



AKD5358A-B

AK5358A Evaluation Board Rev.0

GENERAL DESCRIPTION

AKD5358A-B is an evaluation board for the digital audio 24bit 96kHz A/D converter, AK5358A. AKD5358A-B has analog input circuits and a digital interface transmitter, and can achieve the interface with digital audio systems via opt-connector.

■ **Ordering guide**

AKD5358A-B --- AK5358A Evaluation Board

FUNCTION

- DIT (AK4114) with optical output

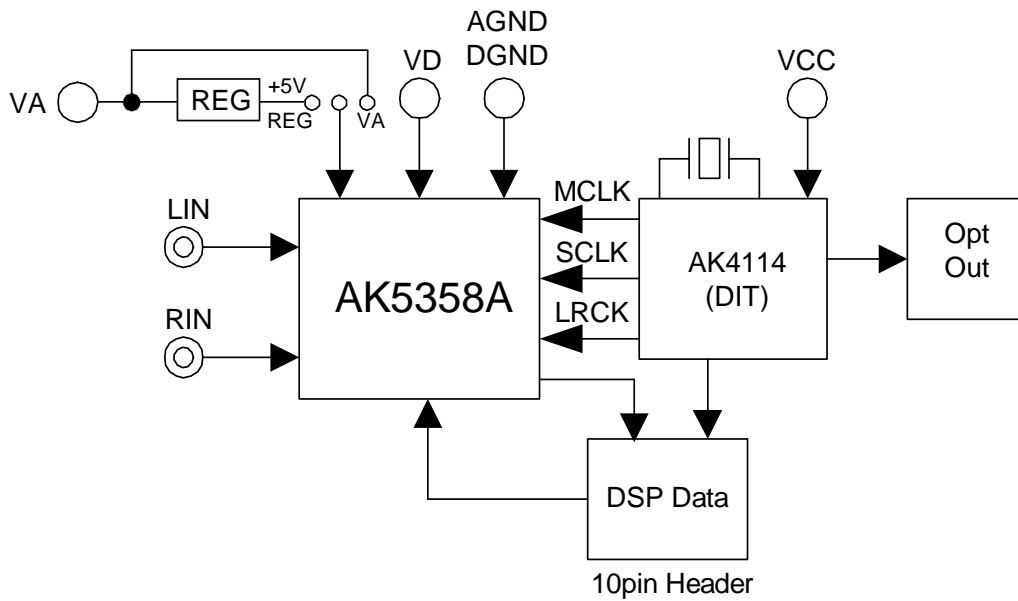


Figure 1. AKD5358A-B Block Diagram

* Circuit diagram and PCB layout are attached at the end of this manual.

1. Evaluation Board Manual

■ Operation sequence

1) Set up the power supply lines.

[VA]	(red)	= +15V	: for VA of AK5358A (typ. 5.0V)
[VD]	(orange)	= 2.7 ~ 5.5V	: for VD of AK5358A, 74HC14 (typ. 5.0V)
[VCC]	(red)	= 3.3V	: for AK4114
[AGND]	(black)	= 0V	: for analog ground
[DGND]	(black)	= 0V	: for logic ground

Each supply line should be distributed from the power supply unit.

2) Set up the evaluation mode, jumper pins and DIP switches. (See the followings.)

3) Power on.

The AK5358A and AK4114 should be reset once bringing SW2 = "L" upon power-up.

■ Evaluation mode

(1) Slave Mode

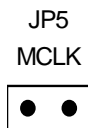
(1-1) A/D evaluation using DIT function of AK4114

PORT2 (DIT) is used. DIT generates audio bi-phase signal from received data and which is output through optical connector (TOTX141). It is possible to connect AKM's D/A converter evaluation boards on the digital-amplifier, which equips DIR input. Nothing should be connected to PORT1 (DSP).



(1-2) All interface signals including master clock are fed externally.

PORT1 (DSP) is used. All interface signals (MCLK, SCLK, LRCK) are provided to the AK5358A through PORT1. JP5 (MCLK) should be open. The DIF1 of SW1 (MODE) should be set to "H".



(2) Master Mode

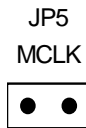
(2-1) A/D evaluation using DIT function of AK4114

PORT2 (DIT) is used. DIT generates audio bi-phase signal from received data and which is output through optical connector (TOTX141). It is possible to connect AKM's D/A converter evaluation boards on the digital-amplifier, which equips DIR input. Nothing should be connected to PORT1 (DSP). The DIF1 of SW1 (MODE) should be set to "H".



(2-2) Master clock is fed externally.

PORT1 (DSP) is used. MCLK is provided to the AK5358A through PORT1. JP5 (MCLK) should be open. The DIF1 of SW1 (MODE) should be set to "H".



■ Other jumper pins set up

1. JP1 (GND) : Analog ground and Digital ground
 OPEN : Separated.
 SHORT: Common. (The connector "DGND" can be open.) <Default>
2. JP2 (CKS1) : Setting of CKS1 pin for AK5358A
 H : Master mode
 L : Slave mode <Default>
3. JP3 (VA) : Select VA for AK5358A
 VA : 5V Supply from VA connector <Default>
 REG : 5V Supply from regulator. VA connector should be supplied +7~15V.
4. JP4 (VD) : Select VD for AK5358A
 Select VD

■ DIP Switch set up

[SW1] (MODE1): Setting the evaluation mode for AK5358A and AK4114
ON is “H”, OFF is “L”. CKS1 should be set by JP2.

No.	Name	OFF (“L”)	ON (“H”)
1	CKS0	See Table 2	
2	CKS2		
3	DIF	MSB justified	I ² S Compatible
4	DIF1	AK4114 Master mode	AK4114 Slave mode

Table 1. Mode Setting

Mode	CKS2	CKS1	CKS0	Input Level	Master/Slave	MCLK	SCLK
0	L	L	L	CMOS	Slave	256/384fs (8k≤fs≤96k) 512/768fs (8k≤fs≤48k)	≥ 48fs or 32fs
1	L	L	H			Reserved	
2	L	H	L	CMOS	Master	256fs (8k≤fs≤96k)	64fs
3	L	H	H	CMOS	Master	512fs (8k≤fs≤48k)	64fs
4	H	L	L			Reserved	
5	H	L	H			Reserved	
6	H	H	L	CMOS	Master	384fs (8k≤fs≤96k)	64fs
7	H	H	H	CMOS	Master	768fs (8k≤fs≤48k)	64fs

Table 2. Mode Setting of AK5358A

Note: AK4114 does not support MCLK=384fs/512fs/768fs.
PORT1 (DSP) should be used when MCLK=384fs/512fs/768fs.

■ The function of the toggle SW

Upper-side is “H” and lower-side is “L”.

[SW2] (PDN): Resets the AK5358A and AK4114. Keep “H” during normal operation.

■ Analog Input Circuits

Analog signal is input via J1(RIN) and J2(LIN) of RCA connectors.

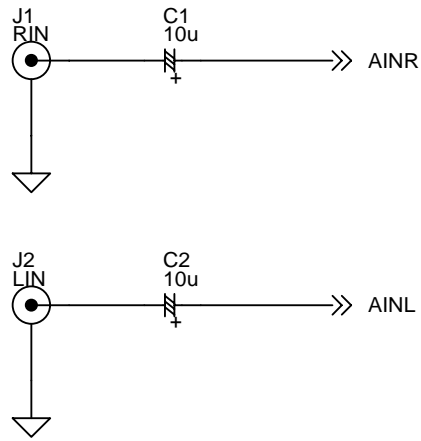


Figure 2. Analog Input circuits

* AKM assumes no responsibility for the trouble when using the circuit examples.

