

DAC 102

Two Input, One Output Digital to Analog Audio Decoder



Safety Instructions

Safety Instructions • English

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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. The Class A limits 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 interference. This interference must be corrected at the expense of the user.

NOTES:

- This unit was tested with shielded I/O cables on the peripheral devices. Shielded cables must be used to ensure compliance with FCC emissions limits.
- For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics see the [Extron Safety and Regulatory Compliance Guide](#) on the Extron website.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

CAUTION: Risk of minor personal injury.

ATTENTION : Risque de blessure mineure.

ATTENTION:

- Risk of property damage.
- Risque de dommages matériels.

NOTE: A note draws attention to important information.

TIP: A tip provides a suggestion to make working with the application easier.

Software Commands

Commands are written in the fonts shown here:

^ARMerge Scene, ,Øp1 scene 1,1 ^B 51 ^W ^C.Ø

[Ø1] RØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]

Esc X1 * X17 * X20 * X23 * X21 CE ←

NOTE: For commands and examples of computer or device responses used in this guide, the character “Ø” is used for the number zero and “O” is the capital letter “O.”

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

Specifications Availability

Product specifications are available on the Extron website, www.extron.com.

Extron Glossary of Terms

A glossary of terms is available at <http://www.extron.com/technology/glossary.aspx>.

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Introduction

This section gives an overview of the Extron DAC 102 audio decoder. Topics include:

- [About this Guide](#)
- [About the DAC 102 Audio Decoder](#)
- [Application Diagrams](#)
- [Features](#)

About this Guide

This guide describes the DAC 102 audio decoder and discusses how to install, configure, and operate them.

In this guide, the terms “decoder” and “audio decoder” refer to the DAC 102 audio decoder.

About the DAC 102 Audio Decoder

The Extron DAC 102 audio decoder is a two input, one output digital to analog audio decoder. It accepts 2-channel LPCM audio signals (up to 192kbps) from either a TOSLINK or S/PDIF coaxial source and converts the signal to balanced/unbalanced 2-channel audio. An integrated remote volume control port allows for output level adjustment and mute control when used with volume controllers such as the VCM series of products.

The DAC 102 bridges digital S/PDIF sources with external analog audio devices such as amplifiers and audio switchers. It accepts digital audio S/PDIF connections over coaxial RCA or optical TOSLINK and converts them to 2-channel analog audio. Balanced/unbalanced analog stereo 2-channel outputs are available over a single 5-pole captive screw connection. Only uncompressed PCM/LPCM formatted (up to 192kbps) audio signals are supported as the DAC 102 does not accept multichannel audio and does not have the ability to downmix. The integrated remote volume control port allows for output level adjustment and mute when used with analog volume controllers such as the VCM series of volume controllers.

To accommodate installation in tight locations, the DAC 102 is housed in a small, low profile 1.3 inch tall plastic enclosure with a mini Type B USB connection.

