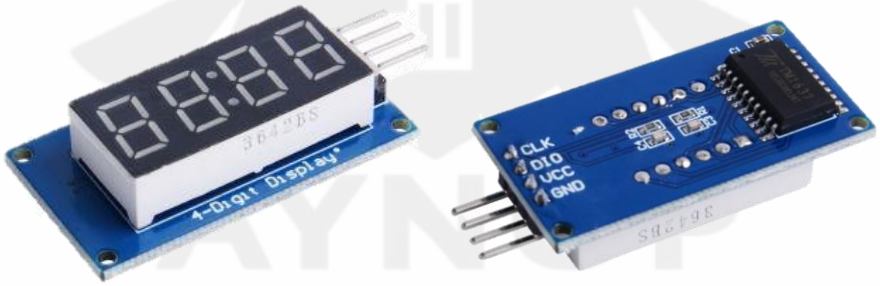
LAUNCH THE PROJECT - 17

4-Digit 7-Segment Display

(using TM1637 Driver)

On AYNOP® UNO Launchpad Kit



Author: AYNOP Enterprises | Doc Version: 1.0 | Date: 22-9-2025

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1. Overview

This project demonstrates how to use a **TM1637-based 4-digit 7-segment display** with Arduino® UNO R4 Minima.

You will learn to:

- Connect the TM1637 module to Arduino using only 2 pins (CLK and DIO).
- Use the **TM1637Display library** to control the display.
- Show a counting number that increases every second from 0 to 9999.

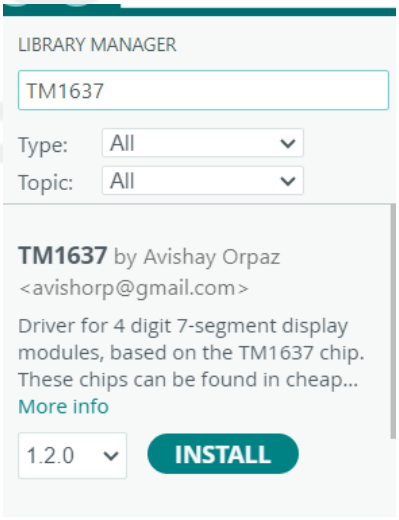
This project introduces you to **multi-digit displays** and how Arduino can drive them with minimal wiring.

2. Components Required

- Arduino® UNO R4 Minima board
- USB Type-C data cable
- TM1637 4-digit 7-segment display module
- Jumper wires

3. Software Required

- Arduino IDE (v2.3.6 or later recommended)
- Library required: **TM1637Display by Avishay Orpaz.**



Installing the Library:

- Open Arduino IDE.
- Go to **Sketch → Include Library → Manage Libraries**
- Search for **TM1637.**
- Install the library.

Note:

We assume the **Arduino UNO R4 Minima board package** is already installed on your machine, as explained in the 00_Getting_Started/00_GettingStarted_Arduino_R4_Minima guide. If it is not installed, please refer to that document and complete the installation before proceeding.

4. Hardware Setup

This section explains how to connect the TM1637 display module.

4.1 Wiring Diagram

- TM1637 **CLK → D3**.
- TM1637 **DIO → D2.**
- TM1637 **VCC → 5V**.
- TM1637 **GND → GND**

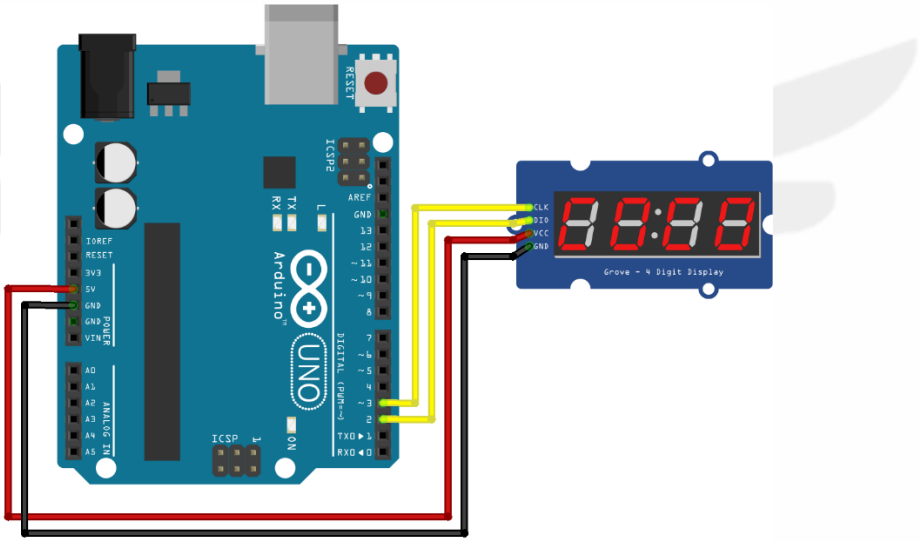


Figure 4.1 – Wiring diagram for TM1637 4-digit display with Arduino UNO R4 Minim

💡 **Tip:** Always disconnect the USB cable before making or changing hardware connections.

