



Cheatsheet: Arduino Command Line

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General

General Information

- This cheatsheet provides the most common command line usage for both the classic Arduino IDE application and the Arduino CLI tool.
- Serial output can be viewed with the *screen* command line utility on Linux and macOS platforms or the Putty application on Windows.
 - Syntax: `$ screen <port> <baud>`
 - Example: `$ screen /dev/tty.usbmodem14202 9600`
 - Exit the screen utility with the CTRL-A CTRL-\ command sequence followed by "y" when asked if you really want to quit.

Resources

- [Using The Arduino Command Line](#) article on [WoolseyWorkshop.com](#).
- [Quick Tip: Using The Screen Utility To View Arduino Serial Output](#) article on [WoolseyWorkshop.com](#).

Cores And Fully Qualified Board Names

- Cores are the platforms to which supported boards belong. The included boards.txt files contain the boards supported for a particular core platform.
- Fully Qualified Board Names (FQBN) are board identifiers used for specifying individual boards with the Arduino IDE and the Arduino CLI.
- Syntax: core = <package>:<architecture>, fqbn = <core>:<board>, where
 - <package> = vendor identifier, typically arduino
 - <architecture> = microcontroller architecture, e.g., avr, megaavr, sam, etc.
 - <board> = board name defined within core boards.txt files, e.g., uno, uno2018, yun, etc.
- FQBN Examples
 - arduino:avr:uno (Arduino Uno R3)
 - arduino:megaavr:uno2018 (Arduino Uno WiFi R2)

Arduino IDE (Classic) Application

General Information

- The Arduino IDE (Integrated Development Environment) is the classic desktop application used to develop and upload programs to an Arduino development board.
- Executable name:
 - Linux: `arduino`
 - macOS: `Arduino`
 - Windows: `arduino_debug.exe`
- Current as of version 1.8.13 (06/16/2020).

Resources

- [Download](#)
- [Documentation](#)

Command Line Usage

- General syntax: `$ arduino [<options>] [<path>/<sketch>.ino]`
- Show version
 - `$ arduino --version`
- Open the IDE
 - `$ arduino`
- Open a sketch in the IDE
 - Syntax: `$ arduino <path>/<sketch>.ino`
 - Example: `$ arduino Blink.ino`
 - Executed from within sketch directory.
 - Example: `$ arduino ~/Documents/Arduino/Blink/Blink.ino`
- Install a board (core)
 - Syntax: `$ arduino --install-boards "<core>[:<version>]"`
 - Example: `$ arduino --install-boards "arduino:sam"`
 - Example: `$ arduino --install-boards "arduino:avr:1.6.2"`
- Verify (compile) a sketch
 - Syntax: `$ arduino [--board <fqbn>[:<parameter>]] --verify <path>/<sketch>.ino`
 - Example: `$ arduino --verify Blink.ino`
 - Executed from within sketch directory with current board preference.
 - Example: `$ arduino --board arduino:avr:uno --verify ~/Documents/Arduino/Blink/Blink.ino`

- **Example:** `$ arduino --board arduino:megaavr:uno2018:mode=off --verify ~/Documents/Arduino/Blink/Blink.ino`
- **Upload a sketch to board**
 - **Syntax:** `$ arduino [--board <fqbn>[:<parameter>] --port <port>] --upload <path>/<sketch>.ino`
 - **Example:** `$ arduino --upload Blink.ino`
 - Executed from within sketch directory with current board and port preferences.
 - **Example:** `$ arduino --board arduino:avr:uno --port /dev/cu.usbserial-A6028SP5 --upload ~/Documents/Arduino/Blink/Blink.ino`
 - **Example:** `$ arduino --board arduino:megaavr:uno2018:mode=off --port /dev/cu.usbmodem14202 --upload ~/Documents/Arduino/Blink/Blink.ino`
- **Get preferences**
 - **Syntax:** `$ arduino --get-pref [<preference>]`
 - **Example:** `$ arduino --get-pref`
 - Returns all preferences.
 - **Example:** `$ arduino --get-pref board`
 - Returns current board preference, e.g., uno, uno2018, etc.
 - **Example:** `$ arduino --get-pref serial.port`
 - Returns current port preference, e.g., /dev/cu.usbserial-A6028SP5, /dev/cu.usbmodem14202, etc.
- **Save preferences**
 - **Syntax:** `$ arduino <options> --save-prefs`
 - **Example:** `$ arduino --board arduino:avr:uno --port /dev/cu.usbserial-A6028SP5 --save-prefs`
 - **Example:** `$ arduino --board arduino:megaavr:uno2018:mode=off --port /dev/cu.usbmodem14202 --save-prefs`
- **Install a library**
 - **Syntax:** `$ arduino --install-library "<library>[:<version>]"`
 - **Example:** `$ arduino --install-library "Madgwick"`
 - **Example:** `$ arduino --install-library "ArduinoJson:6.16.0"`

Arduino CLI Tool

General Information

- The Arduino CLI tool is a command line utility used for developing, managing, and uploading sketches from the command line.
- In addition to being used as a stand alone command line program, the Arduino CLI tool is also the backend for the new Arduino Pro IDE.
- Executable name: `arduino-cli`
- Current as of version 0.14.0 (12/10/2020).

Resources

- Source, download, and documentation available on [GitHub](#).
- [Hands-on with the Arduino CLI!](#) video tutorial by Arduino.

