Appendix
APPENDIX

Mtronix - Precision Measuring Instruments

MPD540 advanced partial discharge measuring system with coupling capacitor

The MPD540 Software

The MPD540 software works in accordance of the hardware system (which is connected to specimen for interest). Here, the software is used to data record, export and analysis. Various MPD540 software features used in research are described here:
The different sections of the MPD540 window:

1. Acquisition unit display. The acquisition unit display shows which units have been detected by the software. Each detected unit is represented by a colored rectangle. A unit can be selected in the acquisition unit display by clicking on the corresponding colored rectangle; the selected unit then shows a dashed selection frame around its box. Selecting a unit prompts the software to show the rest of the workspace, which is not visible if no unit is selected. To hide the visualization and control panel views, click anywhere on the empty space next to the units. This will suspend any measurements currently in progress. To resume, re-select a unit. Hovering with the mouse over a selected unit rectangle will pop up a unit information window, which shows the unit’s status, supply voltage, and any pending warning messages.

2. Visualization display. The visualization display is only visible if a unit is selected in the acquisition unit display. It takes up most of the left side of the workspace. The visualization display is further subdivided in the large scope view the small scope view and the measured quantities display.

3. Control panel. The control panel provides access to all measurement and display options.

4. Large scope view. The large scope view shows the high-voltage curve(s) of the connected acquisition units, as well as the phase-resolved histogram of the currently selected unit. Alternatively, the large scope view may be used to view an overview diagram showing the phase-resolved histograms of all connected acquisition units.

5. Small scope view. The small scope view can be configured to show many curves: the spectrum of the input signal at the PD input (DC through 20 MHz), the time signal at the PD input, trend curves for a variety of measurement quantities, and a replay log (in replay mode).
6. Measured quantities display. The measured quantities display shows the current values for the quantities being measured, such as IEC 60270-conformant charge estimation, voltage, high-voltage frequency, etc.

7. Log area. The log area displays status and warning messages in user-readable form.

8. System status bar. The status bar shows the initialization status of the software by means of 5 LEDs. During startup of the software, the LEDs in the system status bar will be illuminated in succession until all five LEDs are lit.

9. Progress bar. The progress bar visualizes the progress of the current operation. This is used, for example, to show the initialization progress of newly connected units. A message to the left of the progress bar shows what specific operation is being performed (or “ready.” if no operation is pending).

10. Fiber optical status. This display, consisting of two LEDs, shows the integrity of the fiber optical connections on the fiber optics controller. The left LED corresponds to the TX1 and RX1 connectors, the right LED corresponds to the TX2 and RX2 connectors. The LEDs turn green when the FO connection is set up correctly, and red if the connection is made incorrectly or if there is no connection. A yellow LED indicates that a temporary error was detected on the fiber optical network.

**Microsoft Excel/Word 2007**

Microsoft Excel is used for various data sets processing and graph generation and Microsoft Word is used for the compete report generation.

**MATLAB**

MATLAB is a high performance language for technical computing which integrates various functions for computation, visualization and programming with mathematical notations. Typical uses of the same are listed below:

- Math and computation algorithm development
- Data acquisition modeling, simulation and prototyping
- Data analysis, exploration and visualization
- Scientific and engineering graphics
- Application development including graphical user interface building

In the present work, it is used for life estimate modeling, Wavelet transform suitability check, WT data processing and result analysis.