WICED® IDE

CyPE User Guide

Document Number: 002-24604 Rev. *B

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Contents

1 Overview

The Cypress Power Estimator (CyPE) tool provides an estimate of power consumed by a target device (also called platform). This tool is included with the WICED® IDE.

Note: Currently, this tool supports only the CYW943907AEVAL1F, CYW9MCU7x9N364, and CYW920719Q40EVB_01 evaluation kits.

1.1 Setup

The CyPE tool is a JAR plugin in for the WICED IDE. The tool is supported on Windows, Linux, and macOS. Before you can use it with the WICED IDE, you must first modify the application make file to enable CyPE. Open the application make file and add the following string:

```
POWER_ESTIMATOR := 1
```

2 Using CyPE Tool

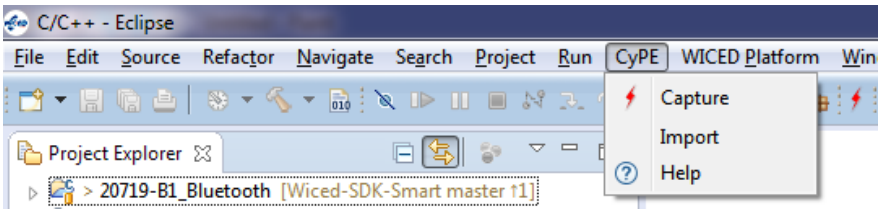
To use the CyPE tool in the WICED IDE, you must first create, build, and program a CyPE-enabled WICED application. Make sure that the target board is connected to the PC using the USB cable.

2.1 Launch CyPE Tool

After successful programming, launch the CyPE Configuration window from the menu, toolbar, or shortcut as follows:

2.1.1 Menu

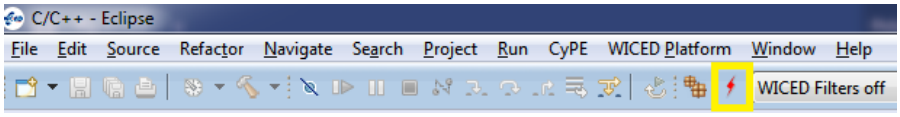
Select the **Capture** option from the **CyPE** menu.



- **Capture**: This feature is used for real-time power logging from the target platform. This feature depends on CyPE feature status for the loaded project. If the CyPE feature is enabled in the open project, the Capture feature gets enabled; otherwise, it is disabled.
- **Import**: This feature is used to import a power log file that was created by the Capture feature in a separate session. The tool creates the power plot using the power events captured in the log file for offline analysis. See Log File for more information.

2.1.2 Toolbar

The **CyPE Capture** button is available in the toolbar.

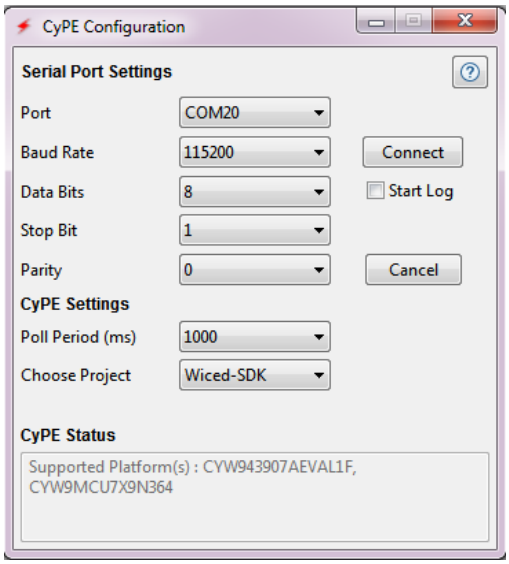


2.1.3 Keyboard Shortcut

Press **Ctrl+4** on the keyboard to launch the CyPE capture window.

2.2 Configure CyPE

The CyPE Configuration dialog provides various settings to allow you to connect to the target platform.



2.2.1 Serial Port Settings

- Select the serial port specified by the target platform's debug UART using the **Port** drop-down menu option.
- The values of **Baud Rate**, **Data Bits**, **Stop Bit**, and **Parity** fields can be kept at their default values or changed according to the debug UART setting of the target platform.

