



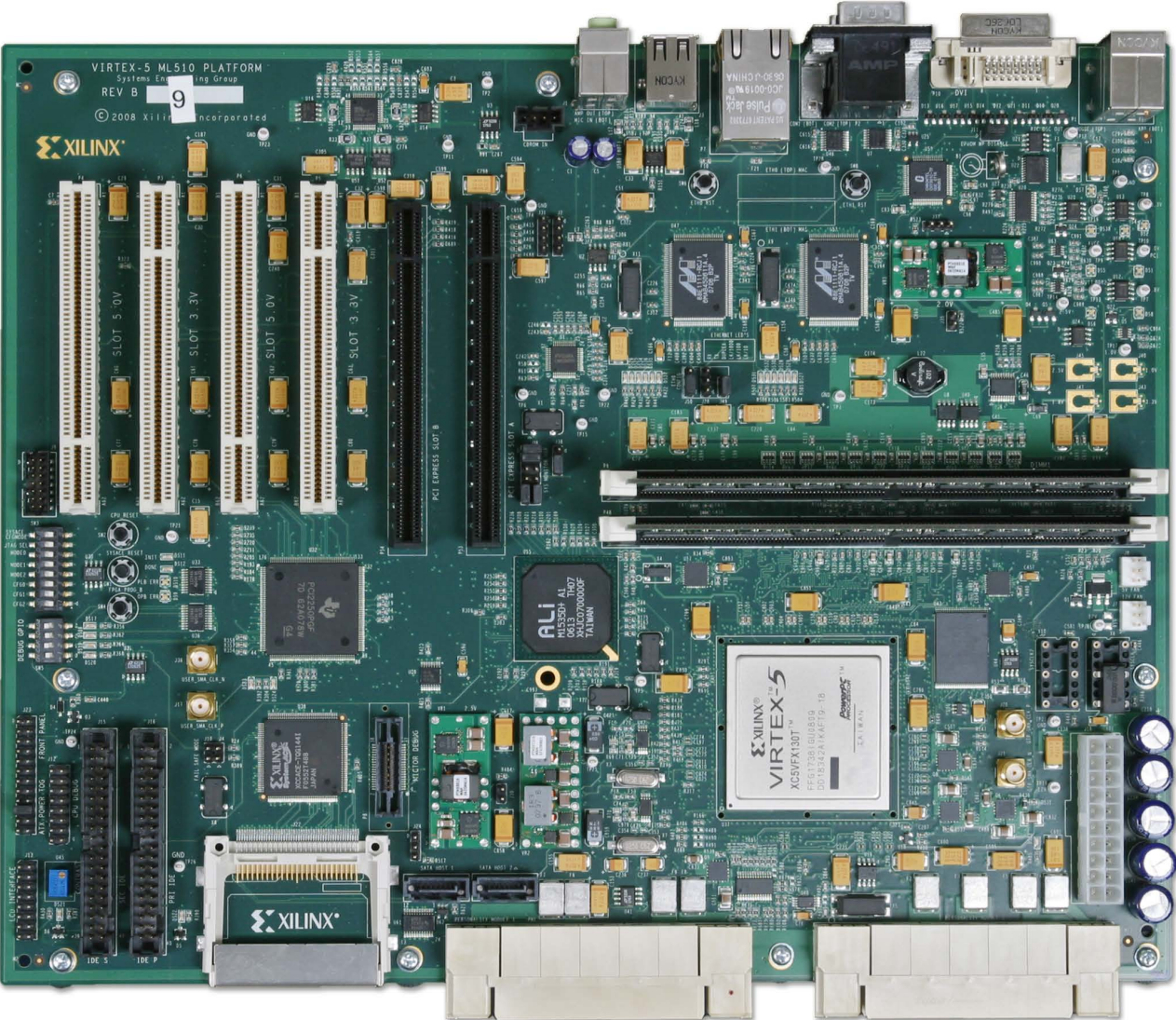
# ML510 System Monitor QuickStart

**June 2010**

# Overview

- **Software Requirements**
- **Hardware Setup**
- **System Monitor Features**
- **ChipScope Setup**
- **Running System Monitor**
- **References**

# Xilinx ML510 Board



Note: Presentation applies to the ML510

# ISE Software Requirements

- Xilinx ISE 12.1 software



# ChipScope Pro Software Requirement

- **Xilinx ChipScope Pro 12.1 software**



# Additional Setup Details

- **Refer to [ml510\\_overview\\_setup.ppt](#) for details on:**

- Software Requirements
- ML510 Board Setup
- Equipment and Cables
- Software
- Network

