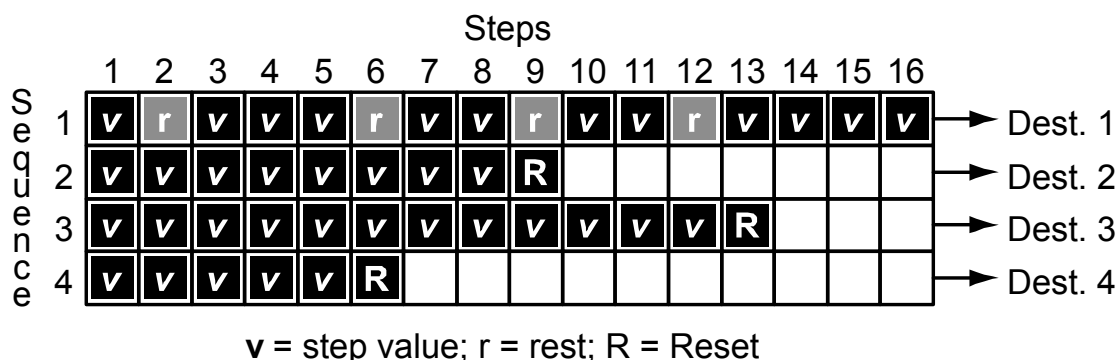
v = step value; R = Reset

**Tip:** Using Reset while programming a sequence can be helpful. For example, when programming a specific melodic line, start by shortening the sequence to four or eight steps until those steps are set, and then gradually move the reset point to lengthen the loop until the desired number of steps is playing.

Sequences do not have to be the same length, however, which makes for some very interesting, less repetitive patterns, particularly when sequences are set to odd and even numbers of steps.



Sequence one has an additional value, Rest, that appears in the list after Reset. Rest prevents the envelopes from being gated by the corresponding step, so a rest in sequence one affects all four sequences. If the sequences are the same length, rests will occur in the same place in all four sequences as they loop. If the sequences are different lengths, the rests in sequence one apply to whatever the current step happens to be in sequences two through four, resulting in a more random-sounding pattern (which can be really cool). In the following example, sequence one is 16 steps long and rests occur at steps 2, 6, 9, and 12. However, sequence two is only eight steps long, so rests occur at steps 2 and 6 the first time it plays through and then at steps 1 and 4—corresponding to steps 9 and 12 in sequence one—the first time it repeats. As sequence two loops, the rests will continue in the same alternating pattern.



## Programming the Sequencer

Programming the sequencer is easy, but there are a few things to consider before you start. Most importantly, what do you want the sequence to do and what modulation destinations will provide the results you're seeking? For example, is the sequencer going to control oscillator frequency? One sequence can control the frequency of both oscillators or one sequence can control oscillator 1 and another sequence can control oscillator 2 for harmonies or countermelodies. A typical application of the sequencer might have sequence one routed to the frequency of both oscillators, sequence two routed to filter cutoff, sequence

three routed to filter resonance, and sequence four routed to amplifier envelope amount for accents. Many of the factory programs have sequences programmed, so you can refer to those to see how certain effects are being achieved.

#### **To program a sequence:**

1. Set the Sequencer On/Off parameter to On.
2. Play a note to start the sequence playing.

To avoid having to hold a key down, set the Push It Mode to Toggle. Then use PUSH IT to start and stop the sequencer. You may also want to change the Push It Note, the BPM, and the Clock Divide.

3. Choose a destination for the sequence.
4. Set the step values for the corresponding sequence to the desired values. To quickly edit a sequence, turn ASSIGN PARAMS on and use one of the ASSIGNABLE PARAMETERS knobs to choose the sequence step and the SELECT or increment (+)/decrement (-) buttons to change the value.

As the sequence loops, you will hear your edits.

5. Follow the same basic steps to program the other sequences.
6. Don't forget to write your edits to memory! Sequences are saved with the related program. Just press WRITE and then the increment (+) button to save the program and sequences.

#### **Slew**

In modular analog synthesizers, a *lag processor* or *slew limiter* is used to create a time-varying change—a smooth transition—between successive, discrete control voltage levels. The rate of change is called the *slew rate* and one common application is to create a glide (aka *portamento*) effect between notes.

Among the possible destinations for Tetra sequences two and four is a sequence-only parameter called Slew. Slew behaves a little differently from the other modulation destinations, in that it is not really a destination at all; instead, it affects the sequence above it. That is, if Slew is the chosen destination for sequence two, it controls sequence one, and Slew in sequence four controls sequence three.

In Tetra's sequencer, Slew sets the slew rate between the previous step's value and the current step's value when the step is gated on. Confused yet? This should help: let's say sequence one is routed to oscillator frequency and sequence two to Slew. Increasing the Slew value for step four will cause the

oscillator frequency to glide from the step three value when step four is gated on. The higher the Slew value, the slower the slew rate. And the slew rate can be different for each step. But its not just for oscillator glide. Slew can be applied to any of the destinations. For example, sequence three could be routed to filter cutoff with Slew in sequence four used to create a less abrupt transition from one step to the next.

**Note:** Depending upon the BPM and Clock Divide settings, the slew rate can actually exceed the time the envelopes are gated on, causing a step in the affected sequence to not reach its set value. For example, if Slew is applied to oscillator frequency, high Slew values may cause a step to sound flat or sharp. If that's not what you want, simply reduce the Slew value.

## Syncing an LFO to the Sequencer

One very useful way to modulate a parameter in sync with a sequence is using an LFO with Clock Sync. A setting of 16 Steps for LFO Frequency with a triangle wave selected and routed to the filter will provide a clean filter sweep over a 16-step sequence, perfectly in sync! This is much easier (and smoother) than manually programming a sequence to sweep the filter.

## Name Parameter

**Edit Name** — The lower LCD line displays the name of the Program with the active character blinking. When ASSIGN PARAMETERS is lit, the parameter control changes the position of the active character and SELECT and the increment (+) and decrement (-) buttons change the character.

# Combos

A combo is a collection of four programs—one per voice—combined to make a sort of super program. How a combo responds to MIDI note data depends largely upon whether or not it is monophonic (that is, unison is on) or polyphonic. The typical uses for a combo are:

**Stacked unison**—All four voices play from a single key or the PUSH IT button with four different programs.

**Multitimbral sequence playback**—Four different programs and their sequences play back simultaneously from a single key or the PUSH IT button.

**“Modular-style” polyphony**—Four-voice polyphony with a different program per voice.

Tetra has 128 combos. To access them, press the mode button to light the COMBO LED. Change combos using SELECT or increment (+) and decrement (-). The bottom row of knobs (PITCH, CUTOFF, etc.) affects all the programs in the combo. Though this may not make sense in all cases, changing all four programs in a combo with a single control makes for some very interesting live editing possibilities.

Each of the Assignable Parameters knobs controls one parameter for the respective voice. That is, knob 1 controls a parameter for voice 1, knob 2 for voice 2, and so on.

## Creating a Combo

It probably goes without saying, but it is generally quicker and easier to create combos using the editor. It can be done without the editor, though.

To create a combo from scratch, press EDIT B/COMBO while in Combo Mode. The display looks something like this:

```
Combo 1 Prt1 V1  
JungleBumple
```

The top line shows the program and the voice to which it is assigned, and the bottom line shows the program name. Use SELECT or the increment or decrement buttons to choose another program. Programs can be selected from other combos or from the regular program banks. For example, choosing Combo 55 Prt2 loads the program from voice 2 of combo 55 into the current combo location. To access the regular program banks, hold the increment button briefly until the next bank is displayed. Then the display will look something like the following:



|              |    |   |    |    |    |
|--------------|----|---|----|----|----|
| C            | 19 | P | 26 | B2 | V1 |
| ManInTheMoon |    |   |    |    |    |

The top row shows the current combo, the program, the bank, and the voice being edited. The bottom row shows the program name.

**Note:** Though the other combos and program banks can be used as a starting point for building new combos, the actual programs used are copies, so any edits made in Combo Mode do not affect the source programs. The converse is also true. Say a combo is created using the program “Arid” and then Arid is subsequently edited in Program Mode. Those changes will not be propagated to the combo. (The edited program can be reassigned to the combo, though.) In other words, Combos contain all parameters for all four voices when saved, and do not rely on referencing or mapping other programs, making organization and maintenance much easier.

Use the PUSH IT button or a MIDI controller to audition any changes made to voice 1.

The ASSIGNABLE PARAMETERS are initially the same as for the chosen program, but can be reassigned, if desired, without affecting the assignments in the original program. Simply press ASSIGN PARAMS and choose the desired parameters as in Program Mode.

**Note:** A few parameters do not appear in Combo Mode, or appear only on certain voices. In addition to the exceptions noted below, Unison Mode, Split Point, and Key Mode never appear in Combo Mode.

When satisfied with the selections/edits, press EDIT B/COMBO again to move on to voice 2. When assignments have been made for all four voices, press EDIT B/COMBO to exit and play the combo.

To set the relative voice volumes in a combo, press EDIT B/COMBO to enter single voice edit mode. The VOLUME knob can then be used to set the Voice Volume parameter for voice 1. Press EDIT B/COMBO again to move on to voice 2, and so on.

The combo’s name is set using the Edit Name parameter for voice 1 (ASSIGNABLE PARAMETER 1) *only* when EDIT B/COMBO is turned off. And, of course, don’t forget to save changes using WRITE. The combo can be saved to the current, or another, memory location. After pressing WRITE, use SELECT to choose the target combo number.

There are other parameters that affect how combos play back. If Unison is set to Off for voice 1 (the Unison on/off parameter *only* appears under voice 1, not



voices 2 through 4), the combo will play back polyphonically. If the PUSH IT button is to be used to latch notes on, Push It Mode must be set to Toggle in each of the voices. To start playback of four sequences simultaneously from the PUSH IT button, set Unison to On in voice 1, set the Push It Mode to Toggle for all four voices, and make sure Sequencer is set to On for all four voices. If the Audio Out parameter in the Global menu is set to Quad, each of the voices in a combo can be processed separately.

The editor has the ability to copy any combo voice or any program layer (A or B) to any other combo voice or program layer. This provides a very fast way to build up combos. For example, say you like the kick drum on voice 1 of a factory combo. You can copy it and paste it to any voice on a new combo. Then, you could find a snare from a different combo, and copy it into a different voice on your new combo. Do the same for the remaining voices and you have a new customized combo that you can then further edit to your liking.

