The Definitive Guide to ROM Hacking for Complete Beginners

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 *                          by InVerse                             *
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 *                          02/28/03                               *
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Introduction:

The purpose of this guide is to supply neophytes to the ROM hacking
realm with pointers to find the information they desire. This guide
will NOT teach you how to ROM hack, it will show you where to find
information on ROM hacking, how to get started and what mistakes to
avoid.

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Table of Contents:

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Document History:

02/28/03 - v1.00 - Initial Release

-==-=-=*=-=-=*=-=-=*=-=-=*=-=-=*=-=-=*=-=-=*=-=-=*=-=-=*=-=-=*=-=-*

Section One - The Basics

0101: What is a ROM?
0102: What is ROM hacking?
0103: Why do people ROM hack?
0104: What type of people ROM hack?
0105: What is the most important quality of a ROM hacker?
0106: Is ROM hacking legal?

Section Two - Getting Started

0201: How do I hack a ROM?
0202: What tools do I need?
0203: So what do I do first?
0204: What's the most important thing I should know before starting?
0205: Why won't xxxxx program work?
0206: What about utilities for Mac OS, Unix, etc?

Section Three - Editing Graphics

0301: How do I edit graphics?
0302: Why are the graphics all scrambled?
0303: Why can't I find the graphics I want to hack?
0304: How do I edit the title screen of a ROM?
0305: Why are the colors all wrong?
0306: How do I change the color of the graphics?
0307: Why don't my changes show up?

Section Four - Editing Text

0401: How do I edit text?
0402: What is a table?
0403: How do I make a table?
0404: What if the text I want to edit is in Japanese?
0405: How do I get more space for my text?
0406: Why can't I find the text I want to edit?
0407: What is a script?

1102: How can I start a ROM hacking group?
1103: How can I get someone to translate a particular game?
1104: Why shouldn't I e-mail a ROM to a ROM hacker?

Section Twelve - The Scene

1201: What is "The Scene"?
1202: Who is a member of "The Scene"?
1203: How can I join "The Scene"?
1204: What are the benefits of "The Scene"?
1205: What are these people talking about?
1206: How do I quit the scene?

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Section One - The Basics
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0101: What is a ROM?

A ROM is a copy of the program from a console cartridge. In other
words, it's the actual game. ROMs can be run by emulators to allow
you to play console games on your computer.

0102: What is ROM hacking?

ROM hacking involves editing a ROM for various purposes. The term
'hacking' derives from the original computer related definition of
the word which means to explore technology. ROM hacking does not
involve breaking the ROM's security so as to deface its web page or
steal its credit card.

ROM hacking might involve translating the text from one language to
another, editing the graphics, fixing a glitch in the coding of the
game or any other number of possible changes.

0103: Why do people ROM hack?

The prominent (and only valid) reason is because they enjoy it. Yes,
they want to see the game they're hacking playable in English. Yes,
some of them like the attention they get from working on a high level
project. But if you don't enjoy facing and overcoming the challenges
involved in ROM hacking, you're never going to successfully complete
a project.

0104: What type of people ROM hack?

Literally all kinds. I've met ROM hackers of every race and from 6 of the 7 continents. I've met ROM hackers who grew up in gangs and ROM hackers who are attending ivy league colleges. In other words, there is no one certain type of person that makes a good ROM hacker. The one quality that all good ROM hackers possess is enjoyment of figuring out how something works and learning new things.

0105: What is the most important quality of a ROM hacker?

Above all else, a ROM hacker must be patient. Without patience, you won't accomplish much. The work is often tedious and boring, but if you stick it out, you'll be highly rewarded.

0106: Is ROM hacking legal?

This is a gray area, but for the most part it's not. ROMs contain copyrighted material, thus editing it is infringing on the copyright. ROM hackers get around this by releasing patches instead of actual edited ROMs. The patches don't contain any information copyrighted by the game's publisher, only a set of changes made by the ROM hacker.

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Section Two - Getting Started
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0201: How do I hack a ROM?

