HighSecLabs
Highest Security Solutions Ltd.

Models:

FA10A-4 Secure Analog Diode
FA10B-4 Secure USB Diode
FA10AM-4 Secure Analog Diode with Microphone Support
FA10BM-4 Secure USB Diode with Microphone Support
FA10AO-4 Secure Always-Open Analog Diode
FA10BO-4 Secure Always-Open USB Diode
FA10AC-4 Secure Analog Diode with Microphone Support and USB Output for Camera
FA10BC-4 Secure USB Diode with Microphone Support and USB Output for Camera
FCA10BB-4 Secure USB Webcam Isolator
FA10BB-4 Secure USB Diode with USB Microphone Support & USB Output for Headset

HLT36561 Rev. 1.0

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INTRODUCTION

The Threat of Using Media Peripherals

Attackers can take control of a media device to listen in to classified or sensitive conversations in secure rooms or transfer data from secure to unsecured networks. HSL's Media Diode family of products connects between a source (a PC usually) and a peripheral media device (speaker/headphone, microphone, or webcam). The Media Diode prevents attackers from exploiting media-related data leakage.

Unidirectional Flow

The Media Diode enforces unidirectional flow of audio signals from its source. This prevents hackers from manipulating a speaker/headphone to function as a microphone, for picking up surrounding conversations. Some models also extend this protection to microphones and webcams.

Note: Enabling a microphone or webcam is done only via the push-button control, and it does not change the unidirectional flow restriction on the product in any way.

Low-Pass Filter

Audio passing through a Media Diode goes through a low-pass filter that restricts the audio frequencies to the range compatible with the human ear. This prevents hackers from attacking by broadcasting high-frequency signals to an external hacking device.

Push-Button Control

The Media Diode has push-buttons to activate the peripherals, which can be configured to adjust how long a connection stays on. These buttons use a bi-color (red and green) LED to show ON/OFF status, and flicker before a disconnection. The Diode also detects a press-and-release as a single event, to prevent keeping the connection open by holding the button down nonstop.

Before Installation

Unpack the Product

Before opening the product's sealed packaging, inspect the seal's condition to ensure that the product was not accessed or tampered with during delivery. If the packaging seal looks suspicious, contact the HSL support team and do not use the product.

- After removing the seal, inspect the packaging content to verify that the required components are included. See the packaging content list.
- After the Media Diode is removed from its packaging materials, carefully inspect the tamper-evident label to ensure that product is properly sealed. If the label is damaged or missing, contact HSL support and do not use the product.

Tamper-Evident Labels

- The Isolator uses a holographic tamper-evident label to provide visual indications in case of enclosure intrusion attempts. These labels indicate white dots or the text "VOID", once removed. When opening the product's packaging, inspect the tamper-evident label.
- If for any reason, one or more tamper-evident labels are missing, appear disrupted, or look different from the example shown here, please call HSL Technical Support and avoid using that product.

***Figure 1**: HSL Holographic Tamper-Evident Label*

Installing the Media Diode

The following procedure applies to all of HSL's Media Diode models.

Connect the Media Diode to the PC

- For all models, connect the USB connector to the PC's USB port.

Note: HSL's Media Diodes are powered by USB.

- For models FA10A-4, FA10AM-4, FA10AO-4 and FA10AC-4, connect the analog audio jack to the source PC's speaker port.

Note: For these models, the USB connection is used only to power the unit (no data).

- For models FA10AM-4 and FA10AC-4, which support mic and speakers and use a 4-pole audio jack:
  - If the PC has a 4-pole audio socket, connect the jack directly.
  - If the PC has a separate speaker and microphone ports:
    - Attach the supplied adapter to the 4-pole audio jack.
    - Connect the adapter's speaker and microphone connectors to their respective ports.

Connect the Peripherals to the Media Diode

- For all models, connect the analog speaker connector to the Media Diode's speaker port.
- For models that enable a microphone, connect the analog microphone connector to the Media Diode's microphone port.
- For models that enable a webcam, connect the webcam to the Media Diode's webcam USB port.

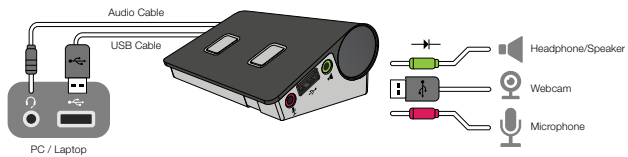

***Figure 2**: Media Diode Setup Configuration*

OPERATION

Models FA10A-4 and FA10B-4 (with a speaker button), the FCA10BB-4 (with a webcam button) and FA10AM-4, FA10BM-4, FA10AC-4 and FA10BC-4 (with both speaker and mic/webcam buttons) let the user open and close the paths between the computer and peripherals manually. By default, the paths are closed until their respective buttons are pressed.

A green LED indicates that the audio path is closed (safe). Pressing the device button opens the audio for 10 minutes, and the LED will change to red to indicate the audio is open (unsafe). 1 minute before the audio path closes, the LED around the button will flicker as a warning. During that time, a long press on the button will extend the time the audio path remains open.