## **Combos and Multi Mode**

Combos can also be used to “cue up” programs used in Multi Mode. When Multi Mode is used with an external sequencer, the sequencer typically determines which programs will play by sending MIDI program change messages on the relevant tracks and MIDI channels. As an alternative, a combination of Combo Mode and Multi Mode can be used to recall four programs—one per voice—and have each voice respond to a different MIDI channel. For more information about Multi Mode, see *Global Parameters* on page 13.

# Using Poly Chain

Poly Chain enables multiple Tetras to be chained together for increased polyphony, up to 16 voices. MIDI note data from a keyboard, sequencer, or other controller is intelligently processed so that, when one synth's maximum polyphony is reached, additional notes are passed through the Poly Chain Out jack and routed to another synth. All that is required is a single MIDI cable for each of the chained synths and a mixer for combining the audio outputs. Tetra can also be poly chained with a Mopho or Prophet '08.

The same programs should be loaded into all the chained synths. The easiest way to do that is to use the Dump command in the Global menu to dump the programs via MIDI from one synth to the other(s).

**Note:** Tetra's program banks 1 and 2 come pre-loaded with the Prophet '08 factory programs.

On the master instrument—the first Tetra in the chain—set Poly Chain to the number of additional voices that will be chained: Out 1 (for poly chaining a Mopho), Out 4, Out 8, or Out 12. To chain three Tetras, set Poly Chain on the intermediate instrument to InOut4. For four Tetras, set the second instrument in the chain to InOut8 and the third to InOut4. Regardless of how many are chained together, the last Tetra is always set to In End. You can also use one or two Tetras to expand the polyphony of a Prophet '08. See the illustration at the end of this section for more information.

You can now virtually ignore the slave unit or units, since the controls on the master will control all units as if they were a single synth. This includes saving a program; if you save an edited program on the master, it will also save the program on the slave(s).

**Note:** If syncing to an external MIDI clock, set MIDI Clock (Global menu) on the master and any intermediate units to MIDI In/Out. Set the last instrument in the chain to MIDI In.

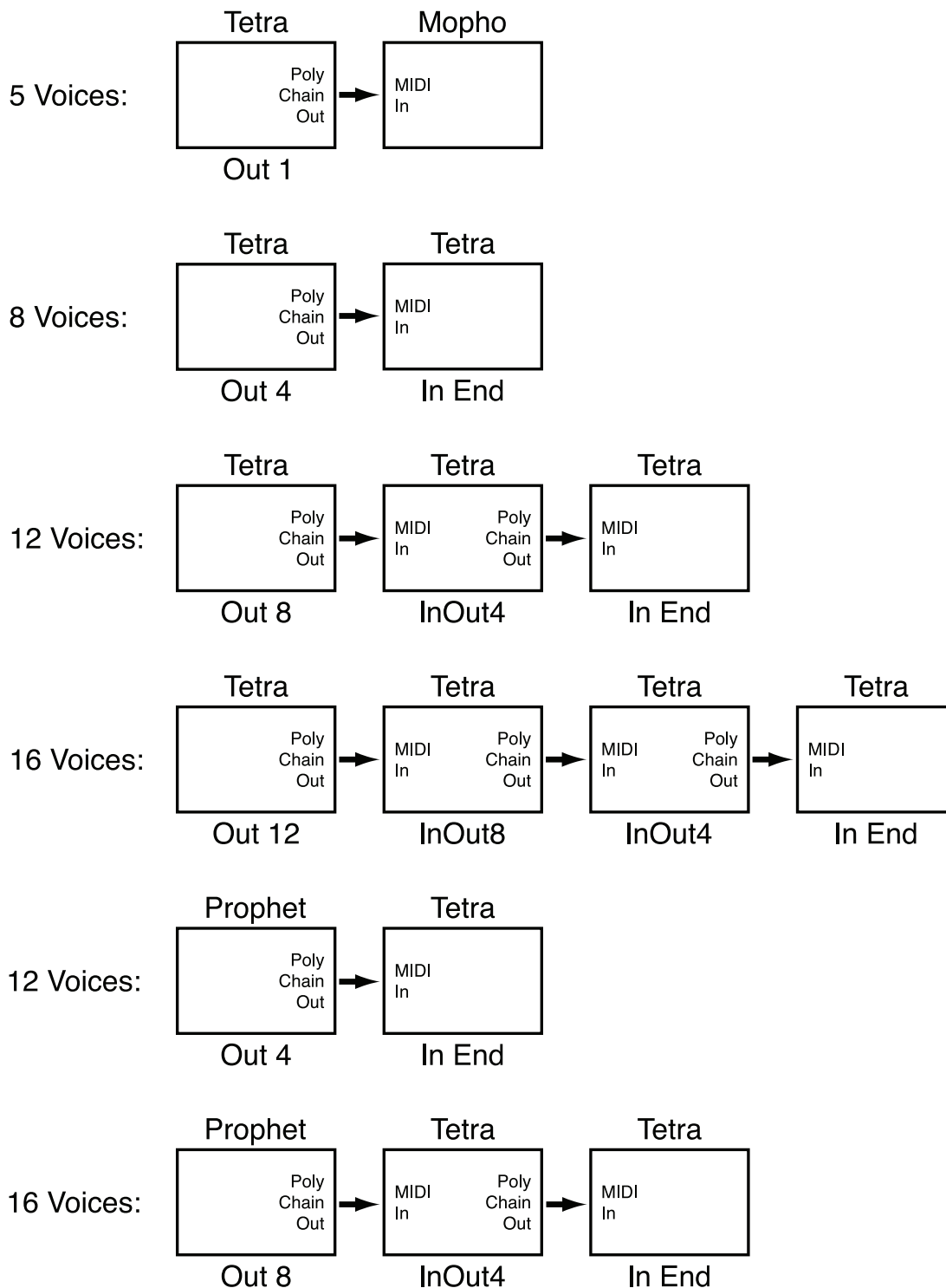
When Poly Chain is set to Off, the Poly Chain MIDI out jack simply duplicates the MIDI out jack.

## A Note About Poly Chain and the Mopho Desktop

Unlike Tetra and the Prophet '08, Mopho does not have layered programs. It is only one voice and so can not do stacked or split programs. Because of that, when slaving a Mopho to a Tetra for poly chaining (for 5 voices total), only Tetra's four voices will play when a stacked or split program is selected. In other words, the Mopho voice will only play in normal keyboard mode.

Also, Mopho's INPUT GAIN (similar to Tetra's FEEDBACK GAIN) is not programmable, so it may take some tweaking to get feedback to sound the same on Mopho and Tetra, even if the same programs are loaded in both. Programs that don't use feedback should sound the same.

## Various Poly Chain Configurations Using Tetra, Mopho, and the Prophet '08\*



\*If Out 4 and Out 8 do not appear as poly chain options on the Prophet, contact [support@davesmithinstruments.com](mailto:support@davesmithinstruments.com) for information about updating the OS.

# Using USB

Tetra's USB 2.0 port enables bidirectional MIDI communication with a computer. A MIDI interface and MIDI cables are not necessary, just a USB cable. Tetra is a Class Compliant USB device. That means it does not require any additional drivers to be installed to communicate with a Mac or Windows computer.

Tetra transmits and receives MIDI data via USB, but does not transmit audio.

**Note:** MIDI In and USB should not be used at the same time, as overlapping messages from different sources may cause Tetra to respond unpredictably. MIDI Out and USB can be used at the same time and transmit the same data. Poly Chain Out is an independent MIDI bus and can be used regardless of the “normal” MIDI connection.

## USB Notes

Under Mac OS X, Tetra will appear as a MIDI port when connected via USB and can be configured using the Mac's Audio MIDI Setup application (typically found in Applications/Utilities).

Under Windows XP, the first time Tetra is connected via USB, the “Found new hardware” alert appears and Tetra is automatically installed—somewhat misleadingly—as “USB Audio Device.” If there is already another Class Compliant USB device installed, Tetra will show up as “USB Audio Device(2)” (or 3 or 4 or...).

### To determine which USB Audio Device is Tetra:

1. Open the System Control Panel
2. Click the Hardware tab.
3. Click Device Manager.
4. Expand “Sound, video, and game controllers.”
5. Right-click any “USB Audio Device” and choose Properties from the pop-up menu.

The General tab of the USB Audio Device Properties window displays the Device Type, Manufacturer, and Location. For Tetra, the Location should read “Location *n* (DSI Tetra).”

Windows Vista essentially behaves the same as XP, but the device name is DSI Tetra rather than USB Audio Device.

In Windows, if you unplug the USB cable and plug it back in while a program has the Tetra port open, you may have to resync. That usually means going to the USB Audio Device (or DSI Tetra) Properties, as in the procedure above, and clicking OK. If Tetra is no longer listed in the Device Manager under “Sound, video, and game controllers,” power Tetra down and back up again while it is connected via USB. It should be detected on power up.

# Modulation Destinations

| Display    | Destination                   |
|------------|-------------------------------|
| Off        | No destination selected       |
| Osc 1 Freq | Oscillator 1 Frequency        |
| Osc 2 Freq | Oscillator 2 Frequency        |
| OscAllFreq | Oscillator 1 and 2 Frequency  |
| Osc Mix    | Oscillator Mix                |
| NoiseLevel | Noise Level                   |
| Osc1 Pulsw | Oscillator 1 Pulse Width      |
| Osc2 Pulsw | Oscillator 2 Pulse Width      |
| Osc All PW | All Oscillators Pulse Width   |
| Low Pass   | Lowpass Filter Frequency      |
| Resonance  | Resonance                     |
| Audio Mod  | Audio Mod Amount              |
| VCA Level  | VCA Amount                    |
| Output Pan | Stereo Pan Position           |
| LFO 1 Freq | LFO 1 Frequency               |
| LFO 2 Freq | LFO 2 Frequency               |
| LFO 3 Freq | LFO 3 Frequency               |
| LFO 4 Freq | LFO 4 Frequency               |
| LFOAllFreq | All LFO Frequencies           |
| LFO 1 Amt  | LFO 1 Amount                  |
| LFO 2 Amt  | LFO 2 Amount                  |
| LFO 3 Amt  | LFO 3 Amount                  |
| LFO 4 Amt  | LFO 4 Amount                  |
| LFOAll Amt | All LFO Amounts               |
| Env 1 Amt  | Envelope 1 Amount (Level)     |
| Env 2 Amt  | Envelope 2 Amount (Level)     |
| Env 3 Amt  | Envelope 3 Amount (Level)     |
| EnvAll Amt | All Envelope Amounts (Levels) |
| Env1Attack | Envelope 1 Attack Rate        |
| Env2Attack | Envelope 2 Attack Rate        |
| Env3Attack | Envelope 3 Attack Rate        |
| EnvAll Att | All Envelope Attack Rates     |
| Env1 Decay | Envelope 1 Decay Rate         |
| Env2 Decay | Envelope 2 Decay Rate         |
| Env3 Decay | Envelope 3 Decay Rate         |
| EnvAll Dec | All Envelope Decay Rates      |
| Env1Releas | Envelope 1 Release Rate       |
| Env2Releas | Envelope 2 Release Rate       |

|            |                                         |
|------------|-----------------------------------------|
| Env3Releas | Envelope 3 Release Rate                 |
| EnvAll Rel | All Envelope Release Rates              |
| Mod 1 Amt  | Modulator 1 Amount                      |
| Mod 2 Amt  | Modulator 2 Amount                      |
| Mod 3 Amt  | Modulator 3 Amount                      |
| Mod 4 Amt  | Modulator 4 Amount                      |
| Fback Vol  | Feedback Volume                         |
| Sub Osc 1  | Sub Oscillator 1 Level                  |
| Sub Osc 2  | Sub Oscillator 2 Level                  |
| Fback Gain | Feedback Gain                           |
| Seq1 Slew  | Sequencer 1 Slew Rate (Seq 2 Dest only) |
| Seq2 Slew  | Sequencer 2 Slew Rate (Seq 4 Dest only) |



