



m108 microphone preamplifier / ADC

Owner's Manual - PRELIMINARY / July 25th, 2016
Grace Design, Lyons, CO / 1.303.823.8100
www.gracedesign.com / info@gracedesign.com

Contents

1. Welcome.....	2
2. Important Safety Information.....	2
3. Overview and Features.....	3
4. Installation.....	4
5. Basic Operation.....	6
6. Using the m108 Mixer.....	10
7. Navigating and Using the Setup Menu.....	12
8. Dante Configuration.....	20
9. Control from Protools®.....	23
10. USB Setup.....	24
11. Block Diagram.....	26
12. Cable Diagrams.....	27
13. Warranty Information.....	28
14. Manual Revision History.....	28

1. Welcome

Thanks for purchasing the m108 mic preamplifier. It has been painstakingly designed and built to provide you with a beautiful sounding, configurable and reliable mic preamp / ADC / interface. We worked very hard to ensure that anyone with modest audio production and engineering abilities can turn it on, plug in a microphone, connect it to a workstation and record. But of course, it also has a very deep and useful feature set of which all users should educate themselves. Not only will this enable you to operate the m108 more efficiently, but will free you up to focus on the music and the recording. So please familiarize yourself with the setup and operational details contained in this manual. And as always with this or any other Grace Design products, please don't hesitate to reach out if you have any questions. We are available by telephone Monday – Friday, 9AM to 5PM MST, or by email at info@gracedesign.com. Also, other information including technical documents and firmware can always be found on our website – www.gracedesign.com. Thanks for reading and enjoy your m108!

2. Important Safety Information

2.1 GENERAL

- Indoor use only
- Ordinary Protection: This equipment should not be exposed to dripping or splashing.
- Avoid placing objects filled with liquids, such as vases or glasses, on this equipment.
- Class I Equipment (grounded type)
- Electrical rating: 90-240V~ 50-60Hz 10W
- Mains supply voltage fluctuations are not to exceed $\pm 10\%$ of the nominal supply voltage.
- Pollution Degree 2
- Installation (Over voltage) Category II for transient overvoltages.
- Maximum Relative Humidity: <80%
- Operation temperature range: 10 °C to 40 °C
- Storage and transportation temperature range –40 °C to 70 °C
- Maximum altitude: 3000m (9843 ft)
- Equipment suitable for continuous operation

2.2 SAFETY MARKING SYMBOLS



This symbol, located on the equipment and in this manual, refers to important instructions. Read this manual thoroughly before operating this equipment.



This symbol, located on the equipment and in this manual, indicates the potential for electrical shock hazard.

2.3 SERVICE INFORMATION

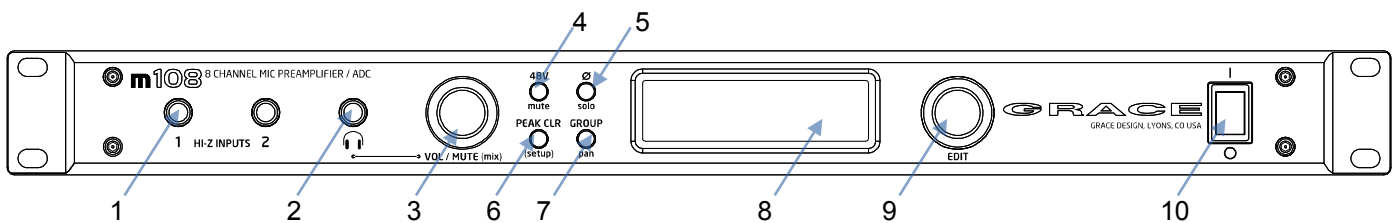
The Grace Design m108 contains no user serviceable components. Contact Grace Design for repair and upgrade information. In the event that your Grace Design m108 needs to be returned to the factory, contact us for a return authorization number.

3. Overview and Features

3.1 Features

- 8 channels of transparent, musical mic preamplifier
- Wide gain range: -6 to 69dB
- 8 channels of balanced analog preamp outputs
- Ribbon mic mode
- 8 channel ADC outputs via AES, ADAT (SMUX), USB Class 2, and DANTE™
- External Word clock in and out
- Reference DAC and headphone amplifier for low-latency monitoring of preamp channels, USB playback from a computer, or DANTE™ audio streams.
- Channel 1 & 2 balanced HI-Z inputs on front panel
- High contrast, wide viewing angle OLED display for all system parameters and setup menu
- Combination RS 485/422 serial / MIDI ports for control from existing m802 RCU or Protools™
- m108 Controller App for Mac OS and Windows computers
- RJ45 Ethernet port with web server for network control using standard web browser
- Expansion slot for optional Audinate / DANTE™ network audio card
- Cooling fan for reliable operation in the harshest environments
- Built in 100-240VAC universal AC power supply
- 5 year transferable warranty
- Made in the USA

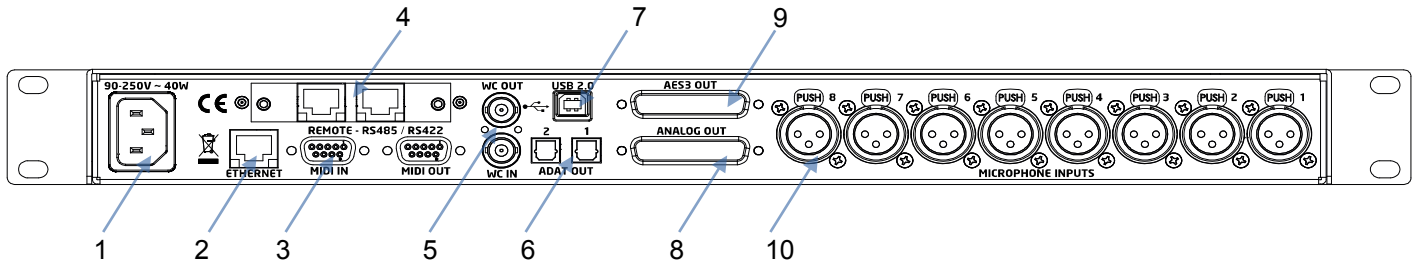
3.2 Front panel connections and controls



1. Hi-Z balanced inputs, CH 1 and 2
2. 1/4" Headphone Jack
3. Encoder: headphone / CR output level control and MUTE – press and hold to enter mixer control
4. 48V phantom power switch / mixer channel mute
5. Phase reverse switch / mixer channel solo / press and hold to enable ribbon mode

6. PEAK CLR / press and hold to enter setup menu
7. GROUP / mixer channel pan control
8. OLED display screen - all system parameters and setup menu
9. EDIT encoder, navigates and controls all system functions
10. Power switch

3.3 Rear Panel Connections



1. IEC 90 - 250VAC power input
2. Ethernet Control Port
3. Serial Control DB9: RS485 / RS 422 - MIDI IN / MIDI OUT
4. Option card slot
5. Word Clock BNC IN / THROUGH / OUT
6. ADAT Lightpipe output
7. USB 2.0 audio interface
8. Analog Out DB25 (Tascam pinout)
9. AES3 Out DB25 (Tascam pinout)
10. Microphone Inputs XLR

4. Installation

4.1 Unboxing Your m108

YOUR m108 BOX WILL CONTAIN

- The m108 preamp
- 6' AC power cable which connects to the 108's universal power supply
- A bag with rubber feet and rack screws
- A USB type A to type B cable
- The owner's manual and warranty registration card

OPEN AND INSPECT THE BOX

Please take care when removing the m108 from its OEM packaging. Our packaging is designed with 'Kor-

rvu[®] suspension inserts, which provide the best protection from the dubious underworld of freight handling – so save your packaging material. Inner boxes will contain all the items listed above. If you think you are missing anything, give your dealer or us a call and we'll get you taken care of right away.

REGISTER YOUR UNIT

We strongly urge you to fill out your warranty registration card. The m108 is covered by a 5 year transferable warranty. Registering your unit will help us contact you if there are important updates and simplifies warranty service. So please take a few minutes to complete and send in the enclosed card, or simply fill out the warranty registration form on our website. We always keep your information private. Thank you!

