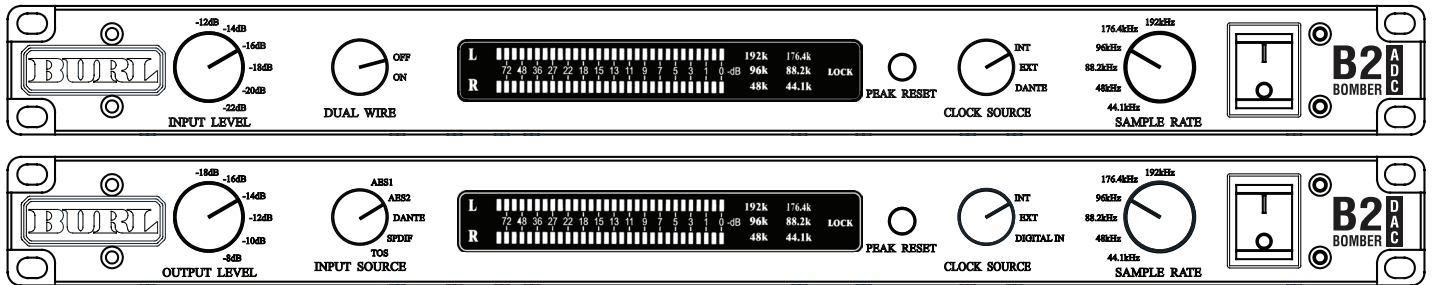


# User Guide

## B2 Bomber ADC

## B2 Bomber DAC

### with Dante™



**Burl Audio**

**March 2015**

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**www.burlaudio.com**

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**MADE IN USA**

# About Burl Audio:

Founded in 2006, BURL Audio is a pro audio gear engineering and manufacturing company located in Santa Cruz, California. Based out of Paradise Recording and spearheaded by Rich Williams, BURL Audio's gear is designed in a commercial recording studio, by professional recording engineers, for recording engineers.

The philosophy of BURL Audio is to provide the best possible recording devices, in modular outboard units, to all levels of recording engineers at a reasonable price. All BURL Audio products are designed to improve your recording, mixdown, and mastering significantly. BURL Audio's products are designed to be a life-long asset to your studio.

BURL Audio is dedicated to bringing you ground breaking studio gear that will change your life. BURL Audio has redefined recording in the digital age with its revolutionary converter design, and now BURL Audio has adopted the audio-over-IP format which has become the de-facto industry standard for pro audio, film and broadcast.

Dante is a high channel count, low latency, fully networkable audio-over Ethernet technology, which allows any number of interfaces and computers to speak to one another via a standard Gigabit Ethernet network. Until now digital audio routing has been limited by point-to-point digital connectivity, which was either proprietary, or based on outdated standards with limited run lengths.

Simply put, the B2 Bombers have redefined digital recording. For anyone who has felt that digital recording has been lacking warmth, musicality, and soul, the B2 Bombers and B80 Mothership are the answer. The B2s were forged from BURL Audio's deep dedication to analog class-A circuitry. The result is not only heard, it is felt. The B2 Bombers stand out from every other interface on the market not because they are colored, but because they do not sterilize the source.

Webster defines burly as follows:

Main Entry: bur·ly

Function: adjective

Inflected Form(s): bur·li·er; -est

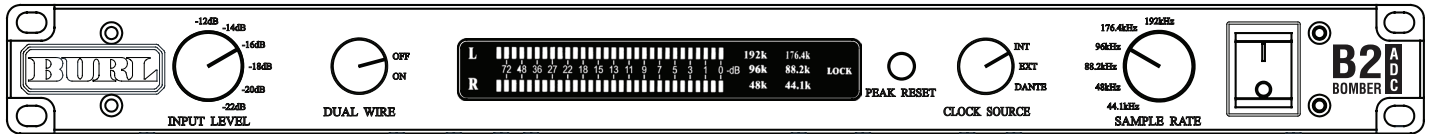
Etymology: Middle English : strongly and heavily built : HUSKY <a burly man>

– bur·li·ly - adverb

– bur·li·ness - noun

Burl is also defined as a tough, yet beautifully knotty base of 2000 year old redwood tree trunks. Burl is the heavy surf and fog that descends without warning over Santa Cruz, California. Burl is the dual rectified guitar and kick drum recorded through a BURL Audio B2 Bomber ADC and B1 Mic Pre. Burl is the toughness and heavy build quality of a BURL Audio unit. BURL is a creative state of mind. BURL is about music, grace, and power.

# B2 BOMBER ADC



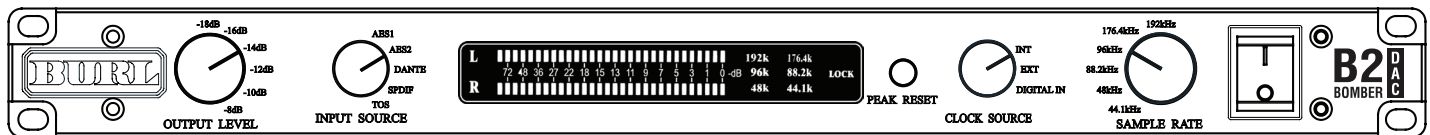
## IN THE BOX:

- B2 BOMBER ADC
- IEC Power Cable
- 4 Rack Screws with Washers

## B2 ADC FEATURES:

- 44.1 kHz to 192 kHz, 24 bit, 2 channel ADC
- Proprietary, high definition, BURL Audio BX1 transformer input
- All class-A, discrete transistors signal path with zero feedback, zero caps
- Audiophile quality 6 position attenuator with standard headroom settings
- High definition metering with simultaneous RMS and peak indication
- Dante, 2xAES, SPDIF and Toslink output, dual wire at 176.4kHz and 192kHz (Dual Wire mode, Left is on AES1, Right is on AES2.)
- BNC word clock input, two outputs of extremely low jitter clock
- Frequency response: **48kHz** = 12Hz to 22kHz, +/- 0.1dB; **96kHz** = 15Hz to 46kHz, +/- 0.1dB; **192kHz** = 18Hz to 94kHz, +/- 0.1dB
- 120dB Dynamic Range (A- weighted), 117dB (no weighting),
- -100dB THD+N (+4dBu = -18dBFS). -94dB THD+N (+21dBu = -1dBFS)