💡 **Tip**: Use short jumper wires for stable connections as display modules are sensitive to lose wiring.

5. Principle – How It Works

The **TM1637 driver IC** is designed to control a 4-digit 7-segment display using only **two pins** (CLK and DIO).

How it works in this project:

- Arduino communicates with the TM1637 using a simple 2-wire protocol.
- The library provides functions to send numbers directly to the display.
- Each digit is formed by lighting up specific segments (a–g).
- The counter runs from 0000 to 9999, updating once per second

This demonstrates how complex multi-digit displays can be controlled efficiently with minimal wiring.

6. Procedure – Steps to Run

1. **Build the Circuit**
   a. Connect the TM1637 module as shown in the **Wiring Diagram (Figure 4.1)**.

2. **Connect the Board**
   a. Use a USB Type-C data cable to connect your UNO R4 Minima to your computer.

3. **Open the Project Code**
   a. Simply **double-click** the file *17_4Digit_Display.ino* in the project folder, and it will open directly in the Arduino IDE (if installed).

4. **Confirm Board Selection**
   a. The IDE usually auto-detects the UNO R4 Minima if the package is installed.
   b. If not installed, refer to the *00_Getting_Started/00_GettingStarted_Arduino_R4_Minima* document to install the necessary board package.
   c. Verify that *Arduino UNO R4 Minima* is selected in the IDE's board selector (top toolbar).

5. **Upload the Code**
   a. Click the **Upload** button (arrow icon) in the top-left corner of the IDE.
   b. Wait until the console displays "**Done uploading**."

6. **Observe the Behaviour**
   a. After uploading, the 4-digit display will start showing numbers.
   b. The display begins from **0000** and increases by 1 every second.
   c. When it reaches 9999, it will stop (or restart if you reset the board)
   d. The brightness level is set to medium (5 out of 7), but you can adjust it in the code.

7. Expected Output

- The 4-digit display will show **0** and increase by **1 every second**.
- The count will continue up to **9999.**

8. Code

The source code for this project is included in the downloaded folder:

📂 *uno-launchpad-kit/01_Basic_Projects/17_4Digit_Display/17_4Digit_Display.ino*

👉 **Tip:**

- To open the project, simply **double-click the .ino file**. If the Arduino IDE is installed, it will launch automatically and load the code.
- If you **haven't installed the Arduino IDE yet**, please refer to:
  📂 uno-launchpad-kit/00_Getting_Started/00_GettingStarted_Arduino_R4_Minima
  to **download and install it.**

8.1 Function References

- setup() – runs once when the board is powered on or reset.
- loop() – runs continuously after setup() finishes.
- TM1637Display(CLK, DIO) – creates a display object with given pins.
- setBrightness(level) – sets brightness (0 = dim, 7 = max).
- clear() – clears the display.
- showNumberDec(number) – displays a decimal number (up to 4 digits).
- delay(ms) – pauses execution for given milliseconds.

📚 **For more details and advanced usage, visit:**

🔗 TM1637Display — The GitHub repo of TM1637Display library.
🔗 Arduino Language Reference — The official guide for all Arduino functions.

9. Troubleshooting Tips

- **Display not turning on?**
  - Check wiring of CLK and DIO pins.
  - Ensure 5V and GND are connected properly.

- **Wrong or garbled numbers?**
  - Confirm correct library is installed.
  - Verify that pins D2 and D3 are used in both code and wiring.

- **Upload error in Arduino IDE?**
  - Verify that the correct board (**Arduino UNO R4 Minima**) is selected in the IDE.
  - Check that the correct **COM port** is chosen.

- **Board not detected vis USB?**
  - Ensure you are using a **data-capable USB Type-C cable** (some cables only provide charging).
  - Try reconnecting the cable or using a different USB port.

- **Board not listed in Arduino IDE?**
  - If you don't see **Arduino UNO R4 Minima** in the board selector, the **board package is not installed**.
  - To fix this, follow the installation steps in:
    📂 *uno-launchpad-kit/00_Getting_Started/00_GettingStarted_Arduino_R4_Minima*

💡 **Tip:** If nothing works, press the **RESET** button on the UNO R4 Minima and try uploading the code again.

10. License

11. Support & Feedback

We value your feedback and are happy to assist with any questions, troubleshooting, or suggestions you may have.

Email: *support@aynop.com*

When sending an email, please include your kit name (AYNOP® UNO Launchpad Kit) and, if applicable, the project name in the subject line. This will help our team respond faster and more accurately. We aim to respond to all queries within 2–3 business days. Your feedback helps us improve our products and create even better learning experiences for all Arduino beginners.