PROPHET64
SID MUSIC SOFTWARE

Sequencer

Introduction

Thank you for choosing the Prophet64 line of software. We are very proud of the Sequencer edition that we believe is a leap forward for Commodore 64 software.

Past development of C64 music programs was always focused on optimizing the audio engine, not much attention was given the user interface. After the back-end audio program was created, developers seemed to lose interest and left the user with the simplest controls possible.
In present day there's not much chance an uninitiated user will find the time it takes to install and learn to use those programs. Hexadecimal numbers, calculating note lengths and pauses or managing memory are not exactly things that will stimulate a 21th century musician.

Developing the Prophet64 Sequencer started out with the user interface. The audio engine was not created until the UI was fully up and running. This does not only show our total dedication to deliver fully comprehensible software, it also makes sense in that development priority should be given areas that demand the most resources. Everything you see on a C64 screen has to be created manually. There are no short cuts like modern object oriented high level languages, visual developing environments or window APIs.

Running an old platform in these days..

In these days we are used to a number of things that are not exactly possible to implement on an 8-bit platform. The inevitable limitations of the C64 may not be that apparent to every user.
For example, undo-functions do not exist and hard drive recording tracks are not to be found.
Still we feel confident in the end result of this project. Just don't get too carried away forgetting that you are in fact using a 25 year old machine!

Why not a full blown MIDI sequencer

With such a similarity to modern sequencers many people will ask this question.
There are two very simple answers to this:
First, the C64 is based on a 1 Mega-hertz processor too slow to play multiple MIDI-tracks without compromising the user interface and main structure of the program. It would work but you wouldn't be able to edit sequences, update the screen etc.
Second, there were a variety of MIDI-interfaces built all totally incompatible with each other.
To expect a modern C64 user to find a specific MIDI-interface in these days is not a likely scenario.

The Prophet64 software was designed as a stand-alone sequencer from the start. The idea is to synchronize it in the absolute simplest way possible, SYNC 24 (DIN-sync).
If you need a master MIDI sequencer to store notes, use a MAC or PC.
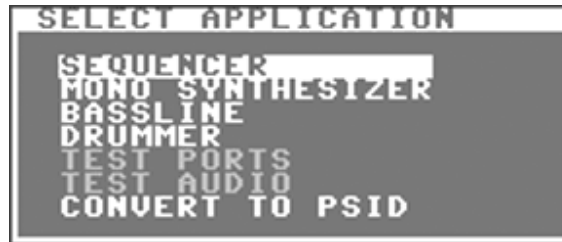If you are desperate to run full MIDI on each of your C64s oscillators look elsewhere, but you are not likely to find an application as user friendly as the Prophet64 Sequencer.

In fact there is a sort of pseudo-MIDI implemented into the Prophet64. All the applications featured on the cartridge are capable of receiving keyboard control data. A dedicated converter can thereby input MIDI note data right into the Prophet64 software.

Using the Prophet64 Sequencer

Starting up

To start the Sequencer, select *Sequencer* in the startup menu and press return.
The program loads from the cartridge and starts up in approx. 7 seconds.

```
SELECT APPLICATION
SEQUENCER
MONO SYNTHESIZER
BASSLINE
DRUMMER
TEST PORTS
TEST AUDIO
CONVERT TO PSID
```

Note:

The user is strongly adviced to carefully read the instructions on how to properly handle the
cartridge in the booklet *Prophet64 - Getting Started* available for download on our site at
http://www.prophet64.com.

Windows

The Sequencer consists of a main screen (the Arrange window) and a set of separate windows for
each editor module.
The arrange window is where you put together and manage the building blocks of your current
creation. These blocks are called sequences and each one holds up to eight measures of note data.
The sequences are played within the arrange window's workspace in any of six tracks. Each track
is locked to a SID oscillator where a second SID installed provides the additional three tracks (nr.
4-6). On top of the six note tracks is a control track for tempo, shuffle and volume data changes.

Notes are inserted, removed and edited in the grid editor with standard piano roll design. It opens
up when double clicking a sequence. Instruments are created with the Instrument Editor, sort of
like a software synthesizer on a MAC/PC sequencer.

All controls are accessed with the mouse when pointing and clicking each object. Values are
altered by clicking at the parameters and moving the mouse up or down. That turns the mouse
pointer into a vertical bar to indicate the value change mode.

Note:

Being larger than the C64's internal memory, the application needs to access the cartridge ROM
to load window modules. Whenever this happens the computer halts for a split second. Be aware
that the short delay may be enough to lose external sync information!
Subsequent calls to open the same window will not initiate ROM loads if it's already present in
the computer's memory.
This constant flow of data between the cartridge and computer requires a flawless expansion port
connection to ensure an error-free execution of the application.

NTSC

Since the old Commodore computers were directly hooked up to TV sets and TV standards around the world differ (NTSC vs. PAL), so do C64s in different markets.
A computer built to run on the NTSC TV system has somewhat higher clock speed and less screen resolution outside the visible screen (it does not restrict the screen image itself).

Running programs that are written for PAL machines on NTSC computers can make things go a bit faster than they were intended to. As for music it does not only play faster but also in a slightly higher pitch. Some programs do not even work at all.
The Prophet64 software works perfectly, however you must adapt the program to NTSC manually.
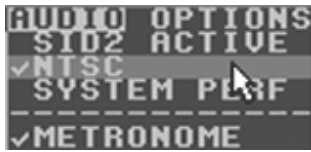
Open up the *AUDIO* menu and check the *NTSC* option.
When active, the Sequencer application adjusts its internal timers as well as the whole frequency scale.
If you are running a C64 built for the PAL system, leave the *NTSC* option unchecked.

Note:

When opening project files or the demo song, don't forget that the NTSC setting affects how the song is being played back. This is due to your own computer, it does not make any difference on what type of machine the song was initially composed. NTSC setting is not saved in the project file.
Make it a practice to always check the NTSC option when starting up the Sequencer.
(Lack of free memory prevented an automatic NTSC/PAL check in the program.)

User Input Controls

The Sequencer edition is compatible with a number of user control devices inserted into Controller port #2. You make the selection of control device in the *OPTIONS* menu.
This must be made manually at startup. Sequencer edition cannot auto-detect what is in the port.

Joystick

Joystick is active when every other control option is deselected. It is the default control at startup.

1351 mouse

This is the option that selects C-1351 mouse or a PC mouse with a special adapter.
1351 mode gives you full control of the Sequencer including right mouse button to access the toolbox. Mouse wheel on certain adapters is also supported.
1351 is the recommended device to use for the Sequencer edition.

Note:

Tips! Press and hold the **Commodore Key** (**C=**) while starting up the Prophet64 Sequencer to automatically activate 1351 mode.

Amiga Mouse

Select this option if you use an Amiga mouse. The C64 does not recognize its right button so you have to use the **F5** key to reach the toolbox.

Atari Mouse

Select this option if you use an Atari mouse for the old Atari 520/1040 ST series. The C64 does not recognize its right button so you have to use the **F5** key to reach the toolbox.

Right Mouse Button

Reading the right mouse button off an Amiga or Atari mouse is technically impossible on an unmodified device. If using a standard Amiga/Atari mouse you will have to access the toolbox with the **F5** key.

It is however possible to convert the signal from the mouse's right button output into a signal that the A/D converter inside the C64 is capable of reading.
In that case Sequencer edition treats values above 128 ($80 hex) on the POT-X pin of controller port #2 as an activated mouse button. Any value below 128 denotes a released button.

Note:

Be aware that an unmodified mouse will let the computer think that the right mouse button is depressed. Selecting the *Right Mouse Button* option in the *OPTIONS* menu will therefore constantly open the toolbox preventing you of controlling the application correctly.
Therefore, do not select *Right Mouse Button* if not working with a modified mouse.

Acceleration

The accelerate option works with both joysticks and 1351 mice.
Joystick acceleration increases the speed of the mouse pointer gradually.
1351 acceleration is more like a modern PC mouse acceleration, it speeds up the pointer the faster you move the mouse. A great time saver as well as relieving your wrists!

Keyboard Control

If you start up the Sequencer with any other device than joystick or accidentally select the wrong device you can always reach for the panic keyboard control.
By pressing the **CTRL** key, keyboard control is activated and the mouse pointer is controlled with the **CRSR** and **RIGHT SHIFT** keys.
F3 key replaces left mouse button and **F5** key is the right button.

However, do not see the keyboard control as anything else than a last resort to take control of the application. Due to C64 keyboard conflict issues this feature is not suited for operating the Prophet64 Sequencer any more than necessary.

A word of advice

As stated earlier in this text it is advisable to either find a 1351 mouse or a PC mouse adapter to operate the Sequencer edition. Not only does it give you a closer and more PC-like response, it is also free from C64 keyboard conflicts:
Due to how C64 keyboard and joystick inputs were designed, data signals on the controller ports sometimes interfer with the keyboard. In practice that means Amiga and Atari mouse operation could seriously block regular keys on the keyboard. One example of this is when editing instruments and using the C64 keyboard to play the sounds. Depending on the current position of the Amiga/Atari mouse the sound might not play at the requested note when hitting that key. The same goes for certain hot keys that trigger options on and off in the application.
Joystick mode has got the same problems but to a much lesser extent.

The 1351 mouse mode does not cause any keyboard conflicts.

Arrange Window

Overview

The Arrange window is the main window in the Sequencer edition. It contains the sequence workspace window (from now on referred to as the *workspace*), a transport window and a property window that displays basic properties of selected items.

The workspace is where you create and arrange sequences.
Each block represents one sequence and can be moved around freely.
Different tools are used to create and work with the sequence objects.
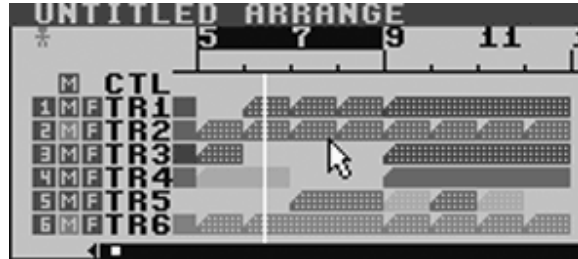
The workspace is 256 measures long. Such a vast area to lay out objects (aka *sequences* and *aliases*) not only makes it possible for a quite lengthy song, it is also a great place to throw out different ideas when working on another project. That's often the time when new ideas keep popping into your head so take advantage of that! Use the empty workspace area to test different variations and angles on your beats, phrases, bridges, verses and choruses.

The Toolbox

Editing objects in the Prophet64 Sequencer is done with a set of tools in the Toolbox.
To access the toolbox:

- Press the right mouse button (or **F5** key) within the workspace area. The toolbox stays open until the right button is released.
- Select the tool you want.
- Close the toolbox by releasing the right mouse button.
- The mouse pointer now takes the shape of the tool you selected and is ready to be used.

	Arrow	No tool selected. Picks and selects objects
	Pencil tool	adds objects
	Eraser tool	removes objects
	Glue tool	merges objects together
	Scissors tool	cuts objects in two

The toolbox is a function you will use frequently when working with the Sequencer.

Sequences

A sequence is an object within the arrange window holding the note information. Sequence objects can be moved, merged ("glued") and copied into alias sequences.

Creating sequences

Clicking the left mouse button anywhere on the workspace with the pencil tool creates a new sequence. Default length is one measure but can be extended up to eight measures by merging two objects with the glue tool.
To keep track of each sequence they are assigned a unique number from 1 to 255 automatically on creation (limited memory prevents the use of full names).
Further identification is possible by the use of individual colors. When created, the sequence first inherits the predefined track color. You can change it afterwards.
With a graphic layout, identifying single objects becomes so easy that you probably will keep track of your sequences visually instead of going for the number identifier. Users of modern MAC/PC sequencer software can testify to that.

The Sequencer edition can store up to 255 sequences with a length of one measure. Every time you *glue sequences* together (more on that later) the limit is reduced.
To monitor remaining memory there is a memory meter in the transport window showing the percentage of used up memory. It can be toggled to show either memory consumption or system performance by checking the *SYSTEM PERF* option in the *AUDIO* menu.

Add a new sequence

- Select the Pencil tool.
- Left click the spot on the workspace where to place the new sequence.
- If the spot is empty, the sequence is created and placed on the workspace. The mouse pointer then switches to a hand allowing you to move the new sequence anywhere you like.
- If there is already an object in that position it is selected instead. Sequencer edition does not handle overlaps.

If the sequence memory of the Prophet64 Sequencer runs out of available storage space you will be notified of this when trying to insert a new sequence:

PROPHET64   **OUT OF MEMORY!**   OK

That means no more sequences can be created. Memory is full.
You will have to clean up by removing (non-alias) sequences you're not using.

Delete a sequence

Sequences are deleted with the eraser tool.

- Select the Eraser tool.
- Left click the object you wish to delete.
- Object is deleted.
  If you try to erase a main sequence with one or more *alias* objects every alias will also be erased. You are first asked to confirm this action. Alias sequences are explained later in this chapter.

