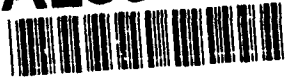


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TASK: UU04  
CDRL: 05203  
30 November 1992

# PCTE Browser Tool Version Description Document Version 1.0

Informal Technical Data



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**94-31243**

STARS-UC-05203/002/00  
30 November 1992

TASK: UU04  
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30 November 1992

VERSION DESCRIPTION DOCUMENT  
For The  
SOFTWARE TECHNOLOGY FOR ADAPTABLE, RELIABLE SYSTEMS  
(STARS)

*PCTE Browser Tool*  
*Version 1.0*  
*SunOS Implementation*

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TASK: UU04  
CDRL: 05203  
30 November 1992

VERSION DESCRIPTION DOCUMENT

PCTE Browser Tool  
Version 1.0  
SunOS Implementation

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VERSION DESCRIPTION DOCUMENT  
PCTE Browser Tool  
Version 1.0  
SunOS Implementation

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## 1 SCOPE

### 1.1 Identification

Version Description Document,  
PCTE Browser Tool (PBT),  
Version 1.0,  
SunOS Implementation

### 1.2 System Overview

The PCTE Browser Tool (PBT) is designed to graphically display parts of a PCTE object base. Selected graphs of objects in the object base and the relationships amongst these objects are displayed at the PBT user's request. The PBT is intended to complement text-oriented commands such as `obj_list_links` and `obj_list_attr` that are included with the Emeraude PCTE V12 release—commands intended to be invoked from the text-oriented `esh` command shell.

## 2 RELATED SOFTWARE

The PBT is an instance of the Reusable Graphical Browser (RGB), a generic graphical browser for the display of networks of nodes and arcs. In the case of the PBT, the nodes displayed by the RGB are PCTE objects, and the arcs are PCTE links. PBT version 1.0 was developed using RGB version 1.0.

The PBT is an X Window System application requiring the installation of X11, Release 4 (X11R4). It is a Motif-oriented application making use of the SA-Motif Ada bindings, version 1.0, a commercial product of Systems Engineering Research Corporation (SERC).

The PBT is ultimately intended for use in an ECMA PCTE environment and has been implemented using the ECMA-162 Ada programming bindings to PCTE. However, in the absence of a conforming ECMA PCTE implementation, the PBT has been built on top of the Emeraude V12 PCTE implementation, using the subset implementation of the ECMA Ada binding developed by Paramax STARS (version 0.2).

## 3 VERSION DESCRIPTION

### 3.1 Inventory of Contents

The PBT distribution is structured as shown below. The top-level directory `pbt` includes PostScript (`VDDpbt.ps`) and clear ASCII text (`VDDpbt.tty`) versions of this document. It contains a complete directory listing of the PBT distribution (`Contents.tty`, reproduced herein as Appendix A). It also contains a PostScript version of the PBT user manual

(USERpbt.ps). It contains the DDL specification (pbt.sds) of the pbt SDS used by the browser. Finally, it contains the following subdirectories, described below:

- pbt/code
- pbt/bin
- pbt/X-Resources
- pbt/X-Resources/bitmaps

### 3.1.1 Subdirectory: pbt/code

This directory contains the Ada source code for the PBT. It also contains the C shell scripts and associated support files needed to rebuild the PBT.

### 3.1.2 Subdirectory: pbt/bin

This is the directory into which the build process moves the PBT executable after a successful compile and link. This directory contains two PBT executables named PBT12.2 and PBT12.3, which have been linked to execute under Emeraude V12.2 and V12.3, respectively.

### 3.1.3 Subdirectory: pbt/X-Resources

This directory contains the PCTE-Browser.black\_n\_white and PCTE-Browser.color files describing the X resource values used by the browser for black-and-white and color monitors, respectively. These values specify such characteristics of the PBT as the dimensions to be used for the various windows created by the browser. This directory also contains the bitmaps subdirectory, described below.

