



EZ-PD™ Analyzer Utility User Guide

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Contents



EZ-PD™ Analyzer Utility User Guide	1
Contents.....	3
1. Introduction.....	4
1.1 Getting Started.....	4
1.2 Additional Learning Resources	4
1.3 Technical Support.....	4
1.4 Document Conventions	4
1.5 Abbreviations	5
2. EZ-PD™ Analyzer Utility	6
2.1 EZ-PD™ Analyzer Utility GUI	6
2.2 Capturing and Viewing PD Packets	7
2.2.1 Capture PD Packets	7
2.2.2 View Packet Details	8
2.2.3 Stop Packet Capture.....	9
2.2.4 Save PD Packets.....	9
2.2.5 Clear PD Packets	10
2.3 Working with PD Packets	10
2.3.1 Open Saved PD Packet Files	10
2.3.2 Mark PD Packets	10
2.3.3 Step Through Marked PD Packets	10
2.3.4 Delete Marker	11
2.3.5 Use Packet Filters.....	11
2.3.6 Set Triggers	12
2.4 Upgrade Firmware	13
3. Troubleshooting	16
3.1 Troubleshooting Guide	16
Revision History	17
Document Revision History	17

1. Introduction



Thank you for your interest in the EZ-PD™ Analyzer Utility. This is a Windows-based utility that works in conjunction with the CY4500 EZ-PD™ Protocol Analyzer to capture the Power Delivery traffic occurring on the Configuration Channel (CC) lines of a Type-C connection; this is a very handy debugging tool for developers.

1.1 Getting Started

This user guide describes the features of the EZ-PD™ Analyzer Utility and how to use it. The [EZ-PD™ Analyzer Utility](#) section explains how to use the tool. The [Troubleshooting](#) section lists the troubleshooting procedure.

1.2 Additional Learning Resources

Visit the CCG web page at www.cypress.com/CCG for the list of Type-C products from Cypress and additional learning resources including datasheets and application notes.

1.3 Technical Support

For assistance, go to www.cypress.com/go/support or contact our live customer support at +1 (800) 858-1810 (in the U.S.) or +1 (408) 943-2600 (international) and follow the voice prompt.

1.4 Document Conventions

Table 1. Document Conventions for Guides

Convention	Usage
Courier New	Displays file locations, user-entered text, and source code: C:\ ...cd\icc\
<i>Italics</i>	Displays file names and reference documentation: The “Configuration Options” section of the <i>HX3 datasheet</i> gives more details about the use of pin straps
File > Open	Represents menu paths: File > Open > New Project
Bold	Displays commands, menu paths, and icon names in procedures: Click the File icon and then click Open .
Times New Roman	Displays an equation: $2 + 2 = 4$
Text in gray boxes	Describes Cautions or unique functionality of the product.

1.5 Abbreviations

Table 2. List of Abbreviations

Abbreviation	Meaning
GUI	Graphical User Interface
PD	Power Delivery
SOP	Start Of Packet
Msg ID	Message Identification
CC	Configuration Channel
PC	Personal computer
Obj Count	Object Count
USB	Universal Serial Bus

