



## General Description

A1569 integrates high bandwidth USB2.0 for 480 mbps transfer rate. With high bandwidth, user can easily download music and upload voice recordings within minutes. Firmware can be upgradeable from USB port. For storage, NAND-type Flash is supported. It can support with 8-bit, 16-bit data bus width NAND Flash or it can use 2 pieces 8-bit NAND Flash to achieve high bandwidth. It can use up to 4 pieces to expand memory storage capacity. 8 bit Error detection and correction is generated for on board NAND Flash. A1569 supports card reader function for SD/MMC card.

Microprocessor is included for user interface. It supports serial interface for different LCD panels. Push bottoms and remote control pad are also provided for user control. Many GPIO pins are for more flexible system design.

DC-DC is integrated. It contains two channels for different system voltages. It can convert power from USB bus power or it can use battery and then boost voltage. Low battery voltage detection is included in this chip.

This SoC Chip includes a high performance stereo FM transmitter designed for portable multimedia systems. It consists of a digital modulator for generating stereo composite signals and a FM transmitter for broadcasting a FM signal on the air. This device employs digital audio input for popular consumer applications and digital stereo modulator to ensure quality audio characteristics.

It supports programmable 88.1, 88.3, 88.5, 88.7MHz FM frequency. This module includes digital port for stereo carrier and analog port for PLL and VCO.



## Feature

### Audio

- Integrated high performance and low power DSP
- Decoding abilities: (vendor optional)
  - MP3(up to 384Kbps), MP2, WMA(up to 320Kbps) and ASF
- Voice record in ADPCM format
- Built-in microphone pre-amplifier
- High performance audio Delta-Sigma DAC
- Built-in stereo headphone amplifier and driver
- User defined flexible multiple band EQ
- Support control interface for FM tuner module
- Digital volume control
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### Storage and Bus interface

- Integrated high bandwidth USB2.0 with on chip PHY
- Supports NAND Flash control for 8-bit , 16-bit and 8-bit \*2 interface
- Supports 4 chip selects for NAND Flash memories
- Automatic 8bit ECC generation and correction
- Support access of SD/MMC Card

### User interface

- NAND/SPI memory firmware upgradeable from USB
- Embedded high performance 8 bits microcontroller
- Support serial LCM interface
- Support digital key pad and remote control key pad
- UART or I2C master for control external device
- Built-in watch-dog-timer
- Built-in on chip debugger with Keil™ Monitor51
- Programmable GPIO
- Support Serial boot ROM



## **FM transmitter**

- Built-in pilot-tone FM stereo modulator circuit
- Built-in PLL for stable frequency transmitting
- Programmable operation frequency range 1Mhz /4MHz
- Central frequency and radiation power are tunable by external L&R

