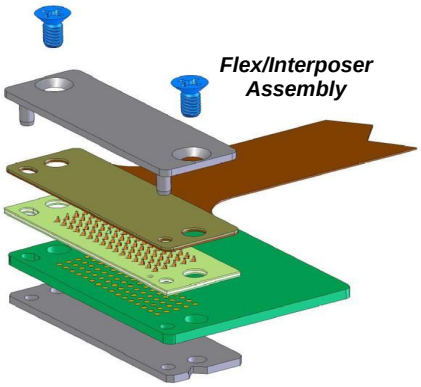
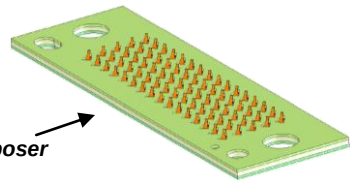
Product Specification:
5-Row Family of Standard Interposers (SPH1)



FEATURES

- High Performance PCBeam™ Connector Technology
- Product options at 1.27mm, 1.0mm, and 0.8mm pitch
- Thickness options from 0.8mm to 3.0mm
- Assembly hardware available
- ROHS 2011/65/EU compliant



OVERVIEW

Utilizing PCBeam™ technology, SPH1 5-row standard connectors are designed for high performance Board-to-Board (BtB) and Flex-to-Board (FtB) applications. There are five standard configurations available, ranging from 80-positions to 120-positions, from 1.27mm pitch to 0.80mm pitch, and from 0.8mm to 3.0mm thick. Compatible hardware is available integrating pin alignment and screw retention for simple assembly into the host system. Neoconix can also provide complete turnkey assemblies that include a high performance FPC.

Standard configurations are as shown below:

Interposer Part Number	Pitch (mm)	Pin Count	Rows	Cols	Length (mm)	Width (mm)	Height (mm)	HW Size	Top Stiffener	Bottom Stiffener
SPH1-F080A	1.27	80	5	16	31.8	9.6	0.8	Small	B01-000625-Lxxx	B01-000629
SPH1-F120A	1.27	120	5	24	41.9	9.6	0.8	Large	B01-000623-Lxxx	B01-000627
SPH1-D120A	1.00	120	5	24	35.7	9.6	0.8	Med	B01-000624-Lxxx	B01-000628
SPH1-D120B	1.00	120	5	24	35.7	9.6	3.0	Med	B01-000624-Lxxx	B01-000628
SPH1-C110A	0.80	110	5	22	31.8	9.6	0.8	Small	B01-000625-Lxxx	B01-000629

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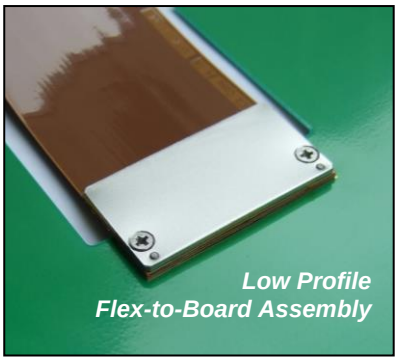
Standard Interposers



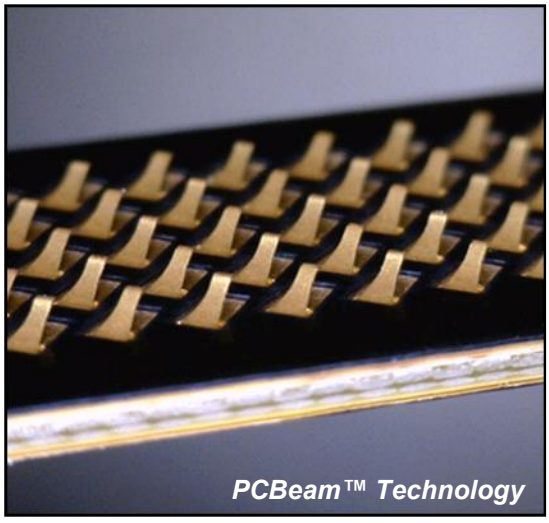
PCBeam™ TECHNOLOGY BACKGROUND:

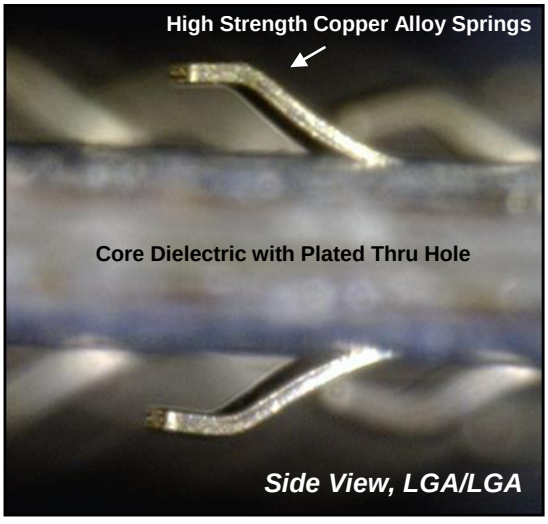
Neoconix interposers are built using innovative PCBeam™ technology. Based on the principles of printed circuit board processing, this lithography & etch based manufacturing method provides unparalleled design flexibility, precision, and performance. Prototype costs and lead times are greatly reduced since no molds are required, and high volume cost-effectiveness is gained through large scale batch processing.

Neoconix' PCBeam interposers offer many features, including the following:

- Continuous, all-metal spring contacts
- Large spring deflection up to 0.50mm to tolerate flatness variations on mating boards
- High current carrying capacity >1.5A
- Excellent signal integrity to 56 Gbps+
- Integrated contact elements – no loose pieces
- Low profile to 0.28mm
- A continuum of available thickness options
- High density capabilities at 0.74mm array pitch
- Excellent true position capabilities
- Optional SMT configuration with solder balls pre-attached on one side of interposer
- High volume manufacturing in Asia-Pacific

While the standard products here are defined with specific configurations, Neoconix' PCBeam technology inherently has tremendous design flexibility. In many cases, fully custom designs can be built with no new tooling required. Flex circuit design and manufacturing is also available to enable fully integrated flex/interposer assemblies.





5-ROW INTERPOSER SPECIFICATIONS*

MECHANICAL

Contact Configuration	single-beam, LGA/LGA
Contact Pitch	1.27mm, 1.0mm, 0.8mm
Contact Count	80, 110, 120
Typical Load / Contact (1.27,1.0, 0.8mm pitch)	55g, 35g, 30g
Contact Deflection Per Side (1.27, 1.0, 0.8mm pitch)	0.25mm, 0.20mm, 0.18mm
Contact Deflection Both Sides (1.27, 1.0, 0.8mm pitch)	0.50mm, 0.40mm, 0.36mm

ELECTRICAL

Current Rating** (1.27, 1.0, 0.8mm pitch)	1.5A, 1.0A, 0.8A per position
Average Resistance	< 30mΩ per position
Insertion Loss @ 5GHz (10Gbps), 0.8mm thickness	< 1dB
Dielectric Withstanding Voltage	100 VAC
Insulation Resistance	100 MΩ

ENVIRONMENTAL

Operating Temperature	-40°C to 105°C
Storage Temperature	-40°C to 105°C
Humidity	500 hrs, 80% RH, 25°C to 85°C
Heat Aging	500 hrs, 100°C
Temperature Cycling	1,000 cycles, 0°C to 100°C
Thermal Shock	10 cycles, -40°C to 60°C
Salt Spray	48 hrs
Mechanical Shock	50 g, 3 axis
Random Vibration	0.02-0.04 g^2/Hz, 3 axis
Insertions	100 mating cycles

