

# **MSSIAH**

**MIDI SID SOFTWARE**

**Mono Synthesizer**

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## Introduction

The MSSIAH Mono Synthesizer software is designed to be a monophonic synthesizer application imitating the behaviors of classic analog machines.

Running in mono mode only, the idea is to put all processing power and audio features into a one-voice synthesizer and thereby increase parameter resolution and modulation capabilities beyond the other apps in the MSSIAH suite.

The Mono Synthesizer is fully controllable via MIDI to make a good companion with the other gear in your recording studio. Playing it with a keyboard is so expressive it makes you think your C64 has a Moog label on the back.

To provide even further resemblance to vintage gear, Mono Synthesizer takes the input from up to four game paddles (stock or home built potentiometers) to turn its virtual knobs.

If you're short on a MIDI keyboard you can play the Mono Synthesizer directly on the C64's keyboard (compatible with the "Music Maker" keyboard overlay). Imagine solo playing in front of a live audience guaranteed to get really excited by the sheer look of someone actually playing a classic game computer from the 80s! (Sorry, we don't carry straps..)

Additionally the program is built around a TB-303 style sequencer that offers repetitive patterns to be played or synchronized externally.

If you're out of inspiration, the "Advanced Random Composer" is featured to create sequencer patterns randomly. A few basic input parameters make an impressive result.

Wrapped up in an appealing user interface anyone can learn in a few minutes makes the Mono Synthesizer a worthy member of the MSSIAH family.

We hope it will be a great tool at hand whenever you need raw monophonic MIDI SID power.

This manual covers all the things you need to know to operate the program.

## Using the Mono Synthesizer

### Starting Up

To start the Mono Synthesizer, select *Mono Synthesizer* in the startup menu and press return. The program loads from the cartridge and starts up in within 6 seconds.



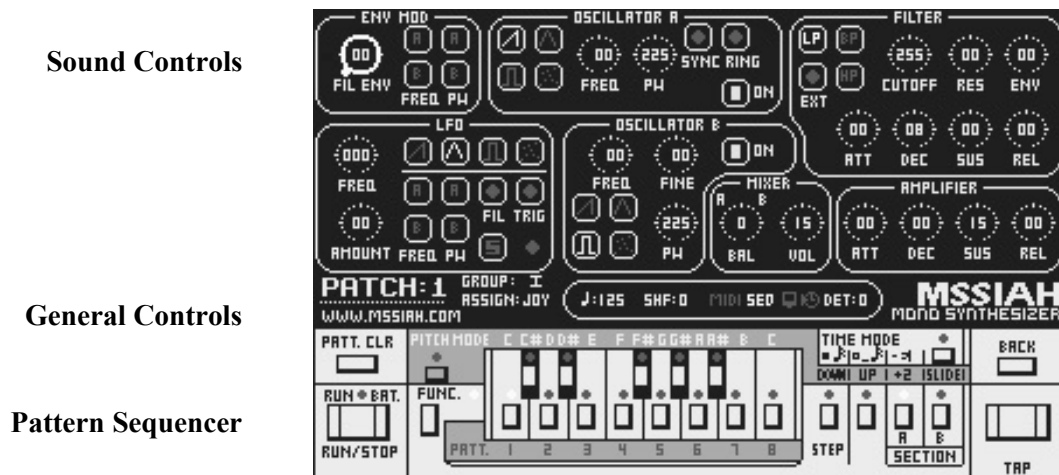
### Note:

The user is strongly advised to carefully read the instructions on how to properly handle the cartridge in the booklet *MSSIAH - Getting Started* available for download at <http://www.mssiah.com>.

### Main Screen

The Mono Synthesizer Main Screen is the default outlook when started up. From here you alter sound parameters, change patches and edit patterns to play.

The Main Screen consists of three sections:



## Sound Controls

The Sound Controls reside on the upper part of the screen. Every parameter is assigned a special key on the C64's keyboard. Some parameters share the same key thus requiring multiple key-presses to activate.

When a knob is active you can tweak it with your joystick or game paddle. The knob visualizes its current value "virtually" on a circular scale. That way you can roughly read out the value with just a quick look at the knob's position.

When using potentiometers (game paddles) you can have four knobs active at the same time.

## General Controls

The General Controls section is where to change patches, assign the current input control, change tempo and banks, activate MIDI mode etc.

The **CRSR UP/DOWN** and **CRSR LEFT/RIGHT** keys select the General Control. The active control is underlined with a dotted line. Holding **COMMODORE (C=)** key while pressing the **CRSR** keys alters the value.

## Sequencer

The pattern sequencer provided is accessed from the bottom of the screen. It closely resembles the Roland TB-303 step sequencer and operates in three different modes; *Normal Mode* (playing), *Pitch Mode* (enter note data) and *Time Mode* (enter a time line).

If you are a TB-303 sequencer novice, you may have some difficulties to grasp the concept at first. Once you get a hold of it though, you will see the great potential creating interesting compositions with this tool

(If not, the *Advanced Random Composer* still provides an additional graphic editor).

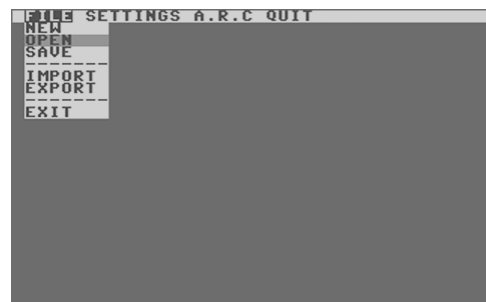
Last, there is a second screen provided:

## Setup Screen

Pressing the **CTRL** key switches display to the Setup Screen. From here you can choose which control to use, whether you run the software on NTSC or PAL machine, access the file operations and much more.

The Setup Screen user interface has several windows in a DOS like environment.

Use the **CRSR** keys to open windows, **RETURN** key to select and **←** key to close window/cancel.



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## **Sequencer Modes**

The pattern sequencer on the Main Screen operates in three different modes affecting the whole Main Screen:

### **Normal Mode**

Normal Mode is the default mode in which you edit sounds, select patterns, play patterns and synchronize the sequencer to MIDI clock.

### **Pitch Mode**

In Pitch Mode you enter and edit notes for the current pattern. Sound Controls and General Controls are inactivated.

### **Time Mode**

Here is where you enter a time line for the notes in the current pattern. Sound Controls and General Controls section are inactivated.

### **Transpose Mode**

Not really an operating mode but a special state in Normal Mode, this mode is activated to alter the transpose setting for the current pattern playing.

## **MIDI Mode**

MIDI mode is the opposite of the Sequencer mode.

To activate MIDI mode, press **COMMODORE (C=)** key and **CRSR UP** key with the cursor on the MIDI/Seq parameter in the controls section. The screen goes blank and awaits MIDI input. If you haven't plugged in your MIDI cable into the MIDI input of the MSSIAH cartridge yet, now is the time to do so. Press the **RUN/STOP** key to exit MIDI mode.

## **New**

In the Setup screen (**CTRL** key) you can erase all the patterns currently residing in the pattern sequencer. Select the *New* item in the *FILE* menu. This does not affect the current patches. Patterns are also lost when quitting the application.

## **Quit/Reboot**

You can quit the Mono Synthesizer and return to the startup menu at anytime by entering the Setup screen (**CTRL** key) and select the *Reboot* menu item in the *QUIT* menu.

All the sound and general controls are saved in between sessions and even if the computer is switched off if you choose to save changes before turning off the MSSIAH. Pattern data is not saved.



## User Input Controls

MSSIAH Mono Synthesizer uses two types of input controls: Joystick and Potentiometers.

### **Joystick**

Joystick is the default input control. Moving the joystick up and down makes the current parameter increase or decrease. Pressing **FIRE** button speeds up the rate of alteration. Joysticks are plugged into controller port #2 that is the one just next to the power switch.

### **Potentiometers**

A potentiometer is a variable resistor that changes its resistance when you turn its knob. The Commodore 64 is capable of sampling the resistance value for applications such as the MSSIAH or Prophet64. Four potentiometers are handled simultaneously by connecting two pots into each controller port. Mono Synthesizer is fully configurable so that you can freely select which pot to use or not. Potentiometers stay active in MIDI mode too.

Technically, it is the audio chip inside the computer that takes care of handling the potentiometers. If your audio chip's pot-readers are defective in any way, one or more pots cannot be used and the same goes for a computer with the audio chip pulled out. Check out the port diagnostics in the MSSIAH Cartridge Startup menu to test your potentiometers.

Old game paddles designed for Commodore computers are in fact potentiometers. If you manage to find one or two of those, you have a true retro style computer and are more than ready to start tweaking the Mono Synthesizer. If not, you can build one yourself. Check out the booklet *MSSIAH - Getting Started* on our website for schematics.

### **Select Control**

Being a modern computer user, one has gotten used to things like plug and play these days. However, the MSSIAH Mono Synthesizer has no way of auto-detecting the control currently attached to your computer. Unless you just started up the application and intend to run a joystick (default), you will have to take care of setting the controls yourself:



- Open the Setup Screen by pressing the **CTRL** key.
- Navigate with the **CRSR** keys to the second menu from the left: *SETTINGS*
- Open up the drop-down menu and select *Controls*.

