

# MindWare 8-Slot BioNex Hardware

## User Reference Guide

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## **Safety**

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## Section 1: Technical Specifications

**Note:** All timings are specified relative to the analog input stream

**\* Specifications tested with minimum test system and configuration. Performance may vary with system configuration and load.**

Range of environmental conditions for which the unit is designed:

- Indoor use
- Altitude to 2000 m
- Temperature for safe operation: 5°C to 40°C
- Maximum relative humidity: 80% for temperature up to 31°C decreasing linearly to 50% at 40°C
- Power supply voltage fluctuations not to exceed  $\pm 10\%$  of the nominal voltage
- Over voltage category II
- Pollution degree 2

Power Input:

- AC Input: 100-240VAC, 50-60Hz, 1.5A
- Fuse: 2A 250V 5x20mm Slo-Blow

Bipolar Power Output<sup>1</sup>:

- $\pm 5V$ , 90mA
- $\pm 12V$ , 25mA
- Protection: External Fuse – 0.5A 250V 5x20mm

Unipolar Power Output<sup>2</sup>:

- 5V
- 300mA

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- Protection: Auto-Reset Fuse

### Analog Inputs:

- 32 Channels
- Resolution: 16-Bit
- Maximum Sample Rate: 250 kS/s over all channels
- Timing Accuracy: 50ppm of sample rate
- Range, accuracy, and noise depends on amplifier module

### Digital Inputs:

- 8 Synchronous Inputs / 16 Synchronous Inputs<sup>2</sup>
  - Maximum Sample Rate: Synchronous with analog sample rate
  - Minimum Pulse Width: 2/Sample Rate
  - Minimum Time Between Pulses: 2/Sample Rate
  - Timing Accuracy: +/- 1/Sample Rate
  - Input High: 2.2V min, 5.25V max
  - Input Low: 0V min, 0.8V max
  - Input High Current: 250 uA
  - Input Low Current: -10uA
  - Pull Down Resistor: 50kohm typ., 20kohm min
- 8 Asynchronous Inputs<sup>1</sup> and Rating Response Buttons
  - Minimum Pulse Width: 70 ms \*
  - Minimum Time Between Pulses: 100 ms \*
  - Timing Accuracy: +/- 70 ms \*

- Input High: 2.2V min, 5.25V max
- Input Low: 0V min, 0.8V max
- Input High Current: 250uA
- Input Low Current: -10uA
- Pull Down Resistor: 50kohm typ., 20kohm min

Trigger:

- 1 Trigger Input

- Trigger Accuracy: <1ms
- Pull Up Resistor<sup>1</sup>: 4.7kohm
- Input High: 2.2V min, 5.25V max
- Input Low: 0V min, 0.8V max
- Input High Current: 250uA
- Input Low Current: -10uA

- 1 Trigger Output

- Maximum Propagation Delay from Trigger In on CE Marked Units: 250ns
- Maximum Propagation Delay from Trigger In on non-CE Marked Units: 10ms
- Pulse Width<sup>2</sup>: 50ms
- Output High: 2.5V min, 5.V max
- Output Low: 0V min, 0.5V max
- Output High Current: 8mA
- Output Low Current: -8mA

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### Analog Output:

- 2 Digital to Analog converters
- Resolution: 16-bit
- Range: +/- 10V
- Output Impedance: 0.2ohm
- Output Drive: +/- 5mA

### Video Capture Module:

- Timing Accuracy: +/- 10 frames \*
- Mode: NTSC or PAL
- Video Input: Composite (BNC), 75ohm
- Audio Input: Line In Stereo (3.5mm jack)
- Resolution: 360x240, 720x480
- Formats: MPEG-1, MPEG-2, MPEG-4, MJPEG

### Legacy Video Capture Module:

- Timing Accuracy: +/- 10 frames \*
- Mode: NTSC or PAL
- Video Input: Composite (BNC) or S-Video (DIN), 75ohm
- Audio Input: Line In Stereo (2x RCA), or Microphone mono (3.5mm 3-pos jack), 10kOhm
- Resolution: 360x240, 720x480

- Formats: MPEG-1, MPEG-2, MPEG-4, MJPEG

**<sup>1</sup>Feature only available in non-CE marked units**

**<sup>2</sup>Feature only available in CE marked units**

## Section 2: Instructions For Use

### Identification of Operating Controls

The operating controls for this hardware are located in the software.

