

Overview

5504FX-EK is a high quality and low cost reference board for effects applications based on SAM5504 (AUDIO & MUSIC MULTI-DSP PROCESSOR).

The SAM5504 can be used in 2 different hardware configurations for different applications. On 5504FX-EK board the SAM5504 is running in a hardware configuration well suited for effects processing.

Digital Audio Streaming can be sent and received through an Audio CODEC or USB port. Effect parameter control can be done via USB port (using MIDI protocol), from an external front panel, or from host port. External SPI SRAM can be added when long delay lines are needed. The firmware can be loaded from serial Flash memory or from host. The SAM5504 provides also firmware code encryption for copy protection purpose.

Beside the SAM5504, the 5504FX-EK_Rev1 hardware includes:

- Audio CODEC: AKM AK4556 (24bit | ADC: S/N=103dB, S/N+D=91dB | DAC: S/N=106dB, S/N+D=90dB)
- SPI NOR Flash memory WINBOND W25X20CLSNIG: 2Mbit, for firmware and data storage
- Footprint for optional SPI SRAM (e.g. MICROCHIP 23LC1024:1Mbit, for extended delay lines)
- USB High Speed, Device mode
- Connection to dedicated Front panel or Host

Hardware Configuration

This reference design kit also includes a front panel. It offer simple user interface made of:

- 16-position selector (Gray encoder)
- 2 x tact switches
- 2 x LEDs
- 3 x analog potentiometers

Operating Mode

5504FX-EK 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 SPI Flash memory for stand-alone mode. The ProgSam tool allows also programming the eFuses in SAM5504 with the encryption key used for code protection.
- Stand-alone mode:
In this mode the SAM5504 loads the program from the SPI Flash memory or form Host 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
FX IN	J2	Mini Jack	Audio stereo input channels (2.3Vpp)
	J5 (Optional, n.m.)	1*3	Audio stereo input channels (2.3Vpp)
FX OUT	J3	Mini Jack	Audio stereo output channels (2.3Vpp)
	J4 (Optional, n.m.)	1*3	Audio stereo output channels (2.3Vpp)
MULTI-PURPOSE INTERFACE	J6	FFC 20, 1mm	Can be used as: - Slave // 8-bit port for firmware download and control from host - Serial Slave port for firmware download and control from host - MIDI port for firmware download and control from host - GPIOs + 3-channel ADC for front panel connection
USB POWER SUPPLY & USB DEVICE PORT	J7	Micro USB B	USB connector used to power the board. Can also be used as USB device full or high speed port.
POWER SUPPLY	J8 (Optional, n.m.)	1*2	Power supply if JD1 open, +5V/0.5A, GND on pin 1
USB DEVICE PORT	J9 (Optional, n.m.)	1*4	USB device full or high speed port if J7 is not used.

