Chapter

31

Editing TTCN Documents (in Windows)

In the TTCN suite, TTCN test components can be edited on table level as well as restructured on a hierarchical level. This chapter describes the editors and information managers in the TTCN suite in Windows and how to use them.

For an overview of the TTCN suite, see chapter 2, *Introduction to the TTCN Suite (in Windows), in the TTCN Suite Getting Started*.

> **Note: Windows version**
>
> **This chapter is Windows only. The corresponding UNIX chapters are chapter 25, *The TTCN Browser (on UNIX)* and chapter 26, *The TTCN Table Editor (on UNIX)*.**

Introduction to the TTCN Suite

The TTCN suite can be used for development, specification and compilation of test system components in the TTCN language. The functionality included will be described below.

The TTCN suite supports all of the standardized, non-compact tables that are defined in ISO/IEC 9646-3. The compact test case dynamic behaviour table (ISO/IEC 9646-3, clause C.3) and concurrent TTCN tables are also supported. The compact tables for constraints (also in Annex C of ISO/IEC 9646-3) are not supported.

The general user interface concepts and common menu choices in Telelogic Tau are described in chapter 1, *User Interface and Basic Operations*.

Different Views of the TTCN Document

The contents of a TTCN test suite can be viewed in *the Browser*, *the Finder* and *the Table Editor*:

- The Browser presents an overview of the TTCN tables. In the Browser it is possible to edit the TTCN table structure, to determine which parts of the test system component to view and to apply a number of operations on it. See "Using the Browser" on page 1237.
- The Table Editor presents TTCN tables for editing, referencing, and a number of table-specific operations. See "Editing Tables" on page 1246.
- The Finder presents a non-hierarchical view of the TTCN tables. Subsets of the total set of tables can be extracted, sorted according to various rules, and a number of operations can be performed on the resulting set of tables. See "Finding and Sorting Tables" on page 1260.

The Log Manager gives another view of the test suite. It presents log outputs from the currently loaded test system components. Information from various operations, such as analysis and simulation, will appear in the test component log in the Log Manager. See "Viewing Log Information" on page 1257.

Functionality to Apply on the TTCN Document

Building Test Components and Tables

- The Data Dictionary is used in conjunction with the Table Editor, and offers an easy way to build TTCN behavior statements from the declared test system components. For more information, see "Creating Behaviour Lines" on page 1253.
- SDL to TTCN Link is similar in use and appearance to the Data Dictionary. It utilizes a Link executable for an SDL system to interactively build the behavior of a TTCN test for that particular system. For more information, see chapter 36, *TTCN Test Suite Generation*.
- Autolink supports semi-automatic generation of TTCN test suites based on SDL specifications. For more information, see chapter 36, *TTCN Test Suite Generation*. The menu choice *Autolink Merge* in the *File* menu may be used for merging Autolink generated MP files into an opened test suite.

Analyzing, Verifying and Executing a Test

- The Analyzer verifies syntactic correctness of test components. For more information, see chapter 32, *Analyzing TTCN Documents (in Windows)*.
- The TTCN to C compiler generates C code from TTCN. For more information, see chapter 33, *The TTCN to C Compiler (in Windows)*.

  The Generic Compiler Interpreter interface is an interface for the adaption of the generated code to a specific target environment. For more information, see chapter 37, *Adaptation of Generated Code*.
- The Simulator allows execution and interactive debugging of test systems. For more information, see chapter 34, *The TTCN-SDL Co-Simulator (in Windows)*.

Starting the TTCN Suite

You can start the TTCN suite from the Organizer in the following ways:

- Select *Tools > Editors > TTCN Browser* in the Organizer. This will also add an untitled TTCN document in the Organizer.
- Double-click on a TTCN document icon already included and connected in the Organizer (or select *Edit* from the *Edit* menu).
- Add a new TTCN document to the Organizer and make sure that the option *Show in editor* is checked in the *Add New* dialog.
- Add an existing TTCN document to the Organizer.

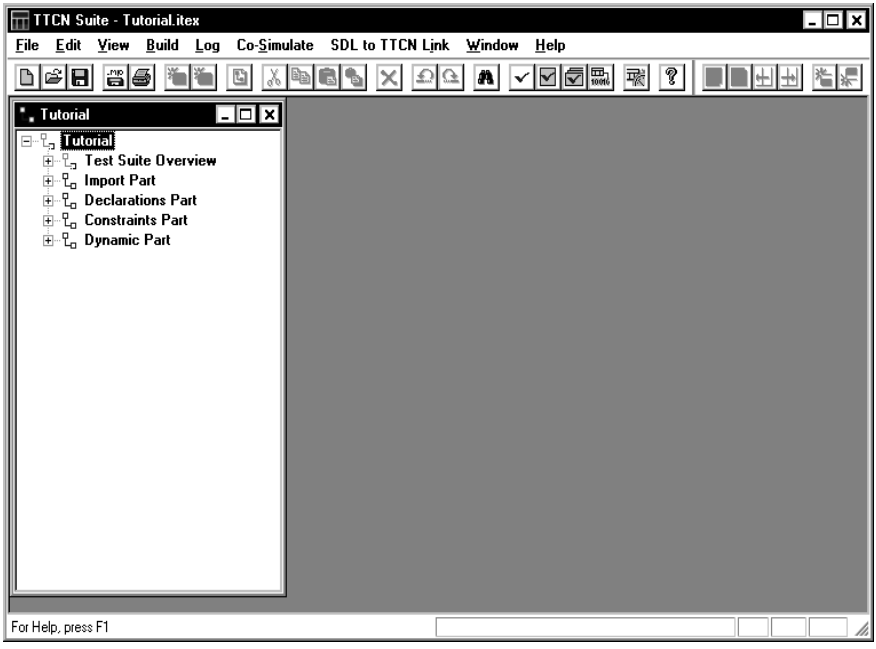

Figure 219:The TTCN suite is started and the Browser displays a modular test suite

Using the Browser

When you open a TTCN document it will be displayed in the Browser. As the structure of TTCN is tree oriented, the Browser presents an overview of the test system component in tree form.

Multiple Browser views can be opened on a document and all editing performed in a Browser will be simultaneously reflected in the other opened Browser windows.