4.2 Connecting the m108

POWER CONNECTIONS



The m108 has a built-in universal power supply which accepts line voltages of 90 to 240VAC. We include a power cable specified for the country where it was ordered, so it should be supplied correctly. If not, please contact your dealer or distributor for help. For safety, it is recommended that the AC power cable be connected to a grounded outlet.

AUDIO CONNECTIONS

Microphone Inputs: Female XLR, pin 2 positive, pin 3 negative and pin 1 ground. 48V phantom power is supplied on pins 2 and 3. With a gain range from -6dB to 69dB these inputs can be used for any type of microphone or as line level inputs.

Analog Balanced Line Outputs: DB25 Tascam pinout (See CABLE DIAGRAMS chapter 13). These outputs are always active. ADC full scale (0dBFS) is referenced to a signal level of +24dBu

AES3 Digital Outputs: DB25 Tascam pinout (See CABLE DIAGRAMS chapter 13) These outputs are active when the ADC is on.

ADAT Lightpipe Outputs: Optical Jacks. These provide 8 channels of audio data on each (at 44.1kHz and 48kHz). At 88.2kHz and 96kHz the ADAT S-MUX is enabled and channels 1-4 are transmitted on ADAT output 1, while channels 5-8 are transmitted on ADAT output 2. 176.4kHz and 192kHz sample rates are not supported over the ADAT interface.

USB Class 2 Audio Interface: USB Type B 8 channel audio output to host computer and 2 channel input from host computer. Use a standard USB type A -to- type B cable (included with your m108). The type A connector is to be plugged in to the HOST computer and the type B connector to the m108 input. PCM 44.1kHz – 192kHz/24 bit is supported. Please refer to USB audio setup on Chapter 11. This jack is also used for m108 firmware upgrades.

Option Card DANTE™ Module: This option provides the m108 with a Dante interface. Two gigabit ethernet ports are provided for redundant Dante networks. The Dante interface provides 8 channels of outputs and inputs at sample rates up to 192kHz to other Dante enabled devices. Detailed instructions for operation are in chapter 8.

Option Card Control Room Outputs: 1/4" TRS Jacks. Tip positive, Ring negative, and Sleeve ground. Provides a single pair of balanced stereo analog speaker outputs, which connect to your stereo monitor system (power amp or powered speakers). Connections are made with standard balanced TRS cables. The output volume of this output is controlled by the Headphone volume control on the front panel.

WORDCLOCK IN: BNC 75Ω or 47kΩ (setup menu selected). The m108 can accept a standard 5V/75Ω Word Clock signal from an external clock generating unit. This might be a stand-alone clock source or

via, for example, the Word Clock output from your digital audio workstation. The m108 locks to the incoming word clock with an ultra low jitter PLL. The PLL has a fast lock mode which rapidly acquires lock and then switches to a high jitter rejections mode with a loop bandwidth of 0.5Hz. This provides exceptional jitter rejection for the ADC and DAC sample clocks. In the event of a dropout or loss of incoming word clock signal, the intelligent PLL will remain at the last known valid frequency. When the signal is restored the PLL will smoothly re-acquire lock.

WORDCLOCK OUT: BNC 75Ω. The Word Clock output allows the user to synchronize other digital audio equipment to the m108. When the menu setting "clock output" is set to external, this connector output is a buffered copy of the signal on the wordclock IN jack. This mode is useful for "daisy chaining" multiple m108s together in a system. When "clock output" is set to internal this connector outputs a buffered copy of the internal m108 wordclock. The output is buffered and is designed to drive a 75Ω line.

REMOTE – RS485 / RS422: DB9. This is a galvanically isolated serial port for controlling the m108. With updated firmware, the m802RCU can control the m108 allowing m108 preamplifiers to be added to an existing m802 system. For wiring diagrams, see chapter 13.

MIDI IN – MIDI OUT: DB9. The m108 can be controlled directly from AVID ProTools® HD, via these jacks and compatible AVID I/O hardware. For wiring instructions, cable diagrams, chapter 13.

ETHERNET: RJ45. This is a standard 100 Base-T Ethernet interface and is used to connect the m108 to a TCP/IP network for the purpose of control via the m108. The m108 contains a web server with which allows for web browser based control.

5. Basic Operation

5.1 The EDIT encoder

This is a rotary push-button encoder which is used to navigate and control system parameters. In the main Preamplifier Control mode and Mixer Control mode it selects preamplifier channels and adjusts parameters. This encoder is also used for controlling the mixer functions and navigating the setup menu.

5.2 The VOL / MUTE (mix)

This push-button encoder is used to control the level of the headphone and control room outputs (if CR option card is installed). Turning the knob clockwise increases the level in 1dB steps. A single press will mute the outputs. Pressing it again will un-mute the outputs.

When the headphone level change is enacted, a temporary flyout window appears on the left side of the display. This window shows the headphone source and level. When level adjustment is complete, the flyout window automatically disappears. Pressing and holding this knob will enter the m108 mixer.

5.3 The Frontpanel Hardware Switches

The labeling convention for these switches is as follows:

UPPERCASE - Preamplifier mode function

lowercase - Mixer mode function

(parenthesis) - Push-Hold function

The four hardware switches between the VOL / MUTE knob and the OLED display enact the following

functions:

- 48V/mute - pressing this switch will turn on the phantom power supply for a selected mic preamp channel. In mixer mode this switch is used to mute the selected mixer channel.
- Ø (ribbon mode) / solo - pressing this switch will reverse the signal polarity of a selected mic preamp channel. Pressing and holding this switch will activate ribbon mic mode. In mixer mode this switch is used to solo the selected mixer channel.
- PEAK CLR / (setup) - pressing this switch will clear all the peak status indicators across all 8 mic preamp channels – or pressing and holding this switch will enter the m108 into Setup Menu mode.
- GROUP / pan - pressing this switch will activate group mode. Pressing and holding this switch while turning the EDIT knob adds (or subtracts) sequential channels to a group.

5.4 The m108 OLED display screen

This screen has three main display modes:

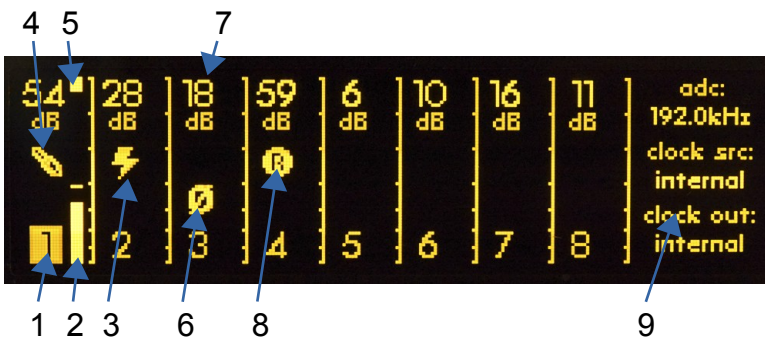
- Preamp mode
- Mixer mode
- Setup mode

The default display mode at power up will be the Preamp Control Mode. This screen is user configurable via the 7 'display modes' in the setup menu, detailed in chapter 7. The factory default screen at power up (titled 'system' in the setup menu) will show the 8 mic preamp channels, and a system status window on the right shows basic ADC and wordclock status.

The Mixer mode is activated by pushing and holding the VOL/MUTE (mix).

The Setup mode is activated by pushing and holding the PEAK CLR/(setup) button.