2.2.2 CyPE Settings

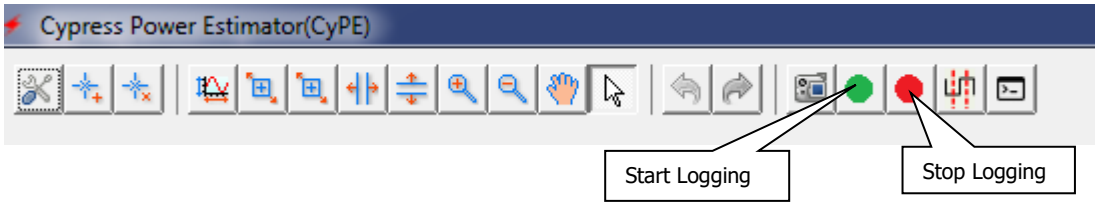
- Select **Choose Project** for the appropriate project on which a capture should be performed. After choosing the project, CyPE is configured with the power database of the platform of the project.
- **CyPE Status** displays the platform supported by the selected project.
- The **Poll Period** decides the period of log request from the CyPE tool to the target board. The poll period value (in milliseconds) is in the range of 300 to 1000 with a gap of 100. If the data logging interferes with the smooth functioning of the app, keep the poll period to the maximum value.

2.2.3 Other Settings

- Select **Start Logging** to start plotting immediately when running the tool.
- After making the appropriate selections, click the **Connect** button.
- The **CyPE Status** is updated at the bottom of this window.

2.3 Start/Stop Logging

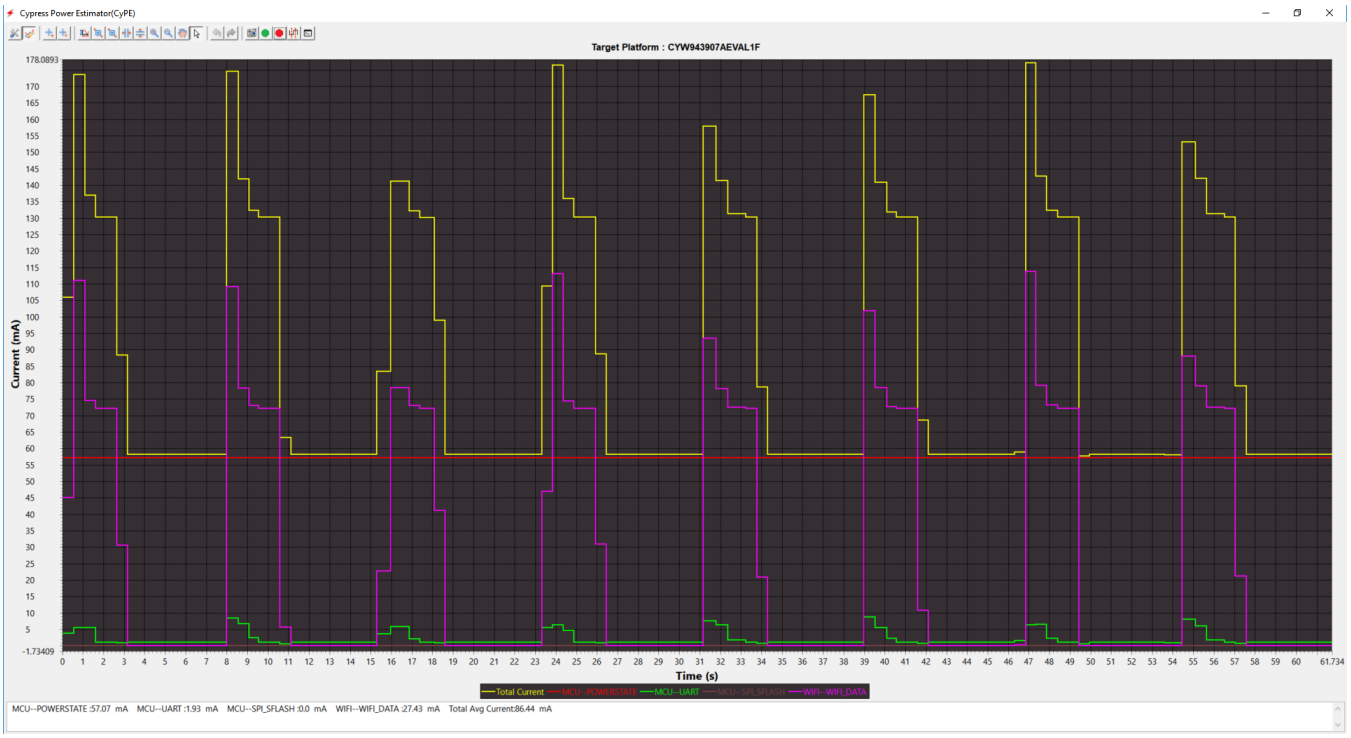
When you enable logging, a plot window with an empty graph appears. Click on the green button to start logging. To stop logging, click on the red button.



