

NI 6062/6251 I/O Box

User Guide

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Engineering Design

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1. Overview

The Engineering Design NI 6062/6251 I/O box is designed to transfer analog and digital signals between external devices and National Instruments (NI) model 6062 and 6251 I/O boards. This guide describes I/O box design and construction. The number and type of connections varies with model, and may include connections for:

- Analog input and output signals
- Input and output triggers for analog acquisition and playback
- Digital input and output signals
- Control signals for two timer channels

The I/O box connects to these signals through BNC connectors, and to the I/O board through a 68-pin bulkhead connector via the I/O cable. Box and cable are shown in the figure.

2. Front and Rear Panel Layout

Medium I/O Box

Following is the front panel for the medium I/O box. The panel includes analog input and analog output connectors:



The rear panel (not shown) may include input and output triggers for analog acquisition and playback.

Large I/O Box

Following are front and rear panels for the large I/O box. The front panel includes analog input, analog output and DIO connectors:



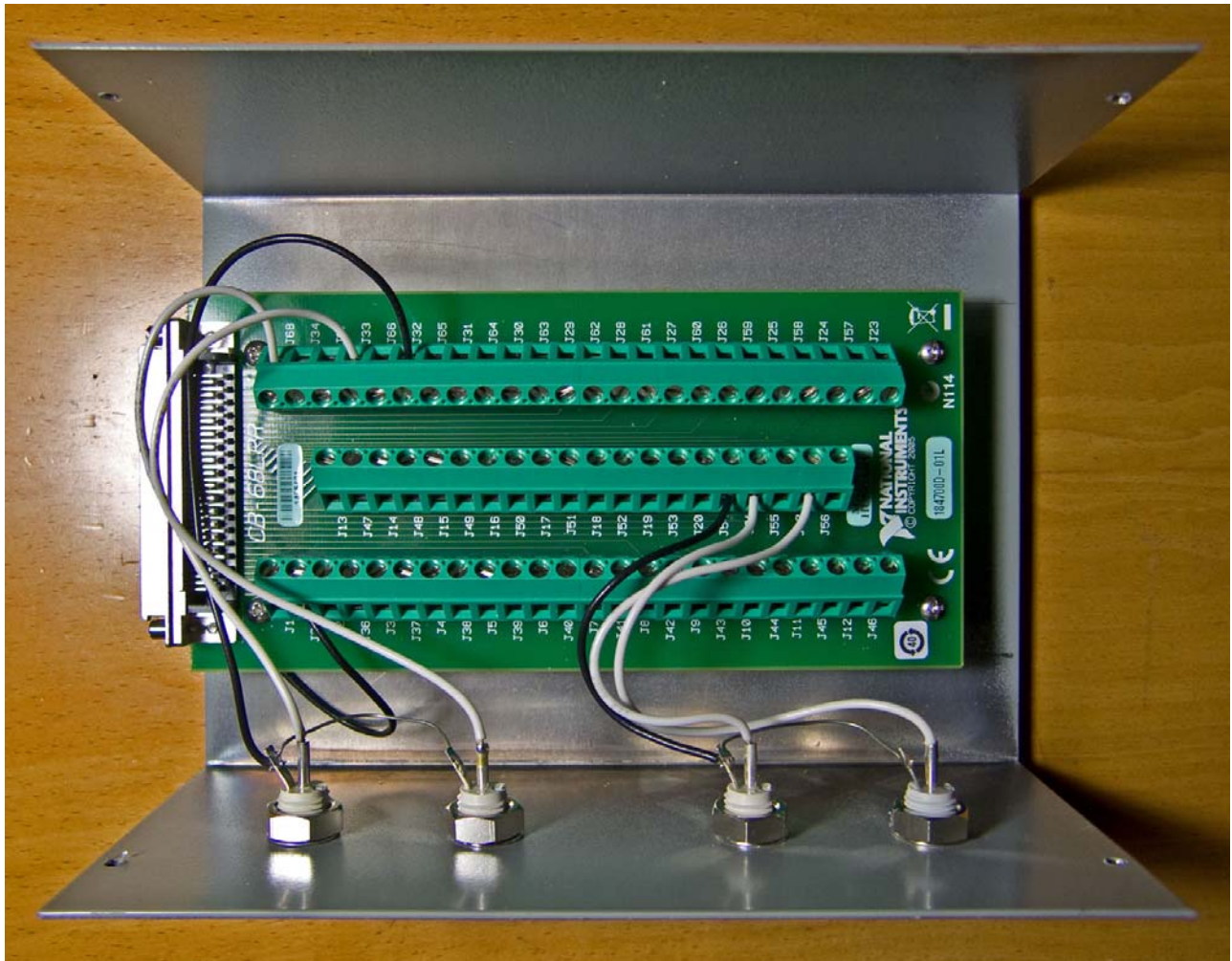
The rear panel includes input and output triggers for analog acquisition and playback and control signals for two timer channels:



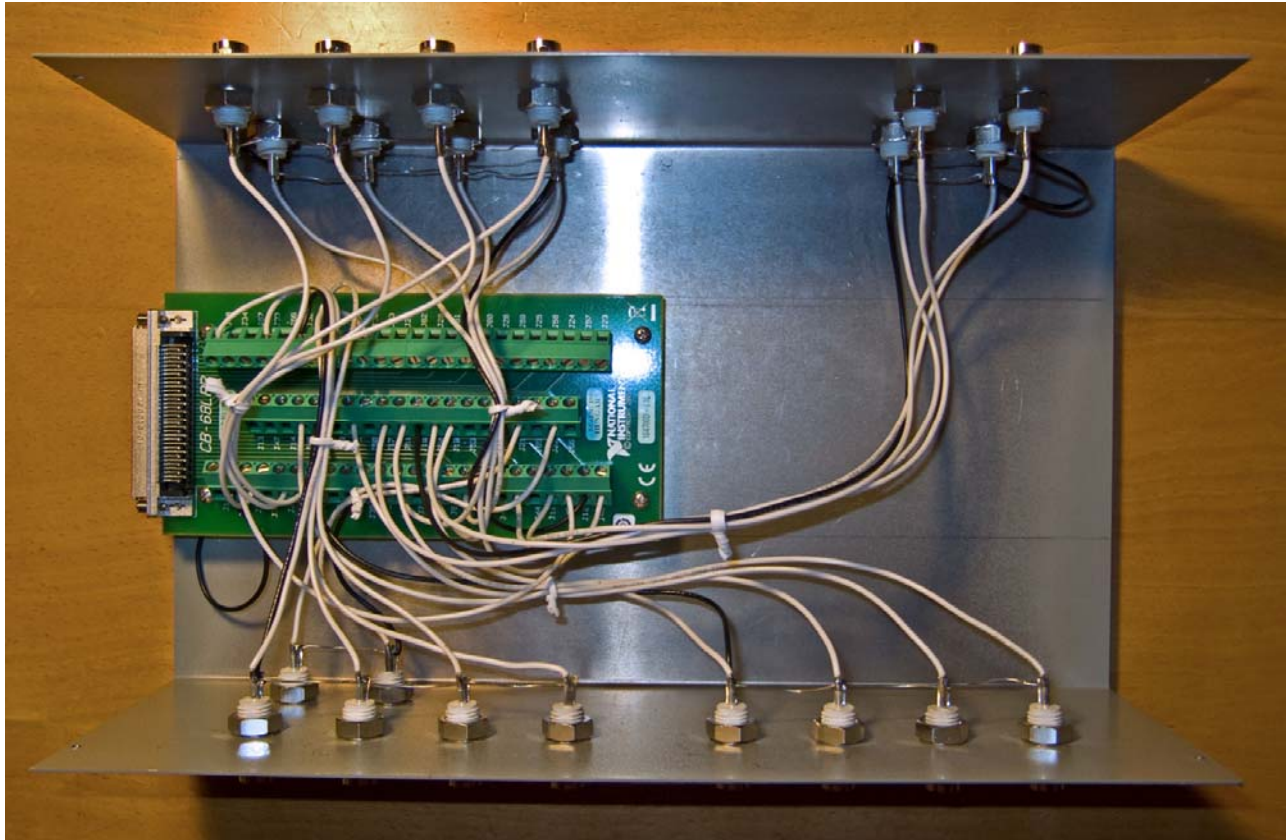
3. Design

The I/O panel consists of a NI screw terminal panel and a number of BNC connectors. The screw terminal panel provides a 68-pin bulkhead connector to connect to the I/O cable and a set of screw terminals wired to the BNC connectors.

