SB200a User Guide

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MAN 196–0402

SB200a User Guide

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TRADEMARKS

SB200a Specifications

Maximum layer count	64+
Via rules	Conventional, blind and buried
Materials library	Foils RC C foils Cores Pre-Preg Solder mask Ident Peelable mask
Post press compensation	Yes (user defined)
Finished thickness compensation	Yes
Cu thickness calculation	Yes
Board thickness calculation	Yes
User library	Yes
Save builds	Yes

Personal Computer Requirements

Computer	IBM PC AT or compatible
Processor	Pentium 1GHz or better
Operating system	Windows 98 Microsoft Windows NT, Windows 2000 SP/XP
Environment	Latest .NET framework installed
System memory required	128MB recommended
Hard disk space required	200MB (min.)
Video standard	SVGA (1024 x 768 min.) Hi color 16 bit
CDROM drive	
Mouse	Microsoft compatible
Licensing	Fixed: Parallel/USB key
	Floating FLEXlm licence (Windows and Linux servers only)

Guide To The Manual

Introduction	Introduces the Polar Instruments SB200a.
Installation/set up	Instructions for installing/uninstalling and activating the SB200a software.
Using the SB200a	Discussion of the SB200a user interface; creating and editing stackups.
The SB200a Materials libraries	Using the SB200a materials libraries, creating new libraries, adding material to the library.
Design rule checking	Using the SB200a Design Rule Checker to correct stackup design errors.

Contents

Introduction to the SB200a

The SB200a Stackup Builder

The Polar SB200a PCB Stackup and Construction Builder is designed to reduce the amount of time consumed in PCB stackup documentation and control. The SB200a offers both interconnect designers (PCB layout engineers) and PCB front-end engineers a fast and professional solution to layer stackup creation. The SB200a is both graphical and easy to use while providing formal documentation for everyone involved in ensuring the correct materials are used in the build process.

The SB200a allows the user to view stackup in 2d or 3d format. Layer and material annotation is clear and easy to read and each layer may be selected and queried to display the associated material type and properties, including the associated data file. Visible drill information ensures that designers instantly know which layers support conventional, blind and buried vias.

Materials library

The SB200a supports a flexible materials library. This allows the designer to use standard materials data, and also provides the facility to create new material libraries. PCB fabricators can also build libraries of commonly stocked materials to give interconnect designers visibility of materials held in stock.

Preferred builds

PCB fabricators are able to create and share preferred builds and exchange this information with designers. Build information also includes blind and buried via information. This simplifies the task of sharing stackup and drilling information between board shops and the design community.

Dimensional information

Finished thickness is a critical dimension in many applications, the SB200a keeps track of finished thickness and tolerance, and allows fabricators the flexibility of adding in house post press thickness for pre preg layers. Additionally the SB200a takes into account plating thickness where appropriate.

Graphical interface

The SB200a offers an easy to interpret graphical interface. Clearly showing the layers supporting blind and buried vias, the SB200a also records the data file for each layer (including ident and peelable mask layers). The graphical interface is especially designed to simplify the process of communication between interconnect designer and fabricator. OEMs who need to manage boards sourced from multiple suppliers will also find this facility invaluable. In addition to physical layers the SB200a adds mask and notation for electrical layers.

Installing the SB200a

Activating the SB200a

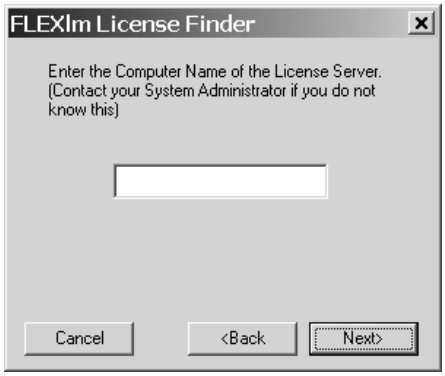
Activation will depend on the license purchased. It will be necessary to activate the product license prior to performing calculations with the SB200a. The SB200a is licensed using the FLEXlm License Manager or a software key connected to either the parallel port (typically LPT1) or a USB port. The FLEXlm licensing files should be installed and running on a locally accessible server. The server must be running to manage licensing.

Licensing the SB200a using FLEXlm

When the first stackup build is performed the SB200a FLEXlm License finder asks for the name of the License Server or License File.

Ensure the **Specify the license Server** option is selected and press **Next**.

Enter the name of the License Server and press **Next**.



The name will normally be the Network Identification name of the computer acting as the Licensing Server.

The SB200a will perform stackup builds within the terms of the license purchased.

Installing the software key

If a software key is used insert the key into the parallel printer port or USB port; if required, plug the printer cable into the software key.

Note: If installing the software key on a Microsoft Windows NT or Windows 2000/XP system it will be necessary to be logged on as Administrator.

Uninstalling the software

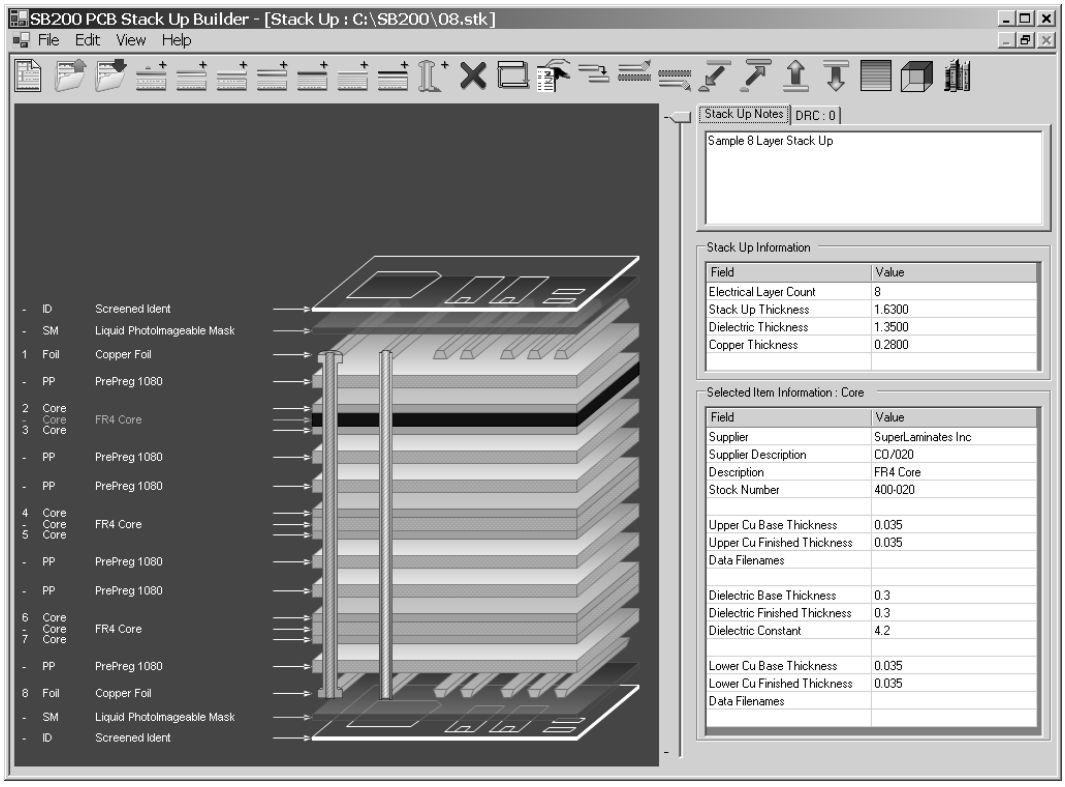
To uninstall the SB200a software click the Windows Start button and choose Settings and Control Panel.

Double-click Add/Remove Programs and choose SB200a from the list. Click Remove.

Using the SB200a Stackup Builder

The SB200a Stackup and Construction Builder

Double-click the SB200a icon to start the SB200a program. The main screen is displayed.



The SB200a screen comprises:

- The menu bar — drop-down menus containing all the SB200a commands
- The tool bar — incorporating short cut tool buttons to the most common menu commands
- The stackup build and construction window — where the board stack up is built and edited
- Stack Up Notes/DRC — a free form text area for explanatory or commentary notes/DRC
- Stack Up Information properties area — table containing information related to the whole stackup.
- Selected Item Information area — properties table containing the attributes of the layer currently selected in the stackup

The SB200a Menu System

The File menu

The **File** menu allows for creation of new stackups, opening, saving and printing existing stackups.