Note:

Tips! There is no 'undo' function in the Prophet64 Sequencer! To prevent accidental removal of objects there is an option that always confirms deletions in the program. The default mode of this option is On.
You access the confirm deletes option in the *EDIT* menu.

```
PROPHET64                                          ⊠

  X            ARE  YOU  SURE?


              CANCEL            OK
```

If you find this option annoying or just want to disable it temporarily, uncheck the *Confirm Deletes* option in the *EDIT* menu.

You can also use the **INST DEL** key to delete the currently selected object.

Several sequences can be deleted at the same time by using *selections* covered later in this chapter.

Glue sequences / Increase sequence length

Two sequence objects can be glued together to form a longer sequence.

- Select the Glue tool.
- Left-click the first sequence to join.
- Hold **LEFT SHIFT** key and left click the second one.
- The objects are glued together.
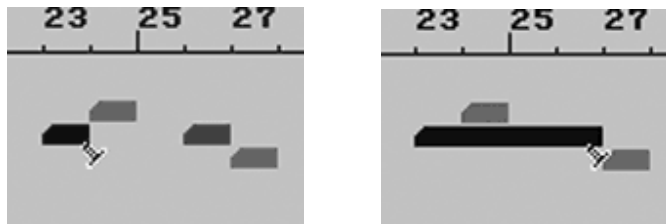
If the two sequences are several measures apart, the gap between them are filled automatically. Merged sequences can be further glued to other objects as long as the maximum length does not exceed eight measures.
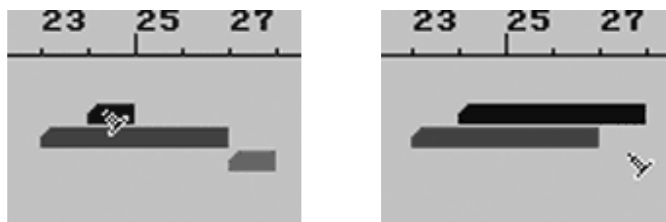
The sequences do not have to be on the same track as long as there is empty space between the two objects. This is taken care of automatically by the Prophet64 Sequencer.

The glue operation can fail for three reasons:
- One or two objects are blocking the way. Unlike modern PC/Mac sequencers Prophet64 does not allow objects to overlap.
- Two objects joined together would form a larger sequence than eight measures.
- Memory is full.

Split sequences

Glued sequences can be split up by the Scissors tool.
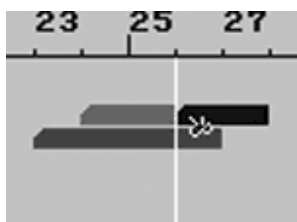
- Select the Scissors tool.
- Left click the position where you want to split the object.
- The result is two sequences with individual number identifiers sharing colors and transpose settings.

The two splitted objects do not consume any more memory than when merged together.

Changing sequence color

Every sequence is assigned its own color for easier recognition. The default color is inherited from the track where you first put it. To change sequence color manually:

- Left-click the sequence with either Arrow or Pencil tool to select it.
- Left-click the value in the property window. Drag mouse up and down to select a new color.
- An *alias sequence* has the same color as its main object. Changing one will also change the other.

Transpose sequence

A sequence can be played back with all its notes transposed up or down 12 semi-notes.

- Select the sequence you wish to transpose.
- Alter the transpose value in the property window.

Cycle Region

Prophet64 Sequencer has a loop function that repeats parts of any length in your song.

- Define the cycle region by marking the selected measures in the upper part of the bar ruler.
- Merge longer regions by holding **LEFT SHIFT** key when clicking on the new start or end measure.
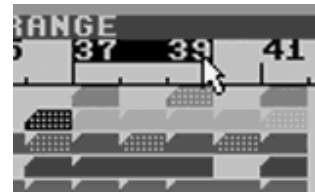
If not already in Cycle mode, Prophet64 Sequencer activates it as you click the bar ruler area.
Cycle mode means that the Song Position Line jumps back to the start position once it has travelled past the end when playing. That creates an eternal loop.

Cycle mode is toggled with the Cycle button in the *Transport Window*. More on that later.

The Song Position Line (SPL)

The Song Position Line (SPL from here) is the white vertical line that marks the current song position in the Arrange window and Grid Editor.
You can set the SPL position by clicking anywhere in the area below the bar ruler.
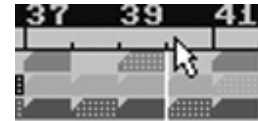
The SPL is also controllable via the **£** key to forward one measure and **CLR HOME** key to move back one measure.

Note:	
Tips! You can make the SPL a little bigger by checking the *Wide SPL* option in the *OPTIONS* menu.	

Catch Mode

The little guy in the upper left corner of the Arrange window indicates whether Catch mode ("follow song") is on or off. Catch mode automatically turns the page when the SPL runs out of the screen. If activated the screen immediately jumps to the position of the SPL. If you start scrolling the window catch mode is automatically switched off.

Transport Window
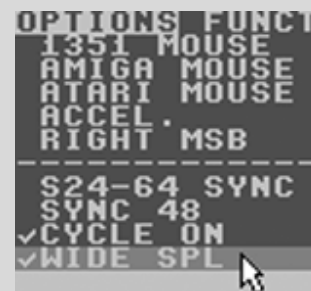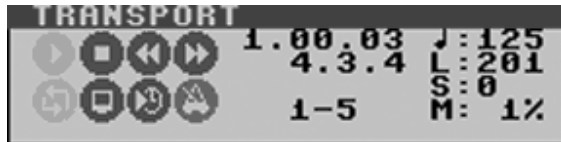
The Transport window includes the controls and parameters that concerns song playing.

	Play	plays from the current SPL position or cycle start if cycle mode is activated.
	Stop	stops playing. Press twice to place SPL at the beginning of the song.
	Rewind	moves SPL one step back. Keep depressed to repeat rewinding.
	Forward	moves SPL one step forward. Keep depressed to repeat forwarding.
	Cycle mode	toggles cycle mode. You can reach this option in the *OPTIONS* menu also or simply press the **C** key.
	Blank screen	activates screen to go blank in the arrange window when playing. Screen becomes visible again when playing is stopped. This will reduce the noise from the audio output significantly thus improving audio quality. Alternatively press the **K** key to toggle blank screen.
	External Sync	activates external synchronization with SYNC24. This option is also accessed via the *OPTIONS* menu or the **Y** key.
	Metronome	activates the metronome in Grid Editor recording mode. The metronome can also be activated in the *AUDIO* menu together with the click note.

Current Position

The transport window displays the current song position in measures, beats and sixteenth notes.

Tempo

When running the Prophet64 Sequencer on internal clock, 14 fixed tempo settings are available. The current tempo is displayed in either black or gray color where black colors refer to classic C64 tempo settings.
If the Sequencer is slaved to external clock, the tempo displays *EXT* and Prophet64 follows the external clock no longer fixed to any tempo settings.

Shuffle

Sequencer edition uses standard Prophet64 shuffle in seven different steps. Shuffle equals "swing" adding groove to the song.

Song Length

Here you set the maximum song length of the current project. When the SPL reaches this end point it stops playing. Bar ruler turns gray passed the song's end position.

Memory/System Performance

The lower right numbers in the Transport window is the Memory meter / System performance meter.
The Memory meter (default) shows how much memory is used up by the sequence objects whereas the System Performance meter shows current CPU load for the audio engine. Peak value holds for a short time. The mode is toggled in the *AUDIO* menu.

Tracks

The left side of the Arrange window shows track numbers, mute buttons and filter indicators.
The *track number* turns to a velocity level meter during playback.
The *mute button* allows you to mute the output from the selected track.
The *filter indicator* lights up when the filter is turned on for the track.
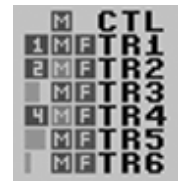
Naming a track

You can set a name for each audio track:
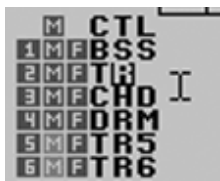
- Double click the old track name.
- Mouse pointer turns into a cursor.
- Enter a new name, use **CRSR** keys to go back/forward.
- Press **Enter** key when done.

Name length is limited to three characters. Use short names like "bss" for bass, "drm" for drums, etc.

Zooming

The Arrange window workspace has three levels of zooming.
The controls for zoom level is located at the lower right corner of the arrange window.

- Use left part of the zoom control to zoom out.
- Use right part of the zoom control to zoom in.

Alternatively:

- Use + key to zoom in.
- Use – key to zoom out
  (Commodore 128 numeric keypad is supported).

Scrolling

You can scroll the workspace forward and backwards with the horizontal scroll bar.
Either click the left or right arrow buttons or grab the scroll box inside the bar and drag it to the wanted position.

If you have a dedicated PC to C64 mouse adapter, Sequencer edition supports the mouse wheel so that you can use it for scrolling too.

When moving objects or marking up a long cycle region that spans over more than one page the workspace window scrolls its content automatically.

Key Control

The Prophet64 Sequencer offers a few hotkeys to access some of the most used functions in the program. The hotkeys were kept to a minimum because of the Commodore 64's user control/ keyboard conflicts.

SPACE	Play / Stop (alternatively)
RETURN	Play
+ / -	Zoom in / out
INST DEL	Delete selected sequence
C	Cycle on / off
K	Blank screen on / off
Y	External sync (SYNC-24) on / off
£	SPL forward one measure
CLR HOME	SPL rewind one measure

- Hot-keys for dialog boxes -

RETURN	Dialog OK
RUN/STOP	Dialog CANCEL

- Commodore C128 numeric keyboard -

ENTER	Start
0	Stop
*****	Record (grid editor)
+	Zoom in
-	Zoom out

Copy/Move sequences

To move a sequence:

- Left click the sequence with either Arrow or Pencil tool. Keep the left mouse button depressed.
- With the mouse pointer shaped like a hand, drag the object to the new position.
- Release the left mouse button and the object slides into the new position if it's empty and there is enough room.

You cannot move or copy control sequences from track 1 to any other track and vice versa.

Copying is the same procedure except keep the **Commodore (C=)** key depressed.
When releasing the left mouse button you then end up with a new object. It is not really a new sequence copy but a so called *Alias* sequence.

Alias Sequences

An alias sequence is not a real object but merely a reference to a main sequence. It therefore contains no data and does not consume any memory. Whenever the main object's data is changed it will also affect the alias.
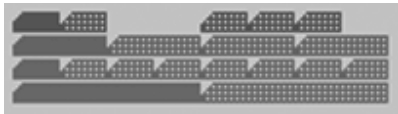
You can identify an alias object by its check pattern.
Main objects are filled.

Aliases are great to free up memory when working with repeated sequences but they also save a lot of work for you. Instead of altering notes in each and every sequence you focus on one object and all the aliases are affected at once. A must have when working with drum sequences.

Creating an alias sequence

Aliases sequences are automatically created when copying a sequence.
(Transforming an alias back to a main object is explained later)

Cutting and gluing alias sequences

Gluing alias sequences is possible as long as both objects share the same main sequence. As aliases are just reference objects the length cannot exceed the length of the main sequence. If the main object is split afterwards, the aliases are also split automatically.
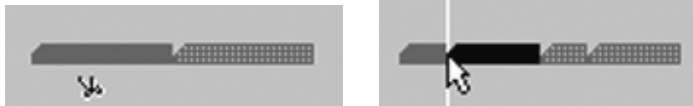
You can split an alias manually too. However, when playing an alias sequence it will always start playing from the beginning of the main object.

Changing colors and transposing aliases

An alias sequence color is always the same as its main object. When you change it in the property window it also affects the main sequence as well as all other aliases.

Transposing is unique for every single object so every alias can have its own transpose setting just like regular sequences.

Editing an alias sequence.

Since alias sequences are reference objects, editing means altering the data in the main sequence. However, when double clicking the alias to open up the grid editor you have three options:

CANCEL
Cancel the operation. Do not open grid editor.

REAL COPY
You create a completely new copy of the alias so your edits take place in a brand new sequence.

ORIGINAL
You edit the alias affecting the main sequence directly. The alias position in the arrangement is kept as the reference point for the grid editor.

The **REAL COPY** option is a great way of making real copies of alias sequences.
The **ORIGINAL** option is great when you have repeated sequences e.g., drum beats, and do not want to look up the main object.
It's important to learn the difference to not confuse one option with the other.

Deleting an alias

Deleting aliases are done the same way as deleting main sequences.
However, if you try to delete a main object that has underlying aliases all of those will be deleted too. They are not allowed to exist freely without a parent object.
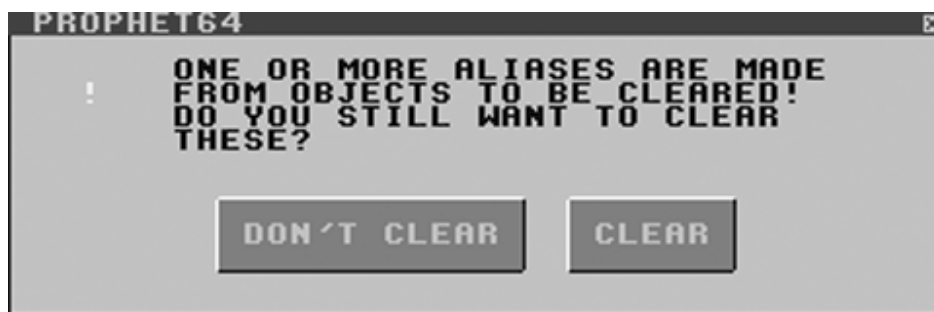
You are given a choice on how to proceed before anything is deleted.