Application Diagrams

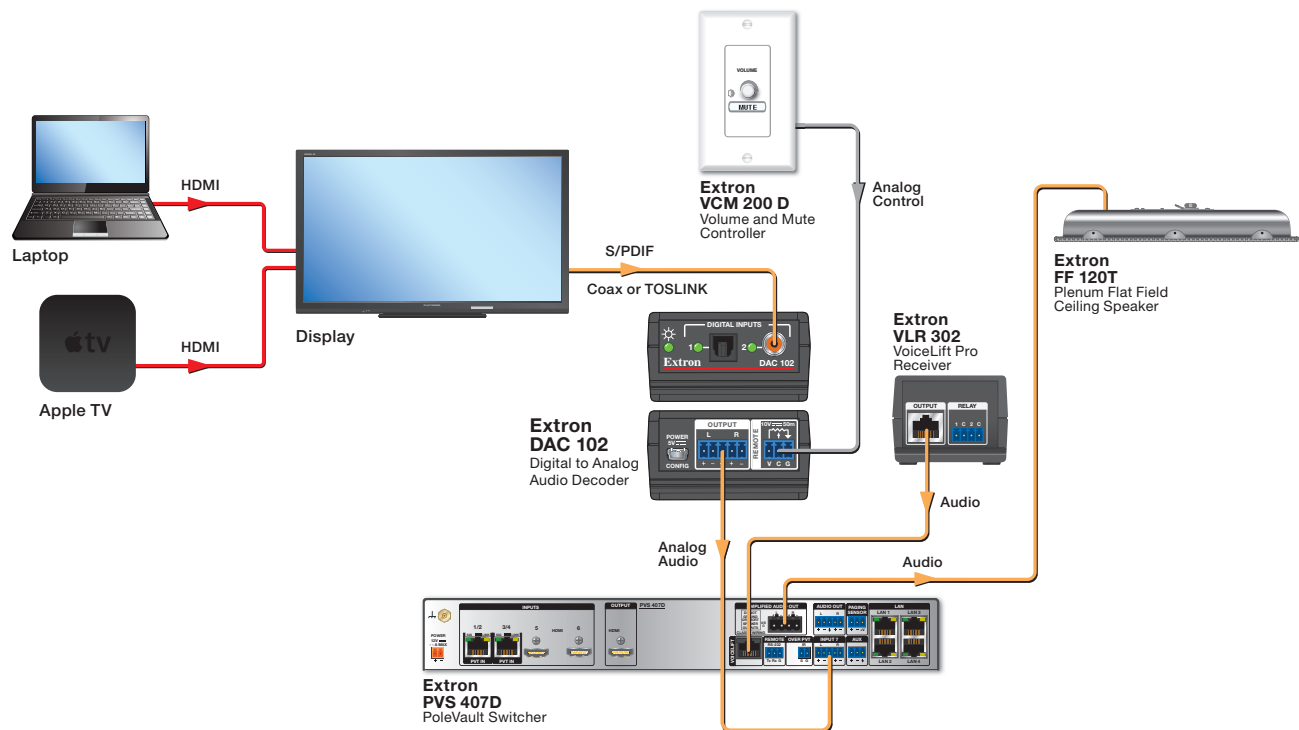


Figure 1. Application with Display Devices

Features

- **Decodes digital audio to analog audio**
- **Inputs** —
 - a. One TOSLINK fiber optic input
 - b. One S/PDIF RCA Input
- **Outputs** —
 - One 5-pole Captive Screw Connector
- **Supports two channel uncompressed digital PCM/LPCM audio at 32 kHz, 44.1 kHz, 48 kHz, 96 kHz, and 192 kHz sample rates** — Resolutions up to 24-bit.
- **Analog balanced or unbalanced line level audio output**
- **Input Priority** — Incoming digital audio formats and sample rates are automatically detected, and only one signal can be processed at a time. For more in depth information, go to the [Input Priority](#) on page 7.
- **Remote Volume Control** — The REMOTE port allows for analog volume and mute control when used in conjunction with a volume controller such as the Extron MLA VC10 Plus or the VCM 200 D.
- **Audio Delay** — Audio delay allows for lip sync correction and can be adjusted between 0-100 ms, in 1 ms steps. Users can adjust audio delay using PCS or Dataviewer software over the USB connection.
- **Housed in a plastic 1.3 inch high, 1/8 rack width enclosure. Includes the ZipClip 25 to install under a desk, on a rack rail system, or in a lectern.**

Installation

This section describes the installation and setup of the DAC 102 audio decoder. Topics include:

- [Installation Overview](#)
- [Rear Panel Connections](#)

Installation Overview

To install and set up the DAC 102:

1. **Turn off all equipment** and disconnect from the power source.
2. **Connect source devices** via the TOSLINK or S/PDIF RCA inputs.
3. **Connect to the 5-pole, 3.5 mm captive screw connection** output of the DAC 102 to an audio amplifier or audio processor (see [figure 2, B](#)).
4. **Connect a volume controller (such as a compatible VCM and MLC analog volume controller)** to the one female 3-pole, 3.5 mm blue captive screw connector for remote volume control (see [figure 2, C](#) on page 5).
5. **Connect power** (see [figure 2, A](#) on page 5) **to the decoder** by connecting the included USB A to USB mini-B cable to the rear female USB mini-B connection. The mini USB port allows the audio decoder to be powered from a 5 V USB power source.

To configure the unit, connect your computer to the POWER/CONFIG USB mini B female connection (see [figure 2, A](#) on page 5). Use Product Configuration Software (PCS) or Simple Instruction Set (SIS) to adjust settings.

6. **Power on the products connected downstream from the DAC 102.**

ATTENTION:

- Do not connect power to the DAC 102 until you have read the [ATTENTION notices](#) on page 5.
- Ne branchez pas l'alimentation au DAC 102 avant d'avoir lu les mises en garde «[ATTENTION](#) aux page 5 ».

Rear Panel Connections

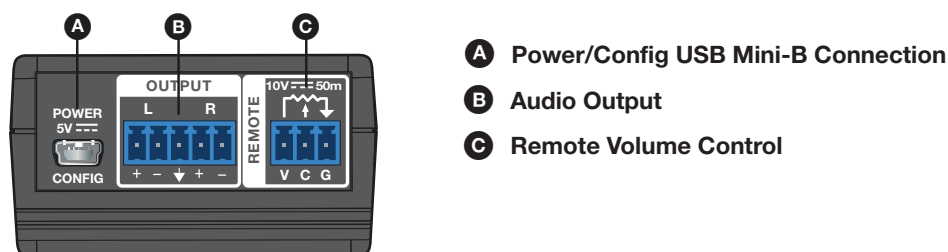


Figure 2. DAC 102 Rear Panel

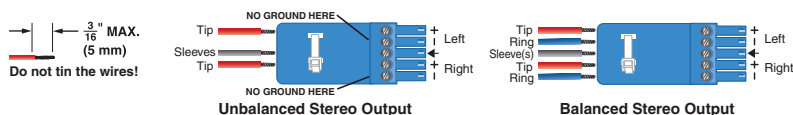
A Power/Config USB Mini-B Connection — One female USB Mini-B connection.

