ADC6820Nxx Audio A/D Converter

USER MANUAL

OSEE TECHNOLOGY CO., LTD.

Product Information

Model: ADC6820N Audio A/D Converter
ADC6820NS Audio A/D Converter
ADC6820N4 Audio A/D Converter
ADC6820NS4 Audio A/D Converter

Version: V010000

Release Date: June 5th, 2008

Company

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ADC6820Nxx Audio A/D Converter

Chapter 1 Introduction

Overview

Four modules will be introduced in Table 1-1 as follows.

Table 1-1 The Description of Audio Processing Module for A/D Converter

Module name	Description
ADC6820N	2-chanel balanced analog audio inputs, 2-channel balanced and unbalanced digital audio outputs respectively, the function of audio delay
ADC6820N4	4-chanel balanced analog audio inputs, 2-channel balanced and unbalanced digital audio outputs respectively, the function of audio delay
ADC6820NS	2-chanel balanced analog audio inputs, 2-channel balanced and unbalanced digital audio outputs respectively, the function of audio delay and tracking.
ADC6820NS4	4-chanel balanced analog audio inputs, 2-channel balanced and unbalanced digital audio outputs respectively, the function of audio delay and tracking

Each module can provide 1-channel balanced or unbalanced DARS input, 1-channel Ref input, users can select one of them as synchronization signal. Each module can generate fixed-rate tone signal and provide flexibility in audio sampling and delay setting.

Features

The ADC6820Nxx offers the following features:

- ✓ Convert analog audio input into balanced and unbalanced digital audio output
- ✓ 2/4 channel audio inputs, 2 channel balanced and unbalanced digital audio outputs respectively
- ✓ Selectable delay and synchronizing mode
- ✓ Either DARS or Ref can be selected as synchronized signal
- ✓ flexibility in audio sampling, and can provide 16-bit, 20-bit, 24-bit sampling setting
- ✓ Generating two fixed-frequency audio signals
- ✓ -96 ~ +12dB audio gain range adjustment
- ✓ flexibility in delay setting, and the maximum is 1980ms @ 32KHz manual delay

- ✓ Local or remote control and monitoring
- ✓ Provide audio tracking function, only valid for ADC6820NS and ADC6820NS4

FCC Caution:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help.

Module Descriptions

The Front Part of Module

Figure 1-1 shows the board of ADC6820Nxx

Fig. 1-1 the Board of ADC6820Nxx

Back Connector

ADC6820Nxx

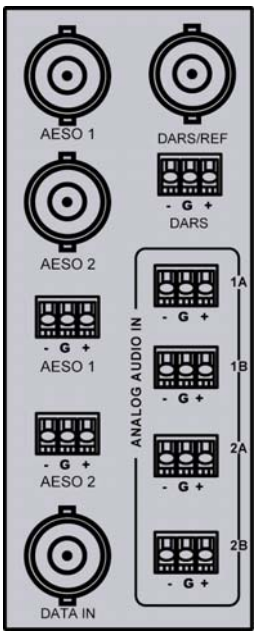


Fig.1-2 Back Connector of ADC6820Nxx

Tab. 1-2 description of ADC6820Nxx Back Connector

Item	Description
AESO1, AESO2 (BNC connector)	AES/EBU unbalanced digital audio output
AESO1, AESO2 (3-pin audio connector)	AES/EBU balanced digital audio output
DATA IN	audio tracking input, only valid for ADC6820NS and ADC6820NS4
DARS/REF	AES/EBU unbalanced digital audio synchronized input or black burst synchronized input（see *setting jumper* for more information）
DARS IN	AES/EBU balanced digital audio synchronized input
ANALOG AUDIO IN 1A,1B	Analog audio input
ANALOG AUDIO IN 2A,2B	Analog audio input, only valid for ADC6820N4(S)

