

[AI2 MAX Soundbar STB]

Analysis Report(Audio noise issue when power on/off)

ALT Confidential Document

Organization
R&D Lab. 2

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2021.11.29

Version
1.0

Revision History

Version	Date	Description	Owner
1.0	2021/11/29	1 st Draft version	Lonnie Kim

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Issue #1

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Background



Mantis #1359(<https://mantis.cnsbg.foxconn.com/vaas/view.php?id=1359>)

Hi Wooshin,

As you may know, we encounter an issue that some SWAN sometimes has audio noise issue while testing power on/off repeatedly in factory.

The attached log "K18X001_abnormality NOISE sound AUDIO AMP CONSOLE LOG.TXT" is the log that has audio noise at 20th times while doing power on/off.

It is a log from testing start. So in front of the log is the OK cases, the last booting log is fail case. I see some abnormal message like below. I think this will cause audio noise.

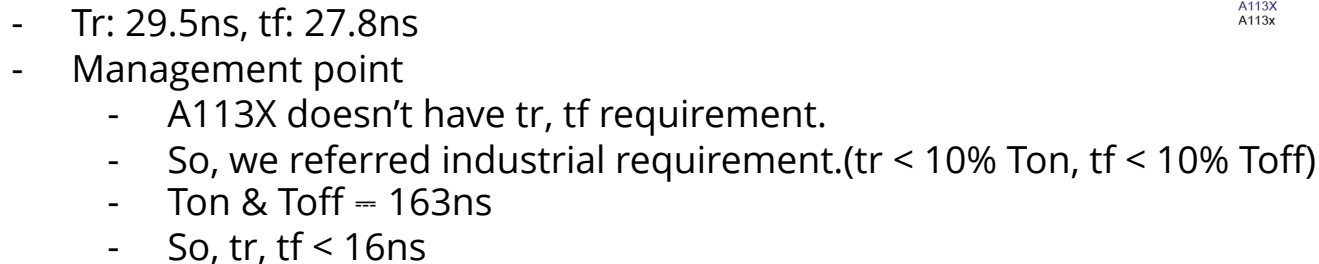
Please help to check why the tdm capture is stop and capture repeatedly.

```
[ 16.960405@0] asoc-aml-card auge_sound: tdm capture stop
[ 26.997962@2] asoc-aml-card auge_sound: tdm prepare capture
[ 26.998200@2] aml_dai_tdm_prepare Expected toddr src:TDMIN_B
[ 27.006102@2] asoc-aml-card auge_sound: tdm capture enable
[ 27.052480@0] asoc-aml-card auge_sound: tdm capture stop
[ 37.237901@2] asoc-aml-card auge_sound: tdm prepare capture
[ 37.238142@2] aml_dai_tdm_prepare Expected toddr src:TDMIN_B
[ 37.245919@2] asoc-aml-card auge_sound: tdm capture enable
[ 37.291973@0] asoc-aml-card auge_sound: tdm capture stop
[ 47.477892@2] asoc-aml-card auge_sound: tdm prepare capture
[ 47.478135@2] aml_dai_tdm_prepare Expected toddr src:TDMIN_B
```

In factory, they power on/off SWAN repeatedly to hear if sound is normal or abnormal

