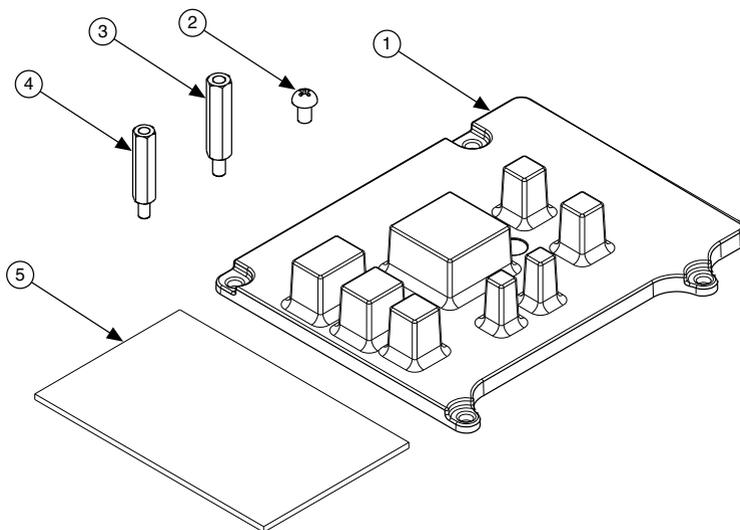INSTALLATION AND SPECIFICATIONS MANUAL

Thermal Kit for NI sbRIO-9607/9627/9637

The Thermal Kit for NI sbRIO-9607/9627/9637 is a heat spreader accessory used to improve the thermal performance of the NI sbRIO-9607/9627/9637.

Figure 1. Contents of the Thermal Kit

1. Heat Spreader (x1)
2. M3x8 mm Pan Head Screw (x6)
3. M3x18 mm Standoff, 4.5 mm Hex (x2)
4. M3x16 mm Standoff, 4.5 mm Hex (x4)
5. Pre-Cut Gap Pad (x1)

Mounting and Environmental Considerations

The heat spreader provided in the Thermal Kit for NI sbRIO-9607/9627/9637 is intended to improve the thermal performance of the NI sbRIO-9607/9627/9637 by removing heat from the components that may limit the maximum operating temperature of the device.

NATIONAL INSTRUMENTS™

Mount the spreader in one of the following configurations:
- With the flat face against a base mounting surface, which ideally is thermally conductive
- With the flat face exposed to air, with a heat sink optionally added to the flat face to convect heat to the surrounding environment

Select a mounting configuration that best fits your application with consideration for the following factors:
- Base mounting material
- System enclosure material
- Interactions with other heat sources in the system
- Size constraints
- Air flow availability

For information and examples on environmental and design factors that can impact the thermal performance of an NI sbRIO system, go to *ni.com/info* and enter the Info Code `sbriocooling`.

Gap Pad

The pre-cut gap pad included in this kit provides a thermal interface material between the heat spreader and the sbRIO device components. You must apply the gap pad to the sbRIO device before you assemble the heat spreader.
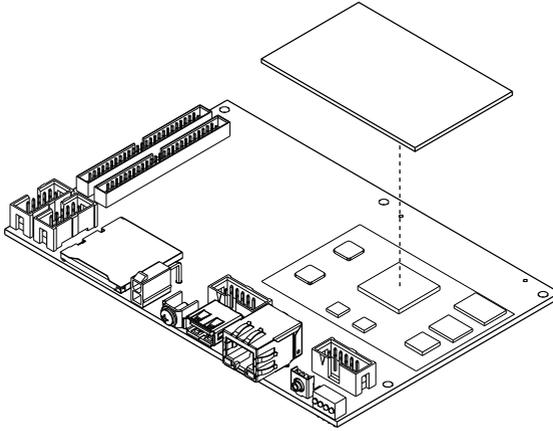
Use the following figures for reference when you complete the steps in the *Installing the Thermal Kit for NI sbRIO-9607/9627/9637* section.

