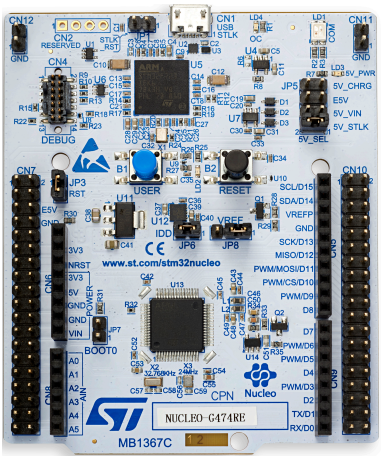
NUCLEO-XXXXRX NUCLEO-XXXXRX-P

Data brief

STM32 Nucleo-64 boards



NUCLEO-G474RE example. Boards with different references show different layouts. Picture is not contractual.

Product status link
NUCLEO-XXXXRX
NUCLEO-F030R8, NUCLEO-F070RB, NUCLEO-F072RB, NUCLEO-F091RC, NUCLEO-F103RB, NUCLEO-F302R8, NUCLEO-F303RE, NUCLEO-F334R8, NUCLEO-F401RE, NUCLEO-F410RB, NUCLEO-F411RE, NUCLEO-F446RE, NUCLEO-G070RB, NUCLEO-G071RB, NUCLEO-G431RB, NUCLEO-G474RE, NUCLEO-L010RB, NUCLEO-L053R8, NUCLEO-L073RZ, NUCLEO-L152RE, NUCLEO-L452RE, NUCLEO-L476RG.
NUCLEO-XXXXRX-P
NUCLEO-L412RB-P, NUCLEO-L433RC-P, NUCLEO-L452RE-P.

arm MBED

Features

- Common features
  - STM32 microcontroller in LQFP64 package
  - 1 user LED shared with Arduino™
  - 1 user and 1 reset push-buttons
  - 32.768 kHz crystal oscillator
  - Board connectors:
    - Arduino™ Uno V3 expansion connector
    - ST morpho extension pin headers for full access to all STM32 I/Os
  - Flexible power-supply options: ST-LINK, USB V_{BUS} or external sources
  - On-board ST-LINK debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port and debug port
  - Comprehensive free software libraries and examples available with the STM32Cube MCU Package
  - Support of a wide choice of Integrated Development Environments (IDEs) including IAR™, Keil® and GCC-based IDEs
- Board-specific features
  - External SMPS to generate V_{core} logic supply
  - 24 MHz HSE
  - Board connectors:
    - External SMPS experimentation dedicated connector
    - Micro-AB or Mini-AB USB connector for the ST-LINK
    - MIPI® debug connector
  - Arm® Mbed Enabled™ compliant

Description

The STM32 Nucleo-64 boards provide an affordable and flexible way for users to try out new concepts and build prototypes by choosing from the various combinations of performance and power consumption features, provided by the STM32 microcontroller. For the compatible boards, the external SMPS significantly reduces power consumption in Run mode.

The Arduino™ Uno V3 connectivity support and the ST morpho headers allow the easy expansion of the functionality of the STM32 Nucleo open development platform with a wide choice of specialized shields.

The STM32 Nucleo-64 board does not require any separate probe as it integrates the ST-LINK debugger/programmer.

The STM32 Nucleo-64 board comes with the STM32 comprehensive free software libraries and examples available with the STM32Cube MCU Package.

1 Ordering information

To order an STM32 Nucleo-64 board, refer to Table 1. For a detailed description of each board, refer to its user manual on the product web page. Additional information is available from the datasheet and reference manual of the target STM32.

Table 1. List of available products

Order code	Board reference	User manual	Target STM32	Differentiating features
NUCLEO-F030R8	MB1136	UM1724	STM32F030R8T6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F070RB			STM32F070RBT6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F072RB			STM32F072RBT6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F091RC			STM32F091RCT6U	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F103RB			STM32F103RBT6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F302R8			STM32F302R8T6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F303RE			STM32F303RET6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F334R8			STM32F334R8T6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F401RE			STM32F401RET6U	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F410RB			STM32F410RBT6U	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F411RE			STM32F411RET6U	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-F446RE			STM32F446RET6U	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-G070RB	MB1360	UM2324	STM32G070RBT6	• ST-LINK/V2-1 on Micro-AB USB connector
NUCLEO-G071RB			STM32G071RBT6	• ST-LINK/V2-1 on Micro-AB USB connector

Order code	Board reference	User manual	Target STM32	Differentiating features
NUCLEO-G431RB	MB1367	UM2505	STM32G431RBT6U	• STLINK-V3E on Micro-AB USB connector • 24 MHz HSE • MIPI® debug connector
NUCLEO-G474RE			STM32G474RET6U	• STLINK-V3E on Micro-AB USB connector • 24 MHz HSE • MIPI® debug connector
NUCLEO-L010RB	MB1136	UM1724	STM32L010RBT6	• ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-L053R8			STM32L053R8T6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-L073RZ			STM32L073RZT6U	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-L152RE			STM32L152RET6	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-L412RB-P	MB1319	UM2206	STM32L412RBT6PU	• ST-LINK/V2-1 on Micro-AB USB connector • External SMPS
NUCLEO-L433RC-P			STM32L433RCT6PU	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Micro-AB USB connector • External SMPS
NUCLEO-L452RE	MB1136	UM1724	STM32L452RET6U	• ST-LINK/V2-1 on Mini-AB USB connector
NUCLEO-L452RE-P	MB1319	UM2206	STM32L452RET6PU	• ST-LINK/V2-1 on Micro-AB USB connector • External SMPS
NUCLEO-L476RG	MB1136	UM1724	STM32L476RGT6U	• Arm® Mbed Enabled™ • ST-LINK/V2-1 on Mini-AB USB connector

1.1 Product marking

Evaluation tools marked as “ES” or “E” are not yet qualified and therefore not ready to be used as reference design or in production. Any consequences deriving from such usage will not be at ST charge. In no event, ST will be liable for any customer usage of these engineering sample tools as reference design or in production.

