



Ultium™ Biomechanics Research System

Analog Output Module User Manual

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1 Introduction

1.1 Brief Description

The Ultium Analog Output Module is an accessory to the Ultium EMG System which allows for users to customize their data collection setup. Specifically, a user could use the Analog Output Module to transmit data, collected from the Ultium system, to a 3rd party software/program in real-time.


1.2 Contradictions

Use of the Ultium system is contra-indicated in individuals who have implanted pacemakers.

2 Definitions

2.1 Graphic Symbols and Meaning

The following international icons and symbols may be found on the Ultium Analog Output Module enclosures and in this user manual. Their meaning is described below.

	<p>Read material in the User Manual wherever this symbol appears.</p>
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2.2 Glossary of Terms

Ultium Sensor -- A small individual radio transmitter typically worn on the body used to measure and transmit bio-potential signals (such as EMG) or motion related signals (such as acceleration). The Ultium System can accommodate up to 16 body worn Ultium Sensors in one network. Two Ultium Systems may be used in parallel, on separate RF networks, to accommodate up to 32 body worn sensors.

Multi-Channel Sensor – Certain Ultium Sensor Types provide more than one signal. An example is a 3-D Accelerometer that provides acceleration data for the x, y and z directions.

3 Identifications

3.1 Model Designation



Ultium Analog Output Module (Part #881)

3.2 Product Versions and Configurations

The Ultium Analog Output Module (Part #881) must be utilized in conjunction with the Ultium Receiver (Part #880).

As the Noraxon Systems require software to perform its function, the equipment is offered in combination with the following computer program:

Noraxon myoRESEARCH® (MR3.12) Software Platform

4 General Warning and Cautions

4.1 Risks and Benefits

There is **no identified risk of physical harm or injury** with use of the Ultium Analog Output Module. The benefit provided by use of the Analog Output Module is that it provides users with the freedom to send analog data in real-time to an external program (ex: MATLAB script for highly specialized research protocols).

4.2 Safety Information Summary



Cautions

- Never use the Ultium System to collect data from a person with an implanted pacemaker
- Never operate the Ultium Analog Output Module within 1 meter of any critical medical device



Warnings

- Do not immerse the Ultium equipment in any water or liquid
- Do not use the Ultium equipment on individuals undergoing MRI, Electro Surgery or Defibrillation
- The Ultium System may produce results that are informative, not diagnostic. Qualified individuals must interpret the results



Attention

- The operator must be familiar with typical characteristics of the signals acquired by the Ultium System and be able to detect anomalies that could interfere with proper interpretation.

5 Getting Started

5.1 Quick Start Guides


Please see the hardware manual for the appropriate EMG system.
P-880: Ultium User Manual

6 Preparing the Product for Use

6.1 Unpacking and Component Identification

	<p>Ultium Analog Output Module (Part #881)</p>
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6.2 Component Inputs, Outputs, and Indicators

<p>1) Ultium Receiver: (Part # 880)</p> 	<p>Refer to the Ultium System user manual (P-8088) for further guidance on how to use this receiver.</p>
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2) Analog Output Module: (Part #881)



Powered Via:
Part #PSU1: 5V DC, 3.0A Power
Supply (See Section 8)

Analog Signal Transmitted to 3rd
Party Data Acquisition Unit or a
Noraxon Analog Input System (Part
#222) via:
25-Pin Male to Female Cable: (Part
#291D)

6.3 Component Interconnections

Step 1



Connect the PSU1 (See
Section 8) to the Analog
Output Module (Part #811) to
provide power.

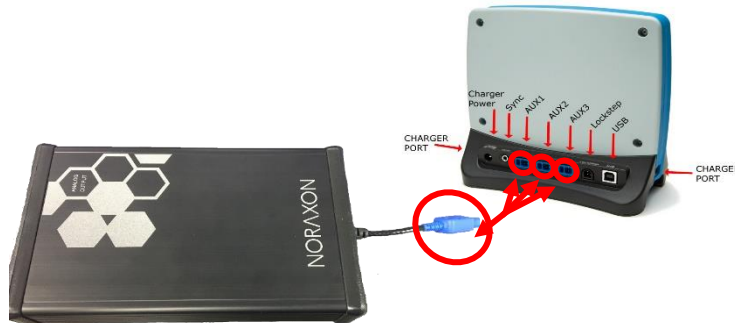
Step 2



Connect the Ultium Receiver
(Part #880) to the computer via
the USB port (USB Type B
Male to USB Type A Male
cable)

