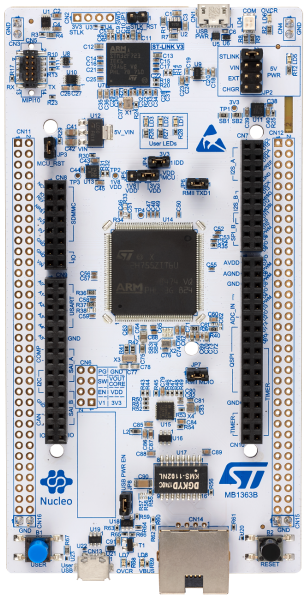
NUCLEO-XXXXZX NUCLEO-XXXXZX-P NUCLEO-XXXXZX-Q

Data brief

STM32 Nucleo-144 boards



NUCLEO-H755ZI-Q example. Boards with different references show different layouts. Picture is not contractual.

Product status link
NUCLEO-XXXXZX
NUCLEO-F207ZG, NUCLEO-F303ZE, NUCLEO-F412ZG, NUCLEO-F413ZH, NUCLEO-F429ZI, NUCLEO-F439ZI, NUCLEO-F446ZE, NUCLEO-F722ZE, NUCLEO-F746ZG, NUCLEO-F756ZG, NUCLEO-F767ZI, NUCLEO-H723ZG, NUCLEO-H743ZI, NUCLEO-H753ZI, NUCLEO-L496ZG, NUCLEO-L4A6ZG, NUCLEO-L4P5ZG, NUCLEO-L4R5ZI.
NUCLEO-XXXXZX-P
NUCLEO-L496ZG-P, NUCLEO-L4R5ZI-P.
NUCLEO-XXXXZX-Q
NUCLEO-H745ZI-Q, NUCLEO-H755ZI-Q, NUCLEO-H7A3ZI-Q, NUCLEO-L552ZE-Q.

arm MBED

Features

- Common features
  - STM32 microcontroller in LQFP144 package
  - 3 user LEDs
  - 2 user and reset push-buttons
  - 32.768 kHz crystal oscillator
  - Board connectors:
    - SWD
    - ST Zio expansion connector including ARDUINO® Uno V3
    - ST morpho expansion connector
  - 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 STM32CubeIDE
- Board-specific features
  - External or internal SMPS to generate V_{core} logic supply
  - Ethernet compliant with IEEE-802.3-2002
  - USB OTG full speed or device only
  - Board connectors:
    - USB with Micro-AB or USB Type-C™
    - Ethernet RJ45
  - Arm® Mbed Enabled™ compliant

Description

The STM32 Nucleo-144 board provides 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 internal or external SMPS significantly reduces power consumption in Run mode.

The ST Zio connector, which extends the ARDUINO® Uno V3 connectivity, and the ST morpho headers provide an easy means of expanding the functionality of the Nucleo open development platform with a wide choice of specialized shields.

The STM32 Nucleo-144 board does not require any separate probe as it integrates the ST-LINK debugger/programmer.

The STM32 Nucleo-144 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-144 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-F207ZG	MB1137	UM1974	STM32F207ZGT6U	• Arm® Mbed Enabled™ • Ethernet • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F303ZE			STM32F303ZET6	• Arm® Mbed Enabled™ • Device-only USB on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F412ZG			STM32F412ZGT6U	• Arm® Mbed Enabled™ • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F413ZH			STM32F413ZHT6U	• USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F429ZI			STM32F429ZIT6U	• Arm® Mbed Enabled™ • Ethernet • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F439ZI			STM32F439ZIT6U	• Arm® Mbed Enabled™ • Ethernet • USB OTG FS on Micro-AB connector • ST-LINK/V2-1 • Cryptography
NUCLEO-F446ZE			STM32F446ZET6U	• Arm® Mbed Enabled™ • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F722ZE			STM32F722ZET6U	• USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F746ZG			STM32F746ZGT6U	• Arm® Mbed Enabled™ • Ethernet • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-F756ZG			STM32F756ZGT6U	• Arm® Mbed Enabled™ • Ethernet • USB OTG FS on Micro-AB connector • ST-LINK/V2-1 • Cryptography

