

NAME

rgbasm — Game Boy assembler

SYNOPSIS

```
rgbasm [-EHhLlVvw] [-b chars] [-D name[=value]] [-g chars] [-I path]
  [-M depend_file] [-MG] [-MP] [-MT target_file] [-MQ target_file]
  [-o out_file] [-P include_file] [-p pad_value] [-Q fix_precision]
  [-r recursion_depth] [-W warning] [-X max_errors] asmfile
```

DESCRIPTION

The **rgbasm** program creates an RGB object file from an assembly source file. The object file format is documented in *rgbds(5)*.

The input *asmfile* can be a path to a file, or `-` to read from standard input.

Note that options can be abbreviated as long as the abbreviation is unambiguous: `--verb` is `--verbose`, but `--ver` is invalid because it could also be `--version`. The arguments are as follows:

- b *chars*, --binary-digits *chars*
Change the two characters used for binary constants. The defaults are 01.
- D *name*[=*value*], --define *name*[=*value*]
Add a string symbol to the compiled source code. This is equivalent to *name* **EQU** "*value*" in code, or *name* **EQU** "1" if *value* is not specified.
- E, --export-all
Export all labels, including unreferenced and local labels.
- g *chars*, --gfx-chars *chars*
Change the four characters used for gfx constants. The defaults are 0123.
- I *path*, --include *path*
Add a new "include path"; *path* must point to a directory. When **aINCLUDE** (including the implicit one from `-P`) or **INCBIN** is attempted, **rgbasm** first looks up the provided path from its working directory; if this fails, it tries again from each of the "include path" directories, in the order they were provided.
- M *depend_file*, --dependfile *depend_file*
Print *make(1)* dependencies to *depend_file*.
- MG To be used in conjunction with `-M`. This makes **rgbasm** assume that missing files are auto-generated: when **INCLUDE** (including the implicit one from `-P`) or **INCBIN** is attempted on a non-existent file, it is added as a dependency, then **rgbasm** exits normally instead of erroring out. This feature is used in automatic updating of makefiles.
- MP When enabled, this causes a phony target to be added for each dependency other than the main file. This prevents *make(1)* from erroring out when dependency files are deleted.
- MT *target_file*
Add a target to the rules emitted by `-M`. The exact string provided will be written, including spaces and special characters.
-MT fileA -MT fileB
is equivalent to
-MT 'fileA fileB'.
If neither this nor `-MQ` is specified, the output file name is used.
- MQ *target_file*
Same as `-MT`, but additionally escapes any special *make(1)* characters, essentially '\$'.
- o *out_file*, --output *out_file*
Write an object file to the given filename.

- P *include_file*, --preinclude *include_file*
Pre-include a file. This acts as if a **INCLUDE** "*include_file*" was read before the input *asmfile*.
- p *pad_value*, --pad-value *pad_value*
Use this as the value for **DS** directives in ROM sections, unless overridden. The default is 0x00.
- Q *fix_precision*, --q-precision *fix_precision*
Use this as the precision of fixed-point numbers after the decimal point, unless they specify their own precision. The default is 16, so fixed-point numbers are Q16.16 (since they are 32-bit integers). The argument may start with a '.' to match the Q notation, for example, -Q .16.
- r *recursion_depth*, --recursion-depth *recursion_depth*
Specifies the recursion depth past which RGBASM will assume being in an infinite loop. The default is 64.
- V, --version
Print the version of the program and exit.
- v, --verbose
Be verbose.
- 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.
- X *max_errors*, --max-errors *max_errors*
If more than this number of errors (not warnings) occur, then abort the assembly process; -X -0 disables this behavior. The default is 100 if **rgbasm** is printing errors to a terminal, and 0 otherwise.

DIAGNOSTICS

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

- Werror
Make all warnings into errors.
- Werror=
Make the specified 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 is an error if used with a meta warning, such as -Werror=all.