# B2 BOMBER DAC



## IN THE BOX:

- B2 BOMBER DAC
- IEC Power Cable
- 4 Rack Screws with Washers

## B2 DAC FEATURES:

- 44.1kHz to 192kHz, 24 bit, 2 channel DAC
- Proprietary custom design BOPA1, all discrete op-amps
- Passive filters
- All class-A, discrete transistor signal path with zero signal path capacitors
- Audiophile quality 6 position attenuator with standard headroom settings
- High definition metering with simultaneous RMS and peak indication
- Dante, 2xAES, SPDIF and Toslink input
- BNC word clock input with two outputs of extremely low jitter clock
- Frequency response: **48kHz** = 10Hz to 22kHz, +/- 0.1dB; **96kHz** = 10Hz to 30kHz, +/- 0.1dB, -0.3 dB @ 40kHz; **192kHz** = 10Hz to 30kHz, +/- 0.1dB, -1.5 dB @ 90kHz
- 115dB Dynamic Range, -96dB THD+N, full scale output = +22dBu

# B2 ADC FRONT PANEL CONTROLS:

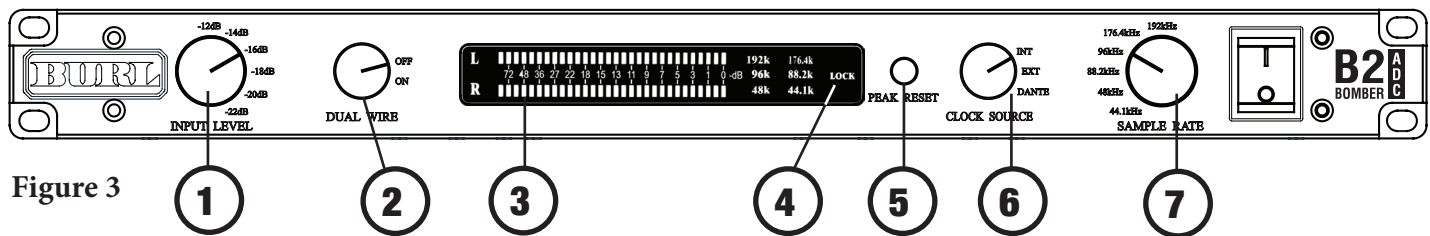


Figure 3

1. **Input Level Attenuator**- **\*\*\*POST TRANSFORMER\*\*\*** Allows quick selection between analog +4dBu = -12, -14, -16, -18, -20, -22 dBfs digital headroom.
2. **Dual Wire**- Sends LEFT to AES1, RIGHT to AES2 at 176.4kHz and 192kHz only. With Dual Wire off, L and R are sent over both AES1 and AES2. Dual Wire must be off for all sample rates other than 192/176.4 kHz.
3. **High Resolution Meter**- 30 segment meter shows RMS level and Peak simultaneously.
4. **Lock**- Red “LOCK” indicates unit is clocking correctly. When not lit, unit is not locked to external clock. Lock is always lit when on internal clock. When lock is lost, unit automatically switches to Internal.
5. **Peak Reset**- Clears the peak light.
6. **Clock Source**- Select Internal Clock, External clock (Word Clock), or DANTE.
7. **Sample Rate Select**- (For internal clock) Manually select sample rate to 44.1, 48, 88.2, 96, 176.4, 192 kHz.

# B2 DAC FRONT PANEL CONTROLS:

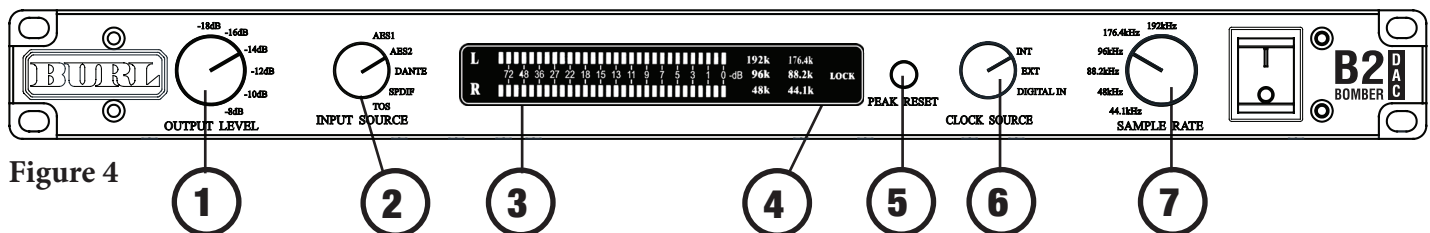


Figure 4

1. **Output Level Attenuator** - Allows quick selection between analog +4dBu = -18, -16, -14, -12, -10, and -8 dBfs digital headroom.
2. **Input Source** - Selects input between AES1, AES2, Dante (optional), SPDIF, or TOS.
3. **High Resolution Meter** - 30 segment meter shows RMS level and Peak simultaneously.
4. **Lock** - Red “LOCK” indicates unit is clocking correctly. When not lit, unit is not locked to external clock. Lock is always lit when on internal clock. When lock is lost, unit automatically switches to Internal.
5. **Peak Reset** - Clears the peak light.
6. **Clock Source** - Select Internal Clock, External clock (Word Clock), or DANTE.
7. **Sample Rate Select** - (For internal clock) Manually select sample rate to 44.1, 48, 88.2, 96, 176.4, 192 kHz.

# B2 ADC REAR UNIT CONNECTIONS:

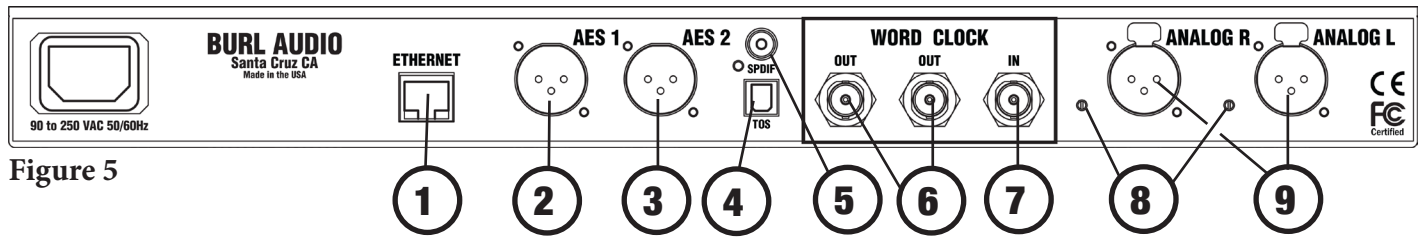


Figure 5

1. **DANTE Ethernet Output.** For units with a Dante “Brooklyn II” card installed.  
(See page 8 for Dante config.)
2. **AES 1-** Digital Output for Ch. L & R (with dual wire “off”), Ch. 1 (with dual wire “on” for 192kHz and 176kHz).
3. **AES 2-** Digital Output for Ch. L & R (with dual wire “off”), Ch. 2 (with dual wire “on” for 192kHz and 176kHz).
4. **TOSLINK-** Digital Output for Ch. L & R.
5. **S/PDIF-** Digital output for Ch. L & R.
6. **Word Clock Output-** Sends word clock out to other units.
7. **Word Clock Input-** Clock input for an external clock.
8. **Analog Input Trim-** For fine tuning input levels.
9. **Analog Input-** Standard XLR input.