- **Terminal Programs**

- This presentation requires the 9600-8-N-1 Baud terminal setup



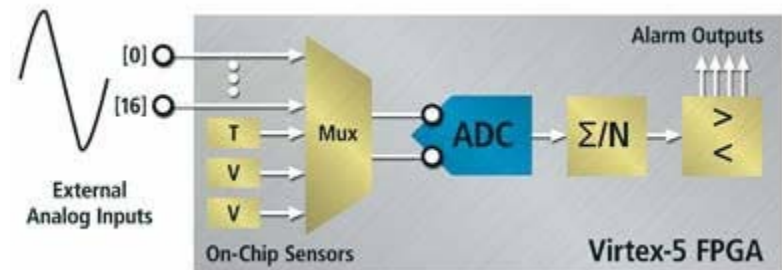
# ML510 Setup

- **Connect the Xilinx Platform Cable USB to the ML510 board**



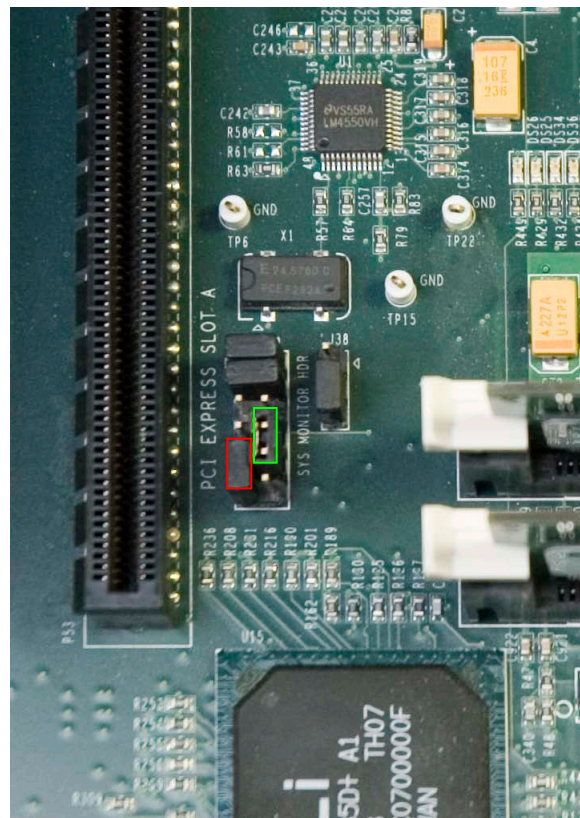
# System Monitor Features

- **Available in all Virtex-5 Devices**
- **On-Chip Temperature Measurement ( $\pm 4^{\circ}\text{C}$ )**
- **On-Chip Power Supply Measurement ( $\pm 1\%$ )**
- **JTAG Accessible**
  - Usable before, during, and after device configuration
- **Accessible from User Logic**
- **Programmable Alarms**
- **User Accessible Analog-to-Digital Converter**
  - 10-bit resolution
  - 200 kSPS (kilo-samples per second)
  - Digital Averaging



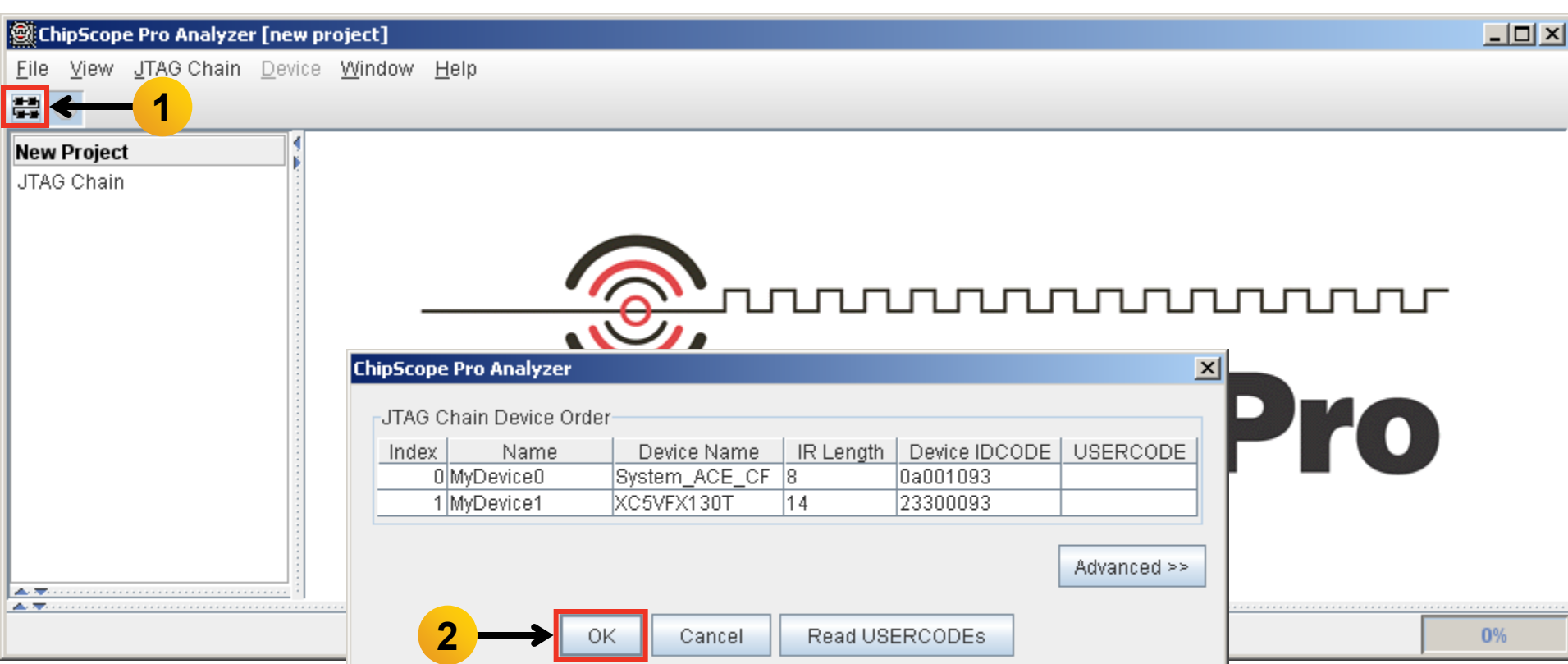
# Connect Jumpers

- Connect pins 9 and 11 of J33
- Connect pins 8 and 10 of J33



# ChipScope Setup

- **After the design compiles, open ChipScope Pro Analyzer**
  - Click on the Open Cable Button (1)
  - Click OK (2)



