

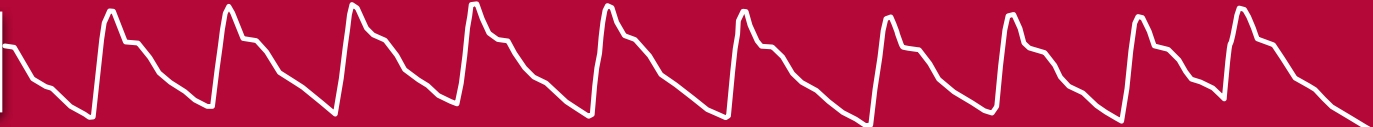
JET™ / Jacketed External Telemetry

DSI Exclusive:
Accurate,
Continuous
Blood Pressure

ECG



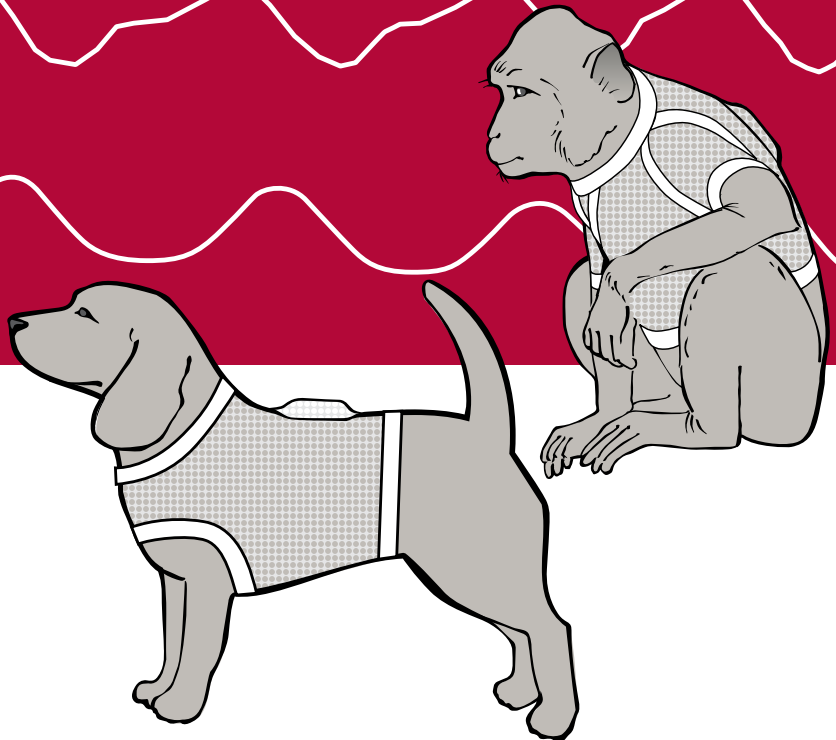
Blood Pressure



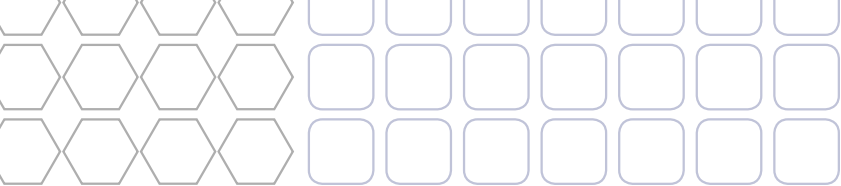
Respiratory Flow



Respiratory Volume



DSI™

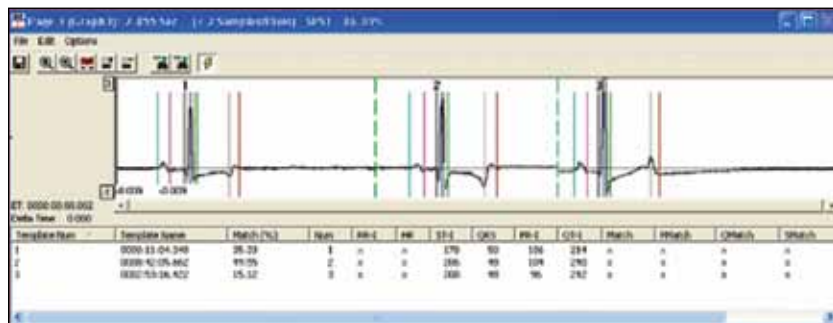


Ponemah Software from DSI

The JET system is fully integrated with DSI's powerful Ponemah software. The Ponemah system provides continuous data storage and experimental analysis either as data are collected, or during subsequent review, with the option of performing these actions in compliance with GLP regulations. This versatile solution is designed for the researcher whose protocol demands flexibility with accurate, continuous and multi-channel acquisition and analysis in a validated environment. The Ponemah system is modular, allowing users to custom design the configuration based upon their application, budget and convenience — without any programming.