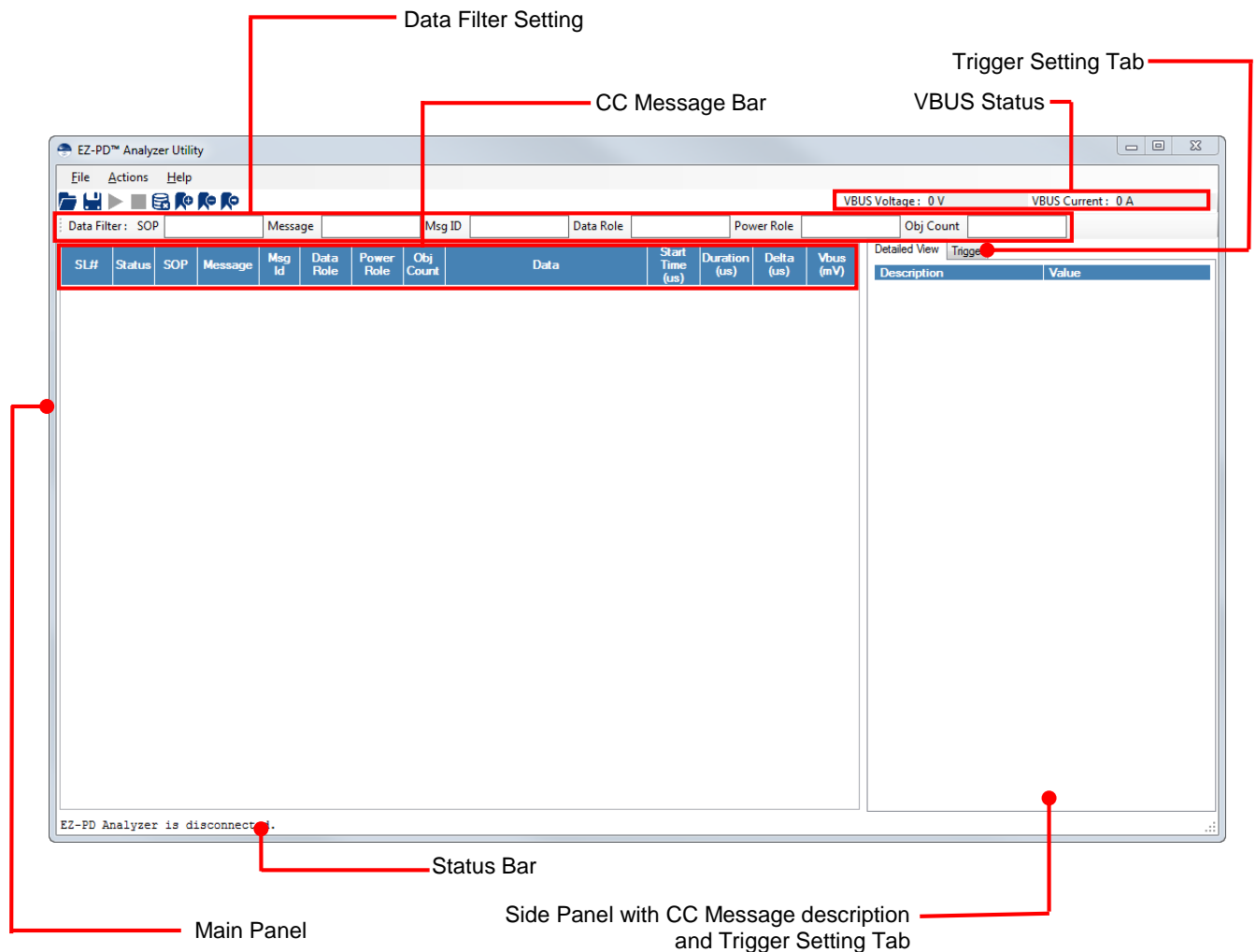
2. EZ-PD™ Analyzer Utility



2.1 EZ-PD™ Analyzer Utility GUI

- Start the EZ-PD™ Analyzer Utility from **Start > All Programs > Cypress > EZ-PD Analyzer Utility > EZ-PD Analyzer Utility**. The EZ-PD™ Analyzer Utility GUI is displayed, as shown in Figure 1.

Figure 1. GUI Layout of EZ-PD™ Analyzer Utility



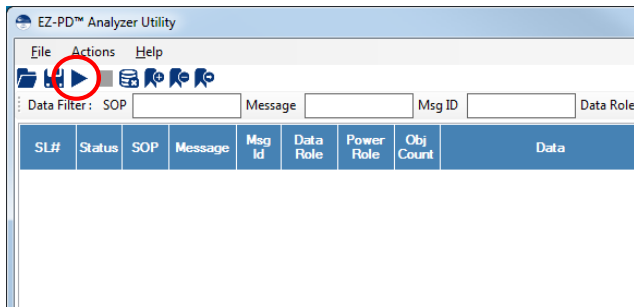
2.2 Capturing and Viewing PD Packets

Before capturing PD Packets, ensure that the CY4500 EZ-PD™ Protocol Analyzer hardware is connected and ready to use. Ensure that the message displayed on the status bar at the bottom shows “EZ-PD Analyzer is connected”.

2.2.1 Capture PD Packets

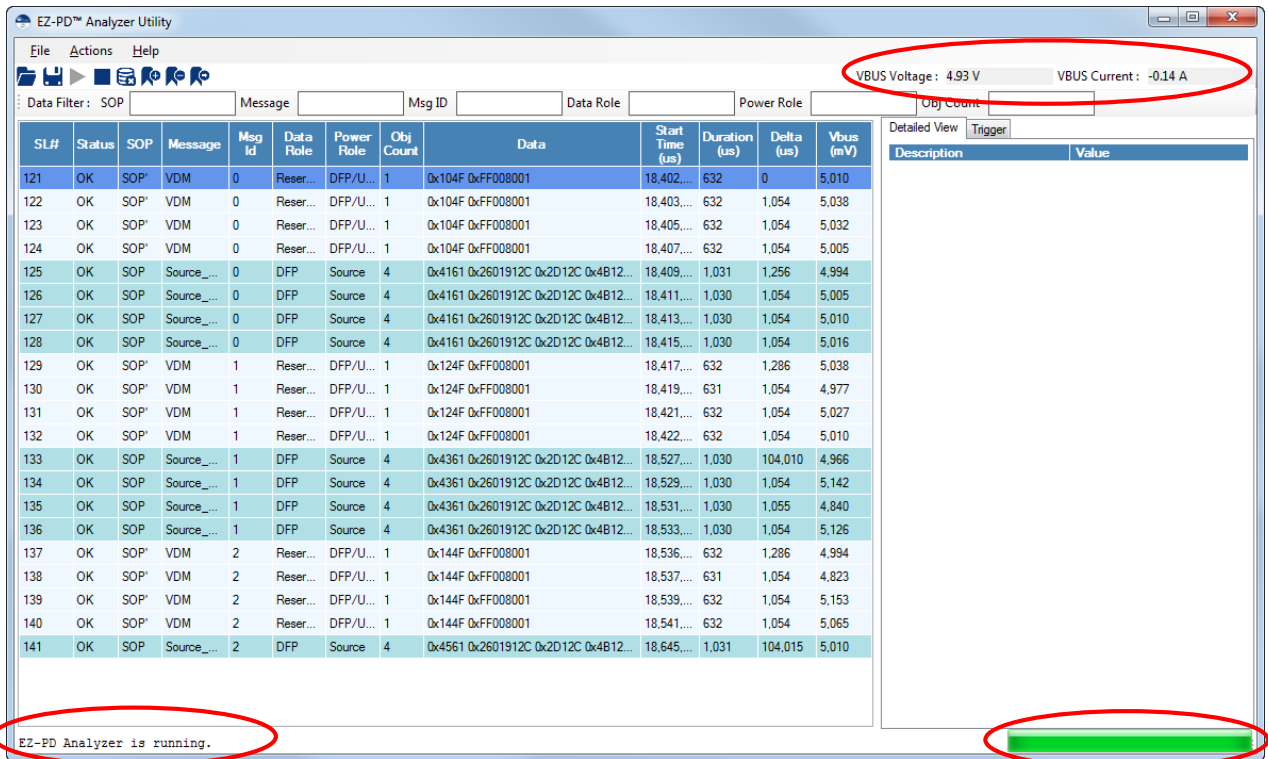
To capture the PD Packets, click **Start Capturing** on the tool bar as shown in [Figure 2](#) or select **Actions > Start Capturing**.