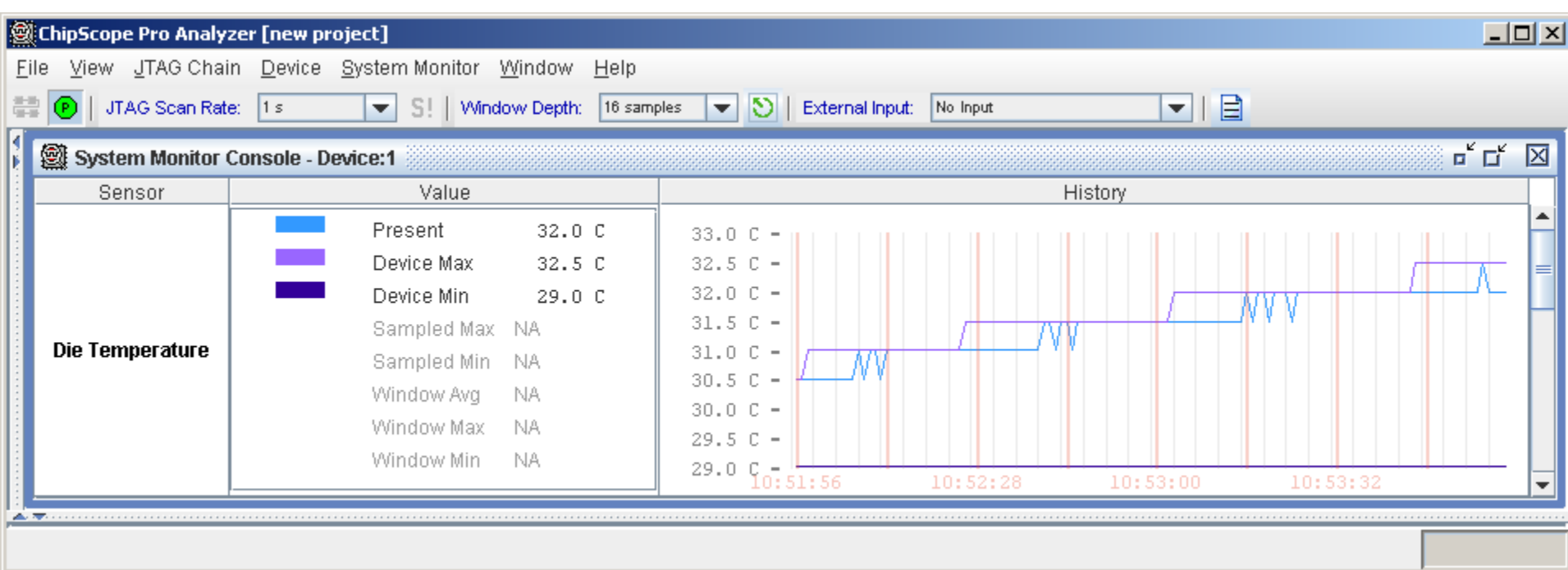
# ChipScope Setup

- Right click on System Monitor Console, select Open System Monitor Console



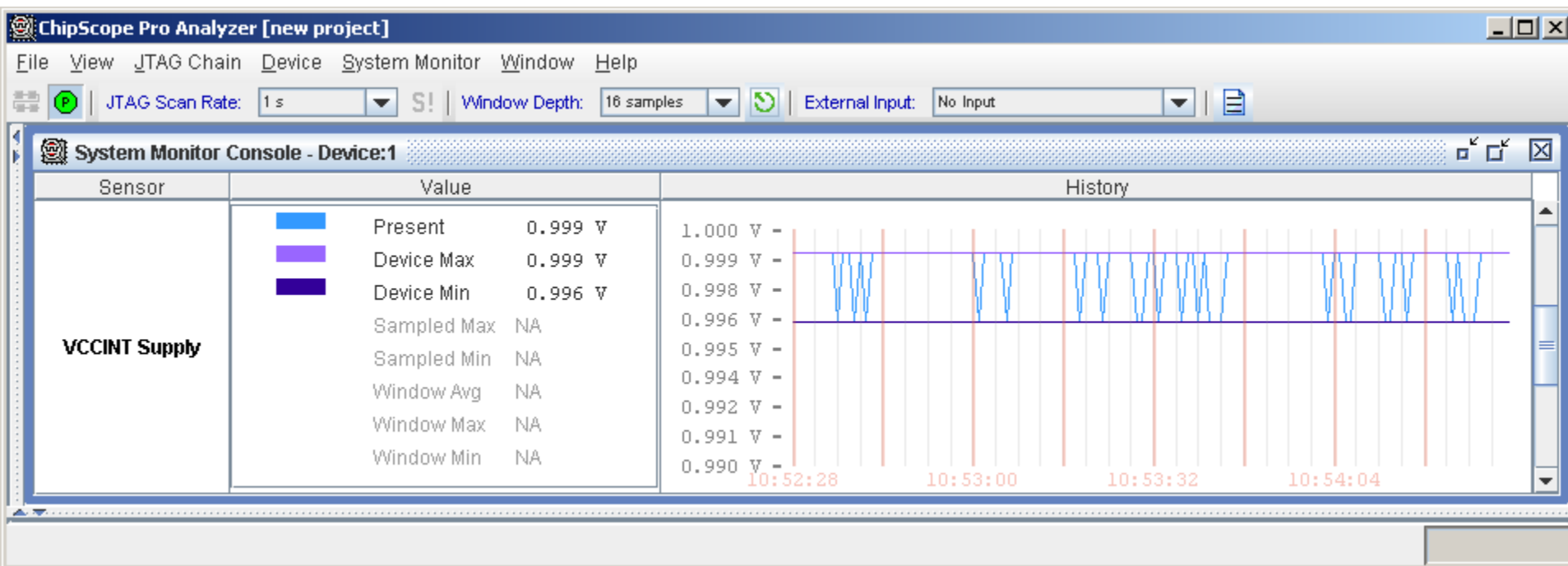
# System Monitor

- Notice the die temperature is increasing
- Bitstream not required for JTAG access of System Monitor



