



Features

16 bits nDSP.

- Features 40 bits MAC (overflow truncate).
- Internal clock speed 50 MHz/50 MIPS (Typ. 32 MHz/32 MIPS).
- 256k bits (32k Bytes) OTP-ROM.
- 64k bits (8k Bytes) SRAM.
- Trimmable R/C oscillator (0.1%) for base clock and digital PLL for high speed clock.
- 1 set of V_{REF} for ADC.
- 1 set of real-time clock (32768 XTAL) I/O option.
- 1 set of crystal oscillator (2~40 MHz XTAL), I/O option.
- Option 1 I/O for external clock input (2~50 MHz) .
- 16 analog inputs and 1 V_{REF} selectable for 14bits ADC input source.
- 3 sets of 14 bits ADC, parallel processing ADC inputs.
- 3 sets of 16 bits Timers
- 3 sets of 8/10 bits PWM outputs, I/O configurable.
- 2 sets of OP-AMP, I/O configurable.
- 1 interpolation generator, for higher sound quality (good SNR).
- Built-in microphone preamplifier, configurable 0~61dB (step 1dB) 62 levels of gain.
- 32dB/17.6~18.8 kHz ultra sound filter and amplifier.
- 24 general purpose I/O, 20 of them can be configured to high by LDO or V_{cc} , 16 of them are interruptable, 16 of them can be touch inputs or counter inputs.
- Voltage selectable LDO (2.6V/2.8V/3.0V/3.2V 100mA).
- 1 LVD (Low Voltage Detect), 4 voltage selectable for detecting.
- 1 LVR (Low Voltage Reset).
- WDT (Watch-Dog Timer).
- 1 SPI (Serial Parallel Interface) 1/2/4 Bits Master mode.
- 116 bits $\Delta \Sigma$ Multi-Level DAC.
- 1 10/11 bits PWM DAC.
- 1 amplifier, 16 levels of volume control.
- 1 Class-AB/PWM speaker amplifier, 4 levels of driving sizes.
- Operating Voltage: 2.4V ~ 5.5V (32MHz).
- Standby Current: 2uA.

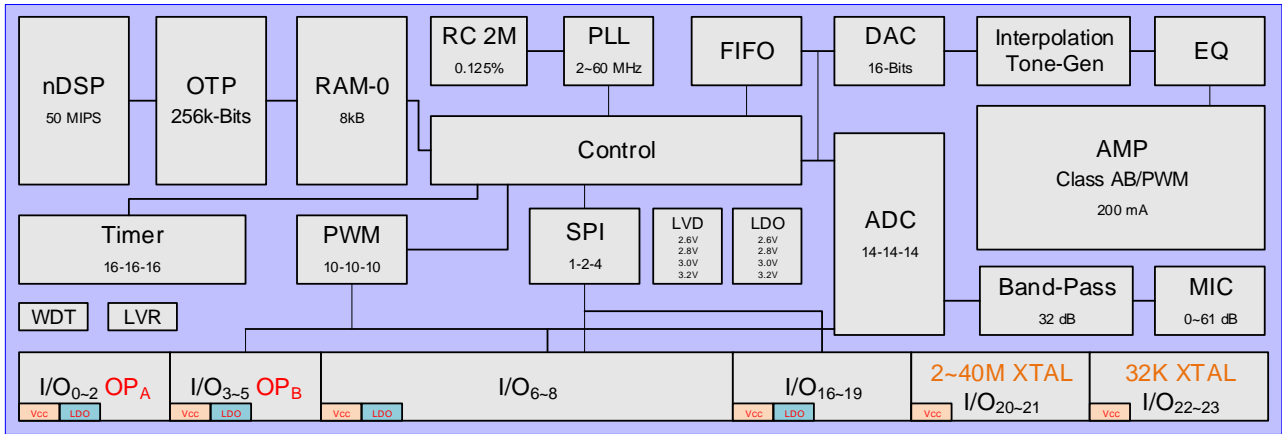
Description

Built-in microphone amplifier signal input system, and with 0 ~ 61dB preamplifier's volume control, can effectively improve the quality of the input speech to improve SNR, to achieve high sensitivity and low noise of the purpose, can be co-ordinated with the 32dB gain of 17.6 ~ 18.8 kHz bandpass filter. reach ultrasonic decoding applications.

