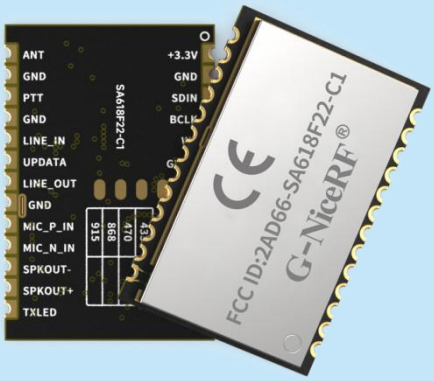
SA618F22-C1

Full-duplex digital and audio wireless transmission module

- 8 people can share high-quality calls
- I2S Digital audio+analog audio
- Mesh Network
- Multi-device concurrent transmission and reception
- Support OTA &Serial upgrade

Product Specification



Catalogue

1. Description ..... - 3 -
2. Features ..... - 3 -
3. Applications ..... - 3 -
4. Block Diagram ..... - 4 -
5. Electrical Characteristics ..... - 4 -
6. Typical Applications: ..... - 5 -
7. Typical application circuit ..... - 5 -
8. Pin definition ..... - 6 -
9. Reset Timing Diagram ..... - 7 -
10. Communication protocol ..... - 7 -
11. Mechanism Dimension(Unit:mm) ..... - 8 -
12. Product order information ..... - 8 -
Appendix :SMD Reflow Chart ..... - 8 -

Note: Revision History

Revision	Date	Comment
V1.0	2024-9	First release
V1.1	2025-8	Update frequency
V1.2	2026-10	Added PCB V3.0 schematic and pin assignment description
V1.3	2026-11	Update sensitivity

*Our company reserves the right to change, correct, enhance, or modify the products and this document at any time without prior notice. Users can obtain the latest relevant information before placing an order. The information in this notice supersedes and replaces the information in previous versions. NiceRF Wireless Technology CO.,LTD reserves all rights.

1. Description

SA618F22-C1 is an upgraded full-duplex wireless digital and audio all-in-one transmission module from our company, featuring shorter latency and supporting high-quality calls for up to 8 users simultaneously. Users can wirelessly transmit data via the serial port and transmit voice signals Microphone,Line in or I2S. The module is equipped with a high-speed microcontroller, echo cancellation circuitry, ESD protection, a high-performance RF chip, and an amplifier, utilizing wideband spread spectrum technology, resulting in low power consumption, long-range capabilities, and flexible frequency adjustment.

SA618F22-C1 supports multi-channel concurrent reception and relay in a Mesh network.

SA618F22-C1 enables full-duplex communication via the serial port and features wireless data transmission with Mesh networking capabilities. It supports over-the-air (OTA) upgrades or serial port upgrades, allowing users to easily set internal parameters and control its transmission functions through the serial port.

SA618F22-C1 is equipped with hardware and software watchdogs to prevent system crashes and includes reverse polarity protection, overcurrent, and overvoltage protection circuits, ensuring the device operates safely and stably in various environments.

SA618F22-C1 is manufactured and tested using strict lead-free processes, complying with RoHS and REACH standards, and is certified by CE and FCC.

The SA618F22-C1 V3.0 version adds a new SPKIN pin, which significantly improves the echo cancellation performance. If the customer's product has a compact size and the microphone is located close to the speaker, we recommend prioritizing the V3.0 version for better audio performance.

