Using the ModelSource 640-pin Generic Device Adapter

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Release R3.6b

November 2001

Contents

Preface

About This Application Note

This application note describes the features and use of the ModelSource™ 640-pin Generic Device Adapter (hereafter referred to as the "Adapter"*)*, which allows you to model a 640-pin device using ModelSource modeling systems.

This application note assumes that you are familiar with model-building procedures as described in these Synopsys documents:

- *Logic Model Development Manual*
- *Shell Software Reference Manual*
- *ModelSource User's Manual*
- *LM-family Modeler Manual*

Related Documents

To see a complete listing, refer to the *Guide to Hardware Modeling Documents*.

Manual Overview

This manual contains the following chapters and appendixes:

Preface	Describes the application note and lists the typographical conventions and symbols used in it; tells how to get technical assistance.
Chapter 1 Describing a 640-pin Logic Model	Describes the hardware and software needed to create a Logic Model using the 640-pin Generic Device Adapter.

Chapter 2 **Building the Daughterboard**	Provides specifications for building the 640-pin Adapter Daughterboard.
Chapter 3 **Connecting the Daughterboard**	Describes the Adapter and provides a procedure for connecting it and the Daughterboard.
Chapter 4 **Developing the Shell Software**	Briefly outlines software development tasks and provides references.
Chapter 5 **Completing the Model**	Describes mounting the Adapter onto the Modeling Systems; labeling the Daughterboard; verifying the model; and unmounting the Adapter.
Appendix A **J1–J6 Connector Pinouts**	Provides a pinout listing for J1-J6 connectors.

Typographical and Symbol Conventions

- **Default UNIX prompt**

  Represented by a percent sign (%).

- **User input** (text entered by the user)

  Shown in **bold** type, as in the following command line example:

  ```
  % cd $LMC_HOME/hdl
  ```

- **System-generated text** (prompts, messages, files, reports)

  Shown as in the following system message:

  ```
  No Mismatches: 66 Vectors processed: 66 Possible
  ```

- **Variables** for which you supply a specific value

  Shown in italic type, as in the following command line example:

  ```
  % setenv LMC_HOME prod_dir
  ```

  In this example, you substitute a specific name for *prod_dir* when you enter the command.

- Command syntax

  Choice among alternatives is shown with a vertical bar (|) as in the following syntax example:

  ```
  -effort_level  low | medium | high
  ```

  In this example, you must choose one of the three possibilities: low, medium, or high.

Optional parameters are enclosed in square brackets ([ ]) as in the following syntax example:

pin1 [*pin2 ... pinN*]

In this example, you must enter at least one pin name (*pin1*), but others are optional ([*pin2 ... pinN*]).

Getting Help

If you have a question while using Synopsys products, use the following resources:

1. Start with the available product documentation installed on your network or located at the root level of your Synopsys CD-ROM. Every documentation set contains overview information in the intro.pdf file.

   Additional Synopsys documentation is available at this URL:

   http://www.synopsys.com/products/lm/docs

   Datasheets for models are available using the Model Directory:

   http://www.synopsys.com/products/lm/modelDir.html

2. Visit the online Support Center at this URL:

   http://www.synopsys.com/support/lm/support.html

   This site gives you access to the following resources:

   - SOLV-IT!, the Synopsys automated problem resolution system
   - product-specific FAQs (frequently asked questions)
   - lists of supported simulators and platforms
   - the ability to open a support help call
   - the ability to submit a delivery request for some product lines

3. If you still have questions, you can call the Support Center:

   North American customers:
   Call the Synopsys Eaglei and Logic Modeling Products Support Center hotline at 1-800-445-1888 (or 1-503-748-6920) from 6:30 AM to 5 PM Pacific Time, Monday through Friday.

   International customers:
   Call your local sales office.

The Synopsys Website

General information about Synopsys and its products is available at this URL:

http://www.synopsys.com

Comments?

To report errors or make suggestions, please send e-mail to:

doc@synopsys.com

To report an error that occurs on a specific page, select the entire page (including headers and footers), and copy to the buffer. Then paste the buffer to the body of your e-mail message. This will provide us with information to identify the source of the problem.

1
Describing a 640-pin Logic Model

This chapter describes the necessary components and provides a procedural summary for building a 640-pin Logic Model.

Hardware Requirements

To build a complete 640-pin Logic Model using the 640-pin Adapter, you need the following hardware:

- The device you want to model, henceforth referred to as the device under test (DUT). The DUT can have up to 640 input, output, and I/O signals, exclusive of supply voltage and auxiliary signals. The DUT can include more than one physical package, as long as the components fit within an area approximately 6” x 6”.
- One 640-pin Generic Device Adapter Daughterboard, henceforth referred to as the “Daughterboard”, to which you attach the DUT.
- Four ModelSource modeling systems, *either* 4 MS3200 units *or* 4 MS3400 units. You cannot mix these two types of units.
- One 640-pin Adapter, which provides the interface between the modeling systems and the Daughterboard.

Software Requirements

To support the 640-pin Logic Model, you need the following software:

- User-created Shell Software files, described in the Shell Software Reference Manual.
- The product-specific Shell Software files GEN640.ADP and GEN640.PKG, provided by Synopsys and described in later text.
- R3.3b or later of the Runtime Modeler Software.
- The lm utility, R3.3b or later, for labeling the Daughterboard.

Procedural Summary

The steps in building a 640-pin Logic Model are as follows:

1. Build the Daughterboard and attach the DUT to it.
2. Connect the Daughterboard to the Adapter.
3. Develop the model Shell Software.
4. Mount the Adapter onto the ModelSource modeling systems.
5. Label the Daughterboard.
6. Verify the model.

Steps 1, 2 and 4 are described in detail in this application note. Steps 3, 5, and 6 are summarized here; for more details, refer to the *Logic Model Development Manual*.

2 Building the Daughterboard

This chapter describes the specifications you must meet when building the Daughterboard.

Daughterboard Description

Figure 1 shows the physical specifications of the Daughterboard from the component side. The Daughterboard is designed to have a footprint area in excess of 10” by 14”, allowing for a multi-chip DUT.

Following are descriptions of some of the items shown on the drawing. All connectors are to be installed from the far side.

- Guide pin holes: These are designed to mate with the guide pins on the Adapter to ensure correct orientation when attaching the Daughterboard to the Adapter.
- Board stiffeners: Four (two long and two short) are required around the perimeter of the Daughterboard to reinforce it. Fabrication drawings for compatible long and short stiffeners are provided in Figure 3 on page 15.
- Connectors J1-J6: These are to be installed from the far side, and are designed to mate with corresponding connectors on the Adapter. The location of Pin A1 of each connector is indicated on the drawing. Details of the connector pins are provided in text that follows.

