

# Changing compiler flags

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Compiler flags are set during the compilation of an Arduino sketch and are used to compile the code in an optimized manner. Developers use flags to create an executable package that is compiled in the manner in which they desire.

## Current compiler flags during sketch uploading in IDE

Detecting libraries used...

```
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -g -Os
-Wall -std=gnu++17 -fpermissive -Wno-sized-deallocation -fno-exceptions -
ffunction-sections -fdata-sections -fno-threadsafe-statics
-Wno-error=narrowing -flto -mrelax -w -x c++ -E -CC -mmcu=avr128da48 -
DF_CPU=24000000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL
-DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\""-
-DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0
"-
```

```
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore/api/deprecated" "-
```

```
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore" "-
```

```
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\variants\\48pin-standard"
```

```
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\sketch\\sketch_jan1
9a.ino.cpp" -o nul
```

Generating function prototypes...

```
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -g -Os -Wall -std=gnu++17 -
fpermissive -Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-
sections -fno-threadsafe-statics -Wno-error=narrowing -flto -mrelax -w -x c++ -E -
CC -mmcu=avr128da48 -DF_CPU=24000000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL -
DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\""-DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -
DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0 "-
```

```
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore/api/deprecated" "-
```

```
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore" "-
```

```
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\variants\\48pin-standard"
```

```
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\sketch\\sketch_jan1
9a.ino.cpp" -o
```

```
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\preproc\\ctags_targ
et_for_gcc_minus_e.cpp"
```

```
"C:\\Users\\paulm\\Downloads\\arduino-1.8.16-windows\\arduino-1.8.16\\tools-
builder\\ctags\\5.8-arduino11/ctags" -u --language-force=c++ -f - --c++-kinds=svpf
--fields=KSTtzn --line-directives
```

```
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\preproc\\ctags_targ
```

```

et_for_gcc_minus_e.cpp"
Compiling sketch...
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-
gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -g -Os -Wall -std=gnu++17 -
fpermissive -Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-
sections -fno-threadsafe-statics -Wno-error=narrowing -MMD -flto -mrelax -
mmcu=avr128da48 -DF_CPU=2400000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL -
DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\" \" -DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -
DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0 \"-
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore/api/deprecated" "-
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore" "-
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\variants\\48pin-standard"
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\sketch\\sketch_jan1
9a.ino.cpp" -o
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\sketch\\sketch_jan1
9a.ino.cpp.o"
Compiling libraries...

```

## Flags set in platforms.txt

```

#####
# DxCore-related definitions #
#####
name=DxCore
versionnum.major=1
versionnum.minor=4
versionnum.patch=6
versionnum.postfix=
versionnum.released=0
version={versionnum.major}.{versionnum.minor}.{versionnum.patch}
{versionnum.postfix}
build.versiondefines=-DARDUINO={runtime.ide.version} -DARDUINO_{build.board} -
DARDUINO_ARCH_{build.arch} -DDXCORE="{version}" -DDXCORE_MAJOR=
{versionnum.major}UL -DDXCORE_MINOR={versionnum.minor}UL -DDXCORE_PATCH=
{versionnum.patch}UL -DDXCORE_RELEASED={versionnum.released}

build.optiondefines=-DF_CPU={build.f_cpu} -DCLOCK_SOURCE={build.clocksource}
{build.attachmode} -DTWI_{build.wire.mode} -DMILLIS_USE_TIMER{build.millistimer}

```

```

#####
# Compile Parameter #
#####

# Force users to see warnings, since it defaults to them being off if you let the

