



# Clarinet

## Executable Test Script Training

**Packet Data Systems Ltd**  
The Wharf, P. O Box 48  
Pangbourne  
Berkshire, RG8 7EG  
United Kingdom

Tel: +44 (0)118 9845944  
Fax: +44 (0)118 9844559

e-mail: [info@pds-test.co.uk](mailto:info@pds-test.co.uk)  
website: [www.pds-test.co.uk](http://www.pds-test.co.uk)

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## Clarinet Executable Test Suites

The table below shows a summary of the test suites currently available:-

<b>ISDN User</b>	TBR003 Layer 2, TBR003 Layer 3, TBR004 Layer 2, TBR004 Layer 3, TBR008, TBR033 Layer 2, TBR033 Layer 3, TBR034 Layer 2, TBR034 Layer 3, 3PTY, CCBS, AOC, CDIV, CLIP, CLIR, COLP, COLR, CONF, CUG, CW, DDI, ECT, MCID, MSN, MWI, SUB, UUS, Basic Call. NIUF Test Suites also available.
<b>ISDN Network</b>	ETS300*** including: Data Link (Layer 2), Basic Call, 3PTY, AOC, CCBS, CCNR, CDIV, CLIP, CLIR, COLP, COLR, CONF, CUG, CW, DDI, ECT, HOLD, MCID, MSN, MWI, SUB, UUS, VPN Basic Call.
<b>QSIG</b>	QSIG Basic Call and GFP
<b>V5.1</b>	Data Link Layer, Network AN Side, Network LE Side (edition 2 also available).
<b>V5.2</b>	Data Link Layer, Network AN Side, Network LE Side (edition 2 also available).
<b>SS7</b>	INAP-CS1, ISUP-V2 Supplementary Services, ISUP-V2 Basic Call, MTP2, MTP3, SCPP, TCAP.
<b>ATM</b>	AF-Test 00041, AF-Test 00060, ATM SSCOP, UNI Basic Call Network Side, ATM UNI Point/Multipoint.
<b>Frame Relay</b>	PVC and SVC.
<b>X25</b>	X25 Layer 2 DTE - ISO X25 Layer 3 DTE - ISO
<b>NMDS</b>	Layer 3 NTN-Side

An up to date list of available ETS can be found on the PDS website: -

[http://www.pds-test.co.uk/conformance\\_directory.html](http://www.pds-test.co.uk/conformance_directory.html)

### The Acacia TTCN Compiler

Acacia, the manufacturers of the Clarinet system have been involved with conformance testing since 1992 and their first task was to develop a TTCN compiler. The TTCN compiler is used to generate Executable Test Scripts (ETS) that are available for customers ready to run on their Clarinet system.

The Clarinet TTCN compiler is available to purchase for those customers who wish to modify the behaviour of a test script or to generate new scripts that are not available as Acacia ETS.

The compiler creates a C program controlling the behaviour of the Clarinet at any layer or layers tested by the script. Other layers are automatically managed by the Clarinet Run-time software. TTCN compiler technical support is provided directly by the Acacia Protocol Centre in Sophia Antipolis, France.

## Software Installation: Clarinet ETS

1. Insert the Clarinet Run-Time CD which will Auto Start.
2. In the second table each Executable Test Suite is listed together with the part numbers used by PDS/Acacia. The part numbers for the ETS you have ordered are clearly highlighted on the PDS delivery note, order acknowledgment and invoice.
3. Identify the ETS you want to install.
4. For more information on the status of the ETS click on the **INFO** hyperlink.
5. To install the ETS click on the **INSTALL** hyperlink.
6. Select to run the program from it's current location.
7. The ETS will install.

The installation of Clarinet ETS creates the directories **Clasets** and one subdirectory for each ETS under the path selected during installation (default: C:\Clarinet).

### Each ETS sub-directory installed on the PC includes all tools necessary to run the ETS:-

- Test case list files (.tda)
- PICS/PIXIT files completed with standard parameters (.pia)
- Documentation files (Word 7.0 and Acrobat format).
- ETS\_ope: provides information about the ETS operation (template files, profiles....)
- ETS\_ref: provides information about the ETS reference (ATS origin).
- IUT profiles, filters to run the clarinet.
- Object files allowing modification of the ATS and the ability to compile using the Clarinet TTCN development package:
  - Custom.obj
  - Userop.obj

## Security Key

The Clarinet ETS and Clarinet DEV-TTCN require the installation and authorisation of the Clarinet security key.

### To install the security Key

**IMPORTANT - Upon receipt of the Acacia Security Key, you must fill in and fax back to Acacia the product registration form which includes a request for passwords section.**

1. Once you have the **passwords**, connect the **security key** to the parallel port of your host PC.
2. From **Windows Explorer** find **Wractive.exe** which will be found in C:\Clarinet\Clatools.
3. **Double click** on **Wractive.exe**.
4. A window will open prompting you to enter the password supplied by Acacia.
5. **Enter the passwords** and click **Apply**.

### Determining the Security Key's Current Authorisation

1. From Windows Explorer find **Wractive.exe** which will be found in C:\Clarinet\Clatools.
2. **Double click** on **Wractive.exe**.
3. Click on **Show Authorisation** to view the serial number of the security key and all currently authorised products.

## Samples of ETS Result Traces

The directory named RUN provided with each ETS on the Clarinet Run-Time CD, contains Clarinet Event files. These files have been created by Acacia who have run the ETS in front of standard IUT. They provide some help to customers who wish to see the TTCN trace and PDU exchange. A filter (**.acf**) is also generally included and this together with the event file (**.ace**) can be copied from the RUN folder on the CD ROM and then pasted into your working Clarinet directory (cladata, claets or own folder). The event file may be viewed and filter applied using the Clarinet Event Editor in the usual way.

