AKD4529
Evaluation board Rev.B for AK4529

GENERAL DESCRIPTION

The AKD4529 is an evaluation board for the AK4529, the Multi-channel Audio CODEC. The AKD4529 also has the digital audio interface and can achieve the interface with digital audio systems via opt-connector or BNC connector.

■ Ordering guide

AKD4529 --- Evaluation board for AK4529
(Cable for connecting with printer port of IBM-AT compatible PC and control software are packed with this.)

FUNCTION

- ☐ **On-board analog input buffer circuit**
- ☐ **Compatible with 2 types of interface**
  - **DIT(AK4103)/DIR(AK4112A) with optical output/input and BNC input**
  - **Direct interface with AC3 decoder by 10pin header**
- ☐ **10pin header for serial control interface**

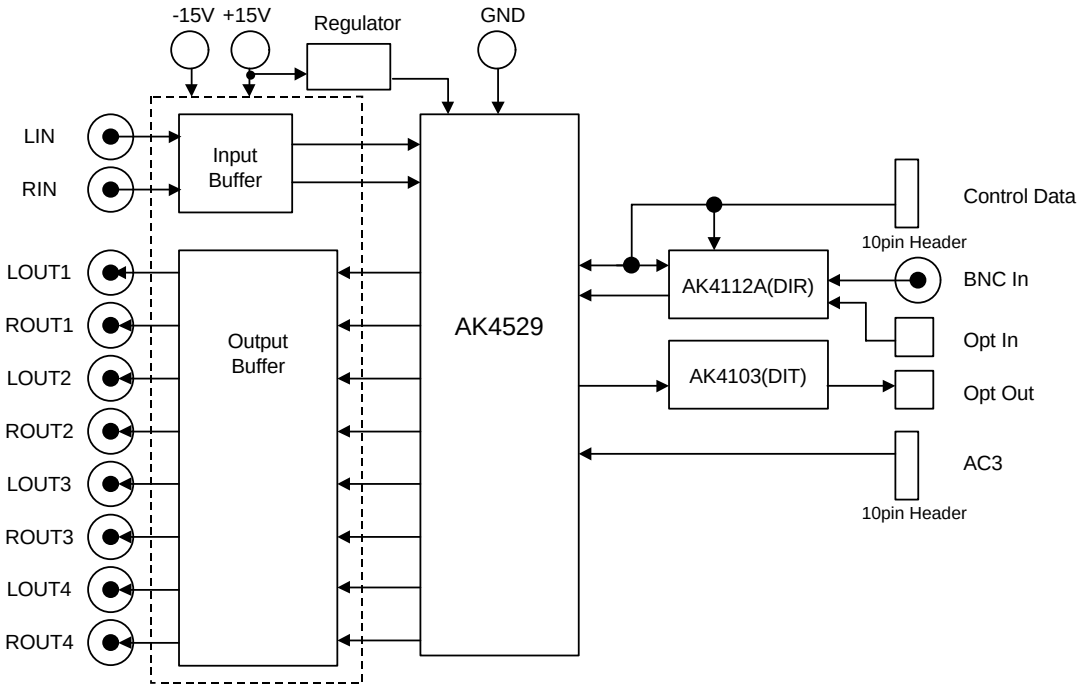
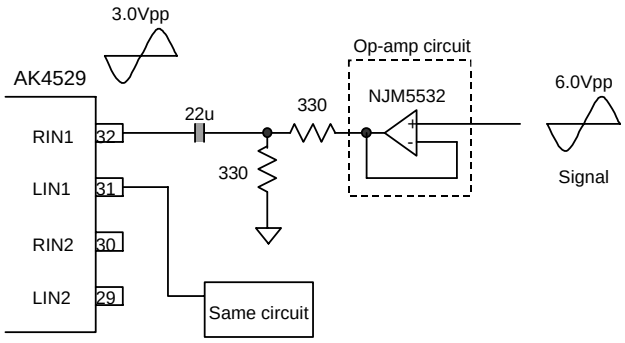


Fig 1. AKD4529 Block Diagram

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

Consideration for analog input circuit



1) Gain

Gain of analog input circuit is

330/(330+330) = -6.02dB.

Therefore input level for this board is

+0.51dBV(=3.0Vpp)+6.02dB

= +6.53dBV = 6.00Vpp = 2.12Vrms.

2) S/N of op-amp circuit (Theory: BW=20k+A)

Non-inverting amp is implemented on board. The output noise level of op-amp circuit is

-126.01dBV = -132.54dB (0dB=+6.53dBV).

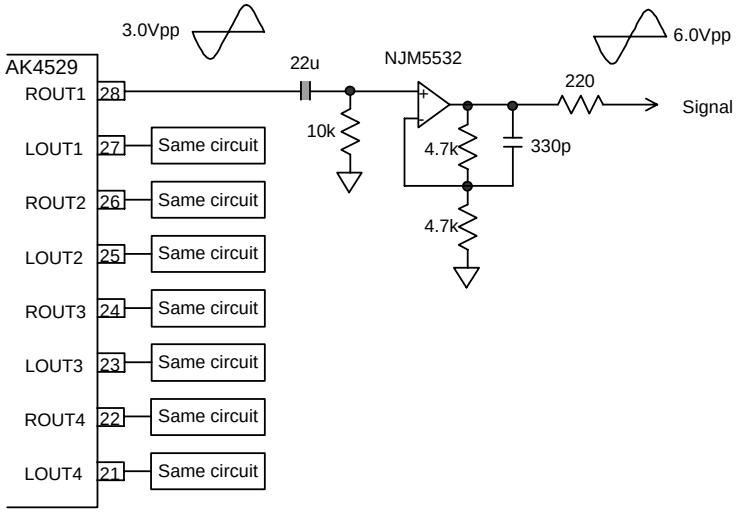
S/N of ADC is

103.6dB (measurement).

Therefore total S/N of op-amp circuit and ADC is

103.59dB (measurement: 103.6dB).

Consideration for analog output circuit



1) Frequency response of HPF

The HPF is implemented on board to cancel the DC offset of analog output of AK4529.

Frequency response of 1st-order HPF

$|\text{Amplitude}|^2 = 1/\{1+(fc/f)^2\}$; $fc=1/2\pi RC=$**0.7Hz**@R=10k,C=22u

fin	20Hz
Frequency Response	**-0.006dB**

2) Gain, S/N and frequency response of op-amp circuit

1st-order filter with non-inverting amp is implemented on board to double the analog output level and attenuate out-of-band noise.

a) Gain

The gain is

1+4.7k/4.7k = +6.02dB.

Therefore the output level of this board is

0.51dBV(=3.0Vpp) + 6.02dB

= 6.53dBV = 6.00Vpp = 2.12Vrms.

b) S/N (Theory: BW=20k+A)

The output noise level of non-inverting amp

-110.36dBV = -116.89dB (0dB=6.53dBV)

S/N of DAC is

106.3dB (measurement)

Therefore total S/N of op-amp circuit and DAC is

105.94dB (measurement: 106.1dB).

c) Frequency response of filter

Frequency response of the 1st-order filter

$|\text{Amplitude}|^2 = K*\{1+(f/fc_2)^2\}/\{1+(f/fc_1)^2\}$;

$K = 1+4.7k/4.7k = 2$,

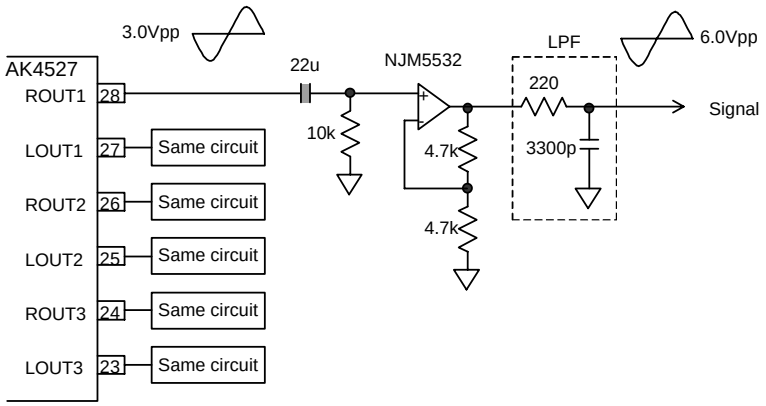
$fc_1 = 1/2\pi RC = 102.7kHz@R=4.7k,C=330p$,

$fc_2 = K*fc_1 = 205.3kHz$

Frequency response referenced to output level of this board is as following table:

fin	DC	20kHz	40kHz	80kHz	145kHz	∞
Frequency Response	0dB	**-0.121dB**	**-0.452dB**	**-1.448dB**	-3dB	-6dB

If the frequency response of filter influences the system, 1st-order LPF is also available as the following figure:



Frequency response of this LPF

$|\text{Amplitude}|^2 = 1/\{1+(f/fc)^2\}$;

$fc = 1/2\pi RC = 219kHz@R=220,C=3300p$

Frequency response referenced to output level of this board is as following table:

fin	DC	20kHz	40kHz	80kHz	219kHz	∞
Frequency Response	0dB	**-0.036dB**	**-0.142dB**	**-0.543dB**	-3dB	-∞dB

The total frequency response of this board is sum of the external filter and internal LPF of AK4529.

These filters are effective to attenuate the high frequency noise since some measurement units is sensitive for out-of-band noise.

■ Operation sequence

(1) **Set up the power supply lines.**

[+12V] (orange jack) = +12 ~ +15V
[-12V] (blue jack) = -12 ~ -15V
[AGND] (black jack) = 0V
[DGND] (black jack) = 0V

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

±12V are supplied to analog interface.
+12V is regulated to +5V and +3.3V by regulators(T1,T2).
+5V is supplied to digital interface, AK4529 and TVDD of AK4112A.
+3.3V is supplied to AVDD and DVDD of AK4112A and TVDD of AK4529.

(2) **Set up the evaluation mode and jumper pins.** (See p.6.)

(3) **Power on.**

The AK4529, AK4112A and AK4103 should be reset once bringing PDN(SW1) “L” upon power-up.

(4) **Set up software.**

The control mode of AK4529 and AK4112A is fixed to “serial”.

The AKD4529 can be controlled via the printer port (parallel port) of IBM-AT compatible PC. Connect PORT1(uP-I/F) with PC by 10-line flat cable packed with the AKD4529.

Take care of the direction of connector. There is a mark at pin#1.
The pin layout of PORT1 is as Figure 2.

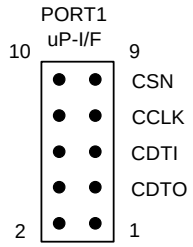


Figure 2. PORT1 pin layout

■ Evaluation mode

1) Evaluation of ADC

TOTX176 is used for digital output. Clock mode of the AK4112A should be set to PLL mode or X'tal mode.

2) Evaluation of DAC

TORX176 or BNC is used for digital input. Clock mode of the AK4112A should be set to PLL mode. "4112A" should be selected on JP4,5,6 and 7.

3) Loopback mode

Clock mode of the AK4112A should be set to PLL mode or X'tal mode. "4112A" should be selected on JP4,5,6 and 7.

4) Evaluation of DAC using DSP

"DSP" should be selected on JP4,5,6 and 7.

Evaluation mode	AK4112A clock set-up	JP4,5,6,7	Used I/F
ADC	CM1="0", CM0="0"(PLL mode) or CM1="0", CM0="1"(X'tal mode)	Don't care	TOTX176 optical output
DAC	CM1="0", CM0="0"(PLL mode)	"4112A"	
Loopback	CM1="0", CM0="1"(X'tal mode)	"4112A"	
Using DSP	CM1="0", CM0="0"(PLL mode)	"DSP"	PORT5(10-pin Header)

(Note.)1. Software "4112.exe" packed with the AKD4529 is used for set-up of the AK4112A.
2. CM1 and CM0 bits are D5 and D4 of Addr=00H, respectively

Table 2.Evalution mode

■ DIP Switch set up. (See the datasheet of AK4529 and AK4103)

1. DFS_4529(SW2-1) set up of AK4529 Sampling speed(fs).

DFS_4529	Sampling Speed (fs)		
OFF	Normal Speed Mode	32kHz~48kHz	Default
ON	Double Speed Mode	64kHz~96kHz	

Table 3. Set up of Sampling Speed (fs)

2. V(SW2-2) set up of for AK4103Validity detect.

V	Validity	
OFF	Valid	Default
ON	Invalid	

Table 4. Set up of Validity

3. FS3(SW2-3) FS2(SW2-4) set up of AK4103 sampling frequency setting.

FS3	FS2	Sampling frequency setting	
OFF	OFF	44.1kHz	Default
OFF	ON	48kHz	
ON	OFF	Reserved	
ON	ON	32kHz	

Table 5. Set up of sampling frequency setting

4. CKS0(SW2-5) set up of AK4103 System Clock .

CKS1	MCLK	fs	
OFF	256fs	28k-108kHz	Default
ON	512fs	28k-54kz	

Table 6.Set up of System Clock

5. DIF0(SW2-6) set up of AK4103 Audio Serial Interface Format.

DIF0	Audio Serial Interface Format	LRCK	BICK	
OFF	24bit, Left justified	H/L	48fs-128fs	Default
ON	24bit, I^2S	L/H	48fs-128fs	

Table 7. Set up of Audio Serial Interface Format

■ Jumper pin set up

[JP1] (GND) ---Analog GND and Digital GND

[JP4,5,6,7]
(SDTI1,2,3,4) --- AK4529 SDTI1,2,3,4 input source select
<DSP> : Serial Data is input from DSP via PORT4.
<4112A> : Serial Data is input from AK4112A SDTO. <default>

[JP3] (V/TX) --- AK4112A V/TX output select.
<V> : Validity. <default>
<TX> : Transmit channel (through data)

[JP2](OPT/COAX) --- The source of the biphase signal input to the AK4112A
<OPT_IN> : Optical input to RX1 of AK4112A <default>
<RX2> : BNC input to RX1 of AK4112A

■ The function of the toggle SW.

[SW1] : Resets the AK4529, AK4112A and AK4103. Keep “H” during normal operation.

■ The indication content for LED.

[LE1] (DZF1) : Zero detection
[LE2] (DZF2_OVF) : Zero detection or Overflow Detection
[LE3] (ERF) : AK4112A unlock and parity error output.
[LE4] (FS96) : AK4112A 96kHz sampling detect.
[LE5] (AUTO) : AK4112A AC-3/MPEG detect.
[LE6] (V) : AK4112A Validity detect

MEASUREMENT RESULTS

1) ADC part

[Measurement condition]

- Measurement unit : Audio Precision, System two, Cascade
- MCLK : 256fs
- BICK : 64fs
- fs : 44.1kHz
- BW : 10Hz~20kHz(fs=44.1kHz), 10Hz~48kHz(fs=96kHz)
- Bit : 24bit
- Power Supply : AVDD=DVDD, TVDD=3.3V
- Interface : DIT(AK4103)
- Temperature : Room

fs=44.1kHz

Parameter	Input signal	Measurement filter	Lch	Rch
S/(N+D)	1kHz, -0.5dB	20kLPF	93.5dB	93.2dB
DR	1kHz, -60dB	20kLPF	99.6dB	99.6dB
		20kLPF+A-weighted	103.2dB	103.2dB
S/N	no signal	20kLPF	99.8dB	99.8dB
		20kLPF+A-weighted	103.6dB	103.6dB

fs=96kHz

Parameter	Input signal	Measurement filter	Lch	Rch
S/(N+D)	1kHz, -0.5dB	fs/2	85.5dB	84.0dB
DR	1kHz, -60dB	fs/2	97.1dB	97.2dB
		20kHz+A-weighted	104.3dB	104.1dB
S/N	no signal	fs/2	97.0dB	97.0dB
		20kHz+A-weighted	104.1dB	104.0dB

2) DAC part

[Measurement condition]