#### 3.1.3.1 Subdirectory: pbt/X-Resources/bitmaps

This directory contains X bitmaps for the icons used by the PBT. These icons represent the different types of PCTE objects (e.g., File) and relationships (e.g., Composition and Reference links) recognized by the browser.

## 3.2 Changes Installed

### 3.2.1 Release 1.0

#### 3.2.1.1 General Changes

- PBT terminology has been changed to be more consistent with PCTE terminology: *Overall Views* are now called *Composite Views*.

Files affected:

callbacks.b.a  
static\_menus.b.a  
utilities.b.a

- Clarified the fact that the link name pattern matching refers to link *type* names. This clarification has been made both to the relevant popup menus and in the relevant user manual sections.

Files affected:

static\_menus.b.a  
USERpbt.ps

- In order to make the PBT output more consistent, PBT commands which display pathnames have been modified to exclude SDS names when the PBT has been customized to exclude such names from View node and arc labels.

Files affected:

utilities.b.a

- Changed the name of the X-Resources/PCTE-bitmaps directory to be called X-Resources/bitmaps. This was done to be consistent with Motif naming conventions for such subdirectories.

Directories affected:

X-Resources/PCTE-bitmaps

- PCTE I/O oriented files used in the 0.1 release of the PBT have been moved into the 0.2 release of the STARS Ada/PCTE bindings, and have, therefore, been removed from this release.

Files deleted:

pcte\_object\_create.a pcte\_support.a  
pcte\_support.b.a  
pcte\_text\_io.a  
pcte\_text\_io.b.a

### 3.2.1.2 Bug Fixes

- Fixed bug that prevented the display of non-key link attributes for links without key attributes.

Files affected:

utilities.b.a

### 3.2.1.3 New Features

- The PBT now has a Motif-oriented look-and-feel, primarily because of the changes made in the 1.0 release of the RGB. (The RGB previously used the STARS Ada/Xt implementation, while it now uses SERC's commercial SA-Motif Ada bindings.) These changes includes the new use of control panels, rather than sequences of popup dialog boxes.

Files affected:

```
Build_PBT.csh
Build_PBT.var
PCTE-Browser.black_n_white
PCTE-Browser.color
bitmaps/a_rel.xbm
bitmaps/a_rel_inv.xbm
bitmaps/back_r.xbm
bitmaps/c_rel.xbm
bitmaps/c_rel_inv.xbm
bitmaps/f_node.xbm
bitmaps/f_node_inv.xbm
bitmaps/i_rel.xbm
bitmaps/i_rel_inv.xbm
bitmaps/o_node.xbm
bitmaps/o_node_inv.xbm
bitmaps/p_node.xbm
bitmaps/p_node_inv.xbm
bitmaps/p_rel.xbm
bitmaps/p_rel_inv.xbm
bitmaps/r_rel.xbm
bitmaps/r_rel_inv.xbm
bitmaps/s_rel.xbm
bitmaps/s_rel_inv.xbm
bitmaps/v_rel.xbm
bitmaps/v_rel_inv.xbm
browser_instance.a
callbacks.a
callbacks_b.a
main.a
static_cmds.a
static_cmds_b.a
static_menus.a
static_menus_b.a
static_panels.a (new)
static_panels_b.a (new)
utilities.a
utilities_b.a
```

- All global PBT commands are now accessible from every View window.

Files affected:

callbacks.a  
callbacks\_b.a  
main.a  
static\_cmds.a  
static\_cmds\_b.a  
static\_menus.a  
static\_menus\_b.a

- The PBT is more customizable. For instance, it is now possible to control what types of links to include in new composite views by default.

Files affected:

callbacks.a  
callbacks\_b.a  
globals.a  
static\_cmds.a  
static\_cmds\_b.a  
static\_menus.a  
static\_menus\_b.a  
utilities.a  
utilities\_b.a

- The PBT now supports the listing of all of the SDSes in the metabase.