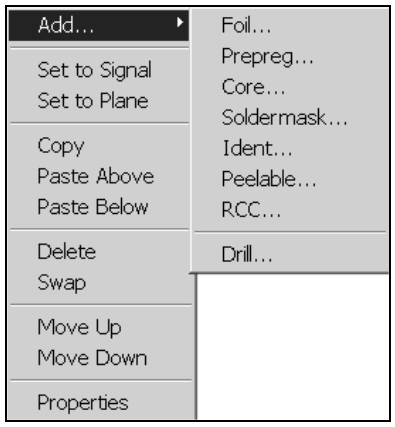
Saving stackups

Click the Save button to save the stackup. Users are recommended to save the stackup frequently during the stackup creation process to avoid data loss.

Backing up stackups and libraries

Stackup files (assigned the .stk extension) and library files (assigned the .mlb extension) should be backed up to a secure location.

The Edit menu



The Edit menu

The **Edit** menu contains most of the commands necessary to create and modify board stack ups. The designer/fabricator works within the free-form stackup build and construction window and adds layers of core, prepreg, foil, etc., from the materials library.

Layers can be moved up or down or copied and pasted, or assigned properties as required. The SB200a will apply design rules to the finished stackup to ensure compliance with good board design, (for example, the SB200a will check for symmetrical layers.)

The View menu

The **View** menu allows the SB200a to display the stackup in a 2-dimensional or 3-dimensional aspect.

The SB200a toolbar

The SB200a toolbar comprises shortcut links to the most popular commands.

Pause the mouse over each tool button to display the tool's screen tip

File operations

 Create new stackup

 Open existing stackup

 Save stackup/changes

Adding layers to the stackup

 Add foil layer to the stackup

 Add resin coated copper layer

 Add prepreg layer

 Add core layer

 Add solder mask

 Add screened ident layer

 Add peelable mask

 Add mechanical/laser drill between layers

Editing the stackup

 Delete selected stackup layer or drill

 Swap selected material

 Display properties dialog for the selected layer or drill

 Copy material of the selected layer

 Paste material above selected layer

 Paste material below selected layer

 Set the selected electrical layer as a signal layer

 Set the selected electrical layer as a plane

 Move selected layer up one layer

 Move selected layer down one layer

Changing the stackup view

 Display 2-dimensional view

 Display 3-dimensional view

Managing the materials library

 Display materials library

Creating a new stackup

The SB200a allows the designer to add or edit stackup layers in any order, from top to bottom, bottom to top or from the center layer outwards. In this example we create a four layer stackup, starting at the center core layer and adding layers above and below.

Adding layers to the stackup

Display materials library

Items added to the stackup are added from the currently open materials library. The SB200a opens *Program Files\Polar\SB200\default.mlb* if it exists; if a different library is required open it via the Materials Library command.

Note: the SB200 does not ship with the default.mlb library. For this discussion open one of the two sample library files, *SB200 inch.mlb* or *SB200 mm.mlb* (stored in the *Program Files\Polar\SB200\Samples* folder at installation time for a default installation.)

Caution: Consistency of units

When defining dimensions for a stackup (for example, layer thicknesses) ensure that all measurements are defined using the same units (mils, mm, etc) throughout the structure and its libraries.

Note: the libraries supplied for these examples are preloaded with sample data only.

Click File|New to clear the stackup screen and notes and information text areas.

Save stackup button

Click the Save button to save the stackup. Users are recommended to save the stackup frequently during the stackup creation process to avoid data loss. Stackup files (.stk) and library files (.mlb) should be backed up to a secure location.

Adding a core layer

Click the Add Core button, the core library is displayed

The core library contains full details of the core material, including base and finished thicknesses, dielectric constant, and upper and lower copper thicknesses.

Base Thickness	Finished Thickness	Dielectric Constant	Upper Cu Thickness	Lower Cu Thickness
0.05	0.05	4.2	0.018	0.018
0.05	0.05	4.2	0.035	0.035
0.05	0.05	4.2	0.07	0.07

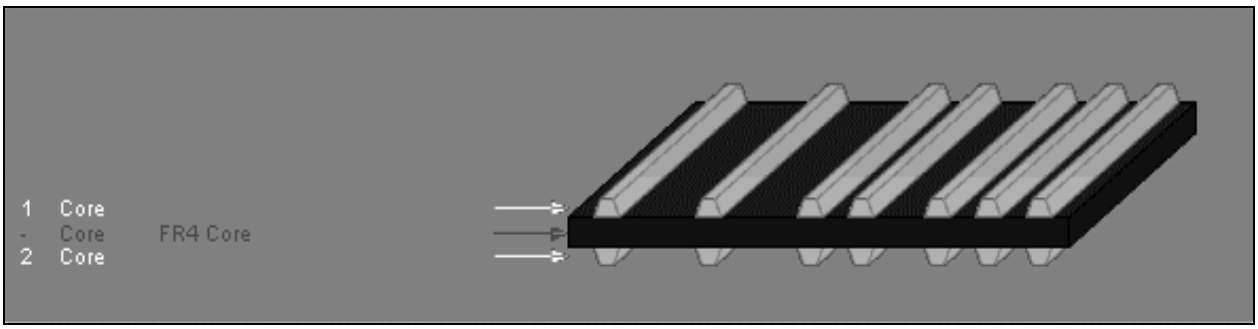
Click on the column button to sort the library list by the selected column.

Choose a core type from the list of cores and click the Add Above button

Add core above selected layer

Add core below selected layer

The core is added to the stackup screen.



Stackup core layer

As each layer is added the stackup information table is updated to reflect the current status of the stackup.

Stack Up Information

Field	Value
Electrical Layer Count	2
Stack Up Thickness	1.0700
Dielectric Thickness	1.0000
Copper Thickness	0.0700

Stackup information table

With the core selected, the Selected Item table displays the properties of the core.

Selected Item Information : Core

Field	Value
Supplier	SuperLaminates Inc
Supplier Description	CO/026
Description	FR4 Core
Stock Number	400-026
Upper Cu Base Thickness	0.035
Upper Cu Finished Thickness	0.035
Data Filenames	
Dielectric Base Thickness	1
Dielectric Finished Thickness	1
Dielectric Constant	4.2
Lower Cu Base Thickness	0.035
Lower Cu Finished Thickness	0.035
Data Filenames	

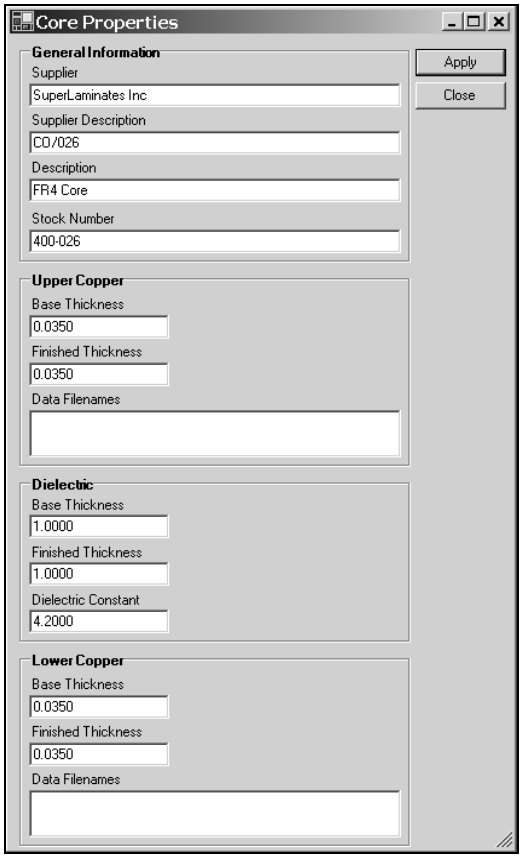
Core layer information

Editing the selected layer properties

To change the properties of the selected object (for example, to modify the value for the finished thickness of the dielectric), right click the object in the stackup and choose Properties from the shortcut menu; the Core Properties dialog is displayed.

Note: the on-screen descriptive text to the left of each layer is plain free form text derived from the layer properties and can be modified using the layer properties dialogs.

When altering descriptions, keep the description short and avoid using dimensional information in text fields which produce on-screen display; if the dimensions specified in the dialog's other text boxes are subsequently changed the on-screen description may not match the true dimensions.