Note: If "Start Logging" option is selected in the CyPE Configuration window, the logging starts automatically.

2.4 Plot

The real-time plot appears as follows. Refer to the Display section for details.



3 Log File

The CyPE tool consists of two main components: Target-WPL and Host-WPL. The Target-WPL component captures the *power events* from different components on the target platform and sends these to the Host-WPL component. The Host-WPL component runs on the PC to receive *power events* over UART and displays the real-time power plot. It refers to a platform-specific power database in XML format and estimates the current based on the power events and duration.

A “Power Event” is defined as a combination of Processor ID, Event ID, and Event Descriptor.

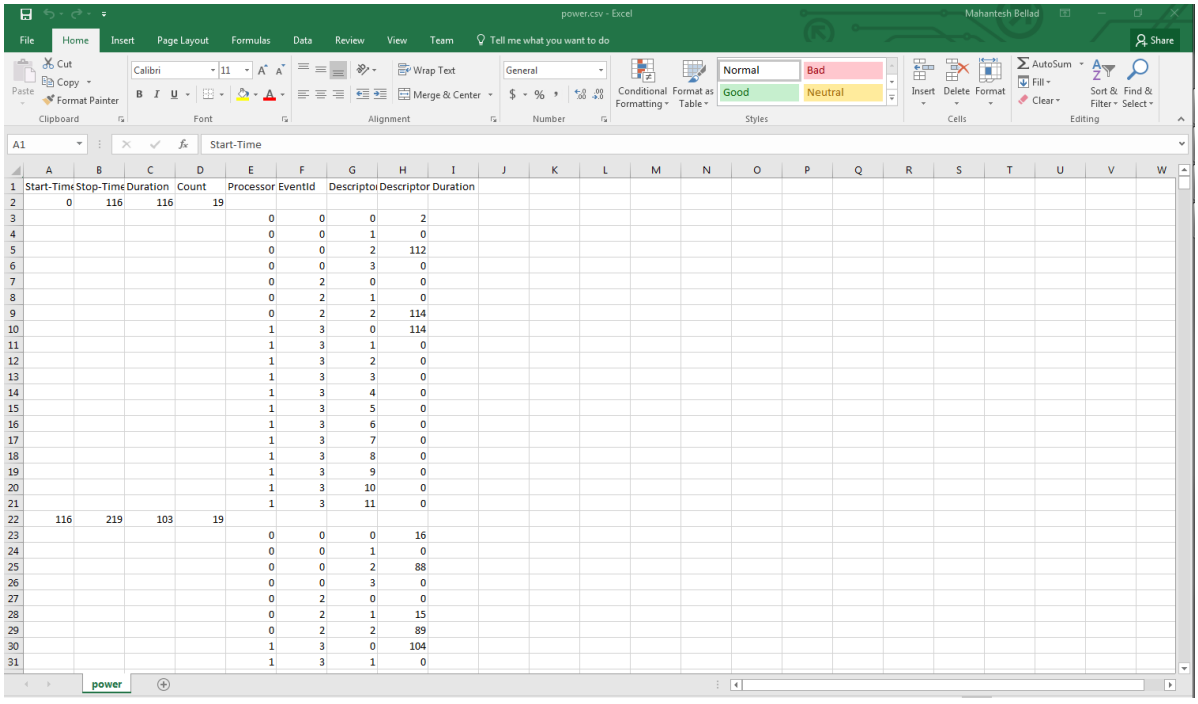
- ***Processor ID***: Each processor available on the target platform is identified by this ID (for example, MCU, Wi-Fi, BT, etc.).
- ***Event ID***: Each power event is identified by this ID (for example, Power State, UART State, Wi-Fi Data, I2S state, etc.).
- ***Event Descriptor (Descriptor)***: Each event is described by the event descriptor. These represent different states assumed by the power events (for example, an MCU Power event can have event descriptors such as Active, Sleep, Deep Sleep, Hibernate, and OFF).
- ***Descriptor Duration***: Captures the duration for which each event descriptor was active.