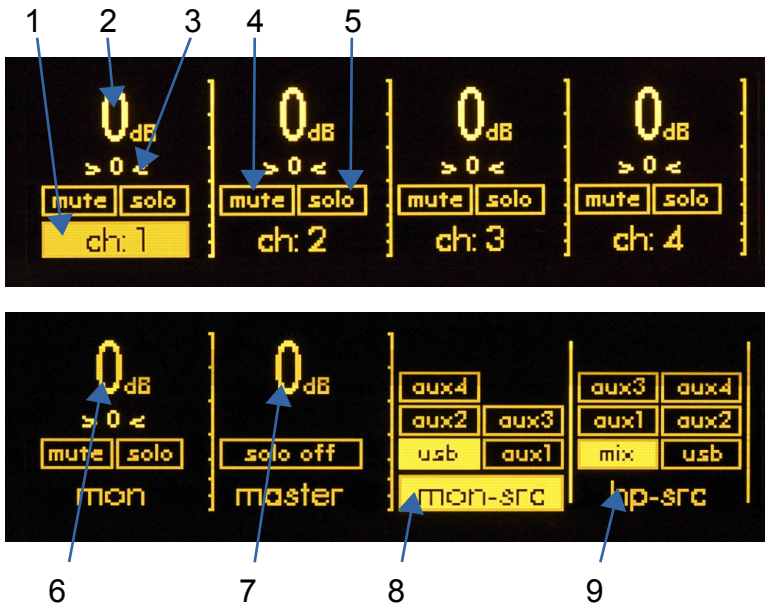
Mic Preamp Operating Screen



1. Channel number
2. Level meter
3. 48V icon
4. Hi-Z input icon
5. Over indicator
6. Phase reverse Icon

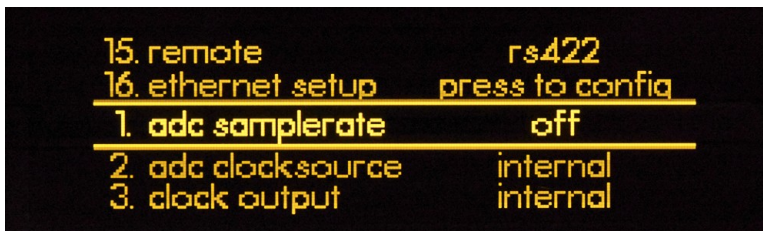
7. Gain level
8. Ribbon mode Icon
9. ADC status display

Mixer Operating Screen



1. Channel number / name
2. Channel level display
3. Channel pan display
4. Mute
5. Solo
6. 2ch monitor level
7. Master level
8. Monitor Source select
9. Headphone Source select

Setup Menu Screen



Setup menu items 1 – 16 (see chapter 7)

5.5 Setting mic preamplifier gain

1. Use the rotary encoder to select a channel.
2. The current channel number becomes reversed (backlit in yellow) and the larger channel number will be displayed on the far right side of the screen.
3. A single press of the EDIT encoder now enters gain adjust mode, which is indicated by the backlit channel number becoming brighter.
4. Turn the EDIT encoder clockwise to increase the mic preamplifier gain, or counter-clockwise to decrease the mic preamplifier gain.
5. When the desired gain level is achieved, press the EDIT encoder again to exit gain adjust mode, which is indicated by the backlit channel dimming to its normal brightness.
6. The settings for a channel can be adjusted with the +48, PHASE, or DATA controls. pressing the +48V or PHASE button toggles that function on or off for that channel.
7. Pressing the EDIT knob enters the Gain Adjust mode. While in Gain Adjust mode, the numeric gain display characters at the top of the screen are highlighted and the rotary encoder adjusts the gain up or down in 1dB steps. Pressing the EDIT control again exits the Gain Adjust mode and returns to the Channel Select mode.

The bar graph meter at the right edge of each channel section is a dBFS level meter which indicates ADC output levels from -60 to 0dBFS.

Note: If you would like a larger view of the selected channel, press and hold the EDIT encoder. This will enter you into 'channel' view, which shows an exploded version of a single channel, with a large level meter, the full channel name and a large gain setting number. Press and hold the EDIT encoder again to return to the previous screen.

5.6 Activating 48V phantom power

To activate 48V phantom power on a preamp channel, use the EDIT knob to select the channel and press the 48V panel switch to the left of the screen. 48V power ON will be indicated by the lightning bolt power icon in the middle of the channel column. Pressing the 48V panel switch again with the channel selected will deactivate 48V phantom power.

5.7 Activating Phase Reverse

To reverse the signal polarity on a preamp channel, use the EDIT knob to select the channel and press the Ø panel switch to the left of the screen. Phase reverse will be indicated by the Ø icon in the middle of the channel column. pressing the Ø panel switch again with the channel selected will deactivate phase reversal.

5.8 Ribbon Mic Mode

To activate Ribbon Mic Mode on a preamp channel, use the EDIT knob to select the channel and press and hold the Ø panel switch to the left of the screen. Ribbon mic mode will be indicated by the 'R' icon in the middle of the channel column. Ribbon Mic Mode prevents 48V phantom power from being inadvertently applied to a mic input to which a ribbon microphone is connected.

5.9 Peak Clear

The m108 signal meters will display a small line to indicate the highest level (peak) a particular channel has achieved. There are 3 modes for displaying these peaks which can be select in the setup menu (chapter 7) 'off, decay, and hold'. If either the decay or hold settings are chosen, then the peak indicator

will remain lit until it is manually cleared with this switch or automatically after a period of time (decay).

As well as signal peaks, the signal level meter will display a bright square next to the gain level number to indicate an OVER at the ADC. If this is shown, a level adjustment should be made. OVER indicators will remain on until cleared with the peak clear switch.

5.10 Channel Group Mode

The Group mode allows between 2 to 8 adjacent mic preamp channels to be grouped together for gain change operations. To enter group mode, press the GROUP switch. Any defined channel groups will appear without vertical dividing lines.

To define a group, place the cursor on the left most channel of the channels to be grouped and turn the EDIT knob clockwise while pressing and holding the GROUP switch. You will notice that the vertical dividing lines between channels disappear as channels are added to a group.

Once in Group mode, gain changes are made in the same manner as in normal Channel select mode. To remove a group, place the cursor on the right most channel of the channels in the group and turn the EDIT knob counter clockwise while pressing and holding the GROUP switch. You will notice that the vertical dividing lines between channels reappear as channels are removed from a group.

Groups are limited to adjacent channels only and groups cannot span between preamplifier units. Also, only gain can be adjusted when in Group mode. To toggle the status of Phantom power or Phase on a channel, you must exit Group mode.

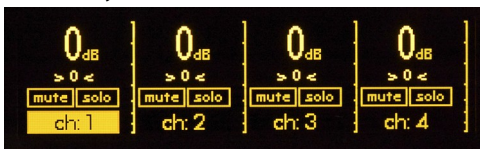
5.11 Using the HI-Z inputs

Channels 1 and 2 can be used as high impedance instrument inputs, for plugging an instrument or line level source directly into the front panel. These 1/4" inputs sense if a cable is plugged in and will automatically activate the HI-Z input. When active, the channel display on the OLED screen will show a 1/4" plug icon. This input has 10M Ohm input impedance.

6. Using the m108 Mixer

The m108 mixer is used to mix and monitor the 8 mic preamp channels as well as 2 incoming auxiliary channels from the USB interface or an installed option module. Monitoring the mixer output is done with the headphone output or the optional stereo CR (control room) output module.

To enter the m108 mixer, press and hold the VOL / MUTE (mix) encoder knob. The mixer screen will appear. This screen has 3 pages which automatically change as the cursor travels across them from side to side. They are:



1. mixer channels 1-4



2. mixer channels 5-8



3. monitor channel, master, monitor source select, and headphone source select

6.1 To adjust the level of a mixer channel

1. Use the EDIT knob to select a channel.
2. Press the EDIT knob to enter level adjust mode, which will be indicated by the numerical level display becoming outlined and the channel name / number becoming brighter.
3. Turning the EDIT knob to adjust the mixer channel level, from 0 down to -90dB in 1dB steps, and then OFF.
4. Press the EDIT knob again to exit level adjust mode.

6.2 To pan a mixer signal left or right in the stereo field

1. Scroll to select the channel you wish to pan.
2. Press the pan switch to enter pan mode, which will be indicated by the pan display becoming outlined and channel name / number becoming brighter.
3. Turn the EDIT knob clockwise to pan the source to the right, or counter-clockwise to pan the source to the left. Note: the pan level increments expand progressively the further a signal is panned.
4. Press the EDIT knob to exit pan mode.