# B2 DAC REAR UNIT CONNECTIONS:

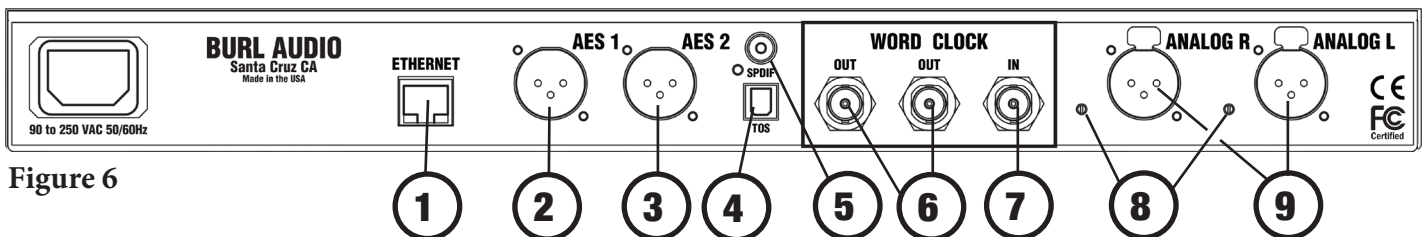


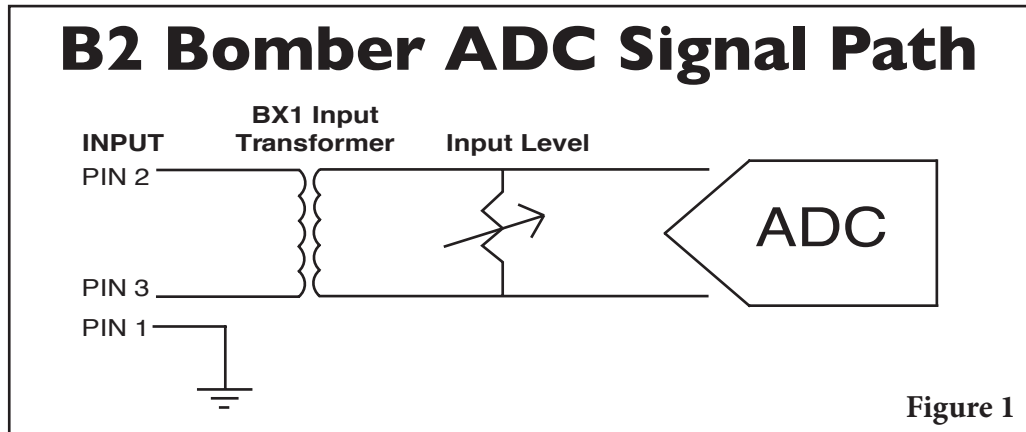
Figure 6

1. **DANTE Ethernet Input** - For units with a Dante “Brooklyn II” card installed.  
(See page 8 for Dante config.)
2. **AES 1** - Digital Input for Ch. L & R (No Dual Wire support)
3. **AES 2** - Digital Input for Ch. L & R (No Dual Wire support)
4. **TOSLINK** - Digital Optical S/PDIF Input for Ch. L & R.
5. **S/PDIF** - Digital S/PDIF Input for Ch. L & R.
6. **Word Clock Output** - Sends word clock out to other units.
7. **Word Clock Input** - Clock input for an external clock.
8. **Analog Output Trim** - For fine tuning output levels.
9. **Analog Output** - Standard XLR output.

# B2 BOMBER ADC

## Getting Started:

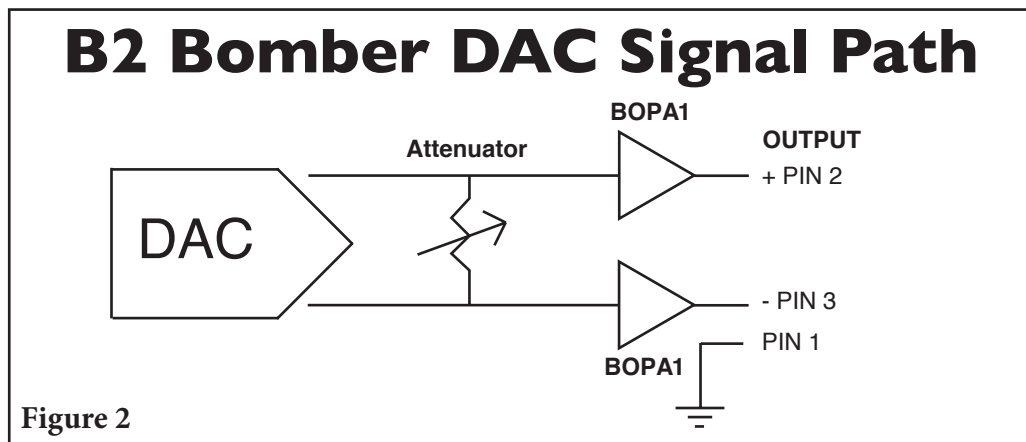
1. Connect XLR cables to analog input.
2. Connect desired digital output (Dante, AES, SPDIF or Optical).
3. Connect Word Clock cables if clocking via Word Clock (clocking via Dante, SPDIF or AES is also possible).
4. Set clock to Int. or Ext. (**Internal clock recommended whenever possible**).
5. Set sample rate on front panel, when clock master.
6. Select Dual Wire **On** or **Off**.
7. Set input level. **We recommend starting at -18 dbfs.**



# B2 BOMBER DAC

## Getting Started:

1. Connect XLR cables to analog output.
2. Connect desired digital Input Source (Dante, AES, SPDIF or Optical).
3. Connect Word Clock cables if clocking via Word Clock (clocking via Dante, SPDIF or AES is also possible).
4. Select Input Source.
5. Set clock to Int., Ext. or Digital In (**Internal clock recommended whenever possible**).
6. Set sample rate on front panel, when clock master.
7. Set Output Level.



# About Dante™

Imagine the possibilities when all audio devices can be networked. Large facilities with multiple control rooms and studios can have easy access to each other. Imagine one control room runs out of outboard gear for a mix. No problem, route audio to the AD/DA in the next control room, utilizing its outboard gear. Need to use two studio main rooms with one control room? Easy, one DAW has total access to the other studio's AD/DA. The band wants to monitor in the lounge? Again, that is no problem, all over standard CAT5e or CAT6 through a gigabit switch. How about simple 2 channel monitoring of a mix-down on a laptop? With Dante's virtual sound card and an Ethernet jack, also not a problem.