MEASUREMENT RESULTS

[Measurement condition]

- Measurement unit : Audio Precision, System Two Cascade
- MCLK : 256fs
- SCLK : 64fs
- fs : 48kHz, 96kHz
- Bit : 24bit
- Power Supply : VA = 5.0V, VD = 5.0V
- Interface : DIT
- Temperature : Room

fs=48kHz

Parameter	Input signal	Measurement filter	Results	
			L ch	R ch
S/(N+D)	1kHz, -1dB	20kLPF	92.2dB	92.2dB
DR	1kHz, -60dB	20kLPF	99.2dB	99.4dB
		20kLPF, A-weighted	101.8dB	102.2dB
S/N	No input	20kLPF	99.6dB	99.6dB
		20kLPF, A-weighted	102.5dB	102.4dB

fs=96kHz

Parameter	Input signal	Measurement filter	Results	
			L ch	R ch
S/(N+D)	1kHz, -1dB	40kLPF	90.0dB	90.0dB
DR	1kHz, -60dB	40kLPF	97.6dB	97.6dB
		40kLPF, A-weighted	104.2dB	104.1dB
S/N	No input	40kLPF	97.6dB	97.6dB
		40kLPF, A-weighted	104.4 dB	104.2dB

[ADC Plot : fs=48kHz]

AKM

AK5358A THD+N vs. Input Level
VA=5V, VD=5V, fs=48kHz, fin=1kHz

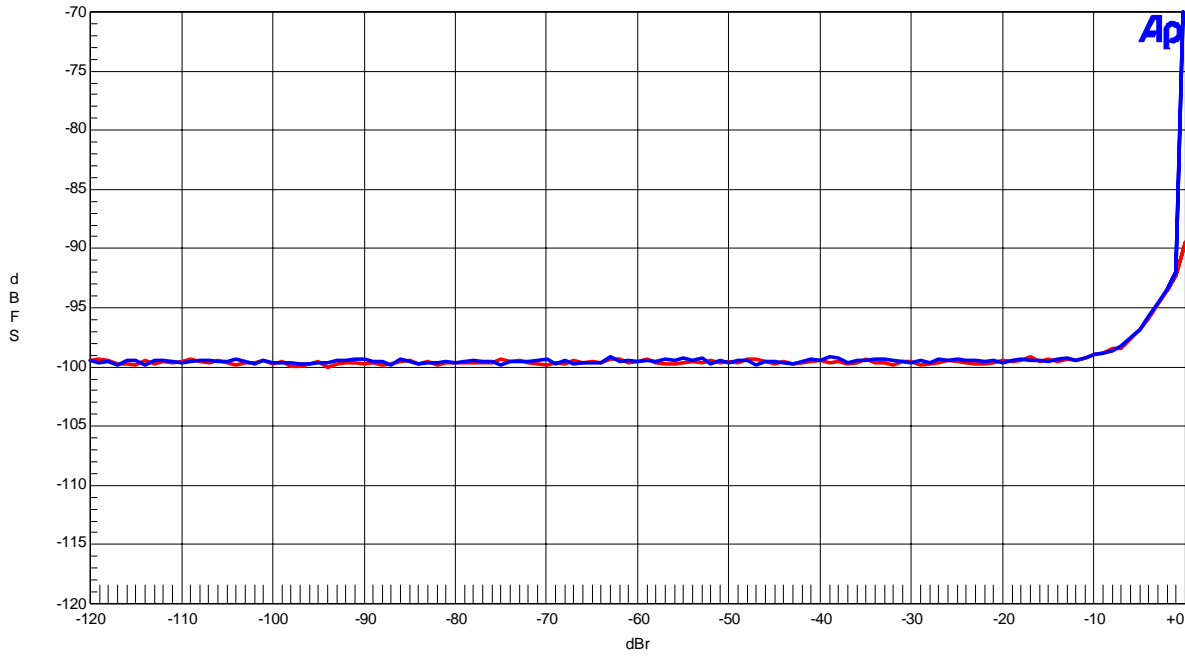


Figure 1. THD+N vs. Input Level

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AK5358A THD+N vs. Input Frequency
VA=5V, VD=5V, fs=48kHz, Input Level=-1dBr

