SSS1700C1 Data Specification

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Product Overview

SSS1700 is 3S highly integrated single chip USB audio controller with on chip oscillator to save the external 12MHz crystal component for headset application. SSS1700 supports 96 KHz 24 bit sampling rate with external audio codec(24bit/96KHz I2S In&Out) and have built-in stereo 16/24 bits ADC, stereo 16/24 bits DAC, earphone driver, five-band hardware EQ, audio PLL, USB clock oscillator, USB FS controller and USB PHY. External 24C02~24C16 EEPROM connection provides flexibility for USB VID/PID/product string, default gain settings, and other customized demands. SSS1700 provides a minimum BOM solution for featured USB audio solutions in Windows / MAC / Android OS.

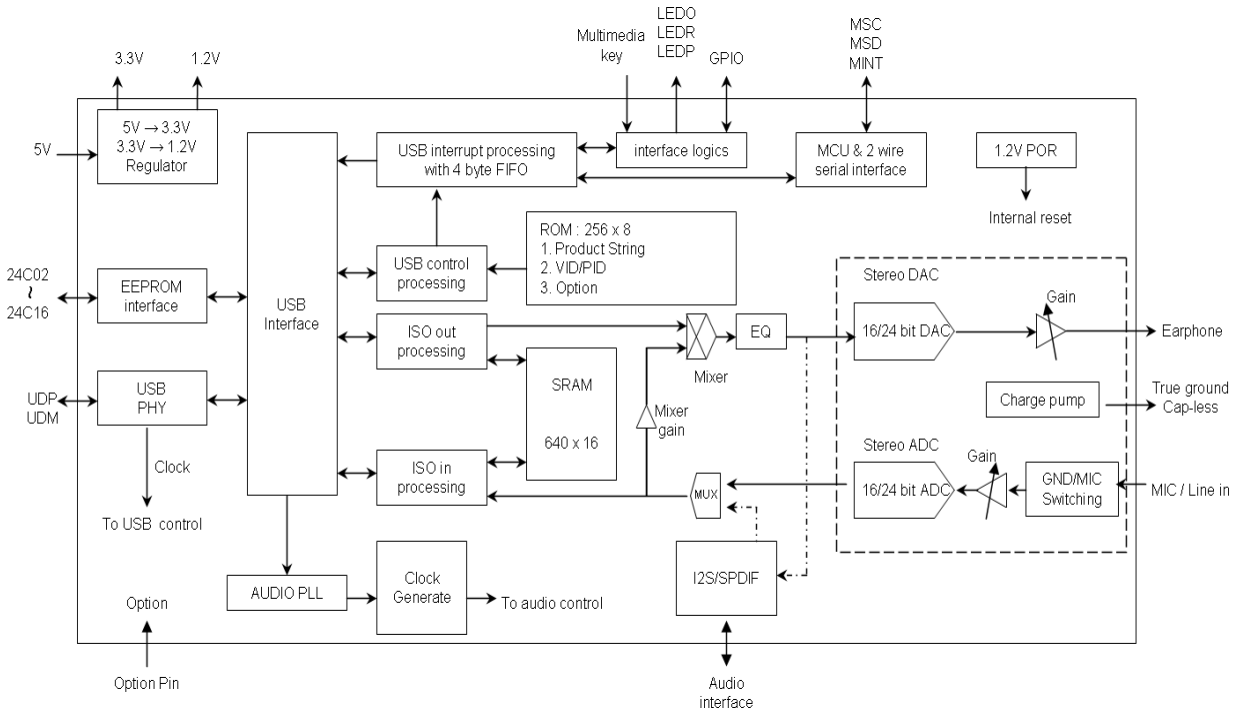
1. Product Features

- Compliant with USB specification v2.0 full speed operation
- Compliant with USB audio device class specification v1.0
- Support 44.1KHz/48KHz/96KHz、16bit/24bit sampling rate (EEPROM Option)
- Embedded digital mixer with default mixer mute after power on (control by OS)
  - when mono ADC is set, both DAC channel mixed with this single ADC data
  - when stereo ADC is set, L-ch DAC mixes with L-ch ADC data and R-ch DAC mixes with R-ch ADC data
- ROM option for power mode setting (USB bus power : default 100mA or configuration 500mA)
- Default support 16&24 bit, 48KHz sampling rate for both ADC and DAC
- Embedded I2S interface (master /slave mode) for 16/24 bit CODEC DAC/ADC (EEPROM Option)
- Embedded SPDIF In&Out interface for 16/24 bit CODEC DAC/ADC (EEPROM Option)
- Embedded crystaless on chip oscillator
- Supports USB suspend/resume mode
- Embedded USB transceiver for USB interface
- For headset function, USB audio function topology has 2 input terminals, 2 output terminals, 1 mixer unit, 1 selector unit, and 3 feature units (some units can be enabled by ROM code option)
- Support one control endpoint, one isochronous out endpoint, one isochronous in endpoint, one interrupt in endpoint (HID uses interrupt in and control out)
- Alternate zero bandwidth setting for releasing playback bandwidth on USB bus when this device is inactive
- Volume up, volume down, playback mute, record mute, next track, previous track, stop and play/pause pin for direct user control
- Two wire serial bus for external MCU control
- Whole EEPROM space can be accessed via MCU
- USB HID for host control synchronization
- External serial EEPROM (24C02~24C16) interface for vendor specific USB VID, PID, product string, serial number, default gain, default EQ setting, playback/record enable, and other options
- EEPROM write function via HID for mass production convenience
- Preloaded VID, PID, and product string and design options with setting priority: 1st is external EEPROM and 2nd is embedded ROM
- Vendor specific requests and new dummy register (10XX_10XX; where XX can be set by register write and read back for verify) for software protect
- GPIO and MCU interface register read/write via HID

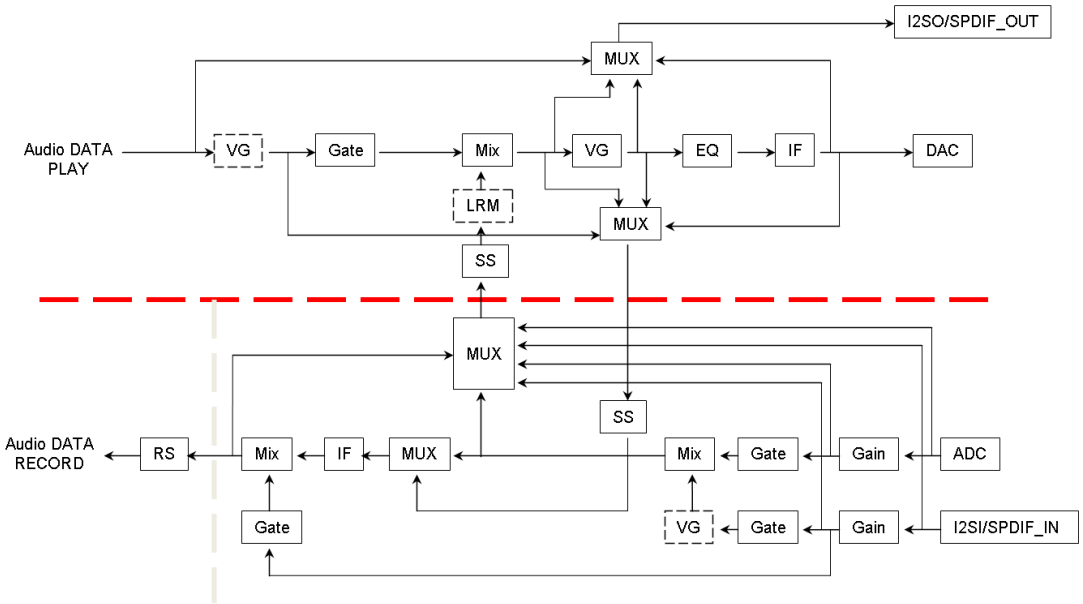
- True Ground Cap-less Headphone Amplifier solution
- Support CTIA/OMTP auto switch for TRRS Audio Jack
- Support AD Key detect
- Support RGB LED (EEPROM Option)
- Support HID Keyboard (EEPROM Option)
- Support IIC initial for external Codec (EEPROM Option)
- Embedded 1.2V POR
- Embedded 5V to 3.3V (with 250mA capability) and 3.3V to 1.2V regulators for single external 5V power supply
- Embedded rotary encoder interface for volume control (EEPROM Option)
- 1.2V digital core and audio PLL operation, 3.3V USB PLL operation and ADC/DAC operation
- Support VR volume control(using ADR)
- Support volume range adjustment(66db ~ -92dB)(1dB Step)
- Support USB DP&DM connection control(using GPI)
- Customize USB bcdDevice code(EEPROM Option)
- Compatible with Win XP, Win 7, Win 10, Win 11, Mac OS, Linux OS and Android OS without additional driver

