Installation Guide for End Users

Hardware and Software



DELTACAST

1 Document change log

Issue	Date	Relevant Information
1.0	2007-04-11	Document creation
2.0	2007-07-11	Support for DELTA-hd-key Linux installation added
3.0	2008-03-14	Integration of DELTA-sdi family
4.0	2008-06-17	Integration of DELTA-hd-e and DELTA-hd-e-key
4.1	2008-11-03	PCIe bus requirements added PCI DELTA-hd and DELTA-hd-key support removed
4.2	2008-12-16	Linux dynamic memory allocation method added
4.3	2009-01-05	Integration of DELTA-sdi-elp family FCC compliance statement added
4.4	2009-02-24	Automatic firmware upgrade on DELTA-hd-e and DELTA-hd-e-key
4.5	2009-04-06	ROHS declarations of conformity added
4.6	2009-04-29	Integration of DELTA-dvi-e
4.7	2009-05-06	Warm Firmware update of DELTA-hd-e and DELTA-dvi-e
4.8	2009-05-25	DELTA-dvi-e conformance statements added ROHS declarations of conformity removed (located in separate documents)
5.0	2009-10-07	Integration of DELTA-codec family
5.1	2010-01-07	A couple of enhancements and clarifications
5.2	2010-03-09	Dual-link DVI integration Cabling recommendations added
5.3	2010-06-24	DELTA-hd-e 40 integration Unified Windows installation procedure New Linux drivers loading procedure using udev
5.4	2010-08-19	DELTA-hd-e 40 FCC compliance added
5.5	2010-09-15	DELTA-3G support added
5.6	2011-03-09	DELTA-3G-e-key 22 support added Windows installation process clarification Linux installation process modification
5.7	2011-06-16	DELTA-hd-e 04 support added Windows installation process clarification Linux installation process clarification
5.8	2011-08-31	DELTA-hd-elp support added RoHS and DoC Notices updated

5.9	2012-03-05	DELTA-hd-elp-d 80 and DELTA-3G-elp-d 40 support added
5.10	2012-06-13	DELTA-hd20-asi01-e support added
5.11	2012-10-31	DELTA-hd-elp-d and DELTA-3G-elp-d support added
5.12	2012-12-10	DELTA-sd-elp-d 80, DELTA-hd-elp-d 62 and DELTA-3G-elp 40 support added
5.13	2013-04-19	DELTA-3G-elp 10,01,11,20,02 and DELTA-3g-elp 2c support added
5.13	2013-05-24	Mac OSX Lion and Mountain Lion support added
5.13	2013-06-17	DELTA-h4k support added
5.14	2013-09-02	DELTA-hd20-asi02-e support added
5.15	2014-02-06	DELTA-sdi, DELTA-hd-e 40 and 04 has been deprecated DELTA-3G-elp-key 11 support added
5.16	2014-05-19	DELTA-sfp-elp and DELTA-asi support added
5.17	2014-12-16	DELTA-hd-e 40,04 and DELTA-hd-elp 40,20,10 has been deprecated
5.18	2015-06-15	DELTA-3G-elp-d 4c and DELTA-3G-elp-d 8c added
5.19	2016-01-14	Windows 7 and Server 2008 R2 SHA-256 support
5.20	2016-01-20	Update Microsoft Security Advisory 3033929 Logo Change Update Linux driver installation
5.20	2016-04-06	Companion Card family overview added
5.21	2016-05-24	DELTA-ip family overview added EOL DELTA-3G-e 22 and DELTA-3G-e-key 22
6.00	2016-10-04	Windows 10 support TICO support added New VideoMasterHD_SP library
6.01	2016-12-06	3G family picture changed VideoMasterHD becomes VideoMaster DELTA-h4k2 support added Creation of a new chapter “DELTA-dv family”
6.02	2017-04-17	Remove XP and 32 bits drivers support Remove old ASI cards support Add new ASI cads support Add recommendation for DELTA-h4k2-elp 20
6.04	2017-10-09	Add support of DELTA-3G-elp-2key-d 22 & 44
6.05	2018-01-03	Add support for DELTA-3G-elp-d 80, 84, 8b configurations Removed SFP cards support
6.06	2018-03-22	Refactoring of the existing documentation Add support for FLEX solution
6.07	2018-06-21	Add support for DELTA-12G-elp-h 1c
6.08	2018-07-05	Add support for FLEX-hmi

6.09	2018-07-23	Add support for FLEX-3G 04 Add support for DELTA-gwy 316-4
6.10	2018-11-07	Add support for DELTA-12G-elp-h 2c
6.11	2019-01-21	Add support for DELTA-3G4c-ASI4c-elp-d
6.12	2019-05-03	Add support for DELTA-12G-elp-h 20 Add support for DELTA-ip-ST2110
6.13	2019-07-23	Add support for FLEX-12G 01/10 Add support for DELTA-12G-elp-h 40,04,22 Add support for FLEX-dp 01
6.14	2019-12-12	Add support for DELTA-12G1c-hmi10-elp and FLEX-hmi 01 Remove support for DELTA-hd-e, DELTA-hd-e-key and dvi cards
6.15	2020-03-19	Add support for DELTA-12G-elp-h 4c Add support for DELTA-12G2c-asi8c-elp-h Remove support for DELTA-12g-elp-h 22
6.16	2020-10-30	Add support for DELTA-12G-e-h 2i1c New DELTACAST.TV installation process
6.17	2021-05-10	Led documentation
6.18	2021-09-09	Minor corrections
6.19	2021-10-29	Merge of DELTA-12G-elp-h 20 and DELTA-12G-elp-h 40 firmware Update MacOS installation procedure
6.20	2022-06-07	Remove support for DELTA-h4k-elp 20 Remove support for DELTA-3G-elp-tico-d 4c Remove support for DELTA-sd-elp-d 80 Remove support for DELTA-hd-elp-d 80/44/62 Remove support for DELTA-3g4c-asi4c-elp-d
6.21	2023-06-12	Add support for DELTA-12G-elp-key 11 Remove support for DELTA-asi* cards Remove support for DELTA-3G40-hd40-elp-d Restore support for DELTA-h4k-elp 20
6.21.01	2023-07-06	Add new firmware for DELTA-h4k2-elp 20 with async FLASH
6.22	2023-10-06	Add support for DELTA-12G-elp 4c Add description of FWUpdater viewer when run through service
6.22.01	2023-11-09	Correction for DELTA-12G-elp 4c description
6.24	2024-02-12	Add support for DELTA-12G2c-hmi10-elp
6.25	2024-03-19	Add description of new installers and installation methods Remove 32b support entirely Remove Linux deprecated memory allocations
6.25.1	2024-04-17	Update description of installation and uninstallation on MacOS Restore copy of DLLs to System32
6.26	2024-08-23	Add support for DELTA-12G-e-h 4i2c

		DELTA-12G2c-hmi10-elp LED documentation FLEX configuration options
6.27	2024-12-13	Add support for DELTA-12G11-hmi11-e-key
6.28	2025-01-21	Add support for DELTA-12G-elp 2c
6.29	2025-03-13	Add support for DELTA-12G-e-h 4o2c
6.30	2025-04-02	Add support for DELTA-hmi-e 40
6.30.1	2025-05-13	Fix LED information for DELTA-12G11-hmi11-e-key
6.32	2025-09-19	Add support for DELTA-12G-e-h 8c
6.32.1	2025-09-26	Add missing LEDs documentation for DELTA-12G-e-h 8c
6.33.0	2025-11-07	Fix LED documentation for DELTA-hmi-e 40
6.33.1	2025-12-04	Update supported OS and platforms information
6.33.3	2026-01-23	Add support for DELTA-3G40-hd40-elp-d Add support for DELTA-3G-elp 22 and DELTA-3G-elp 04 Add support for A-TIC companion card Add note for DELTA-12G-e-h 8c and GPU on NVIDIA platforms
6.34	2026-02-20	Add note for fast startup on Windows Add support for DELTA-LTC-1
6.35	2026-05-04	Update info for Linux latest validated versions Fix LED documentation for some missing description and wrong ordering Update FWUpdater documentation to accommodate for latest FWUpdater changes
6.36.0	2026-06-05	Add support for DELTA-ip25-44-elp Add note on docker containers Remove support for DELTA-ip-st2022 cards
6.37.0	2026-09-08	Add support for DELTA-IP25-44-SDI-4c-elp and DELTA-IP25-44-SDI-4c-e
6.38.0	2026-11-06	Add support for DELTA-hmi-elp 20

2 Contents

1 Document change log 1
2 Contents 5
3 ABOUT THIS GUIDE 7
3.1 Document objectives 7
3.2 Who should read this guide? 7
3.3 Related documentation 7
3.4 Document conventions 8
3.4.1 Notes 8
3.4.2 Cautions 8
3.4.3 Warnings 8
4 PRODUCT OVERVIEW 9
4.1 PCIe Cards 9
4.1.1 Supported Operating Systems 9
4.1.2 SDI cards overview 10
4.1.3 DV cards overview 14
4.1.4 Mixed Interfaces cards overview 16
4.1.5 IP cards overview 17
4.1.6 Companion Cards overview 19
4.1.7 Timecode Cards overview 20
4.1.8 Specific cables 20
4.2 FLEX Solution 21
4.2.1 How does it work? 21
4.2.2 Supported Operating Systems 21
4.2.3 DELTA-gwy family 22
4.2.4 FLEX modules 23
4.2.5 Specific cables 26
5 INSTALLATION 27
5.1 Hardware installation 27
5.1.1 PCIe Cards 28
5.1.2 FLEX Solution 30

5.1.3 Cabling recommendations 33
5.2 Software installation 34
5.2.1 Important note 35
5.2.2 Windows software installation 36
5.2.3 Linux software installation 45
5.2.4 Mac OS installation 50
6 CONFIGURATION 61
6.1 Available configurations depending on the hardware 61
6.1.1 SDI cards configurations 61
6.1.2 IP cards configurations 62
6.1.3 FLEX configurations 62
6.2 Retrieving the card ID and the configuration ID 63
6.3 Applying a new configuration 64
7 PRODUCTS, DRIVERS and FIRMWARES 65
8 TROUBLESHOOTING 67
8.1 General 67
8.1.1 Windows 67
8.1.2 Mac OS 67
8.2 PCIe Cards 68
8.2.1 General 68
8.2.2 Windows 68
8.2.3 Docker containers 68
8.2.4 LED 69
8.3 FLEX Solution 78
8.3.1 DELTA-gwy 78
8.3.2 FLEX modules 78
8.3.3 LED 78
9 ANNEX A: CONFORMANCE 81
9.1 FCC Notice 81
9.2 ICES-003 Class A Notice - Avis NMB-003, Classe A 82
9.3 DoC Notices 83

3 ABOUT THIS GUIDE

This guide covers the DELTACAST cards hardware installation, and provides setup instructions of the VideoMaster redistributable package, under Windows and Mac OS.

You can always access the latest DELTACAST documentation on the Internet at https://www.deltacast.tv/.

3.1 Document objectives

This publication describes specific procedures for preparing your equipment for the initial installation of DELTACAST products from the two existing solutions:

Solutions	Families or product types
PCIe Cards	SDI cards DV cards Mixed Interfaces cards ASI cards IP cards
FLEX Solution	DELTA-gwy FLEX DV products FLEX SDI products

The document also deals with the installation of the **VideoMaster** software.

3.2 Who should read this guide?

To use this publication, you should be familiar with electronic circuitry and software installation practices and preferably have experience as an electronic or computer science technician.

3.3 Related documentation

Please refer to the **VideoMaster SDK** documentation – VideoMaster.chm or VideoMaster.pdf – for more information on the concepts used by **VideoMaster** and the functions implemented. Please contact DELTACAST if you do not own these documents.

3.4 Document conventions

3.4.1 Notes

Notes use the following conventions:

	*<u>Note:</u> Means reader take note. Notes contain helpful suggestions or references to material not covered in the publication.*

3.4.2 Cautions

Cautions use the following conventions:

	*<u>Caution:</u> Means reader must be careful. In this situation, you might do something that could result in equipment damage or loss of data.*

3.4.3 Warnings

Warnings use the following conventions:

	*<u>Warning:</u> This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and familiar with standard practices for preventing accidents.*

4 PRODUCT OVERVIEW

4.1 PCIe Cards

4.1.1 Supported Operating Systems

PCIe cards are supported on the following operating systems:

- Windows
- Linux
- Mac OS

4.1.2 SDI cards overview

4.1.2.1 DELTA-12G cards

The **DELTA-12G** is a very high-performance and low-cost 12G, 6G, 3G, HD and SD SDI ingest and playout solution for PCI Express (PCIe) bus computers.

This device meets all the specifications for ST 2082-10, 2081-10, 424, 292 and ST 259 equipment with extensive features to help the real-time processing of 12G, 6G, 3G, HD and SD SDI streams on the host computer. The DELTA-12G is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of SDI processing services and an easy-to-use programming interface for controlling the card.



The family of products is composed of:

Product Name	PCIe Bus	Fixed inputs	Fixed outputs	Bi-dir
DELTA-12G-elp-h 1c	PCI Express 3.0 x8	0	0	1 x 12G 3 x 3G
DELTA-12G-elp-h 2c *	PCI Express 3.0 x8	0	0	2 x 12G 6 x 3G
DELTA-12G-elp-h 20 *	PCI Express 3.0 x8	2 x 12G 6 x 3G	0	0
DELTA-12G-elp-h 40 *	PCI Express 3.0 x8	4 x 12G 4 x 3G	0	0
DELTA-12G-elp-h 04 *	PCI Express 3.0 x8	0	4 x 12G 4 x 3G	0
DELTA-12G-elp-h 4c*	PCI Express 3.0 x8	0	0	4 x 12G 4 x 3G
DELTA-12G-e-h 4i2c	PCI Express 3.0 x8	4 x 12G 4 x 3G	0	2 x 12G 2 x 3G
DELTA-12G-e-h 4o2c	PCI Express 3.0 x8	0	4 x 12G 4 x 3G	2 x 12G 2 x 3G
DELTA-12G-elp-key 11 (-nr)	PCI Express 3.0 x4	1 x 12G	1 x 12G	0
DELTA-12G-elp 4c	PCI Express 3.0 x8	0	0	4 x 12G
DELTA-12G-elp 2c	PCI Express 3.0 x8	0	0	2 x 12G
DELTA-12G-e-h 8c	PCI Express 4.0 x8	0	0	8 x 12G

(*) card configuration can be changed using “FWUpdater” tool. See “CONFIGURATION” chapter for more detailed information

4.1.2.2 DELTA-3G cards

DELTA-3G is a very high-performance and low-cost 3G, HD and SD SDI ingest and playout solution for PCI Express (PCIe) bus computers.

This device meets all the specifications for ST 424, 292 and ST 259 equipment with extensive features to help the real-time processing of 3G, HD and SD SDI streams on the host computer. The DELTA-3G is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of SDI processing services and an easy-to-use programming interface for controlling the card.



The family of products is composed of:

Product Name	PCIe Bus	Fixed inputs	Fixed outputs	Bi-dir
DELTA-3G-elp-d 8c *	PCI Express 2.0 x8	0	0	8 x 3G
DELTA-3G-elp-d 8b *	PCI Express 2.0 x8	0	0	8 x 3G
DELTA-3G-elp-d 80 *	PCI Express 2.0 x8	8 x 3G	0	0
DELTA-3G-elp-d 84 *	PCI Express 2.0 x8	4 x 3G	0	4 x 3G
DELTA-3G-elp-d 4c	PCI Express 2.0 x8	0	0	4 x 3G
DELTA-3G-elp 01	PCI Express 2.0 x4	0	1 x 3G	0
DELTA-3G-elp 02	PCI Express 2.0 x4	0	2 x 3G	0
DELTA-3G-elp 10	PCI Express 2.0 x4	1 x 3G	0	0
DELTA-3G-elp 11	PCI Express 2.0 x4	1 x 3G	1 x 3G	0
DELTA-3G-elp 20	PCI Express 2.0 x4	2 x 3G	0	0
DELTA-3G-elp 22	PCI Express 2.0 x4	2 x 3G	2 x 3G	0
DELTA-3G-elp 40	PCI Express 2.0 x4	4 x 3G	0	0
DELTA-3G-elp 04	PCI Express 2.0 x4	0	4 x 3G	0
DELTA-3G-elp-d 01	PCI Express 2.0 x4	0	1 x 3G	0
DELTA-3G-elp-d 02	PCI Express 2.0 x4	0	2 x 3G	0
DELTA-3G-elp-d 04	PCI Express 2.0 x4	0	4 x 3G	0

DELTA-3G-elp-d 10	PCI Express 2.0 x4	1 x 3G	0	0
DELTA-3G-elp-d 11	PCI Express 2.0 x4	1 x 3G	1 x 3G	0
DELTA-3G-elp-d 12	PCI Express 2.0 x4	1 x 3G	2 x 3G	0
DELTA-3G-elp-d 20	PCI Express 2.0 x4	2 x 3G	0	0
DELTA-3G-elp-d 21	PCI Express 2.0 x4	2 x 3G	1 x 3G	0
DELTA-3G-elp-d 22	PCI Express 2.0 x4	2 x 3G	2 x 3G	0
DELTA-3G-elp-d 40	PCI Express 2.0 x4	4 x 3G	0	0
DELTA-3G40-hd40-elp-d	PCI Express 2.0 x4	4 x 3G 4 x HD	0	0

(*) card configuration can be changed using “FWUpdater” tool. See “CONFIGURATION” chapter for more detailed information

Some cards also host HDMI monitoring outputs.

4.1.2.3 DELTA-key cards

The **DELTA-key** is a very high-performance and low-cost 3G, HD and SD hardware linear keyers and SDI ingest and playout solutions for PCI Express (PCIe) bus computers.

These devices host extensive features to help the real-time processing of 3G, HD and SD SDI streams on the host computer. The DELTA-key is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of SDI processing services and an easy-to-use programming interface for controlling the card.