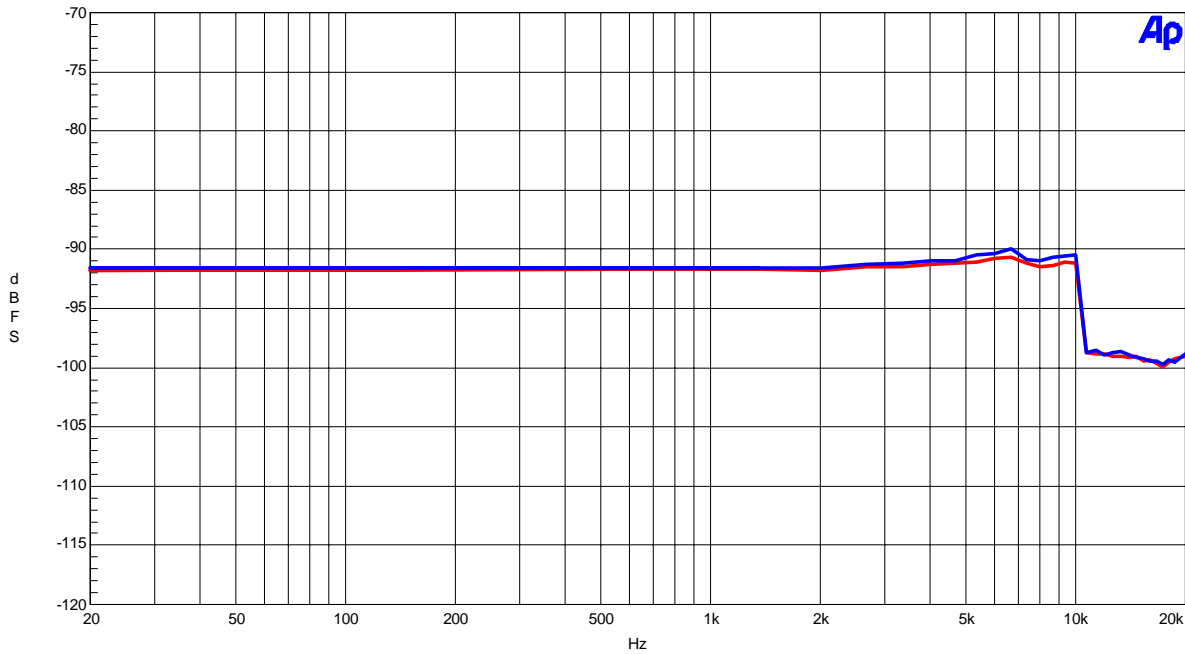


Figure 2. THD+N vs. Input Frequency

AKM

AK5358A Linearity
VA=5V, VD=5V, fs=48kHz, fin=1kHz

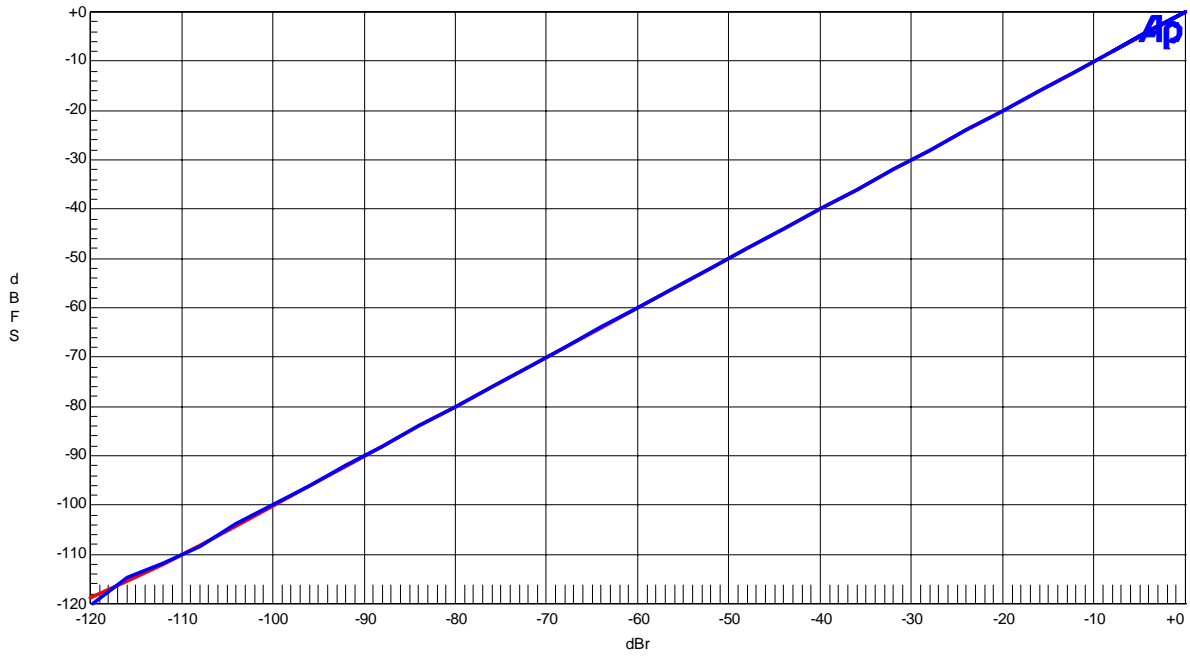


Figure 3. Linearity

AKM

AK5358A Frequency Response
VA=5V, VD=5V, fs=48kHz, Input Level=-1dBr

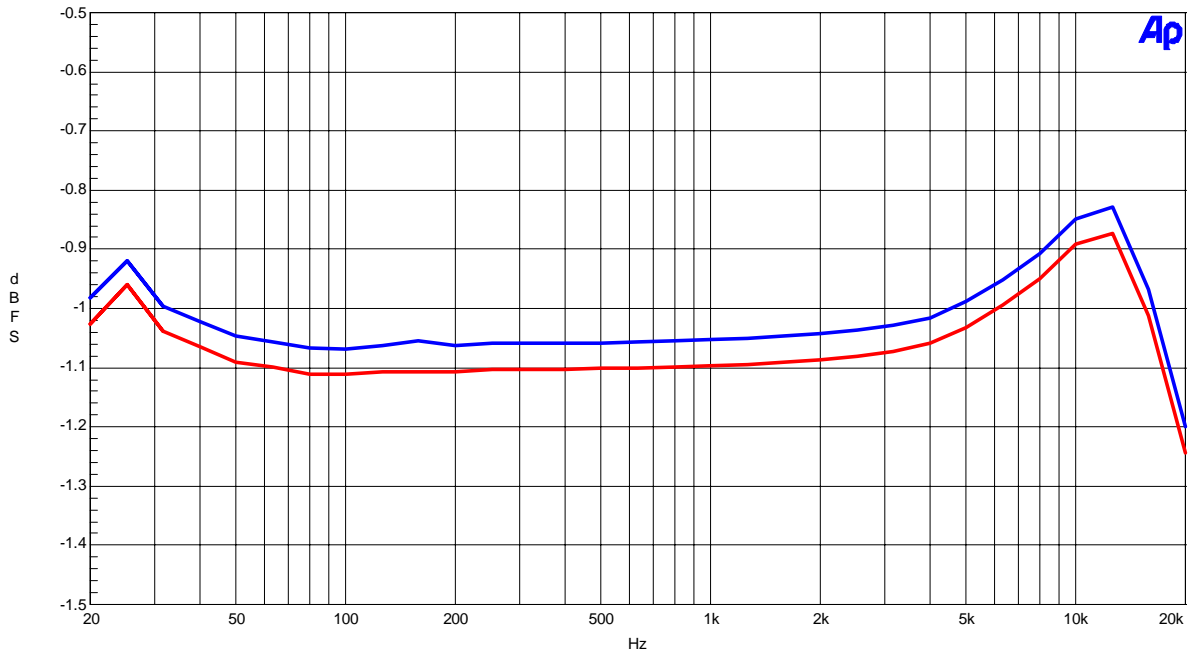


Figure 4. Frequency Response

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AK5358A Crosstalk
VA=5V, VD=5V, fs=48kHz, Input Level=-1dB

