

Overview

5504-DK is a high quality stand-alone development board based on SAM5504B (AUDIO & MUSIC MULTI-DSP PROCESSOR).

The SAM5504B can be used in 2 different hardware configurations for different applications. On 5504-DK board the SAM5504B is running in the hardware configuration dedicated to sound module or keyboard instruments built around low cost Quad SPI memory components.

Samples are stored in Quad SPI Flash and read from it in Quad I/O Read Mode (100MHz) through the SAM5504B Sample Cache Controller to reach 81-voice polyphony.

Thanks to the secondary functions implemented beside primary functions of numerous pins, 5504-DK also offers plenty of audio I2S IOs, SPDIF IO and USB audio.

Beside the SAM5504B, the 5504-DK_Rev0 hardware includes:

- 2 Audio DAC: AKM AK4384(24-bit, DR:106dB, THD+N:-94dB)
- 1 Audio ADC AKM AK5386 (24-bit, DR:110dB, S/(N+D):96dB)
- 512Mbit Quad SPI Flash Memory: SPANSION S25FL512SAGMFI01
- USB High Speed, Device port
- Optical SPDIF In and Out

Operating Mode

5504-DK operates on two modes:

- **Debug mode:**
The board is connected to a PC through the Dream 5000DBG-IF adaptor. The firmware can be downloaded and debugged into Quad SPI Flash memory with Dream SamVS-C development software. With SamVS or ProgSam software tool it is possible to program the firmware in Quad SPI Flash memory for stand-alone mode. With ProgSam tool it is also possible to program the eFuses in SAM5504B for encryption / copy protection of firmware code and sound bank content.
The sound bank can also be loaded into Quad SPI Flash memory using UXChange.exe software or copying it directly from USB drive plugged through 5000USBH-IF adapter.
- **Stand-alone mode:**
In this mode the SAM5504B executes the program from the Quad SPI Flash memory playing MIDI events from USB Midi and optionally scans the front panel and the piano keyboard.

Connectors Configuration

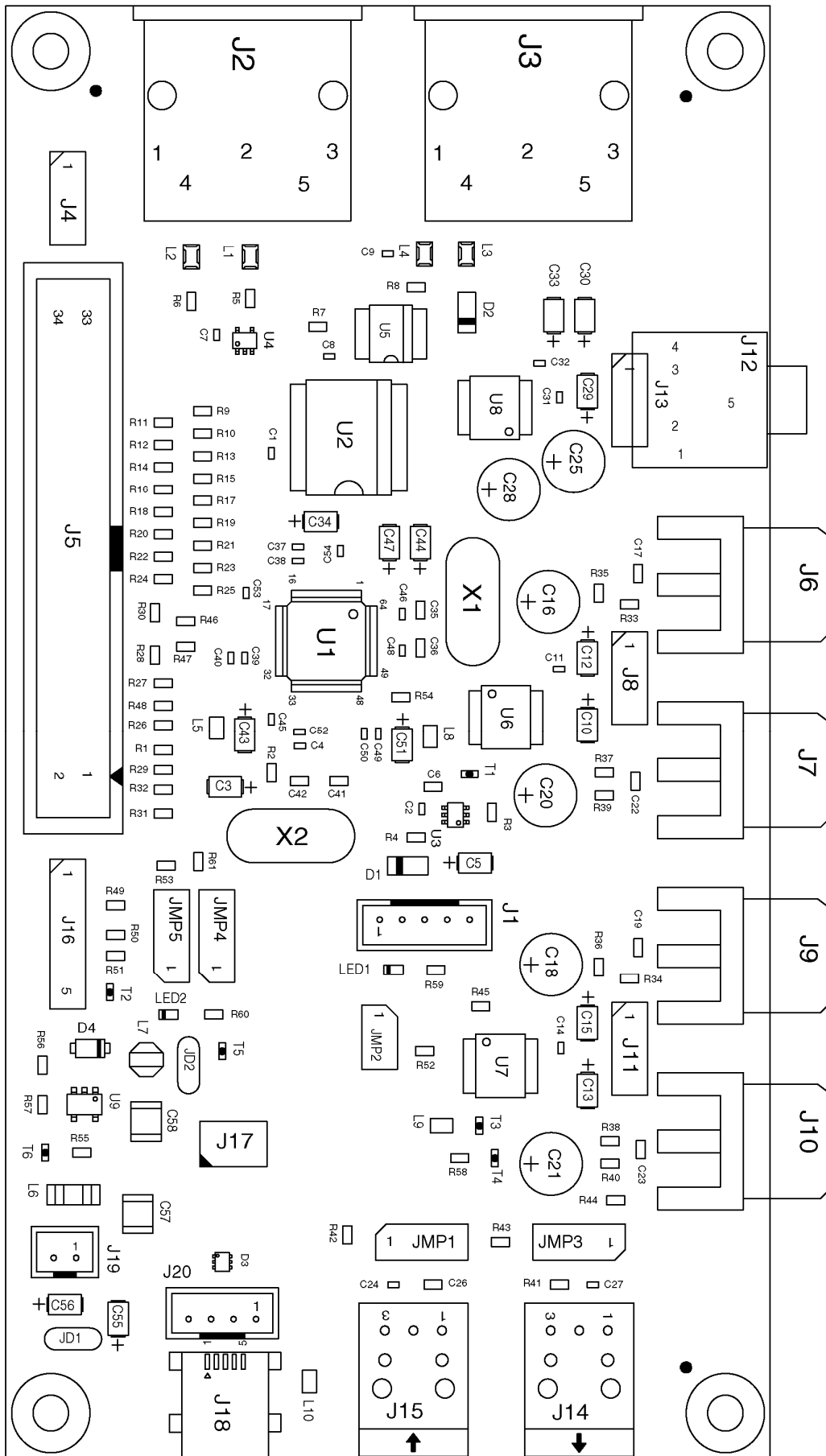
Name	Reference	Type	Description
DEBUG / PROGRAM	J1	JST PH Series, 1*5	Serial connection for debug and program, compatible with Dream 5000DBG-IF
MIDI OUT	J2	5-pin Din	Standard MIDI OUT at 31.25kb/s
MIDI IN	J3	5-pin Din	Standard MIDI IN at 31.25kb/s
MIDI LVTTTL	J4	1*3	MIDI LVTTTL IO at 31.25kb/s
EXTENSIONS	J5	HE10, 2*17	Audio extension or Scanning interface or Versatile IOs.
LINE OUT1L	J6	RCA	Audio output 1L (1.2V RMS)
LINE OUT1R	J7	RCA	Audio output 1R (1.2V RMS)
	J8 (Optional, n.m.)	1*3	Audio output 1 stereo (1.2V RMS)
LINE OUT2L	J9	RCA	Audio output 2L (1.2V RMS)
LINE OUT2R	J10	RCA	Audio output 2R (1.2V RMS)
	J11 (Optional, n.m.)	1*3	Audio output 2 stereo (1.2V RMS)
LINE IN	J12	Mini Jack	Audio input channels 0-1 (1V RMS)
	J13 (Optional, n.m.)	1*3	Audio input channels 0-1 (1V RMS)
SPDIF OUT	J14	DLT2160A	SPDIF Audio Optical Output
SPDIF IN	J15	DLR2160	SPDIF Audio Optical Input
ANALOG INPUTS	J16	1*5	Analog inputs for potentiometers
To 5000USBH-IF	J17	HARWIN M22 2*3	Connection for USB drive adapter: 5000USBH-IF
USB POWER SUPPLY & USB DEVICE PORT	J18	Mini USB B	USB connector used to power the board. Can also be used as USB device full or high speed port.
POWER SUPPLY	J19 (Optional, n.m.)	1*2	Power supply if JD1 open, +5V/0.5A, GND on pin 1
USB DEVICE PORT	J20 (Optional, n.m.)	1*4	USB device full or high speed port if J18 is not used.

