5704FX-DK_Rev1

Professional Audio

Development and Evaluation Board for SAM5704

Overview

5704FX-DK is a high quality reference board for development and evaluation of Professional Audio applications based on SAM5704 (AUDIO & MUSIC MULTI-DSP PROCESSOR).
The SAM5704 can be used in 6 different hardware configurations for different applications. On 5704FX-DK board the SAM5704 is running in the hardware configuration dedicated to audio professional processing.
Digital Audio Streaming can be send and received through I2S, SPDIF, USB, Ethernet embedded ports. External SRAM can be connected for extended delay lines. Firmware can be loaded from host or from low cost serial Flash memory. The SAM5704 provides also firmware code encryption for copy protection purpose.

Beside the SAM5704, the 5704FX-DK_Rev0 hardware includes:

- 3 Audio DAC: AKM AK4384(24-bit, DR:106dB, THD+N:-94dB)
- 1 Audio ADC AKM AK5386 (24-bit, DR:110dB, S/(N+D):96dB)
- 8Mbit SRAM (optional): CYPRESS CY62157EV30LL (512k*16) for extended delay lines
- DataFlash® memory ATMEL AT45DB041D. for firmware and data storage
- USB High Speed, Device mode
- Ethernet PHY and connector
- Optical SPDIF In and Out

Operating Mode

5704FX-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 internal RAM with Dream SamVS-C development software. With SamVS or ProgSam software tool it is possible to program the firmware in DataFlash memory for stand-alone mode. The ProgSam tool allows also programming the eFuses in SAM5704 with the encryption key used for code protection.
- Stand-alone mode:
  In this mode the SAM5704 loads the program from the DataFlash memory at startup then executes it in its internal RAM.