# Modulation Sources

| Display   | Source                   |
|-----------|--------------------------|
| Off       | No source selected       |
| Sequence1 | Sequence 1               |
| Sequence2 | Sequence 2               |
| Sequence3 | Sequence 3               |
| Sequence4 | Sequence 4               |
| LFO 1     | LFO 1                    |
| LFO 2     | LFO 2                    |
| LFO 3     | LFO 3                    |
| LFO 4     | LFO 4                    |
| Filt Env1 | Filter Envelope          |
| VCA Env 2 | Amp (VCA) Envelope       |
| Envelope3 | Envelope 3               |
| PitchBend | Pitch Bend               |
| Mod Wheel | Mod Wheel                |
| Pressure  | Pressure (Aftertouch)    |
| MidBreath | MIDI — Breath Controller |
| Midi Foot | MIDI — Foot Controller   |
| Midi Exp  | MIDI — Expression        |
| Velocity  | Keyboard Note Velocity   |
| KeyNumber | Keyboard Note Number     |
| Noise     | Noise                    |

# Parameter List

|                     |                     |                      |
|---------------------|---------------------|----------------------|
| Osc 1 Frequency     | VCA Env Release     | Mod 3 Amount         |
| Osc 1 Fine Freq     | Pan Spread          | Mod 3 Destination    |
| Oscillator 1 Shape  | Program Volume      | Mod 4 Source         |
| Oscillator 1 Glide  | LFO 1 Frequency     | Mod 4 Amount         |
| Osc 1 Key Track     | LFO 1 Shape         | Mod 4 Destination    |
| Sub Osc 1 Level     | LFO 1 Amount        | Mod Wheel Amount     |
| Osc 2 Frequency     | LFO 1 Destination   | Mod Wheel Dest       |
| Osc 2 Fine Freq     | LFO 1 Key Sync      | Pressure Amount      |
| Oscillator 2 Shape  | LFO 2 Frequency     | Pressure Destination |
| Oscillator 2 Glide  | LFO 2 Shape         | Breath Amount        |
| Osc 2 Key Track     | LFO 2 Amount        | Breath Destination   |
| Sub Osc 2 Level     | LFO 2 Destination   | Velocity Amount      |
| Osc Hard Sync       | LFO 2 Key Sync      | Velocity Destination |
| Glide Mode          | LFO 3 Frequency     | Foot Control Amt     |
| Oscillator Slop     | LFO 3 Shape         | Foot Control Dest    |
| Pitch Wheel Range   | LFO 3 Amount        | Unison Mode*         |
| Oscillator Mix      | LFO 3 Destination   | Unison Assign        |
| Noise Level         | LFO 3 Key Sync      | Unison On/Off**      |
| Feedback Volume     | LFO 4 Frequency     | Push It Note         |
| Feedback Gain       | LFO 4 Shape         | Push It Velocity     |
| Filter Cutoff Freq  | LFO 4 Amount        | Push It Mode         |
| Filter Resonance    | LFO 4 Destination   | Split Point†         |
| Filter Keyboard Amt | LFO 4 Key Sync      | Key Mode†            |
| Filter Audio Mod    | Env 3 Destination   | Clock BPM            |
| Filter Config/Mode  | Envelope 3 Amount   | Clock Divide         |
| Filter Env Amount   | Envelope 3 Velocity | Arpeggiator Mode     |
| Filter Env Velocity | Envelope 3 Delay    | Arpeggiator On/Off   |
| Filter Env Delay    | Envelope 3 Attack   | Sequence Trigger     |
| Filter Env Attack   | Envelope 3 Decay    | Sequencer On/Off     |
| Filter Env Decay    | Envelope 3 Sustain  | Seq 1 Destination    |
| Filter Env Sustain  | Envelope 3 Release  | Seq 2 Destination    |
| Filter Env Release  | Envelope 3 Repeat   | Seq 3 Destination    |
| VCA Level           | Mod 1 Source        | Seq 4 Destination    |
| VCA Env Amount      | Mod 1 Amount        | Seq 1 Steps 1 - 16   |
| VCA Env Velocity    | Mod 1 Destination   | Seq 2 Steps 1 - 16   |
| VCA Env Delay       | Mod 2 Source        | Seq 3 Steps 1 - 16   |
| VCA Env Attack      | Mod 2 Amount        | Seq 4 Steps 1 - 16   |
| VCA Env Decay       | Mod 2 Destination   | Edit Name            |
| VCA Env Sustain     | Mod 3 Source        |                      |

\* Program Mode only; not in Combo Mode

\*\* In Combo Mode, voice 1 only

† Program Mode, layer A only

# Support

## Troubleshooting

Here are a few suggestions for resolving problems that may occur.

### **The sequencer has stopped running.**

Make sure Clock in the Global menu is set to Internal.

### **Some of the programs sound different.**

Check the Mod Wheel position. The Mod Wheel can do a lot more than just add vibrato. Also, some of the programs use the sequencer to shape the sound so make sure Clock in the Global menu is set to Internal.

### **There is a ground hum in the audio output.**

USB can cause ground loops, so try to resolve any grounding issues between the computer and Tetra. Or use MIDI, which is opto-isolated.

### **Tetra is behaving erratically.**

This is almost always caused by a MIDI data loop. Make sure that any MIDI Thru functionality is turned off on the MIDI interface/hardware or in the MIDI software application (sequencer or whatever). Disconnect all Tetra's MIDI connections—MIDI and USB cables—and see if the problem persists. You can also monitor the MIDI traffic with MIDI Monitor (Mac OS) or MIDI-OX (Windows) to see if Tetra is being overrun with duplicate messages.

### **An oscillator or the filter sounds strange or out of tune.**

Hold down ASSIGN PARAMS and press the mode switch to run the calibration routine.

**Note:** It is not necessary to run the calibration routine on a regular basis. You should only run it if you are experiencing problems.

Still experiencing a problem with Tetra? Reset the Global parameters (in the Global menu).

## Contacting Technical Support

If you are still having a problem with Tetra, contact Technical Support at [support@davesmithinstruments.com](mailto:support@davesmithinstruments.com). Please include your Tetra's serial number, the version of the operating systems (Main and Voice displayed on startup), and the purchase date.

**Note:** If you have not already reset the Global parameters and run the calibration routine (see *Troubleshooting* above), you should do it before

contacting Technical Support. It's probably the first thing they'll ask you to do.

## Warranty Repair

Dave Smith Instruments warrants that Tetra will be free from defects in materials and/or workmanship for 1 year from the date of purchase. Please register your product online at [www.davesmithinstruments.com](http://www.davesmithinstruments.com) to establish the date of purchase. (This is not a requirement for warranty service, but it will help expedite the process.)

Please contact [support@davesmithinstruments.com](mailto:support@davesmithinstruments.com) to determine the best course of action for getting your Tetra repaired. For your own protection, as well as ours, **please do not return any product to Dave Smith Instruments without a return authorization (RA) number**. To issue an RA number, Technical Support needs:

- Your name
- Your return address
- Your email address
- A phone number where you can be reached
- Your Tetra's serial number
- The date of purchase and where purchased

If you need to return your instrument for repair, you are responsible for getting it to DSI. We highly recommend insuring it and packing in the original packaging. Damage resulting from shipping a product with insufficient packaging is not covered by warranty.

# MIDI Implementation

Tetra receives MIDI data according to the mode controls under GLOBAL. In addition, there is interaction between some of the program parameters that determine the overall response of Tetra to MIDI data. Note that the following applies to using both the MIDI jacks and USB.

Following are the Global parameters that affect response to MIDI:

**MIDI Channel:** ALL, 1...16 — Selects the MIDI channel to send and receive data, 1 to 16. All receives on any channel.

**Clock:** see table — Selects the MIDI clock status as follows:

| Display    | MIDI Clock Setting                      |
|------------|-----------------------------------------|
| Internal   | MIDI clock is neither sent nor received |
| MIDI Out   | MIDI clock is sent                      |
| MIDI In    | MIDI clock is received                  |
| MIDIIn/Out | MIDI clock is received and transmitted  |

**MIDI Parameter Send:** NRPN, CC, Off — Changes to the values of Tetra's front panel controls are transmitted via MIDI as Non-registered Parameter Number (NRPN) controllers or as Continuous Controllers (CC). Transmission of parameters can also be turned off.

**MIDI Parameter Receive:** All, NRPN, CC, Off — Sets the method by which Tetra receives parameter changes via MIDI. As with transmission, NRPNs are the preferred method, though some controllers may only be able to send CCs.

**MIDI Control:** Off, On — When On, the synth will respond to MIDI controllers, including Pitch Wheel, Mod Wheel, Pedal, Breath, Volume, and Expression.

**MIDI SysEx:** Off, On — When On, the synth will respond to received MIDI SysEx messages, and will transmit them, when prompted, to the MIDI Out.