“n.m.” = not mounted

Jumper Configuration

Reference	Default Setting	Description
JMP1	1-2	Select I2S or SPDIF audio input hardware for DAAD0-SPDIF_IO multiplexed pin: <ul style="list-style-type: none"> 1-2: I2S hardware input (DAAD0 primary function) 2-3: SPDIF hardware input (SPDIF_IO secondary function) Note: Primary and secondary function on a same pin are mutually exclusives.
JMP2	Closed	Connect DABD1 to U7 (LINE OUT 2).
JMP3	1-2	Select I2S or SPDIF audio output hardware for DABD0-SPDIF_OI multiplexed pin: <ul style="list-style-type: none"> 1-2: I2S hardware output (DABD0 primary function) 2-3: SPDIF hardware output (SPDIF_OI secondary function) Note: Primary and secondary function on a same pin are mutually exclusives.
JMP4	0	Main Oscillator OSC1 frequency select: <ul style="list-style-type: none"> JMP5 -> 0, JMP4 -> 0 : 12 MHz (default) JMP5 -> 0, JMP4 -> 1 : 9.6 MHz JMP5 -> 1, JMP4 -> 0 : 11.2896 MHz JMP5 -> 1, JMP4 -> 1 : 12.288 MHz
JMP5	0	
JD1	Closed	Power supply source <ul style="list-style-type: none"> Closed: Power supply from USB VBUS Open: Power supply from J19
JD2	Closed	For test and measurement on 3.3V power supply

