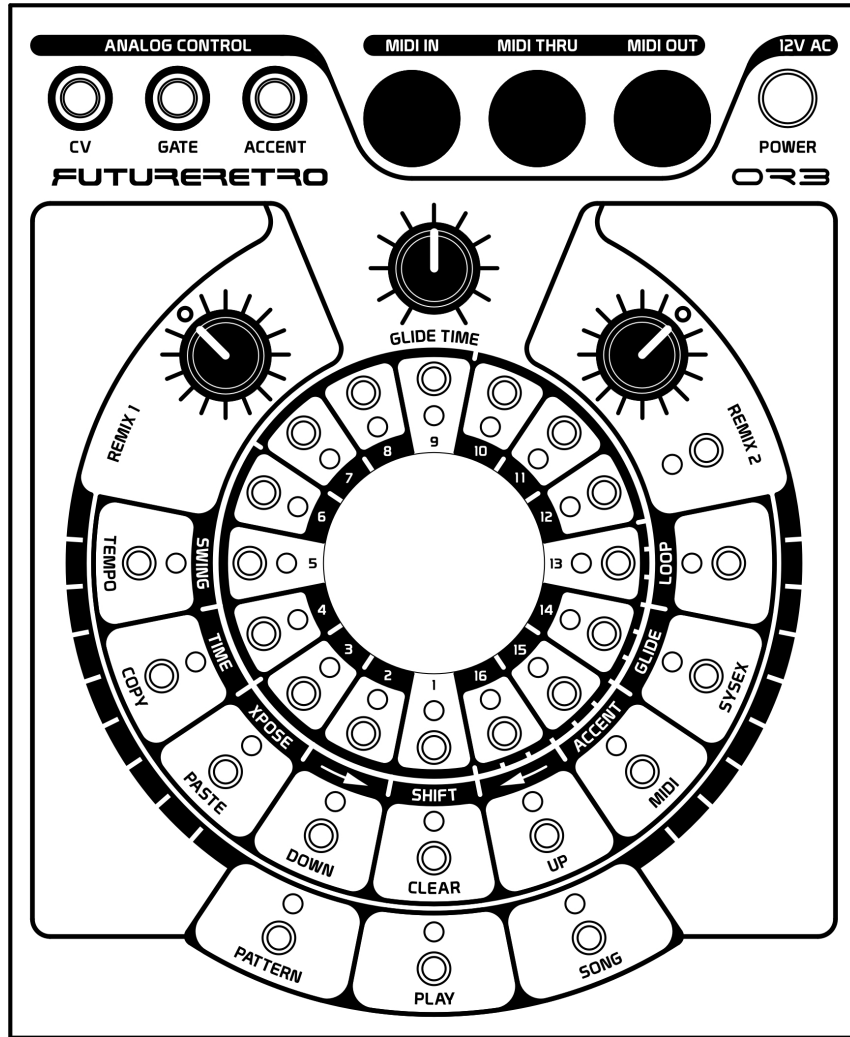


FUTURERETRO



OR3

operation manual



Written and produced by Jered Flickinger
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Future Retro Synthesizers

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INTRODUCTION

Thank you for choosing the Orb. Please take time to read through the entire manual for a complete understanding of the operations and procedures needed to master this device.

OVERVIEW

The Orb is a single-track programmable digital step sequencer designed to play analog and MIDI instruments.

The Orb is a perfect choice for sequencing our XS semi-modular synthesizer, and various other MIDI and CV/Gate type synthesizers.

This step-based sequencer provides 256 storable patterns that users can create and edit in real-time while the unit plays. Patterns may be selected and played in any order live, or prearranged into one of the 16 song locations stored in memory. In addition, the Orb offers our Remix feature that provides 256 variations for every pattern and song, for more than 65,000 possible patterns right out of the box.

The Orb can play external MIDI sound modules and CV/Gate type synthesizers, sync playback with other MIDI sequencers, and also act as a MIDI to CV/Gate converter.

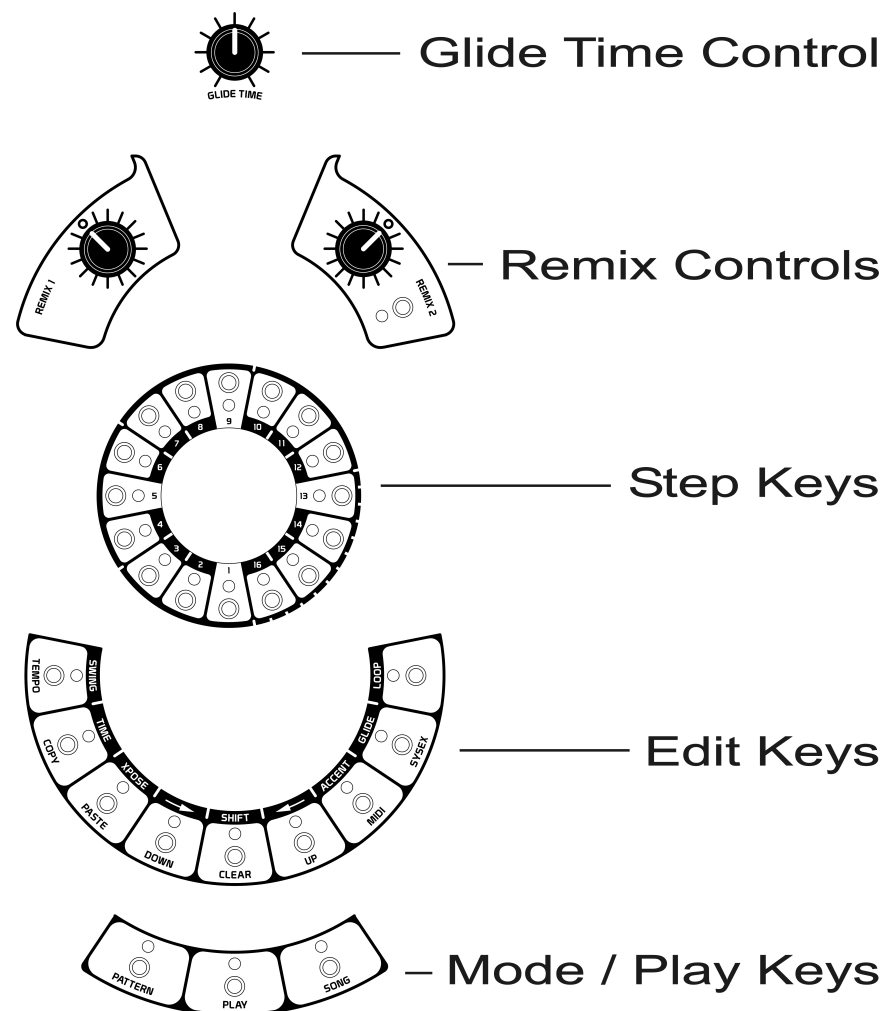
PHILOSOPHY

The Orb is based on the same sequencer design used in our Revolution synthesizer/sequencer. In fact, patterns created in the Orb can also be used in the Revolution units and vice versa. The Orb is designed to illustrate loop-based music in a much more natural way than has been provided in the past with traditional instruments. Think about it....

The basis of music is time. Time is nothing more than our perception of the heavenly bodies spinning through their celestial orbits.

From ancient sundials to modern analog clocks, time has been represented as the circle, a cycle which never ends, illustrating the infinite within a finite amount of space. So why not use this same knowledge to represent music?

Enjoy the power of the Orb!



MAINTENANCE

POWER

Use only the 12 volt AC/AC 1 Amp output power supply provided with this unit. If you should ever lose this power supply, please contact us for a replacement. Never use DC output power supplies, as they will not provide enough current to power the unit properly.

CARE

Avoid exposing the unit to smoke or to damp, dusty, or extreme hot and cold environments. To clean the unit, use a soft damp cloth. Do not use abrasive cleaners, as these may harm the surface and finish of the unit.

BACKUP BATTERY

The Orb contains an internal 3.6 volt lithium backup battery for the sequencer's RAM. This battery will last for approximately 10 years in this unit. However, at some point in the future, this battery may need to be replaced.

As a general rule, always back up your patterns and songs using the SysEx Dump feature to prevent the accidental loss of your work. Definitely save your work before the battery is replaced, since all information will be lost when the battery is removed.

To replace the battery yourself, use the following procedure:

Loosen the Phillips screws holding the side panels on the unit. Remove the 4 black and 4 silver Phillips screws on the bottom of the unit. Pull the bottom chassis away from the top chassis. Locate the battery and its holder on the jack board. Remove the old battery from its holder and replace with a TL-5104/S type lithium battery of +3.6 volts rated at 2,100 mAh. Make sure the battery is installed with the correct polarity! Once the battery has been replaced, reinstall the bottom chassis and the Phillips screws. Other lithium batteries may be used as long as they are of the AA size, rated at +3.6 volts, and have a current rating of 1,900 mAh or more. Note that the mAh rating of the battery determines the life span of being

able to back up the internal memory. So a higher mAh rating provides a longer battery life.

FUSE

Should the fuse in the Orb need replacing, use the following procedure to change the fuse:

Loosen the Phillips screws holding the side panels on the unit. Remove the 4 black and 4 silver Phillips screws on the bottom of the unit. Pull the bottom chassis away from the top chassis and locate the fuse near the Power jack. Remove the old fuse and replace only with a 1 amp fast-acting fuse. Once the fuse has been replaced, reinstall the bottom chassis and the Phillips screws.

PRODUCT WARRANTY AND SUPPORT

The Orb comes with a 1 year limited warranty covering any mechanical or electrical defects. This warranty does not cover damage due to misuse or abuse of this product. To validate your warranty, you must register your product online within 1 month of the original purchase date at the following URL:

www.future-retro.com/register.html

Should you experience problems with your machine, we recommend you first check the Support page of our website for up-to-date help on common problems.

Support URL:

www.future-retro.com/support.html

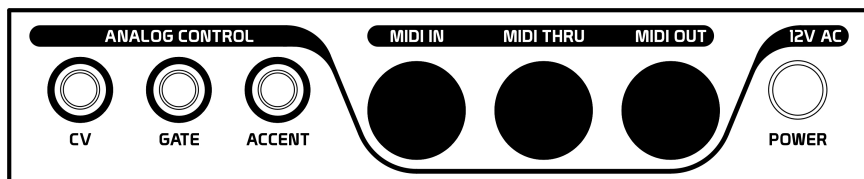
If you find that you still have questions after reading the Support page of our website, you may contact us by phone or email. You must have an authorization to return a unit to us for repairs.