Connectors Configuration

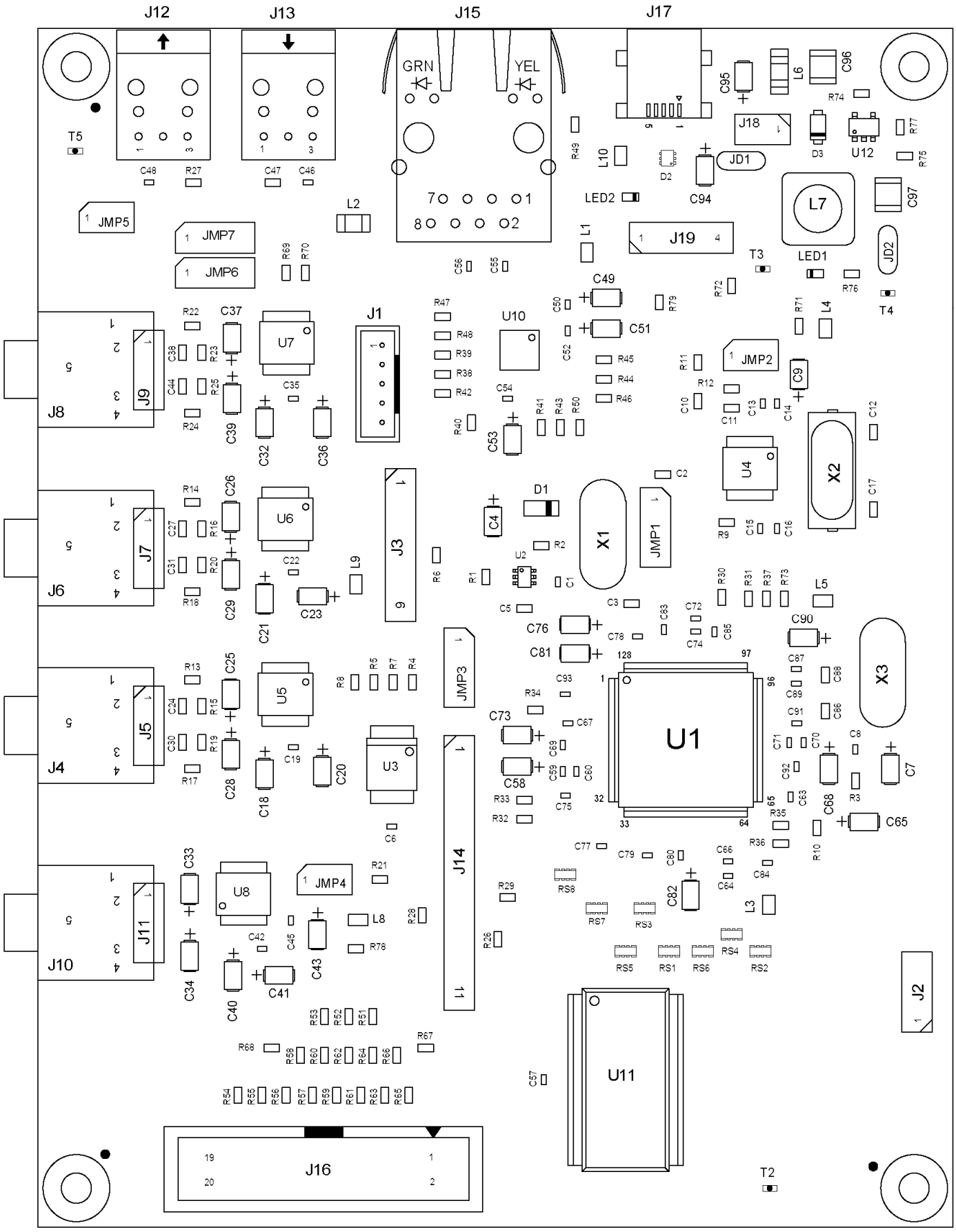
Name	Reference	Type	Description
DEBUG / PROGRAM	J1	JST PH Series, 1*5	Serial connection for debug and program, compatible with Dream 5000DBG-IF
ANA INPUT	J2	1*3	Analog input for potentiometer
MIDI	J3	1*6	Access to MIDI1 and MIDI2 ports
LINE OUT 0-1	J4	Mini Jack	Audio output channels 0-1 (1.2V RMS)
	J5 (Optional, n.m.)	1*3	Audio output channels 0-1 (1.2V RMS)
LINE OUT 2-3	J6	Mini Jack	Audio output channels 2-3 (1.2V RMS)
	J7 (Optional, n.m.)	1*3	Audio output channels 2-3 (1.2V RMS)
LINE OUT 4-5	J8	Mini Jack	Audio output channels 4-5 (1.2V RMS)
	J9 (Optional, n.m.)	1*3	Audio output channels 4-5 (1.2V RMS)
LINE IN 0-1	J10	Mini Jack	Audio input channels 0-1 (1V RMS)
	J11 (Optional, n.m.)	1*3	Audio input channels 0-1 (1V RMS)
SPDIF OUT	J12	DLT2160A	SPDIF Audio Optical Output
SPDIF IN	J13	DLR2160	SPDIF Audio Optical Input
AUDIO EXT	J14	1*11	Extension for additional digital audios I/Os
ETHERNET	J15	WURTH 7499011121A	ETHERNET 10/100
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.

