

# National Instruments™ SCB-68 Breakout Box

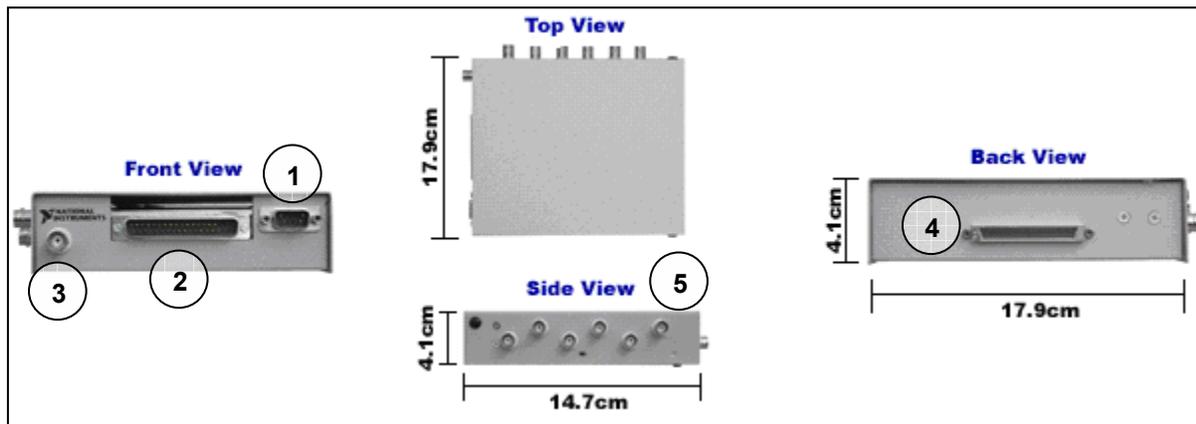
## Description

The SCB-68 is a shielded I/O connector block that has been modified by Plexon to facilitate interfacing Plexon hardware with the National Instruments 16-channel A/D boards PCI-6040E, PCI-6052E, and PCI-6070E.

Plexon recommends that the A/D card be configured for Non-Referenced Singled Ended operation. In this mode, the output of each channel of the A/D card is the amplified difference between a channel input and a common reference input called AISENSE.

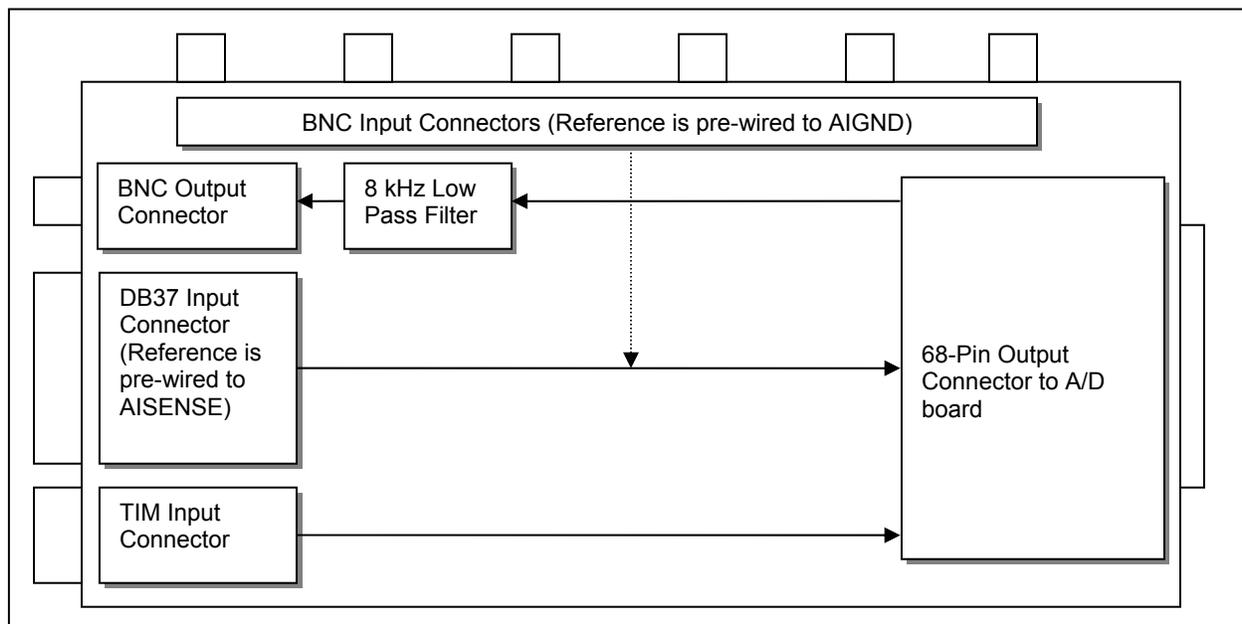
Figure 1 shows the pictorial and quick connection diagram and Figure 2 shows the functional diagram of the SCB-68.