Files affected:

callbacks\_b.a  
static\_menus\_b.a  
utilities.a  
utilities\_b.a

- Local Views can now be created via the global Display command button, as well as via point-and-click operations on objects in existing Views. This means that it is now just as easy to create Local Views as it is to create Composite Views.

Files affected:

callbacks.a  
callbacks\_b.a  
static\_cmds.a  
static\_cmds\_b.a  
static\_menus.a  
static\_menus\_b.a  
utilities.a  
utilities\_b.a

- The PBT now supports command line arguments. These arguments can be used to perform such actions as to control customizable PBT features, to set the initial Current

Object, to set the initial working schema, and to create initial Composite and/or Local Views.

Files affected:

globals.a  
utilities.a  
c\_interface.a (new)  
c\_interface\_b.a (new)  
system\_env.a (new)  
system\_env\_b.a (new)  
utilities\_b.a

- The PBT now supports the invoking of arbitrary PCTE processes on behalf of PCTE objects. This new capability allows for specialized viewer programs to be invoked for specialized types of file objects. Previously, the only way that a file object could be viewed was to display it in a text window—something that could only be done for pure ASCII text files. Now, for instance, a Software Through Picture (StP) diagram, stored in a PCTE file object, can be viewed from within the PBT using the appropriate StP diagram display utility.

Files affected:

callbacks.a  
callbacks\_b.a  
env\_int.c (new)  
utilities.a  
utilities\_b.a

### 3.3 Adaptation Data

#### 3.3.1 Operating Environment

Sun-4 Workstations with at least 32 megabytes of main memory

SunOS, Version 4.1.2

X Window System, Version 11, Release 4

Use of any "standard" X window manager (e.g., twm or mwm)

Emeraude PCTE V12.2 or V12.3

#### 3.3.2 Development Environment

Sun-4 workstation with 32 megabytes of main memory

SunOS, Version 4.1.2

STARS Reusable Graphical Browser (RGB), Version 1.0

STARS Ada bindings to ECMA PCTE (Ada/PCTE), Version 0.2

SERC Ada/Motif, Version 1.0 (commercial Ada bindings to Motif)

X Window System, Version 11, Release 4

OSF/Motif 1.1.1

SunAda version 1.0 Ada compilation system

### 3.3.3 Configuration-Unique Data

There are two explicit dependencies in the PBT itself to UNIX, in its use of the "exit" procedure as part of the PBT termination processing, and its access to UNIX environment variables. These features are accessible via the Ada *pragma INTERFACE* capability in the code files `utilities.b.a` and `system_env.b.a`.

The PBT makes extensive use of ECMA PCTE Ada bindings, which, in its current implementation is highly dependent upon the Emeraude V12 PCTE implementation.

### 3.4 Interface Compatibility

The 1.0 release of the PBT supports all of the functionality of the previous PBT release (0.1). However, the commands and menus used to access many of these functions have been revised in the change to a Motif-oriented user interface.

### 3.5 Installation Instructions

The sections below describe the steps needed to:

- build the PBT executable (optional—see the note at end of section 3.5.1)
- install the PBT's X Resource file, `PCTE-Browser`
- install the PBT executable in the environment
- install the SDS (`pbt`) needed by the browser in the PCTE metabase

(See the accompanying PBT user manual for details on how to use the browser.)

### 3.5.1 Build Procedure

This section describes the procedure for compiling and linking the PBT program using the SunAda 1.0 Ada compilation system from Sun Microsystems.

The build process assumes the following. Before proceeding with the build of the PBT, first verify that these assumptions are correct.