## **Power management**

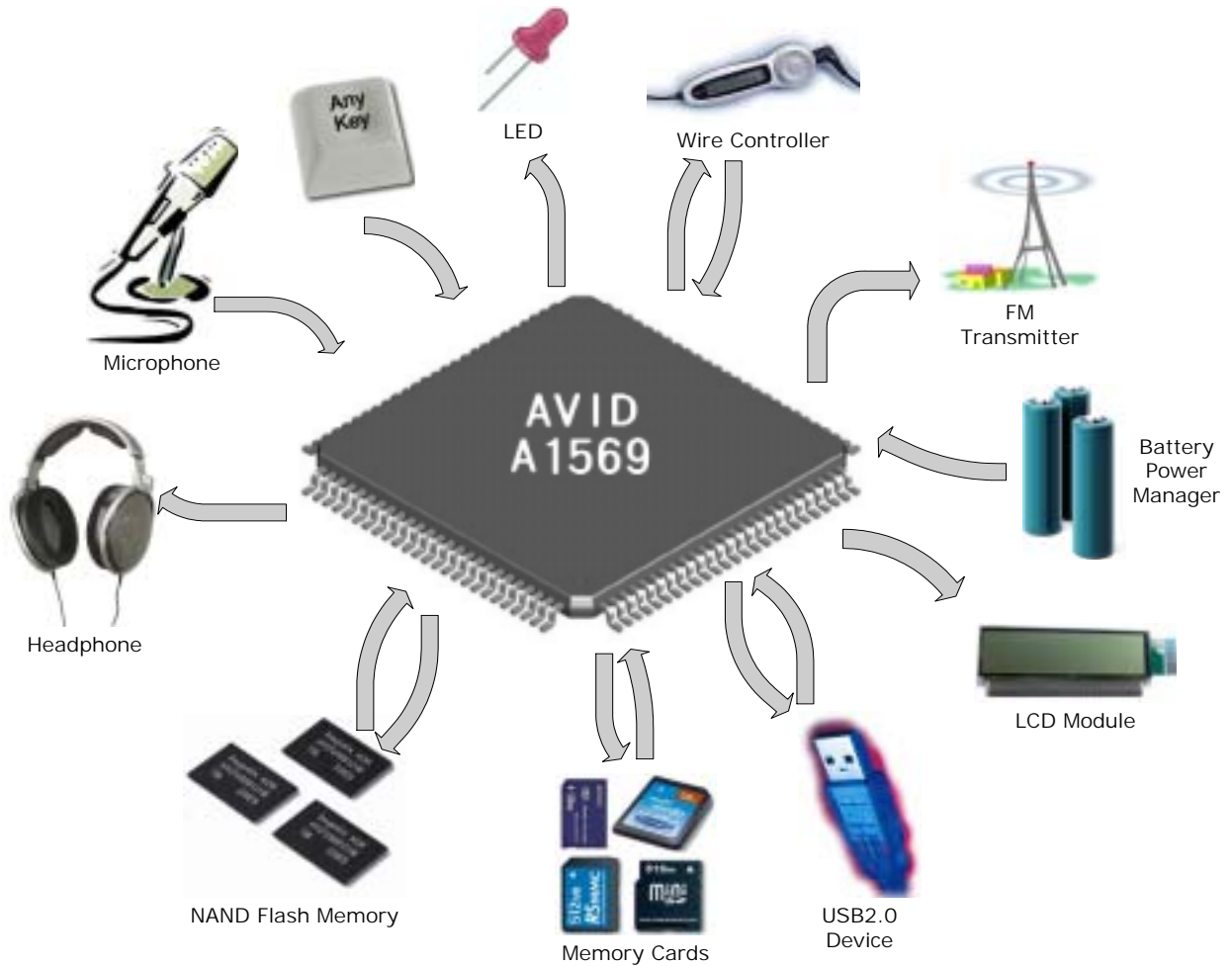
- On chip high efficient (typical application < 105mW)
  - 2 channel DC-DC converter, 3.3V,1.8V (10% range programmable)
- Built-in power-on-reset circuit
- Sophisticated power management
- Tolerance 0.9V supply voltage
- Battery power level detection
- RTC and alarm wakeup power design

