



Configuring the NI BNC-2090 Rack Mount Box for use with MiDAS DA

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Abstract

This application note describes the hardware connections for installing a National Instruments Rack-Mounted BNC-2090 terminal block for use with MiDAS DA. While the BNC-2090 is not a standard accessory sold by Xcitex for use with MiDAS DA, it can easily be substituted for the standard BNC breakout box.

Overview

The BNC-2090 is a rack-mountable breakout box designed for use with National Instruments data acquisition cards. The BNC-2090 has 16 BNC inputs on the front panel, labeled **ACH 0 ... ACH 15**. (ACH = Analog Channel.) Consequently, the BNC-2090 will accommodate 8 different channels of analog data inputs or 16 channels of single ended analog data inputs.

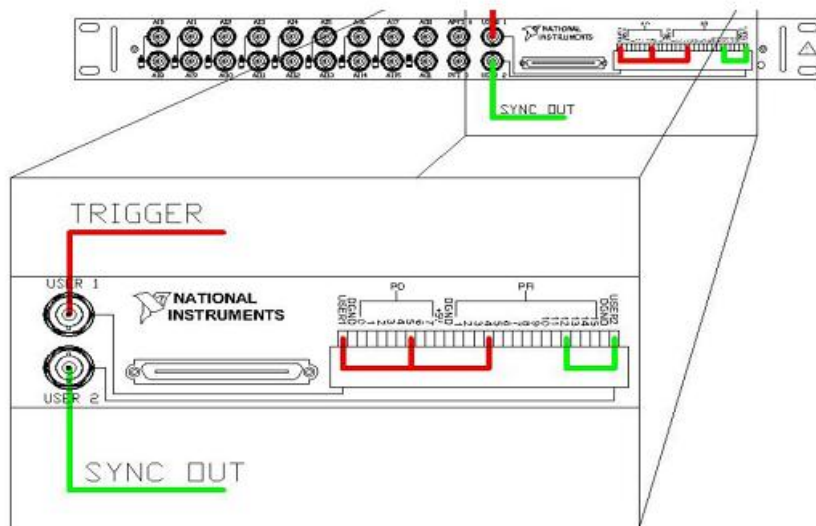


BNC-2090 Purchased from Xcitex

If you purchase your rack-mounted BNC-2090 box from Xcitex, the box comes pre-configured with three jumpers in place, as shown in the diagram below.

Confirm that the first jumper is securely affixed to both the **PFI4** and **USER2** terminals, with a second jumper going from **PFI4** to **PO.5**. Confirm that the third jumper is securely affixed to both the **PFI1** and **CTR1 OUT** terminals.

Restart your computer. Upon restart, Windows should detect your new hardware and install the appropriate drivers.



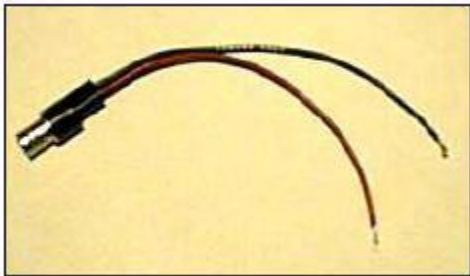
BNC-2090 Purchased from National Instruments

If you purchase your rack-mounted BNC-2090 box from National Instruments, you will need to install jumpers for use with MiDAS DA.

1. Move the switch in the back of the BNC-2090 box to the **MIO** position.
2. Set the internal signal conditioning jumper per the manufacturer's instructions (see National Instruments BNC-2090 User Manual, Chapter 2 and Chapter 3).
3. Disconnect the standard (black) BNC Breakout Box that comes with MiDAS DA (National Instruments BNC-2110 breakout box).
4. Connect the MiDAS DA cable directly to the BNC-2090 box (either front or back).

5. Make the following wire jumpers on the front of the BNC-2090:

- **PFI4 to USER2**
- **PFI1 to CTR1 OUT.**



6. You must also create the Sync Out synchronization cable. Using a BNC pigtail as shown above, make the following connections:

- **Red (center post) wire to CTR0 OUT**
- **Black (outside ground) wire to GROUND**

7. Label this pigtail **Sync Out**.

8. From this connector, run the BNC sync cable to the camera **Sync In** connector.

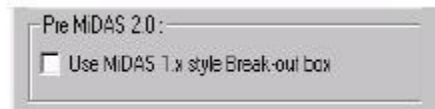
9. Connect your external trigger to **USER2**. Label this connector **Trigger In**.