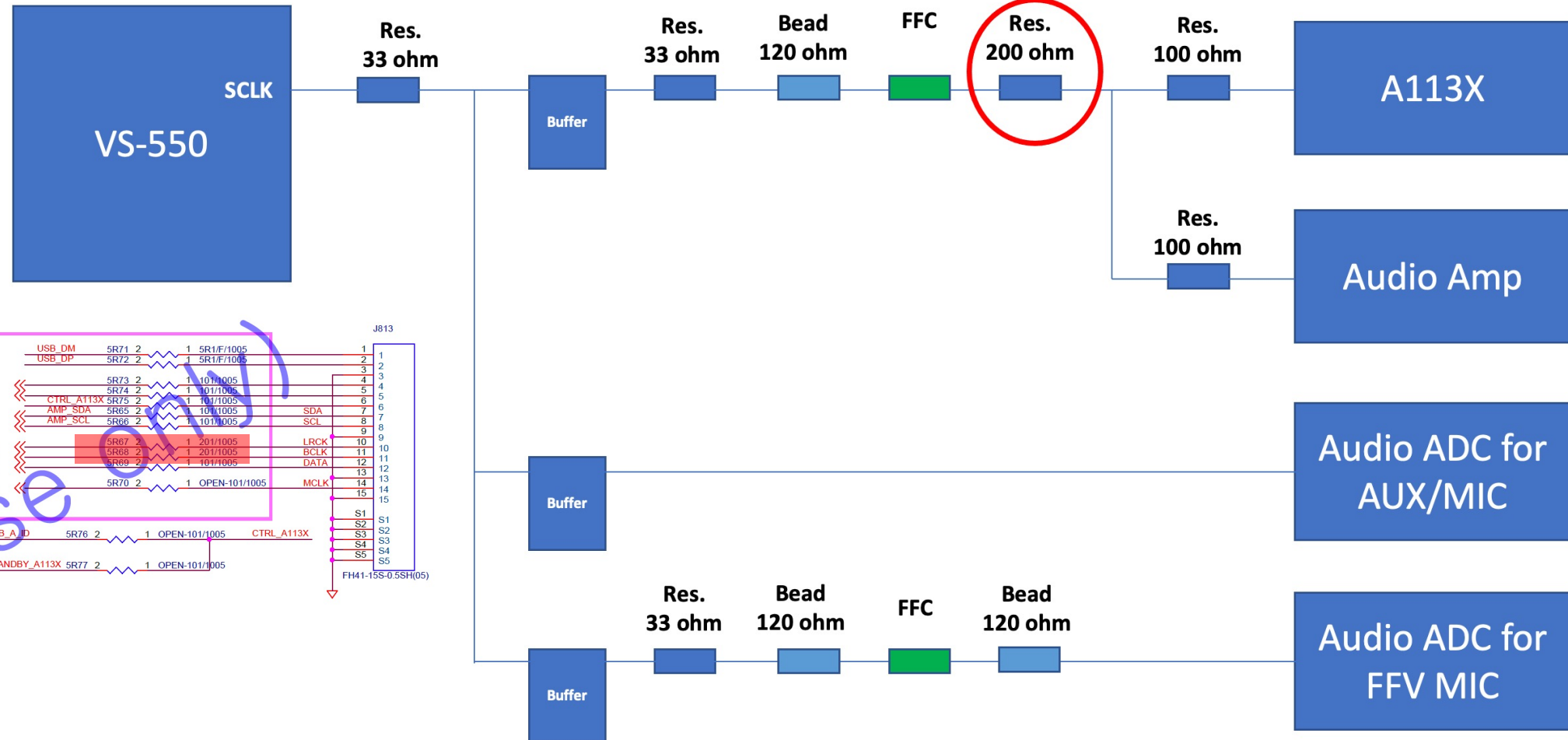


- Reproduce issue without any change(failure rate: 5/100)
- Waveform analysis
- A113X BCLK input(R107 pin1)

[illegible]