MATERIALS

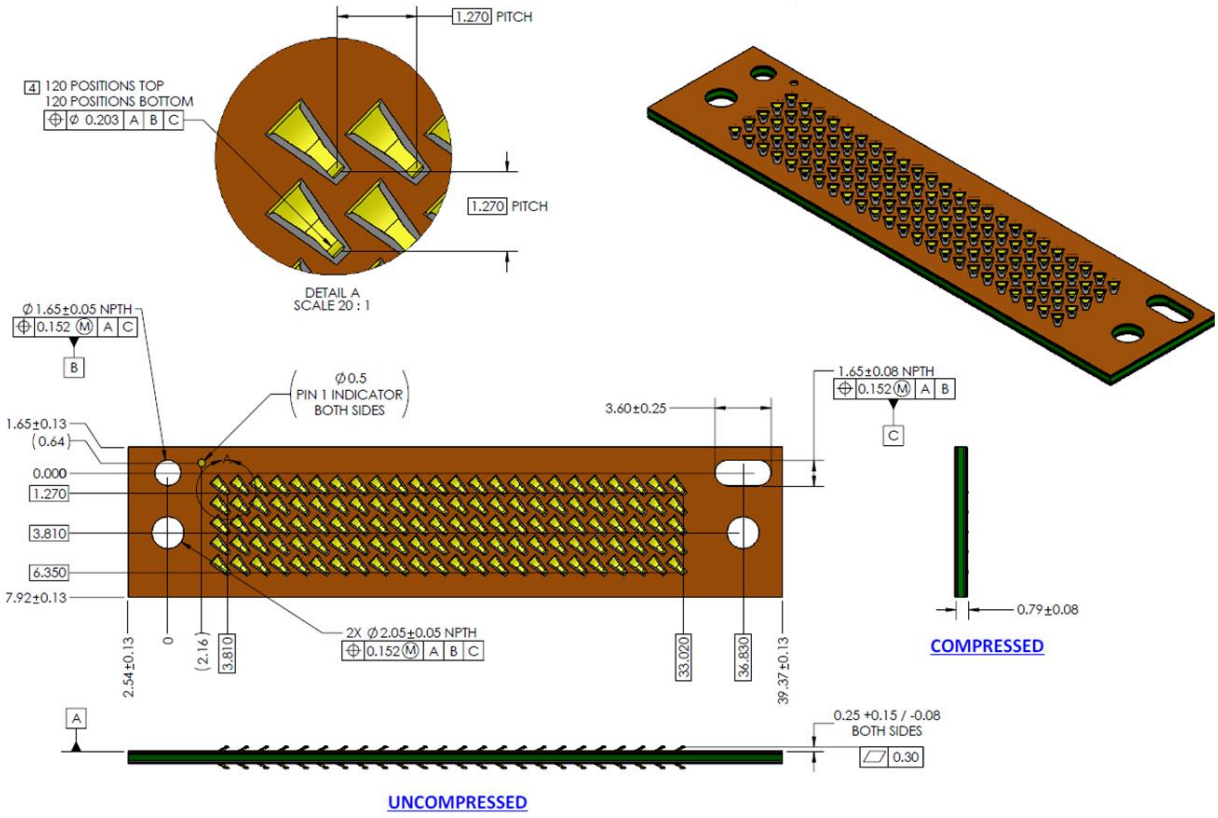
Core Dielectric	laminate
Contact Elements	copper alloy
Contact Plating	15 µin hard Au over Ni
Surface Insulator	polyimide

** Specifications are subject to change without notice.*

*** Current rating is an approximate "rule of thumb" for a few power contacts. Actual rating depends on customer's pinout, proximity of nearby power contacts, and other design details. Please contact Neoconix for input on your specific design.*

DIMENSIONAL INFORMATION - INTERPOSERS

(Example = SPH1-F120A, 120pos)



Note: This example is for reference only. Please refer to the product drawing for the specific part number of interest.