2. Block & Audio Path Diagram

2.1 Block Diagram



2.2 Audio Path



3. Electric Characteristics

3.1 Absolute Maximum Rating

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	VCC5A	-0.3 to +5.5	V
DC Input Voltage	Vin	-0.3 to +3.6	V
Operating Temperature	T_{opr}	-20 to +85	^{0}C
Storage Temperature	T_{stg}	-20 to +120	^{0}C
Human Body Model ESD	HBM	4000	V
Machine Model ESD	MM	200	V

3.2 DC Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Regulation Supply Voltage	VCC5A	4.4	5	5.5	V
Regulation Output Voltage	VCC33	3.0	3.3	3.6	V
	VCC12	1.08	1.2	1.32	V
Regulation Driving Capability	REGdrv33			150	mA
	REGdrv12			100	mA
CODEC Supply Voltage	VDDCP	3.0	3.3	3.6	V
	AVDD	3.0	3.3	3.6	V
Earphone Driver Supply Voltage	HPVDD	1.48	1.65	1.8	V
	HPVSS	-1.48	-1.65	-1.8	V
Microphone Bias Voltage	MICBIAS	2.25	2.5	2.75	V
IO Supply Voltage	VCCIO	3.0	3.3	3.6	V
IO Input Voltage	Vin	-0.3	3.3	3.6	V
Core Supply Voltage	VCCK	1.08	1.2	1.32	V

3.3 AC Characteristics

3.3.1 Headphone Output (A-Weighted)

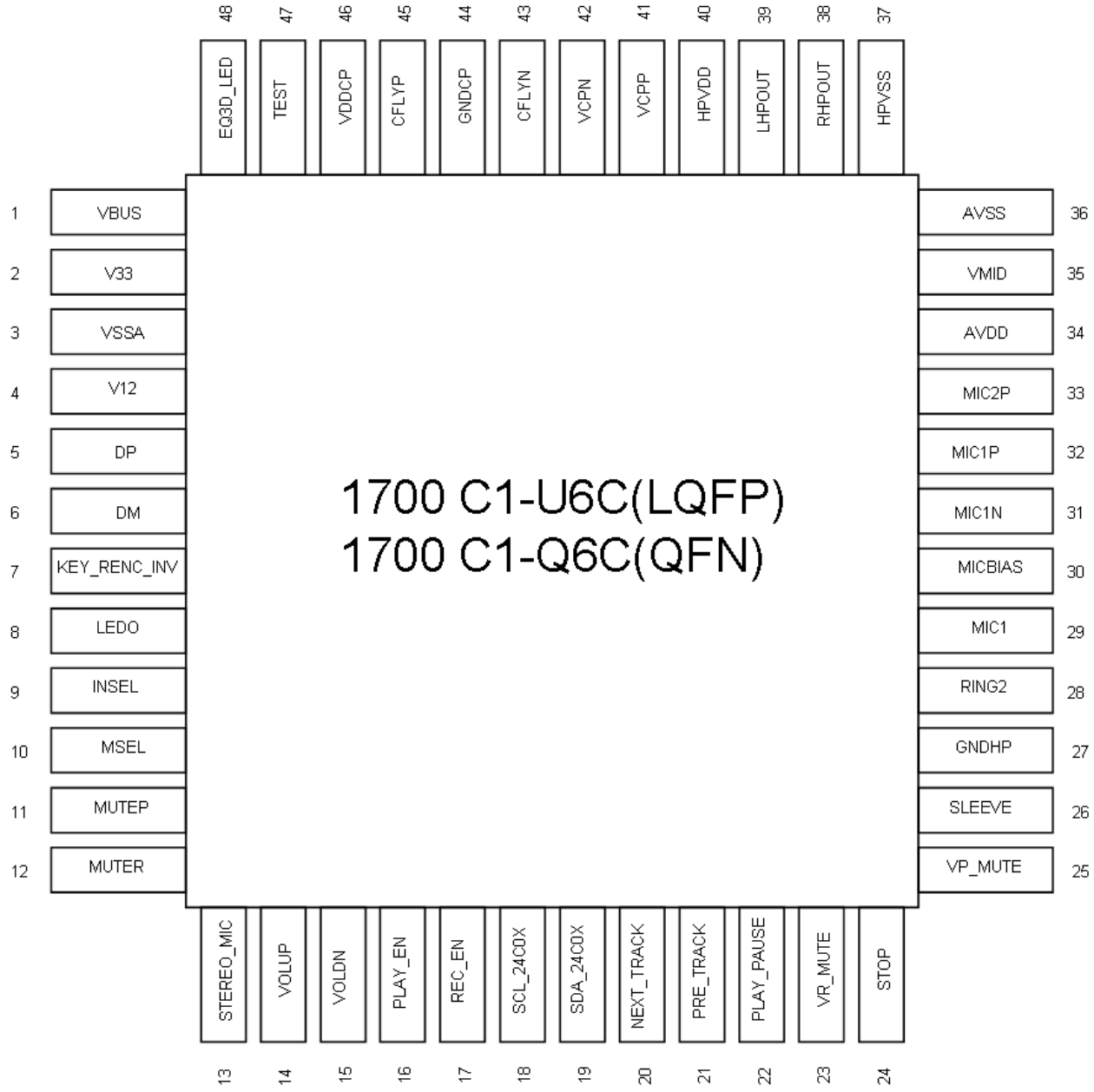
PARAMETER	CONDITION	MIN.	TYP.	MAX.	UNIT
Pmax Output power @1% THD+N	RL = 32 Ω, VCC33A = 3.3 V	--	28	--	mW
SNR (Signal-to-noise ratio)	Idle channel	--	91	--	dB
THD+N Total harmonic distortion	1KHz @ -3dB; 32Ω load; 10mW	--	-75	--	dB