### Warnings

Review the following safety precautions to avoid injury and prevent damage to the BioNex hardware and any products connected to it. To avoid potential hazards, use this equipment only as specified.



This symbol indicates the equipment is to be serviced by trained personnel only. Failure to comply risks electric shock.



**WARNING:** This symbol on the equipment indicates that more detailed information will be found in the instruction manual.



**WARNING:** The ground pin on the Power Cable must remain intact. Failure to comply risks electric shock.

When positioning the BioNex 8-Slot chassis ensure the power switch is easily accessible.

If any equipment is used in a manner not specified by the manufacturer the protection provided by the equipment may be impaired.

## Accessories and Consumables



8-Slot E-Prime Trigger Cable

Part #40-0027-00

Instructions:

- Turn power to the BioNex hardware off
- Connect the DB25 with the pigtail RCA connector to the Digital I/O 1 or Digital I/O 2 port
- Connect the RCA connector to the Trigger Input jack
- With a small slotted screwdriver, gently screw the DB25 connector into place
- Connect the 2<sup>nd</sup> DB25 connector to the parallel port of the computer with E-Prime installed



0.5A 250 V 5X20 mm Fast Acting Fuse

Part #55-0833-00

Instructions:

- Turn power to the BioNex hardware off
- Unplug the power cable from the BioNex hardware
- With a slotted screwdriver, turn the fuse holder and remove the fuse from the chassis
- Replace the fuse and re-insert the fuse into the fuse holder



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2A T 250 V 5X20 mm Slow Blow Fuse

Part #55-0834-00

Instructions:

- Turn power to the BioNex hardware off
- Unplug the power cable from the BioNex hardware
- With needle nose pliers, gently remove the fuse drawer from the power entry module.
- Replace fuse
- Re-insert the fuse drawer into the power entry module



## Section 3: Input/Output Connections

### Back Panel



1

$\pm 5V, 90mA$

- Tip - +5V
- Ring - -5V
- Sleeve - Common

2

±12V, 25mA

- Tip - +12V
- Ring - -12V
- Sleeve - Common

3

TRIGGER INPUT - Event Trigger Input

- Tip - TTL Level In
- Sleeve - Ground

4

TRIGGER OUTPUT

- Tip - TTL Level Out
- Sleeve - Ground

5

DAC 1

- Digital to Analog Output - 1/8" Mono Audio Jack
  - Tip - DC Voltage out
  - Sleeve - Ground
  - 0-5V DC Range

6

DAC 2

- Digital to Analog Output – 1/8" Mono Audio Jack
  - Tip – DC Voltage out
  - Sleeve – Ground
  - 0-5V DC Range

7

FUSE

- Replace with 250V, 0.5A Fuse

8

SYNC

- Tip – Sync
- Sleeve - Ground

9

USB

- Standard USB Type-B connector

10

DIGITAL I/O 1

- Asynchronous Digital Input/Output
- Software Selectable
- DB25
  - Pin 1 - Pin 16 : Bit 0 – Bit 15
  - Pin 17 – Pin 25 : Ground

11

### DIGITAL I/O 2

- Synchronous Digital Input/Output
- Software Selectable
- DB25
  - Pin 1 – Pin 16 : Bit 0 – Bit 15
  - Pin 17 – Pin 25 : Ground

12

### POWER ENTRY MODULE

- AC Input: 100–240VAC, 50-60Hz, 1.5A
- Power Toggle Switch
- 2A T 250 V 5X20 mm Fast Acting Fuse

## Front Panel



1 COMP

- Standard BNC Composite Video connection

2 S-VID

- Standard S-Video connection

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**3**

AUDIO IN

- Left and Right RCA audio connections

**4**

MIC IN

- Standard 1/8" Audio connection

**5**

SUBJECT IN

- Amphenol PL-700 Connection
- Requires MindWare Subject Cable Dual 5 Position (Part #40-0020)

**6**

TRANSDUCER/RATING DIAL IN

- Amphenol PL-500 Connection
- Requires MindWare Transducers or MindWare Rating Dials to function properly