Figure 2. Capturing PD Packets on the EZ-PD™ Analyzer Utility



The status bar indicates that the EZ-PD™ Analyzer is running. The progress bar located at the bottom right corner turns green whenever PD packets are received by the utility. The captured PD packets are displayed in the main panel as shown in [Figure 3](#).

Figure 3. PD Packets Captured Using the EZ-PD™ Analyzer Utility



The various fields of PD packets which are displayed in the Main Panel of the GUI are described in [Table 3](#).

Table 3 Details of captured PD Packets

Field Name	Description
SL#	Message serial no.
Status	Overall status of the message
SOP	K-code marker used to delineate the start of the packet
Message	PD Message Type
Msg Id	Identifier for the message
Data Role	Current Data Role of the Port
Power Role	Current Power Role of the Port
Obj Count	Number of 32-bit data object(s) that follow the header
Data	32-bit data object with header
Start Time (us)	Start time of PD message
Duration (us)	Duration of a PD message
Delta (us)	Time difference between previous and current PD message
Vbus (mV)	Vbus voltage during the PD message capture

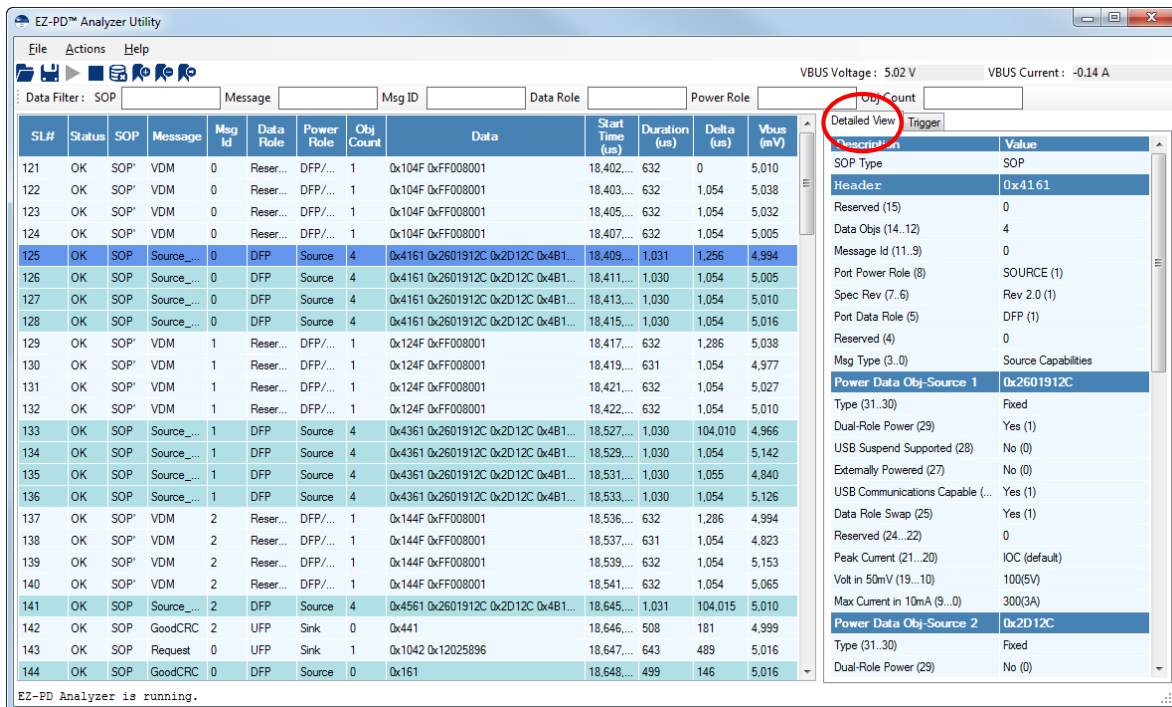
Note that the EZ-PD™ Analyzer Utility supports decoding of PD packets as per USB PD Specification Revision 2.0, V1.2.

Note that VBUS status (Voltage and Current) is displayed live at the right top corner of the GUI as shown in Figure 3.

2.2.2 View Packet Details

Click a packet to view its details in the side panel under the **Detailed View** tab as shown in Figure 4.

Figure 4. Details of the Selected PD Packet



The screenshot shows the EZ-PD Analyzer Utility interface. At the top, it displays 'VBUS Voltage: 5.02 V' and 'VBUS Current: -0.14 A'. Below this is a search filter for 'SOP' and a table of captured PD packets. The table has columns for SL#, Status, SOP, Message, Msg Id, Data Role, Power Role, Obj Count, Data, Start Time (us), Duration (us), Delta (us), and Vbus (mV). Packet 125 is selected. To the right, the 'Detailed View' tab is active, showing the following details:

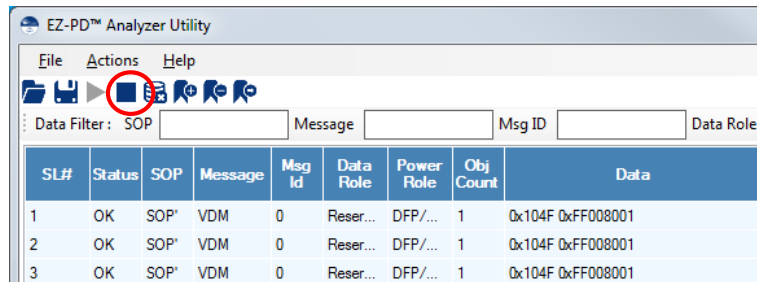
Field Name	Value
SOP Type	SOP
Header	0x4161
Reserved (15)	0
Data Obj(s) (14..12)	4
Message Id (11..9)	0
Port Power Role (8)	SOURCE (1)
Spec Rev (7..6)	Rev 2.0 (1)
Port Data Role (5)	DFP (1)
Reserved (4)	0
Msg Type (3..0)	Source Capabilities
Power Data Obj-Source 1	0x2601912C
Type (31..30)	Fixed
Dual-Role Power (29)	Yes (1)
USB Suspend Supported (28)	No (0)
Externally Powered (27)	No (0)
USB Communications Capable (...)	Yes (1)
Data Role Swap (25)	Yes (1)
Reserved (24..22)	0
Peak Current (21..20)	IOC (default)
Volt in 50mV (19..10)	100(5V)
Max Current in 10mA (9...0)	300(3A)
Power Data Obj-Source 2	0x2D12C
Type (31..30)	Fixed
Dual-Role Power (29)	No (0)