In addition to this, you may create sub Browsers. This means that you restrict the view to only display a few nodes. In combination with the possibility to have multiple Browsers open on the same test document, this enables you to keep just the interesting bits of information in a couple of small Browser windows.

By using the edit operations, such as *Add In* and *Delete*, you can manipulate the Browser structure to build a complete TTCN system component. You can control the amount of information actually displayed in a Browser, by collapsing and expanding sub trees.

Opening the Browser and a TTCN Document

You open the Browser and a TTCN document by selecting *New* or *Open* from the *File* menu. From the *File* menu, you can also select the four most recently used files.

> **Hint:**
>
> If you try to open very large test suites, for example containing extensive constraint declarations, you may get an error message about "scanner buffer overflow". You can solve this by setting the environment variable ITEX_SCANNER_BUFFER_SIZE to a high value, for example 75 000 000.

To open additional Browsers for the same component:

- Make sure the Browser is active and select *File > New Window*.

The Browser is also opened automatically when the TTCN suite is started from the Organizer, as described in "Starting the TTCN Suite" on page 1236.

The Browser User Interface

The initial structure of a TTCN tree contains place holders for the static parts of the system component. These *static nodes* are automatically created by the TTCN suite whenever you create a new test system component. What you usually do when you build a test system component is to add *dynamic child nodes* to the static nodes, and fill them with test specification data. Examples of static nodes are the Declarations Part and the Constraints Part. Examples of dynamic nodes include tables, groups or objects in a table (e.g. test case variables).

The Browser displays all the static nodes in the order defined in the TTCN standard. This ordering cannot be changed. For example, it is not possible to have the Constraints Part coming before the Declarations Part. Only the dynamic items – the tables – may be added and deleted.

Static nodes are the only nodes that can become the root of a sub Browser.

Static Nodes in the Browser

Static nodes can take on four different appearances depending on the *parse status* of dynamic nodes below. Whenever you analyze a sub-tree, or parts of it, or edit it in a way such that the parse status of one or more dynamic nodes is altered, an abnormal parse status is indicated by the appearance of the static parent nodes.

This is an ordinary static node. All children to this node have been analyzed with status OK.

This is a static node where at least one of the dynamic nodes in the sub tree below has not yet been analyzed or is in need of analysis. There are no erroneous dynamic nodes.

This is a static node where at least one of the dynamic nodes in the sub tree below has been analyzed with an error or warning as result. In the actual view, the arrow is **red** for errors and **purple** for warnings.

To find a table that has to be corrected, you follow the marked nodes through the tree. Note that erroneous nodes have precedence over non-parsed ones, so even a single erroneous child to a static node will make it red no matter how many non-analyzed nodes there are in the sub-tree.

It may be that some of the static nodes will remain unused. A TTCN test system component is allowed to leave out the use of for example *Test Case Variables*. However, although this empty node will be displayed in the Browser, it will not be printed or output in the TTCN-MP format.

Dynamic Nodes in the Browser

A dynamic node is always associated with a table and can be accessed by the Table Editor. Two kinds of dynamic nodes can have children, namely *multiple tables* and *group tables*. Multiple tables look just like ordinary table icons, with the added feature of possible children, whereas group tables (referred to as *group nodes* in the Browser) have a different look to distinguish them somewhat from the others.

This is a group node with all dynamic nodes in its sub tree analyzed with status OK.

This is a group node with a sub-tree containing at least one non-analyzed dynamic node, but no erroneous ones.

This is a group node with a sub-tree containing at least one dynamic node analyzed with an erroneous status or a warning. In the actual view, the color is red for errors and purple for warnings.

This is a dynamic node (or multi-table) that is analyzed with status OK.

This is a dynamic node that needs to be analyzed.

This is a dynamic node that has been analyzed and contains one error. In the actual view, the cross is red for errors and purple for warnings.

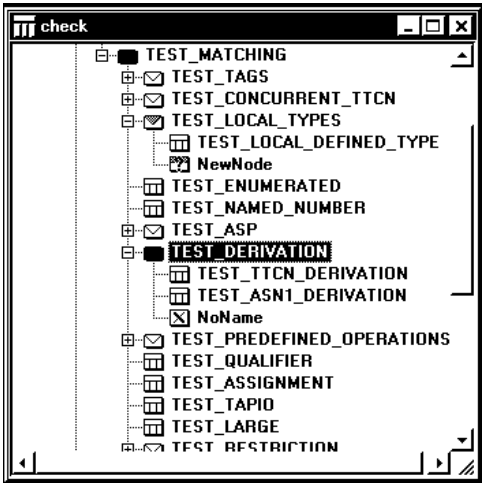

Figure 220: Different node types in a Browser

Controlling the Nodes in the Browser

As the Browser displays the information in a TTCN document in a tree oriented way, it is very simple to control the amount of information that the you want to see at a specific moment.

Expanding and Collapsing a Node

Nodes with sub-trees are possible to expand and collapse to show or hide the branch below it. This works in the same way that you expand and collapse directory levels in the Windows Explorer by double-clicking.[1]

- The shortcut for collapse is `<Left arrow>` when an expanded node is selected.
- The shortcut for expand is `<Right arrow>` when a collapsed node is selected.

1. Note that test group nodes differ. Double-clicking a group node that is expanded always opens its associated table instead of collapsing it. Click on the minus sign to the left of the group icon instead.

Selecting Nodes

Click a node to select it. <Ctrl>-click a node to extend the current selection.

Instead of using the mouse for navigation, you can use the following shortcuts:

- To move the selection to the next node, use <Down Arrow>.
- To move the selection to the previous node, use <Up Arrow>.

Renaming Dynamic Nodes

To rename a dynamic node:

- Click the name of a selected node, then type the new name and press <Enter>.
  – You can also change the name in the table itself.

Creating a Sub Browser

To create a sub Browser:

- Select *Make Sub Browser* from the *View* menu. This replaces the contents of the active Browser with the selected node and its sub tree.

To get a Browser with the full TTCN document tree, select *New Window* from the *Window* menu.

Editing the Browser Structure

The static structure is automatically generated when a TTCN document is first created and cannot be edited. To build an individual TTCN system component, you need to add named tables – such as PDUs, constraints and behavior tables – and named objects to the multi-object tables – such as test case variables, PCOs and timers.

Use the *Edit* menu choices for adding, deleting, copying, pasting, etc, *editable nodes* – also called dynamic nodes – (that is, groups, tables or objects in a multiple object table) in the Browser.

