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› [EC Buying](#) /

› [EC Buying STM32F401CCU6 Development Board User Manual](#)

EC Buying STM32F401CCU6

EC Buying STM32F401CCU6 Development Board User Manual

Model: STM32F401CCU6

1. INTRODUCTION

This manual provides essential information for the proper setup, operation, and maintenance of your EC Buying STM32F401CCU6 Minimum Core System Learning Development Board. This board is designed for learning and development with the STM32F401 ARM Cortex-M4 microcontroller, offering a compact and versatile platform for various embedded projects.

2. PRODUCT OVERVIEW

The STM32F401CCU6 development board is a compact module featuring the STM32F401CCU6 microcontroller. It includes a Type-C USB interface for power and data, along with various GPIO pins for external connections. Key features include:

- Microcontroller: STM32F401CCU6 (ARM Cortex-M4)
- Operating Frequency: Up to 84 MHz
- Flash Memory: Up to 256 Kbytes
- RAM: 64 Kbytes SRAM
- OTP Memory: 512 bytes
- USB Interface: Type-C
- Integrated Reset (NRST) and Boot (BOOT0) buttons
- Power LED (PWR) and User LED (KEY)

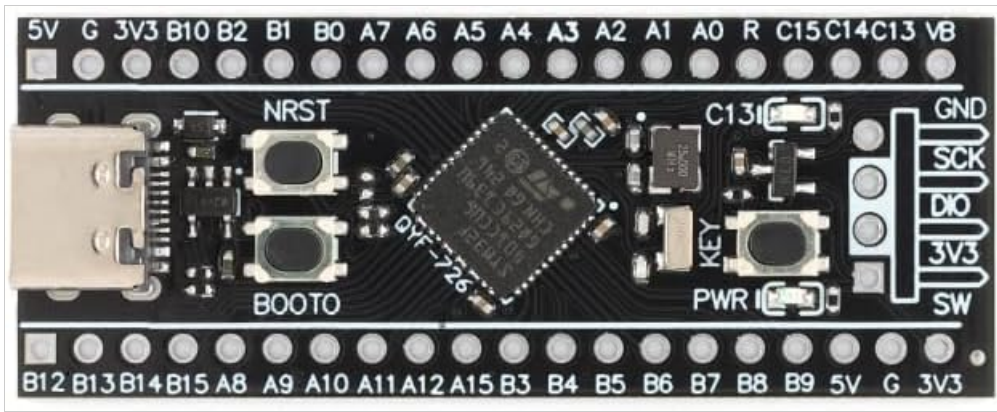


Figure 2.1: Top view of the STM32F401CCU6 development board, highlighting the main components and pin layout.

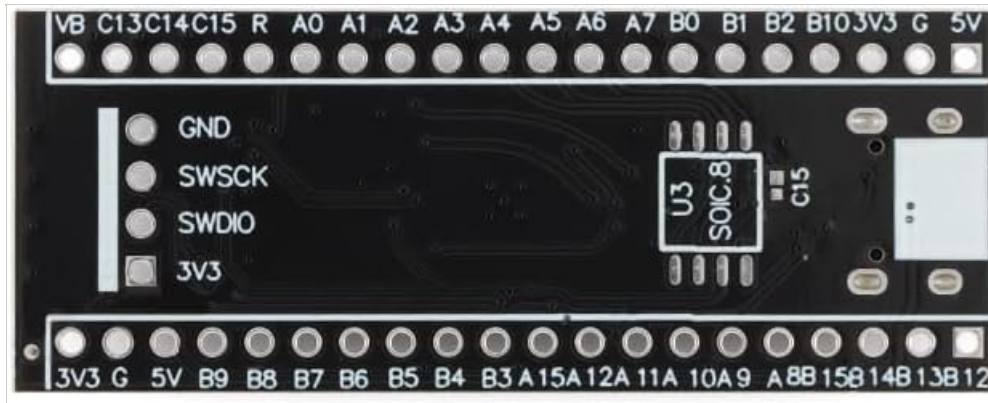


Figure 2.2: Bottom view of the STM32F401CCU6 development board, illustrating the reverse side of the PCB.