Dante is what makes this all possible and now BURL Audio has embraced this technology. The B80 Mothership, the B2 Bomber ADC and the B2 Bomber DAC are now all Dante compatible.

Now you can run multiple B2 Bombers or a B80 Mothership from a laptop or any computer with just an Ethernet jack. Not only that, but any digital gear, including mixing consoles with Dante, can now directly interface with the B80 Mothership and the B2 Bombers.

*For more information please visit [www.burlaudio.com/burl-audio-with-dante](http://www.burlaudio.com/burl-audio-with-dante)*

## About Dante Virtual Soundcard:

The Dante Virtual Soundcard is a software application that turns your PC or Mac into a Dante-enabled device, allowing Dante audio traffic to be transmitted and received using the standard Ethernet port. No additional hardware is required.

The latest version of the Dante Virtual Soundcard supports the Core Audio (Mac OS X), Steinberg ASIO (Windows), and WDM (Windows) audio interfaces, and can be used with any supporting audio application.

Once you install the Dante Virtual Soundcard on a PC or Mac and connect it to the Dante network, you can:

- View and change the current audio sample rate
- Customize the receive latency (latency a receiving device should use before play out)
- View and set your Ethernet network interface, and view network interface details
- Start and stop the Dante Virtual Soundcard
- Select the number of audio channels available in the Dante Virtual Soundcard (CoreAudio and ASIO only)
- On Windows, you can also:
  - Select ASIO or WDM mode
  - View and set ASIO- specific parameters

**FOR MORE INFORMATION ABOUT DANTE SOUND CARD PLEASE VISIT  
<https://www.audinate.com/resources/technical-documentation>**

## **About Dante Controller:**

Dante Controller is a software application provided by Audinate which allows users to configure and route audio around Dante networks. It is available for PCs running Windows 7 (SP1 and above), 8 and 8.1, and Apple Macs running OS X 10.7.5, 10.8.5 and 10.9.

Once you install Dante Controller on your PC or Mac and connect it to a Dante network, you can use Dante Controller to:

- View all Dante-enabled audio devices and their channels on the network
- View Dante-enabled device clock and network settings
- Route audio on these devices, and view the state of existing audio routes
- Change the labels of audio channels from numbers to names that suit you
- Customize the receive latency (latency before play out)
- Save audio routing presets
- Apply previously saved presets
- Edit presets offline, and apply as configurations for new network deployments
- View and set per device configuration options including:
  - Changing the device name
  - Changing sample rate and clock settings
  - Viewing detailed network information
  - Access the device web page to upgrade firmware and license information (where supported)
  - Identify a device for example by flashing LEDs (where supported)
- View network status information, including:
  - Multicast bandwidth across the network
  - Transmit and receive bandwidth for each device
- View device performance information, including latency statistics and packet errors
- View clock status information for each device, including frequency offset history and clock event logs

**FOR MORE INFORMATION ABOUT DANTE CONTROLLER PLEASE VISIT  
<https://www.audinate.com/resources/technical-documentation>**

# DANTE QUICK START

1. Download and install “Dante Controller” and purchase “Dante Virtual Soundcard,” or Dante PCIe Card.  
Dante Virtual Soundcard -Go to [www.audinate.com/products/software](http://www.audinate.com/products/software)  
Dante PCIe Card -Focusrite Rednet PCIe card recommended
2. Using Cat6 Ethernet cable, connect the B2 Bomber to a gigabit switch. Connect your DAW computer to the same switch with CAT6 cable. For best results, start by removing all other connections to the switch. Dante should be on it’s own network.
3. Start by setting the B2 to Internal Clock, and desired sample rate (we recommend 96k).
4. Open “Dante Virtual Soundcard” (Figure 7)
  - Click START to turn on Dante Virtual Soundcard.

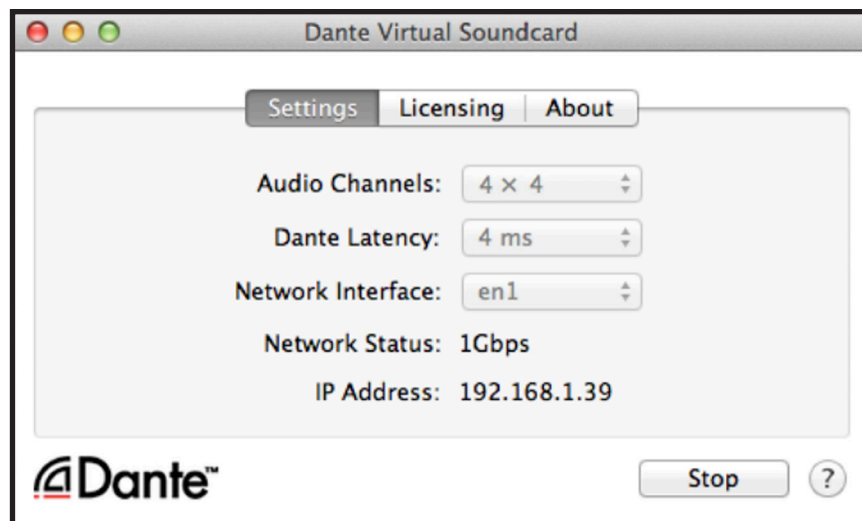


Figure 7

5. Open “Dante Controller”
6. Click on ROUTING tab (Figure 8, page 9)

Click on the corresponding coordinates to enable device, as per Figure 8.

*Note: Transmitters refers to signal coming from ADC to Dante card.  
Receivers refers to Dante card sending signal to DAC.*

