

## Overview

5716-DK is a high quality stand-alone development and reference board based on SAM5716 (AUDIO & MUSIC MULTI-DSP PROCESSOR) dedicated to high range sound modules and professional effect devices.

The SAM5716 can be used in 6 different hardware configurations for different applications. On 5716-DK board the SAM5716 is running in the hardware configuration dedicated to applications with firmware and sound bank stored in NAND Flash, sample cache and extended delay lines in SDRAM. Also it can be used for firmware boot-loaded from serial NOR Flash, e.g. in Professional Audio applications in which the NAND Flash is not required.

Beside the SAM5716 the 5716-DK\_Rev3 hardware includes:

- 2 x Audio DAC: AKM AK4384 (24-bit, DR:106dB, THD+N:-94dB)
- Audio ADC AKM AK5386 (24-bit, DR:110dB, S/(N+D):96dB)
- 8Gbit NAND Flash MICRON MT29F8G08ABACAWP
- 64Mbit SDRAM: MICRON MT48LC4M16A2P-7E
- 2Mbit SPI NOR Flash memory WINBOND W25X20CLSNIG for firmware and data storage
- USB High Speed Device Port
- Optical SPDIF In and Out

## Dream NAND Flash Solution

DREAM NAND Flash solution allows the storage of large sound banks in cost-effective NAND Flash memory devices. Thanks to its sophisticated sample cache system, the SAM5716 offers high performances, security and reliability:

- Support SLC NAND Flash technology (up to 8GByte)
- High polyphony: up to 256 voices + effects
- Transparent pages transfer from NAND to SDRAM buffers
- Automatic error correction (ECC)
- Bad block management and wear leveling ensuring NAND Flash lifetime
- AES-protected sound banks with on-the-fly decryption
- Sound bank compiler for NAND Flash technology

## Operating Modes

5716-DK\_Rev3 operates on two modes:

- **Debug/Program mode:**  
The board is connected to a PC through the Dream 5000DBG-IF adaptor. Firmware can be downloaded and debugged into internal or external SDRAM with Dream SamVS-C development software.  
With SamVS or ProgSam software tool it is possible to program the firmware into NAND Flash memory or SPI NOR Flash memory for stand-alone mode.  
The sound bank can be loaded into NAND Flash memory using Dream UXChange.exe software or copying it directly from USB drive connected through 5000USBH-IF adapter.  
With ProgSam tool it is also possible to program the eFuses on SAM5716 for encryption / copy protection of firmware code and sound bank content.
- **Stand-alone mode:**  
In this mode the SAM5716 loads the firmware from the NAND Flash or SPI NOR Flash.

## Connectors Configuration

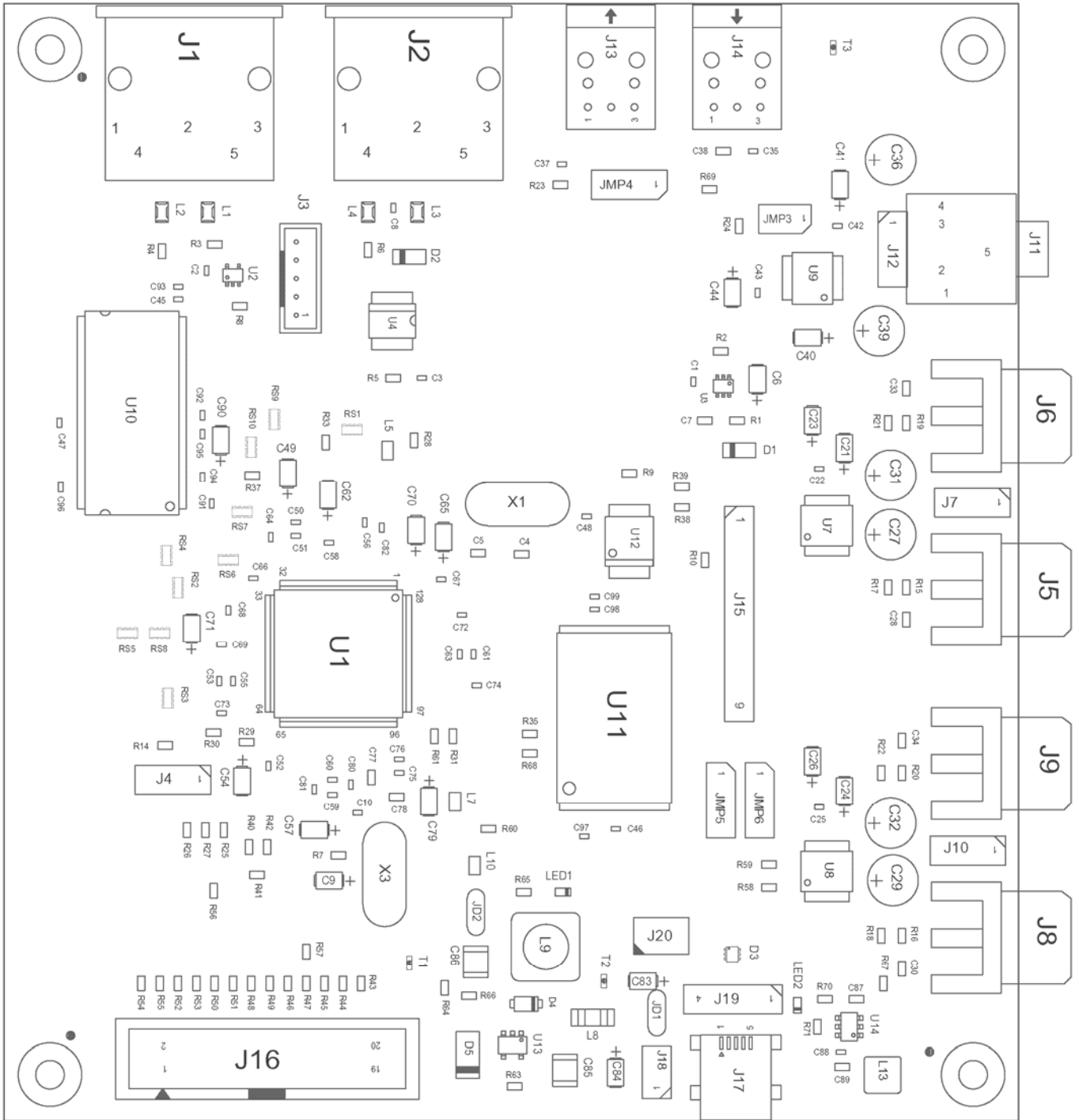
Name	Reference	Type	Description
MIDI OUT	J1	5-pin Din	Standard MIDI OUT at 31.25kb/s
MIDI IN	J2	5-pin Din	Standard MIDI IN at 31.25kb/s
DEBUG / PROGRAM	J3	JST PH Series, 1*5	Serial connection for debug and program, compatible with Dream 5000DBG-IF
VIN	J4	1*3	Analog input for potentiometer
LINE OUT 1L	J5	RCA	Left audio line 1 output (1.2V RMS)
LINE OUT 1R	J6	RCA	Right audio line 1 output (1.2V RMS)
	J7 (Optional, n.m.)	1*3	Stereo audio line 1 output (1.2V RMS)
LINE OUT 2L	J8	RCA	Left audio line 2 output (1.2V RMS)
LINE OUT 2R	J9	RCA	Right audio line 2 output (1.2V RMS)
	J10 (Optional, n.m.)	1*3	Stereo audio line 2 output (1.2V RMS)
LINE IN	J11	Mini Jack	Stereo audio input (1V RMS)
	J12 (Optional, n.m.)	1*3	Stereo audio input (1V RMS)
SPDIF OUT	J13	DLT2160A	SPDIF Audio Optical Output
SPDIF IN	J14	DLR2160	SPDIF Audio Optical Input
AUDIO Extensions	J15 (Optional)	1*9	Extension for additional digital audio I/Os
SLAVE 8-BIT // IF	J16	HE10, 2*10	Access to 8-bit // port and to Serial Slave Synchronous Interface.
USB POWER SUPPLY & USB DEVICE PORT	J17	Mini USB B	USB connector used to power the board. Can also be used as USB device full or high speed port.
POWER SUPPLY	J18 (Optional, n.m.)	1*2	Power supply if JD1 open, +5V/0.5A, GND on pin 1
USB DEVICE PORT	J19 (Optional, n.m.)	1*4	USB device full or high speed port if J17 is not used.
To 5000USBH-IF	J20	HARWIN M22 2*3	Connection for USB drive adapter: 5000USBH-IF.