The first option sets the current control type, either joystick or potentiometers (*POT / JOY*). As you select POT, all four potentiometers can be turned on or off individually.



The second option blocks the potentiometers unless the **LEFT SHIFT** key is depressed. Why?

Well, as you will notice, potentiometers can be a bit 'shaky' switching values periodically.

It's not so much of a problem when turning the VCF frequency or LFO amount but causes unintentional tweaks in case you select the wrong parameter by accident.

The L-Shift option only passes through your pot movements whenever the **LEFT SHIFT** key is depressed. Release it and the pots have no effect on the parameter value.

With the L-Shift option activated it is fully possible to hit the **CAPS LOCK** key and manually cancel the shift key prevention. This is not recommended as it may cause C64 keyboard conflicts and select unwanted parameters.

### **Assigning Potentiometers**

When using potentiometers in the Main Screen you can tweak them all at the same time and all the knobs will turn accordingly. However, selecting the active sound parameter for each individual potentiometer is done one at a time. The *Assign* parameter in the General Controls section holds the current active potentiometer.

As the pot is activated, pressing the sound control keys will select the active knob for that specific pot only.

Alias	Controller port pin
1-X	1
2-X	2
1-Y	1
2-Y	2

## MIDI Mode

When editing sounds, patterns and various other parameters Mono Synthesizer operates in *Sequencer* mode. That means it responds to internal/external clock signals and plays the pattern sequencer whenever it is started.

Switching the Mono Synthesizer into *MIDI mode* however, blanks the screen and instead responds to MIDI according to the configuration in the setup menu (if selected as primary control, potentiometers are still active in MIDI mode too).



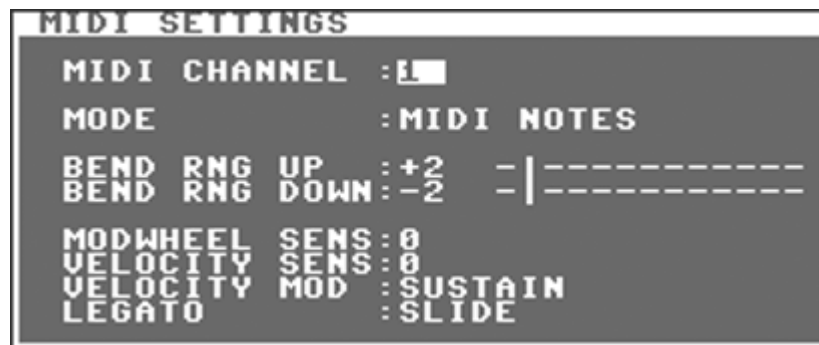
MIDI mode is switched on in the General Controls section.

To switch back to Sequencer mode, press the **RUN/STOP** key.

### Connect your MIDI Cable

MSSIAH Mono Synthesizer is integrated with the MSSIAH Cartridge's built in MIDI interface. The connector on top of the cartridge is a MIDI input and that is where you insert your MIDI cable that goes to the output of your sequencer or master keyboard. Note that the MSSIAH cartridge does not have a MIDI output.

Though MIDI mode is activated in the Main Screen, its setup parameters are accessed via the setup screen.



### MIDI Channel

The MIDI channel parameter sets the receive channel 1-16 or off (displayed with two dashes - -). It does not make a lot of sense turning off the receive channel but since the MSSIAH Sequencer application is capable of handling six MIDI channels simultaneously it can also turn off individual tracks. The other applications (such as this one, the Mono Synthesizer) use it for compatibility reasons.

### Mode

When switched to MIDI mode Mono Synthesizer awaits MIDI input such as note events (key on and key offs), control change messages etc.

However, by selecting *C64 Keyboard* instead of *MIDI Notes*, MIDI mode will ignore all MIDI note events in favor of the built in keyboard of the C64. Control change and program change messages still work though and so does the potentiometers.

In other words, this mode turns your MSSIAH equipped favorite 80s computer to a cool stage keyboard to really play the machine in front of a live audience.

The C64 keys used for playing notes are the ones on the upper half of the keyboard (**Q2W3ER..etc**) thereby offering full compatibility with the old “Music Maker” keyboard overlay in case you happen to have one of those lying around..

Use the **F1** key to increase the base octave and **F3** key to decrease it. Use the **F5** and **F7** keys to increase and decrease the current patch number.

### ***Bend Range up***

Adjust the bend range of the pitch wheel when moved upwards in 24 semitone steps.

### ***Bend Range down***

Adjust the bend range of the pitch wheel when moved downwards in 24 semitone steps.

### ***Mod wheel Sensitivity***

Adjust the modulation wheel sensitivity, i.e., how much the wheel will affect the LFO modulation depth. Mod wheel is the equivalent to control change #01.

### ***Velocity Sensitivity***

Adjust the velocity sensitivity from the MIDI keyboard.

### ***Velocity Modulation***

You can choose to apply the velocity to either VCA’s sustain level or the filter envelope modulation depth.

Sustain level velocity is applied to the VCA’s sustain level directly so make sure your envelope has got a full sustain level and preferably no decay.

### ***Legato***

Select whether to slide in between legato notes (played without release in between) or not.

This setting also applies to the C64 keyboard if MIDI mode is operating in C64 Keyboard mode.

### ***Synchronization in MIDI mode***

MIDI clock is still active in MIDI mode to sync the LFO. If you select the user port as clock source in the SYNC settings (see *Synchronization* section in the *Settings* chapter) DIN sync is activated instead.

### ***Note Length Trig Problem***

Most grid editors found on popular PC/Mac sequencers will default the note length to a full 16th or 32rd note (see left image on next page).

That means the note off is sent just before the next adjacent (if any) note triggers.

Though most synthesizers handle this well the SID does not. When triggering off a SID oscillator the chip needs a little extra time to recover before the next trig occurs.



Therefore, when working with an external sequencer, shorten the length of notes so that a note off doesn't get too close to the next note on (right image).

## Edit Sounds

The MSSIAH Mono Synthesizer can store eight patches with your sounds.

A patch is the full collection of parameters that makes up the sound you are playing.

All the instrument data of the eight patches is saved in between sessions and can even be recalled the next time you start up the MSSIAH if you choose to save your changes before turning off the computer.

### Changing the Current Patch

Change the current patch in the general controls section. Put the general control cursor under PATCH and hold the **COMMODORE (C=)** key. Then scroll through the patches by pressing the **CRSR** keys.

Patches can also be changed via MIDI sending a program change message. Note that both manual patch changes as well as MIDI program changes set the new patch instantly. That may cause incorrect pitching to occur if pitch modulation has been applied. Playing a new note immediately corrects the pitch.

### The Structure of a Sound

The Mono Synthesizer's sound layout is based on two oscillators, A and B, playing in unison. Each oscillator has four different waveforms and separate tuning. There are additional effects for the oscillators such as ring modulation, waveform synchronization and fine tune.

The filter has a hardware envelope that can be routed to modulate both oscillator frequency and pulse width. Filter types are low pass, band pass and high pass or all combined. External sources can be filtered too.

The third SID oscillator operates as an LFO with four waveforms, capable of modulating oscillator frequency, waveform pulse widths and filters. It is also possible to synchronize the LFO to the internal or external clock. Volume curve is set by the SID hardware envelope.

### Note:

Each parameter described in this chapter is accessed with an assigned key on the C64 keyboard. In the *Key Map* chapter you will find a complete list of those keys.

### Oscillator A

The Oscillator A section contains all parameters to control Oscillator A.

#### Waveforms

The symbols on the left represent the available SID oscillator waveforms. Though this software allows you to add waveforms freely it's not certain that it will produce the results you want. The 8580 is capable of mixing the saw tooth, triangle and pulse waveforms whereas only triangle and pulse generally work with the 6581. The noise waveform cannot be mixed.

#### Frequency

The frequency parameter sets the pitch for Oscillator A in semi-note steps. You can pitch it up and down 24 semi-notes.



### **Pulse Width**

When selecting the pulse waveform the PW (Pulse Width) parameter adjusts the width of the pulse wave. This produces a variety of sounds ranging from the total bleepiness of a full pulse width to warmer or sharper sounds with a narrow pulse.

Modulating the pulse width produces animated sounds that are similar to two detuned oscillators. Classic C64 leads and fat bass sounds were built up this way. The default value of 225 makes a completely full 50/50 pulse waveform.

### **Waveform Synchronization**

To synchronize a waveform means locking Oscillator A's frequency to the frequency of Oscillator B. To hear the typical sync effect you need to change either oscillator's frequency manually or with the envelope/ LFO. Take a look at default (factory) patch #5 for some examples. Synchronization is a SID hardware feature.

### **Ring Modulation**

With this effect oscillator A becomes ring modulated to oscillator B. The outcome is completely dependent on oscillator A's frequency in relation to osc. B. When modulating frequencies, go for osc. A.

Ring modulation works best when using the triangle waveform on both oscillators.

### **On**

The On-setting toggles the oscillator on/off. Note that this parameter is turned on/off inverted to the others. Push your controller up to turn it off and down to turn it on. When turned off, Oscillator A is completely shut off.

## ***Oscillator B***

The Oscillator B section contains all parameters to control the Oscillator B. Those are the same as for osc. A.

### **Fine**

The extra fine tune parameter is the only thing that differs the osc. A and B sections. It enables you to tune the B-oscillator up or down in fifty steps each.

