



Product Updates.....2



Tech Tips .....3



Upcoming Meetings & Box Sorting.....4

o summer | o 2009

# TDT news

## From Moth to Man...

### On the Road with Victor Rush, PhD

When people outside our field ask what TDT does, it can be difficult to find an answer that will convey what we do in a concrete, relatable way. Do we say we make research equipment for researchers developing brain computer interfaces for neuroprosthetics? Do we mention that our equipment is often used in drug screening trials? Maybe mention that scientists around the world use our equipment for basic research in neuroethology, psychophysics, and biomedical research.

Our flexible System 3 data acquisition, stimulus generation, and experiment control platform is used for all of these things and many more. Maybe we should just send them on the road with our staff scientist, Victor Rush, PhD. Earlier this summer, Dr. Rush set out on a multi-lab journey that took him from the study of the Tobacco Hornworm moth to an investigation working with alert human subjects.

#### Leg one, the flight of the moth...

Dr. Rush began his journey by flying across the country in search of a little enlightenment on the subject of how smell plays a role in flight behavior in insects. Dr. John Hildebrand's lab at the University of Arizona in Tucson is currently studying the sex-pheromonal communication system and the flight behavior it regulates in the Tobacco Hornworm moth, *Manduca Sexta*.

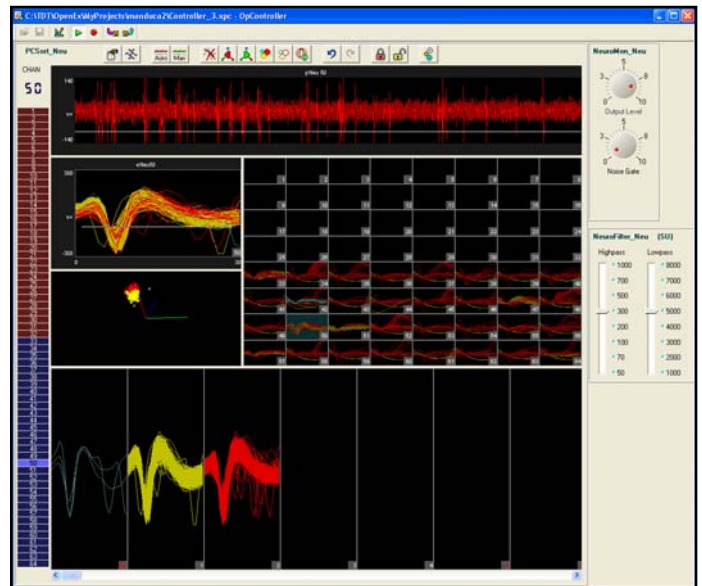
The lab is focusing on the specifics of both odor and electronically guided flight of the moths

and has found the nervous system of the Tobacco Hornworm to be a useful model for the exploration of neural development and function.

While Dr. Rush was visiting the lab, Dr. Hong Lei and Dr. Jeffrey Riffell were successful in recording unit activity from several channels only hours after setting the system up. Recordings were made on the TDT System 3 RZ2 bioamp processor and PZ2 amplifier using OpenEx Software.

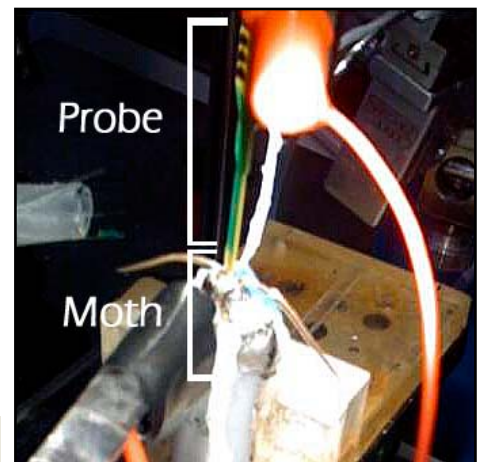
In using all 64 recording sites spread across the lobe, an functionally equivalent structure to the olfactory bulb in vertebrates, Dr. Lei explained that it will be possible to examine the pathways of signal transmission in this structure. The TDT system provides a flexible interface for stimulus control and real-time spike sorting.

Future hopes for this experiment include real-time spike triggered averaging.



Above: 32-Channel recording from the manduca sexta.

Below: Probe and moth during recording.



Continued on page 2

# Testimonial

I am writing a testimonial in support of Tucker-Davis Technologies (TDT) neurophysiological monitoring systems. My conviction to write this testimonial is commonplace -- I am delighted with TDT's products and support services.

