What is the 3KEYMASTER I/S?

The 3KEYMASTER Instructor Station (I/S) is a powerful role-based configuration of the 3KEYMASTER Graphical Engineering Station (GES). The I/S is for use by an instructor to perform simulation control, monitoring, and data visualization activities. Modeling functions, which are normally available to developers, are restricted on the I/S.

3KEYMASTER I/S Advantages

- Customization for user's look and feel preferences — no programming knowledge required
- Flexible and cost-effective solution for customer-specific I/S needs
- Integration with third-party environments
- Expandable — easy to add new features
- Automatic data-recorder, with user-defined recording time interval
- Recording of trainee and instructor actions for replay
- Navigation using interconnected objects and diagrams
- V&V capability with common time-interval for easy comparison of charts
- Easy to use — access to simulation controls using menus, configurable functional buttons, or by clicking on objects in panel graphics, modeling or visualization diagrams

3KEYMASTER I/S Features

- GUI-based object-oriented design
- Full-featured, click-of-the-mouse simulation controls - run, freeze, snapshot, initialize, backtrack, etc.
- Easy insertion of component failures, malfunctions, remote actions, and overrides
- Access to all engineering diagrams used for modeling and information display - e.g., P&ID, logic and control, and electrical diagrams, hard panel mimics, HMI emulations
- High-quality digitized panel images for use in panel graphics
- Powerful visualization using model parameters, multi-variable trend charts and tables; and watch objects
- Model value based animation of object icons
- Compound-logic and parameter-limits based events, triggers, and alerts
- Interface with alarms and sounds
- Recording of HMI actions and use of scripting for creating scenarios for simulation run
- Display or hide information layers
- Archive, search, and file-load capability, e.g., scenarios, monitored parameters lists, etc.
- No limit on number of initial condition files
- Automatically monitor, record, and grade critical trainee performance (TPR)
- Means to test the simulator by running existing and/or newly created scenarios and produce a report based on the test results (SBT)

Why Choose the 3KEYMASTER Instructor Station?

The 3KEYMASTER Instructor Station inherits all the advantages of the GES, including the Windows® environment-based development, fully object-oriented design approach, flexible human interface design, easy integration, and the speed with which it can be configured. It can be used with the 3KEYMASTER environment or integrated with other vendor’s simulation environments.
What is the SVIC Tool?

The SVIC Tool is comprised of the Scope Tool, V&V Tool, and Initial Condition (IC) Resnap Manager; the SVIC Tool runs in the 3KEYMASTER environment by adding a 3KEYMASTER standard Task. These tools have been developed based on user requests to provide additional features within the simulator environment to enhance the engineering and training use of the system. Built-in archiving of simulator data, according to user-defined scoping or investigative control factors and settings, are provided.

The SVIC Tool has three primary functions:

**Scoping** - the user may create Scoping scenarios by selecting independent and dependent parameters for evaluation. Successive Scoping runs are performed by changing the independent parameters, such as tube diameter or length, using special pre-defined rules. For each run, the dependent parameters, such as pressure, temperature, and enthalpy are monitored for maximum and minimum values, for comparison with acceptance criteria.

**V&V** - A user may start a special Scope run with pre-defined parameters and save them into special archive files. The saved data are then compared to new data from subsequent runs. The output of the comparison are trends (curves with old and new data) and special reports.

**IC Resnap Manager** - The user is able to re-snap selected Initial Conditions using a special Scope run. For each IC, the Scope Task automatically resets, waits for system parameters to stabilize within prescribed limits, and re-snaps the IC with a new name based on the old IC.

**Scope Tool Features**

- Allows a user to repeatedly run transient scenarios with minor or major changes in independent parameters, such as constants, and record the values of dependent parameters for each run for later evaluation
- Allows the user to set pass or fail criteria for the dependent variables, accelerating the user’s evaluation of results from multiple transient runs
- Provides a record of all dependent parameters for each scoping transient execution for later trending and study
- Provides a report based on acceptance criteria defined by the user
- Includes an analyzer, which allows the user to plot resultant data through 2D or 3D graphic representation using Microsoft® Excel

**V&V Tool Features**

- Allows a user to archive the values of parameters during a transient through use of the 3KEYMASTER monitored parameters functionality
- Multiple V&V transient tests can be selected and executed in a specified order, with results stored for review and critique at a later time
- Comparison between transient runs can be performed by overlaying trends from various runs for better visualization of results
- Automatic reporting on parameter deviation based on a percentage deviation, selectable by the user
- Ability to include 3KEYMASTER scenarios and event triggers as part of the transient
- Supports annual certification testing by providing automated comparison of transients