Signal Flow

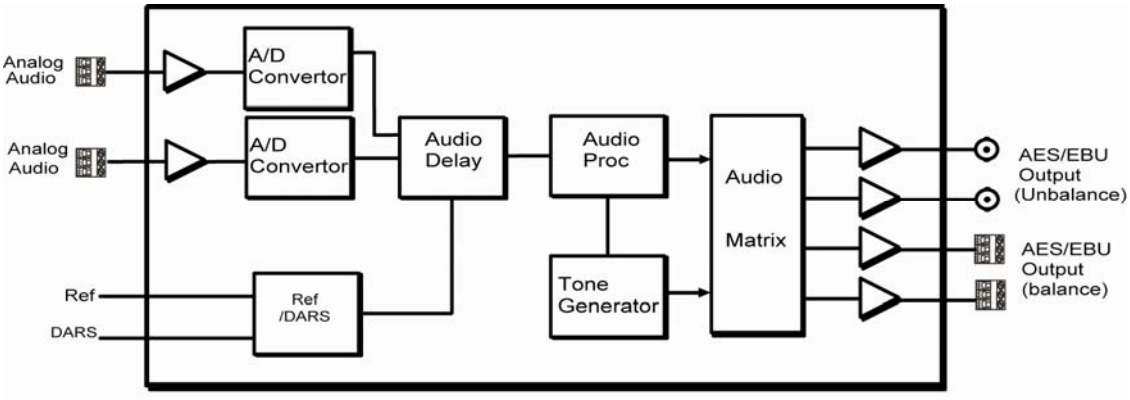


Fig. 1-3 Signal Flow of ADC6820N

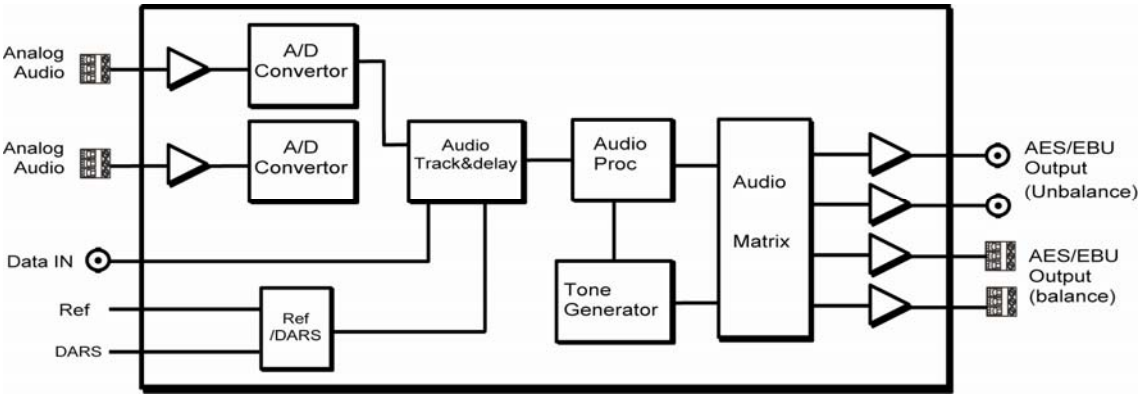


Fig. 1-4 Signal Flow of ADC6820NS

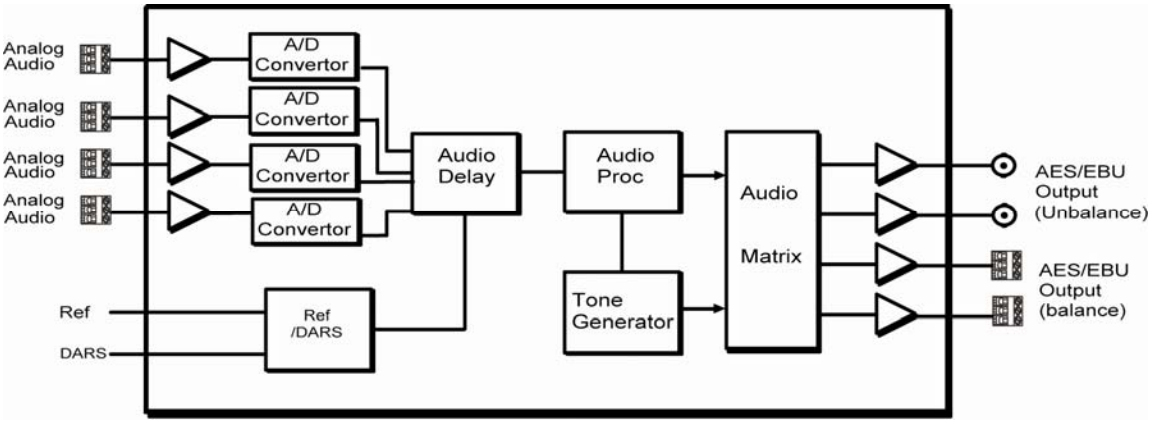


Fig. 1-5 Signal Flow of ADC6820N4

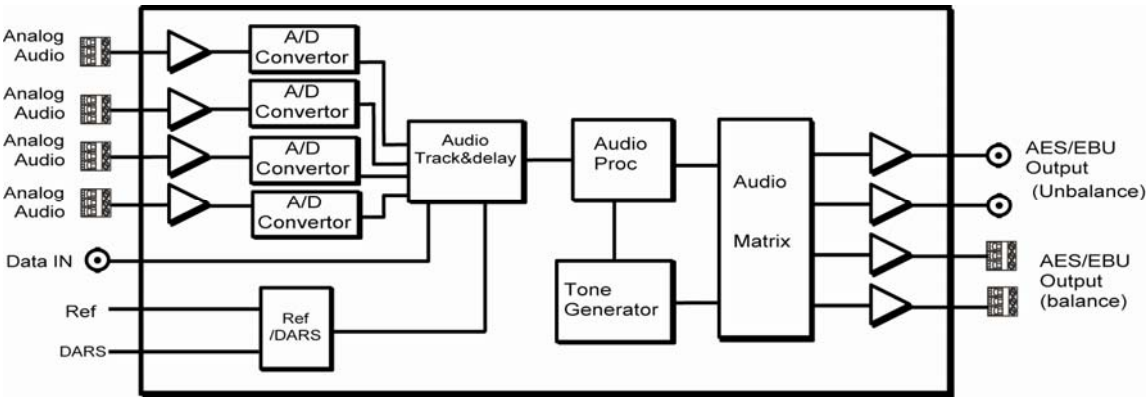


Fig. 1-6 Signal Flow of ADC6820NS4

Chapter 2 Installation

Overview

The power consumption for module and the maximum power ratings that frame can sustain have to be confirmed before installing the module.

In this chapter, the following topics on installation process for ADC6820Nxx are discussed below:

- Unpacking the module
- Setting Jumper
- Installing the module
- Making the connections
- Removing the module

Maximum Power Ratings for Frame

The maximum power ratings that different types of frames can sustain are listed in the Table 2-1

Tab. 2-1 Maximum Power Consumption

Frame	Maximum Voltage	Redundant Power Supplies	Numbers of Slots
6800N-1U	40W	Yes	4
6800N-2U	60W	Yes	10

Unpacking the Module

Preparing the Product for Installation

Contact your dealer right now if any items are missing.

Follow the procedures below before installing the module:

- Check the equipment for any invisible damage that may have occurred during transit.
- Confirm all the items listed on the packing list have been received.
- Remove all the packing material including electrostatic-resistant packing.
- Retain these packing for future use.

