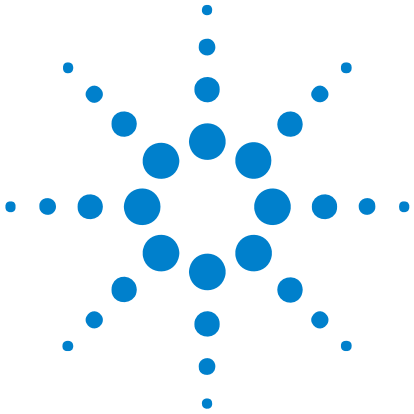

MIPI DSI Tools

Online Help

Agilent Technologies

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Using the MIPI DSI Tools

In this guide, you will learn about the following tools:

- DSI Image Inserter (see page 7)
- DSI Image Extractor (see page 24)
- DSI Image Extractor (Command Mode) (see page 28)
- DSI Command Sender (see page 33)

Contents

1 DSI Image Inserter

DSI compliant peripherals support one of the following two basic modes of operation: video mode and command mode. In command mode, transactions take the form of sending commands and data to a peripheral, such as a display module, which incorporates a display controller. In video mode, transfers from a host processor to a peripheral take the form of real-time pixel stream. The video mode is further divided into burst mode and non-burst mode.

The DSI Image Inserter tool provides three tabs for different modes of image insertion: Burst Mode, Non-Burst Mode, and Command Mode. All sections in this chapter explains the GUI for these modes.

In this chapter, you will learn to use the DSI Image Inserter tool that allows you to create a DSI ASCII format file using a BMP file. The DSI ASCII file is then used by the Signal Inserter tool to generate the CSV file for pattern generator. In addition to this, the DSI Image Inserter tool provides options to open the Signal Inserter tool, as well as it also allows you to create the pattern generator CSV file without leaving the tool.

The DSI Image Inserter Dialog box provides the following tabs:

- Burst Mode (see page 8)
- Non Burst Mode (see page 12)
- Command Mode (see page 16)

The DSI Image Inserter also provides the following dialog box:

- Image Viewer (see page 20)

Burst Mode

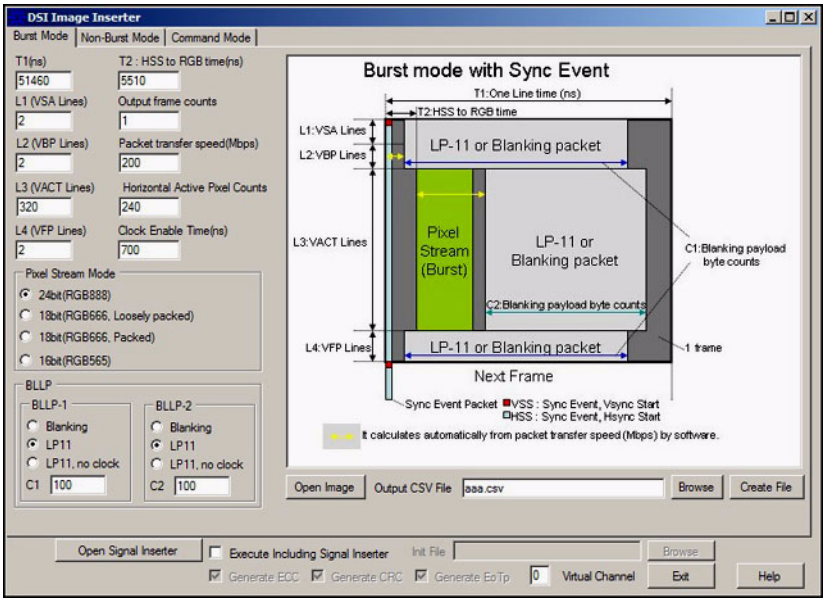
In *burst mode*, blocks of pixel data can be transferred in a short time using a compressed burst format. This is a good strategy to reduce overall DSI power consumption, as well as enabling larger blocks of time for other data transmissions over the Link in either direction.

The Burst Mode tab allows you to create an ASCII as well as pattern generator CSV file with the burst mode capabilities.

To access the Burst Mode tab:

- Select the **Start > Programs > Agilent Logic Analyzer > Utilities > MIPI DSI Tools > DSI Image Inserter** menu command, and then select the **Burst Mode** tab.

  The following figure displays the Burst Mode tab.



The following table describes the components of the Burst Mode tab.

Table 1 Components of the Burst Mode tab

Component	Description
T1	Specifies the time (in nanoseconds) for displaying one line, which includes displaying sync information, blanking packets, pixel packets, time in Low Power (LP) state.
T2: HSS to RGB time	Specifies the time period (in nanoseconds) from Horizontal Sync Start (HSS) packet to the first RGB packet, i.e. pixel packet.

Table 1 Components of the Burst Mode tab (continued)

