Creating VHDM Customer Use Connector Configurations

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1. Introduction

This document instructs you how to use the simplified models provided to create custom Daughtercard (DC) and Backplane (BP) module configurations for VHDM.

You can use the models supplied in any 3-D CAD system, using the appropriate file format. Read these instructions even if you do not use Pro/ENGINEER as certain component placement offsets must be applied regardless of the CAD application.

Models supplied in native Pro/ENGINEER, IGES and as STEP files.

Basic Pro/ENGINEER skills (file creation and retrieval as well as component assembly operations) are required in order to follow the instructions.

You must use *Pro/ENGINEER Release 2000i^2 or later*, as the native Pro/ENGINEER models cannot be opened in earlier releases.

The example provided depicts the models and assembly procedure for the standard VHDM 8 Row, however, several other product lines (listed in section 2) currently have Pro/ENGINEER models available (check with the Product Line Manager to get the latest list of available products). The assembly rules and procedures for these products are similar to those outlined for VHDM.

Revised (Pro/ENGINEER Release 2000i^2), Feb 28, 2002
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2. Available Simplified Product Models

The following models are currently offered on-line. Download the data set of interest, and unzip the files into a directory. The models were created using Simplified Interchange.

Note: The models have been stored in Pro/ENGINEER Releases 18 through 2000i; and only support *wireframe display* when previewed using the Release 2000i^2 Preview function. You may want to save the models with the *config.pro* option **save_model_display** set to any of the **shading_*** options to take full advantage of the Preview function.

VHDM 6 Row

File name:	Description:
p1007-customername.asm	Sample Top Assembly
p1007-bp-customername.asm	Sample Backplane Assembly
p1007-dc-customername.asm	Sample Daughtercard Assembly
si-p1007-bp-10pos.prt	10 position Open BP Module
si-p1007-bp-25pos.prt	25 position Open BP Module
si-p1007-bp-ltpol10pos.prt	10 position Left BP Module
si-p1007-bp-ltpol25pos.prt	25 position Left BP Module
si-p1007-bp-rtpol10pos.prt	10 position Right BP Module
si-p1007-bp-rtpol25pos.prt	25 position Right BP Module
si-p1007-bp-pwrmod.prt	BP Power Module
si-p1007-dc-power.prt	DC Power Module
si-p1007-wafer.prt	DC Wafer
si-p1007-guide.prt	DC Guide Module
si-p1007-endcap.prt	DC End Cap
si-p1007-stiffener-customername.prt	Stiffener

VHDM Right Angle Male (RAM)

File name:	Description:
si-ram_component_setup.asm	
si-p1009-pwrmod.prt	Power Module
si-p1009-wafer.prt	Wafer
si-p1009-pol-guide-mod.prt	Guide Module
sis-p1009-stiffener-formed.prt	Stiffener

VHDM HSD 5 Row

File name:	Description:
si-p1018-assy-bp-10-openguide.prt	10 position Open BP Module
si-p1018-assy-bp-25-openguide.prt	25 position Open BP Module
si-p1018-assy-bp-10-leftguide.prt	10 position Left BP Module
si-p1018-assy-bp-25-leftguide.prt	25 position Left BP Module
si-p1018-assy-bp-10-rightguide.prt	10 position Right BP Module
si-p1018-assy-bp-25-rightguide.prt	25 position Right BP Module
???	BP Power Module
si-p1018-dc-power-module-assy.prt	DC Power Module
si-p1018-dc-wafer-assy.prt	DC Wafer
si-p1018-dc-grounded-guide-mod.prt	DC ESD Guide Module
si-p1018-dc-guidance-mod-assy.prt	DC Guide Module
si-p1018-dc-endcap-assy.prt	DC End Cap
si-p1018-stiffener_304_12in.asm	Stiffener assembly
sis-p1018-stiffener_12in_304mm.prt	Stiffener
si-p1018-dc-coax-module.prt	Coax Module

NeXLev – Plug

File name:	Description:
Si-p1002-pd-shroud 10x10x10	100 position; 2.5 high
Si-p1002-pd-shroud 10x10x20	200 position; 2.5 high
Si-p1002-pd-shroud 10x10x30	300 position; 2.5 high
Si-p1002-pd-shroud 10x12x10	100 position; 4.5 high
Si-p1002-pd-shroud 10x12x20	200 position; 4.5 high
Si-p1002-pd-shroud 10x12x30	300 position; 4.5 high
Si-p1002-pd-shroud 10x14x10	100 position; 6.5 high
Si-p1002-pd-shroud 10x14x20	200 position; 6.5 high
Si-p1002-pd-shroud 10x14x30	300 position; 6.5 high