Our office is open Monday through Friday, 10 a.m. to 5 p.m. Central Standard Time (CST).

Phone: (785) 827-9278

Email: support@future-retro.com

CONNECTIONS



12V AC

Connect the power supply provided with your unit in the Power jack located on the bottom of the unit. Use only 12V AC output power supplies rated at 1 Amp to power the unit.

DC output power supplies will not provide enough current to power the unit properly.

POWER

This is the main power switch. Push this switch to turn the unit on and off.

CV OUT

When notes are played in the Orb, a 1 volt per octave control voltage is generated at this output. Typically, you will want to connect this to the Pitch CV Input of an analog synthesizer, although it could also be used to modulate other analog parameters such as a filter's cutoff frequency, and so forth.

GATE OUT

When notes are played in the Orb, a +12 volt (positive polarity) gate signal is generated at this output. Typically, you will want to connect this output to the Gate Input of an analog synthesizer to trigger its envelopes.

ACCENT OUT

When the Orb plays a note written with an Accent on that step, a +10 volt (positive polarity) gate signal is generated at this output for controlling analog equipment. The duration of this Accented gate signal will last for 100% of a pattern's step. Typically, you will connect this output to the Velocity Input of an analog synthesizer.

MIDI IN

Use a MIDI cable to connect this input to another device's MIDI Out, so that the Orb will sync its playback to the other MIDI devices, or act as a MIDI to CV/Gate converter. You may also use this connection when receiving a SysEx Dump of patterns and songs from another device.

MIDI THRU

All information being received by the Orb's MIDI IN will be sent directly to the MIDI THRU output. Use a MIDI cable to connect this output to the MIDI Input of another device for creating a daisy chain between multiple units.

MIDI OUT

Use a MIDI cable to connect this output to the MIDI Input of another device, so that the other device can be played by or sync its playback to the Orb. You may also use this connection when sending a SysEx Dump of patterns and songs to another device.

SEQUENCER OVERVIEW

The Orb is a single-track programmable digital step sequencer for recording and playing back musical patterns and songs. All the information for a pattern can be edited while the sequencer is either playing or stopped. The sequencer automatically saves all changes made to patterns and songs. This allows users to create and manipulate patterns live and hear the changes as they are made.

With the Orb's sequencer, you can play external MIDI sound modules, as well as analog CV/Gate type synthesizers.

STRUCTURE

There are 256 user patterns arranged as 16 banks of 16 patterns. Each pattern can be up to 1 measure in length, which is then divided into 12 or 16 equal steps depending on the time signature.

Each pattern records the time signature, notes, pitches, accents, glides, loop point, and swing amount. Patterns can also be copied and pasted, shifted in time, transposed, and remixed, as well as be played forward or in reverse.

Patterns can be selected and played live in any order while in Pattern mode. Patterns can also be prearranged into one of the 16 song locations. Each song will record the order that patterns will play, along with the transpose setting for each pattern, and the loop point for the song. Each song can arrange up to 3,580 measures' worth of music. Songs can also have their patterns remixed or be played forward or in reverse for all sorts of interesting variations.

Patterns and songs created in the Orb are universally compatible with those in our Revolution synthesizer. Using the SysEx Dump feature in these products allows you to transfer patterns and songs from one unit into the other.

In addition, you may also use the SysEx feature to transfer patterns and songs created in the Orb to a computer for storage purposes.

USING THE SEQUENCER

The Orb's sequencer has two main modes that you will work with. This is what we call Pattern mode and Song mode. When the Song key indicator is on, the machine is in Song mode. When the Song key indicator is off, the machine is in Pattern mode. To change from one mode to the other, the sequencer must first be stopped; then by pressing the Song key, you can change modes.

In Song mode, you can do the following:

- Select a song
- Edit and arrange patterns to form a song
- Play a song
- Remix a song
- Change a song's tempo
- Set up the global MIDI parameters
- Perform a SysEx MIDI dump

In Pattern mode, you can do the following:

- Select patterns
- Edit a pattern
- Play patterns
- Remix patterns
- Adjust the global tempo setting for all patterns
- Set the global transpose setting for all patterns

PLAYING PATTERNS

The Play key is used to start and stop the playback of patterns and songs. To play a pattern or song forward, simply press the Play key. The Play key indicator will blink at the tempo the sequencer is playing at. To stop playback of the sequencer, press the Play key again. The Play key indicator will be off, showing that the sequencer is stopped.

Patterns can also be played in reverse. If the unit is stopped and you wish to play a pattern backward, hold the Shift/Clear key and then press the Play key. The pattern will now be playing backward. To stop the sequencer, press the Play key.

While a pattern is playing, you can change its direction to play forward or backward by using the same technique as above. Hold the Shift/Clear key and then press the Play key. When the loop point for the currently playing pattern is reached, the sequencer will change the playback direction.

Note: If the Orb's MIDI parameter has been set to EXTERNAL, when the Play key is pressed, its indicator will light up and stay on, showing that the unit is cued up and waiting for an external MIDI sequencer to send a Start command.

SELECTING PATTERNS

Patterns are arranged as 16 banks of 16 patterns for a total of 256 patterns in all. Before selecting a pattern, you must first make sure that you are in Pattern mode. This is shown by the Song key indicator being off.

To enter Pattern Select mode, press the Pattern key so that its indicator turns on. The numeric display (in the center of the unit) will now show the bank number 1–16 that is currently selected. One of the 16 selector key indicators (located around the outside of the display) will be on to show which pattern is selected for the bank you are currently in. If none of the selector key indicators are on, the current pattern selected is in another bank. If this is the case, use the Up/Down keys to go through the other banks and see what pattern is currently selected. To select a different pattern, use the Up/Down keys to select the bank and then press one of the 16 selector keys that represent the pattern within the bank.

Selecting a pattern can be done while the sequencer is playing. If one pattern is currently playing and you select another, the new pattern's key indicator will be on at half the brightness than that of the pattern currently playing. This shows that the pattern is cued and waiting until the pattern currently playing has reached its loop point. Once the loop point has been reached, the cued pattern will begin its playback. You can change the pattern that is cued and ready to play next at any time until the current pattern reaches its loop point.

Each pattern will play continuously until either a new pattern is selected or the sequencer is stopped.

Patterns may also be selected remotely from another MIDI device by setting up the Orb to respond to MIDI Program Change messages. Please refer to the MIDI section about Program Change messages on page 41 for more details on how to do this.

MULTIPLE PATTERN CUEING

It is possible to chain the playback of up to 16 patterns in a bank to create longer looping arrangements. To do so, enter Pattern Select mode as you normally do when selecting patterns. Press and hold the first pattern you wish to play and then press the last pattern that is to be included in the loop.

Notice that patterns will be played sequentially from the lowest pattern number to the highest pattern number. The first pattern selected to play in the arrangement must have a lower pattern number than that of the last pattern selected to be included in the loop.

Once multiple patterns have been cued and are playing, you can select another group of patterns to play when the first group reaches its last step. When cueing up a second group of patterns, you can select patterns in any bank and even partially overlapping the patterns currently playing.

EDITING PATTERNS

Pattern Edit mode is where one measure of music can be recorded or edited for each pattern.

These patterns can later be arranged into a song. Each pattern records the note durations and their pitches, accents, glides, loop point, time signature, and swing amount. Every time a pattern is edited, the changes are automatically saved by the sequencer.

You must make sure not to change a pattern that you wish to keep. By doing so, you will overwrite the old pattern with new data. To avoid this, use the Copy/Paste function described on page 21.

To edit patterns, you must be in Pattern mode (the Song key indicator will be off). First select the desired bank and pattern for the pattern you wish to edit. Once the pattern is selected, press the Pattern key to enter Pattern Edit mode (the Pattern key indicator will turn off).

All pattern editing can be done while the sequencer is stopped or playing, which allows you to hear the changes you make. In this way you can select a pattern, edit it, and then select another pattern to play or edit while the sequencer continues to play. Instant live improv! Since the sequencer automatically saves all changes made, there is no need to stop the music.

When multiple patterns have been cued and are playing, you can enter Pattern Edit mode to edit individual patterns. To edit a cued pattern, wait until the desired pattern is playing and then enter Pattern Edit mode by pressing the Pattern key. The current pattern will loop by itself so you can hear all the changes you are making. Once the pattern has been edited as desired, you may exit Pattern Edit mode. The cued patterns will continue playing sequentially as before.

When the sequencer is playing and a pattern is being edited, you will notice that the 16 Step key indicators will blink to show the current step being played. You can use this as a quick way to pinpoint steps that you wish to edit. It can also serve as a visual indication of where the loop point is set for that pattern.

ENTERING NOTES

When in Pattern Edit mode, the 16 Step key indicators will be used to display where notes are placed in that pattern. The brightness of the indicators will determine where notes start, the length of their sustain duration, and where rests occur.

- A Note On (where a note begins) will be shown by a Step key indicator being on at full brightness.
- The sustained portion for a note will be shown by the Step key indicator being on, but only half as bright as a Note On.
- A rest is shown by the Step key indicator being off.

NOTE ON

To enter notes, you must be in Pattern Edit mode (Pattern key indicator will be off). Placing 16th or 12th notes (depending on which time signature is selected) is done using the same method. By using the 16 Step keys, simply press the keys one at a time where you wish notes to exist. The indicators for the notes you enter will now be on at their brightest state.

SUSTAIN

To place sustained notes, press and hold the Step key where the note is to start, and then press the Step key that represents the last step that you want this note to sustain to. The first Step key indicator of a sustained note will be on at full brightness, showing that that is where the note starts. The sustained portion of the note will cause those Step key indicators to be on at half brightness.

As an example, place and hold a 16th note and press the next Step key in the clockwise direction. Doing this just wrote an 8th note. Use this method to create notes of various durations.

Notice that the last step of a sustained note must be higher in value than where the note starts. For instance, a note may start on Step 1 and sustain to Step 16. A note can't start at Step 9 and sustain to Step 5. If you need a note to sustain past Step 16, you will need to use the glide function discussed later in this manual.

REST

Placing rests is done by simply leaving notes off, or clearing notes that appear in the position you want to be a rest. Rests will be shown as the Step key indicator being off. To write a rest to a step where a note already exists, press and hold the Shift/Clear key and then press the Step key where you want the rest to be placed.