Core Properties

Change the Dielectric finished thickness to the corrected value and click Apply.

Adding data file names

If available, add the data file name(s) to the upper and lower copper layers and click Apply.

Close the dialog when all changes are completed.

Changes will be reflected in the Stackup Information table

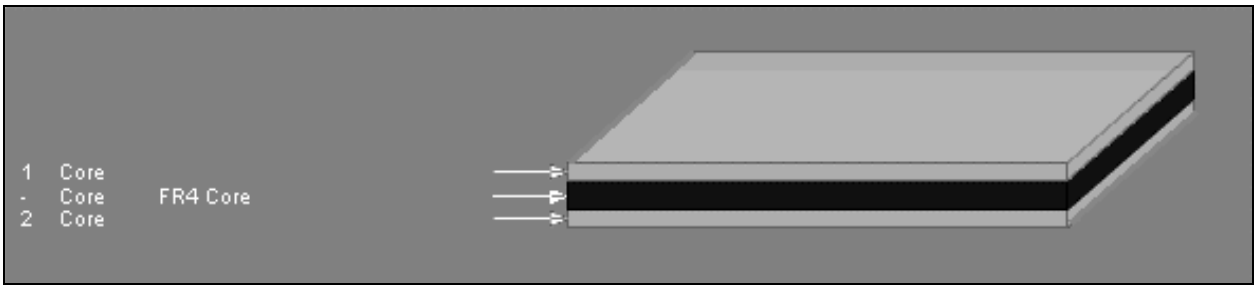
Changing a layer function

In this example we change both signal layers above and below the core dielectric to planes.

Set Layer Plane

Click the lower signal layer and click the Set Layer Plane button. Repeat for the upper signal layer.

The changes are reflected in the stackup window



Exchanging layers

Library Swap button

To change just the core dielectric (leaving the copper layers unaffected) select the core material (for example the FR4 in the graphic above) and click the Swap Selected Material button. Choose the new core type from the library and click the Swap button.

The layer properties will change to reflect the new material and changes appear in the Stackup Information table.

Adding Prepreg layers

Add Prepreg button

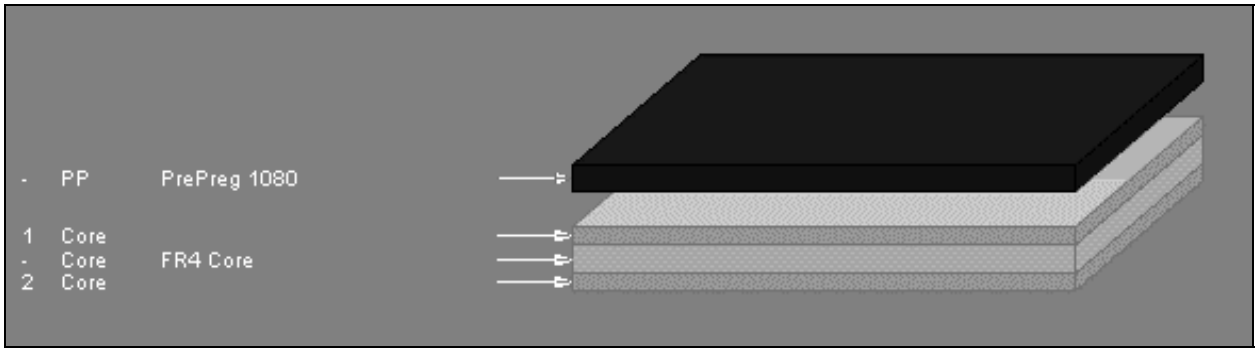
With the core selected, click the Add Prepreg button; the Add Prepreg library is displayed.

Description	Stock Number	Base Thickness	Finished Thickness	Dielectric Constant
PrePreg 1080	300-001	0.075	0.075	4.2
PrePreg 3080	300-002	0.077	0.077	4.2
PrePreg 3113	300-003	0.102	0.102	4.2
PrePreg 1651	300-004	0.152	0.152	4.2
PrePreg 7628	300-005	0.2	0.2	4.2

The Prepreg library contains details of the Prepreg material, including the Prepreg's base and finished thickness and dielectric constant.

Add Prepreg Above

Choose the Prepreg material from the database and click the Add Prepreg Above button.

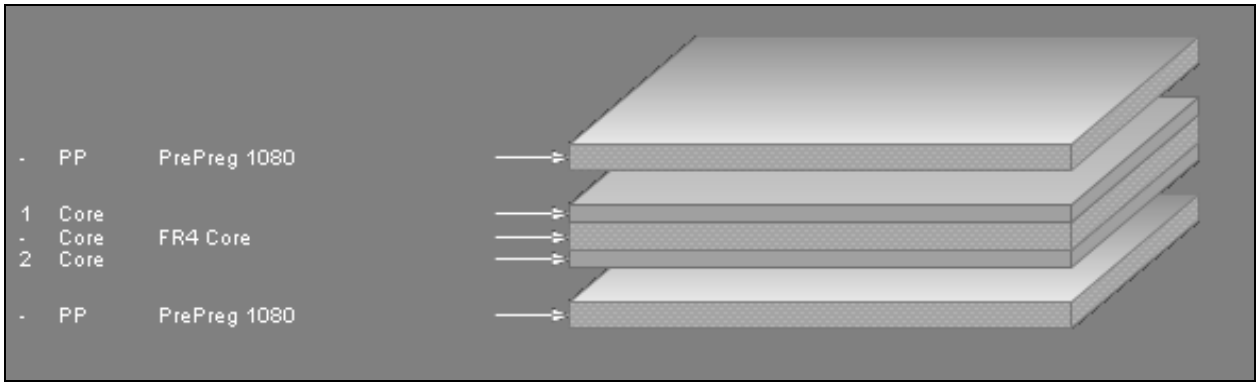


The Prepreg layer is added above the core.

Click the Add Prepreg button to display the Add Prepreg library and click the Add Below button

Add Prepreg Below

The layer of Prepreg is added below the core.

