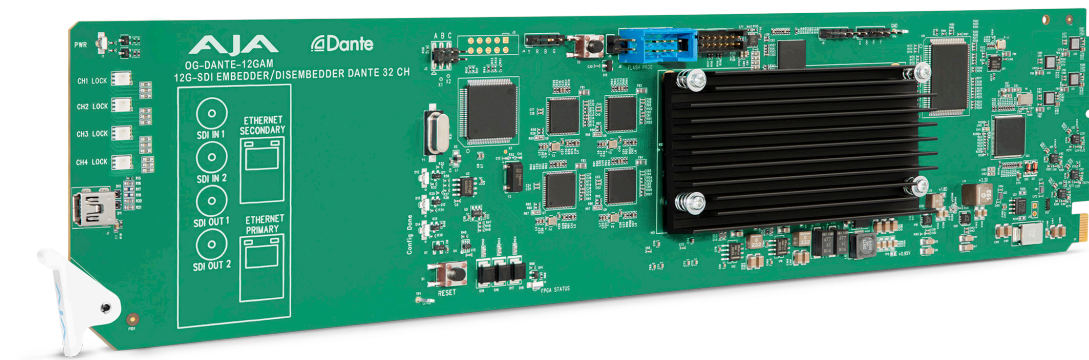# Chapter 1 – Introduction

Card Overview

The OG-DANTE-12GAM is a standalone 12G-SDI openGear converter card that routes and receives SDI embedded audio to and from the Dante audio ecosystem. It is ideal for system integrators who wish to handle broadcast audio over SDI with the ability to transport the audio in and out of an Ethernet environment.

The OG-DANTE-12GAM is a dual 12G-SDI, 16-Channel per SDI port (for a total of 32 channels per card) Dante embedder/disembedder with Dashboard support. Dante allows uncompressed, multi-channel, low latency high-resolution digital audio to be distributed across a switched Ethernet network using standard TCP/IP protocols while meeting the stringent quality requirements of professional audio.

The OG-DANTE-12GAM provides a high density method of bridging audio to and from the Dante domain to source and destination equipment containing SDI I/O with embedded audio. When using a single fully-loaded openGear frame, 10 cards can be utilized to allow 640 channels of audio bridging between SDI and Dante.

Dante audio networking provides digital audio distribution over local networking with low latency, using standard network hardware or by connecting into a standard network infrastructure. This offers many advantages, including audio system scalability, easier installation, and simplified wiring.

The OG-DANTE-12GAM automatically detects and configures to the input video standard. 12G-SDI formats up to 4K/UltraHD 60 are supported (see for a complete listing). The SDI outputs have minimal video latency and support up to 32 channels of embedded audio.

NOTE: *2048x1080p/psf 29.97 and 30 formats support a maximum of 8 channels embedded audio.*

Features

- openGear compatible card (requires 2 slots, rear card included)
- Use with openGear OG-3 and OG-X 2RU frames. DFR-8321 frame is not supported.
- Dashboard is used for SDI configuration and status
- Dante Controller is used to route the audio paths. It is also used for all Dante audio network status and configuration.
- Dante support – allows 12G-SDI audio embedding to and from Dante ecosystem
- Dual SDI Channel Support – allows a total of 32 channels (2x 16-Channels)
- 640 Channels available per openGear frame when fully populated with 10x OG-DANTE-12GAM cards
- 12G, 6G, 3G, HD, and SD-SDI embedder/disembedder
- 2x BNC 12G-SDI input
- 2x BNC 12G-SDI output
- 1x Primary and 1x Secondary Gigabit Ethernet ports for Dante network redundancy
- Setup via DashBoard network control software
- Control via a range of Dante Software
- Hot-swap capable
- Five-year warranty

DashBoard for openGear

DashBoard by Ross Video is used to work with openGear cards and frames. Use DashBoard as part of the configuration process of OG-DANTE-12GAM during setup of the system integration.

Dante Applications

In addition to DashBoard, a number of software applications from Audinate are used to work with the Dante ecosystem.

Dante Controller

Dante Controller is the most important Dante application. Dante Controller shows the OG-DANTE-12GAM openGear card as 32 routable audio sources and 32 routable audio destinations. Use this application to set up the audio routing betweeen Dante devices, control the audio connections in the Dante setup, and move audio in real-time over an ethernet network.

Dante Domain Manager

Use Dante Domain Manager to manage the Dante network. It supports setting up authentication, security, and other similar attributes for management of various network architectures.

Dante Via

Use Dante Via to configure audio devices to appear on the Dante network; for example, making the stereo audio portion of U-TAP appear as two audio source channels on the Dante network.

Appendix A – Specifications

OG-DANTE-12GAM Tech Specs

Video Formats

- (4K) 4096x2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (UltraHD) 3840x2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (2K) 2048x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920x1080i 50, 59.94, 60
- (HD) 1280x720p 50, 59.94, 60
- (SD) 625i 50
- (SD) 525i 59.94
- RGB and YCbCr, 4:4:4/4:2:2, 10-bit

NOTE: Raster and frame rate dependent, please see OG-DANTE-12GAM Video Formats below.