Component	Description
L1 (VSA Lines)	Specifies the number of lines for the vertical sync active area.
Output frame counts	Specifies the number of frames to be created in the CSV file. The value in the **Output frame counts** text box must always be less than or equal to the number of images loaded in Image Viewer. Additionally, images are taken in ascending order. That is, if you specify N, then Image Inserter takes image 1 to N from the Image Viewer.
L2 (VBP Lines)	Specifies the number of lines for the vertical back porch area.
Packet transfer speed	Accepts the transfer speed of the packet, which is determined by the frequency of the Oscillator. You should only specify this value here, as any other value will be ignored by the tool.
L3 (VACT Lines)	Specifies the number of vertically active lines per frame, that is, height of the image. The value you specify here should match with the value in the Image Height text box (refer Image Viewer (see page 20)).
Horizontal Active Pixel Counts	Specifies the image width. The value you specify here should match with the value in the Image Width text box (refer Image Viewer (see page 20)).
L4 (VFP Lines)	Specifies the number of lines for the vertical front porch area.
Clock Enable Time	Specifies the time (in nanoseconds) to enable the clock before the next scheduled packet. The value specified in this text box is significant only when you have selected the L11, no clock option in the BLLP section.
Pixel Stream Mode	Selects the format of the image data: • 24bit(RGB888) • 18bit(RGB666, Loosely packed) • 18bit(RGB666, Packed) • 16bit(RGB565)
BLLP	Provides the following components for each Blanking or Low Power Level (BLLP-1 and BLLP-2): • **Blanking** — Select this when you want host processor to send a blanking packet. Selecting this option fills BLLP with a blanking packet of appropriate payload size. • **LP11** — Select this when you want the host processor to go to Low Power state. In this case, no packets are generated for BLLP. • **LP11, no clock** — Select this when you want the host processor to go to Low Power state, and also switch off the clock to reduce power consumption even more. In this case, the clock is disabled at the beginning of BLLP and is enabled again at the end of BLLP. Selecting this option also require you to specify the appropriate clock enable time in the Clock Enable Time text box. • **C1** — Specifies the payload byte count for the packets of BLLP-1. • **C2** — Specifies the payload byte count for the packets of BLLP-2.

Table 1 Components of the Burst Mode tab (continued)

Component	Description
Open Image	Opens Image Viewer (see page 20).
Output CSV File	Specifies the name of the CSV file you want to create. You can also click **Browse** to specify the desired location, along with the name, of the CSV file.
Create File	Creates the specified file. Remember the following points about Create File: • If the **Execute Including Signal Inserter** check box is not selected, clicking **Create File** creates an ASCII file. Use the Agilent Signal Inserter tool to convert this ASCII file to the pattern generator compatible CSV file. • If the **Execute Including Signal Inserter** check box is selected, clicking **Create File** creates an ASCII file as well as the pattern generator compatible CSV file. For example, if you typed Image01.csv in the Output CSV File text box, clicking **Create File** creates the following two files: *Image01.csv_Base.csv* (ASCII format) and *Image01.csv* (pattern generator compatible CSV format).
Open Signal Inserter	Displays the Agilent Signal Inserter tool, which you use to convert the intermediate ASCII file to the pattern generator compatible CSV file. The **Open Signal Inserter** command button is disabled if the **Execute Including Signal Inserter** check box is selected.
Execute Including Signal Inserter	Instructs the DSI Image Inserter to create the pattern generator compatible CSV file, along with the intermediate ASCII file, whenever Create File is clicked. Selecting **Execute Including Signal Inserter** also lets you use the following components: • **Init File** — Allows you to specify the file that contains the INIT sequence. You can also browse and select the file containing the INIT sequence using the Browse command button. • **Generate ECC** — Select to generate ECC in the packet headers. If this check box is not selected, then all ECC are set to zero. • **Generate CRC** — Select when you want to generate CRC in the packet footers. If this check box is not selected, then all CRC are set to zero. • **Generate EoTp** — Select to generate End of Transmission packets.
Virtual Channel	Specifies which one out of the four virtual channel (0, 1, 2, or 3) to use.
Exit	Closes the tool.
Help	Displays online help.

NOTE

The time to switch on the DSI clock depends on the values of the Waveform Timing Controls. The exact timing behavior is described in the DSI specification. For exact scheduling of the next packet after a BLLP it is important to enable the clock before BLLP ends. If the clock is enabled too late, the next packet will be delayed.

The DSI Image Inserter tool does not check if the BLLP is long enough to disable and enable the clock. It also does not check if the configured time is sufficient to enable the clock again before the next scheduled packet after the BLLP. It is recommended to check the values of the Waveform Timing Controls and look up the timing behavior in the DSI specification before using this feature.

For information on Waveform Timing Controls, refer to the **Stimulus** tab of the N4851/61A MIPI DPHY Analysis/Stimulus Probes dialog box in the *Agilent Logic Analyzer* application.

Non Burst Mode

The *non-burst mode* has two formats:

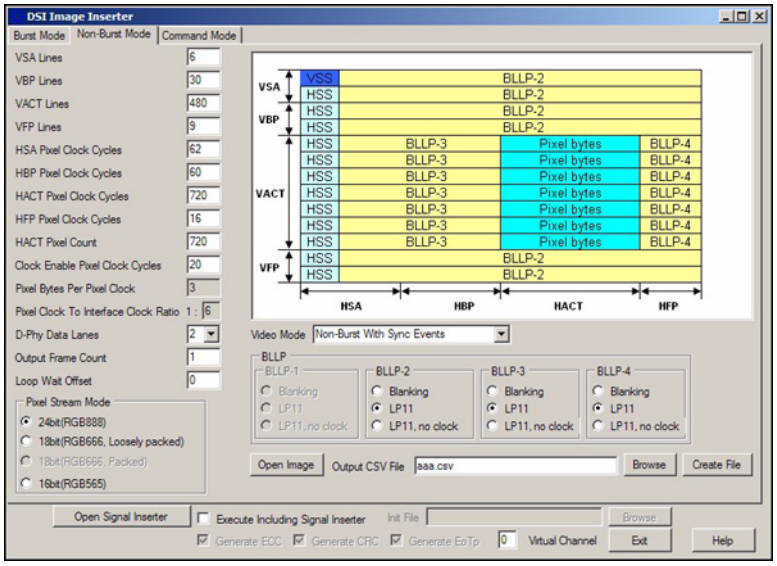
- *Non-burst mode with sync pulses* — the goal is to accurately convey DPI-type timing over the DSI serial Link. This includes matching DPI pixel-transmission rates, and widths of timing events like sync pulses. Accordingly, synchronization periods are defined using packets transmitting both start and end of sync pulses.
- *Non-burst mode with sync events* — only the start of each synchronization pulse is transmitted.

The Non-Burst Mode tab allows you to create ASCII as well as pattern generator CSV files with the non-burst mode capabilities.

To access the Burst Mode tab:

- Select the **Start > Programs > Agilent Logic Analyzer > Utilities > MIPI DSI Tools > DSI Image Inserter** menu command, and then select the **Non-Burst Mode** tab.

The following figure displays the Non-Burst Mode tab.



The following table describes the components of the Non-Burst Mode tab.

Table 2 Components of the Non-Burst Mode tab

Component	Description
Video Mode	Provides the following options: • **Non-Burst With Sync Pulses** — Select this option when you want synchronization periods to be defined using packets transmitting both start and end of sync pulses. • **Non-Burst With Sync Events** — Select this option when you want that only the start of each synchronization pulse is transmitted.
VSA Lines	Specifies the number of lines for the vertical sync active area.
VBP Lines	Specifies the number of lines for the vertical back porch area.
VACT Lines	Specifies the number of vertically active lines per frame, that is, height of the image. The value you specify here should match with the value in the Image Height text box (refer Image Viewer (see page 20)).
HSA Pixel Clock Cycles	Specifies the number of pixel clock cycles for the horizontal sync active area.
HBP Pixel Clock Cycles	Specifies the number of pixel clock cycles for the horizontal back porch area.
HACT Pixel Clock Cycles	Specifies the number of pixel clock cycles for the horizontal pixels per line. The value you specify here should match with the value in the **HACT Pixel Count** text box.
HFP Pixel Clock Cycles	Specifies the pixel clock cycles for the horizontal front porch area.
HACT Pixel Count	Specifies the image width. The value you specify here should match with the value in the **Image Width** text box (refer Image Viewer (see page 20)).
Clock Enable Pixel Clock Cycles	Specifies the time (in pixel clock cycles) to enable the clock before the next scheduled packet. The value specified in this text box is significant only when you have selected the L11, no clock option in the BLLP section.
Pixel Bytes Per Pixel Clock	Shows the number of pixel bytes per pixel clock cycle. The value shown here depends on the option selected in the Pixel Stream Mode section.
Pixel Clock To Interface Clock Ratio	Shows the pixel clock to the interface clock ratio. The value shown here depends on the option selected in the Pixel Stream Mode section or the value specified in the **Pixel Clock To Interface Clock Ratio** text box.
D-Phy Data Lanes	Provides options (1 and 2) to allow you to specify the physical data lanes. The value that you specify here will affect the pixel clock to interface clock ratio.
Output Frame Count	Specifies the number of frames to be created in the CSV file.

Table 2 Components of the Non-Burst Mode tab (continued)

Component	Description
Loop Wait Offset	Specifies a value in pixel clocks to adjust the time between the last packet in an image frame and the next VSS (that is, the first packet of the next frame).
Pixel Stream Mode	Provides the following options to select the format of the image data: • 24bit(RGB888) • 18bit(RGB666, Loosely packed) • 16bit(RGB565)
BLLP	Provides the following components for each Blanking or Low Power Level (BLLP-1, BLLP-2, BLLP-3, and BLLP-4): • **Blanking** — Select Blanking when you want host processor to send a blanking packet. Selecting this option fills BLLP with a blanking packet of appropriate payload size. • **LP11** — Select LP11 when you want the host processor to go to Low Power state. In this case, no packets are generated for BLLP. • **LP11, no clock** — Select LP11, no clock when you want the host processor to go to Low Power state, and also switch off the clock to reduce power consumption even more. In this case, the clock is disabled at the beginning of BLLP and is enabled again at the end of BLLP. Selecting this option also require you to specify the appropriate clock enable time in the Clock Enable Pixel Clock Cycles text box.
Open Image	Opens Image Viewer (see page 20).
Output CSV File	Specify the name of the CSV file you want to create. You can also click **Browse** to specify the desired location, along with the name, of the CSV file.
Create File	Creates the specified file. Remember the following points about Create File: • If the **Execute Including Signal Inserter** check box is not selected, clicking **Create File** creates an ASCII file. Use the Agilent Signal Inserter tool to convert this ASCII file to the pattern generator compatible CSV file. • If the **Execute Including Signal Inserter** check box is selected, clicking **Create File** creates an ASCII file as well as the pattern generator compatible CSV file. For example, if you typed Image01.csv in the Output CSV File text box, clicking **Create File** creates the following two files: *Image01.csv_Base.csv* (ASCII format) and *Image01.csv* (pattern generator compatible CSV format).
Open Signal Inserter	Displays the Agilent Signal Inserter tool, which you use to convert the intermediate ASCII file to the pattern generator compatible CSV file. The Open Signal Inserter command button is disabled if the Execute Including Signal Inserter check box is selected.

