PXI-2593 Features

2025-03-20

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PXI-2593 Pinout

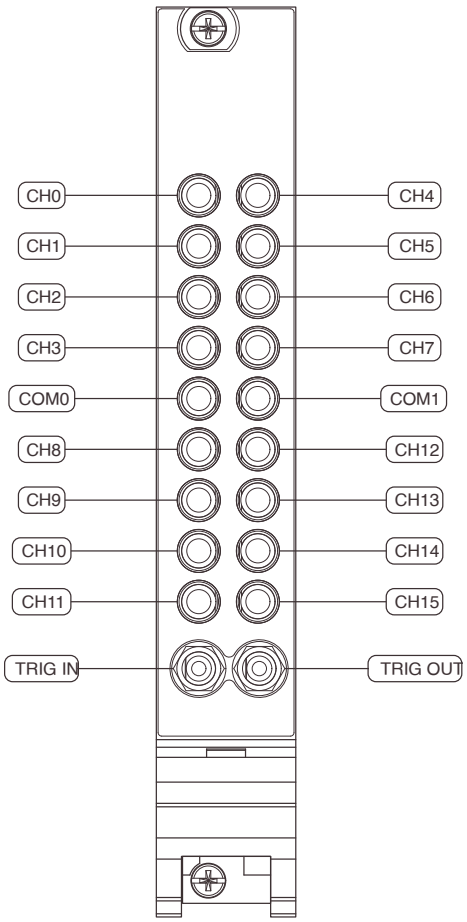


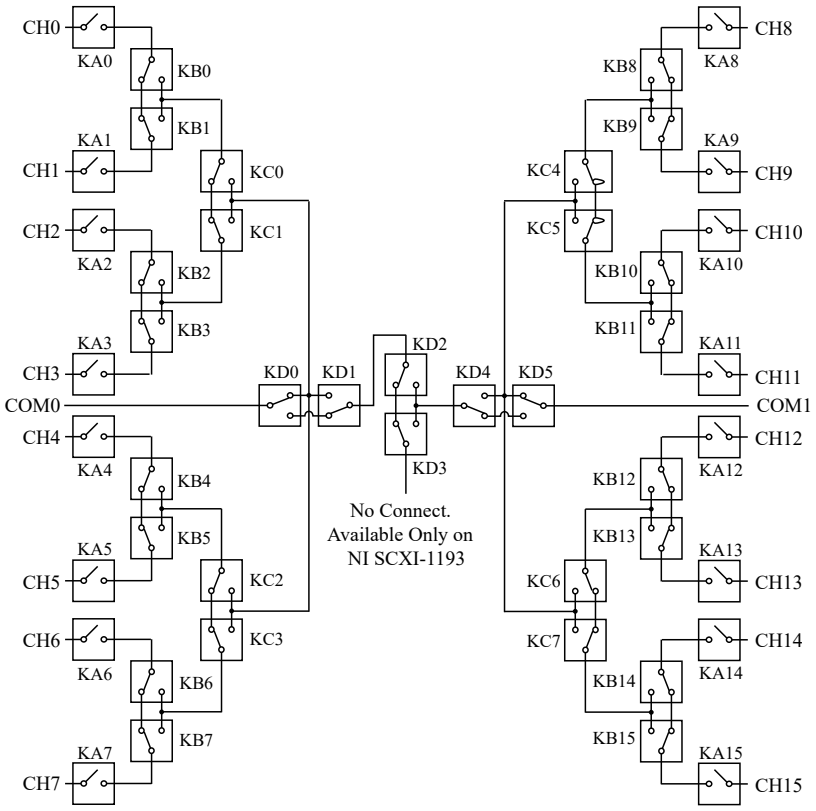
Table 1. Signal Descriptions

Signal	Description
CH***x***	Signal connection
COM***x***	Routing destination for corresponding signal connections
TRIG IN	Trigger input connection
TRIG OUT	Trigger output connection

PXI-2593 Hardware Diagram

This figure shows the hardware diagram of the module.

Note Relay names are the same for every topology.



