

CerePlex E

PN-10510 – E128

PN-10511 – E96

Instructions for Use



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Warnings and Cautions

Warnings

The CerePlex E is NOT to be used for stimulation.

The patient/subject should not attempt to remove the connections themselves.

Use caution when connecting and disconnecting the Cable to the CerePlex E to minimize the risk of the cable being accidentally pulled or tugged.

Do not use the CerePlex E in the presence of flammable anesthetic agents or any other reagents.

- Avoid strong static discharges from sources like television or computer monitors. Strong ESD can damage the electrical components of the system.
- Keep the CerePlex E away from liquids. Contact with water, shower spray, or wet surfaces can lead to the patient/subject receiving an electrical shock.
- Connecting external instruments to the CerePlex E may compromise electrical safety.
- Always use antistatic or electrostatic discharge (ESD) safe gloves when connecting the CerePlex E.
- Use only the supplied Blackrock Microsystems components (Cerebus™ system, Digital Hub, CerePlex E HDMI 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 E 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 E and any other connected devices.

Cautions

Read this entire manual prior to using the device.

This product is for animal research only.

Specifications

Model Name	Blackrock CerePlex E
Power Requirements	+5 VDC, 150 mA maximum load
Resolution	16-bit, at 250 nV per bit resolution
Sampling Frequency	30 ksps
Mode of Operation	Continuous
Input Hardware Filter (User selectable)	<p>Normal mode: 0.3 Hz (1st order) – 7.5 kHz (3rd order)</p> <p>Wide-band mode: 0.02 Hz (1st order) – 10 kHz (3rd order)</p>
Input Filter Type	Butterworth
Input Impedance	1300 M Ω @ 10 Hz, 13 M Ω @ 1 kHz
Auto Impedance Measurement Range	5 k Ω – 1 M Ω
Maximum Input Range	-8.192 mV to 8.191 mV with respect to reference
Water Ingress Protection	Ordinary Equipment, not fluid resistant, IP20
Dimensions	L 24.9 mm x W 17.7 mm x H 17.9 mm
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)

Introduction

The Blackrock CerePlex E provides a compact interface from a microelectrode array to Blackrock’s Cerebus or CerePlex Direct bio-potential recording systems for up to 128 channels on the E128 or 96 channels on the E96. The CerePlex E is designed for high fidelity transmission and recording of extracellular spikes and local field potentials from the brain. The Blackrock CerePlex E converts analog signals to digital format right at the recording site which dramatically reduces noise introduced to the signal during transmission. **Figure 1** depicts how the CerePlex E can integrate into a complete neural recording system.

