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Dynamic Access for Mentor

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About Dynamic Access for Mentor

Agilent EEsof and Mentor Graphics have developed an integrated RF design flow that provides the following benefits:

- Reduces the number of design cycles
- Improves design robustness
- Increases speed for time to market

Dynamic Access for Mentor supports these goals by including these characteristics:

- Provides a bidirectional link for RF design information between ADS and Mentor
- Supports both layout and schematic transfer
- Allows ADS simulation of Mentor RF schematic designs without transferring a schematic
- Uses an interprocess communication link to eliminate user-management of the data transfer process

Mentor now supplies an RF design solution as an option for DxDesigner and Expedition that provides the Mentor side of the Dynamic Access for Mentor link. This RF Option also includes a complete symbol library of ADS passive and transmission line elements, facilitating the transfer of RF design information between ADS and Mentor.

Dynamic Access for Mentor Overview

Dynamic Access for Mentor supports two distinct design flows:

- **RF Design Starts in ADS**
For RF designers comfortable in ADS, RF designs started, tuned, and optimized in ADS can be moved into the Mentor environment for integration with the rest of a PCB design. ADS designs using transmission line elements are transferred directly from the schematic and layout windows.
- **RF Design Starts in Mentor**
Using the ADS element library included with the Mentor RF Option, a designer can now create RF schematic designs in the Mentor environment, as well as incorporate RF schematics imported from ADS. These designs can be maintained in the Mentor environment, while retaining the ability to send them back to ADS for circuit level and electromagnetic simulation.

Design information can be transferred as schematics and layouts, when full component libraries are available, and as netlist files for simulation, requiring only electrical model libraries.

Requirements for Dynamic Access for Mentor

Supported Operating Systems and Products

The ADS side of the Dynamic Access for Mentor link is supported on the following operating systems:

32-bit Operating System	Microsoft Windows XP Professional SP3 Microsoft Windows Vista Enterprise SP1 Microsoft Windows 7 Enterprise Redhat RHEL WS 4.x
64-bit Operating System	Microsoft Windows XP Professional x64 Microsoft Windows Vista Enterprise SP1 64-bit edition Microsoft Windows 7 Enterprise 64-bit edition Redhat RHEL WS 4.x

For details about ADS system requirements, see *Check the System Requirements for Windows* (instalpc) and *Linux* (install).

Dynamic Access for Mentor supports Mentor Graphics Expedition Enterprise 2007.2 and later. Version 2007.5 or later is recommended. All examples in this document feature DxDesigner and Expedition. It will also work with BoardStation XE.

The Mentor side of the link is supported on the following operating systems:

- Microsoft Windows XP and Vista 32 bit (use compatibility mode on 64 bit platforms)
- Solaris SPARC 8, 9, and 10 (preferred)
- Red Hat Enterprise Linux 3 (Update 8 or later), 4, and 5 (preferred)

Dynamic Access for Mentor requires either a full Mentor Graphics local installation, or a reduced run-time installation available from Mentor Graphics support.

A Mentor EE 2007.2 installation will need updates to support the latest functionality. To ensure that the Mentor installation is up to date, Mentor customers should download and install *RF Connect* from Mentor's SupportNet.

License Requirements

To use Dynamic Access for Mentor, ensure that you have valid licenses for the ADS schematic and layout environments. No additional ADS licenses are needed. For more information on ADS licenses, see *Managing ADS Licenses* (instalpc).

For Mentor licenses, check with your local corporate Mentor administrator.

Dynamic Access for Mentor Library Requirements

An RF design started in ADS can be transferred to Mentor for inclusion in a larger PCB

system. To transfer parameterized information about the components and interconnects that make up the design, ADS and Mentor must share compatible libraries, with identical symbols and layout footprints. For simulation, the ADS library must include electrical model information for each element in the schematic. In the past, this has required extensive custom library development work.

With the schematic and layout RF Options, Mentor now provides compatible symbol libraries for most passive ADS elements, including transmission line components such as microstrip and stripline. This means that ADS designs that use these elements can move into the Mentor environment without user-supplied libraries.

The Mentor side of the Dynamic Access for Mentor link includes utilities to create and manage the ADS-compatible symbol library.

Installing Dynamic Access for Mentor

Dynamic Access for Mentor is delivered as a design kit with the ADS product. The Dynamic Access for Mentor design kit is not installed by default, but is managed using the standard design kit installation process. You can add the design kit using the **Design Kit** menu on the ADS main window.

Installing the Dynamic Access for Mentor Design Kit

Follow the steps below to add Dynamic Access for Mentor and activate the link:

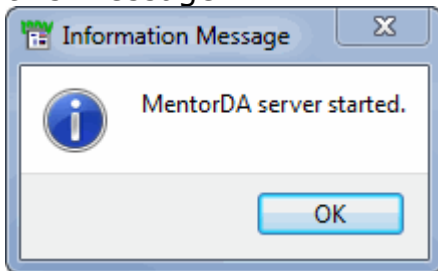
1. From the ADS main window, choose **DesignKit > Manage Favorite Design Kits**.
2. The Manage Favorite Design Kits dialog box opens.
3. Click **Add Library Definition File**
4. Navigate to `<ADS_install_dir>/pcb_connect/MentorDA_wdk`, select the `lib.defs` file and click **Open**. (You do not need to unzip the file.)
5. Enter the Design Kit Name and click **OK**.

When the installation completes successfully, a *MentorDA* menu will appear in the main window's menu bar.

Checking the Dynamic Access for Mentor Setup

To verify that the Dynamic Access for Mentor installation is working:

1. Select the **MentorDA** menu on the ADS main window.
2. Verify that the **Start MentorDA Server** menu item is enabled. If it is disabled, Dynamic Access for Mentor functionality is not available. Usually, this is caused by a missing `.dll` file, `MentorADSMessaging.dll`. This file is supplied by Mentor Graphics. See [Troubleshooting the Dynamic Access for Mentor Setup](#) for more information.
3. Select **MentorDA > Start MentorDA Server** to open the Start Server dialog.
4. Click **OK** to accept the default values. If the server starts successfully, you will see this message:



Troubleshooting the Dynamic Access for Mentor Setup

If the *Start MentorDA Server* menu pick is inactive, something has prevented the Dynamic Access for Mentor plugin from loading into ADS, usually a missing library. One external dynamically loaded library (`.dll` or `.so`) is required. Mentor Graphics supplies this file,

named *MentorADSMessaging.dll*, for Windows operating systems, and *libMentorADSMessaging4.so*, for Linux. It is located in the Mentor installation folder. The Mentor installation process typically adds the path to this file to the system path, making it available to ADS. If the ADS path does not include the Mentor installation folders, you must add them before Dynamic Access for Mentor will operate properly. On Linux, the LD_LIBRARY_PATH environment variable may need to be edited.

If you cannot locate this file, or you do not have a local installation of a Mentor product that includes it, contact your Mentor Graphics representative for assistance.

Setting Up the Dynamic Access for Mentor Link

The Dynamic Access for Mentor link operates as a client/server system, with ADS providing the server function. The server process in ADS can connect to one or more Mentor clients. Typically, this will include one DxDesigner schematic connection and one Expedition layout connection.