First, you have to decide what type of hack you want to do. Do you want to hack the text of a game? Do you want to change the graphics? Are you interested in designing entire new levels? Once you've decided what to do, then you can figure out how to do it.

0202: What tools do I need?

This will depend on what you intend to do. In general, you'll need a hex editor & a tile editor. You can do quite well with just these two things to start. When your hacking skills improve, you'll want to include thing such as table makers, script dumpers and others. If your goal is to create new levels, you'll need a level editor for the game you're wanting to hack.

0203: So what do I do first?

Play around. Open the ROM up in your hex editor & graphics editor and look around. Experiment with different things and see what happens. Don't expect to make some awesome new game on your first attempt, because it's not going to happen.

0204: What's the most important thing I should know before starting?

Always (and I mean ALWAYS) back up your work. You never know when you might make a mistake that screws up all of your previous work. Keep multiple copies of your hack because you might screw something up and not even notice until you've changed several other things. And don't just keep a copy on your hard drive, back up to a floppy disk or CD. It's also a good idea to store a copy of your progress somewhere on the Internet just in case your house burns down or something and you lose your hard drive *and* backups. Many a project has went -poof- due to some hapless ROM hacker not properly backing up his work.

0205: Why won't xxxxx program work?

Many ROM hacking utilities were written in DOS, which is no longer supported by Windows XP. If your operating system is XP, that could be the reason. Some utilities might work under a DOS emulator such as DOS Box but, for the most part, you'll just have to find another tool to get the job done. There are Win32 programs that can accomplish most ROM hacking tasks, you'll just have to adapt to them.

Alternatively, if you're getting a strange error. Make sure you're using the program according to the readme file. Try redownloading the file to make sure you didn't get a corrupt download. Also, some programs require additional files (extenders for DOS, DLLs for Windows) so make sure you have all of these. Required files will be listed in the documentation of the utility on most occasions.

0206: What about utilities for Mac OS, Unix, etc?

There are very few ROM hacking tools for Mac OS or Unix. By 'very few' I mean almost none. The only reason for this is that nobody has bothered to write any. There's nothing about Mac OS or Unix that make it difficult to ROM hack, it's just that more programmers use Win/DOS systems, so nobody wrote tools for anything else. You can try a Windows emulator if you want to ROM hack from a non-Windows OS.

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Section Three - Editing Graphics
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0301: How do I edit graphics?

You'll need to use a tile editor for this. (See Section Eleven -
Tools for recommendations on tile editors.)

0302: Why are the graphics all scrambled?

That's just how the graphics are stored in the ROM. There is no way
to put them in order. You'll have to search and experiment to get
things right. (See 0105)

0303: Why can't I find the graphics I want to hack?

If you've searched the ROM and can't find the graphics you want to
hack, chances are they're compressed. While it's certainly possible
to uncompress graphics, it's not a simple task and not something a
beginning ROM hacker should attempt. Set that project off to the side
and work on something else until you've mastered the basic skills.
Then you can worry about learning assembly. (See Section Nine)

0304: How do I edit the title screen of a ROM?

As long as the title screen isn't compressed, you edit it exactly
like you would any other graphic, just that it's bigger. Consult
"Title Screen Hacking Made Easy" by InVerse for more on this
topic.

0305: Why are the colors all wrong?

Every game uses a different palette and there's no way for most
graphic editors to know what that palette is. Some utilities will
allow you to load a palette from a save state but most of the time,
you'll simply have to adjust the palette by hand. Remember, though,
these changes aren't permanent. You have to hack the palette within
the ROM in order to save color changes.

0306: How do I change the color of the graphics?

Some emulators and utilities will allow you to modify the palette
within that program but this isn't a permanent change. For this, you
will have to do some palette hacking. Try The Palette Hacking Doc by
Toma for NES palette hacking or SNES Palette Format by Jay.

0307: Why don't my changes show up?

