CDI-CA Auxiliary Digital Input Cards
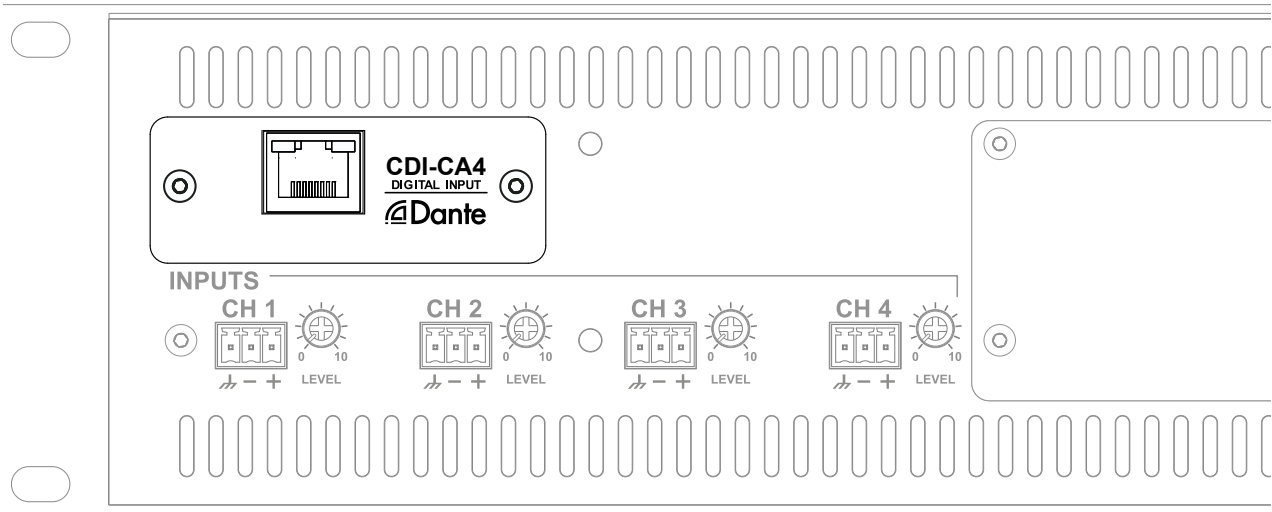
Models CDI-CA2, CDI-CA4, CDI-CA8

Installation and Setup Guide

Contents

INTRODUCTION

The CDI-CA range of optional, retrofittable digital input cards is designed for use with the Cloud CA Series of digital power amplifiers. When fitted, a CDI-CA card allows the host amplifier to be connected to a Dante™ AoIP (Audio over Internet Protocol) network, and to derive some or all of its audio sources from the network instead of from its normal analogue inputs.

Three versions of the digital input card are available: the primary difference is the number of audio channels that the card can simultaneously source from the Dante stream to present to the amplifier as alternative audio inputs:

- CDI-CA2 – two Dante channels
- CDI-CA4 – four Dante channels
- CDI-CA8 – eight Dante channels

The three versions are the same physical size. The CDI-CA2 and CDI-CA4 are almost identical in appearance: they have a single 100 Mb/s Ethernet port and are supplied with a faceplate. The CDI-CA8 has two 1Gb/s Ethernet ports, which can be used either as a gigabit switch or operate as primary and secondary ports in a dual redundant network; a faceplate is not needed for its installation.

The cards are compatible with the following amplifier models:

- CA2500 and CA2250 (two channels)
- CA4250 (four channels)
- CA6160 (six channels)
- CA8125 (eight channels)

The card is designed to fit the amplifier's rear panel expansion bay.

Scope of this Guide

This manual describes the mechanical and electrical installation of the card. It also explains its power requirements, and how to configure the card to suit the amplifier's specific application.

> **NOTE**: A description of Audinate Dante Controller software and instructions for its use are beyond the scope of this Guide. It is assumed that the installer has a working knowledge of Dante Controller.

What's in the box

- CDI-CA digital input card
- Installation Guide (this document)
- Card faceplate (CDI-CA2 and CDI-CA4 only)
- 2qty M3 x 6 panhead screws (spare)

Amplifier/Dante card compatibility

All versions of the CDI-CA digital input card are mechanically and electrically compatible with all amplifiers in the Cloud CA Series. When a channel on the card is enabled, the audio signal derived from the Dante network simply replaces the analogue input for the relevant amplifier channel.