6.3 To mute a mixer signal

1. Scroll to select the channel you wish to mute.
2. Press the mute switch. The channel will be muted and mute status will be indicated by the mute icon being backlight yellow.
3. Press the the mute switch again to un-mute the channel.

6.4 Solo a mixer channel

1. Scroll to select the channel you wish to solo.
2. Press the solo switch. The channel will be solo'd and solo status will be indicated by the solo indicator icon being backlight bright yellow.
3. Press the the solo switch again to un-solo the channel.

6.5 The MON channel

The MON (monitor) channel is a stereo channel that can be be sourced by any of the m108's available 2ch monitor inputs:

- USB 2.0 interface
- Aux pairs 1 – 4

The USB channels are whatever stereo audio source is being sent to your m108 from your computer's

USB audio buss, either from the computer OS audio output or your from your DAW (see USB audio setup, chapter 9).

The aux pairs will only be available if there is an option card installed on the m108 which presents audio inputs. Currently this would only be from the Dante network audio option module (see Dante Module option, chapter 8).

6.6 Master Channel

This channel sets the overall level of the mixer output, from 0 down to -90dB in 1dB steps, and then OFF. The output of the mixer will be sent to the headphones if the headphone source MIX is selected. (see below) This channel has a 'solo off' switch which deactivates solo on all channels, allowing you to hear all mixer channels immediately without having to manually un-solo individual channels.

6.7 mon-src (Monitor Source)

This menu is used to select which 2ch source is present at the monitor channel. Options are: aux1-4 and USB. To select the input you wish to monitor:

1. scroll the EDIT knob to the 'mon-src' menu, and press the knob to enter the source select mode.
2. Scroll the EDIT knob until your desired source is selected.
3. press the EDIT knob to enter your selection.
4. To exit this select mode, you need to scroll the EDIT knob counter-clockwise until you reach 'mon-src', then press to exit.

6.8 hp-src (Headphone Source)

This menu is used to select which 2ch source is present at the headphone output. Options are: aux pairs 1-4, USB and MIX. To select the source you wish to monitor with the headphones:

1. Scroll the EDIT knob to the 'hp-src' menu, and press the knob to enter the source select mode.
2. Scroll the EDIT knob until your desired source is selected.
3. Press the EDIT knob to enter you selection.
4. To exit this select mode, you need to scroll the EDIT knob counter-clockwise until you reach 'hp-src', press to exit.

7. Navigating and Using the Setup Menu

Because there are so many ways to use the m108, we have designed a very simple but powerful setup menu for controlling all available setup parameters.

7.1 To enter and navigate the setup menu

1. Press and hold the PEAK CLR (setup) hardware switch on the front panel. The display will change to show a vertical list of all available setup menu items.
2. Menu navigation mode - turning the EDIT encoder knob clockwise will scroll up the list numerically, counter-clockwise will scroll down the list numerically.
3. The selected list menu item will be in the vertical center of the screen, displayed between an underline and overline and its brightness intensified.

4. Once the desired menu item has been selected, pressing the EDIT knob enters edit mode, which is shown by the entire row of the menu item becoming back-lit by a background gradient bar.

From here, items in the setup will have 2 options for making adjustments

1. In edit mode, turn the EDIT knob to scroll through the list of available settings (all of which are described in detail below). When the setting you desire is displayed, press the EDIT knob to enter the section and exit edit mode. You will be returned to the setup menu navigation mode.
2. If the menu item you have selected reads 'press to config', then pressing the EDIT knob will open a new panel specific to that menu item with a separate array of editable items. These menu items will be explained in detail below.
3. The m108 responds to parameter changes in real time but the settings are not saved to non-volatile memory until you exit from the setup menu.

7.2 The 16 setup menu items (listed in order)

1 - adc samplerate

This setting adjusts the ADC sample rate. To set the sample rate you wish to use:

1. Press the EDIT encoder to enter edit mode
2. Turn the knob to select the desired sample rate
3. Press the EDIT knob again to enter your selection and exit edit mode

The available options are:

- off
- 44.1kHz
- 48kHz
- 88.2kHz
- 96kHz
- 176.4kHz
- 192kHz
- usb – select this to have the sample rate automatically set by the USB audio interface
- dante - select this to enable the optional DANTE interface. When DANTE is enabled the sample rate is set in the device configuration tab for the m108 in DANTE Controller.

2 - adc clocksource

This setting sets which wordclock source the m108 ADC uses to operate. To set the clocksource you wish to use:

1. Press the EDIT encoder to enter edit mode
2. Turn the knob to select the desired clocksource
3. Press the EDIT knob again to enter your selection and exit edit mode

The available options are:

- internal – uses the m108's internal oscillator as the clocksource
- word – uses incoming external wordclock source connected to the wordclock in BNC connector on

the rearpanel.

- word – 75Ω Same as above but with 75Ω termination
- dante - uses incoming external wordclock source from the optional Dante Network Audio card

3 - dante ext. syn

This setting selects the clock source for when the m108 is the Dante network clock master. If the "Allow Sync to External" check box is checked in Dante Controller, then the clock source for the m108 will switch to the clock source selected in the Dante ext. sync menu. To set your desired dante ext. syn option:

1. Scroll to the setup menu item #4 'clock output'
2. Press the EDIT encoder to enter edit mode
3. Turn the knob to select your desired option
4. Press the EDIT knob again to enter your selection and exit edit mode

Note that there can only be one clock master on a Dante network. The available options are

- internal
- word
- word – 75 ohm

4 - clock output

This setting sets which wordclock source will be present at the WC OUT/THROUGH BNC connector on the m108 rear panel. To set your desired clock output setting:

1. Scroll to the setup menu item #4 'clock output'
2. Press the EDIT encoder to enter edit mode
3. Turn the knob to select your desired option
4. Press the EDIT knob again to enter your selection and exit edit mode

The available options are:

- internal
- external

5 - digital format

Sets the AES3 output format to indicate professional or consumer in the digital stream. To set your desired digital output format:

1. Scroll to the setup menu item #5 'digital format'
2. Press the EDIT encoder to enter edit mode
3. Then turn the knob to select your desired format
4. Press the EDIT knob again to enter your selection and exit edit mode

The available options are:

- professional
- consumer

6 - phones power up level

This option allows you to store a specific level that the headphone output will return to every time the m108 is powered on. To set your desired phones power up level:

1. Scroll to the setup menu item #6 'phones power up level'
2. Press the EDIT encoder to enter edit mode
3. Turn the knob to select your desired option from 0 – 99
4. Press the EDIT knob again to enter your selection and exit edit mode

7 - meter peaks

The m108 signal meters will display a small line to indicate the highest level (peak) a particular channel has achieved. To set your desired meter peak setting:

1. Scroll to the setup menu item #7 'meter peaks'
2. Press the EDIT encoder to enter edit mode
3. Then turn the knob to select your desired option
4. Press the EDIT knob again to enter your selection and exit edit mode

You can set these peak indicators to do the following:

- off – signal peaks are not recorded or displayed
- decay – the peak signal indicator only remains for a short interval and then automatically disappears
- hold - the peak signal indicator is permanently displayed until a higher peak has been recorded or the peak clear switch is pressed

8 - display mode

The main mic preamp operating screen has 7 different display modes that you can choose between depending on how you are using the system and what display information you would like to see on the screen as default. To set your desired display mode:

1. Scroll to the setup menu to item #8 'display mode'
2. Press the EDIT encoder to enter edit mode
3. Turn the knob to select your desired option
4. Press the EDIT knob again to enter your selection and exit edit mode

The display mode options are:

- system – in this mode, all 8 mic preamp channels are shown in a row, with the right side screen area displaying ADC sample rate, clock source and clock output.
- gain – in this mode, all 8 mic preamp channels are shown in a row, with the right side screen area displaying the channel name or number (if no name is entered), and the selected channel's gain level with large number.
- phones - in this mode, all 8 mic preamp channels are shown in a row, with the left side screen area displaying the selected headphone source and headphone output level with a large number.
- phones / sys - in this mode, all 8 mic preamp channels are shown in a row with slightly narrowed

columns, with the left side screen area displaying the selected headphone source and headphone output level with a large number; and the right side screen area displaying ADC sample rate, clock source and clock output.