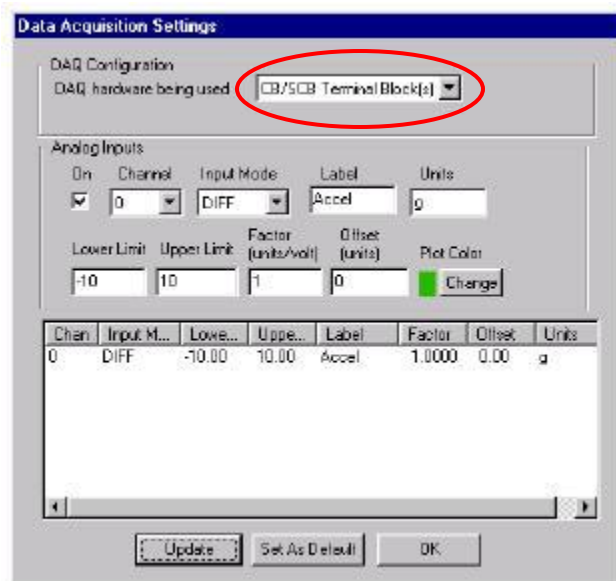
10. Launch MiDAS DA.

11. From the Options menu, select **Record Options**.

12. Make sure that the checkbox for "Use MiDAS 1.x style Break-out box" is **NOT** checked.



13. Click **Options** and select **Data Acquisition Settings**. The DAQ Configuration window appears.



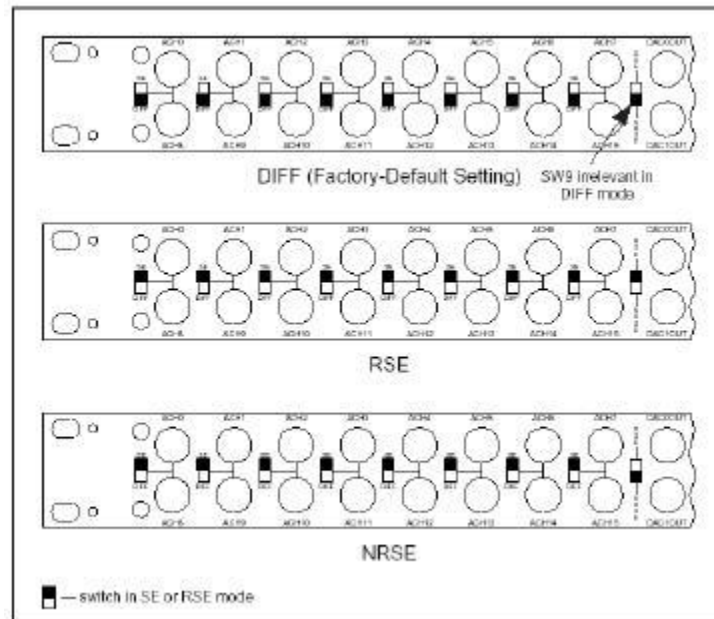
14. Select **CB/SCB Terminal Block(s)** from the dropdown menu for DAQ hardware being used.

Connecting Sensors to the BNC-2090

The BNC-2090 can accept either 8 differential inputs or 16 single ended inputs. Unlike the BNC-2110 BNC Breakout Box or the CB-68 Terminal Block, all the inputs must be the same. So, this box must be used with all Single Ended or Differential sensors – you cannot mix types. If you desire to mix types of sensors (differential and single ended), we recommend using the CB-68 Terminal Block.

Note: Please refer to the MiDAS DA User Guide for additional information on the following procedures.

1. Determine which type of sensors you are using – Differential or Single Ended.
2. If you are using Single Ended sensors, determine if you are using them in Non-Referenced (NRSE) or Referenced (RSE) mode.
3. Configure all the switches on the front panel of the BNC-2090 box to match your sensor type and mode of use, as illustrated in the following diagram (reproduced from the National Instruments BNC-2090 User Manual):



4. If you are using only Differential sensors, connect your sensors (8 max) across the top row of BNC inputs (ACH0 through ACH7), always starting with ACH0.

Note: DO NOT connect any sensors or other inputs to the bottom row (ACH8 through ACH15). These MUST be empty.

5. If you are using Single Ended sensors (NRSE or RSE), connect your sensors (16 max) across both rows of BNC inputs (ACH0 through ACH15), always starting with ACH0.

6. Set the MiDAS DA data acquisition settings for each channel to match the front panel switch settings of the BNC-2090. To access the MiDAS DA data acquisition settings, click **Options** and select **Data Acquisition Settings**. The following window appears. The various parts of this window are described in the *MiDAS DA User Guide*.



For example, if your measurement is using Differential signal inputs, set all the used channels to **DIFF** input mode and set the Upper and Lower Limits per the instruction in the *MiDAS DA User Guide*.

Note: The Software Input Mode settings (DIFF, NRSE, or RSE) need to match the switch settings on the front of the BNC-2090 box (and these settings need to match the sensor types).

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