
88x HDMI 1.4 3D Application Note

Rev: D



1 Overview of the 3D Application for the 88x

The 3D feature provided in the 88x series test instrument enables you to test the ability of your 3D capable HDTV to process HDMI vendor specific infoframes with 3D metadata and to render 3D formats. The 88x 3D feature can test 3D using the CEA-861E timings (resolutions).

The 88x 3D feature can test the following 3D structures:

- Frame packing (Notes 1, 2)
- Line alternative (Notes 1, 2)
- Side-by-side (full) (Notes 2)
- L + Depth (Notes 1, 2, 4)
- Side-by-side (half) (Note 3)
- Top and Bottom

Notes:

1. There are some current limitations for the 882EA related to interlaced formats.
(Results in error 2270.)
2. The 88xEA cannot test resolutions whose total horizontal pixel count exceed 2048 pixels.
(Results in error 2152.)
3. Some high resolution 861E timings (those with pixel rates of 148.5MHz) cannot be supported by any 88x series devices except for side by side half. These unsupported timings will not appear in the menu 88x menu.
4. The 3D Bitmap Conversion Tool cannot create bitmaps for this structure.

2 Rendering 3D Images

This section provides detailed procedures for rendering 3D images.

2.1 Prerequisites for testing with the 3D images

In order to use the 3D utility to test your display you will need to ensure that the following prerequisites are met:

- Upgrade your 88x to the current release. Read the Release Notes to verify which release supports the 3D images.
- Locate the Quantum Data 3D bitmaps or use your own 3D bitmaps – The Quantum Data bitmaps are available from the Quantum Data website at:
http://www.quantumdata.com/apps/3D/sample_BMP.asp.
- (optional) If you wish to create your own 3D bitmaps from stereoscopic image pairs that you have, then you will need to acquire the Quantum Data Bitmap Conversion Tool. This tool enables you to create 3D ready images that use various 3D format structures from existing stereographic bitmaps (left and right eye views). This utility is available at the Quantum Data downloads page:
www.quantumdata.com/downloads/. You do not need this tool if you already have 3D bitmap test images or if you want to use the Quantum Data 3D bitmaps.
- Load the 3D ready bitmap images onto the compact flash card in the 88x slot using the FTP Browser utility.

2.2 Workflow for rendering 3D images

The following describes the workflow for testing using the 882 Quantum Data 3D utility. This workflow assumes that you have satisfied the pre-requisites described above.

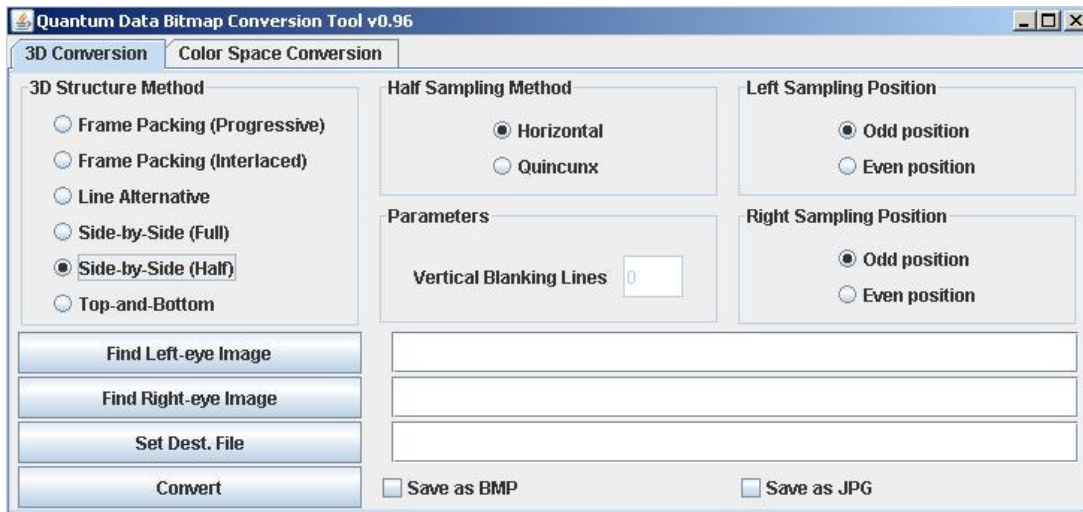
- Select a valid 3D timing (format) through 88x front panel in **Basic** mode or through the command line.
- Specify the 3D format structure.
- Select the 3D ready bitmap test image either through the 88x front panel using the **Browse** mode or the command line.