The **Detailed View** tab lists all the attributes of a selected PD packet. Refer to Section 6 (Protocol Layer) of the USB PD Specification Revision 2.0, V1.2 to get more details about the type of PD messages (Control Messages & Data Messages) and their attributes.

2.2.3 Stop Packet Capture

Click the **Stop Capturing** icon in the tool bar as shown in [Figure 5](#) or select **Actions > Stop Capturing**.

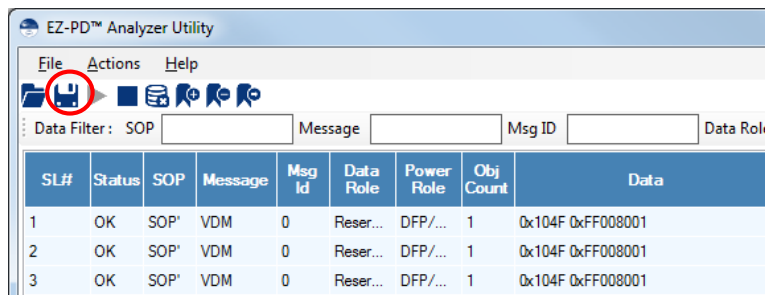
Figure 5 Stop Capturing PD Packets Using the EZ-PD™ Analyzer Utility



2.2.4 Save PD Packets

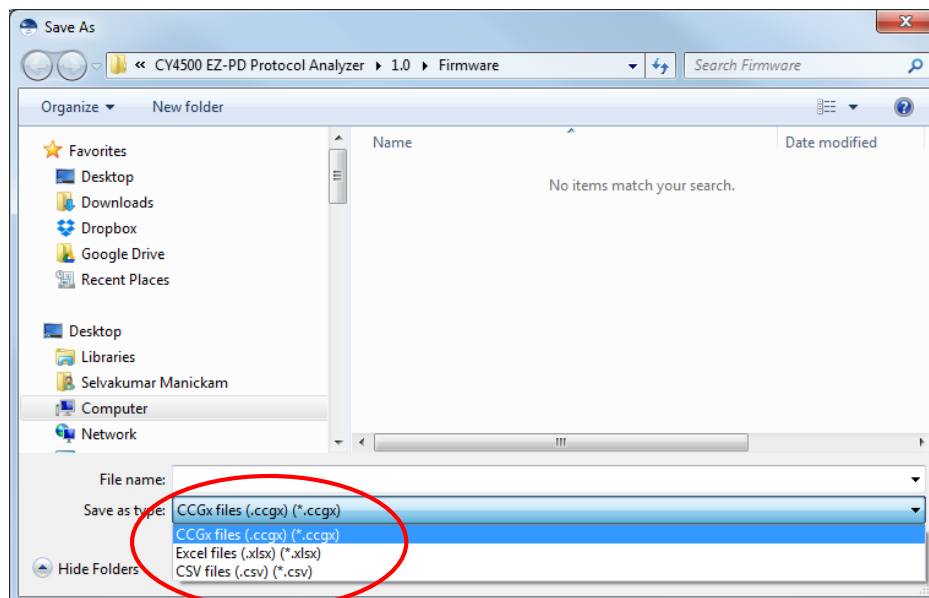
Click the **Save File** icon in the tool bar as shown in [Figure 6](#) or select **File > Save** to save the captured PD Packets.

Figure 6 Save PD Packets Using the EZ-PD™ Analyzer Utility



The packets can be saved in any of the following 3 file format (.ccgx / .xlsx / .csv) as shown in [Figure 7](#).

Figure 7 File formats for PD Packets

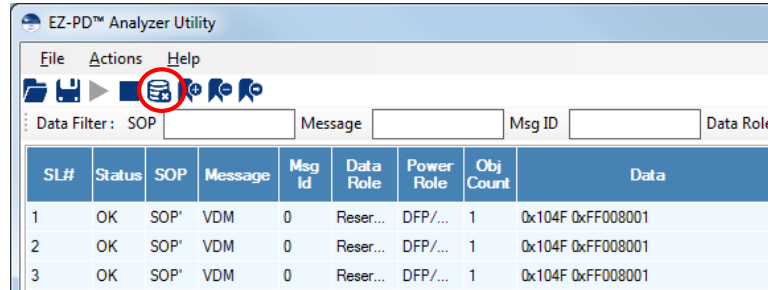


Note that .CCGX file is a proprietary Cypress format. Files stored in this format can be opened using the utility.

