NI-9469 Getting Started

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NI-9469 Overview

The NI-9469 is a synchronization module for C Series platforms. It has a configurable multi-port interface that enables distribution of triggers and clocks from a host chassis, and an onboard DDS and PLL for clock generation and synchronization capabilities.

Connecting the NI-9469

The NI-9469 has three RJ45 connectors on the front panel labeled Port 0, 1, and 2. These connectors use standard straight through CAT 5e Ethernet cabling to provide connection to other NI-9469 modules only . Each port is software configurable to drive or receive four differential signals through the cable, which are referred to as Line 0 to 3. Each port can carry either four triggers, or three triggers and one clock, in which Line 3 is dedicated to carry the clock.

Routing the NI-9469

The NI-9469 features a configurable crosspoint switch. You can control the routing of signals and the onboard clock generator between each front port and the trigger lines in the backplane. However, the crosspoint switch is not a full routing matrix. You can connect only the same Line or Trig number. For example, Line 0 to Trig 0, but not Line 0 to Trig 2. However, you can route clock signals on only Line 3 or Trig 3. The following figure details the crosspoint switch's routing capabilities.

> **Note** You can set only eight of the 12 total port lines as outputs due to power constraints.

Figure 1. Routing Capabilities of the Crosspoint Switch

Sources \ Destinations	Port 0 Line 0	Port 0 Line 1	Port 0 Line 2	Port 0 Line 3	Port 1 Line 0	Port 1 Line 1	Port 1 Line 2	Port 1 Line 3	Port 2 Line 0	Port 2 Line 1	Port 2 Line 2	Port 2 Line 3	Backplane Trig 0	Backplane Trig 1	Backplane Trig 2	Backplane Trig 3
Port 0 Line 0				X	X				X				X			
Port 0 Line 1						X				X				X		
Port 0 Line 2							X				X				X	
Port 0 Line 3								X				X				X
Port 1 Line 0	X								X				X			
Port 1 Line 1		X								X				X		
Port 1 Line 2			X								X				X	
Port 1 Line 3				X								X				X
Port 2 Line 0	X				X								X			
Port 2 Line 1		X				X								X		
Port 2 Line 2			X				X								X	
Port 2 Line 3				X				X								X
Backplane Trig 0	X				X				X							
Backplane Trig 1		X				X				X						
Backplane Trig 2			X				X				X					
Backplane Trig 3				X				X				X				
Onboard Clk Gen				X				X				X				X

> ✏️ **Note** The preceding figure details hardware routing capability only. Software imposed limitations may prevent certain routing or input/output functions from being realized. For more information, refer to the documentation for your specific software platform.

NI-9469 Application

In a basic application, a single NI-9469 module is inserted into each host C Series chassis. One module is set as master, the remainder as slaves, and all modules are connected with a tree topology. Figure 2 shows a tree topology example. More advanced and customizable options create a flexible topological network of NI-9469 modules. Refer to the *Topologies* section for examples of various topological networks.

Based on user needs, you may desire certain topologies over others due to application or timing requirements. Because signals are physically propagated over cabling, the module cannot compensate for inherent cable delays and skew. For example, if all slave modules must receive triggers at the same time with minimal skew and delay, a star topology with short length-matched cables is preferred. Refer to Figure 3 for a star topology configuration example.
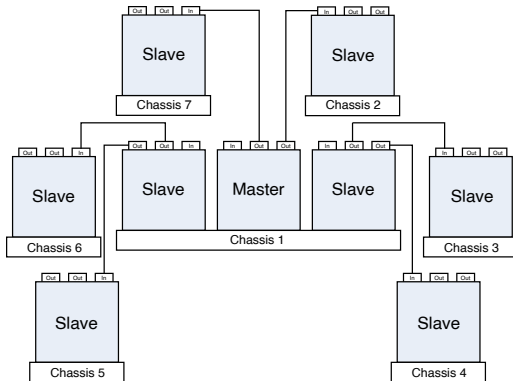
If maximum separation distance is required, connect the modules using a daisy chain topology with maximum cable length per hop, as shown in Figure 4. Refer to the *Cable* section for information about maximum cable length.
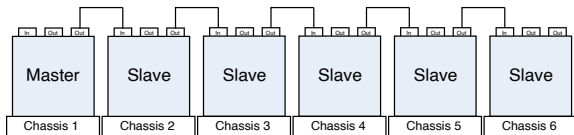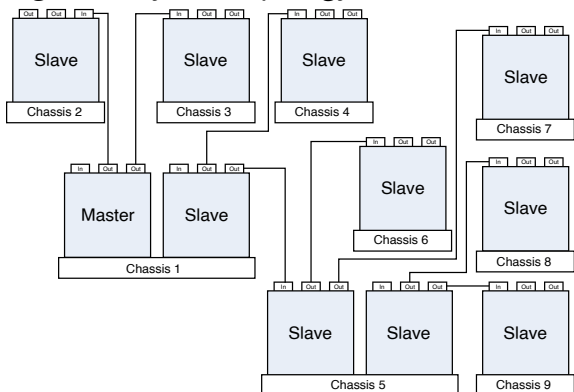
Topologies

Figure 2. Tree Topology
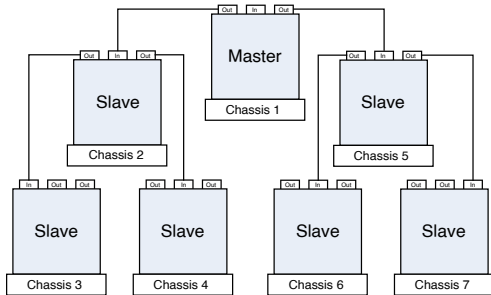
Figure 3. Star Topology

Figure 4. Daisychain Topology

Figure 5. Hybrid Topology

Activity LEDs

The NI-9469 has four front panel LEDs labeled Trig 0, Trig 1, Trig 2, and Trig 3/Clk. The LEDs blink when activity is detected on the corresponding line to or from the carrier.

Sleep Mode

This module supports a low-power sleep mode. Support for sleep mode at the system level depends on the chassis the module is plugged into. Refer to the chassis manual for information about support for sleep mode. If the chassis supports sleep mode, refer to the software help for information about enabling sleep mode. Visit ni.com/info and enter `cseriesdoc` for information about C Series documentation.

Typically, when a system is in sleep mode, you cannot communicate with the modules. In sleep mode, the system consumes minimal power and may dissipate less heat than it does in normal mode. Refer to the **NI-9469 Specifications** section for more information about power consumption and thermal dissipation.

Notice that when the NI-9469 is in sleep mode, the clock generation settings (if used) must be reconfigured when the module exits sleep mode and power is restored.

Conformal Coating

The NI-9469 is available with conformal coating for additional protection in corrosive and condensing environments, including environments with molds and dust.

In addition to the environmental specifications listed in the **NI-9469 Safety, Environmental, and Regulatory Information**, the NI-9469 with conformal coating meets the following specification for the device temperature range. To meet this specification, you must follow the appropriate setup requirements for condensing environments. Refer to **Conformal Coating and NI RIO Products** for more information about conformal coating and the setup requirements for condensing environments.

Operating humidity (IEC 60068-2-30 Test Db)	80 to 100% RH, condensing

Related information:

- Conformal Coating and NI RIO Products