

A Magnetic Scrolls Interpreter Release 0.19

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January 4, 2020

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```

The Pawn, The Guild of Thieves, Jinxter, Fish!, Corruption, Myth and Wonderland are interactive fiction games copyright Magnetic Scrolls Ltd, 1984-1990.

Magnetic Scrolls was an interactive fiction developer, based in London UK, active between 1984 and 1990 and pioneer of audio-visually elaborate text adventures.

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Introduction

"I am having great trouble in finding someone to perform an extremely simple task and I wonder if you would help me out. If you deliver this sealed letter to King Erik of Kerovnia, you will be well rewarded when I next meet you on your travels and I would be forever indebted to you."

— Kronos the magician

Hello, and thank you for your interest. dMagnetic is a Magnetic Scrolls interpreter. It can be used to play the following classics:

- The Pawn
- The Guild of Thieves
- Jinxter
- Fish!
- Corruption
- Myth
- Wonderland

Those games were Text adventures, a popular genre during the 1980s. They were telling a story in written form, and to advance, players had to type in instructions. Since players were presented with a story, one with which they could interact, those were also affectionally called "interactive fiction".

To explore the environment, for example, one would type in GO NORTH, GO UP OF NW. OPEN DOOR would open a door, and to talk to other characters was started by something like SAY HELLO. Players also had so solve puzzles, rescue a princess (or not), which was a big part of the

gameplay. Magnetic Scrolls took great pride in its advanced parser, which was famous for being able to understand instructions such as PLANT THE POT PLANT IN THE PLANT POT WITH THE TROWEL.

Some games used graphics to illustrate the story, and Magnetic Scrolls' games were particularly famous for the beauty of the images they used.

The 1980s were also a decade in which several home computer systems were fighting for dominance. Software, and games, had to be written for as many of those platforms as possible, to reach a wider audience. For developers, this meant writing in assembler for several processors. Finding an error in one system, or even a small rewrite to the story would have caused a painstakingly tedious process, where the software for all the other systems had to be checked and modified as well.

Magnetic Scrolls' solution to this was to create a virtual machine, one that was greatly inspired by the popular 68000 processor, and to develop the games for this. This machine was ported to different platforms, and the story, the puzzles, and the images had to be designed only once.

By itself, <code>dMagnetic</code> is not a game. It is an implementation of the virtual machine. It requires the original game binaries to run. In theory, it could run other software as well, but it has not been designed for that.

The purpose of this document is to explain the usage of dMagnetic, to allow users on modern computers to play the classics.

Thank you Hugh. Thank you Stefan. Thank you Niclas and David for your pioneering work on reverse engineering.

And finally: Thank you Magnetic Scrolls for being one of the reasons that have gotten me into computer science.

Getting started

"The Guild and I have surveyed this region and know exactly how much of value is to be obtained. Jump to the jetty and begin your work. Return here when you have completed your business. And remember, I and my associates will be keeping an eye on you."

— The master thief

2.1 Downloading and compiling dMagnetic

dMagnetic can be downloaded from its homepage(2). Since it has been developed on OpenBSD and was later ported to Linux, it can be downloaded within a terminal window by typing

This should result in an executable file called "dMagnetic". Typing

```
% ./dMagnetic --help
```

should print out the most important command line parameters.

2.2 The game binaries

dMagnetic by itself is not a game. It is an interpreter for game binaries, offering two possibilities to play them. The first is by owning the original files from the MS-DOS release of the games. The second, a more robust way, is using .mag and .gfx container files.

2.2.1 .mag and .gfx

The container format has been developed by Niclas Karlsson and David Kinder; it allowed for a uniform way of combining the necessary game binaries from different platforms into two files: One for the story and the interpreter (.mag), and one for the BEAUTIFUL graphics (.gfx). Magnetic Scrolls is especially known for the latter.