First, make sure you've saved the changes in your editor. This may
sound obvious, but almost everyone (myself included) has forgotten to
click save at one time or another and then wondered why nothing had
changed.

Also, if you're reloading from a save state, keep in mind that some
of the information you are hacking may be stored in that save state.
This means you'll have to do something to flush the memory in order
to see your new graphics. In some games, this might be as simple as
going to an inventory or pause screen. Others might require you to
enter another area. Sometimes, you'll simply have to die and start
that level over again to see your changes.

Another possibility is that your ROM is set as read only. Check the
attributes and make sure read only isn't selected.

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VIII. Section Four - Editing Text
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0401: How do I edit text?

You open the ROM in a hex editor, along with the appropriate table,
and edit away. (See Section Eleven - Tools for a recommendation of
hex editors.)

0402: What is a table?

A table is a file that tells a hex editor what font characters
correspond with what hex values. Tables are only readable by hex
editors that are specifically designed for ROM hacking purposes.

0403: How do I make a table?

It's a relatively simple process but still goes beyond the scope of
this FAQ. Consult the document The Definitive Guide to ROM Hacking
Tables by InVerse or Tables for Dummies by satsu.

0404: What if the text I want to edit is in Japanese?

You edit it just like you do English text. You'll need a table that
includes Japanese characters if you want to see them in the hex

editor. For information on translating Japanese, see Section Ten.

0405: How do I get more space for my text?

You'll quickly find out that you can't simply add more text to a ROM.
In order to make more room for your text, you'll have to learn to
hack pointers. Consult the document The Mad Hacker's Guide to
Pointers by The Mad Hacker.

0406: Why can't I find the text I want to edit?

There are 2 possibilities. First, if you can find some but not all of
the text, perhaps the game uses more than one font. This can result
in needing more than one table. Consult The Definitive Guide to ROM
Hacking Tables by InVerse for more information on this.

Secondly, it's possible that the ROM you chose has a compressed
script. If this is the case, it will require assembly level hacking
to decompress the script. This isn't something a novice is likely to
grasp, so I recommend putting the project aside until you've mastered
the basics of ROM hacking. Then you can try more advanced subjects.
(See Section Nine)

0407: What is a script?

A script is a file containing all of the text from a game. Rather
than hacking the text directly in a hex editor, you can extract a
script, change the text as you see fit in a word processing program,
then reinsert the script.

0408: How do I extract/insert a script?

If your ROM's script uses a consistent format, you can use one of the
prebuilt script dumpers. If there are any strange features in your
ROM's script, you might have to build a custom script dumper. (See
Section Eleven - Tools.)

0409: How do I build a custom script dumper?

This will require knowledge of C, Visual Basic or some other
programming language and involves more than just ROM hacking.

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IX. Section Five - Editing Other Things
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0501: How do I edit levels?

Some popular (and a few unpopular) games have utilities specifically
built to edit the levels, so first check for one of those. If the
game you want to edit doesn't have a level editor already, you'll
have to figure out the level format yourself by corrupting the ROM.
Consult Basic ROM Corruption by InVerse for more details.

0502: How do I edit statistics?

As with levels, a few popular games have utilities specifically for
this purpose. If the game doesn't have such a tool, you'll have to
search for the location of the statistics via ROM corruption. Consult
Basic ROM Corruption by InVerse for more details.

0503: How do I edit items?

If you're wanting to edit the statistics of items, see 0502. If
you're wanting to edit what items your character currently has in a
game, see 0504.

0504: How do I hack save states?

Save state editing is a bit more precise than other types of editing.
Consult Hacking RPG Inventories by The Spook for more details.

0505: How do I make Game Genie codes permanent?

This involves hex editing the ROM. Consult Game Genie Doc by SnowBro
for more details.

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X. Section Six - Translating
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0601: How do I translate Japanese?

You aren't going to learn Japanese from a tutorial. If you are
interested in learning the language, consult section XVIII References
for a list of sites that provide educational information concerning
the Japanese language. If you're just interested in getting the

Japanese in your project translated, you might be best served by locating a Japanese speaker willing to translate for you.

