

PROPHET64

SID MUSIC SOFTWARE

Mono Synthesizer
Bassline
(Free Versions)

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Introduction

The Prophet64 is a suite of synthesizer software for the Commodore 64. It closely resembles user interfaces of old classic synthesizers, sequencers and drum machines.

The objective is however not to emulate but to imitate the characteristics of the classic machines in order to provide a familiar interface to the C64 audio circuit for modern musicians.

The software is distributed on a hardware cartridge that is sold exclusively via the prophet64.com website. There are also three lighter versions of the software available for free. This manual covers two of them, the Mono Synthesizer and the Bassline.

Mono Synthesizer is exactly what the name implies, a monophonic two oscillator synthesizer that unleashes the SID circuit to its fullest as a 'standard' synthesizer. To play the sounds it utilizes a simple TB-303 sequencer with a set of user programmable patterns.

Bassline however, takes the 303 concept a bit further by applying the same philosophy behind the infamous TB-303 on the patterns and sound circuit.

All editions of the Prophet64 suite is controllable with either joystick or a potentiometer ("game paddle") connected to controller port #2 of the C64.

Via the specific s24-64 interface connector in the so called "user port" in the back of the C64, the user can connect a DIN-sync master device and slave the Prophet64 software to an external modern sequencer.

Note: This manual covers the free versions of the Mono Synthesizer and Bassline software. Although they are fully functional including loading/saving and has been available for over two years and downloaded by thousands of users all over the world, they do not fully reflect the commercial software. Bassline for example, has a much more mature audio engine that closer resembles the acid sound of the TB-303 machine*.

User Interface

The user interface of the Prophet64 Mono Synthesizer has three parts, each explained separately in this manual:

- Sound Editor (upper main screen)
- Pattern Sequencer (lower main screen)
- Setup Menu (separate screen for general settings and file operations)

The main screen operates in different modes depending on editing or playing patterns.

- NORMAL MODE playing patterns and edit sounds
- RUN MODE NORMAL MODE when playing. Sound editing is possible.
- PITCH MODE entering notes into the pattern sequencer
- TIME MODE entering a pattern time line

Terms of use

The Prophet64 is free of charge and does not require any license nor registration to use. Prophet64.com preserves the right to distribute, develop and maintain this software explicitly. The program is not to be sold, marketed or in other ways commercially exploited by any third party.

* the purpose is not to fully emulate a TB-303. That would be impossible with a C64 SID circuit.

Playing

Playing patterns works just like on the real TB-303.



It is possible in NORMAL MODE only.
As you leave NORMAL MODE, the keys and functions for playing are deactivated.

Keys for NORMAL MODE:

F1	PITCH MODE
F3	TIME MODE
F5	Transpose
F7	NORMAL MODE
CTRL	Setup menu
RETURN	Tap (test tone)
SPACE BAR	Blank Screen
RUN/STOP	Play pattern (internal sync only)

Additional keys: (TB-edition)

Z	Tempo
X	Shuffle
Right SHIFT	Main volume

Select Pattern



The Prophet64 has two pattern sections each holding eight patterns.
Keys 1 to 8 select pattern to play or edit.

Multiple patterns selected activate a chain play (more on that later) though only one pattern at a time is edited.



Keys **A** and **B** switch pattern section A and B.

1 - 8	Select pattern 1-8
A	Select bank A
CLR/HOME	Select bank B

Run Mode



The **RUN/STOP** key starts and stops playing the current pattern. When playing, Prophet 64 goes into RUN MODE. The RUN/BAT light indicates this. To start playing, Prophet64 must be in NORMAL MODE.

The RUN/STOP key has no effect if the Prophet64 is hooked up to an external sequencer. Starting and stopping is then handled by the master sequencer. Playing is executed as soon as the Prophet64 receives a RUN-signal on the user port.

Chain Play

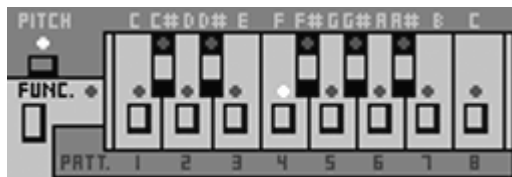
If more than one pattern key is pressed simultaneously, multiple patterns are selected and the



Prophet64 plays them sequentially in what is called a 'chain play'. The real TB-303 limits chain playing to four patterns in a row while Prophet64 plays up to eight. The patterns in the chain must be adjacent, e.g. it is not possible to chain play patterns 1 and 7 only.