- phones / gain - in this mode, all 8 mic preamp channels are shown in a row with slightly narrowed columns, with the left side screen area displaying the selected headphone source and headphone output level with a large number; and the right side screen area displaying the channel name or number (if no name is entered), and the selected channel's gain level with large number.
- channel – in this mode only a single channel is displayed at a time. There is a large horizontal dBFS meter across the top which includes scale numbers between -60 and 0dBFS. The full 11 character channel name is shown (if entered), as well as the +48V and phase reverse status, with a large channel gain number displayed in the right side screen area.
- phones / channel – in this mode only a single channel is displayed at a time. The left side screen area displays the selected headphone source and headphone output level with a large number. The middle of the screen has the large horizontal dBFS meter across the top which includes scale numbers between -60 and 0dBFS. The full 11 character channel name is shown (if entered), as well as the +48V and phase reverse status, and the large gain number is displayed in the right side screen area.

9 - display brightness

The high contrast OLED display can be set to 3 brightness settings. To set your desired screen brightness:

1. Scroll to the setup menu item #9 'display brightness'
2. Press the EDIT encoder to enter edit mode
3. Turn the knob to select your desired option
4. Press the EDIT knob again to enter your selection and exit edit mode

The display brightness options are:

- low
- norm
- high

10 - display auto dim

To help ensure a long service life, the m108 OLED display will automatically dim its intensity after a pre-set amount of time. Any front panel operation (switch press or knob turn) will restore the screen's default brightness level and reset the auto dim timer. To set the desired auto dim timer:

1. Scroll to the setup menu item #10 'display auto dim'
2. Press the EDIT encoder to enter edit mode
3. Then turn the knob to select your desired option
4. Press the EDIT knob again to enter your selection and exit edit mode

The auto dim timer settings are:

- 2min
- 5min
- 10min

- 15min
- 30min
- 45min

11 - channel name

The m108 allows you to enter a custom name up to 11 characters for individual channels. To enter a custom name:

1. Scroll to the setup menu item #11 and press the EDIT encoder to enter channel name edit mode ('press to config')
2. A new menu will appear, with 4 fields to navigate
3. Turn the EDIT knob to select the fields
4. The selected field will be displayed between an underline and overline and its brightness intensified
5. Press the EDIT knob to enter edit mode for the selected field, which will be indicated with a bright gradient background

The channel name edit fields are:

- channel number – turn the EDIT knob to select the channel number, press to enter the channel number select mode, then turn the encoder to select the number. When you have reached the number you want, press again to enter. You will be returned to the channel name menu.
- channel name – Push here to enter the individual characters of the name. An underline cursor will appear, which can be scrolled across the bottom of the individual character positions. Press the EDIT knob to input the desired character. Options are: lowercase letters a-z, uppercase letters A-Z, numbers 0-9, a space, and a dash. When you are done selecting a character, press the encoder to enter your character and advance to the next character you wish to edit. When you are done, scroll to and push the left side back arrow to enter the name.
- done – scroll here and push the EDIT encoder to save your entry and return to the setup menu.
- clear name – scroll here and push the EDIT encoder to clear all previously entered characters in the name field.

12 - preset recall

All of the m108 settings, including preamp level settings, ADC and wordclock settings, mixer settings, custom name settings etc.. can be stored into one of the 99 available presets and recalled. To recall a previously stored preset:

1. Press the EDIT encoder to enter preset recall mode ('press to config')
2. A new menu will appear, with 3 fields to navigate
3. Turn the EDIT knob to select the fields, the selected field will be displayed between an underline and overline and its brightness intensified
4. Press the EDIT knob to enter edit mode for the selected field, which will be indicated with a bright gradient background

The preset recall fields are:

select desired preset number 1 – 99 – Turn the EDIT knob to select the preset name / number you wish to recall. When you have selected it, press the encoder to enter it and return to the menu.

recall – To recall the preset name / number you have selected, scroll here and press the EDIT knob. the preset will be recalled and you will be automatically returned to the setup menu.

cancel - To cancel your preset recall, scroll here and press the EDIT knob. The preset will not be recalled and you will be automatically returned to the setup menu.

Recalling preset 0 will restore all settings to factory defaults.

13 - preset save

All of the m108 settings, including preamp level settings, ADC and wordclock settings, mixer settings, custom name settings etc.. can be stored into one of the 99 available presets and recalled. To save the current m108 settings into a new preset:

1. Scroll to the setup menu item #13 'preset save' and press the EDIT encoder to enter preset save screen ('press to config')
2. A new menu will appear, with 5 fields to navigate
3. Turn the EDIT knob to select the fields
4. The selected field will be displayed between an underline and overline and its brightness intensified
5. Press the EDIT knob to enter edit mode for the selected field, which will be indicated with a bright gradient background

The preset save edit fields are:

- preset number – turn the EDIT knob to select the preset number, press to enter the channel preset select mode, then turn the encoder to select the number 1 - 99. When you have reached the number you want use, press again to enter. You will be returned to the preset save menu.
- name – Push here to enter the individual characters of the name. An underline cursor will appear, which can be scrolled across the bottom of the individual character positions. Press the EDIT knob to input the desired character. Options are: lowercase letters a-z, uppercase letters A-Z, numbers 0-9, a space, and a dash. When you are done selecting a character, press the encoder to enter the character and to return to the character select mode and advance to the next character you wish to edit. When you are done, scroll to and push the left side back arrow to enter the name. There is no auto correct.
- save – scroll to this area and push the EDIT encoder to save your entry and return to the setup menu.
- cancel - scroll to this area and push the EDIT encoder to cancel your preset save and return to the setup menu.
- reset name – scroll to this are and push the EDIT encoder to clear all previously entered characters in the name field.

14 - preamp id / name

m108 preamplifiers are able to be configured into large channel count, multi-unit systems. In a multi-unit system, each m108 preamp will require its own unique id number. Along with a unique id number, the preamp can have a custom name that will be displayed in the m108 Controller App and on the m108 web interface. To enter a custom name:

1. Scroll to the setup menu item #14 and press the EDIT encoder to enter preamp id / name edit mode ('press to config')

2. A new menu will appear, with 4 fields to navigate
3. Turn the EDIT knob to select the fields
4. The selected field will be displayed between an underline and overline and its brightness intensified.
5. Press the EDIT knob to enter edit mode for the selected field, which will be indicated with a bright gradient background.

The preamp id / name edit fields are:

- id number – turn the EDIT knob to select the preamp id number, press to enter the preamp id number select mode, then turn the encoder to select the number, from 1 - 12. When you have reached the number you want, press again to enter. You will be returned to the channel name menu.
- preamp name – Push here to enter the individual characters of the preamp name. An underline cursor will appear, which can be scrolled across the bottom of the individual character positions. Press the EDIT knob to input the desired character. Options are: lowercase letters a-z, uppercase letters A-Z, numbers 0-9, a space, and a dash. When you are done selecting a character, press the encoder enter your character to return to the character select mode and advance to the next character you wish to edit. When you are done, scroll to and push the left side back arrow to enter the name. There is no auto correct.
- done – scroll here and push the EDIT encoder to save your entry and return to the setup menu.
- clear name – scroll here and push the EDIT encoder to clear all previously entered characters in the name field.