- Measurement unit : Audio Precision, System two, Cascade
- MCLK : 256fs
- BICK : 64fs
- fs : 44.1kHz, 96kHz
- BW : 10Hz~22kHz (fs=44.1kHz), 10Hz~40kHz (fs=96kHz)
- Bit : 24bit
- Power Supply : AVDD=DVDD, TVDD=3.3V
- Interface : DIR(AK4112A)
- Temperature : Room

fs=44.1kHz

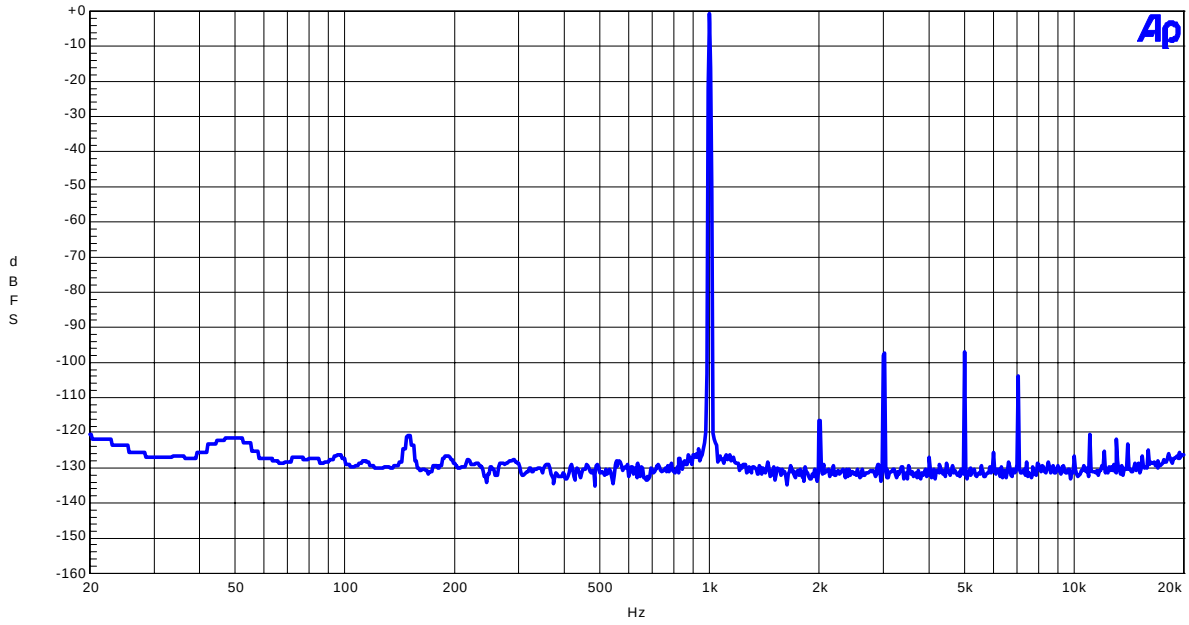
Parameter	Input signal	Measurement filter	Lch	Rch
S/(N+D)	1kHz, -0.5dB	20kLPF	97.6dB	97.3dB
DR	1kHz, -60dB	20kLPF	103.2dB	103.2dB
		22kLPF+A-weighted	106.1dB	106.1dB
S/N	no signal	20kLPF	103.2dB	103.2dB
		22kLPF+A-weighted	106.1dB	106.1dB

fs=96kHz

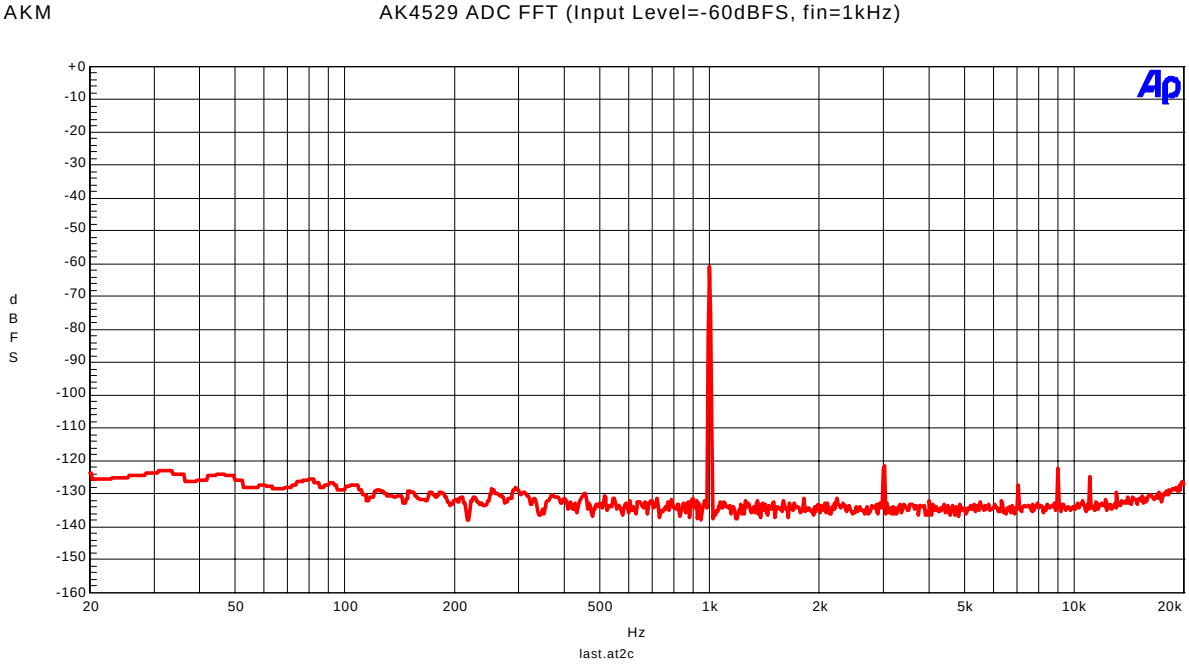
Parameter	Input signal	Measurement filter	Lch	Rch
S/(N+D)	1kHz, -0.5dB	40kHzLPF	95.5dB	96.0dB
DR	1kHz, -60dB	40kHzLPF	101.0dB	101.0dB
		22kHz+A-weighted	106.0dB	106.0dB
S/N	no signal	40kHz	101.2dB	101.2dB
		22kHz+A-weighted	106.2dB	106.2dB

1.ADC

(ADC fs=44.1kHz)

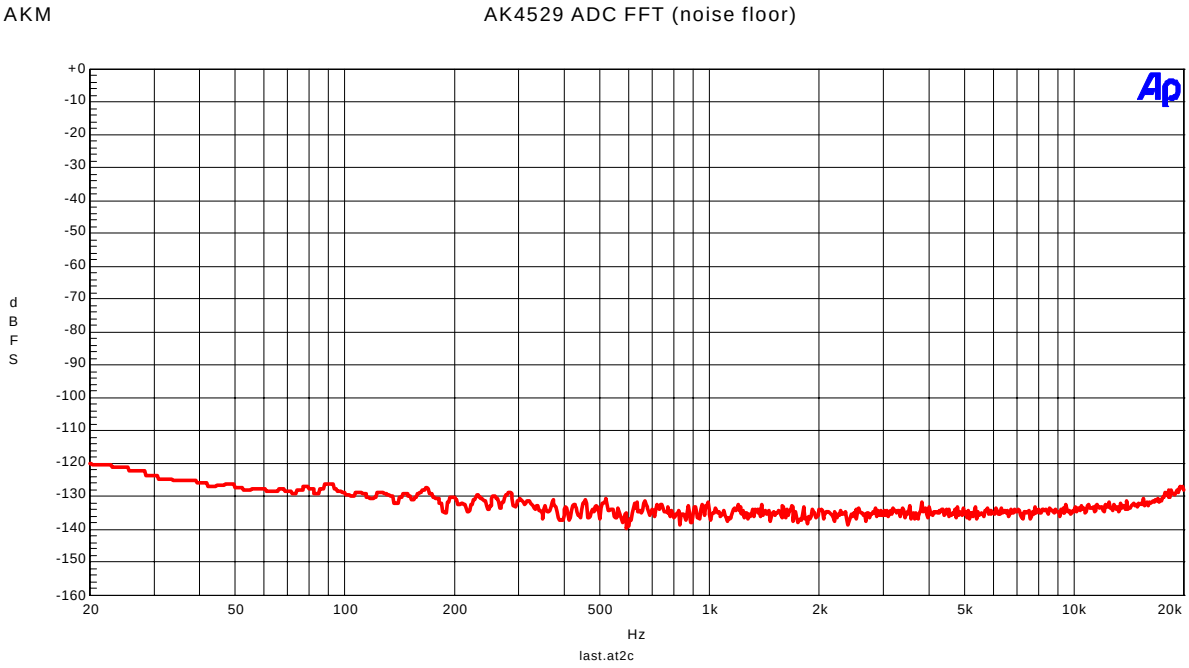


FFT (Input=-0.5dBFS, fin=1kHz)



FFT (Input=-60dBFS, fin=1kHz)

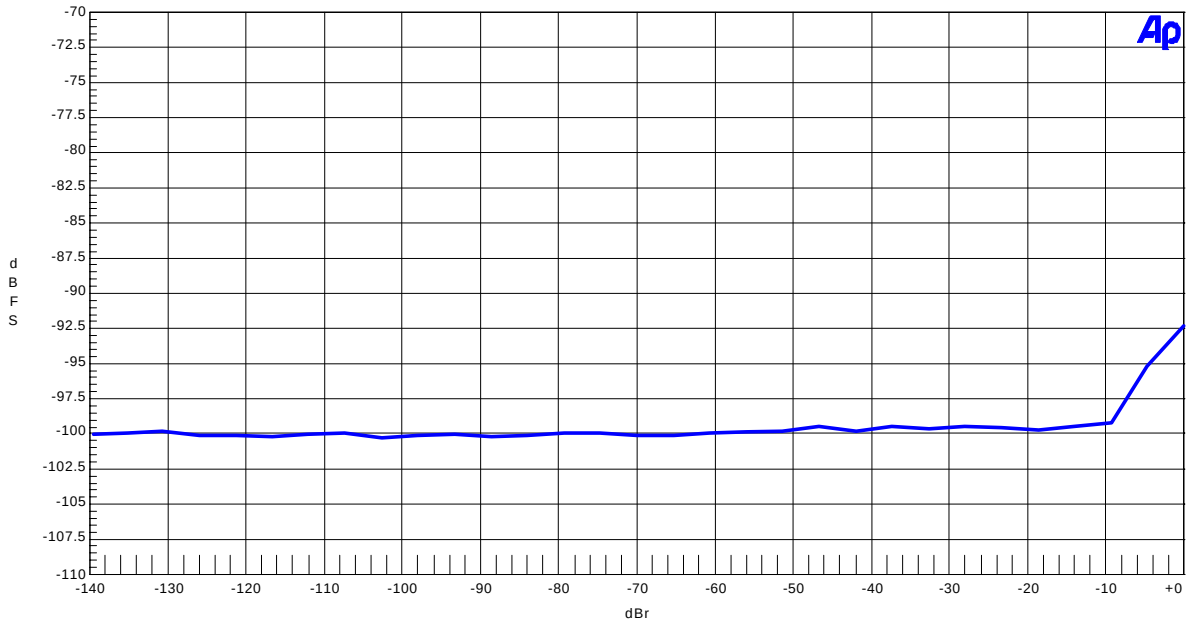
(ADC fs=44.1kHz)



FFT (noise floor)

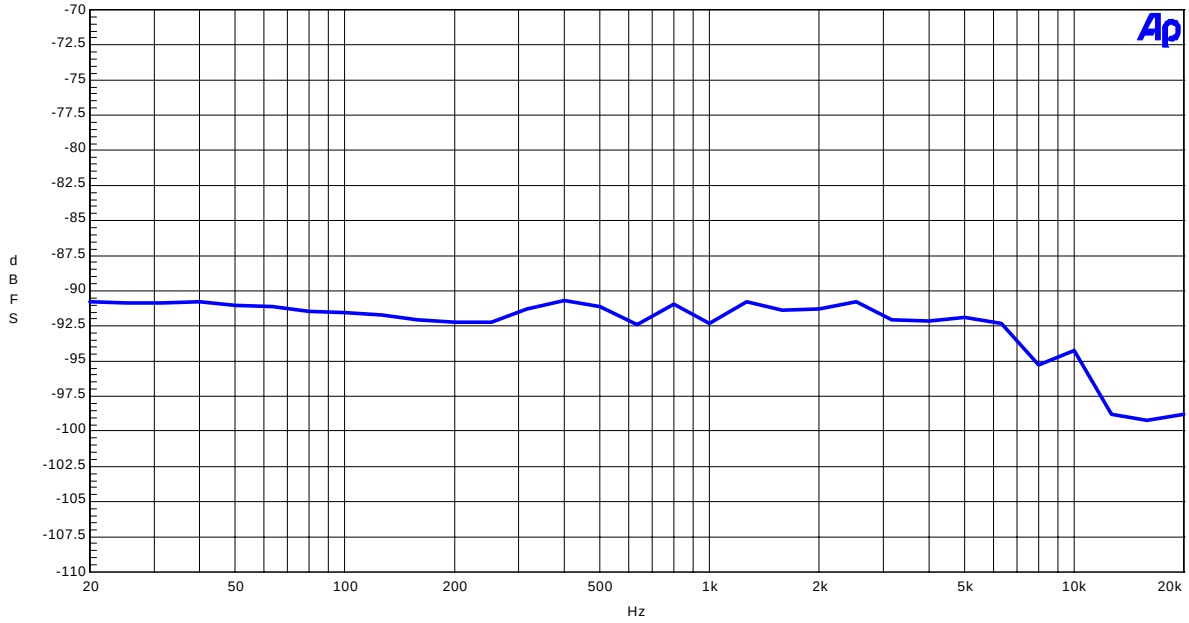
(ADC fs=44.1kHz)

AKM AK4529 ADC THD + N vs Amplitude(fin=1kHz)



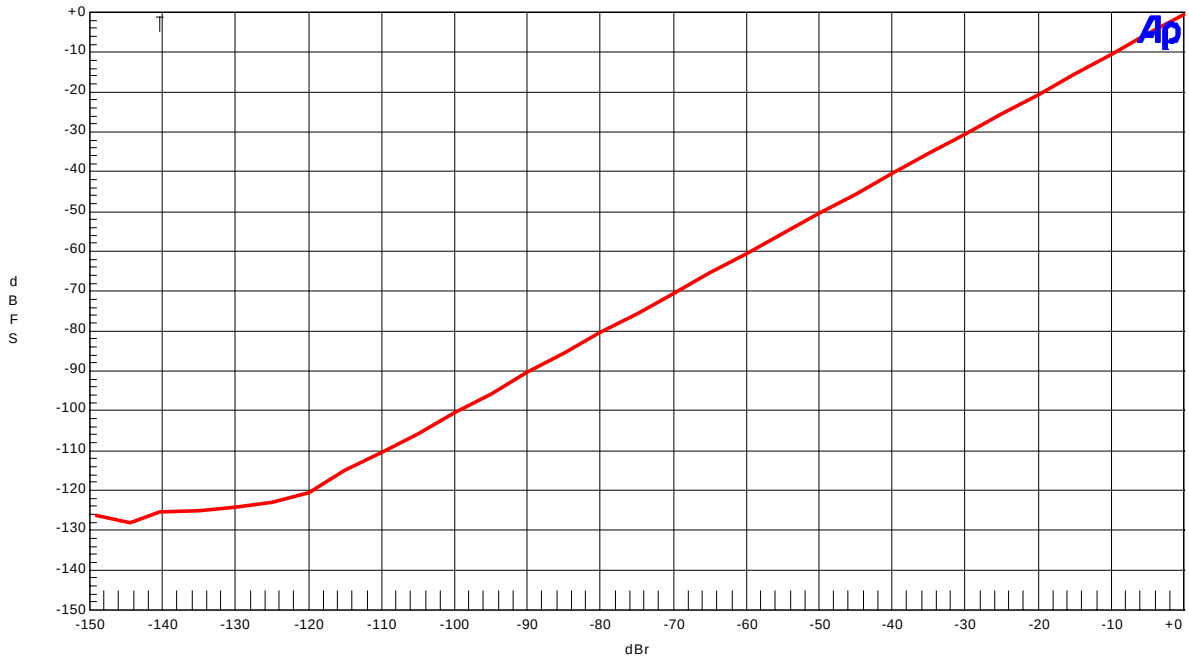
THD + N vs Amplitude (fin=1kHz)

AKM AK4529 ADC THD + N vs Input Frequency(Input Level=-0.5dB)

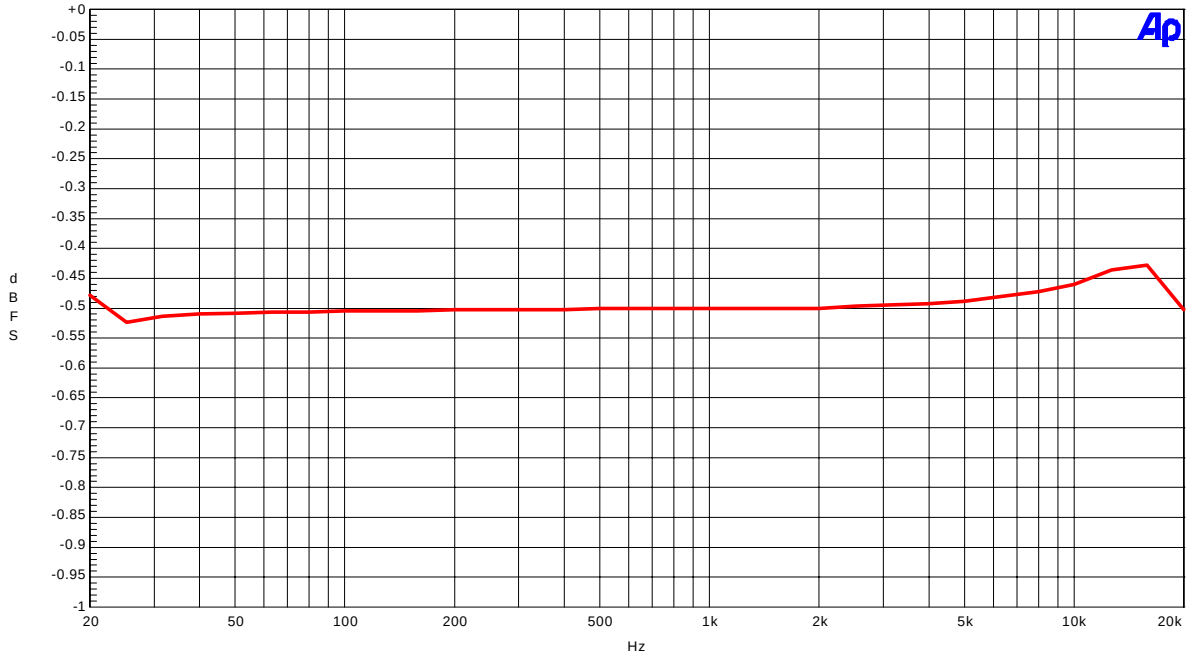


THD + N vs Input Frequency (Input=-0.5dBFS)