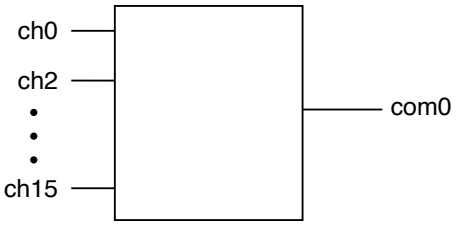
PXI-2593 Topologies

PXI-2593 16x1 Multiplexer

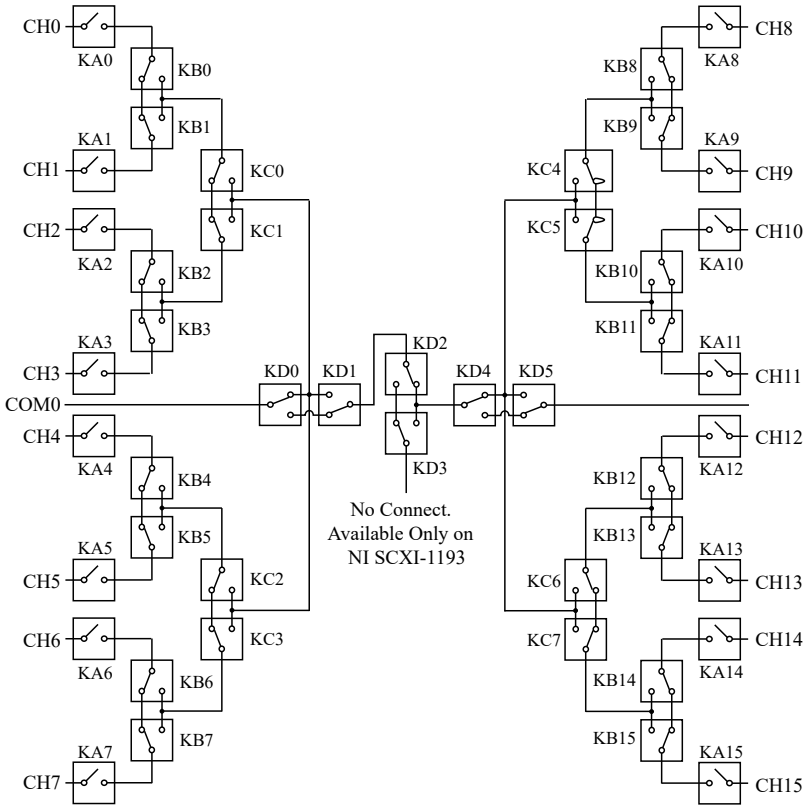
This figure describes the 16x1 multiplexer topology of the module.

Module software name: 2593/16x1 Mux (NISWITCH_TOPOLOGY_2593_16X1_MUX)

16x1 Multiplexer



16x1 Multiplexer Reset Position



The module in this topology contains 16 channels connected to a common channel. These channels are referred to as ch<0..15>, and the common channel is referred to as com0. You can connect any channel to com0 in this topology.

Making a Connection

You can connect the channels of the module using the niSwitch Connect Channels VI or the `niSwitch_Connect` function. For example, to connect channel 15 to common 0, call the niSwitch Connect Channels VI or the `niSwitch_Connect` function with the **channel 1** parameter set to `ch15` and the **channel 2** parameter set to

`com0`.

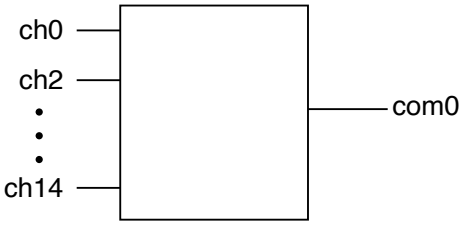
When scanning the module, a typical scan list entry could be `ch2->com0;`. This entry routes the signal from ch2 to com0.