Transpose

Pressing and holding key **F5** in NORMAL MODE lights up but does not activate the PITCH



MODE. Any of the keys **Q2W3ER5T6Y7UI** changes key for the current pattern playing on the next measure. As **F5** is released, Prophet 64 falls back to NORMAL MODE.

The transpose function is real time, it does not alter any notes stored in the pattern.

Clear Patterns

Simultaneously pressing **←** and a pattern key (**1 – 8**) activates the clear pattern function. The screen border turns white and waits for key **Y** to confirm or **N** to cancel.

Sound Editing

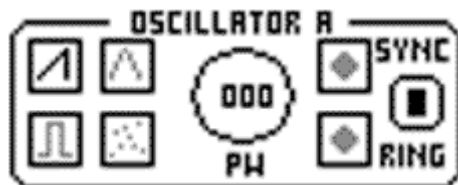
This section explains the sound parameters of the Mono Synthesizer and Bassline briefly. It does not cover the basics of general synthesizer sound editing. Knowledge in basic sound programming is required to grasp these contents (as well as serious Prophet64 editing).

Every sound parameter has it's own key on the C64 keyboard for swift access and the joystick or potentiometer alter the values. Depending on the configuration, the left shift button may have to be pressed to activate the potentiometer. If using a joystick, fire button speeds up value increments/decrements.

Oscillator A

Waveforms

Simple waveform adding is possible on the SID though the only audible option is sine and square waves together. On some SIDs the sine can be replaced with a saw for a somewhat louder result.



Pulse Width

The value of 225 represents a 50/50 square.

Sync, Ring Mod, On/off

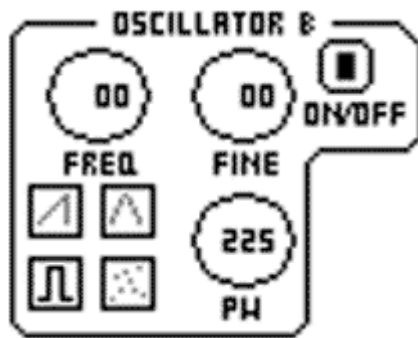
The three buttons toggle Frequency Sync, Ring Modulation and Oscillator A on/off.

When synchronizing osc A and osc B varying the pitch of osc B is required to hear any effect. Ring modulation generally only works with sine waves.

Side note: Oscillator A and B are switched off by pushing the joystick upwards instead of downwards as on all other toggled parameters.

T	Sawtooth/Sine wave (select repeatedly)
Y	Square/Noise wave (select repeatedly)
U	Pulse width
I	Select repeatedly for Sync, Ring Mod, On/Off

Oscillator B



Oscillator B is no different from osc A other than extra parameters to control frequency and fine tune.

Frequency (pitch coarse)

ranges four octaves from -24 to +24 semi notes.

Fine Tune

Fine tune ranges from -50 to +50. Perfect for those widely detuned flat sounds of euro-style pads.

G	Frequency (pitch coarse)
H	Fine tune
J	Osc B on/off
B	Sawtooth/Sine wave (select repeatedly)
N	Square/Noise wave (select repeatedly)
M	Pulse width

Mixer

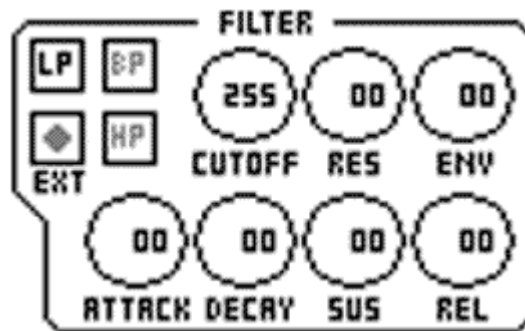


Oscillator balance virtually changes the VCA sustain values on both oscillators. This means only VCA ADSR settings such as 0-0-15-0 will provide a mix/balance result though sustain value does not have to be set at 15.

This is more of a compromise than a correct way of handling oscillator balance. There is not much of a choice as the SID lacks individual oscillator volume controls.

K	Mix (balance)
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VCF



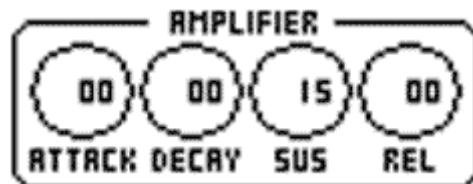
The VCF section controls the C64's filter modes. Either one can be selected or combined together.