3.3.2 Microphone Input Characteristics

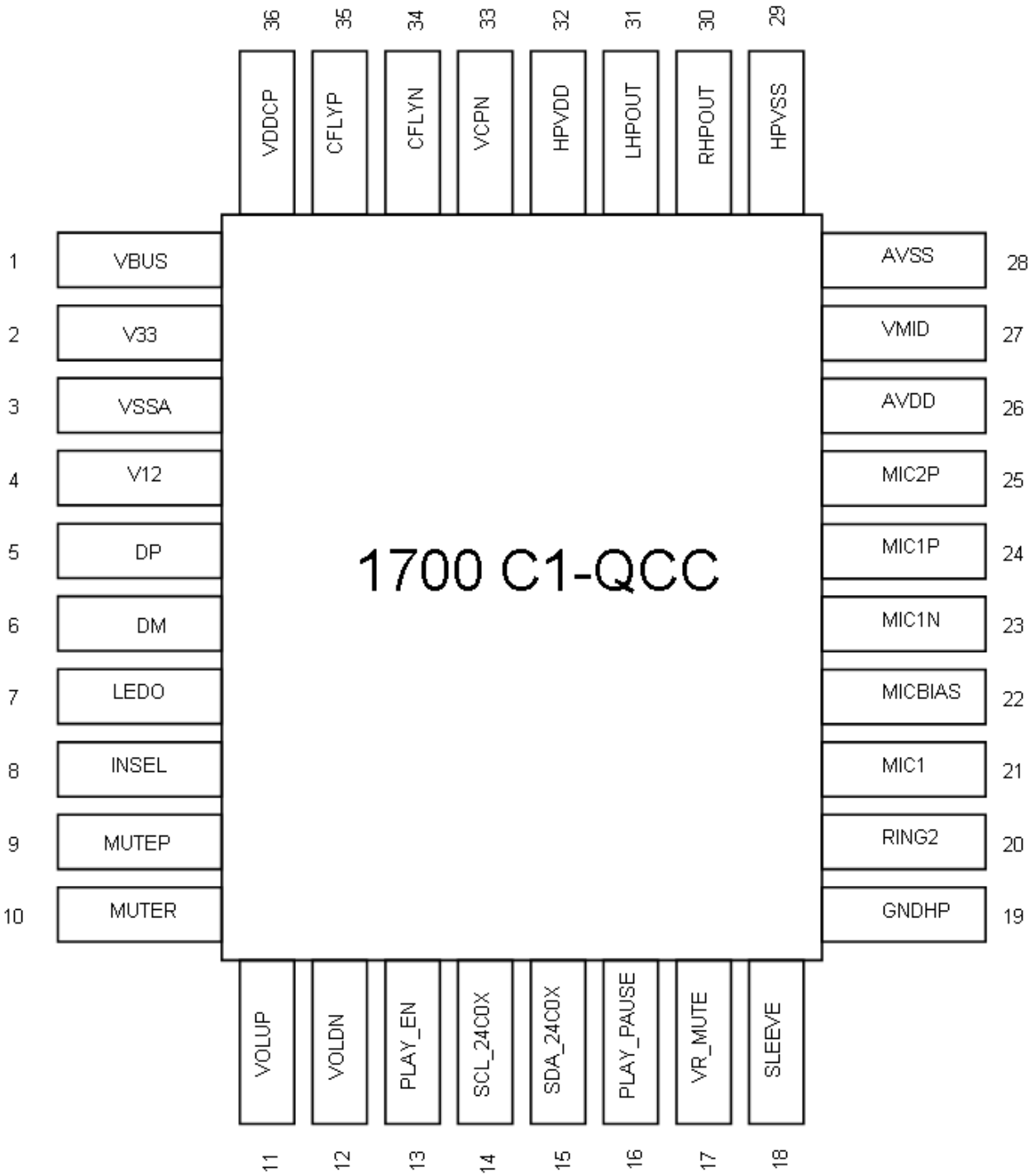
SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
AMP	Microphone gain amplification	-4.5		+21	dB
	Microphone gain Boost		+21		dB
GSTEP	ADC gain step		0.75		dB
DR	Dynamic range @ 997Hz -60dB FS gain = 0dB		91		dB
SNR	SNR @ idle channel gain = 0dB		91		dB
THD+N	THD+N @ 997Hz -3dB FS gain = 0dB		-85		dB
FS	Signal full scale input gain = 0dB		0.75*VCC33A		V

4. Pin Description

4.1 Pin Out Chart for 48 Pin LQFP/QFN



4.2 Pin Out Chart for 36 Pin QFN



4.3 Pin List Table

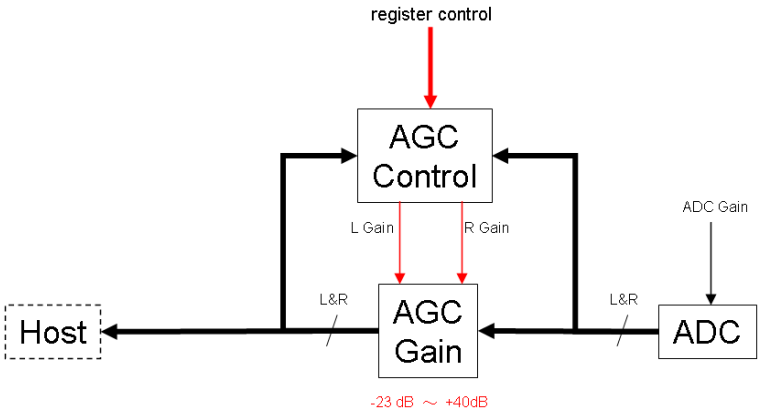
U6C/ Q6C Pin	QCC Pin	Symbol	IO Type	Normal status	Description	Mark
1	1	VBUS	P	P	5V Power input	
2	2	V33	P	P	3.3V Power output	
3	3	VSSA	P	P	Ground	
4	4	V12	P	P	1.2V Power output	
5	5	DP	AIO	AIO	USB data D+	
6	6	DM	AIO	AIO	USB data D-	
7		KEY_RENC_INV	IO,PU	I	Button & rotary encoder function change 1 : normal (HID/hardware Gain control function define in rom) 0 : function change (HID/hardware Gain control function swap)	
8	7	LEDO	IO,PD	O	LED Out (toggling for data transmit)	
9	8	INSEL	IO,PU	I	Line in mode select	
10		MSEL	IO,PU	I	Mixer enable 1: enable mixer 0: disable mixer	
11	9	MUTEP	IO,PU	I	Playback Mute	
12	10	MUTER	IO,PU	I	Record Mute	
13		STEREO_MIC	IO,PU	I	MIC Select 1: STEREO (for EEPROM option) 0: MONO (normal setting)	
14	11	VOLUP	IO,PU	I	Volume up	
15	12	VOLDN	IO,PU	I	Volume down	
16	13	PLAY_EN	IO,PU	I	PLAY Enable option 0: disable 1: enable	
17		REC_EN	IO,PU	I	REC Enable option 0: disable 1: enable	
18	14	SCL_24C0X	IO,PU	O	External ROM(24C0X) serial bus clock pin	
19	15	SDA_24C0X	IO,PU	IO	External ROM(24C0X) serial bus data pin	
20		NEXT_TRACK	IO,PU	I	Next Track	
21		PRE_TRACK	IO,PU	I	Previous Track	
22	16	PLAY_PAUSE	IO,PU	I	PLAY/PAUSE	
23	17	VR_MUTE	IO,PD	O	Record mute indicator	

24		STOP	IO,PU	I	stop	
25		VP_MUTE	IO,PD	O	Play mute indicator	
26	18	SLEEVE	Ground/Analog Input	Analog Input	Microphone or ground, connect to SLEEVE of headset jack	
27	19	GNDHP	Ground	Ground	Headphone ground connect to PCB analog ground	
28	20	RING2	Ground/Analog Input	Ground	Microphone or ground, connect to RING2 of headset jack	
29	21	MIC1	Analog Input	Analog Input	The DC input for the analog accessory detect, connect to MICBIAS with 2.2k Ohm resistance.	
30	22	MICBIAS	Analog O	Analog O	Microphone bias voltage output	
31	23	MIC1N	Analog I	Analog I	Microphone input(AC coupled)	
32	24	MIC1P	Analog I	Analog I	Microphone input(AC coupled)	
33	25	MIC2P	Analog I	Analog I	Microphone input(AC coupled)	
34	26	AVDD	P	P	Analog power supply 3.3V typ.	
35	27	VMID	Analog IO	Analog IO	Mid-rail reference decoupling point	
36	28	AVSS	P	P	Analog ground	
37	29	HPVSS	Negative Power	Negative Power	Headphone driver negative power supply -1.65V, connect to VCPN on PCB	
38	30	RHPOUT	Analog O	Analog O	Right channel headphone driver output	
39	31	LHPOUT	Analog O	Analog O	Left channel headphone driver output	
40	32	HPVDD	Power	Power	Headphone driver power supply 1.65V, connect to VCPP on PCB	
41		VCPP	Analog O	Analog O	Charge pump positive output, for headphone driver power supply.	
42	33	VCPN	Analog O	Analog O	Charge pump negative output, for headphone driver power supply.	
43	34	CFLYN	Analog O	Analog O	Charge pump flying capacitor pin	
44		GNDCP	P	P	Charge pump ground	
45	35	CFLYP	Analog O	Analog O	Charge pump flying capacitor pin	
46	36	VDDCP	P	P	Charge pump power supply	
47		TEST	I,PD	I	Test mode 0: normal 1: test mode	
48		EQ3D_LED	IO,PD	O	EQ&3D LED Out	