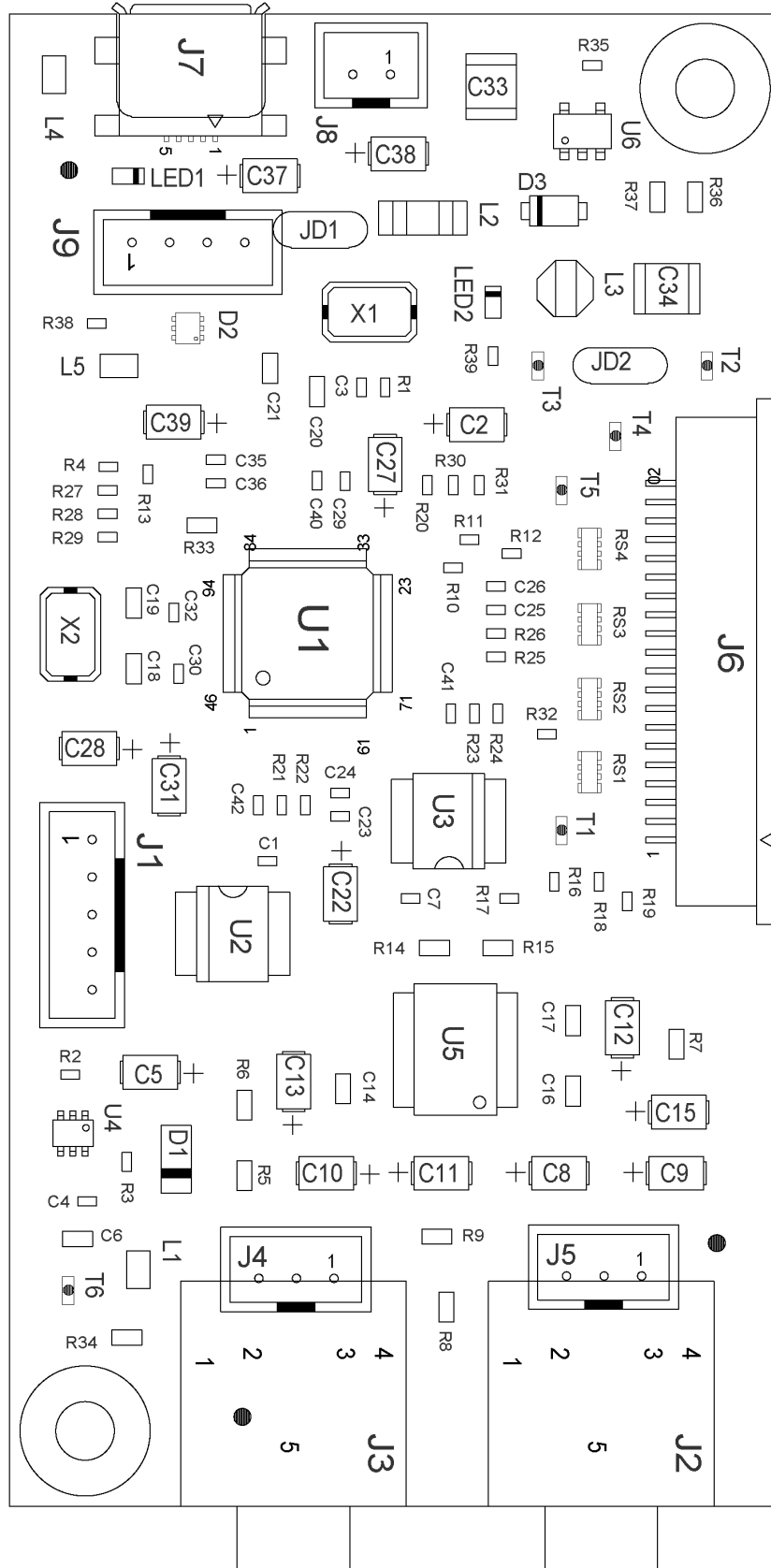
“n.m.” = not mounted

Jumper Configuration

Reference	Default Setting	Description
JD1	Closed	Power supply source <ul style="list-style-type: none"> Closed: Power supply from USB VBUS Open: Power supply from J8
JD2	Closed	For test and measurement on 3.3V power supply