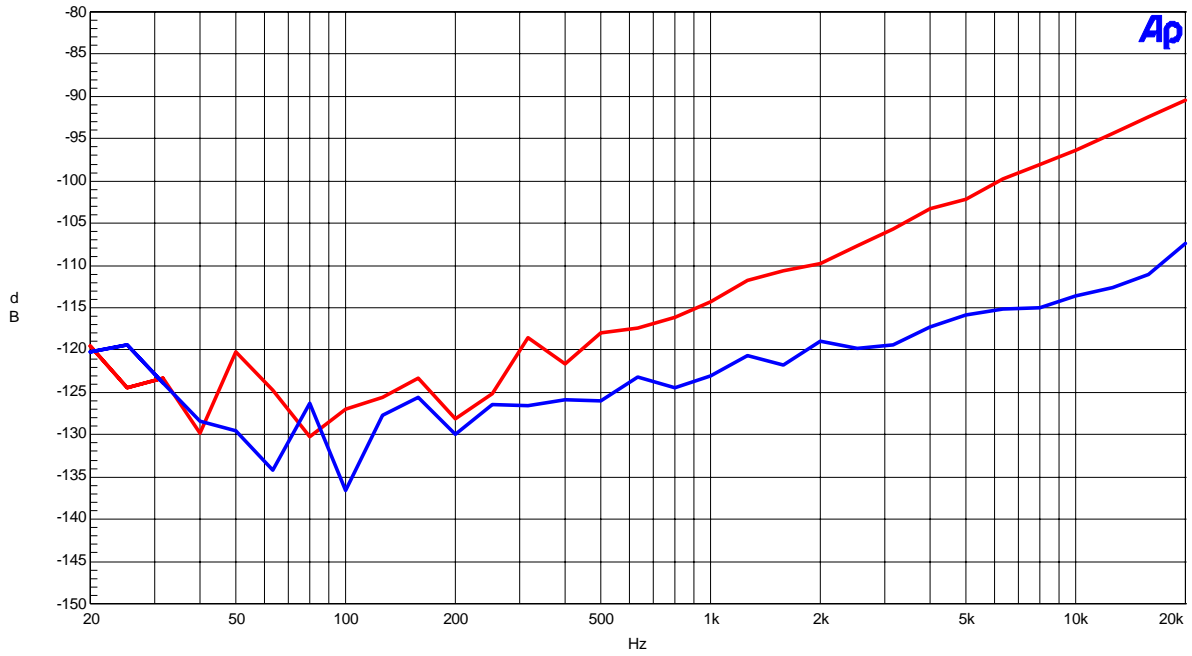


Figure 5. Crosstalk

AKM

AK5358A FFT
VA=5V, VD=5A, fs=48kHz, fin=1kHz, Input Level=-1dB

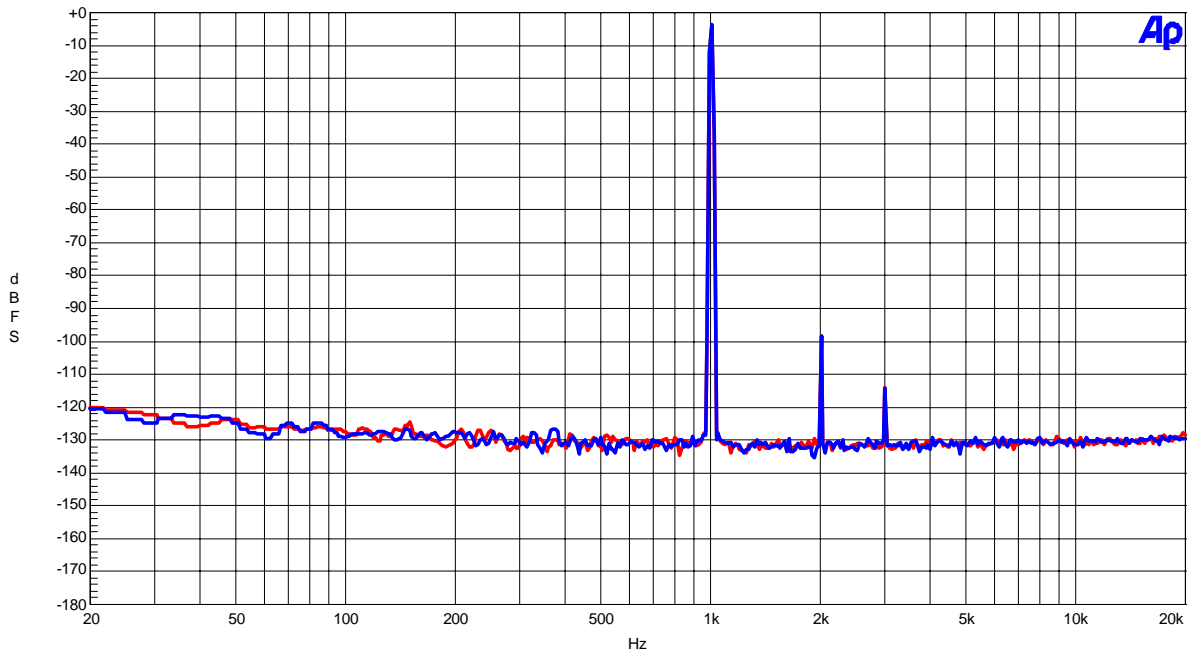


Figure 6. FFT Plot

AKM

AK5358A FFT
VA=5V, VD=5A, fs=48kHz, fin=1kHz, Input Level=-60dB

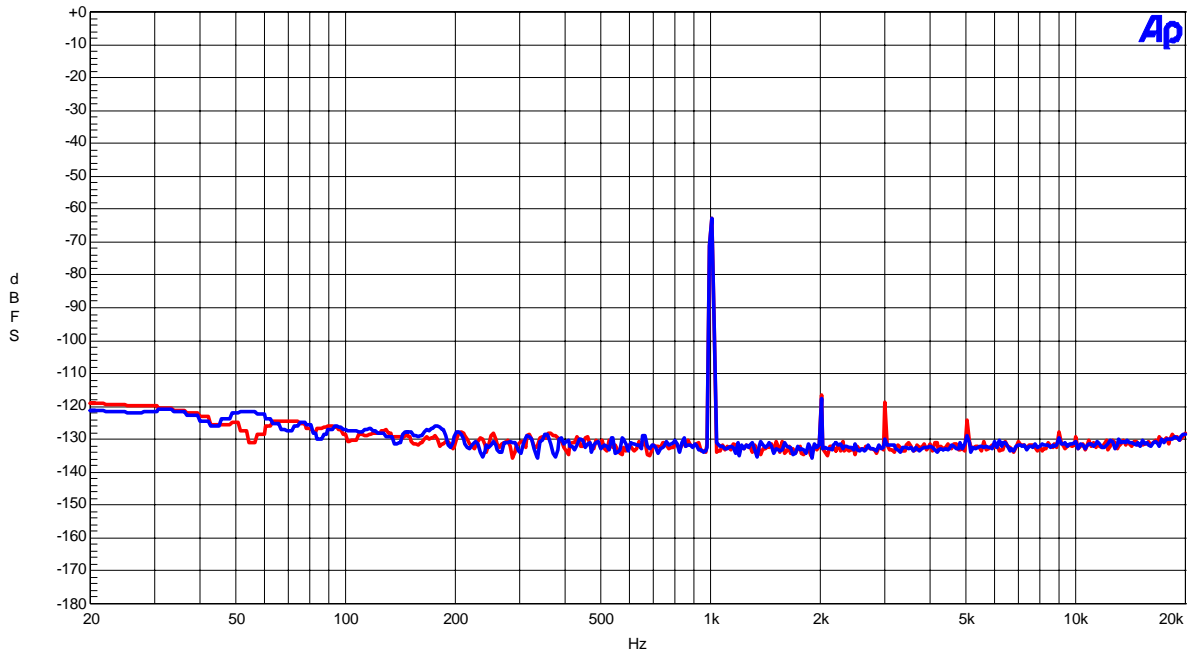


Figure 7. FFT Plot

AKM

AK5358A FFT
VA=5V, VD=5A, fs=48kHz, fin=No signal

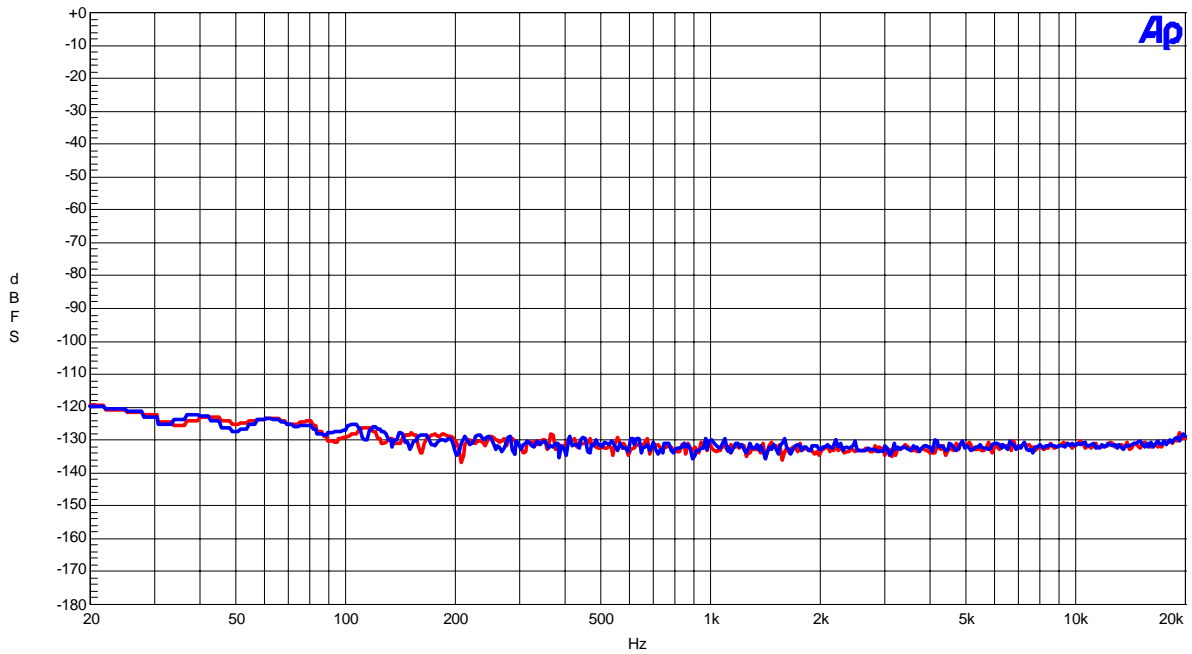


Figure 8. FFT Plot

[ADC Plot : fs=96kHz]

AKM

AK5358A THD+N vs. Input Level
VA=5V, VD=5V, fs=96kHz, fin=1kHz

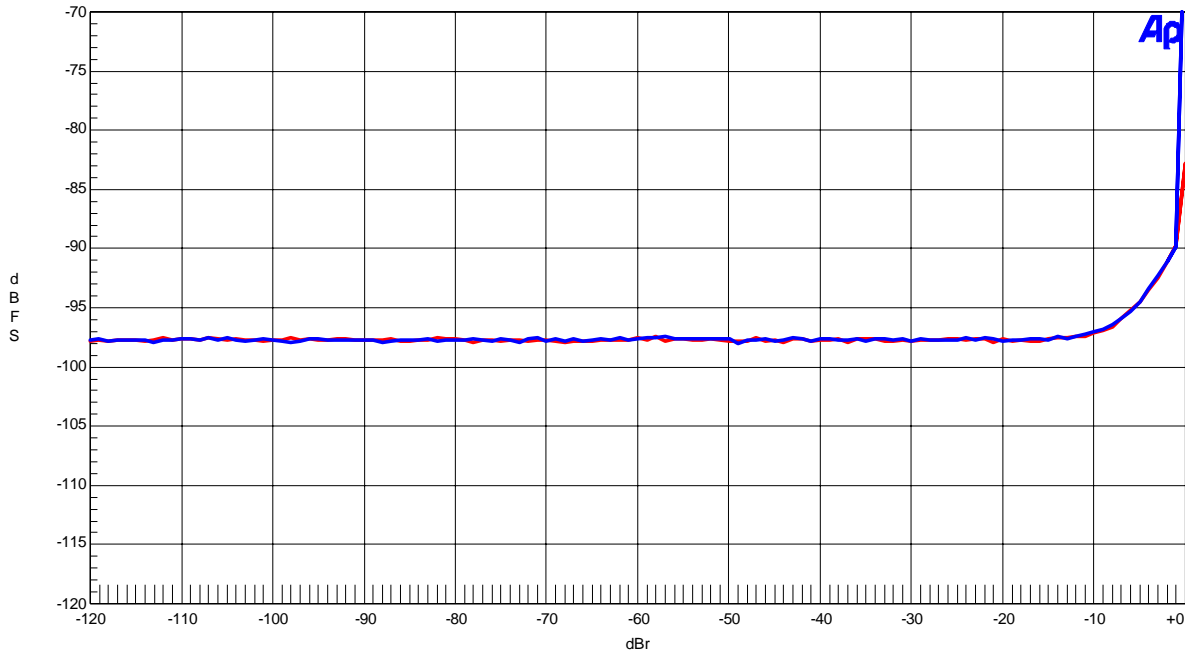


Figure 9. THD+N vs. Input Level

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AK5358A THD+N vs. Input Frequency
VA=5V, VD=5V, fs=96kHz, Input Level=-1dBr

