

## OUT SERIES

### Headphones

- OUT1 High Fidelity Headphones
- OUT1A Ultra-Wide Frequency Response Headphones
- OUT100 Monaural Headphone
- 40HP Monaural Headphones

### LED

- OUT4 Visual Stimulus: Controllable LED
- OUT103 LED Cable

- OUT2 BNC Output Adapter
- OUT3 *for TTL pulses only—see [Stimulators](#)*
- OUT5 *see [STMISOLA](#)*
- OUT101 Tubephone
- OUT01E Foam Ear Inserts:
- OUT101R Plastic Tubes
- OUT102 Piezo Audio Transducer
- OUT6 DSUB9 to RJ11 Output Adapter

## OUT1 HIGH-FIDELITY HEADPHONES

These wide response high-fidelity headphones are used for auditory stimulus (short tones or clicks) or to listen to physiological signals (like EMG) directly. The Headphones are comfortable and lightweight (3 ounces) and include a 2 meter cable so the Subject can be seated a comfortable distance from the acquisition unit.

Unlike other Smart Sensors that connect to the MP3X, the OUT1 connects to the “Analog out” port on the back panel of the MP3X.



## OUT1 SPECIFICATIONS

- Cable Length: 2 meters
- Connector Type: 9 Pin DIN (female)

## OUT1A WIDE-FREQUENCY RESPONSE HEADPHONES

These ultra-wide frequency response headphones connect directly to the headphone port on the MP36 or MP36R data acquisition unit.

Features of these multi-purpose headphones include:

- High dynamic range
- High-resolution capsule
- 1/8" connector plus 1/4" adapter included
- Single-sided cord
- Oval-shaped ear cups
- Comfortable headband
- High-quality components and exceptionally rugged construction



## OUT1A SPECIFICATIONS

- Connector: 1/8" TRS connector plus 1/4" TRS adapter
- Interface: MP36 or MP36R (not compatible with other MP units)
- Frequency response: 20 Hz - 20 kHz

- Max. power handling: 100 mW
- Impedance: 32 Ohm
- Sensitivity: 105 dB @ 1 kHz
- Cord length: 2 meters
- Dimensions: 11-3/4" x 9-3/4" x 8-1/4"

## OUT100 MONAURAL HEADPHONES

These monaural headphones can be used with the STM100C stimulator module to deliver a tone signal while recording data for startle response or other stimulus-response studies. The headphones can also be used to listen to raw signals (such as EMG), piped through the STM100C from an amplifier output. The OUT100 is a wide response, high efficiency headphone, weighing 85 grams and is equipped with a 1.8 meter cord terminated in a 6.3 mm (1/4") phone plug.

### OUT100 SPECIFICATIONS

Weight:	85 grams
Connector Type:	6.3 mm (1/4")
Cable length:	1.8 meters
Speaker:	28 mm dia 32 ohm dynamic Mylaar
Impedance:	16 Ohm @ 1.0 kHz
Power Handling:	100 mW max
Frequency response:	20 Hz - 20 kHz
Average SPL:	108 dB ± 4 dB
Adapter (included):	1/4" mono adapter plug



## 40HP MONAURAL HEADPHONES

These monaural headphones are used with Biopac Science Lab MP40 and Biopac Student Lab MP45 for stimulus response experiments and to listen to EMG signals. The 40HP is a wide-response, high-efficiency headphone.

### 40HP SPECIFICATIONS

Cable Length:	5 meters
Connector Type:	3.5 mm phone plug



## OUT2 BNC (M) OUTPUT ADAPTER

This BNC adapter is designed to output signals from the MP3X unit to other devices (such as external amplified speakers and scopes). This 2-meter adapter cable terminates in a male BNC for easy connections.