15 - remote

The m108 can be remotely controlled via several different protocols. To set the desired control protocol:

1. Scroll to the setup menu item #15 'remote'
2. Press the EDIT encoder to enter edit mode
3. Then turn the knob to select your desired option
4. Press the EDIT knob again to enter your selection and exit edit mode

The control protocol options are:

- off
- rs485
- rs422
- midi
- ethernet

1 - ethernet setup

To connect an m108 to an ethernet TCP/IP network, you will need to configure its unique TCP/IP settings. To configure these:

1. Scroll to the setup menu item #16 'ethernet setup' and press the EDIT encoder to enter ethernet setup screen ('press to config')
2. A new menu will appear, with sever fields to navigate
3. Turn the EDIT knob to select the fields

4. The selected field will be displayed between an underline and overline and its brightness intensified
5. Press the EDIT knob to enter edit mode for the selected field, which will be indicated with a bright gradient background

The ethernet edit fields are:

- mode – selects between auto (dhcp) and static. Auto (dhcp - Dynamic Host Configuration Protocol) allows the m108 to be automatically assigned a unique ip address by a DHCP server. Static setting allows the m108 user to define a the unit's ip address manually. Press and turn the edit knob to select between the two options. Press again to return to the menu.
- ip (dhcp) – If the ip mode has been set to auto, then this field will not be editable and will simply display the current ip address the m108 has been assigned by the network host.
- ip (static) – If the ethernet mode has been set to static, use this field to manually enter the unique ip number for the preamp. Push to enter the individual numbers of the ip number. An underline / overline cursor will appear, which can be scrolled across the individual number fields. Press the EDIT knob to input the desired number from 1-255. When you are done selecting a number, press the encoder enter and return to the number input mode and advance to the next number to edit. When you are done, scroll to and push the left side back arrow to enter the ip number.
- mac – the 'media access code' is a unique, specific hard-wired address assigned to every individual m108. This field is non-editable. The MAC address is useful for integrating and troubleshooting an m108 on an ip network.
- done – scroll to this area and push the EDIT encoder to save your entry and return to the setup menu.

8. Dante Configuration

The Dante option provides the m108 with two gigabit ethernet ports for streaming 8 channels of audio at sample rates up to 192kHz to other Dante enabled devices. The heart of the Dante interface is the Brooklyn II module. This is where the digital audio data is sent to and recieved from the Dante network "flows".

While most of the ADC configuration and setup is the same as the ADAT and AES3 interfaces, there are some clock architecture concepts that are unique to the Dante enabled m108.

We strongly recommend reading through the Dante Controller software user guide to become familiar with Dante networking basics.

The pdf can be downloaded <http://dev.audinate.com/GA/dante-controller/userguide/pdf/latest/>. The html version is <http://dev.audinate.com/GA/dante-controller/userguide/webhelp/>

Connections

On the rear panel of the m108, the Dante interface module features two gigabit Ethernet ports. One labeled PRIMARY and one labeled SECONDARY. This allows the m108 to operate in full redundant mode if required. When operating on a single non-redundant network then the PRIMARY port should be used.

Refer to the Dante Controller user guide for more information on redundancy.

Dante Setup

There are menu items in the m108 setup menu for configuring Dante:

- Setup menu # 1: adc samplerate
- Setup menu # 2: adc clocksource
- Setup menu # 3: dante ext. sync

To enable the Dante interface go to Setup menu # 1: adc samplerate and select "dante".

This connects the Dante interface to the network and configures the ADC to the last used Dante sample rate. Sample rate changes must be made from the Dante Controller interface. Selecting any other option from the adc samplerate menu will turn the Dante interface off.

Setup menu # 3: dante ext. sync stores the clock source preference for when the m108 is the Dante network clock master. The options are internal, word, and word – 75Ω.

If the "Allow Sync to External" check box is checked in Dante Controller then the clock source for the m108 will switch to the clock source selected in the dante ext. sync menu. Note that there can only be one clock master on a Dante network.

Setup menu # 2: adc clocksource menu item will automatically switch to "dante" when Dante is enabled in the adc samplerate menu. The options "word", and "word - 75Ω" will be available but "internal" will not be available as this would result in the m108 clock and the Dante clock being asynchronous. When Dante is disabled, the adc clocksource will automatically change to "internal".

Clocking

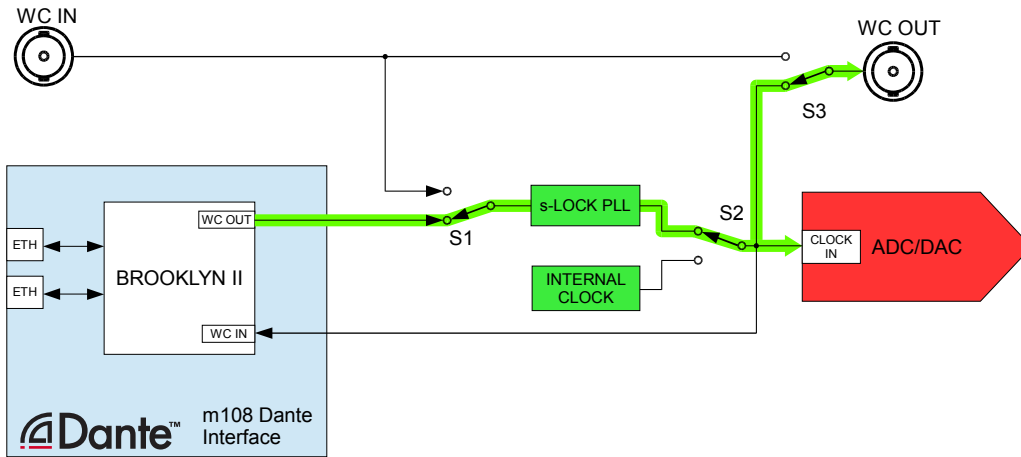
When Dante is enabled by selecting it in the sample rate menu, the adc clocksource menu item will automatically select "dante" and the m108's sLock PLL will lock to the Dante clock.

This puts the m108 in Dante Clock Mode 1 (see below for clock mode descriptions). The sLock PLL in the m108 will then lock to the Dante network clock and audio will flow to the Dante network. When powered-off, the m108 will save the current configuration to non volatile memory. When powered back on, the m108 will restore the previous configuration and there will be an approximately 10 second delay while the Dante module is initialized.

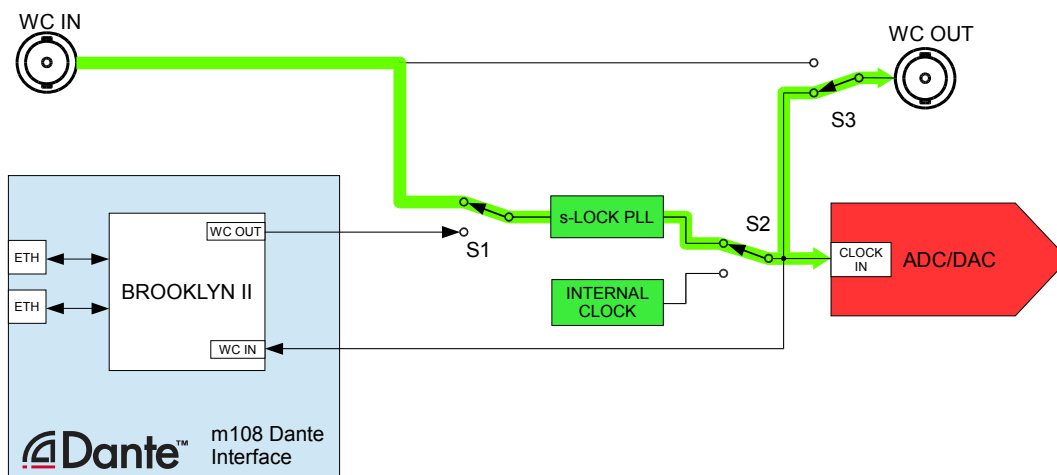
Clock Modes

There are a total of 4 clocking modes for the m108 with Dante. Below is a description of each.