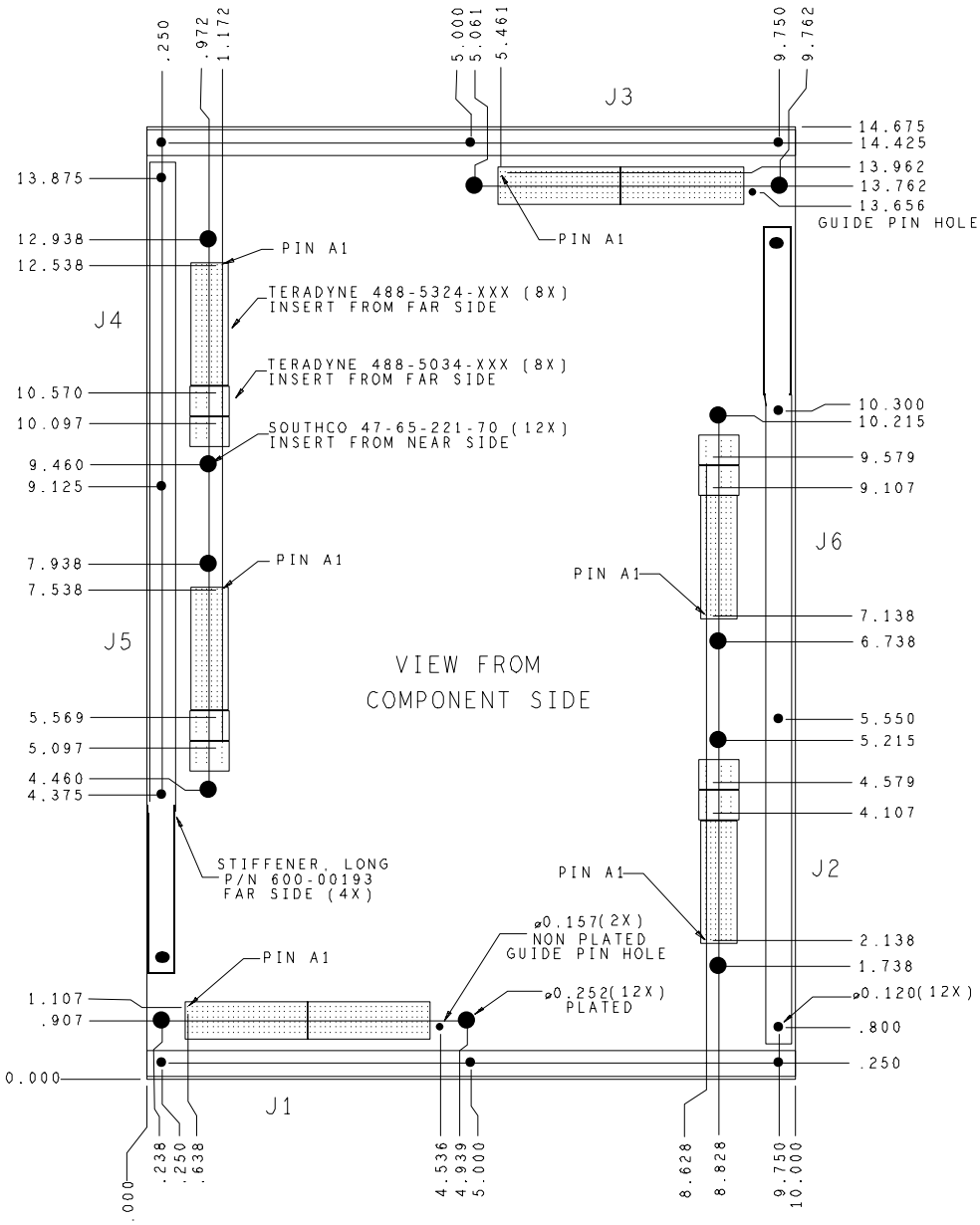


Figure 1: 640-pin Adapter Daughterboard

Connector Pin Detail

Connectors J1–J6 include the connections (DUT1–DUT640) between the DUT and the Adapter through the Daughterboard and, in addition, supply voltage, ground connections, and various auxiliary signals. Figure 2 shows details of J1–J6 connector pins, from the component side. Pinouts are listed in “J1–J6 Connector Pinouts” on page 29.

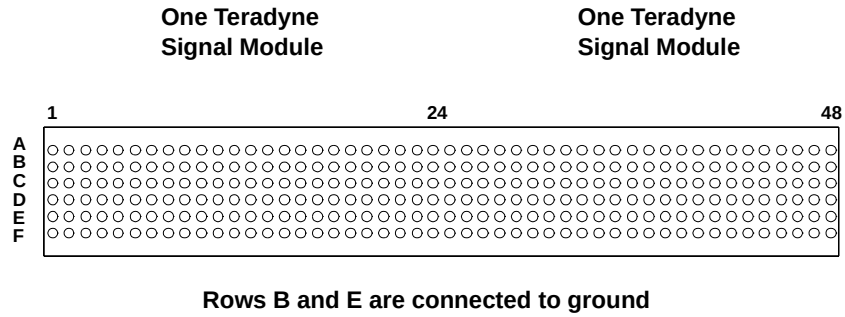
Connectors J1 and J3

These connectors include two each of Teradyne signal modules, and have 6 rows of 48 pins each. You will notice in Appendix A that no connections are listed for Rows B and E; these are exclusively ground.

Connectors J2, J4, J5 and J6

These connectors include one each of Teradyne signal modules (A1–F24, at the left of the figure) and two each of Teradyne power modules (AP1–FP4 and AP5–FP8, at the right of the figure). As with connectors J1 and J3, the left (signal module) side has rows B and E exclusively connected to ground. The right (power module) side has no rows B, C, or E.