The CyPE tool logs all power events sent by the target platform to the tool into a file named *<platform_name>_<datetime>.csv* (for example, *CYW943907AEVAL1F_2018-07-04_11-30-02.csv*). This file is kept in the .ped zip container along with the power database file in the WICED IDE workspace location under the *CyPE_log* folder. The data is logged for the capture duration triggered by the start and stop buttons in the UI. This file is useful in debugging because this captures each event’s power state along with the duration spent in that state. It will provide details like how many Wi-Fi packets are sent in each data rate, along with a few other parameters such as Wi-Fi PM mode, current band, and current bandwidth.

The ped zip container can be imported into the tool for offline analysis and can be shared across other stations.

- Power log container is named as *<platform_name>_<datetime>.ped*
- The container has *<platform_name>.xml* and *<platform_name>_<datetime>.csv*
- *<platform_name>.csv* stores the power log data captured from the target platform

The following image shows a sample page of a csv file.



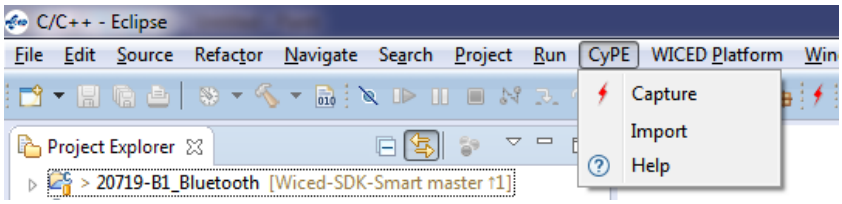
	A	B	C	D	E	F	G	H	I
1	Start-Time	Stop-Time	Duration	Count	Processor	EventId	Descriptor	Descriptor	Duration
2	0	116	116	19					
3					0	0	0	2	
4					0	0	1	0	
5					0	0	2	112	
6					0	0	3	0	
7					0	2	0	0	
8					0	2	1	0	
9					0	2	2	114	
10					1	3	0	114	
11					1	3	1	0	
12					1	3	2	0	
13					1	3	3	0	
14					1	3	4	0	
15					1	3	5	0	
16					1	3	6	0	
17					1	3	7	0	
18					1	3	8	0	
19					1	3	9	0	
20					1	3	10	0	
21					1	3	11	0	
22	116	219	103	19					
23					0	0	0	16	
24					0	0	1	0	
25					0	0	2	88	
26					0	0	3	0	
27					0	2	0	0	
28					0	2	1	15	
29					0	2	2	89	
30					1	3	0	104	
31					1	3	1	0	

Note: The csv file can be used for manual offline analysis only because the CyPE tool import feature needs the ped file to do the power plot. To get the csv file, unzip the ped container.

