CoolNESs-guide

COLLABORATORS

	TITLE : CoolNESs-guide		
ACTION	*NAME*	*DATE*	*SIGNATURE*
WRITTEN BY		August 24, 2022	

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

Contents

Chapter 1

CoolNESs-guide

1.1   CoolNESs, speedier than Mario on mushrooms!

```
                          CoolNESs a cool NES-emulator for Amiga
                      By Fredrik Olsson
                 version 0.72 [1998-11-01]


New in V 0.72: Continue & Freeze/Melt.



Features:
   Support for Mapper: 1-5, 7-11, 15, 16, 18, 19, 21-25, 32-34, 64-66, 68, 69, 78.
   10 inputs (Normal+CD32pad+MegaDrivepad+4pl-adapt) and keyboard.
   4player-adapter and paddle.
   Screenscrolling.
   SplitScreen.
   All known VRAM mirroring-modes (1screen, horizontal, vertical, 4screen).
   8 & 16 high sprites.
   Battery save.
   Soundsupport.  (both square-waves, triangle and noise or PCM)
   Keyfile support.
   GUI.
   Screengrabing.
   Continue.
   Internal

             IPS
              support.
   Support for

             palette
              files.
   Support for CLI arguments.



             Copyright
              Who owns this.

             Introduction
              What is this anyway?
```

```
                    Requirements
                     What exactly do you need.

                    Usage
                     How to use this thingi.

                    The Future
                     I see..... somethings.

                    History
                     How it was before.

                    Registration
                     The limits and what you can do about them!

                    Bugs
                     Nasty little buggers.

                    Author
                     Thats me, the man.

                    F.A.Q.
                     Questions from people who wonder.

                    Thanks
                     People I wanna thank.
```

1.2 Thanks

   I would like to thank the following people for their help in obtaining
information regarding NES emulation.

Marat Fayzulin,   Would never have started without his doc!

Yoshi,   Thanks for the docs on sound.

Alex Krasivsky,   He started the research on the NES-hardware.

Juan Antonio Gomez Galvez, Thanks a lot, for hints on the code and stuff.

Firebug   Very good mapper doc.

D   Has done extensive research on mappers.

Goroh   For confirming some of the "facts" i've come up with.

All the people on the NES-Dev mailing list.

ThanNks to all Amiga-Users.....
All who registered   Thanks alot for the moral support.
Specially to all who have payed for it:

Blonde Lion,
Martin Chantler,
SnuskBob,
Olov Sandell,
Björn Johansson,
Nikolaos Theologou,
Fredrik Eriksson,
Josef Andersson,
Robert Karlsson,
Peter Mattsson,
Carl Röjstrand,
Gouygou David,
Johan Eriksson,
Paul Murphy,
Marcus Johansson,
Lars-Erik Åström,
Daniel Beorchia,
Andreas Olsson,
Christopher Hart,
Jesper Klingvall,
Per-Ola Eriksson,
Peter Fischer,
David Ståhl,
Erik Dahlberg,
Niclas Aronsson,
Nicholas Nilsson,
Lennart Johannesson,
Kenneth Johannesson,
Johan Rönnblom,
Christian Andersson,
Nicola Filotto,
Jonas Österberg,
Christian Westman,
Jimmy Johansson,
Mikael Törnquist,
Alan Stokes,
Makoto Kawamura,
Thomas Palestig,
Krister Skrtic,
Jon Åslund,
Jesper Andersson,
Cagnac Forbier,
Steven Anderson,
Kjell Lindén,
Krister Nylén,
Jukka Varsaluoma,
Björn Andersson,
Erik Dalén,
Dinos Costanti,
Paul Ellis,
Joona Pöhö,
Andreas Witte,
Juan Orellana,
Gonneau David,
Michael Bromery,
Jaakko Pohjamo,
Crepin Oliver,

```
Martin Persson,
Pasi Ylinen,
Anders Karlsson.


All the WarD-members.
Guru, for always wondering "how is it going with CoolNESs?" ;)
Tesla, for some crazy ideas for CoolNESs and help with the keyfile+GUI.
Ash, hopefully providing some gfx soon.
Axe, for being the best friend ever =)
xTs, will there ever be a CooLYNX?.
Classes, code & coke, party & beer.
CaB, for maintaining the WarD homepage.
BluMental, for being a realy kewl dude.
$tud for making excelent music.

Spot/Up Rough, We're gonna make kewl musicdiscs, right!?!.
Skope/Up Rough, MAN watta jungle tjunez.

Tomas Amsrud for the kewl icons and install script, also for maintaining his site.

Nintendo???

More to come.......
```