**Figure 1 - National Instruments SCB-68 Pictorial Diagram and Quick Connection Guide**



1	<p><b>TIM Input Connector</b>                      Map System – connects to TIM board                      Recorder System - not used</p>
2	<p><b>DB37 Input Connector</b>                      Connects to PBX output                      Reference pre-wired to AISENSE</p>
3	<p><b>BNC Output Connector</b>                      MAP System – not used                      Recorder System – connects to oscilloscope</p>
4	<p><b>68 Pin Output Connector</b>                      Connects to NIDAQ card in PC                      See PCI E Series User Manual (<a href="http://www.ni.com">www.ni.com</a>)</p>
5	<p><b>BNC Input Connectors (Optional)</b>                      6 BNC connectors                      Use of each is optional                      If used replace any or all of channels 11-16 on the DB37 connector – see text</p>

Figure 2 - National Instruments SCB-68 Functional Diagram



### TIM Input Connector

The TIM Input Connector is a male DB9 connector that can be used to bring external timing signals to the NIDAQ board. When used in conjunction with a MAP system, the TIM Input Connector receives a clock and a start signal from the MAP. These signals ensure that the continuous data acquired by the NIDAQ board is synchronized with the spike data recorded by the MAP box. The TIM Input Connector is not used with Recorder systems.

### DB37 Input Connector

The DB37 Input Connector is the default analog signal input to the SCB-68. There are 16 analog inputs and one common reference input (AISENSE). The recorded signal for each channel is the amplified difference between the channel input and the common reference input.

**Caution:** The signal sources should be ground referenced, not “floating”. If you have a “floating” signal source such as a battery powered device please contact Plexon for assistance in connecting it to the SCB-68.

### BNC Input Connectors

The BNC Input Connectors are not initially configured but may optionally be used to connect analog signals from a separate source than that used for the DB37 Input Connector. Each optional BNC input may be used instead of the corresponding input from the DB37 Input Connector (see page 4 for details on configuring a BNC input). The BNC inputs are intended for use with relatively large amplitude (> 1V) input signals and low levels of gain on the NIDAQ card.

**Caution:** The outer conductor of each BNC is connected to the ground of the NIDAQ card, “AIGND”. Note, however, that the recorded signal is still the difference between the input and the common reference input AISENSE from the DB37 Connector. Thus, you must have a signal source connected to the DB37 Input Connector before using the BNC inputs. If you would like to use one or more BNC connectors with no input connected to the DB37 input connector, please contact Plexon for assistance.

## 68 Pin Output Connector

The 68 Pin Output Connector connects to a NIDAQ board in a PC. For more information see the National Instruments PCI Series-E User Manual.

## BNC Output Connector

The BNC Output Connector outputs the active channel when using Recorder software and is not used with a MAP system.