Check the Packing List

Tab. 2-2 Packed Components

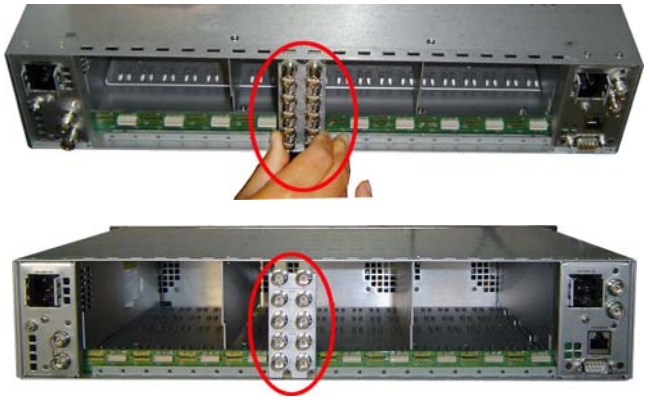
Model Name	Description
ADC6820N	ADC6820N module (1pc); back connector (1pc), and other accessories
ADC6820NS	ADC6820NS module (1pc); back connector (1pc), and other accessories
ADC6820N4	ADC6820N4 module (1pc); back connector (1pc), and other accessories
ADC6820NS4	ADC6820NS4 module (1pc); back connector (1pc), and other accessories

Installing the Module

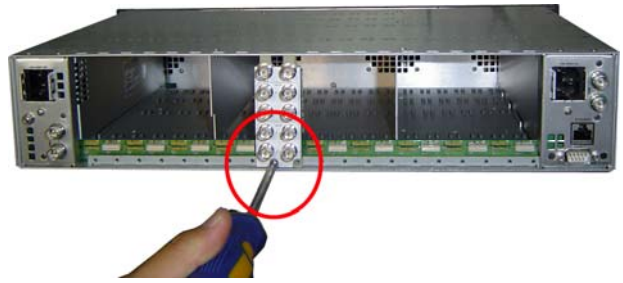
Caution：Static electricity may cause sensitive semiconductor out of order. Avoid installing or removing the module in the electrostatic-induced environment.

Follow the following steps to install the module:

Step 1



Step2



Step3

Step 4

Step5

Fig. 2-1 Installation of 2U Frame of 6800N Series

- ✓ Locate the position for back connector and insert the back connector
- ✓ Fasten the screw to fix the back connector.
- ✓ Locate the slot for module.
- ✓ Get the module installed in the slot, push the module slightly along the slot, press module again to confirm that the module is installed firmly and then close swivel handle.
- ✓ Install the front panel.

Making the Connections

Please connect signals based on Fig. 1-2.

Removing the Module

Follow the following steps to remove ADC6820Nxx module:

1. Open the front part of frame.
2. Open the swivel handle to the full.

3. First make sure the frame stands firmly, and then pull the module gently along the slot till out of frame.
4. Install the front panel.

Setting Jumper

There exist four 3-pin jumpers, and the following table gives their definition.

Tab. 2-3 Description of ADC6820Nxx Jumpers

Item	Description
JP15 LOCAL/FRAME.	LOCAL: a external synchronized signal input FRAME: The synchronized signal is provided by 6800 Frame the default setting is local
JP17（TERMINATION） ON/OFF Only valid for DATA IN（refer to Tab. 1-2）	When setting JP17 at ON, you need to connect BNC with 75Ω termination. When setting JP17 at OFF, you need not to connect BNC with 75Ω termination. the default setting is on.
JP19 REF/COMP	REF: synchronized signal input COMP: reserved you must set JP19 at REF (Please don't change the default setting).
JP20 DARS/BB	DARS: AES/EBU digital audio synchronized signal input BB: analog black burst synchronized signal input
JP13，JP14 BAL/UNBAL	BAL: AES/EBU balanced digital audio synchronized input UNBAL: AES/EBU unbalanced digital audio synchronized input
JP16 DATA/ SDI	DATA: audio tracking signal input SDI: reserved you must set JP16 at DATA (Please don't change the default setting).
JP18 (LOC/RMT)/LOCAL	LOCAL: local control LOC/RMT: local and remote control used to choose control mode, the default setting is LOC/RMT.
JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP8, JP9, JP10, JP11, JP12	Select the gain of audio outputs 16dB~28dB adjustable. When jumpers JP1~JP12 is unconnected, the gain is 16dB.