In most sound contracting installations, the most pragmatic option will be to fit the CDI-CA card version with the least number of Dante channels necessary to match the number of amplifier channels. These combinations will be:

- a CDI-CA2 card in a CA2250 or CA2500 amplifier
- a CDI-CA4 card in a CA4250
- a CDI-CA8 card in a CA6160 or CA8125 amplifier

However, if certain routing restrictions are acceptable, a card version with fewer Dante channels than the number of channels in the amplifier may be used; this option is discussed below (see "Card channel count less than amplifier channel count"). The amplifier's standard range of input routing options, available via the rear panel DIP switches, will continue to offer the same degree of flexibility as with the existing analogue inputs.

There may also be circumstances where the additional features of the CDI-CA8 may be of benefit in an amplifier with fewer than eight channels (see "Card channel count greater than amplifier channel count", below).

Card channel count less than amplifier channel count

Fitting a digital input card with fewer Dante channels than the amplifier will simply limit the number of separate audio streams that are available as amplifier inputs. For example, fitting a CDI-CA2 card (two Dante channels) in a CA4250 amplifier (four channels) will make either of the two Dante channels which have been assigned to the card in Dante Controller available as alternative amplifier inputs.

The two Dante channels will replace the analogue inputs for amplifier channels 1 and 2, and by using the rear panel DIP switches, may also be routed to channels 3 and/or 4 in the same manner as the analogue inputs. A typical case would be where the two Dante channels are a stereo pair: the left channel becomes amplifier channel 1's source and the right channel 2's source: the DIP switches can be set to route the stereo pair to channels 3 (left) and 4 (right) as well.

Card channel count greater than amplifier channel count

It should be recognised that if a digital input card with more Dante channels is fitted in an amplifier with fewer channels, the higher-numbered Dante channels will have no audio routing paths available to them within the CA Series amplifier itself. Thus if a CDI-CA4 card is fitted in a CA2500 two-channel amplifier, card channels 3 and 4 will be redundant, as only card channels 1 and 2 will be routable.

A special case is the use of the CDI-CA8 card's dual ports. Fitting a CDI-CA8 card in any CA Series amplifier will permit connection to a dual redundant network. Alternatively, the card may be configured so that it acts as a two port Ethernet switch, which may be useful to aid network distribution.
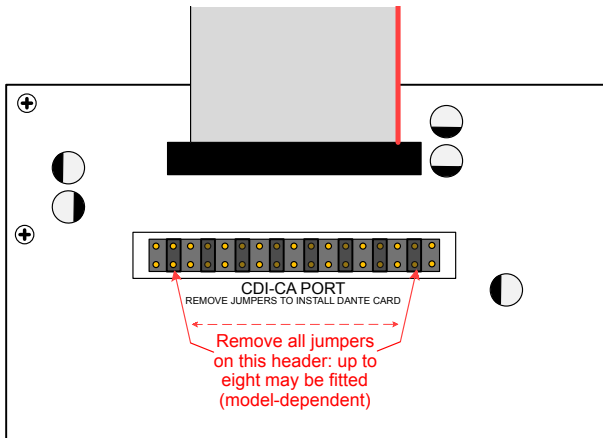
INSTALLATION

IMPORTANT: The instructions which follow throughout this Installation Guide are applicable to all versions of the CDI-CA card, **unless the text explicitly states otherwise.**

Mechanical fitting and internal connection

Fit the CDI-CA card within the CA Series amplifier according to the instructions below:

1. Disconnect the CA amplifier from the AC mains.

2. If the amplifier is installed in an equipment rack, disconnect all audio and control wiring (noting connections), remove the unit from the rack and place on a convenient flat surface.

3. Remove the top cover: there are 9qty panhead self-taping screws on the top panel. Orientate the unit with the rear panel towards you.

4. Remove the two M3 panhead screws securing the expansion port blanking plate, and remove the plate.

5. Locate the 34-way header marked CDI-CA PORT on the internal PCB immediately behind the two empty RJ45 punch-outs in the rear panel. This header carries up to eight jumpers (amplifier model dependent): they should all be removed. It is recommended that they are kept somewhere safe in case the digital input card ever needs to be temporarily removed from the amplifier. The PCB silk-screening indicates the correct positions for their replacement, should the need arise.