The family of products is composed of:

Product Name	PCIe Bus	Fixed inputs	Fixed outputs	Bi-dir	Keyers
DELTA-3G-elp-key 11	PCI Express 2.0 x4	1 x 3G	1 x 3G	0	1
DELTA-3G-elp-key-d 2K	PCI Express 2.0 x8	2 x 3G	2 x 3G	0	2
DELTA-3G-elp-key-d 4K	PCI Express 2.0 x8	4 x 3G	4 x 3G	0	4
DELTA-3G-elp-2key-d 22	PCI Express 2.0 x8	2 x 3G	2 x 3G	0	2
DELTA-3G-elp-2key-d 44	PCI Express 2.0 x8	4 x 3G	4 x 3G	0	2

4.1.3 DV cards overview

DV stands for « Digital Video » and regroups the following technologies:

- HDMI
- DisplayPort

4.1.3.1 DELTA-h4k(2) cards

The **DELTA-h4k(2)** is a very high-performance and low-cost HDMI ingest solution for PCIe bus computers.

This device meets all the specifications of the Digital Display Working Group (DDWG) industry consortium with extensive features to help the real-time processing of HDMI streams on the host computer. The DELTA-h4k(2) is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of HDMI processing services and an easy-to-use programming interface for controlling the card.



The family of products is composed of:

Product Name	PCIe Bus	Fixed inputs	Fixed outputs	Supported Interfaces
DELTA-h4k-elp 20	PCI Express 2.0 x4	2	0	DVI-D, HDMI 1.3, HDMI 1.4b, HDMI 2.0 (only YUV 4:2:0 UHD and 4k 50/60Hz)
DELTA-h4k2-elp 20	PCI Express 2.0 x8	2	0	DVI-D, HDMI 1.3, HDMI 1.4b, HDMI 2.0

4.1.3.2 DELTA-hmi cards

The **DELTA-hmi** is a very high-performance and low-cost HDMI ingest solution for PCIe bus computers.

This device meets all the specifications of the Digital Display Working Group (DDWG) industry consortium with extensive features to help the real-time processing of HDMI streams on the host computer. The DELTA-hmi is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of HDMI processing services and an easy-to-use programming interface for controlling the card.



The family of products is composed of:

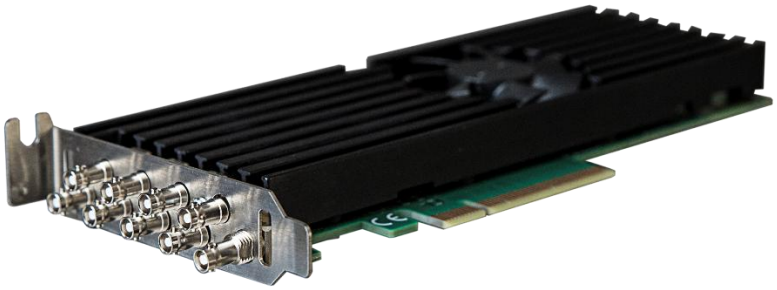
Product Name	PCIe Bus	Fixed inputs	Fixed outputs	Supported Interfaces
DELTA-hmi-e 40	PCI Express 3.0 x8	4	0	DVI-D, HDMI 1.3, HDMI 1.4b, HDMI 2.0, HDMI 2.1
DELTA-hmi-elp 20	PCI Express 3.0 x8	2	0	DVI-D, HDMI 1.3, HDMI 1.4b, HDMI 2.0, HDMI 2.1

4.1.4 Mixed Interfaces cards overview

The **DELTACAST Mixed Interfaces cards** are PCI Express cards including a mix of ASI, SDI or HDMI ingest and playout channels.

4.1.4.1 SDI - ASI cards

The DELTA-12G2c-asi8c-elp-h cards meet all the specifications for ST 2082-10*, 2081-10*, 424, 292 and ST 259 equipment, as well as for DVB ASI equipment.



* DELTA-12G2c-asi8c-elp-h only

4.1.4.2 SDI - DV cards

The DELTA-12G2c-hmi10-elp meets all the specifications for ST 424, 292 and ST 259 equipment, as well as all the specifications of HDMI 2.0b reception device.



The DELTACAST Mixed Interfaces cards are designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of ASI and SDI processing services and an easy-to-use programming interface for controlling the card.

The family of products is composed of:

Product Name	PCIe Bus	Fixed inputs	Fixed outputs	Bi-dir
DELTA-12G2c-hmi10-elp	PCI Express 3.0 x8	1 x HDMI	0	2 x 12G 2 x 3G
DELTA-12G2c-asi8c-elp-h	PCI Express 3.0 x8			2 x 12G/ASI 6 x 3G/ASI

4.1.4.3 SDI - DV key cards

The DELTA-12G11-hmi11-e-key meets all the specifications for ST 424, 292 and ST 259 equipment, as well as all the specifications of HDMI 2.0b reception and transmission device. With its hardware keyer components, it is specially designed for critical real-time AI/AR video pipelines requiring live overlays over either 12G-SDI or HDMI video up to 4K60.



The DELTACAST Mixed Interfaces cards are designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of HDMI and SDI processing services and an easy-to-use programming interface for controlling the card.

The family of products is composed of:

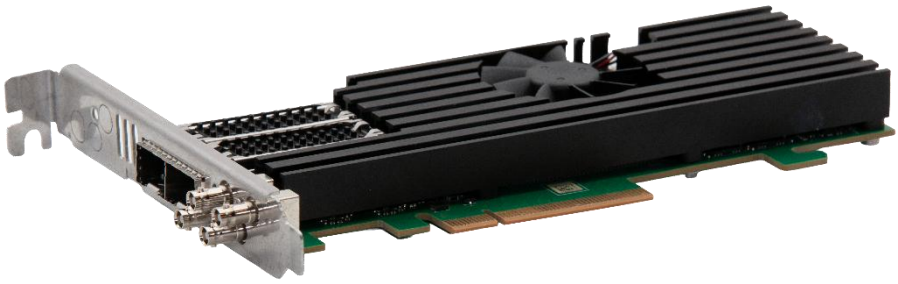
Product Name	PCIe Bus	Fixed inputs	Fixed outputs	Bi-dir	Keyers
DELTA-12G11-hmi11-e-key	PCI Express 3.0 x8	1 x 12G 1 x HDMI	1 x 12G 1 x HDMI	0	2

4.1.4.4 SDI - IP cards

The DELTA-ip25-sdi family of devices meets all the specifications for ST 424, 292 and ST 259 equipment, as well as ST2110 sender and receiver requirements.

This family mixes the following interfaces:

- SDI connectors able to manage the transmission or the reception of 3G or HD SDI signals, with some of them able to manage the transmission or the reception of 6G and 12G signals.
- Two SFP 25Gb Ethernet ports. The second Ethernet port is dedicated to Seamless Protection Switching (redundant stream).



The family of products is composed of:

Product Name	PCIe Bus	Number of Input	Number of Output
DELTA-IP25-44-SDI-4c-e **DELTA-IP25-44-SDI-4c-elp**	PCI Express 3.0 x8	4 ST2110 streams 4 x 12G	4 ST2110 streams 4 x 12G

4.1.5 IP cards overview

DELTA-ip is a very high-performance and low-cost 3G, HD and SD ST 2110 ingest and playout solution for PCI Express (PCIe) bus computers.

The **DELTA-ip** is designed for easy integration with customer applications.

A comprehensive software development kit (SDK) includes device drivers for standard platforms, a range of SDI/IP processing services and an easy-to-use programming interface for controlling the card.



The family of products is composed of:

Product Name	PCIe Bus	Number of Input	Number of Output
DELTA-ip-ST2110 10	PCI Express 2.0 x8	1 (max 4 ST2110 streams)	0
DELTA-ip-ST2110 01	PCI Express 2.0 x8	0	1 (max 4 ST2110 streams)
DELTA-ip25-44-elp	PCI Express 3.0 x8	4 ST2110 streams	4 ST2110 streams

Physical connectors (10Gbe/25Gbe) must be distinguished from logical streams (RTP packets in the network).

The second Ethernet port is reserved for redundant stream (Seamless Protection Switching –SMPTE ST2022-7).

4.1.6 Companion Cards overview

The **Companion Cards** family is an extension cards family whom purpose is to extend DELTACAST cards functionalities.

4.1.6.1 A-LTC Companion Card

A-LTC card can fit either on top of its low-profile host card, sharing the same bracket, or next to it and occupy an empty PCIe slot.

The **A-LTC** extended functionality is:

- LTC capture (single-ended LTC analog source)



4.1.6.2 A-TIC Companion Card

A-TIC card can fit either on top of its low-profile host card, sharing the same bracket, or next to it and occupy an empty PCIe slot.

The **A-TIC** extended functionality is:

- LTC capture (single-ended LTC analog source)
- Blackburst reference input
- Blackburst reference output

4.1.7 Timecode Cards overview

The **Timecode Cards** family is a family of devices whose purpose is to allow the reception of external timecode information.

4.1.7.1 DELTA-LTC-1 Timecode Card



The **DELTA-LTC-1** is a high-profile card that exposes a LTC capture connector, allowing the reception of timecode information.

4.1.8 Specific cables

The DELTA-12G-elp-h 4i2c and 4o2c cards have a “multi-card synchronization” feature allowing to propagate synchronization flags between multiple devices by daisy-chaining them through a dedicated connector. The daisy-chaining of the card is done using a ribbon cable.

The family of products is composed of:

Product Name	Length	Locking System
A-MCSC-0100	10 cm	No

4.2 FLEX Solution

4.2.1 How does it work?



The FLEX solution requires:

- a PCI Express gateway card,
- video I/O modules,
- specific cables.

Installing the FLEX solution consists in:

- Plugging a gateway card in a PCI Express slot of your sever.
- Connecting one or more video I/O module to the gateway using specific cables.

4.2.2 Supported Operating Systems

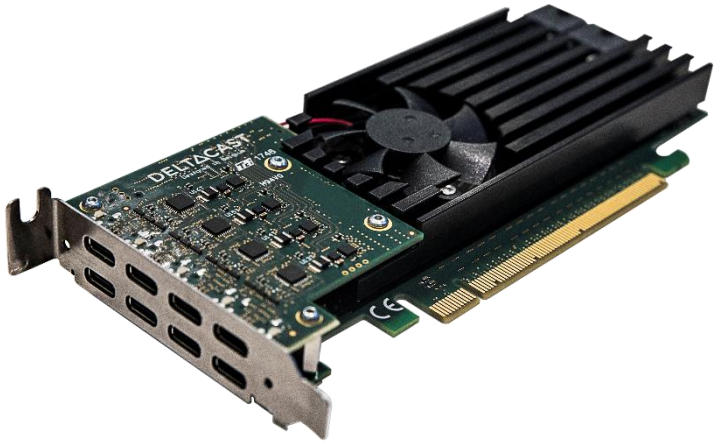
FLEX products are supported on the following operating systems:

- Windows
- Linux

4.2.3 DELTA-gwy family

4.2.3.1 DELTA-gwy 316 and 308 cards

The DELTA-gwy 316 and 308 are gateways you plug in a PCI Express slot of your server. They feature ports on which you connect external FLEX modules using specific cables.



The family of products is composed of:

Product Name	PCIe Bus	Consumption	External PCIe Power Supply Needed	Number Of Downstream Ports
DELTA-gwy 316-8	PCI Express 3.0 x16	Max 150W	1 x PCI Express 150W-ATX » power connector	8
DELTA-gwy 316-4	PCI Express 3.0 x16	Max 150W	1 x PCI Express 150W-ATX » power connector	4
DELTA-gwy 308-8	PCI Express 3.0 x8	Max 150W	1 x PCI Express 150W-ATX » power connector	8
DELTA-gwy 308-4	PCI Express 3.0 x8	Max 150W	1 x PCI Express 150W-ATX » power connector	4

4.2.4 FLEX modules

4.2.4.1 FLEX DV modules

DV stands for « Digital Video » and regroups the following technologies:

- HDMI
- DisplayPort

4.2.4.1.1 FLEX-dp

The **FLEX-dp** is a very high-performance and low-cost DisplayPort ingest and playout solution for DELTA-gwy boards.

This device meets all the specifications of the Video Electronics Standards Association (VESA) with extensive features to help the real-time processing of DisplayPort streams on the host computer. The FLEX-dp is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for Windows and Linux platforms, a range of DisplayPort processing services and an easy-to-use programming interface for controlling the card.



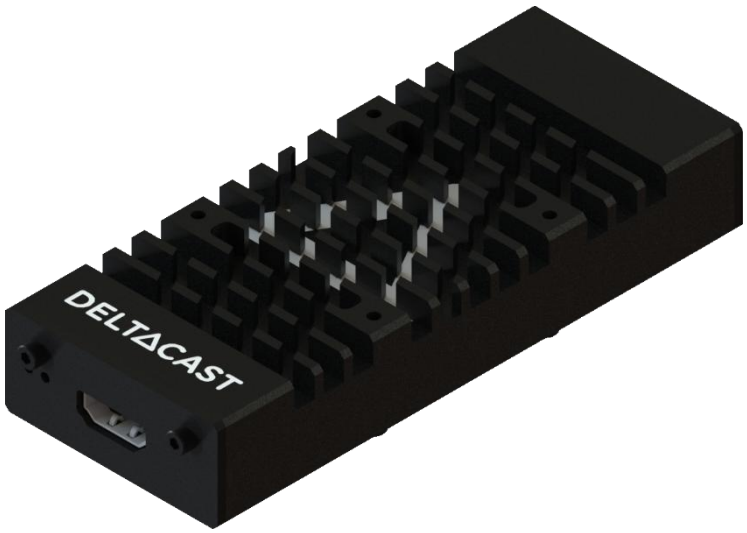
The family of products is composed of:

Product Name	Fixed inputs	Fixed outputs	DisplayPort Standard
FLEX-dp 10	1	0	DisplayPort 1.2
FLEX-dp 01	0	1	DisplayPort 1.2

4.2.4.1.2 FLEX-hmi

The **FLEX-hmi** is a very high-performance and low-cost HDMI ingest solution for DELTA-gwy boards.

This device meets all the specifications of the Video Electronics Standards Association (VESA) with extensive features to help the real-time processing of HDMI streams on the host computer. The FLEX-hmi is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for Windows and Linux platforms, a range of HDMI processing services and an easy-to-use programming interface for controlling the card.



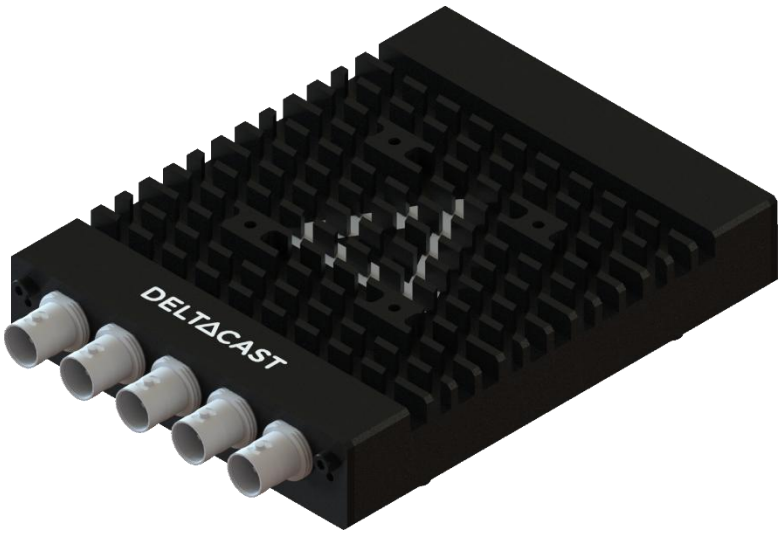
The family of products is composed of:

Product Name	Fixed inputs	Fixed outputs	Supported Interfaces
FLEX-hmi 10	1	0	DVI-D, HDMI 1.3, HDMI 1.4b, HDMI 2.0
FLEX-hmi 01	0	1	DVI-D, HDMI 1.3, HDMI 1.4b, HDMI 2.0

4.2.4.2 FLEX SDI modules

The **FLEX-3G** and **FLEX-12G** are very high-performance and low-cost SDI ingest and playout solutions for DELTA-gwy boards.

These devices meet all the specifications for ST 2082-10*, 2081-10*, 424, 292 and ST 259 equipment with extensive features to help the real-time processing of 12G*, 6G*, 3G, HD and SD SDI streams on the host computer. The FLEX-sdi is designed for easy integration with customer applications. A comprehensive software development kit (SDK) includes device drivers for Windows and Linux platforms, a range of SDI processing services and an easy-to-use programming interface for controlling the card.



Product Name	Fixed inputs	Fixed outputs
FLEX-3G 40	4 x 3G	0
FLEX-3G 04	0	4 x 3G
FLEX-12G 10	1 x 12G and 3 x 3G	0
FLEX-12G 01	0	1 x 12G and 3 x 3G

****FLEX-12G** only*

4.2.5 Specific cables

With the FLEX solution, it is necessary to use the provided cables. These are based on USB-C connectors and are especially qualified for FLEX use case.

	*<u>Warning:</u> although FLEX products use USB-C connectivity, these products do not comply with USB-C. Meaning that:* • You can't plug a FLEX module onto a regular USB-C port. • You can't plug third-party USB-C devices into the downstream ports of the gateway card.

The family of products is composed of:

Product Name	Length	Locking System
A-FLEX-1M	1m	No
A-FLEX-50CM-L	0.5m	Yes

5 INSTALLATION

5.1 Hardware installation

This chapter assume you are installing one or several DELTACAST devices and accompanying software on a new computer or a computer that has not been used before with such a card.

Before carrying on with the hardware installation, please shut down the PC and unplug the power supply cable from your PC case.

	*Caution: Static electricity from your body can damage sensitive electronic components on the DELTACAST devices. Please avoid touching the chips and other components and try to handle the card by its edges. Also drain static electricity from your body by touching a bare metal surface on your computer chassis before you install or remove any parts of your system. If you have grounding wrist strap, use it while handling DELTACAST devices.*

If you wish to upgrade the driver with a new version downloaded from the DELTACAST web site, please consult the appropriate topics in this guide.

	*Caution: Please read carefully the detailed instructions that follow before attempting to install any software or hardware component of this product. Inappropriate operation may result in a broken or malfunctioning system.*

This chapter is divided into several sub-chapters:

Sub-chapters	Content
PCIe Cards	Hardware installation of PCIe cards
FLEX Solution	Hardware installation of FLEX solution
Cabling recommendations	Cabling recommendations according to a given video interface

5.1.1 PCIe Cards

5.1.1.1 PCIe bus considerations

Not all PCIe bus controllers offer the same performances. Depending on the platform they are plugged in, DELTACAST devices could not be able to support full-speed transfers on all their channels, because of a bandwidth limitation on the motherboard itself.