PXI-2593 8x1 Terminated Multiplexer

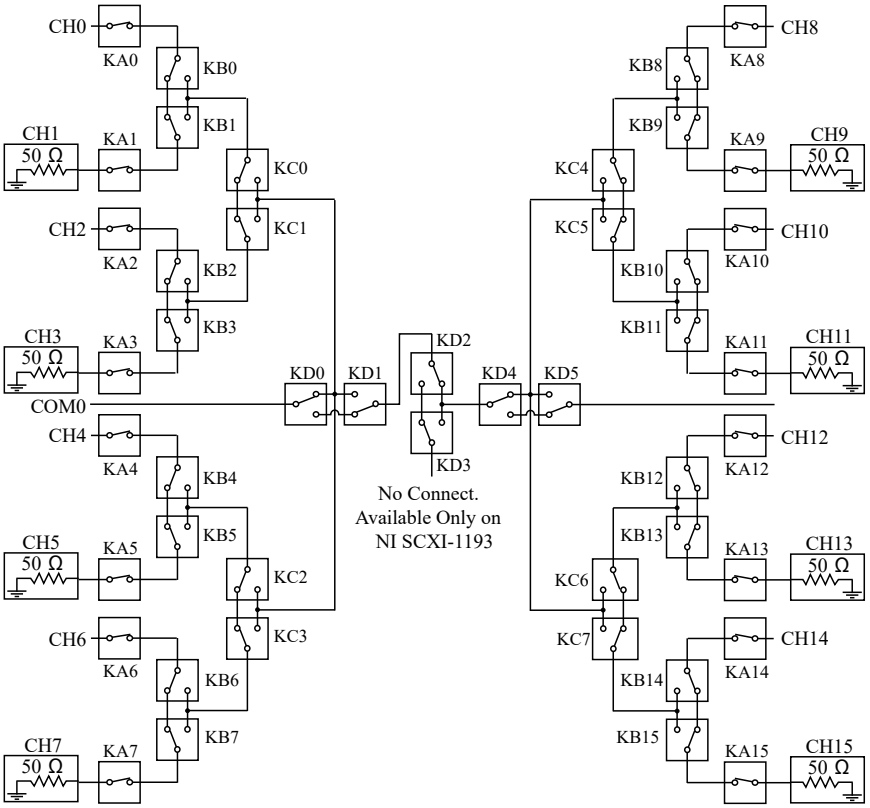
This figure describes the 8x1 terminated multiplexer topology of the module.

Module software name: 2593/8x1 Terminated Mux
(NISWITCH_TOPOLOGY_2593_8X1_TERMINATED_MUX)

8x1 Multiplexer



8x1 Terminated Multiplexer Reset Position



For proper termination, connect an external terminator, such as the 50 Ω MCX terminator (NI part number 778831-01), to every odd channel. Any input channel not connected to the COM is routed back to its associated termination channel.

The module in this topology contains 8 channels connected to a common channel. These channels are referred to as ch<0..14>, and the common channel is referred to as com0. You can connect any even input channel to com0 in this topology.

Making a Connection

You can connect the channels of the module using the niSwitch Connect Channels VI or the `niSwitch_Connect` function. For example, to connect channel 14 to common 0, call the niSwitch Connect Channels VI or the `niSwitch_Connect` function with the **channel 1** parameter set to `ch14` and the **channel 2** parameter set to `com0`.

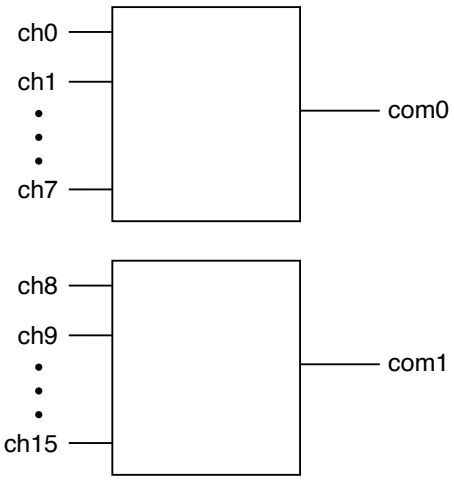
When scanning the module, a typical scan list entry could be `ch2->com0;`. This entry routes the signal from ch2 to com0.