NeXLev – Receptacle

File name:	Description:
Si-p1002-pd-hsg 10x10x10	100 position; 7.5 high
Si-p1002-pd-hsg 10x10x20	200 position; 7.5 high
Si-p1002-pd-hsg 10x10x30	300 position; 7.5 high
Si-p1002-pd-hsg 10x13x10	100 position; 10.5 high
Si-p1002-pd-hsg 10x13x20	200 position; 10.5 high
Si-p1002-pd-hsg 10x13x30	300 position; 10.5 hig
Si-p1002-pd-hsg 10x18x10	100 position; 15.5 high
Si-p1002-pd-hsg 10x18x20	200 position; 15.5 high
Si-p1002-pd-hsg 10x18x30	300 position; 15.5 high
Si-p1002-pd-hsg 10x26x10	100 position; 23.5 high
Si-p1002-pd-hsg 10x26x20	200 position; 23.5 high
Si-p1002-pd-hsg 10x26x30	300 position; 23.5 high

VHDM and VHDM HSD 8 Row

Objects available as native Pro/ENGINEER parts (.prt), as IGES files (.igs), and as STEP files (.stp)

File name:	Description:
si-p1006-wafer	DC Wafer
si-p1006-hsd-wafer	DC HSD Wafer
si-p1006-bp-pwr	BP Power Module
si-p1006-dc-pwr	DC Power Module
si-p1006-dc-polarizer	DC Polarizing/Guidance Module
si-p1006-grnd-guide	DC ESD Grounding Guide Module
si-p1006-endcap	DC End Cap
si-p1006-stiffener-example	DC Stiffener
si-p1006-vhd8-bp-10pos	10 position Open BP Module
si-p1006-vhd8-bp-25pos	25 position OpenBP Module
si-p1006-vhd8-bp-ltpol10pos	10 position Left BP Module
si-p1006-vhd8-bp-ltpol25pos	25 position Left BP Module
si-p1006-vhd8-bp-rtpol10pos	10 position Right BP Module
si-p1006-vhd8-bp-rtpol25pos	25 position Right BP Module
si-p1006-hsd8-bp-10pos	10 position HSD Open BP Module
si-p1006-hsd8-bp-25pos	25 position HSD Open BP Module
si-p1006-hsd8-bp-ltpol10pos	10 position HSD Left BP Module
si-p1006-hsd8-bp-ltpol25pos	25 position HSD Left BP Module
si-p1006-hsd8-bp-rtpol10pos	10 position HSD Right BP Module
si-p1006-hsd8-bp-rtpol25pos	25 position HSD Right BP Module

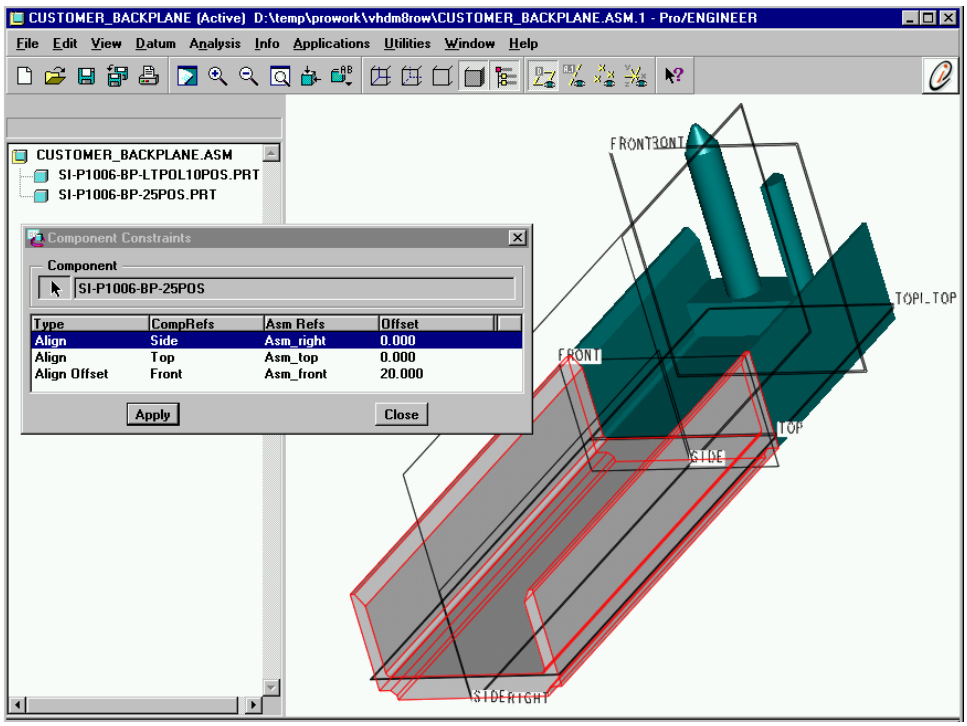
The following files represent the actual design featured in these instructions:

p1006-example.asm	Sample Top Assembly (Pro/ENGINEER only)
p1006-bp-example.asm	Sample BP Assembly (Pro/ENGINEER only)
p1006-dc-example.asm	Sample DC Assembly (Pro/ENGINEER only)
p1006-dc-pwb.prt	Sample DC PCB and footprint (Pro/ENGINEER only)
p1006-bp-pwb.prt	Sample BP PCB and footprint (Pro/ENGINEER only)

3. Creating a Custom Backplane Assembly

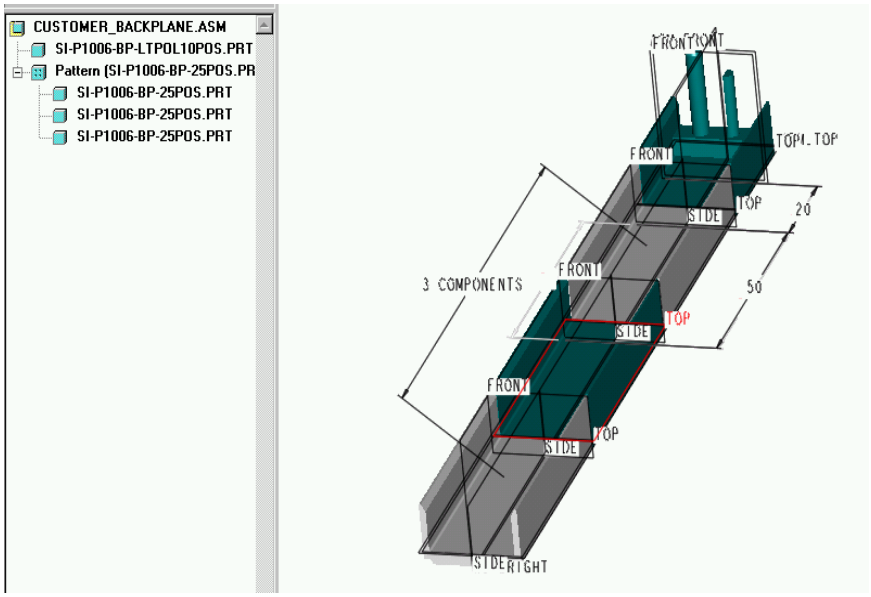
The following example provides the steps for a typical backplane slot using **VHDM 8 Row** open and guide modules. Use similar assembly techniques to configure different configurations or another product line. The proper part and offset dimensions can be found on-line in the respective *Module Configuration* sections.

1. Create a new, metric design assembly (with length unit in [mm],) based on your company start template or the *mmNs_asm_design* template (Rel. 2000i^2).
   Note: If you don't use any templates, create three default datum planes in the empty assembly, and rename them (e.g. to ASM_RIGHT, ASM_TOP, and ASM_FRONT).
   To adjust the length unit (or to switch the system of units used), select **Set Up, Units** from the ASSEMBLY menu. Be sure to show assembly features in the Model tree to facilitate reference selection when constraining parts.
2. Assemble the left polarizing backplane module. In the example, the 10-position module is chosen. *Note:* Always start with the left polarizing module.
   Select **Component, Assemble**, select *si-p1006-bp-ltpol10pos.prt*, press **Open**. Constrain this part using the **Default** constraint. *Note:* The assembly and part default planes should now coincide. The assembly front datum plane (ASM_FRONT in this example; your name may differ) will be a key reference for each subsequent component.
3. Next, assemble a backplane module. In the example, the 25-position module is chosen.
   Select **Component, Assemble**, select *si-p1006-bp-25pos.prt*, press **Open**.
   Constrain this part by **aligning** its SIDE plane with the assembly's side or right plane, and its TOP plane with the assembly's top plane. Make the third constraint an **Align Offset** between the part's FRONT plane and the assembly's front plane at **20mm** (because the connector pitch is in 2mm increments, and a 10 position x 2mm thus yields 20mm to the next BP module.)

