![MNT ZZ9000AX logo]

MNT ZZ9000AX R-1 Quickstart Manual

Dear MNT Customer,

Thank you for purchasing the MNT ZZ9000AX Audio Expansion for the MNT ZZ9000 multifunction graphics card for Commodore Amiga computers.

Package Contents

- MNT ZZ9000AX Card
- Stainless steel slot bracket
- Bag containing 2× M2 mounting screws and 2× M2 nuts
- Data Cable (complicated cable for connecting ZZ9000AX to ZZ9000)
- Internal Audio Cable (3 leads)
- This manual

Warranty

MNT Research covers the warranty to the extent required by law for the unmodified product. Warranty does not cover user supplied firmware or any modifications made to the card, nor does it cover any damage by inserting it into a computer or other user supplied device. Use at your own risk!

Declaration of Conformity

MNT ZZ9000AX may only be operated in a shielding steel enclosure. MNT Research assures that the included product complies with the requirements of the following European Directives and DIN standards:

EMC Directive 2014/30/EU (EN55032: 2015/A11:2020, EN 55035:2017/A11:2020)
Low Voltage Directive 2014/35/EU (EN 62368-1:2014)
RoHS Directive 2011/65/EU (EN 63000: 2018)

Get updates and source code at:
https://mntre.com/zz9000

Need help? Write to
support@mntre.com

Join our IRC channel **#mnt-amiga** on **irc.libera.chat**

Hardware Installation: Cables

Connect the **first half (8 pins, black/red/gray/white)** of the Data Cable to the **bottom row** of ZZ9000 header on ZZ9000AX as pictured.

Connect **white and gray leads** to the **second column** of the MIO header on ZZ9000. Make sure to skip the first two pins of the header!

Connect the **second half (8 pins, only 1 purple and 2 white leads)** of Data Cable to the **top row** of ZZ9000 header on ZZ9000AX as pictured.

Connect the **second half (7 pins)** and the **single purple lead** of Data Cable to the EXPANSION header on ZZ9000 as pictured. Black and red go near the EXPANSION label.

Connect **one end** of the Internal Audio Cable to the PAULA INPUT header on ZZ9000AX as pictured.

Connect the **other end** of the Internal Audio Cable to the AAUD header on ZZ9000 as pictured. The 2 pins close to the AAUD label are left open.

Hardware Installation

1. Remove the protective tape from the steel slot bracket. Use a cloth to wipe away any residue from the bracket.

2. Mount the slot bracket to ZZ9000AX with 2× supplied M2 screws and nuts. The nuts go on the bottom side as pictured.

3. Connect ZZ9000AX to ZZ9000 using the Data and Internal Audio Cables as described in the "Hardware Installation: Cables" section of this manual.

4. Mount ZZ9000AX above ZZ9000 in your Amiga 2000/3000/4000.

Software Installation

1. Install the AHI system version 4.18. We recommend not to use AHI version 6, as it has significantly higher CPU usage and can cause audio stuttering.

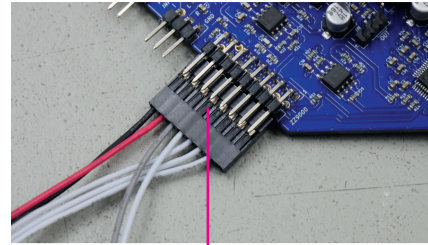- AHI on Aminet: **http://aminet.net/package/driver/audio/ahiusr_4.18**

2. Download and install the ZZ9000AX drivers that are included in the ZZ9000 driver package. Power cycle your Amiga. Then, configure ZZ9000AX in AHI Preferences.