Powerful Analysis

Ponemah **ECG Analysis** has been used and validated extensively over the last 15 years, allowing you to confidently compute meaningful parameters on a beat-to-beat basis in many species.



ECG PRO, a template-based analysis module, is available to enhance your data analysis. This sophisticated module greatly simplifies the process and reduces the amount of time spent reviewing and evaluating data. Changes made to one beat will be applied to all other matching morphologies throughout a dataset.

Blood Pressure and **Respiration** endpoints also may be determined via powerful yet easy to use analysis modules.

Integrated Video

Ponemah facilitates recording of video data along with JET. Once recorded, video data can be synchronized and reviewed with the associated data to complement the analysis process. Thus, video data can be associated temporally with ECG, Blood Pressure and Activity data, identify artifacts and to associate behavioral changes with the telemetered data.

Study Management

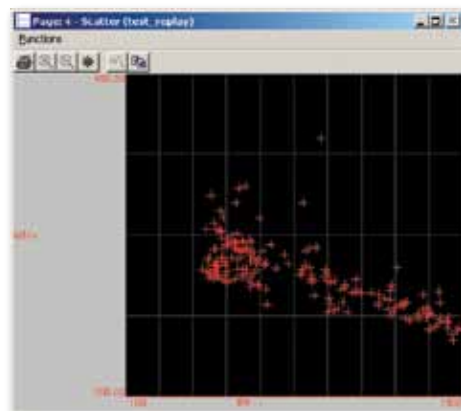
Designed to enhance study execution and resulting data management, the Study option enables users to define a complete study prior to any data collection or analysis and easily summarize resulting data into reports through DSI Reporting. Operating on SQL Server technology; the Study option facilitates data management across multiple workstations, increases data security and reduces errors.

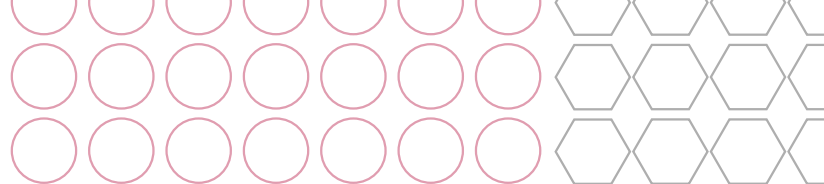
Optional Features

- Data Security Option utilizes a Smart Card and Card Reader along with selected Microsoft® file structure to operate within FDA 21 CFR Part 11 regulations.
- Study Protocol Option is available for enhanced study management capabilities.
- DSI Reporting offers an easy to use method for generation of report-ready tables and graphs.
- OpenART data may be collected simultaneously with JET on a single computer.
- Video Integration is available through the use of ethernet-enabled cameras.

Analysis Modules

- Electrocardiogram Analysis Module is required for ECG analysis.
- ECG PRO, Pattern Recognition Option Module is available for enhanced ECG analysis.
- Pulmonary Airflow Analysis Module is required for respiratory analysis.
- Blood Pressure Analysis Module is required for blood pressure analysis.





A Complete and Accurate Assessment That is Simple, Fast, Reliable, and Low Cost

How Do We Do It?

- **Non-Invasive, Jacketed Physiological Measurements**
 - Provide Continuous, High Quality Data for Short or Long Durations
 - From Freely Moving, Unstressed Animals
 - In a Single, Pair, or Group Housing Setting
 - For up to 36¹ Animals in the Same Room
- **Via Devices that Provide a Flexible Design Permitting the Collection of:**
 - Superior ECG
 - Minimally Invasive Blood Pressure²
 - Respiration Rate and Volume
 - Temperature
 - Activity
- **Combined with World Class Software**
 - Complete GLP Solution
 - Powerful Automated Analysis
 - Study Management
 - Customized Reporting
- **All in a System that was Designed for Maximum Portability**
 - Minimal Equipment with Simple Ethernet Connections
 - Leads the Industry in Most Animals Monitored per Computer
 - Simplicity and Reliability of Bluetooth
 - ▼ No need for technical assistance to maintain group housing capabilities
 - ▼ No possibility of crosstalk
- **From a Trusted and Reliable Source**
 - Excellent Service and Support
 - Complete Solution Provider

At the core of DSI's JET™ system is an externally-worn Bluetooth® enabled telemetry device designed for toxicology and safety pharmacology laboratories conducting large animal studies. It can be used to monitor ECG, blood pressure, respiration, temperature, and activity. Up to 36 devices may be used in the same room without interference. Five device models are available to meet your needs.