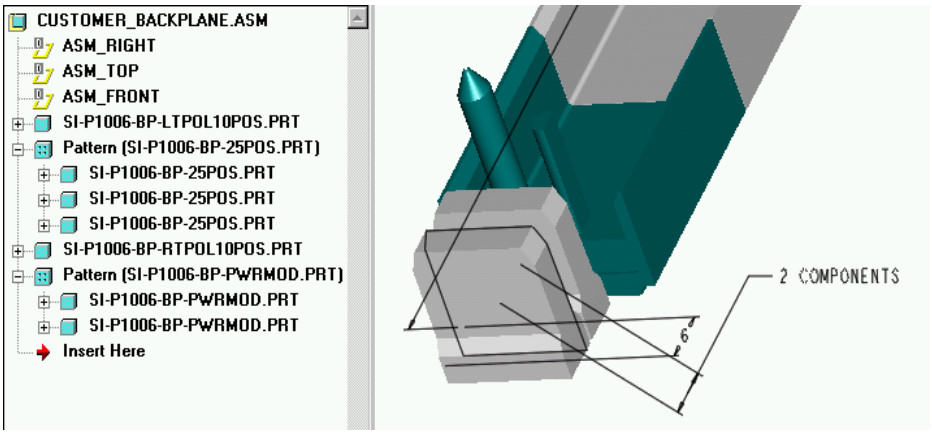
   Note: Do not assemble parts by mating surfaces—this would yield an incorrect assembly. Always *align offset* parts by their respective widths. The solid models are slightly shorter to represent the clearance. Dimensions must always be incremented by 2mm.

4. Next, assemble additional signal modules while adhering to the configuration rules for the product line chosen. In the example, another two 25-position modules will be added. *Note:* You can use *component patterns* (**Component, Pattern**) or the *Repeat* functionality (**Adv Utils, Repeat**) to quickly add additional modules.
   In the example, the 25-pos signal module is patterned to yield a total of three.
   The offset dimension (20mm) created in Step 3 drives this pattern. Enter an offset of **50mm** (because the connector pitch is in 2mm increments, and a 25 position module equals 50mm to the next BP module.)



5. Next in the example, the 10-pos right polarizing BP module *si-p1006-bp-rtpol10pos.prt* is assembled. Again, **align** the top and side/right datum planes of part and assembly, followed by an **Align Offset** between the part's FRONT plane and the assembly's (!) front plane. In the example, this offset has to be **170mm** (20mm+3x50mm).

6. Lastly, two power modules are added. Open the part *si-p1006-bp-pwrmod.prt*, then **align** the top and side/right datum planes of part and assembly, followed by an **Align Offset** between the part's FRONT plane and the assembly's front plane. In the example, this offset has to be **198mm** (20mm+3x50mm+27mm=197mm, adjusted by one mm to satisfy the 2mm increment rule). *Note:* The proper spacing is driven by the daughtercard assembly. The second instance is created by patterning the first power module with an offset of **6mm** (the width of the power module).

