

JAGA16 Users' Manual

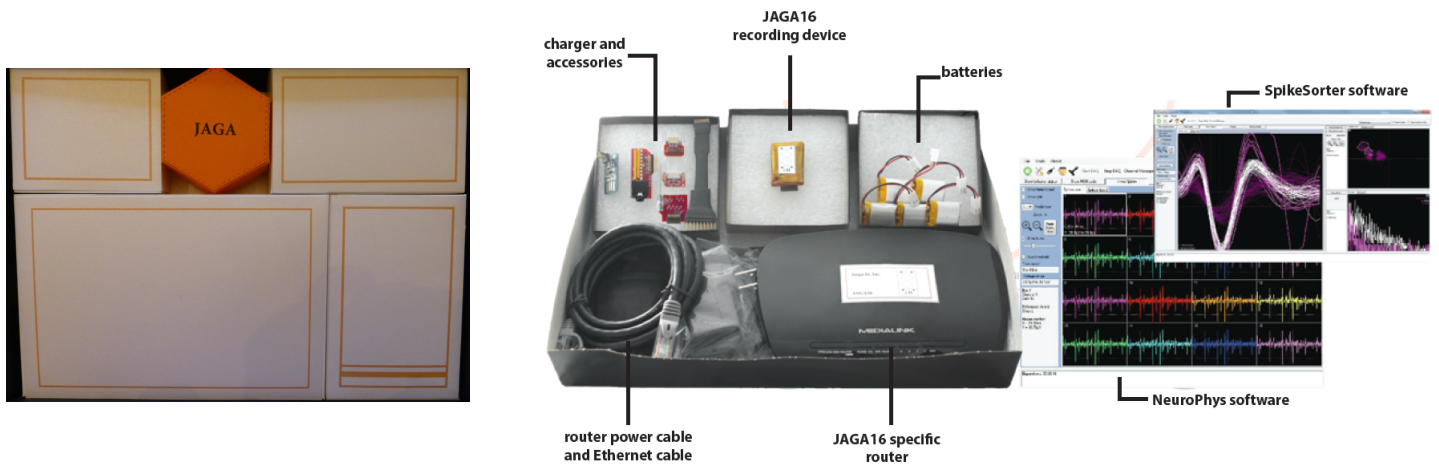
v.4.2

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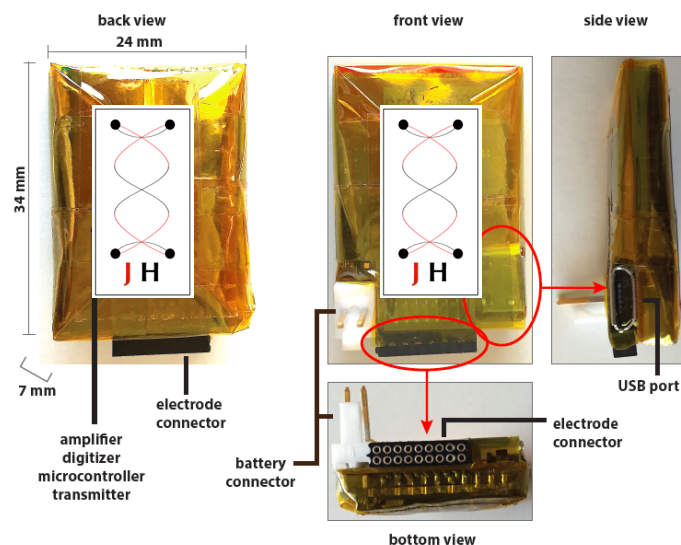
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What is Included

- JAGA16 recording device: amplifier, digitizer, filter, microprocessor, transmitter all in one
- Batteries, battery charger, Accessories
- Router, power cable
- GUI software: if you purchase a complete package