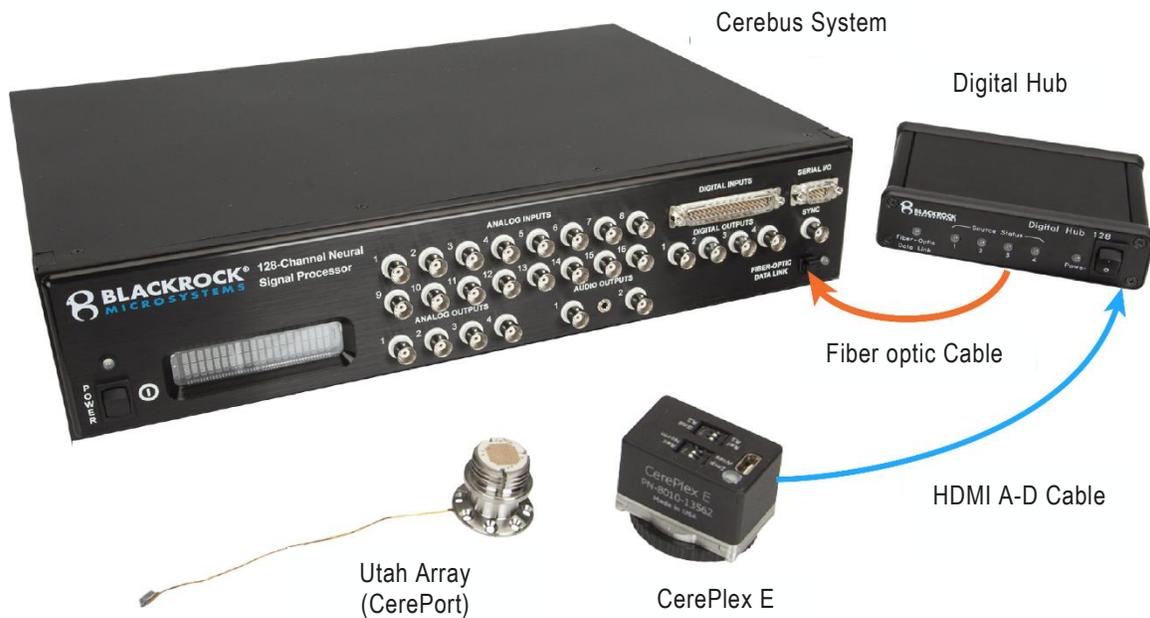


Figure 1- Blackrock CerePlex E Set-up

Blackrock’s Digital Hub, Multielectrode Arrays, Cerebus System, and CerePlex Direct are each sold separately. For more information about available setups and configurations please refer to our website at www.blackrockmicro.com

Hardware

Blackrock CerePlex E Pin-out

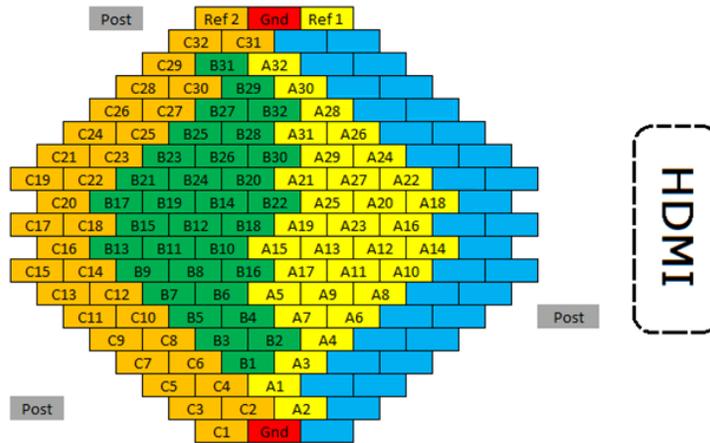
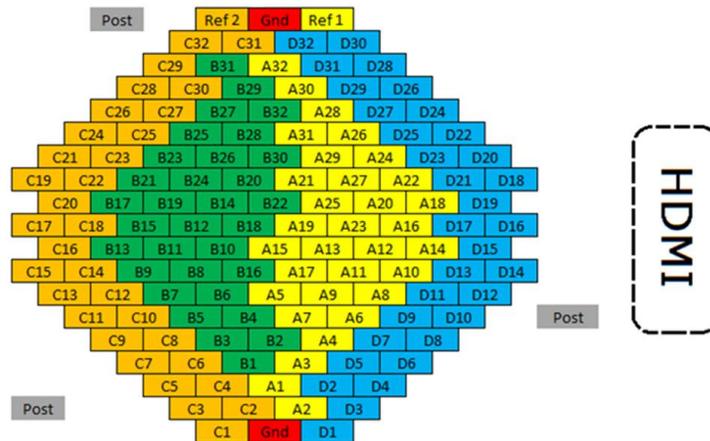


Figure 2- CerePlex E128 input connector pin-out mapping (Top). CerePlex E96 input connector pin-out mapping (Middle). View of the LGA board through the filament film (Bottom).

The following images illustrate the CerePlex E input and output connector pin-outs.

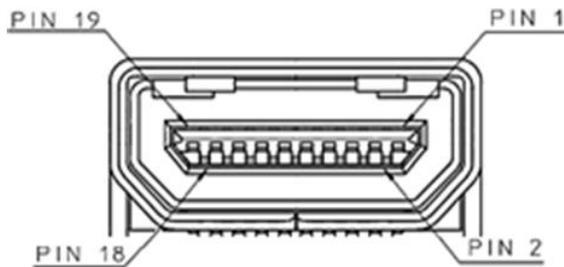


Figure 3- CerePlex E Output Connector Pin-out.