## MIDI Messages

### System Real-time Messages

| Status    | Description       |
|-----------|-------------------|
| 1111 1000 | MIDI Timing Clock |

### Received Channel Messages

| Status    | Second    | Third    | Description                                                        |
|-----------|-----------|----------|--------------------------------------------------------------------|
| 1000 nnnn | 0kkkkkkk  | 0vvvvvvv | Note Off. Velocity is ignored                                      |
| 1001 nnnn | 0kkkkkkk  | 0vvvvvvv | Note On. Note off if vvvvvvv = 0                                   |
| 1010 nnnn | 0kkkkkkk  | 0vvvvvvv | Polyphonic Key Pressure                                            |
| 1011 nnnn | 0vvvvvvv  | 0vvvvvvv | Control Change; see "Received Controller Messages" table following |
| 1100 nnnn | 0pppppppp |          | Program change, 0-127 for Programs 1-128 within current Bank       |
| 1101 nnnn | 0vvvvvvv  |          | Channel Pressure                                                   |
| 1110 nnnn | 0vvvvvvv  | 0vvvvvvv | Pitch Bend LS Byte then MS Byte                                    |

Notes: 0kkkkkkk Note number 0 — 127  
nnnn Channel number 0 to 15 (MIDI channel 1-16). Ignored if MIDI channel set to ALL  
0vvvvvvv Value

### Received Controller Messages

| Status    | Second | Third    | Description                                                                      |
|-----------|--------|----------|----------------------------------------------------------------------------------|
| 1011 nnnn | 1      | 0vvvvvvv | Mod Wheel — directly assignable controller                                       |
| 1011 nnnn | 2      | 0vvvvvvv | Breath Controller — directly assignable controller                               |
| 1011 nnnn | 4      | 0vvvvvvv | Foot Controller — directly assignable controller                                 |
| 1011 nnnn | 7      | 0vvvvvvv | Volume — Combined with Master Volume and Voice Volume                            |
| 1011 nnnn | 74     | 0vvvvvvv | Brightness — Added to low-pass filter cutoff frequency                           |
| 1011 nnnn | 11     | 0vvvvvvv | Expression Controller — directly assignable controller                           |
| 1011 nnnn | 32     | 0vvvvvvv | Bank Select — 0 -3 select banks 1 – 4; others ignored                            |
| 1011 nnnn | 64     | 0vvvvvvv | Damper pedal — holds envelopes in Sustain if 0100 0000 or higher                 |
| 1011 nnnn | 123    | 0vvvvvvv | All Notes Off — clear all MIDI notes                                             |
| 1011 nnnn | 121    | 0vvvvvvv | Reset All Controllers — clears all MIDI controllers to 0, MIDI volume to maximum |

See sections below for additional Continuous Controller (CC) and Non-registered Parameter Number (NRPN) messages received.

### Transmitted Channel Messages

| Status    | Second    | Third | Description                                                      |
|-----------|-----------|-------|------------------------------------------------------------------|
| 1100 nnnn | 0pppppppp |       | Program change, 0 — 127 for Programs 1 — 128 within current Bank |

### Transmitted Controller Messages

| Status    | Second    | Third    | Description          |
|-----------|-----------|----------|----------------------|
| 1011 nnnn | 0000 0111 | 0vvvvvvv | Volume knob          |
| 1011 nnnn | 0010 0000 | 0vvvvvvv | Bank Select — 0 to 2 |

See sections below for additional Continuous Controller (CC) and Non-registered Parameter Number (NRPN) messages transmitted.

### Additional Continuous Controllers (CCs) Transmitted/Received

The following table details how CCs are mapped onto Tetra's controls. They are transmitted when MIDI Parameter Send is set to CC in Global, and recognized when received when MIDI Parameter Receive is set to either CC or All in Global.

| Parameter       | CC  |                 |     |
|-----------------|-----|-----------------|-----|
| OSC 1 FREQ      | 20  | FIL SUS         | 111 |
| OSC 1 FREQ FINE | 21  | FIL REL         | 112 |
| OSC 1 SHAPE     | 22  |                 |     |
| GLIDE 1         | 23  | VCA LEVEL       | 113 |
|                 |     | OUTPUT PAN      | 114 |
| OSC 2 FREQ      | 24  | VCA ENV AMOUNT  | 115 |
| OSC 2 FREQ FINE | 25  | AMP ENV VEL AMT | 116 |
| OSC 2 SHAPE     | 26  | VCA DEL         | 117 |
| GLIDE 2         | 27  | VCA ATT         | 118 |
|                 |     | VCA DEC         | 119 |
| OSC MIX         | 28  | VCA SUS         | 75  |
| NOISE LEVEL     | 29  | VCA REL         | 76  |
|                 |     |                 |     |
| SUB OSC 1 LEVEL | 30  | ENV3 DEST       | 85  |
| SUB OSC 2 LEVEL | 31  | ENV3 AMT        | 86  |
|                 |     | ENV 3 VEL AMT   | 87  |
| FEEDBACK VOLUME | 52  | ENV 3 DELAY     | 88  |
| FEEDBACK GAIN   | 53  | ENV3 ATT        | 89  |
|                 |     | ENV3 DEC        | 90  |
| FILTER FREQ     | 102 | ENV3 SUS        | 77  |
| RESONANCE       | 103 | ENV3 REL        | 78  |
| FIL KEY AMT     | 104 |                 |     |
| FIL AUDIO MOD   | 105 | TEMPO           | 14  |
| FILTER ENV AMT  | 106 | TIME SIG        | 15  |
| FIL ENV VEL AMT | 107 |                 |     |
| FIL DEL         | 108 |                 |     |
| FIL ATT         | 109 |                 |     |
| FIL DEC         | 110 |                 |     |

## NRPN Messages

The Non-Registered Parameter Number (NRPN) MIDI messages are used to transmit and receive both global and program parameters. They are transmitted when MIDI Parameter Send is set to NRPN in Global, and received when MIDI Parameter Receive is set to either NRPN or All in Global.

The messages are handled in standard MIDI format using the NRPN CC commands in running status byte format. Below is the format used for transmitting a NRPN parameter:

### Transmitted NRPN Messages

| Status    | Description                  |
|-----------|------------------------------|
| 1011 nnnn | Control Change               |
| 0110 0011 | NRPN parameter number MSB CC |
| 0vvv vvvv | Parameter Number MSB         |
| 0110 0010 | NRPN parameter number LSB CC |
| 0vvv vvvv | Parameter Number LSB         |
| 0000 0110 | NRPN parameter value MSB CC  |
| 0vvv vvvv | Parameter value MSB          |
| 0010 0110 | NRPN parameter value LSB CC  |
| 0vvv vvvv | Parameter value LSB          |

The parameter number can be found in the two tables below, one for Global parameters, and the other for Program parameters. The parameter numbers and the parameter values are broken into two 7-bit bytes for MIDI transmission; the LSB has the seven least-significant bits, and the MSB has the seven most-significant bits, though in most cases the MSB will be zero or one, and never more than two.

When receiving an NRPN, all messages do not necessarily need to be transmitted, since the synth will track the most recent NRPN number, though it is usually good practice to send the entire message above.

Once an NRPN is selected, the synth will also respond to NRPN Data Increment and Decrement commands, which some controllers utilize. Finally, it responds to one RPN (Registered Parameter Number) command, the RPN/NRPN Reset command, which can be handy for resetting the currently selected parameter to a known state.



## Received NRPN Messages

| Status    | Second    | Third    | Description                                                                                |
|-----------|-----------|----------|--------------------------------------------------------------------------------------------|
| 1011 nnnn | 0110 0011 | 0vvvvvvv | NRPN parameter number MSB CC                                                               |
| 1011 nnnn | 0110 0010 | 0vvvvvvv | NRPN parameter number LSB CC                                                               |
| 1011 nnnn | 0000 0110 | 0vvvvvvv | NRPN parameter value MSB CC                                                                |
| 1011 nnnn | 0010 0110 | 0vvvvvvv | NRPN parameter value LSB CC                                                                |
| 1011 nnnn | 0110 0000 | 0xxxxxxx | NRPN parameter value Increment                                                             |
| 1011 nnnn | 0110 0001 | 0xxxxxxx | NRPN parameter value Decrement                                                             |
| 1011 nnnn | 0010 0101 | 0111111  | RPN parameter number MSB CC - Reset NRPN parameter number (when both MSB and LSB received) |
| 1011 nnnn | 0010 0100 | 0111111  | RPN parameter number LSB CC - Reset NRPN parameter number (when both MSB and LSB received) |

## Global Parameter Data

The following table shows the Global data sent and received on global parameter dumps, and the corresponding NRPN numbers.

| NRPN | Range   | Description                                                                                                                                                                                                                            |
|------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 384  | 0 - 24  | Master Transpose: 0= -12 semitones (1 octave), 12=0 (no transpose), and 24= +12 semitones.                                                                                                                                             |
| 385  | 0 - 100 | Master Fine Tune: 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents                                                                                                                                                                   |
| 386  | 0 - 16  | MIDI Channel: if = 0, data received on all MIDI channels. Otherwise = channel number 1 - 16.                                                                                                                                           |
| 387  | 0 - 7   | Poly Chain*<br>0 Off<br>1 Out 1<br>2 Out 4<br>3 Out 8<br>4 Out 12<br>5 In End<br>6 InOut4<br>7 InOut8                                                                                                                                  |
| 388  | 0 - 4   | MIDI Clock Source*<br>0 Use Internal clock, don't send MIDI clock<br>1 Voice 1 is the master clock in Combo mode<br>2 Use Internal clock, send MIDI clock<br>3 Use MIDI clock In<br>4 Use MIDI clock In, and retransmit MIDI clock out |
| 389  | 0 - 1   | Local Control* Off/On                                                                                                                                                                                                                  |
| 390  | 0 - 2   | Parameter Send*:<br>0 NRPN<br>1 CC<br>2 Off                                                                                                                                                                                            |

|     |        |                                                                                  |
|-----|--------|----------------------------------------------------------------------------------|
| 391 | 0 - 3  | Parameter Receive†:<br>0 All<br>1 NRPN only<br>2 CC only<br>3 Off                |
| 394 | 0 - 1  | MIDI Controller Send/Receive Off/On                                              |
| 395 | 0 - 1  | MIDI Sysex Send/Receive Off/On                                                   |
| 400 | 0 - 3  | Audio Out:<br>0 Stereo<br>1 Mono<br>2 Quad<br>3 Q LR34                           |
| 403 | 0 - 13 | Balance Tweak*: 0 = -7, 7 = 0, and 13 = 7                                        |
| 404 | 0 - 2  | Pot Mode: Relative, Passthru, Jump                                               |
| 406 | 0 - 1  | MIDI Out Select*:<br>0 MIDI Out<br>1 MIDI Thru                                   |
| 407 | 0 - 1  | Multi Mode Off/On                                                                |
| 411 | 0 - 1  | Select layer A (0) or B (1)                                                      |
| 412 | 0 - 1  | Select Program mode (0) or Combo mode (1)                                        |
| 413 | 0 - 4  | Select voice<br>0 All voices<br>1 Voice 1<br>2 Voice 2<br>3 Voice 3<br>4 Voice 4 |

\*Received, but not sent.