Starting the Dynamic Access for Mentor Server in ADS

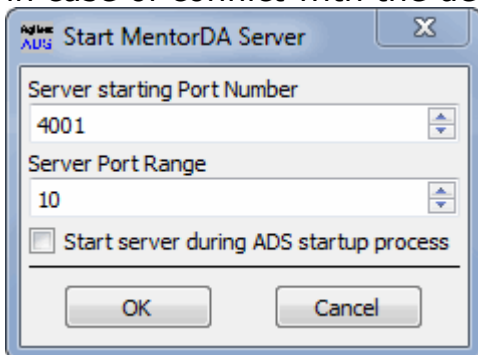
The Dynamic Access for Mentor link between ADS and Mentor uses a pair of TCP ports for communication. The Dynamic Access for Mentor connection can link ADS and Mentor on the same computer, or on different computers over the network.

Note

Though the Dynamic Access for Mentor link allows multiple client connections, use only one connection at a time for improved performance. You should disconnect an existing link before requesting another.

To start the Dynamic Access for Mentor server and establish a link:

1. In the ADS main window, choose **MentorDA > Start MentorDA Server**. The following dialog box appears enabling you to specify a range of ports for ADS to use, in case of conflict with the default port.



2. ADS will choose the first unused port in this range for the Dynamic Access for Mentor link. Accept the default values unless you encounter port number conflicts.
3. After the ADS server starts, request a link connection from Mentor DxDesigner or Expedition. See [Starting the Dynamic Access for Mentor Client in DxDesigner](#) or [Starting the Dynamic Access for Mentor Client in Expedition](#)
4. To display the Dynamic Access for Mentor server status, choose **MentorDA > Show Server Connections**.
5. To stop the server process, choose **MentorDA > Stop MentorDA Server**.

Starting the Dynamic Access for Mentor Client in DxDesigner

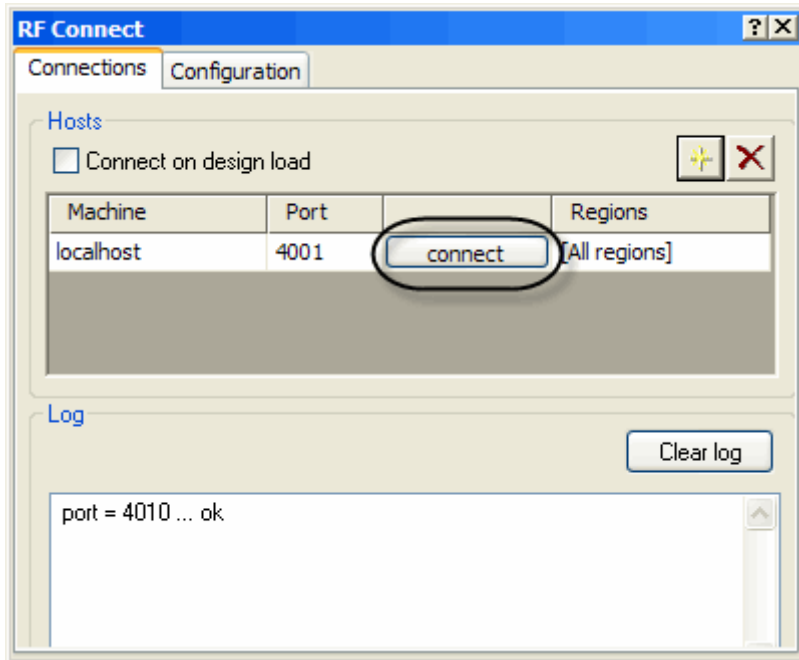
To set a Dynamic Access for Mentor connection from Mentor DxDesigner to an ADS

server:

1. Enable the *DxRFEngineer* license. This activates the RF toolbar.
2. In the toolbar, click the Mentor-Agilent link button to open DxDesigner's RF Connect dialog.



3. In the RF Connect dialog, click **connect** to set a local connection to the Dynamic Access for Mentor server in ADS.



Starting the Dynamic Access for Mentor Client in Expedition

To set a Dynamic Access for Mentor connection from Mentor Expedition to an ADS server:

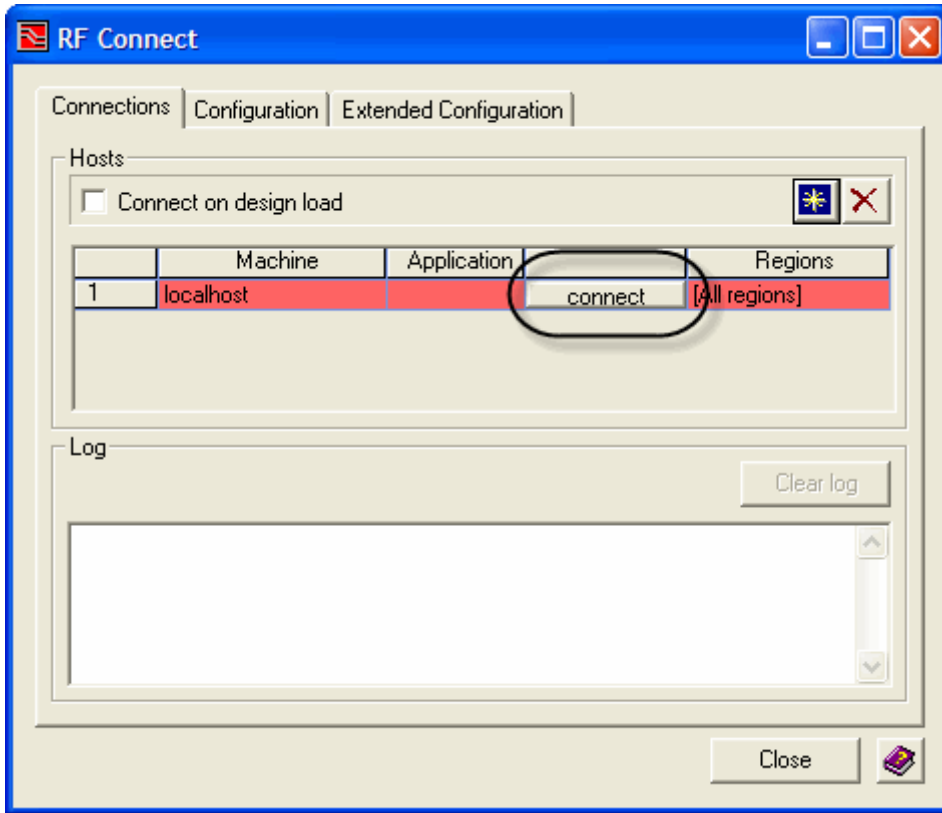
1. In Mentor Expedition, click **Setup** > **Licensed Modules** > **Advanced Technology Pro (RF)** to activate Expedition's RF Toolkit.
2. In the Expedition toolbar, click the **RF Toolkit** button to open the RF Toolkit toolbar.



3. In the RF Toolkit toolbar, click the **Mentor-Agilent** link button to open Expedition's RF Connect dialog.



4. In the RF Connect dialog, click **connect** to set a local connection to the Dynamic Access for Mentor server in ADS.



Additional Connection Features in Mentor

The additional configuration tabs on the Mentor RF Connect dialog boxes allow connections to remote ADS servers that are more complex. Please see your Mentor documentation for more information about these capabilities.

Sending Designs from ADS to Mentor

Many RF designers begin in ADS, using the power and features of ADS to optimize the performance of the design. This design must then be moved into the Mentor environment for integration with other subsystems and backend processing for fabrication.

