

Revealing the Secrets of the Brain

Bittium NeurOne™ Tesla



Bittium

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- DC EEG/ERP
- TMS EEG
- fMRI-EEG
- 40 to 1200 channels
- Up to 30 persons
- 24 bit resolution
- DC-3500 Hz



Bittium NeurOne™ Tesla neuroscience measurement system offers more accuracy, cleaner signal, faster sampling, modular solution and more flexibility and expandability by utilizing the latest advances in digital signal processing.

Bittium NeurOne™ Tesla is a versatile system and it can be used widely in different neuroscience and psychological applications. Bittium NeurOne™ Tesla is especially designed for use together with transcranial magnetic stimulators having extremely large dynamic range and special reduction technology to remove magnetic artifacts in short latencies. Advanced amplifier design enables using both AC and DC recording modes the way you want. Innovative Tesla MRI amplifier brings MRI compatibility to NeurOne™.

Connectivity to be trusted.

Bittium is a trusted Nordic company with over 30 years of expertise in advanced radio communication technologies and biosignal processing.

Bittium provides reliable and secure solutions for connectivity, tactical communications and measuring and monitoring of biosignals.

Bittium offers medical technology in biosignals measuring and monitoring for cardiology, neurophysiology, neuroscience, rehabilitation, occupational health and sports medicine. Bittium develops cutting-edge technology for cardiac applications such as holtering, cardiac telemetry and cardiac rehabilitation, as well as high-end EEG solutions for TMS-EEG and fMRI-EEG applications, remote monitoring EEG applications, and emergency EEG applications. The products meet European Union medical CE requirements and the company's quality system meets ISO 9001, ISO 13485 directive MDD 93/42/EEC requirements.

Medical Products

- Bittium Faros™
- Bittium Cardiac Rehabilitation System™
- Bittium NeurOne™
- Bittium BrainStatus™

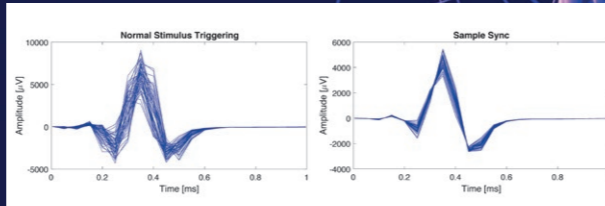
Applications



Syncbox system with 2 x 120 channels

- EEG/EP
- ERP research
- EEG + TMS research
- EMG research with many channels
- Group studies (up to 30 amplifiers and digital video)
- fMRI-EEG research (optional)

Advanced Technology



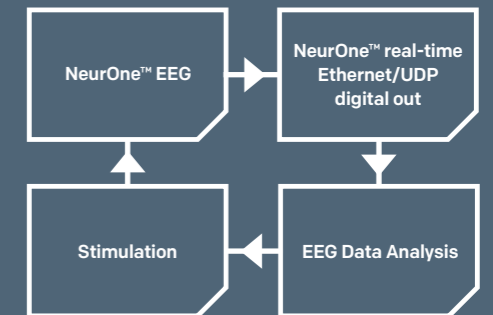
- 24-bit resolution
- Wide band DC-3500 Hz
- Large dynamic range +/- 430 mV
- AC and DC measurement modes switchable channel by channel
- 40-channel amplifiers having 32 EEG and 8 bipolar channels
- 40 to 160 channels in basic version
- Real-time Ethernet/UDP output
- EEG sample synchronized triggering (see picture for actual measurement – hand held coil)
- Windows 64-bit software with online averaging and TMS artifact correction
- Active or passive electrodes

Tesla Station



Tesla station brings easily movable trolley, built in battery (110 Ah) and a 320 channels system with color coded cap connectors into one package.

Real-Time Digital Out



New add-on card to NeurOne™ Main unit, upgrades available to existing systems!

- Ethernet UDP
- Protocol based output channels selection
- 24 bit measurement data output with constant delivery rate of 100, 250, 500, 1000, 2000, 3000, 4000 and 5000 Hz
- Performance scales up when using several Main Units

Description:	Powerful and Versatile Electroencephalography Research system
Monopolar Channels:	32 channels per amplifier (full system 128) – expandable to 960 with Brainstorm technology
Bipolar Channels:	8 channels per amplifier (full system 32) – expandable to 240 with Brainstorm technology
High level Channels:	Max. 8 per amplifier, connected through isolated analog adapter (to bipolar channels), range $\pm 5V$ or $\pm 10V$ (settable)
Digital (TTL) Inputs:	2 isolated trigger in/out lines, 8-bit unisolated trigger in (with Syncbox up to 10x)

Sampling method:	All channels sampled simultaneously	
Available sampling rates:	NeurOne™ <ul style="list-style-type: none"> • 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 5000 Hz, 10 kHz (160 ch) • 20 kHz (up to 80 ch), 40 kHz (up to 40 ch), 80 kHz (up to 20 ch) 	NeurOne™ Brainstorm technology with Syncbox <ul style="list-style-type: none"> • 80 kHz (max. 10 x 20 channels, one amp/main unit), 40 kHz (max. 10 x 40 channels – one amp/main unit), 20 kHz (max. 1200 channels) • 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 5000 Hz, 10 kHz
A/D Resolution:	24 bit	
Input Impedance:	> 1 G Ω	
CMRR:	Typically 106 dB	

	DC Mode	AC Mode
Bandwidth:	LP: 3.5 kHz	HP: 0.16 Hz, LP: 3.5 kHz
Full scale Input Range:	± 430 mV	± 86 mV
System Gain:	10	50
Sensitivity:	51 nV/bit	10.2 nV/bit
Noise:	<0.8 μV RMS (0–200 Hz) <2.0 μV RMS (DC–3500 Hz)	<0.6 μV RMS (0.16–200 Hz) <1.5 μV RMS (0.16–3500 Hz)
Transient Artifact Protection:	High Speed Switch (settable)	
Mute:	Mute for AC/DC stage (settable)	
Impedance measurement:	1 k Ω to 200 k Ω	

Connections:	Tesla amplifier Power 6V, Fibers, Cap connection (40 ch), Bipolar/Module (8 ch incl. power for modules $\pm 5V$ max. 1000 mA) Main unit - Black Power 12V, Ethernet, Fibers to Headbox (x 4), Trig In/Out (x 2), 8-bit Trig, Audio Out (2 ch) * Main unit - High Power 12V, Ethernet, SPI, Isolated Headbox Power (x 4), Fibers to Headbox (x 4), Serial Port (x 3), Trig In/Out (x 2), 8-bit Trig, Analog Out (16 ch), Audio Out (2 ch) * Syncbox Master Trig In and Trig button, External Clock In input (BNC or fiber), 10 fiber connectors (1 Master, 9 Slave) * optional real-time Ethernet/UDP digital out
Amplifier size/color:	16 x 12 x 8 cm, 1.260 kg, Beige (Tesla), Black (Tesla MRI)
Main unit size, black:	33 x 27 x 7 cm, 2.9 kg
Main unit size, high:	33 x 27 x 12 cm, 3.6 kg

NeurOne™ software:	64-bit Windows, optional BCI2000 and SIMULINK driver, video. Readers for BESA and Matlab as well as EEGLAB plug-in available for free
System Classification:	MDD class IIa. Type BF applied part
Safety Specification:	EN 60601-1, EN 60601-1-1, EN 60601-1-2, EN 60601-1-4, EN 60601-2-26
Warranty:	2 years



Users of Bittium NeurOne™ in the USA please note:
 Caution – For research use only. Not for use in diagnostic procedures. Device may be used for non-clinical laboratory research.