## Connector Pin-outs

Figure 3 – DB37 Input Connector Pin-out

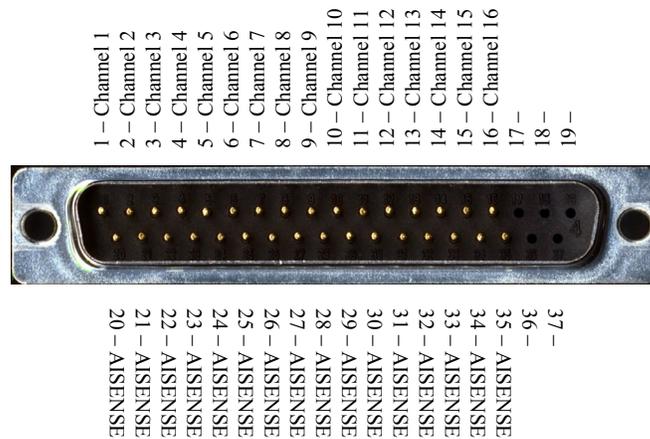
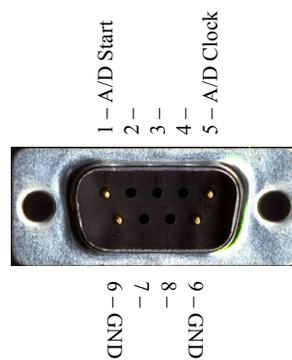
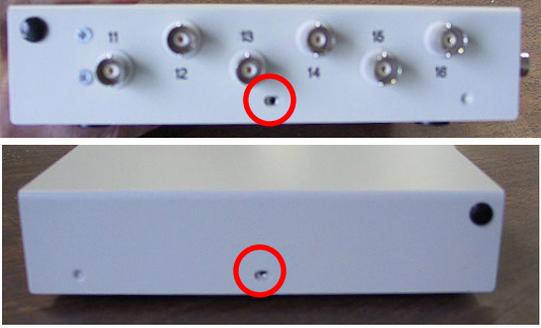
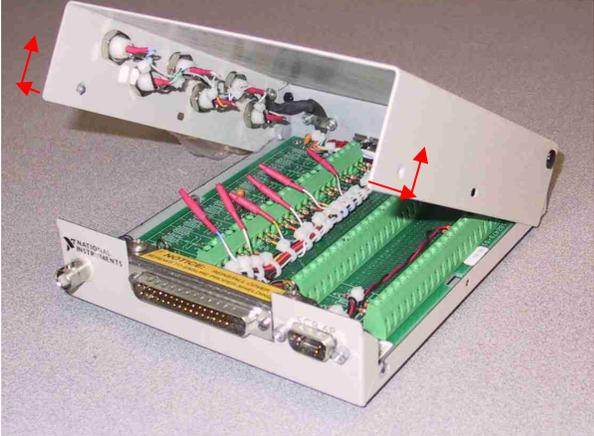


Figure 4 – TIM Input Connector Pin-out



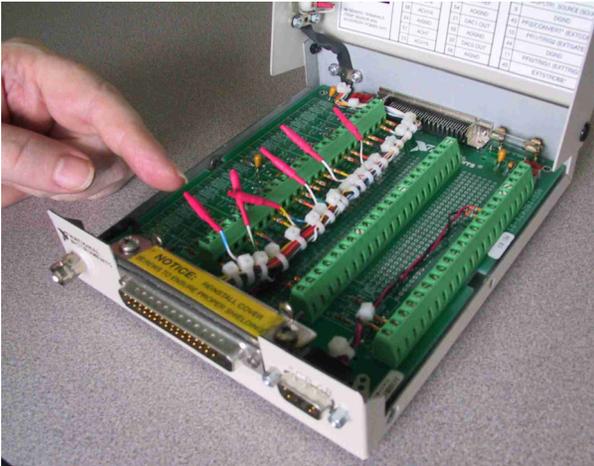
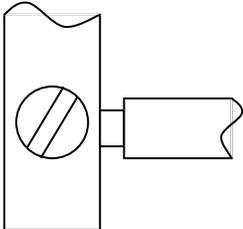
### Procedure for Connecting BNC Inputs

The optional BNC inputs for channels 11-16 may be used instead of the corresponding inputs from the DB37 input connector. Use the procedure in the table below to connect an optional BNC input.

Step	Action	Diagram
1	<p><b>Remove Panel Screws</b></p> <p>Remove the screw from the bottom center of the Analog Input panel. Also, remove the screw from the panel on the opposite side.</p>	
2	<p><b>Open the Lid</b></p> <p>Open the SCB-68 with the National Instruments logo nearest you. You will need to use horizontal pressure on the bottom corners of the lid and force the lid upward as shown by the arrows on the diagram.</p>	