Figure 2. Side View and Layers of Gap Pad
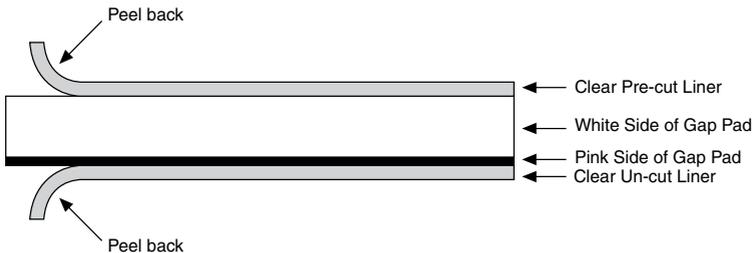
Figure 3. Gap Pad Placement on Board Surface

Installing the Thermal Kit for NI sbRIO-9607/9627/9637

What to use:

- Socket driver, 4.5 mm
- Screwdriver, Phillips #1

The section provides installation procedures for the following example configurations.

- Installing the flat face of the heat spreader to the base mounting surface
- Installing with the flat face of the heat spreader exposed to air
- Installing with a RIO Mezzanine Card

Installing the Flat Face of the Heat Spreader to the Base Mounting Surface

Figure 4. Flat Face Mated to Base Mounting Surface
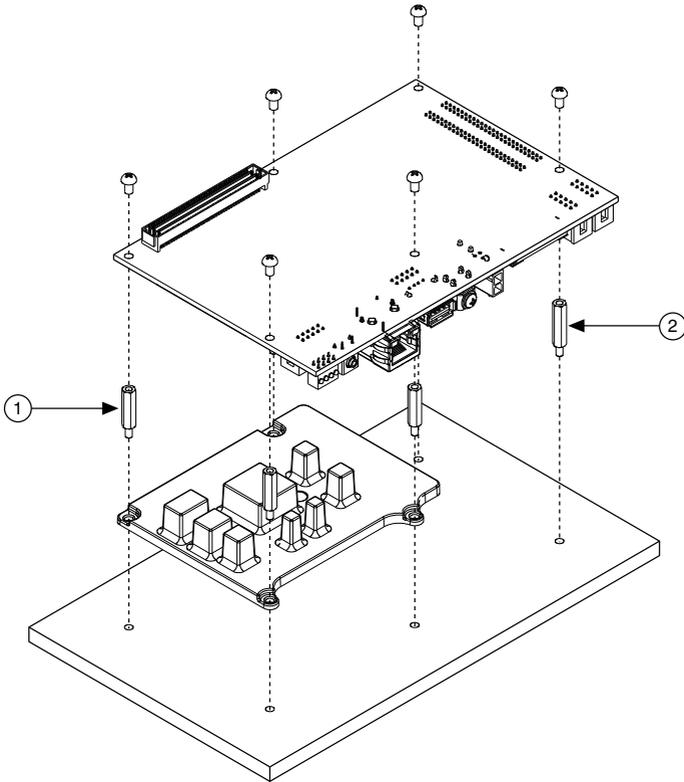
1. Standoff, 16.00 mm (0.63 in.)
2. Standoff, 18.00 mm (0.71 in.)

1. Remove the liners from the gap pad and apply the white side of the pad to the outlined box on the board surface.
2. Fasten the heat spreader to the mounting surface with the provided 16 mm standoffs. Tighten completely.

> **Note** Optionally, you can use thermal interface material between the heat spreader and mounting surface. Note that thermal interface material may affect system stack height and levelness.