Fine tuning two oscillators is a great way of adding "air" to your sound. Overdo it and you get the classic Euro-pad, like default (factory) patch #2.



## ***Tuning with PAL / NTSC***

The current pitch of the Mono Synthesizer is determined by the PAL/NTSC-setting on the Setup Screen. Since NTSC-machines run a little faster than PAL machines, tuning is affected also. The NTSC/PAL setting is automatically set on startup, if this fails (Mono Synthesizer plays out of tune) you need to select system manually. Read more about it in the *Settings* chapter.

## ***Pitch Wheel***

When using extreme bend ranges for MIDI Pitch Wheel and playing higher notes, you might experience stepped pitching, a.k.a. "stair casing". This is due to the SID circuit not using linear values when converting digital frequency to analog audio. MSSIAH itself uses the full 14-bit resolution for pitch wheel control.

## Mixer

### Balance

Balance sets the balance between oscillator A and B. Actually the SID oscillators do not have individual volume settings. The only way to manipulate the volume is through the VCA envelope.



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The balance setting is therefore a software compromise. It adjusts the VCA sustain value for the oscillators respectively to match the balance setting. It works really well when using an envelope with a maximum sustain value and preferably a zero decay. Keep this in mind when relying on balance in your current patch: tweaking the envelope may cancel the balance effect.

### Volume

The volume parameter directly affects the overall SID volume level.

If you experience distortion when using the filters, try to lower this level one to three steps and see if it helps out.

## Filter

The filter section gives you direct control of filter type, frequency tweaks and the filter envelope.



### Filter Type

You can set the SID filter to low pass, band pass or high pass. Any of the three filter types can be combined with various results. If you wish to input an external signal through the C64 audio input/output activate the EXT parameter.

### Cutoff Frequency

The cutoff frequency is directly routed to the SID filter frequency. It works as long as no other modulator affects it. When using LFO on the filter the cutoff setting determines the lowest point of the LFO modulation.

### Resonance

This parameter sets the SID filter resonance.

### Envelope Modulation

This parameter applies envelope modulation to the filter. When tweaking it, it's a good idea to leave cutoff frequency at a zero value. That way the filter won't jump up to whatever setting the frequency parameter has got when you reach the parameter bottom (as zero envelope amount 'releases' the filter modulation). Envelope and LFO modulation can be used at the same time. Activate filter LFO mod in the LFO section.

### Envelope

The envelope parameters Attack, Decay, Sustain and Release operate a SID envelope especially dedicated to the filter. It can also be routed to modulate other parameters in the Mono Synthesizer.

Beware of that SID envelopes have some flaws that make them behave irrationally.

Read more about it below in the section *A word about the SID envelopes*.



## ***A word about the SID filter***

In a perfect SID world the filters would work just like any other analog, digital or software filter. Unfortunately the filters were inconsistent in between the SID revisions. All of this is covered in the booklet *MSSIAH - Getting Started* available for download on our site.

In short, filters on older SIDs do not sound as good as the newer ones. In fact, some really old ones are completely silent when the filters are turned on. In that case Mono Synthesizer and Bassline applications might appear not to work at all.

## ***Amplifier***

The amplifier section controls the volume envelope that shapes volume curve of the sound.

Attack, Decay, Sustain and Release all affects the built in SID VCA envelope.



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## ***A word about the SID envelopes***

SID envelope anomalies make them fail to trigger properly every five to eight notes or so. The effect is apparent when you lower the sustain value and start applying decay settings. To overcome the constant ‘hiccups’ one trick is to set the attack time to a non-zero value, like 1. If you don’t wish an audible envelope attack, don’t worry, the value of 1 is hardly noticeable.

## ***Initialize Envelopes***

The trick with a low attack is not always helpful, e.g. when using extreme ADSR-settings. Luckily there is another way to tame the stubborn SID envelopes and that is to brutally initialize it before the next note triggers, a technique often referred to as “Hard restart”.

The best timing considered is to restart it approx. 33 milliseconds before the new note triggers.

Mono Synthesizer offers two ways of achieving this:

### ***Init Envelope on Release***

This is the simplest form of initialization and works with both MIDI data and the internal pattern sequencer. By setting this parameter every note release causes the envelope to reset.

For example, playing the pattern sequencer makes every note trig off a “hard restart”. Playing your MIDI keyboard makes a hard restart to occur whenever you release the current key (legato playing is not affected).

Note that with the *Init Env* setting you cannot use envelope release cycles. The audio is completely shut off on release. This is by far the simplest form of initializing envelopes. You find the Init Env setting in the MIDI settings window on the Setup Screen.

### ***Control Change #65***

This option is when using the Mono Synthesizer in MIDI mode. By sending the control change message #65 the envelope is immediately initialized.

Together with the change message 65 you also provide the type of restart that you wish to use with a value of 0 to 8. In the *MIDI Controller List* chapter there is a list of the different restart values.

For example, the value 2 means that the ADSR is reset with a full decay value (the rest of them being zero) and the envelope trig is set to 8 (disable the oscillator).

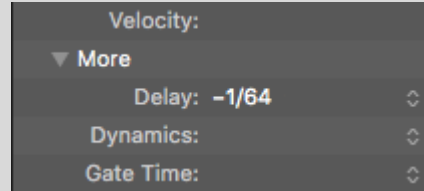
(The type #6 says “reload”. This means that the ADSR is reloaded with the current setting instead of given an extreme restart value).

The type of reset that will work best depends on the envelope setting. When tweaking that MIDI sequence to perfection, you will probably need to try out a couple of different init types before you find the best solution.

Note: When sending a change message 65 to the Mono Synthesizer you also change the default init type for key release-init. You can use any type except #6. Default is #5.

**Tips:**

When using control change #65 to init envelopes, a good idea is to put the #65 message on the same events as the notes but in an empty sequence on the same MIDI channel. By altering the delay property for that sequence it can be made to play back approx. 33 ms ahead of the notes.



To really nail it and have a perfectly triggered SID envelope you may have to play around with the delay time as well as the init mode 0-8.

**Envelope Modulation**

The envelope modulation section routes the filter envelope to other destinations.



**Filter Envelope**

The amount of filter envelope is set with the Fil Env knob. Zero means no modulation but does not turn it off. As long as any of the destination buttons are activated the Mono Synthesizer has ‘locked’ the filter envelope modulation to that particular destination.

**Frequency**

Filter envelope can be applied to the frequency of both oscillator A and B. Good examples of this are sirens and drum sounds with a pitch slope. It makes a perfect sync and ring mod. effect too.

**Pulse Width**

The pulse width of both oscillators A and B can be modulated by the filter envelope. You won’t hear the effect unless the oscillator is set to a pulse waveform.

**LFO**

The LFO used in the Mono Synthesizer app is in fact SID oscillator #3 running at a lower frequency rate. It can be used to modulate several parameters and set to operate in any of the four standard SID waveforms.

As an extra feature you can synchronize the LFO to the internal or external (MIDI) clock.



**Frequency**

You can set the frequency of the LFO in 255 steps. At zero the LFO stops completely. The LED in the lower right corner of the LFO section blinks whenever the LFO cycle is in its upper range. That way you can monitor the LFO speed. If LFO sync is activated, the number displayed in the **FREQ** knob represents the length of a full LFO cycle.

**Amount**

With the amount parameter you decide how much LFO modulation to apply to the various destinations. Zero means no modulation. When using modulation wheel in MIDI mode any non-neutral position will override this setting.

**Waveform**

Selects any of the four SID waveforms: Saw tooth, Triangle, Square or Noise (random).

**Frequency**

You can set the LFO to modulate the frequency of either oscillator A, B or both. A common use for this is when creating a vibrato.

**Pulse Width**

This parameter routes the LFO amount to the pulse width of either oscillator A, B or both. By modulating the pulse with a lower frequency rate, classic C64 pads and bass sounds come to life.

**Filter**

Toggles the filter cutoff frequency as LFO destination.

**Trig**

Activating the LFO to trig means that it restarts whenever a new note triggers (not legato notes).

**Sync**

The S-button switches the LFO to sync mode. LFO oscillation is now synchronized with the internal or external (MIDI) clock. With this you can create cool LFO sweeps in sync with the music.

## ***How to Improve Audio Quality***

When using the SID circuit inside the Commodore 64, the computer's graphic chip (the *VIC*) adds a significant amount of noise in the audio chain.

The easiest way to reduce the noise is to blank out the screen. In the Mono Synthesizer, the screen goes blank whenever you press the **SPACE BAR** key. Press it again and it reappears.

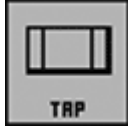
A convenient way to put this off your checklist when recording is to make use of the automatic blank-screen feature. It blanks the screen whenever the sequencer starts playing and brings it back when it stops. External or internal sync mode does not matter, it works in both modes. You find the setting in the general controls as a monitor icon.



In MIDI mode the screen goes blank no matter the blank screen setting.

## Tap

You can test the sound at any time by pressing the tap button (**RETURN** key). This produces a middle-C tone as long as you keep the tap button depressed. It's a great way to quickly test your current patch.



The tap feature works in normal mode only.  
It is disabled when Mono Synthesizer is set to external sync mode.