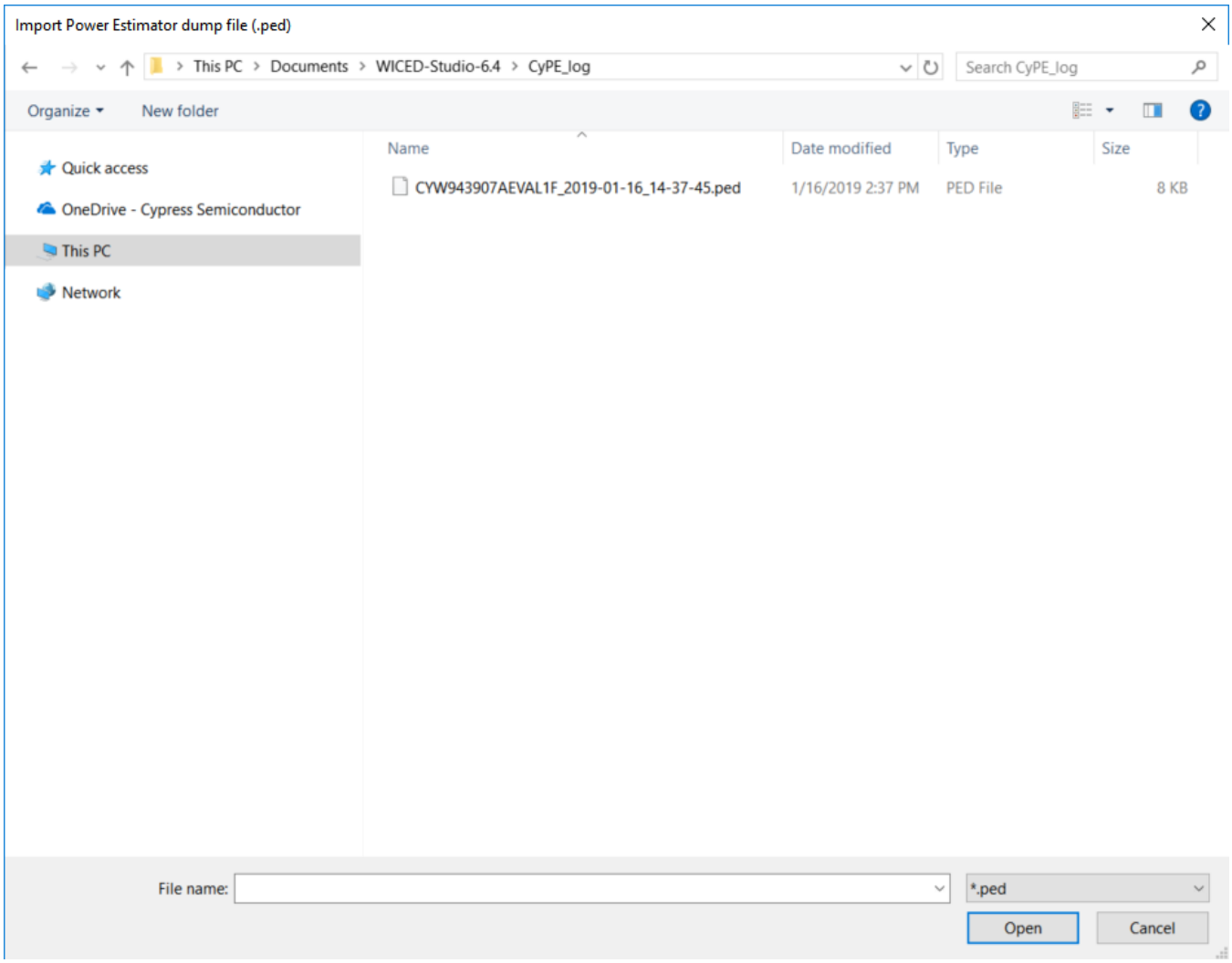
4 Offline Analysis

The CyPE tool supports offline analysis. Using this feature, a captured log file can be viewed offline to perform some offline analysis on the power log data that is captured.

As described under Log File, logs are stored in the ped zip container along with power database file in the WICED installation location under the *CyPE_log* folder. To import the ped file and view it using the CyPE offline analysis tool, click on the **CyPE** menu and select **Import**.



This will open a file browser window to select the ped file.



Select a file for viewing and click **Open**. This will plot traces corresponding to the log data in the ped file.

5 Display

5.1 Parameters Displayed

The CyPE tool displays the following parameters:

5.1.1 Target Name

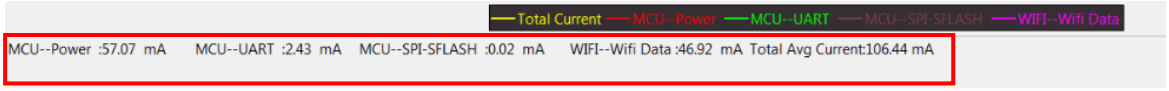
The CyPE tool displays the name of the target detected at the top of the plot window.

5.1.2 Power Parameters

The CyPE tool displays the following power parameters in real time:

- Plot of current consumed by individual power events on each processor
- Plot of current consumed by the platform
- Average current consumed by individual power events
- Average current consumed by the platform

The average current for each event is displayed at the bottom of the plot window.



5.1.3 Event Color Coding

Each power event trace is plotted in a unique color to make it easy for observation. The color mapping between an event and the trace is shown at the bottom of the plot area.

5.2 Display Tools

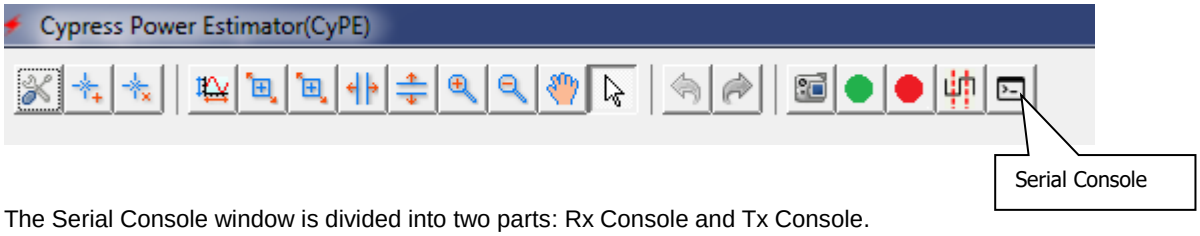
The CyPE display provides various commands in the toolbar. There will be a tool tip for each button that describes its functionality as shown below.