0602: Can I use an online translator?

You could, but your script would likely come out horribly mangled. Online translators are far from accurate. For example, using the most popular online translator, BabelFish, the sentence "Let's go in the room." translates to "That with everyone you will try going in the room." Now if it does such a bad job with a simple sentence, imagine how badly it will mangle an entire script. Online translators are fine when you want to translate individual item names or the occasional short sentence but relying on them to translate a game script for you is pointless.

0603: How can I find a script translator?

Your best bet is to post on ROM hacking related messageboards asking for a translator. Don't just say "I want to hack such and such game and need a translator." though, because you're unlikely to receive much help. You need to show evidence that you're capable of handling the project. Do some initial hacking to show that you know what you're doing. Change some dialogue text and show off your work with screen shots. The text you hack in doesn't need to be correct, it just needs to show that you're capable of hacking the ROM. Also, it helps to have your script dumped (see 0408) so you can inform a prospective translator of just how much text needs to be translated.

0604: How can I view Japanese characters on my computer?

Some programs have built in support. For example, in Internet Explorer, there is a Japanese (Auto-Select) option under Encoding in the View menu. Other programs will require you to install a Japanese font. There are also programs you can run that will allow you to view Japanese in just about any program. (See Section 10 - Tools for more information.)

0605: How can I type in Japanese?

In Windows XP or 2000, you can enable the native IME by going to Control Panel and selecting Regional and Language Options. Click Add and select Japanese as the Input Language. This will add Japanese as an installed service. You can then set the Language Bar and Key Settings button to allow you to type in Japanese.

If you're using Windows 95 or 98, you can download a Global Input
Method Editor from Microsoft's website (http://www.microsoft.com).

Macintosh users can select Japanese from the keyboard menu. There
are IME's for Unix as well. Your best bet is to check the website
for your particular flavor to find the best method to accomplish
this.

Another option is to download a Japanese word processing program.
(See Section 10 - Tools for more information.)

0606: What are the different types of Japanese characters?

There are four basic types of Japanese characters that you'll have to
deal with while ROM hacking. The most prevalent are hiragana and
katakana, collectively referred to as kana. Kana is the written
version of the Japanese spoken language. In other words, much like
Romanic alphabets, each kana has a specific sound that it makes.
Hiragana characters generally correspond to native Japanese words.
Katakana are usually used to write non-native words and names. For
each sound in the Japanese "alphabet", there is a corresponding
hiragana and katakana character.

Next up is kanji. Kanji are the big, complicated characters that most
people associate with Japanese (though kanji is used in Chinese and
Korean as well.) Each kanji represents a specific word or idea. There
are several thousand kanji. Finally, there is romaji which is when
Japanese words are written using Romanic characters. You'll probably
never actually encounter romaji in a game, but if you spend any time
on ROM hacking messageboards or chat rooms, you'll likely encounter
it.

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XI. Section Seven - Advanced ROM Hacking
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0701: What is an ISO?

An ISO is an image taken from a CD, much as a ROM is an image taken
from a cartridge. Referring to an ISO as a "Playstation ROM" will
likely get you ridiculed.

0702: How do I hack Playstation games?

There have been a few complete Playstation translations, so interest

in hacking for PSX is on the rise. Since you're dealing with a CD instead of a ROM, some things will obviously be different. The basics are still the same, though. You'll still be hex editing the text, using relative searching to locate it, etc. Consult "The PlayStation Translation Doc" by Cless for more information.

0703: How do I hack games for newer systems?

There have been translation projects involving Saturn, Dreamcast and PS2 games, among others. As of this writing, no complete translations have been released for any of these systems, however. Once again, the basics are going to be the same but you'll just have to experiment on your own to figure out anything special regarding a certain system.

0704: How do I hack PC games?

Once again, the basics of ROM hacking apply to PC games. Search the web and you'll likely find some tutorials regarding hacking PC games.

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XII. Section Eight - Assembly
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0801: What is assembly language?