EXT routes an incoming signal through the filter.

Envelope amount completely overrides the cutoff setting.

O	Select repeatedly for LowPass, BandPass, HighPass filter
P	Filter external source on/off
@	Cutoff frequency
*	Resonance
↑	Envelope amount
L	Attack
:	Decay
;	Sustain
=	Release

VCA



VCA envelope.

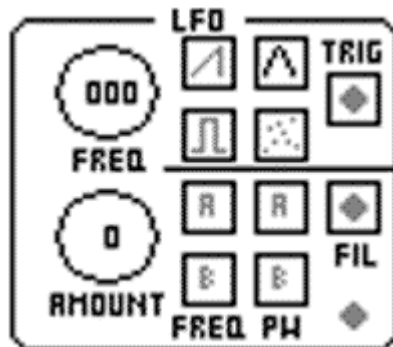
,	Attack
.	Decay
/	Sustain
Shift	Release

A word on the ADSR bug

Anyone who has played around with a really good envelope (such as the ones on the Minimoog and Pro-One) knows the importance of a fast and responsive attack and decay. Unfortunately the SID does not shine when it comes to envelopes. If using decay, attack MUST have a non-zero value. If not, you will experience the envelope bug where notes randomly "hiccup" when triggering.

LFO

The LFO is SID oscillator 3 running silently at a lower frequency. That is why Mono Synthesizer has got only two oscillators.



Frequency / Amount

Frequency sets the speed of the LFO. Amount sets the amount of modulation. It has no effect unless destination is selected.

Waveform

The waveforms are standard SID oscillator waveforms. Adding is not recommended for LFO actions.

Trig

Trig restarts the LFO every time a new note triggers.

Destination

Destinations available are: Oscillator A/B frequency, Oscillator A/B pulse width and Filter frequency.

A	LFO frequency (speed)
Z	LFO amount
S	Sawtooth/Sine wave (select repeatedly)
D	Square/Noise wave (select repeatedly)
F	Retrig LFO on note-on
X	LFO dest. osc. A/B (select repeatedly)
C	LFO dest. pulse A/B (select repeatedly)
V	LFO dest. VCF frequency

Envelope Modulation



The VCF envelope can be applied to either Oscillator A frequency or Oscillator B pulse width.

FIL ENV is the amount of envelope modulation.

Q	VCF envelope amount
W	VCF env. destination Osc. A frequency
E	VCF env destination Osc. B pulse width

Bassline



The set of parameters for the Bassline are exactly the same as on the TB-303. Accent setting only affects accentuated notes.

A	Mix in (external source)
S	Sawtooth wave
D	Square wave
G	VCF cutoff frequency
H	VCF resonance
J	Envelope amount
K	Envelope decay
L	Accent amount

Pattern Editing

Patterns are the heart of the Prophet64. They are edited in exactly the same way as on the TB-303. Experienced 303 users will be well familiar with the user interface.

For a newbie, the procedure can be a bit hard to grasp at first. A good advice is to read the real TB-303 manual that explains the process of pattern editing pedagogically and thoroughly.

303 manuals are available on the web.

The sequence is entered in two steps.

- **PITCH MODE:** Enter the notes
- **TIME MODE:** Enter a time line for the notes.

Pitch Mode

Key **F1** enters PITCH MODE

The light indicates that pitch mode is activated and sound parameters are no longer editable. Entering pitch mode immediately exits RUN MODE if playing.



The keys **Q2W3ER5T6Y7UI** on the C64 keyboard represents each note.

Q equals the note C, **W** equals D and so on..

While entering notes, keys **+**, **-** and **£** toggle octaves -1 octave, +1 octave and +2 octaves. The note and octave buttons must be pressed at the same time.

One pattern holds 16 notes so when the end is reached, the pattern counter starts over again and notes are overwritten (pressing **F1** resets the pattern counter at any time).

RETURN key ("tap") steps forward and **INST/DEL** key steps backwards.

Holding TAP-button (**RETURN**) is quite handy when toggling octaves and sliding. More on that later..

Q,W,E,R...	C,C#,D,D# etc..
+	-1 octave toggle
-	+1 octave toggle
£	+2 octaves toggle (accent on TB-edition)
CLR/HOME	Slide toggle
RETURN	One step forward ("tap")
INST/DEL	One step backwards
F7	Back to NORMAL MODE
F1	Reset pattern counter

Time Mode

Key **F3** enters TIME MODE.