Generating the Test Suite Overview

The test suite overview is a collection of tables that contain test suite structure, test case index and default index. These are used for reference in a printed copy of the system component, as described in the TTCN standard. The overview will be generated the first time you print the test suite, export it or open the overview tables. The generation may take a little while, but it is only needed once for each session, as the tables are automatically updated when you edit the test suite.

Adding Nodes

To add a new dynamic node as the last child of the selected node:

- Select *Add In* from the *Edit* menu.
  – The shortcut is `<Ctrl+Shift+A>`.

  In the case of multiple-object tables, select the node that represents the multiple-table. When you select *Add In,* a new node will be added as the last child node.

To add a new dynamic node before the selected node:

- Select *Add* from the *Edit* menu. As with *Add In,* the new table will be unnamed.
  – The shortcut is `<Ctrl+A>`.

Adding Groups

It is possible to add a new test case group, a new test step group or a new default group in the Dynamic Part.

To add a new group as the last child to the selected node:

- Select *Add Group In* from the *Edit* menu.

To add a new group before the selected node:

- Select *Add Group* from the *Edit* menu.

To add a table to a group, select the group and *Add In*.

Adding Compact Tables

It is possible to specify that all the test cases in a given group are displayed in the compact format (see Annex C, clause C.3 of ISO/IEC 9646-3). The following commands allow the insertion of compact groups in the test suite hierarchy:

To add a compact group before the selected node:

- Select *Add Compact Group* from the *Edit* menu.

To add a compact group as the last child of the selected node:

- Select *Add Compact Group In* from the *Edit* menu.

Cutting, Copying and Pasting Nodes

You may cut or copy dynamic nodes. Dynamic nodes may also be pasted according to compatible classes, for example:

- Test suite parameters, test suite constants, test suite variables and test case variables may be pasted into each other.
- TTCN ASP, PDU, structured type and CM definitions may be pasted into each other and into TTCN ASP, PDU, structured type and CM constraints (and vice versa).
- ASN.1 ASP, PDU, structured type and CM definitions may be pasted into each other and into ASN.1 ASP, PDU, structured type and CM constraints (and vice versa).
- Test case, test step and default behaviors may be pasted into each other.

However, it is not possible to paste a constraint, for example, as a test case behaviour.

Paste is not available if the clipboard contains an object of an incompatible type to the selected object.

To cut the selected node and its sub tree:

- Select *Edit* > *Cut*.
  - The shortcut is `<Ctrl+X>`.

To copy the selected node and its sub tree:

- Select *Edit* > *Copy*.
  - The shortcut is `<Ctrl+C>`.

To paste a node before the selected node:

- Select *Edit* > *Paste*.

To paste a node as the last child to the selected node:

- Select *Edit* > *Paste In*.
  - The shortcut is `<Ctrl+V>`.

Creating Constraints

The most convenient way of creating a constraint is to copy the corresponding type and paste it as a constraint. Do this by copying the chosen type (ASP, PDU, CM or structured type), and then pasting it among the corresponding constraints. This works for both tabular constraints and for ASN.1 constraints.

The pasted table will have all its local names filled in. All that remains is to give the constraint a name and fill in the values.

Deleting Nodes

Dynamic nodes may be removed from the test document.

To delete the selected node and its sub tree:

- Select *Delete* from the *Edit* menu.

Undoing/Redoing Operations

All editing commands can be undone, and undone actions can be redone.

- To revert the last edit step, select *Undo* from the *Edit* menu.
  - The shortcut is `<Ctrl+Z>`.

- To revert the last *Undo*, select *Redo* from the *Edit* menu.
  - The shortcut is `<Ctrl+Y>`.

Opening a Table

To open a table, either:

- Double-click a table node in the Browser.
- Select a table node and then press `<Enter>`
- Select a table node and then *Open Table Editor* from the *View* menu.

It is possible to open several tables at the same time, but if it is more than ten, you will be asked to confirm it.

Printing a TTCN Document

To print a TTCN document:

- Select *Print* from the *File* menu.
  - The shortcut is `<Ctrl+P>`.

For more information, see "The Print Dialogs in the TTCN Suite" on page 324 in chapter 5, *Printing Documents and Diagrams*.

Editing Tables

The Table Editor is used for editing various TTCN tables. It displays the tables in three different parts: the header, the body and the footer. Each part, as well as many fields, can be resized.

You can edit tables by using the mouse and/or the keyboard. Rows in a table can easily be added, copied (both within a table and between other tables) and removed. The Table Editor shows the analysis status of the table contents, by use of colored text, and provides for immediate visual feedback during test simulation.

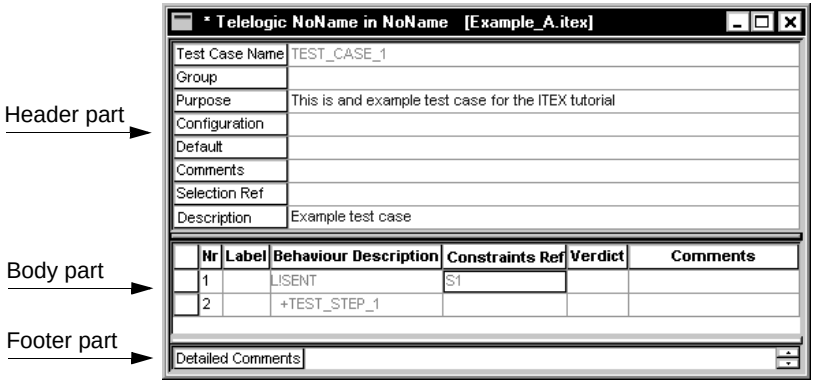

Figure 221: A Table Editor for a test case

Resizing Cells and Table Parts

The three parts of a table – header, body and footer – are separated by horizontal bars, which you can drag to change the relative size and to hide parts of the table from view.

You can change the individual height of rows by dragging the leftmost row separator. In the body part, you may also change the individual width of columns by dragging the separators of the header fields.

Note that changing the column width may have effect on the row height, as the row will change to display all information it contains.

Renaming a Table

To change the name of a table, you can either rename its node in the Browser or edit the table name in the table itself.

Setting the Input Focus

To set the input focus in another part of a table, either:

- Click in a cell in that part.
- Use `<left arrow>` and `<right arrow>` to move between the last field of one part and the first field of another part.