Table 2 Components of the Non-Burst Mode tab (continued)

Component	Description
Execute Including Signal Inserter	Instructs the DSI Image Inserter to create the pattern generator compatible CSV file, along with the intermediate ASCII file, whenever Create File is clicked. Selecting Execute Including Signal Inserter also allows you to use the following components: • **Init File** — Allows you to specify the file that contains the INIT sequence. You can also browse and select the file containing the INIT sequence using the Browse command button. • **Generate ECC** — Select to generate ECC in the packet headers. If this check box is not selected, then all ECC are set to zero. • **Generate CRC** — Select when you want to generate CRC in the packet footers. If this check box is not selected, then all CRC are set to zero. • **Generate EoTp** — Select to generate End of Transmission packets.
Virtual Channel	Specifies which one out of the four virtual channel (0, 1, 2, or 3) to use.
Exit	Closes the tool.
Help	Displays online help.

Command Mode

Command mode refers to an operation in which transactions take place in the form of sending DCS commands and data to a peripheral, such as a display module, which incorporates a display controller.

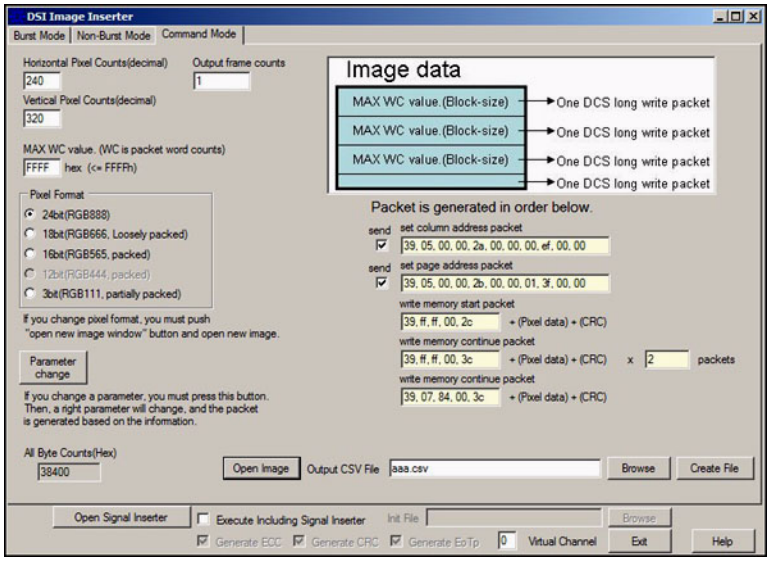
Unlike the video mode, i.e. burst and non-burst modes, exact video timing (and hence the sync data) is not needed in the command mode.

In the DSI Image Inserter dialog box, the Command Mode tab allows you to convert one or more images into pattern generator compatible CSV form. This tab also allows you to write your own desired DCS commands and add them to the resulting pattern generator CSV file.

To access the Burst Mode tab:

- Select the **Start > Programs > Agilent Logic Analyzer > Utilities > MIPI DSI Tools > DSI Image Inserter** menu command, and then select the **Command Mode** tab.

The following figure displays the Command Mode tab.



The following table describes the components of the Command Mode tab.

Table 3 Components of the Command Mode tab

Component	Description
Horizontal Pixel Counts	Specifies the image width. The value you specify here should match with the value in the Image Width text box (refer Image Viewer (see page 20)).
Vertical Pixel Counts	Specifies the height of the image. The value you specify here should match with the value in the Image Height text box (refer Image Viewer (see page 20)).
MAX WC value	Specifies the size of the packet (in hexadecimal).
Output frame counts	Specifies the number of frames to be created in the CSV file.
Pixel Format	Select the format of the image data in the CSV file. • 24bit(RGB888) • 18bit(RGB666, Loosely packed) • 16bit(RGB565, packed) • 3bit(RGB111, partially packed)
Parameter change	Click **Parameter change** every time you modify any of the following components: • **Horizontal Pixel Counts** • **Vertical Pixel Counts** • **MAX WC value** Doing this appropriately updates the value of the **All Byte Counts** and packets.
All Byte Counts	Displays the total count of the bytes to be saved in the CSV file. The value displayed here depends on the following components: • **Horizontal Pixel Counts** • **Vertical Pixel Counts** Each time you change the value in any of these two components, click **Parameter change** to appropriately update the value in **All Byte Counts**.
set column address packet	Specifies the comma separated values for the parameters of the set_column_address DSI command, which defines the column extent of the frame memory accessed by the host processor with the read_memory_continue and write_memory_continue commands. Selecting the left adjacent send check box ensures that these values gets written to the CSV file.
set page address packet	Specifies the comma separated values for the parameters of the set_page_address DSI command, which defines the page extent of the frame memory accessed by the host processor with the read_memory_continue and write_memory_continue commands. Selecting the left adjacent send check box ensures that these values gets written to the CSV file.

Table 3 Components of the Command Mode tab (continued)

Component	Description
write memory start packet	Specifies the comma separated values for the parameters of the write_memory_start DSI command, which transfers image data from the host processor to the frame memory of the display module, starting from the pixel location specified by the set_column_address and set_page_address commands.
write memory continue packet	Specifies the comma separated values for the parameters of the write_memory_continue DSI command, which transfers image data from the host processor to the frame memory of the display module, continuing from the pixel location following the write_memory_start or the previous write_memory_continue command.
packets	Displays the number of packets into which the frame data will be divided. The value displayed here depends on the value specified in the MAX WC value text box. Therefore, when you change the value in the MAX WC value text box, click **Parameter change** to appropriately update the value in the packets text box.
Open Image	Opens Image Viewer (see page 20).
Output CSV File	Specifies the name of the CSV file you want to create. You can also click **Browse** to specify the desired location, along with the name, of the CSV file.
Create File	Creates the specified file. Remember the following points about Create File: • If the **Execute Including Signal Inserter** check box is not selected, clicking **Create File** creates an ASCII file. Use the Agilent Signal Inserter tool to convert this ASCII file to the pattern generator compatible CSV file. • If the **Execute Including Signal Inserter** check box is selected, clicking **Create File** creates an ASCII file as well as the pattern generator compatible CSV file. For example, if you typed Image01.csv in the Output CSV File text box, clicking **Create File** creates the following two files: *Image01.csv_Base.csv* (ASCII format) and *Image01.csv* (pattern generator compatible CSV format).
Open Signal Inserter	Displays the Agilent Signal Inserter tool, which you use to convert the intermediate ASCII file to the pattern generator compatible CSV file. The **Open Signal Inserter** command button is disabled if the **Execute Including Signal Inserter** check box is selected.