When selecting the host motherboard, always get that point into account.

Moreover, depending on the device you use, the PCI Express slot needed might be different from one device to another.

2 use cases are to be taken into account:

- Plugging a device in a *less performant PCIe slot*:
  The device has restricted performances.
- Plugging a device in a *more performant PCIe slot*:
  Make sure that your motherboard can downgrade the PCIe slot to fit to the device.

5.1.1.2 What you need for installation

Once the PC case is opened, identify an appropriate PCI Express slot. If any doubt exists, please refer to the documentation of your motherboard.

Among the available PCIe slots, it is preferable to choose the highly ventilated ones and to select a smart repartition of cards for better heat dissipation.

	*Caution: An incorrectly ventilated card may behave improperly, or might even be damaged during operation.*

Select the most appropriate slot for each of the DELTACAST devices you wish to install, and remove the metal plate located on the PC case in regard to those slots. Don't lose the screws, as you will need them to fasten the cards later on.

5.1.1.3 Installing in the computer

To install the cards, repeat the following steps for each device:

- Carefully align the card with its selected PCIe slot.
- Slide the card towards the slot until it touches. Make sure that the bracket of the card slips into the opening left by the metal plate you have just removed.
- Once the card touches its slot and is correctly aligned, press it into the connector until it is firmly in place.
- Secure the card by fastening its bracket to the PC case using the screw you removed one moment ago.

Once all your devices are installed, close your PC case, plug in the power supply cable and turn it on to proceed with software installation.

	*<u>Caution – HOT SURFACE</u>* *The heatsink may remain hot after system shutdown. Wait approximately 5 to 10 minutes before handling the card to avoid the risk of burns.*

5.1.2 FLEX Solution

5.1.2.1 What you need for installation

- A computer with an empty appropriate PCI Express slot,
- a external « PCI Express 150W-ATX » power cable,
- a PCI Express gateway card,
- FLEX module(s),
- specific cable(s).

5.1.2.2 Installing

5.1.2.2.1 Installing a DELTA-gwy

This chapter is only applicable to DELTA-gwy family's products.

5.1.2.2.1.1 PCIe bus considerations

Not all PCIe bus controllers offer the same performances. Depending on the platform they are plugged in, DELTACAST devices could not be able to support full-speed transfers on all their channels, because of a bandwidth limitation on the motherboard itself.

When selecting the host motherboard, always get that point into account.

Moreover, depending on the device you use, the PCI Express slot needed might be different from one device to another.

2 use cases are to be taken into account:

- Plugging a device in a *less performant PCIe slot*:
  The device has restricted performances.
  For example, a DELTA-gwy 316-8 is meant to be usable with 8 FLEX modules when it is installed in a PCI Express 3.0 x16 slot. If it were to be installed in a PCI Express 3.0 x8 slot instead, it would only be capable handling 4 FLEX modules correctly.
- Plugging a device in a *more performant PCIe slot*:
  Make sure that your motherboard can downgrade the PCIe slot to fit to the device.

5.1.2.2.1.2 External power supply considerations

DELTA-gwy cards need external power supply in order to operate.

2 things are important to be taken into account:

- Your alimentation must be capable to provide the needed energy for the card along with the energy needed for the rest of your computer.
- You need to have an external « PCI Express 150W-ATX » power cable for the card.

5.1.2.2.1.3 What you need for installation

Once the PC case is opened, identify an appropriate PCI Express slot. If any doubt exists, please refer to the documentation of your motherboard.

Among the available PCIe slots, it is preferable to choose the highly ventilated ones and to select a smart repartition of cards for better heat dissipation.

	*<u>Caution:</u> An incorrectly ventilated card may behave improperly, or might even be damaged during operation.*

Select the most appropriate slot for each of the DELTACAST devices you wish to install, and remove the metal plate located on the PC case in regard to those slots. Don't lose the screws, as you will need them to fasten the cards later on.

Also, identify the external « PCI Express 150W-ATX » power cable you will use and make sure they are long enough to go from the power supply until the card.

5.1.2.2.1.4 Installing in the computer

To install the cards, repeat the following steps for each device:

- Carefully align the card with its selected PCIe slot.
- Slide the card towards the slot until it touches. Make sure that the bracket of the card slips into the opening left by the metal plate you have just removed.
- Once the card touches its slot and is correctly aligned, press it into the connector until it is firmly in place.
- Secure the card by fastening its bracket to the PC case using the screw you removed one moment ago.
- Connect « PCI Express 150W-ATX » power cable to the « PCI Express 150W-ATX » connector of the card.

Once all your devices are installed, close your PC case, plug in the power supply cable and go on with the FLEX module(s) installation procedure.

	*<u>Caution – HOT SURFACE</u>* *The heatsink may remain hot after system shutdown. Wait approximately 5 to 10 minutes before handling the card to avoid the risk of burns.*

5.1.2.2.2 Installing FLEX module(s)

Once your DELTA-gwy has been installed, what you need to do is connecting the FLEX module(s) you want to use to the DELTA-gwy with specific cables.

	*Caution:* Be careful to either plug the module(s) while the computer is shutdown or restart the computer after having plugged the module(s).

5.1.2.2.2.1 Temperature Warning

In the FLEX modules, the enclosure also plays the role of heat dissipation for the electronics contained within the module.

As a consequence, when powered and when used FLEX modules can quickly reach high temperatures (close to 80°C – 176°F in certain conditions).

DELTACAST recommends to be very cautious when manipulating hot devices after usage. Allow sufficient cooling time before handling the module.

Providing adequate air flow to the FLEX heatsink allows drastically reducing the module temperature.

5.1.3 Cabling recommendations

It is recommended to use quality cables to avoid signal perturbations and unexpected behaviour.

5.1.3.1 For SDI reception and streaming:

Coaxial RG6 or RG59 (75 Ohms) cables are required and low loss cables are recommended for 3G (ex. BELDEN 1694A, 1505A or 1855A), for 6G (ex. BELDEN 1855A) and for 12G (ex. BELDEN 1855R).

5.1.3.2 For IP reception and streaming (SFP+ 10Gbit Ethernet transceiver):

10GbE SDP+ transceiver must be compatible with the "SFI" electric interface and work at 10.3125Gbps (SFF Committee SFF-8431: Specifications for Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module “SFP+”).

- SFP+ 10GbE optical transceiver modules (10GBASE-SR, -LR or –ER)
- SFP+ Direct Attach copper Cables (10GSFP+Cu passive or active copper cable assembly). Warning: 10GSFP+Cu can only be used on systems with common grounds. Connecting systems with different ground potential with SFP+ direct attach cable results in a short and may cause damage.
- SFP+ Direct Attach optical cable.

5.1.3.3 For DisplayPort reception and streaming

The following table describes the characteristics a DisplayPort cable needs having depending on the product:

Product Name	DisplayPort Standard
FLEX-dp 10	DisplayPort 1.2
FLEX-dp 01	DisplayPort 1.2

5.1.3.4 For HDMI reception

The following table describes the characteristics a HDMI cable needs having depending on the product:

Product Name	HDMI cable capabilities
DELTA-h4k-elp 20	HDMI 1.4 Ready
DELTA-h4k2-elp 20	HDMI 2.0 Ready
FLEX-hmi	HDMI 2.0 Ready
DELTA-12G2c-hmi10-elp	HDMI 2.0 Ready
DELTA-12G11-hmi11-e-key	HDMI 2.0 Ready
DELTA-hmi-e 40	HDMI 2.1 or 2.0 Ready
DELTA-hmi-elp 20	HDMI 2.1 or 2.0 Ready

5.2 Software installation

This chapter explain how to install one or several DELTACAST devices on a new computer or a computer that has already been used before with such a device.

	*Caution: Please read carefully the detailed instructions that follow before attempting to install any software or hardware component of this product. Inappropriate operation may result in a broken or malfunctioning system.*

This chapter is divided into several sub-chapters:

Sub-chapters
Important note
Windows software installation
Mac OS installation

5.2.1 Important note

5.2.1.1 Usage with 3rd party applications

In most cases, DELTACAST cards and FLEX modules are intended to be used with 3rd party applications which have been developed over the VideoMaster SDK (Software Development Kit).

If your 3rd party application vendor provided specific requirements or installation instructions for the DELTACAST device, they prevail over this guide.

Specifically, although DELTACAST generally recommends using the latest VideoMaster redist version available onto our download center at www.deltacast.tv, the application you are using the DELTACAST card with could require another – specific or older – version of VideoMaster, and in this case it is most of the time redistributed with the application. In case of doubt, we recommend double-checking this with the 3rd party application vendor.

5.2.1.2 Onboard firmware management

DELTACAST devices are based on FPGA and other programmable hardware components.

These cards store their firmwares in an onboard memory module, and the onboard firmware version must match the version of the software modules – drivers and libraries – installed on the host computer.

That is what the DELTACAST installation script registers and executes the firmware updater (FWUpdater) service, responsible for verifying and updating when needed the firmwares hosted on the devices present in the system. That check and update operation is performed during the installation process, as well as in background at each computer boot.

The update of an onboard firmware takes quite a long time – up to several minutes – and absolutely needs a computer restart in the end to complete. The computer restart is asked in a user interface when the update is done during the installation script execution. When the firmware update is performed during the operating system start, the need for a restart is signaled by specific error codes triggered by the VideoMaster libraries and – hopefully – handled by the calling application.

5.2.2 Windows software installation

The following table depicts the supported solutions on Windows:

Solutions	Supported on Windows
PCIe Cards	✓
FLEX Solution	✓

The SDK supports the following versions of Windows:

- Microsoft Windows 10, 64-bit editions
- Microsoft Windows 11
- Microsoft Windows 2016 Server
- Microsoft Windows 2019 Server
- Microsoft Windows 2022 Server
- Microsoft Windows 2025 Server

VideoMaster SDK is fully operational on Windows 10 but due to some changes made by Microsoft into their security signature system, the VideoMaster drivers might not be correctly recognized. You are invited to contact Deltacast support service for any problem regarding signatures.

5.2.2.1 What you need for installation

To set up the machine wherein you will operate the DELTACAST cards, you must:

- First have successfully completed the hardware installation described above
- Run the installation script as detailed below

Always ensure yourself to use the package corresponding to the SDK version your application has been compiled for. In case of any doubt on the version to install, please contact the application supplier.

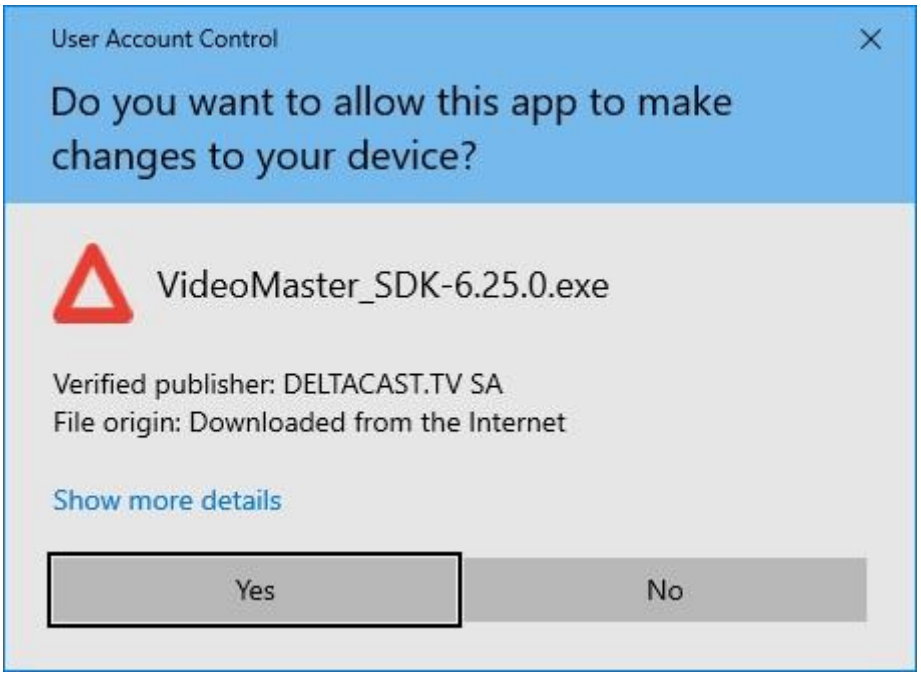
	*<u>Note:</u> You must ensure that, once logged in, you have sufficient privileges to complete both a driver installation and a standard application setup process.*

5.2.2.3 Installation procedure

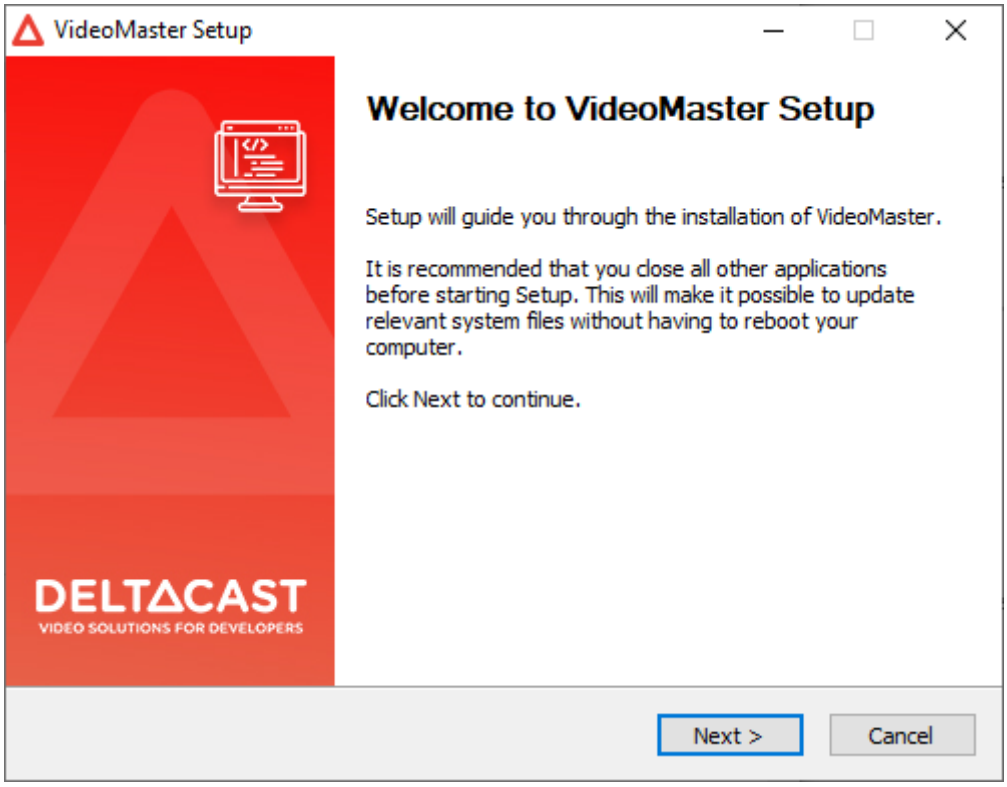
By default the installation of a DELTACAST device and the VideoMaster is done through the installation executable.

	*<u>Note:</u> The installer can also be launched in silent mode (no GUI). To do that, open an admin terminal and run the executable with the "/S" argument.*

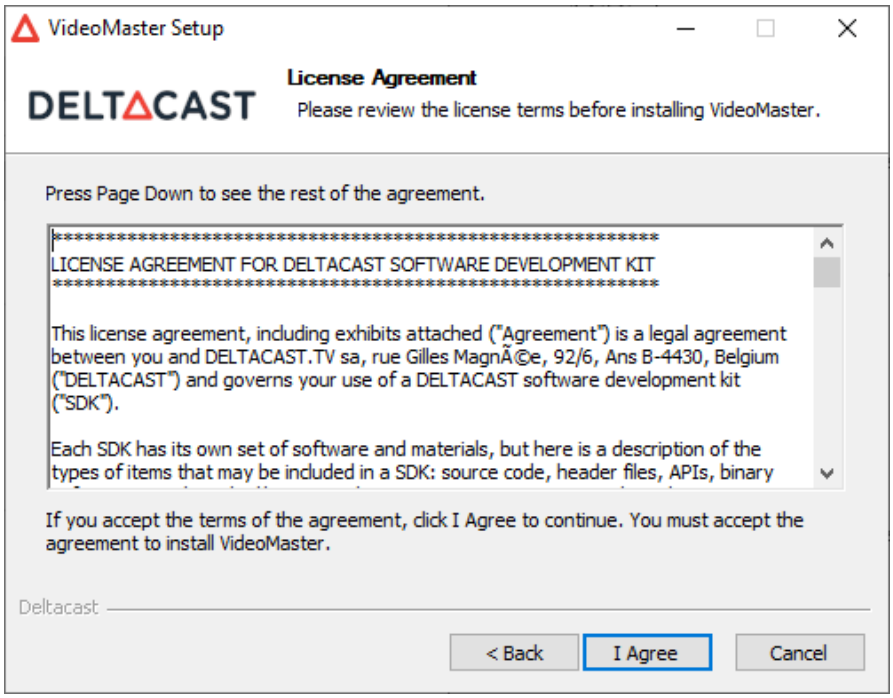
Upon launching the application by double clicking on the executable, you will be prompted to grant administrator rights.