Layout



Bill of Material

SAM5504B - Development Board Revised: Tuesday, October 06, 2015

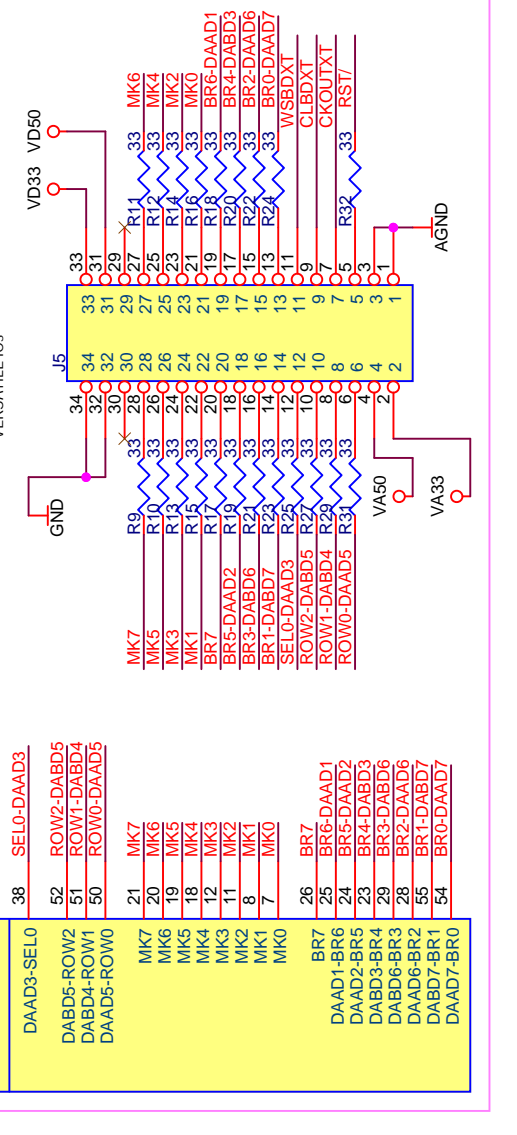
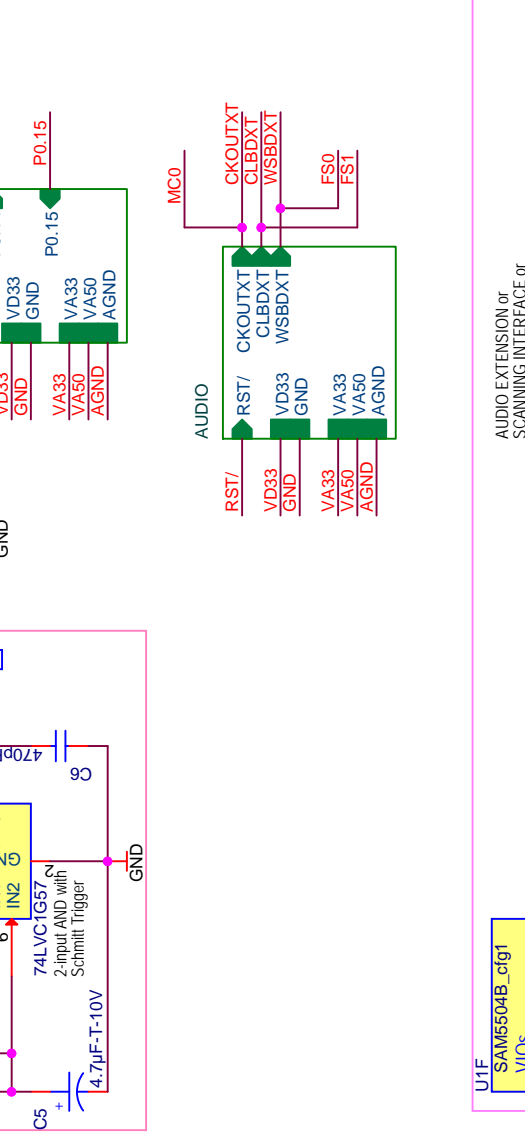