ECO point

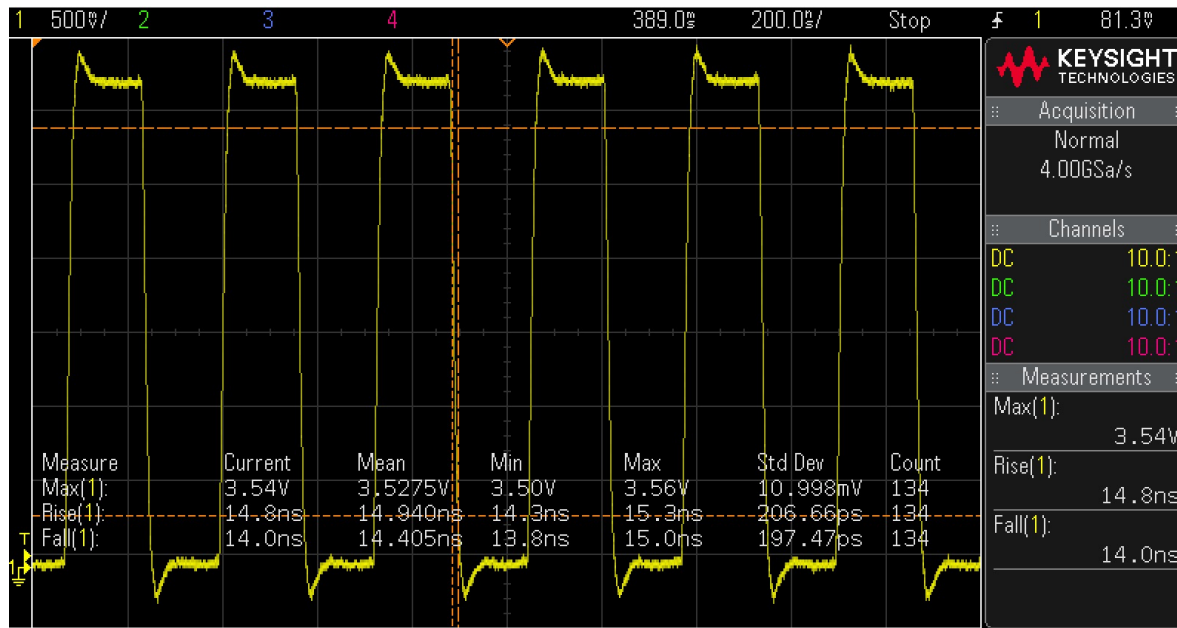
5R68, 5R67: 200ohm -> 51ohm



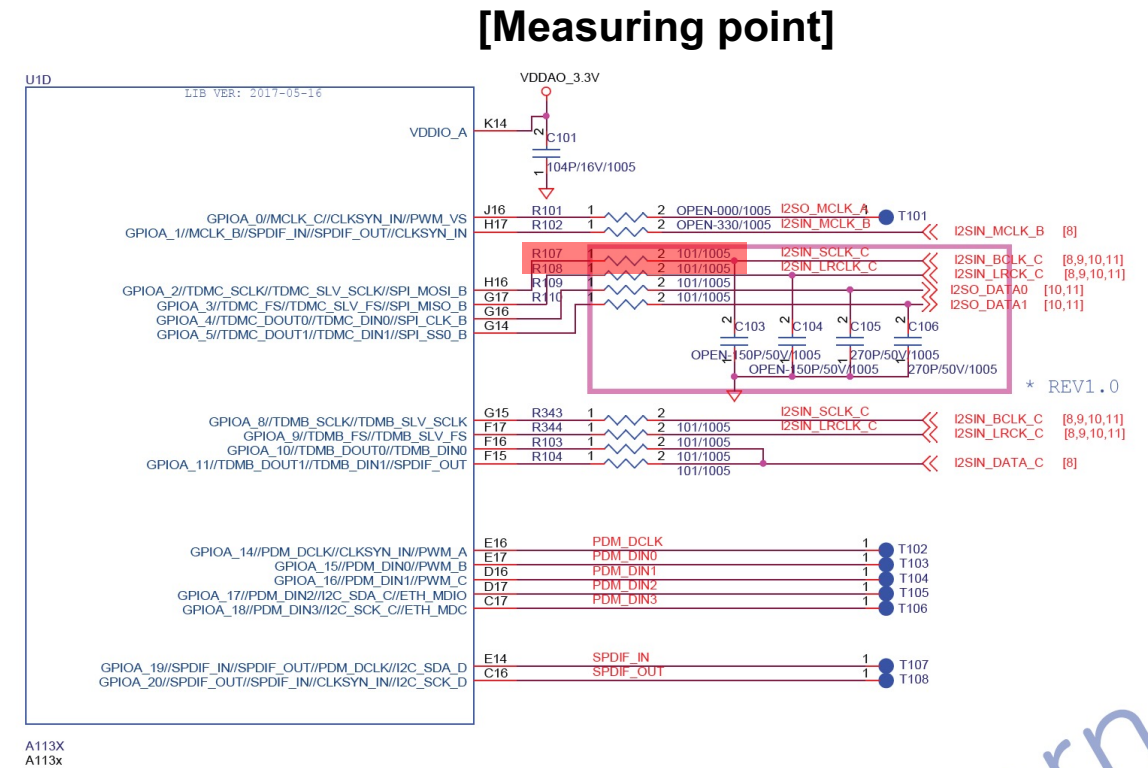
Analysis after ECO

Analysis after ECO

- Waveform analysis
- A113X BCLK input(R107 pin1)



- $T_r: 14.8ns < 16ns$
- $T_f: 14.0ns < 16ns$
- Test result: 0/100(failure rate)





Validation test(tr/tf timing affect to audio noise)

1. Another STB(Audio noise issue observed sometimes)
 - Before ECO(5R67, 5R68: 200ohm): 2/100(failure rate)
 - After ECO(5R67, 5R68: 200ohm -> 51ohm): 0/100(failure rate)
 - Re-ECO to before status(5R67, 5R68: 51ohm -> 200ohm): 2/100(failure rate)
 2. Normal STB
 - Before ECO(5R67, 5R68: 200ohm): 0/100(failure rate)
 - Increase R value(5R67, 5R68: 200ohm -> 270ohm): 2/100(failure rate)
- > We can check if tr, tf affect to audio noise.