“n.m.” = not mounted

## Jumper Configuration

Reference	Default Setting	Description	
JMP3	Closed	Connect DAAD0 to LINE IN	
JMP4	1-2	SPDIF OUT or DABD0 <ul style="list-style-type: none"> <li>1-2: SPDIF OUT is not used. DABD0 can be used for LINE OUT 1</li> <li>2-3: SPDIF OUT is used. DABD0 cannot be used LINE OUT 1</li> </ul>	
JMP5	0	Main Oscillator OSC1 frequency select: <ul style="list-style-type: none"> <li>JMP6 -&gt; 0, JMP5 -&gt; 0 : 12 MHz (default)</li> <li>JMP6 -&gt; 0, JMP5 -&gt; 1 : 9.6 MHz</li> <li>JMP6 -&gt; 1, JMP5 -&gt; 0 : 11.2896 MHz</li> <li>JMP6 -&gt; 1, JMP5 -&gt; 1 : 12.288 MHz</li> </ul>	
JMP6	0		
JD1	Closed		Power supply source <ul style="list-style-type: none"> <li>Closed: Power supply from USB VBUS</li> <li>Open: Power supply from J18</li> </ul>
JD2	Closed		For test and measurement on 3.3V power supply

Layout



Bill of Material

SAM5716 - DEVELOPMENT BOARD - Revised: September 24, 2019

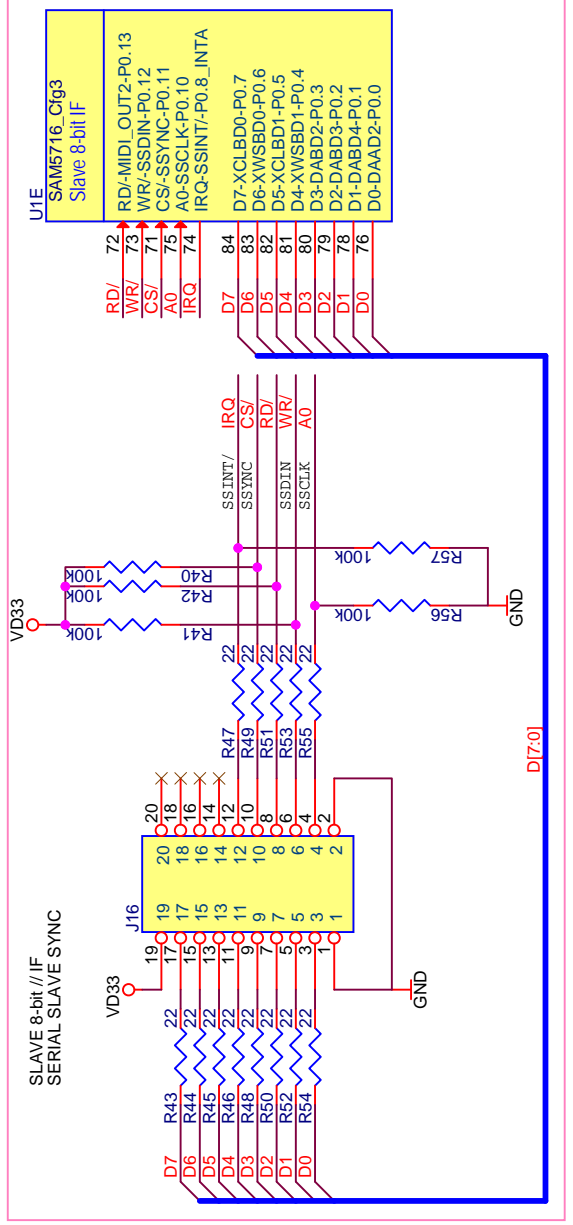
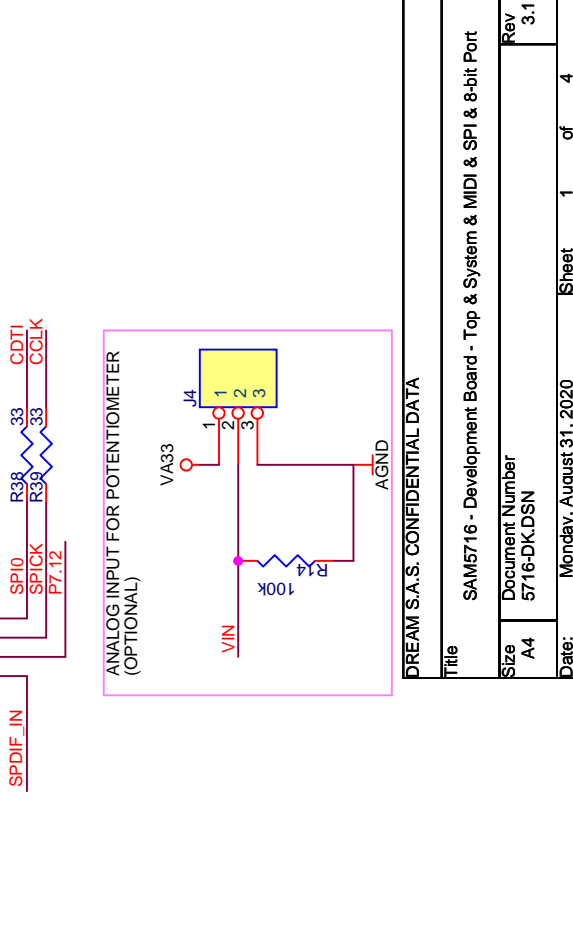
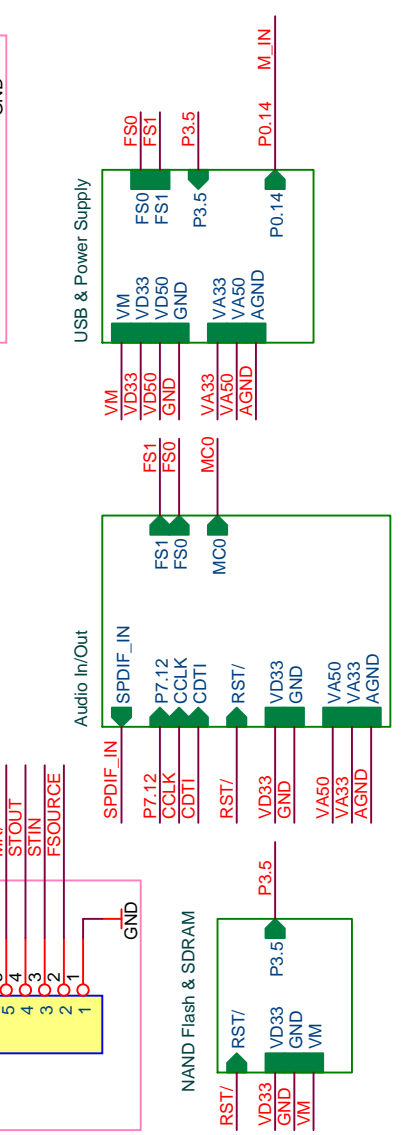
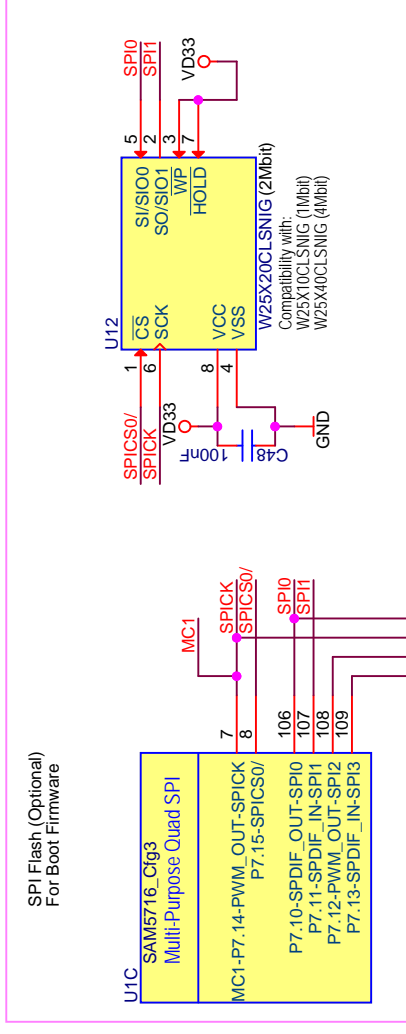
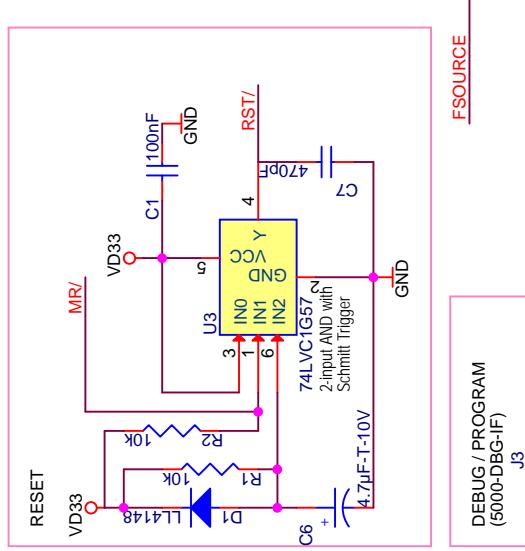
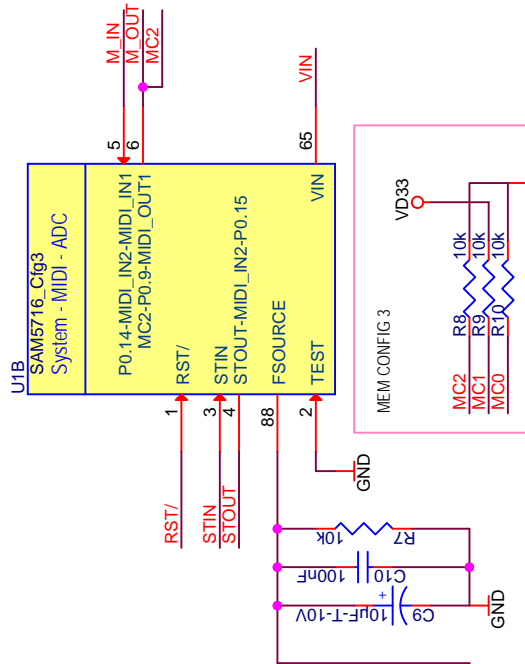
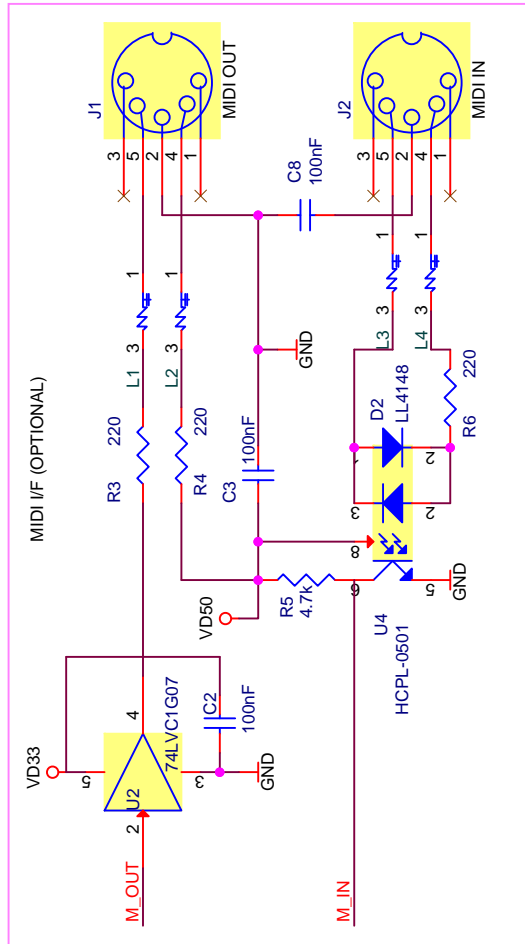
5716-DK.DSN Revision: 3