Several of those containers can be downloaded from the Magnetic Scrolls Memorial's Website(1). Afterwards, "The Pawn" can be played by typing

```
% ./dMagnetic -mag pawn.mag -gfx pawn.gfx
```

This should start the game in the same terminal window. It is now possible to play, or to close dMagnetic by typing QUIT.

By default, the size of the terminal is expected to be at least 125 columns wide and 50 rows high. Running dMagnetic in a smaller window might result in distorted output. Changing the window size helps, but if this is not possible, please see chapter 3.1.

2.2.2 MS DOS bingries

In case somebody is lucky enough to own an original copy of "The Pawn", and has installed it in the directory /C/GAMES/PAWN, typing

```
% ./dMagnetic -msdosdir /C/GAMES/PAWN -vmode high_ansi2
```

will read the binaries and load them into the virtual machine. This version also provides a beautiful title screen, which is shown before the actual game can be played in the terminal window.

As with the .mag and .gfx files, the terminal window's size is expected to have at least 125 columns and 50 rows. Additionally, the graphics are in a slightly different format. Chapter 3.6 explains how to view them with a richer amount of colours.

It should be noted that this works only with "The Pawn" and "The Guild of Thieves" at the moment (Version 0.19)

2.3 Taking the first steps

Once dMagnetic has been started to play "The Pawn" by either one of

```
% ./dMagnetic -mag pawn.mag -gfx pawn.gfx
% ./dMagnetic -msdosdir /C/GAMES/PAWN
```

the game is running. The player is greeted with a screen, consisting of four elements, as seen in Figure 2.1. On the top, there is a header, giving away the room the player is currently in, as well as the score and the number of steps already taken. Below that comes the story in the form of text. (It IS a text adventure afterall). Occasionally, the rooms have some illustrative images. Which will be, by default, rendered in ANSI Art. (Chapter 3.4 elaborates on the -vmode low_ansi option).



Figure 2.1: "The Pawn", running in dMagnetic 0.19. Visible elements when playing "The Pawn" are: The header (1), the image (2) (in this case rendered in ANSI art), the text (3) and the input prompt (4).

The last element is the input prompt, starting with >. To advance in the game, and the story, text adventures require the player to type in instructions. Going north three times from the starting point in "The Pawn", for example, will lead the player to a larger boulder.

```
> GO NORTH
> GO NORTH
> GO NORTH
```

From here, going back to the starting point, and east afterwards will lead to the first enocunter with Kronos the magician.

```
> GO SOUTH. GO SOUTH. GO SOUTH.
> GO EAST
```

As it turns out, he is pretty hard to kill.

```
> KILL KRONOS
Kronos waves his wand and you are knocked to the ground.
"That should teach you", he says with conviction.
```

The game can be left anytime by typing QUIT.

To store the game's status before can be done by typing

```
> SAVE
Please enter filename: WHATNOW.GAM
Are you sure (y/n)? y
```

and later be restored with

```
> LOAD
Please enter filename: WHATNOW.GAM
Are you sure (y/n)? y
> LOOK
```

And **yes**: When playing with the MS DOS binaries, old savegames work.

2.4 Saving the configuration in an .ini-file

In case the user is getting more inclined to run any of the games more often, typing in full pathnames before being able to run the game might become a tedious chore. Instead, it is possible to create a dMagnetic.ini file in the home directory. This allows for a shortcut.

```
% echo "[FILES]" > ~ /dMagnetic.ini
% echo "pawnmag=" 'pwd '"/pawn.mag" >> ~ /dMagnetic.ini
% echo "pawnmag=" 'pwd '"/pawn.gfx" >> ~ /dMagnetic.ini
```

This way, a single command line option is required to select "The Pawn" for playing

```
% ./dMagnetic pawn
```

A more comprehensive dMagnetic.ini file can be produced by typing

```
% ./dMagnetic -helpini >~/dMagnetic.ini
```

This file needs to be edited.