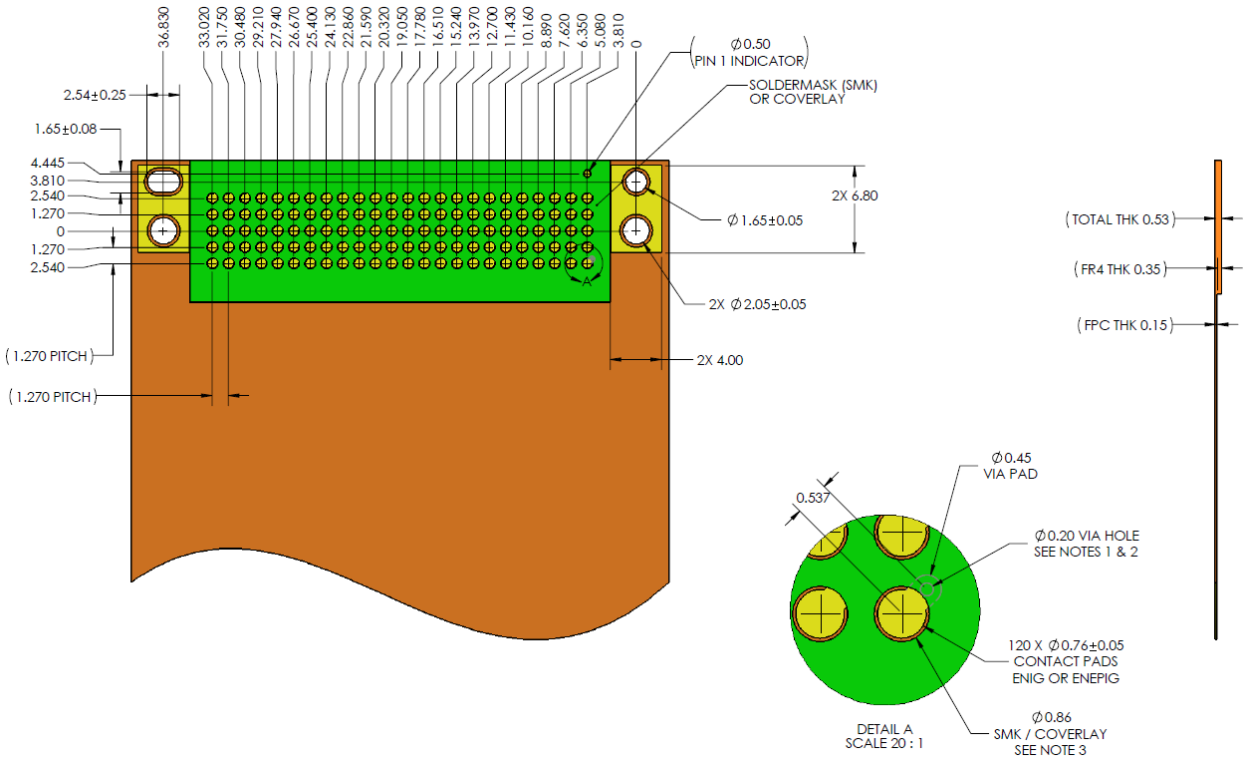
RECOMMENDED FPC DESIGN

(Example = SPH1-F120A, 120pos)

The recommended pad geometry is described below for reference. The via is located under the "base" of the corresponding contact spring. Soldermask or coverlay does not need to be present in the array area. If it is present, it should not protrude more than 0.03mm from the LGA pad surface.

Recommended plating finishes are ENIG, ENEPIG, or electrolytic hard gold.

The specific FPC layout recommendation is included in the drawing package for each SPH1 part number.