2.2.5 Clear PD Packets

Click the **Clear Data** icon in the tool bar as shown in [Figure 8](#) or select **Actions > Clear Data** to clear all the captured PD Packets

Figure 8 Clearing the captured PD Packets



2.3 Working with PD Packets

2.3.1 Open Saved PD Packet Files

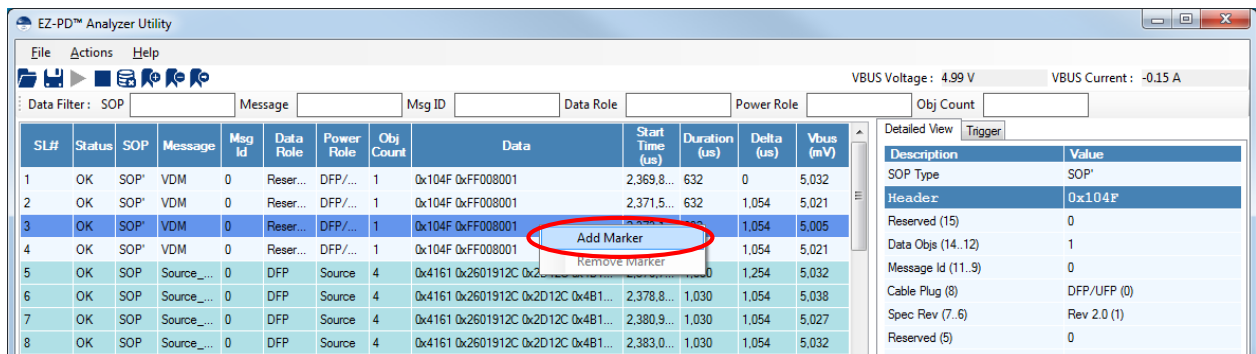
The saved PD Packet files (.ccgx) can be viewed even when the EZ-PD™ Protocol Analyzer hardware is not connected to the PC. Click the **Open File** button on the tool bar (or select **File > Open**). Browse and select the saved CCGX file.

2.3.2 Mark PD Packets

The PD Packets displayed in the main panel can be marked for easier debugging.

Right-click a packet and select **Add Marker**, as shown in [Figure 9](#). The marked Packet is highlighted in red.

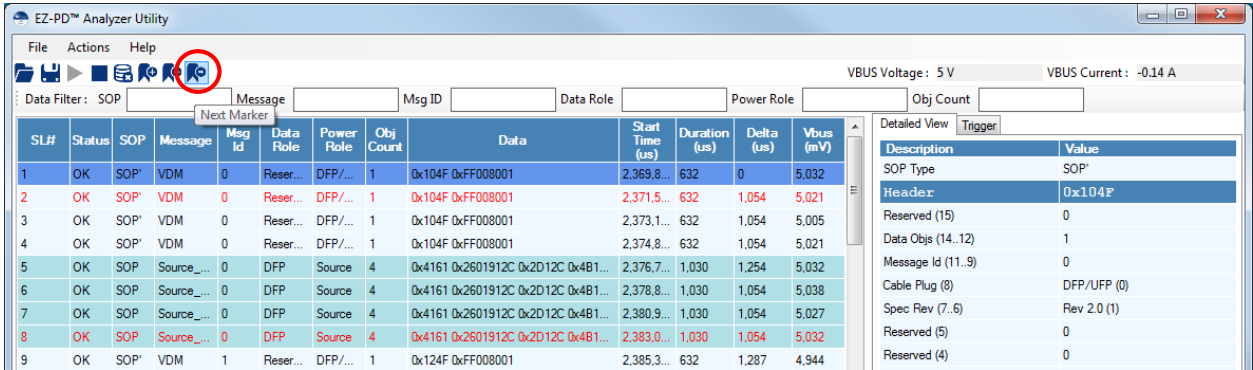
Figure 9 Adding Marker to PD Packets



2.3.3 Step through Marked PD Packets

Click the **Next Marker** button on the toolbar (or, select **Actions > Next Marker**) to step through marked packets as shown in [Figure 10](#).

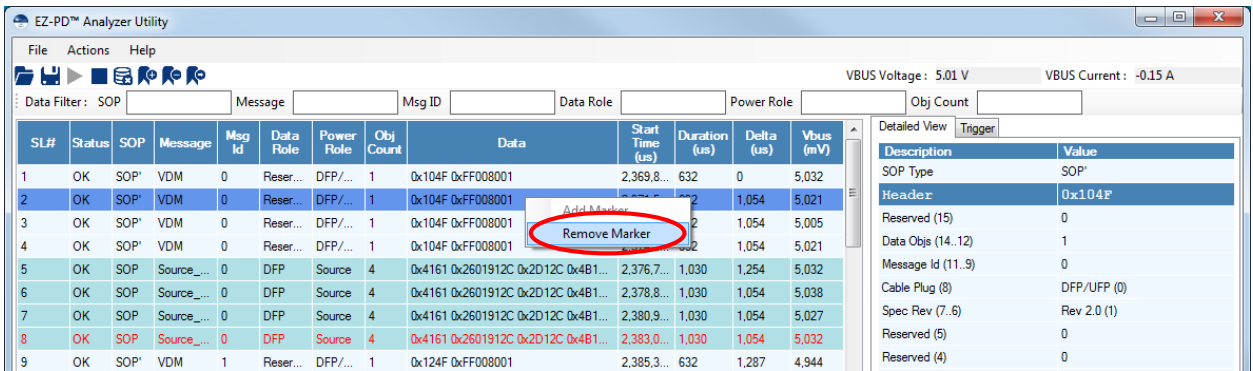
Figure 10 Accessing Marked PD Packets from the Next Marker Icon in the Tool Bar



2.3.4 Delete Marker

Right-click the marked packet and select **Remove Marker** as shown in Figure 11.

