
New “Event Capture diagnostics added to PowerPlus”

R. Zara 1/13/2016

In 2014 with the release of the NWL Global Display Unit (GDU) NWL added the capability to snapshot and display running waveforms of critical signals within the PowerPlus power supply. This feature has greatly improved the diagnostic capabilities of the PowerPlus.

Beginning with PowerPlus firmware version v2.40 of the DSP based control board, we have expanded these diagnostic tools to help aid in the process of diagnosing possible problems within the PowerPlus or the associated Precipitator electrical field.

How it works:

Capturing the Event Data:

The PowerPlus DSP control continually monitors multiple sensors within the power supply during its normal operation at an extremely fast sampling rate. The “Event data capture” feature continually records five of these signals in a time loop of approximately 0.3 seconds. This time loop is continually overwriting the prior 0.3 seconds data. The process is similar to how a security DVR stores surveillance video in a time loop overwriting the data after a set time period based on the size of the systems internal storage. When a PowerPlus alarm occurs, if the alarm is of a type that triggers the event data capture feature, the data recording will continue for approximately 200 mSec post trigger then halt preserving the event data. Also at this time the event data will be written to the DSP boards SD-Card if one is present. This will result in a waveform with approximately 100 mSec of pre-event data and approximately 200 mSec of post-event data.

How to view the event:

There are currently 3 ways to view this event.

1. Using the NWL GDU display to view the waveforms.
2. Using NWL PCAMS to upload and display the waveforms.
3. Opening the SD Card file with Microsoft Excel or a similar program then charting the data.

Analyzing via the NWL GDU:

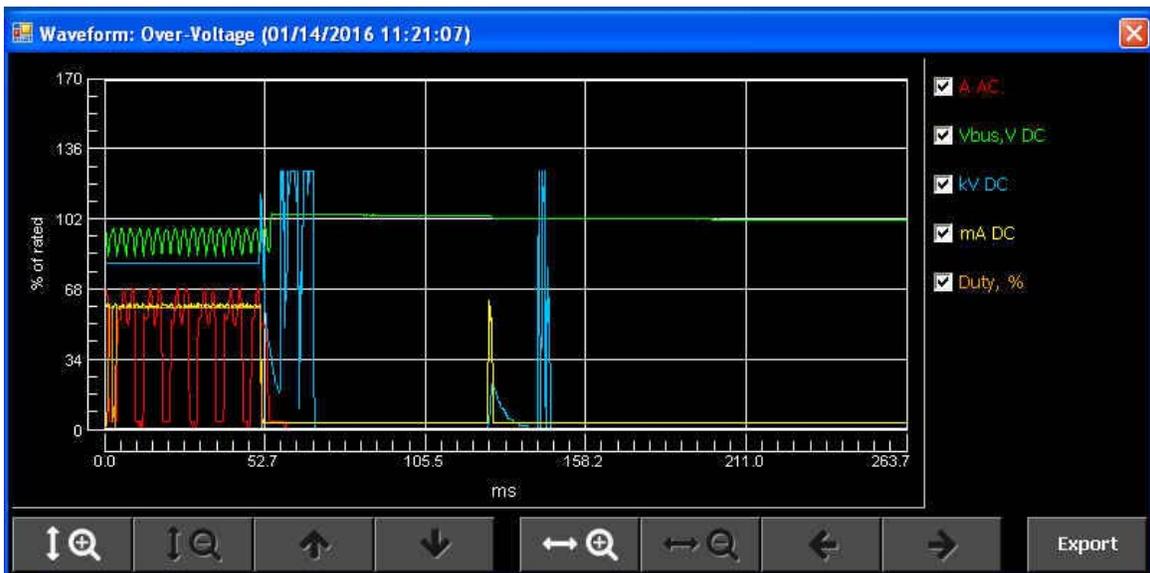
Beginning with GDU software version v1.3.0.0 we have added the ability to upload and display the previous alarm event waveform on the GDU screen similar to viewing the scope waveforms. Each of the five available waves can be viewed simultaneously or selectively hidden for clarity. The

waveform also has zoom and panning controls to zero in on a particular section of the wave. Below is a sample of what a user may see

GDU Alarm Tab: Notice the new “Waveform” button.