Tab. 2-4 gives an example for jumper-setting:

Tab. 2-4 Setting a Synchronized Signal Input via Jumpers

Item	Description
Choose a common synchronized signal provided by 6800N Frame	Set JP15 at FRAME
Choose a synchronized signal provided by back connector	Set JP15 at LOCAL, JP19 at REF, and JP20 at BB

Choose a DARS unbalanced digital audio input as synchronization	Set JP19 at REF, JP20 at DARS, JP13 and JP14 at UNBAL
Choose a DARS unbalanced digital audio input as synchronization	Set JP19 at REF, JP20 at DARS, JP13 and JP14 at BAL

LED Indicator

There exist two LED modes, one is output select mode, the other is general mode. LED mode is related with the positions of SW1.

Output Select Mode

To ADC6820N(S), the position of SW1 is at 5 or 6.

But to ADC6820N(S)4, the position of SW1 is at A, B, C or D while being in the status of Bank 0.

Tab. 2-5 Description of LED Indicator (output select mode)

Item （color）	**Related indicator**	**Description**
POWER（green）	Power supply	On: Power is supplied.
CONFIG（orange）	Device status	On: The device is Initializing.
BS0（orange）	Bank select (only for ADC6820N(S)4)	On, Bank 1 is selected Off, Bank 0 is selected
BS1	Reserved	
AUD1/525（green）	IN 1A	On, choose IN 1A signal as output Off, not choose IN 1A signal as output
AUD2/AUTO（green）	IN 1B	On, choose IN 1B signal as output Off, not choose IN 1B signal as output
AUD3/625（green）	IN 2A (only for ADC6820N(S)4)	On, choose IN 2A signal as output Off, not choose IN 2A signal as output
AUD4/DARS（green）	IN 2B(only for ADC6820N(S)4)	On, choose IN 2B signal as output Off, not choose IN 2B signal as output
EBO（green）	MIX	On, choose MIX signal as output Off, not choose MIX signal as output
MODE（green）	Tone	On, choose tone signal as output Off, not choose tone signal as output

Note: when choosing in 1 sum or in 2 sum as output, LED MIX and related LED will be on. For example, when in 1 sum is selected as output, LED 1A, 1B and MIX are all on.

General Mode

To ADC6820N(S), the position of SW1 is setting at other point except 5 and 6.

But to ADC6820N(S)4, the position of SW1 is setting at other point except A, B, C and D while being in Bank 0. SW1 can be setting at any point during Bank 1.

Tab. 2-6 Description of LED Indicator (general mode)

Item （color）	Related indicator	Description
POWER（green）	Power supply	On: Power is supplied.
CONFIG（orange）	Device status	On: The device is Initializing.
BS0（orange）	Bank select (only for ADC6820N(S)4)	On: Bank 1 is selected Off: Bank 0 is selected
BS1	Reserved	
AUD1/525 （green）	IN 1A	On: Analog audio input is right Off: No signal Flashing: There exist audio signal but the signal is in overload error
AUD2/AUTO （green）	IN 1B	On: Analog audio input is right Off: No signal Flashing: There exist audio signal but the signal is in overload error
AUD3/625 （green）	IN 2A (only for ADC6820N(S)4)	On: Analog audio input is right Off: No signal Flashing: There exist audio signal but the signal is in overload error
AUD4/DARS （green）	IN 2B(only for ADC6820N(S)4)	On: Analog audio input is right Off: No signal Flashing: There exist audio signal but the signal is in overload error
EBO（green）	Ref	On: the current setting is locked at genlock and work in normal Off: the current setting is not locked at genlock Flashing: the current setting is locked at genlock but the genlock signal is not available
MODE（green）	DARS	On: the current setting is locked at DARS and work in normal Off: the current setting is not locked at DARS Flashing: the current setting is locked at DARS but the DARS signal is wrong or not available

