

Trigger Output Module (Wireless)

User's Guide

**May 2008 Edition
PM-U03**

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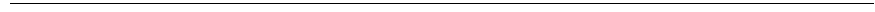
**Specifications and procedures outlined in
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without notice.**

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Important Information

Intended Use

The Trigger Output Module is designed for research, investigational and scholarship purposes only. This device is designed to be used only with approved Delsys® systems. Delsys® products are not intended for measurement purposes or for use in the treatment and diagnosis of humans.

Technical Service and Support

For information and assistance visit our web site at:

www.delsys.com

Contact us at:

E-mail: support@delsys.com

tel: (617) 236 0599

Warnings and Precautions



Consult all accompanying documents for precautionary statements and other important information.



Consult accompanying user's guide for detailed instructions.



Keep the device dry. The presence of liquids may compromise the safety features of the device.



Handle with care.



Sensitive electronic device. Avoid static discharges. Do not operate or store near strong electrostatic, electromagnetic, magnetic or radioactive fields. Interference from external sources may decrease the signal-to-noise ratio or result in corrupted data.



This device may cause electrical disturbances in sensitive equipment within its operating environment.



Connect only to Delsys-approved devices.



Immediately discontinue device use if a change in the device's performance is noted. Contact Delsys technical support for assistance.



Delsys Inc. guarantees the safety, reliability, and performance of the equipment only if assembly, modifications and repairs are carried out by authorized technicians; the electrical installation complies with the appropriate requirements; and the equipment is used in accordance with the instructions for use.

Device Information



Do not dispose this product with house waste. Contact Delsys Inc. for instructions on responsibly disposing this device. This product should not be mixed with other commercial wastes.



Date of Manufacturing (appears on device)



Serial Number (appears on device)



DELSYS INC.
650 Beacon St.
Boston MA 02215
USA

Manufacturer

Disclaimer

DELSYS INC. makes no warranties, express or implied, as to the quality and performance of this product including but not limited to, any implied warranty of applicability for other than research uses by qualified individuals. DELSYS INC. shall not be liable to any person for any medical expenses or any direct or consequential damages resulting from any defect, failure or malfunction, whether a claim for such damages is based upon theory of warranty, contract, tort or otherwise. No representative, agent, or licensed practitioner is authorized to waive this disclaimer. DELSYS INC. makes no diagnosis or prescription by virtue of anything about this product.

Limited Warranty

The Trigger Output Module is warranted against failure of materials and workmanship for a period of 1 year from the date of delivery, provided that the product is given proper care and has not been subject to abuse during this period. This warranty is in lieu of all other warranties expressed or implied. Operation of this device outside specifications determined by DELSYS INC. or use with any other input devices other than DELSYS INC. sensors constitute an invalidation of this limited warranty. This warranty is not transferable.

Trigger Output Module (Wireless)

The Trigger Output Module allows the Myomonitor to control the start and stop of Secondary Data Acquisition Systems while maintaining its wireless freedom. Please consult Technical Note 301 (Synchronization and Triggering) and Technical Note 302 (Myomonitor Data Synchronization) for important information if you are new to these concepts. These are available on the Delsys web site at www.delsys.com.



Figure 1. Trigger Output Module (NI USB-6501)

The Trigger Output Module is a National Instrument USB-6501 Digital I/O device that plugs into the Host Computer. It outputs Start and Stop Trigger Output signals. The communication scheme is portrayed below.

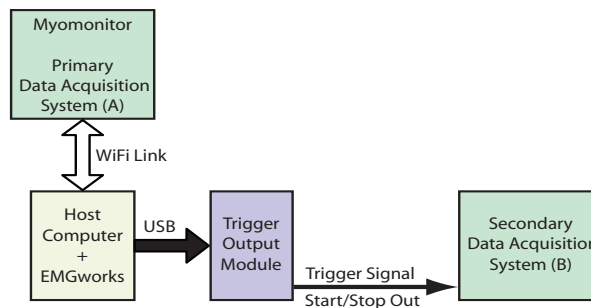


Figure 2. Trigger Output Module Communication Scheme. The Myomonitor communicates with the Host Computer through a wireless network link. The Start/Stop Trigger Output signals are sent from the Myomonitor to EMGworks via this link. EMGworks then issues Start/Stop Trigger Output signals through the USB port to the Trigger Output Module. These signals are then used to control the start/stop of a Secondary Data Acquisition System.



Please refer to the Myomonitor EMG System Installation Guide for instructions on installing and configuring EMGworks and Trigger Output Module.

Trigger Output Module Signals

The Start Trigger Output signal consists of a 5 Volt pulse that occurs on terminal 17 (“P0.0”) each time that the Myomonitor begins data acquisition. The Stop Trigger Output signal is a 5 Volt pulse that occurs on terminal 18 (“P0.1”) each time that the Myomonitor stops data acquisition. Additionally, there is a third digital signal on terminal 19 (“P0.2”) which set high for the duration of data acquisition. The ground is common for all signals and is available on terminals 25, 26, and 32.