- The entire PBT delivery contents have previously been loaded onto the local file system. For purposes of these installation instructions, the top-level directory for the PBT delivery shall be referred to as */local/pbt*.
- SERC's SA-Motif, version 1.0, has previously been installed onto the local file system, at a location to be referred to below as */local/serc\_samotif*.
- The Reusable Graphical Browser, version 1.0, has previously been loaded onto the local file system, at a location to be referred to below as */local/rgb*.
- The RGB library has previously been built using the SunAda 1.0 Ada compiler. See the VDD for the RGB release for information on how to build this library. This library is assumed to be found in the following UNIX directory: */local/rgb/Build\_SunAda1.0/rgb*
- The Emeraude PCTE implementation, version V12.3, has been loaded onto the local file system, at a location to be referred to below as */local/emeraude\_pcte*.
- The PCTE Ada Bindings implementation version 0.2, has been loaded onto the local file system, at a location to be referred to below as */local/adapcte*.
- The PCTE PCTE Ada Bindings has previously been built using the SunAda 1.0 Ada compilation system. See the VDD for the Ada Bindings release for information on how to build this library. This library is assumed to be found in the following UNIX directory: */local/adapcte02/Build\_SunAda1.0*
- The Xlib archive file corresponding to the X11R4 delivery has previously been created. Consult with your local system administrator for the exact location of the Xlib archive file on your system. For purposes of this discussion, it is assumed that this file can be found at:

- */usr/lib/X11/libX11.a*

To build the PBT, first edit the *code/Build\_PBT.var* file to reflect the actual operating environment. This file (listed in its entirety in Appendix B.1) initializes the environment variables used by the rest of the build process. Variables that must be initialized include the following:

- PBT - the top level directory of the PBT distribution



- RGB – the directory containing the RGB Ada library built using SunAda 1.0
- LIBX – the pathname of the X11R4 Xlib archive
- COMPILERPATH – the pathname of the top-level directory of the SunAda 1.0 compilation system
- PCTE – the directory containing the SunAda library for the ECMA PCTE Ada bindings (Ada/PCTE)
- PCTE\_ROOT – the top level directory of the PCTE delivery

Once the `code/Build_PBT.var` file has been edited, the rest of the compiling and linking of the PBT is fully automated. Simply `cd` to the PBT distribution's code directory and execute the `code/Build_PBT.csh` C shell script (shown in its entirety in Appendix B.2), as in the following example:

```
% cd /local/pbt/code
% Build_PBT.csh >& Build.out &
```

This script creates the directory called `Build_SunAda1.0` below the top-level PBT directory in which the PBT's SunAda library will be created and in which the link will take place.

**IMPORTANT NOTE:** This step is optional and can be skipped because (already compiled and linked) executables for Emeraude V12.2 and Emeraude V12.3 environment have been included in the release. To skip the build step, simply rename the appropriate executable from the `bin` directory, as in the following UNIX commands:

```
mv /local/pbt/bin/PBT12.2 /local/pbt/bin/PBT      or
mv /local/pbt/bin/PBT12.3 /local/pbt/bin/PBT
```

In this example, `/local/pbt` would be replaced by the actual full UNIX pathname of the appropriate site-specific directory.

### 3.5.2 Executable Installation Procedure

Assuming that the build is successful, the executable PBT will be moved into the `bin` directory beneath the top-level PBT directory—replacing any version of PBT previously in that directory.

The PBT executable could be installed as a static context within the PCTE object base prior to its first use. However, it can also be accessed from within PCTE by placing it in a UNIX directory that is part of the UNIX `PATH` environment variable. Therefore, it is assumed that the user will either include the PBT's `bin` directory in the user's path, or will copy the PBT executable to another directory already in the path (e.g., `/usr/local/bin`).

### 3.5.3 Installing the X Resource Files

A number of UNIX files associated with the PBT must be on-line at the time that the PBT is executed:

- A set of files describing the bitmaps to be used for the various node and link icons.
- The "X resource file" associated with the PBT, `PCTE-Browser`, describing such information as which bitmap to use for which type of object, what dimensions to use for the various widgets used by the PBT, etc.