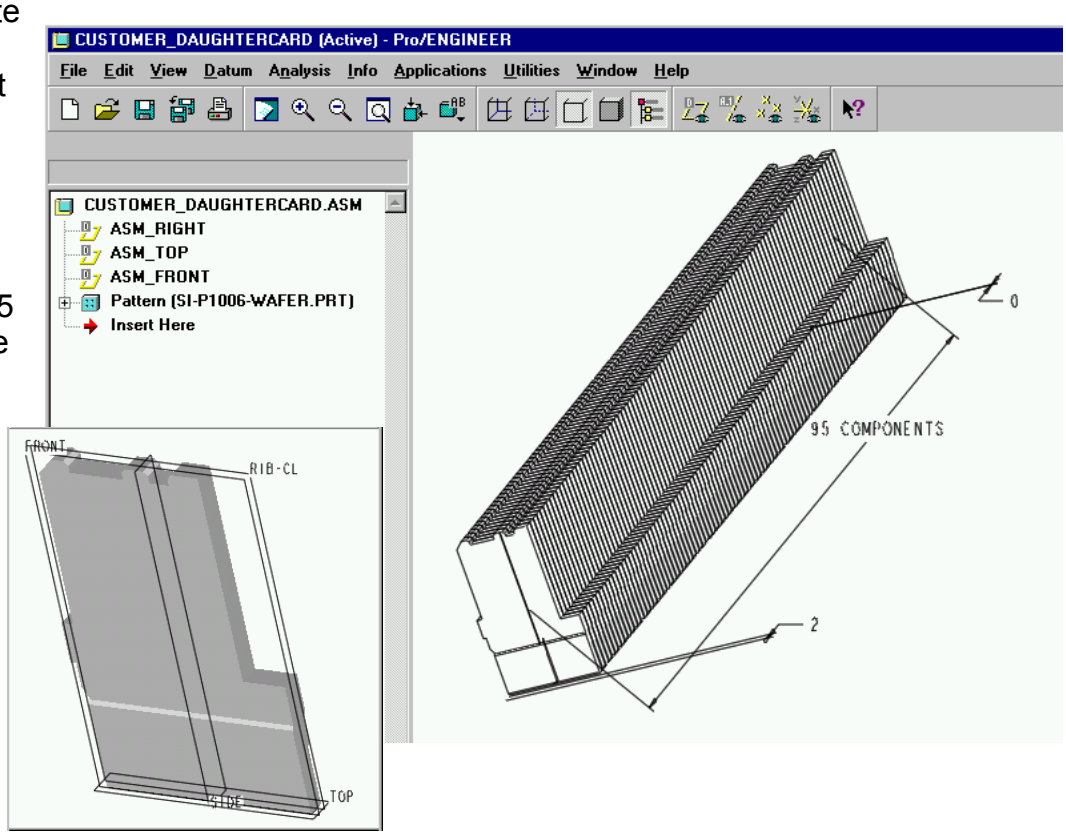


The backplane assembly is now complete.
Note: For this particular example, you can assemble a PCB representation with footprints *(p1006-bp-pwb.prt*, pick respective instance) using the **Default** constraint.

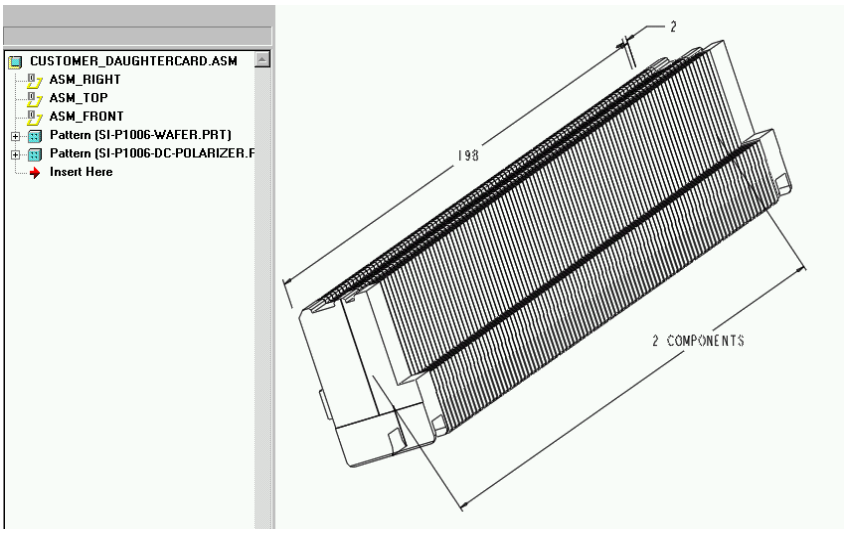
4. Creating a Custom Daughtercard Assembly

The following example provides the steps for a typical daughtercard configuration using **VHDM 8 Row** modules. Use similar assembly techniques to configure different configurations or another product line. The proper part and offset dimensions can be found on-line in the respective *Module Configuration* sections.