(ADC fs=44.1kHz)

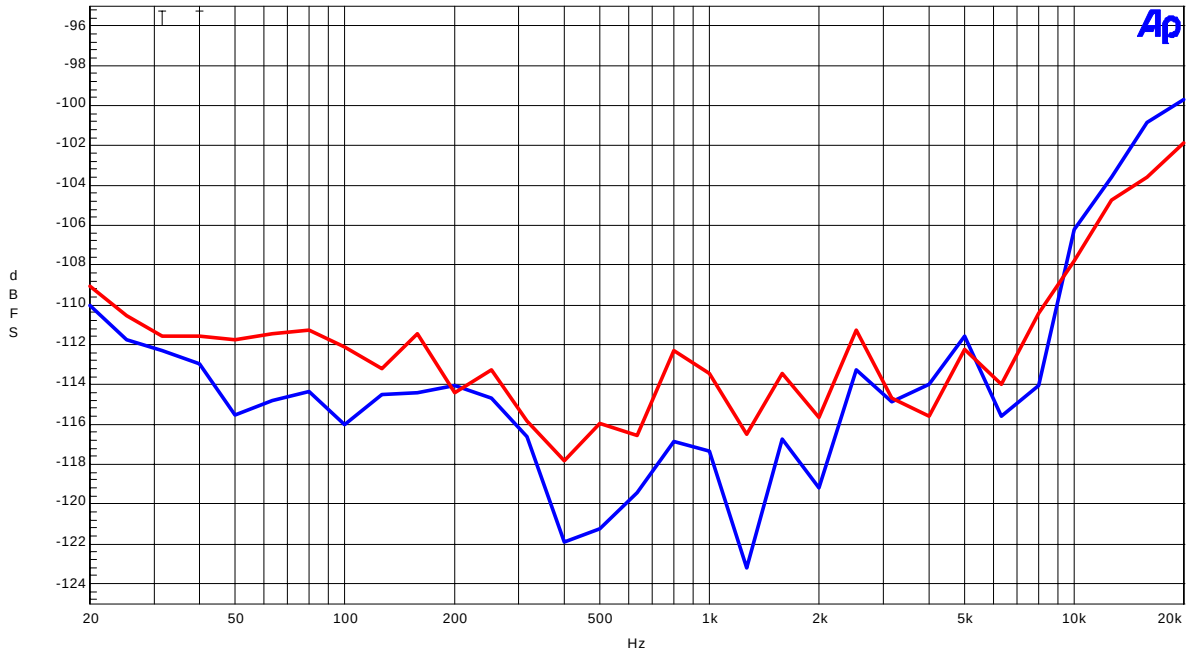


Linearity(fin=1kHz)



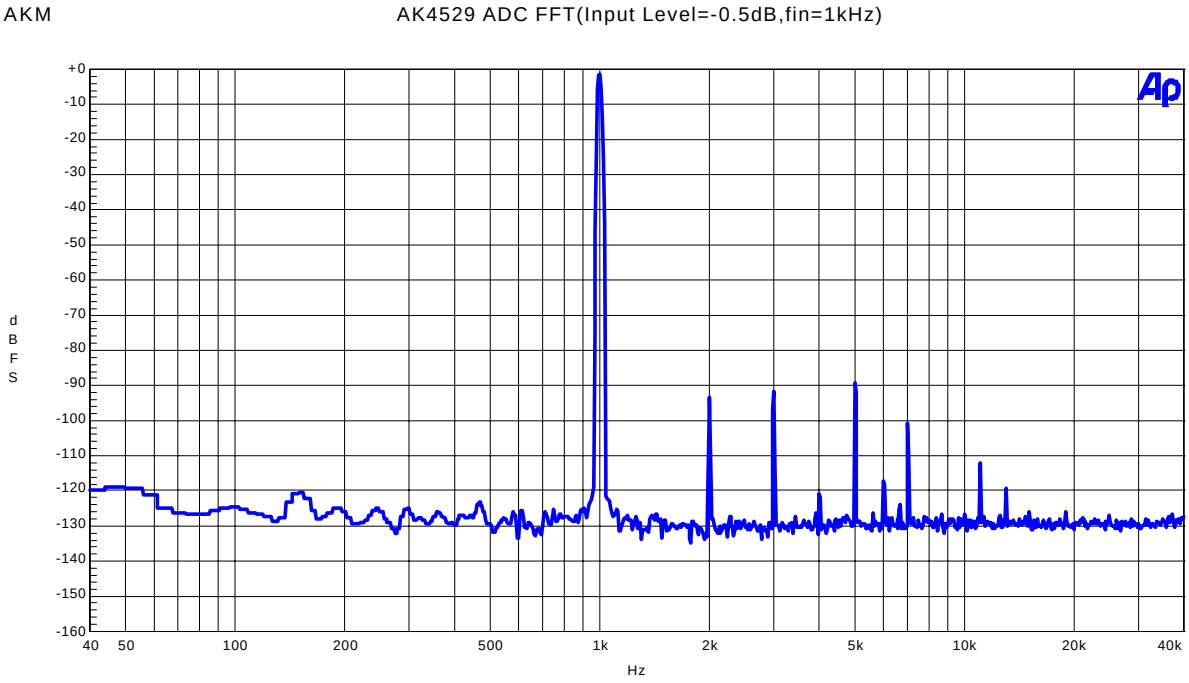
Frequency Response(Input Level=-0.5dBFS)
(including input RC filter)

(ADC fs=44.1kHz)

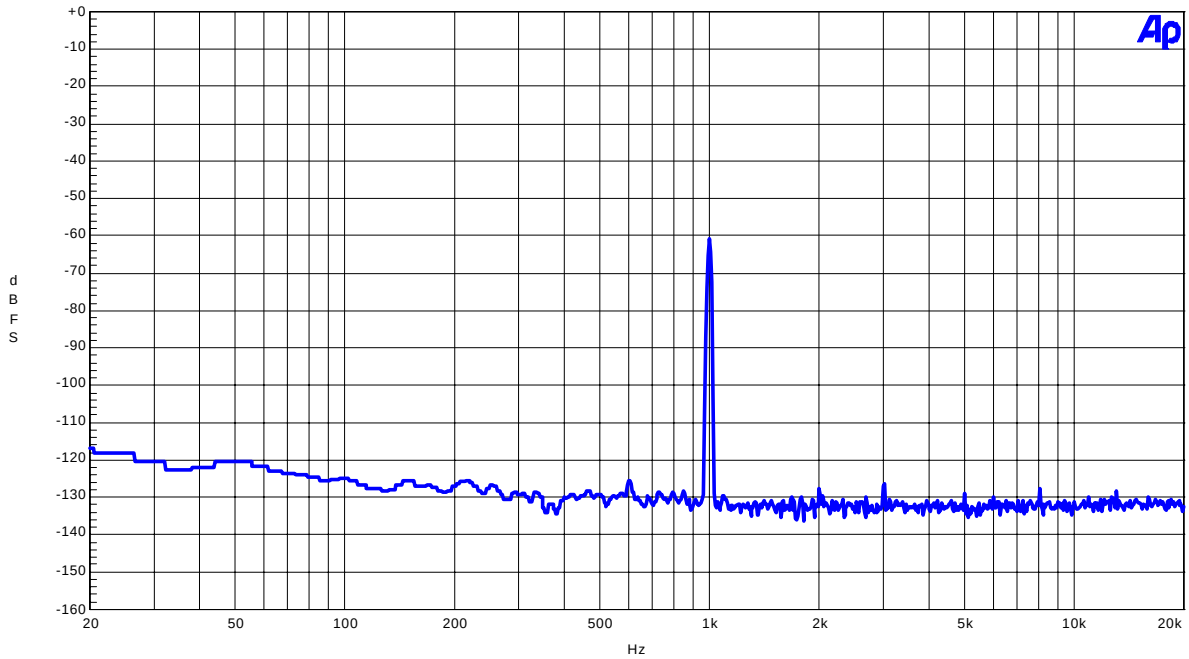


Crosstalk (Upper@1k = Lch, Lower@1k = Rch)

(ADC fs=96kHz)

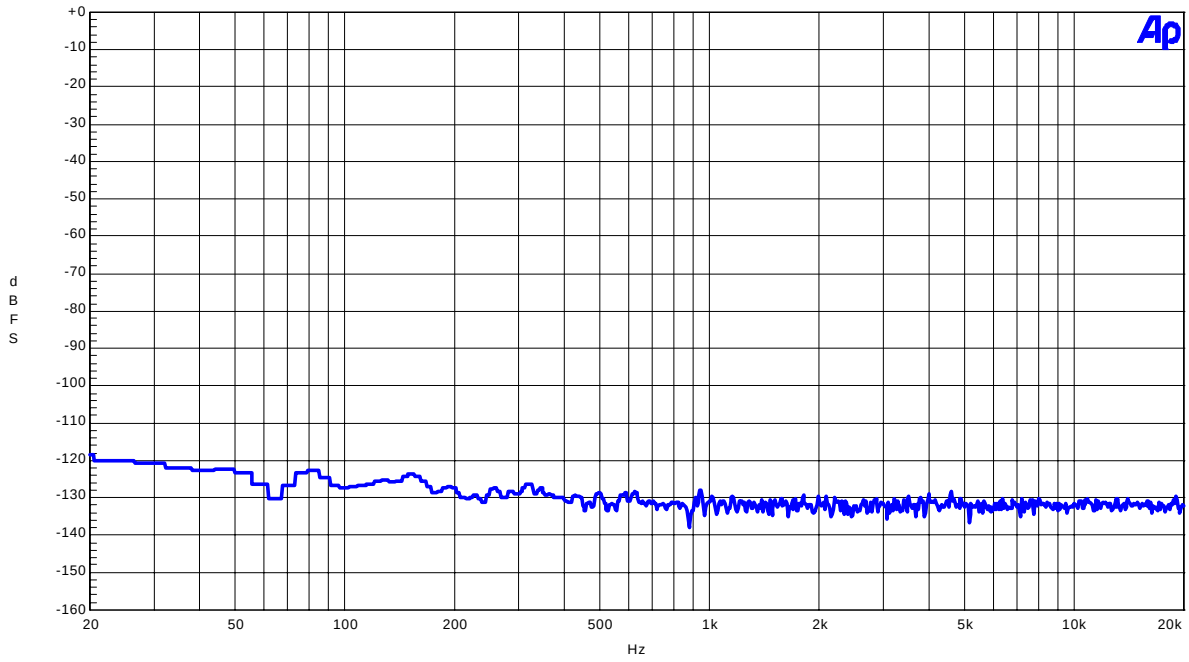


FFT(Input=-0.5dBFS, fin=1kHz)



FFT(Input=-60dBFS, fin=1kHz)

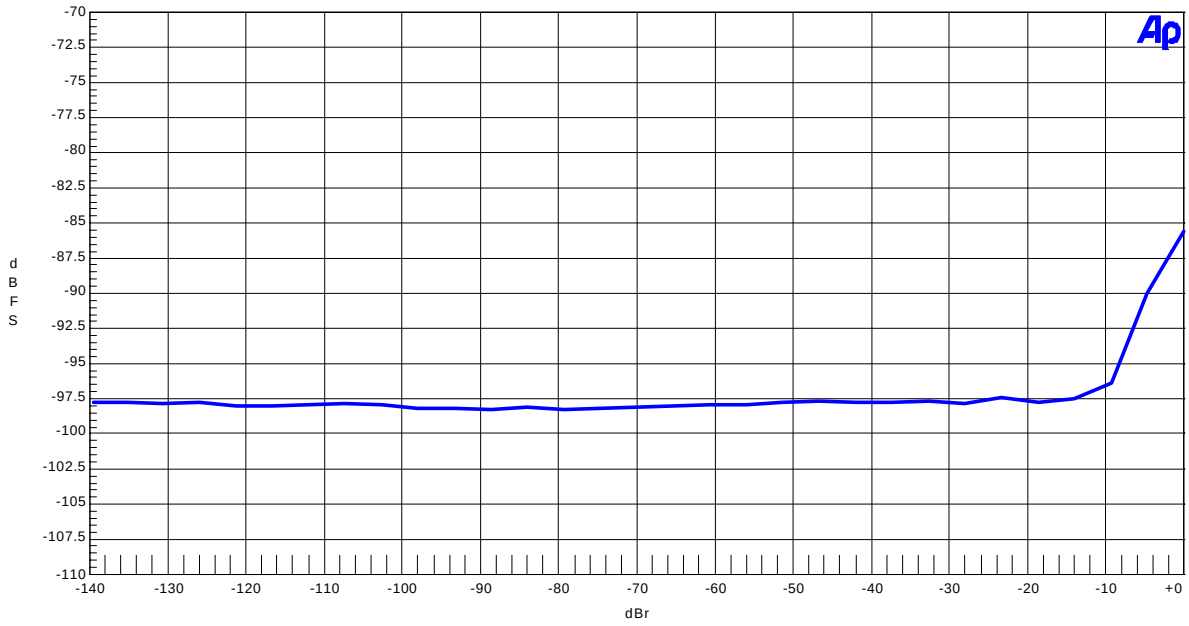
(ADC fs=96kHz)



FFT(Noise floor)

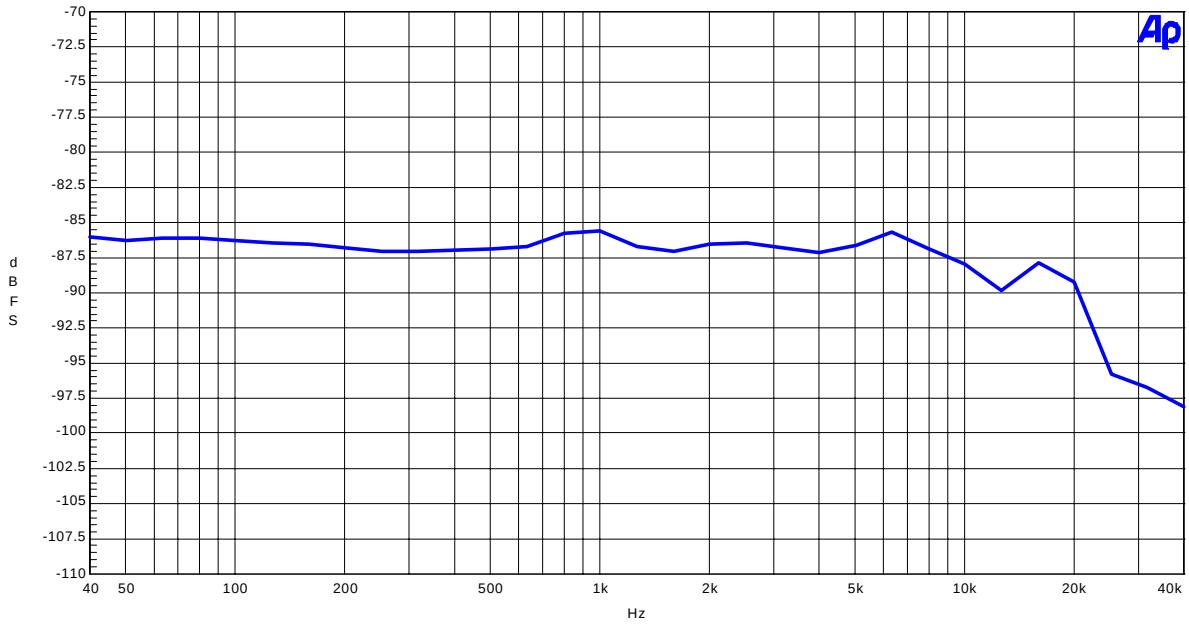
(ADC fs=96kHz)

AKM AK4529 ADC THD + N vs Amplitude(fin=1kHz)



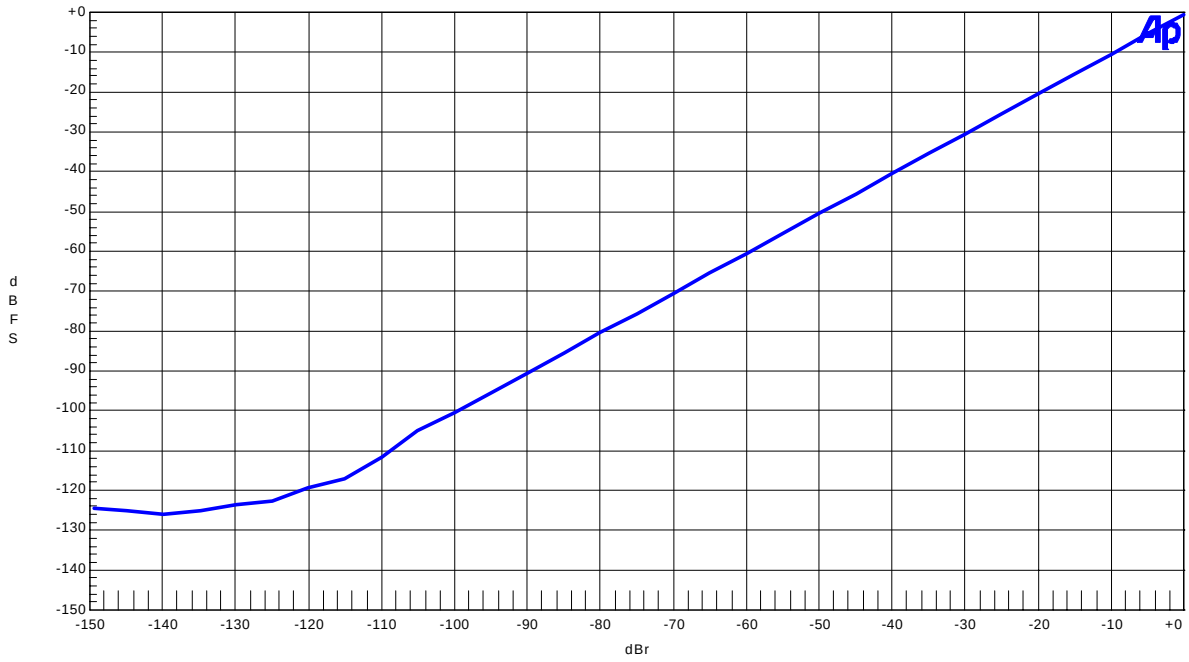
THD + N vs Amplitude(fin=1kHz)