†Sent, but ignored when received.

## Program Parameter Data

The following table lists Tetra's voice parameters. The parameter number in the program and edit buffer dumps are different than the NRPN numbers as seen; this was to maintain NRPN compatibility with the Prophet '08 as much as possible.

| Parm | A | B   | Range   | Description                                                                                                                             |
|------|---|-----|---------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 0    | 0 | 200 | 0 – 120 | Oscillator 1 Frequency, 0 – 120 in semitones (10 octave range)                                                                          |
| 1    | 1 | 201 | 0 – 100 | Oscillator 1 Fine Tune; 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents                                                              |
| 2    | 2 | 202 | 0-103   | Oscillator 1 Shape<br>0 Oscillator Off<br>1 Sawtooth<br>2 Triangle<br>3 Sawtooth/triangle mix<br>4 – 103 Pulse Wave, Pulse width 0 – 99 |
| 3    | 3 | 203 | 0 - 127 | Oscillator 1 Glide                                                                                                                      |

|    |    |     |         |                                                                                                                                         |
|----|----|-----|---------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 4  | 4  | 204 | 0 - 1   | Oscillator 1 Keyboard Off/On                                                                                                            |
| 6  | 5  | 205 | 0 - 120 | Oscillator 2 Frequency, 0 - 120 in semitones (10 octave range)                                                                          |
| 7  | 6  | 206 | 0 - 100 | Oscillator 2 Fine Tune; 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents                                                              |
| 8  | 7  | 207 | 0-103   | Oscillator 2 Shape<br>0 Oscillator Off<br>1 Sawtooth<br>2 Triangle<br>3 Sawtooth/triangle mix<br>4 - 103 Pulse Wave, Pulse width 0 - 99 |
| 9  | 8  | 208 | 0 - 127 | Oscillator 2 Glide                                                                                                                      |
| 10 | 9  | 209 | 0 - 1   | Oscillator 2 Keyboard Off/On                                                                                                            |
| 12 | 10 | 210 | 0 - 1   | Sync off/on                                                                                                                             |
| 13 | 11 | 211 | 0 - 3   | Glide Mode:<br>0 fixed rate<br>1 fixed rate auto<br>2 fixed time<br>3 fixed time auto                                                   |
| 14 | 12 | 212 | 0 - 5   | Oscillator Slop                                                                                                                         |
| 16 | 13 | 213 | 0 - 127 | Oscillator 1 - 2 Mix                                                                                                                    |
| 17 | 14 | 214 | 0 - 127 | Noise Level                                                                                                                             |
|    |    |     |         |                                                                                                                                         |
| 20 | 15 | 215 | 0 - 164 | Filter Frequency, steps in semitones                                                                                                    |
| 21 | 16 | 216 | 0 - 127 | Resonance                                                                                                                               |
| 22 | 17 | 217 | 0 - 127 | Filter Keyboard Amount                                                                                                                  |
| 23 | 18 | 218 | 0 - 127 | Filter Audio Modulation                                                                                                                 |
| 24 | 19 | 219 | 0 - 1   | Filter Poles 0: 2-pole; 1: 4-pole                                                                                                       |
| 25 | 20 | 220 | 0 - 254 | Filter Envelope Amount; -127 to +127                                                                                                    |
| 26 | 21 | 221 | 0 - 127 | Filter Envelope Velocity Amount                                                                                                         |
| 27 | 22 | 222 | 0 - 127 | Filter Envelope Delay                                                                                                                   |
| 28 | 23 | 223 | 0 - 127 | Filter Envelope Attack                                                                                                                  |
| 29 | 24 | 224 | 0 - 127 | Filter Envelope Decay                                                                                                                   |
| 30 | 25 | 225 | 0 - 127 | Filter Envelope Sustain                                                                                                                 |
| 31 | 26 | 226 | 0 - 127 | Filter Envelope Release                                                                                                                 |
|    |    |     |         |                                                                                                                                         |
| 32 | 27 | 227 | 0 - 127 | VCA Initial Level                                                                                                                       |
| 40 | 28 | 228 | 0 - 127 | Output Spread                                                                                                                           |
| 41 | 29 | 229 | 0 - 127 | Voice Volume                                                                                                                            |
| 33 | 30 | 230 | 0 - 127 | VCA Envelope Amount                                                                                                                     |
| 34 | 31 | 231 | 0 - 127 | VCA Envelope Velocity Amount                                                                                                            |
| 35 | 32 | 232 | 0 - 127 | VCA Envelope Delay                                                                                                                      |
| 36 | 33 | 233 | 0 - 127 | VCA Envelope Attack                                                                                                                     |
| 37 | 34 | 234 | 0 - 127 | VCA Envelope Decay                                                                                                                      |
| 38 | 35 | 235 | 0 - 127 | VCA Envelope Sustain                                                                                                                    |
| 39 | 36 | 236 | 0 - 127 | VCA Envelope Release                                                                                                                    |

|    |    |     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|----|-----|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 42 | 37 | 237 | 0 - 166 | LFO 1 Frequency; 0 – 150 unsynced frequencies<br>151 Sequence speed divided by 32<br>152 Sequence speed divided by 16<br>153 Sequence speed divided by 8<br>154 Sequence speed divided by 6<br>155 Sequence speed divided by 4<br>156 Sequence speed divided by 3<br>157 Sequence speed divided by 2<br>158 Sequence speed divided by 1.5<br>159 One cycle per step<br>160 Two cycles per three steps<br>161 Two cycles per step<br>162 One cycles per three steps<br>163 Four cycles per step<br>164 Six cycles per step<br>165 Eight cycles per step<br>166 Sixteen cycles per step |
| 43 | 38 | 238 | 0 - 4   | LFO 1 Shape<br>0 Triangle<br>1 Reverse Sawtooth<br>2 Sawtooth<br>3 Pulse (square)<br>4 Random                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 44 | 39 | 239 | 0 - 127 | LFO 1 Amount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 45 | 40 | 240 | 0 - 43  | LFO 1 Mod Destination; See Modulation Destination list below                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 46 | 41 | 241 | 0 - 1   | LFO 1 Key Sync Off/On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 47 | 42 | 242 | 0 - 166 | LFO 2 Frequency; same as LFO 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 48 | 43 | 243 | 0 - 4   | LFO 2 Shape; same as LFO 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 49 | 44 | 244 | 0 - 127 | LFO 2 Amount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 50 | 45 | 245 | 0 - 43  | LFO 2 Mod Destination; See Modulation Destination list below                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 51 | 46 | 246 | 0 - 1   | LFO 2 Key Sync Off/On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 52 | 47 | 247 | 0 - 166 | LFO 3 Frequency; same as LFO 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 53 | 48 | 248 | 0 - 4   | LFO 3 Shape; same as LFO 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 54 | 49 | 249 | 0 - 127 | LFO 3 Amount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 55 | 50 | 250 | 0 - 43  | LFO 3 Mod Destination; See Modulation Destination list below                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 56 | 51 | 251 | 0 - 1   | LFO 3 Key Sync Off/On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 57 | 52 | 252 | 0 - 166 | LFO 4 Frequency; same as LFO 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 58 | 53 | 253 | 0 - 4   | LFO 4 Shape; same as LFO 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 59 | 54 | 254 | 0 - 127 | LFO 4 Amount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 60 | 55 | 255 | 0 - 43  | LFO 4 Mod Destination; See Modulation Destination list below                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 61 | 56 | 256 | 0 - 1   | LFO 4 Key Sync Off/On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 62 | 57 | 257 | 0 - 43  | Envelope 3 Mod Destination; See Mod Destination list below                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 63 | 58 | 258 | 0 - 254 | Envelope 3 Amount; -127 to +127                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 64 | 59 | 259 | 0 - 127 | Envelope 3 Velocity Amount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 65 | 60 | 260 | 0 - 127 | Envelope 3 Delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|     |    |     |         |                                                          |
|-----|----|-----|---------|----------------------------------------------------------|
| 66  | 61 | 261 | 0 - 127 | Envelope 3 Attack                                        |
| 67  | 62 | 262 | 0 - 127 | Envelope 3 Decay                                         |
| 68  | 63 | 263 | 0 - 127 | Envelope 3 Sustain                                       |
| 69  | 64 | 264 | 0 - 127 | Envelope 3 Release                                       |
|     |    |     |         |                                                          |
| 71  | 65 | 265 | 0 - 20  | Mod 1 Source; See Modulation Source list below           |
| 72  | 66 | 266 | 0 - 254 | Mod 1 Amount; -127 to +127                               |
| 73  | 67 | 267 | 0 - 47  | Mod 1 Destination; See Modulation Destination list below |
| 74  | 68 | 268 | 0 - 20  | Mod 2 Source; See Modulation Source list below           |
| 75  | 69 | 269 | 0 - 254 | Mod 2 Amount; -127 to +127                               |
| 76  | 70 | 270 | 0 - 47  | Mod 2 Destination; See Modulation Destination list below |
| 77  | 71 | 271 | 0 - 20  | Mod 3 Source; See Modulation Source list below           |
| 78  | 72 | 272 | 0 - 254 | Mod3 Amount; -127 to +127                                |
| 79  | 73 | 273 | 0 - 47  | Mod 3 Destination; See Modulation Destination list below |
| 80  | 74 | 274 | 0 - 20  | Mod 4 Source; See Modulation Source list below           |
| 81  | 75 | 275 | 0 - 254 | Mod 4 Amount; -127 to +127                               |
| 82  | 76 | 276 | 0 - 47  | Mod 4 Destination; See Modulation Destination list below |
|     |    |     |         |                                                          |
| 107 | 77 | 277 | 0 - 47  | Sequence 1 Destination; See ModDestination list below    |
| 108 | 78 | 278 | 0 - 47  | Sequence 2 Destination; See ModDestination list below    |
| 109 | 79 | 279 | 0 - 47  | Sequence 3 Destination; See ModDestination list below    |
| 110 | 80 | 280 | 0 - 47  | Sequence 4 Destination; See ModDestination list below    |
|     |    |     |         |                                                          |
| 83  | 81 | 281 | 0 - 254 | Mod Wheel Amount; -127 to +127                           |
| 84  | 82 | 282 | 0 - 47  | Mod Wheel Destination; See ModDestination list below     |
| 85  | 83 | 283 | 0 - 254 | Pressure Amount; -127 to +127                            |
| 86  | 84 | 284 | 0 - 47  | Pressure Destination; See ModDestination list below      |
| 87  | 85 | 285 | 0 - 254 | Breath Amount; -127 to +127                              |
| 88  | 86 | 286 | 0 - 47  | Breath Destination; See ModDestination list below        |
| 89  | 87 | 287 | 0 - 254 | Velocity Amount; -127 to +127                            |
| 90  | 88 | 288 | 0 - 47  | Velocity Destination; See ModDestination list below      |
| 91  | 89 | 289 | 0 - 254 | Foot Control Amount; -127 to +127                        |
| 92  | 90 | 290 | 0 - 47  | Foot Control Destination; See ModDestination list below  |