Selections

A selection is a consecutive block of sequences that are about to be moved, copied, deleted or transformed in one of several ways. The limited memory prevents buffering of sequence selections so they only exist on creation and processing is done immediately thereafter. Sequence selections have a maximum range of 64 measures. All seven tracks may be included although control objects and ordinary note sequences cannot co-exist on the same track.

How to make a selection

- Press and hold the **LEFT SHIFT** key.
- Press left mouse button and draw the mouse on the workspace to select an area.
  The area is marked out with brackets.
- Release **LEFT SHIFT** key still holding left mouse button depressed to make the selection active. You can tell this by the mouse pointer changing to a hand icon.
  The selection is now ready to move, copy or transform.
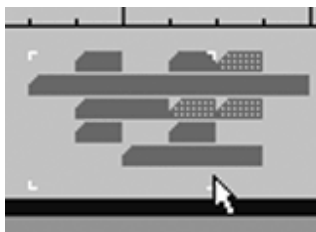
Not all sequences may be included in your selection. Only full objects within the marked up area is considered valid for the selection.
The left image illustrates this:
The longest sequence, second from the top, is not included nor the one in the bottom as they are sticking out of the white brackets.

Copy/Moving selections

Move

- Press and hold the **LEFT SHIFT** key
- Press and hold left mouse button and mark up the area with either Arrow or Pencil tool.
- Release the **LEFT SHIFT** key still holding down the left mouse button.
  As the mouse icon turns into a hand you are free to move your selection anywhere on the workspace.
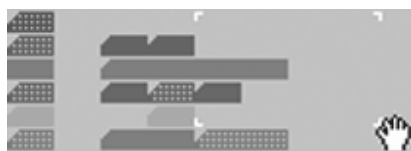
- When the selection is in place release the left mouse button and the objects are moved. If there are objects blocking the way the move is canceled. Empty spots in your selection are considered transparent.
- After the selected sequences are moved (or operation is aborted) the selection seizes to exist. You will need to define a new selection for every new action.

Copy

- Press and hold the **LEFT SHIFT** key
- Press and hold left mouse button and mark up the area with either Arrow or Pencil tool
- Release the **LEFT SHIFT** key and move your selection.
- Before you release the left mouse button to drop the selection, press and hold **COMMODORE (C=)** key.
  The selection is now copied as alias sequences into the new position.
  Just like moving objects copying is not executed if there are blocking objects.
  Empty space in your selection is considered transparent.

Note:

If you have a large selection that spans over several pages it's a good idea to start marking it up in the opposite side of the moving direction.
That way you will see what's ahead in the arrangement when dragging the selection.

Delete Selections

Instead of deleting a large amount of sequences with the eraser tool there is a convenient way of doing this with the help of a selection.
First you need to tell the Prophet64 Sequencer that you want to treat the selections as deletions.

- Check the *Delete Selections* option in the *EDIT* menu.
- Press and hold the **LEFT SHIFT** key.
- Press and hold the left mouse button and mark up the area containing the sequences you wish to delete just like when copying and moving.
- Release left mouse button to start deleting.
- Make sure to uncheck the *Delete Selections* option when you are finished unless you plan to use it repeatedly on multiple selections.

As a matter of safety, *-- remember there is no undo-function --* you are asked to confirm this action regardless of the current state of the *Confirm Actions* option in the *EDIT* menu.

Note that all alias sequences belonging to main objects in the selection are removed also regardless of their position within the workspace. This without confirmation.

Note:

Caution! Make sure to uncheck the *Delete Selections* option after you're done unless you really plan to use it repeatedly on multiple selections.

Transform Selections

Just like deleting there is a way to perform a set of actions on a large selection of objects.

- Select *Transform Options* in the *FUNCTIONS* menu, select action and set parameters (explained later in a separate chapter).
- Press and hold the **LEFT SHIFT** key.
- Press and hold the left mouse button and mark up the selection of sequences whose notes you wish to transform.
- Release either the **LEFT SHIFT** key or the left mouse button to start transforming.

If you have checked the *Confirm Actions* option in the *EDIT* menu you will first be asked to confirm the action. If it's unchecked actions will be taken without your confirmation. Aliases are not affected.

If both *Delete Selections* AND *Transform Selections* options are checked in the *EDIT* menu Transform has priority when making a selection.

Note:

Caution! Make sure to uncheck the *Transform Selections* option after you're done unless you really plan to use it repeatedly on multiple selections.

New (initialize project)

By selecting *New* in the *FILE* menu you can initialize memory to start a new project.
You will be asked to confirm the action since the New function completely wipes out your current project, even the instruments. Unsaved work is lost.

Naming the project

The project's name is displayed in the title of the Arrange window.
Default name is *Untitled* until you save the project. Then the filename is automatically used as project name and will be seen in the Arrange window title.
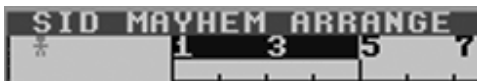
If you would like to name your project prior to saving you can always fake it by selecting *SDR* as the media source and then abort when Prophet64 Sequencer asks you to start your device. The window title will then display the project name.
More on saving and loading later.

Editing Sequences

Grid Editor

Note sequences are edited in the grid editor window.
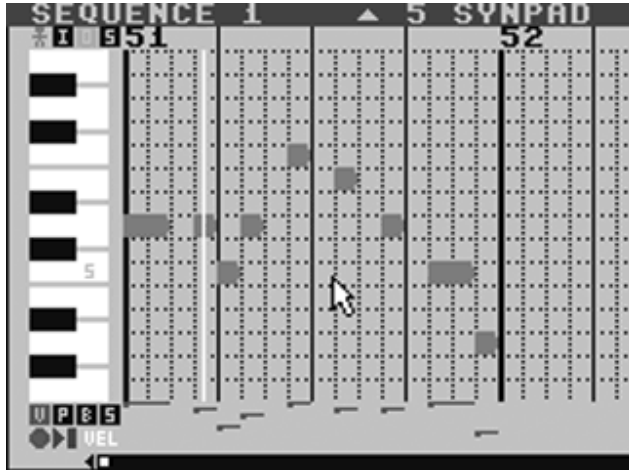
Grid editors are often called piano roll editors referring to the old player pianos like the pianola. It's the same principle except the holes of the piano roll is made up by note blocks on the screen. If one would imagine the 'roll' moving left then the vertical positioning of the block would represent the pitch whereas its length and horizontal position would correspond to the note's length and timing.

Grid editors are great to get a quick visual overview of a musical phrase. They are also superior to other editors when altering note lengths.
Chord editing becomes a really easy task too of course the Prophet64 Sequencer being a monophonic editor does not handle multiple notes playing in unison.

Underneath the grid is an additional editor to alter note info such as velocity and program changes. The data is positioned right under its parent notes.

Open for edit

The grid editor window opens whenever you double click a note sequence.
Alias sequences however, being merely reference pointers to main sequences, cannot be edited directly. When double-clicking an alias you need to decide how to handle it:

CANCEL
Cancel the operation, do not edit.

REAL COPY
Make a real sequence object out of this alias sequence and open it with the grid editor.

ORIGINAL
Open the grid editor at the selected sequence's position and edit the data. In this case the data belongs to the main sequence i.e., the original sequence is being edited.

-So, which one do I choose?
If you want to edit specific notes on a specific position in the song you need to convert the alias to a real sequence.
If you on the other hand want to edit a whole loop of alias objects where they all are children of the same main sequence, choosing to edit the original is a better idea since your edits will affect the whole loop.

A great example of this is when making a drum track. Let's say you have a simple four measure drum loop (track 3 in the right image).
The first sequence is repeated four times.
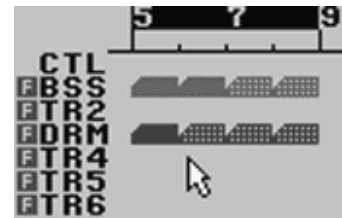
Now assume you want to add an extra snare drum strike in between beat 2 and 4 for the whole drum beat.
In this case you could either go for the main sequence and add the extra notes for the snare drum or go for an alias sequence and select to edit the ORIGINAL.
If you have lots of aliases it's probably easier to double-click the closest object instead of looking for the main sequence. Either way will do the job.
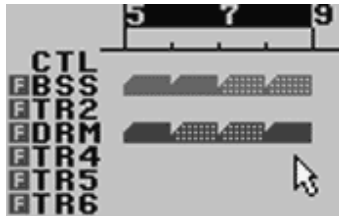
Let's say you also want to make a variation in the last measure before the loop starts over.
Now is the time to make a REAL COPY to distinguish the last sequence from the rest. As you select the real copy option the alias becomes a new sequence and anything you change in it will not affect or be affected by the other sequences.

When you continue to copy your drum beat, the first three objects and the last one will be different sequences.
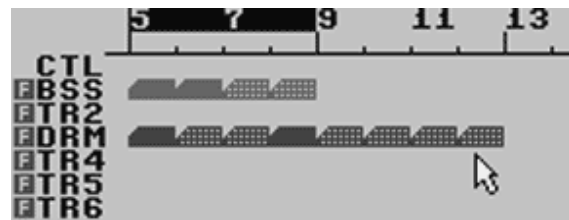
Controlling

Just like the rest of the Sequencer, the grid editor is fully mouse controlled.
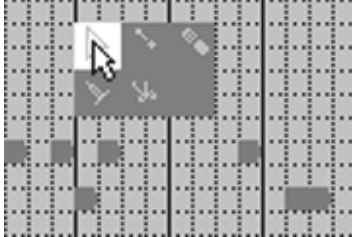
 Notes are inserted, moved, copied and deleted with the same tools in the toolbox.

The grid editor window scrolls vertically to reach all the eight octaves and horizontally if the sequence length exceeds the two measures of screen space. If you open up a sequence that is only 1 or 2 measures long you cannot scroll the window horizontally.

Use the scroll bars to scroll the window. You can use the mouse wheel to scroll the vertical position also.

Insert a note

To insert a note:

- Select the Pencil tool.
- Select an instrument for the note.

- Point at a free position to place the note and click the left mouse button.
- The note is inserted with the chosen instrument. The length is one sixteenth note unless default note length has changed by extending or gluing.

Monophonic editor

The Prophet64 grid editor is monophonic. It means that unlike other grid editors it cannot overlap notes since only one note is allowed to play at a time. When inserting or moving notes onto others there are two ways to handle it:

- Overwrite whatever is there. Long notes are interrupted by the new ones.
- Prevent overwrites completely. Inserting or moving notes onto existing ones becomes impossible.

 You find the settings for the overwrite mode in the *EDIT* menu. Checking or unchecking the *Overwrite Notes* option toggles the overwrite mode. Default is to overwrite notes so if you want to protect a certain sequence when editing make sure to uncheck this option.

Try out the different modes yourself so that you really understand the difference.

Erase a note

- Select the Eraser tool.
- Click on the note you wish to remove.

There are two alternative ways to erase notes:
- Press the **INST DEL** key and the selected note(s) is deleted.
- With the pencil tool, double click the note to be erased .

Split Notes

Splitting notes works in the same way as cutting sequences with the scissors tool.

- Select the Scissors tool.
- Click on the note where you want to cut it.

The result is two new objects sharing the same velocity and program change values.

Glue Notes

To glue two notes together:

- Select the Glue tool.
- Select one of the notes to tie.
- Hold **LEFT SHIFT** key and click on the other note.

Notes are tied if they are on the same key and no notes are blocking the way in between them.

Extend Notes
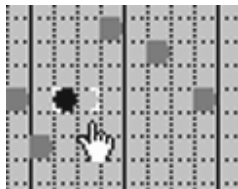
Instead of adding two notes and gluing there is a better way to alter note lengths.
When clicking on the rightmost part of a note block the mouse pointer turns into a finger and you can set a new length by moving the mouse left and right.
It works on selections also.

Whenever you change the length of a note that becomes the new default.

Move / Copy Notes

To move notes:

- Select either Arrow or Pencil tool.
- Left-click the note to move and keep the mouse button depressed.
- Drag the note to a new place.
- Release the left mouse button.

Copying is the same procedure except press and hold the **COMMODORE** (**C=**) key during the whole operation. Unlike the arrange window workspace, notes do not have alias objects.

Depending on the current state of the overwrite option notes are kept or overwritten when moving/copying a note or whole selections of notes.