- The DAC 102 is powered by a 5 V USB power source.
- The USB connection may also be used with a PC for configuration and firmware updates when needed. When updating firmware, the connected computer must supply ample current over the USB connection in order to power the DAC 102.

B Audio Output — One female 5-pole (3.5 mm) blue captive screw connector for 2-channel balanced/unbalanced audio output.

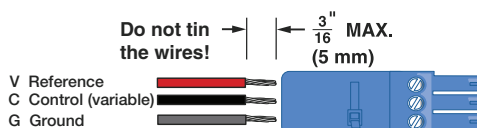
Output supports 2-channel analog line level audio on both balanced and unbalanced connections.

- Nominal output level +6 dBV consumer level unbalanced.
- Nominal output level +12 dBV when wired for balanced output.



C Remote Volume Control — One female 3-pole (3.5 mm) blue captive screw connector for remote volume control.

The rear panel REMOTE port allows for the optional analog volume and mute control, when used in conjunction with optional volume controllers such as the Extron MLA VC10 Plus, VCM series products, MLC 64 RS VC D, and MLC 55 RS VC.



ATTENTION:

- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to building structure or similar structure.
- Cette installation doit toujours être conforme aux dispositions applicables du Code américain de l'électricité (National Electrical Code) ANSI/NFPA 70, article 725, et du Code canadien de l'électricité, partie 1, section 16. La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.
- This product is intended to be powered by a UL Listed power source marked "Class 2" or "LPS", output rated 5Vdc or from a USB port on a Listed device.
- Ce produit doit être alimenté par une source d'alimentation certifiée UL de classe 2 ou LPS, avec une tension nominale 5 Vcc ou depuis un port USB d'un appareil certifié.

Audio Delay

The DAC 102 supports up to 100 ms of audio delay for correcting lip sync issues. Lip sync issues occur when the video content does not match the timing of the audio.

Audio delay can be adjusted from a PC via Simple Instruction Set (SIS) commands or Product Configuration Software (PCS).

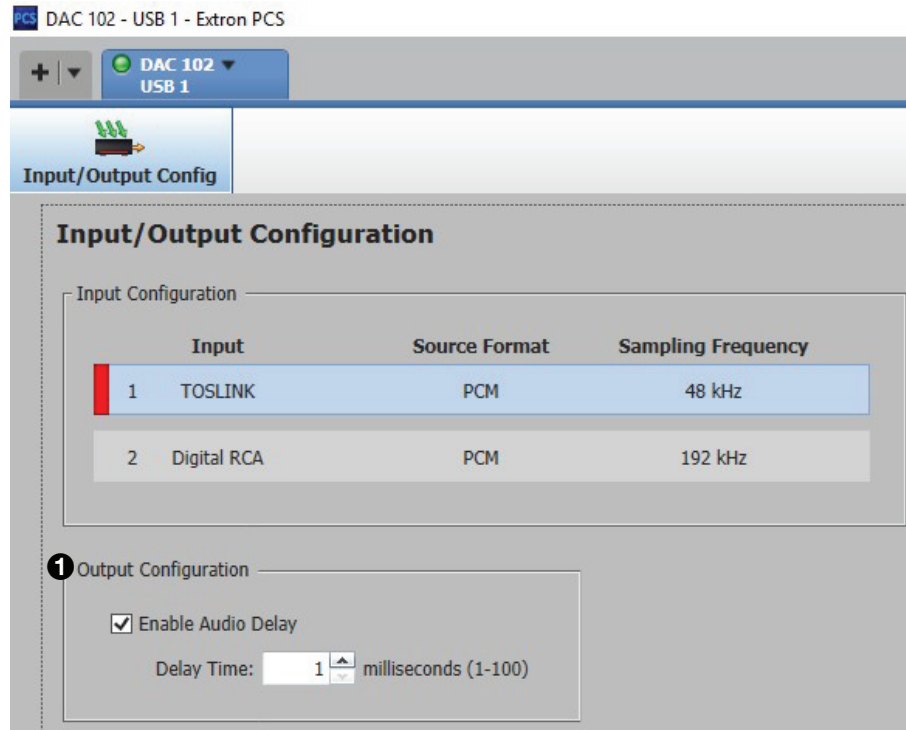


Figure 3. PCS Interface - Input/Output Config

See [Configure the Decoder with PCS](#) on page 13 to learn how to configure audio delay on the DAC 102.

Operation

This section describes the operation of the DAC 102 audio decoder. Topics include:

- **Front Panel Features**
- **TOSLINK and S/PDIF RCA Inputs**

Front Panel Features

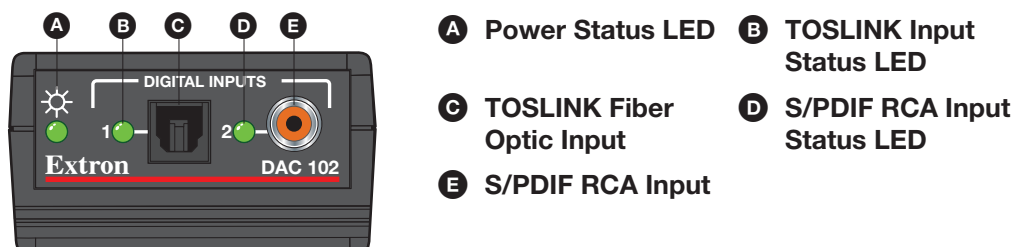


Figure 4. DAC 102 Front Panel

- A Power Status LED Indicator** — One green LED for power and status indication. Lights when the unit is powered.
- B TOSLINK Input Status LED** — One green LED that indicates active TOSLINK input.
- C TOSLINK Fiber Optic Input** — One TOSLINK fiber optic input connection.
- D S/PDIF RCA Input Status LED** — One green LED that indicated active S/PDIF RCA input.
- E S/PDIF RCA Input** — One female orange RCA connector for coaxial S/PDIF audio input.