1. Create a new, metric design assembly (with length unit in [mm],) based on your company start template or the *mmNs_asm_design* template (Rel. 2000i^2).
   Note: If you don't use any templates, create three default datum planes in the empty assembly, and rename them (e.g. to ASM_RIGHT, ASM_TOP, and ASM_FRONT).
   To adjust the length unit (or to switch the system of units used), select **Set Up, Units** from the ASSEMBLY menu. Be sure to show assembly features in the Model tree to facilitate reference selection when constraining parts.
2. The key component of the daughtercard assembly is the wafer. Assemble a wafer. Select **Component, Assemble**, select *si-p1006wafer.prt*, press **Open**. Constrain this part by **aligning** its SIDE plane with the assembly's side or right plane, and its TOP plane with the assembly's top plane. Make the third constraint an **Align Offset** between the part's FRONT plane and the assembly's front plane at **0mm.** This offset dimension is important as the part will be patterned in the next step.
3. Next, additional wafers will be added by simply patterning the master wafer at 2mm increments (the pitch from one wafer to the next).
   Select **Component, Pattern** and pick the wafer part. Select the offset dimension (**0mm**) from the previous step to drive this pattern. Enter an offset of **2mm.** Select **Done**. Enter the appropriate number of wafers. Select **Done**. In the example, a total of **95** wafers are needed (10+25+25+25 +10, cp. to the backplane configuration example created in section 3).

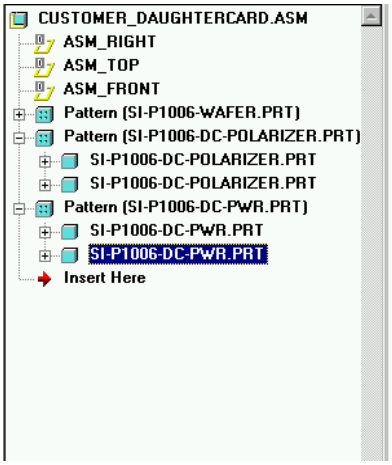


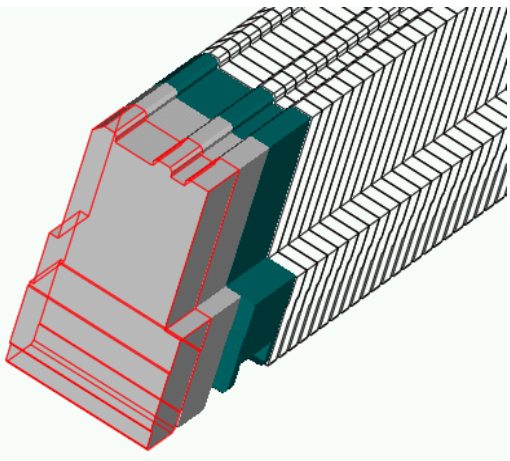
4. Next, the two polarizers are assembled. Select **Component, Assemble**, select *si-p1006-dc-polarizer.prt*, press **Open**. Constrain this part by **aligning** its SIDE plane with the assembly's side or right plane, and its TOP plane with the assembly's top plane. Make the third constraint an **Align Offset** between the part's FRONT plane and the <u>first</u> wafer's RIB-CL datum plane (!) at **-2mm** (the minus reverses direction). This offset dimension is important as this part will be patterned to yield the correct spacing for the polarizer at the other end of the wafer column. (Daughtercard left and right polarizers are the same part.)



Select **Component, Pattern** and pick the polarizer module. Select the offset dimension (**2mm**) from the previous step (the minus no longer shows) to drive this pattern. Choose **Dim Pattern**, not Ref Pattern. Enter an offset of **-198mm** (95x2mm+8mm for the polarizer offset; the minus again reverses direction). Select **Done**. Enter **2**. Select **Done**.

5. Lastly, two daughtercard power modules will be assembled. Select **Component, Assemble**, select *si-p1006-dc-pwr.prt*, press **Open**. Constrain this part by **aligning** its SIDE plane with the assembly's side or right plane, and its TOP plane with the assembly's top plane. Make the third constraint an **Align Offset** between the part's FRONT plane and the <u>first</u> wafer's RIB-CL datum plane at **202mm.** Again, use patterning to create the second instance: Select **Component, Pattern** and pick the power module. Choose the **Dim Pattern**, select the offset dimension (**202mm**), and pattern at **6mm**.