CDI-CA PORT
REMOVE JUMPERS TO INSTALL DANTE CARD

Remove all jumpers on this header: up to eight may be fitted (model-dependent)

6. The CDI-CA card has a ribbon cable extending from the rear of the PCB: plug its 34-way connector into the now-empty CDI-CA PORT header.Replace the top cover using the same screws (Step 3).

CDI-CA2 and CDI-CA4 only:

7. Align the card so that the single RJ45 connector projects through the left-hand punch-out (**PRIMARY**).

8. Secure the card in place with the M3 x 6 screws, passing the screws through the supplied faceplate so that the faceplate blanks off the **SECONDARY** punch-out.
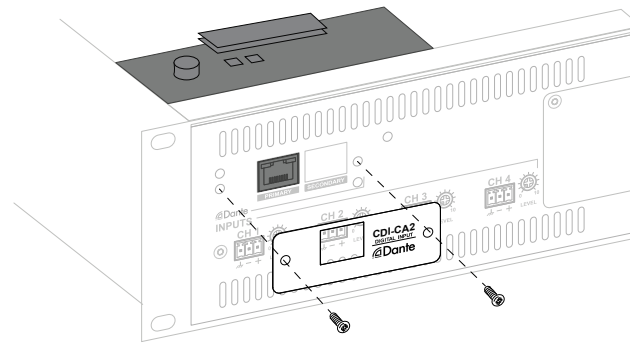
CDI-CA8 only:

9. Align the card so that the two RJ45 connectors project through the punch-outs.

10. Secure the card in place with the M3 x 6 screws. Note the CDI-CA8 does not require a faceplate.
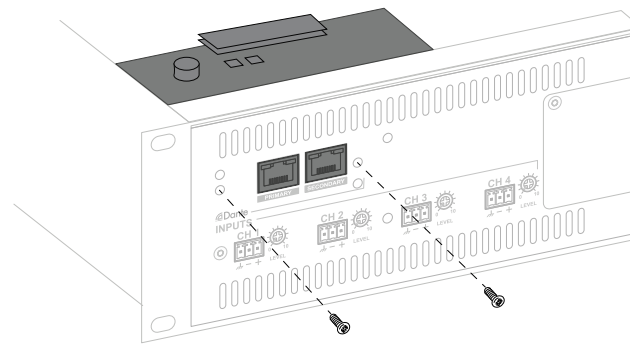
11. Replace the top cover using the same screws (Step 3).

12. Reinstall the amplifier in the rack (if necessary), and reconnect.

Power considerations

CDI-CA cards are powered via PoE (Power over Ethernet); they do not derive their DC power from the host amplifier. This ensures the current available to the amplifier channels is uncompromised.

In most installations, the card's network port (either port in the case of the CDI-CA8) will be connected to a network switch, thus installers should ensure that this switch is PoE-capable and that PoE is enabled for the port in use (if per-port power activation is an option). For all versions, the card's power consumption is less than the 3.84 W rating applicable to Class 1 PoE, so Class 1-rated ports should cause no issues.