No matter what language a game was originally written in, when it is compiled, it's converted to machine language. Using a disassembler, you can convert a ROM into assembly language. Each processor type has its own flavor of assembly, hence NES, SNES, etc will use different types of assembly.

0802: What is assembly hacking?

Assembly hacking is when you hack a ROM by disassembling it and rewriting portions of the assembly code. This will give you much greater control over the changes, since you'll be able to see exactly what is happening within the game.

0803: How do I learn assembly language?

You're not going to learn Assembly language from a single tutorial like you will with most ROM hacking techniques. You'll have to read what documents exist and then start breaking a ROM in order to really learn Assembly. Try "6502 Microprocessor" (commonly named 6502.txt)

or "A 65816 Primer" by Brett Tabke. Once you learn one assembly
language, it will generally be easier to learn others. The basic
principles are the same, the implementation just differs.

0804: What assembly language do various consoles use?

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Nintendo                          Sega
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NES.............6502              Master System........z80
SNES..........65816               Genesis...........68000
N64............MIPS               Saturn..............SH2
Gamecube.......MIPS               Dreamcast...........SH4
Gameboy.........z80               GameGear............z80
GBA........ARM7TDMI

Other                             Sony
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MSX.............z80               PSX................MIPS
X-Box...........x86               PS2................MIPS
TG16...........6280
NGPC.........93c141
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XIII. Section Nine - Miscellaneous
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0901: Why are hacks/translations distributed as IPS patches?

As was previously mentioned, ROMs are copyrighted files and it is
illegal to distribute them. It's also illegal to modify them. If a
ROM hacker were to distribute hacked ROMs, they would be in danger of
having their website shut down. An IPS patch doesn't contain any
copyrighted data from the ROM, it simply contains a list of changes
that need to be applied to an unhacked ROM in order to convert it to
your hack. IPS files are also much smaller than ROMs, so it saves on
bandwidth to distribute IPS patches. Not to mention, most sites that
carry translations refuse to post hacked ROMs, so if you want the
word to get out about your work, you'll need to distribute it in IPS
form.

0902: What should I pick for my first translation project?

Well, the obvious answer is "something easy". It's usually easiest
to start with an NES or Gameboy action or puzzle game. There's also
nothing wrong with doing a text hack of a game already in English
just to get the experience of various techniques without having to

complicate things by dealing with a language you don't understand.
It's really not a good idea to choose a big RPG as your initial
project, though. Get some experience first, then move on to bigger
and better things.

0903: Why are there so many unfinished hacks for a certain game?

If there are multiple unfinished patches for a single game, it's
likely that there are problems with the game that make it difficult
to hack. That doesn't mean that it's impossible to translate that
particular game, just that nobody who has the skills to accomplish it
has sat down and worked on it. Many games, mostly RPGs, have taken
several years of effort to actually complete a translation. A lot of
the time, new ROM hackers will pick up a big RPG with grandiose ideas
of translating it and garnering instant fame. Then they run into the
same problem that everyone else who attempted it encountered, or else
they just get overwhelmed by the shear size of such an endeavor, and
give up. If there are multiple patches for a single game, it's
probably safe to say that it would be a bad choice for a first
project.

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XIV. Section Ten - Tools
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1001: What graphics hacking tools should I use?

Tile Layer Pro is hands down the best tile editor for just about
everything you'll need to do. Tile Mod is another popular graphics
editor that can do a few things TLP can't. YY-Chr is also worth a
look. There are many editors that can accomplish most hacking, so
just use the one that you're most comfortable with.

1002: What text hacking tools should I use?

For hex editing, Hexposure is the king. Unfortunately, it's a DOS
application, so if you're using Windows XP, you'll have to go with
Hexecute or Translhextion. For script dumping, ROM Juice is probably
the only really decent general extractor and Gizmo is probably the
best inserter. In general, however, it's usually better to use a
custom built tool.

1003: What emulators are good for hacking?

