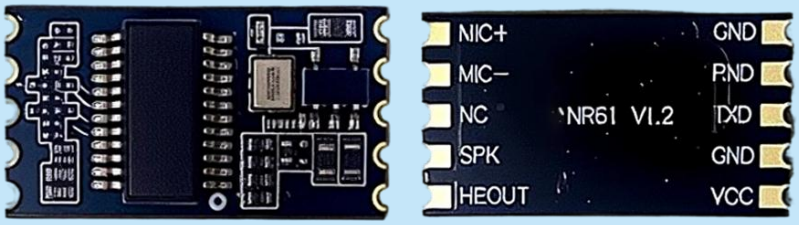
NR61 Echo Cancellation & Noise Reduction Audio Processing Module

- Maximum noise suppression ≤80dB
- Powerful ambient noise suppression and AEC capability
- Compact size, stamp-hole design, convenient for easy integration

Product Specification



Catalog

1. Description ..... - 2 -
2. Features ..... - 2 -
3. Applications ..... - 2 --
4. SNR Improvement Performance ..... - 3 -
5. Electrical Characteristics ..... - 3 -
6. Parameter Commands ..... - 4 -
7. Typical Application ..... - 5 -
8. Pin definition ..... - 5 -
9. Size(Unit:mm) ..... - 6 -
Appendix :SMD Reflow Chart ..... - 6 -

Note: Revision History

Revision	Date	Comment
V1.0	2026-4	First release
V1.1	2026-9	Update Pin definition

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1. Description

The NR61 module is a general-purpose, portable, low-power, high-performance AI-based noise reduction module designed for voice processing applications. It supports both noise suppression and AEC (Acoustic Echo Cancellation), making it suitable for full-duplex communication systems such as:

- In-vehicle communication
- Building intercom systems
- Counter/window intercom systems
- Conference calls
- Headsets and hands-free devices

Supported noise types include: wind noise, howling feedback, keyboard noise, traffic noise, music, and crowd noise.

The module supports EQ and AGC adjustment, and the volume can be configured via serial commands to meet various application requirements.

2. Features

- Designed for near-field noise reduction, best performance when the voice is within 10 cm of the microphone
- Environmental noise suppression ≤80 dB
- Filters non-human voice noise such as:
  - Steady-state noise
  - Music noise
  - Wind noise
  - Transient random noise
  - Mechanical noise
- Noise reduction latency: 84 ms from MIC input to HPOUT output
- Sampling rate: 16 kHz, 16-bit
- Adaptive AEC (Acoustic Echo Cancellation)
- Deep-learning based noise reduction algorithm

3. Applications

- Online video conference systems
- Hospital call systems
- Building intercom systems
- Bank counter communication systems
- Any scenario requiring background noise suppression

4. SNR Improvement Performance

Under various environments, the module improves voice SNR by approximately 40 dB on average:

Test Environment	Original SNR (dB)	After NR SNR (dB)
White Noise	10.85	43.95
Market	4.3	47.34
Supermarket	5.39	47.04
Wind Noise	4.13	49.88
Construction Site	7.46	39.25
Traffic Intersection	7.37	52.11
Barbershop	5.77	49.39
Beverage Shop	6.39	49.46
Shopping Mall	3.55	42.08
Game Center	6.3	48.65
Average	6.15	46.92

5. Electrical Characteristics

Parameters	Condition	Min.	Typ.	Max.	Unit
Power Supply		3.3		5.5	V
Working temperature		-20	25	85	℃
Current consumption					
Operating current			30		mA
Noise reduction parameters					
Signal-to-noise ratio	Signal power to background noise ratio		-5<SNR<0		
Maximum noise suppression	Microphone ambient noise		≤80		db
Voice distance	Distance from the person to the microphone		<10		cm
Processing Latency			84		ms
Startup Time	Power-on to valid output		<200		ms
Interface Characteristics					
Microphone Input	Differential		1		
Reference Input	AEC		1		
Audio Output			HPOUT		
Configuration Interface	Parameter configuration		UART		

6. Parameter Commands

Users can read or modify the module's microphone gain via the UART interface (which affects the speaker volume on the receiving side). Serial command transmission shall comply with the following protocol:

Serial Interface Parameters:

Baud Rate: 921600 bps Data Bits: 8 bits Stop Bits: 1 bit Parity: None

Command Format: AA FA + Command + [Parameter]

Command: 1 byte

Parameter: Optional, 0 or HEX data

Command Definitions

[01] Read Microphone Gain

Command: AA FA 01

Parameter: None

Response: Microphone gain + \r\n

Example:

Response: 05 0D 0A

Interpretation: Current microphone gain = 05

Gain Range: 01 – 07 (01 = minimum)

[02] Restore Default Microphone Gain

Command: AA FA 02

Parameter: None

Response: "OK\r\n" or "ERROR\r\n"

Default Gain: 05

[03] Set Microphone Gain

Command: AA FA 03 XX

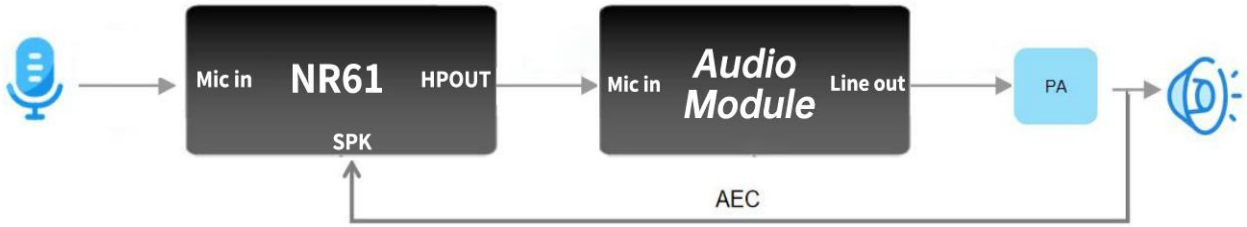
Parameter: XX = 01 – 07

Response: "OK\r\n" or "ERROR\r\n"

Note: All configuration parameters take effect only after a power cycle.