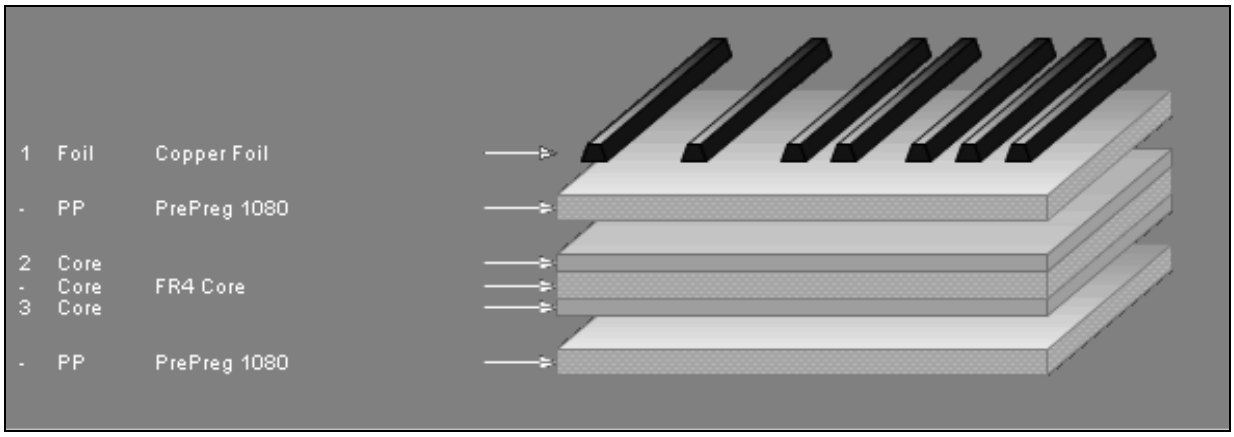


Adding a layer of copper foil

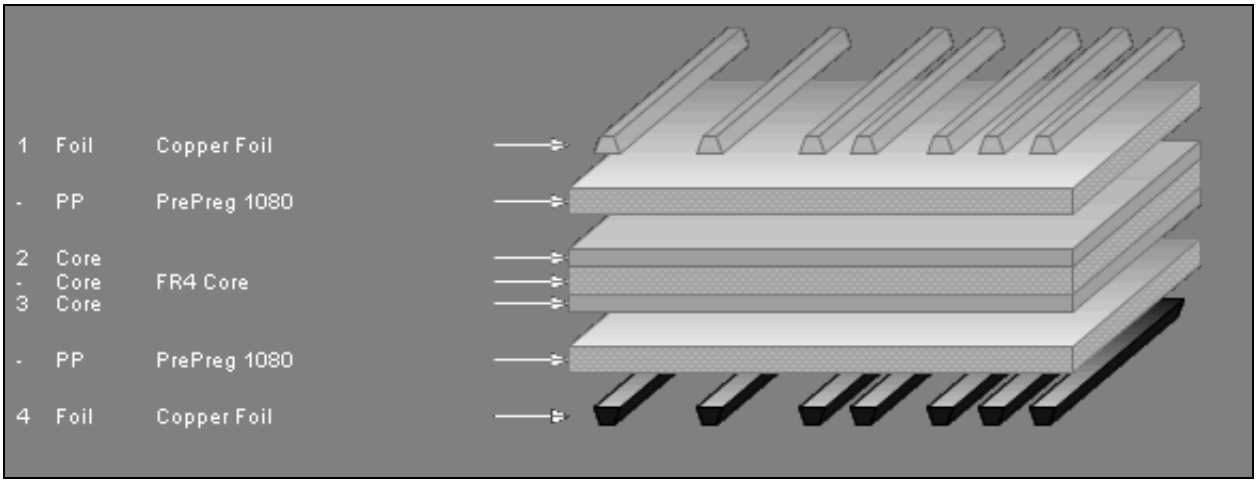
Select the upper layer of Prepreg and click the Add Foil button to display the copper foil library.

	Supplier	Supplier Description	Description	Stock Number	Cu Thickness
▶	SuperLaminates Inc	FO/001	Copper Foil	100-001	0.018
	SuperLaminates Inc	FO/002	Copper Foil	100-002	0.035
	SuperLaminates Inc	FO/003	Copper Foil	100-003	0.07

Choose the foil type and click Add Above, the copper foil layer is added above the selected Prepreg layer.



Repeat the procedure for the lower Prepreg layer: select the lower Prepreg layer and add a layer of copper foil below the layer.

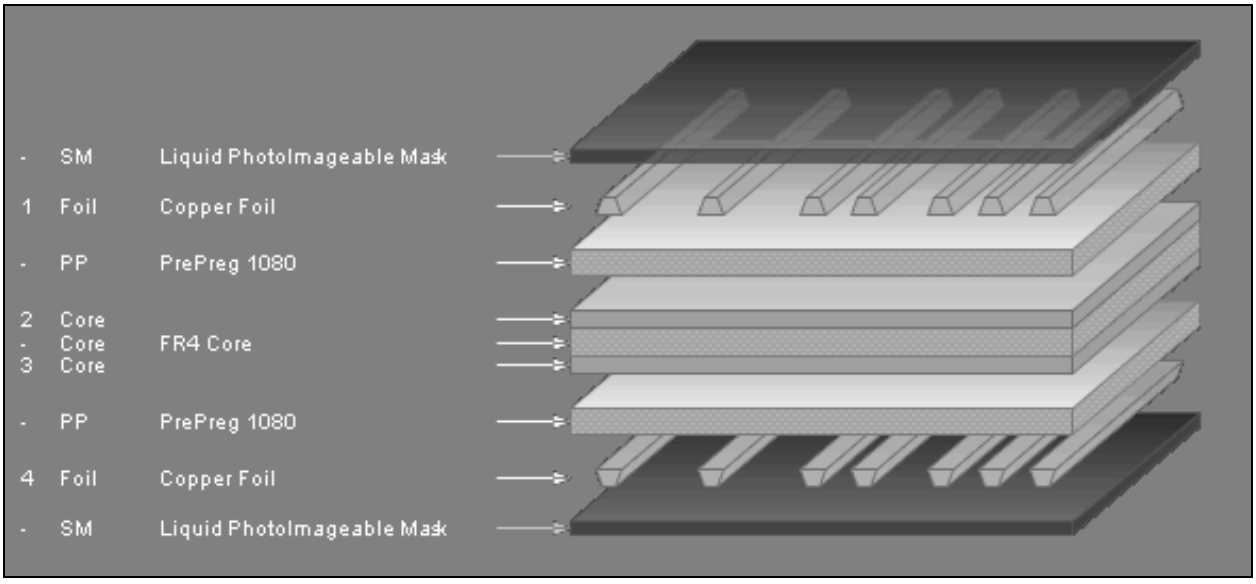


To alter the foil properties, right-click the foil layer and choose Properties.

Note the stackup is built symmetrically about the center layer.

Adding solder mask layers

With the upper layer of foil selected, click the Add Soldermask button to add a layer of LPI soldermask above the foil. Repeat the process for the lower foil layer.

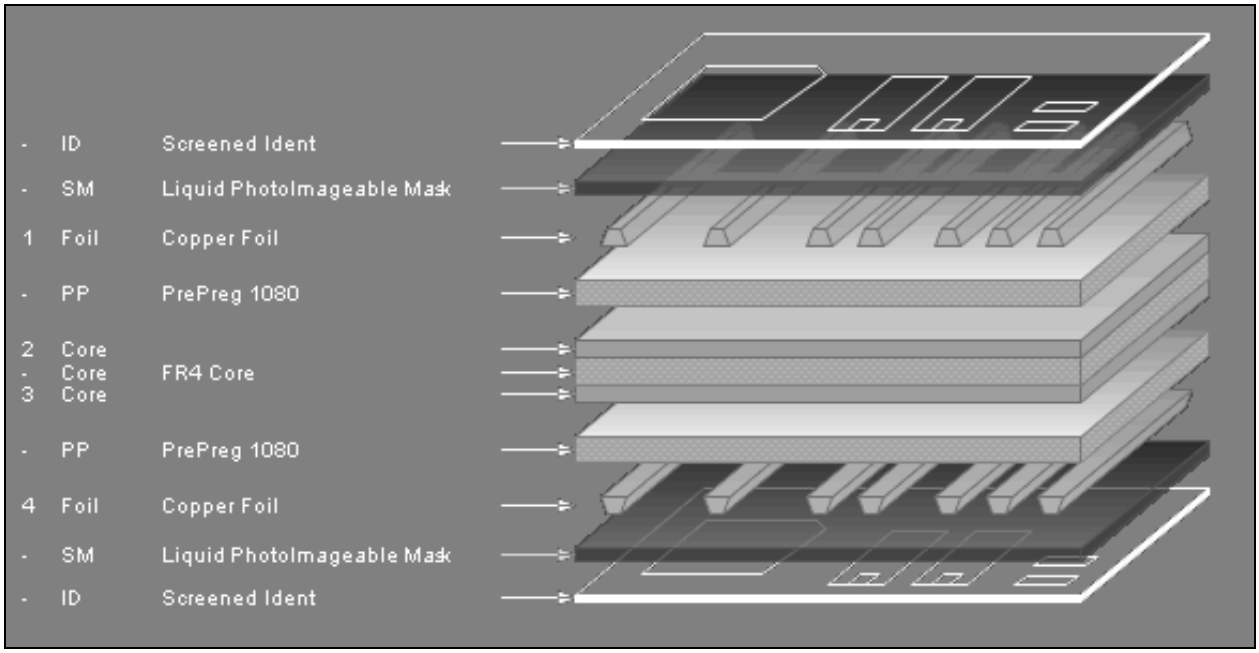


Adding the Ident layers

Select the lower LPI soldermask layer and click the Ident button to add a layer of Screened Ident below the layer. The sample Ident library includes ink thickness and color.

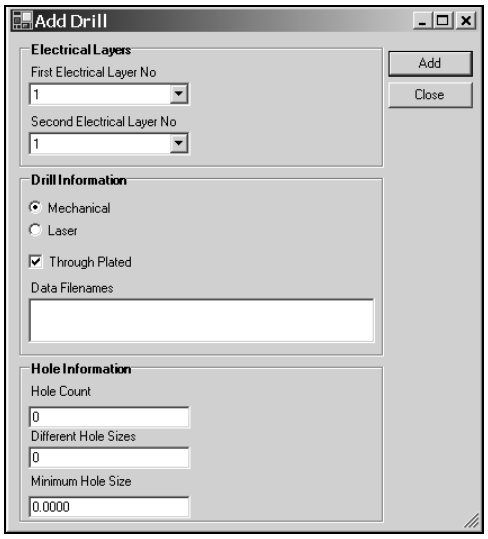
	Supplier	Supplier Description	Description	Stock Number	Ink Thickness	Ink Colour
▶	SuperInks Inc	ID/001	Screened Ident	600-001	0.05	White
	SuperInks Inc	ID/002	Screened Ident	600-002	0.05	Yellow
	SuperInks Inc	ID/003	Screened Ident	600-003	0.05	Black

Repeat for the upper layer.