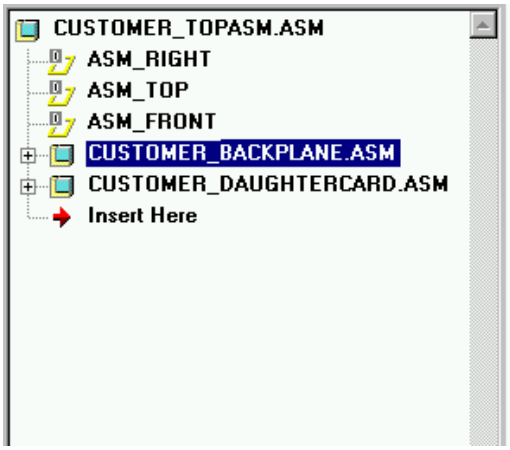
The daughtercard assembly is now complete.

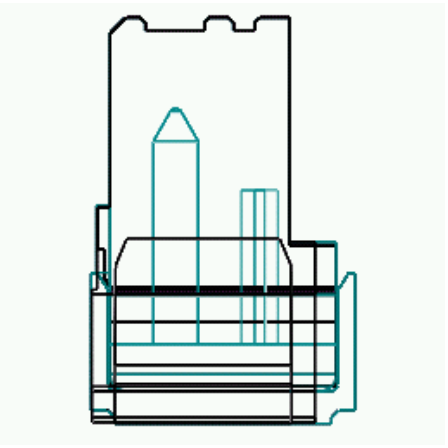
Note: For this particular example, you can assemble the stiffener (*si-p1006-stiffener-example.prt*): **Align** SIDE with the assembly's side, **Align** TOP with the assembly's top, and **Align Offset** FRONT at **208mm** to the first wafer's RIB-CL datum; and also assemble a PCB representation with footprints *(p1006-dc-pwb.prt*, pick respective instance) using the **Default** constraint.

5. Combining Daughtercard and Backplane Assemblies

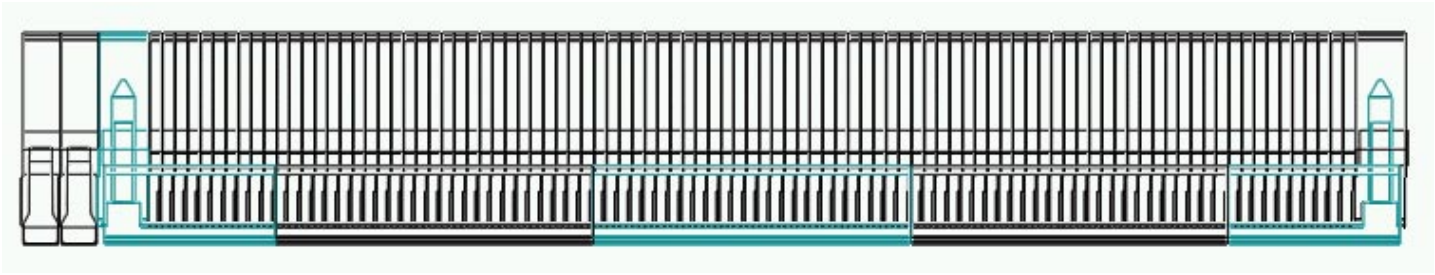
In this last section the custom-created **VHDM 8 Row** daughtercard and backplane assemblies created in sections 3 and 4 are mated in a top assembly. Use the same assembly technique to mate BP and DC assemblies of another configuration or another product line.

1. Create a new, metric design assembly (with length unit in [mm],) based on your company start template or the *mmNs_asm_design* template (Rel. 2000i^2).
   Note: If you don't use any templates, create three default datum planes in the empty assembly, and rename them (e.g. to ASM_RIGHT, ASM_TOP, and ASM_FRONT).
   To adjust the length unit (or to switch the system of units used), select **Set Up, Units** from the ASSEMBLY menu. Be sure to show assembly features in the Model tree to facilitate reference selection when constraining parts.
2. The first component of this top assembly will be the backplane assembly.
   Select **Component, Assemble**, select the backplane assembly created earlier, press **Open**. Constrain this part using the **Default** constraint. *Note:* The assembly default planes should now coincide.
3. The second component of this top assembly will be the daughtercard assembly.
   Select **Component, Assemble**, select the daughtercard assembly created earlier, press **Open**. Constrain this part using the **Default** constraint, -or- align side and front planes, then align-offset (0mm) the top planes to be able to quickly mate and unmate the connector assemblies.





The custom top assembly is now complete.



Notes: Be sure to turn on *Axis Display* to see the locations of the plated through holes and mounting holes in both BP and DC assemblies.
The screenshots omit the boards and the stiffener part.