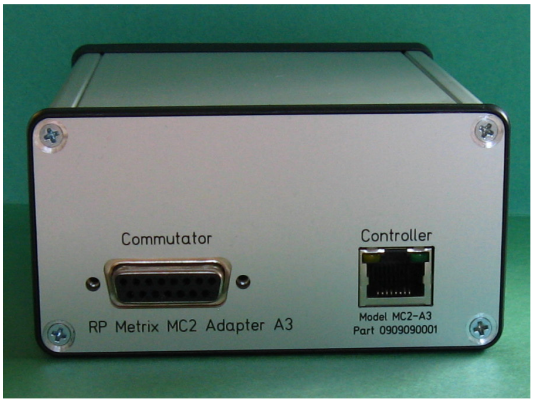
RP Metrix

Motor Controller MC2 Adapter A3	MC2_A3

Single-channel Microdrive Motor Controller Adapter for 4-Electrode Miniature Microdrive Neural Recording Systems



- **Power and Control from ND1MC2 Motor Controller**
- **1 motor drive channel**
- **Relay isolation of MC2 motor drive and ground signals**
- **15-pin commutator connector**
- **4 BNC electrode signal connectors**
- **2 stimulus signal binding posts**
- **3 bipolar preamplfier power/ground binding posts**
- **Generates preamplifier blanking signal**
- **Power and activity LEDs**

Ordering Information

Configuration	Model Number
Motor Controller MC2 Adapter A3	MC2_A3

Absolute Maximum Ratings

Characteristic	Symbol	Min	Typ	Max	Unit
Motor Circuit Current	I_{MOT}	0		500	mA
Motor Circuit Voltage	V_{MOT}	2.4		4.6	V
Output Short-Circuit to Ground Duration	t_{SC}			∞	sec
Operating Temperature	T_A	0		70	°C
Storage Temperature	T_S	-40		85	°C
USB Host VBus	V_{VBUS}	-0.3	5.0	5.5	V
USB Host D+, D-	V_{USBD}	-0.5		5.25	V
Blanking Output Current	I_{BL}	-20		20	mA

Specifications

At T_A = +25°C, V_{DC} = 5V, unless otherwise noted.

Characteristic	Symbol	Min	Typ	Max	Unit
Input DC Supply Voltage (in operation)	V_{DC}	4.5	5.0	5.5	V
Operating Supply Current	I_S		50	100	mA
Blanking High Level Output Voltage	V_{OH}		2.4		V
Blanking Low Level Output Voltage	V_{OL}		0.4		V

Description

The Motor Controller MC2 Adapter A3 is a table top module that connects an RP Metrix MC2 or MC2+ Motor Controller to the motor within an ND1HS1 or ND1HS2 Single-Drive Neural Headstage. The MC2 motor controller connects to the adapter via the rear panel RJ-45 **Controller connector**. The adapter routes the motor drive signals from the MC2 through internal relay circuits to the 15-pin **Commutator connector**. The MC2 motor activation signal energizes the internal relays. The 15-pin connector is compatible with RP Metrix preamplifiers, including the 4-channel ND1PA and 2-channel ND1PAX preamplifiers.

The adapter also routes other headstage signals to the A3 front panel:

- Four electrode signals (**BNC connectors E1 to E4**)
- Two stimulus signals (**binding posts Stim1 and Stim2**)
- Signal ground (**Gnd binding post**)
- Bipolar preamplifier power (**binding posts +V and –V).**

The A3 adapter has two LED indicators mounted at the Controller connector:

- Green indicates the adapter is powered by the MC2
- Yellow indicates the motor drive signals are active.

The Controller connector mates to a standard Ethernet style 8-wire RJ-45 cable. The motor cable carries signals as described in the MC2 datasheet (ND1MC2.pdf):

- 3 Motor drive signals
- 1 Motor activation signal
- 5V DC power
- Motor controller ground
- USB 1.2 compatible differential pair (for future use)

The adapter uses the MC2 motor activation signal to connect the drive signals to the commutator/preamp and to enable the preamp blanking signal.

I/O Information

MC2A3-J1 (RJ-45 Jack) 8-Pin Controller Interface Connector

Pin #	Signal	Input/Output
1	USBA1 VBus (5V DC)	Input
2	USBA1 Ground	--------
3	Motor Drive 1	Input
4	Motor Drive 2	Input
5	Motor Drive 3	Input
6	Motor Active Indicator	Input
7	USBA1 D+	Input/Output
8	USBA1 D-	Input/Output

MC2A3-J2 (DB-15 Female) 15-Pin Commutator Interface Connector

Pin #	Signal	Input/Output	Front Panel
1	Signal Ground	--------	Gnd
2	RefOut1	Input	
3	SigOut1	Input	E1
4	SigOut3	Input	E3
5	Blank Preamp	Output	
6	Stim3	Output	
7	Stim2	Output	Stim2
8	Vpos	Output	+V
9	Motor2	Output	
10	Stim1	Output	Stim1
11	SigOut2	Input	E2
12	SigOut4	Input	E4
13	Motor1	Output	
14	Motor3	Output	
15	Vneg	Output	-V

Grounding

The Controller and Commutator connectors accept shielded cable connectors. In each case the shields are connected to signal ground via a 10 Meg Ohm resistor in parallel with a 4.7 nF capacitor.

The shields connect directly to the A3 enclosure.

When deactivated, the relay circuits connect each motor drive signal to signal ground through a respective 10 KOhm resistor.

When activated, the relay circuits disconnect the drive signals from the grounding resistors and connect them to the respective Commutator connector pins.

The motor controller ground may optionally connect to signal ground during motor activation, by installing internal 2-pin shunt J8. The factory default is to not install the J8 shunt, so that the grounds are isolated.