PXI-2593 Dual 8x1 Multiplexer

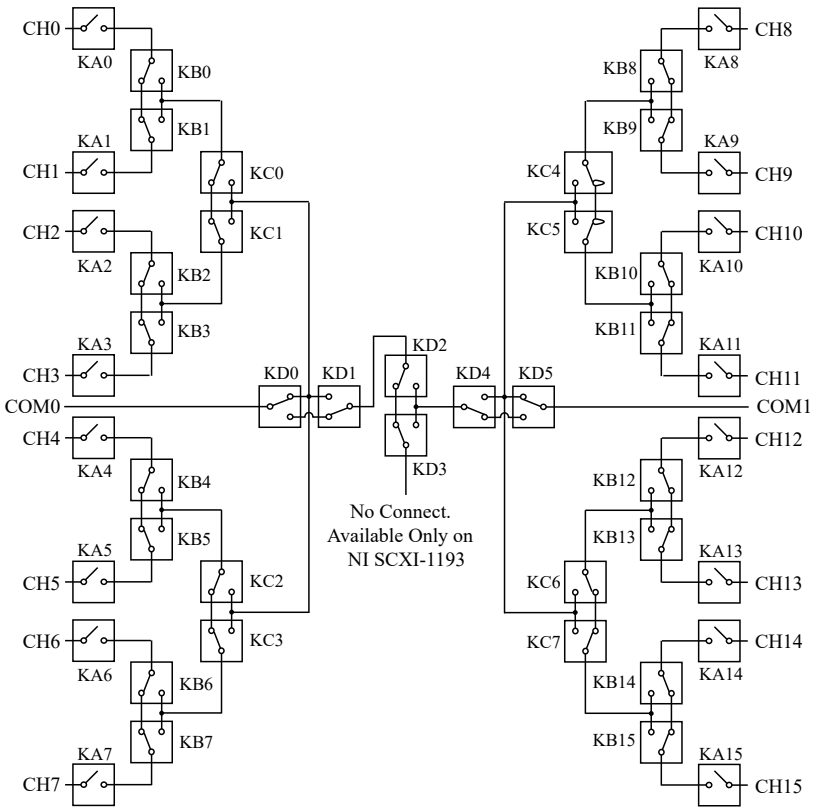
This figure describes the dual 8x1 multiplexer topology of the module.

Module software name: Dual 8×1 Multiplexer: 2593/Dual 8x1 Mux (NISWITCH_TOPOLOGY_2593_DUAL_8X1_MUX)

Dual 8x1 Multiplexer



Dual 8x1 Multiplexer Reset Position



Making a Connection

The module in this topology contains two banks of eight input channels connected to a common channel. These input channels are referred to as ch<0..15>, and the two common channels are referred to as com0 and com1. You can only connect to the common channel that is in the same bank. The banks are organized as follows:

Input Channels	Common Channel
ch0, ch1, ch2, ch3, ch4, ch5, ch6, ch7	com0
ch8, ch9, ch10, ch11, ch12, ch13, ch14, ch15	com1

For example, you can connect ch7 to com0; however, you cannot connect ch7 to com1 in this topology.

You can connect the channels of the module using the niSwitch Connect Channels VI or the `niSwitch_Connect` function. For example, to connect channel 15 to common 1, call the niSwitch Connect Channels VI or the `niSwitch_Connect`

function with the **channel 1** parameter set to `ch15` and the **channel 2** parameter set to `com1`.

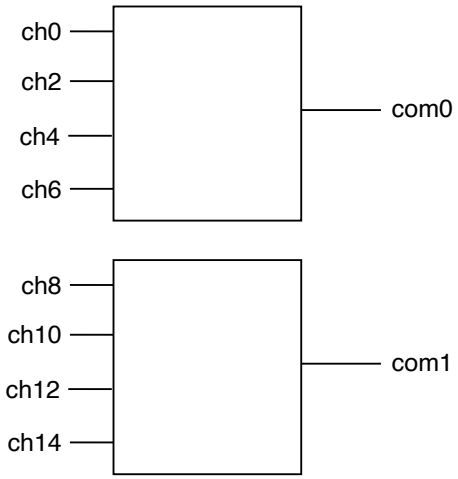
When scanning the module, a typical scan list entry could be `ch2->com0;`. This entry routes the signal from ch2 to com0.