Page 1

Item	Quantity	Reference	Part	Manufacturer	Designation
1	33	C1, C2, C3, C8, C10, C22, C25, C35, C37, C42, C43, C45, C46, C47, C48, C50, C52, C53, C56, C59, C61, C67, C68, C72, C73, C75, C80, C81, C88, C94, C95, C96, C99	100nF		
2	4	C4, C5, C77, C78	22pF		
3	2	C6, C65	4.7µF-T-10V		
4	1	C7	470pF		
5	15	C9, C21, C23, C24, C26, C41, C44, C49, C54, C57, C62, C70, C71, C79, C90	10µF-T-10V		
6	4	C27, C29, C31, C32	22µF-Low dist	PANASONIC	ECA1HAM220X
7	4	C28, C30, C33, C34	2.2nF		
8	2	C36, C39	10µF-Low Dist	PANASONIC	ECA1HAM100X
9	1	C38	30pF		
10	1	C40	2.2µF-T-10V		
11	7	C51, C64, C69, C74, C82, C92, C98	470pF		
12	6	C55, C58, C60, C63, C66, C76	10nF		
13	2	C83, C84	1µF-T		
14	2	C85, C86	22µF-X5R		
15	2	C87, C89	10µF-X5R		
16	3	C91, C93, C97	N.M.		
17	2	D1, D2	LL4148	VISHAY	LL4148
18	1	D3	TPD2E1B06	TI	TPD2E1B06
19	1	D4	CRS08	TOSHIBA	CRS08
20	1	D5	1N4002		
21	4	H1, H2, H3, H4	Fixing_Hole		
22	2	JD1, JD2	Jumper Disk1P		
23	1	JMP3	Jumper1P	Generic	BA25-Male-7mm-Gold
24	3	JMP4, JMP5, JMP6	Jumper2P	Generic	BA25-Male-7mm-Gold
25	2	J1, J2	MIDI_DIN		
26	1	J3	B5B-PH-K-S	JST	B5B-PH-K-S
27	1	J4	HEAD_3	Generic	BA25-Male-7mm-Gold
28	4	J5, J6, J8, J9	RCA_JACK	KEYSTONE	901
29	2	J7, J10	N.M.		
30	1	J11	JACK 3.5 STEREO	3E	15.427

