

Blackrock CerePlex A

Instructions for Use

PN-7384



Blackrock Microsystems, LLC

630 Komas Drive • Suite 200
Salt Lake City • UT 84108

T: +1 (801) 582-5533

www.blackrockmicro.com
support@blackrockmicro.com

Table of Contents

1	Warnings, Cautions, and Specifications.....	3
1.1	Warnings.....	3
1.2	Cautions.....	3
1.3	Specifications.....	3
2	Introduction.....	4
3	Hardware.....	5
3.1	Blackrock CerePlex A Pin-out	5
3.2	Jumper Selection.....	6
3.3	Impedance and Reference Selection	6
4	Instruction for Assembly.....	7
5	Warranty.....	7
5.1	Return Merchandise Authorization (RMA).....	7

1 Warnings, Cautions, and Specifications

1.1 Warnings

- Do not touch any exposed electrical conductors when the CerePlex A connector is attached to devices on subject's head as this may result in inducing electric charge to the neural tissue. Irreversible damage may occur.
- The CerePlex A is NOT to be used as a stimulation source.
- Use caution when connecting and disconnecting the Cable to the CerePlex A to minimize the risk of the cable being accidentally pulled or tugged.
- Do not use the CerePlex A in the presence of flammable anesthetic agents or any other reagents.
- Avoid strong static discharges from sources like television or computer monitors because it can damage the electrical components of the system.
- Keep the CerePlex A away from liquids. Contact with water, shower spray, or wet surfaces can lead to the patient receiving an electrical shock.
- Always use antistatic or electrostatic discharge (ESD) safe gloves when connecting the CerePlex A.
- Use only the supplied Blackrock Microsystems components (Cerebus™ system, Digital Hub128, CerePlex A Cable). Substitution of components not supplied by Blackrock Microsystems may affect system performance and patient/ subject safety.
- Do not leave the patient/subject connected to the CerePlex A when the Cerebus™ System is not in use.
- Use caution when placing cables and other connectors to minimize the likelihood of tripping or accidentally pulling on cables. Pulled cables may cause damage to the CerePlex A or any other connected devices.

1.2 Cautions

- Read this entire manual prior to using the device.
- This product is for animal research only.

1.3 Specifications

Model Name	Blackrock CerePlex A
Power Requirements	+5/-3 VDC, 150 mA maximum load
Sampling Frequency	30 ksps
Mode of Operation	Continuous
Input Frequency Range	0.3 Hz – 7.5 kHz / 0.02 Hz – 10 kHz (User selectable)
Input Impedance	1300 MΩ @ 10 Hz, 13 MΩ @ 1 kHz
Maximum Input Range	± 8.169 mV with respect to reference @ normal gain ± 65.352 mV with respect to reference @ low gain
Water Ingress Protection	Ordinary Equipment, not fluid resistant, IP20
Operating Environment	10°C to 40°C, 5 to 95% R.H. (non-condensing)
Storage Environment	-20°C to 50°C, 5 to 100% R.H. (non-condensing)
Resolution	16-bit ADC. 250 nV/bit @ normal gain, 2 μV/bit @ low Gain

2 Introduction

The Blackrock CerePlex A provides an interface between the Cerebus/CerePlex Direct recording systems and up to 128 microelectrodes for high fidelity transmission and recording of extracellular spikes and local field potentials from the brain. The Blackrock CerePlex A converts analog signals to digital format which dramatically reduces the noise introduced to the signal during transmission. Figure 2-1 below shows an application overview of how the CerePlex A fits into a complete neural recording system.