JAGA16 at a glance



Note

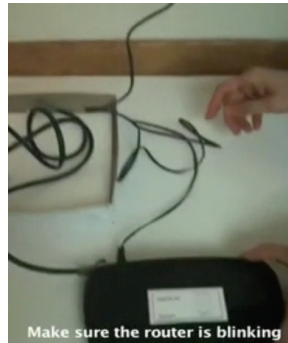
- JAGA16 device is not just a headstage, but contains all components
- Our device replaces conventional electrophysiology systems, that are bulky, wired and more expensive.
- All you need to do is “plug and measure”
- For more info, contact us at info@jinga-hi.com

QUICK CHECK BEFORE START

- * Do you already have implanted electrodes on the animal and are ready to record? Check JAGA16 pin orientation.
- ** Did you install our software (GUI or Open-source)? See our software manual.
- *** Have your batteries charged? See JAGA16 Users' Guide for charging batteries.

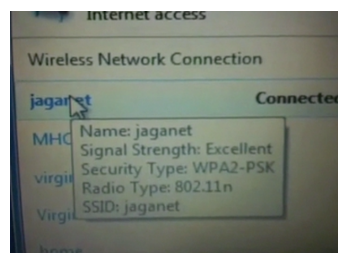
How to Use JAGA16: Quick Summary*

- Power the router



- Find the network name jagenet on your computer **

The password is provided via email



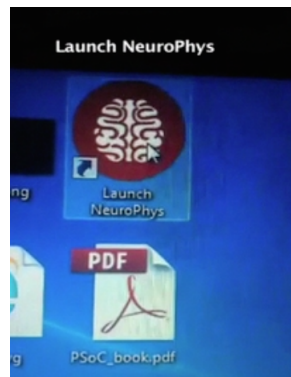
- Power JAGA16 device by connecting the battery ***

Green light should be on, Red light on the other side has to flash for a few seconds

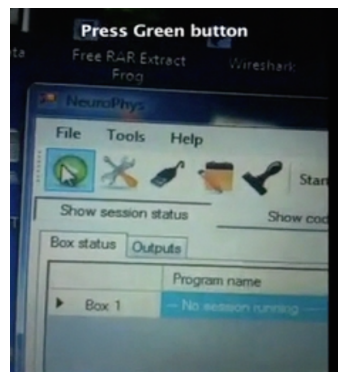


- Click on the GUI software button

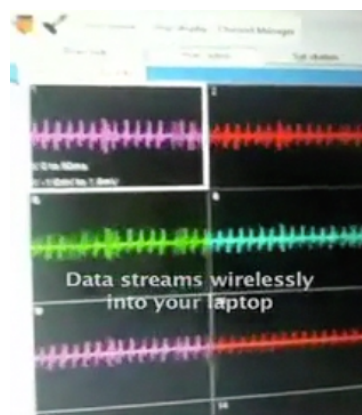
If you use Python open source codes, See our software manual



- Press start on the software



- The data appears on your screen of the computer

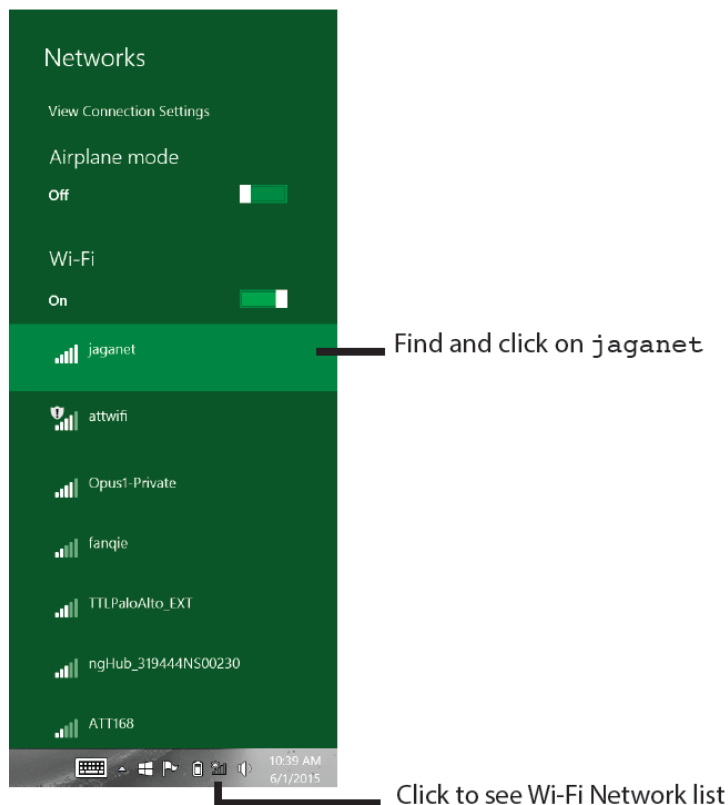


If you want to use JAGA16 without a router, you will need a special network for your computer. Please contact us info@jinga-hi.com

How to Use JAGA16: Step by Step Guide

1. Establish connection between the JAGA router and your computer.

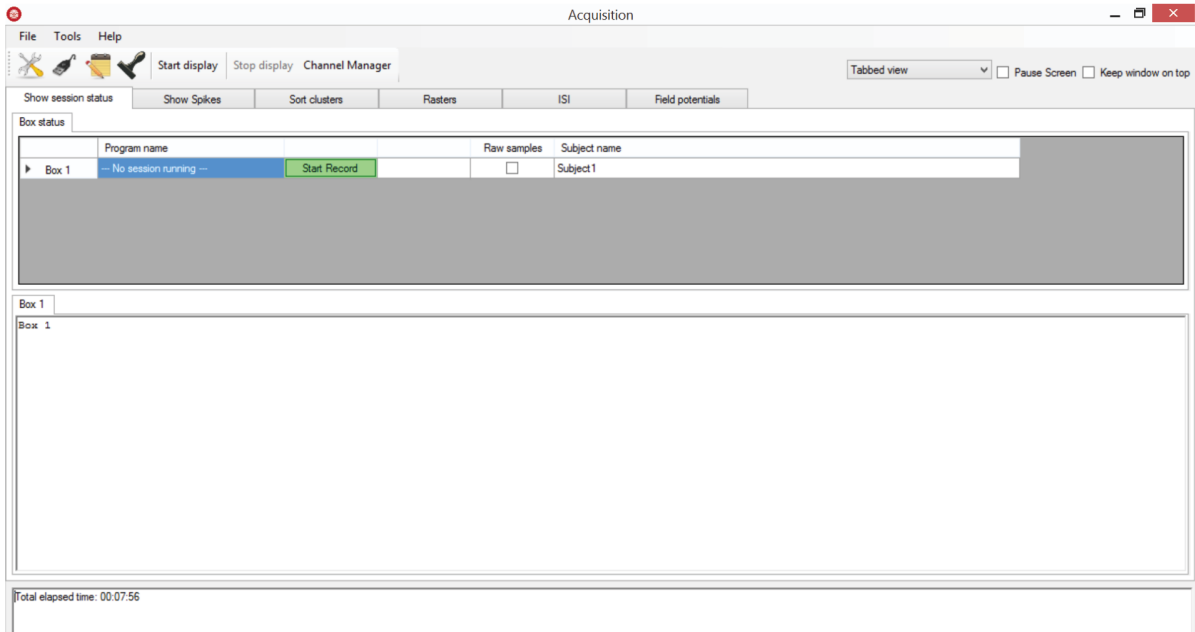
- a. Power the JAGA router by plugging it into a wall outlet.
- b. Go to your computer's Wi-Fi network list by clicking on  icon on your PC (bottom-right corner of screen), or clicking on  icon on your Mac (top-right corner of screen).
- c. Find jaganet.



Note: If you want to connect the router directly to your computer using an Ethernet cable, see section **Frequently Asked Questions**

2. Launch software.

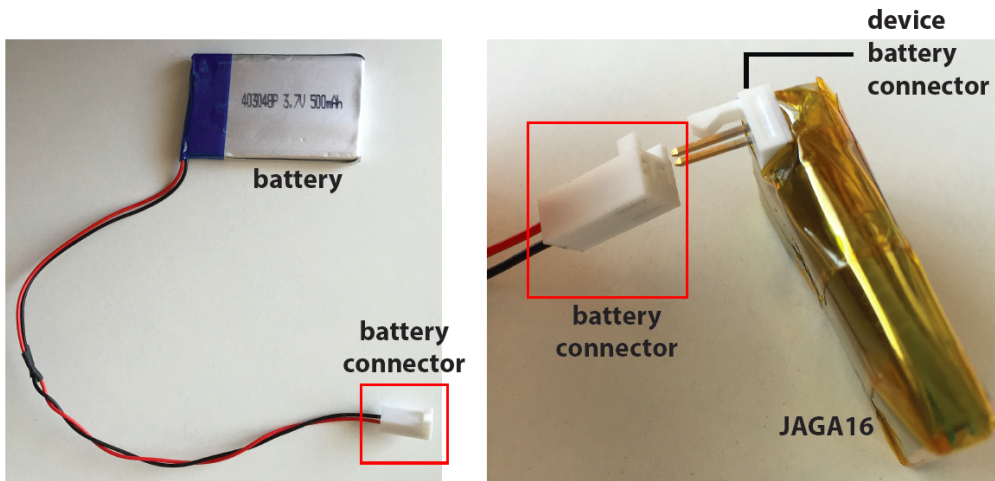
For **NeuroPhys**: double-click on the NeuroPhys  icon and you will see a window that looks like this:



For **Python Codes**: Type at the command line `python jaga_display.py` in the directory where the files are

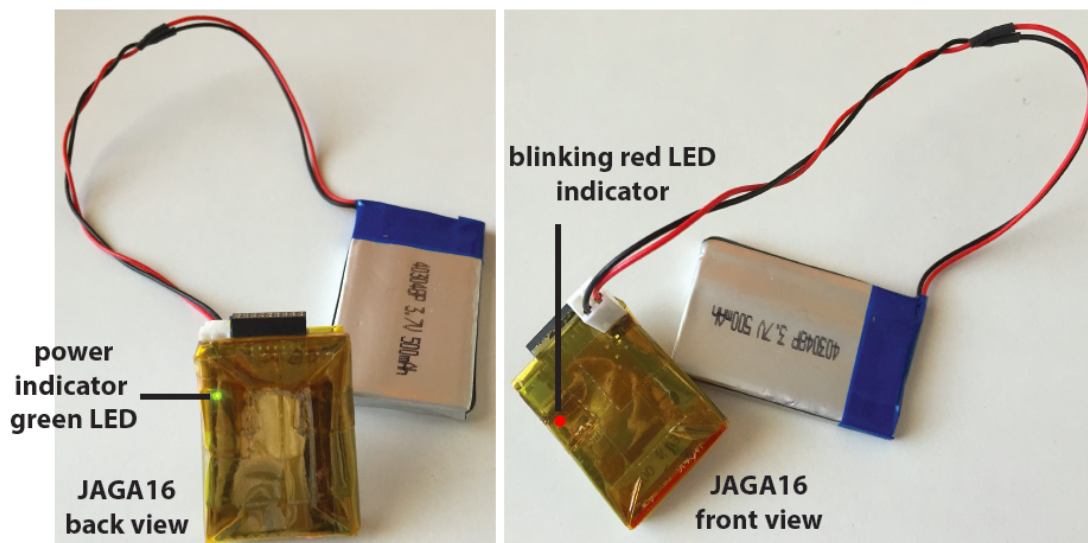
3. Power-up JAGA16 and wait until JAGA16 blinks.

- a. Power the device by connecting battery to JAGA16.



Power-up JAGA16 by connecting it to the battery via the connectors.

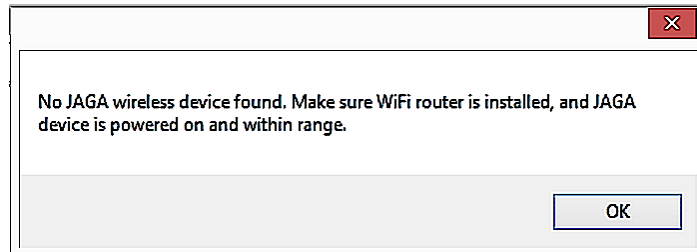
- b. Immediately upon connecting the battery to the device, a green LED will light up on the RF module of JAGA16 (back side). This green LED will remain lit as long as JAGA16 is powered.
- c. Quickly flip device to the other side and watch for a red LED indicator and make sure it blinks for a second and goes away.



Green LED will light up first. Quickly flip over device to make sure a red LED blinks on/off for ~second and turns off. It is easy to miss the red LED indicator. The green LED power indicator will remain on as long as JAGA16 is powered by the battery.

4. **Run NeuroPhys** by clicking **Start Display**. Or run `jaga_ephys.m` in MATLAB by pressing the green button.

Note: The following error message will pop up if you click **Start display** in NeuroPhys without waiting for the flashing red light on the device.



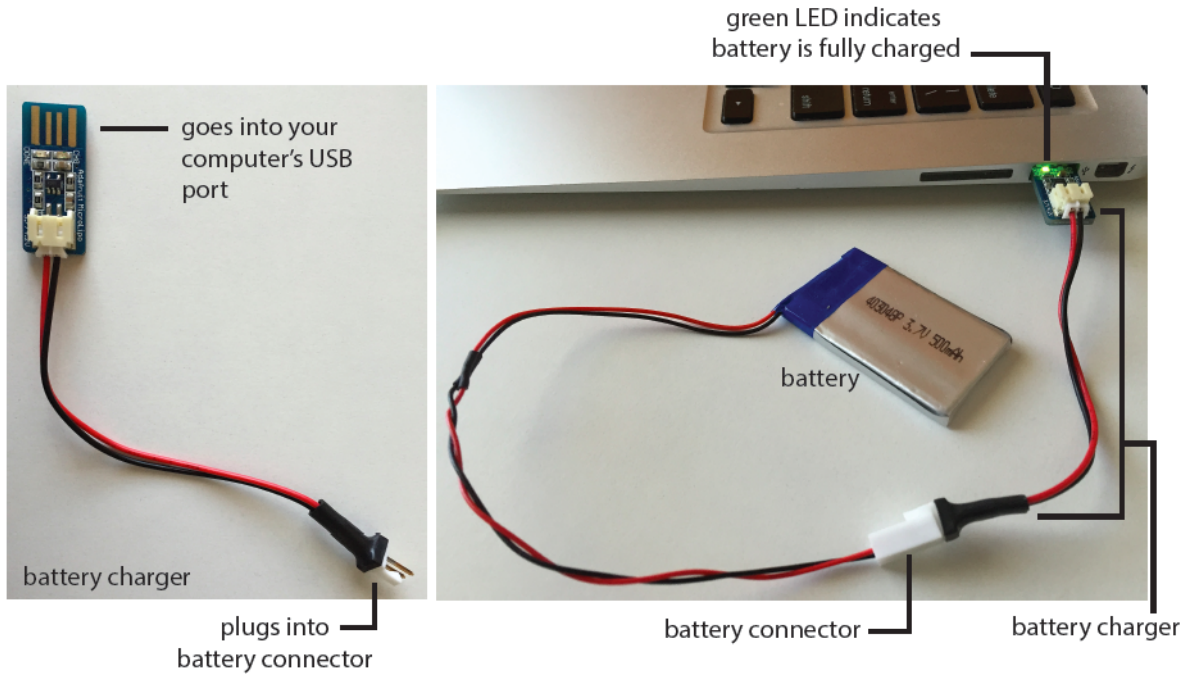
If you see this message, unplug the battery and repeat steps in 3, *and make sure* you see the blinking red LED before clicking **Start Display**.

Note: Windows may block jaga network with NeuroPhys. If the connection does not occur

Go to Control Panel > Security > System and Security > Allow and app through Windows Firewall (in the Windows Firewall section)

How to recharge the battery

1. **Connect the battery to the battery charger.** The charger's connector can be plugged into the battery only in one orientation to prevent burning the circuit.
2. **Plug the charger (connected to your battery) into your computer's USB port** or a wall USB outlet.
3. **Red LED will light up when the battery needs charging.** The light will turn green when the battery is fully charged.



Frequently asked questions

What are common noise sources ? JAGA16 has excellent signal quality (electrode (~MOhm) -driven noise is comparable to Johnson noise). If your data is noisy, one source of noise can be a poor connection of your electrodes to the JAGA device. Make sure your electrodes are properly attached to the JAGA16 electrode connector. If your electrodes are damaged or they fail to make a firm connection to the JAGA16 connector, your data will be noisy. Also make sure that your reference electrode is properly attached to the correct channel on JAGA16.

Signals can get intermittent?

Your computer CPU can be slow or you do have an additional RF traffic in your room.

How do you improve JAGA16 signal?

1. Try to see if JAGA 16 is in a Wi-Fi congested area. (See below)
2. Avoid setting up your experiment in an area crowded with Wi-Fi routers, 2.4GHz wireless phones or microwave-based equipment.
3. Try connecting the router to your computer using an Ethernet cable. (See below)
4. If this fails, place the router and the JAGA device inside a Faraday cage. Connect the router to your computer via an Ethernet cable passed through an opening in the Faraday cage.

How do I find out whether JAGA16 is in a Wi-Fi congested location?

1. Scan the channels around you using iStumbler or other similar applications.
2. Find a channel that is not being used.
3. Access 192.168.8.1 on your website. Log in with “jaganet” as wireless SSID and the password provided to you, and press “Apply”. Go to Advanced Settings >Wireless Settings> Channels. Select the channel that is NOT widely used around you. Factory setting is set for Autoselect.
4. Also see our PDF document “How to find the best channel for jaganet for your environment”.

How do you connect the router to your computer using an Ethernet cable, not by Wi-Fi?

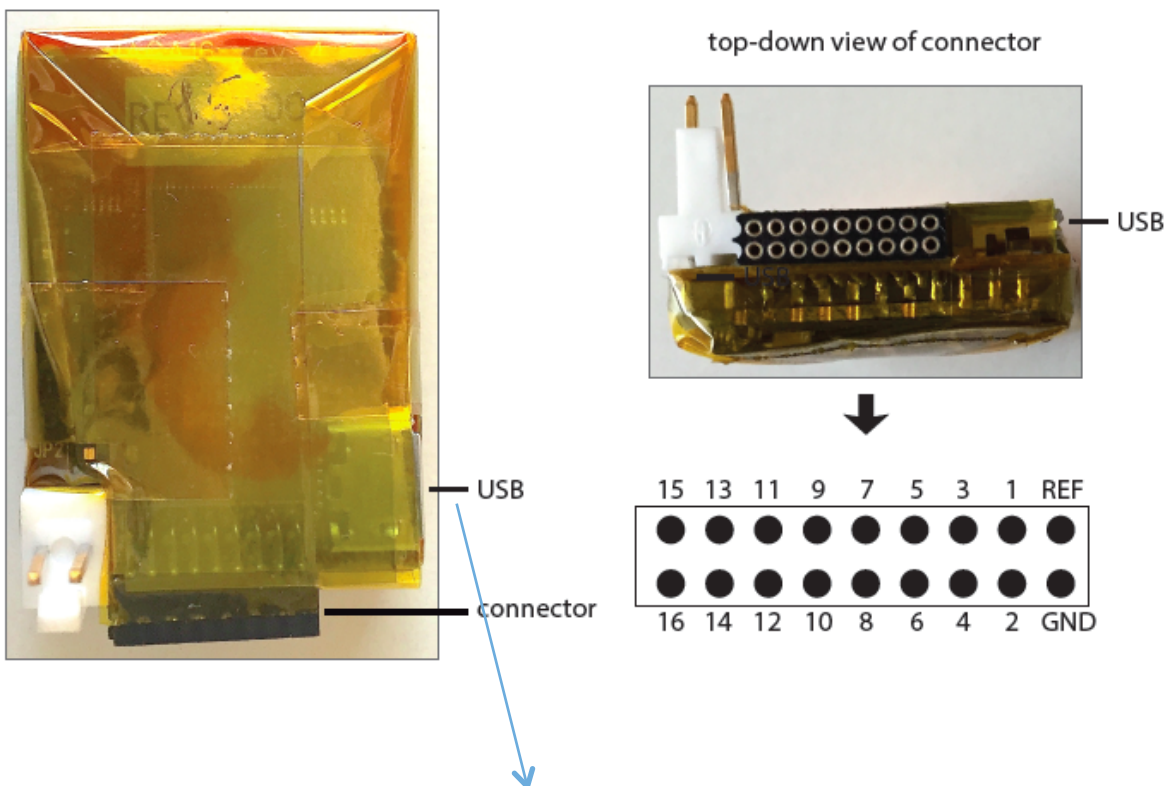
1. Turn off Wi-Fi on your computer.
2. Unplug and re-plug the router’s power.
3. Connect the router to your computer using an Ethernet cable. Use any of the yellow Ethernet port on the back of the router (do not use the WAN port). Select DHCP on your computer’s wired interface configuration.
4. Turn off the JAGA device, and then turn it back on.

JAGA16 pin orientations

We use a Millmax connector for input electrodes (2 x 9 pins, 0.05" spacing, MILL-MAX-852-10-100-10-001000 for male pins, 853-93-100-10-001000 for female pins).

To determine the pin orientation:

1. Orient the pins by holding JAGA16 with the micro-USB port situated at the bottom right of the device.
2. Reference (REF) and Ground (GND) pins are found closest to the USB side.
3. Top row is odd numbered channels and the bottom row is even numbered channels.



This USB is mostly for our engineers' purpose for testing the device. However you can actually use this USB port to power the device instead of using the battery.

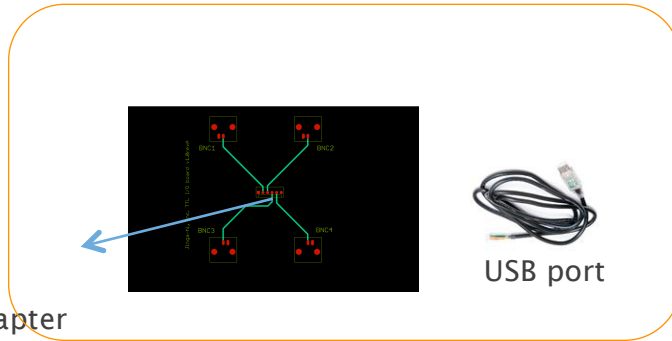
Accessories:

Adapters: We provide various adapters that can interface with your electrode connectors.

TTL/in-out: We provide a TTL/in-out board with which you synchronize your neural recording

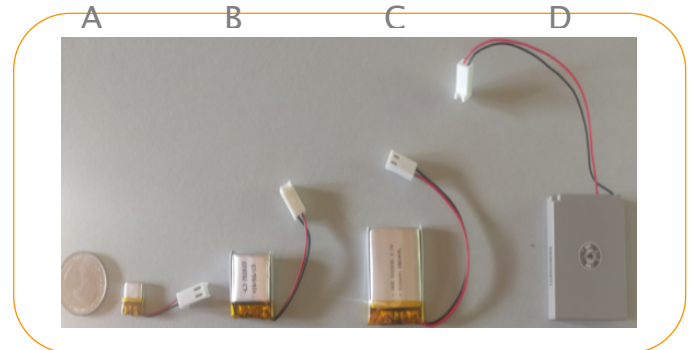
Batteries: We use Lithium Poly batteries that are rechargeable.

A: 1.1g (25mAh) B:5.6g (250mAh) C:12(500mAh) D: 24 g(1200mAh) can be used in the followings. A: headstage for rat/mice B:waist on mice/headstage for rat C:waist on rat/headstage for monkeys D: monkeys



FTDI adapter

TTL in/out board



Batteries

Further notes

- We can provide additional sets of batteries, battery chargers, and adapters (used for connecting JAGA16 to Omnetics connectors).
- Several JAGA devices can be used simultaneously.
- JAGA devices can be used without a router using your computer.
- Please contact us for more information at info@jinga-hi.com.