HDMI EDID Emulator

User Manual
(Release Software 1.19, Firmware 1.13)

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Introduction

This User Manual documents the HDMI EDID Emulator (HDMI-EDID-EM_) as used with Wilder Technologies HDMI test adapter products. The HDMI EDID Emulator allows testing the basic EDID operation of an HDMI Source (DUT) by emulating the EDID presentation of an HDMI Sink or the basic EDID operation of an HDMI Sink (DUT) by emulating the EDID acquisition of an HDMI Source. HDMI Sink and Source Emulation must be purchased separately. They share the same Hardware and Software.

EDID Version 1.3-bit patterns for HDMI 1.4 and 2.0 are provided as PC Files. (Note: HDMI 2.1 patterns are being developed at this time.) A pattern, downloaded to the EDID Emulator hardware using provided PC Software, is presented to the DUT via a Wilder Technologies HDMI-A Test Adapter. Some parts of the EDID pattern can be edited before download. In particular, Short Video Descriptors may be edited to include up to 31 video formats, including those in CTA-861-G which is part of HDMI 2.1. The provided EDID 2.0 pattern includes the HF VSDB which includes the Scramble bit. Version 1.13 added HDMI 2.1 video formats (VICS), and adds the ability to edit the additions to the HF VSDB included in HDMI 2.1. The edited EDID patterns may be saved as files for reuse. NOTE: HDCP authentication is not provided. Some sources disable the video after a few seconds if authentication does not occur. Note that the HDMI CTS requires that HDCP be turned off.

The EDID Emulator is a successor product to the EDID/Low Frequency Control Board which provides a ROM based EDID pattern that cannot be edited.

Software is used to support testing of HDMI products. The software is detailed in the section: “HDMI EDID Emulator Software”.

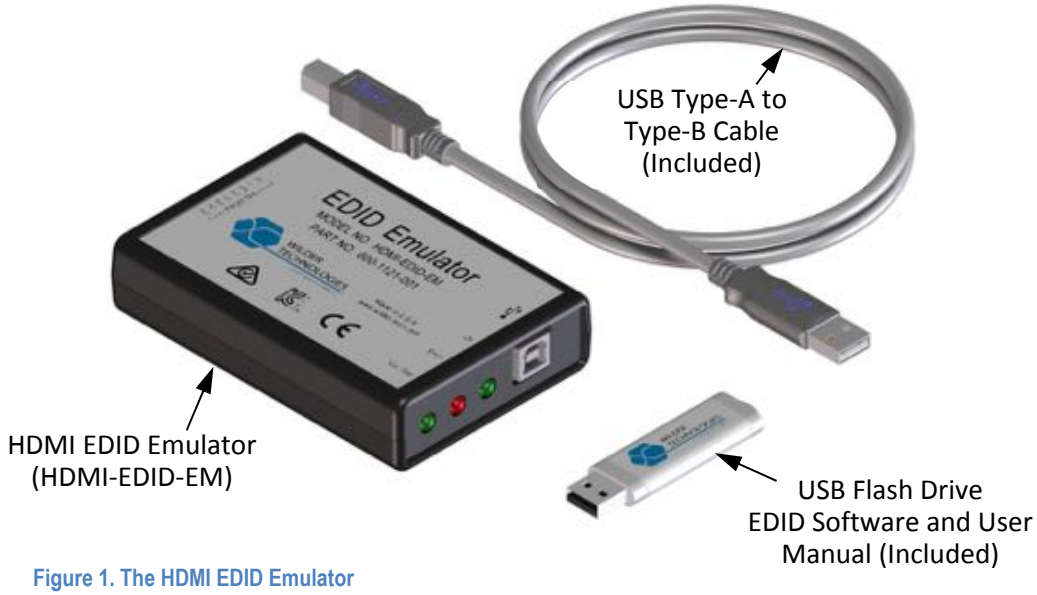


Figure 1. The HDMI EDID Emulator

Provided with each HDMI EDID Emulator (HDMI-EDID-EM_) are the following supporting materials.

- (1) USB Cable, Type A to Type B, 3 ft.
- (1) USB Flash Drive Containing HDMI EDID Emulator Software and this User Manual.

Product Inspection

Upon receiving the HDMI EDID Emulator from Wilder Technologies, perform the following product inspection:

- Inspect the outer shipping container, foam-lined instrument case, and product for damage. Retain the outer cardboard shipping container until the contents of the shipment have been inspected for completeness and the product has been checked mechanically and electrically. Use the foam-lined instrument-case for secure storage of the Wilder Technologies EDID Emulator when not in use.

- Locate the shipping list and verify that all items ordered were received.

- In the unlikely event that the product is defective or incomplete, the “Limited Warranty” section discusses how to contact Wilder Technologies for technical assistance and/or how to package the product for return.

The EDID Emulator and Wilder Technologies HDMI Test Adapter Care and Handling Precautions

When using the HDMI EDID Emulator with Wilder Technologies HDMI test adapters, careful handling is required to avoid damage. Improper handling techniques, or using too small a cable bend radius, can damage the coaxial cable connections within test adapter housings or the cables themselves. This can occur at any point along the cable. To achieve optimum performance and to prolong the HDMI EDID Emulator and HDMI TPA's life, observe the following handling precautions:

- **CAUTION 1: Avoid Torque Forces** (Twisting)
  While individual coaxial cables within Wilder Technologies test adapters have some rotational freedom, twisting the HDMI TPA as a unit, with one end held stationary, in excess of +/- 90° may damage or severely degrade performance. Adherence to Caution 5 (below) helps to avoid exceeding twist limits.

- **CAUTION 2: Avoid Sharp Cable Bends**
  Never bend coaxial cables into a radius of 26 mm (1-inch) or less. Never bend cables greater than 90°. Single or multiple cable bends must be kept within this limit. Bending the Wilder Technologies HDMI TPA cables less than a 26mm (1-Inch) radius will permanently damage or severely degrade test adapter performance.

- **CAUTION 3: Avoid Cable Tension** (Pull Forces)
  Never apply tension (pull forces) to an individual coaxial cable that is greater than 2.3 kg (5 lbs.). To avoid applying tension, always place accessories and equipment on a surface that allows adjustment to eliminate tension on the Wilder Technologies TPAs and cables. Use adjustable elevation stands or apparatus to accurately place and support the HDMI TPA.

- **CAUTION 4: Connect the Wilder Technologies HDMI TPAs First**
  To prevent twisting, bending, or applying tension to the coaxial cables when connecting a Wilder Technologies HDMI TPA, always attach the HDMI TPA to the device under test (DUT) or cable under test before attaching any SMA connectors. Carefully align the HDMI, Low-Speed, and/or USB connectors and then gently push the connectors together until fully seated.

  If the Wilder Technologies HDMI TPA must be turned or twisted to make connection to the DUT, avoid using the HDMI TPA housing alone to make this occur. Try to distribute the torque forces along the length of the test setup and cabling. If this is not possible, it is recommended to first loosen or disconnect the SMA connections at the HDMI TPA, make the connection to the DUT and then re-tighten or attach the test equipment leads.

NOTE: Only grip the test adapter housing when inserting or extracting the HDMI TPA to or from the DUT. Pulling directly on the Wilder Technologies HDMI TPA cables or using them to insert the HDMI TPA may cause damage.

- **CAUTION 5: Carefully Make SMA Connections**
  To connect the Wilder Technologies HDMI TPA SMA connectors, follow these steps:

  1. Hold the cable stationary by grasping the cable at the black heat-shrink section near the SMA connector.

  2. Insert the mating SMA barrel and hand-tighten the free-spinning SMA nut onto the connector while avoiding pulling, bending, or twisting the HDMI TPA coaxial cable.

  3. The Wilder Technologies HDMI TPA SMA connectors have flats that accept an open-end 1/4-inch or 6.5mm wrench. When attaching instrument cables to these test adapters, it is recommended that the SMA connectors be mechanically held and the test leads be tightened to the equipment manufacturer's torque recommendations, normally 5 in-lbs., using a 5/16-inch open-end wrench.

     If the test set-up requires repositioning, first loosen or disconnect the SMA connections to avoid twisting, bending, or tension.

  NOTE: A drop in signal amplitude by half or 6db during the testing of a lane may indicate that a cable has been mechanically pulled free of coaxial cable connections internal to the Wilder Technologies HDMI TPA assembly. This could be determined by checking if the cable has any lateral play relative to the TPA. This would only occur when the TPA has exceeded the pull force as specified within the mechanical specification. If the cable cannot be re-seated, the test adapter will need to be sent back to the factory for service.

- **CAUTION 6: Independently Support Instrument Cables or Accessories**
  Excessive weight from instrument cables and/or accessories connected to the HDMI EDID Emulator or Wilder Technologies HDMI TPA can cause damage or affect the test results and performance. Be sure to provide appropriate means to support and stabilize all test set-up components.

General HDMI EDID Emulator, HDMI Test Adapter, Cable, and Connector

Observing simple precautions can ensure accurate and reliable measurements.

Handling and Storage

Before each use of the HDMI EDID Emulator, ensure that all connectors are clean. Handle all cables carefully and store the HDMI EDID Emulator and HDMI test adapters in the foam-lined instrument case when not in use, if possible. For Wilder Technologies HDMI test adapters, do not set connectors contact end down. Install the SMA protective end caps when the test adapter is not in use.

Visual Inspection

Be sure to inspect all cable connectors carefully before making a connection. Inspect all cables for metal particles, scratches, deformed threads, dents, or bent, broken, or misaligned SMA connector center conductors. Do not use damaged cables.

Cleaning

If necessary, clean the connectors using low-pressure (less than 60 PSI) compressed air or nitrogen with an effective oil-vapor filter and condensation trap. Clean SMA connector threads, if necessary, using a lint-free swab or cleaning cloth moistened with isopropyl alcohol. Always completely dry a connector before use. Do not use abrasives to clean the connectors. Re-inspect connectors, making sure no particles or residue remains.

Making Connections

Before making any connections, review the “Care and Handling Precautions” section. Follow these guidelines when making connections:

- Align cables and connectors carefully
- Make preliminary connections lightly
- To tighten SMA connections, turn connector nut only
- Do not apply bending force to coaxial cables
- Do not over-tighten preliminary connections
- Do not twist or screw-in cables
- For SMA connections, use an appropriately sized torque wrench, and do not tighten past the “break” point of the torque wrench

Electrostatic Discharge Information

Protection against electrostatic discharge (ESD) is essential while connecting, inspecting, or cleaning the HDMI EDID Emulator and connectors when attached to a static-sensitive circuit (such as those found in test sets).

Electrostatic discharge can damage or destroy electronic components. Be sure to perform all work on electronic assemblies at a static-safe work station, using two types of ESD protection:

- Conductive table-mat and wrist-strap combination
- Conductive floor-mat and heel-strap combination

When used together, both of these types provide a significant level of ESD protection. Used alone, the table-mat and wrist-strap combination provide adequate ESD protection. To ensure user safety, the static-safe accessories must provide at least 1 MΩ of isolation from ground. Acceptable ESD accessories may be purchased from a local supplier.

WARNING: These techniques for a static-safe work station should not be used when working on circuitry with a voltage potential greater than 500 volts.

Mechanical and Environmental Specifications

NOTE: All specifications in this manual are subject to change.

Table 1. General Specifications

ITEM	DESCRIPTION
Usage Environment	Controlled indoor environment
HDMI-EDID-EM_ Length x Width x Height	111.25 mm (4.38 in) x 74.93 mm (2.95 in) x 26.92 mm (1.06 in)
Operating Temperature	0°C to +55°C (32°F to +131°F) (Characteristic)
Storage Temperature	-40°C to +70°C (-40°F to +158°F) (Characteristic)

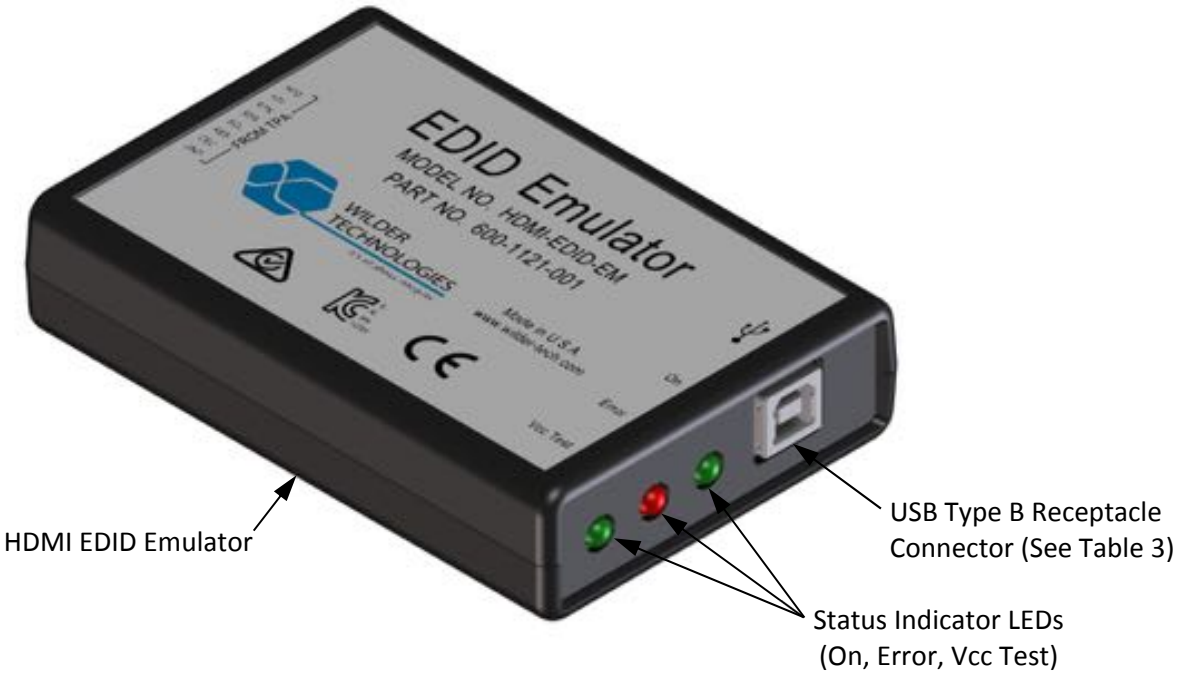


Figure 2. Connectors and Indicators (HDMI EDID Emulator shown)

Figure 3. 8-Position Low-Speed Connector (HDMI EDID Emulator shown)

HDMI EDID Emulator Pin-Out

The HDMI EDID Emulator has a single low-speed connector and a USB connector. The 8-position low-speed connector is for connection from the HDMI Test Adapter. The individual signal names are identified for the 8-position low-speed connector on the product label. The USB connector provides power to the HDMI EDID Emulator as well as the connection to the user PC. Figures 2 and 3, above, refer to pin-description tables for each of the connector types.