Connectors J1 and J3



Connectors J2, J4, J5 and J6

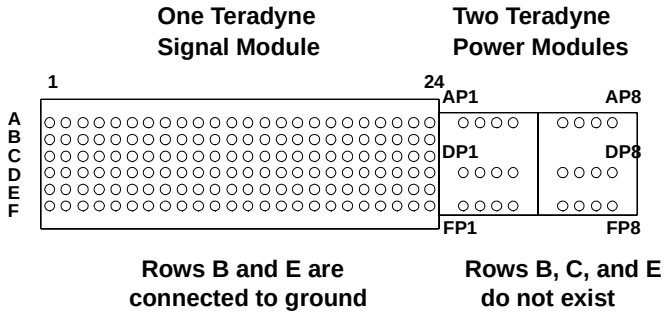


Figure 2: Connector Pin Detail, Shown from Component Side

Parts List

The required parts are as follows:

- Eight Teradyne HDM signal modules, 488-5324-*XXX*. These are available either as press fit or solder tail, in a variety of tail lengths. The last three digits (*XXX*) of the part number depend on which type you choose; for specific part numbers, see the Teradyne product documentation.
- Eight Teradyne HDM power modules, 437-5034-500. These are currently available only as solder tail.
- Twelve Southco retractable screw fasteners, 47-65-221-70.
- To mount the stiffeners:
  - Fourteen 4-40 1/4” pan head Phillips screws

- Fourteen #4 lock washers
- Fourteen #4 flat washers

- One EEProm, Catalyst semiconductor CAT93C86.

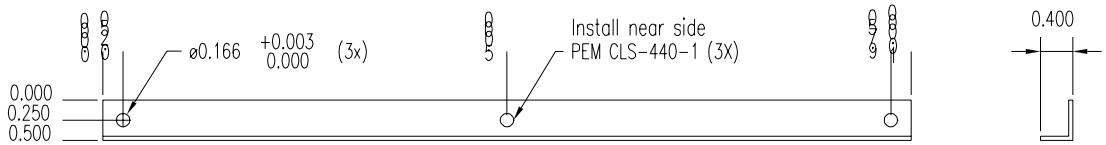
Note

The above does not include the package type designation; that is up to the model designer.

- Two Synopsys board stiffeners (short), 600-00193 (or build according to specifications).
- Two Synopsys board stiffeners (long), 600-00XXX (or build according to specifications).

Figure 3 shows a drawing of the short and long board stiffeners.

Short Stiffener



Long Stiffener

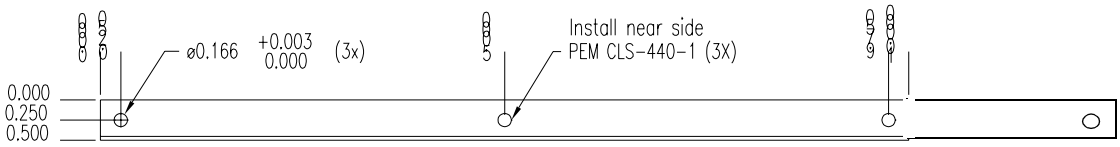


Figure 3: Fabrication Drawing of Board Stiffeners

Requirements

- You must locate the connectors and guide pin holes exactly as shown in Figure 1 on page 12, so that the Daughterboard will fit onto the Adapter.
- The height of the DUT above the Daughterboard must not exceed 2.25 inches.

- The DUT signal traces (DUT1 through DUT640) are controlled impedance, and must be 93 ohms ± 10%. (All other signals are uncontrolled but will function correctly at 93 ohms.)
- You must make the following specific connections:
  - J1-A1 to J1-F48 (SEAT1)
  - J2-A1 to J2-F24 (SEAT2)
  - J3-A1 to J3-F48 (SEAT3)
  - J4-A1 to J4-F24 (SEAT4)
  - J5-A1 to J5-F24 (SEAT5)
  - J6-A1 to J6-F24 (SEAT6)

  (These connections pass a daisychain signal through all four J connectors to allow the ModelSource system to detect whether or not the Adapter is seated correctly.)
- You must provide a series termination of 4.7 ohms within 1 inch of the DUT's signal pins. Use as small a surface mount package as can practically be mounted.

Routing Guidelines

Provide connections for your DUT device(s) on the Daughterboard. Route the DUT signals (DUT1 through DUT640) and other appropriate signals to the J connector pins according to the pinout listing in "J1–J6 Connector Pinouts" on page 29.

The following are some guidelines:

- For optimal pattern clock rates, ensure that all DUT signals are the same length, or nearly so (within 0.5 inch).
- Use *either* microstrip (preferred) *or* stripline for the signal layers, but do not mix them, because their propagation velocities are different. Use microstrip if the signal routing fits on two layers; use stripline if the signal routing requires more than two layers.
- For ease of testing, create test points for the following signals:
  - J1-D17 (KEEPALIVE)
  - J1-A15 (TRIGGER)
  - J1-A19 (PLAY)
  - J1-A17 (SAMPLE)
  - Any voltages used by the DUT

- J4-FP5–J4-FP8 (FANP12V), if used
- DUT signal used for DUT clock

- You can connect to any of the available power supplies listed in Table 1. Do not interconnect different power supplies.

Table 1: Available Power Supplies

Pins	Signal	Power Supply
J2-AP5–J2-AP8 J4-AP5–J4-AP8	P5V	+5V DC, 6A max
J2-AP1–J2-AP4	ADJVCC1	+3-5V DC, 6A max
J4-AP1–J4-AP4	ADJVCC2	+3-5V DC, 6A max
J4-FP1–J4-FP4	M5V	-5.2V DC, 400mA max
J2-FP5–J2-FP8	P12V	+12V DC, 400mA max
J4-FP5–J4-FP8	FANP12V	+12V DC, 400mA max (for fan/heat sink only)

- For bypass/decoupling capacitors, follow the DUT manufacturer's recommendations, if provided; otherwise, use the following guidelines:
  - For each supply of P5V, ADJVCC1 or ADJVCC2, provide 47µF, 16V tantalum (use two of these, if space permits).
  - For each supply of P12V, M5V, provide 10µF, 16V tantalum.
  - For bypass, for every 25 signal pins, place a pair of 0.1µF and 0.01µF high frequency X7R or NPO capacitors directly underneath the device, if possible, or around the perimeter of the device.

3 Connecting the Daughterboard

This section describes the Adapter and gives instructions for interconnecting it and the Daughterboard.