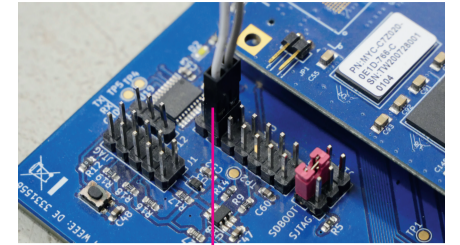- ZZ9000AX drivers and tools: **https://mntre.com/zz9000**

SigmaDSP

The audio chip on ZZ9000AX—Analog Devices ADAU1701—features a 28-/56-bit, 50 MIPS SigmaDSP (digital audio processor). The DSP program determines the signal flow to and from ZZ9000AX, including digital mixing and optional effects. The default program (which mixes AHI and Amiga Paula sound) is included in the ZZ9000 firmware, but can be changed with the free SigmaStudio software from Analog Devices and an upcoming tool from MNT Research. Visit the ZZ9000 website for tools and updates.
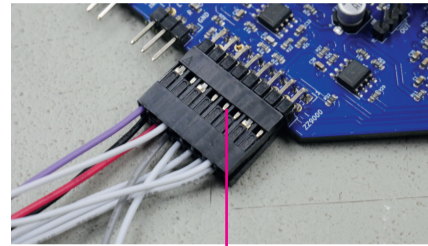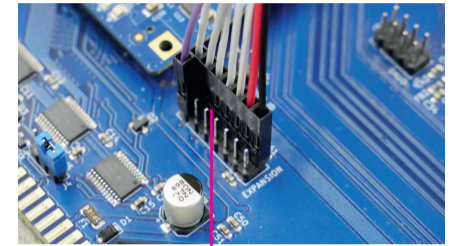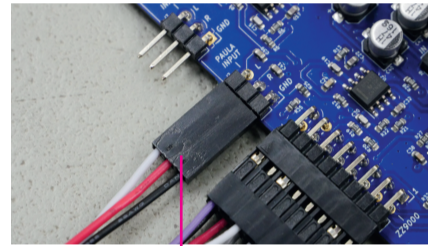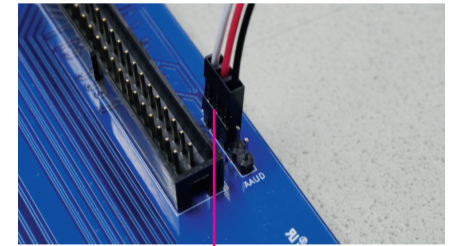

Aux input/output
(Right channel)

Line output
(Left channel)

Aux input/output
(Left channel)

Line output
(Right channel)
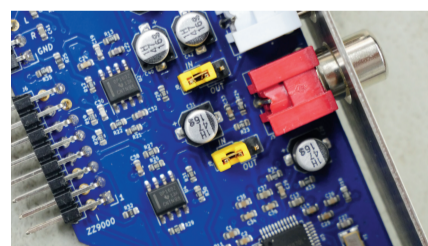
Jumpers and Headers

ZZ9000AX has two IN/OUT headers that you can use to set the direction of the two auxiliary audio channels. When the jumpers are in the IN position, you can input or sample stereo audio through these channels. In the OUT position, the channels can be used as additional outputs.
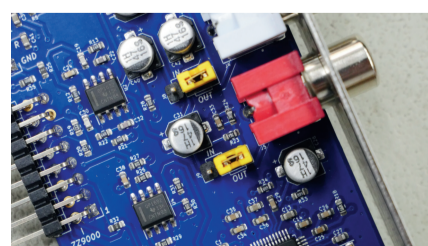
Please note that if you change the jumpers, you also need to set up the DSP program accordingly. By default, the DSP program is configured for audio input on the auxiliary channels.