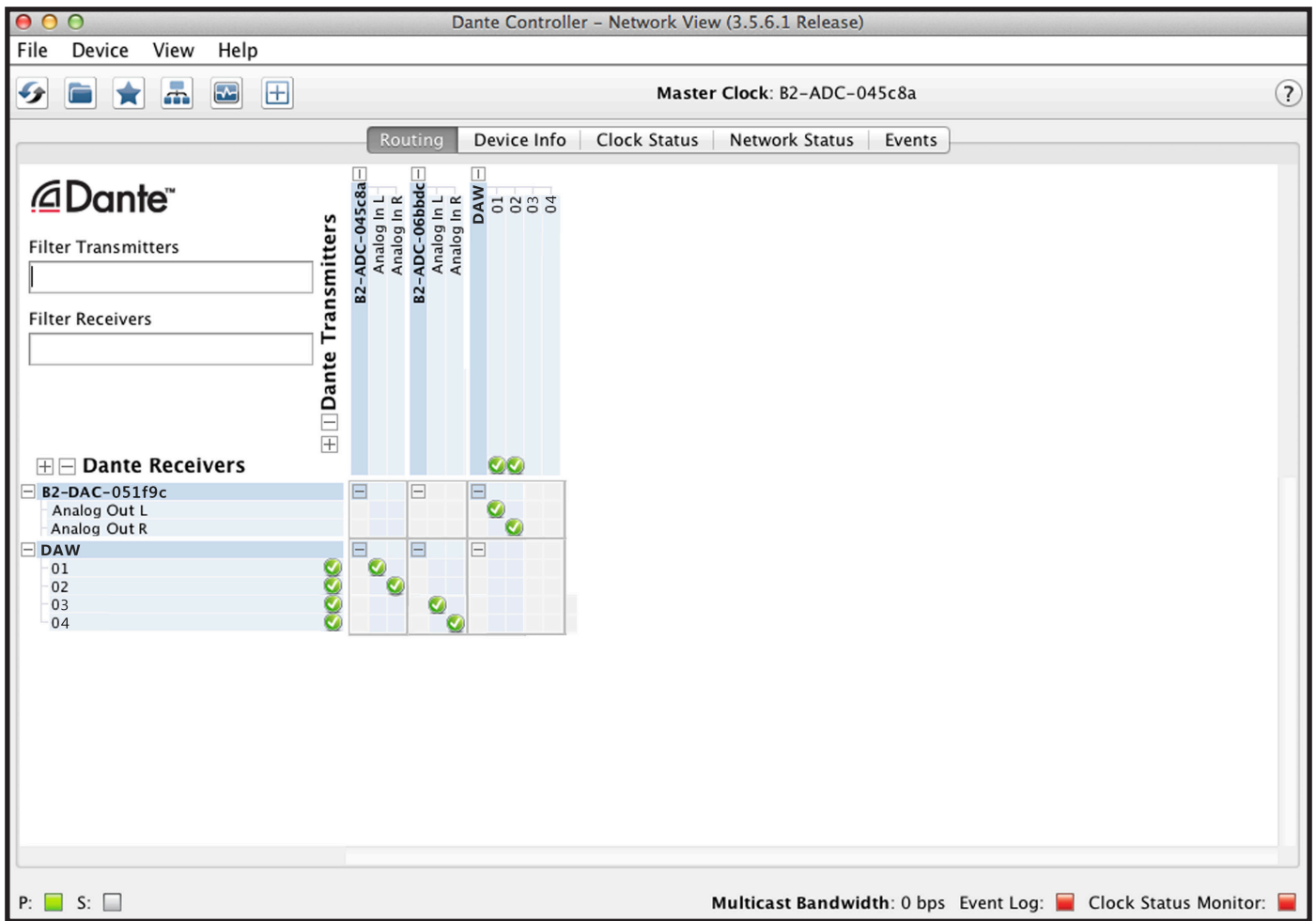


Figure 8: Example with 2 ADCs and 1 DAC

7. Click on DEVICE INFO, double click on B2 Bomber ADC/DAC (Figure 9, below).

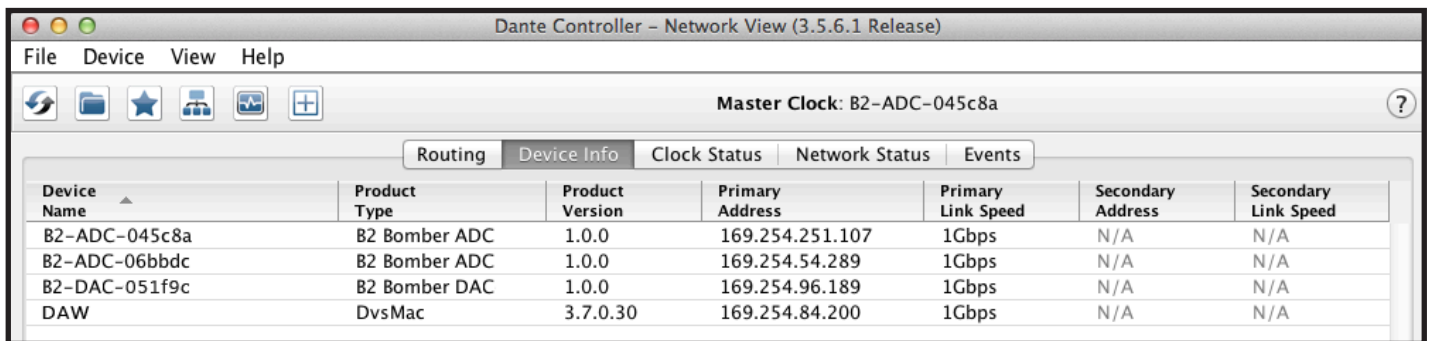
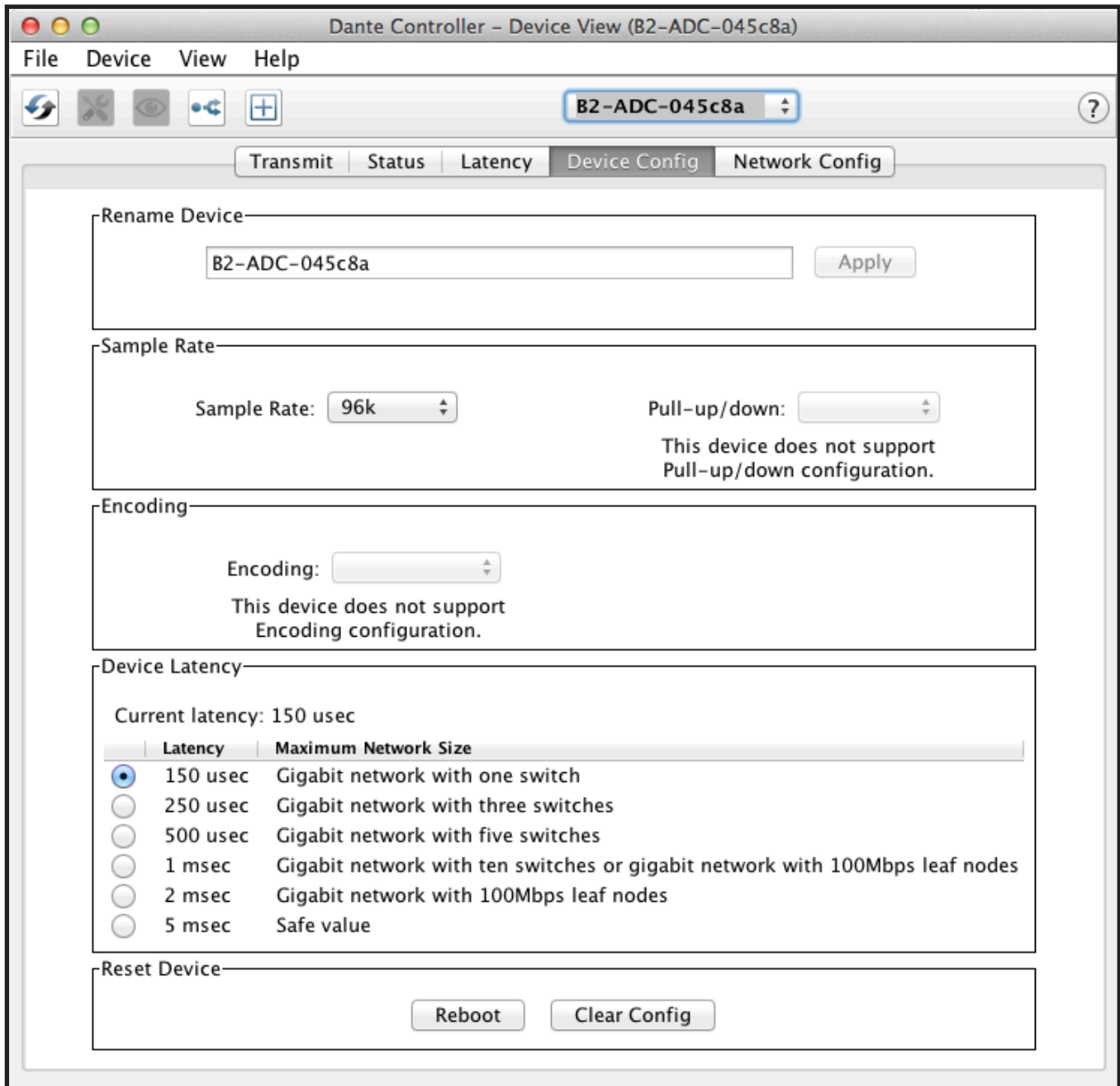