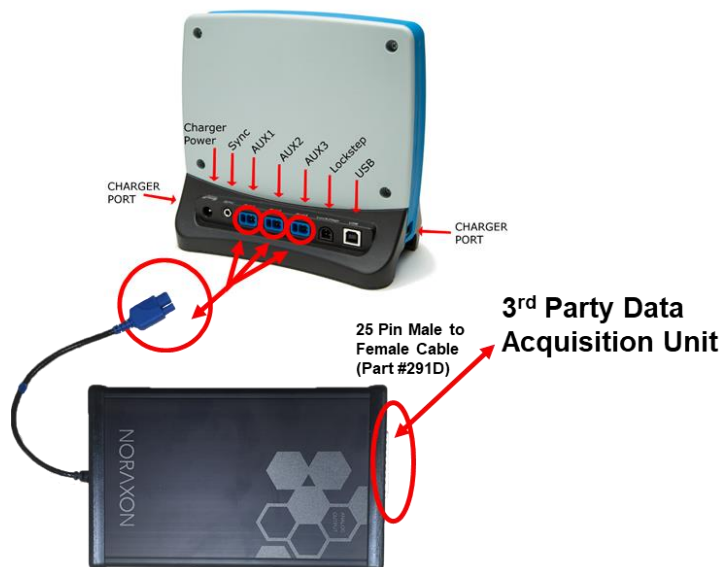
Step 3

Connect the Ultium Receiver (Part #880) to the Ultium Analog Output Module (Part #881) via one of the three Auxiliary Ports (AUX1, AUX2, or AUX3).



Step 4

Connect the Analog Output Module (Part #881) to a 3rd Party Data Acquisition Unit (DAQ) via 25-Pin Male to Female Cable (Part #291D)




6.4 Device Communication (Driver) Software Installation

No driver installation is needed. The Ultium Receiver communicates over the USB port.

6.5 Companion Software Installation

The Ultium System is compatible Noraxon MR3 software.

6.5.1 MR3 Installation

1. Insert the MR3 USB flash drive into the PC
2. A menu will automatically pop up
3. Click on “Install MR3” and follow the Wizard’s instructions
4. Double click  on the icon to start the MR3 software

6.6 Companion Software Configuration

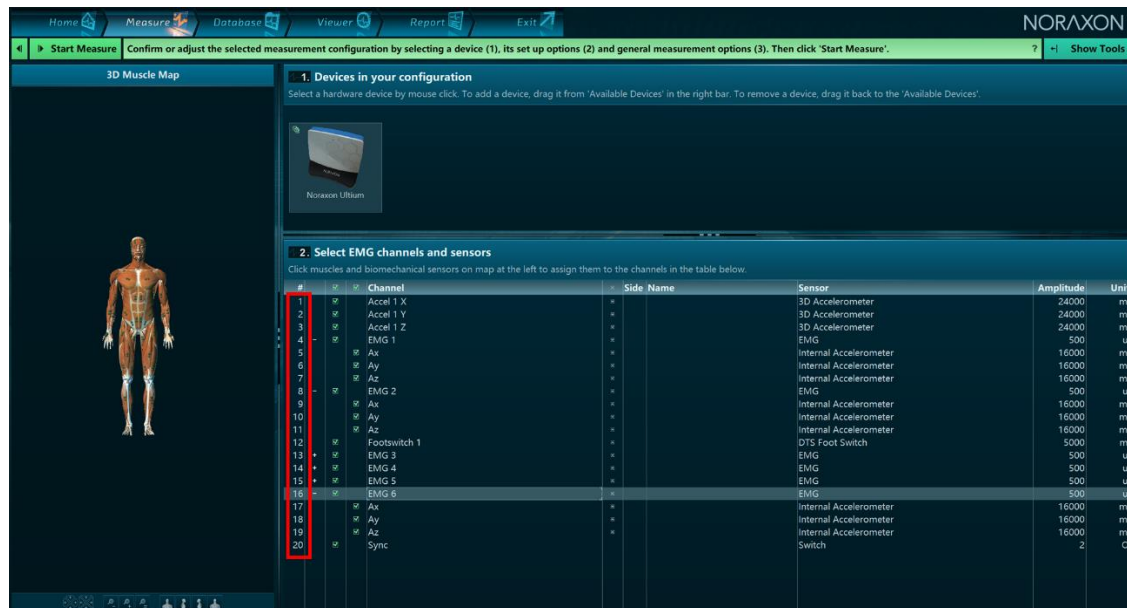
Before the Ultium Analog Output Module can be used with the Noraxon Ultium system, the companion software must be configured to recognize the different components that make up the system. Refer to the Ultium System’s hardware manual for further instructions.