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.
- Wextra
This enables extra warnings that are less likely to pose a problem, but that may still be wanted.
- 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 flag also has a negation (for example, -Wcharmap-redef enables the warning that -Wno-charmap-redef disables). Only the non-default flag is listed here. Ignoring the "no-" prefix, entries are listed alphabetically.

- Wno-assert
Warn when **WARN**-type assertions fail. (See “Aborting the assembly process” in *rgbasm(5)* for **ASSERT**).
- Wbackwards-for
Warn when **FOR** loops have their start and stop values switched according to the step value. This warning is enabled by `-Wall`.
- Wbuiltin-args
Warn about incorrect arguments to built-in functions, such as **STRSUB**() with indexes outside of the string’s bounds. This warning is enabled by `-Wall`.
- Wcharmap-redef
Warn when re-defining a charmap mapping. This warning is enabled by `-Wall`.
- Wdiv
Warn when dividing the smallest negative integer (-2^{31}) by -1 , which yields itself due to integer overflow.
- Wempty-macro-arg
Warn when a macro argument is empty. This warning is enabled by `-Wextra`.
- Wempty-strrpl
Warn when **STRRPL**() is called with an empty string as its second argument (the substring to replace). This warning is enabled by `-Wall`.
- Wlarge-constant
Warn when a constant too large to fit in a signed 32-bit integer is encountered. This warning is enabled by `-Wall`.
- Wmacro-shift
Warn when shifting macro arguments past their limits. This warning is enabled by `-Wextra`.
- Wno-obsolete
Warn when obsolete constructs such as the **_PI** constant or **PRINTT** directive are encountered.
- Wnumeric-string=
Warn when a multi-character string is treated as a number. `-Wnumeric-string=0` or `-Wno-numeric-string` disables this warning. `-Wnumeric-string=1` or just `-Wnumeric-string` warns about strings longer than four characters, since four or fewer characters fit within a 32-bit integer. `-Wnumeric-string=2` warns about any multi-character string.
- Wshift
Warn when shifting right a negative value. Use a division by 2^{**N} instead.
- Wshift-amount
Warn when a shift’s operand is negative or greater than 32.
- Wtruncation=
Warn when an implicit truncation (for example, **db** to an 8-bit value) loses some bits. `-Wtruncation=0` or `-Wno-truncation` disables this warning. `-Wtruncation=1` warns when an N-bit value is 2^{**N} or greater, or less than -2^{**N} . `-Wtruncation=2` or just `-Wtruncation` also warns when an N-bit value is less than $-2^{**(N-1)}$, which will not fit in two’s complement encoding.
- Wunmapped-char=
Warn when a character goes through charmap conversion but has no defined mapping. `-Wunmapped-char=0` or `-Wunmapped-char` disables this warning. `-Wunmapped-char=1` or just `-Wunmapped-char` only warns if the active charmap is not empty. `-Wunmapped-char=2` warns if the active charmap is empty, and/or is not the default

```
charmap 'main'.
```

```
-Wno-user
```

Warn when the **WARN** built-in is executed. (See “Aborting the assembly process” in *rgbasm(5)* for **WARN**).

EXAMPLES

You can assemble a source file in two ways.

Straightforward way:

```
$ rgbasm -o bar.o foo.asm
```

Pipes way:

```
$ cat foo.asm | rgbasm -o bar.o -
```

```
$ rgbasm -o bar.o - < foo.asm
```

The resulting object file is not yet a usable ROM image—it must first be run through *rgblink(1)* and then *rgbfix(1)*.

BUGS

Please report bugs on *GitHub*: <https://github.com/gbdev/rgbds/issues>.

SEE ALSO

rgbasm(5), *rgblink(1)*, *rgbfix(1)*, *rgbgfx(1)*, *gbz80(7)*, *rgbds(5)*, *rgbds(7)*

HISTORY

rgbasm was originally written by Carsten Sørensen as part of the ASMotor package, and was later repackaged in RGBDS by Justin Lloyd. It is now maintained by a number of contributors at <https://github.com/gbdev/rgbds>.