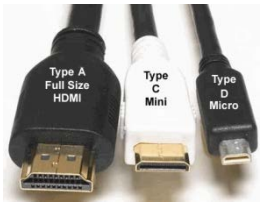


Interpretation of HDMI EDID Data

Using the WFM5250 HDMI/SDI Waveform Monitor for HDMI Signals

When dealing with an end-to-end video system, we are increasingly confronted with the fact that end of the chain uses the HDMI (High Definition Multimedia Interface), (e.g., a Camera, Set Top Box or DVD player). This standard incorporates into its structure an encryption system which can severely limit the possibilities for analysis if the measuring device is not HDCP (High Bandwidth Digital Content Protection) compliant. Developed and adopted by an industrial consortium led by Intel, this content protection algorithm prohibits displaying images on non-complaint HDCP displays.

It is based on an accurate identification of the source and the display, leading to a single encryption key that will only benefit the two devices. There is an exchange of data between the source and destination, and is structured into the EDID (Extended Display Identification Data) packets. This EDID data can be analyzed with the Auxiliary Data Status of the WFM5250 Waveform Monitor.

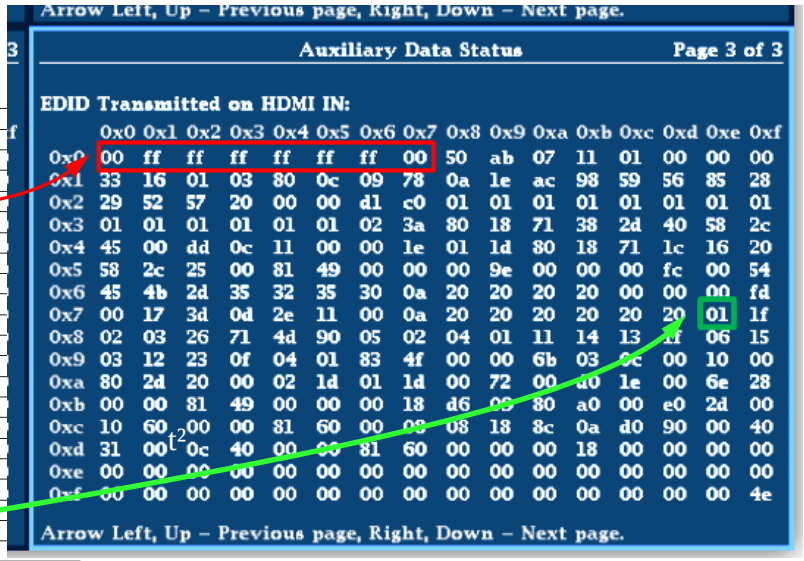
The following describes how it works and how to interpret the data.

Principle of the HDCP Pairing Procedure

- Upon connection, the source sends an identification code to the receiver.
- To demonstrate eligibility, the receiver must respond within 100ms with its code
- With these two identifiers, the source and the receiver calculate internally a unique key called a session key (unique and secret 56-bit key)
- The media is encrypted with this key that only the connected receiver can decode. A synchronization sequence is then exchanged every 128 frames.

Row	Column	Value	Description
0x0	0x0 - 0x7	00 FF FF FF FF FF FF 00	Fixed Header
0x0	0x8 - 0x9	XX XX	Manufacturer ID
0x0	0xa - 0xb	XX XX	Manufacturer Product Code
0x0	0xc - 0xf	XX XX XX XX	Serial Number
0x1	0x0	XX	Week of Manufacture
0x1	0x1	XX	Year of Manufacture
0x1	0x2	01	EDID Version
0x1	0x3	03	EDID Version
0x1	0x4 - 0x8	XX XX XX XX XX	Display Parameters
0x1	0x9 - 0xf	XX XX XX XX XX XX XX	Chromaticity Coordinates
0x2	0x0 - 0x2	XX XX XX	Chromaticity Coordinates
0x2	0x3 - 0x5	XX XX XX	Established timing bitmap
0x2	0x6 - 0xf	XX.....XX	Standard timing information
0x3	0x0 - 0x5	XX.....XX	Standard timing information
0x3	0x6 - 0xf	XX.....XX	Descriptor 1
0x4	0x0 - 0x7	XX.....XX	Descriptor 1
0x4	0x8 - 0xf	XX.....XX	Descriptor 2
0x5	0x0 - 0x9	XX.....XX	Descriptor 2
0x5	0xa - 0xf	XX.....XX	Descriptor 3
0x6	0x0 - 0xb	XX.....XX	Descriptor 3
0x6	0xc - 0xf	XX.....XX	Descriptor 4
0x7	0x0 - 0xd	XX.....XX	Descriptor 4
0x7	0xe	XX	Number of Extensions
0x7	0xf	XX	Checksum

The 0x7/0xe byte indicates the number of 128-byte blocks that follow in the so called 'Extended' data corresponding to the V2 standard. Find here all of the bytes that follow in the list.



At right, the EDID data descriptions. Above, the display screen for the waveform monitor.