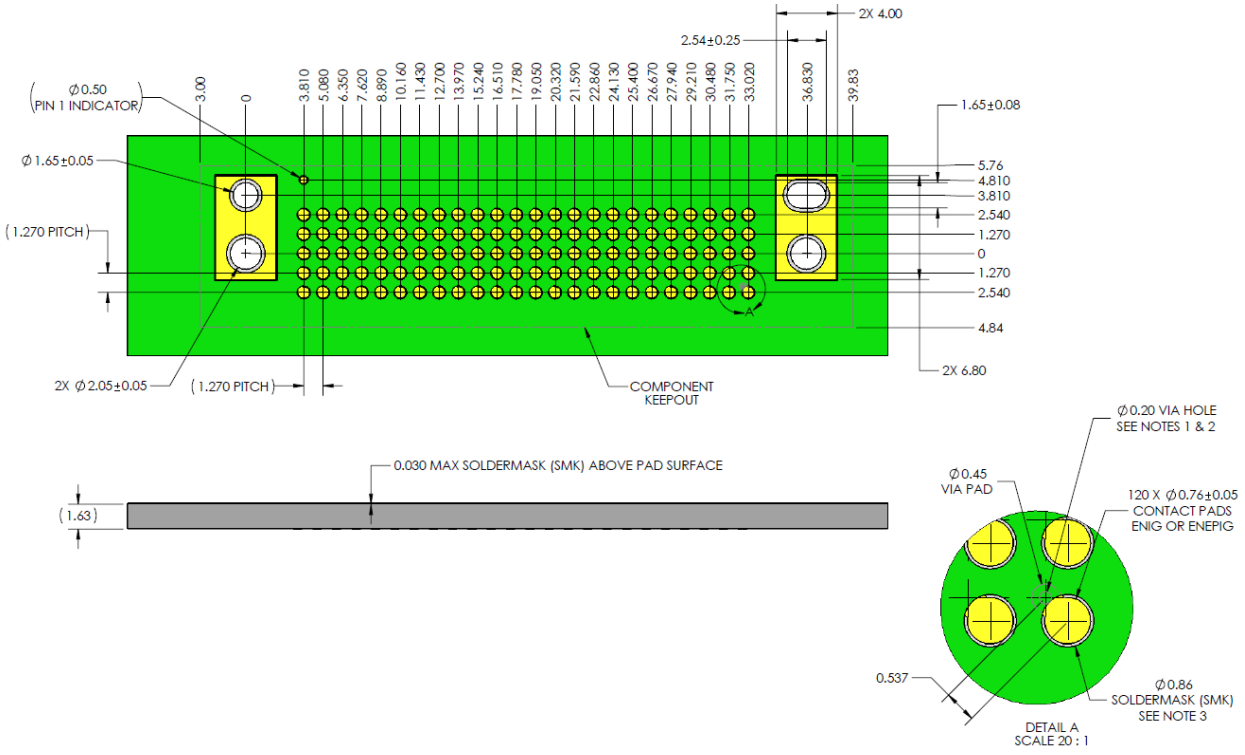
RECOMMENDED PCB DESIGN

(Example = SPH1-F120A, 120pos)

The recommended pad geometry for the PCB is analogous to the geometry for the FPC. An example is shown below for reference. Detailed recommendations for each part number are included in each part number's drawing set.

The PCB mating pads must be gold plated with ENIG, ENEPIG, or electrolytic hard gold.

With the FPC or PCB layout, it is possible to deviate from the pad geometry shown, but a Neoconix review is suggested, and a separate tolerance analysis is recommended, especially if the pad size will be smaller than shown below.