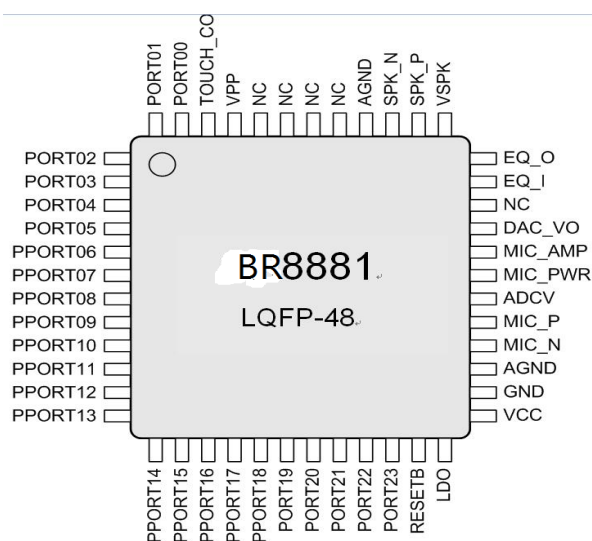
Applications of this product focuses on high computing demand operation of the spectrum can be given for high-end speech recognition / non-specific speaker, a high compression rate voice codecs, the output of high-quality audio recording products, long the voice Memo, language learning machine , and with the power management of mobile devices.



Block Diagram



腳位訊號



Pins Configuration

Pin No.	Designation	I/O	Description
1	PORT02	I/O	LDO/Vcc Port I/O 2. OPA_N.
2	PORT03	I/O	LDO/Vcc Port I/O 3. PWM-0. OPA_P.
3	PORT04	I/O	LDO/Vcc Port I/O 4. PWM-1. OPB_N.
4	PORT05	I/O	LDO/Vcc Port I/O 5. PWM-2. OPB_P.
5	PORT06	I/O	LDO/Vcc Port I/O 6. SPI_IO3.
6	PORT07	I/O	LDO/Vcc Port I/O 7. SPI_SSB.
7	PORT08	I/O	LDO/Vcc Port I/O 8. SPI_SCK.
8	PORT09	I/O	LDO/Vcc Port I/O 9. SPI_IO1/SPI_MISO.
9	PORT10	I/O	LDO/Vcc Port I/O 10. SPI_IO0/SPI_MOSI.
10	PORT11	I/O	LDO/Vcc Port I/O 11. SPI_IO2. PWM-0.
11	PORT12	I/O	LDO/Vcc Port I/O 12. PWM-1.
12	PORT13	I/O	LDO/Vcc Port I/O 13. PWM-2.
13	PORT14	I/O	LDO/Vcc Port I/O 14. I2C SCK
14	PORT15	I/O	LDO/Vcc Port I/O 15. I2C SDA
15	PORT16	I/O	LDO/Vcc Port I/O 16.
16	PORT17	I/O	LDO/Vcc Port I/O 17.
17	PORT18	I/O	LDO/Vcc Port I/O 18.
18	PORT19	I/O	LDO/Vcc Port I/O 19.
19	PORT20	I/O	Port I/O 20. 4M XTAL_I.
20	PORT21	I/O	Port I/O 21. 4M XTAL_O.
21	PORT22	I/O	Port I/O 22. 32768 XTAL_I.
22	PORT23	I/O	Port I/O 23. 32768 XTAL_O.
23	RESETB	I	System Reset.
24	LDO	P	System Core LDO 2.6/2.8/3.0/3.2V.
25	VCC	P	System Power Supply.



26	GND	P	System Ground.
27	AGND	P	System Analog Ground.
28	MIC_N	I	MIC-N Input.
29	MIC_P	I	MIC-P Input.
30	ADC_V	P	System ADC Power Supply..
31	MIC_PWR	P	MIC Power.
32	MIC_AMP	O	MIC Pre-Amplifier Output.
33	DAC_VO	O	DAC Voltage Output.
34	NC	P	NC
35	EQ_I	I	OP-EQ N Input.
36	EQ_O	O	OP-EQ Output.
37	VSPK	P	Speaker Power Supply.
38	SPK_P	O	Speaker P Connect.
39	SPK_N	O	Speaker N Connect.
40	AGND	P	System Analog Ground.
41-44	NC	P	NC.
45	VPP	P	System OTP Power Supply.
46	TOUCH_CO	O	Touch CAP.
47	PORT00	I/O	LDO/Vcc Port I/O 0. OPA_O.
48	PORT01	I/O	LDO/Vcc Port I/O 1. OPB_O.