Video Input Digital

- 2-channel independent 12G-SDI BNC connectors, SMPTE 259/292/424/2081/2082
  - Single Link SD/HD/2K/UltraHD/4K

Video Output Digital

- 2-channel independent 12G-SDI BNC connectors, SMPTE 259/292/424/2081/2082
  - Single Link SD/HD/2K/UltraHD/4K

Cable Equalization

(Belden 1694A coax)
- 12 Gbps, 65m
- 6 Gbps, 120m
- 3 Gbps, 180m
- 1.5 Gbps, 200m
- 270 Mbps, 405m

Video Path Delay

Video Out is a delayed, reclocked version of Video In, at the same format and frame rate. Video Out is undefined when no input.
- Video Latency, time measured between video input and video output connector:
  - 12G = 3.2 μsec
  - 6G = 3.2 μsec
  - 3G level B-DL = 6.3 μsec
  - 3G level A = 3.2 μsec
  - HD (1.5 Gb) = 6.3 μsec
  - SD (270 Mb) = 17.2 μsec

Audio Input Digital

- SDI: Two independent 12G-SDI BNC connectors, 16 embedded channels each
- Dante: 1x Primary Ethernet port and 1x Secondary Ethernet port, 32-channels

Audio Output Digital

- SDI: Two independent 12G-SDI BNC connectors, 16 embedded channels each
- Dante: 1x Primary and 1x Secondary Gigabit Ethernet ports, 32-channels

SDI Embedded Audio

- SMPTE 299M (12G/6G/3G/1.5G): 24-bit, 48 kHz synchronous
- SMPTE 272M (SD): 20-bit, 48 kHz synchronous
- Incoming embedded audio can be passed, removed, or overridden
- 4 groups (16-channels) of audio supported per SDI path

NOTE: 2048x1080p/PsF 29.97 and 30 formats support a maximum of 8-channels embedded audio.

Dante Audio

- Sample Rates: 44.1kHz, 48kHz, 88.2kHz, 96kHz
- Encoding: PCM 16, PCM 24, PCM 32

Audio Latency

- Embed Path   1500 μsec
- Disembed Path   1410 μsec

User Interface

- openGear DashBoard network control software via Windows, macOS or Linux
- Dante Controller

Size

- openGear standard form factor, front slot and rear card. Two slots required for each card.

Weight

- 0.5 lb (0.3 kg)

Power

- openGear frame compatible, 15 watts max per card

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

OG-Dante-12GAM Video I/O Formats

4K/UltraHD Inputs Supported

1x 12Gb SDI:

Format	Frame Rate	Colorspace	Sampling	Bit Depth
• 3840x2160p	23.98, 24, 25, 29.97, 30	YCbCr/RGB	4:4:4	10
• 3840x2160p	50, 59.94, 60	YCbCr	4:2:2	10
• 4096x2160p	23.98, 24, 25, 29.97, 30	YCbCr/RGB	4:4:4	10
• 4096x2160p	50, 59.94, 60	YCbCr	4:2:2	10

1x 6Gb SDI:

Format	Frame Rate	Colorspace	Sampling	Bit Depth
• 3840x2160p	23.98, 24, 25, 29.97, 30	YCbCr	4:2:2	10
• 4096x2160p	23.98, 24, 25, 29.97, 30	YCbCr	4:2:2	10

2K/HD Inputs Supported

1x 3Gb SDI:

Format	Frame Rate	Level A/B	Colorspace	Sampling	Bit Depth
• 1280x720p	50, 59.94, 60	A	YCbCr/RGB	4:4:4	10
• 1920x1080i	50, 59.94, 60	A or B-DL	YCbCr/RGB	4:4:4	10
• 1920x1080p	23.98, 24, 25, 29.97, 30	A or B-DL	YCbCr/RGB	4:4:4	10
• 1920x1080p	50, 59.94, 60	A or B-DL	YCbCr	4:2:2	10
• 1920x1080PsF	23.98, 24, 25, 29.97, 30	A or B-DL	YCbCr/RGB	4:4:4	10
• 2048x1080p	23.98, 24, 25, 29.97, 30	A or B-DL	YCbCr/RGB	4:4:4	10
• 2048x1080p	50, 59.94, 60	A or B-DL	YCbCr	4:2:2	10
• 2048x1080PsF	23.98, 24, 25, 29.97, 30	A or B-DL	YCbCr/RGB	4:4:4	10

1x 1.5Gb SDI:

Format	Frame Rate	Colorspace	Sampling	Bit Depth
• 1280x720p	50, 59.94, 60	YCbCr	4:2:2	10
• 1920x1080i	50, 59.94, 60	YCbCr	4:2:2	10
• 1920x1080p	23.98, 24, 25, 29.97, 30	YCbCr	4:2:2	10
• 1920x1080PsF	23.98, 24, 25, 29.97, 30	YCbCr	4:2:2	10

| • 2048x1080p | 23.98, 24, 25, 29.97, 30 | | YCbCr | 4:2:2 | 10 |
| • 2048x1080PsF | 23.98, 24, 25, 29.97, 30 | | YCbCr | 4:2:2 | 10 |

SD Inputs Supported

1x 270Mb SDI:

Format	Frame Rate		Colorspace	Sampling	Bit Depth
• 525i	59.94		YCbCr	4:2:2	10
• 625i	50		YCbCr	4:2:2	10