Table 3 Components of the Command Mode tab (continued)

Component	Description
Execute Including Signal Inserter	Instructs the DSI Image Inserter to create the pattern generator compatible CSV file, along with the intermediate ASCII file, whenever **Create File** is clicked. Selecting Execute Including Signal Inserter also allows you to use the following components: • **Init File** — Allows you to specify the file that contains the INIT sequence. You can also browse and select the file containing the INIT sequence using the Browse command button. • **Generate ECC** — Select to generate ECC in the packet headers. If this check box is not selected, then all ECC are set to zero. • **Generate CRC** — Select when you want to generate CRC in the packet footers. If this check box is not selected, then all CRC are set to zero. • **Generate EoTp** — Select to generate End of Transmission packets.
Virtual Channel	Specifies which one out of the four virtual channel (0, 1, 2, or 3) to use.
Exit	Closes the tool.
Help	Displays online help.

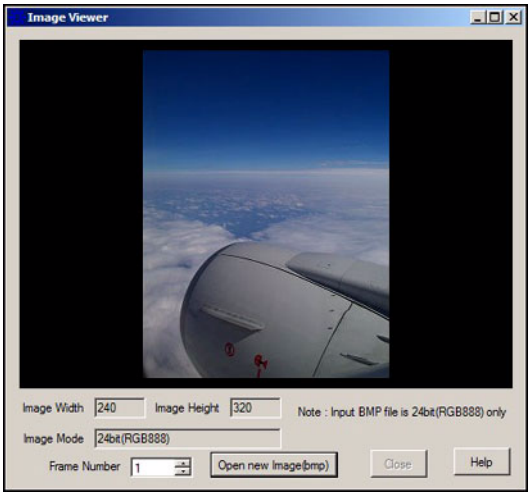
Image Viewer

Image Viewer allows you to select one or more image files that you can insert in the pattern generator compatible CSV file. All three tabs (Burst Mode, Non-Burst Mode, and Command Mode) in DSI Image Inserter provides the Open Image command button that you can click to access Image Viewer.

To access Image Viewer:

- Click **Open Image**.

  The Image Viewer dialog box appears.



As displayed in the figure above, an image is shown in the Image Display area. You can bring an image to the Image Display area using the Open new Image command button. Clicking Open new Image displays the Open dialog box, which allows you to browse and select a desired image.

NOTE In Image Viewer, you can open only BMP files of 24 bit (RGB888) only.

When you open an image, its width, height, and mode appears in Image Width, Image Height, and Image Mode text boxes, respectively. Additionally, opening an image automatically adds it to the list of images to inserted in the pattern generator CSV file.

The Frame Number text box allows you to add more frames in Image Viewer. For example, typing 4 in the Frame Number text box and then pressing the <tab> key on the keyboard add 3 new frames (i.e. frames 2, 3,

and 4) in addition to the existing frame 1. You can navigate between these frames using the vertical scroll buttons given within the text box. Clicking the upper scroll bar also adds a new frame, if not added already.

Once you are done adding images, close the Image Viewer dialog box by clicking × at the top right corner, and then get back with specifying the other image insertion settings.

1 DSI Image Inserter

2
Image Extractor Tools

This chapter provides information on how to use the image extractor tools to extract an image from the DSI data captured in the logic analyzer.

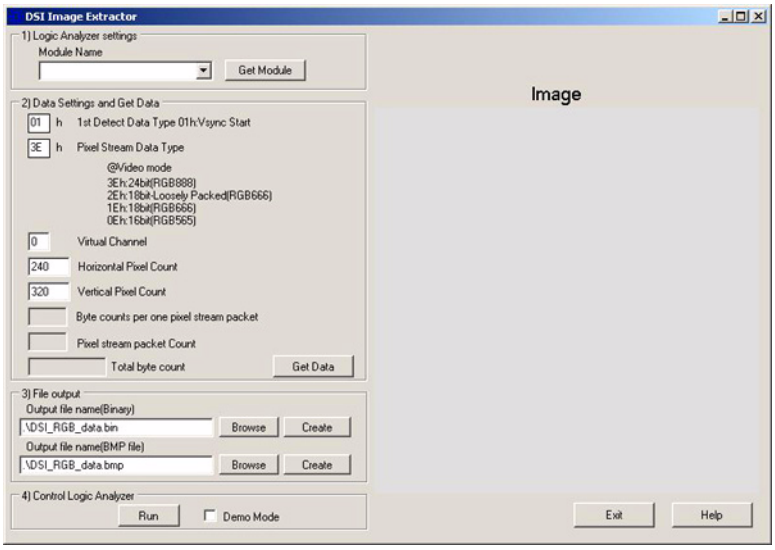
DSI Image Extractor

The DSI Image Extractor tool allows you to extract the image from the DSI data, which was captured in the Logic Analyzer application, by searching for the VSync Start (VSS) packet and then extracting the data in pixel packets.