## Editing an ETS Profile

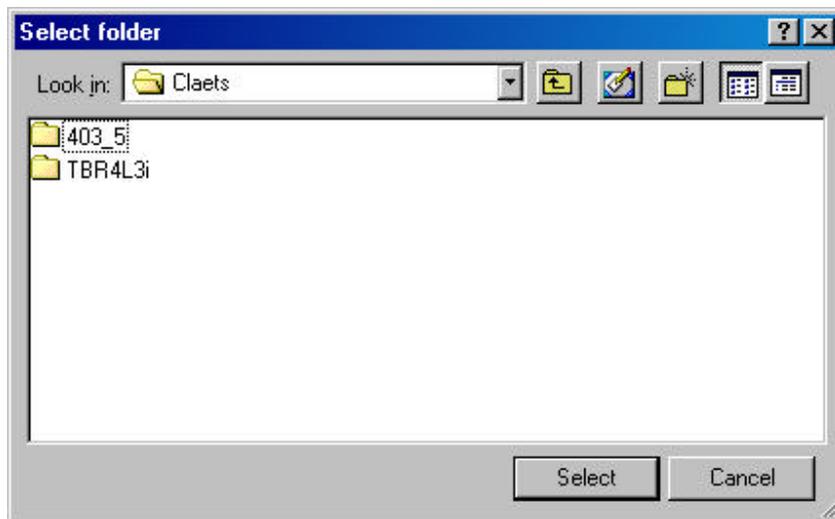
While using the Clarinet for basic simulation and analysis you will be working in the C:\Clarinet\Cladata directory which contains all the profiles and filters for these functions.

In order to run the conformance test software the first step is to change the working directory to **C:\Clarinet\Claits**.

This is achieved by clicking on **Directory** in the **Clarinet-Manager Dialog 1 window**.

You will see that it shows **Cladata** as the default directory and a list of profiles, events and filters contained in this folder.

**Click** on the  icon to go up one level. This will take you to the Clarinet directory and you will see that this contains three folders: **Cladata, Claits and Clatools**. Double click to **select Claits** to see folders for each of the ETS conformance packages that have been installed onto your system.



Choose one of these by **double clicking** it and then click on **select**. You will now have returned to the Clarinet-Manager Dialog 1 window and you can click on the far left hand icon to edit a profile in exactly the same way as it works for simulation.

Click on  to see the profiles that are available. Usually one or two tests will be provided that will test the status of the IUT and then one, which has been pre-configured to test a device using typical PICS/PIXIT parameters and the full list of test cases. This is provided so that you can see examples of what is required and in what format, before any test suite is executed.

Name	Description
INIT.ACP	C1+C2: T2-NET SL=Q931-ET GENE(1COM)+RESP(Yes)
IUT.ACP	C1+C2: T2-USR SL=Q931-ET GENE(5COM)+RESP(Yes)
Tbr4I3i_tel.acp	C1: T2-NETWORK SL=User-Program

## Example Using TBR4L3

Select **TBR4L3** from the **Claets** folder as described in the ETS profile.

**Click** to edit the profile **TBR4-tel.acp** (if you need to select CRC4 click on options under the Clarinet interface and click in the box to select CRC4).

Now **click** on **TTCN User Program** and this will open the **TTCN Signalling User Program window**. In this window you will notice the program name (**.exe**) for the **TBR4L3** test suite and the file names containing the **test case list (.tda)** and **PICS/PIXIT parameters (.pia)**.

From this window it is also possible to change the delay before the first test case is executed and then the delay between each subsequent test case. This allows the user to slow down the speed of execution if his IUT needs time to reach a stable state.

**TTCN signalling user program**

Program name:  
Tbr4l3i.EXE  Initialize Q921 emulator  
 Initialize Q931 emulator

Beginning:  
After emulator init.

Profile execution end:  
After user prog. end

Parameters:

Test descriptor file:  
Tbr4l3i.tda Edit...

PICS / PIXIT file:  
Tbr4l3i\_TEL.pia Edit...

ASN.1 Length Field  
 Indefinite BER encoding

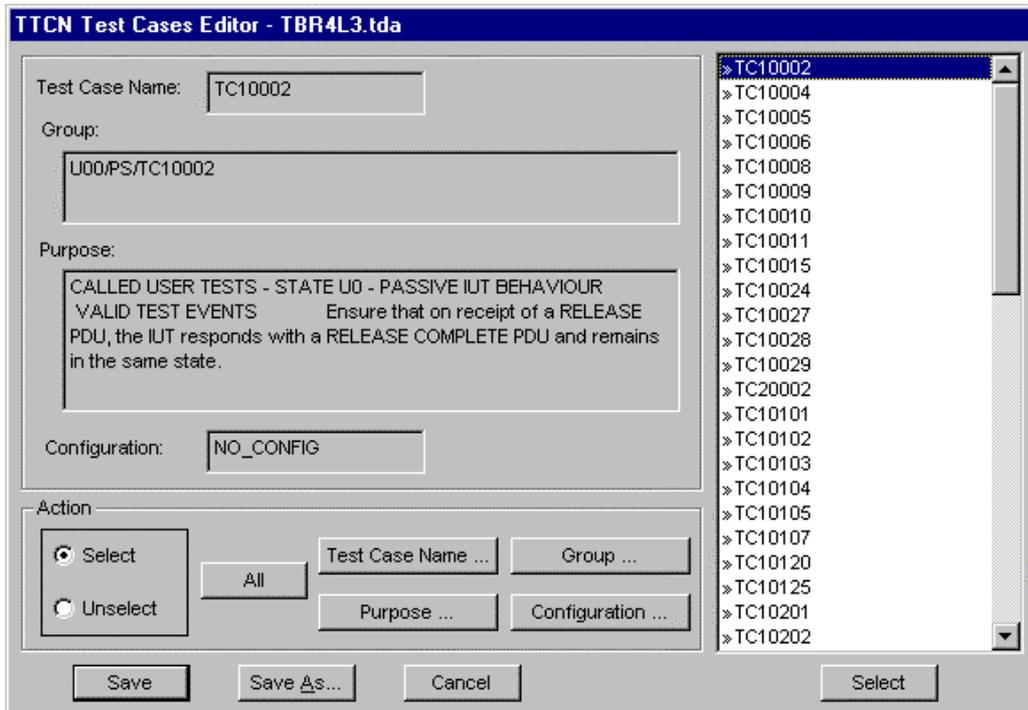
Waiting time before:  
First "TestCase" Others "TestCase"  
3 sec. 3 sec.

Interface managed by user program from other interface

OK  
Cancel  
Help

## Test Case List Selection

Click **Edit** next to **Test Descriptor file** to open the **TBR4L3.tda test case list file**. By default, all test cases are selected and the cursor is positioned over the first test case which is TC10002. A description of the purpose of TC10002 is shown in the Purpose window and if you click the mouse pointer to select a different test case, you will see that each one has its own purpose explained in this way.