Table 2. HDMI-EDID-EM_ 8-position J1 Cable Connector, (Low-Speed)

LABEL	PIN NO.	DESCRIPTION
GND	Pin 1	RF Ground
CEC	Pin 2	Consumer Electronics Control
RES	Pin 3	Utility for non-HEAC operation, or HEAC+ for Source and Sink
SCL	Pin 4	I^2C Clock for DDC
SDA	Pin 5	I^2C Data for DDC
RTN	Pin 6	DDC/CEC Ground
+5V	Pin 7	+5V Power
HPD	Pin 8	Hot Plug Detect for non-HEAC operation, or HEAC- for Source and Sink

Table 3. HDMI-EDID-EM_ Pin Assignments for USB Connector

SIGNAL IDENTIFICATION	PIN NO.	DESCRIPTION
Vbus	Pin 1	+5V power supply
D-	Pin 2	Data (n)
D+	Pin 3	Data (p)
RTN	Pin 4	Return, (connected to Ground)
None	Connector Shell	Ground

Electrical Specifications

NOTE: All specifications in this manual are subject to change.

Table 4. HDMI EDID Emulator Electrical Specifications

SPECIFICATION	MINIMUM	TYPICAL	MAXIMUM	NOTES
HPD current (mA), Vhpd = 3.3V			2.75	
CEC current (uA), Vcec = 3.3V			122.2	
Product Voltage (Vdc)	4.5	5.0	5.5	
Power Dissipation (mW)			500	

HDMI EDID Emulator User Models

The figure below illustrates an example of an HDMI EDID Emulator and an HDMI Plug Test Adapter used to test a typical HDMI EDID interface.

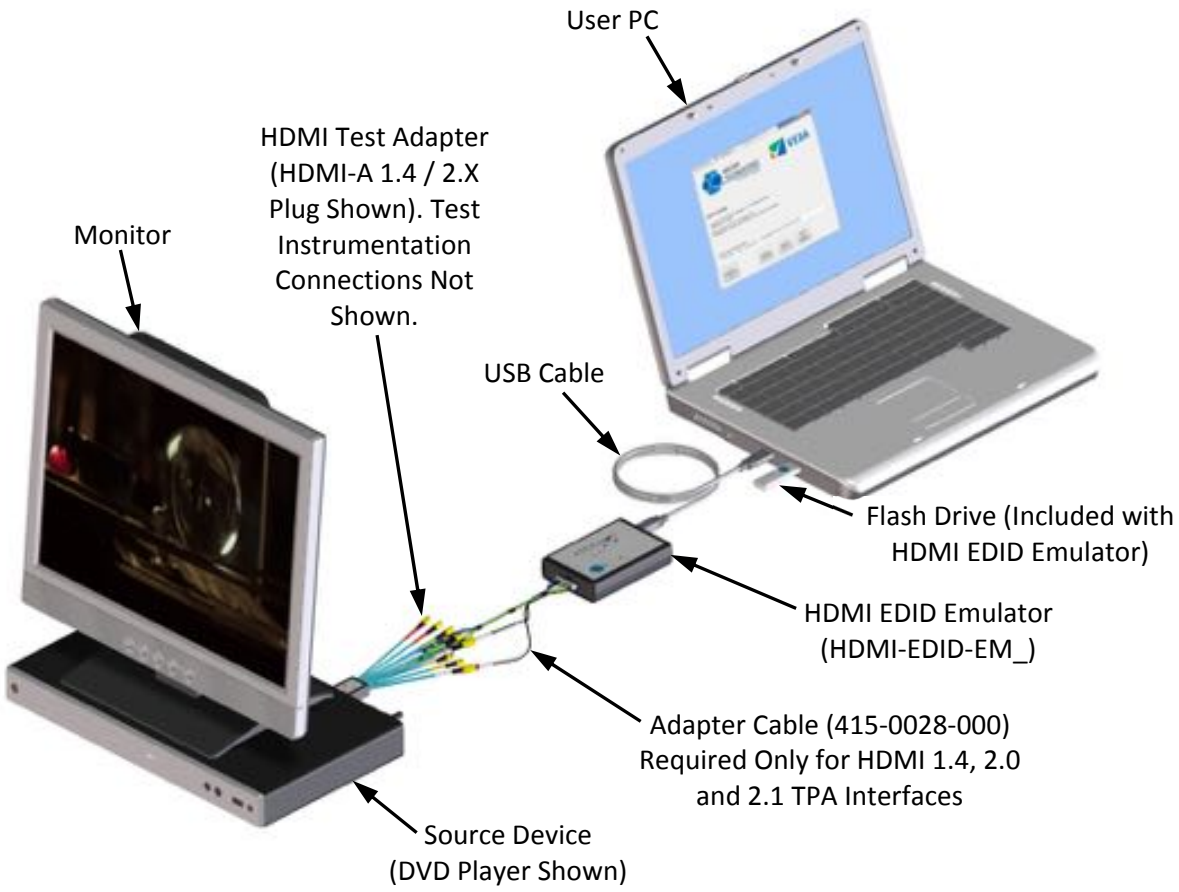
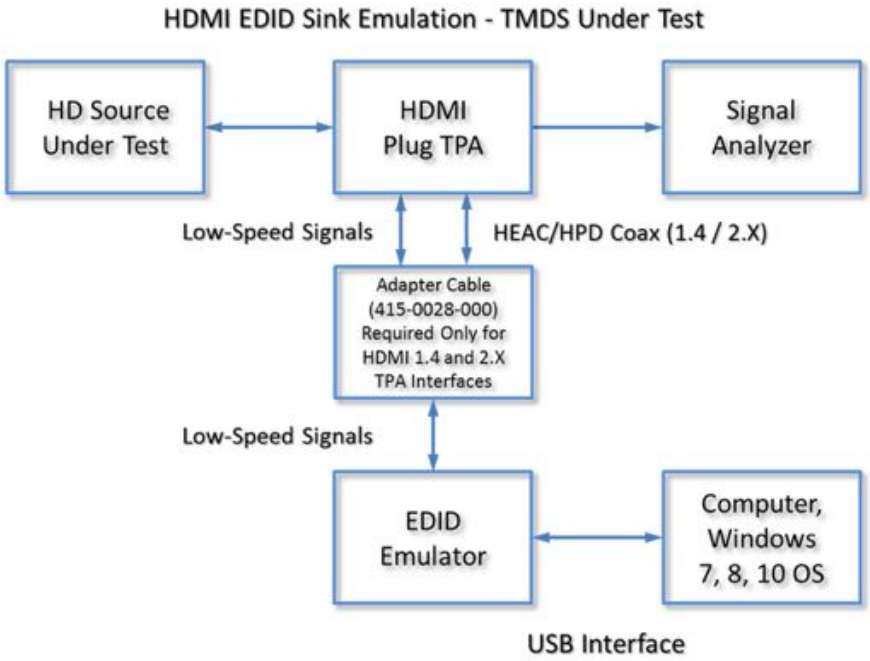
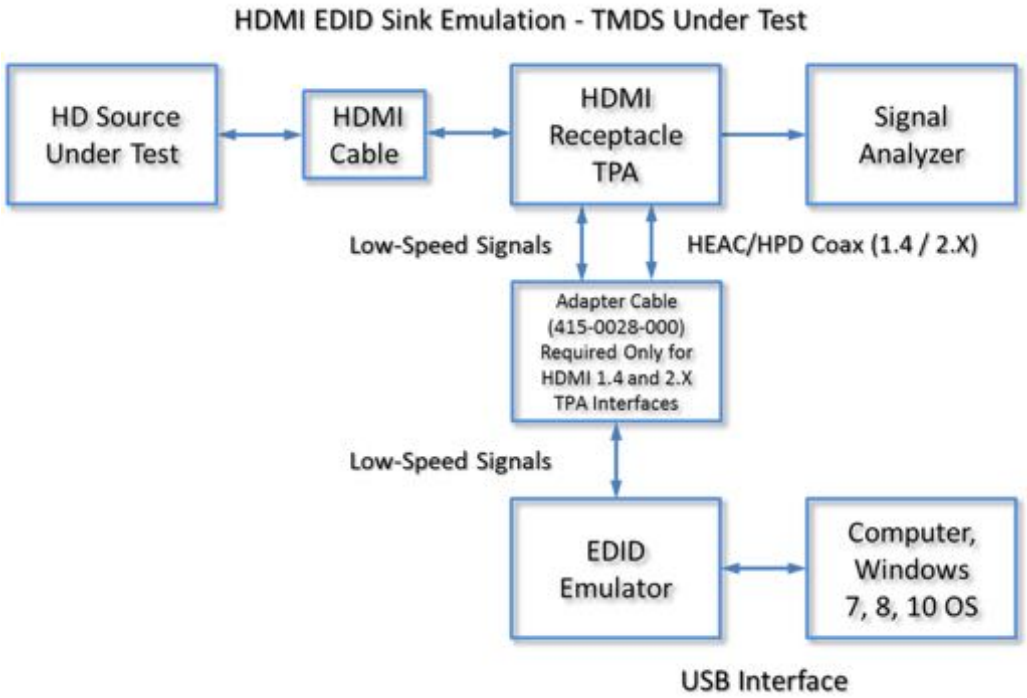


Figure 4. An HDMI EDID Emulator (HDMI-EDID-EM_) connected to a Source Device using an HDMI Test Adapter

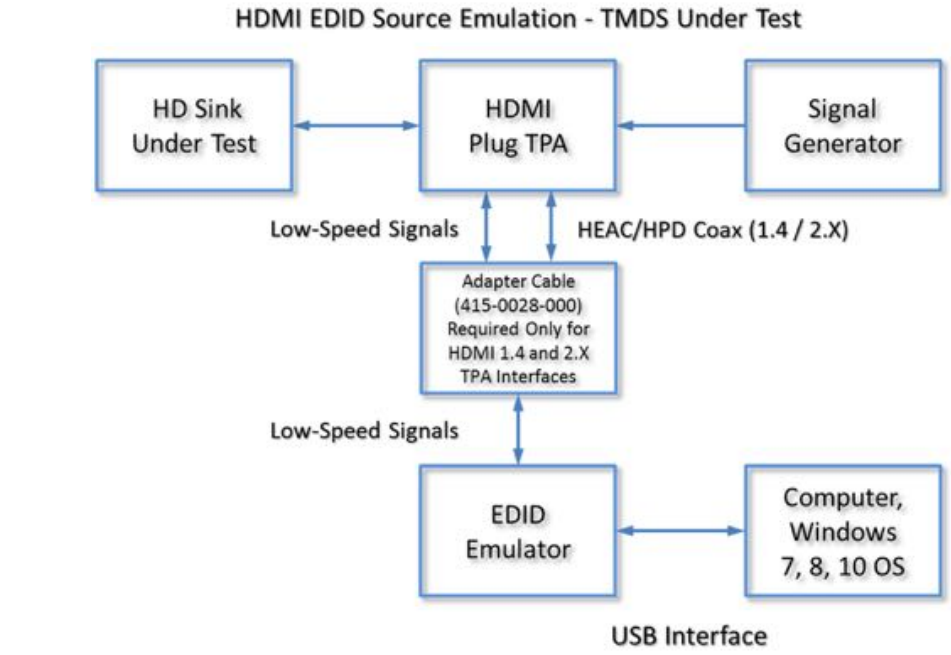
This example illustrates an HDMI Source test set-up using the HDMI EDID Emulator and an HDMI Plug Test Adapter to connect to the Source Device and Instrumentation:



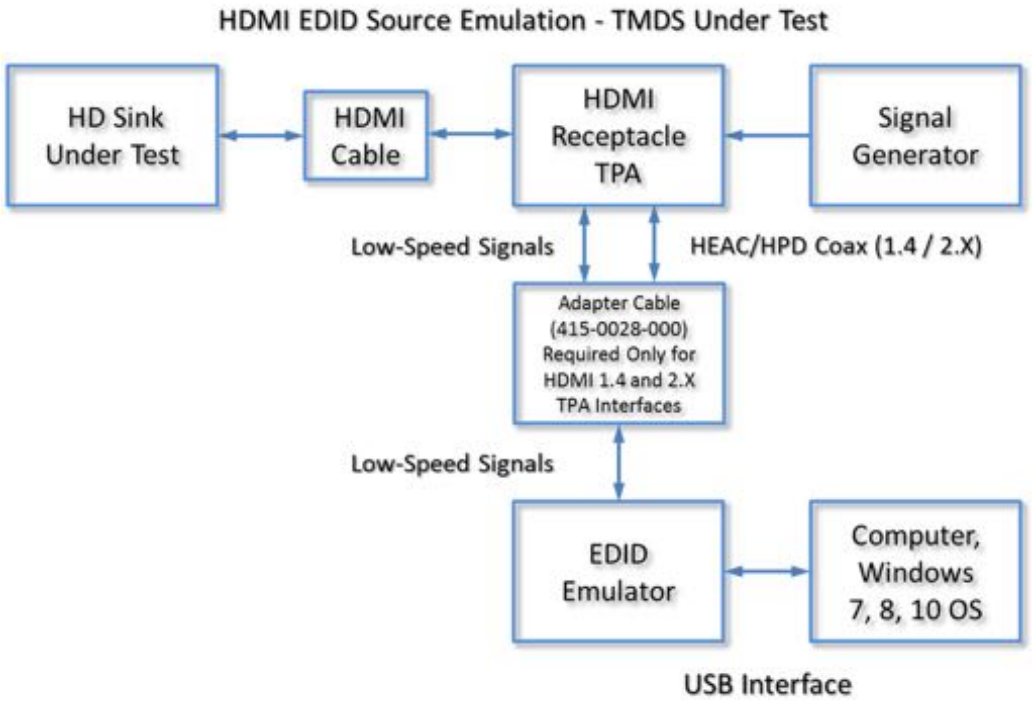
This example illustrates an HDMI Source test set-up using the HDMI EDID Emulator, an HDMI Receptacle TPA, and an HDMI Cable to connect to the Source Device and Instrumentation:



This example illustrates an HDMI Sink test set-up using the HDMI EDID Emulator and an HDMI Plug Test Adapter to connect to the Sink Device and Instrumentation:



This example illustrates an HDMI Sink test set-up using the HDMI EDID Emulator, an HDMI Receptacle TPA, and an HDMI Cable to connect to the Sink Device and Instrumentation:



HDMI EDID Emulator Software

Introduction

The included Software (SW) operates the Wilder Technologies HDMI EDID Emulator (HDMI-EDID-EM_) via a USB connection from a PC. The User Interface (UI) provides Screens that allow direct interaction with the HDMI EDID Emulator Hardware. The SW will run on most PCs with Windows 7, 8, and 10. A powered USB port is required.