There is a way to write new notes without having to clear previous notes. For instance, if you place a new note in the sustained portion of a note, the new note will now be in the position you selected. This now shortens the previous sustained note, which then will sustain until the step where the new note is written.

The Step key indicators for these positions will also change to show how the previous sustained note was shortened.

By writing a sustained note over previous notes, the previous notes will no longer be heard. You can use this method to change a sustained note's duration. Any new notes written over a sustained note's Note On will override the entire sustained note. The only exception is that you cannot write a 16th note over a sustained note's Note On. To do this, you must first clear the sustained note and then write the 16th note.

CLEARING NOTES

There are two ways to clear previous note data that exists within a pattern. You can either clear all the notes at once or clear individual notes one at a time.

To clear all notes from a pattern, first make sure you are in Pattern Select mode (the Pattern key indicator will be on). Select and hold the Step key for the pattern you wish to clear all the notes from, and then press the Shift/Clear key. You can press the Pattern key and enter Pattern Edit mode to verify that all the Step key indicators are now off.

To clear individual notes, enter Pattern Edit mode (the Pattern key indicator will be off). Press and hold the Shift/Clear key and press the Step key that represents the Note On for the note you want to clear. You can clear as many notes as you want while holding the Shift/Clear key. Once you are done clearing individual notes, you may release the Shift/Clear key. All the notes you cleared will be shown with their Step key indicator being off.

Notice that clearing notes only erases where notes are placed and their durations. Other pattern information such as the step's pitch, accent, glide, loop point, time signature, and swing amount will still retain their values. This is a safety in case you accidentally erase notes or an entire pattern by mistake. You then only need to re-enter where notes are located and their duration.

CHANGING A NOTE'S PITCH

Once notes exist in a pattern, you can change the pitch that each one is to play. Select a pattern you would like to edit and then enter Pattern Edit mode. When in Pattern Edit mode, one of the 16 Step key indicators will be flashing to indicate that it is the current step selected and ready to be edited. You can select a different note to edit by pressing the Step key where that note starts.

Notice that pressing any Step keys other than where a note starts will write a new note, as described in the previous section.

Once a note is selected, the display will show the pitch of that note, ranging from C1 to D#6. Notice that the display will show an = sign for sharp notes. Using the Up/Down keys, select the desired pitch for the currently selected step. When the sequencer is playing and you change a note's pitch in this way, each time that the pattern reaches this step the new note pitch will be played. If you hold a note's Step key while you change the note's pitch, the new pitch will not take effect until you release that note's Step key. You can use this method to ensure that only the desired pitches will be heard while the sequencer is playing.

Notice that pitches programmed into the sequencer can actually range from C1 to C9. However, the sequencer will only play back pitches in the range of C1 to D#6. The extended range of E6 through C9 is provided only to retain the original pitches of a pattern when it is transposed up to +36 half-steps.

There is also an offset to the pitch values transmitted and received via MIDI, so that a pitch of C1 in the sequencer is equal to MIDI note C2, and pitch D#6 in the sequencer is equal to MIDI note D#7.

RECORDING ACCENTS

Accents written into the sequencer are transmitted over MIDI as low/high Velocity values, and they also generate a +10 volt positive polarity gate for 100% duration of the accent step at the Accent jack for controlling analog synthesizers.

To record or place accents for notes, first select the pattern you want to edit and then enter Pattern Edit mode. One of the Step key indicators will be flashing to show the current step selected to be edited. Select any note by pressing the Step key where that note starts. When a note is selected, the Accent key indicator will be on if an accent is written for that step, or off if no accent has been placed on the step. By pressing the Accent key, you can turn accents on or off for that step. Placing accents can be done while the sequencer is playing or stopped.

CLEARING ALL ACCENTS

To clear all of the accents in a pattern, press and hold the Shift/Clear key and then press the Accent key.

RECORDING GLIDES

Glides written into the sequencer will allow the pitch of one note to smoothly transition to the pitch of the following step when using the CV analog output. The time it takes to transition from one pitch to another is determined by the Glide Time control on the front panel.

When controlling an external MIDI synthesizer, notes set to glide in the Orb will be transmitted as two notes playing slightly overlapped with one another. In most MIDI synthesizers, this playing of two notes slightly overlapped can then be used to initiate a glide within the external synthesizer. The glide time would then be determined by parameter settings within that external synthesizer.

To record or place glides for notes, first select the pattern you want to edit and then enter Pattern Edit mode. One of the Step key indicators will be flashing to show the current step selected to be edited. Select any note by pressing the Step key where that note starts.

When a note is selected, the Glide key indicator will be on when a note is set to glide, and off when no glide is written for that step. By pressing the Glide key, you can turn glides on or off for that step. Placing glides can be done while the sequencer is playing or stopped.

Notice that sustained notes can't extend beyond Step 16. If you want a note to seamlessly carry over from Step 16 to Step 1, place a glide on Step 16, and set Step 1's pitch to the same value as Step 16.

CLEARING ALL GLIDES

To clear all of the glides in a pattern, press and hold the Shift/Clear key and then press the Glide key.

SETTING THE LOOP POINT

Each pattern has its own loop point that is used to set the number of steps a pattern will play before it loops and begins playing from the beginning again. A pattern using 3/4 as the time signature can play as many as 12 steps. A pattern using 4/4 as the time signature can play as many as 16 steps.

To set the loop point, select the pattern you wish to edit and enter Pattern Edit mode. Select the Step key that represents the last step you wish the pattern to play in its loop. You can then press the Loop key to place the loop point at that step. The Loop key indicator will be on, showing a loop point is set for this step. To change the loop point, select another step of the pattern and press the Loop key.

CLEARING THE LOOP POINT

The loop point can be cleared in one of two ways. The first method is to select the step where the loop point exists and press the Loop key, turning the Loop key indicator off.

You may find the second method easier to use, which is to press and hold the Shift/Clear key and then press the Loop key. This will remove the loop point from whatever step it was previously written.

SELECTING THE AMOUNT OF SWING

The Orb's Swing function will delay the playback of all even-numbered steps. This can be used to add a more human feel to patterns.

To change the swing amount, first select the pattern you want to edit and then enter Pattern Edit mode. Press and hold the Swing/Tempo key and the display will show a value ranging from 0–3. While holding the Swing/Tempo key, use the Up/Down keys to select a new value of swing. A swing value of 0 means no swing will occur. A swing value of 1 will have a small amount of effect while a swing value of 3 will have the greatest effect.

SELECTING A TIME SIGNATURE

There are two time signatures to choose from when writing a pattern: 3/4 and 4/4.

Each time signature simply divides the measure of a pattern into 12 (3/4) or 16 (4/4) equal parts.

The artwork around the Step key numbers best illustrates the divisions of the 4/4 time signature. You may also notice the small outer ring of artwork surrounding the sequencer step keys will illustrate the divisions of the 3/4 time signature.

To change the time signature for a pattern, select the pattern to edit and then enter Pattern Edit mode. Press and hold the Time/Copy key and the display will show the current time signature as either 3/4 or 4/4. While holding the Time/Copy key, you can use the Up/Down keys to select the appropriate time signature. Once the time signature is set you can release the Time/Copy key. You can change this time signature setting while the unit is playing or stopped.

TRANSPOSING PATTERNS

When playing patterns in Pattern mode, the Transpose function has a global effect on all the patterns. The Transpose function allows you to shift all of a pattern's notes up or down 36 half-steps from the pitches originally programmed into the pattern.

To change the transpose setting, first enter Pattern Edit mode. Press and hold the Xpose/Paste key and the display will show the current value (–36 to 36) of transposition. While holding the Xpose/Paste key, you can use the Up/Down keys to change the transpose setting.

The range of notes the Orb can play is C1 to D#6. If a pattern's notes are transposed beyond this range, the notes will be interpreted as rests.

Once the Xpose/Paste key is released, the new transpose value will take effect. This transpose setting will be saved even when the unit's power is turned off. If you want to reset the transpose setting to 0 while in Pattern Edit mode, hold the Shift/Clear key and press the Xpose/Paste key.

As an alternative method, you can also latch the transpose function on or off by quickly pressing the Xpose/Paste key. When this key is pressed quickly, its indicator will remain on, and again the Up/Down keys are used to select the transpose value. Changes made to this transpose setting will be updated once a pattern loops and begins playing the first step again. When you are done changing the transpose value, quickly press the Xpose/Paste key again to exit Transpose mode.

You can permanently transpose all the notes for a pattern. First select the correct transpose setting for a pattern, then while holding the Xpose/Paste key, press the Time/Copy key. The pattern's notes will be rewritten to the new pitch values and the transpose setting will be reset to 0.

SHIFTING PATTERNS

It is possible to shift all the contents of a pattern forward or backward in time from where they currently are. This is a useful feature if you have already created a pattern, but need to offset the notes' timing so that they are aligned with the beat correctly.

To shift a pattern, first select the desired pattern to be edited and then enter Pattern Edit mode. Press and hold the Shift/Clear key and then use the Up/Down keys to shift the pattern Up (clockwise) or Down (counter-clockwise). If pattern shifting is done while the sequencer is stopped, you will shift the pattern one step for every key press of Up/Down keys. If pattern shifting is done while the sequencer is playing, the pattern will shift one step every time a new step is played, as long as the Up/Down key is held.

CHANGING THE TEMPO

When in Pattern mode, the tempo setting will determine the rate at which all patterns will be played. To adjust the tempo, first make sure you are in Pattern Select mode (Pattern key indicator will be on). Press and hold the Swing/Tempo key and the display will show the current tempo selected. While holding the Swing/Tempo key, you can use the Up/Down keys to adjust the tempo from 20 to 250 beats per minute (bpm). When the tempo is changed and a sequence is playing, the tempo change will have an immediate effect on the rate at which a pattern plays. This tempo setting is saved even when the unit's power is turned off.

COPYING AND PASTING PATTERNS

Before editing a pattern you like, it would be wise to copy it to another location to be edited. Copying patterns can also be useful when creating several patterns with slight variations.

To copy a pattern from one location to another, stop the sequencer and enter Pattern Select mode.

Select and hold the Step key for the pattern you wish to copy, and then press the Time/Copy key. This places a copy of that pattern in a temporary memory location where it will remain until either a new pattern is copied, or the power is turned off.

Since a copy of the pattern is placed in temporary memory, you can now select and play other patterns to find a location to paste the pattern to. When you have found a location, stop the sequencer, hold the Step key for the pattern you wish to paste to, and then press the Xpose/Paste key. The pattern you had copied will now be written in this location.

