MDR-50 Breakout Board
User Manual

Revision 1.0
2/26/2010

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List of Figures and Tables

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1 Document Overview

This document describes the operation of the MDR-50 Breakout Board.   It also gives examples of common setups and uses.
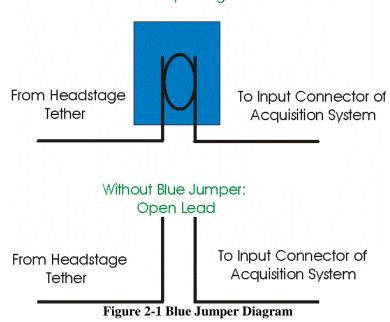
2 MDR-50 Breakout Board Overview

The MDR-50 Breakout Board is used to make custom (non-standard) signal connections between a headstage tether and the input channel of a Neuralynx acquisition system. In most cases the acquisition system input connector will be on the ERP-27, DRS-36, or Digital Lynx Input Board.

The board has a Female MDR-50 connector (on the Headstage/Tether connection side) and a Male MDR-50 (on the acquisition system connection side) to allow it to be conveniently inserted between the tether and the acquisition system input. Except for Ground (PGnd) all signal and power connections from each connector are present on 47 standard "shorting jumper" pins. Each of these pins from each connector is placed adjacent to the corresponding pin to allow a standard "shorting jumper" to be placed on the two pins to make the "normal" connection.   If a nonstandard connection is needed for signal(s) between the tether and acquisition system the respective jumper(s) can be removed and the signal path can be broken, tapped or rerouted as needed. External connections can also be made to the pins on either side.

Note that by inserting all 47 shorting jumpers (Figure 2-0-1), they will make a standard pass through connection as if this board were not used.

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With Blue Jumper: Signal Pass

From Headstage
Tether

To Input Connector of
Acquisition System

**Without Blue Jumper:
Open Lead**

From Headstage
Tether

To Input Connector of
Acquisition System

Figure 2-1 Blue Jumper Diagram

The MDR-50 Breakout Board is used as an interface between your tether adaptor and input connector. In most cases this input connector will be your ERP-27, DRS, or Input Board. The MDR-50 is meant to give the user the ability to split individual channels into multiple outputs.
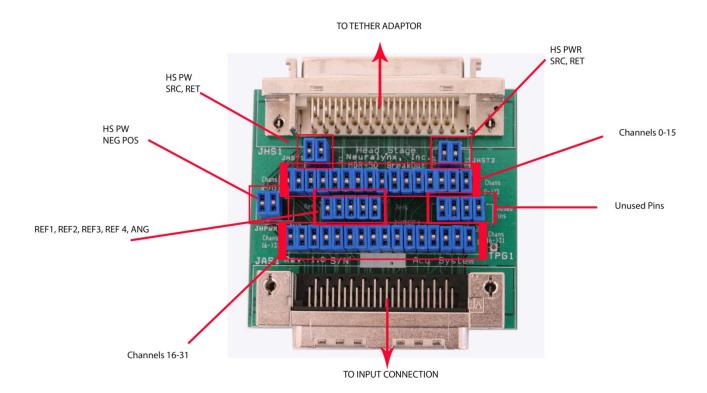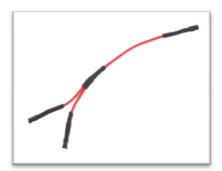
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Figure 2-0-1 MDR-50 Pins

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3 Product Unpacking

The MDR-50 is shipped with blue jumpers and Y-jumpers (Figure 3-1). Both of these connection devices will aid the user in passing signals through directly or splitting a signal into multiple signals. The MDR-50 Breakout Board is also designed to take input from external sources and pass them to your acquisition system. We will visit this topic in Section 7.
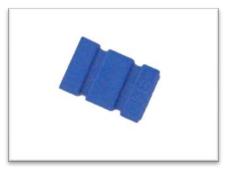

Figure 3-1 Y-Jumper and Blue Jumper

4 Jumper Configurations

With all jumpers in place on the MDR-50 breakout board, all signals pass through unaltered. Each channel is associated with two pins. In Figure 4-1, the channel 16 electrical signal comes from a headstage tether to Pin 2. With a jumper connecting Pin 2 and Pin 1, the signal passes through directly to the acquisition system. If the blue jumper is removed, the signal will *not* pass through to the acquisition system. The same is true for each channel and its associated pair of pins on the breakout board. Take note of which connector on your board is labeled "Head Stage" and which is labeled "Acq System."
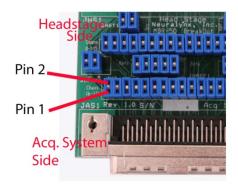
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Figure 4-1 Individual Channel Labeling

5   Modifying a Channel with the Y-Jumpers

The MDR-50 Breakout Board can be used to split one channel into two. The Y-jumpers give you the ability to split one channel into two.