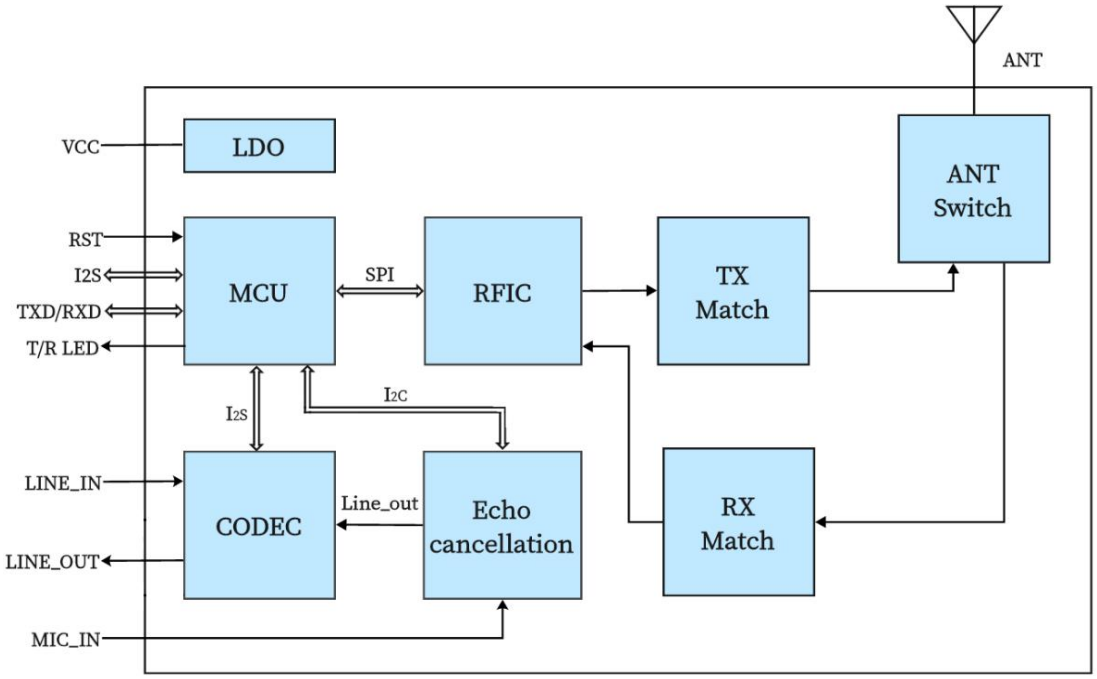
2. Features

- Frequency Band UHF 420-510MHz (Customizable 150-960 MHz)
- Up to 8 devices transmit simultaneously (Receive unlimited)
- Echo cancellation function
- VOX function
- High integration and compact size
- Low power consumption in sleep mode
- 1-2KM transmission distance in the open area
- Supports 2 to 8 people in high-quality simultaneous calls
- Shorter call latency
- I2S Digital audio+analog audio
- Line In + Mic input
- Full-duplex data transmission
- Mesh Network
- Support OTA &Serial upgrade
- High reception sensitivity: -104 dBm

3. Applications

- Fire emergency communication
- Metro,Tunnel communication
- Riding intercom system
- High-quality full duplex walkie talkie
- Conference telephone system
- Building community security system
- Security intercom system for special scenarios
- Earphone walkie talkie
- Special job assignment walkie talkie

4. Block Diagram



5. Electrical Characteristics

Parameters	Condition	Min.	Typ.	Max.	Unit
Power Supply		2.3	3.3	3.6	V
Working temperature		-30	25	70	℃
Current consumption					
Sleep current			12		uA
RX Current	@no voice output		50		mA
TX current(High power)	@22dBm Average		60		mA
RF Parameters					
Operating frequency	UHF	420		510	MHz
Customizable frequency		150		960	MHz
Default shipping frequency	UHF (1MHz interval)	440.125		455.125	MHz
Transmit power	Default	0		22	dBm
Second Harmonic			-40		dBm
Bandwidth（BW)			500		KHz
Receiving sensitivity			-104		dBm
Audio parameters					
Modulation sensitivity			10	100	mV
Receive signal-to-noise ratio(SNR)			90		dB
Frequency response		60		3800	Hz
Voice output（line out)	Load 16 Ω			40	mW
Delay parameters	8channels	160	200	240	ms