This Manual is for Software Version 1.19 and Firmware Version 1.13. Firmware Version 1.13 must be installed for SCDC operation. The Firmware is Field Upgradable. Please contact Wilder Technologies if the Firmware in your EDID Emulator needs to be upgraded.

HDMI 2.0 Users that need to 'force' a Source to a particular Video Format may want to use the Video Format Preference Data Block available for the first time in this SW Version. This list of formats supersedes all other methods of determining preference.

EDID Emulator Software File List

These files are included in the Flash Drive.

Wilder_EDM.exe	The Wilder HDMI EDID UI Executable
Wilder_EDM_***_Wilder07Mar2018.key	License Key (*** = Configuration Dependent)
Wilder_HDMI_NET45_API.dll	.NET 4.5 based API file. Required to run Wilder_EDM.exe
Wilder_HDMI_NET40_API.dll	.NET 4.0 based API file. Not required to run Wilder_EDM.exe
EDID_HDMI_V14B_C.WEH	EDID Starter File for HDMI 1.4
EDID_HDMI_V20_C.WEH	EDID Starter File for HDMI 2.0
EDID_HDMI_V21_C.WEH (not included at this time.	EDID Starter File for HDMI 2.1 (In Development)
HDMI EDID Emulator User Manual.pdf	Documentation Files v1.19 (910-0037-000 Rev. J)
HDMI EDID Emulator API Listing.pdf	API Listing for HDMI EDID Emulator (910-0037-100 Rev. A)

Installation

The SW will run on Windows 7, 8, and 10. Microsoft .NET Version **4.5** or greater is required. Some Windows 7 computers do not have this version. It may be downloaded from the Microsoft web site. If .NET is earlier than 4.5 there may be a message reporting that .NET is too old or an Error Message that includes the text "IAsyncState".

Copy the software distribution files to a folder on the PC from which the EDID Emulator Software/User Interface will be run. The .exe, .dll, and .key files should remain in this folder, but all other files can be moved.

Run the `Wilder_EDM.exe` program. The start screen should report that its version is **1.19** or later. The SW will not further operate without a license.

Licensing

A license file `Wilder_EDM_*.key` must be installed in the same folder as the `.exe` file. It is created by Wilder Technologies and included on the USB flash drive that comes with the EDID Emulator Hardware. If a license key is not found included with the USB flash drive or the incorrect license file was included, please contact Wilder at support@wilder-tech.com and include the EDID Emulator Hardware Serial Number (located on the underside of the hardware, formatted "WTxxxxx") within the email.

If the following screen appears, it may indicate that the license key has not been installed, or not installed in the same directory as the Wilder_EDM.exe files.

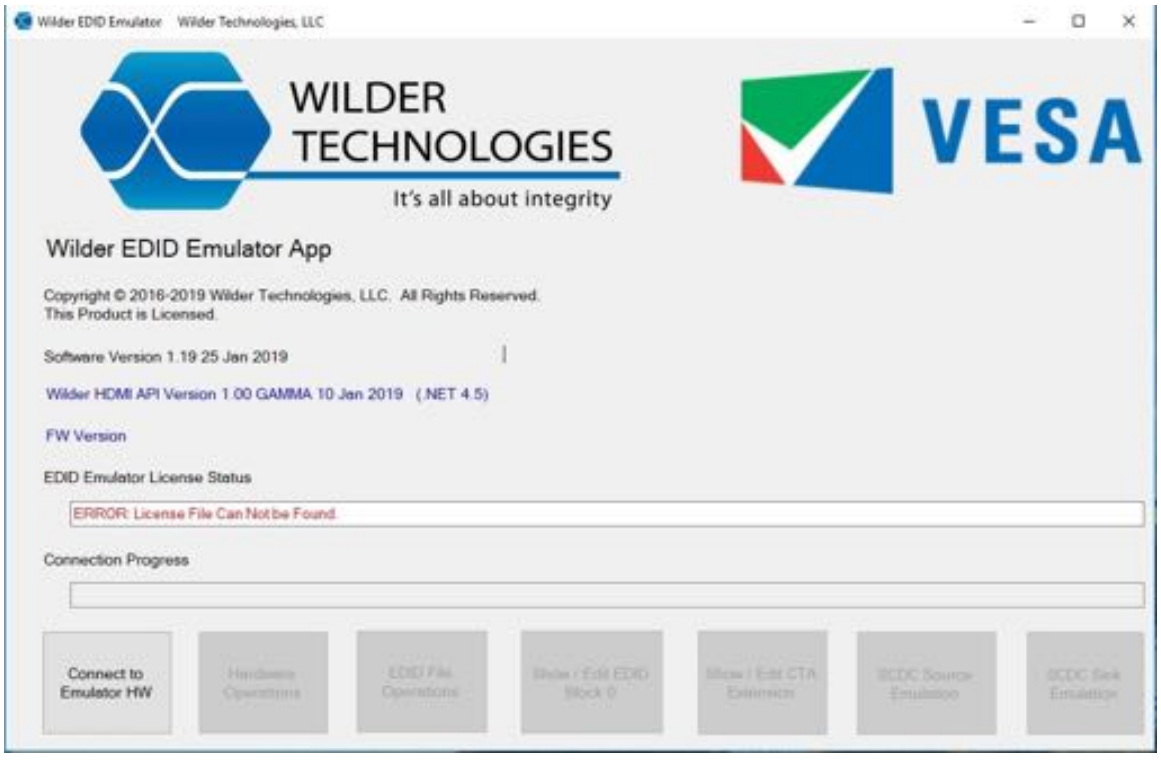


Figure 5. EDID License Error Screen

HDMI EDID SW Version 1.19 Emulator Capabilities and Features

HDMI EDID Emulator Hardware Capabilities

- Includes all Capabilities of Wilder Product HDMI-TPA-E (E-EDID/Low-Frequency Control Board). Wilder Part Number 110-1006-000.
- Supports One and Two Block EDIDs Version 1.3 and 1.4
- An EDID may be presented to an HDMI Source DUT (Sink Emulation) (Purchase Option)
- An EDID may be acquired from an HDMI Sink DUT (Source Emulations) (Purchase Option)
- E-DDC (Enhanced Display Data Channel) 100 Kbits/sec I2C access.
- HPD can be set: float, 3.3V, 5.0V, or 0.0V
- CEC can be set: float, 3.3V, or 0.0V
- +5V (VCC) can be set: float, 3.3V, or 5.0V

HDMI EDID Emulator Software Capabilities

- PC Software Program operates the EDID Emulator HW via USB.
- EDIDs for presentation to and acquisition from DUTs are saved in PC Files.
- Selected EDID fields of EDID Files can be Edited in Place, Saved, and Downloaded to the Hardware for presentation to the DUT.
- SCDC Source and Sink Emulation.

HDMI EDID Emulator EDID Edit Capabilities

- Edits are performed on Existing EDID files.
- EDID 1.4b and EDID 2.0 starter files are provided.
- The user can View and/or Edit certain Parts of EDID Block 0.
  - Header (View)
  - Established Timing Bitmap (View; Edit)
  - Descriptors of types Detailed Timing, Dummy, Monitor Name, Monitor Range Limits, Unspecified Text, Monitor Serial Number (View; Edit)
  - Detailed Timing Descriptor fields may be filled with a CEA Format defined in CTA-861-G.
  - A Descriptor's Type may be changed using "Advanced Editing"
- The user can Edit certain Block 1 (CEA Extension) Fields.
  - CEA Header (View; Edit Descriptor Native Total and bits)
  - Short Video Descriptors Data Block (View; Edit: delete and add VICs)
  - HDMI Vendor Specific Data Block if Present (View; Edit except parts of 3D)
  - HDMI Forum Vendor Specific Data Block if Present (View; Edit)
  - Descriptors if Present (View; Edit)
  - A Descriptor's Type may be changed using "Advanced Editing
  - CEA Video 4:2:0 Data Block Bitmap and Video 4:2:0 Only Data Block (View; Edit: delete)
  - CEA Video Preference Data Block (View; Edit: delete)
  - Additions to the HF VSDB to support HDMI 2.1

HDMI EDID Emulator PC Program Operation

The Start and Control Screen comes up when `Wilder_EDM.exe` is run. Version information and several navigation buttons will appear.

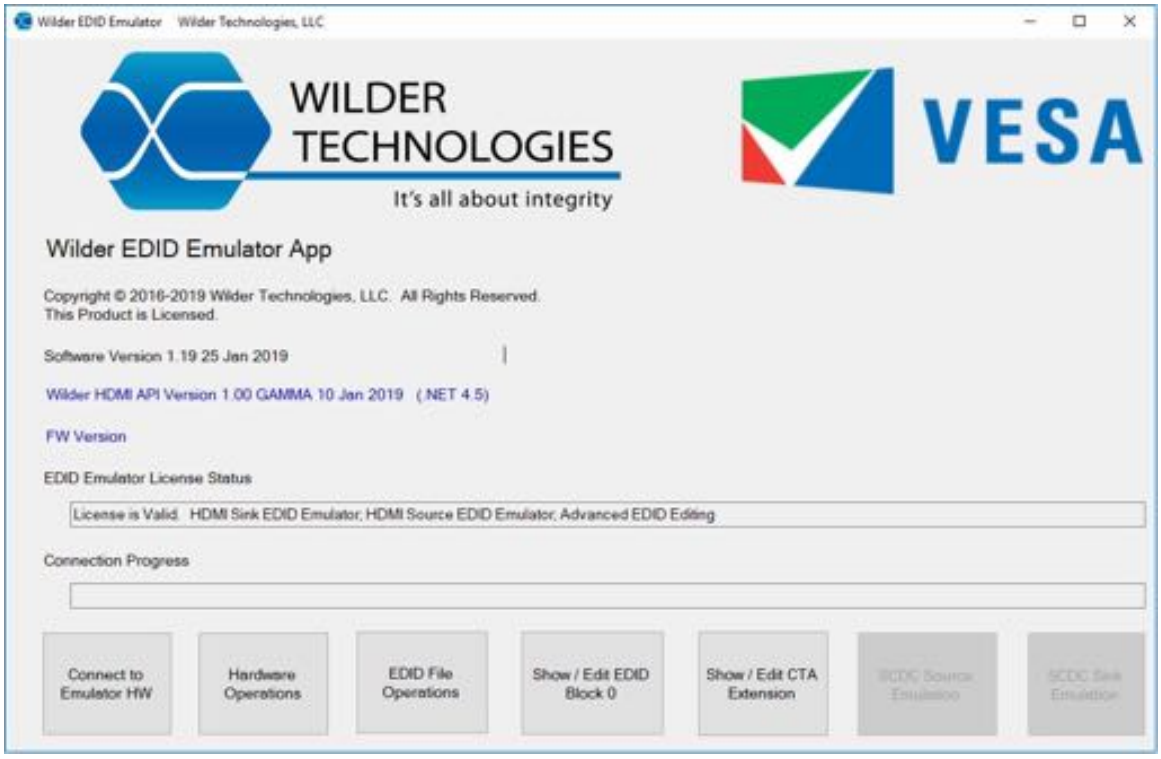


Figure 6. EDID Start and Control Screen

EDID Emulator PC Program Connection to EDID Emulator Hardware

NOTE: The UI/EDID Emulator Software is available to the user without requiring a connection to the HDMI EDID Emulator hardware, allowing editing to existing EDID files and/or new EDID file creation.

To operate both the UI and Hardware (HW) together, the PC Program must connect to the HDMI EDID Emulator Hardware.

- Connect HW to Powered USB Port. (Note: Upon initial connection, both the “On” (green) and “Error” (red) LEDs will blink together. Refer to the “LED Indicators” section of this manual.
- Select the [Hardware Operations] button on the Start Screen.

- The following screen appears:

  (NOTE: The [Download …] and [Set for Sink Emulation] buttons only appear if Sink Emulation was purchased. The [Acquire …] and [Set for Source Emulation] buttons only appear if Source Emulation was purchased.)