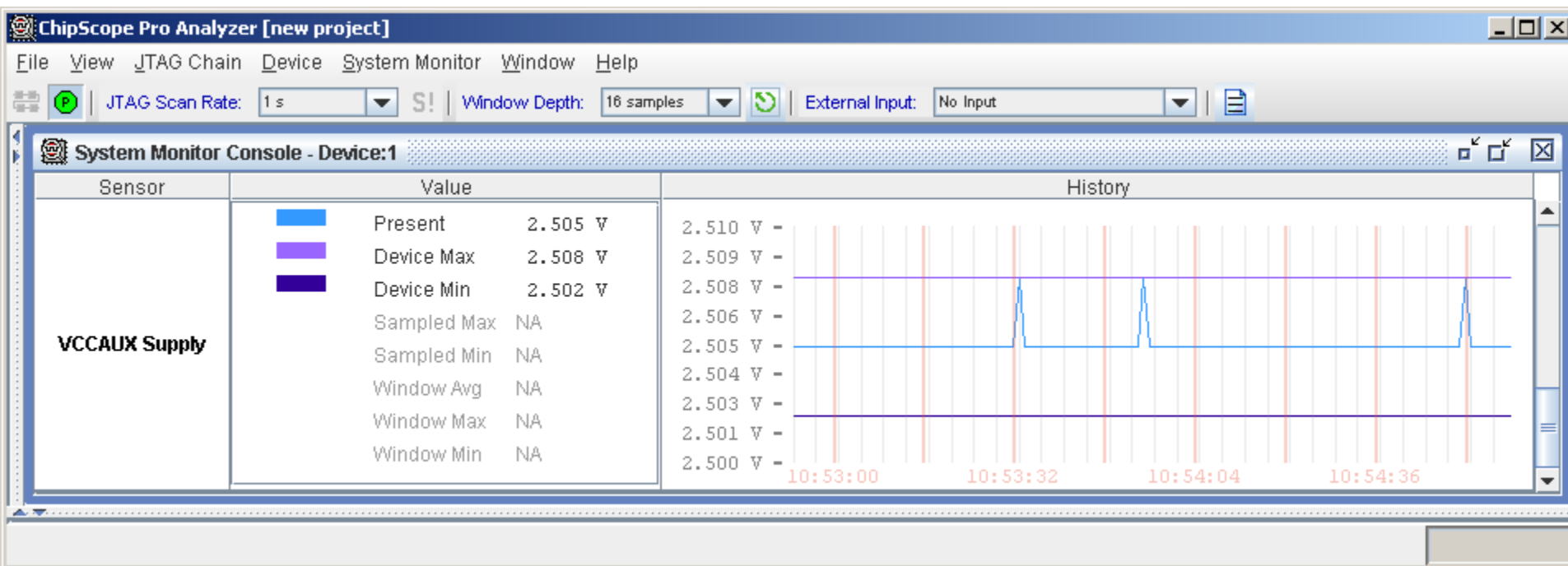
# System Monitor

- Scroll down to see VCCINT Supply



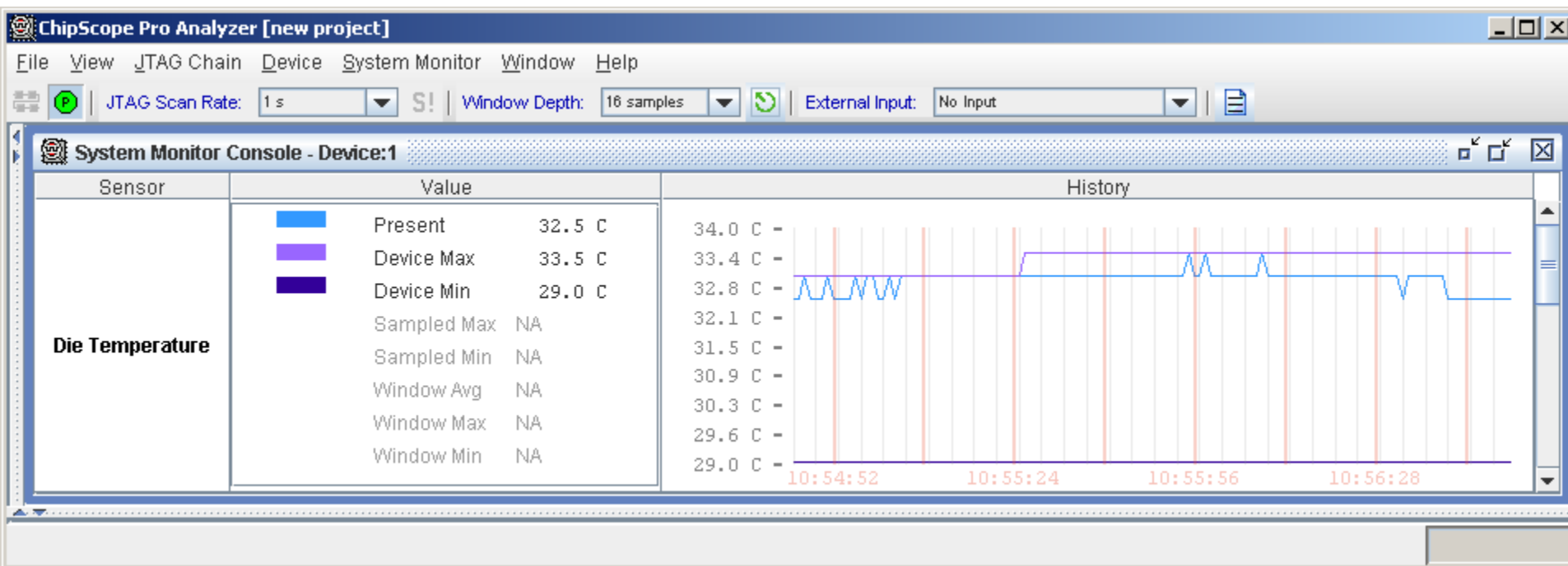
# System Monitor

- Scroll down to see VCCAUX Supply



# System Monitor

- Placing one's thumb on top of the chip reduced the temperature as seen below



# System Monitor

- User selectable temperature units (Fahrenheit or Celsius)

The screenshot shows the ChipScope Pro Analyzer interface. The main window is titled "System Monitor Console - Device:1". It displays a table of sensor values and a history graph. A context menu is open over the "On-Chip Sensors" list, showing the "Units" option selected, with "Celsius" checked and "Fahrenheit" unchecked.