Adapter Description

Figure 4 shows a drawing of the Adapter. The items of interest to the user are as follows:

- Connectors that mate with Daughterboard connectors J1–J6
- Ejectors for disconnecting the Daughterboard from the Adapter
- Guide pins that fit the Daughterboard guide pin holes to ensure correct orientation
- Test points for the signals TRIGGER, KEEPALIVE, PLAY, FEEDBACK, SAMPLE, ADJVCC1, +5V, -5V, and GND

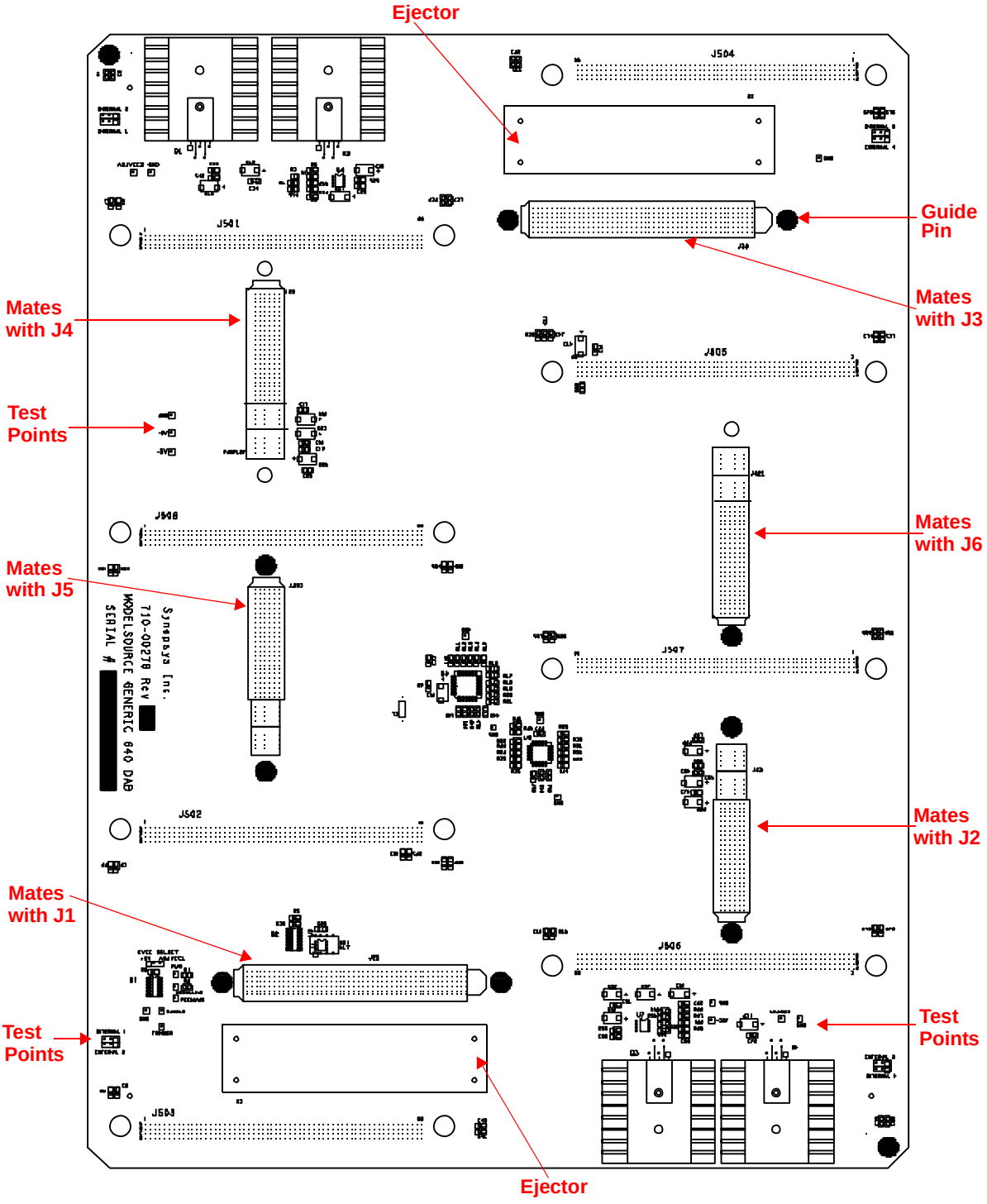


Figure 4: The 640-pin Generic Device Adapter

Procedures

Caution

Do not connect or disconnect the Daughterboard to or from the Adapter while the Adapter is mounted on the ModelSource modeling systems.

To connect the Daughterboard to the Adapter, follow these steps:

1. Remove the lid from the Adapter.
2. Set the Daughterboard on the Adapter, engaging the guide pins through the guide pin holes.
3. Push firmly to seat.
4. Hand-tighten each of the Southco retractable screw fasteners.
5. Replace the Adapter lid.

To disconnect the Daughterboard from the Adapter, follow these steps:

1. Remove the lid from the Adapter.
2. Loosen the Southco retractable screw fasteners.
3. Push the ejectors on the Adapter.
4. Carefully lift the Daughterboard from the Adapter.
5. Replace the Adapter lid.

4
Developing the Shell Software

The Shell Software file requirements for a 640-pin Logic model are similar to those for standard Logic Models, and are summarized here. For more information, see the *Shell Software Reference Manual*.

User-Generated Files

As for all Generic Device Adapters, you must create one or more Shell Software files that contain DUT-specific information, such as pinouts, device names, propagation delays, timing checks.

Files Provided by Synopsys

- The Adapter Mapping (.ADP) file, GEN640.ADP: This file provides signal mapping between the Adapter and the ModelSource modeling system. You should be able to use this file without modification.
- A template Package Mapping (.PKG) file, GEN640.PKG: The .PKG file provides signal mapping between the Daughterboard and the DUT; the template file contains Daughterboard pin names mapped to duplicate pin names, for those pins used for DUT signals. You create the custom .PKG file by editing the template and replacing the duplicate pin names with your DUT pin names.

Figure 5 shows part of the template GEN640.PKG file provided by Synopsys.

```
{*****************************************************************}
{* Copyright (c) 2001by Synopsys, Incorporated                   *}
{*All rights reserved.                                            *}
{*****************************************************************}
{* Logic Model PACKAGE map file for Generic 640 Device Adapter.   *}
{*****************************************************************}
{ package_map_revision  A                                         *}
{*****************************************************************}
package_mapping
   J1A2   =   J1A2
   J1A3   =   J1A3
   J1A4   =   J1A4
   J1A5   =   J1A5
   J1A6   =   J1A6
   J1A7   =   J1A7
   J1A8   =   J1A8
   J1A9   =   J1A9
   J1A10  =  J1A10
   J1A11  =  J1A11
   J1A12  =  J1A12
   J1A13  =  J1A13
   J1A21  =  J1A21
   J1A22  =  J1A22
   J1A23  =  J1A23
   J1A24  =  J1A24
   J1A25  =  J1A25
```

Figure 5: Partial GEN640.PKG File

To customize this file for your DUT, you replace the first name on each line with the name of the appropriate signal on your DUT.

For example, you change the first line

```
J1A2   =   J1A2
```

to

```
DUTpname =   J1A2
```

5 Completing the Model

This chapter describes the tasks needed to complete the model: mounting the Adapter onto the Modeling Systems, labeling the Daughterboard, and verifying the model. It also describes how to unmount the Adapter from the Modeling Systems.

