

# STM32Cube Command Line Toolset User Manual

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## UM3088 STM32Cube command-line toolset quick start guide User manual

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## Introduction

This document is a brief guide for users to get started quickly with STM32CubeCLT, the STMicroelectronics command-line toolset for STM32 MCUs.

STM32CubeCLT offers all the STM32CubeIDE facilities packaged for command-prompt use by third-party IDEs, or continuous integration and continuous development (CD/CI).

### The streamlined single STM32CubeCLT package includes:

- CLI (command-line interface) versions of ST tools like toolchain, probe connection utility, and flash memory programming utility
- Up-to-date system view descriptor (SVD) files

- Any other IDE relevant metadata STM32CubeCLT allows:
- Building a program for STM32 MCU devices using an enhanced GNU toolchain for STM32
- Programming STM32 MCU internal memories (flash memory, RAM, OTP, and others) and external memories
- Verifying the programming content (checksum, verification during and after programming, comparison with file)
- Automating the STM32 MCU programming
- Debugging applications through the interface of STM32 MCU products, which provides access to MCU internal resources using basic debug features



## General information

The STM32CubeCLT command-line toolset for STM32 MCUs provides tools to build, program, run, and debug applications targeting STM32 microcontrollers based on the Arm® Cortex® -M processor.

### Note:

Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

## Reference documents

- Command-line toolset for STM32 MCUs (DB4839), STM32CubeCLT data brief
- STM32CubeCLT installation guide (UM3089)
- STM32CubeCLT release note (RN0132)

## Screenshots in this document

The screenshots provided in Section 2, Section 3, and Section 4 are only examples of the tool usage from a command prompt.

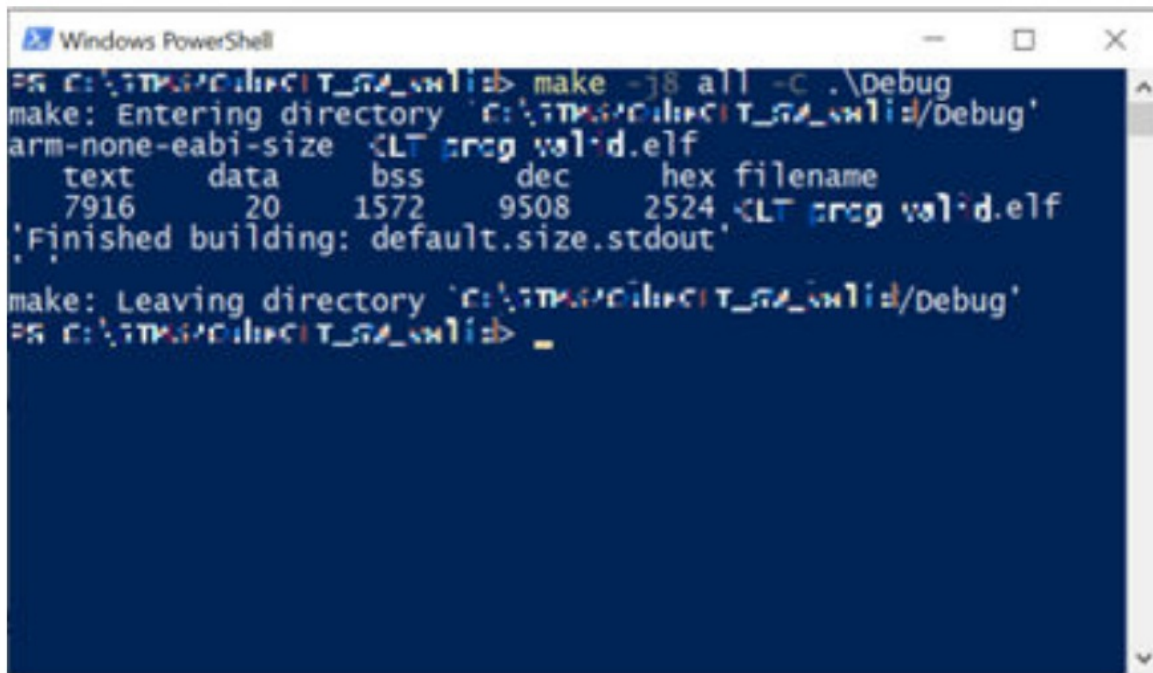
The integration in third-party IDEs or the use in CD/CI scripts is not illustrated in this document.