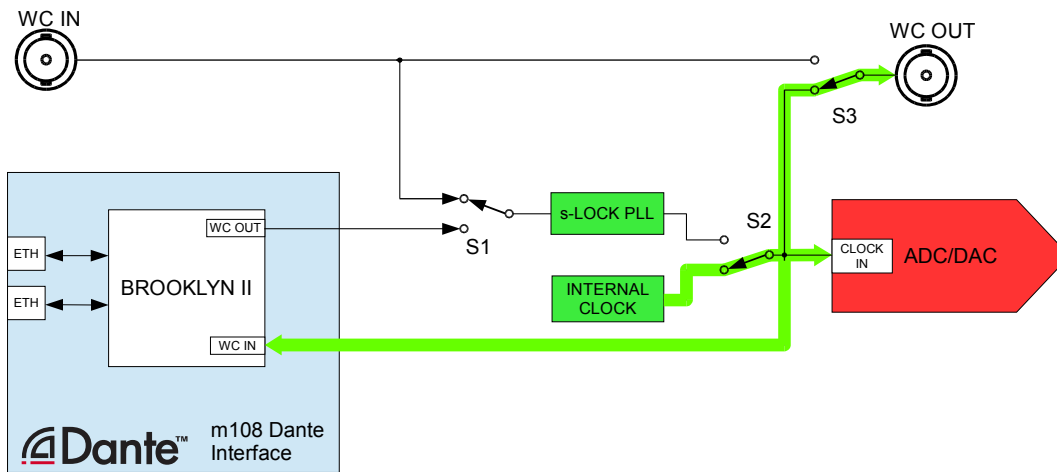
1. Brooklyn II card is Dante clock slave. adc clocksource is "dante", ADC is clocked from Brooklyn II. Note: This is the most common and recommended configuration.



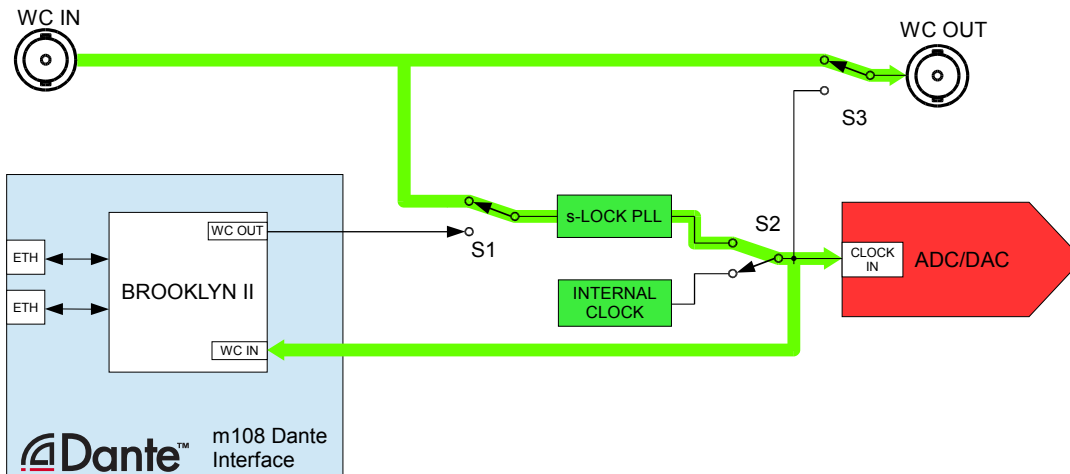
- Brooklyn II card is Dante clock slave. adc clocksource is "word" or "word 75Ω"; ADC is clocked from External Word Clock. Note: In this mode the external WC IN must be synchronous with the Dante Network Clock. If the external WC is not synchronous with the Dante clock then the Brooklyn II might mute the audio. If the two clocks are close in frequency but not synchronous, corrupt audio data will be transmitted - (ticking, or dropped samples).



- Brooklyn II is Dante clock master. dante ext. sync is "internal" adc clocksource is "internal", m108 is System Master using Internal Clock. Note: Check boxes "Preferred Master" and "Enable Sync To External" for this m108 in the Dante Controller Clock Status Window.



Brooklyn II is Dante Clock Master. dante ext. sync is "word" of "word - 75Ω" adc clocksource is "word" of "word - 75Ω", m108 is System Master using external WC IN. Note: Check boxes "Preferred Master" and "Enable Sync To External" in Dante Controller.



9. Control from Protools®

The m108 can be controlled directly from AVID ProTools® HD, via the MIDI combination jacks on the m108 and the AVID I/O. Using the m108 with ProTools® requires some setup in ProTools® and the host computer's MIDI configuration (MSS for windows, AMS for MAC). When connected to a ProTools® system, the m108 is designed to emulate the AVID®Pre. This means that configuring the m108 in the "I/O" and "Peripherals" settings in ProTools®, it is necessary to choose the exact same settings as the AVID®Pre.

For a detailed discussion of Pro Tools® Pre configuration, please read the AVID PRE user guide which can be found here: http://www.avid.com/~-/media/avid/files/support-pdf/resources-pdf/pre_guide_v90_70448.pdf (file subject to relocation, google will help). Chapter 3 includes operating system as well as Pro Tools® configuration information which will allow Pro Tools® to recognize the m108 as a AVID Pre.

Since the AVID Pre and the m108 have differing features, there will be some m108 functions that are not available when in MIDI mode. As well, there are AVID Pre functions that do not exist on the m108. Following is a summary of these limitations:

Gain Control

The m108 has a gain range of -6, 2 – 69dB in 1dB steps. When in MIDI control mode the m108 switches to a gain range of -6 to 63db in 3db steps. If the m108 has channels set to gain values that are not available in MIDI control mode and the m108 receives MIDI activity, it will change these channels to the next lowest gain setting that is available in MIDI control mode. If the MIDI control mode times out and the m108 returns to its normal control mode, all of the channel gain settings will be unchanged. A gain setting of 0dB in ProTools will result in a gain setting of -6dB on the m108.

Pad

The m108 does not have a pad circuit so a PAD command will be ignored.

Input Impedance

The m108 does not have adjustable input impedance so Input Impedance commands will be ignored.

Mute

The m108 does not have a mute function so this command will be ignored.

10. USB Setup

Computer Audio Requirements

Regardless of the type of computer you will use to with the m108, it must have at least one available USB port. The m108 ships with a standard USB type A to type B cable. The type A connector plugs in to the computer and the type B connector to the m108 USB jack.

The m108's asynchronous mode USB controller supports standard driverless operation on Mac OSX since version 10.x.x. Sample rates up to 192kHz are supported. For Windows PC computers, users will need to download and install a free driver on their computer. This driver can be found on our website <http://www.gracedesign.com/support/support.htm>

On Mac computers driverless operation basically means 'plug and play'. The m108 will automatically show up in your computer's list of supported audio devices as 'm108'. The m108 will provide 8 input channels and 2 output channels. In most cases, simply choose the m108 as your audio recording or playback device and the system will work.

In the event that you have any setup issues which aren't addressed by these resources, feel free to contact us directly at 303.823.8100 Monday through Friday 9 – 5, MST.

Using the m108 as a DAW interface

With the extremely high quality audio recording and playback, the m108 can be a great option as a stand-alone I/O device with your digital audio workstation. However, using it in conjunction with other USB audio devices connected to your workstation computer's USB buss will require some adjustments to your computers audio settings.