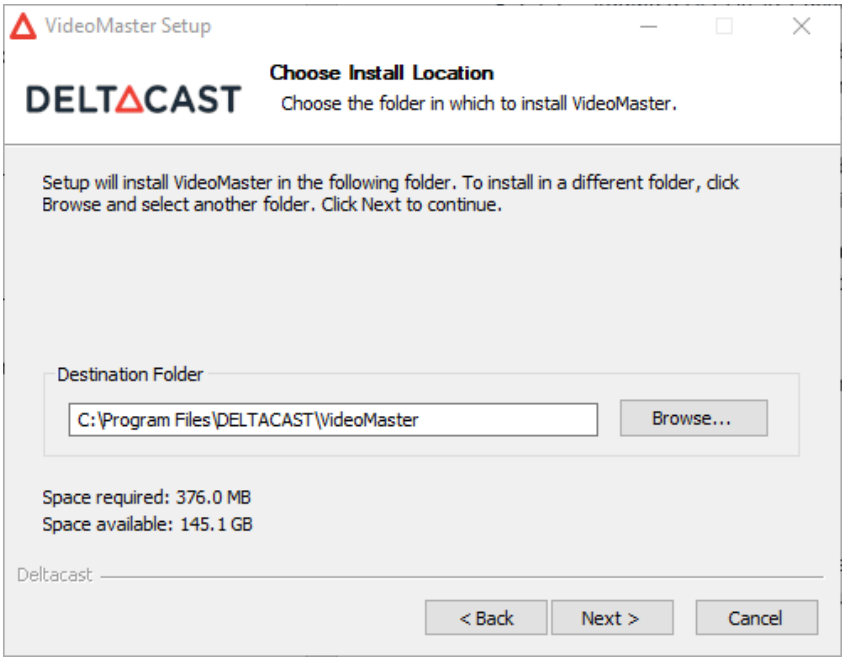
Click "Yes" to proceed.



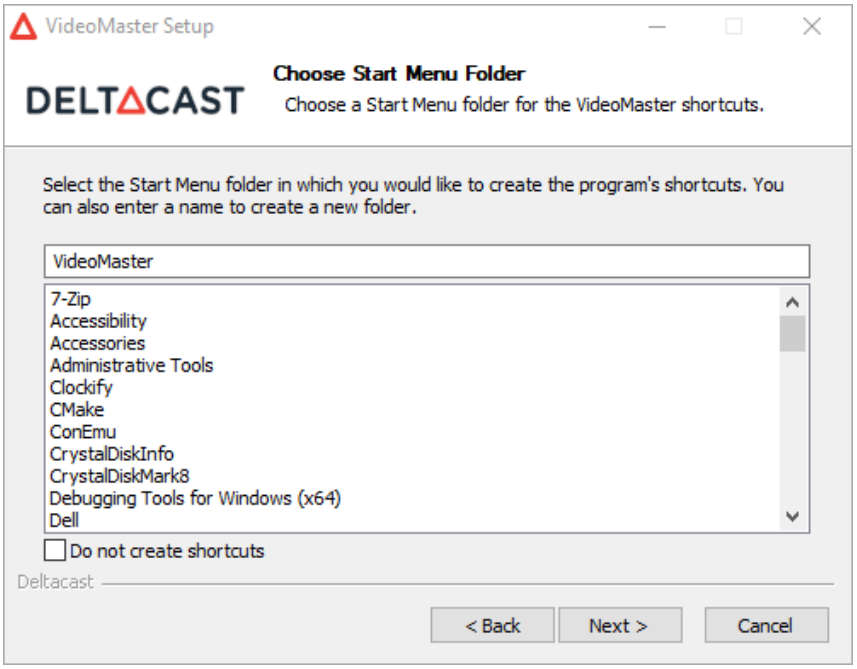
Next, you will need to review and accept the VideoMaster license agreement.



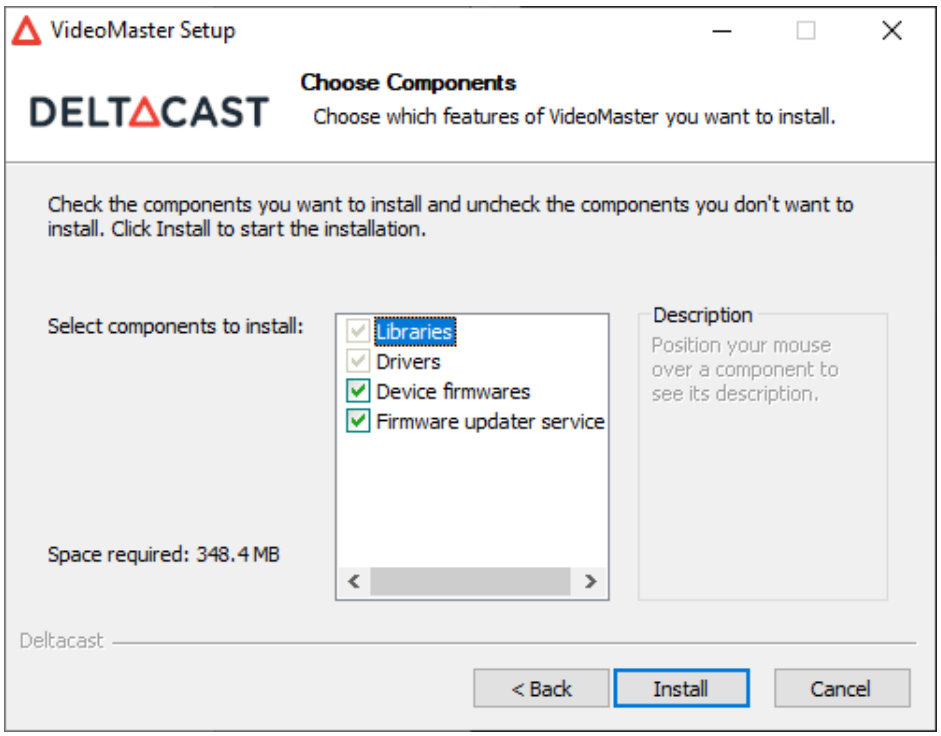
Following this, you'll be prompted to select an installation root directory. You can opt for the default *directory or specify another one that better suits your needs.*



The subsequent step will inquire if you wish to create Start Menu items. These optional items include shortcuts to the VideoMaster user guide and to the uninstallation executable.



You will now be able to choose which components you want to install according to your needs.



You'll notice some components are greyed out. These represent the device **drivers** and user space **libraries** (DLLs), which are essential for running any VideoMaster-related software. They form the bare minimum requirements. The VideoMaster DLLs will be copied to the System32 folder.

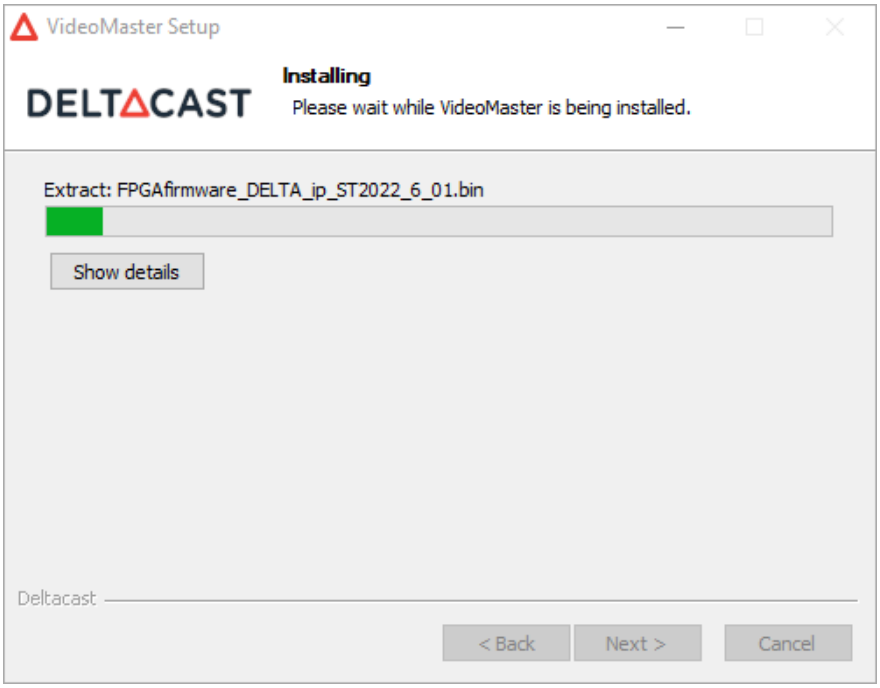
The **device firmware** files correspond to the boards' firmware, ensuring compatibility with the devices and libraries being installed.

The **firmware updater service** corresponds to the FWUpdater executable, the FWUpdater viewer and their installation. This component needs the **device firmwares**. You can read more about the VideoMaster firmware updater later in this document.

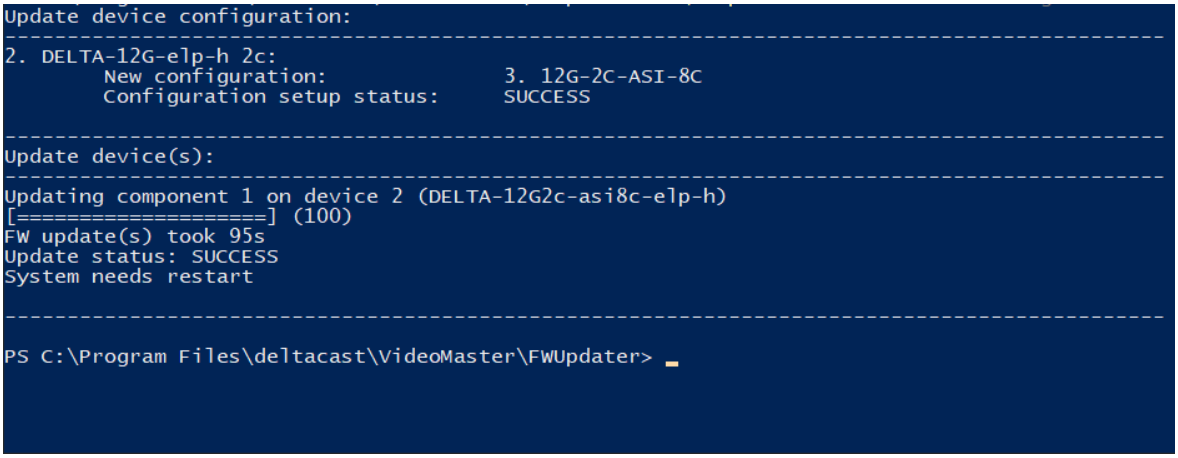
	*Note:* Except in specific conditions, we recommend letting the “Device firmwares” and “Firmware updater service” boxes ticked, as they are tightly coupled to the installed driver versions

Once you are ready, click on the “Install” button to proceed.

The actual installation will now begin.



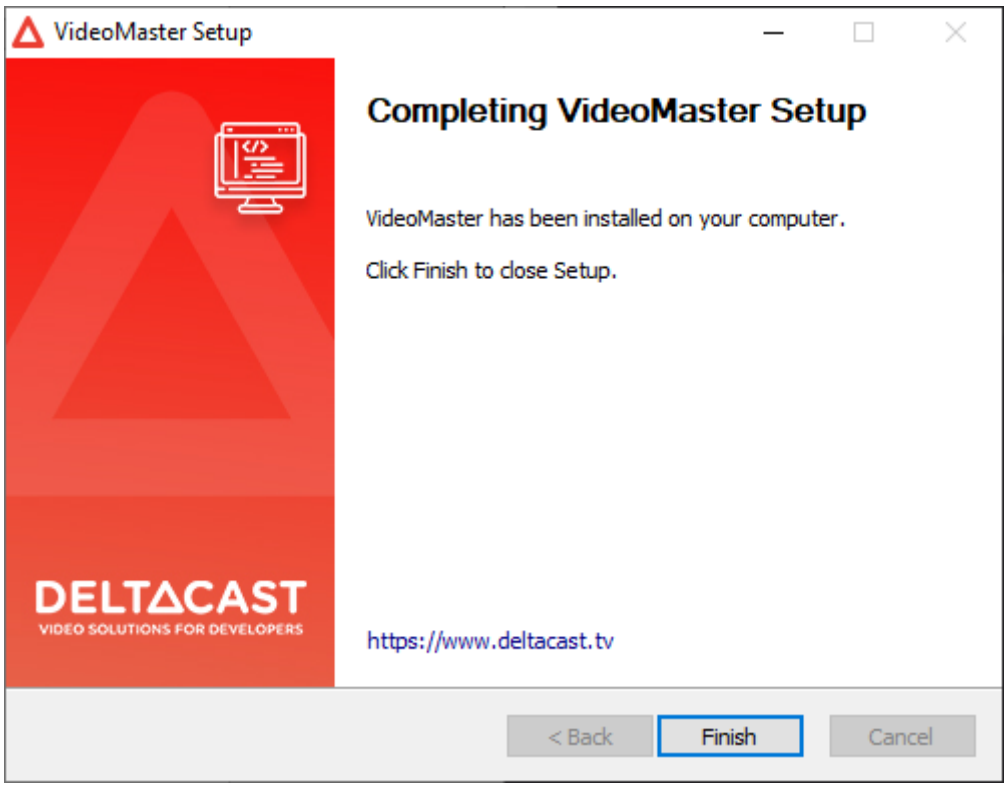
Toward the end of the installation, if selected in the component selection page, the **firmware updater** will attempt to update the device's firmware. A terminal emulator window will pop up, providing updates on the firmware update status.



⚠	Caution: *Firmware update operation could take quite a long time (up to 3 minutes) if onboard firmware is being updated. Do not interrupt the installation process!*

After a firmware update, a reboot is always mandatory to use the device. A dialog will offer to reboot. It is recommended to select “Yes”.

The installation application will also offer to open de VideoMaster user guide.



5.2.2.4 Adding a DELTACAST devices to a system already equipped with other DELTACAST devices

Adding or replacing a DELTACAST device on a system already equipped with a DELTACAST device issued from the same family is transparent for the user. There is no need to re-install the driver and the FWUpdater service will update the device firmware in background if needed.

Note that in event of firmware update, the system needs to be rebooted in order to finalize the update. Your DELTACAST device will not be functional unless you reboot.

Adding a DELTACAST device from a different family than the one already/previously present in the system requires to run the installation application like explained in the previous chapter.

At the beginning of the installation, a dialog box will ask if the current software version should be uninstalled before proceeding with the new installation. **Please make sure to select "Yes"**.

For more information on the driver required depending on the device, see the "PRODUCTS, DRIVERS, and FIRMWARES" section.

5.2.2.5 Upgrading VideoMaster (6.25+)

To upgrade to a more recent version VideoMaster, just start the installation application.

At the beginning of the installation process, a dialog box will ask if the current software version should be uninstalled before proceeding with the new installation. **Please make sure to select "Yes"**.

5.2.2.6 Legacy considerations (-6.25)

If you are upgrading from an earlier version than VideoMaster 6.25, some additional steps might be required. The installer application will try to remove any `VideoMasterHD*.dll` in:

- `C:\Windows\system32`

And the "FWUpdater" directory in:

- `C:\Program Files\DELTACAST\VideoMaster\`

Please delete any remaining traces of VideoMaster in the paths you specified in your version of the now deprecated "install.bat".

5.2.2.7 VideoMaster libraries

The VideoMaster libraries implement all the VideoMaster functionalities and act as the interface between the application, and the underlying drivers and hardware. They are mandatory to operate any DELTACAST card.

The VideoMaster libraries are a set of DLL files compiled for 64-bit Windows operating system. By default the VideoMaster installation application copies them automatically in System32 folder.

5.2.2.8 FWUpdater application

The FWUpdater application is launched at Windows startup by the FWUpdater service.

You can check the FWUpdater chapter for detail information about its usage.

	*Windows' "fast startup" setting, enabled by default on most recent systems, prevents services to run when booting up.* *We recommend disabling this setting to ensure that the FWUpdater service properly runs every time.*

5.2.2.9 Uninstalling the SDK

To uninstall the VideoMaster SDK, use the `Uninstall VideoMaster.exe` located at the root of the installation location, the default is `C:/Program Files/DELTACAST/VideoMaster/`.

5.2.2.10 Downgrading from 6.25+ to -6.25

If you wish to downgrade VideoMaster to an earlier version than 6.25.0, please make sure to uninstall the current version through its dedicated "uninstaller".

5.2.3 Linux software installation

The following table depicts the supported solutions on Linux:

Solutions	Supported on Linux
PCIe Cards	✓
FLEX Solution	✓

Most of the steps of the VideoMaster Linux SDK installation may slightly differ from the procedure depicted here below, depending on your distribution.

The SDK requires a 64b Linux distribution and supports kernel version from 3.9.5 upwards. Note that it also requires glibc with version >= 2.31.

Refer to the release notes for the latest validated Linux kernel version.

DELTACAST qualified ARM64 support on the following ARM64 platform models:

- NVIDIA® Jetson AGX Xavier
- NVIDIA® Jetson AGX Orin



On some platforms using an NVIDIA® GPU, you may need to run the following command after having installed or uninstalled on of our cards (e.g. DELTA-12G-e-h 8c) if you no longer have access to the GUI:

```
$ sudo nvidia-xconfig
```

5.2.3.1 Package content

Name	Installation path	Description
Drivers	`/usr/src/<driver_name>-<version>`	Contains the devices drivers kernel modules blobs
Libraries	`/usr/lib/libvideomasterhd*.so`	The shared libraries

FWUpdater	`/usr/share/deltacast/videomaster/tools/firmware_updater`
	`/usr/bin/delta-firmware-updater`
	`/lib/systemd/system/delta-firmware-updater.service`
	`/home/$(SUDO_USER)/.config/autostart/delta-firmware-updater-viewer.desktop`
		Contains the FWUpdater executable and the service configuration files.

Firmware files	/usr/lib/firmware	Devices firmware files

5.2.3.2 A note on DKMS

VideoMaster now supports DKMS (Dynamic Kernel Module Support), an open-source project by Intel. DKMS automates the recompilation of kernel modules when your distribution's kernel updates, ensuring optimal compatibility and reducing developer workload.

5.2.3.3 Debian based distributions

5.2.3.3.1 Installation procedure

Dependencies:

- build-essential
- dkms

Before proceeding with the package installation, ensure that the necessary dependencies are installed, or that you have internet access for automatic installation via apt.

It is also recommended to make sure your system is up to date.

```
$ sudo apt update && sudo apt upgrade
```

and reboot in case any kernel upgrade has occurred.

To install the VideoMaster, open a terminal application and navigate to the directory containing the .deb archive. Install the package with:

```
$ sudo apt install ./VideoMaster_REDIST-<VERSION>-<ARCHITECTURE>.deb
```

You should see some output about DKMS installing the drivers for your kernels. Then the FWUpdater might perform a device firmware upgrade.

⚠	Caution: *Firmware update operation could take quite a long time (up to 3 minutes) if onboard firmware is being updated. Do not interrupt the installation process!*

5.2.3.3.2 Upgrading VideoMaster (6.25+)

To upgrade VideoMaster, repeat the installation procedure with the new VideoMaster .deb archive.

