STM32 development boards portfolio

Ecosystem Marketing
Q2’2021
Development tools overview

STM32 Nucleo
Flexible prototyping
www.st.com/stm32nucleo

Discovery kits
Key feature prototyping
www.st.com/stm32discovery

Evaluation boards
Full feature evaluation
www.st.com/stm32evaltools

STM32 Nucleo expansion
Functionality add-on
www.st.com/x-nucleo

Third-party boards
From full evaluation to open hardware

STM32 Nucleo key assets

Flexible prototyping

Unlimited expansion capabilities

Simply show the whole STM32 portfolio to the communities
<table>
<thead>
<tr>
<th></th>
<th>Nucleo-32 32-pin MCU</th>
<th>Nucleo-64 64-pin MCU</th>
<th>Nucleo-144 144-pin MCU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethernet</strong></td>
<td></td>
<td>***</td>
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<tr>
<td><strong>USB</strong></td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td><strong>ST Zio</strong></td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>(Uno extended)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>**Arduino Uno</td>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td><strong>ST morpho</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Arduino Nano</strong></td>
<td>*</td>
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</tbody>
</table>
STM32 Nucleo-144 structure

- Flexible board power supply: through USB or external source
- Integrated STLink: drag & drop device Flash programming
- One STM32 MCU flavor with 144 pins
- Arduino Uno & ST Zio connectors: easy access to add-ons
- ST morpho extension pins: direct access to all MCU I/Os
- Ethernet & USB OTG (optional)
Amazing STM32 Nucleo boards

Stretching boundaries

STM32H7 Nucleo-144
STM32L4 Nucleo-32

NCLEO-H745ZI-Q

High performance
STM32H745 dual-core
CoreMark 3223

NCLEO-L412KB

Lower power
STM32L412
ULPMark-CP 447
ULPMark-PP 167
A broad range of Performance, Peripherals, Power, Price

www.st.com/stm32nucleo

Legend:
- Mainstream
- Ultra-low-power
- High-performance
- Wireless
-P Corresponding to External SMPS version
-Q Corresponding to Internal SMPS version

- HW crypto/Hash version available
- Available in H1 2021
Association with shields

- Specialized functionality add-on
- Smooth integration with STM32Cube software library
- Multiple IDEs (STM32CubeIDE, IAR, Arm®…)

Sense
Power
Interact
Connect
Move
Nucleo expansion boards from ST

Sensors and analog
- X-NUCLEO-IKS02A1 MOTION AND ENVIRONMENTAL SENSORS
- X-NUCLEO-53L3A2 PROXIMITY SENSOR
- X-NUCLEO-CCA02M2 DIGITAL MICROPHONE
- X-NUCLEO-AMICAM1 ANALOG MICROPHONE

Communication
- X-NUCLEO-NFC04A1 DYNAMIC NFC TAG
- X-NUCLEO-NFC06A1 NFC CARD READER
- X-NUCLEO-PLM01A1 POWER LINE COMMUNICATION
- X-NUCLEO-GNSS1A1 ASSISTED GNSS
- X-NUCLEO-USBPDM1 USB TYPE-C
- X-NUCLEO-SAFEA1 SECURE ELEMENT

Motor drive
- X-NUCLEO-IHM01A1 STEPPER MOTOR DRIVER
- X-NUCLEO-IHM02A1 TWO AXES STEPPER MOTOR DRIVER
- X-NUCLEO-IHM03A1 HIGH POWER STEPPER MOTOR DRIVER
- X-NUCLEO-IHM04A1 DUAL BRUSH DC MOTOR DRIVER
- X-NUCLEO-IHM05A1 BIPOLAR STEPPER MOTOR DRIVER
- X-NUCLEO-IHM06A1 LOW VOLTAGE STEPPER MOTOR DRIVER
- X-NUCLEO-IHM07M1 STEPPER MOTOR DRIVER
- X-NUCLEO-IHM16M1 THREE PHASE BRUSHLESS MOTOR DRIVER

Translate
- X-NUCLEO-ICA01A1 MULTIFUNCTIONAL EXPANSION BASED ON OPERATIONAL AMPLIFIERS
- X-NUCLEO-CCA01M1 SOUND TERMINAL
- X-NUCLEO-LED61A1 LED DRIVER
- X-NUCLEO-GFX01M1 GRAPHICAL DISPLAY

More references at: www.st.com/x-nucleo
STM32 power shield key assets

Accurate power profiling

- Ultra-low power consumption measurements
- Compatible with all Nucleo form factors (32 / 64 / 144)
- Graphical analysis with STM32CubeMonitor-Power tool
- Custom test sessions with scripting
- Reference tool for EEMBC ULPMark benchmark
STM32 power shield anatomy

- Power supply through USB
- STM32L496VGT6 MCU @ 80 MHz
- 3 x 12-bit ADC @ 3.2 Msamples/s
- Arduino connectors compatible with Nucleo-32, 64 & 144 boards
- 4-wire connector for any type of target board
- Local display: EEMBC ULPBench score

More information at: www.st.com/xnucleo
Ultra-low-power consumption measurements:
- Supply target board from 1.8 to 3.3V
- Dynamic current from 100 nA to 50 mA
- Static current from 1 nA to 200 mA
- Accuracy approximately 2%

Intuitive user experience:
- Two operating modes (stand-alone or PC-controlled)
- Graphical PC application (reference: STM32CubeMonPwr)

Resale price (RRP) $70

Official EEMBC Energy Monitor v2.0:
- Direct computation of ULPMark scores
Nucleo expansion boards from 3rd parties

**LoRaWAN communication**
Frequency range from 868 to 930 MHz
LoRaWAN-compliant protocol stack

**Industrial Ethernet protocols**
PROFINET®, Ethernet/IP™, EtherCAT, POWERLINK, Sercos®, and Modbus®

More information at:
www.st.com/stm32evaltools
**Nucleo boards for wireless communication**