“E” or “ES” marking examples of location:

- On the targeted STM32 that is soldered on the board (for illustration of STM32 marking, refer to the STM32 datasheet “Package information” paragraph at the *www.st.com* website).
- Next to the evaluation tool ordering part number that is stuck or silk-screen printed on the board.

Some boards feature a specific STM32 device version, which allows the operation of any bundled commercial stack/library available. This STM32 device shows a "U" marking option at the end of the standard part number and is not available for sales.

In order to use the same commercial stack in his application, a developer may need to purchase a part number specific to this stack/library. The price of those part numbers includes the stack/library royalties.

1.2 Codification

The meaning of the codification is explained in Table 2.

Table 2. Codification explanation

NUCLEO-XXYYRT NUCLEO-XXYYRT-P	Description	Example: NUCLEO-L452RE
XX	MCU series in STM32 Arm Cortex MCUs	STM32L4 Series
YY	MCU product line in the series	STM32L452
R	STM32 package pin count	64 pins
T	STM32 Flash memory size: • 8 for 64 Kbytes • B for 128 Kbytes • C for 256 Kbytes • E for 512 Kbytes • G for 1 Mbyte • Z for 192 Kbytes	512 Kbytes
-P	STM32 has external SMPS function	No SMPS

The order code is mentioned on a sticker placed on the top side of the board.

2 Development environment

2.1 System requirements

- Windows® OS (7, 8 and 10), Linux® 64-bit, or macOS®
- USB Type-A to Micro-B or USB Type-A to Mini-B cable (depending on the board reference)

Note: macOS® is a trademark of Apple Inc. registered in the U.S. and other countries.

2.2 Development toolchains

- Keil® MDK-ARM(1)
- IAR™ EWARM(1)
- GCC-based IDEs
- Arm® Mbed™(2) online(3) (see mbed.org)

Notes:

1. *On Windows® only.*
2. *Arm and Mbed are registered trademarks or trademarks of Arm Limited (or its subsidiaries) in the US and or elsewhere.*
3. *Refer to the www.mbed.com website and to the "Ordering information" section to determine which order codes are supported.*

2.3 Demonstration software

The demonstration software, included in the STM32Cube MCU Package corresponding to the on-board microcontroller, is preloaded in the STM32 Flash memory for easy demonstration of the device peripherals in standalone mode. The latest versions of the demonstration source code and associated documentation can be downloaded from *www.st.com*.

Revision history

Table 3. Document revision history

Date	Version	Changes
10-Feb-2014	1	Initial release.
13-Feb-2014	2	Added *Table 1: Device summary* and updated *Table 2: Ordering information*.
11-Apr-2014	3	Extended the applicability to NUCLEO-F302R8. Updated *Table 1: Device summary* and *Table 2: Ordering information*.
26-May-2014	4	Extended the applicability to NUCLEO-L053R8, NUCLEO-F072RB, NUCLEO-F334R8 and NUCLEO-F411RE. Updated *Table 1* and *Table 2*.
9-Sep-2014	5	Extended the applicability to NUCLEO-F091RC and NUCLEO-F303RE. Updated *Features*. Updated *Table 1: Device summary* and *Table 2: Ordering information*.
16-Dec-2014	6	Extended the applicability to NUCLEO-F070RB, NUCLEO-L073RZ and NUCLEO-L476RG. Updated *Table 1: Device summary* and *Table 2: Ordering information*.
8-Jul-2015	7	Extended the applicability to NUCLEO-F410RB, NUCLEO-F446RE. Updated *Table 1: Device summary* and *Table 2: Ordering information*.
29-Nov-2016	8	Extended the applicability to NUCLEO-L452RE. Updated *Table 1: Device summary* and *Table 2: Ordering information*. Added *Table 3: Codification explanation*.
16-Nov-2017	9	Extended document scope to the NUCLEO-L452RE-P and NUCLEO-L433RC-P boards: • Updated *Features* • Updated *Table 1: Device summary*, *Table 2: Ordering information* and *Table 3: Codification explanation* • Updated *System requirement*, *Development toolchains* and *Demonstration software*
15-Dec-2017	10	Updated *Features*, *Description* and *System requirement*. Extended document scope to the NUCLEO-L010RB board: updated *Table 1: Device summary* and *Table 2: Ordering information*.
24-Aug-2018	11	Extended document scope to the NUCLEO-L412RB-P board: updated *Table 1: Device summary* and *Table 2: Ordering information*.
22-Oct-2018	12	Extended document scope to the NUCLEO-G070RB and NUCLEO-G071RB boards: • Updated *Table 1: Device summary* and *Table 2: Ordering information* • Added NUCLEO-GXXXRX top view on the cover page
8-Apr-2019	13	Revised the entire document to accommodate to multiple feature combinations: • Reorganized Features • Updated Description • Added Ordering information and Development environment • Updated Table 1. List of available products and Table 2. Codification explanation Extended document scope to the NUCLEO-G431RB and NUCLEO-G474RE boards.

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