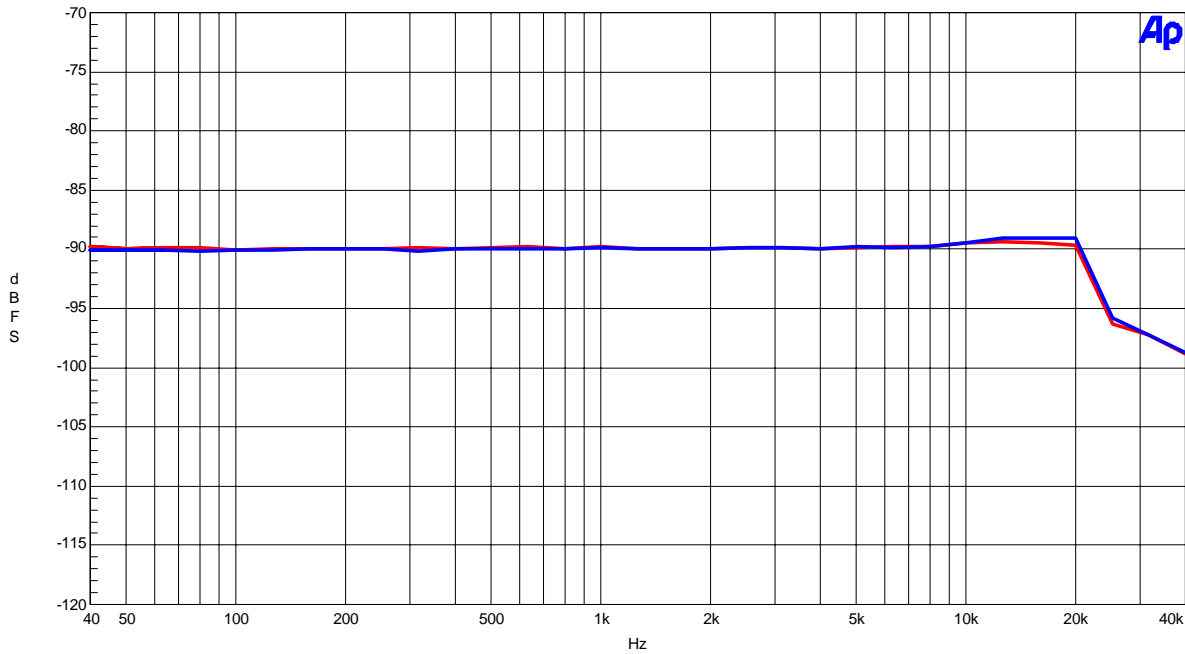


Figure 10. THD+N vs. Input Frequency

AKM

AK5358A Linearity
VA=5V, VD=5V, fs=96kHz, fin=1kHz

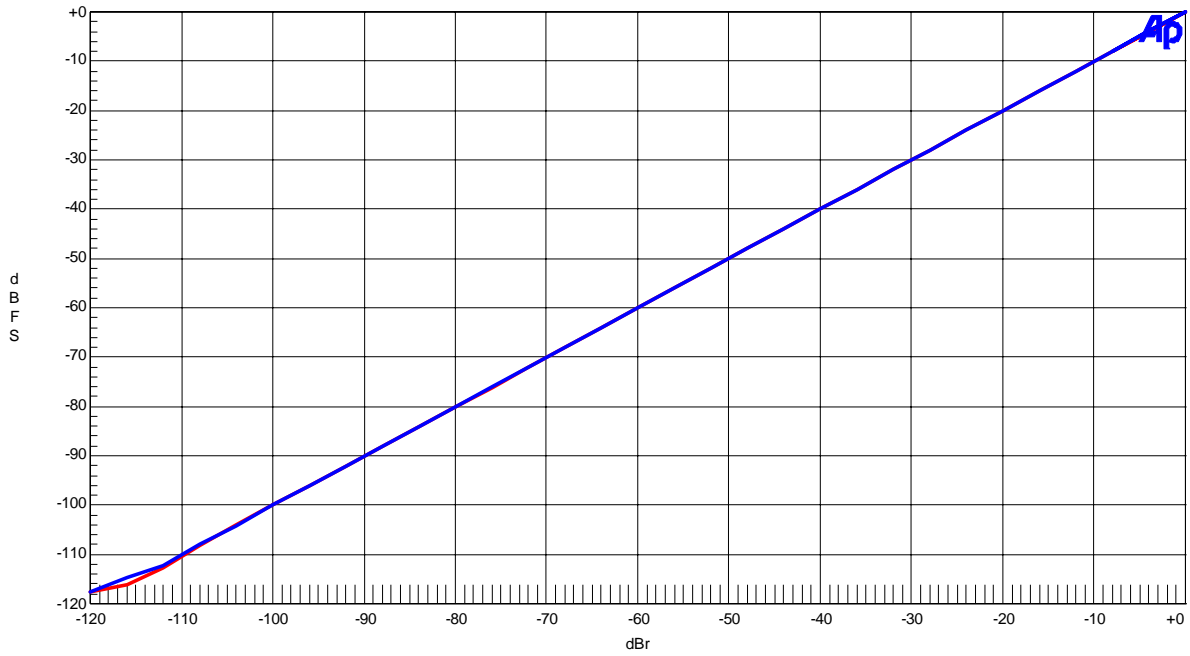


Figure 11. Linearity

AKM

AK5358A Frequency Response
VA=5V, VD=5V, fs=96kHz, Input Level=-1dBr

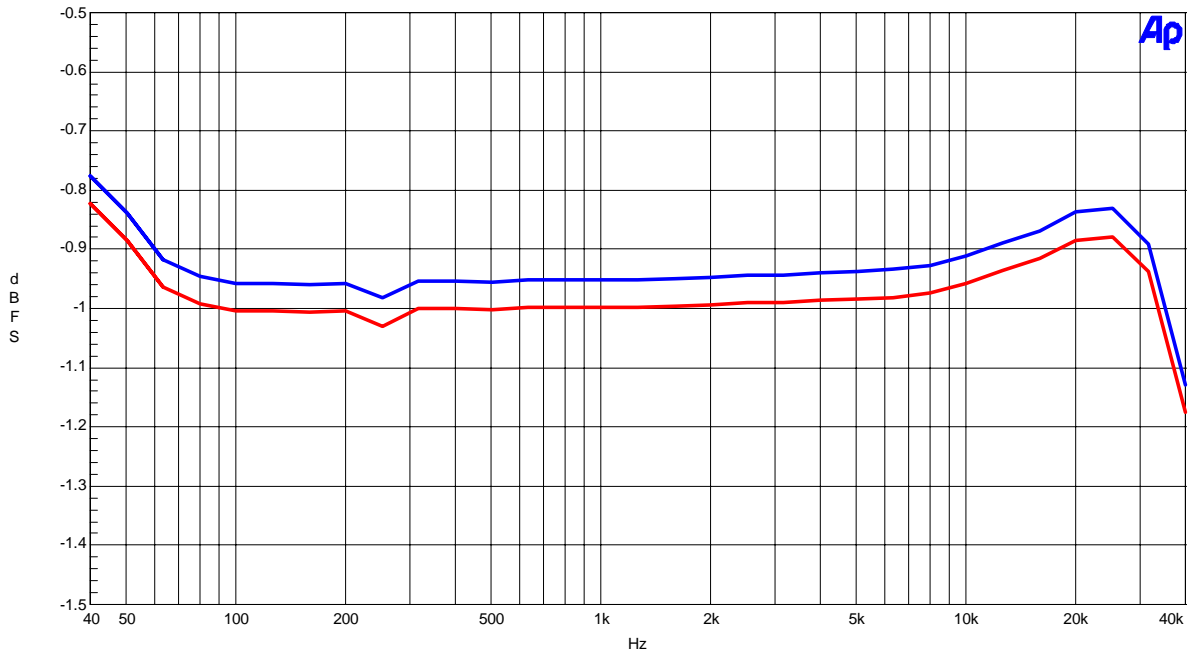


Figure 12. Frequency Response

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AK5358A Crosstalk
VA=5V, VD=5V, fs=96kHz, Input Level=-1dB_r