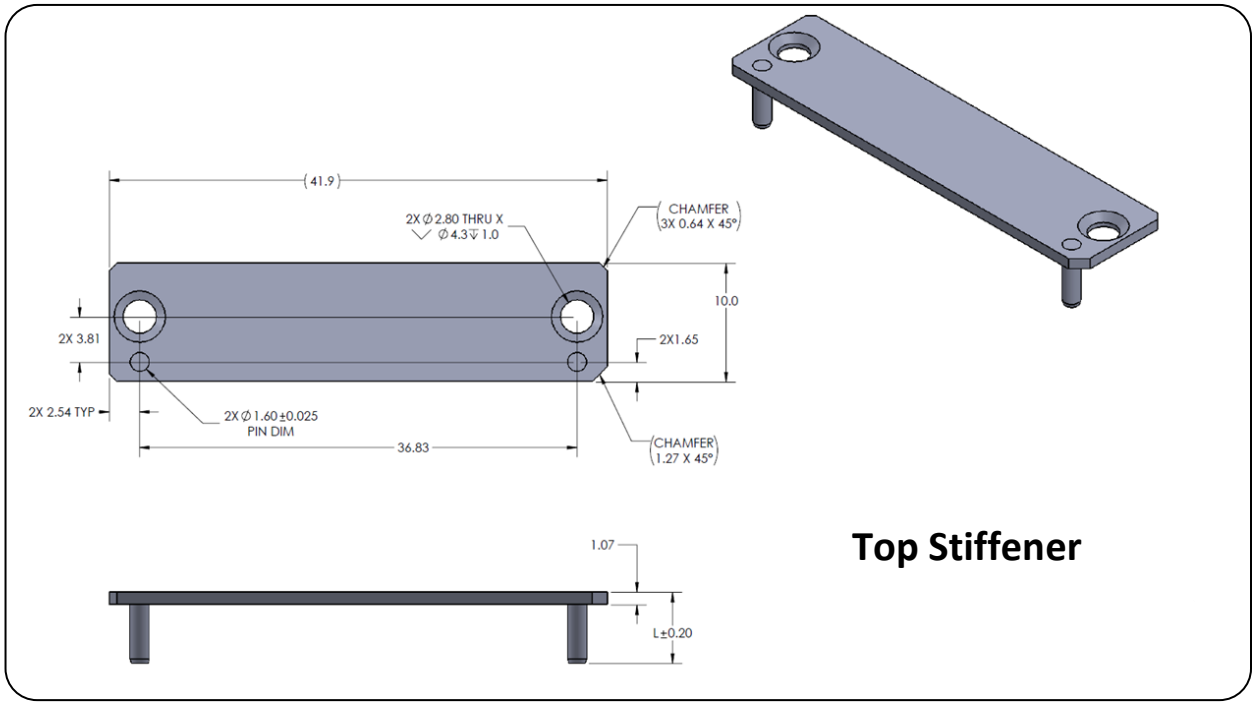


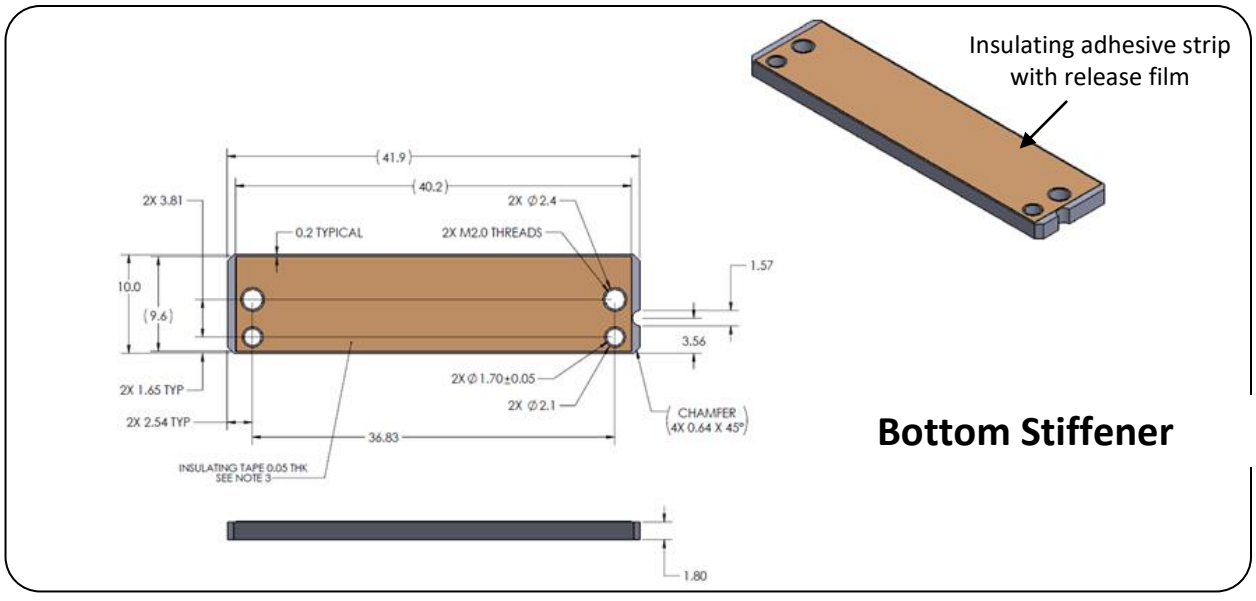
COMPRESSION HARDWARE (Optional)

(Example = SPH1-F120A, 120pos → "Large" Stiffeners)

Neoconix can provide hardware compatible with the SPH1 interposer products. The hardware includes:

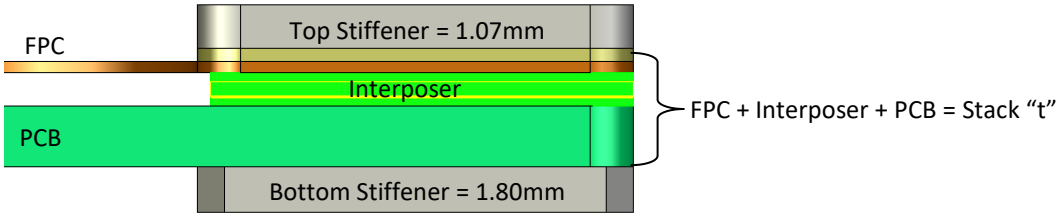
(1) Top Stiffener plate with integrated alignment pins
(2) Bottom Stiffener plate with threaded holes and insulating tape
(3) Flathead M2 screws





Several pin/screw lengths are available, depending on the overall assembly thickness. The table below shows the recommended pin/screw length as a function of stack-up thickness. These recommendations are based on achieving at least 3 full threads of engagement (1.2mm) into the Bottom Stiffener. In some cases, the pins and tails of the screws may protrude underneath the Bottom Stiffener. If that is not allowable in your design, then a custom screw and pin length may be required.