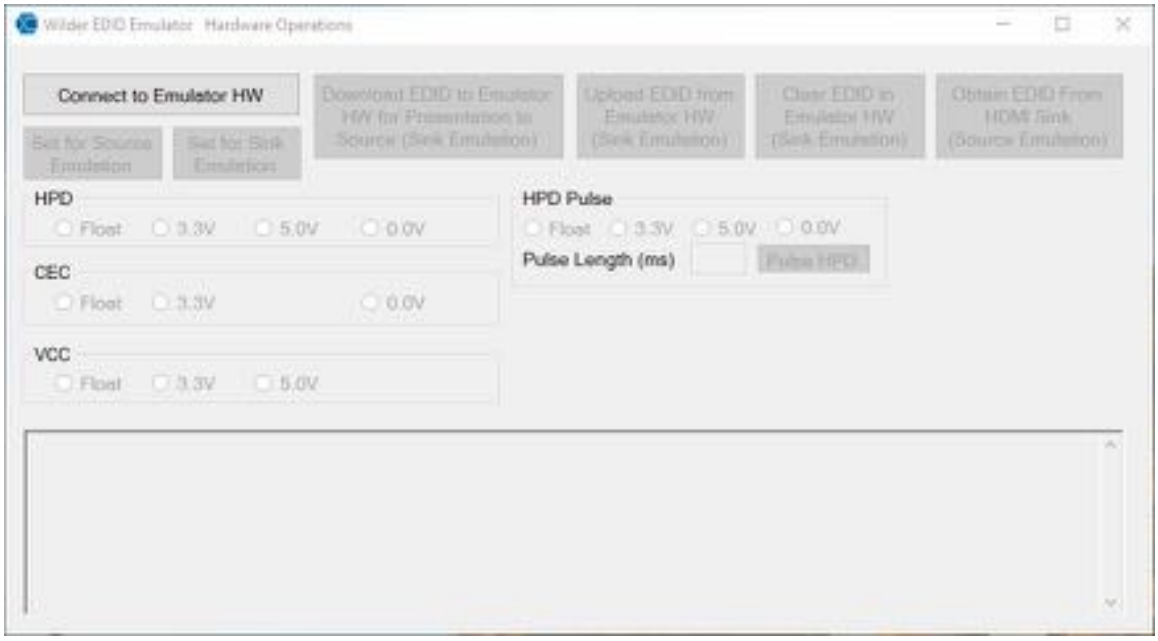


Figure 7. Hardware Operations Screen before HW Connection

- Select the [Connect to HW] button to connect to the HDMI EDID Emulator hardware.
- The “Hardware Operations” screen log box will update to indicate connection to the HW.

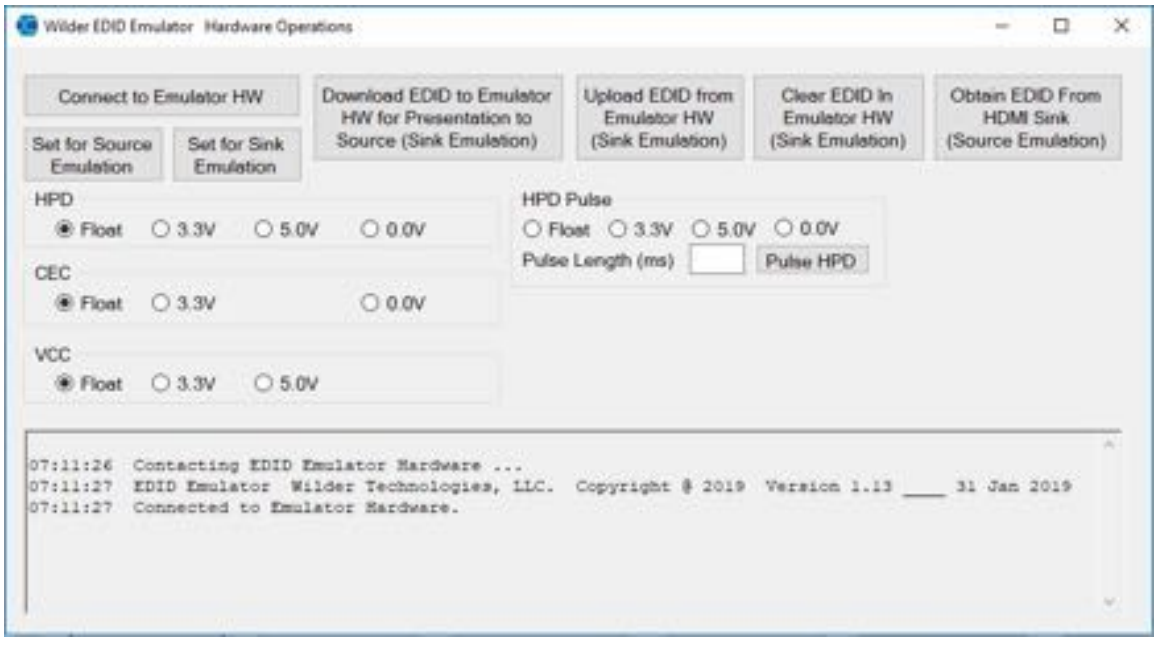


Figure 8. Hardware Operations Screen after HW Connection

- Verify that text similar to

```
Contacting EDID Emulator Hardware ...
EDID Emulator  Wilder Technologies, LLC.
Copyright @ 2018  Version 1.13 ____ 31 Jan 2019
```

appears.

If the PC Program is ended the Emulator Hardware will retain its state.

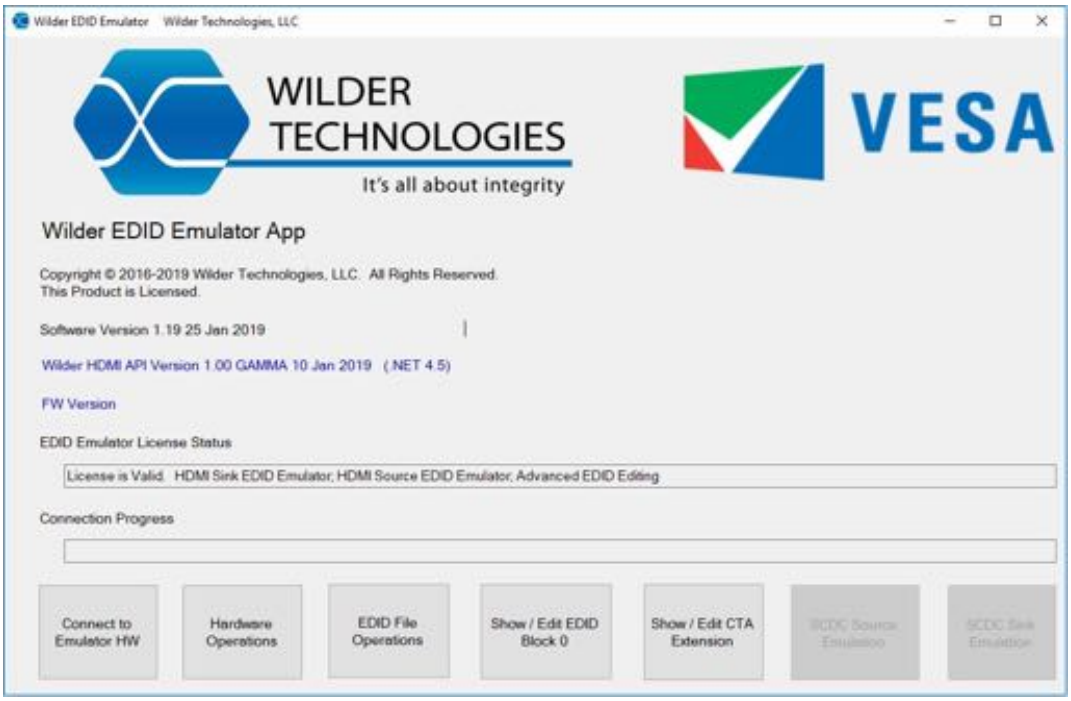


Figure 9. EDID Start and Control Screen

EDID Emulator Control Screen

These are activated by buttons on the Start and Control Screen. Only one instance of each is allowed.

- Hardware Operations ..... Connect to HW, Download EDID to HW, Acquire EDID from Sink.
- EDID File Operations ..... Load, Save, Re-Load from Disk and Examine EDID Files.
- Show/Edit EDID Block 0 ..... Edit some Fields in the Block 0.
- Show/Edit CEA Extension ..... Edit some Fields in the First EDID Extension Block.
- SCDC Source Emulation ..... Allows SCDC Offsets to be Read from and Written to the Sink DUT. [Set for Source Emulation] button in Hardware Operations screen must be pressed before this button becomes available.
- SCDC Sink Emulation ..... Emulates SCDC Offset Array for presentation to the Source DUT. [Set for Sink Emulation] button in Hardware Operations screen must be pressed before this button becomes available.

EDID File Operations

Allows an EDID File to be loaded. Two "Starter" EDID files are provided with the EDID Emulator software and are accessible from the "Open" file screen that appears. After being loaded, the contents of the loaded file are displayed in Hexadecimal. The file may be saved to the disk (typically after an edit) and Downloaded to the Hardware. Changes to the EDID may be made via the Edit Screens.

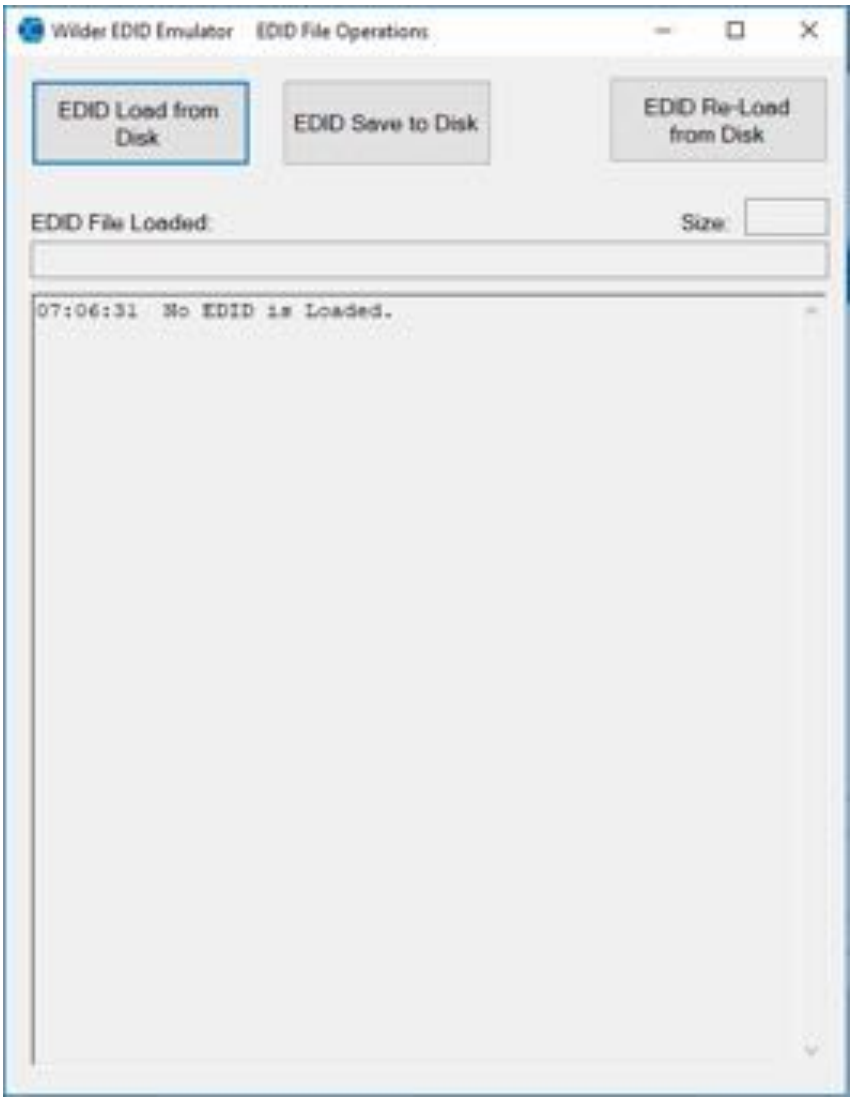


Figure 10. EDID File Operations Screen without Table

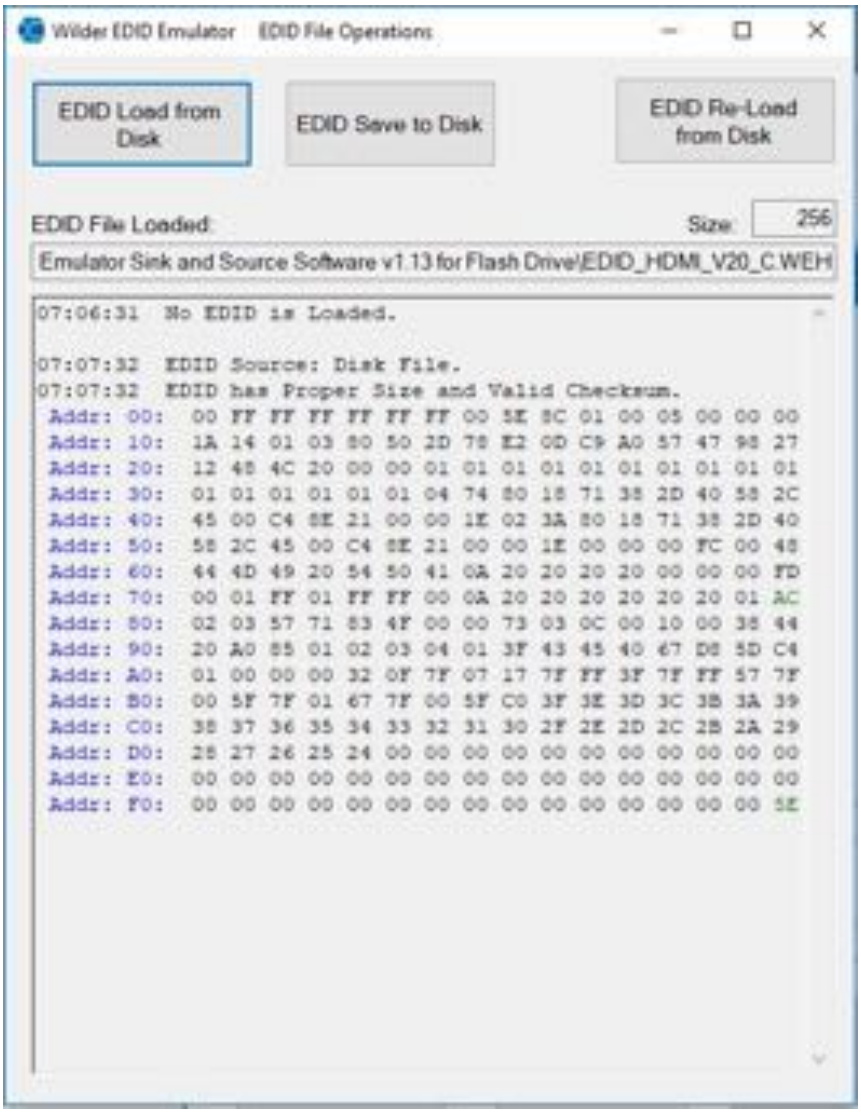


Figure 11. EDID File Operations Screen with Table

EDID Block 0

Most parts of Block 0 of the Loaded EDID file may be edited via this screen. Illegal values are shown in Red. The Descriptor Type (not shown) in each Descriptor Position can be changed using the drop-down control.