Sensor	Value
Present	33.0 C
Device Max	33.5 C
Device Min	29.0 C
Sampled Max	NA
Sampled Min	NA
Window Avg	NA
Window Max	NA
Window Min	NA

**Die Temperature**

History graph showing temperature fluctuations over time, with a blue line representing the current temperature and a purple horizontal line indicating the device maximum. The y-axis ranges from 29.0 C to 34.0 C. The x-axis shows timestamps: 10:55:56, 10:56:44, and 10:57:32.

# System Monitor

- Change the displayed traces
- ChipScope can configure System Monitor at any time

The screenshot shows the ChipScope Pro Analyzer interface. The main window is titled "System Monitor Console - Device:1". It features a table of sensor data and a history graph.

Sensor	Value	History
Present	33.0 C	
Device Max	33.5 C	
Device Min	29.0 C	
Sampled Max	NA	
Sampled Min	NA	
Window Avg	NA	
Window Max	NA	
Window Min	NA	
Die Temperature		

A context menu is open over the graph, listing the following items with checkboxes:

- Present
- Device Max
- Device Min
- Sampled Max
- Sampled Min
- Window Avg
- Window Max
- Window Min

# System Monitor

- Select the external Input V\_P/V\_N
- System Monitor is capable of monitoring 17 external channels

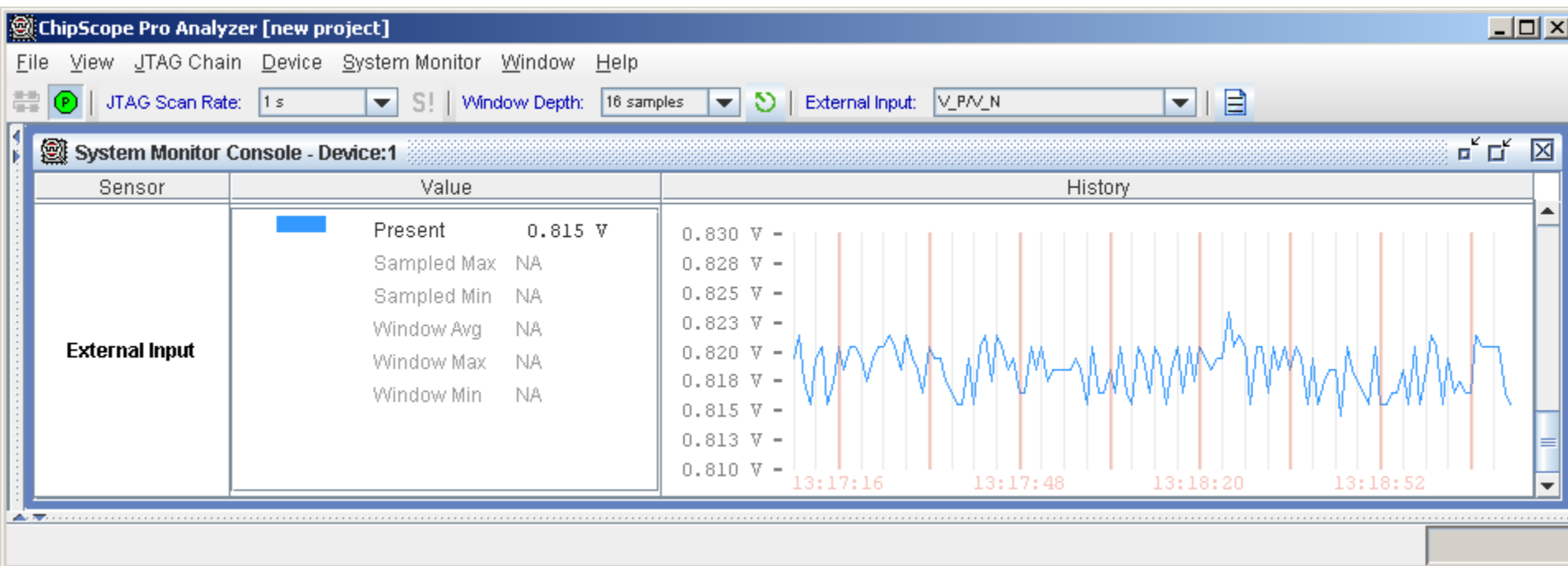
The screenshot displays the ChipScope Pro Analyzer interface. The main window is titled "System Monitor Console - Device:1". It features a table of sensor data and a waveform display.

Sensor	Value
Die Temperature	Present
	Device Max
	Device Min
	Sampled Max NA
	Sampled Min 30.5 C
	Window Avg NA
	Window Max NA
	Window Min NA

The waveform display shows a signal over time, with a vertical axis ranging from 29.0 C to 32.1 C. The time axis shows markers at 10:57:00, 10:57:48, and 10:58:36.