TOSLINK and S/PDIF RCA Inputs

Digital PCM/LPCM 2-channel audio from either coaxial RCA or TOSLINK source devices can be used.

Supported Digital Audio Formats

- Supports 2-channel uncompressed digital PCM/LPCM audio at 32 kHz, 44.1 kHz, 48 kHz, 96 kHz, and 192 kHz sample rates at up to 24-bit resolution
- Input signals that are not the PCM/LPCM rates listed above will not be supported. When incompatible formats are detected, the DAC 102 will mute the output to prevent damage to speakers downstream.

Input Priority

- Incoming digital audio formats and sample rates are automatically detected.
- Only one input signal can be processed at a time.
- Inputs are automatically switched based on priority and cannot be selected manually.

See the table on the next page for Input status, Priority, and LED states:

State	Active Input	Input 1 LED (TOSLINK/Optical)	Input 2 LED (S/PDIF RCA)
Input 1: No Signal Input 2: No Signal	—	OFF	OFF
Input 1: Compatible Source Input 2: No Signal	1	Solid	OFF
Input 1: No Signal Input 2: Compatible Source	2	OFF	Solid
Input 1: Compatible Source Input 2: Compatible Source	1	Solid	Slow Blink
Input 1: Compatible Source Input 2: Incompatible Source	1	Solid	Fast Blink
Input 1: Incompatible Source Input 2: Compatible Source	2	Fast Blink	Solid
Input 1: Incompatible Source Input 2: No Signal	—	Fast Blink	OFF
Input 1: No Signal Input 2: Incompatible Source	—	OFF	Fast Blink
Input 1: Incompatible Source Input 2: Incompatible Source	—	Fast Blink	Fast Blink

SIS Communication and Control

This section describes remote operation of the DAC 102 audio decoder. Topics include:

- **Using Simple Instruction Set (SIS) Commands**
- **Symbol Definitions**
- **Command and Response Table for SIS Commands**

Using Simple Instruction Set (SIS) Commands

The DAC 102 decoder can be remotely set up and controlled via Extron SIS commands issued from a computer or control system via USB from the computer USB port to the rear panel Power/Configuration port (see [figure 2](#) on page 5).

Host-to-switcher Communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command sequence. You can enter these commands from your computer using a communication software program such as Extron DataViewer. When the switcher determines that a command is valid, it executes the command and sends a response to the host device.

Responses from the DAC 102 to the host computer end with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Switcher-initiated Messages

When a local event such as a front panel selection or change in signal status takes place, the switcher responds by sending a message to the host, indicating what change has occurred. No response is required from the host.

The switcher sends the following message when it is first powered on:

(C) Copyright 2019, Extron Electronics, DAC 102, V1.00, 60-1811-01↵

- V1.00 is the firmware version number

NOTE: This message is displayed at power-up with the USB connection only.

Using the Command and Response Table

The Command and Response Table for SIS Commands lists valid ASCII and hexadecimal command codes, the switcher responses to the host, and a description of the command function or the results of executing the command.

The conversion table below is for use with the command and response table.

ASCII to Hex Conversion Table																Esc	1B	CR	0D	LF	0A
Space	20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27						
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F						
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37						
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F						
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47						
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F						
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57						
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F						
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67						
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F						
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77						
x	78	y	79	z	7A	{	7B		7C	}	7D	~	7E	DEL	7F						

Figure 5. ASCII to Hex Conversion Table

Symbol Definitions

- X1** = Active Input number
In0 = none
In1 = TOSLINK
In2 = S/PDIF RCA
- X2** = Source 1 Format (Source LED indication on front panel)
Ø = Not Present
1 = PCM (**PCM and 2-CH**)
2 = Unsupported format
- X3** = Source 2 Format (Source LED indication on front panel)
Ø = Not Present
1 = PCM (**PCM and 2-CH**)
2 = Unsupported format
- X4** = Source 1 Format Sampling Frequency
Ø = None
1 = 32 kHz
2 = 44.1 kHz
3 = 48 kHz
4 = 88.2 kHz
5 = 96 kHz
6 = 192 kHz
- X5** = Source 2 Format Sampling Frequency
Ø = None
1 = 32 kHz
2 = 44.1 kHz
3 = 48 kHz
4 = 88.2 kHz
5 = 96 kHz
6 = 192 kHz
- X6** = Audio Delay
Ø = 0 seconds (No Delay, default)
1 - 100 = Delay in Milliseconds