JET-EA-BP

- 1 Lead ECG
- BP with Add-On
- Activity via 3 Axis Accelerometer

JET-3ETA-BP

- 7 Lead ECG or 3 Differential Channels
- BP with Add-On
- Surface Temperature Sensor
- Activity via 3 Axis Accelerometer

JET-5ETA-BP

- 9 Lead ECG or 5 Differential Channels
- BP with Add-On
- Surface Temperature Sensor
- Activity via 3 Axis Accelerometer

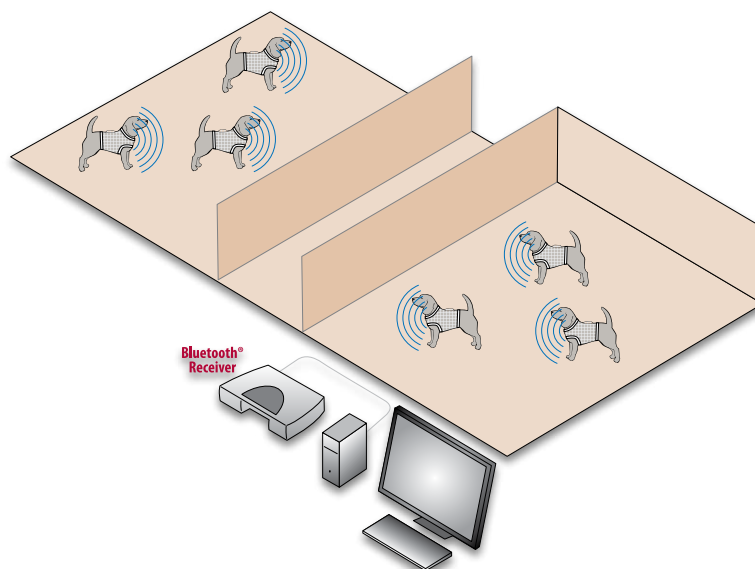
Respiration capabilities may be added to two of these models via the use of accessory equipment.

JET-3ETA-BP + Respiratory Add-On

- 1 Lead ECG
- BP with Add-On
- Respiration (Chest and Abdomen)
- Surface Temperature Sensor
- Activity via 3 Axis Accelerometer

JET-5ETA-BP + Respiratory Add-On

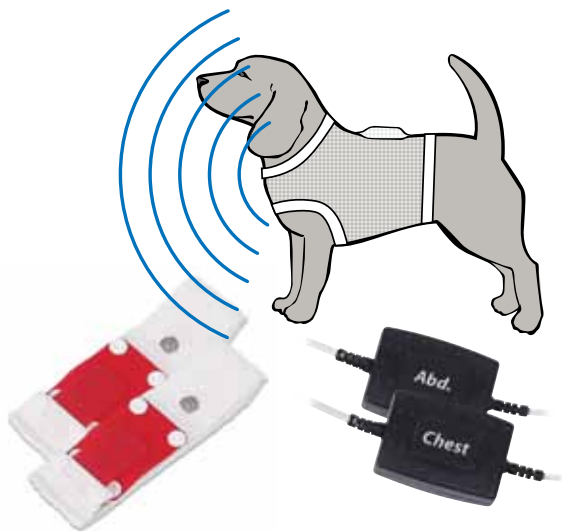
- 7 Lead ECG or 3 Differential Channels
- BP with Add-On
- Respiration (Chest and Abdomen)
- Surface Temperature Sensor
- Activity via 3 Axis Accelerometer



The JET Device was specially designed to provide clean ECGs with clear morphologies at a size and weight that minimize animal impact.

JET Lead sets are reusable and attach to standard snap electrodes. If damaged they are easily and inexpensively replaced to minimize ongoing costs.

¹ 36 device limit for the JET-EA-BP and JET-3ETA-BP. 18 device limit for the JET-5ETA-BP.
² Blood Pressure requires a minimally invasive surgery to implant a miniature transmitter.
 The Bluetooth® word mark is owned by the Bluetooth SIG, Inc. and any use of such mark by Data Sciences International is under license.



Respiratory Inductive Plethysmography (RIP) uses state of the art technology to monitor respiration externally in a non-invasive manner. It allows stress-free data collection from free roaming animals and is superior to piezo-resistive effort belts due to the ability to more accurately assess changes in respiratory volume.