The [EDID Update from Edits] button causes the edits to operate on the loaded EDID data. If there is an illegal value when the [EDID Update from Edits] button is selected all values on the screen will be restored to those of the last successful update. The [Undo Edits since Last EDID Update] button will restore the values on the Edit Screen to those of the last update. After an Update the hexadecimal display in the "EDID File Operations" screen will update. The loaded EDID must be downloaded for presentation to the Source DUT.

Figure 12. EDID Block 0 Screen (Unedited Example)

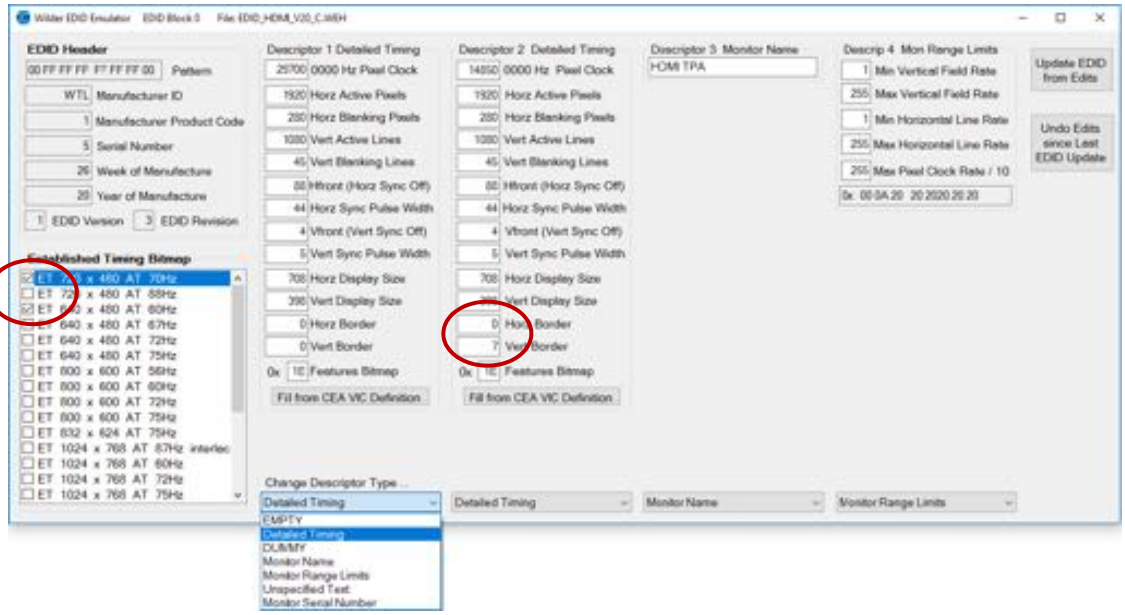


Figure 13. EDID Block 0 Screen (Edited Example)

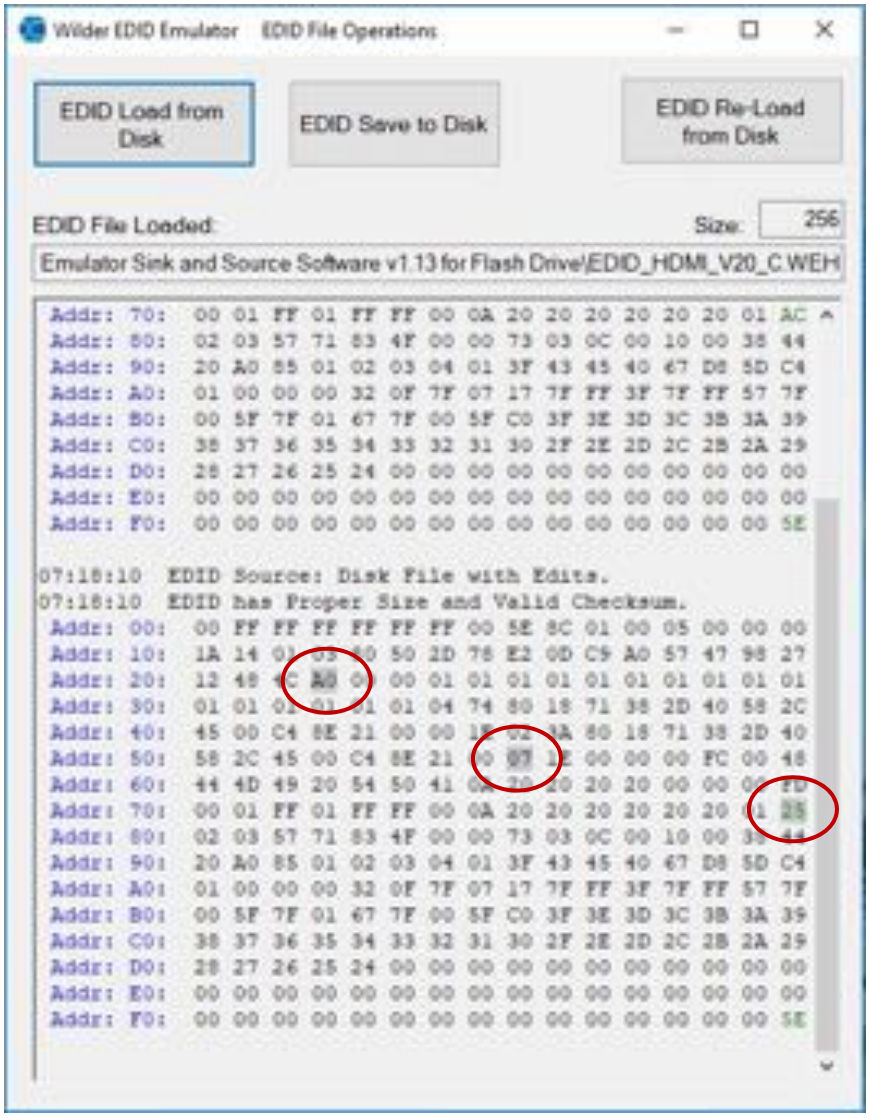


Figure 14. EDID File Operations Screen after EDID Block 0 Edits

NOTE: The gray highlights show the changes since the EDID file was Loaded.

EDID CEA Extension Block

The CEA Extension Block content of the loaded EDID file is shown in three tabs on the "EDID CEA Extension Block" screen. The Tab "CEA Header and Data Blocks" shows the CEA Header and the HDMI VSDBs, the tab "Video Data Blocks" shows the four types of Video Data Block and the tab "CEA Descriptors" shows Descriptors.

Most parts of CEA Block may be edited via this screen. Illegal values are shown in Red.

From the "Video Data Block tab, a Short Video Descriptor (VIC) may be inserted, deleted, or moved in the" Video Data Block", the "4:2:0 Only Video Data Block", and the "Video Format Preference Block". To insert select a VIC on the list (this is the insertion point), then select the [Insert] button to add a VIC to the Data Block above the selected VIC. Bits in the "4:2:0" Capability Bitmap are set using checkboxes that are on the right side of the" Video Data Block" list.

From the "CEA Descriptors" tab, Detailed Timing Descriptors (and other descriptor types) may be created and edited in the space remaining in the CEA Extension Block. Descriptors require 18 bytes. The "Advanced Editing" option allows a Descriptor type to be changed.

Each tab has an [EDID Update from Edits] button that causes the edits from all tabs to be applied to the loaded EDID file. If there is an illegal value when the [EDID Update from Edits] button is selected all values on the screen will be restored to those of the last successful update. The [Undo Edits since Last EDID Update] button will restore the values on the Edit Screen to those of the last update. After an Update the hexadecimal display in the "EDID File Operations" screen will update. The EDID must be downloaded for presentation to the Source DUT.

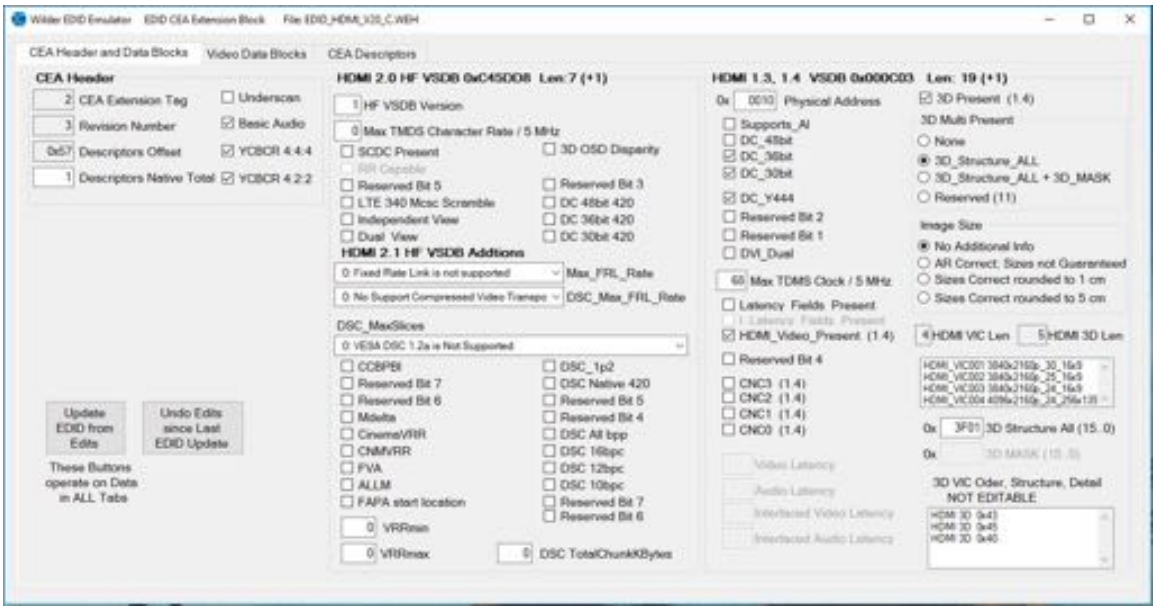


Figure 15. EDID CEA Extension Block Screen Tab 1 (Unedited Example)

Figure 16. EDID CEA Extension Block Screen Tab 2 (Unedited Example)

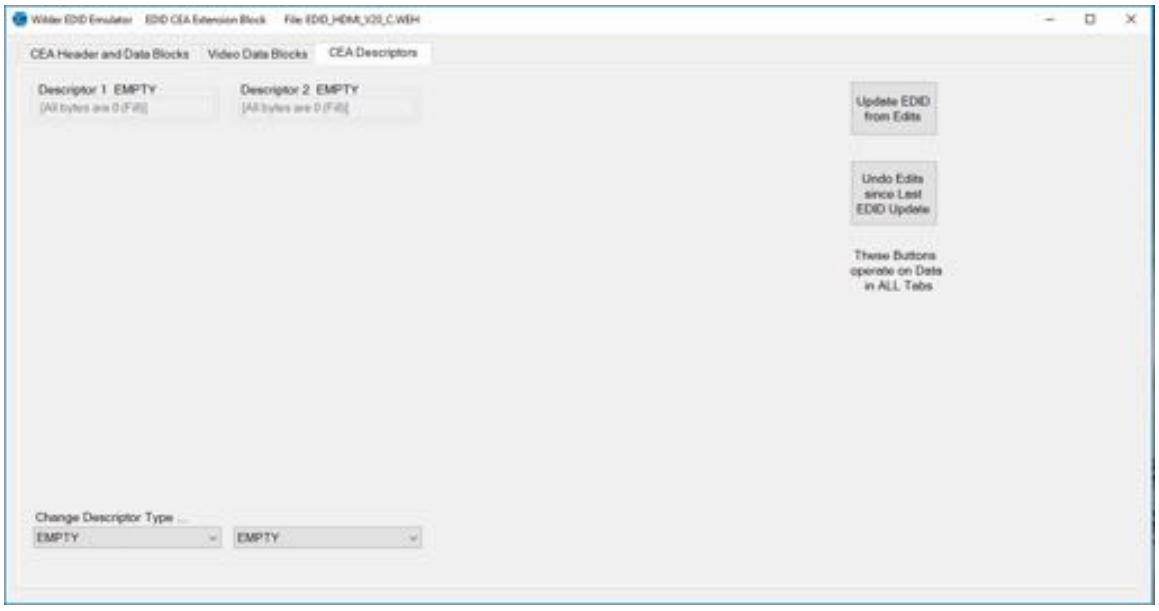


Figure 17. EDID CEA Extension Block Screen Tab 3 (Unedited Example)

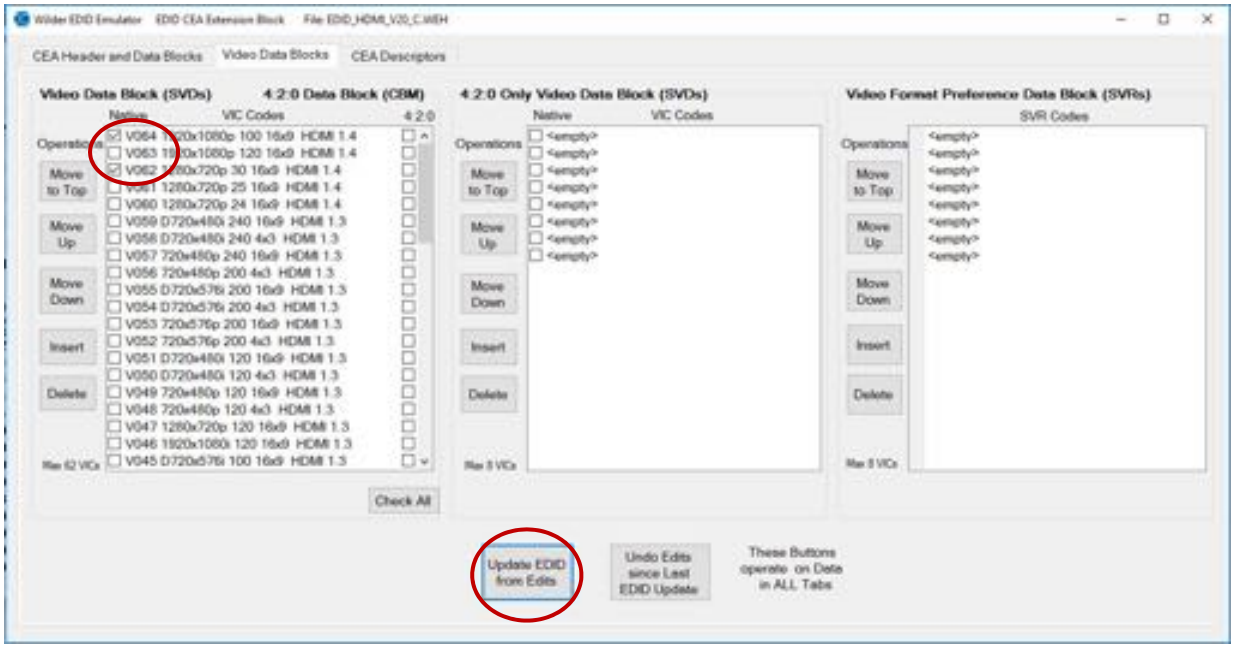


Figure 18. EDID CEA Extension Block Screen Tab 2 (Edited Example)