# System Monitor

- Voltage measured on external ADC inputs through the previously connected jumpers



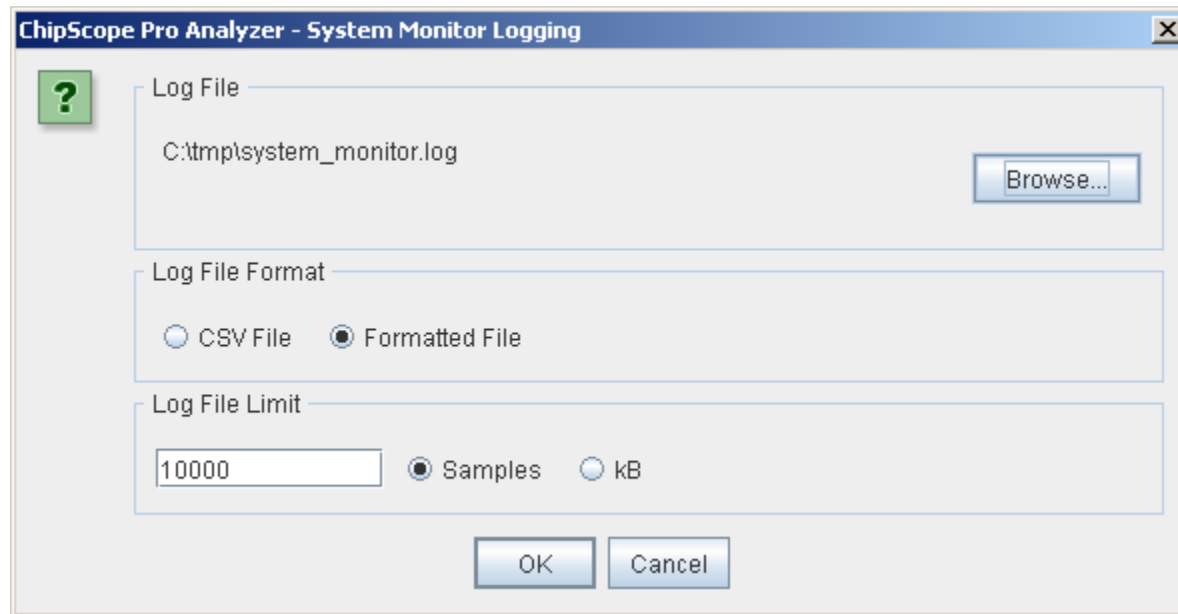
# System Monitor Log File

- Select System Monitor → Setup Logging...

The screenshot displays the ChipScope Pro Analyzer interface. The 'System Monitor' menu is open, showing options such as 'JTAG Scan Rate', 'Sample Once', 'Window Depth', 'External Input', 'Reset', 'Setup Logging...', 'Enable Logging', 'Enable Calibration', 'Always Over-write Registers', 'Edit Register...', and 'Close'. The 'Setup Logging...' option is highlighted. The 'System Monitor Console' window shows a table with columns for 'Sensor' and 'External Input'. The 'External Input' section displays a waveform graph with a y-axis ranging from 0.810 V to 0.830 V and a time axis showing timestamps like 13:22:20, 13:22:52, 13:23:24, and 13:23:56.