PXI-2593 Dual 4x1 Terminated Multiplexer

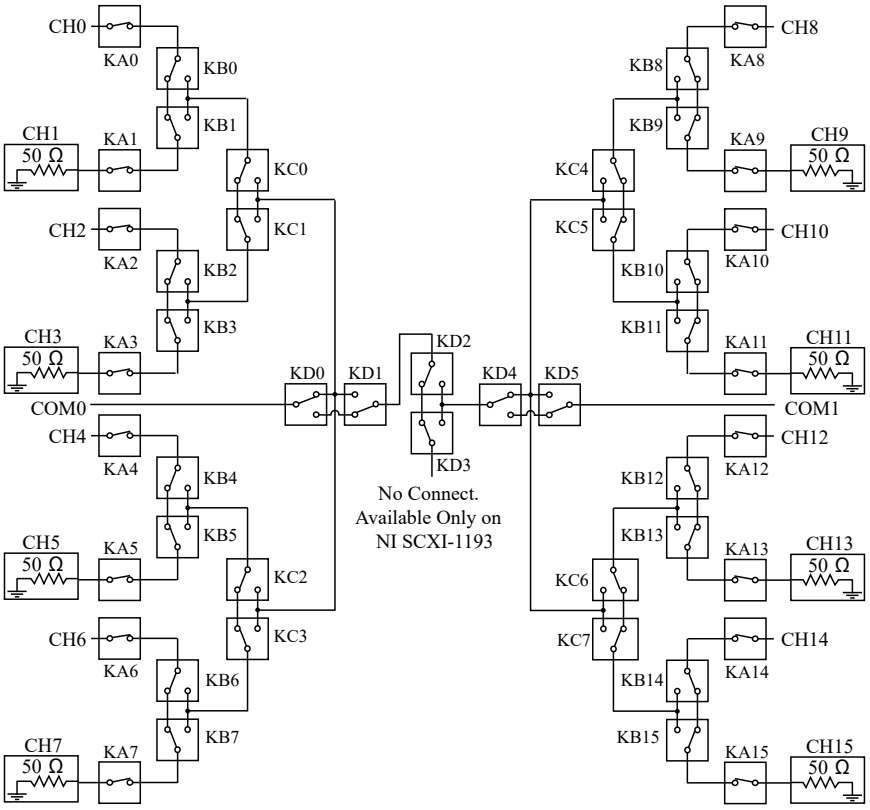
This figure describes the dual 4x1 terminated multiplexer topology of the module.

Module software name: 2593/Dual 4x1 Terminated Mux
(NISWITCH_TOPOLOGY_2593_DUAL_4X1_TERMINATED_MUX)

Dual 4x1 Terminated Multiplexer



Dual 4x1 Terminated Multiplexer Reset Position



Making a Connection

For proper termination, connect an external terminator, such as the 50 Ω MCX terminator (NI part number 778831-01), to every odd channel. Any input channel not connected to the COM is routed back to its associated termination channel.

The module in this topology contains two banks of four input channels connected to a common channel. These input channels are the even channels from channel 0 to channel 14. The two common channels are referred to as com0 and com1. You can only connect to the common channel that is in the same bank. The banks are organized as follows:

Input Channels	Common Channel
ch0, ch2, ch4, ch6	com0
ch8, ch10, ch12, ch14	com1

For example, you can connect ch6 to com0; however, you cannot connect ch6 to com1

in this topology.

You can connect the channels of the module using the niSwitch Connect Channels VI or the `niSwitch_Connect` function. For example, to connect channel 14 to common 1, call the niSwitch Connect Channels VI or the `niSwitch_Connect` function with the **channel 1** parameter set to `ch14` and the **channel 2** parameter set to `com1`.

When scanning the module, a typical scan list entry could be `ch2->com0;`. This disconnects ch2 from its termination and route it to com0.

PXI-2593 Independent Topology

This figure describes the independent topology of the module.

Module software name: 2593/Independent
(NISWITCH_TOPOLOGY_2593_INDEPENDENT)

The module supports the independent topology, allowing you to utilize its full routing capabilities. Possible configurations include 3×1 multiplexers and dimensionally flexible sparse matrices.

3×1 Multiplexers

The module can be configured as a 3×1 multiplexer.

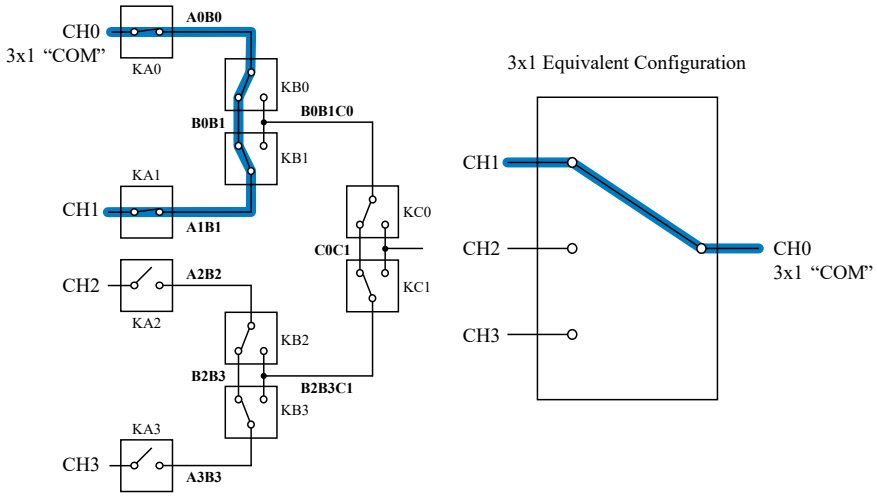
Each group of four channels (0:3, 4:7, 8:11, etc.) can be configured as independent, unterminated 3×1 multiplexers. Choose one channel as the "common," and route it to the other three channels.