6. Typical Applications:

- Headset Walkie-talkie


Headset Walkie-talkie


Cycling with Travel Buddies


High-altitude Work


Shipboard Communication

- Handheld radio


High-end
Full-duplex Walkie-talkie


Property Security

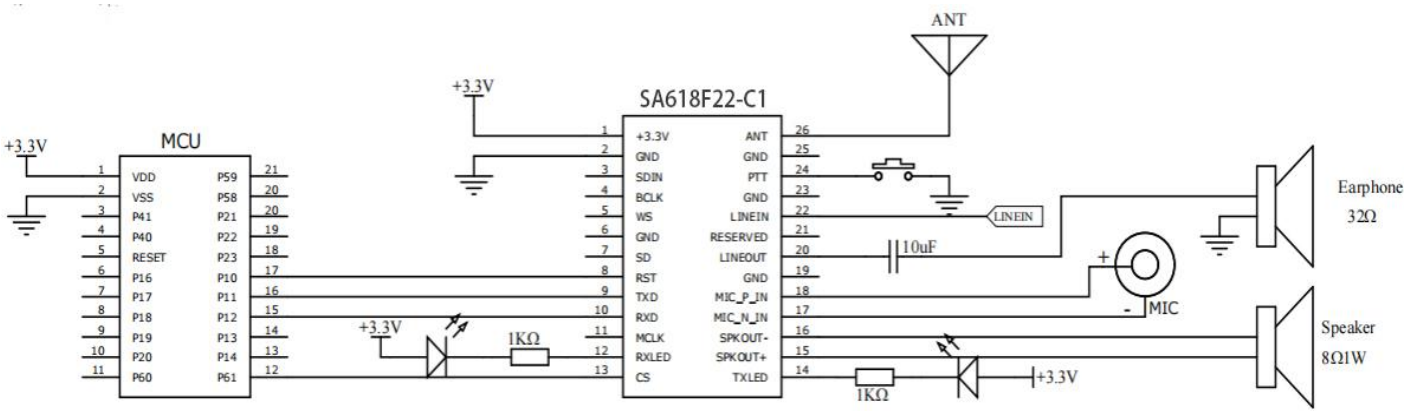

Subway Communication


Emergency Rescue

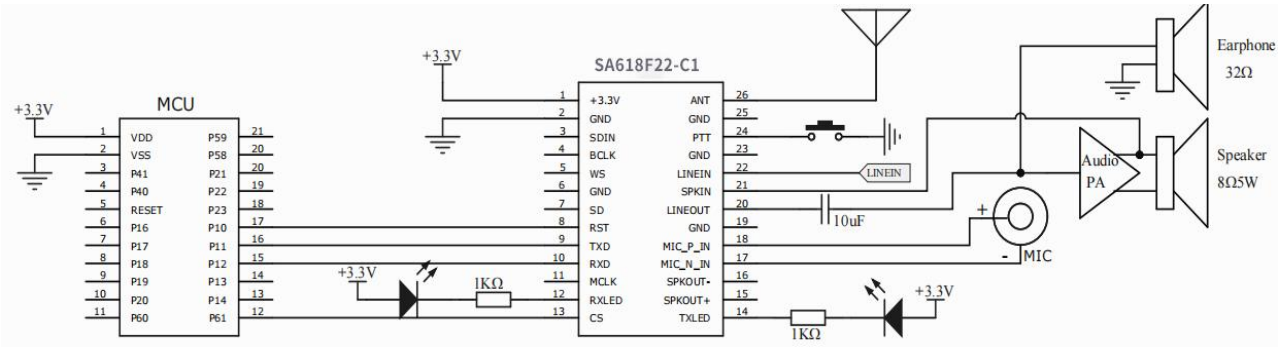
7. Typical application circuit

- Analog input and analog output application circuit (built-in audio amplifier)