**IC Manager Features**

- Automated re-snap of one or a set of ICs to reduce the re-snap time needed on a simulator due to changes to the simulator software.
- Performs a stability test on the IC based on critical parameters and allowable deviations
- Allows user to update the ICs from temporary locations in a fast and efficient manner
- Data archive for later review and critique of IC stability
- Provides reporting on failed IC snaps based on stability criteria
- Supports the test and validation of plant system modifications

**Key Components**

The SVIC Tool integrates various functions of the 3KEYMASTER Environment to provide the user with the SVIC functionality. The functions that participate in this integration are:

- The 3KEYMASTER real-time executive
- The 3KEYMASTER Historian Features
- The 3KEYMASTER Trending Capabilities
- The 3KEYMASTER Scenario Builder
- Special Reports
SVIC Tool Uses

WSC has a history of advancing the state of the art for simulation. The 3KEYMASTER platform has been assessed and selected by some of the leading power-sector companies as being “best-of-breed” and “engineering-grade.” It provides a path towards more cost-effective management of simulation that is flexible, efficient, and of the highest-quality; allowing easy integration into existing engineering processes.

The SVIC tools provides added functionality to improve user efficiency in the areas of complex tuning of simulator parameters, scoping and sizing of equipment, re-verification of simulator performance based on previously certified simulator transient tests, and the automated recalibration of ICs when upgrades to the simulator have occurred. SVIC also supports Quality Control functions.

Why Choose the SVIC Tool?

The SVIC Tool distinguishes itself with its ease of use and efficiency, achieved by leveraging native features of 3KEYMASTER Environment to provide the necessary Scoping, V&V and IC Maintenance functions. Its automation features make it ideally suitable for:

- Regression testing
- Re-certifications
- Iterative design, test, and analysis cycles
- Achieving time savings by the Instructors on maintenance of simulation loads

Scenario Based Testing (SBT)

The V&V option of the 3KEYMASTER GES Instructor Station menu opens the submenu of Scoping Tool options that includes the SBT Wizard. The SBT Wizard provides a means to test the simulator by running existing and/or newly-created SBT scenarios and can produce a report that generates trends and tables based on the test results from the SBT scenarios. The wizard uses many components including scenario file(s), Monitored Parameter file(s), Initial Conditions, and specified stop conditions. An SBT scenario can be run by including the scenario name, the desired MP file, and the IC in the proper fields of the SBT template portion of the wizard dialog shown in the first figure below. Clicking the Generate Report button in the SBT Template generates a report based on the run results of the selected or created SBT scenarios shown in the SBT list window. The report generated by the Wizard presents information drawn from the 3KEYMASTER I/S directory, instructor/operator log, alarm log, and scenarios. The second figure shows the front-end for the SBT Report Utility, which is used to generate and/or merge one or more SBT reports along with excerpts from a sample SBT report.
Trainee Performance Review (TPR)

TPR is a standard 3KEYMASTER component that automatically monitors, records, and grades critical trainee performance. Any parameters that a student can monitor may be selected for TPR monitoring, storage, and recall. TPR allows the instructor to select a set of parameters used to gauge the student’s performance during a training session. These conditions and parameters are saved as a TPR file. More than one TPR parameter set can be active at a time, allowing instructors to vary the variables to monitor. All TPR parameter sets, as well as associated high and low limits can be chosen. Once activated, the selected parameters and limits are displayed, along with an indication of all parameters that have gone outside specified limits.

Instructor Station Tablet

A Windows-based Tablet (3KEYTAB) has been developed for use as a portable instructor station with a customizable configuration. 3KEYTAB can be used with Full Scope, GlassTop, or Classroom Simulators.

Due to the smaller size screen of a tablet, the customer’s Instructor Station is tailored to allow for easy interaction with the user’s fingers and the touchscreen.

Features

A few features that make 3KEYTAB a great addition to 3KEYMASTER are:

- User Friendly Customizable Menus (some may have scrolling properties or multiple levels)
- Large Buttons for easy access
- Easy Navigation
- Custom Status Bars

Customization Approach

The Tablet has been carefully designed to provide ease of use to instructors in all industries. With the vast amount of Instructor Stations which have been delivered, each Tablet I/S can be customized to a specific design requested by the client.

Display Areas (as shown in figure below)

1) Simulation Status Bar
2) Control Bar
3) Main Display Area
4) Plant Conditions Status Bar

To learn more about WSC’s simulation products, solutions, and services, visit

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