Chapter 3 Operation and Control

Switches and Keys

Refer to **Figure 3-1** or **Table 3-1**（Bank 0） or **Table 3-2**（Bank 1） to complete control

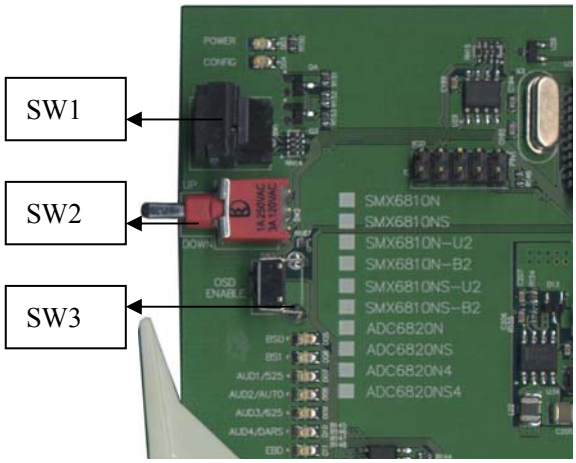


Fig. 3-1 Switches and key

Rotate SW1 at the position of 0, and select the proper Bank by SW2.

Bank Selection
The SW1 has two Banks
Rotate the SW1 at the position of "0". The position of "0" is always used to select Bank.
Turn SW2 up or down to select Bank.

1. SW1 Mode Selection

   SW1 is a 16-position rotary switch, which is used to select the specific setting.
   The selection range is: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.

2. SW2 Mode Selection

   SW2 is a toggle switch, which is used to decide the concrete figure of the setting made by SW1.
   SW2 is a 3-position toggle switch, used to decide the concrete figure of the setting made by SW1.
   To keep SW2 at the position of "UP" or "DOWN", the continuous adjustment can be achieved.

3. SW3

   Press the SW3 to activate OSD.

Tab. 3-1 ADC6820N（S） Function setting

SW1 Position	Parameter	Function	Options	Default
0	Reserved	Reserved		
1	In Ch 1A Level	Adjust the gain of Channel-1A	-96~ +12dB in 0.5dB step	0dB
2	In Ch 1B Level	Adjust the gain of Channel 1B	-96~ +12dB in 0.5dB step	0dB
3	In Ch 1A Invert	Invert Channel-1A	Off On	Off
4	In Ch 1B Invert	Invert Channel-1B	Off On	Off
5	Out Ch 1A Source	select one source as the output of Channel-1A	in 1A/in 1B/in 1 sum /tone1/tone2/mute	in 1A
6	Out Ch 1B Source	select one source as the output of Channel-1B	in 1A/in 1B/in 1 sum /tone1/tone2/mute	in 1B
7	Out bits	Setting the word length of audio output	16/20/24	24
8	Lock Source	Select one signal that audio signal is locked to	DARS/genlock/freerun	DARS
9	Sample Rate	Setting sampling rate（note: when audio signal is locked to DARS, that is, lock source＝DARS, the setting is invalid.）	32k/48k/96k	48k
A	Ch1A Delay	Channel 1A delay	0~1980 ms @ 32 kHz 0~1320ms @ 48 kHz 0~660 ms @ 96 kHz	0.000ms
B	Ch1B Delay	Channel 1B delay	0~1980 ms @ 32 kHz 0~1320ms @ 48 kHz 0~660 ms @ 96 kHz	0.000ms

SW1 Position	Parameter	Function	Options	Default
C	Auto Track	Audio tracking delay (only valid for ADC6820NS)	Enable Disable	Disable
D	No Signal Delay	No Signal Delay	0 ~255s	30s
E	No Signal Threshold	No Signal Threshold	-72dB/-66dB/-60dB/-54dB/-48dB	-60dB
F	Factory recall	Restore the default of parameters	Yes（toggle SW2 to restore）	No