As an exercise, click **Unselect** in the **Action** area. Now click **All** to deselect all the test cases.

Highlight the first test case and look in the Group area (at the top of the window) where you will see the indication: U00/PS/TC10002. This is the group number and you can click to select each individual test case down to TC20002 before the group changes from U00/ to U01/.

The certified test laboratories usually test one group at a time and this can be achieved easily with the Clarinet system as detailed below.

First click **Select** in the **Action** area. Now click **Group** and type in **U00/** followed by **OK**. Immediately you will see that the first 14 test cases become selected.

Use the same method to select group U01/, U02/ and so on.

Alternatively, you can highlight any individual test case and manually select or de-select it by clicking on **Select** at the bottom of the list (bottom right hand corner).

Other selection mechanisms include the Test Case Name, part of the Purpose (for example type "RELEASE" and see that all the test cases with a purpose including the word RELEASE become selected), or the Configuration (if specified).

The selection process allows the user to choose test cases from a particular group or those that test a particular function, which is very useful.

After you have chosen the most suitable range of test cases for your testing, you can save this list under a new name for inclusion in any profile by clicking on **Save As** and entering a name with a **.tda** extension.

## PICS/PIXIT Parameter Selection

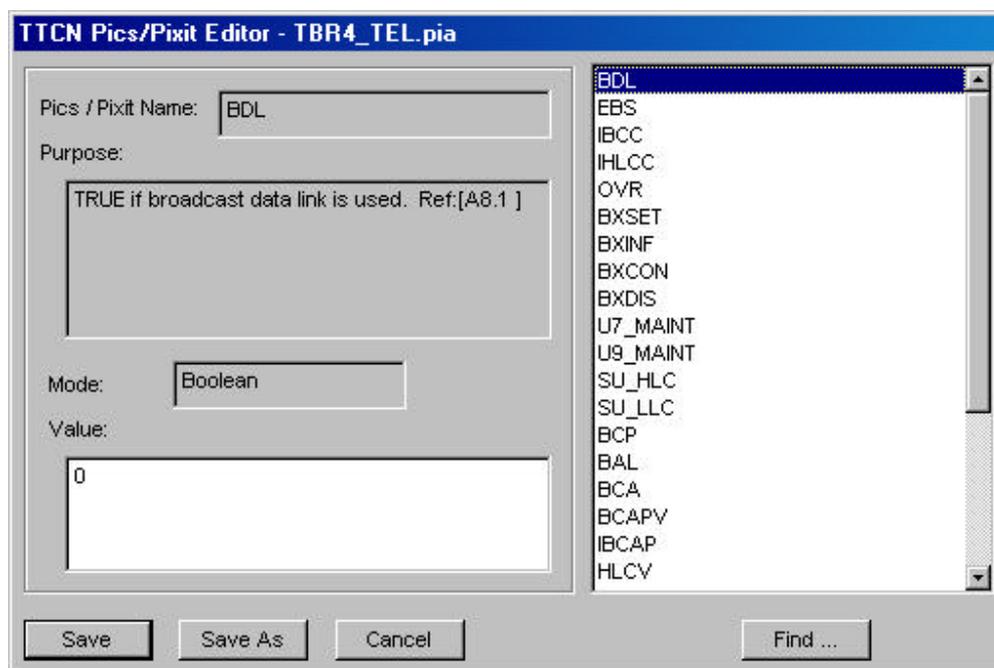
From the TTCN Signalling User Program window click **Edit** next to PICS/PIXIT file to open the **TBR4\_TEL.pia** PICS/PIXIT parameter file.

By default the cursor is positioned over the first parameter **BDL**. A description of the purpose of this parameter is shown in the Purpose window, and you will see that it is: TRUE if broadcast data link is used.

Below the purpose window there is a Value window and an indication of the mode of selection, which in this case is Boolean.

The value shown by default is "0" which identifies that broadcast data link is not used. If it is used on the IUT then simply replace the 0 with a 1 and the statement now becomes TRUE.

Use the mouse pointer and click to select other parameters in the list to see their purpose and the default value.



Some parameters such as BCAPV (Bearer Capability Valid) are in a hexadecimal mode so the required value needs to be entered in HEX.

In the TBR4L3 example, the default value is 04 03 80 90 a3, which is the information element code (04), followed by the information length (03 = 3 octets), followed by the information itself (80 90 a3 – A standard "speech" call).

A standard data call has the hex code 88 90, which is just two octets, so to change the Bearer Capability Valid value accordingly, use the same information element code (04), followed by the change in information length (02 = 2 octets), followed by the change in information itself (88 90 = A standard data call).

So, to specify that a valid bearer capability used whilst testing your IUT should be a standard data call, change the value from 04 03 80 90 a3 (default) to 04 02 88 90.

The developers of the IUT will always have access to the required PICS/PIXIT parameters to enable relevant testing, and it is usually a matter of obtaining these and then entering them one by one into the Clarinet PICS/PIXIT editor.

Once entered, the required values for each IUT can be saved in a new file by clicking **Save As**, entering a new name and using the extension **.pia**.

## Selective Expression

The Clarinet system uses the latest TTCN compiler which includes the function of selective expression to simplify configuration. Selective expression looks through the PICS/PIXIT parameters that have been entered for the IUT and automatically de-selects any test cases that are not relevant even if the test case has been previously selected by the user. In the verdict list added to the end of each event file there are two columns, one to identify which test cases were selected and the other to identify whether or not they were executed. These columns help you identify which test cases are relevant to your IUT based on PICS/PIXIT parameters entered and may help to debug the configuration for your equipment which will prove useful.

## Running an ETS Profile

Once the conformance test script profile has been edited to contain a list of the test cases and PICS/PIXIT parameters applicable to the IUT, running it is very simple.

Using the **Clarinet-Manager Dialog 1 window**, click on  now click on the down arrow to see all the profiles available and select the one that you wish to run.

Click **OK** to run the profile and the event trace containing all test stages and protocol messages exchanged will open together with a status window indicating the start of each test case and the verdict.

PICS/PIXIT parameters used will be automatically inserted at the start of the event trace and a summary of the verdicts will be inserted at the end so that all relevant information is contained in just one file.