To access the DSI Image Extractor tool:

- Select the **Start > Programs > Agilent Logic Analyzer > Utilities > MIPI DSI Tools > DSI Image Extractor** menu command.

  This displays the DSI Image Extractor dialog box.



Once you have accessed this tool, use the following steps to extract an image.

- "Step 1: Specify Logic Analyzer Settings" on page 25
- "Step 2: Specify Data Settings" on page 25
- "Step 3: Specify the Output File" on page 26
- "Step 4: Run Logic Analyzer" on page 27

Step 1: Specify Logic Analyzer Settings

Specifying Logic Analyzer settings require you to specify the name of the Logic Analyzer module to use. To do this:

1 Click Get Module in the Logic Analyzer settings section.

This gets the names of all available Logic Analyzer modules, such as analyzer as well as pattern generator modules, and list them in the Module Name drop-down list.

2 Select the analyzer module, such as MIPI D-PHY Analyzer, to use from the Module Name drop-down list.

This completes the Logic Analyzer settings.

Next • "Step 2: Specify Data Settings" on page 25

Step 2: Specify Data Settings

After specifying the Logic Analyzer module to use, specify the data settings of the image to be extracted in the Data Settings and Get Data section. In this section:

1 Specify the data type of the vertical sync start (VSS) packet in the **1st Detect Data Type 01h:Vsync Start** text box.

The h symbol, right-adjacent to the text box, signifies that the value typed in the text box is an hexadecimal value.

2 Specify the data type of the pixel stream in the **Pixel Stream Data Type** text box.

Here, specify the value based on the Pixel Stream Mode option you selected in the DSI Image Inserter tool. That is, specify:

- 3E for 24 bit (RGB888)
- 2E for 18 bit Loosely Packed (RGB666)
- 1E for 18 bit (RGB666)
- 0E for 16 bit (RGB565)

The h symbol, right-adjacent to the text box, signifies that the value typed in the text box is an hexadecimal value.

3 Specify the virtual channel to use in the **Virtual Channel** text box.

The value you specify here should match with the virtual channel from which you want to extract the image data.

4 Specify the image width in the **Horizontal Pixel Count** text box.

The value you specify here should match with the image width for which you have loaded the pattern generator CSV file.

5 Specify the height of the image in the **Vertical Pixel Count** text box.

The value you specify here should match with the image height for which you have loaded the pattern generator CSV file.

6 Click **Get Data**.

This calculates the entered image data and shows the resulting data in the following fields:

- **Byte counts per one pixel stream packet** – Shows the number of bytes needed for each pixel stream packet.
- **Pixel stream packet count** – Shows the number of pixel stream packets.
- **Total byte count** – Shows the total number of bytes needed to extract the image.

This completes setting up the image data.

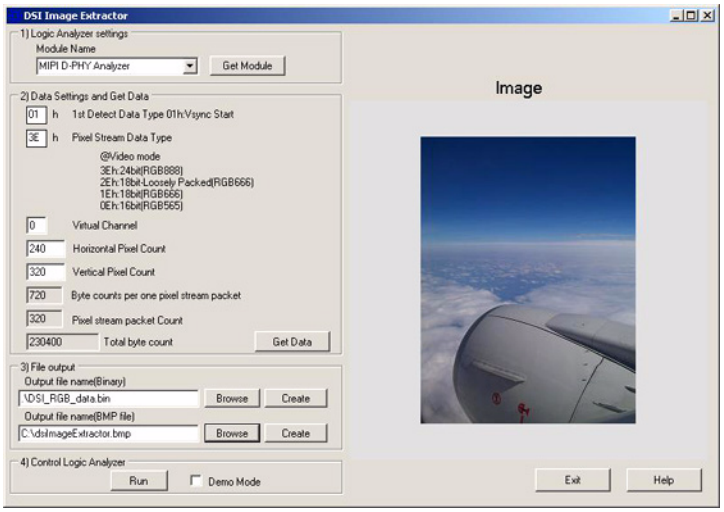
Next • "Step 3: Specify the Output File" on page 26

Step 3: Specify the Output File

Specify the name of the file, in which you want to extract the image, in the File output section. In this section, specify the file name in the **Output file name (BMP file)** text box. Alternatively, click **Browse** to display the Save As dialog box, which allows you to save the BMP file at a desired location and with a desired name.

Once you specified the file name and location, click **Create** to create the new image file with the specified name and at the specified location. This also displays the extracted image in the Image section.

This completes the process for extracting an image.



Next • "Step 4: Run Logic Analyzer" on page 27

Step 4: Run Logic Analyzer

There may be a situation when you want to run Logic Analyzer to re-capture the image data. In such a situation, click **Run** to run Logic Analyzer without leaving the DSI Image Extractor tool.

The Control Logic Analyzer section also provides the **Demo Mode** check box, which you should select when you want to work with Logic Analyzer in offline mode. That is, load an .ala file with data into Logic Analyzer. Then, click Run when the Demo Mode check box is selected. This extracts the image.