2.3 Creating 3D ready images

Use the following procedures to create the 3D ready images from two stereographic bitmaps using the Quantum Data 3D Bitmap Conversion Tool.

Note: If you have your own 3D bitmap images or if you are using the bitmap images provided by Quantum Data, you do not need to use this procedure.

1. Acquire 3D stereographic image pairs (left and right) and place them in a convenient directory in your PC.
2. Download the Quantum Data 3D Bitmap Conversion Tool available from the Quantum Data website at: www.quantumdata.com/downloads/. Unzip the file and place it in a convenient location on your PC. This tool will convert a pair of 3D stereographic image pairs into a 3D bitmap of a specific 3D format that you can use in your 882.
3. Launch the Bitmap Conversion Tool by double clicking on the application icon. The application opens as shown below:



4. Load the left eye image residing on your PC by clicking on the **Find Left-eye Image** activation button. When you select the image, it will appear in the first entry field under the list of parameters just to the right of the **Find Left-eye Image** activation button.
5. Load the right eye image residing on your PC by clicking on the **Find Right-eye Image** activation button. When you select the image, it will appear in the second entry field under the list of parameters just to the left of the **Find Right-eye Image** activation button.

6. Select the desired **3D Structure Method** using the radio buttons. The following table lists the various methods and the settings associated with them:

Table: 3D Structure Methods and Parameters				
3D Structure Method	Half Sampling Method	Left Sampling Position	Parameter – Vertical Blanking Lines	Right Sampling Position
Frame Packing	Not applicable	Not applicable	The number of lines between the left and right eye image – typically set to 30 lines for 720 timings and 45 lines for 1080 timings	Not applicable
Field Alternative	Not applicable	Not applicable	The number of lines between the left and right eye image – typically set to 30 lines for 720 timings and 45 lines for 1080 timings	Not applicable
Line Alternative	Not applicable	Not applicable	Not applicable	Not applicable
Top and Bottom	Not applicable	Not applicable	Not applicable	Not applicable
Side-by-Side (Full)	Not applicable	Not applicable	Not applicable	Not applicable
Side-by-Side (Half)	One of: <ul style="list-style-type: none"> ▪ Horizontal ▪ Quincunx 	One of: <ul style="list-style-type: none"> ▪ Odd position ▪ Even position 	Not applicable	One of: <ul style="list-style-type: none"> ▪ Odd position ▪ Even position

7. Set the name and directory where the resulting 3D ready image will be stored using the **Set Dest. File** activation button. When you select the name and directory, it will appear in the third entry field under the list of parameters.

Note: It is important to use a naming convention that identifies the format resolution of the image including the frame rate and the 3D structure. You are limited to using only 8 characters which is all that can be shown in the 88x front panel LCD. For example you could use a naming convention as follows:

FFFFDDDD, where:

- FFFF are four characters for the number of lines in the format timing, typically either 0720 for 720 or 1080 for 1080.
- DDDD are four characters for the 3D structure used. Either:
 - TP for Top and Bottom
 - FP for Frame Packing
 - LALT for Line Alternative
 - SBSF for Side-by-Side (Full)
 - HHEE for Side-by-Side (Half) Horizontal sub-sampling Even left, Even right
 - HHEO for Side-by-Side (Half) Horizontal sub-sampling Even left, Odd right

- HHOE for Side-by-Side (Half) Horizontal sub-sampling Odd left, Even right
- HHOO for Side-by-Side (Half) Horizontal sub-sampling Odd left, Odd right
- HQEE for Side-by-Side (Half) Quincunx matrix Even left, Even right
- HQEO for Side-by-Side (Half) Quincunx matrix Even left, Odd right
- HQOE for Side-by-Side (Half) Quincunx matrix Odd left, Even right
- HQOO for Side-by-Side (Half) Quincunx matrix Odd left, Odd right