The following are some of the important commands that can be helpful while analyzing the plot:

- Auto Scale
- Rubberband Zoom
- Dynamic Zoom
- Horizontal Zoom
- Vertical Zoom
- Zoom in
- Zoom out
- Panning
- Save Snapshot
- Marker

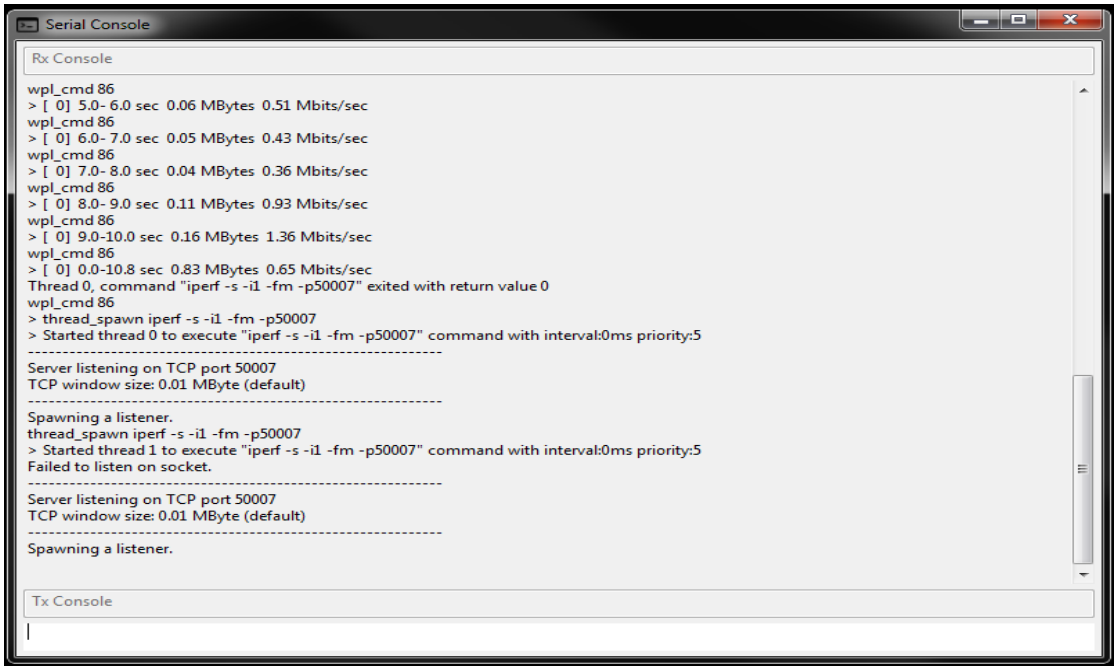
6 Serial Console

The CyPE tool provides a Serial Console window to interact with the target platform. Open this window by clicking on the **Serial Console** button on the toolbar.



The Serial Console window is divided into two parts: Rx Console and Tx Console.

- Rx Console: This part of the Serial Console window prints the logs thrown by the target platform.
- Tx Console: This part of the Serial Console window allows you to execute console commands supported by the target platform by typing them and pressing the **Enter** key.

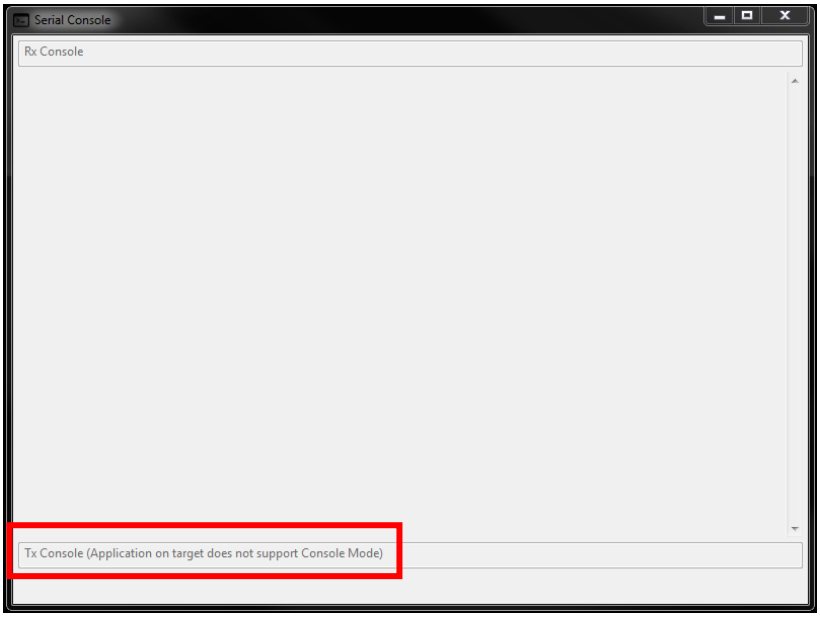


6.1 Console Mode

If the WICED application supports the command console, the Serial Console window will have a Tx Console area enabled to send commands to the target platform. The Rx Console area will print the logs from the target platform. This mode is called Console Mode.