Dynamic Access for Mentor supports this design flow:

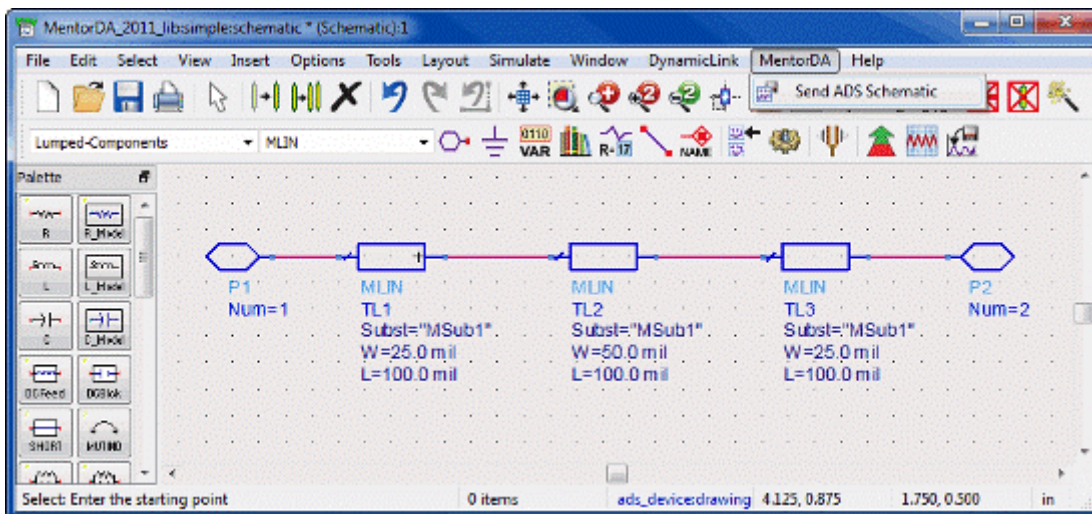
- ADS schematics can be transferred to Mentor DxDesigner
- ADS layouts can be transferred to Mentor Expedition

Schematic Transfers

Before you can send a schematic to Mentor, ensure that you can establish a Mentor-ADS link as described in *Starting the Dynamic Access for Mentor Server in ADS (mentorlink)*. Also, you must have an open ADS workspace with a schematic ready to send.

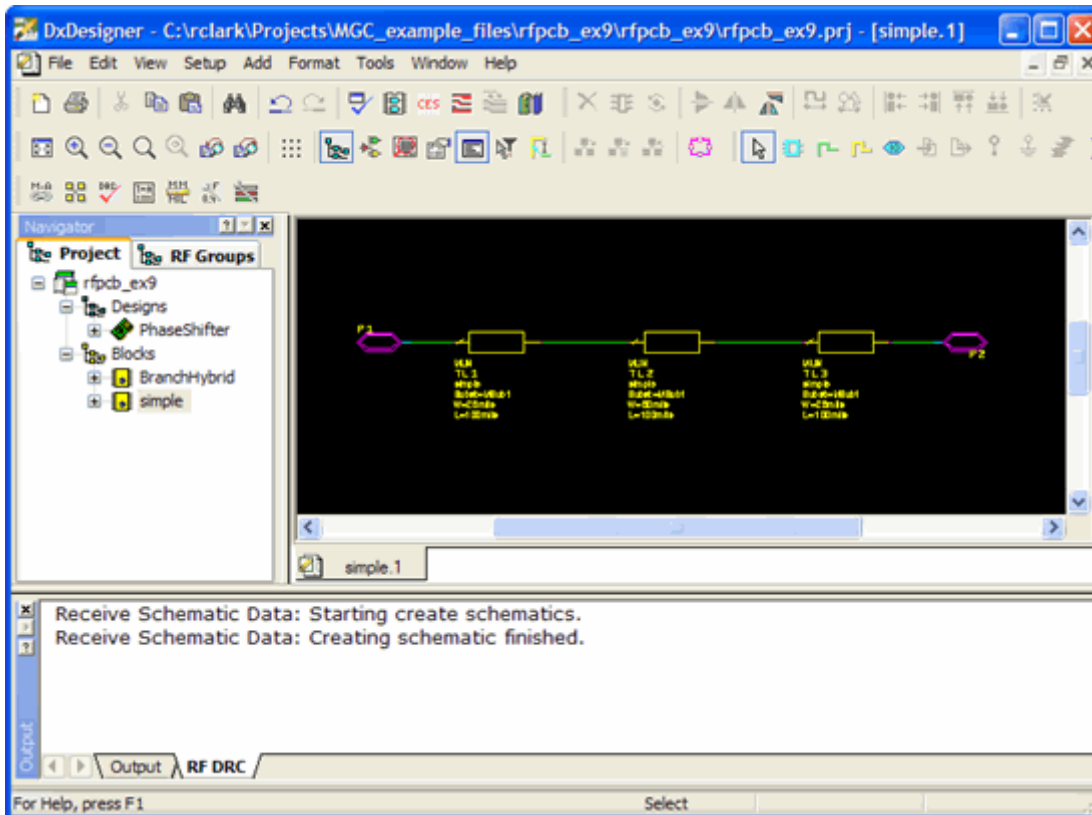
To send a schematic design from ADS to Mentor DxDesigner:

1. Make sure the schematic meets the following requirements:
 - The schematic must include only those components that are available in the Mentor-ADS symbol library. For more information about available components contact your corporate Mentor library administrator.
 - The schematic design must be flat since Mentor does not support ADS-style hierarchical designs.
2. Start the Dynamic Access for Mentor server from the ADS main window (see *Starting the Dynamic Access for Mentor Server in ADS (mentorlink)*).
3. Start a Dynamic Access for Mentor link connection from DxDesigner to ADS (see *Starting the Dynamic Access for Mentor Client in DxDesigner (mentorlink)*).
4. On the ADS schematic window, click **MentorDA > Send ADS Schematic** to transfer the design.



The ADS schematic is transferred into DxDesigner as a *block* as shown in the following example:

4.



Layout Transfers

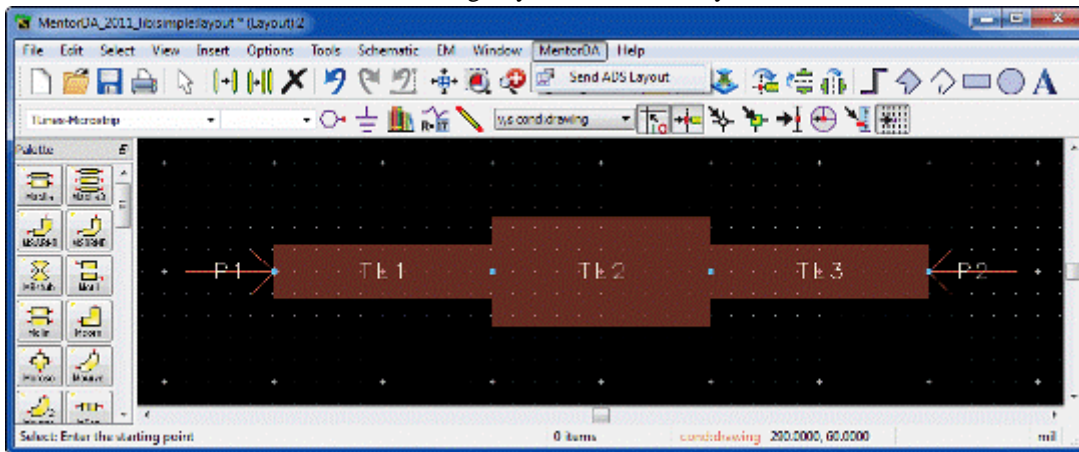
Before you can send a layout to Mentor, ensure that you can establish a Mentor-ADS link as described in *Starting the Dynamic Access for Mentor Server in ADS (mentorlink)*. Also, you must have an open ADS workspace with a layout ready to send.