The TIME MODE light is lit up as nothing becomes editable but timing values. If RUN MODE was active, Prophet64 immediately stops playing like when entering PITCH MODE.

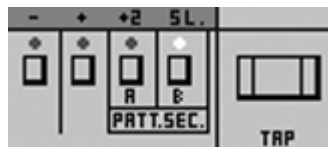
Time mode holds 16 steps, each a timing value determining whether Prophet64 should:

- play a note, i.e. pick the next note entered in PITCH MODE
- hold playing, pause 1/16th and hold (i.e. tie) the previous note
- pause playing, no sound for 1/16th

Like PITCH MODE, **RETURN** key taps forward but there is no tapping backwards. When all timing values are entered time mode automatically exits to NORMAL MODE.

+	Play 1/16th note (plays next note entered in PITCH MODE)
-	Pause 1/16th (tie previous note)
£	Pause 1/16th (silence)
RETURN	One step forward ("tap")
F7	Back to NORMAL MODE
F3	Reset pattern counter (restart editing)

Slides and Octaves



Adding slides in PITCH MODE is achieved by pressing and holding the **RETURN** key and toggle the slide with **CLR/HOME**.

Octaves can also be toggled this way.

Bear in mind that slides only trigger when two notes follow each other without a silent pause.

Accent

The Prophet64 Bassline has an accent-trigger instead of a fourth octave. Holding TAP-button (**RETURN**) and key **£** toggles the accent. It's just like setting octave +2 in the Prophet64 Mono Synthesizer.

Walk-through Example – create a simple bass line

A neat help on the way to master the skills of 303 pattern editing is a real world example:

- Example 1 – Michael Jackson, "Thriller"



Translated to Prophet64 pitches and time lines it looks like this:

-C# MINOR, sixteen steps-

PITCH: **B C# E F# C# C# C#**

TIME: **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 key **1 - 8**
- Enter PITCH MODE with key **F1**
- Enter all the notes with the following keys: **U 2 E 5 2 2 2**
- Enter the octaves: **F1** once, **RETURN ONCE** and hold and press the + key
- **TAP (RETURN)** forward to the sixth one, hold and press +

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

- Enter TIME MODE with key **F3**
- Enter timing values with keys: **+ - + - + - + - - 1 + 1 1 1 +**

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

- Example 2 – "Billie Jean"



-F# minor, sixteen steps-

PITCH: **F# C# E F# E C# B C#**

TIME: **ON-OFF-ON-OFF-ON-OFF-ON-OFF-ON-OFF-ON-OFF-ON-OFF-ON-OFF**

Follow the procedure from example 1 but use these keys instead:

PITCH: **5 2 E 5 E 2 B--+ 2**

TIME: **+ - + - + - + - + - + - + - + -**

(for pitch: B--+ means that B and + are pressed at the same time)

Setup Menu

The setup menu accesses general settings, file operations and the Advanced Random Composer.

The following keys navigate the menus:

CRSR Up/Down	Navigate menus up/down
CRSR Left/Right	Alter parameter values
←	Go back
RETURN	Go back
1,2,3,4,5,6	Hot keys to menu items

Controls

Selects which control to alter parameter values: Joystick or Potentiometers (both in port 2).



Potentiometers come in pairs, X or Y.

The two different settings for potentiometers determines whether or not the **LEFT SHIFT** key must be pressed to allow a value readout, a convenient way to prevent values to be overwritten on parameter change. Option 'POT X' doesn't require shift key while 'POT X-' does.

Note: Only in this particular window, **RETURN** key confirms the selected choice. If exited with the **←** key, the action is canceled.

Tempo

Selects tempo in steps of 14, "EXT" for External Sync source or "X/2" for double sync. Prophet64 has a default tempo setting of 9 (approx 115 BPM) at startup. Lower tempo values lower the tempo and vice versa.

To slave the Prophet64 to DIN-Sync with the S24-64 interface, this setting must be set to EXT. The tempo is then determined by the master sequencer.

Double Sync

X/2 means double sync. That means that Prophet64 takes twice as many sync pulses to advance a pattern. The effect is that it plays on half speed of the master sequencer's tempo resulting in a much better shuffle.