## Second SID

Mono Synthesizer mirrors all sound parameters onto a second SID. If you have one installed (like with the SID2SID circuit board) you can hear the sound coming out of both SIDs.

You do not need to activate anything as long as it's correctly installed it plays back the same audio.

Use it to play fat unison leads or pan hard left/hard right for some stereo SID sounds or simply choose the SID you think sounds the best.

## Detune

The rightmost setting in the General Controls section is a detune setting that sets the pitch slightly off center in each direction for SID #1 and #2. Detuning may affect other oscillator tunings in the current patch as well. When set to zero no detune is applied.



## Using Control Change

Mono Synthesizer MIDI mode enables you to control all the sound parameters via MIDI with control change messages. In the *MIDI Controller List* chapter you will find a complete list of the control change numbers and values accepted.

MIDI control change messages accept a value between 0 and 127. As you may have noticed, some of Mono Synthesizer's knobs range from 0 to 255. This is true for LFO frequency, oscillator pulse and filter cutoff frequency.

There are three different ways of altering these parameters via control change messages:

- Quick* applies your value multiplied by two. You reach the full range but misses every second value.
- Lower* applies the value directly but only gets up to 127 as top value.
- Upper* applies the value + 128. That way you reach the upper range 128-255.

Using *Lower* and *Upper* together you can reach the full range in intervals of one. If you need quick tweaking across the full scale and settle with half the resolution, go for the *Quick* option.

Remember to make some room in between messages when sending control change messages to the MSSIAH Mono Synthesizer. It accepts cc-messages with an interval of approximately 2 ms. That means you shouldn't put two control change messages on the same MIDI event.

## The Pattern Sequencer

### Playing Patterns

Playing patterns on the Mono Synthesizer is pretty straightforward. If you are only interested in using the Mono Synthesizer for MIDI playing you can skip this and the next chapter.

### Open the Demo Patterns

To have some patterns to play around with you can start by opening the demo project patterns. The demo contains both sounds and patterns to try out the software. Now we will only open the patterns.

Enter the Setup Screen using the **CTRL** key. Then, using the **CRSR** keys to navigate and **RETURN** key to select, choose to *Open* in the *FILE* menu.

Now select the last item, *DEMO*, select *PATTERNS* and press **RETURN** key. Press **Y** key to confirm when asked if you are sure to load the demo.



Loading is ready in a split second. Use ← key to return to the Main Screen.

### Select Patterns

Mono Synthesizer memorizes a total of 64 patterns organized into four groups. With a specific group selected you can play any of its 16 patterns. Patterns are arranged into sections of two with eight patterns in each section.



To select a pattern use keys **1 - 8**.



To switch sections use key **A** for section *A* and **CLR/HOME** for section *B*.

Selecting a pattern while another one is playing will put the next one on hold until it's time to play it. Patterns that are currently playing flash in sync with the current tempo. Patterns put on hold do not flash until they start playing.

### Run Mode

Press the **RUN/STOP** key to start playing. The LED on the run/stop button lights to indicate that the 'machine' is now in run mode. Press **RUN/STOP** key again stop playing.



up  
to

If Mono Synthesizer is synced to MIDI clock then the pattern sequencer starts when the MIDI master device sends a start signal. The run/stop button has no effect.

## Tempo

You set the internal tempo in the general controls section. The BPM value displayed is an estimated value.



If you are running the software on an NTSC-machine, make sure to adjust the system setting to NTSC (see the *Settings* chapter for more info).

## Shuffle

The shuffle setting is next to the tempo setting.



Shuffle alters the 'swing' of the playback with various amounts and manipulates the sync signal accordingly. Too high a shuffle set at higher tempos may cause drop outs.

## Chain Play

You can play a row of up to eight consecutive patterns by holding down the key for the first one and then the last one. The row of patterns lights up with the active one flashing.

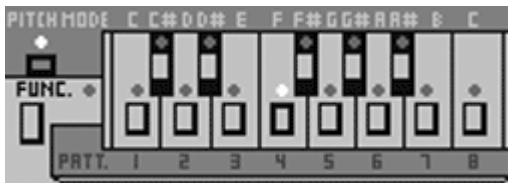


When selecting new patterns or a new chain of patterns Mono Synthesizer first plays through the old row of patterns before moving on to the next.

## Transpose

Press and hold **F5** key to enter transpose mode while playing.

While holding F5 key, select a note for the transpose with the upper C64 keyboard.



The selected transpose starts at the next measure. If a whole chain of patterns are active the transpose starts at the next round.

When you restart the sequencer, the transpose value is reset to normal (none).

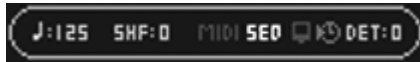
Release the **F5** key to exit transpose mode.

**Note:**

*Tips!* If you want to start the transpose immediately without waiting for the next measure, hold down the **RIGHT SHIFT** key while pressing the transpose key (**F5**).

**External Synchronizing**

You can choose to synchronize the Mono Synthesizer's pattern sequencer with an external MIDI clock signal or a Sync24 signal input on the user port.



To activate external synchronization use the general controls and move the cursor to the clock icon. When active, the clock icon lights up in blue color.

Mono Synthesizer is now in slave mode and responds to MIDI start and stop and plays in time with your MIDI clock.

In the sync settings on the setup screen (see the *Settings* chapter) you can choose to use a Sync24 signal fed through the user port instead. Read more about hooking up Sync24 gear to the MSSIAH in the booklet *MSSIAH - Getting Started* (available for download on our site).

**External Pattern Select**

All sixteen white keys between C<sub>1</sub> and D<sub>3</sub> on your MIDI keyboard correspond to pattern 1 to 16 in the current group. It is possible to play this on the MIDI receive channel during external MIDI synchronization and have the Mono Synthesizer change pattern accordingly.

For this to work the Mono Synthesizer's sync mode must be set to *MIDI+PSEL* in the sync settings (see the *Settings* chapter).

## Editing Patterns

Editing patterns with the MSSIAH Mono Synthesizer is much like using the Roland TB-303's step sequencer. Even though beginners find the concept a bit confusing at first, it is quite simple once you learn how to use it.

If one seeks to create different harmonic textures that stand out, the TB-303 way of editing surely is a good place to start. Mono Synthesizer offers some extra help by laying out the time code visually.

The procedure is to first enter the notes included in the pattern. Second is to edit a time line, i.e. when and where to trigger the notes. This is quite the opposite of other sequencers where notes and time lines are blended together (like grid editors).

Note and time edits affect the currently selected pattern. When chaining patterns only the first one will be edited.

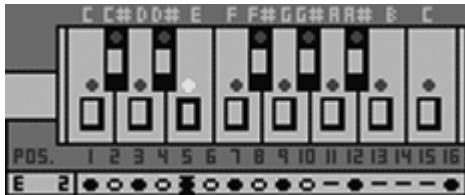
### Pitch Mode

The notes are entered into the pattern in Pitch Mode. Enter Pitch Mode by pressing the **F1** key.



Pitch mode disables sound parameters and general controls. All you can do is enter the notes into the selected pattern. The pitch mode LED lights up and the normal mode LED goes out.

A pattern contains up to 16 notes. As you press the keys **Q 2 W 3 E R 5 T 6 Y 7 U I** on the upper part of the keyboard you input the note into the pitch storage of the pattern. The note counter increments until it reaches 16 and flips over to the first note again. You can reset the counter manually at anytime by pressing the pitch mode button (**F1** key) once again. New notes entered overwrite old ones.



The note LED lights up when you press the corresponding key. You can see the current note and octave in the lower left corner.

Pressing the octave buttons (+ - £ keys) together with a note button toggles the note's octave.



Using the Tap (**RETURN** key) and Back (**INST/DEL** key) buttons can step through the note data back and forth without altering the notes. Press and hold the Tap button and you can alter the octaves and slide for the current note. Read more about the slide further down this chapter.

### Play or Hold

The Sync window on the Setup Screen provides two different settings for handling audio playback during Pitch Mode or Time Mode edits.



*HOLD* means that audio is stopped if the sequencer is running and all your edits echo its sound to the audio output.

*PLAY* means that your edits are silent. Audio is still controlled by the sequencer and the pattern continues to play during editing.

Regardless of what you use the sequencer still stays in sync with the current clock source. Exiting Pitch or Time mode after editing using *HOLD*, the sequencer “catches up” and still plays in sync with the rest of your gear.

Note that even if a chain of patterns is playing, only the first pattern in the chain is the one that is actually being edited.

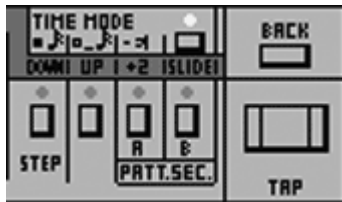
## Time Mode

After entering a set of notes into the pattern it is time to create the time line.

The length of the time line is equal to the pattern length. Each step defines whether to:

- Trig a new note (i.e., pick the next one from the list of notes you entered in Pitch Mode)
- Pause 1/16th step and hold (tie) the previous note
- Pause playing, no sound for 1/16th step.

Enter Time Mode by pressing **F3** key. If the sync setting in the Setup Menu is set to *HOLD*, the sequencer stops running when entering Time Mode.