- [X7]** = Verbose Mode
 Ø = None
 1 = Verbose mode (default)
 2 = Tagged responses for queries
 3 = Verbose mode and tagged responses for queries
[X8] = User Assigned Device Name
[X9] = Firmware version (to the second decimal place)

Command and Response Table for SIS Commands

Command	ASCII Command (Host to Decoder)	Response (Decoder to Host)	Additional Description
Request Part Number	N	6Ø-1811-Ø1↵ Pno6Ø-1811-Ø1↵	68-1811-01 Vrb mode 2/3
Query firmware version	Q	[X9]↵ VerØ1*[X9]↵	Show firmware version [X9], to the second decimal place. Vrb mode 2/3
View input	!	[X1]↵	
Source Format Information Request	I	SrcFormat[X2][X3]•Sampling[X4][X5]↵	
Set Audio Delay	[Esc][X6]ADLY↵	Adly[X6]↵	<i>Delays audio output from 0-100mS 1mS per step. Affects both (L and R) audio channels</i>
View Audio Delay	[Esc]ADLY↵	[X6]↵	
Set verbose mode	[Esc][X7]CV↵	Vrb[X7]↵	
View verbose mode	[Esc]CV↵	[X7]↵	
Set Unit Name	[Esc][X8]CN↵	Ipn•[X8]↵	
Set Unit Name to Factory Default	[Esc]•CN↵	Ipn•DAC-1Ø2↵	
View Unit Name	[Esc]CN↵	[X8]↵	
Reset all device settings to factory	[Esc]ZXXX↵	Zpx↵	

NOTE: See [Symbol Definitions](#) starting on the previous page to learn what the [X] values represent.

Product Configuration Software

The Extron Product Configuration Software (PCS) offers another way to configure the DAC 102 via a USB connection in addition to the SIS commands.

This section describes software installation and communication, along with updating firmware.

Topics in this section include:

- [Downloading PCS from the Extron Website](#)
- [Configure the Decoder with PCS](#)
- [Updating Firmware Using PCS](#)

Downloading PCS from the Extron Website

Extron Product Configuration Software (PCS) is an easy option for configuring the DAC 102.

Visit www.extron.com to download and install the PCS software.

1. Mouse over the **Download** tab at the top of the homepage (see figure 6, ❶ below).

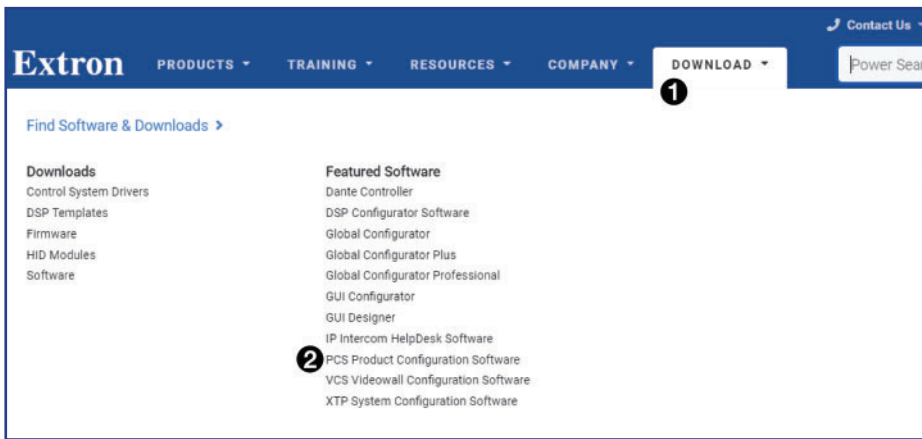


Figure 6. PCS Software Link on Download Tab

2. Click on the **PCS** link in the drop-down menu (❷).

The PCS window opens with the current version.

Version	Release Date	New in the Current Release	Size	Release Notes
4.4.3	May 20, 2019	• Added support for the HC 402 Series (Listed as HCR 102)	195.7 MB	0.4 MB

Figure 7. PCS Software Download Link

3. Click **Download** (see figure 6, ❶) and follow the on-screen instructions to install the software.

Configure the Decoder with PCS

1. Connect a control PC via USB to the DAC 102 audio decoder. The Windows-based PC communicates with the audio decoder via the USB port.
2. Open the PCS software on the control PC from the PCS icon loaded on the desktop (optional, see image on the right) or from the Start menu.

Click **Start > Programs > Extron Electronics > Extron Product Configuration Software**



The Product Configuration Software opens to the Device Discovery screen.

