Output files

modules.order

This file records the order in which modules appear in Makefiles. This is used by modprobe to deterministically resolve aliases that match multiple modules.

modules.builtin

This file lists all modules that are built into the kernel. This is used by modprobe to not fail when trying to load something builtin.

Environment variables

KCPPFLAGS

Additional options to pass when preprocessing. The preprocessing options will be used in all cases where kbuild does preprocessing including building C files and assembler files.

KAFLAGS

Additional options to the assembler.

KCFLAGS

Additional options to the C compiler.

KBUILD_VERBOSE

Set the kbuild verbosity. Can be assigned same values as "V=...".
See make help for the full list.
Setting "V=..." takes precedence over KBUILD_VERBOSE.

KBUILD_EXTMOD

Set the directory to look for the kernel source when building external modules.
The directory can be specified in several ways:
1) Use "M=..." on the command line
2) Environmnet variable KBUILD_EXTMOD
3) Environmnet variable SUBDIRS
The possibilities are listed in the order they take precedence.
Using "M=..." will always override the others.

KBUILD_OUTPUT

Specify the output directory when building the kernel.
The output directory can also be specificed using "O=...".
Setting "O=..." takes precedence over KBUILD_OUTPUT.

ARCH

Set ARCH to the architecture to be built.

In most cases the name of the architecture is the same as the
directory name found in the arch/ directory.
But some architectures such as x86 and sparc have aliases.
x86: i386 for 32 bit, x86_64 for 64 bit
sparc: sparc for 32 bit, sparc64 for 64 bit

CROSS_COMPILE

Specify an optional fixed part of the binutils filename.
CROSS_COMPILE can be a part of the filename or the full path.

CROSS_COMPILE is also used for ccache in some setups.

CF

Additional options for sparse.
CF is often used on the command-line like this:

```
    make CF=-Wbitwise C=2
```

INSTALL_PATH

INSTALL_PATH specifies where to place the updated kernel and system map
images. Default is /boot, but you can set it to other values.

INSTALLKERNEL

Install script called when using "make install".
The default name is "installkernel".

The script will be called with the following arguments:

```
    $1 - kernel version
    $2 - kernel image file
    $3 - kernel map file
    $4 - default install path (use root directory if blank)
```

The implmentation of "make install" is architecture specific
and it may differ from the above.

INSTALLKERNEL is provided to enable the possibility to
specify a custom installer when cross compiling a kernel.

MODLIB

Specify where to install modules.
The default value is:

```
     $(INSTALL_MOD_PATH)/lib/modules/$(KERNELRELEASE)
```

The value can be overridden in which case the default value is ignored.

INSTALL_MOD_PATH

INSTALL_MOD_PATH specifies a prefix to MODLIB for module directory
relocations required by build roots. This is not defined in the
makefile but the argument can be passed to make if needed.

INSTALL_MOD_STRIP

INSTALL_MOD_STRIP, if defined, will cause modules to be stripped after they are installed. If INSTALL_MOD_STRIP is '1', then the default option --strip-debug will be used. Otherwise, INSTALL_MOD_STRIP will used as the options to the strip command.

INSTALL_FW_PATH

INSTALL_FW_PATH specifies where to install the firmware blobs.
The default value is:

```
    $(INSTALL_MOD_PATH)/lib/firmware
```

The value can be overridden in which case the default value is ignored.

INSTALL_HDR_PATH

INSTALL_HDR_PATH specifies where to install user space headers when executing "make headers_*".
The default value is:

```
    $(objtree)/usr
```

$(objtree) is the directory where output files are saved.
The output directory is often set using "O=..." on the commandline.

The value can be overridden in which case the default value is ignored.

KBUILD_MODPOST_WARN

KBUILD_MODPOST_WARN can be set to avoid errors in case of undefined symbols in the final module linking stage. It changes such errors into warnings.

KBUILD_MODPOST_NOFINAL

KBUILD_MODPOST_NOFINAL can be set to skip the final link of modules.
This is solely useful to speed up test compiles.

KBUILD_EXTRA_SYMBOLS

For modules that use symbols from other modules.
See more details in modules.txt.

ALLSOURCE_ARCHS

For tags/TAGS/cscope targets, you can specify more than one arch to be included in the databases, separated by blank space. E.g.:

```
    $ make ALLSOURCE_ARCHS="x86 mips arm" tags
```

To get all available archs you can also specify all. E.g.:

```
    $ make ALLSOURCE_ARCHS=all tags
```