3. SETUP

Follow these steps to prepare your STM32F401CCU6 development board for use:

1. **Solder Pin Headers (Optional):** The board typically comes without soldered pin headers. If you intend to use the GPIO pins with breadboards or jumper wires, solder the included pin headers to the designated through-holes. Ensure proper alignment and secure connections.
2. **Connect to Computer:** Use a standard USB Type-C cable to connect the development board to your computer. The board will draw power from the USB port.
3. **Driver Installation:** Your operating system may automatically install necessary drivers. If not, you may need to manually install drivers for the STM32 Virtual COM Port or DFU (Device Firmware Upgrade) mode. Refer to STMicroelectronics documentation or community resources for specific driver installation instructions for your OS.
4. **Integrated Development Environment (IDE) Setup:** Install an appropriate IDE for STM32 development, such as STM32CubeIDE, Keil MDK, IAR Embedded Workbench, or PlatformIO with VS Code. Configure the IDE to recognize the STM32F401CCU6 microcontroller.
5. **Toolchain Installation:** Ensure you have the necessary ARM GCC toolchain installed and configured within your chosen IDE for compiling code for the Cortex-M4 processor.

4. OPERATING INSTRUCTIONS

This section outlines basic operational procedures for the STM32F401CCU6 development board.

4.1 Powering the Board

The board is primarily powered via the USB Type-C port. Once connected to a computer or a compatible USB power

adapter, the PWR LED (usually red) should illuminate, indicating that the board is receiving power.

4.2 Programming the Microcontroller

The STM32F401CCU6 supports programming via its DFU bootloader over USB, eliminating the need for an external programmer like an ST-Link for basic operations. Alternatively, you can use SWD (Serial Wire Debug) for more advanced debugging and programming.

1. DFU Mode Programming:

- Press and hold the BOOT0 button.
- Press and release the NRST (Reset) button.
- Release the BOOT0 button. The board is now in DFU mode.
- Use your IDE or a DFU utility (e.g., STM32CubeProgrammer) to upload your compiled firmware (.hex or .bin file) to the board.
- After successful upload, press the NRST button to run your program.

2. SWD Programming/Debugging:

- Connect an SWD programmer (e.g., ST-Link V2) to the SWD pins on the board (SWCLK, SWDIO, GND, 3V3).
- Configure your IDE to use the connected SWD programmer.
- Upload and debug your code directly through the SWD interface.

4.3 GPIO Usage

The board exposes numerous General Purpose Input/Output (GPIO) pins. Refer to the STM32F401CCU6 datasheet and board schematics for detailed pin assignments and alternate functions. Remember that this is a 3.3V logic board; avoid connecting 5V signals directly to GPIO pins without proper level shifting.

5. MAINTENANCE

To ensure the longevity and reliable operation of your development board, observe the following maintenance guidelines:

- **Handle with Care:** Avoid dropping the board or subjecting it to physical shock.
- **Static Discharge Protection:** Always handle the board in an ESD-safe environment. Use an anti-static wrist strap and mat to prevent damage from electrostatic discharge.
- **Keep Dry:** Protect the board from moisture and liquids. Store it in a dry environment.
- **Cleanliness:** Keep the board free from dust and debris. Use a soft, dry brush or compressed air for cleaning. Do not use liquid cleaners.
- **Power Supply:** Use a stable 5V power supply via the USB Type-C port. Avoid using unregulated or over-voltage power sources.
- **Storage:** When not in use, store the board in its original packaging or an anti-static bag.

6. TROUBLESHOOTING

If you encounter issues with your STM32F401CCU6 development board, consider the following troubleshooting steps:

• Board Not Powering On:

- Check the USB Type-C cable and ensure it is securely connected to both the board and the power source.
- Verify that the USB power source (computer port or adapter) is functional.
- Ensure the PWR LED illuminates when connected. If not, the board may not be receiving power.