5.2.3.3.3 Legacy considerations (-6.25)

If you are upgrading from an earlier version than VideoMaster 6.25, some additional steps might be required. The package installer will:

- Unload and remove the VideoMaster's kernel modules in `/lib/modules/$(uname -r)/`
- Remove any VideoMaster rules in `/etc/udev/` and `/etc/udev/rules.d`
- Remove the FWUpdater in `/opt/deltacast/videomaster` and `/opt/deltacast.tv/videomaster` and the services `/lib/systemd/system/delta-firmware-updater.service`.
- Remove any `libvideomasterhd*.so*` in `/usr/lib/`, `/usr/local/lib`, `/usr/lib64`, `/usr/local/lib64`

Please delete any traces of VideoMaster remaining in paths not listed here before attempting an upgrade to 6.25+.

5.2.3.3.4 Uninstallation

To uninstall VideoMaster and its dependencies:

```
$ sudo apt autoremove videomaster
```

To remove VideoMaster only:

```
$ sudo apt remove videomaster
```

5.2.3.3.5 Downgrading from 6.25+ to -6.25

If you wish to downgrade VideoMaster to an earlier version that 6.25.0, please make sure to uninstall the current version.

5.2.3.3.6 Some useful commands

- Get the version of the currently installed VideoMaster

```
$ sudo apt list --installed | grep videomaster
videomaster/now 6.25.0 arm64 [installed,local]
```

- List the kernel modules installed with dkms

```
$ sudo dkms status
```

- Get device information with the FWUpdater

```
$ delta-firmware-updater device list
```

5.2.3.4 RPM based distributions

5.2.3.4.1 Installation procedure

Dependencies:

- make
- gcc
- epel-release
- dkms

To install dkms, you need to enable the epel (Extended Package for Enterprise Linux) repository. You can achieve this by installing the epel-release package:

```
$ sudo dnf install epel-release
```

Before proceeding with the package installation, ensure that the necessary dependencies are installed, or that you have internet access for automatic installation via dnf.

It is also recommended to make sure your system is up to date.

```
$ sudo dnf update
```

To install the VideoMaster SDK, open a terminal application and navigate to the directory containing the .rpm archive. Install the package with:

```
$ sudo dnf install ./VideoMaster_REDIST-<VERSION>-<ARCHITECTURE>.rpm
```

You should see some output about DKMS installing the drivers for your kernels. And then the FWUpdater might perform a device firmware upgrade.

	Caution: *Firmware update operation could take quite a long time (up to 3 minutes) if onboard firmware is being updated. Do not interrupt the installation process!*

5.2.3.4.2 Upgrading VideoMaster (6.25+)

To upgrade VideoMaster, repeat the installation procedure with the new VideoMaster .rpm archive.

5.2.3.4.3 Legacy considerations (-6.25)

If you are upgrading from an earlier version than VideoMaster 6.25, some additional steps might be required. The package installer will:

- Unload and remove the VideoMaster kernel modules in `/lib/modules/$(uname -r)/`
- Remove any VideoMaster rules in `/etc/udev/` and `/etc/udev/rules.d`
- Remove the FWUpdater in `/opt/deltacast/videomaster` and `/opt/deltacast.tv/videomaster` and the services `/lib/systemd/system/delta-firmware-updater.service`.
- Remove any `libvideomasterhd*.so*` in `/usr/lib/`, `/usr/local/lib`, `/usr/lib64`, `/usr/local/lib64`

Please delete any traces of VideoMaster remaining in paths not listed here before attempting an upgrade to 6.25+.

5.2.3.4.4 Uninstallation

To uninstall VideoMaster and its dependencies:

```
$ sudo dnf autoremove videomaster
```

To remove VideoMaster only:

```
$ sudo dnf remove videomaster
```

5.2.3.4.5 Downgrading from 6.25+ to -6.25

If you wish to downgrade VideoMaster to an earlier version than 6.25.0, please make sure to uninstall the current version.

5.2.3.4.6 Some useful commands

- Get the version of the currently installed VideoMaster

```
$ sudo dnf list installed | grep videomaster
videomaster.x86_64    6.25.0    @local
```

- List the kernel modules installed with dkms

```
$ sudo dkms status
```

- Get device information with the FWUpdater

```
$ delta-firmware-updater device list
```

5.2.4 Mac OS installation

The following table depicts the supported solutions on Mac OS:

Solutions	Supported on Mac OS
PCIe Cards	✓
FLEX Solution	

The SDK supports the following versions of macOS:

- macOS 12 – Monterey
- macOS 13 – Ventura
- macOS 14 – Sonoma
- macOS 15 – Sequoia
- macOS 26 - Tahoe support

The SDK is fully validated on macOS 26.

5.2.4.1 What you need for installation

To set up the machine wherein you will operate the DELTACAST cards, you must:

- First have successfully completed the hardware installation described above
- Install the VideoMaster redist package, as detailed below

5.2.4.2 Package content

Name	Installation path	Description
Uninstaller	`/Applications/Deltacast/uninstall_videomaster.sh`	Uninstall script
Drivers	`/Library/Extensions/delta-x300.kext`	Contains the devices drivers kext
Libraries	`/Library/Frameworks/VideoMasterHD*.framework`	The frameworks libraries

FWUpdater	`/Library/Application Support/Deltacast/firmware_updater`
	`/Library/LaunchDeamons/tv.Deltacast.Startup.plist`
	`/Library/LaunchAgents/tv.Deltacast.StartupViewer.plist`
		Contains the FWUpdater executable and the service configuration files.

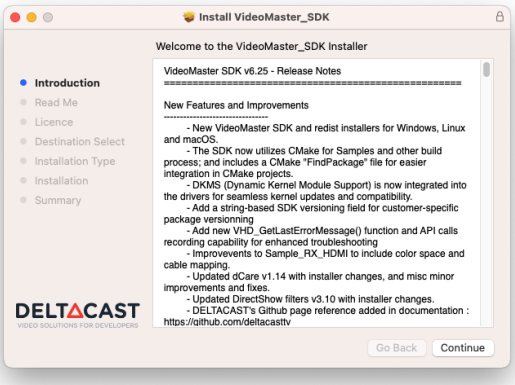
Firmware files	`/Library/Application Support/Deltacast/binaries`	Devices firmware files

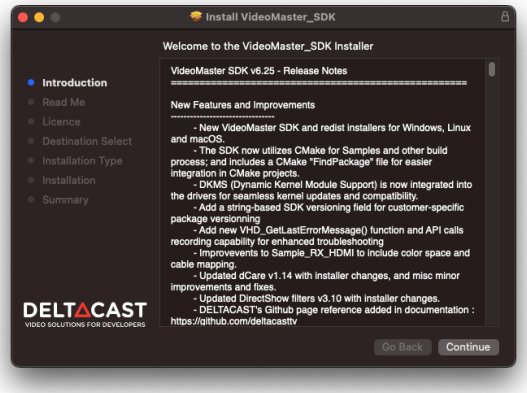
	*<u>Note:</u> the VideoMaster installation requires a restart of the computer. You need to log as root during the installation.*

5.2.4.3 Installation procedure

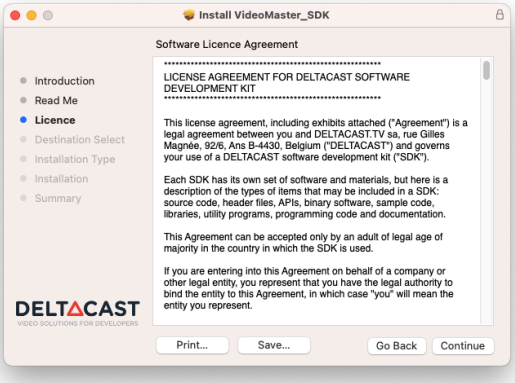
	*<u>Note:</u> The very first step is to uninstall the currently installed package, if any. In order to perform this action, please refer to the "Uninstalling VideoMaster" section of the "Installation Guide" related to that package.*

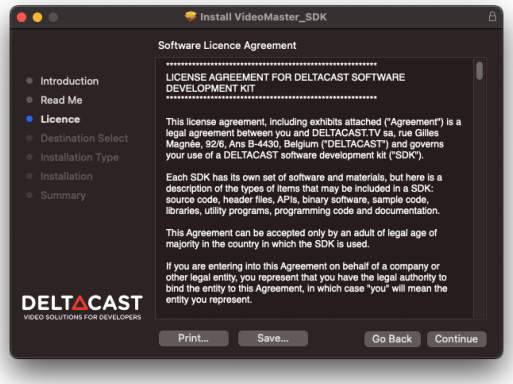
Upon executing the installation package, you'll be presented with this interface.

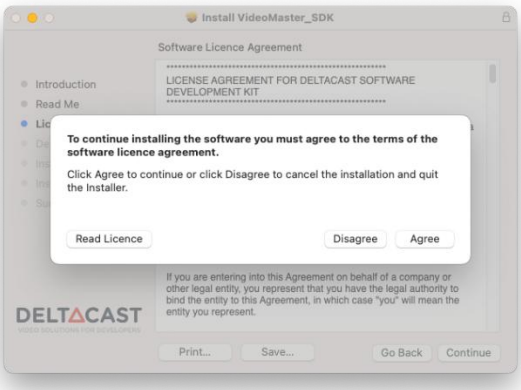




Then select *Continue* to display the next panels which display the license that needs to be approved.

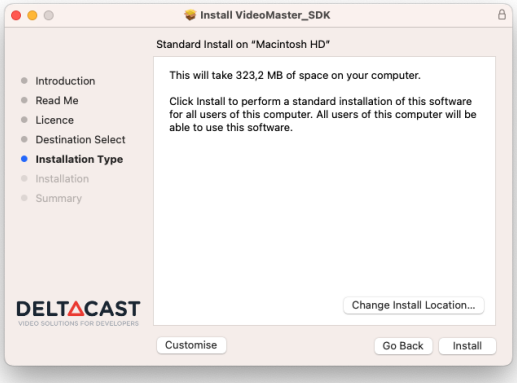


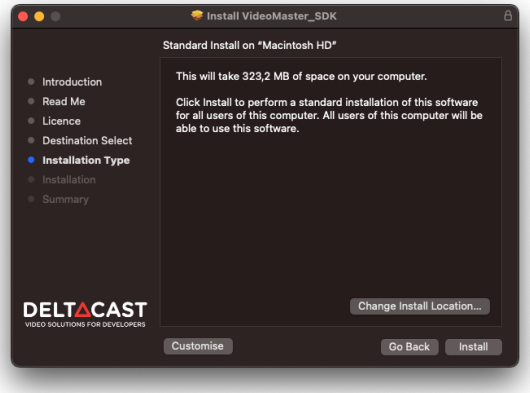




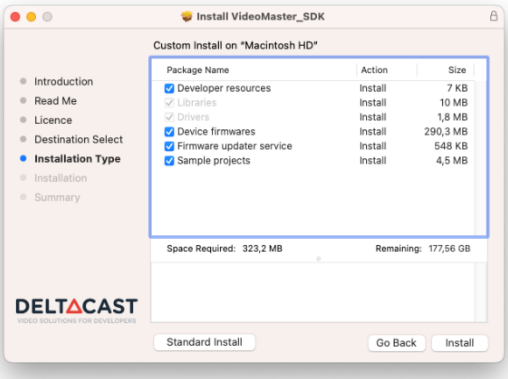


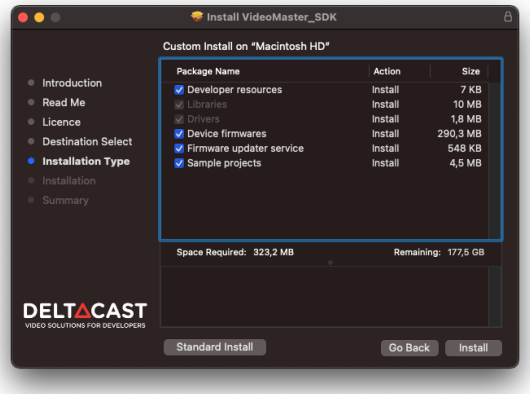
Upon approval of the license, you are being offered the choice between a standard installation and a customized one.





Should you opt for the customized installation, VideoMaster allows you to choose which components you want to install.





You'll notice some components are greyed out. These represent the device **drivers** and user space **libraries (Frameworks)**, which are essential for running any VideoMaster-related software. They form the bare minimum requirements.

The **device firmware** files correspond to the boards' firmware, ensuring compatibility with the devices and libraries being installed.

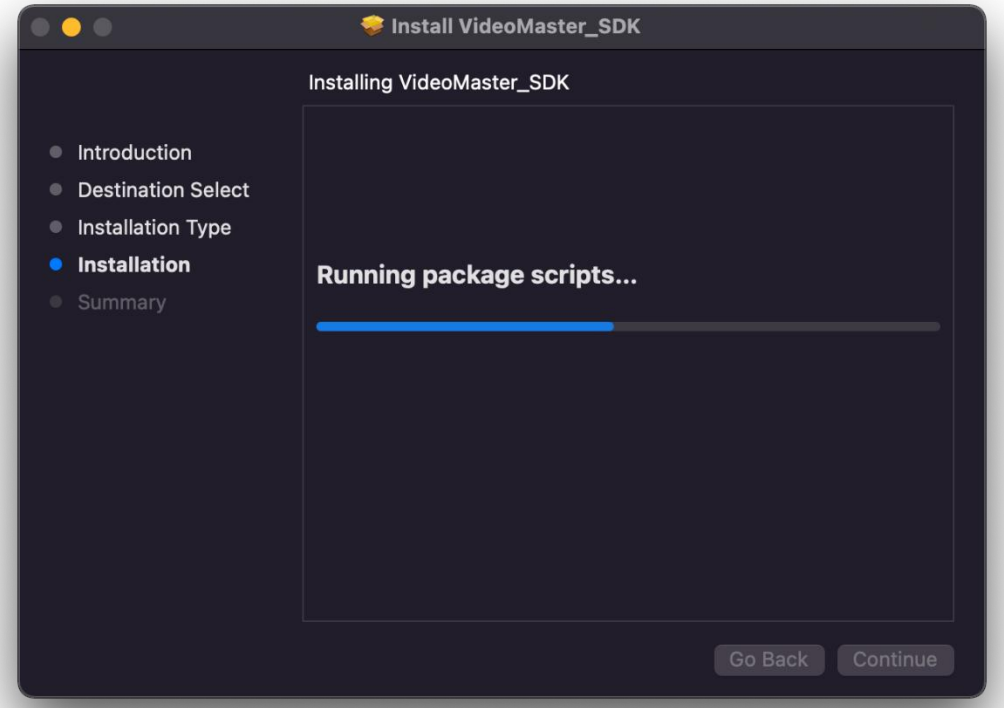
The **firmware updater service** corresponds to the FWUpdater executable, the FWUpdater viewer and their installation. This component needs the **device firmwares**. You can read more about the VideoMaster's firmware updater later in this document.

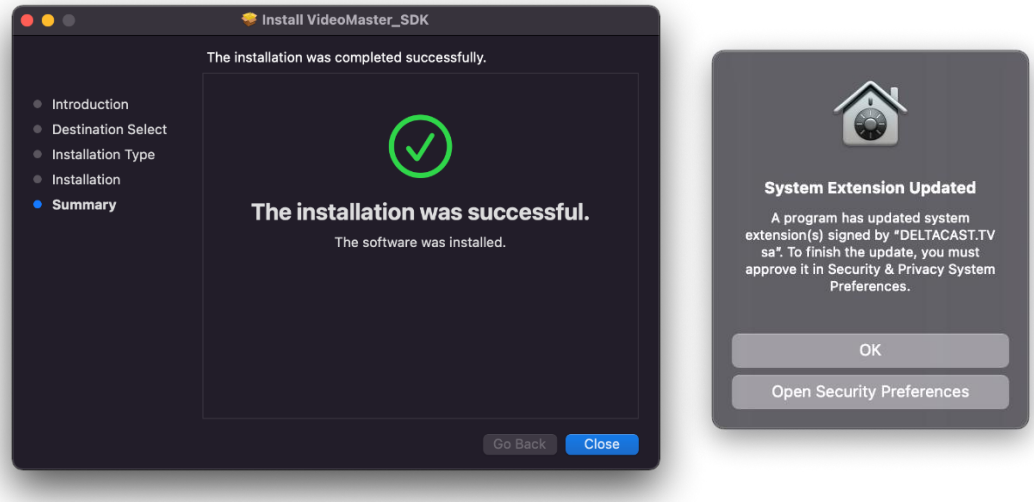
	*Note:* Except in specific conditions, we recommend letting the "Device firmwares" and "Firmware updater service" boxes ticked, as they are tightly coupled to the installed driver versions

Once you are ready, click on the "Install" button to proceed.

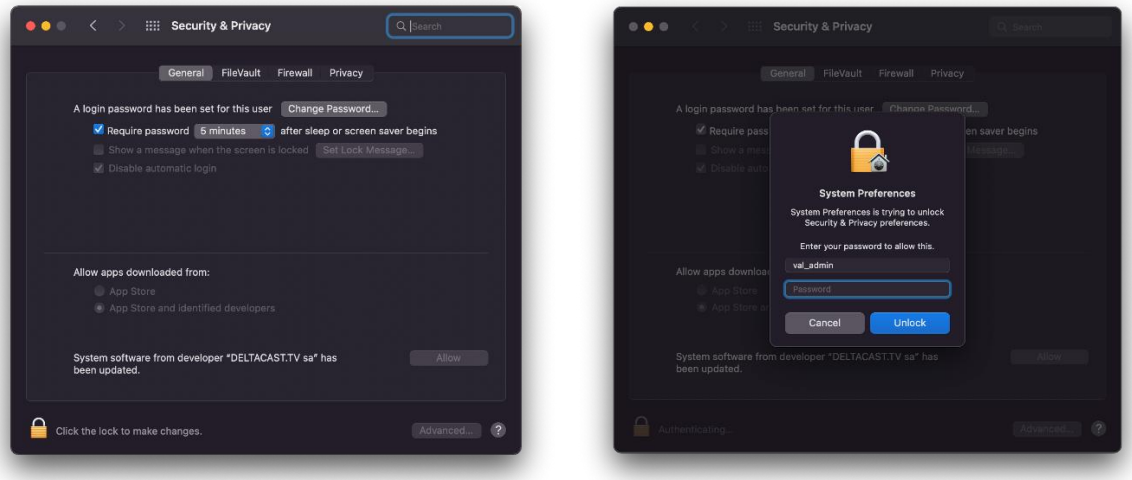


A new window appears to let you enter your *name* and *password* to begin the installation. Complete the fields and click *Install Software*.