**See also:** SS9LA BNC Input Adapter

### OUT2 SPECIFICATIONS

Cable Length:	2 meters
Connector Type:	BNC (male)



## OUT4 VISUAL STIMULUS: CONTROLLABLE LED

The OUT4 is a controllable high-brightness LED output device mounted on an angled stand intended to provide a good viewing angle for subjects. Use OUT4 for visual stimulus presentation in Biopac Student Lab Lesson 11A Reaction Time - Visual Stimulus, Visual Evoked Potential experiments, and more. Set LED intensity via Use MP Menu > Output Control > Visual Stim Controllable LED - OUT4; set flash rate/sequence via MP Menu > Output Control > Pulse Sequence.



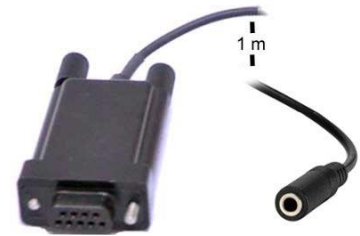
### OUT4 SPECIFICATIONS

LED:	White, Relative Luminous Intensity up to ~5000 mcd, adjustable
Interface:	MP36 or MP35 "Analog Out" port* (Pulse Out 0-5 V)
Cable:	2 meters

\* OUT4 is not compatible with a) Research System MP36R at this time because AcqKnowledge 4.4 and below does not include the required output control, b) with MP45, c) with MP30 except if used in place of SS10L in BSL Lesson 11.

**OUT5 STMISOLA INTERFACE FOR MP36/36R**

This DSUB9 to 3.5 mm mono jack interface allows the MP36/36R to be used with the STMISOLA isolated linear stimulator for arbitrary stimulus output (range -10 V to +10 V). The 1 m interface connects the MP36/36R Analog Out and the STMISOLA 3.5 mm mono plug/cable.



Compatible with:

- MP36 with BSL 4.1.2 and above
- MP36R with AcqKnowledge 4.4.2 and above

**OUT6 DSUB9 TO RJ11 OUTPUT ADAPTER**

Use this DSUB9 to RJ11 jack Output Adapter to map the analog output of an MP36 or MP36R to an RJ jack; allows stimulators designed with AMI/HLT-compatible connections to be connected to MP36/36R units. Control the STMTHERM, or other stimulators that have RJ11 input cables.



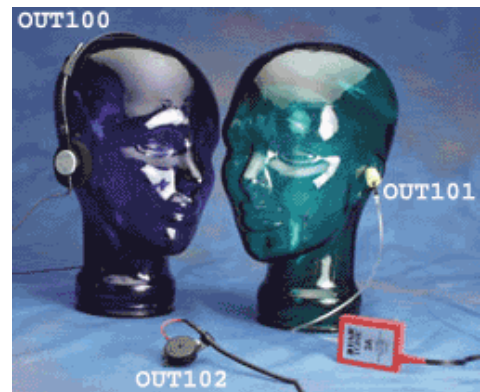
**OUT101 TUBEPHONE**

- **OUT101E** Replacement Foam Ear Inserts: pkg. of 50
- **OUT101T** Replacement Plastic Tubes: pkg. of 4

*OUT101 Components: one Tubeophone, plastic tube and 50 foam ear inserts*

Use the OUT101 tubeophone to deliver clicks and tones in auditory evoked response applications (i.e. ABR).

The tubeophone design consists of a monaural acoustic transducer attached to a short, flexible, plastic tube, which fits into the subject's ear with the aid of a foam tip.



Use of the tubeophone reduces ambient noise and bone conduction problems, which can interfere with auditory response recordings. Furthermore, because the Tubeophone provides a 1 msec acoustic signal delay (due to plastic tube), it automatically separates true response from electromagnetic artifact resulting from speaker activation.

**MP36 and MP36R** interface options:

- BSL System stimulator (model BSLSTM): use BSLCBL6 and Radio Shack P/N 274-047 ¼" to 1/8" phono adapter
- BSL MP36 data acquisition unit Analog Out port: use OUT3 plus BSLCBL6 and Radio Shack P/N 274-047 ¼" to 1/8" phono adapter
- MP36 headphone port: use Radio Shack P/N 274-047 ¼" to 1/8" phono adapter; note—volume may not reach the same levels as the Analog Out port

**Calibration for Auditory Brainstem Response Studies**

To calibrate the OUT101 Tubeophone, use an [Etymotic ER-7C Probe Microphone](#)—this microphone provides a calibrated output voltage which is a function of applied Sound Pressure Level (SPL). The sensitivity is 50 mV/Pascal (-46 dB re: 1 V/uBar): 0 dB SPL = 0 dBuV. Place the Probe Microphone insert tube in the auditory canal prior to the insertion of the OUT101 foam tip.