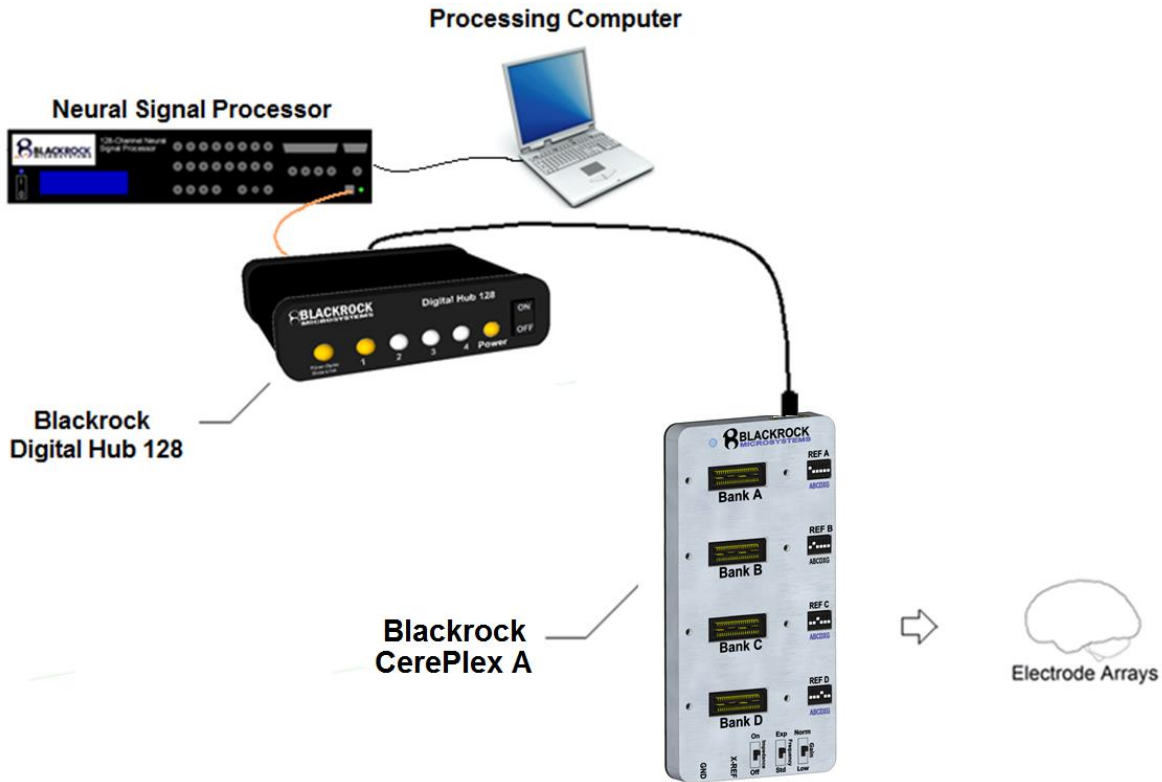
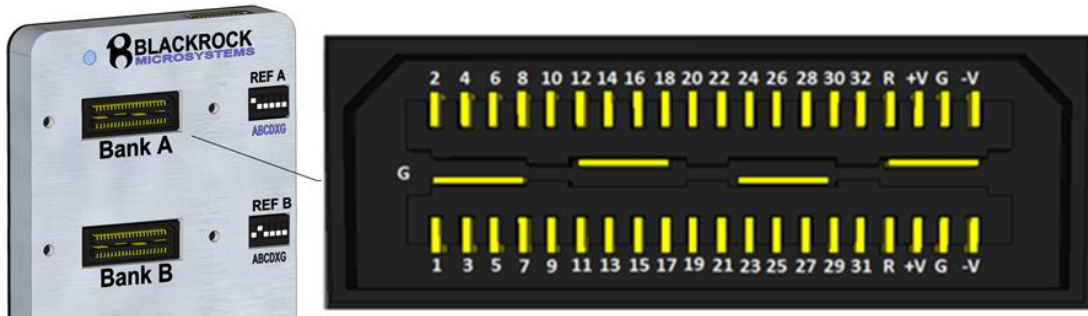


Figure 2-1: Blackrock CerePlex A Set-up

* Blackrock Digital Hub 128, CerePlex Direct and Cerebus Acquisition System are each purchased separately.

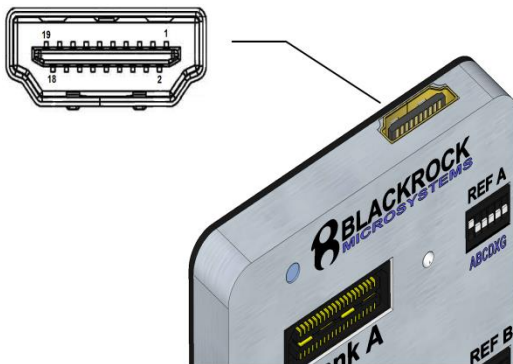
3 Hardware

3.1 Blackrock CerePlex A Pin-out



*G=Ground, R= Reference, +V=+3V, -V=-3V.

Figure 3-1: CerePlex A Input Connector Pin-Out



HDMI/D Pin #	Description
10	Clock+
12	Clock-
14	Fast Settle
2, 5, 8, 11, 19	Ground
18	V+ (5V)
17	V- (-3V)
7	Data+
9	Data-

Figure 3-2: CerePlex A Output Connector Pin-Out

3.2 Reference Selection

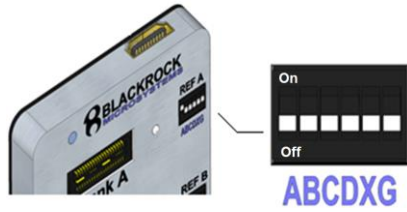


Figure 3-3: CerePlex A Ref DIP Switch

Each input bank of the CerePlex A can use a separate reference. The DIP switches can be used to select the reference to be used for each bank on the CerePlex A. Each DIP switch has six jumper selections for each bank (Fig. 3-3). The X & G positions are for external reference and ground that are connected to the green and red touch-proof jacks at the lower position of the CerePlex A. The default has A at the On position for the Ref A DIP switch, B at the On position for the Ref B DIP switch, C at the On position for the Ref C DIP switch and D at the On position for the Ref D DIP switch. By using the DIP switches on the

CerePlex A, reference can be selected from a different bank. For example, if both bank A and bank B are connected to different electrode arrays. On bank A, to use the reference from bank B instead of its original reference, switch A Off and switch B On, on the bank A DIP switch. This will cause bank B and bank A to share the same reference from connector B. Each bank can use its own reference, the reference from any of the other three banks, the external reference or the external ground by switching the jumper on its corresponding DIP switch. Only one switch for each bank should be in the On position.