It is possible to use several dMagnetic.ini files. To distinguish between them, the -ini parameter can be used on the command line

```
% ./dMagnetic -ini dMagnetic.test.ini pawn
```

Graphics

"We knew you'd stop the Seven Deadly Fins. Good show! It's a shame they got away again. But now I suggest you take a vacation. You've earned it, old boy." — Sir Playfair Panchax

Magnetic Scrolls' games were famous for the beautiful images with which they enriched their stories. dMagnetic has been designed to run in a terminal, but it offers various ways of displaying them, by means of the -vmode commandline parameter. To make the selection permanently, the entry mode= in the [DEFAULTGUI] section of the dMagnetic.ini file can be changed. An illustration about the different options for playing the games can be seen in figure 3.1.

If the user wishes to try out the monochrome mode, for example, the command line used would be

% dMagnetic -vmode monochrome pawn

In case this mode is satisfactory, the entry in the <code>[DEFAULTGUI]</code> section would then be changed to

mode=monochrome

This way, the extra parameter can then be skipped the next time <code>dMagnetic</code> is being started

% dMagnetic pawn

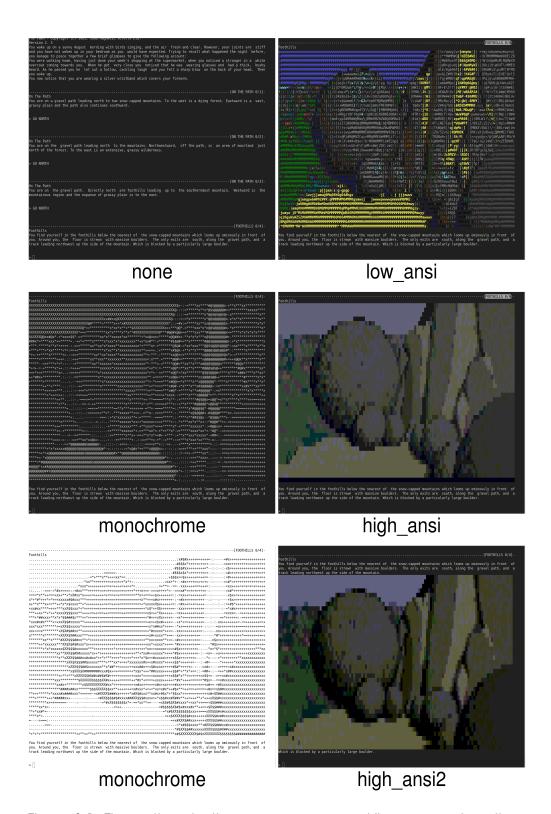


Figure 3.1: The options for the -vmode command line parameter offer a wide range of possibilities to experience "The Pawn" in a terminal window. Left: No colour modes. Right: colour modes. The actual choice does not only depend on the user's preference, but also on the capabilities of the terminal window.

3.1 Size of the graphics

The size of the graphics, its height and its width, are configurable within the .ini file or via command line paramters. In the .ini file, the entries are rows and columns within the [DEFAULTGUI] section.

```
[DEFAULTGUI] rows=40 columns=120
```

The same values can be passed to dMagnetic with the vrows and vcols parameter

```
% ./dMagnetic -vcols 120 -vrows 40 pawn
```

By default, a UNIX terminal offers only 80x25 characters. If a user wishes to play within this confined space, it is possible to restrict the graphics to 15 lines.

```
% ./dMagnetic -vcols 80 -vrows 15 pawn
```

Which is 60% of the available space. An example can be seen in the top half of figure 3.2.

Alternatively, the images can be rendered in a higher resolution. This requires nothing more than a resize of the terminal window. However, with this technique, a pixel is exactly as wide as a character in the textual output. Meaning, that when the pixels get smaller, the texts get smaller. This can be seen in the bottom half of figure 3.2.

Choosing the actual size of the images should thus be up to the user's personal preferences.