1.3 Copyright

```
    This guide and the executable CoolNESs-file is
    copyright 1997-1998 Fredrik Olsson. This is shareware so spread it as much
    as you like, non altered. But don't spread the keyfiles.

    This Software is provided "As is", so if your computer or anything
    else bursts into flames or starts leaking or anything else unpleasent
    happens and you think you can blame me, you'r wrong. You are responsible.
    Don't use this if you don't like it.

    This product may only be used on an Amiga compatible computer.

    It may not be sold for profit.
    If published on a coverdisc/cd with a magazine I would like a copy of
    the magazine or atleast be noticed about it.

    You are not allowed to use this software in the creation of weapons.

    If you cant read this text then you MUST ask a friend or
    a parent to read it for you  ;)

    If you happen to crack the keyfiles I would like one registered on me ;)
```

1.4 Contact Me

```
                    I've just moved to my own apartment now, it happend faster than  ←
                        I thought.
    Telephone and internet-connection is now setup,
    so I can read my mail more often.
    I hope to be able to update CoolNESs a bit more often now.


       EMail:
    flubba@hem2.passagen.se
    fredrik.k.olsson@europe.eds.com

       HomePage:
    http://hem2.passagen.se/flubba/ (coolness.html)

       Mail:
    Fredrik Olsson
    Hjortmossegatan 84
    461 51 Trollhättan
    Sweden

       Telephone:
    +46 (0)520-39253

       IRC:
    FluBBa


For registration see
                Limitations
```

1.5 Introduction

```
    I was looking for a cool NES-emulator but all around me was darkness. ;)

    Well it all started out a couple of years ago when I started on a Zelda-
    simulator, first we started recreating the graphics, and then some rutines
    but the more I coded the more I saw how much time this would take.
    So when I heard of Nes-emulator for the Amiga I thougt......

    Eeeh well at least I tried to think :)

    I started the coding of the CPU with help from a source from Aminet,
    This wasn't too good, so I started redoing everything from scratch.
    Downloaded docs from a Finnish site about the 6502 and soon had a working
    CPU-core, then Juan contacted me and he teached me a couple of tricks.
    I then applied this to the core and rewrote it a couple of times.
    As it stands now this should be the fastest 6502-core available for Amiga.
    Free for anyone to use.

    So here is the result of some weeks thinking and some weeks of coding.
    (Actully it begins to look like months and a year now....)

    Zelda is working now! =)
```

This was my first and only goal actually.

And it's coded in 100% assembler, sorry I don't know how to code C.
The GUI is coded in C, but that's my friends (Peter Bengtsson) work.

                              CoolNESs!

1.6 Usage of CoolNESs

                    Remember to copy the tabs.gadget to SYS:Classes/Gadgets/ !!!

Kind of simple actualy, just run it from cli or WB.
Click Load and select a *.nes file and away you go.
Now also takes arguments from cli (Good for DOpus =).
All buttons should have a shortcut-key also, experiment!

Return or Yellow works as Start.

Right_Shift or Green works as Select.

Left_Alt, Fire1 or Red is B.

Left_Amiga, Left_Shift, Fire2 or Blue is A.

Arrow_Keys or joy is direction.

F1 selects normal joy1.
F2 selects CD32pad1.
F3 selects MegaDrivepad1.
                What
                 do I need?
F5 turns on joy2.
F6 selects Zapper2 emulation with mouse2 (test).
F7 selects Paddle emulation with mouse2.
Esc or Play is used to Quit.
BackSpace (<-) insert coin (vs-system).
F9 selects NMI-rate (slowmotion, some games work better).
F10 or Forward+Backward is Reset.
Help IRQ on/off (only mapper 4 & 5 yet).
* Grab screen (the star on the numerical keypad).
P Freeze game.
O Melt game (continue frozen game).
Keyboard1 is always connected to Input1.