## **Package Type**

- LQFP-128-pin

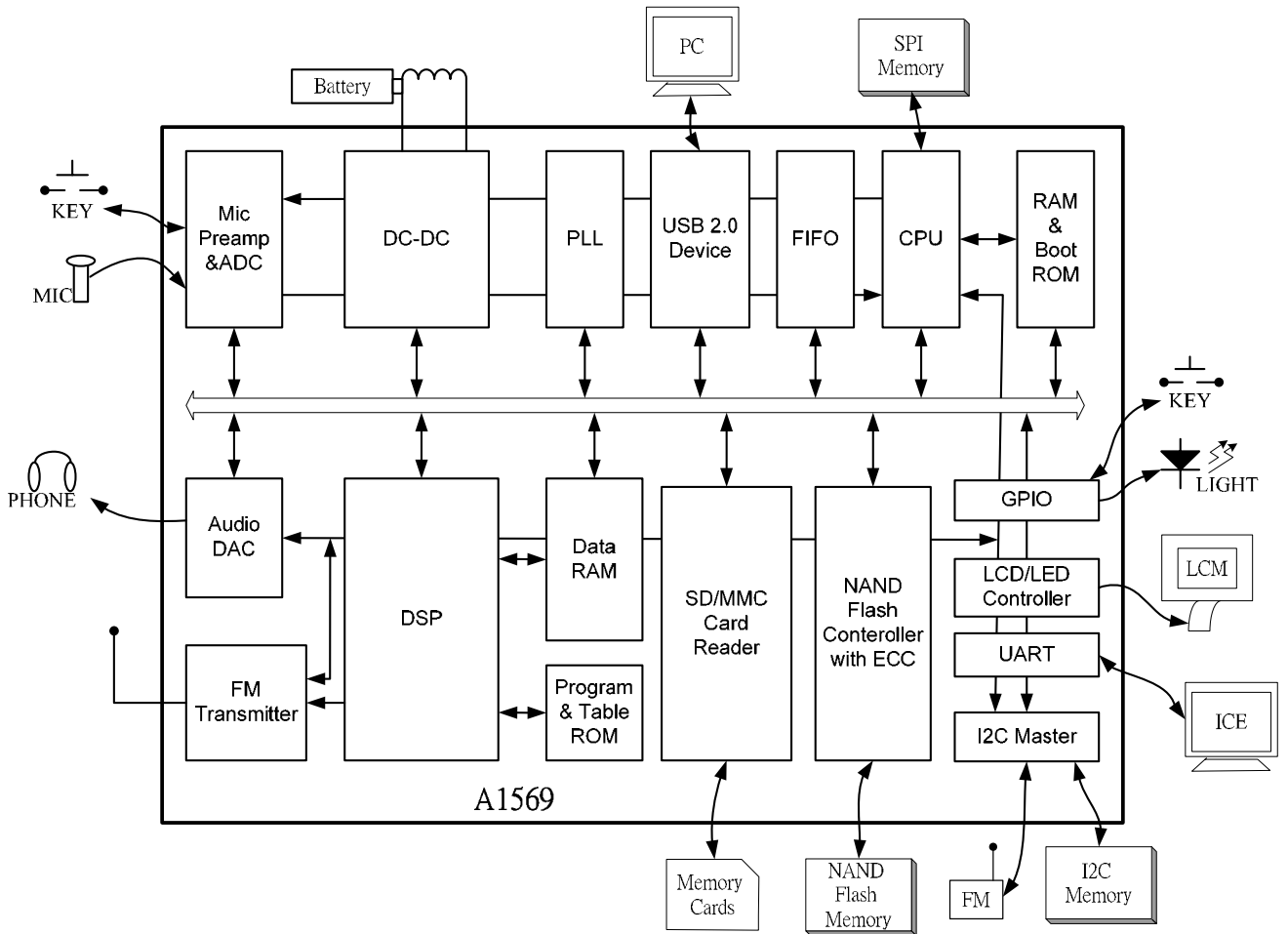


### Block Diagram





### Architecture





## Pin Configuration

LQFP Package

Pin Number	Pin Name	Attrib.	Description
1	HPVDD	ANA	Headphone power
2	HPRINN	ANA	Headphone Right Channel In
3	HPLINN	ANA	Headphone Left Channel In
4	HPBYP	ANA	Headphone Bypass Capacitor
5	AVCC3	ANA	DAC Power Supply
6	AVRC1	ANA	DAC Voltage Reference Capacitor
7	LOUT	ANA	DAC Left Channel Out
8	COUT	ANA	DAC Voltage Reference Capacitor
9	ROUT	ANA	DAC Right Channel Out
10	AVRC2	ANA	Reference bias capacitor
11	AGND3	ANA	DAC Ground
12	GNDAD	ANA	Key scan & Voice Recording Ground
13	CVTI	ANA	ADC Top reference voltage
14	OPT1	ANA	ADC Optional Channel 1 In
15	OPT2	ANA	ADC Optional Channel 2 In
16	VDDAD	ANA	Key scan & Voice Recording Power
17	MICN	ANA	Mic positive input
18	MICP	ANA	Mic negative input
19	VDDMIC	ANA	MIC regulated power(3.3 to 2.8)
20	TVDD18D	ANA	Linear regulator 1.8V output
21	TVDD33R	ANA	Linear regulator 3.3V output
22	TVSS33R	ANA	Linear regulator Ground
23	HTVDD50	ANA	USB 5V power
24	X1	ANA	32.768 K OSC
25	X2	ANA	32.768K OSC
26	VPOUT	ANA	RTC /Ring OSC power
27	VBY	ANA	Battery in
28	VSSDC	ANA	DC2DC analog ground
29	SHDN_SOC	ANA	DC2DC Hi enable power down and output will be pull low to zero