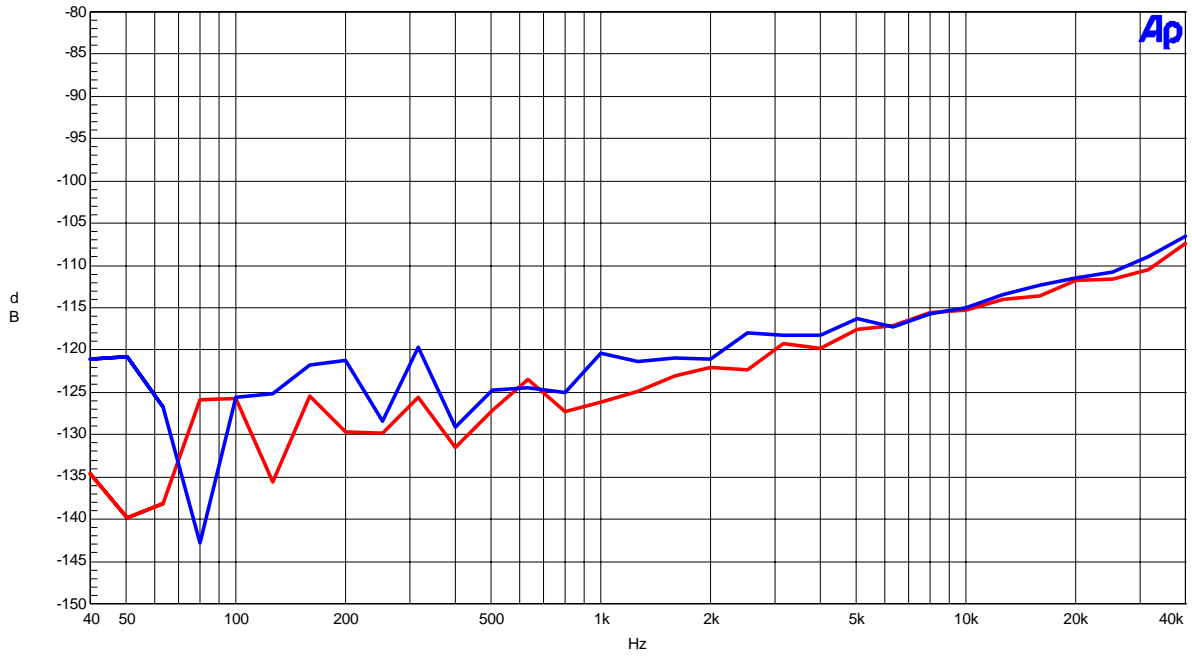


Figure 13. Crosstalk

AKM

AK5358A FFT
VA=5V, VD=5A, fs=96kHz, fin=1kHz, Input Level=-1dB_r

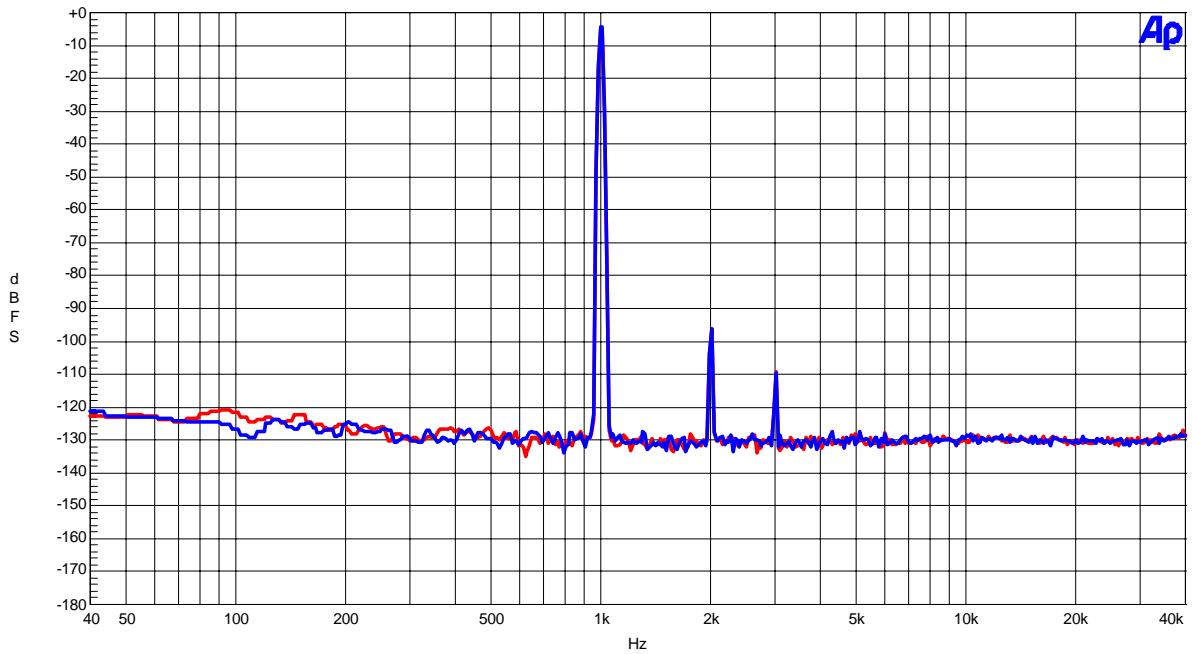


Figure 14. FFT Plot

AKM

AK5358A FFT
VA=5V, VD=5A, fs=96kHz, fin=1kHz, Input Level=-60dB

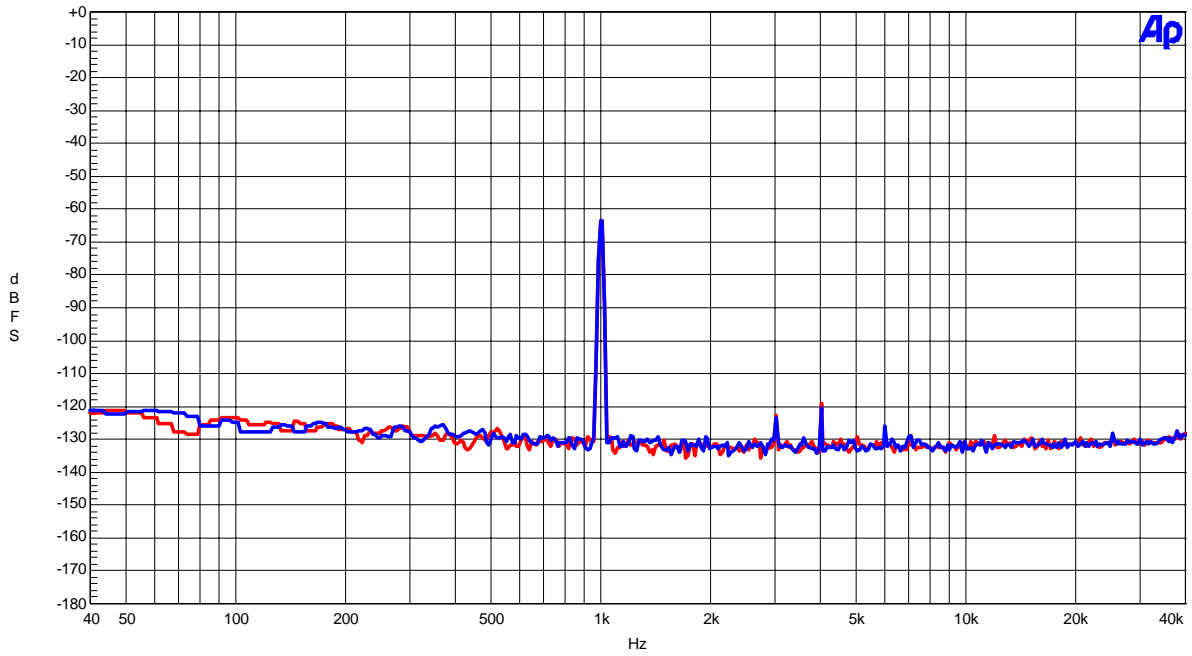