              Custom Palettes

              Patching games
                Picture of keys

1.7 Funny, Amusing and irritating Questions.

```
                  CoolNESs F.A.Q.
Q=Question A=Answer S=Solution

(1)
  Q: Why is my game quiting for no reason?
  A: Some games are very touchy about the timing,
  and as CoolNESs uses the Amiga hardware to do the timing
  and the CPU for emulation this screws things up sometimes.
  I've done a fix for this now but it's not perfect.
  S: Try to use F9 for slower NMI (slowmotion).
(2)
  Q: Why does the sound (noise) suck!?
  A: The documentation is not very good in this field,
  and as I don't have much time to do any research on
  my own right now, this will have to wait a bit.
  S: Register and turn off the noise-channel =)
(3)
  Q: Why isn't the battery-save working on Zelda?
  A: Probably cause the battery-bit in the header isn't set or the
  filename is missing .nes on the end.
  S: Use a Hexeditor and alter bit#1 in byte #6 (0 first), or use a
  special program for modyfing NES-headers.
(4)
  Q: Why do I only see the statusbar correct in some games?
  A: That is probably due to a splitscreen.
  S: Use Help-key to turn on IRQ (and splitscreen).
(5)
  Q: Why do I get nothing but a black screen?
  A: Probably because you have no PAL/NTSC monitor.
  S: Hmmm, not much to do more than to plug in your old TV-set.
(6)
  Q: Why isn't the logo displayed on SMB?
  A: This is a hacked version (no 2player option either).
  S: Get the real one.
(7)
  Q: Where do I find my favourite game on the net?
  A: How should I know ?!
  S: Use your favourite search-engine (FTP) and your head.
(8)
  Q: Why is it so slow?
  A: Emulation takes time. There may be some small optimizations
  in the future.
  S: Buy a Pentium200 and run Nesticle ;)
(9)
  Q: How do I use custom palettes?
  A: Rename the file to CoolNESs.pal or to "gamename.pal".
  S: Take a look at the
                  Palette
                  Instructions.
```

1.8   How to use IPS (International Patching System).

```
To use IPS-files with CoolNESs all you have to do is copy the IPS-file to the
same directory as the NES-file and rename it accordingly (Zelda.nes & Zelda.ips) ←
     .
Then you just mark the _Patch_ button in the prefs-page of the GUI, if there is
no IPS-file nothing will happen. If you have several patches for the same game
then it's smart to save all your patches in a special directory, and just copy
and rename them when you gonna change patch.

I'm open for suggestions on this one, thank you.
I had to sacrifice the Filter button for this at the moment.
```

1.9   How to modify your MegaDrive/Genesis gamepad.

```
To make your MegaDrive pad work with CoolNESs (and Wzonka Lad and ADOOM)
all you have to do is switch places on pin 5 and 7 on the pad
(and maybe put a 470ohm resistor between them).

Easy? =)
Okey, to make a short explanation long, here is the whole story.
The Amigas joyport has 9 pins. 1 for ground and 1 for +5V, 4 for direction
and 2 for firebuttons, so this leaves 1 pin left.
So how can you get 1 pin to connect to 2 buttons? You use a multiplexer!
This is what the MegaDrive does, it uses a 74HC157 to change which buttons
to check for. So the 2 pins that go to the firebuttons can actually
adress 4 buttons, A, B, C, and Start.

The only problem is that +5V is pin 7 on the Amiga, and on a MegaDrive
this is pin 5.

So all you have to do is to open up your MegaDrive pad and find cable
7 and 5 and switch em round. This can require soldering, and if you'r
not familiar with that, _DON'T TRY IT_. or you can, but I've warned you.
I take no responsibility what so ever if something nasty should happen.
There shouldn't be a problem though.

Please note that doing this will make the controller incompatible with
your MegaDrive/Genesis.

Also check Aminet/util/libs/ControlPad.lha , and ADOOM readme.
```

1.10   How does the Palette Work?

```
Screwed up palette???

If you have encountered any VS-games or think that the original
```

palette of CoolNESs doesn't match, then you can now make your own!

The format is either raw (from Nesticle), RGBRGBRGB..... at least 192 bytes long ↩
    ,
or normal IFF format (from DPaint or similar), number of colours must
be at least 64.