It's not good for much else, but Nesticle has a pattern editor that

will allow you to do a certain amount of graphics hacking directly in
an NES ROM. FCE Ultra and Nesten both feature debuggers for NES.
SNES9X LT is a version of the popular SNES emulator with a debugger
built in. No$GB is another popular emulator, this one for Gameboy,
that features a debugger. Many other systems have emulators with
debuggers as well. Check the documentation to find out which ones.

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XV. Section Eleven - Etiquette
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1101: How can I ask for help without getting flamed?

One of the biggest problems a neophyte to ROM hacking has is an
unfamiliarity with how to go about obtaining help when a problem is
encountered. Most will simply post a question on a messageboard or
e-mail a ROM hacker without first considering their actions.

To avoid being flamed on a messageboard, first make sure you've read
any documents regarding the subject you're asking about, to make sure
your question isn't answered there. Secondly, read through the board
and make sure nobody else has asked the same question. One of the
main reasons people get flamed is because they ask a question that
has already been answered several times. Finally, be specific. Don't
just say "How do I hack Metroid?", state exactly what you're trying
to do and what problem you're having. Explain what you've tried so
far and then ask for assistance. And don't expect to get an answer.
Nobody is obligated to help you and getting pissed off because you
don't immediately get the answer you need isn't going to do any good.

Also, never e-mail a ROM hacker asking for help unless they've made
it clear that it is ok to do so. If you have a specific question
regarding something they've written or a hack they've released, then
it may be okay to ask them about it, unless their website or
documentation says not to do so. Don't e-mail a ROM hacker asking for
help with a utility they didn't write or a system they haven't hacked
for, however. Doing so will most likely get you ignored and/or flamed
and you don't need to piss off the people whose assistance you need.

1102: How can I start a ROM hacking group?

One of the biggest neophyte mistakes is to attempt to start a new
ROM hacking group to accomplish some project you've thought up. First
of all, no experienced ROM hacker is going to join a group founded
by someone who's never released a ROM hack. Secondly, unless you plan
to do a significant portion of the work (and no, managing a team does
not count) then most ROM hackers will avoid your attempt to start a

group because it looks like you're wanting to take credit for their hard work. If you really want to start a ROM hacking group, then show some progress on a project of your own and then solicit people to help you with it. It's generally easier to find an existing group and offer your services to them, however.

1103: How can I get someone to translate a particular game?

Asking someone to translate a particular game rarely ever works. Most ROM hackers work only on games they enjoy. Asking someone to translate a game, even if it's a sequel or similar to another game they've hacked, is most likely only going to annoy them. The best way you can go about getting a particular game translated is to build a shrine, of sorts, to it. Post screen shots, summarize the game, in short, show people why that particular game really needs to be translated. Then link your shrine on a few general ROM hacking forums and hope for the best.

1104: Why shouldn't I e-mail a ROM to a ROM hacker?

A sure fire way to gain hatred from the ROM hacking elite is to send them ROMs via e-mail and ask them to translate it. For starters, most ROM hackers know exactly where to get any ROM they could ever want. Sending a ROM via e-mail can be a problem for multiple reasons. First of all, just because you have a 'leet broadband connection doesn't mean that your recipient does. They could be on a very slow dialup and a large file such as a ROM could clog up their bandwidth for a significant amount of time, thus turning them against you before they have even read your request. Just because you CAN send large files via e-mail doesn't mean you should. That's not the purpose of e-mail. You can use a car to slaughter cattle as well, but that doesn't mean it's a good idea. Secondly, you have no idea where a ROM hacker might be checking their mail from. It's almost a guarantee that the ROM you're sending is copyrighted material, and some people don't appreciate unwittingly downloading illegal files on someone else's computer or in their laptop at a local cafe. In short, never e-mail a ROM without explicit permission from the recipient.

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XVI. The Scene
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1201: What is "The Scene"?

"The Scene" (which you'll often see written in bold) refers to a large subset of ROM hackers who communicate via IRC and various

messageboards. "The Scene" is like a family. A fat, lazy, annoying family of assholes, most of whom hate each other.

