Import Excel Data, SS1 Files Using State Simulation Features in Doble Protection Suite and Doble RTS

Introduction

Doble Protection Suite™ is the software interface of Doble F6150 Power System Simulators and accessory equipment. Doble RTS™ universal relay testing software works with a variety of relay test sets.

Both products provide comprehensive test environments with the flexiblility to accommodate technical and operational requirements. Either software test platform supports manual and automated testing, including dynamic test operations that feature state sequencing in which test quantities that simulate power system events are applied to the relay in a series of discrete pre-fault, fault and post-fault states.

State sequencing is an accepted method of evaluating relay logic and can be applied when testing protection schemes during end-to-end system tests.

Problem: Converting system model data into state simulations

There are many details to consider when designing realistic fault scenarios for testing protection system performance dynamically. The development of test plans that incorporate state sequencing quickly becomes complex. Beyond just documenting setup connections and pass/fail criteria at given test values, state sequencing requires an understanding of how to convert engineering data into the test scenario.

On the testing side, this means referencing the protection engineer's calculations for the quantities that define the expected protection operations the relay will perform, as well as the values that produce faults. A confident understanding of these parameters is crucial for building well-thought-out dynamic tests that achieve results appropriately.

## Solution: Import Excel data, SS1 files into Protection Suite and RTS

Protection engineers develop system models using software tools and and data formats can vary. Microsoft® Excel spreadsheets is one such tool, but on the testing side, spreadsheets require manual data entry, copying and pasting of data, the creation of macros and math conversions. This method introduces a significant potential for errors and is labor intensive. Regardless, both Protection Suite and RTS have utilities for importing and working with data from Excel.

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Protection engineering software, such as Aspen OneLiner™ and PSS®CAPE, are tools for developing protection schemes on a virtual system. Parameters and boundaries of protection systems that are designed in Aspen OneLiner and PSS CAPE can be rendered into exportable files with the *.ss1 extension. These SS1 files contain the engineering data needed for building state simulations efficiently.

The SS1 file originated as an export format from Aspen OneLiner software that was compatible with Doble ProTesT™ software. Over the years, the SS1 file has become an industry standard format supported by many software products.

Both Protection Suite v5 and RTS v7 can import SS1 files and apply their data for defining pre-fault/fault/post-fault system conditions and their durations. Importing SS1 files from Aspen OneLiner and PSS CAPE directly into either Protection Suite or RTS can be a time-saving advantage over manual conversion steps involved when dealing with intermediary Excel spreadsheets.
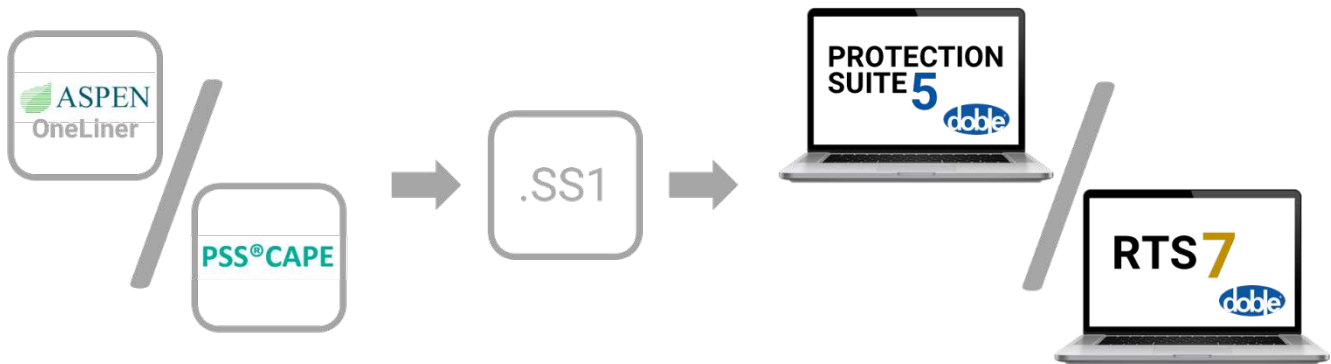
Whether using Excel spreadsheets or protection engineering software like Aspen OneLiner or PSS CAPE, there are automated software tools in Protection Suite v5 and RTS v7 that will help you import and work with data from Excel spreadsheets and SS1 files efficiently when developing state simulations for the purposes of dynamic testing on protection systems.