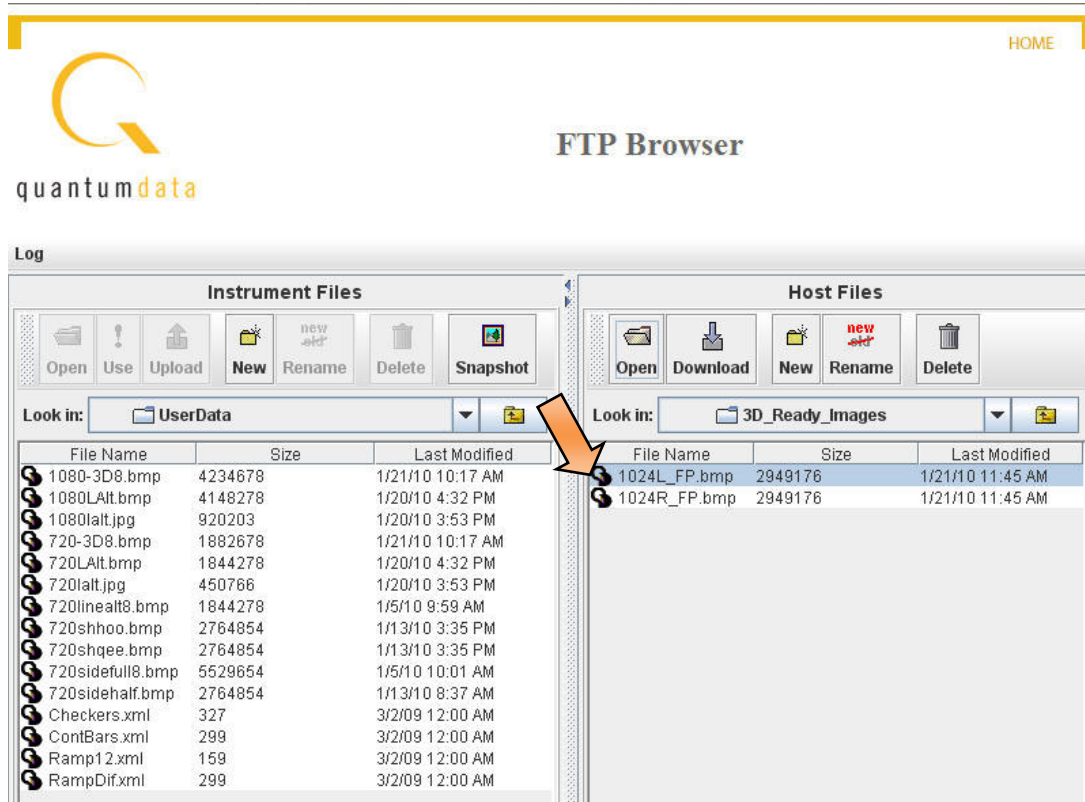
For example: 1080HQEO would represent a 1080p format using the Side-by-Side structure using Quincunx matrix with Even left eye and Odd right eye.

8. Specify whether you want to save the resulting 3D ready image as a bitmap (BMP) using the checkbox provided. JPEG is not recommended.
9. Click on the **Convert** activation button to make the conversion and save the file in the specified directory using the specified name.

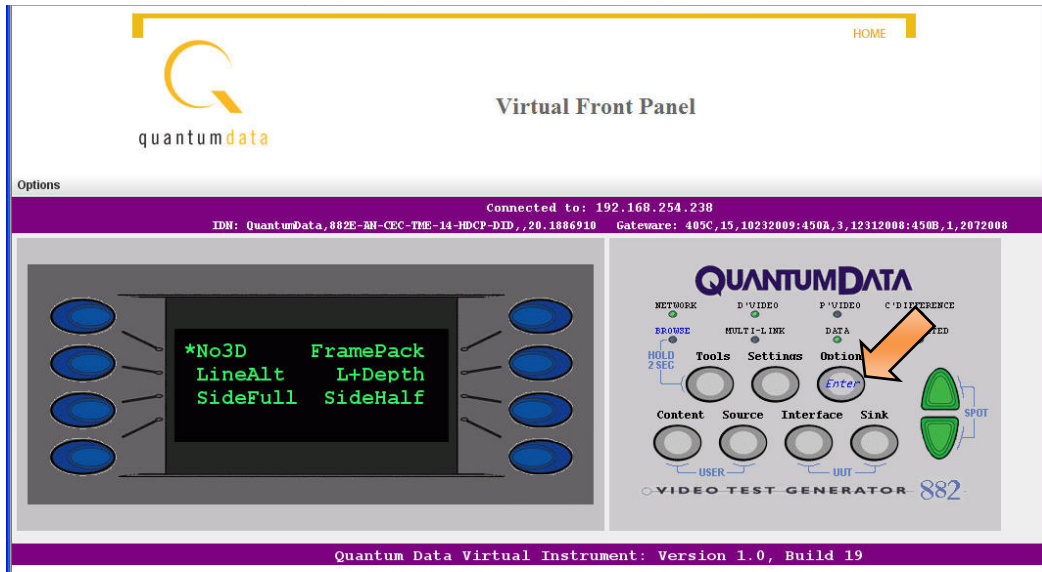
2.4 Rendering 3D ready images

Use the following procedures to render the 3D ready images with your 88x.