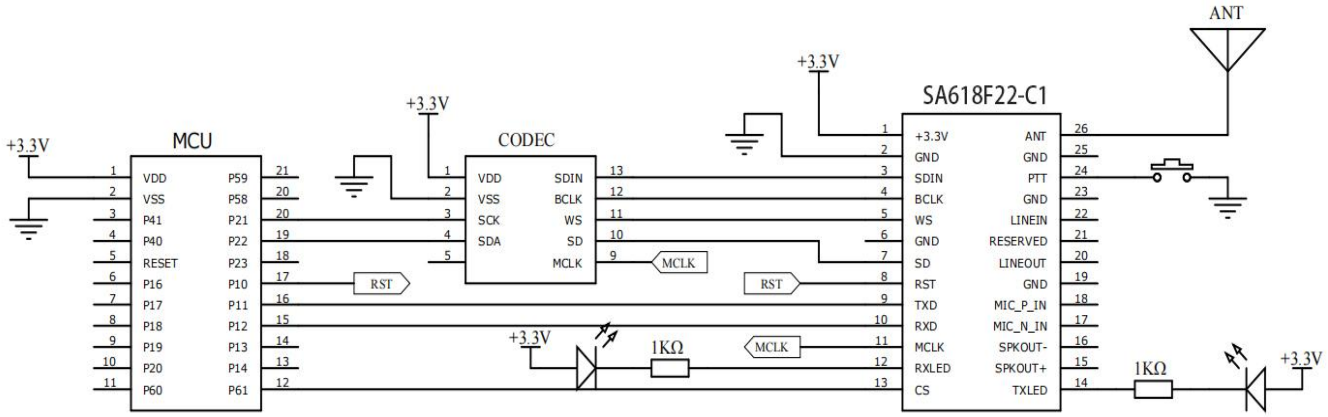
V2.2 Typical Application Circuit



V3.0 Typical Application Circuit



■ IIS input and output application circuit



8. Pin definition

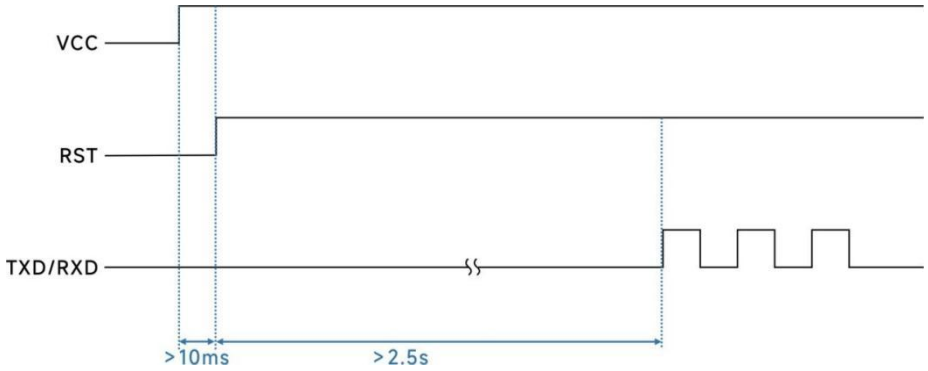


Pin NO.	Pin name	I/O	Description
1	+3.3V		Connect to power positive（2.3-3.6V）
2,6,19,23,25	GND		Connect to power negative
3	SDIN	I	External I2S (0-3.3V)
4	BCLK	O	External I2S (0-3.3V)
5	WS	O	External I2S (0-3.3V)
7	SD	O	External I2S (0-3.3V)
8	RST	I	Module reset pin, pull low for more than 5 ms to reset the module
9	TXD	O	Module serial port transmit pin
10	RXD	I	Module serial port receive pin
11	MCLK	O	ExternalI2S (0-3.3V)
12	RXLED	O	Receiving indicator, connected with external led, turn on by low level output when data or voice received, (suggest 1K ohm resistor for current limitation)
13	CS	I	The module's sleep pin， high level for operation and low level for sleep, with an internal pull-up, defaulting to high level.
14	TXLED	O	Transmitting indicator, connected with external led, turn on by low level output when data or voice is transmitting, (suggest 1K ohm resistor for current limitation)