Command Line Usage

- General syntax: `$ arduino-cli [<command>] [<options>] [<path>/<sketch>]`
- Get help
 - Syntax: `$ arduino-cli`
 - Syntax: `$ arduino-cli help [<command>]`
 - Syntax: `$ arduino-cli [<command>] --help`
 - Example: `$ arduino-cli`
 - Example: `$ arduino-cli help board`
 - Example: `$ arduino-cli compile --help`
- Show version
 - `$ arduino-cli version`
- Update all core (platform) and library indexes
 - `$ arduino-cli update`
- List all outdated cores and libraries that can be upgraded
 - `$ arduino-cli outdated`
- Upgrade all outdated cores and libraries to latest versions
 - `$ arduino-cli upgrade`
- List installed cores
 - `$ arduino-cli core list`
- Upgrade installed cores
 - `$ arduino-cli core upgrade`
- Search for cores
 - Syntax: `$ arduino-cli core search <search>`
 - Example: `$ arduino-cli core search arduino`

- **Example:** `$ arduino-cli core search samd`
- **Install a core (board platform)**
 - **Syntax:** `$ arduino-cli core install <core>[@<version>]`
 - **Example:** `$ arduino-cli core install arduino:megaavr@1.8.4`
- **List supported boards**
 - `$ arduino-cli board listall`
- **Discover connected board(s)**
 - `$ arduino-cli board list`
- **List board details**
 - **Syntax:** `$ arduino-cli board details <fqbn>[:parameters]`
 - **Example:** `$ arduino-cli board details arduino:megaavr:uno2018`
- **Create a new sketch**
 - **Creates the sketch folder with the associated .ino file.**
 - **Syntax:** `$ arduino-cli sketch new [path]<sketch>`
 - **Example:** `$ arduino-cli sketch new Blink`
- **Archive a sketch to a zip file**
 - **Syntax:** `$ arduino-cli sketch archive [[path]<sketch>] [[path]<zip>]`
 - **Example:** `$ arduino-cli sketch archive ~/Arduino/Blink`
 - **Archives sketch and places zip file one directory up from sketch location.**
 - **Example:** `$ arduino-cli sketch archive`
 - **Executed from within sketch directory.**
 - **Archives sketch and places zip file one directory up.**
- **Compile (verify) a sketch**
 - **Syntax:** `$ arduino-cli compile --fqbn <fqbn>[:parameters] [<path>/<sketch>]`
 - **Example:** `$ arduino-cli compile --fqbn arduino:avr:uno`
 - **Executed from within sketch directory.**
 - **Example:** `$ arduino-cli compile --fqbn arduino:megaavr:uno2018:mode=off ~/Documents/Arduino/Blink`
- **Upload a sketch to board**
 - **Syntax:** `$ arduino-cli upload --fqbn <fqbn>[:parameters] --port <port> [<path>/<sketch>]`
 - **Example:** `$ arduino-cli upload --fqbn arduino:avr:uno --port /dev/cu.usbserial-A6028SP5`
 - **Executed from within sketch directory.**
 - **Example:** `$ arduino-cli upload --fqbn arduino:megaavr:uno2018:mode=off --port /dev/cu.usbmodem14202 ~/Documents/Arduino/Blink`
- **Attach a specific sketch to a specific board**
 - **Creates a sketch.json configuration file within the sketch directory.**

- **Syntax:** `$ arduino-cli board attach <port>|<fqbn> [<path>/<sketch>]`
- **Example:** `$ arduino-cli board attach serial:///dev/cu.usbmodem14202`
 - Executed from within sketch directory.
- **Example:** `$ arduino-cli board attach arduino:megaavr:uno2018`
 - Executed from within sketch directory.
- Once a sketch is attached to a specific board, you can run simple commands like the following from within the sketch directory.
 - `$ arduino-cli compile`
 - `$ arduino-cli upload`
 - `$ arduino-cli compile --upload`
- **List installed libraries**
 - `$ arduino-cli lib list`
- **Upgrade installed libraries**
 - `$ arduino-cli lib upgrade`
- **Search for libraries**
 - **Syntax:** `$ arduino-cli lib search <lib>`
 - **Example:** `$ arduino-cli lib search Madgwick`
- **Install a library**
 - **Syntax:** `$ arduino-cli lib install <library>[@<version>]`
 - **Example:** `$ arduino-cli lib install Madgwick`
 - **Example:** `$ arduino-cli lib install ArduinoJson@6.16.0`
- **List example sketches included in libraries**
 - **Syntax:** `$ arduino-cli lib examples [<lib>]`
 - **Example:** `$ arduino-cli lib examples Adafruit_NeoPixel`

Revisions

Version	Date	Modifications
1.4	01/21/2021	- Fixed a few accidental issues with the 1.3 version.
1.3	01/12/2021	- Added descriptions for the Arduino IDE application and the arduino-cli tool. - Added optional version attribute to arduino-cli <i>core install</i> command. - Added arduino-cli <i>lib examples</i> and <i>sketch archive</i> commands. - Removed outdated items. - Updated text coloring and formatting. - Other minor changes.
1.2	08/29/2020	- Updated the Arduino CLI Tool section to add a video tutorial link, change the current version to 0.12.1, and add the new "outdated", "update", "upgrade", and "board attach" commands. - Added screen utility information along with a link to the Quick Tip: Using The Screen Utility To View Arduino Serial Output article. - Other minor wording changes for clarity.
1.1	10/24/2019	- Specified "classic" version of the Arduino IDE along with mentioning the new Pro version. - Added current version accuracy. - Added <i>arduino-cli core upgrade</i> command. - Updated <i>arduino-cli sketch new</i> command to reflect change from old default sketch directory to new current directory. - Added <i>arduino-cli lib update-index</i> command. - Added <i>arduino-cli lib list</i> command. - Added <i>arduino-cli lib upgrade</i> command. - Changed : to @ for <i>arduino-cli lib install</i> command.
1.0	04/14/2019	Initial version.