You can continue to place the copied pattern in as many locations as you want by selecting each location individually and pressing the Xpose/Paste key.

REMIXING PATTERNS

The Remix feature provides 256 variations for playing patterns.

This is not just some randomization of the original patterns either. It is a mathematical process that creates new ways of stepping through a pattern's information to create variations of that pattern.

When the Remix feature is used, you may want to consider the information programmed into the steps of a pattern as possibilities. Remix can use any of the 16 steps of a pattern to create new patterns. In some cases, a remix will play the same step multiple times within one measure of music.

There is one basic rule a remix will always follow: whatever information is programmed into Step 1 will always play as the first step of a remix.

The Remix function can be activated at any time, whether in Pattern Edit mode, Pattern Select mode, or Song mode. In addition, the remix can be turned on or off while the unit is stopped or playing. If the unit is playing and Remix is activated or a new remix is selected, the change will take effect as soon as the next step plays.

To turn the Remix function on, press the Remix key in the Remix 2 section. Its indicator will light, showing that Remix has been activated.

When the Remix function is on, the two rotary switches located in the Remix 1 and Remix 2 sections will be used to select different remix patterns. If you enter Pattern Edit mode, you can see the new order in which the remix is selecting steps of the pattern to play.

When Remix controls 1 and 2 are both set to their “O” position, Remix will have no effect on the original pattern even if the Remix key indicator is on. This is the default remix pattern that will play a pattern sequentially from Step 1 through 16 as normal.

The best way to understand what happens when patterns are remixed is to play around and experiment. The results of a remix will be different for every pattern you have created. Try looping a pattern and turning the Remix feature on for only the last couple steps of a pattern to create a transitional fill. Or you might just want to create variations of a melody line that you have already programmed, which can be further transposed and used for other parts of the same song.

For playing different remixes live, you might take the DJ approach to selecting new remixes where you let one remix play for a while so the listener becomes familiar with it. Select a new remix every now and then to create a fill, or start introducing the next remix that will eventually play all the way through.

A blank pattern sheet is provided on the following page. Photocopy the pattern sheet and use it to write down the contents of a pattern, as well as make notes.

Pattern Name:		Bank #	Time Signature:							
Tempo:		Pattern #	Swing:							
Comments:										
					Loop					1
					Glide					2
					Accent					3
					Pitch					4
					Note					5
					Step					6
										7
										8
										9
										10
										11
										12
										13
										14
										15
					16					

WORKING WITH SONGS

SELECTING SONGS

Selecting a song is done in the same way that patterns are selected, except that you must be in Song mode. To enter Song mode, first stop the playback of the unit and press the Song key. Its indicator will turn on, showing that Song mode is currently selected.

To select a song, press the Step key indicator (1–16) to select one of the 16 song locations. If the sequencer is already playing a song and another song is selected, the newly selected song's Step key indicator will be on at half brightness, showing that it is cued up and will begin its playback as soon as the first song reaches its loop point.

PLAYING SONGS

You must be in Song mode to play songs. Select a song to play by pressing one of the 16 Step keys. Press the Play key to begin playback of the song. The display will show the current step of the song playing. If you press the Play key while the song is playing, playback will stop but remain on the current step of the song. Pressing the Play key again will resume playback from the current step. If you want to start playback from the beginning of the song, press the Shift/Clear key before starting playback.

EDITING SONGS

All song editing is done in Song mode. To enter Song mode, stop the sequencer and then press the Song key so that its indicator turns on. All song editing must be done while the sequencer is stopped.

Song editing is used to arrange your patterns into a song. There are 16 song locations available and each is capable of arranging up to 3,580 measures of patterns. Each song step records the pattern that will play for that step, how much the pattern is to be transposed from its original pitch, and whether or not it will be the last pattern played in the song before it starts over again or loops. Each song also records the tempo that it will play at.

SELECTING PATTERNS FOR A SONG STEP

When in Song mode, the display will show the current step being edited or played. You can select the desired song step by using the Up/Down keys. You can also reset the song to Step 1 at any time by pressing the Shift/Clear key.

To edit a song, you simply select the patterns in the order they are to play in the song, change the transpose setting if needed, and set a loop point on the last step you wish to play in the song.

To change the pattern that a song step will play, select the song step you wish to edit, and then press and hold the Pattern key. The display will now show the bank, and Step keys 1–16 are used to select the a pattern within that bank. While holding the Pattern key, use the Up/Down keys to select the bank and then press the Step key to select a pattern within that bank. Release the Pattern key once you have made your selection. Select the pattern for each step in this way until all the patterns are in their correct order.

To see how your song sounds so far, press the Shift/Clear key to reset the song to Step 1 and then press the Play key to begin playback. Press the Play key again to stop the song's playback when you are finished. If you need to make changes to the song, use the Up/Down keys to select the step to edit and make the necessary changes.

All changes made when editing the song are automatically saved by the sequencer.

TRANSPOSING A SONG STEP

The pattern for each song step can be transposed up or down 36 half-steps in pitch from the notes originally programmed into that pattern.

To transpose a song step, select the song step and then press the Xpose/Paste key. While holding the Xpose/Paste key, the display will show the current transpose setting for that step's pattern.

Use the Up/Down keys to change the transpose setting for that song step.

Release the Xpose/Paste key when you are done and the sequencer will automatically save your changes.

To reset the transposition to a value of 0 for all the song steps, press and hold the Shift/Clear key, and then press the Xpose/Paste key. This will allow all of the patterns in the song to play at their original programmed pitches.

SETTING THE LOOP POINT FOR A SONG

A loop point is recorded into a song step to indicate that this will be the last step played before the sequencer goes back to the beginning of the song and starts playing it again. If you want to find what song step is set to loop, you can use the Up/Down keys to step through the song and see which step is set to loop. This is indicated by the Loop key indicator being on for that step of the song.

To set a loop point for a step, use the Up/Down keys to first select that step, and then press the Loop key. In the same way, if you wish to remove a loop point from a song step, simply press the Loop key to remove the loop point. You may also clear all of the loop points from a song by pressing and holding the Shift/Clear key, and then pressing the Loop key. This will be most useful when creating new songs rather than finding the existing loop points one at a time and clearing them out.

All changes made to the loop point settings are automatically saved by the sequencer.

SETTING A SONG'S TEMPO

Each song records the tempo it will play back at. Select the song you wish to change the tempo of, and then press the Swing/Tempo key. As you hold the Swing/Tempo key, the display will show the current tempo setting. Using the Up/Down keys, you can change the song's tempo from 20 to 250 bpm. Once the tempo is correct, release the Swing/Tempo key and the sequencer will automatically save your changes.

ADVANCED SONG EDITING

It is possible to jump from the currently selected song step to Pattern Edit mode and edit the pattern used for that song step. If a song is at any point other than the first step of the first pattern and you exit Song mode, the pattern used for the current song step will automatically be selected with all its song parameters, for editing in Pattern mode.

To clarify, let's say that you are on Step 3 of a song and that song step uses pattern 16 in bank 16 with a transpose value of +12. If you exit Song mode, pattern 16 of bank 16 will be automatically be selected in Pattern mode.

If you hold down the Xpose/Paste key while in Pattern Edit mode, you will notice it is set for +12, just as it was for the song step. In addition, the tempo the pattern plays at in Pattern mode will also be the same as the tempo that the song was set for. This allows you to easily edit a pattern and hear exactly what it will sound like for the song.

You can now make changes to the pattern or even select a different pattern you would like to use for the current step of the song. If you change the tempo while in Pattern mode, it will change the entire song's tempo as well.

Once you are through editing the pattern for the current song step, return to Song mode and all the changes will be accepted and saved by the sequencer automatically.

If you are in Song mode and wish to return to the Pattern mode without the sequencer automatically selecting the current song step's pattern, press the Shift/Clear key before you exit Song mode.

Note: To access the MIDI and SysEx modes, you must enter Song mode. Once changes are made in either of these modes, if the current song selected is at any location other than Step 1, you will activate the Advanced Song Editing function. In this case, it would be a good habit to always hit the Shift/Clear key before you exit Song mode, which will return you to where you previously were in Pattern mode before making adjustments to the MIDI and SysEx parameters.

Song Name:	Tempo:
------------	--------

[illegible]

Song Name:	Tempo:
------------	--------

[illegible]

MIDI MODES

PLAYING AN EXTERNAL MIDI SOUND MODULE

You can play external MIDI sound modules with the Orb's sequencer.

For this setup, connect the MIDI Out of the Orb to the MIDI In of the external MIDI sound module.

To set up the MIDI mode of the Orb, press the Song key (the Song key indicator should be on) to enter Song mode.

Press the Accent/MIDI key to enter MIDI mode.

The display will show whether MIDI is set for "INT" or "EXT." Use the Up/Down keys to select "INT," for INTERNAL operation.

Press the Accent/MIDI key again and the display will show the MIDI channel that the Orb will send note information on.

Use the Up/Down keys to select the same channel as set for the external MIDI sound module.

Press the Accent/MIDI key again and the display will show the program change page. Use the Up/Down keys to change this setting to "Pcof" if you don't want patterns in the Orb to select patches remotely in the external MIDI sound module. If you would like patterns in the Orb to select different patches in the MIDI sound module, you can turn this feature on, or "Pcon". Press the Accent/MIDI key once again to exit MIDI mode.