- **Computer Not Recognizing Board:**

- Ensure necessary drivers are installed (refer to Section 3: Setup).
- Try a different USB port or cable.
- Restart your computer.
- Check Device Manager (Windows) or `lsusb` (Linux) to see if the device is detected, even if drivers are missing.

- **Firmware Upload Failure:**

- Confirm the board is in DFU mode (BOOT0 held, NRST pressed/released, then BOOT0 released).
- Verify your IDE or programming tool is correctly configured for the STM32F401CCU6.
- Check for error messages in your IDE or programming utility. These often provide clues about the issue.
- Ensure the firmware file is valid and compatible with the microcontroller.

- **Program Not Running:**

- After uploading, press the NRST button to reset the microcontroller and start execution of the new program.
- Verify your code logic. A simple 'blink' program can help confirm basic functionality.
- Check for any hardware conflicts or incorrect pin configurations in your code.

7. SPECIFICATIONS

Feature	Detail
Microcontroller	STM32F401CCU6 (ARM Cortex-M4)
CPU Speed	Up to 84 MHz
Flash Memory	256 Kbytes
RAM (SRAM)	64 Kbytes
OTP Memory	512 bytes
USB Interface	Type-C
Operating Voltage	3.3V (via USB 5V input)
Dimensions	Approximately 52mm x 20mm
Item Weight	Approximately 1.09 ounces

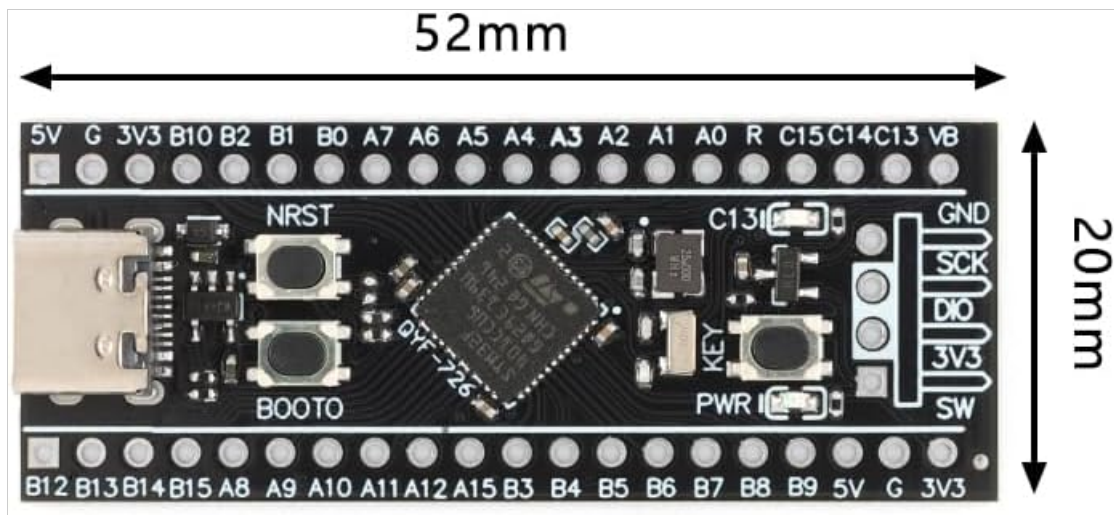


Figure 7.1: STM32F401CCU6 development board with approximate dimensions.

8. WARRANTY AND SUPPORT

EC Buying products are typically covered by a standard manufacturer's warranty. For specific warranty details, including duration and coverage, please refer to the product packaging or contact EC Buying customer support directly. For technical assistance, documentation, or community support, please visit the official STMicroelectronics website or relevant online forums dedicated to STM32 development.

Contact Information:

- For product-related inquiries, please contact your retailer or EC Buying customer service.
- For technical documentation and community support related to the STM32 microcontroller, visit [STMicroelectronics Official Website](#).