Figure 9: Example shows Device Info, with 2 ADCs and 1 DAC. The number after “B2-ADC” is the network MAC address

- Click on DEVICE CONFIG. then select sample rate and select lowest latency (With the Dante PCIe Card, latency of 150 usec is possible. With the Virtual Sound Card, latency is 4msec). (Figure 10, below).

*Note: you will have to set sample rate for each device!*



**Figure 10:** Example shows Device Config for first ADC.

*Note: With multiple units, sample rate needs to be set for each unit, including the DAW.*

*Note: Actual latency used between two endpoints is the larger of the two endpoint settings. In this case, anything to or from Dante Virtual Soundcard can only go as low as the setting for DVS (4ms being the lowest). Using a PCIe card is recommended to get down to 150µs.*

# DANTE CLOCKING

There are 3 ways to clock the B2 Bomber ADC/DAC with Dante:

1. B2 ADC/DAC set to Internal. Brooklyn II (BKII) card set to External (Recommended)
2. B2 ADC/DAC set to External Clock, BKII card set to External
3. B2 ADC/DAC set to Dante, BKII card set to Internal

SEE FIGURE 12 (NEXT PAGE) FOR B2 INTERNAL CLOCKING DIAGRAM

## CLOCKING B2 BOMBER ADC/DAC TO INTERNAL WORD CLOCK:



1. Set B2 front panel to INT
2. Open Dante Controller, select DEVICE INFO
3. Double Click on device “B2-xxxxxx”
4. Click on CLOCK STATUS. (Fig. 11, below)
5. Set B2 Bomber to “Preferred Master”, and “Enable to sync to External
6. Make sure each device including host DAW is set to correct sample rate in Device Config (as per step 8, page 9)

The screenshot shows the 'Dante Controller - Network View (3.5.6.1 Release)' window. The 'Clock Status' tab is selected, showing a table of devices. The 'Master Clock' is set to 'B2-ADC-045c8a'. The table lists four devices: B2-ADC-045c8a (External, Master), B2-ADC-06bbdc (Dante, Slave), B2-DAC-051f9c (Dante, Slave), and DAW (Dante, Slave). The 'Preferred Master' checkbox is checked for B2-ADC-045c8a, and the 'Enable Sync To External' checkbox is also checked for it.

Device Name	Sync	Mute	Clock Source	Primary Status	Secondary Status	Preferred Master	Enable Sync To External
B2-ADC-045c8a	<input checked="" type="checkbox"/>	<input type="checkbox"/>	External	Master	N/A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B2-ADC-06bbdc	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dante	Slave	N/A	<input type="checkbox"/>	<input type="checkbox"/>
B2-DAC-051f9c	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dante	Slave	N/A	<input type="checkbox"/>	<input type="checkbox"/>
DAW	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dante	Slave	N/A	Slave Only	N/A

Fig. 11: Example shows B2 ADC on Internal clock. Dante card is synced to B2 clock. (Recommended)

NOTE: PREFERRED MASTER REFERS TO DANTE NETWORK, NOT B2 FRONT PANEL!