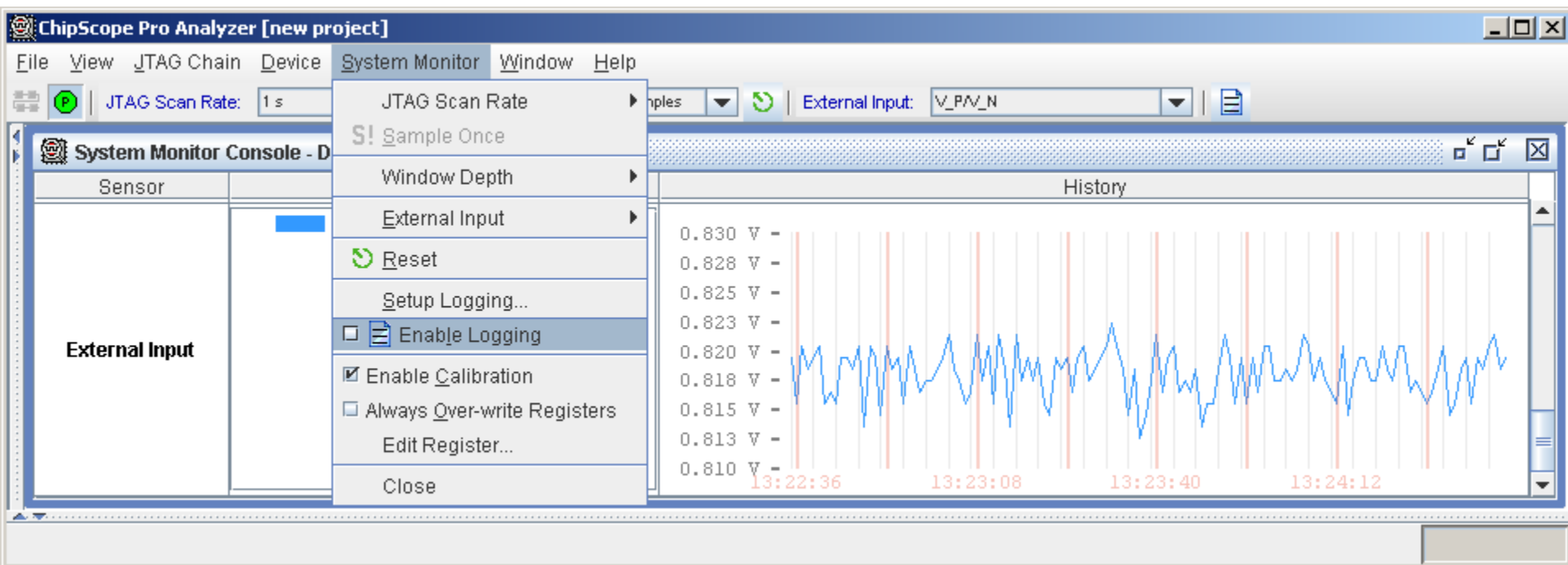
# System Monitor Log File

- Set the log file, and logging options



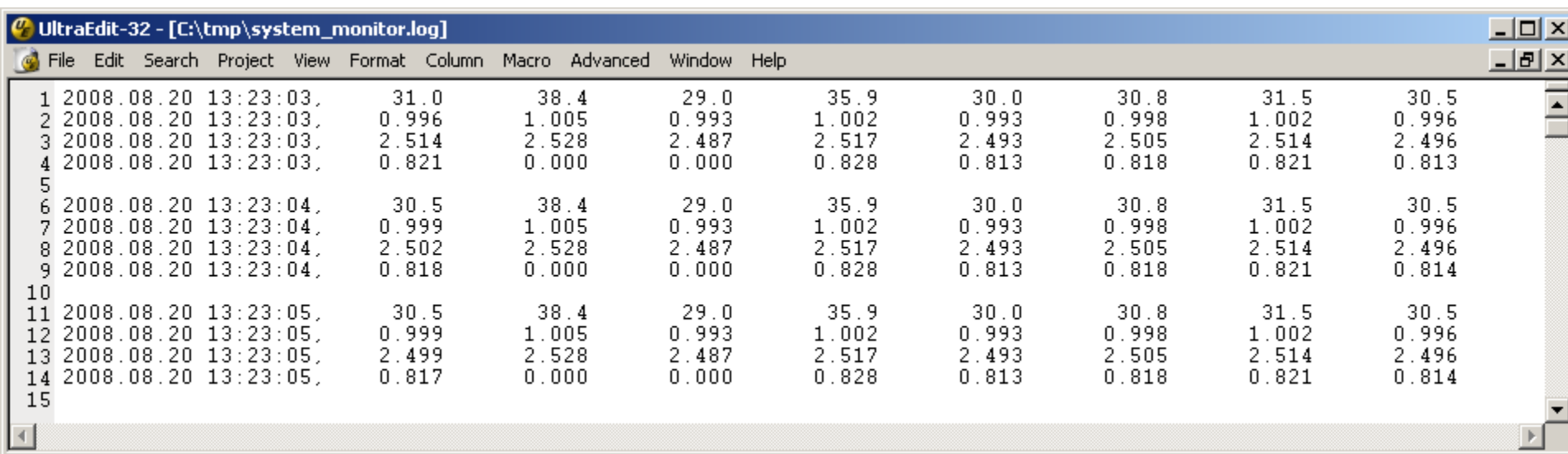
# System Monitor Log File

- Select System Monitor → Enable logging



# System Monitor Log File

- View log file in text editor

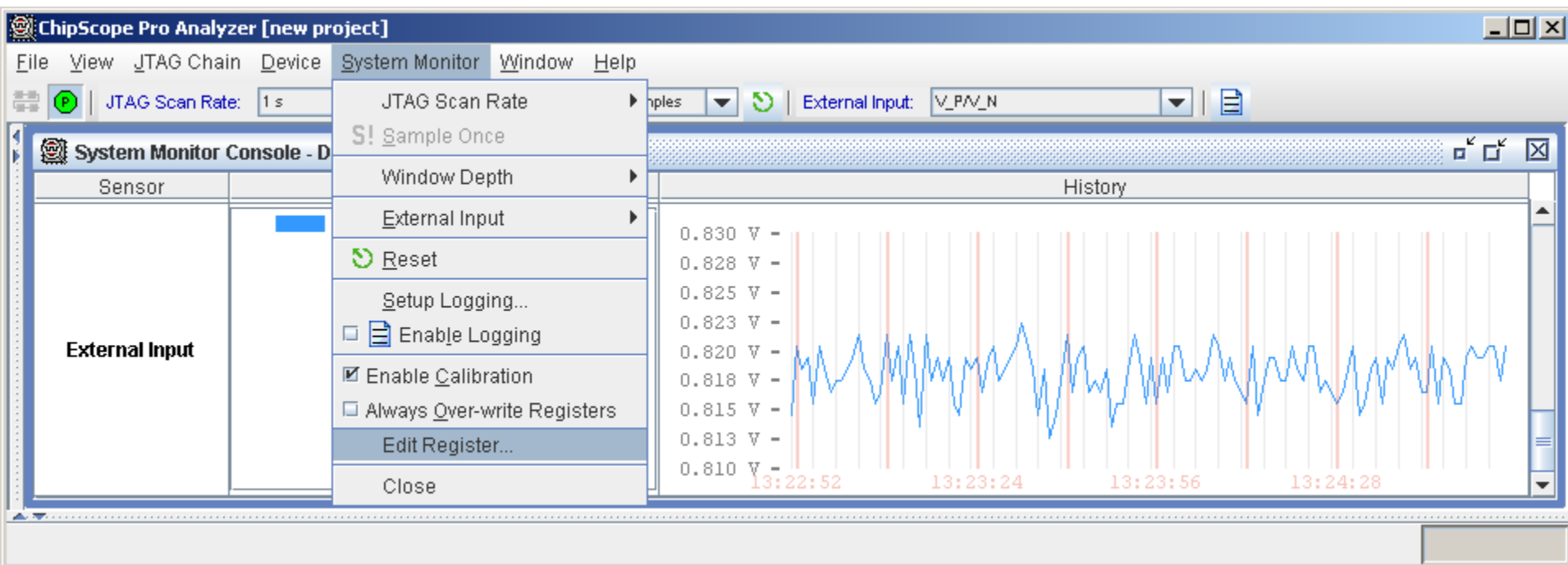


The screenshot shows a text editor window titled "UltraEdit-32 - [C:\tmp\system\_monitor.log]". The window contains a log file with 15 lines of data. Each line represents a timestamp and several numerical values. The data is as follows:

1	2008.08.20	13:23:03,	31.0	38.4	29.0	35.9	30.0	30.8	31.5	30.5
2	2008.08.20	13:23:03,	0.996	1.005	0.993	1.002	0.993	0.998	1.002	0.996
3	2008.08.20	13:23:03,	2.514	2.528	2.487	2.517	2.493	2.505	2.514	2.496
4	2008.08.20	13:23:03,	0.821	0.000	0.000	0.828	0.813	0.818	0.821	0.813
5										
6	2008.08.20	13:23:04,	30.5	38.4	29.0	35.9	30.0	30.8	31.5	30.5
7	2008.08.20	13:23:04,	0.999	1.005	0.993	1.002	0.993	0.998	1.002	0.996
8	2008.08.20	13:23:04,	2.502	2.528	2.487	2.517	2.493	2.505	2.514	2.496
9	2008.08.20	13:23:04,	0.818	0.000	0.000	0.828	0.813	0.818	0.821	0.814
10										
11	2008.08.20	13:23:05,	30.5	38.4	29.0	35.9	30.0	30.8	31.5	30.5
12	2008.08.20	13:23:05,	0.999	1.005	0.993	1.002	0.993	0.998	1.002	0.996
13	2008.08.20	13:23:05,	2.499	2.528	2.487	2.517	2.493	2.505	2.514	2.496
14	2008.08.20	13:23:05,	0.817	0.000	0.000	0.828	0.813	0.818	0.821	0.814
15										

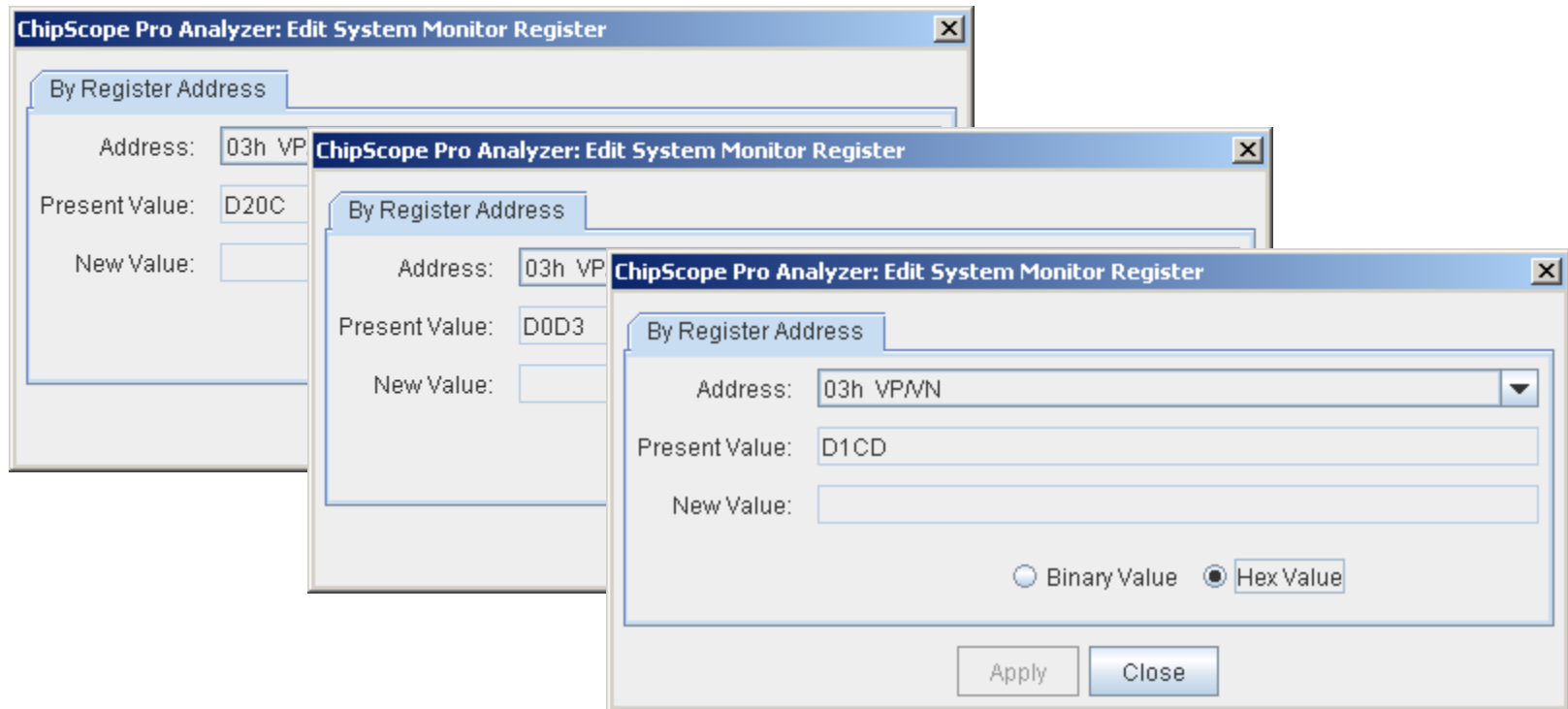
# System Monitor Registers

- Select System Monitor → Edit Register...



# System Monitor Registers

- View the VP/VN Register; note the value varies over time



# References

# Documentation

- **ChipScope Pro**

- ChipScope Pro Software and Cores User Guide

[http://www.xilinx.com/support/documentation/sw\\_manuals/xilinx12\\_1/chipscope\\_pro\\_sw\\_cores\\_ug029.pdf](http://www.xilinx.com/support/documentation/sw_manuals/xilinx12_1/chipscope_pro_sw_cores_ug029.pdf)

# Documentation

# Documentation

- **Virtex-5**

- Virtex-5 FPGA Family

<http://www.xilinx.com/products/virtex5/index.htm>

- **ML510 Documentation**

- ML510 Overview

<http://www.xilinx.com/products/devkits/HW-V5-ML510-G.htm>

- ML510 Evaluation Platform User Guide – UG356

[http://www.xilinx.com/support/documentation/boards\\_and\\_kits/ug356.pdf](http://www.xilinx.com/support/documentation/boards_and_kits/ug356.pdf)

- ML510 Reference Design User Guide – UG355

[http://www.xilinx.com/support/documentation/boards\\_and\\_kits/ug355.pdf](http://www.xilinx.com/support/documentation/boards_and_kits/ug355.pdf)