Mounting the Adapter onto the ModelSource Modeling Systems

To mount the Adapter onto the ModelSource modeling systems, follow these steps:

1. Make a stack of four MS3200 or four MS3400 modeling systems (do not mix these two modeling systems). Connect the modeling systems together as described in "Chapter 2: Installation" in the *ModelSource User's Manual*.

Note

Do not stack the modelings systems more than four high. Ensure that the surface on which the modelers are stacked is flat and rigid.

2. Place the base of the Adapter against the front of the sets of four connected modeling systems, hanging the Adapter's hook receptacles on the positioning hooks of the modeling systems. Pull the Adapter gently towards you to make sure that it is securely balanced on the hooks.
3. Seat the modeling boards in the ModelSource modeling systems onto the Adapter as described in the following paragraph.

   Each modeling system has a knob on the right and on the left side for moving the top and bottom modeling boards, respectively, backwards and forwards. Turn each knob individually counterclockwise to bring each modeling board forward to connect with the Adapter.

Labeling the Daughterboard

After you have completed the Shell Software and mounted the Adapter and Daughterboard onto the ModelSource modeling systems, you must verify the Daughterboard's label and update it if necessary.

Note

Ensure that the Daughterboard is seated on the Adapter before you verify and update the label. If the daughterboard is not seated, the software will report the label as "GEN640", the label of the Adapter itself.

If it is necessary to update the Daughterboard's label, use the lm Label Device Adapter utility to change the adapter's label to the *device_name* used in the model's Shell Software. For more details, refer to "Label Device Adapter" in the *ModelSource User's Manual*.

Verifying the Model

After you have developed the model, you must verify it. For more information, see the *ModelSource User's Manual* and the *Logic Model Development Manual*.

Note

The pattern memory available for simulation is limited to the smallest amount of available memory on any one of the eight modeling boards in the four modelers.

Unmounting the Adapter from the ModelSource Modeling Systems

To remove the Adapter from the ModelSource modeling systems, follow these steps:

1. Ensure that the Adapter is not currently in use (that is, the In Use LEDs are not illuminated).
2. Turn each knob individually clockwise, to unseat each modeling board connector from the Adapter.
3. Verify that the “Seated LED” on each modeling board is no longer illuminated.
4. Push the Adapter so that it is flush against the front panel of the modeling system assembly, and slide it up as far as you can.
5. Pull the Adapter straight out and away from the modeling system assembly.

A
J1–J6 Connector Pinouts

The pinouts for connectors J1 through J6 of the 640-pin Adapter and the Daughterboard are listed in Table 2. Do not use pins that are labeled RESERVED.

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	A1	SEAT1
J1	A2	DUT171
J1	A3	DUT173
J1	A4	DUT170
J1	A5	DUT169
J1	A6	DUT168
J1	A7	DUT167
J1	A8	DUT166
J1	A9	DUT165
J1	A10	DUT164
J1	A11	DUT163
J1	A12	DUT162
J1	A13	DUT161
J1	A14	NC
J1	A15	TRIGGER

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	A16	NC
J1	A17	SAMPLE
J1	A18	NC
J1	A19	PLAY
J1	A20	NC
J1	A21	DUT198
J1	A22	DUT197
J1	A23	DUT196
J1	A24	DUT202
J1	A25	DUT194
J1	A26	DUT193
J1	A27	DUT192
J1	A28	DUT191
J1	A29	DUT190
J1	A30	DUT189
J1	A31	DUT188
J1	A32	DUT187
J1	A33	DUT186
J1	A34	DUT185
J1	A35	DUT226
J1	A36	DUT225
J1	A37	DUT224
J1	A38	DUT223
J1	A39	DUT222
J1	A40	DUT221

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	A41	DUT220
J1	A42	DUT219
J1	A43	DUT218
J1	A44	DUT217
J1	A45	DUT237
J1	A46	DUT215
J1	A47	DUT214
J1	A48	DUT213
J1	C1	NC
J1	C2	DUT172
J1	C3	DUT174
J1	C4	DUT175
J1	C5	DUT176
J1	C6	DUT177
J1	C7	DUT178
J1	C8	DUT179
J1	C9	DUT180
J1	C10	DUT181
J1	C11	DUT182
J1	C12	DUT183
J1	C13	DUT184
J1	C14	NC
J1	C15	NC
J1	C16	NC
J1	C17	TEMP

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	C18	NC
J1	C19	NC
J1	C20	NC
J1	C21	DUT199
J1	C22	DUT200
J1	C23	DUT201
J1	C24	DUT195
J1	C25	DUT203
J1	C26	DUT204
J1	C27	DUT205
J1	C28	DUT206
J1	C29	DUT207
J1	C30	DUT208
J1	C31	DUT209
J1	C32	DUT210
J1	C33	DUT211
J1	C34	DUT212
J1	C35	DUT227
J1	C36	DUT228
J1	C37	DUT229
J1	C38	DUT230
J1	C39	DUT231
J1	C40	DUT232
J1	C41	DUT233
J1	C42	DUT234

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	C43	DUT235
J1	C44	DUT236
J1	C45	DUT216
J1	C46	DUT238
J1	C47	DUT239
J1	C48	DUT240
J1	D1	DUT11
J1	D2	DUT13
J1	D3	DUT10
J1	D4	DUT9
J1	D5	DUT8
J1	D6	DUT7
J1	D7	DUT6
J1	D8	DUT5
J1	D9	DUT4
J1	D10	DUT3
J1	D11	DUT2
J1	D12	DUT1
J1	D13	NC
J1	D14	NC
J1	D15	FEEDBACK
J1	D16	NC
J1	D17	KEEPALIVE
J1	D18	NC
J1	D19	NC

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	D20	DUT38
J1	D21	DUT37
J1	D22	DUT36
J1	D23	DUT42
J1	D24	DUT34
J1	D25	DUT33
J1	D26	DUT32
J1	D27	DUT31
J1	D28	DUT30
J1	D29	DUT29
J1	D30	DUT28
J1	D31	DUT27
J1	D32	DUT26
J1	D33	DUT25
J1	D34	DUT66
J1	D35	DUT65
J1	D36	DUT64
J1	D37	DUT63
J1	D38	DUT62
J1	D39	DUT61
J1	D40	DUT60
J1	D41	DUT59
J1	D42	DUT58
J1	D43	DUT57
J1	D44	DUT77