## Automatic IUT Status Checks

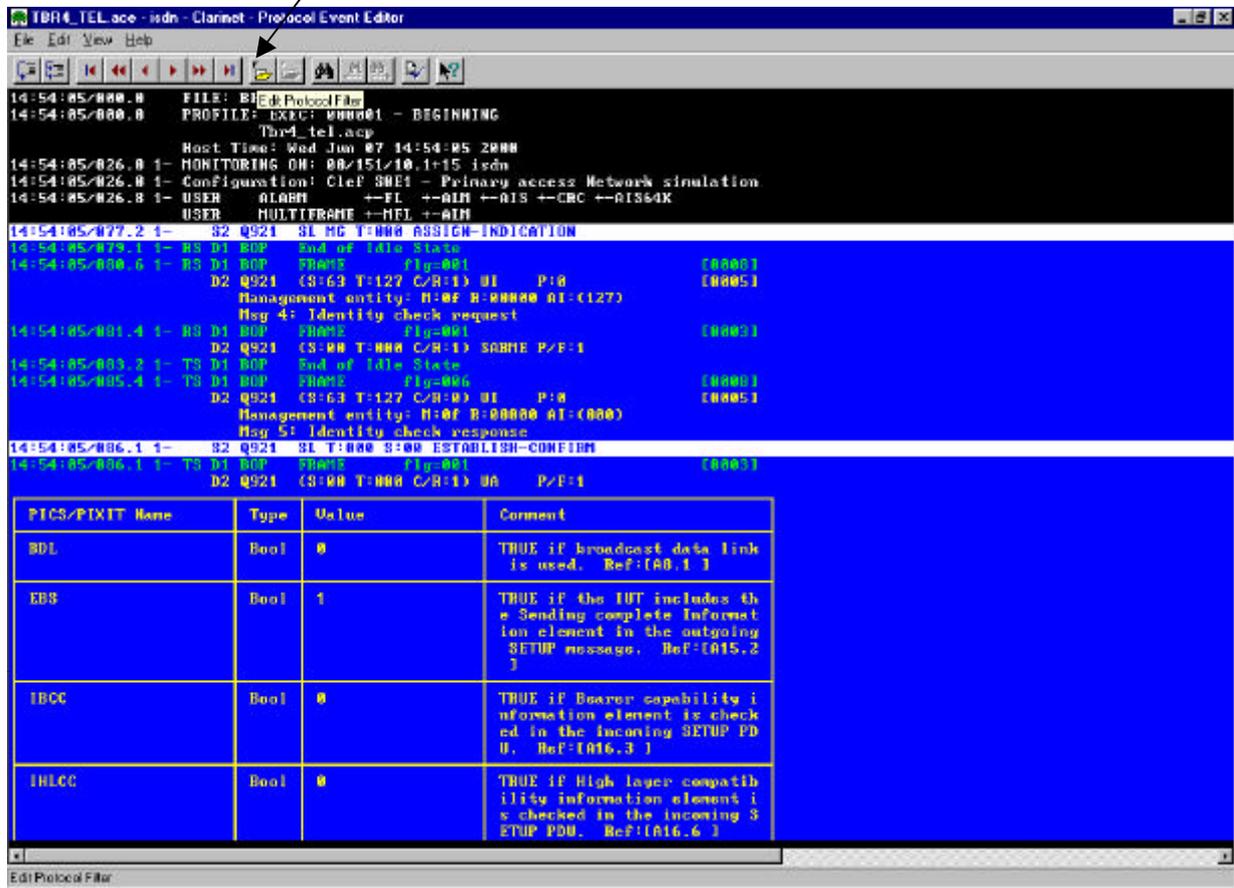
Before the actual test script starts the Clarinet is often pre-configured to test the IUT in order to ensure that it is in the correct state before execution of the script. This is to reduce the number of unexpected 'failed' verdicts that will appear if the IUT is not ready.

For example, if you are running an ISDN conformance test script such as TBR4L3, the Clarinet will bring up Layer 2 and then automatically send an empty setup message to the IUT. If the IUT is ready to accept a setup message it will notice the missing Information Element contents and respond with a RELEASE COMPLETE using a cause value of 96 – Mandatory IE is missing.

These basic tests have been linked to the ETS profile but are also included independently in the list of profiles available when any test script is installed. For example, with TBR4L3 the automatically installed test profiles include IUT (used for testing the basic IUT configuration) and INIT (used to test that Layer 2 is active and the IUT is ready to accept Layer 3 messages).

## Creating a Display Filter

A display filter used with any protocol event file may be opened and modified by clicking on the  icon at the top of the event file (in a real time display or off line display). Alternatively, click  in the middle of the Clarinet-Manager Dialog 1 window and select the name of the filter that you wish to modify.



The screenshot shows the 'Protocol Event Editor' window. The top toolbar contains a filter icon (a yellow folder with a magnifying glass) which is highlighted by an arrow. Below the toolbar, a list of protocol events is displayed, including messages like 'S2 Q921 BL MG T:000 ASSIGN-INDICATION' and 'S1 T:000 S:000 ESTABLISH-CONFIRM'. At the bottom of the window, a table lists filter parameters:

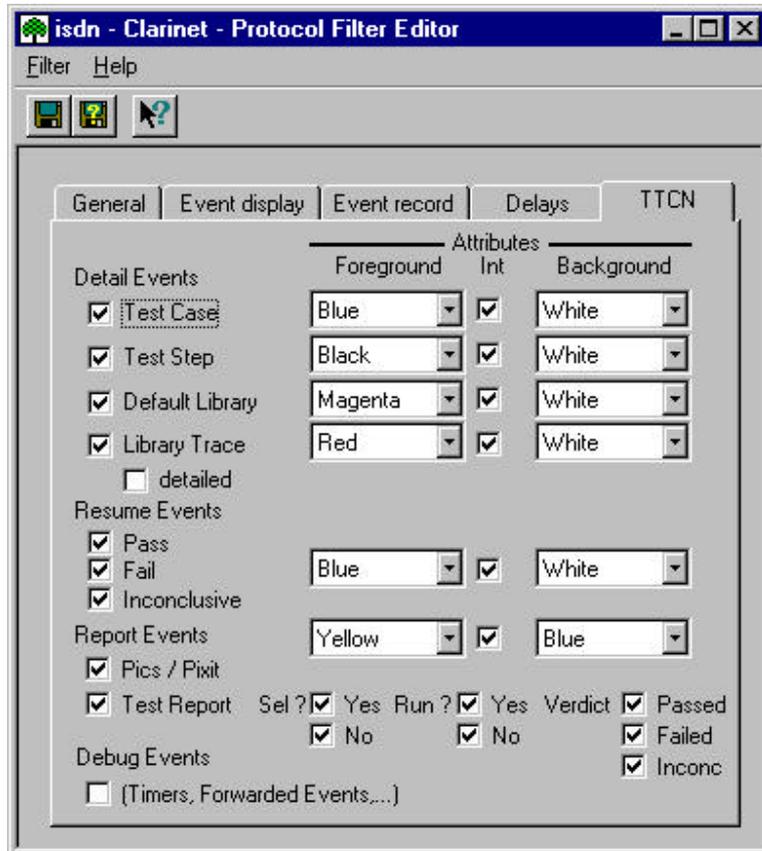
PICS/PIXIT Name	Type	Value	Comment
BDL	Bool	0	TRUE if broadcast data link is used. Ref:(A8.1)
EBS	Bool	1	TRUE if the IUT includes the Sending complete Information element in the outgoing SETUP message. Ref:(A15.2)
IBCC	Bool	0	TRUE if Bearer capability information element is checked in the incoming SETUP PDU. Ref:(A16.3)
IHLCC	Bool	0	TRUE if High layer compatibility information element is checked in the incoming SETUP PDU. Ref:(A16.6)



The screenshot shows the 'Clarinet - Manager Dialog - 1' window. The menu bar includes 'Profile', 'Filter', 'Events', 'Directory', and 'Help'. The toolbar contains several icons, including a filter icon (a yellow folder with a magnifying glass) which is highlighted by an arrow.

There are five tabs along the top of the filter editor but the most important for conformance testing are the second and the fifth tabs. The second tab is called 'Event Display' and allows removal of unwanted protocol layers and to change the colours (attributes) of the protocol messages transmitted or received.

The fifth tab is called 'TTCN' and defaults to all options being selected but if required you can deselect certain verdicts, detail and events from the display. It is also possible to change ETS foreground and background attributes so that the display looks exactly as required.



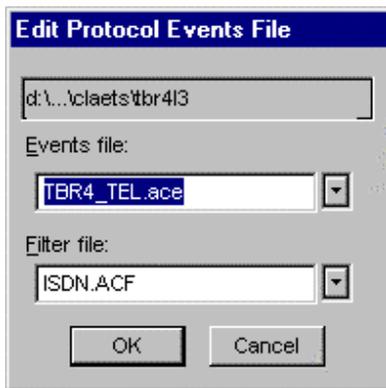
The maximum detail default selection will show all the TTCN stages interleaved with all protocol messages as they arrive or leave the interface pod. This is useful because it allows the user to see exactly how far the IUT progressed through the test before any problems occurred. If preferred, separate windows can be opened each containing pre-selected levels of information by applying different user created filters to the same event file.

## To Edit a Recorded Event

1. From the **Clarinet-Manager Dialog – 1** window click on the **fourth icon from the right** to open a protocol event file.



2. Select the required **Events** and **Filter** files. Click on **OK**.



3. Your file will be displayed for you to scroll up and down and by using the  icon you can search for any verdict such as passed, failed or any matching text in the event file.

## To Print a Recorded Event File

Once the event has been opened on the display:

1. The cursor should be placed at the start of the trace – Press the '**Home**' key
2. **Select the Edit menu.**
3. **Select Copy ASCII.**
4. Place the cursor at the **end of the trace** – Press the '**End**' key.
5. **Select the menu Edit.**
6. **Select Copy ASCII.**
7. An ASCII Clipboard **Save As** dialog will be displayed.
8. **Select a location and name for the file** – the file extension should be '**.txt**'.
9. **Click Save.** The file will be saved in C:\Clarinet\Claets directory.
10. The .txt file may now be opened and printed from Wordpad etc.

## The Clarinet TTCN-HTML Display Tool

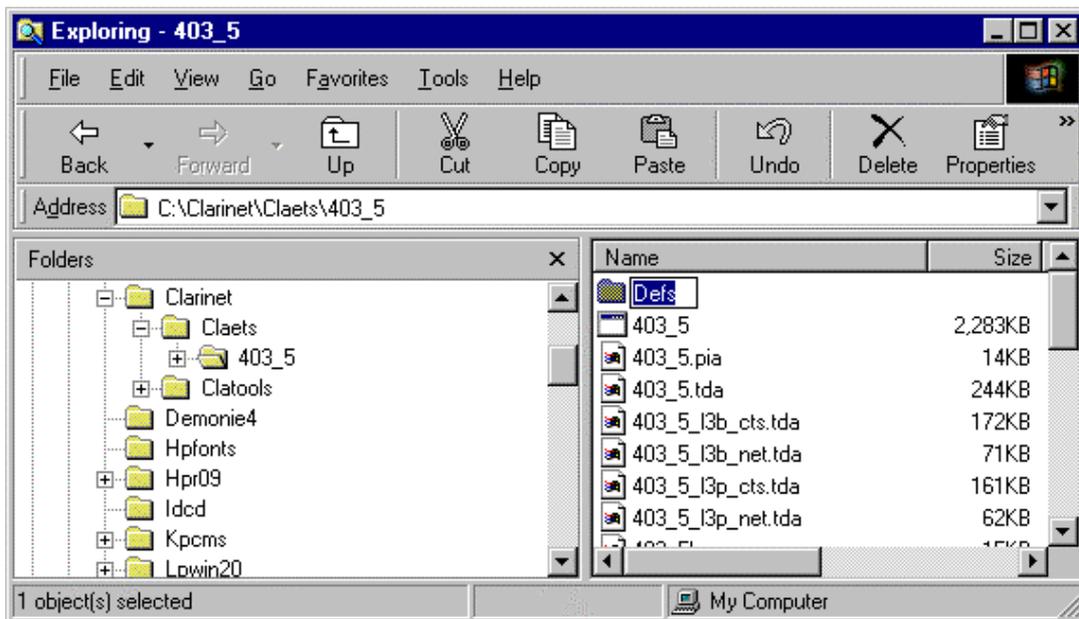
This tool allows the user to view the ATS (Abstract Test Suite) in Html format which is useful when analysing the results of ETS execution.