In the case of the `PCTE-Browser` file, two different versions are supplied in the release:

- `PCTE-Browser.color` - for use on color monitors
- `PCTE-Browser.black_n.white` - for use on monochrome monitors

Depending upon the kind of monitor being used, one of these two files should be linked under the name `PCTE-Browser`, as in:

```
ln PCTE-Browser.color PCTE-Browser
```

It is also important to make sure that the `bitmaps` subdirectory is located in the same directory as is the `PCTE-Browser` file. If it is not installed in the same directory, then the PBT will not be able to locate and use the bitmap files found in this subdirectory when the browser is invoked.

### 3.5.4 Installing the PBT-Oriented SDS

Some of the new PBT features depend upon the presence of the `pbt` SDS. In order to install this SDS into the PCTE metabase, the DDL specification of this SDS must be compiled. A file containing this DDL specification is included in this delivery, under the name `/local/pbt/pbt.sds`. To compile this file, it is necessary to first log into PCTE and then execute the `sds_compile` command, as in:

```
sds_compile /local/pbt/pbt.sds
```

In this example, `/local/pbt` would be replaced by the actual full UNIX pathname of the appropriate site-specific directory.

## 3.6 Potential Problems

1. When the Initial Browser window is used to create the first Composite or Local View, the PBT is designed to transform the Initial Browser window into the View window.

This transformation involves expanding the size of the window, after which the second (view-specific) menu bar is added, along with the graph of the new View at the bottom of the window. However, occasionally, the window will be expanded in size, but the second menu bar and the graph will not be displayed. If and when this happens, simply use the window manager to resize the window: Even a very small change in window size—as small as one pixel—will cause the View window to be displayed properly.

2. The PCTE-Browser is required to be in the directory identified by the XAPPLRES DIR environment variable. If it is not found in this directory, or if the XAPPLRES DIR variable is not properly set, then the PBT will terminate at the first attempt to create a Composite or Local View window, with the following error message:

```
Error in kernel:: exception_handler: below bottom of user stack
```

3. If the `bitmaps` subdirectory is not found in the directory identified by XAPPLRES DIR, then the browser will not be able to display the proper node and link icons in View windows.
4. The PBT will occasionally crash when deleting a View window if a number of View windows had previously been deleted.
5. Warning messages will occasionally be written to the PBT's standard output device when selected windows (primarily control panels) are closed down. These warning messages are harmless and can all be ignored. The following are examples of such warnings:

```
Warning: XtRemoveGrab asked to remove a widget not on the list
```

```
Warning: Attempt to remove non-existent passive grab
```

### 3.7 Enhancements

Possible future enhancements to the PBT include:

- Addition of a PCTE object base editing capability.
- Addition of a graphical SDS display and editing capability.
- Improved graph layout algorithms.
- Migration to a conforming ECMA PCTE environment.

## 4 USER FEEDBACK

We encourage experimentation with the PBT, and we solicit feedback from the PCTE community to assist us in improving the product. Thus, we would greatly appreciate your comments, suggestions, and criticisms.

## A Appendix: Inventory of Contents

NOTE: "\*" identifies executables; "/" identifies directories.

pbt:

Contents.tty

USERpbt.ps

VDDpbt.ps

VDDpbt.tty

X-Resources/

bin/

code/

pbt.sds

X-Resources:

PCTE-Browser.black\_n\_white

PCTE-Browser.color

bitmaps/

X-Resources/bitmaps:

a\_rel.xbm

a\_rel\_inv.xbm

back\_r.xbm

c\_rel.xbm

c\_rel\_inv.xbm

f\_node.xbm

f\_node\_inv.xbm

i\_rel.xbm

i\_rel\_inv.xbm

o\_node.xbm

o\_node\_inv.xbm

p\_node.xbm

p\_node\_inv.xbm

p\_rel.xbm

p\_rel\_inv.xbm

r\_rel.xbm

r\_rel\_inv.xbm

s\_rel.xbm

s\_rel\_inv.xbm

v\_rel.xbm

v\_rel\_inv.xbm

bin:

PBT12.2\*

PBT12.3\*

code:

Build\_PBT.csh\*  
Build\_PBT.var  
browser\_instance.a  
browser\_params.a  
browser\_params\_b.a  
c\_interface.a  
c\_interface\_b.a  
callbacks.a  
callbacks\_b.a  
env\_int.c  
globals.a  
main.a  
pcte\_layout.a  
pcte\_layout\_b.a  
pipe\_int.c  
static\_cmds.a  
static\_cmds\_b.a  
static\_menus.a  
static\_menus\_b.a  
static\_panels.a  
static\_panels\_b.a  
system\_env.a  
system\_env\_b.a  
utilities.a  
utilities\_b.a

**B Appendix: Unix Installation Scripts****B.1 File: Build\_PBT.var**

```
1 #
2 # Edit these lines and leave them uncommented if you do not want to
3 # be prompted for the environment variables
4 #
5 setenv PBT          /local/pbt
6 setenv RGB          /local/rgb/Build_SunAda1.0/rgb
7 setenv LIBX         /usr/lib/libX11.a
8 setenv COMPILERPATH /local/SunAda
9 setenv SAMOTIFHOME  /local/serc_samotif
10 setenv PCTE         /local/adapcte/Build_SunAda1.0
11 setenv PCTE_ROOT    /local/emeraude_pcte
12
13 # Variables that need not be modified:
14 setenv OS           4.1
15 setenv Sun          4
16 setenv COMPILERNAME sunada
17 setenv COMPVERSION SunAda1.0
18 setenv TARGET       $PBT/Build_$COMPVERSION
19
20 #
21 # Define the location of the PBT source code directories.
22 #
23 if ( ! $?PBT ) then
24     echo ""
25     echo "Specify path to top level PBT directory "
26     echo "(e.g. /local/pbt01) "
27     echo ""
28     echo -n "          PBT = "
29     setenv PBT $<
30     echo ""
31 endif
32 if ( ! -e $PBT ) then
33     echo ""
34     echo "*** $PBT does not exist ***"
35     echo "*** Script aborted ***"
36     echo ""
37     unsetenv PBT
38     exit -1
39 endif
40
41 #
```

```
42 # Define the location of the RGB source code directories.
43 #
44
45 if ( ! $?RGB ) then
46     echo ""
47     echo "Specify path to directory containing RGB Ada library "
48     echo "(e.g. /local/rgb05/Build_SunAda1.0/rgb) "
49     echo ""
50     echo -n "          RGB = "
51     setenv RGB $<
52     echo ""
53 endif
54 if ( ! -e $RGB ) then
55     echo ""
56     echo "*** $RGB does not exist ***"
57     echo "*** Script aborted ***"
58     echo ""
59     unsetenv RGB
60     exit -1
61 endif
62
63
64 #
65 # Define the location of the dependencies.
66 #
67
68 #
69 # Define the location of the X11R3/R4 Xlib archives
70 #   where XLIB = path to the X11 Xlib object archive (e.g./usr/lib/libX11.a)
71 #
72 if ( ! $?LIBX ) then
73     echo ""
74     echo "Specify the path to the X11 Xlib object archive "
75     echo "(e.g. /usr/lib/libX11.a ) "
76     echo ""
77     echo -n "          LIBX = "
78     setenv LIBX $<
79     echo ""
80 endif
81 if ( ! -e $LIBX ) then
82     echo ""
83     echo "*** $LIBX does not exist ***"
84     echo "*** Script aborted ***"
85     echo ""
86     unsetenv LIBX
```

```
87     exit -1
88 endif
89
90 #
91 # Define C Language compilation variable
92 #
93 setenv CC          " cc -g -c "
94
95 #
96 # Determine the Ada compilation system to use
97 #
98 #
99 # Establish a path to the SunAda compilation system
100 #
101 if ( ! $?COMPILERNAME || ! $?COMPVERSION || ! $?COMPILERPATH ) then
102     echo ""
103     echo "Please select your compiler name: [sunada] "