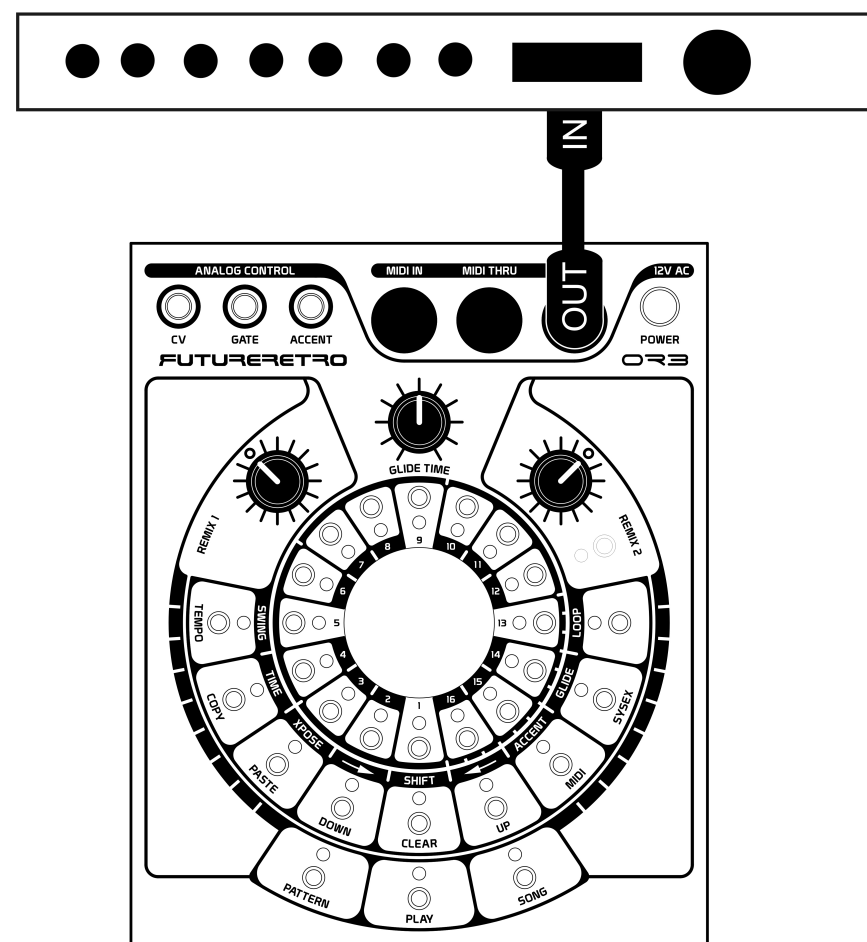
You will need to set up the MIDI sound module to play the sound you want on the same MIDI channel that the Orb is sending note information on. Once this is done, select the pattern or song in the Orb and press the Play key. The MIDI sound module should now play the notes programmed into the Orb's sequencer. Notice that if you have the MIDI program change message turned on, and the sound module responds to these messages, selecting different patterns will also select different sound patches in the sound module.

When accents or glides are programmed in the sequencer, they may have a totally different effect on the MIDI sound module's sound, depending on how the module is set up to respond to Velocity changes or two keys being played at the same time.

When a note in the Orb is programmed with an accent, a Velocity value 127 is sent for that note.

When a glide is programmed into the Orb, the sound module will see this as the first note overlapping the second note for a short period of time.

MIDI Sound Module



PLAYING VOLTAGE CONTROLLED SYNTHESIZERS

The Orb provides a CV (control voltage) output, along with a Gate output for playing pre-MIDI and modular analog synthesizers. The CV that the Orb generates is the most widely used 1 volt per octave standard. The Gate signal that the Orb generates is a positive polarity-type gate ranging from 0 volts (Note Off) to +12 volts (Note On). This standard was used on the early Roland, Arp, and Sequential Circuits analog synthesizers, and is still used by today's analog synthesizer companies to control their devices.

As a general rule, always turn the power off for devices when making connections.

For this setup, first connect the CV Out of the Orb to the CV input of the external analog device using a 1/4" mono cable. You will also need to connect the Gate Out of the Orb to the Gate input of the external device using another 1/4" mono cable.

And finally, if the synthesizer you are controlling has a Velocity input, connect the Accent out of the Orb to the Velocity input of the external device using another 1/4" mono cable.

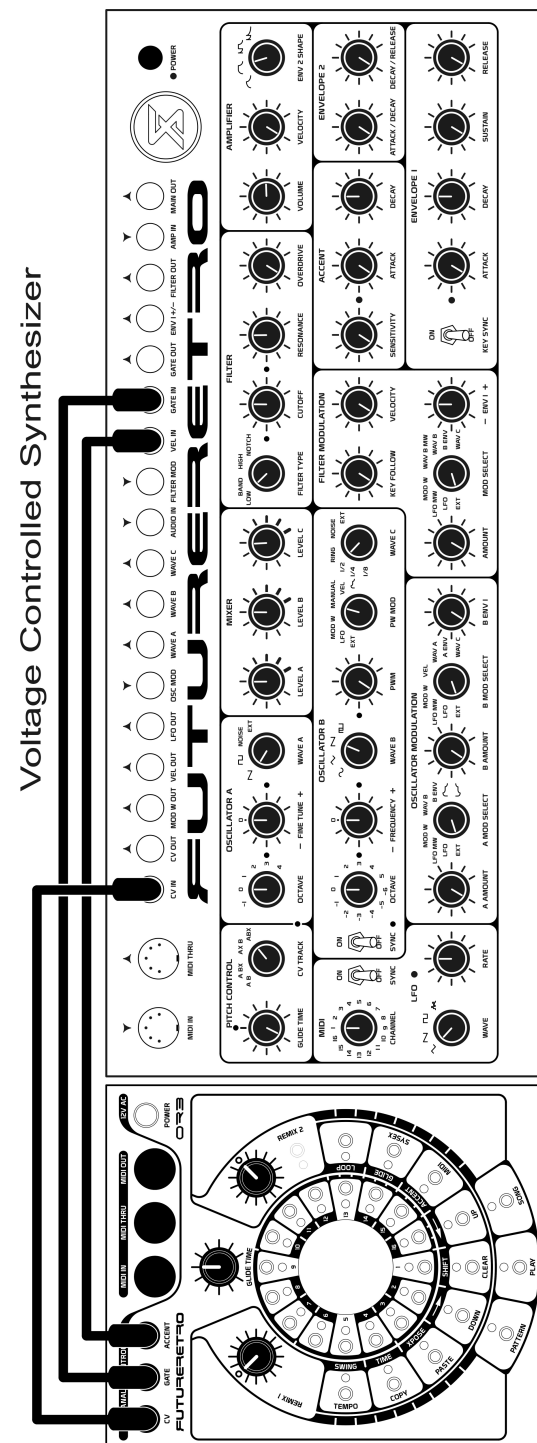
Most analog synthesizers will automatically use these external signals once they are plugged into the unit. If your device requires you to set up parameters in that module to use these external control signals, do that now.

Start playback of the Orb's sequencer and you should hear the notes programmed into the sequencer playing the external module.

You are free to select and edit different patterns within the Orb as you normally would.

Notes that are programmed to glide in the sequencer will cause the CV output to slew at the rate set by the Orb's Glide Time control located on the front panel.

You can also sync the Orb's playback to an external MIDI Clock while playing the external analog module.



USING THE ORB AS A MASTER CLOCK

Using the Orb as a master clock allows other sequencers and drum machines to synchronize their playback to the Orb. In this configuration, the Orb acts as the master device that allows it to control the start, stop, and tempo for all the sequencers connected.

For this setup, connect the MIDI Out of the Orb to the MIDI In of the devices you wish to synchronize. To set up the MIDI parameters in the Orb, press the Song key (the Song indicator should turn on) to enter Song mode.

Now press the Accent/MIDI key. This key's indicator will turn on when you are in MIDI mode. At this point the display will show "INT" or "EXT." Use the Up/Down keys to select "INT." This indicates that the Orb will operate under its own INTERNAL MIDI settings.

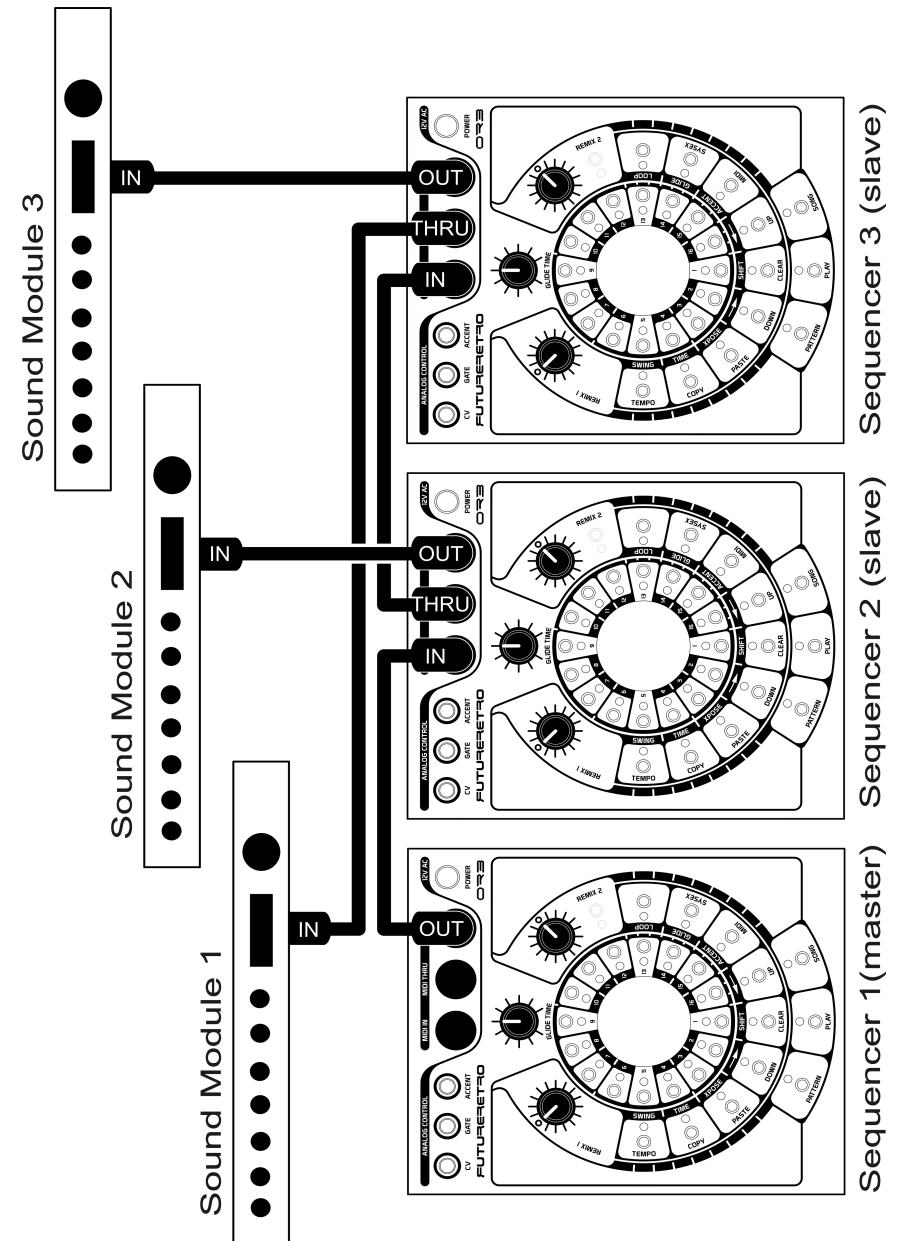
Press the Accent/MIDI key again. The display will now show which MIDI channel (1–16) the Orb sends and receives information on. You can change the MIDI channel setting using the Up/Down keys.