If the companion software is properly configured, see the following instructions for using the Ultium Analog Output Module.

With the Analog Output Module properly connected (see Component Interconnections above), the data collected in MR3 will be automatically sent to the third part data acquisition unit that is connected via a 25-pin male to female cable (Part #291D). Each module allows for the transmission of up to 16 channels. For instructions as to which pins correspond to which channel, view the bottom of the Analog Output Module.



If your applications call for more than 16 analog signals, two Analog Output Modules may be used. In which case, a total of 32 signals can be sent through the analog output terminals at once. The numbers given to the channels in the configuration (see image below) correspond to the order in which data is sent through the Analog Output Module.



Please refer to the Ultium User Manual for instructions on how to collect data in MR3.

7 Operating Instructions

7.1 Safety Information Summary

Strictly follow all safety practices given in section 4 of this manual. The most critical ones are repeated here.



CAUTIONS

- Never use the Noraxon Ultium System on a person with an implanted pacemaker
- Never operate the Noraxon Ultium System within 1 meter of any critical medical device

7.2 Normal Functions with Interface to a PC

Consult the user manual for the companion software for descriptions of the setup, playback and analysis of the data acquired by the Ultium system.

7.3 Exceptional Functions/Situations (error messages)

Please see the user manual for the appropriate Noraxon system (P-880) for possible error messages.

7.4 Shutdown after Use

At the end of the day:

- Place all EMG sensors inside the sensor docking station(s).
- Press the Sensor Power button on the back of the Ultium Receiver to power all sensors off.

7.5 Storage and Protecting Between Usages


For extended storage or when travelling:

- Place all sensors into the sensor docking station and power them off. (Press the power button on the back of the Ultium receiver. When the sensors are shutdown they will stop blinking completely.)
- Position all components inside the system traveling case according to their prepared cavities.



8 Accessories and Optional Modules

8.1 Accessories

Part No.	Description
PSU1	<p>PSU 1 Power Supply (5VDC, 3.0 A)</p> 

291D	25-Pin Male to Female Cable
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As new accessories may be available after the time of printing, please check the Noraxon website at this link for the latest offerings

<https://www.noraxon.com/>

9 Cleaning

9.1 Safety Precautions When Cleaning



WARNING

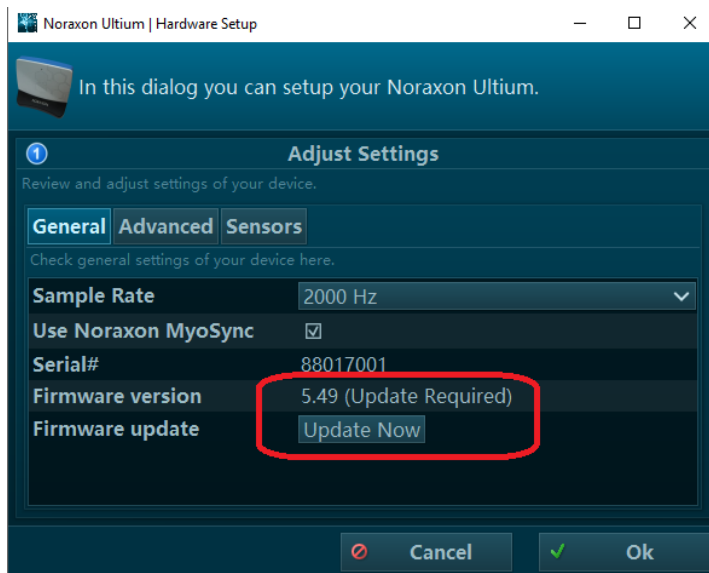
Only use a damp cloth with mild soap and water or isopropyl alcohol to clean the Ultium SmartLeads.

Do not immerse Ultium equipment (Sensors, SmartLeads, Receiver, Analog Output Module) in any water or liquid.