Adding drill information

To add a drill information between layers click the Add Drill button; the Add Drill dialog is displayed.



Choose the first and second electrical layer numbers (layers 1 and 4 in the example).

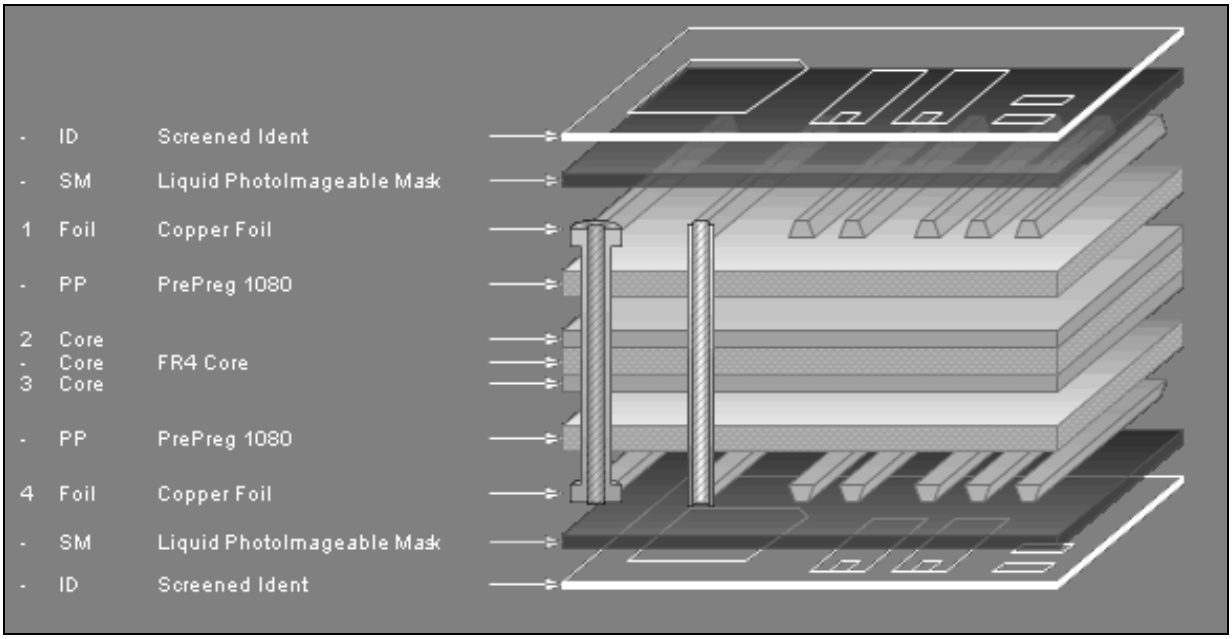
Specify the drill type, mechanical or laser and whether through plated.

Optionally, add the NC drill data filenames.

Optionally, add the hole count, number of different hole sizes and the minimum hole size. Click Add and close the dialog.

The drill information is added to the stackup. In the example we have added drill information for through plated and non-through plated.

This completes the stackup; the finished stackup is shown below



Deleting a layer

Delete layer

To remove a layer from the stackup select the layer and click the Delete button.

Copying layers

Copy Material

With layers defined it will often be found more convenient to copy an existing layer and paste it into the stackup than to create a new layer “from scratch”. Select the layer to be copied and click the Copy Material button.

Click the layer nearest the destination location and choose Paste Above or Paste Below as appropriate

Note: when modifying the stackup it may be necessary to redefine the drill information to reflect the changes.

Moving layers

Move selected layer up one layer

Move selected layer down one layer

To move layers within the stackup use the Move Up and Move down buttons.

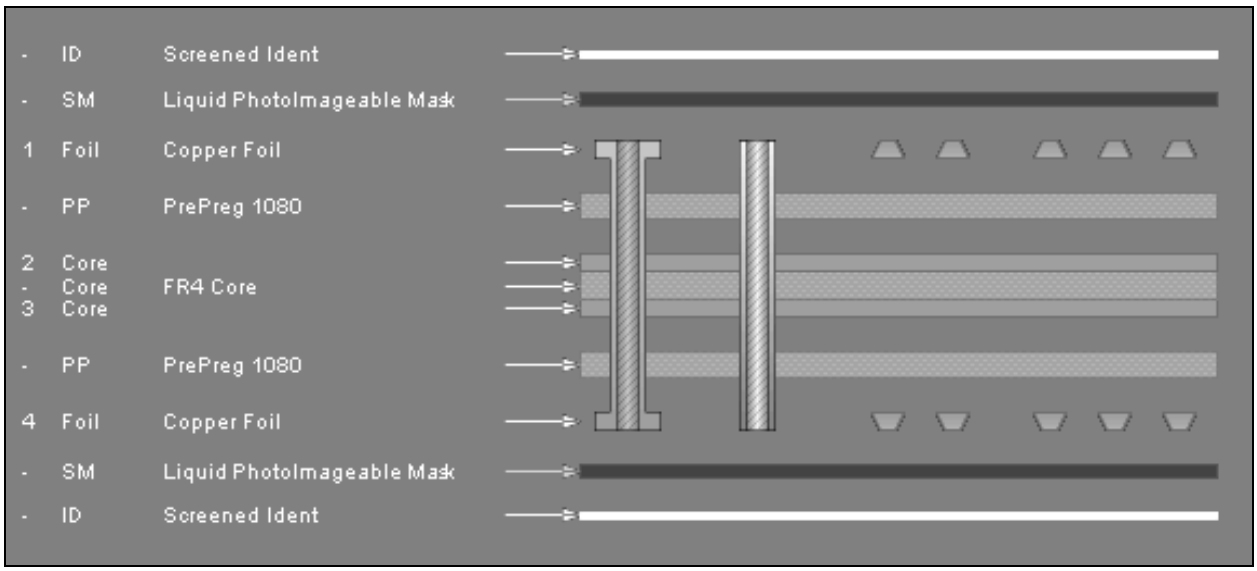
When a layer is moved it is exchanged with the layer above or below, respectively.

Displaying the stackup in 2-dimensional view

View 2D button

To change the view of the stackup from its default 3-dimensional aspect, click the View 2D button.

The stackup is displayed in 2-dimensional view.



Display 3DI view

Click the View 3D button to restore the 3 dimensional view.