Tab. 3-2 ADC6820N（S）4 Function setting (Bank 0)

SW1 Position	Parameter	Function	Options	Default
0	Bank select	Select Bank	Bank 0 Bank 1	Bank 0
1	Lock Source	Select one signal that audio signal is locked to	DARS/Genlock/freerun/	DARS
2	In Ch 1A Level	Adjust the gain of Channel-1A	-96~ +12dB in 0.5dB step	0dB
3	In Ch 1B Level	Adjust the gain of Channel 1B	-96~ +12dB in 0.5dB step	0dB
4	In Ch 2A Level	Adjust the gain of Channel-2A	-96~ +12dB in 0.5dB step	0dB
5	In Ch 2B Level	Adjust the gain of Channel 2B	-96~ +12dB in 0.5dB step	0dB
6	In Ch 1A Invert	Invert Channel-1A	Off On	Off
7	In Ch 1B Invert	Invert Channel-1B	Off On	Off

SW1 Position	Parameter	Function	Options	Default
8	In Ch 2A Invert	Invert Channel-2A	Off On	Off
9	In Ch 2B Invert	Invert Channel-2B	Off On	Off
A	Out Ch 1A Source	select one source as the output of Channel-1A	in 1A/in 1B /in 2A /in 2B /in 1 sum / in 2 sum /tone1/tone2/mute	in 1A
B	Out Ch 1B Source	select one source as the output of Channel-1B	in 1A/in 1B /in 2A /in 2B /in 1 sum / in 2 sum /tone1/tone2/mute	in 1B
C	Out Ch 2A Source	select one source as the output of Channel-2A	in 1A/in 1B /in 2A /in 2B /in 1 sum / in 2 sum /tone1/tone2/mute	in 2A
D	Out Ch 2B Source	select one source as the output of Channel-2B	in 1A/in 1B /in 2A /in 2B /in 1 sum / in 2 sum /tone1/tone2/mute	in 2B
E	Reserved			
F	Factory recall	Restore the default of parameters	Yes（toggle SW2 to restore）	No

Tab. 3-3 ADC6820N（S）4 Function setting (Bank 1)

SW1 Position	Parameter	Function	Options	Default
0	Bank select	Select Bank	Bank 0 Bank 1	Bank 0
1	Out Ch1 bits	Setting the word length of audio output Channel 1	16/20/24	24
2	Out Ch2 bits	Setting the word length of audio output Channel 2	16/20/24	24
3	Sample Rate	Setting sampling rate（note: when audio signal is locked to DARS, that is, lock	32k/48k/96k	48k

SW1 Position	Parameter	Function	Options	Default
		source＝DARS, the setting is invalid.）		
4	Ch1A Delay	Ch1A Delay	0~1980 ms @ 32 kHz 0~1320ms @ 48 kHz 0~660 ms @ 96 kHz	0.000ms
5	Ch1B Delay	Ch1B Delay	0~1980 ms @ 32 kHz 0~1320ms @ 48 kHz 0~660 ms @ 96 kHz	0.000ms
6	Ch2A Delay	Ch2A Delay	0~1980 ms @ 32 kHz 0~1320ms @ 48 kHz 0~660 ms @ 96 kHz	0.000ms
7	Ch2B Delay	Ch2B Delay	0~1980 ms @ 32 kHz 0~1320ms @ 48 kHz 0~660 ms @ 96 kHz	0.000ms
8	Auto Track	Audio tracking delay (only valid for ADC6820NS4)	Enable Disable	Disable
9	No Signal Delay	No Signal Delay	0 ~255s	30s
A	No Signal Threshold	No Signal Threshold	-72dB/-66dB/-60dB/-54dB/-48dB	-60dB
B~F	Reserved			

Note the following when setting parameters

- When power is supplied, the default setting of ADC6820N(S)4 is Bank 0.
- It is not need to choose Bank to ADC6820N(S), rotate SW1 to set at one position, and then toggle SW2 to adjust the corresponding parameter.
- Keep SW2 up or down can adjust continually
- Go back to the default

  To ADC6820N(S)4, set it at Bank 0, rotate SW1 to F, and toggle SW2.