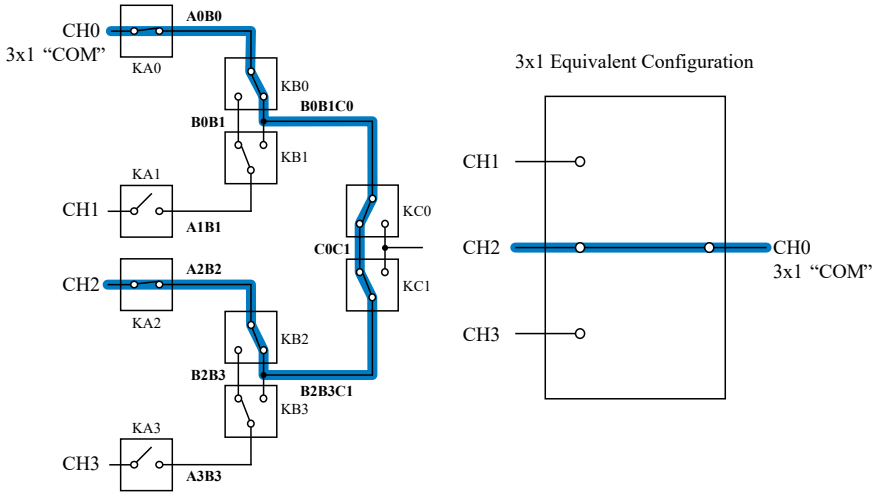
For example, choosing CH0 as a 3×1 common, route CH1, CH2, and CH3 to it with the command options described in the following table and figure.

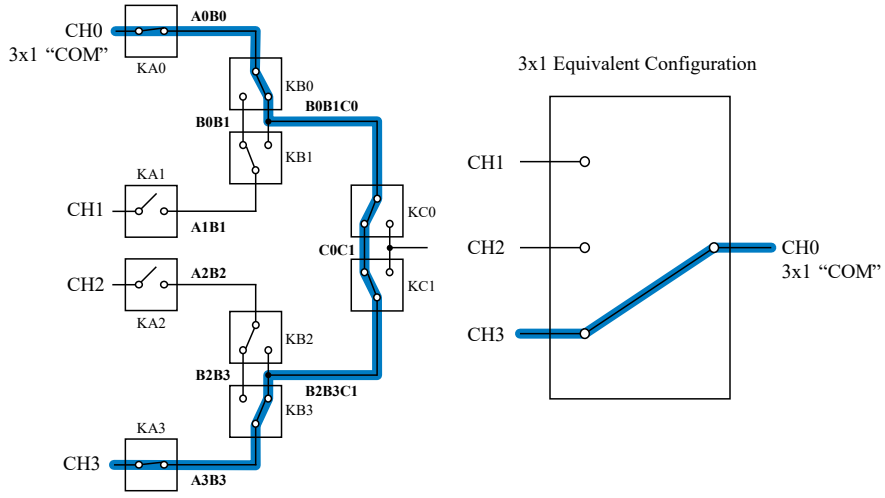
Route	Connect / Disconnect Calls Connection List	Individual Relay Control
CH0-> CH1	CH0->A0B0, A0B0->B0B1, B0B1->A1B1, A1B1->CH1	Close KA0, KA1 Open KB0, KB1

Route	Connect / Disconnect Calls Connection List	Individual Relay Control
CH0-> CH2	CH0->A0B0, A0B0->B0B1C0, B0B1C0->C0C1, C0C1->B2B3C1, B2B3C1->A2B2, A2B2->CH2	Close KA0, KB0, KA2, KB2 Open KB1*, KB3*, KC0, KC1
CH0-> CH3	CH0->A0B0, A0B0->B0B1C0, B0B1C0->C0C1, C0C1->B2B3C1, B2B3C1->A3B3, A3B3->CH3	Close KA0, KB0, KA3, KB3 Open KB1*, KB2* KC0, KC1
*Switch unused relays away from the signal path to improve high-frequency performance.		