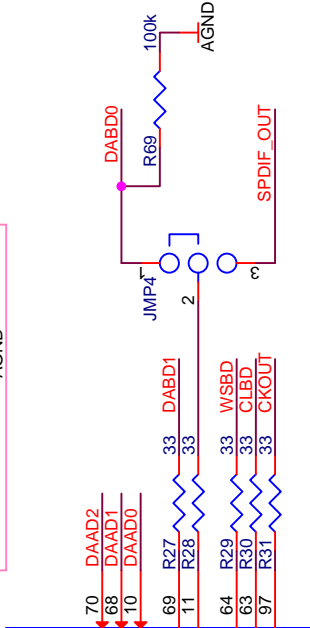
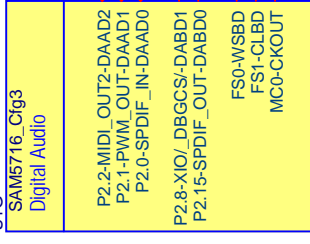
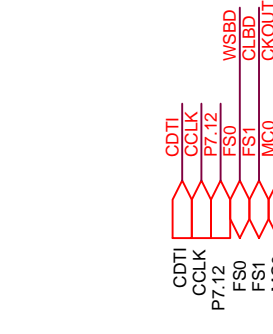
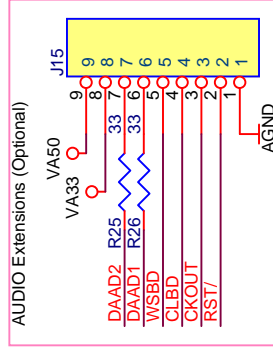
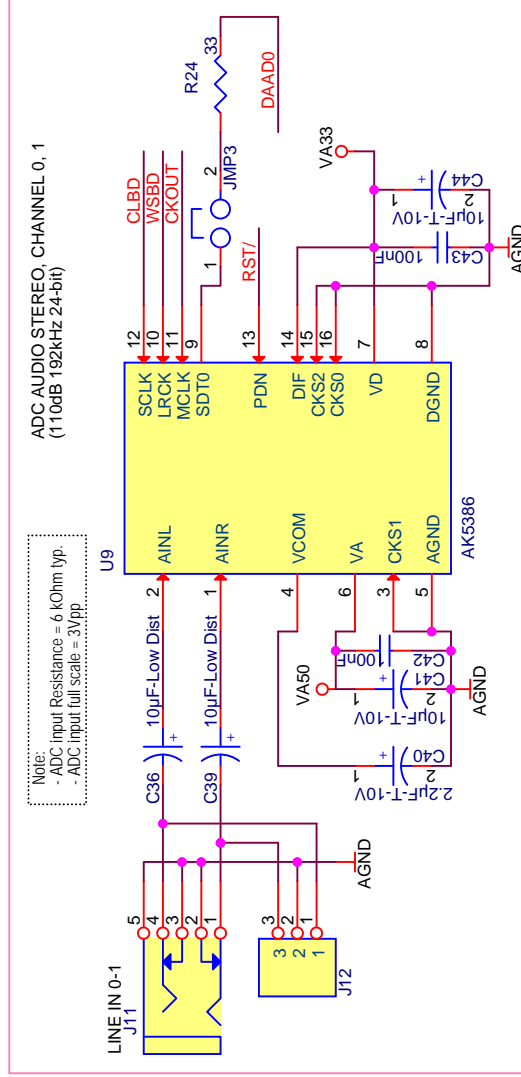
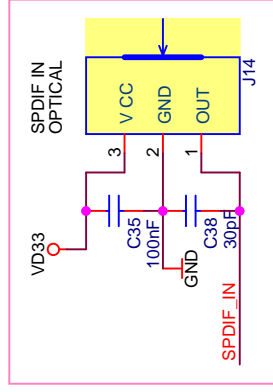
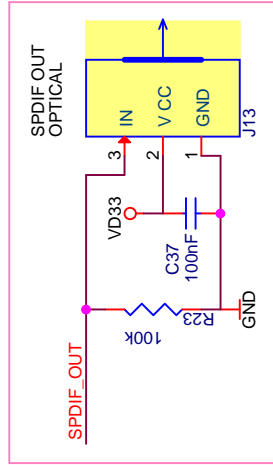
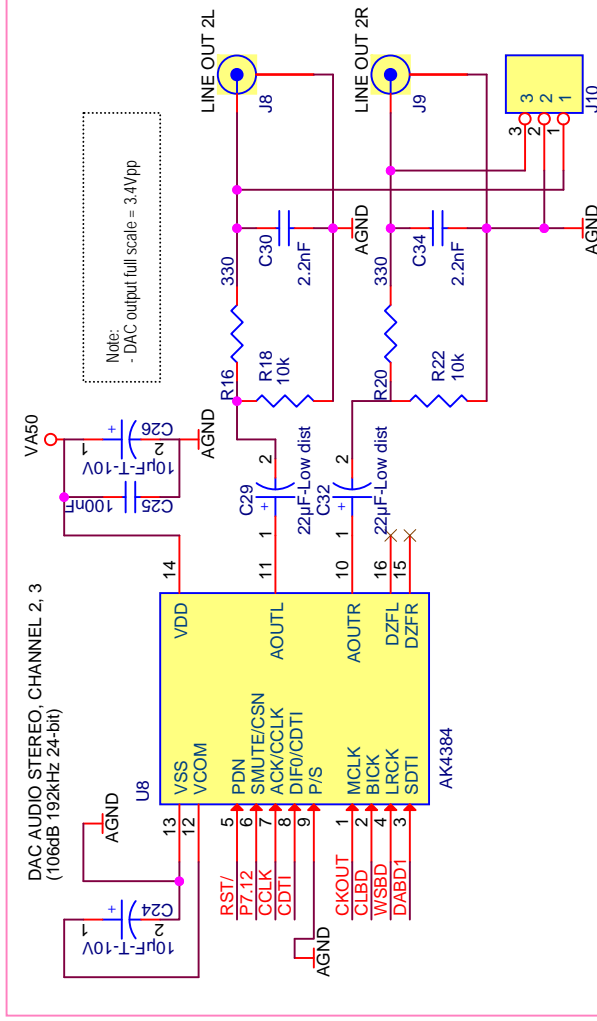
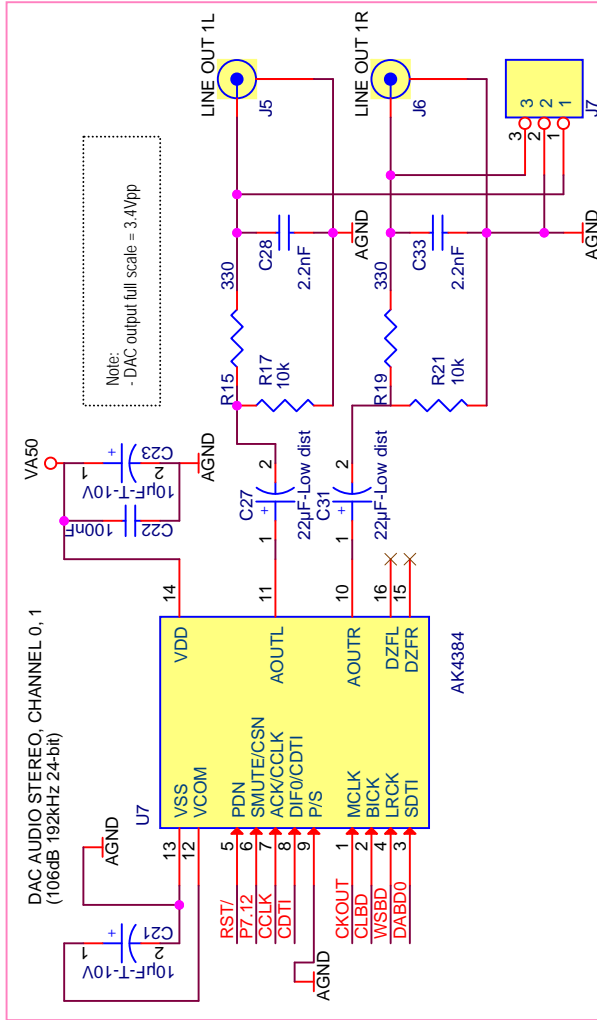
Item	Quantity	Reference	Part	Manufacturer	Designation
31	1	J12	N.M.		
32	1	J13	DLT2160A	AIXIN OPTO-ELECTRICAL	DLT2160A
33	1	J14	DLR2160	AIXIN OPTO-ELECTRICAL	DLR2160
34	1	J15	HEAD_9	Generic	BA25-Male-7mm-Gold
35	1	J16	HEAD_10X2		
36	1	J17	651 005 161 21	WERI	651 005 161 21
37	1	J18	N.M.		
38	1	J19	N.M.		
39	1	J20	M22-2020305	HARTWIN	M22-2020305
40	1	LED1	TLMS1000-Vishay	VISHAY	TLMS1000-GS08
41	1	LED2	TLMG1100-Vishay	VISHAY	TLMG1100
42	4	L1, L2, L3, L4	NFM21CC102R1H3	MURATA	NFM21CC102R1H
43	2	L5, L10	742792093	WURTH	742792093
44	1	L7	7427920415	WURTH	7427920415
45	1	L8	1806J0500204MXTE07	KNOWLES SYFER	1806J0500204MXTE07
46	1	L9	744777003	WURTH	744777003
47	1	L13	744031004	WURTH	744777003
48	10	RS1, RS2, RS3, RS4, RS5, RS6, RS7, RS8, RS9, RS10	4x33		
49	12	R1, R2, R7, R8, R9, R10, R17, R18, R21, R22, R58, R59	10k		
50	3	R3, R4, R6	220		
51	2	R5, R35	4.7k		
52	9	R14, R23, R40, R41, R42, R56, R57, R63, R69	100k		
53	4	R15, R16, R19, R20	330		
54	12	R24, R25, R26, R27, R28, R29, R30, R31, R33, R37, R38, R39	33		
55	13	R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55	22		
56	1	R60	1k		
57	1	R61	12k, 1%		
58	1	R64	45.3k 1%		
59	2	R65, R68	750		