Shuffle

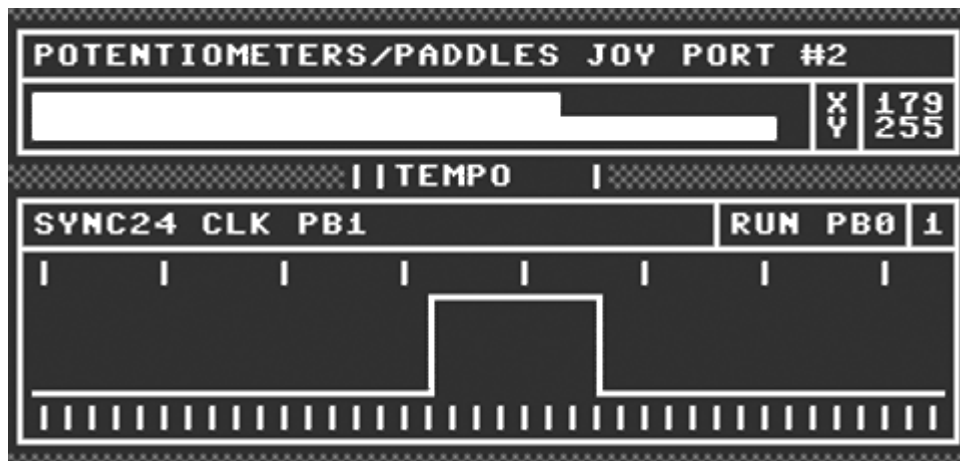
Shuffle means to get the music to "swing". This is achieved by delaying every second note instead of playing straight sixteenths. The more delay, the more it swings. Generally, higher tempo requires less swing and vice versa.

A machine famous for great swing is the renowned Roland TR-909 drum machine (the swing timing has even been copied right off in the Emagic Logic sequencer software). The internal sequencer shuffles the notes as long as the 909 is the MIDI-master. When the 909 is slaved to an external sequencer, the MIDI clock is in control and it no longer shuffles. The Prophet64 works in the same way, it's a slave device that receives a sync-signal and would for that reason not have been able to shuffle. However, it does shuffle thanks to a quick'n dirty work around, delaying the SYNC 24 clock pulses for simple swing. The resolution for this (6 clocks per 1/16th note) is not very accurate. For more shuffle resolution, use the double sync feature ("X/2")

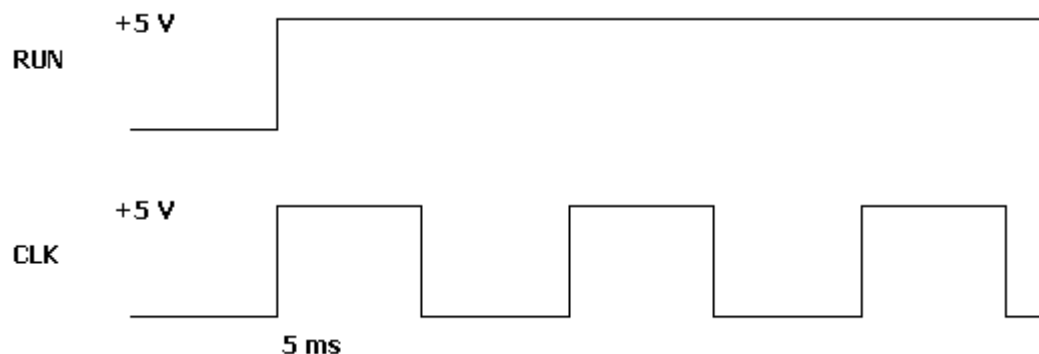
Port Check

The port check function is a great way of testing home-built potentiometers as well as the s24-64 interface.

Sync pulses display in an "oscilloscope" where each vertical grid-line in the bottom scales to 1 ms. The average sync pulse should show up as a five character long pulse.



SYNC 24 uses +5V pulses that last for approx. 5 ms. The Prophet64 accepts a pulse width of at least 2 ms. The port check function 'tics' every sixth pulse (= 1/16th note).



Files

This is where all loading and saving onto disk or tape is handled.

Disk Saving:

DSAVE means Disk Save.



Enter a filename and press **RETURN**. The suffix ".P64" (or ".303" for Bassline) is added automatically and the file is saved to disk.

← aborts.

A Prophet64 file contains sound parameters, patterns, control and shuffle settings in only 3 blocks of disk space which means an ordinary 5 1/4" floppy has room for 200 files.