|     |    |     |          |                                                                                                                                                                                                                                                                                                                                   |
|-----|----|-----|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 101 | 91 | 291 | 30 - 250 | BPM tempo                                                                                                                                                                                                                                                                                                                         |
| 102 | 92 | 292 | 0 - 12   | Clock Divide:<br>Half Note<br>Quarter Note<br>Eighth Note<br>Eighth Note half swing<br>Eighth Note full swing<br>Eighth Note triplets<br>Sixteenth Note<br>Sixteenth Note half swing<br>Sixteenth Note full swing<br>Sixteenth Note triplets<br>Thirty-second Notes<br>Thirty-second Notes triplets<br>Sixty-Fourth note triplets |
| 15  | 93 | 293 | 0 - 12   | Pitch Bend Range                                                                                                                                                                                                                                                                                                                  |
| 105 | 94 | 294 | 0 - 4    | Sequencer Trigger:<br>0 Normal<br>1 Normal, no reset<br>2 No gate<br>3 No gate/no reset<br>4 key step                                                                                                                                                                                                                             |
| 94  | 95 | 295 | 0 - 5    | Key Mode:<br>0 Low note priority<br>1 Low note priority with re-trigger<br>2 High note priority<br>3 High note priority with re-trigger<br>4 Last note hit priority<br>5 Last note hit priority with re-trigger                                                                                                                   |
| 93  | 96 | 296 | 0 - 4    | Unison Mode:<br>0 1 voice<br>1 All voices<br>2 All voices detune1<br>3 All voices detune2<br>4 All voices detune3                                                                                                                                                                                                                 |
| 103 | 97 | 297 | 0 - 3    | Arpeggiator Mode:<br>0 Up<br>1 Down<br>2 Up/Down,<br>3 Assign<br>4 Random<br>5 2 Octaves Up<br>6 2 Octaves Down<br>7 2 Octaves Up/Down<br>8 2 Octaves Assign<br>9 2 Octaves Random<br>10 3 Octaves Up<br>11 3 Octaves Down<br>12 3 Octaves Up/Down<br>13 3 Octaves Assign<br>14 3 Octaves Random                                  |
| 70  | 98 | 298 | 0 - 1    | Envelope 3 Repeat Mode; off/on                                                                                                                                                                                                                                                                                                    |
| 95  | 99 | 299 | 0 - 1    | Unison; off/on                                                                                                                                                                                                                                                                                                                    |

|     |         |         |          |                                                                                                |
|-----|---------|---------|----------|------------------------------------------------------------------------------------------------|
| 104 | 100     | 300     | 0 - 1    | Arpeggiator; off/on                                                                            |
| 106 | 101     | 301     | 0 - 1    | Gated Sequencer; off/on                                                                        |
| 111 | 105     | X       | 0 - 183  | Assignable Parameter 1                                                                         |
| 112 | 106     | X       | 0 - 183  | Assignable Parameter 2                                                                         |
| 113 | 107     | X       | 0 - 183  | Assignable Parameter 3                                                                         |
| 114 | 108     | X       | 0 - 183  | Assignable Parameter 4                                                                         |
| 19  | 110     | 310     | 0 - 127  | Feedback Gain                                                                                  |
| 96  | 111     | 311     | 0 - 127  | Push It Note: C0 to C10                                                                        |
| 97  | 112     | 312     | 0 - 127  | Push It Velocity                                                                               |
| 98  | 113     | 313     | 0 - 1    | Push It Mode: Normal, Toggle                                                                   |
| 5   | 114     | 314     | 0 - 127  | Sub Oscillator 1 Level                                                                         |
| 11  | 115     | 315     | 0 - 127  | Sub Oscillator 2 Level                                                                         |
| 18  | 116     | 316     | 0 - 127  | Feedback Volume                                                                                |
| 117 | 117     | X       |          | Editor Byte                                                                                    |
| 99  | 118     | X       | 0 - 127  | Split Point; 60 = C3                                                                           |
| 100 | 119     | X       | 0 - 2    | Keyboard Mode:<br>Normal<br>Stack<br>Split                                                     |
| 120 | 120-135 | 320-335 | 0 - 127  | Sequence Track1, steps 1 – 16<br>0 to 125: Normal sequence step value<br>126 Reset<br>127 Rest |
| 136 | 136-151 | 336-351 | 0 - 126  | Sequence Track 2, steps 1 – 16<br>0 to 125: Normal sequence step value<br>126 Reset            |
| 152 | 152-167 | 352-367 | 0 - 126  | Sequence Track 3, steps 1 – 16<br>0 to 125: Normal sequence step value<br>126 Reset            |
| 168 | 168-183 | 368-383 | 0 - 126  | Sequence Track 4, steps 1 – 16<br>0 to 125: Normal sequence step value<br>126 Reset            |
| 184 | 184-199 | X       | 32 - 127 | Name characters 1 – 16, in ASCII format                                                        |

The following tables list the values used with the program parameters to specify modulation destinations and sources.

| Mod Destinations        | Value |
|-------------------------|-------|
| Off                     | 0     |
| Osc 1 Freq              | 1     |
| Osc 2 Freq              | 2     |
| Osc 1 and 2 Freq        | 3     |
| Osc Mix                 | 4     |
| Noise Level             | 5     |
| Osc 1 Pulse Width       | 6     |
| Osc 2 Pulse Width       | 7     |
| Osc 1 and 2 Pulse Width | 8     |
| Filter Frequency        | 9     |
| Resonance               | 10    |
| Filter Audio Mod Amt    | 11    |
| VCA Level               | 12    |
| Pan Spread              | 13    |
| LFO 1 Freq              | 14    |
| LFO 2 Freq              | 15    |
| LFO 3 Freq              | 16    |
| LFO 4 Freq              | 17    |
| All LFO Freq            | 18    |
| LFO 1 Amt               | 19    |
| LFO 2 Amt               | 20    |
| LFO 3 Amt               | 21    |
| LFO 4 Amt               | 22    |
| All LFO Amt             | 23    |
| Filter Env Amt          | 24    |
| Amp Env Amt             | 25    |
| Env 3 Amt               | 26    |
| All Env Amounts         | 27    |
| Env 1 Attack            | 28    |
| Env 2 Attack            | 29    |
| Env 3 Attack            | 30    |
| All Env Attacks         | 31    |
| Env 1 Decay             | 32    |
| Env 2 Decay             | 33    |
| Env 3 Decay             | 34    |
| All Env Decays          | 35    |
| Env 1 Release           | 36    |

|                  |    |
|------------------|----|
| Env 2 Release    | 37 |
| Env 3 Release    | 38 |
| All Env Releases | 39 |
| Mod 1 Amt        | 40 |
| Mod 2 Amt        | 41 |
| Mod 3 Amt        | 42 |
| Mod 4 Amt        | 43 |
| Feedback Volume  | 44 |
| Sub Osc 1 Level  | 45 |
| Sub Osc 2 Level  | 46 |
| Feedback Gain    | 47 |
| Slew*            | 48 |

\*Sequence 2 and 4 only

| Mod Sources      | Value |
|------------------|-------|
| Off              | 0     |
| Sequence Track 1 | 1     |
| Sequence Track 2 | 2     |
| Sequence Track 3 | 3     |
| Sequence Track 4 | 4     |
| LFO 1            | 5     |
| LFO 2            | 6     |
| LFO 3            | 7     |
| LFO 4            | 8     |
| Filter Envelope  | 9     |
| Amp Envelope     | 10    |
| Envelope 3       | 11    |
| Pitch Bend       | 12    |
| Mod Wheel        | 13    |
| Pressure         | 14    |
| MIDI Breath      | 15    |
| MIDI Foot        | 16    |
| MIDI Expression  | 17    |
| Velocity         | 18    |
| Note Number      | 19    |
| Noise            | 20    |

## Combo Parameter Data

Combo Mode has its own set of NRPNs that enable the parameters for each of the combo's parts to be addressed on one global MIDI channel. Ranges are the same as for the previously listed program parameters.



**Note:** In Multi Mode, the regular, program NRPNs are received and transmitted for each of the four voices on their separate MIDI channels.