Order code	Board reference	User manual	Target STM32	Differentiating features
NUCLEO-F767ZI	MB1137	UM1974	STM32F767ZIT6U	• Arm® Mbed Enabled™ • Ethernet • On-board USB OTG • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-H743ZI(1)			STM32H743ZIT6U	• Arm® Mbed Enabled™ • Ethernet • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-H723ZG	MB1364	UM2407	STM32H723ZGT6U	• Ethernet • USB OTG FS on Micro-AB connector • STLINK-V3E
NUCLEO-H743ZI2			STM32H743ZIT6U	• Ethernet • USB OTG FS on Micro-AB connector • STLINK-V3E
NUCLEO-H753ZI			STM32H753ZIT6U	• Ethernet • USB OTG FS on Micro-AB connector • STLINK-V3E • Cryptography
NUCLEO-H745ZI-Q	MB1363	UM2408	STM32H745ZIT6U	• Ethernet • USB OTG FS on Micro-AB connector • STLINK-V3E • Internal SMPS
NUCLEO-H755ZI-Q			STM32H755ZIT6U	• Ethernet • USB OTG FS on Micro-AB connector • STLINK-V3E • Internal SMPS • Cryptography
NUCLEO-H7A3ZI-Q			STM32H7A3ZIT6QU	• USB OTG FS on Micro-AB connector • STLINK-V3E • Internal SMPS
NUCLEO-L496ZG	MB1312	UM2179	STM32L496ZGT6U	• Arm® Mbed Enabled™ • USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-L496ZG-P			STM32L496ZGT6PU	• USB OTG FS on Micro-AB connector • ST-LINK/V2-1 • External SMPS
NUCLEO-L4A6ZG			STM32L4A6ZGT6U	• USB OTG FS on Micro-AB connector • ST-LINK/V2-1 • Cryptography
NUCLEO-L4P5ZG			STM32L4P5ZGT6U	• USB OTG FS on Micro-AB connector • ST-LINK/V2-1
NUCLEO-L4R5ZI			STM32L4R5ZIT6U	• Arm® Mbed Enabled™ • USB OTG FS on Micro-AB connector • ST-LINK/V2-1

Order code	Board reference	User manual	Target STM32	Differentiating features
NUCLEO-L4R5ZI-P	MB1312	UM2179	STM32L4R5ZIT6PU	• Arm® Mbed Enabled™ • USB OTG FS on Micro-AB connector • ST-LINK/V2-1 • External SMPS
NUCLEO-L552ZE-Q	MB1361	UM2581	STM32L552ZET6QU	• Device-only USB FS on USB Type-C™ connector • ST-LINK/V2-1 • Internal SMPS

1. *Replaced with NUCLEO-H743ZI2.*

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 designs or in production.

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

- On the targeted STM32 that is soldered on the board (For an 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-XXYYZT NUCLEO-XXYYZT-P NUCLEO-XXYYZT-Q	Description	Example: NUCLEO-L496ZG-P
XX	MCU series in STM32 Arm Cortex MCUs	STM32L4 Series
YY	MCU product line in the series	STM32L496
Z	STM32 package pin count	144 pins
T	STM32 Flash memory size: • E for 512 Kbytes • G for 1 Mbyte • H for 1.5 Mbytes • I for 2 Mbytes	1 Mbyte
-P	STM32 has external SMPS function	External SMPS
-Q	STM32 has internal SMPS function	-

The order code is mentioned on a sticker placed on the top or bottom 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 cable

Note: macOS® is a trademark of Apple Inc. registered in the U.S. and other countries.
All other trademarks are the property of their respective owners.

2.2 Development toolchains

- IAR™ - EWARM(1)
- Keil® - MDK-ARM(1)
- STMicroelectronics - STM32CubeIDE
- Arm® Mbed™(2) online(3) (see mbed.org)

Note:
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
15-Feb-2017	1	Initial version.
16-Mar-2017	2	Document now scopes NUCLEO-L496ZG and NUCLEO-L496ZG-P products. Updated: • Cover page features (to cover LL APIs) • Cover page description • *Table 2: Ordering information* • *Table 3: Codification explanation*
08-Aug-2017	3	Document now also scopes NUCLEO-L4R5ZI product. Added *Table 1: Device summary*. Updated: • *Support of a wide choice of Integrated Development Environments (IDEs) including IAR™, Keil®, GCCbased IDEs* • Cover page description • *Table 2: Ordering information* • *Table 3: Codification explanation*
30-Aug-2017	4	Updated *Table 2: Ordering information*.
3-Nov-2017	5	Document scope extended to the NUCLEO-F207ZG, NUCLEO-F303ZE, NUCLEO-F412ZG, NUCLEO-F413ZH, NUCLEO-F429ZI, NUCLEO-F446ZE, NUCLEO-F722ZE, NUCLEO-F746ZG, NUCLEO-F767ZI, and NUCLEO-H743ZI products. Updated: • *Features* • *Development toolchains* • *Table 1: Device summary* • *Table 2: Ordering information*
15-Dec-2017	6	Document scope extended to the NUCLEO-L4A6ZG, NUCLEO-F439ZI and NUCLEO-F756ZG products. Updated: • *Features* • *System requirements* • *Table 1: Device summary* • *Table 2: Ordering information*
1-Feb-2018	7	Document scope extended to the NUCLEO-L4R5ZI-P product: updated *Table 1: Device summary* and *Table 2: Ordering information*.
8-Apr-2019	8	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-H743ZI2, NUCLEO-H745ZI-Q, NUCLEO-H753ZI, and NUCLEO-H755ZI-Q boards.
18-Apr-2019	9	Extended document scope to the NUCLEO-L552ZE-Q board.
30-Oct-2019	10	Extended document scope to the NUCLEO-H7A3ZI-Q board.

Date	Version	Changes
26-Nov-2019	11	Extended document scope to the NUCLEO-L4P5ZG board.
24-Mar-2020	12	Extended document scope to the NUCLEO-H723ZG board.
3-Apr-2020	13	Updated order code NUCLEO-H743ZI in List of available products.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

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

© 2020 STMicroelectronics – All rights reserved