Preliminary

A1569

Flash Media Player with FM Transmitter SoC

30	CP18	ANA	Compensation connection
31	FB18	ANA	DC2DC feedback
32	VOUT18	ANA	DC2DC 1.8V output
33	PGND18	ANA	DC2DC 1.8V driver Ground
34	LX18	ANA	Connection to the external inductor for 1.8V
35	LX33	ANA	Connection to the external inductor for 3.3V
36	PGND33	ANA	DC2DC driver Ground
37	VOUT33	ANA	DC2DC output
38	FB33	ANA	DC2DC feedback
39	CP33	ANA	Compensation connection
40	VSSCO	PWR	Digital Core Ground
41	VDDCO	PWR	Digital Core Power Supply
42	SEG27/GPIO7	ANA/I/O	(1) LCM SEGMENT27 (2)GPIO port 7
43	SEG26/GPIO4	ANA/I/O	(1)LCM SEGMENT DATA26(2)GPIO port 4
44	SEG25/GPIO5	ANA/I/O	(1) LCM SEGMENT DATA25(2)GPIO port 5
45	SEG24/FLCE2#/GPIO24	ANA/I/O	(1) LCM SEGMENT DATA24(2)Flash Memory Chip Enable 2; (3) GPIO port 24
46	SEG23/FLCE3#/GPIO23	ANA/I/O	(1) LCM SEGMENT DATA23(2)Flash Memory Chip Enable 3; (2) GPIO port 23
47	VSSIO	PWR	Digital IO Ground
48	SEG22/FLRB1#/GPIO22	ANA/I/O	(1) LCM DATA22(2) Flash Memory Ready/Busy input 1; (2) GPIO port 22
49	SEG21/GPIO21	ANA/I/O	(1) LCM SEGMENT DATA 21 (2) GPIO port 21
50	SEG20/GPIO20	ANA/I/O	(1) LCM SEGMENT DATA20 (2) GPIO port 20
51	SEG19/LCCS#/GPIO19	ANA/I/O	(1) LCM SEGMENT DATA 19 (2) LCM Chip Select (3) GPIO port 19
52	SEG18/LCA0/GPIO18	ANA/I/O	(1) LCM SEGMENT DATA 18 (2) LCM Address 0 (3) GPIO port 18
53	SEG17/LCSI/GPIO17	ANA/I/O	(1) LCM SEGMENT DATA 17 (2) LCM Serial Data (3) LCM Read Enable (Intel) (4) LCM Enable (Motorola)(5)GPIO17
54	SEG16/LCSCL/GOIP16	ANA/I/O	(1) LCM SEGMENT DATA 16 (2) LCM Serial Clock (3) LCM Write Enable (Intel) (4) LCM R/W# (Motorola)(5)GPIO16
55	VDDIO	PWR	Digital IO Power Supply
56	SEG15//FLD15/UA15/GPIO15	ANA/I/O	(1) LCM SEGMENT DATA15(2) FLASH DATA15 (3) 8051 Address 15 (4) GPIO port 15
57	SEG14/FLD14/UA14/GPIO14	ANA/I/O	(1) LCM SEGMENT DATA 14(2) FLASH DATA14(3) 8051



			Address 14 (4) GPIO port 14
58	SEG13/FLD13/UA13	ANA/I/O	(1) LCM SEGMENT DATA 13(2) FLASH DATA13(3) 8051 Address 13 (4) GPIO port 13
59	SEG12/FLD12/UA12	ANA/I/O	(1) LCM SEGMENT DATA 12(2) FLASH DATA12(3) 8051 Address 12 (4) GPIO port 12
60	SEG11/FLD11/UA11	ANA/I/O	(1) LCM SEGMENT DATA 11(2) FLASH DATA11(3) 8051 Address 11 (4) GPIO port 11
61	SEG10/FLD10/UA10	ANA/I/O	(1) LCM SEGMENT DATA 10(2) FLASH DATA10(3) 8051 Address 10 (4) GPIO port 10
62	SEG9/FLD9/UA9	ANA/I/O	(1) LCM SEGMENT DATA 9(2) FLASH DATA9(3) 8051 Address 9 (4) GPIO port 9
63	SEG8/FLD8/UA8	ANA/I/O	(1) LCM SEGMENT DATA 8(2) FLASH DATA8(3) 8051 Address 8 (4) GPIO port 8
64	VSSIO	PWR	Digital IO Ground
65	VLCD	PWR	LCD Power REFERENCE 5V TOLERANCE
66	SEG7/UAD7	ANA/I/O	(1) LCM SEGMENT DATA 7 (2)8051 Address/Data 7
67	SEG6/UAD6	ANA/I/O	(1) LCM SEGMENT DATA 6 (2)8051 Address/Data 6
68	SEG5/UAD5	ANA/I/O	(1) LCM SEGMENT DATA 5 (2) 8051 Address/Data 5
69	SEG4/UAD4	ANA/I/O	(1) LCM SEGMENT DATA 4 (2)8051 Address/Data 4
70	SEG3/UAD3	ANA/I/O	(1) LCM SEGMENT DATA3 (2)8051 Address/Data 3
71	SEG2/UAD2	ANA/I/O	(1) LCM SEGMENT DATA 2 (2) 8051 Address/Data 2
72	SEG1/UAD1	ANA/I/O	(1) LCM SEGMENT DATA 1 (2)8051 Address/Data 1
73	SEG0/UAD0	ANA/I/O	(1) LCM SEGMENT DATA 0 (2)8051 Address/Data 0
74	COM3/URE#	ANA/O	(1) LCD COMMON DATA 3 (2)8051 Read Enable
75	COM2/UALE	ANA/O	(1) LCD COMMON DATA 2 (2)8051 Address Latch Enable
76	COM1/UWE#	ANA/O	(1) LCD COMMON DATA 1 (2)8051 Write Enable
77	COM0/ROMOE#	ANA/O	(1) LCD COMMON DATA 0 (2) 8051 External ROM Output Enable
78	VSSCO	PWR	Digital Core Ground
79	VDDCO	PWR	Digital Core Power Supply
80	VSSCO	PWR	Digital Core Ground
81	VDDIO	PWR	Digital IO Power Supply
82	FLD7	I/O	Flash Memory Data 7
83	FLD6	I/O	Flash Memory Data 6
84	FLD5	I/O	Flash Memory Data 5
85	FLD4	I/O	Flash Memory Data 4