Use the following keys to define the timing information for each 1/16th note:

- + key Trig note
- key Pause and hold
- £ key Pause and silence

It is not possible to insert a pause-and-hold after a silent pause. The Time Mode editor adjusts this automatically.

Use Tap button (**RETURN** key) to step forward in the editor. The corresponding LEDs light up and display the time data for each step. Step backwards using the **DELETE** key.

When the step counter has reached the pattern length, Time Mode exits back to Normal Mode. If you wish to do this manually at anytime, press the Normal Mode button (**F7** key).

## Slides / Octaves

If you press and hold the Tap button (**RETURN** key) in pitch mode, slides and octaves are toggled with the following keys:

- DOWN** button (+ key) one octave down
- UP** button (- key) one octave up
- +2** button (£ key) two octaves up
- SLIDE** button (CLR/HOME key) slide

Whenever the sequencer plays a note that contains a slide, it instantly starts to slide from the previous note. However, if the note was preceded by a silent pause the slide is ignored, obviously, and the note triggers as normal.

## ***Pattern Length***

Pattern lengths are variable in 16 steps. You set the length pressing and holding Normal Mode button (F7 key) and tap the DOWN button (+ key) the number of times its new length.

E.g., if you wish the pattern to be 12 steps long, press and hold F7 and tap the DOWN button twelve times.



All patterns default to a length of 16 at startup.

## ***Graphic Note and Time Line Display***

When both Time and Pitch Mode are active the graphic note and time display below the sequencer's keyboard becomes visible and shows the timing information with a cursor at the current position.



The symbol represents:

- Trig note
- Pause and hold
- ⊘ Pause and silence

By looking at the graphic display you can quickly see where and what you are editing.

In Time Mode, as you are tapping back and forth, the note at the current position is displayed in the lower left corner next to the time line.

In Pitch Mode, as you go back and forth and enter notes, the cursor moves to the next trig position.

## ***Insert and Delete***

To insert a note or time information, place the cursor where you want the insertion and press:

**RIGHT SHIFT** key and **INST/DEL** key.

Pitch mode inserts the same note as on the current position.

Time mode inserts the same time code as on the current position. If it's a note it also inserts the same note as on the current position.

To delete, place the cursor where you want the deletion to take place and press:

**COMMODORE (C=)** key and **INST/DEL** key.

The remaining pattern data to the right of the cursor is shifted one step to the left into the cursor's position.

Note that as you can only place the cursor on notes in Pitch Mode you need to enter Time Mode to insert and delete pauses.

### **Cut / Copy / Paste**

Cut-Copy-Paste operations are performed by pressing and holding the PATT.CLR button (← key) together with the pattern you wish to cut, copy or paste into.



The screen border turns gray and the software stops and awaits your choice of action. Then press:

- **X** key                      to cut the pattern selected. The pattern is erased and its content is placed into the copy buffer.
- **C** key                        to copy the pattern selected. The pattern is left untouched but its content is placed into the copy buffer.
- **V** key                        to paste the copy buffer data into the pattern selected.
- **RUN/STOP** key            Cancel operation

As you can see Mono Synthesizer uses the same standard keys like any other PC operating system for cutting, copying and pasting so it's quite easy to remember.

When you have performed the copy/paste the screen border returns to black and you regain control of the program.

## Settings

The Mono Synthesizer settings, i.e., MIDI, controls, synchronization etc., are available in the Setup Screen. Access the screen by pressing the **CTRL** key and use the **CRSR** keys, ← key and **RETURN** key to navigate, cancel and select action.

### Controls

Pot/Joy settings were covered earlier in this manual. Check out the section *Select Control* in the chapter *User Input Controls* to learn how to select controls for this application.

### Synchronization



#### Sync

Sync selects the input for synchronization to play the sequencer patterns via MIDI.

<i>MIDI CLK</i>	MIDI clock through the MIDI Input of the MSSIAH MIDI interface on the cartridge
<i>MIDI + PSEL</i>	MIDI clock + pattern select
<i>USER PORT</i>	Use Sync24 input on the user port

When Mono Synthesizer is switched to external sync mode these settings determine how the program responds to external sync signals.

The *MIDI+PSEL* accepts MIDI note input on the MIDI receive channel (see the *MIDI Mode* chapter). Any white key between C<sub>1</sub> and D<sub>3</sub> corresponds to pattern 1-16 in the current group.

The *USERPORT* option makes Mono Synthesizer respond to a Sync24 signal fed into two dedicated pins on the user port. That way you can slave the application to units such as the TR-606, TR-707 etc.

Read more about Sync24 and the user port in the booklet *MSSIAH – Getting Started*, download it on [www.mssiah.com](http://www.mssiah.com).

#### Tics

Tics refer to how many tics of the sync clock it takes to play a full beat. A value of 24 is the standard sync rate whereas 48 makes the Mono Synthesizer play at half speed thus needs the double tempo to keep up.

48 tics is a great way of getting some extra shuffle resolution but it requires your master sequencer to play at double speed.

#### On Edit

This parameter controls the behavior of the pitch and time modes.

If you select *PLAY* the notes you play or tap do not echo and the sequencer continues playing. Live changes while the pattern is playing are possible.

*HOLD* means that the pattern sequencer stops and you will be able to hear the notes play back when entered or tapped.

### **Release**

This parameter decides how to deal with note offs in MIDI and the pattern sequencer.

If you select *NORMAL* the sequencer trigs off notes in a normal fashion.

If you select *INIT ENV* the envelope is initialized (“hard restart”).

Read more about initializing envelopes in the section *Initialize Envelopes* in the *Edit Sounds* chapter.

### **System**

Commodore 64s came in two different versions, one for the NTSC TV-system and one for the PAL TV-system. Since NTSC versions run a little faster and play music at a slightly higher pitch, it's a good idea to adjust the Mono Synthesizer to whatever system your computer was built for. So how do you know what system your C64 is adapted to? Well, it's a matter of knowing what type of TV-system your country/region has got. Generally one can say that most countries in Europe run the PAL system whereas North America and Japan use NTSC.



### **Slide Time**

The slide time is adjustable in four steps on the Mono Synthesizer.

That means it can be used both as a legato portamento effect as well as a 303 slide.

A setting of 3 (default) is equal to the TB-303 slide.

### **MIDI**

Check out the chapter *MIDI Mode* for more info on MIDI settings.

## Advanced Random Composer

The Advanced Random Composer (A.R.C.) is a built in randomize feature where you can create harmonically interesting results from a set of rudimentary input parameters.

The program then uses those parameters to fill a pattern with total random notes, though pre-determined out of your settings.

The result can be anything from totally awesome new inspiring music to a complete mayhem, it all depends on your inputs.

Your C64 needs to be equipped with a fully operational SID in the original socket (SID oscillator #3 is used to obtain random numbers).

The A.R.C. is located in the Setup screen. Press the **CTRL** key to access it and then use the **CRSR** keys to navigate to the *A.R.C* menu.

Random patterns are created by first telling the A.R.C. how to operate (*Settings*) and then executing the randomizer itself (*Random!*).



### Lock Notes

Use the upper and lower part of your C64 keyboard to toggle the notes you wish to include in the randomize process.

Press **CLR/HOME** key to clear all selected notes.

### Length

The length parameter determines how many notes that will be included in the pattern. Select any number of notes in between 1 and 16. If you choose RND, the A.R.C. makes a random decision for you instead.

**LENGTH :** RND

### Range

The locked notes can also be randomly placed in any octave. By setting a range of 1 to 3 octaves, you increase the octave span used in the random process.

**RANGE :** 3

### **Slide**

Select whether to include a random slide or not.



### **Accent**

Accent is a feature of the MSSIAH Bassline. It is not available on the Mono Synthesizer.

### **Group/Section/Pattern**

Select which pattern to use for the random process by choosing *Group* (1-4), *Section* (A/B) and *Pattern* (1-8). The currently selected pattern is automatically pre-selected when entering the Setup screen. If you change the selected pattern in the A.R.C. it also changes the selected pattern on the Main Screen.



### **Random!**

When you have completed the A.R.C. settings, enter the *Random!* menu item in the *SETTINGS* menu and the random process starts.

Note that if you haven't locked any notes for this process, the task exits.



When the A.R.C. is done creating your random pattern it automatically opens it with the editor window.



### **Example**

Look at the picture of the overall A.R.C. settings in the top of this chapter and input the same parameters. Those settings have proved to produce interesting results more than often. Try it out, add some notes, try it with and without slide.

Learn to use the Advanced Random Composer as a tool to complement your creativity, or for that matter, a last minute help in absence thereof.

### **Editor**

There is an alternative way of editing patterns featured in the A.R.C.

It is opened automatically when a random pattern has been created. You can open it manually by selecting the *Edit* item in the *A.R.C.* menu.