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	D45	DUT55
J1	D46	DUT54
J1	D47	DUT53
J1	D48	NC
J1	F1	DUT12
J1	F2	DUT14
J1	F3	DUT15
J1	F4	DUT16
J1	F5	DUT17
J1	F6	DUT18
J1	F7	DUT19
J1	F8	DUT20
J1	F9	DUT21
J1	F10	DUT22
J1	F11	DUT23
J1	F12	DUT24
J1	F13	NC
J1	F14	EEOUT
J1	F15	EEIN
J1	F16	EECLK
J1	F17	EEPE
J1	F18	EESEL
J1	F19	EEVCC
J1	F20	DUT39
J1	F21	DUT40

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	F22	DUT41
J1	F23	DUT35
J1	F24	DUT43
J1	F25	DUT44
J1	F26	DUT45
J1	F27	DUT46
J1	F28	DUT47
J1	F29	DUT48
J1	F30	DUT49
J1	F31	DUT50
J1	F32	DUT51
J1	F33	DUT52
J1	F34	DUT67
J1	F35	DUT68
J1	F36	DUT69
J1	F37	DUT70
J1	F38	DUT71
J1	F39	DUT72
J1	F40	DUT73
J1	F41	DUT74
J1	F42	DUT75
J1	F43	DUT76
J1	F44	DUT56
J1	F45	DUT78
J1	F46	DUT79

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J1	F47	DUT80
J1	F48	SEAT1
J2	A1	SEAT2
J2	A2	DUT160
J2	A3	DUT159
J2	A4	DUT158
J2	A5	DUT136
J2	A6	DUT156
J2	A7	DUT155
J2	A8	DUT154
J2	A9	DUT153
J2	A10	DUT152
J2	A11	DUT151
J2	A12	DUT150
J2	A13	DUT149
J2	A14	DUT148
J2	A15	DUT147
J2	A16	DUT132
J2	A17	DUT131
J2	A18	DUT130
J2	A19	DUT129
J2	A20	DUT128
J2	A21	DUT127
J2	A22	NC

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J2	A23	NC
J2	A24	NC
J2	C1	NC
J2	C2	DUT133
J2	C3	DUT134
J2	C4	DUT135
J2	C5	DUT157
J2	C6	DUT137
J2	C7	DUT138
J2	C8	DUT139
J2	C9	DUT140
J2	C10	DUT141
J2	C11	DUT142
J2	C12	DUT143
J2	C13	DUT144
J2	C14	DUT145
J2	C15	DUT146
J2	C16	DUT105
J2	C17	DUT106
J2	C18	DUT107
J2	C19	DUT108
J2	C20	DUT109
J2	C21	DUT110
J2	C22	NC
J2	C23	NC

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J2	C24	NC
J2	D1	NC
J2	D2	DUT91
J2	D3	DUT93
J2	D4	DUT90
J2	D5	DUT89
J2	D6	DUT88
J2	D7	DUT87
J2	D8	DUT86
J2	D9	DUT85
J2	D10	DUT84
J2	D11	DUT83
J2	D12	DUT82
J2	D13	DUT81
J2	D14	DUT118
J2	D15	DUT117
J2	D16	DUT116
J2	D17	DUT122
J2	D18	DUT114
J2	D19	DUT113
J2	D20	DUT112
J2	D21	DUT111
J2	D22	NC
J2	D23	NC
J2	D24	NC

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J2	F1	NC
J2	F2	DUT92
J2	F3	DUT94
J2	F4	DUT95
J2	F5	DUT96
J2	F6	DUT97
J2	F7	DUT98
J2	F8	DUT99
J2	F9	DUT100
J2	F10	DUT101
J2	F11	DUT102
J2	F12	DUT103
J2	F13	DUT104
J2	F14	DUT119
J2	F15	DUT120
J2	F16	DUT121
J2	F17	DUT115
J2	F18	DUT123
J2	F19	DUT124
J2	F20	DUT125
J2	F21	DUT126
J2	F22	NC
J2	F23	NC
J2	F24	SEAT2
J2	AP1	ADJVCC1

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J2	AP2	ADJVCC1
J2	AP3	ADJVCC1
J2	AP4	ADJVCC1
J2	AP5	P5V
J2	AP6	P5V
J2	AP7	P5V
J2	AP8	P5V
J2	DP1	GND
J2	DP2	GND
J2	DP3	GND
J2	DP4	GND
J2	DP5	GND
J2	DP6	GND
J2	DP7	GND
J2	DP8	GND
J2	FP1	NC
J2	FP2	NC
J2	FP3	NC
J2	FP4	NC
J2	FP5	P12V
J2	FP6	P12V
J2	FP7	P12V
J2	FP8	P12V
J3	A1	SEAT3

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	A2	DUT640
J3	A3	DUT639
J3	A4	DUT638
J3	A5	DUT616
J3	A6	DUT636
J3	A7	DUT635
J3	A8	DUT634
J3	A9	DUT633
J3	A10	DUT632
J3	A11	DUT631
J3	A12	DUT630
J3	A13	DUT629
J3	A14	DUT628
J3	A15	DUT627
J3	A16	DUT612
J3	A17	DUT611
J3	A18	DUT610
J3	A19	DUT609
J3	A20	DUT608
J3	A21	DUT607
J3	A22	DUT606
J3	A23	DUT605
J3	A24	DUT604
J3	A25	DUT603
J3	A26	DUT595

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	A27	DUT601
J3	A28	DUT600
J3	A29	DUT599
J3	A30	NC
J3	A31	RESERVED (AD13)
J3	A32	RESERVED (AD7)
J3	A33	RESERVED (AD5)
J3	A34	RESERVED (AD0)
J3	A35	RESERVED (-ACK)
J3	A36	NC
J3	A37	DUT584
J3	A38	DUT583
J3	A39	DUT582
J3	A40	DUT581
J3	A41	DUT580
J3	A42	DUT579
J3	A43	DUT578
J3	A44	DUT577
J3	A45	DUT576
J3	A46	DUT575
J3	A47	DUT574
J3	A48	DUT572
J3	C1	NC
J3	C2	DUT613
J3	C3	DUT614

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	C4	DUT615
J3	C5	DUT637
J3	C6	DUT617
J3	C7	DUT618
J3	C8	DUT619
J3	C9	DUT620
J3	C10	DUT621
J3	C11	DUT622
J3	C12	DUT623
J3	C13	DUT624
J3	C14	DUT625
J3	C15	DUT626
J3	C16	DUT585
J3	C17	DUT586
J3	C18	DUT587
J3	C19	DUT588
J3	C20	DUT589
J3	C21	DUT590
J3	C22	DUT591
J3	C23	DUT592
J3	C24	DUT593
J3	C25	DUT594
J3	C26	DUT602
J3	C27	DUT596
J3	C28	DUT597