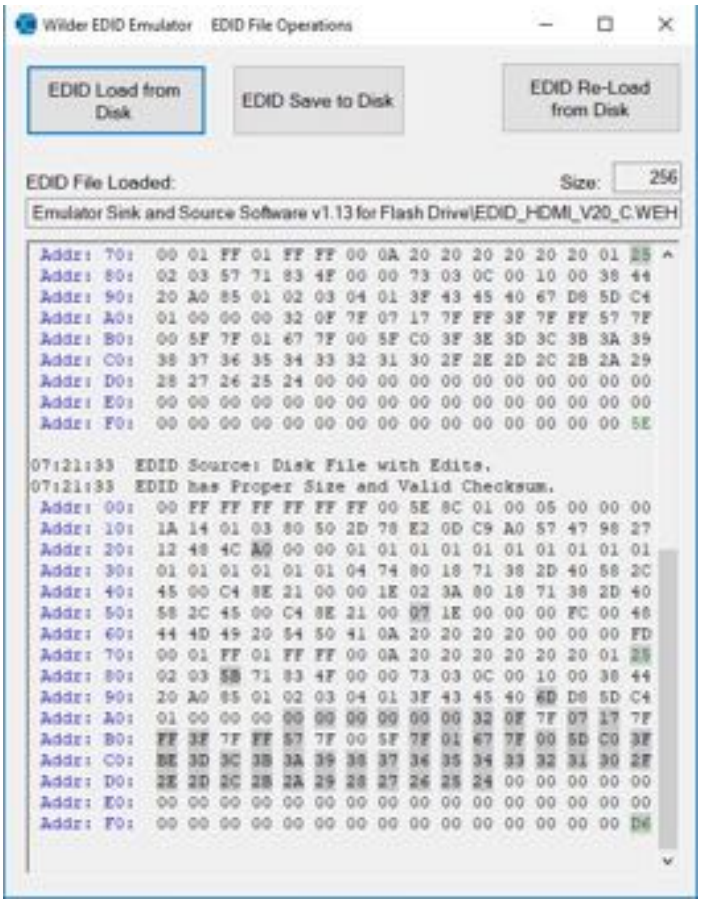


Figure 19. EDID File Operations Screen after EDID CEA Extension Block Tab 2 Edits

EDID Save Edits

After the desired edits have been made from the EDID Block 0 and EDID CEA Extension Block screens, the user may save the data to the PC. The [EDID Save to Disk] button is accessed from the "EDID File Operations" screen (see below). Upon selecting this option, the user is presented a browser window to name the file and select the save location. Note: The original EDID "WEH" starter files are protected and cannot be overwritten.

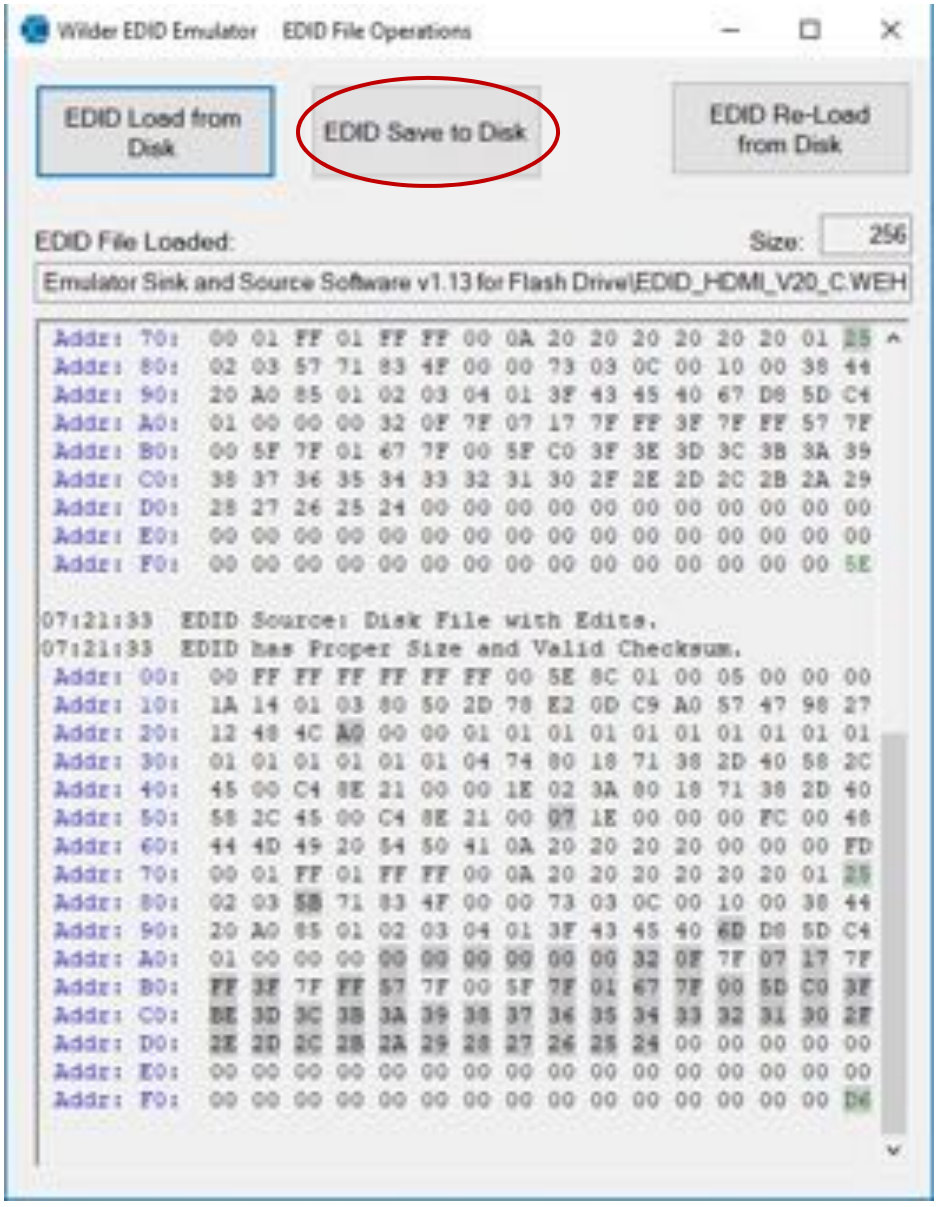


Figure 20. EDID Save to Disk

Download EDID to HW for Presentation to an HDMI Source

NOTE: This button only appears if EDID Sink Emulation has been purchased.

After the desired edits have been made from the EDID Block 0 and EDID CEA Extension screens, the user can download the data to the EDID Emulator for presentation to the Source DUT. The [Download EDID to HW for Presentation to Source (Sink Emulation)] button is accessed from the "HW Operations" screen (see below). Upon selecting this option, the HW Operations status log is updated and shows the edited file has been downloaded and the completion status

A Downloaded EDID is presented to the HDMI source (DUT) via the J1 (marked "FROM TPA") connector on the Hardware.

NOTE: EDIDs downloaded to the EDID Emulator will be preserved even after power to the module has been removed. It will present to the DUT even if the power to the EDID Emulator HW is cycled, the HW in connected to another PC or connect to a power only USB. Selecting the [Clear EDID Download] button will remove the preserved EDID. Thereafter no EDID is presented to the Source until the next download.

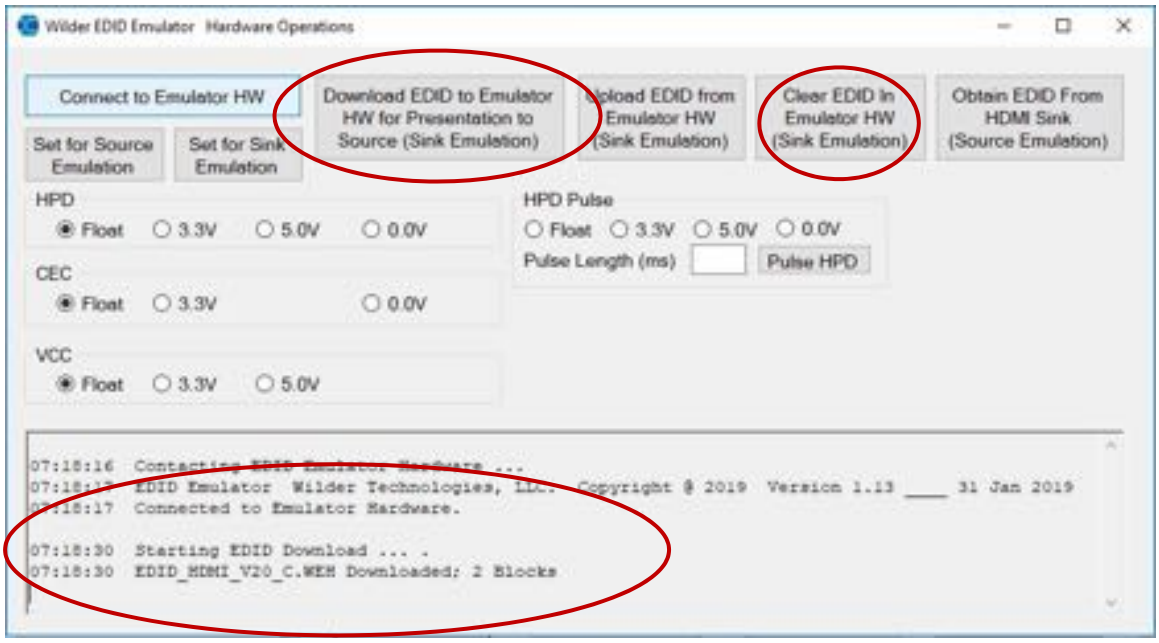


Figure 21. EDID Download to HW (Sink Emulation)

Obtain EDID from HDMI Sink

NOTE: This button only appears if EDID Source Emulation has been purchased.

Select the [Obtain EDID From HDMI Sink (Source Emulation)] button. The EDID will be acquired from the Sink DUT. The hexadecimal data will appear on the "EDID File Operations" screen, where it can be examined and saved to the disk. It may be edited using the EDID edit screens.

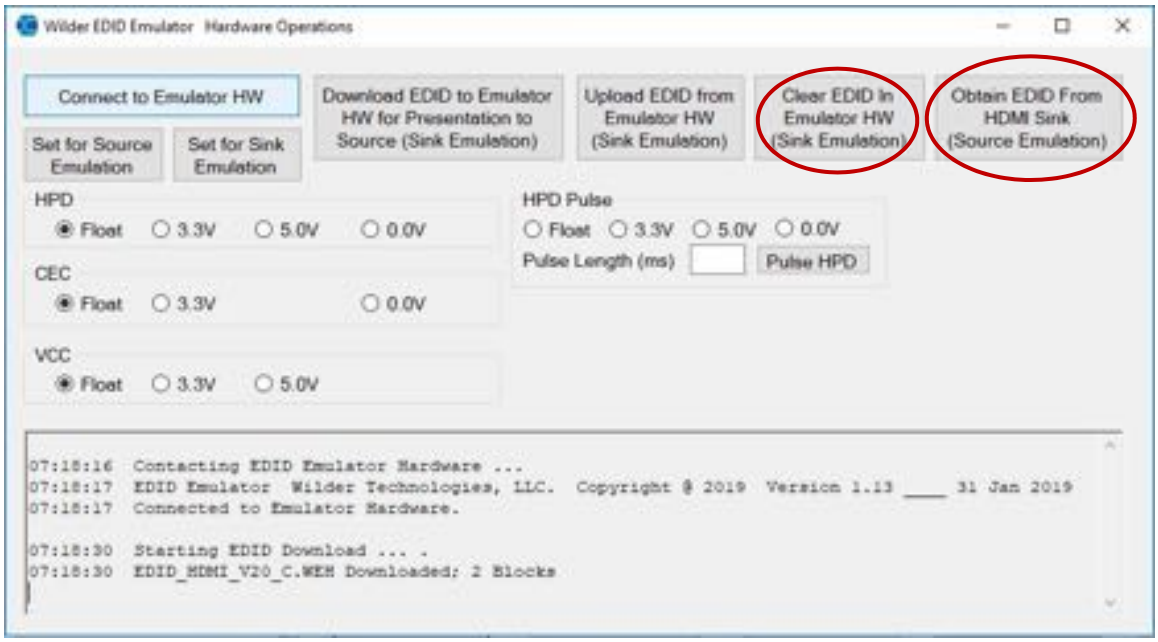


Figure 22. EDID Obtained from HW (Source Emulation)

HDMI Source SCDC Emulation

Status and Data Control Channel (SCDC) was introduced with HDMI 2.0 to allow an HDMI Source to obtain some data and change some settings in the HDMI Sink after the Source has obtained the EDID from the Sink and high-speed data transmission has started. The SCDC was then expanded for HDMI 2.1 to allow the support of FRL mode.

The Wilder EDID Emulator supports SCDC Source Emulation starting with Version 1.09.

SCDC is an array of 256 bytes maintained by the Sink and accessible by the Source via the same I^2C used for EDID. The Source is the I^2C Master and initiates reads and writes. Byte locations are called 'Offsets'.