Measurement of respiratory parameters utilizes RIP and requires the placement of two bands around the chest and abdomen. These bands connect to electronics modules which plug directly into the JET differential leadset, replacing two biopotential channels. As such, this Add-On is appropriate for use with either the JET-3ETA-BP or JET-5ETA-BP.

Respiratory Modules have an internal battery life of >2700 hours. To preserve battery life, modules should be stored without cables connected.

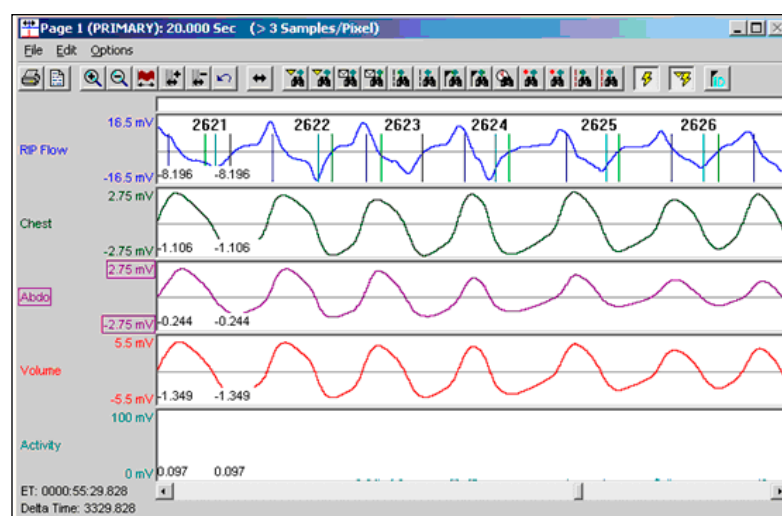
Belts may be washed by hand or washing machine with standard clothing detergents and are expected to work for multiple uses.

Cables between the modules and belts are easily and inexpensively replaced to minimize ongoing equipment costs.

The JET Respiratory Add-On

Accurate measurements of respiratory volume and rate are available through the addition of a JET Respiratory Add-On and Ponemah Pulmonary Airflow Analysis Module. Two bands are placed around the chest and abdomen to measure changes in diameter. After calibration, these changes in diameter enable determination of respiration rate, tidal volume, and minute volume. Respiratory Flow parameters are also available.

If used in combination with ECG and Blood Pressure, cardiopulmonary dependencies may be determined.



Calibration

Accurate Volume and Flow related endpoints require calibration. The Ponemah software enables two types of calibrations and allows for direct calibration versus a pneumotach, as well as a known or assumed tidal volume, for flexibility to your application.

Ease of Use

The JET Respiratory Add-On was designed to be adaptable to your study needs. For example, if you perform a respiratory study on canines one day but need to perform another study on primates the next, you can simply exchange the bands for the appropriate size and use the same equipment. Furthermore, should an animal damage the bands or cables, you can easily and inexpensively replace these items without needing to replace the more expensive electronics modules. These subtle design features allow for enhanced ease of use, lower operating costs, and increased flexibility in how you use your equipment.

Jackets and Undershirts

Use of the JET device typically requires a jacket to protect the equipment from the animal. DSI has found that taking proactive measures such as undershirts or adhesive wraps helps maintain positioning of electrodes, cabling, belts, or other accessories, extending acquisition timeframes. Jackets are commercially available in a standardized JET format for various species and also can be customized. Contact DSI to maximize your JET solution.

The JET Blood Pressure Add-On

Expand on your Jacketed External Telemetry (JET™) capabilities with the JET BP Add-On and acquire accurate, continuous blood pressure data from a minimally invasive implant. No other system provides comparable accuracy or power for hemodynamics studies.

JET BP Add-On

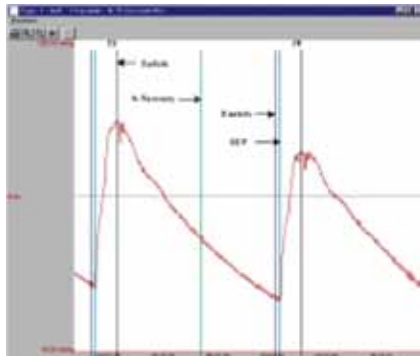
The JET Blood Pressure Add-On consists of a remote antenna receiver and electronics module that are interfaced directly to the JET device. Together these components receive a signal from a DSI pressure-only implant. The implant and receiver antenna should be as close as possible for optimal performance.