Item	Quantity	Reference	Part	Manufacturer	Designation
60	1	R66	10k 1%		
61	1	R67	0		
62	1	R70	270k 1%		
63	1	R71	180k 1%		
64	3	T1, T2, T3	TestPoint	Vogt	N.M. (985.62 or 1000C.22)
65	1	U1	SAM5716_Cfg3	DREAM	SAM5716
66	1	U2	74LVC1G07	TI	74LVC1G07DCK
67	1	U3	74LVC1G57	TI	74LVC1G57DCK
68	1	U4	HCPL-0501		
69	2	U7, U8	AK4384	AKM	AK4384VT
70	1	U9	AK5386	AKM	AK5386VT
71	1	U10	MT48LC4M16A2P-7E	MICRON	MT48LC4M16A2P-7E
72	1	U11	MT29F8G08ABACAWP	MICRON	MT29F8G08ABACAWP
73	1	U12	W25X20CLSNI	WINBOND	W25X20CLSNI
74	1	U13	LM2830X	NS	LM2830X
75	1	U14	TPS61070		
76	1	X1	12.288 MHz + socket	FISCHER	PQ18
77	1	X3	12 MHz + socket	FISCHER	PQ18



**DREAM S.A.S. CONFIDENTIAL DATA**

File	SAM5716 - Development Board - Top & System & MIDI & SPI & 8-bit Port
Size	Document Number
A4	5716-DK.DSN
Date:	Monday, August 31, 2020
Sheet	1 of 4
Rev	3.1



DREAM S.A.S. CONFIDENTIAL DATA

Title SAM5716 - Development Board - Audio

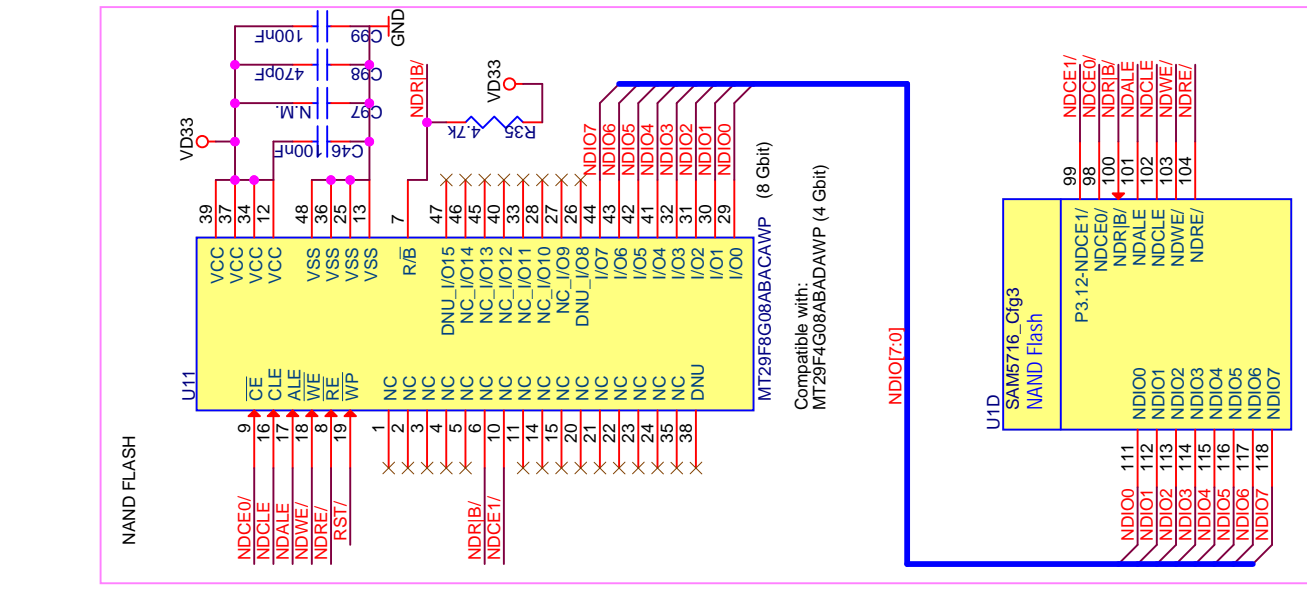
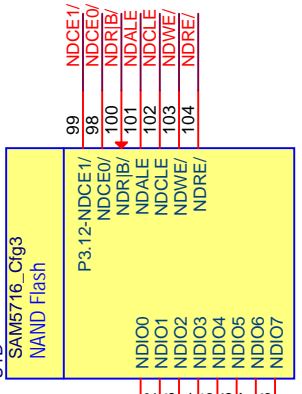
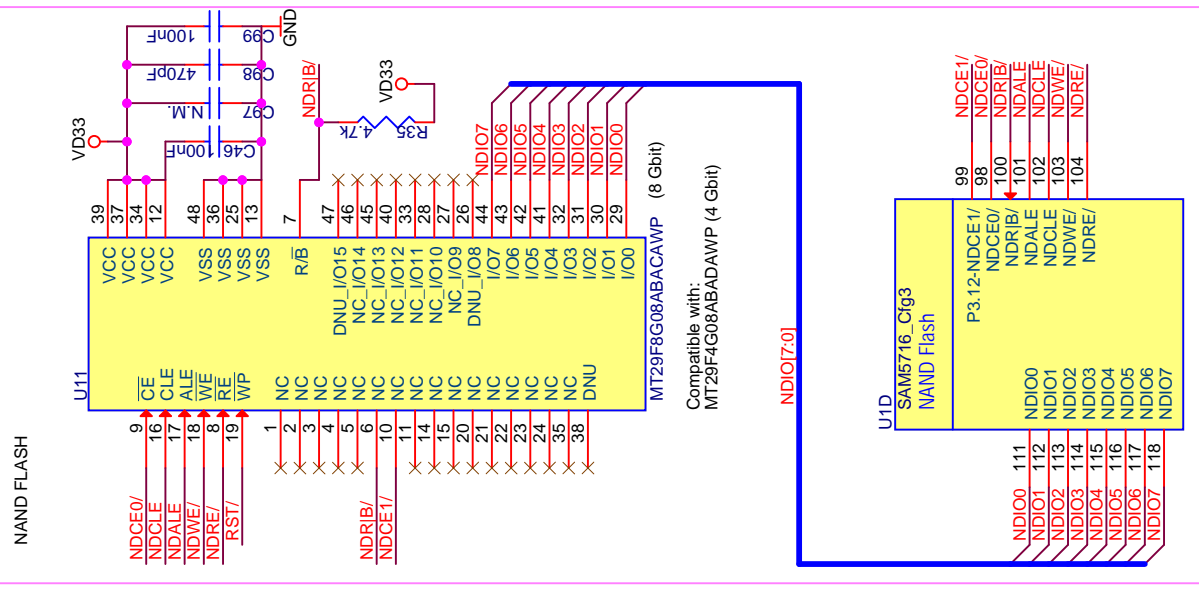
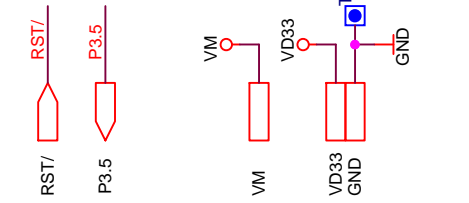
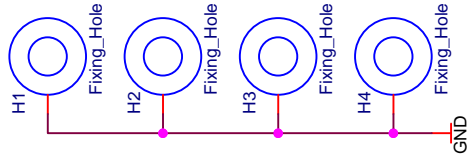
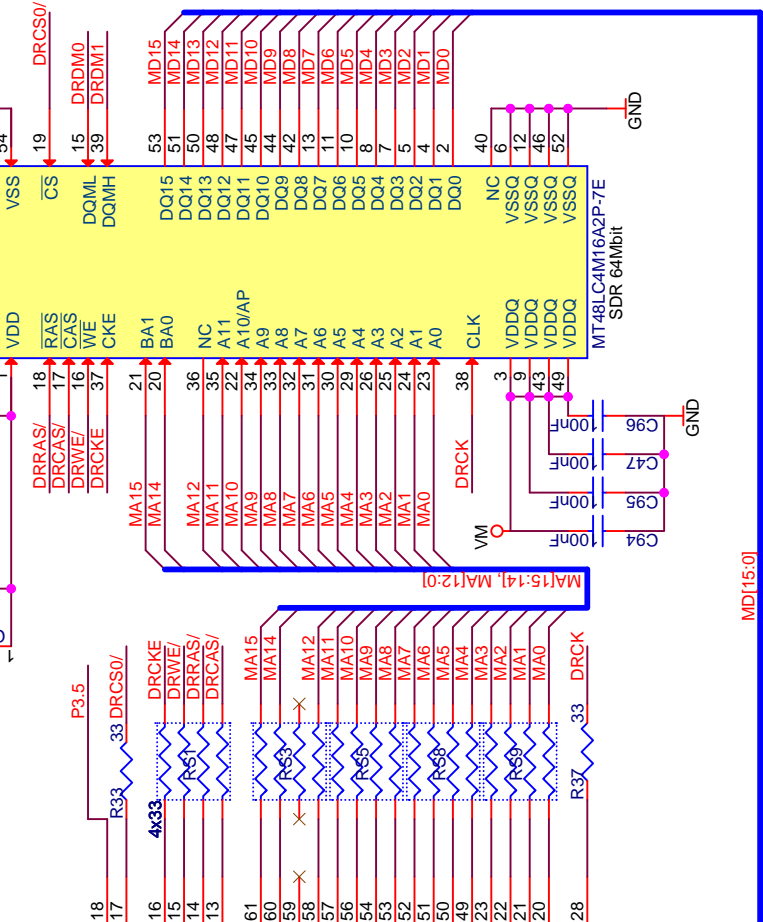
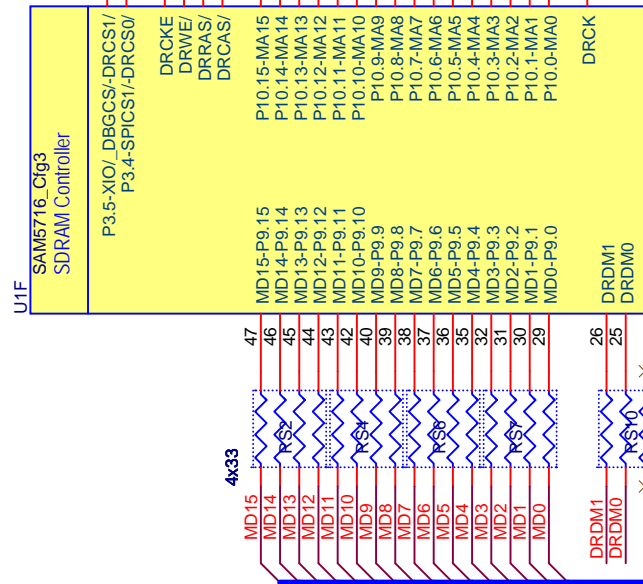
Size Document Number