And to use it all you have to do is name the file CoolNESs.pal and stick it in
the program directory or name it after a certain game and put in the same ↩
    directory
as the game.

There should be an example file to get you started.
Even though CoolNESs should find the palette in a picture you'd probably just ↩
    want
to save the palette alone.

1.11   Requirements of CoolNESs.

To start the emulator you need AGA and a 68020 or better.
Installed "tabs.gadget" in SYS:Classes/Gadgets/ .
Right now a PAL/NTSC-monitor is required too.
To get good speed (50/60 fps) you will need a 25MHz+ processor
and fast-mem. Many intros and some games still _only_ needs
14MHz and fastmem for 50fps (60fps in NTSC).
You tell me if this is "fast".

It needs a total of 500k chip and 250k any mem.
Plus mem for the cartridge. Varys from 24k to 1M.
Fastmem is not needed but highly recommended.

A 2button+ joystick is nice but not necessary.

A NES-rom would be fun also... =)
And NO! I wont send any to you! Not if its Copyrighted.
Just found out that ELITE is free to spread, too bad it doesnt
work yet.

Maybe I write a demo for the NES. :)

1.12   What to come in the future.

There are a lot of things to come in the future.
To bad I can't predict the future ;)

Better sound.

New mappertypes.

Save frozen games to disc.

Better sprites. Priority. (faster if its possible?).

Vertical splitscreen.

XPK support.

Cycle-count and system-screen to allow for real multitasking.
And a non-AGA version???

NES-DiskDrive???

FamilyBasic Keyboard???

Zapper, try F6 =)

A kewl demo, to show off some gfx.

V1.0? Never!