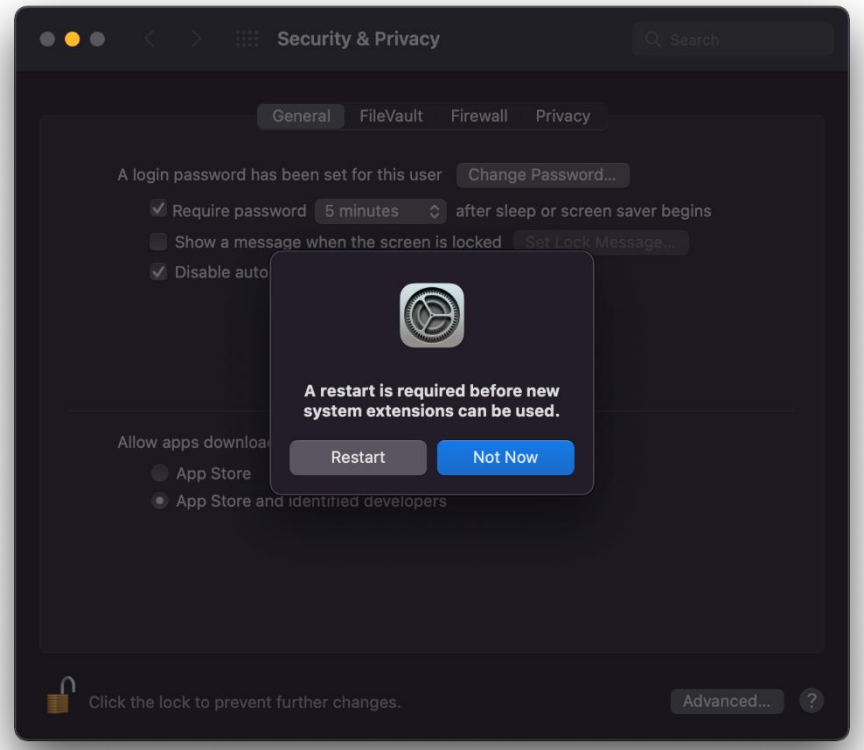




Once the installation complete close the installer using the *Close* button. At the same time a *System Extension Updated* warning pop-up. Click *Open Security Preference*.



In the *Security & Privacy* panel, click on the lock in the bottom left of the panel, enter your password and then click on *Unlock.*



After allowing the DELTACAST kext a new panel appears and asks you to restart the system.

It is strongly recommended not to click on “Not Now” and restart the system through the Apple menu. If the system is restarted this way the kext cache will be corrupted and the system will go into recovery mode on the next boot in order to allow the freshly installed kext.

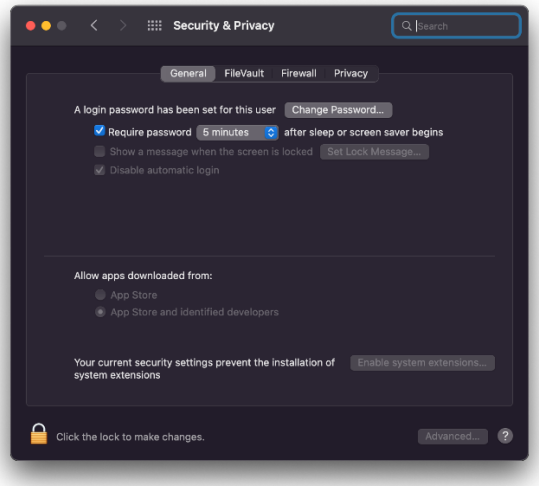
Once the system rebooted the card firmware is updated if needed, in background, by the FWUpdater application. In this case trying to use the card within any application will return a “Firmware update in progress” error until the firmware update process ends.

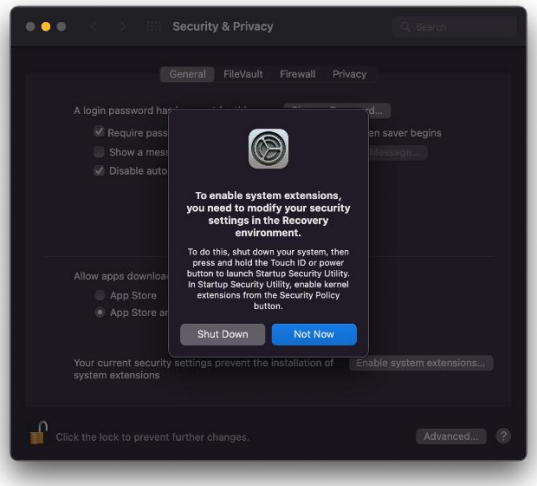
Once the firmware updated ends the system has to be restarted so the new firmware is loaded. Trying to use the card within any application before the system is rebooted will return a “System needs restart” error.

⚠	Caution: *Firmware update operation during the installation step could take quite a long time (up to 3 minutes) if onboard firmware is being updated. Do not interrupt the installation process!*

5.2.4.4 Allowing system extension on Apple silicon (M1, M2, …)

In case you install a DELTACAST card in an Apple silicon that has never had a kernel extension installed before you should be prompted to allow the system extension on the system before being able to allow the DELTACAST kext loading on the system. In this event the following panel requiring the user to enable system extensions.





Click on the lock in the bottom left of the panel, enter your password and then click on *Shut Down.*

Once the system powered off, press and maintain pressed the power button of the system during at least 10 seconds in order to boot in *Recovery Mode*.



In the first panel select the system you are installing the DELTACAST on and click *Security Policy*.



Then check *Reduced Security* and *Allow user management of kernel extensions from identified developpers*. Click *OK*. Enter your password when you are asked to and click OK.

The new security policy is applied and the panel closes.

At this point you can shutdown the system using Apple menu, reboot it and allow the DELTACAST kext in the *Security & Privacy* panel such as explaine in the previous chapter.

5.2.4.5 VideoMaster libraries

The VideoMaster libraries are a set of frameworks.

During the installation process, the core, audio, vbi and vbi data VideoMaster frameworks are automatically copied in `/Library/Frameworks`.

5.2.4.6 Kext loading authorization

The error code 27 (Kext loading error) means that the DELTACAST kext failed to load because it does not have the user approval.

In theory the system, at the first load of the DELTACAST kext, should ask the user to if he wants to unblock the kext or not.

If the system did not ask or if the user did not unblock the kext, then he has to go in the "Security and Privacy" settings to unblock it manually.

The following Apple's developer technical note explains how to do that:
https://developer.apple.com/library/archive/technotes/tn2459/_index.html

5.2.4.7 Adding a DELTACAST devices to a system

Adding or replacing a DELTACAST device on a system already equipped with a DELTACAST device is transparent for the user. There is no need to re-install the driver and the FWUpdater service launched at startup will update the device firmware in background if needed.

Note that in event of firmware update, the system needs to be rebooted in order to finalize the update. Your DELTACAST device will not be functional unless you reboot.

5.2.4.8 Upgrading VideoMaster

To upgrade VideoMaster, repeat the installation procedure with the new VideoMaster package installer.

5.2.4.9 Uninstalling VideoMaster

The package installer app doesn't currently allow the automated uninstallation of VideoMaster. Although, if you wish to uninstall VideoMaster, an uninstallation script is provided under `/Applications/Deltacast/` and can be executed as follows:

```
sudo /Applications/Deltacast/uninstall_videomaster.sh
```

The script asks for a reboot once it has completed its operations. This action is mandatory before trying to perform any other VideoMaster installation. You can choose to perform it later but please be aware that not rebooting prior to installing the new package results in undefined behavior.

5.2.4.10 Upgrading from 6.25 to 6.25.1+

If you wish to upgrade from VideoMaster 6.25.0 to a later version, please make sure to uninstall the current version following the uninstall procedure described in the installation guide from 6.25.0.

5.2.4.11 Downgrading from 6.25.1+ to -6.25

If you wish to downgrade VideoMaster to an earlier version than 6.25.1, please make sure to uninstall the current version following the uninstall procedure described above.

6 CONFIGURATION

Some DELTACAST hardware devices support several different firmwares to implement different products. We call them configurations. The user can switch from one configuration to another one using the FWUpdater application, delivered with VideoMaster.

- On macOS the application is installed in *>Library>Application Support>Deltacast*
- On Windows the application is installed in C:\Program Files\deltacast\VideoMaster\tools\firmware_updater

6.1 Available configurations depending on the hardware

6.1.1 SDI cards configurations

Part number \ Configuration	8C	8b	84	80	3G4c-ASI4c *	2C	20	12G2c-asi8c	40	04	4c	4i2c	4o2c
DELTA-3G-elp-d 8C	x	x	x	x	x								
DELTA-3G-elp-d 8b	x	x	x	x	x								
DELTA-3G-elp-d 84	x	x	x	x	x								
DELTA-3G-elp-d 80	x	x	x	x	x								
DELTA-12G-elp-h 2C						x	x	x					
DELTA-12G-elp-h 20						x	x	x					
DELTA-12G2c-asi8c-elp-h						x	x	x					
DELTA-12G-elp-h 40									x	x	x		
DELTA-12G-elp-h 04									x	x	x		
DELTA-12G-elp-h 4c									x	x	x		
DELTA-12G-e-h 4i2c												x	x
DELTA-12G-e-h 4o2c												x	x

(*) If card version is equal or higher than 4.2

6.1.2 IP cards configurations

Part number \ Configuration	ST2110_RX	ST2110_TX
DELTA-ip-ST2110 10	x	x
DELTA-ip-ST2110 01	x	x

6.1.3 FLEX configurations

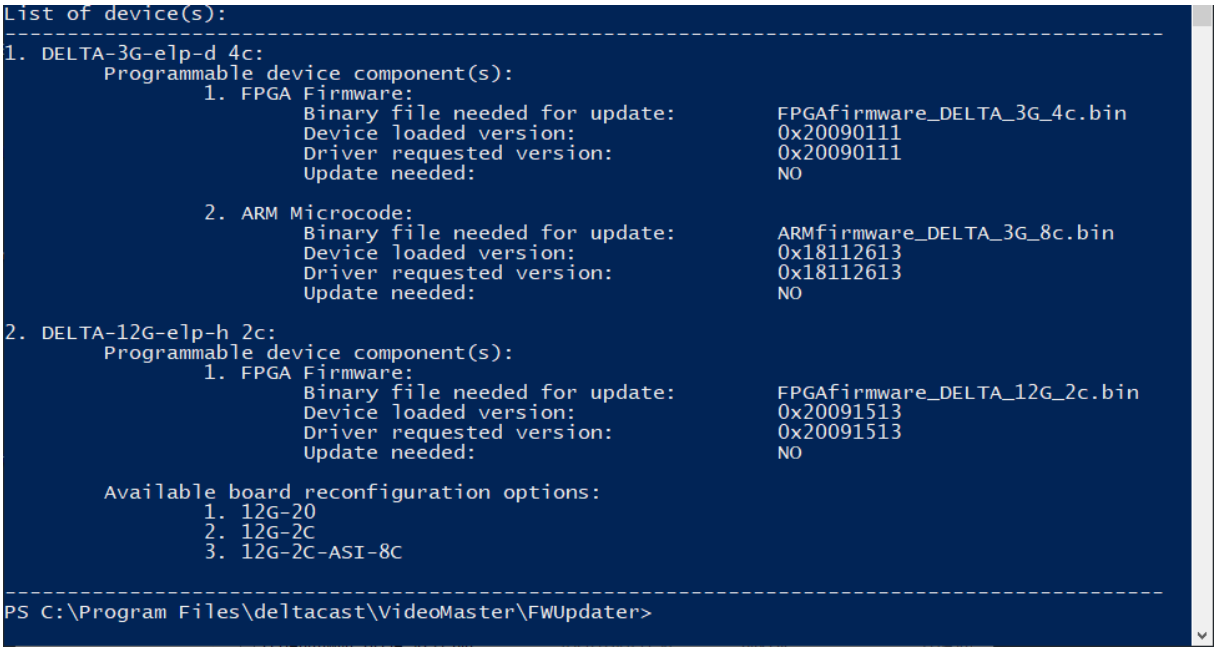
Part number \ Configuration	FLEX-12G 10	FLEX-12G 01
FLEX-12G 10	x	x
FLEX-12G 01	x	x

If your DELTACAST device is listed in the above tables and you wish to change the configuration, the different steps to do so are described below

6.2 Retrieving the card ID and the configuration ID

Launch a powershell (Windows 10) or a command line with administrator rights and run `delta-firmware-updater.exe` with `config list` as arguments

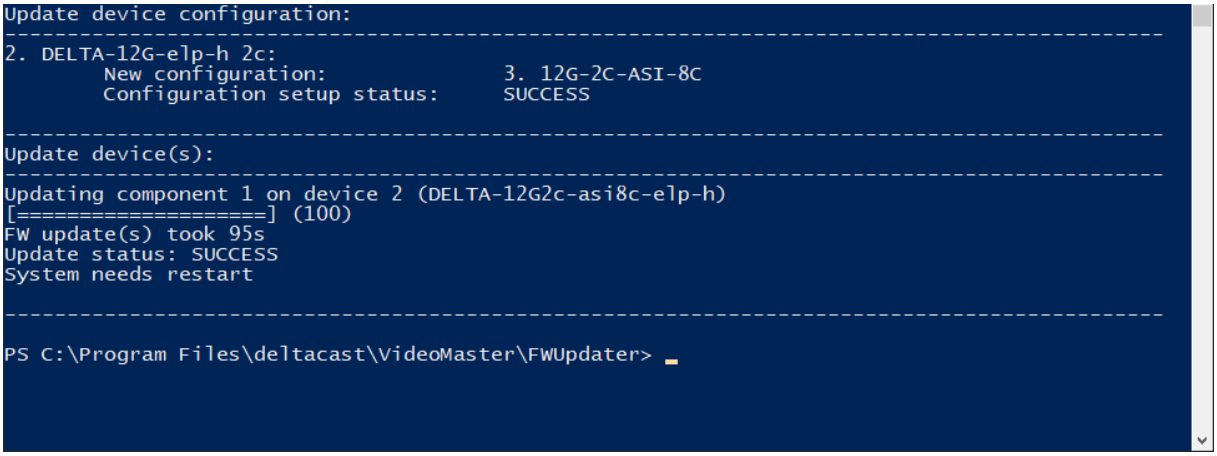
The application lists all the DELTACAST devices installed, their corresponding ID and the different configurations supported by the hardware as well as their corresponding ID.



6.3 Applying a new configuration

In the same powershell / command line, run `delta-firmware-updater.exe` with `config update --id=<device_id> --config-index=<config_id>`

A restart is needed to complete the operation as changing a card configuration also triggers an update of the onboard firmware.



7 PRODUCTS, DRIVERS and FIRMWARES

All the DELTACAST video cards share the same drivers named delta-x300. The FLEX gateway cards are handled by the delta-gwy drivers, and the FLEX modules use the flex-x400 drivers.

The following tables summarize driver and firmware needs of DELTACAST devices. Note that depending on the operating system, the driver extension differs: .sys extension for Windows and .kext extension for MacOS.

PCIe Cards' Part Numbers	Driver	Firmware
DELTA-3G-elp-d 40 and DELTA-3G-elp 40	delta-x300	FPGAfirmware_DELTA_3G_40.bin
DELTA-3G-elp-d 22,21,12,11,20,02,10,01	delta-x300	FPGAfirmware_DELTA_3G_22.bin ARMfirmware_DELTA_hd_3G.bin
DELTA-3G-elp-d 04 DELTA-3G-elp 04	delta-x300	FPGAfirmware_DELTA_3G_04.bin ARMfirmware_DELTA_hd_3G.bin
DELTA-3G-elp 10,01,11,20,02,22	delta-x300	FPGAfirmware_DELTA_3G_22.bin ARMfirmware_DELTA_hd_3G.bin
DELTA-3G40-hd40-elp-d	delta-x300	FPGAfirmware_DELTA_3G_40_hd_40.bin
DELTA-h4k	delta-x300	FPGAfirmware_DELTA_HDMI.bin ARMfirmware_DELTA_HDMI.bin
DELTA-3G-elp-key 11	delta-x300	FPGAfirmware_DELTA_3G_11.bin ARMfirmware_DELTA_hd_3G.bin
DELTA-3G-elp-d 4c	delta-x300	FPGAfirmware_DELTA_3G_4c.bin ARMfirmware_DELTA_3G_8c.bin
DELTA-3G-elp-d 8c	delta-x300	FPGAfirmware_DELTA_3G_8c.bin ARMfirmware_DELTA_3G_8c.bin
DELTA-3G-elp-d 80	delta-x300	FPGAfirmware_DELTA_3G_80.bin ARMfirmware_DELTA_3G_8c.bin
DELTA-3G-elp-d 84	delta-x300	FPGAfirmware_DELTA_3G_84.bin ARMfirmware_DELTA_3G_8c.bin
DELTA-3G-elp-d 8b	delta-x300	FPGAfirmware_DELTA_3G_8b.bin ARMfirmware_DELTA_3G_8c.bin
DELTA-ip-ST2110 01, 10	delta-x300	FPGAfirmware_DELTA_ip_ST2110_XX.bin ARMfirmware_DELTA_ip_ST110.bin Microblazefirmware_DELTA_ip_ST2110_10.bin
DELTA-3G-elp-key-d 2K,4K	delta-x300	FPGAfirmware_DELTA_3G_Key.bin ARMfirmware_DELTA_3G_8c.bin
DELTA-h4k2-elp 20	delta-x300	FPGAfirmware_DELTA_h4k2_elp_20.bin or (depending on mounted flash) FPGAfirmware_DELTA_h4k2_elp_20_async_flash.bin
DELTA-3G-elp-2key-d 22, 44	delta-x300	FPGAfirmware_DELTA_3G_2Key.bin ARMfirmware_DELTA_3G_8c.bin
DELTA-12G-elp-h 1c	delta-x300	FPGAfirmware_DELTA_12G_1c.bin
DELTA-12G-elp-h 2c	delta-x300	FPGAfirmware_DELTA_12G_2c.bin
DELTA-12G-elp-h 20	delta-x300	FPGAfirmware_DELTA_12G_40.bin
DELTA-12G-elp-h 40	delta-x300	FPGAfirmware_DELTA_12G_40.bin
DELTA-12G-elp-h 04	delta-x300	FPGAfirmware_DELTA_12G_04.bin