It does not matter which channel is selected for this configuration, as the start, stop, and tempo information of the Orb is sent as a global message that is not specific to any one MIDI channel.

Press the Accent/MIDI key again, and the display will show the MIDI Program Change page. For more information on using MIDI Program Change messages, please read page 41.

Press the Accent/MIDI key once more to exit MIDI mode. The Accent/MIDI key indicator will now be off.

You will need to refer to the owner's manual of the device you wish to sync or slave to the Orb. You will need to set the device's MIDI parameters to respond to an external MIDI clock. When this has been done, starting and stopping playback of the Orb will start and stop playback of the slaved device. The tempo of the slave device is now controlled by the Orb's tempo.



Notice how multiple Orbs can be connected together, syncing to one another while playing external sound modules.

SYNCING THE ORB TO AN EXTERNAL CLOCK

The Orb can synchronize its playback to any other MIDI sequencer. In this setup, the Orb acts as a slave where the start, stop, and tempo are all controlled by another MIDI device.

For this setup, connect the MIDI Out of the master sequencer to the MIDI In of the Orb.

To set up the Orb's MIDI mode, first press the Song key (the Song key indicator should be on) to enter Song mode.

Now press the Accent/MIDI key to enter MIDI mode. The Accent/MIDI key indicator will now be on, showing that you are in MIDI mode, and the display will show whether MIDI is set for "INT" or "EXT."

Use the Up/Down keys to change MIDI mode to "EXT." In this mode, the Orb will respond to EXTERNAL MIDI messages.

Press the Accent/MIDI key again, and the display will show which MIDI channel the Orb will send and receive its MIDI information on.

For the Orb to synchronize to a master sequencer, it does not matter what MIDI channel is selected, as MIDI Start/Stop and Clock commands are a global message not specific to any one MIDI channel.

Press the Accent/MIDI key again and the display will show the MIDI Program Change page. For more information on using MIDI Program Change messages, please read page 41.

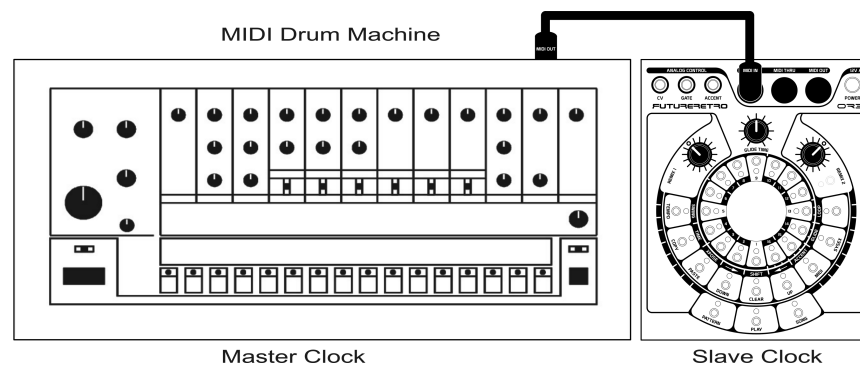
Press the Accent/MIDI key once more to exit MIDI mode. The Accent/MIDI key indicator will now be off.

Select the song or pattern you want the Orb to play, and press the Play key. The Play key indicator will turn on, showing that the sequencer is now cued and ready to begin playback.

Make sure that the master sequencer is set to a mode that allows it to act as a master and send the start, stop, and tempo information. Once this has been done, starting/stopping and changing the tempo of the master device will also control these same parameters in the Orb.

Avoid having the master sequencer send MMC or MTC as the clock. All the Orb needs to receive is simple MIDI Clock/Start/Stop commands.

Note: If the Play key indicator is on, the Orb works as a slave (syncing its playback). When the Play key indicator is off and MIDI mode is set to EXTERNAL, the Orb will receive MIDI Note data on the selected MIDI channel and convert this information into CV, Gate and Velocity analog signals, as described on the next page.



USING THE ORB AS A MIDI TO CV CONVERTER

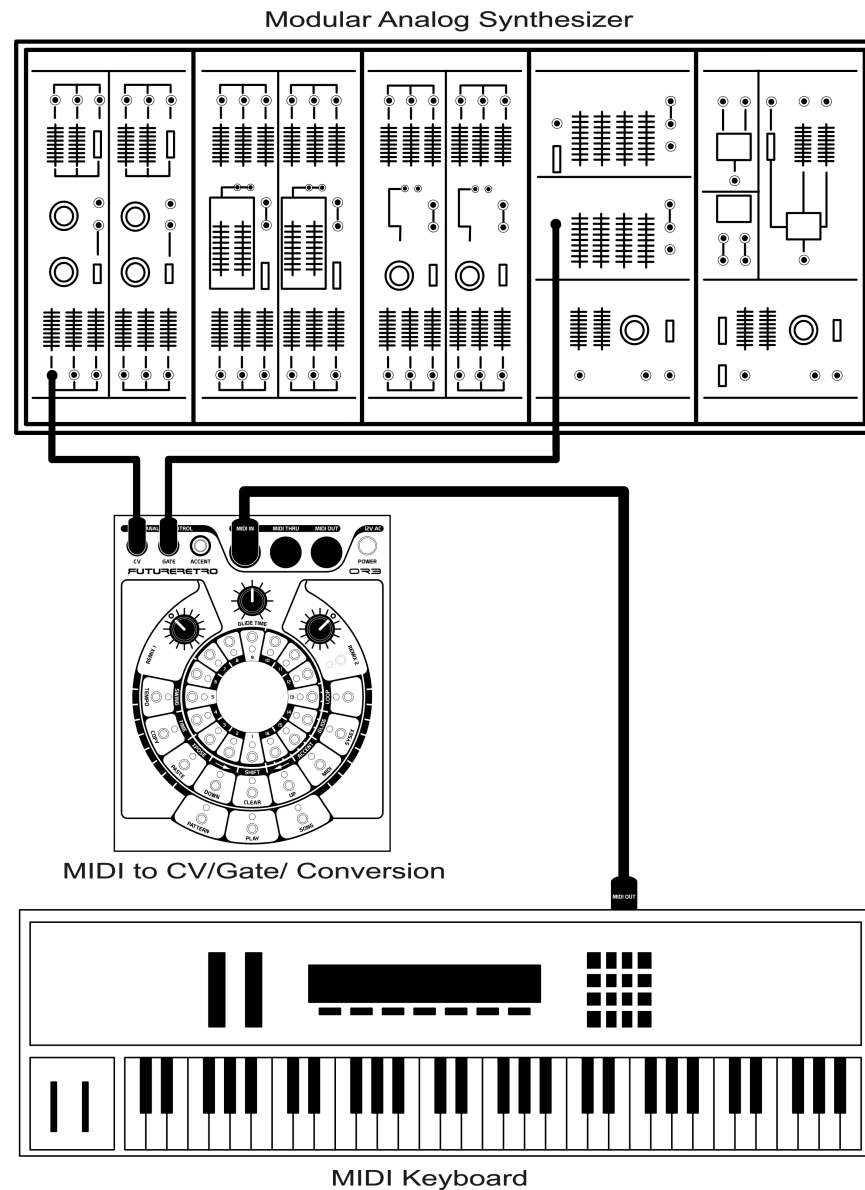
When the Orb's MIDI mode is set to EXTERNAL, you can convert external MIDI messages from a MIDI controller or another MIDI sequencer into the appropriate CV/Gate signals needed to control an analog synthesizer connected to the Orb. This is similar to what a standalone MIDI to CV converter does.

The only difference between this mode and syncing the Orb to an external MIDI clock is that instead of pressing the Play key to cue up MIDI sync, you simply don't cue the Play key.

In this mode, when a MIDI note in the range of C2 to D#7 is received by the Orb, the Orb will generate a positive polarity gate at the Gate output for the duration the note is held. In addition, the Orb will generate a control voltage representing the note's pitch at the CV output. A gliding note can be created by having the Orb receive two MIDI notes played slightly overlapped in time.

In order for the Orb to generate an accented gate at the Accent output, the MIDI note received must have a Velocity value greater than 63. Any notes received with a Velocity value equal to or less than 63 will not generate an accented gate signal.

For best results, always filter out or avoid sending MIDI information to the Orb that it does not respond to, such as MIDI CC, Aftertouch, Pitch Bend, Mod Wheel, and so forth.



MIDI PROGRAM CHANGE

The Orb supports MIDI Program Change messages. These messages allow other MIDI sequencers to remotely select patterns to play within the Orb, or the Orb can select patterns remotely in other MIDI sequencers that support Program Change messages. The Program Change messages sent by the Orb can also be used to select different sound patches in an external MIDI sound module.

If you would like the Orb to send or respond to MIDI Program Change messages, you must first set up the MIDI parameters in Song mode.

Stop the unit's playback, and press the Song key (the Song key indicator should turn on) to enter Song mode.

Press the Accent/MIDI key and the display will show "INT" or "EXT." When set to INTERNAL, the Orb will send Program Change messages to external MIDI sequencers or sound modules whenever a new pattern is selected. When set to EXTERNAL, the Orb will sync its playback to an external MIDI sequencer. Program change messages sent by the external MIDI sequencer can then be used to select different patterns to play in the Orb. Use the Up/Down keys to select the appropriate mode.

Press the Accent/MIDI key again and the display will show the MIDI channel (1–16) that the Orb sends and receives information on. Use the Up/Down keys to select the MIDI channel you wish to send or receive MIDI Program Change messages on. The MIDI channel must be the same as the device sending or receiving MIDI Program Change messages.

Press the Accent/MIDI key again and the display will show the setting for Program Change messages.

At this point, there are two options: "Pcof" or "PCon." When "Pcof" is selected, Program Change messages will not be sent or received by the Orb. When "Pcon" is selected, the Orb will send

and respond to MIDI Program Change messages. Use the Up/Down keys to select the appropriate setting.

Press the Accent/MIDI key once more to exit MIDI mode. The Accent/MIDI key indicator will now be off.