  To ADC6820N(S), rotate SW1 to F, and toggle SW2.
- When setting ADC6820N(S)4, please pay attention to the status of LED indicators.
- Adjust delay

There are 1320 steps the range between 0 and the maximum. Each step means different. One step denotes 1.5ms when the sampling rate is 32KHz, 1.0ms when the sampling rate is 48KHz, and 0.5ms when the sampling rate is 96KHz.

Chapter 4 Specifications

In this chapter, the specifications in the following subjects are introduced:

- ✓ Analog Audio input
- ✓ Unbalanced AES/EBU Output
- ✓ Balanced AES/EBU Output
- ✓ External Reference Input

Analog Audio input

Tab. 4-1 Analog Audio Input Specifications

Item	**Parameter**
Standard	Electronic, balanced
connector	3-pin audio connector
Input coupling	AC
Impedance	High resistance
Level range	+16 dBu to +28 dBu

Unbalanced AES/EBU Audio output

Tab.4-2 Unbalanced AES/EBU Output Specifications

Item	**Parameter**
Connector	BNC per IEC 169-8
Level	1.0 V +/-10% (peak to peak)
DC offset	0.0V±50.0mV
Rise/fall time	30 to 44 ns (10% to 90% amplitude)
Impedance	75 Ω
Return loss	>25 dB, 0.1 to 6.0 MHz

Balanced AES/EBU Output

Tab. 4-3 Balanced AES/EBU Output Specifications

Item	**Parameter**
Connector	3-pin connector (male)
Signal level	2.0 to 7.0 V (peak to peak)

Jitter	+/-20 ns
Rise and fall time	5 to 30 ns (10% to 90% amplitude)
Impedance	110 Ω +/- 20% (0.1 to 6 MHz)
CMRR	>30 dB below output signal (0 to 6 MHz)

External Reference Input

Tab. 4-4 External Reference Input Specifications

Item	**Parameter**
Connector	BNC: unbalanced 3-pin audio Connector: balanced
Impedance	75Ω: unbalanced, 110Ω: balanced
Return loss	>30dB up to 6MHz(unbalanced)
AES sampling rate	32KHz,48KHz,96KHz

Note: Specifications are subject to change without notice

Warranty for osee product

What the warranty covers:

osee warrants its products to be free from defects in material and workmanship during the warranty period of two year from purchase date. If a product proves to be defective in material or workmanship during the warranty period, osee will, at its sole option, repair or replace the product with a similar product. The replacement unit will be covered by the balance of the time remaining on the customer's original limited warranty.

No sales personnel of the seller or any other person is authorized to make any warranties other than those described above, or to extend the duration of any warranties on behalf of osee, beyond the time period describe above.

This warranty is extended to the first consumer only, and proof of purchase is necessary to honor the warranty. If there is no proof of purchase provided with a warranty claim, osee reserves the right not to honor the warranty set forth above. Therefore, labor and parts may be charged to the consumer.

What the warranty does not cover:

1. Any product on which the serial number has been defaced, modified or removed.
2. Damage, deterioration or malfunction resulting from:
   - Accident, misuse, neglect, fire, water, lightning, or other acts of nature, unauthorized product modification, or failure to follow instructions supplied with the product
   - Repair or attempted repair by anyone not authorized by osee
   - Any damage of the product due to shipment.
   - Removal or installation of the product.
   - Causes external to the product, such as electric power fluctuations or failure.
   - Use of supplies or parts not meeting osee product's specifications.
   - Normal wear and tear.
   - Any other cause which does not relate to a product defect.