5. Function Descriptions

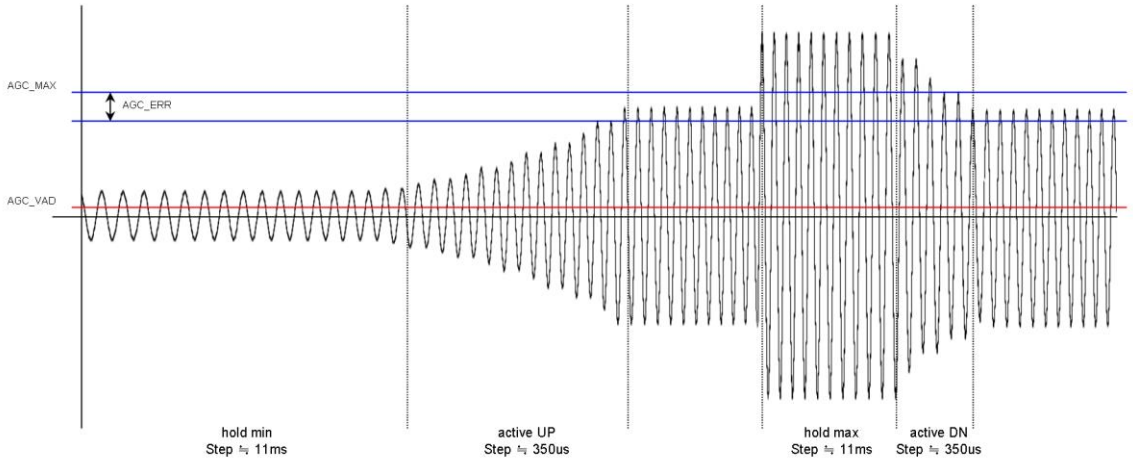
5.1 Automatic Gain Control (AGC)

SSS1700 has AGC (Automatic Gain Control) function. It can be used to automatically adjust the output range of ADC, which can let ADC outputs remain in a stable range. AGC control schematic diagram as below, the gain adjustable range is -23dB ~ + 40dB, with each step 1dB adjusted.



AGC parameter setting can be set in EEPROM. The control features include stability of time, error range, active manner, hold time, speed adjusting and son on, these parameters need for individual settings. Its operational diagram refers as below:

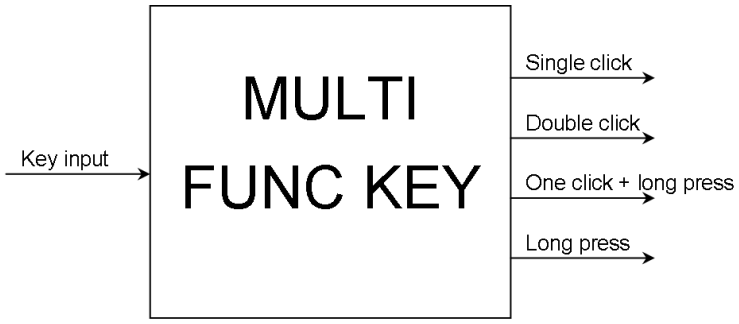
AGC tuning is targeted at within two blue lines. Shown in front of diagram, signal is below the blue line interval, then AGC amplifier the signal to the blue range. Similarly in the illustration, the signal is over the blue interval, and then AGC will down the signal to the blue range.



* AGC function is only valid for built-in ADC of SSS1700

5.2 MULTI FUNCTION KEY (4 Key)

SSS1700 support maximum 4 multifunction keys. By EEPROM settings, each multifunction key can have up to four different button operation manners. Four kinds of different button operation are "a short press", "consecutive two short press", "a short and a long press" and "a long press". Each multifunction key corresponds to different control manner for different function demand, so that can achieve the purpose of streamlining the key number of requirements. Setting diagram is as follows:



Key input can be set from :

ON.	Key input
1	VOLUP
2	VOLDN
3	MUTEP
4	MUTER
5	NEXT_TRACK
6	PRE_TRACK
7	STOP
8	PLAY_PAUSE
9	EQ_NEXT
10	USER_KEY
11	GPIO5
12	GPIO6
13	GPIO7
14	GPIO8
15	GPIO9
16	AD_LEVEL_K01
17	AD_LEVEL_K02
18	AD_LEVEL_K03
19	AD_LEVEL_K04
20	AD_LEVEL_K05

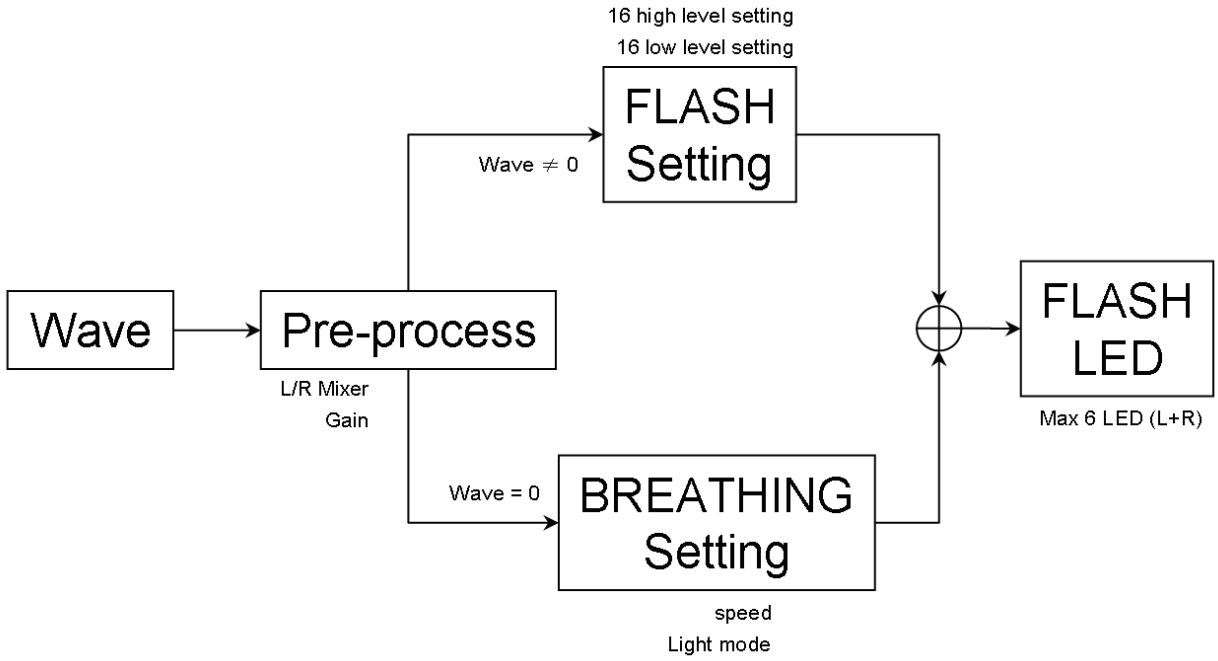
Function output can be assign to :

ON.	Function output
1	VOLUP
2	VOLDN
3	MUTEP
4	MUTER
5	NEXT_TRACK
6	PRE_TRACK
7	STOP
8	PLAY_PAUSE
9	EQ_NEXT
10	USER_KEY
11	S3D_NEXT
12	GPO9
13	GPO8
14	GPO7
15	GPO6
16	GPO5