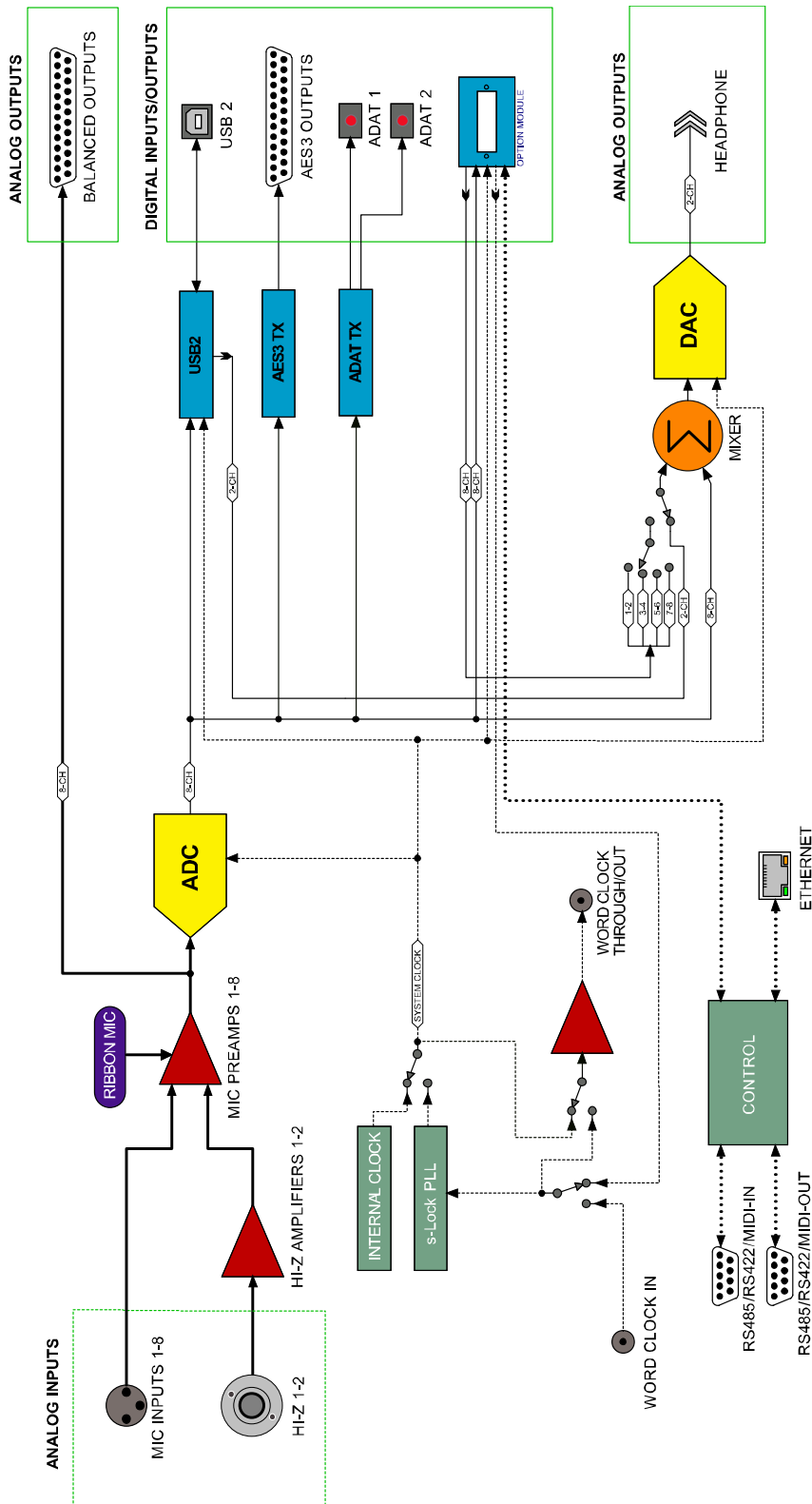
For Mac OS X, this is achieved by setting up the m108 in an 'aggregate audio device' setup, with the

m108 as the default input and playback` device.

For Win 98 – Win 7, you will need to use 'asio4all' drivers- <http://www.asio4all.com/>.

With both of these setups, if you are using multiple I/O devices, you will need to pay careful attention to clocking. In Mac / Core audio aggregate setups, you are able to set which device is the clock master. However, this means that other devices may be sample rate converted, which we do not recommend.

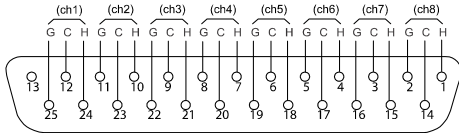
11. Block Diagram



12. Cable Diagrams

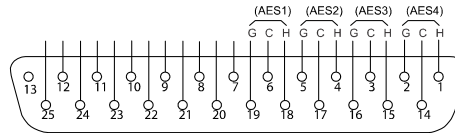
DB25 pinouts

DB25 Analog Output Connector



H = HOT(+) C = COLD(-) G = GROUND

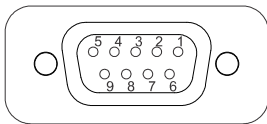
DB25 Digital Output Connector



H = HOT(+) C = COLD(-) G = GROUND

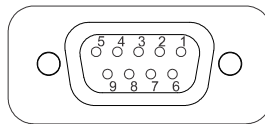
DB9 pinouts

m108 preamplifier DB9 pinout
REMOTE / MIDI IN



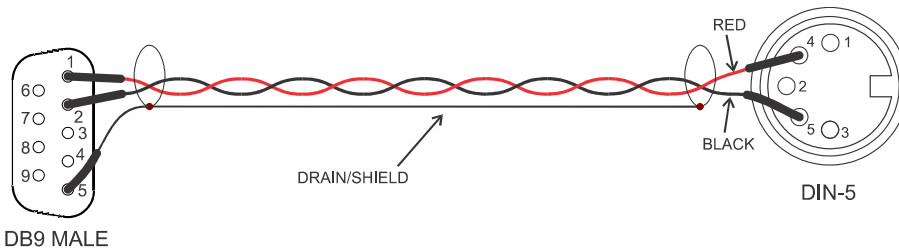
- 1 MIDI IN+
- 2 MIDI IN-
- 3 RS485 / RS422 TX-
- 4 RS422 RX-
- 5 Chassis GND
- 6 RS485 / RS422 TX+
- 7 RS485 / RS422 GND (GND-ISO)
- 8 RS422 RX+

m108 preamplifier DB9 pinout
REMOTE / MIDI OUT



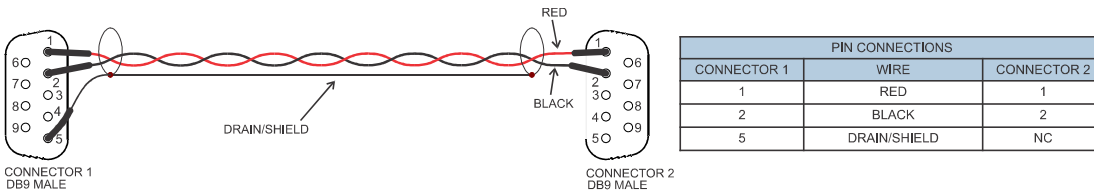
- 1 MIDI OUT+
- 2 MIDI OUT-
- 3 RS485 / RS422 TX-
- 4 RS422 RX-
- 5 Chassis GND
- 6 RS485 / RS422 TX+
- 7 RS485 / RS422 GND (GND-ISO)
- 8 RS422 RX+
- 9 N/C

MIDI breakout cable



PIN CONNECTIONS		
DB9 MALE	WIRE	DIN-5
1	RED	4
2	BLACK	5
5	SHIELD	2

MIDI jumper



PIN CONNECTIONS		
CONNECTOR 1	WIRE	CONNECTOR 2
1	RED	1
2	BLACK	2
5	DRAIN/SHIELD	NC

13. Warranty Information

- Grace Design warrants this product to be free of defective parts and workmanship for a period of five years. This warranty period begins at the original date of purchase and is transferable to any person who may subsequently purchase the product during this time.
- This warranty excludes the following conditions: normal wear and tear, misuse, customer negligence, accidental damage, unauthorized repair or modification, cosmetic damage and damage incurred during shipment.
- During the time of this warranty, Grace Design will repair or replace, at its option, any defective parts or repair defective workmanship without charge, provided the customer has appropriate proof of purchase and that the product has its original factory serial number.
- In order for Grace Design to provide efficient and timely warranty service, it is important that you mail the completed warranty registration card enclosed with all of our products within 10 days of the original date of purchase. You may also register your product directly with Grace Design by telephone (303-823-8100 Monday-Friday 9:00am to 5:00pm MST), or you can register your product online at www.gracedesign.com.
- This warranty is in lieu of all other warranties whether written, expressed, or implied, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
- In no event will Grace Design be liable for lost profits or any other incidental, consequential or Exemplary damages, even if Grace Design is aware of the possibility of such damages. In no event will Grace Design's liability exceed the purchase price of the product.
- This warranty gives the customer specific legal rights. The customer may also have other rights, which vary from state to state. Some states do not allow limitations on implied warranties or consequential damages, so some of the limitations of the above may not apply to a particular customer.

14. Manual Revision History

Rev.	Description	Date	Initials
A	Initial release	07/25/16	EDG