Pressing the “Waveform” button will upload and display the previous alarms waveform data.



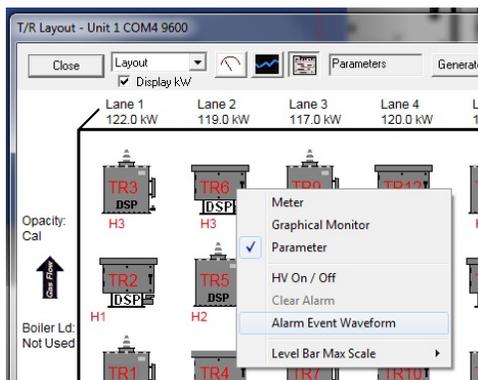
Same waveform zoomed & panned.



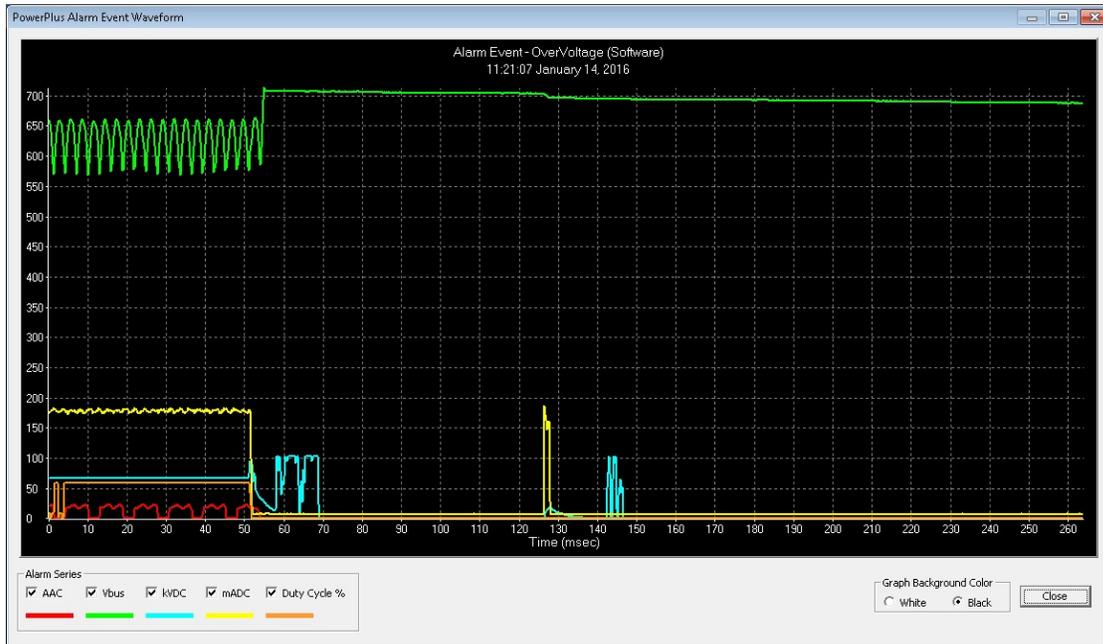
Analyzing via the NWL PCAMS:

Beginning with PCAMS software version v5.6.0 we have added the ability to upload and display a PowerPlus alarm event waveform from any connected PowerPlus that supports this new feature. The alarm event waveform is accessed via T/R Layout view by right-clicking the mouse while pointing to a PowerPlus unit exposing the context menu. If the associated PowerPlus supports this feature the “Alarm Event Waveform” menu selection will be enabled. Clicking on this menu selection will begin the upload process and result in displaying the waveforms. As with the GDU these waveforms can be selectively hidden, zoomed or panned for clarity. The dialog can also be maximized to utilize 100% of the attached computers monitor. Below are the sample images.