Quad NRPNs come from/go to all four voices in a combo.

| Parm | Parameter       | 1       | 2   | 3        | 4    | Quad |
|------|-----------------|---------|-----|----------|------|------|
| 0    | OSC 1 FREQ      | 512     | 768 | 1024     | 1280 | 1536 |
| 1    | OSC 1 FREQ FINE | 513     | 769 | 1025     | 1281 | 1537 |
| 2    | OSC 1 SHAPE     | 514     | 770 | 1026     | 1282 | 1538 |
| 3    | GLIDE 1         | 515     | 771 | 1027     | 1283 | 1539 |
| 4    | OSC 1 KEY       | 516     | 772 | 1028     | 1284 | 1540 |
| 6    | OSC 2 FREQ      | 517     | 773 | 1029     | 1285 | 1541 |
| 7    | OSC 2 FREQ FINE | 518     | 774 | 1030     | 1286 | 1542 |
| 8    | OSC 2 SHAPE     | 519     | 775 | 1031     | 1287 | 1543 |
| 9    | GLIDE 2         | 520     | 776 | 1032     | 1288 | 1544 |
| 10   | OSC 2 KEY       | 521     | 777 | 1033     | 1289 | 1545 |
| 12   | SYNC            | 522     | 778 | 1034     | 1290 | 1546 |
| 13   | GLIDE MODE      | 523     | 779 | 1035     | 1291 | 1547 |
| 14   | OSC SLOP        | 524     | 780 | 1036     | 1292 | 1548 |
| 16   | OSC MIX         | 525     | 781 | 1037     | 1293 | 1549 |
| 17   | NOISE LEVEL     | 526     | 782 | 1038     | 1294 | 1550 |
|      |                 |         |     |          |      |      |
| 20   | FILTER FREQ     | 527     | 783 | 1039     | 1295 | 1551 |
| 21   | RESONANCE       | 528     | 784 | 1040     | 1296 | 1552 |
| 22   | FIL KEY AMT     | 529     | 785 | 1041     | 1297 | 1553 |
| 23   | FIL AUDIO MOD   | 530     | 786 | 1042     | 1298 | 1554 |
| 24   | FILTER POLES    | 531     | 787 | 1043     | 1299 | 1555 |
| 25   | FILTER ENV AMT  | 532     | 788 | 1044     | 1300 | 1556 |
| 26   | FIL ENV VEL AMT | 533     | 789 | 1045     | 1301 | 1557 |
| 27   | FIL DEL         | 534     | 790 | 1046     | 1302 | 1558 |
| 28   | FIL ATT         | 535     | 791 | 1047     | 1303 | 1559 |
| 29   | FIL DEC         | 536     | 792 | 1048     | 1304 | 1560 |
| 30   | FIL SUS         | 537     | 793 | 1049     | 1305 | 1561 |
| 31   | FIL REL         | 538     | 794 | 1050     | 1306 | 1562 |
|      |                 |         |     |          |      |      |
| 32   | VCA LEVEL       | 539     | 795 | 1051     | 1307 | 1563 |
| 40   | OUTPUT PAN      | 540     | 796 | 1052     | 1308 | 1564 |
| 41   | PRESET VOLUME   | 541 (A) | X   | 1053 (B) | X    | X    |
| 33   | VCA ENV AMOUNT  | 542     | 798 | 1054     | 1310 | 1566 |

|    |                    |     |     |      |      |      |
|----|--------------------|-----|-----|------|------|------|
| 34 | VCA ENV VEL<br>AMT | 543 | 799 | 1055 | 1311 | 1567 |
| 35 | VCA DEL            | 544 | 800 | 1056 | 1312 | 1568 |
| 36 | VCA ATT            | 545 | 801 | 1057 | 1313 | 1569 |
| 37 | VCA DEC            | 546 | 802 | 1058 | 1314 | 1570 |
| 38 | VCA SUS            | 547 | 803 | 1059 | 1315 | 1571 |
| 39 | VCA REL            | 548 | 804 | 1060 | 1316 | 1572 |
|    |                    |     |     |      |      |      |
| 42 | LFO 1 FREQ         | 549 | 805 | 1061 | 1317 | 1573 |
| 43 | LFO 1 SHAPE        | 550 | 806 | 1062 | 1318 | 1574 |
| 44 | LFO 1 AMT          | 551 | 807 | 1063 | 1319 | 1575 |
| 45 | LFO 1 DEST         | 552 | 808 | 1064 | 1320 | 1576 |
| 46 | LFO 1 SYNC         | 553 | 809 | 1065 | 1321 | 1577 |
| 47 | LFO 2 FREQ         | 554 | 810 | 1066 | 1322 | 1578 |
| 48 | LFO 2 SHAPE        | 555 | 811 | 1067 | 1323 | 1579 |
| 49 | LFO 2 AMT          | 556 | 812 | 1068 | 1324 | 1580 |
| 50 | LFO 2 DEST         | 557 | 813 | 1069 | 1325 | 1581 |
| 51 | LFO 2 SYNC         | 558 | 814 | 1070 | 1326 | 1582 |
| 52 | LFO 3 FREQ         | 559 | 815 | 1071 | 1327 | 1583 |
| 53 | LFO 3 SHAPE        | 560 | 816 | 1072 | 1328 | 1584 |
| 54 | LFO 3 AMT          | 561 | 817 | 1073 | 1329 | 1585 |
| 55 | LFO 3 DEST         | 562 | 818 | 1074 | 1330 | 1586 |
| 56 | LFO 3 SYNC         | 563 | 819 | 1075 | 1331 | 1587 |
| 57 | LFO 4 FREQ         | 564 | 820 | 1076 | 1332 | 1588 |
| 58 | LFO 4 SHAPE        | 565 | 821 | 1077 | 1333 | 1589 |
| 59 | LFO 4 AMT          | 566 | 822 | 1078 | 1334 | 1590 |
| 60 | LFO 4 DEST         | 567 | 823 | 1079 | 1335 | 1591 |
| 61 | LFO 4 SYNC         | 568 | 824 | 1080 | 1336 | 1592 |
|    |                    |     |     |      |      |      |
| 62 | ENV3 DEST          | 569 | 825 | 1081 | 1337 | 1593 |
| 63 | ENV3 AMT           | 570 | 826 | 1082 | 1338 | 1594 |
| 64 | ENV 3 VEL AMT      | 571 | 827 | 1083 | 1339 | 1595 |
| 65 | ENV 3 DELAY        | 572 | 828 | 1084 | 1340 | 1596 |
| 66 | ENV3 ATT           | 573 | 829 | 1085 | 1341 | 1597 |
| 67 | ENV3 DEC           | 574 | 830 | 1086 | 1342 | 1598 |
| 68 | ENV3 SUS           | 575 | 831 | 1087 | 1343 | 1599 |
| 69 | ENV3 REL           | 576 | 832 | 1088 | 1344 | 1600 |
|    |                    |     |     |      |      |      |
| 71 | MOD SOURCE 1       | 577 | 833 | 1089 | 1345 | 1601 |
| 72 | MOD AMT 1          | 578 | 834 | 1090 | 1346 | 1602 |
| 73 | MOD DEST 1         | 579 | 835 | 1091 | 1347 | 1603 |
| 74 | MOD SOURCE 2       | 580 | 836 | 1092 | 1348 | 1604 |
| 75 | MOD AMT 2          | 581 | 837 | 1093 | 1349 | 1605 |
| 76 | MOD DEST 2         | 582 | 838 | 1094 | 1350 | 1606 |

|     |                     |     |     |      |      |      |
|-----|---------------------|-----|-----|------|------|------|
| 77  | MOD SOURCE 3        | 583 | 839 | 1095 | 1351 | 1607 |
| 78  | MOD AMT 3           | 584 | 840 | 1096 | 1352 | 1608 |
| 79  | MOD DEST 3          | 585 | 841 | 1097 | 1353 | 1609 |
| 80  | MOD SOURCE 4        | 586 | 842 | 1098 | 1354 | 1610 |
| 81  | MOD AMT 4           | 587 | 843 | 1099 | 1355 | 1611 |
| 82  | MOD DEST 4          | 588 | 844 | 1100 | 1356 | 1612 |
|     |                     |     |     |      |      |      |
| 107 | SEQ 1 DEST          | 589 | 845 | 1101 | 1357 | 1613 |
| 108 | SEQ 2 DEST          | 590 | 846 | 1102 | 1358 | 1614 |
| 109 | SEQ 3 DEST          | 591 | 847 | 1103 | 1359 | 1615 |
| 110 | SEQ 4 DEST          | 592 | 848 | 1104 | 1360 | 1616 |
|     |                     |     |     |      |      |      |
| 83  | MOD WHEEL<br>AMT    | 593 | 849 | 1105 | 1361 | 1617 |
| 84  | MOD WHEEL<br>DEST   | 594 | 850 | 1106 | 1362 | 1618 |
| 85  | PRESSURE AMT        | 595 | 851 | 1107 | 1363 | 1619 |
| 86  | PRESSURE<br>DEST    | 596 | 852 | 1108 | 1364 | 1620 |
| 87  | BREATH AMT          | 597 | 853 | 1109 | 1365 | 1621 |
| 88  | BREATH DEST         | 598 | 854 | 1110 | 1366 | 1622 |
| 89  | VELOCITY AMT        | 599 | 855 | 1111 | 1367 | 1623 |
| 90  | VELOCITY DEST       | 600 | 856 | 1112 | 1368 | 1624 |
| 91  | FOOT AMT            | 601 | 857 | 1113 | 1369 | 1625 |
| 92  | FOOT DEST           | 602 | 858 | 1114 | 1370 | 1626 |
|     |                     |     |     |      |      |      |
| 101 | TEMPO               | 603 | 859 | 1115 | 1371 | 1627 |
| 102 | TIME SIG            | 604 | 860 | 1116 | 1372 | 1628 |
| 15  | PBEND RANGE         | 605 | 861 | 1117 | 1373 | 1629 |
| 105 | SEQ TRIGGER         | 606 | 862 | 1118 | 1374 | 1630 |
| 93  | UNISON MODE         | 607 | X   | X    | X    | X    |
| 94  | UNISON<br>ASSIGN    | 608 | 864 | 1120 | 1376 | 1632 |
| 97  | ARP MODE            | 609 | X   | X    | X    | X    |
| 70  | REPEAT MODE         | 610 | 866 | 1122 | 1378 | 1634 |
| 95  | UNISON ON<br>OFF    | 611 | 867 | 1123 | 1379 | 1635 |
| 104 | ARP ON OFF          | 612 | X   | X    | X    | X    |
| 106 | SEQ ON OFF          | 613 | 869 | 1125 | 1381 | 1637 |
|     |                     |     |     |      |      |      |
| 111 | PARAM ENC<br>SEL V1 | 617 | X   | X    | X    | X    |
| 112 | PARAM ENC<br>SEL V2 | 618 | X   | X    | X    | X    |
| 113 | PARAM ENC<br>SEL V3 | 619 | X   | X    | X    | X    |

|     |                     |              |              |                |                |                |
|-----|---------------------|--------------|--------------|----------------|----------------|----------------|
| 114 | PARAM ENC<br>SEL V4 | 620          | X            | X              | X              | X              |
| 19  | FEEDBACK<br>GAIN    | 622          | 878          | 1134           | 1390           | 1646           |
| 96  | PUSH IT NOTE        | 623          | 879          | 1135           | 1391           | 1647           |
| 97  | PUSH IT<br>VELOCITY | 624          | 880          | 1136           | 1392           | 1648           |
| 98  | PUSH IT MODE        | 625          | 881          | 1137           | 1393           | 1649           |
| 5   | SUB OSC 1 VOL       | 626          | 882          | 1138           | 1394           | 1650           |
| 11  | SUB OSC 2 VOL       | 627          | 883          | 1139           | 1395           | 1651           |
| 18  | FEEDBACK VOL        | 628          | 884          | 1140           | 1396           | 1652           |
| 117 | EDITOR BYTE         | 629          |              |                |                |                |
| 120 | SEQ 1               | 632 –<br>647 | 888 –<br>903 | 1144 –<br>1159 | 1400 –<br>1415 | 1656 –<br>1671 |
| 136 | SEQ 2               | 648 –<br>663 | 904 –<br>919 | 1160 –<br>1175 | 1416 –<br>1431 | 1672 –<br>1687 |
| 152 | SEQ 3               | 664 –<br>679 | 920 –<br>935 | 1176 –<br>1191 | 1432 –<br>1447 | 1688 –<br>1703 |
| 168 | SEQ 4               | 680 –<br>695 | 936 –<br>951 | 1192 –<br>1207 | 1448 –<br>1463 | 1704 –<br>1719 |
|     | COMBO NAME          | 696 –<br>712 | X            | X              | X              | X              |