Note

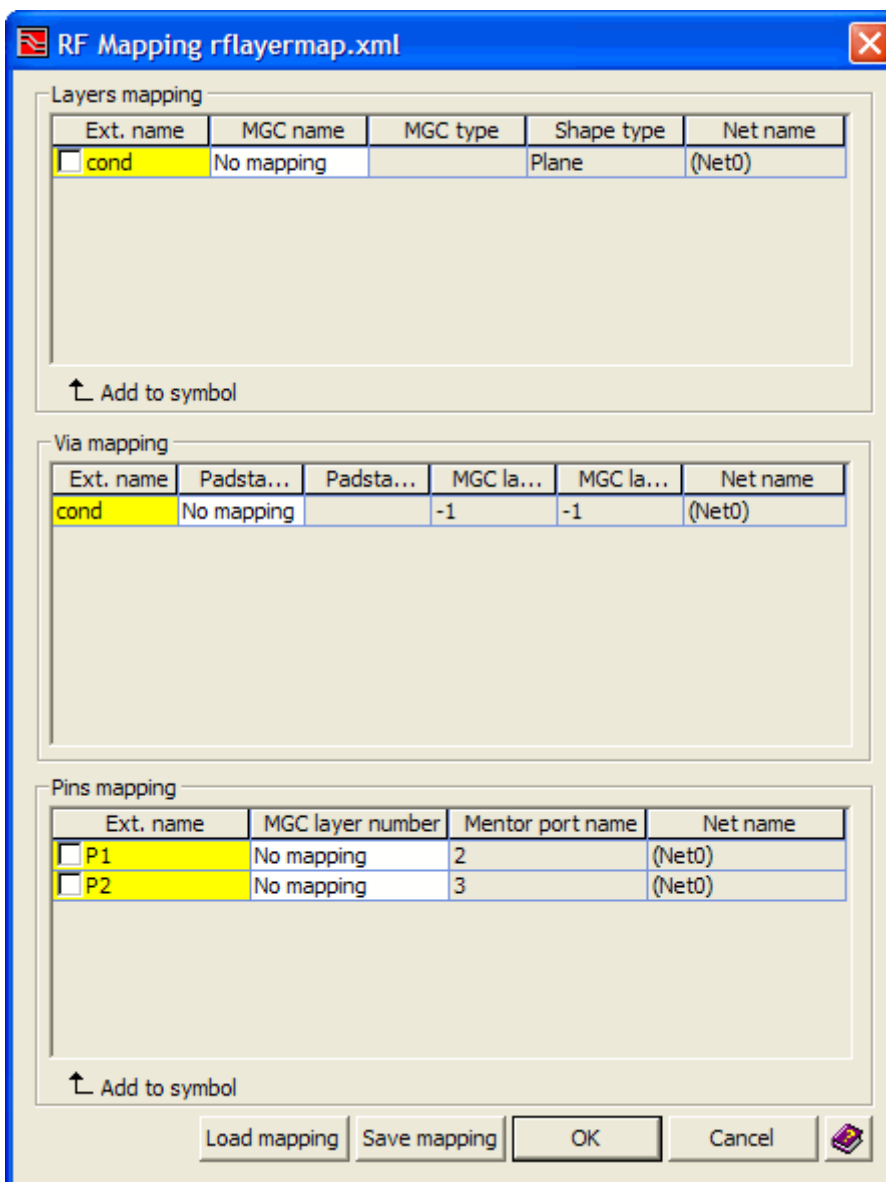
Paths, traces, and meander lines cannot be exported from ADS Layout to Mentor Expedition. You must convert these structures to polygons before transferring the layout.

To send a layout from ADS to Expedition:

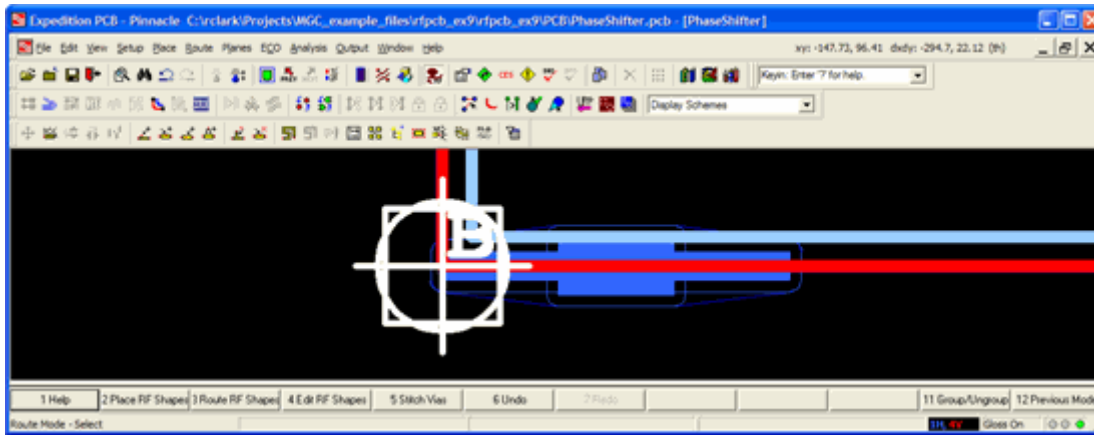
1. Start the Dynamic Access for Mentor server from the ADS main window (see *Starting the Dynamic Access for Mentor Server in ADS (mentorlink)*).
2. Start a Dynamic Access for Mentor link connection from Expedition to ADS (see *Starting the Dynamic Access for Mentor Client in Expedition (mentorlink)*).
3. On the ADS layout window, click **MentorDA** > **Send ADS Layout** to transfer the design.



4. When Expedition receives the layout data, it opens a layer and via mapping dialog as shown in the following example:



5. Set up the mapping in the dialog. See the Mentor documentation for more information about this process. When you complete the layer mapping, the ADS layout information is inserted as an *RF Group* at the origin of the Mentor layout as shown in the following figure:



Sending Designs from Mentor to ADS

Dynamic Access for Mentor can transfer design information from Mentor board design tools to ADS. This can be used for design refinement of RF subsystems designed in the Mentor environment, or for verification of ADS RF designs embedded in a Mentor board design.

Several Dynamic Access for Mentor features support these goals:

- Mentor RF designs can be netlisted in Mentor, with the resulting netlist sent to ADS for simulation.
- The actual RF schematic can be transferred from Mentor to ADS.
- An arbitrary Mentor layout can be sent to ADS as geometric information for EM simulation.
- RF layouts can be sent to ADS as parameterized components.
- Mentor RF designs can be netlisted in Mentor and simulated in ADS.

Before you can use any of these features to send designs to ADS, ensure that you can establish the Mentor-ADS link as described in *Starting the Dynamic Access for Mentor Server in ADS* (mentorlink). All of these features also require that you have an open ADS workspace.

RF Groups in Mentor

All RF design transfers from Mentor to ADS are based on the concept of the *RF Group*. RF Groups are created in Mentor by selecting a group of schematic or layout objects, and using the RF Group dialog to add them to a new or existing RF Group. The RF grouping does not change the board design; it associates a group of design objects with an RF Group name for further processing.

Mentor DxDesigner and Expedition each have RF Group user interfaces which provide the same functions. RF Group functionality may not be available in the Mentor environment until the RF environment is activated as described in *Setting Up the Dynamic Access for Mentor Link* (mentorlink).