```

```

IDE have it's way.
compiler.warning_flags=-Wall
compiler.warning_flags.none=-Wall
compiler.warning_flags.default=-Wall
compiler.warning_flags.more=-Wall
compiler.warning_flags.all=-Wall -Wextra

# Default "compiler.path" is correct, change only if you want to override the
initial value
compiler.path={runtime.tools.avr-gcc.path}/bin/
compiler.c.cmd=avr-gcc
compiler.c.flags=-c -g -Os {compiler.warning_flags} -std=gnu11 -ffunction-sections
-fdata-sections -MMD -flto -fno-fat-lto-objects -mrelax -Werror=implicit-function-
declaration -Wundef
# DxCORE has the three additional FLMAP sections for mapped flash
compiler.c.elf.flags={compiler.warning_flags} -Os -g -flto -fuse-linker-plugin -
mrelax -Wl,--gc-sections,--section-start={build.text_section_start},--section-
start=.FLMAP_SECTION1=0x8000,--section-start=.FLMAP_SECTION2=0x10000,--section-
start=.FLMAP_SECTION3=0x18000
compiler.c.elf.cmd=avr-gcc
compiler.S.flags=-c -g -x assembler-with-cpp -flto -MMD
compiler.cpp.cmd=avr-g++
compiler.cpp.flags=-c -g -Os {compiler.warning_flags} -std=gnu++17 -fpermissive -
Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-sections -fno-
threadsafe-statics -Wno-error=narrowing -MMD -flto -mrelax
compiler.ar.cmd=avr-gcc-ar
compiler.ar.flags=rcs
compiler.objcopy.cmd=avr-objcopy
compiler.objcopy.eep.flags=-O ihex -j .eeprom --set-section-
flags=.eeprom=alloc,load --no-change-warnings --change-section-lma .eeprom=0
compiler.objdump.cmd=avr-objdump
compiler.objdump.flags=--disassemble --source --line-numbers --demangle --
section=.text
compiler.nm.cmd=avr-nm
compiler.nm.flags=--numeric-sort --line-numbers --demangle --print-size --format=s
compiler.elf2hex.flags=-O ihex -R .eeprom
compiler.elf2hex.bin.flags=-O binary -R .eeprom
compiler.elf2hex.cmd=avr-objcopy
compiler.ldflags=
compiler.libraries.ldflags=
compiler.size.cmd=avr-size

```

## Adding or removing standard cpp flags

Changing the c++ flags found in platforms.txt appears to be done by changing this line of code:

```

compiler.cpp.flags=-c -g -Os {compiler.warning_flags} -std=gnu++17 -fpermissive -
Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-sections -fno-
threadsafe-statics -Wno-error=narrowing -MMD -flto -mrelax

```

These flags get added to these lines in the IDE's compilation:

```
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-
gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -g -Os -Wall -std=gnu++17 -
fpermissive -Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-
sections -fno-threadsafe-statics -Wno-error=narrowing -flto -mrelax -w -x c++ -E -
CC -mmcu=avr128da48 -DF_CPU=24000000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL -
DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\" \" -DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -
DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0 \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore/api/deprecated\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\variants\\48pin-standard\"
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\sketch\\sketch_jan1
9a.ino.cpp" -o
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\preproc\\ctags_targ
et_for_gcc_minus_e.cpp"
```

and

```
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-
gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -g -Os -Wall -std=gnu++17 -
fpermissive -Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-
sections -fno-threadsafe-statics -Wno-error=narrowing -MMD -flto -mrelax -
mmcu=avr128da48 -DF_CPU=24000000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL -
DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\" \" -DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -
DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0 \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore/api/deprecated\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\variants\\48pin-standard\"
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\sketch\\sketch_jan1
9a.ino.cpp" -o
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_884040\\sketch\\sketch_jan1
9a.ino.cpp.o"
```

## Adding or removing build options

Changing the build options require setting variables in boards.txt and through the IDE's menu system. These settings are then used in platforms.txt to set flags for build options in the IDE. Changing the flags occurs in platforms.txt here:

```
build.versiondefines=-DARDUINO={runtime.ide.version} -DARDUINO_{build.board} -
DARDUINO_ARCH_{build.arch} -DDXCORE="{version}" -DDXCORE_MAJOR=
```

```
{versionnum.major}UL -DDXCORE_MINOR={versionnum.minor}UL -DDXCORE_PATCH=
{versionnum.patch}UL -DDXCORE_RELEASED={versionnum.released}

build.optiondefines=-DF_CPU={build.f_cpu} -DCLOCK_SOURCE={build.clocksource}
{build.attachmode} -DTWI_{build.wire.mode} -DMILLIS_USE_TIMER{build.millistimer}
```