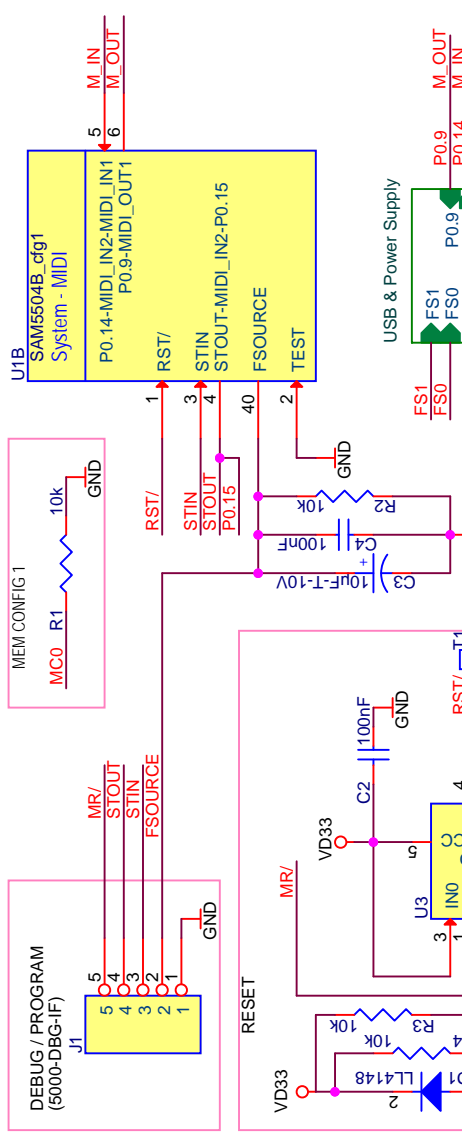
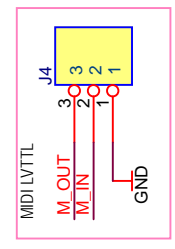
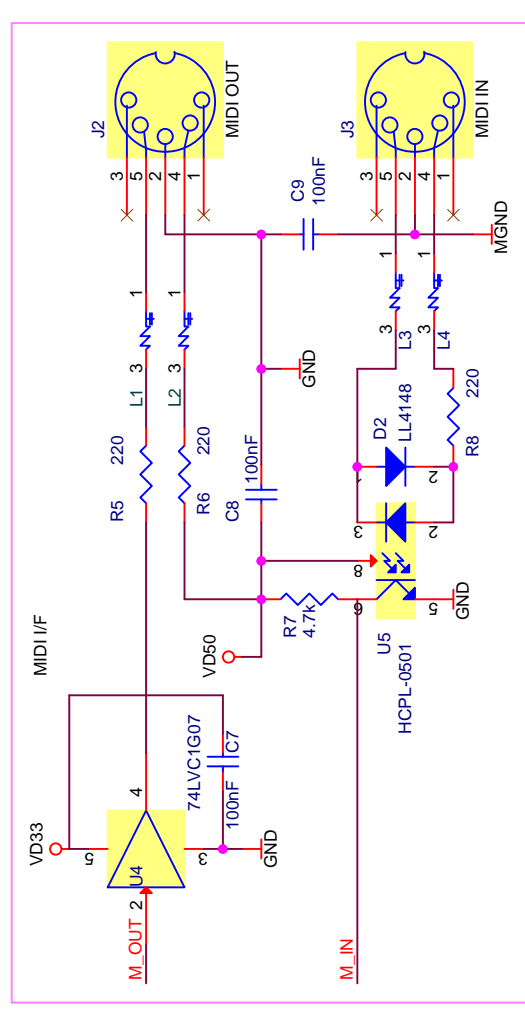
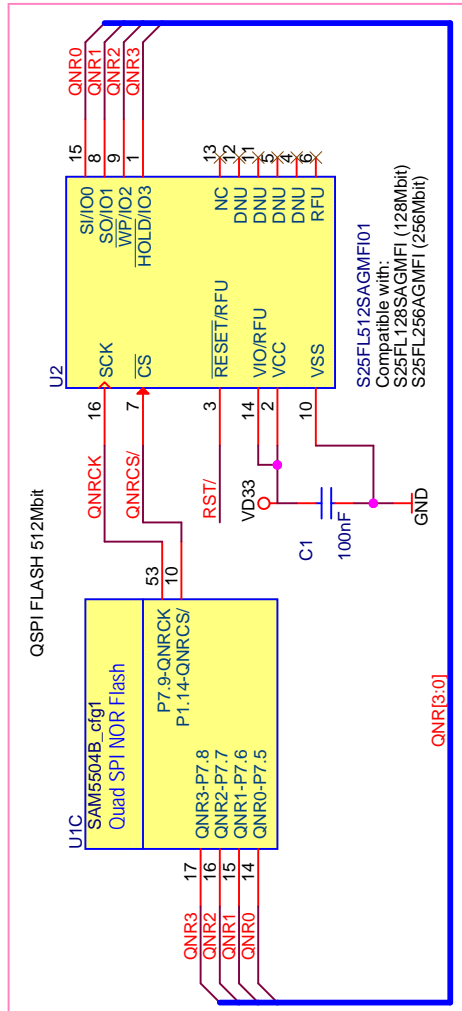
5504-DK.DSN Revision: 0