Sending a Schematic Netlist for Simulation

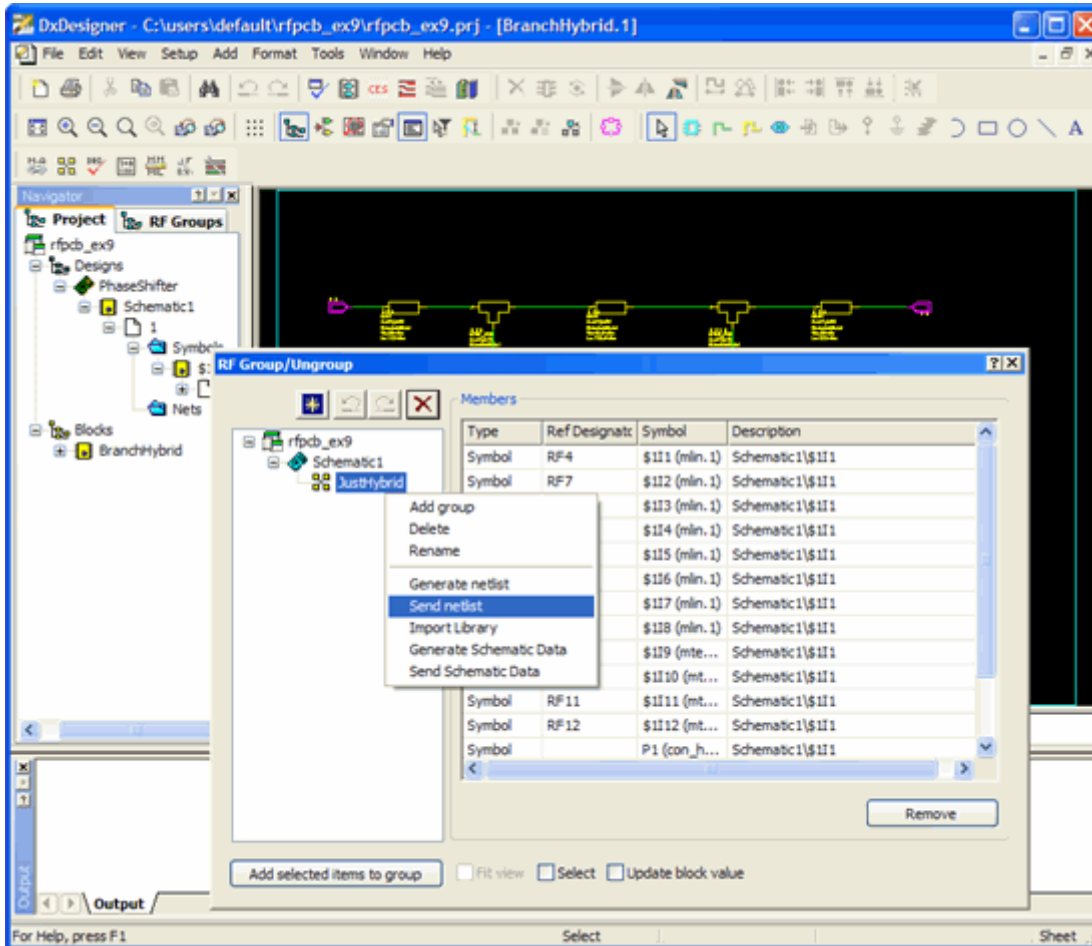
Mentor library components can include ADS netlisting properties. The ADS symbol library in DxDesigner is an example of this capability. RF design groups containing elements with netlisting properties can be sent as a dynamic netlist to ADS for simulation. The resulting netlist appears in ADS as a *black box* symbol that can be used in an ADS schematic.

Note

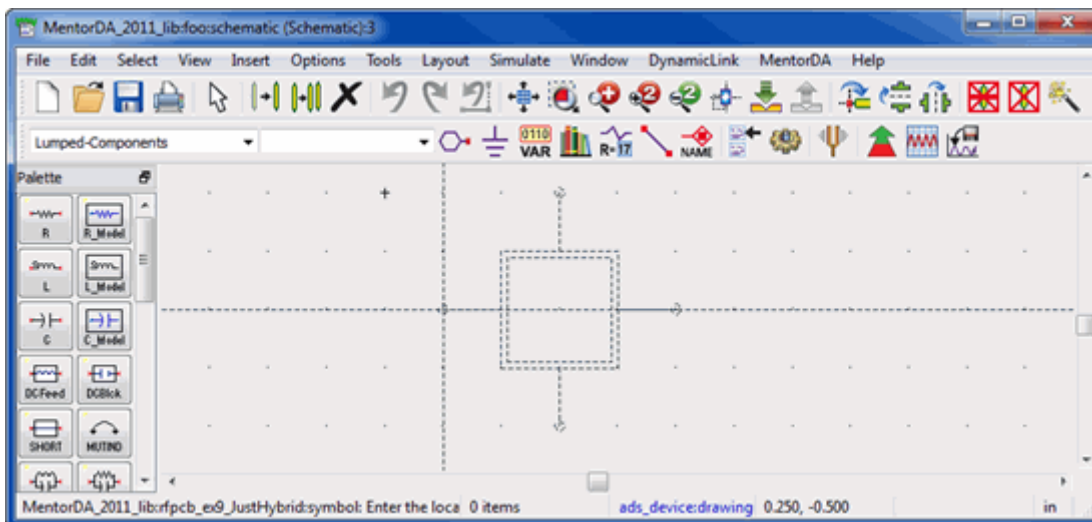
If two schematics are used in a single project in DxDesigner, you can define a group only in that schematic design that has been set as a root. You cannot define a group in that schematic design that has not been set as a root.

To send a netlist from DxDesigner:

1. Define an RF Group.
2. From the RF Group/Ungroup dialog, select the group in the tree list to be transferred.
3. Right-click the name to open the context menu, and choose **Send Netlist**.

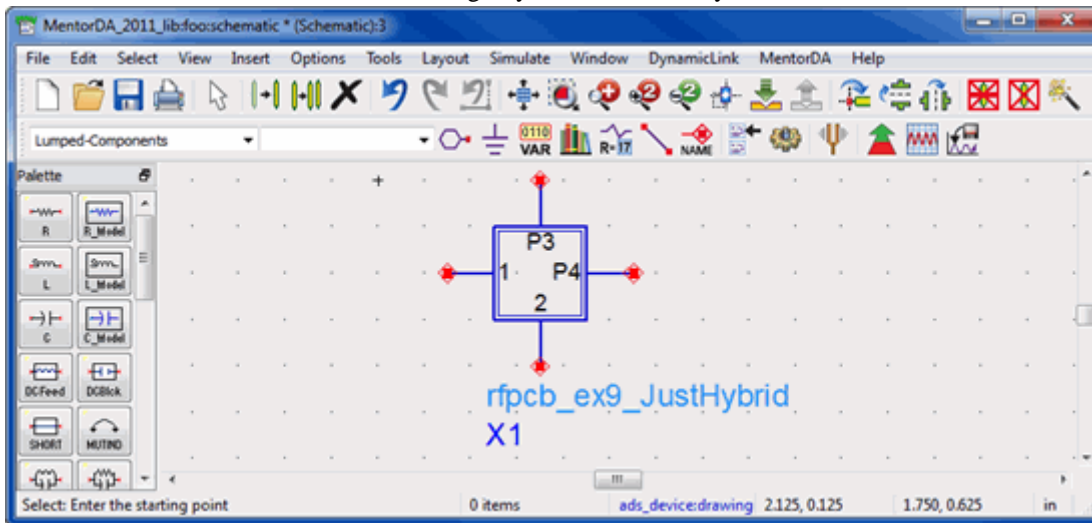


4. The active ADS schematic will pop forward, and the black-box symbol outline will appear for insertion. Click the component to complete the insertion.



5. After the Mentor netlist component is placed, the port names are visible. The names come from the identifiers supplied in the Mentor netlist. You can now wire the component to a design for use in an ADS circuit simulation.