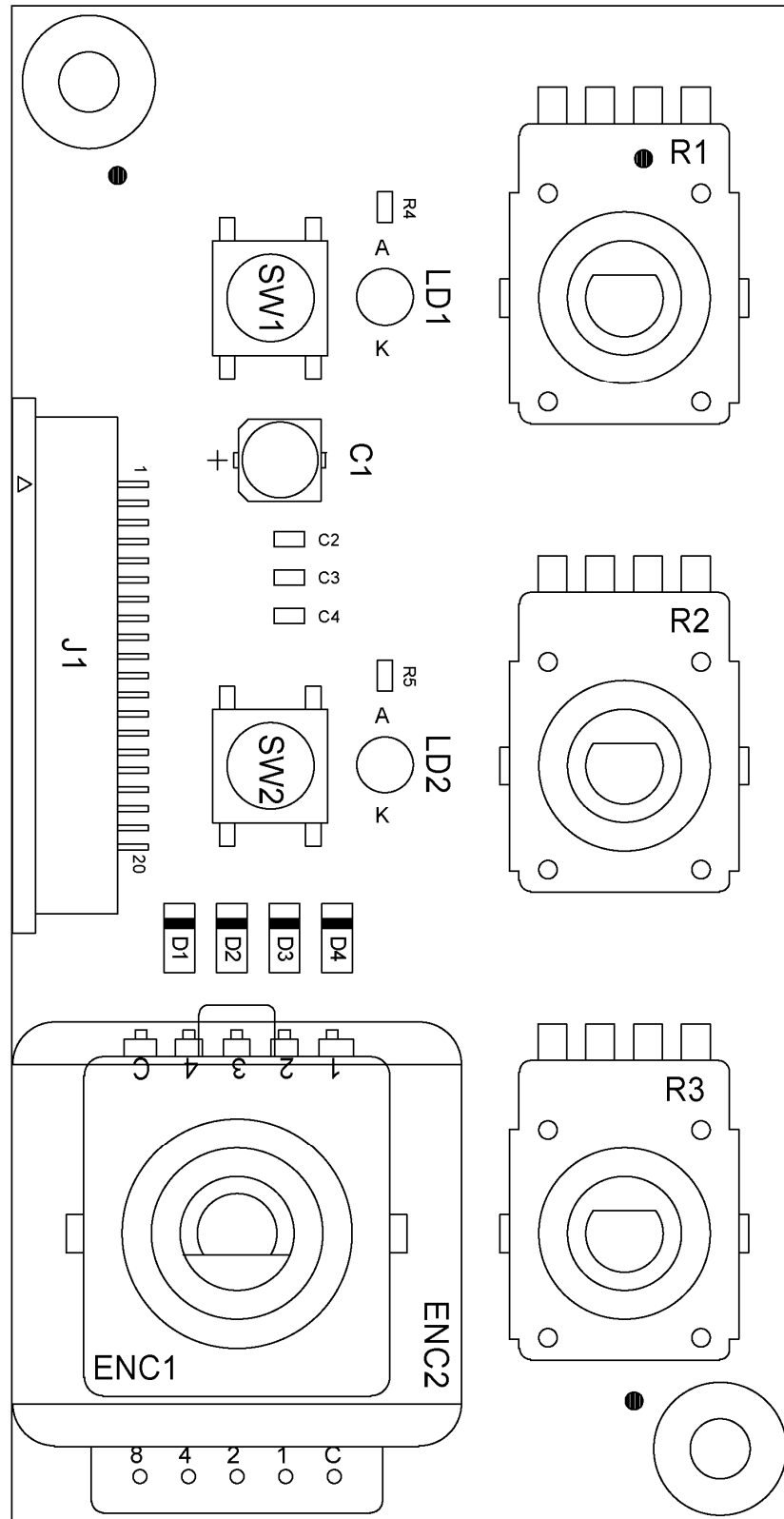
Layout – Effect Board

Size: 0.37 dm² (89.50 mm x 41.00 mm)



Layout – Front Panel

Size: 0.37 dm² (89.50 mm x 41.00 mm)