HDMI Pin #	Description
12	Clock +
14	Clock -
2	Fast Settle
1 & 7	Ground
19	V+
9	Data +
11	Data -

Instructions for Assembly

The CerePlex E is designed to mate with the CerePort connector attached to Blackrock Utah Arrays. For further information about different types of Utah Arrays and their connectors please refer to the document titled “LB 0514 - Blackrock Research Assemblies” which is available for download on the Blackrock Microsystems website. The CerePlex E is equipped with three guide posts that are visible in bottom pane of the **Figure 2**. These guide posts must be perfectly aligned with the three available notches around the edge of the CerePort connector to facilitate a correct connection between CerePlex E and the CerePort array. For a detailed procedure on how to connect the CerePlex E headstage to CerePort connector please refer to the following instructions:

Connect the CerePlex E to the host device through an HDMI A-D cable. (See **Figure 4**, left panel)

Power on the connected host device.

The LED on the CerePlex E should light up as blue.

Roughly align the guide pins with the pedestal before attaching to the pedestal (refer to **Figure 4**, middle panel).

Hold the CerePlex E housing with one hand and gently rotate the wheel clockwise with another hand (depicted in **Figure 4**, right panel).

While screwing down, slightly rotate the housing left or right until you feel the guide posts slide into the notches.

Once the CerePlex E is aligned with the pedestal, rotate the wheel until the device is secured to the pedestal.

The blue LED will turn green when the device is connected correctly.

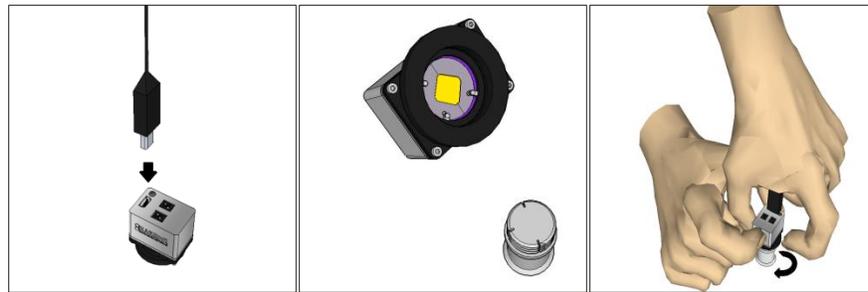


Figure 4- Instructions on connecting the CerePlex E to a CerePort pedestal.

The instructions above are also detailed in one of the Blackrock training videos which can be accessed online from the Blackrock Microsystems website under How-to Videos.

Note: The CerePlex E can safely be powered off or disconnected from the Digital Hub while connected to the CerePort Pedestal.

Description of Switches on the CerePlex E



Figure 5- Available switches on the CerePlex E
There are four switches on top of the CerePlex E.

Impedance and Recording selector switch

When the selector is positioned on “Imp” the CerePlex E enters impedance measurement mode. This mode enables users to measure impedance of electrodes via Blackrock’s Central Suite. For information regarding impedance measurement please refer to the document titled “LB 0574 Central IFU,” which is available for download from the Blackrock Microsystems website. To revert the CerePlex E headstage into the recording mode, simply toggle the switch to “Rec” position (recording).

Frequency Range Selector Wide & Norm

This switch toggles between two different hardware-based filter input settings. The “Wide” filter setting corresponds to an input frequency range from 0.02 Hz to 10 kHz. “Norm” (Normal) filter setting is between 0.3 Hz to 7.5 kHz.

Reference and Ground Selector

This switch allows the user to select between different sources to use as the input reference. If the switch is toggled to “Gnd” mode, subject ground will be used as the input reference to the amplifier. Setting the switch position on “Ref” (Reference), will use one of the implanted reference wires (R1 or R2) as input reference. R1 and R2 can be selected by another switch adjacent to reference and ground selector (see below).

