



DSI™

a division of
Harvard Bioscience, Inc.

PhysioTel™ HD-S02 and HD-X02

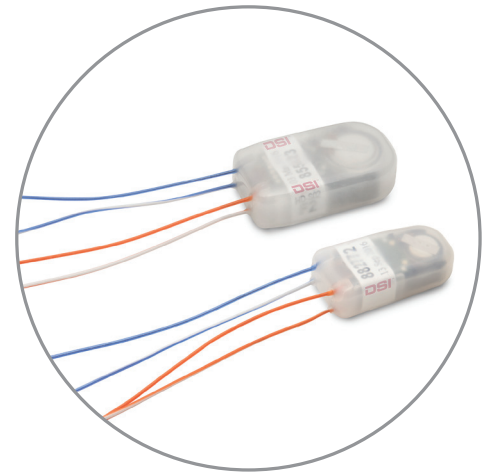
Small Animal Neuroscience Telemetry

Sleep ▪ Seizure ▪ Affective Disorders ▪ Movement Disorders ▪ Neurodegenerative Disorders

The HD-S02 and HD-X02 implants enable researchers to continuously collect two biopotential channels (typically EEG and EMG), temperature and activity. The HD-S02 replaces the F40-EET, and the HD-X02 replaces the F20-EET.

Improved Product Specifications:

- Reduction in weight and volume
 - » Enhances animal welfare
- Wider bandwidth
 - » Captures more frequency content
- Additional battery life for rat studies
 - » Prolong studies & use implants more frequently



HD-S02 for small animals and HD-X02 for mice.

Comparison of PhysioTel HD Implants to PhysioTel Implants

Specifications	HD-S02	F40-EET	HD-X02	F20-EET
Bandwidth	0.5 – 100 Hz	1-50 Hz	0.5-80 Hz	1-50 Hz
Battery Life	5 months	3 months	1.5 months	1.5 months
Weight	4.7 g	7 g	2.2 g	3.9 g
Volume	3.3 cc	3.7 cc	1.7 cc	1.9 cc
Minimum Subject Weight	175 g	175 g	19 g	20 g

Benefits of Wider Bandwidth in PhysioTel HD Implants

Low Frequencies < 1 Hz

More EEG frequency content is captured in the Delta band, helpful for scoring slow wave sleep

High Frequencies > 50 Hz

More EEG frequency content is captured in the Gamma band, helpful for studying multiple neuroscience applications

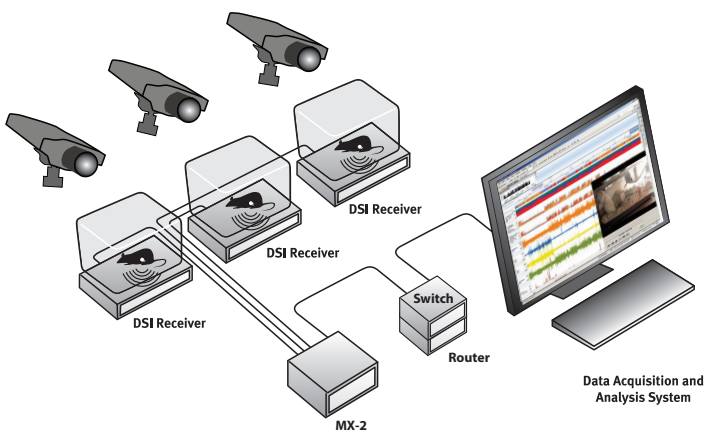


Solutions You Can Trust for Your Neuroscience Applications

DSI has developed proven technologies, products and services for researchers performing neuroscience studies covering many application areas including: sleep, seizure, affective disorders, movement disorders, neurodegenerative disorders, among other applications.

Category	Research Area Examples	Example Methods
Sleep	Insomnia Narcolepsy Restless Leg Syndrome Sleep Apnea	Sleep scoring through frequency and amplitude analysis of EEG and EMG. Video is also used to distinguish between REM and wakefulness
Seizure	Epilepsy Traumatic Brain Injury Brain Cancer Chemical Defense	Seizure detection based on EEG amplitude and morphology assessment, skeletal muscle EMG, and video for confirmation of convulsive activity
Affective Disorders	Depression Bipolar Disorder Anxiety	Frequency and amplitude based EEG analysis and video for behavioral analysis
Movement Disorders	Ataxia Dystonia Essential Tremor Parkinson's Disease	Skeletal muscle EMG and video for confirmation of tremor activity
Neurodegenerative Disorders	Alzheimer's Disease Amyotrophic Lateral Sclerosis (ALS) Dementia Huntington's Disease	EEG may be collected from the surface of the brain and also from deep brain regions.* EEG data is then analyzed using frequency and amplitude based methods

*DSI does not sell the deep-brain electrodes required for this application. Contact DSI for additional details.



PhysioTel HD Implants. Focus on What Matters: Data

- Device on-time counter to track remaining battery life
- Auto-configuration of implants to save time
- Encoded animal ID to prevent wrong data collection