104     echo ""
105     echo -n " COMPILERNAME = "
106     setenv COMPILERNAME $<
107     echo ""
108     switch ($COMPILERNAME)
109     case SunAda:
110     case SUNADA:
111     case sunada:
112         echo -n "Are you building with SunAda1.0? [y,n](n) "
113         set COMPVERSION = $<
114         echo ""
115         switch ($COMPVERSION)
116         case Y:
117         case y:
118             set COMPVERSION = SunAda1.0
119             breaksw
120         case N:
121         case n:
122         default:
123             set COMPVERSION = SunAda
124             echo ""
125             echo "Warning! Software has only been tested using SunAda 1.0."
126             breaksw
127         endsw
128     breaksw
129 default:
130     echo ""
131     echo "You must specify a compiler name."
```



```
132     echo ""
133     unsetenv COMPVERSION
134     exit -1
135     breaksw
136 endsw
137
138     echo ""
139     echo "Specify path to the compiler (e.g. /local/SunAda)"
140     echo ""
141     echo -n "   COMPILERPATH = "
142     setenv COMPILERPATH $<
143     if ( ( $COMPILERPATH == ) || ( ! -e $COMPILERPATH/bin/ada ) ) then
144         echo ""
145         echo "*** Cannot find Ada compiler in $COMPILERPATH/bin ***"
146         echo "*** Script aborted ***"
147         echo ""
148         unsetenv COMPILERPATH
149         exit -1
150     endif
151 endif
152 if ( -e $COMPILERPATH/bin/ada ) then
153     if ( $COMPILERNAME == "sunada" ) then
154         setenv COMPILERBIN $COMPILERPATH/bin
155         setenv COMPILE    "$COMPILERBIN/ada -v -e -OO "
156         setenv LINK      "$COMPILERBIN/a.ld "
157     endif
158 else
159     echo ""
160     echo "*** Cannot find $COMPILERPATH/bin/ada ***"
161     echo "*** Script aborted ***"
162     echo ""
163     unsetenv COMPILERPATH
164     exit -1
165 endif
166
167
168 #
169 # Define the Destination of the PBT build
170 # where TARGET = path to build destination (e.g. $PBT/Build_SunAda1.0)
171 #
172 if ( ! $?TARGET ) then
173     echo ""
174     echo "Specify the path to the TARGET directory "
175     echo "(Defaults to $PBT/Build_${COMPVERSION}) "
176     echo ""
```

```
177 echo -n "          TARGET = "  
178 setenv TEMP $<  
179 echo ""  
180 if ( $TEMP == ) then # check for null entry  
181     setenv TARGET $PBT/Build_${COMPVERSION}  
182     unsetenv TEMP  
183 else  
184     setenv TARGET $TEMP  
185     unsetenv TEMP  
186 endif  
187 endif  
188  
189 echo ""  
190 echo "          TARGET = $TARGET"  
191 echo ""  
192 echo "          RGB = $RGB"  
193 echo "          PBT = $PBT"  
194 echo "          PCTE_ROOT = $PCTE_ROOT"  
195 echo ""  
196 echo "          LIBX = $LIBX"  
197 echo "    COMPILERNAME = $COMPILERNAME"  
198 echo "    COMPVERSION = $COMPVERSION"  
199 echo "    COMPILERPATH = $COMPILERPATH"  
200 echo "    COMPILE = $COMPILE"  
201 echo "    LINK = $LINK"  
202 echo "    OS = $OS"  
203 echo "    Sun = $Sun"  
204  
205 #  
206 # Create the directories for the build  
207 #  
208 if ( ! -d $TARGET ) mkdir $TARGET  
209 if ( ! -d $TARGET/rgb ) mkdir $TARGET/rgb  
210 if ( ! -d $TARGET/application ) mkdir $TARGET/application
```