1202: Who is a member of "The Scene"?

Just about anyone who participates in a "Scene" related chat room or messageboard is a part of the scene. If someone denies being a part of "The Scene", they probably are, particularly if that denial occurs in/on a "Scene" related chat room or messageboard.

1203: How can I join "The Scene"?

Just start hanging around various ROM hacking messageboards and chat rooms and you'll eventually become trapped in "The Scene". Some people will claim there is a membership fee that must be paid in hentai but that has been unconfirmed as of this writing. Any ability or knowledge in regards to ROM hacking is completely irrelevant.

1204: What are the benefits of "The Scene"?

Well, if you're into lame cartoon pornography, jokes about sexual orientation and the occasional reach around, then "The Scene" is for you. If you actually hope to make progress in your ROM hacking, then there are no benefits.

1205: What are these people talking about?

Hell if I know, consult "The Emulation Dictionary" by satsu.

1206: How do I quit the scene?

First, get frustrated with some minor thing. Then post on all the messageboards about how you're quitting "The Scene". Wait for a day or two and then start working on your projects again, after a week or so, start posting on the messageboards again. This might not make sense now, but it will after you've been around "The Scene" for a few weeks.

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XVII. Resources
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General ROM Hacking Information

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------- --- ------- ----------
The Repository - http://www.romhacking.com
Zophar's Domain - http://www.zophar.net
CTC - http://www.confederatedtranslationcompany.com


Translation Archives
----------- --------
The Whirlpool - http://donut.parodius.com
RPGd - http://rpgd.emulationworld.com


Non-Translation Hacks
-------------- -----
Acmlm's ROM Hack Domain - http://acmlm.overclocked.org
Challenge Games - http://www.cg-games.net
RuSteD ROM Hacks - http://bmf.rustedmagick.com


Japanese Information
-------- -----------
Japanese Online - http://www.learn-japanese.com
Jim Breen's Page - http://www.csse.monash.edu.au/~jwb/japanese.html
The Japanese Page - http://www.thejapanesepage.com
Japanese Online - http://www.japanese-online.com/


My Websites
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Suicidal Translations - http://www.pigtails.net/ST
Anywayz... 21st Century Parasite - http://www.anywayz.org


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XVIII. Conclusion:
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Above all else, remember that this is a hobby and nothing more. Too
many people (myself included) get caught up in the politics of "the
scene" and forget that it's all about video games. So whatever you
do, don't forget that. I mean, what's the point of a hobby if you're
not having fun?

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XIX. Credits:
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There are entirely too many people to credit/thank for the existence
of this document.

Thanks to:

SnowBro for writing many of the tools that made ROM hacking what it is today.

Klarth for providing various answers in this document, particularly in regards to the Advanced ROM Hacking and Assembly sections.

Neil_ for providing information, inspiration, entertaining and a general respite from the ignorance that is "The Scene".

Musashi for helping me out when I first got started, providing the translation for several of my earlier projects and hacking several great games himself.

Anybody who has ever written a utility or tutorial, translated a script, answered a ROM hacking question on a messageboard or released a quality hack or translation.

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XX. Contact Info:
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I'm not an exceptional ROM hacker. I wrote this document in hopes of helping some people learn to ROM hack and to save time in answering the same questions over and over again on messageboards. If you have questions regarding ROM hacking, you're going to get a lot more help by asking on a messageboard than you will by e-mailing me. If you find an error in this document, then contact me and I'll most likely fix it. Do NOT under ANY circumstances e-mail me asking to translate a game and if you e-mail me a ROM, you will suffer horribly. If you can comply with these rules, my e-mail address is inverse@pigtails.net

The most recent copy of this file can always be found at my website Suicidal Translations (http://www.pigtails.net/ST) along with other documents and utilities I've written and my own ROM translations.

-InVerse

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02/28/01    -    ROM Hacking for Complete Beginners    -    v1.00
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