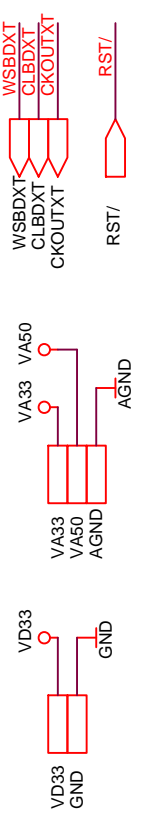
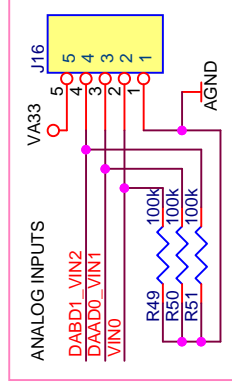
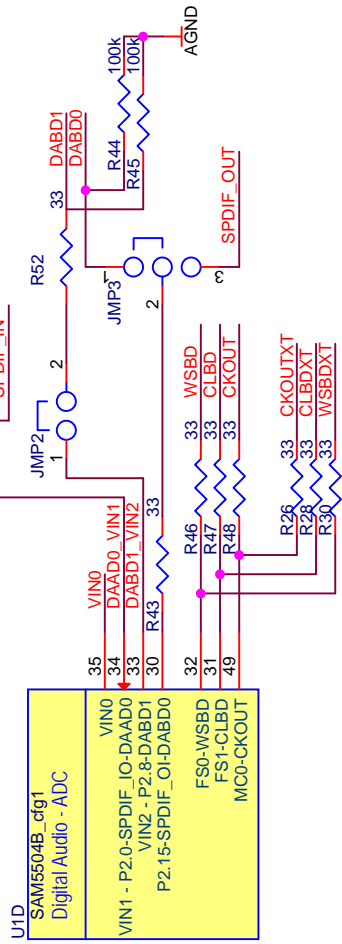
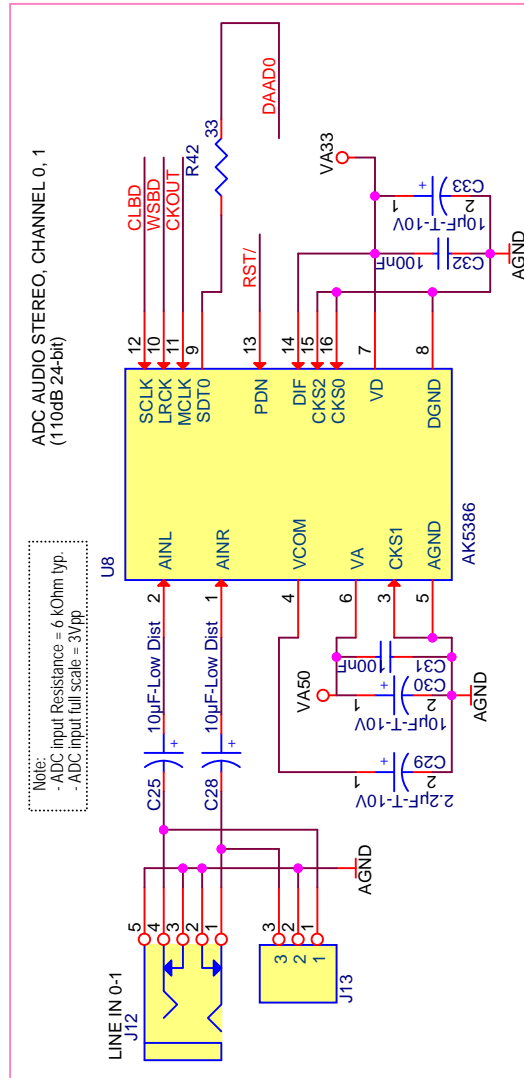
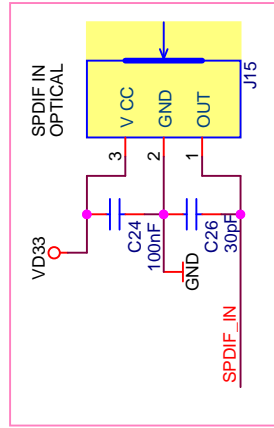
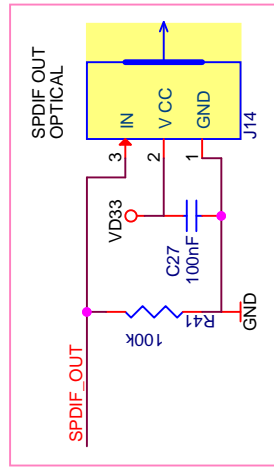
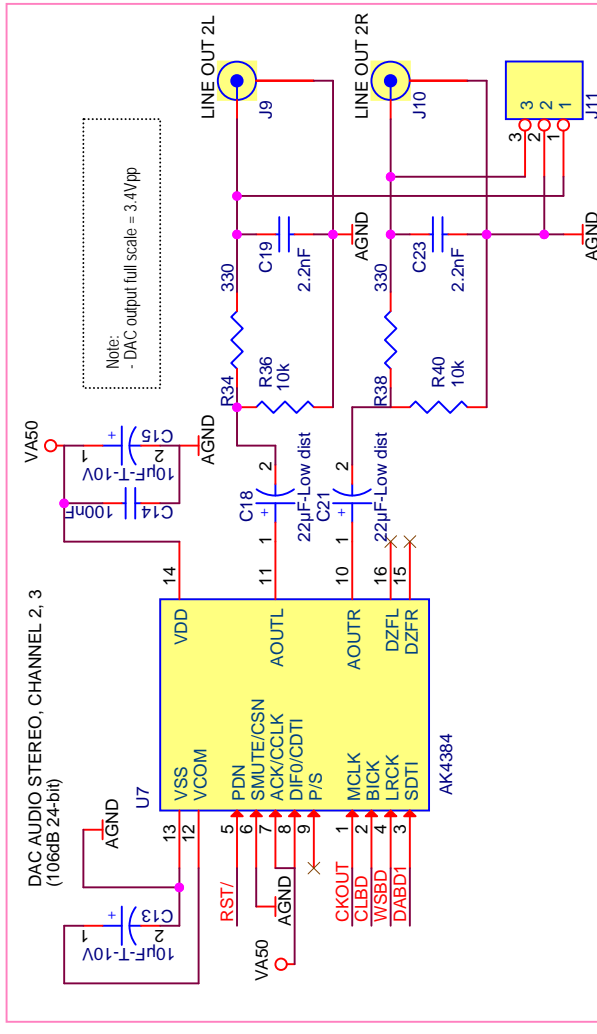
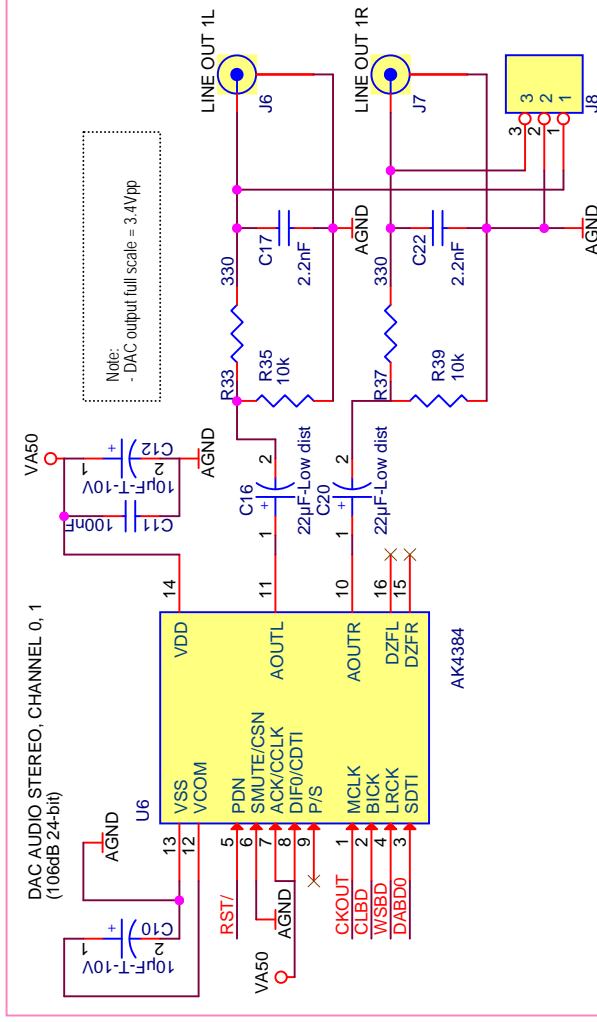
Page 1