DSI Image Extractor (Command Mode)

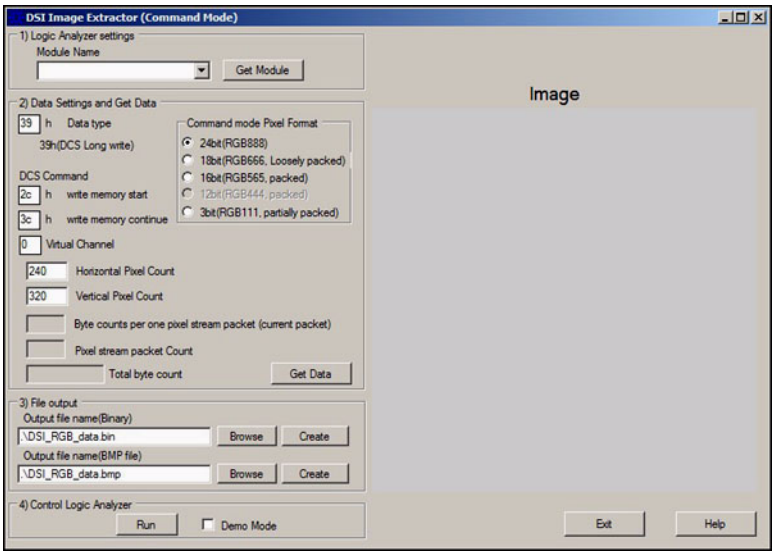
The DSI Image Extractor (Command Mode) tool allows you to extract the image from the DSI data, which was captured in the Logic Analyzer application, by searching for the specified data type of the DCS long write packet and then extracting the image data. This is the same data that you inserted using the Command Mode tab of the DSI Image Inserter tool.

For information on the DSI Image Inserter tool, refer to Agilent N4861A MIPI D-PHY Stimulus Probe, User’s Guide).

To access the DSI Image Extractor (Command Mode) tool:

- Select the **Start > Programs > Agilent Logic Analyzer > Utilities > MIPI DSI Tools > DSI Image Extractor (Command Mode)** menu command.

  This displays the DSI Image Extractor (Command Mode) dialog box.



Once you have accessed this tool, use the following steps to extract an image.

- "Step 1: Specify Logic Analyzer Settings" on page 29
- "Step 2: Specify Data Settings" on page 29
- "Step 3: Specify the Output File" on page 30
- "Step 4: Run Logic Analyzer" on page 31

Step 1: Specify Logic Analyzer Settings

Specifying Logic Analyzer settings require you to specify the name of the Logic Analyzer module to use. To do this:

1 Click **Get Module** in the Logic Analyzer settings section.

This gets the names of all available Logic Analyzer modules, such as analyzer as well as pattern generator modules, and list them in the Module Name drop-down list.

2 Select the analyzer module, such as MIPI D-PHY Analyzer, to use from the **Module Name** drop-down list.

This completes the Logic Analyzer settings.

Next • "Step 2: Specify Data Settings" on page 29

Step 2: Specify Data Settings

After specifying the Logic Analyzer module to use, specify the data settings of the image to be extracted in the Data Settings and Get Data section. In this section:

1 Specify the data type of the *DCS Long write* packet in the **Data type** text box.

The h symbol, right-adjacent to the text box, signifies that the value typed in the text box is an hexadecimal value.

2 Specify the DCS command for *write memory start* in the **write memory start** text box.

The h symbol, right-adjacent to the text box, signifies that the value typed in the text box is an hexadecimal value.

3 Specify the DCS command for *write memory continue* in the **write memory continue** text box.

The h symbol, right-adjacent to the text box, signifies that the value typed in the text box is an hexadecimal value.

4 Select an appropriate option for pixel format from the **Command mode Pixel Format** section.

The option you select here should match with the option selected in the Pixel Format section of the Command Mode tab given in the DSI Image Inserter tool.

5 Specify the virtual channel to use in the **Virtual Channel** text box.

The value you specify here should match with the virtual channel from which you want to extract the image data.

6 Specify the image width in the **Horizontal Pixel Count** text box.

The value you specify here should match with the image width for which you have loaded the pattern generator CSV file.

7 Specify the height of the image in the **Vertical Pixel Count** text box.

The value you specify here should match with the image height for which you have loaded the pattern generator CSV file.

8 Click **Get Data**.

This calculates the entered image data and shows the resulting data in the following fields:

- **Byte counts per one pixel stream packet** – Shows the number of bytes needed for each pixel stream packet.
- **Pixel stream packet count** – Shows the number of pixel stream packets.
- **Total byte count** – Shows the total number of bytes needed to extract the image.

This completes setting up the image data.

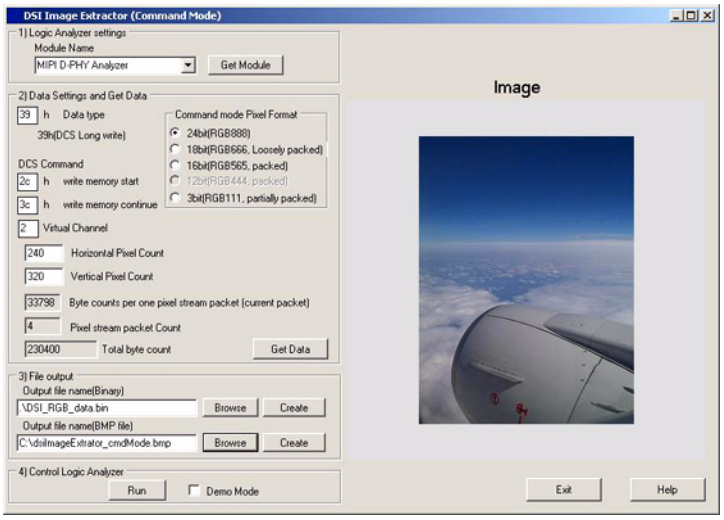
Next • "Step 3: Specify the Output File" on page 30

Step 3: Specify the Output File

Specify the name of the file, in which you want to extract the image, in the File output section. In this section, specify the file name in the **Output file name (BMP file)** text box. Alternatively, click **Browse** to display the Save As dialog box, which allows you to save the BMP file at a desired location and with a desired name.