DELTA-12G-elp-h 4c	delta-x300	FPGAfirmware_DELTA_12G_4c.bin
DELTA-12G-e-h 4i2c	delta-x300	FPGAfirmware_DELTA_12G_4i2c.bin
DELTA-12G-elp-key 11 (-nr)	delta-x300	FPGAfirmware_DELTA_12G_key11.bin
DELTA-12G2c-asi8c-elp-h	delta-x300	FPGAfirmware_DELTA_12G2c_asi8c.bin
DELTA-12G2c-hmi10-elp	delta-x300	FPGAfirmware_DELTA_12G2c_hmi10.bin
DELTA-12G-elp 4c	delta-x300	FPGAfirmware_DELTA_12G_4c_bnc.bin
DELTA-12G11-hmi11-e-key	delta-x300	FPGAfirmware_DELTA_12G11_hmi11_key.bin
DELTA-12G-elp 2c	delta-x300	FPGAfirmware_DELTA_12G_2c_bnc.bin
DELTA-12G-e-h 4o2c	delta-x300	FPGAfirmware_DELTA_12G_4o2c.bin
DELTA-hmi-e 40	delta-x300	FPGAfirmware_DELTA_hmi_e_40.bin
DELTA-12G-e-h 8c	delta-x300	FPGAfirmware_DELTA_12G_e_h_8c_bot.bin FPGAfirmware_DELTA_12G_e_h_8c_top.bin Switchfirmware_DELTA_12G_E_H_8C.pmc Switchconfig_DELTA_12G_E_H_8C.pmc
DELTA-ip25-44-elp	delta-x300	FPGAfirmware_DELTA_ip_d25_q12g.bin
DELTA-IP25-44-SDI-4c-e(lp)	delta-x300	FPGAfirmware_DELTA_ip25_44_sdi_4c.bin
DELTA-hmi-elp 20	delta-x300	FPGAfirmware_DELTA_hmi_elp_20.bin

FLEX Products' Part Numbers	Driver	Firmware
DELTA-GWY 316-8	delta-gwy	SwitchConfig_Gateway.pmc SwitchFirmware_Gateway.pmc UCfirmware_Gateway.bin
DELTA-GWY 316-4	delta-gwy	SwitchConfig_Gateway.pmc SwitchFirmware_Gateway.pmc UCfirmware_Gateway.bin
DELTA-GWY 308-8	delta-gwy	SwitchConfig_Gateway.pmc SwitchFirmware_Gateway.pmc UCfirmware_Gateway.bin
DELTA-GWY 308-4	delta-gwy	SwitchConfig_Gateway.pmc SwitchFirmware_Gateway.pmc UCfirmware_Gateway.bin
FLEX-dp 10	flex-x400	FPGAfirmware_FLEX_dp_10.bin
FLEX-dp 01	flex-x400	FPGAfirmware_FLEX_dp_01.bin
FLEX-hmi 10	flex-x400	FPGAfirmware_FLEX_hmi_10.bin
FLEX-hmi 01	flex-x400	FPGAfirmware_FLEX_hmi_01.bin
FLEX-3G 40	flex-x400	FPGAfirmware_FLEX_sdi_40.bin
FLEX-3G 04	flex-x400	FPGAfirmware_FLEX_sdi_04.bin
FLEX-12G 10	flex-x400	FPGAfirmware_FLEX_12g_10.bin
FLEX-12G 01	flex-x400	FPGAfirmware_FLEX_12g_01.bin

8 TROUBLESHOOTING

This chapter contains a series of known issues and their solutions.

This chapter is divided as follows:

Chapter	Content
General	Issues one could encounter with any DELTACAST products.
PCIe Cards	Issues one could encounter with any PCIe Cards products
FLEX Solution	Issues one could encounter with any FLEX Solution's products

If you have encountered problems installing or operating one DELTACAST hardware, browse through this list and locate the most appropriate case. If you cannot find the suitable solution in this list, please browse the DELTACAST web site, which contains an up-to-date troubleshooting section and a FAQ.

8.1 General

⊙ **DELTACAST driver installation failed due to a hardware conflict**

☞ There could be a conflict with another device (such as a network controller). Try re-installing the driver after having removed all other non-essential devices and, once installed, re-install the removed cards.

⊙ **My computer crashes after days and days of perfect running**

☞ Some components on the DELTACAST devices require adequate ventilation. Please ensure that your PC is correctly ventilated.

☞ If your DELTACAST devices are well ventilated, please browse the DELTACAST web site and check for any driver or VideoMaster updates.

8.1.1 Windows

⊙ **My Windows application does not see my DELTACAST device.**

☞ Check in the device manager if any error code are reported for the DELTACAST device and contact the DELTACAST support.

8.1.2 Mac OS

⊙ **I have multiple devices connected but cannot properly operate them.**

☞ If an error is returned by the application handling those devices or if the devices behave unexpectedly (e.g. unknown board model), there could be a lack of shared memory preventing the SDK to work properly. In this case, the following values should be increased sufficiently:

```
sudo sysctl -w kern.sysv.shmmax=xxxxxxxx
sudo sysctl -w kern.sysv.shmmin=1
```

```
sudo sysctl -w kern.sysv.shmseg=xx
sudo sysctl -w kern.sysv.shmall=xxxx
```

For instance, doubling or quadrupling the default values would be a good start.

Please note that these values are not persistent and are lost after a reboot of the platform. To make them permanent, multiple solutions exist. One of them consists in placing a plist file into /Library/LaunchDaemons/ which runs and sets the shared memory parameters on boot.

8.2 PCIe Cards

8.2.1 General

⊙ **I cannot insert my DELTACAST card in a PCIe slot**

☞ If you are installing your card in a new PC, PCIe slots may present some mechanical resistance as the card slides into the slot. Press the card strongly but carefully into the slot.

⊙ **My computer will not boot since I installed one DELTACAST device**

☞ The first issue could be that your card is not correctly positioned into its slot. In this case, turn off all power supplies and ensure that the card properly fits into the slot.

☞ Another possible issue is that a cable (IDE cable) or PC component (RAM module) has been accidentally moved and not correctly repositioned during the installation.

8.2.2 Windows

⊙ **After having placed a DELTACAST device in my PC and re-started it, Windows did not prompted me to install a driver**

☞ The DELTACAST device installation is done using a script provided in the redistributable package. Please refer to the installation chapter.

8.2.3 Docker containers

⊙ **My application that is running in a Docker container has incoherent information about the cards installed.**

☞ This typically means that the application is running in a different IPC namespace and/or does not have access to some shared memory context. Ensure that the main container is run with `--ipc=host` and other containers are run with the following options:

`--ipc=container:name_of_main_container`

`--priviliged` access.

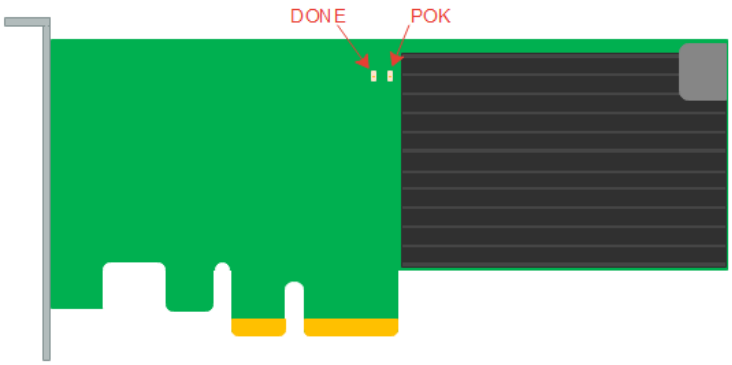
You also need to map `/dev/shm` using `-v/dev/shm:/dev/shm`.

8.2.4 LED

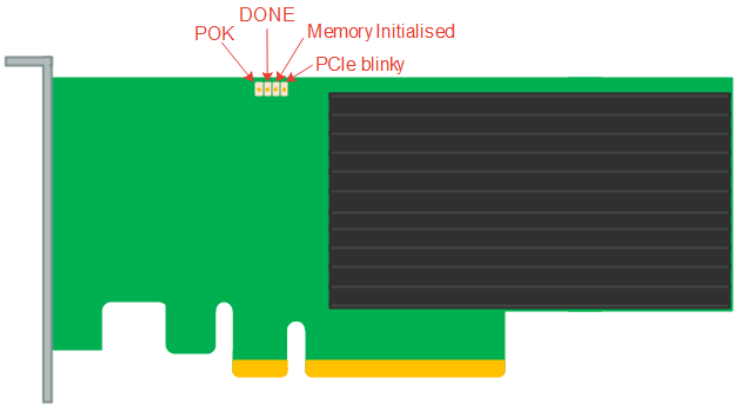
DELTACAST cards include a series of LEDs giving information about their status and operating mode.

These LEDS can help you to troubleshoot and understand what is going on the card, and to communicate more efficiently with our technical support staff.

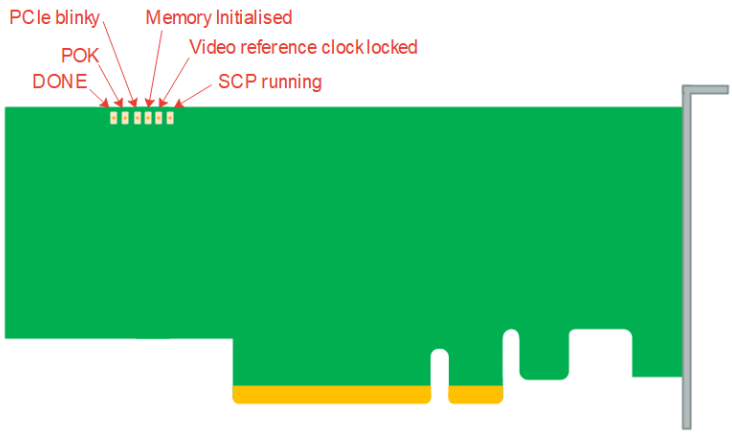
As detailed below, the families and generations of DELTACAST cards use different combinations of LEDs position, behavior and meaning.

DELTA-sd DELTA-hd DELTA-3G-elp-d 11, 10, 01 DELTA-3G-elp-d 22, 02, 20, 21, 12 DELTA-3G-elp-d 04, 40 DELTA-3G-elp 11, 10, 01 DELTA-3G-elp 04, 40 DELTA-3G-elp 20, 02, 22 DELTA-3G-elp-key 11 DELTA-3G40-hd40-elp-d DELTA-h4k-elp 20	

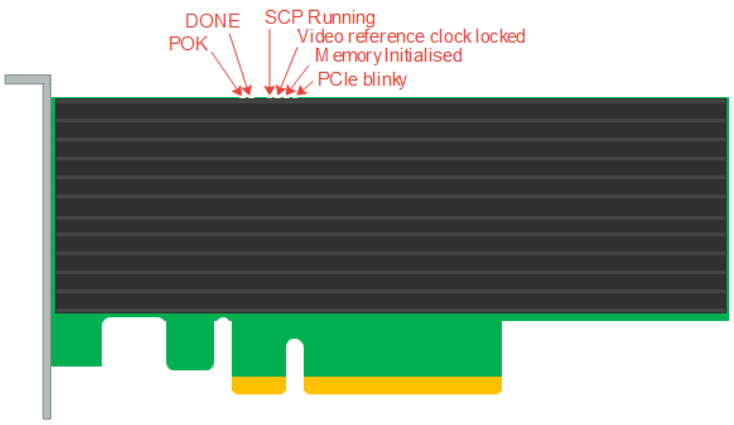
POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded

DELTA-3G-elp-d 8c, 8b, 80, 84 DELTA-3G-elp-d 4c DELTA-3G-elp-2key-d 22, 44 DELTA-3G-elp-key-d 2K, 4K DELTA-ip-ST2110 10, 01	

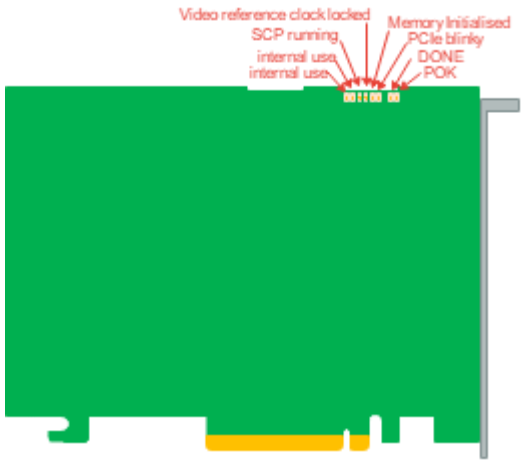
POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
PCIe blinky	Led toggles once the PCIe clock is received

DELTA-h4k2-elp 20	

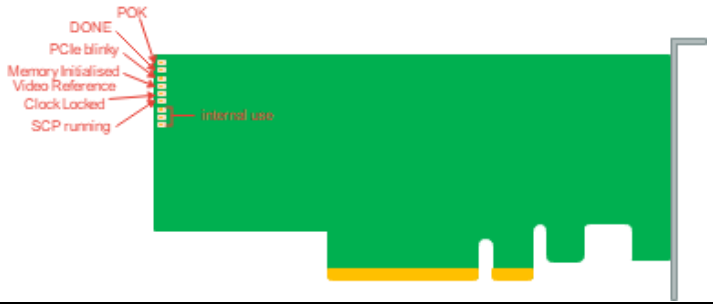
POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
PCIe blinky	Led toggles once the PCIe clock is received
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
Video reference clock locked	Led turns on when the video reference clock is ready to be used
SCP running	If a SCP is present in the design and well loaded, the led turns on

DELTA-12G-elp-h 1c, 2c, 20 DELTA-12G2c-asi8c-elp-h DELTA-12G-elp-h 40, 04, 4c DELTA-12G-elp 2c, 4c DELTA-12G2c-hmi10-elp	

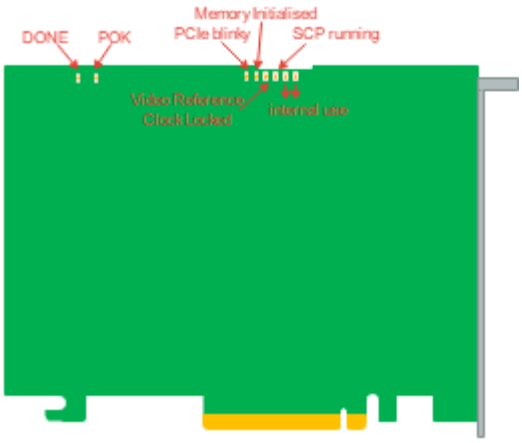
POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
PCIe blinky	Led toggles once the PCIe clock is received
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
Video reference clock locked	Led turns on when the video reference clock is ready to be used
SCP running	If a SCP is present in the design and well loaded, the led turns on

DELTA-12G-e-h 4i2c DELTA-12G-e-h 4o2c	

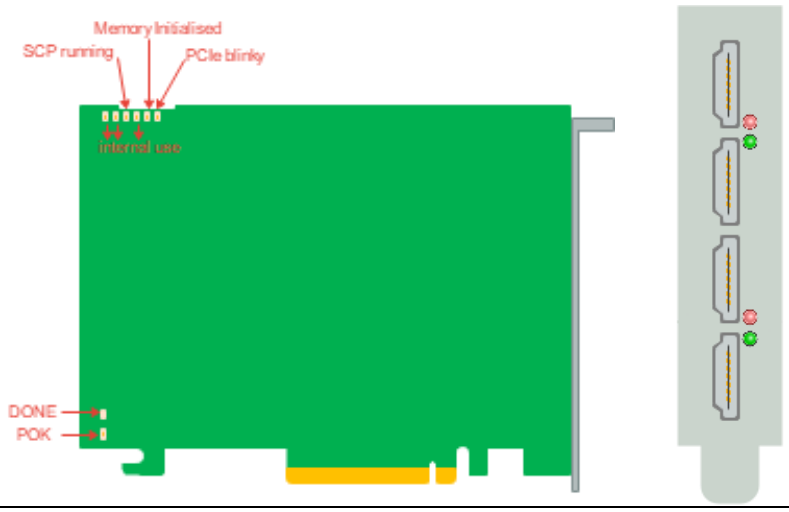
POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
PCIe blinky	Led toggles once the PCIe clock is received
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
Video reference clock locked	Led turns on when the video reference clock is ready to be used
SCP running	If a SCP is present in the design and well loaded, the led turns on

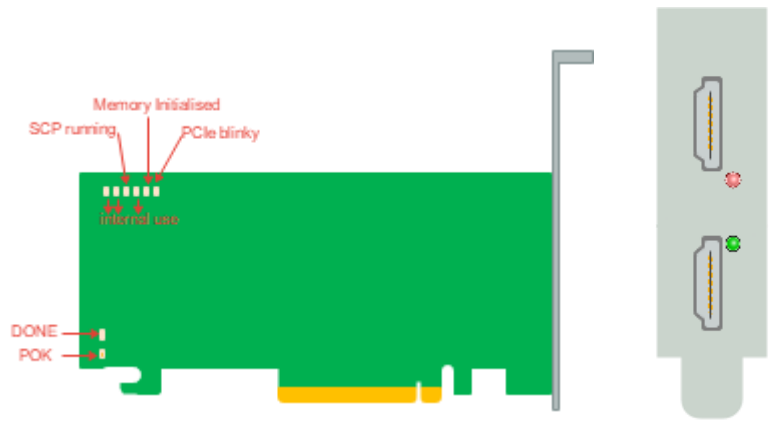
DELTA-12G-elp-key 11	

POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
PCIe blinky	Led toggles once the PCIe clock is received