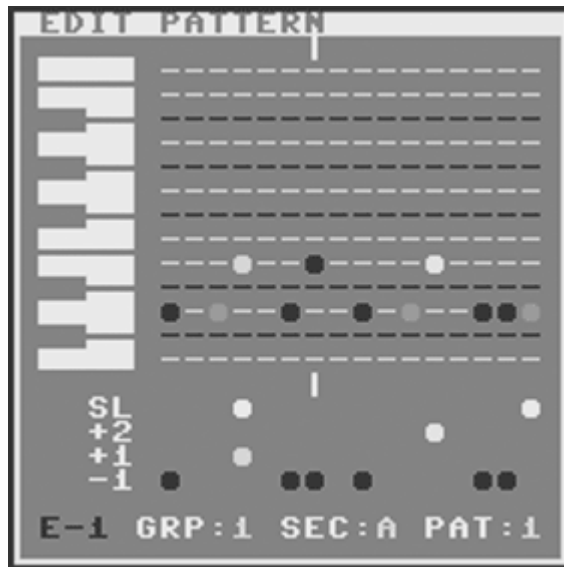


The editor is a simple form of piano-bar grid editor where the horizontal positioning of the 'dot' represents the timing and the vertical position its note value.

### ***Navigating***

Use the **CRSR** keys to move the cursor forward and backwards. The cursor is the vertical bar just above and below the grid. The lower left corner of the window shows the note value at the current position in plain text.

Each note octave is represented by different colors. Blue notes reside one octave down, green notes are played back at normal pitch whereas light green notes are transposed one octave up and yellow ones are the ones in the highest octave (+2).



### ***Delete***

If you press the **INST/DEL** key all the notes to the right are shifted one step to the left overwriting the note at the cursor's position.

Note that even the pattern length is decreased at the same time. If you wish to keep the same pattern length you will need to make the appropriate insertion to make up for the shortened length.

### ***Insert***

Insert is the opposite of delete. When inserting a note, all the ones to the right are pushed one step forward. Use **RIGHT SHIFT** key together with the **INST/DEL** to perform an insertion. As you make the insert, the rest of the pattern is moved one step to the right and leaves an open space at the cursor's position for you to insert a new note. Notes that are pushed out of the window are lost.

### ***Clear Pattern***

Press **RIGHT SHIFT** key and **CLR/HOME** key to clear the whole pattern. You are asked to confirm your choice before the pattern is cleared.

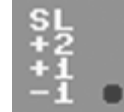


### **Alter Notes**

Use the note keys (**Q2W3ER5T6Y7UI**) to alter the note value at the cursor's position. Octaves and slides are not affected.

### **Octaves**

Use **+**, **-** and **£** keys to toggle the octave on the note at the cursor's position. If you try this at a point where there is no note, no data is changed.



### **Slides**

Use **CLR/HOME** key to toggle a slide for the note at the cursor's position. If there is no note there, no data is changed.

### **Change Pattern**

When you start up the editor it holds the current pattern selected. You can change this at any time.

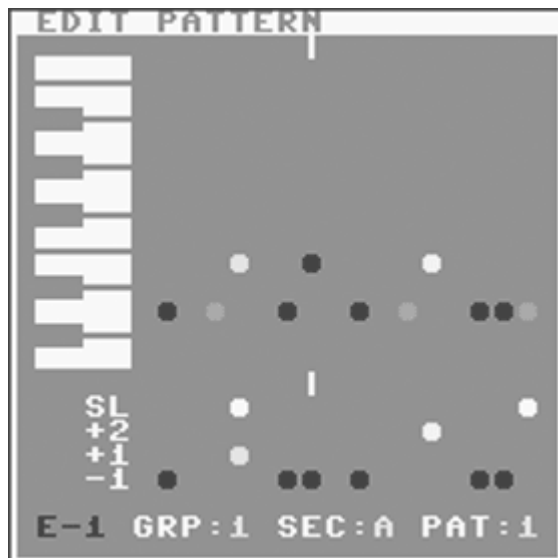
- F1/F2** keys     change banks
- F3** key         toggle section A/B
- F5/F6** keys    select pattern

**GRP:1 SEC:A PAT:1**

If you change the pattern in the editor, it stays selected as you return to the Main Screen.

### **Toggle grid**

You can toggle the grid on/off by pressing the **F7** key.



## Files

Press **CTRL** key to open the setup screen. From here you access the Mono Synthesizer file operations. Use **CRSR** keys and **RIGHT SHIFT** to navigate and **RETURN** key to execute a function/select file etc. Use ← key to cancel/step back.

### Media

Mono Synthesizer supports loading and saving data from disk or tape.

#### Disk

All disk operations start by asking you to choose device number:



Unless you have changed your disk drive's device number, 8 is default, use **CRSR** keys to change device number.

Loading from disk means that a directory window opens with a list of valid files on your floppy. You then select the file you wish to load.

The directory window shows the amount of free blocks in the upper right corner.



The file operations for the floppy drive make use of the operating system's basic disk functionality. There are no delete-functions and no replace-and-save options built in. If you try to save the file onto disk using an already existing name the save is interrupted and the drive light flashes.

When reading the directory the correct type of files is automatically collected.

If there are no files of that particular type on the disk you will get a *No Files* error. It does not necessarily mean that the disk is empty rather than empty of that type of files.

The file type depends on the file operation you selected, whether it's a full project load or a specific import.

**MSSIAH Mono Synthesizer File Types:**

File suffix	Disk space	Tape no.	Size	
<i>.P64</i>	11 blocks	≈ 23	2.5 Kb	Mono Synthesizer project
<i>.PAT</i>	1 block	≈ 7	< 1 Kb	Single pattern export
<i>.PCH</i>	1 block	≈ 6	< 1 Kb	Single patch export

Pattern export files are compatible with the MSSIAH Bassline and vice versa.

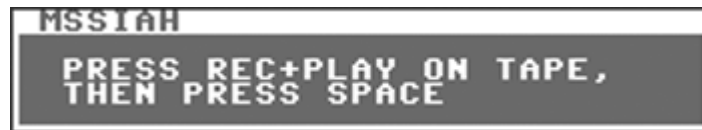
**Note:** the suffix *.P64* comes from its predecessor the *Prophet64* ([www.prophet64.com](http://www.prophet64.com)). MSSIAH Mono Synthesizer reads Prophet64 Mono Synthesizer *.p64* files.

**Tape**

The tape functions are standard C64 and not turbo tape.

A small modification bypasses the regular start and record button sensitivity so that it's up to the user to initiate the start of a tape load or save.

This opens up the possibility to modify a digital audio source to replace the standard 1530 datasette unit.



Whenever loading and saving you will have to press **SPACE** key on the C64 to make the computer start the load/save.

When loading, Mono Synthesizer checks the type of the file found. If the file suffix does not match the correct one, loading is interrupted and you are notified.

If the file type is correct, loading automatically continues and the screen color turns green to confirm that the file is ok.

**Note:**

The tape motor is shut off at all times until you request a load or save. As the dialog box asks you to start recording or playing it is finally switched back on.

You probably need to rewind or forward the tape to the right position before loading or saving so now is the time to do so. Since the datasette buttons are not being sensed, pressing rew/ffw will not trigger the load/save. Only the **SPACE** key does.

## Opening the Demo Files

To open the demo patterns or patches:

- Select *Open* in the *FILE* menu.



- Navigate with the **CRSR** keys to the menu item *DEMO*.



- Press **RETURN** key to select to open the demo project.
- Choose whether to load the demo patterns or demo patches #1 (leads) or #2 (bass sounds).



- Press **Y** key or **RETURN** key to confirm. The **N** key or **←** key cancels.
- When loading is done (takes a split second) press **←** to return to the Main Screen.

## Save Project

A project save includes all the patterns and patches and as well as control settings.  
Make sure to save often to avoid losing your work!!

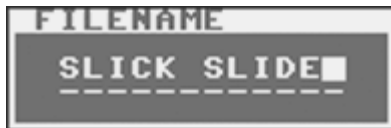
To save a Mono Synthesizer project:

**Disk:**

- Select *Save* in the *FILE* menu.



- Use **CRSR** keys and select *DISK* as media source and press **RETURN** key.
- Enter a non-existing filename in the filename dialog.



You can use all letters from *a-z* and *0-9* as well as some additional characters. Use **INST/DEL** key with and without the **LEFT SHIFT** key to insert/delete text. Press **RETURN** when ready or ← to cancel and go back.

- Select device (8 is default)
- File saves onto disk. After saving is done press ← key to return to the Main Screen.
- If the disk already contains a project file with the same filename the drive light flashes and you are notified with a Save Error message box.

**Tape:**

- Select *Save* in the *FILE* menu.
- User **CRSR** keys to select *Tape* as media source and press **RETURN** key.
- Enter a filename in the dialog and press **RETURN** when ready or ← to cancel.
- A dialog box asks you to press **REC+PLAY** on your tape recorder and then press **SPACE** key to start the save. The tape motor is now unlocked for you to first rewind or forward the tape to the correct position.
- Press **SPACE** key to start saving.
- Screen goes blank while saving.
- When saving is done press ← key to return to the Main Screen.
- You can break the save operation anytime during saving by pressing the **RUN/STOP** key.