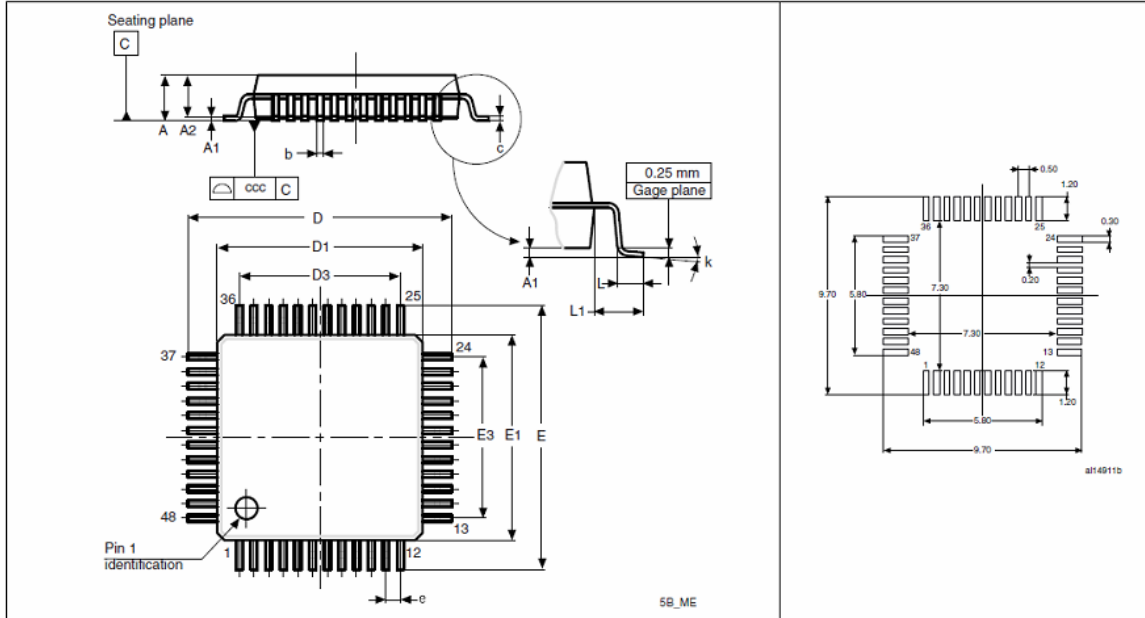
DC characteristic (V_{CC} = 3.0V, AV_{CC} = 3.0V, GND = 0V, TA = 25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
P00~P23 EQ_O	Driving Current		4		mA	V _{OH} =2.7
SPK_P SPK_N	Driving Current		200		mA	R _L =8 V _{OH} =2.7
P00~P23 EQ_O	Sink Current		4		mA	V _{OL} =0.3
SPK_P SPK_N	Sink Current		200		mA	R _L =8 V _{OL} =0.3
I_STD	Standby Current			2	uA	
Input High Voltage	All Input	2.0		3.3	V	
Input Low Voltage	All Input	-0.3		0.8	V	
Voltage	Operation Voltage	2.0	3.3	5.5	V	
Temperature	Operation Temperature	-40		85	°C	

