Nexus 2 Advanced USBL Systems

www.appliedacoustics.com
Applied Acoustics’ Nexus 2 is the second generation of digital USBL system designed as a highly advanced positioning and tracking system that is quick to deploy and straightforward to operate. Featuring AAE Sigma 2 acoustic protocols, the Nexus 2’s digital Spread Spectrum transmissions provide a secure acoustic link with very low susceptibility to interference, enabling precise and reliable positioning over an extended operational range.

Able to determine the positions of up to 16 dynamic subsea targets simultaneously, Nexus 2 is ideal for many deep or extremely shallow water applications where multiple assets are to be tracked. These operations can include UXO surveys utilising several magnetometers or sidescan sonars, diving operations, and for use at offshore worksites where several vehicles may be in use concurrently. The long range capability and exceptional accuracy specifications make Nexus 2 particularly effective for long layback towed applications.

**Nexus 2**

**Advanced USBL**

For precise subsea positioning

**Key features**
- Bi-directional Sigma 2 Spread Spectrum acoustics
- Optimised beacon refresh rate
- 16 target tracking
- Geographical navigation overlays
- EasyCal 2 embedded calibration tool with AutoCal Wizard
- Data telemetry options
- Common interrogate frequency
- Sound velocity profile upload facility

The system features a choice of transceivers - directional or hemispherical - and enhancements to the design of the these have helped to create an extremely accurate USBL system, boasting positioning accuracies of up to 0.12% of slant range and a calculated bearing resolution of 0.01 degrees. Optimum system performance is delivered when used in conjunction with Applied Acoustics’ Sigma 2 enabled 1100, 1200A or 1300A series transponders, however versatility is assured due to its compatibility with legacy products and transponders from third party manufacturers.

Embedded as standard within each Nexus 2 system are a comprehensive range of software features and survey tools such as the EchoPLOT geo-referenced graphical overlay function and EasyCal 2 calibration tool with AutoCal Wizard. These features are provided to ensure swift and easy set to work procedures, saving valuable time and project costs. Remote support software is also embedded giving Applied Acoustics’ Support Team the ability to monitor operations and assist with diagnostics from anywhere in the world, and the Nexus 2 recording/playback function allows tracking missions to be reviewed in any PC with Nexus Demo App installed.

www.appliedacoustics.com
# Technical Specification

**EASYTRAK NEXUS 2 CONSOLE, MODEL 2692**

Provides DC power, high speed digital communications to the transceiver with an embedded graphical navigation interface. Supplied with monitor, keyboard and mouse.

**Dimensions**
- 19" Rack mount. 2U, 482 x 88 x 345mm

**Weight**
- 5.4kg

**Power requirements**
- 90 to 250 Vac at 250 VA maximum

**Connection to transceiver**
- Rear panel connector for 2686 Transceiver

**Built-in PC.**
- Industrial i3 board running embedded Win 7, 32GB HD

**Temperature**
- Operating: -10° to +40°C
- Storage: -20° to +50°C

**Front panel indicators**
- LED indicators for power and serial status

**Serial communications**
- 4 x RS-232 External Input Port.
- 3 x Data Out Ports

**Data Output**
- AAE format V1 and V2, TP-112EC, TP-EC W/PR, Simrad 300P, Simrad 309, Simrad SP50MSB, Pseudo SGPGRMC, NMEA $GPGGA, NMEA $GPVVTG, NMEA $GPTLL, Pseudo $GPGGA, KLEIN 3000 (Quick set)

**Multiple outputs available**

**Compass Input**
- SGB-HTDS, SGB-HTDt, NMEA HDT, HDG

**VRU Input**
- TCM-2.X, $HCXDR, TSS1

**GPS / DGPS Input**
- NMEA; GLL, GGA, RMC, Geo Referenced Graphical Overlay, GeoTiff, DXF

**Target Heading Input**
- NMEA DBT, DBK, DBS, DPT, AAE

**Target Depth Input**
- GPS Time synch

**Responder Output**
- Positive 12V pulse 5ms long

**USB**
- 6 ports available, 2 on front panel

**Ethernet**
- 2 x 1Gbps standard RJ45 jack, Ethernet UDP Data Port

**Audio**
- Audible activity indicator

**TRANSCEIVER, TYPE 2686 AND 2780 SPECIFICATIONS**

Factory calibrated multi-element transceiver head complete with integral AHRS, depth sensor and temperature sensor.

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminium silicon bronze</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight in air/water</td>
<td>2686 16kg/11kg</td>
</tr>
<tr>
<td>2780 21kg/15kg</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>2686 152mm Ø x 432mm</td>
</tr>
<tr>
<td>2780 200mm Ø x 432mm</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Operating: -10° to +40°C</td>
</tr>
<tr>
<td>Storage: -20° to +50°C</td>
<td></td>
</tr>
<tr>
<td>Depth rating</td>
<td>30m</td>
</tr>
<tr>
<td>Electrical supply</td>
<td>48Vdc</td>
</tr>
<tr>
<td>Depth sensor</td>
<td>5 bar, accuracy 0.25% between -10° to +40°C</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>1° resolution between -10° and +40°C</td>
</tr>
<tr>
<td>Frequency band (MF)</td>
<td>18 - 32 kHz</td>
</tr>
<tr>
<td>Transmitter</td>
<td>Variable, typical max 192dB re 1µPa at 1m</td>
</tr>
</tbody>
</table>

**Compatible transponders**
- AAE Sigma 1, Sigma 2 Digital Spread Spectrum and AAE Tone channels.
- AAE V-NAV channels. HPR 400 channels 1100, 1000, 1200A, 1300A Series Beacons, Digital Depth Transponders, AAE Release and Telemetry Beacons.

**Interrogation rate System**
- >2Hz refresh rate. Internally set or external key
- Externally assessed for immunity and emissions; conforms to 89/336/EEC. RoHS compliant

**Cable length**
- Max 150m

**Accuracy**
- Based on the correct speed of sound being entered, no ray bending and an acceptable S/N ratio
- Position repeatability, calibrated and measured with SNR > 20dB rel. 1µPa in a controlled test environment.

---

**TRANSCEIVER PERFORMANCE**

<table>
<thead>
<tr>
<th>Transceiver</th>
<th>Console</th>
<th>Beam Pattern</th>
<th>Acoustic Precision Degrees</th>
<th>Acoustic % Slant range</th>
<th>Internal AHRS Precision</th>
<th>Acoustic +Internal AHRS %</th>
<th>Acoustic +External AHRS %</th>
<th>Max Range</th>
<th>Range Resolution</th>
<th>UK Export Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>2686 - N</td>
<td>EZT-2692</td>
<td>180°</td>
<td>0.25° CHMS</td>
<td>0.45%</td>
<td>0.5°</td>
<td>1.49%</td>
<td>0.45%</td>
<td>995m</td>
<td>0.01m</td>
<td>No</td>
</tr>
<tr>
<td>2686 - C</td>
<td>EZT-2692</td>
<td>180°</td>
<td>0.25° CHMS</td>
<td>0.45%</td>
<td>0.5°</td>
<td>1.49%</td>
<td>0.45%</td>
<td>2000m</td>
<td>0.01m</td>
<td>Yes</td>
</tr>
<tr>
<td>2780 - N</td>
<td>EZT-2692</td>
<td>150°</td>
<td>0.07° CHMS</td>
<td>0.12%</td>
<td>0.5°</td>
<td>1.17%</td>
<td>0.12%</td>
<td>995m</td>
<td>0.01m</td>
<td>No</td>
</tr>
<tr>
<td>2780 - C</td>
<td>EZT-2692</td>
<td>150°</td>
<td>0.07° CHMS</td>
<td>0.12%</td>
<td>0.5°</td>
<td>1.17%</td>
<td>0.12%</td>
<td>3000m</td>
<td>0.01m</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Specifications subject to change without notice ©Applied Acoustic Engineering Ltd February 2018
With on-going research and development in cutting edge technology and acute awareness of current and future industry needs, our commitment to our customers is second to none. We are equally determined to aid and assist our customers worldwide with a network of partners, suppliers and overseas Support Centres. Together, we offer engineering excellence, trusted products and a first class professional service on a global scale.