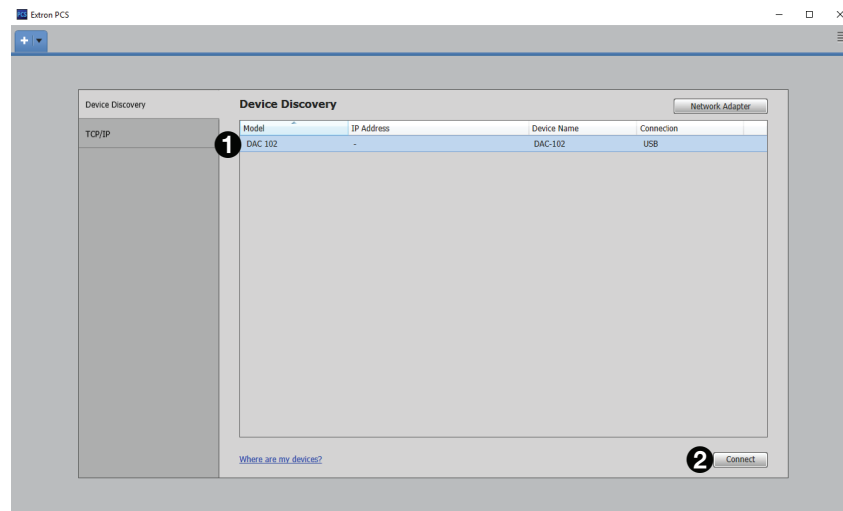


Figure 8. PCS Device Discovery Screen

3. Select the **DAC 102** device by clicking on it to highlight it in the list (see figure 8, ① above).
4. Click **Connect** (②).

The Product Configuration Software opens to the device main menu (see figure 8).

Input/Output Configuration Menu

This menu allows the user to configure the active inputs and output.

Input Configuration

The audio decoder gives details on what kind of signal is coming through its two inputs. Both inputs have the same two indicators: source format and sampling frequency.

Source format tells what type of audio signal is coming in through the respective input (see figure 9 on the next page, ①).

Sampling frequency details the frequency of the signal (see figure 9 on the next page, ②).

If no signal is found, then the Source Format will say **Not Present** and the Sampling Frequency will say **None**.

The Input Configuration panel allows the user to see which input is selected and the status of an input. Inputs cannot be manually selected in the DAC 102. Rather, inputs are automatically switched based on input priority in firmware.

The red bar on the side of the DAC 102 main menu indicates which input is currently selected.

Output Configuration Panel

The DAC 102 allows its user to configure audio delay (see figure 9 on the next page, ③). Audio delay can be enabled and have its delay time customized from zero milliseconds (default) to 100 milliseconds.

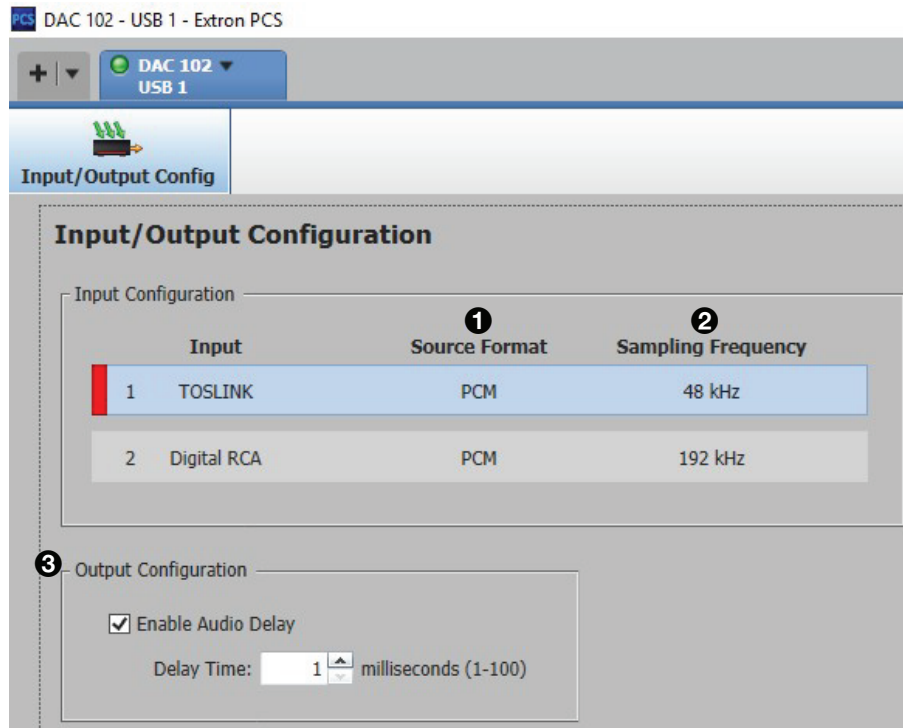


Figure 9. DAC 102 Main Menu

Updating Firmware Using PCS

Updates to the DAC 102 firmware are periodically made available on the Extron [website](http://www.extron.com). The version of firmware on the device can be found under **Settings** in PCS (see [figure 12](#) on the next page).

The following sections detail how to update the DAC 102 via PCS.