1. Place a compact flash card into the 88x slot provided.
2. Transfer the 3D ready images from your PC to the compact flash card using the 88x FTP Browser utility. On the **Instrument Field** side of the FTP Browser, navigate to the card0/library/UserData directory, and then transfer the files from your **Host Files** on the PC to the **Instrument Files**. Refer to the following screen.



3. Select the format from the 88x using either the front panel or the command line.
 - A. To load the format through the front panel:
 1. Press the **Source** button and then select the format. Be sure and select the format that is associated with the 3D ready bitmap image you are intending to render. Note that the 88x should be in the Basic mode when you select the format.
 2. Press the **Options** button repeatedly until the 3D menu appears. Select the desired 3D Structure as shown below:



- B. To load the format through the command line. Enter the following commands (example only):

```
FMTL 720p20
X3DM 1 0 // Use the table below to determine what values to enter
FMTU
```

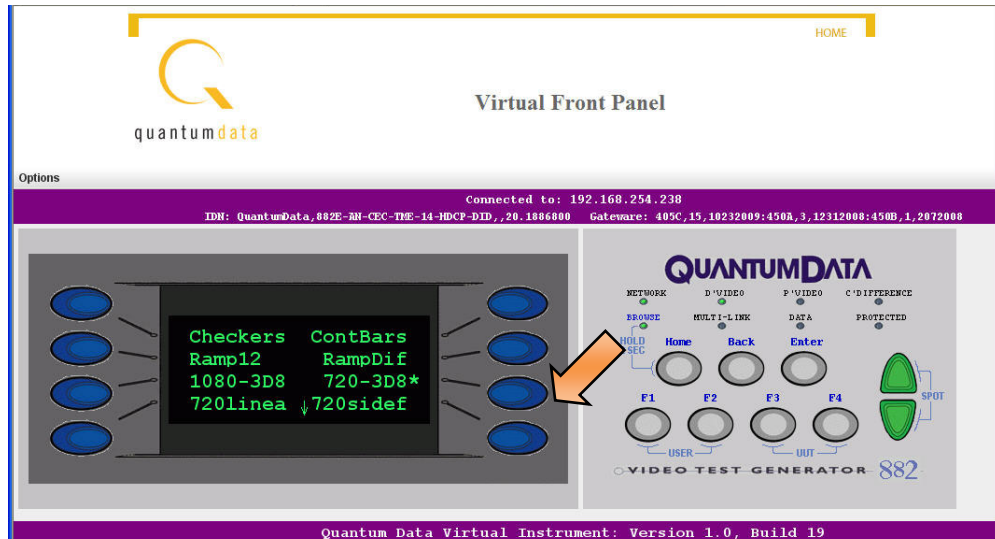

Table: X3DM Command Parameters		
Parameter No.	Description	Value Permitted
1	Enable or disable 3D	0 – Disable 1 - Enable
2	3D method	0 – Frame Packing 2 – Line Alternative 3 – Side-by-Side (Full) 4 – L + Depth 6 – Top and Bottom 8 – Side-by-Side (Half)
3	Applies to Side-by-Side (Half) only	Horizontal Sub-Sampling: 0 – Odd/Left picture, Odd/Right picture 1 – Odd/Left picture, Even/Right picture 2 – Even/Left picture, Odd/Right picture 3 – Even/Left picture, Even/Right picture Quincunx Matrix: 4 – Odd/Left picture, Odd/Right picture 5 – Odd/Left picture, Even/Right picture 6 – Even/Left picture, Odd/Right picture 7 – Even/Left picture, Even/Right picture
<p>Examples:</p> <pre>X3DM 1 0 // enables 3D sends Frame Packing X3DM 1 8 3 // enables 3D sends out Side-by-Side using Even/Left picture, Even/Right picture horizontal subsampling X3DM 0 // disables 3D</pre>		

4. Select the 3D ready image from the 88x using either the front panel or the command line:

A. Using the Front Panel

1. Put the 88x into the **Browse** mode. To use the **Browse** mode hold the **Tools** key down until you see an indication on the LCD that the 88x has activated the **Browse** mode.
2. Select PCCard and then navigate to the Library/UserData directory
3. Select the 3D ready image using the blue button adjacent to the desired 3D ready image in the list. Return to the **Basic** mode after making your selection.

When you select a 3D capable format and 3D ready image, the 88x transmits the image out the HDMI output port and also sends the HDMI vendor specific infoframe with the necessary 3D metadata.



B. Using the command line:

1. Enter the following command to load the 3D ready image:

```
IMGL /card0/library/UserData/720-3D8.bmp
IMGU
```

END OF PROCEDURE