3. When mounting the NI sbRIO-9627/9637, fasten the provided 18 mm standoffs to the mounting surface in the sbRIO footprint holes not used to fasten the heat spreader. Tighten completely.
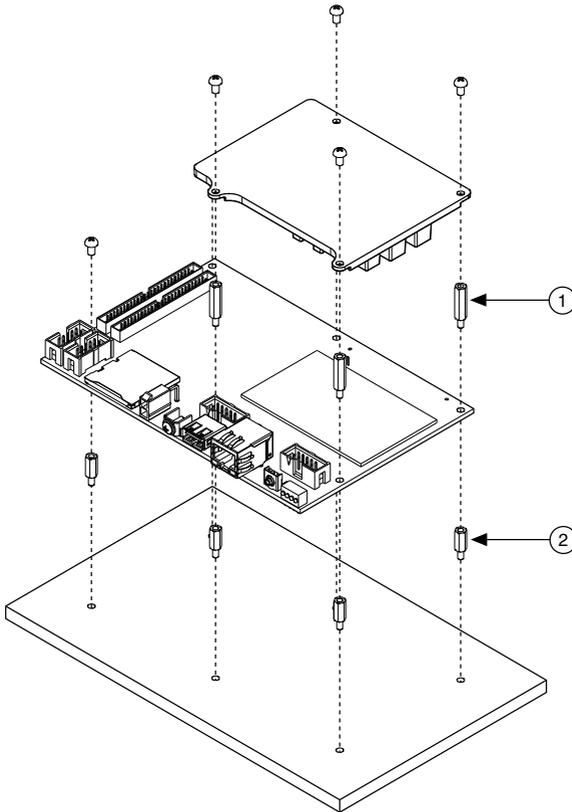
4. Align the sbRIO device to standoff holes and fasten using provided screws. Use caution when aligning the sbRIO device. Once it has been fastened, separating the heat spreader and sbRIO device will be difficult and could potentially damage components.

> ⚠ **Caution** The gap pad is a viscoelastic material and compressing it too quickly places a large amount of stress on board components. If you must use an automatic screwdriver, fasten these screws at a rate less than 4.23 mm/s (10 in./min.) to prevent damage during assembly.

Installing With the Flat Face of the Heat Spreader Exposed to Air

Figure 5. Flat Face Exposed to Air

1. Standoff, 16.00 mm (0.63 in.)
2. Standoff (not provided)

1. Remove the liners from the gap pad and apply the white side of the pad to the outlined box on the board surface.
2. Fasten standoffs (not provided) to the mounting surface.

3. Align the sbRIO device on standoffs and fasten using provided 16 mm standoffs. When mounting the NI sbRIO-9627/9637, fasten the last two holes with provided screws. Tighten completely.

4. Align the heat spreader to standoff holes and fasten using provided screws. Use caution when aligning the heat spreader. Once it has been fastened, separating the heat spreader and sbRIO device will be difficult and could potentially damage components.

⚠ **Caution** The gap pad is a viscoelastic material and compressing it too quickly places a large amount of stress on board components. If you must use an automatic screwdriver, fasten these screws at a rate less than 4.23 mm/s (10 in./min.) to prevent damage during assembly.

Installing With a RIO Mezzanine Card (RMC)

Figure 6. With RMC
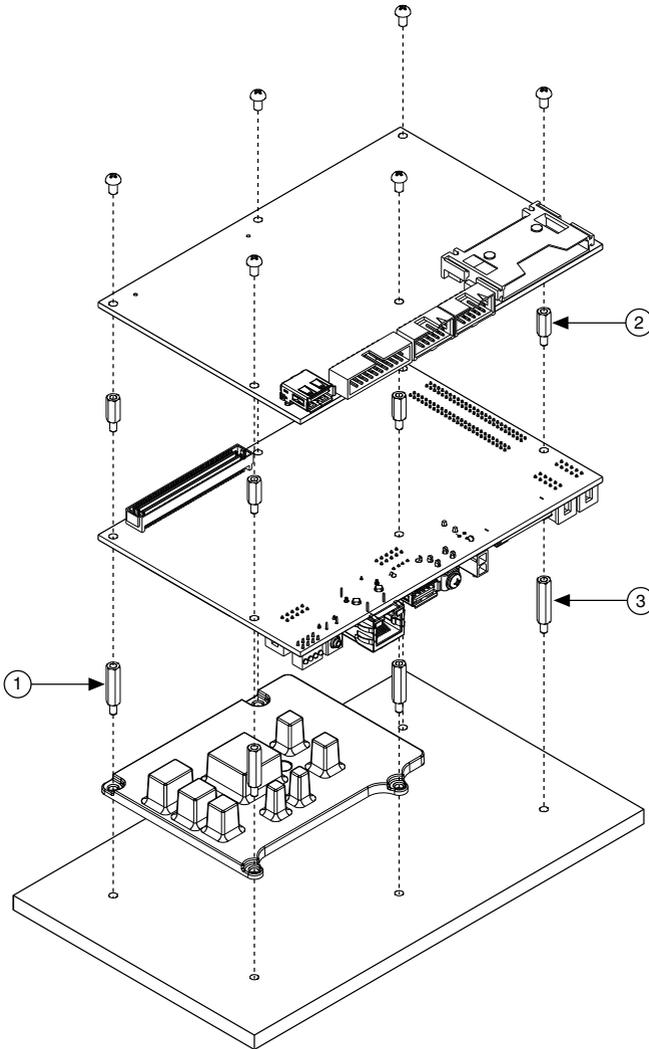
1. Standoff, 16.00 mm (0.63 in.)
2. Standoff (not provided)
3. Standoff, 18.00 mm (0.71 in.)