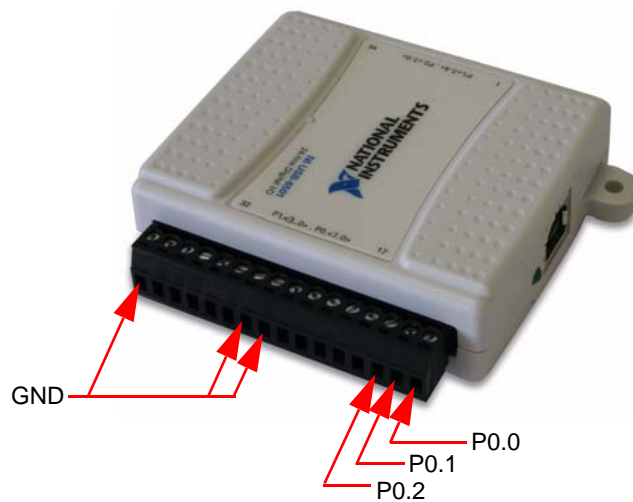


Figure 3. Terminals of the USB-6501 Digital I/O Device

Terminal Number	Terminal Name	Description
17	P0.0	Start Trigger Output
18	P0.1	Stop Trigger Output
19	P0.2	Acquisition Flag
25, 26, 32	GND	Common Ground

When the USB-6501 Digital I/O device is first turned on, the digital terminals are all configured to be high-impedance inputs and will register +5V if measured. This is normal.

When a Test using the Myomonitor is loaded in EMGworks, the Start Trigger Output and Stop Trigger Output terminals will be configured to the low state (i.e. ground potential).



Refer to the EMGworks User Guide and the Myomonitor EMG System Installation Guide for details on loading and configuring a Test in EMGworks.

When data acquisition is started by the Myomonitor, the Start Trigger Output terminal will generate a positive pulse for approximately 1ms and will return back to the low (zero) state. There is a short PC-dependent delay (less than 5ms) between the start of data acquisition and the Start Trigger Output pulse.

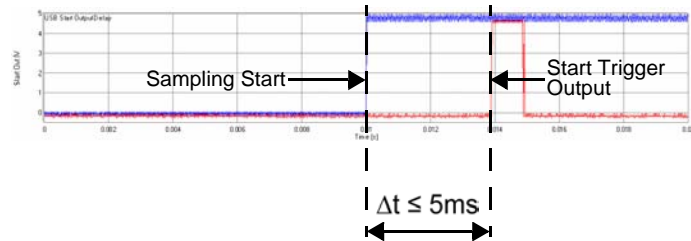


Figure 4. Start Trigger Output Delay

The Stop Trigger Output signal has a longer delay (less than 500ms), but is less critical for synchronization purposes than the Start Trigger Output.

The Acquisition Flag is a digital signal that is asserted in the high state only during data acquisition. This flag on P0.2 is asserted at the same time as the Sampling Start Signal is pulsed on P0.1, as shown in the figure below

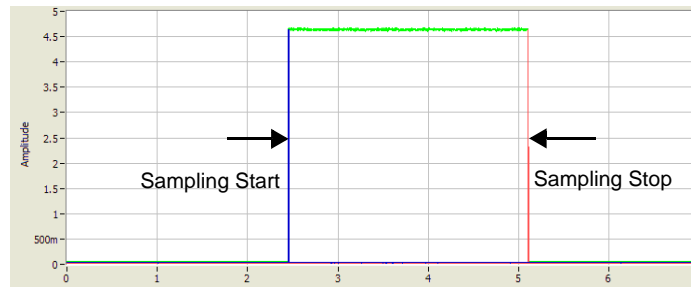


Figure 5. The Acquisition Flag on P0.2 is asserted high for the duration of data acquisition and is low in all other circumstances. Blue trace- Start Trigger. Red trace- Stop Trigger. Green trace- Acquisition Flag.



Make sure that all connections are made to the proper side of the Trigger Output Module, which is labeled 17 - 32.



Make sure that all of the outputs from the Trigger Output Module are connected to high impedance inputs of other devices. Do not make low impedance connections to this device, as damage will occur.

Specifications

Trigger Output Module

General	
Dimensions	85.1mm x 81.8mm x 23.1mm
Bus Type	USB
I/O Connectors	Screw Terminals

Electrical	
Logic	5 V
Max Current Load	5-10 mA
Start/Stop Output Pulse Duration	1 ms
Start Output Pulse Delay	< 5 ms
Stop Output Pulse Delay	< 500 ms



Please refer the National Instruments USB-6501 documentation that was shipped with the device for detailed information regarding the device specifications.

Component References

Part Description	Part Number
Trigger Output Module (Wireless) Package	DS-U05
Trigger Output Module (Wireless)	SC-A13
Trigger Output Module (Wireless) User's Guide	PM-U03
Myomonitor IV Installation Guide for Wireless Operation	PM-M06
EMGworks User's Guide	PM-E04
EMGworks Installation Guide	PM-E05