## Building

The STM32CubeCLT package contains the GNU tools for STM32 toolchain to build a program for an STM32 microcontroller. A Windows® console window example is shown in Figure 1.

1. Open a console in the project folder.
2. Execute the following command to build the project: `> make -j8 all -C .\Debug`

**Figure 1. Build output**



```
PS C:\STM32CubeCLT_GA_011> make -j8 all -C .\Debug
make: Entering directory 'C:\STM32CubeCLT_GA_011\Debug'
arm-none-eabi-size <LT prog valid.elf
  text    data     bss      dec     hex filename
  7916     20    1572    9508    2524 <LT prog valid.elf
'Finished building: default.size.stdout'
make: Leaving directory 'C:\STM32CubeCLT_GA_011\Debug'
PS C:\STM32CubeCLT_GA_011> _
```

**Note:** The make utility might require a separate installation step.

## Board programming

The STM32CubeCLT package contains the STM32CubeProgrammer (STM32CubeProg), which is used to program the build obtained previously into the target STM32 microcontroller.

1. Make sure that the ST-LINK connection is detected
2. Select the project folder location in the console window
3. Optionally, erase all the flash memory content (refer to Figure 2): > STM32\_Programmer\_CLI.exe -c port=SWD freq=4000 -e all
4. Upload the program file to the 0x08000000 flash memory address (refer to Figure 3): > STM32\_Programmer\_CLI.exe -c port=SWD freq=4000 -w .\Debug\YOUR\_PROGRAM.elf 0x08000000

Figure 2. Flash memory erase output

```
Windows PowerShell
C:\ST\STM32CubeCLT\bin> STM32_Programmer_CLI.exe -c port=SWD freq=4000 -e all

-----
STM32CubeProgrammer v2.12.0-B03
-----

ST-LINK SN : 005300263137510133333639
ST-LINK FW : V3110M3
Board      : NUCLEO-G474RE
Voltage    : 3.29V
SWD freq   : 3300 KHz
Connect mode: Normal
Reset mode : Software reset
Device ID  : 0x469
Revision ID: Rev B
Device name: STM32G47x/G48x
Flash size : 512 KBytes
Device type: MCU
Device CPU  : Cortex-M4
BL Version  : 0xD3

Mass erase ...
Mass erase successfully achieved
```

Figure 3. Program upload output

```
Windows PowerShell
C:\ST\STM32CubeCLT\bin> STM32_Programmer_CLI.exe -c port=SWD freq=4000 -r -i debug\CL -prog val'd.e -f 0x00000000

-----
STM32CubeProgrammer v2.12.0-B03
-----

ST-LINK SN : 005300263137510133333639
ST-LINK FW : V3110M3
Board      : NUCLEO-G474RE
Voltage    : 3.29V
SWD freq   : 3300 KHz
Connect mode: Normal
Reset mode : Software reset
Device ID  : 0x469
Revision ID: Rev B
Device name: STM32G47x/G48x
Flash size : 512 KBytes
Device type: MCU
Device CPU  : Cortex-M4
BL Version  : 0xD3

Warning: Write address is ignored for hex, sec, s19 and elf files

Memory programming ...
Opening and parsing file: C:\ST\STM32CubeCLT\bin\debug\CL\prog\val'd.e
File      : C:\ST\STM32CubeCLT\bin\debug\CL\prog\val'd.e
Size     : 7.75 KB
Address  : 0x00000000

Erasing memory corresponding to segment 0:
Erasing internal memory sectors (0/3)
Download in progress: 100%

File download complete
Time elapsed during download operation: 00:00:00.767
C:\ST\STM32CubeCLT\bin>
```

## Debugging

In addition to the GNU tools for STM32 toolchain, the STM32CubeCLT package contains also the ST-LINK GDB server. Both are needed to start a debug session.