If a PoE network switch is unavailable, a Class 1 PoE injector may be employed. These are readily available from trade suppliers at low cost and will generally be supplied with a separate AC adaptor. The injector should be rated for 100Mb/s use in the case of the CDI-CA2 and CDI-CA4, and for 1000Mb/s in the case of the CDI-CA8.
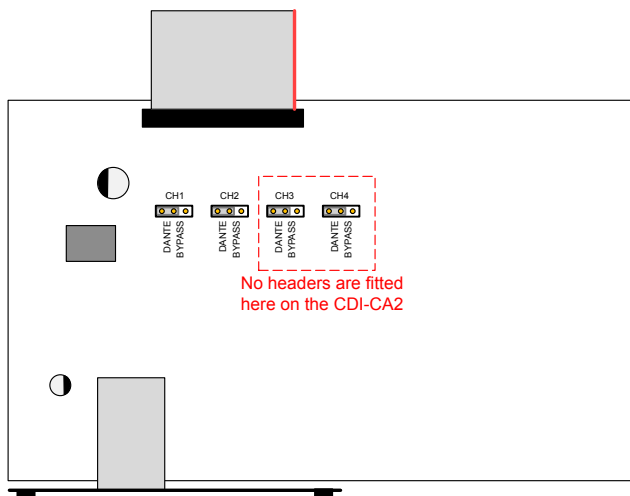
Connect the injector between the network switch and the CDI-CA card as shown:
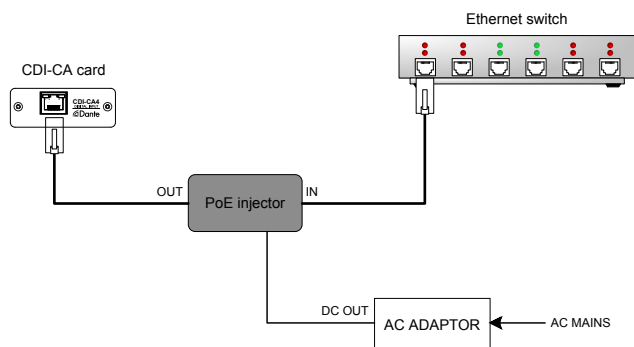
Audio configuration

CDI-CA2 and CDI-CA4 only

The method of selecting the digital input card as the audio source for each amplifier channel is the same for both CDI-CA2 and CDI-CA4 cards. (The CDI-CA2 is a partly–populated version of the CDI-CA4).

The cards have a 3-pin header per channel: two on the CDI-CA2 and four on the CDI-CA4. The position of the jumper on each header determines whether the relevant amplifier channel receives its audio source from the digital input card (**DANTE** position), or from the channel's analogue input (**BYPASS** position). Cards are shipped with the jumpers for all channels in the **DANTE** position: if one or more analogue inputs are to be used, move the jumpers for the relevant channels to **BYPASS**.

Whichever position the jumper is in, the amplifier's rear panel **INPUT ROUTING** DIP switches continue to operate in the normal manner. Thus it possible to route a Dante audio channel to multiple amplifier channels by using the DIP switches to "parallel" inputs. Please see the CA Series Installation and User Guide (pp13/14) for full details.

CDI-CA8 only

The CDI-CA8 card has no on-board jumpers. Each of the eight individual Dante channels on the card may be selected as the audio source for the corresponding amplifier channel from Dante Controller. Details are given in the following section (see "CDI-CA8 operating modes").

Note that when the Dante card is in use, the amplifier's rear panel **INPUT ROUTING** DIP switches continue to operate in the normal manner Thus it possible to route a Dante audio channel to multiple amplifier channels by using the DIP switches to "parallel" inputs. Please see the CA Series Installation and User Guide (pp13/14) for full details.

Connecting to the Dante network

Observing the power requirements explained in the "power considerations" section (see page 4), connect the CDI-CA card to the Dante network with standard Ethernet cables. Cat 5e cable is recommended for use with the CDI-CA8 card due to the higher data rate the card can handle.

The two LEDs integral with the RJ45 socket(s) indicate network activity. On all card versions, the green **LINK** LEDs indicate network activity and will normally blink occasionally. On the single port on the CDI-CA2 and CDI-CA4 the orange 100M LED will illuminate when a 100Mb/s data rate is detected on the network: on the CDI-CA8 the orange 1G LEDs indicate a 1000Mb/s data rate.

Use Dante Controller to identify the CDI-CA card as a receiver on the network. The application will display the name indicated on the barcoded ID sticker affixed to the outside of the shipping carton; a duplicate sticker can be found on the top of the PCB (CDI-CA2 and CDI-CA4) or on the underside of the PCB (CDI-CA8). The name will typically be in the format e.g., "CDI-CA4-932cda". (Note that the characters following the second hyphen are always the last six characters of the card's MAC address.) The card can be renamed from the `Device Info` tab; select the card, then the `Device Config` tab.

Dante subscriptions to the card should be defined in the normal manner.