3.3 Operation Mode Switches

There are three switches on the bottom of the CerePlex A.

1. Impedance

When Impedance is switched to On, the CerePlex A goes into Impedance mode. To return to recording neural signals, toggle the switch back to Off. Because impedance testing requires a driving signal to be delivered to the electrodes, Impedance mode will not work if a headstage is connected between the electrode and the CerePlex A. A passive adapter may be required to connect the CerePlex A to the electrode connector. Contact Blackrock Support to determine the appropriate adapter for the specific electrodes under test.



In Impedance mode, the CerePlex A delivers to each electrode sequentially a 1 kHz, 1 nA peak-to-peak current for 100 ms. In order to obtain accurate impedance values, a 1 ft shielded ribbon cable (Blackrock PN-8819) must be used because the cable capacitance affects the measured impedance. In the Central Software Suite version 6.04 the following equation must be used to account for the cable impedance. In Central versions 6.05 and later, this calculation is performed automatically.

$$\text{Impedance (k}\Omega\text{)} = \left(\frac{1}{\text{Measured Value (k}\Omega\text{)} - 2} - \frac{1}{4900} \right)^{-1}$$

2. Frequency

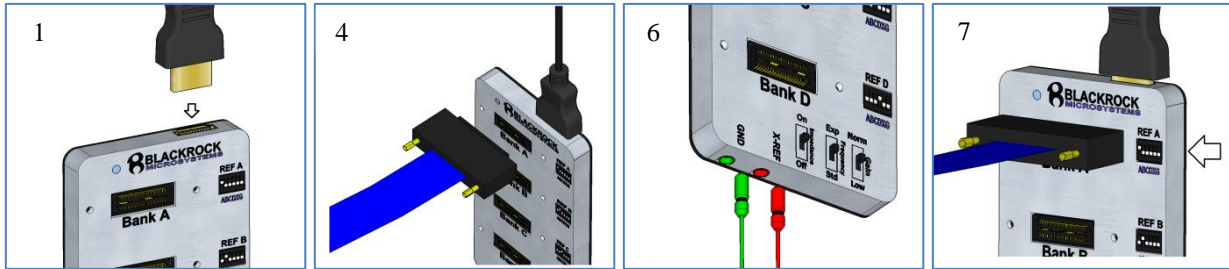
This switch provides different filter ranges. Exp (Expanded) is from 0.02 Hz to 10 kHz and Std (Standard) is 0.3 Hz to 7.5 kHz.

3. Gain

This switch adjusts the gain of the input signal for all the channels. At Norm (Normal) position, the system gain is 1. At the low position, the gain is 23/183 (~0.126).

4 Instruction for Assembly

1. Connect CerePlex A to the host device through an HDMI A-A cable.
2. Turn on the power of the connected host device.
3. The LED on the CerePlex A should light up as blue.
4. Plug in the blue shielded cable and screw it down to secure the connection.
5. Connect the other end of the blue shielded cable to a headstage or to the electrode terminal.
6. If different ground and reference are needed, use the two connectors at the bottom of the external ground and reference.
7. Verify that the reference DIP switches for each bank connected bank are set to the desired position.



**After recording, turn off the power before any disconnection.

5 Warranty

Blackrock Microsystems, Inc. warrants that its products are free from defects in materials and manufacturing for a period of one year from the date of shipment. Blackrock will, at its option, repair or replace any product that does not comply with this warranty. This warranty is voided by:

1. Any modification or attempted modification to the product done by anyone other than an authorized Blackrock employee
2. Any abuse, negligent handling or misapplication of the product.

This constitutes the sole warranty made by Blackrock, LLC. There are no other warranties, expressed or implied, which extend beyond those described herein or to anyone other than the original purchaser, including the implied warranties of merchantability and fitness for a particular purpose. In no event shall Blackrock Microsystems, LLC be liable for any incidental or consequential damages, or for the infringement of any patent rights or third party rights due to the use of its products.

5.1 Return Merchandise Authorization (RMA)

In the unlikely event that your device needs to be returned to Blackrock for repair or maintenance, do not send any equipment back without a Return Merchandise Authorization Number. An RMA number will be issued to you by a Blackrock representative. If you need to obtain an RMA number, you may contact a product support representative at +1(801) 582-5533.

Once an RMA number has been issued, it is important to safely pack the returned item for shipping back to Blackrock. It is preferred that you save the original boxes and packing materials that your system arrived in for return shipment. Please address the package as follows:

Blackrock Microsystems, LLC
ATTN: RMA#
630 Komas Dr., Suite 200
Salt Lake City, UT 84108 USA
Tel: +1 (801) 582-5533