**7**

HIGH LEVEL IN

- Standard 1/8" Audio connection

## Section 4: Cleaning Instructions

To remove scratches on front panels:

- With an eraser gently rub across the scratch
- Clean off any debris before using

Cleaning Hardware:

- Turn the power to the BioNex off
- Disconnect the power and all other cables connected to the device
- With a slightly damp cloth, wipe off hardware
  - o Avoid getting moisture in exposed connectors
- Allow to dry thoroughly before reconnecting power

## Section 5: Additional/Optional Parts and Services

### Rack Mounting

- Can be ordered with the BioNex
- Equipment must be returned to the manufacturer to have the Rack Mounting hardware installed.

### Video Acquisition



- o Available in Single, Dual, and Quad modes
- o Can be ordered with the BioNex hardware
- o Equipment must be returned to the manufacturer to have the Video module(s) installed

### Acquisition Modules



#### Impedance Cardiograph & GSC

- o Optional with the BioNex hardware
- o Equipment can be ordered separately from the BioNex hardware for installation in existing systems
  - See Module Installation below for installation instructions
- o Subject harness sold separately (Part #40-0020)



### 3 Channel Bio-Amplifier & GSC

- Optional with the BioNex hardware
- Equipment can be ordered separately from the BioNex hardware for installation in existing systems
  - See Module Installation below for installation instructions
- Subject harness sold separately (Part #40-0020)



### 4 Channel Bio-Amplifier

- Optional with BioNex hardware
- Equipment can be ordered separately from the BioNex hardware for installation in existing systems
  - See Module Installation below for installation instructions
- Subject harness sold separately (Part #40-0020)



### 4 Channel High Level Pass Through

- Optional with BioNex hardware
- Equipment can be ordered separately from the BioNex hardware for installation in existing systems
  - See Module Installation below for installation instructions



### 4 Channel Rating Response

- Optional with BioNex hardware
- Equipment can be ordered separately from the BioNex hardware for installation in existing systems
  - See Module Installation below for installation instructions
-

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## 4 Channel Transducer

- Optional with BioNex hardware
- Equipment can be ordered separately from the BioNex hardware for installation in existing systems
  - See Module Installation below for installation instructions
- Transducers are sold separately

## Module Installation Instructions

- Turn off the power to the BioNex hardware
- Unplug the power cable from the BioNex hardware
- Slide Module into empty slot
  - Make sure the card is in the top and bottom rails
- With a small slotted screwdriver gently screw the top and bottom screws into place



## Section 6: Test System and Configuration

Minimum System Requirements:

- 1024x768 graphics resolution
- USB 2.0 with no USB hubs between machine and BioNex
- 4GB RAM for Windows XP
- 8GB RAM for Windows 7

Basic Test System:

- 2.8GHz Intel Core 2 Duo
- 4GB RAM
- Windows XP

BioNex 8-Slot Testing Configuration

- BioLab version 3.0.8
- 1000 Samples/sec
- 1/sec Update Rate
- 16 Analog Input channels enabled
- 8 Synchronous Digital Event channels enabled
- 8 Asynchronous Digital Event channels enabled
- 2 Channels of video at 720x480 resolution, MPEG-4 encoded

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## DECLARATION OF CONFORMITY

Application of Council Directive: Low Voltage Equipment Directive (2006/95/EC)

Standards to which Conformity is declared: EN 61010-1:2001

Application of Council Directive: Electro Magnetic Compatibility (2004/108/EC)

Standards to which Conformity is declared: EN 61326-1:2006

Manufacturer Name: MindWare Technologies Ltd.

Manufacturer Address: 1020-F Taylor Station Rd.

Gahanna, OH 43230

USA

Type of Equipment: Behavioral Research Monitor

Model Number: 50-3711-08

Serial Number(s) All First year of manufacture 2009

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards, and this Declaration is supported by a Technical File located at the Factory. Conformity Assessment is consistent with the requirements of the Directives.

Place - Gahanna, Ohio, USA

\_\_\_\_\_ (Signature)

9-1-09 (Date)

Martin G. Gillman (Printed Name)

V.P. Engineering (Position)



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