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A1569

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86	FLD3/SDD3	I/O	(1) Flash Memory Data 3 (2) SD Card Data 3
87	FLD2/SDD2	I/O	(1) Flash Memory Data 2 (2)SD Card Data 2
88	FLD1/SDD1	I/O	(1) Flash Memory Data 1 (2) SD Card Data 1
89	FLD0/SDD0	I/O	(1) Flash Memory Data 0 (2) SD Card Data 0
90	VSSIO	PWR	Digital IO Ground
91	FLCLE/GPIO13	O	Flash Memory Command Latch Enable
92	FLALE/GPIO12	O	Flash Memory Address Latch Enable
93	SDCLK	O	SD/MMC Clock
94	FLRE#/SDCMD	O/IO	(1) Flash Memory Read Enable (2) SD Card Command
95	FLCE1#/GPIO11	O	Flash Memory Chip Enable 1
96	FLCE0#/GPIO10	O	Flash Memory Chip Enable 0
97	VDDIO	PWR	Digital IO Power Supply
98	VSSIO	PWR	Digital IO Ground
99	FLRB0#	I	Flash Memory Ready/Busy input 0
100	FLWE#/GPIO9	O	Flash Memory Write Enable
101	FLWP#/GPIO8	O	Flash Memory Write Protect
102	ICSDA	I/O	I2C Serial Data
103	ICSCL	I/O	I2C Serial Clock
104	URXD	I	(1)8051 UART RXD0
105	UTXD	O	(1) 8051 UART TXD0
106	RESET#	I	System Reset
107	GPIO6/EXTINT#	I/O	(1) GPIO port 6 (2) External Interrupt
108	GPIO3/OPT3	I/O	GPIO port 3/OPT3 input
109	GPIO2	I/O	GPIO port 2
110	GPIO1	I/O	GPIO port 1
111	GPIO0	I/O	GPIO port 0
112	XIN	I	Crystal (12MHz) Input
113	XOUT	O	Crystal (12MHz) Output
114	VSSCO	PWR	Digital Core Ground
115	VDDCO	PWR	Digital Core Power Supply
116	VSSPL	PWR	PLL Ground
117	VDDPL	PWR	PLL Power Supply
118	DM	ANA	PHY Differential Minus
119	VSS	PWR	PHY Digital Ground
120	DP	ANA	PHY Differential Plus
121	REXT	ANA	PHY External Resistor 6K



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**A1569**

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122	VD33P	PWR	PHY Core Power Supply (3.3V)
123	VS33P	PWR	PHY Core Ground
124	VSSA	PWR	PHY PLL Ground
125	VDDA	PWR	PHY PLL Power Supply (1.8V)
126	HPLOUT	ANA	Headphone Left Channel Out
127	HPGND	PWR	Headphone Ground
128	HPROUT	ANA	Headphone Right Channel Out



## DC Electrical Characteristics

(Ta = 25 VDD(Core Logic) (24,54,70,105)= 1.8V, VDDIO(26,49,64,74,86,102)=3.3V, AVDD,VDDPL=1.8V)

Item	Symbol	Pins	Specified Value			Unit	Conditions
			Min	Typ	Max		
Input "High"	VIH	Group1,2,4	2.0		5.5	V	
Input "Low"	VIL	Group1,2,4			0.80	V	
Schmitt Trig L to H	VT+	Group3,5	1.44	1.50	1.56	V	
Schmitt Trig H to L	VT-	Group3,5	0.89	0.94	0.99	V	
Pull-Up resistance	Rup	Group1,3,4,5	39	65	116	K	
Output "High"	VOH	Group1,2,3,4	2.4			V	
Output "Low"	VOL	Group1,2,3,4			0.4	V	
Output "High" current	IOH	Group1,2,3,4		4		mA	
Output "Low" current	IOL	Group1,2,3,4		4		mA	
Crystal Frequency		OSCO,OSCI		12		MHz	



Package

- LQFP-128-pin