DELTA-12G11-hmi11-e-key	

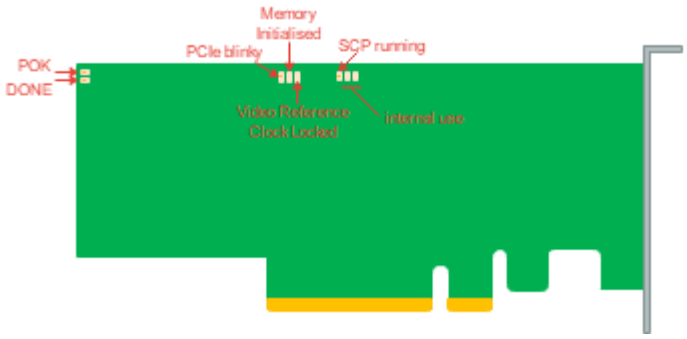
POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
PCIe blinky	Led toggles once the PCIe clock is received
Video reference clock locked	Led turns on when the video reference clock is ready to be used
SCP running	If a SCP is present in the design and well loaded, the led turns on

DELTA-hmi-e 40	

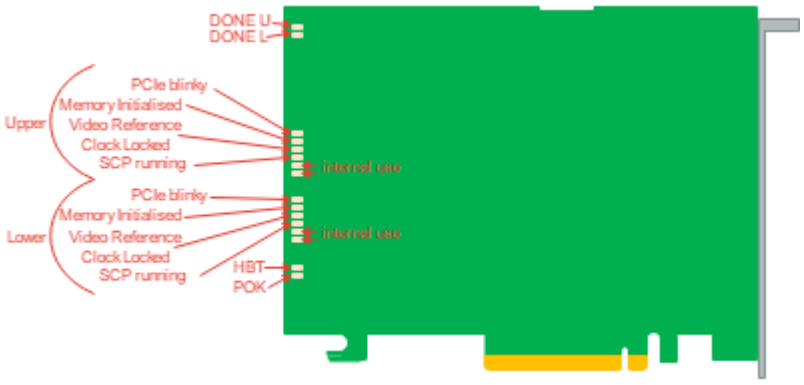
DELTA-hmi-elp 20	

POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
PCIe blinky	Led toggles once the PCIe clock is received
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
SCP running	Led turns ON once the SCP is correctly loaded and running

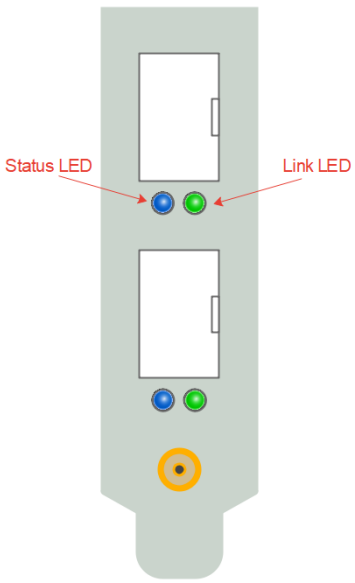
Channel State	Bracket LED
No HDMI cable is detected	**White**
Cable is detected but no signal locked	**Red**
Signal locked but unsupported format	**Orange**
Valid signal locked, supported TMDS format	**Green**
Valid signal locked, FRL-3	**Turquoise**
Valid signal locked, FRL-4/5/6	**Blue**
CRC error or other signal errors	**0.3s Red flash**

DELTA-12G-elp 2c/4c	

POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the Lower FPGA programmation succeeded
PCIe blinky	Led toggles once the PCIe clock is received
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
Video reference clock locked	Led turns on when the video reference clock is ready to be used
SCP running	If a SCP is present in the design and well loaded, the led turns on

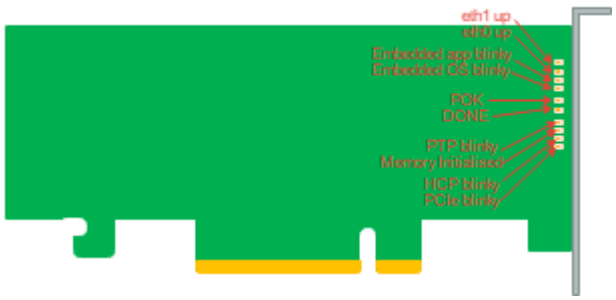
DELTA-12G-e-h 8c	

POK	Led turns ON once the power-up sequencing of the board succeeded
HBT	Led toggles to indicate the well-functioning of the PCIe switch
DONE U	Led turns ON once the Upper FPGA programmation succeeded
DONE L	Led turns ON once the Lower FPGA programmation succeeded
PCIe blinky	Led toggles once the PCIe clock is received
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
Video reference clock locked	Led turns on when the video reference clock is ready to be used
SCP running	If a SCP is present in the design and well loaded, the led turns on

DELTA-ip ST2110 10, 01	

ST2110 10		
State	Status LED	Link LED
Error	Red	Green
Power On	Blue	Blue
SFP plugged	Blue	Green (blinking on activity)

ST2110 01		
State	Status LED	Link LED
Error	Red	Green
Power On	Yellow	Yellow
SFP plugged	Yellow	Green

DELTA-ip25-44-elp	

PCIe blinky	Led toggles at 1Hz once the PCIe clock is received
HCP blinky	Led toggles at 1Hz once the HCP interface clock is running
Memory Initialised	Led turns ON once the on-board DDR memory is calibrated
PTP blinky	Led toggles each time the PTP time passes one second
POK	Led turns ON once the power-up sequencing of the board succeeded
DONE	Led turns ON once the FPGA programmation succeeded
Embedded OS blinky	Led toggles at 1Hz when the embedded OS is running
Embedded app blinky	Led toggles at 2Hz when the embedded application is running
Eth0 up	Led turns ON if eth0 link is up
Eth1 up	Led turns ON if eth1 link is up

8.3 FLEX Solution

8.3.1 DELTA-gwy

8.3.1.1 General

⊙ **I cannot insert my DELTACAST card in a PCIe slot**

☞ If you are installing your card in a new PC, PCIe slots may present some mechanical resistance as the card slides into the slot. Press the card strongly but carefully into the slot.

8.3.2 FLEX modules

8.3.2.1 General

⊙ **The FLEX module doesn't appear in my operating system**

☞ Your FLEX module could have been plugged while the operating system was running. In that case, please restart your computer.

☞ Your DELTA-gwy might not be powered with an external « PCI Express 150W-ATX » power cable. Please make sure that it is the case.

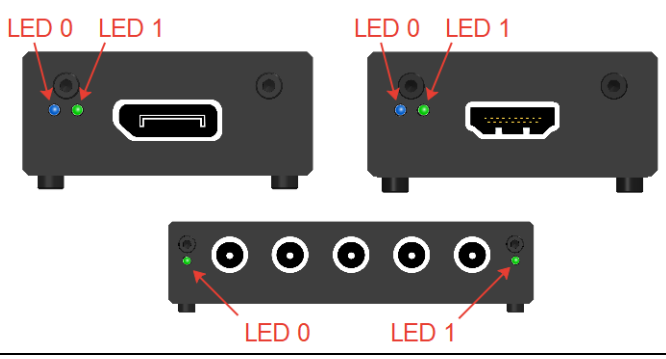
☞ Your FLEX module might not be connected properly to your DELTA-gwy. If it is connected properly, please make sure that you are using the specific cables provided with the solution.

8.3.3 LED

DELTACAST FLEX modules include a series of LEDs giving information about their status and operating mode.

These LEDS can help you to troubleshoot and understand what is going on the card, and to communicate more efficiently with our technical support staff.

As detailed below, the families and generations of DELTACAST cards use different combinations of LEDs position, behavior and meaning.

FLEX-DP 10, 01 FLEX-HMI 10, 01 FLEX-3G 40, 04 FLEX-12G 10, 01	

FLEX-DP 10		
Status	LED 0	LED 1
PCIe issue	Steady Red	
PCIe OK and DDR not calibrated	Steady Orange	
Board OK	Blinking Green	
No DisplayPort cable	Blinking Green	Steady Red
DisplayPort link training failure	Blinking Green	Steady Orange
DisplayPort OK	Blinking Green	Steady Green
FLEX-DP 01		
Status	LED 0	LED 1
PCIe issue	Steady Red	
PCIe OK and DDR not calibrated	Steady Orange	
Board OK	Blinking Blue	
No DisplayPort cable	Blinking Blue	Steady Red
DisplayPort link training failure	Blinking Blue	Steady Orange
DisplayPort OK	Blinking Blue	Steady Green
FLEX-HMI 01		
Status	LED 0	LED 1
PCIe issue	Steady Red	
PCIe OK and DDR not calibrated	Steady Orange	
Board OK	Blinking Blue	
No HDMI cable	Blinking Blue	Steady Red
HDMI Lock Issue	Blinking Blue	Steady Orange
HDMI OK	Blinking Blue	Steady Green
FLEX-HMI 10		
Status	LED 0	LED 1
PCIe issue	Steady Red	
PCIe OK and DDR not calibrated	Steady Orange	
Board OK	Blinking Green	
No HDMI cable	Blinking Green	Steady Red
HDMI Lock Issue	Blinking Green	Steady Orange
HDMI OK	Blinking Green	Steady Green
FLEX-3G 40 & FLEX-12G 10		
Status	LED 0	LED 1
PCIe issue	Steady Red	
PCIe OK and DDR not calibrated	Steady Orange	
No Video Reference Clock	Blinking Green	Steady Red
Board OK – No Video Locked	Blinking Green	
Board OK – 1 Channel Locked	Blinking Green	Steady Yellow
Board OK – 2 Channels Locked	Blinking Green	Steady Magenta
Board OK – 3 Channels Locked	Blinking Green	Steady Blue
Board OK – 4 Channels Locked	Blinking Green	Steady Green

FLEX-3G 04 & FLEX-12G 01		
Status	LED 0	LED 1
PCIe issue	Steady Red	
PCIe OK and DDR not calibrated	Steady Orange	
No Video Reference Clock	Blinking Blue	Steady Red
Board OK	Blinking Blue	Steady Green

9 ANNEX A: CONFORMANCE

9.1 FCC Notice

Per FCC Part 2 Section 2. 1077(a)

Manufacturer's name:	DELTACAST
Manufacturer's address:	Rue Gilles Magnée 92/6 4430 Ans BELGIUM
Manufacturer's phone:	+32-4-239 7884

Hereby declares the products:

Trade name: DELTACAST

Model numbers:

DELTA-3G-elp 40
DELTA-3G-elp 01
DELTA-3G-elp 10
DELTA-3G-elp 11
DELTA-3G-elp 20
DELTA-3G-elp 11
DELTA-3G-elp 2c
DELTA-3G-elp-key 11

DELTA-3G-elp-key-d 4K
DELTA-3G-elp-key-d 2K
DELTA-3G-elp-2key-d 22
DELTA-3G-elp-2key-d 44

DELTA-3G-elp-d 40
DELTA-3G-elp-d 20
DELTA-3G-elp-d 10
DELTA-3G-elp-d 21
DELTA-3G-elp-d 22
DELTA-3G-elp-d 12
DELTA-3G-elp-d 11
DELTA-3G-elp-d 01
DELTA-3G-elp-d 02
DELTA-3G-elp-d 04
DELTA-3G-elp-d 4c
DELTA-3G-elp-d 8c
DELTA-3G-elp-d 80
DELTA-3G-elp-d 84
DELTA-3G-elp-d 8b

DELTA-3G-elp-tico-d 4c

DELTA-hd-elp-d 80
DELTA-hd-elp-d 44
DELTA-hd-elp-d 62

DELTA-hd-e-key 22
DELTA-hd-e-key 11

DELTA-hd-e 22
DELTA-hd-e 21
DELTA-hd-e 12
DELTA-hd-e 11
DELTA-hd-e 20
DELTA-hd-e 02
DELTA-hd-e 10
DELTA-hd-e 01

DELTA-dvi-e 20
DELTA-dvi-e 10
DELTA-h4k-elp 20
DELTA-h4k2-elp 20

DELTA-ip-ST2110 10
DELTA-ip-ST2110 01

DELTA-hd10-asi12-e
DELTA-hd11-asi11-e
DELTA-hd20-asi01-e
DELTA-hd10-asi10-e
DELTA-hd20-asi02-e
DELTA-3G4c-ASI4c-elp-d
DELTA-12G2c-hmi10-elp
DELTA-12G2c-asi8c-elp-h

DELTA-asi-elp-d 4c
DELTA-asi-elp-d 8c
DELTA-asi-elp 11
DELTA-asi-elp 40
A-LTC-1

DELTA-gwy 316-8
DELTA-gwy 316-4

FLEX-dp 10
FLEX-dp 01
FLEX-hmi 10
FLEX-hmi 01
FLEX-3G 40
FLEX-3G 04
FLEX-12G 10
FLEX-12G 01

DELTA-12G-elp-h 1c
DELTA-12G-elp-h 2c
DELTA-12G-elp-h 20
DELTA-12G-elp-h 40
DELTA-12G-elp-h 04
DELTA-12G-elp-h 22
DELTA-12G-elp-h 4c
DELTA-12G-elp-key 11
DELTA-12G-elp-key 11 -nr
DELTA-12G-elp-key 11 -cp
DELTA-12G-e-h 2i1c
DELTA-12G-e-h 4i2c
DELTA-12G-e-h 4o2c
DELTA-12G-elp 4c
DELTA-12G11-hmi11-e-key
DELTA-12G-elp 2c

Conform to the following specifications: **FCC CFR47 Part 15 Subpart B**.

Supplementary Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Notes: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RF Interference Warning: This is a Class A product. In a domestic environment this product may cause radio frequency (RF) interference, in which case the user may be required to take adequate measures.

Modifications: Any modifications made to this device that are not approved by DELTACAST may void the authority granted to the user by the FCC to operate this equipment.

9.2 ICES-003 Class A Notice - Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

9.3 DoC Notices

EU Declaration of Conformity

The following products are in conformity with the relevant Union harmonisation legislation: EU Electromagnetic Compatibility Directive (2014/30/EU), RoHS Directive (2011/65/UE) and are CE-marked accordingly.

Products (Part Numbers)	DELTA-ip-ST2022-6 xx, DELTA-ip-ST2022-6-tico, DELTA-ip-ST2110 xx, DELTA-3G-elp xx, DELTA-3G-elp-d 8b, DELTA-3G-elp-d 80, DELTA-3G-elp-d 84,DELTA-3G-elp-d 08, DELTA-3G-elp-d xx, DELTA-3G-elp-key 11, DELTA-3G40-hd40-elp-d, DELTA-3G-elp-d 4c, DELTA-3G-elp-d 8c, DELTA-3G-elp-tico-d 4c, DELTA-3G-elp-key-d 4K, DELTA-3G-elp-key-d 2K, DELTA-3G-elp-2key-d 44, DELTA-3G-elp-2key-d 22, DELTA-dvi-e xx, DELTA-hd-e xx, DELTA-3G4c-ASI4c-elp-d, DELTA-hd-e-key xx, DELTA-hdxx-asixx-e, DELTA-hd-elp-d xx, DELTA-sd-elp-d 80, DELTA-asi-elp xx, DELTA-asi-elp-d xc, A-LTC-1 where xx is a 2-digit number where x is a 1-digit number -bb, -pc, -lb, -nb and -cd options no mentioned but included
Tested by request of	**DELTACAST.TV** Rue Gilles Magnée 92/6 B-4430 ANS (Belgium)
Manufactured at	**DELTACAST.TV** Rue Gilles Magnée 92/6 B-4430 ANS (Belgium)
Classification	Professional audio, video, audio-visual and entertainment lighting control apparatus
Trade mark	DELTACAST
Type of the equipment	Digital video to PCI-express gateway

For the evaluation of EU 2014/30/EU EMC directive, the harmonized standard listed below were applied:

Emission	Immunity
EN 55103-1:2009 + A1:2012	EN 55103-2:2009
EN 55022:2006	EN 61000-4-4:2004
	EN 61000-4-2:1995 + A1:1998 + A2:2001
	EN 61000-4-3:2006 + A1 :2008

Ans, 20th May 2019

O. Roba, General Manager

EU Declaration of Conformity

The following products are in conformity with the relevant Union harmonisation legislation: EU Electromagnetic Compatibility Directive (2014/30/EU), RoHS Directive (2015/863) and are CE-marked accordingly.

Products (Part Numbers)	DELTA-h4k-elp 20, DELTA-h4k2-elp 20, DELTA-12G-elp-h 1c, DELTA-12G-elp-h 2c, DELTA-12G-elp-h 4c, DELTA-12G-elp-h 40, DELTA-12G-elp-h 04, DELTA-12G-elp-h 22, DELTA-12G-elp-h 20, DELTA-12G2c-asi8c-elp-h, DELTA-12G1c-hmi10-elp, DELTA-12G2c-hmi10-elp, DELTA-12G11-hmi11-e-key, DELTA-12G-e-h 2i1c, DELTA-12G-e-h 4i2c, DELTA-12G-e-h 4o2c, DELTA-12G-elp-key 11, DELTA-12G-elp 4c, DELTA-12G-elp 2c, DELTA-12G-e-h xiyc, FLEX-dp 10, FLEX-dp 01, FLEX-3G 40, FLEX-3G 04, FLEX-hmi 10, FLEX-hmi 01, FLEX-12G 10, FLEX-12G 01, DELTA-gwy 316-4, DELTA-gwy 316-8, DELTA-gwy 308-4, FLEX-R1U -bb, -pc, -lb, -nb, -nr, -cp and -cd options no mentioned but included
Tested by request of	**DELTACAST.TV** Rue Gilles Magnée 92/6 B-4430 ANS (Belgium)
Manufactured at	**DELTACAST.TV** Rue Gilles Magnée 92/6 B-4430 ANS (Belgium)
Classification	Professional audio, video, audio-visual and entertainment lighting control apparatus
Trade mark	DELTACAST
Type of the equipment	Digital video to PCI-express gateway

For the evaluation of EU 2014/30/EU EMC directive, the harmonized standard listed below were applied:

Emission	**Immunity**
EN 55032:2012	EN 55103-2:2009 EN 61000-4-4:2004 EN 61000-4-2:1995 + A1:1998 + A2:2001 EN 55035:2017 EN 61000-4-3:2006 + A1:2008 + A2:2010 EN 61000-4-6:2013

Ans, 13th December 2024

F. Devisch, CEO



DELTACAST

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