Note: The amount of time the audio remains open, the duration of the warning LED flickering, and the type of press needed for a time extension can all be adjusted using the Media Diode Configuration Tool.

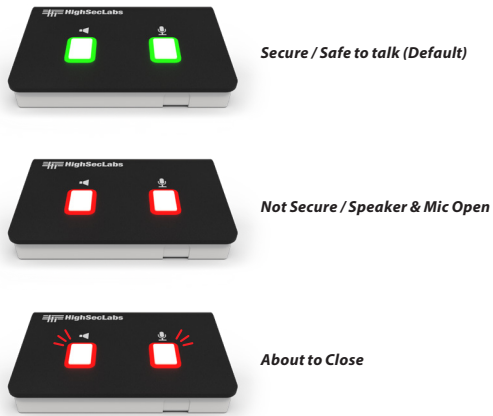

***Figure 3**: Media Diode Open/Closed Indicators*

CONFIGURATION

In the configurable Media Diode family, each button press opens or closes the connection to one or all connected peripherals (speaker, microphone, or webcam). The configuration tool allows the user to adjust how long the connection remains open.

Note: the FA10A0-4 and FA10B0-4 Always-Open Media Diodes do not have push buttons and are therefore not configurable.

Required Hardware

- **Configuration PC:** A PC to adjust the Media Diode's settings.

Note: configuration cannot be done if the Configuration PC and the host PC are connected to the Media Diode at the same time.

- **Micro USB to USB Type A Cable:** connects the configuration PC to the Media Diode, via the Media Diode's micro-USB port.

Required Software

- **Media Diode Configuration Tool:** the program that allows settings to be adjusted. The current version of the Config Tool can be found here: https://highseclabs.com/dow_type/drivers-tools/
- **Windows Operating System:** Windows 10 or higher
- **.NET Framework:** release 4.6.1 or higher

Connecting the Media Diode to the Configuration PC

- Using the Micro-USB to USB Type A cable, connect the Micro USB jack to the Conf port on the Media Diode.

***Figure 4**: Media Diode Configuration Port*

- Connect the USB Type A jack to the Configuration PC.
- Open the Configuration PC's Device Manager and confirm which COM port has been added.

CONFIGURATION

Installing and Running the Media Diode Configuration Tool

- Download the Media Diode Configuration tool onto the dedicated Configuration PC.
- Once installed, the icon will appear on the desktop.
- Double-click the icon to open the Media Diode Configuration Tool.

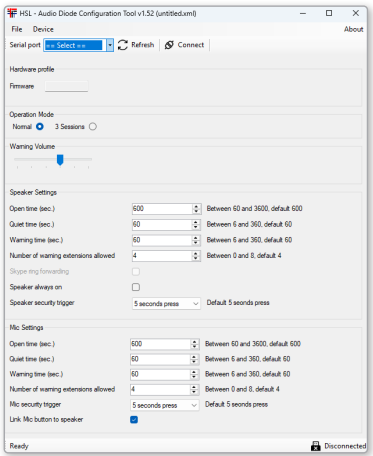

***Figure 5**: Media Diode Configuration Tool Screen*

- From the Serial Port list, select the COM port connected to the Media Diode.
- Click **Connect**.
- In the dialog box that appears, enter the password. By default, this password is Admin1234.

Configuring the Media Diode

Set the following Media Diode parameters:

PARAMETER	DESCRIPTION
Volume Slider Options	
Warning Volume	Adjust the warning sound volume.
Speaker/Headphone Button Options	
Open Time (sec)	Adjust how long the speaker/headphone is open after pressing the button.
Quiet Time (sec)	Adjust how long the speaker/headphone remains open if no audio has passed after pressing the button. **Note:** The amount of Open Time must be greater than the amount of Quiet Time.
Warning Time (sec)	Adjust how long before a warning notice signals the end of Open time, allowing a time extension by pressing the button.
Number of extensions allowed	Adjust how many Warning time extensions are allowed for the microphone and speaker.
Speaker Always On	Enable or disable whether the speaker/ headphone is always open, ignoring the button (**Not recommended**).
Microphone Button Options	
Open Time (sec)	Adjust how long the microphone is open after pressing the button.
Quiet Time (sec)	Adjust how long the microphone remains open if no audio has passed after pressing the button. (Note: Open time takes priority over Quiet time).
Warning Time (sec)	Adjust how long before a warning notice signals the end of Open time, allowing a time extension by pressing the button.
Number of extensions allowed	Adjust how many Warning time extensions are allowed for the microphone.
Link Mic button to Speaker	Enable or disable whether the microphone button also opens the speaker/headphone.
Mic safety trigger	Select the type of button-press to keep the microphone open: a simple press, a double press, or a 5-second press (default).

After changing the parameters, click the Save to Device icon to apply the new configuration to the Media Diode.

- To save the configuration as an XML file on the Configuration PC, click the File menu and select "Save As."
- To load a previously created XML file, click the File menu and select "Open," then select the desired file.

Once the settings have been saved, click the Disconnect icon to disconnect from the Configuration PC, then disconnect the Micro-USB cable from the Conf port.

Restart the device, then connect it to the Source PC as shown in Fig. 2.

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