“n.m.” = not mounted

Jumper Configuration

Reference	Default Setting	Description
JMP1	1-2	Select clock source for OSC2_X1pin: • 1-2: Xtal connected between OSC2_X1 and OSC2_X2 • 2-3: ACLK clock from VCXO connected to OSC2_X1
JMP2	Closed	Connect PWM_OUT (taken as secondary function of DAAD1 pin) to VCXO input.
JMP3	1-2	Select I2S audio output source for LINE OUT 0-1: • 1-2: DABD3 used for LINE OUT 0-1 • 2-3: DABD0 used for LINE OUT 0-1. Note: Secondary function for DABD0 pin is SPDIF_OUT. If SPDIF_OUT function is used, then DABD0 cannot be used.
JMP4	Closed	Connect DAAD0 to LINE IN 0-1.
JMP5	Closed	Connect SPDIF_OUT to SPDIF Optical Output Connector.
JMP6	0	Main Oscillator OSC1 frequency select: • JMP7 -> 0, JMP6 -> 0 : 12 MHz (default) • JMP7 -> 0, JMP6 -> 1 : 9.6 MHz • JMP7 -> 1, JMP6 -> 0 : 11.2896 MHz • JMP7 -> 1, JMP6 -> 1 : 12.288 MHz
JMP7	0	
JD1	Closed	Power supply source • Closed: Power supply from USB VBUS • Open: Power supply from J18
JD2	Closed	For test and measurement on 3.3V power supply