5.



Sending a Schematic

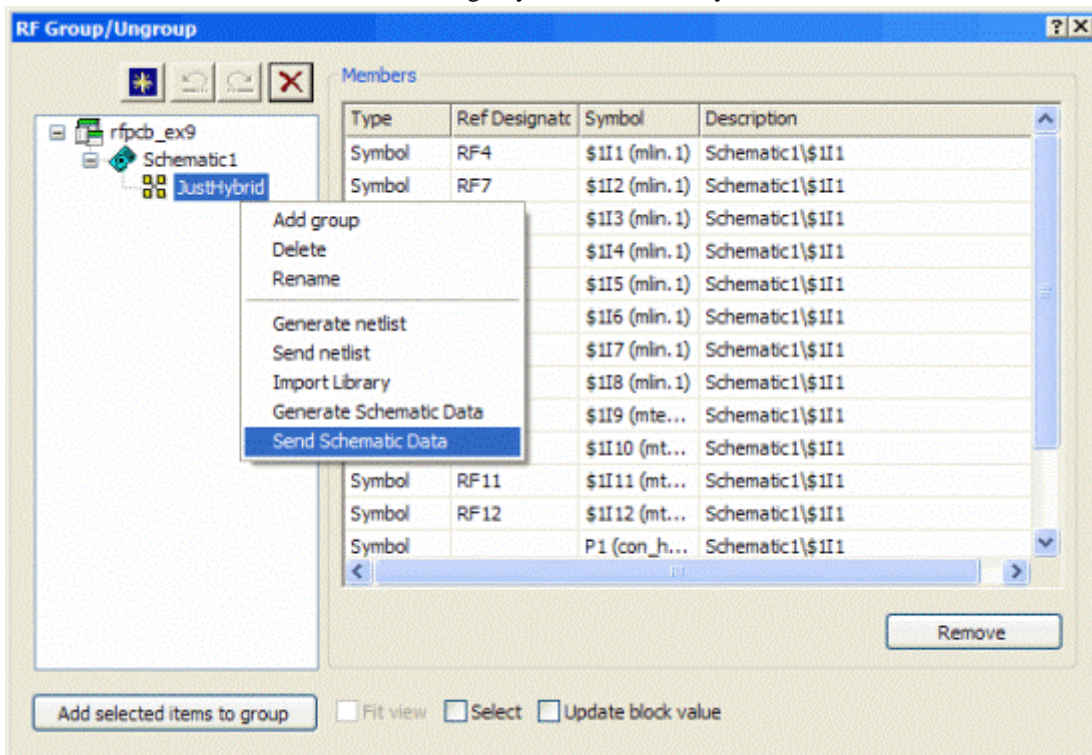
The Dynamic Access for Mentor link can send a DxDesigner schematic from Mentor to ADS. With some restrictions, an RF Group in DxDesigner is sent to ADS as a schematic design, where it can be modified and optimized like any other ADS schematic design. One restriction is that the source Mentor schematic must be flat, and completely visible in one schematic view—no block instances are allowed.

To send a schematic from DxDesigner:

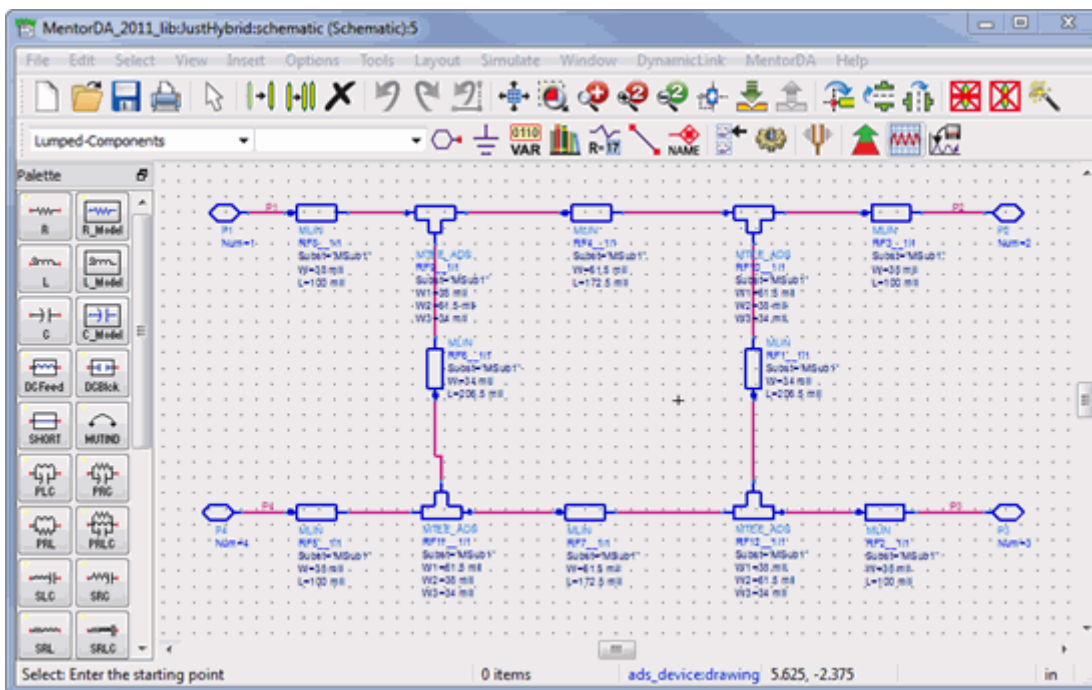
1. Define an RF Group.
2. From the RF Group/Ungroup dialog, select the group in the tree list to be transferred.
3. Right-click the name to open the context menu, and choose **Send Schematic Data**.

Note

The actual element level schematic must be visible in the DxDesigner schematic window, not a higher level block instance. Push into blocks for a successful transfer. This also means that transferred schematics cannot span blocks.



- On the ADS side, a new design will be created using the same name as the RF Group. Use this design as a building block in more complex ADS simulations.



