NAME

rgbfix — Game Boy header utility and checksum fixer

SYNOPSIS

rgbfix [-hjsVvw] [-C | -c] [--color *when*] [-f *fix_spec*] [-i *game_id*]
[-k *licensee_str*] [-L *logo_file*] [-l *licensee_id*] [-m *mbc_type*]
[-n *rom_version*] [-o *out_file*] [-p *pad_value*] [-r *ram_size*]
[-t *title_str*] [-W *warning*] *file ...*

DESCRIPTION

The **rgbfix** program changes headers of Game Boy ROM images, typically generated by *rgblink*(1), though it will work with *any* Game Boy ROM. It also performs other correctness operations, such as padding. **rgbfix** only changes the fields for which it has values specified. Developers are advised to fill those fields with 0x00 bytes in their source code before running **rgbfix**, and to have already populated whichever fields they don't specify using **rgbfix**.

ARGUMENTS

rgbfix accepts the usual short and long options, such as `-V` and `--version`. Options later in the command line override those set earlier, except for when duplicate options are considered an error. Options can be abbreviated as long as the abbreviation is unambiguous: `--ver` is `--version`, but `--v` is invalid because it could also be `--validate`.

Unless otherwise noted, passing '`-`' (a single dash) as a file name makes **rgbfix** use standard input (for input files) or standard output (for output files). To suppress this behavior, and open a file in the current directory actually called '`-`', pass `./-` instead. Using standard input or output for more than one file in a single command may produce unexpected results.

rgbfix accepts decimal, hexadecimal, octal, and binary for numeric option arguments. Decimal numbers are written as usual; hexadecimal numbers must be prefixed with either '`$`' or '`0x`'; octal numbers must be prefixed with either '`&`' or '`0o`'; and binary numbers must be prefixed with either '`%`' or '`0b`'. (The prefixes '`$`' and '`&`' will likely need escaping or quoting to avoid being interpreted by the shell.) Leading zeros (after the base prefix, if any) are accepted, and letters are not case-sensitive. For example, all of these are equivalent: '`42`', `042`, `0x2A`, `0X2A`, `0x2a`, `&52`, `0o52`, `0O052`, `0b00101010`, `0B101010`.

The following options are accepted:

`-C`, `--color-only`
: Set the Game Boy Color–only flag (*0x143*) to 0xC0. This overrides `-c` if it was set prior.

`-c`, `--color-compatible`
: Set the Game Boy Color–compatible flag: (*0x143*) to 0x80. This overrides `-c` if it was set prior.

`--color` *when*
: Specify when to highlight warning and error messages with color: `always`, `never`, or `auto`. `auto` determines whether to use colors based on the *NO_COLOR*: https://no-color.org/ or *FORCE_COLOR*: https://force-color.org/ environment variables, or whether the output is to a TTY.

`-f` *fix_spec*, `--fix-spec` *fix_spec*
: Fix certain header values that the Game Boy checks for correctness. Alternatively, intentionally trash these values by writing their binary inverse instead. *fix_spec* is a string containing any combination of the following characters:

  - `l` Fix the Nintendo logo (*0x104–0x133*).
  - `L` Trash the Nintendo logo.
  - `h` Fix the header checksum (*0x14D*).
  - `H` Trash the header checksum.
  - `g` Fix the global checksum (*0x14E–0x14F*).
  - `G` Trash the global checksum.

`-h`, `--help`
: Print help text for the program and exit.

`-i` *game_id*, `--game-id` *game_id*
: Set the game ID string (*0x13F–0x142*) to a given string. If it's longer than 4 characters, it will be truncated.

`-j`, `--non-japanese`
: Set the non-Japanese region flag (*0x14A*) to 0x01.

`-k` *licensee_str*, `--new-licensee` *licensee_str*
: Set the new licensee string (*0x144–0x145*) to a given string. If it's longer than 2 characters, it will be truncated.

`-L` *logo_file*, `--logo` *logo_file*
: Specify a logo file to use instead of the official Nintendo logo. The file must be 48 bytes of 1bpp tile data; the source image should be 48 pixels wide and 8 pixels tall.

`-l` *licensee_id*, `--old-licensee` *licensee_id*
: Set the old licensee code (*0x14B*) to a given value from 0 to 0xFF. This value is deprecated and should be set to 0x33 in all new software.

`-m` *mbc_type*, `--mbc-type` *mbc_type*
: Set the MBC type (*0x147*) to a given value from 0 to 0xFF.

  This value may also be an MBC name. The list of accepted names can be obtained by passing `help` or `list` as the argument. Any amount of whitespace (space and tabs) is allowed around plus signs, and the order of "components" is free, as long as the MBC name is first. There are special considerations to take for the TPP1 mapper; see the "TPP1" section below.

`-n` *rom_version*, `--rom-version` *rom_version*
: Set the ROM version (*0x14C*) to a given value from 0 to 0xFF.

`-o` *out_file*, `--output` *out_file*
: Write the modified ROM image to the given file, or '-' to write to standard output. If not specified, the input files are modified in-place, or written to standard output if read from standard input.

`-p` *pad_value*, `--pad-value` *pad_value*
: Pad the ROM image to a valid size with a given pad value from 0 to 255 (0xFF). **`rgbfix`** will automatically pick a size from 32 KiB, 64 KiB, 128 KiB, ..., 8192 KiB. The cartridge size byte (*0x148*) will be changed to reflect this new size. The recommended padding value is 0xFF, to speed up writing the ROM to flash chips, and to avoid "nop slides" into VRAM.