7. Typical Application

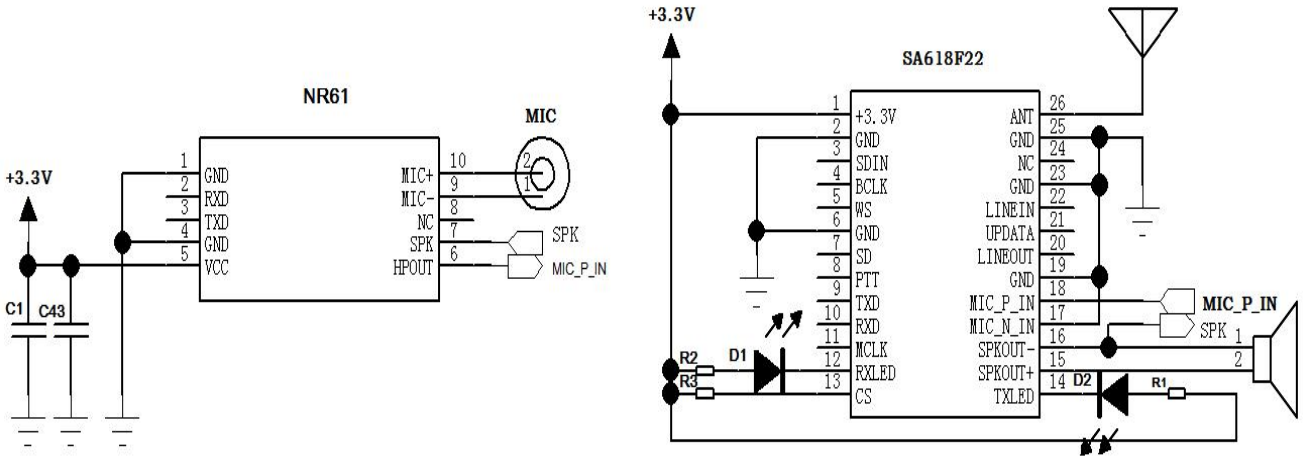
- Noise reduction + AEC dual-function system



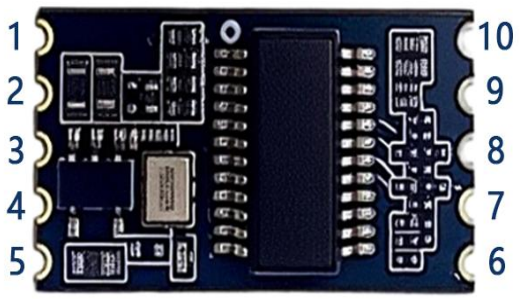
- Noise reduction only configuration



- Compatible with external modules (e.g., SA618F22)



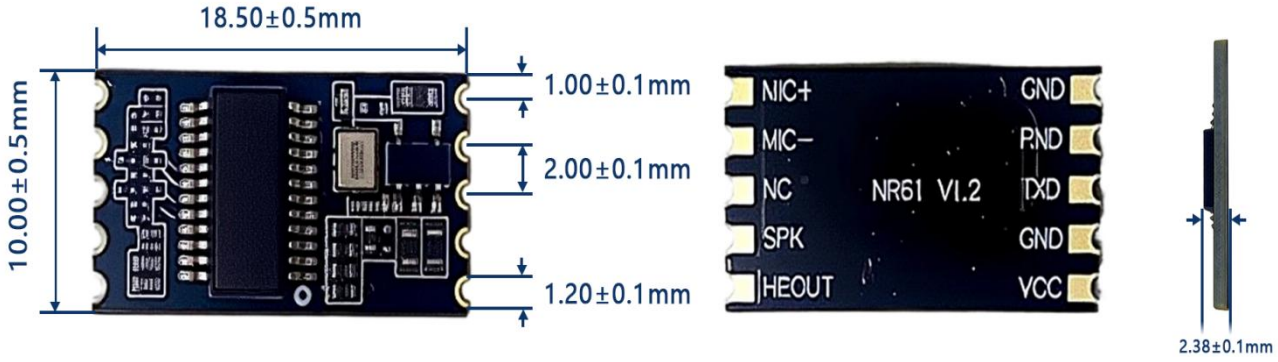
8. Pin definition





Pin NO	Pin name	I/O	Description
1,4	GND		Connect to power ground
2	RXD	I	Serial data reception (connect to MCU TXD)
3	TXD	O	Serial data transmission (connect to MCU RXD)
5	VCC		External power supply positive terminal(Minimum 3.3V, Maximum 5.5V)
6	HPOUT	O	audio output pin is typically connected to the MIC_IN pin of the customer's product
7	SPK	I	Reference audio input (speaker output)
8	NC	I	Floating (Not connected)
9	MIC-	I	Microphone negative input pin
10	MIC+	I	Microphone positive input pin

9. Size(Unit:mm)



Appendix :SMD Reflow Chart

Below reflow profile is recommended for SMT technology:

