

**RHD2000 Evaluation System Catalog** 



20 September 2016

The RHD2000 Evaluation System is a modular family of open-source hardware and software that allows users to record biopotential signals from up to 256 low-noise amplifier channels using the revolutionary new RHD2000 series of digital electrophysiology chips from Intan Technologies. For more information on the items listed in this catalog, visit http://www.intantech.com/RHD2000\_evaluation\_system.html.

For prices and order forms visit http://www.intantech.com/pricing.html.





The **RHD2000 USB interface board** connects to a host computer via a standard USB 2.0 cable. Small **amplifier boards** connect to this controller via thin, flexible all-digital **SPI interface cables**. Amplifier boards are available with unipolar electrode inputs and a common reference input (commonly used in neural recording applications) or with bipolar electrode inputs (commonly used in surface EMG or ECG applications). Some boards contain 3-axis accelerometers that may be used to monitor motion or orientation with respect to gravity.



**RHD2000 USB interface board** (#C3100)

Includes USB 2.0 cable and power source.

Each RHD2000 USB interface board supports up to four SPI interface cables.



RHD2000 3-ft (0.9 m) SPI interface cable (#C3203) RHD2000 6-ft (1.8 m) SPI interface cable (#C3206) RHD2000 3-ft (0.9 m) Ultra Thin SPI interface cable (#C3213)

RHD2000 6-ft (1.8 m) Ultra Thin SPI interface cable (#C3216)

Multiple SPI cables may be daisy-chained to form longer cables up to 10 meters (33 feet) in length.

Both standard (blue) and ultra thin (violet) SPI cables are shown here.





**RHD2132 amplifier board** with 32 unipolar inputs (#C3314)



**RHD2216 amplifier board** with 16 bipolar inputs (#C3313)



**RHD2164 amplifier board** with 64 unipolar inputs (#C3315)

RHD2132 amplifier / accelerometer board with 32 unipolar inputs and 3-axis

accelerometer (#C3324)

RHD2216 amplifier / accelerometer board with 16 bipolar inputs and 3-axis accelerometer (#C3323)



RHD2132 16-channel amplifier board with 16 unipolar inputs (#C3334)



RHD2000 128-channel amplifier board with 128 unipolar inputs (#C3316)





**RHD2000 Electrode Adapters** 



### Amplifier Boards with 2x Omnetics A79025 36-pin Connectors

RHD2164 amplifier board with 64 unipolar inputs (#C3315)



Direct connection to NeuroNexus H64LP electrode connectors with 2x Omnetics NPD-36 connectors with 4 guide posts each or two of the adapters shown below.

### Amplifier Boards with Omnetics A79025 36-pin Connector

RHD2132 amplifier board with 32 unipolar inputs (#C3314)

RHD2216 amplifier board with 16 bipolar inputs (#C3313)

RHD2132 amplifier / accelerometer board with 32 unipolar inputs and 3-axis accelerometer (#C3324)

RHD2216 amplifier / accelerometer **board** with 16 bipolar inputs and 3-axis accelerometer (#C3323)



Direct connection to electrodes with Omnetics NPD-36 connectors with 4 guide posts such as NeuroNexus CM, OCM, and H32 chronic electrode connectors, Plexon CON/32m-V connector, or Blackrock CerePlex M connector,



### RHD2000 electrode adapter board with 36-pin connector (#C3410)

Wires may be soldered into holes, or 16-pin DIP socket (included) may be soldered onto board to connect to a NeuroNexus A. OA. or D16 acute electrode connector.

RHD2000 36-pin wire adapter for 36-pin connector (#C3420)

## Amplifier Boards with Omnetics A79041 18-pin Connector

Direct connection to electrodes with Omnetics NPD-18 connectors with 2 guide posts such as NeuroNexus CM, OCM, and HC16 chronic electrode connectors.

RHD2132 16-channel amplifier board with 16 unipolar inputs (#C3334)



For more information on these items, see the RHD2000 evaluation system datasheet at www.intantech.com/downloads.html.

# or



RHA/RHD2000 18-pin wire adapter for 16-channel amplifier board (#B7600)



## **RHD2000 Dual Headstage Adapters**



The **RHD2000 dual headstage adapter** allows two amplifier boards to share a single SPI interface cable.

(Cannot be used with the RHD2000 128-channel amplifier board.)

For more information, see the RHD2000 dual interface adapter datasheet at www.intantech.com/downloads.html



RHD2000 dual headstage adapter (#C3440)

A 96-channel headstage with accelerometer created by combining an RHD2164 amplifier board with an RHD2132 amplifier/accelerometer board.





## **RHD2000 SPI Cable Adapters**



The **RHD2000 SPI cable adapter board** provides a convenient way to access all 12 wires in an **RHD2000 SPI interface cable**. These boards may be used to develop interfaces between custom hardware under development and existing Intan products.

For more information, see the RHD2000 SPI cable/connector specification at www.intantech.com/downloads.html



RHD2000 SPI interface cable



**RHD2000 SPI cable adapter board** for custom SPI interface applications (#C3430)







Intan Technologies offers free, open-source interface software that allows users to acquire data from the RHD2000 Evaluation System.

A compiled, executable version of this software for Windows, as well as the C++/Qt source code, is available at **www.intantech.com/downloads.html#software**.



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The **RHD2000 MATLAB Toolbox** (#S2120) is available for users who wish to integrate the RHD2000 Evaluation System directly with MATLAB. For more information on the MATLAB toolbox, see **www.intantech.com/RHD2000\_matlab\_toolbox.html**.

The **RHD2000 LabVIEW Library** (#S2100) allows users to control the RHD2000 Evaluation System directly from LabVIEW. For more information on the LabVIEW library, see **www.intantech.com/RHD2000\_labview\_library.html**.





## **RHD2000 Electroplating Board**





The **RHD2000 electroplating board** (#C3180) works with the 128-channel amplifier board. Together, these modules support automated electroplating of microelectrode arrays.

Includes USB 2.0 cable and power source.



The electroplating MATLAB GUI requires the **RHD2000 MATLAB Toolbox** (#S2120) for operation.

For more information on these items, see www.intantech.com/RHD2000\_electroplating\_board.html.



# **RHD2000** Digital Electrophysiology Chips





**RHD2216** and **RHD2132** chips are available in standard 8.0 mm × 8.0 mm 56-pin QFN surface mount packages (left and above left) and as 4.8 mm × 4.1 mm bare die (above right). **RHD2164** chips are available as 7.3 mm × 4.2 mm bare die only.

**RHD2216 digital electrophysiology chip** with 16 × 2 bipolar (differential) inputs in QFN surface-mount package (#D8213) as bare die (#P8003)

RHD2132 digital electrophysiology chip with 32 unipolar inputs and common reference input in QFN surface-mount package (#D8214) as bare die (#P8004)

RHD2164 digital electrophysiology chip with 64 unipolar inputs and common reference input as bare die only (#P8005)

For more information on these items, see the **RHD2000 series digital electrophysiology interface chip datasheet** at www.intantech.com/downloads.html.