From the “SCDC Source Emulation” Screen SCDC Offsets may be Read from and Written to the Sink DUT. Within this window there will be 2 tabs. The first tab, named “SCDC Defined Offsets”, contains controls for defined SCDC offsets which have individual controls for Reading and, if appropriate, Writing. The second tab named, “SCDC Byte Map”, contains the byte map for the entire SCDC and controls to write to specific SCDC offsets. Note that access to undefined Offsets may not be supported by the DUT and that some defined Offsets are Read Only.

Most Sinks require 5 Volts from the Source for SCDC operation. This can be provided by setting VCC on the 'Hardware Operations' Screen.

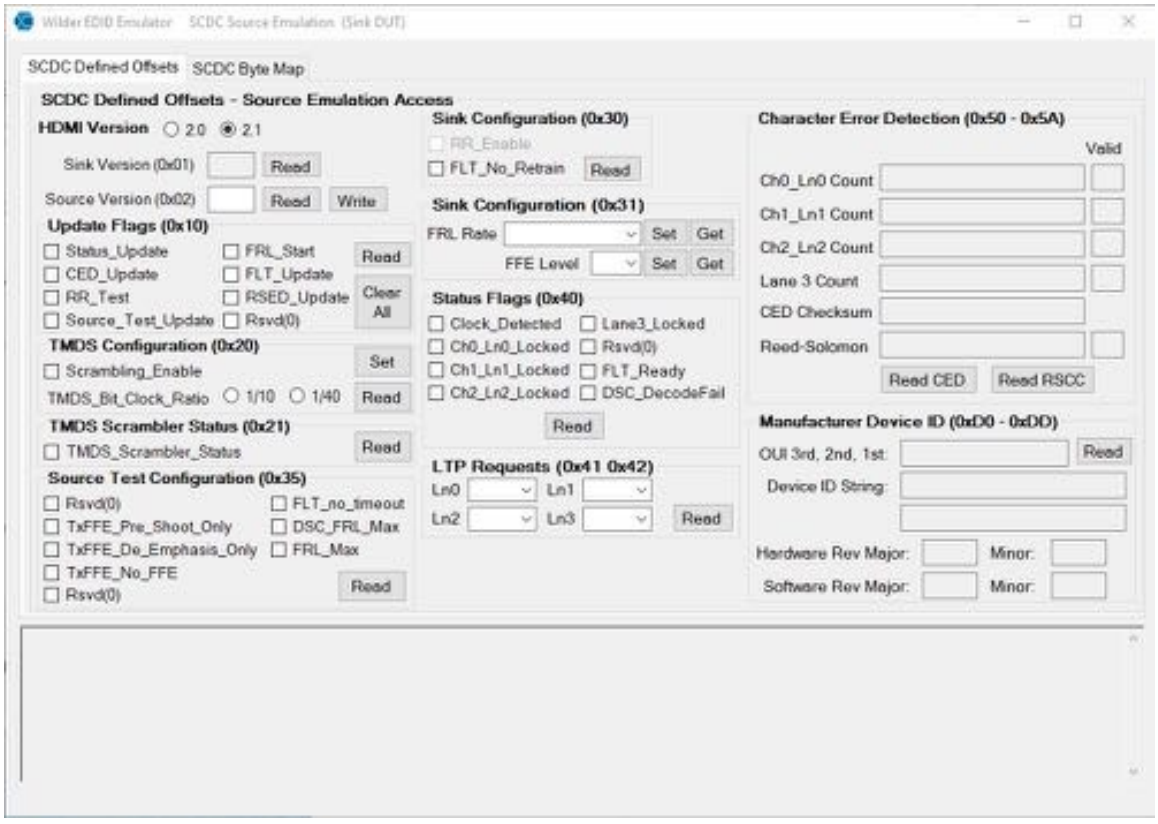


Figure 23. HDMI Source SCDC Emulation SCDC Defined Offsets Screen (Unedited)

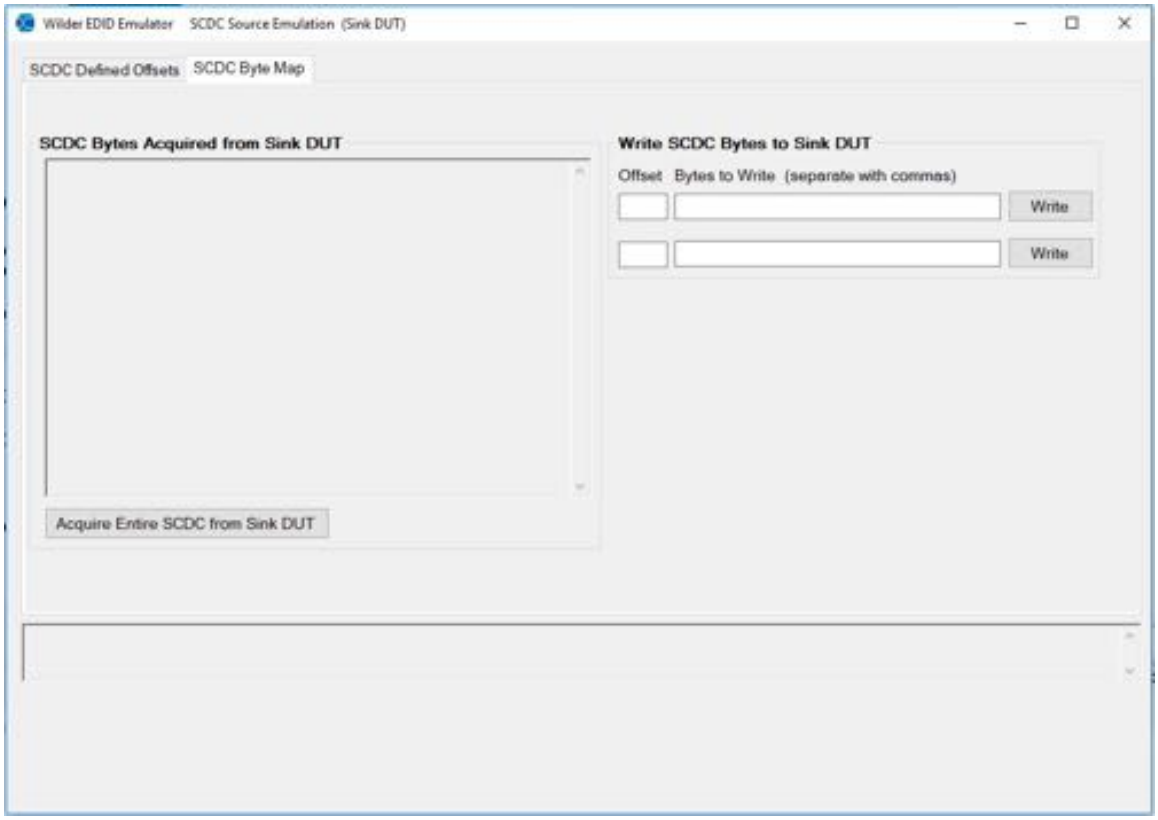


Figure 24. HDMI Source SCDC Emulation SCDC Byte Map Screen (Unedited)

HDMI Sink SCDC Emulation

The Wilder EDID Emulator supports SCDC Sink Emulation starting with Version 1.09.

SCDC is an array of 256 bytes maintained by the Sink and accessible by the Source via the same I^2C used for EDID. The Source is the I^2C Master and initiates reads and writes. Byte locations are called “Offsets”.

From the “SCDC Sink Emulation” Screen SCDC Offsets may be Read from and Written to. Within this window there will be 2 tabs. The first tab, named “SCDC Defined Offsets”, contains controls for defined SCDC offsets which have individual controls for Reading and Writing. The second tab, named “SCDC Byte Map”, contains the SCDC byte array where each individual offset can be written to. Select the [Download SCDC to HW for Presentation to Source DUT (Sink Emulation)] button to transfer the bytes to the Sink Emulator for presentation to the Source DUT.

Select the [Upload SCDC from HW] button to transfer bytes from the Sink Emulator to the Screen. This allows inspection of Offsets which values may have been changed by the Source DUT. Those that have changed since the last Download are highlighted.

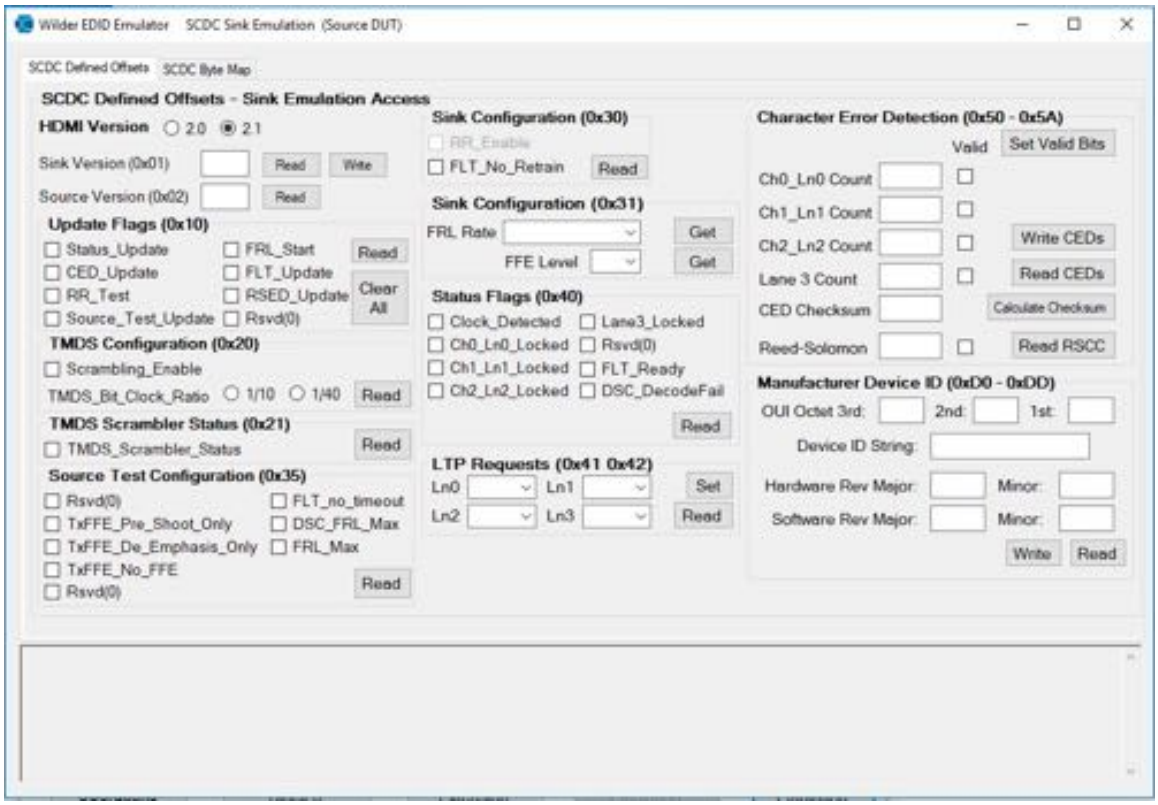


Figure 25. HDMI Sink SCDC Emulation SCDC Defined Offset Screen (Unedited)

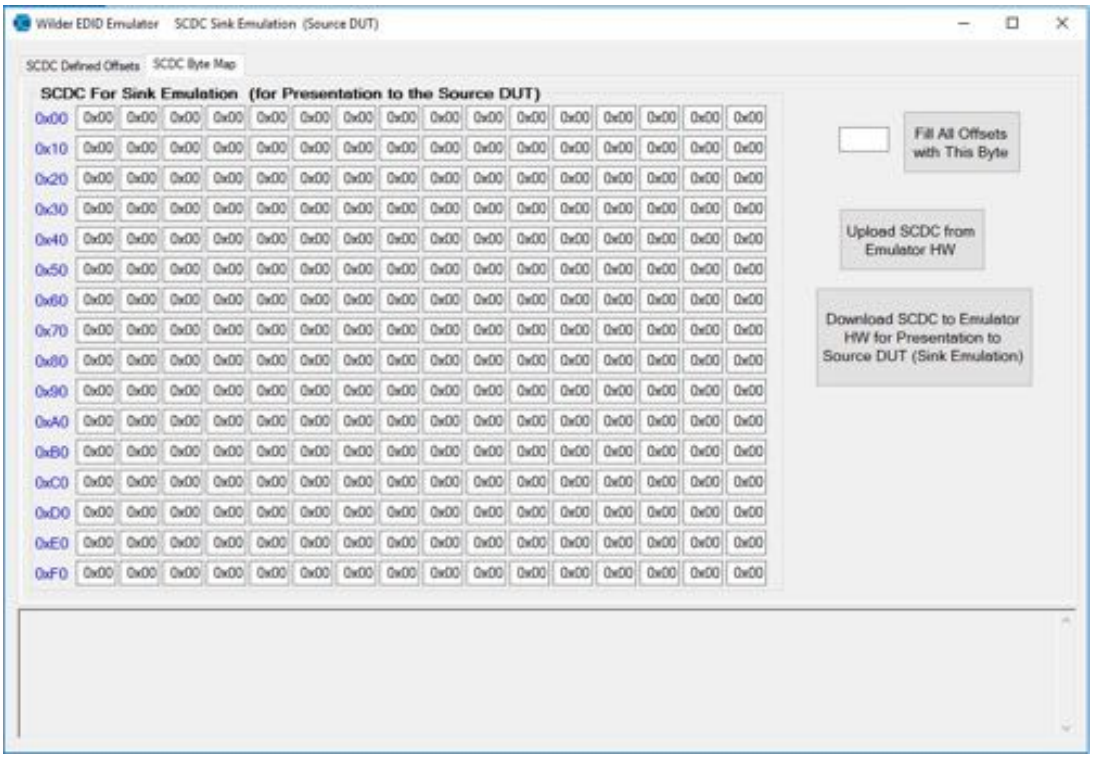


Figure 26. HDMI Sink SCDC Emulation SCDC Byte Map Screen (Unedited)

HDMI EDID Emulator LED Indicators and Error Messages

LED Indicators

- "On" Indicator (Green): A blinking "On" LED indicates normal operation. If the "On" LED is stuck On or Off, it indicates that the Firmware is not properly running.
- "Error" Indicator (Red): The "Error" LED is normally Off. However, when an EDID has never been downloaded OR the saved EDID is corrupt, the red "Error" indicator will blink in synchrony with the green "On" indicator. (This means that no EDID is presented to the DUT.) After an EDID is downloaded from the PC, the blinking of the red "Error" indicators will cease.
- "Vcc Test" Indicator (Green): The "Vcc Test" LED is driven by HW and indicates that Vcc is presented to the DUT. (Ref. Presented through connector J1, Pin-7.)