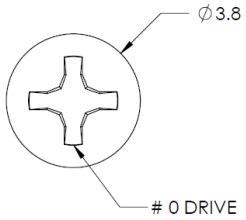
CROSS-SECTIONAL VIEW

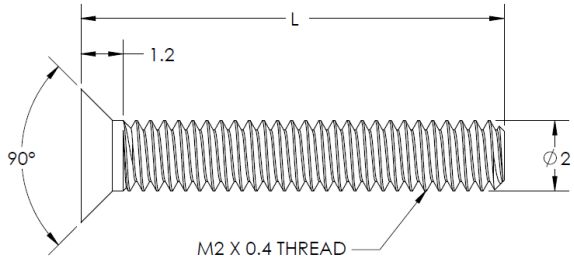


Recommended Pin & Screw Length

Stack "t" (mm)	Recommended Screw & Pin Length (mm)	P/N Suffix	Top Stiffener P/N (Small)	Top Stiffener P/N (Medium)	Top Stiffener P/N (Large)	M2 Flathead Screw
<2.8	5mm	L050	B01-000625-L050	B01-000624-L050	B01-000623-L050	B01-000738
2.8 – 3.7	6mm	L060	B01-000625-L060	B01-000624-L060	B01-000623-L060	B01-000739
3.8 – 4.7	7mm	L070	B01-000625-L070	B01-000624-L070	B01-000623-L070	B01-000740
4.8 – 5.7	8mm	L080	B01-000625-L080	B01-000624-L080	B01-000623-L080	B01-000741
5.8 – 6.7	9mm	L090	B01-000625-L090	B01-000624-L090	B01-000623-L090	B01-000742
6.8 – 7.7	10mm	L100	B01-000625-L100	B01-000624-L100	B01-000623-L100	B01-000743
7.8 – 8.7	11mm	L110	B01-000625-L110	B01-000624-L110	B01-000623-L110	B01-000744
8.8 – 9.7	12mm	L120	B01-000625-L120	B01-000624-L120	B01-000623-L120	B01-000745

For the Top Stiffener, the "Lxxx" extension defines the length of the alignment pins contained in stiffener.





Part Number	L
B01-000738	5 mm
B01-000739	6 mm
B01-000740	7 mm
B01-000741	8 mm
B01-000742	9 mm
B01-000743	10 mm
B01-000744	11 mm
B01-000745	12 mm

Screw Reference Drawing (see drawing # B01-000737 for more detail)