Selections

As opposed to the arrange window the grid editor offers an in-memory selection feature. That means you can select any notes you like to include in the selection and they stay selected until you close the grid editor window.
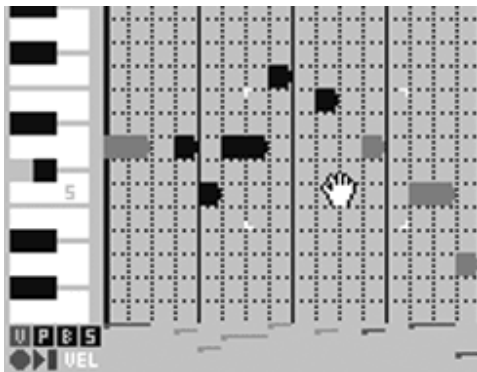
Move, copy, extend and eraser tool all operate on selections.
That means if you have more than one note selected while for example deleting, all of those notes will be erased.

There are several ways to include notes in a selection:

- Left-click a note.
- Drag the mouse over an area of notes you wish to include
- Press (click) a key on the left piano keyboard to select all notes on the same key.
- Use the *Select All* function in the *EDIT* menu, alternatively press **Commodore** (**C=**) key together with the **A** key. That will select all notes in the open sequence.

Holding the **LEFT SHIFT** key includes the note to an already defined selection. If you don't, all the previous selected notes are deselected.
Left-clicking a note multiple times holding the **LEFT SHIFT** key toggles its selection.
Selected notes are displayed in black color.

Move / Copy selection
To move a selection:

- Left-click any of the selected notes.
- Drag the selection to a new position.

To copy the selection

- Same as moving but press and hold the **COMMODORE** (**C=**) key during the whole operation.

The overwrite option applies to moving and copying both single notes and selections.

Note:

If you have unchecked the *Overwrite Notes* option in the *EDIT* menu you could end up losing or corrupting the whole selection if moving it onto an already occupied area in the grid editor.

Note Controls

Note controls are assigned values set individually for each note or in between them.
They appear in the space just below the grid editor.

The four types of controls are:

V   Velocity
P   Program Change (instrument)
B   Pitch Bend
S   Slide

Editing is done one at a time which means you have to choose the active control.
You do this by clicking any of the four buttons in the lower left corner of the window.
The active control type is displayed in plain abbreviated text right under the buttons.

Velocity

Every note has a velocity value. It modulates any of three parameters as seen later in the Instrument Editor.
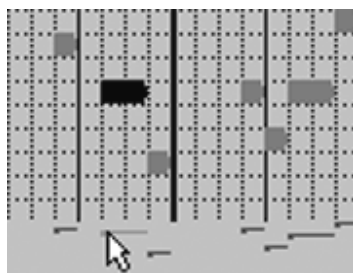
To alter the velocity value, grab the vertical bar representing the value and drag it up or down.
You don't have to be dead-on, clicking in the neighboring area will do.

Program Change

PRG   Program change sets the instrument for the current note.
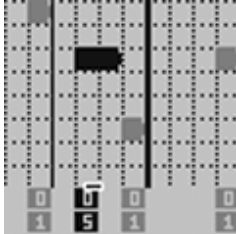
If you click on the program change value the mouse pointer turns into a vertical bar and you can move the mouse up and down to alter the value. You cannot manually insert program changes in between notes. They are automatically inserted with the new note when using the pencil tool.

Pitch Bend

BEND   Pitch bends have never been easier to insert in a C64 application:
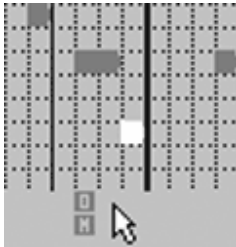
- Find the position where you want the pitch bend to start.
- Click on it in the note control editor.

      -That's it!

The next following note turns white indicating that it's the destination for the bend.

The only limit is that the longest distance between the pitch bend and the next upcoming note must not exceed 16 steps.

The program itself sees to it that it isn't. If you move the white note farther away from the bend point than 16 steps the bend automatically disappears.
If you try to insert a pitch bend where there are no destination notes available within 16 steps, no bend is inserted.
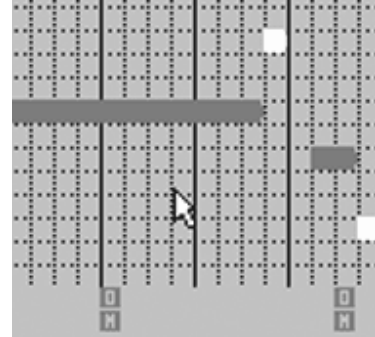
Slide

SLIDE   Slide is similar to the one found in the Mono Synthesizer and Bassline editions.
To activate a slide click the note you want to slide to. It's displayed in a white color just like pitch bend notes. Sliding starts instantly when the note is up for playing.

Playing

To start playing in the grid editor use the same keys as in the arrange window. You can also use the play/stop button in the lower left corner of the window. Press it once to start playing and once again to stop. While playing the button gets a lighter blue color.

Cycle

The grid editor offers a higher cycle resolution than the arrange window.
Start and end points can start on any sixteenth note. This makes it perfect for looped edits.
The cycle region goes back to full measure resolution when you close the grid editor but the start and end points are kept until you open it the next time.

To create a cycle:

- Mark out the cycle region in the upper part of the bar ruler.
- Press **LEFT SHIFT** key to join an already defined region.

SPL

You can set the SPL by clicking in the lower part of the bar ruler. Alternatively use the **£** key to step forward and the **CLR HOME** key to step backwards.

Catch

 When catch mode is activated the screen is automatically updated to follow the SPL. This occurs as long as the SPL is inside the boundaries of the current sequence.
If you start scrolling the grid editor window horizontally, catch mode is automatically switched off.

Solo

 The solo function mutes all tracks except the one for the current sequence.
That way you listen to it in solo. Very convenient when editing.

Output (echo notes)

 When output is activated notes that are selected, inserted or moved are echoed in the same track. The same thing goes for clicking the piano keys on the left side of the screen.
If the sequence is transposed so are the echoed notes.

Colors

The grid editor uses several colors to display notes.
Lower velocity makes the note appear in darker colors whereas a higher velocity results in a light color. Selected notes are displayed in black color and destination-notes for a slide or pitch bend appear in white.

Alternative Editing

Instead of using the mouse to insert notes you can use a step input for some fast composing.

Step input keyboard

The input mode is activated with the **I**-button in the upper left corner of the window.

- With the Sequencer not playing, press the **I**-button to turn step input mode on.
- Set the SPL at the position you wish to start.
- Set instrument and octave in the window title bar.
- Play the notes you want to insert on the C64 keyboard.
- Use SPL buttons (**£** and **CLR/HOME**) to step forward to create pauses or backwards to go back.

When you're done, turn off the input mode to not accidentally overwrite any notes.
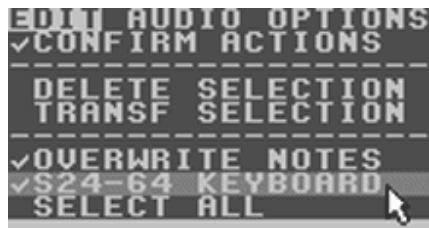
If you wish to use an external keyboard check the *s24-64 keyboard* option in the *EDIT* menu.
Sequencer edition now inputs notes from the input signals on the user port instead of the C64 keyboard. However, this requires an external dedicated interface to convert MIDI-signals to s24-64II data.

When in s24-64II keyboard mode, external sync is turned off.

Recording

It's also possible to record sequences into the grid editor in real time.

- Press the record button in the lower left corner of the window to start recording. If the Sequencer is already playing, recording starts instantly.
  If not, SPL starts from cycle start. If cycle mode is turned off it starts two measures ahead of the open sequence.
- Provided that the SPL is within the current sequence's boundaries and the grid editor window is open, all key strokes on either C64 keyboard or the external keyboard (if active) is recorded into the sequence.
- Recording mode is turned off either by stopping the sequencer, exiting the grid editor or deactivating recording mode by clicking the record button once again.

- C128 users can use the numeric pad ***** key to start recording.

Metronome

There is a built in metronome to guide your playing when recording.

The metronome works on SID 6581 revisions only.

8580 cannot handle the technique used to produce the click.
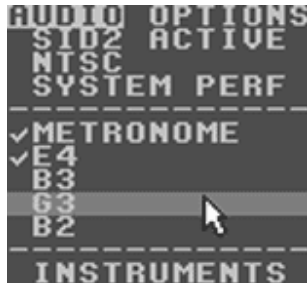
To activate the metronome and select any of the five metronome key notes check the options in the *AUDIO* menu.

You can use the metronome button in the transport window to toggle the metronome too.
Metronome is turned on by default at start up.

Transform Functions

Transform functions affect notes directly. These are covered in a separate chapter.

Control Sequence Editor

The first track in the workspace window is a control track for control sequences only.
A control sequence is a special object that contains special event data. The data is stored within the sequence on every second sixteenth note.
The color is gray and the length is fixed at one measure. You have 31 control sequences available and those can be further copied as alias objects like the other sequences.
Control sequences only exist within the control track and cannot be moved or copied outside of it.

The Control Sequence editor is where you edit the control objects. It's a modal window that opens up when double-clicking a control sequence.
Double-clicking an alias object will give you the choice of either editing the original data or to create a new copy.

The data is laid out in eight columns with one row for every data type. The columns represent every two sixteenth notes in the timeline. You change the value by clicking on it and move the mouse up and down. The value is cleared before editing starts.

The types of data events you can store in the control sequences are:

Tempo Changes

The first row stores information about tempo changes. If you set a value in any of the eight time positions the tempo will change at that position in the song.

Synchronization Resolution

The second row is where to put changes in synchronization resolution. That is whether to run on 24 or 48 tics per quarter note.

Volume Change

Volume changes are stored in the third row. Values go from 0 to 15 and affect both the internal SID and second if installed.

Shuffle Change

Second row from the bottom stores shuffle changes. Values go from 0 to 7. A zero equals no shuffle.

Note:

Sequencer edition does not automatically restore the tempo, volume or shuffle levels. Whenever you change these, you will have to manually change them back or add another control sequence to do it for you.
Tempo and shuffle can be manually altered in the transport window. Volume does not have a manual control.

Pattern Select

The last row sends pattern select commands to the s24-64II interface.
If you have a Prophet64 Mono Synthesizer, Bassline or Drummer edition connected to the Sequencer's user port and active in external sync mode they can receive these commands and change patterns according to your output.

Even though the control sequence has eight positions to send pattern select information the receiver will not switch pattern until the start of the next measure. Therefore it's wise to send the pattern select number a couple of sixteenth notes ahead of the next measure. Sending several different numbers has no effect, only the last one.

Be aware of that sending pattern selects will lock up the other edition's pattern until its synchronization mode is switched back to internal clock.

Sequencer edition mirrors the synchronization signal on the s24-64II so that the other connected computer follows it.
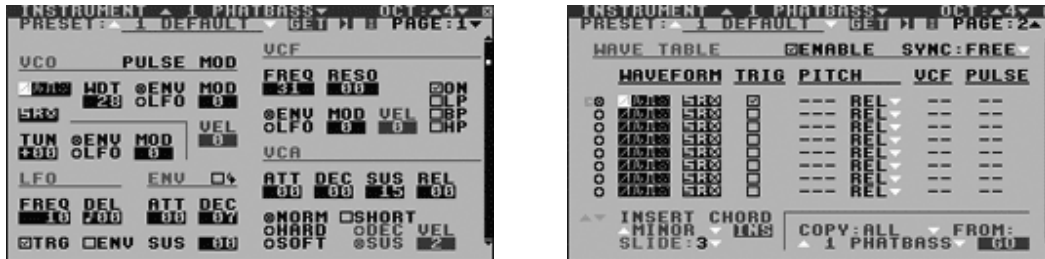
Note:

Instructions on how to build the s24-64II interface and correctly connect the pins for pattern select are described in the booklet *Prophet64 – Getting Started*.
It also contains important information on what to look out for when connecting the user port of one C64 to another. Please read it carefully before attempting to connect two computers together.

Instrument Editor

The Prophet64 Sequencer has a total of 32 instrument "slots". You edit those in the instrument editor window by choosing the *Instrument Editor* option in the *AUDIO* menu.

The editor window has two pages to access all parameters.

Note:

If you are a complete newbie to synthesizer sound editing, this manual will not be of much help. You should first get information on how to 'program' synthesizers elsewhere.

Selecting Instrument

The title bar of the instrument editor window displays the current selected instrument, its name and which octave to use for playing.

The selected instrument is the same as in the grid editor. When you change it there, it also changes in this window and vice versa. Use the arrows to alter instrument and octave.

Naming an Instrument

Double-click the instrument name in the title bar and enter a new name. Press **RETURN** key when ready.

Factory Presets

To simplify the instrument creation process a total of 68 factory presets were included in the application. These can be loaded into an instrument slot for direct usage or further edits.
Even if you are a pro on editing instruments the presets are a fast point to start.
A newbie will certainly benefit from the easy access to lots of classic sounds from the SID and that is why this chapter starts with focusing on those presets.