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EDID Data

Data identifying a source or display is stored in a block of 256 bytes encoded in hexadecimal (V2.0). The data always begins with an easy to recognize header (in red below). Followed by various data such as resolution and standard of the media, brand, type, serial number, date of manufacture, supported resolution, the color space, the timing etc. Careful analysis of EDID data often helps to identify the nature of the pairing defects. That is why the waveform monitor displays three separate pages: A page summarizing the main parameters decoded in the clear, raw EDID received from the receiver, and those sent by the source (see Figure 1 for example – page 3 of 3).

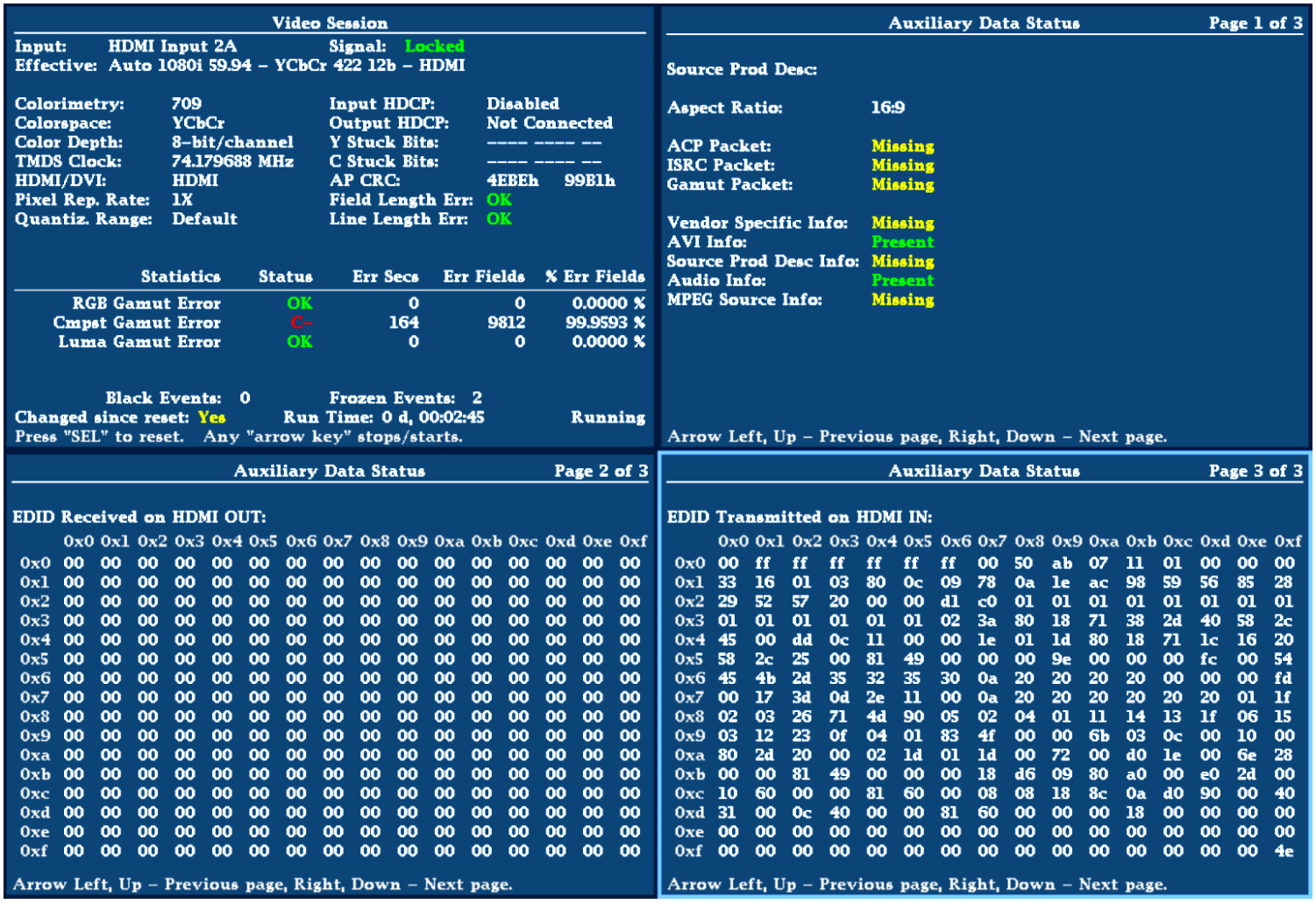

Figure 1. Video Session and Aux Data Status of HDMI input.

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1. Select the STATUS button on the waveform monitor for one of the tiles and push and hold this button to display the menu select the Aux Data Display under the Display Type menu.
    a. There are three pages within this display and pressing the Left or Right arrow keys will cycle through the menus as shown in Figure 2.
2. Pressing the Help button while in this Aux Data Status display can show a brief summary of the EDID Syntax as shown in Figure 1.
    a. The user can also download this EDID information via the web interface of the instrument.

Note

- The EDID information is stored within the Sink (Input) device and provided to the Source (Output) when the connection is made.
- The EDID information is then used by the source to configure the appropriate video and audio signals to provide to the Sink.
- When the HDMI loop through output is connected from the WFM5250 the EDID information can be obtained from the connected device.

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