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	C29	DUT598
J3	C30	NC
J3	C31	RESERVED (AD11)
J3	C32	RESERVED (AD12)
J3	C33	RESERVED (AD6)
J3	C34	RESERVED (AD2)
J3	C35	RESERVED (-WR)
J3	C36	NC
J3	C37	DUT561
J3	C38	DUT562
J3	C39	DUT563
J3	C40	DUT564
J3	C41	DUT565
J3	C42	DUT566
J3	C43	DUT567
J3	C44	DUT568
J3	C45	DUT569
J3	C46	DUT570
J3	C47	DUT573
J3	C48	DUT571
J3	D1	DUT480
J3	D2	DUT479
J3	D3	DUT478
J3	D4	DUT456
J3	D5	DUT476

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	D6	DUT475
J3	D7	DUT474
J3	D8	DUT473
J3	D9	DUT472
J3	D10	DUT471
J3	D11	DUT470
J3	D12	DUT469
J3	D13	DUT468
J3	D14	DUT467
J3	D15	DUT452
J3	D16	DUT451
J3	D17	DUT450
J3	D18	DUT449
J3	D19	DUT448
J3	D20	DUT447
J3	D21	DUT446
J3	D22	DUT445
J3	D23	DUT444
J3	D24	DUT443
J3	D25	DUT435
J3	D26	DUT441
J3	D27	DUT440
J3	D28	DUT439
J3	D29	NC
J3	D30	RESERVED (AD10)

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	D31	RESERVED (AD9)
J3	D32	RESERVED (AD3)
J3	D33	RESERVED (AD4)
J3	D34	RESERVED (-RD)
J3	D35	NC
J3	D36	DUT424
J3	D37	DUT423
J3	D38	DUT422
J3	D39	DUT421
J3	D40	DUT420
J3	D41	DUT419
J3	D42	DUT418
J3	D43	DUT417
J3	D44	DUT416
J3	D45	DUT415
J3	D46	DUT414
J3	D47	DUT412
J3	D48	NC
J3	F1	DUT453
J3	F2	DUT454
J3	F3	DUT455
J3	F4	DUT477
J3	F5	DUT457
J3	F6	DUT458
J3	F7	DUT459

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	F8	DUT460
J3	F9	DUT461
J3	F10	DUT462
J3	F11	DUT463
J3	F12	DUT464
J3	F13	DUT465
J3	F14	DUT466
J3	F15	DUT425
J3	F16	DUT426
J3	F17	DUT427
J3	F18	DUT428
J3	F19	DUT429
J3	F20	DUT430
J3	F21	DUT431
J3	F22	DUT432
J3	F23	DUT433
J3	F24	DUT434
J3	F25	DUT442
J3	F26	DUT436
J3	F27	DUT437
J3	F28	DUT438
J3	F29	NC
J3	F30	RESERVED (AD14)
J3	F31	RESERVED (AD8)
J3	F32	RESERVED (AD1)

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J3	F33	RESERVED (AD15)
J3	F34	RESERVED (-AS)
J3	F35	NC
J3	F36	DUT401
J3	F37	DUT402
J3	F38	DUT403
J3	F39	DUT404
J3	F40	DUT405
J3	F41	DUT406
J3	F42	DUT407
J3	F43	DUT408
J3	F44	DUT409
J3	F45	DUT410
J3	F46	DUT413
J3	F47	DUT411
J3	F48	SEAT3
J4	A1	SEAT4
J4	A2	DUT560
J4	A3	DUT559
J4	A4	DUT558
J4	A5	DUT536
J4	A6	DUT556
J4	A7	DUT555
J4	A8	DUT554

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J4	A9	DUT553
J4	A10	DUT552
J4	A11	DUT551
J4	A12	DUT550
J4	A13	DUT549
J4	A14	DUT548
J4	A15	DUT547
J4	A16	DUT532
J4	A17	DUT531
J4	A18	DUT530
J4	A19	DUT529
J4	A20	DUT528
J4	A21	DUT527
J4	A22	NC
J4	A23	NC
J4	A24	NC
J4	C1	NC
J4	C2	DUT533
J4	C3	DUT534
J4	C4	DUT535
J4	C5	DUT557
J4	C6	DUT537
J4	C7	DUT538
J4	C8	DUT539
J4	C9	DUT540

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J4	C10	DUT541
J4	C11	DUT542
J4	C12	DUT543
J4	C13	DUT544
J4	C14	DUT545
J4	C15	DUT546
J4	C16	DUT505
J4	C17	DUT506
J4	C18	DUT507
J4	C19	DUT508
J4	C20	DUT509
J4	C21	DUT510
J4	C22	NC
J4	C23	NC
J4	C24	NC
J4	D1	NC
J4	D2	DUT491
J4	D3	DUT493
J4	D4	DUT490
J4	D5	DUT489
J4	D6	DUT488
J4	D7	DUT487
J4	D8	DUT486
J4	D9	DUT485
J4	D10	DUT484

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J4	D11	DUT483
J4	D12	DUT482
J4	D13	DUT481
J4	D14	DUT518
J4	D15	DUT517
J4	D16	DUT516
J4	D17	DUT522
J4	D18	DUT514
J4	D19	DUT513
J4	D20	DUT512
J4	D21	DUT511
J4	D22	NC
J4	D23	NC
J4	D24	NC
J4	F1	NC
J4	F2	DUT492
J4	F3	DUT494
J4	F4	DUT495
J4	F5	DUT496
J4	F6	DUT497
J4	F7	DUT498
J4	F8	DUT499
J4	F9	DUT500
J4	F10	DUT501
J4	F11	DUT502

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J4	F12	DUT503
J4	F13	DUT504
J4	F14	DUT519
J4	F15	DUT520
J4	F16	DUT521
J4	F17	DUT515
J4	F18	DUT523
J4	F19	DUT524
J4	F20	DUT525
J4	F21	DUT526
J4	F22	NC
J4	F23	NC
J4	F24	SEAT4
J4	AP1	ADJVCC2
J4	AP2	ADJVCC2
J4	AP3	ADJVCC2
J4	AP4	ADJVCC2
J4	AP5	P5V
J4	AP6	P5V
J4	AP7	P5V
J4	AP8	P5V
J4	DP1	GND
J4	DP2	GND
J4	DP3	GND
J4	DP4	GND

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J4	DP5	GND
J4	DP6	GND
J4	DP7	GND
J4	DP8	GND
J4	FP1	M5V
J4	FP2	M5V
J4	FP3	M5V
J4	FP4	M5V
J4	FP5	FANP12V
J4	FP6	FANP12V
J4	FP7	FANP12V
J4	FP8	FANP12V
J5	A1	SEAT5
J5	A2	DUT400
J5	A3	DUT399
J5	A4	DUT398
J5	A5	DUT376
J5	A6	DUT396
J5	A7	DUT395
J5	A8	DUT394
J5	A9	DUT393
J5	A10	DUT392
J5	A11	DUT391
J5	A12	DUT390