Medium I/O Box



Large I/O Box



4. Construction

Parts List

{	1	Hammond 1411M	Aluminum box, 6" W x 3" H x 3" D	[small]
{	1	Hammond 1411Q	Aluminum box, 7" W x 3" H x 5" D	[medium]
{	1	Hammond 1411X	Aluminum box, 12" W x 4" H x 7" D	[large]
		Amphenol 31-10	BNC F iso chassis conn	
			4 2 In / 2 Out w/o trig	
			8 2 In / 2 Out w/ trig	
			6 4 In / 2 Out w/o trig	
			10 8 In / 2 Out w/o trig	
			14 8 In / 2 Out w/ trig	
			22 Omni box	
	4	3M SJ-5018SP	Rubber feet, .50 x .50 x .23	

1	Natl Instr CB-68LPR	Connector block
	Belden 8524 / Wht	22-ga Hookup wire
	Belden 8524 / Blk	22-ga Hookup wire
	Belden 8021	22-ga Buss wire
	Online Labels OL450	Clear labels, 4-1/4 x 5-1/2

Wiring Table

NOTE: NI boards and screw terminal panel use same pin numbers (unlike DT).

Note: medium box has 3 separate shield busses and large box has 6 separate shield busses. Each shield buss is tied to a separate gnd pin on terminal panel.

1. BNC to screw panel

Signal -----	Screw panel -----	Chassis -----
Analog Input: 4 chan -----		
AIn 0	68	In 1: tip
AIn 1	33	In 2: tip
AIn 2	65	In 3: tip
AIn 3	30	In 4: tip
AIn gnd	32	AIn shield bus

NOTE: tie AIn shields w/ buss wire and connect to AIn gnd as shown.

Analog Output: 2 chan -----		
DACOut 0	22	Out 1: tip
DACOut 1	21	Out 2: tip
AOut gnd	54	AOut shield bus

NOTE: tie AOut shields w/ buss wire and connect to AOut gnd as shown.

Analog I/O Trigger -----		
PFI-0 / P1-0	11	Acq In: tip
PFI-1 / P1-1	10	Play In: tip
P0-0	52	Acq Out: tip
P0-1	17	Play Out: tip
Dig gnd	18	Trig shield bus

NOTE: tie Trigger shields w/ buss wire and connect to Dig gnd as shown.

DIO

Port 0 / Bit 4	19	DIO 0:	tip
Port 0 / Bit 5	51	DIO 1:	tip
Port 0 / Bit 6	16	DIO 2:	tip
Port 0 / Bit 7	48	DIO 3:	tip
Dig gnd	15		DIO shield bus

NOTE: tie DIO shields w/ buss wire and connect to Dig gnd as shown.

Timer 1

Ctr0 Src / PFI 8	37	In:	tip
Ctr0 Gate / PFI 9	3	Gate:	tip
Ctr0 Aux / PFI 10	45	Aux:	tip
Ctr0 Out / PFI 12	2	Out:	tip

NOTE: tie Timer 1 shields w/ buss wire and connect to Timer 2 shield bus.

Timer 2

Ctrl Src / PFI 3	42	In:	tip
Ctrl Gate / PFI 4	41	Gate:	tip
Ctrl Aux / PFI 11	46	Aux:	tip
Ctrl Out / PFI 13	40	Out:	tip
Dig gnd	12		Timer 1 & 2 shield bus

NOTE: tie Timer 2 shields w/ buss wire and connect to Dig gnd as shown.

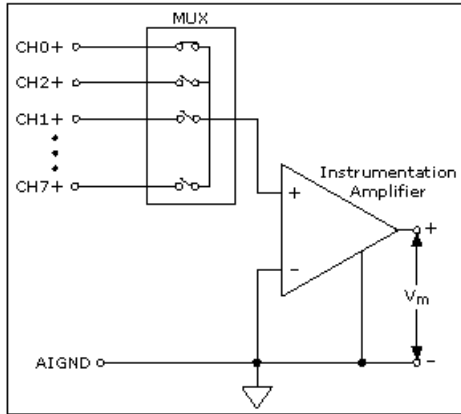
2. Analog ground

1. Connect the BNC shields together and connect to AIn Gnd, which is internal analog ground reference on the I/O board.

2. Grounding approach

- Assume inputs are floating => tie gnds to measurement ground = "AIn Gnd"
- Connect resulting SE signals to SE inputs on I/O board
- Perform acq in Ground-Referenced Single Ended (RSE) mode

3. Here is NI drawing of RSE connection:



3. Chassis ground

Connect digital ground to a chassis ground lug.

Signal	Screw panel	Chassis
-----	-----	-----
Dig gnd	35	Chassis gnd