Downloading the DAC 102 Firmware

To obtain the latest version of firmware for the DAC 102:

1. Go to www.extron.com, mouse over the **Download** tab at the top of the page (1).

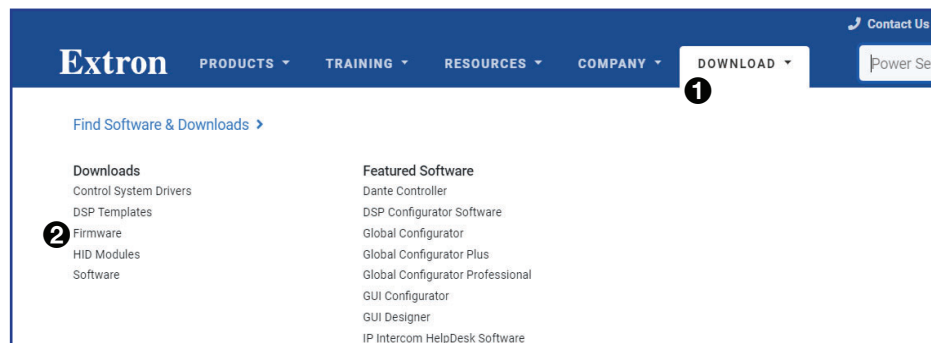


Figure 10. Firmware Link on the Download Tab

2. Click the **Firmware** link (2) in the drop-down menu. The **Firmware** page opens.

3. Click the letter **D** from the alphabetic navigation bar (❶), to locate the firmware.



Figure 11. Firmware Page with Alphabetic Navigation Bar

4. Scroll down the page until you find the firmware for your unit.
5. Click **Release Notes** to see the issues that have been addressed by the latest update.
6. Click **Download** and follow the on-screen instructions.
7. Follow the on-screen instructions to install the firmware. Make a note of where the firmware file is stored on the PC.

ATTENTION:

- The extension of the firmware file must be .s19. Opening a file with an incorrect extension may cause the device to stop functioning.
- L'extension du fichier firmware doit être .s19. Si un fichier est ouvert avec une mauvaise extension, l'appareil peut arrêter de fonctionner.

Loading the Firmware to the DAC 102 via PCS

To load a new version of firmware to the DAC 102 using PCS:

1. Connect your computer to the DAC 102 via a rear panel USB config port (see [Rear Panel Connections](#) on page 5).
2. If need be, download the latest version of DAC 102 firmware to your computer (see [Downloading the DAC 102 Firmware](#) on the previous page).
3. Open the Product Configuration Software via the PCS icon installed during the download (optional) or your desktop **Start** menu by making the following selections:

Start > All Programs > Extron Electronics > Extron Product Configuration Software



The **PCS** window opens with the **Device Discovery** window displayed in front. Select the **DAC 102** from the list, then select **Connect**.

4. After connecting to PCS, click the drop down arrow to bring up the menu. From the drop down menu, scroll down to **Update Firmware** and select **Update Firmware to this Device...**

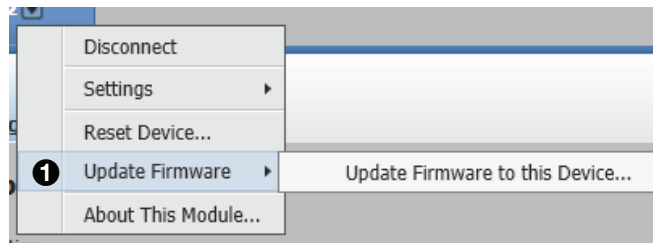


Figure 12. PCS Drop Down Menu

5. An **Update Firmware** window appears, select **Continue** to go into the **Update Firmware to this Device** window.

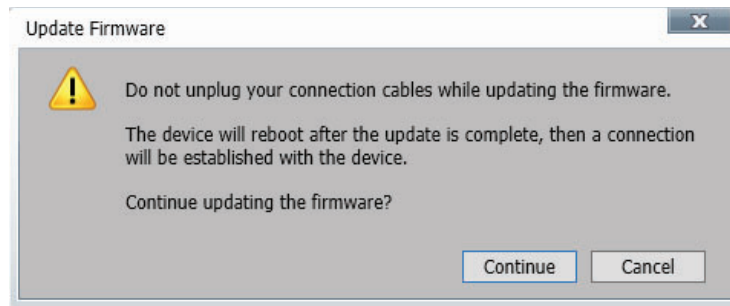


Figure 13. Update Firmware Caution Window

6. Select **Open Firmware File**, and search for the firmware file.

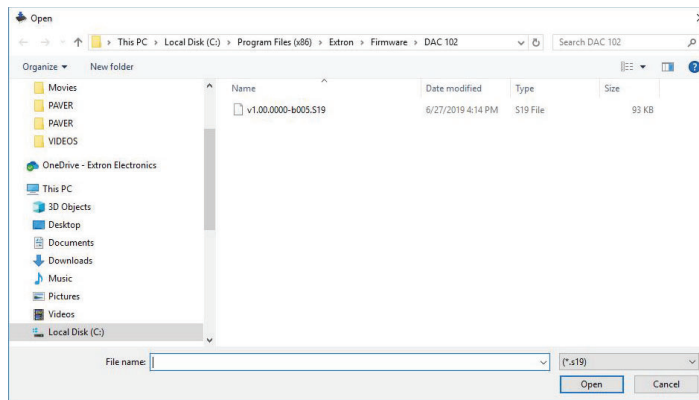


Figure 14. Open Window for Firmware File Selection

7. Select **Open**, and upon returning to the previous window, select **Update** to update the DAC 102 firmware. Once the update is complete, a window acknowledging the firmware has been successfully updated.