3.2 Text only

Adding the paramter -vmode none to the commandline allows the user to play the games as pure text adventures.

```
% dMagnetic -vmode none -vcols 50 pawn -----[ON THE PATH 0/1]-On The Path You are on a gravel path leading north to two snow capped mountains. To the west is a dying forest. Eastward is a vast, grassy plain and the path also continues southward.
```

It should be noted that this case also requires the addition of the -vcols parameter, to show the text with proper line wraps.

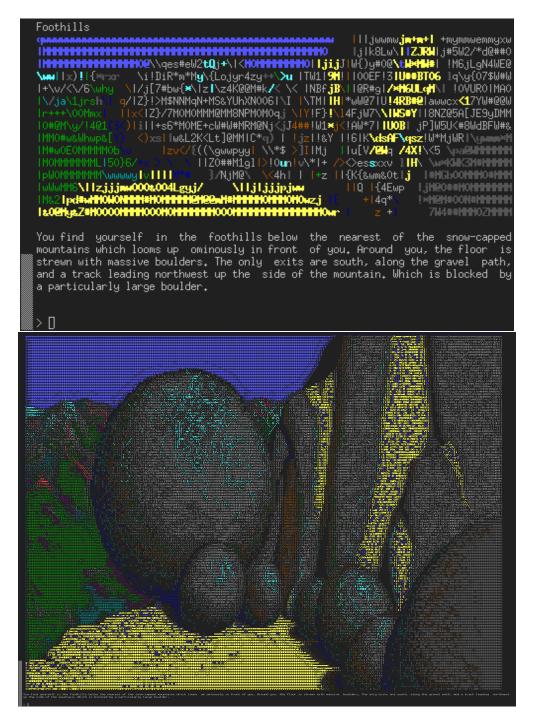


Figure 3.2: Top: "The Pawn", running in xterm, with -vcols 80 -vrows 15. The graphics are scaled down to fit within a terminal window with 80 columns and 25 rows. Bottom: "The Pawn", running in xterm, with -vcols 260 -vrows 150. The image takes up most of the screen and shows the highest amount of detail. However, the text becomes smaller.

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To make the text-only output the default, the entry mode=none in the [DEFAULTGUI] section of the dMagnetic.ini file needs to be set.

The standard alignment for the text is block aligned (-valign block). This can be changed with the commandline option -valign left or -valign right.

```
% dMagnetic -vmode none -vcols 50 -valign left pawn ------[ON THE PATH 0/1]- On The Path You are on a gravel path leading north to two snow capped mountains. To the west is a dying forest. Eastward is a vast, grassy plain and the path also continues southward.
```

Currently, the right alignment is considered broken.

The preferred alignment option can be set within the [DEFAULTGUI] section with the align entry.

3.3 Monochrome

The -vmode monochrome parameter offers the possibility to play the game with images, even if the terminal does not have any colour-capability.

The effect is acquired by calculating the intensity, or brightness, of each pixel, which is then translated into a character. The characters can be configured by changing the monochrome_characters entry of the [DEFAULTGUI] section in the dMagnetic.ini file. Said entry defines a ramp, from left to right, of increasing intensity.

It should be noted that the background of the terminal window factors into the appearance of the image, as seen in figure 3.3.

One a white background, this technique works as followed: Small characters, such as a dot., will be perceived as light. On the other hand, larger characters, such as @ cover more of the white background and are being perceived as dark.



Figure 3.3: The monochrome output with different characters configured in the dMagnetic.ini file. Top: Optimized for black backgrounds. Bottom: Optimized for white backgrounds.

3.4. LOW ANSI 17

3.4 Low Ansi

Using <code>-vmode low_ansi</code> is rendering the images in ANSI art. The colours are first projected into a limited colour palette. Afterwards, from a selection of characters, the ones representing the image best are being chosen.

It is possible to configure the characters used for rendering, by changing the entry <code>low_ansi_characters</code> in the <code>[DEFAULTGUI]</code> section of the dMagnetic.ini file.