1.13   The history of CoolNESs

```
              Ver 0.72  1 Nov 1998. Released at Compusphere X.
  Continue and freeze/melt.
  All settings in the GUI should work now =) (except sprite update).

Ver 0.71  25 Oct 1998.
  Screengrabing (* on numerical keypad).

Ver 0.70  17 Sep 1998.
  Now includes a French guide (V0.69).
  Support for palette files (raw and IFF).
              Palette?
                 Added PAL/NTSC switch.
  Added mapper#78 (Holy Diver).
  Fixed some sprite problems with MMC5.
  Changed CPU-core for all games with <=32kb PROM.
  Updated writes to the PPU (faster).
  Set IRQ default to off. Use HELP to turn on.

Ver 0.692  11 July 1998.
  Fixed the IPS-routine to support packed data and not lock up.

Ver 0.69    7 July 1998.
  Added insert coin for vs-system (backspace, <- )
  Added a fix for the "gfx-take-too-long-time-so-now-I-quit" bug =)
  Fixed nearly all gfx for mapper #9/#10.
  Added a little looping on samples (Punch Out).
  Fixed sample active-bit in PPU (Racket Attack)
  Smal speedup in CPU-code.
  Fixed a minor error in PPU-Scroll registers (NARC).
  Added
              IPS
               "on-the-fly" support (patch games).
  Added mapper#66 (SMB/DuckHunt 2-IN-1, Gumshoe).
  Added mapper#65 (Hammering Harry 2 Jap).
  Added support for paddle (Arkanoid) use F7 to turn on.
```

```
Ver 0.68    17 May 1998.
  Smal fix to PPU code (more accurate and faster).
  Added mapper#10 (Fire Emblem Jap).
  Added mapper#18 (BasesLoaded Jap).
  Added mapper#64 (Shinobi).
  Added mapper#68 (AfterBurner2) still glitches.
  Added mapper#69 (Batman1 Jap, Batman2:Return of the Joker).
  Smal fix for Mapper#21 (KonamiWorld2).
  Smal fix for Mapper#23.
  Added IRQ for mapper#19 (3Gohukas).

Ver 0.67    10 May 1998.
  Added mapper#24 (CV3 Jap).
  Added install-script.
  Smal fix to Noise channel.
  Smal fix to Triangle channel.
  Smal fix to PCM channel.
  Mapper-routines rewritten a bit.

Ver 0.66    29 March 1998.
  Smal fix to Noise channel.
  Smal fix to mapper#4 which caused some games to behave strange.
  Added PCM channel (not together with noise yet).
  Smal speedup in gfx-routines.
  Added support for 2 CPU-cores, makes non mapping games (0 & 3) faster.

Ver 0.65    22 March 1998.
  Small fixes to the GUI, now takes arguments from CLI again.
  Smal fixes to mapper 22 and 34.
  Added mapper#33 (PonPokoPon J).
  Added mapper#32 (ImageFight J).
  Added mapper#25 (Gradius2 J).
  First try to make a splitscreen (only one split yet).
  Added a F.A.Q. to this guide plus some more things.
  Changed the CPU-core to the one in V0.61 as the last one was buggy.
  Lots of fixes to Mapper#5 (Bandit Kings of Ancient China).
  Fixed the palette for "Punch Out". Edited some entries.

Ver 0.64     8 March 1998.
  Now you can pay with D-Mark (Germany).
  Lowered the price to £10 for GB.
  Fixed Mapper#4 (SMB3, TMNT3).
  Fixed a bug in VRam layout, Trojan prints more text.

Ver 0.63     2 March 1998.
  Fixed Mapper#1 (Wrath of the Black Manta).
  Fixed Mapper#34 (DragonBall).
  Added Mapper#16 (DragonBallZ(2)), no IRQ yet.
  Added Mapper#8 (Doraemon).
  Added Mapper#23 (Kid Dracula).
  Added Mapper#22 (Twin Bee 3), still glitches.
  Added Mapper#21 (Goemon2).
  Rewritten graphic-routines.

Ver 0.62    22 February 1998.
  Fixed the joyroutine to handle upper 3 bits (more games start).
```

```
   Added noise, isn't quite right yet.
   Optimizations to the CPU-core, this is a test.

Ver 0.61    19 February 1998.
  Tweaked the sound a bit.
  Smal bugfixes to the GUI.

Ver 0.60    15 February 1998.
  Added sound for unregistered users.
  Rewrote the CPU-core to handle memory mapping in realtime.
  Added mapper#34 (3D World Runner).
  Added mapper#19 (Splatter House).
  Removed mapper#16 as it was invalid.
  Added mapper#5 (CastleVania3).
  Fixed the VROM switching for mapper#4, #5 and #19 (faster).
  Rewrote some PPU,CPU and sprite code (Bubble Bobble2 a bit faster).
  Enhanced the sound-routines.
  Smal fixes to the GUI.

Ver 0.59    10 December 1997.
  Added GUI.

Ver 0.49     never released 17 November 1997.
  Added IRQ support for Mapper#4 (Batman3 & Jurassic Park doesn't lock up).
  Added 4player-addapter support.
  Fixed Mapper#1 a bit (Zelda2 now looks good).

Ver 0.48    10 November 1997.
  Rewrote the keyboard-routine to use the OS.
  Fixed a bug in the PPU which caused many RARE-games to look strange.
  Added 4Screen VRam (Gauntlet works).
  Fixed a small bug when exited.
  Added Mapper#15 (100in1).

Ver 0.47    3 November 1997.
  Added Mapper#16.
  Smal speedup in hardware access.
  Now doesn't quit till you cancel.
  Fixed Mapper#7 a bit.
  Added support for cli argument, now also finds the keyfile from cli.
  Fixed bugs in ASL-requester/prefs.
  Added support for modified Megadrive-pad. Check
              MegaDrivePad
              Ver 0.46    12 October 1997.
  Now remembers the last directory.
  Small speedup in spriteroutines.
  Speedup in some Mapper#4 games.
  Smal fixes to memoryhandling (no leaks).
  New MWB-icons by Tomas Amsrud.

Ver 0.45    29 September 1997.
  Fixed the sprites! =)
  Minor speedup in the cpu routine SBC + memory access.

Ver 0.441   14 September 1997.
  Fixed the mapper routine wich I screwed up in V0.44.
```

Ver 0.44   11 September 1997.
  Added Mapper#4. Most Gfx seem okey now, no IRQ is supported yet.

Ver 0.43   5 September 1997.
  Added CD32-joypad support.
  Fixed the keyboardhandler.
  Fixed dutycycles in sound(some games sound much better).

Ver 0.42b   27 August 1997.
  Fixed backgroundcolour (again).
  Added Mapper#11.
  Major speed improvements.
  Turned of filters (will be selectable).
  Fixed border bug.
  Rewrote soundroutines.