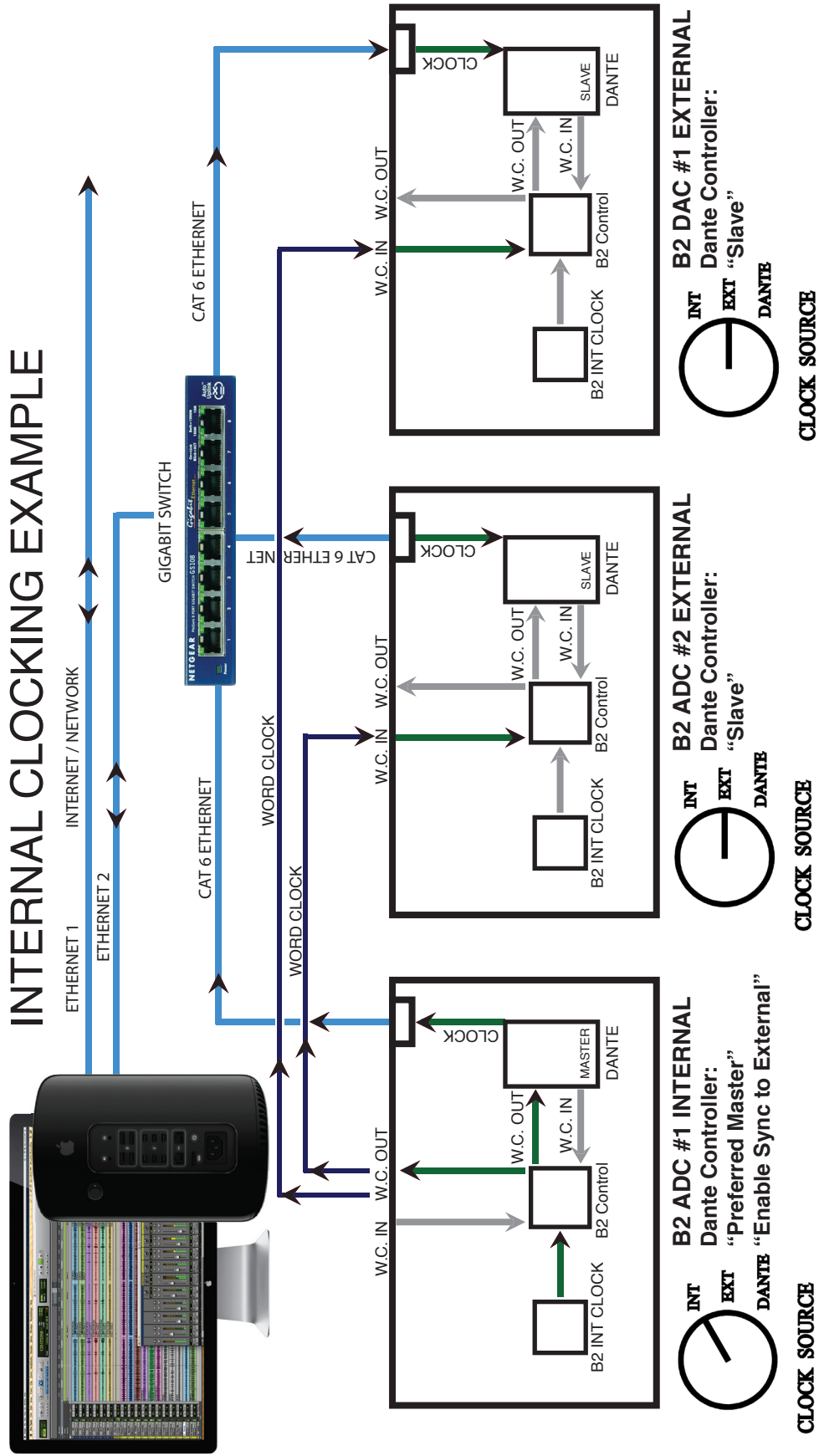
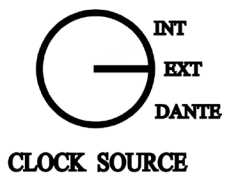


Figure 12

# CLOCKING B2 BOMBER ADC/DAC TO EXTERNAL WORD CLOCK:

SEE FIGURE 14 (NEXT PAGE) FOR B2 EXTERNAL WORD CLOCK CLOCKING DIAGRAM



1. Set B2 to EXT
2. Open Dante Controller, select DEVICE INFO
3. Double Click on device “B2-xxxxxx”
4. Click on CLOCK STATUS. (**Fig. 13, below**)
5. Set B2 Bomber to “Preferred Master”, select “Enable to sync to External”
6. Make sure each device including host DAW is set to correct sample rate in Device Config (as per step 8, page 9)

Device Name	Sync	Mute	Clock Source	Primary Status	Secondary Status	Preferred Master	Enable Sync To External
B2-ADC-045c8a	<input checked="" type="checkbox"/>		External	Master	N/A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B2-ADC-06bbdc	<input checked="" type="checkbox"/>		Dante	Slave	N/A	<input type="checkbox"/>	<input type="checkbox"/>
B2-DAC-051f9c	<input checked="" type="checkbox"/>		Dante	Slave	N/A	<input type="checkbox"/>	<input type="checkbox"/>
DAW	<input checked="" type="checkbox"/>		Dante	Slave	N/A	Slave Only	N/A

Fig. 13: Example shows B2 ADC on External clock. Dante card is also synced to External clock.

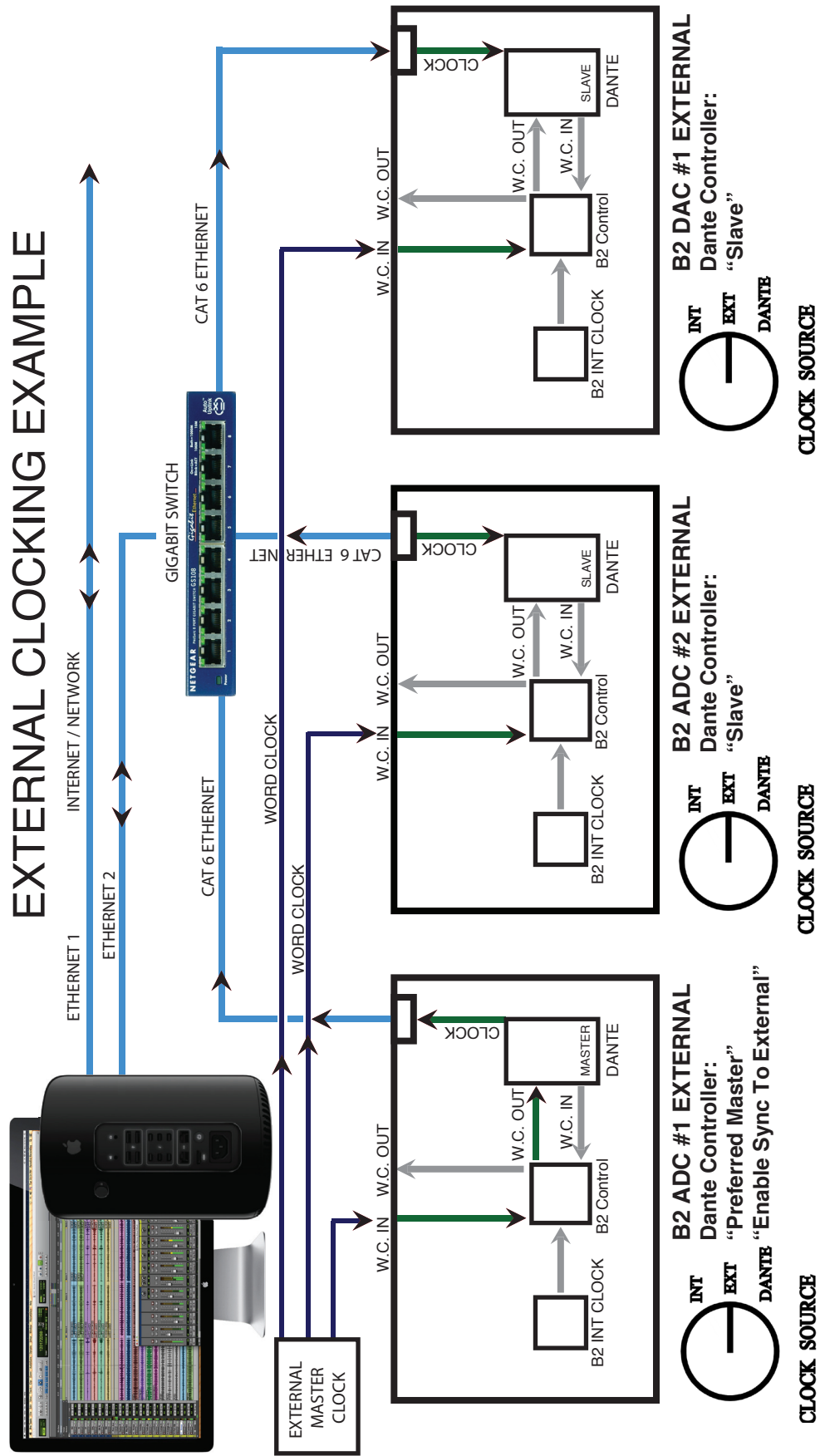
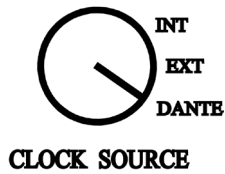