10 Maintenance

10.1 Device Software (firmware) updates

The internal program (firmware) inside the various Ultium devices can be updated via MR3. The user will be notified within the Ultium System hardware setup if an update is required. Ensure that all sensors are placed in the Ultium charging dock, the charging dock is connected to the Ultium receiver, and the Ultium Analog Output Module is connected to the Ultium receiver prior to initiating the firmware update. If you start the update prior to completing this step, you may need to update again (firmware update button will still be present in hardware setup).



10.2 Maintenance by Qualified Individuals

The following activities should only be undertaken by PC support (IT) personnel, equipment technicians or those with suitable training.

10.3 Companion Software Updates

- Perform a backup of the data folders to a separate drive as a precaution.
- Click on the Patch/Update link provided in the email or as given on the [Noraxon website](#).
- Download the Patch/Update file.
- To install the Patch/Update, click “Run” on the dialog box. No password is required.



Attention

All EMG sensors should be fully charged before a firmware update is performed.

11 Troubleshooting, Default Diagnosis

Symptom: **Problem with the EMG Sensor recognizing the SmartLead**

Possible Reason

- SmartLead is disconnected or loose
- Firmware in the Sensor is outdated. The EMG Sensor Status LED may be solid Yellow.

Remedial Action

- Check that the SmartLead is inserted fully.
- Sensor firmware is periodically updated to support newly designed SmartLeads. Make sure you have installed the latest version of MR3 and run a firmware update if needed.

11.1 Website Link to FAQ

Answers to common questions can be found at Noraxon's Frequently Asked Questions (FAQ) website page at this link:

<https://www.noraxon.com/support-learn/technical-support/faqs/>

Other educational material is available at this link:

<https://www.noraxon.com/support-learn/technical-support/>

12 Service and Repair

12.1 Availability of Circuit Diagrams and Component Lists

Noraxon will make available on request circuit schematics, component parts lists and calibration instructions to assist qualified technical personnel in the service and maintenance of the Ultium Analog Output Module, where applicable.

12.2 Warranty Information

Noraxon equipment including optional items is guaranteed to be free from defects in material and workmanship for 1 year from the date of purchase. The warranty period begins on the date of product shipment from Scottsdale, Arizona.

Warranty coverage does not apply to damage incurred through accident, alteration, abuse or failure to follow instructions contained in this document.

An optional extended warranty is available. Please contact Noraxon USA for further details.

12.3 Submitting Technical Support Requests

A Support Request can be submitted using the online form available at this link:

<https://www.noraxon.com/support-learn/support-request/>

Provide all information requested by the form including a **detailed** description of the problem being experienced and your telephone number or e-mail address.

12.4 Returning Equipment

Be sure to obtain an RMA Number (return material authorization) before returning any equipment. Completing the online service request form will assign an RMA Number. Otherwise contact Noraxon USA.

<https://www.noraxon.com/support-learn/rma-request/>

Send the equipment **postage prepaid** and **insured** to the address below. Include the RMA Number on the shipment label. Mark the package “Goods to be repaired – Made in USA” to avoid unnecessary customs charges. (Beware listing a Customs or Insurance value of \$5,000.00 USD or more will result in a delay at United States Customs.)

Noraxon USA
15770 N. Greenway-Hayden Loop
Suite 100
Scottsdale, AZ
85260, USA

If you are shipping from outside the USA please use UPS, FedEx, DHL, or EMS (US Postal Service) and **not a freight-forwarder**. Using a freight-forwarder incurs additional brokerage fees. If a package is shipped to Noraxon via a carrier other than the ones listed above, it may be refused.

13 Spare Parts and Consumables

13.1 Consumable Items

There are not any consumable items for this product.

13.2 Replaceable Items

There are not any replaceable items for this product.

14 Specifications of the Product

14.1 Expected Useful Lifetime

The Ultium Analog Output Module has a usable life of seven years.

14.2 Physical Specifications

- SmartLead Dimensions:
 - 1.9 cm Width x 1.1 cm Thickness, Length varies slightly
- Analog Output Module Weight: 0.8 lbs. (362.87 g)

14.3 Environmental Conditions for Storage and Transport

- Ambient Temperature: -40C to +70C
- Relative Humidity: 10% to 100%
- Atmospheric Pressure: 500hPa to 1060hPa