ON.	Function output
17	A_UP
18	A_DN
19	A_MUTE
20	B_UP
21	B_DN
22	B_MUTE
23	C_UP
24	C_DN
25	C_MUTE
26	ROTARE_LED
27	BREATHING_LED
28	RGB_ACT
29	RGB_COLORING
30	RGB_COLOR
31	
32	

5.3 LED FLASH

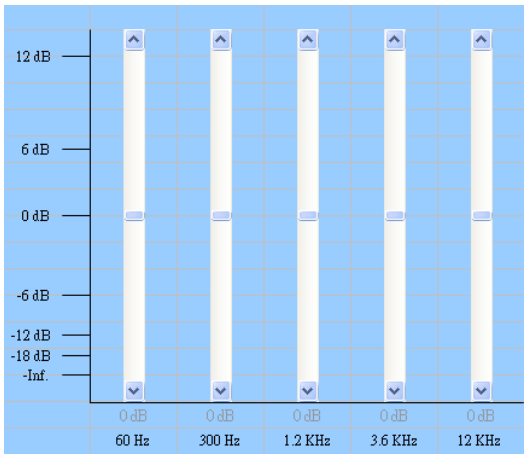
SSS1700 has the function of stereo audio wave gradient indicator. By EEPROM settings, can provide up to six indication signals (the difference between L/R, for each channel share three indication signals). Indication signal can be connected to LED to be audio output gradient indicator. When the audio signal is zero, the LEDs can be set for as breathing lights to increase product diversity.
The following is a functional diagram:



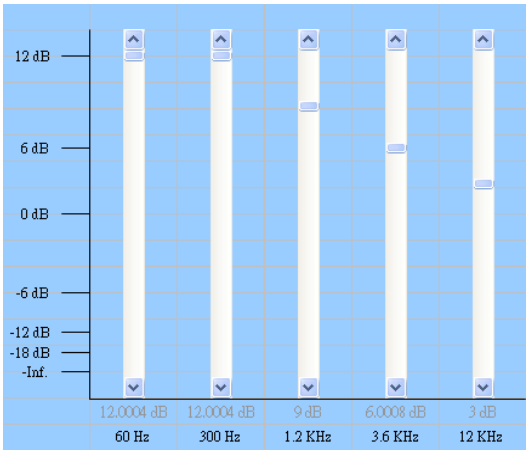
When setting for audio output indicator, it can be adjusted in accordance with the desired output range; each indicator signals can have 16 levels to do proposed audio settings.

5.4 Five-band Equalizer

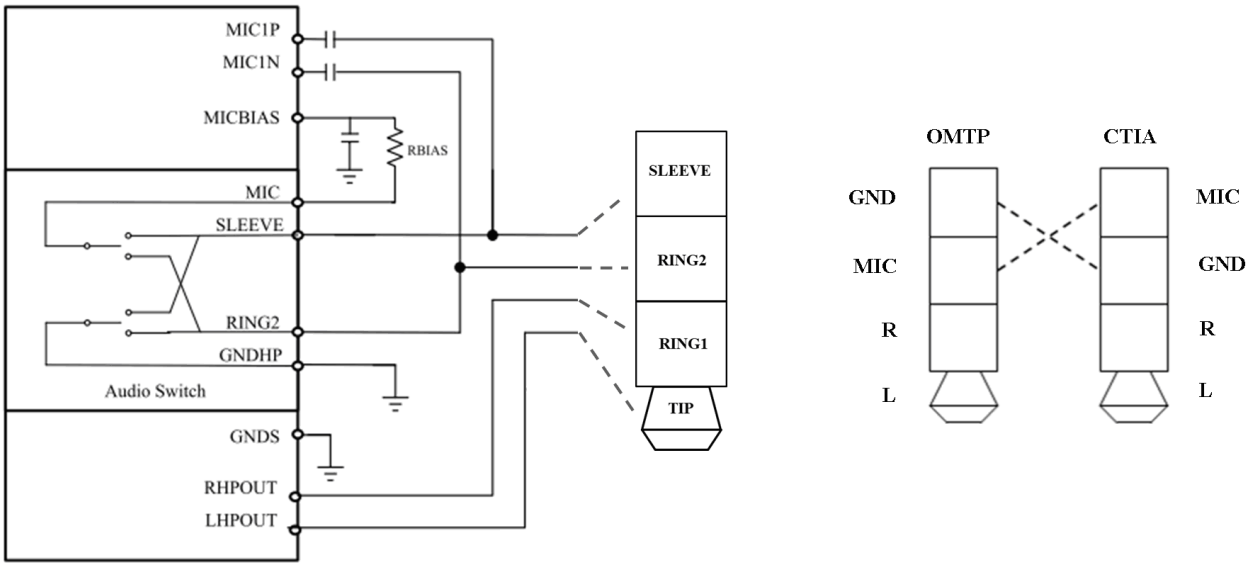
SSS1700 on playback path built 5 Band EQ functions to provide user to make sound effect adjustment. These frequencies of five-band EQ are fixed at 60Hz, 300Hz, 1.2KHz, 3.6KHz and 12KHz, respectively. Gain can be set for each band is + 12dB ~ -∞dB, as follows:



User can adjust a variety of sound effects according to requirement; the results will be stored in EEPROM after adjustment, and it can use single button to change different sound effect in cycle approach, simultaneously, also provide a single LED for indication of ON/OFF sound effect. By default, SSS1700 built-in a subwoofer sound settings, therefore, under no external EEPROM case, there is still an EQ sound transformation for user. Preset bass (SUBWOOFER) sound settings are as follows:



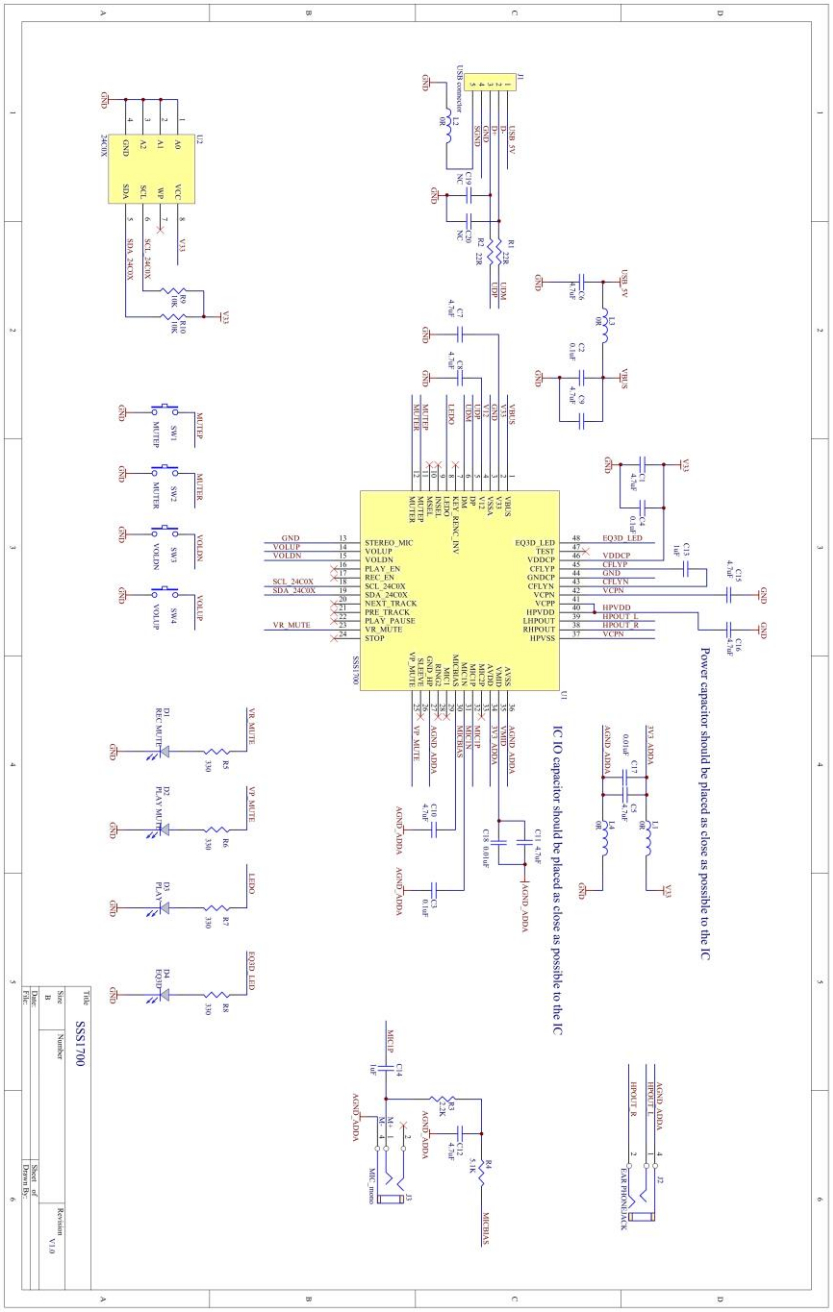
5.5 CTIA/OMTP auto switch for TRRS Headset Jack