Conclusion

1. We will release ECO to factory
 - 5R67, 5R68: 200ohm -> 51ohm



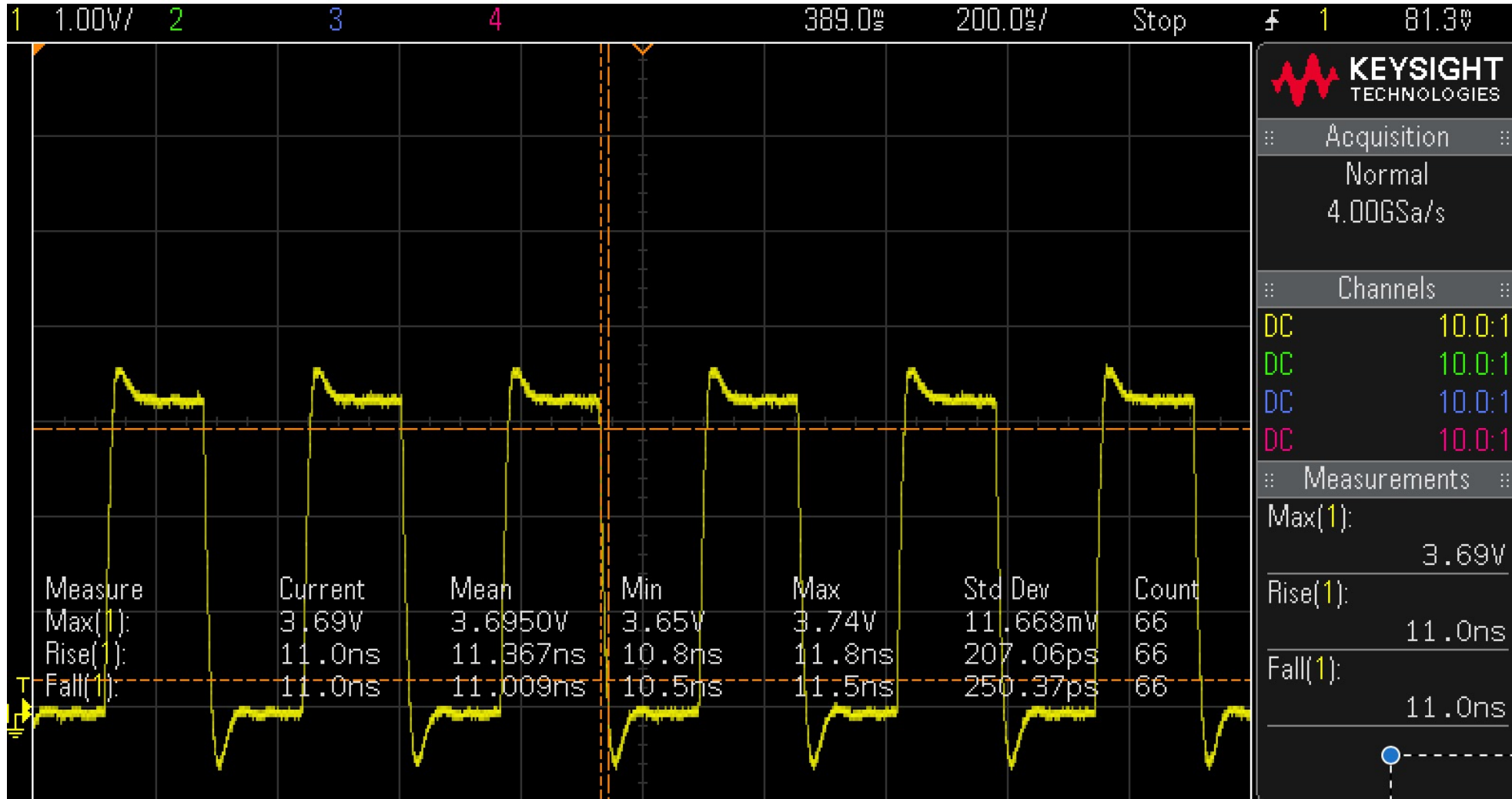
Issue #2



I2S waveform over CX20810 absolute maximum value

BCLK of I2S in CX20810(FFV ADC)

- Vmax: 3.69V(observed undershoot/overshoot)





I2S waveform exceed CX20810 absolute value

I2S shall not over 3.6V(absolute maximum rating)
-> So, Foxconn shall find suitable value it can not over absolute maximum rating.

CX20810/CX20811 Data Sheet

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3 - Absolute Maximum Ratings

Parameter	Min	Typical	Max	Unit	Comments
5V System Voltage Supply VDD_CP12IN VDD_LDO33IN	-0.4	5.0	5.5	V	Powers charge pump and PLL LDO Powers analog LDO
3.3V System Voltage Supply PVDD33_PWM	-0.4	3.3	3.6	V	Powers PWM driver
Digital I/Os VDD33_DIG (1.8/3.3)	-0.4	1.8/3.3	3.6	V	VDD33_DIG powers digital I/Os
VDD_I2S (1.8/3.3)	-0.4	1.8/3.3	3.6	V	VDD_I2S powers I ² S Interface
Operating Temperature	-40		85	°C	
Junction Temperature	-40		125	°C	
Storage Temperature	-40		150	°C	

Thank you!