**B.2 Script: Build\_PBT.csh**

```
1  #! /bin/csh -f
2  echo ""
3  echo "Defining installation-dependent variables"
4  echo ""
5  source Build_PBT.var
6
7  if ! -e $TARGET mkdir $TARGET
8
9  cd $TARGET
10
11  echo ""
12  echo "Building Ada libraries for the PCTE Browser Tool (PBT)"
13  echo "-- a sample application of the Reusable Graphical Browser --"
14  echo ""
15  if ( $COMPILERNAME == "sunada" ) then
16    if (! -e $RGB/ada.lib) then
17      echo "Sorry. RGB must be built first. Script aborted."
18      exit -1
19    endif
20
21    if (-e ada.lib ) a.rmlib -f          # clean out old library
22    $SAMOTIFHOME/sup/x11.mklib
23
24    echo ""
25    echo "Establishing dependencies"
26    echo ""
27
28    $COMPILERBIN/a.path -i $PCTE
29    $COMPILERBIN/a.path -i $RGB
30  else
31    echo "Sorry. Only SunAda is currently supported. Script aborted."
32    exit -1
33  endif
34
35  echo ""
36  echo "Building TARGET directory with symbolic links to source code"
37  echo ""
38  foreach file ($PBT/code/*.a $PBT/code/*.c)
39    if ( ! -e ${file:t} ) ln -s $file ${file:t}
40  end
41
42  cd $TARGET
43
```

```
44 echo ""
45 echo "Compiling the C source"
46 echo ""
47 cc -c pipe_int.c
48 if ( $status != 0 ) exit $status
49 cc -c env_int.c
50 if ( $status != 0 ) exit $status
51
52 echo ""
53 echo "Compiling the PBT source"
54 echo ""
55 $COMPILE c_interface.a
56 if ( $status != 0 ) exit $status
57 $COMPILE c_interface_b.a
58 if ( $status != 0 ) exit $status
59 $COMPILE browser_params.a
60 if ( $status != 0 ) exit $status
61 $COMPILE browser_params_b.a
62 if ( $status != 0 ) exit $status
63 $COMPILE browser_instance.a
64 if ( $status != 0 ) exit $status
65 $COMPILE system_env.a
66 if ( $status != 0 ) exit $status
67 $COMPILE system_env_b.a
68 if ( $status != 0 ) exit $status
69 $COMPILE pcte_layout.a
70 if ( $status != 0 ) exit $status
71 $COMPILE pcte_layout_b.a
72 if ( $status != 0 ) exit $status
73 $COMPILE globals.a
74 if ( $status != 0 ) exit $status
75 $COMPILE static_menus.a
76 if ( $status != 0 ) exit $status
77 $COMPILE static_cmds.a
78 if ( $status != 0 ) exit $status
79 $COMPILE callbacks.a
80 if ( $status != 0 ) exit $status
81 $COMPILE static_panels.a
82 if ( $status != 0 ) exit $status
83 $COMPILE static_menus_b.a
84 if ( $status != 0 ) exit $status
85 $COMPILE static_cmds_b.a
86 if ( $status != 0 ) exit $status
87 $COMPILE utilities.a
88 if ( $status != 0 ) exit $status
```

```
89 $COMPILE static_panels_b.a
90 if ( $status != 0 ) exit $status
91 $COMPILE utilities_b.a
92 if ( $status != 0 ) exit $status
93 $COMPILE callbacks_b.a
94 if ( $status != 0 ) exit $status
95 $COMPILE main.a
96 if ( $status != 0 ) exit $status
97
98 echo ""
99 echo "Linking the objects"
100 echo ""
101 set objects = ($RGB/call_ada.o $PCTE/util.o pipe_int.o env_int.o)
102 set libs = ($LIBX $PCTE_ROOT/lib/libemer.a)
103 $LINK -v main $objects -o PBT $libs
104 if ( $status != 0 ) exit $status
105 mv PBT $PBT/bin/PBT
106
107 echo ""
108 echo "Build Complete"
```