

lamaPLC: HT16K33 display controller

The **HT16K33** is a memory-mapped, multi-function LED controller driver. The device supports a maximum of 128 display segments (16 segments and 8 commons) and a 13×3 Maximum matrix key scan circuit. The software-configurable features of the HT16K33 make it suitable for a wide range of LED applications, including LED modules and display subsystems. The HT16K33 is compatible with most microcontrollers and communicates via a two-line bidirectional I²C bus.



HT16K33 IC Feature

- Operating voltage: **4.5V-5.5V**
- Integrated RC oscillator
- I²C-bus interface
- 16×8-bit RAM for display data storage
- Max. 16×8 patterns, 16 segments, and eight commons
- R/W address auto-increment
- Max. 13×3 matrix key scanning
- 16-step dimming circuit
- Supports 20/24/28-pin SOP package types



I²C addressing

The base I²C address for an HT16K33 is **0x70**, but it can be changed to one of seven other addresses by setting the four address pins (**A0-A3**) via hardware. Each HT16K33 chip can have a unique address from **0x70** to **0x77**. If multiple HT16K33 devices are used on the same bus, each must have a distinct address, and if you use more than one, their addresses must be sequential, such as **0x70**, **0x71**, **0x72**.



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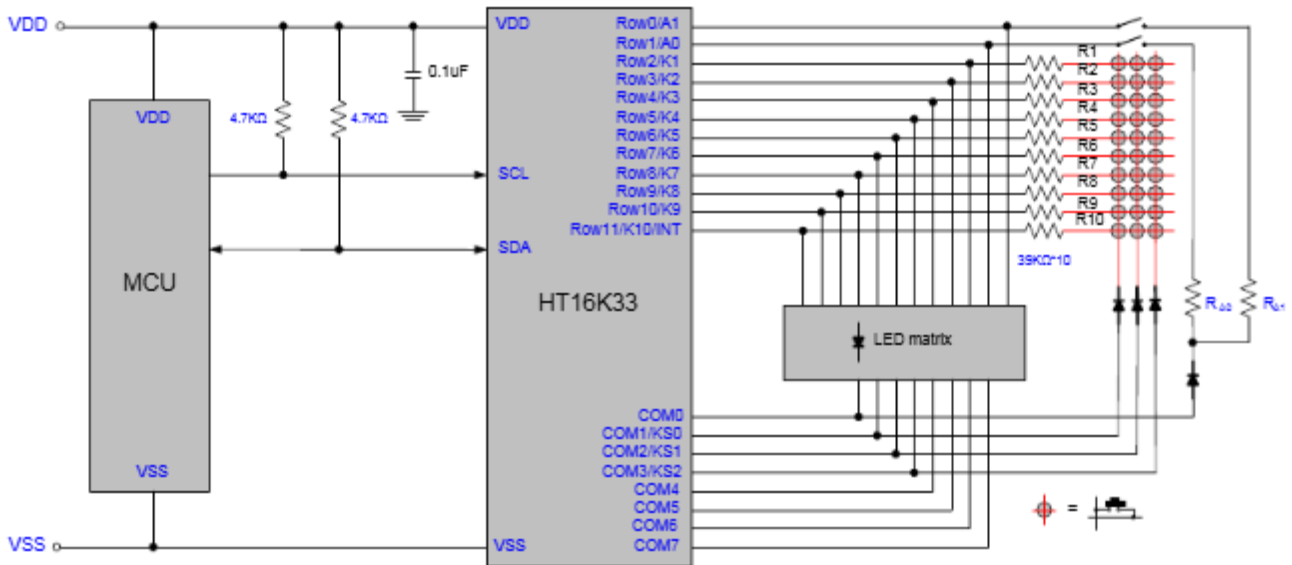
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Schema

12*8 display application: (No INT pin function and 10*3 key function):



Arduino Wiring Diagram

The HT16K33 uses standard I²C pins. Connect your display as follows:

HT16K33 Pin	Arduino Uno Pin	Arduino Mega Pin	Description
VCC	5V	5V	Power (4.5V-5.5V)
GND	GND	GND	Ground
SDA	A4	20	Serial Data
SCL	A5	21	Serial Clock

Required Libraries

You will need two libraries from Adafruit:

- Adafruit LED Backpack Library
- Adafruit GFX Library

Install these via the Arduino Library Manager (*Tools > Manage Libraries...*).

Arduino Example Code

This sketch demonstrates basic numeric display and colon control using the [Adafruit_LED_Backpack](#) library.

```
#include <Wire.h>
#include <Adafruit_GFX.h>
#include "Adafruit_LEDBackpack.h"

// Create the display object (Default I2C address is 0x70)
Adafruit_7segment matrix = Adafruit_7segment();

void setup() {
  matrix.begin(0x70); // Initialize with I2C address
  matrix.setBrightness(10); // Set brightness from 0 to 15
}

void loop() {
  // 1. Display a whole number
  matrix.print(1234, DEC);
  matrix.writeDisplay();
  delay(2000);

  // 2. Display a floating point number
  matrix.print(12.34);
  matrix.writeDisplay();
  delay(2000);

  // 3. Simple Counter with blinking colon
  for (uint16_t counter = 0; counter < 100; counter++) {
    matrix.println(counter);
    matrix.drawColon(counter % 2 == 0); // Blink colon every other tick
    matrix.writeDisplay();
    delay(200);
  }
}
```

<https://docs.arduino.cc/libraries/simple-ht16k33-library/>

Sources

<https://www.digikey.com/htmldatasheets/production/2070902/0/0/1/ht16k33.html>

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