**Open Project**

To open a Mono Synthesizer project:

**Disk:**

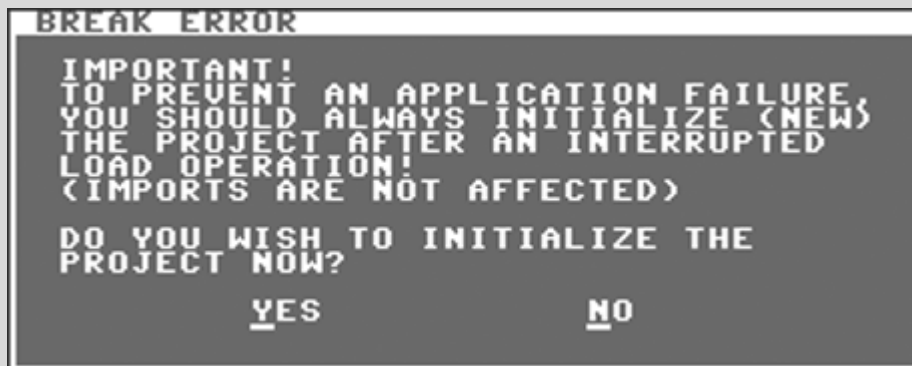
- Select *Open* in the *FILE* menu.



- Insert the disk with the project file you wish to open.
- Use the **CRSR** keys to select *DISK* as media source and press **RETURN** key.
- Select device (8 is default)
- Wait until the directory is loaded.
- In the directory window use **CRSR** keys to navigate to the file you wish to load and press **RETURN** key to start loading. If you wish to cancel press ← key to go back one step. If there are no files on the disk you will be notified by a message box saying *No files*. In that case press ← key to go back, insert a new disk and try again.
- When the file is loaded you press the ← key to exit the files screen.

**Note:**

***Important!*** If you interrupt a load process of a Mono Synthesizer project you are warned that the application could suffer from an unrecoverable failure. While this is a major case for the Sequencer application it is of lesser importance for the Mono Synthesizer. To not cause misbehavior of the application you are advised to initialize memory if you for any reason have interrupted a load operation.



Press **Y** key or **RETURN** key to go through and initialize the memory.

If you do not carry out this initialization now you can do it later at any time with the *New* function in the *FILE* menu.

This message pops up if you interrupt an import also. However, imports cannot do any harm whatsoever so you can just ignore it.

## Export Pattern

You can export the full content of a pattern onto disk or tape.

The exported pattern can be imported back into the Mono Synthesizer and Bassline editions.

To export a pattern:

- Select *Export* in the *FILE* menu.



- Use **CRSR** keys to select to export a pattern then press **RETURN** key.



The pattern that is exported is the current pattern selected in the Main Screen.

If you have selected a chain of patterns only the first one is exported.

- Continue to read the section for your media choice below:

### Disk:

- Use **CRSR** keys to select *Disk* as media source and then press **RETURN** key.
- Enter a non-existing filename in the filename dialog. You can use all letters from *a-z* and *0-9* as well as some additional characters. Use **INST/DEL** key with or without the **LEFT SHIFT** key to insert/delete text.
- Press **RETURN** key to start saving or ← to cancel.
- Select device (8 is default)
- When done saving, press ← key to return to the Main Screen.
- If the disk you have inserted already contains a pattern file with the same name the drive light flashes and you are notified with a Save Error message box.

### Tape:

- User **CRSR** keys to select *Tape* as media source and press **RETURN** key.
- Enter a filename in the dialog and press **RETURN** when ready or ← to cancel.
- A dialog asks you to press **REC+PLAY** on your tape recorder and then press **SPACE** key to start the save. The tape motor is now unlocked for you to first rewind or forward the tape to the correct position.
- Press **SPACE** key to start saving.
- Screen goes blank while saving.
- When saving is done press ← key to return to the Main Screen.
- You can break the save operation anytime during saving by pressing the **RUN/STOP** key.

## ***Import Pattern***

Exported patterns can be imported into existing ones. Even exported Bassline patterns are compatible (except for the accent data).

The pattern is imported into the currently selected pattern on the Main Screen. Selecting a chain of patterns does not matter, the import loads into the first one in the chain.

To import a pattern:

- Select *Import* in the *FILE* menu.



- Use **CRSR** keys to select to import a pattern then press **RETURN** key.
- Press **RETURN** key and continue to read the section for your media choice below:

### **Disk:**

- Use **CRSR** keys to select *Disk* as media source and then press **RETURN** key.
- Select device (8 is default).
- Select a file in the directory list.  
(If the disk you have inserted does not contain any pattern files you are notified with the *No files* message box.)
- When done loading, press ← key to return to the Main Screen.

### **Tape:**

- Use the **CRSR** keys to select *Tape* as media source and press **RETURN** key.
- A dialog asks you to press **PLAY** on your tape recorder and then press **SPACE** key to start loading. The tape motor is now unlocked for you to first rewind or forward the tape to the correct position.
- Press **SPACE** key to start loading and the screen goes blank.
- When a pattern file (*.PAT*) is found the screen color turns green and the file continues to load. If a different file type is found the operation is halted.
- When loading is done press ← key to return to the Main Screen.
- You can break the load operation anytime during the load process by pressing the **RUN/STOP** key.  
However, this opens the initialize screen asking you to clear the memory. Read more about it in the *Open Project* section.

## ***Export Patch***

You can export a patch including all the sound parameters onto disk or tape.



To export a patch:

- Select *Export* in the *FILE* menu.
- Use **CRSR** keys to select to export a patch then press **RETURN** key.



The patch that is exported is the selected one in the Main Screen.

- Continue to read the section for your media choice below:

#### **Disk:**

- Use **CRSR** keys to select *Disk* as media source and then press **RETURN** key.
- Enter a non-existing filename in the filename dialog. You can use all letters from *a-z* and *0-9* as well as additional characters. Use **INST/DEL** key with or without the **LEFT SHIFT** key to insert/delete text.
- Press **RETURN** key to start saving or ← to cancel.
- Select device (8 is default).
- When done saving, press ← key to return to the Main Screen.
- If the disk you have inserted already contains a patch file with the same name the drive light flashes and you are notified with a Save Error message box.

#### **Tape:**

- User **CRSR** keys to select *Tape* as media source and press **RETURN** key.
- Enter a filename in the dialog and press **RETURN** when ready or ← to cancel.
- A dialog asks you to press **REC+PLAY** on your tape recorder and then press **SPACE** key to start the save. The tape motor is now unlocked for you to first rewind or forward the tape to the correct position.
- Press **SPACE** key to start saving.
- Screen goes blank while saving.
- When saving is done press ← key to return to the Main Screen.
- You can break the save operation anytime during saving by pressing the **RUN/STOP** key.

### ***Import Patch***

An exported patch can be imported back into any of the eight patches in the Mono Synthesizer. The current patch selected on the Main Screen is used as destination when importing.

To import a patch:

- Select *Import* in the *FILE* menu.
- Use **CRSR** keys to select to import a patch then press **RETURN** key.
- Press **RETURN** key and continue to read the section for your media choice below:

#### **Disk:**

- Use **CRSR** keys to select *Disk* as media source and then press **RETURN** key.

- Select device (8 is default)
- Select a file in the directory list.  
(If the disk you have inserted does not contain any patches you are notified with the *No files* message box.)
- Press **RETURN** key to start loading or ← to cancel.
- When done loading, press ← key to return to the Main Screen.

**Tape:**

- Use the **CRSR** keys to select *Tape* as media source and press **RETURN** key.
- A dialog asks you to press **PLAY** on your tape recorder and then press **SPACE** key to start loading. The tape motor is now unlocked for you to first rewind or forward the tape to the correct position.
- Press **SPACE** key to start loading and the screen goes blank.
- When a patch file (*.PCH*) is found the screen color turns green and the file continues to load. If a different file type is found the operation is halted.
- When loading is done press ← key to return to the Main Screen.
- You can break the load operation anytime during the load process by pressing the **RUN/STOP** key.

However, this opens the initialize screen asking you to clear the memory. Read more about it in the *Open Project* section.

## Example Guide to Editing Patterns

For beginners, the concept of pattern editing might be a bit confusing at first. A neat help on the way to master the skills of 303 pattern editing is real world examples:

### - Example 1 – Michael Jackson, "Thriller"

The first example uses the classic bass line that is repeated throughout the 1982 Michael Jackson hit song "Thriller". The musical score looks something like this:



Translated to Mono Synthesizer pitches and time lines it looks like this:

-C# MINOR, sixteen steps-

Pitches:

**B C# E F# C# C# C#**

Time line:

**ON-OFF-ON-OFF-ON-OFF-ON-OFF-ON-OFF-PAUSE-ON-PAUSE-PAUSE-PAUSE-ON**

The first and sixth notes are played in the lowest octave.

- Select an empty pattern with **1 - 8** keys.
- Enter Pitch Mode with the **F1** key.
- Enter all the notes with the following keys: **U 2 E 5 2 2 2**
- Enter the octaves: Press **F1** key once to rewind pitch mode counter, press and hold the **RETURN** key and then press the + key
- Tap (**RETURN** key) forward to the sixth one, hold the tap button and press + key.

The notes are now entered. Move on to the time line:

- Enter Time Mode with **F3** key.
- Enter timing values with keys: **+ - + - + - + - 1 + 1 1 1 +**  
This will correspond with the time line of on, offs and pauses that we picked out from the score earlier.

Hit **RUN/STOP** key or, if synced externally, start the master sequencer and listen to the result.



## Key Map

A full overview of keys used in the MSSIAH Mono Synthesizer (US/English keyboard).