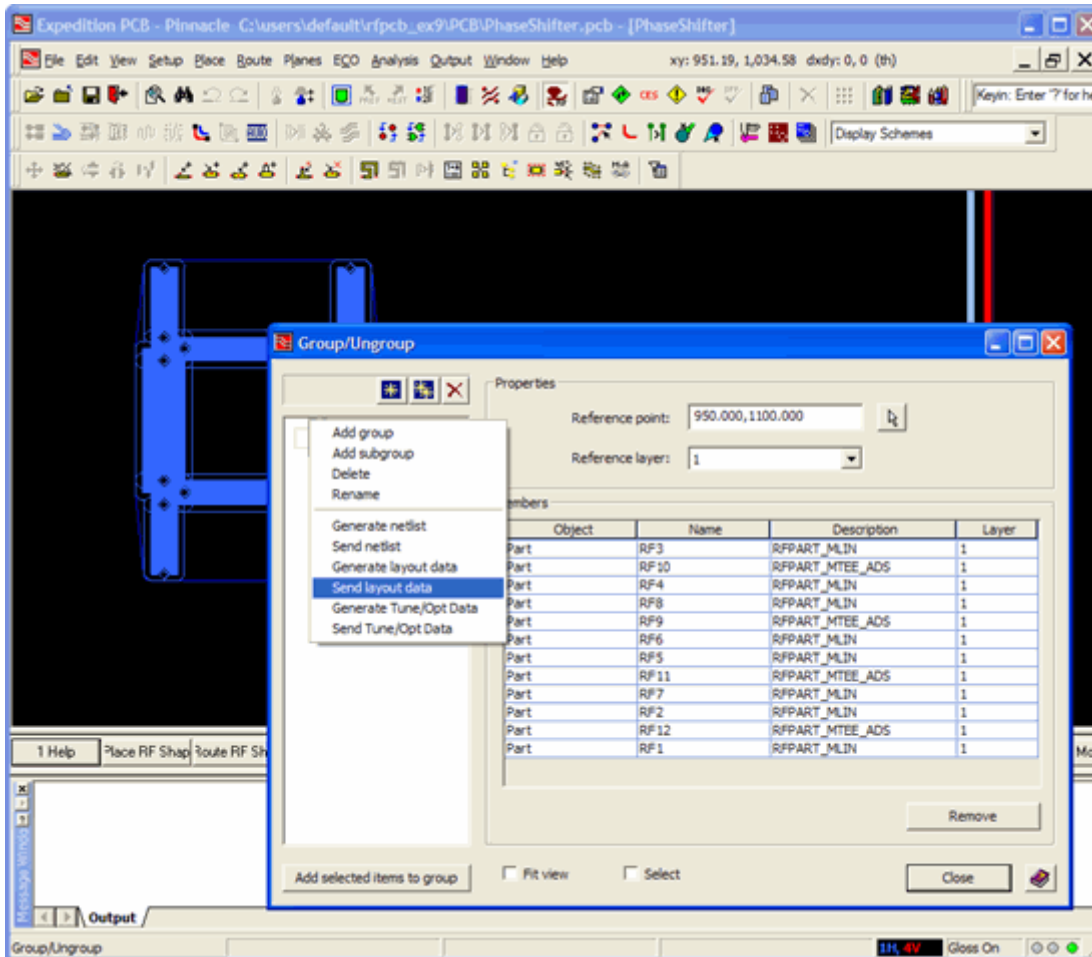
Sending a Layout as Polygons

Expedition layout RF Groups can be sent to ADS layout as geometric information. In this type of transfer, all Mentor objects are reduced to simple polygons and sent over the Dynamic Access for Mentor link to ADS. Along with the layout geometry, substrate information from the Mentor layout database is sent to ADS as a *.slm* file for use in Momentum electromagnetic simulations. Since the Mentor database does not include all of

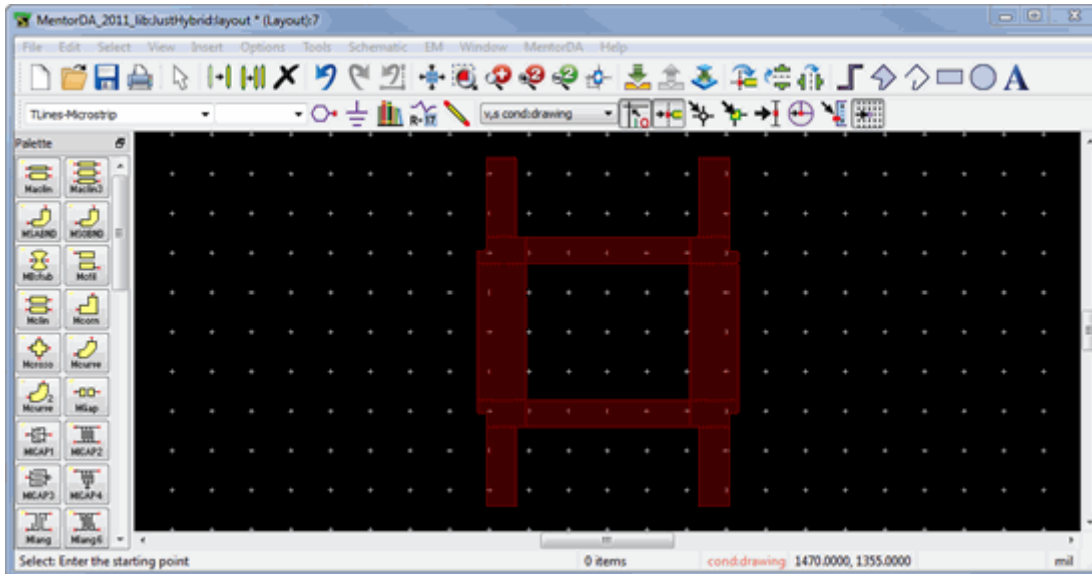
the physical parameters that Momentum requires, additional substrate editing will be needed in ADS.

To send a geometric layout from Mentor Expedition to ADS:

1. Define an RF Group.
2. From the RF Group/Ungroup dialog, select the group in the tree list to be transferred.
3. Right-click the name to open the context menu, and choose **Send layout data**.



A new ADS layout window will open containing the polygon-based imported layout.



A new *.slm* substrate information file will also be copied into the ADS workspace. You can manually load it for use with Momentum. It will have the same name as the RF Group that produced it.

1. Edit the substrate parameters as usual, if necessary.

Note

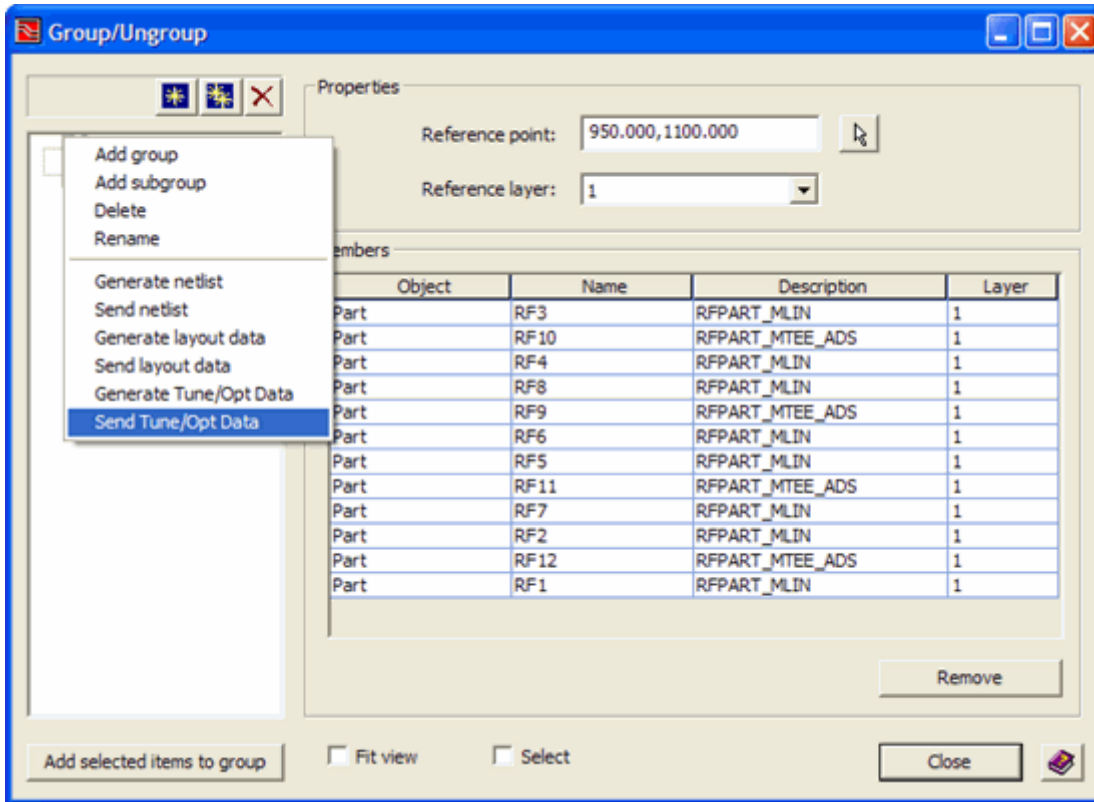
If you edit the substrate parameters, save the changes into a new file since an existing *.slm* file will be overwritten by a later import.