Bill of Material

SAM5504 - FX Evaluation Board - Revised: June 02, 2015

5504FX-EK.DSN Revision: 1

Page 1

Item	Quantity	Reference	Part	Manufacturer	Designation
1	13	C1, C3, C4, C7, C23, C25, C29, C30, C32, C35, C40, C41, C42	100nF		
2	7	C2, C12, C15, C22, C27, C31, C39	10µF-T-10V		
3	2	C5, C28	4.7µF-T-10V		
4	1	C6	470pF		
5	2	C8, C9	10µF-T-10V-0.9R	AVX	TPSA106K010R0900
6	2	C10, C11	22µF-T-10V-0.9R	AVX	TPSA226K010R0900
7	1	C13	2.2µF-T-10V		
8	3	C14, C16, C17	100nF		
9	4	C18, C19, C20, C21	22pF		
10	3	C24, C26, C36	10nF		
11	2	C33, C34	22µF-X5R		
12	2	C37, C38	1µF-T		
13	1	D1	LL4148	VISHAY	LL4148
14	1	D2	TPD2E1B06	TI	TPD2E1B06
15	1	D3	CRS08	TOSHIBA	CRS08
16	2	JD1, JD2	Jumper Disk1P		
17	1	J1	B5B-PH-K-S	JST	B5B-PH-K-S
18	2	J2, J3	JACK 3.5 STEREO	3E	15.427
19	2	J4, J5	N.M.	JST	B3B-PH-K-S
20	1	J6	AMP- 2-84952-0	TYCO ELECTRONICS	AMP- 2-84952-0
21	1	J7	47642-0001	MOLEX	47642-0001
22	1	J8	N.M.	JST	B2B-PH-K-S
23	1	J9	N.M.	JST	B4B-PH-K-S
24	1	LED1	TLMG1100-Vishay	VISHAY	TLMG1100
25	1	LED2	TLMS1000-Vishay	VISHAY	TLMS1000-GS08
26	3	L1, L4, L5	742792093	WURTH	742792093
27	1	L2	NFM41PC204F1H3	MURATA	NFM41PC204F1H3
28	1	L3	744029003	WURTH	744029003
29	4	RS1, RS2, RS3, RS4	4x100		
30	6	R1, R2, R3, R4, R17, R19	10k		
31	2	R5, R8	220		
32	3	R6, R9, R14	10k		
33	1	R7	5.1		

SAM5504 - FX Evaluation Board - Revised: June 02, 2015

5504FX-EK.DSN Revision: 1

Page 2

Item	Quantity	Reference	Part	Manufacturer	Designation
34	4	R10, R11, R12, R13	33		
35	1	R15	N.M.		
36	2	R16, R18	N.M.		
37	14	R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R35	100k		
38	1	R33	12k, 1%		
39	1	R34	0		
40	1	R36	45.3k 1%		
41	1	R37	10k 1%		
42	2	R38, R39	750		
43	6	T1, T2, T3, T4, T5, T6	TestPoint	Vogt	N.M. (985.62 or 1000C.22)
44	1	U1	SAM5504_cfg2	DREAM	SAM5504
45	1	U2	W25X20CLSNIG	WINBOND	W25X20CLSNIG
46	1	U3	N.M.	MICROCHIP	23LC1024-I/SN
47	1	U4	74LVC1G57	TI	74LVC1G57DCK
48	1	U5	AK4556	AKM	AK4556VT
49	1	U6	LM2830X	NS	LM2830X
50	1	X1	12 MHz	ABRACON	ABM3-12.000MHZ- D2Y-T
51	1	X2	N.M.		