Item	Quantity	Reference	Part	Manufacturer	Designation
1	21	C1, C2, C4, C7, C8, C9, C11, C14, C24, C27, C31, C32, C37, C39, C45, C46, C48, C49, C52, C53, C54	100nF		
2	11	C3, C10, C12, C13, C15, C30, C33, C34, C43, C47, C51	10µF-T-10V		
3	2	C5, C44	4.7µF-T-10V		
4	1	C6	470pF		
5	4	C16, C18, C20, C21	22µF-Low dist	PANASONIC	ECA1HAM220X
6	4	C17, C19, C22, C23	2.2nF		
7	2	C25, C28	10µF-Low Dist	PANASONIC	ECA1HAM100X
8	1	C26	30pF		
9	1	C29	2.2µF-T-10V		
10	4	C35, C36, C41, C42	22pF		
11	3	C38, C40, C50	10nF		
12	2	C55, C56	1µF-T		
13	2	C57, C58	22µF-X5R		
14	2	D1, D2	LL4148	VISHAY	LL4148
15	1	D3	TPD2E1B06	TI	TPD2E1B06
16	1	D4	CRS08	TOSHIBA	CRS08
17	2	JD1, JD2	Jumper Disk1P		
18	4	JMP1, JMP3, JMP4, JMP5	Jumper2P	Generic	BA25-Male-7mm-Gold
19	1	JMP2	Jumper1P	Generic	BA25-Male-7mm-Gold
20	1	J1	B5B-PH-K-S	JST	B5B-PH-K-S
21	2	J2, J3	MIDI_DIN		
22	1	J4	HEAD_3	Generic	BA25-Male-7mm-Gold
23	1	J5	HEAD_17X2		
24	4	J6, J7, J9, J10	RCA_JACK	KEYSTONE	901
25	2	J8, J11	N.M.		
26	1	J12	JACK 3.5 STEREO	3E	15.427
27	1	J13	N.M.		
28	1	J14	DLT2160A	AIXIN OPTO-ELECTRICAL	DLT2160A