To set the input focus within a part, either point and click or use the arrow keys. There are also some shortcuts:

To Move to:	Use This Key Combination
Next field in same row	`<Tab>`
Previous field in same row	`<Shift+Tab>`
Last field in same column	`<Ctrl+Down arrow>`
First field in same column	`<Ctrl+Up arrow>`
First field	`<Ctrl+Home>`
Last field	`<Ctrl+End>`

Editing Text in a Table

When you have used the keyboard to move the input focus to a field, the contents of the field will be **replaced** with the new text when you start typing. To edit the existing text, you have to press `<Home>` or `<End>` first.

If you use the mouse to explicitly set the input focus in a field, you can start editing the existing text directly with the keyboard.

The table fields will expand automatically to accommodate the text. You can also add a line break in the text by using `<Return>`.

To cut, copy and paste text in the fields, you use the corresponding commands in the popup menu, the *Edit* menu or the standard Windows

shortcuts. However, note that it is only possible to paste text into a table field when the field contains a text pointer.

> **Note:**
>
> The paste buffer for text is not the same as the one used for entire rows in the body of a table.

Auto completion of identifiers

When editing tables, it is possible to auto-complete identifier table names while editing text in the Table Editor.

Start to type any identifier (a table with this name should already exist in the test suite). Type one or more letters, then press <CTRL-space>. TTCN Suite will find the tables that match the text typed. If one match is found, the typed name will be completed with the found one. If several matches are found, a pop-up window with a list of names will be displayed. It is possible to select one by using keyboard (“Up”, “Down” arrows for navigate, “Enter” to select, “ESC” for cancel) or mouse (double-click to select, click outside the window for cancel).

Editing Rows in the Body of a Table

You can add, delete, cut and copy rows in the body of all TTCN tables that contain more than one column. This is not possible in the headers and footers, since the formats of these parts of a table are defined by the TTCN standard.

The ASN.1 tables only have a single column with a single row and therefore adding, deleting, cutting and copying rows is not applicable. However, the contents of ASN.1 tables can still be copied, pasted, etc, as text.

Selecting and Deselecting Rows

- Select rows in the body of a table by clicking in the leftmost cell of a row (the “row button”). This deselects other selected rows.
- Select range of rows in the body by first selecting one row and then `<Shift>`-clicking another.
- Toggle the selection of a row by `<Ctrl>`-clicking the leftmost cell of the row.

Note:

Setting the input focus will also deselect all selected rows.

Cutting, Copying and Pasting Rows

Rows in the body of a table may be cut, copied and pasted. *Copy* and *Paste* work across all the different tables although the *Paste* command is mainly intended for use among tables of the same or similar types.

To cut selected row or rows from the table:

- Select *Edit* > *Cut*.
  - The shortcut is `<Ctrl+X>`.

To copy selected row or rows:

- Select *Edit* > *Copy*.
  - The shortcut is `<Ctrl+C>`.

To paste a row or rows:

- Select *Edit* > *Paste*.
  - The shortcut is `<Ctrl+V>`.

To paste a row or rows before the current row:

- Select *Paste In* from the *Edit* menu.

It is possible to paste a row when a body row or field is selected.

Note:

The paste buffer for entire rows in the body of a table, is not the same as the one used for text.

Deleting rows

To delete the selected row or rows, select *Delete* from the *Edit* menu.

Inserting Rows

To insert a new row before a selected row:

- Select *Insert New Row Before* from the *Edit* menu.

  Only one row may be selected. If no row is selected, the new row will be created first in the table.

  – The shortcut is `<Ctrl+Ins>`.

To insert a new row after a selected row:

- Select *Insert New Row After* from the *Edit* menu.

  Only one row may be selected. If no row is selected, the new row will be created last in the table.

  – The shortcut is `<Ins>`.

To insert a new tree header row before a selected row:

- Select *Insert Local Tree Before* from the *Edit* menu.

  Only one row may be selected. This command only works in dynamic behaviour tables. If no row is selected, the new row will be created first in the table.

To insert a new tree header row after a selected row:

- Select *Insert Local Tree After* from the *Edit* menu.

  Only one row may be selected. This command only works in dynamic behaviour tables. If no row is selected, the new row will be created last in the table.

You may also use `<Ins>` to insert rows. Where the row will be inserted depends on the input focus:

- If input focus is in the header or footer of a table, a new row is added after the last row in the body of the table.
- If input focus is set on a field in the body of the table, a new row is added after the field that has the input focus. The input focus will be transferred to the corresponding field in the new row.

- `<Ctrl+Ins>` gives the same effect as above but the new row is inserted **before** the row/field.

Indenting Behaviour Lines

The indention of behaviour lines can be increased and decreased:

To increase the indentation of a row in focus, or selected rows, by one position:

- Select *Increase Indention Level* from the *Edit* menu.

To decrease the indentation of row in focus, or the selected rows, by one position:

- Select *Decrease Indention Level* from the *Edit* menu.

Browsing in the Table Editor

If you right-click a table field containing an identifier, you may open the table representing the identifier from the pop-up menu:

- To save the current table in the history and display the definition of the selected identifier in the current Table Editor:
  - Select *Open <Identifier>* from the pop-up menu.
- To display a pop-up menu containing the header rows of the identified table:
  - `<Control>`-right-click the identifier.
- If the identifier is associated with a one-line table, the whole table is displayed in the pop-up. To select the identifier in the popup will have the same effect as *Open <Identifier>* (described above).
- To open the table associated with the identifier in a new Table Editor window:
  - Select *Open <Identifier> in New Window* from the popup menu.

    The new window gets a new (empty) history buffer and is completely independent of the table from which it was opened.

The Table Editor maintains a history of tables displayed with *Open <Identifier>* described above. This is similar to going back and forward in a web browser:

To go forward in the history of the Table Editor:

- Select *Go Forward* from the popup menu or the *View* menu.

To go back in the history of the Table Editor:

- Select *Go Back* from the popup menu or the *View* menu.

Creating Behaviour Lines

The Data Dictionary gives you an alternative way of writing behaviour lines, by providing easy access to lists of PCOs, types, constraints, timers, etc, that you have already defined

Before you can use the Data Dictionary, the TTCN document has to be analyzed, because PCOs, types and constraints with major reference problems or missing type references will not be presented in the lists in the dialog.