Ver 0.41b   11 August 1997.
  Added Keyfile support. Thanks to Blonde Lion. =)
  Rewrote some of the CPU emulation. Thanks to Juan Antonio Gomez.
  Added minimal soundsupport.

Ver 0.40b   9 August 1997.
  Added 16pixel high sprites.
  Added battery save.
  Mapper#1 Partially working. Zelda, KidIcarus, Metroid, Castlevania2.
  Edited sprite-flag in PPUstatus register (again).
  Fixed the background-color.
  Minor update of the gfx&cpu-routines.

Ver 0.39b   2 August 1997.
  Lowered vertical resolution.
  Fixed Mapper7 and Mapper9.
  (Have you seen the PunchOut-logo in Darkness?)

Ver 0.38b   1 August 1997.
  Fixed sprite-flag in PPUstatus register (many more games work).

Ver 0.37b   30 July 1997.
  Added First try on mapper9, Punch Out.
  Rewrote some cpu-routines (saved 10 cycles on rotate-left).
  Rewrote the gfx-routines (scrolling games faster).
  Added keyboard-support (not good but it works).
  No more NMI during MemSwapping, mapper2 works better.
  Moved gfx-routines out of the interupt. woops!
  Added First try on mapper7, Wizards&Warriors etc.
  Mapper3 changed to "Noncopying", pointer instead (faster).
  Added MemAlloc for CartSize.

Ver 0.36b   17 July 1997.
  Added Asl-requester.
  Added RomInfo

Ver 0.3 never released.
  Fixed a groovy bug in the CPU-command SBC.

Ver 0.2   never released.
  Made screen-core.

```
  Made cpu-core.

Ver 0.1    never released   29 June 1997.
  Started on the concept of a NES-emulator.
  Downloaded Marats NES-Doc.
```

1.14 Limitations.

```
               Are there Limitations!?!

  If you are unregistered a requester appears when you start CoolNESs.
  You'll need a keyfile to unlook this limitation.
  Some mappers still not emulated.
  And splitscreens and IRQ-emulation is not what it could be.


  This will change in the
              Future
              , but I want your response.
  So if you want a full version then register.
  This keyfile will work with all future versions of CoolNESs.

  And from now on it will cost:
        15 USD. US-Dollar.
        10 GBP. Great-Britain Pound.
        30 DEM. Deutsche Mark.
       100 SKR. Svenska Kronor.
  Only bills please, no coins (if it's possible).
  Or you can send _International_ postal money.
  Or if you have an old Nintendo game cartridge, I _may_ trade it for
  a keyfile, but then you _must_ contact
              me
               first.
  Games I'd like:
  RCProAm(2), CobraTriangle, TMNT(2), etc.


  Send your full name, _adress_ and money to:

  Fredrik Olsson
  Hjortmossegatan 84
  461 51 Trollhättan
  Sweden

  You will need an email-adress to receive keyfile.
  or send me an error free disk plus $2/£1/10Skr or enough stamps.
```

1.15 BUGS!!!!

```
              Are there BUGS!?!


The CPU-emulation should be quite OK by now, there is still
no write protection of ROM for Read-Modify-Write instructions.
I Still have problems with the timing of some games, shouldn't
happen as often now though.
Joy2 has problems with some games.
The keyboard and joy seem to miss keys sometimes.



Probably some more to....

Check
             Limitations
              also.
For Bugreports check
             my adress
              .
Remember to include computer plus processor info.
Any patches. Rom + Wb info.
I don't want any reports about games not working, or trashed
graphics. I know about it.
BUT! If you see a game with an unsupported mapper type, please
contact me.
```

1.16   index

```
             Author
              Thats me, the man.

             Bugs
              Nasty little buggers.

             Copyright
              Who owns this.

             F.A.Q.
              Questions from people who wonder.

             History
              How it was before.

             Introduction
              What is this anyway?

             IPS
              How to use IPS on NES roms.
  Joy and keys  A help picture.

             Limitations
              The limits and what you can do about them!
```

```
MegaDrivepad
 How to modify your MD-pad.

Palettes
 How to use Custom Palettes.

Requirements
 What exactly do you need.

Thanks
 People I wanna thank.

The Future
 I see..... somethings.

Usage
 How to use this thingi.
```