The tool splits a TTCN ATS into HTML pages enabling:-

- The ability to view the TTCN ATS with any HTML explorer.
- The ability to jump directly from the Clarinet Event Editor to the TTCN ATS.

## The DEFS Directory

When you install your ETS (see installation instruction on page 4) the installation procedure creates a directory dedicated to each ETS under \claets. The HTML pages are located in the Defs sub-directory of each\* ETS directory.



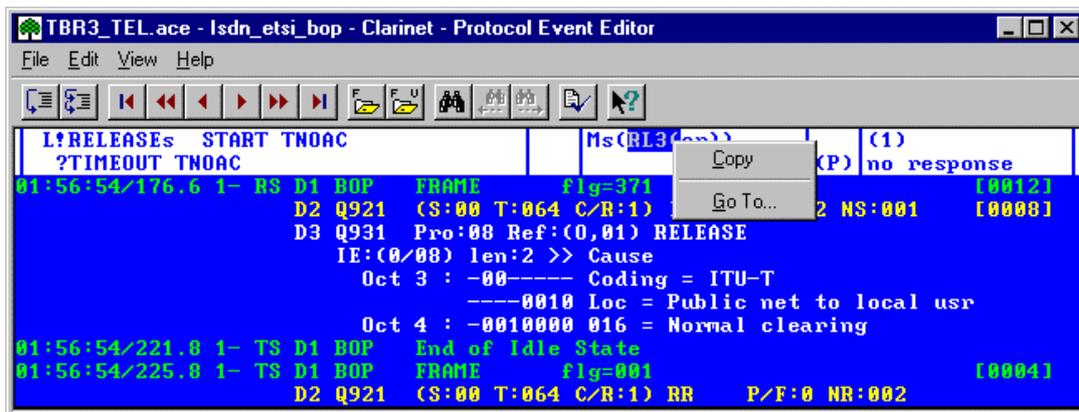
The window above shows the Defs subdirectory in the Claets\403-5 directory.

\* The Clarinet ETS CD-ROM only includes the DEFS directory's for the latest ETS to be developed.

## Jumping from the Clarinet Event-Editor to HTML Pages

The Clarinet Event-Editor displays the TTCN traces which are merged with protocol events when executing the ETS.

By clicking the right button of the mouse, a **Go To...** command is available to jump to the TTCN definition selected on the Event Editor screen.



# Executable Test Suite Report Generator

## Introduction

This tool generates a Protocol Conformance Test Report from an Acacia protocol trace. It consists of a pair of template files for Microsoft Word 97, one of which contains a Visual Basic macro.

## Installation

This tool consists of two files:-

**Generate a Test Report.dot**  
**ReportTemplate\ReportTemplate.dot**

These files are supplied on the **Clarinet Run-Time CD** in the **Tools directory**. The templates can be found in the **Report folder**. If you are using Word 2000 the templates can be found in the Report2000 folder.

1. The file '**Generate a Test Report.dot**' and the sub-directory '**ReportTemplate**', and contents should be **copied** into a directory specified in Word for either **User Templates** or **Workgroup Templates**.
2. To find the location for these templates: Start **Word**, **select the Tools menu**, **select Options**, **Click the File Locations tab**. The entries **User Templates** and **Workgroup Templates** should be displayed.
3. **Copy** the templates into this location (remember if you are using Word 2000 copy the templates within the Report2000 folder).

## Operating Instructions

The TTCN tab within the protocol filter should have the following options selected:-

Detail Events – Test Case  
Detail Events – Test Step  
Detail Events – Default Library  
Detail Events

**The protocol filter (.acf file) delivered with the suite has all the appropriate options selected.**

Once the test suite has finished running:

1. The **protocol trace file** should be opened with the **Clarinet-Manager**.
2. The cursor should be placed at the start of the trace – Press the '**Home**' key
3. **Select the Edit menu**.
4. **Select the menu entry Copy ASCII**.
5. Place the cursor at the **end of the trace** – Press the '**End**' key.
6. **Select the Edit menu**
7. **Select the menu entry Copy ASCII**.
8. An ASCII Clipboard **Save As** dialog will be displayed.
9. **Select a location and name for the file** – the file extension should be '**.txt**'.
10. **Click Save**. The file will be saved in C:\Clarinet\Claets directory.

## Generating the Report from the text file

1. Open **Word**.
2. **Select** the **File** menu.
3. **Select** **New**.
4. **Select** the **General** tab.
5. **Select** the **Generate a Test Report.dot** icon. Ensure that Create a New Document is selected.
6. **Click OK**.
7. An **Open file dialog** will be displayed. **Select the file** saved in step 9 above.
8. **Click OK**. It may take some time to process the text file!
9. A tabbed dialog box will be displayed. **Complete the fields**, (for further details, see following pages).
10. When all the fields have been completed click **Done**.
11. The file may now be saved or printed as you would any Word document.

If Macro Virus Protection is enabled a warning may be displayed – this is normal: enable the macro or the tool will not run. This is not a virus!

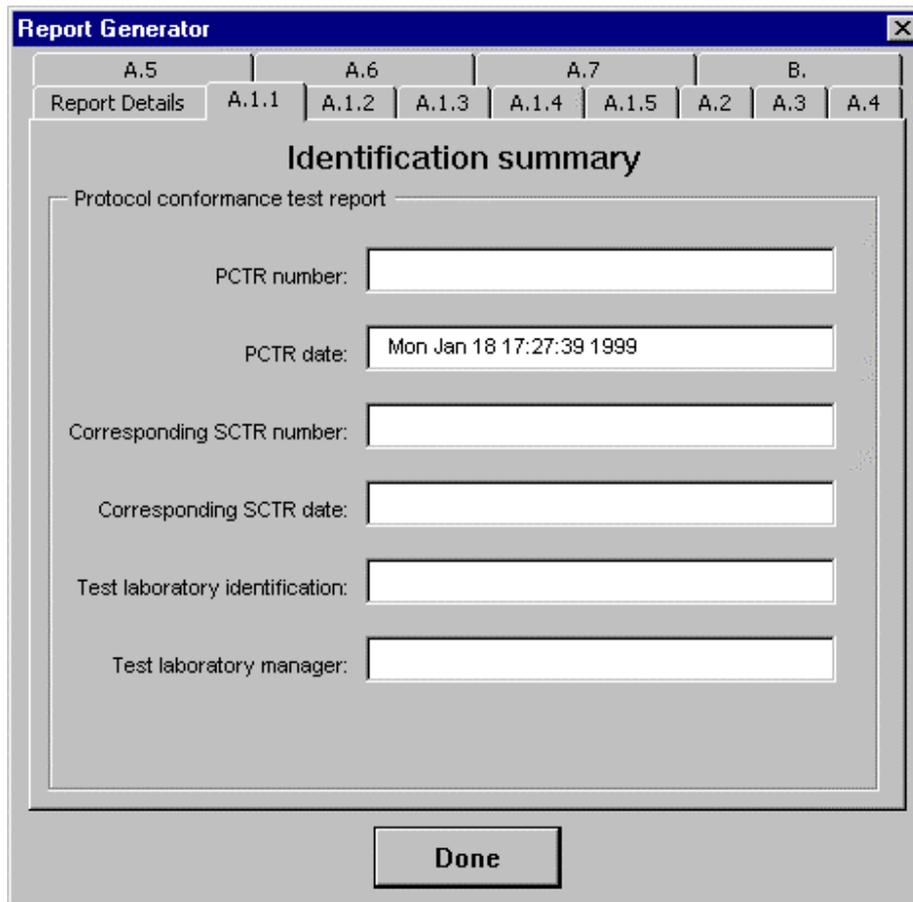
Note – this tool can generate large files!

