

LamaPLC: MAX4466/MAX9814: Low-noise Microphone Preamplifiers

The MAX4466 and MAX9814 are low-noise microphone preamplifiers typically used with electret microphones to convert sound into electrical signals for microcontrollers like Arduino.

MAX4466: Fixed Gain Amplifier

The MAX4466 is a straightforward operational amplifier optimized for use as a microphone preamp.



- **How it works:** It amplifies incoming audio by a set amount that you can manually tune using a potentiometer (trimmer).
- **Key Advantage:** It provides consistent, predictable gain. If the sound volume stays the same, the output stays the same.
- **Best For:** Audio-reactive projects (like FFT visualizers), precise sound level monitoring, and voice changers where you want full manual control over sensitivity.

MAX9814: Automatic Gain Control (AGC) Amplifier

The MAX9814 is a more sophisticated chip that features Automatic Gain Control (AGC).

- **How it works:** It dynamically adjusts its own gain. It makes quiet sounds louder and prevents loud sounds from “clipping” (distorting) by automatically lowering their volume.
- **Key Advantage:** It handles unpredictable environments where sound levels vary wildly without needing manual adjustment.
- **Best For:** Voice recognition, conferencing systems, portable recorders, and any application where you need a stable output level regardless of how far away the speaker is.


Comparison Table: MAX4466 vs. MAX9814

Feature	MAX4466	MAX9814
		
Gain Control	Manual: Adjusted via an onboard potentiometer.	Automatic (AGC): Automatically adjusts to keep sound levels constant.
Gain Range	Variable from 25x to 125x (~28dB to 42dB).	Selectable base gains of 40dB, 50dB, or 60dB.
Operating Voltage	2.4V to 5.5V	2.7V to 5.5V
Noise Level	Low: Known for excellent power supply rejection (112dB)	Very Low: Features 30nV/rtHz input-referred noise density
Behavior	Predictable and consistent output for fixed sounds	Adaptive; prevents “clipping” from sudden loud noises

Feature	MAX4466	MAX9814
Complexity	Simple op-amp; easy to wire and use	Advanced; allows tuning "Attack" and "Release" ratios
Best For	Audio-reactive LEDs, FFT visualizers, and precise monitoring	Voice recognition, conferencing, and dynamic environments

Key Differences

- **Audio Consistency:** Choose the MAX4466 if you need your electrical signal volume to accurately reflect the room volume. Choose the MAX9814 if you want the signal to stay "loud and clear" even if the speaker moves closer or further away from the mic.
- **Power Efficiency:** The MAX4466 is a micropower device, drawing only about 24 µA, making it slightly better suited to ultra-low-power battery applications than the MAX9814.



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MAX9814 Module Pinout Table

^Pin^Name^Description|

VCC	Power Supply	Input voltage, typically 2.7V to 5.5V
GND	Ground	Common ground for power and signal
OUT	Analog Output	Audio signal output (approx. 2Vpp max) with a 1.25V DC bias
GAIN	Gain Control	Sets the maximum amplification level (see configuration below)
AR	Attack/Release	Adjusts the AGC's attack-to-release time ratio (see configuration below)

Configuration Settings

You can change the behavior of the module by connecting the GAIN and AR pins to VCC, GND, or leaving them "floating" (unconnected).

Gain Settings (Maximum Gain)

- **Unconnected (Floating):** 60dB (Maximum sensitivity).
- **Connected to GND:** 50dB.
- **Connected to VCC:** 40dB (Minimum sensitivity).

AR (Attack/Release Ratio) Settings

This controls how quickly the AGC responds to volume changes.

- **Unconnected (Floating):** 1:4000 ratio (Slowest response; best for most general purposes).
- **Connected to VCC:** 1:2000 ratio.

- **Connected to GND:** 1:500 ratio (Fastest response).

Pro-Tip: For the cleanest signal on an Arduino, connect VCC to 3.3V rather than 5V to minimize electrical noise from the power rail.

Arduino & MAX9814

Here's an example sketch to read audio signals from the MAX9814 and display the amplitude on the Serial Monitor:

```
const int microphonePin = A0; // Connect MAX9814 OUT to A0

void setup() {
  Serial.begin(9600);
  Serial.println("MAX9814 Microphone Test");
}

void loop() {
  int audioValue = analogRead(microphonePin); // Read audio signal
  Serial.print("Audio Amplitude: ");

  // use the Arduino Serial Print -> Tools > Serial Monitor
  // use the Arduino Serial Plotter -> Tools > Serial Plotter
  Serial.println(audioValue);

  delay(10); // Small delay for smooth readings
}
```

Sensor topics on lamaPLC

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• LamaPLC: ENS ScioSense Multi-gas sensors with I²C communication	2026/04/23 21:52	ens160 , sciosense , gas-quality , i2c , communication , sensor , arduino , code , eco2 , tvoc , aqi , indoor air quality , iaq , co2 , voc
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• LamaPLC: GM MEMS Gas-sensors	2026/04/23 21:52	gm-102b , gm-302b , gm-502b , gm-702b , mems , gas-quality , sensor , arduino , code , nitrogen dioxide , no2 , volatile organic compounds , voc , carbon monoxide , co , ethyl alcohol , c2h5ch , formaldehyde , ch2o , alcohol , c2h5oh
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• LamaPLC: HTU TE Connectivity temperature/humidity sensors with I²C communication	2026/04/23 21:52	htu , htu31d , htu21d , htu20d , sht20 , htu20 , sht21 , htu21 , si7021 , gy-21 , gy-213v , hdc1080 , si702 , gy-20 , sht31 , htu31 , si7031 , gy-31 , te connectivity , temperature , humidity , i2c , communication , sensor , arduino , code
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• LamaPLC: MQ Winsen Gas-sensors	2026/04/23 21:52	mq , mq-2 , mq-3 , mq-4 , mq-5 , mq-6 , mq-7 , mq-8 , mq-9 , mq-131 , mq-135 , mq-137 , winsen , gas-sensor , sensor , arduino , code , alcohol , c₂h₅oh , benzine gas , smoke , lpg , propane , c₃h₈ , hydrogen , h₂ , methane , ch₄ , iso-butane , town gas , ammonia , nh₃
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