The OUT101 Tubephone sound delivery tube and the Probe Microphone sound input tube will then be exposed to the same auditory chamber. Accordingly, the SPL is recorded, via the Probe Microphone, simultaneously with applied auditory stimulus from the OUT101 Tubephone.

## OUT101 SPECIFICATIONS

Response:	Compares to TDH-39, 49 or 50 audiometric headphones
Acoustic signal delay:	1 msec
Dimensions:	3.8 cm (wide) x 5 cm (high) x 1 cm (thick)
Cable termination:	6.3 mm (1/4") phone plug
Cable length:	1.8 meters
Cable clip:	Yes; clip attaches to fabric or fixtures

## OUT102 PIEZO AUDIO TRANSDUCER

The OUT102 piezo transducer is very useful for providing an audible stimulus, or alarm, when a physiological signal passes a certain threshold. As such, the OUT102 makes an excellent audible BPM indicator for ECG, blood pressure, or respiration signals. The device can also be used to indicate when temperature or other slowly moving variable (e.g., electrodermal response) passes a certain threshold.

The following interface cables are included with the OUT102:

- 1 x 3.5 mm cable ([CBL100](#)) for connecting the OUT102 to a Digital I/O port on the UIM100C rear panel for operation with Control Channel outputs
- 1 x Y-Splitter (CBL212) to permit the MP System to sample the drive waveform from stimulus presentation setups; permits recording of the drive waveform timing and amplitude
- 2 x Unisolated RJ11 to 3.5 mm Jack ([CBL122](#))



The OUT102 Piezo transducer may be connected directly to the STM100C stimulator module 50 ohm output. When the stimulator module output rises above 1.5 volts, the Piezo indicator will emit a constant audible signal (3.0 kHz @ 80 dB).

The threshold for the OUT102 is determined by adjusting the amplitude control on the STM100C module. The specific Biopotential or Transducer amplifier signal monitored can be recorded while simultaneously directed through the STM100C module. To operate as described here, the source amplifier needs to be set to CH16, STM100C is set to CH16 input, and source signal must be able to reach at least +1.5 V of amplitude. Source signal gain can typically be sufficiently adjusted by using the gain switch on the source amplifier module. STM100C amplitude control can be used to attenuate the source signal, as required, to help activate the Piezo transducer on only the desired source signal portions.

The OUT102 also connects directly to the UIM100C digital I/O ports for operation with Control Channel outputs. An adapter is included for connecting the OUT102 to the UIM100C digital I/O ports.

The included splitter (CBL212 3.5 mm male mono phone plug to two 3.5 mm female mono sockets) and connector cable (CBL100 3.5 mm mono male to 3.5 mm mono male) permit the analog drive signal to be directed to two locations. The drive signal—usually from DA0 or DA1—is typically directed to the splitter cable. One socket output of the CBL212 splitter cable is directed to the OUT102 input. The other socket output of the CBL212 splitter cable is looped back to drive an available MP input, via CBL100, through the UIM100C. In this manner, during acquisition, the stimulus level and timing will be indicated on the recording.

## OUT102 SPECIFICATIONS

Dimensions (case):	50.29 mm (W) x 65.41 mm (L) x 45.15 mm (H)
Cable Length:	1.8 meters
Connector Type:	3.5 mm phone plug + adapter for the UIM100C digital I/O ports



### OUT103 LED CABLE

Use this LED cable to synchronize a light flash. The 3 meter cable makes it easy to use the LED for a variety of protocols. Terminates for connection to Analog OUT 0/1 and includes adapter for connection to Digital I/O. **Media synchronization** - Windows only - AcqKnowledge 4.1 and above.