Opening the Data Dictionary

To open the Data Dictionary:

1. Select a body row in a behaviour table.
   - If you have not inserted a behaviour line yet, the input focus should be somewhere in the header of the table.
2. Select *Data Dictionary* from the *View* menu.

It is only possible to have one *Data Dictionary* dialog opened.

The *Data Dictionary* dialog contains:

- Three different tabs: *Send/Receive*, *Timer* and *Attachment*, from which you can select different statements to generate.
- Three fields: *Behaviour Line*, *Constraint* and *Verdict*, whose contents will be inserted as a TTCN line in the table. It is also possible to edit the fields manually.
- Three buttons: *Apply*, *Clear* and *Close* (the first two only enabled when a body row of a behaviour table is selected):
  - Click the *Apply* button to add a new row – containing the contents of the *Behaviour Line*, *Constraint* and *Verdict* fields – to the table.
  - Click the *Clear* button to reset the dialog and deselect all selections in the current tab.

Generating a Send or Receive Statement

Generate a send or receive statement by selecting a PCO, a type and a constraint. You can also add a timer, assignment and qualifier.

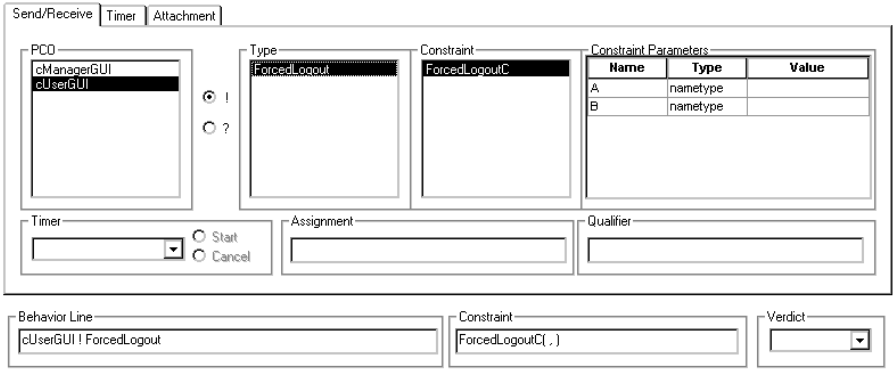

Figure 222: The Send/Receive tab in the Data Dictionary dialog

To add a send or receive statement:

1. Select the *Send/Receive* tab.
2. Select a PCO.

   The *Type* and *Constraints* list will be updated and only show the entries that are valid for the currently selected PCO.
3. Select the *!* radio button for a send statement or the *?* radio button for a receive statement.
4. Select an ASP or a PDU in the *Types* list.

   The *PCO* and *Constraints* lists will be updated accordingly.
5. Select a constraint.

   The *Type* and *Constraints* list will be updated.

   – If the constraint is a parametric constraint, a choice for each parameter will be displayed in the *Constraints Parameter* area, which you can select.

6. Optionally you can add a timer statement by selecting the *Start* or *Cancel* radio button.

   To insert a start statement, you also have to select a timer.

   It is not possible to select timeout or to specify a timeout value here. You have to do that in the *Timer* tab of the dialog.

7. Optionally, add assignments separated by commas and without parenthesis.

8. Optionally, add qualifier statements, without brackets.

9. Optionally, add a verdict.

10. Click *Apply*

    A new row – containing the contents of the *Behaviour Line*, *Constraint* and *Verdict* fields in the dialog – will be added after the currently selected row and the new row will be selected.

Adding a Timer Statement

In the *Timer* tab, you may generate a StartTimer, CancelTimer or a Timeout statement. As described above, you can also add timer statements from the *Send/Receive* tab. The difference is that from this tab you can also add Timeout value to the timer and you can add a timeout statement.

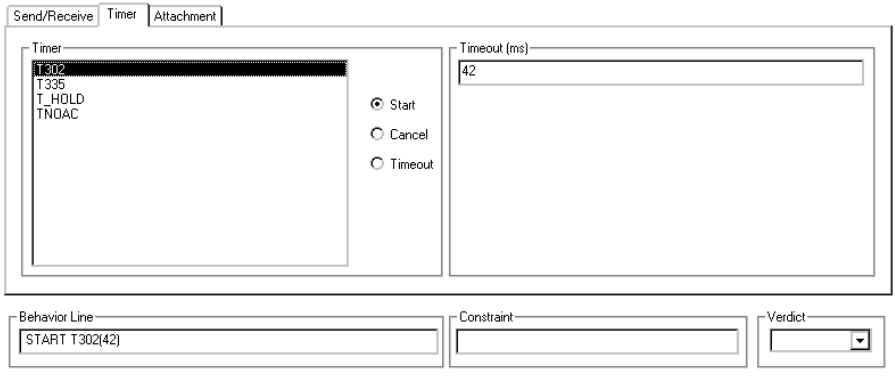

Figure 223: The Timer tab in the Data Dictionary dialog

To add a timer statement:

1. Select the *Timer* tab in the dialog.
2. Select a timer.
3. Select the *Start*, *Cancel* or *Timeout* radio button.
4. If you selected *Start* or *Timeout*, you also have to specify a timer duration in the *Timeout* field.
5. Click *Apply*.

   A new row – containing the contents of the *Behaviour Line*, *Constraint* and *Verdict* fields in the dialog – will be added after the currently selected row and the new row will be selected.

Adding an Attachment Statement

Generate an Attachment statement by selecting a test step and specifying an actual parameter list (if the test step has a formal parameter list).

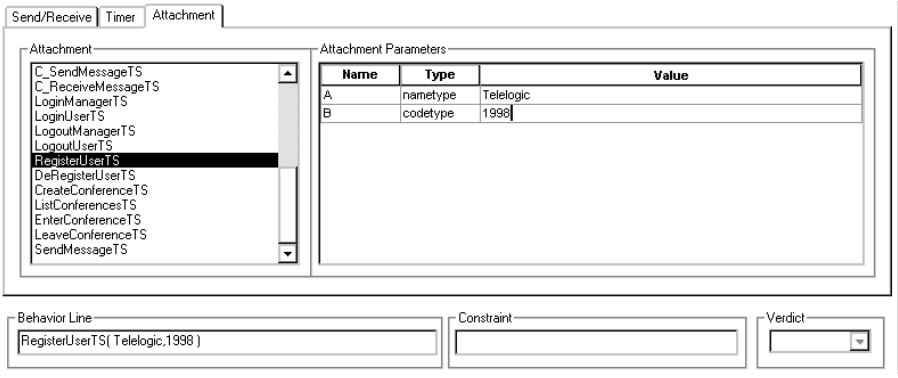

Figure 224: The Attachment tab in the Data Dictionary dialog

To add an attachment statement:

1. Select the *Attachment* tab.
2. Select an attachment.
3. If the selected test step has a formal parameter list, specify the parameter values in the *Attachment Parameters* area.