Note You can use an RMC with the heat spreader in either mounting orientation. However, the standoffs used to separate the sbRIO and the RMC are not provided in

this kit. The following figure shows one example of an RMC being installed to an NI sbRIO-9627 with the flat face of the heat spreader mated to the base mounting surface.

1. Remove the liners from the gap pad and apply the white side of the pad to the outlined box on the board surface.

2. Fasten the heat spreader to the mounting surface with the provided 16 mm standoffs. Tighten completely.

   📝 **Note** Optionally, you can use thermal interface material between the heat spreader and mounting surface. Note that thermal interface material may affect system stack height and levelness.

3. When mounting the NI sbRIO-9627, fasten the provided 18 mm standoffs to mounting surface in the sbRIO footprint holes not used to fasten the heat spreader. Tighten completely.

4. Align the sbRIO device to standoff holes and fasten using standoffs of the proper height (not provided). Refer to your sbRIO device user manual on *ni.com/manuals* for information about selecting the proper standoff height. Use caution when aligning the sbRIO device. Once it has been fastened, separating the heat spreader and sbRIO device will be difficult and could potentially damage components.

   ⚠️ **Caution** The gap pad is a viscoelastic material and compressing it too quickly places a large amount of stress on board components. If you must use an automatic screwdriver, fasten these screws at a rate less than 4.23 mm/s (10 in./min.) to prevent damage during assembly.

5. Align the RMC to the standoff holes and mate the RMC connectors. Fasten using the provided screws.

Specifications

Physical Characteristics

Torque for screws	0.56 N · m (5.0 lb · in)
Weight	125.1 g (4.413 oz)

Environmental

Systems that use the heat spreader included in this kit must still validate an sbRIO device by following the product specifications document on *ni.com/manuals*. When validating thermal performance using the analog method, you can optionally measure the heat spreader temperature instead of measuring the individual component case temperatures. The heat spreader temperature must not exceed 85 °C when measured in the designated center depression. Regardless of validation method, ensure that the CPU/FPGA reported onboard temperature sensor does not exceed the maximum value listed in the product specifications document on *ni.com/manuals*.

Figure 7. Heat Spreader Temperature Measurement Location
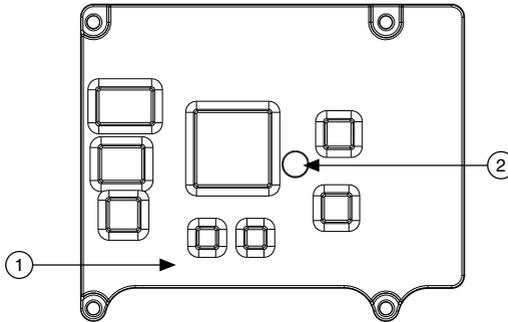
1. Heat Spreader
2. Center Depression

![Note icon] **Note** For information and examples on environmental and design factors that can impact the thermal performance of an NI sbRIO system, visit *ni.com/info* and enter the Info Code sbriocooling.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at *ni.com/environment*. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

![WEEE icon] **EU Customers** At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit *ni.com/environment/weee*.

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