Primary line out

J1 FOUT1L
FOUT1L R4 49.9k
C11 3.3nF
GND
R3 604
C9 47uF
C8 470pF
U1B OPA1692
R2 4,75k
C10 150pF
R1 4,75k
OUT1L
C12 0.1uF
GND
+3V3
U1C OPA1692
GND

J3 FOUT1R
FOUT1R R8 49.9k
C18 3.3nF
GND
R7 604
C16 47uF
C15 470pF
U1A OPA1692
R6 4,75k
C17 150pF
R5 4,75k
OUT1R
GND
+3V3

Secondary output or input selector

J8 XAUDSEL1
XAUD1L
FOUT2L
J4 FOUT2L
R17 49.9k
C23 3.3nF
GND
R15 604
C21 47uF
C19 470pF
U2B OPA1692
R13 4,75k
C22 150pF
R12 4,75k
OUT2L
C24 0.1uF
GND
+3V3
U2C OPA1692
GND

J9 XAUDSEL2
XAUD2R
FOUT2R
J5 FOUT2R
R24 49.9k
C33 3.3nF
GND
R23 604
C31 47uF
C30 470pF
U2A OPA1692
R22 4,75k
C32 150pF
R21 4,75k
OUT2R
GND
+3V3

Analog Input Mixer

INL
R26 100
U3B OPA1692
R27 100
R28 100
C39 10uF
C40 47uF
AMIL
XAUDL

INR
R29 100
U4A OPA1692
R30 100
R31 100
C41 10uF
C42 47uF
AMIR
XAUDR

C38 0.1uF
GND
+3V3
U4C OPA1692
GND

C7 0.1uF
C6 0.1uF
C5 0.1uF
C4 10uF
+1V8
GND
H2 Mount
H3 Logo
H4 Badge
H1 Mount
GND

C3 0.1uF
C2 0.1uF
C1 10uF
+3V3
GND

C14 0.1uF
C13 10uF
+3V3
GND

47uF: 865080342006

Analog Audio Input from CDDA or other internal source
J7 XAUD
1
2 XAUDR
3 XAUDL
GND
R32
INPUT_LRCLK
OUTPUT_LRCLK
ADAU outputs LRCLK and consumes it as well

Analog Audio Input from Amiga Chipset
J2 AAUD
1
R25
2 AMIR
3 AMIL
GND

Analog Audio Input
J6 ZZ
SDATA_IN0
SDATA_IN1
SDATA_IN2
SDATA_IN3
SDATA_OUT0
SDATA_OUT1
RESET
GND
INPUT_LRCLK
INPUT_BCLK
OUTPUT_LRCLK
OUTPUT_BCLK
SCL
SDA
+3V3
GND

C29 0.1uF
C28 47uF
GND
R9 1k
+3V3
Q1 BC857
+1V8
PWR_FLAG
+1V8
U3 ADAU1701
VDRIVE
VOUT0 OUT1L
VOUT1 OUT1R
VOUT2 OUT2L
VOUT3 OUT2R
CM
DVDD
IOVDD
PVDD
AVDD
ADC0
ADC1
ADC_RES
OSC0
MCLKI
PLL_LF
PLL_MODE0
PLL_MODE1
ADDR0
ADDR1/CDATA/WB
CLATCH/WP
SDA/COUT
SCL/CCLK
RESET
SELFBOOT
FILTA
FILTD
AGND
DGND
RSVD
PGND
MP0 SDATA_IN0
MP1 SDATA_IN1
MP2 SDATA_IN2
MP3 SDATA_IN3
MP4 INPUT_LRCLK
MP5 INPUT_BCLK
MP6 SDATA_OUT0
MP7 SDATA_OUT1
MP8 SDATA_OUT2
MP9 SDATA_OUT3
MP10 OUTPUT_LRCLK
MP11 OUTPUT_BCLK

C37 0.1uF
GND
+3V3
J10 GPIO
SDATA_OUT2
SDATA_OUT3
GND

R11 18k
INL
INR
R14 18R
R16 18R
GND
R33 4,75k
R34 4,75k
GND
C36 10uF
C35 10uF
C34 0.1uF
GND

R10 100
Y1 12.288MHz
C20 10pF
C27 10pF
GND
+3V3
R19 2k2
R20 2k2
SDA
SCL
+3V3

R18 4,75
C26 56nF
+3V3
GND
R35 4,75k
+3V3
RESET
GND

C25 3.3nF

ZZ9000AX