Press the Song key to exit Song mode and begin sending or responding to Program Change messages.

Note: The Orb only sends or responds to MIDI Program Change messages while in Pattern mode. Song mode does not support these messages.

To send program change messages to an external device, connect the MIDI Out of the Orb to the MIDI In of the external device. You will also need to make sure this external device is set up to respond to Program Change messages on the same MIDI channel selected in the Orb. When playback is stopped, selecting different patterns in the Orb will send the appropriate Program Change message to the external device. When the Orb is playing patterns, each time a new pattern begins playback, the appropriate Program Change message will be sent to the external device.

To allow an external sequencer to remotely select patterns in the Orb, connect the MIDI Out of the external sequencer to the MIDI In of the Orb. Make sure the external sequencer is set up to send Program Change messages on the same MIDI channel selected in the Orb.

Press the Play key on the Orb to cue up its playback to the external sequencer. Pressing play on the external sequencer will now begin playback of the Orb (syncing its playback to the external sequencer), and any Program Change Messages received while the Orb is syncing can be used to select different patterns to play. The Orb will respond instantly to any Program Change message received. If a pattern is at Step 8 when a program change message is received, a new pattern will be selected and will start playing from Step 8. If you want the patterns to be selected at even measures, you will need to send a Program Change message at the beginning of the measure.

MIDI SYSTEM EXCLUSIVE

The Orb supports MIDI System Exclusive messages (SysEx), for saving and loading your patterns and songs to other Orb units, our Revolution units, or MIDI SysEx computer programs.

The pattern and song SysEx format used in the Orb is universally compatible with our Revolution product. In this way, patterns and songs may be transferred from one unit to the other.

To do a SysEx Dump, you will need to connect the MIDI Out of the Orb to the MIDI In of the device you are transferring data to, and the MIDI Out of that device connected to the MIDI In of the Orb.

Note: Only one MIDI cable is needed to load or save information, as the Orb does not require a hand shake with the other device. By using two MIDI cables as mentioned, loading or saving operations can be done from either machine.

Make sure the Orb's playback is stopped, then enter Song mode and press the Glide/SysEx key.

The SysEx key indicator will turn on to show that you are in SysEx mode. The display will show either "save" or "load." Using the Up/Down keys, you can specify whether the Orb will save or load SysEx data.

If you are loading data into the Orb, you simply need to select Load and then cue the unit to receive a transfer by pressing the Play key.

If you are saving data, press the Glide/SysEx key again. The display will show either "bank" or "song." Use the Up/Down keys to select whether the type of transfer will be banks of patterns or entire songs. Press the SysEx key again and the display will show which pattern bank or song will be transferred. Use the Up/Down keys to select 1–16 or "all." When 1–16 is selected, that bank of patterns or that song will be transferred. If "all" is selected, you can transfer all the patterns or songs in one process.

You are now ready to load or save SysEx data with the other machine.

If you are saving the SysEx data from the Orb to another device, you will first need to set that other device to a ready-to-receive mode. Once this has been done, select "save" in the Orb's SysEx mode, and then press the Play key on the Orb to start the SysEx Dump.

The Play key indicator will turn on and the display will show the packet number being saved during the SysEx transfer. When the transfer is complete, the Play key indicator will turn off.

Consecutive saves may be made without entering and exiting SysEx mode by simply selecting the song or patterns and pressing the Play key. The receiving device must always be set up and armed to receive data before the transfer is started.

If you are loading SysEx data into the Orb, first select "load" in the Orb's SysEx mode, then press the Play key to initiate the ready-to-receive mode. The Orb will then be armed and waiting for the SysEx information to be sent. You may now start sending SysEx information from the other device. The Play key indicator will turn off when the transfer is complete. If a checksum error is encountered during the transfer, the Glide/SysEx key indicator will blink. If an error does occur, repeat the transfer again or exit the SysEx mode to clear the error.

When pattern banks or songs are loaded using SysEx, they are placed in the location they were originally saved from. However, you may change a pattern bank or song's location by editing the sixth byte of the general header, remembering that 0=1, 4=5, 15=16, and so on. The pattern bank or song can then be loaded to the new location in the Orb.

To exit SysEx mode, press the Glide SysEx key until its indicator turns off, returning you to Song mode. Always exit SysEx mode before trying to edit or play patterns and songs.

SYSEX INFORMATION

MFG ID=07
CHANNEL#=01
MODEL#=77
RAW DATA TRANSFER/PACKET=512 BYTES
PACKET SIZE ENCODED=604 BYTES

GENERAL HEADER INFORMATION

SIZE=11 BYTES
General header is sent once to identify packets to follow.

CONTENTS

F0=SYSEX START
07=MFG ID
01=CHANNEL#
77=MODEL ID
XX=BANK/SONG, 0=BANK, 1=SONG
XX=BANK/SONG#, 0–15, 16=ALL
XX=LSB
XX= *not used*
XX=MSB
F7=SYSEX STOP

PACKET INFORMATION

SIZE=604 BYTES
Packet is sent for every 512 bytes of raw data.

CONTENTS

F0=SYSEX START
07=MFG ID
01=RECEIVE ID
77=MODEL ID
XX=PACKET COUNT (00–7F)
XX=597 BYTES OF ENCODED DATA
XX=CHECKSUM
F7=SYSEX STOP

PACKET SIZE INFORMATION		
1 BANK	1 PACKET	604 BYTES
ALL BANKS	16 PACKETS	9,499 BYTES
1 SONG	14 PACKETS	8,313 BYTES
ALL SONGS	224 PACKETS	132,843 BYTES
When transferring SysEx data to another device, make sure the receiving device has the available buffer size before attempting to download or save the files.		

ADDITIONAL NOTES

CREATING A DEFAULT PATTERN

As stated earlier in the sequencer operations section, clearing patterns only removes Note On and duration information. You might want to create your own default pattern and save it to a special pattern location, such as bank 16, pattern 16. This pattern could then be programmed however you wish, perhaps with all 16th notes written at the pitch of C3. Or something that you would consider a nice starting point for creating your other patterns. This pattern could then be copied once, and pasted every time you wish to create a new pattern with the default settings.

SYNCING THE ORB'S PLAYBACK

In the previous MIDI MODE section, we discuss how you can play external MIDI sound modules and CV/Gate type synthesizers with the Orb's sequencer.

In the setups we describe, the Orb is playing these external devices while using its own internal sequencer settings. You may also sync the Orb's sequencer playback to any external MIDI sequencer while performing these same operations.

RESETTING A SONG TO STEP 1

When in Song mode, you can reset the song to Step 1 or the beginning of the song by pressing the Shift/Clear key when playback is stopped. When a song is playing, the Shift/Clear key (used in conjunction with the Play key) is used to determine the direction that patterns will play, either forward or backward. If you are syncing to an external clock while in Song mode, when playback stops, you may be at some song step location other than Step 1. If the Orb receives a MIDI continue message, playback will resume from the current location of the song. However, if you wish to restart the song from the beginning, or Step 1, you will need to un-cue the Orb's playback by pressing the Play key (turning the Play key indicator off), then press the Shift/Clear key to take you back to the beginning of the song, and finally re-cue the Orb by pressing the Play key once again (Play key indicator will be on).

THE LOGIC OF PLAYING PATTERNS BACKWARD

Most sequencers that allow you to play a pattern forward and backward will start at Step 1 and play sequentially to Step 16, then reverse their direction playing Step 16 again and followed by 15, 14, 13, all the way until Step 1 is played again. The problem with this method is that it creates double hits at a measure's boundaries, and can throw off the timing of a pattern's rhythm.

The Orb is unique in the way that patterns are played backward, by always playing Step 1 as the first step even when counting backward. This then allows all the down beats to remain on down beats, and off beats to remain on off beats. You should find that this produces a much more pleasing rhythmic experience.

Timing	!		*		!		*		!		*		!		*	
Forward	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Backward	1	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2

The chart above shows the alignment of beats playing forward compared to how they play backward. The “!” represent quarter notes, while the “*” represents 8th notes. Notice how similar beats are interchangeable.

REMIXING PATTERNS

When patterns are remixed, if the sustained portion of a note is selected to play, nothing will be heard. This is because the Orb stores all of a note's information in the step that represents the Note On or beginning of a sustained note. The sustained portion of a note is there to simply represent the duration of that note. However, if a sustained note is created by gliding one step's pitch to another step with the same pitch value, you can create the same sustaining effect. When a pattern is remixed and one of these glided notes is selected to play, it will play and even glide to the pitch of the note that follows. Remember this when remixing patterns. Both methods will produce different results, so experiment to find which works best for your music.

REMIXING SLICED AUDIO BEATS

There are several software and hardware devices now available that allow you to sample a measure's worth of music and slice it up into individual beats. If you have access to one of these devices, you may benefit by using the Orb to remix these audio slices into new arrangements.

For the best results, divide the original measure of sampled beats into 16 equal parts. Map them to a keyboard so that playing something like C2, C#2, D2, D#2, E2, F2, F#2, and so on, plays them back in their original sequential order. Create a similar pattern in the Orb to play these individual beat slices in their original sequential order.

Be sure to connect the Orb's MIDI Out to the MIDI In of the device playing the sliced audio beats. Once you have your pattern created to play these slices back in their original order, you can let the fun begin. First try playing the pattern forward to make sure it sounds similar to the original. Next try playing the pattern backward. And finally, go nuts remixing these beat slices using the Orb's Remix feature. Remember that the Remix feature can be activated at any time within a measure, so you might try playing a pattern normally, and activating the Remix feature for only a specific part of the music to create variations. The key is to experiment. Have fun!

REMIXED PATTERNS DO NOT PLAY BACKWARD

Whenever the Remix function is activated and you try to play a pattern backward, it will play backward but it will no longer be remixed. The Pattern Reverse feature overrides the Remix feature, so that patterns will only play backward sequentially. If the Remix feature is activated and the pattern is playing backward, you can change the playback to forward to resume having the pattern remixed again. This can lead to some interesting results as well, so experiment!

TIPS ON PLAYING THE XS WITH THE ORB

When playing the XS semi-modular synthesizer with the Orb, there are a several things one can do that might not be obvious at first. Since the XS can be played using both MIDI and CV/Gate signals, it is often advantageous to use both methods simultaneously.

Connect the MIDI Out jack of the Orb to the MIDI In of the XS. Connect the CV Out of the Orb to the CV In of the XS, the Gate Out of the Orb to the Gate In of the XS, and the Accent Out of the Orb to the Velocity In of the XS.