AKM AK4529 ADC THD + N vs Input Frequency(Input Level=-0.5dB)

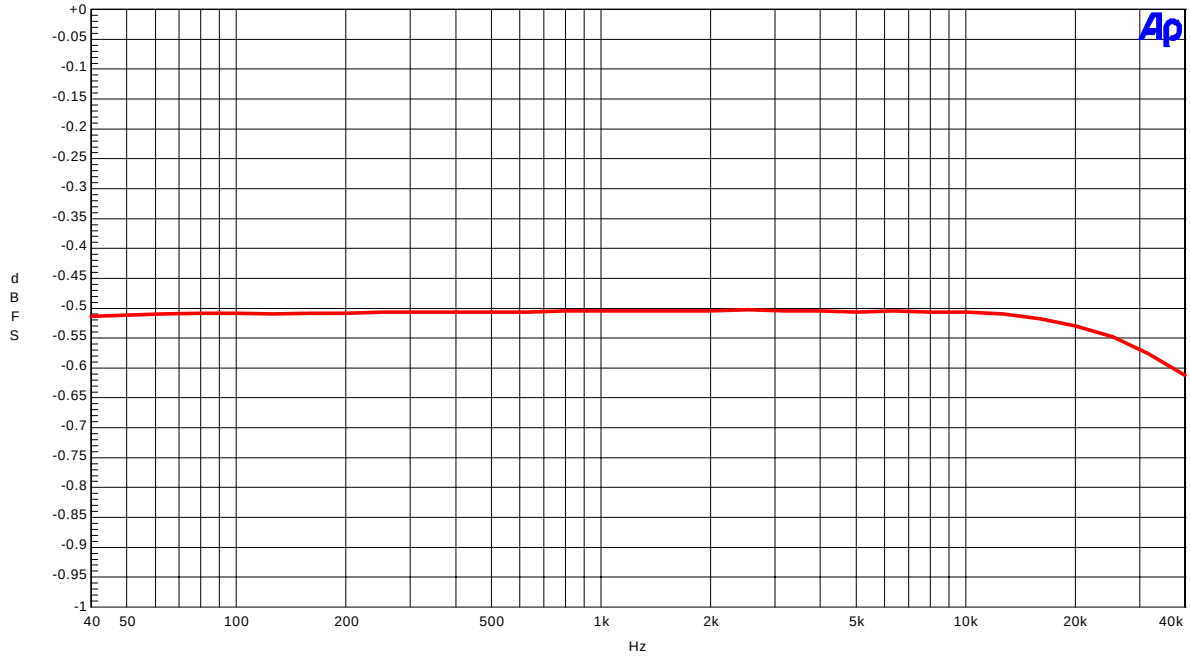


THd + N vs Input Frequency(Input Level=-0.5dBFS)

(ADC fs=96kHz)

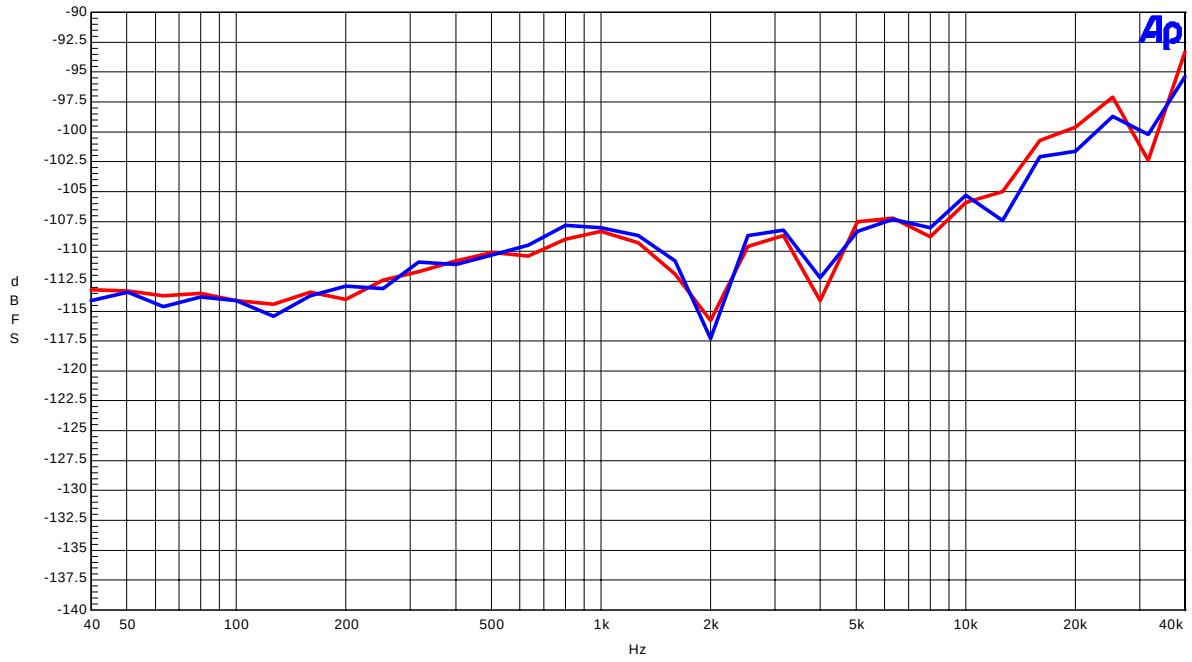


Linearity(fin=1kHz)



Frequency Response(Input Level=-0.5dBFS)
(including input RC filter)

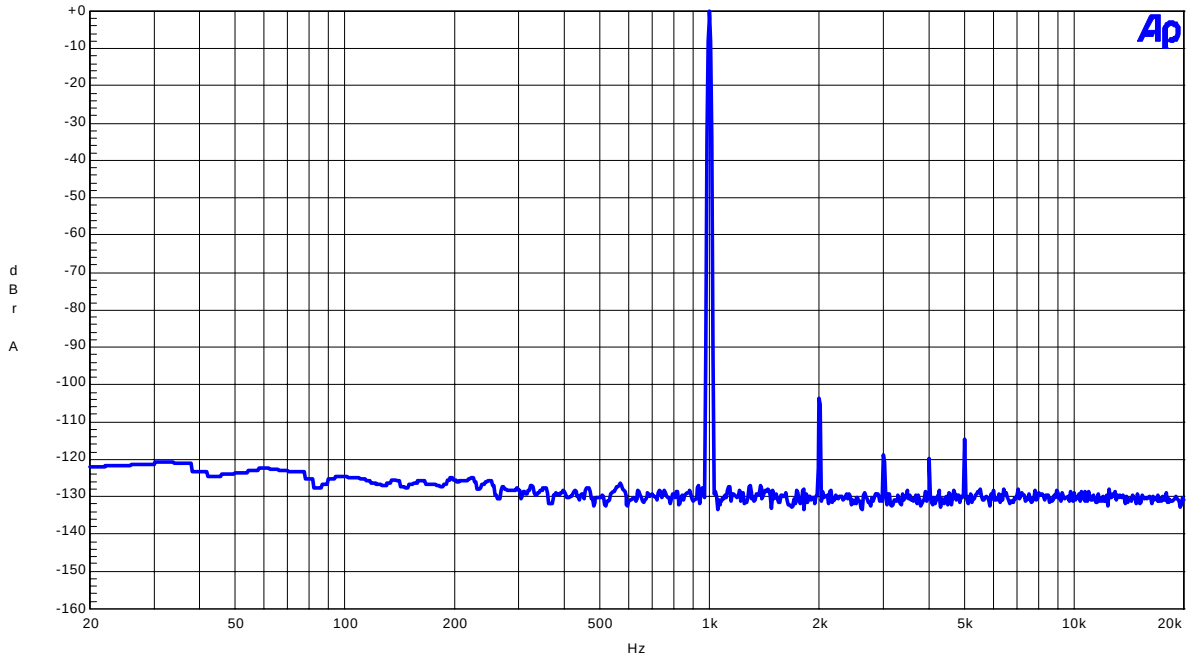
(ADC fs=96kHz)



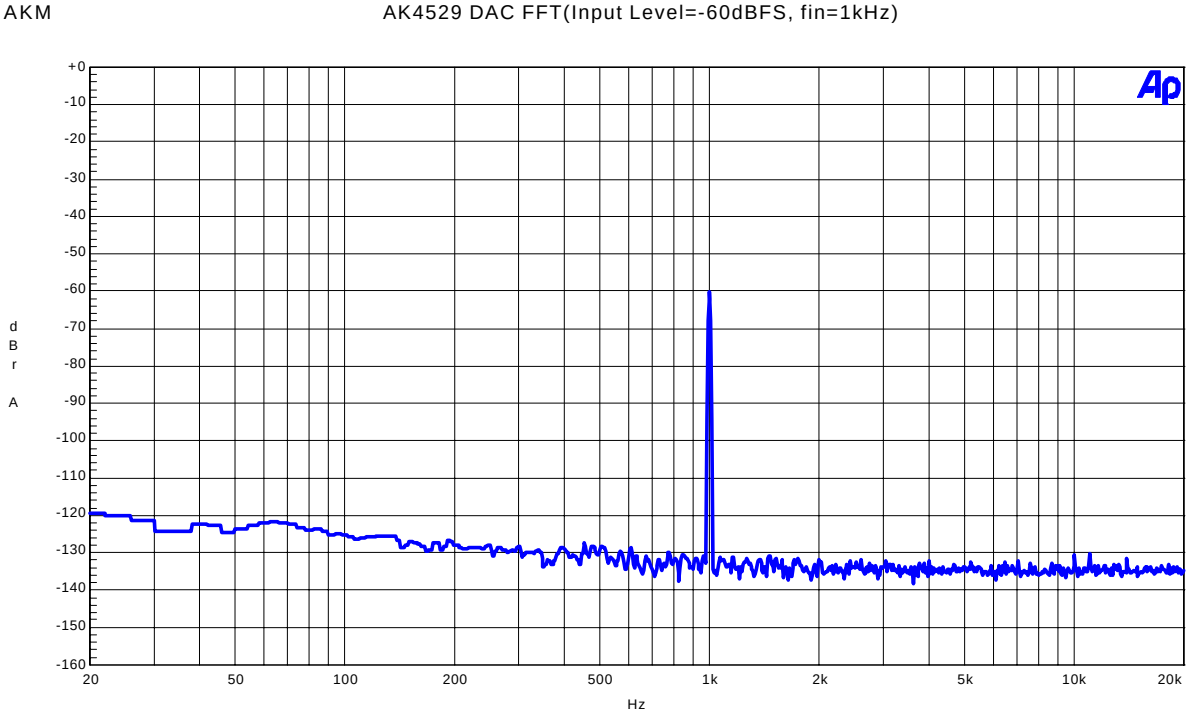
Crosstalk (Upper = Rch, Lower = Lch)

2.DAC

(DAC fs=44.1kHz)

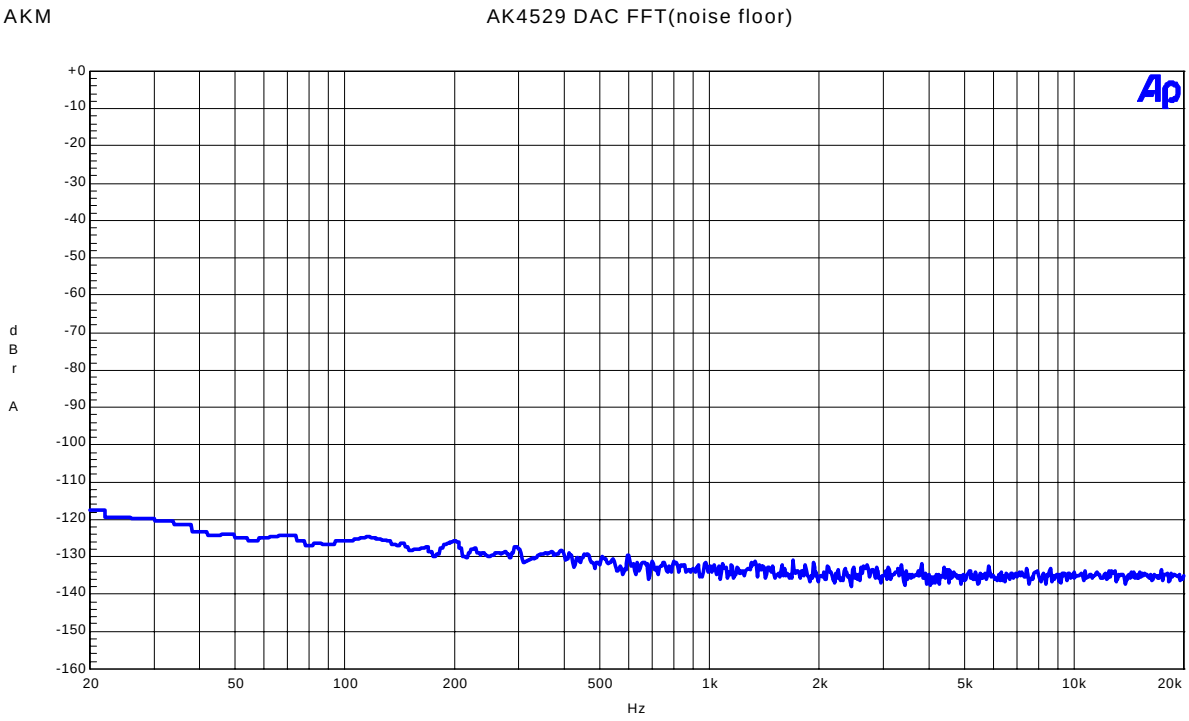


FFT (Input=0dBFS, fin=1kHz)

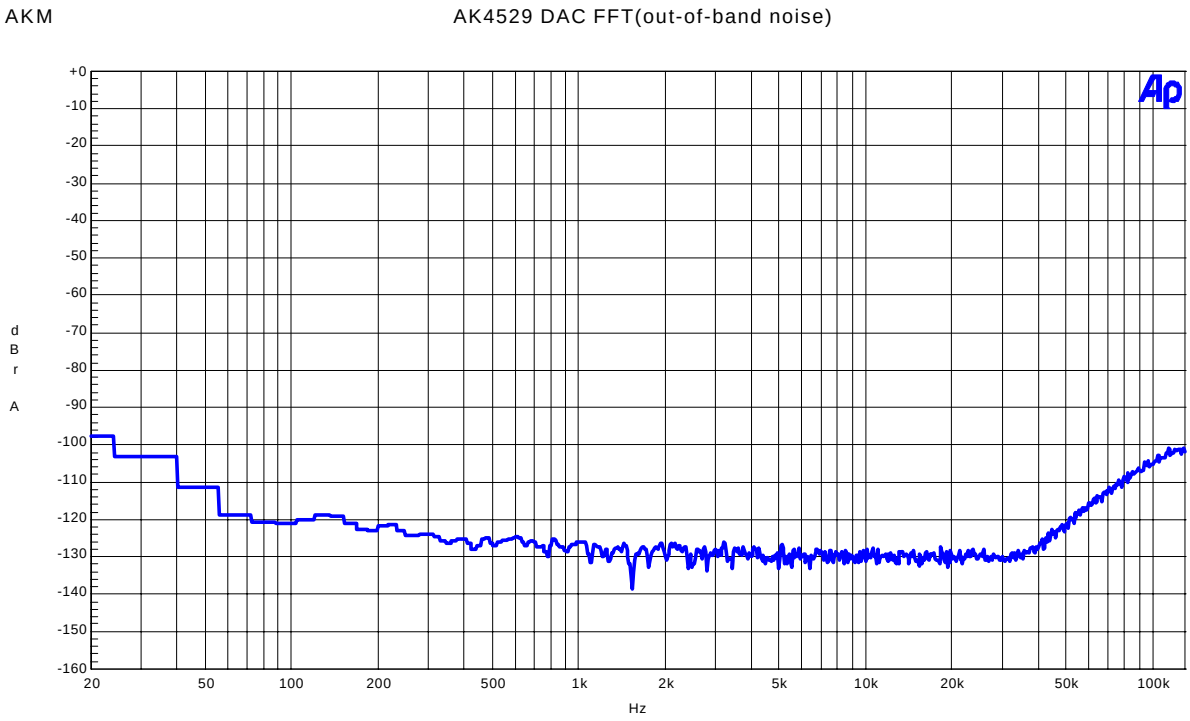


FFT (Input=-60dBFS, fin=1kHz)

(DAC fs=44.1kHz)