## Sysex Messages

### Universal System Exclusive Message (Device Inquiry)

| Status    | Description                                                                                                               |
|-----------|---------------------------------------------------------------------------------------------------------------------------|
| 1111 0000 | System Exclusive (SysEx)                                                                                                  |
| 0111 1110 | Non-realtime message                                                                                                      |
| 0vvv vvvv | If MIDI channel is set to 1-16, 0vvvvvvv must match (unless MIDI Channel = ALL); always responds if 0vvvvvvv = 0111 1111. |
| 0000 0110 | Inquiry Message                                                                                                           |
| 0000 0001 | Inquiry Request                                                                                                           |
| 1111 0111 | End of Exclusive (EOX)                                                                                                    |

Tetra responds with:

| Status    | Description              |
|-----------|--------------------------|
| 1111 0000 | System Exclusive (SysEx) |
| 0111 1110 | Non-realtime message     |

|           |                                                                                        |
|-----------|----------------------------------------------------------------------------------------|
| 0vvv vvvv | If MIDI Channel = ALL, 0vvvvvvv = 0111 1111. Otherwise 0vvvvvvv = Channel Number 0-15. |
| 0000 0110 | Inquiry Message                                                                        |
| 0000 0010 | Inquiry Reply                                                                          |
| 0000 0001 | DSI ID                                                                                 |
| 0010 0110 | Tetra ID (Family LS)                                                                   |
| 0000 0001 | Family MS                                                                              |
| 0000 0000 | Family Member LS                                                                       |
| 0000 0000 | Family Member MS                                                                       |
| 0jjj nnnn | Main Software version: jjj — Minor rev; nnnn — Major rev                               |
| 0000 0000 | Zero Byte                                                                              |
| 0000 0000 | Zero Byte                                                                              |
| 1111 0111 | End of Exclusive (EOX)                                                                 |

#### Request Program Dump

| Status    | Description              |
|-----------|--------------------------|
| 1111 0000 | System Exclusive (SysEx) |
| 0000 0001 | DSI ID                   |
| 0010 0110 | Tetra ID                 |
| 0000 0101 | Request Program Transmit |
| 0000 00vv | Bank Number, 0 — 1       |
| 0vvv vvvv | Program Number, 0 — 127  |
| 1111 0111 | End of Exclusive (EOX)   |

Tetra will respond by sending out the Program Data in the format described below in *Program Data Dump*.

#### Request Program Edit Buffer Dump

| Status    | Description                          |
|-----------|--------------------------------------|
| 1111 0000 | System Exclusive (SysEx)             |
| 0000 0001 | DSI ID                               |
| 0010 0110 | Tetra ID                             |
| 0000 0110 | Request Program Edit Buffer Transmit |
| 1111 0111 | End of Exclusive (EOX)               |

Tetra will respond by sending out the current Program edit buffer in the format described below in *Program Edit Buffer Data Dump*.

#### **Request Global Parameter Dump**

| Status    | Description                       |
|-----------|-----------------------------------|
| 1111 0000 | System Exclusive (SysEx)          |
| 0000 0001 | DSI ID                            |
| 0010 0110 | Tetra ID                          |
| 0000 1110 | Request Global Parameter Transmit |
| 1111 0111 | End of Exclusive (EOX)            |

Tetra will respond by sending out the current values of Global Parameters in the format described below in *Global Parameters Data Dump*.

#### **Request Combo Dump**

| Status    | Description              |
|-----------|--------------------------|
| 1111 0000 | System Exclusive (SysEx) |
| 0000 0001 | DSI ID                   |
| 0010 0110 | Tetra ID                 |
| 0010 0001 | Request Combo Transmit   |
| 0vvv vvvv | Combo Number, 0 - 127    |
| 1111 0111 | End of Exclusive (EOX)   |

Tetra will respond by sending out the Combo Data in the format described below in *Combo Data Dump*.

#### **Request Combo Edit Buffer Dump**

| Status    | Description                        |
|-----------|------------------------------------|
| 1111 0000 | System Exclusive (SysEx)           |
| 0000 0001 | DSI ID                             |
| 0010 0110 | Tetra ID                           |
| 0011 1000 | Request Combo Edit Buffer Transmit |
| 1111 0111 | End of Exclusive (EOX)             |

Tetra will respond by sending out the Combo Data in the format described below in *Combo Edit Buffer Data Dump*.

**Program Data Dump**

| Status    | Description                                                                   |
|-----------|-------------------------------------------------------------------------------|
| 1111 0000 | System Exclusive (SysEx)                                                      |
| 0000 0001 | DSI ID                                                                        |
| 0010 0110 | Tetra ID                                                                      |
| 0000 0010 | Program Data                                                                  |
| 0000 00vv | Bank Number, 0 - 3                                                            |
| 0vvv vvvv | Program Number, 0 - 127                                                       |
| 0vvv vvvv | 384 bytes expanded to 446 MIDI bytes in “packed MS bit” format (see page 66.) |
| 1111 0111 | End of Exclusive (EOX)                                                        |

**Program Edit Buffer Data Dump**

| Status    | Description                                                                   |
|-----------|-------------------------------------------------------------------------------|
| 1111 0000 | System Exclusive (SysEx)                                                      |
| 0000 0001 | DSI ID                                                                        |
| 0010 0110 | Tetra ID                                                                      |
| 0000 0011 | Edit Buffer Data                                                              |
| 0vvv vvvv | 384 bytes expanded to 446 MIDI bytes in “packed MS bit” format (see page 66.) |
| 1111 0111 | End of Exclusive (EOX)                                                        |

**Combo Data Dump**

| Status    | Description                                                                     |
|-----------|---------------------------------------------------------------------------------|
| 1111 0000 | System Exclusive (SysEx)                                                        |
| 0000 0001 | DSI ID                                                                          |
| 0010 0110 | Tetra ID                                                                        |
| 0010 0010 | Combo Data                                                                      |
| 0vvv vvvv | Combo Number, 0 - 127                                                           |
| 0vvv vvvv | 1024 bytes expanded to 1177 MIDI bytes in “packed MS bit” format (see page 66.) |
| 1111 0111 | End of Exclusive (EOX)                                                          |

#### Combo Edit Buffer Data Dump

| Status    | Description                                                                     |
|-----------|---------------------------------------------------------------------------------|
| 1111 0000 | System Exclusive (SysEx)                                                        |
| 0000 0001 | DSI ID                                                                          |
| 0010 0110 | Tetra ID                                                                        |
| 0011 0111 | Edit Buffer Data                                                                |
| 0vvv vvvv | 1024 bytes expanded to 1177 MIDI bytes in “packed MS bit” format (see page 66.) |
| 1111 0111 | End of Exclusive (EOX)                                                          |

#### Global Parameters Data Dump

| Status    | Description                                                                                         |
|-----------|-----------------------------------------------------------------------------------------------------|
| 1111 0000 | System Exclusive (SysEx)                                                                            |
| 0000 0001 | DSI ID                                                                                              |
| 0010 0110 | Tetra ID                                                                                            |
| 0000 1111 | Main Parameter Data                                                                                 |
| 0vvv vvvv | 20 nibbles (LS then MS) for 10 Global parameters. Global Parameters are listed starting on page 51. |
| 1111 0111 | End of Exclusive (EOX)                                                                              |

**Note:** The Global Parameters Data Dump is not recognized when received; it is only transmitted when requested. NRPN messages are used to change Globals.

#### Mode Change: Program Mode

| Status    | Description              |
|-----------|--------------------------|
| 1111 0000 | System Exclusive (SysEx) |
| 0000 0001 | DSI ID                   |
| 0010 0110 | Tetra ID                 |
| 0011 0000 | Select Program Mode      |
| 1111 0111 | End of Exclusive (EOX)   |



**Mode Change: Combo Mode**

| Status    | Description              |
|-----------|--------------------------|
| 1111 0000 | System Exclusive (SysEx) |
| 0000 0001 | DSI ID                   |
| 0010 0110 | Tetra ID                 |
| 0011 0001 | Select Combo Mode        |
| 1111 0111 | End of Exclusive (EOX)   |

## Packed Data Format

Data is packed in 8 byte “packets”, with the MS bit stripped from 7 parameter bytes, and packed into an eighth byte, which is sent at the start of the 8 byte packet.

Example:

**Input Data**

```
1 A7 A6 A5 A4 A3 A2 A1 A0
2 B7 B6 B5 B4 B3 B2 B1 B0
3 C7 C6 C5 C4 C3 C2 C1 C0
4 D7 D6 D5 D4 D3 D2 D1 D0
5 E7 E6 E5 E4 E3 E2 E1 E0
6 F7 F6 F5 F4 F3 F2 F1 F0
7 G7 G6 G5 G4 G3 G2 G1 G0
```

**Packed MIDI data**

```
1 00 G7 F7 E7 D7 C7 B7 A7
2 00 A6 A5 A4 A3 A2 A1 A0
3 00 B6 B5 B4 B3 B2 B1 B0
4 00 C6 C5 C4 C3 C2 C1 C0
5 00 D6 D5 D4 D3 D2 D1 D0
6 00 E6 E5 E4 E3 E2 E1 E0
7 00 F6 F5 F4 F3 F2 F1 F0
8 00 G6 G5 G4 G3 G2 G1 G0
```

This explains why it takes 293 MIDI bytes to transmit 256 Program data bytes.

# Hidden Functions

Hold the ASSIGN PARAMETERS switch and hit the Mode switch to calibrate the low-pass filter and analog oscillator waveshapes. This should not be necessary for normal operation.



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