The 68 presets can be loaded into any of the 32 instrument slots. However, since nr. 17-32 are not capable of running wave table sounds it's not a good idea to load a wave table preset into any of those slots. You recognize wave table presets by the dash sign next to the preset number.
Some sounds are also using filters and therefore vary in quality in between SID revisions.

The first preset named *Default* is the same as the startup instrument loaded into all the slots. With a simple sawtooth waveform and a sustain-only envelope it's very basic and great to start with when creating new sounds. It's a quick patch to play with when learning the application (or if you're just in the mood for some early 90s gangsta funk!).

PRESET: ▲ 15 NEATLEAD ▼ GET

To select a preset, use the arrow buttons to find a sound of interest then double click the *Get* button.

1. DEFAULT	18. BASSGTR3	-35. OP HIHAT	52. DYNASTY
2. BEEFSTEAK	19. SYNBASS1	-36. COWBELL	53. ELECSNAP
3. SYNPAD	20. SYNBASS2	-37. SIMMONS	54. WHEELER
4. EUROPAD	21. 8580 BASS	-38. DISCOTOM	55. GOGETIT
5. NICEPAD	22. POP BASS	-39. BIGSLOPE	-56. LASTNINJA
6. C64LEAD1	-23. C64 BASS	40. VELOPULSE	-57. CHDMINOR
7. C64LEAD2	-24. HUBKICK1	41. ANALOGVL	-58. CHDMAJOR
8. C64LEAD3	-25. HUBKICK2	42. BANJO	-59. FALLING
9. JR EWING	-26. POP KICK	43. TUBA	-60. BASS BD
10. VACUUMDOG	-27. ELECKICK	44. FLUTE	-61. BASS SD
11. LEAD US	-28. DEEPKICK	45. MELOTRON	-62. BASS HH
12. PAN PIPE	-29. HUBBSNR1	46. CLAVINET	-63. AREA 51
-13. STARLEAD	-30. HUBBSNR2	47. CHINA	-64. POLE POS
-14. WARPLEAD	-31. POPSNARE	48. WHINING	65. DUCKTALK
15. NEATLEAD	-32. SOFTSNR1	49. CHARMED	66. CHEVY9C1
16. BASSGTR1	-33. SOFTSNR2	50. INFECTED	-67. LASERHIT
17. BASSGTR2	-34. CL HIHAT	51. RATTLER	68. BOEING737

Testing Instruments

I   You can use the C64 keyboard (or external keyboard with the s24-64II keyboard feature) to play the instrument live. As long as the Input-button is active use the **ZSXDCV**… keys for the lower octave and **Q2W3ER**.. keys for the higher octave.

The lower part of the C64 keyboard follows the default octave in the window title bar.
The instrument plays in the track of the last selected sequence.
(Note: s24-64II keyboard feature requires a dedicated device to convert incoming signals).

Sound Layout

Prophet64 Sequencer instruments have settings for oscillator (VCO), filter (VCF) and amplitude envelope generator (VCA). Added to this are three independent sources of modulation, a wave table for instrument 1–16 and additional settings like hard restart and tuning.

Modulators available are the low frequency oscillator (LFO) and the software envelope (ENV). Both of them can be routed to either pulse, pitch or filter frequency.
For greater flexibility the LFO can also act as a simple envelope and the envelope can be set to repeat like an LFO.
Note velocity is available as a real time controllable modulator to affect pulse, filter and VCA.

The wave table has eight rows of data to change waveform, pitch, filter and pulse settings. You can loop it from any position within the table and synchronize it to either internal/external clock, sixteenth notes, thirty-second notes or just let it run free (classic C64).

Editing

Click the left mousebutton in the black region surrounding the numbers and move the mouse up/down to alter the value. Keep both mouse-buttons depressed to reset the value. Radio buttons and check boxes are checked or toggled with the left mouse button as usual.

VCO

The VCO section includes settings for waveform, pitch and pulse modulation.
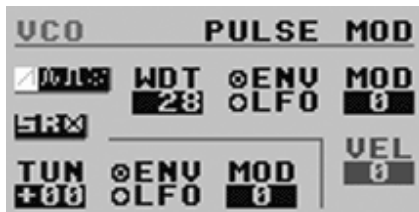
The four leftmost buttons select waveform(s). Click on the one(s) that graphically represents the SID waveform(s) you want: Sawtooth, Sine, Pulse or Noise. On the SID 8580 R5 any of the waveforms except noise can be mixed. The SID 6581 can only mix pulse and sine, all other combinations will result in silence.

The three buttons below the waveform buttons select built-in effects for the SID VCO:

Waveform Synchronization
This means that the frequency of this oscillator is synchronized with the frequency of another oscillator playing on a different track.

Ring modulation
This means that the sawtooth output of this oscillator is replaced with a ring modulated combination of this oscillator and another oscillator's output playing on a different track. Ring modulation is often used to create the sound of bells.

Oscillator Disabled
This turns off the oscillator completely.

Which oscillator is affected?
When using sync and ring mod the corresponding oscillator that affects this instrument's oscillator depends on in which track the instrument is playing.
(Note: here we use the Sequencer term "track" when actually referring to another oscillator)

Take a look at this table:

SID #	Sync/Ring mod instrument played in track:	Affects instrument playing in track:
1	1	3
1	2	1
1	3	2
2	4	6
2	5	4
2	6	5

Example:
Let's say you have created an instrument with oscillator synchronization currently playing in track 2. Looking up track 2 in the second column shows that the other instrument (oscillator) playing in track 1 is the one affected (third column).

If you copy the sequence from track 2 to track 1 the terms are changed. Now as the sequence is playing in track 1, it will affect the instrument playing in track 3.
If you didn't get that, take a look at the table: Instrument played in track 1 affects instrument played in track 3.
It's really not that hard, just remember that you are not totally free of choosing tracks for your sequences when using sync and ring.mod effects. Use the table as a guidance.

Note:

You should only set sync or ring mod on the instrument playing in the first track not the corresponding one. That will cause another sync/ring mod to occur.

Pulse
The width of the pulse waveform is defined and modulated in the VCO pulse section.
The *WDT* parameter is for basic pulse width, any other influence from either *LFO* or *ENV* will use this width-setting as a base point.
If you apply velocity modulation both LFO and ENV are inactivated for pulse mods.

Pitch
The pitch of the oscillator can be modified with either *ENV* or *LFO* for effects like vibrato, sirens, drum slopes etc.
The tune setting compensates pitch adding. It's also great for fine tuning effects if you play two similar instruments in different tracks. Detuned in each direction they form the classic 'euro' sound of modern dance music.

LFO

The LFO is a software driven Low Frequency Oscillator that can also function as a simple envelope.

The frequency operating range is between 0 and 127. Lower values make a slower oscillation whereas higher ones make the lfo go faster.
A zero value equals no oscillation at all.
You can delay the LFO operation with up to 15 sixteenth notes by setting the *DEL* value.

The LFO runs continously and resets only when a program change switches to another instrument. If you wish to retrigger the LFO at every strike of a new note check the *TRG* box.
As you do this you will notice another checkbox appearing named *ENV*.

When checking *ENV* the LFO turns into a rudimentary envelope using the frequency setting as a decay value. Lower values make a slower decay whereas higher values speed it up.
Unlike real envelopes, the LFO envelope stops when it reaches zero. There are no sustain or release settings and no attacks either.

ENV

The software envelope is an attack-decay-sustain envelope with the ability to also function as a simple yet quite controllable LFO.
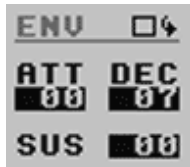
The different phases of the software envelope works just like a "real" envelope. You have 15 fixed values for every parameter.

It starts with the attack phase and moves on to the decay phase and then stops when it reaches the sustain level.

By checking the loop symbol the envelope turns into an LFO.
It works by looping the attack and decay phase endlessly. This way you get two alternating speeds when oscillating. If you want a standard sine wave set the same value for attack and decay.

VCF

The SID has only one filter that can be turned on or off for each of the oscillators. This requires some special treatment to get it right. More on that in a second, first let's have a look at the parameters:
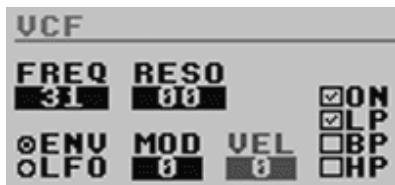
To filter is activated for the selected instrument by checking the *ON* checkbox. When checked an additional checkbox appears with filter type options. These are:
LowPass (*LP*), BandPass (*BP*) and HighPass (*HP*).
Any of those types must be selected in order for the filter to function properly. Several types can be mixed.

You can set frequency and resonance and modulate the frequency directly with either *ENV* or *LFO*. Select the source of modulation with the radiobuttons and then set the modulation amount (*MOD*).
The current frequency setting affects how low the filter goes. This comes in handy when modulating the filter frequency with a slow LFO to not shut the sound off completely as the LFO reaches a zero value.
(On that note you should know that all SIDs are different so there are no guarantees where you find the exact cutoff position for absolute silence, if any.)

By turning up the *VEL* parameter you apply velocity modulation directly to the filter frequency. If you set the *MOD* parameter at the same time then velocity affects the modulation depth instead.

SID Filter Rules

The SID filter has to be turned on and off individually for each oscillator using it. Sequencer edition handles this automatically whenever it encounters a program change with a filter instrument. You can watch it happening by looking at the *F*-icons light up when a filter instrument is playing.
When another instrument without filters comes up, the application turns the filter off again and you will notice how the *F*-icon for that track goes out .
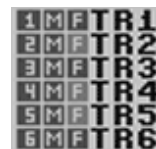
Because each SID circuit has only got one filter shared by all oscillators, the frequency and resonance settings are the same for all three. This means that in spite of the convenient filter handling you must still be aware of how the filter works and how to deal with it.

In practice it means that when you use two different filtered instruments on two different tracks within the same SID (1-3 or 4-6) they will have the exact same filter settings. The result is not likely what you wanted.

To prevent a frequency/resonance conflict Sequencer edition has an internal priority order: Whenever multiple tracks try to access the filter, the one being played in the track with the highest number "wins". This opens up for playing two or three tracks in unison with the same VCF modulation effect. The instrument playing in the highest track takes care of filtering as long as the other ones have the filter turned on.
On the other hand, if you want to play a synthesizer bass and a lead sound each with separate filters on two separate tracks within the same SID, you can't. Either compromise or put one instrument in a SID #1 track (1-3) and the other one in a SID #2 track (4-6).

Please note that this is not an issue with the Sequencer edition being poorly designed. It's a SID circuit limitation. Fact is no synthesizer circuit was ever designed with more than one filter per chip and Sequencer edition actually helps you out a great deal when handling it!

VCA

The VCA section controls the SID VCA envelope, sound triggering and velocity.

VCA envelope has separate controls for Attack, Decay, Sustain and Release.
These are the only parameters available for manipulating SID oscillator volume.
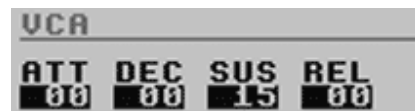
Additional VCA Settings

The controls beneath the envelope handle triggering, note trig-offs and velocity modulation.

Triggering includes three types:

NORM
Normal trigger.

HARD
Hard Restart. Initializes the SID envelope for the current track on each new note.

SOFT
Soft Restart. Another form of hard restart that preloads the SID registers with the new parameter values instead of initializing them.
This technique was first used in the early versions of the Drummer edition with great success. It enabled sounds to be triggered at different accentuated volumes completely free of clicks and pops caused by the hard restart.

The restart occurs some time before the note is about to trigger. The time depends on the speed of the song as it runs on internal or external clock.

SHORT

The *SHORT* option means that the note is shut off a little earlier. The result is a shorter note more like a TB-303. Hard and soft restarts are triggered earlier too.
Use this if you want 303 style for your notes or playing at high tempos and using hard/soft restart.

Velocity
Setting the *MOD* parameter routes note velocity to the VCA envelope.

The higher mod value the more effect of the velocity span. With a value of 3 the velocity curve is applied to the VCA envelope destination parameter directly.

The destination is either decay (*DEC*) or sustain level (*SUS*) of the VCA envelope.

Sustain velocity

With sustain velocity the modulation affects the sustain only. This makes perfect velocity sensitive sounds if attack, decay and release settings are all left at zero, like the default sound.

Decay velocity

Decay velocity works better when using hard restarted sounds, for example drums.

If you try to make a sound with a VCA decay and low sustain value and you don't hear any effect it's most likely because of the velocity *MOD*. Turn it off with a zero value.

How to master the SID envelopes

By now you have probably learned that the SID envelope occasionally triggers quite poorly. This only happens every 8 notes or so which makes it impossible to predict.
Back in the C64 heydays clever coders and musicians examined the SID carefully and came up with a cure called *hard restart*.
The idea behind hard restart is to initialize the SID envelopes a given amount of time before trigging the note. 33 mS is considered the optimal time.

Hard restart does not allow envelope release if two notes are triggered close together because it cuts off the sound completely. The upside however, is that the envelope triggers better.

All envelope settings do not work in every given situation. For example, wave table sounds with a textured content and rapidly switching the sound in between notes can be a bit tricky for the SID. So even if using hard restart you still need to tweak the ADSR to find the right settings.
This is what defines a good SID musician. Learn to master the envelope and how to find solutions in different situations and spend a little more time to experiment and get the envelopes right.

A concrete example of problems you will encounter when working with SID and wave tables is starting a wave table sound with the noise waveform.
These are known to cause trouble when retriggering, especially after a release phase from a previously played sound. The oscillator is then kept busy which is good in some occasions and really bad in others.

ATT	DEC	SUS	REL
00	08	04	04

Another example is when using fast decays for snappy sounds. Even with hard restart activated they might fail. Mostly this is due to the song's tempo that makes the pre-trig time deviate too much from the optimal 33 mS value.

ATT	DEC	SUS	REL
01	08	02	00

A trick to get around it is to use the Short option which re-triggers a little earlier, another is to apply a value of 1 on the attack setting (an old Prophet64 trick from the Mono Synthesizer).

Exactly how to deal with SID envelope issues is impossible to cover in this manual. Different situations require different angles. It's a matter of experimenting and tweaking and slowly gain the experience.

Wave Tables

Wave table is the accepted term for a predefined list of changes applied to waveform and pitch periodically about every 20 mS (classic C64). Another word often used is *arpeggio*, the technical term for broken chords.
It is the trick behind the infamous drum and chord sounds of the C64 era.

```
WAVE TABLE        ☑ENABLE   SYNC:FREE▼

    WAVEFORM   TRIG PITCH        VCF  PULSE

 ○  △◌◻◻  ⊑⊒⊠   ☑   C#5 ABS▼   31   08
 ⊗  △◌◻◻  ⊑⊒⊠   ☑   +03 REL▼   15   19
 ⊗  △◌◻◻  ⊑⊒⊠   ☐   030 ADD▼   07   --
 ⊗  △◌◻◻  ⊑⊒⊠   ☑   095 SUB▼   01   24
 ⊗  △◌◻◻  ⊑⊒⊠   ☐   --- REL▼   00   --
 ⊗  △◌◻◻  ⊑⊒⊠   ☐   --- REL▼   --   --
 ○  △◌◻◻  ⊑⊒⊠   ☐   --- REL▼   --   --
 ○  △◌◻◻  ⊑⊒⊠   ☐   --- REL▼   --   --
```

In the past most wave table editors were pretty hard to grasp. Parameters, waveforms, pitches and repeat points all had to be altered in hexadecimal numbers. Often the user also had to learn the control bits for different functions.
The Prophet64 Sequencer provides a fully graphic interface completely mouse controlled. Just left-click the parameter to change and move the mouse up or down to change the value.

Memory limitations restrict the use of wave tables to the first 16 instruments only. Length is fully variable but has a maximum of eight rows.
Each row stores changes in waveform, pitch, filter cutoff frequency and pulse width.

Wave table settings reside on page 2 of the instrument editor.   **PAGE : 1▾**
Either use the scroll bar or press the arrow next to the page number display to flip pages.

☑ENABLE

First check the wave table enable checkbox to activate the wave table.
The table data turns from gray into black indicating that it is enabled for editing.

When activated, waveform settings on page 1 are turned off and is completely controlled by the
wave table instead.

Loop

The first column displays loop points for the current wave table.
It's an eight step radio button list where the top button checked is the loop repeat start
position and the last one checked is the end point. To visualize it further Sequencer
edition draws a green line between the two points.
The wave table starts to play from the absolute top and then advances one step at a time
when the sync-criteria you have given is fulfilled.
When the end point is reached it jumps back to the repeat start point.

Set the repeat start point by left-clicking the radio button at the position you
want. Then set the end point by left-clicking the radio button at the requested end
position holding the **LEFT SHIFT** key.
Since there is no way to turn off the loop, you need to set the last position of your
table as both repeat start and end point if you want it to stop when the table has
finished playing. Keep in mind that this will repeat the waveform, pitch, pulse
and filter settings in that last row.

Moving a looped table

Right under the loop controls are two arrow buttons. These move the whole loop section
(the table rows within the 'green' area) up or down.
It does not only move the loop points but everything inside the loop also. Data outside the
boundaries is overwritten.

Waveform

The waveform column selectes waveform for the current row.
The four waveform buttons and three additional ones are just the same as in page 1.
Refer to the *VCO* section earlier in this chapter for more info.

Click the buttons to select waveform for each row respectively in the
wave table. Leave it empty if you want the previous waveform, just
don't forget to set a waveform for the first row.
As you enable a wave table the VCO section in page 1 becomes
inactive and the sound completely relies on the table to handle this.

Trig

The trig column determines whether to trig the sound on or off.

To trig a sound set a waveform for the same row and check the trig checkbox. To trig off a sound set a waveform for the same row but leave the checkbox unchecked.

Do not check the trig checkbox if you don't have a waveform on the same row. That results in no sound at all and might confuse the SID envelope.

Pitch

This column sets the pitch change for the current row.

The pitch setting has four different modes:

Absolute
In absolute mode you define the note to be played regardless of note and transpose values. The table's pitch column displays the absolute note.

Relative
Relative is the standard mode for wave table pitches. It transposes the pitch a given amount of semi-notes up or down from the current note, transpose included.
Make three or four relative pitch changes in a harmonic pattern and you've got yourself a chord.

Add
Adding pitch means adding a value to the current frequency. While relative pitch operates in semi-notes, add (and sub) uses direct frequency.
This is ideal to create a pitch slope for drums or sound effects like sirens etc.

Sub
The same as add but subtracts the value instead.

Filter

The filter value in a wave table row overrides the current filter frequency setting.

If you don't know how the filter works see the *VCF* section earlier in this chapter.

Pulse

The pulse value in a wave table row overrides the current pulse setting.

Wave Table Synchronization

You can choose between four different ways to advance wave table row when playing.

SYNC:FREE

FREE
Classic C64 style. The time in between each row is approximately 20 mS.

TICS
The wave table advances at every tic from the internal or external clock. There are six tics per sixteenth note in SYNC24 mode. The result is a slower or faster wave table sound depending on the current tempo.

1/16
Wave table advances every sixteenth note.

1/32
Wave table advances twice as fast as the last option, at every thirty-second note.

You can try out these different sync modes to create interesting sounds.
Try changing waveforms every sixteenth note, perhaps combined with some waveform sync. or ring modulation effects. Or try running a thirty-second note classic arpeggio.

Wave Table Transpose and Pitch Bend

Transpose settings on a sequence will affect wave table rows with relative pitch change data only. Absolute and add/sub pitches are not affected.
Pitch bends affect all add/sub changes and relative pitch changes with a zero value (no transpose).

Insert Chord Function

To quickly create chords there is a handy *Insert Chord* function. Just select a type of chord and double click the *INS* button.

INSERT CHORD
MINOR9 INS

The pitch pattern is inserted into the first four rows of the wave table. All other data is unaffected.

Wavetable Example: A Simple Bassdrum

To make it easier to understand the wave table concept, here are two examples of the most commonly used wave table sounds. Let's start with a bassdrum.
To imitate a bassdrum sound, we need to break it down to some basic building blocks:
First, there's the initial click of the drum pedal beater.
Second, there is a sloped pitch falling from a medium frequency to the absolute bottom.

To create such a sound with a wave table we'll use a noise waveform to define the click and switch to a pulse wave to create the slope. You can later experiment with different pulse settings or even change the waveform to a sine or sawtooth.

To make it as simple as possible we use only three rows:

WAVEFORM	TRIG	PITCH		VCF	PULSE
⏻	☑	D#7	ABS	--	--
⏻	☑	+01	REL	--	--
⏻	☐	151	SUB	--	--
⏻	☐	---	REL	--	--

The first row is a noise wave with an absolute pitch pretty high up.
The second row is the first pulse sound. You will need this row to have a reference note for sliding. We choose a medium frequency in relative mode so that you can vary the pitch when playing the sound later on.
The last row is an infinite loop continuously subtracting 151 from the current pitch. That should make a nice slope falling down until it hits the bottom. You probably need to tweak the subtraction value further when adjusting the kick to the tempo and style of your song.

Finally we set the VCA envelope to hide the very last part of the slope. Try these settings:

```
UCA
ATT DEC SUS REL
 81  10  82  00

○NORM □SHORT
⊗HARD  ○DEC  UEL
○SOFT  ⊗SUS   0
```

Wavetable Example 2: A Simple Chord.

A normal chord such as C-major consists of three or four tones in a harmonic pattern. In this case: C – E – G and possibly an additional C one octave up to thicken the sound.

The wave table plays through this sequence of notes repeatedly to create the illusion of a full chord. Of course it will not sound like a real chord with three or four voices playing in unison but a very special sound that truly defines the computer game era of the 80s.
Play it back to any old gamer or coder and notice the nostalgic smile on their faces..

```
     WAVEFORM  TRIG PITCH
 ⊗                ☑   --- REL▼
 ⊗                □   +03 REL▼
 ⊗                □   +07 REL▼
 ⊗                □   +12 REL▼
 ○                □   --- REL▼
 ○                □   --- REL▼
 ○                □   --- REL▼
 ○                □   --- REL▼
```

You can also play the fundamental tones of the chord in another sequence to make it more interesting such as starting with the third note one octave lower etc.
Nevertheless, it's recommended to use the *Insert Chord* function to create a wave table chord from the ground up. It is very convenient and a fast way to get started.

Slide Time

You can set the slide time for every single instrument. This opens up for legato features (no re-triggering) or fast portamento effects.
Using a value of 3 (default) and you'll get the classic TB-303 slide.

```
SLIDE:3▼
```

Slide times range from **1** (fast) to **4** (slow). You change it in the lower left corner of the instrument editor in page 2.

Copy Instruments

Instead of using a pen and paper to write down an instrument's parameters and then re-enter those into another instrument slot the Sequencer edition has a simple yet very handy copy function.
You find it in the lower right corner of the instrument editor window on page 2.

First select if you want to copy all of the instrument's parameters or just the wave table and then select from which instrument slot to copy. Finally click the *GO* button to execute the copy.
(Note: Trying to copy a table does not have any effect on slots above 17.)

Having access to a copy function is great if you have filled up the lower 16 slots with instruments that do not utilize wave tables. To make way for a new wave table instrument you need to move a non-table instrument to any of the upper 16 slots.
Another example is working with multiple identical instruments. Instead of starting to create the same instrument in the next slot you just select it and press *GO* to copy.

Note:

Tips! Put all your instruments without wave tables in the upper slots (17-32). That way you free up space for instruments that really need the tables.

Transform

The transform functions are designed to perform time-consuming tasks on a multiple selection of notes. This is very useful when you have many similar changes to make.
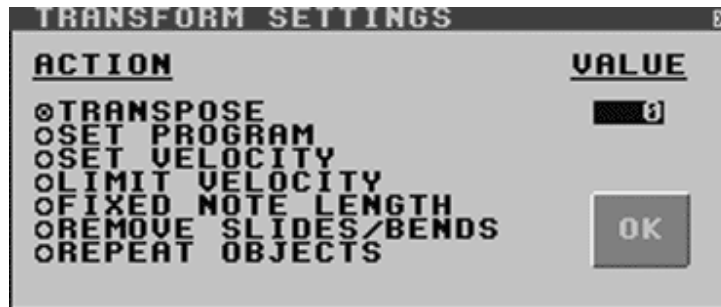
Transform functions work with the two types of selections available in the Sequencer:

- Arrange window workspace objects, i.e., sequences (non-alias).
- Grid editor window objects, i.e., selected notes.

To transform a sequence object in the arrange window:

- Open the *Trsf Settings* in the *FUNCTIONS* menu, select a function and set the value.
  Then close the transform settings window.
  Clicking *Ok* will <u>not</u> start the function.
- Check the *Transform Selections* option in the *EDIT* menu.
- Make the selection as usual:
  Press **LEFT SHIFT** key
  Click the left mouse button and mark out the selection with the mouse.
- As you release either **LEFT SHIFT** key or left mouse button the selection becomes active and the transform function starts.
- Only valid sequences (full non-alias objects within the brackets) are affected.
- After you are done, uncheck the *Transform Selections* option to be sure that you do not accidentally trigger it when making a normal selection.

To transform a selection of notes in the grid editor:

- Select the notes you wish to transform
- Open the transform settings window by choosing *Trsf Settings* in the *FUNCTIONS* menu and make your choice.
- Click *OK* and the transformation starts.

Notice the difference in how the *OK*-button works in the Transform Settings window.
Only with an open grid editor window the button executes the function.
That is because the grid editor has a stored selection whereas the arrange window hasn't.
The arrange window needs to execute the function after the selection is made.

To select a function, click the radio button next to the one you wish to use and set the parameter value. The value has a different meaning for every single function.

Transpose

This option transposes the note frequency either up or down. Select a transpose setting to add or subtract from the selected notes.

Set Program

This option alters the program changes (instruments). Select a value between 1 and 32.

Set Velocity

This option sets all note velocities to a fixed value between 0 and 15.

Limit Velocity

This option lets you set a treshold for which the velocity should never exceed.
When the function executes it automatically lowers any velocity above the treshold.

Fixed Note Length

A convenient way to length-quantize all the notes in your selection. You can easily decide that all notes should have the length of, for example, four sixteenth notes.
In practice this requires free space so every note might not be converted. Whenever another note gets in its way the note length is stopped. No overwriting occurs.

Remove Slides/Bends

This option removes slide and pitch bend commands from the sequence.
In the grid editor this function ignores selections. *All* slide and bend commands within the open sequence are removed.

Repeat Objects

This function is very useful if you have a long loop of sequences or notes. It repeats your selection any number of times you like.
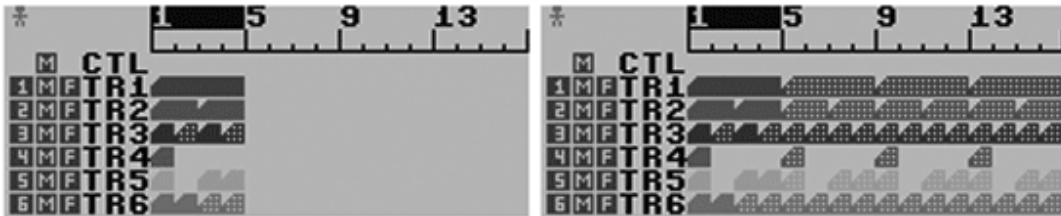
Repeating objects in the arrange window means that all valid (objects within the brackets) sequences are copied a predefined number of times as alias objects.
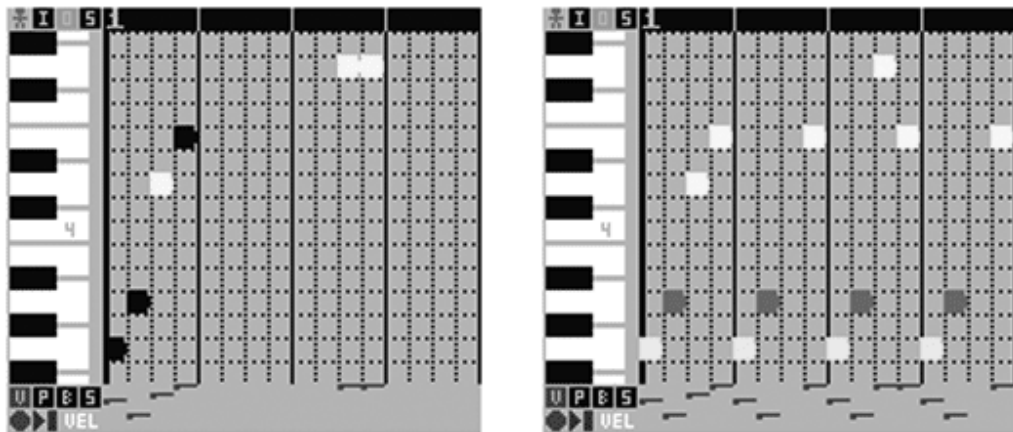Destination area starts at the end of the active selection.

The grid editor handles the repeat objects function by copying selected notes:
The sequence of notes repeated starts at the first selected note and finishes at the last selected one. All selected (black) notes within that range are repeated starting one sixteenth note after the last one selected.

Depending on the current state of the *Overwrite Notes* option in the *EDIT* menu, blocking notes are overwritten or ignored.

Note:

Try out the these functions for yourself and learn how to properly use them in your work and how they can help you to be more effective.
Caution! Make sure to uncheck the *Transform Selections* option in the *EDIT* menu when you're done to prevent accidental loss of data

Advanced Random Composer

The Advanced Random Composer is a modal window where you can create a random sequence.
For this to work you must select a non-alias sequence or have the grid editor open.
Your C64 needs to be equipped with a fully operational SID in the original socket (SID oscillator #3 is used to obtain random numbers).
Control sequences and alias sequences are not affected.

The A.R.C. uses your parameters to decide how many notes and which ones to include and in what range to operate. The result is then stored in your current selected sequence and can be played back or further edited just like any other object.
Depending on your input the result can be very harmonicly interesting.

You open the Advanced Random Composer by selecting *A.R.C.* in the *FUNCTIONS* menu.

Lock Notes

Click the left mouse button on those notes you wish to lock (include in the process).
Click once again to unlock (exclude).

You can also use the upper and lower part of the computer's keyboard as a piano keyboard to toggle the locked notes.
If you wish to clear the whole keyboard press the **CLR HOME** key.

Range

Range is the span of octaves to use.

RANGE:6

The random process always starts with the currently selected octave (see the title window in either grid editor or instrument editor). The range you decide is then randomly added to the current octave. A value of 1 keeps it in the same range at all times.

Steps

The maximum amount of notes to be included. This depends on the length of the selected sequence. You can also select *RND* to let the A.R.C. randomly decide the amount of notes.

STEPS:RND

Press the left mouse button and move the mouse up/down to alter the step value.

Slide

Select whether to include a random slide or not.

SLIDE:⊗YES
○NO

If yes, the A.R.C. randomly decides to put a slide on each note or not.

Velocity

Select how much to randomly decrease velocity for the notes.

VEL. :-15

The lower value the greater span of velocity.
If you leave this parameter at zero all notes get maximum velocity.

Start Randomizing!

Click on the randomize button to start.

RND

You can interrupt the process at anytime by pressing the **RUN/STOP** key.

Example

Look at the overall A.R.C. picture 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.

Files

The file operations in the Prophet64 Sequencer has a separate screen window. Even though accessed via the *FILE* menu there is no further mouse control once the files screen is entered. Use the **CRSR** keys and **RIGHT SHIFT** to navigate and **RETURN** key to execute a function/select file etc. Use ← key to cancel/step back.

Media

The Sequencer uses two types of media to load and save data: disk and SDR.
Tape is not supported.

Disk

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.

```
SELECT FILE  286
MY PROJECT
MY PROJECT2
BEATSNBREAKS
CANTLETYOUGO
```

The file operations for the floppy drive make use of the operating system's disk functionality. In practice this means that there are no delete-functions built in and no replace-and-save options. If you try to save the file onto disk using a name that already exists the save is interrupted and the drive light flashes.

When reading the directory the correct type of files are 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 on that type of files.
The *No Files* dialog displays the number of blocks free on the disk in the upper right corner for you to see whether it's totally empty or not.

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

Prophet64 Sequencer File Types:

File suffix	Disk space		
.ARR	77 blocks	> 19 Kb	Sequencer project including instruments
.SEQ	2 blocks	< 1 Kb	Single sequence export
.INS	1 blocks	< 1 Kb	Single instrument export

SDR

SDR is short for Serial Data Register, a hidden feature never used by any peripheral device released for the C64 platform.
The SDR works with a serial data stream on the user port. A dedicated device must handle this data to store it on a separate media.

This makes file management an issue for the user and not the Prophet64 file functions.
For example, one could save SDR data onto a digital device like pure audio data. The user then decides where to put the file, how to handle multiple saves etc.

The procedure for saving and loading SDR data is very simple. You are asked to start your digital device and then press space to start the C64 read/write sequence.
Saving can be switched to verifying instead. That makes the program read from the SDR device comparing the saved data to the current memory. The save is then considered valid if the SDR data is identical to the memory data.

Several speeds are available for SDR save, enabling the output to fit various devices. Speed is selected when saving. SDR loading automatically adjusts to incoming data.

While saving and loading the screen flashes in different colors. Every time a new block of 256 bytes is finished the set of colors changes.
If the type of the file found when loading is wrong, loading halts and you are notified.
Note that the C64 does not have any control of the SDR device's current state i.e., it cannot control the player to actually start or stop.

Opening the Demo Song

To open the demo song:

- 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 song.
- Press **Y** key or **RETURN** key to confirm. The **N** key or ← key cancels.
- When the demo song is opened (takes a split second) press ← to return to the arrange window.

You need two SIDs installed (using a SID2SID for example) to hear the full demo song.

If you are running the program on a Commodore 64 built for the NTSC TV system you must also adjust the Sequencer to NTSC. See the chapter *Using the Prophet64 Sequencer* for more info.

Save Project

A project save includes arrangement data, sequences, instruments and settings.
Make sure to save often to avoid losing your work!!

To save a Sequencer 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.

- File saves onto disk. After saving is done press ← key to return to the arrange window.
- If the disk already contains a project file with the same filename the drive light flashes and you are notified with a *Save Error* messagebox.

SDR:
- Select *Save* in the *FILE* menu.
- Use **CRSR** keys to select *SDR* as media source and press **RETURN** key.
- Enter a filename in the dialog and press **RETURN** when ready or ← to cancel.
- Select a speed for SDR. Start by using slower speeds and gradually try out the device with faster settings.
- Now make your digital device ready (start recording).
- Press **SPACE** key.
- Screen goes blank and flashes while saving.
- When saving is done press ← key to return to the arrange window.
- You can break the save operation anytime during saving by pressing the **RUN/STOP** key.

Verifying SDR Saves

After an SDR save, data can be verified:

- Go through the save process once again from the start and enter the exact same filename.
- When the messagebox asks you to press space there is also an option to press **CTRL** key to start the verifying process.
- Press **CTRL** key. Screen goes blank.
- Start supplying data from your digital device (that is, play it back, not record!).
- If data is found to deviate from the current memory the verify process is interrupted and you are notified. If not, the verify process continues until the file is fully compared and you are notified that everything is ok.

Open Project

To open a Sequencer 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.
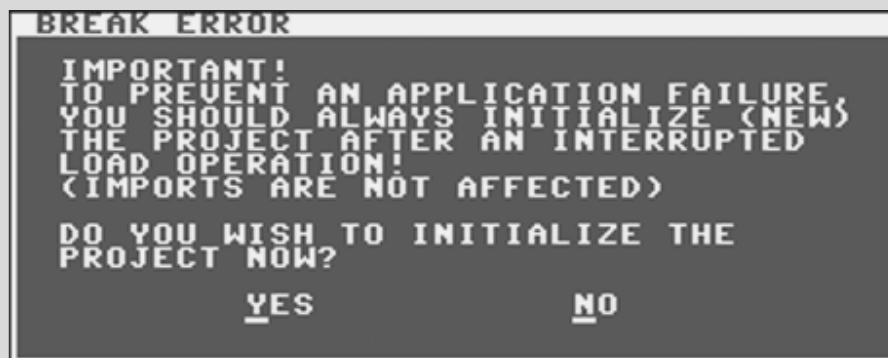- Wait until the directory is loaded.

- 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.

SDR:

- Select *Open* in the *FILE* menu.
- Use the **CRSR** keys to select *SDR* as media source and press **RETURN** key.
- Make your digital device ready.
- The dialog box asks you to press space and then start your digital device.
- Press **SPACE** key. Screen goes blank and awaits your digital device.
- Start your digital device (play back). Screen flashes as data is received.
- When the file is loaded press the ← key to exit the files screen
- If a file is found with a different file type type, loading stops and you are notified.
- You can break the operation anytime during loading by pressing the **RUN/STOP** key. However, this opens the initialize screen asking you to clear the memory.

Note:

Important! If you interrupt a loading process of a Sequencer project vital data might be corrupt when returning to the arrange window. This can cause a fatal crash if ignored. Therefore it is adviced that you initialize memory if you for any reason have interrupted a load operation.

```
BREAK ERROR

IMPORTANT!
TO PREVENT AN APPLICATION FAILURE,
YOU SHOULD ALWAYS INITIALIZE (NEW)
THE PROJECT AFTER AN INTERRUPTED
LOAD OPERATION!
(IMPORTS ARE NOT AFFECTED)

DO YOU WISH TO INITIALIZE THE
PROJECT NOW?

        YES              NO
```

Press **Y** key or **RETURN** key to go through and initialize the memory.
You can do this later at any time with the *New* function in the *FILE* menu. Just be aware of that further edits in a corrupt project might cause the Sequencer application to suffer from irreparable runtime errors forcing you to switch the power off to proceed.

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

Export Sequence

You can export the full content of a sequence onto disk or SDR.
All notes, velocity values and note controls are saved, color and transpose settings are not.

To export a sequence:

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

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

- Use **CRSR** keys to select which sequence to export, then press **RETURN** key.

  Note that sequences that exist are displayed in white color. Black ones are not selectable.

- 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.
- When done saving, press ← key to return to the arrange window.
- If the disk you have inserted already contains a sequence file with the same name the drive light flashes and you are notified with a *Save Error* messagebox.

SDR:
- Use **CRSR** keys to select *SDR* as media source and then press **RETURN** key.
- Enter a filename in the dialog and press **RETURN** when ready.
- Select the SDR speed.
- Now make your digital device ready (start recording).
- Press **SPACE** key.
- Screen goes blank and flashes while saving.
- When done saving press ← key to return to the arrange window.

Export Instrument

You can export a full instrument including the wave table onto disk or SDR.

To export an instrument:

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

```
SELECT
SEQUENCE
INSTRUMENT
```
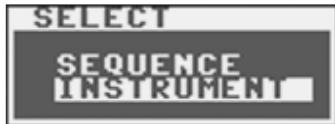
- Use **CRSR** keys to select which instrument to export, then press **RETURN** key.

```
INS
01
```

- 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.
- When done saving, press ← key to return to the arrange window.
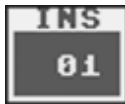- If the disk you have inserted already contains an instrument file with the same name the drive light flashes and you are notified with a *Save Error* messagebox.

SDR:
- Use **CRSR** keys to select *SDR* as media source and then press **RETURN** key.
- Enter a filename in the dialog and press **RETURN** when ready.
- Select the SDR speed.
- Now make your digital device ready (start recording).
- Press **SPACE** key.
- Screen goes blank and flashes as data is transmitted.
- When saving is done press ← key to return to the arrange window.
- You can break the save operation anytime during saving by pressing the **RUN/STOP** key.

Import Instrument

You can import an instrument into any of the 32 slots. The first 16 slots accept full instruments, the last 16 (17-32) will only load basic instrument data, no wave tables.

To import an instrument:

- Select *Import* in the *FILE* menu.
- Use **CRSR** keys to select to import an instrument then press **RETURN** key.
- Use **CRSR** keys to select which instrument slot to import into.
- 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 a file in the directory list.
  (If the disk you have inserted does not contain any instrument files you are notified with the *No files* messagebox.)
- Press **RETURN** key to start loading or ← to cancel.
- When done loading, press ← key to return to the arrange window.

SDR:

- Use **CRSR** keys to select *SDR* as media source and then press **RETURN** key.
- Press **SPACE** key.
- Start playing back data on your digital device.
- When done loading, press ← key to return to the arrange window.
- If a file is found with a different file type, loading stops and you are notified.

Making PSID Files

The Prophet64 Cartridge features a separate application that converts your Sequencer projects to either C64 stand-alone executable files or PC PSID files.

The Sequencer files are not made to be compact in size or even optimized for CPU performance. In fact they eat both memory and CPU power.
Those looking for a player to include Prophet64 Sequencer projects in demos or games will be disappointed to find it is not possible. The Sequencer was primarily developed as a music sequencing tool for recording studios, not to make game or demo music.

```
SELECT APPLICATION
SEQUENCER
MONO SYNTHESIZER
BASSLINE
DRUMMER
TEST PORTS
TEST AUDIO
CONVERT TO PSID
```

Select the last menu item Convert To PSID in the startup menu and press the **RETURN** key to start the application.

Loading a Sequencer Project

When the application starts you have one option only and that is to read the directory to load a Sequencer project file.

```
LOAD FILE
READ DIRECTORY
```

Note that this application only supports disk files. If your project is saved with SDR media first load it into the Sequencer and then save it onto a floppy disk.

- Insert the floppy disk containing your Sequencer project and hit the **RETURN** key to load the directory.
- Select the project file you wish to convert in the list of appropriate files (only *.ARR* files are listed).
- At this point you can either cancel and return to the main startup menu using the ← key or continue and start loading the file with the **RETURN** key.

Set Properties

When the file is loaded the main window opens with file properties and output file options.

You fill out the form and press *SAVE!* to start compressing and saving the final file.

When the file is saved the application returns to the Prophet64 Cartridge startup menu.

Note that you cannot escape to the startup menu from the property window other than to save the file unless you switch off/on the power on your C64.

Making a C64 stand-alone exe file

To create a file that plays directly on a C64 (or a PC-emulator):

- Select *C64* as the type using **CRSR** keys left and right.
- Enter a filename for the output file. Make sure it does not already exist.
- Enter a title, author and copyright statement for your song.
- If you want to target a SID select either *6581* or *8580* or *No* if it doesn't matter.
  In this case the target SID does not have any other effect but to show the listener for which SID version the song was originally composed.
- If using SID #2 you can set a base address to access the SID. For C64 exe files this is used as a guidance only since the user is free to set this address when starting the file later on. If you wish not to playback any additional SID #2 tracks or your song is made for one SID only, select *Off*.
- Select *SAVE!* and the file compresses and saves.
- When done saving you are returned to the main startup menu.

Playing the file on a C64

To play the file on a real C64 or an emulator:

- With the Prophet64 Cartridge removed, load the executable file from the C64 startup screen using the basic disk load command:
  LOAD "filename",8,1
  (Exchange "filename" with the name of your file enclosed with double quotes.)
- Press **RETURN** key.
- File starts to load. When ready enter:
  RUN
- press the **RETURN** key.

The player program starts up.
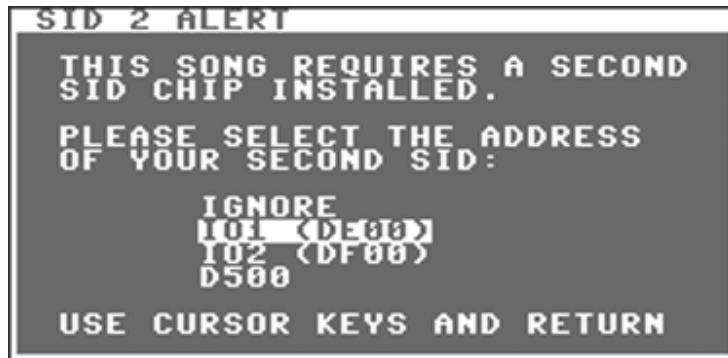
If the song uses SID #2 you are first presented with an option where to address the second SID.
If you don't have a second SID installed you can select to ignore. Note that you won't hear all six tracks with only one SID installed.
Ignoring also means that the program wont cause conflicts with fast loader cartridges etc. that might be present on the expansion port.
Read more about accessing the second SID in the end of this chapter.

While playing, pressing **SPACE BAR** key blanks out the screen to improve audio quality.
RETURN key restarts the song.

Loops

Important to know when saving your Sequencer project is to decide how to loop the song.
If you leave cycle mode activated the playback will loop the cycle range.
If you save the file with cycle mode off the playback will loop the last measure defined as the song's end point.

If you want the song to stop make sure you set the end point one measure after the last object (see picture on the left).

It is however recommended to always leave cycle mode activated and define a cycle to play even if the looped range is a completely empty area.

Playing the file in the VICE emulator

VICE is one of few (the only?) PC-emulators capable of reproducing a second SID.
Though versions of the VICE emulator might differ, here is a general explanation on how to play a double-SID version of your song in that emulator. VICE version used in this example is 1.14

To activate the second SID:
Select the window for SID settings in the VICE emulator.
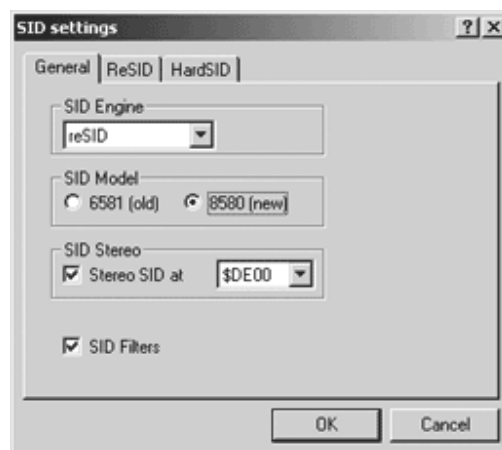
Activate the SID Stereo option and select the same address you chose in the menu when starting to play the song. $DE00, $DF00 or $D500 are your alternatives even though VICE gives you lots of options. To keep it simple, use the same address Prophet64 is originally designed for: $DE00.

Note that the sound quality in VICE is reduced when emulating six SID oscillators compared to only three.

Making a PSID File

The procedure of making a PSID file is somewhat similar to making a C64 executable file.

-If you haven't already, read the section on *loops* earlier in this chapter to understand how to set the cycle correctly.

- Select *PSID* as the type using **CRSR** keys left and right.   TYPE: PSID
- Enter a filename for the output file. Make sure it does not already exist.
- Enter a title, author and copyright statement/release year for your song (the copyright field is labeled *released* in PC players referring to the year of release).
- If you want to target a SID select either *6581* or *8580*. Select *No* if it doesn't matter.
- Currently there are no PSID players capable of generating an extra SID. Therefore it's best to turn SID #2 *Off*.
- Select *SAVE!* and the file compresses and saves. When done saving you are returned to the main startup menu.

- Transfer the saved **PRG** file to a PC computer (This is not covered in this manual. There are numerous programs and explanations on how to do this on the net).

  To run the file in a program such as *SIDplay* you will need to remove the **PRG** header before renaming the file to **.SID**.
  The header is really nothing else than two bytes determing its memory location within the C64 memory.

- Install a program capable of editing binary files. Any hex editor will do, in this manual we use Microsoft Visual Studio as an example. Just be aware that MS Notepad or similar text editors will not do!
- Rename the **.PRG** file to **.BIN**
- Open the .bin file in the hex editor.
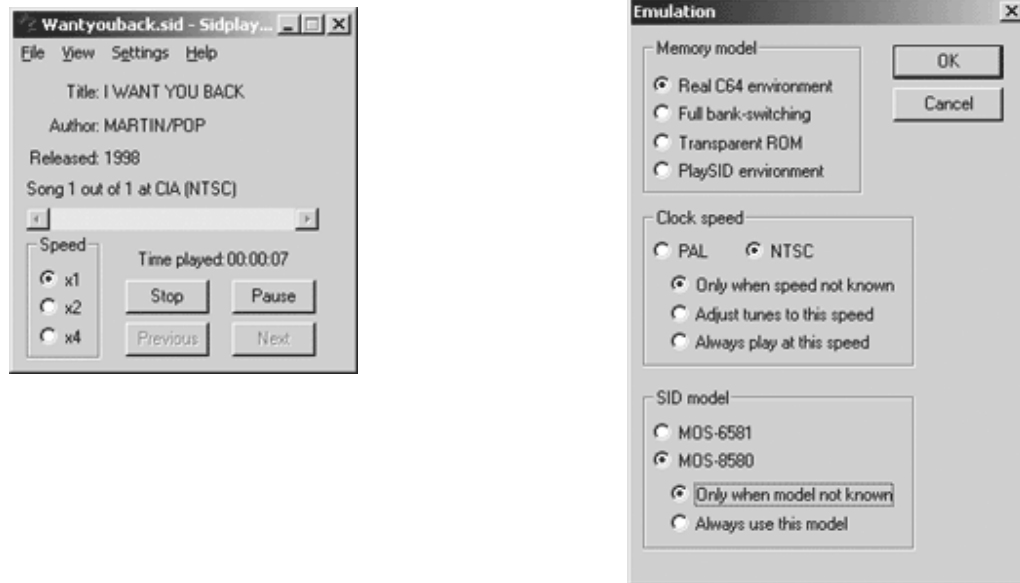- Remove the two very first bytes in the file.
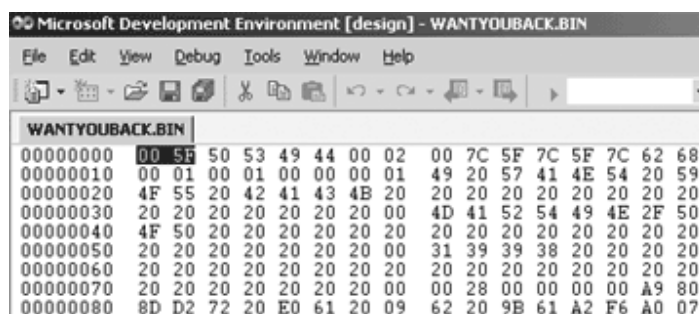
- Save the file
- Rename the file extension to **.SID**
- Load it into SIDplay and try it out.

Playing the file in SIDplay

In SIDplay, select to open a SID-file and pick the one you just converted.
The song starts playing automatically when loaded. The title, author and copyright fields are all
displayed in the main window (left picture).

If you choose the *only when not known*-option for clock speed and SID model (right picture), the
song will play back with the correct speed and SID model according to the file properties.

Addressing the SID #2

The SID #2 can be accessed in different ways. The most common technique is to 'hijack' one of
the two address lines of the cartridge expansion port.
Needless to say, a cartridge present in the port needs at least one and sometimes both of these
addresses thereby causing a conflict with the second SID.

The address lines are called IO1 ($DE00) and IO2 ($DF00).
Prophet64 Cartridge uses IO1 to access the second SID. That is the address line you solder from
the SID2SID onto the seventh pin on the back of the expansion port (inside the computer).

When playing back a stand-alone compressed Sequencer file it is possible to choose either IO1 or
IO2 as second SID base address. It is also possible to choose $D500 as the base address.
However, $D500 requires special decoding circuits to allow a proper access to the second SID.
If your computer is not modified with such logic, do not select $D500 as the base address. It will
only sound weird or be completely silent.

When playing back the song on an emulator such as VICE, these addresses are virtual so it does
not matter whether you choose $DE00, $DF00 or $D500. Just make sure you set the same address
for the VICE's second SID as you did in the Prophet64 executable startup-window.