Refer to the following figure for an example of a 3×1 configuration using CH0-CH3 on the module.







The module can be configured as quad 3×1 multiplexers using its 16 channels. The COM terminals are unused.

Dimensionally Flexible Sparse Matrix

The module architecture allows signals to be routed between any channel pair or common pair while maintaining >500 MHz bandwidth and minimizing RF stubs and reflections. The architecture provides more flexibility than traditional sparse matrices because the shape of the matrix is user-defined, and there is no restriction on row-to-row or column-to-column connections. For additional information about dimensionally flexible sparse matrices, refer to ***Advanced Signal Routing with the NI PXI/PXIe-2593 and NI SCXI-1193 RF Switches*** at ni.com/r/ex2qd9.

Figure 1. Routing Configuration

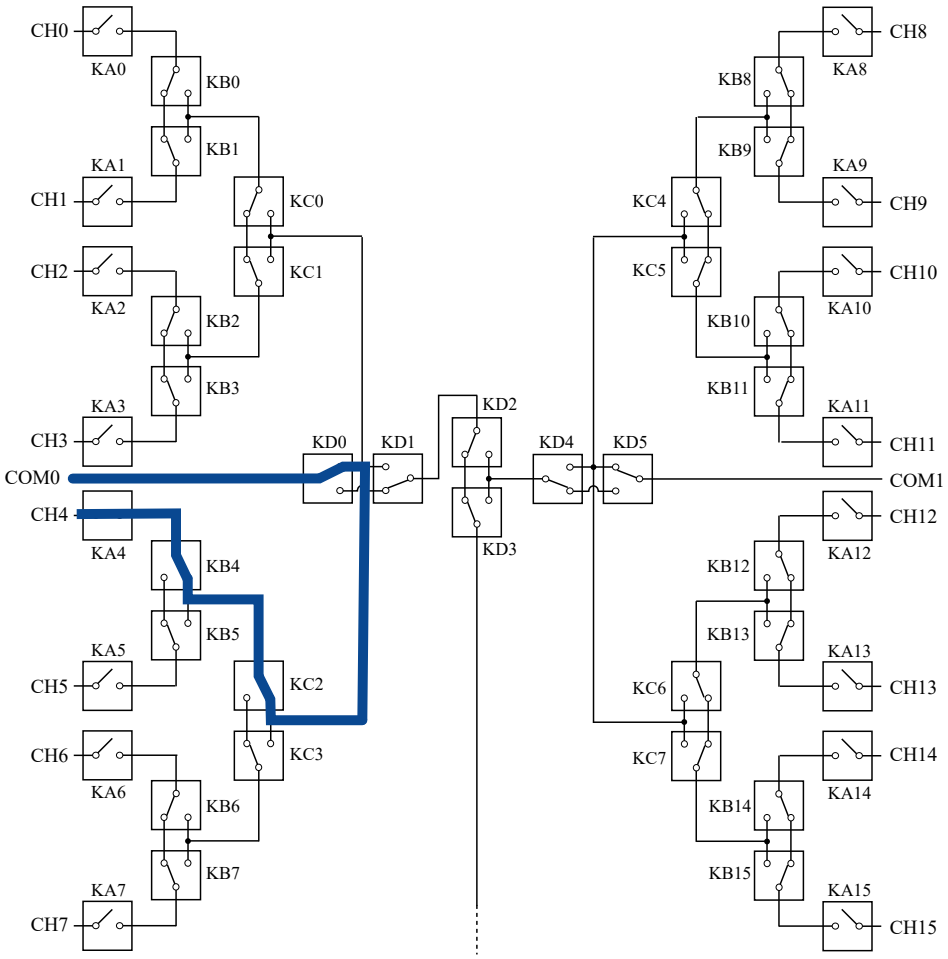
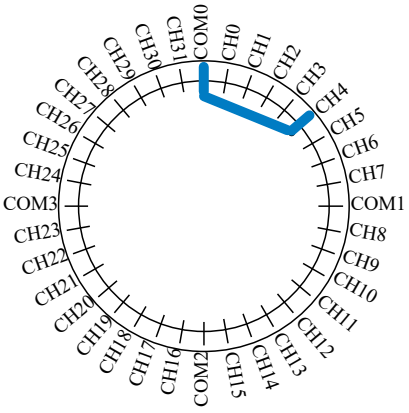


Figure 2. Equivalent Representation



Making a Connection

Control the individual relays with the niSwitch Relay Control VI or the `niSwitch_RelayControl` function (refer to the module hardware diagram for relay names). For example, to connect CH2 to COM0 on the module, call the niSwitch

Relay Control VI or the `niSwitch_RelayControl` function with **relay action** set to **Relay Closed** and relay name set to `KA0`. Repeat the call to the niSwitch Relay Control VI or the `niSwitch_RelayControl` function to close KB1 then KC0.