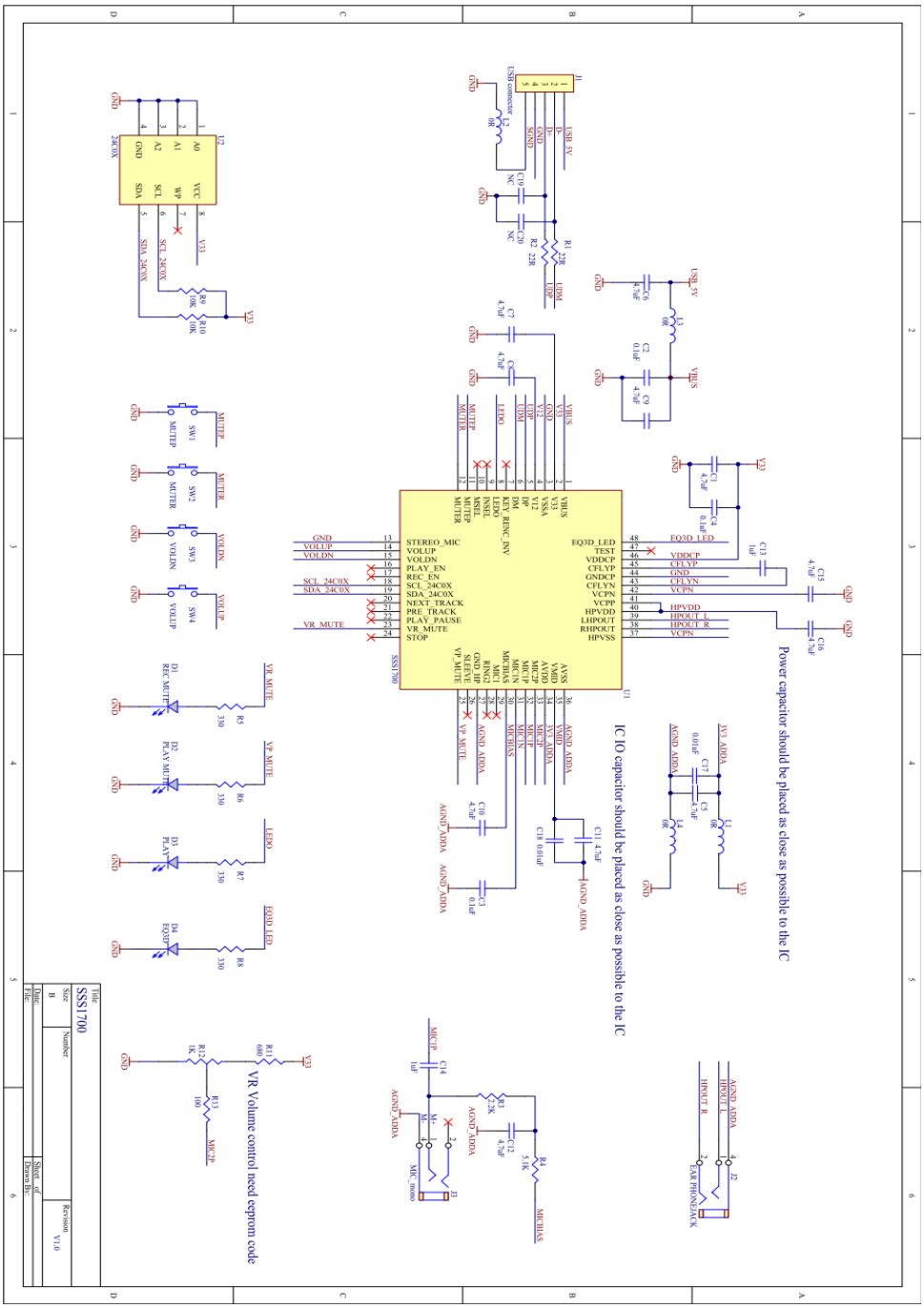
The CODEC detects the locations of ground (GND) and microphone (MIC) poles on the audio plug and routes them to the appropriate connections. This allows the end user to plug headsets with different audio pole configurations into the mobile device and have them operate correctly.