Item	Quantity	Reference	Part	Manufacturer	Designation
29	1	J15	DLR2160	AIXIN OPTO-ELECTRICAL	DLR2160
30	1	J16	HEAD_5	Generic	BA25-Male-7mm-Gold
31	1	J17	M22-2020305	HARTWIN	M22-2020305
32	1	J18	651 005 161 21	WERI	651 005 161 21
33	1	J19	N.M.	JST	B2B-PH-K-S
34	1	J20	N.M.	JST	B4B-PH-K-S
35	1	LED1	TLMG1100-Vishay	VISHAY	TLMG1100
36	1	LED2	TLMS1000-Vishay	VISHAY	TLMS1000-GS08
37	4	L1, L2, L3, L4	NFM21CC102R1H3	MURATA	NFM21CC102R1H
38	4	L5, L8, L9, L10	742792093	WURTH	742792093
39	1	L6	NFM41PC204F1H3	MURATA	NFM41PC204F1H3
40	1	L7	744029003	WURTH	744029003
41	10	R1, R2, R3, R4, R35, R36, R39, R40, R52, R53	10k		
42	3	R5, R6, R8	220		
43	1	R7	4.7k		
44	30	R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R42, R43, R46, R47, R48, R52	33		
45	4	R33, R34, R37, R38	330		
46	7	R41, R44, R45, R49, R50, R51, R55	100k		
47	1	R54	12k, 1%		
48	1	R56	45.3k 1%		
49	1	R57	10k 1%		
50	1	R58	0		
51	2	R59, R60	750		
52	6	T1, T2, T3, T4, T5, T6	TestPoint	Vogt	N.M. (985.62 or 1000C.22)
53	1	U1	SAM5504B_cfg1	DREAM	SAM5504B
54	1	U2	S25FL512SAGMFI01	SPANSION	S25FL512SAGMFI01
55	1	U3	74LVC1G57	TI	74LVC1G57DCK
56	1	U4	74LVC1G07	TI	74LVC1G07DCK
57	1	U5	HCPL-0501		