Figure 15. FFT Plot

AKM

AK5358A FFT
VA=5V, VD=5A, fs=96kHz, fin=No signal

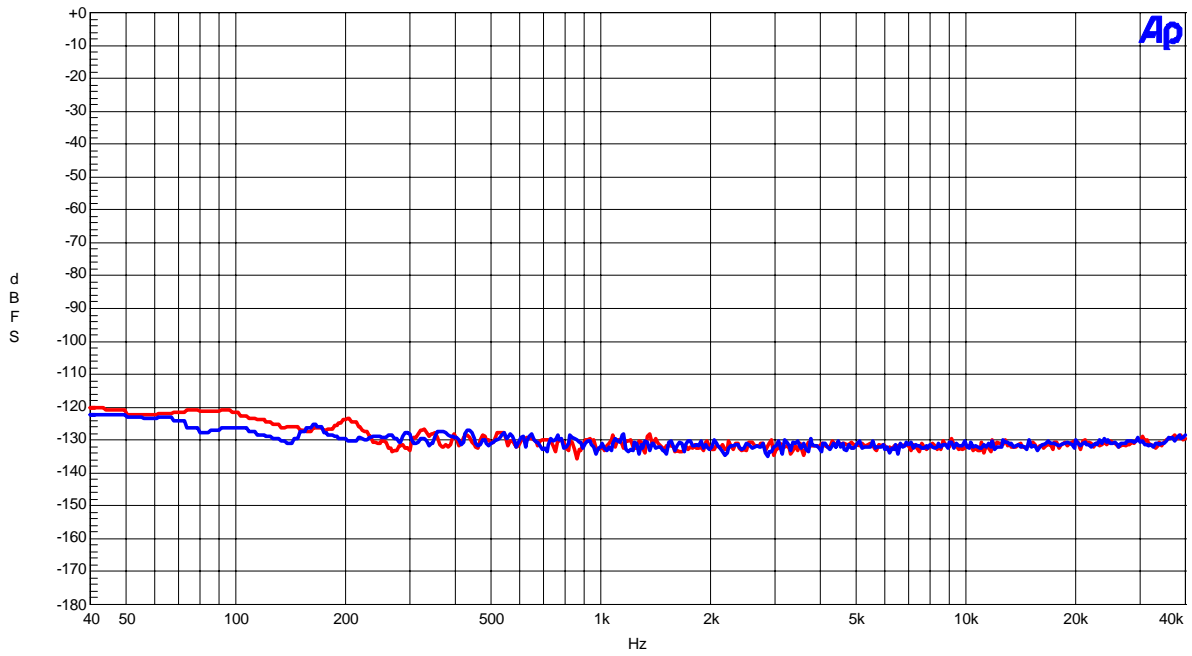


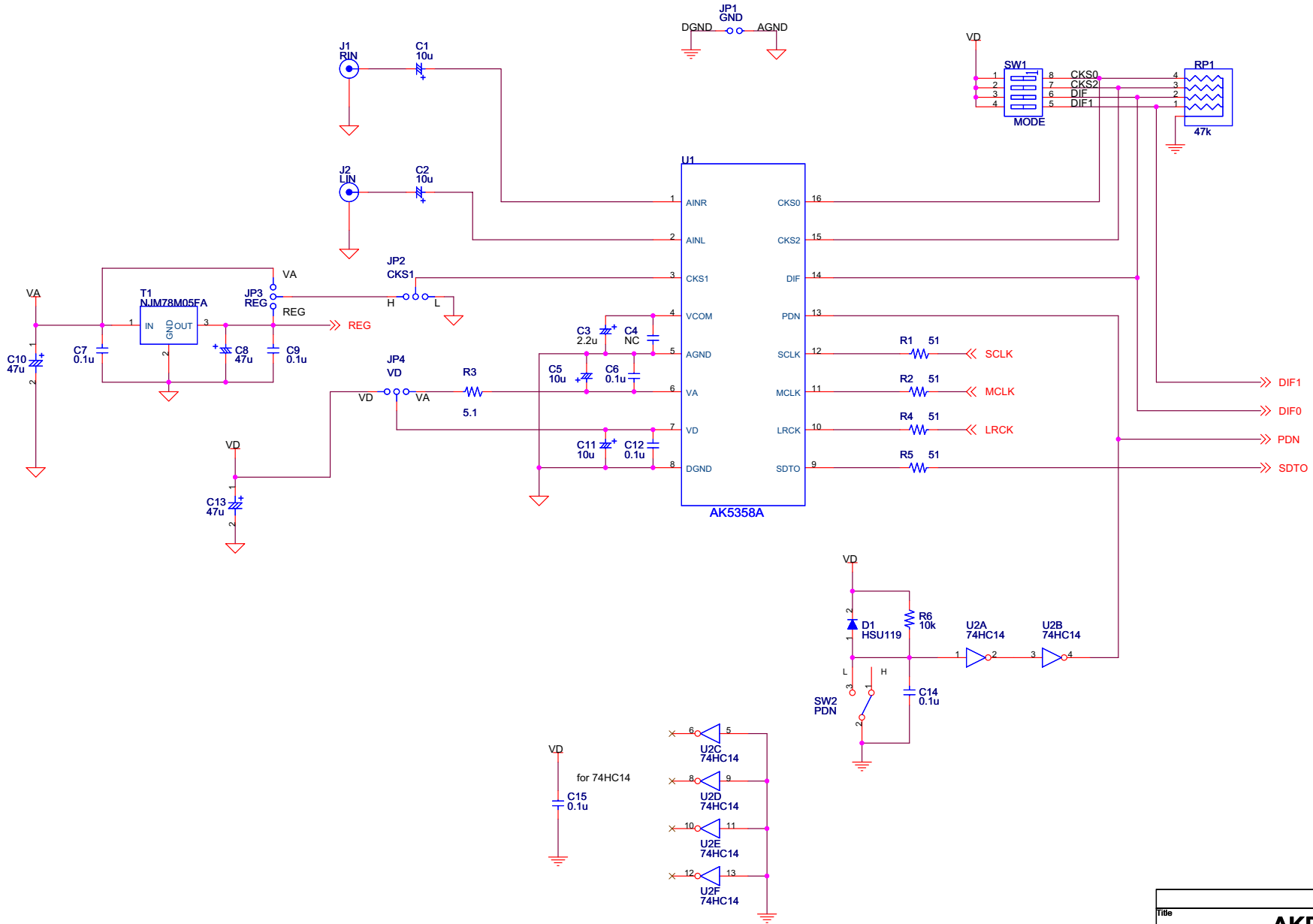
Figure 16. FFT Plot

Revision History

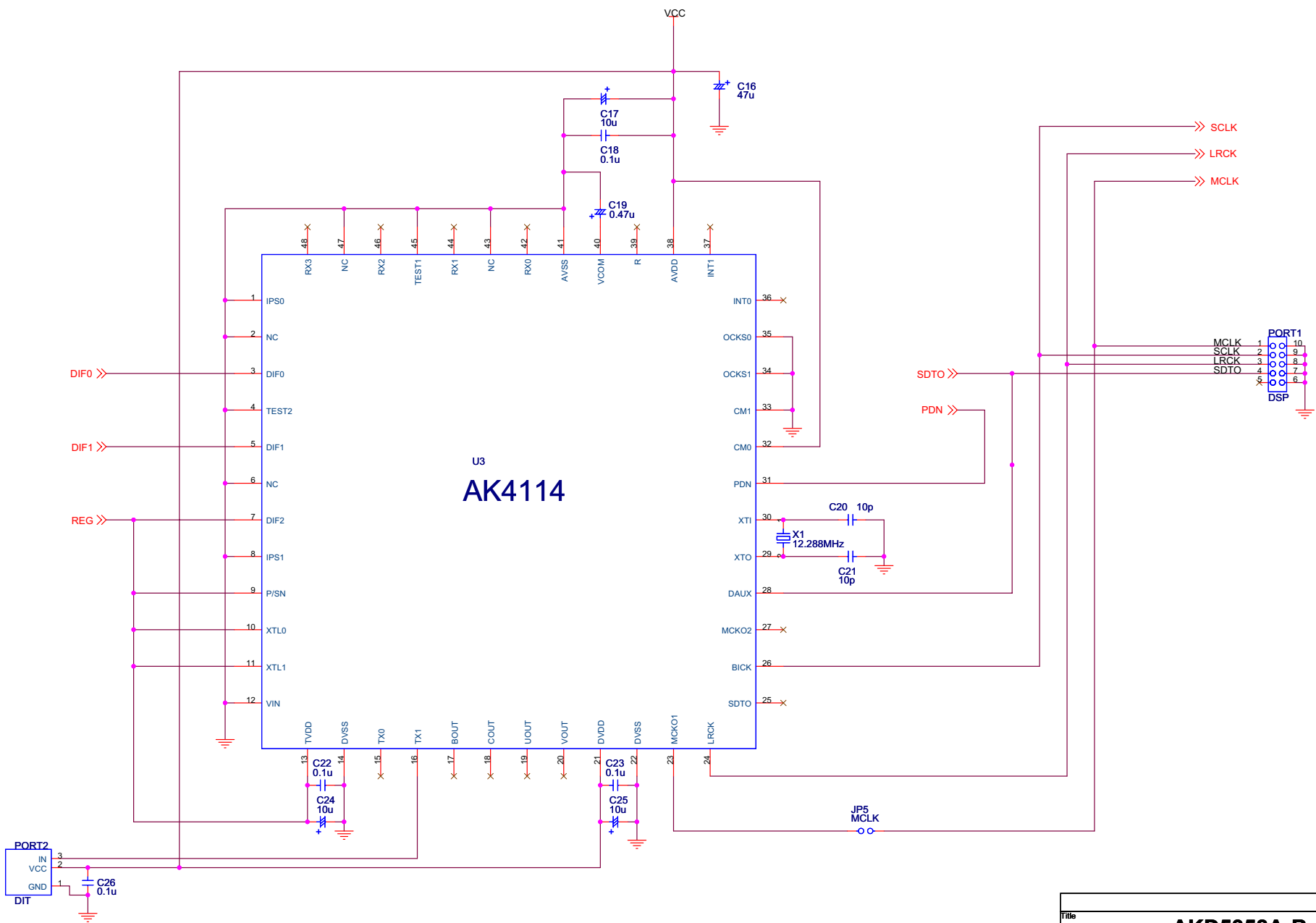