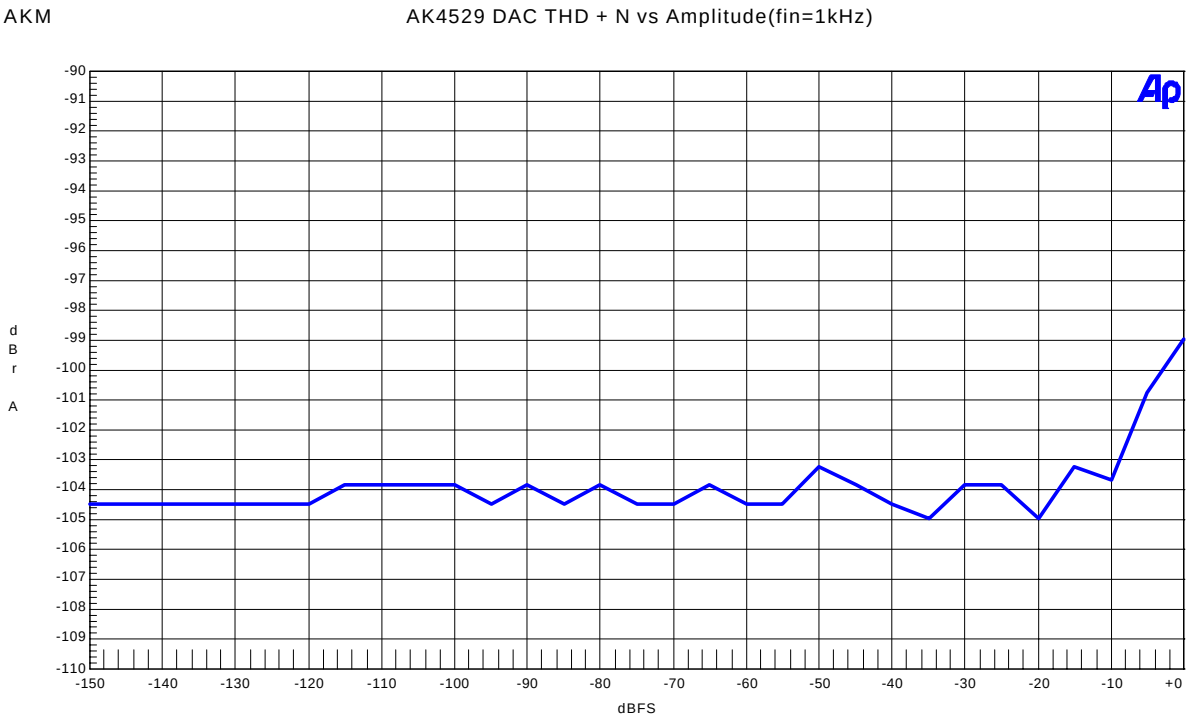


FFT (Noise floor)

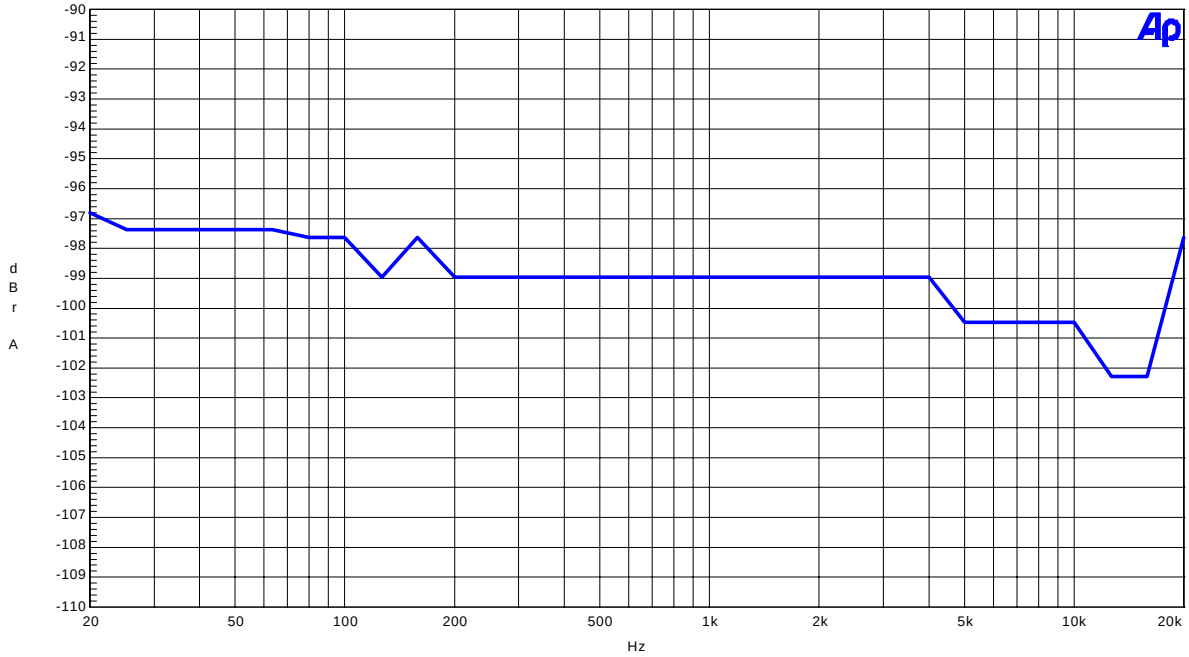


FFT (Outband noise)

(DAC fs=44.1kHz)

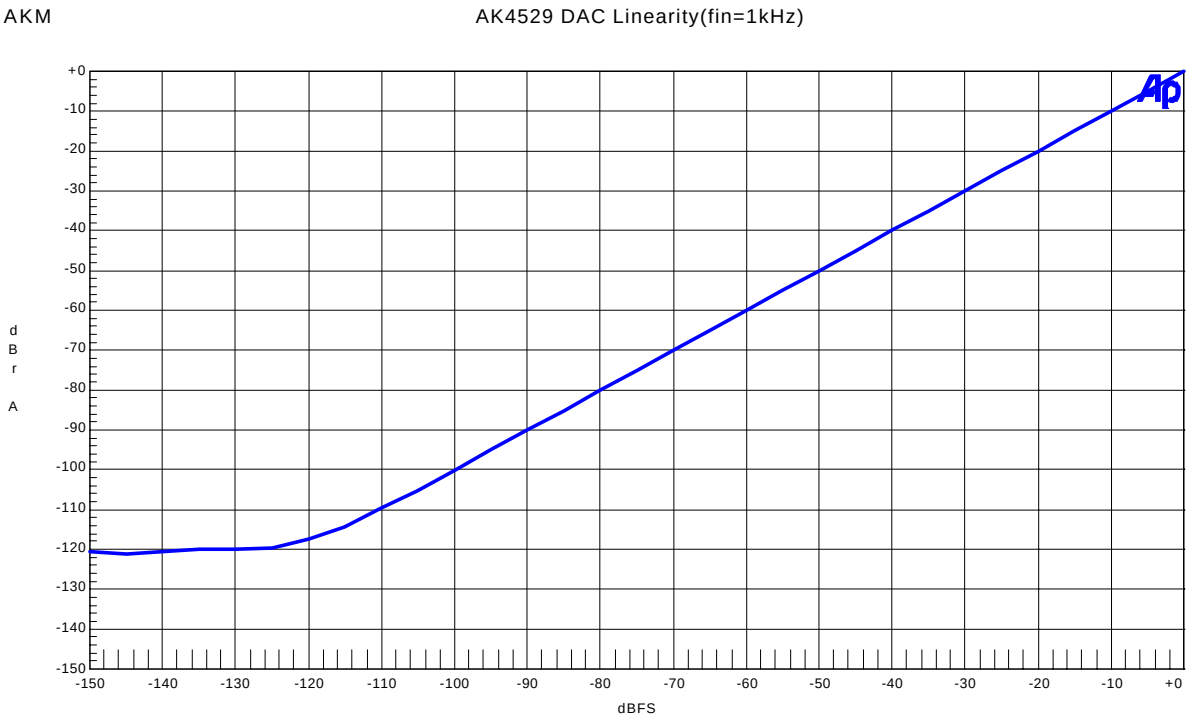


THD + N vs Amplitude(fin=1kHz)

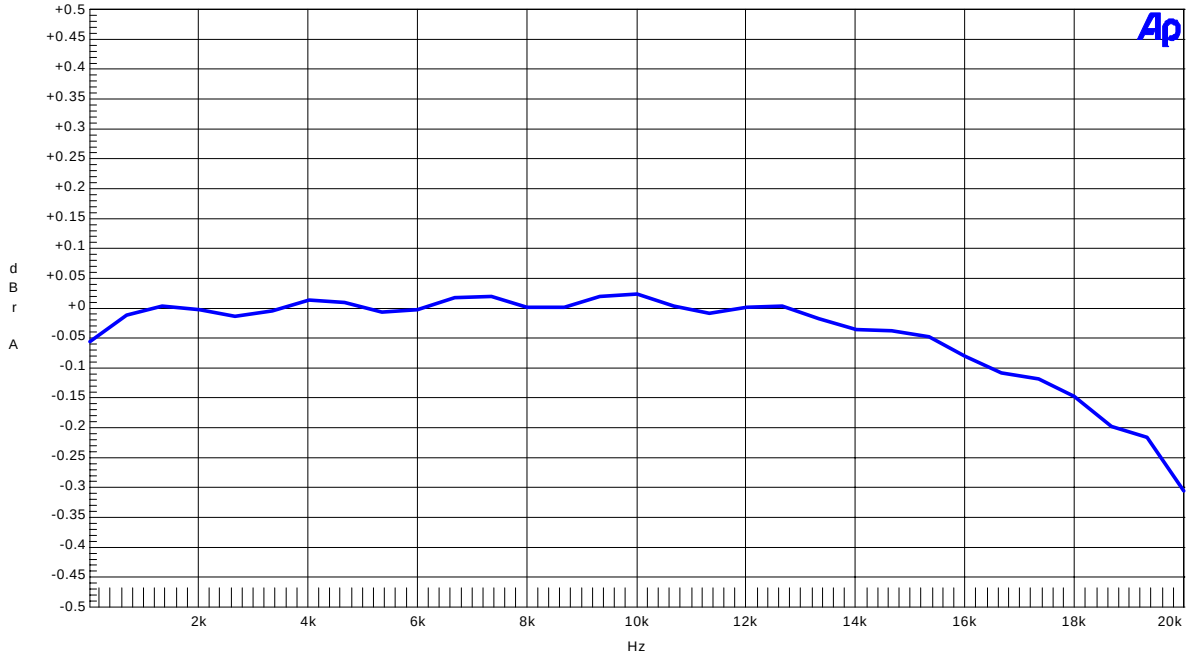


THD + N vs Input Frequency (Input=0dBFS)

(DAC fs=44.1kHz)



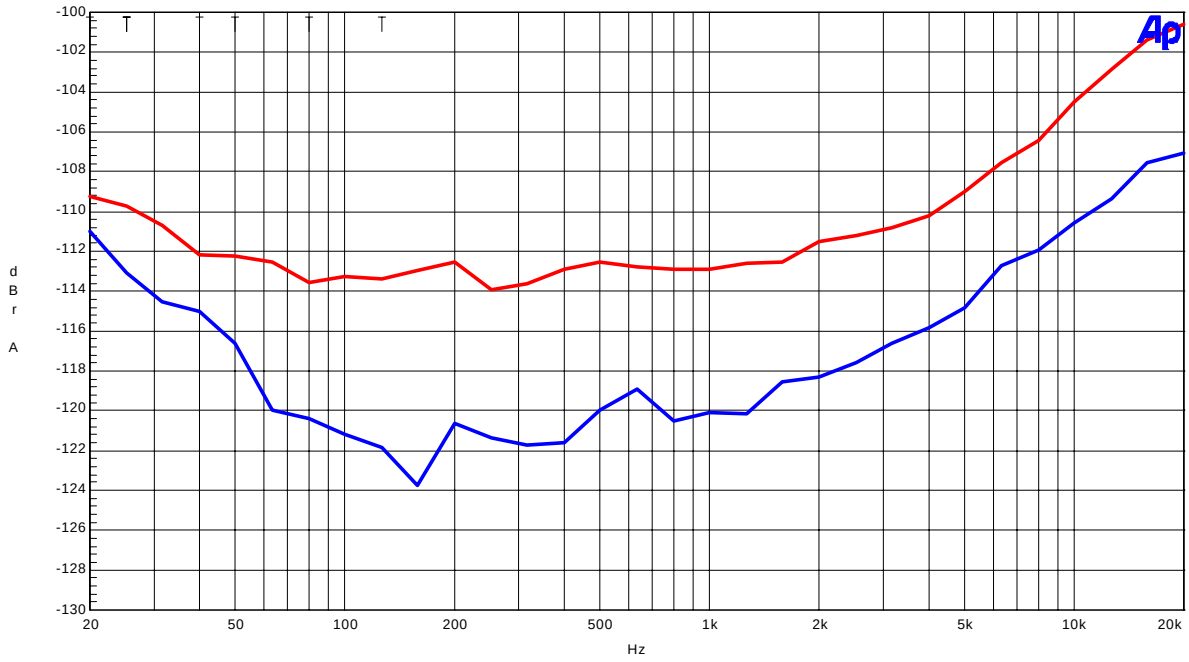
Linearity(fin=1kHz)



Frequency Response(Input Level=0dBFS)
(including external RC filter)

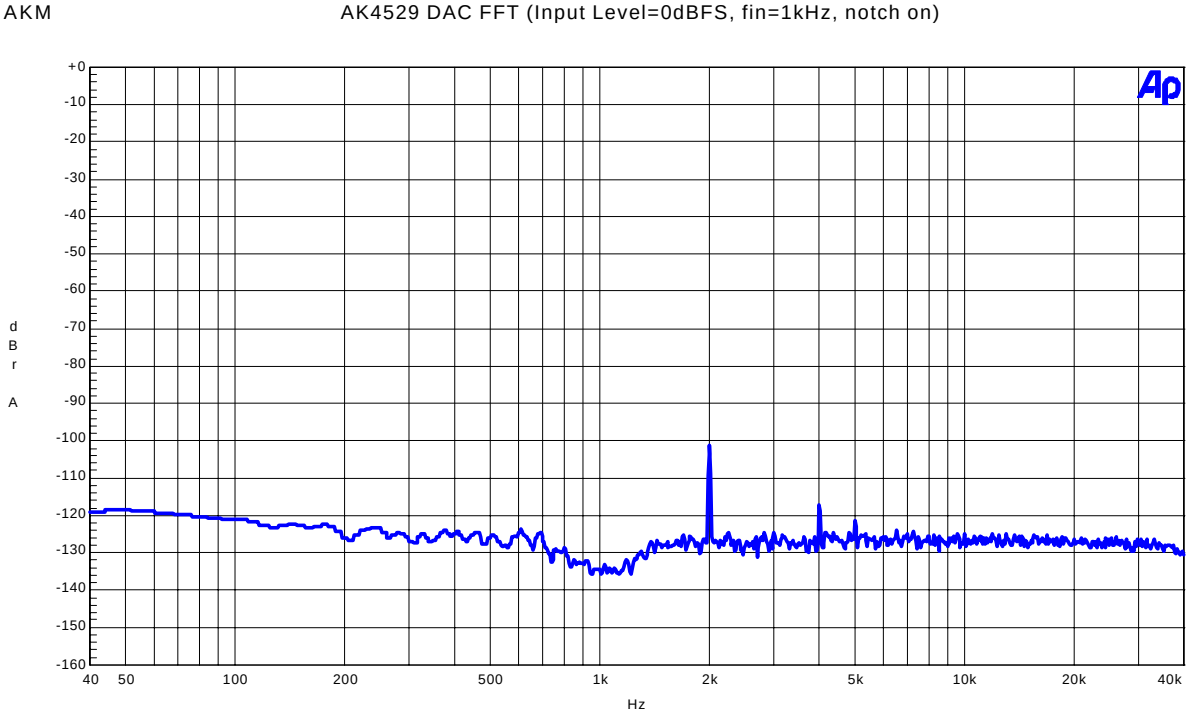
(DAC fs=44.1kHz)

AKM AK4529 DAC Crosstalk(Input Level=0dBFS, Upper@1kHz:Rch-->Lch, Lower@1kHz:Lch-->Rch)

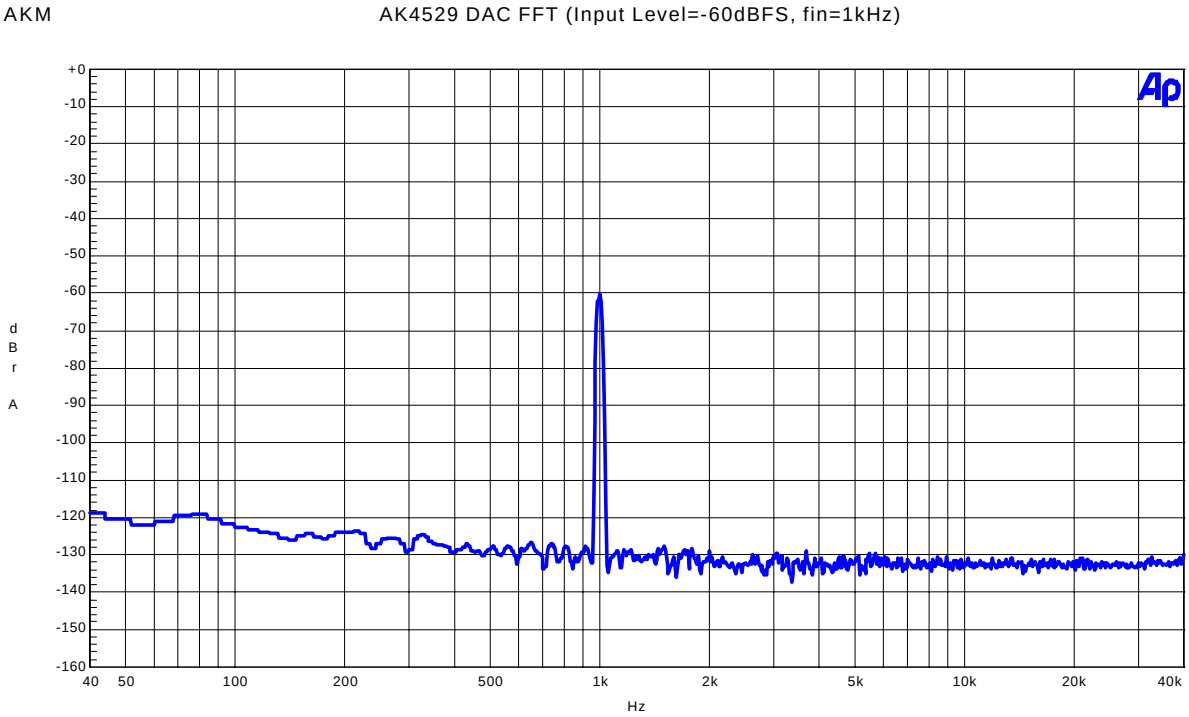


Crosstalk(Upper=Rch, Lower=Lch)