Figure 14

# CLOCKING B2 BOMBER ADC/DAC TO DANTE

SEE FIGURE 16 (NEXT PAGE) FOR B2 DANTE CLOCKING DIAGRAM:



1. Set B2 to DANTE
2. Open Dante Controller, select DEVICE INFO
3. Double Click on device “B2-xxxxxx”
4. Click on CLOCK STATUS.(**Fig. 15, below**)
5. Select B2 Bomber as “Preferred Master”, Deselect “Enable to sync to External”
6. Make sure each device including host DAW is set to correct sample rate in Device Config (as per step 8, page 9)

Dante Controller – Network View (3.5.6.1 Release)

File Device View Help

Master Clock: B2-ADC-045c8a

Routing | Device Info | **Clock Status** | Network Status | Events

Device Name	Sync	Mute	Clock Source	Primary Status	Secondary Status	Preferred Master	Enable Sync To External
B2-ADC-045c8a	<input checked="" type="checkbox"/>		Dante	<b>Master</b>	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B2-ADC-06bbdc	<input checked="" type="checkbox"/>		Dante	Slave	N/A	<input type="checkbox"/>	<input type="checkbox"/>
B2-DAC-051f9c	<input checked="" type="checkbox"/>		Dante	Slave	N/A	<input type="checkbox"/>	<input type="checkbox"/>
DAW	<input checked="" type="checkbox"/>		Dante	Slave	N/A	Slave Only	N/A

Fig. 15: Example shows B2 ADC on Dante clock, Dante card is Master clock.

# ALL DANTE CLOCKING EXAMPLE

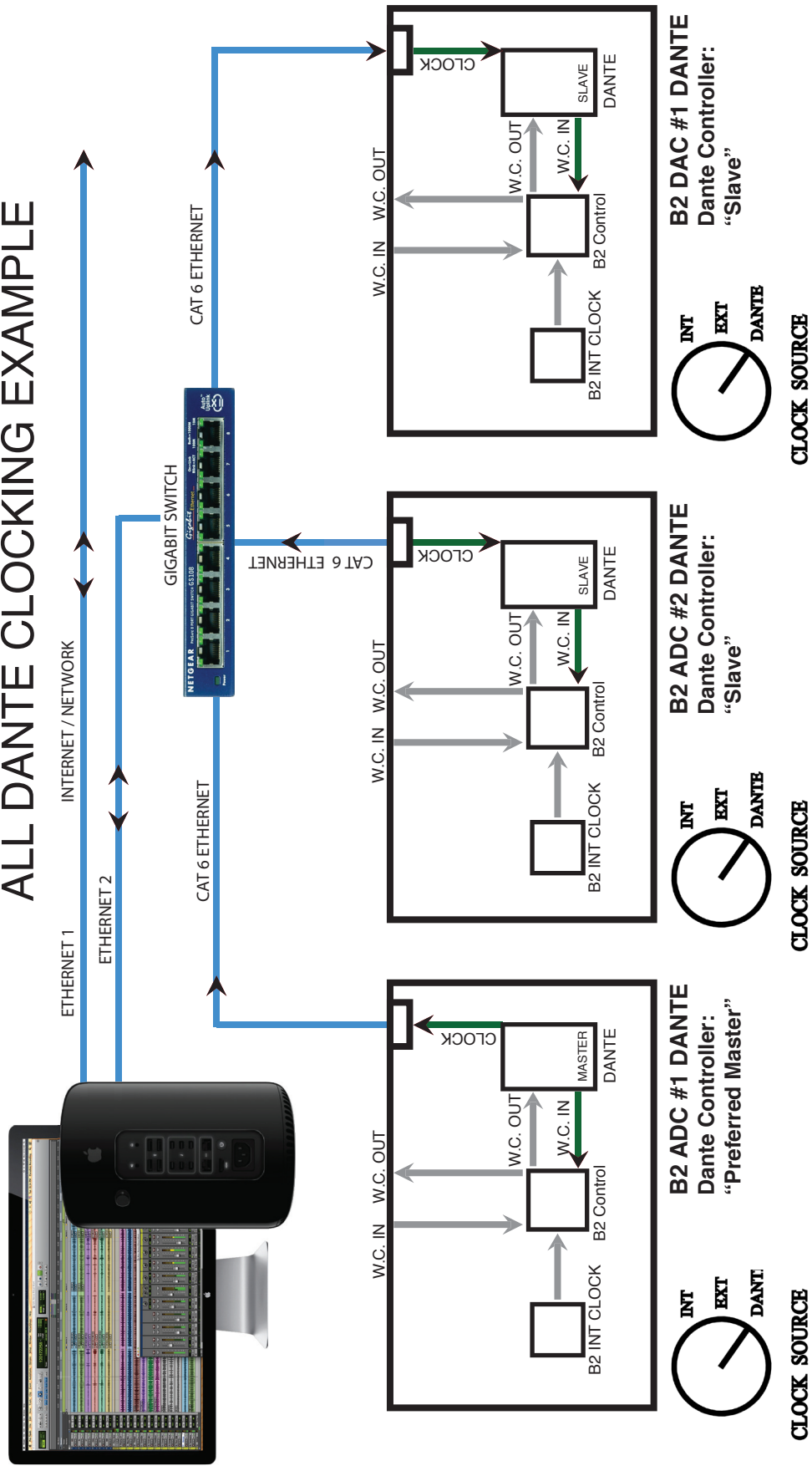


Figure 16