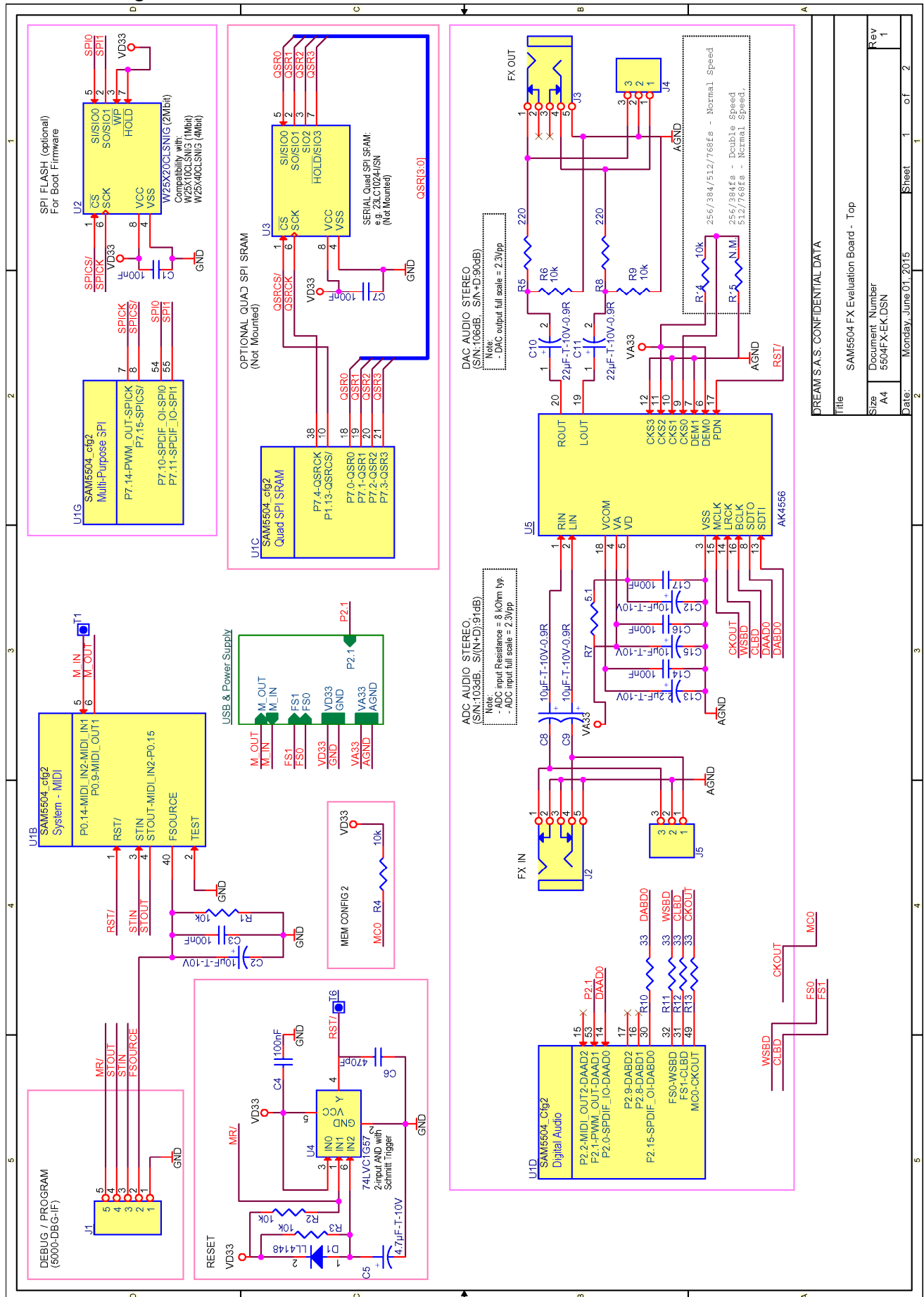
Front Panel - Guitar Effect - Revised: February 11, 2015

5504FXFP-EK.DSN Revision: 0

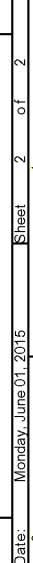
Page 1

Item	Quantity	Reference	Part	Manufacturer	Designation
1	1	C1	10 μ F-A-16V		
2	3	C2, C3, C4	100nF		
3	4	D1, D2, D3, D4	LL4148		
4	1	ENC1	REB161(9x7)PVB20FHGRY1-4-16-PCE	NOBLE	REB161(9x7)PVB20FHGRY1-4-16-PCE
5	1	ENC2	25LB22-G	GRAYHILL	25LB22-G
6	1	J1	AMP- 2-84952-0	TYCO ELECTRONICS	AMP- 2-84952-0
7	1	LD1	TLHG4400-Vishay	VISHAY	TLHG4400
8	1	LD2	TLHR4400-Vishay	VISHAY	TLHR4400
9	3	R1,R2,R3	STRK11K07	ALPS	STRK11K07
10	2	R4,R5	560		
11	2	SW1,SW2	DTSM-6	APEM	DFTSM-61N