6. Reference Application Circuit for LQFP48 (U6C) / QFN (Q6C)

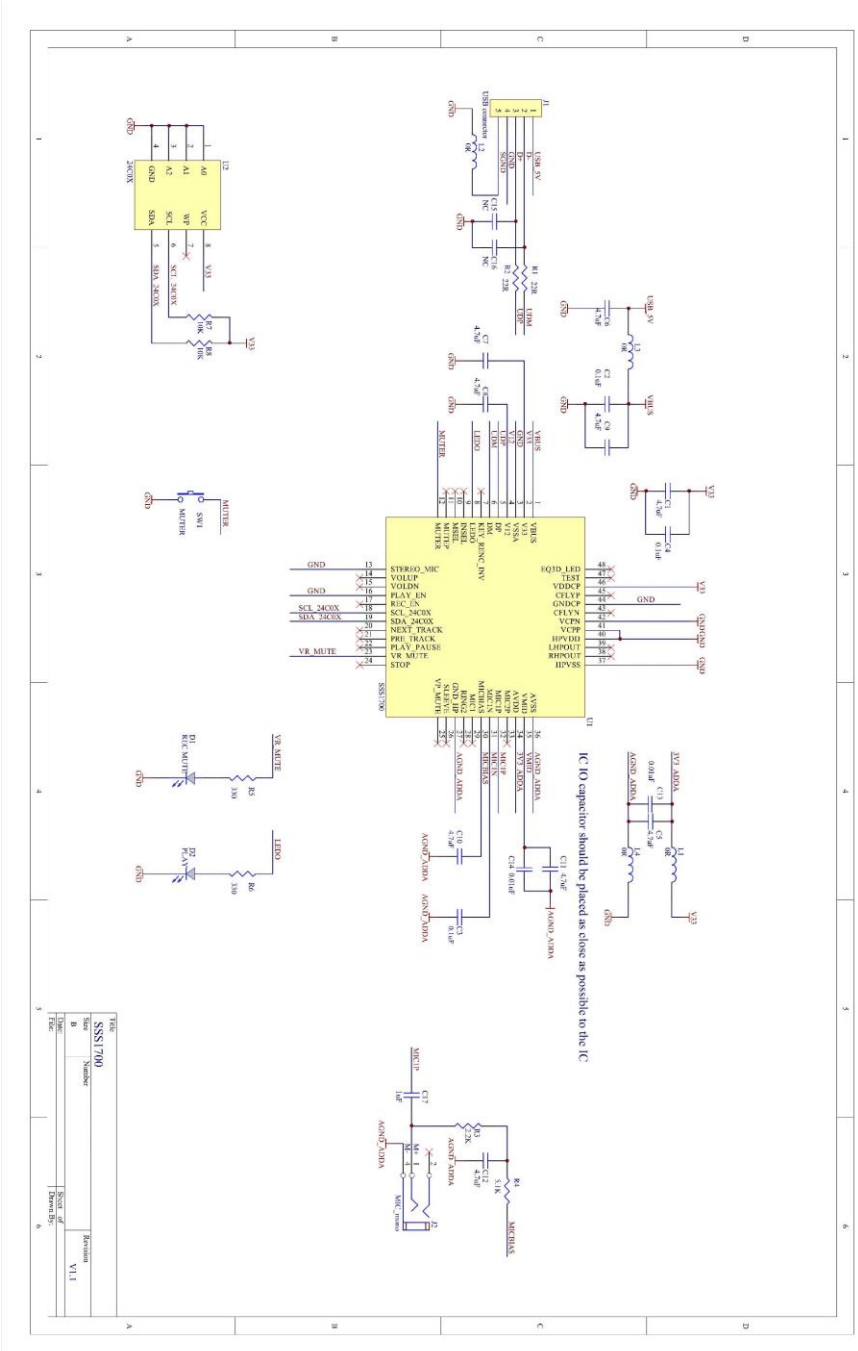
6.1 USB Headset Application Circuit



6.2 USB Headset Application Circuit (VR volume control)

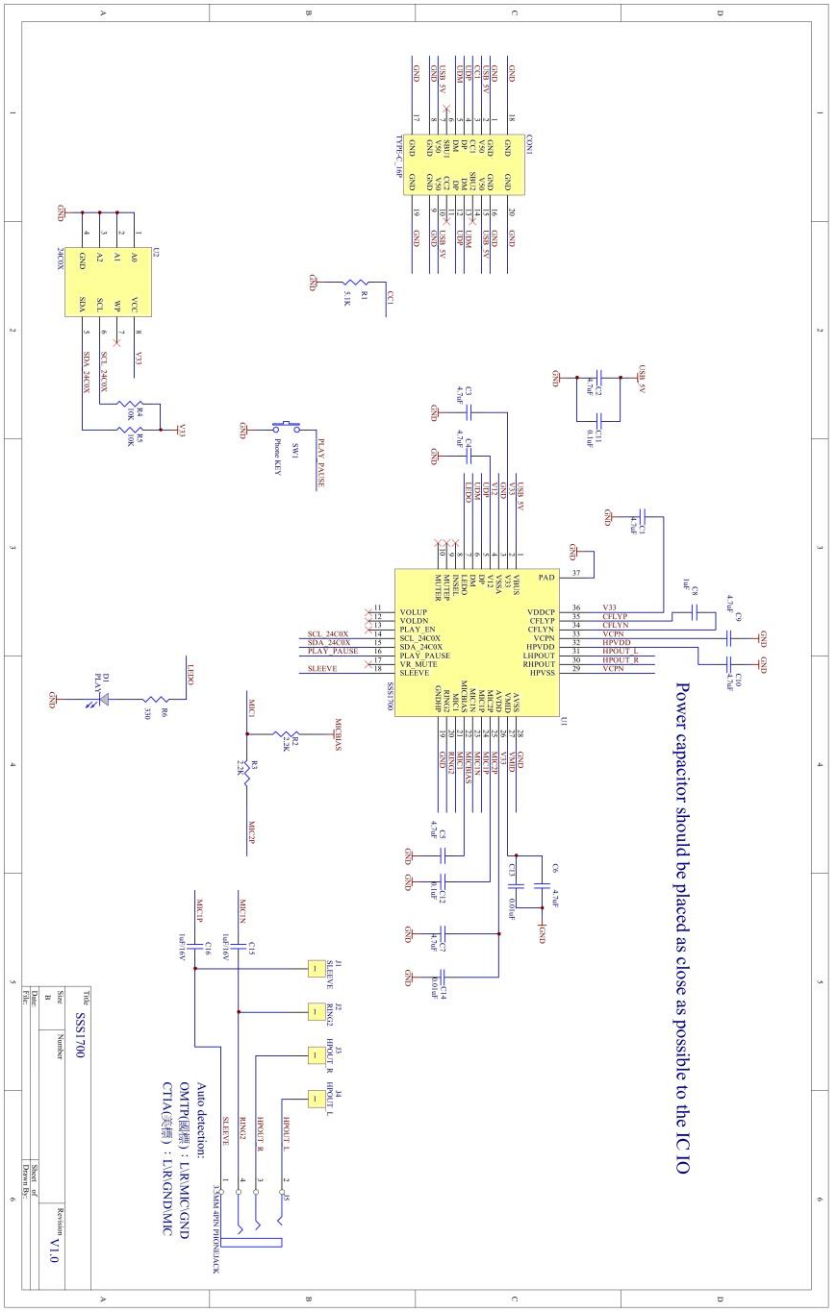


6.3 USB Mono MIC Application Circuit



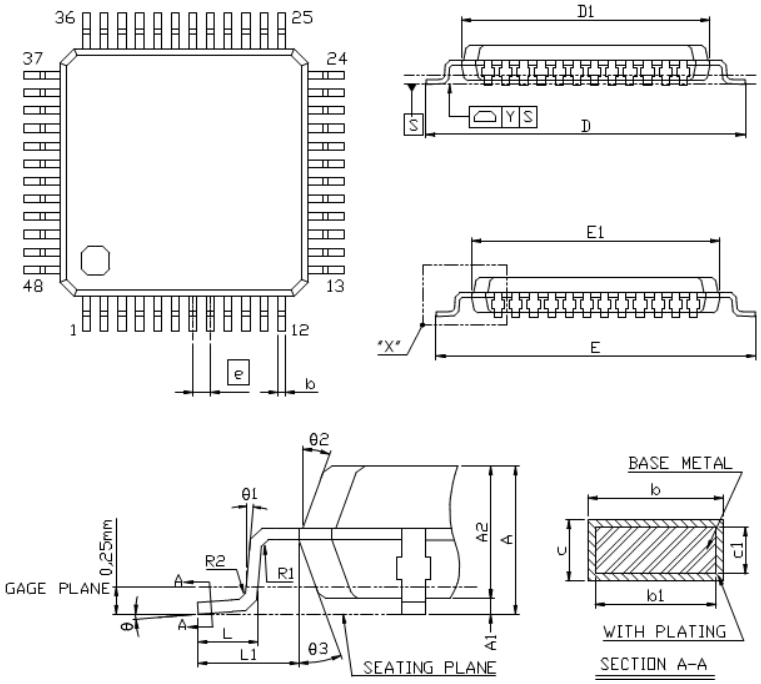
7. Reference Application Circuit for QFN36 (QCC)