Error Messages

- If the user PC has a version of Microsoft .NET that is earlier than 4.5 there may be a message reporting that .NET is too old or an Error Message that includes the text "IAsyncState". To resolve the error, the user PC will need to install Microsoft .NET Version **4.5** or greater. It may be downloaded from the Microsoft web site
- License File Can Not be Found – Indicates that a license file does not exist or is invalid. The file must be in the same directory as the Wilder_EDM.exe file.

Wilder Technologies, LLC – Limited Warranty

Wilder Technologies, LLC warrants that each Test Adapter, 1) is free from defects in materials and workmanship and, 2) conforms to Wilder Technologies specifications for a period of 12 months, with the exceptions of the Intel-Based TBTCI and TBTCAM Test Adapters, whereby are warranted for a period of 6 months, all other aspects of the Wilder Technologies, LLC warranty apply.

See Consumable and Fragile Material Warranty for exceptions to the 12-month warranty

The warranty period for a Test Adapter is a specified, fixed period commencing on the date of ship from Wilder Technologies, LLC. If you did not purchase your Test Adapter directly from Wilder Technologies, LLC, the serial number and a valid proof of purchase will be required to establish your purchase date. If you do not have a valid proof of purchase, the warranty period will be measured from the date of ship from Wilder Technologies, LLC.

If, during the warranty period, the Test Adapter is not in good working order, Wilder Technologies, LLC will, at its option, repair or replace it at no additional charge, except as is set forth below. In some cases, the replacement Test Adapter may not be new and may have been previously installed. Regardless of the Test Adapter's production status, Wilder Technologies, LLC appropriate warranty terms apply.

Consumable and Fragile Material Warranty
Wilder Technologies, LLC warrants that consumable materials and all fragile materials supplied by Wilder Technologies, LLC either as part of an instrument or system, or supplied separately, will be free from defects in material and workmanship at the time of shipment.

Extent of Warranty
The warranty does not cover the repair or exchange of a Test Adapter resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which Wilder Technologies, LLC is not responsible. The warranty is voided by removal or alteration of Test Adapter or parts identification labels. The initial three months are unconditional; the remaining months excludes plugs, receptacles and SMA connectors. Connectors are wear items and excluded from the warranty after the initial three months.

These warranties are your exclusive warranties and replace all other warranties or conditions, express or implied, including but not limited to, the implied warranties or conditions or merchantability and fitness for a particular purpose. These warranties give you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction. Some jurisdictions do not allow the exclusion or limitation of express or implied warranties, so the above exclusion or limitation may not apply to you. In that event, such warranties are limited in duration to the warranty period. No warranties apply after that period.

Items Not Covered by Warranty
Wilder Technologies, LLC does not warrant uninterrupted or error-free operation of a Test Adapter.

Any technical or other support provided for a Test Adapter under warranty, such as assistance via telephone with "how-to" questions and those regarding Test Adapter set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND**.

Warranty Service
Warranty service may be obtained from Wilder Technologies, LLC by returning a Wilder Technologies, LLC Returns Material Authorization and the Test Adapter to Wilder Technologies, LLC during the warranty period. To obtain RMA number, contact support@wilder-tech.com.

You may be required to present proof of purchase or other similar proof of warranty entitlement. You are responsible for any associated transportation charges, duties and insurance between you and Wilder Technologies, LLC. In all instances, you must ship Test Adapters in Wilder Technologies, LLC approved packaging. Information on packaging guidelines can be found at: www.wilder-tech.com. Wilder Technologies, LLC will ship repaired or replacement Test Adapter Delivery Duty Prepaid (DDP) and will pay for return shipment. You will receive title to the repaired or replacement Test Adapter and you will be the importer of record.

Wilder Technologies, LLC – Terms & Conditions of Sale

1. **Other Documents:** This Agreement may NOT be altered, supplemented, or amended by the use of any other document(s) unless otherwise agreed to in a written agreement signed by both you and Wilder Technologies, LLC. If you do not receive an invoice or acknowledgement in the mail, via e-mail, or with your Product, information about your purchase may be obtained at support@wilder-tech.com or by contacting your sales representative.

2. **Payment Terms, Orders, Quotes, Interest:** Terms of payment are within Wilder Technologies, LLC's sole discretion, and unless otherwise agreed to by Wilder Technologies, LLC, payment must be received by Wilder Technologies, LLC prior to Wilder Technologies, LLC's acceptance of an order. Payment for the products will be made by credit card, wire transfer, or some other prearranged payment method unless credit terms have been agreed to by Wilder Technologies, LLC. Invoices are due and payable within the time period noted on your invoice, measured from the date of the invoice. Wilder Technologies, LLC may invoice parts of an order separately. Your order is subject to cancellation by Wilder Technologies, LLC, in Wilder Technologies, LLC's sole discretion. Unless you and Wilder Technologies, LLC have agreed to a different discount, Wilder Technologies, LLC's standard pricing policy for Wilder Technologies, LLC-branded systems, which includes hardware, software and services in one discounted price, allocates the discount off list price applicable to the service portion of the system to be equal to the overall calculated percentage discount off list price on the entire system. Wilder Technologies, LLC is not responsible for pricing, typographical, or other errors in any offer by Wilder Technologies, LLC and reserves the right to cancel any orders resulting from such errors.

3. **Shipping Charges; Taxes; Title; Risk of Loss:** Shipping, handling, duties and tariffs are additional unless otherwise expressly indicated at the time of sale. Title to products passes from Wilder Technologies, LLC to Customer on shipment from Wilder Technologies, LLC's facility. Loss or damage that occurs during shipping by a carrier selected by Wilder Technologies, LLC is Wilder Technologies, LLC's responsibility. Loss or damage that occurs during shipping by a carrier selected by you is your responsibility. You must notify Wilder Technologies, LLC within 7 days of the date of your invoice or acknowledgement if you believe any part of your purchase is missing, wrong or damaged. Unless you provide Wilder Technologies, LLC with a valid and correct tax exemption certificate applicable to your purchase of Product and the Product ship-to location, you are responsible for sales and other taxes associated with the order. **Shipping dates are estimates only**.

4. **WARRANTY:** WILDER TECHNOLOGIES, LLC, warrants that the item(s) manufactured under the Buyer's contract shall be free from defects in materials and workmanship furnished by WILDER TECHNOLOGIES, LLC, and shall conform to the applicable drawings and specifications. WILDER TECHNOLOGIES, LLC'S liability herein, for breach of warranty, contract or negligence in manufacturing, shall be limited to repair or replacement. Repair or replacement of defective items will be applicable only if the Buyer notifies WILDER TECHNOLOGIES, LLC, by written notice within 30-days of delivery. All claims shall be addressed to: support@wilder-tech.com or WILDER TECHNOLOGIES, LLC, 6101A East 18th Street, Vancouver, Washington 98661 U.S.A.; ATTENTION: Customer Service Manager. WILDER TECHNOLOGIES, LLC, reserves the right to inspect at the Buyer's plant all items claimed to be defective or nonconforming prior to authorizing their return. WILDER TECHNOLOGIES, LLC, assumes no liability for the results of the use of its components in conjunction with other electric, electronic or mechanical components, circuits and/or systems. The foregoing constitutes the sole and exclusive remedy of the Buyer and the exclusive liability of WILDER TECHNOLOGIES, LLC, and is IN LIEU OF ANY AND ALL OTHER WARRANTIES, STATUTORY, IMPLIED OR EXPRESSED AS TO MERCHANTABILITY, FITNESS FOR THE PURPOSE SOLD, DESCRIPTION, QUALITY, and PRODUCTIVENESS OR ANY OTHER MATTER. Without limiting the foregoing, in no event shall WILDER TECHNOLOGIES, LLC, be liable for loss of use, profit or other collateral, or for special and/or consequential damages.

5. **RETURNED GOODS:** WILDER TECHNOLOGIES, LLC, will accept only those goods for return that have been authorized for return. All goods authorized for return shall be assigned a Returned Material Authorization (RMA) Number. The RMA Number shall be clearly marked on the shipping container(s) and all documentation accompanying the goods authorized for return. The RMA Number shall be assigned by WILDER TECHNOLOGIES, LLC pursuant to the conditions set forth in Paragraph 4, WARRANTY.

6. **UNITED STATES GOVERNMENT CONTRACTS:** In the event this offer is accepted under Government contract, WILDER TECHNOLOGIES, LLC, agrees to accept clauses required by Government regulations and to waive WILDER TECHNOLOGIES, LLC conditions inconsistent therewith. WILDER TECHNOLOGIES, LLC, certifies that it is a regular manufacturer or dealer of the goods and/or services offered herein and that the prices offered do not exceed those charged to any customer for like quantities, services or materials under the same conditions.

Compliance with Environmental Legislation

Wilder Technologies, LLC, is dedicated to complying with the requirements of all applicable environmental legislation and regulations, including appropriate recycling and/or disposal of our products.

WEEE Compliance Statement

The European Union adopted Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), with requirements that went into effect July 4, 2012. WEEE is intended to reduce the disposal of waste from electrical and electronic equipment by establishing guidelines for prevention, reuse, recycling and recovery.

Wilder Technologies has practices and processes in place to conform to the requirements in this important Directive.

In support of our environmental goals, effective January 1st, 2009 Wilder Technologies, LLC has partnered with EG Metals Inc. – Metal and Electronics Recycling of Hillsboro, Oregon, www.egmetalrecycling.com, to recycle our obsolete and electronic waste in accordance with the European Union Directive 2012/19/EU on waste electrical and electronic equipment ("WEEE Directive").

As a service to our customers, Wilder Technologies is also available for managing the proper recycling and/or disposal of all Wilder Technologies products that have reached the end of their useful life. For further information and return instructions, contact support@wilder-tech.com.

CE

Compliance to RoHS Substance Restrictions

Wilder Technologies, LLC certifies that the parts described in this document are compliant to the substance restrictions of Directive 2011/65/EU of the European Parliament, and of the Council of 8 June, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive), prohibiting the use in homogeneous materials in excess of the listed maximum concentration value, except in cases where use is allowed by applicable exemptions listed in Annex III and Annex IV of the Directive.

Compliance with RoHS has been verified through internal controls at design and production sites, including establishment of processes for specifying and controlling materials and segregation of non-compliant parts, receipt of supplier declarations of compliance and/or analytical test.

EMC Product Compliance

Classification:

Test and Measurement (incl. Part 2-1)

Standard(s):

United States

Exempt from FCC 47 CFR Part 15

European Union

EMC Directive 2014/30/EU

EN 61326-1:2013 and EN 61326-2-1:2013 Environment Basic: EMC Requirements for Class A electrical equipment

CISPR 11+A1:2010 - Radiated and Conducted Emissions, Group 1, Class A

IEC 61000-4-11:2004 - Power Line Voltage Fluctuation Immunity

IEC 61000-4-2:2008 - Electrostatic Discharge Immunity

IEC 61000-4-3+A1+A2:2010 - RF Electromagnetic Field Immunity

IEC 61000-4-4+A1:2010 - Electrical Fast Transient Burst Immunity

IEC 61000-4-5:2005 - Power Line Surge Immunity

IEC 61000-4-6:2008 - RF Conducted Immunity

Australia / New Zealand

Australia Radiocommunications Act 1992

CISPR 11+A1:2010 Radiated and Conducted Emissions, Group 1, Class A in accordance with EN 61326

Conditions and Notes

- This product is intended for use in non-residential areas only. Use in residential areas may cause electromagnetic interference.
- Emissions that exceed the limits of applicable listed standards may occur when the equipment is connected to a test object.
- Equipment may not meet the immunity requirements of applicable listed standards when test leads and/or test probes are connected.
- Compliance demonstrated using high quality, shielded interface cables.
- Declaration is valid only for products bearing the Tektronix mark on the instrument case as shown below, Version A or later.

Glossary of Terms

TERMINOLOGY	DEFINITION
Aggressor	A signal imposed on a system (i.e., cable assembly) to measure response on other signal carriers.
ARC	Audio Return Channel, used to send an audio stream from the sink to the source or repeater.
Box-to-box connection	HDMI Type-A link between two boxes detachable by an end user. An HDMI Type-A cable-connector assembly for the box-to-box connection shall have three TMDS Link lanes.
CEC	Consumer Electronics Control
DDC	Display Data Channel (VESA)
Dual-standard Device Source or Sink	Device that supports both Thunderbolt and DVI/HDMI operating modes.
DUT	Device Under Test
HDMI Ethernet	HDMI Ethernet provides a full duplex connection between HDMI devices which conforms to 100Base-TX IEEE 802.3 standard [4n].
HDMI Type-A Receiver	Circuitry that receives the incoming HDMI Type-A TMDS Link data. Located in Sink Device and the upstream port of Intermediate Device.
HDMI Type-A Transmitter	Circuitry that transmits the HDMI Type-A TMDS Link data located in Source Device and in the downstream port of Intermediate Device.
HDMI-TPA	HDMI Type-A Test Point Access. A specialized assembly that interfaces to a HDMI Type-A receptacle or plug and enables access of signals for measurement or stimulation.
Informative	The designation of a test that is not required for compliance but is considered important from a characterization standpoint. It is provided for informational purposes only.
Normative	The designation of a test that is required for compliance.
SCDC	Status and Data Control Channel
Sink Device	A device that contains A/V stream sinks for display and/or sound.
Source Device	A device that contains a stream source and originates an isochronous A/V stream.
TMDS	Transition Minimized Differential Signaling
TPA	Test Point Access
Victim	A signal carrier on a system that has a response imposed on it by other signals in the system.
VSDB	Vendor Specific Data Block

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