Figure 11 Deleting a Marker

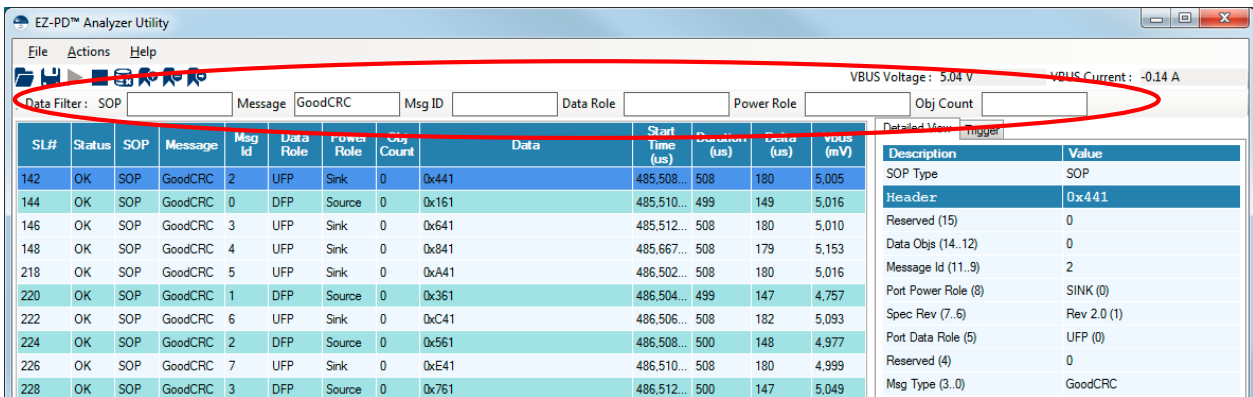


2.3.5 Use Packet Filters

The packets displayed in the main panel can be filtered based on certain parameters, such as **SOP**, **Message**, **Msg ID**, **Data Role**, **Power Role**, and **Obj Count**. For example, if the **Data Filter** for parameter **Message** is specified as 'GoodCRC' as shown in Figure 12, only the PD Packets with GoodCRC as the value for the Message field are shown in the main viewing panel; the rest of the packets are hidden.

To filter the data packets, enter the filter value in the appropriate field on the Data Filter bar.

Figure 12 Setting up a Data Filter

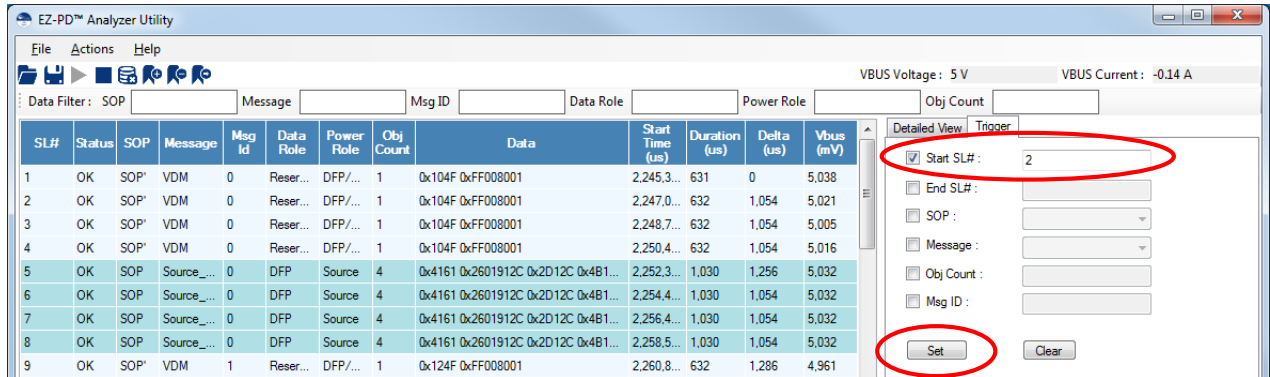


2.3.6 Set Triggers

For complex debugging where an external system needs to be triggered for a specific PD event or for a combination of PD events, the utility provides an option to set the trigger conditions.

Click on the **Trigger** Tab and set the trigger criteria as shown in Figure 13. Click **Set** to activate the trigger

Figure 13. Setting Trigger condition from the Trigger tab



Following is the procedure to change the trigger criteria which has been activated:

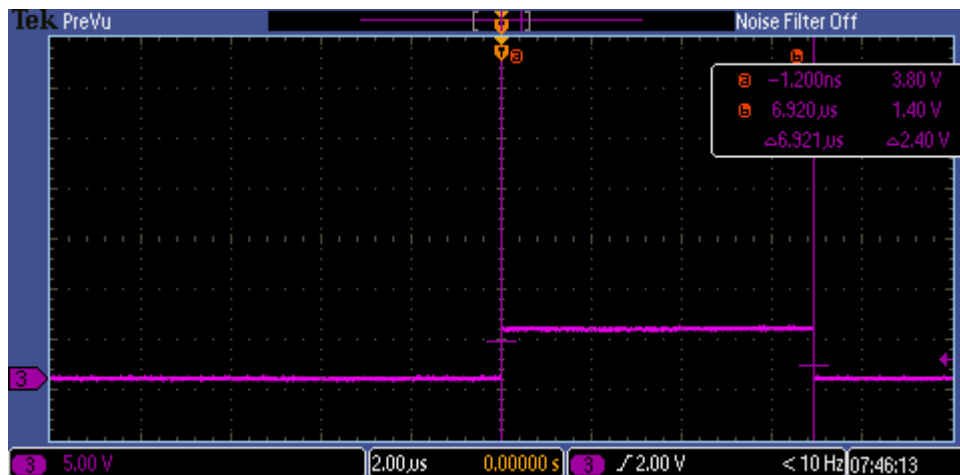
- Change the trigger criteria in the **Trigger** Tab
- Click **Set** to activate the new trigger criteria

Note: Trigger and PD packet capture are independent activities. Activating a trigger does not require PD packet capture (using **Actions > Start Capturing**) to be in progress.

You can set six trigger conditions as follows:

- **Start SL#:** This trigger condition is tied to a GPIO (SOM-Start of Message) on the CY4500 EZ-PD™ Protocol Analyzer hardware. Depending on the SL# number set, the GPIO gets triggered. For example, if the **Start SL#** is set to '2', the GPIO will be triggered when the second PD packet is captured. An Oscilloscope capture on the GPIO under this trigger condition will be as shown in Figure 14.