CDI-CA8 operating modes

Audio routing from the digital input card to the amplifier channels is essentially automatic, and if the rear panel **INPUT ROUTING** DIP switches are all in their OFF position (switch up), Channel n of the Dante card will be routed to Channel n of the amplifier. This means that when installed in a CA8125 amplifier, Outputs 1 to 8 of the CDI-CA8 card will become the sources for amplifier channels 1 to 8 respectively. As described above, the **INPUT ROUTING** switches remain fully operative, and may be set to parallel the inputs, if wished.

Redundant operation:

The CDI-CA8 card can provide fail-safe operation when Dante Redundant Mode has been enabled (via Dante Controller). Two identical and separate Dante networks (primary and secondary) will need to be in place; the secondary network should be connected to the CDI-CA8's **SECONDARY** port. With Dante Redundant Mode enabled, if the primary network fails, the card will automatically switch to the secondary network. This will be carrying identical data, thus all previously defined audio paths will be retained.

The CDI-CA8 card can also provide "analogue fall-back" action under certain conditions: these are dependent on the selection of the operating mode, 'A' (the default) and 'B'. Mode B provides an extra safeguard in addition to that provided by dual network operation. To make use of this facility, a separate analogue emergency feed should be provided, and connected to the channel's analogue input.

The two modes are selected by jumper J1, at the top left-hand corner of the card (see below):

CDI-CA8 card
(only primary components shown)
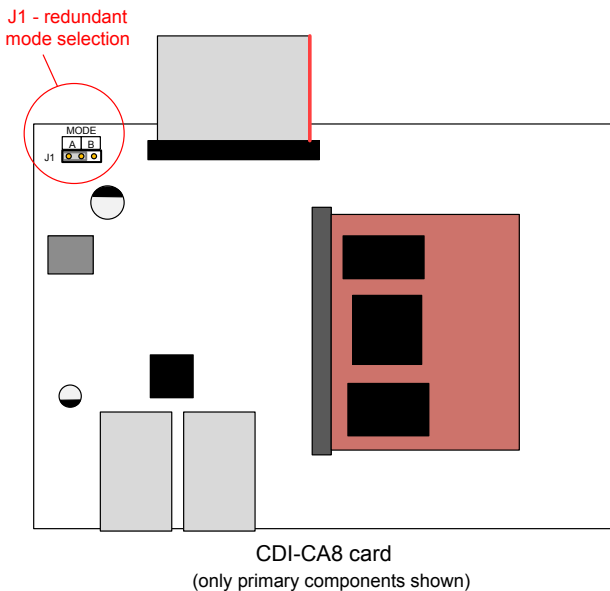
Mode A:

When the default Mode A is selected, the definition of a valid Dante subscription for a card channel (made in Dante Controller) will automatically enable the audio routing for that channel from the card to the corresponding amplifier input. Primary mode failure will force the secondary network to be selected, provided Dante Redundant Mode has been enabled.

If the channel's defined subscription is deleted, the amplifier channel will select its analogue input as a "fall-back" action.

Mode B:

If Mode B is selected, the definition of a valid Dante subscription for a card channel (made in Dante Controller) will automatically enable the audio routing for that channel from the card to the corresponding amplifier input, as with Mode A.

If the primary network fails and Dante Redundant Mode has been enabled, the card will perform a switchover to the **SECONDARY** port. In the event of loss of just the channel's Dante subscription (as opposed to the loss of the entire network), analogue fall-back will be triggered, and the amplifier channel will switch to its analogue input. This is because Dante Redundant Mode only takes effect in the event of complete network failure.

If Dante Redundant Mode has not been enabled, and the channel's subscription becomes invalid in some way, the card will also perform analogue fall-back.

TECHNICAL SPECIFICATIONS

		CDI-CA2	CDI-CA4	CDI-CA8
Dante channels		2	4	8
Simultaneous receive flows		1 or 2		Up to 8
Sample rates		Dante: 48/44.1/88.2/96 kHz AES67: 48 kHz		
Encoding		16/24/32-bit PCM (default 24-bit PCM)		
Data rates		100 Mb/s		1 Gb/s
Connectors		1 x RJ45		2 x RJ45
Secondary port modes		(not applicable)		Switched (default); Redundant
LEDs		Network speed, Link status		
Power consumption		0.8 W	0.9 W	2.4 W
Software compatibility	Configuration and Routing	Audinate Dante Controller		
	Security and Domain management	Audinate DDM		

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