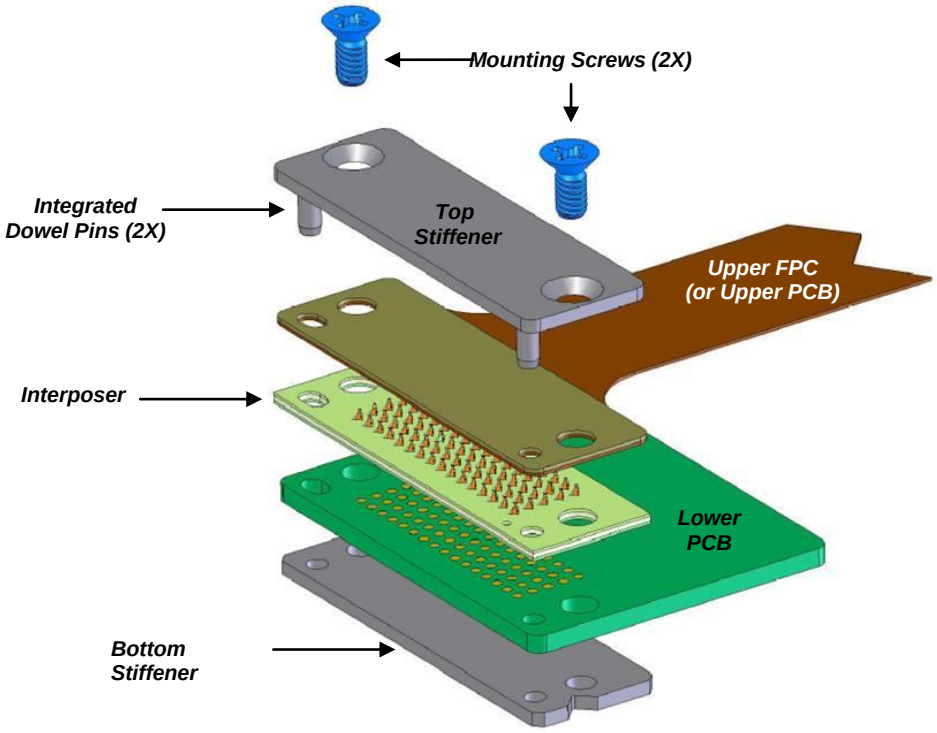
ASSEMBLY INSTRUCTIONS

The proper assembly sequence is as follows:

IMPORTANT: Handle interposers only by edges and avoid touching PCBeam contact elements. Likewise, avoid touching (and potentially contaminating) the gold mating pads on PCB & FPC. The use of latex gloves is recommended.

1. Temporarily insert *Top Stiffener* onto the interposer side (top side) of the *Lower PCB*.
2. Remove protective lining on *Bottom Stiffener* to expose underlying adhesive.
3. Using the alignment pins from *Top Stiffener* as a guide, carefully attach the *Bottom Stiffener* onto the bottom side of the *Lower PCB*. Press firmly to engage the adhesive.
4. Remove the *Top Stiffener* from the *Lower PCB*
5. Insert the *Top Stiffener* over the *Upper FPC* (or PCB), using the integrated dowel pins for alignment.
6. Slip the interposer onto the pad-side of the *Upper FPC*, using the dowel pins for alignment.
7. Attach the *Upper FPC/Interposer/Top Stiffener* assembly to the *Lower PCB/ Bottom Stiffener*, using the dowel pins for alignment.
8. While applying finger pressure on the center of the *Top Stiffener*, attach the two screws from the *Top Stiffener* into the threaded *Bottom Stiffener* to secure the assembly together. The recommended starting torque is 12 - 16 oz*in (0.9 – 1.2 kg*cm).
    a. The torque setting can be adjusted as needed for a specific design. The interposer is designed to be fully compressed such that no airgap should be visible between interposer and PCB/FPC at the screw points. Some minor bowing in the center is allowable.

Compression hardware can be custom designed when desired. Please ensure that the hardware solution provides sufficient rigidity based on the contact force that is applied by each of the contact element positions. For example, an 80-position 1.27mm pitch interposer would exert 55gf x 80 pos = 4.4kg (or 9.7Lbs) of normal force.



HANDLING GUIDELINES

- The use of latex gloves is recommended when handling interposers. As with any normal force connector, avoid touching contact tips and handle the product only by its edges.
- When clamping the assembly together, please ensure that the force is applied uniformly. Force should be applied vertically through the z-axis and not in an angled direction.
- Cleaning is typically not needed if the product is kept in original packaging. When necessary, cleaning can be employed with the use of compressed air. Direct the flow of air in the direction that the contact elements are pointing. Cleaning can also be performed with an ultrasonic bath of isopropyl alcohol (IPA). A 5 minute soak can be followed by a 10 minute bake at 65°C.
- When not in use, please keep product stored in original packaging.

ORDERING INFO

To obtain a quotation, please contact the Neoconix sales office at sales@neoconix.com or 408-530-9393. The SPH1 interposers, Top stiffeners, Bottom Stiffeners, and screws should be ordered separately.

Custom interposers and hardware are also available from Neoconix. Please contact the factory to request a quotation.

Corporate Headquarters:
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REVISION HISTORY

Rev	Date	ECN	Description
Rev A	11/3/2011	N/A	Initial release.
Rev B	6/10/2016	1175	Update part numbers, contact info, hardware ordering info, other misc updates.
Rev C	5/30/2018	1208	Update top stiffener plate part number, stiffener drawing, typical load
Rev D	10/2/2019	1252	Update part numbers, add insulating tape on bottom stiffener, update drawings.