The text file and resultant Word document can be quite large. The size is dependent upon the number of test cases contained in the test suite. Six hundred tests will result in a 2000 page test report that will be saved as an 18MByte Word file. This text file will require about 13MBytes of space and the tool requires the same amount of disk space as the text file, as workspace – this is freed after the tool has finished.

In-order to speed up the operation of the tool it is recommended that the text file should be stored and operated from the local hard-drive.

## Detailed Instructions on Completing the Dialog Boxes

The main dialog box consists of a number of tabbed pages. The tabs correspond to the sections of the ETSI 'New Regime' Protocol Conformance Test Report. As the fields are completed the corresponding sections of the document are completed. Some fields are automatically completed from the data in the protocol trace file; for example, below the field 'PCTR date' has been extracted from the file. If these suggestions do not correspond to the correct information these fields can be edited.



The screenshot shows a window titled "Report Generator" with a close button (X) in the top right corner. The window contains a tabbed interface with the following tabs: "Report Details", "A.1.1", "A.1.2", "A.1.3", "A.1.4", "A.1.5", "A.2", "A.3", and "A.4". The "Report Details" tab is currently selected. The main content area is titled "Identification summary" and contains the following fields:

- Protocol conformance test report: (Label)
- PCTR number:
- PCTR date:
- Corresponding SCTR number:
- Corresponding SCTR date:
- Test laboratory identification:
- Test laboratory manager:

At the bottom of the dialog box is a "Done" button.

Some pages contain large text boxes to allow extensive information to be entered. To start on a new line press the 'Shift' + 'Enter' combination. If the text fills the text box scroll bars will be displayed to allow the text to be easily edited.

The screenshot shows a window titled "Report Generator" with a blue title bar and a close button. Below the title bar is a navigation menu with tabs labeled A.5, A.6, A.7, and B. The "Report Details" tab is selected, showing sub-tabs A.1.1 through A.1.5, A.2, A.3, and A.4. The main content area is titled "Limits and reservations" and contains the following text:

*Additional information relevant to the technical contents or further use of the test report, or to the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.*

Below this text is a large, empty rectangular text box for user input. At the bottom center of the window is a button labeled "Done".

Some pages have a Boolean choice, select the option that corresponds. The text is taken directly from the relevant paragraphs in the ETSI proforma. **Caution** - some contain a double negative, for instance the following example!

The screenshot shows a window titled "Report Generator" with a close button in the top right corner. Below the title bar is a navigation bar with tabs labeled A.5, A.6, A.7, and B. The A.7 tab is active, and it contains sub-tabs labeled Report Details, A.1.1, A.1.2, A.1.3, A.1.4, A.1.5, A.2, A.3, and A.4. The main content area is titled "IUT conformance status" and contains the following text:

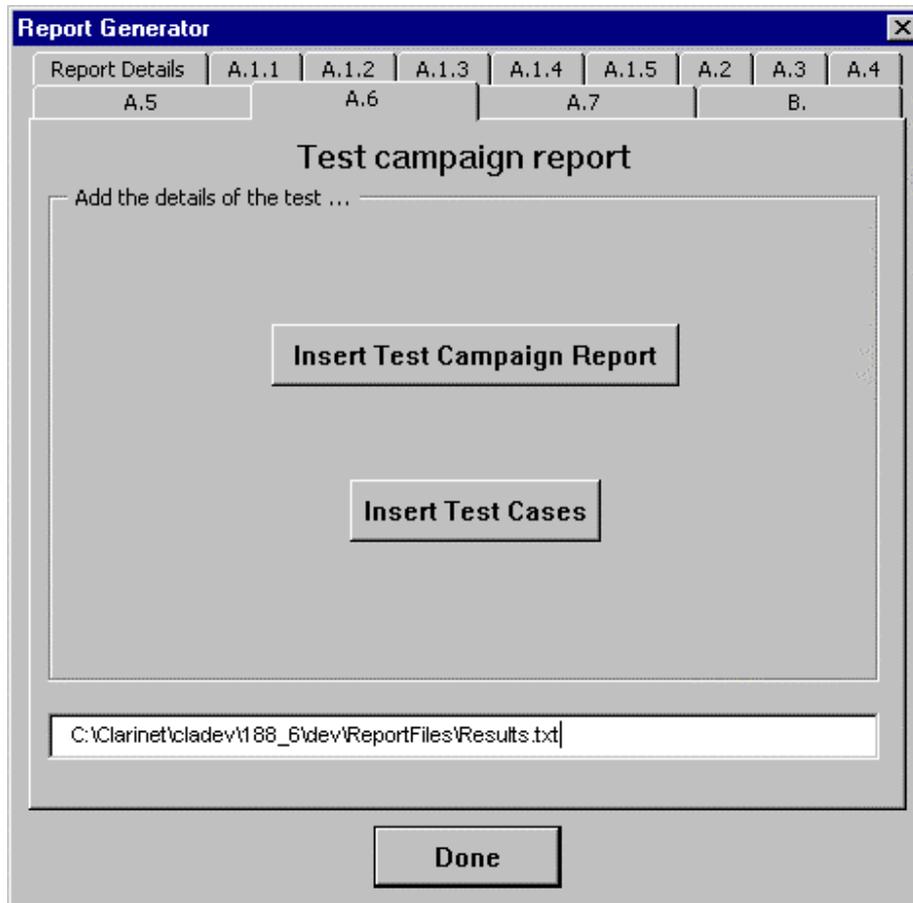
This IUT  **has** been shown by conformance assesment to be non-conforming to the specified protocol

**has not**

At the bottom of the window is a "Done" button.