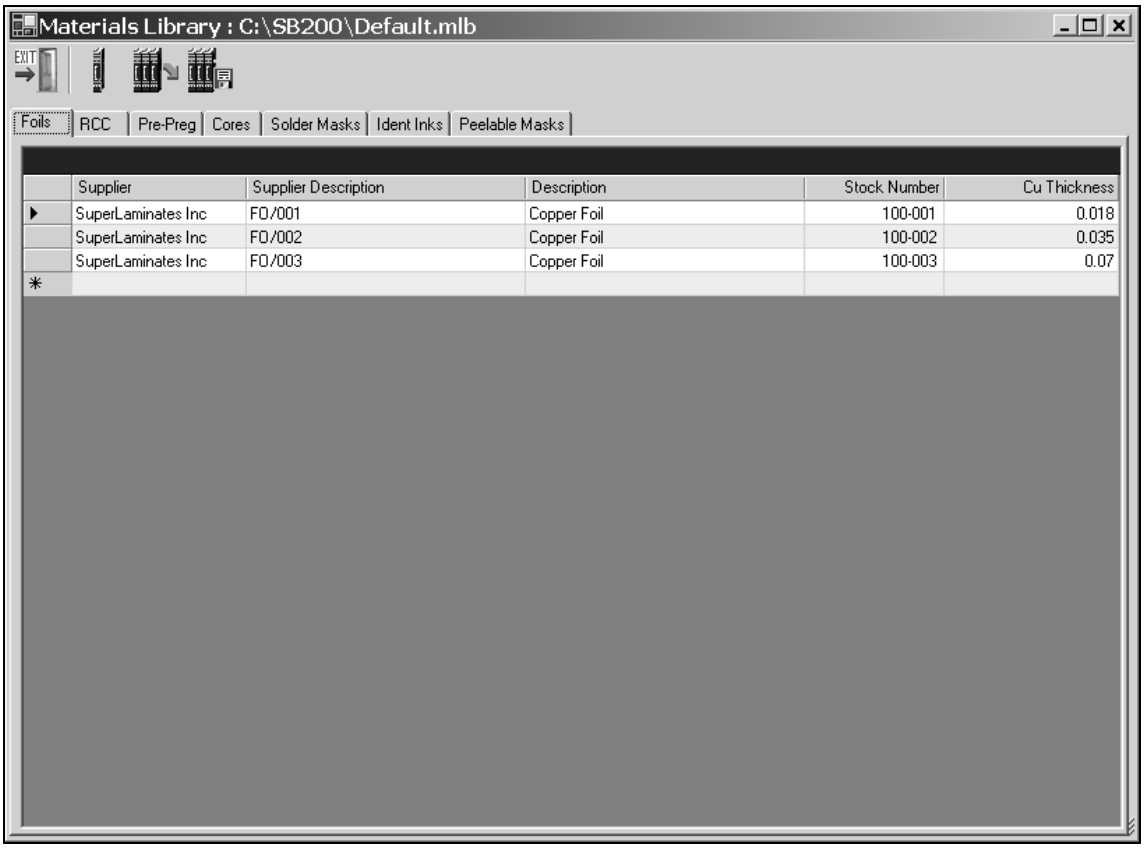
Using the SB200a materials libraries

Materials Library

The materials libraries allow designers to manage their own libraries of board materials.

Click the Materials Library button to display the Materials Library window.

When the SB200a is started the material library *Program Files\Polar\SB200\default.mlb* is opened (if it exists).



Each library component type is accessible via its associated tab. Click on the Tab to view or edit the component type.

Materials library toolbar

The Materials Library is managed via its toolbar

Clear Materials Library

Open Materials Library

Save Materials Library

Creating a new library

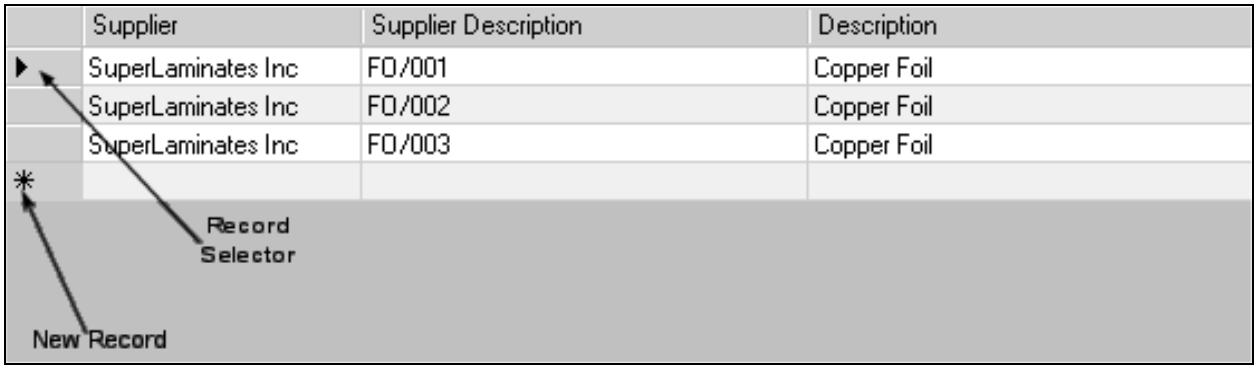
To create a new library click the Clear Materials Library button; the library is removed from the library manager. Click the Save Materials Library button to create the new library. To have the library load as the SB200a starts, assign the name *default.mlb* to the library and save it in the same folder as the SB200 program files (for example, *Program Files\Polar\SB200\default.mlb*).

Adding material to the library

Caution: Consistency of units

When defining dimensions, e.g. layer thicknesses, for a stackup ensure that all measurements are defined using the same units (mils, mm, etc) throughout the structure and its libraries.

Open the library to be modified. To add material types to a library click the associated component type tab; click into the empty record at the bottom of each list and enter the material details.



To delete a record, click the record selector and press Delete.

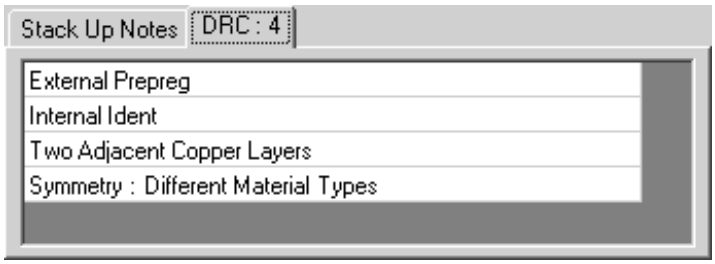
Design Rule Checking

The SB200a includes facilities to check for errors in stackup design, such as layers placed in invalid order or asymmetrical structures.

The Design Rule Checker (DRC) displays results in the DRC dialog. As each design rule is broken the SB200a increments the error count on the DRC tab.

Viewing design rule errors

Click the DRC tab to view errors.



The Design Rule Checker checks include checking for:

Two Adjacent Copper Layers

Resin Coated Copper on Internal Layer

External Prepreg

Internal Solder Mask

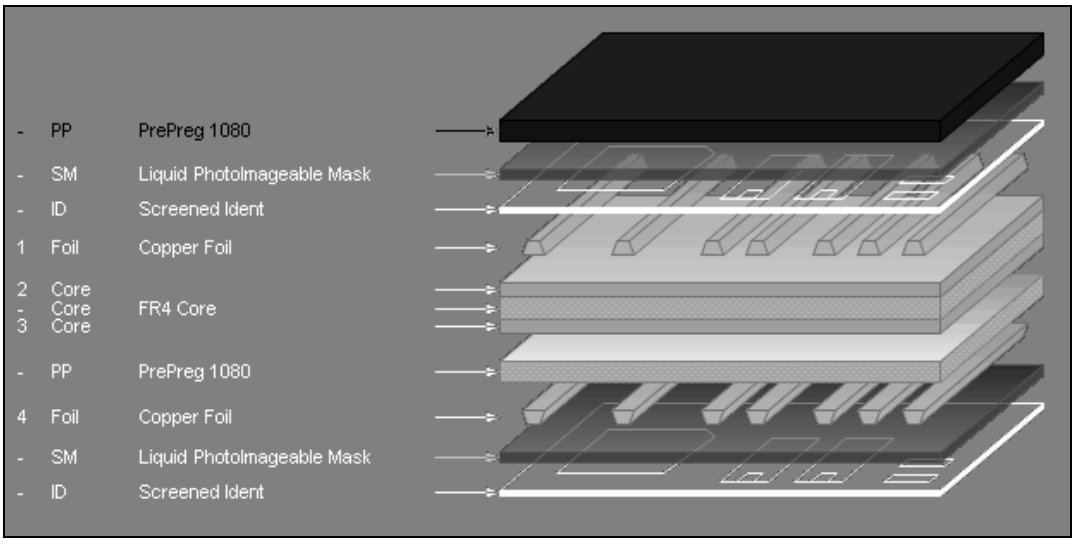
Internal Ident

Internal Peelable Mask

Symmetry : Different Material Types

Copper not Balanced

The errors shown in the dialog above correspond to the stackup structure on the facing page. Errors are highlighted in red.



Correcting design rule errors

Users are strongly recommended to work through and correct errors in the order in which the errors are listed.

In the example stackup one of the Prepreg layers (shown selected) is external to the layer of copper foil. This will result in three errors: the *External Prepreg* error, the *Two Adjacent Copper Layers* error and the *Symmetry: Different material types* error. Placing the Prepreg layer into its correct position in the stack will clear both errors.

The Ident layer (normally the outermost layer) is located on an internal layer.

Two layers of copper are adjacent (effectively a short circuit between copper layers).

The stackup is built asymmetrically.

Move the layers to their correct location in the stackup to correct errors. Note that clearing each error may clear other errors in the process.

FLEXlm server-side installation

This document describes a simple FLEXlm server-side installation for the Polar SB200a.