Layout



Bill of Material

SAM5704 Development Board - Revised: October 20, 2015
5704FX-DK.DSN Revision: 1.2
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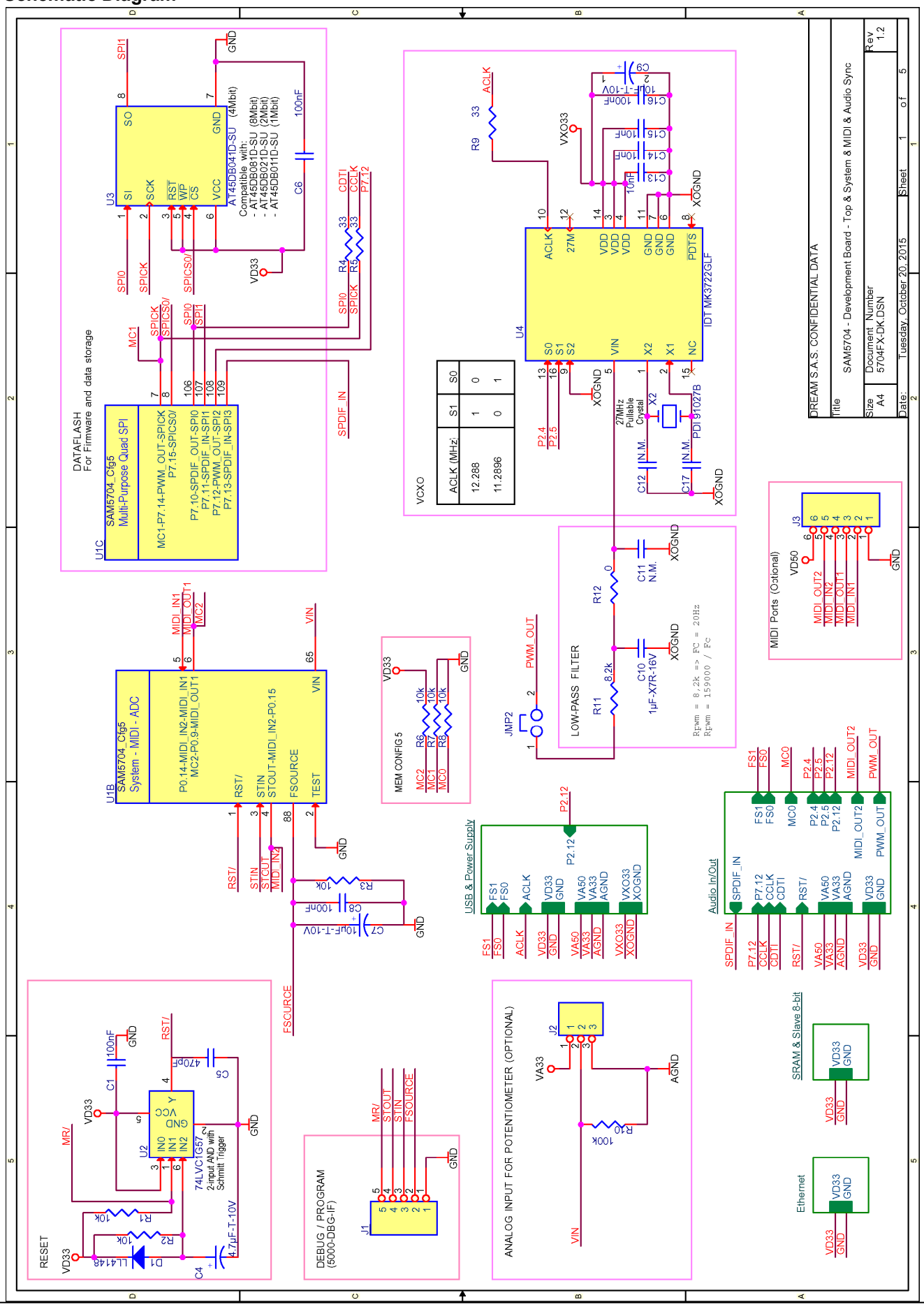
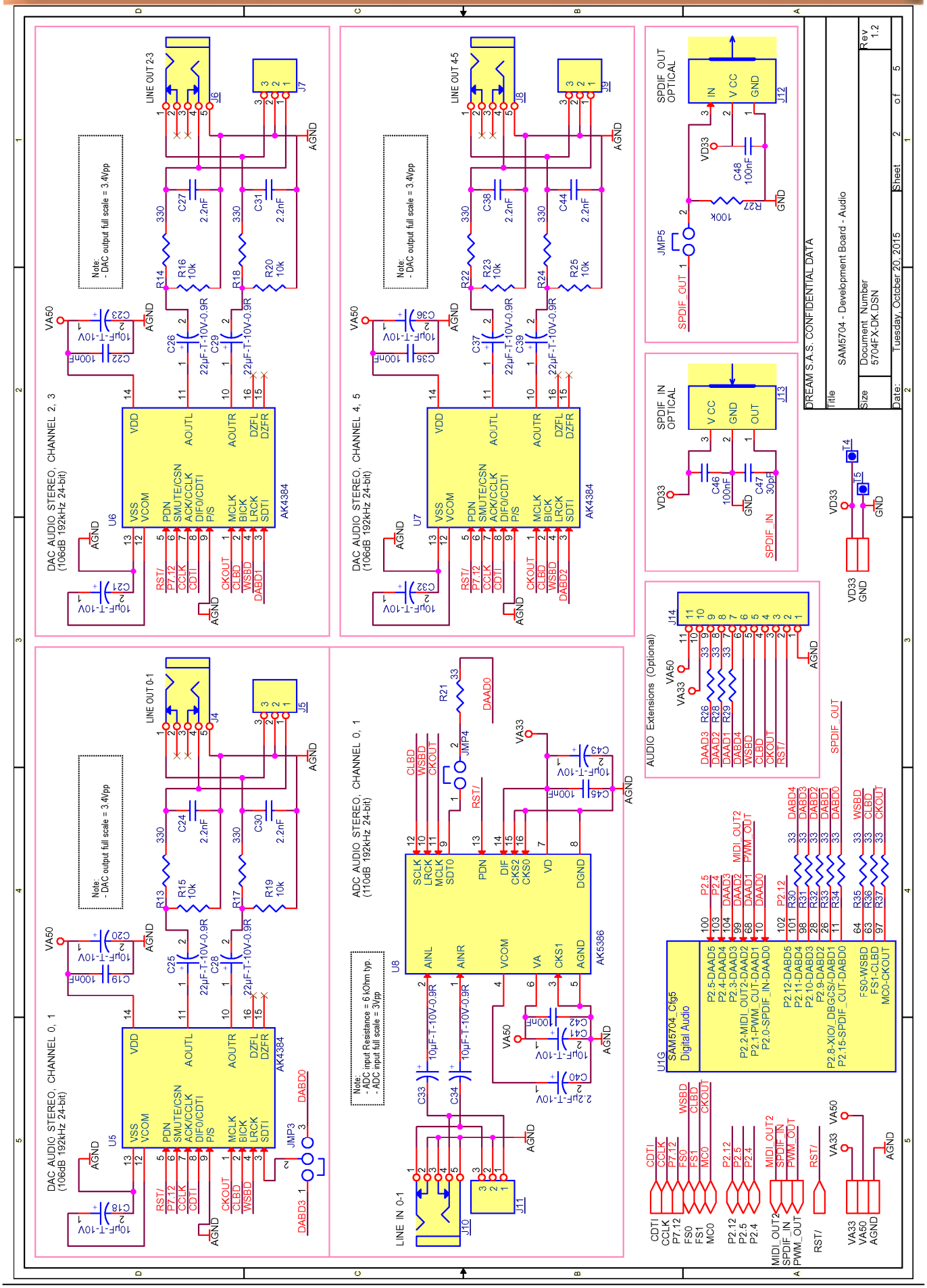
Item	Quantity	Reference	Part	Manufacturer	Designation
1	33	C1, C6, C8, C16, C19, C22, C35, C42, C45, C46, C48, C50, C52, C54, C55, C56, C57, C59, C63, C64, C67, C70, C72, C75, C78, C79, C83, C84, C85, C87, C91, C92, C93	100nF		
2	4	C2, C3, C86, C88	22pF		
3	2	C4, C76	4.7µF-T-10V		
4	1	C5	470pF		
5	17	C7, C9, C18, C20, C21, C23, C32, C36, C41, C43, C58, C65, C68, C73, C81, C82, C90	10µF-T-10V		
6	1	C10	1µF-X7R-16V		
7	3	C11, C12, C17	N.M.		
8	11	C13, C14, C15, C60, C66, C69, C71, C74, C77, C80, C89	10nF		