7.1 Type-C Headset Application Circuit



8. Package Information

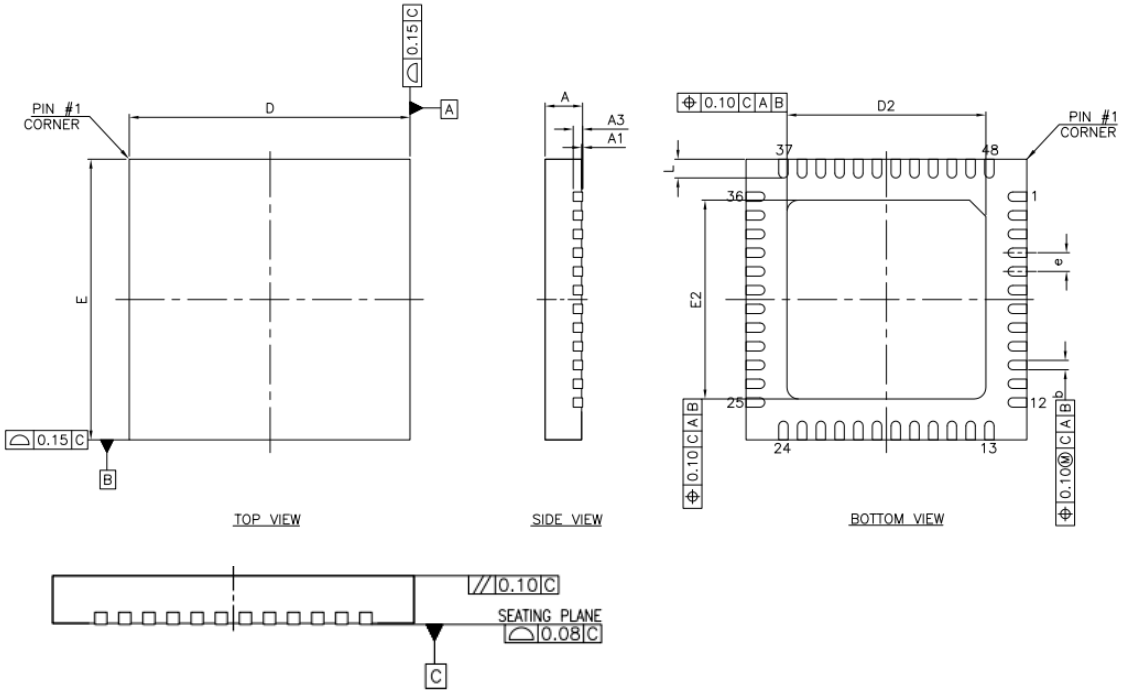
8.1 LQFP 48



SYMBOL	DIMENSION (MM)			DIMENSION (MIL)		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A			1.60			63.0
A1	0.05	0.10	0.15	2.0	3.9	5.9
A2	1.35	1.40	1.45	53.1	55.1	57.1
b	0.17	0.22	0.27	6.7	8.7	10.6
b1	0.17	0.20	0.23	6.7	7.9	9.1
c	0.09		0.20	3.5		7.9
c1	0.09		0.16	3.5		6.3
D	8.90	9.00	9.10	350.4	354.3	358.3
D1	6.90	7.00	7.10	271.7	275.6	279.5
E	8.90	9.00	9.10	350.4	354.3	358.3
E1	6.90	7.00	7.10	271.7	275.6	279.5
e	0.45	0.50	0.55	17.7	19.7	21.7
L	0.50	0.60	0.70	19.7	23.6	27.6
L1	0.85	1.00	1.15	33.5	39.4	45.3
R1	0.08			3.1		
R2	0.08		0.20	3.1		7.9
Y			0.08			3.1
θ	0°	3.5°	7°	0°	3.5°	7°
θ1	0°			0°		
θ2	11°	12°	13°	11°	12°	13°
θ3	11°	12°	13°	11°	12°	13°

NOTE:
1.REFER TO JEDEC MS-026 (ISSUE D) / BBC
2.DIMENSION D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION.
ALLOWABLE PROTRUSION IS 0.25mm PER SIDE D1 AND E1 ARE
MAXIMUM PLASTIC BODY SIZE DIMENSION INCLUDING MOLD MISMATCH.
3.DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE
DAMBAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED
THE MAXIMUM b DIMENSION BY MORE THAN 0.08mm.
4.ALL DIMENSIONS ARE IN MILLIMETERS.
5.DIMENSION CONVERSION FACTOR : 1mm=39.37mil

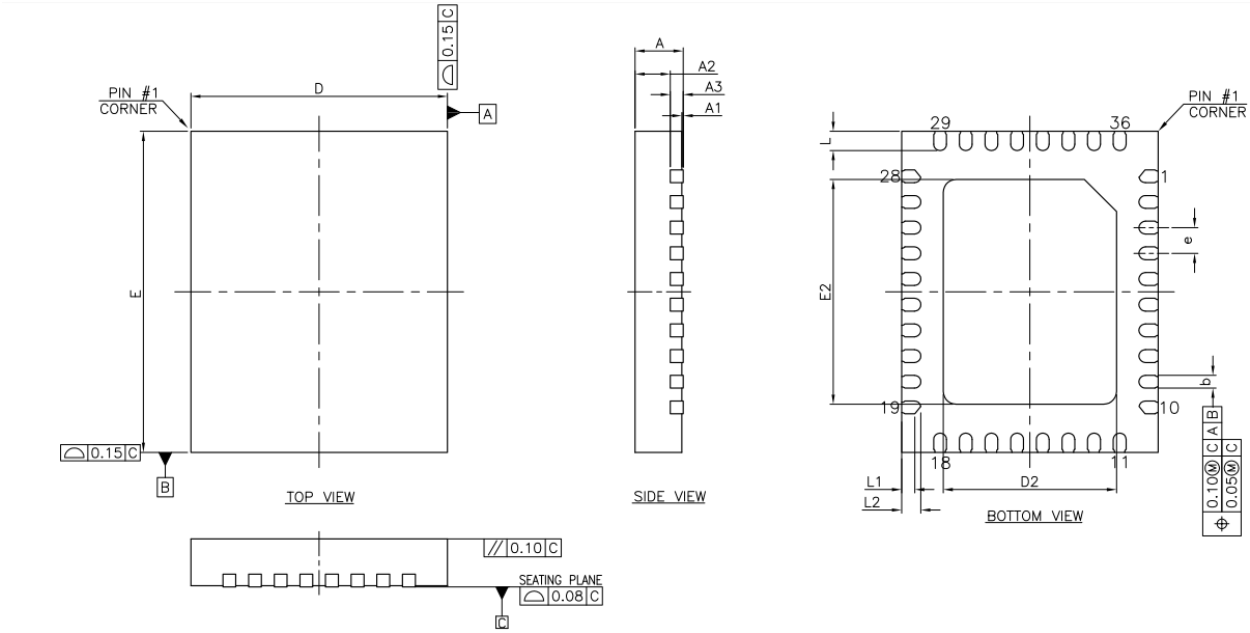
8.2 QFN 48



	SYMBOL	MIN.	NOM	MAX.	MIN.	NOM	MAX.
Total thickness	A	0.70	0.75	0.80	0.60	0.65	0.70
Standoff	A1	0.00	0.02	0.05	0.00	0.02	0.05
Lead thickness	A3	0.20 REF.			0.20 REF.		
Body size	D	5.90	6.00	6.10	5.90	6.00	6.10
	E	5.90	6.00	6.10	5.90	6.00	6.10

Pad size	Lead width b			Exposed pad width D2			Exposed pad length E2			Lead pitch e	Lead length L			LEAD FINISH	
	MIN.	NOM	MAX.	MIN.	NOM	MAX.	MIN.	NOM	MAX.		MIN.	NOM	MAX.	Pure Tin	PPF
189x189MIL	0.15	0.20	0.25	4.15	4.25	4.35	4.15	4.25	4.35	0.40 BSC	0.30	0.40	0.50	V	X

8.3 QFN36



	SYMBOL	MIN.	NOM	MAX.
Total thickness	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Mold thickness	A2	0.50	0.55	0.60
Lead thickness	A3		0.20 REF.	
Body size	D	3.95	4.00	4.05
	E	4.95	5.00	5.05
Lead width	b	0.15	0.20	0.25
Exposed pad width	D2	2.65	2.70	2.75
Exposed pad length	E2	3.45	3.50	3.55
Lead pitch	e		0.40 BSC	
Lead length	L	0.25	0.30	0.35
	L1	–	0.20	–
	L2	–	0.29	–
Lead count	N		36L	

9. Ordering Information

Part Number	Package Type
SSS1700C1-U6C	LQFP-48pin
SSS1700C1-Q6C	QFN-48pin
SSS1700C1-QCC	QFN-36pin

10. Revision History

Revision	Date	Description
1.0	2024/09/25	First Release
1.1	2024/11/19	Update Ch3.1- Operating Temperature : from 0~+80 ^{0}C to -20~+85 ^{0}C

单击下面可查看定价，库存，交付和生命周期等信息

>>3S(Solid state system)(鑫创科技)