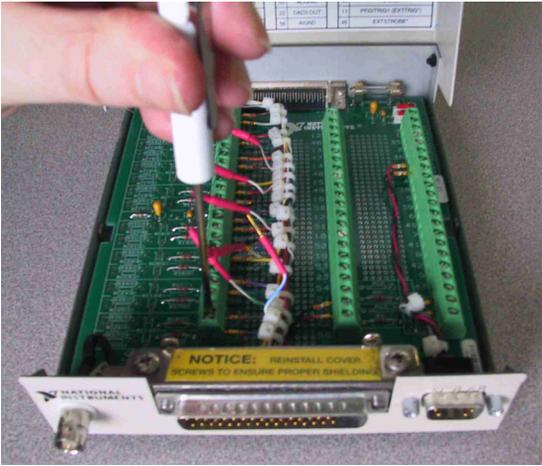
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3	<p><b>Identify Long Terminal Strip</b></p> <p>Locate the terminal strips on the inside of the bottom case of the SCB-68. Find the longest terminal strip.</p>																																																			
4	<p><b>Identify DB37 Signal Lines</b></p> <p>On the long terminal strip locate the terminal that corresponds to an analog channel you wish to use.</p> <p>Channel 11 = Pin 31 (ACH10)            Channel 12 = Pin 63 (ACH11)            Channel 13 = Pin 61 (ACH12)            Channel 14 = Pin 26 (ACH13)            Channel 15 = Pin 58 (ACH14)            Channel 16 = Pin 23 (ACH15)</p> <p>In the diagram, the corresponding pins are identified by <b>bold</b> font and enclosed by red ellipses.</p> <p>Suppose you wish to use Channel 16, then terminal 23 at the bottom of the strip would be the correct selection (colored blue).</p>	<table border="1"> <thead> <tr> <th>Pin #</th> <th>Signal</th> </tr> </thead> <tbody> <tr><td>68</td><td>ACH0</td></tr> <tr><td>34</td><td>ACH8</td></tr> <tr><td>67</td><td>AIGND</td></tr> <tr><td>33</td><td>ACH1</td></tr> <tr><td>66</td><td>ACH9</td></tr> <tr><td>32</td><td>AIGND</td></tr> <tr><td>65</td><td>ACH2</td></tr> <tr><td><b>31</b></td><td><b>ACH10</b></td></tr> <tr><td>64</td><td>AIGND</td></tr> <tr><td>30</td><td>ACH3</td></tr> <tr><td><b>63</b></td><td><b>ACH11</b></td></tr> <tr><td>29</td><td>AIGND</td></tr> <tr><td>62</td><td>AISENSE</td></tr> <tr><td>28</td><td>ACH4</td></tr> <tr><td><b>61</b></td><td><b>ACH12</b></td></tr> <tr><td>27</td><td>AIGND</td></tr> <tr><td>60</td><td>ACH5</td></tr> <tr><td><b>26</b></td><td><b>ACH13</b></td></tr> <tr><td>59</td><td>AIGND</td></tr> <tr><td>25</td><td>ACH6</td></tr> <tr><td><b>58</b></td><td><b>ACH14</b></td></tr> <tr><td>24</td><td>AIGND</td></tr> <tr><td>57</td><td>ACH7</td></tr> <tr><td><b>23</b></td><td><b>ACH15</b></td></tr> </tbody> </table>	Pin #	Signal	68	ACH0	34	ACH8	67	AIGND	33	ACH1	66	ACH9	32	AIGND	65	ACH2	<b>31</b>	<b>ACH10</b>	64	AIGND	30	ACH3	<b>63</b>	<b>ACH11</b>	29	AIGND	62	AISENSE	28	ACH4	<b>61</b>	<b>ACH12</b>	27	AIGND	60	ACH5	<b>26</b>	<b>ACH13</b>	59	AIGND	25	ACH6	<b>58</b>	<b>ACH14</b>	24	AIGND	57	ACH7	<b>23</b>	<b>ACH15</b>
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Step	Action	Diagram
<p>5</p> <p><b>Disconnect DB37 Signal Line(s)</b></p> <p>Loosen the screw of the appropriate terminal and remove the wire connected to it.</p> <p>Note the color of the wire:            Channel 11 = brown            Channel 12 = red            Channel 13 = orange            Channel 14 = yellow            Channel 15 = green            Channel 16 = blue</p>		
<p>6</p> <p><b>Identify BNC Signal Line(s)</b></p> <p>There are several loose white wires with color stripes that have red protective coverings attached. Find the wire whose stripe matches the color of the wire removed from the terminal strip.</p> <p>Channel 11 = brown stripe            Channel 12 = red stripe            Channel 13 = orange stripe            Channel 14 = yellow stripe            Channel 15 = green stripe            Channel 16 = blue stripe</p>		

Step	Action	Diagram
7	<p><b>Transfer Protective Covering</b> Remove the protective covering of the selected BNC wire.</p>  <p>Transfer the protective covering to the solid colored wire removed from the terminal strip in Step 5.</p> 	
		
8	<p><b>Insert BNC Signal Line(s)</b> Insert the selected BNC wire into the terminal strip.</p>	

# Data Sheet



Step	Action	Diagram
9	<b>Tighten the Screw</b> Tighten the screw of the selected terminal.	
10	Repeat Steps 3-9 for each channel chosen	