9	6	C24, C27, C30, C31, C38, C44	2.2nF		
10	6	C25, C26, C28, C29, C37, C39	22µF-T-10V-0.9R	AVX	TPSA226K010R0900
11	2	C33, C34	10µF-T-10V-0.9R	AVX	TPSA106K010R0900
12	1	C40	2.2µF-T-10V		
13	1	C47	30pF		
14	2	C49, C53	22µF-T-6V		
15	1	C51	2.2µF-T-6V		
16	2	C94, C95	1µF-T		
17	2	C96, C97	22µF-X5R		
18	1	D1	LL4148	VISHAY	LL4148
19	1	D2	TPD2E1B06	TI	TPD2E1B06
20	1	D3	CRS08	TOSHIBA	CRS08
21	2	JD1, JD2	Jumper Disk1P		
22	4	JMP1, JMP3, JMP6, JMP7	Jumper2P	Generic	BA25-Male-7mm-Gold
23	3	JMP2, JMP4, JMP5	Jumper1P	Generic	BA25-Male-7mm-Gold
24	1	J1	B5B-PH-K-S	JST	B5B-PH-K-S
25	1	J2	HEAD_3	Generic	BA25-Male-7mm-Gold
26	1	J3	HEAD_6	Generic	BA25-Male-7mm-Gold
27	3	J4, J6, J8	JACK 3.5 STEREO	3E	15.427
28	3	J5, J7, J9	N.M.		
29	1	J10	JACK 3.5 STEREO	3E	15.427
30	1	J11	N.M.		