Implant

The DSI pressure-only implant is typically placed in the femoral or carotid artery to enable a direct blood pressure measurement via a simple, fast, and minimally invasive surgical procedure with a rapid recovery. Based on experience with canines and primates, the duration is 10 – 15 minutes from first incision to final suture. Implant sites are typically located within the optimal distance of a JET BP antenna that is housed inside a protective jacket.

Accurate and Continuous Data and Analysis

Accurate, continuous blood pressure data allows for determination of Systolic, Diastolic, and Mean pressures, along with Heart Rate and +/-dP/dt on a beat-to-beat basis – and you can look at the waveform morphology!



Histopathology

Due to the small size and simple surgery, histopathology concerns can be successfully mitigated. No significant histopathology was observed following implantation of up to 15 weeks.

**DSI Exclusive:
Accurate,
Continuous
Blood Pressure**



DSI Pressure Only Implants

- **PA-C10-TOX-SA/PA-C10-TOX-LA**
 - Specially designed for large animal JET studies
 - 1.1 cc plus suture rib and catheter
 - SA Catheter: ~0.7 mm diameter with 7, 8, or 10 cm length
 - LA Catheter: ~1.2 mm diameter with 10, 15, or 25 cm length
 - 6 week continuous battery life
 - Note: The standard PA-C10 is not recommended for this application*
- **PA-C40**
 - 4.5 cc
 - 8, 10, or 15 cm catheter length
 - 4 month continuous battery life
- **PA-D70**
 - 25 cc
 - 25, 30, 35, or 40 cm catheter length
 - 4 month continuous battery life

Obtaining Blood Pressure via JET requires a minimally invasive implant; however, researchers seeking highly accurate and continuous blood pressure waveform data, will find other technologies just do not compare.

Non-Invasive Blood Pressure Cuff

- Significantly less accurate
- Non-continuous
- Stress inducing
- Typically non-ambulatory
- Difficult to use in ambulatory implementations

Catheter via Vascular Access Port

- Potential for infection
- Requires significant maintenance
- Use of heparin in port maintenance produces complications
- Surgical procedure required

Crosstalk is possible when using JET Blood Pressure in a group-housing situation. However, the design of the system minimizes the possibility of crosstalk because the PA-C10-TOX implant has a short transmission range and the JET BP Antenna may be placed very close to the implant.

To learn more, talk to a DSI representative
 at 1-800-262-9687 (U.S.A./Canada)
 1-651-481-7400 (worldwide)
 or visit www.datasci.com

Specifications

	Biopotential	Temperature	Activity	Blood Pressure Add-On Module	Respiration Add-On Module
Input Range:	± 10 mV	0-70 deg C with ±0.5 deg C Accuracy	3-axis Accelerometer	Defined by Implant	2 Channels
Sample Rate:	750 Hz	50 Hz	10 Hz	Defined by Implant	50 Hz
Bandwidth:	0.1 – 250 Hz				
Input Impedance:	10 MOhm				
Noise:	< 20 µVpp				

General

	JET-EA-BP	JET-3ETA-BP	JET-5ETA-BP
Device Size:	3.75 x 2.5 x 1.1 inches 95 x 64 x 28 mm	3.75 x 2.5 x 1.1 inches 95 x 64 x 28 mm	3.75 x 2.5 x 1.1 inches 95 x 64 x 28 mm
Weight/Volume:	5.3 ounces (150 grams)/170 cc	5.3 ounces (150 grams)/170 cc	5.3 ounces (150 grams)/170 cc
Animals Per Acquisition Station: <small>(multiple Acquisition Stations can be used together to accommodate large groups of animals)</small>	16 Animals (128 channel max per system)	16 Animals (128 channel max per system)	16 Animals (128 channel max per system)
Devices Per Receiver:	6	4-6*	4
Devices Per Room:	36	36	18
Transmission Range:	10 meters	10 meters	10 meters
Battery Life:	> 1 day (rechargeable)	> 1 day (rechargeable)	> 1 day (rechargeable)
Receiver:	Ethernet Connection	Ethernet Connection	Ethernet Connection

Specifications are subject to change. This device contains FCC ID QQQWT12 which complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference, and 2. This device must accept any interference received, including interference that may cause undesired operation.

**For a small number of devices, six devices per receiver may be acceptable. Four devices per receiver are recommended for optimal performance.*



119 14th Street NW • Suite 100 • St. Paul, MN U.S.A. 55112
 +1-651-481-7400 • 1-800-262-9687 • Fax 1-651-481-7404
www.datasci.com • information@datasci.com