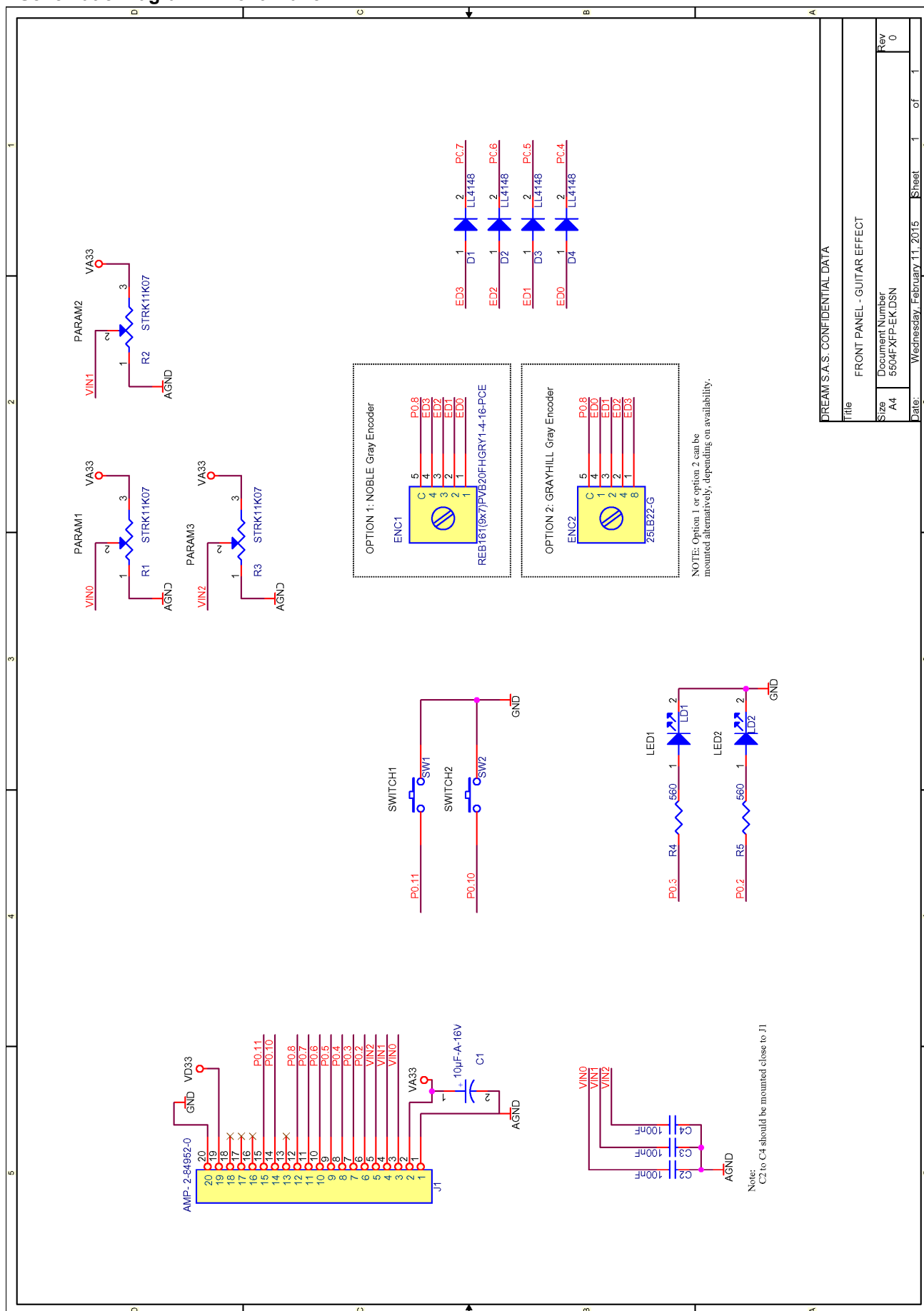
Schematic Diagram – Effect Board



Title		SAM5504 FX Evaluation Board - Top	
Size	Document Number	5504FX-EK.DSN	
A4	Rev	1	
Date:	Monday, June 01, 2015	Sheet	1 of 2



Schematic Diagram – Front "Panel



DREAM S.A.S. CONFIDENTIAL DATA

Title FRONT PANEL - GUITAR EFFECT

Size A4 Document Number 5504FXP-EK DSN

Rev 0

Date: Wednesday, February 11, 2015 Sheet 1 of 1

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