Once you specified the file name and location, click **Create** to create the new image file with the specified name and at the specified location. This also displays the extracted image in the Image section.

This completes the process for extracting an image.



Next • "Step 4: Run Logic Analyzer" on page 31

Step 4: Run Logic Analyzer

There may be a situation when you want to run Logic Analyzer to re-capture the image data. In such a situation, click **Run** to run Logic Analyzer without leaving the DSI Image Extractor tool.

The Control Logic Analyzer section also provides the **Demo Mode** check box, which you should select when you want to work with Logic Analyzer in offline mode. That is, load an .ala file with data into Logic Analyzer. Then, click Run when the Demo Mode check box is selected. This extracts the image.

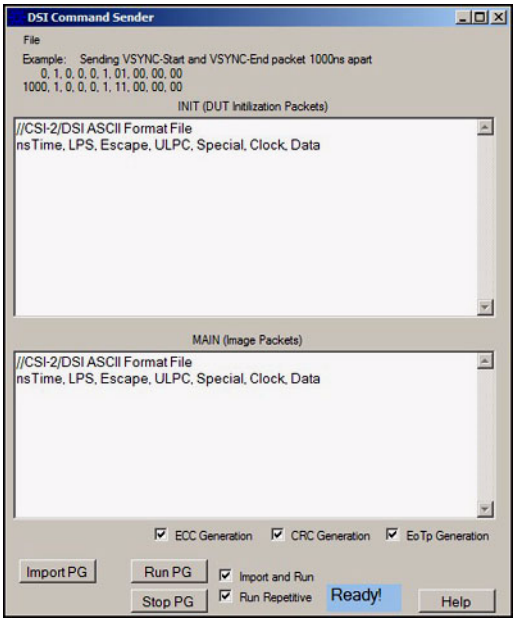
3 DSI Command Sender

The DSI Command Sender tool allows you to write DSI commands to specify the initialization data as well as the main packet payload data. Once written, the DSI Command Sender tool allows you to send these commands to the device under test immediately, or to save them in files for later use. All commands that you specify in DSI Command Sender must be in compliance with the DSI ASCII format.

To access the DSI Command Sender tool:

- Select the **Start > Programs > Agilent Logic Analyzer > Utilities > MIPI DSI Tools > DSI Command Sender** menu command.

  This displays the DSI Command Sender dialog box.



The following table describes the components of the DSI Command Sender dialog box.

Table 4 Components of the DSI Command Sender dialog box

Component	Description
File	Provides the following menu commands: • **Save** — Provides submenu commands to save the INIT and MAIN sequences to separate CSV files. • **Open** — Provides submenu commands to load the saved INIT and MAIN sequences into the DSI Command Sender tool.
INIT	Writes the packet initialization data. The format to specify this data (also given at the top in the INIT section) is: `nsTime, LPS, Escape, ULPC, Special, Clock, Data` Where, • *nsTime* — is the time in nanoseconds to wait (from the beginning of the file) before outputting this line. • *LPS* — when set to 1, indicates to go to Low Power State at the end of the packet. Default value (0) means do not go to LPS, i.e. create a multi-packet transmission. • *Escape* — when set to 1, starts an ESCAPE sequence (for example LPDT). • *ULPC* — when set to 1, enters ultra low power mode on the clock lane. • Special — specifies the special packet number 1, 2, 3 or 4. Zero (0) value here means special packet field is disabled. • *Clock* — when set to 1 enables the clock. • *Data* — specifies the bytes of data for the packet. The contents of this section must comply with the DSI ASCII format.
MAIN	Writes the packet payload data. The format to specify this data (also given at the top in the MAIN section) is: `nsTime, LPS, Escape, ULPC, Special, Clock, Data` Where, • *nsTime* — is the time in nanoseconds to wait (from the beginning of the file) before outputting this line. • *LPS* — when set to 1, indicates to go to Low Power State at the end of the packet. Default value (0) means do not go to LPS, i.e. create a multi-packet transmission. • *Escape* — when set to 1, starts an ESCAPE sequence (for example LPDT). • *ULPC* — when set to 1, enters ultra low power mode on the clock lane. • Special — specifies the special packet number 1, 2, 3 or 4. Zero (0) value here means special packet field is disabled. • *Clock* — when set to 1 enables the clock. • *Data* — specifies the bytes of data for the packet. The contents of this section must comply with the DSI ASCII format.
ECC Generation	Generates ECC in the packet headers. If this check box is not selected, then all ECC are set to zero.

Table 4 Components of the DSI Command Sender dialog box (continued)

Component	Description
CRC Generation	Generates CRC in the packet footers. If this check box is not selected, then all CRC are set to zero.
EoTp Generation	Generates End of Transmission packets. Special packets are not generated when EoTp Generation is selected. Select EoTp Generation only when the Special attribute in the INIT or MAIN section is set to zero.
Import PG	Sends the contents of the INIT and MAIN sections to pattern generator in CSV format.
Run PG	Runs pattern generator.
Stop PG	Stops pattern generator.
Import and Run	Performs the following actions every time you click Run PG: • Send the contents of the INIT and MAIN sections to pattern generator in CSV format. • Run pattern generator.
Run Repetitive	Runs the pattern generator repetitively. If Run Repetitive is not selected, then pattern generator will run only once for each time you click Run PG.
Help	Displays online help.

NOTE You cannot send an EoTp if Special is equal to 1, 2, 3, or 4 in the INIT or MAIN section. An attempt to do so displays an error message, and the DSI Command Sender tool closes.

3 DSI Command Sender

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