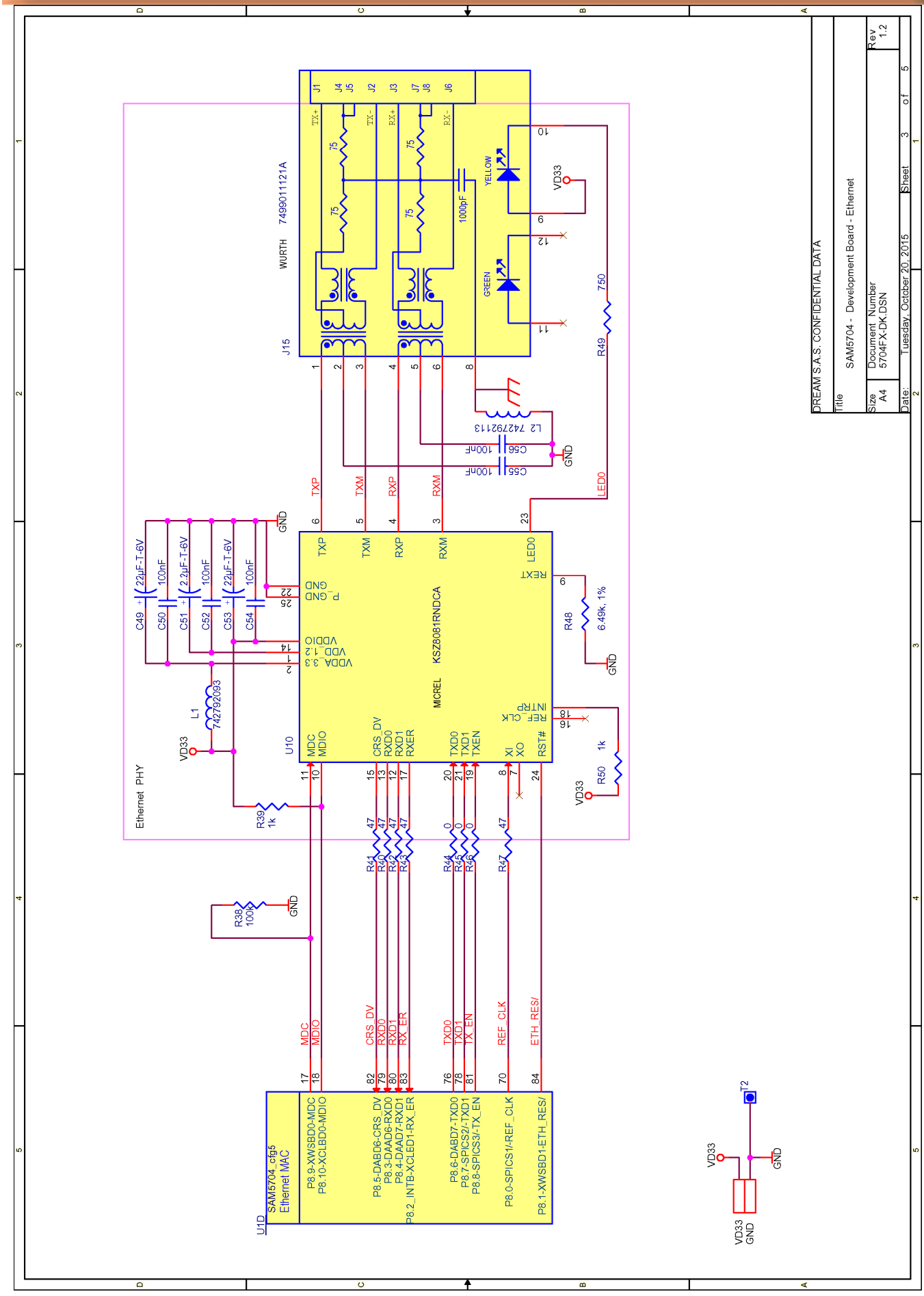
Item	Quantity	Reference	Part	Manufacturer	Designation
31	1	J12	DLT2160A	AIXIN OPTO-ELECTRICAL	DLT2160A
32	1	J13	DLR2160	AIXIN OPTO-ELECTRICAL	DLR2160
33	1	J14	HEAD_11	Generic	BA25-Male-7mm-Gold
34	1	J15	7499011121A	WURTH	7499011121A
35	1	J16	HEAD_10X2		
36	1	J17	651 005 161 21	WERI	651 005 161 21
37	1	J18	N.M.		
38	1	J19	N.M.		
39	1	LED1	TLMS1000-Vishay	VISHAY	TLMS1000-GS08
40	1	LED2	TLMG1100-Vishay	VISHAY	TLMG1100
41	7	L1, L3, L4, L5, L8, L9, L10	742792093	WURTH	742792093
42	1	L2	742792113	WURTH	742792113
43	1	L6	NFM41PC204F1H3	MURATA	NFM41PC204F1H3
44	1	L7	744777003	WURTH	744777003
45	8	RS1, RS2, RS3, RS4, RS5, RS6, RS7, RS8	4x10		
46	14	R1, R2, R3, R6, R7, R8, R15, R16, R19, R20, R23, R25, R69, R70	10k		
47	15	R4, R5, R9, R21, R26, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37	33		
48	9	R10, R27, R38, R51, R52, R53, R67, R68, R74	100k		
49	1	R11	8, 2k		
50	6	R12, R44, R45, R46, R71, R78	0		
51	6	R13, R14, R17, R18, R22, R24	330		
52	3	R39, R50, R72	1k		
53	5	R40, R41, R42, R43, R47	47		
54	1	R48	6.49k, 1%		
55	3	R49, R76, R79	750		
56	13	R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66	22		
57	1	R73	12k, 1%		
58	1	R75	45.3k 1%		
59	1	R77	10k 1%		
60	4	T2, T3, T4, T5	TestPoint	Vogt	N.M. (985.62 or 1000C.22)