(DAC fs=96kHz)

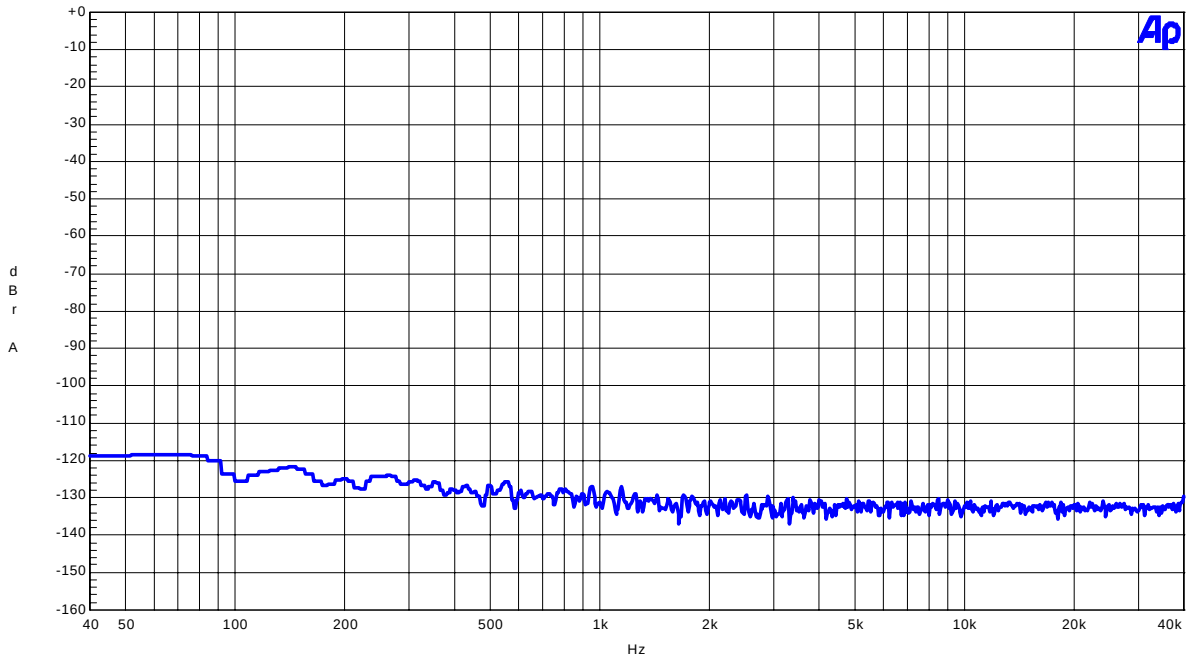


FFT (Input=0dBFS, fin=1kHz, Notch)

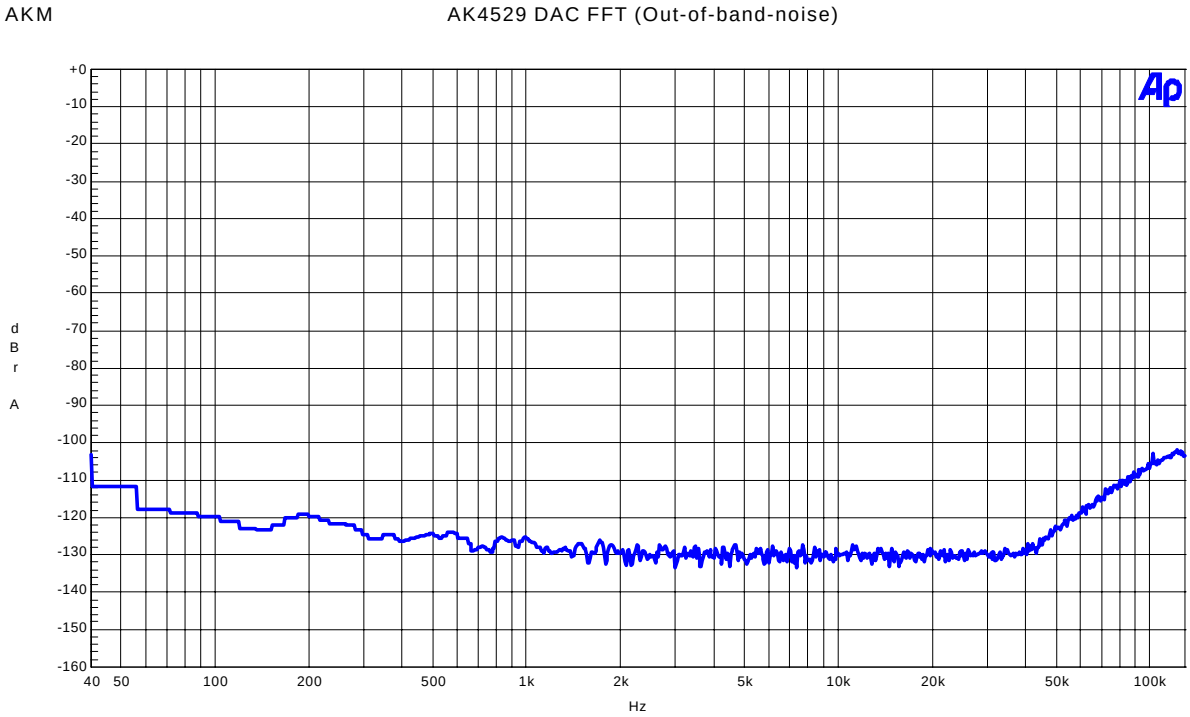


FFT (Input=-60dBFS,fin=1kHz)

(DAC fs=96kHz)

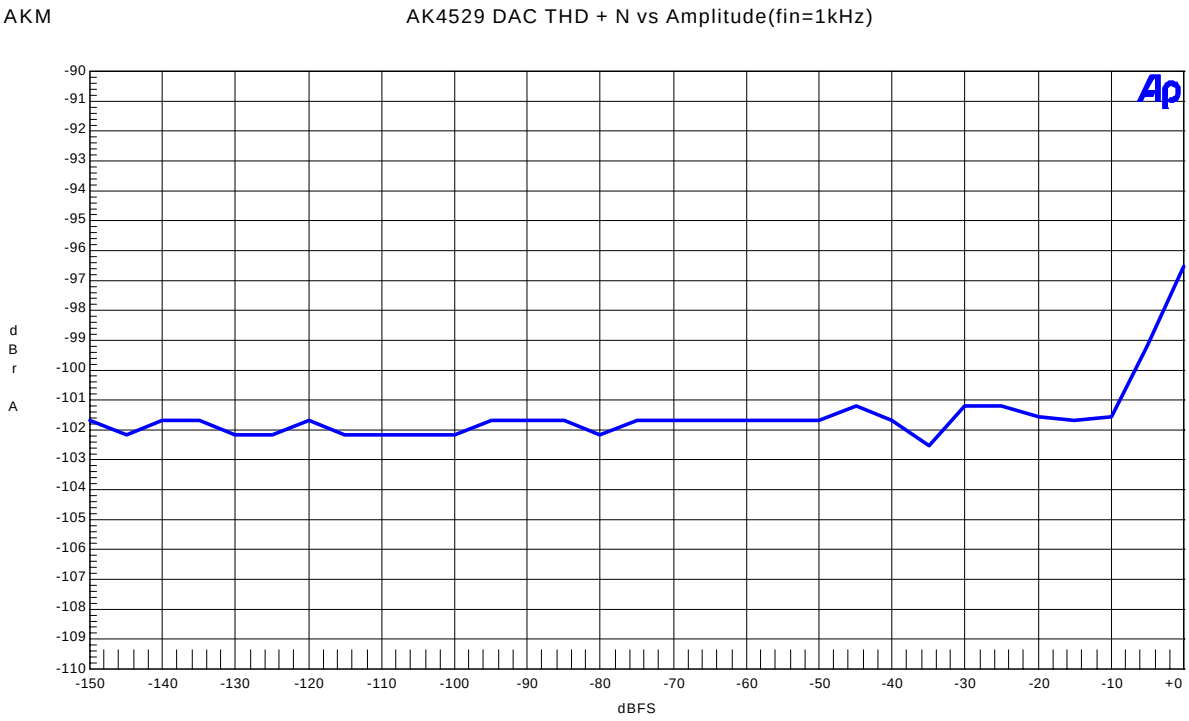


FFT (Noise floor)

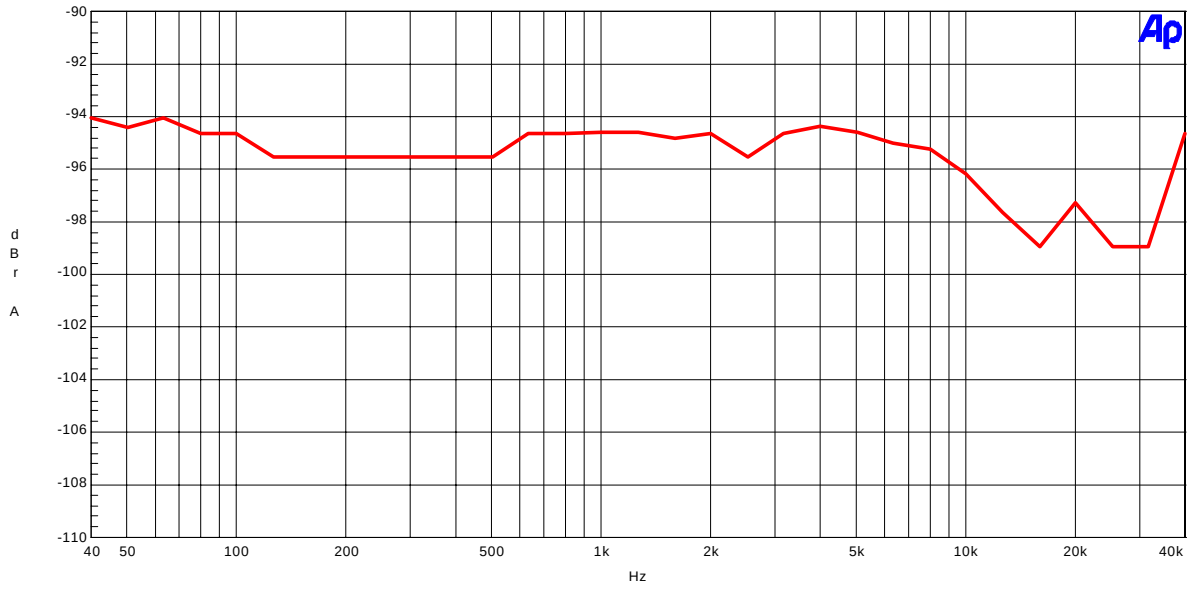


FFT (Outband noise)

(DAC fs=96kHz)

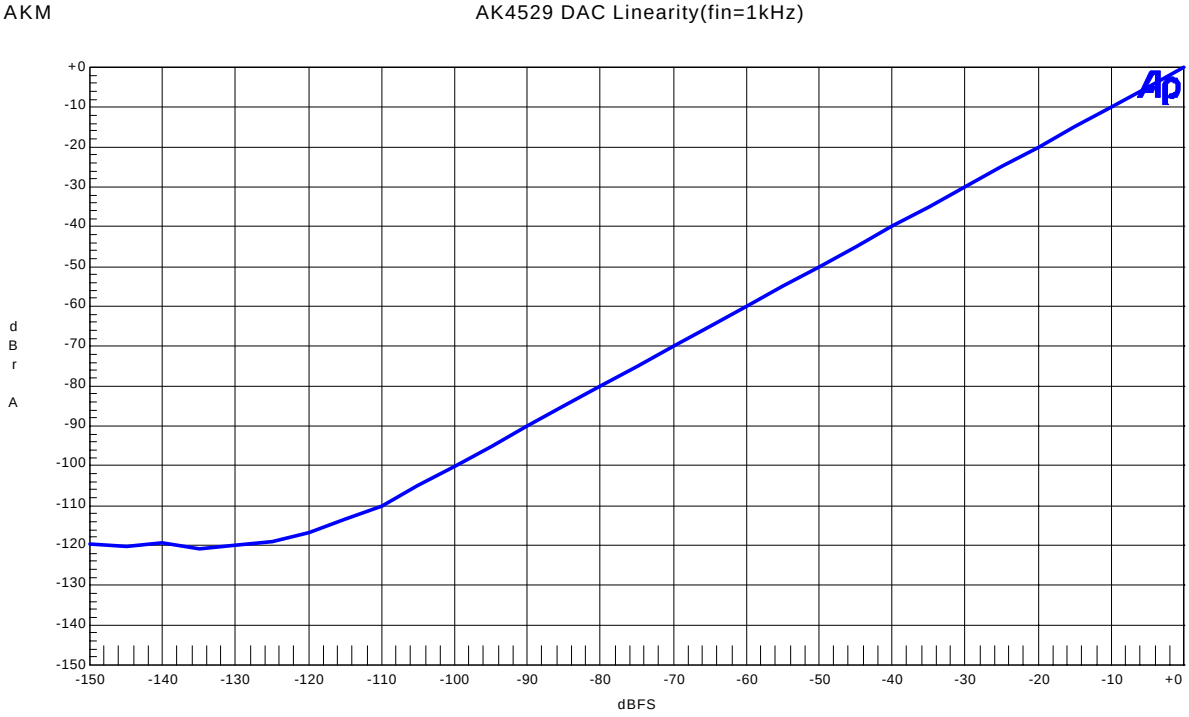


THD + N vs Amplitude (fin=1kHz)

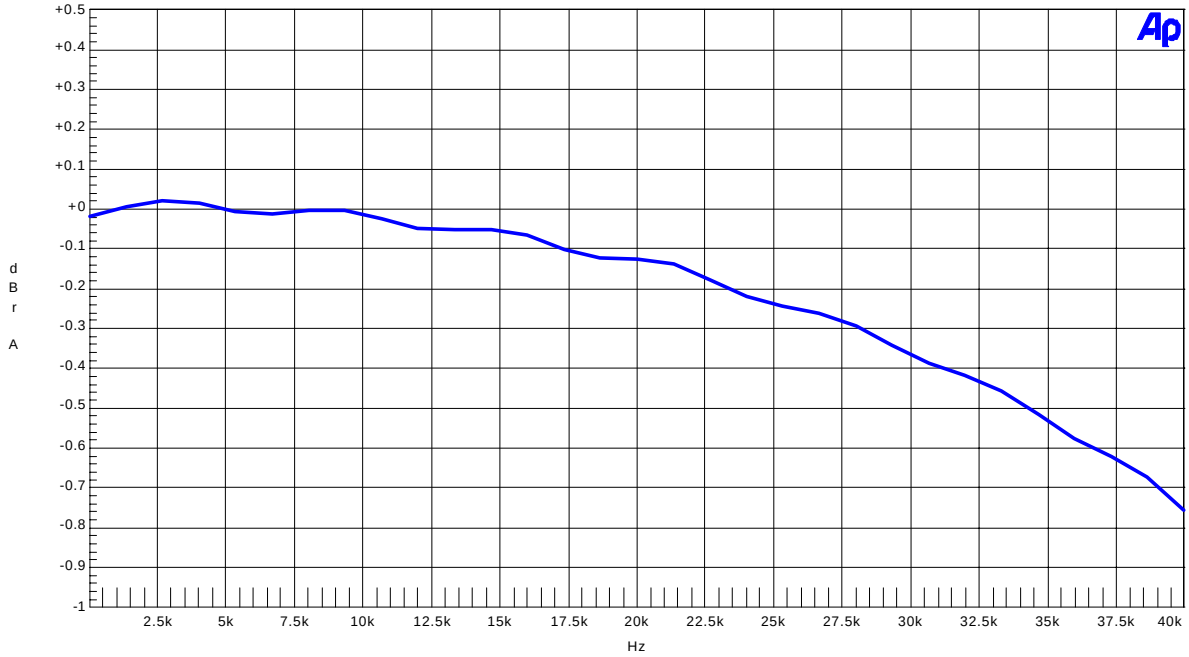


THD + N vs Input Frequency (Input=0dBFS)

(DAC fs=96kHz)