Sending a Layout as Components

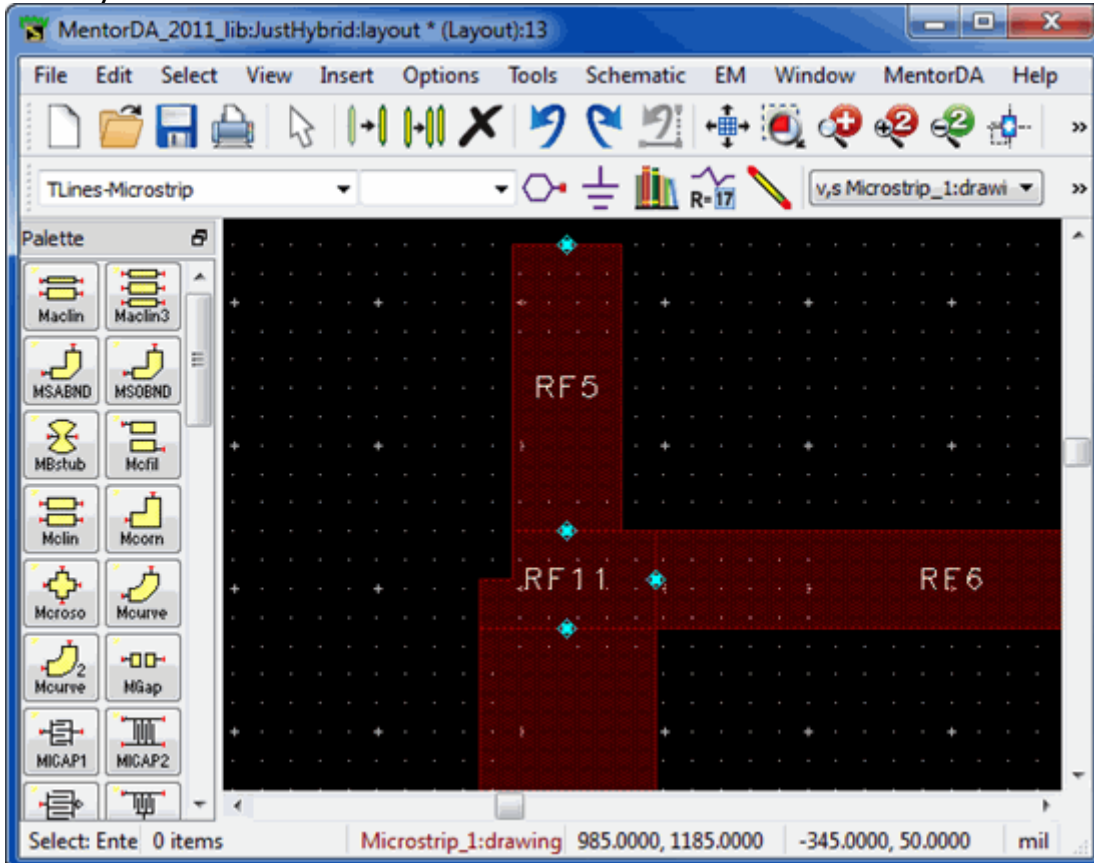
Expedition RF Groups containing components that have equivalent components in the ADS library can be sent over the Dynamic Access for Mentor link as ADS layouts containing parameterized components, not just simple polygons. The resulting ADS layout can be used to generate an ADS schematic, and can be used in circuit level simulation.

To send a parameterized layout from Mentor Expedition to ADS:

1. Define an RF Group.
2. From the RF Group/Ungroup dialog, select the group in the tree list to be transferred.
3. Right-click the name to open the context menu, and choose **Send Tune/Opt Data**.



The resulting layout view will open in a new layout window. The cell's schematic view will contain substrate-related information for the transmission line elements used in the layout.



Sending a Layout Netlist for Simulation

In cases where full layout transfer is not needed, an ADS netlist representing an RF Group can be sent from Expedition to ADS. Elements from the ADS symbol library are netlisted according to their netlisting properties. Simple trace elements also are converted to ADS transmission line equivalents and inserted in the netlist.

The netlist transfer process is similar to one used to transfer a schematic netlist from DxDesigner described above in [Sending a Schematic Netlist for Simulation](#).

To send the netlist from Expedition:

1. Define an RF Group.
2. From the RF Group/Ungroup dialog, select the group in the tree list to be transferred.
3. Right-click the name to open the context menu, and choose **Send Netlist**.
4. The active ADS schematic will pop forward, and the black-box symbol outline will appear for insertion. Click the component to complete the insertion.
5. After the Mentor netlist component is placed, the port names are visible. The names come from the identifiers supplied in the Mentor netlist. You can now wire the component to a design for use in an ADS circuit simulation.

Troubleshooting Dynamic Access for Mentor

This section discusses some of the current Dynamic Access for Mentor use-model limitations and known issues.

Dynamic Access for Mentor Use Model

Substrate definition and transfer

Mentor DxDesigner and Expedition have significantly different use models for substrate information than Agilent ADS. Substrate data for ADS symbol library components in DxDesigner is managed with a substrate dialog which edits a centralized substrate database. ADS uses substrate data components which are placed on schematics and follow scoping rules in a hierarchical design.

Netlists sent from Mentor to ADS for simulation will have the necessary ADS substrate components added to the dynamic component netlist file. No additional work is needed for correct simulation.

Schematics sent from Mentor to ADS will not have any substrate components, and so will need these to be added manually before the schematic can be used in ADS simulations.

Schematics sent from ADS to Mentor may have substrate component blocks on the schematic, and a matching symbol will appear in the Mentor schematic. These blocks will not affect the central substrate database, and will need to be removed from the schematic before it can be packaged for transfer to Expedition for layout.

Geometric layouts sent from Expedition to ADS will include a *.slm* file which defines the substrate stack and its material parameters. This will be derived from the Expedition layer stack definition, and not from the central RF substrate database used by ADS symbol library components. The Mentor user must ensure that these two Mentor substrate definitions match and make sense together.

Parameterized layouts sent from Expedition to ADS will have have substrate information on the schematic page of the ADS design. This will be derived from the central RF substrate database, not the Expedition layer stack definition.

Layouts sent from ADS to Expedition include the schematic page information, which may include substrate information. As of EE2007.2, Expedition does not do anything with this information.

Circuit design heirarchy

ADS supports hierarchical designs, with arbitrary levels of nested schematic instances. While Mentor DxDesigner allows nested block instances on the top level schematic, they are really inline instances of a block template, rather than true hierarchy in the ADS

sense.

Currently, only flat schematics with no block hierarchy can be sent from DxDesigner to ADS, since the schematic must be completely visible in the DxDesigner schematic window. RF groups with block hierarchy are allowed, but will be sent as a flattened netlist.

ADS schematics to be transferred to DxDesigner must be flat, with no hierarchy. Each symbol on the ADS schematic must have an equivalent in the Mentor environment.

Port definition rules

Port placement on geometric layout transfers is determined in the Mentor environment, and there is no control over these ports from the ADS side of the link. As of EE2007.2, only single ports with no ground reference are transferred. Ports may require additional manual adjustment in ADS before EM simulation.

Ground plane transfer

Information about this topic will be added when available.

Unit string translation

There are some differences between Mentor and ADS unit name strings, for example Mentor "mils" versus ADS "mil". These differences are automatically translated in the transfer process, and can be ignored in the Mentor environment.

Known Dynamic Access for Mentor Issues

None at this time.