### General Keys:

<b>RUN/STOP</b>	Start/stop playing / Exit MIDI mode
<b>SPACE</b>	Manually blank the screen
<b>F1</b>	Pitch Mode
<b>F3</b>	Time Mode
<b>F5</b>	Transpose Mode
<b>F7</b>	Normal Mode
<b>CTRL</b>	Setup Screen
<b>CRSR keys</b>	Move General Control cursor
<b>COMMODORE (C=)</b>	Alter General Control values
<b>RETURN</b>	Tap (test tone)
<b>←</b>	Pattern clear

### Tone Controls

#### Env mod

<b>Q</b>	Fil Env
<b>W</b>	Freq A / B
<b>E</b>	Pulse Width A / B

#### LFO

<b>A</b>	Frequency
<b>S</b>	Waveform
<b>Z</b>	Amount
<b>X</b>	Frequency A / B
<b>C</b>	Pulse Width A / B
<b>D</b>	Filter Frequency / LFO sync
<b>F</b>	Key Trig

#### Oscillator A

<b>R</b>	Waveforms
<b>T</b>	Frequency
<b>Y</b>	Pulse Width
<b>U</b>	Osc Sync / Ring Modulation
<b>I</b>	Oscillator On / Off

#### Oscillator B

<b>G</b>	Frequency
<b>H</b>	Fine Tune
<b>J</b>	Oscillator On / Off
<b>V</b>	Waveforms
<b>B</b>	Pulse Width

Mixer

**N** Balance  
**M** Volume

Filter

**O** External Filter Input  
**P** Filter Type  
**@** Frequency  
**\*** Resonance  
**↑** Envelope Amount  
**L** Attack  
**:** Decay  
**;** Sustain  
**=** Release

Amplifier

**,** Attack  
**.** Decay  
**/** Sustain  
**RIGHT SHIFT** Release

**Pattern Sequencer Pitch Mode**

**F1** Reset step counter (restart editing)  
**F7** Normal Mode  
**RETURN** “Tap”, one step forward / edit current  
**INST/DEL** One step backward  
**Q2W3ER5T6Y7UI** Note keys  
**+** Toggle -1 octave (down)  
**-** Toggle +1 octave (up)  
**£** Toggle +2 octaves  
**CLR/HOME** Toggle slide  
**RIGHT SHIFT + INST/DEL** Insert note at current position  
**COMMODORE (C=) + INST/DEL** Delete note at current position

**Pattern Sequencer Time Mode:**

**F3** Reset step counter (restart editing)  
**F7** Normal Mode  
**RETURN** “Tap”, one step forward  
**INST/DEL** One step backward  
**+** Note on  
**-** Note off  
**£** Pause  
**RIGHT SHIFT + INST/DEL** Insert note at current position  
**COMMODORE (C=) + INST/DEL** Delete note at current position

## MIDI Implementation Chart

MSSIAH Mono Synthesizer		<b>MIDI Implementation Chart</b>		Version: 1.00
Function		Transmitted *1	Recognized	Remarks
Basic Channel	Default	X	1-16, off	Memorized
	Changed	X	1-16, off	Memorized
Mode	Default	X	Mode 4	
	Messages	X	X	
Note Number:	True Voice	X	24-107 (C <sub>0</sub> – B <sub>6</sub> )	
		X	24-107 (C <sub>0</sub> – B <sub>6</sub> )	
Velocity	Note On	X	9nH, v=1-127	
	Note Off	X	9nH, v=0 or 8nH	
After Touch	Key's	X	X	
	Channel's	X	X	
Pitch Bend		X	o	0-24 semitone steps (14 bit resolution)
Control Change	1	X	o	
	7	X	o	*2
	65-104	X	o	*2
	120	X	o	
	123	X	o	
Program Change:	True #	X	o	
		X	1-8	*2 *3
System Exclusive		X	X	
System Common:	Song pos	X	X	
	Song sel	X	X	
	Tune	X	X	
System Real Time:	Clock	X	o	
	Commands	X	o	Start, Stop
Aux Messages:	All Sound OFF	X	(120) o	Pitch Wheel only
	Reset Cntrl	X	o	
	Local ON/OFF	X	X	
	All Notes OFF	X	(123) o	
	Active Sens	X	X	
	System Res	X	X	
Notes		*1 MSSIAH Cartridge does not transmit MIDI. *2 Values outside of limits are recognized as top or bottom value. *3 Program changes switches patch immediately.		

Mode 1: OMNI ON, POLY  
Mode 3: OMNI OFF, POLY

Mode 2: OMNI ON, MONO  
Mode 4: OMNI OFF, MONO

o : Yes  
X : No

**MIDI Controller List**

No.	Function	Limit	Remarks
1	Modulation Wheel	0-127	
7	Patch Volume	0-15	
65	Envelope Init (hard restart)	0-8	0 = ADSR=0000, Trig=0 1 = ADSR=0000, Trig=8 2 = ADSR=0F00, Trig=8 3 = ADSR=00FF, Trig=8 4 = ADSR=FFFF, Trig=8 5 = ADSR=0F0F, Trig=8 6 = ADSR=reload, Trig=8 7 = ADSR=0000, Trig=9 8 = ADSR=0000, Trig=1
66	Slide Time	1-4	
67	Envelope Modulation	0-31	
68	Envelope Mod Frequency	0-3	0 = None 1 = Frequency Osc A 2 = Frequency Osc B 3 = Both
69	Envelope Mod Pulse Width	0-3	0 = None 1 = Pulse Width Osc A 2 = Pulse Width Osc B 3 = Both
70	Osc A Waveform	0-32	See separate table below
71	Osc B Waveform	0-8	See separate table below
72	Osc A Frequency	40-88	64 = zero
73	Osc B Frequency	40-88	64 = zero
74	Osc B Fine Tune	14-114	64 = zero
75	Osc A Pulse Width Quick	0-127	True #: multiply by 2
76	Osc A Pulse Width Lower	0-127	True #: 0-127
77	Osc A Pulse Width Upper	0-127	True #: 128-255
78	Osc B Pulse Width Quick	0-127	True #: multiply by 2
79	Osc B Pulse Width Lower	0-127	True #: 0-127
80	Osc B Pulse Width Upper	0-127	True #: 128-255
81	LFO Frequency Quick	0-127 *	True #: multiply by 2
82	LFO Frequency Lower	0-127 *	True #: 0-127
83	LFO Frequency Upper	0-127 *	True #: 128-255
84	LFO Amount	0-31	



85	LFO Control	0-3	0 = None 1 = Key Trig 2 = MIDI clk sync LFO 3 = Key Trig + MIDI clk sync LFO
86	LFO Waveform	0-4	0 = None 1 = Sine 2 = Saw 3 = Pulse 4 = Noise
87	LFO Destination Freq	0-3	0 = None 1 = Osc A Frequency 2 = Osc B Frequency 3 = Osc A + B Frequency
88	LFO Destination Pulse + Filter	0-7	0 = None 1 = Filter 2 = Osc A Pulse Width 3 = Osc B Pulse Width 4 = Osc A + B Pulse Width 5 = Filter + Osc A Pulse Width 6 = Filter + Osc B Pulse Width 7 = Filter + Osc A + B Pulse Width
89	Mixer	57-71	57 = A-7, 64 = middle, 71 = B-7
90	Filter Type	0-15	0 = OFF 1 = Lowpass 2 = Bandpass 3 = Highpass 4 = Lowpass + Bandpass 5 = Lowpass + Highpass 6 = Bandpass + Highpass 7 = Lowpass + Bandpass + Highpass 8 = Lowpass + Ext 9 = Bandpass + Ext 10 = Highpass + Ext 11 = Lowpass + Bandpass + Ext 12 = Lowpass + Highpass + Ext 13 = Bandpass + Highpass + Ext 14 = Lowpass + Bandpass + Highpass + Ext 15 = Ext
91	Filter Cutoff Quick	0-127	True #: multiply by 2
92	Filter Cutoff Lower	0-127	True#: 0-127
93	Filter Cutoff Upper	0-127	True#: 128-255
94	Filter Resonance	0-15	
95	Filter Envelope Amount	0-31	
96	Filter Envelope Attack	0-15	
97	Filter Envelope Decay	0-15	

98	Filter Envelope Sustain	0-15	
99	Filter Envelope Release	0-15	
100	VCA Attack	0-15	
101	VCA Decay	0-15	
102	VCA Sustain	0-15	
103	VCA Release	0-15	
104	SID #1 / SID #2 Detune	0-9	
120	All Sound OFF	Any	
121	Reset All Controllers	Any	Resets pitch wheel only
123	All Notes OFF	Any	
Notes			* Limit is 0-13 when LFO runs in clock mode. Use cc #82 to set LFO speed in clock mode since #81 multiplies by 2 and #83 constantly sets top value ('32')

<b>Selectable Waveforms</b> (Control Change #70, # 71)			
	<b>+ Ringmod.</b>	<b>+ Sync</b>	<b>+ Ringmod. + Sync</b>
0 OFF			
1 Sine	9	17	25
2 Saw	10	18	26
3 Pulse	11	19	27
4 Noise	12	20	28
5 Sine + Saw	13	21	29
6 Sine + Pulse	14	22	30
7 Saw + Pulse	15	23	31
8 Saw + Sine + Pulse	16	24	32

MIDI channel and bend ranges are saved in between sessions and even when the computer is switched off if you choose to save your changes when shutting down the MSSIAH.