Figure 14 Trigger waveform output



- **End SL#:** This trigger condition is tied to another GPIO (EOM-End of Message) on the EZ-PD™ Protocol Analyzer Hardware. Depending on the SL# number set, this GPIO gets triggered. For example, if the **End SL#** is set to '100', the GPIO will be triggered when the 100th CC message is captured.

You can set four more trigger conditions: **SOP**, **Message**, **Obj Count** and **Msg ID**. The GPIO (MTR-Message Trigger) pin on the EZ-PD™ Protocol Analyzer Hardware is triggered by a single event or a combination of the events set by **SOP**, **Message**, **Obj Count** and **Msg ID**.

- **SOP** (Start of Packet): Select **SOP** and set the type of SOP. The MTR pin is triggered when the selected SOP type occurs. For example, if you set the type of SOP as SOP', then the MTR pin gets triggered each time an SOP' packet is captured on the CC lines.
- **Message**: Select **Msg Type** and set the message type. The MTR pin is triggered when a message of the specified type is captured on the CC line. For example, if you set the message type as VDM, the MTR pin is triggered when a VDM message is captured on the CC lines.
- **Obj Count**: Select **Obj Count** and set its value. The MTR pin is triggered when a packet of the specified Object count is captured on the CC line. For example, if you set the Obj Count as '1', the MTR pin gets triggered each time the Obj Count is '1'.
- **Msg ID**: Select **Msg ID** and set the value for the trigger condition. The MTR pin is triggered when a message with the specified message ID appears on the CC line. For example, if you set the Msg ID as '1', the MTR pin gets triggered each time the Msg ID is '1'.

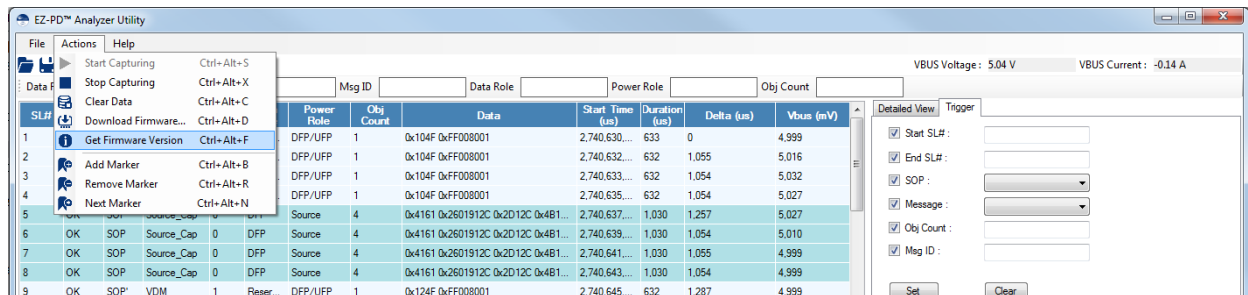
You can set these four trigger conditions individually or in combination, such as setting value for **SOP** and **Message** fields at the same time. Trigger occurs when all the specified conditions are met.

2.4 Upgrade Firmware

The CY4500 EZ-PD™ Protocol Analyzer Hardware comes with the latest firmware pre-installed during manufacturing. However, if a new firmware version becomes available, the analyzer can be updated directly from the EZ-PD™ Analyzer Utility as described below.

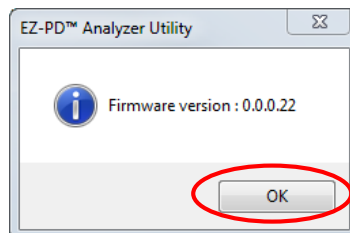
Check the current firmware loaded on the EZ-PD™ Protocol Analyzer Hardware by selecting **Actions > Get Firmware Version** as shown in [Figure 15](#).

Figure 15. Get the current firmware version



Wait for the Firmware version dialog box to appear as shown in [Figure 16](#).

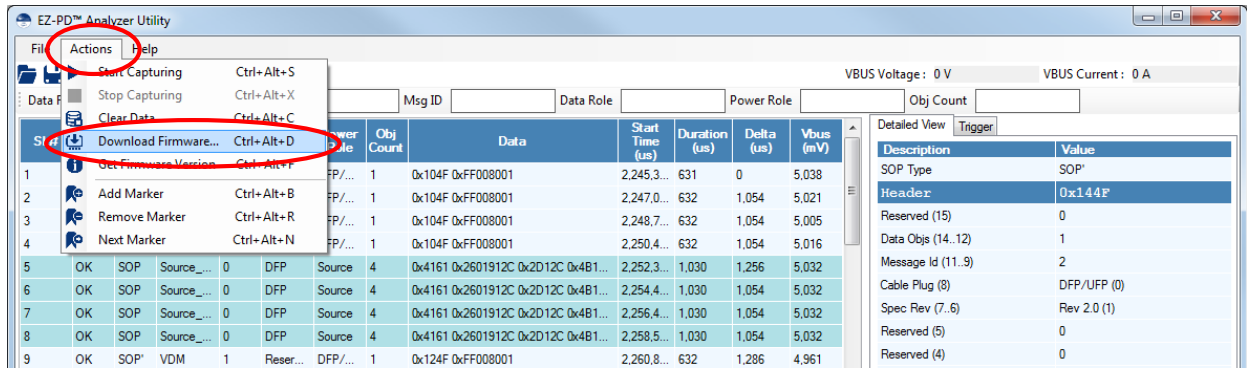
Figure 16. Firmware version dialog box



Click **OK** to return to the main menu. Proceed with rest of the instructions to download the firmware in case a newer version is available.

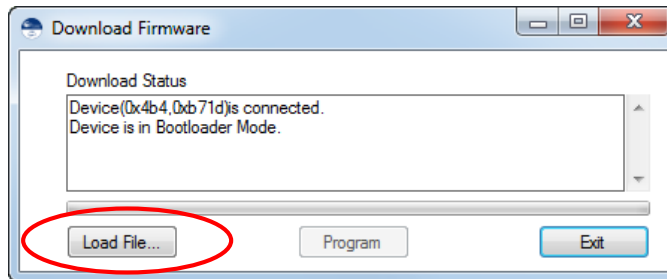
Select **Actions > Download Firmware** as shown in [Figure 17](#).