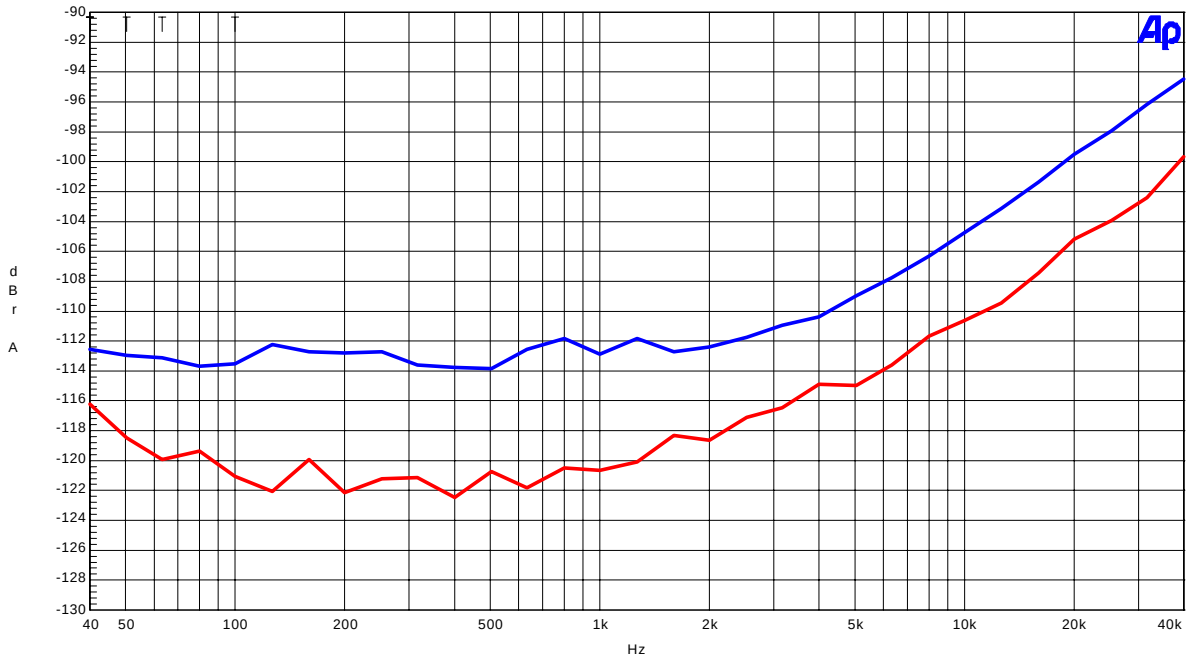


Linearity(fin=1kHz)



Frequency Response(Input Level=0dBFS)
(including external RC filter)

(DAC fs=96kHz)



Crosstalk (Upper=Lch, Lower=Rch)

AK4529 Control Program operation manual

1. Connect IBM-AT compatible PC with Eva-board by 10-line type flat cable (packed with Eva-board).
   Take care of the direction of 10pin Header (Refer to manual of Eva-board).
2. Start up “WINDOWS 95” or “WINDOWS 98”.
3. Insert the floppy-disk packed with Eva-board into the floppy-disk drive.
4. Set up “MS-DOS” from start menu.
5. Change directory to the floppy-disk drive(ex.a:) at MS-DOS prompt.
6. Type “4529”.
7. Then follow the displayed comment (See the following).

========== <<Operating flow>> ==========
Write data/ Display register map/ Reset etc.→ loop
==========

At first the following message is displayed:

```
****** AK4529 Control Program ver 2.0 , '00/9 ******
 copyright(c) 2000, Asahi Kasei Microsystems co.,ltd.
                  All rights reserved.
```

Then the following default register map is displayed (Loop starts from here):

```
AK4529 : 3-wire Serial control mode    CAD1-0=01  ----------------------------
 ADDR = 00 : 00 <Control 1>  ( 0     0      0      TDM   DIF1  DIF0   0      SMUTE)
 ADDR = 01 : 00 <Control 2>  ( 0     0      LOOP1 LOOP0 SDOS  DFS    ACKS   0     )
 ADDR = 02 : 00 <L1 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )
 ADDR = 03 : 00 <R1 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )
 ADDR = 04 : 00 <L2 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )
 ADDR = 05 : 00 <R2 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )
 ADDR = 06 : 00 <L3 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )
 ADDR = 07 : 00 <R3 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )
 ADDR = 08 : 00 <DEM>        (DEMD1 DEMD0 DEMA1  DEMA0 DEMB1 DEMB0 DEMC1 DEMC0)
 ADDR = 09 : 01 <CLK Mode>   ( LIN   RIN   ATS1   ATS0  0      0      0      RSTN )
 ADDR = 0A : 3F <DZF>        ( OVFE DZFM3 DZFM2  DZFM1 DZFM0 PWVRN PWADN PWDAN)
 ADDR = 0B : 00 <L4 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )
 ADDR = 0C : 00 <R4 ATT>     ( ATT7  ATT6   ATT5   ATT4  ATT3  ATT2   ATT1   ATT0 )

Input 1(Write), R(Reset), T(Table), I(Increment) or D(Decrement) :
```

1) If you input “1”, you can write data to AK4529.

```
    You can write data to AK4529
Input Register Address (2 figure, hex) (00-0C) =
```

Input register address in 2 figures of hexadecimal.
Then current data of this address is displayed:

```
AK4529
 ADDR = 00 : 08 <Control 1>  ( 0     0     0     TDM   DIF1  DIF0  0     SMUTE)
                               0     0     0     0     1     0     0     0
Input Register Data    (2 figure, hex) (00-FF) =
```

You can write control data to this address. Input control data in 2 figures of hexadecimal.
Refer to datasheet of AK4529.
Then the data written to this address is displayed:

```
AK4529
 ADDR = 00 : 0C <Control 1>  ( 0     0     0     TDM   DIF1  DIF0  0     SMUTE)
                               0     0     0     0     1     1     0     0
```

2) If you input “R” or “r”, this program writes default data to all register addresses.

3) If you input “T” or “t”, current register map is displayed.

4) If you input “I” or “i”, this program increment data of current address by 1.

5) If you input “D” or “d”, this program decrement data of current address by 1.

6) If you input “S” or “s”, this program is terminated.

AK4112A Control Program operation manual

1. Connect IBM-AT compatible PC with Eva-board by 10-line type flat cable (packed with Eva-board).
   Take care of the direction of 10pin Header (Refer to manual of Eva-board).
2. Start up “WINDOWS 95” or “WINDOWS 98”.
3. Insert the floppy-disk packed with Eva-board into the floppy-disk drive.
4. Set up “MS-DOS” from start menu.
5. Change directory to the floppy-disk drive(ex.a:) at MS-DOS prompt.
6. Type “4112”.
7. Then follow the displayed comment (See the following).

========== <<Operating flow>> ==========
Write data/ Display register map/ Reset etc.→ loop
==========

At first the following message is displayed:

```
****** AK4112 Control Program ver 2.0 , '00/1 ******
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```

Then the following is displayed:

After chip address is defined, the following default register map is displayed (Loop starts from here):

```
AK4112 Register Map
 ADDR = 00 : 03 <CLK PD ctrl> (0     BCU   CM1   CM0   OCKS1 OCKS0 PWN   RSTN )
 ADDR = 01 : 80 <I/O    ctrl> (MPAR  MTSC  CS12  XTE   IPS1  IPS0  OPS1  OPS0 )
 ADDR = 02 : 4A <FMT DM ctrl> (V/TX  DIF2  DIF1  DIF0  DEAU  DEM1  DEM0  DFS  )
 ADDR = 03 : 00 <RCV STAT 1>  (ERF    0    AUDIO AUTO  PEM   FS1   FS0   RFS96)
 ADDR = 04 : 00 <RCV STAT 2>  (CV    STC   CRC  UNLOCK V     FRERR BIP   PAR  )
 ADDR = 05 : 00 <ChA STAT 0>  (CA7   CA6   CA5   CA4   CA3   CA2   CA1   CA0 )
 ADDR = 06 : 00 <ChA STAT 1>  (CA15  CA14  CA13  CA12  CA11  CA10  CA9   CA8 )
 ADDR = 07 : 00 <ChA STAT 2>  (CA23  CA22  CA21  CA20  CA19  CA18  CA17  CA16)
 ADDR = 08 : 00 <ChA STAT 3>  (CA31  CA30  CA29  CA28  CA27  CA26  CA25  CA24)
 ADDR = 09 : 00 <ChB STAT 0>  (CB7   CB6   CB5   CB4   CB3   CB2   CB1   CB0 )
 ADDR = 0A : 00 <ChB STAT 1>  (CB15  CB14  CB13  CB12  CB11  CB10  CB9   CB8 )
 ADDR = 0B : 00 <ChB STAT 2>  (CB23  CB22  CB21  CB20  CB19  CB18  CB17  CB16)
 ADDR = 0C : 00 <ChB STAT 3>  (CB31  CB30  CB29  CB28  CB27  CB26  CB25  CB24)
 ADDR = 0D : 00 <BstPre Pc 0> (PC7   PC6   PC5   PC4    PC3   PC2   PC1   PC0  )
 ADDR = 0E : 00 <BstPre Pc 1> (PC15  PC14  PC13  PC12  PC11  PC10  PC9   PC8  )
 ADDR = 0F : 00 <BstPre Pd 0> (PD7   PD6   PD5   PD4    PD3   PD2   PD1   PD0  )
 ADDR = 10 : 00 <BstPre Pd 1> (PD15  PD14  PD13  PD12  PD11  PD10  PD9   PD8  )
 ADDR = 11 : 02 <Count ctrl>  (0     0     0     0     0     EFH1  EFH0  XFS96)
Input 0(Read), 1(Write), R(Reset), T(Table) or S(Stop) :
```

1) If you input “0”, you can read data from AK4112A.

```
    You can read data from AK4112
Input Register Address (2 figure, hex) (00H-11H) =
```

Input register address in 2 figures of hexadecimal.
Then current data of this address is displayed:

```
AK4112A
 ADDR = 00 : 03 <CLK PD ctrl> (0     BCU   CM1   CM0   OCKS1 OCKS0 PWN   RSTN)
                                0     0     0     0     0     0     1     1
```

2) If you input “1”, you can write data to AK4112A.

```
    You can write data to AK4112
Input Register Address (2 figure, hex) (00H-02H or 11H) =
```

Input register address in 2 figures of hexadecimal.
Then current data of this address is displayed:

```
AK4112A
 ADDR = 00 : 03 <CLK PD ctrl> (0     BCU   CM1   CM0   OCKS1 OCKS0 PWN   RSTN)
                                0     0     0     0     0     0     1     1
Input Register Data    (2 figure, hex) =
```

You can write control data to this address. Input control data in 2 figures of hexadecimal.
Refer to datasheet of AK4112A.
Then the data written to this address is displayed:

```
AK4112
 ADDR = 00 : 23 <CLK PD ctrl> (0     BCU   CM1   CM0   OCKS1 OCKS0 PWN   RSTN)
                                0     0     1     0     0     0     1     1
```

3) If you input “R” or “r”, this program writes default data to all register addresses.

4) If you input “T” or “t”, current register map is displayed.

5) If you input “S” or “s”, this program is terminated.

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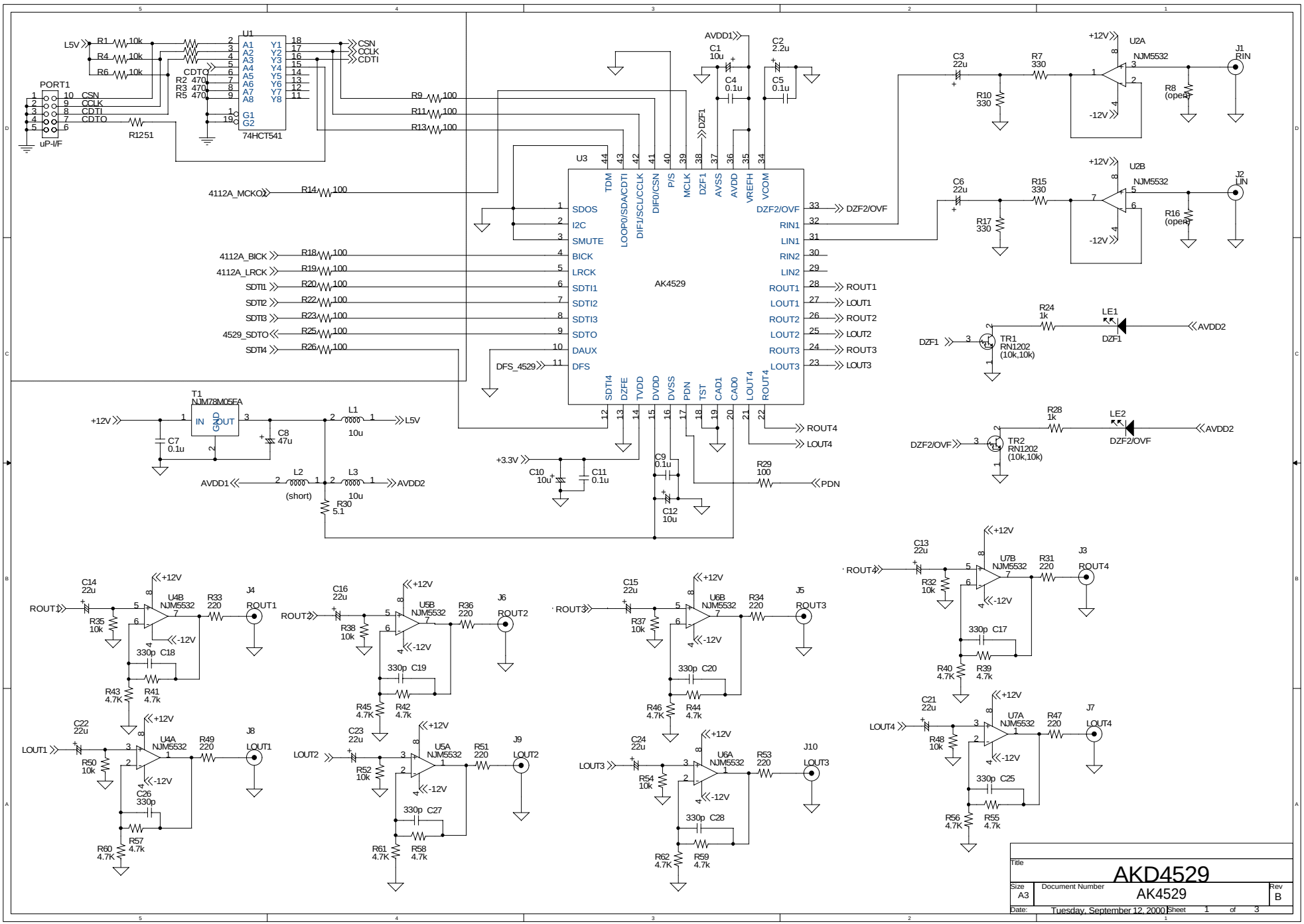
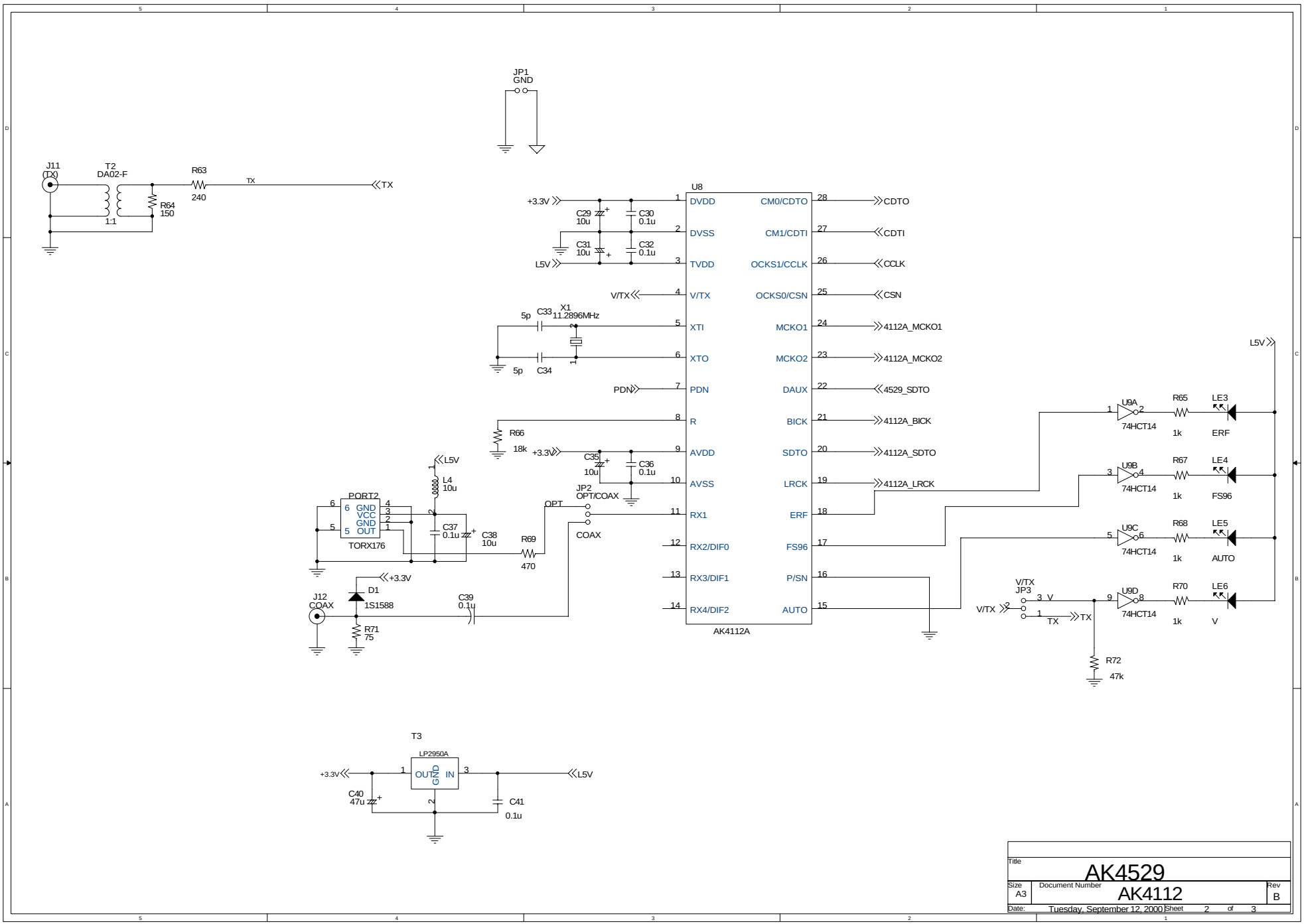
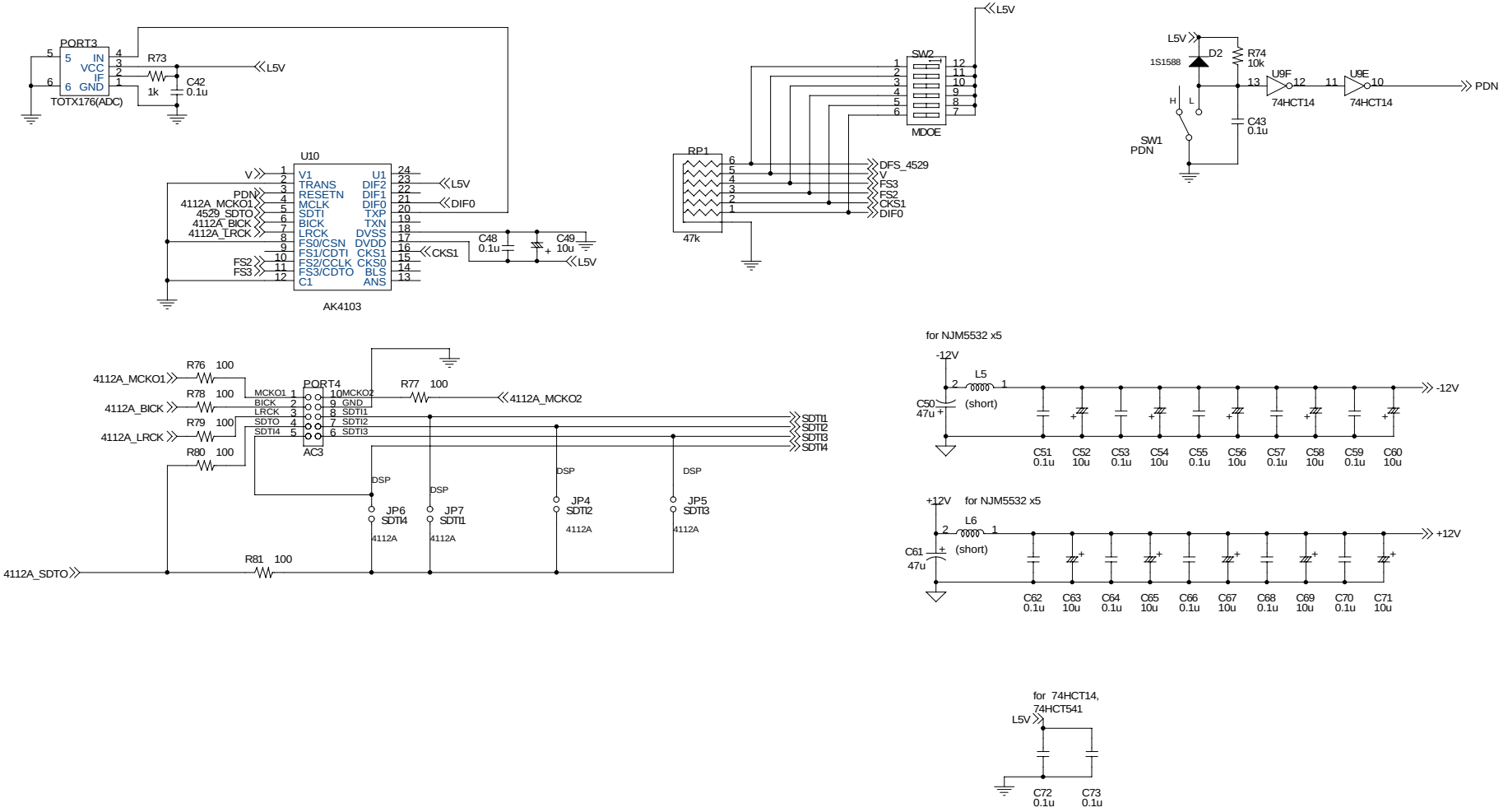

AK4529
74HCT541
NJM5532
NJM78M05FA
PORT1
uP-I/F
CSN
CCLK
CDTI
CDTO
4112A_MCKO2
4112A_BICK
4112A_LRCK
SDTI1
SDTI2
SDTI3
4529_SDTO
SDTI4
DFS_4529
DZF2/OVF
ROUT1
LOUT1
ROUT2
LOUT2
ROUT3
LOUT3
ROUT4
LOUT4
PDN
AVDD1
AVDD2
DZF1
L5V
+12V
-12V
+3.3V
(short)
Title
AKD4529
Size
A3
Document Number
AK4529
Rev
B
Date:
Tuesday, September 12, 2000
Sheet
1
of
3



Title	AK4529		
Size A3	Document Number AK4112		Rev B
Date: Tuesday, September 12, 2000	Sheet 2 of 3		



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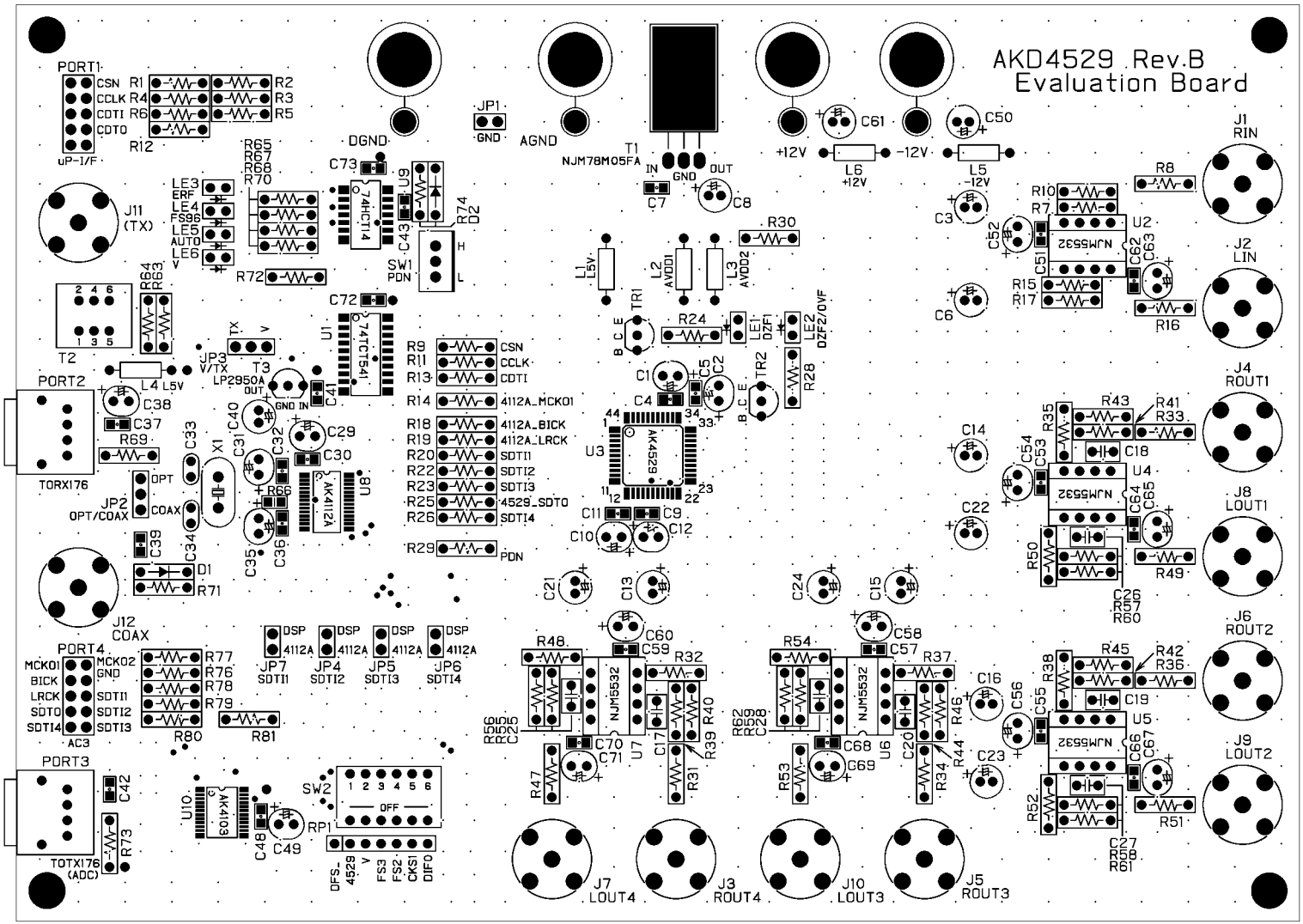
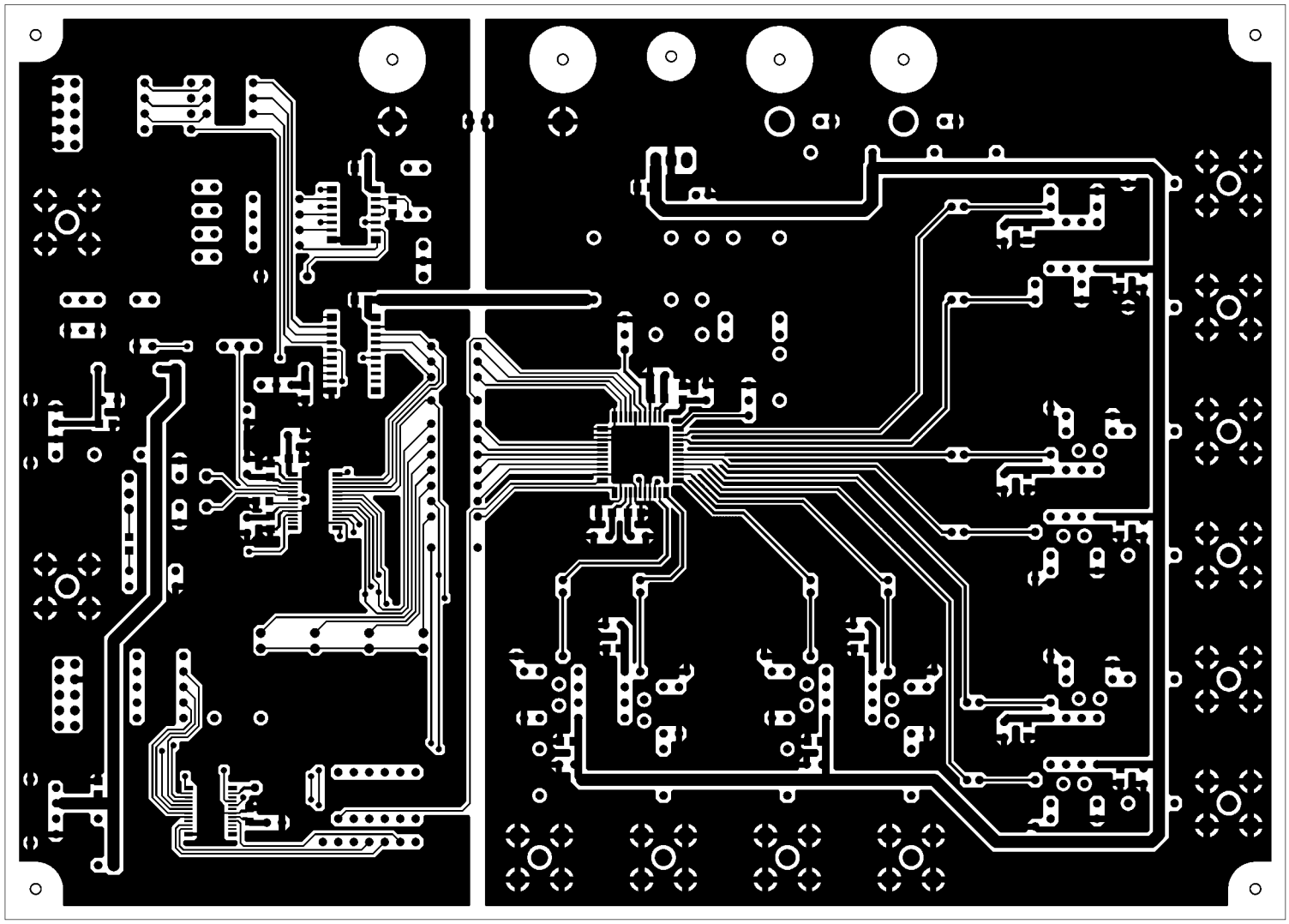
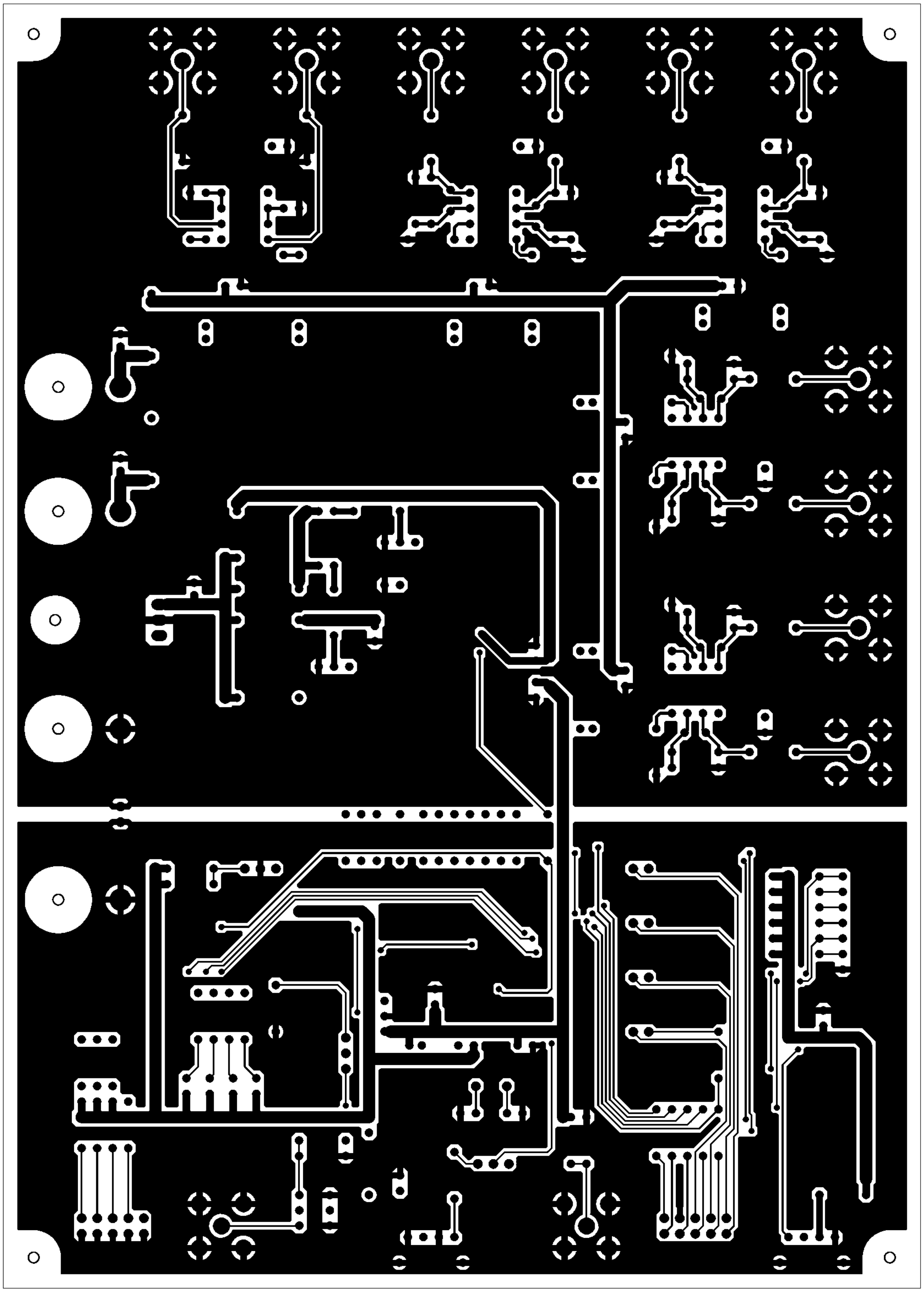
Size A3	Document Number Interface	Rev B
Date: Tuesday, September 12, 2000	Sheet 3 of 3	



AKD4529 Rev.B L1 SR SILK



AKD4529 Rev.B L1


AKD4529 Rev.B L2