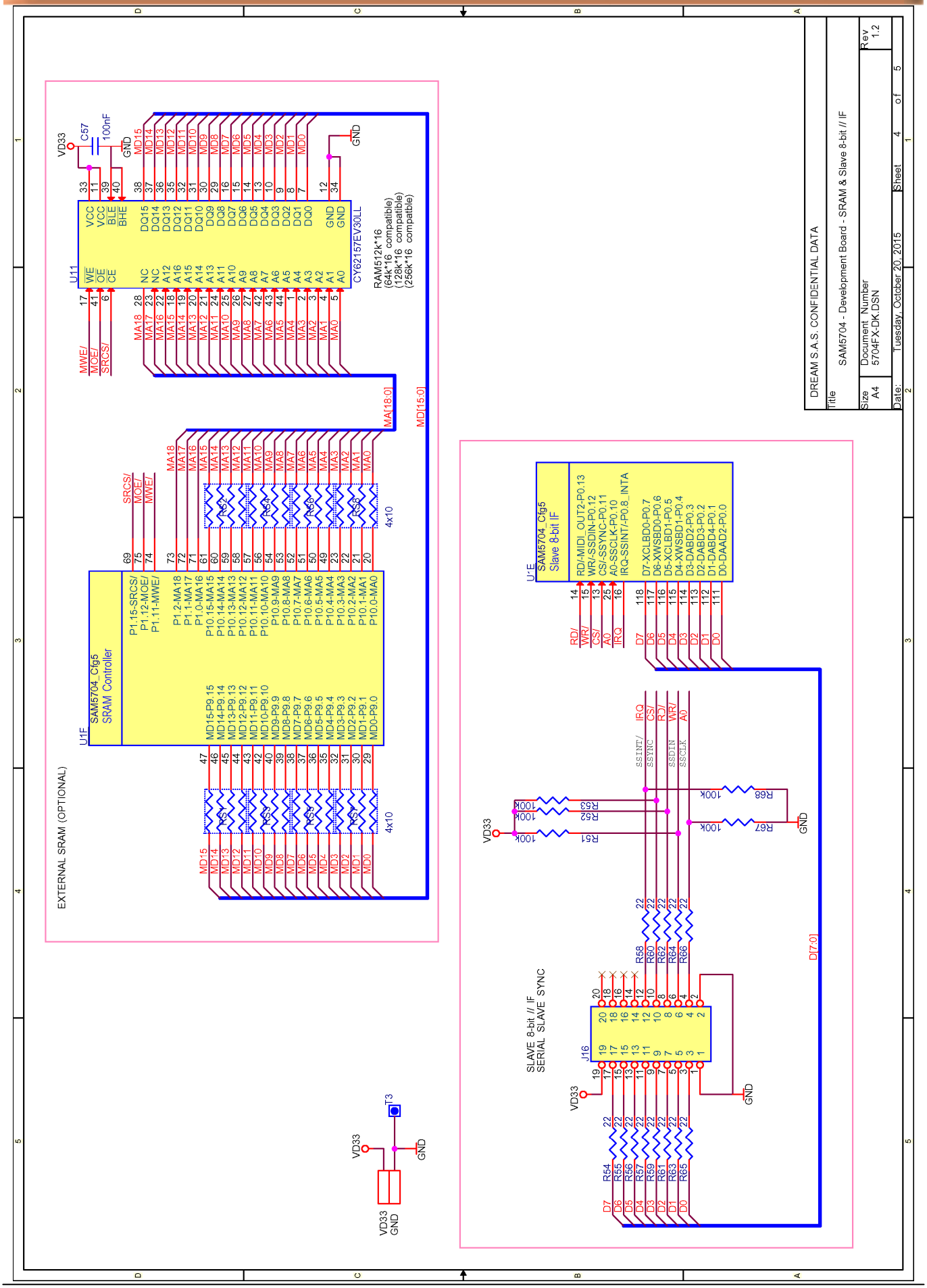
Item	Quantity	Reference	Part	Manufacturer	Designation
61	1	U1	SAM5704_Cfg5		
62	1	U2	74LVC1G57	TI	74LVC1G57DCK
63	1	U3	AT45DB041D-SU	ATMEL	AT45DB041D-SU or AT45DB041D-SSU
64	1	U4	IDT MK3722GLF	IDT	MK3722GLF
65	3	U5, U6, U7	AK4384	AKM	AK4384VT
66	1	U8	AK5386	AKM	AK5386VT
67	1	U10	KSZ8081RNDCA	MICREL	KSZ8081RNDCA
68	1	U11	CY62157EV30LL	CYPRESS	CY62157EV30LL
69	1	U12	LM2830X	NS	LM2830X
70	1	X1	12.288 MHz + socket	FISCHER	PQ18
71	1	X2	PDI 91027B	PDI	L427000XFSA14BC
72	1	X3	12 MHz + socket	FISCHER	PQ18