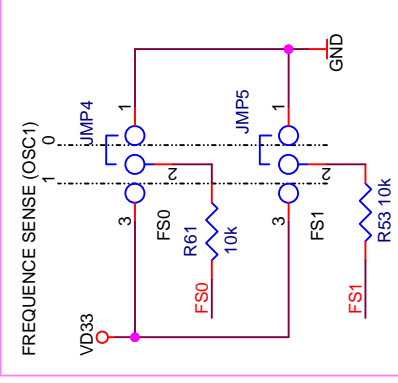
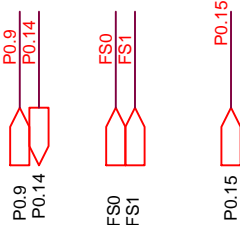
Item	Quantity	Reference	Part	Manufacturer	Designation
58	2	U6, U7	AK4384	AKM	AK4384VT
59	1	U8	AK5386	AKM	AK5386VT
60	1	U9	LM2830X	NS	LM2830X
61	1	X1	12.288MHz	FISCHER	PQ18+12.288MHz
62	1	X2	12MHz	FISCHER	PQ18+12MHz



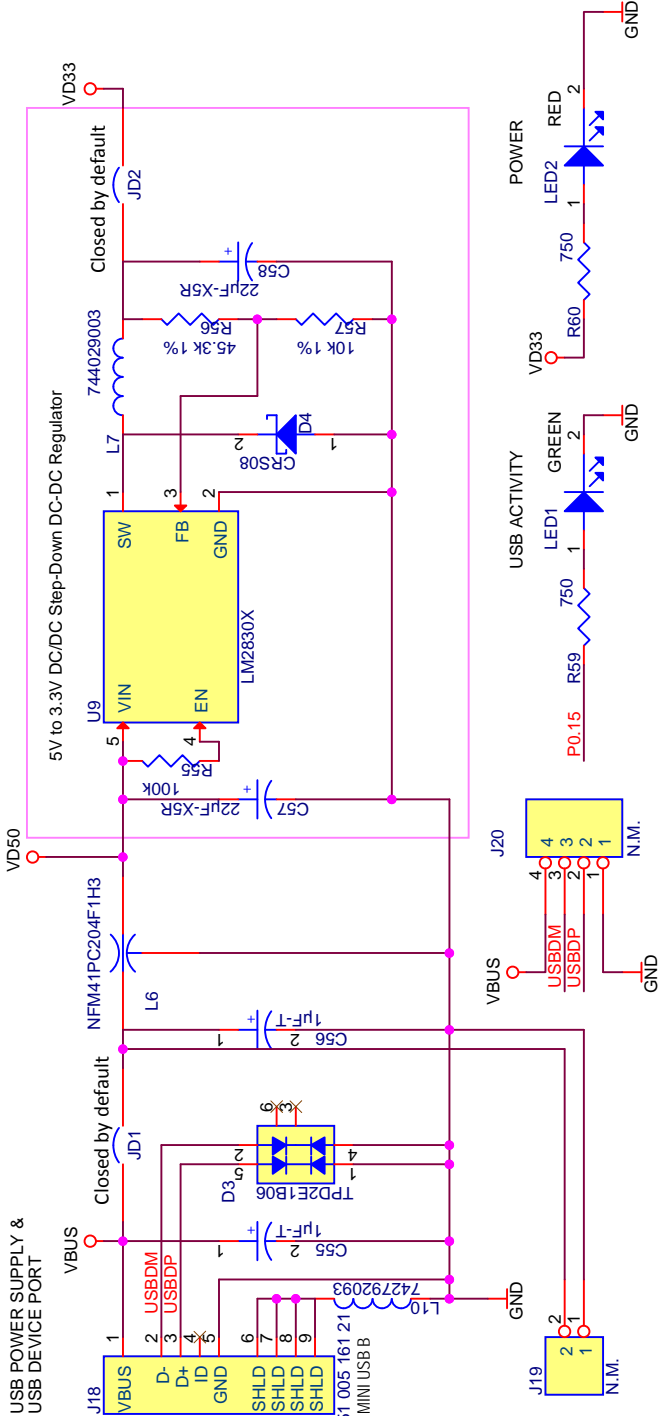
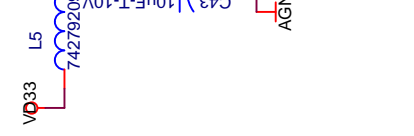
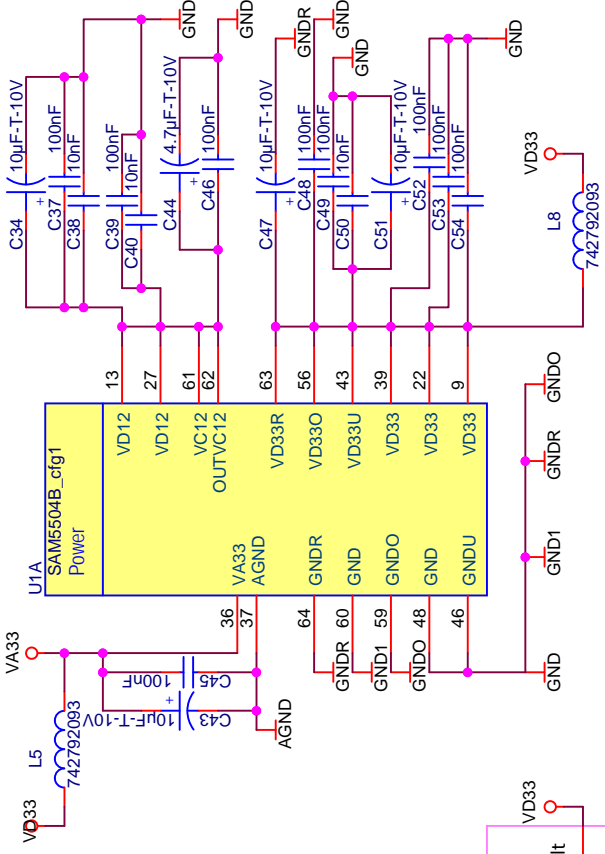
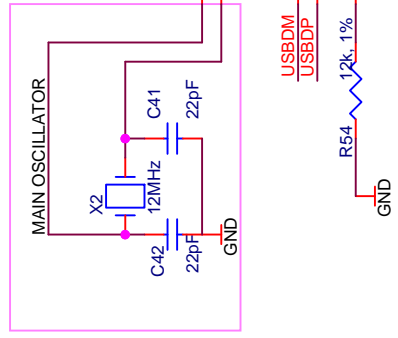
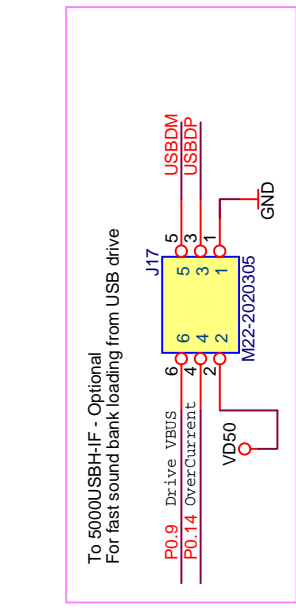
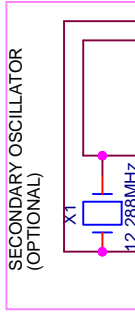


DREAM S.A.S. CONFIDENTIAL DATA

Title	SAM504 - Development Board - Audio
Size	Document Number 5504-DK.DSN
Date	Tuesday, October 06, 2015
Sheet	2 of 3
Rev	0



Freq (MHz)	FS1	FS0
12 (Default)	0	0
9.6	0	1
11.2896	1	0
12.288	1	1



Dream Contact

info@dream.fr

Website

<http://www.dream.fr>

This publication neither states nor implies any warranty of any kind, including, but not limited to, implied warrants of merchantability or fitness for a particular application. Dream assumes no responsibility for the use of any circuitry. No circuit patent licenses are implied. The information in this publication is believed to be accurate in all respects at the time of publication but is subject to change without notice. Dream assumes no responsibility for errors and omissions, and disclaims responsibility for any consequences resulting from the information included herein.