6.2 CyPE Mode

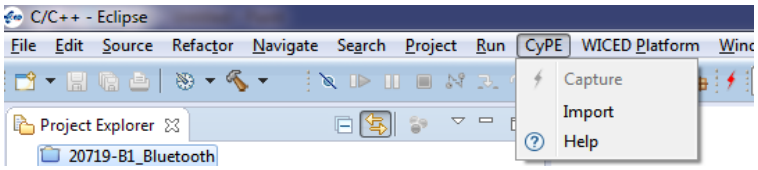
If the WICED application is not a console application, the Serial Console window will not have the Tx Console area enabled. Only the Rx Console area is enabled to print the logs from the target. This is called CyPE Mode, because the CyPE tool only uses the UART for sending the commands to the target platform. The Tx Console area shows the message as highlighted in the following image.


Serial Console
Rx Console
Tx Console (Application on target does not support Console Mode)

7 Troubleshooting

7.1 Disabled Capture Feature

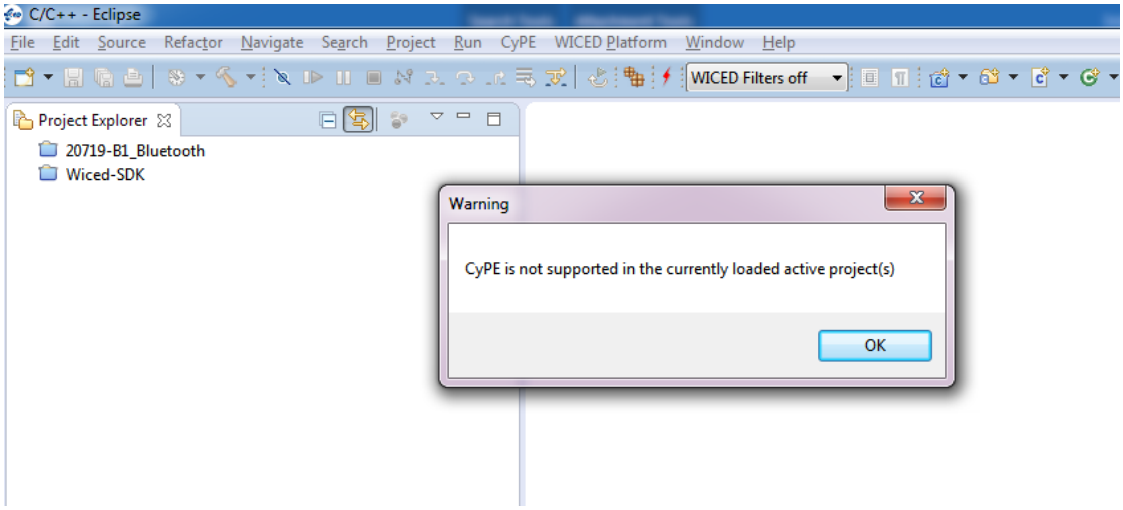
When clicking the **CyPE** menu, if **Capture** appears disabled, it means that the loaded open project does not support the CyPE feature.



If at least one loaded open project supports CyPE, then the Capture feature will be enabled.

7.2 "CyPE is not Supported" error

If there is no open project with CyPE enabled, the following error message appears:



7.3 Plotting window does not open

After configuring CyPE settings and clicking **Connect**, if the plot window does not open, one of the following errors could have occurred:

1. Failure to detect the target
2. Missing platform power database XML file
3. Version mismatch between the power database file and the Target-CyPE software
4. Failure to get Processor list/Event list/Descriptor list from the target

A message will appear for each of these errors with a corresponding description. Check for the above errors and address the problem as follows:

7.3.1 Case 1:

- Make sure that you have connected the target platform to the PC with USB cable.
- Make sure that you have selected the correct COM port.
- Make sure that the CyPE tool is supported and enabled on the platform.