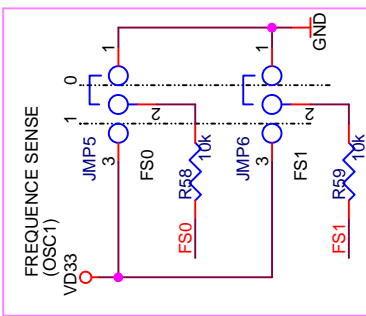
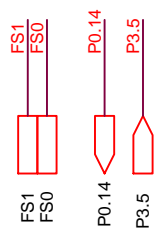
Rev 5716-DK.DSN

Date: Monday, August 31, 2020 Sheet 2 of 4

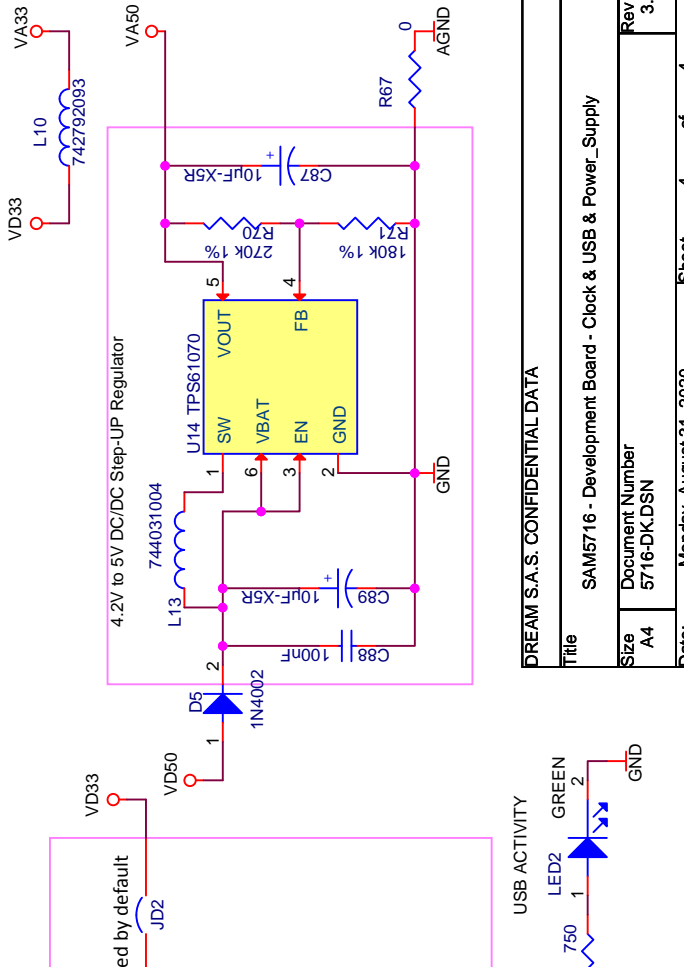
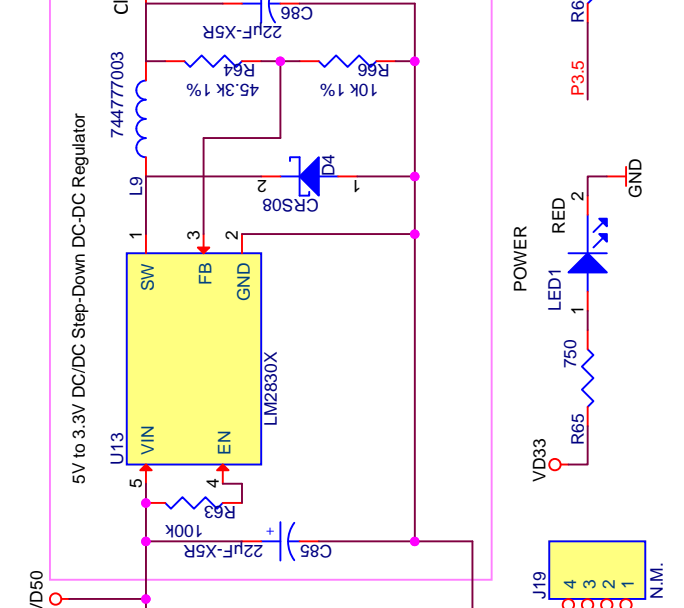
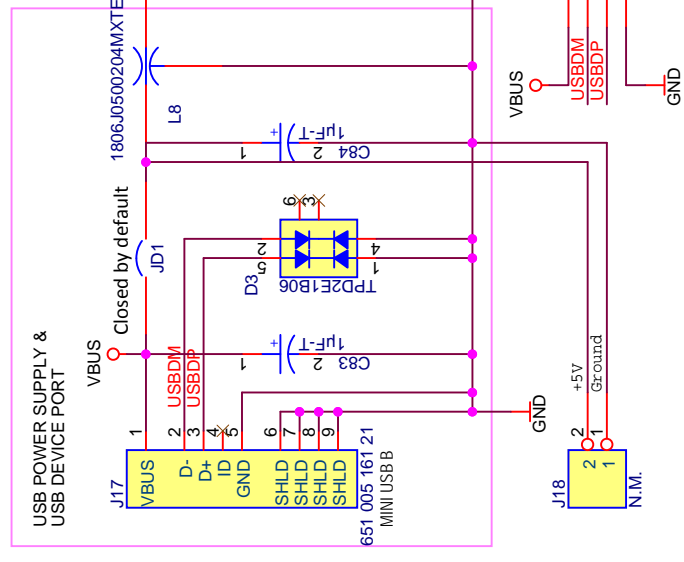
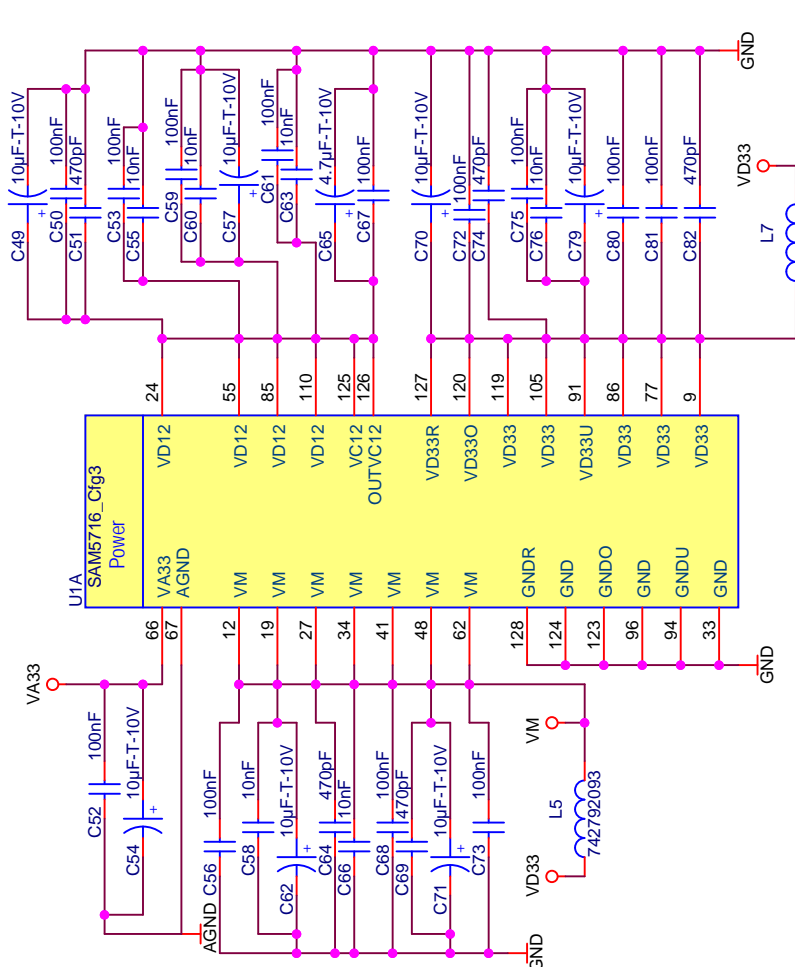
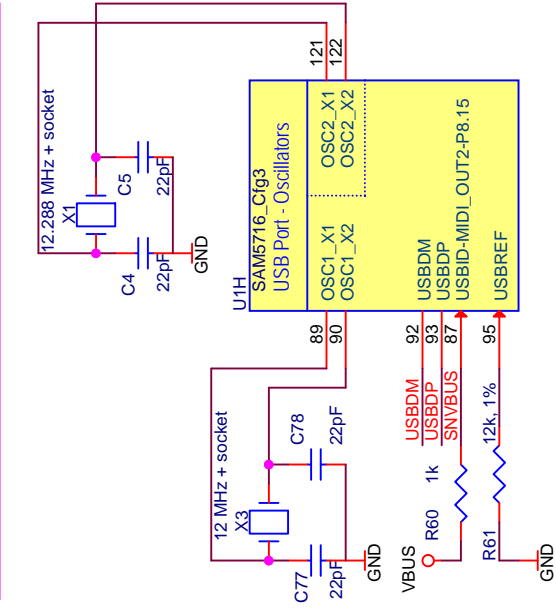
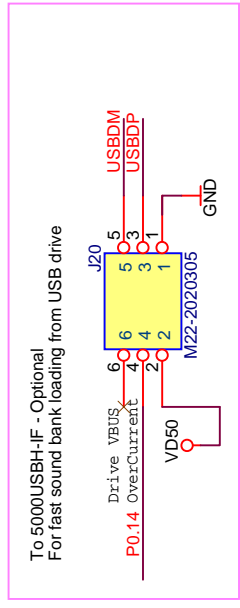


SDR SDRAM





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](mailto: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.*