Even though the filename stays until the next time the save menu is entered, present files on the disk cannot be overwritten. No warnings are given at any attempt duplicating a filename except a flashing light on the disk drive.

When re-saving, use reference numbers to the latest save, i.e., 'MYMUSIC', 'MYMUSIC2', 'MYMUSIC3' etc.

Disk Loading

DLOAD means Disk Load. The option presents a directory list from which files are selected and loaded.



Only .p64 files (.303 for Bassline) are listed in the file selector.

CRSR keys scroll up and down.

RETURN key selects a file to load.

← key cancels.

If there are no p64-files present on the current disk, a 'no files' message is displayed.

Tape Saving

TSAVE means Tape Save. The procedure is similar to disk save.



To start recording, **REC & PLAY** must be pressed on the tape device but Prophet64 does not sense any switches on a 1530/31 datasette. Instead it waits for the user to press **SPACE BAR**. That way any tape player, digital or analog, works as long as the

audio out is routed into the datasette input on the back of the C64. Even the output of a PC sound card is theoretically possible to be the source of data.

The file is saved in standard Commodore tape format, not turbo tape.
It takes up 9 numbers on an analog audio tape.

Operation is cancelled with the ← key. If saving already begun, **RUN/STOP** aborts.

Tape Loading

TLOAD means Tape Load.

Just like the saving procedure, the tape device has to be started and then confirmed with the **SPACE BAR**. The tape key sensor is not checked.



Prophet64 looks for Prophet64 files, that is ".P64" (or ".303" for Bassline). If another file is found, operation is immediately aborted and an error message is displayed together with the name of the file that was found.

If a correct Prophet64 file is found, the screen turns green and the file loads. As it takes up 9 numbers on the tape, loading time is approx. 30 seconds.



When loading is done, the screen goes back to normal and the filename is displayed.

Use the ← key to go back.

Loading is aborted with the **RUN/STOP** key. In case of that, the Prophet64 patterns and sound might sound weird as not all the data has been loaded properly.

A.R.C. - Advanced Random Composer

The Advanced Random Composer is a user friendly pattern sequencer that composes patterns out of several parameters allowing great control of random composing.

The keys to navigate the A.R.C. are the same as for Setup Menu.

Lock notes



The A.R.C. must be instructed what notes to include in a random pattern. It will randomly select between these notes when creating the pattern.

The keyboard toggles the notes to lock.

The notes stay selected until changed even if A.R.C. is exited (they are not saved to disk)



Z,S,X,D..	Lower octave notes toggle
Q,2,W,3...	Upper octave notes toggle
CLR/HOME	Clear notes
←	Go back
RETURN	Go back

Range

This determines what range of octaves the A.R.C. will set for the locked notes. The Mono Synthesizer reaches four octaves, Bassline only three.

Steps

This parameter sets the amount of notes for the randomized pattern. It is possible to precisely decide the number of notes or let the A.R.C. decide itself (option "RND").

If steps are less than 16, notes are positioned at random.

Accent

Selects whether to include an accent or not. (Bassline only)
Accents are positioned at random.

Slide

Selects whether to include slide or not.
Slides are positioned at random.

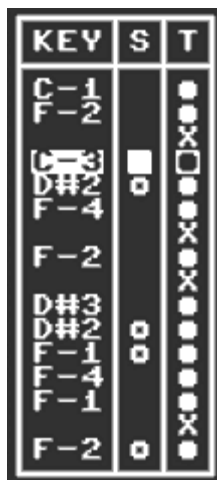
Select Pattern

Selects a destination for the randomized pattern.
The current pattern active in the Main Screen is always the default pattern selected.

Random!

Random! starts the randomize sequence. When ready, it opens up the editor.

Edit



The editor can be an alternative way of composing, correcting or editing patterns.

It shows notes, octaves, slides, accents and time-lines in a simple format. Though a pattern is fully editable, the A.R.C. cannot play any pattern or sounds. Playing is for Main Screen only.

Z,S,X,D...	C,C#,D,D#..
1 - 4	Select octave
-	Pause 1/16th note (tie previous)
£	Silence 1/16th note
↑	Accent on/off (TB-edition only)
CLR/HOME	Slide on/off
SHIFT + CLR/HOME	Clear pattern (confirm w Y/N)
INST/DEL	Delete (shift pattern)
SHIFT + INST/DEL	Insert
CRSR Up/Down	Navigate up/down
←	Go back