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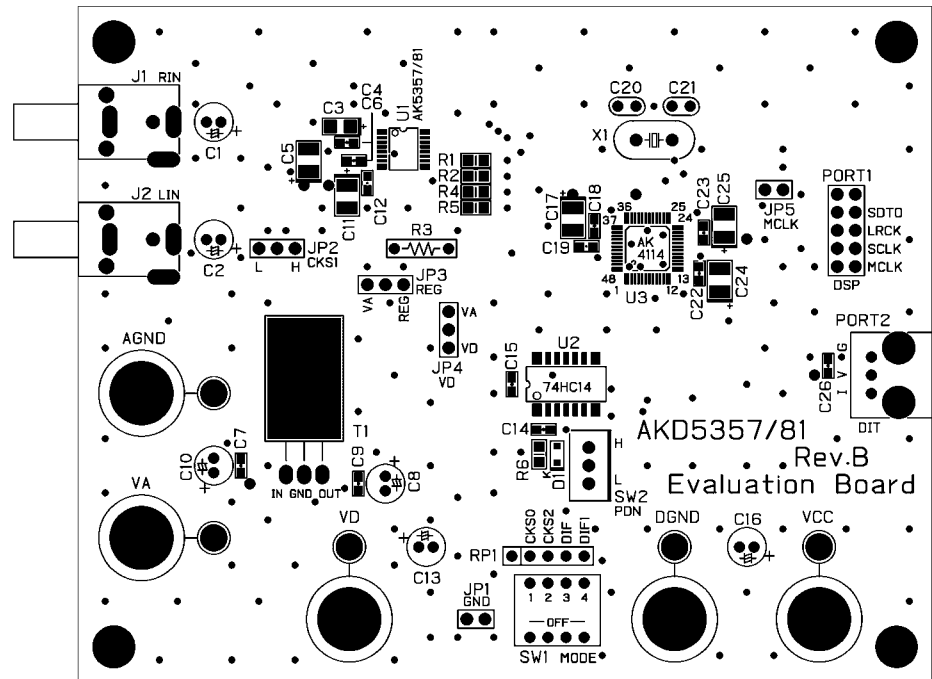
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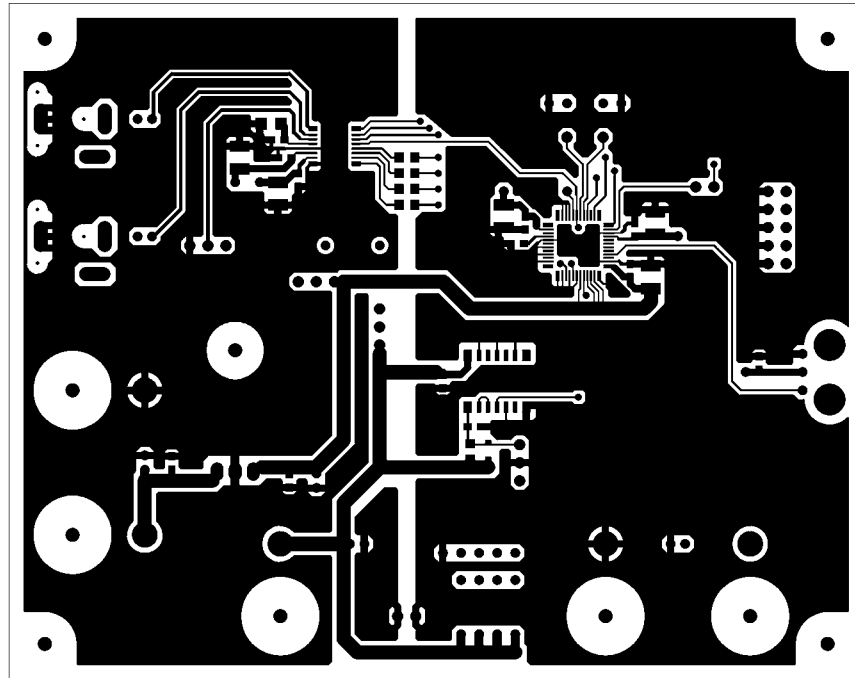
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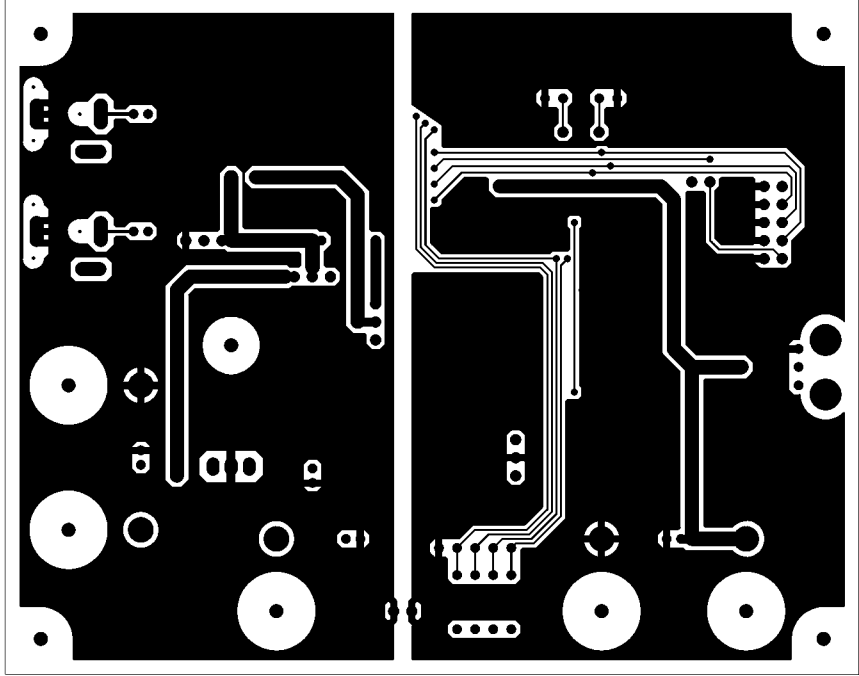
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