These flags can be viewed in the IDE's verbose output here:

```
Detecting libraries used...
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-
gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -g -Os
-Wall -std=gnu++17 -fpermissive -Wno-sized-deallocation -fno-exceptions -
ffunction-sections -fdata-sections -fno-threadsafe-statics
-Wno-error=narrowing -flto -mrelax -w -x c++ -E -CC -mmcu=avr128da48 -
DF_CPU=24000000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL
-DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\""
-DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0
```

## Changing Flags

### Removing -g -Os

IDE output after changing platforms.txt:

```
Detecting libraries used...
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-
gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -Wall -std=gnu++17 -fpermissive -
Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-sections -fno-
threadsafe-statics -Wno-error=narrowing -flto -mrelax -w -x c++ -E -CC -
mmcu=avr128da48 -DF_CPU=24000000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL -
DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\"" -DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -
DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0 "-
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore/api/deprecated" "-
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\cores\\dxcore" "-
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
1.4.6\\variants\\48pin-standard"
"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_814046\\sketch\\sketch_jan1
9a.ino.cpp" -o nul
Generating function prototypes...
"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-
gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++" -c -Wall -std=gnu++17 -fpermissive -
Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-sections -fno-
threadsafe-statics -Wno-error=narrowing -flto -mrelax -w -x c++ -E -CC -
mmcu=avr128da48 -DF_CPU=24000000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL -
```

```
DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\" \" -DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -
DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0 \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
\\1.4.6\\cores\\dxcore/api/deprecated\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
\\1.4.6\\cores\\dxcore\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
\\1.4.6\\variants\\48pin-standard\"
\"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_814046\\sketch\\sketch_jan1
9a.ino.cpp\" -o
\"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_814046\\preproc\\ctags_targ
et_for_gcc_minus_e.cpp\"
```

Changing platforms.txt by removing the -g and -Os flags has removed them from the compilation.

## Adding -O0 flag to platforms.txt

IDE output after changing platforms.txt:

```
Compiling sketch...
\"C:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\tools\\avr-
gcc\\7.3.0-atmel3.6.1-azduino4b/bin/avr-g++\" -c -O0 -Wall -std=gnu++17 -
fpermissive -Wno-sized-deallocation -fno-exceptions -ffunction-sections -fdata-
sections -fno-threadsafe-statics -Wno-error=narrowing -MMD -flto -mrelax -
mmcu=avr128da48 -DF_CPU=2400000L -DCLOCK_SOURCE=0 -DCORE_ATTACH_ALL -
DTWI_MORS_SINGLE -DMILLIS_USE_TIMERB2 -DARDUINO=10816 -DARDUINO_avrda -
DARDUINO_ARCH_MEGA AVR "-DDXCORE=\"1.4.6\" \" -DDXCORE_MAJOR=1UL -DDXCORE_MINOR=4UL -
DDXCORE_PATCH=6UL -DDXCORE_RELEASED=0 \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
\\1.4.6\\cores\\dxcore/api/deprecated\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
\\1.4.6\\cores\\dxcore\" \" -
IC:\\Users\\paulm\\AppData\\Local\\Arduino15\\packages\\DxCore\\hardware\\megaavr\\
\\1.4.6\\variants\\48pin-standard\"
\"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_617891\\sketch\\sketch_jan1
9a.ino.cpp\" -o
\"C:\\Users\\paulm\\AppData\\Local\\Temp\\arduino_build_617891\\sketch\\sketch_jan1
9a.ino.cpp.o\"
Compiling libraries...
```

The -O0 flag is now used during compilation.