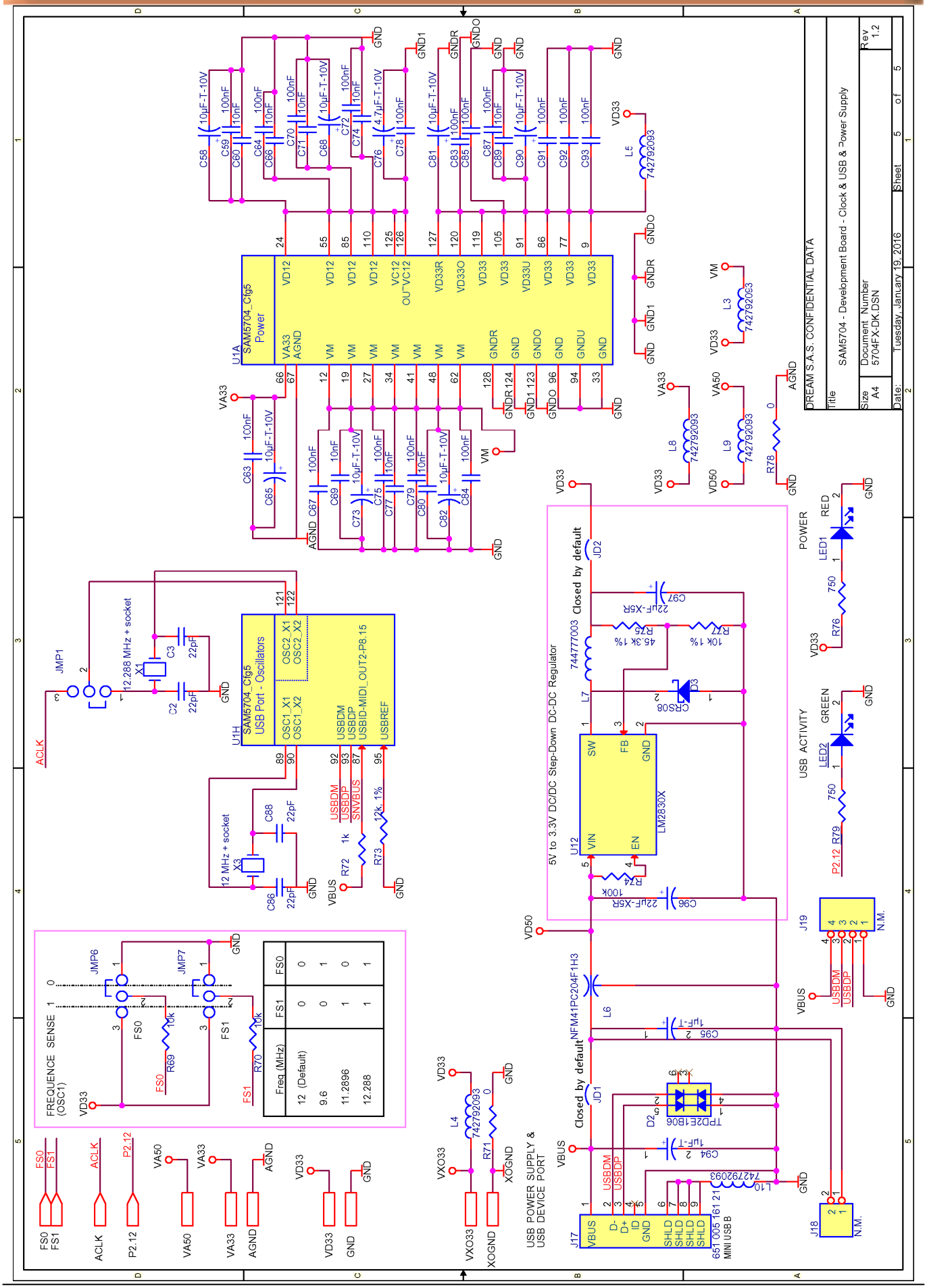
Schematic Diagram











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