Splitting a Channel in Two Using a Y-Jumper
1. Remove the blue jumper from the pin pair of the channel you want to split.
2. Take the two short wires at the top of the "Y" section of the Y-jumper and connect them to the pins where the blue jumper was removed. It does not matter which wire goes to which pin, this connection acts the same as a blue jumper by passing the channel signal through.
3. Remove a blue jumper from a channel that is not being used. The channel associated with this jumper will no longer pass through.
4. Connect the remaining long end of the Y-jumper to the pin on the "Acq System" side of where you removed the blue jumper in Step 3. The split channel has now taken the place of the removed channel.
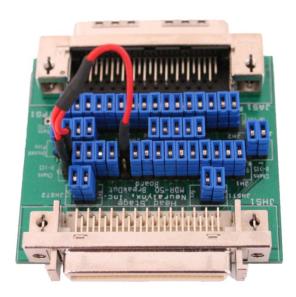
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Figure 5-1 Using a Y-Jumper to Split a Channel

In Figure 5-1 the Y-jumper is splitting the data coming into Channel 1 and splitting it to Channel 6. The data coming in on Channel 1 will now be able to be referenced and displayed as two distinct Acquisition Entities in Cheetah. Because all referencing is done in the analog domain, this board gives you the ability to reference one channel in two different ways.

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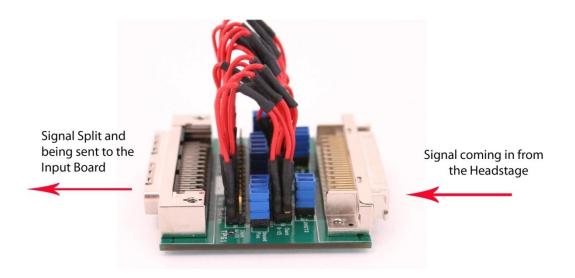support@Neuralynx.com

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Figure 5-2 All Channels

In Figure 5-2, Channels 0-15 are being directly driven through to the input board and are also being split to channels 16-31 (see Table 6-1) respectively.

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Channel Number on MDR-50	Input Acquisition Entity	Output Acquisition Entity
Channel 0	Channel 0	Channel 0
Channel 1	Channel 1	Channel 1
Channel 2	Channel 2	Channel 2
Channel 3	Channel 3	Channel 3
Channel 4	Channel 4	Channel 4
Channel 5	Channel 5	Channel 5
Channel 6	Channel 6	Channel 6
Channel 7	Channel 7	Channel 7
Channel 8	Channel 8	Channel 8
Channel 9	Channel 9	Channel 9
Channel 10	Channel 10	Channel 10
Channel 11	Channel 11	Channel 11
Channel 12	Channel 12	Channel 12
Channel 13	Channel 13	Channel 13
Channel 14	Channel 14	Channel 14
Channel 15	Channel 15	Channel 15
Channel 16	NA	Channel 0
Channel 17	NA	Channel 1
Channel 18	NA	Channel 2
Channel 19	NA	Channel 3
Channel 20	NA	Channel 4
Channel 21	NA	Channel 5
Channel 22	NA	Channel 6
Channel 23	NA	Channel 7
Channel 24	NA	Channel 8
Channel 25	NA	Channel 9
Channel 26	NA	Channel 10
Channel 27	NA	Channel 11
Channel 28	NA	Channel 12
Channel 29	NA	Channel 13
Channel 30	NA	Channel 14

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| Channel 31 | NA | Channel 15 |

Table 5-1 Output for Figure 5-2

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6 Soldering a Connection

The same techniques that were used in section 5 can be "hard wired" using stripped wire and solder.

7 Inputting an External Source

The MDR-50 Breakout Board can also be used to input a signal from a source other than a headstage. To do this, the signal should be connected directly to "Acq System" side pin of a channel with the blue jumper removed. This connects your external source signal directly to the acquisition system on the channel that it is wired to.

8 Overview Diagrams

The MDR50 has four main uses and capabilities. Figure 8-1 will overview all uses of the MDR-50 Breakout Board.

1) Normal Connection
2) Copying one input signal to another channel
3) Tapping off of a signal to an external connection/system
4) Inserting an external signal

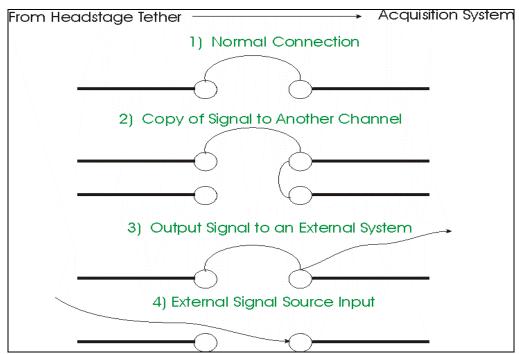Revision 1.0
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Figure 8-1 4_Uses of MDR50 Breakout

9 Referencing Multiple Channels

The MDR-50 can also give the user the capability to use one channel as a common reference across multiple input boards. The user can "hard wire" the board to allow one channel to be shared across multiple channels. See Figure 9-1 for input connection.

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Figure 9-1 Common Reference

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