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J5	A13	DUT389
J5	A14	DUT388
J5	A15	DUT387
J5	A16	DUT372
J5	A17	DUT371
J5	A18	DUT370
J5	A19	DUT369
J5	A20	DUT368
J5	A21	DUT367
J5	A22	NC
J5	A23	NC
J5	A24	NC
J5	C1	NC
J5	C2	DUT373
J5	C3	DUT374
J5	C4	DUT375
J5	C5	DUT397
J5	C6	DUT377
J5	C7	DUT378
J5	C8	DUT379
J5	C9	DUT380
J5	C10	DUT381
J5	C11	DUT382
J5	C12	DUT383
J5	C13	DUT384

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J5	C14	DUT385
J5	C15	DUT386
J5	C16	DUT345
J5	C17	DUT346
J5	C18	DUT347
J5	C19	DUT348
J5	C20	DUT349
J5	C21	DUT350
J5	C22	NC
J5	C23	NC
J5	C24	NC
J5	D1	NC
J5	D2	DUT331
J5	D3	DUT333
J5	D4	DUT330
J5	D5	DUT329
J5	D6	DUT328
J5	D7	DUT327
J5	D8	DUT326
J5	D9	DUT325
J5	D10	DUT324
J5	D11	DUT323
J5	D12	DUT322
J5	D13	DUT321
J5	D14	DUT358

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J5	D15	DUT357
J5	D16	DUT356
J5	D17	DUT362
J5	D18	DUT354
J5	D19	DUT353
J5	D20	DUT352
J5	D21	DUT351
J5	D22	NC
J5	D23	NC
J5	D24	NC
J5	F1	NC
J5	F2	DUT332
J5	F3	DUT334
J5	F4	DUT335
J5	F5	DUT336
J5	F6	DUT337
J5	F7	DUT338
J5	F8	DUT339
J5	F9	DUT340
J5	F10	DUT341
J5	F11	DUT342
J5	F12	DUT343
J5	F13	DUT344
J5	F14	DUT359
J5	F15	DUT360

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J5	F16	DUT361
J5	F17	DUT355
J5	F18	DUT363
J5	F19	DUT364
J5	F20	DUT365
J5	F21	DUT366
J5	F22	NC
J5	F23	NC
J5	F24	SEAT5
J5	AP1	RESERVED
J5	AP2	RESERVED
J5	AP3	RESERVED
J5	AP4	RESERVED
J5	AP5	RESERVED
J5	AP6	RESERVED
J5	AP7	RESERVED
J5	AP8	RESERVED
J5	DP1	GND
J5	DP2	GND
J5	DP3	GND
J5	DP4	GND
J5	DP5	GND
J5	DP6	GND
J5	DP7	GND
J5	DP8	GND

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J5	FP1	RESERVED
J5	FP2	RESERVED
J5	FP3	RESERVED
J5	FP4	RESERVED
J5	FP5	RESERVED
J5	FP6	RESERVED
J5	FP7	RESERVED
J5	FP8	RESERVED
J6	A1	SEAT6
J6	A2	DUT320
J6	A3	DUT319
J6	A4	DUT318
J6	A5	DUT296
J6	A6	DUT316
J6	A7	DUT315
J6	A8	DUT314
J6	A9	DUT313
J6	A10	DUT312
J6	A11	DUT311
J6	A12	DUT310
J6	A13	DUT309
J6	A14	DUT308
J6	A15	DUT307
J6	A16	DUT292

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J6	A17	DUT291
J6	A18	DUT290
J6	A19	DUT289
J6	A20	DUT288
J6	A21	DUT287
J6	A22	NC
J6	A23	NC
J6	A24	NC
J6	C1	NC
J6	C2	DUT293
J6	C3	DUT294
J6	C4	DUT295
J6	C5	DUT317
J6	C6	DUT297
J6	C7	DUT298
J6	C8	DUT299
J6	C9	DUT300
J6	C10	DUT301
J6	C11	DUT302
J6	C12	DUT303
J6	C13	DUT304
J6	C14	DUT305
J6	C15	DUT306
J6	C16	DUT265
J6	C17	DUT266

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J6	C18	DUT267
J6	C19	DUT268
J6	C20	DUT269
J6	C21	DUT270
J6	C22	NC
J6	C23	NC
J6	C24	NC
J6	D1	NC
J6	D2	DUT251
J6	D3	DUT253
J6	D4	DUT250
J6	D5	DUT249
J6	D6	DUT248
J6	D7	DUT247
J6	D8	DUT246
J6	D9	DUT245
J6	D10	DUT244
J6	D11	DUT243
J6	D12	DUT242
J6	D13	DUT241
J6	D14	DUT278
J6	D15	DUT277
J6	D16	DUT276
J6	D17	DUT282
J6	D18	DUT274

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J6	D19	DUT273
J6	D20	DUT272
J6	D21	DUT271
J6	D22	NC
J6	D23	NC
J6	D24	NC
J6	F1	NC
J6	F2	DUT252
J6	F3	DUT254
J6	F4	DUT255
J6	F5	DUT256
J6	F6	DUT257
J6	F7	DUT258
J6	F8	DUT259
J6	F9	DUT260
J6	F10	DUT261
J6	F11	DUT262
J6	F12	DUT263
J6	F13	DUT264
J6	F14	DUT279
J6	F15	DUT280
J6	F16	DUT281
J6	F17	DUT275
J6	F18	DUT283
J6	F19	DUT284

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J6	F20	DUT285
J6	F21	DUT286
J6	F22	NC
J6	F23	NC
J6	F24	SEAT6
J6	AP1	RESERVED
J6	AP2	RESERVED
J6	AP3	RESERVED
J6	AP4	RESERVED
J6	AP5	RESERVED
J6	AP6	RESERVED
J6	AP7	RESERVED
J6	AP8	RESERVED
J6	DP1	GND
J6	DP2	GND
J6	DP3	GND
J6	DP4	GND
J6	DP5	GND
J6	DP6	GND
J6	DP7	GND
J6	DP8	GND
J6	FP1	NC
J6	FP2	NC
J6	FP3	NC
J6	FP4	NC

Table 2: Pinouts for Connectors J1-J6

Connector	Pin	Signal
J6	FP5	RESERVED
J6	FP6	RESERVED
J6	FP7	RESERVED
J6	FP8	RESERVED