Begin playing a pattern within the Orb to play the XS. Now you can adjust the CV Track control settings in the XS to determine if an oscillator is to controlled via MIDI or the external CV signal. Start by setting the CV Track control to the A B setting, and tuning both oscillators so they play in true unison.

Now set the CV Track control to the AX B, or A BX settings. The first thing you will notice is that the oscillators become slightly detuned, which can be useful for creating an instant chorus-type effect.

Another useful aspect of this setting is that one oscillator is being controlled via MIDI and the other via the CV In jack. When notes are set to glide within the Orb, you now have a separate glide time control for each oscillator (using the Glide Time controls on the Orb and the XS). Try playing a pattern in the Orb that contains gliding notes, and set each Glide Time control to different settings for all sorts of unusual sound possibilities.

You will also notice that by using the Accent Out of the Orb connected to the Velocity In of the XS, you get a much wider range of Velocity control within the XS. This is because the Accent Out of the Orb ranges from 0 to +10 volts (a full range), compared to the Velocity MIDI messages the Orb sends, which will be either 63 or 127 for non-accented/accented notes (or only half the full range).

TRANSPOSING THE XS USING MIDI

It is possible to play the XS with the Orb, and to be able to transpose the played pitches in the XS using a MIDI keyboard.

For this setup, you will need to connect the CV Out of the Orb to the OSC MOD In of the XS, the Gate Out of the Orb to the Gate In of the XS, and the Accent Out of the Orb to the Velocity In of the XS. Connect the MIDI Out of any MIDI controller or keyboard to the MIDI In of the XS.

In the XS, set the CV Track control to the A B setting. In the Oscillator Modulation section, set the A Mod Select to EXT with the A Amount control turned fully clockwise, and set the B Mod Select control to EXT with the B Amount control turned fully clockwise.

This then allows the Orb to control the pitch of both oscillators in the XS using the modulation section, while MIDI notes received by the MIDI controller or keyboard are used to transpose the oscillators.

Start out by playing MIDI note C2 on your MIDI keyboard, and begin playback of the Orb sequencer. You should hear the XS playing notes just as they are programmed into the Orb. While the sequence plays you can play notes on your MIDI keyboard in the range of C2 to C7 to transpose the pitch the XS oscillators play. Notice that the transpose takes effect as soon as a new pitch is played on the MIDI keyboard.

As an alternative, if you have another analog sequencer or analog keyboard with a CV output, you could substitute either of them in place of the MIDI keyboard to transpose oscillators in the XS.

In this case, you would not need to connect a MIDI keyboard to the XS MIDI in. Instead you would connect the CV Out of your sequencer or analog keyboard to the CV In of the XS. Then set the CV Track control of the XS to the ABX setting.

USING MULTIPLE ORBS

Consider the advantages of using multiple Orb units to play a single analog synthesizer. By synchronizing the playback of multiple Orb units, they can all be played back simultaneously in perfect time with one another.

Now imagine having, for example, three Orb units controlling an XS semi-modular synthesizer. Each Orb could be used to control a different section of the XS. But the advantage is that each Orb can be doing its own thing. So let's say that you have one Orb assigned to control the pitch of the oscillators in the XS. The second Orb controls the filter cutoff, or velocity of notes in the XS. The third Orb controls the triggering of the envelopes in the XS.

Now that each element has been reduced to its simplest form, you can change the pattern controlling the note pitches without changing the rhythm of the XS and vice versa. Change the filter cutoff frequency or note velocity without the pitch or rhythm changing.

But the fun really begins when you play with patterns of various lengths within each Orb. The result is pure polyrhythm heaven.

You could also use two Orbs, each controlling one of the oscillators within the XS to generate duophonic synth lines.

ATTACHING THE ORB TO THE XS AND RACK MOUNTING MULTIPLE ORB UNITS

The Orb is the same size as our XS unit and has been designed so it is possible to attach the Orb to either or both ends of the XS. The Orb has also been designed so that when three units are attached side by side, and rack ears are added to the outer two units, the group will fit into a standard 19" rack enclosure.

For information on how to do this, please see the additional documentation provided on the Orb page of our website.

Be sure to check the Orb product page of our website for any future tips and tricks or additions to the information provided in this manual.

CALIBRATING THE ORB'S CV OUTPUT

The Orb provides a single access hole on its bottom chassis for calibrating the CV output. This trimmer is set at the factory but may need to be adjusted over time.

To make adjustments to the trimmer, we recommend using a small flat-blade screwdriver.

Before making any adjustments, turn the unit's power on and let the unit warm up for at least 15 minutes.

You may find it easier to calibrate this trimmer by setting the Orb on its side on a soft surface so you have access to the front panel controls and the bottom trimmer access hole at the same time.

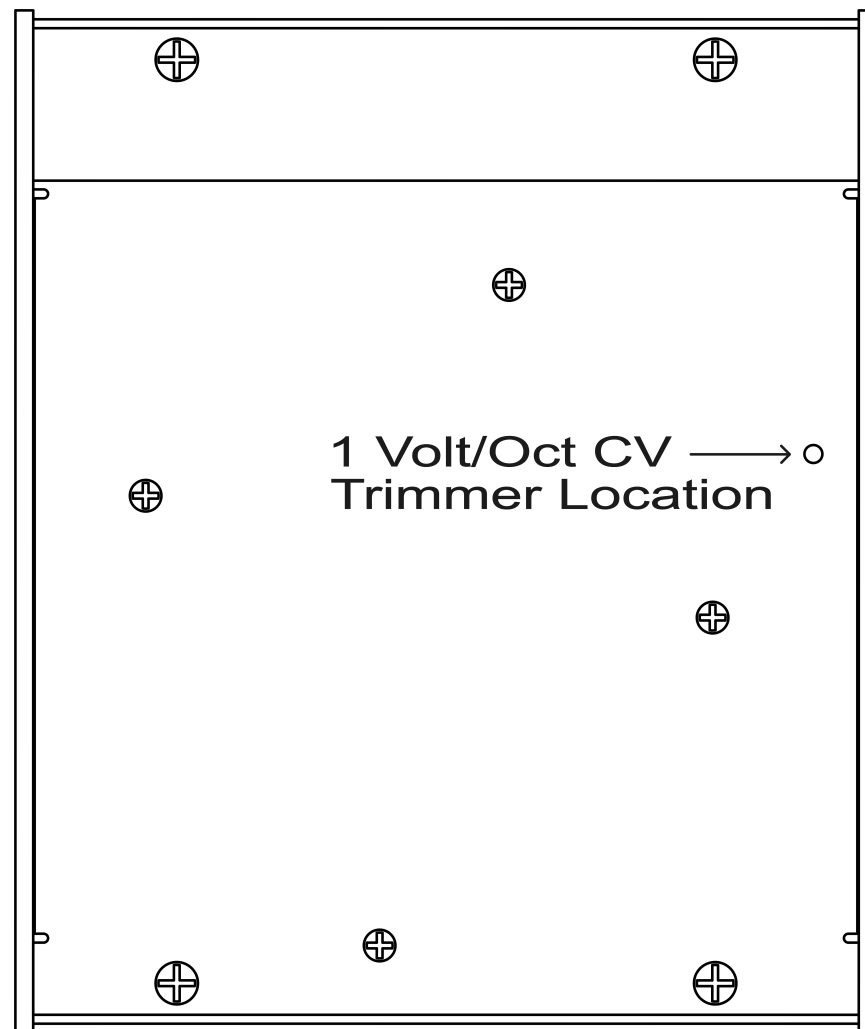
First create two different patterns, each containing only one note. The first pattern should be programmed to play a pitch of C1, and the second pattern should play a pitch of C6.

Make sure that the Orb's Xpose setting is set to "0."

If you have a voltmeter, plug a short 1/4" cable into the CV Out jack and connect the leads of your voltmeter to the other end of the 1/4" cable. Play the pattern containing C1 and check the voltage being generated. Play the pattern containing C6 and adjust the trimmer until the voltage generated is 5 volts higher than that of C1. You may need toggle back and forth a few times, checking the voltage of C1 and then adjusting for C6 until the difference is exactly 5 volts.

If you don't have a voltmeter, connect the CV Out and Gate Out to a 1V/Oct synthesizer that is properly calibrated. Play the two patterns containing C1 and C6 while adjusting T1 until the external synthesizer plays the correct scaling. A slight adjustment is usually all that is needed.

Note: This method is not as accurate as using a voltmeter.



SPECIFICATIONS

SEQUENCER

- NUMBER OF PATTERNS: 256 patterns (16 banks x 16 patterns)
- RECORDED PATTERN CONTENT: note duration, pitch, accent, glide, loop point, time signature, swing amount
- NUMBER OF STEPS PER PATTERN: 3/4 time=12 steps max, 4/4 time=16 steps max
- NOTE PITCH RANGE: C1 to D#6 (internal), C2 to D#7 (MIDI)
- LOOP POINT: 1 to 16 notes per pattern to loop
- PATTERN TRANSPOSE: from -36 to +36 notes
- OTHER PATTERN FEATURES: pattern remixing, play patterns forward or backward, copy and paste patterns, pattern shifting, permanent pattern transposing, multiple pattern cueing, LED chase, real-time editing of pattern information while the sequencer is running or stopped, sequencer automatically saves all editing
- REMIX: 256 variations for each pattern and song
- NUMBER OF SONGS: 16
- NUMBER OF STEPS PER SONG: up to 3,580 measures
- RECORDED SONG CONTENT: tempo, bank/pattern for each step, pattern transpose for each step, song loop point
- SONG PATTERN TRANSPOSE: from -36 to +36 notes steps for each song step
- TEMPO RANGE: from 20 to 250 bpm
- MIDI FUNCTIONS: On/Off, channel selectable from 1 to 16, Program Change messages for selecting patterns or sounds remotely
- MIDI SYNC: internal or external clock
- MIDI SYSEX: for dumping patterns and songs
- MIDI DATA: note on/off, pitch, velocity, (transmitted and received)
- MIDI TO CV/GATE CONVERTER

INTERFACING

MIDI: In, Thru, Out

1/4" JACKS: 1V/Oct CV out, +12V Gate out, +10V Accent out

POWER

12V AC input, current rating of 1 amp or 1,000 mA

DIMENSIONS

7" (L) x 6" (W) x 2.75" (H)

UNIT WEIGHT

1.75 lbs.