7.3.2 Cases 2 and 3:

Make sure that you have selected the correct project in the CyPE Capture window. The selected project must match with the project launched on target platform.

7.3.3 Case 4:

Reset the hardware and repeat the procedure.

7.4 No response for Start log

If the target platform is in any of the sleep modes (Sleep or Deep Sleep), it may not respond to the **Start** button. A message displays "Response Not Received". Bring the target platform out of the sleep state and click **Start** again.

7.5 No response for Stop log

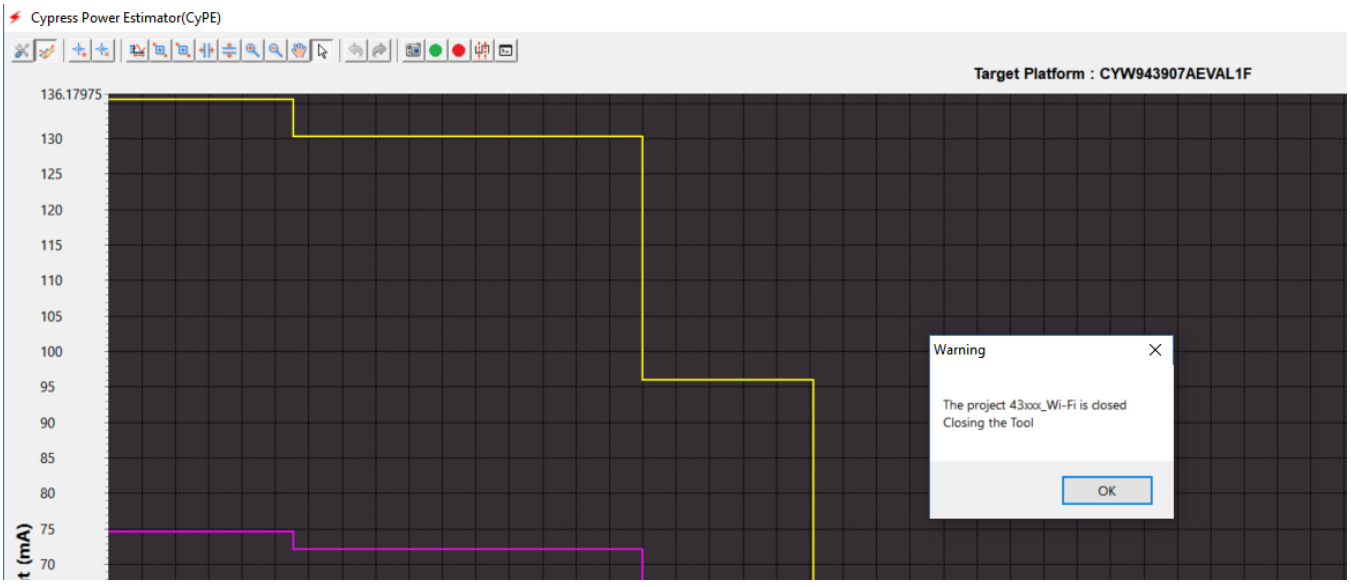
If the target platform is in any of the sleep modes (Sleep or Deep Sleep), it may not respond to the Stop button. A message displays “Response Not Received". Bring the target platform out of the sleep state and restart the capture. Make sure that the Stop command is issued when the target platform is not in any of the sleep modes.

7.6 Tx Console is not enabled

If the application supports the command console and the CyPE tool does not enable the Tx console, close the CyPE tool, reset the hardware, and try to connect again.

7.7 “Project Closed” error

When the CyPE tool is running, if the chosen project is closed from the workspace either by manually closing in the Project Explorer or by switching the project, the following appears, showing the name of the project being closed. Click **OK** to close the CyPE tool.



8 Limitations/Known Issues

The basic principle behind the power estimation is to log different states and the duration in each state for each identified power event. This duration along with the predefined value of the current for these states is used to calculate the estimated power.

If the power numbers vary for different boards for a given platform version, then the tool will not be able to capture this, because there is a single current database maintained for a supported platform.

The tool depends on the power database for power estimation. If the database is wrong, then the power estimation will be wrong.

Finally, the tool is only estimating the power and this is not the actual power. To get the actual power number, use a hardware tool such as Agilent.

Document History

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**	6312206	09/17/2018	Initial version
*A	6373917	02/11/2018	Updated copyright notice
*B	6490920	02/21/2019	Updated document title Updated in Cypress template

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