`-r` *ram_size*, `--ram-size` *ram_size*
: Set the RAM size (*0x149*) to a given value from 0 to 0xFF.

`-s`, `--sgb-compatible`
: Set the SGB flag (*0x146*) to 0x03. This flag will be ignored by the SGB unless the old licensee code (`-l`) is 0x33!

`-t` *title*, `--title` *title*
: Set the title string (*0x134–0x143*) to a given string. If the title is longer than the maximum length, it will be truncated. The max length is 11 characters if the game ID (`-i`) is specified, 15 characters if the CGB flag (`-c` or `-C`) is specified but the game ID is not, and 16 characters otherwise.

`-V`, `--version`
: Print the version of the program and exit.

`-v`, `--validate`
: Equivalent to `-f lhg`.

`-W` *`warning`*, `--warning` *`warning`*
: Set warning flag *`warning`*. A warning message will be printed if *`warning`* is an unknown warning flag. See the "DIAGNOSTICS" section for a list of warnings.

`-w`
: Disable all warning output, even when turned into errors.

DIAGNOSTICS

Warnings are diagnostic messages that indicate possibly erroneous behavior that does not necessarily compromise the header-fixing process. The following options alter the way warnings are processed.

`-Werror`
: Make all warnings into errors. This can be negated as `-Wno-error` to prevent turning all warnings into errors.

`-Werror=`
: Make the specified warning or meta warning into an error. A warning's name is appended (example: `-Werror=obsolete`), and this warning is implicitly enabled and turned into an error. This can be negated as `-Wno-error=` to prevent turning a specified warning into an error, even if `-Werror` is in effect.

The following warnings are "meta" warnings, that enable a collection of other warnings. If a specific warning is toggled via a meta flag and a specific one, the more specific one takes priority. The position on the command-line acts as a tie breaker, the last one taking effect.

`-Wall`
: This enables warnings that are likely to indicate an error or undesired behavior, and that can easily be fixed.

`-Weverything`
: Enables literally every warning.

The following warnings are actual warning flags; with each description, the corresponding warning flag is included. Note that each of these flags also has a negation (for example, `-Wobsolete` enables the warning that `-Wno-obsolete` disables; and `-Wall` enables every warning that `-Wno-all` disables). Only the non-default flag is listed here. Ignoring the "no-" prefix, entries are listed alphabetically.

`-Wno-mbc`
: Warn when there are inconsistencies with or caveats about the specified MBC type.

`-Wno-obsolete`
: Warn when obsolete features are encountered, which have been deprecated and may later be removed.

`-Wno-overwrite`
: Warn when overwriting different non-zero bytes in the header.

`-Wno-sgb`
: Warn when the SGB flag (`-s`) conflicts with the old licensee code (`-l`).

`-Wno-truncation`
: Warn when truncating values to fit the available space.

EXAMPLES

Most values in the ROM header do not matter to the actual console, and most are seldom useful anyway. The bare minimum requirements for a workable program are the header checksum, the Nintendo logo, and (if needed) the CGB/SGB flags. It is a good idea to pad the image to a valid size as well ("valid" meaning a power of 2, times 32 KiB).

The following will make a plain, non-color Game Boy game without checking for a valid size:

```
$ rgbfix -v foo.gb
```

The following will make a SGB-enabled, color-enabled game with a title of “foobar”, and pad it to a valid size. (The Game Boy itself does not use the title, but some emulators or ROM managers do.)

```
$ rgbfix -vcs -l 0x33 -p 255 -t foobar baz.gb
```

The following will duplicate the header of the game “Survival Kids”, sans global checksum:

```
$ rgbfix -cjsv -k A4 -l 0x33 -m 0x1B -p 0xFF -r 3 -t SURVIVALKIDAVKE SurvivalKids.gbc
```

TPP1

TPP1 is a homebrew mapper designed as a functional superset of the common traditional MBCs, allowing larger ROM and RAM sizes combined with other hardware features. Its specification, as well as more resources, can be found online at https://github.com/aaaaaa123456789/tpp1.

MBC name

The MBC name for TPP1 is more complex than standard mappers. It must be followed with the revision number, of the form `major.minor`, where both `major` and `minor` are decimal, 8-bit integers. There may be any amount of spaces or underscores between `TPP1` and the revision number. **`rgbfix`** only supports 1.x revisions, and will reject everything else.

Like other mappers, the name may be followed with a list of optional, ‘`+`’-separated features; however, `RAM` should not be specified, as the TPP1 mapper implicitly requests RAM if a non-zero RAM size is specified. Therefore, **`rgbfix`** will ignore the `RAM` feature on a TPP1 mapper.

Special considerations

TPP1 overwrites the byte at *0x14A*, usually indicating the region destination (see `-j`), with one of its three identification bytes. Therefore, **`rgbfix`** will warn about and ignore `-j` if used in combination with TPP1.

BUGS

Please report bugs or mistakes in this documentation on *GitHub*: https://github.com/gbdev/rgbds/issues.

SEE ALSO

rgbasm(1), *rgblink*(1), *rgbgfx*(1), *gbz80*(7), *rgbds*(7)

HISTORY

`rgbfix` was originally written by Carsten Sørensen as a standalone program called GBFix, which was then packaged in ASMotor, and was later repackaged in RGBDS by Justin Lloyd. It is now maintained by a number of contributors at https://github.com/gbdev/rgbds.