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 VBUS 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 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>
<thead>
<tr>
<th>Order code</th>
<th>Board reference</th>
<th>User manual</th>
<th>Target STM32</th>
<th>Differentiating features</th>
</tr>
</thead>
</table>
| 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™  
• Ethernet  
• 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 |
<table>
<thead>
<tr>
<th>Order code</th>
<th>Board reference</th>
<th>User manual</th>
<th>Target STM32</th>
<th>Differentiating features</th>
</tr>
</thead>
</table>
| 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 |                 |             | STM32H743ZIT6U        | • Arm® Mbed Enabled™  
                           • Ethernet  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V2-1 |
| NUCLEO-H743ZI | MB1346          | UM2407      | STM32H743ZIT6U        | • Ethernet  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V3E |
| NUCLEO-H753ZI | MB1364          | UM2407      | STM32H753ZIT6U        | • Ethernet  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V3E  
                           • Cryptography |
| NUCLEO-H745ZI | MB1363          | UM2408      | STM32H745ZIT6U        | • Ethernet  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V3E  
                           • Internal SMPS |
| NUCLEO-H755ZI | MB1363          | UM2408      | STM32H755ZIT6U        | • Ethernet  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V3E  
                           • Internal SMPS  
                           • Cryptography |
| NUCLEO-H7A3ZI | MB1312          | UM2179      | STM32H7A3ZIT6QU       | • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V3E  
                           • Internal SMPS |
| NUCLEO-L496ZG |                 |             | STM32L496ZGT6U        | • Arm® Mbed Enabled™  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V2-1 |
| NUCLEO-L496ZG | MB1312          | UM2179      | STM32L496ZGT6PU       | • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V2-1  
                           • External SMPS |
| NUCLEO-L4A6ZG | MB1312          | UM2179      | STM32L4A6ZGT6U        | • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V2-1  
                           • Cryptography |
| NUCLEO-L4R5ZI |                 |             | STM32L4R5ZIT6U        | • Arm® Mbed Enabled™  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V2-1 |
| NUCLEO-L4R5ZI | MB1312          | UM2179      | STM32L4R5ZIT6PU       | • Arm® Mbed Enabled™  
                           • USB OTG FS on Micro-AB connector  
                           • ST-LINK/V2-1  
                           • External SMPS |
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 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.

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<tr>
<th>NUCLEO-XXYYZT</th>
<th>Description</th>
<th>Example: NUCLEO-L496ZG-P</th>
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<tr>
<td>XX</td>
<td>MCU series in STM32 Arm Cortex MCUs</td>
<td>STM32L4 Series</td>
</tr>
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<td>YY</td>
<td>MCU product line in the series</td>
<td>STM32L496</td>
</tr>
<tr>
<td>Z</td>
<td>STM32 package pin count</td>
<td>144 pins</td>
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</tbody>
</table>
| 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 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

- Keil® MDK-ARM(1)
- IAR™ EWARM(1)
- GCC-based IDEs
- Arm® Mbed™ 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**

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Changes</th>
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<tr>
<td>15-Feb-2017</td>
<td>1</td>
<td>Initial version.</td>
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<td></td>
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<td>Updated:</td>
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<tr>
<td></td>
<td></td>
<td>• Cover page features (to cover LL APIs)</td>
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<tr>
<td></td>
<td></td>
<td>• Cover page description</td>
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<td></td>
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<td>• Table 2: Ordering information</td>
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<td>• Table 3: Codification explanation</td>
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<tr>
<td>08-Aug-2017</td>
<td>3</td>
<td>Document now also scopes NUCLEO-L4R5ZI product.</td>
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<tr>
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<td>Added Table 1: Device summary.</td>
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<td>• Support of a wide choice of Integrated Development Environments (IDES) including IAR™, Keil®, GCCbased IDEs</td>
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<td></td>
<td>• Cover page description</td>
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<tr>
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<td>• Table 2: Ordering information</td>
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<td>30-Aug-2017</td>
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<td>1-Feb-2018</td>
<td>7</td>
<td>Document scope extended to the NUCLEO-L4R5ZI-P product: updated Table 1: Device summary and Table 2: Ordering information.</td>
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<td>8-Apr-2019</td>
<td>8</td>
<td>Revised the entire document to accommodate to multiple feature combinations:</td>
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<td>• Reorganized Features</td>
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<tr>
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<td>• Updated Description</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Added Ordering information and Development environment</td>
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<td>• Updated Table 1. List of available products and Table 2. Codification explanation</td>
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<tr>
<td>18-Apr-2019</td>
<td>9</td>
<td>Extended document scope to the NUCLEO-L552ZE-Q board.</td>
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