Unlike other testimonials, though, my experiences were not positive from the start. I think this is important to mention because (a) it is the truth and (b) it is much more difficult to impress me once my initial opinions are unfavorable. The transition from displeased to delighted is a testament of my journey with TDT's products and support services. Ultimately, this testimonial describes how my initial impressions were wrong.

I began using TDT neurophysiological monitoring systems when I joined a new lab, I had all of my previous experiences with a different system. I did not take to the transition well. My neural recordings were inconsistent from one day to the next (I conduct chronic recordings), the recordings were very noisy, and nothing that I did seemed to solve the problem. Although these were my initial experiences, they originated from my attempting to monitor neural activity with poorly calibrated equipment. No company can ever be faulted for this circumstance.

With the incredible support of the Tucker-Davis support staff, the problem was identified and resolved. Now my recordings are very consistent across days, the data are very clean, and the system is very stable -- I can reliably monitor 96 channels simultaneously with their System 3!

In the future, I will continue using TDT and I encourage you to consider their products for your research.

Jillian Fecteau, Ph.D.  
The Netherlands Institute for Neuroscience.

April '09

## From Moth to Man, Continued from Page 1

### Leg two, cognitive neuroscience...

After the thrilling success in Tucson Arizona, Dr. Rush flew to Stanford University where Dr. Josef Parvizi and crew are using the System 3 platform in Cognitive Neuroscience research. Dr. Rush assisted with the development of a project for recording from Electrocorticography (ECoG) arrays with human subjects. They were able to quickly setup and record from a 128-channel ECoG array device with an alert patient. TDT's System 3 RZ2 processor and PZ3 amplifier provided a real-time solution for recording and processing evoked potentials.

So in two legs of a single journey Dr. Rush was able to see two very different experiments developed using the same equipment platform: System 3 and the Z-Series Real-Time Bioamp Processor. •

## Product Updates...

### New Flex Ribbon Cables for Arrays...

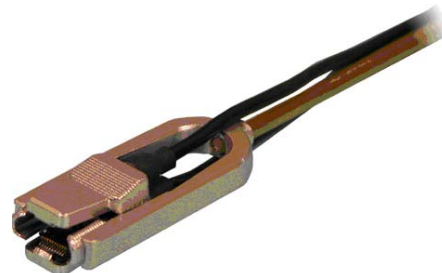
TDT has engineered a new feature for our ZIF-Clip® microwire arrays. The new Flex Ribbon type array provides a 26 mm flexible ribbon cable (one per 16-channels) which offers increased maneuverability for the electrode. The Flex Ribbon arrays currently support only 250 um electrode spacing but are available online now for both 16 and 32-channel microwire arrays!



In addition to the flex ribbon configuration, users ordering 32-channel arrays may specify whether or not the electrode sites are attached or separated. This means the electrode lands can be configured as one 32 channel array or two separate 16 channel arrays with a common 32 channel ZIF-Clip® connector. •

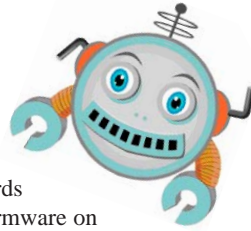
### That's No Tuning Fork...

Put your musical instruments down, no fondue either...TDT's new ZIF-Clip® Holder makes life a lot easier for acute preparations with the ZIF-Clip headstage. The ZIF-Clip® Holder simplifies electrode insertion by securing your ZIF-Clip® headstage firmly, enabling use with most micromanipulators



The headstage holder is approximately 4.5" in length (the stabilizing rod is 3" in length and has a 3/32" diameter). •

# Tech Tips...



## The Whole 256 Yards!

If your system was purchased before June 2009 and you've tried to record data from channel 256 on the PZ2, you'll notice that the channel records erroneous data or appears grounded. This is actually a problem with the firmware on your RZ2 and it will have to be reprogrammed to resolve this issue. If your research calls for the maximum number of channels, give tech support a call and we'll get you up and running on all 256 channels! •

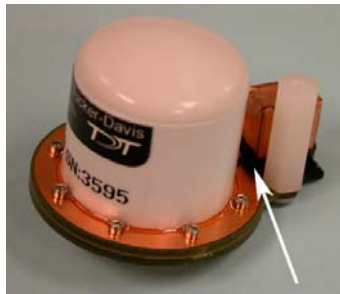
## I Can't Hear You!

If the speaker volume on your ES1 or EC1 electrostatic speaker is too low, we might know the reason. Over time or with exposure to high temperatures the adhesive holding the copper foil shielding in place can fail. This can result in contact with the grounded bolts of the ES1/EC1 housing causing a short circuit and a 30dB SPL drop across all frequencies.