The included 3.5 mm mono splitter (3.5 mm male mono phone plug to two 3.5 mm female mono sockets) and one CBL100 (3.5 mm mono male to 3.5 mm mono male cable) permit the analog drive signal to be directed to two locations. The drive signal – usually from DA0 or DA1 – is typically directed to the splitter cable. One socket output of the splitter cable is directed to the OUT103 input. The other socket output of the splitter cable is looped back to drive an available MP input, via CBL100, through the UIM100C. In this manner, during acquisition, the stimulus level and timing will be indicated on the recording.



#### Option 1: MP150 and UIM100C setup using an Analog Output

- a. Connect the OUT103's 3.5 mm phone plug from the LED to one of the arms of the included Y-cable.
- b. Connect the included CBL100 to the other arm of the Y-cable.
- c. Connect the stem of the Y-cable to one of the two Analog Output connections near the bottom of the front face of the UIM100C.
- d. Connect the other end of the CBL100 to an otherwise unused Analog Channel also on the front face of the UIM100C.
- e. Use "MP160/150 > Set Up Channels..." (in AcqKnowledge 4.4, choose "Channels" in the left pane after choosing "MP160/150 > Set Up Data Acquisition...") and acquire and plot the analog channel to which the CBL100 is connected.
- f. Use "MP160/150 > Set Up Stimulator..." (in AcqKnowledge 4.4, choose "Stimulator" in the left pane after choosing "MP160/150 > Set Up Data Acquisition...") to send 5 volt pulses through the Analog Output.

#### Option 1: MP160 and AMI100D/HLT100C setup using an Analog Output

- a. Connect the OUT103's 3.5 mm phone plug from the LED to one of the arms of the included Y-cable.
- b. Connect the included CBL100 to the other arm of the Y-cable.
- c. Connect the stem of the Y-cable to a CBL122 connected to one of the two Analog Output connections near the bottom of the front face of the AMI100D/HLT100C.
- d. Connect the other end of the CBL100 to a CBL122 connected to an otherwise unused Analog Channel also on the front face of the AMI100D/HLT100C.
- e. Use "MP160 > Set Up Channels..." (in AcqKnowledge 5, choose "Channels" in the left pane after choosing "MP160 > Set Up Data Acquisition...") and acquire and plot the analog channel to which the CBL100 is connected.
- f. Use "MP160 > Set Up Stimulator..." (in AcqKnowledge 5, choose "Stimulator" in the left pane after choosing "MP160 > Set Up Data Acquisition...") to send 5 volt pulses through the Analog Output.

#### Option 2: MP150 and UIM100C setup using a Digital I/O Channel

- a. Connect the OUT103 2 mm pin adapter to the 3.5 mm plug on the OUT103 cable.
- b. Connect the red OUT103 2 mm pin to a Digital I/O channel on the rear of the UIM100C and the black pin to GND D on the rear of the UIM100C.
- c. Use MP150 > Set Up Channels to acquire and plot the Digital I/O channel the OUT103 is connected to.
- d. Set MP150 > Show Manual Control
  - Set for 'Output.'

- Enable the 'Set immediately' option.
- Click the Digital I/O channel the OUT103 was connected to toggle between 0 and 1.

If necessary, click the 'Set' button to update the manual control and output a digital pulse.

**MP36R setup - additional items required**

- a. Connect an OUT3 (BNC adapter) to the 'Analog Out' port on the rear of the MP36R.
- b. Connect a BSLCBL6 (interface cable: BNC to 3.5 mm) to the OUT3.
- c. Connect the OUT103 3.5 mm plug to the BSLCBL6 3.5 mm socket.
- d. Set MP36 > Output Control 'Low Voltage Stim' option
  - Set Pulse width to 100 msec.
  - Set Pulse level to 5 volts – set Reference Channel to any digital channel.
  - Click the D'ON' button to output a digital pulse.