Figure 17. Enabling Download FW from the Menu Bar



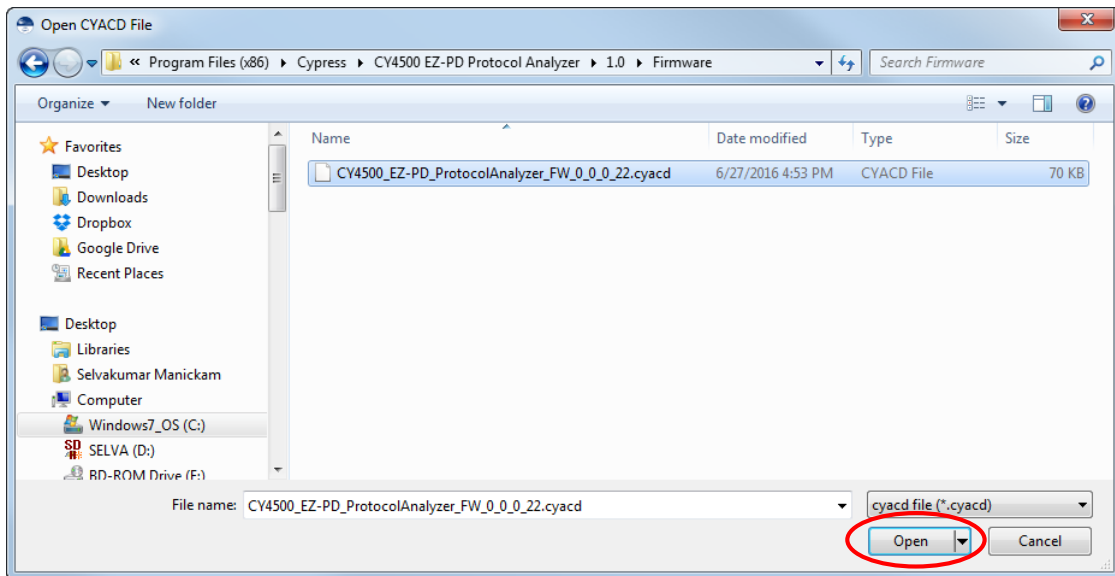
Wait for the Firmware Download dialog box to appear as shown [Figure 18](#) and click **Load File...**

Figure 18. Firmware Download Dialog Box



Select the CY4500 firmware file (.cyacd) as shown in [Figure 19](#) and click **Open**.

Figure 19. Selecting the CY4500 Firmware File

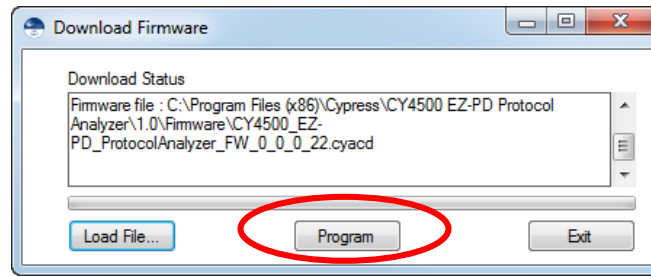


The CY4500 firmware file is included as part of the CY4500 Installer and it can be located at *<Install Directory>\CY4500 EZ-PD Protocol Analyzer\1.0\Firmware*.

Note: On Windows 32-bit platform the default *<Install Directory>* is *C:\Program Files\Cypress*; on the Windows 64-bit platform, it is *C:\Program Files (x86)\Cypress*

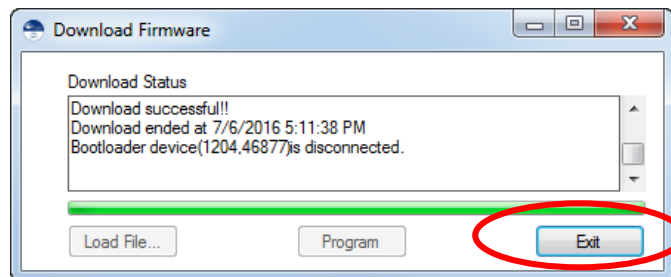
Click **Program** to initiate the firmware download as shown in [Figure 20](#).

Figure 20. Initiating firmware download



Wait for the firmware download to complete as shown in [Figure 21](#).

Figure 21. Completion of firmware download



The CY4500 EZ-PD Protocol Analyzer Hardware restarts with the latest firmware once the firmware download is successful. Click **Exit** to return to the main window of the utility.

3. Troubleshooting



3.1 Troubleshooting Guide

Problem	Possible Cause	Possible Solution
The EZ-PD™ Analyzer Utility does not detect the CY4500 EZ-PD™ Protocol Analyzer Hardware	Device driver is not bound to the device	Manually bind the driver following the procedure given in the <i>Quick Start Guide</i> provided with the CY4500 EZ-PD™ Protocol Analyzer
When a saved file is opened, Vbus status is not reflected correctly	Vbus status cannot be saved. This is always live data that is shown with respect to the connected device and the Vbus voltage and current that is consumed at that time.	Do not look for Vbus status information from the saved file
PD Packets are not getting displayed after connecting the Type-C device under test	The Type-C connector may have loose contact or The Type-C device is not inserted properly into the CY4500 EZ-PD™ Protocol Analyzer Hardware	Check the Type-C plug for any abnormality for loose contact Insert the Type-C device under test or cable fully inside the EZ-PD™ Protocol Analyzer Hardware

Revision History



Document Revision History

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Document Number: 002-12896			
Revision	Issue Date	Origin of Change	Description of Change
**	07/07/2016	MKRS	Initial revision