Viewing Log Information

The Log Manager is a collection of log outputs, where each test system component can report information. The Log Manager contains one log per test component, and one common pane that is used for general information.

Examples of actions that can result in log information:

- Analysis of one or more tables: The resulting errors (if any).
- Opening an MP file: Result of the operation.
- Simulation: Simulator traces are reported on both the component log, and the general log.

The Log Manager can be configured to behave in various ways. The default setting is for the Log Manager to be hidden, but appear whenever log output is present. Only one instance of the Log Manager is available.

The contents of each log can be saved as a text file.

You can open tables by clicking and then `<Ctrl>`-right-clicking the name of the table in the log.

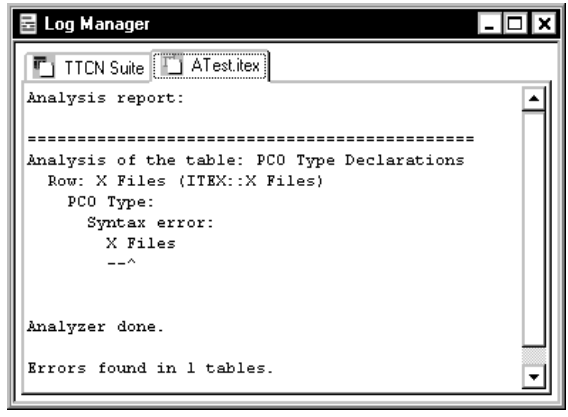

Figure 225: The Log Manager window

Automatic Appearance

The Log Manager can be made to automatically become visible whenever new information is available in a log. This can be handy to reduce the amount of windows open at a given time as the Log Manager can be closed when it is not needed.

To allow the Log Manager to automatically open whenever new information is available:

- Select *Auto-Raise Log* from the *Log* menu.

Changing the Appearance of the Log

The log font can be made smaller or larger, allowing more information to be viewed or increased readability.

To make the log text larger:

- Select *Increase Log Font Size* in the *Log* menu.
  - The shortcut is `<Ctrl+Alt+L>`

To make the log text smaller:

- Select *Decrease Log Font Size* in the *Log* menu.
  - The shortcut is `<Ctrl+Shift+L>`

Exporting Information from the Log

The information contained in a log can be copied to the clipboard, or saved to disk as an ordinary text file. In addition to normal text-selection, all text can also be selected with one operation.

To select all text:

- Select *Select All In Log* in the *Log* menu.

To copy the selection to the clipboard:

- Select *Copy Log* in the *Log* menu.

To save all text in a log to a file:

- Select *Save Log* in the *Log* menu.

Clearing the Log

To clear the displayed log:

- Select *Clear Log* in the *Log* menu

Finding and Sorting Tables

As an alternative to the Browser, you can use the Finder for displaying TTCN tables in a list, without the ordering restrictions imposed by the TTCN tree structure.

You can search for and display tables in the Finder. The search may for example be based on name, type and content. You can either use the entire TTCN document (the Browser contents) or the Finder list as search source, and extend or restrict the number of tables displayed in any number of steps.

Another way of searching is relationally. This means that you search for tables that reference or are referenced by tables selected in the Finder. The relational search cannot be combined with the ordinary.

The tables that will be displayed after a search, can be sorted by a number of criteria:

- Name
- Type
- Path in the test tree
- Parse status
- Latest analyze time stamp
- Latest modification time

Reversed sorting is also possible.

In addition, it is possible to for example open, analyze, rename and delete tables from the Finder, but not cut, copy, paste and insert since that require a tree context.

Opening the Finder

To open the Finder:

- Select *Open Finder* from the *View* menu.
  – The shortcut is `<Ctrl+F>`

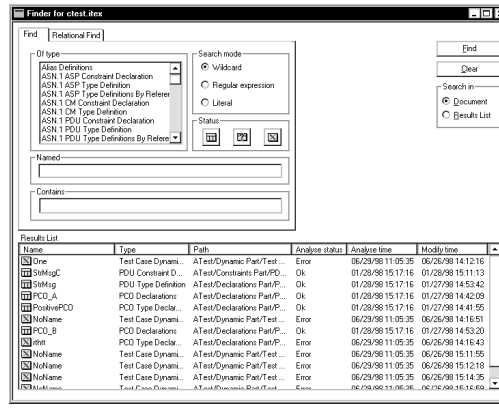

Figure 226: The Finder

The Finder consists of three areas:

- The *Find/Relational Find* area, where you specify criteria for the tables to be found and inserted in the *Results List*.
- The *Search In* area, where you can select to search for tables in the entire document or only in the *Results List*.
- The *Results List*, where the sorted list of TTCN tables are kept.

About Search Criteria

Search criteria are used for **restricting** a search. This means that if you do not specify any search criteria – all fields are empty and no buttons are clicked – before you click the *Find* button, all dynamic TTCN tables of the test system component will be displayed.

Consequently, if you specify one or more search criteria, TTCN tables that match at least one of the criteria, will be displayed in the Finder. Additionally, this means that specifying all possible search criteria has

the same effect as specifying none. This is merely as a convenience for quickly adding all tables of the test system component, as the closed search criteria is not meaningful.

Note:

The search criteria are used for an OR-style search.