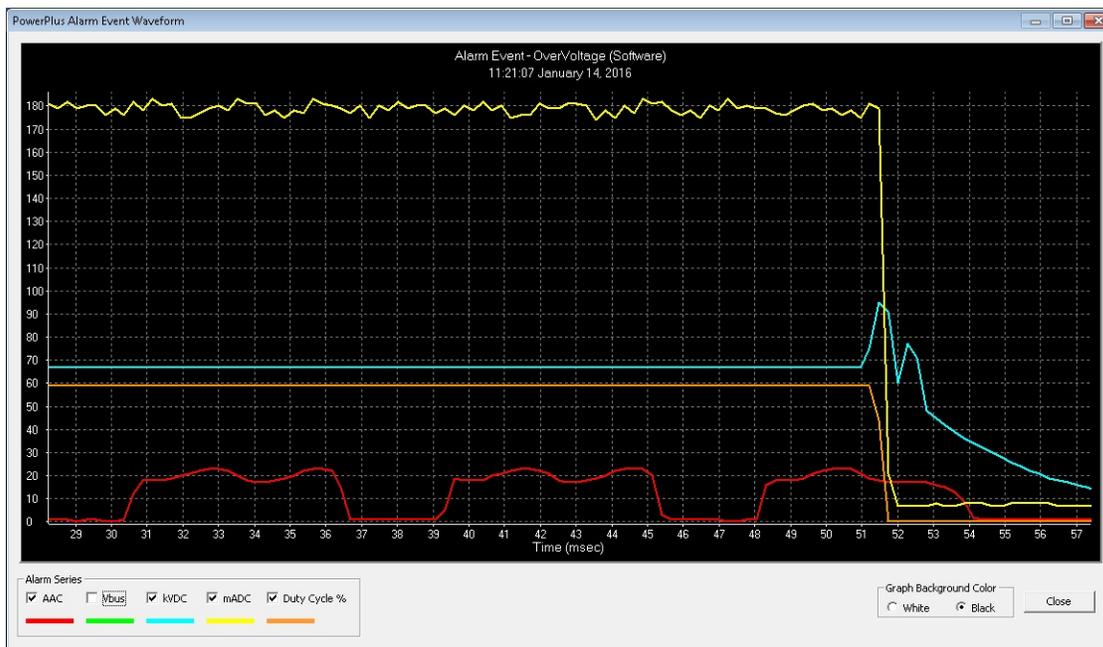
PCAMS: Context Menu.



PCAMS: Displayed waveforms.



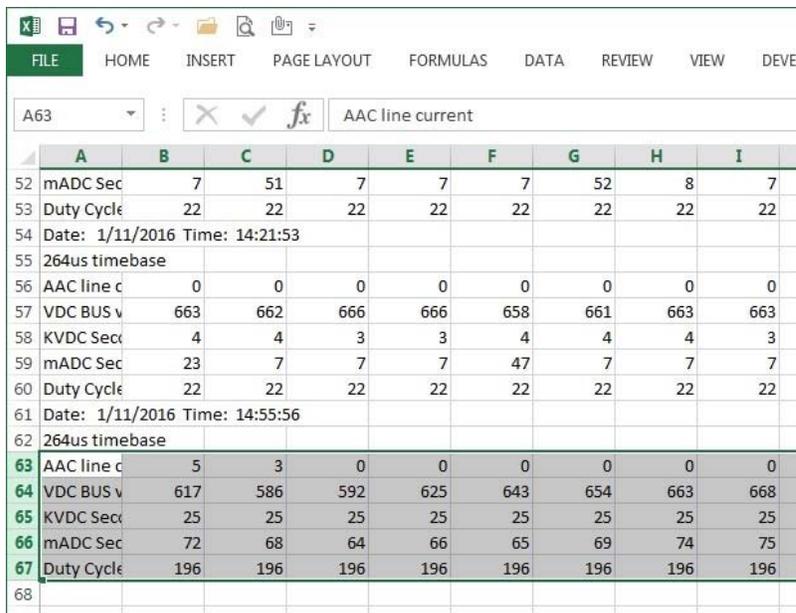
PCAMS: Waveforms zoomed.