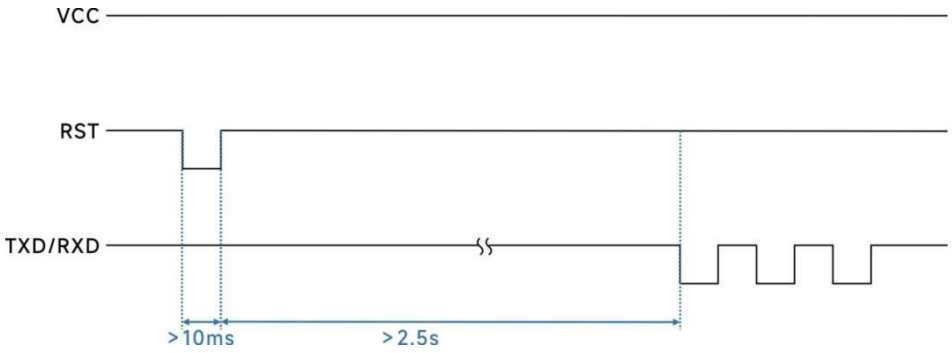
15	SPKOUT+	O	External connect 8Ω 2W speaker
16	SPKOUT-	O	External connect 8Ω 2W speaker
17	MIC_N_IN	I	Negative electrode of external microphone
18	MIC_P_IN	I	Positive electrode of external microphone
20	LINE_OUT	O	Connected with 16 Ω earphones
21	Reserved		Module test pin, user should leave it unconnected
	SPKIN	I	Echo cancellation sampling input, connected to the speaker output. Refer to the Typical Application Circuit (PCB V3.0) for details.
22	LINE_IN	I	Line in ,maximum 1VRMS
24	PTT	I	Press to talk, pull down to enter transmission mode, pull high or leave open to enter receive mode, pull-up internally,
26	ANT		Connected with 50ohm Antenna

9. Reset Timing Diagram

➢Power-on Reset Timing Diagram



➢Reset time chart from working mode



10. Communication protocol

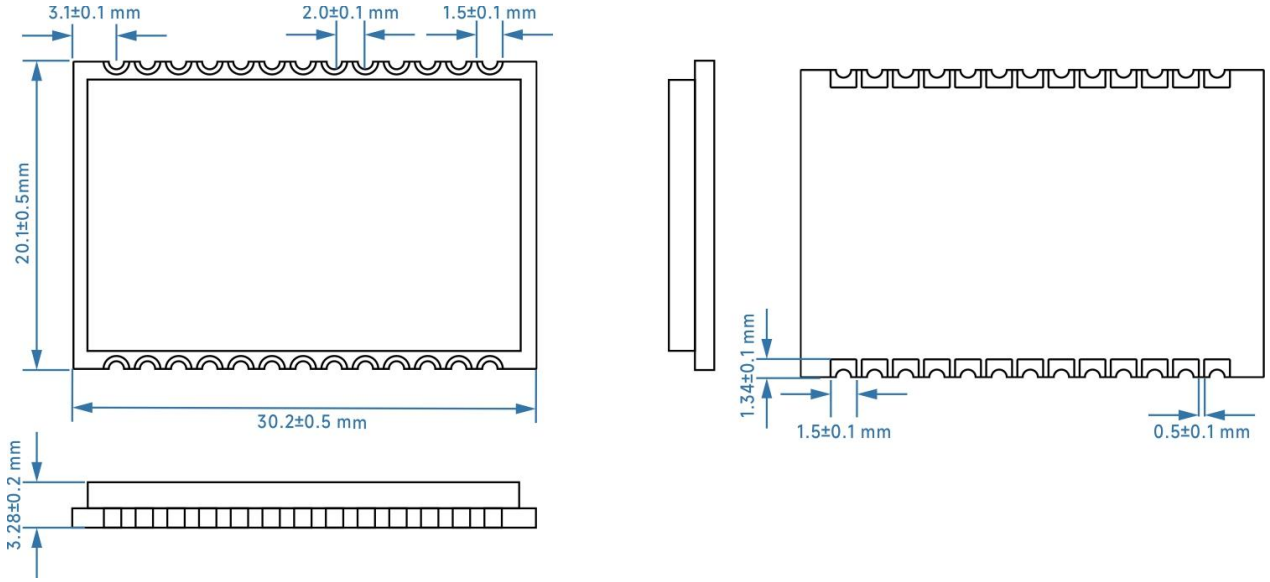
The wireless audio module can be configured or controlled by serial command :

The format is : 115200, 8, N, 1 Baud rate : 115200 Parity checking: none

All commands start with '0xAA 0xFA', Ended with '0x0d 0x0a'

*Details please refer to “ SA618F22-C1 communication protocol”.

11. Mechanism Dimension(Unit:mm)



12. Product order information

Product Number	Description
SA618F22-C1-U	Working frequency range 420~510MHz
SA618F22-C1-XXX	Other customized working frequency bands: 150~960 MHz

Appendix :SMD Reflow Chart

Below reflow profile is recommended for SMT technology:

