

# MG Tracker

*draft* version 0.90



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## 1 Introduction

The MG Tracker is a music editor that utilises Matt Gray's Commodore 64 Dominator music player from Remix64 compo:

<http://www.remix64.com/articles/matt-gray-reformation-chiptune-driver-competition.html>

If you have any comments or ideas for new functionalities, please contact me at [slajerek@gmail.com](mailto:slajerek@gmail.com)

## Credits

- C64 music player code by Matt Gray & Marcin Skoczylas
- Tracker code by Marcin Skoczylas
- Graphics by Isildur/Samar
- Testing by Matt Gray, Isildur/Samar, F4SUS7/Samar

**Thanks to Matt Gray for his input, suggestions and testing of this tool.**

## 2 Usage instructions

Tracker starts with a default piece the Matt Gray's Dominator. You can delete the song by clicking left at the top NEW button and create an empty song.

In overall it is important to remember that underneath there's an ordinary working Commodore 64 with Matt Gray's replayer code, so maybe something could become unstable and buggy. If you think that music player is hanged then you can get back things to be working again by initializing the song (by pressing / key).

At the top there is a list of patterns for 3 channels, each channel has its own list of patterns. Numbers at the top indicate the order of patterns on each channel. Selected pattern notes and effects are shown at the bottom. You can move the cursor by mouse-clicking in the pattern list (top) or in the pattern notes at the bottom, this can also be achieved by pressing CTRL+' keyboard key.

All values are represented in hexadecimal. Thus, the numbers are in this order below: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, 10, 11, 12

Usage of the editor is mostly done using computer keyboard. Normal edition method is that you pause the song (SPACE key), move cursor (arrow keys), type notes (Q, 2, W, 3, E, R ...), add note commands and effects (Alt+I, Alt+S, Alt+R ...), and from time to time trigger current row notes by pressing ENTER key. Remember that to have

anything playable you must first set SPEED (Alt+S) for more than 0, because otherwise the replayer will become locked at first row immediately at the beginning of song. So when song starts the first line should be SPEED command setting otherwise it could lead to problems and tune might not play at all.

You can also start playing the music and then press note keys (Q,2,W,3...) that will be recorded, and what was previously in the pattern at that position will be replaced by the note typed.

## 2.1 Note commands

Notes can have commands attached on the pattern row. The commands are added by pressing ALT key with a letter that corresponds to the effect. For example to add a *Set song Tempo* command, the **Fxx** command, you need to press ALT+F, to add *Select Instrument* command **Ixx**, you need to press ALT+I. One note can have multiple types of commands attached.

### **Fxx**

#### **Set song Tempo**

Song Tempo is global counter which counts number of frames between consecutive song ticks.

**xx** is a value in frames between consecutive notes.

### **Sxx**

#### **Set Note duration**

This command is used to select duration of the Note, also upcoming notes before next duration („speed”) is set. Duration value is a number of ticks, so total note time duration depends on selected Song Tempo.

**xx** is a value in ticks between consecutive notes.

## **Ixx**

### **Select Instrument**

You can select instrument for next notes using this command.

**xx** is the instrument number.

## **Uxx**

### **Slide Up effect**

Slide Up adds each frame a selected value to the sound frequency.

**xx** is value that will be added to the frequency each frame.

## **Dxx**

### **Slide Down effect**

Slide Up subtracts each frame a selected value from the sound frequency.

**xx** is value that will be subtracted from the frequency each frame.

## **Vxx**

### **Start Vibrato effect**

Vibrato range is set with instrument. The **Vxx** command waits selected number of frames and starts the vibrato effects as per instrument definition.

**xx** is number of frames before the vibrato will be started.

## **Arpeggio**

To insert arpeggio you can press Alt+A. When arpeggio effect is selected you can press numbers associated to an arpeggio to select it (numbers 0-F). Values of transpose are displayed near the Note, for example: 047, means that 3 notes will be played, a base note, and transpose of 4 and 7.

## **Bx**

### **Select filter band**

This command sets the filter band which is used by SID. Value **x** is a 4-bit value, a bit

mask meaning which band to be set, i.e. this is a right nibble to be written to \$D418.

Definition of bits for filter band bit mask:

| 4              | 3         | 2         | 1        |
|----------------|-----------|-----------|----------|
| mute channel 3 | high pass | band pass | low pass |

Possible parameters for *set filter band* command are:

**B1** = set low pass

**B2** = set band pass

**B3** = set low + band pass

**B4** = set high pass

**B5** = set high + low pass

**B6** = set high + band pass

**B7** = set high + band + low pass

## Mxyzz

### Set filter sweep

This command adds Matt's style filter modulation (sweep), parameters are:

**x**=F to sweep down, or **x**=0 to sweep up

**y** is a value of cutoff step

**zz** is a delay, number of frames between consecutive cutoff steps

For example:

**MF104**: sweep filter cutoff down by 1 every 4<sup>th</sup> tick

**M0416**: sweep filter cutoff up by 4 every 16<sup>th</sup> tick

## Rxy

### Set Resonance and select Channel for filter

This command has two different values, left (**x**) sets the value of Resonance, the right (**y**) decides if current channel output should be filtered. Parameters:

**x** value of Filter Resonance

**y** select or un-select current channel for filter:

value 1 sets the filter on current channel

value 0 removes the filter from current channel.

## **Cxx**

### **Set filter cutoff value**

Use this command to immediately set the filter cutoff value.

**xx** is most-significant 8-bit cutoff value.

## **Txx**

### **Jump to position in Filter Table**

This command is used to start execution of the Filter Table program or break currently executed row in Filter Table and jump to a new row position in the Filter Table.

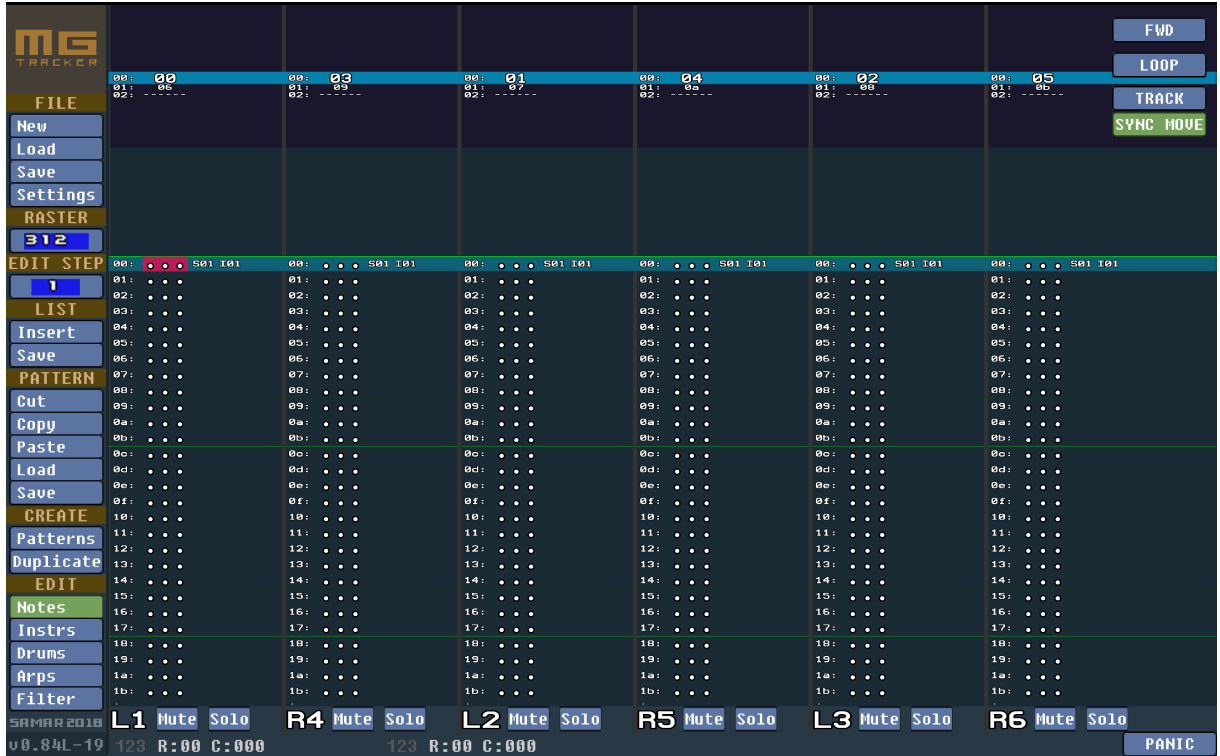
**xx** is a new row position of the Filter Table.

a value of 00 stops execution of Filter Table program.

Note that all filter commands are controlling a filter on SID associated to current channel, thus one filter in Mono mode, and two filters in dual SID/Stereo.

## 3 Application Screens

### 3.1 Notes Editor



### 3.2 Instruments Editor

### 3.3 Drums Editor

### 3.4 Arps Editor

### 3.5 Filter Table Editor

Filter Table defines a program that control the Filter values more precisely. To start the program you need to jump to some Filter Table row position, this can be achieved by a **Txx** note command or by associating the jump with Instrument by setting a Filter Table row position in the Instrument Editor. Position 00 is special and is reserved to



stop the program, so to stop any execution of Filter Table you can use **T00** note command.

The Filter Table shows three values in columns, for example:

01: F0 1F

03: 00 108

06: FE 20

08: 4F 00 01

0B: 20 FF FF

0E: FF 06

First number is a filter table row, then next values define a command and argument for this row. In the example above row 1 contains command F0 and argument 1F.

Commands that can be used in Filter Table are:

#### **F0 xy**

Set filter Band **x** and Resonance **y**, for example F0 1F means set Band to 1 (that is a low pass filter, see Band command for defines) and set Resonance to F.

#### **00 xxx**

Set Filter Cutoff to **xxx**. SID's filter cutoff is a 12-bit value. For example, 00 108 sets Filter Cutoff to 108.

#### **FE xx**

Pause Filter Table program execution for next **xx** frames.

#### **FF xx**

Jump to Filter Table row position **xx**. Value of 00 will stop the program execution.

**xx yyyy**

If the command value **xx** is in range from 01 to EF, then the command becomes a Filter Cutoff Sweep. The **xx** is a number of frames for which the filter cutoff sweep will be performed, and **yyyy** is a signed 16-bit cutoff step value. For example, if **xx** is 4F and **yyyy** is set to 0001, that means the filter cutoff will be advanced by +0001 for next 4F frames. Another example, values of **20 FF FE** mean that filter cutoff will be subtracted by 1 for next 20 frames.

TODO: + / - in filter table sweep

## 4 Keyboard shortcuts

|                         |  |
|-------------------------|--|
| ← or →                  | move cursor (change channel or effect value)             |
| ↑ or ↓                  | move cursor (in pattern list or in pattern)              |
| TAB                     | move to next channel                                     |
| SHIFT+TAB               | move to previous channel                                 |
| ALT+↑<br>or DEL key     | delete row (in pattern list or pattern)                  |
| ALT+↓<br>or INSERT key  | add row (in pattern list or pattern)                     |
| CTRL + ←<br>or CTRL + → | change pattern number                                    |
| ALT + ←<br>or ALT + →   | change pattern number                                    |
| CTRL + ↑<br>or CTRL + ↓ | move pattern list  |
| ALT + ↓                 | move values down (replace with next row), all channels   |
| ALT + SHIFT + ↓         | move values down, one channel only                       |
| ALT + ↑                 | move values up (replace with previous row), all channels |
| ALT + SHIFT + ↑         | move values up, one channel only                         |
| SPACE                   | pause/play   |
| /                       | init & play song from first pattern                      |
| / (TODO)                | play pattern   |
| ENTER                   | play row   |
| Q2W3ER5T6Y... etc       | notes keyboard   |
| ZSXDCVGHNJM... etc      | notes keyboard one octave down                           |
| [ or ]                  | change octave number                                     |
| ,                       | insert OFF note (note key up)                            |

|              |  |
|--------------|--|
| Alt+S or F3  | insert SPEED (note duration)                     |
| Alt+I or F4  | insert INSTRUMENT (select instrument)            |
| Alt+U or F5  | insert SLIDE UP effect                           |
| Alt+D or F6  | insert SLIDE DOWN effect                         |
| Alt+V or F8  | insert VIBRATO effect                            |
| Alt+A or F9  | insert ARPEGGIO (select ARP by pressing 0-F key) |
| Alt+F or F10 | insert SET TEMPO                                 |
| 0-9, A-F     | when on effect then edit effect value numbers    |
| BACKSPACE    | remove note/effect at cursor                     |
| SHIFT+F1     | transpose down current channel's pattern notes   |
| SHIFT+F2     | transpose up current channel's pattern notes     |
| CTRL+F1      | transpose pattern notes down in all 3 channels   |
| CTRL+F2      | transpose pattern notes up in all 3 channels     |
| SHIFT+F3     | cut current channel's pattern                    |
| SHIFT+F4     | copy current channel's pattern                   |
| SHIFT+F5     | paste current channel's pattern                  |
| CTRL+X       | cut pattern                                      |
| CTRL+C       | copy pattern                                     |
| CTRL+V       | paste pattern                                    |
| CTRL+S       | quick save song to local cache                   |
| CTRL+L       | quick load song from local cache                 |
| CTRL+W       | quick save pattern                               |
| CTRL+O       | quick load pattern                               |

|              |   |
|--------------|---|
| CTRL+'       | switch to pattern list and pattern data |
| '            | note step +1                            |
|              | note step -1                            |
| CTRL+Z       | undo                                    |
| CTRL+SHIFT+Z | redo                                    |
| CTRL+I       | instruments screen                      |
| CTRL+D       | drums screen                            |
| CTRL+A       | arps screen                             |
| CTRL+W       | notes screen                            |
| CTRL+F       | for fullscreen notes mode               |
| CTRL+M       | export song to asm                      |
| CTRL+N       | optimize song                           |

## 5 List of libraries

- SID Engine used is SidPlay2 (ReSID): <http://sidplay2.sourceforge.net>  
Copyright (C) 2001 by Simon White, Copyright (C) 2004 Dag Lem
- PlayerLibSidplay from SIDPLAY: <http://www.sidmusic.org/sidplay/mac/>
- Portaudio: <http://www.portaudio.com>
- RtMidi: realtime MIDI i/o C++ classes  
Copyright (c) 2003-2014 Gary P. Scavone
- libpng, lodepng, stb\_image, zlib, libvorbis (tremor)

## 6 Change log

### v0.90

- Integrated Matt Gray's player v4.3 (1988) with previously not released draft code for SID filters
- Added Filter Table to control the filters precisely (12 cutoff, 16 bit filter sweep)
- Stereo dual SID support
- Added status bar for SID filters
- Select number of rows for a bar (each 4th) and tact (each 16th) step markings
- Max number of patterns increased to 208 (\$D0)
- Change font size by Ctrl+Mouse wheel scroll, pinch-zoom gesture or in Settings
- Scroll channels by mouse wheel or scroll gesture
- Mute/Solo channels
- Select Jam or Silent mode when song is paused
- Select arrangements of channels in Stereo: LLLRRR or LRLRLR
- Store and restore settings
- PAGE UP/PAGE DOWN key for quick move in patterns
- INS/DEL key to increase/decrease number of rows
- Overall UX and functionality bug fixes

## **v0.80**

- Settings menu to set SID model and PAL/NTSC environment.
- MIDI support (please restart the app to refresh MIDI ports)
- LOOP switch button to loop the pattern
- NEW SONG creates 6 prepared patterns automatically

## **v0.71 (2015/05/17)**

First public release. Bug fixes.

## **v0.7 (2015/05/14)**

- new UI design by Isildur/Samar!
- new keyboard shortcuts: ctrl+i instruments screen, ctrl+d drums screen, ctrl+a arps screen, ctrl+w notes screen
- ctrl+f for fullscreen notes mode
- portable dialogs and multiplatform release

## **v0.6 (2015/03/30)**

- export song to asm (ctrl+m)
- optimize song (ctrl+n)

## **v0.5b (2015/03/29)**

- bug fixed: arp length was sometimes not set correctly
- bug fixed: F10 was not working on Windows

### **v0.5 (2015/03/28)**

- "Rectangle" replaced to "Pulse", thanks Chris Abbot
- panic button added
- duplicate patterns: copy patterns from all 3 tracks and paste as new 3 patterns
- (SHIFT+) ALT+DOWN/UP move line down/up
- fixed bug with BACKSPACE on OFF
- save list with patterns data
- insert list with patterns data and match existing patterns
- changes history in instr/drum/arp (Cancel button added)
- CTRL+Z: undo, CTRL+SHIFT+Z: REDO

### **v0.4 (2015/03/20)**

- change extend/shrink using SHIFT+UP/DOWN
- extend/shrink drum by SHIFT+UP/DOWN

### **v0.3 (2015/03/18)**

- +ptns inserts after
- save pattern list / insert pattern list
- show cursor in pattern list
- more patterns (extended to 128 patterns)
- copy, paste, quick load/save arp/instr/drum



- new keyboard shortcuts added
- delete moves cursor down x lines
- driver BUG: 0x67 was blocking ARP counter for one tick
- save/load dialog for arp/instr/drum/pattern list
- set raster step (BPM simulation):  $\text{next raster} = ((\text{current raster} + \text{raster step}) \% \text{num raster lines})$

## **v0.2 (2015/03/13)**

- instruments table
- drums table
- arps table
- big cursor that shows if user is editing pattern list
- ctrl+up/down always move pattern list (remove the !ctrl check)
- save/load song dialog

## **v0.1-04 (2015/02/19)**

- Changed notes view to be more Amiga tracker / FT2-like
- Added SET TEMPO effect to Matt's replayer
- Added FWD button to forward
- Added SYNCMOVE to sync keyboard movements with C64's replayer
- Added "Add Patterns" button

## **v0.01-02 (2015/02/15)**

First version. Matt's player v4.2 integrated.