1. Start the ST-LINK GDB server in another Windows® PowerShell® window (refer to Figure 4): > ST-LINK\_gdbserver.exe -d -v -t -cp C:\ST\STM32CubeCLT\STM32CubeProgrammer\bin
2. Use the GNU tools for STM32 toolchain to start the GDB client in the PowerShell® window:  
> arm-none-eabi-gdb.exe  
> (gdb) target remote localhost:port (use the port indicated in the GDB server opened connection)

The connection is established and GDB server session messages are displayed as shown in Figure 5. It is then possible to run GDB commands in the debug session, for instance to reload an .elf program using GDB: > (gdb) load YOUR\_PROGRAM.elf

Figure 4. GDB server output

```

C:\Program Files\STMicroelectronics\STM32CubeProgrammer> ST-LINK_gdbserver.exe -i -s -t -p C:\ST\STM32CubeCLT\STM32CubeProgrammer\bin

STMicroelectronics ST-LINK GDB server. Version 22w41.DEVELOPMENT.VERSION
Copyright (C) 2022, STMicroelectronics. All rights reserved.

Starting server with the following options:
  Persistent Mode      : Disabled
  Logging Level        : 31
  Listen Port Number   : 61234
  Status Refresh Delay : 15s
  verbose mode         : Enabled
  SMD debug            : Enabled

COM frequency = 24000 khz
target connection mode: Default
Reading non-cable for AP 0 0000000000
Hardware watchpoint supported by the target
ST-LINK Firmware version : V3110M3
Device ID: 0x469
PC: 0x80003ab
ST-LINK device status: HALT_MODE
ST-LINK detects target voltage = 3.29 V
ST-LINK device status: HALT_MODE
ST-LINK device initialization OK
stm32device, pollandnotify running...
stm32device state change: 0 -> 1
Waiting for connection on port 61235...
Waiting for debugger connection...
Waiting for connection on port 61234...
Accepted connection on port 61234...
Debugger connected
Waiting for debugger connection...
Waiting for connection on port 61234...
GDB session thread running
gdbsessionManager, session started: 1
  
```

Figure 5. GDB client output

```

C:\Program Files\STMicroelectronics\STM32CubeProgrammer> arm-none-eabi-gdb.exe
GNU gdb (GNU Tools for STM32 10.1-2021.10.20/110a-1100) 10.2.90.20210621-g11
Copyright (C) 2021 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-mingw32 --target=arm-none-eabi".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word".
(gdb) target remote localhost:61234
Remote debugging using localhost:61234
Warning: No executable has been specified and target does not support
determining executable automatically. Try using the "file" command.
*stm32003ab in ?? ()
(gdb)
  
```

## Revision history

Table 1. Document revision history

Date	Revision	Changes
16-Feb-23	1	Initial release.

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Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

## Documents / Resources

	<p><a href="#">ST STM32Cube Command Line Toolset</a> [pdf] User Manual UM3088, STM32Cube Command Line Toolset, STM32Cube, Command Line Toolset, Toolset</p>
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## References

-  [STMicroelectronics: Our technology starts with you](#)
-  [STMicroelectronics Trademark List - STMicroelectronics](#)
-  [STM32CubeCLT - STM32CubeCLT is a toolset for third-party integrated development environment \(IDE\) providers, allowing the use of STMicroelectronics proprietary tools within their own IDE frameworks. - STMicroelectronics](#)
-  [STM32CubeIDE - Integrated Development Environment for STM32 - STMicroelectronics](#)
-  [STM32CubeProg - STM32CubeProgrammer software for all STM32 - STMicroelectronics](#)