Full details of the FlexLm product capabilities are contained in the the FlexLm User Manual or on the www.macrovision.com web site.

Note: You will need to be logged into the server with Administrator privileges to perform this installation.

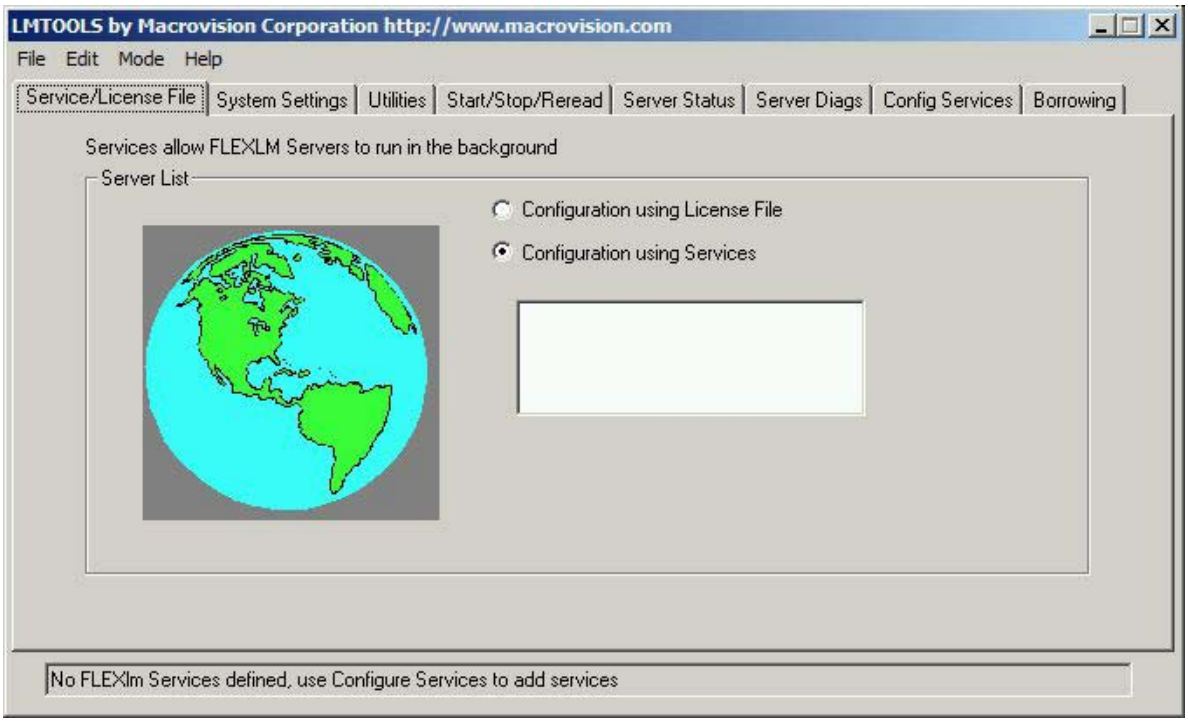
Step 1 – Starting the installer

Insert the installation disk into the CDROM drive of the server. Start the installer via Setup.exe on the supplied disk.

This will create a folder on the server which by default is: *C:\ProgramFiles\FlexLm\V9.2*

Step 2 – Running LMTOOLS

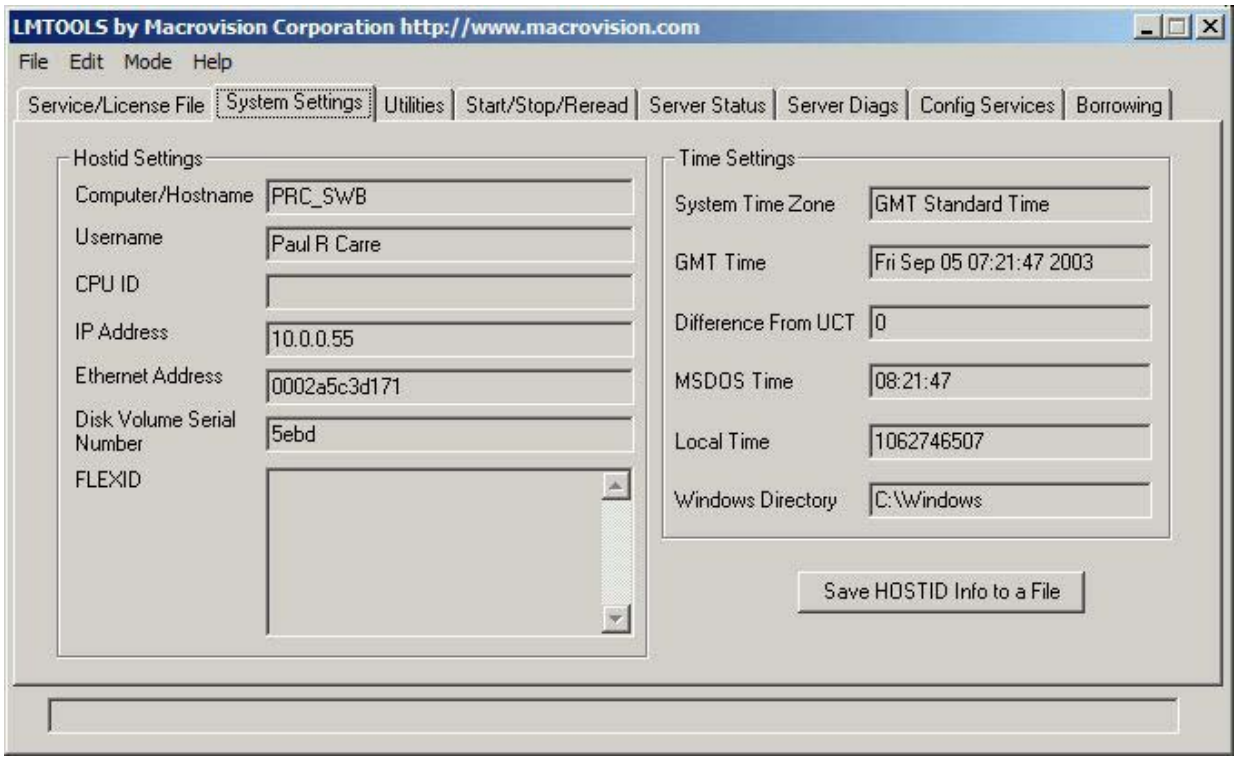
Navigate to the folder created in Step 1 and run the LMTOOLS.exe program.



LMTOOLS dialog box

Step 3 – Creating the HOSTID file

Select the **System Settings** tab.



LMTOOLS System Settings

The System Settings page displays critical information about your selected server machine. Click the Save HOSTID Info to a File button.

This will create a text file that you will need to email to: flexlm.support@polarinstruments.com

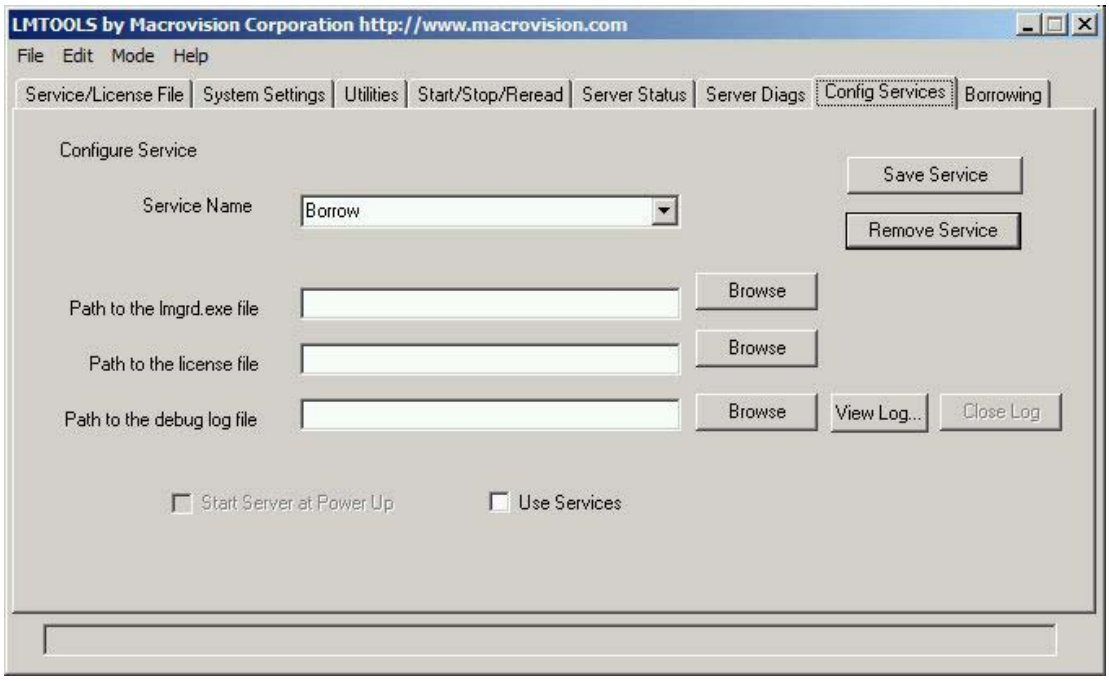
Note: Please also include within the email the Company Name that you would like associated with the licence file. Failure to do this will result in a delay in issuing the licence. Once Polar Instruments has received and processed this information you will be returned a custom licence file by email.