Analyzing via Excel:

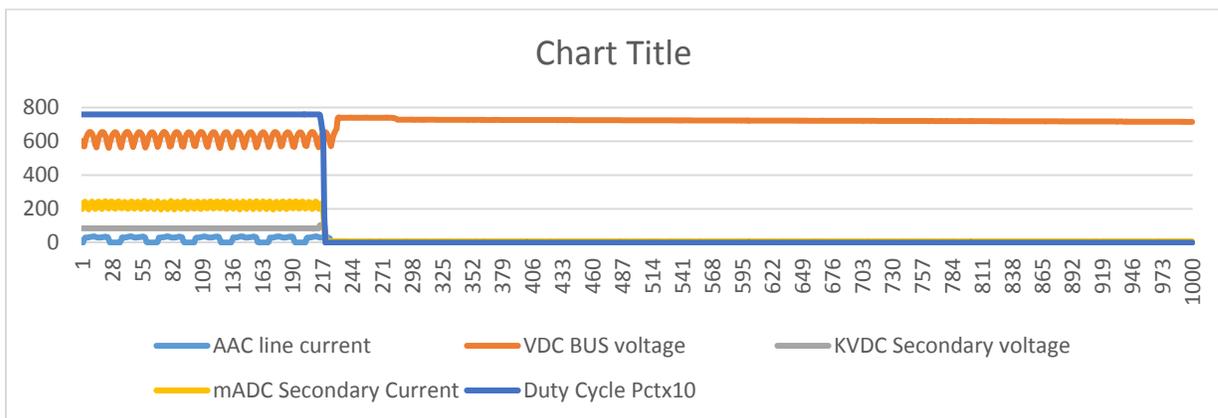
This process begins with retrieving the SD-Card from the associated PowerPlus DSP control board. This SD-Card can then be viewed with a Windows computer. Using windows file manager, navigate to the SD-Card and open the Wave.csv file with Excel. Normally double-clicking on the filename will start Excel with wave.csv file being loaded. Once the file is open within Excel the user can simply scroll to the desired waveform which are labeled with the event attributes (Date, time) and select the 5 rows of data then using the normal Excel commands to insert a "Line chart". In Excel version 2013 the process is minimized to selecting the rows then two mouse clicks later you see your waveforms. Below are sample screen shots.

Excel: Selecting the data.



	A	B	C	D	E	F	G	H	I
52	mADC Sec	7	51	7	7	7	52	8	7
53	Duty Cycle	22	22	22	22	22	22	22	22
54	Date: 1/11/2016 Time: 14:21:53								
55	264us timebase								
56	AAC line c	0	0	0	0	0	0	0	0
57	VDC BUS v	663	662	666	666	658	661	663	663
58	KVDC Sec	4	4	3	3	4	4	4	3
59	mADC Sec	23	7	7	7	47	7	7	7
60	Duty Cycle	22	22	22	22	22	22	22	22
61	Date: 1/11/2016 Time: 14:55:56								
62	264us timebase								
63	AAC line c	5	3	0	0	0	0	0	0
64	VDC BUS v	617	586	592	625	643	654	663	668
65	KVDC Sec	25	25	25	25	25	25	25	25
66	mADC Sec	72	68	64	66	65	69	74	75
67	Duty Cycle	196	196	196	196	196	196	196	196

Excel: Inserted Chart.



Other Feature additions by Product

GDU – Global Display Unit:

- 2014-Q3:
 - Initial release for PowerPlus / Optimizer SCR controls (16 languages).
- 2015-Q2:
 - Added GRC application to GDU (English only).
- 2016-Q1:
 - Added 5 additional languages to GRC application.
 - Chinese (Simplified)
 - French
 - Korean
 - Portuguese (Brazil)
 - Russian
 - Spanish
 - Added Rapper Test fire waveform.
 - Added PowerPlus Alarm event waveform.

PowerPlus:

- 2016-Q1:
 - Added Trend file to SD Card.
 - Added Event Waveforms to SD Card.
 - Allow Event waveforms to be transmitted to GDU/Pcams

SmartRap-DSP:

- 2016-Q1:
 - Added Test fire Waveforms to SD Card.
 - Allow Test fire waveforms to be transmitted to GDU/Pcams.

PCAMS:

- 2016-Q1:
 - Added feature to display Powerplus alarm event waveforms.
 - Added feature to display GRC Test fire waveforms.
 - Added support for new parameters in PowerPlus, Optimizer-DSP, SmartCpu-DSP & SmartRap-DSP.
 - Added support for Wago 230v Digital Input.