R1 and R2 Reference selector

Use this switch to select which of the two available reference wires to use as the input reference. A switch position to R1 selects reference wire number 1 as the input reference. The R2 switch selects the reference wire number 2 as shown in Figure 5. The Ref/Gnd switch must be in Ref mode for this switch to be effective.

Cleaning and Maintenance Instructions

General Cleaning

Do NOT immerse the CerePlex E in water or cleaning solutions. Overuse of cleaning liquids might cause swelling of the filament film.

The collar assembly underneath the CerePlex E should be inspected before each use and cleaned every time after use.

1. Visually inspect the connector; remove any particles if present.
2. Visually inspect the film. If the film is swollen or degraded, follow the section titled “Filament Film Replacement” (see below) to replace the film.
3. If necessary, clean the connector with a cotton swab and 70% alcohol. Do not let the cleaning solution pool. Allow the solution to dry before making contacts.
4. The connector and the film must also be cleaned after use with cotton swab and 70% alcohol. Do not allow the solution to pool.

Filament Film Replacement

The filament film which is visible from under the CerePlex E (See **Figure 2**, bottom panel) provides a conductive and uniform medium in between the input pins of the CerePlex E and the connectors on top of the CerePort array

pedestals. The filament film comes with a unique electrical characteristic—it is conductive in the vertical direction with respect to the film surface, linking the contacts on the CerePlex E input and the pins on the CerePort Array LGA. The filament film also prevents spread of current horizontally across the adjacent pins on the connector. After repeated usage, dust or bodily particles can accumulate on the filament film which can affect the signal quality on the CerePlex E.

The filament film has been tested to withstand one year of normal usage. It is recommended to regularly check the condition of the filament film before use and replace it at least once a year or whenever there is a degradation in signal quality. Filament film replacement is a simple procedure (See **Figure 6**) and can be conducted by following the procedures below:

1. Loosen the four screws on the CerePlex E by turning them counterclockwise.
2. Hold the bottom three plates together and lift them away from the cover.
3. Remove the old filament film and clean the nearby area on the plate and the PCB with cotton swab and 70% alcohol.
4. Place a new filament film onto the plate. Make sure the holes on the film are aligned with the pins on the plate.
5. Replace the assembly and fasten the four corner screws clockwise.



Figure 6- Replacing the Filament Film

Return Merchandise Authorization

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 (RMA). 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 or by emailing support@blackrockmicro.com.

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 S. Komas Dr., Suite 200
Salt Lake City, UT 84108 USA
Tel: +1 (801) 582 5533

Warranty

Blackrock Microsystems (“Blackrock”) warrants that its products are free from defects in materials and manufacturing for a period of one year from the date of shipment. At its option, Blackrock will 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 performed by anyone other than an authorized Blackrock employee; (2) any abuse, negligent handling or misapplication of the product; or (3) any sale or other transfer of the product by the original purchaser.

Except for the warranty set forth in the preceding paragraph, Blackrock provides no warranties of any kind, either express or implied, by fact or law, and hereby disclaims all other warranties, including without limitation the implied warranties of merchantability, fitness for a particular purpose, and non-infringement of third-party patent or other intellectual property rights.

Blackrock shall not be liable for special, indirect, incidental, punitive, exemplary or consequential damages (including without limitation, damages resulting from loss of use, loss of profits, interruption or loss of business or other economic loss) arising out of non-compliance with any warranty. Blackrock’s entire liability shall be limited to providing the remedy set forth in the previous paragraph.

Support

Blackrock prides itself in its customer support. For additional information on this product or any of our products, you can contact our Support team through the contact information below:

Manuals, Software Downloads, and Application Notes

www.blackrockmicro.com/technical-support

Complaints

When filing a complaint, please provide the product description, product number, software version, lot number, complainant's name and address, and the nature of the complaints.

Issues or Questions

www.blackrockmicro.com/technical-support

support@blackrockmicro.com

Tel: +1 (801) 582-5533