Note: Until the custom licence file is correctly installed on the server machine the SB200a software cannot be used. The custom licence file is allocated to the nominated server machine and cannot be used on any other server.

Step 4 – Configuring the SB200a service

Once you have received your custom licence file from Polar Instruments copy it to the same folder that currently contains LMTOOLS.exe.

Select the **Config Services** tab



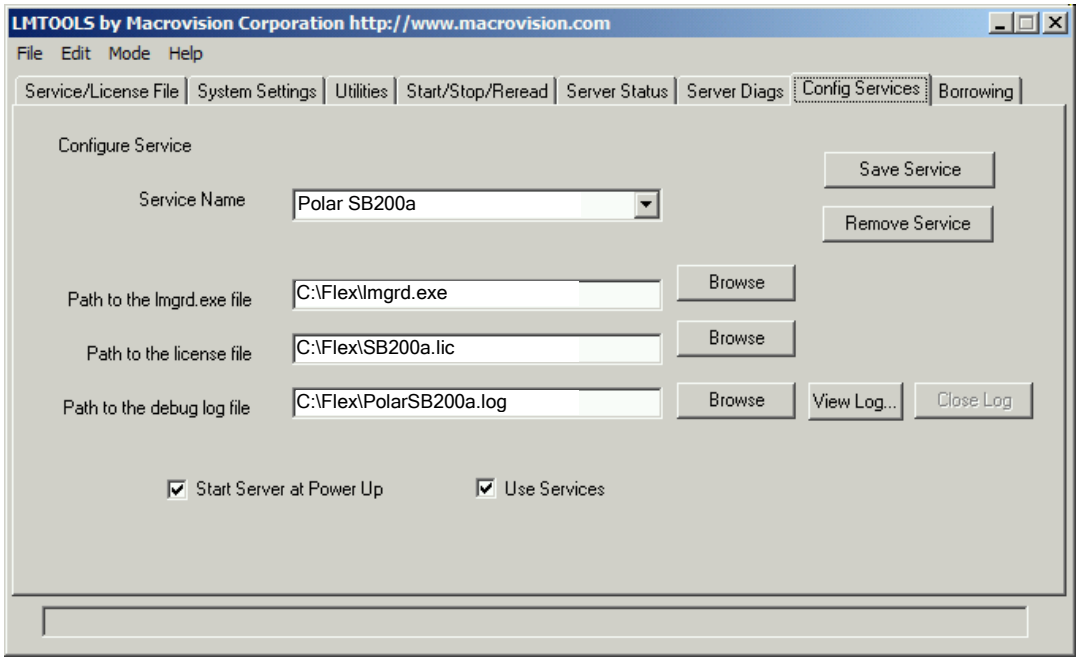
Config Services tab

In the **Service Name** dropdown enter the service name:

Polar SB200a

Use the three **Browse** buttons to select the **lmgrd.exe** file, the **SB200A.lic** file and the Polar **SB200A.log** file.

Select the Use Services and Start Server at Power Up checkboxes.

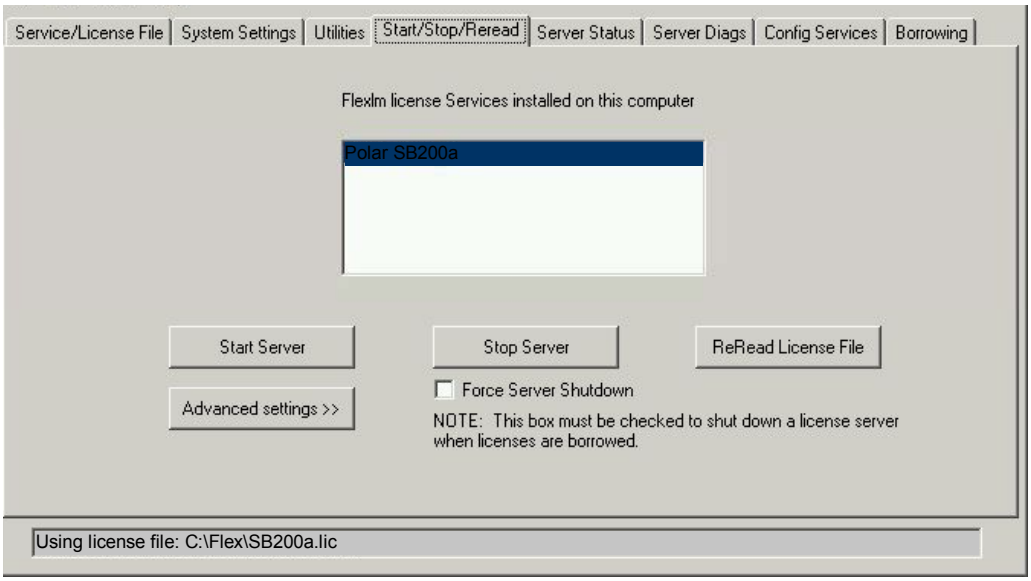


Config Services tab

Before leaving this page select the **Save Service** button to store these settings.

Step 5 – Starting the server

Select the Start/Stop/Reread tab



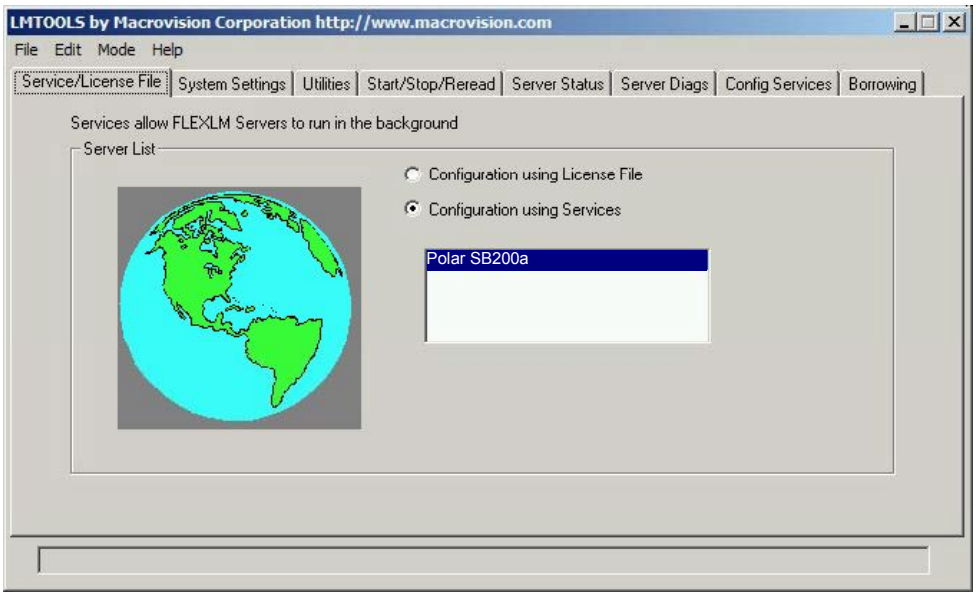
Start/Stop/Reread tab

Select the **Start Server** button; this should be the only time that you are required to do this as this service will be now be run at the time of server start up.

Step 6 – Verifying the SB200a service

Select the Service/Licence File tab

This should now show the Polar SB200a Service.



Service/Licence File tab

This completes the server side installation; please refer to the FLEXlm User Manual for additional information.