**LoRaWAN node & gateway**
LRWAN2 frequency > 800 MHz,
LRWAN3 frequency < 500 MHz,
LoRaWAN-compliant protocol stack

**Multiprotocol RF transceiver**
Bluetooth™ 5.2 and IEEE 802.15.4-2011 compliant

**Long Range wireless node**
Frequency range 150-960 MHz
LoRa, (G)FSK, (G)MSK, BPSK modulations
LoRaWAN, Sigfox-compliant protocol stack
Latest discovery kits

STM32WB5MM-DK
B-U585IOT02A
B-L462E-CELL1
B-L072Z-LRWAN1
STM32G0316-DISCO
B-G474E-DPOWER1
STM32H735G-DK
STM32MP157F-DK2
# Discovery kit portfolio 1/5

<table>
<thead>
<tr>
<th>Part number</th>
<th>MCU</th>
<th>USB</th>
<th>Audio</th>
<th>Display</th>
<th>Connectivity</th>
<th>Expansion</th>
<th>STLink</th>
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<tbody>
<tr>
<td>STM32F0DISCOVERY</td>
<td>STM32F051</td>
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More information at: [www.st.com/stm32discovery](http://www.st.com/stm32discovery)
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<td>OTG</td>
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<td>Arduino Uno, Pmod, STmod+, MikroBus, Grove</td>
<td>V3</td>
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More information at: [www.st.com/stm32discovery](http://www.st.com/stm32discovery)
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<th>Part number</th>
<th>MCU</th>
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<th>Audio</th>
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<th>Connectivity</th>
<th>Expansion</th>
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<td>32F412GDISCOVERY</td>
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<td>32F469IDISCOVERY</td>
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<td>Arduino Uno</td>
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<td>Arduino Uno, Pmod, STMMod+, Mikrobus, Grove</td>
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<td>Arduino Uno, STMMod+, Mikrobus, Grove</td>
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<td>OLED 128x64</td>
<td>BLE v5.2, Zigbee, Thread</td>
<td>Arduino Uno, STMMod+, Mikrobus, Grove</td>
<td>V2-1</td>
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More information at: [www.st.com/stm32discovery](http://www.st.com/stm32discovery)
## Discovery kit portfolio 5/5

<table>
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<th>Description</th>
<th>Key features</th>
<th>Expansion</th>
<th>STLink</th>
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<tbody>
<tr>
<td>B-L072Z-LRWAN1</td>
<td>STM32L072</td>
<td>All-in-one low-power wireless node</td>
<td>LoRa, Sigfox, WMbus AAA-battery operation</td>
<td>Arduino Uno, ST morpho</td>
<td>V2-1</td>
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<tr>
<td>B-L4S5I-IOT01A</td>
<td>STM32L4S5</td>
<td>All-in-one IoT node with low-power connectivity &amp; multiway sensing</td>
<td>BLE, NFC, Wi-Fi, Sensors (digital microphone, 9-axis navigation, pressure, humidity, temperature, proximity / gesture detection)</td>
<td>Arduino Uno, Pmod</td>
<td>V2-1</td>
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<td>B-U585I-IOT02A</td>
<td>STM32U585</td>
<td>All-in-one IoT node with low-power connectivity &amp; multiway sensing</td>
<td>BLE, Wi-Fi, Sensors (digital microphone, 9-axis navigation, pressure, humidity, temperature, proximity/gesture detection)</td>
<td>Arduino Uno, Pmod, STmod+, MikroBus, Grove</td>
<td>V3</td>
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<tr>
<td>B-L462E-CELL1</td>
<td>STM32L462</td>
<td>Worldwide Cellular IoT node LTE catM / NB-IoT</td>
<td>eSIM and MicroSIM, 3-month dataplan included</td>
<td>STmod+, MikroBus, Grove</td>
<td>V2-1</td>
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I-CUBE-LRWAN     LoRaWAN-compliant software expansion for STM32Cube

X-CUBE-CLOUD     Cloud connectors as expansion for STM32Cube (Amazon Web Services, Microsoft Azure, IBM Watson)

X-CUBE-SFOX      Sigfox-compliant software expansion for STM32Cube

X-CUBE-CELLULAR  Cellular software framework as expansion for STM32Cube.

More information at: www.st.com/stm32app-discovery
STM32U5 discovery IoT node…

Multi-link communication, multiway sensing

- PMOD extension connector
- Gyro/Accelero/Magnetometer, Proximity, Pressure, Humidity, Temperature sensors
- STMOD+ extension connector
- Audio mics
- BLE module (WB5MM)
- Integrated STLink: drag & drop Flash programming
- Wi-Fi module
- STM32U585 MCU
- Arduino Uno extension connectors
- USB Type-C connector

B-U585I-IOT02A
...Delivers user-friendly cloud access

Direct connection to cloud services
Low-power communication
Environmental awareness: humidity, pressure, temp
Detection hub: motion, proximity, audio
Direct support of communities

Cloud STM32Cube Expansion Packages
Latest evaluation boards

STM32G081B-EVAL
STM32G474E-EVAL
STM32H757I-EVAL
STM32L552E-EV
Evaluation board portfolio

<table>
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<tr>
<th>Mainstream</th>
<th>Ultra-low-power</th>
<th>High-performance</th>
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More information at: www.st.com/stm32evaltools
STM32 boards contribute to communities

- **52** ARM MBED Enabled Boards
  - (full list here)

- **30** Expansion Boards
  - (full list here)

- **55** ARDUINO Boards
  - (full list here)

- **10** Expansion Boards
  - (libraries)
Our technology starts with You

Find out more at www.st.com/stm32