When scanning the module, use the channel names in the scan list. A typical scan list entry could be `ch2->com0;`. This entry routes the signal connected to CH2 to COM0.

Valid Internal Channels

To determine the internal channel names, combine the names of all relays adjacent to a channel, in alphabetical order, and remove the K's. For example, the channel connecting KA0 and KB0 is called A0B0.

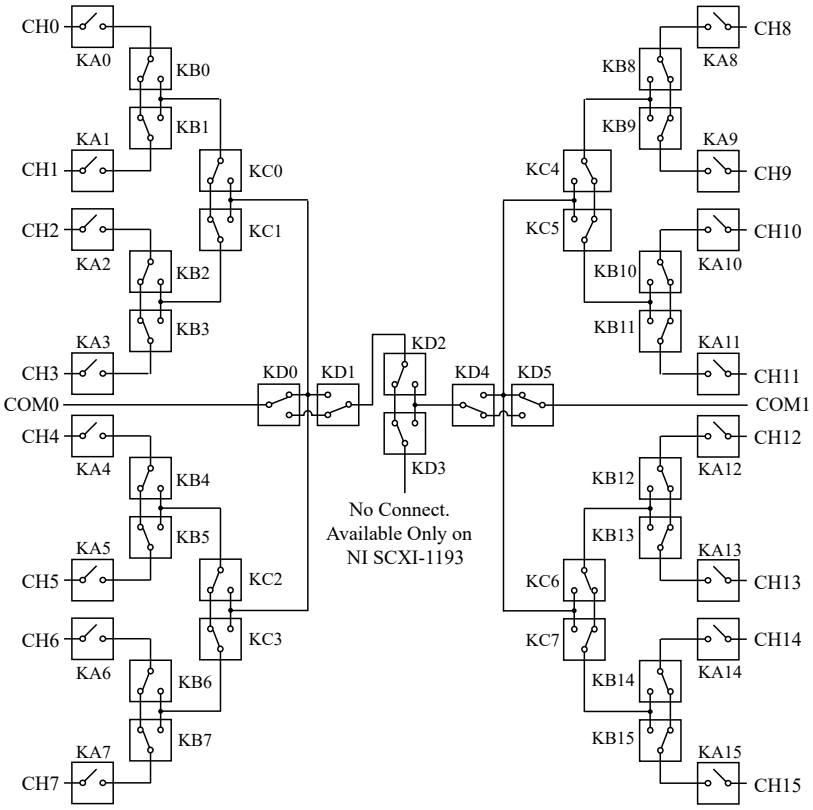
For example, to connect CH0 to COM0 using internal channel names, you need to call the following:

```
niSwitch_Connect (exampleSession, ch0, a0b0);
```

```
niSwitch_Connect (exampleSession, a0b0, b0b1c0);
```

```
niSwitch_Connect (exampleSession, b0b1c0, c0c1c2c3d0d1);
```

```
niSwitch_Connect (exampleSession, c0c1c2c3d0d1, com0);
```



The following is a list of the valid internal channel names:

a0b0	b0b1	c0c1	ch4
a10b10	b0b1c0	c0c1c2c3d0d1	ch5
a11b11	b10b11	c2c3	ch6
a12b12	b10b11c5	c4c5	ch7
a13b13	b12b13	c4c5c6c7d4d5	ch8
a14b14	b12b13c6	c6c7	ch9
a15b15	b14b15	ch0	com0
a1b1	b14b15c7	ch10	com1
a2b2	b2b3	ch11	d0d1
a3b3	b2b3c1	ch12	d1d2
a4b4	b4b5	ch13	d2d3
a5b5	b4b5c2	ch14	d2d3d4

a6b6	b6b7	ch15	d4d5
a7b7	b6b7c3	ch1	
a8b8	b8b9	ch2	
a9b9	b8b9c4	ch3	