This mode works best in terminal windows which offer the VGA ANSI RGB palette in appendix D.

3.5 High Ansi

Using -vmode high_ansi is rendering the images with the real RGB values. It requires a terminal window with the capability to do so, otherwise the image will be invisible.

This mode provides a rich amount of colours, however, one pixel is as large as a single character. The output will look blocky and pixelated.

3.6 High Ansi 2

As with the High Ansi mode, this mode requires a terminal window with the capability of showing real RGB values.

The MS DOS version utilized half-tone graphics for the images. This way, 16 colors were combined in 2x2 pixel blocks, to create the illusion of a richer amount of colors.

This technique worked well on CRT monitors of the 1980s, but as figure 3.4 shows, creates some issues on digital monitors. Thus, the command line parameter $-vmode\ high_ansi2$ can be used to combine the 2x2 pixels into a single one.

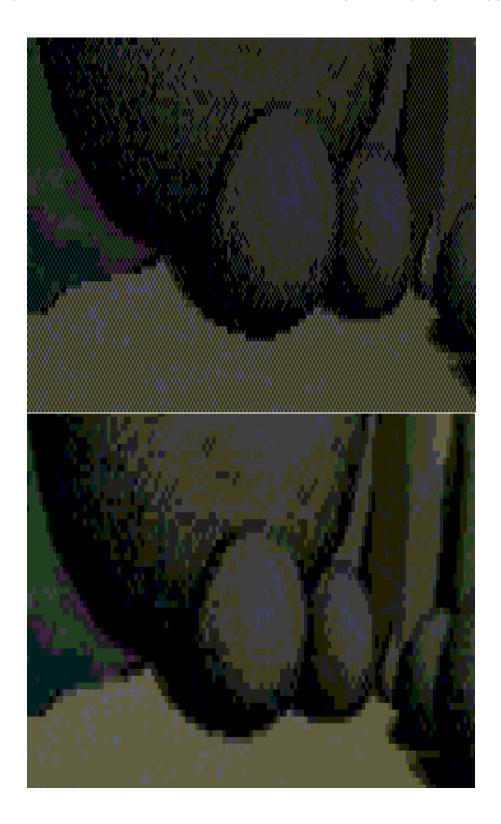


Figure 3.4: The MS DOS version of "The Pawn" used half-tone graphics for the image. dMagnetic offers two possibilities of rendering those. Top: -vmode high_ansi. Bottom: -vmode high_ansi2.

Random events

"We play a variation on the game of Blackjack." — Charon

Certain elements of the games rely on chance, to make playing through them more challenging. Those elements require a random number generator. dMagnetic offers the possibilities to generate the numbers internally, or externally, from the operating system. They can be chosen with the command line parameter -rmode pseudo or -rmode real, and further configured with the parameter -rseed 12345.

Within the dmagnetic.ini file, the [RANDOM] section can be used to make the choice permanent.

[RANDOM]
mode=pseudo
;mode=real
seed=12345

4.1 Pseudo random

The pseudo random generator offers some sort of determinism when playing through the game. This is necessary for scripted playthroughs (See chapter 5). Basically, the numbers advance with each command that has been typed in. So after the same amount of instructions, the same event happens.

Using -rseed 12345 gives the random number generator the start value of 12345. Using a different value will, obviously, result in a different timing of events, and sometimes a different outcome of the game.

4.2 External random generator

A different experience whilst playing can be achieved with the option $-rmode\ real$. This is using the random number generator of the operating system. The option given by the -rseed parameter is used as additional salt.

The random numbers generated here are more sophisticated, even used for cryptographic purposes. Thus, the events happening in the game become much less predictable.

This mode is recommended for a repeated playthrough.

Advanced logging

"Derek, that Scott Electronics deal did brilliantly." — David Rogers

dMagnetic is reading from standard input and writing to standard output. It is thus easy to do some logging in the form of

```
% dMagnetic pawn | tee pawn.log
```

However, this is does not work for walkthroughs, since it would only write the story and the images into a file, but not the commands being typed in.