Electrostatic speakers may be state of the art, but you don't have to be an electrical engineer to turn up the volume. Just tie a fastener (an orthodontic rubber band or adhesive tape works well) around the foil transformer.



Before



After

If you'd rather leave this to the professionals after all, just contact us at [support@tdt.com](mailto:support@tdt.com). We love any excuse to play with rubber bands and adhesive. •

## Can't We All Just Get Along?

Timing errors may occur when using the RA8GA, PA5, or HTI3 if the zBUS clock lines become overloaded. This happens most often when two RA8GA devices are placed in the same zBUS caddie, but can also happen with any other combination of these devices. If pressing a button gets you nothing more than some flashing LEDs, chances are your RA8GA, PA5, and/or HTI3 may not be getting along.

To workaround this issue if you have a multi-rack system, try rearranging the problem devices so that they are not located in the same zBUS caddie. Or contact us at [support@tdt.com](mailto:support@tdt.com) to schedule them for one of our team building, re-programming retreats. •

For more tech tips see the SUPPORT page on the TDT Website...

[www.tdt.com](http://www.tdt.com)

## So that's how it works...

Ever wondered what TTankInterfaces is all about? TDT has added a new example for OpenDeveloper! Check out the example to see how you can create a graphical interface for your custom software that will allow you to select a tank, block, and event much as you would in OpenScope or any TDT developed OpenEx application.

The example shows how the TTankInterfaces pass information to each other through a Matlab GUI (graphic user interface) and how you can customize the interface.

### Try it!

If you have OpenDeveloper and Matlab 7.0 or greater...

1. Download TTankInterfaces.zip online at: <http://www.tdt.com/downloads/sys3docs.htm>.
2. Run Main.m provided with the example to try it out.
3. Select an event and click the button to display the total number of the selected events for the selected block.

### Dig in!

This example showcases the flexibility of TDT's OpenDeveloper and allows users to experiment with a useful framework.

- Dig into the code in Main.m, TTankInterfaces.m, and RunAnalysis.m to see how it works!

Contact TDT at [support@tdt.com](mailto:support@tdt.com) with any questions. •

At TDT we know that people are one of our most valuable assets. We're pleased to introduce the newest member of our tech support team.

Chris Walters graduated from Eastern Nazarene College with course work in Physics and Engineering. Chris has worked for Meditech, a Boston area medical software company doing software development, training, server maintenance, and installations and at Sage Software, healthcare division where he provided Tech Support, Hardware Support, and Database Maintenance. On a more personal note, Chris enjoys horseback riding, hiking, boating, and camping. •

# Introducing Box Sorting

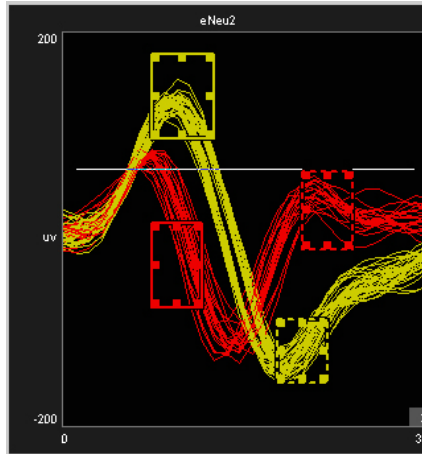
Available in SpikePac v 2.10

## **Box Sorting Using the Waveform Space**

The BoxSort control set utilizes a pair of color-coded boxes (one solid and one dotted) to classify each unit. A total of eight box pairs are available for sorting candidate waveforms. Box sorting allows units to be assigned based on a set of requirements defined for each unit.

## **Box Sort Unit Requirements**

1. Candidate waveforms must enter the solid box only one time.
2. Candidate waveforms must contain data points that pass through both boxes in the pair.
3. One digitized point of the candidate waveform must exist in each box. The waveform space (shown below) displays all spike waveforms for the active channel. Users can identify potential units by using mouse based manipulation tools.



## **Available Now**

Spike v2.10 is part of the latest release of TDT software. If you already own SpikePac, you can download this version from the Downloads page on the TDT website: <http://www.tdt.com/downloads.htm>. If you're interested in adding SpikePac to your OpenEx Software Suite, contact our Sales team for more information: [info@tdt.com](mailto:info@tdt.com).

# TDT

**Tucker-Davis Technologies**

11930 Research Circle  
Alachua, FL 32615

## Upcoming Meetings:

See us on the road...

EMBC 09  
September 2-6, 2009  
Minneapolis, MN

Neuroscience 2009  
Oct. 17-21, 2009  
Chicago, IL

American Epilepsy Society  
December 4-8, 2009  
Boston, MA