芯片封装

LQFP48, 48-pin low-profile quad flat package

Recommended footprint

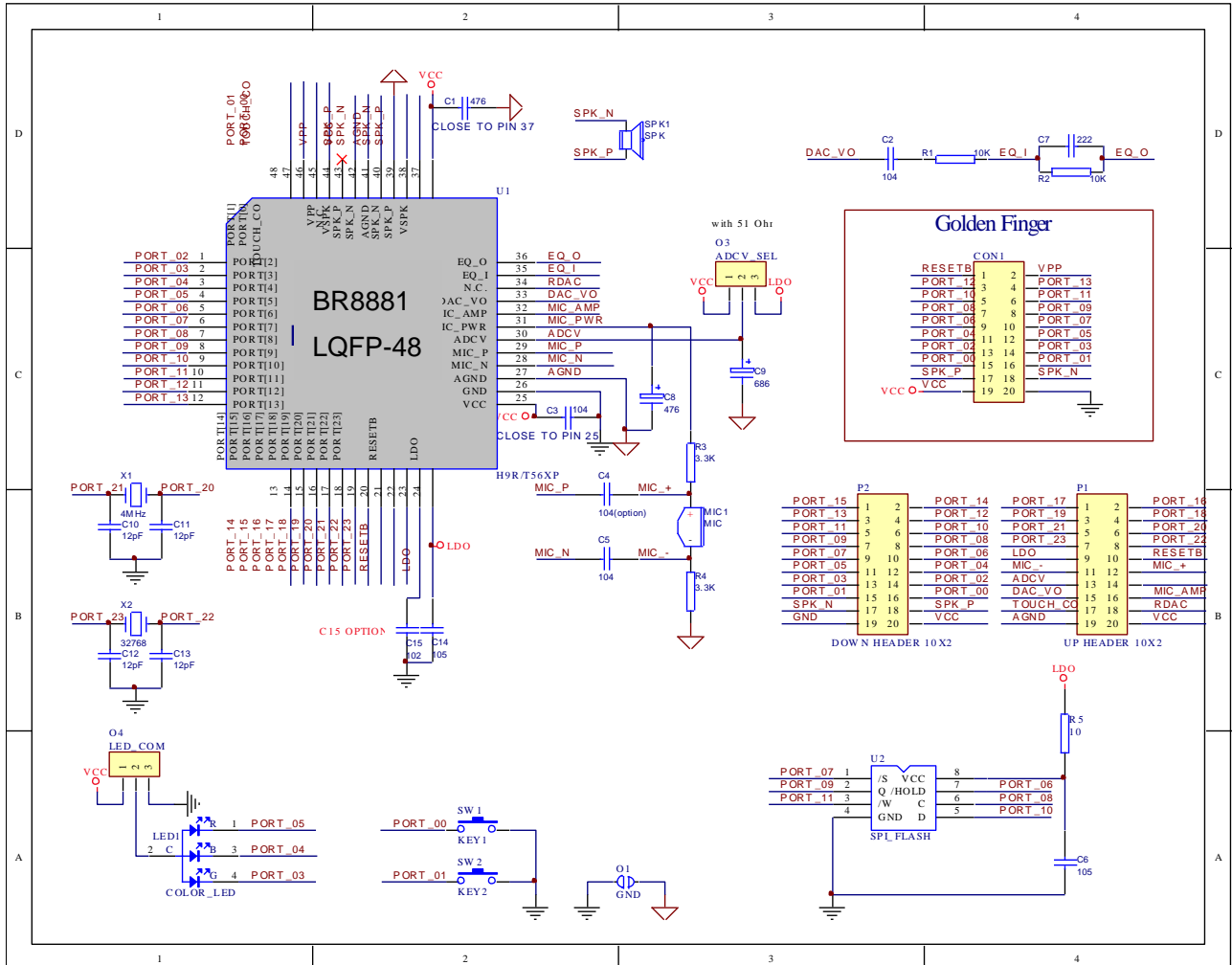


LQFP48, 48-pin low-profile quad flat package mechanical data

Symbol	millimeters			inches		
	Typ	Min	Max	Typ	Min	Max
A			1.600			0.0630
A1		0.050	0.150		0.0020	0.0059
A2	1.400	1.350	1.450	0.0551	0.0531	0.0571
b	0.220	0.170	0.270	0.0087	0.0067	0.0106
c		0.090	0.200		0.0035	0.0079
D	9.000	8.800	9.200	0.3543	0.3465	0.3622
D1	7.000	6.800	7.200	0.2756	0.2677	0.2835
D3	5.500			0.2165		
E	9.000	8.800	9.200	0.3543	0.3465	0.3622
E1	7.000	6.800	7.200	0.2756	0.2677	0.2835
E3	5.500			0.2165		
e	0.500			0.0197		
L	0.600	0.450	0.750	0.0236	0.0177	0.0295
L1	1.000			0.0394		
k	3.5°	0°	7°	3.5°	0°	7°
ccc		0.080			0.0031	

應用線路

Demo-Board



Demo-Board (Mini)