5.1 A walkthrough script

A better way to store the commands, and nothing else, comes with the $-v\log p$ arameter.

```
% dMagnetic pawn -vlog pawncmds.log -rmode pseudo -rseed 1
> NORTH. NORTH. NORTH.
> quit
> q
> y
% cat pawncmds.log
NORTH. NORTH. NORTH.
quit
q
y
```

Since -rmode pseudo has been chosen, the random events are deterministic (See chapter 4.1). Thus, the inputs can be played back easily with the same result as before:

```
% cat pawncmds.log | dMagnetic pawn -rmode pseudo -rseed 1
```

They can also be copied from the .log file and pasted into a new session of dMagnetic, to get back to the same point as before.

5.2 Turning a walkthrough into a story

To retrace the steps where something went wrong, it is better to have the story along with the commands. To log the inputs as well as the output, the parameter -vecho repeats whatever the user has typed in. This makes dMagnetic work together with the tee command.

```
% dMagnetic pawn -vecho | tee pawn.txt
```

When trying to write a walkthrough script, it is thus recommended to use the following commandline

```
% dMagnetic pawn -vlog pawncmds.log -vecho \
  -rmode pseudo -rseed 12345 | tee pawn.txt
```

Once the walkthrough is finished, it can be turned into a book EASILY by typing

(Even though pawn.txt should be edited so that the images are not spread out over several pages...)

Appendix A

Command line parameters

Configuration					
-ini dMagnetic.ini		Location and name of the .ini file.			
Loading the	Loading the game				
-mag	pawn.mag	Location and name of the .mag container			
-gfx	pawn.gfx	Location and name of the .gfx container			
-msdosdir	/C/GAMES/PAWN	Location and name of the directory			
		containing the MSDOS binaries.			
	pawn	Read the location of the .mag and .gfx			
	guild	containers from the dMagnetic.ini file.			
	jinxter				
	fish				
	corruption				
	myth				
	wonderland				
Graphic out	_				
-vcols	120	Maximum number of columns for the image			
-vrows	40	Maximum number of rows for the image			
-vmode	none	Graphic output mode			
	monochrome				
	low_ansi				
	high_ansi				
	high_ansi2	Special mode for the MS DOS images.			
Text alignment					
-valign	block				
	left				
	right	Currently broken			
Logging					
-vlog	pawncmds.log	Write the commands into a file			
-vecho		Repeat the commands on the output console			

Random events			
-rmode	pseudo	Deterministic random events	
	real	Real random	
-rseed	12345	Seed/salt for the random number generator	
Others			
help		Prints out the most important parameters	
helpini		Prints out an example of the .ini file.	
version		Prints out the version of dMagnetic.	
-bsd		Prints out the license.	

Appendix B

dMagnetic.ini file

Special characters			
\		Escape sequence	
;		Comment	
\;		Escaped; (Not a comment)	
\\		Escaped \	
Section [FILES]	configures the location of the gam	e binaries.	
pawnmag	/usr/local/games/pawn.mag	Container format by (1).	
pawngfx	/usr/local/games/pawn.gfx		
guildmag	/usr/local/games/guild.mag		
guildgfx	/usr/local/games/guild.gfx		
jinxtermag	/usr/local/games/jinxter.mag		
jinxtergfx	/usr/local/games/jinxter.gfx		
corruptionmag	/usr/local/games/ccorrupt.mag		
corruptiongfx	/usr/local/games/ccorrupt.gfx		
fishmag	/usr/local/games/fish.mag		
fishgfx	/usr/local/games/fish.gfx		
mythmag	/usr/local/games/myth.mag		
mythgfx	/usr/local/games/myth.gfx		
wonderlandmag	/usr/local/games/wonder.mag		
wonderlandgfx	/usr/local/games/wonder.gfx		
pawnmsdos	/C/GAMES/PAWN	Alternative:	
guildmsdos	/C/GAMES/GUILD	MS DOS binaries	
Section [RANDOM]	configures the random events		
mode	pseudo	Deterministic	
	real	Real random	
seed	12345	Seed/salt	

Section [DEFAULTGUI] configures the output		
rows	40	Number of rows
columns	120	Number of columns
align	left	
	block	
	right	Currently broken
mode	none	
	monochrome	
	low_ansi	
	high_ansi	May not work in very terminal
	high_ansi2	Special mode for the MS DOS images
low_ansi_characters	/\\IMS	Characters with which the
		Low ansi output is being rendered
monochrome_characters	.:-=*x\$X	Characters with which the monochrome
		output is being rendered. It is actually
		a ramp of increasing intensity.

B.1 Example

```
% dMagnetic --helpini
; you can download the files from
; https://msmemorial.if-legends.org/magnetic.php
pawnmag=/usr/share/games/magneticscrolls/pawn.mag
pawngfx=/usr/share/games/magneticscrolls/pawn.gfx
;pawnmsdos=/usr/share/games/magneticscrolls/msdosversions/PAWN
guildmag=/usr/share/games/magneticscrolls/guild.mag
quildgfx=/usr/share/games/magneticscrolls/guild.gfx
; guildmsdos=/usr/share/games/magneticscrolls/msdosversions/GUILD
jinxtermag=/usr/share/games/magneticscrolls/jinxter.mag
jinxtergfx=/usr/share/games/magneticscrolls/jinxter.gfx
corruptionmag=/usr/share/games/magneticscrolls/ccorrupt.mag
corruptiongfx=/usr/share/games/magneticscrolls/ccorrupt.gfx
fishmag=/usr/share/games/magneticscrolls/fish.mag
fishgfx=/usr/share/games/magneticscrolls/fish.gfx mythmag=/usr/share/games/magneticscrolls/myth.mag mythgfx=/usr/share/games/magneticscrolls/myth.gfx
wonderlandmag=/usr/share/games/magneticscrolls/wonder.mag
wonderlandgfx=/usr/share/games/magneticscrolls/wonder.gfx
[RANDOM]
mode=pseudo
;mode=real
seed=12345
[DEFAULTGUI]
rows=40
columns=120; align=left
align=block
;align=right
; mode=none
; mode=monochrome
;mode=low_ansi
mode=high_ansi
;mode=high_ansi2
low_ansi_characters=\\/|=
monochrome_characters= .:-=+*x#@$X
```

Appendix C

Priorities

C.1 Location of .ini files

Highest priority: -ini parameter.

~/dMagnetic.ini (Home directory)

/etc/dMagnetic.ini

/usr/local/share/dMagnetic.ini

/usr/local/share/games/dMagnetic.ini

/usr/local/games/dMagnetic.ini

/usr/share/dMagnetic.ini

/usr/share/games/dMagnetic.ini
/usr/share/dMagnetic/dMagnetic.ini

/usr/games/dMagnetic.ini

/usr/games/dMagnetic/dMagnetic.ini

Lowest priority: ./dMagnetic.ini (current directory)

C.2 Configuration

Highest priority: Command line parameters.

Medium priority: Read from the ini file. Lowest priority: Pre-compiled values

Appendix D

ANSI RGB values

Colours for the low ansi mode are being chosen from this palette

Black	#00000
Red	#AA0000
Green	#00AA00
Brown	#AA5500
Blue	#0000AA
Magenta	#AA00AA
Cyan	#00AAAA
Grey	#AAAAA
Dark Grey	#555555
Bright red	#FF5555
Bright Green	#55FF55
Yellow	#FFFF55
Bright blue	#5555FF
Bright Magenta	#FF55FF
Bright Cyan	#55FFFF
White	#FFFFFF

Bibliography

- (1) The magnetic scrolls memorial. https://msmemorial.if-legends.org/
- (2) dMagnetic home. https://www.dettus.net/dMagnetic