This page allows the insertion of a brief test report, by clicking Insert Test Campaign Report. This is in the form of a table with one line per test, as found at the end of a test campaign.

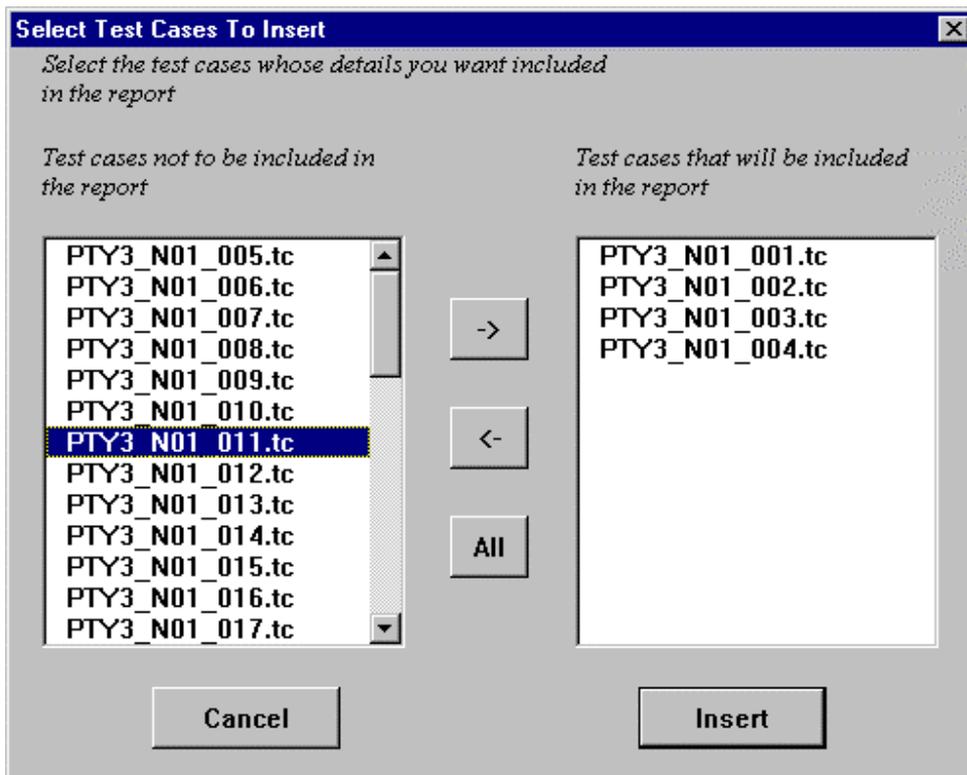
Insert Test Cases opens another dialog box ...



With this dialog box the full traces of the test cases can be included in the test report. Only those test cases in the right hand box will be included in the test report. To simply include the full traces for all the test cases click All. To select individual test cases (for example only those tests which failed) select the name of the test case and click the right arrow. In case of error an entry in the right hand box can be returned to the left hand box using the left arrow. Double clicking an entry will move that entry to the opposite box. Multiple entries can be selected by using the shift and control keys.

Test cases will be inserted in the order in which they appear in the right hand text box – entries are added to the bottom of the list.

When all the test cases whose complete details are required in the report have been added to the right hand box **click Insert...**



## Modifying the Test Report Template

The tool employs a template to generate the report. The default template is based on the ETSI proforma found in Annex A of the 'New Regime' ATS.

This template can be fully modified by the user to suit their requirements.

The name of the template must be ReportTemplate.dot and it must be found in the a sub-directory called ReportTemplate. The template (containing the Visual Basic source for the tool) 'Generate A Test Report.dot' must be found in the parent directory. These should be found on one of the paths that Word uses to find its templates – this is described on page 16.

The Visual Basic program behind this template completes the template by searching for bookmarks and inserting text at these points. A replacement template should therefore include these bookmarks. The program will still function if some of these bookmarks are not present.

This is a list of the Bookmarks that should be included in the Template:

APC\_Abstract\_test\_method  
APC\_ATS\_Spec  
APC\_Comments\_Begin  
APC\_Comments\_End  
APC\_Conf\_log\_refs  
APC\_Conformance\_status †  
APC\_Dates\_of\_testing  
APC\_Dynamic\_conf\_summary\_details\_begin  
APC\_Dynamic\_conf\_summary\_details\_end  
APC\_Dynamic\_conformance\_summary †  
APC\_Limits\_and\_reservations\_begin  
APC\_Limits\_and\_reservations\_end  
APC\_Means\_of\_testing\_id  
APC\_Name  
APC\_Observations\_begin  
APC\_Observations\_end  
APC\_PCTR\_date  
APC\_PCTR\_number  
APC\_PICS  
APC\_PIXIT  
APC\_PIXIT\_ref\_number  
APC\_Previous\_PCTRs  
APC\_Protocol\_Specification  
APC\_Report\_author\_begin  
APC\_Report\_author\_end  
APC\_Report\_title\_begin  
APC\_Report\_title\_end  
APC\_Retention\_date\_for\_refs  
APC\_SCTR\_date  
APC\_SCTR\_number  
APC\_Static\_conformance\_report\_begin  
APC\_Static\_conformance\_report\_end  
APC\_Static\_conformance\_summary †  
APC\_Test\_campaign\_report  
APC\_Test\_cases  
APC\_Test\_lab\_id  
APC\_Test\_lab\_manager  
APC\_Version

The bookmark pairs ending with “begin” and “end ” should be present in pairs with paragraph marks between them. (Clearly the “begin” should be before the “end”!)

† These bookmarks are for Boolean choices (is/is not, does/does not, has/has not) and should precede the first of these choices.

Specifications subject to change without notice.

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