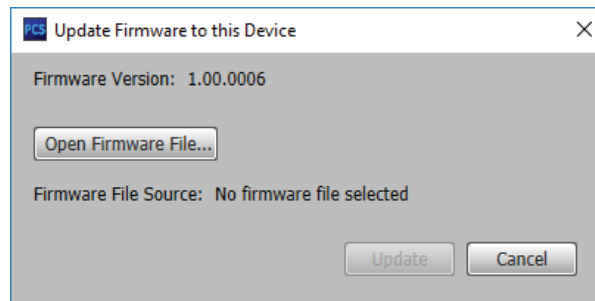


Figure 15. Open Firmware Window

Mounting

The DAC 102 audio decoder can be set on a table or mounted on a desk, podium, or table with the optional ZipClip 25.

Rack Rail Mounting

The DAC 102 audio decoder can be mounted onto a rack rail using a ZipClip 25 mounting kit. (see the mounting instructions provided with the kit).

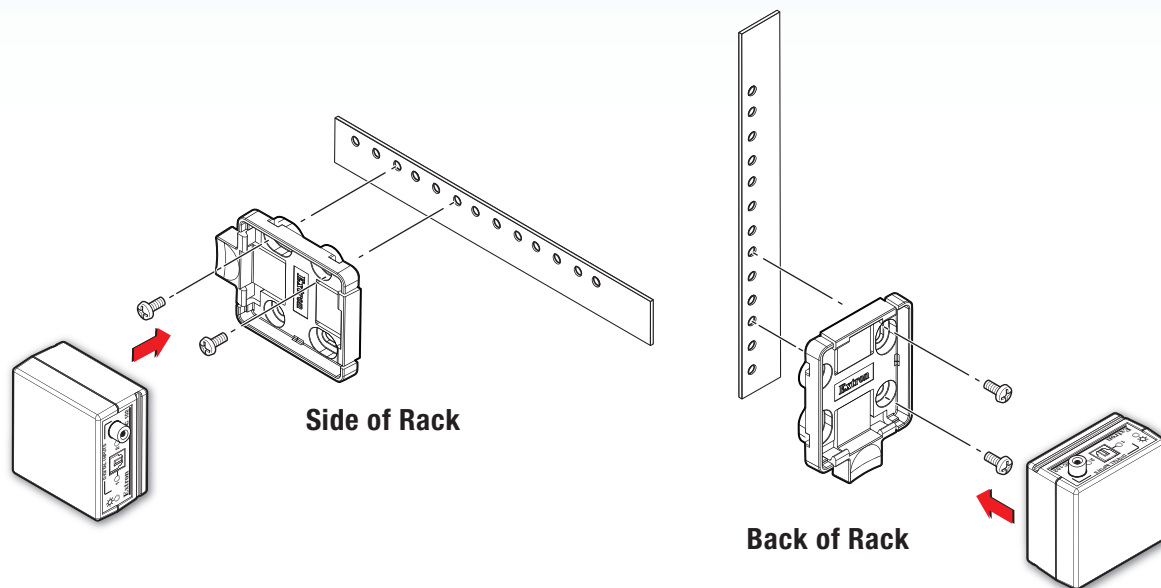


Figure 16. Rack Rail Installation Diagram

Furniture Mounting

The DAC 102 can be mounted under a desk, table, or podium using a ZipClip 25 mounting kit (see the mounting instructions provided with the kit).

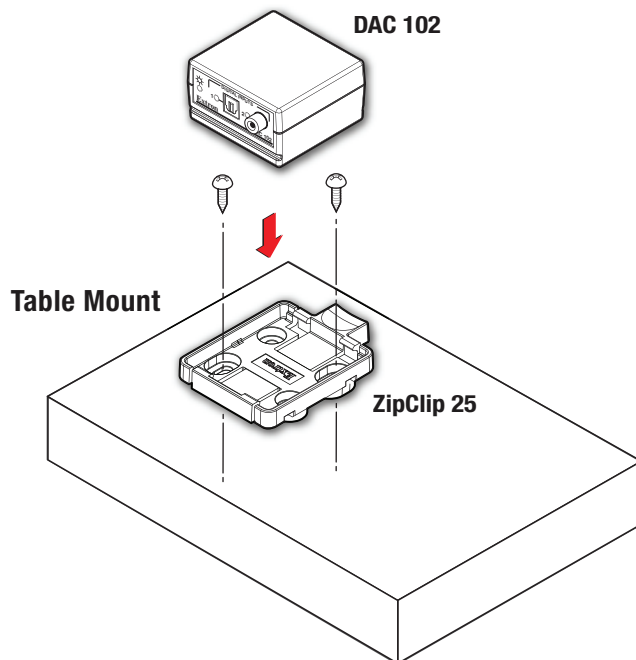


Figure 17. Table Mounting Diagram

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Japan:

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe and Africa:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:

Extron Asia Pte Ltd
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:

Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: 714.491.1500 or 800.633.9876

Asia: 65.6383.4400

Europe: 31.33.453.4040

Japan: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.