Finding Tables

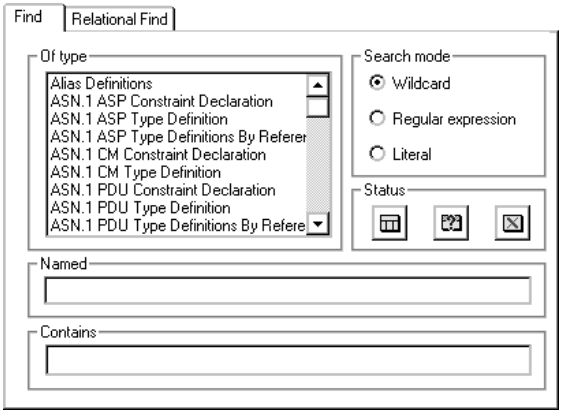

Figure 227: The Find tab in the Finder

To search for tables:

1. Select the *Find* tab.
2. Select *Document* in the *Search in* area to search for tables in the entire TTCN document.
   - If you select *Results List*, the search criteria will be used to restrict the set of TTCN tables already present in the *Results List*.
3. Select one or several table types in the *Of type* list.

   This list contains all existing TTCN and ASN.1 table types supported.

4. Click a *Search mode* radio button.

   This selection affects the text you type in the *Name* and *Contains* fields. If you are not going to use those fields in the search, the search mode does not affect the search at all.

   – *Wildcard*

     The *Name* and *Contains* fields can contain wildcards. This means that “a*body” will match “anybody” and “antibody”, while “a??body” only will match “anybody”.

   – *Regular expression*

     The *Name* and *Contains* fields contain regular expression, with its more advanced syntax and matching possibilities. This means that “any[bt]” will match “anybody” and “anything” but not “anyone”.

   – *Literal*

     The *Name* and *Contains* fields contain the exact text. This means that “any?” only will match “any?”.

5. Optionally, type some text in the *Name* field.

   The tables with names that match will be found.

6. Optionally, type some text in the *Contains* field.

   The tables with contents that match will be found.

7. Optionally, click one or several *Status* buttons to sort out tables of a different parse status.

   For example, if you select the error button, only tables with erroneous parse status will be found.

8. Click *Find*.

   Tables that match at least one of the search criteria you have specified will be displayed in the *Results List*.

Finding Tables Relationally

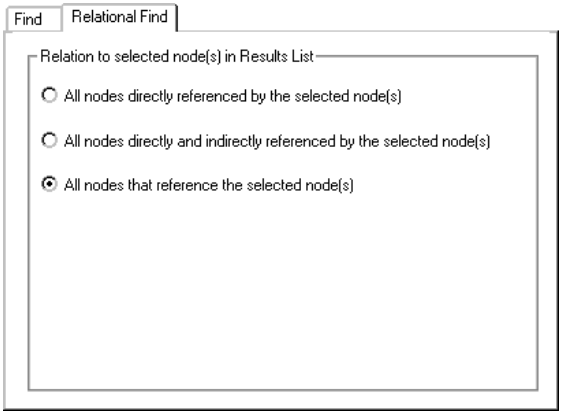

Figure 228: The Relational Find tab in the Finder

You can search for tables that are referenced by and that reference tables that are displayed and selected in the *Results list*. To do this:

1. Select the *Relational Find* tab.
2. Select one or several tables in the *Results List*.
3. Select one of the following radio buttons:
   - *All nodes directly referenced by the selected node(s)*

     Replaces the contents of the *Results List* with all nodes that are directly referenced by the tables currently selected in the list.
   - *All nodes directly and indirectly referenced by the selected node(s)*

     Same as above, but expands the search to include tables that are referenced by the referenced tables, and so forth.
   - *All nodes that reference the selected node(s)*

     Replaces the contents of the *Results List* with all nodes that reference the tables selected in the list.
4. Click *Find*.

   The *Results List* will be updated in accordance with your settings.

Editing and Sorting the Results List

The *Results List* contains a subset of all dynamic TTCN tables in the TTCN document. You can perform most standard operation on the tables. However, it is not possible to cut, copy, paste or insert tables, since this requires the structural context of the Browser.

> **Caution!**
>
> Even if the elements of the *Results List* are presented without structural ordering, they still follow the TTCN hierarchy. This means that if you delete a group node, the group and its entire sub tree will be removed.

Sorting the *Results List*

The contents of the *Results List* can be sorted if you click on the header of the information column. The available information is:

- *Name*

  The name of the table.

- *Type*

  The TTCN or ASN.1 type of the table.

- *Path*

  The path of the tree leading to this table on the form root/..../parent/node.

- *Analyze status*

  The parse status of the table.

- *Analyze time*

  The last time the table was analyzed.

- *Modify time*

  The last time the table was modified.

Click a second time on the header to sort the list in reverse order.

Clearing the *Results List*

Click *Clear* to clear the contents of the *Results List*.

Converting to TTCN-MP

TTCN-GR – the *gr*aphical notation – is the format used when you edit or print a test suite in the TTCN suite. TTCN-MP – the textual notation (*m*achine *p*rocessable) – can be used when you want to import a TTCN document into a non-TTCN suite tool or make backups.

To convert a TTCN document to TTCN-MP, either:

- Select *Save As* from the *File* menu.

  This opens a dialog where you can save the current document as TTCN-MP.

- Click the *Export to MP* button.

  This opens a dialog where you can export the current document to TTCN-MP. The MP file will be written to disk, but not opened.

Both TTCN-MP and TTCN-GR can be opened in TTCN Suite.

For a full supported EBNF, see "The TTCN-MP Syntax Productions in BNF" on page 1530 in chapter 39, *Languages Supported in the TTCN Suite*.

The Standard MP Format

When you convert to MP, the TTCN document does not have to be analyzed or correct. TTCN-MP will be generated even for documents that are neither complete nor error-free. This implies that the generated MP file may be, but is not necessarily, conformant to the standardized TTCN-MP format

However, to ensure that the TTCN-MP document can be read by a non-TTCN suite tool, you should analyze the document and correct any errors.

The Telelogic MP Format

An optional but non-standard TTCN-MP for compact tables and ASN.1 references is supported. Additional fields in dynamic tables (fields which are transferred to test suite overview tables) are also supported. You are recommended to use this format for transferring TTCN document between the TTCN suite instances and for making backups of the TTCN documents. Otherwise it works just as the standard MP format.

MP File Format Problem when Opening

When you open certain TTCN-MP documents, a problem with transferring the information (e.g. description) in the overview tables to the tables in Dynamic Part, may occur.

The TTCN standard allow path specifications to optionally include the document name first. This has the unfortunate effect that if the TTCN document contains a top level group with the same name as the TTCN document, there is, in general, no way of knowing if the first part of the paths is a group identifier or the TTCN document identifier.

TTCN Suite assumes that if the first part of the path is equal to the document name, it is the optional document name and, when converting, strips it away. When the document is saved as or exported to MP, the document name is always added to the front of all paths. That way, TTCN Suite is always able to open the MP files it exports.

If the TTCN document contains top level group identifiers equal to the document name, and TTCN Suite is unable to resolve the paths, temporarily change the document name in the MP file and change it back once inside TTCN Suite.

Note that ITEX 2.0 did not add the document name at export, and therefore the problem described may apply when open MP files exported by ITEX 2.0.

Fields Containing the '$' Character

The contents of table fields in a TTCN-MP file are usually ignored. However, to make it possible to open non-bounded free text fields (for example TS_VarValue field) with embedded dollar characters ('$'), those fields will be syntax checked. This means that it is not possible to convert TTCN documents containing unmatched single or double quotes in non-bounded freetext fields, that is, when you open a TTCN-MP file, syntax errors in those fields will not be tolerated.

Revision Control

There is no integrated revision control system in the TTCN suite. Since normal visible files are used to store the TTCN documents, it is easy to integrate the TTCN suite in a revision control system. However, since the `.itex` file format is binary, it is better to use the TTCN-MP format.

Converting to HTML

It is possible to export a TTCN document, or only a part of it, to HTML. The result will be one HTML-file containing what you selected to export, and – when applicable – hypertext links as well as information about the structure of the test suite will also be generated.

To convert a TTCN document to HTML:

1. Select the top node in the Browser.
   – You may also select only a part of the test suite, but multiple-selection is not possible.
2. Select *Save As* from the *File* menu.

   A dialog will be opened where you can save the document as HTML.

It is also possible to convert a currently opened table to HTML. To do this:

- Select *Generate HTML* from the pop-up menu in the Table Editor.

Shortcuts

Common Shortcuts

Shortcut	Action
Ctrl+N	Creates a new test suite.
Ctrl+O	Opens an existing test suite.
Ctrl+S	Saves the test suite to file.
Ctrl+P	Prints the test suite.
Ctrl+Z	Undoes latest editing action(s).
Ctrl+Y	Redoes latest undone editing action(s).
Ctrl+L	Shows/Hides Log Manager.
Ctrl+F	Opens a new Finder.
F7	Analyzes the selected node and its sub-tree.
F8	Generates code for the current test suite.
Alt+F8	Displays an options dialog to allow the user to set options for tools working on the Browser.
F5	Runs/continues current simulation.
Pause	Pauses current simulation.
Ctrl+Break	Aborts current simulation.
F11	Steps current simulation.

Browser Shortcuts

Shortcut	Action
<Up arrow>	Sets the focus to the above node in the Browser.
<Down arrow>	Sets the focus to the below node in the Browser.
<Right arrow>	If the selected node is collapsed and has children, it will be expanded. If the selected node is expanded and has children the selection will move to the first child.

Shortcut	Action
<Left arrow>	If the selected node is the root of an expanded sub-tree, the sub-tree will be collapsed. If the selected node is the root of a collapsed sub-tree the selection will move to the parent of the current node (if any).
<Ctrl+X>	Cuts the selected non-static node in the Browser.
<Ctrl+C>	Copies the selected non-static node in the Browser.
<Ctrl+V>	Pastes the contents of the cut/copy buffer after the selected node.
<Ctrl+Shift+V>	Pastes the contents of the cut/copy buffer as a child to the selected node.
<Delete>	Deletes selected node(s).
<Enter>	Opens a Table Editor for each selected node.
<Ctrl+A>	Adds a new table after the selected node.
<Ctrl+Shift+A>	Adds a new table as a child to the selected node.
Click	Sets selection on a node in the Browser.
Right-click	If the mouse pointer is above a node, sets selection on that node and display node specific pop-up menu. If no node is selected, displays background pop-up menu.
Double-click	If the selected node is a static node, the sub-tree will either be collapsed or expanded. If the selected node is a collapsed group, its sub-tree will be expanded. Otherwise the associated group table is opened. Finally, if the node is a non-static table a Table Editor for that node will be opened.
<Shift>-click	Selects/deselects all nodes between this selected node and the previously selected nodes.
<Ctrl>-click	Selects/deselects a node without affecting already selected nodes.

Table Editor Shortcuts

Shortcut	Action
<Tab>	Moves to the next editable field.
<Shift+Tab>	Moves to the previous editable field.
<Ctrl+Up arrow>	Moves to the previous line.
<Ctrl+Left arrow>	Moves to the next editable field.
<Ctrl+Down arrow>	Moves to the next line.
<Ctrl+Right arrow>	Moves to the previous editable field.
<Ctrl+Space>	Toggles selection of current row in a table body.
<Alt+Left arrow>	Moves forward in history.
<Alt+Right arrow>	Move back in history.
<Page Up>/<Page Down>	Scroll stable one page.
<F7>	Analyzes the current table.
<Ctrl+X>	Cuts selected rows.
<Ctrl+V>	Pastes rows after the selected row, or last if no selection exist.
<Ctrl+C>	Copies selected rows.
<F9>	Toggles breakpoint on selected row(s)
Right-click	Context sensitive popup.
<Ctrl>-right-click	Displays the definition of the currently selected identifier.
Click	Sets text selection and clear row selection.
<Ctrl>-click	Toggles row selection.

Log Manager Shortcuts

Shortcut	Action
<Ctrl+Alt+L>	Increases font size.
<Ctrl+Shift+L>	Decreases font size.

Finder Shortcuts

Shortcut	Action
<Up arrow>	Sets the focus to the above node in the *Results List*.
<Down arrow>	Sets the focus to the below node in the *Results List*.
<Ctrl+C>	Copies the selected non-static node in the *Results List*.
<Delete>	Deletes selected node(s).
<Enter>	Opens a Table Editor for each selected node.
Click	Sets selection on a node in the *Results List*.
Right-click	If the mouse pointer is above a node, sets selection on that node and display node specific pop-up menu. If no node is selected, displays background pop-up menu.
Double-click	Opens a Table Editor for the selected node.
<Shift>-click	Selects/deselects all nodes between this selected node and the previously selected nodes.
<Ctrl>-click	Selects/deselects a node without affecting already selected nodes.